

## **ABSTRACT**

*Technological developments, especially in the field of electricity are very developed. Significant developments such as an automated system for filling water in a tank. Because the process of filling and emptying water in the tank is very inefficient if it is still done manually. To monitor the height of the water level in the tank, the volume of water should not exceed the capacity of the tank. In the tank plant, an input actuator is needed that can adjust the water level in the tank. So to automate the system, a PLC-based controller is used which has a fast response. In this system, if measurements are made, there is still noise or error. To measure the water level in the tank using an ultrasonic sensor. To overcome these problems, the Kalman filter is used to remove noise or errors. The results of the measurement of the water level measured using an ultrasonic sensor that does not use a kalman filter will be compared with a system that is simulated on simulink and uses a kalman filter, to find out whether the use of a kalman filter has been able to eliminate noise or errors that occur. The results obtained from this research get the best performance when testing ultrasonic sensors with a kalman filter with a matrix value of  $A = -0.1$   $B = 0.01$   $C = 0.2$   $D = 0$ , with a value of  $Q = 0.1$  and  $R = 1$ .with value RMSE 2260.185.*

**Keywords:** *Kalman Filter, Noise, PLC, Ultrasonic Sensor*