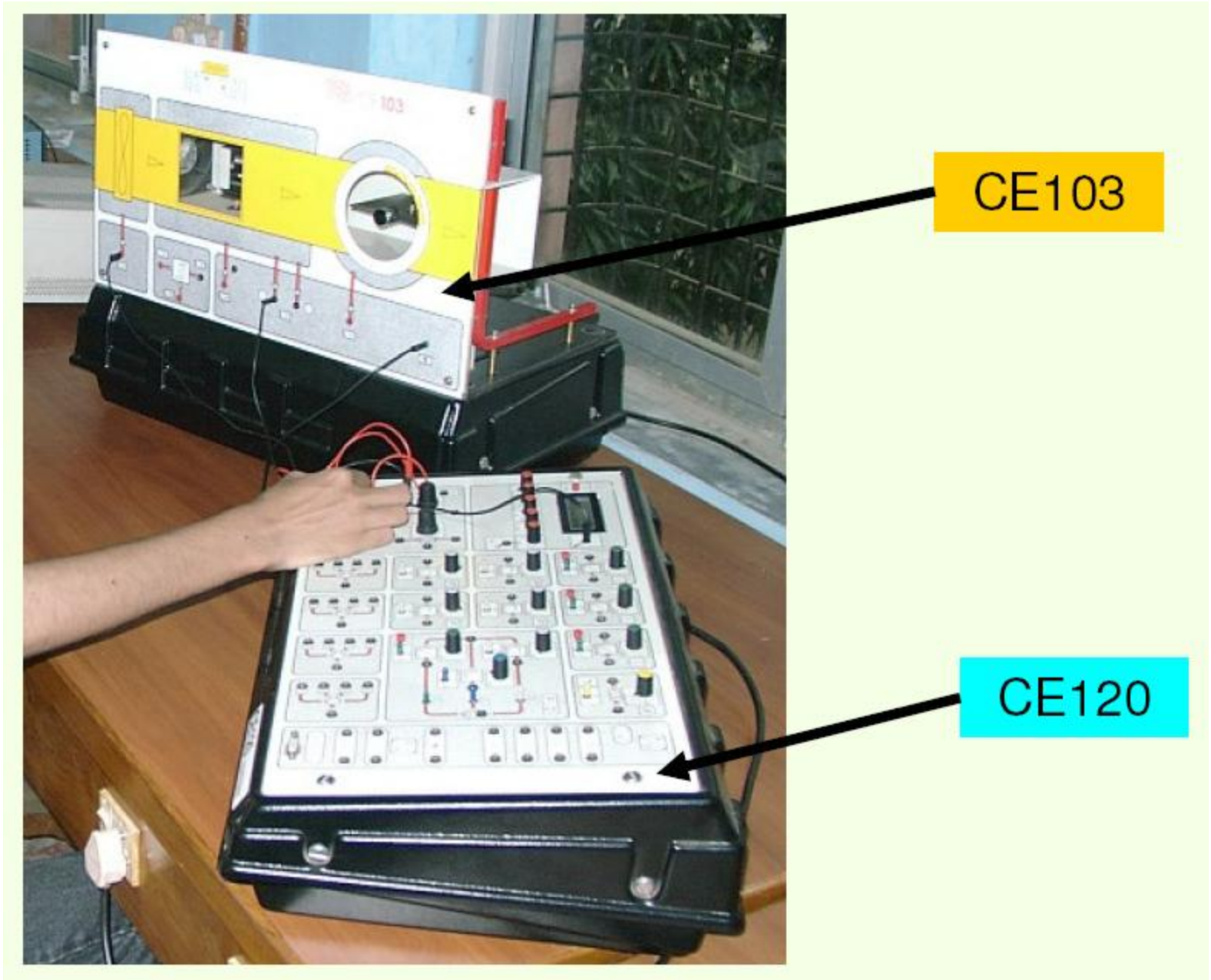
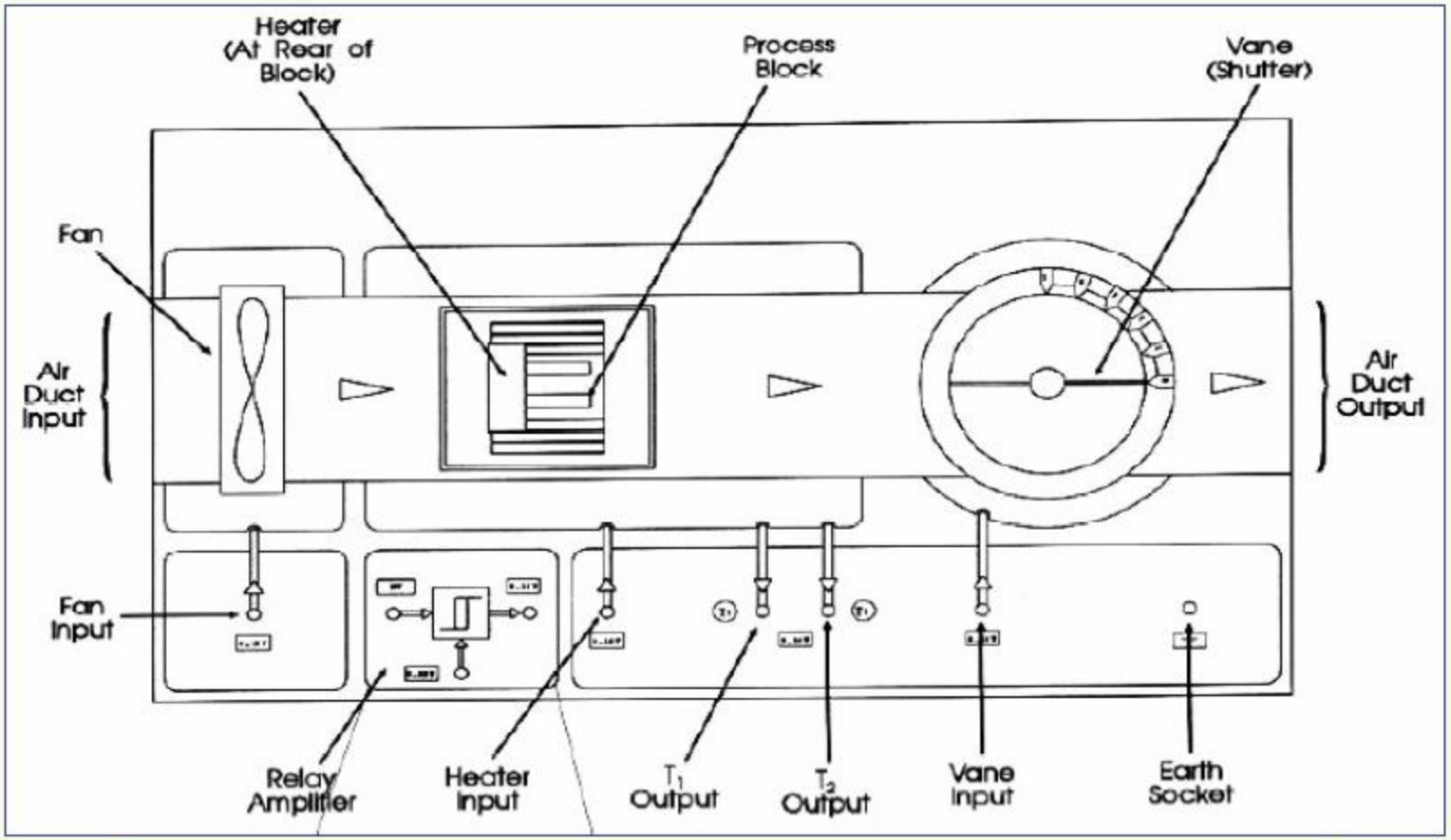
AE 230 - **Modeling and Simulation Laboratory**

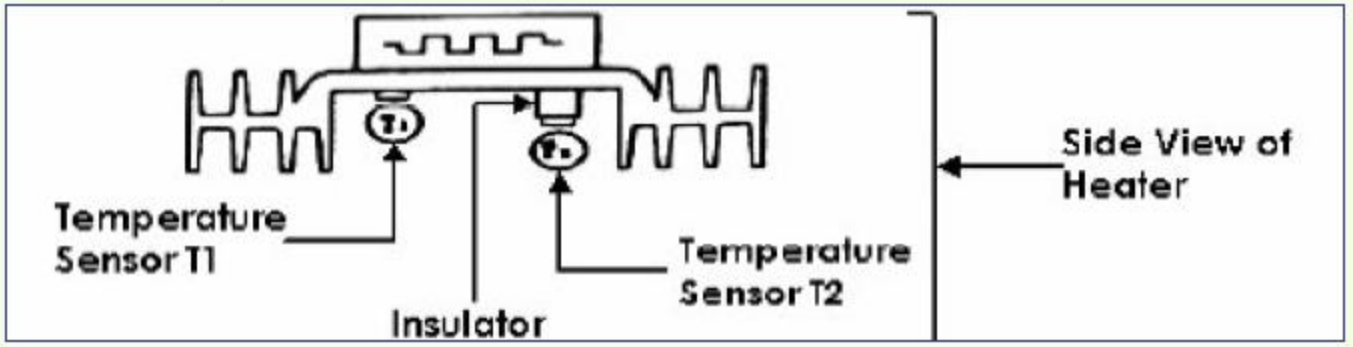
AE – 230 Modeling and Simulation Laboratory

- ***Servo Systems : DC Motor; Step response for time constant & DC gain***
- ***Thermal Systems : Heating of metal block & Heating of air; step response for time constant, DC gain & transport lag due to sensor***
- ***Torsion Disk System: Free-free and restrained elastic system models; Natural frequency & damping; Mass stiffness & damping evaluation***
- ***Ball Plate system - Ball motion over a flat plate***

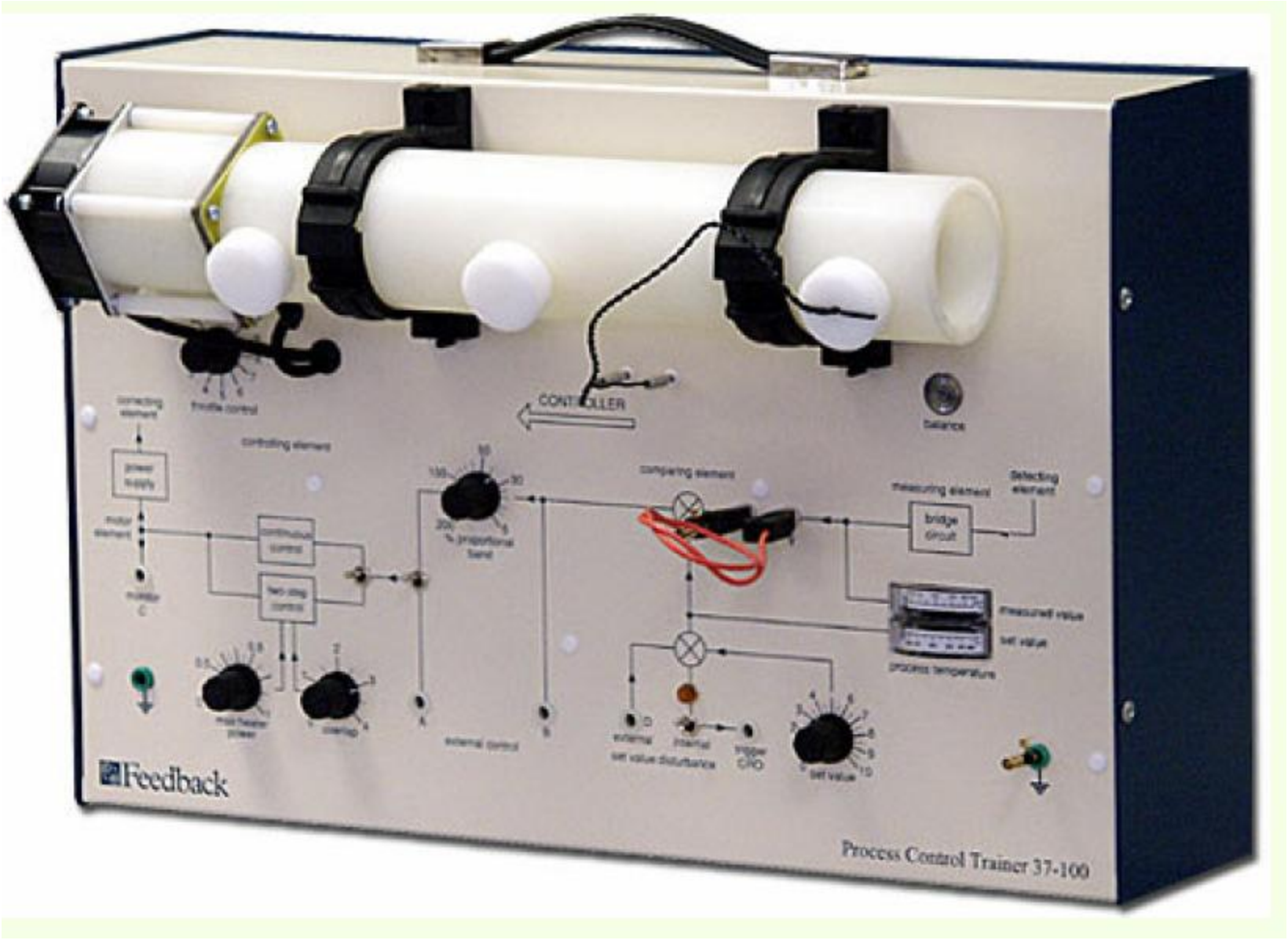


CE – 103 Thermal setup

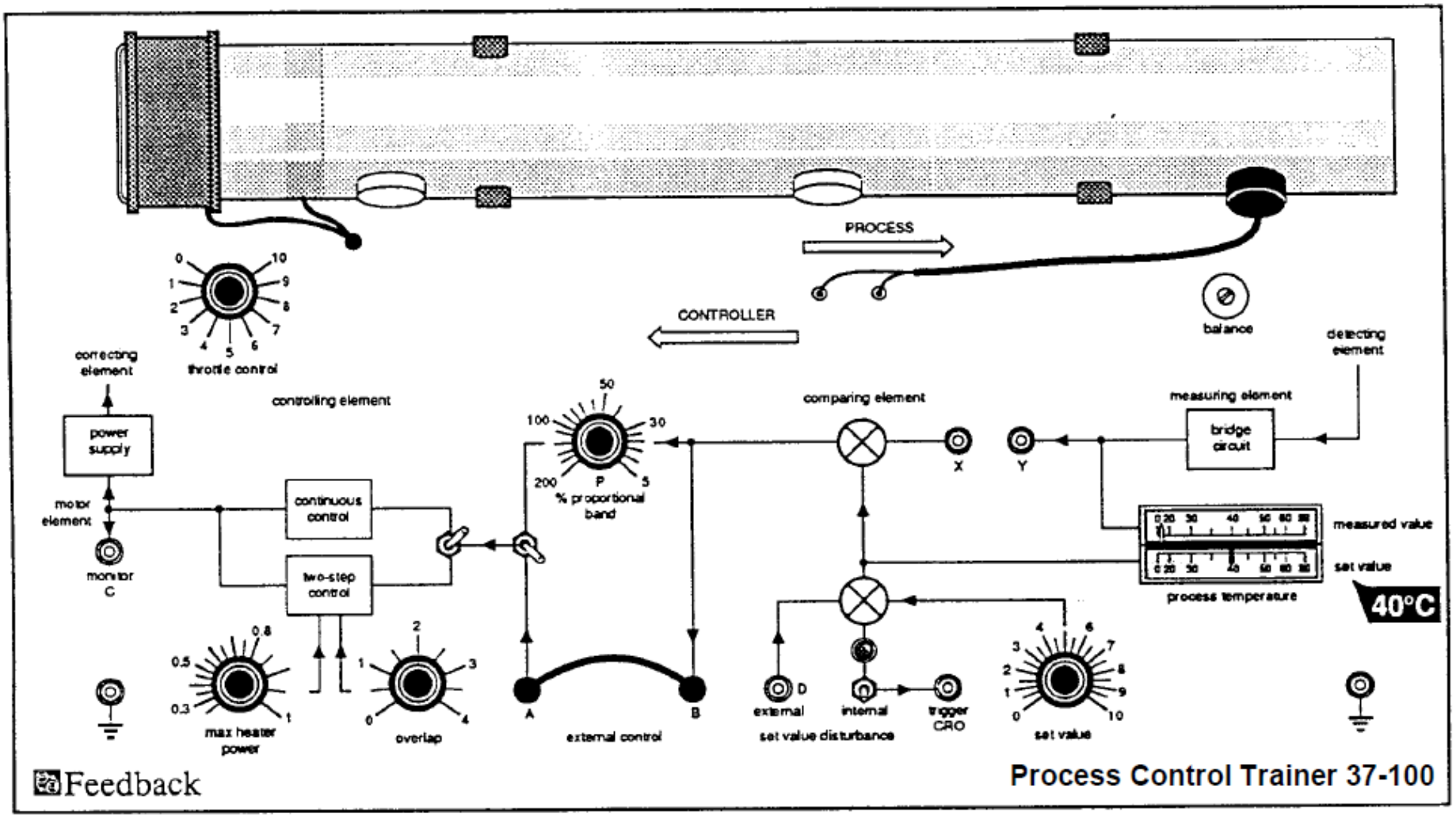




CE – 103 Thermal setup

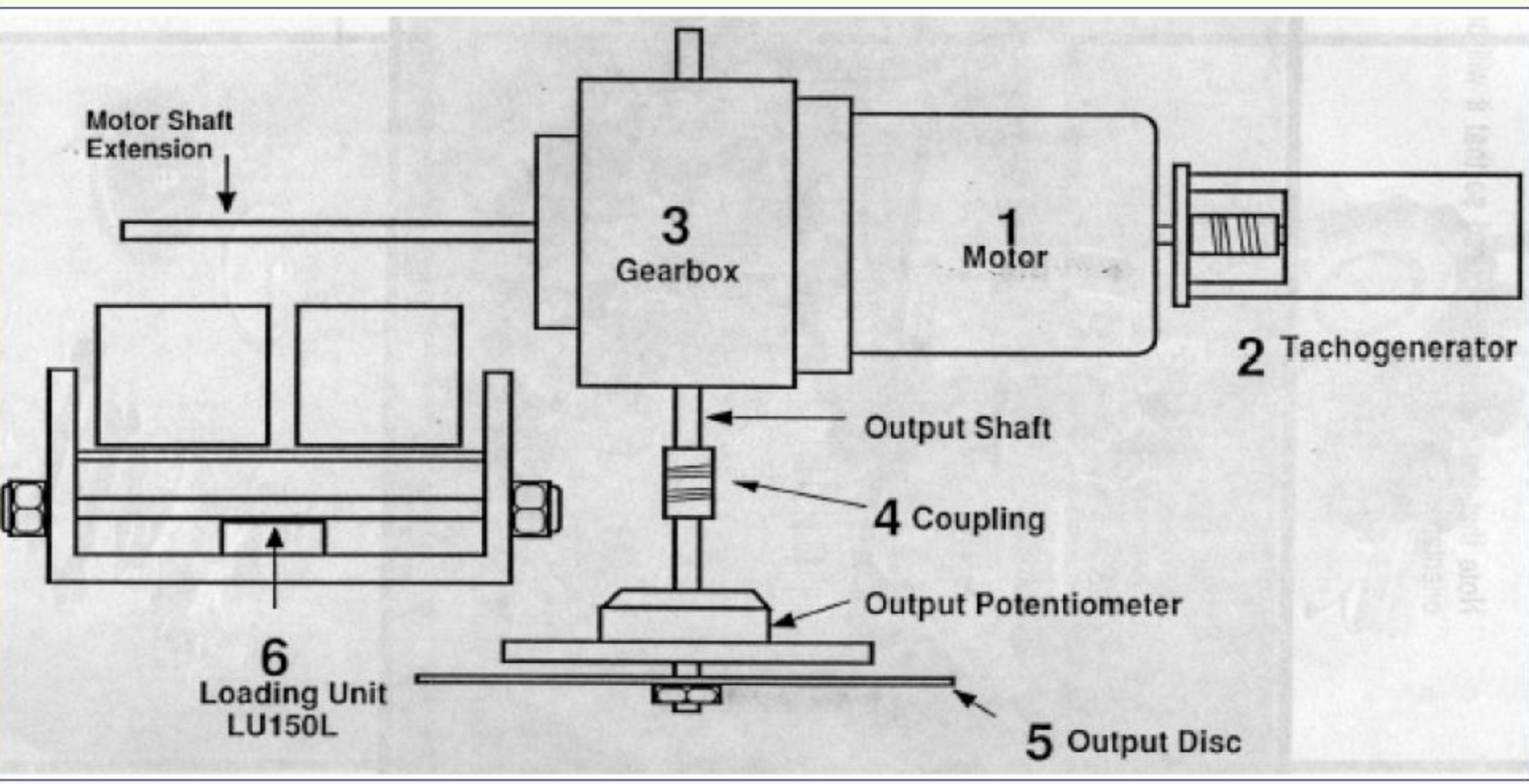


PT - 326 Thermal setup



37-100- Thermal setup

ES 151 – Electromechanical setup



ES 151 – Electromechanical setup

Modular servo – Electromechanical setup

MATLAB - Homework

a) Signal generation – Pulse generator, Signal builder, sine wave and step

b) Numerical integration – integrate sine (at) using simulink; a = 1, 10, 100

c) Numerical differentiation – differentiate sine (at) using simulink; a = 1, 10, 100

d) Give the out of b to c and write your observations

e) Interpolation – (x = 1 2 3 4 5 6; y = 0 1 7 9 6 1) find y for x = 2.5, 3.1, 5.5. What happens for x = 0.5 and 7

f) Learn about Mux, Demux, delay, scope, XY-graph,

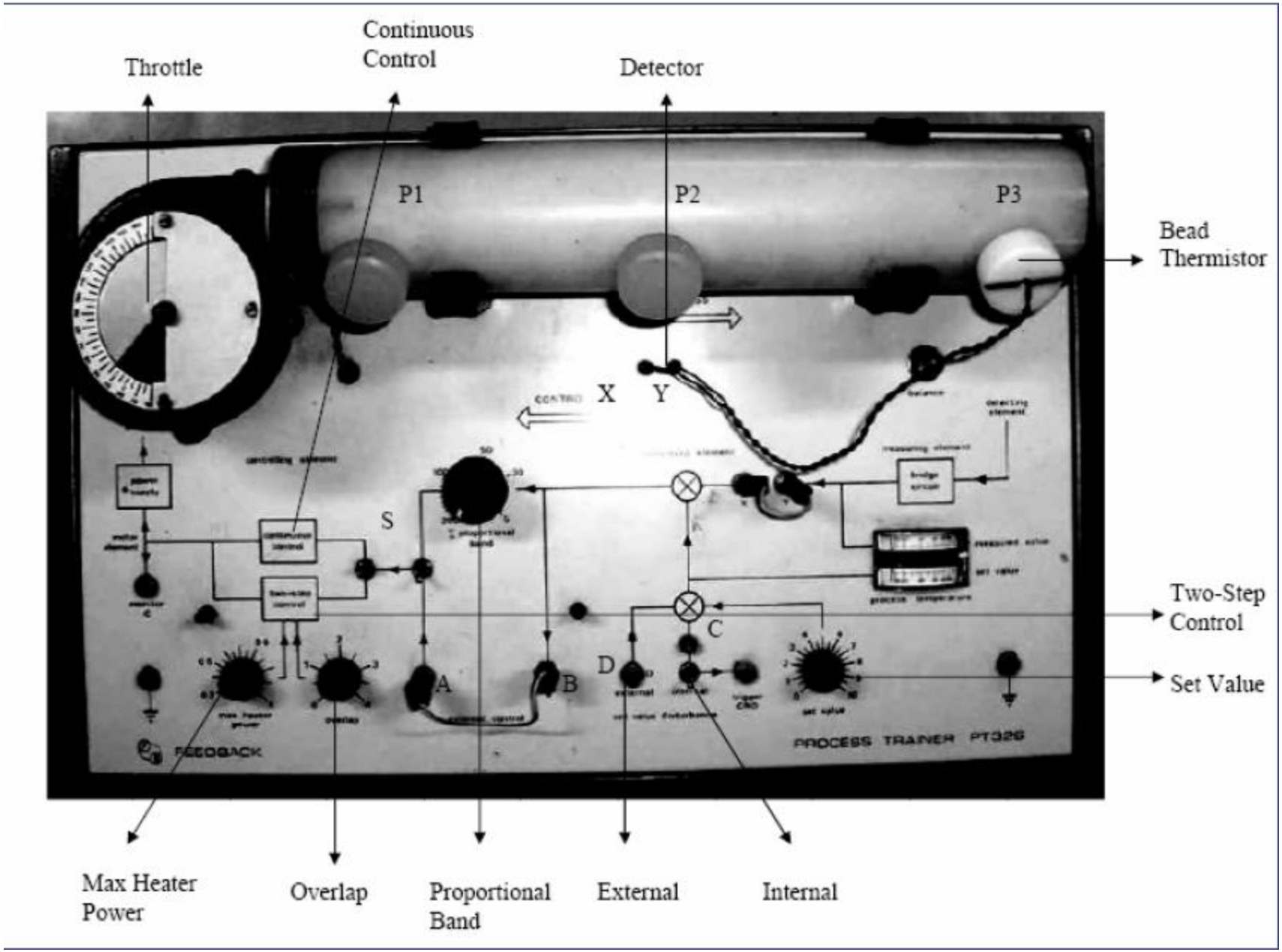
g) Use Simulink create function Y = X^2+Z^2, where X=sin(t) and Z = cos(t). For Y write function in the form of equation.

Give your comments on the b, c, d and e

Homework

Write two systems for each with justification: a) Non-physical system b) Non Causal system c) Discreet system d) Variable parameter system

Submit handwritten journal for above.



PT 326 - Thermal setup