



# QRAE Plus

## Four-Gas Confined Space Gas Detector

### Advanced and Compact Four-Gas Confined Space Gas Detector

The **QRAE Plus** is a full-featured, compact, two- to four-sensor confined space gas detector. Key features include easy-to-change, externally accessed battery packs (available in both alkaline and rechargeable versions) and a water-resistant case. The rechargeable, Lithium-ion battery pack provides up to 20 hours of continuous operation. The **QRAE Plus** includes 16,000 datalogging points of storage capacity for download to any PC compatible with Windows 98, NT, 2000 and XP.

#### Key Features

##### One to four plug-in "smart" sensors

- Combustibles
- Oxygen
- Hydrogen sulfide
- Carbon monoxide

##### Optional toxic sensors

- Sulfur Dioxide (SO<sub>2</sub>)
- Nitric Oxide (NO)
- Nitrogen Dioxide (NO<sub>2</sub>)
- Chlorine (Cl<sub>2</sub>)
- Hydrogen Cyanide (HCN)
- Ammonia (NH<sub>3</sub>)
- Phosphine (PH<sub>3</sub>)

**Rechargeable Lithium-ion battery pack** provides up to 20 hours of continuous operation

**Rugged housing** with stands use in harsh environments

- Water- and dust-resistant case
- Strong protective rubber boot

#### Additional Advantages

- Highly resistant to radio-frequency and other electromagnetic interference
- Strong, built-in sample draw pump draws up to 100 feet (30 meters horizontally or vertically)
- Also available in diffusion configuration
- One-button calibration with auto-zero capability
- Loud audible alarm
- Bright visible alarm
- Interchangeable Lithium-ion and alkaline battery packs

#### Applications

##### Confined Space Entry

- Waste-water treatment plants
- Marine and off-shore oil wells
- Landfill operations
- Trenches, silos, railcars
- Coal mines
- Cruise ships
- Sewers and manholes
- Tunnels

**Refineries and petrochemical plants** including off-shore drilling and plant shutdowns

##### Power plants

##### Pulp and paper industry

##### Steel mills



ATEX



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## Specifications\*

### Sensor Specifications

Gas Monitor	Range	Resolution
Oxygen	0-30.0%	0.1%
Combustible	0-100% LEL	1% LEL
Carbon Monoxide	0-500 ppm	1 ppm
Hydrogen Sulfide	0-100 ppm	1 ppm
Sulfur Dioxide	0-20.0 ppm	0.1 ppm
Nitric Oxide	0-250 ppm	1 ppm
Nitrogen Dioxide	0-20.0 ppm	0.1 ppm
Chlorine	0-10.0 ppm	0.1 ppm
Hydrogen Cyanide	0-100 ppm	1 ppm
Ammonia	0-50 ppm	1 ppm
Phosphine	0-5.0 ppm	0.1 ppm

### Detector Specifications

<b>Size</b>	4.5"L x 3.0"W x 1.8"H (11.5 x 7.6 x 4.6 cm)
<b>Weight</b>	15 oz (425 g) with battery w/o rubber boot
<b>Sensors</b>	<ul style="list-style-type: none"> <li>• Combustible: Protected dual-mode catalytic bead</li> <li>• Oxygen: Electrochemical fuel-cell</li> <li>• Toxic: Interchangeable electrochemical for CO, H<sub>2</sub>S, SO<sub>2</sub>, NO, NO<sub>2</sub>, Cl<sub>2</sub>, HCN, NH<sub>3</sub>, and PH<sub>3</sub></li> </ul>
<b>Battery</b>	<ul style="list-style-type: none"> <li>• Interchangeable Li-ion and alkaline battery packs</li> <li>• Rechargeable units include Li-ion battery pack with internal smart charging, 120V AC/DC wall adapter, and spare alkaline battery pack</li> </ul>
<b>Operating Hours</b>	<ul style="list-style-type: none"> <li>• Diffusion: Up to 20 hours continuous operation with Li-ion battery, up to 18 hours with alkaline battery (typical without alarm)</li> <li>• Pump: Up to 16 hours continuous operation with Li-ion battery, up to 12 hours with alkaline battery (typical without alarm)</li> </ul>
<b>Display</b>	2 line, 16 digit LCD with LED back light automatically in dim light or alarm condition
<b>Keypad</b>	1 operation and 2 programming keys
<b>Direct Readout</b>	Instantaneous reading of up to four sensors <ul style="list-style-type: none"> <li>• Oxygen as percentage by volume</li> <li>• Combustible gas as percentage of lower explosive limit (LEL) (scalable using Correction Factors)               <ul style="list-style-type: none"> <li>- Thermal conductivity mode as percent volume (option)</li> </ul> </li> <li>• Toxic gases as parts per million by volume</li> <li>• High and low values for all gases</li> <li>• STEL and TWA values of toxic gases</li> <li>• Battery and shutdown voltage</li> <li>• Date, time, elapsed time, temperature</li> </ul>
<b>Alarms</b>	95dB buzzer (at 30 cm) and flashing red LED to indicate exceeded preset limits <ul style="list-style-type: none"> <li>• High: 3 beeps, vibrations and flashes per second</li> <li>• Low: 2 beeps, vibrations and flashes per second</li> <li>• STEL and TWA: 1 beep, vibration and flash per second</li> <li>• Alarms latching with manual override or automatic reset</li> <li>• Additional diagnostic alarm and display message for low battery and pump stall</li> </ul>
<b>EM/RFI</b>	Highly resistant to EMI/RFI. Compliant with EMC Directive 89/336/EEC
<b>IP Rating</b>	IP-55, protected against dust and low-pressure jets of water from all directions
<b>Datalogging</b>	Standard 67 hours at one-minute intervals, with serial number of unit, user ID, site number, calibration date
<b>Calibration</b>	Two-point calibration for zero and span, user-selectable three-point calibration for oxygen
<b>Sampling Pump</b>	Optional, internal pump with user selectable flow-rate: High: ~250cc/min, Low: ~150cc/min
<b>Low Flow Alarm</b>	Auto shut-off pump at low flow condition

### Detector Specifications (continued)

<b>Hazard Area Approval</b>	<ul style="list-style-type: none"> <li>• US and Canada: UL, CSA (pump only), Classified as Intrinsically Safe for use in Class I, Division I Groups A, B, C, D, T3C</li> <li>• Europe: ATEX II 2G EEx ia d IIC T3 &amp; T4</li> </ul>
<b>Approval</b>	-4° to 113°F (-20° to 45°C)
<b>Temperature Humidity</b>	0% to 95% relative humidity (non-condensing)
<b>Attachments</b>	Belt Clip on rugged black rubber boot
<b>Warranty</b>	Lifetime on non-consuming components (per RAE Systems Standard Limited Warranty) 2 years for O <sub>2</sub> , LEL and CO, and H <sub>2</sub> S sensors 1 year for all other electrochemical sensors 1 year for pump and battery

\*Ongoing projects to enhance our products mean that these specifications are subject to change

### Monitor-only includes:

- Monitor as specified
- Sensors as specified
- Calibration adapter
- Quick reference guide
- Operation and maintenance manual
- Training CDROM
- Rubber boot with belt-clip
- Pumped units additionally include:
  - 3 external filters
  - External filter adapter
  - Inlet probe 3"
- ProRAE Suite Software Package for Windows 98, 2000, NT and XP
- Computer interface cable

### Battery Options

- Alkaline-only includes standard alkaline battery pack
- Rechargeable units include:
  - Lithium-ion battery pack
  - 120 V or 230 V AC/DC wall adapter
  - Spare alkaline battery pack

### Monitor with Accessories Kit

- Hard transport case with pre-cut foam
- 15 feet (5 meters) Tygon® tubing
- Constant-flow hand pump (for diffusion models)
- Tool Kit

### Optional Calibration Kit

- Four-gas mix in a 34L cylinder (50% LEL, 20.9% O<sub>2</sub>, 10 ppm Hydrogen Sulfide, 50 ppm Carbon Monoxide)
- Calibration regulator and tubing

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