KY-003 Hall Effect Sensor Module - Detailed Explanation

What is the KY-003 Module?

The **KY-003 Hall Effect Sensor Module** is a small electronic device used for detecting the presence of a **magnetic field**. It works based on the **Hall Effect**, which states that when a magnetic field is applied perpendicular to the surface of a conductor with current flowing through it, a voltage difference (Hall voltage) is generated across the conductor.

What Does It Do?

The KY-003 module **detects the presence of a magnetic field** and outputs a **digital HIGH or LOW signal** accordingly. When a strong enough **south pole** of a magnet is brought close to the sensor, it **activates (LOW)**; when removed, it **deactivates (HIGH)**.

This module is commonly used for:

- **Magnetic field detection**
- **Proximity sensing** (e.g., detecting door open/close states)
- **Rotational speed measurement** (used in tachometers, motors, etc.)
- **Contactless switch applications**

How Does KY-003 Work?

1. **When there is no magnetic field** → The sensor **outputs HIGH (1)**.
2. **When a magnetic field (south pole) is near** → The sensor **outputs LOW (0)**.
3. **If you reverse the magnet (north pole)** → In most cases, **nothing will happen** because KY-003 is usually a **unipolar sensor** (only reacts to one polarity).

KY-003 Pinout:

- **VCC (Power Supply)** → Connect to **5V**
- **GND (Ground)** → Connect to **GND**
- **Signal (S)** → Digital output (connects to an **Arduino digital pin**)

Does KY-003 Detect North or South Pole?

The KY-003 sensor is **unipolar**, meaning it typically detects **only one pole of a magnet (south pole)**. If you place the **north pole** near the sensor, it may **not trigger a response**.

However, some variations of Hall effect sensors (like **bipolar** or **omnipolar**) can detect both poles.

Key Features of KY-003

Feature	Description
Operating Voltage	3.3V - 5V
Output Type	Digital (HIGH or LOW)
Sensing Type	Magnetic field detection
Magnetic Sensitivity	Typically reacts to **south pole** of a magnet
Response Time	Very fast (microseconds)
Common Uses	Proximity sensing, RPM measurement, security systems

Conclusion

- The **KY-003 Hall Effect sensor** is a **digital sensor** that detects magnetic fields and outputs **HIGH (no field) or LOW (field detected)**.
- It is **unipolar**, meaning it **only responds to the south pole** of a magnet.
- Common applications include **proximity sensors, contactless switches, and motor speed measurement**.

[KY-003: HALL SENSOR MODULE EXPLANATION OF ALL THE FUNCTIONS (A3144 402)](#)

[How Do Hall Effect Sensors Work? - The Learning Circuit](#)