Limit Switches

To control the limits of the XY core movement, we have considered limit switches as the optimal sensors. They are economical, easy to control, and perfectly meet our needs. We will use one sensor at each end of the game "board", so we will use 4 for this function.

We will also use another one that will be located inside the piece where the piece with magnets will be introduced to ensure that the piece has been inserted correctly.

To fulfill these functions, we also considered using magnetic sensors, but we discarded them to avoid possible noise that could be generated in the Hall effect sensors that we will use to control the movement of the moving piece.

The chosen sensor is the following: Omron SS-5D Switch.

Technical Memory: Omron SS Series Subminiature Basic Switch (SS-5D)

General Information

The SS-5D switch is an electromechanical device that acts as a momentary switch. This means that its state changes (open/closed) when pressed and returns to its original state when released. These types of switches are commonly used in presence detection, control, and safety applications.

Technical Features

- Type: Subminiature basic switch Series:
- SS Rated current: 100 mA
- Rated voltage: 5 VCC to 24 VCC
- Output type: NPN
- Material: PBT housing, socket terminal
- Operating temperature: -40 °C to +85 °C
- Operating force: 0.49 N (11 oz)
- Mechanical life: 1,000,000 cycles
- Electrical life: 250,000 cycles

Dimensions

- Length: 5.4 mm
- Depth: 8.4 mm
- Height: 6 mm

Conclusion

The Omron SS-5D switch is a versatile and economical subminiature basic switch suitable for various presence detection and control applications. It is important to consider the technical characteristics and design considerations to ensure safe and effective operation in your project.

Technical Memory of the SS-5D Switch with Arduino Nano

Features of the SS-5D switch

- Type: Subminiature switch
- Series: SS Rated
- current: 100 mA
- Rated voltage: 5 VCC to 24 VCC
- Output type: NPN
- Material: PBT housing, socket terminal

Features of Arduino Nano

- Microcontroller: ATmega328P
- Supply voltage: 5
- VCC Supply current: 30 mA
- Digital input/output pins: 14
- Analog pins: 8

Compatibility Analysis

Supply voltage: The SS-5D switch works with voltages from 5 VCC to 24 VCC, including the 5 VCC provided by Arduino Nano. This means that you do not need a voltage converter to work with Arduino Nano.

Current: The SS-5D switch consumes 100 mA, which is below the 30 mA per pin limit of Arduino Nano. This means that it will not overload the Arduino Nano pin to which it is connected.

Output type: The SS-5D switch has an NPN output, which is compatible with the digital input pins of Arduino Nano. This means that it can be connected directly to a digital input pin of Arduino Nano without the need for additional components.

Connection

To connect the SS-5D switch to Arduino Nano, the following components are needed:

- Omron SS-5D series subminiature basic switch
- Cabling

- 100 Ω resistor (optional)

The Omron SS series subminiature basic switch with reference SS-5D is compatible with Arduino Nano and can be connected directly to the board without the need for additional components.

Datasheet: https://www.mouser.es/datasheet/2/307/en_ss-1509069.pdf