

About RAE Systems

RAE Systems is a leading global provider of rapidly deployable sensor network solutions that enable real-time safety and security threat detection. RAE Systems' products are used in over 65 countries by many of the world's leading corporations and government agencies.

RAE Systems' products offer solutions in multi-sensor chemical detection, wireless gas detection, and radiation and digital video monitoring through a range of network options. Applications include personal, portable, area, and fixed monitoring in energy production and refining, industrial and environmental safety, and public and government first responder security sectors.

A proven technology leader that owns and manufactures its chemical sensor technology, RAE Systems holds over 18 chemical sensor patents and two digital video recorder patents, and has developed proprietary photoionization, wireless, and radiation technologies. By leveraging an established, China-based manufacturing subsidiary with its global sales channel and partners, RAE Systems provides the highest level of quality, value, and satisfaction to its customers around the world.



RAE Systems Product Selection Guide

Product Category	Tubes	Single-Gas			Multi-Gas			Multi-Gas Plus PID			PID		Compound-Specific		Autocal Station	
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Product Name	Tubes and Pump	BadgeRAE	ToxiRAE II	ToxiRAE Plus PID	QRAE II	QRAE Plus	VRAE	EntryRAE	MultiRAE Plus	MultiRAE IR	MiniRAE 3000	ppbRAE 3000	UltraRAE	ChemRAE	AutoRAE	
Product Description	RAE Colorimetric Gas Detection Tubes	Zero maintenance two-year Gas Detector for H ₂ S or CO	Reusable Single-Gas Personal Protection Monitor	PID Personal Gas Monitor with Rechargeable Battery	Compact Multi-Gas Detector for H ₂ S, CO, O ₂ , Combustibles	4-Gas Confined Space Monitor	Hand-held 5-Gas Survey Monitor	4-Gas Confined Space Entry Monitor, with Photoionization (PID) Detector	5-Gas Monitor with VOC Detection	5-Gas Monitor with VOC and CO ₂ Detection	Hand-held VOC Monitor	Hand-held ppb VOC Monitor	Specific Compound Monitor	Wireless Chemical Warfare Agent Detector	Automated Bump Test and Calibration System	
Measurements & Range																
Combustibles	Hydrocarbons (HC): 50 to 1,000 ppm	—	—	—	1 to 100% LEL	1 to 100% LEL	1 to 100% LEL 1 to 100% VOL	1 to 100% LEL 1 to 5% VOL	1 to 100% LEL	1 to 100% LEL	1 to 100% LEL	—	—	—	—	Yes
O ₂	—	—	0.1 to 30% VOL	—	0.1 to 30% VOL	0.1 to 30% VOL	0.1 to 30% VOL	0.1 to 30% VOL	0.1 to 30% VOL	0.1 to 30% VOL	0.1 to 30% VOL	—	—	—	—	Yes
CO, H ₂ S	CO: 5 ppm to 4% (5 Tubes) H ₂ S: 0.2 ppm to 40% (10 Tubes)	CO: 1 to 300 ppm H ₂ S: 1 to 100 ppm (no concentration displayed)	CO: 1 to 500 ppm or 10 to 2,000 ppm H ₂ S: 1 to 100 ppm	—	CO: 1 to 1,000 ppm H ₂ S: 1 to 100 ppm	CO: 1 to 500 ppm H ₂ S: 1 to 100 ppm	CO: 1 to 1,500 ppm H ₂ S: 1 to 500 ppm	CO: 1 to 500 ppm H ₂ S: 1 to 100 ppm	CO: 1 to 500 ppm H ₂ S: 1 to 100 ppm	CO: 1 to 500 ppm H ₂ S: 1 to 100 ppm	CO: 1 to 500 ppm H ₂ S: 1 to 100 ppm	—	—	—	—	Yes
Other Sensors	More than 30 gases available	—	NH ₃ , Cl ₂ , ClO ₂ , HCN, NO, NO ₂ , PH ₃ , SO ₂	—	SO ₂	SO ₂ , NO, NO ₂ , Cl ₂ , HCN, NH ₃ , PH ₃	SO ₂ , NO, NO ₂ , Cl ₂ , HCN, NH ₃ , PH ₃	—	SO ₂ , NO, NO ₂ , Cl ₂ , HCN, NH ₃ , PH ₃	SO ₂ , NO, NO ₂ , Cl ₂ , HCN, NH ₃ , PH ₃ , CO ₂	—	—	Specific: Benzene: 0.1 to 200 ppm Butadiene: 0.1 to 200 ppm	CWA Library TIC Library	No	
PID	—	—	—	10.6 eV: 0.1 to 2,000 ppm 9.8 eV: 0.1 to 2,000 ppm	—	—	—	10.6 eV: 1 to 1,000 ppm	10.6 eV: 0.1 to 2,000 ppm 9.8 eV: 0.1 to 2,000 ppm	10.6 eV: 0.1 to 2,000 ppm 9.8 eV: 0.1 to 2,000 ppm	10.6 eV: 0.1 to 15,000 ppm 9.8 eV: 0.1 to 5,000 ppm 11.7 eV: 0.1 to 2,000 ppm	10.6 eV: 1 ppb to 10,000 ppm 9.8 eV: 10 ppb to 5,000 ppm 11.7 eV: 10 ppb to 2,000 ppm	10.6 eV: 0.1 to 2,000 ppm 9.8 eV: 0.1 to 2,000 ppm 11.7 eV: 0.1 to 2,000 ppm	—	—	Yes
Radiation	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	No
Features																
Wireless	—	—	—	—	—	Yes	—	—	Yes	Yes	Yes	Yes	—	Yes	—	
GPS	—	—	—	—	—	—	—	—	—	—	When used with RAELink3	When used with RAELink3	—	—	—	
Datalogging	—	—	Peak logging	4,000 data points	60,000 data points	16,000 data points	16,000 data points	36,000 data points	24,000 data points	24,000 data points	520,000	520,000	3,000 data points	—	—	
AutoRAE	—	—	—	—	Yes	Yes	—	Yes	Yes	Yes	Yes	Yes	—	—	—	
Certifications	—	UL, cUL, ATEX, IECEx	UL, cUL, ATEX, IECEx	UL, cUL, ATEX	cCSAus, ATEX, IECEx (pending)	UL, CSA, ATEX	UL, cUL	UL, cUL, ATEX	UL, cUL, ATEX	UL, cUL, ATEX	—	cCSAus, ATEX (pending)	cCSAus, ATEX (pending)	UL, cUL, ATEX	—	
Sampling Mode	Manual pump	Diffusion	Diffusion	Diffusion with fan	Diffusion	Diffusion or pump	Pump	Pump	Pump	Pump	Pump	Pump	Pump	Pump	—	
AutoRAE Compatible	—	—	—	—	Yes	Yes	—	Yes	Yes	Yes	Yes	Yes	—	—	—	

RAE Systems Product Selection Guide (CONTINUED)

Product Category	Area Monitoring					Fixed				Radiation			Decision Support Tools		
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Product Name	MeshGuard	SentryRAE Steel	AreaRAE Steel	RAELink2	SolarRAE	RAEGuard LEL	RAEGuard IR	RAEGuard EC	RAEGuard PID	GammaRAE II R	NeutronRAE II	DoseRAE	PlumeRAE	HazRAE	LifeShirt
Product Description	Wireless Gas Detector with Extended Battery Life	Multi-Channel, Compact, and Transportable Multi-Gas Monitor	Rapidly Deployable Wireless Multi-Gas Monitor	Portable Wireless Modem—Remote Host	Remote Alternative Power Source	Fixed Catalytic Gas Detector & Transmitter	Fixed Infrared Gas Detector & Transmitter	Fixed Toxic Gas Detector & Transmitter	Fixed PID Detector & Transmitter	Radiation Detector and Dosimeter in one	Personal Radiation Detector	Electronic Personal Dosimeter	Plume Measurement and Decision Support	Chem/Bio/WMD/Rad Decision Support	Real-Time Life Sign Monitoring of First Responders & Industrial Personnel
Measurements & Range															
Combustibles	Available January, 2008	1 to 100% LEL	1 to 100% LEL	—	—	1 to 100% LEL	HC (C ₃ H ₈) 1 to 100% LEL Methane (CH ₄) 1 to 100% LEL	—	—	—	—	—	1 to 100% LEL	—	—
O ₂	—	0.1 to 30% VOL	0.1 to 30% VOL	—	—	—	—	0 to 30% VOL	—	—	—	—	0.1 to 30% VOL	—	—
CO, H ₂ S	CO: 1 to 500 ppm CO: 10 to 2,000 ppm H ₂ S: 1 to 100 ppm	CO: 1 to 500 ppm H ₂ S: 1 to 100 ppm	CO: 1 to 500 ppm CO: 10 to 20,000 ppm H ₂ S: 1 to 100 ppm	—	—	—	—	CO: 1 to 1,000 ppm H ₂ S: 1 to 300 ppm	—	—	—	—	CO: 1 to 500 ppm CO: 10 to 20,000 ppm H ₂ S: 1 to 100 ppm	—	—
Other Sensors	—	SO ₂ , NO, NO ₂ , Cl ₂ , HCN, NH ₃ , PH ₃	SO ₂ , HF, NO, NO ₂ , Cl ₂ , HCN, NH ₃ , PH ₃ , HCl	—	—	—	—	SO ₂ : 0.1 to 150 ppm	—	—	—	—	SO ₂ , HF, NO, NO ₂ , Cl ₂ , HCN, NH ₃ , PH ₃ , HCl	96,000 materials MHE electronic library	Heart rate, breath rate, skin temperature, activity posture
PID	—	10.6 eV: 0.1 to 2,000 ppm 9.8 eV: 0.1 to 2,000 ppm	10.6 eV: 0.1 to 2,000 ppm 9.8 eV: 0.1 to 2,000 ppm	—	—	—	—	—	10.6 eV: 10 to 20 ppm 0.1 to 100 ppm 1 to 1,000 ppm 9.8 eV: 10 to 20 ppm 0.1 to 100 ppm 1 to 1,000 ppm	—	—	—	10.6 eV: 0.1 to 2,000 ppm 9.8 eV: 0.1 to 2,000 ppm	—	—
Radiation	—	—	Optional Gamma 1 to 4,000 1MR/h	—	—	—	—	—	—	Gamma 1MR/h to 10 R/h	Gamma: 1MR/h to 4,000 R/h Neutron: 1 to 100Cps	Gamma 1MR/h to 500 R/h	Optional Gamma 1 to 4,000 1MR/h	692 isotopes	—
Features															
Wireless	Yes 2.4 GHz Mesh Network	Yes (With external RAELink2)	Yes Built-in 869 or 900 MHz	Yes Built-in 869 or 900 MHz	Yes	—	—	—	—	Yes	Yes	—	Yes Built-in 869 or 900 MHz	Yes Internet enabled	Yes Built-in 869 or 900 MHz
GPS	—	—	Yes	—	—	—	—	—	—	—	—	—	Yes	—	—
Datalogging	—	20,000 data points	20,000 data points	—	—	—	—	—	—	60,000 points	30,000 points	200 points	20,000 data points	Saves previous search results	—
Outputs	—	—	—	N/A	—	4-20mA RS-485 2 dry contacts	4-20mA RS-485 2 dry contacts	4-20mA RS-485 2 dry contacts	4-20mA RS-485 2 dry contacts	N/A	N/A	N/A	—	SD card or connect to PC	N/A
Certifications	UL, cUL, C1 D1, ATEX, IECEx (all pending)	UL	cCSAus, C1 D2, ATEX, CE iP53	CE	—	UL, ATEX	UL, ATEX	UL, cUL, ATEX	UL, cUL, ATEX	Intrinsically Safe (cCSAus, ATEX) CE iP67	Intrinsically Safe (cCSAus, ATEX) CE iP67	CE iP54	—	US DHS Safety Act: Effective	CE
Sampling Mode	Diffusion	Pump	Pump	N/A	—	Diffusion	Diffusion	Diffusion	Pump	Continuous	Continuous	Continuous	Pump	—	N/A

RAE Detector Tubes & Pumps

Colorimetric Gas Detection Tubes

RAE Systems' large selection of Colorimetric Detection Tubes offer quick, on-the-spot measurements of many gases and vapors at a low cost. The tubes are easy to read with a sharp, clear color change, provide accuracy with no need for calibration, and are manufactured by RAE Systems.



Why Choose Tubes Over Traditional Gas Monitors?

RAE Systems detection tubes are used over other analytical methods primarily for their simplicity of use, quick response time, low cost, and ease of maintenance. Since each tube is pre-calibrated, the user does not need any calibration equipment.

Key Features: RAE Tubes

- Easy to read
- Easy to use
- Low cost
- Flexible
- Fast
- Specific
- Maintenance-free
- Multi-Gas detection
- Accurate

Key Features: RAE Pump

- Solid metal construction with RAE Systems' exclusive lifetime warranty
- Springless piston design for accurate 50 and 100 cc volumes
- Tube tip breaker and glass tip holder
- Clear end-of-flow indicator
- Tapered inlet design avoids leaks with different diameter tubes
- Simple stroke counter
- Additional accessories include remote sampling hoses with 15' (5 m) or 35' (11 m) lengths

Gas Tubes Available

Acetone (C ₃ H ₆ O)	Hydrogen Sulfide (H ₂ S)
Amines (RNH ₂)	MEK-Methyl Ethyl Ketone (C ₄ H ₈ O)
Ammonia (NH ₃)	Mercaptans (RSH)
Benzene (C ₆ H ₆)	Methyl Bromide (CH ₃ Br)
Butane (C ₄ H ₁₀)	Nitrogen Dioxide (NO ₂)
Carbon Dioxide (CO ₂)	Nitrogen Oxides (NO _{xv})
Carbon Monoxide (CO)	Ozone (O ₃)
Chlorine (Cl ₂)	Phenol (C ₆ H ₆ O)
Chlorine Dioxide (ClO ₂)	Phosphine (PH ₃)
Diesel Fuel & Jet Fuel	Sulfur Dioxide (SO ₂)
Ethanol (C ₂ H ₆ O)	Toluene (C ₇ H ₈)
Formaldehyde (CH ₂ O)	Trichloroethylene (C ₂ HCl ₃)
Gasoline (C _n H _m)	Vinyl Chloride (C ₂ H ₃ Cl)
Hydrocarbons (HC)	Water Vapor (H ₂ O)
Hydrogen Chloride (HCl)	Xylene (C ₈ H ₁₀)
Hydrogen Cyanide (HCN)	
Hydrogen Fluoride (HF)	



Ordering Information

Part Numbers

H₂S 10-103-10
CO 10-102-18

Toll-Free: 877-723-2878



BadgeRAE

Single Gas Detector

The BadgeRAE personal gas detector provides up to 2 years of continuous, economical, and maintenance-free protection from exposure to Hydrogen Sulfide (H₂S) or Carbon Monoxide (CO).

OSHA Standards

What are the OSHA standards for Carbon Monoxide exposure?

- The OSHA PEL is 50 parts per million (ppm). OSHA standards prohibit worker exposure to no more than 50 parts of the gas per million parts of air averaged during an 8-hour time period.

What are the OSHA standards for H₂S exposure?

- Exposures shall not exceed 20 ppm (ceiling) with the following exception: If no other measureable exposure occurs during the 8-hour work shift, exposures may exceed 20 ppm, but not more than 50 ppm (peak), for a single time period of up to 10 minutes.

Key Features

- Up to 2 years of continuous protection
- Once activated BadgeRAE is always on and monitoring
- No maintenance
 - No sensor replacement
 - No calibration
- Large, easy-to-read LCD display
- One-button integrity self test
 - Alarm function
 - Operational life remaining
 - Alarm limits
 - Peak reading over 24 hours
 - Alarm-minutes used
- Rugged housing
 - Durable, highly impact resistant, carbon loaded ABS housing
 - Highly resistant to RFI interference
 - IP-55 rated weather resistant

- Hands-free use
 - Small enough to be clipped onto a hardhat, shirt pocket, shoulder-strap or belt
- Alarms
 - Low and high alarms
 - 3-D bright LED alarm light
 - Loud buzzer

BadgeRAE Test Station

- Automated bump test station
- Verifies sensor accuracy and response time, and updates the BadgeRAE's display
- Internal controller manages gas flow (saves calibration gas)



Specifications

Sensor Specifications

Gas	Nominal Range	Resolution	Factory Alarm Settings*		Alarm Response
			Low	High	
Hydrogen Sulfide	0 to 100 ppm	1 ppm	10 ppm	15 ppm	<60 seconds
Carbon Monoxide	0 to 300 ppm	1 ppm	35 ppm	200 ppm	<60 seconds

*Custom alarm set points available

Detector Specifications

Size	3.6" x 1.9" x 0.9" (9.3cm x 4.9cm x 2.2cm) Maximum height at sensor vent: 1.36" (3.2cm)
Weight	2.9 oz (83 g) with battery and sensor
Operating Period	2 years typical life
Operating Temperature	<ul style="list-style-type: none"> • Continuous: -4° to 114° F (-20° to 45° C) (T5; for IECEx T4) • Intermittent: -40° to 131° F (-40° to 55° C) (T5; for IECEx T4)



Ordering Information

Part Numbers

H₂S Monitor 045-0000-100
CO Monitor 045-0000-000
BadgeRAE Test Station 045-0520-000

Toll-Free: 877-723-2878



ToxiRAE II Single-Gas Detector

The ToxiRAE II single-gas monitor continuously displays toxic gas concentrations and costs slightly more than disposable gas detectors. Unlike typical disposables that only display remaining sensor life, the ToxiRAE II is a full-featured gas monitor providing continuous, digital display of the gas concentration, STEL, TWA and peak values as well as high, low, TWA and STEL alarms.

Why ToxiRAE II Versus Disposables?

A simple-to-use one-button product, the ToxiRAE II is easy to calibrate. Use the preset alarms or modify the alarms to meet your specific requirements.

In contrast to disposables that are turned on once and remain on until their batteries expire, you may decide when and where to use your ToxiRAE II, and you may turn it on and off accordingly.

Key Features

- IP Rating: IP-65*
- Field-replaceable filter, battery
- Field-replaceable sensor in Europe and Asia only
- Highly resistant to EMI/RFI. Compliant with EMC Directive 89/336/EEC, +60 volts/meter
- Stainless-steel corrosion-resistant alligator clip
- Large, easy-to-read continuous display of gas concentration in ppm
- Displays STEL, TWA, peak values, and alarm minutes used
- 2-year warranty
- User-adjustable High, Low, STEL and TWA alarms

- Bright red flashing alarm
- Loud, 90 dB buzzer
- Built-in vibration alarm
- Holds Peak values
- Simple calibration

* Expected



Specifications

Default Sensor Settings

Gas	Range (ppm)	Resolution (ppm)
Ammonia (NH ₃)	0 to 50	1
Carbon Monoxide (CO)	0 to 500	1
Carbon Monoxide (CO)	0 to 1,999	10
Chlorine (Cl ₂)	0 to 10	0.1
Chlorine Dioxide (ClO ₂)	0 to 1	0.01
Hydrogen Cyanide (HCN)	0 to 100	1
Hydrogen Sulfide (H ₂ S)	0 to 100	1
Nitric Oxide (NO)	0 to 250	1
Nitrogen Dioxide (NO ₂)	0 to 20	0.1
Oxygen (O ₂)	0 to 30%	0.1%
Phosphine (PH ₃)	0 to 5	0.01
Sulfur Dioxide (SO ₂)	0 to 20	0.1

Sensors are not interchangeable.

Detector Specifications

Size	3.6" x 1.9" x 0.9" (9.3cm x 4.9cm x 2.2cm)
Weight	3.6 oz (102 g) with clip
Operating Period	2 years typical battery life for CO/H ₂ S/O ₂ sensors or 730 minutes of alarm
Operating Temperature	-40° to 131° F (-40° to 55° C) (T5; for IECEx T4) for O ₂ , CO, and H ₂ S



Ordering Information

Part Numbers

CO Monitor 045-0512-000
H₂S Monitor 045-0511-000
O₂ Monitor 045-0006-000

Toll-Free: 877-723-2878



ToxiRAE Plus PID Pocket VOC Monitor

The ToxiRAE Plus PID is the world's first and only pocket-sized datalogging photoionization detector (PID). Its small size brings the "broad-band" capabilities of the PID/VOC detector to a personal level for up to 10 hours of continuous and instantaneous monitoring of volatile organic compounds (VOCs).

Definition of TWA, STEL and Ceiling

Typically, the TWA is the lowest value, STEL is somewhat higher and the Ceiling is the highest. Ceiling is the concentration that should never be exceeded, even for one instant. The STEL is a running average concentration over the immediately previous 15-minute period.

The instantaneous concentrations may exceed the STEL value as long as they never exceed the Ceiling, and the 15-minute running average never exceeds the STEL limit. If the STEL alarm level is reached, the worker must be removed from STEL-level exposure for at least one hour.

Workers can be exposed to a maximum of four STEL periods per 8-hour shift, with at least one hour between exposure periods.

For detailed information about calculating STEL, TWA, Min, Max, and Average Values for ToxiRAE PID, refer to RAE Systems Technical Note TN-119 at www.raesystems.com.

Ordering Information

Part number

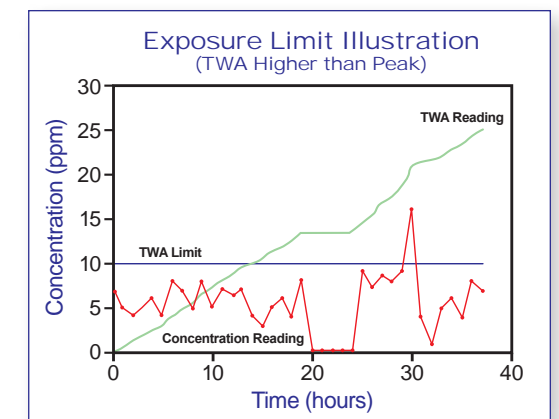
ToxiRAE PID with Datalogging
007-0002-001

Toll-Free: 877-723-2878

Key Features

- Small and light enough to wear in a pocket for a full working shift of protection
- The ToxiRAE Plus PID lamp and sensor come apart in seconds for easy maintenance without tools
- User-friendly screens make it easy to use for simple applications and flexible enough for sophisticated options
- Measure more chemicals than with any other personal PID. With over 38 standard Correction Factors available and the largest printed list of Correction Factors in the world (300+), ToxiRAE Plus PID offers the ability to accurately measure more ionizable chemicals than any other PID
- Large keys operable with up to 3 layers of gloves

- Easy-to-read display with backlight
- Store up to 67 hours of data at one-minute intervals for download to PC with optional datalogging
- Varying audio alarm signals for different alarm conditions including STEL, TWA and Peak
- 10.6 and 9.8 eV lamps are available



Specifications

Sensor Specifications

Gas	Range	Resolution	Response Time
VOC	0 to 99.9 ppm 100 to 2000 ppm	0.1 ppm 1 ppm	5 seconds 5 seconds

Detector Specifications

Size	6.0" L x 1.75" W x 1.0" H (15.2cm x 4.4cm x 2.5cm)
Weight	6.4 oz with battery (180 g)
Operating Period	10 hours continuous operation
Datalogging	Optional 4,000 points downloadable to PC with serial number of unit, user ID, site number, calibration and check-calibration time, date and value
Operating Temperature	-4° to 104°F (-20° to 40° C) (T4) for VOC detectors





QRAE II

Compact Multi-Gas Detector for H₂S, CO, O₂, and Combustibles

The QRAE II is a full-featured, compact, one- to four-sensor gas detector for detection of hydrogen sulfide, carbon monoxide, oxygen and combustibles. Key features include easy-to-change, externally accessed battery packs (available in rechargeable and alkaline versions), a water-resistant case and a new state-of-the-art O₂ sensor with extended life.



Why Solid Polymer Electrolyte Technology for Oxygen Measurement?

Patented SPE O₂™ Oxygen sensor with unique features:

- Lead-free design that already complies with future RoHS Standard
- Extended life compared to lead-type electrochemical oxygen sensors, resulting in low cost of ownership
- Leak-free design, minimizing downtime
- Increased long-term stability
- Fast response

Key Features

- Best EMI/RFI immunity technology for products in its class, eliminating radio interference
- Easy access to sensors, filter and battery compartment without exposing electronic components to potential damage
- Large graphic display for easy overview of gas type and concentration
- Alkaline adapter and rechargeable Lithium-ion battery pack provide up to 14 hours of continuous operation
- Rugged housing withstands harsh environments
- IP-65 water- and dust-resistant case
- Strong, protective, concussion-proof design
- Diffusion mode, with optional manual sample pump

Specifications

Default Sensor Settings

Gas Monitor	Range	Resolution
Oxygen	0 to 30.0%	0.1%
Combustible	0 to 100% LEL	1% LEL
Carbon Monoxide	0 to 1000 ppm	1 ppm
Hydrogen Sulfide	0 to 100 ppm	1 ppm

Detector Specifications

Size	5" L x 2.8" W x 1.5" H (12.5cm x 7.2cm x 3.8cm)
Weight	12 oz (350 g)
Operating Period	Diffusion: Up to 14 hours continuous operation with Lithium-ion battery, up to 10 hours with alkaline battery (typical, without alarm)
Datalogging	Standard 12 days at one-minute intervals
Operating Temperature	-4° to 122° F (-20° to 50° C) (T4) (ATEX and IECEx only)

- Intuitive simple-to-operate two-button user interface
- Display can be flipped 180° with the push of a button for easy viewing from belt or hand
- Multi-language support
- Loud 95 dB audible alarm
- Bright red flashing visible alarm
- Vibration alarm



Ordering Information

Part Numbers

QRAE II with Lithium-Ion	020-0401-000
QRAE II Pack of Ten	020-0401-010
Multi-Unit Charger	020-3461-005

Toll-Free: 877-723-2878



QRAE Plus

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.



What is a Confined Space?

The confined space entry standard was established by OSHA 29CFR 1910.146 in April of 1993. The standard was developed to provide a defined work plan for confined space entry. Confined space entries are part of a daily routine throughout the industrial workplace.

A Confined Space Is Defined As a Space That:

- Is large enough for an employee to enter and perform work.
- Has limited or restricted means for entry or exit.
- Is not designed for continuous human occupancy.

Atmospheric Hazards in Confined Spaces

Atmospheric hazards in a confined space are those that expose entrants to a risk such as death, entrapment, injury, or acute illness from one or more of the following causes:

- **Oxygen:** An atmospheric oxygen concentration below 19.5% (oxygen deficiency), or above 23.5% (oxygen enrichment)
- **Combustible gases**
- **Toxic gases**

The **QRAE Plus CSE Monitor** is preset as an easy-to-use tool to comply with the atmospheric testing required by OSHA 29CFR 1910.146.

Ordering Information

Part Numbers

QRAE Plus LEL/O₂/CO/H₂S with CSE Kit 028-1112-012

Toll-Free: 877-723-2878

Key Features

- **One to four plug-in "smart" sensors**
 - Combustibles
 - Oxygen
 - Hydrogen sulfide
 - Carbon monoxide
- **Optional toxic sensors**
 - Sulfur dioxide (SO₂)
 - Nitric oxide (NO)
 - Nitrogen dioxide (NO₂)
 - Chlorine (Cl₂)

- Hydrogen cyanide (HCN)
- Ammonia (NH₃)
- Phosphine (PH₃)

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

- **Strong, built-in sample draw pump** draws up to 100 feet (30 meters) horizontally or vertically

Specifications

Sensor Specifications

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

Detector Specifications

Size	4.5" L x 3.0" W x 1.8" H (11.5cm x 7.6cm x 4.6cm)
Weight	15 oz (425 g) with battery, without rubber boot
Operating Period	<ul style="list-style-type: none"> • Diffusion: Up to 20 hours continuous operation with Lithium-ion battery, up to 18 hours with alkaline battery (typical without alarm) • Pump: Up to 16 hours continuous operation with Lithium-ion battery, up to 12 hours with alkaline battery (typical without alarm)
Datalogging	Standard 67 hours at one-minute intervals, with serial number of unit, user ID, site number, calibration date
Operating Temperature	-4° to 113° F (-20° to 45° C) (T3 or T4)





VRAE

Hand-Held Five-Gas Survey Monitor

The VRAE is a powerful, pumped, one- to five-gas monitor that monitors combustibles in the percent by volume range, regardless of oxygen levels. The VRAE is capable of monitoring either combustibles, oxygen, and three toxic gases or combustibles and four toxic gases. Its durable Nickel-Metal-Hydride batteries, powerful internal pump and rugged frame make it ideal for leak detection and site surveys.

Why VRAE?

VRAE is unique due to its ability to utilize up to four toxic sensors at once. It also offers a unique TC sensor that can be used in atmospheres lacking oxygen (inert) and can monitor both LEL and Vol% measurements.



Key Features

- Toxic sensors include CO, H₂S, SO₂, NO, NO₂, Cl₂, NH₃, HCN, PH₃
- Unique TC sensor that monitors LEL and Vol%
- Large alarm-activated backlit LCD display
- Visual alarm with flashing LED
- Large keys usable with gloved hand
- Rigid inlet probe
- 10 hours continuous operation
- Sample collection port
- Optional 16,000 data points downloadable to PC
- Strong protective rubber boot
- Internal sample draw pump for quick response and remote sampling
- Smart battery charging with status indication and LED indicator
- Snap-in rechargeable NiMH or alkaline battery pack
- 48 built-in Correction Factors for LEL sensor
- 4 toxic sensor version available

Specifications

Sensor Specifications

Sensor	Range	Extended Range	Resolution
Combustible	0 to 100% LEL 0 to 100% VOL	—	1%
Oxygen	0 to 30.0%	—	1%
Carbon Monoxide	0 to 500 ppm	1,500 ppm	1 ppm
Hydrogen Sulfide	0 to 100 ppm	500 ppm	1 ppm
Sulfur Dioxide	0 to 20.0 ppm	150 ppm	0.1 ppm
Nitric Oxide	0 to 250 ppm	1,000 ppm	1 ppm
Nitrogen Dioxide	0 to 30.0 ppm	150 ppm	0.1 ppm
Chlorine	0 to 10.0 ppm	30 ppm	0.1 ppm
Hydrogen Cyanide	0 to 100 ppm	100 ppm	1 ppm
Ammonia	0 to 50 ppm	200 ppm	1 ppm
Phosphine	0 to 5.0 ppm	20 ppm	0.1 ppm

Detector Specifications

Size	8.3" L x 3.0" W x 1.9" H (21 cm x 7.6 cm x 4.9 cm)
Weight	20 oz with battery pack (568 g)
Operating Hours	10 hours continuous operation
Datalogging	Optional 16,000 points (53 hours, 5 channels at one minute intervals)
Operating Temperature	-4° F to 113° F (-20° C to 45° C) (T3)

Ordering Information

Part Numbers

VRAE LEL/Vol/O₂/H₂S/CO/SO₂
018-1112-305

Toll-Free: 877-723-2878



EntryRAE

Confined Space Entry Monitor

The EntryRAE is a 4-gas monitor, plus photoionization (PID) detector. Reliable, easy to operate, and simple to calibrate, the EntryRAE delivers added protection without added complexity. The plug and play, patented self-cleaning PID is one of the most reliable and durable PIDs available today.



Why EntryRAE PID?

Typical 4-gas monitors do not detect volatile organic compounds (VOCs). VOCs are combustible, and often toxic at levels far below 10% LEL. These are common industrial compounds you find in, or bring into, a confined space. They are commonly found in:

- Fuels, oils, degreasers
- Industrial cleaners
- Heat transfer fluids
- Solvents, paints
- Plastics, resins, adhesives
- Pesticides and herbicides

LEL sensors can be poisoned by many common chemicals, including:

- Silicone compounds
- Lead compounds
- Sulfur compounds
- Phosphates

Just a few parts per million of these compounds can degrade an LEL sensor.

A PID detects VOCs. A PID is a reliable backup for your LEL sensor. Combine a PID and a 4-gas monitor and you have true protection from the unexpected.

Ordering Information

Part Numbers

EntryRAE unit with
Confined Space Kit and Cal Gas
046-P111-104

Toll-Free: 877-723-2878

Key Features

- Reliable, self-cleaning VOC detector
- Also includes CO, H₂S, LEL and O₂ sensors
- Simple to operate
- Easy to calibrate
- Durable, weather-resistant rubber body
- Datalogging included and automatic
- Big display with auto-backlight
- Loud alarm
- Bright red flashing LED alarms
- Up to 16 hours of continuous operation
- Interchangeable Lithium-ion and alkaline battery packs
- Charging cradle doubles as an external battery charger
- Powerful pump allows sample draws up to 100 feet (30 meters)
- Low-flow pump alarm



Specifications

Sensor Specifications

Sensor	Range	Resolution
PID	0 to 999 ppm VOC	1 ppm VOC
Oxygen	0 to 30.0%	0.1%
Combustible Gases	0 to 100% LEL 0 to 5% Volume	1% LEL 1% Volume
Carbon Monoxide	0 to 500 ppm	1 ppm
Hydrogen Sulfide	0-100 ppm	1 ppm

Detector Specifications

Size	5.9" L x 3.3" W x 1.9" H (15 x 8.3 x 4.8 cm) without clip
Weight	20 oz (567 g) with battery and clip
Operating Hours	Up to 16 hours continuous with Lithium-ion (typical). Up to 12 hours with alkaline
Operating Temperature	UL/cUL: -4° to 122° F (-20° to 50° C) (T3) ATEX: -4° to 116° F (-20° to 47° C) (T4)



MultiRAE Plus

One- to Five-Gas Monitor with VOC Detection

The MultiRAE Plus combines a PID (Photoionization Detector) with the standard four gases of a confined space monitor (O₂, LEL, and two toxic gas sensors) in one compact monitor with an internal sampling pump. The MultiRAE Plus is quickly and easily changed from a sophisticated technician instrument to a simple text-only monitor. The same monitor can be used as a personal monitor, a hand-held sniffer or as a continuous-operation area monitor.



Using PIDs for 10% of LEL Decisions

One of the many requirements for entering confined spaces outlined in 29 CFR 1910.146 (OSHA's confined space entry standard) is the measurement of confined spaces for flammable gases. Prior to entry of a confined space, the level of flammable gases must be below 10% of LEL (lower explosive limit). The most common sensor used for measuring LEL is the Wheatstone bridge/catalytic bead/pellistor sensor ("Wheatstone bridge").

LEL Sensor Limitations:

- "Heavier" hydrocarbon vapors have difficulty diffusing into the LEL sensor and reduce its output
- Common chemicals may poison LEL sensors

PIDs: Alternatives for 10% of LEL

Photoionization detectors (PIDs) are sensitive hydrocarbon sensors originally designed to measure ppm levels of hydrocarbons for the environmental industry. PIDs are uniquely suited for measuring hydrocarbon mixtures. Because PIDs use an optical technology, they are resistant to the poisons that can ruin Wheatstone bridge sensors.

Key Features

- O₂, LEL, PID and any two plug-in "smart" toxic sensors: CO, H₂S, SO₂, NO, NO₂, Cl₂, HCN, NH₂, PH₂
- 0 to 2,000 ppm measurement of VOCs (volatile organic compounds) with 0.1 ppm resolution
- Measure more chemicals with over 60 Correction Factors built into the MultiRAE Plus memory and the largest printed list of Correction Factors in the world (300+) available with RAE Systems TN-106

Specifications

Sensor Specifications

Sensor	Range	Resolution
Oxygen	0 to 30%	0.1%
Combustible Gas	0 to 100% LEL	1% LEL
VOCs	0 to 200 ppm 200 to 2000 ppm	0.1 ppm 1 ppm
Carbon Monoxide	0 to 500 ppm	1 ppm
Hydrogen Sulfide	0 to 100 ppm	1 ppm
Sulfur Dioxide	0 to 20 ppm	0.1 ppm
Nitric Oxide	0 to 250 ppm	1 ppm
Nitrogen Dioxide	0 to 20 ppm	0.1 ppm
Chlorine	0 to 10 ppm	0.1 ppm
Hydrogen Cyanide	0 to 100 ppm	1 ppm
Ammonia	0 to 50 ppm	1 ppm
Phosphine	0 to 5 ppm	0.1 ppm

Detector Specifications

Size	8.3" L x 3.0" W x 1.9" H (21cm x 7.6cm x 4.9cm)
Weight	20 oz with battery pack (568 g)
Operating Hours	10 hours continuous operation
Datalogging	Optional 16,000 points (53 hours, 5 channels at one-minute intervals)
Operating Temperature	-4° F to 113° F (-20° C to 45° C) (for UL/cJUL T3; for ATEX T3 or T4)

- When work schedules require putting in more than the 14 hours supplied by the advanced Lithium-ion battery, the drop-in alkaline pack supplied with every MultiRAE Plus allows you to finish the job
- User-friendly screens make it easy to use for simple applications and flexible enough for sophisticated options
- Rugged Rubber Boot assures that the MultiRAE Plus survives the bumps and knocks of tough field use
- Strong, built-in sample pump draws up to 100 feet (30m) horizontally or vertically. Large external filter and automatic low flowage
- Store up to 80 hours of data at one-minute intervals for all 5 sensors for download to PC (with the optional datalogging)



Ordering Information

Part number

MultiRAE Plus LEL/O₂/H₂S/CO/PID with Kit
009-3121-014

Toll-Free: 877-723-2878

MultiRAE IR

One- to Five-Gas Monitor with CO₂ and VOC Detection

The MultiRAE IR combines a PID (Photoionization Detector) and Carbon Dioxide (CO₂) sensor with O₂, LEL, and one specific toxic gas sensor in a compact monitor with an internal sampling pump. The MultiRAE IR is ideal for Indoor Air Quality (IAQ) applications.



CO₂: An Indirect Measurement of IAQ

Infrared (IR) carbon dioxide (CO₂, not to be confused with carbon monoxide, or CO) monitors are among the most popular monitors for assessing the air quality of indoor environments both in portable survey instruments and in permanent control systems. But, CO₂ monitors are only one measurement tool for IAQ.

PIDs: A Magnifying Glass for IAQ "Detectives"

PIDs complement CO₂ monitors by providing a direct measurement tool for VOC contaminants. Finishes, fabrics, carpets, building materials and microbial contamination (mold, dust mites, etc.) all emit VOCs that affect indoor air quality, yet these VOCs would never be noticed if only CO₂ were measured. PIDs provide a direct-reading technique to identify and locate these contaminants.

Key Features

- O₂, LEL, PID and any two plug-in "smart" toxic sensors: CO, H₂S, SO₂, NO, NO₂, Cl₂, HCN, NH₃, PH₃
- 0 to 20,000 ppm measurement of CO₂ using our patented non-dispersive infrared (NDIR) sensor
- 0 to 2,000 ppm measurement of VOCs (volatile organic compounds) with 0.1 ppm resolution

Specifications

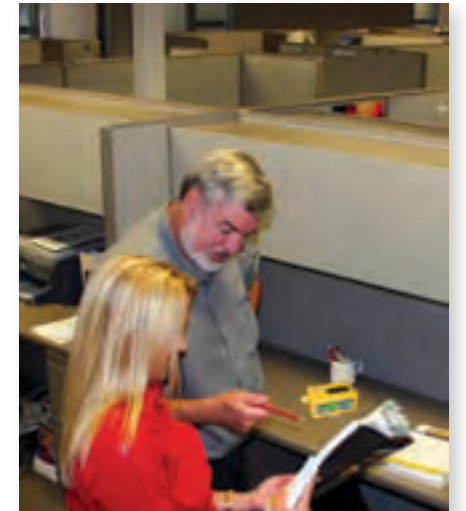
Sensor Specifications

Sensor	Range	Resolution
Oxygen	0 to 30%	0.1%
Combustible Gas	0 to 100% LEL	1% LEL
VOCs	0 to 200 ppm 200 to 2000 ppm	0.1 ppm 1 ppm
Carbon Monoxide	0 to 500 ppm	1 ppm
Carbon Dioxide	0 to 20,000 ppm	10 ppm
Hydrogen Sulfide	0 to 100 ppm	1 ppm
Sulfur Dioxide	0 to 20 ppm	0.1 ppm
Nitric Oxide	0 to 250 ppm	1 ppm
Nitrogen Dioxide	0 to 20 ppm	0.1 ppm
Chlorine	0 to 10 ppm	0.1 ppm
Hydrogen Cyanide	0 to 100 ppm	1 ppm
Ammonia	0 to 50 ppm	1 ppm
Phosphine	0 to 5 ppm	0.1 ppm

Detector Specifications

Size	8.3" L x 3.0" W x 1.9" H (21cm x 7.6cm x 4.9cm)
Weight	20 oz with battery pack (568 g)
Operating Hours	10 hours continuous operation
Datalogging	Optional 16,000 points (53 hours, 5 channels at one-minute intervals)
Operating Temperature	-4° F to 113° F (-20° C to 45° C)

- Measure more chemicals with over 60 Correction Factors built into the MultiRAE IR memory and the largest printed list of Correction Factors in the world (300+)
- Drop-in Battery: When work schedules require putting in more than the 12 hours supplied by the advanced Lithium-ion battery, the drop-in alkaline pack supplied with every MultiRAE IR allows you to finish the job
- Strong, built-in sample pump draws up to 100 feet (30 meters) horizontally or vertically. External filter and automatic low-flow alarm protect the MultiRAE IR from damage
- Store up to 80 hours of data at one-minute intervals for all 5 sensors for download to PC with built-in datalogging



Ordering Information

Part number

MultiRAE IR LEL/O₂/CO/CO₂/PID with Kit
037-32C1-012

Toll-Free: 877-723-2878

MiniRAE 3000

Portable Handheld VOC Monitor



The MiniRAE 3000 is the most advanced handheld volatile organic compound (VOC) monitor on the market. Its extended range of 0 to 15,000 ppm makes it an ideal instrument for applications from industrial hygiene to leak detection and HazMat. The RF modem allows real-time data transmissions with a base controller located up to 500 feet away, or two miles with optional RAELink3 portable modem.



MiniRAE 3000 Uses

Industrial hygienists, certified engineers and preventive maintenance consultants can quickly receive and exchange data via the MiniRAE 3000's built-in RF modem, ensuring real-time data is available as needed, without delay.

Maintenance, process, and production managers will appreciate the handheld unit's extended lamp life, its self-cleaning capabilities and easy access to its sensor lamp, minimizing downtime.

Corporate clean-up teams, environmental engineers and consultants, and government agencies recognize the MiniRAE 3000 as the must-have tool crucial to isolating contaminated soil and pollution mapping for environmental cleanup sites.

Equipment and rental companies will appreciate how easy the MiniRAE 3000 is to service, in addition to self-cleaning and easy access to the lamp and sensor.

Key Features

- Proven PID technology. The patented sensor provides the following unique features:
 - 3-second response time
 - Extended range up to 15,000 ppm with improved linearity
 - Humidity compensation with integrated humidity and temperature sensors
- Real-time wireless data transmission with built-in RF modem or Bluetooth®
- Designed for simple service
- Easy access to lamp and sensor in seconds without tools
- Large graphic display for easy overview of gas type, Correction Factor and concentration
- Integrated flashlight for visibility in low light conditions
- Integrated RAE Systems Correction Factors list for more than 200 compounds to measure more chemicals than any other PID
- Multi-language support with 12 languages encoded
- IP-67 waterproof design for easy cleaning and decontamination in water
- Automatic lamp type recognition
- 3-year 10.6eV lamp warranty



Specifications

Sensor Specifications

Gas	Range	Resolution	Response Time T90
VOCs	0 to 999.9 ppm	0.1 ppm	< 3 seconds
	1000 to 15,000 ppm	1 ppm	< 3 seconds

Detector Specifications

Size	10" L x 3.0" W x 2.5" H (25.5cm x 7.6cm x 6.4cm)
Weight	26 oz (738 g)
Operating Period	16 hours of operation (12 hours with alkaline battery)
Datalogging	Standard 6 months at one-minute intervals
Operating Temperature	-4° to 122° F (-20° to 50° C) (T4)



Ordering Information

Part number

MiniRAE 3000 with 10.6 eV with Cal Kit
059-B111-100

Toll-Free: 877-723-2878

ppbRAE 3000

Portable Handheld VOC Monitor



The ppbRAE 3000 is the most advanced handheld volatile organic compound (VOC) monitor on the market. Its extended range of 1 ppb to 10,000 ppm makes it an ideal instrument for applications from HazMat/Homeland Security and industrial hygiene to indoor air quality and military applications. The RF modem allows real-time data communication with a base controller located up to 500 feet away, two miles with optional RAELink3 portable modem.



ppbRAE 3000 Uses

HazMat teams, firefighters, and arson investigators know they can depend on the ppbRAE 3000 to be rugged and ready for duty when they need it. The unit operates for extended periods thanks to a long life, drop-in lithium-ion battery pack.

Military, police and SWAT personnel will appreciate RAE System's three-button user interface. Oversized buttons enable ease of use while wearing gloves. The ppbRAE 3000's 95dB acoustic alarm is readily heard in the noisiest environments and its ultra-bright optical alarm is highly visible and easy to notice. The built-in flashlight provides additional safety and functionality in dark conditions.

Decontamination personnel will appreciate the IP-67 rating during cleaning and decontamination in water.

Key Features

- Proven PID technology. The patented sensor provides the following unique features:
 - 3-second response time
 - Extended range from 1 ppb to 10,000 ppm with improved linearity
 - Humidity compensation with integrated humidity and temperature sensors
- Real-time wireless data transmission with built-in RF modem or Bluetooth
- Designed for simple service
- Easy access to lamp and sensor in seconds without tools
- Big graphic display for easy overview of gas type, Correction Factor and concentration
- Integrated flashlight for better view in dark conditions
- Integrated RAE Systems Correction Factors list for more than 200 compounds to measure more chemicals than any other PID
- Multi-language support with 12 languages encoded
- IP-67 waterproof design for easy cleaning and decontamination in water
- Automatic lamp type recognition
- 3-year 10.6eV lamp warranty



Specifications

Sensor Specifications

Gas	Range	Resolution	Response Time T90
VOCs	0 to 9999 ppb	1 ppb	< 3 seconds
	10 to 999 ppm	0.1 ppm	< 3 seconds
	1000 to 9999 ppm	1 ppm	< 3 seconds

Detector Specifications

Size	10" L x 3.0" W x 2.5" H (25.5cm x 7.6cm x 6.4cm)
Weight	26 oz (738 g)
Operating Period	16 hours of operation (12 hours with alkaline battery)
Datalogging	Standard 6 months at one-minute intervals
Operating Temperature	-4° to 122° F (-20° to 50° C) (T4)



Ordering Information

Part number

ppbRAE 3000 with 10.6 eV with Cal Kit
059-C111-100

Toll-Free: 877-723-2878



UltraRAE

Specific Compound Monitor

UltraRAE is a quick spot-check monitor used with compound-specific separation tubes, typically employed by occupational health, safety and environmental personnel in refinery applications. The combination proprietary Filter Tube and PID provides faster analysis than conventional colorimetric tubes and gas chromatographs. Interchangeable RAE-Sep™ Filter Tubes include Benzene, Methylene Chloride, and Butadiene.

Why Monitor Benzene?

Benzene is a known human carcinogen that is present in automotive gasoline and other fuels in concentrations typically 0.2 to 3%. Its regulated exposure limit is so low (proposed 8-hour day TWA of 0.5 ppm) that its concentration alone usually defines the toxicity of the fuel vapors as a whole. Thus, it is necessary to measure low concentrations of benzene (often ≤ 1 ppmv) in the presence of much higher concentrations (tens to hundreds of ppmv total) of the hundreds of aromatic and aliphatic compounds that make up gasoline.

Specific Benzene Measurements

RAE-Sep™ benzene tubes scrub nearly all components out of gasoline vapors except benzene. This is accomplished through a proprietary absorption medium in the tubes. Further selectivity is afforded by using a 9.8 eV lamp, which responds strongly to aromatics but weakly to many hydrocarbons.

Applications include tank entry pre-screening during refinery and plant maintenance, hazardous material response, marine spill response and refinery downstream monitoring.

Key Features

- The only compound-specific monitor with the combination of interchangeable separation tubes and PID
- 3 to 10 times faster analysis than conventional tube or portable gas chromatograph methods
 - Results obtained in seconds (<75 seconds), rather than minutes
 - Detects benzene down to 0.1 ppm in 60 seconds
- Excellent range and linearity
 - Measures down to 0.1 ppm and up to over 200 ppm benzene (no more GC column overload problems)
 - More accurate than gas detection tubes

- Internal pump
 - Allows you to sample deep (up to 30ft, or 10m) into a confined space
 - Prevents liquid flow into the monitor
 - Warns if sample tubing is blocked or crimped



Specifications

Sensor Specifications

Gas	VOC	Benzene	Halocarbons	Butadiene
Range	0 to 2000 ppm	0 to 200 ppm	0 to 200 ppm	0 to 200 ppm
Resolution	0.1 ppm 0 to 99.9 ppm 1 ppm 100 to 2000 ppm	0.1 ppm	0.2 ppm	0.1 ppm
Calibration Gas	100 ppm Isobutylene	5 ppm Benzene	Compound Dependent	5 ppm Butadiene
UV Lamp	9.8, 10.6 or 11.7eV	9.8 eV	11.7 eV	9.8 eV
Inference Rejection	None	300 ppm Toluene*	300 ppm Acetone*	150 ppm Hexane*

* Refer to RAE Systems' Technical Notes 127, 133 and 147 for more details

Detector Specifications

Size	7.75" L x 2.75" W x 1.5" H (19.7cm x 7.0cm x 3.8cm)
Weight	6 oz with battery pack (455 g)
Operating Period	10 hours continuous operation
Datalogging	<ul style="list-style-type: none"> • Standard 3,000 points including sample number, gas reading, time/date, specific vapor • Header information includes monitor serial number, user ID and site number
Operating Temperature	32° to 104°F (0° to 40°C) (for UL/cUL T3; for ATEX T4)



Ordering Information

Part Numbers

UltraRAE Benzene with Kit
012-0000-000

Toll-Free: 877-723-2878



ChemRAE

Chemical Warfare Agent Detection

The ChemRAE Portable, Wireless CWA Detector is RAE Systems' next-generation sensor technology based on tested and proven Open Loop Ion Mobility Spectrometry (IMS) technology. The ChemRAE uses an improved Ion Mobility Cell™, which provides enhanced selectivity and sensitivity. It is designed to detect Chemical Warfare Agents (CWAs) and toxic industrial chemicals (TICs).

Why ChemRAE?

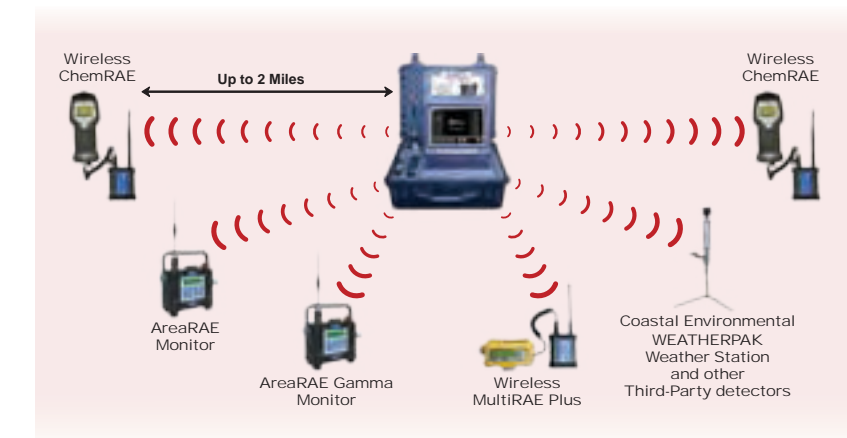
In today's world the detection of chemical warfare agents (CWAs) such as nerve and blister agents is critical. But just as critical is the way in which this capability is integrated into the rapid deployment system.

ChemRAE can be used as a stand-alone portable monitor or integrated into an AreaRAE network by using a RAELink2 modem. Integration into an AreaRAE network allows users to add CWA detection to their existing complement of AreaRAE and RAE Systems portable gas monitors. The ChemRAE weighs less than 2 lbs (0.8 kg) and can be powered by a rechargeable lithium-ion battery pack or AA alkaline batteries. The system has a clear, simple user interface, which can be operated with just one hand.

Key Features

- Industry-leading IMS technology
- Wireless integration into AreaRAE networks
- Dosage measurement
- Agent identification

- Adjustable sensitivity
- Light weight
- Simple one-hand operation
- Low life-cycle cost with no consumable components



Specifications

Chemical Detected	Low Alarm Limit	Low Alarm Limit (mg/m3)
Nerve Agents		
GA (Tabun), GB (Sarin)	0.2 ppm	0.02
GD (Soman), GF (Cyclo-Sarin)/VX	0.1 ppm	0.01
Blister Agents		
HD (Sulfur Mustard)	0.312 ppm	2.00
L (Lewisite)	0.242 ppm	2.00
Blood Agents		
Ethylene Oxide	100 ppm	180
Acrylonitrile	100 ppm	217
Hydrogen Sulfide	10 ppm	14
Arsine	5 ppm	16
Ammonia	400 ppm	278
Phosphor Trichloride	25 ppm	140
Carbon Disulphide	500 ppm	1557
Allyl Alcohol	40 ppm	95

Ordering Information

Part Numbers

ChemRAE with RAELink2
039-D100-000

Toll-Free: 877-723-2878





AutoRAE

Automated Bump Test and Calibration System

AutoRAE is an auto-calibration, bump test and charging system for RAE Systems gas monitors. AutoRAE instrument cradles are available for the QRAE, QRAE Plus, MultiRAE Plus, EntryRAE, MiniRAE 2000, QRAE II, MiniRAE 3000 and ppbRAE 3000.

Automatic Versus Manual Calibration

Manual calibration of gas monitors can be time consuming. The AutoRAE provides a solution:

- Calibration of up to 10 monitors at once eliminates manual calibration
- Calibration data is stored on a PC for record keeping
- Instruments are charged overnight

Key Features

- **Easy to Use**
Press the button once for a bump test, twice for calibration, and walk away. A few minutes later, easy-to-read LEDs inform you of the status of the gas monitor's sensors. If the monitor fails the bump test, the system automatically performs a calibration.
- **Printing Capability**
The ability to print bump and calibration certificates with an optional external printer for record keeping.
- **For One, Two, or Many**
Each AutoRAE Controller can accommodate up to 10 instrument cradles. Cradles can be easily added or removed when the job demands it.
- **Snap-Together Construction**
Connecting the cradle to the Controller and connecting cradles to each other is a snap. A single rigid mechanism

containing all three throughputs (power, data, and gas) snaps one cradle to another. Simply place the monitor in a cradle (with the external filter on) and the power, gas, and data ports of the gas monitor are all engaged.



Specifications

Calibration Gas Specifications

Sensor(s) Calibrated	Gas	Regulator
PID	100 ppm Isobutylene	Demand-flow
Oxygen	Fresh Air or 18%	None
Combustible, Carbon Monoxide, and Hydrogen Sulfide	<ul style="list-style-type: none"> • 4-gas mix: 50% LEL, 20.9% O₂, 10 ppm H₂S, 50 ppm CO • 4-gas mix: 50% LEL, 18% O₂, 10 ppm H₂S, 50 ppm CO 	Demand-flow



Ordering Information

Part Numbers

AutoRAE Controller	048-0153-000
QRAE II Cradle	048-0600-000
MultiRAE/QRAE Cradle	048-0200-000

Toll-Free: 877-723-2878



MeshGuard

Stand-Alone Wireless Toxic Gas Detector

MeshGuard is a wireless single toxic gas detector integrated with a radio module. It can work as a fixed device or a portable device. Its radio communicates in the global 2.4GHz license-free frequency band. This is a perfect semi-mobile gas detector for fast deployment during turnarounds and plant shutdowns.

What is a Mesh Radio?

A Mesh Radio is capable of routing data around obstacles and provides redundant routing to guarantee high data transmission.

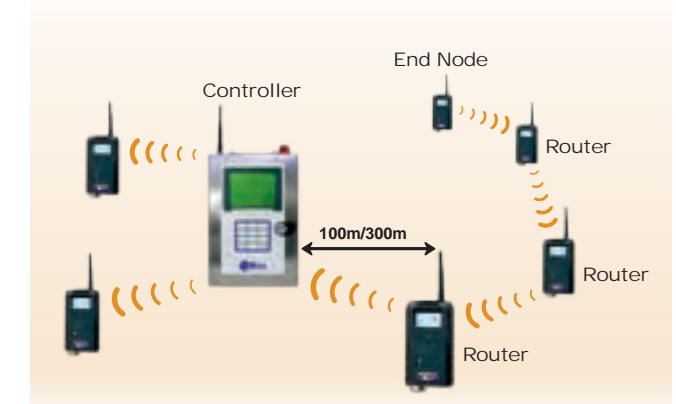
What Makes MeshGuard Unique?

- Rapidly deployable, semi-fixed/ fixed gas monitoring
 - Battery powered
 - Ease of installation and re deployment
 - Off-site service and maintenance
 - 9 to 12 months of continuous operation
- Hazardous location operation
 - Approved for C1D1 location operation
- Mixing fixed and mobile detection
 - Allows portable monitor to work in a fixed infrastructure
 - Real-time location tracking of mobile detector

Key Features

- 2.4GHz radio board replaceable Mesh Networks
- Mesh network function
- Operating distance: 100m/300m line of sight
- Low power consumption with long battery life
- Sensors supported: H₂S, CO
- Field-replaceable battery and sensor
- Loud audio alarm, 92dB @ 30cm
- Large, easy-to-read continuous display of gas concentration in ppm
- User-adjustable high, low, STEL, and TWA alarms

- Bright red flashing alarm
- Built-in vibration alarm as an option for portable applications
- Simple calibration
- Highly resistant to RFI interference
- IP-65 rated weather resistant
- Small enough to be handheld



Specifications

Detector Specifications

Size	10.5" L x 3.7" W x 2.1" H (26.5cm x 9.5cm x 5.5cm)
Weight	1.3 lbs (0.6 kg)
Operating Hours	Minimum of 6 months under normal alarm conditions (10 minutes per day)
Operating Temperature	-40° to 113° F (-40° to 45° C) (H ₂ S) / -4° to 113° F (-20° to 45° C) (CO)

Sensor Settings

Gas	Range	Resolution	Response Time (T90)
Carbon Monoxide (CO)	0 to 500 ppm	1 ppm	30 seconds
Carbon Monoxide (CO)	0 to 2000 ppm	1 ppm	30 seconds
Hydrogen Sulfide (H ₂ S)	0 to 100 ppm	1 ppm	20 seconds



Toll-Free: 877-723-2878

SentryRAE Steel

Portable Five-Gas Monitor with the Highest Level of Intrinsic Safety



The SentryRAE Steel detector is designed for use in circumstances where it is advantageous for the customer to leave the detector in a central location and provide monitoring information for a group of workers. The extra-bright, cluster LED alarm-light, large display, and very loud audible alarm convey readings and alarm state information over a substantially wider area than typical personal portable detectors.



Why SentryRAE Steel?

The SentryRAE Steel provides the highest level of intrinsic safety, Class 1 Division 1 Groups A, B, C, and D, allowing you the freedom to take the instrument into almost any environment. The SentryRAE Steel also provides a 36 hour battery life and 20,000 datalogging points. This combination allows you to accurately measure and record sensor readings while minimizing the amount of time spent changing batteries and downloading data to your PC.

Key Features

- 5-gas monitor (O₂, LEL, PID and any two plug-in toxic sensors)
- Highest level of intrinsic safety: Class 1 Division 1 Groups A, B, C, and D
- Rugged stainless steel housing is both durable and easy to clean
- 36-hour battery life
- Strong, built-in sampling pump (500 cc/min) capable of drawing a sample from up to 100 feet (30 meters) away
- Optional BiPod stand available



SentryRAE on the optional BiPod stand

Specifications

Sensor Settings

Gas Monitor	Range	Resolution
Oxygen	0 to 30.0%	0.1%
Combustible	1 to 100% LEL	1% LEL
VOCs	0 to 199 ppm 200 to 2,000 ppm	0.1 ppm 1 ppm
Carbon Monoxide	0 to 500 ppm	1 ppm
Carbon Monoxide	10 to 2000 ppm	10 ppm
Hydrogen Sulfide	0 to 100 ppm	1 ppm
Sulfur Dioxide	0 to 20.0 ppm	0.1 ppm
Nitric Oxide	0 to 250 ppm	1 ppm
Nitrogen Dioxide	0 to 20.0 ppm	0.1 ppm
Chlorine	0 to 10.0 ppm	0.1 ppm
Hydrogen Cyanide	0 to 100 ppm	1 ppm
Ammonia	0 to 50 ppm	1 ppm
Phosphine	0 to 5.0 ppm	0.1 ppm
Hydrogen Chloride	2 to 15 ppm	1 ppm
Hydrogen Fluoride	2 to 10 ppm	1 ppm

Detector Specifications

Size	9.25" L x 5.0" W x 9.25" D (235mm x 127mm x 235mm) without handle
Weight	13.85 lbs (6.3 kg) with battery pack
Operating Hours	36 hours continuous stand-alone operation
Datalogging	4,000 points for each sensor with time stamp, serial number, user ID, site ID
Operating Temperature	-4° to 104° F (-20° to 40° C) (T3)



Ordering Information

Part Numbers

SentryRAE Steel
LEL/O₂/H₂S/CO/PID with Kit
040-3121-A12

Toll-Free: 877-723-2878

AreaRAE Steel

Rapidly Deployable, Wireless Multi-gas Monitor



AreaRAE Steel is a one- to five-sensor gas detector equipped with a wireless RF (radio frequency) modem which allows the unit to communicate and transmit readings and other information on a real-time basis with a remotely located base controller. Housed in an extremely rugged stainless-steel enclosure, it is designed for applications in harsh environments.



Why AreaRAE Steel?

Over the past five years, the AreaRAE Wireless Platform has become the benchmark for rapidly deployable hazardous environment detection systems. Today it sets the standard for incident response through widespread use by many fire departments, police departments, civil support teams, government agencies, and industrial users.

A rapid deployment system needs to deliver a wide variety of chemical, biological, radiological, or nuclear (CBRN) sensor solutions. The most complete packages are the AreaRAE and AreaRAE Gamma monitors.



Ordering Information

Part number

AreaRAE Steel LEL/O₂/CO/H₂S/PID
039-W112-111

RDK System Package
039-R121-127

Toll-Free: 877-723-2878

Key Features

- Up to five sensors (PID, LEL, O₂ and two toxic gas electrochemical)
- Loud buzzer and large, extra-bright warning light
- Large LCD display and keypad
- Rugged, weather-resistant stainless-steel housing (IP-55)
- Built-in sampling pump
- Interchangeable Lithium-ion or alkaline battery pack
- Continuous operation via AC source

Additional Advantages

- Real-time wireless data transmission with built-in RF modem
- View real-time sensor data and alarm status at headquarters or command center
- ProRAE Remote software simultaneously controls and displays readings for up to 32 remote detectors
- License-free, ISM wireless transmission with communication range up to 2 miles (3km), extendable with RAElink2 Repeaters
- Optional GPS provides ability to track and display readings from remote detectors
- Optional BiPod stand available

Specifications

Sensor Settings

Gas Monitor	Range	Resolution
Oxygen	0 to 30.0%	0.1%
Combustible	1 to 100% LEL	1% LEL
VOCs	0 to 199 ppm 200 to 2,000 ppm	0.1 ppm 1 ppm
Carbon Monoxide	0 to 500 ppm	1 ppm
Carbon Monoxide	10 to 2000 ppm	10ppm
Hydrogen Sulfide	0 to 100 ppm	1 ppm
Sulfur Dioxide	0 to 20.0 ppm	0.1 ppm
Nitric Oxide	0 to 250 ppm	1 ppm
Nitrogen Dioxide	0 to 20.0 ppm	0.1 ppm
Chlorine	0 to 10.0 ppm	0.1 ppm
Hydrogen Cyanide	0 to 100 ppm	1 ppm
Ammonia	0 to 50 ppm	1 ppm
Phosphine	0 to 5.0 ppm	0.1 ppm
Hydrogen Chloride	2 to 15 ppm	1 ppm
Hydrogen Fluoride	2 to 10 ppm	1 ppm

Detector Specifications

Size	9.25" L x 5.0" W x 9.25" D (235mm x 127mm x 235mm) without handle
Weight	13.85 lbs (6.3 kg) with battery pack
Operating Hours	36 hours continuous stand-alone operation 24 hours continuous wireless operation (Lithium-ion battery) 18 hours continuous wireless operation (alkaline battery)
Datalogging	4,000 points for each sensor with time stamp, serial number, user ID, site ID
Operating Temperature	-4° to 104° F (-20° to 40° C) (T3)





RAELink2

Open Communications for the AreaRAE Wireless Platform

RAELink2 allows real-time data transmission between remote monitors and the base station, which can be located up to two miles (3km) away. A single host controller can communicate with up to 32 RAELink2 modems at a time.

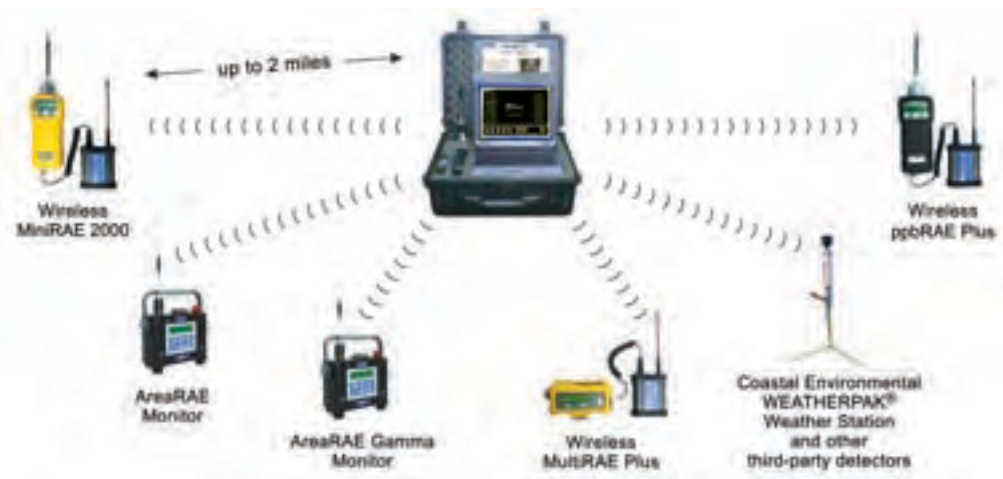
Why RAELink2?

RAELink2 allows users to add portable instruments to their AreaRAE wireless network. By plugging a RAELink2 Remote modem into a portable instrument, real-time sensor readings are wirelessly transmitted to a host controller up to two miles away. RAELink2 modems available include:

- RAELink2 Host
- RAELink2 Remote—for MiniRAE 2000, ppbRAE and MultiRAE
- RAELink2 Repeater
- RAELink2 APD2000
- RAELink2 ChemSentry
- RAELink2 DustTrak
- RAELink2 LifeShirt

Key Features

- Allows portable instruments to send data wirelessly onto an AreaRAE network
- Gateway for other vendors' detectors and detection technologies to the AreaRAE Wireless Platform
- Real-time communication and display of remote sensor readings
- 24-hour battery life
- License-free, spread-spectrum technology



Ordering Information

Part number	
RAELink2 Host	029-5001-200
RAELink2 Remote	029-5002-200

Toll-Free: 877-723-2878



SolarRAE

Remote Alternative Power Source

The RAE Solar Enclosure provides safe and reliable power generation without the expense of installing utility power. The solar system is designed to be used with AreaRAE wireless detectors or any RAE Systems wireless product including the MiniRAE, ppbRAE, MultiRAE, and ChemRAE.

Why SolarRAE?

SolarRAE provides remote power for RAE Systems monitors. Each system has an externally mounted 30-watt solar panel that provides power to a 55 Amp/hr sealed gel battery specifically designed for solar systems. In addition, each solar enclosure is equipped with a powerful fan that automatically circulates cool air inside the enclosure when a specific temperature threshold is reached. Fully charged, a solar enclosure can provide up to 2 weeks of continuous usage with no additional solar input.

Features

- Up to 2 weeks of continuous power with no sunlight
- Ruggedized steel enclosure
- Local viewing window
- 30W solar panel
- Fan to regulate internal temperature
- External fiberglass antenna

Key Features

- Ruggedized steel enclosure to withstand harsh environments
- Viewing window allows for local readings and alarm notification
- Powerful ventilation fan enables use in hot environments
- Large 55 Amp/hr gel battery specifically designed for solar applications
- Fully adjustable (tilt and rotate) 30W solar panel to maximize power output
- Fully adjustable external antenna to maximize radio transmission distances
- Lightning arrestor to prevent damage to internal components

SolarRAE is compatible with:

- AreaRAE series
- SentryRAE
- ChemRAE
- MultiRAE
- MiniRAE 2000
- ppbRAE Plus
- MiniRAE 3000
- ppbRAE 3000



Ordering Information

Part number	
SolarRAE	029-5050-100

Toll-Free: 877-723-2878





RAEGuard LEL

Fixed Gas Detector

Combustible Gas Transmitter

The RAEGuard LEL is a permanently mounted (fixed) catalytic bead combustible gas detector/transmitter that operates from a 9 to 36 VDC power source and provides an analog (4 to 20mA) and digital (RS-485) signal output in the range of 0 to 100% LEL combustible gas.

Applications

- Refineries
- Oil production
- Chemical plants
- Industrial safety
- Shipyard and maritime
- Power plants
- Steel mills

Key Features

- Housed in an explosion-proof enclosure, the RAEGuard LEL is equipped with a local digital display of the gas concentration and function keys for performing calibration
- The RAEGuard LEL can be operated with a standard 4 to 20mA/RS-485 controller or as a stand-alone sensor module
- Highly poison-resistant catalytic bead combustible gas LEL sensor
- 4-20mA analog output of 0-100% LEL combustible gas including methane, acetylene, propane or other combustible gases
- Explosion-proof enclosure for hazardous environment application
- Magnetic key interface eliminates need to open explosion-proof housing when making calibration or other minor adjustments
- Operation at 9 to 36 VDC
- Dry contact output (<30V, 2A)

Specifications

Sensor Specifications

Gas	Range (ppm)	Resolution (ppm)	Response Time (T90)
Combustible Gas	0 to 100% LEL	1% LEL	15 seconds

Detector Specifications

Size	5.0" L x 5.0" W x 4.5" H (12.7cm x 12.7cm x 11.5cm)
Weight	5.5 lbs (2.5 kg)
Operating Temperature	-4° to +131° F (-20° to +55° C) (T6)
Humidity	0% to 95% relative humidity (non-condensing)



Ordering Information

Part Numbers

RAEGuard LEL 0 to 100% LEL, UL
036-0003-000

Toll-Free: 877-723-2878



RAEGuard IR

Fixed Gas Detector

IR Combustible Transmitter

The RAEGuard IR is a permanently mounted (fixed) hydrocarbon gas sensor/transmitter that operates from a 9 to 36 VDC power source and provides an analog (4 to 20mA) and digital (RS-485) signal output in the range of 0 to 100% LEL hydrocarbon equivalent. The RAEGuard IR is based on RAE Systems' patented technology of non-dispersive infrared (NDIR) for methane or hydrocarbon.

Applications

- Refineries
- Oil production
- Chemical plants
- Industrial safety
- Waste water treatment plants
- Shipyard and maritime
- Power plants
- Steel mill

Key Features

- Non-dispersive infrared technology with built-in temperature compensation
- 4-20mA analog output of 0-100% LEL hydrocarbons
- High immunity to poisoning
- Explosion-proof enclosure for hazardous environment application
- Magnetic key interface eliminates need to open explosion-proof housing when making calibration or other minor adjustments
- Long-life infrared source and detector
- Operation at 9 to 36 VDC
- Dry contact output (<30V, 2A)

Specifications

Sensor Specifications

Gas	Range (ppm)	Resolution (ppm)	Response Time (T90)
Methane (CH ₄)	0 to 100% LEL	1%	<30 seconds
Hydrocarbons (HC)	0 to 100% LEL	1%	<30 seconds

Detector Specifications

Size	5.0" L x 5.0" W x 4.5" H (12.7cm x 12.7cm x 11.5cm)
Weight	5.5 lbs (2.5 kg)
Operating Temperature	-4° to +131° F (-20° to +55° C) (T6)
Humidity	0% to 95% relative humidity (non-condensing)



Ordering Information

Part Numbers

RAEGuard IR HC: 0 to 100% LEL, UL
036-0006-000

RAEGuard IR CH₄: 0 to 100% LEL, UL
036-0006-001

Toll-Free: 877-723-2878



RAEGuard EC

Fixed Gas Detector

Toxic Gas Transmitter

The RAEGuard EC is a permanently mounted (fixed) toxic gas or oxygen sensor/transmitter that operates from a 9 to 36 VDC power source and provides an analog (4 to 20mA) and digital (RS-485) signal output.

Applications

- Refineries
- Oil production
- Chemical plants
- Industrial safety
- Pulp & Paper
- Heavy industry
- Wastewater treatment plants
- Shipyard and maritime
- Power plants
- Steel mills

Key Features

- Housed in an explosion-proof enclosure, the RAEGuard EC is equipped with a local digital display of the gas concentration and function keys for performing calibration
- The RAEGuard EC is operated with a standard 4 to 20mA/RS-485 controller or as a stand-alone sensor module
- Explosion-proof 7R-sized electro-chemical sensor
- 4-20mA analog output of specified sensor
- Explosion-proof enclosure for hazardous locations
- Local displays with adjustment keys
- Magnetic key interface eliminates need to open explosion-proof housing when making calibration or other minor adjustments
- Operation at 9 to 36 VDC
- Dry contact output (<30V, 2A)

Specifications

Gas	Range (ppm)	Resolution (ppm)	Response Time (T90)
Oxygen (O ₂)	0 to 30%	0.1%	<20 seconds
Carbon Monoxide (CO)	0 to 1000	1	<30 seconds
Hydrogen Sulfide (H ₂ S)	0 to 300	1	<20 seconds
Sulfur Dioxide (SO ₂)	0 to 150	0.1	<30 seconds

Detector Specifications

Size	5.0" L x 5.0" W x 4.5" H (12.7cm x 12.7cm x 11.5cm)
Weight	5.5 lbs (2.5 kg)
Operating Temperature	-4° to +131° F (-20° to +55° C) (T6)
Humidity	0% to 95% relative humidity (non-condensing)

Ordering Information

Part Numbers

RAEGuard H₂S: 0 to 300 ppm, UL
036-0003-010

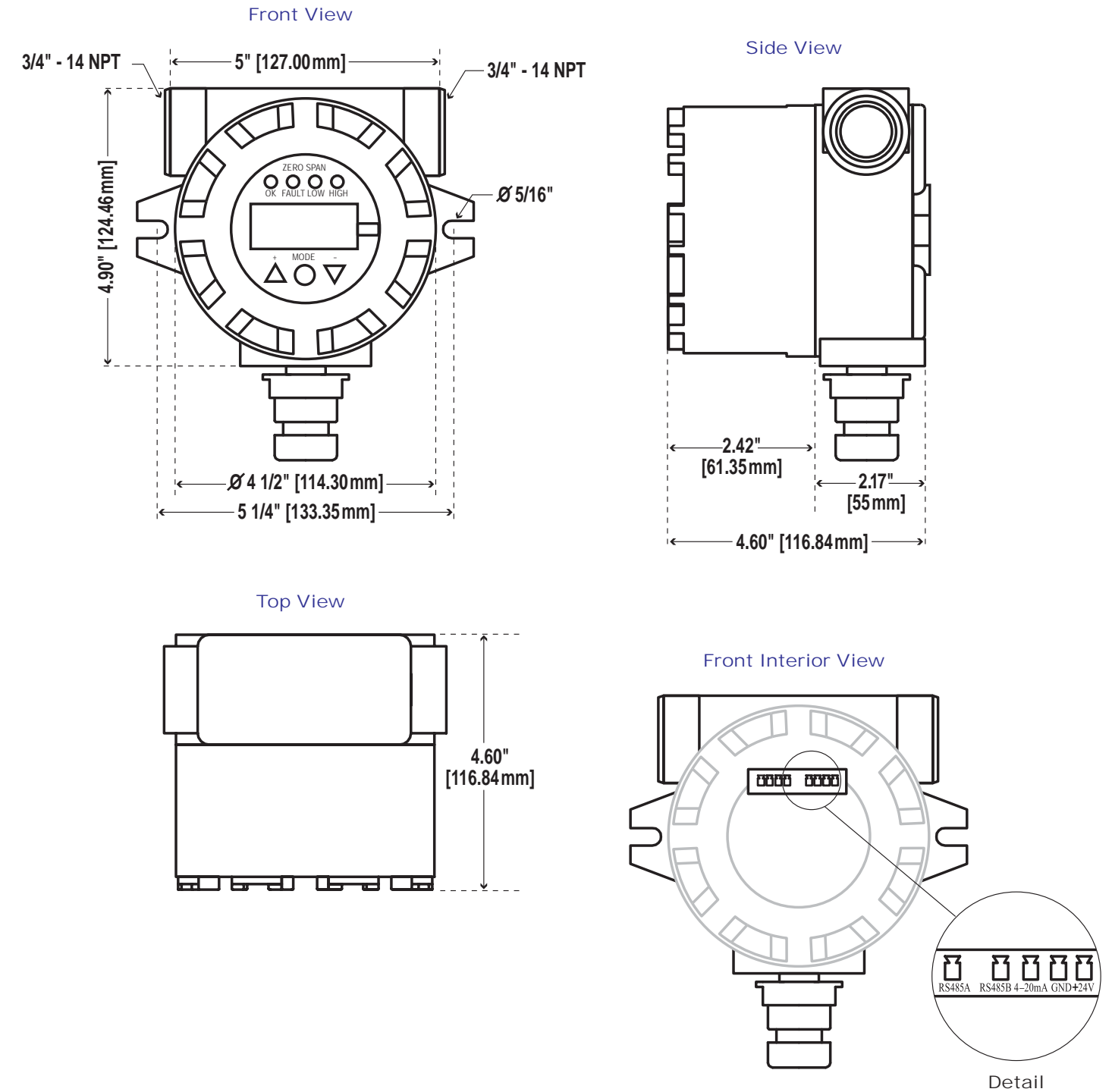
RAEGuard CO: 0 to 1000 ppm, UL
036-0003-020

RAEGuard O₂: 0 to 30%, UL
036-0003-040

RAEGuard SO₂: 0 to 150 ppm, UL
036-0003-080

Toll-Free: 877-723-2878

RAEGuard IR, LEL, EC Schematics





RAEGuard PID

Fixed Gas Detector

The RAEGuard PID is a permanently mounted (fixed) Photoionization Detector (PID) transmitter that operates from a 9 to 36 VDC power source and provides an analog (4-20 mA) signal output in three full-scale ranges of 20 ppm, 100 ppm, or 1,000 ppm isobutylene equivalent.

What Does a PID Measure?

The largest group of compounds measured by a PID are Organic: compounds that contain Carbon (C) atoms. These include:

- **Aromatics.** Compounds containing a benzene ring, including benzene, toluene, ethyl benzene and xylene.
- **Ketones and aldehydes.** Compounds with a C=O bond, including acetone, methyl ethyl ketone (MEK) and acetaldehyde.
- **Amines and amides.** Carbon compounds containing nitrogen, like diethylamine.
- **Chlorinated hydrocarbons.** Trichloroethylene (TCE), perchloroethylene (PERC).
- **Sulfur compounds.** Mercaptans, sulfides.
- **Unsaturated hydrocarbons.** Like butadiene and isobutylene.
- **Alcohols.** Like isopropanol (IPA) and ethanol.
- **Saturated hydrocarbons.** Like butane and octane.

Key Features

- Equipped with a local digital display of the gas concentration and functional keys for performing calibration
- 4-20 mA analog output ranging from 0.1 to 100.0 ppm, or 1 to 1,000 ppm isobutylene equivalent
- 4-20 mA analog output ranging from 0.01 to 20.00 ppm isobutylene equivalent for ultra-sensitive version
- Explosion-proof enclosure for hazardous locations
- Long-life 10.6 eV ultraviolet lamp and 3D Sensor
- Built-in pump with patented self-cleaning duty cycle operation
- Local displays with adjustment keys
- Magnetic key interface eliminates the need to open explosion-proof housing when making calibration and other minor adjustments
- Operation at 9 to 36V DC
- Two dry contact outputs (<30V,2A)

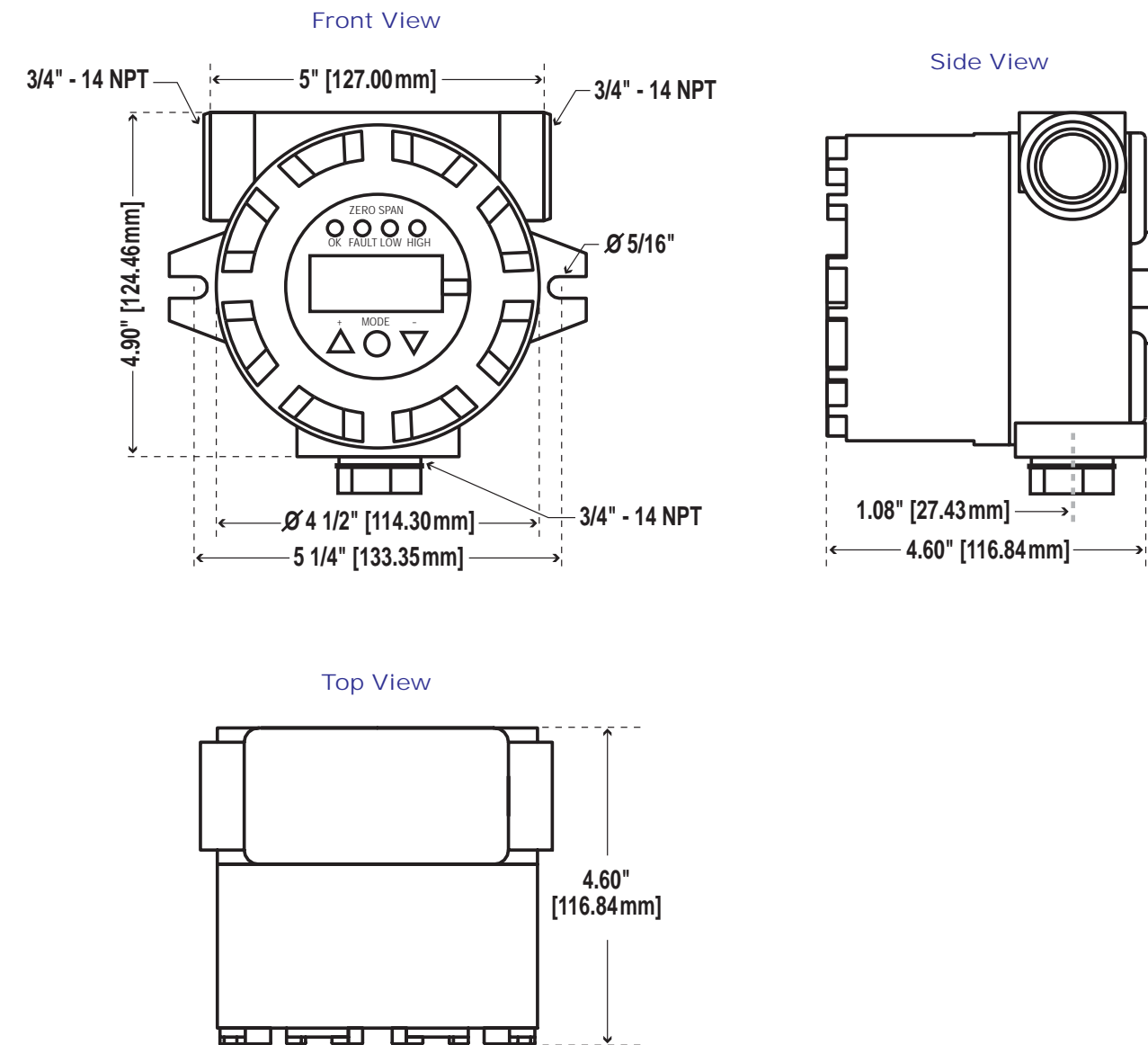
Specifications

Gas	Range (ppm)	Resolution (ppm)	Response Time (T90)
VOC	0.01 to 20 ppm	0.01 ppm	40 seconds
VOC	0.1 to 100 ppm	0.1 ppm	40 seconds
VOC	1.0 to 1000 ppm	1 ppm	40 seconds

Detector Specifications

Size	5.0" L x 5.0" W x 4.5" H (127mm x 127mm x 115mm)
Weight	5.5 lbs (2.5 kg)
Operating Temperature	-4° to 131 °F (-20° to 55° C) (T6)

RAEGuard PID Schematics



Ordering Information

Part Numbers

RAEGuard PID 1 to 1000 ppm: 036-0005-000
 RAEGuard PID 0.1 to 100 ppm: 036-0005-001
 RAEGuard PID 0.01 to 20 ppm: 036-0005-002

Toll-Free: 877-723-2878

GammaRAE II R

Personal Radiation Detector and Dosimeter



GammaRAE II R is two instruments in one: it has the rapid response of a detector and the accurate dose measurements of a dosimeter.



Why GammaRAE II R?

- Designed specifically to meet the needs of first responders
- Dual functionality: Sensitive detector and accurate dosimeter in one
- Fast, two-second response to radiological threats
- Certified intrinsically safe for superior protection in the unknown environments encountered by first responders
- No calibration required
- Multiple alarm alerts: loud audible buzzer, bright flashing LEDs and built-in vibration alerts
- ProRAE Studio Radiation software allows datalogs, dose and alarm information to be downloaded, and instrument settings to be configured

Key Features

- Sensitive CsI scintillator for excellent search capability and fast response
- Energy-compensated PIN diode sensor for high dose rate range and accurate dosimeter capabilities
- Prominent visible, audible and vibration alarm alerts
- Immersible in water for easy decontamination
- Top-mounted, invertable display
- Continuous digital readout in rem/hour or in Sievert/hour and counts-per-second
- Two operation keys, simple intuitive programming
- Large, 30,000-point datalog capacity, downloaded via cable-free Bluetooth® connection



Ordering Information

Part Number

GammaRAE II R Kit: 047-0501-000

Kit includes:

- GammaRAE II R personal radiation detector/dosimeter
- Interchangeable belt clip and alligator clamp
- Wrist strap
- User's Guide
- Calibration certificate
- ProRAE Studio Radiation software
- 2 AA alkaline batteries

Specifications

Sensors	CsI (TI) + Photodiode Energy-Compensated PIN Diode
Energy Range	0.06 to 3.0MeV
Dose Equivalent Rate (DER) for ¹³⁷ Cs	1μR/h to 10 R/h (0.01μSv/h to 0.1 Sv/h)
Accuracy of DER	±20%
Dose Range	1μR to 999.9 R (0.01μSv to 9.9 Sv)
Time to Alarm	≤2 seconds
Battery Runtime	Up to 900 hours



Toll-Free: 877-723-2878

NeutronRAE II

Personal Neutron and Gamma Radiation Detector



NeutronRAE II is the first personal radiation detector to provide rapid detection of both neutron and gamma radiation sources even in potentially flammable environments. Certified intrinsically safe and water-immersible for chemical decontamination purposes, the NeutronRAE II can be safely used in more environments than any other personal gamma and neutron radiation detector.



Why NeutronRAE II?

- Designed to meet the needs of first responders
- Fast, two-second response to radiological threats
- Certified intrinsically safe for superior protection in the unknown environments encountered by first responders
- No calibration required

Key Features

- Detects neutrons from weapons-grade Plutonium (²³⁹Pu) and gamma rays from potential "dirty bomb" materials
- Sensitive CsI and LiI scintillators for excellent search capability and fast response
- Prominent visible, audible and vibration alarms
- Immersible in water for easy decontamination
- Top-mounted, invertable display
- Continuous digital readout in microRem/hour (μR/h) or microSievert/hour (μSv/h) and counts per second (cps) for gamma radiation, and counts per second for neutron radiation

- Two operation keys and simple, intuitive programming
- Two AA alkaline batteries last up to 900 hours
- Large, 30,000-point datalog capacity, downloaded via cable-free Bluetooth® connection



Ordering Information

Part Number

NeutronRAE II Kit: 047-0401-000

Kits include:

- NeutronRAE II personal radiation detector
- Interchangeable belt clip and alligator clamp
- Wrist strap
- User's Guide
- Calibration certificate
- ProRAE Studio Radiation Software
- 2 AA alkaline batteries

Specifications

Sensor	Type of Radiation Detected	Energy Range	Measuring Range
CsI (TI) + Photodiode	Gamma	0.06 to 3.0MeV	1 to 4000μR/h (0.01 to 40μSv/h)
LiI (Eu) + Photodiode	Neutron	Thermal to 14MeV	1 to 100 cps

Accuracy of Dose Equivalent Rate (DER) for ¹³⁷ Cs	±20%
Dose Range (gamma only)	1μR to 999 R (0.01μSv to 9.9 Sv)
Time to Alarm	≤2 seconds (gamma) ≤2 seconds (neutron)
Battery Runtime	Up to 900 hours



Toll-Free: 877-723-2878



DoseRAE and DoseRAE-P Electronic Personal Radiation Dosimeter

DoseRAE is a rugged, lightweight, direct-reading electronic personal dosimeter that provides superior dose monitoring accuracy.

Why DoseRAE?

- Designed to be more rugged than traditional electronic personal dosimeters (EPDs) for more reliable use in industrial environments
- Loud audible buzzer and bright flashing LED alarm alerts
- Stay-time and stay-time warning alarms give the wearer advance notice to finish work in a radiation area before reaching the dose alarm threshold
- Two versions, DoseRAE and DoseRAE-P, allow optimal control and management for organizations of any size
 - DoseRAE-P allows alarm settings to be programmed “on-the-fly” using the dosimeter’s buttons, or using the dosimeter reader
 - DoseRAE’s alarm settings can be changed only using the dosimeter reader

Key Features

- Geiger-Mueller tube for superior accuracy and protection from RFI, microphonic and temperature effects
- Prominent visual and audible alarm alerts
- Extended 0 to 9.99 Sv (0 to 999 R) dose range
- Easy-to-read auto-ranging LCD provides dose, dose rate and stay-time information
- A single AA battery lasts up to 750 hours
- Dose history stores 200 datapoints
- Dust and shock resistant
- Multiple alarms based on dose, dose rate and stay-time
- Long calibration life
- Built-in self-test continuously monitors the condition of the radiation sensor, and alerts the wearer if the dosimeter is not functioning properly



Specifications

Sensor	Miniature energy-compensated Geiger-Mueller tube
Energy Range	0.055 to 6MeV
Dose Rate Range	0 to 5 Sv/h (0 to 500 R/h)
Dose Rate Accuracy	±15%
Dose Range	0µSv to 9.99 Sv (0µR to 999 R)
Dose Resolution	≤0.02µSv (≤2µR)
Battery Runtime	Up to 750 hours

Ordering Information

Part Number

DoseRAE-P 035-0004-000
DoseRAE 035-0007-000

Kits include:

- DoseRAE or DoseRAE-P dosimeter
- Interchangeable belt clip and alligator clamp
- User’s Guide
- Calibration Card
- 1 AA alkaline battery

Toll-Free: 877-723-2878



PlumeRAE

Plume Measurement and Decision Support for First Responders

PlumeRAE is a turn-key solution that integrates real-time wireless gas monitoring, real-time meteorological data, global positioning satellite (GPS) data, and powerful computing software to provide the most reliable plume dispersion modeling available today.

Why PlumeRAE?

Plume dispersion modeling has been around as a tool for emergency responders for some time. The Achilles’ heel of this technique is the identification of the release rate. More simply stated, the most difficult question to answer is: “How big is the hole, and how much gas is flowing?” The key benefit of plume measurement is the ability to “back-calculate” the chemical release rate based on measured weather and gas concentration information.

A fully integrated, wireless, portable weather station is a critical component of the PlumeRAE solution. The weather station can be set up in seconds to provide automated weather information. An integrated weather station, real-time AreaRAE wireless gas monitoring and GPS combine with mapping and computation algorithms to enable true plume measurement, as opposed to traditional plume modeling.

Key Features

Plume Measurement

PlumeRAE gives first responders information to make crucial decisions.

- GPS-equipped AreaRAE wireless monitors placed in strategic locations measure the levels of critical toxic chemicals and communicate their measurements to a ProRAE Remote Base Station
- ProRAE Remote, running on a standard laptop computer, feeds this information to the Plume Measurement Software that is running on the same PC
- Weather data transmitted by a Coastal Environmental Systems WEATHERPAK® completes the information package needed for analysis
- The Plume Measurement Software integrates the information and shows users a picture of the toxic plume, the speed at which it is spreading, and the concentration of the toxic compound

Decision Support

PlumeRAE gives first responders the information they need along with decision support so that they can answer critical questions and take immediate, effective action.

First Responders can:

- Track and validate plume impact
- Employ intelligent placement tactics for safely locating responders
- Evaluate the toxicological effect on responders and the community
- Create emergency response strategy
- Understand how long the event will persist
- Save the event for post-event analysis



Specifications

- Up to 32 GPS enabled AreaRAE gas monitors
- 1 Coastal Environmental WeatherPak, wireless, portable weather station
- 1 ProRAE Remote Software on a rapidly deployable host PC

Ordering Information

Part Number

PlumeRAE Solution Bundle
(With RDK and WEATHERPAK) 039-PR30-000

Toll-Free: 877-723-2878





HazRAE

Chem/Bio/WMD/Rad Decision Support

Developed specifically to address the unique needs of first responders, HazRAE is the most complete hazardous materials decision support application for chemical, biological, radiological and WMD assessments.

Why HazRAE?

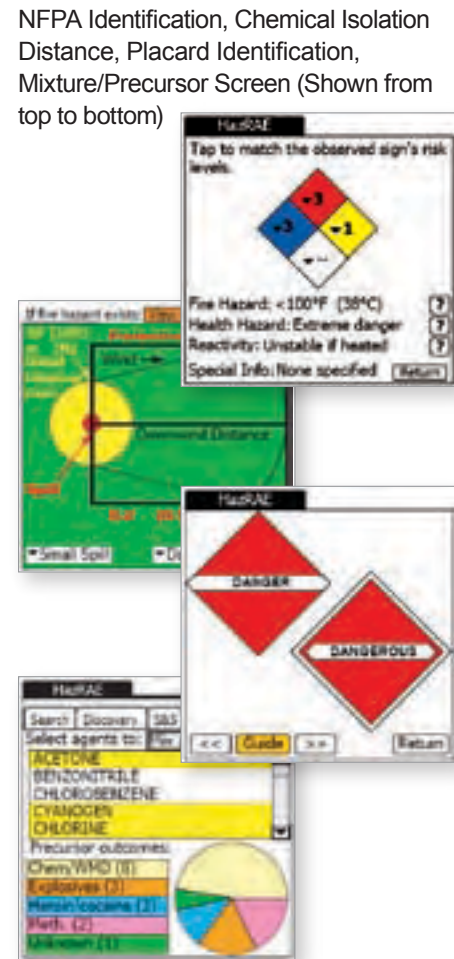
HazRAE is the only tool of its type to be approved under the US Department of Homeland Security's SAFETY Act as an Effective Anti-Terrorism Product.

- HazRAE is developed specifically to address the unique needs of first responders
- HazRAE's materials database can be searched using traditional identifiers (name, UN or OAS number) or by physical properties (color, odor) or by exposure symptoms
- HazRAE provides Improvised Explosive Device (IED) and Improvised Nuclear Device (IND) standoff distances and evaluation calculators
- Identify correction factors for RAE Systems 9.8eV, 10.6eV and 11.7eV PID lamps
- Identify agent-specific Personal Protective Equipment (PPE)
- Organization-specific documentation can be added and referenced through HazRAE

Key Features

- Integrated response information for more than 96,000 chemical and biological agents, radioactive materials, improvised explosive devices and detonators.
- More than 150 fields containing physical properties, material hazard categories, decontamination procedures, working allowances, reactivity, Acute Exposure Guidelines (AEGs), Military Exposure Guidelines (MEGs), Levels of Concern (LOCs), and more
- Intuitive, full-color view of isolation distances and protective action zones
- Time-stamped, high-resolution accountability logging
- HazRAE is the only DOD Common Operating Environment/Joint Technical Architecture compliant solution
- Integrated interactive NFPA704 classification identifier
- Cargo and railcar placard identification
- Detonator identification
- User-programmable PPE preplans

Example screens from HazRAE:



Ordering Information

Part Number
HazRAE PDA Kit* 055-5000-000

Kit includes:
HP iPAQ PDA and HazRAE software on SD card

*Software-only kits available

Toll-Free: 877-723-2878

Specifications

PDA Version	<ul style="list-style-type: none"> • Requires Windows® operating system • 12 MB memory • TouchScreen
Dose Rate Range	<ul style="list-style-type: none"> • Requires Windows 98 or higher operating system • 12 MB memory



LifeShirt

Real-time Life Sign Monitoring of First Responders

The LifeShirt was created to meet the needs of first responders, HazMat workers, firefighters, industrial cleanup crews, and homeland security personnel. The LifeShirt is a durable, lightweight chest strap embedded with sensors that continuously collect life sign information.

Why LifeShirt?

In emergency situations, people may push themselves too hard, leading to personal safety concerns and reduced efficiency. The data from the LifeShirt helps commanders determine when to rotate out team members for restorative breaks, to improve efficiency. The LifeShirt is also helpful when situations call for teams to wear heavy protective clothing. These outfits can lead to potential health issues, including heat stress.

The LifeShirt system provides real-time life sign information in an easy-to-read visual display, allowing commanders to make informed decisions and proactively intervene to assist their teams in completing critical missions.

Key Features

- Wireless integration into AreaRAE networks
- Adjustable sensitivity
- Lightweight
- Simple one-hand operation
- Low life-cycle cost with no consumable components

Applications

- First Responder monitor
- Personal Protection monitor
- HazMat management



Ordering Information

Part Number
LifeShirt Team Kit 039-LK00-000

Toll-Free: 877-723-2878



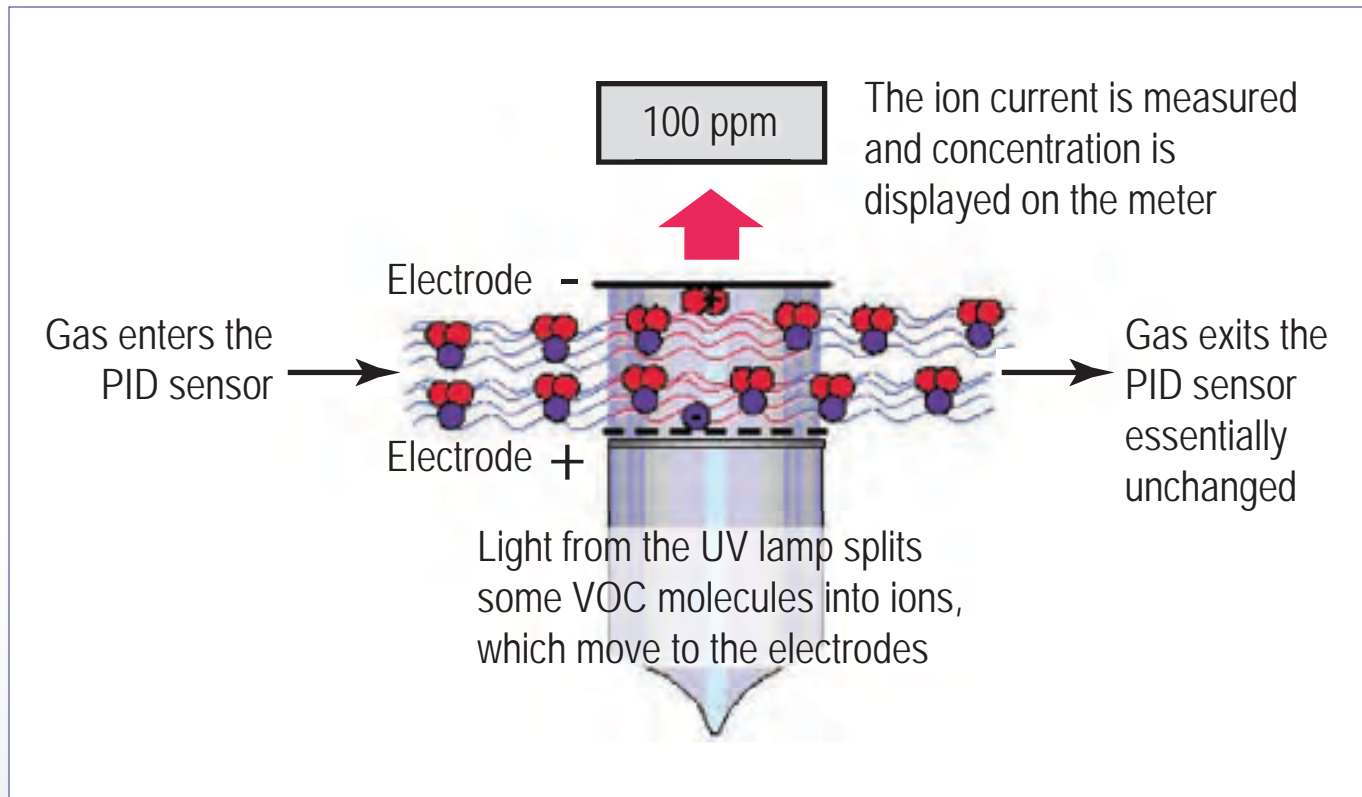
What is a Photoionization Detector (PID)?



A PID, short for photoionization detector, is a broadband sensor that responds to a large variety of organic and some inorganic compounds.

The general class of compounds suitable for detection is volatile organic compounds (VOCs) or hydrocarbons (HC). Because of their sensitivity and fast response at extremely low concentrations of compounds (parts per billion), PIDs protect workers not only from gases immediately dangerous to life, but also from toxic vapors that have long-term health effects.

How Does a PID Work?



What Does a PID Detect?

A PID measures all compounds whose ionization energy (IE) is less than the energy of the lamp photons (see figure at right). RAE Systems offers 9.8, 10.6, and 11.7 eV lamps.

Broadband Toxic Compound Monitoring in the Workplace

Until recently, the only low-cost way to get a “Go” or “No Go” reading for toxic VOCs was through the use of broadband toxic sensor such as MOS (metal oxide semiconductor) or lower explosive limit (LEL) sensors. These are not sensitive enough to provide accurate warnings of most toxic vapors until the permissible exposure levels are greatly exceeded. For example, benzene’s permissible exposure limit is 1 ppm, due to its highly carcinogenic nature. PIDs can easily measure down to 0.1 ppm benzene, while MOS and LEL sensors are best used above 100 ppm and cannot detect these low levels.

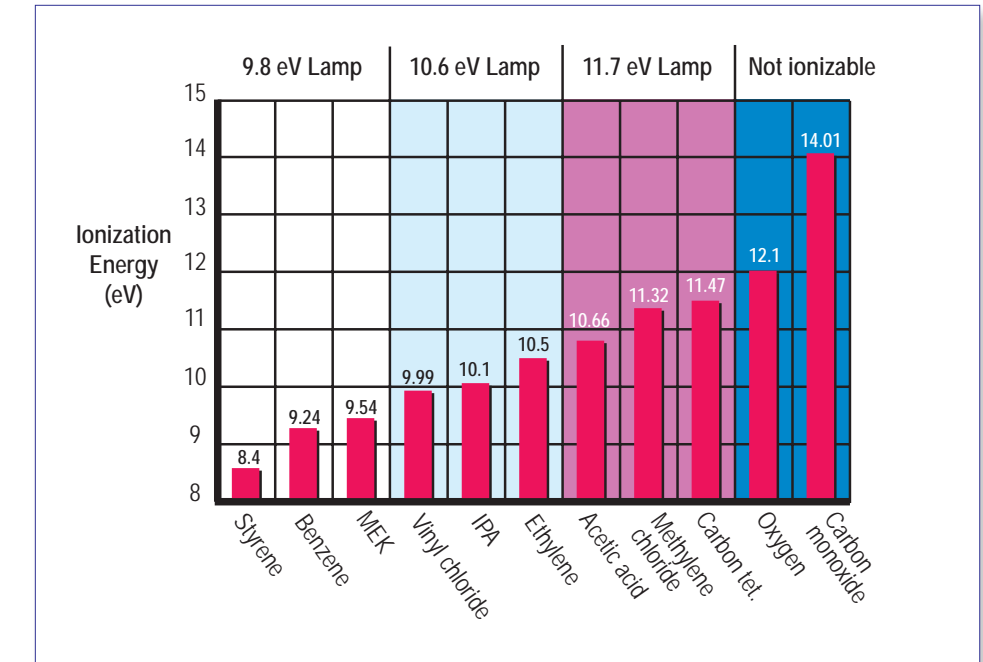
Advantages of a PID

1. Very sensitive – low ppm readings measured with confidence.
2. Instantaneous display, updated every second, for real-time monitoring of toxic chemicals.
3. Threshold monitoring—visible and audible alarms in real time for STEL (short-term exposure limit), TWA (time-weighted average), and Peak. Alarm signals vary for each condition.
4. Datalog for compliance and work shift trend analysis.
5. Fast, simple calibration with isobutylene. A large table of correction factors is available, alleviating the need to purchase many calibration gases.

Protection Vs. Detection

PIDs have traditionally been considered “detection” instruments, particularly well suited for use by first responders and entry teams to determine the extent of a spill or airborne emission. RAE Systems’ PIDs are “protection” monitors, quantifying chemical concentrations and alerting workers to hazardous conditions. Other applications include PID ppm and ppb monitoring for combustible gases such as jet fuel, gasoline, and solvents.

Ionization Energies (IE) for some common chemicals



Continuous Monitoring Alarms When Permissible Exposure Levels are Exceeded

Other methods such as colorimetric tubes provide only a snapshot of the concentration and no real-time alarm, unless the sample happens to be taken at the exact time of the peak occurrence. RAE Systems PID monitors provide ongoing detection and instantaneous alarms to indicate when exposure limits have been exceeded for a wide range of chemicals.

When limits are exceeded, the datalogging feature of RAE Systems monitors allows the individual to store, recall, and “see” exactly when the levels were a problem, whereas a tube cannot indicate when a level was exceeded or whether it happened all at one time or over the course of a worker’s shift.

Data from RAE Systems monitors can be instantly accessed from a personal computer. An individual can be asked what happened to create a situation in which exposure limits were exceeded while the individual can still recollect what happened. The answer could be as simple as cleaning with solvents or the failure of a ventilator. Therefore, with fast-

acting PIDs, instantaneous alarms and datalogging, RAE Systems monitors allow safety action to be taken immediately. Other methods, such as activated charcoal sampling, can take days or weeks to get results back from a lab.

Measuring a “Witches’ Brew” of Chemicals for a Particular Toxic

PIDs can be used to measure a highly toxic component of a complex mixture if its percentage in the mixture is known. For example, if a gasoline contains 1% benzene and the broadband PID reading for the entire gasoline mixture is below 50 ppm, then benzene is below its Permissible Exposure Limit (PEL) of 0.5 ppm.

PID

Examples of Volatile Organic Compounds Detected by PID

9.8 eV Lamp

Acetone
Allyl Alcohol
Allyl Glycidyl Ether
Aminopyridine
Aniline
Anisidine
Anisole
Benzene
Benzyl Alcohol
Benzyl Chloride
Butadiene
Butoxyethanol
Butylamine
Butyl Cellosolve
Butyl Glycidyl Ether
Butyl Mercaptan
Camphor Vapor
Chloroacetophenone
Chlorobenzene
Chloroprene
Cresol
Crotonaldehyde
Cumene
Cyclohexane
Cyclohexanol
Cyclohexanone
Cyclohexene
Cyclopentadiene
Diacetone Alcohol
Decane
Dichlorobenzene
Dichloroethyl Ether
Dichloroethylene
Dichlorvos
Diesel Fuel
Diethylaminoethanol
Diethylamine
Diglycidyl Ether
Diisobutyl Ketone
Diisopropylamine
N,N-Dimethylacetamide
Dimethylamine
Dimethylaniline
Dimethylformamide
Dimethylhydrazine
Dimethyl Sulfoxide
Dioxane
Diphenyl
Ethanolamine
Ethoxyethyl Acetate

Ethyl Amyl Ketone
Ethyl Benzene
Ethyl Butyl Ketone
Ethylamine
Ethylenediamine
Ethyleneimine
Ethyl Ether
Ethyl Hexyl Acrylate
Ethyl Mercaptan
Ethyl Silicate
Ethyl Sulfide
Furfural
Furfuryl Alcohol
Gasoline
Hexanone
Isopar Solvents
Isophorone
Isopropyl Ether
Isopropylamine
Isopropyl Glycidyl Ether
JP-4, -5, -8
Kerosene
Limonene
Mesityl Oxide
Methyl Amyl Ketone
Methyl Cellosolve
Methyl Ethyl Ketone
Methyl Ether
Methyl Hydrazine
Methyl Iodide
Methyl Mercaptan
Methyl Methacrylate
N-Methyl Pyrrolidone
Methyl Styrene
Methylamine
Methylcyclohexane
Methylcyclohexanone
Methylcyclohexanol
Mineral Spirits
Monomethylaniline
Morpholine
Naphtha
Naphthalene
Nitrobenzene
Nitrochlorobenzene
Nitromethane
Nonane
Norpar Solvents
Pentanone
Perchloroethylene

PGMEA
Phenol
Phenyl Ether
Phenylhydrazine
Pinene
Propylene Imine
Pyridine
Quinone
Stibine
Stoddard Solvent
Styrene
Tetrachloroethylene
Tetrahydrofuran
Toluene
Toluene diisocyanate
Toluidine
Toner Fluid
Trichloroethylene
Triethylamine
Turpentine
Vinyl Bromide
Vinylidene Chloride
Vinyl Cyclohexene
Vinylpyrrolidinone
Vinyl Toluene
White Spirit
Xylene

10.6 eV Lamp (including 9.8 eV compounds)

Acetaldehyde
Acetic Anhydride
Acrolein
Allyl Chloride
Amyl Acetate
Amyl Alcohol
Bromoform
n-Bromopropane
Butyl Acetate
Butyl Acrylate
Butyl Alcohol
Carbon Disulfide
Chloroacetaldehyde
Dimethyl Methyl-
Phosphonate
Epichlorohydrin
Ethanol
Ethyl Acetate
Ethyl Acrylate
Ethyl Bromide

Ethylene Dibromide
Ethyl Lactate
Glycidol
Heptane
Hexane
Hexyl Acetate
Hydrogen Sulfide
Iodine
Isoamyl Acetate
Isobutyl Acetate
Isobutyl Alcohol
Isopropyl Acetate
Isopropyl Alcohol
Ketene
Methyl Acetate
Methyl Acetylene
Methyl Acrylate
Methyl Bromide
Methyl Isocyanate
Octane
Pentane
Phosphine
Propyl Acetate
Propyl Alcohol
Propylene Oxide
Triethyl Borate
Triethyl Phosphate
Vinyl Chloride

11.7 eV Lamp (including all 9.8 & 10.6 eV compounds)

Acetic Acid
Acetylene
Acrylonitrile
Carbon Tetrachloride
Chlorodibromo-
methane
Chloroform
Chlorotrimethylsilane
Dichloroethane
Epichlorohydrin
Ethyl Chloride
Ethane
Ethylene Dichloride
Ethylene Oxide
Ethyl Formate
Formaldehyde
Formic Acid
Hexachloroethane
Liquid Petroleum Gas

Methyl Alcohol
Methyl Chloride
Methyl Chloroform
Methylene Chloride
Methyl Formate
Nitroethane
Nitromethane
Nitropropane
Phosgene
Propane
Propylene Dichloride
Propyl Nitrate
Propargyl Alcohol
Tetrachloroethane
Trichloroethane
Trichloromethylsilane

Not Detected by PID

Acetonitrile
Carbon Dioxide
Carbon Monoxide
Freons
Hydrogen
Hydrogen Bromide
Hydrogen Chloride
Hydrogen Cyanide
Hydrogen Fluoride
Hydrogen Peroxide
Methane
Nitric Acid
Nitrogen
Oxygen
Ozone
Sulfur Dioxide
Sulfuric Acid
Vikane
(Sulfuryl Fluoride)
Water