



**100 RPM Encoder motor with wheel assembly  
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## 100 RPM Encoder motor with wheel assembly

Position encoders are used for controlling position and velocity of the robot. It can also be used for close loop velocity control.



**Wheel**



**Encoder Disc**



**Optical Encoder**

## 100 RPM Encoder Motor With Wheel Assembly

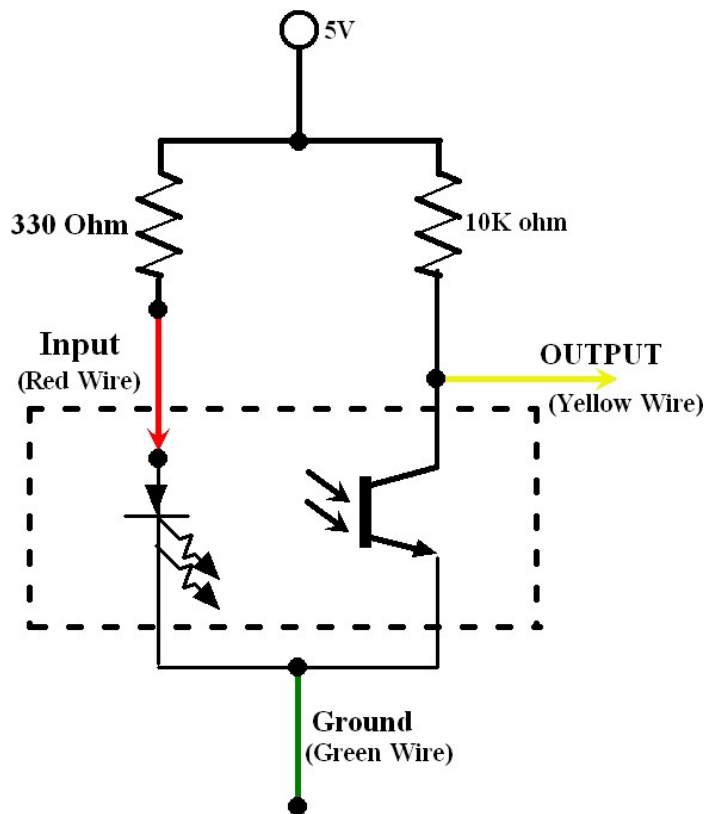
This motor assembly consists of DC geared motor, Optical encoder, Encoder disc and wheel. Optical encoder has an infrared emitting diode facing a photo detector in molded plastic housing. High quality stainless steel slotted encoder disc is mounted on the wheel axel which rotates in-between the optical encoder. When light coming from IR LED is blocked because of encoder disc photo detector gives 5V (logic 1). When encoder disc's slot comes in front of IR LED it allows the light to pass this causes photo detector to change the state to 0V (logic 0).

Wheels are made up of high strength nylon. It has high quality rubber grip. Wheel has thickness of 10mm and diameter of 51.5mm. If rubber grip is removed it exposes "V" groove of the wheel. So that same wheel can be used as pulley.

DC motor has Brass gears and steel pinions to ensure longer life and better wear and tear properties. The gears are fixed on hardened steel spindles polished to a mirror finish. These spindles rotate between bronze plates which ensures silent running. The output shaft rotates in a sintered bushing. The whole assembly is covered with a plastic ring. All the bearings are permanently lubricated and therefore require no maintenance. The motor is screwed to the gear box from inside.

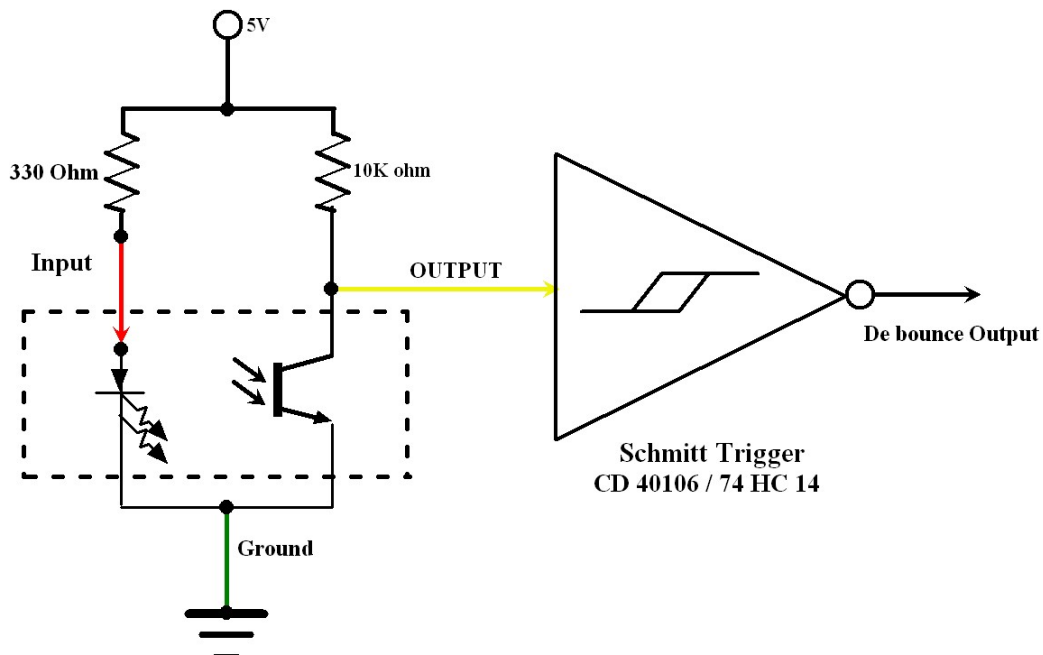
**How to interface position encoder with your circuit:**

To use this encoder assembly minimal numbers of components are required.



Green wire can be connected directly to the ground. Red wire is +ve terminal of IR LED. To limit current flowing through this LED connect 330 ohm resistor in series. Yellow wire is the output terminal of the photo detector. You have to connect 10K ohm resistor between Vcc (5V) and output terminal for proper biasing. Output can be taken out from the output terminal.

It is recommended that you connect CD40106 (CMOS) or 74HC14 (TTL) Schmitt trigger inverter as a buffer in between position encoder and your circuit. This will prevent loading on the photo detector and also provide debouncing to the encoder by adding hysteresis in the output.



### Calculating Robot Motion with an Encoder:

For every pulse sent out by the encoder wheel rotates by fixed angle. To calculate the distance traveled by the robot for each pulse, we need wheel diameter and encoder resolution or number of slots on the disc (counts per revolution).

$$\text{Distance traveled per encoder count} = \frac{\text{Wheel circumference}}{\text{Counts per revolution}}$$

**Velocity = Distance traveled per encoder count / time**

**Position Encoder:**

Encoder resolution: 5.44mm / pulse.

**Motor Specifications:**

Length: 46mm

Diameter: 36mm

DC supply: 4 to 12V

RPM (rated at 12V): 100 RPM

Brush type: Precious metal

Gear head diameter: 37mm

Output type: Centered

Shaft diameter: 6mm

Shaft length: 22mm

Gear assembly: Spur

Torque (depending upon RPM): 0.25 to 7Kg/cm

**Wheel:**

Material: Nylon

Diameter (Including rubber grip): 51.97 mm

Wheel thickness: 10mm

'V' groove under rubber grip can be used as pulley

Hole: 6mm