CONTROL SYSTEMS

LAB 2 REPORT

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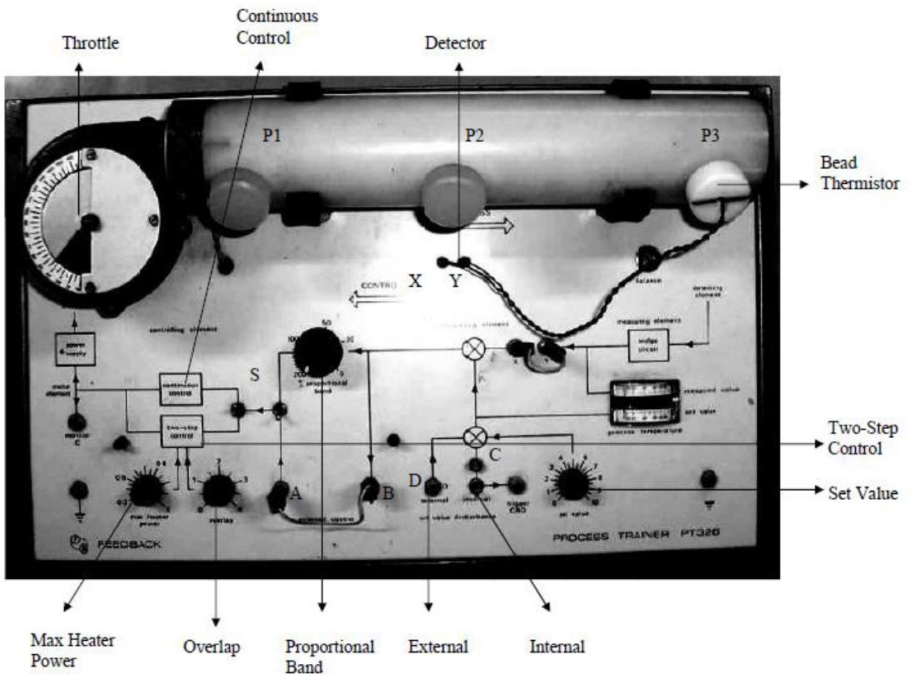
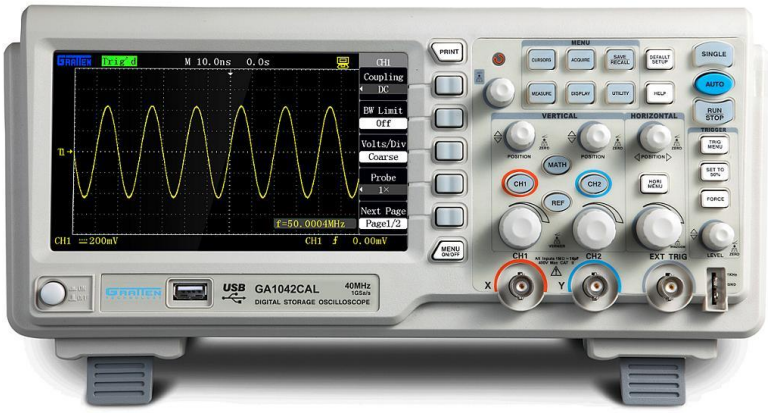
DEVICES USED

PT 326 PROCESS TRAINER



OSCILLOSCOPE



EXPERIMENT RESULTS

Due to the processor trainer being damaged, we managed to salvage one reading, which isn't entirely correct due to the noise and error.

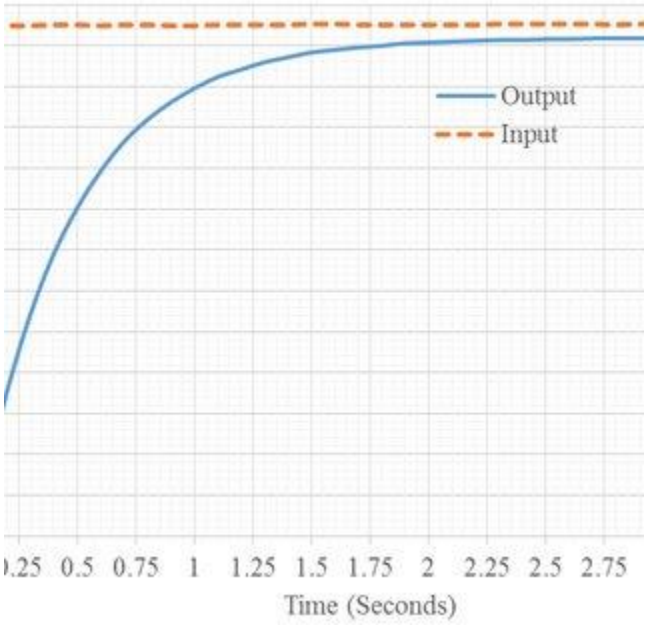
Reading was done at temperature = 80C

Variables	Measured values
K_{opt}	16.67
V_{out}	12V
e_{ss}	1V
Calculated $V_{10\%}$	1.2V
Calculated $V_{90\%}$	10.8V
Measured $V_{10\%}$	Couldn't identify (Faulty device)
Measured $V_{90\%}$	11.2V
Measured t10%	Couldn't identify (Faulty device)
M_p	13.6V

GRAPHS

Since we only managed to get one reading, so it was impossible to get the graph

Theoretically , it should look like this:



EFFECT OF INCREASING THE GAIN ON STEADY STATE ERROR

As the gain increases the value of the steady state error decreases due to them being inversely proportional.

$$K \propto \frac{1}{e_{ss}}$$

OPTIMAL GAIN

$$K_{opt} = \frac{K}{6} = \frac{100}{6} = 16.7$$

THE VALUE OF THE GAIN THAT CAUSES THE OSCILLATED ERROR AND THE FREQUENCY OF OSCILLATIONS

Couldn't be measured due to the given circumstances.

THE ZIEGLER-NICHOLS METHOD

Since we couldn't calculate the frequency, we can only calculate the Proportional only control gain:

$$K_c = \frac{K}{2} = \frac{100}{2} = 50$$

Values are quite varying and inaccurate due to the errors caused by the faulty system.