

## **ABSTRACT**

*Incinerator is a tool used to perform incineration, which is a combustion method with high and controlled temperatures. To increase the results of perfect combustion, temperature control is needed to achieve a high and constant combustion temperature so that it can reduce combustion residues and harmful exhaust emissions. This study aims to design and build an automation system for controlling the temperature of urban solid waste incineration using a PLC with an HMI interface. The CP1E-NA20DR-A PLC is used as the main controller, while the Weintek MT8071iP series HMI is used to monitor and adjust the temperature setpoint. The temperature sensor used is a type K thermocouple. Temperature control is carried out using a two-position controller method using a relay and a blower as an actuator to provide air supply to the incinerator. The fuels used include dry leaves, grumbles, and coconut shells. The first test is the thermocouple, the results obtained show that each increase in the thermocouple temperature is accompanied by a proportional increase in voltage. The next test is the Relay and Blower, the results are that the relay is able to send the required voltage to the blower of 23.05 V and the blower is active when it gets voltage from the relay. The overall system testing was carried out by combustion using two different methods, namely combustion with a temperature controller involving a temperature setpoint setting of 350°C and the use of a blower as an air supplier and combustion without a blower. The results of the combustion test showed that combustion using a blower had a combustion rate of  $1.5 \times 10^{-3}$  kg/s with a combustion efficiency of 97%, while combustion without a blower had a combustion rate of  $0.9 \times 10^{-3}$  kg/s with a combustion efficiency of 92%.*

**Keywords:** *Incinerator, two position controller, Programmable Logic Controller, Human Machine Interface.*