PS1000: ProSimlab Software

Process Control & Instrumentation Simulator:

The PS-1000: PROSIMLAB is a simulation software package to teach and experience the basic and advanced concepts of process control and instrumentation. Using PROSIMLAB, the trainee learns:

- Basic concepts of measurement and Instrumentation
- DCS operations
- Basic controls — Flow, pressure, level, temperature
- Advanced control — Split range, cascade, ratio, three-element boiler, feed forward / feedback controls.
- Tuning of P,I, D values
- Instrumentation troubleshooting

PS-1001: On-Off Level Control:

This module simulates an On-Off Controller used to control the liquid level in a drum. The trainee can operate the inlet and outlet valves to change the inlet / outlet flows, which will affect the level of the drum and can observe the On-off level control action. The trainee can also change the Hi-set and Low-set values of this On-off level controller.

PS-1002: On-Off Temperature Control:

This module simulates an On-Off Controller used to control the temperature of the liquid in a drum. Steam is used to heat up the liquid in the drum and trainee can operate the inlet / outlet valves to change the inlet / outlet flows of the drum. The inlet flow change will affect the temperature of the liquid in the drum and the on-off temperature controller regulates the steam flow in order to maintain the temperature.

PS-1003: P & PI Controller:

This module simulates a flow controller with Proportional term and a flow controller with Proportional and Integral terms. The trainee can study and compare the behavior of both the controllers for any external disturbances or set point changes. Trainee can also tune the P & I values to study the controller performance.

PS-1004: Pressure Controller:

This module simulates a vapor drum with a pressure controller. The first vapor inlet flow can be regulated by changing the globe valve position and the second vapor inlet flow is under open/close block valve operation. The trainee can change the two inlet vapor flows, tune P & I of the controller and study the process dynamics and controller performance.

PS-1005: Level Controller:

This module simulates a liquid drum with a level controller. The inlet liquid flow can be regulated by changing the globe valve position. The DP cell measures the pressure drop across the liquid height, SDBT, SLPC, I/P converter and final control valve are simulated. The trainee can understand these components of the level controller, tune P & I of the level controller and study the process dynamics and controller performance.

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PS-1006: Direct and cascade Control:

This module simulates two of identical liquid drums — one with direct level controller and the other with cascade level controllers. The trainee can change the inlet flow, storage tank pressure, etc. The trainee can learn the superiority of the cascade controller by giving an external disturbance to the process.

PS-1007: Split range pressure Control:

This module simulates a Split Range Pressure Controller which controls the pressure in the pressure vessel by controlling the two valves — the 1st Valve is on the process line and the 2nd valve is on the flare.

PS-1008: Ratio Control:

This module simulates a ratio control which controls flow of stream "A" in proportion to flow of stream "B". The trainee can set the desired ratio as the set point of the ratio controller and can understand the ratio control system.

PS-1009: Feedback and Feed forward Control:

This module simulates a feedback temperature controller of a furnace and a feed forward temperature controller of a furnace. The trainee can change feed flow and understand the performance and benefit of the feed forward controller.

PS-1010: Three element boiler Control:

This module simulates a boiler drum level controller that takes feed forward signal form the steam flow and sums it to the drum level to determine the set point to the feed water flow controller. The trainee can understand the benefit of 3-element controller especially during "Shrink and Swell" of the boiler drum.

PS-1011: Control valve characteristic:

This module is designed to study the characteristics of different control valves like Linear Control Valve, Equal Percentage Control Valve and Quick Opening Control Valve.

PS-1012: Characteristic coefficient of Control valve:

This module is to study the inherent characteristic co-efficient of control valves. For the same valve opening and DP, the trainee can alter the Specific Gravity of the fluid and observe the response.

PS-1013: Rangeability of Control valve:

In the simulated module, a Butterfly Valve and a Globe Valve are used for two Flow Controllers located in two identical lines having the same pressure drop. Trainee can compare the performances of these valves and find out which valve gives a better performance (stability in maintaining the flow) in wide range of operation.

PS-1014: Interacting and non-interacting Level systems:

This module simulates two interacting level tanks and two non-interacting level tanks. The trainee can study their behaviors and also learn the controller tuning in each case.

PS-1015: Basic Instrumentation troubleshooting:

This module simulates a typical overhead section of a separation unit which consists of overhead condenser, reflux drum, reflux flow, drum vapor flow and product flow. The system simulates condenser outlet temperature, drum pressure controller, reflux controller and drum level controller. All the elements like sensor, Input Barriers, S.T.E.D, SLPC, output Barriers, I/P converters, Instrument air regulator and final control element are included in the simulation. Troubleshooting and calibration of these elements can be learnt through this simulation module.