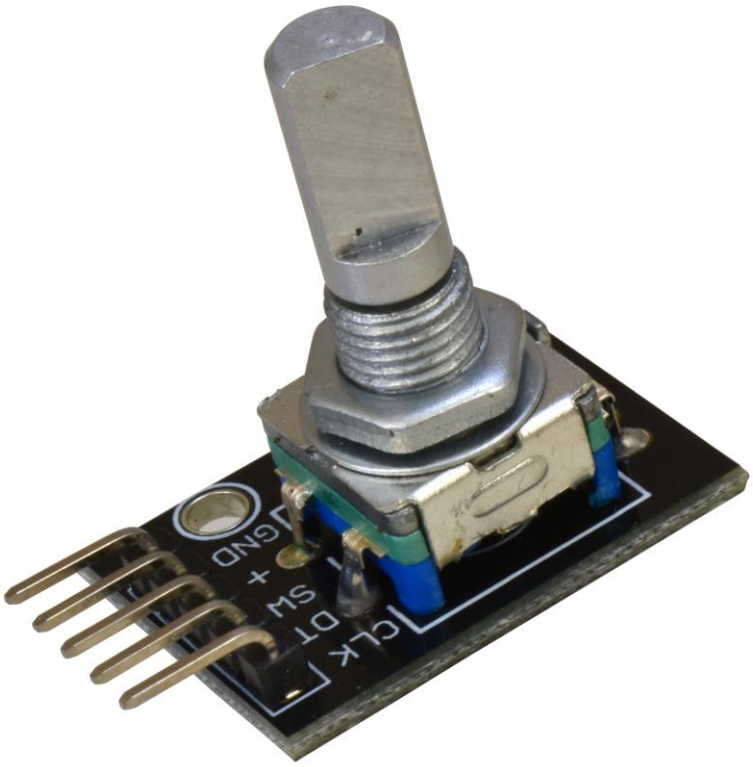
ROTARY ENCODER MODULE - HR0024



The KY-040 rotary encoder is a rotary input device (as in knob) that provides an indication of how much the knob has been rotated and what direction it is rotating in. It is a great device for stepper and servo motor control. It can also be used in applications such as digital potentiometers.

Type – SKU ASS-1058

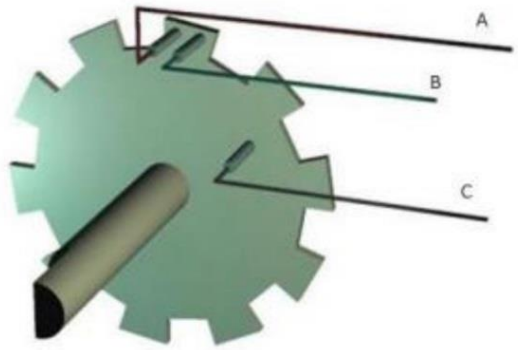
Brief Data:

- Operating voltage: 5V
- Pulses / 360^{o} Rotation: 20
- Output: 2-bit gray code
- Mechanical Angle: 360^{0} continuous
- With built in push button switch (push to operate)
- Dimensions: (30 x 18 x 30)mm
- Compatible with Arduino / Raspberry Pi controller board

A rotary encoder has a fixed number of positions per revolution. These positions are easily felt as small “clicks” when the encoder is turned. The KY-040 module has thirty of these positions. In the case of the KY-040, they are oriented as shown. Inside the encoder are two switches. One switch connects pin A to pin C and the other switch connects pin B to C.

In each encoder position, both switches are either opened or closed. Each click causes these switches to change states as follows:

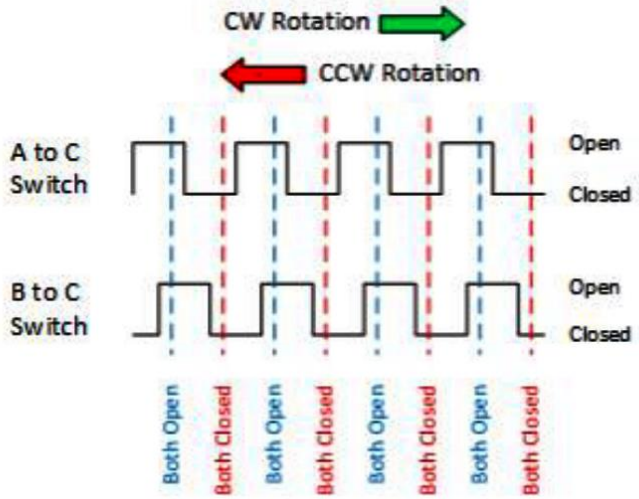
- If both switches are closed, turning the encoder either clockwise or counter-clockwise one position will cause both switches to open
- If both switches are open, turning the encoder either clockwise or counter-clockwise one position will cause both switches to close.



The illustration to the side is representative of how the switch is constructed. As can be seen, the angular position of the A terminal and the B terminal is such that:

- Rotating the switch clockwise will cause the switch connecting A and C to change states first.
- Rotating the switch counter-clockwise will cause the switch connecting B and C to change states first.

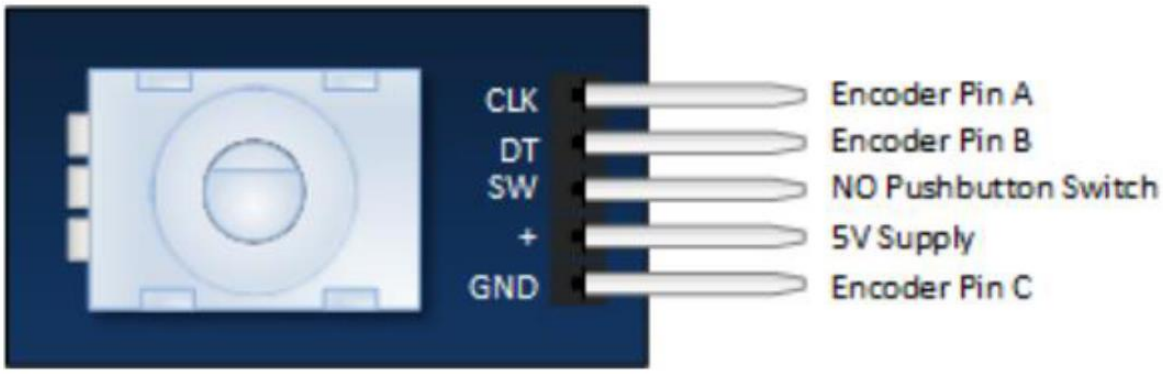
The opening and closing of the switches can be represented as wave forms, as shown below.–



The direction of rotations determines which switch changes state first. If A changes state first, the switch is rotating in a clockwise direction. If B changes state first, the switch is rotating in a clockwise direction.

Pin Assignment:

The pin connections for this rotary encoder are identified in the illustration below.



The module is designed so that a low is output when the switches are closed and a high when the switches are open. The low is generated by placing a ground at Pin C and passing it to the CLK and DT pins when the switches are closed. The high is generated with a 5V supply input and pull-up resistors, such that CLK and DT are both high when the switches are open. Note, previously mentioned is the existence of a push button switch that is integral to the encoder. If the shaft is pressed, a normally open switch will close. The feature is useful if the switch function needs to be changed. For example, the ability to change between coarse and fine adjustments can be made.

Rotary Encoder Schematic: