ARA-X4 Multi Gas Detector

Instrument User Manual V1.0

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Safety

Legal Notices Regarding the Safe Operation of Equipment

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- To the extent permitted by law, ION Science Ltd shall not be liable to any person or entity for any loss or damage which may arise from the use of this manual.
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Symbols

	**WARNING!** Risk of injury or death.
	**CAUTION** Risk of damage to equipment.
	**INFORMATION** Useful information, or hint about usage.
	**RECYCLING** Recycle all packaging.
	**WEEE REGULATIONS** Ensure that waste electrical equipment is disposed of correctly.

Warnings, Cautions and Information Notifications

The following warnings, cautions and information notifications apply to the product described in this manual.

	This equipment must be operated and serviced by qualified personnel only. Read this manual and follow all instructions to ensure safe use.
	Do not charge the battery in hazardous locations.
	Replacing components may impair Intrinsic Safety.

Some materials can permanently damage the sensor. Protect the LEL sensor from exposure to lead compounds, silicones, and chlorinated hydrocarbons.

Before daily use:

Make sure the sensor and audio ports are not blocked.

Perform the self-test to ensure the display, alarms and vibration are operating.

Check the message on the LCD display to view the result of the self-test.

Ensure that the O2 Sensor is calibrated at least every 30 days in a clear air environment. The toxic gas sensors (CO, H2S, SO2 & HCN) and LEL sensor must be calibrated every year. See the Calibration section.

Perform a bump test at least once every day. In addition, always perform a bump test if the detector has been subject to physical impact, liquid immersion, an over limit alarm event, or change of ownership, or at any time you think the detector is not working correctly.

Perform a bump test by exposing the detector to a concentration of gas that exceeds the low alarm set points. Recommended gas concentrations are:

- H2S: 25 ppm,
- CO: 100 ppm,
- SO2: 10 ppm,
- HCN: 10 ppm,
- O2: 18%,
- LEL 50%.

If the device fails the bump test, perform a calibration and retest. If the device still fails after a calibration, contact ION Science Ltd.

The combustible sensor is factory calibrated to 50% LEL methane. When monitoring other LEL gas, calibrate the sensor with the appropriate gas.

The ARA-X4 is a multi-gas detector, not a measuring device.

Read the relevant parts of this manual carefully before replacing battery, gas filter or sensors. See Replace Components.

Use only an ION Science Ltd approved battery. Using unapproved batteries can risk explosion or fire.

If you suspect any malfunction or have any technical problems, contact ION Science Ltd.

Do not place the ARA-X4 close to any hot surfaces.

Ne pas placer le produit à proximité d'une surface chaude.

The ARA-X4 has been designed and certified Intrinsically Safe.

Specific Conditions of Use

- The equipment shall only be used in an area of at least pollution degree 2 as defined in IEC/EN 60664-1
- Use only with the specified sensors. Please refer to the sensors list at the back of this manual.
- Charge the battery only in a non-hazardous location with an ambient temperature range of 0 °C to +45 °C.

Disposal

The ARA-X4 does not include any toxic materials. However, if it has been contaminated by toxic materials, then exercise due care and follow the appropriate regulations when disposing of it.

Always adhere to local regulations and procedures when disposing of the device.

ION Science Ltd offers a take back service. Contact ION Science Ltd for more information.

RECYCLING

This device contains a lithium-ion battery. Dispose of lithium cells immediately. Do not disassemble the battery and do not dispose of it in a fire. Do not mix with the solid waste stream. Spent batteries must be disposed of by a qualified recycler or hazardous materials handler.

WEEE REGULATIONS

Ensure that electrical equipment is disposed of correctly.

Product Overview

The ARA-X4 is a portable multi gas detector.

Getting Started

Turning on the ARA-X4

Press and hold the left-hand button for 3 seconds to activate the ARA-X4. The ARA-X4 emits a starting sound and starts sensor warm up. A progress bar indicates warm up progress.

Ensure the ARA-X4 is fully charged prior to the first use.

Please note that the ARA-X4 batteries are shipped with 30% battery charge to adhere to IATA shipping regulations relating to the shipment of li-ion batteries.
Refer to Charging the battery.

ARA-X4 requires a 1-minute warm-up time prior to use.

Self-test

After activation and warm up, ARA-X4 performs a self-test.

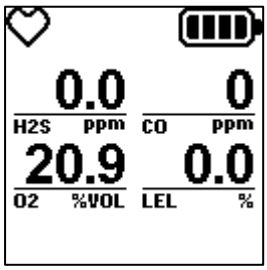
The self-test has these steps:

- Light the green LEDs for 1 sec.
- Light the red LEDs for 1 sec.

- Light the Health LED for 1 sec.
- Light the green backlight for 1 sec.
- Light the red backlight for 1 sec.
- Operate the buzzer for 1 sec.
- Operate the vibrator for 1 sec.
- Perform sensor test.
- Perform auto-zero (if configured to do so).

You must check that each step of the self-test is working correctly.
After the self-test is completed, auto-zero, bump test or calibration will start if configured to do so.
NOTE: Follow any instructions on the LCD display.

Main Display



The displayed sensors may differ depending on the model sensor configuration.

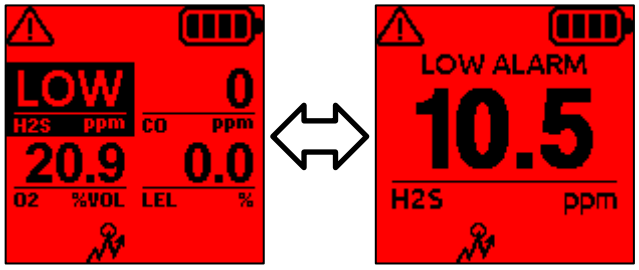
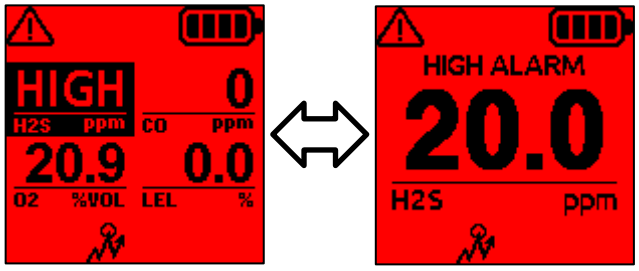
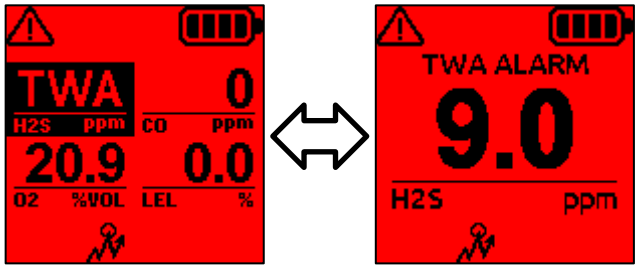
Icons

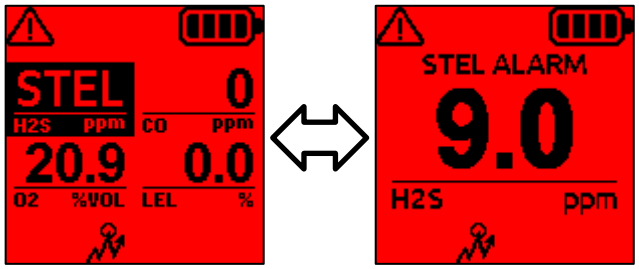
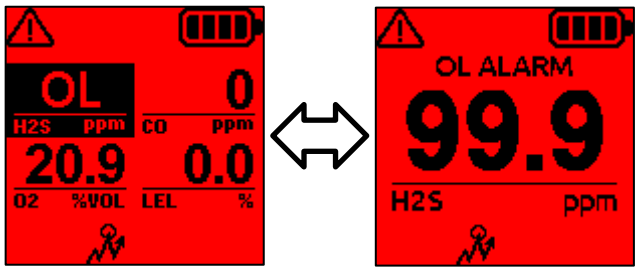
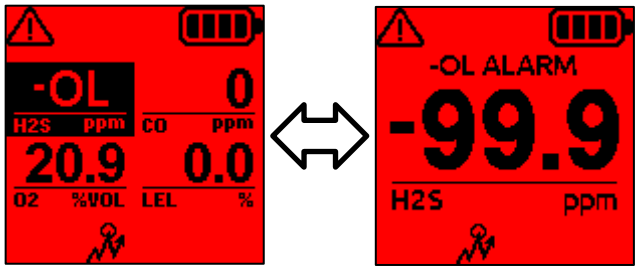
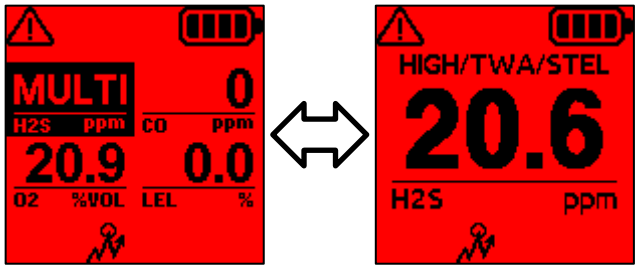
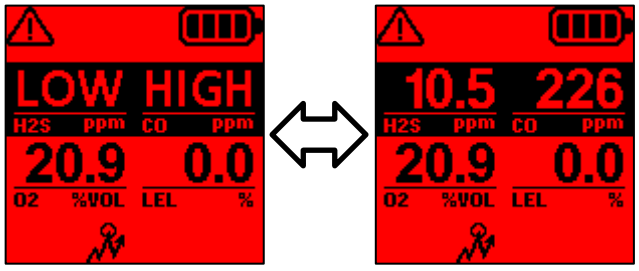
Name	ICON	Description
Normal running		Health icon blinks at 1 second intervals
Warning		An error or reminder has occurred
Stealth		Stealth mode is active
Logging		ARA-X4 is logging data
Battery		Full (80% to 100% charge)
		60% to 80% charge
		40% to 60% charge

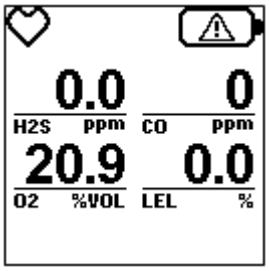
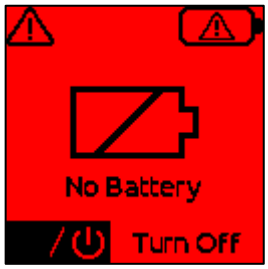
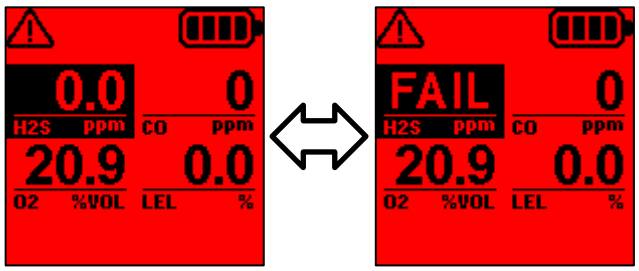
		15% to 40% charge
		Empty (5% 15% charge)
		Charging
Bump		Bump test is overdue
CAL		Calibration is overdue
Peak		Visible if there are peak values

Alarms

When the ARA-X4 detects gases over the alarm threshold, the backlight, buzzer, and LEDs activate. The display alternates every two seconds between the main screen with the alarm type, and the fully expanded screen.

Alarm Type	Display	Description
Low		Backlight red Yellow LED flash (2/sec) Buzzer on (1/sec) Vibrator on (1/sec)
High		Backlight red Red LED flash (4/sec) Buzzer on (2/sec) Vibrator on (2/sec)
TWA (Time Weighted Average)		Backlight red Yellow LED flash (2/sec) Buzzer on (2/sec) Vibrator on (1/sec)

STEL (Short Term Exposure Limit)		Backlight red Red LED flash (2/sec) Buzzer on (2/sec) Vibrator on (1/sec)
OL (Over limit)		Backlight red Red LED flash (4/sec) Buzzer on (2/sec) Vibrator on (2/sec)
Minus OL (Under limit)		Backlight red Red LED flash (4/sec) Buzzer on (2/sec) Vibrator on (2/sec)
Multi		Backlight red Red LED flash (4/sec) Buzzer on (2/sec) Vibrator on (2/sec) All activated alarm types on expanded screen.
More than 2 sensors Alarm active		Backlight red Red LED flash (4/sec) Buzzer on (2/sec) Vibrator on (2/sec) Instead of expanded screen, it displays gas concentrations.

Low Battery (Under 20%)		Beep shortly every 12secs
Critical Battery		Backlight red Red LED flash (4/sec) Buzzer on (2/sec) Vibrator on (2/sec) Turn off within 2 minutes or by holding power button.
Sensor Failure		First 10 sec: Backlight red Red LED flash (2/sec) Buzzer on (2/sec) Vibrator on (1/sec) After 10 sec: Red LED Flash (1/4sec)

Safe Mode

In Safe mode, the SAFE icon replaces sensor readings unless an alarm is triggered. This removes the need for users to assess and interpret the information from the sensor. This may be preferred by some users.

You can configure SAFE mode by connecting to ARA-X Manager via the ARA-X Docking Station or IR Link, or directly via the device menu.

Turning on the Backlight

Press the right-hand button to activate the ARA-X4 LCD backlight.

Turning off the ARA-X4

To turn off the ARA-X4, press and hold the left-hand button. The message ***Turn off*** is displayed, followed briefly by a 3-2-1 countdown. This is accompanied by vibration and an audible alert. The LCD goes blank when the instrument is off. If you release the button at any point before the LCD goes blank, the device stays on.

Flip Screen

The ARA-X4 has a flip-screen feature, which provides users with the option to change the orientation of the displayed information. The device can be configured via the Device Settings screen or ARA-X Manager software to either:

Auto flip screen:

- This flip screen option is recommended for users who prefer to attach the device to their clothing. With this option, the screen automatically flips if you hold the ARA-X4 at a 135-degree angle for 1 to 2 seconds. The screen goes back to normal if you hold the ARA-X4 vertically.

Always flip screen:

- The screen remains flipped unless the ARA-X4 is reconfigured by the user.

Manual flip screen:

- The left-hand button can be configured via the Device Settings menu, or the ARA-X Docking Station, to manually change the orientation of the display on button press.

Flip screen disabled:

- The flip screen functionality will be switched off. The device will use the standard screen orientation.

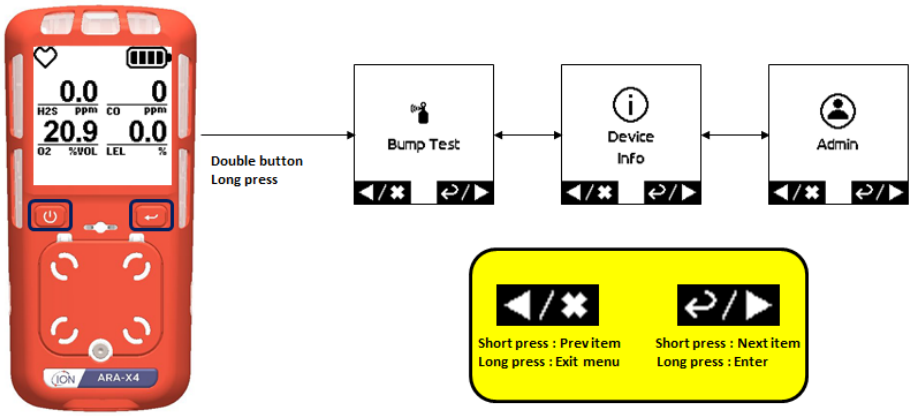
Menu Mode

When in Menu mode, ARA-X4 displays an icon-based user interface at the bottom of the LCD.

In Standard Menu Mode, you can access the following options:

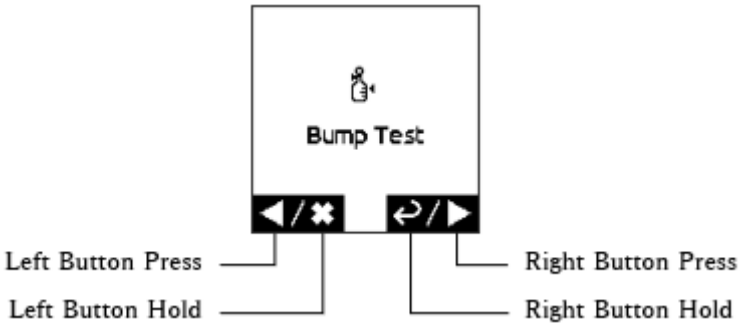
- Bump Test
- Device Info

You can also select to access the Admin Menu, which requires a 4-digit password. Refer to the 'Enter Password' section of this manual.



In Admin Menu mode, you configure the device, check its status, or perform maintenance, using these options:

- Bump Test
- Calibration
- Sensor Configuration
- Alarm Settings
- Device Settings
- Language
- Diagnostics
- Device Info
- Logging



This table describes the icons.

Icon	Description	Icon	Description
◀	Go to previous item	▶	Go to next item
✖	Exit	↵	Enter/Select/Change option
+	Increase number	−	Decrease number
0 1...	Increase number (at Enter Password screen)		

To activate the left or right icon, press the left-hand or right-hand button once.

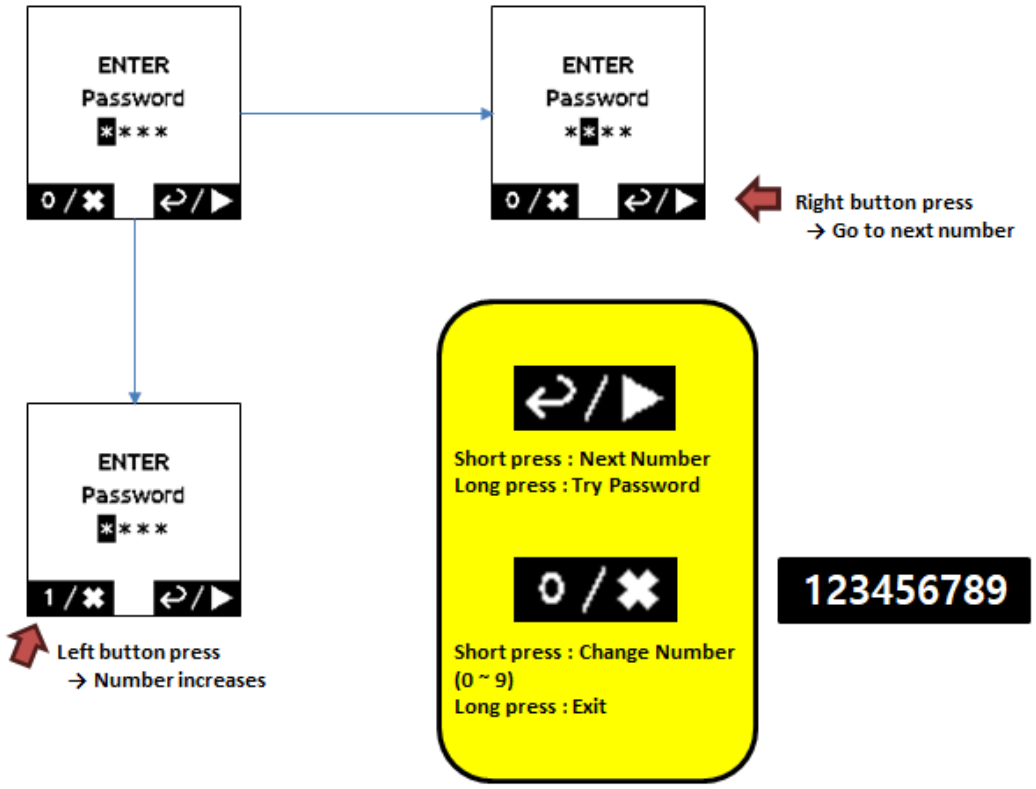
To activate the inner left and right icons, press and hold the left-hand button or the right-hand button as appropriate.

Enter Password

When entering Admin Menu mode, a password screen will appear. You must enter the 4-digit password to access Admin Menu mode.

The default password is 0000. We recommend that an authorised person changes the password, via IR Link or Menu mode, before issuing the device to a user.

Press and hold both buttons on the main display to open the Enter Password screen.

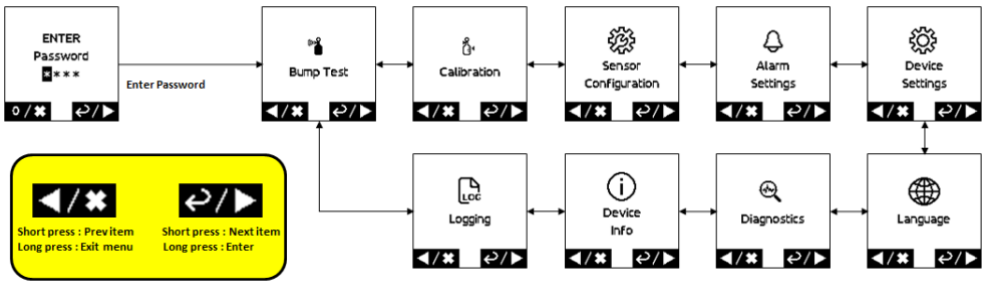


Each time you press the left-hand button, the highlighted number increases by one, from zero to nine and then back to zero. When you have selected the required number, press the right-hand button to move to the next number.

When you have selected all four digits of the password, press and hold the right-hand button to submit the password.

If the password is incorrect, the ARA-X4 beeps five times. The device returns to the Standard Menu mode in which only Bump Test and Device Info can be selected. Enter the correct password to display the full menu.

In Admin mode, all modes provided by the ARA-X4 can be accessed.



Bump Test Menu

This menu has these options:

- Bump Due
- Bump Test Start

Bump test due shows the number of days until the next bump test is due for each sensor.

If a bump test is due, the health warning (⚠) icon and the bump test reminder icon ( )are displayed on the main screen. The Bump Due screen indicates the sensors for which a bump test is overdue.

To start a bump test, select the option and press and hold the right-hand button.

NOTE: You can run a bump test at any time. We recommend that you run a bump test once a day and after the device suffers possible damage, such as from an impact.

See Performing a Bump Test section for the bump test procedure.

Calibration Menu

This menu has these options

- Calibration Due
- Quick Zero Start
- Manual Calibration Start

Calibration Due shows the number of days until the next calibration is due.

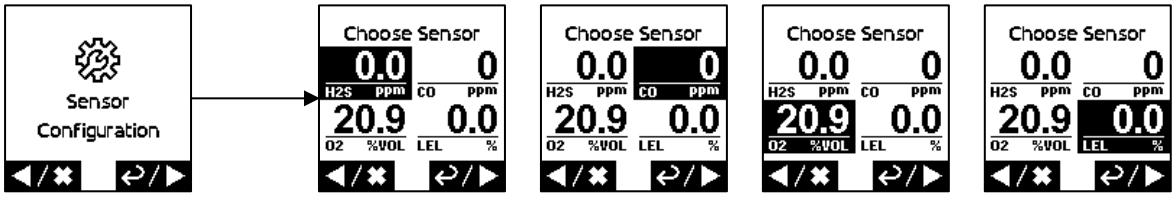
If calibration is due, the health warning (⚠) icon and the calibration reminder icon ( ) are displayed, on the main screen, for each sensor.

To start the quick zero process or a calibration, select the required option and press and hold the right-hand button.

See Calibrating Sensors for the calibration procedure.

Sensor Configuration Menu

When you enter the Configuration menu, choose the sensor to configure. Press the right-hand button to move from sensor to sensor. Press and hold the right-hand button to select the sensor.



You can configure these options for the sensors:

- Enable/Disable sensor.
- Start-up Zero: Enable/Disable.
- Alarm Mode: Latched/Auto reset.
  In Latched mode, the alarm continues after gas concentrations have dropped below high or low alarm. In Auto reset mode, the alarms are reset when the concentrations drop below the alarm limits.

- Measurement Gas (LEL pellistor sensor only).
- LEL Display Unit (LEL sensor only): %LEL/%Vol.
- Next Bump Due.
- Next CAL Due.

Alarm Settings Menu

This menu has these alarm volume settings.

Low alarm	
High alarm	
TWA alarm	
STEL alarm	

Device Settings Menu

This menu has these options:

- Set date and time
- Display Settings
    - Display Mode:
        - Safe mode
        - Standard mode
    - Backlight Level
        - Dark
        - Bright
    - Flip Screen:
        - Auto
        - Always Flip
        - Disabled
- Left-button quick access – please refer to Quick Access Buttons section below
- Right-button quick access - please refer to Quick Access Buttons section below
- Stealth mode:
        - On
        - Off
- Confidence type:
        - Disabled
        - LED

    - Beep
    - LED+Beep

The confidence type gives you an indication that the device is working correctly.

- Change Password
- Factory Reset

Quick Access Buttons

The left-hand button and the right-hand button have these defaults when you press them:

- Left: Datalog On
- Right: None

You can change these defaults to one of several quick-access options for each button. Press and hold the button and select one of these options:

- Datalog On
- Manual Flip
- Quick Zero
- Bump Test
- Calibration
- Self-test

Language Menu

ARA-X4 supports these languages.

- English
- French
- German
- Dutch
- Spanish
- Italian
- Portuguese
- Chinese

Diagnostics Menu

This menu displays these values and options:

- Current Errors
- TWA Value
- STEL Value
- Reset TWA/STEL?
- Peak Value
- Peak Clear (displayed only if there is a peak value)
- Manual Selftest Start?

Device Info Menu

This menu displays this information about the device:

- Firmware version
- Serial Number
- Model
- User ID

Logging Menu

This menu has these options:

- Current stored data logs
- Clear Datalogs?
- Change Logging type:
    - Manual on / off
    - Always on
    - On event
- Datalog interval
- Start Logging? or Stop Logging?, as appropriate.

Performing a Bump Test

Perform a bump test regularly to test sensors and alarms. You can specify a period, in days, after which ARA-X4 counts down to the next due bump test. This does not prevent you running a bump test at any other time, such as when the device suffers an impact. We recommend that you do a bump test once a day.

Before starting Bump test, ensure you are in a clean, normal atmosphere (20.9% v/v O2) that is free of hazardous gas.

1. Select one of these options:

- Multi Bump – to test all sensors simultaneously
- Single Bump – to test sensors separately

2. If you select Single, select the sensor to test.
3. The device will first run through a zeroing sequence. Please ensure that the ARA-X4 is in clean air for this step.
4. Once the zero has completed, connect the calibration cap to the supplied tubing and attach it to the gas plate, then apply gas to the sensors.

During the test, the screen displays sensor readings. We recommend not to interrupt the test, however, it is possible to abort the bump test by following the on-screen instructions.

If the sensor detects sufficient gas (80% of test gas concentration), the bump test is passed. The result of the test is displayed on-screen.

Check the result and hold the right button to go back to main display.

NOTE: The concentration of gas that the device must detect to pass the test can be configured by ARA-X Docking station or IR Link. The default is 80% of test gas concentration.

Zeroing Sensors

If the Auto-zero option is enabled, ARA-X4 starts to zero sensors automatically when you switch it on. You can also start Quick Zero from the Calibration menu. When zeroing sensors, the device must be in a normal atmosphere (20.9% v/v O2) where there is no hazardous gas.

When zeroing starts, the screen displays current sensor readings.

After several seconds, the results are displayed. If there are no failures, the screen goes back to the main display after 3 seconds.

Calibration Procedure

To maintain sensitivity of the device, we recommend that you calibrate the ARA-X4 regularly. You can specify a period, in days, after which ARA-X4 counts down to the next due calibration. You can perform a manual calibration from Menu mode.

Before starting calibration, you must be in a normal atmosphere (20.9% v/v O_2) where no hazardous gas is present.

1. Select Manual CAL Start and choose one of these calibration options:

- Multi calibration
- Single calibration

2. If you choose Single calibration, choose the sensor to calibrate.
3. If you choose Multi calibration, use a multi gas that covers all installed sensors.

   The ARA-X4 begins by zeroing the sensor. When Zero Start is displayed, press the right-hand button to start zeroing. The procedure is same as for auto-zero or quick zero. Refer to Zeroing Sensors.
4. If the device passes zeroing, ***Apply gas*** is displayed on-screen. Connect the calibration cap to the tubing and attach it to the gas plate.

   The sensor reading is displayed if ARA-X4 detects gas. Do not interrupt calibration.
5. After a few minutes, the calibration result is displayed. Press and hold the right-hand button to go back to the main display.

We recommend not to interrupt the calibration routine, however, it is possible to abort the calibration by following the on-screen instructions.

Calibration gas concentrations

CO	H2S	O2	LEL	HCN	SO2
100 ppm	25 ppm	18% v/v	50% (CH4 2.5%)	10 ppm	10 ppm

Logs

The ARA-X4 stores a test log, alarm events, and datalogs. You can use the IR Link to download the logs to ARA-X Manager.

Bump Test Log/Calibration Log

Whenever a bump test or calibration is performed, a bump or calibration log is stored in data memory. The ARA-X4 can save a maximum of 50 bump logs and 50 calibration logs.

Event Log

If an alarm event occurs, the ARA-X4 monitors the peak level and duration. This information is saved as an event log. The ARA-X4 can save a maximum of 50 event logs.

Datalog

The ARA-X4 saves its real-time readings and status in data memory. The datalog frequency (1 to 240 seconds) can be set with the Logging option in the menu, or by connecting to ARA-X Manager via IR Link or ARA-X Docking Station. The ARA-X4 can save a maximum of 60,000 datalogs.

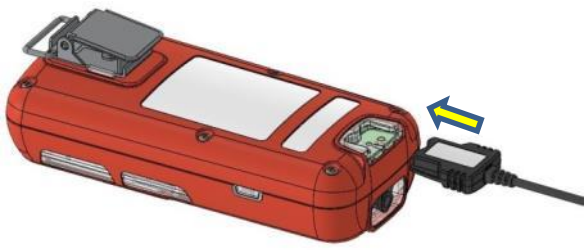
This information is saved in datalogs:

- Time & Date
- Sensor readings
- Alarm status
- Error status
- Temperature
- Battery voltage

Maintenance

Charging the Battery

Connect the supplied 6VDC adapter to the charging terminal located on the bottom side of the device.



- Charging - Plug the charging connector all the way.
- Remove - Unplug the charging connector to ARA-X4.

Not Charging

Charging and suppling power

– RED charge LED on

▪ The battery charging requires up to 6 hours from a fully depleted battery.

▪ The RED LED may remain on after charging for more than 6 hours. This is not a charging problem. It means that ARA-X4 is operating on an external power.

1) When removing the charging cable, do not pull on the cable itself, as it may become damaged. Please pull on the charging connector, not the cable.

2) Be careful to prevent an electrical short at the contact part of the unused charging cable. When not charging, turn off the power of the 6VDC adapter.

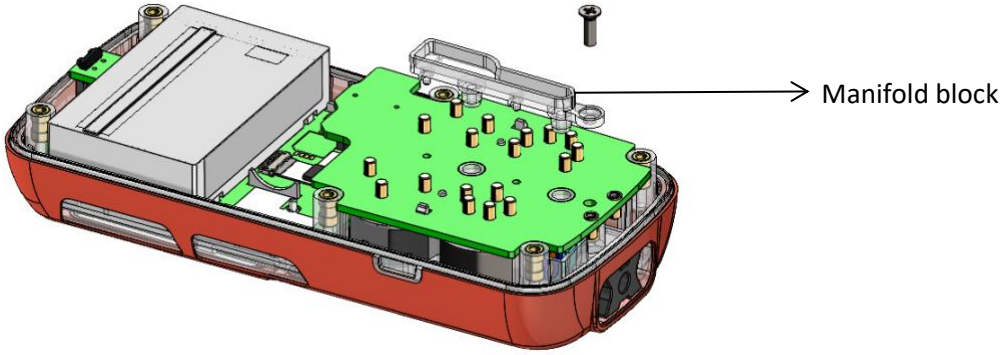
Replacing sensors

NOTE: Use only sensors provided by ION Science Ltd. Users can replace equivalent sensor types only.

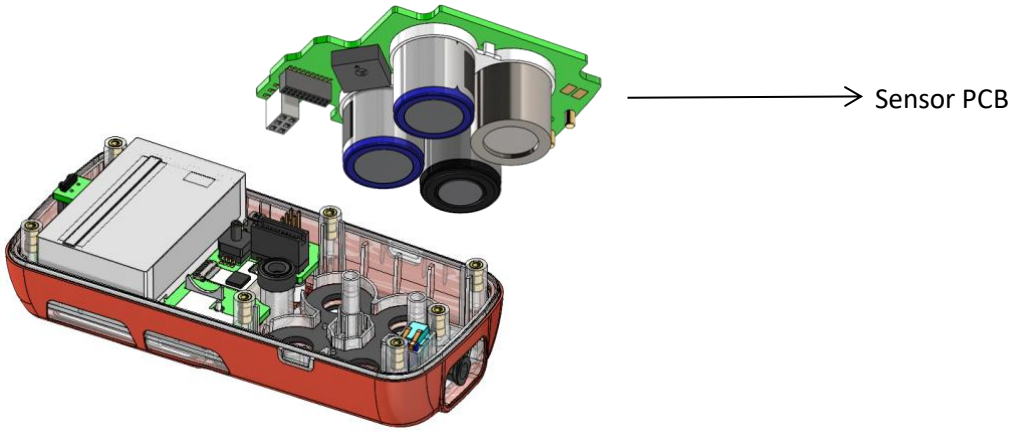
Replace sensors only in a non-hazardous environment.

1. Turn off the device.
2. Unscrew the 6 pan head machine screws of the rear case and separate the cases.

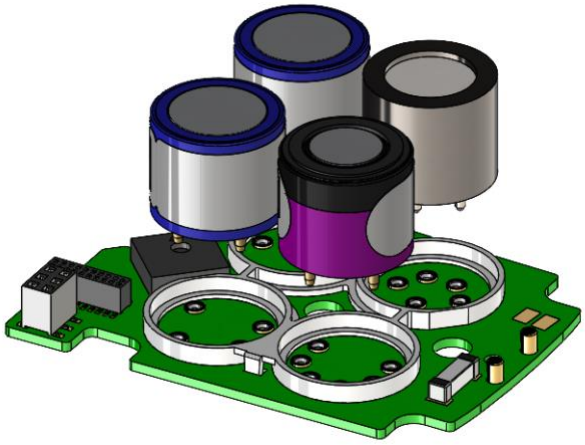
3. Unscrew the single countersunk machine screw on the manifold block.



4. Disconnect the sensor PCB from the main PCB.



5. Separate the sensor to be replaced from the sensor PCB.



6. Insert the new sensor into the sensor PCB in the correct orientation.

7. Carefully connect the sensor PCB equipped with the new sensor to the main PCB.

8. Install the manifold block with the tube.

9. Reinstall the single countersunk machine screw to the manifold.

10. Fit the rear case.

11. Tighten the rear case with the 6 pan head machine screws.

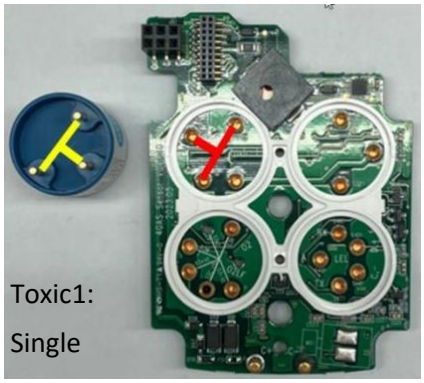
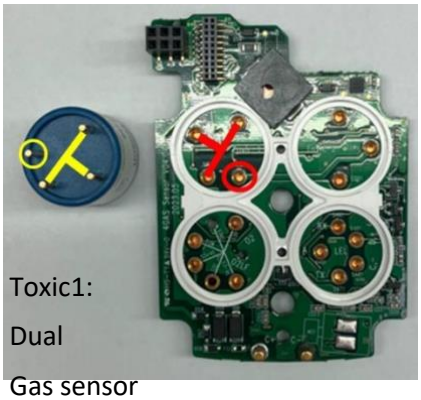
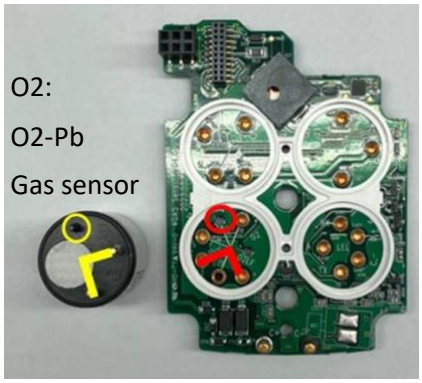
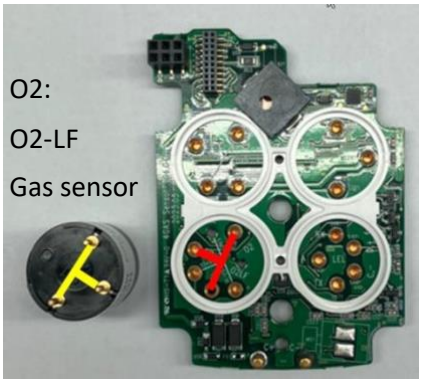
12. Turn on the instrument.

13. Calibrate the sensor before use. The sensors require a warm-up time after replacement, to stabilise the sensors before calibration. The device should be left running for 1 hour (CO, H2S, DualTox, HCN, SO_2, LEL) or 8 hours (O_2 sensors) prior to calibration.

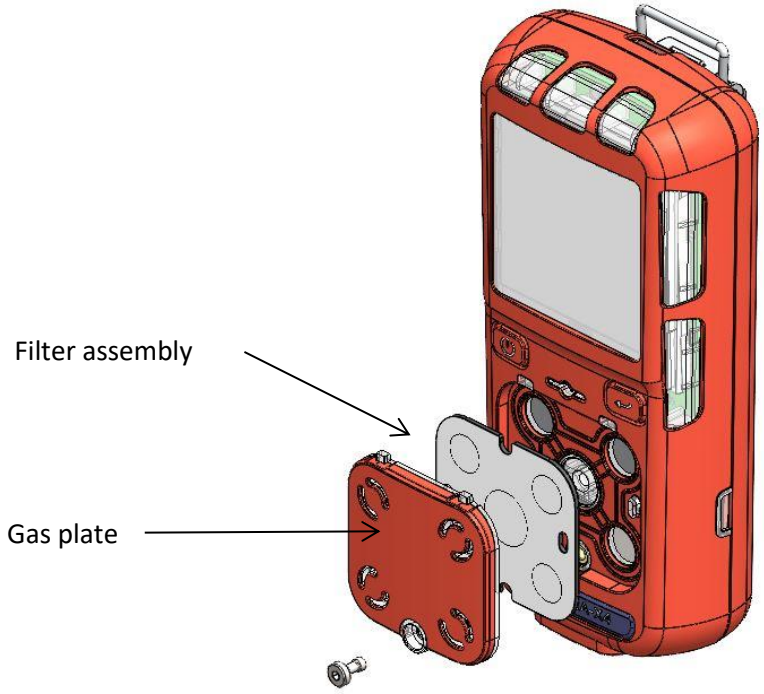
Check the coupling and assembly position of the gas sensor.

Be careful not to damage the parts of the PCB when replacing the gas sensor.
Do not overtighten the captive screw.
The replaced sensor must have a warm-up time to stabilize the sensor
The tightening torque must comply with the following specifications: 6 kgf·cm for the rear case and 4 kgf·cm for the manifold

Orientation of the Toxic1 and O2 Gas Sensors

 Toxic1: Single Gas sensor	 Toxic1: Dual Gas sensor	The Toxic 1 sensor can be single or dual, with different pin connections. The dual sensor has a 4-pin connector. Ensure that you orient the sensor correctly when you replace it. In these images, the red and yellow Ts show the correct orientations.
 O2: O2-Pb Gas sensor	 O2: O2-LF Gas sensor	O2 sensors are applicable to both O2-Pb and O2-LF types. Ensure that you orient the sensor correctly when you replace it.

Replacing the Filter



1. Use a 2mm hex wrench, to unscrew the cover bolt.
2. Separate the gas plate.
3. Remove the filter assembly.
4. Insert a new filter assembly.
5. Assemble the gas plate.
6. Tighten the cover bolt.

Check that there is no contamination or damage to the filter assembly.
Be careful not to damage the filter when assembling the gas plate.

ARA-X Manager PC Software

The ARA-X Manager application is used to connect to and maintain the ARA X Docking Station and ARA-X4 devices.

The ARA-X Manager enables you to perform maintenance and configuration tasks on the ARA-X4 and docking station, to download data files, and update the firmware of ARA-X4 and ARA-X Docking Station. You can also upgrade the firmware of the docking station remotely using the provided USB memory stick when not directly connected to ARA-X Manager.

You can use these methods to connect the ARA-X4 to the PC on which ARA-X Manager is installed:

- Via the IR Link accessory
  A USB cable connects the IR Link accessory to the PC. An infrared connection links the ARA-X4 to the IR Link accessory.
- With the ARA-X Docking Station
  You place the ARA-X4 in the docking station, which is connected to the PC by a cable.

You can use the docking station without connecting it to the ARA-X Manager. Refer to the ARA-X Docking Station User Manual.

Download the ARA-X Manager software and latest firmware file from ionscience.com.

Overview

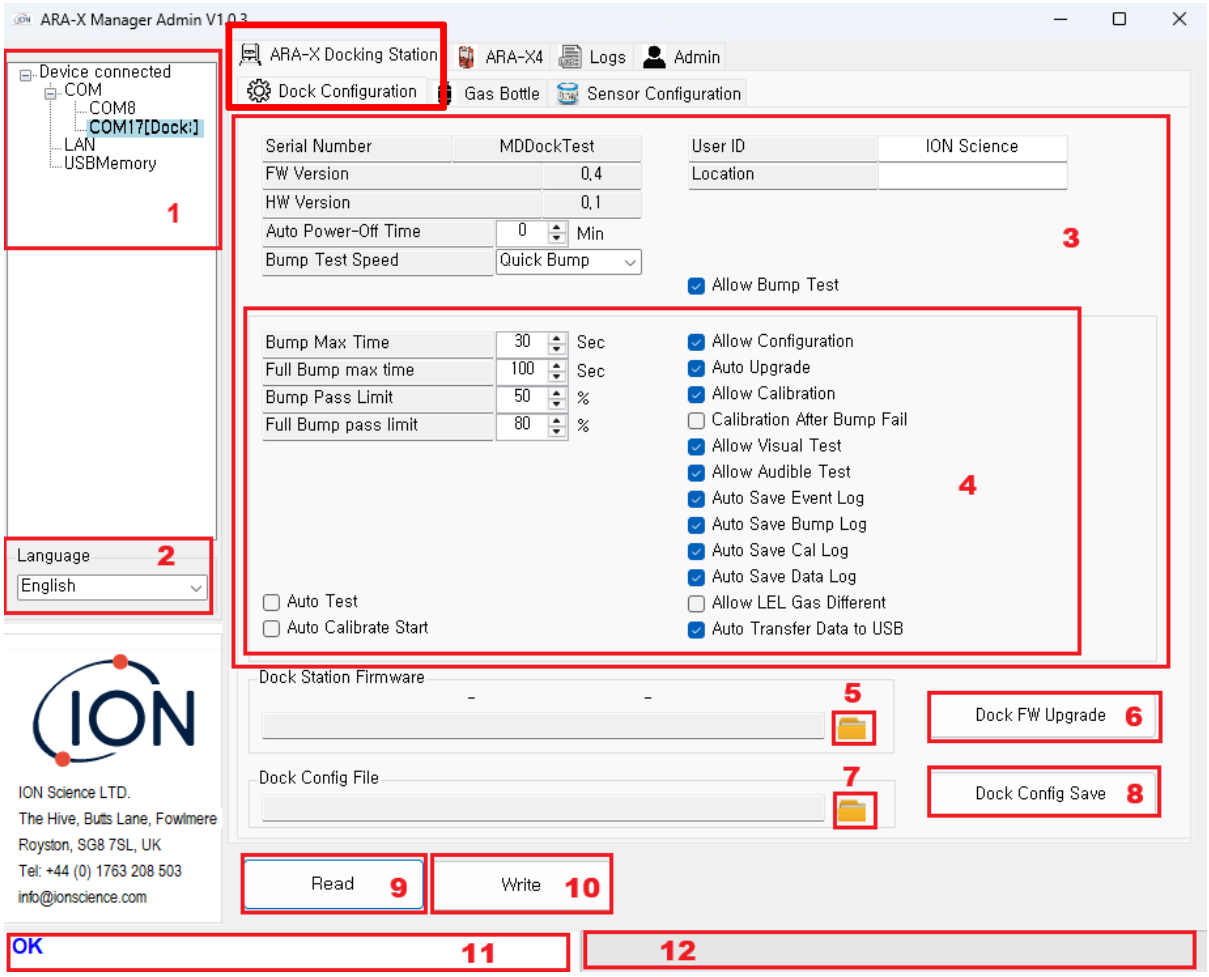
The ARA-X Manager has two top-level tabs: ARA-Docking Station and ARA-X4.

The images and tables below describe the layout and purpose of the available fields.

In the tables, all options marked “Read only”, automatically reflect the settings on the connected ARA-X and cannot be updated. Options marked “User (Read only), Admin (Read/Write)” can be updated by an Admin user.

ARA-X Docking Station Configuration

In ARA-X Manager, click the ARA-X Docking Station tab.



1	**Device connected**	**When connecting to ARA-X Manager, you must select your method of connection to the PC:** **Com** : Device connected to serial port (ARA-X4 or ARA-X Docking Station). **LAN** : Device connected to LAN port (Docking Station only) **USBMemory**: USB Memory inserted into PC.
2	**Language**	**SW Language** : English, German, French, Spanish, Italian, Portuguese, Chinese, Dutch
3	**Dock configuration**	**Serial Number**: Dock Serial Number (Read only). **FW (firmware) version**: Dock FW version (Read only). **HW (hardware) version**: Dock HW version (Read only). **User ID**: User (Read only), Admin (Read/Write). **Location**: Where the dock is located. User (Read only), Admin (Read/Write). **Allow Bump Test**: Bump test allowed. **Auto Power-Off Time** : Automatically turns off power when idle for a specified period of time. User (Read only), Admin (Read/Write). **Bump Test Speed**: Users can select to carry out a Quick Bump or Full Bump Test. Bump times can be modified in the section below. User (Read only), Admin (Read/Write).

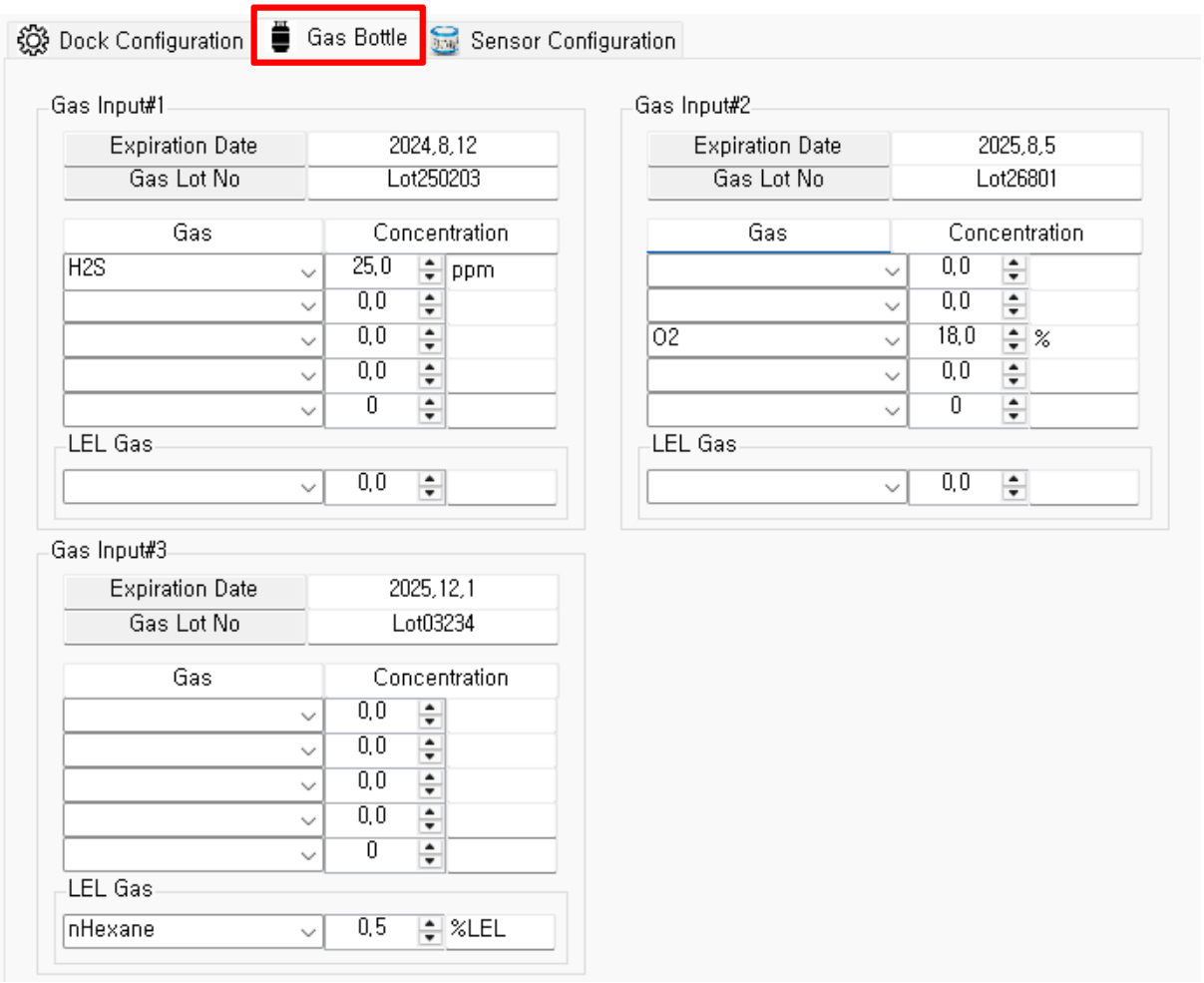
4	**Dock configuration** (Admin Mode)	**Bump Max Time**: Select the Quick Bump Test runtime between 10 to 60 sec. **Full Bump max time**: Select the Full Bump Test runtime between 10 to 120 sec. **Bump Pass Limit**: Set the Quick Bump Test pass limit between 50 to 80%, Default 50%. **Full Bump pass limit**: Set the Full Bump Test pass limit between 80 to 100%, Default 90%. **Max Cal Time:** 120 sec (default). If calibration does not pass after the specified time, a calibration failure error is displayed. **Allow Bump Test:** Bump test allowed via Docking Station **Allow Configuration**: Configuration allowed via Docking Station. **Auto Upgrade:** Automatically upgrades firmware when ARA-X4 connected. **Allow Calibrate**: Calibrate allowed via Docking Station. **Calibration After Bump Failed**: Auto calibrates the ARA-X4 if bump test fails. **Allow Visual Test**: Allows testing of alarm LED lights. **Allow Audible Test**: Allow alarm sound generator testing. **Auto Save Event Log**: Event Log is automatically saved. **Auto Save Bump Log**: Bump Log is automatically saved. **Auto Save Cal Log**: Calibration Log is automatically saved. **Auto Save Datalog**: Data Log is automatically saved. **Allow LEL Gas Different**: Allows for differences between set gas and test gas. **Auto Transfer Data To USB**: Automatically transfers data to USB when ARA-X4 is connected to Docking Station and a USB memory is inserted. **Auto Test**: Bump test starts automatically when unit is recognised. **Auto Calibrate Start**: In the auto test situation, if calibration is overdue, calibration starts automatically instead of Bump.
5	Docking Station Firmware	Button to load Dock firmware upgrade file from PC. You can choose which upgrade file to use.
6	Start FW Upgrade	Button to start the firmware upgrade.
7	Dock Config Open	Button to load Dock configuration file from a saved location. Configurations can be saved and then be used to configure multiple devices.
8	Dock Config Save	Button to save a Dock configuration file to a location
9	Read	Button to read config file and log file from the Device or USB memory folder.
10	Write	Button to write the config file and firmware to the device.
11	Status Bar	Displays the status as text when interacting with ARA-X Manager button options. Error messages are displayed as appropriate.
12	Progress Bar	The green progress bar indicates the results of actions and communication progress, such as connecting to ARA-X Manager or downloading data.

Gas Bottle Settings

On the Gas Bottle tab, an Admin user can add these details of the gas cylinder used:

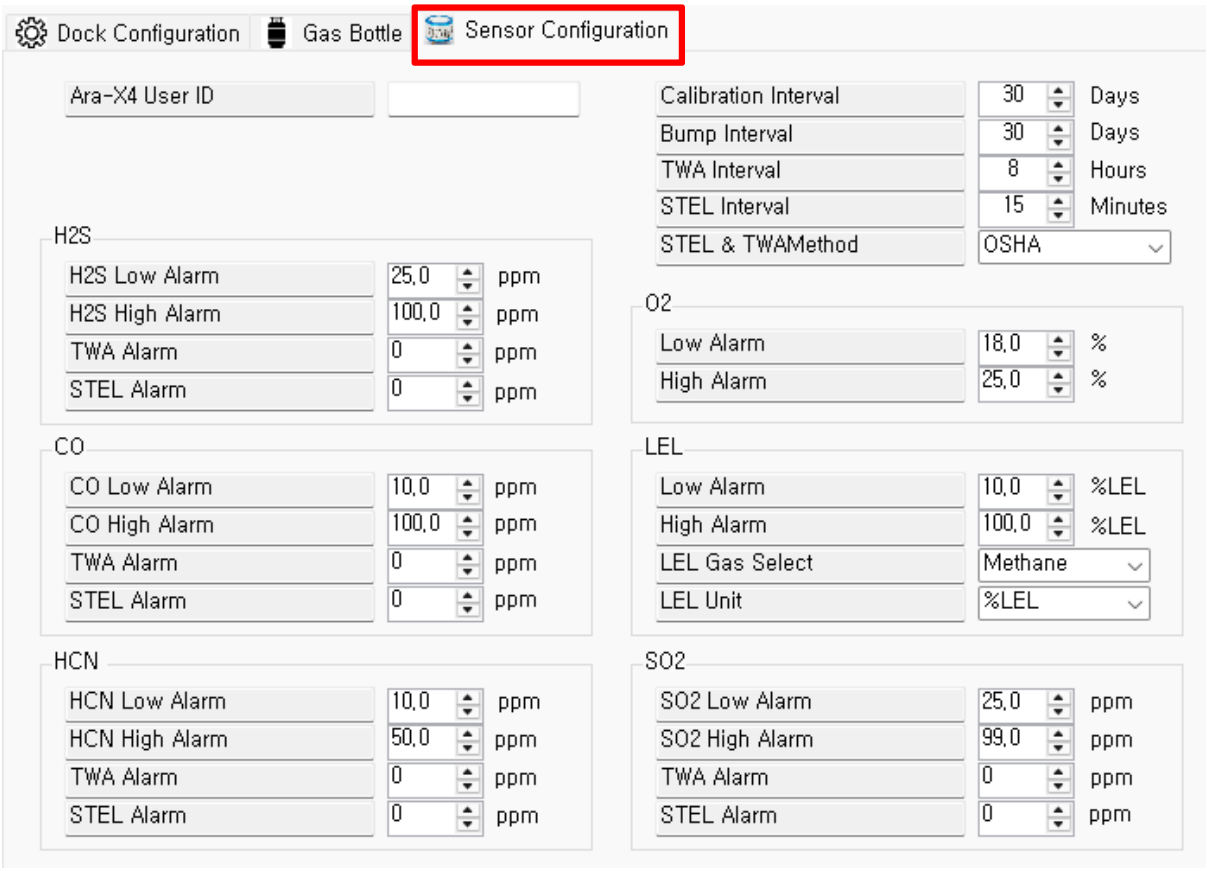
- Serial number
- Expiration data
- Gas
- Gas concentration

Standard users have read-only access to the information. Select ‘write’ to apply settings to the device.



Docking Station Sensor Configuration

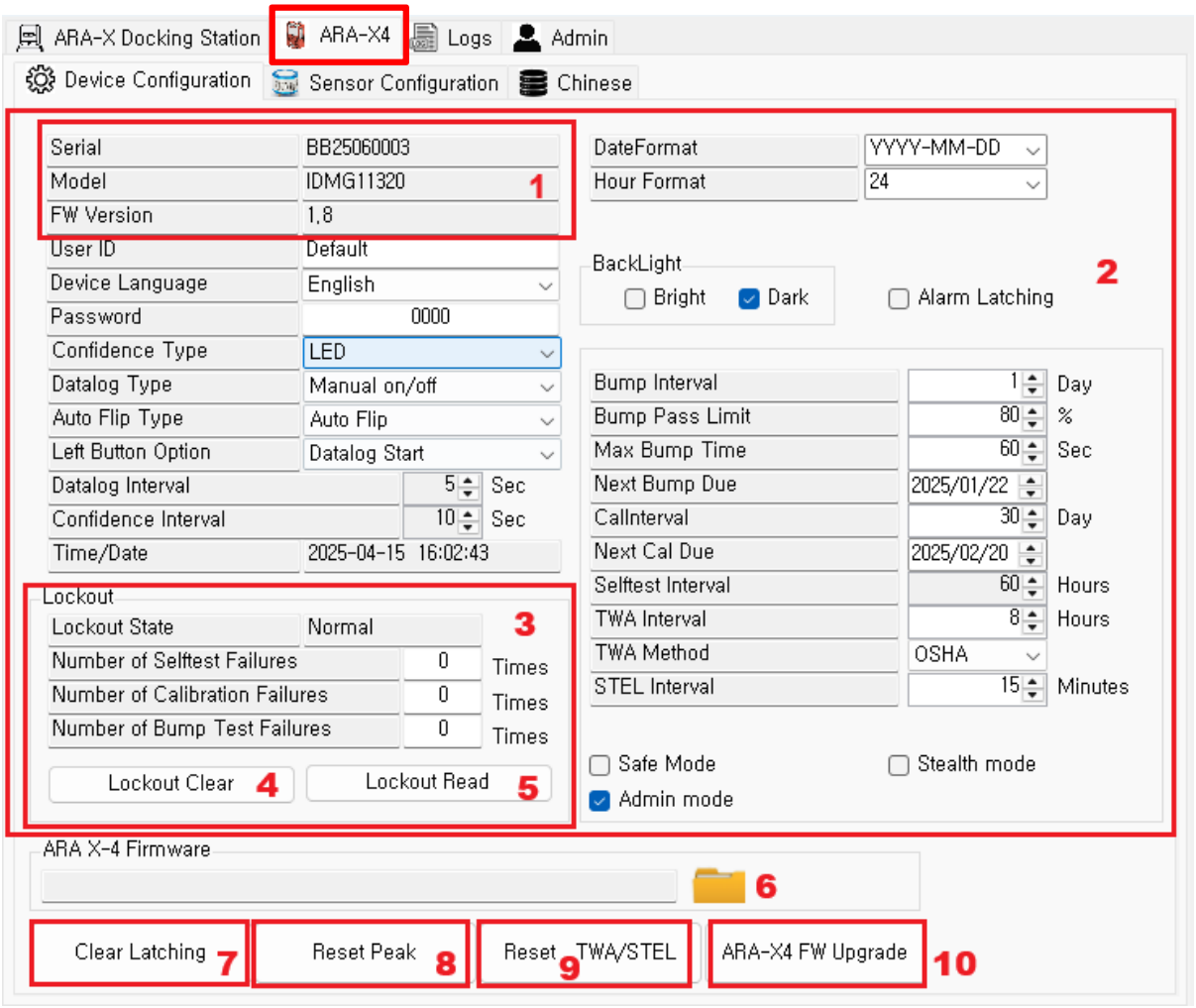
ARA-X Manager automatically updates to reflect the sensor configuration on the connected ARA-X4. If required, you can edit the sensor configuration, in this screen:



1	Ara-X4 User ID	You can set a User ID to the ARA-X4 User (Read only), Admin (Read/Write).
2	H2S Sensor	Set alarms (Low, High, TWA, STEL). User (Read only), Admin (Read/Write).
3	CO Sensor	Set alarms (Low, High, TWA, STEL). User (Read only), Admin (Read/Write).
4	HCN Sensor	Set alarms (Low, High, TWA, STEL). User (Read only), Admin (Read/Write).
5	O2 Sensor	Set alarms (Low, High). User (Read only), Admin (Read/Write).
6	LEL Sensor	Set alarms (Low, High). Select LEL gas type: Select LEL unit: %LEL, %VOL User (Read only), Admin (Read/Write).
7	SO2 Sensor	Set alarms (Low, High, TWA, STEL). User (Read only), Admin (Read/Write).

ARA-X4 Device Configuration

In ARA-X Manager, click the ARA-X4 tab.

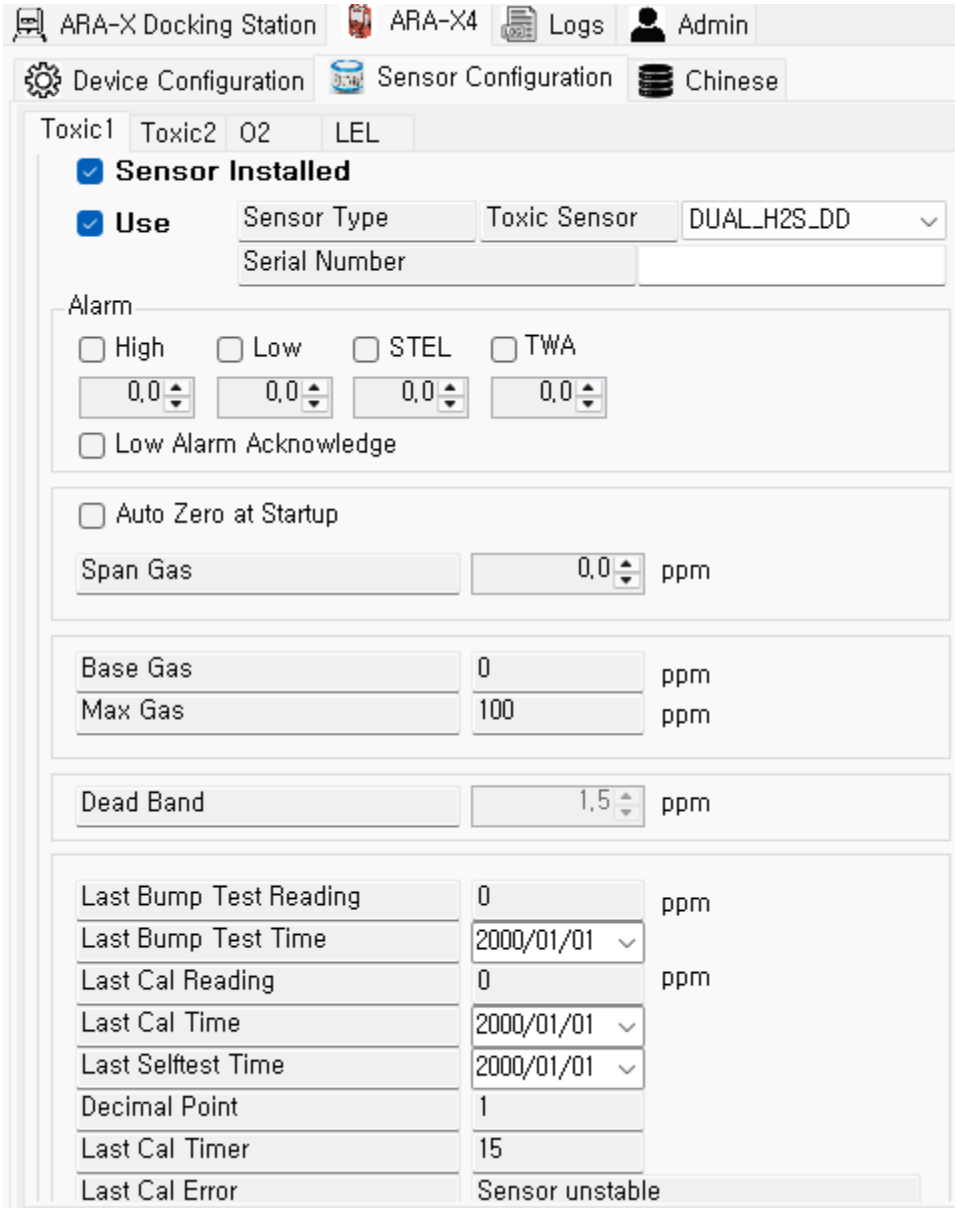


1	Device Information (Read only)	**Serial Number**: ARA-X4 Serial number **Model:** ARA-X4 model number **FW Version**: Firmware version of ARA-X4 device.
2	Device Settings	**User ID**: Set a User ID to the ARA-X4 A user ID can be used to assign a device to a particular user or site. User (Read only), Admin (Read/Write). The default value of this setting is "Default." **Device Language**: Select languages - English, German, French, Spanish, Italian, Portuguese, Dutch, and Chinese. **Password**: Input a password for the device to limit access to the Admin menu (Admin Read/Write). **Confidence Type**: indicates health of the ARA-X4 whilst in use. You can select: Disable, LED, Beep, LED + Beep. **Datalog Type**: You can select: Manual on/off, Always on, Log on Event. **Auto Flip Type**: You can configure the LCD orientation: Manual flip, Auto flip, Always flip.

		Left button option: You can configure the quick access function, accessible by pressing the left button: None, Datalog start, Manual flip quick, Quick zero. **Data Log Interval**: Set the data log frequency. **Confidence Interval**: Set confidence alert interval. **Backlight**: Set the backlight to bright or dark **Alarm Latching**: when configured to latch the alarm, the audible, vibration and buzzer alarms remain on even if the gas level returns to normal, until you press the reset button. **Safe Mode**: hides the gas readings from the display, but triggers the audible and visual alarms when hazardous gas is present **Stealth Mode**: Disables the use of buzzer and LED. **Admin Mode**: Admin mode is activated. Admin (Read/Write). **Alarm Latching**: when selected, the User must acknowledge the alarm message on screen to reset the alarms **Date Format**: Set the date format. **Hour Format**: Set the time format **Bump Interval**: Set the frequency between bump test reminders **Bump Pass Limit**: Set the Bump Test pass limit between 50 to 90%. Default 50% **Max Bump Time**: Set the max bump time between 10 to 120 sec. Default is set to 30 sec **Next Bump Due**: The next time a gas detector needs to be bump tested **Cal Interval**: The frequency of calibration **Next Cal Due**: The next time a gas detector needs to be calibrated **Self-test Interval**: The next time a gas detector needs to run a self-test **TWA Interval**: The time-weighted average interval **TWA Method**: select the STEL and TWA values to use, choose from OSHA, NIOSH, EH40, ACGIH. **STEL Interval**: A gas detector's short-term exposure limit interval.
3	Lockout state (Admin Mode)	**Lockout State**: When Self-test, Calibration, and Bump tests each fail 10 times in a row, a lockout state occurs. **Number of Self-test Failure**: Number of consecutive failed self-tests **Number of Calibration Failure**: Number of consecutive failed calibrations **Number of Bump Test Failure**: Number of consecutive failed bump tests
4	Lockout Clear	Button to clear current Lock out content.
5	Lockout Read	Button to read current Lock out content.
6	Select file	Button to load firmware upgrade file from PC.
7	Clear Latching	Button to clear the state in which an alarm occurs and is latching.
8	Reset Peak	Button to reset the recorded peak value of the sensor.
9	Reset TWA/STEL	Button to resets recorded values for STEL/TWA.
10	Upgrade Firmware	Button to start Firmware upgrade.
11	ARA-X4 Config Save	Save a configuration, which can be re-loaded onto other ARA-X4 devices
12	ARA-X4 Config Load	Load a previously saved configuration file, which can be loaded to ARA-X4

ARA-X4 Sensor Configuration

Toxic1 sensor configuration



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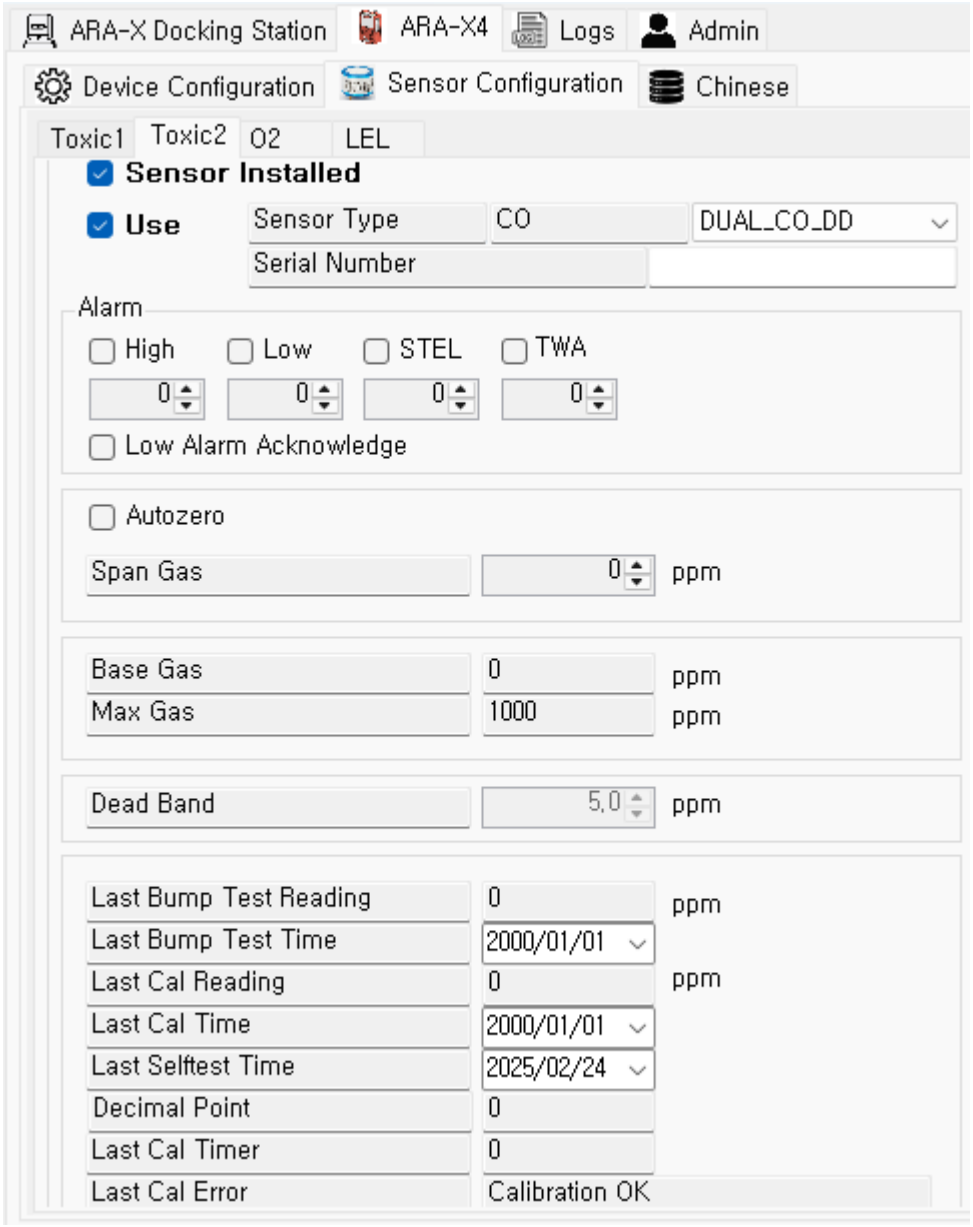
Sensor Installed	Tick box checked indicates Toxic1 sensor is installed. User (Read only), Admin (Read/Write).
Use	Tick box checked indicates, Toxic1 sensor is activated. You can enable or disable an installed sensor. Disabled sensors are not shown on the ARA-X4 display and do not monitor the associated gas.
Sensor type	The sensor type must be selected when changing the sensor type. User (read only), Admin (read/write)
Serial Number	Sensor serial number. User (Read only), Admin (Read/Write).

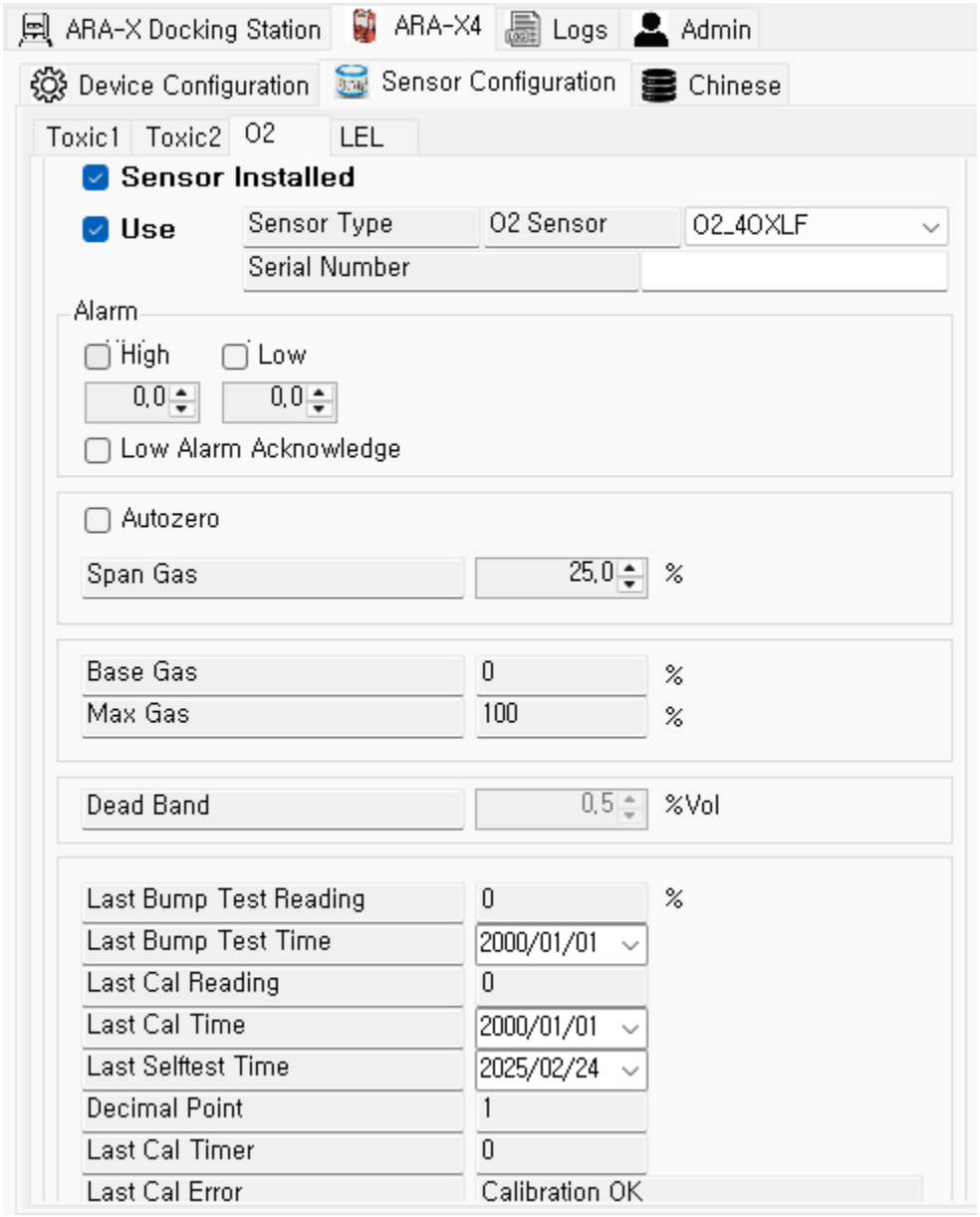
High Alarm	When ticked, the High alarm is used. User (Read only), Admin (Read/Write).
Low Alarm	When ticked, the Low alarm is used. User (Read only), Admin (Read/Write).
STEL Alarm	When ticked, the STEL alarm is used. User (Read only), Admin (Read/Write).
TWA Alarm	When ticked, the TWA alarm is used. User (Read only), Admin (Read/Write).
Low Alarm Acknowledge	When ticked, users must acknowledge a low alarm to reset the audio and visual alarms.
Auto Zero at Start Up	When ticked,, the Auto Zero at start up function is used.
Span Gas	Set span gas concentration.
Base Gas	Basic gas concentration used. (Read only).
Max Gas	Max gas concentration. (Read only).
Dead band	Zero-point error range. (Read only).
Last Bump test Reading	The value read from the last Bump test. (Read only).
Last Bump test Time	Last bump test time. (Read only).
Last Cal Reading	The value read from the last calibration. (Read only).
Last Cal Time	Last calibration Time. (Read only).
Last Self-test Time	Last self-test Time. (Read only).
Decimal Point	Decimal Point. (Read only).
Last Cal Timer	Last calibration duration. (Read only).
Last Cal Error	Last calibration error. (Read only).

Toxic2 sensor configuration



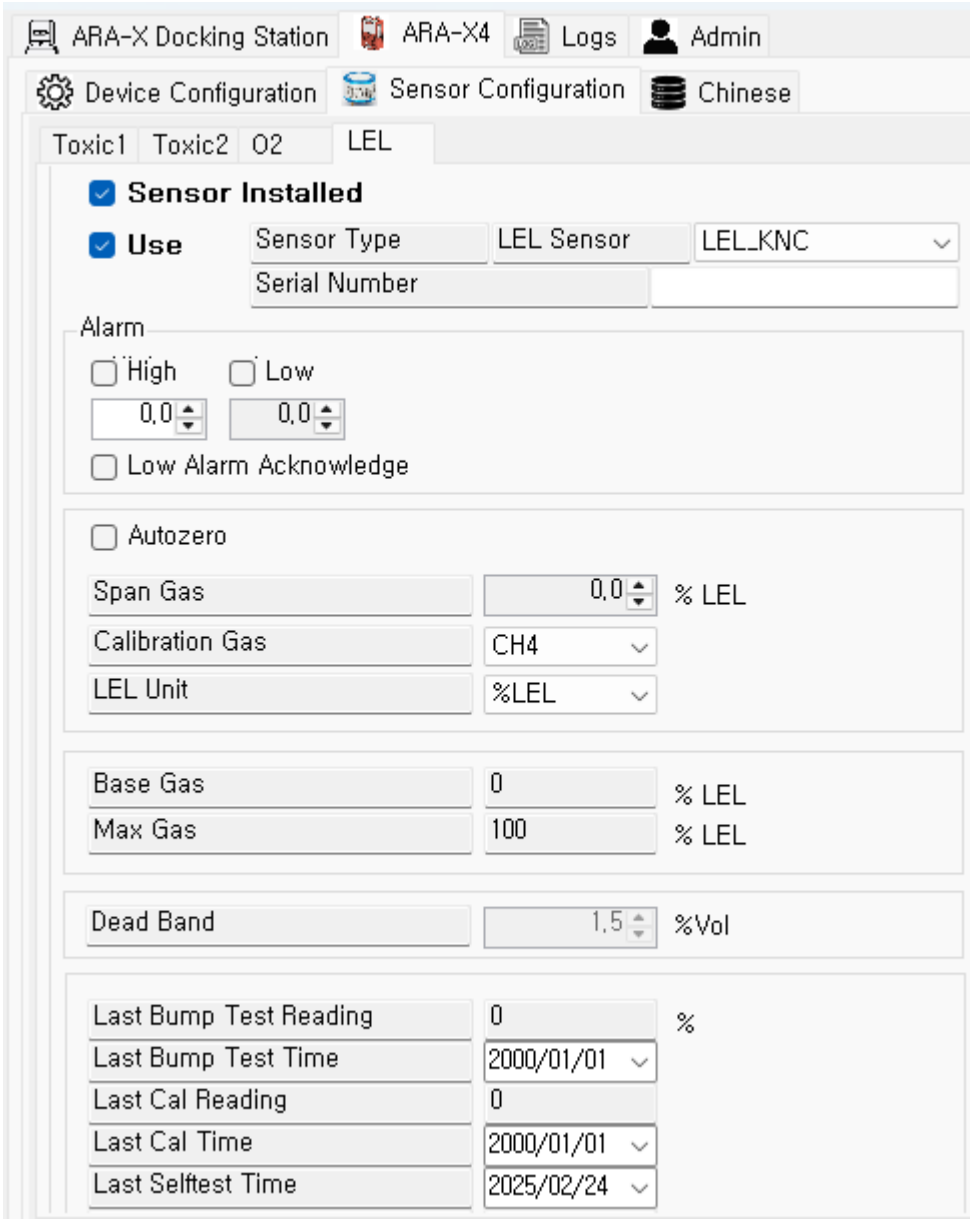
Refer to Toxic1 Sensor Configuration

O2 Sensor Configuration



Refer to Toxic1 Sensor Configuration

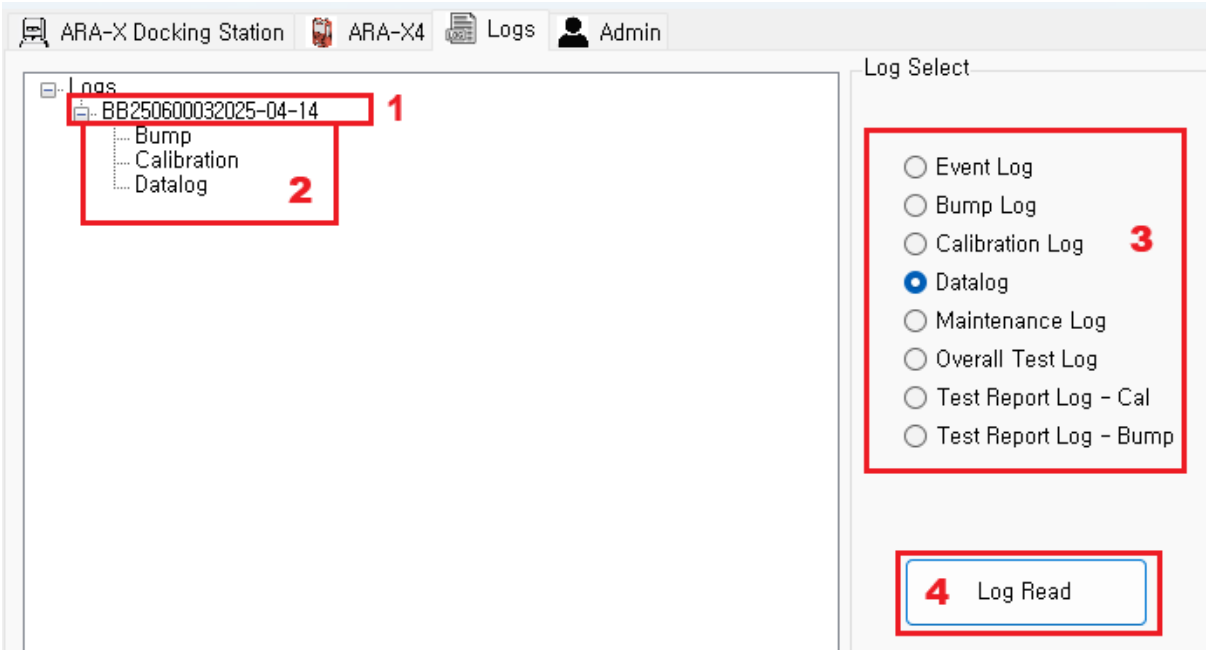
LEL Sensor Configuration



Refer to Toxic1 Sensor Configuration, plus:

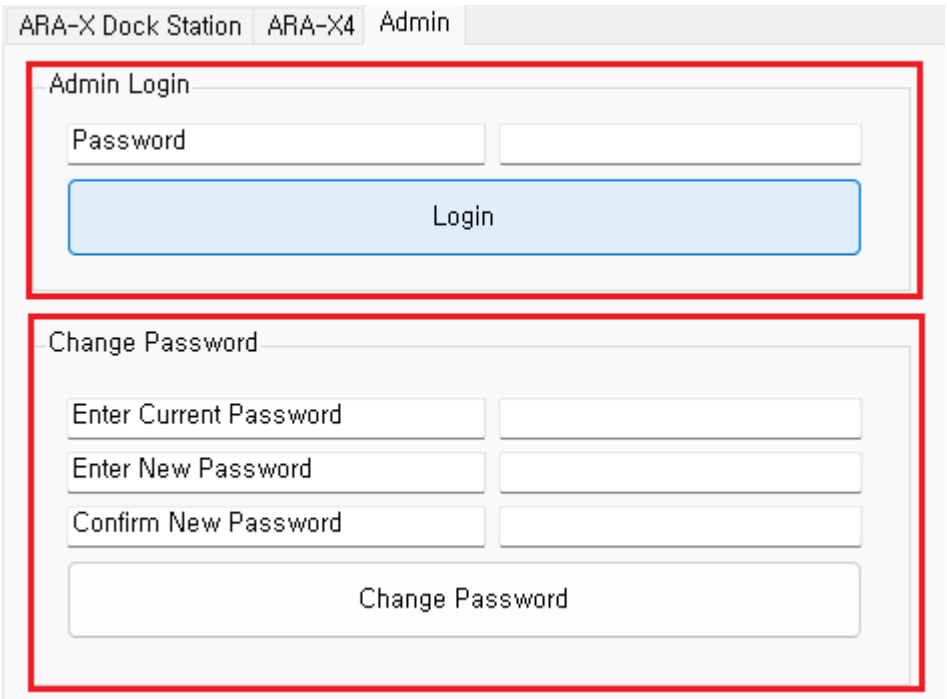
Calibration Gas	CH4 - Methane, H2 - Hydrogen C2H4 - Ethylene C2H6 - Ethane C3H8 - Propane C4H10 - Butane C5H12 - Pentane C6H14 - Hexane
LEL Unit	%LEL or %VOL

Logs



1	Excel file	Data log file name, which includes the device serial number and time. Data logs are stored in the following location, as default: C:\ION Science LTD\Ara-X Manager\ION Science\ARAX\Logs
2	Sheet name	Details the datalog information captured, and the sheet names within the excel file (Datalog, Bump, Event, Calibration, Bump, TestReportCal, TestReportBump, Maintenance, Overalltest).
3	Log select	Select the log file to load.
4	Log Read	Button to read the Log file from ARA-X Docking station or ARA-X4.
5	Log Read All	To read all logs from the ARA-X4 device at once

Admin Login



Admin Login: Enter your password and log in to use ARA-X Manager in administrator mode. The initial password is "2025".

Change Password: An Admin user can change passwords by entering a current password and a new password.

Technical Specification

Appearance	Size (excl. belt clip)	67 x 140 x 34 mm
	Weight	<300g
	Button	2-Button Operation
Environment	Operating temperature	-20˚C to 55˚C (-4˚F to 131˚F)
	Humidity	5 ~ 95% RH
	IP	IP67
Display	Display	Liquid Crystal Display: 45 x 45 mm, Internal backlight (red and green), FSTN, COG, 128x128 Graphic LCD, FPC
Alarm	Alarm conditions	Low, High, TWA, STEL, OL, -OL, Multi alarm
	Visual alarm	6 Red/Green LED, plus 1 Green LED (confidence)
	Audible alarm	PIEZO Buzzer, 95dB @ 30cm
	Vibrating alarm	Vibrator (temperatures greater than -10℃)
Battery	Characteristics	Li-ion Battery, DC 3.7V, 2000mAh
	Typical run time	18 hours for 4Gas-LEL Pellistor model 60 days for 4Gas-LEL IR model*
	Charging time	6 hours to full charge (from fully depleted battery)
Gas Sensor	Types	Electro Chemical: CO, H_2S, O_2, SO_2, HCN Pellistor: LEL (CH4) NDIR: LEL (CH4)
	Detection Range	CO: 0 to 500ppm H_2S: 0 to 100ppm O_2: 0 to 25% SO_2: 0 to 20 ppm HCN: 0 to 30 ppm LEL: 0 to 100%LEL
	T90 response time	O_2 (L): <15 sec O_2 (LF): <20 sec CO: <30 sec H_2S: <30 sec DualTox CO: <40 sec DualTox H2S: <30 sec LEL (CAT): <30 sec LEL (IR): <45 sec HCN: <75 sec SO_2: <60 sec
Data Log	Storage	Up to 50 bump log, 50 calibration log, 50 event log and 60,000 data logs.

*Based on 11 hours use per day

Detailed Gas Sensor Information

Gas Type / Detection Range	Sensor type	Sensor P/N
O2 0 ~ 25%	Leaded	926223
	Lead free	926224
CO 0 ~ 500ppm	Single gas	926220
H2S 0 ~ 100ppm	Single gas	926221
CO/H2S Dual	Dual-Tox	926222
SO2 0 ~ 20ppm	Single gas	926227
HCN 0 ~ 50ppm	Single gas	926228
LEL 0 ~ 100 %LEL	Pellistor	926225
	NDIR	926226

Default Alarm Levels

Gas	CO (ppm)	H2S (ppm)	O2 (%)	LEL (%)	SO2 (ppm)	HCN (ppm)
High	200	15	23.5	20	5	10
Low	35	10	19.5	10	10	4.7

Troubleshooting

This table lists problems that you may encounter, and possible solutions. If you cannot resolve a problem, contact your local service centre or distributor, or return the device for service. The device may have to be dismantled.

Problem	Solution
ARA-X4 does not activate	Press and hold the left-hand  power button for at least two seconds. If the device does not power on: Charge the battery: Connect the 6Vdc adapter. Check that the red charging LED is lit. Charge for at least thirty minutes and then turn on the device. If the charging LED does not light or if the device does not charge, the battery or a fuse might be damaged. Please contact your local service centre.
LCD or backlight does not turn on	Turn the device off and on. Check that the LCD is displayed during the self-test. If problems persist, please contact your local service centre.
Alarm LEDs do not turn on	Turn the device off and on. Check that the LEDs turn on during the self-test. If problems persist, please contact your local service centre.
Alarm buzzer is weak, or buzzer does not work	Turn the device off and on. Check for the buzzer sound during the self-test. Ensure that the buzzer hole is not blocked. If problems persist, please contact your local service centre.
Alarm vibration is weak, or vibrator does not work	Turn the device off and on. Check for vibration during the self-test. If problems persist, please contact your local service centre.
Unable to communicate with the ARA-X Manager via the IR Link / IR settings are not enabled	Clean the IR windows on your ARA-X4 and IR Link. With no other electronic devices nearby, place the ARA-X4 and the IR Link face to face, 5cm to 7cm apart. Attempt communication. Cover the space near the ARA-X4 and IR Link with paper or cloth to block ambient light. Do

	not block the communication path between devices. If problems persist, please contact your local service centre.
Gas sensor has failed	Use IR Link to check the model name and the gas sensor configuration. Check the model name ordering for sensor configuration. If the model number and sensor configuration are correct, turn the device off and on. Check the sensor during the self-test. If problems persist, please contact your local service centre.
LEL sensor has failed	Check the gas sensor configuration. Turn the device off and on. Check the self-test result. The LEL sensor may require replacement. If problems persist, please contact your local service centre.
LCD Flip does not work	Change the Flip screen settings and check the display. Turn the device off and on. If problems persist, please contact your local service centre.
Bump test fails	Re-calibrate the sensor. If problems persist, please contact your local service centre.
Calibration fails	Re-calibrate the sensor. If calibration continues to fail, replace the sensor. If problems persist, please contact your local service centre.

Limited Warranty

ION Science Ltd warrants the product to be free from defects in material and workmanship under normal use and service for a period of five years, beginning on the date of shipment to the buyer. This warranty extends only to the sale of new and unused products to the original buyer.

This warranty does not include:

- Any damage or defects attributable to repair of the product by any person other than by an authorised service centre, or the installation of unapproved parts on the product; or
- Any product which in ION Science Ltd's opinion, has been misused, altered, neglected or damaged, by accident or abnormal conditions of operation, handling or use.

The obligations set forth in this warranty are conditional on:

- Proper storage, installation, calibration, use, maintenance and compliance with the product manual instructions and any other applicable recommendations of ION Science Ltd;
- The buyer promptly notifying ION Science Ltd of any defect and, if required, promptly making the product available for correction. No goods shall be returned to ION Science Ltd,. until receipt by the buyer of shipping instructions from ION Science Ltd; and
- The right of ION Science Ltd to require that the buyer provide proof of purchase such as the original invoice, bill of sale or packing slip to establish that the product is within the warranty period.

Please refer to the ION Science ARA-X4 warranty statement for full details.

Certifications / Approvals

- ATEX
    - Ex ia op is IIC T4 Ga or Ex da ia IIC T4 Ga
      Certificate number: KSCP 24ATEX0024X
- IECEx
    - Ex ia op is IIC T4 Ga or Ex da ia IIC T4 Ga
      IECEx KSCP 24.0047X

      Ex ia op is IIC T4 Ga or Ex da ia IIC T4 Ga

      KSCP 24ATEX0024X

      IECEx KSCP 24.0047X
- North America **- PENDING**
    - CL. I Div 1 Groups A, B, C, D, T4; CL. I ZN 0. AEx ia op is IIC T4 Ga or CL. I ZN 0. AEx da ia IIC T4 Ga

- Ambient Temperature

  -20℃ ≤ Ta ≤ +55℃

CALL GEOTECH TODAY (800) 833-7958

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email: sales@geotechenv.com • website: www.geotechenv.com