Megacraft Enterprises Pvt. Ltd.
16, Electronic Sadan II, MIDC Bhosari, Pune 411026, Maharashtra, India
Mob No :- 8669617184/8669617186/8669617185
Email: mail@megacraft.net | Website: www.megacraft.net

Application of Rotary Sensor in the Closed Loop Control system for Rotary Position Sensing

A Control system is an interconnection of components forming a system configuration which will provide a desired system response. Any operation to be controlled is known as Process.

Working Principle :

A Closed loop control system utilizes an additional signal that measures the actual output. It then compares the actual output with desired setpoint, which in turn adjusts the controller to produce the desired output response. The DC motor plays a significant role in modern industrial drives due to its higher performance, reliability, adjustable speed control etc. These are several types of applications where the load on the DC motor varies over a speed range. In home appliances, washers, dryers and compressors are good examples. In automotive, fuel pump control, electronic steering control, engine control and electric vehicle control are good examples of these. Now we'll look at the control system that results from using a DC motor and rotary encoder. Suppose you want the motor to make one complete rotation. Your program tells the controller to move at 100% duty cycle. The motor starts moving, and as it does, the encoder updates your program with the motor's current position. The program then re-evaluates the situation and tells the controller a new duty cycle. If your program is clever, it can adjust the duty cycle to gradually decrease as you get closer to your target position. If an external force is used to stop the motor, your rotary encoder would indicate to your program that the motor has stopped moving, and it could increase the duty cycle or activate another system designed to take care of the problem. This type of control is called a closed-loop controller, because the actual output of the system constantly loops back into the calculation that determines the future output. By installing a rotary encoder onto your stepper motor, you can create a similar closed-loop system with all of the same benefits of a stepper motor.

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If the motor stalls and desynchronizes with the controller, you can restart it. If you miss steps or take too many, they can be accounted for instead of accumulating over time. If your gearbox backlash introduces a few degrees of error after a number of rotations, that error can be eliminated with a rotary encoder. Here in this application the a motor encoder is a rotary encoder mounted to an electric motor that provides closed loop feedback signals by tracking the speed and position of a motor shaft.