



APPLICATION BRIEF

Gas Detection For Life

July 2000

BACKUP BATTERIES EMITTING HYDROGEN



Customer Type:

Cellular telephone cell sites, backup battery stations, or any battery rooms.

Application Description:

Since batteries are such an effective energy storage medium for almost any backup power system, many industries use backup battery banks for emergency power. The need for gas monitoring occurs while these backup batteries are being charged. Typically, batteries are continuously trickle charged. After an incident that requires battery use, a higher charge is used to quickly restore the batteries to full capacity. This charging process generates **hydrogen gas** which is emitted into the battery storage room. The faster the charge rate is, the higher the hydrogen generation rate is.

Backup batteries are normally of the lead acid type, however some are liquid based, gel cells, or even sealed type batteries. No matter which of these battery types they are, hydrogen is generated while being charged.

Hazard:

Hydrogen is a highly flammable gas. The National Fire Protection Association lists the lower explosive level (LEL) for Hydrogen as 4% by volume. If sufficient hydrogen collects in a room, it can potentially explode if ignited. This type of explosive hazard can destroy equipment as well as causing injury or death to personnel. The likelihood of this happening depends on the number of batteries, their charge rate, the size of the room, and the ventilation available for the room. Although this may not be a common occurrence, the potential hazard exists with any type of enclosed backup battery station. This danger can be eliminated by monitoring for a hydro-

gen buildup, and taking appropriate action if a build up occurs.

RKI's Solution:

RKI has developed the Model PS2 for this type of application. The PS2 is a low cost, stand alone, continuous gas monitor designed specifically for trouble-free hydrogen gas monitoring. The PS2 uses a long life, low maintenance metal oxide sensor for detection of hydrogen gas. The unit has two alarm levels, typically set to 10% LEL (0.4% volume hydrogen) and 30% LEL (1.2% volume hydrogen). If these alarm levels are exceeded, the PS2 activates a 10 amp relay for each level, and also its own audible and visual alarm. If action is taken at the first alarm level (for example, turning on a ventilation fan in a room to clear out the hydrogen), then the second alarm level should never be exceeded. The second alarm level typically would be used for more drastic action, such as turning on a bigger fan, cutting off the battery charge, or sounding a louder or remote alarm to bring attention to the problem.

The PS2 is a simplified, stand alone fixed system that is easy to install. It comes in a compact wall mounting enclosure, with terminals inside for power and remote alarm connections. The unit can be powered by 24 VDC, or optionally by 115 VAC (which ships with a 6 foot power cable), or 48VDC. Since hydrogen is lighter than air (vapor density for H2 is 0.1), emissions will typically rise. The PS2's sensor is on the end of a 30 foot cable, so that it can be mounted above the batteries. RKI recommends that a yearly check of sensor response is performed. A low cost calibration kit is available through RKI that will deliver a small amount of hydrogen to the sensor and confirm that the sensor will go into alarm. The PS2's metal oxide sensor has an extremely long life-span. It is not uncommon for this sensor to last 5 to 10 years or even longer. The PS2 is an economical, trouble-free solution that is ideal for monitoring battery rooms.

Equipment Needed:

- 73-1020RK-01PS2 for LEL detection, 24VDC
- 73-1021RK-01PS2 for LEL detection, 115VAC
- 81-PS2H2-LVCal Kit, PS2, H2, 34L

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