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INTRODUCTION TO VARIOUS ELECTRIC DRIVE-TRAIN TOPOLOGIES



INTRODUCTION

Image result for Configuration and control of Brushless Motor drives
An ESC or an Electronic Speed Controller controls the brushless motor movement or speed by activating the appropriate to create the rotating magnetic field so that the motor rotates. The higher the frequency or the quicker the ESC goes through the 6 intervals, the higher the speed of the motor will be.



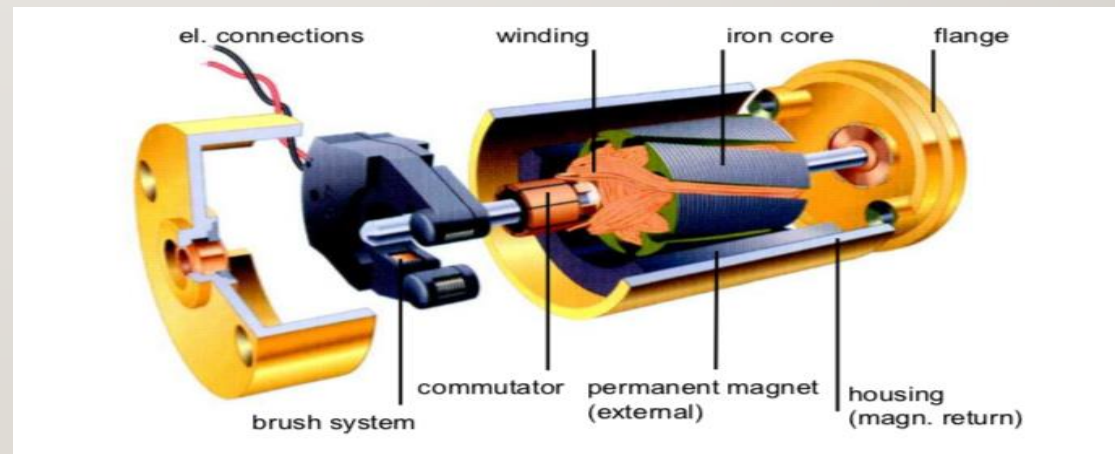
MOTOR CONTROL AND DRIVES

Motor Controllers and Drives are electrical or electronic devices that regulate motor speed, torque, and position outputs. The drive modifies the power input to the motor to achieve the desired output. Motor Controllers and Drives are electrical or electronic devices that regulate motor speed, torque, and position outputs. The controller circuits are commonly integrated with the drive circuits as one stand-alone unit, thus the terms motor drive and motor controller are frequently used interchangeably. There are four basic motor controller and drive types: AC, DC, servo, and stepper, each having an input power type modified to the desired output function to match with an application.



BRUSHLESS DRIVE

- There are two types of commonly used DC motors: Brushed motors, and brushless motors (or BLDC motors). As their names imply, DC brushed motors have brushes, which are used to commutate the motor to cause it to spin. Brushless motors replace the mechanical commutation function with electronic control.





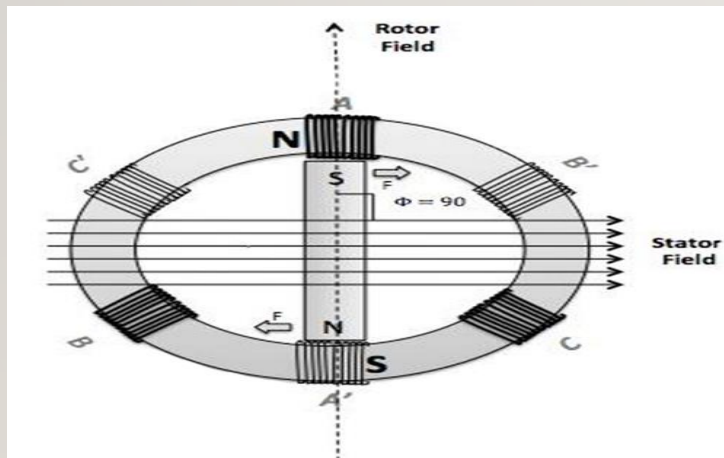
MOTORS ARE CONTROLLER

- DC motors use wound coils of wire to create a magnetic field. In a brushed motor, these coils are free to rotate to drive a shaft – they are the part of the motor that’s called the “rotor”.
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- The fixed part of the motor is called the “stator”. Permanent magnets are used to provide a stationary magnetic field. Normally these magnets are positioned on the inner surface of the stator, outside of the rotor.
- In order to create torque, which makes the rotor spin, the magnetic field of the rotor needs to continuously rotate, so that it’s field attracts and repels the fixed field of the stator.



TYPES OF BLDC CONTROLS

- At present, there are 3 control methods for BLDC motor: FOC (known as vector frequency control, magnetic-field vector directional control), square-wave control (also known as trapezoidal wave control, 120° control, 6-step commutation control) and sine wave control





CONCLUSION

- Brushless DC motors have some significant advantages over their competitors, such as brushed motors, largely because of the electronic commutation. It allows the controller to switch the current promptly and thus regulate the motor's characteristics effectively. In this article, we'll consider the peculiarities of a brushless DC motor controller. You will learn about its operating principles as well as the design features and challenges you should know about before building your own device.