KY-025 Reed Switch Magnetic Field Sensor Module - Detailed Explanation

What is KY-025?

The **KY-025 Reed Switch Magnetic Field Sensor** is an **Arduino-compatible module** used to **detect magnetic fields**. It consists of a **reed switch**, a **potentiometer** for sensitivity adjustment, and both **analog and digital outputs**.

This sensor is commonly used in **door/window security systems, proximity sensing, robotics, and industrial applications** where detecting the presence or absence of a magnetic field is necessary.

Components of KY-025

The **KY-025 module** contains the following key components:

1. **Reed Switch** – A mechanical switch that changes state when exposed to a magnetic field.
2. **LM393 Comparator** – Converts the analog signal into a digital output based on a set threshold.
3. **Potentiometer** – Adjusts the sensitivity of the sensor for digital output.
4. **Resistors and Capacitors** – Used for signal stabilization.
5. **Indicator LED** – Lights up when the magnetic field is detected.
6. **Output Pins** – Provides **both analog and digital outputs**.

How Does KY-025 Work?

The KY-025 module works based on a **reed switch mechanism**. The switch consists of **two metal contacts** that are normally open (disconnected). When a magnet is brought **near the sensor**, the contacts **close**, completing the circuit and allowing current to pass.

Two Types of Outputs

1. **Digital Output (D0 - Pin 2)**
    - The built-in **LM393 comparator** processes the signal from the reed switch.
    - The **potentiometer** adjusts the threshold at which the digital output triggers.
    - If the measured value exceeds this threshold, the **D0 pin goes HIGH** (1).
    - If the measured value is below the threshold, the **D0 pin remains LOW** (0).
2. **Analog Output (A0 - Pin A0)**
    - Provides a continuous range of values between **0 - 1023** based on the **magnetic field strength**.
    - Stronger magnetic fields result in **higher values**, while weaker fields give **lower values**.

Pin Configuration

Pin	Description
VCC	Power supply (+5V)
GND	Ground (0V)
D0	Digital output (HIGH when field is detected)
A0	Analog output (0-1023 based on field strength)

KY-025 vs KY-021 - What's the Difference?

Both **KY-025** and **KY-021** are **magnetic field sensors**, but they have some key differences:

Feature	KY-025	KY-021
Output Type	Analog + Digital	Only Digital
Potentiometer	Yes (Adjustable Sensitivity)	No
Comparator (LM393)	Yes	No
Detection Range	Adjustable	Fixed

KY-025 is more **versatile** because it can measure **both field presence (digital) and field strength (analog)**, while **KY-021** only detects the presence of a magnetic field.

Applications of KY-025

Security Systems – Detects door/window opening (if a magnet is attached to the moving part).
Robotics – Used in **object detection** and **navigation**.
Industrial Automation – Used in machinery for position sensing.
Proximity Sensors – Can be used in **automated switches**.
Speed Sensors – Detects rotating magnets in motor speed monitoring.

KY-025 and KY-021 Reed switch