# Introduction

The Gravity: SFA40 HCHO Sensor is a high-precision electrochemical module designed to solve the biggest pain point in air quality monitoring: false alarms. Powered by the industry-leading Sensirion SFA40 chip, this formaldehyde detector specifically targets HCHO molecules while ignoring common household odors like alcohol or perfumes. Featuring a built-in SHT4x sensor for automatic temperature and humidity compensation, this monitoring unit delivers reliable data for smart home devices, HVAC systems, and DIY air purifiers.

**Zero False Alarms: Anti-Interference Design**

Standard sensors often spike simply because someone peeled an orange or used hand sanitizer. This electrochemical HCHO sensor solves this by utilizing advanced electrode materials with a cross-sensitivity to ethanol of less than 0.3%. It ensures that a rising reading indicates actual formaldehyde, not just a change in daily household scents.

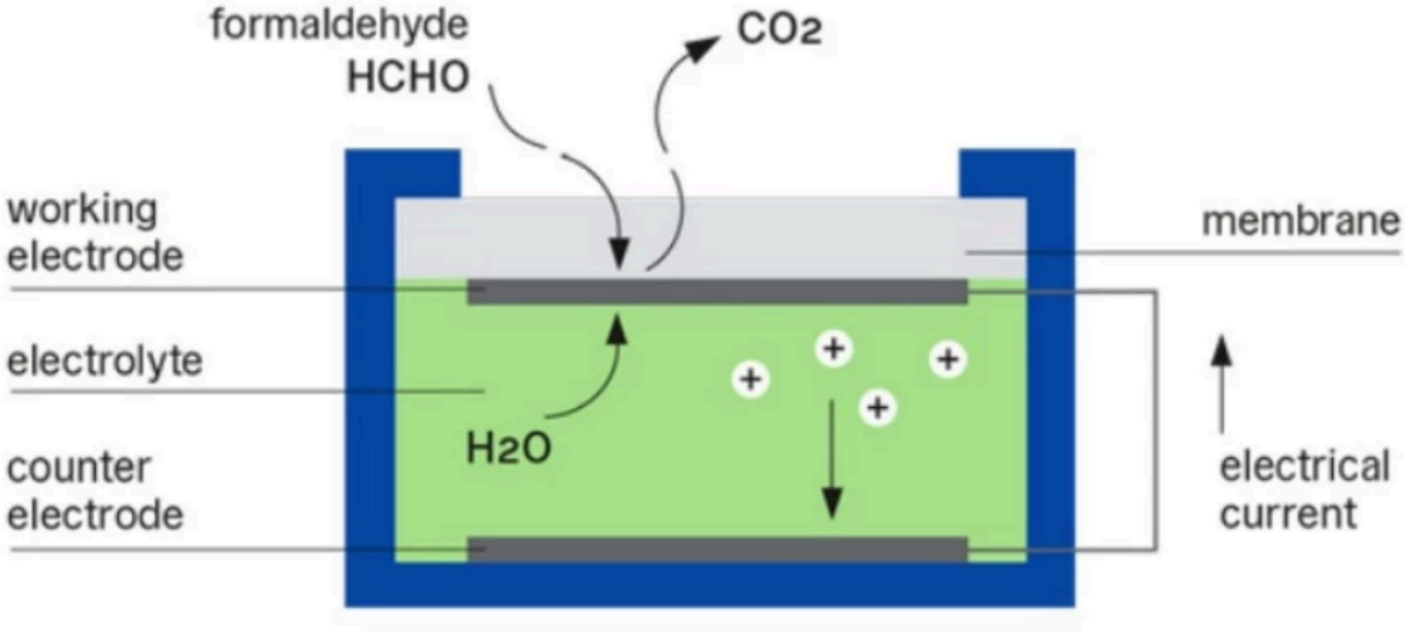


Figure: Advanced Electrochemical Principle for Specific HCHO Detection

**Laboratory-Grade Sensitivity (20 ppb)**

Detecting trace gases requires immense precision. The Gravity SFA40 module boasts a detection threshold of just 20 ppb. To put this in perspective, finding 20 ppb is equivalent to finding 20 grains of rice in 15,600 kilograms of rice. Whether you are tracking faint off-gassing from new furniture or conducting scientific research, this sensor captures minute changes that other devices miss.


Figure: Ultra-high Sensitivity: Detecting 20ppb is like finding 20 grains in 15 tons of rice.

**Integrated Environmental Compensation**

To prevent data drift caused by heat or moisture, the SFA40 analysis board integrates a SHT4x sensor. This onboard coprocessor automatically calibrates the formaldehyde readings based on real-time temperature and humidity, ensuring consistency whether the device is in a damp basement or a dry office.

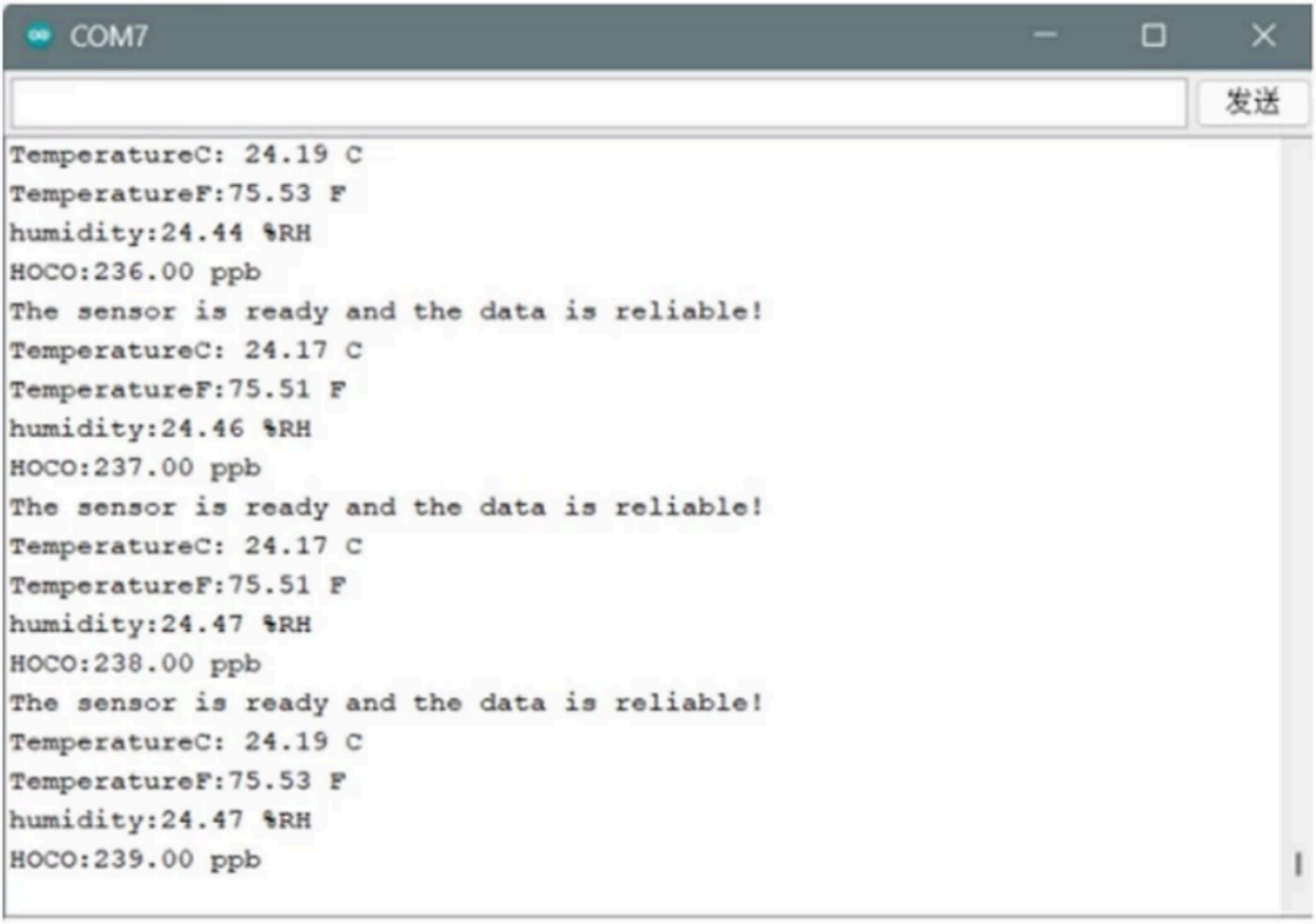


Figure: Real-time Output: Simultaneous HCHO, Temperature, and Humidity Monitoring.

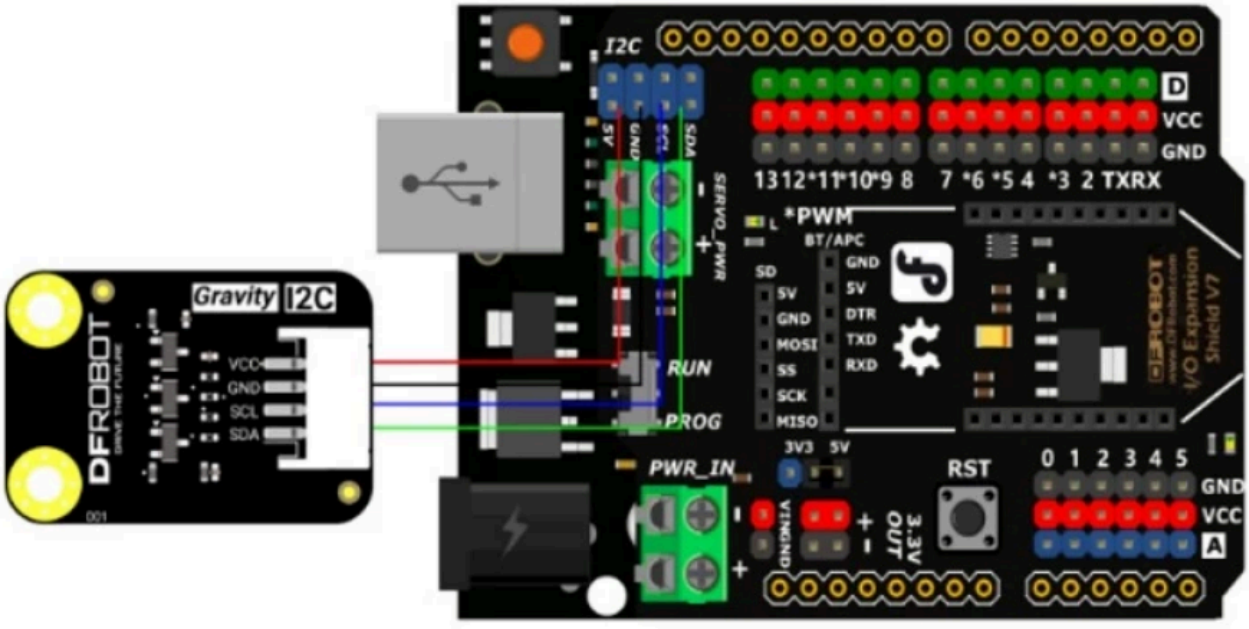


Figure: Plug-and-Play Gravity I2C Interface with Arduino.

# Applications

- Smart Home Air Guardians: Build a monitor that alerts you when new furniture off-gases formaldehyde.
- Automated Ventilation: Trigger fans or open windows automatically when HCHO levels exceed safe limits (>80 ppb).
- Smart Air Purifiers: Create a device that only activates filtration when pollutants are actually present, saving energy.

- Portable Health Checkers: Design a handheld logger to inspect air quality in different rooms or new cars.

## Specification

- Typical accuracy: ±20ppb or ±20% m.v (@0~200ppb measurement range)
- Wide measurement range: 0–1000 ppb
- Low cross-sensitivity: Cross-sensitivity to ethanol ＜0.3%
- Supply Voltage: 3.3–5V
- Operating Temperature: 0~50℃
- Operating Humidity： 10~90%R.H
- Operating Current: 80μA(Average@2Hz), 2mA(peak)
- Size: 32 * 22mm

## Shipping List

- Gravity: SFA40 HCHO Sensor x1
- Gravity 4pin sensor cable x1

## Documents

- Product Wiki