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QKVJULBN BME280 Temperature Humidity Atmospheric Pressure Sensor User Manual

1. INTRODUCTION

This manual provides essential information for the proper installation, operation, and maintenance of the QKVJULBN BME280 Temperature, Humidity, and Atmospheric Pressure Sensor module. The BME280 is a high-precision environmental sensor designed for various applications requiring accurate environmental data. It supports both I2C and RS485 communication interfaces, offering flexibility for integration into different systems.

2. PRODUCT OVERVIEW

The QKVJULBN BME280 sensor module integrates a BME280 chip within a robust metal probe housing, making it suitable for various environments. It measures temperature, relative humidity, and atmospheric pressure. The module is available with different cable lengths and communication protocols (I2C or RS485) to suit specific application needs.



Figure 1: QKVJULBN BME280 Sensor Module with integrated cable and exposed wires for connection.

Key features include:

- Integrated BME280 sensor for temperature, humidity, and pressure.
- Durable metal probe design.
- Available with I2C or RS485 communication interfaces.
- Various cable lengths for flexible deployment.



Figure 2: Close-up view of the BME280 sensor's metal probe tip, showing the protective cap over the sensing elements.

3. SPECIFICATIONS

Feature	Value
Sensor Type	BME280 (Temperature, Humidity, Atmospheric Pressure)
Communication Interface	I2C or RS485
Package Dimensions	0.39 x 0.39 x 0.39 inches (sensor probe)
Item Weight	1.76 ounces
Manufacturer	QKVJULBN

Feature	Value
Model Number	QKVJULBN

4. SETUP

4.1 Power Supply

The sensor requires a stable DC power supply. Refer to the specific product variant documentation for exact voltage requirements, typically 3.3V or 5V. Ensure correct polarity when connecting power.

4.2 Wiring Connections

The sensor module comes with a cable featuring multiple wires for power and data communication. Identify the wires based on their color coding, which typically follows standard conventions:

- **Red:** VCC (Power Supply)
- **Black:** GND (Ground)
- **Green/Yellow:** Data Line (SDA for I2C, A for RS485)
- **Blue/White:** Data Line (SCL for I2C, B for RS485)

4.2.1 I2C Interface Connection

For I2C communication, connect the sensor to your microcontroller or host system as follows:

- Sensor VCC to Microcontroller VCC (e.g., 3.3V or 5V)
- Sensor GND to Microcontroller GND
- Sensor SDA to Microcontroller SDA
- Sensor SCL to Microcontroller SCL

Ensure pull-up resistors are correctly configured on the SDA and SCL lines if not already integrated into your microcontroller board or the sensor module.

4.2.2 RS485 Interface Connection

For RS485 communication, connect the sensor to your RS485 transceiver or host system as follows:

- Sensor VCC to Power Supply VCC
- Sensor GND to Power Supply GND
- Sensor A (Data+) to RS485 Transceiver A (Data+)
- Sensor B (Data-) to RS485 Transceiver B (Data-)

RS485 is a differential communication protocol, suitable for longer distances and noisy environments. Ensure proper termination resistors are used in the RS485 network if required by your setup.

5. OPERATING INSTRUCTIONS

5.1 Data Acquisition (I2C)

To read data from the BME280 sensor via I2C, you will typically use a microcontroller with an I2C library. The BME280 has a specific I2C address (usually 0x76 or 0x77). You will need to initialize the sensor, configure its operating modes (e.g., oversampling rates for temperature, humidity, pressure, and filter settings), and then read the raw sensor data from its registers. The raw data then needs to be converted into meaningful units (Celsius, %RH, hPa) using the calibration

parameters stored within the sensor.

5.2 Data Acquisition (RS485)

For RS485 communication, the sensor typically operates using the Modbus RTU protocol. You will need an RS485 master device (e.g., a PLC, industrial PC, or microcontroller with an RS485 transceiver) to send Modbus commands to the sensor. The sensor will respond with the requested temperature, humidity, and pressure data. Refer to the specific Modbus register map provided with your RS485 variant for details on reading sensor values.

5.3 Environmental Considerations

For optimal performance, avoid placing the sensor in direct sunlight, near heat sources, or in areas with extreme airflow variations. The metal probe is designed for durability, but prolonged exposure to corrosive gases or liquids should be avoided unless specified for such environments.

6. MAINTENANCE

The BME280 sensor module is designed for low maintenance. However, periodic checks can ensure continued accuracy and longevity.

- **Cleaning:** If the sensor probe becomes dirty, gently wipe the metal housing with a soft, dry cloth. Avoid using abrasive cleaners or solvents. Do not attempt to clean the internal sensing elements directly, as this can damage the sensor.
- **Inspection:** Periodically inspect the cable for any signs of damage, such as cuts or fraying. Ensure all connections remain secure.
- **Environmental Protection:** While the metal probe offers protection, ensure the sensor is not subjected to conditions beyond its specified operating range for temperature and humidity.

7. TROUBLESHOOTING

If you encounter issues with your BME280 sensor module, consider the following troubleshooting steps:

- **No Readings or Incorrect Data:**
 - Verify all wiring connections (VCC, GND, SDA/SCL or A/B) are correct and secure.
 - Check the power supply voltage to ensure it is within the sensor's operating range.
 - For I2C, confirm the correct I2C address (0x76 or 0x77) is being used in your code.
 - For RS485, ensure the Modbus address and register map are correctly configured.
 - Ensure your microcontroller's I2C or UART (for RS485) interface is properly initialized.
 - Check for any software errors in your data acquisition code.
- **Sensor Not Detected (I2C):**
 - Perform an I2C scanner sketch to detect devices on the bus.
 - Ensure pull-up resistors are present on SDA and SCL lines.
- **Inconsistent Readings:**
 - Ensure the sensor is not exposed to rapid temperature changes or drafts.
 - Verify the sensor is not placed near heat-generating components.
 - Check for electromagnetic interference, especially with long cables.

8. WARRANTY AND SUPPORT

For warranty information and technical support, please refer to the documentation provided at the time of purchase or contact QKVJULBN customer service directly. Keep your purchase receipt or order number handy for faster service.

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