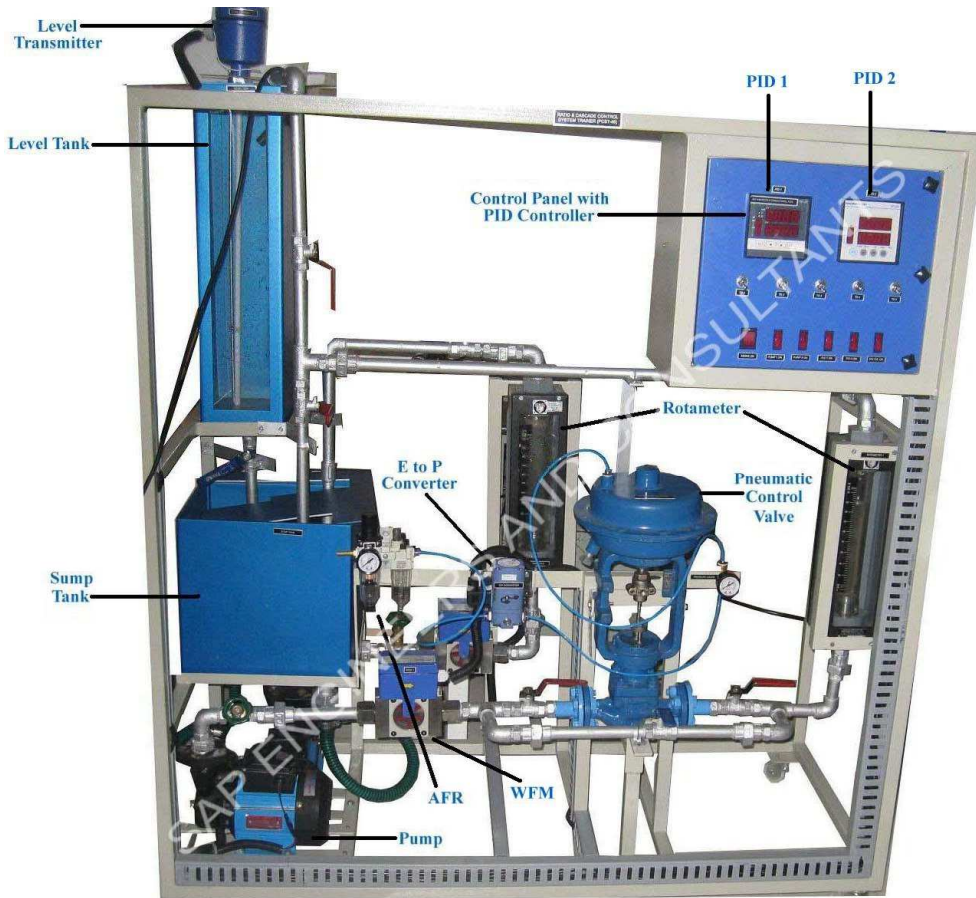


**SAP E & C CASCADE AND RATIO CONTROL TRAINER**  
(PRODUCT CODE: PCST - 46)



**CASCADE AND RATIO CONTROL SYSTEM TRAINER**

The **Cascade and Ratio Control Trainer (PCST – 46)** is the system, which outlines the Basics of Cascade and Ratio Control considering Flow, Level as Process Parameters.

**KEY WORDS-**

- Feedback Control.
- Feedback Flow Control.
- Feedback Level Control.
- Cascade Control. (Flow + Level)
- Ratio Control.
- PID Control.
- P, P+I, P+I+D Controller Action

**Technical Specification-**

| No. | Item Name                | Technical Specifications  |
|-----|--------------------------|---|
| 1   | Sump tank-               | Material: Stainless Steel 1.5 mm thick/P.P 5mm thick , Capacity: 30 liters, Dimension: 1ft (L) ×1ft (W) ×1ft (H).   |
| 2   | Level Tank-              | Material P.P. 5mm thick, Dimension: 150(L) mm× 150(W) mm× 600(H) mm   |
| 3   | Piping-                  | ½" Class B GI, with ½" SS ball valves: 10 No.   |
| 4   | Centrifugal Pump-        | ¼ H.P., 1φ 230 V AC supply, Surface mounting.   |
| 5   | 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"  |
| 6   | Level Transmitter        | Input: 0-400 / 0-500 mm, Output: 4-20 mA, Supply: 24 VDC, 100 mA. Type: 2-wire Capacitance type, Mounting: Top 2" screwed connection.                               |
| 7   | Level Switch-            | Float operated, Float Material: SS304, Switching Current: 0.5A Switching voltage: 240 VAC/200 VDC, Switch Action: Reversible, Weight: 315 Gms                       |
| 8   | Pneumatic Control Valve- | Size: ½", Type; Two way Globe type (Air to Close), Equal Percentage Type, Cv: 5 US GPM, with diaphragm actuator. Flange connection: PCD: 60 mm, ID16 mm, OD: 90 mm. |
| 9   | Rotameter-               | 2 no. Range: 0-1000 LPH, Glass tube type/acrylic body, Connection: ½", Bob material: SS 304, Mounting: Inlet Bottom Outlet Top.                                     |
| 10  | E/P Converter-           | Input: 4-20 mA, Output: 3-15 psi, Connection: ¼" NPT / BSP.   |
| 11  | A.F.R / F.R.L. Unit-     | 0-10 Kg/cm <sup>2</sup> with pressure gauge, Connection: ¼" NPT / BSP.  |

**SAP E & C    CASCADE AND RATIO CONTROL TRAINER**  
(PRODUCT CODE: PCST - 46)



|           |   |  |
|-----------|---|--|
| <b>12</b> | <b>Electronic PID Controller-</b>             | 2 no. Single input PID (1 NO.) & Dual input ( 1 No.),for Cascade and Ratio, With Serial PC Interface (ASCII Protocol) USB / Ethernet / RS 485 / RS 232, Cut Out Size: 92mm×92mm×144mm, Input: 4-20 mA, Output: 4-20 mA, Display: Dual for PV & SP, Bar graph display for Output & deviation. Hi-Low Alarm annunciations. |
| <b>13</b> | <b>Electrical Control Panel-</b>              | 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)  |
| <b>14</b> | <b>SCADA Application Software (Optional)-</b> | SCADA 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 and Printing of data in Graphical and tabular form. Interactive Graphical User Interface (GUI) includes.  |
| <b>15</b> | <b>Computer (Optional)-</b>                   | PC with color monitor: 15", PC Pentium Dual Core, With serial communication ports, 160/300 GB HDD, 512 MB/ 1GB RAM.  |
| <b>16</b> | <b>Air Compressor (Optional)-</b>             | Tank capacity: 25 Liters, Discharge: 2 CFM, Motor: 2 H.P. 230 V AC Operated, Working pressure: 5-6 kg/cm <sup>2</sup> .  |

**Range of experiments:**

- ❖ Study of multivariable loop, Cascade Control, Ratio Loop.
- ❖ Study of Feedback Flow, Feedback Level 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 flow meter & control valve.
- ❖ Study of SCADA Application Software/ Computerized Control of Cascade and Ratio Control System (Optional).
- ❖ Auxiliary Experiments.

**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 Application Software connectivity for analysis of Cascade Control Loop (Optional).

**SAP E & C CASCADE AND RATIO CONTROL TRAINER**  
(PRODUCT CODE: PCST - 46)



**System Dimension-** 4.5 Ft. (L) X 1.5 Ft. (W) X 4.5 Ft. (H)

**Services Required-**

- ❖ Electric supply 1 $\phi$  230 V AC, 50 Hz.
- ❖ Clean, dry Compressed air supply at 2.1 Kg/cm<sup>2</sup>.
- ❖ Water Supply and Drainage Arrangement.

**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**



Regd. Off. : Shop No. 26-27, 'Srushti', Survey No.82, Near Guru Ganesh Nagar,  
Eklavya College Road (D.P.Road), Kothrud, Pune - 411 038

Telephone : (020) 2538 4737

Mobile : 94220 88946, 95524 75082

Fax : (020) 2538 3544

Email : [pravinsdeode@vsnl.net](mailto:pravinsdeode@vsnl.net), [sapengineerspune@gmail.com](mailto:sapengineerspune@gmail.com)

Website : [www.sapengineers.com](http://www.sapengineers.com) / [www.sapengineers.co.in](http://www.sapengineers.co.in)

3/3\_2