

Methane Gas Sensor MQ-4 (Analog / Digital Output)

Product Description

The **MQ-4 Methane Gas Sensor (Analog/Digital)** is a highly reliable and cost-effective gas detection module designed for **detecting methane (CH₄) and natural gas leaks** in both domestic and industrial environments. Widely used in gas alarm systems, safety monitoring devices, and embedded electronics projects, the MQ-4 sensor offers **accurate detection, fast response time, and dual output support**, making it an excellent choice for engineers, students, and system integrators.

Methane is a highly flammable gas commonly found in **natural gas pipelines, LPG systems, mining operations, biogas plants, and household gas appliances**. Undetected methane leaks pose serious risks including fire, explosion, and health hazards. The MQ-4 sensor addresses these risks by continuously monitoring gas concentration levels and providing real-time output signals that can be processed by microcontrollers, alarm circuits, or control systems.

The MQ-4 sensor is based on **semiconductor gas sensing technology**, where changes in methane concentration cause variations in electrical resistance within the sensor's sensitive layer. These changes are converted into output signals that reflect gas concentration levels. The sensor module typically includes both **analog output** for continuous concentration monitoring and **digital output** for threshold-based detection using an onboard comparator.

With its **analog output**, the MQ-4 allows users to measure varying methane concentration levels and perform data analysis, calibration, or logging. The **digital output** provides a simple HIGH/LOW signal when gas concentration exceeds a preset limit, making it ideal for triggering alarms, relays, or safety shutdown systems. The adjustable sensitivity potentiometer enables users to fine-tune the detection threshold according to specific application requirements.

Designed for ease of use, the MQ-4 sensor module operates at a standard **5V DC supply**, making it compatible with popular development platforms such as microcontroller boards, embedded controllers, and DIY electronics projects. The sensor requires a warm-up period to stabilize its readings, after which it delivers consistent and reliable performance.

Thanks to its **compact size, low cost, and flexible output options**, the MQ-4 Methane Gas Sensor is widely used in gas leak detectors, home safety devices, industrial gas monitoring systems, and educational electronics experiments. Whether you are developing a smart gas alarm, building a safety monitoring system, or learning about gas sensing technology, the MQ-4 provides a dependable and practical solution.

Key Features & Benefits

Sensitive Methane Gas Detection

- Specifically designed to detect methane (CH₄)
- Suitable for natural gas leak monitoring
- High sensitivity to combustible gases

Dual Output Options

- **Analog output** for continuous gas concentration monitoring
- **Digital output** for threshold-based detection
- Supports both advanced analysis and simple alarm triggering

Adjustable Detection Threshold

- Built-in potentiometer for sensitivity adjustment
- Allows customization for different environments
- Improves accuracy and reduces false alarms

Fast Response & Recovery Time

- Quickly detects changes in methane concentration
- Suitable for real-time monitoring applications
- Enhances safety by early leak detection

Stable & Reliable Performance

- Semiconductor sensing element ensures consistency
- Designed for long-term use
- Reliable readings after proper warm-up

Easy Integration

- Operates on standard 5V DC supply
- Compatible with microcontrollers and embedded systems
- Simple wiring for quick setup

Compact & Lightweight Design

- Small form factor for space-constrained designs
- Easy to mount in enclosures or PCBs
- Ideal for portable or fixed installations

Low Power Consumption

- Suitable for continuous monitoring
- Efficient heater design
- Works well in both mains-powered and controlled environments

Wide Application Range

- Home gas leak alarms
 - Industrial safety monitoring
 - Natural gas and biogas systems
 - Mining safety equipment
 - Embedded system development
 - Educational and training projects
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Applications

- Methane and natural gas leak detection
 - Gas alarm and warning systems
 - Smart home safety devices
 - Industrial gas monitoring solutions
 - Embedded electronics and IoT projects
 - Academic and laboratory experiments
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Why Choose the MQ-4 Methane Gas Sensor?

The **MQ-4 Methane Gas Sensor** offers an ideal balance of **performance, simplicity, and affordability**. Its ability to provide both analog and digital outputs makes it flexible for a wide range of applications, from simple alarm systems to advanced data-driven monitoring solutions. The adjustable sensitivity and stable performance ensure reliable detection in various environments.

Whether you are building a commercial gas detection system or experimenting with gas sensors in a learning environment, the MQ-4 delivers dependable methane detection with minimal setup and proven reliability.