WATER TEMPERATURE CONTROL SYSTEM TRAINER

The **Water Temperature Control Trainer (PCST - 08)** is the system, which outlines the basics of Closed Loop Water Temperature Control and various aspects related to it.

**KEY WORDS:**

- Feedback Water Temperature Control.
- PID control.
- SCADA Based Water Temperature Control
- P, P+I, P+I+D Controller Action.
- USB / Ethernet / RS232 / RS 485/ Modbus Communication
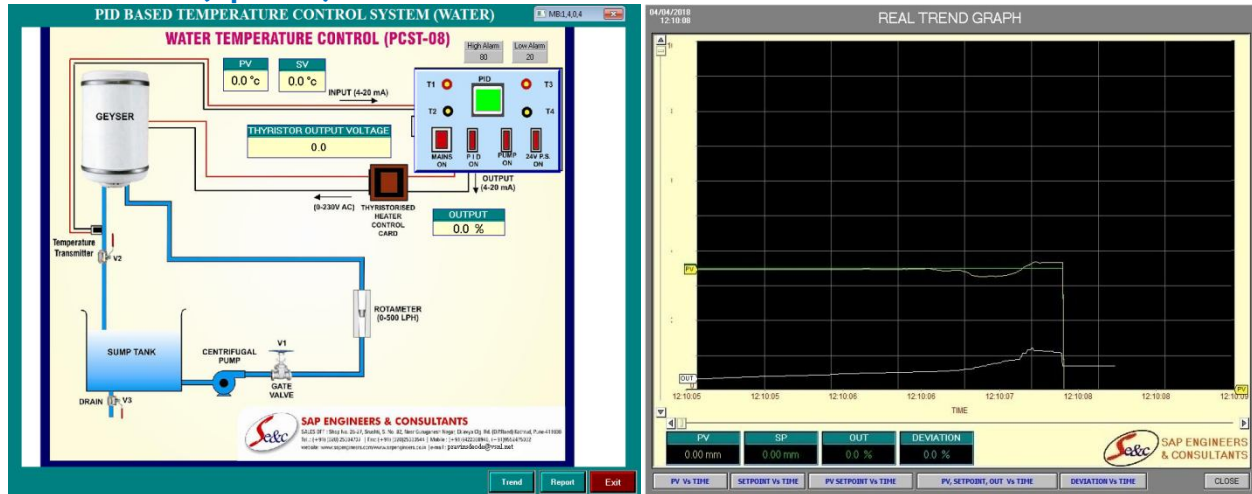- Ability to hook up with DCS (Distributed Control System Trainer)

## Technical Specification: -

| No. | Item Name | Technical Specifications |
|---|---|---|
| 1 | **Temperature Transmitter-** | Input: RTD / Thermocouple, Output: 4-20mA Sensor Length: 150 mm, DC Supply 24V, 50mA Range: 0-100°C |
| 2 | **Sump tank-** | Material: PP 5mm thick /SS304 1.5 mm thick, Capacity: 30 liters, Dimension: 1 ft (L) ×1ft (W) ×1 ft (H). |
| 3 | **Process Tank-** | Geyser (Heater) Capacity: 1-2Liters with Thermostat |
| 4 | **Thyresterized phase angle control card-** | Input: 4-20mA, Panel mounted, Output: 0-230 V AC, 6A max. |
| 5 | **Rotameter-** | Size ½" Range: 500 LPH / 1000 LPH, Glass tube type/ Acrylic body |
| 6 | **Electronic PID Controller-** | With Serial PC Interface (ASCII/MODBUS Protocol) USB / Ethernet / RS 485 / RS232 for SCADA option only, Cut Out Size: 92mm×92mm×144mm, Input: RTD/4-20 mA Input type, Output; 4-20 mA, Display: Dual for PV & SP, High-Low Alarm annunciation, Bar graph display (Optional) |
| 7 | **Electrical Control Panel-** | MS Powder coated panel with switches, indicator, test points, Controller on front facia, UK 2.5 Terminal Connectors mounted on DIN rail channel, use of 0.5 sq mm multistrand wire with proper insulated Lugs, Ferruling, neat wire dressing & clamping. Wires and power cables are seated through 1" × 1" PVC cable tray |
| 8 | **Centrifugal Pump-** | ½ HP, 1φ 230 V AC supply, Surface mounting |
| 9 | **Piping-** | Size ½" G.I. with ½" gate valves: 1 No., ½" NRV: 1 no., Ball valve: 1 no. |
| 10 | **Panel Dimension** | 1ft. (L) × 1ft. (W) × 1ft. (H) |
| 11 | **SCADA Application Software (Optional)-** | SCADA Application S/W, PID control setting (P, PI, PD and PID mode), Auto/Manual Tuning of PID, Data Storage, Off Line analysis, online Data Acquisition, Simulation |

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| | | and Printing of data in Graphical and Tabular form. Interactive Graphical User Interface (GUI) included. |
| 12 | Computer (Optional)- | PC with color monitor: 18.5'', Intel Core i3, 500 GB HDD, 4GB RAM, Keyboard & Mouse, DVD Writer, With supporting OS and Communication port. |

### SCADA Screen (Optional):



### Range of experiments:

- ❖ Study of single loop proportional, integral and derivative control.
- ❖ Study of operation and calibration of sensors/transmitter.
- ❖ Study of stability of single loop control.
- ❖ Configure micro controller based PID to give manual output, change controller mode as Manual or Auto, give ON-OFF, proportional, integral, derivative PI and PID Control, change local set point, configure and run a set point ramp, configure measured values to either percentage or temp.. Demonstrate the proportional control of temperature, with offset, overshoot, Instability optimum value of proportional band or gain.
- ❖ Demonstrate the use of RTD (or a transmitter) for the measurement of temperature of water. Show the operation of a thyristor to control the energy input of an electrical heater.
- ❖ Demonstrate the effect of integral control and the optimization of the integral (reset) time for temperature control.
- ❖ Optimize the parameters for PID control of temperature; demonstrate the use of automatic tuning.
- ❖ Study of SCADA Application Software/ Computerized Control of Water Temperature Control System Control System. (Optional)

### Features: -

- ❖ Compact Ergonomic Design.
- ❖ User Friendly, Self Explanatory Systems.
- ❖ Electrical control panel.
- ❖ Enhanced Electrical Safety Considerations.
- ❖ Training Manual, mimic Charts for Operation Ease.
- ❖ Inbuilt Safety Measures to avoid improper usage.
- ❖ Computer Interface & SCADA software connectivity for analysis of Temperature Control System Trainer (Optional).
- ❖ Caster wheel mounted movable frame

**System Dimension:**   4 Ft. (L) X 1.5 Ft. (W) X 4 Ft. (H)

**Services Required:**
- ❖ Water supply and drainage arrangement.
- ❖ Electric supply 1φ 230 V AC, 50 Hz.

**Note:**

All descriptive matter and illustrations are intended to give only a general idea of the equipment Detailed specifications may be altered at the company's discretion without any notice

Manufactured/Marketed By

**SAP ENGINEERS & CONSULTANTS**

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|---|---|
| Regd. Off. | : Shop No. 26-27,'Srushti', Survey No.82, Near Guru Ganesh Nagar, Eklavya College Road (D.P.Road), Kothrud, Pune - 411 038, India |
| Telephone | : (020) 2538 4737 |
| Mobile | : +91 94220 88946, +91 9552475082 |
| Fax | : (020) 2538 3544 |
| Email | : sales@sapengineers.com |
| Website | : www.sapengineers.com / www.sapengineers.co.in |