ACEIRMC 16590

ACEIRMC GY-273 QMC5883L/HMC5883L 3-Axis Magnetometer Sensor Module

USER MANUAL

1. Introduction

This manual provides instructions for the ACEIRMC GY-273 3-Axis Magnetometer Sensor Module. This module is designed for low-field magnetic sensing and is commonly used in applications requiring compassing and magnetometry, such as with Arduino and other microcontrollers. The module typically integrates either the QMC5883L or HMC5883L sensor IC, both offering a digital I2C interface for communication. Users should verify the specific chip marking on their module as there can be differences in required software libraries and performance between the QMC5883L and HMC5883L.

2. Setup

2.1 Module Overview

The GY-273 module is a compact board featuring the magnetometer sensor, supporting components, and connection pins. It operates on a 3V to 5V power supply.

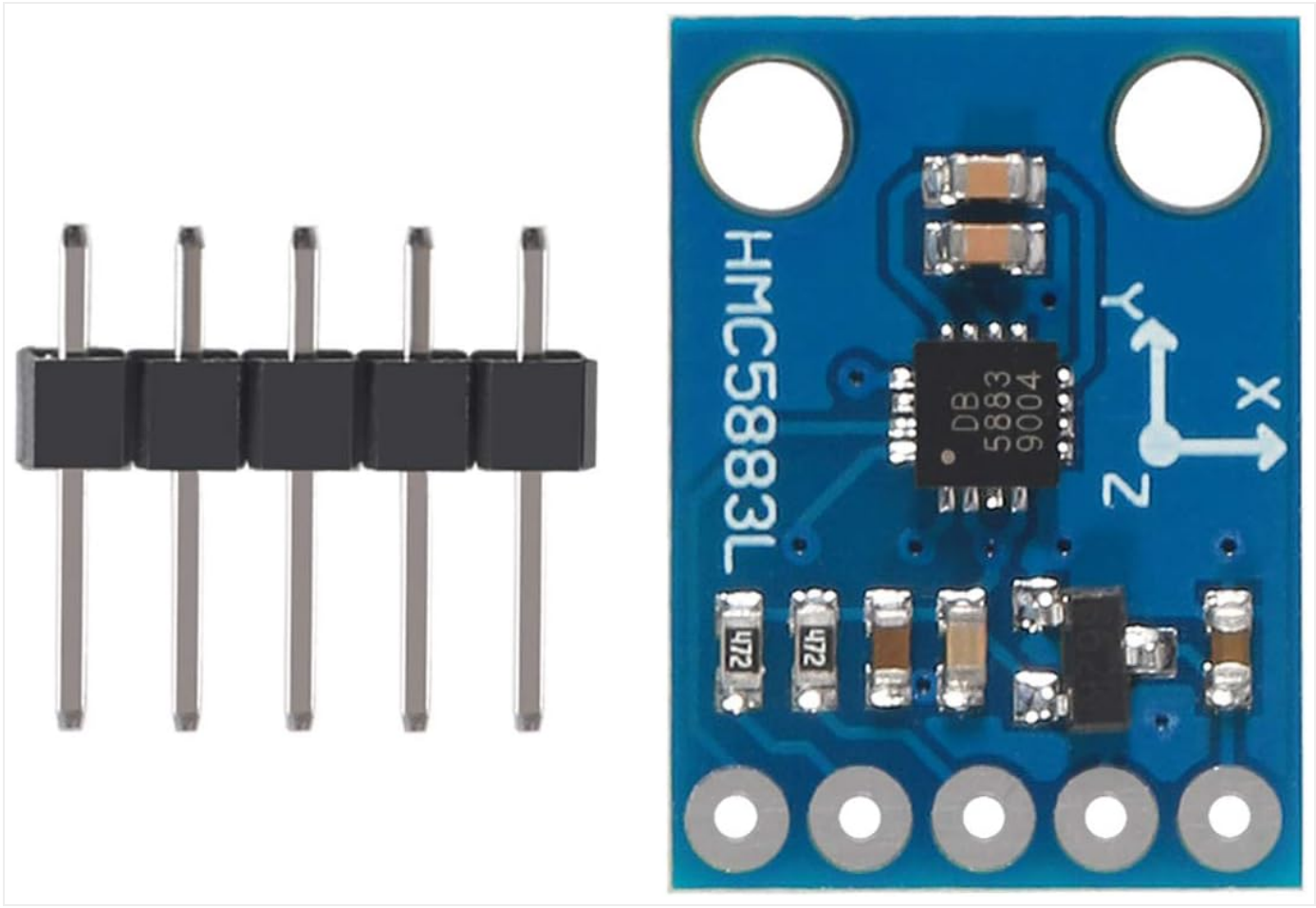

Figure 1: Front view of the GY-273 sensor module. This image shows the top side of the GY-273 sensor module, featuring the main sensor chip (marked HMC5883L in this specific image), surface-mount components, and the X, Y, Z axis indicators. The attached header pins are visible on the left side, ready for connection to a breadboard or microcontroller.

2.2 Pinout Description

The module typically has five pins for connection:

- **VCC:** Power supply input (3V-5V).
- **GND:** Ground connection.
- **SCL:** I2C Serial Clock line.
- **SDA:** I2C Serial Data line.
- **DRDY:** Data Ready output (optional, indicates new data is available).

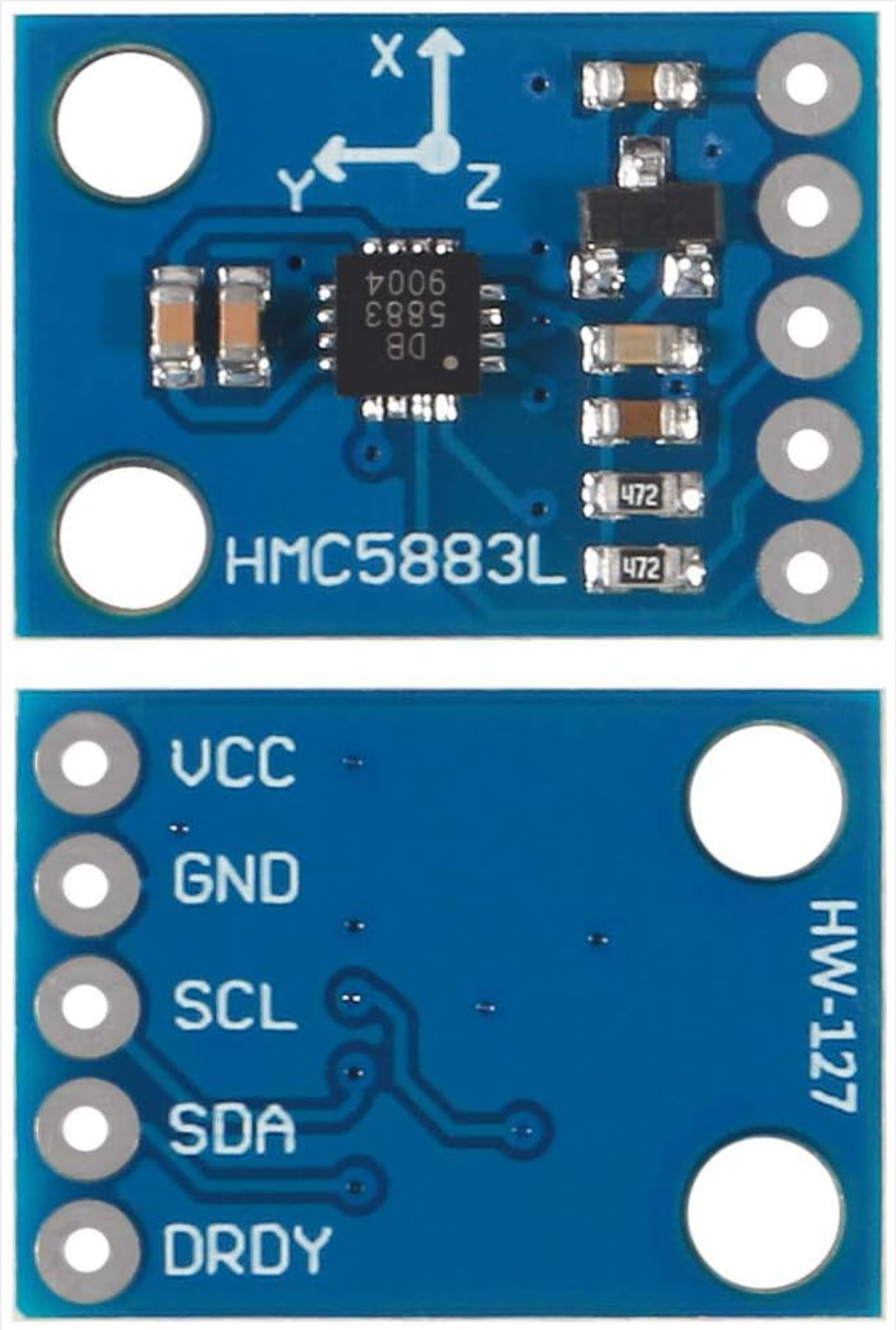

Figure 2: Back view of the GY-273 module with pin labels. This image displays the underside of the GY-273 module, clearly labeling the connection pins: VCC (power supply), GND (ground), SCL (I2C clock), SDA (I2C data), and DRDY (data ready). This view is essential for correct wiring.

2.3 Wiring to a Microcontroller (e.g., Arduino)

Connect the module to your microcontroller as follows:

1. Connect **VCC** to the 3.3V or 5V output of your microcontroller (ensure compatibility).
2. Connect **GND** to the Ground pin of your microcontroller.
3. Connect **SCL** to the I2C SCL pin of your microcontroller (e.g., A5 on Arduino Uno, D1 on ESP32).
4. Connect **SDA** to the I2C SDA pin of your microcontroller (e.g., A4 on Arduino Uno, D2 on ESP32).

5. The **DRDY** pin is optional and can be connected to a digital input pin if you wish to use interrupt-driven data acquisition.

3. Operating Instructions

3.1 Basic Functionality

The GY-273 module measures the strength and direction of magnetic fields along three orthogonal axes (X, Y, and Z). This data can be processed by a microcontroller to determine compass heading or detect magnetic anomalies.

3.2 I2C Communication

The module communicates via the I2C (Inter-Integrated Circuit) protocol. This requires two wires (SDA and SCL) for data transfer. Your microcontroller will act as the I2C master, requesting data from the sensor module (slave).

3.3 Software Libraries

To interface with the module, you will typically need a specific software library for your microcontroller platform (e.g., Arduino IDE). Search for libraries compatible with either QMC5883L or HMC5883L, depending on the chip present on your module. These libraries handle the low-level I2C communication and provide functions to read magnetic field values.

3.4 Calibration

For accurate compass readings, the magnetometer requires calibration. This process typically involves rotating the sensor through all axes to map out the magnetic field environment and compensate for hard-iron and soft-iron distortions. Refer to your chosen software library's documentation for specific calibration procedures.

4. Maintenance

The GY-273 module is a sensitive electronic component. Follow these guidelines for proper maintenance:

- **Handle with Care:** Avoid dropping or subjecting the module to physical shock.
- **Static Electricity:** Always handle the module in an anti-static environment to prevent damage from electrostatic discharge (ESD).
- **Environmental Conditions:** Keep the module away from excessive moisture, dust, and extreme temperatures.
- **Secure Connections:** Ensure all wiring connections are firm and properly insulated to prevent short circuits.

5. Troubleshooting

If you encounter issues with your GY-273 module, consider the following troubleshooting steps:

- **Module Not Detected:**
  - Verify power (VCC) and ground (GND) connections are correct and stable (3V-5V).
  - Check I2C wiring (SDA, SCL) for continuity and correct pin assignment on your microcontroller.
  - Ensure the I2C address used in your code matches the module's default address (typically 0x1E for HMC5883L or 0x0D for QMC5883L).
  - Run an I2C scanner sketch to confirm if the module is visible on the bus.
- **Inaccurate Readings:**
  - **Calibration:** Perform a proper calibration procedure as described in the operating instructions. Uncalibrated magnetometers will provide inaccurate data.
  - **Magnetic Interference:** Keep the module away from strong magnetic fields, motors, power supplies, and other

electronic components that can generate electromagnetic interference.

- **Chip Discrepancy:** Confirm whether your module uses a QMC5883L or HMC5883L chip. The chip marking is usually visible on the main IC. Ensure you are using the correct software library for your specific chip. Libraries for HMC5883L may not work correctly with QMC5883L, and vice-versa.

- **No Data Output:**
  - Check your code for correct initialization of the I2C bus and the sensor library.
  - Ensure you are calling the data reading functions correctly and frequently enough.

6. Specifications

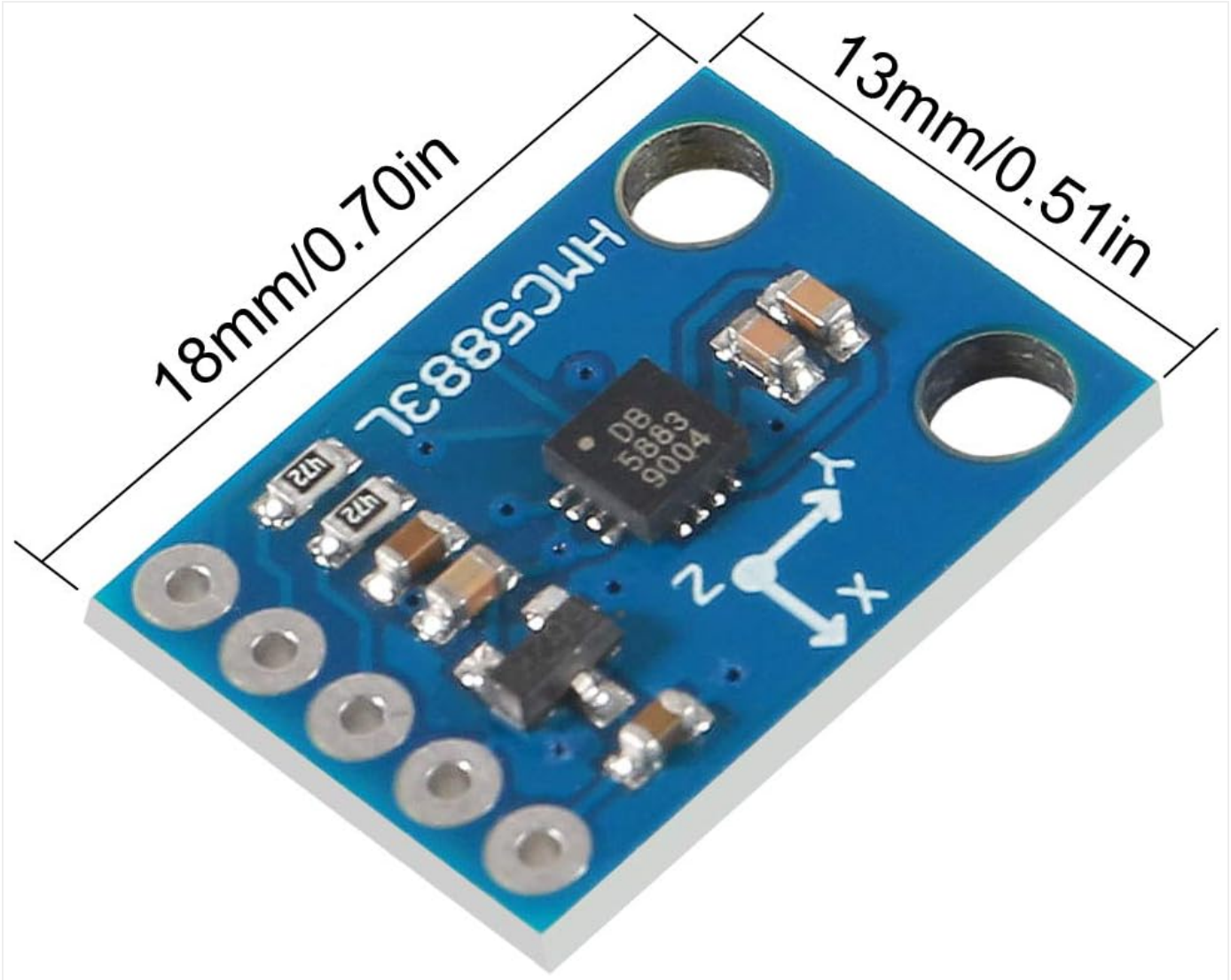

Figure 3: Module dimensions. This image illustrates the physical dimensions of the GY-273 module, showing its width as 18mm (0.70 inches) and length as 13mm (0.51 inches). These measurements are crucial for integration into projects.

Feature	Specification
Model	GY-273
Sensor IC	QMC5883L / HMC5883L (verify chip marking)
Axes	3-Axis (X, Y, Z)
Interface	IIC / I2C

Feature	Specification
Power Supply	3V - 5V DC
Measurement Range	Milli-gauss to 8 gauss
Compass Heading Accuracy	1° to 2° (typical for HMC5883L)
Dimensions (L x W)	18mm x 13mm (0.71" x 0.51")
Material	Plastic, PCB
Color	Blue
Item Weight	Approximately 0.317 ounces

7. Warranty and Support

Specific warranty information for this product is not provided in the available data. For any warranty claims, technical support, or further assistance, please contact the seller or manufacturer directly through your purchase platform. Ensure you have your order details and product model number (16590) ready when contacting support.