

## SAP E&C PC-PID BASED MULTI-PROCESS CONTROL SYSTEM TRAINER (PCMT-01)



This trainer is highly flexible and modular system for studying of various control loops in industrial processes. It has been designed to include these processes in a single structure. The system infact includes transducers, actuators, PID + computerized control with SCADA Software.

### Key Words: -

- ❖ Feedback Control,
- ❖ Feedback Flow control,
- ❖ Feedback Level control,
- ❖ Feedback Pressure control,
- ❖ Feedback Temperature control,
- ❖ Cascade control (Level+Flow, Pressure+Flow)
- ❖ Ratio control (Flow+Flow).
- ❖ Split Range control

### Technical Specifications:

- ❖ Sump tank: - Material: Stainless Steel, 2 mm thick/P.P.5mm thick , Capacity: 30 liters, Dimension: 1.5ft (L) ×1ft (W) ×1 ft (H).
- ❖ Level Tank: - Material: acrylic 5 mm thick  
Dimension: 150mm (Ø) ×500mm (H).
- ❖ Temperature Cabinet: - 1'' thick insulation wall, with circulating fan & Thermostat, Heater: 1 KW.  
Dimension: 1.25ft (L) ×1.25ft (W) ×2ft (H).
- ❖ Pressure vessel: - Shape: Cylindrical, Material: SS 304,  
Diameter: 150 mm, Length: 300 mm,  
Capacity: 15 Kg/cm<sup>2</sup>, with ½'' BSP connection for pressure gauge, inlet & drain facility
- ❖ Piping: - 1'' Class B GI with 1'' SS ball valves: 17 no.
- ❖ Flow meter: - 2 no. Size: 1'', Turbine type/ wfm type,  
Range: 0-2000 LPH, supply: 24 V DC, 100 mA.  
Output: 4-20 mA, Type: 3-wire type.  
Mounting: Horizontal, Connection; ½''
- ❖ Level Transmitter: - Input: 0-400 /0-500 mm  
Output: 4-20 mA, supply: 24 V DC, 100 mA.  
Type: 2-wire capacitance type  
Mounting: Top 2'' screwed connection.
- ❖ Pressure Transmitter: - Input: 0-2.5 Kg/cm<sup>2</sup>/ 0-4 Kg/cm<sup>2</sup>  
Output: 4-20 mA, supply: 24 V DC, 50 mA.  
Type: 2-wire Piezoresistive type, Medium: Water Pressure.  
Mounting: Top ½''BSP connection

- ❖ Temperature Transmitter: - Input: RTD, Output: 4-20 mA, Type: 2-wire type, Range: 0-200 ° C.
- ❖ Thyresterized Phase Angle Control Card: - Input: 4-20 mA, Output: 0-230 VAC variable, 10 A Max.
- ❖ Pneumatic control valve: - 2 no. Size: 1", Characteristics: Equal percentage. Type: Two way Globe type with valve Positioner (Air to Close) & two way Globe type with valve Positioner (Air to Open), Cv: 9 US GPM, with diaphragm actuator. Flange connection: PCD: 80 mm, ID: 26 mm, OD: 110 mm. Positioner Action: 0.2 to 1.0 Kg/cm<sup>2</sup> (with Bypass), (Direct Action / Reverse Action) Pneumatic Input Signal: 0.2 to 1.0 Kg/cm<sup>2</sup> (Without Bypass)
- ❖ Rotameter: - 2 no. Range: 0-2000 LPH, Glass tube type/acrylic body , Bob Material: SS 304 Connection: 1", Mounting: Inlet- Bottom, Outlet- Top.
- ❖ E/P Converter: - Input: 4-20 mA, Output: 3-15 psi, Connection ¼" NPT / BSP, Supply 1.4 Kg/cm<sup>2</sup>.
- ❖ Air Filter Regulator: - 0-10 Kg/cm<sup>2</sup> with pressure gauge, Connection ¼" NPT / BSP.
- ❖ Level Switch: - Float operated, Float Material; SS304 Switching voltage: 240 VAC\200 VDC Switching Current; 2A, Switch Action; Reversible, Weight: 315 Gms.
- ❖ Current Meters: - 3 no. Range 0-20 mA, Supply: 230 V AC, Cut out: 44mm×92 mm×110 mm.
- ❖ Isolator: - 2 no. Signal Isolators, Input: 4-20 mA, Output: 4-20 mA, Supply: 230 V AC.
- ❖ Power Supply: - 24 V DC, 1.5 A, Size: 48mm×126mm×68mm.
- ❖ Electronic PID Controller: - 2 No., Single input PID & Dual Input PID, with Serial Interface (ASCII Protocol) RS 232 Cut Out Size; 92×92×144mm, Input: 4-20 mA, Output: 4-20 mA, Display: Dual for PV & SP, Bargraph display for Output & deviation, Hi-Low alarm annunciation.
- ❖ 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 1sq mm Multistrand wire with proper insulated Lugs, Ferruling & neat wire dressing & clamping Wires & power cables are seated through 1"×1" PVC cable tray. Dimension: 1ft (L) ×1ft (W) ×1ft (H).
- ❖ SCADA Application Software: - (Optional) SCADA S/W, PID control settings (P, PI, PD and PID mode), Auto/Manual Tuning of PID, Data Storage, Off Line analysis, Online Data Acquisition, Simulation and Printing Of data in Graphical and tabular form. Interactive Graphical. User Interface (GUI) included.
- ❖ Air Compressor: - (Optional) Tank capacity: 30 Liters, Discharge: 2 CFM Motor: ½ H.P. 230 V AC Operated working pressure: 3-4 kg/cm<sup>2</sup>
- ❖ Computer: - (Optional) PC with color monitor: 15", PC Pentium Dual Core, with 2 serial communication ports, 80 GB HDD, 512 MB RAM, Floppy Drive.

**Features:**

- ❖ Compact Ergonomic Design.
- ❖ User Friendly, Self Explanatory Systems.
- ❖ Leak proof Safety Measures, sturdy piping.
- ❖ Enhanced Electrical Safety Considerations.
- ❖ Training Manuals mimic Charts for Operation Ease.
- ❖ System Frame with Caster Wheel Arrangement for ease in movement.
- ❖ M.S. powder coated cubical plant with standard Instrument Mountings.
- ❖ Inbuilt Safety Measures to avoid improper usage.
- ❖ SCADA software connectivity for analysis of Multiprocess Trainer.

**Process Equipments:**

- ❖ A sump tank and transparent acrylic tank (secondary) containing water.
- ❖ A control system for liquid flow across the two tanks
- ❖ A control system for liquid level in secondary tank.
- ❖ An oven for temperature control.
- ❖ A pressure vessel for pressure control.
- ❖ Electrical control panel along with PC Interface module.
- ❖ ON-OFF Control: Level, Pressure, Temperature.

**Range of experiments:**

- ❖ Feedback control: - Flow, Level, Temperature and Pressure.
- ❖ Cascade control: - Level + Flow, Pressure + Flow.
- ❖ Ratio control: - Flow/Flow.
- ❖ Split Range control: - Pressure.
- ❖ Study of SCADA Application Software/ Computerized Control of Multi-Process Control System.

**Services Required:**

- ❖ 230 V Single phase AC Supply, Water Supply and its Drain Arrangement.
- ❖ Clean, Dry, Compressed Air Supply at 2.1 Kg/cm<sup>2</sup>.
- ❖ Printer (Optional).

**System Dimensions:** 6 Ft. (L) X 2.5 Ft. (W) X 5.5 Ft. (H)

**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.

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