



AutoRAE 2

Automatic Test and Calibration System



The AutoRAE 2 Automatic Test and Calibration System for RAE Systems portable monitors makes instrument testing and calibration compliance as easy as pressing a button. Simply cradle the monitor, and the system takes care of calibration, testing, and battery recharging.

The AutoRAE 2 system is flexible and modular, and can be configured to efficiently meet your calibration and records management requirements. An AutoRAE 2 system can be as simple as a single cradle deployed in stand-alone mode to calibrate one instrument at a time, or as powerful as a networked, controller-based system supporting 10 instrument cradles and 5 distinct calibration gases or gas mixtures.

- Easy, one-touch bump testing, calibration, charging, and records management
- Supports a wide variety of gases, including exotics
- Optimized for field use—does not require a computer to operate
- Firmware-upgradeable to protect your investment

KEY FEATURES

- Automatic testing, calibration, charging system
- Deployable as a stand-alone cradle or a controller-based system with up to 10 cradles
- Controller with a large, color LCD display
- Networking capability
- Up to 5 calibration gas cylinders can be connected at the same time*
- Automatic instrument FW update option
- Instruments datalogging file recorded automatically on controller SD card
- Bench-top or wall-mounted use
- Instruments supported: ToxiRAE Pro, ToxiRAE Pro LEL, ToxiRAE Pro PID, ToxiRAE Pro CO₂, QRAE 3, MultiRAE Lite (Pumped), MultiRAE and MultiRAE Pro
- Single cradle for all QRAE 3 and ToxiRAE Pro family instruments

INDUSTRIES

- Oil and Gas
- Industrial
- Environmental
- Fire Service
- National Security



The high-resolution color display on the controller provides a rich, intuitive user experience.

*Supported only on configurations that include the AutoRAE 2 Controller

AutoRAE 2

Automatic Test and Calibration System



SPECIFICATIONS

Size	AutoRAE 2 Controller: 5.63" W x 10.43" L x 1.73" H (143 x 265 x 44 mm) MultiRAE Cradle ⁴ : 6.50" W x 12.68" L x 4.37" H (165 x 322 x 111 mm) QRAE 3 Cradle: 6.50" W x 12.60" L x 4.65" H (165 x 320 x 118 mm) ToxiRAE Pro Cradle: 6.50" W x 11.61" L x 3.91" H (165 x 295 x 99 mm) Terminal Adapter: 2.17" W x 8.86" L x 1.65" H (55 x 225 x 42 mm)
Weight	AutoRAE 2 Controller: 1.9 lbs. (0.86 kg) MultiRAE Cradle: 1.9 lbs. (0.86 kg) QRAE 3 Cradle: 2.16 lbs (0.98kg) ToxiRAE Pro Cradle: 1.96 lbs. (0.89 kg) Terminal Adapter: 0.33 lbs. (0.15 kg)
Power Supply	AutoRAE 2 Controller: AC adapter (110V to 240V input, 12V output, 7.5A) Charges up to 10 instruments at a time Cradles: AC adapter (110V to 240V input, 12V, 1.25A output) Charges one instrument at a time
Cradles Supported	AutoRAE 2 Controller: Up to 10 cradles total (any mix, any order) Cradles: No additional cradles supported
Display	AutoRAE 2 Controller: 5.7" TFT (320 x 240) graphical backlit color LCD Cradles: 2 seven-segment LEDs
Buttons	AutoRAE 2 Controller: 3 buttons ([Mode], [Y/+], and [N/-]) Cradles: 2 buttons ([Bump] and [Cal])
Real-time Clock	AutoRAE 2 Controller: Yes Cradles: Yes
Visual Alarm/Indicators	AutoRAE 2 Controller: Color graphical LCD display Cradles: Tri-color (red/green/yellow) LED lights
Audible Alarm	AutoRAE 2 Controller: 90dB @ 12" (30 cm) Cradles: Same as above
Gas Inlet/Outlet Ports	AutoRAE 2 Controller: 6 inlets (1 dedicated fresh air inlet and 5 configurable calibration gas inlets); 1 exhaust port Cradles: 3 inlets (1 dedicated fresh air inlet and 2 configurable calibration gas inlets); 1 exhaust port
Gas Port Connectors	AutoRAE 2 Controller: Connectors with 200-series barb, 1/8" (3.18 mm) ID tubing Cradles: Same as above
Gas Regulator	AutoRAE 2 Controller: Demand-flow regulator (0 to 1,000 psig/70 bar) Cradles: Same as above
Pump Flow Rate	AutoRAE 2 Controller: Built-in pump (500 ml/min) Cradles: NA for pumped instruments, (400 ml/min typical) for diffusion instruments
Data Storage	AutoRAE 2 Controller: Standard 2 GB SD card with security lock Cradles: None. Data stored only on PC
PC Communications	AutoRAE 2 Controller: USB (Type B) port for direct connection to PC Cradles: Same as above
Printer Support	Cradles: Direct printing on serial (RS-232) printers

Networking	AutoRAE 2 Controller: Direct cable (RJ-45 10/100 Base T port) Wi-Fi module (accessory) Cradles: Not supported
System Configuration	AutoRAE 2 Controller: PC-based configuration via ProRAE Studio II software. Can be performed using networking capability Cradles: PC-based configuration via ProRAE Studio II software
Wall-mounting Accessory	AutoRAE 2 Controller: Standard TS35 DIN rail Cradles: Standard TS35 DIN rail
Operating Temperature	AutoRAE 2 Controller: 32° F to 122° F (0° C to 50° C) Cradles: 32° F to 122° F (0° C to 50° C)
Operating Humidity	AutoRAE 2 Controller: 5% to 95% relative humidity (non-condensing) Cradles: 5% to 95% relative humidity (non-condensing)
Languages	AutoRAE 2 Controller: English Cradles: English
Compliance	AutoRAE 2 Controller: CE Cradles: CE
Warranty	AutoRAE 2 Controller: 2-year limited warranty Cradles: 2-year limited warranty

Specifications are subject to change

ORDERING OPTIONS

The AutoRAE 2 Automatic Test and Calibration System and its components can be ordered using the Portables Pricing Guide via RAE Systems distribution partners selling portable products.

ORDERING INFORMATION

Product	Part Number
AutoRAE 2 Controller Includes terminal adapter	T02-0107-000
AutoRAE 2 Cradle for ToxiRAE Pro Models Includes adapters for all ToxiRAE Pro models	T02-3101-000
AutoRAE 2 Cradle for MultiRAE Pumped Models	T02-0103-000
AutoRAE 2 Cradle for QRAE 3 Models	T02-0203-000
AutoRAE 2 Cradle for MultiRAE Pumped Models	T02-0103-000
Wi-Fi Module for AutoRAE 2 Controller	T02-0303-000



An AutoRAE 2 system configured with the Controller and three Cradles for ToxiRAE Pro, QRAE 3 and MultiRAE pumped monitors.

CORPORATE HEADQUARTERS

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Middle East +00971.4.440.5949
China +86.10.5885.8788-3000
Asia Pacific +852.2669.0828

DS-1083-03

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26-0452 A 2 of 12



MeshGuard Accessories

Tools That Enhance Your MeshGuard Monitoring Network

RAE Systems MeshGuard monitors detect a wide range of gases and quickly relay their data to a central controller in a self-forming, self-healing mesh radio network. MeshGuard is rapidly deployable in industrial and remote monitoring applications. All detectors are certified for the most hazardous environments—Class I, Division 1 or Zone 0. A variety of accessories are available for use with the MeshGuard wireless gas detection system.



PowerPak connected to MeshGuard monitor. Monitor is shown in protective stainless-steel housing, secured with included hardware.

RAE POWERPAK

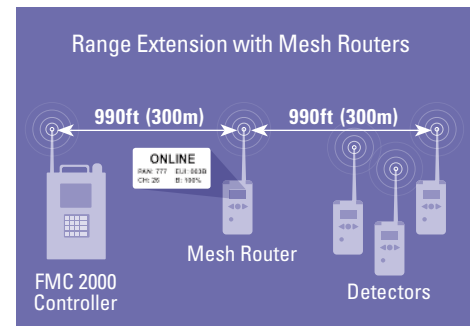
The RAE PowerPak is a rechargeable, external battery used to extend the run time of MeshGuard detectors.

- Powerpak is Class I, Division 1 (Zone 0) certified
- Hot swappable in the field
- PowerPak can operate an LEL detector for 20+ days, or an electrochemical sensor for 18+ months

SPECIFICATIONS*

Size	14.25" H x 10.2" W x 5.75" D (36.2cm x 26cm x 14.6 cm)
Weight	33 lbs (15kg) with four internal batteries
Operating Temperature	-40° to 131° F (-40° to +55° C)
Certifications	US and Canada: Class I, Division 1, Groups A, B, C,D, T4 Europe: ATEX IM1/II 1G Ex ia I/IIC T4 IECEx Ex ia I/IIC T4 Contact manufacturer for country-specific certification

*Specifications are subject to change.



MESH ROUTER

The Mesh Router allows wireless sensor networks to be deployed at greater distances from a central controller. MeshGuard Monitors and Routers work together to find the best possible transmission path for the sensor readings. The MeshRouter displays the real-time wireless signal strength at any given location, which enables rapid determination of suitable locations for MeshGuard Monitors.

The Mesh Router is a Class I, Division 1 (Zone 0) portable wireless device that has two primary functions:

1. To extend the wireless transmission range between points.
2. As a system deployment tool. Prior to deploying detectors, the Mesh Router can provide real-time signal strength at any given location.

The Mesh Router can operate continuously for 10+ days with an internal battery or 45+ days with an external PowerPak.

MeshGuard Accessories



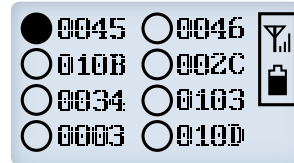
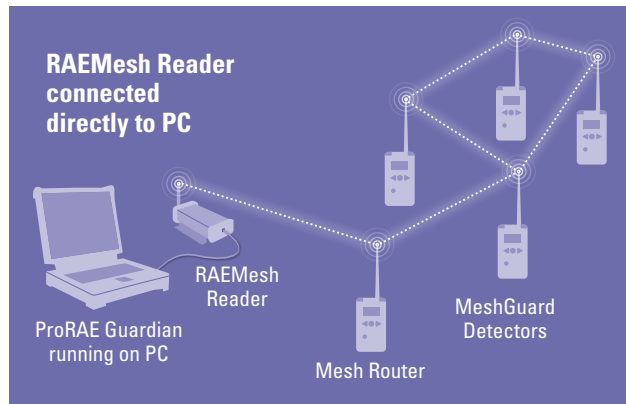
Tools That Enhance Your MeshGuard Monitoring Network



RAEMESH READER

The RAEMesh Reader is a device that allows the use of PC (instead of dedicated controller) to monitor wireless detectors in real time.

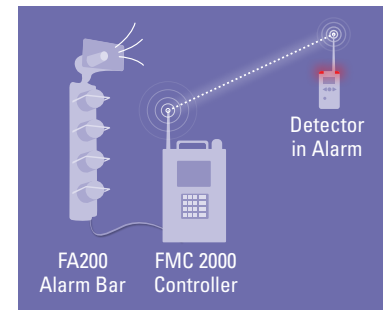
- The RAE Mesh Reader receives data wirelessly from remote detectors, and pushes data to ProRAE Guardian software running on a PC
- The RAE Mesh Reader can push data directly to a PC via RS232, or to a remote PC via ethernet
- The RAE MeshReader is designed to be located in non-hazardous, indoor locations. An optional outdoor antenna with a 30ft (10m) cable can be used to extend the usage to outdoor locations



ECHOVIEW

The RAE Systems EchoView is a portable, intrinsically safe (Class I, Division 1 and Zone 0) alarm notification device that allows you to monitor your sensor network remotely. It displays the sensor readings of up to 16 MeshGuard Monitors on a wireless network and retrieves all monitor information that is typically viewed on the system controller.

- Class I, Division 1 (Zone 0) certified
- Allows users to be away from the controller and still be notified of alarm conditions
- The EchoView gets all sensor readings directly from the controller
- 10+ days run time with internal battery, 45+ days run-time with external PowerPak



FA200 ALARM BAR

The FA200 Alarm Bar has one audible (112dB at 10ft/3m) and four visible alarms. The alarm logic is fully configurable from the FMC 2000 multi-channel controller.

The FA200 Alarm Bar uses a simple mil-spec connector to connect to the FMC-2000 controller up to 30ft (10m) away. The five internal relays on the controller come pre-wired for use with an FA200 Alarm Bar, or can be rewired to trigger a variety of external alarms or process controls.

CORPORATE HEADQUARTERS

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DS-1072-02

WORLDWIDE SALES OFFICES

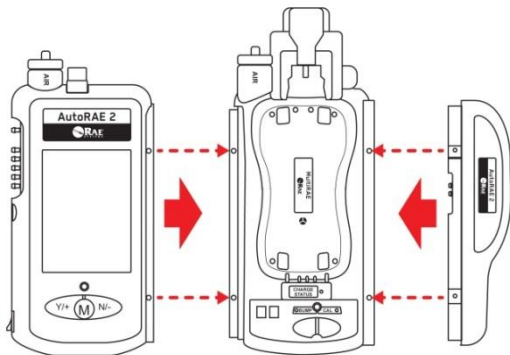
USA/Canada 1.877.723.2878
Europe +45.86.52.51.55
Middle East +00971.4.440.5949
China +86.10.5885.8788-3000
Asia Pacific +852.2669.0828

Setup

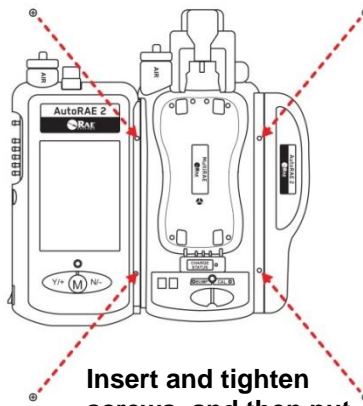
Before using the AutoRAE 2 Controller and AutoRAE 2 Cradle(s) to bump test or calibrate ToxiRAE Pro-family, QRAE 3, MicroRAE, Handheld PID, and/or MultiRAE-family (pumped versions) instruments, follow the instructions in the AutoRAE 2 User's Guide for programming the gas configurations. The steps to follow for assembly and gas configuration, as well as functionality, are the same for all cradles.

Connections

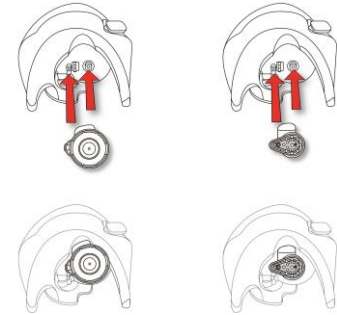
Assemble the system. Connect the AutoRAE 2 Controller to any Cradles, and then connect the Terminator. For ToxiRAE Pro Cradles, insert the appropriate adapter.



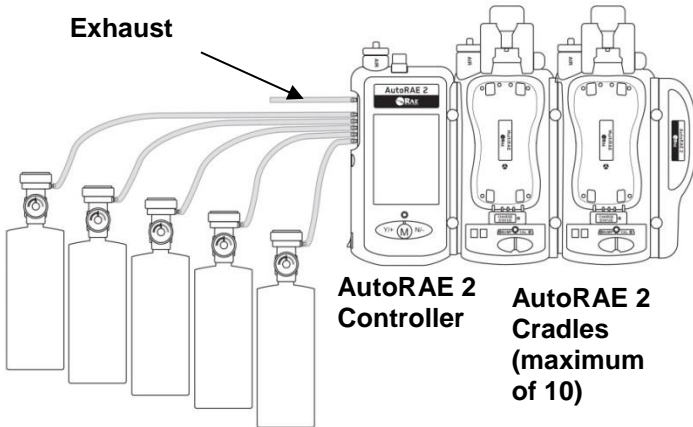
Attach Controller to Cradle(s) and then attach Terminal Adapter to last Cradle.



Insert and tighten screws, and then put caps over screws.

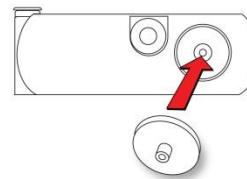


The ToxiRAE Pro Cradle requires an adapter to be inserted in the capture mechanism. ToxiRAE Pro and ToxiRAE Pro LEL (L) and ToxiRAE Pro PID (R).

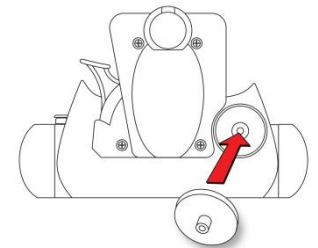


Calibration gas cylinders (each must have a demand-flow regulator)

AutoRAE 2 Controller
AutoRAE 2 Cradles (maximum of 10)



Press filter onto receptacle at end of Controller

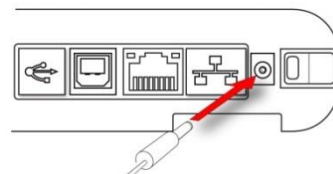
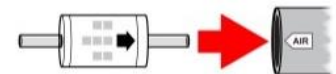


Press filter onto receptacle at end of Cradle



UltraRAE 3000 or ppbRAE 3000 only:

Use an Active Carbon Filter for VOC filtering



Plug the barrel from AC adapter into jack. Then plug its cord into the transformer, and the transformer into AC power source.

Important! Make sure an SD card is installed in the AutoRAE 2 Controller. The system cannot operate if an SD card is not installed. For installation instructions, consult the AutoRAE 2 User's Guide. Make sure the AutoRAE 2 Controller's RTC (real-time clock) has been set in ProRAE Studio II before its first use.

Turning The System On

Toggle the switch on the side of the AutoRAE 2 Controller. The display and power LED glow, and the LEDs on attached cradles light up. The AutoRAE 2's internal pump and the valves in the system are tested. If self-checkout is successful, the system is ready to use. The display provides a list of the AutoRAE 2 Cradles, and if there are instruments in them, the names of the instruments are included in this list.

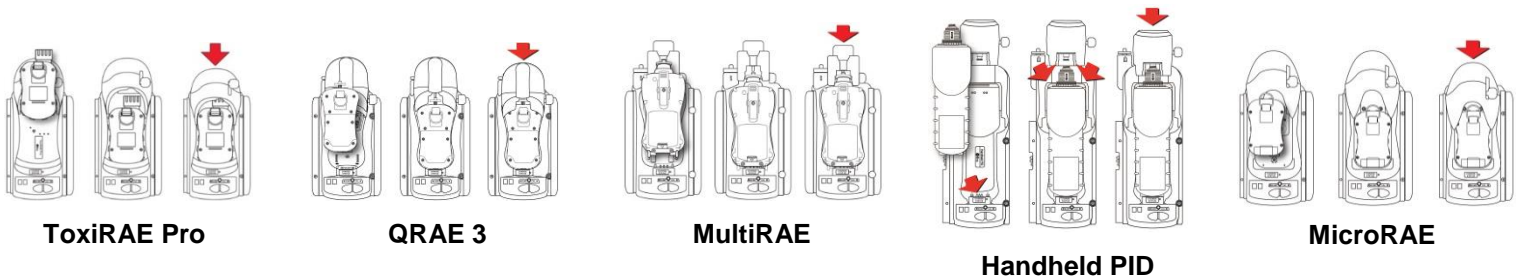
Make sure calibration gases match the configurations created in ProRAE Studio II and transferred to the AutoRAE 2 Controller. Also make sure the gas cylinders have sufficient gas in them and that they are attached properly.

Place An Instrument In The Cradle

Make sure the filter on the instrument is not dirty or clogged (MiniRAE 3000, ppbRAE 3000, UltraRAE 3000, and MiniRAE Lite must be equipped with Quick Connectors and have their inlet probes removed).

Important! For MicroRAE, make sure the external filter is removed from the unit before placing it in the Cradle.

1. Make sure the instrument is in AutoRAE 2 Mode or turned off.
2. Place the instrument into the cradle face-down, making sure that it is aligned correctly with the contacts on the AutoRAE 2 Cradle's charging port. There are two alignment points on one side and one alignment point on the other side, designed to mate with matching points on the bottom of the instrument.
3. Press in on the capture mechanism to lock the instrument in place.



Automatic Warm-Up Before Bump Testing Or Calibrating

When you place an instrument in the cradle and lock the capture mechanism, the instrument begins charging and is automatically warmed up. Warm-up time depends on the sensors installed in the instrument and their individual warm-up requirements.

Display Color Coding

The AutoRAE 2 Controller has a color display, so colors are used to indicate status in different categories of information.

Status	Color	Explanation
Pass	Green	<ol style="list-style-type: none"> 1. All sensors and alarms passed bump test. 2. All sensors and alarms passed calibration.
Pass?	Green	<ol style="list-style-type: none"> 1. All sensors that were tested passed bump test. Some sensors were not tested. 2. All sensors that were calibrated passed calibration. Some sensors were not calibrated.
Fail	Red	<ol style="list-style-type: none"> 1. One or more sensors or alarms failed bump test. 2. One or more sensors or alarms failed calibration. 3. Monitor not detected after 30 minutes. 4. Monitor warm-up or other error.
Warning	Yellow	Sensor does not match the gas.
Warm-up	None	Instrument warm-up.
Ready	None	Instrument ready to bump test or calibrate.

Bump Testing

You can bump test all or individually selected instruments that are seated in the system's cradles.

From the main screen, enter Bump Test by pressing [Y/+] twice ("Function" and then "Select").

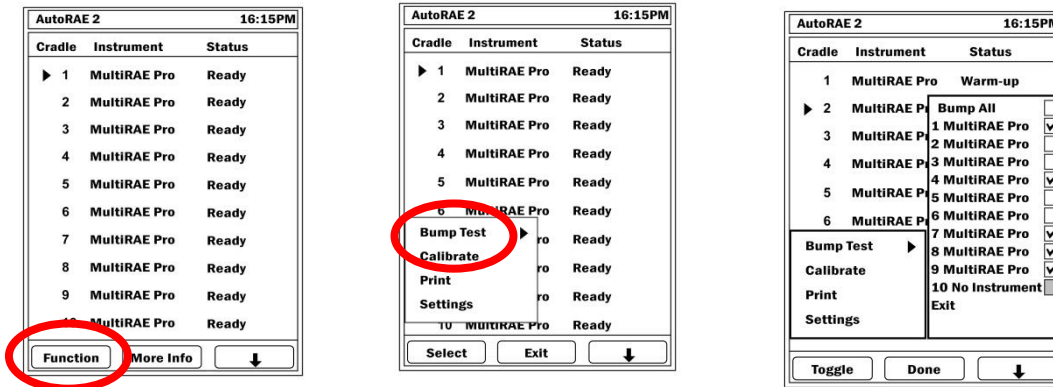
Note: Any cradle that does not have an instrument in it is shown with a gray checkbox. You cannot check/uncheck this box.

To select all instruments in cradles to bump test:

1. Press [Y/+]. When you check "Bump All," the "Bump All" checkbox and all of the other checkboxes for cradled instruments are automatically checked.
2. Press [MODE] for "Done."
3. Press [Y/+] to start.

To select specific instruments to bump test:

1. Press [N/-] to scroll down the list to an instrument you want to select for bump testing.
2. Press [Y/+] to toggle the selection between unchecked and checked.
3. Press [MODE] for "Done."
4. Press [N/-] to select "Exit," and then press [Y/+] to exit.



If you did not press [Y/+] to start the process, then a countdown begins. When the countdown reaches zero, then the instruments are bump tested.

To abort a bump test: Press [N/-]. You will be asked if you want to abort the process. Press [Y/+] for "Yes" and [N/-] for "No."

IMPORTANT!

If an instrument does not pass a bump test, a full calibration is automatically started.

Calibration

You can calibrate all or individually selected instruments that are seated in the system's cradles.

From the main screen, enter Calibrate by pressing [Y/+] ("Function"), and then [N/-] until "Calibrate" is highlighted. Then press [Y/+] to select it.

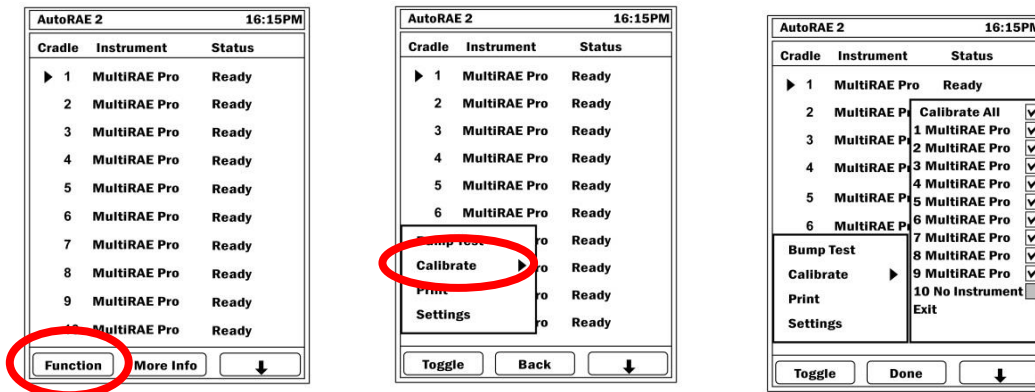
Note: Any cradle that does not have an instrument in it is shown with a gray checkbox. You cannot check/uncheck this box.

To select all instruments to calibrate:

1. Press [Y/+]. When you check "Calibrate All," the "Calibrate All" checkbox and all of the other checkboxes for cradled instruments are checked.
2. Press [MODE] for "Done."
3. Press [Y/+] to start.

To select specific instruments to calibrate:

1. Press [N/-] to scroll down the list to an instrument you want to select for calibration.
2. Press [Y/+] to toggle the selection between unchecked and checked.
3. Press [MODE] for "Done."
4. Press [N/-] to select "Exit," and then press [Y/+] to exit.

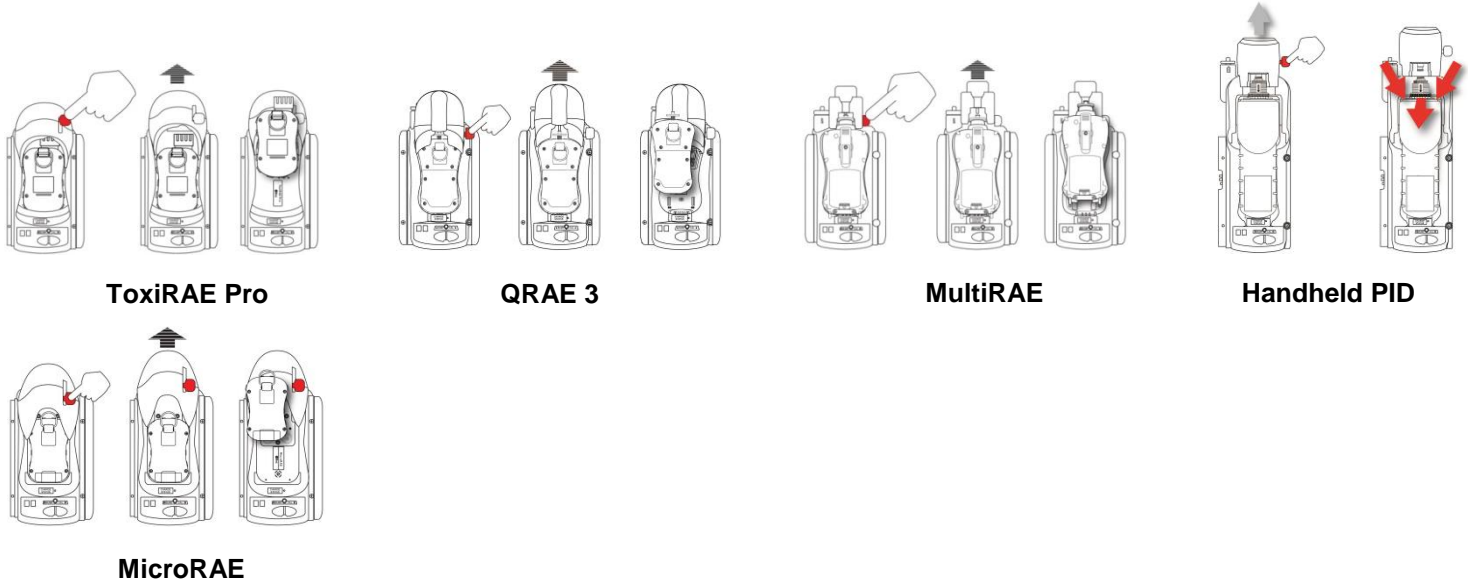


If you did not press [Y/+] to start the process, then a countdown begins. When the countdown reaches zero, then the instruments are calibrated.

To abort calibration: Press [N/-]. You will be asked if you want to abort the process. Press [Y/+] for "Yes" and [N/-] for "No."

Removing An Instrument From A Cradle

To remove an instrument from a cradle, press the button to release the capture mechanism. Then lift the instrument from its inlet end.



Charging An Instrument's Battery

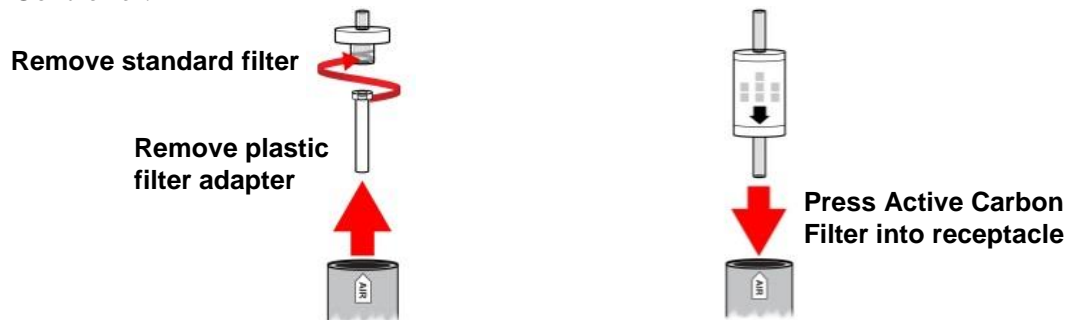
Each AutoRAE 2 Cradle attached to an AutoRAE 2 Controller automatically charges an instrument's battery when it is docked. The Charge Status LED glows red to indicate that charging is taking place. When the instrument's battery is fully charged, the LED glows green.

Active Carbon Filter For Removing VOC

Whether zeroing a ppbRAE 3000, an UltrRAE 3000, or in an environment in which the ambient air has VOC (volatile organic compounds), it is strongly recommended to use an Active Carbon Filter (P/N: 490-0006-000), which filters out VOC from the air.

When an AutoRAE Controller is used with one or more Cradles, the air inlet on each attached cradle is disabled and air is taken in through the Controller's air inlet. Therefore, you only need to use one Active Carbon Filter for the Controller instead of on each cradle. To install the Active Carbon Filter on the Controller:

1. Remove the standard filter (if one is installed).
2. Remove the plastic filter adapter by twisting the plastic filter clockwise while gently pulling outward.
3. Press the Active Carbon Filter into the receptacle. The filter is designed for 20 uses. To help you keep track of how many calibrations are performed, there are 20 small boxes painted on the surface of the filter that you can mark with a pen after each use. **Note:** Make sure the arrow on the side of the filter points toward the Controller.

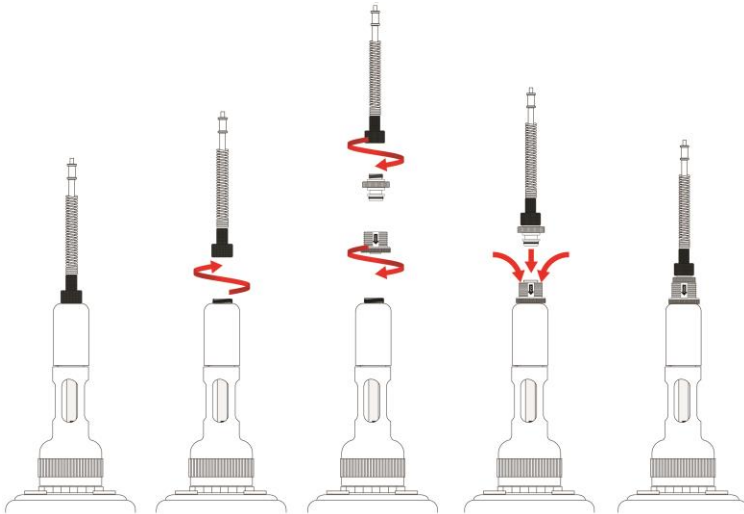


Handheld PID Monitors Must Be Equipped With A Quick Connector

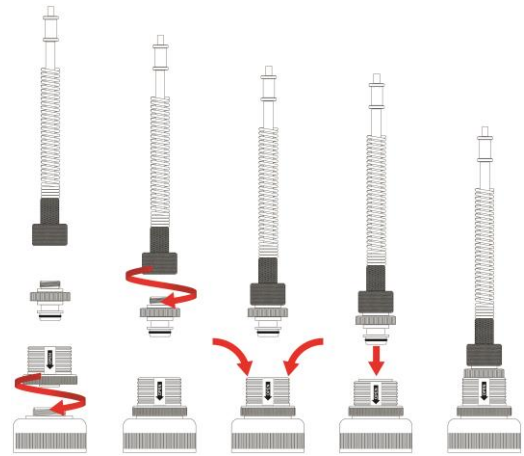
You must remove the inlet probe before placing a handheld PID instrument (MiniRAE Lite, MiniRAE 3000, ppbRAE 3000, or UltraRAE 3000) into the cradle. If the instrument does not have a Quick Connector (P/N: T02-3301-000) already installed, you must install one.

Installing A Quick Connector

UltraRAE 3000:



MiniRAE Lite, MiniRAE 3000, or ppbRAE 3000:



Do not use a RAE-Sep Tube in the UltraRAE 3000 tube holder when using it with an AutoRAE 2 Cradle.



EchoView Host

Mini-Controller for Closed-Loop Wireless Solutions for Portable Gas Monitors



The EchoView Host mini-controller is the cornerstone of RAE Systems' Closed-Loop Wireless Solutions for portable gas monitors. This rugged handheld device can establish a self-contained wireless network with up to eight supported RAE Systems portable monitors and display their readings and alarm status in real time on an easy-to-read screen.

RAE Systems' Closed-Loop Wireless Solutions provide safety professionals real-time access to the readings and alarm status of workers' gas monitors to enable faster incident response. Safety officers who may not be directly at the scene can now have the same real-time visibility as those in the "hot zone."

- Remote wireless access to real-time readings and alarm status of portable gas monitors for faster incident response
- Supported wireless gas monitors:
 - ToxiRAE Pro single-gas monitor family
 - QRAE 3 4-gas pumped and diffusion monitor family
 - MultiRAE multi-gas/multi-threat monitor family
- Intrinsically safe for Class I, Division 1 hazardous environments

KEY FEATURES

- Establishes a closed-loop wireless network with and displays real-time readings and alarm status of up to eight portable gas monitors at the same time
- Communication range extendable to 0.6 mi (1 km) with Mesh Routers
- Field-replaceable battery with a 10-day runtime
- Bright-red high-visibility alarm lights
- Loud audible alarm, 90dB @ 30cm
- Highly-resistant to electromagnetic and radio interference
- IP-65 water and dust ingress protection rating

APPLICATIONS

- Aircraft maintenance (wing tank entry)
- Confined space entry
- Environmental
- Fire service
- HazMat response
- Refinery turnarounds

Mesh Router extends the communications range between the EchoView Host and gas monitors



ToxiRAE Pro, QRAE 3 and MultiRAE wireless portable gas monitors



EchoView Host



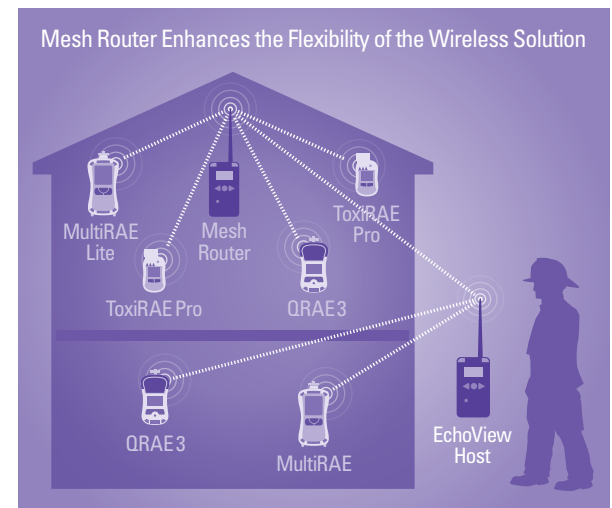
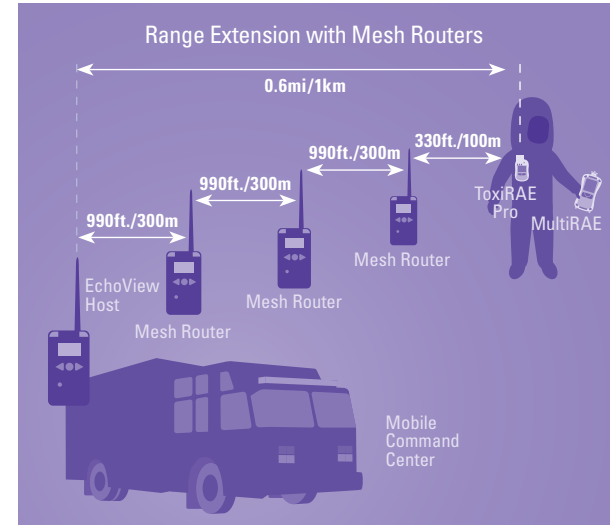
Mini-Controller for Closed-Loop Wireless Solutions for Portable Gas Monitors

SPECIFICATIONS*

Size	10.5" L x 3.7" W x 2.1" H (26.5 cm x 9.5 cm x 5.5 cm)
Weight	1.3 lbs (0.6 kg)
Visual Alarm	2 super-bright red LED lights
Audible Alarm	90dB @ 30cm
Wireless Network	RAE Systems Dedicated Wireless Network
Wireless Frequency	ISM license-free bands
Wireless Range (Typical)	990 feet (300 meters) - EchoView to Mesh Router 330 feet (100 meters) - EchoView to ToxiRAE Pro, QRAE 3 and MultiRAE
Keypad	Three operation and programming keys
Display	Backlit LCD (1" x 1.5" / 72mm x 108mm)
Power Supply	Disposable Lithium battery
Operating Time	10 days, 24/7
Operating Temperature	-4° to 122° F (-20° to +50° C)
Humidity	10% to 90% relative humidity, non-condensing
IP Rating	IP-65
Certifications	US and Canada: Class I, Division 1, Groups A, B, C and D, T4 Europe: ATEX IM1/II 1G Ex ia I/IIC T4 IECEX Ex ia I/IIC T4
RF Certifications	FCC Part 15, CE. Contact manufacturer for country-specific wireless certification
Warranty	1 year

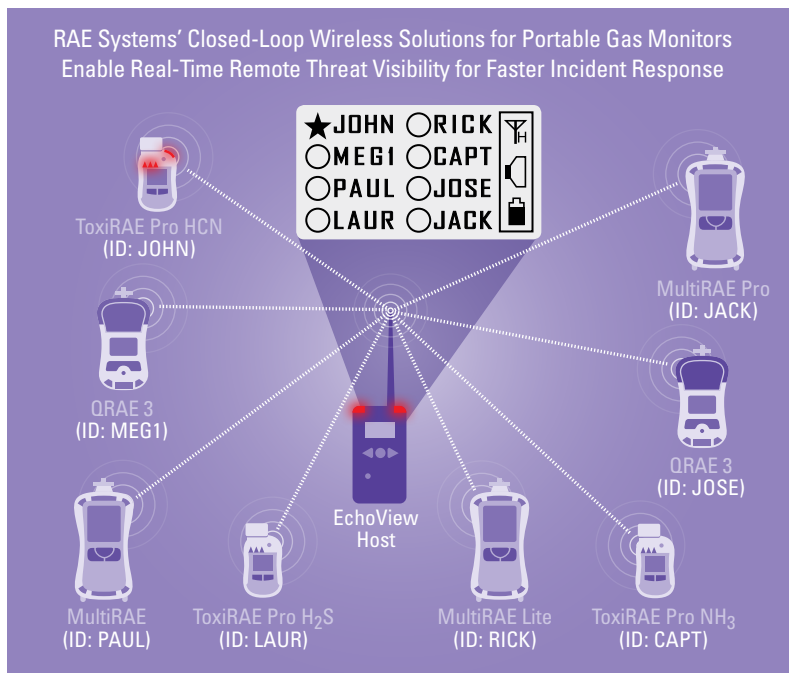
*Specifications are subject to change.

RAE SYSTEMS' CLOSED-LOOP WIRELESS SOLUTIONS FOR PORTABLE GAS MONITORS WITH ECHOVIEW HOST MINI-CONTROLLER



ORDERING INFORMATION

EchoView Host: F04-Axx1-100
 Mesh Router: F04-Bxx1-100
 Refer to the Portables Pricing Guide for specific part numbers



CORPORATE HEADQUARTERS

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