ARA DOCK4

User Manual V1.0

Contents

Safety

Legal Notices Regarding the Safe Operation of Equipment

- Whilst every attempt is made to ensure the accuracy of the information contained in this manual, ION Science accepts no liability for errors or omissions in the manual, or any consequences deriving from the use of information contained herein. It is provided "as is" and without any representation, term, condition or warranty of any kind, either expressed or implied.
- To the extent permitted by law, ION Science shall not be liable to any person or entity for any loss or damage which may arise from the use of this manual.
- We reserve the right at any time and without any notice to remove, amend or vary any of the content which appears in this manual.

Symbols

	**WARNING!** **USED TO INDICATE DANGER WARNINGS WHERE THERE IS A RISK OF INJURY OR DEATH.**
	**Caution** **Used to indicate a caution where there is a risk of damage to equipment.**
	**Information** Important information or useful hints about usage.
	**Recycling** Recycle all packaging.
	**WEEE Regulations** Ensure that waste electrical equipment is disposed of correctly.

Warnings, Cautions and Information notifications

The following Cautions apply to the product described in this manual.

	Read the ARA DOCK4 Manual and follow all instructions to ensure proper use and safe installation.
	Do not use the ARA DOCK4 if it appears to be damaged. Inspect it before each use.
	Do not use the ARA DOCK4 in a hazardous environment. The ARA DOCK4 must be attached to a venting system or be used in a well-ventilated area.

	Do not expose the ARA DOCK4 to electrical or mechanical shocks before, during, or after use.
	Do not allow liquids to enter the dock or into the flow path.
	Ensure the ARA DOCK4 is used with certified calibration gas.
	Do not use expired calibration gas.
	Do not attempt to disassemble, adjust, or service the equipment unless instructions are provided to perform a procedure in this manual.
	Do not charge the battery in temperatures above or below the specified range of 0 ℃ to 40℃

Disposal

- The equipment does not include any toxic materials, but if it has been contaminated by toxic materials, then exercise due care and follow the appropriate regulations when disposing.
- Always adhere to local regulations and procedures when disposing of the equipment.
- ION Science Ltd offers a take back service. Please contact us for more information.

	**RECYCLING** The detector contains a lithium battery that must be disposed in an appropriate recycling bin.
	**WEEE REGULATIONS** Ensure that electrical equipment is disposed of correctly.

Normal Operating Conditions

The ION ARA DOCK4 is designed to be safe in the following conditions:

- Indoor use only;
- Normal atmosphere (20.9% v/v O2) that is free of hazardous gas;
- Temperature range of +5°C to +40°C (+41°F to +104°F) ; and
- Relative humidity of 10% to 90% non-condensing.

If the intended operating environment does not match these criteria, ION Science recommends that you consult a qualified professional specialist prior to installing and using ION ARA DOCK4.

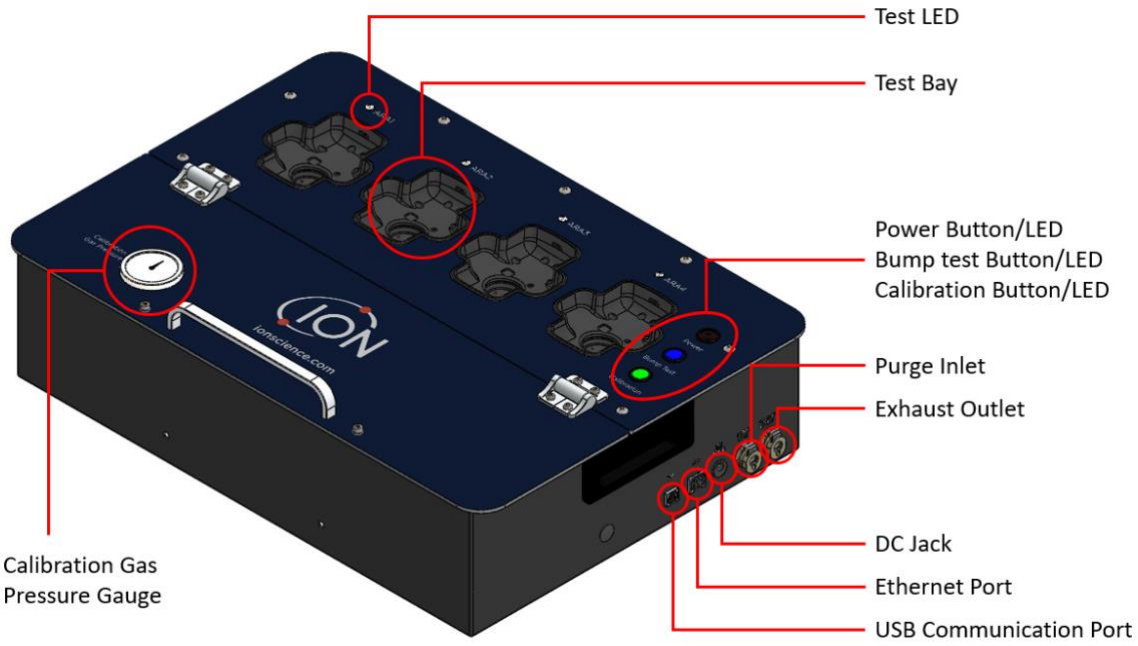
Device Overview

The ION ARA DOCK4 is an automatic test and calibration station for use with portable gas detectors ARA 100/100H/200/200H/300/400 manufactured by ION Science. The ARA DOCK4 performs essential procedures for maintenance of gas detectors including Bump test, Calibration, Buzzer test, LED test and data log transfers, by one button operation. ARA DOCK4 can test up to 4 gas detectors at once.

The ARA DOCK4 has two power sources. A 12V DC mains power supply and an internal rechargeable battery. The internal rechargeable battery provides approximately 5 hours of continuous operation (based on 4 ARA's inserted)

The ARA DOCK4 can be connected to a PC to facilitate Dock4Manager software. Dock4Manager allows authorised users to customise various settings on the ARA DOCK4, eg. changing test configurations and upgrading FW.

Hardware Overview



Power Button	Turn On / Off the ARA DOCK4. Power button has 2 colour LEDs (Red and Green).
Bump test Button	Start Bump test for inserted ARA gas detectors. Bump button has blue colour LED.
Calibration Button	Start Calibration for inserted ARA gas detectors. Bump button has green colour LED.

Test Bays	Test Bays for ARA gas detectors. insertion of ARA gas detectors is detected through IrDA communication.
Test LEDs	Test LED is a 2-colour-LED and shows red/green/orange. It shows the Bump or CAL Test result of ARA gas detectors inserted into each Test Bay.
DC Jack	Vdc 12V, 1.5A Adaptor Connector, 5.5/2.1pi
Ethernet Port	RJ45 with 2 LEDs. LEDs indicate Link and Active status.
USB Communication Port	USB 2.0 type B Receptacle.
Purge inlet	1/8" Hose Barb coupler. Used to supply fresh air.
Exhaust Outlet	1/8" Hose Barb coupler. Gas and fresh air used in the test are exhausted here.
Calibration Gas Pressure Gauge	Gauge for checking Gas remaining. Max 1,500 psi

Technical Specifications

Dimension	496.8 x 340 x 115 mm (20.0 x 13.4 x 4.5 in)
Weight	7 kg, (/wo gas cylinder)
Enclosure	Aluminium
Operating temperature	5℃ ~ 40℃ (+41°F to +104°F)
Humidity	10% to 90% non-condensing
Altitude	1,000m (3,280.84ft)
Storage temperature	-10℃ ~ 60℃ (+14°F to +140°F)
Power supply	Supply Voltage: - Input: 110-240V a.c, 50/60Hz Max 0.5A - Output: 12 V d.c, 1.5A Power Rating - 12 V d.c, 1.5A (Adapter) - 7.4V d.c., 2,750mAh (Internal Battery)
Type of equipment	Process Control Equipment Pollution Degree 2 Installation Category I
RTC	Provide time and date stamp

Data Storage	Internal USB 2.0 Memory Stick (16GB) for event log.
External Interface	1 USB port - USB 2.0 1 RJ45 - Ethernet 10/100
Display	Unit LED - 2colour(R/G) LED x4 Power button LED - 2 colour(R/G) Bump button LED - 1 colour (B) CAL button LED - 1 colour (G)
Test unit type	SD100
Test unit recognition	IrDA communication
Sensors	Audio and optical
Tests	Bump, Calibration, Data Transfer, Audible alarm, visual alarm
Gases Available	H2S - 25ppm, CO-100ppm, O2-18%, SO2-10ppm (Adjustable)
Gas Cylinder	Compatible with 116L (3.5”Φ x 15.25”), C10 valve
Gas connection	Built-in
Gas In/Out	1 ambient air(purge) inlet with 1/8” hose 1 exhaust outlet with 1/8” hose
Pump	2 built-ins, 250 – 350 mL per minute
Solenoid	5 built-ins
Battery	Lithium-Ion Battery Pack, ST-LI-29E 2S1P, 2INR19/65 7.4V, 2,750mAh, 20.08Wh
Battery Charging time	3 hours
Warranty	Full 2 years beginning at date of shipment to the buyer

Prepare the ARA DOCK4 for test

Equipment Installation

The ARA DOCK4 can be located on a desk-top/workbench or wall mounted. A wall mount kit is available from ION Science p/n 908224.

Select a suitable installation location. Each module or gang of connected modules requires:

- Place the ARA DOCK4 on a clean, dry work surface.
- Access to calibration gas cylinder Inlet and Outlet tubes to clean air.
- Access to a network connection, if using.

WARNING: The equipment must be used only in a normal atmosphere (20.9% v/v O2) that is free of hazardous gas.

WARNING: **Do not use the equipment in a hazardous area.**

WARNING: Failure to adhere to this caution can lead to fire and/or explosion.

WARNING: Do not install near heat sources or on vibrating surfaces.

WARNING: The equipment is intended for indoor use only.

WARNING: This equipment uses potentially harmful gas for calibrations. The equipment must be attached to a venting system or be used in a well-ventilated area.

Charging

The ARA DOCK4 is powered by External 12Vdc Adapter and internal rechargeable battery. Connect the supplied 12Vdc adapter to the DC Jacks on the ARA DOCK4 to charge the battery. A complete charge takes approximately 3 hours. The fully charged ARA DOCK4 can perform up to 750 bump test cycles with 4 Unit Test.

- The charger is for indoor use only.
- The ARA DOCK4 only charges using DC power.
- The ARA DOCK4 will not charge while bump tests or calibrations are being performed.
- If the battery is low, charge the ARA DOCK4 for 30 minutes then begin a test. When the test is complete resume charging the battery.

Calibration Gas Installation

The ARA DOCK4 needs a calibration gas cylinder to be installed to perform tests on the gas detectors. The procedure to install gas cylinder is as follow.

1) Remove the Access Hatch Screws and lift the access panel.
2) Put gas cylinder into the holder and thread into the fitting until tight.
3) Check if gas gauge indicates the gas cylinder pressure.
4) Wrap around with rubber strap

The recommended default gas types and concentrations as below. The Dock4Manager software allows you to change span gas settings.

Recommended Calibration Span Gas Concentrations

H_2S: 25 ppm	**CO: 100 ppm**	**O_2: 18 %**	**SO_2: 10 ppm**

Calibration gas cylinder types 2AL, 8AL, 34L, 58L and equivalents are compatible with the ARA DOCK4.

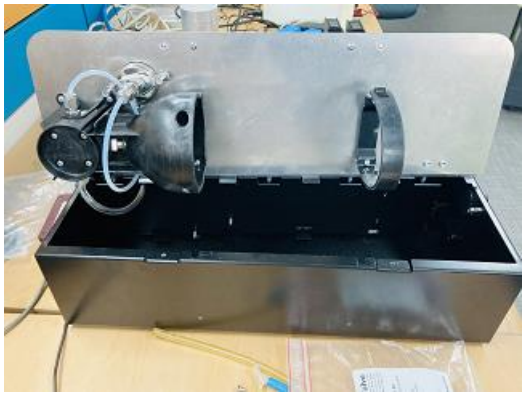
WARNING: When connecting an external gas cylinder, be sure to connect a fitting that matches with the ARA DOCK4. Use of incorrect fitting may lead to gas leaks

WARNING: Ensure the gas is certificated and is not expired.

WARNING: Ensure that all calibration gas cylinders are in good condition.

WARNING: Ensure that all calibration gas cylinders contain enough gas.

WARNING: This equipment uses toxic gas for calibrations. The equipment must be attached to a venting system or be used in a well-ventilated area.



Lift the access panel.

Connected gas cylinder.

Set Ventilation Flow Path

When operating the ARA DOCK4, ensure the environment is 20.9% v/v O_2 and free of hazardous gas. If it is indoors and ventilation is of concern, use appropriate tubing from the exhaust outlet port and locate end-of-line in a well ventilated area or outdoors.

The procedure is below:

1) Push 1/8” tube into the PURGE INLET on the side of the ARA DOCK4 and press the lock button.
2) Repeat 1) for the EXHAUST OUTLET.
3) When disconnect the tubes, press the metal cover on the side.

WARNING: Be sure that tubing is not too long and is not blocked.

WARNING: Ensure the exhaust tubing is not connected to a negative pressure system.

Purge Inlet - 1/8” Tube connect to Clean Air

Exhaust Outlet - 1/8” Tube connect to ventilation

Operate the ARA DOCK4

Turn on/off the ARA DOCK4

Press the Power Button to turn on the ARA DOCK4. If it is powered, the Power Button will light up according to the ARA DOCK4status.

Power Button LED	Status
Green	Normal
Green blinking	Battery Low
Orange	On FW Upgrade progress
Red blinking	Missing USB Memory

1) The ARA DOCK4 can be operated when the Power Button lights up green.
2) The ARA DOCK4 will automatically turn itself off if it is idle for long time.

- If User configures not to allow turning itself off, Press the Power Button more than 5 sec and release to turn it off.
- If the ARA DOCK4 is not powered or the Power Button is blinking green, Connect the DC power adapter.
- If the Power Button keeps orange colour, wait until FW Upgrade finishes.
- If the Power Buttons is blinking red, check if the USB Memory is properly installed.

Set gas detectors on Test Bays

1) Gas detectors must be installed in the Test Bays to test.
2) Push the gas detectors into the Test Bays until it is firmly fixed. The ARA DOCK4 can test up to 4 detectors simultaneously.

WARNING: If gas detectors are not inserted correctly, it may lead gas leak and/or failure of test.

Start Tests

There are two types of operations depending upon which button is pressed.

- Bump Test (Blue): Confirms the detectors' response to the applied gas.
- Calibration (Green): Calibrates the detectors' measurement accuracy against the applied gas.

1) After gas detectors are installed, press Bump Test Button of Calibration Button to start tests.
2) A bump test will take 10~30 seconds, and calibration will take approximately 90 seconds.
3) While the test is active, the LEDs will turn ORANGE.
4) When the test has completed, the LEDs will turn GREEN for pass or RED for fail.

Test LEDs	Status
Orange	Test is active
Green	Test Passed
Red	Test Failed

Every test also performs the following maintenance operations:

- Save each detector's event logs
- Change each detector's configurations (if Configuration allowed)
- Upgrade each detector's firmware (if required)
- Buzzer test
- LED test
- Hibernate detector (if model supported and Configuration allowed)

WARNING: Do not remove gas detectors until the test completes.

Management of the ARA DOCK4

Replace gas cylinder

If you need to test gas detectors that is different from the gas type currently installed, or if the gas cylinder runs out of gas due to continuous use, you will need to replace the gas cylinder.

WARNING: A small amount of gas may leak when gas cylinder is removed. Remove it in a well-ventilated area.

WARNING: Continuous use of the ARA DOCK4 when a gas cylinder is empty may damage the ARA DOCK4. Ensure that gas cylinder is replaced when appropriate.

Connect Communication Cable for Dock4Manager software

To use the Dock4Manager to manage the ARA DOCK4, a communication cable must be connected. The ARA DOCK4 has an ethernet and USB port. Either ports can be used to connect to a PC.

Dock4Manager Software Features

Change gas configurations

If a calibration gas cylinder of different gases or concentrations is only available which differs from the recommended default calibration gases, then these span values need to be changed and sent (write) to the ARA DOCK4 via Dock4Manager.

Install ARA Gas Detector Firmware Upgrade Image

To perform a firmware upgrade to ARA gas detectors via ARA DOCK4, the firmware upgrade image file must be installed in the ARA DOCK4. Users can easily upload the file to ARA DOCK4 by Using Dock4Manager.

Firmware Upgrade of the ARA DOCK4

Users can update ARA DOCK4 as latest version using Dock4Manager.

Read Event/Test Logs

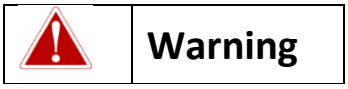
Dock4Manager can read event/test logs from ARA DOCK4, generate reports and forward via email. It can also print test and calibration certificates.

There are many other features. Please refer to Dock4Manager Manual.

Equipment maintenance and service

Disconnect power and turn-off the ARA DOCK4 before performing maintenance or cleaning.

To avoid personal injury or damage to the module, use only replacement parts and/or accessories obtained from ION Science. No user-serviceable parts are inside the ARA DOCK4.



No user-serviceable parts inside

1) If the equipment is damaged or parts are missing, contact ION Science immediately.
2) Substitution of components may impair the safety of the equipment.
3) Do not attempt to disassemble, adjust, or service the equipment unless instructions are provided to perform a procedure, or a component is listed as a user-replaceable component in the user manual.
4) Use only replacement components provided by ION Science.
5) Do not expose the equipment to electrical shock or severe and/or continuous mechanical shock.

To maintain the base station in good operating condition, perform the following basic maintenance as required.

- To ensure quality product operation, maintain a log of all maintenance that is performed.
- Clean the exterior with a soft, damp cloth. Do not use solvents, soaps, or polishes.
- Adequate clearance for the power cord, cables and tubing.
- Adequate clearance for normal use, maintenance and cleaning.

Troubleshooting

Problem	Solution
The ARA DOCK4 does not activate.	Connect the power adapter.
Bump test fails and gas leaks out.	Confirm that all gas connections are attached correctly.
Bump test fails and gas pressure gauge is almost zero	Replace the empty gas cylinder.
Gas cylinder does not fit to tubing and cannot be installed to ARA DOCK4.	Inspect the tubing and replace with new one if it is damaged.
Power Buttons is blinking red	Check if the USB Memory is properly installed.
The audible alarm test fails during bump test or calibration.	Clean the audible alarm hole
The visual alarm test fails during bump test or calibration.	1) clean the ARA unit's LEDs 2) clean the visual alarm hole in test bays

Limited Warranty

Certifications / Approvals:

CE, FCC, UKCA, UL (pending)

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