Grove - 12-bit Magnetic Rotary Position Sensor / Encoder (AS5600)

SKU 101020692

The Grove - AS5600 is a programmable 12-bit high-resolution contactless magnetic rotary position sensor. Compared with the traditional potentiometer, it has significant advantages: **high precision**, **non-contact**, **no rotation angle limitation**.

If you want to know more about this demo, please check Open-Source Inverted Pendulum

We all know about the potentiometer, quoted from Wikipedia "A potentiometer is a three-terminal resistor with a sliding or rotating contact that forms an adjustable voltage divider." Simply put, the potentiometer converts relative position information into electrical signals. But the traditional potentiometer needs to be in contact with the object being measured. What about scenes that need to be contactless, such as high-speed motor, or high-precision robot arm? Well, the answer to the contactless potentiometer solution is the **Grove - 12-bit Magnetic Rotary Position Sensor (AS5600)**.

The Grove - AS5600 is a programmable 12-bit high-resolution contactless magnetic rotary position sensor. The Grove - AS5600 can work as **magnetic potentiometer** or **magnetic encoder** with excellent reliability and durability. Compared with the traditional potentiometer/encoder, the Grove - AS5600 has significant advantages: **high precision**, **non-contact**, **no rotation angle limitation**. All those advantages make it is perfectly suitable for non-contact angle measurement applications, such as the robot arm, tripod head, motor closed-loop control, machine tool axis positioning.

· Contact type
· High precision(10bit)
· Incremental Rotary Encoders
· Not programmable
· Square wave pulse output
· No library support
· Expensive(over $20)
· Large
· Special decoders are also required in special scenarios.

· Contactless
· High precision(12bit)
· Absolute Rotary Encoders
· Programmable
· PWM/Analog/I2C Bus
· Full function AS5600 library
· Cost-effective ($5.9)
· Small
· No decoder required

Traditional Encoder   Magnetic Encoder

AS5600 is based on the Hall Effect, the build-in **Hall sensor** can detect changes in the direction of the magnetic field, thus, there is also no rotation angle limit. Then the magnetic field direction information is amplified by the amplifier, with the help of the build-in 12 bit A/D, the AS5600 module can output 4096 positions per round. The output is selectable, you can either use the I2C interface to output the RAW data or output the PWM wave/Analog wave via the OUT pin. Meanwhile, the maximum angle is also programmable, you can set the maximum angle from 18° to 360°, which means that the measured angular accuracy is up to 18/4096.

Raw Angle = 0
(Raw Angle = 4096)
0°

Raw Angle = 1024
90°

270°
Raw Angle = 3072

180°
Raw Angle = 2048
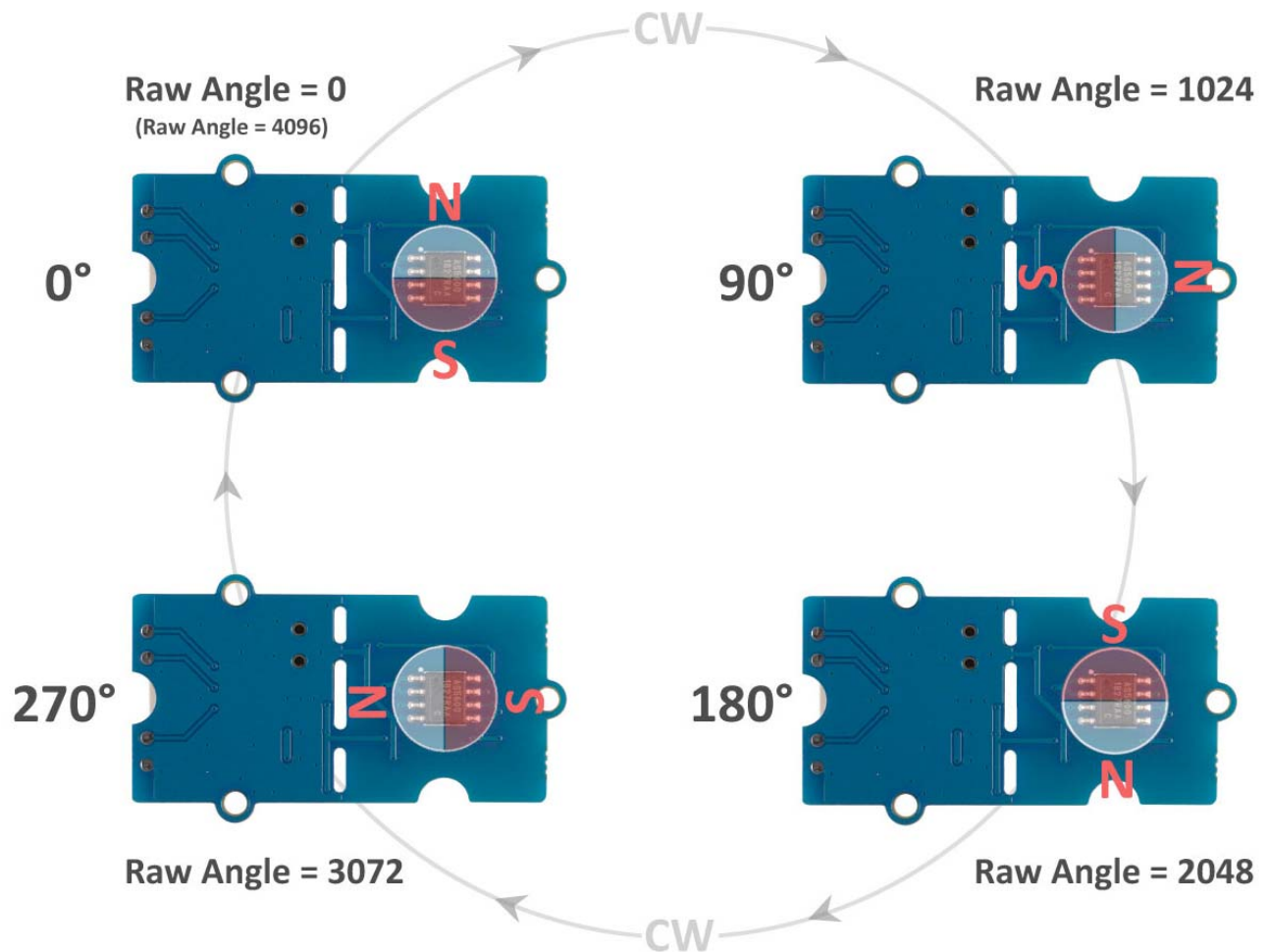
AS5600 is excellent for the non-contact rotary position sensor, so we made this AS5600 Breakout Board in the Grove form factor. With the Grove I2C connector, you can easily connect this AS5600 module to Arduino. Also, we provide the full function AS5600 Arduino library.

Attention

The AS5600 has certain requirements for the magnetic field to be measured. Please use a magnet similar in size to the chip. The module should be measured as close as possible to the magnetic field and the AS5600 sensor center should be aligned with the center of the magnetic field. The vertical distance is preferably from 0.5 mm to 3 mm.
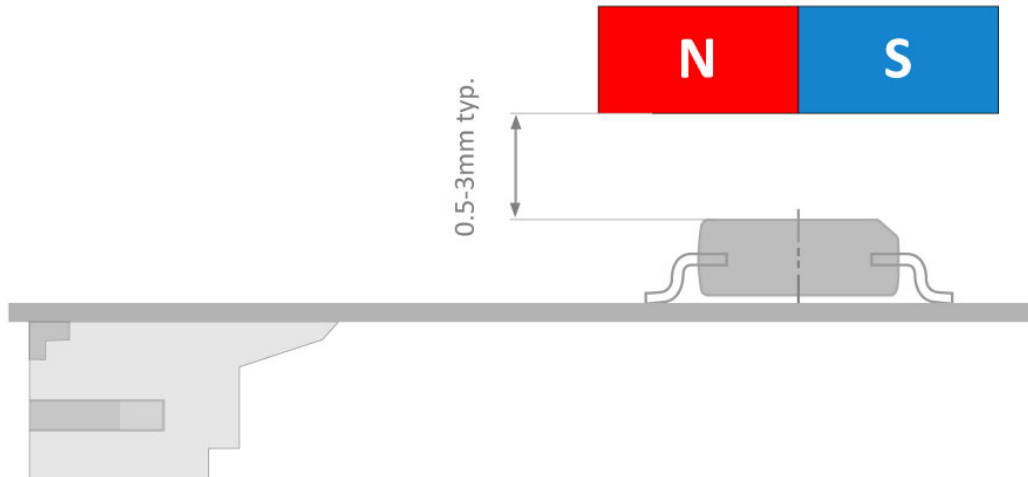
Applicable magnet description

Since the AS5600 has certain requirements for the magnetic field to be measured. We recommend a round magnet that is about the same size as the chip.
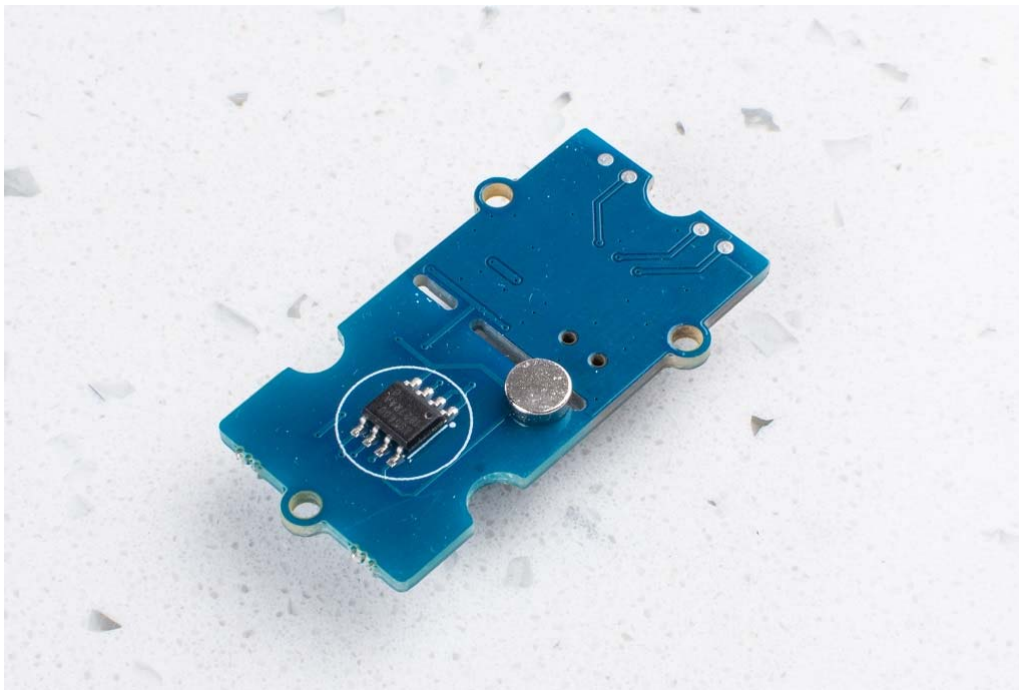

Features

- Non-contact, no rotation angle limitation
- 12-bit high-resolution, 4096 positions per round
- Grove I2C, PWM/Analog Output
- Great flexibility on angular excursion: Maximum angle programmable from 18° up to 360°

Applications

- Motor closed-loop control
- Robot arm
- Tripod head
- Industrial machine control

Hardware Overview

Clockwise / Counter
Clockwise Switch

AS5600 Sensor IC
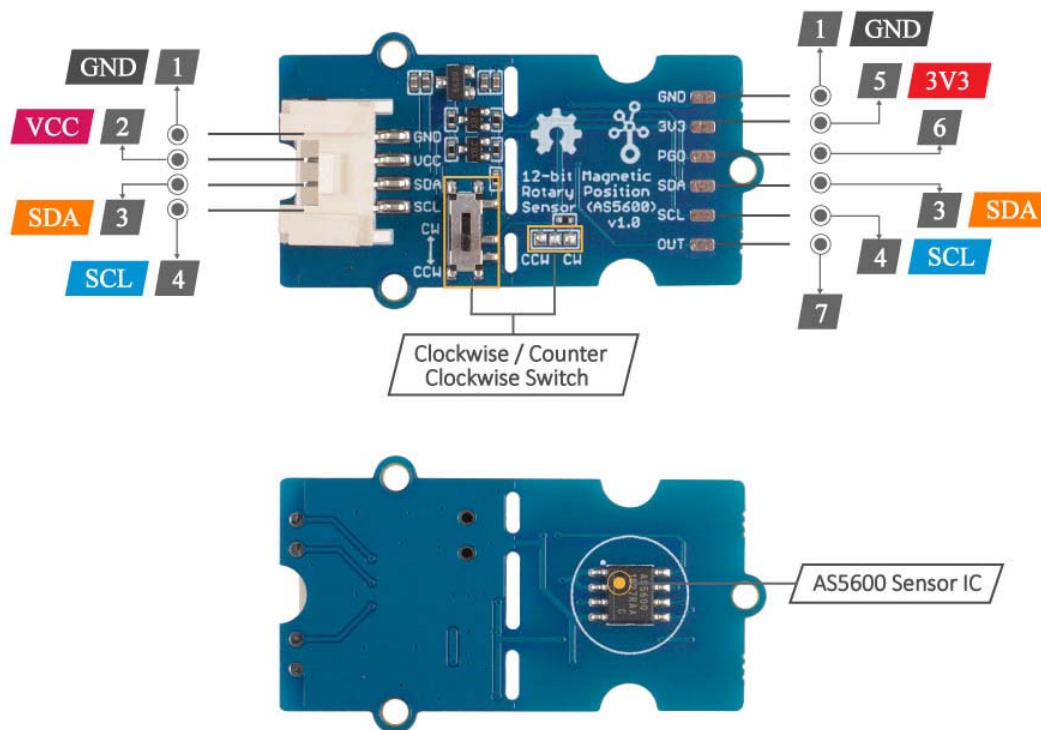
1 : Connect to the system GND

3 : Serial date of I2C

2 : VCC power supply, 5V/3.3V

4 : Serial clock of I2C

5 : VCC power supply for IC, 3V3 only

6 : The PGO pin is used to initialize programming to set the initial and end positions of the rotation angle.

7 : The OUT pin is used to output the duty cycle signal, and the way to output the signal can be configured by software.

ECCN/HTS

ECCN	EAR99
HSCODE	9031900090
UPC	