MQ-2 Gas Sensor Overview

The **MQ-2** gas sensor is a widely used **gas detection module** that can detect a variety of gases in the air. It is primarily used for **detecting combustible and toxic gases**, making it useful in **industrial safety systems, home gas leak detectors, and air quality monitoring applications**.

Gases Detected by MQ-2

The **MQ-2** sensor can detect the presence of multiple gases, including:

1. **Methane (CH_4)** – Commonly found in natural gas leaks.
2. **Butane (C_4H_{10})** – Used in lighters, portable stoves, and fuel systems.
3. **Propane (C_3H_8)** – Found in cooking gas and heating systems.
4. **LPG (Liquefied Petroleum Gas)** – A mix of propane and butane used in household and industrial applications.
5. **Hydrogen (H_2)** – Used in fuel cells and industrial processes.
6. **Alcohol (Ethanol, C_2H_6O)** – Found in alcoholic beverages, hand sanitizers, and cleaning products.
7. **Carbon Monoxide (CO)** – A toxic gas produced by incomplete combustion.
8. **Smoke** – MQ-2 can detect smoke from fires or burning materials.

Common Uses of the MQ-2 Sensor

Application	Description
Gas Leakage Detection	Used in home gas leak alarms to detect **LPG, propane, and methane** leaks.
Fire & Smoke Detection	Can be used in **early fire warning systems**.
Industrial Safety	Monitors toxic and combustible gases in factories and workplaces.
Air Quality Monitoring	Detects harmful gases and pollutants for indoor air quality improvement.
Alcohol Detection	Can be used in breathalyzers for detecting **ethanol** levels.

Sensitivity Levels for Different Gases

The MQ-2 sensor has different sensitivity levels for various gases. Below is a **comparison table** showing the sensitivity levels (relative response).

Gas	**Sensitivity Level** (Relative Response)
Methane (CH_4)	High
LPG (Liquefied Petroleum Gas)	High
Hydrogen (H_2)	High
Propane (C_3H_8)	High
Smoke	Medium-High
Carbon Monoxide (CO)	Medium
Alcohol (Ethanol)	Low

Working Principle of MQ-2

- The MQ-2 sensor contains a **metal oxide semiconductor (SnO_2)** that **changes resistance** when exposed to gases.
- The **higher the gas concentration, the lower the resistance**, resulting in a change in output voltage.
- The **analog output (A0)** provides a voltage proportional to the gas concentration.

Conclusion

The **MQ-2 gas sensor** is a versatile and widely used sensor for **combustible and toxic gas detection**. It is commonly used in **home safety devices, fire alarms, and industrial safety applications**. However, for **precise gas measurement**, calibration is required, and different MQ-series sensors might be better suited for specific gases (e.g., **MQ-3 for Alcohol, MQ-7 for CO**).