

# Assignment

1. In slide#12, find out what it means by cogging for a BLDC motor.
2. Rather than design and build custom controllers, many designers look for prebuilt circuits called electronic speed control (ESC) systems to control BLDC motors (Fig. 1). Find an ESC for BLDC motors on internet and answer the following questions.

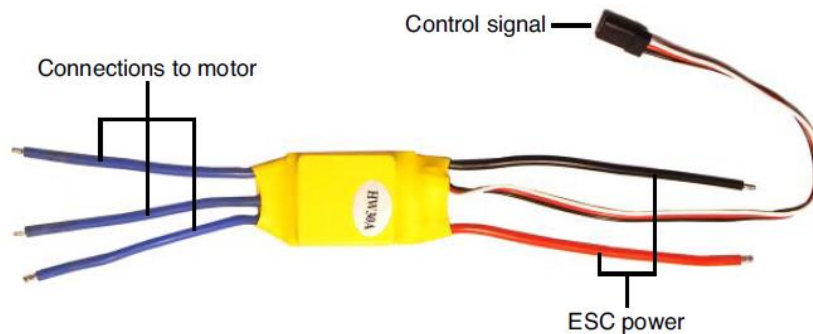


Figure 1. Example electronic speed controller for a sensorless BLDC

- a) Explain what each terminal of the ESC does.
  - b) Look at its specifications and give its electrical characteristics.
  - c) Does it have a battery eliminator circuit (BEC)? Find the purpose of a BEC.
  - d) What control signals should be given to the ESC via a microcontroller?
3. L6234 IC is a three-phase motor driver IC. As the first step to build your custom BLDC ESC, go through the datasheet of L6234 and explain how the theories you learnt in the Robot Motion – II lecture be realized using L6234 in an ESC. How will you control it from a microcontroller?

Note: You are not required to understand every aspect of the L6234 IC datasheet. A fundamental understanding of how to use the IC is sufficient, and any detailed circuit diagrams are not required.

4. Find a stepper motor driver that is compatible with Arduino board on the internet, and answer the following questions.
  - a) What is the main IC on the motor driver?
  - b) How many stepper motors can be controlled simultaneously using the motor driver you found?
  - c) Does it support micro-stepping mode?
  - d) Explain how you can use it to drive a stepper motor together with Arduino board.