



The Flow Control System Trainer is the system, which outlines the basics of Closed Loop Flow Control and various aspects related to it.

#### KEY WORDS:

- ❖ Feedback control.
- ❖ Feedback Flow 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 liter, Dimension: 1 ft (L) ×1ft (W) ×1 ft (H).
- ❖ Piping: - ½” GI, Class B, with ½” SS ball valves: 6 No.
- ❖ Centrifugal Pump: - ¼ H.P., 230 V AC supply, Surface mounting.
- ❖ Flowmeter: - ½”, Turbine type / WFM type DPT with orifice plate (Optional).  
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”
- ❖ Pneumatic control valve: - Size: ½”, Type: Two way Globe type (Air to Close)  
Cv: 5 US GPM, with diaphragm actuator, equal % characteristics  
Flange connection: PCD: 60 mm, ID: 16 mm, OD: 90 mm.
- ❖ Rotameter: - 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,  
Supply: 1.4 Kg/cm<sup>2</sup>
- ❖ Air Pressure Regulator: - 0-10 Kg/cm<sup>2</sup> with pressure gauge, Connection ¼” NPT / BSP.
- ❖ Power Supply: - 24 V DC, 1 A, Size: 48mm×126mm×68mm.
- ❖ Electronics PID Controller: - With Serial PC Interface (A ASCII Protocol) 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 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, Feruling & 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 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) included.
- ❖ Computer: - (OPTIONAL) PC with colour monitor: 15", PC Pentium Dual Core, with serial communication ports, 80 GB HDD, 512 MB RAM, Floppy Drive.
- ❖ 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>

**Features: -**

- ❖ Understand the concept of feedback FLOW control loop.
- ❖ User Friendly, Self Explanatory Systems.
- ❖ Leak proof Safety Measures, sturdy piping.
- ❖ Enhanced Electrical Safety Considerations.
- ❖ Training Manual & 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 (Optional), SCADA software connectivity for analysis of Flow Control System Trainer.

**Range of experiments:**

- ❖ Study of single loop Proportional (P), Integral (I) and Derivative control (D).
- ❖ Study of operation and calibration of transmitters, I/P converter and Control Valve.
- ❖ Study of programming and operation of PID controller.
- ❖ Study of stability of single loop Flow Control System.
- ❖ Configure microcontroller based controller to give manual output, changing controller modes (Manual/ Auto), Checking ON-OFF, Proportional, Integral, Derivative, PI and PID control actions, change local Set point, configure and run a set point ramp, configure measured values to either percentage or engineering units.
- ❖ Auxiliary experiments.
- ❖ Study of SCADA Application Software/ Computerized Control of Flow Control System.

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

**Services Required:**

- ❖ Water supply and drainage arrangement.
- ❖ Electric supply 230 V AC, 50 Hz.
- ❖ Clean, dry and dust free Compressed air supply 2.1 kg/cm<sup>2</sup>.

**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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