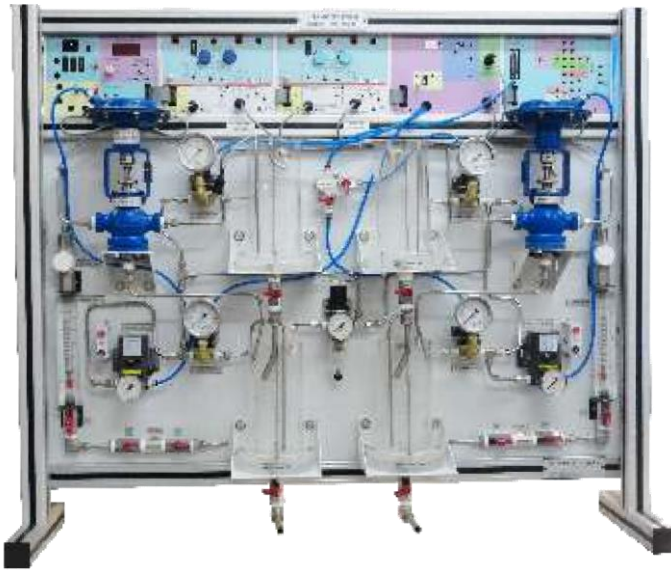


PROCESS CONTROL TRAINER 4 Tank System (Model: TMS-PCT/4T)



SALIENT FEATURES

- ◆ Lightweight, yet sturdy, tabletop, Aluminium profile flat panel setup, with SS (304/316) piping for and wide angle view of every component in process. No hidden parts.
- ◆ Individual control loops as well as Advance control schemes like SISO, MIMO, **coupled tank** made easy for student.
- ◆ Connection through polarized FRC connectors, sturdy 4mm Banana sockets & Patch cords enabling quick setting up of variety of process control experiments.
- ◆ P4/XP / win 7 window based PID controller (**DDC**) software package with P, PI & PID control, Ratio & cascade control, three operating modes, Online graph drawing & data acquisition modes (**SCADA**). PC not in scope of supply
- ◆ Option to implement MIMO strategy using MATLAB enabled interface, SDK for MATLAB.dll provided.
- ◆ Useful for Post Graduate projects and research purpose. Student Workbook and Instructors Guide supplied.

Technical Specifications (Controller Section)

◆ Computer Interface panel (CIPII)

- Connects to PC (WIN7/8/10) parallel port through 25 pin M to F cable / 1.5mtr.
- 8 ADC channels I/P: 0 to 2.5V FS with 1 no. input simulation pot. 2 DAC channel O/P 2.5V FS.
- V to I function block: I/P 0 to 2.5V & O/P 0-20 or 4-20mA (100 ohm load) switch settable.
- I to V function block: I/P 4 to 20mA & O/P 0 - 2.5V
- USB converter to interface 25 pin D connector on CIP panel to USB enclosed in 25 Pin D shell using Type A to mini B cable.

◆ Instrumentation Power supply cum Multichannel DPM panel (EMT 8)

- DC Multi Output power supply.
- Provides 1 Ph. AC supply through 3 MCB's, 4A each to power up other panels in the rack.
- Multi channel DPM for digital display of process parameters.
- 20 pin FRC power bus to supply power to neighboring panels.

◆ Thyristor Actuator cum signal conditioning panel (TAP) EMT-9/CE2 x 3 Nos.

- Thyristor bridge based 0-200V/3A using cosine firing circuit, I/P 0 to 2.5Vdc.
- Supports signal conditioning for level sensor with Instrumentation Amplifier & Flow Sensor (Water / Air) with F to V converter to generate 0-2.5Vdc (FS).

◆ PC (WIN7/8/10/FAT32) based multi PID controller Software (PC not in scope of supply but P4/XP/WIN7 with parallel /USB port needed)

• Online monitoring / Data acquisition / PID Software

- On Installable (CD) works under XP, WIN7/8/10. PC with parallel port / USB needed.

- Multiple PID Controllers limited only by Hardware Port availability.
- Channel/IO setting is multi inputs multi outputs [MIMO].
- RS485 [MODBUS] interface provided using USB to serial converter cable.

• Operating modes

a) Graph Plotting :

1] Process Monitoring Mode :

Draw graphs of time series, XY cartesian, Polar, burst mode provided with multiple channels including MODBUS & multiple graphs. Cursors for X & Y axis for measurement & online graphs saving for reproduction.

2] BOM Mode :

Draw graph of time series of single channel with 1KHz frequency rate.

b) PID controller Mode

- PID controller with parameter like Integral Time T_i (0.01-64000), Sampling Time T_s (0.1-99.9), Derivative Time T_d (0-99.9), Proportional Band P_b (1-999), Derivative Gain K_d (1-999), Set Value R_n (0-99.9), PID output Upper Limit U_h (0-99.9), PID output Lower Limit U_l (0-99.9).
- Facility to set units for output viz. (%) °C, RPM, V, mm, LPH, kg/cm², μ si/cm, Degree optionally experiments with advance process control scheme viz; Ratio, Cascade, feed forward with Aux PID, Ratio station & FF transfer function calculator, Alarm setting, ON/OFF control, square root extractor for Orifice.
- **Function Generator** : Sine / Triangular / Square wave generator with frequency 0.01 Hz to 1 Hz, Amplitude is 0 to 2.5 V i.e. 0 - 100%

Setup Specifications :

Parameters	Four Tank System (Model : TMS- PCT-4T)
Controlled Medium	Water
Sump/Storage tank capacity	1 No. 50 litre Plastic PVC
Process tank capacity/ material	4 nos. of cylindrical plexiglass material made process tank 1.5 liter each with one drain outlet and one Air bubbler inlet.
Electric sensor Type / output Range	4 nos. of Level WC Pressure Sensor 0 - 200mm, Level Measurement by Bubbler method, Signal conditioned Output 0 - 2.5V.
Control Elements	• 2 Nos. of variable speed motorized centrifugal pumps driven from EMT9 (2Nos.) Panel I/P 0 to 2.5V, O/P 0 to 195VDC, Pump Speed = 0 to 2800 RPM • 3 Port Control Valves : 2 Nos. of 3 way pneumatically operated CV's air to close/air to open, 2 nos. of output ports, linear type ½" size diaphragm operated CV=0.4 with I to P converter I/P 4 to 20mA O/P 3 to 15 Psi.
Rotameter	2 Nos., Acrylic body ½ inch size, 0 - 200 LPH.
Generaton & Distribution Pump	1 No. 0.62KW, 1/12 HP, 2800 RPM, ½" outlet, 500 LPH, Head 9 meters with brass impeller.
Bourden Gauges	0 - 600 mm Water Column x 4 Nos., Pressure gauges 0 - 2.5 kg / cm ² x 3 Nos.
Manual SS valves Piping Material/Size	½" Size 10 Nos., ¼" Size 2 Nos., Stainless steel, ½" for water, ¼" for air.
Air Filter & Regulators or Accessories	5 Nos., 0 - 10 bar Size ¼", Oil catcher (¼" Size Max. pressure 10 bar) - 1 No.
Air Compressor	0 - 7 bar, ½ HP, 230VAC supply (Optional)
Mech. Size/Weight	1165(L) X 300(W) X 990(H)mm / 38 kg.
List of Experiments	1) First order SISO, 2) MIMO Non interactive, 3) MIMO Interactive 4) Matlab based control.
Optional	PLC based controller can be provided needs to purchase TMS-PLC trainer separately.

**Air
Compressor
(10 Bar)**



**USB to
IO converter
cable**

