Gas Detected by

RC SYSTEMS

Combustible and Toxic Gas Detectors

Carbon Dioxide Infrared

The key components of an IR CO2 detector are light source, measurement chamber, interference filter, and IR detector. IR radiation is directed from the light source through the measured gas to the detector. A filter located in front of the detector prevents wavelengths other than that specific to the measured gas from passing through to the detector. The light intensity is detected and converted into a gas concentration value

- **Carbon Dioxide**

Combustible

R.C. Systems Combustible Gas Detectors feature both the Catalytic Bead and Infrared Sensor.

The Catalytic Bead ("Catbeads" or "pellistor") sensor consist of a "reference bead" and an "analytic bead" wired into a Wheatstone bridge circuit. Catbeads burn a small amount of gas on the analytic bead which causes it to get hotter, increasing the resistance and voltage drop which creates an imbalance of the bridge circuit proportional to concentration.

The Infrared (IR) Sensor utilizes band pass filters to pass an analytical and a reference wavelength of IR light through a volume of the gas. The measurement is possible because some target gases absorb very specific wavelengths of IR light. Both the reference and analytical wavelengths are passed through the gas measuring path and reflected back onto the IR detectors. The presence of target gas will reduce the intensity of the analytical beam but not the reference beam similar to the way smoke affects visible light. The reference detector monitors the intensity of the two infrared sources and automatically compensates for loss of signal due to dirty optics or source aging.

• **Acetylene** • **Butane** • **Ethane** • **Ethanol**	• **Ethylene Oxide** • **Hexane** • **Hydrogen** • **Methane**	• **Pentane** • **Propane** • **Propylene**

Photoionization

The Photo-Ionization Detector (PID) is a vapor and gas detector that detects a variety of organic compounds. Photo-ionization occurs when an atom or molecule absorbs light of sufficient energy to cause an electron to leave and create a positive ion.

The PID is comprised of an ultraviolet lamp that emits photons that are absorbed by the compound in an ionization chamber. Ions (atoms or molecules that have gained or lost electrons and thus have a net positive or negative charge) produced during this process are collected by electrodes. The current generated provides a measure of the analyte concentration. Because only a small fraction of the analyte molecules are actually ionized, this method is considered nondestructive, allowing it to be used in conjunction with another detector to confirm analytical results

- **Benzene**

Toxic and Oxygen

The Electrochemical Sensor (often referred to as Echem sensors or EC) is a sensor primarily used for Toxic gases and Oxygen detection.

When using a EC sensor, the gas diffuses into the sensor, through the back of the porous membrane to the working electrode where it is oxidized or reduced. This electrochemical reaction results in an electric current that passes through the external circuit. In addition to measuring, amplifying and performing other signal processing functions, the external circuit maintains the voltage across the sensor between the working and counter electrodes for a two electrode sensor or between the working and reference electrodes for a three electrode cell. At the counter electrode an equal and opposite reaction occurs, such that if the working electrode is an oxidation, then the counter electrode is a reduction.

• **Ammonia** • **Arsine** • **Carbon Monoxide** • **Chlorine** • **Chlorine Dioxide** • **Ethylene Oxide** • **Fluorine**	• **Hydrogen** • **Hydrogen Chloride** • **Hydrogen Cyanide** • **Hydrogen Fluoride** • **Hydrogen Sulfide**	• **Nitric Oxide** • **Nitrogen Dioxide** • **Oxygen** • **Ozone** • **Phosphine (PH3)** • **Silane (SiH4)** • **Sulfur Dioxide**