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Creative Gas Detection Solutions

SENSOR TECHNOLOGY

Infrared (IR) Sensors:

The infrared sensor is offered for CO_2 and hydrocarbons. The level of CO_2 can be from low ppm to % by volume concentrations. The range for hydrocarbons is generally 0-100% LEL. In addition to methane, propane is offered for detection of other typical hydrocarbons. The IR sensor utilizes an infrared light source of a certain wavelength that is highly absorbed by the gas to be monitored. In the process, the infrared light is passed through the gas in the sample chamber. The target gas absorbs the select wavelength proportional to the gas concentration, which is measured and displayed. Different wavelengths are used for CO_2 versus hydrocarbons so there is no cross sensitivity between these two applications. IR sensors can be used to measure hydrocarbons in an inert environment. Water vapor and corrosive gases, such as H_2S, are to be avoided.

Electrochemical (EC) Sensors:

Electrochemical sensors are used primarily for detection of inorganic gases, CO, H_2S, SO_2, etc. These sensors consist of electrodes, electrolyte and air/liquid separation barrier. Gas molecules enter the cell and, as a result of an oxidation/reduction reaction, generate an electrical current proportional to the gas concentration. Unlike MOS and PID sensors, EC sensors are quite specific, but some cross sensitivity to other similar gases generally exists.

Metal Oxide Semiconductor (MOS) Sensors:

An MOS sensor consists of a heated bead composed of mixed metal oxides that decrease in resistance in the presence of many different gases and vapors. These sensors are used for the detection of various hydrocarbons and organic solvents at ppm or percent LEL levels. They can be optimized and calibrated for a particular gas or group of gases, but they are inherently non-specific. High humidity conditions can result in higher, upscale readings, while extremely dry conditions have the reverse effect.

Photoionization Detector (PID) Sensors:

The PID sensor utilizes a UV lamp to produce high-energy radiation which reacts with the sample gas to generate a measurable flow of charged particles, the process known as photoionization. While lamps of different energy level are available, 10.6 eV is the most common. Various gases have different Ionization Potentials. A 10.6 eV PID can detect those gases having an IP of less than 10.6 eV. The PID is used for ppm or even ppb levels of VOC's. Like the MOS, PID sensors are very non-specific, as defined by the energy level of the UV lamp and the IP of the gases present. Water vapor will suppress readings, and corrosive gases, such as H_2S, can damage the sensor.

Catalytic (CAT) LEL Sensors:

Catalytic sensors are used to detect combustible hydrocarbons in the range of 0-100% LEL. Within this definition, these sensors are completely non-specific, however, their proper application depends upon the level of cross sensitivity response and the 100% LEL concentration for different gases. Methane is the most common calibration gas, but propane and other gases are used for other applications. The sensor consists of a pair of elements, one active and the other a reference bead, which are connected to a classic "Wheatstone Bridge". The active and reference elements create an electrical signal proportional to the gas concentration. Catalytic sensors are subject to silicone poisoning and the corrosive effects of certain gases.