

## SAP E&C RATIO & CASCADE CONTROL SYSTEM TRAINER (PCST-46) COMPUTERISED (OPTIONAL)



The Ratio & Cascade Control System Trainer is the system, which outlines the Basics of Ratio & Cascade Control considering Flow, Level as Process Parameters.

### KEY WORDS:

- Feedback control.
- Feedback Flow control.
- Feedback Level Control
- Ratio control.
- PID control.
- P, P+I, P+I+D CONTROLLER ACTION

### Technical Specification: -

- ❖ Sump tank: - Material: Stainless Steel, 2 mm thick/P.P 5mm thick , Capacity: 30 liters, Dimension: 1ft (L) ×1ft (W) ×1ft (H).
- ❖ Level Tank: - Dimension: 150(Ø) mm×400(H) mm.
- ❖ Piping: - ½” Class B GI, with ½” SS ball valves: 10 No.
- ❖ Centrifugal Pump: - ¼ H.P., 230 V AC supply, Surface mounting.
- ❖ Flow meter: - 2 nos. ½”, turbine type / WFM type, Range: 0-600 LPH/0-1000 LPH. Output: 4-20 mA, Type: 3-wire type, Supply: 24 V DC: 100 mA 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, Type, Mounting: Top 2” screwed connection.
- ❖ Level Switch: - Float operated, Float Material: SS304, Switching Current: 2A Switching voltage: 240 VAC\200 VDC Switch Action: Reversible, Weight: 315 Gms
- ❖ Pneumatic control valve: - Size: ½”, Type; Two way Globe type (Air to Close) Cv: 5 US GPM, with diaphragm actuator. Flange connection: PCD: 60 mm, ID16 mm, OD: 90 mm.
- ❖ Rotameter: - 2 no. Range: 0-1000 LPH, Glass tube type/acrylic body, Connection: ½”, Bob material: SS 304, Mounting: Inlet Bottom Outlet Top.
- ❖ E/P Converter: - Input: 4-20 mA, Output: 3-15 psi, Connection: ¼” NPT / BSP.
- ❖ Air pressure Regulator: - 0-10 Kg/cm<sup>2</sup> with pressure gauge, Connection: ¼” NPT / BSP.
- ❖ Electronic PID Controller: - 2 no. Single input PID (1 NO.) & Dual input ( 1 No.),for Cascade and Ratio, with Serial PC Interface (ASCII Protocol) RS 232, Cut Out Size: 92mm×92mm×144mm, Input: 4-20 mA, Output: 4-20 mA, Display: Dual for PV & SP, Bargraph display for Output & deviation. Hi-Low Alarm annunciations.

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- ❖ SCADA Application  
Software: - SCADA S/W, PID control setting (P, PI, PD and PID mode),  
(OPTIONAL) 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) includes.
- ❖ 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.  
Dimension: 1ft (L) ×1ft (W) ×1ft (H)
- ❖ Computer: - PC with colour monitor: 15'', PC Pentium Dual Core,  
(OPTIONAL) With serial communication ports, 80 GB HDD, 512 MB RAM, Floppy Drive.
- ❖ Air Compressor: - Tank capacity: 30 Liters, Discharge: 2 CFM  
(OPTIONAL) Motor: 1/2 H.P. 230 V AC Operated, Working pressure: 3-4 kg/cm<sup>2</sup>

#### Features:

- ❖ Compact Ergonomic Design.
- ❖ User Friendly, Self Explanatory Systems.
- ❖ Leak proof Safety Measures, Sturdy Piping & Robust Construction.
- ❖ 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.
- ❖ Computer Interface & SCADA software connectivity for analysis of Cascade Control Loop (Optional).

#### Range Of Experiments:

- ❖ Study of multivariable loop, Cascade Control, RATIO LOOP.
- ❖ Study of single loop Proportional (P), Integral (I), and Derivative (D) control.
- ❖ Study of operation and calibration of transmitters, I/P converter and pneumatic control valve.
- ❖ Study of programming and operation of PID controller.
- ❖ Study of stability of dual loop cascade & ratio control system (Flow - Level Control).
- ❖ Study of rotameter, capacitance type level sensor, wheel flowmeter & control valve.
- ❖ Study of SCADA Application Software/ Computerized Control of Ratio and Cascade Control System.
- ❖ Auxiliary Experiments.

**System Dimensions:** 4.5 Ft. (L) X 1.5 Ft. (W) X 4.5 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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