Pune Techtrol
Training Institute
(A div of Pune Techtrol Pvt Ltd)

Techtrol
Innovating Level Controls Since 1984

We Have Embarked on Providing Industrial Career-oriented Practical Training in Instrumentation & Control to Enhance Skills of Fresh/Employed Instrumentation Engineers & Technicians

In keeping with Prime Minister's drive for skilled India

- Conducted by qualified & experienced faculty headed by Mr. C N Shukla – B.E (Instrumentation and control) with more than 40 years experience in Thermal Power Stations, Gas Turbines, Pharmaceuticals and Biotechnology.
- Interactive training in the form of power point presentation with detailed explanation
- Introduction to theoretical aspects of measurement and control system with stress on practical aspects of industrial applications
- Hands-on practical sessions to help participants gain working confidence
- Basics of various industrial processes will be explained
- Introduction to Micro processor based programmable devices & Automation
- Certificate will be issued to all participants

Training Venue	Starting Date & Duration	Days (per week)	Time
Pune Techtrol Pvt Ltd J-52/7 MIDC, Bhosari, Pune - 411026	**15th Dec 2014** **Two Months**	**3 Days** (Monday, Tuesday & Wednesday	**4 pm to 6 pm** OR **5 pm to 7 pm** (To be decided in consultation with participants)

Course Fee : Rs 2,000/- each (Max. 30 participants per batch)

Contact :
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Practical experiments to be studied/carried out by the participants during the course in “Industrial Training”

1. Demonstration of Ohm's law, V = R X I. Arrangement to be done with parallel plates immersed in water. Plates shall be movable, vertically and horizontally.

2. Level control systems : The circuits shall be rigged up by the participants as per enclosed circuit diagram. The products manufactured by 'Pune Techtrol' shall be used for the purpose. Changes in the set-points / operating points shall be made as given in the description and the results shall be tabulated.

3. On / Off control. Digital temperature indicator with two adjustable set points. Intermediate relay / contactor for higher loads.

4. Building up ladder logic diagram and programming of 'Programmable Logic Controller' (PLC):-

   - Level control system : Ladder logic is to be created by referring to the process diagram and the operating conditions mentioned. The ladder logic shall be programmed into the PLC. The circuit shall be wired as per the wiring diagram. Various operating conditions shall be simulated using switches and results shall be verified & tabulated.

   - Control system for passenger lift : Ladder logic is to be created by referring to the process diagram and the operating conditions mentioned. The ladder logic shall be programmed into the PLC. The circuit shall be wired as per the wiring diagram. Various operating conditions shall be simulated using switches and results shall be verified & tabulated.

5. Programming of Variable Frequency Drive (VFD) :- Demonstration of speed control of a centrifugal pump. Verify relationships between speed, pump pressure, flow rate and power consumption.

6. Temperature control system :- Temperature control of water flowing out from the heat exchanger. The circuit is to be rigged up as per the diagram, using on / off controller and PID controller. Verify the effect on the performance of the control system by varying the P, I & D parameters.

7. Electrical systems :- HT and LT power distribution. Draw and rig-up the circuits for Direct On Line (DOL) starter and the Star – Delta starter. Verify the effect on starting currents of motor. Use VFD as starter for the motor.

8. Electrical actuators, solenoid valves (two way, three way & four way) solenoid pilot-operated on/off valves. Pneumatically operated valves, positioners.

Syllabus for the Training Course

A. INSTRUMENTATION AND CONTROL ENGINEERING

- Basics of Principals of Sensors and Transducers, Control System Components.
- Different types of instruments used for measurement of parameters such as level, temperature, pressure, flow, pH, conductivity, density, viscosity, speed, vibrations, relative humidity. Units of measurement of these parameters.
- Definition of measurement. Units of measurement of physical parameters. Accuracy, precision, resolution. Calibration, standards, traceability.
- Basic principles and elements of the feedback control system. Understanding PID Control system. Determining tuning Constants for good control performance. Practical Application of Feedback Control. Feedback Control Algorithm.
- Cascade control, Feed forward control, Ratio control, Selective Control , Split range control.
- Programmable Logic Controllers (PLCs) and Distributed Control Systems (DCS).
- Types of valves (butterfly, globe, ball, gate, solenoid). Flow characteristics of Globe type control valves. Valve positioners. On/off type valve actuators.
- Instrumentation cables:- Multi-core cables, shielded, twisted pair. Ethernet cables, fiber-optic cables, junction boxes. Instrumentation erection practices.

B. ELECTRICAL ENGINEERING

- Basic electrical engineering. Transformers, DOL and star-delta type motor starters.
- Working of squirrel cage induction motor which is the main work-horse of industry. (97 % of the electrical motors used as prime movers in industry, are induction motors.)
- Variable Frequency Drives (VFD) and Soft Starters.
- Receiving and distribution of electrical power.
- Electrical safety and safe working practices.
- Generation of Electricity
    - ✓ Thermal power generation by use of furnace oil, coal & briquettes. Fire tube & water tube boilers. Heat calculations.
    - ✓ Principle of operation & layout of Hydraulic power station and Atomic power plant.

Syllabus for the Training Course

C. MECHANICAL ENGINEERING-UTILITY PLANTS

(Water treatment, compressors, chillers, HVAC systems & boilers) and Biotech Processes

- Purification of water – Ultra Filtration – Reverse Osmosis – Water For Injection (WFI)
- Compressed air systems. Reciprocating, Centrifugal, Screw types of compressors.
- Refrigeration & air-conditioning systems (HVAC)
  - ✓ Chilling plants – Water and brine
  - ✓ Vapor absorption chillers
  - ✓ Ventilation, air conditioning & air filtration.
  - ✓ Building automation. Air Handling Units (AHU)
- Generation and distribution of steam required in processes
- Principles and working of Biotech processes used in manufacturing of pharmaceutical products.
- Conservation of energy:-
  - ✓ Importance of energy. Methods of conservation of energy used in different types of processes.
  - ✓ Principle of working of Variable Frequency Drives (VFD).
  - ✓ Use of VFDs for blowers and pumps. Pumps & pumping systems. Mechanical seals.
  - ✓ Efficient generation & utilization of steam. Steam pressure reducing valves. Steam traps.

Pune Techtrol Pvt Ltd

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