

# DESIGN OF SINGLE PHASE CONTROLLED RECTIFIER USING PID CONTROLLER FOR DC MOTOR SPEED CONTROL SYSTEM

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## ABSTRACT

DC motor are one of the electrical machines in the industry that require DC sources. To obtain a DC voltage that can vary, a controlled rectifier is needed. Controlled rectifiers are circuits that convert AC voltage sources into DC voltages that can be controlled or regulated. To get the expected rotation speed, a control system with control is needed, one of which is the PID controller. The design of this rectifier is made to design a full-controlled controlled rectifier. After making the design of the rectifier then determine the components needed. The components needed to make a full-wave controlled rectifier are SCR, DC motor, rotary encoder speed sensor, and microcontroller. System design with the best control using PID control with  $K_p$  89,  $K_i$  49 and  $K_d$  27. Based on the results of the system simulation in closed-loop conditions the results are in the form of a transient response that is not able to reach the given setpoint value. From the results of the prototype at the time of setpoint 60 Rpm without using a controller, the motor cannot reach the setpoint with a speed value of 56.03 Rpm. The prototype with a 120 Rpm setpoint motorbike also cannot reach the setpoint, where the average motor speed is 59.55 Rpm. From the results of the prototype at the 59.4 Rpm setpoint using the controller, the motor can reach a setpoint with a speed value of 59.9 Rpm. The prototype with a 120 Rpm setpoint motorbike also cannot reach the setpoint, where the average speed of the motor is 61.02 Rpm

**Keyword :** *Controlled rectifier, DC Motor, PID Controller*