NOYITO MAX6675

NOYITO MAX6675 K-Type Thermocouple Module User Manual

Model: MAX6675

1. Introduction

This manual provides detailed instructions for the installation, operation, and maintenance of the NOYITO MAX6675 K-Type Thermocouple Temperature Sensor Module. This module is designed to accurately measure temperatures using a K-type thermocouple and convert the analog signal into a digital format via an SPI interface, making it suitable for various industrial and hobbyist applications.

2. Product Overview

The NOYITO MAX6675 module is a cold-junction compensated K-type thermocouple to digital converter. It provides a 12-bit resolution, allowing for precise temperature measurements. The module includes a K-type thermocouple sensor, offering a wide temperature measurement range.

Key Features:

- **Test Temperature Range:** 0°C-1024°C, with a converter temperature resolution of 0.25°C.
- **Operating Voltage Range:** 3.0V-5.5V.
- **Operating Current:** 50mA.
- **Operating Temperature Range:** -20°C-85°C.
- **Interface:** SPI (Serial Peripheral Interface).
- **Module Size:** 15mm * 28mm, with 3mm diameter screw holes for mounting.

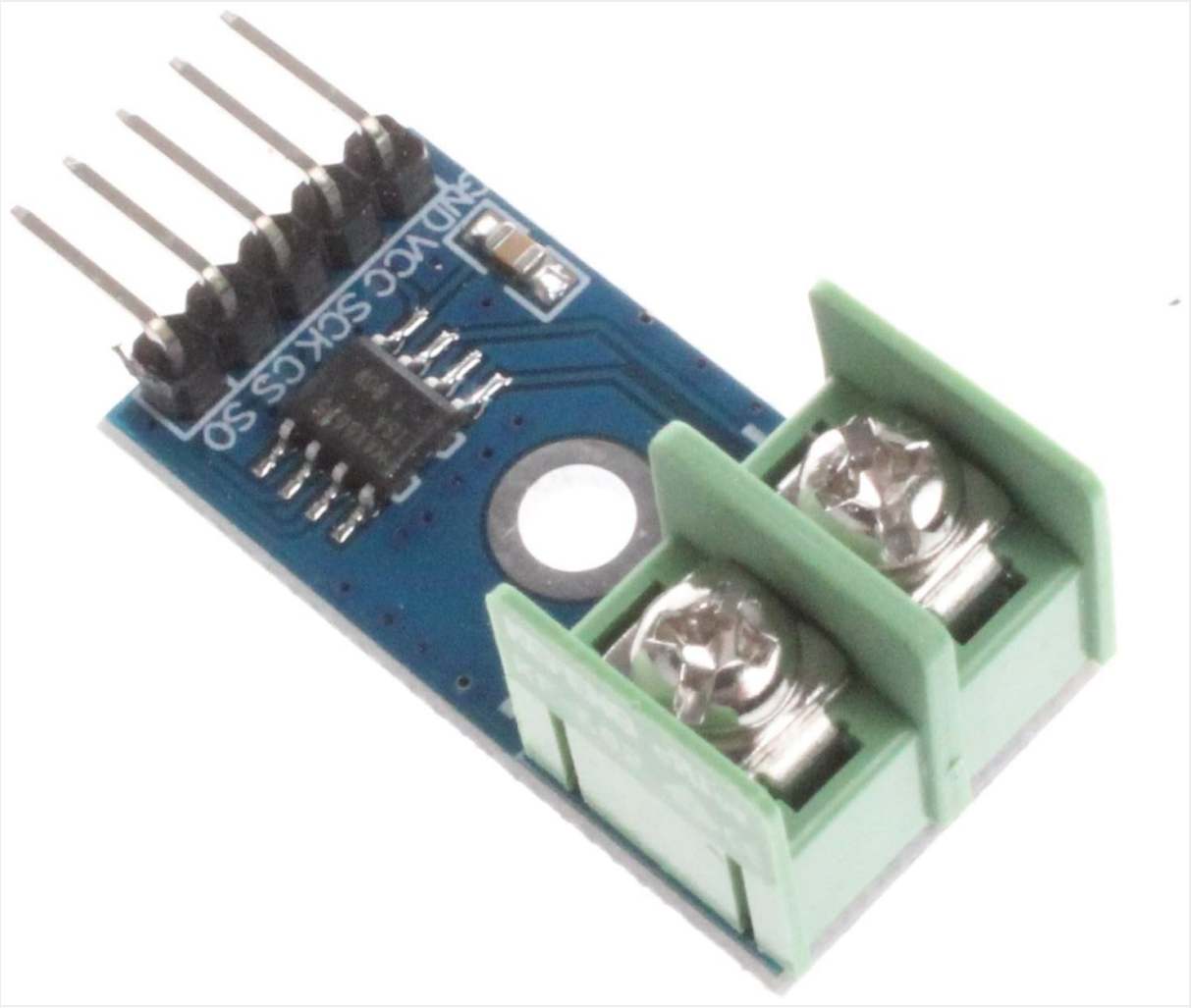

Figure 2.1: Angled view of the NOYITO MAX6675 module. This image provides a general perspective of the module's compact design.

3. Specifications

Specification	Value
Brand	NOYITO
Model	MAX6675
Interface	SPI
Test Temperature Range	0°C-1024°C
Converter Temperature Resolution	0.25°C
Operating Voltage Range	3.0V-5.5V
Operating Current	50mA
Operating Temperature Range	-20°C-85°C
Module Size (L x W)	28mm x 15mm
Measurement Accuracy	±0.25°C
Output Type	Digital, Electrical Signal

Specification	Value
Material	Copper (Thermocouple)

4. Setup

Follow these steps to correctly set up your NOYITO MAX6675 module and K-type thermocouple.

4.1 Component Identification

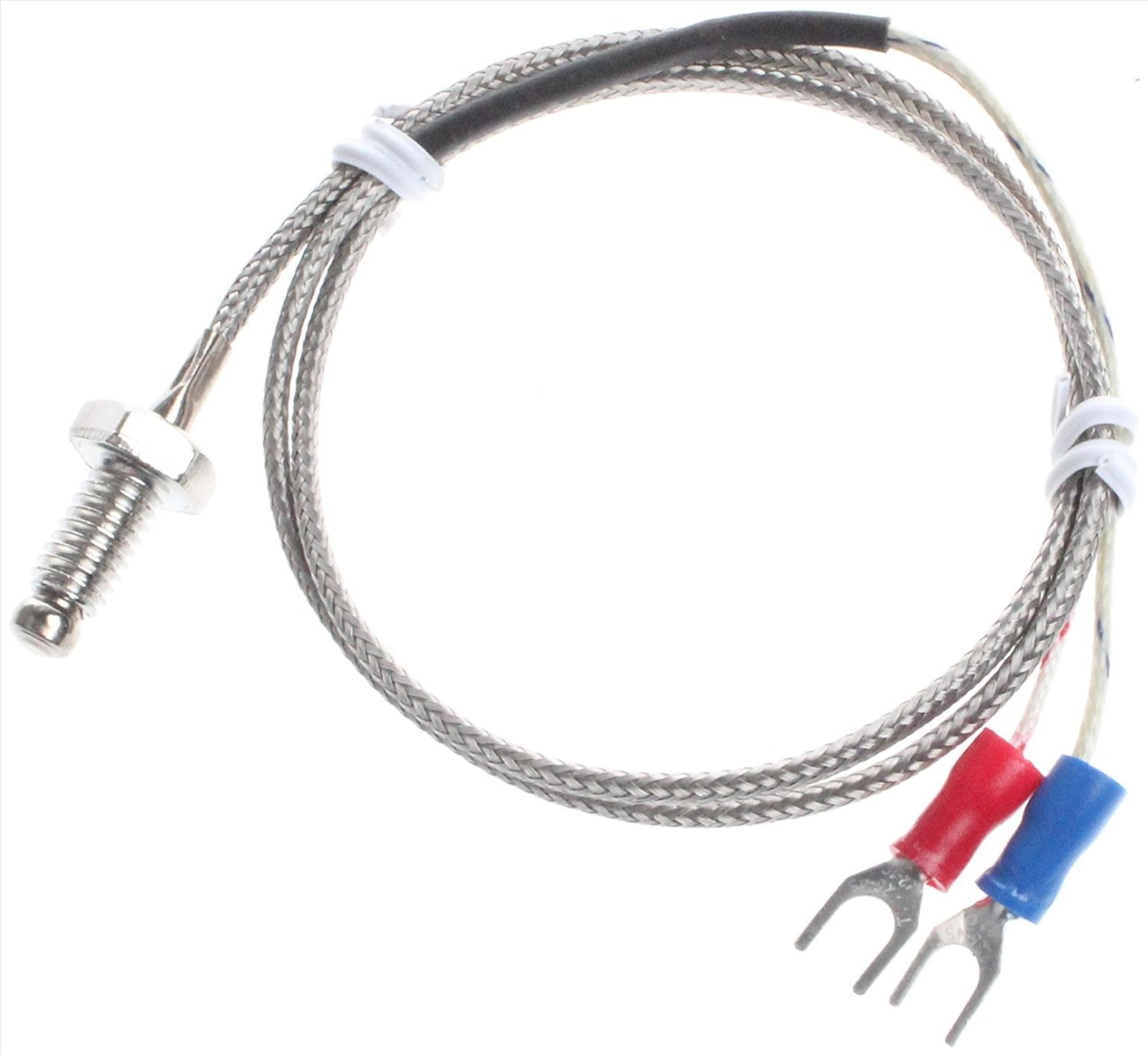

Figure 4.1: K-Type Thermocouple Sensor. This image displays the K-Type thermocouple sensor, featuring an M6 screw thread for secure mounting and two spade connectors (red for positive, blue for negative) for easy connection to the MAX6675 module.

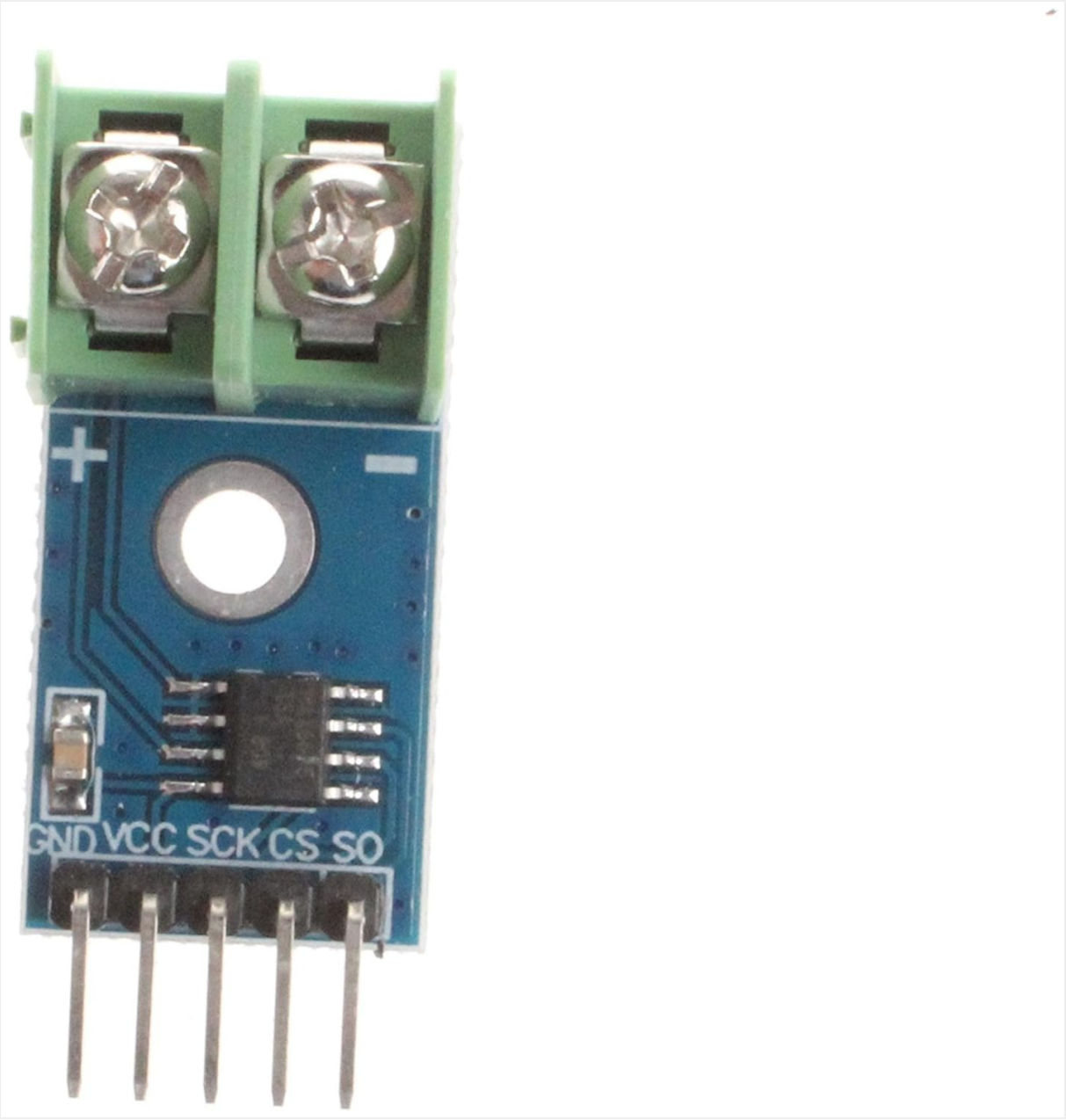

Figure 4.2: MAX6675 Module Pinout. A detailed view of the MAX6675 module highlighting the green screw terminals for connecting the K-type thermocouple and the five header pins for power (GND, VCC) and SPI communication (SCK, CS, SO) with a microcontroller.

4.2 Wiring Instructions

1. **Connect the K-Type Thermocouple:**
    - Identify the positive (+) and negative (-) terminals of your K-type thermocouple. Typically, the red spade connector is positive and the blue is negative.
    - Loosen the screws on the green terminal block of the MAX6675 module.
    - Insert the positive (+) wire of the thermocouple into the terminal marked with a '+' on the module.
    - Insert the negative (-) wire of the thermocouple into the terminal marked with a '-' on the module.
    - Tighten the screws to secure the connections. Ensure a firm connection to prevent inaccurate readings.
2. **Connect the MAX6675 Module to a Microcontroller (e.g., Arduino):**
    - **GND:** Connect the GND pin of the MAX6675 module to the Ground (GND) pin of your

microcontroller.

- **VCC:** Connect the VCC pin of the MAX6675 module to the 3.3V or 5V power supply pin of your microcontroller (the module supports 3.0V-5.5V).
- **SCK (Serial Clock):** Connect the SCK pin of the MAX6675 module to the SPI clock pin of your microcontroller (e.g., Digital Pin 13 on Arduino Uno).
- **CS (Chip Select):** Connect the CS pin of the MAX6675 module to a digital output pin on your microcontroller (e.g., Digital Pin 10 on Arduino Uno). This pin controls when the module is active for communication.
- **SO (Serial Output):** Connect the SO pin of the MAX6675 module to the SPI MISO (Master In Slave Out) pin of your microcontroller (e.g., Digital Pin 12 on Arduino Uno).

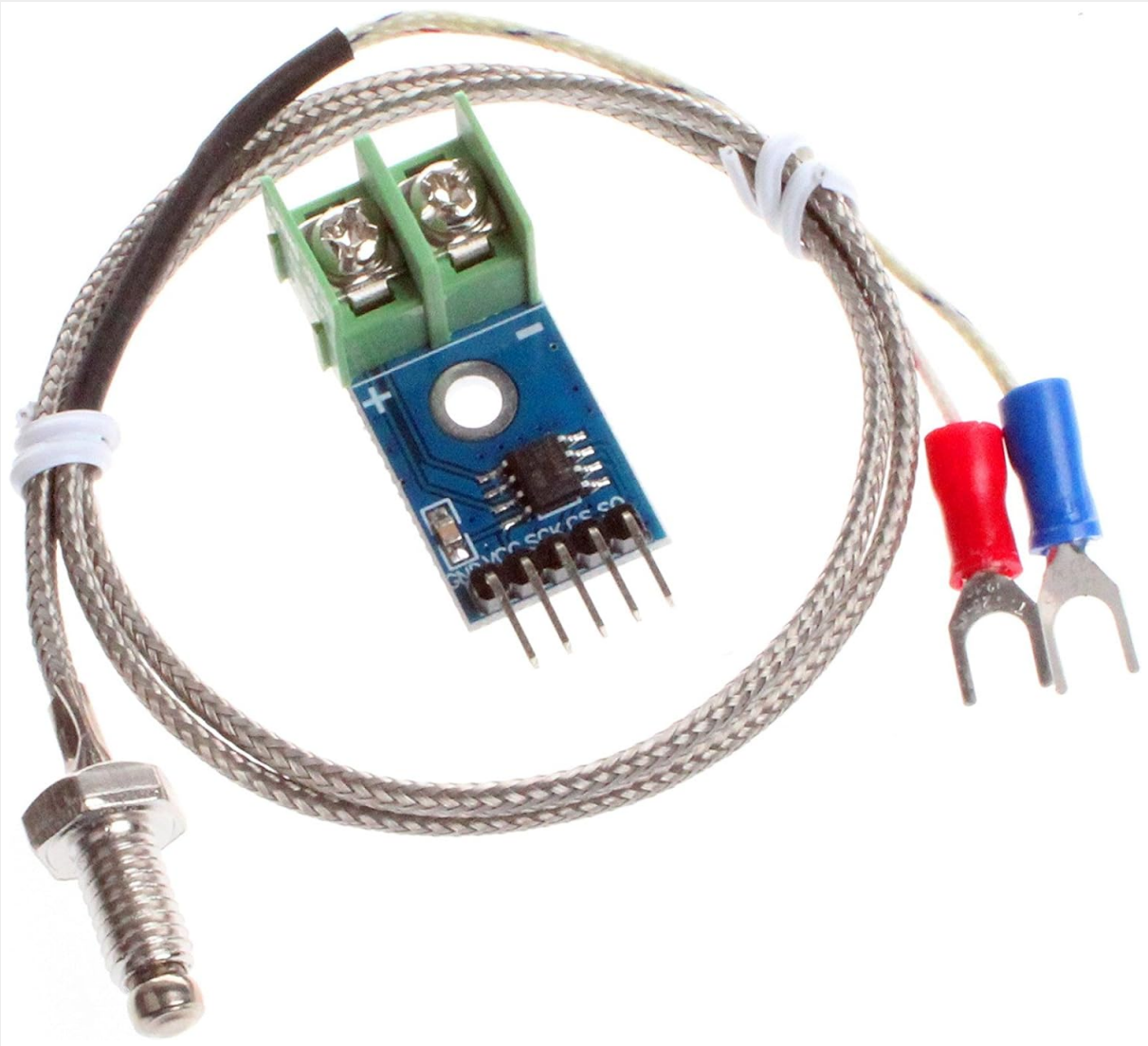

Figure 4.3: Fully Assembled Module. This image shows the complete NOYITO MAX6675 module with the K-type thermocouple attached, illustrating a typical setup.

5. Operating Instructions

Once the module is correctly wired to your microcontroller, you can begin reading temperature data. The MAX6675 communicates using the SPI protocol.

1. **Software Setup:**
    - For microcontrollers like Arduino, dedicated libraries are available to simplify communication with the MAX6675. Search for "MAX6675 library" in your IDE's library manager.
    - Install the appropriate library.

2. **Reading Temperature:**
    - Initialize the MAX6675 object in your code, specifying the CS, SO, and SCK pins you connected.
    - Use the library's functions to read the temperature. The module provides temperature readings in Celsius.
    - The MAX6675 internally performs cold-junction compensation, so no external compensation is typically required for the module itself.
3. **Temperature Range and Resolution:**
    - The module can measure temperatures from 0°C to 1024°C.
    - The temperature resolution is 0.25°C, meaning it can detect temperature changes in increments of 0.25 degrees Celsius.

6. Maintenance

The NOYITO MAX6675 module is designed for durability, but proper care ensures its longevity and accurate performance.

- **Environmental Conditions:** Keep the module in a dry environment, away from excessive moisture, dust, and corrosive substances.
- **Temperature Exposure:** Avoid exposing the module to temperatures outside its specified operating range (-20°C to 85°C).
- **Cleaning:** If cleaning is necessary, gently wipe the module with a soft, dry cloth. Do not use liquid cleaners or solvents.
- **Handling:** Handle the module with care to avoid physical damage to the components or connections.
- **Thermocouple Care:** Ensure the K-type thermocouple is not bent sharply or subjected to excessive mechanical stress, which can affect its accuracy or lead to breakage.

7. Troubleshooting

If you encounter issues with your MAX6675 module, refer to the following troubleshooting tips:

- **No Temperature Reading or Erratic Readings:**
    - **Check Wiring:** Verify all connections (GND, VCC, SCK, CS, SO) between the module and the microcontroller are secure and correctly matched.
    - **Thermocouple Polarity:** Ensure the K-type thermocouple is connected with the correct polarity (+ to +, - to -) to the module's screw terminals. Incorrect polarity will result in incorrect readings.
    - **Power Supply:** Confirm the module is receiving stable power within the 3.0V-5.5V range.
    - **SPI Communication:** Double-check that the correct SPI pins are defined in your software and that the Chip Select (CS) pin is being toggled correctly to initiate communication.
    - **Thermocouple Integrity:** Inspect the thermocouple wire for any damage, kinks, or breaks. A damaged thermocouple will not provide accurate readings.
- **Temperature Reading is Always 0°C or 1023.75°C:**
    - These values often indicate a communication error or an open thermocouple circuit. Recheck all wiring, especially the thermocouple connections.
- **Module Not Powering On:**

- Verify the VCC and GND connections are correct and that your power supply is active.

8. Warranty and Support

Warranty: The NOYITO MAX6675 Module is covered by the manufacturer's one-year after-sale warranty. Please retain your proof of purchase for warranty claims.
Technical Support: For technical assistance, detailed inquiries, or further troubleshooting beyond this manual, please contact NOYITO customer support. Refer to the product packaging or the retailer's website for contact information.