

# GPR-7500 (A)IS H<sub>2</sub>S Analyzers

## User Guide AII-UG-3002-EN Rev0



| Issue No. | Description              | Date       | Author Initials |
|-----------|--------------------------|------------|-----------------|
| 0         | Original document issued | 11/06/2025 | OP              |
|           |                          |            |                 |
|           |                          |            |                 |



GPR-7500 (A)IS H<sub>2</sub>S Analyzers

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## Before using your GPR-7500 (A)IS

### Safety information

Please read this guide, ensuring that you fully understand the content before attempting to set up, maintain or use the GPR-7500 (A)IS. Important safety information is highlighted throughout this document as follows:



The electrical warning symbol indicates instructions that must be followed to avoid serious or fatal injury from hazardous voltages and electric shock.



The warning symbol indicates instructions that must be followed to avoid minor, serious or even fatal injury to personnel.



The **electrostatic discharge (ESD) warning** symbol indicates the user must take precautions and follow the necessary steps to avoid generating electrostatic discharge.



The **caution** symbol indicates instructions that must be followed to avoid damage to equipment (hardware and/or software) or the occurrence of a system failure.

**NOTE:** Highlights an essential operating procedure, condition, or statement.

## Abbreviations

|      |                                 |
|------|---------------------------------|
| AC   | Alternating Current             |
| DC   | Direct Current                  |
| °C   | Degrees Celsius                 |
| °F   | Degrees Fahrenheit              |
| EC   | Electrochemical                 |
| ELV  | Extra Low Voltage               |
| ESD  | Electrostatic Discharge         |
| FSD  | Full-scale Deflection           |
| g    | Grams                           |
| GND  | Ground                          |
| IS   | Intrinsically Safe              |
| kg   | Kilograms                       |
| lb   | Pounds                          |
| LDL  | Lower Detection Limit           |
| LED  | Light Emitting Diode            |
| LPM  | Liters Per Minute               |
| mA   | Milliampere                     |
| OEM  | Original Equipment Manufacturer |
| oz   | Ounces                          |
| PC   | Personal Computer               |
| PCB  | Printed Circuit Board           |
| PLC  | Programmable Logic Controller   |
| ppb  | Parts Per Billion               |
| ppm  | Parts Per Million               |
| SCFH | Standard Cubic Feet per Hour    |
| SS   | Stainless Steel                 |

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# 1 Introduction

This user guide is applicable to the GPR-7500 IS and GPR-7500 AIS hydrogen sulphide analyzers.

**⚠ These products are for indoor and outdoor use. If they are used in a manner not specified by the manufacturer, the protection provided by this equipment may be impaired.**

This document contains the following information for your analyzer:

- Installation
- Connection
- Operation
- Maintenance and troubleshooting.

To ensure that the latest guide is being used please visit the All website [www.aji1.com](http://www.aji1.com). Access the latest datasheets, user guides, certificates and more at the product page **Downloads** tab.



GPR-7500 (A)IS

## 1.1 Overview

GPR hydrogen sulphide (H<sub>2</sub>S) analyzers are reliable, compact, robust, and designed to perform verification measurements in a variety of industrial H<sub>2</sub>S applications.

Your GPR-7500 (A)IS analyzer features:

- Simple, intuitive HMI
- User-selectable or automatic adjusted measurement ranges
- Gas temperature compensation
- Loop or line-powered configurations
- Two user-configurable alarms (AIS only)
- Range of sampling options available for different applications
- Modbus digital output (AIS only)

## 1.2 Models

There GPR range of H<sub>2</sub>S analyzers covered in this guide are as follows:

- GPR-7500 IS - H<sub>2</sub>S online analyzer
- GPR-7500 AIS - H<sub>2</sub>S online analyzer with user-configurable alarms

### 1.2.1 GPR-7500 IS

An analyzer designed for hydrogen sulfide (H<sub>2</sub>S) monitoring applications. It provides 4-20 mA analog output only, operates on 12-28 V DC power, and it is typically used when the signal will be sent to a remote PLC or control system. It is intended for users who only need basic measurements without local alarms or digital communication.

### 1.2.2 GPR-7500 AIS

A full analyzer with additional functionality. It includes the same 4-20 mA analog output as the IS model but also offers Modbus RTU digital communication, two user-programmable alarm relays, and barometric pressure compensation for more stable readings under changing ambient conditions. It can operate on either DC or AC power and is better suited for standalone or advances monitoring setups where local display, alarms, or communication with other systems are needed.

## 1.3 Applications

The GPR-7500 (A)IS is designed for applications that require monitoring the presence of H<sub>2</sub>S in natural gas and bio-methane.

## 1.4 Sensors

Maintenance-free electrochemical sensors are galvanic cells capable of superior performance, accuracy and stability; designed to be unaffected by the presence of background gases. As a consumptive sensor type, it is disposable and requires only periodic calibration.

Each sensor has a different operational life, and the replacement frequency is dependent on the individual application.

If contaminants are present in the sample gas, the sensor can be affected, and the validity of the measurement impacted. Please ensure that the sensor is protected, and any contamination is prevented from reaching the analyzer's pipework and the sensor.

Consult the Aii sales team about our cost-effective standard sample conditioning systems.

**NOTE: Calibration is required each time your sensor is replaced. Ideally, your sensor should be replaced before reaching the end of its operational life.**

**Table 1: Available sensor types:**

|                |                |
|----------------|----------------|
| Analyzer model | GPR-7500 (A)IS |
| Sensor number  | OSV-72-7H      |



|                                                     |                                             |
|-----------------------------------------------------|---------------------------------------------|
|                                                     | OSV-72-7HH<br>OSV-72-7H-LD<br>OSV-72-7HH-LD |
| <b>Recommended H<sub>2</sub>S Measurement Range</b> | 0...100 ppm <sub>v</sub>                    |
| <b>Minimum Range</b>                                | 0.01 ppm <sub>v</sub>                       |

For full sensor technical specifications, please refer to "Appendix A - Technical Specifications" on page 37.

#### 1.4.1 OSV-72-7H sensor

This sensor is designed for higher range H<sub>2</sub>S measurement ranges of 0-500 ppm, 0-1000 ppm, or 0-2000 ppm. It uses an electrochemical sensing principle and is intended for applications where the H<sub>2</sub>S concentrations are relatively large.

Operation life for this sensor is up to 24 months however; replacement frequency is dependent on the individual application.

#### 1.4.2 OSV-72-7HH sensor

This sensor is designed for higher range H<sub>2</sub>S measurement ranges of 0-20 ppm, 0-50 ppm, or 0-100 ppm. It uses an electrochemical sensing principle and is intended for applications where the H<sub>2</sub>S concentrations are relatively small.

Operational life for this sensor is up to 24 months however; replacement frequency is dependent on the individual application.

#### 1.4.3 OSV-72-7H-LD sensor

This sensor is designed for higher range H<sub>2</sub>S measurement in sample gas streams that may contain occasional liquids. Sensor with the "-LD" suffix – indicating a Liquid Drain, requires a sampling block in the system. This is the standard sensor for use with sample gas containing occasional liquid. The -LD version uses a screw-in housing and has a 4-pin molex process connection, while the sensing element itself is identical to the standard sensor.

Operational life for this sensor is up to 24 months however; replacement frequency is dependent on the individual application.

#### 1.4.4 OSV-72-7HH-LD sensor

This sensor is designed for lower range, sensitive monitoring of H<sub>2</sub>S measurement in sample gas streams that may contain occasional liquids. Sensor with the "-LD" suffix – indicating a Liquid Drain, requires a sampling block in the system. This is the standard sensor for use with sample gas containing occasional liquid. The -LD version uses a screw-in housing and has a 4-pin molex process connection, while the sensing element itself is identical to the standard sensor.

Operational life for this sensor is up to 24 months however; replacement frequency is dependent on the individual application.

### 1.5 Further general considerations

When your GPR-7500 (A)IS analyzer is used with, or inside, other equipment please consider the following:

- The analyzer should not be submerged in any liquid. Care should be taken to ensure liquids are not

spilled and objects do not fall into the unit.

- Avoid force when using connectors, switches and knobs. Before moving your analyzer, be sure to disconnect the wiring/power cord and any cables connected to the output terminals.
- Ensure the sensor selected and supplied is suitable for the gas composition to which it will be presented; if in doubt, review the application and consult the Aii Factory before initiating the installation.
- The products covered in this guide should be evaluated to the environmental conditions up to 2000m altitude and within the temperature range applicable to your sensor; refer to "Appendix A - Technical Specifications" for details.
- The products covered by this guide should be installed using the manufacturer's instructions.
- Only the sensor provided by the manufacturer is to be used with the analyzer.

**NOTE: In natural gas applications such as extraction and transmission, a low voltage current is applied to the pipeline itself to inhibit corrosion of the pipeline. As a result, electronic devices connected to the pipeline can be affected unless they are adequately grounded.**

### 1.5.1 Conditions of use in hazardous areas

**NOTE: Especially when a sample pump is fitted, always ensure the power is switched off prior to accessing the Ex enclosure for any purpose other than normal operation, or prior to disconnecting any cables.**

Refer to "Appendix B - Hazardous Area Certification" on page 38 for certification details.

- i) All versions of the enclosure are manufactured in aluminum. In rare cases, ignition sources due to impact and friction sparks could occur. This should be considered during installation, particularly if the equipment is installed in a Zone 0 location.
- ii) The online gas analyzers has non-metallic parts incorporated in the enclosure of this equipment which may generate an ignition-capable level of electrostatic charge, under certain extreme circumstances. Therefore, the equipment shall not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge on such surfaces. This is particularly important if the equipment is installed in a Zone 0 location. In addition, the equipment shall only be cleaned with damp cloth.
- iii) The online gas analyzer is not capable of withstanding the 500 V insulation test required by Clause 6.3.12 of IEC 60079-11. This should be considered when installing the equipment.
- iv) When connected using a conduit system, the explosion-proof enclosures type Adalet type XIHLX require conduit seals that satisfy the requirements in "Table 2: Conduit seal requirements" must be used.

Table 2: Conduit seal requirements

| Size | Seals       |
|------|-------------|
| 1"   | Within 1.8" |
| 3/4" | Optional    |
| 1/2" | Optional    |

- v) When connected with cable glands, the glands shall be a suitably Listed Explosion-proof type, suitable for the applicable Class and Division or Class and Zone, Gas Group, T-Class and ambient temperature. It shall only employ sealing around individual cores. Additional thread adapters shall not be used

## 1.5.2 Specific conditions of use

The enclosure of this equipment contains aluminum which may present an ignition hazard if subjected to impact or friction in the hazardous area. Ensure that the equipment is only used in applications where this will not occur.

Intrinsically safe circuits are not insulated from the equipment enclosure.

The enclosure of this equipment may present an electrostatic charging hazard in hazardous areas. To minimize the risk, consider the following:

- Control environmental humidity to appropriate levels to reduce the generation of static electricity.
- Protect equipment from direct airflow that could cause charge transfer.
- Ensure that any contact with the enclosure is made using insulating objects.
- Implement a continuous method to safely dissipate electrostatic charges.
- Connect indicated terminal to earth (ground).

## 1.6 Understanding equipment labels

|                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p><b>Analytical Industries Inc.</b><br/>2855 METROPOLITAN PLACE, POMONA, CA 91766 USA<br/>TEL: 909 392 6900, FAX: 909 392 3665, E-MAIL: info@aii1.com<br/><b>GPR-7500 (A)IS H<sub>2</sub>S Analyzer</b> S/N: 308860688</p> | <ul style="list-style-type: none"> <li>• <b>Product Identification:</b> Model Specifies the product type and functionality.</li> <li>• <b>S/N (Serial Number):</b> Unique identifier for this specific unit. Use for warranty or support inquiries.</li> <li>• <b>CE Mark:</b> Demonstrate compliance with European safety, health, and environmental protection standards.</li> <li>• <b>USA Flag Icon:</b> Indicates that the product is made or assembled in the USA.</li> <li>• <b>Manufacture and Date:</b> Location of manufacturer and date manufactured (YYMMDD).</li> </ul> |
|  <p><b>ATTENTION</b><br/>OBSERVE PRECAUTIONS<br/>FOR HANDLING<br/><b>ELECTROSTATIC<br/>SENSITIVE DEVICES</b></p>                                                                                                             | <ul style="list-style-type: none"> <li>• Yellow label with a triangle and hand symbol indicates that the device is sensitive to electrostatic discharge (ESD).</li> <li>• Handle this device in an ESD-protected environment.</li> <li>• Use appropriate anti-static measures such as wrist straps, anti-static mats, or ESD-safe clothing.</li> <li>• Avoid touching circuit components with bare hands to prevent potential damage.</li> </ul>                                                                                                                                     |
|                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>• Ground symbol marks a terminal that should be connected to the Earth (ground) for safety.</li> <li>• Always ensure device is properly grounded, otherwise can result in malfunction or pose a serious safety hazard.</li> </ul>                                                                                                                                                                                                                                                                                                             |

## 1.7 Safety approvals and directives



The CE marking indicates GPR-7500 (A)IS H<sub>2</sub>S analyzer conformity to European health, safety, safety and environmental protection directives..



The Ex marking indicates GPR-7500 (A)IS H<sub>2</sub>S analyzer conformity to European Union directive 2014/34/EU (ATEX) and UK Statutory Instrument 2016 No. 1107 (as amended) (UKEX). It complies with Intrinsically Safe (I.S) standards for equipment category 2 when used following the instructions for safe use in this user guide. This makes it normally suitable for use in Zones 1 or 2 hazardous areas.



This UKCA marking demonstrates GPR-7500 (A)IS H<sub>2</sub>S analyzer complies with UK designated standards in electric and electronic engineering and measuring technology.



The MET marking certifies GPR-7500 (A)IS H<sub>2</sub>S analyzer is compliant in North America and Canada, with the electrical and hazardous location safety directive.

**NOTE:** The GPR-7500 (A)IS analyzers are not tri-rated. These analyzers are built to comply with ATEX / IECEx / UKEX or cMETus.

The hazardous area compliance rating is shown on the rating plate on the analyzer. Please ensure your analyzer is compliant with site or location requirements. These guide details installation, operation and support for all GPR-7500 (A)IS analyzers for all certifications.

## 2 Installation

NOTE: Installation, operation and maintenance of this equipment should be carried out only by appropriately trained and suitably qualified technicians in accordance with the instructions in this user guide, and any applicable standards/certificates associated with the country, industry and application.



Failure to correctly adhere to these instructions may result in serious or even fatal injury. In this regard, the manufacturer will not be held liable.

NOTE: The operator may only perform modifications and repairs to the equipment or system with approval from the manufacturer.



Do not operate damaged equipment. If faults cannot be rectified, the equipment must be taken out of service and secured against unintentional commissioning.

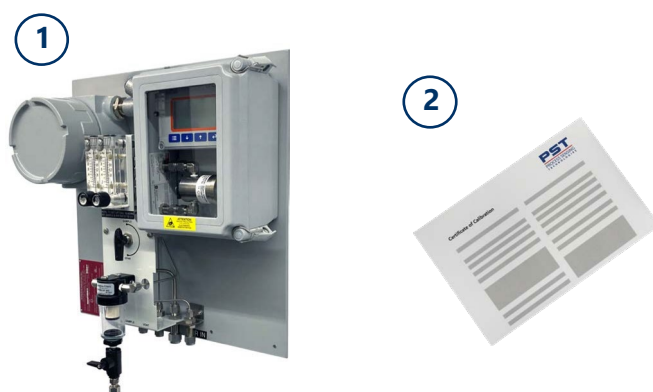
Before using your GPR-7500 (A)IS, ensure that its specifications are suitable for the process in which it will be installed.

## 2.1 Unpack your analyzer

The GPR-7500 (A)IS will be supplied in a custom box which should be retained for future use (such as a service return).

Your GPR-7500 (A)IS analyzer pack is comprised of the following equipment (pack contents may vary depending on your specification):

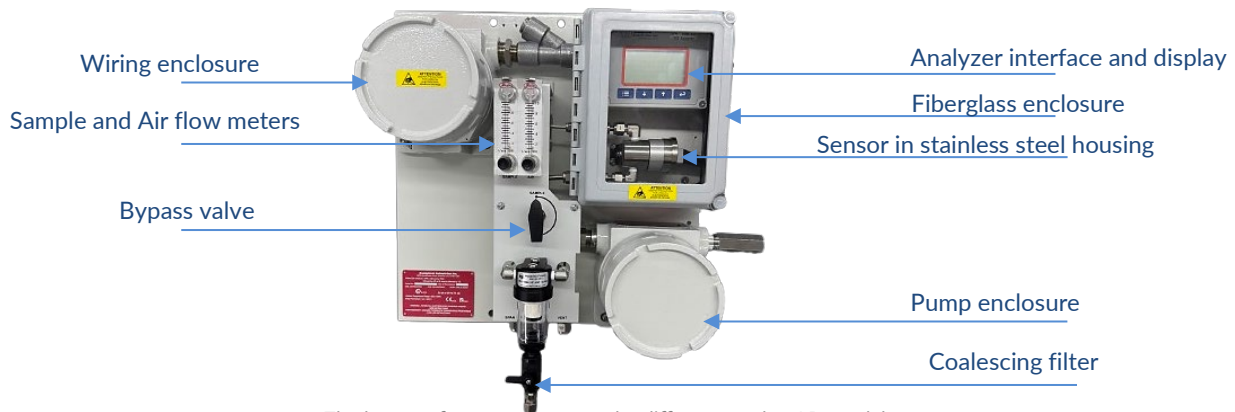
1. GPR-7500 (A)IS analyzer with H<sub>2</sub>S sensor installed
2. All Factory calibration certificate



*Figure 1. Contents of GPR-7500 (A)IS pack*

## 2.2 Analyzer features

The GPR-7500 (A)IS analyzer consists of three interconnected enclosures (without the optional sample conditioning system and panel) and measures 17.2" (L) x 5.7" (W) x 18.5" (H). See "Appendix E - Mounting Information" on page 49 for further information.



*The layout of components may be different on the -LD model.*

**Figure 2. The GPR-7500 (A)IS line-powered H<sub>2</sub>S analyzer set-up**

## 2.3 Mount your analyzer

The analyzer is approved for indoor as well as outdoor use. However, avoid mounting in an area where direct sun might expose the analyzer beyond the recommended operating temperature range. If possible, install a small hood over the analyzer for rain water drain and to prevent over-heating of analyzer, or place the analyzer in an enclosure with active cooling. In hot regions, installing the analyzer without active cooling may expose it to temperatures exceeding the specified operating limits.

- Find the appropriate location to install the analyzer.
- Ensure that the mounting and operation is only in the upright vertical orientation, see Figure 2.
- To facilitate convenient servicing the interior of the analyzers, secure the back plate to a vertical surface approximately 1.5 m (5 ft) from the floor or a level accessible to service personnel. This requires the user to supply four (4) additional proper size screws and anchors.

**NOTE: For installations where the temperature will be outside of the stated operating temperature range -10 °C...+45 °C (14 °F ...113 °F) please consult Aii Sales to discuss enclosure options.**

This GPR-7500 (A)IS configuration is designed to be mounted directly to any flat vertical surface, wall or bulkhead plate. Please see "Appendix E - Mounting Information" on page 49.

The analyzer's design provides immunity from RFI/EMI by maintaining good conductive contact between the two halves of the enclosures via a conductive gasket (the smaller enclosure containing signal processing electronics).

The surfaces contacting the conductive gasket are unpainted. Do not paint these areas. Painting will negate the RFI/EMI protection.

**⚠ Do not remove or discard the gaskets from either the Ex enclosure or the fiberglass enclosure. Failure to reinstall either of the gaskets will void the NEMA 4, UL Type 3R rating and the immunity to RFI/EMI.**

For mounting requirements and information, please refer to "Appendix E - Mounting Information" on page 49.

## 3 Connection

Supply power to the analyzer only as rated by the specification or markings on the analyzer enclosure. The wiring that connects the analyzer to the power source should be installed in accordance with recognized electrical standards.

Ensure that the analyzer case is properly grounded and meets the requirements for area classification where the analyzer is installed. Never use force when removing wiring from a terminal connection.

### 3.1 Connect your power supply (IS models)

This configuration is **loop-powered**; it requires an 18...24 V DC power supply on a 4...20 mA loop.

Incoming power is connected via a 3-way terminal block mounted on a PCB, which is located within the explosion-proof enclosure.

 **Do not supply voltage more than specified in this guide and noted near the power input terminal of the analyzer.**

 **Do not apply line-power to the GPR-7500 IS. If line-power is applied to an IS-configured analyzer, it will result in damage to the main PCB.**



*Figure 3. Wiring and connection (IS models)*

The maximum power consumption for GPR-7500 IS analyzers is no more than 1 W.

### 3.2 Connect your power supply, alarms and outputs (AIS model only)

This configuration is **line-powered**; it requires a DC line supply 12... 24 V DC nominal (28 V DC maximum).

Incoming power, alarm relays, and signal output connections are made to 3 terminal blocks mounted on a PCB located in the explosion proof enclosure.



### 3.2.1 Power Supply

**!** Do not supply voltage more than specified in this guide and noted near the power input terminal of the analyzer.



Figure 4. Wiring and connection (AIS models)

The PCB in the flame-proof enclosure contains a power-limiting intrinsically safe barrier that limits the total power available to the analyzer in the general-purpose enclosure.

For the GPR-7500 AIS models, power consumption must not exceed 28 W.

### 3.2.2 Alarms

The analyzer has two alarm relay contacts.

Table 3: Alarm relay contact rating

|                                                                |                  |              |
|----------------------------------------------------------------|------------------|--------------|
| Alarm relay contact rating:<br>3A @ 28 V AC or<br>3A @ 28 V DC | Alarm 2<br>(AL2) | Relay 2 (NO) |
|                                                                |                  | Relay 2 (NC) |
|                                                                | Alarm 1<br>(AL1) | Relay 1 (NO) |
|                                                                |                  | Relay 1 (NC) |

- **Type:** SPCO (NO, NC and C)
- **Contact Rating, Max:** 5 A at 30 V DC, or 10 A at 250 V AC
- Hysteresis is 2 % of the set point
- AL1 and AL2 can be configured as **OFF**, **LOW** or **HIGH**
- A low alarm switches on when the H<sub>2</sub>S reading is below the set point, and switches off when it is above the set point + hysteresis
- A high alarm switches on when the H<sub>2</sub>S reading is above the set point and switches off when it is below the set point – hysteresis.

### 3.3 Outputs

IS analyzer models have one 4...20 mA analog output channel, which is loop powered by the control system.

AIS analyzer models have one 4...20 analog output channel, which is powered internally by the analyzer. It also provides Modbus communication over RS485 digital serial output, as well as two user-configurable HIGH and LOW alarms as shown in "Table 3: Alarm relay contact rating" on page 11.

#### Digital output

The AIS analyzer has Modbus (RTU) communications over RS485

- **Type:** Modbus RTU over RS485
- **RS485:** 2-wire (plus ground)
- **Baud rate:** User-selectable through menu 9600 / 28800 / 57600 / 115200 / 230400 BPS
- **Parity:** User-selectable through menu - EVEN / ODD / NONE
- **Data bits:** 8
- **Stop bits:** 1

### 3.4 Hazardous area connections

For installation in a hazardous area:

- Entity parameters for all connection facilities are as follows:
  - $U_i = 28 \text{ V DC}$ ,  $I_i = 93 \text{ mA}$  (loop-powered)
  - $U_m = U_{\max} = 28 \text{ V DC}$  (line-powered)
- All cables must be shielded to ground at customer side
- Use a certified cable gland or stopper box
- The power cable to the Ex enclosure must be supplied through a conduit approved for use in hazardous areas.
- Secure the wires to the power input terminal block by using the integral screws of the terminal block. Do not substitute terminal screws. Refer to "Table 2: Conduit seal requirements" on page 4 for more information.

**NOTE:** The required electrical safety barriers are factory installed within the Ex enclosure. No additional external barriers are necessary.

### 3.5 Connecting the air pump

The pump connections are made in the lower-right circular enclosure.

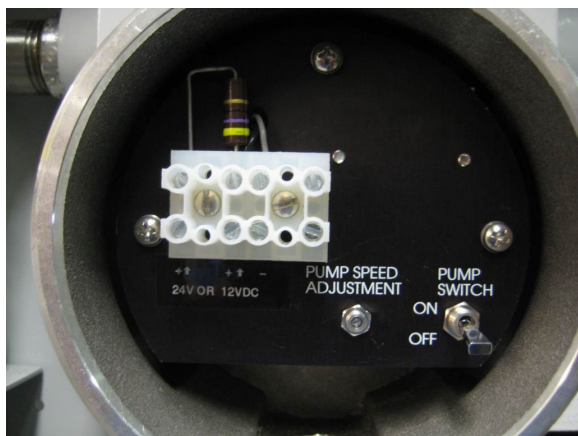


Figure 5. Air pump panel

The power to the Air Pump is to be provided to the analyzer separately and must run through an approved conduit. Pump can be powered by 12 or 24 VDC, ensure that 12 VDC power is connected to 12 VDC terminal or if 24 VDC is used, it is connected to 24 VDC terminal.



**Connecting the incorrect voltage to the pump terminals may result in permanent damage to the pump. Always verify the supply voltage before connecting power.**

After establishing power, turn the pump switch to ON position.

The user may need to adjust the pump speed to get proper air flow. If an adjustment is needed, open the air flow meter completely and turn the potentiometer clockwise or anti-clockwise until the air flow is 2 SCFH. Leave the potentiometer at the set position and adjust the air flow to 2 SCFH (1 SCFH for ranges above 100 PPM).

After establishing power, securely tighten the Ex enclosure lid by hand until it is fully sealed.

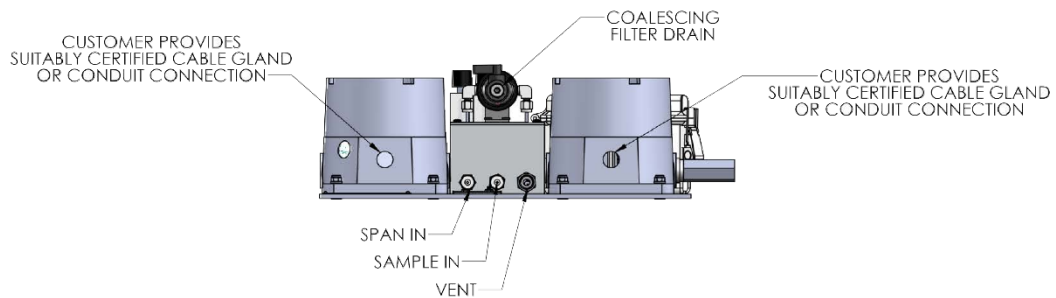
**NOTE: In order for the installation to comply with hazardous certification, the Ex enclosure lid must be properly secured. Safe operation of the unit in a hazardous area is dependent on the correct mounting and tightening of the enclosure lid.**

## 4 Before connecting gas

### 4.1 Necessary considerations before gas connection

GPR-7500 (A)IS analyzers require air dilution and can be configured for use with either ambient or compressed air.

See [Figure 6](#) and [Figure 7](#) below for positions of the span, sample inlets, vent outlet and ambient

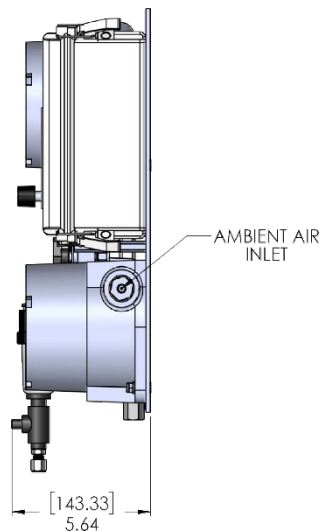


airports.

*Figure 6. Gas ports (bottom elevation)*

The inlet and outlet vent gas lines require 1/4" stainless steel compression type tube fittings.

The sample inlet tubing must be stainless steel (SS). The sample vent line may be of SS when vented to a flare.



*Figure 7. Ambient air port (right elevation)*

To ensure the best possible operation, a review of the installation is recommended to ensure sample gas is optimal:

- Sample gas quality
- Is the sensor suitable for gas?
- Is the sample gas clean and liquid free?

**NOTE:** If operated in potentially contaminated gases, which can interfere with measurement and reduce the sensor's life expectancy. Consult Aii for recommendations concerning the proper selection and installation of components.

## 4.2 Connect your sample gas



**Working with hydrogen sulfide (H<sub>2</sub>S) poses serious health and safety risks.**

H<sub>2</sub>S is a colorless, highly toxic gas and inhalation of even low concentrations can lead to severe health effects, including respiratory distress, eye irritation, and, in extreme cases, unconsciousness or death.

Only personnel trained in handling H<sub>2</sub>S and emergency response procedures for H<sub>2</sub>S should use this equipment. It is imperative that strict safety protocols are adhered to, and appropriate personal protective equipment (PPE) is used.

To connect your gas:

1. See [Figure 6 and Figure 7 on page 14](#) for port designation and connect your Sample and Vent lines accordingly.
2. Regulate the sample pressure as described in below in "4.3 Calibration gases."
3. Connect a 3/8" vent line to the compression fitting to be used for venting the sample.
4. Connect a 1/4" sample line to the compression fitting to be used to bring sample gas to the analyzer.
5. Set the Sample gas pressure between 15 and 30 psig.
6. Set the flow rate.

For an analyzer configured to low ppm measurements, a ratio of 1:1 must be used. For example:

|              |        |
|--------------|--------|
| Sample gas   | 1 SCFH |
| Dilution air | 1 SCFH |

For an analyzer configured to high ppm measurements, a ratio of 1:10 must be used. For example:

|              |                                   |
|--------------|-----------------------------------|
| Sample gas   | set to 20 on the flow meter scale |
| Dilution air | set to 40 on the flow meter scale |



**Do not place your finger over the vent (it pressurizes the sensor) to test the flow indicator when gas is flowing to the sensor. Removing your finger (the restriction) generates a vacuum on the sensor and may damage the sensor, voiding the sensor warranty.**

## 4.3 Calibration gases

**NOTE:** It is recommended that you use span gases for calibration to ensure the best measurement readings.

A cylinder of the appropriate certified span gas should be made available for installation and commissioning. Calibration gas will need to be set to the same input pressure and flow rate as the sample gas to ensure calibration integrity. The certified span gas should be approximately 80 % of the full scale range, or 1 full range, above the intended measuring range.

## 4.4 Sample gas requirements

All gas analyzers utilizing electrochemical H<sub>2</sub>S sensors respond to partial pressure changes in H<sub>2</sub>S. To ensure accurate measurement of the H<sub>2</sub>S sample, gas must be presented to the analyzer at a stable pressure and flow rate.

### 4.4.1 Inlet pressure

For the analyzers designed to measure H<sub>2</sub>S in a flowing gas stream, the inlet sample pressure must be regulated in the range 15...30 psig.

### 4.4.2 Outlet pressure

The sample must be vented at a pressure less than the inlet pressure so that the sample gas can flow through the sensor housing. Ideally, the sample should be vented to the atmosphere or into a flare at atmospheric pressure.

**NOTE:** The sensor may be used at slightly positive pressure (e.g., when sample is vented to a common exhaust where the pressure might be higher than 1 atmosphere). However, the pressure at the sensor **must remain constant at all times** including during the span calibration. This may be accomplished by using a back-pressure regulator on the vent line of the analyzer.

If assistance is required to configure a measurement at a positive pressure, please contact Aii with full application details for a review.



A sudden change in pressure at the sensor may result in the sensor electrolyte leakage.

## 4.5 Prepare your span gas

Avoid contamination of the span gas cylinder when connecting the pressure regulator. Bleed the air filled regulator for a couple of minutes before closing the vent valve of the pressure regulator (faster GPR-7500 (A)IS H<sub>2</sub>S Analyzer User Guide ProcessSensing.com 15 and more reliable method of purging the regulator than simply allowing the span gas to flow through the regulator and the span gas line).

The following components/tools are required to set up a span gas cylinder:

- Certified span gas cylinder with an H<sub>2</sub>S concentration, balance nitrogen, of approximately 80 % of the full scale range above the intended measuring range.
- A pressure regulator to enable reduction of gas pressure to be between 15 and 30 psi.
- A flow meter (for use only if the analyzer is not equipped with one) to set the flow rate between 1 and 2 SCFH (0.5..1 LPM).

- d. Suitable fittings and 1/8" diameter metal tubing to connect the regulator to the inlet of the analyzer.



**Do not exceed the recommended pressure. Excessive pressure will make flow adjustment more difficult.**

## 5 Operation

This section details the best practice operation for a correctly installed analyzer. Please refer to "2 Installation" on page 7 for analyzer installation guidance and gas connection.

### 5.1 User interface

The GPR-7500 (A)IS has a 3.5-inch LCD display and a four-key keypad interface.

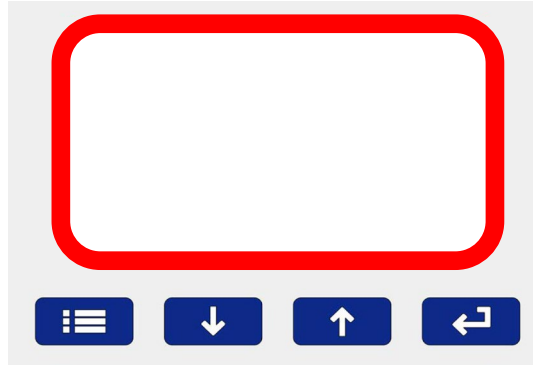


Figure 8. GPR-7500 (A)IS user interface

The interface keys can be used as identified in the table below:

Table 2: Interface key functions

| Key                                                                                 | Function             |
|-------------------------------------------------------------------------------------|----------------------|
|  | Menu open/close      |
|  | Enter                |
|  | Next (increment)     |
|  | Previous (decrement) |



## 5.2 Initial start-up and self-test

Once the analyzer is correctly installed and loop power applied the analyzer will immediately start up. The digital display responds instantaneously and will display an initial start-up screen:

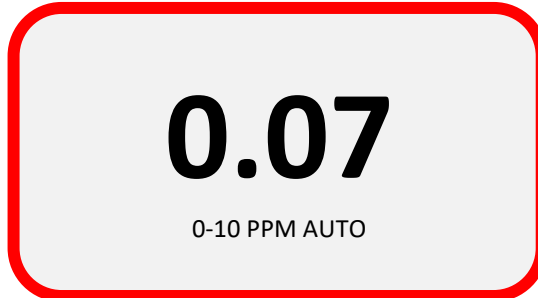


*Figure 9. GPR-series analyzer start-up screen*

After self-diagnostic tests, the analyzer switches to sampling mode and displays the H<sub>2</sub>S reading from the sensor (larger size numeric value) and the measurement range (small size font with units).

**Auto** indicates that the analyzer is in AUTO mode. In this mode, the measured value affects the range, which will automatically adjust to the next higher level. See **Range** in [Figure 11 on page 20](#) in the **Main Menu** to select.

If the **Auto** is not selected, the range display will not show **Auto**. An example of a sampling mode screen is shown below in [Figure 10](#).



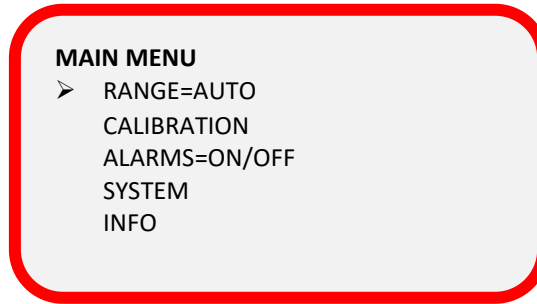
*Figure 10. Measurement mode display*

## 5.3 Menus

**NOTE:** Available menu options and sequences will vary between analyzer model and sensor type.

### 5.3.1 Main Menu and interface keys

To access the Main Menu, press the **Menu** key and the following Main Menu display will appear:



*Figure 11. Main menu display*

This screen shows the menu options available.

- Use the  and  keys to move the cursor to the desired menu
- Press  to access the sub menu
- Use the  key to return to the previous screen.

#### Range

Configure analyzer measurement range (see "5.3.2 Range selection" on page 21).

#### Calibration

Perform zero, span or analog calibration functions (see " 5.3.4 Analyzer Calibration" on page 23).

#### Alarms

Perform zero, span or analog calibration functions (see " 5.3.4 Analyzer Calibration" on page 23).

#### System

Configure system-level settings (see "5.3.6 System" on page 25).

#### Info

View analyzer information (see "5.3.7 Info" on page 26).

### 5.3.2 Range selection

Within the Range menu, you can select 6 options. The range is linked to the display and the 4...20 mA analog output of the analyzer.



Figure 12. Range display

#### Range menu options

In the Range menu:

1. Use  and  to move the cursor to the desired range option.
2. Once the cursor is pointing to your chosen range, press  to select the range.

Selecting a range will cause the **Auto** option to change to **Fixed**. To select Auto, use  to move the cursor to **Fixed**, then press  to toggle between **Auto** and **Fixed**.

#### Auto

Selecting **Auto** will enable automatic adjustment of your measurement range depending on the H<sub>2</sub>S levels detected by your H<sub>2</sub>S sensor. For example, a 0...10 ppm range will change to 0...100 ppm if the measured H<sub>2</sub>S value is higher than 10 ppm.

#### Default Range

This option will prevent incorrect range-setting if multiple users have access to the analyzer.

If the analyzer range has been changed, for instance for the purpose of checks or maintenance, and a default range has been pre-set, the analyzer will automatically return to the default range after 30 minutes of inactivity.

**Def Range** allows you to set the default range for the analyzer. Within this sub-menu, all standard ranges or **Auto** mode can be selected.

It is recommended that you set your preferred default range for the analyzer.

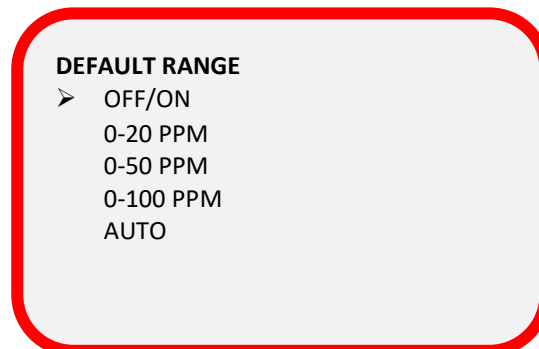


Figure 13. Default range displays

### Measurements outside guide range

If the H<sub>2</sub>S reading goes above the guide or auto range maximum value, the values will be displayed up to 10% above the maximum range. Beyond this, an OVER RANGE warning will be displayed.

#### 5.3.3 Set sensor serial number

Updating the sensor serial number is critical for the calibration process.

When replacing H<sub>2</sub>S sensors it is important to update the sensor serial number. To view the current 9-digit sensor serial number, enter the **Calibration** menu.

The sensor serial number can be seen in the menu as shown below:

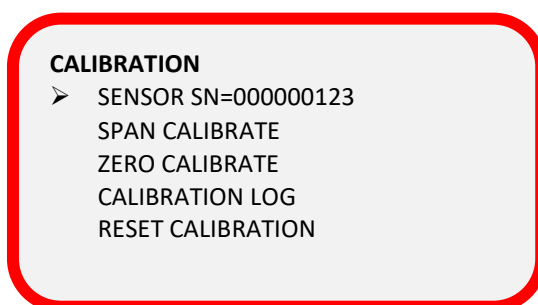


Figure 14. Calibration display

**NOTE:** Changing the sensor serial number will reset span and zero calibrations to Factory defaults and clear the calibration log. It should only be changed when a new sensor is installed.

To change the sensor serial number:

1. Use  to select **Sensor SN=00000000**.  
The display will change as shown below in [Figure 15](#).

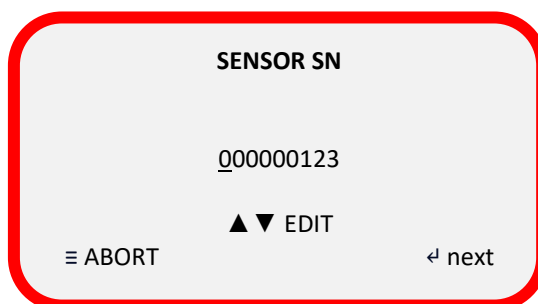


Figure 15. Sensor serial number display

2. Enter your sensor serial number by using  or  to edit the value.
3. Press  to progress to the next digit or  to move to the previous digit.
4. When you have entered your sensor serial number's last digit, press  to **Accept** the new serial number.

### 5.3.4 Analyzer calibration

All electrochemical sensor-based analyzers require periodic calibration. The electrochemical sensor signal will remain relatively constant throughout its useful life, however, some components in a gas stream, e.g. sulfides, can adversely affect the sensor causing changes in sensitivity with time. As such, regular calibration is recommended to ensure accuracy and ascertain the integrity of the sensor (e.g. weekly intervals to a 3-month maximum). See the Aii Factory calibration certificate supplied with your module for specific calibration gas values.

Always use good calibration practices.

- Calibrate the analyzer at or close to the temperature and pressure of the sample gas.
- Use known reference gases or fresh air.
- Allow suitable stability time, especially when making significant changes in measurement value (e.g. 20.9 % to 0.0 %). Use the table below for guidance.

**Table 3: Example stability times**

| Condition example               | Typical stability time |
|---------------------------------|------------------------|
| Air (20.9 %) to 0.01 %          | <2 minutes             |
| 2 minute air exposure to 10 ppm | 60 minutes             |

up to 10% above the maximum range. Beyond this, an OVER RANGE warning will be displayed.

### 5.3.5 Zero and span vs span calibration

Electrochemical H<sub>2</sub>S sensors generate an electrical current that is linear or proportional to the H<sub>2</sub>S concentration in a sample gas. In the absence of H<sub>2</sub>S the sensor exhibits an absolute zero, i.e. the sensor does not generate a current output in the absence of H<sub>2</sub>S. Given the properties of linearity and an absolute zero, a single point calibration is possible.

Zero calibration is recommended only when the application demands optimum accuracy of better than 5 % of the lowest range of the analyzer (e.g. for an analyzer configured for 0...25 % range, we would recommend a zero calibration if measurements below 1.0 % H<sub>2</sub>S were required).

Span calibration is required routinely for accurate measurements of H<sub>2</sub>S.

**NOTE: Zero calibration should always be carried out before a span calibration.**

#### Zero calibration

The zero calibration adjustments are limited to 50 ppm of the most sensitive range. All analyzers are QC-tested to confirm the zero calibration. Should you observe a zero calibration error more than 50 ppm of the lowest range, we recommend first:

- Check the sample system for any possible leaks
- Ensure the analyzer has been given 15 minutes to stabilize on the zero gas (air)
- Ensure CLIP = OFF, refer to "Clipping" on page 27 for information.

If adequate time is not allowed for the analyzer to establish the true baseline and a ZERO calibration is performed, the analyzer will likely display a negative reading in the sample mode when exposed to zero gas. If a negative reading is observed, we recommend repeating the ZERO calibration. Refer to [Table 3 on page 11](#) for example stability times.

To perform a zero calibration:

1. Enter the **Calibration** menu and select **Zero Calibrate**.  
The analyzer will switch to **Zero Cal** mode and display the live readings.

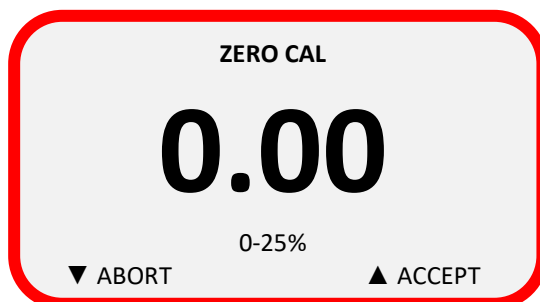


Figure 16. Zero calibration display

2. Once gas reading is stable, **Accept** or **Abort** the calibration.  
The calibration will **Pass** or **Fail**, and the analyzer will return to normal operation at the configured range.

During calibration ensure stability of readings, secure gas connections and supply of suitable reference gas.

### Span calibration

To perform a Span Calibration, enter the **Calibration** menu and select **Span Calibration**.

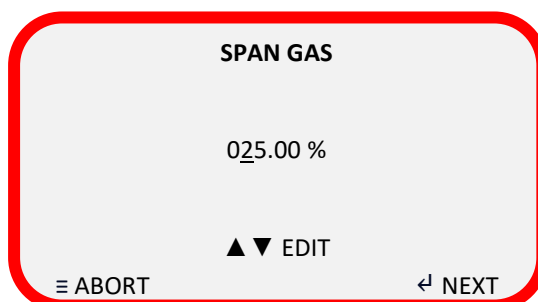


Figure 17. Span gas display

In the sub-menu, set the Span Gas value. If using certified cylinder gas, this can be found on the certificate that was supplied with the cylinder:

1. Use  to progress to the next digit or  to move to the previous digit; use  and  to edit the values.

**NOTE:** When a Span or Zero Cal starts, only "Abort" with  is shown until the reading is stable, then "Accept" with  appears.

2. Now select the unit in use (% or ppm).
3. When you press , the analyzer will switch to the appropriate range and display the live readings.

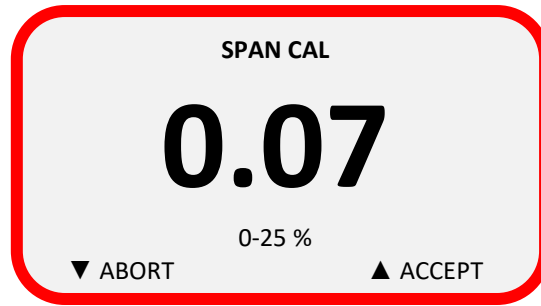


Figure 18. Span calibration display

Once gas reading is stable you can **Accept** or **Abort** the calibration. The calibration will **Pass** or **Fail** and the analyzer will return to normal operation at the configured range.

During calibration ensure stability of readings, secure gas connections and supply of suitable reference gas.

### Calibration log

The Cal Log shows a summary of events on the analyzer. A total of 256 records can be recorded.

Details included are shown below:

| Date     | Cal Type | Correction Value | Pass/Fail |                                                |
|----------|----------|------------------|-----------|------------------------------------------------|
| 01/01/23 | RST      |                  |           | ZRO = Zero calibration                         |
| 01/01/23 | SPN      | -0.05            | P         | SPN = Span calibration                         |
| 01/01/23 | ZRO      | -1.00            | F         | RST = Reset calibration to factory calibration |

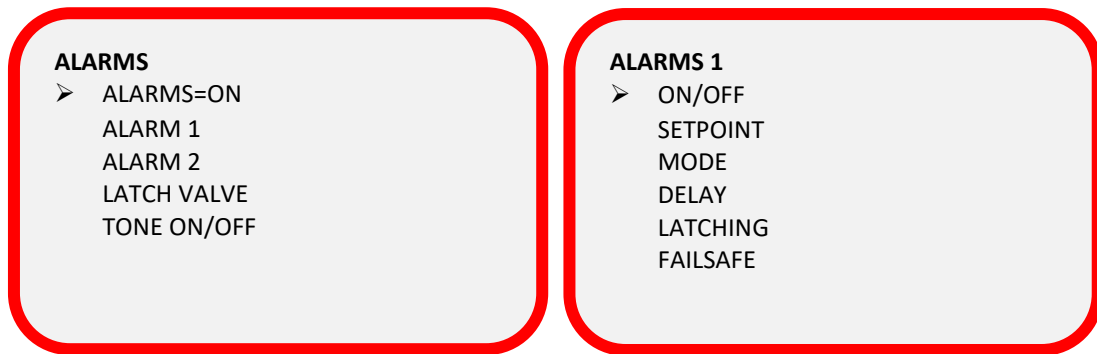
**NOTE:** The correction value does not relate to actual readings it is a proportional value. This value can be used by the Aii Factory for diagnostics.

### Reset Calibration

This function clears all stored calibration data (such as span and zero adjustments) and restores it to the factory default calibration values. After resetting, the sensor will operate as if it were newly installed, and you will need to perform a new zero calibration and/or span calibration before use.

## 5.3.6 Alarms

This menu can be used to configure settings for one or both of the alarms.

*Figure 18. Alarm displays*

### On/Off

Enable/disable both alarms (master enable).

### Setpoint

Define the alarm trigger point.

### Mode

Define alarm mode as high or low.

### Delay

Define the alarm activation delay.

### Latching

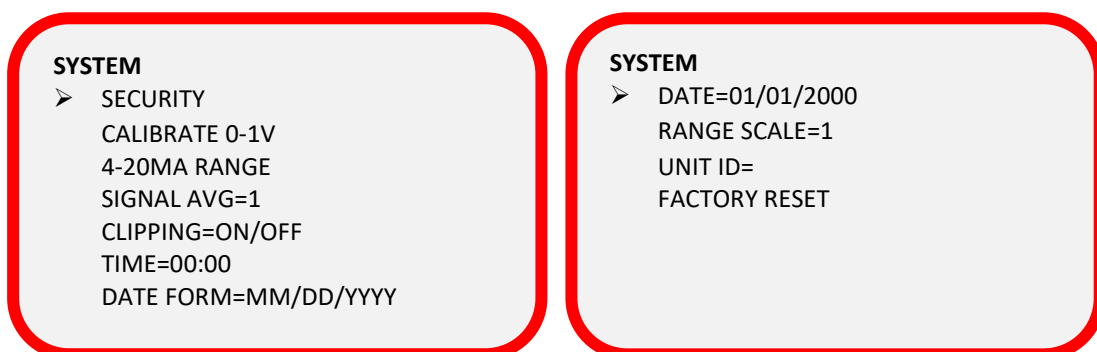
Enable/disable both alarms (master enable).

### Failsafe

Define the alarm as latching or non-latching.

## 5.3.7 System

Use the System menu to make the system adjustments shown in [Figure 19](#).

*Figure 19. System display*



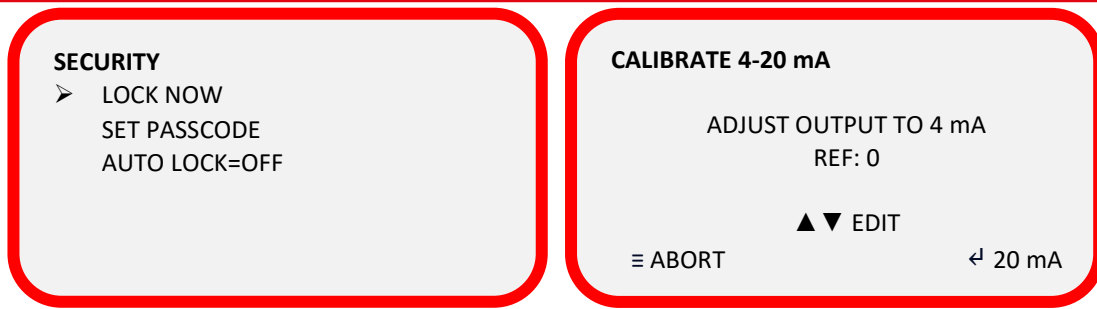


Figure 20. System sub-menu displays

### Security

- Enable Screen Lock with a passcode (default code is 0000)
- Set Passcode > Set the 4-digit passcode
- Enable Auto Lock > Locks the screen after 30 minutes.

### Calibrate 4...20 mA

This sub-menu allows a direct offset to be applied to the 4...20 mA analog output.

1. Use the keypad to adjust the reference corrections for both 4 and 20 mA output.
2. Select **Accept** to apply the adjustments or **Abort**.

### Modbus

Please refer to "Appendix F - Modbus Register (AIS only)" on page 50 for details.

### Signal AV - signal average

This function enables the setup of a measurement rolling average. A value between 1...100 readings can be used in a simple average calculation for the display measurements. Measurements are made at 1 Hz so that a value of 60 will give a 1-minute rolling average.

Higher signal average will help remove measurement instability but will reduce measurement response.

### Clipping

Enabling Clipping will stop the analyzer displaying below 0 ppm / 0 % readings.

### Time

Sets the on board 24-hour clock for event logging.

### Date form

These user-configurable functions enables you to set your date format preference. Default is shown as the following:

MM/DD/YYYY

### Date

Set the on board device date (after a full power cycle the date time will be 00:00 1 Jan 2000).

## Edit ranges

Adjusts the ppm range max values by a multiple (0-5)

For example, setting Range Scale to 5 will give the following Range Options in the **Range** menu:

- 0-50 ppm
- 0-500 ppm
- 0-5000 ppm

Your analyzer is supplied with a Range scale of 1 as standard. This will generate ranges of:

- 0-10 ppm
- 0-100 ppm
- 0-1000 ppm

**NOTE:** Range scale only applies to the lowest three ranges of group 1 H<sub>2</sub>S (10, 100, 1000 ppm H<sub>2</sub>S).

## Unit ID

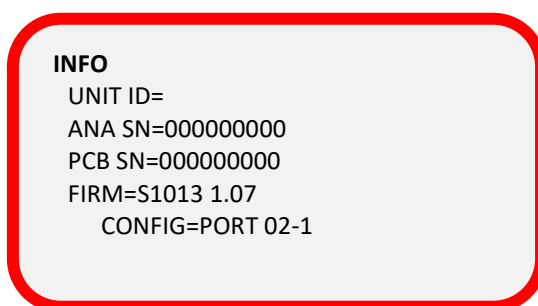
Allows an Alpha numerical ID (up to 8 characters) to be given to the analyzer. This value will be stamped on log files and displayed on the INFO SCREEN.

## Factory reset

Reverts all settings to Factory Configuration including security settings, sensor calibration and analog calibration.

### 5.3.8 Info

The **Info** menu displays the device information including:



*Figure 21. Info display*

- **UNIT ID:** User defined (this is left blank for user, usually a location ID or asset number can be changed here)
- **ANA SN:** Serial number of the analyzer (The 9-digit analyzer serial number is also displayed in log files)
- **PCB SN:** Serial number of the circuit board (a 9-digit number)
- **FIRM:** Firmware part number and revision
- **CONFIG:** This number refers to your analyzer's power, gas and Factory group number.

## 6 Maintenance

The GPR-7500 (A)IS will provide reliable and fault-free service with regular maintenance and calibration.

During periods without use, the sensor should be purged with nitrogen or argon gas to preserve the sensor life as good practice.

**⚠ Do not attempt to make repairs to the analyzer. This will void the warranty and may result in electrical shock, injury, or damage. All servicing should be referred to qualified service personnel.**

### 6.1 Sensor replacement

A sensor will be installed in your analyzer when you first receive it, however you will need to replace it as it reaches end-of-life.

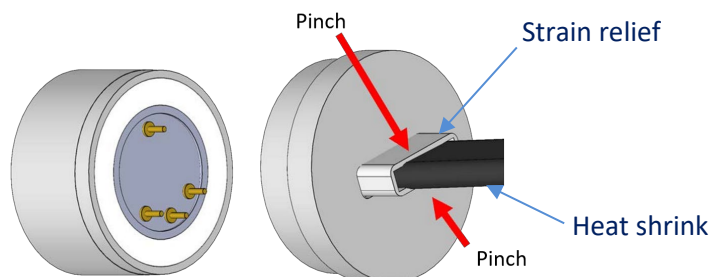
Calibration can no longer be performed when your sensor reaches the end of its serviceable life. The GPR-7500 (A)IS H<sub>2</sub>S analyzer is equipped with stainless steel sensor housing. This housing offers ease of replacement of sensors whilst preventing any leakage into the system. The two sections of the sensor are held together by a metal clamp secured in place by an easily accessed bolt.

The integrity of the sensor housing has been tested at the Aii Factory prior to shipment.

The analyzer must be calibrated once the installation has been completed and periodically thereafter.

To install or replace a H<sub>2</sub>S sensor:

1. Power down your analyzer before removing the old sensor (refer to [Figure 4 on page 11](#) for guidance).
2. Turn off the sample gas flow. Sample gas must not be flowing through the analyzer when the sensor is being replaced.
3. Let the air pump or compressed air remain on, and pushing air throughout the analyzer.
4. Using the two latches, open the window of the main enclosure.
5. Remove the top sensor assembly by pulling on both the strain relief and heat shrink. The PCB will be removed with the top sensor assembly. See [Figure 22](#).

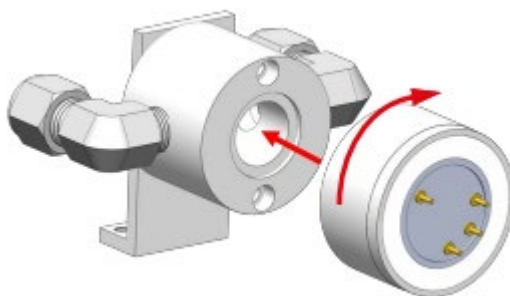


*Figure 22. Removing the top sensor assembly*

6. Remove the old sensor from the housing by turning it counter-clockwise. Dispose of the spent sensor.
7. Remove the new sensor from its packaging, ensuring the grounding wire is also removed from the sensor pins.

**NOTE: The grounding wire must be removed from the sensor pins to avoid shorting the sensor during installation.**

8. Install the new sensor by turning it clockwise in the housing.



*Figure 23. Installing the sensor*

9. Guide the PCB onto the sensor by pinching the strain relief and heat shrink attached to the top sensor assembly. Ensure all four pins are correctly aligned.



*Figure 24. Aligning your sensor and PCB*

10. Close the window of the main enclosure, securing it with the two latches
11. Turn on the gas flow and power on the analyzer.

**!** Always minimize the time that the sensor is exposed to ambient air.

A regular program of calibration will mitigate against sudden sensor failure. It is advisable to establish a program of preventative maintenance to ensure process downtime is kept to a minimum or avoided.

## 6.2 Routine cleaning

During sensor replacement, it is recommended that light cleaning of electrical contacts is carried out.

**!** Never use chemical cleaning agents, solvents or high pressure water or steam to clean the equipment. Do not submerge in water.

To perform routine cleaning:

1. Use a clean cloth that is damp with water to wipe away dust and dirt from the outside of the unit.
2. Dry the analyzer with a clean, dry cloth.

The maximum interval between routine inspections should be determined with consideration of the application and importance of the measurement.

The interval should be reassessed on a regular basis and can be extended and reduced as the process control requires.

This can be carried out during sensor replacement. To perform routine inspection:

1. Ensure the gas entry and vent ports on the sensor housing are not obstructed.
2. Inspect the sensor housing seal and replace it if damage is visible.

## 6.3 Troubleshooting

- Ensure the correct calibration gas is used when performing a validation or calibration of your analyzer. This will prevent unpredictable operation and incorrect readings.
- The calibration gas should be within range of your GPR-7500 (A)IS, typically 100 ppm for the 0...1 % range analyzer, and 20.9 % for the 0...25 %. See the Aii Factory calibration certificate supplied with your module for specific calibration gas values.
- A faulty sensor or one that is incorrectly installed will display 'FLT' on your analyzer's display.
- Do not expose the sensor to moisture in an un-powered state. If this happens, allow the sensor to dry out, and if necessary, apply clean dry inert gas.

Table 4: Troubleshooting causes and recommendations

| Symptoms                                                                      | Possible cause                                                                                                                   | Recommended actions                                                                                                                                                                                                |
|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Slow recovery.                                                                | At installation, defective sensor.                                                                                               | Replace sensor if recovery is unacceptable or H <sub>2</sub> S reading fails to reach 10 % of lowest range.                                                                                                        |
|                                                                               | Air leak in sample system connection(s).                                                                                         | Leak test the entire sample system: Vary the flow rate, if the H <sub>2</sub> S reading changes inversely with the change in flow rate indicates an air leak - the correct source of leak.                         |
|                                                                               | Abnormality in zero gas.                                                                                                         | Qualify with zero gas.<br>Replace sensor.                                                                                                                                                                          |
|                                                                               | Damaged in service - prolonged exposure to air, electrolyte leak.                                                                | Replace sensor.                                                                                                                                                                                                    |
|                                                                               | Sensor is nearing the end of life.                                                                                               | Replace sensor.                                                                                                                                                                                                    |
| High H <sub>2</sub> S reading after installing or replacing sensor.           | Analyzer calibrated before sensor stabilized caused by:                                                                          |                                                                                                                                                                                                                    |
|                                                                               | Prolonged exposure to ambient air, worse if sensor was left in air unshorted.                                                    | Allow H <sub>2</sub> S reading to stabilize before making any calibration adjustment, continue purging with zero gas.                                                                                              |
|                                                                               | Air leak in sample system connection(s).                                                                                         | Leak test the entire sample system (above).                                                                                                                                                                        |
|                                                                               | Abnormality in zero gas.                                                                                                         | Qualify with zero gas.                                                                                                                                                                                             |
| High H <sub>2</sub> S reading sampling.                                       | Flow rate exceeds limits Pressurized sensor.                                                                                     | Correct pressure and flow rate.<br>Remove restriction on vent line or open.                                                                                                                                        |
|                                                                               | Improper sensor selection.                                                                                                       | SHUT OFF valve completely.<br>Replace GPR/PSR sensor with XLT sensor when CO <sub>2</sub> or acid gases are present.<br>Replace GPR/PSR sensor with -H sensor when H <sub>2</sub> or He gas is the background gas. |
|                                                                               | Abnormality in sample gas measurement.                                                                                           | Validate with portable H <sub>2</sub> S analyzer.                                                                                                                                                                  |
| Response time slow.                                                           | Air leak, dead legs, longer distance of sample line, low flow rate, high volume of optional filters and scrubbers.               | Leak test sample system bringing sample gas to an analyzer, reduce dead volume and/or increase sample flow rate.                                                                                                   |
| H <sub>2</sub> S reading doesn't agree with expected H <sub>2</sub> S values. | Pressure and temperature of the sample may be different than the span gas used for calibration<br>Abnormality in the sample gas. | Calibrate the analyzer (calibrate close to the pressure and temperature of the sample gas).<br><br>Qualify sample gas independently.                                                                               |

| Symptoms                                                                                                                                          | Possible cause                                                                                                                                                                                                               | Recommended actions                                                                                                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Erratic H <sub>2</sub> S reading or No H <sub>2</sub> S reading.                                                                                  | Test sensor signal output independent from analyzer.                                                                                                                                                                         | Remove sensor from housing. Using a volt- meter set to uA output, apply the (+) lead to the outer ring of the sensor PCB and the (-) lead to the center circle to obtain the sensor's output in air. If there is no current signal, replace the sensor, otherwise contact the Aii Factory. |
|                                                                                                                                                   | Abrupt changes in sample pressure.                                                                                                                                                                                           | Regulate sample gas pressure and flow.                                                                                                                                                                                                                                                     |
|                                                                                                                                                   | Dirty electrical contacts in upper section of sensor housing.                                                                                                                                                                | Replace sensor.                                                                                                                                                                                                                                                                            |
|                                                                                                                                                   | Corroded solder joints on sensor PCB from corrosive sample or electrolyte leakage from sensor<br>Corroded Spring loaded contact in upper section of sensor housing from liquid in sample or electrolyte leakage from sensor. | Clean spring loaded contacts in upper section of sensor housing with a damp cloth or cotton swab, water or IPA can be used. If electrolyte leakage from sensor is evident, replace sensor.                                                                                                 |
|                                                                                                                                                   | Liquid in sensor housing.                                                                                                                                                                                                    | Wipe sensor and sensor housing with a damp cloth or cotton swab. Water or IPA can be used.                                                                                                                                                                                                 |
|                                                                                                                                                   | Improper sensor selection.                                                                                                                                                                                                   | Replace GPR/PSR series sensor with XLT sensor when CO <sub>2</sub> or acid gases are present.                                                                                                                                                                                              |
|                                                                                                                                                   | Presence of other interference gases.                                                                                                                                                                                        | Consult Aii Factory.                                                                                                                                                                                                                                                                       |
|                                                                                                                                                   | Presence of sulfur gases.                                                                                                                                                                                                    | Replace the sensor and install H <sub>2</sub> S scrubber.                                                                                                                                                                                                                                  |
|                                                                                                                                                   | Unauthorized maintenance.                                                                                                                                                                                                    | Replace sensor, obtain authorized service.                                                                                                                                                                                                                                                 |
|                                                                                                                                                   | Sensor is nearing the end of life.                                                                                                                                                                                           | Replace sensor.                                                                                                                                                                                                                                                                            |
| Erratic H <sub>2</sub> S reading or Negative H <sub>2</sub> S reading or No H <sub>2</sub> S reading possibly accompanied by electrolyte leakage. | Pressurizing of the sensor by flowing gas to the sensor with the vent restricted                                                                                                                                             | Zero the analyzer. If not successful replace the sensor.                                                                                                                                                                                                                                   |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                           |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
|  | <p>Pressurizing of the sensor by flowing gas to the sensor with SHUT OFF valve closed then suddenly removing the restriction to draw a vacuum on the sensor or partially opening the valves upstream of the analyzer when using a pump downstream of the analyzer to draw sample from a process at atmospheric pressure or a slight vacuum.</p> <p>A pressurized sensor may not leak but still can produce negative readings.</p> <p>Placing a vacuum on the sensor in excess 40" of water column is strongly discouraged.</p> | <p>Avoid drawing a vacuum on the sensor.</p>                              |
|  | <p>A premature ZERO OFFSET of analyzer.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p>From MAIN MENU select DEFAULT ZERO and perform a zero calibration.</p> |



## 7 Warranty information

The design and manufacture of Analytical Industries Inc. H<sub>2</sub>S analyzers and H<sub>2</sub>S sensors are performed under a certified Quality Assurance System that conforms to established standards and incorporates state of the art materials and components for superior performance and minimal cost of ownership.

Prior to shipment every analyzer is thoroughly tested by the manufacturer and documented in the form of a Quality Control Certification that is included in the Owner's Guide accompanying every analyzer.

When operated and maintained in accordance with the Owner's Guide, the units will provide many years of reliable service.

### 7.1 Coverage

Under normal operating conditions, the analyzers and sensors are warranted to be free of defects in materials and workmanship for the period specified in accordance with the most recently published specifications, said period begins with the date of shipment by the manufacturer.

The manufacturer information and serial number of this analyzer are located on the rear of the analyzer. Analytical Industries Inc. reserves the right in its sole discretion to invalidate this warranty if the serial number does not appear on the analyzer.

If your Analytical Industries Inc. monitor, analyzer and/or H<sub>2</sub>S sensor is determined to be defective with respect to material and/or workmanship, Aii will repair it or, at our option, replace it at no charge to you.

This warranty applies to all monitors, analyzers and sensors purchased worldwide.

### 7.2 Limitations

Analytical Industries Inc. will not pay for: loss of time; inconvenience; loss of use of your Analytical Industries Inc. analyzer or property damage caused by your Analytical Industries Inc. analyzer or its failure to work; any special, incidental or consequential damages; or any damage resulting from alterations, misuse or abuse; lack of proper maintenance; unauthorized repair or modification of the analyzer; affixing of any attachment not provided with the analyzer or other failure to follow the user guide.

**US Customers only:** Some states and provinces do not allow limitations on the duration of an implied warranty or the exclusion or limitation of special, incidental or consequential damages, in this case, these exclusions may not apply. This warranty gives you specific legal rights. You may have other rights, which vary between states and provinces.

### 7.3 Exclusions

This warranty does not cover installation; defects resulting from accidents; damage while in transit to our service location; damage resulting from alterations, misuse or abuse; lack of proper maintenance;

unauthorized repair or modification of the analyzer; affixing of any label or attachment not provided with the analyzer; fire, flood, or acts of God; or other failure to follow the User Guide.

## 7.4 Service

For queries related to service and warranty, please contact your local Analytical Industries office, sales partner or supplier.

Offices are listed at [Aii1.com](http://Aii1.com) or email [us.ii.sales@dwyeromega.com](mailto:us.ii.sales@dwyeromega.com).



## 8 Appendices

### Appendix A - Technical Specifications

| Sensor                                          |                                         |                                    |                                                                             |               |
|-------------------------------------------------|-----------------------------------------|------------------------------------|-----------------------------------------------------------------------------|---------------|
| Electrochemical                                 | Standard                                |                                    | -LD                                                                         |               |
| Model Number                                    | OSV-72-7H                               | OSV-72-7HH                         | OSV-72-7H-LD                                                                | OSV-72-7HH-LD |
| Measuring Range                                 | 0...20, 0...50, 0...100 ppmV            |                                    | 0...20, 0...50, 0...100 ppmV (optional: 0...500, 0...1,000, 0...2,000 ppmV) |               |
| Output Resolution                               | 0.01 ppm <sub>V</sub>                   |                                    |                                                                             |               |
| Lower Detection Limit (LDL)                     | 0.1 ppm <sub>V</sub>                    |                                    | 0.1 ppmV (1 ppmV with optional ranges)                                      |               |
| Sample Flow Rate<br>(application dependent)     | 1:1 ratio (air: sample)                 |                                    | 1:1 ratio (air: sample)<br>1:10 ratio (air: sample for optional ranges)     |               |
| Pressure Range                                  | 5...30 psi (0.3... 2 bar)               |                                    |                                                                             |               |
| Response Time (T90)                             | < 60 seconds                            |                                    |                                                                             |               |
| Operating Temperature Range                     | -10...+45 °C (+14...113 °F)             |                                    |                                                                             |               |
| Humidity                                        | 0...80 % rh non-condensing              |                                    |                                                                             |               |
| Life Expectancy<br>(application dependent)      | 24 months in 1000 ppm <sub>V</sub>      | 24 months in 1000 ppm <sub>V</sub> | 24 months in air                                                            |               |
| Shelf Life                                      | `Up to 3 months                         |                                    |                                                                             |               |
| Calibration Interval<br>(application dependent) | 30 days                                 |                                    |                                                                             |               |
| Analyzer                                        |                                         |                                    |                                                                             |               |
| Electrical                                      |                                         |                                    |                                                                             |               |
| Display                                         | LCD                                     |                                    |                                                                             |               |
| Output Signal                                   | 4...20 mA                               |                                    |                                                                             |               |
| Digital Communications                          | Modbus (AIS only)                       |                                    |                                                                             |               |
| Relay Output Options                            | Two user-configurable alarms (AIS only) |                                    |                                                                             |               |
| Power Supply                                    | 12...28 V DC (IS)<br>12...24 V DC (AIS) |                                    |                                                                             |               |
| Maximum Power Consumption                       | 1 W (IS)<br>28 W (AIS)                  |                                    |                                                                             |               |
| Mechanical                                      |                                         |                                    |                                                                             |               |
| Ingress Protection                              | NEMA 3R                                 |                                    |                                                                             |               |
| Analyzer Housing Material                       | Fiberglass                              |                                    |                                                                             |               |
| Mounting                                        | Flat / Horizontal surface               |                                    |                                                                             |               |
| Compliance                                      |                                         |                                    |                                                                             |               |
| Complies with EMC Directive: 2014/30/EU         |                                         |                                    |                                                                             |               |
| Electrical Safety: EN 61010-1                   |                                         |                                    |                                                                             |               |

## Appendix B – Compliance

| Region               | Certification details                                                                                                                                                                                                                                                                            | Standards                                                                                                                                                                                                                                                                   |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Europe               | <br>ATEX / UKCA<br><br><b>With optional air pump:</b><br>II 2 G Ex db ia IIB+H2 T4 Gb<br>Tamb (–20 °C...+50 °C)<br><br><b>Without optional air pump:</b><br>II 2 G Ex db ia IIC T4 Gb<br>Tamb (–20 °C...+50 °C) | EN 60079-0:2018<br>EN 60079-1:2014<br>EN 60079-11:2012                                                                                                                                                                                                                      |
| North America/Canada | <br>cMETus<br>Class I, Division 1, Groups B, C & D, T4<br>Class I, Zone 1, AEx db ia IIB+H2 T4 Gb, Ex db ia IIB+H2 T4 Gb<br>Tamb (–20 °C...+50 °C)                                                              | UL 60079-0:2019 (R2020)<br>UL 60079-1:2020<br>UL 60079-11:2013 (R2018)<br>UL 1203:2022<br>UL 61010-1:2019<br><br>CSA C22.2 No. 60079-0:2019<br>CSA C22.2 No. 60079-1:16 (R2021)<br>CSA C22.2 No. 60079-11:2014 (R2018)<br>CSA C22.2 No. 30:20<br>CSA C22.2 No. 61010-1:2017 |
| International        | <br>IECEx<br><b>With optional air pump:</b><br>Ex db ia IIB+H2 T4 Gb<br>Tamb (–20 °C...+50 °C)<br><br><b>Without optional air pump:</b><br>Ex db ia IIC T4 Gb<br>Tamb (–20 °C...+50 °C)                       | IEC 60079-0:2017<br>IEC 60079-1:2014<br>IEC 60079-11:2011                                                                                                                                                                                                                   |

## Appendix C - Safety Data Sheet



### Safety Data Sheet (KOH)



#### I. Product Identification

**Product Name:** Oxygen Sensor (Series AII, GPR, PSR, Private Label derivations)  
**Product Use:** Oxygen Sensors  
**Manufacturer:** Analytical Industries Inc.  
**Address:** 2855 Metropolitan Place, Pomona, CA 92767 USA  
**Contact Information:** Tel: 909-392-6900, Fax: 909-392-3665, email: info@aai1.com  
**Emergency Number:**  
  
**Date Prepared:** January 1, 1995  
**Date Revised:** January 31, 2023

#### II. Hazardou(s) Identification

##### GHS Classification:

Lead (Pb)

##### Health

Acute Toxicity- Category (Inhalation)  
 Acute Toxicity- Category 4 (oral/dermal)  
 Carcinogenic- Category 2  
 Reproductive/Developmental- Category 2  
 Target organ Toxicity (Repeated) Category 2

##### Environmental

Acute Aquatic Toxicity-Cat  
 Chronic Aquatic Toxicity-Category 1

##### Physical

NA

Potassium Hydroxide (KOH)

##### Health

Corrosive to Metal- Category 1  
 Acute Toxicity- Category 4 (oral)  
 Skin Corrosion-Category 1A  
 Serious Eye Damage-Category 1

##### Environmental

Acute Aquatic Toxicity-Cat

##### Physical

NA

##### GHS Labels:

Potassium Hydroxide (KOH)

Symbols:



##### Hazardous Statements

- Danger
- May be corrosive to metal
- Harmful if swallowed
- Causes severe skin burns and eye damage
- Harmful to aquatic life

##### Precautionary Statements

- Wash skin thoroughly after handling.
- Do not eat, drink or smoke when using this product.
- Avoid release to the environment.
- Wear protective gloves/ protective clothing/ eye protection/ face protection.
- IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell.
- IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
- IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/ shower.
- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER for doctor/ physician.
- Wash contaminated clothing before reuse.
- Absorb spillage to prevent material damage.
- Store in corrosive resistant stainless steel container with a resistant inner liner.
- Dispose of contents/ container to an approved waste disposal plant.

##### GHS Labels:

Lead (Pb)



## Safety Data Sheet (KOH)



### Symbols:



### Hazardous Statements

- Warning !
- Harmful if swallowed
- Suspected of causing cancer.
- Suspected of damaging fertility or the unborn child.
- May cause damage to organs through prolonged or repeated exposure.
- Very toxic to aquatic life with long lasting effects.

### Precautionary Statements

- If breathed in, move person into fresh air. In not breathing, give artificial respiration. Consult a physician.
- In case of skin contact, wash off with soap and plenty of water.
- In case of eye contact, flush eyes with water as a precaution.
- If swallowed, rinse mouth with water.

## III. Composition /Information on Ingredients

| Material<br>Lead (Pb)     | C.A.S. #<br>7439-92-1 | Weight %<br>50-75 | GHS Classification<br>Carc 1A; H350<br>Aquatic Acute 1; H400 | Notes<br>Substance classified with a health & Environmental hazard.<br>Substance with a work place limit |
|---------------------------|-----------------------|-------------------|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| Potassium Hydroxide (KOH) | 1310-58-3             | 1.0-10            | Acute Tox. 4; H302<br>Skin Corr.1A; H314                     | Substance classified with a health & Environmental hazard.<br>Substance with a work place limit.         |

## IV. First Aid Measures

### 4.1. Description of aid measures

#### General:

- In all cases of doubt, or when symptoms persist, seek medical attention. Never give anything by mouth to an unconscious person.

#### Inhalation:

- Remove to fresh air, keep patient warm and at rest. If breathing is irregular or stopped, give artificial respiration. If unconscious place in the recovery position and obtain immediate

#### Eyes:

- Irrigate copiously with clean water for at least 15 minutes, holding the eyelids apart and seek medical attention.

#### Skin:

- Remove contaminated clothing. Wash skin thoroughly with soap and water or use a recognized skin cleanser.

#### Ingestion:

- Do NOT induce vomiting. Rinse mouth and slowly drink several glasses of water. Call a physician. Do NOT give anything by mouth to an unconscious or convulsing person.

### 4.2. Most important symptoms and effects, both acute and delayed

- The most important known symptoms and effects are described in the labelling (see section II) and/or in section XI

## V. Fire -Fighting Measures

### 5.1. Extinguishing media

- Use standard fire fighting media on surrounding materials including water spray, foam, and carbon dioxide. (Do not use dry chemical extinguisher containing ammonium

### 5.2. Special hazards arising from the substance or mixture

- Lead Oxides.

### 5.3. Advice for fire-fighters

- Wear self-contained breathing apparatus for firefighting if necessary.

### 5.4. Further Information

- Gives off hydrogen by reaction with metals.

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## Safety Data Sheet (KOH)



### VI. Accidental release measures

**Note:** The Oxygen sensor contains a strong basic solution encapsulated in a plastic housing. Under normal operating conditions the solution (electrolyte) is never exposed. In case of a leak please observe the following instructions:

- |                                                                                 |                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>6.1. Personal precautions, protective equipment and emergency procedures</b> | <ul style="list-style-type: none"> <li>• Use appropriate personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. For personal protection see section VII.</li> </ul> |
| <b>6.2. Environmental precautions</b>                                           | <ul style="list-style-type: none"> <li>• Do not allow spills to enter drains or waterways. Use good personal hygiene practices. Wash hands before eating, drinking, smoking or using toilet. Promptly remove soiled clothing and wash thoroughly before reuse.</li> </ul>                   |
| <b>6.3. Methods and material for containment and cleaning up</b>                | <ul style="list-style-type: none"> <li>• Contain spillage. Neutralize spill with soda ash or lime. Carefully place material into clean dry contain and cover. Flush spill area with water. Avoid creating dust.</li> </ul>                                                                  |

### VII. Handling and storage

- |                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>7.1. Precautions for safe handling</b>                                | <ul style="list-style-type: none"> <li>• Under normal circumstances the lead anode and potassium hydroxide electrolyte are sealed inside the oxygen sensor which is then sealed in a polyethylene bag and placed in a cardboard box for shipment) and do not present a health hazard. The following guidelines are provided in the event an oxygen sensor leaks electrolyte.</li> <li>• Before opening the bag containing the sensor cell, check the sensor cell for leakage. If the sensor cell leaks, do not open the bag. If there is liquid around the cell while in the instrument, put on gloves and eye protection before removing the sensor cell.</li> </ul> |
| <b>7.2. Conditions for safe storage, including any incompatibilities</b> | <ul style="list-style-type: none"> <li>• Store sensors in a cool, dry and well-ventilated places. Exercise due caution to prevent damage to or leakage from the container. Keep containers closed when not in use.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>7.3. Specific end use(s)</b>                                          | <ul style="list-style-type: none"> <li>• Apart from the uses mentioned in section I no other specifies are stipulated.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

### VIII. Exposure Controls/Personal Protection

#### 8.1. Control parameters

| Exposure        |                     |          |                                                                    |
|-----------------|---------------------|----------|--------------------------------------------------------------------|
| CAS No.         | Ingredient          | Source   | Value                                                              |
| 0001310-58-3    | Potassium hydroxide | OSHA     | No Establish Limits                                                |
|                 |                     | ACGIH    | Ceiling: 2mg/m <sup>3</sup>                                        |
|                 |                     | NIOSH    | Ceiling: 2mg/m <sup>3</sup>                                        |
| 007439-92-1     | Lead (Pb)           | Supplier | No Establish Limits                                                |
|                 |                     | OSHA     | (1910.1025)TWA 0.050mg/m <sup>3</sup>                              |
|                 |                     | ACGIH    | TWA:0.05 mg/m <sup>3</sup> R,2B,2A                                 |
|                 |                     | NIOSH    | TWA (8 Hour)0.050 mg/m <sup>3</sup>                                |
|                 |                     | Supplier | No Establish Limits                                                |
| Carcinogen Data |                     |          |                                                                    |
| CAS No.         | Ingredient          | Source   | Value                                                              |
| 0001310-58-3    | Potassium hydroxide | OSHA     | Select Carcinogen: No                                              |
|                 |                     | NTP      | Known: No; Suspected: No                                           |
|                 |                     | IARC     | Group 1: No; Group 2a: No; Group 2b: No; Group 3: No; Group 4: No; |
| 007439-92-1     | Lead (Pb)           | OSHA     | Select Carcinogen: Yes                                             |



## Safety Data Sheet (KOH)



NTP Known: No; Suspected: Yes  
 IARC Group 1: No; Group 2a: No; Group 2b: Yes; Group 3: No; Group 4: No

### 8.2. Exposure controls Respiratory

- If workers are exposed to concentrations above the exposure limit they must use the appropriate, certified respirators.

### Eyes

- Chemical splash goggles

### Skin

- Apron, face shield Wear gloves. Gloves must be resistant to corrosive materials. Nitrile or PVC gloves are suitable. Do not use cotton or leather gloves.

### Engineering Controls

- Provide adequate ventilation. Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction. If these are not sufficient to maintain concentrations of particulates and any vapor below occupational exposure limits suitable respiratory protection must be worn.

### Other Work Practices

- Use good personal hygiene practices. Wash hands before eating, drinking, smoking or using toilet. Promptly remove soiled clothing and wash thoroughly before reuse.

## IX. Physical / Chemical Characteristics

### 9.1 Information on basic physical and chemical properties

#### Material / Component:

#### Lead (Pb) - Anode

#### Potassium Hydroxide (KOH) - Electrolyte

#### Appearance

Article Solid

Form: Liquid; Color: Clear Translucent

#### Odor

None

None

#### Odor threshold

Not Measured

Not Measured

#### pH

Not Measured

>13

#### Melting point / freezing point

>328° C

Not Measured

#### Initial boiling point and boiling range

>1320° C

Not Measured

#### Flash Point

Not Measured

>100° C

#### Evaporation rate (Ether = 1)

Not Measured

Not Measured

#### Flammability (solid, gas)

Not Applicable

Not Measured

#### Upper/lower flammability or explosive limits

Not Measured

Not Measured

#### Vapor pressure

Not Measured

Not Measured

#### Vapor Density

Not Measured

Not Measured

#### Specific Gravity

Not Measured

Not Measured

#### Solubility in Water

Insoluble

100% (Water based solution)

#### Partition coefficient n-octanol/water (Log Kow)

Not Measured

Not Measured

#### Auto-ignition temperature

Not Measured

Not Measured

#### Decomposition temperature

Not Measured

Not Measured

#### Viscosity (cSt)

Not Measured

Not Measured

### 9.2. Other information

No other relevant information.

## X. Stability and Reactivity

### 10.1. Reactivity

- Hazardous Polymerization will not occur

### 10.2. Chemical stability

- Stable under normal circumstances

### 10.3. Possibility of hazardous reactions

- Incompatible with strong oxidizers, leather and halogenated compounds. Product will react with 'soft' metals such as aluminum, tin, magnesium, and zinc releasing flammable





## Safety Data Sheet (KOH)



- |                                                                                                                    |                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>10.4. Conditions to avoid</p> <p>10.5. Incompatible materials</p> <p>10.6. Hazardous decomposition products</p> | <p>hydrogen gas.</p> <ul style="list-style-type: none"> <li>• Excessive heat and open flame.</li> <li>• Aluminum, organic materials, acid chlorides, acid anhydrides, magnesium, copper. Avoid contact with acids and hydrogen peroxide &gt;52%</li> <li>• Toxic fumes.</li> </ul> |
|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## XI. Toxicological Information

### 11.1 Information on toxicological effects (Potassium Hydroxide)

#### Acute toxicity

- LD50 Oral - Rat- 333mg/kg
- Inhalation : no data available
- Dermal: no data available

#### Skin Corrosion/irritation

- Skin Rabbit- Severe skin irritation 24 h

#### Serious eye damage/eye irritation

- Eyes Rabbit- Corrosive to eyes (OECD Test Guideline 405)

#### Respiratory or skin sensitization

- No Data Available

#### Germ cell mutagenicity

- No Data Available

#### Carcinogenicity

**IARC** • No component of this product presents at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

**ACGIH** • No component of this product presents at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

**NTP** • No component of this product presents at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP

**OSHA** • No component of this product presents at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA

#### Reproductive toxicity

- No Data Available

#### Specific target organ toxicity-single exposure

- No Data Available

#### Specific target organ toxicity-repeated exposure

- No Data Available

#### Additional information

- RTECS: TT2100000

### 11.2 Information on toxicological effects (Lead)

#### Acute toxicity

- Inhalation : no data available
- Dermal: no data available

#### Skin Corrosion/irritation

- No Data Available

#### Serious eye damage/eye irritation

- No Data Available

#### Respiratory or skin sensitization

- No Data Available

#### Germ cell mutagenicity

- Rat - Cytogenetic analysis

#### Carcinogenicity

- Limited evidence of carcinogenicity in animal studies

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## Safety Data Sheet (KOH)



**IARC** • 2B-Group 2B. Possibly carcinogenic to humans (Lead)  
**NTP** • Reasonably anticipated to be a human carcinogen (Lead)  
**OSHA** • 1910.1025 (Lead)

### Reproductive toxicity

- Suspected human reproductive toxicant
- Rat-Inhalation: Effects on Newborn; Biochemical metabolic
- Rat-Oral: Effects on Newborn; Behavioral
- Mouse-Oral: Effect on Fertility: Female fertility index (e.g., # females pregnant per # sperm positive females; # females pregnant per # females mated). Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea).

### Development Toxicity

- Rat-Inhalation: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Blood and lymphatic system (including spleen and marrow).
- Rat-Oral: Specific Developmental Abnormalities: Blood and lymphatic system (including spleen and marrow). Effects on Newborn: Growth statistics (e.g., reduced weight gain)
- Rat-Oral: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Embryo or Fetus: Fetal death.
- Mouse-Oral: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Embryo or Fetus: Fetal death.

Specific target organ toxicity – single exposure • No Data Available

Specific target organ toxicity – repeated exposure • May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard • No Data Available

Additional Information • RTECS: OF7525000

## XII. Ecological Information

### 12.1. Toxicity Very toxic to aquatic life Aquatic Ecotoxicity

| Ingredient                           | 96 hr. LC50 fish, mg/l | 48 hr. EC50 crustacea, mg/l | ErC50 algae, mg/l                      |
|--------------------------------------|------------------------|-----------------------------|----------------------------------------|
| Lead Compounds (as Pb) - (7439-92-1) | 0.44, Cyprinus carpio  | 4.40, Daphnia magna         | 0.25 (72 hr.), Scenedesmus subspicatus |
| Potassium hydroxide. - (1310-58-3)   | Not Available          | Not Available               | Not Available                          |

### 12.1. Persistence and degradability

- There is no data available on the preparation itself.

### 12.3. Bioaccumulative potential

- Not Measured

### 12.4. Mobility in soil

- No Data Available

### 12.5. Result of PBT and vPvB assessment

- This Product contains no PBT and vPvB chemicals.

### 12.6. Other adverse effects

- Lead is bioaccumulative in most aquatic life and mammals. It is highly mobile as lead dust or fume, yet forms complexes with organic material which limits its mobility.

## XIII. Disposal Considerations

### 13.1. Waste treatment methods

- Do not allow into drains or water courses. Wastes and emptied containers should be disposed of in accordance with regulations made under the Control of Pollution Act and the Environmental Protection Act.

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## Safety Data Sheet (KOH)



• Using information provided in this data sheet advice should be obtained from the Waste Regulation Authority, whether the special waste regulations apply.

### XIV. Transport Information

|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DOT:                  | <ul style="list-style-type: none"> <li>Regulated. Refer to Small Quantity Exceptions: 49 CFR 173.4</li> <li>UN3266, Corrosive liquid, basic, inorganic, n.o.s., (potassium hydroxide, lead), 8, II</li> <li>NOTE: This description is used for shipping purposes when not using Analytical Industries Inc. US DOT Approval.</li> <li>UN3363, Dangerous Goods in Machinery or Dangerous Goods in Apparatus, 9. NOTE: This description is used when shipping under the US DOT Approval.</li> </ul> |
| IATA:                 | <ul style="list-style-type: none"> <li>Regulated. Meets criteria for IATA Dangerous Goods in Excepted Quantities, Section 2.7</li> </ul>                                                                                                                                                                                                                                                                                                                                                         |
| Environmental hazards |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| IMDG                  | <ul style="list-style-type: none"> <li>Marine Pollutant: Yes ( Lead Compounds (as Pb) )</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                               |

### XV. Regulatory Information

|                                                |                                                                                                                                                                                                                          |
|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Regulatory Overview                            | <ul style="list-style-type: none"> <li>The regulatory data in Section 15 is not intended to be all-inclusive, only selected regulations are represented.</li> </ul>                                                      |
| Toxic Substance Control Act ( TSCA )           | <ul style="list-style-type: none"> <li>All components of this material are either listed or exempt from listing on the TSCA Inventory</li> </ul>                                                                         |
| WHMIS Classification                           | <ul style="list-style-type: none"> <li>D2A E</li> </ul>                                                                                                                                                                  |
| US EPA Tier II Hazards                         | <div style="text-align: right;">           Fire: No<br/>           Sudden Release of Pressure: No<br/>           Reactive: No<br/>           Immediate (Acute): Yes<br/>           Delayed (Chronic): Yes         </div> |
| EPCRA 311/312 Chemicals and RQs (lbs.):        | <ul style="list-style-type: none"> <li>Lead Compounds (as Pb) ( 10.00)</li> <li>Potassium hydroxide. ( 1,000.00)</li> </ul>                                                                                              |
| EPCRA 302 Extremely Hazardous :                | <ul style="list-style-type: none"> <li>(No Product Ingredients Listed)</li> </ul>                                                                                                                                        |
| EPCRA 313 Toxic Chemicals:                     | <ul style="list-style-type: none"> <li>Lead Compounds (as Pb)</li> </ul>                                                                                                                                                 |
| Proposition 65 - Carcinogens (>0.0%):          | <ul style="list-style-type: none"> <li>Lead Compounds (as Pb)</li> </ul>                                                                                                                                                 |
| Proposition 65 - Developmental Toxins (>0.0%): | <ul style="list-style-type: none"> <li>Lead Compounds (as Pb)</li> </ul>                                                                                                                                                 |
| Proposition 65 - Female Repro Toxins (>0.0%):  | <ul style="list-style-type: none"> <li>Lead Compounds (as Pb)</li> </ul>                                                                                                                                                 |
| Proposition 65 - Male Repro Toxins (>0.0%):    | <ul style="list-style-type: none"> <li>Lead Compounds (as Pb)</li> </ul>                                                                                                                                                 |
| N.J. RTK Substances (>1%):                     | <ul style="list-style-type: none"> <li>Lead Compounds (as Pb)</li> <li>Potassium hydroxide.</li> </ul>                                                                                                                   |

### XVI. Other Information

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, expressed or implied, is made with respect to the information contained herein. We accept no responsibility and disclaim all liability for any harmful effects which may be caused by exposure to our products. Customers/users of this product must comply with all applicable health and safety laws, regulations, and orders.

H302 Harmful if swallowed.

Page 7 of 8

PFR 7.3-1002-0 Rev 1



**Safety Data Sheet (KOH)**



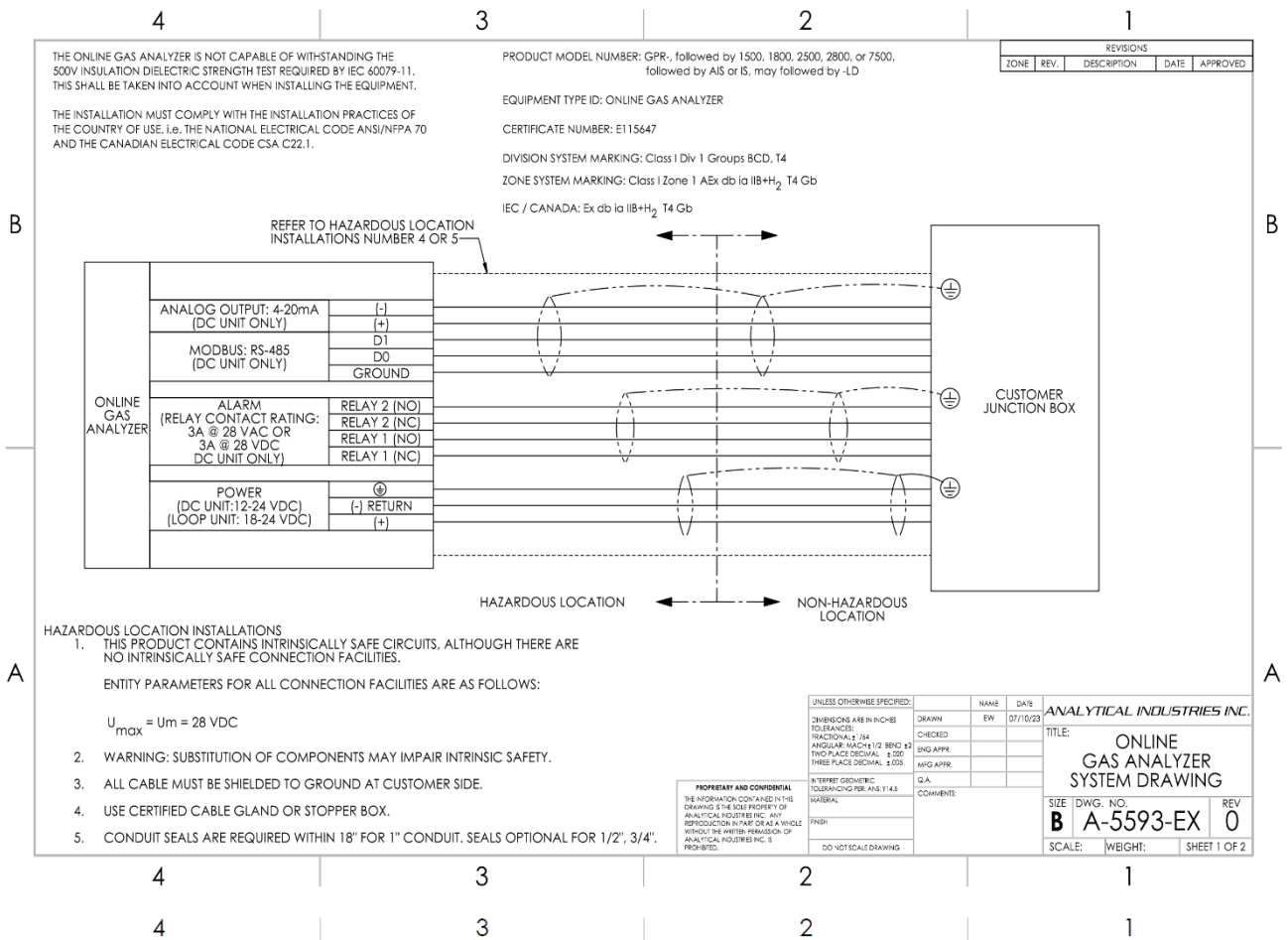
H314 Causes severe skin burns and eye damage.  
H350 May cause cancer.  
H400 Very toxic to aquatic life.

**This is the first version in the GHS SDS format. Listings of changes from previous versions in other formats are not applicable.**

All chemicals may pose unknown hazards and should be used with caution. While the information contained in this Material Safety Data Sheet is believed to be correct and is offered for your information, consideration and investigation, Analytical Industries Inc assumes no responsibility of the completeness or accuracy of the information contained herein.

End of Document

## Appendix D – Hazardous Area Installation Drawings



### Online Gas Analyzer Specific Conditions of Use:

- All versions of the enclosure are manufactured from Aluminium. In rare cases, ignition sources due to impact and friction sparks could occur. This shall be considered during installation, particularly if the equipment is installed in a Class I Division 1 or a Class I, Zone 0 location.
- The Online Gas Analyzers have non-metallic parts incorporated in the enclosure of this equipment which may generate an ignition-capable level of electrostatic charge, under certain extreme circumstances. Therefore, the equipment shall not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge on such surfaces. This is particularly important if the equipment is installed in a Class I Division 1 or a Class I, Zone 1 location. In addition, the equipment shall only be cleaned with a damp cloth.
- The Online Gas Analyzer is not capable of withstanding the 500V insulation test required by Clause 6.3.12 of UL/CSAC22.2 No. 60079-11. This shall be taken into account when installing the equipment.
- When connected using a conduit system, the Explosion-proof Enclosures type Adalet type XIHLX require conduit seals that satisfy the following requirement:

| Conduit Size | Conduit Seals |
|--------------|---------------|
| 1"           | With 18"      |
| 3/4"         | Optional      |
| 1/2"         | Optional      |

- When connected with with cable glands, the glands shall be a suitably Listed Explosion-proof type, suitable for the applicable Class and Division or Class and Zone, Gas Group, T-Class and ambient temperature. It shall only employ sealing around individual cores. Additional thread adapters shall not be used.

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:

FRACTIONAL: ±1/64

ANGULAR: MATCH 1/2 BEND ±2

TWO PLACE DECIMAL: ±.005

THREE PLACE DECIMAL: ±.003

INTERPRET GEOMETRIC TOLERANCING PER ANSI Y14.5

MATERIAL:

FINISH:

DO NOT SCALE DRAWING

NAME: EW

DATE: 07/10/23

ANALYTICAL INDUSTRIES INC.

TITLE: ONLINE GAS ANALYZER SYSTEM DRAWING

SIZE: DWG. NO. B A-5593-EX

REV: 0

SCALE: WEIGHT: SHEET 2 OF 2

| 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      | 3            |          | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  | 1 |  |                                                                                                                                                                                                                                                                                          |  |           |      |                            |                                                             |      |      |             |                                                       |  |         |  |                                                                                      |  |           |  |                |  |              |  |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------|------|----------------------------|-------------------------------------------------------------|------|------|-------------|-------------------------------------------------------|--|---------|--|--------------------------------------------------------------------------------------|--|-----------|--|----------------|--|--------------|--|--|
| <p>L'ANALYSEUR DE GAZ EN LIGNE N'EST PAS CAPABLE DE SUPPORTER L'ESSAI DE RIGIDITÉ DIÉLECTRIQUE DE 500V REQUIS PAR LA NORME IEC 60079-11. IL CONVIENT D'EN TENIR COMPTE LORS DE L'INSTALLATION DE L'ÉQUIPEMENT.</p> <p>L'INSTALLATION DOIT ÊTRE CONFORME AUX PRATIQUES D'INSTALLATION DU PAYS D'UTILISATION, C'EST-À-DIRE LE CODE ÉLECTRIQUE NATIONAL ANSI/NFPA 70 ET LE CODE ÉLECTRIQUE CANADIEN CSA C22.1.</p>                                                                                                                                                                                                                                                                                                                                                                     |      |              |          | <p>NUMÉRO DE MODÈLE DU PRODUIT: GPR-, suivi de 1500, 1800, 2500, 2800, ou 7500, suivi de AIS or IS, peut être suivi de -LD</p> <p>TYPE D'ÉQUIPEMENT ID : ANALYSEUR DE GAZ EN LIGNE</p> <p>NUMÉRO DE CERTIFICAT : E115647</p> <p>MARQUAGE DU SYSTÈME DE DIVISION : Class I Div 1 Groups BCD, T4</p> <p>MARQUAGE DU SYSTÈME DE ZONES : Class I Zone 1 AEx db ia IB+H<sub>2</sub> T4 Gb</p> <p>IEC / CANADA: Ex db ia IB+H<sub>2</sub> T4 Gb</p>                                                                                                                                                                                                                                                                                                |  |   |  | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4">RÉVISIONS</th> </tr> <tr> <th>ZONE</th> <th>REV.</th> <th>DESCRIPTION</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> |  | RÉVISIONS |      |                            |                                                             | ZONE | REV. | DESCRIPTION | DATE                                                  |  |         |  |                                                                                      |  |           |  |                |  |              |  |  |
| RÉVISIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |              |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |   |  |                                                                                                                                                                                                                                                                                          |  |           |      |                            |                                                             |      |      |             |                                                       |  |         |  |                                                                                      |  |           |  |                |  |              |  |  |
| ZONE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | REV. | DESCRIPTION  | DATE     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |   |  |                                                                                                                                                                                                                                                                                          |  |           |      |                            |                                                             |      |      |             |                                                       |  |         |  |                                                                                      |  |           |  |                |  |              |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |              |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |   |  |                                                                                                                                                                                                                                                                                          |  |           |      |                            |                                                             |      |      |             |                                                       |  |         |  |                                                                                      |  |           |  |                |  |              |  |  |
| <p>SE RÉFÉRER AUX INSTALLATIONS D'EMPLACEMENTS DANGEREUX NUMÉRO 4 OU 5</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |              |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |   |  |                                                                                                                                                                                                                                                                                          |  |           |      |                            |                                                             |      |      |             |                                                       |  |         |  |                                                                                      |  |           |  |                |  |              |  |  |
| <p>INSTALLATIONS EN ZONE DANGEREUSE</p> <ol style="list-style-type: none"> <li>CE PRODUIT CONTIENT DES CIRCUITS DE SÉCURITÉ INTRINSÈQUE, BIEN QU'IL N'Y AIT PAS DE DISPOSITIFS DE CONNEXION DE SÉCURITÉ INTRINSÈQUE.</li> <li>LES PARAMÈTRES DE L'ENTITÉ POUR TOUTES LES INSTALLATIONS DE CONNEXION SONT LES SUIVANTS :<br/>U<sub>max</sub> = U<sub>m</sub> = 28 VDC</li> <li>AVERTISSEMENTS : LA SUBSTITUTION DE COMPOSANTS PEUT NUIRE À LA SÉCURITÉ INTRINSÈQUE.</li> <li>TOUTS LES CÂBLES DOIVENT ÊTRE BLINDÉS JUSQU'À LA TERRE PAR LE CLIENT.</li> <li>UTILISER UN PRESSE-ÉTOUPE OU UNE BOÎTE D'ARRÊT CERTIFIÉS.</li> <li>DES JOINTS DE CONDUITS DE MOINS DE 18" SONT REQUIS POUR LES CONDUITS DE 1". LES JOINTS SONT FACULTATIFS POUR LES CONDUITS DE 1/2" ET 3/4".</li> </ol> |      |              |          | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">SAUF INDICATION CONTRAIRE</th> <th>NOM</th> <th>DATE</th> <th rowspan="4">ANALYTICAL INDUSTRIES INC.</th> </tr> </thead> <tbody> <tr> <td colspan="2">LES DIMENSIONS SONT EXPRIMÉES EN POUCES AVEC DES TOLERANCES</td> <td>EW</td> <td>07/10/23</td> </tr> <tr> <td colspan="2">FRACTIONNELLES: 1/16, 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 1</td> <td>VERIFIÉ</td> <td> </td> </tr> <tr> <td colspan="2">DÉCAIMALES À DEUX PLACES: 0,05, 0,10, 0,15, 0,20, 0,25, 0,30, 0,35, 0,40, 0,45, 0,50</td> <td>ENG APPR.</td> <td> </td> </tr> <tr> <td colspan="2">INTERPRÉTATION</td> <td>COMMENTAIRES</td> <td> </td> <td> </td> </tr> </tbody> </table> |  |   |  | SAUF INDICATION CONTRAIRE                                                                                                                                                                                                                                                                |  | NOM       | DATE | ANALYTICAL INDUSTRIES INC. | LES DIMENSIONS SONT EXPRIMÉES EN POUCES AVEC DES TOLERANCES |      | EW   | 07/10/23    | FRACTIONNELLES: 1/16, 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 1 |  | VERIFIÉ |  | DÉCAIMALES À DEUX PLACES: 0,05, 0,10, 0,15, 0,20, 0,25, 0,30, 0,35, 0,40, 0,45, 0,50 |  | ENG APPR. |  | INTERPRÉTATION |  | COMMENTAIRES |  |  |
| SAUF INDICATION CONTRAIRE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      | NOM          | DATE     | ANALYTICAL INDUSTRIES INC.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |   |  |                                                                                                                                                                                                                                                                                          |  |           |      |                            |                                                             |      |      |             |                                                       |  |         |  |                                                                                      |  |           |  |                |  |              |  |  |
| LES DIMENSIONS SONT EXPRIMÉES EN POUCES AVEC DES TOLERANCES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      | EW           | 07/10/23 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |   |  |                                                                                                                                                                                                                                                                                          |  |           |      |                            |                                                             |      |      |             |                                                       |  |         |  |                                                                                      |  |           |  |                |  |              |  |  |
| FRACTIONNELLES: 1/16, 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      | VERIFIÉ      |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |   |  |                                                                                                                                                                                                                                                                                          |  |           |      |                            |                                                             |      |      |             |                                                       |  |         |  |                                                                                      |  |           |  |                |  |              |  |  |
| DÉCAIMALES À DEUX PLACES: 0,05, 0,10, 0,15, 0,20, 0,25, 0,30, 0,35, 0,40, 0,45, 0,50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      | ENG APPR.    |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |   |  |                                                                                                                                                                                                                                                                                          |  |           |      |                            |                                                             |      |      |             |                                                       |  |         |  |                                                                                      |  |           |  |                |  |              |  |  |
| INTERPRÉTATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      | COMMENTAIRES |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |   |  |                                                                                                                                                                                                                                                                                          |  |           |      |                            |                                                             |      |      |             |                                                       |  |         |  |                                                                                      |  |           |  |                |  |              |  |  |

### Conditions spécifiques d'utilisation de l'analyseur de gaz en ligne :

- Toutes les versions du boîtier sont fabriquées en aluminium. Dans de rares cas, des sources d'inflammation dues à des chocs et à des étincelles de frottement peuvent se produire. Il convient d'en tenir compte lors de l'installation, en particulier si l'équipement est installé dans un emplacement de classe I, division 1 ou de classe I, zone 0.
- Les analyseurs de gaz en ligne comportent des pièces non métalliques incorporées dans le Boîtier de cet équipement qui peuvent générer un niveau de charge électrostatique capable de s'enflammer, dans certaines circonstances extrêmes. Par conséquent, l'équipement ne doit pas être installé dans un endroit où les conditions extérieures sont propices à l'accumulation de charges électrostatiques sur ces surfaces. Ceci est particulièrement important si l'équipement est installé dans un endroit de Classe I Division 1 ou de Classe I, Zone 1. En outre, l'équipement ne doit être nettoyé qu'avec un chiffon humide.
- L'analyseur de gaz en ligne n'est pas capable de résister à l'essai d'isolation de 500 V requis par l'article 6.3.12 de la norme UL/CSAC22.2 n° 60079-11. Il convient d'en tenir compte lors de l'installation de l'équipement.
- Lorsqu'ils sont raccordés à l'aide d'un système de conduits, les Boîtiers antidéflagrants de type Adalet de type XIHLX nécessitent des joints de conduits qui satisfont à l'exigence suivante :

| Taille du conduit | Joints de conduits |
|-------------------|--------------------|
| 1"                | Avec 18"           |
| 3/4"              | En option          |
| 1/2"              | En option          |

Lorsqu'ils sont raccordés à des presse-étoupes, ceux-ci doivent être du type antidéflagrant homologué pour la classe et la division applicables, ou pour la classe et la zone, le groupe de gaz, la classe T et la température ambiante. Ils doivent uniquement assurer l'étanchéité autour des conducteurs individuels. Des adaptateurs filetés supplémentaires ne doivent pas être utilisés.

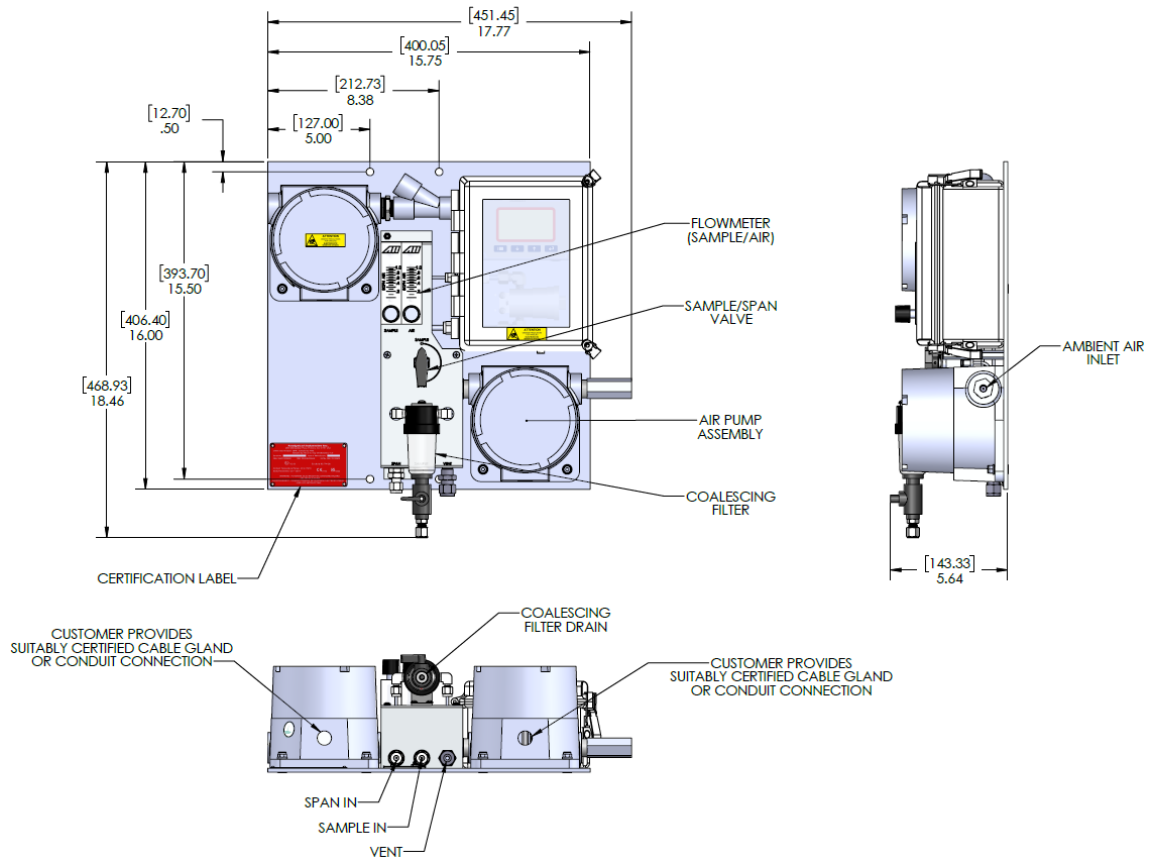
| SAUF INDICATION CONTRAIRE                                                            |  | NOM          | DATE     | ANALYTICAL INDUSTRIES INC. |
|--------------------------------------------------------------------------------------|--|--------------|----------|----------------------------|
| LES DIMENSIONS SONT EXPRIMÉES EN POUCES AVEC DES TOLERANCES                          |  | EW           | 07/10/23 |                            |
| FRACTIONNELLES: 1/16, 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 1                                |  | VERIFIÉ      |          |                            |
| DÉCAIMALES À DEUX PLACES: 0,05, 0,10, 0,15, 0,20, 0,25, 0,30, 0,35, 0,40, 0,45, 0,50 |  | ENG APPR.    |          |                            |
| INTERPRÉTATION                                                                       |  | COMMENTAIRES |          |                            |

| TITRE:                    |        |
|---------------------------|--------|
| ANALYSEUR DE GAZ EN LIGNE |        |
| SCHEMA DU SYSTEME         |        |
| TAILLE DWG. NO.           | REV    |
| <b>B</b> A-5593-EX        | 0      |
| ÉCHELLE:                  | POIDS: |
| FICHE 2 SUR 2             |        |

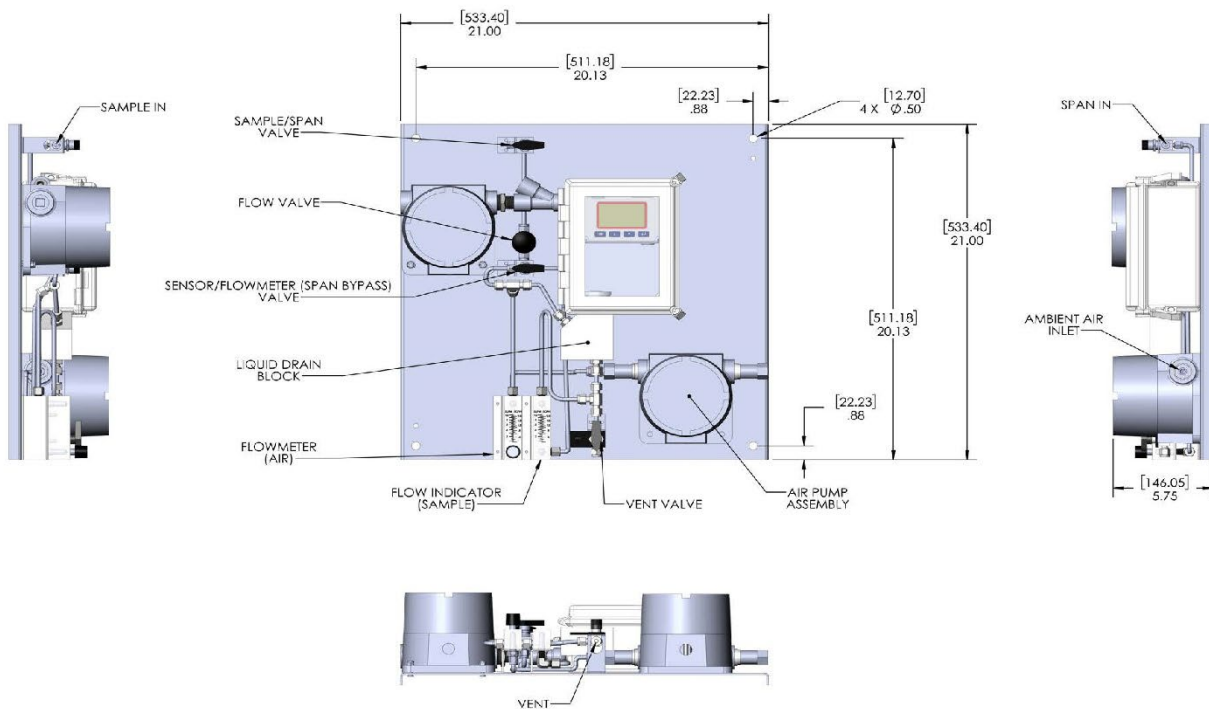


## Appendix E - Mounting Information

### GPR-7500 (A)IS (with optional air pump)



### GPR-7500 (A)IS LD (with Air Pump)



## Appendix F - Modbus register (AIS only)

### Modbus Register Map

| ADDR | REG | DESCRIPTION                  | R/W | VALID VALUES         | UNIT     | SCALE | FORMAT |         |
|------|-----|------------------------------|-----|----------------------|----------|-------|--------|---------|
| 0    | 1   | Gas concentration, high word | R   |                      | (Note 1) |       | S-INT  | Monitor |
| 1    | 2   | Gas concentration, low word  |     |                      |          |       |        |         |
| 2    | 3   | Calibration in progress      | R   | 0=no, 1=zero, 2=span |          |       | U-INT  |         |
| 3    | 4   | Range number                 | R/W | 1-5                  |          |       | U-INT  |         |
| 4    | 5   | Range mode                   | R/W | 0>manual, 1=auto     |          |       | U-INT  |         |
| 5    | 6   | Temperature                  | R   |                      | C        | x100  | S-INT  |         |
| 6    | 7   | Error Code                   | R   | (Note 2)             |          |       | U-INT  |         |
| 7    | 8   | Alarm 1 status               | R   | 0=inactive, 1=active |          |       | U-INT  |         |
| 8    | 9   | Alarm 2 status               | R   | 0=inactive, 1=active |          |       | U-INT  |         |
| 18   | 19  | Analyzer S/N, high word      | R   | 0-999999999          |          |       | U-INT  | Info    |
| 19   | 20  | Analyzer S/N, low word       |     |                      |          |       |        |         |
| 20   | 21  | Sensor S/N, high word        | R   | 0-999999999          |          |       | U-INT  |         |
| 21   | 22  | Sensor S/N, low word         |     |                      |          |       |        |         |
| 22   | 23  | Restart Analyzer             | W   | 255                  |          |       | U-INT  |         |

Note 1: If the lowest range is PPM, UNIT=PPM, SCALE=x100. If lowest range is %, UNIT=%, SCALE=x10 Note 2:

|       |                              |
|-------|------------------------------|
| bit 0 | gas concentration over range |
| bit 1 | amp over range               |
| bit 2 | temperature out of range     |
| bit 3 | amp calibration error        |
| bit 4 | battery low                  |
| bit 5 | date not set                 |

### Modbus Specifications

**Addressing:** Slave, 1 to 247\* **Broadcast:** No

**Baud Rate:** 9600, 28800, 57600, 115200, 230400 BPS

**Parity:** EVEN (1 stop bit), ODD (1 stop bit), NONE (2 stop bits)

**Mode:** RTU

**Electrical:** RS485 2-wire cabling (half-duplex), up to 256 devices without repeater

**Connector:** Screw Terminals

**Supported Functions:** Read Holding Registers (Function 3), Write Single Register (Function 6)

**Valid Register Addresses:** 0-22

**Response Rate:** <1 second (MODBUS master requests should be sent fewer than one request per second)

*\*It is imperative that each device on a network be assigned a unique address in order for the network to function properly.*



## Appendix G - Menu Displays

### MAIN MENU

- RANGE=AUTO
- CALIBRATION
- ALARMS=ON/OFF
- SYSTEM
- INFO

### RANGE

- AUTO
- 0-20 PPM
- 0-50 PPM
- 0-100 PPM
- DEF RANGE=OFF

### DEFAULT RANGE

- OFF/ON
- 0-20 PPM
- 0-50 PPM
- 0-100 PPM
- AUTO

### ALARMS

- ALARMS=ON
- ALARM 1
- ALARM 2
- LATCH VALVE
- TONE ON/OFF

### ALARMS 1

- ON/OFF
- SETPOINT
- MODE
- DELAY
- LATCHING
- FAILSAFE

### SYSTEM

- SECURITY
- CALIBRATE 0-1V
- 4-20mA RANGE
- SIGNAL AVG=1
- CLIPPING=ON/OFF
- TIME=00:00
- DATE FORM=MM/DD/YYYY

### SECURITY

- LOCK NOW
- SET PASSCODE
- AUTO LOCK=OFF

### CALIBRATE 4-20 mA

ADJUST OUTPUT TO 4 mA  
REF: 0

▲ ▼ EDIT

≡ ABORT

↵ 20 mA

### SYSTEM

- DATE=01/01/2000
- RANGE SCALE=1
- UNIT ID=
- FACTORY RESET

### MODBUS

- SLAVE ID=001
- BAUD RATE=9600
- PARITY
- RESET COUNTERS
- TOTAL
- ERRORS
- EXCEPT

### INFO

UNIT ID=  
ANA SN=000000000  
PCB SN=000000000  
FIRM=S1013 1.07  
CONFIG=PORT 02-1

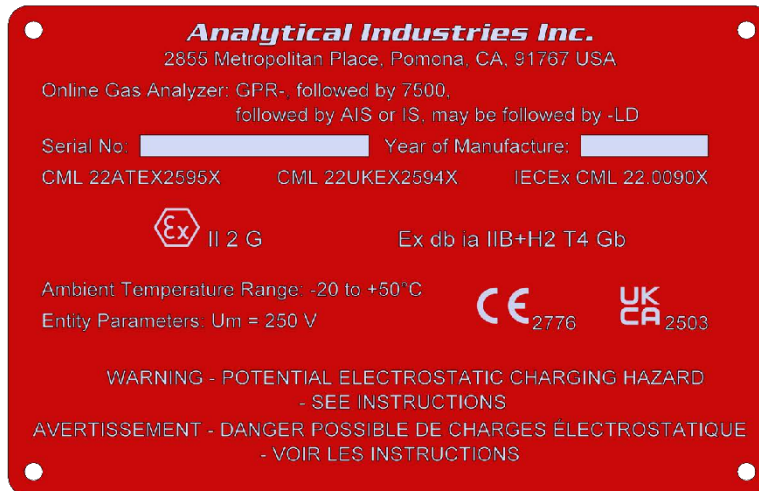
NOTE: The menu structure may vary depending on your configuration.

## Appendix H - Spare Parts

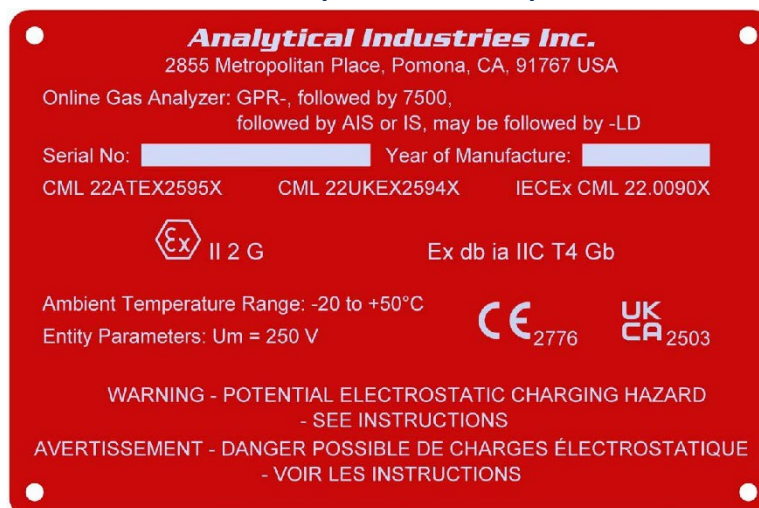
| Sensors                  | Description                                                                                                       |
|--------------------------|-------------------------------------------------------------------------------------------------------------------|
| OSV-72-7H                | ppm H <sub>2</sub> S sensor                                                                                       |
| OSV-72-7H-LD             | ppm H <sub>2</sub> S sensor for analyzers with liquid drain system                                                |
| OSV-72-7HH               | ppm H <sub>2</sub> S sensor optimized for He and H <sub>2</sub> background gases                                  |
| OSV-72-7HH-LD            | ppm H <sub>2</sub> S sensor for gases with < 0.5 % CO <sub>2</sub> presence and analyzer with liquid drain system |
| Consumable Items         | Description                                                                                                       |
| FLTR-103                 | Coalescing filter element (sampling system only, not LD)                                                          |
| Analyzer Hardware Spares | Description                                                                                                       |
| B-2762-A-3-18            | Housing sensor top assembly stainless steel                                                                       |
| CHEM-1008-2              | H <sub>2</sub> S scrubber material (sampling system only, not LD)                                                 |
|                          |                                                                                                                   |

## Appendix I - Rating Plates

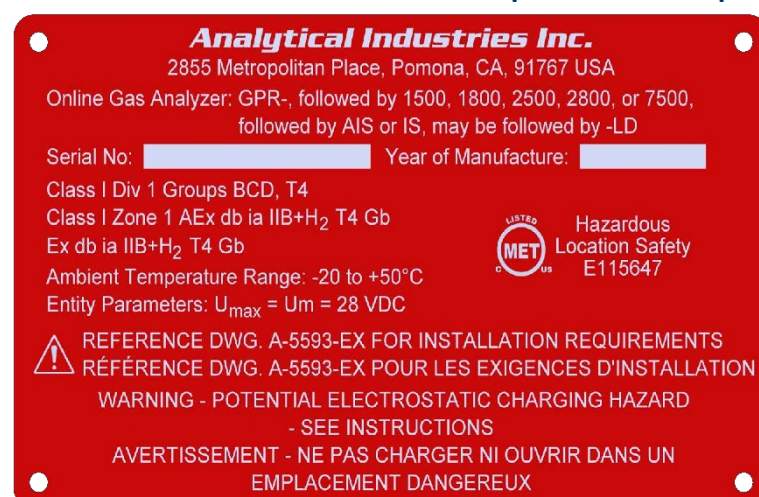
### With Optional Air Pump



### Without Optional Air Pump



### North America: With or Without Optional Air Pump



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## Appendix J - Quality, Recycling, and Warranty Information

Aii is part of the DwyerOmega (DO) Group. The DO Oxygen group of companies - Aii, Ntron and SST - comply with applicable national and international standards and directives.

Full information can be found on this website

<https://aai1.com>

The compliance site contains information on the following directives:

- ATEX (equipment for explosive atmosphere, Europe)
- CE
- IECEx
- REACH (Registration, Evaluation, Authorization, and Restriction of Chemicals)
- Recycling policy
- RoHS (Restriction of Hazardous Substances in electrical and electronic equipment)
- UKCA
- WEEE (Waste Electrical and Electronic Equipment recycling).

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