	Cincinnati Fire Department Fire Training Supplement DRILL BOOK	SECTION #1 General Fire Fighting
Date: June 2007	TOPIC TITLE: Q-Rae Multi-gas Monitor	Total # of Pages: 4
Section #: 1		Topic #: 17

TOPIC #16 Q-Rae Multi-Gas Monitor

Overview

The Q-Rae monitor is a programmable intrinsically safe multi gas monitor designed to provide continuous exposure monitoring of the following gasses:



OXY	Oxygen
H ₂ S	Hydrogen Sulfide
CO	Carbon Monoxide
LEL	Combustible Gasses

It is lightweight, portable and will provide up to 20 hours of continuous use on one charge when the battery is new. It has internal settings that allow for it to alarm when a hazardous condition is present.


The Q-Rae monitor comes in a carrying case with the following components included.

- 1) An operator's manual
- 2) A laminated quick reference guide
- 3) Q-Rae training CD
- 4) Inlet probe with Teflon Tubing
- 5) Pack of three external filters
- 6) Wall Plug battery charger
- 7) Alkaline Battery adapter for AA Batteries
- 8) Q-Rae Monitor with Rubber boot

Fire companies shall not attempt to re-configure the Q-Rae monitor. The monitor is provided to fire companies in "Text" mode and should not be altered.

Battery and Charging Concerns

The batteries in the Cincinnati Fire Department Q-Rae monitors are Lithium Ion batteries. A full charge will give approximately 20 hours of continuous operation. The run time is for ideal conditions, with a new battery and is not subject to adverse conditions such as extreme cold. It takes approximately 10 hours to charge the battery from a completely dead state. The LED will be red while charging. Once fully charged the LED will switch from red to green. The display will also indicate, "Fully charged Lithium Ion". The Q-Rae may be continuously charged without damaging the unit. The battery will lose its charge slowly over time. It should be recharged weekly, regardless of use.

	Cincinnati Fire Department Fire Training Supplement DRILL BOOK	SECTION #1 General Fire Fighting
Date: June 2007 Section #: 1	TOPIC TITLE: Q-Rae Multi-gas Monitor	Total # of Pages: 4 Topic #: 17

Lithium Ion batteries power all CFD Q-Rae monitors. RAE Systems does make the same monitor with a NiCad Battery. The NiCad battery is not as efficient as the Lithium Ion. It will not last as long and will build a memory. If a company sends in a unit for repair, the temporary replacement from RAE Systems may be a NiCad battery. When the unit is fully charged the screen will display “NiCad” instead of “LiIon” if a NiCad battery has been substituted.

The Alkaline battery adapter can be used in place of the Battery pack. This adapter is to be used in emergency situations only when there is no time to charge the battery. This battery pack uses 4 AA batteries and will give 12 to 14 hours of operation. To use this adapter, remove the cover of the monitor and unplug the battery pack from the battery connector replacing with the alkaline battery adapter. This battery adapter is intrinsically safe.

When the unit is fully charged the display will show 4.8 volts or higher. When the charge falls to about 4.4 volts a flashing “Bat” will appear in the display, which indicates approximately 20-30 minutes of run time remaining. When the charge level reaches 4.2 volts the unit will shut off automatically.

Water Trap Filter


The water trap filter is a Teflon membrane that prevents water and dust from being sucked up into the unit and causing damage. **This water filter is twisted onto the unit not pushed on or pulled off.** The unit may not be used without this filter in place.

Power On/Off

To turn on the Q-Rae Monitor press and hold the [MODE] key. The display will show “on”. When turning on the unit, watch the display as it cycles through. The display will show the software version it is using, the model number, serial number of the unit, current date and time, and ambient temperature of the unit. The date and time will only display if it has been set properly and the battery has not been completely exhausted.

At this point, the monitor will go through and check each installed sensor. When a sensor is detected to be at the end of its expected and warrantee life, the screen will display “Warranty Expired”. If this occurs, return the unit to Squad 14 for servicing.

After self-checking the sensors, the monitor will display additional information concerning its alarm limits for each installed sensor. The monitor will then ask if you want to do a fresh air calibration. Press [Y/+] and allow the unit to zero out.

	Cincinnati Fire Department Fire Training Supplement DRILL BOOK	SECTION #1 General Fire Fighting
Date: June 2007 Section #: 1	TOPIC TITLE: Q-Rae Multi-gas Monitor	Total # of Pages: 4 Topic #: 17

Note the Fresh Air calibration should only be conducted in a clean air environment. Member should not be in the space to be monitored or near exhaust fumes when performing a fresh air calibration.

At the conclusion of this fresh air calibration, the unit is ready to monitor the environment. This whole process from turning the unit on until it is ready to monitor should only take approximately 2 minutes.

To turn the unit off, press and hold the [MODE] button for 5 seconds.

Backlight

The unit is equipped with an automatic sensor that recognizes low light situations and will automatically turn on the backlight. If manual activation of the backlight is desired, it can be turned on manually by pressing and holding the [N/-] key for one second. In this mode the light will turn on and shut off after a preset amount of time to conserve battery power. The use of the backlight increases the drain on the battery by up to 30%.

Integrated Sampling Pump


The Q-Rae has an integrated sampling pump. This pump can be heard anytime the unit is on and operating. It serves as the mechanism for drawing air over the sensors to sample. The air is brought into the unit at the filter attached to the side of the monitor. If this filter gets blocked or is clogged in any way, it will automatically shut down to protect the pump from burning up. If the pump shuts down, it will go into an alarm mode and the alarm will sound and the LED will flash red.

Once the blockage is removed, the alarm will continue to sound until such time as the [Y/+] key is pressed signaling the unit it is OK to turn the pump back on.

Alarm Signals

The alarm limits are pre programmed into the Q-Rae monitor. This keeps the firefighter from having to memorize the action levels on all the gasses the monitor can detect. Whenever the preset limits are exceeded a loud buzzer will sound and a flashing LED will light.

Pressing the [Y/+] key once will test the alarm to ensure its operation.

	Cincinnati Fire Department Fire Training Supplement DRILL BOOK	SECTION #1 General Fire Fighting
Date: June 2007 Section #: 1	TOPIC TITLE: Q-Rae Multi-gas Monitor	Total # of Pages: 4 Topic #: 17

Programming the Q-Rae Monitor

Engine and Truck companies should not attempt to re-program the Q-Rae Monitor. Squad companies will maintain the monitors when necessary.

Sampling Hints

When air sampling in a space, remember to sample all three areas in the space. The top, middle, and bottom of the space should be sampled. When sampling spaces that cannot be entered, the unit may be tied to a rope or cord and lowered into the space. The alarm will audibly sound if a hazardous atmosphere is present.

When monitoring for explosive limits remember that the unit is calibrated for Methane gas and is only precise if the gas it is “sniffing” is methane. The monitor will still detect explosive ranges for other gases such as gasoline or propane spills and leaks but a conversion must be applied in order to get the exact percentage of LEL. This conversion is known as a correction factor. It is highly suggested that fire companies using the Q-Rae monitor place a laminated copy of the correction factors with the monitor on the apparatus. A list of correction factors for the most common gasses can be found in appendix B of the Q-Rae manual or for a more expansive list on the Internet from www.raesystems.com.

Correction Factor Example

While operating at a gasoline spill inside a residence, your company decides to monitor the vapor levels in the basement. You know the spilled substance is gasoline. Since gasoline is heavier than air, you monitor at the lowest point and obtain a reading of 5% LEL on the monitor. This is not a high enough level to put the monitor into alarm but when the conversion factor for gasoline is applied it is 5% multiplied by the factor for gasoline of 2.1 to come up with a reading of just over 10%. This is enough to put the monitor in alarm. In this example it can be seen that even when the monitor does not alarm, a gas can be at action levels.