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› Teyleten Robot SCD41 Gas Sensor Module User Manual

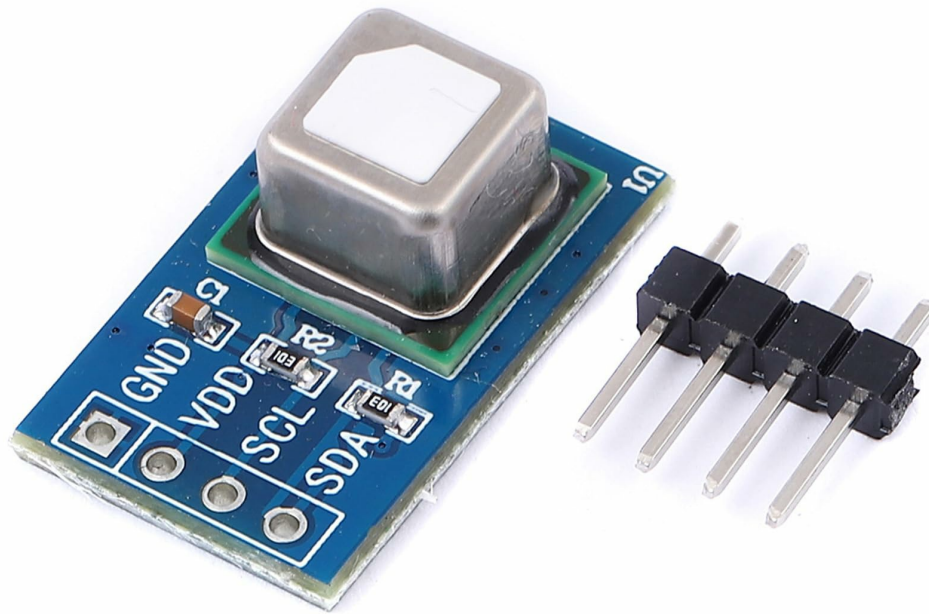
Teyleten Robot SCD41

Teyleten Robot SCD41 Gas Sensor Module User Manual

Model: SCD41

1. INTRODUCTION

The Teyleten Robot SCD41 is a high-accuracy and cost-effective gas sensor module designed for measuring CO₂, temperature, and humidity. It features an on-chip temperature and humidity compensation mechanism, utilizing built-in sensors for precise environmental monitoring. The module provides a digital I²C interface for communication and is suitable for applications requiring intelligent adjustment of indoor ventilation systems based on CO₂ concentration, contributing to a healthy and efficient environment.



This image displays the Teyleten Robot SCD41 Gas Sensor Module, highlighting its compact design with a blue printed circuit board (PCB) and the main sensor component. The module features several connection pins for integration into electronic projects.

2. PRODUCT FEATURES

- **Supply Voltage Range:** 2.4V to 5.5V
- **High CO2 Accuracy:** \pm (40 ppm + 5%)
- **Interface:** Digital I2C
- **Integrated Sensors:** Temperature and Humidity
- **Low Power Operation:** Less than 0.4 mA average at 5V, with 1 measurement every 5 minutes
- **CO2 Measurement Range:** 400 ppm to 5000 ppm

3. SETUP INSTRUCTIONS

The SCD41 module is designed for easy integration into various electronic projects. Follow these steps for proper setup:

1. **Power Supply Connection:** Connect the module to a stable power source within the 2.4V to 5.5V range. A stable 3.3V supply is often recommended to prevent disconnections. Ensure proper polarity.
2. **Ground Connection:** Establish a common ground connection between the SCD41 module and your microcontroller (e.g., Arduino, ESP32). Failure to do so can lead to communication errors and incorrect readings.
3. **I2C Interface:** Connect the I2C data (SDA) and clock (SCL) pins of the SCD41 module to the corresponding I2C pins on your microcontroller. The module uses a standard digital I2C interface.
4. **Physical Placement:** Position the sensor in an area with open air circulation. Avoid placing it in direct, forced airflow, as this can affect CO2 measurement accuracy.
5. **Software Integration:** Utilize appropriate libraries for your chosen microcontroller platform (e.g., Arduino libraries for SCD4x sensors) to communicate with the module via I2C.

4. OPERATING INSTRUCTIONS

Once the SCD41 module is correctly set up, follow these guidelines for operation:

- **Initial Stabilization:** After power-up, allow several minutes for the sensor to stabilize. Temperature and humidity readings typically stabilize within a few minutes. CO2 readings may take longer to return to baseline after significant fluctuations.
- **Reading Data:** Use your microcontroller's I2C communication functions to request CO2, temperature, and humidity data from the SCD41 module. Refer to the sensor's datasheet or library documentation for specific commands.
- **Automatic Self-Calibration:** The SCD41 may feature an automatic self-calibration function. For consistent and predictable readings, especially in controlled environments, it is often recommended to disable this feature in your software configuration.
- **Environmental Considerations:** The sensor is sensitive to airflow and sound due to its CO2 measurement principle. Ensure it is exposed to ambient air without direct drafts or excessive noise.

5. MAINTENANCE

To ensure the longevity and optimal performance of your SCD41 Gas Sensor Module, consider the following maintenance practices:

- **Cleanliness:** Keep the sensor module free from dust, dirt, and moisture. Avoid touching the sensor element directly.
- **Environmental Protection:** If operating in harsh environments, consider an appropriate enclosure that allows for air circulation but protects the module from physical damage or excessive contaminants.
- **Stable Power:** Ensure the power supply remains stable and within the specified voltage range to prevent operational issues.
- **Avoid Physical Stress:** Handle the module carefully to prevent damage to the PCB or sensor components.

6. TROUBLESHOOTING

Problem	Possible Cause	Solution
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Problem	Possible Cause	Solution
Sensor not responding or giving unknown errors.	<ul style="list-style-type: none"> No common ground between sensor and microcontroller. Unstable or insufficient power supply. Incorrect I2C wiring. 	<ul style="list-style-type: none"> Ensure a common ground connection. Verify power supply stability (e.g., add a capacitor across VCC and GND). Double-check SDA/SCL connections.
Inaccurate or fluctuating CO2 readings.	<ul style="list-style-type: none"> Sensor exposed to direct, forced airflow. High ambient noise affecting measurement. Automatic self-calibration interfering. 	<ul style="list-style-type: none"> Relocate sensor to an area with open, but not forced, airflow. Ensure sensor is not near loud noise sources. Consider disabling automatic self-calibration in software.
Incorrect temperature or humidity readings.	<ul style="list-style-type: none"> Sensor not fully stabilized after power-up. Inherent calibration offset (especially for temperature). 	<ul style="list-style-type: none"> Allow several minutes for stabilization after power-up. Note that temperature and humidity sensors may have slight offsets; CO2 calibration is supported, but temperature calibration may not be directly adjustable on the sensor itself. Consider external temperature/humidity sensors for critical applications if precise calibration is required.

7. SPECIFICATIONS

Parameter	Value
Brand	Teyleten Robot
Model Number	D36- (SCD41)
Supply Voltage Range	2.4V - 5.5V
CO2 Measurement Range	400 ppm - 5000 ppm
CO2 Accuracy	± (40 ppm + 5%)
Interface	Digital I2C
Integrated Sensors	Temperature, Humidity
Average Current Consumption	<0.4 mA @ 5V (1 measurement/5 min)

8. WARRANTY AND SUPPORT

Specific warranty information for the Teyleten Robot SCD41 Gas Sensor Module is not provided in this manual. For details regarding warranty coverage, technical support, or further assistance, please refer to the product packaging, the manufacturer's official website, or contact your point of purchase.

