



ELECTRICAL SERVO MOTOR

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Servo Motor



A Servo Motor is a motor which is part of a servomechanism. It is typically paired with some type of encoder to provide positioning and speed feedback.



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Servo Motor Basics



A Servo Motor is defined as an automatic device that uses an error-correction routine to correct its motion. The term servo can be applied to systems other than a Servo Motor; systems that use a feedback mechanism such as an encoder or other feedback device to control the motion parameters.

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Servo Motor Basics



Typically when the term servo is used it applies to a 'Servo Motor' but is also used as a general control term, meaning that a feedback loop is used to position an item.

Servo Motor Basics



A servomechanism may or may not use a servo motor. For example, a household furnace is a servomechanism that is controlled by a thermostat. Once a set temperature is reached, there is feedback signaling it to shut off; making it a “servo” in nature. The term “servo” describes more of a function or task, than it does a specific product line. For this guide, we will discuss servo motors specifically.

Servo Motor Basics



A servo motor can be a DC, AC, or brushless DC motor, combined with a position sensor; in most cases, a digital encoder. A servo motor is typically the motor selected when it is essential that there is a high degree of confidence that the servo motor and drive system will closely track what is asked of it.

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Physical Properties of a Servo Motor



A Servo Motor consists of three major parts: a motor, control board, and potentiometer (variable resistor) connected to the output shaft. The motor utilizes a set of gears to rotate the potentiometer and the output shaft at the same time. The potentiometer, which controls the angle of the servo motor, allows the control circuitry to monitor the current angle of the servo motor.

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Physical Properties of a Servo Motor



The motor, through a series of gears, turns the output shaft and the potentiometer simultaneously. The potentiometer is fed into the servo control circuit and when the control circuit detects that the position is correct, it stops the servo motor. If the control circuit detects that the angle is not correct, it will turn the servo motor the correct direction until the angle is correct.

Physical Properties of a Servo Motor



Normally a servo motor is used to control an angular motion of between 0 and 180 degrees. It is not mechanically capable (unless modified) of turning any farther due to the mechanical stop build on to the main output gear.

Where are Servo Motors used?



Servos are extremely useful in robotics and automation. Servo motors are used across various automation fields specifically where the motor must be able to operate at a range of speeds without overheating, operate at zero speed while being able to retain its load in a set position, as well as operate at low speeds.

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Where are Servo Motors used?



The aerospace industry makes use of servo motors in their hydraulic systems to contain system hydraulic fluid. The servo motor is relatively small in size, yet very powerful. A servo motor also draws power proportional to the mechanical load.

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