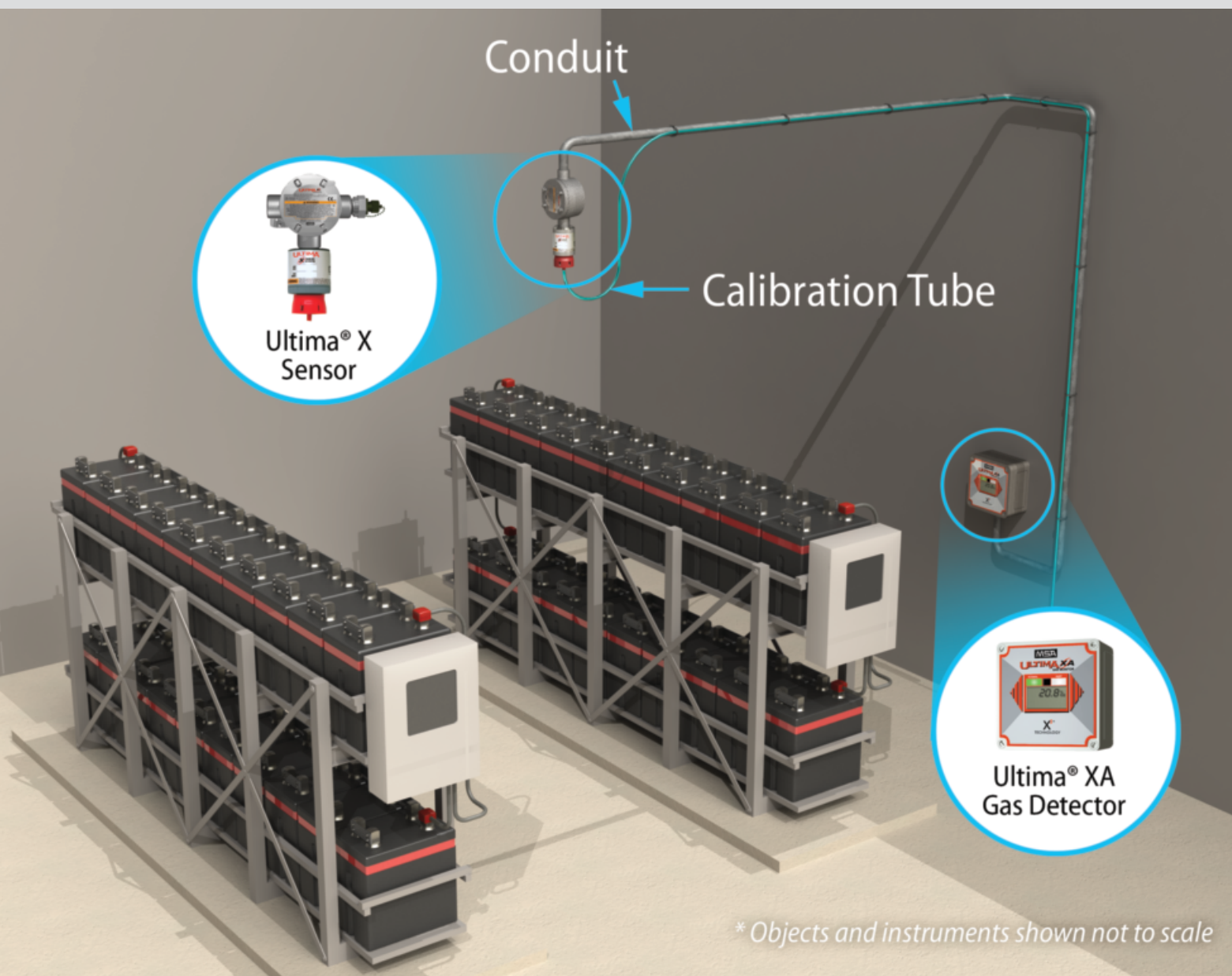


Hydrogen Monitoring in Battery Backup Applications



*Because every life has a **purpose...***

Hydrogen Monitoring in Battery Backup Applications



Battery back-up installations for equipment such as telecommunication stations and computers are normally situated in small rooms with little ventilation. This confined space provides an excellent opportunity for hydrogen to accumulate and reach combustible levels.

The batteries are continuously being charged to ensure maximum efficiency. A byproduct of the recharging process is hydrogen gas, which is produced by the chemical reaction and should be contained inside the battery. 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. Sometimes, however, the batteries leak. Since they are extremely light, hydrogen molecules rise rapidly and can pool at the roof or ceiling of the battery room, which may result in an explosive condition. For reliability, safety and compliance with local building codes and NFPA 111, it is important to have continuous monitoring for hydrogen gas in these applications.

In most instances, the sensor/transmitter is mounted on the ceiling, while the monitoring panel is mounted outside the room. Any build-up will cause an alarm and/or initiate ventilation.

A second common application is in warehouses where battery powered forklifts are used. Charging stations are commonly lined up in areas where a large number of vehicles can be charged simultaneously. Due to the size and number of batteries, dangerous levels of H_2 can accumulate.

An MSA transmitter, when outfitted with an electrochemical cell, provides a continuous reading of the hydrogen concentration. Since hydrogen has a 4% by volume Lower Explosive Limit (LEL), this gives the end user an indication of a very small leak (< 1% LEL) that can be investigated and remedied. In addition to this low-level measurement, a catalytic bead sensor can be used to monitor larger leaks that could result in an explosive atmosphere (0-100% LEL or higher).

There are two main factors to take into consideration when mounting the sensors:

- Relative density of hydrogen is 0.069, making it lighter than air. Therefore sensors should be mounted at or near the ceiling, away from any source of fresh air, which may dilute the sample.
- Remote sensors are normally used, with panels being mounted away from hydrogen source.

The volume of space that exists from 18" below the ceiling to the ceiling is often considered a classified area according to the NFPA, requiring a sensor installed in the area to have an explosion-proof rating. This sensor is connected to a transmitter or controller which can either be explosion-proof as well, or can be installed in a non-classified, general-purpose area. A hose can be run from the sensor to the user interface for calibration and/or gas check purposes.

The transmitter or controller can be configured to send a signal to a Building Automation System, or can be used as a stand-alone system to initiate actions such as opening vents or louvers, and activating ventilation fans. Considering most of these applications are usually unmanned, the gas concentration can be communicated to an end user's internal network for notification purposes.



Ultima® X Gas Monitor System

Designed to provide thorough, continuous monitoring of many hazardous gases, these indoor/outdoor monitors offer excellent performance with MSA quality craftsmanship.

- Multi-sensor configuration (X3) allows for the use of dual sensing technologies to provide layers of protection
- Patented sensor disconnect-under-power feature allows sensors to be replaced in hazardous areas without area declassification
- Interchangeable smart sensors eliminate the need for reconfiguration



TRIGARD® Standalone Single- or Multi-sensor Unit

The TRIGARD System employs MSA's precision craftsmanship to detect combustible gases, including hydrogen, as well as other toxic gases.

- Simple push-button calibration
- Single circuit board increases reliability
- Sturdy NEMA 4X design
- Multiple sensor mounting options



GasGard® XL Controller

Monitor up to eight remote gas sensors with the highly accurate wall-mounted GasGard XL Controller.

- Large, multi-language LCD display provides real-time readings and offers full-system diagnosis
- Housed in durable, fire-retardant ABS plastic
- Sensor features a buzzer that sounds up to 85 dB
- Convenient upload system enables event-log transfer via ethernet or USB

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Our dedication to safety has been the key to our impressive year-over-year growth. In 8 of the past 10 years we've achieved record growth numbers, with annual revenues of more than \$1 billion.

Our Mission

MSA's mission is to see to it that men and women may work in safety and that they, their families, and their communities may live in health throughout the world.

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Note: This Bulletin contains only a general description of the products shown. While uses and performance capabilities are described, under no circumstances shall the products be used by untrained or unqualified individuals and not until the product instructions including any warnings or cautions provided have been thoroughly read and understood. Only they contain the complete and detailed information concerning proper use and care of these products.



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