

SAP E&C HEAT EXCHANGER TEMPERATURE CONTROL MODULE (PCST-07)



The setup outlines the basic of Tube & Shell type Heat Exchanger & Feedback Temperature Control Loop.

Technical Specification: -

- ❖ Hot water Tank (HWT): - Material: polypropylene, rustproof, covered on the top.
Capacity: 80 liter.
Dimension: 18'' (L) ×12'' (W) ×20'' (H)
- ❖ Cold Water Tank (CWT): - Material: PVC Foam sheet, Capacity: 50 liter.
Dimension: 18'' (L) ×12'' (W) ×14'' (H)
- ❖ Piping: - ½'' GI, Class B, with ½'' SS ball valves: 20 nos.
- ❖ Pump For HWT: - Type: Centrifugal pump,
Capacity: ¼ HP, Supply: 230 V AC
Temperature: 100° C, Discharge: 1200 LPH,
Size: 19mm×19mm.
- ❖ Pump For CWT: Type: Centrifugal pump,
Capacity: ¼ HP, Supply: 230 V AC
Temperature: 100° C, Discharge: 1200 LPH,
Size: 19mm×19mm
- ❖ Heater coil: - Size: Circular in shape, 1'' diameter
Mounting: Side mounting on the tank.
Connection: 1 ½'', Power: 4000 Watts, 230 V AC.
- ❖ Pneumatic control valve: - Size: ½'', Characteristics: Linear
Type: Two ways Globe type (Air to Open)
Cv: 5 us GPM, with diaphragm actuator. Area 10 sq. inch.
Flange connection: PCD: 60 mm, ID: 16 mm, OD: 90 mm.
- ❖ Rotameter: - 2 Nos., Range: 100-1000 LPH, Glass Tube Type/ Acrylic body,
Connection: ½'', Bob material: SS 304
Mounting: Inlet Bottom Outlet Top.
Pressure: 3 Kg/cm², Temperature: 100° C
- ❖ Thermostat/ Temperature:- Type: Bi-metallic type, Length: 8'',
(Temperature controller) Mounting: Side mounting thermowell insertion
Type, Temperature Range: 0-150° C

- ❖ Four Point Temperature Indicator
/ Transmitter: - Input: RTD pt- 100 type,
Range: 0-200° C,
Display: 3 ½ digit LCD Display× 4 nos.
Size: 96mm×144mm×188 mm,
Mounting: Panel mounting,
Retransmission Output: 0-2 VDC×4 nos.
- ❖ Heat Exchanger: - Type: Tube & shell type,
Shell (Drum) Diameter: 12'', Shell (Drum) Length: 30'',
Shell (Drum) Wall thickness: 8 mm,
Tube material: copper, Tube Wall thickness: 1.5 mm.
Length of Cu tube for heat transfer: 31 ft
Temperature Range: 100° C, End Connection: ½'' BSP.
- ❖ Temperature Sensors: - 4 nos. Type: Pt-100 (RTD) type, Length: 2'',
Tube Diameter: 6 mm,
Connection: ½'' BSP threading SS socket welded.
- ❖ Skid / Frame: - Dimension: 70''×20''×48'',
Cube Size: 40×40×18 gauge,
MS painted frame mounted on castor wheels for
Smooth movable operation.
- ❖ E/P Converter: - Input: 4-20 mA, Output: 3-15 psi.
Connection: ¼'' NPT / BSP.
- ❖ Air Filter Regulator: - 0-10 Kg/cm² with pressure gauge, Connection: ¼'' NPT / BSP.
- ❖ Miniature Level Switch: - Mounting: Side mounting, NO/NC type selectable,
230 V AC operating.
- ❖ Electronic PID Controller: - PID controller is single loop PID
Serial PC Interface (ASCII Protocol) RS 232,
Cut Out Size: 92mm×92 mm×144mm,
Input: RTD, Output: 4-20 mA, Range: 0-400° C.
Display: Dual for PV & SP, Bar graph display for
Output & deviation, Hi-Low alarm annunciation.
- ❖ SCADA Application
Software: - SCADA S/W, experimentation, PID control setting
(Optional) (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 User Interface (GUI).
- ❖ Computer: - PC with colour monitor: 15'', PC Pentium Dual Core,
(Optional) 80 GB HDD, 512 MB RAM, Floppy Drive.
- ❖ 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 multistand 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).

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.
- ❖ Computer Interface (Optional).
- ❖ SCADA software connectivity for analysis of temperature control loop using Tube and Shell type heat exchanger. (Optional)

System Components:

- ❖ Tube & shell type heat exchanger.
- ❖ Water heating system.
- ❖ Hot & cold water storage tanks.
- ❖ Hot & cold-water circulation system.
- ❖ Flow monitoring on rotameter.
- ❖ RTD temperature sensors for inlet & outlet temperature of tubes & Shell. (4 Nos.)
- ❖ Temp. Transmitter with 4-20 mA o/p for both inlet & outlet/Temperature sensors compatible with four point temperature Indicator.
- ❖ Pump for HWT / CWT.
- ❖ Pneumatically operated control valve & electro pneumatic converter for regulation of hot water through shell for control of cold water outlet temperature
- ❖ PID controller with RS- 232 port connectivity.

Range Of Experiments:

- ❖ Study of Tube & Shell type Heat Exchanger.
- ❖ Feed Back Temperature Control Loop.
- ❖ Study of SCADA Application Software/ Computerized Control of Heat Exchanger Temperature Control System.

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

Services Required:

- ❖ Water Supply and Drainage Arrangement.
- ❖ Clean, compressed, dry air supply at 2.1 Kg/cm².
- ❖ Electric Supply 230 V AC 50 Hz.

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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