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Product Name :	**Product Code :**
Process Plant Trainer (Process Control Trainer)	NLAB-TECHNICALAB33004

Description :

Process Plant Trainer (Process Control Trainer)

Technical Specification :

A bench mounted process plant trainer with multiple streams both interacting and noninteracting.
The process plant incorporates a miniature three-stage plate heat exchanger heated from a hot water circulator, two independent feed tanks, a holding tube with product divert valve and two variable-speed peristaltic pumps
Temperature, level, flow and conductivity control loops can be implemented
Manual control, single feedback loops, through to sophisticated cascade loops and distributed supervisory control of the whole process by a remotely located computer can be demonstrated
The effect of â€˜dead timeâ€™ and heat recycle can be demonstrated
An electrical console provides measurement and control of the process plant and enables a variety of control techniques including manual operation, on/off control, control from an external signal and control from a PC or PLC
The equipment incorporates electrical fault simulation and control, data logging software, and a USB computer interface.
Features
Multiple inputs, multiple sensors, multiple control strategies - Manual control, single feedback loops, through to sophisticated cascade loops
Temperature, level, flow and conductivity control loops can be implemented
Effects of â€˜dead timeâ€™ > Operational sequencing, including startup and shutdown
Recycle implications on process control
On/off, proportioning, PID, PLC, SCADA
Fault simulation and diagnosis
Includes computer interface (USB) plus sophisticated based educational and data logging software. Description

The process is modelled on an industrial high temperature short time (HTST) pasteurisation process.
In this process the product stream has to be kept at a predetermined temperature for a minimum time, usually for bacteriological purposes.
This is effected by the use of a holding tube, which delays the product stream, thus posing particular process control problems and introducing the concept of â€˜dead timeâ€™.

Other reasons why the HTST process is a particularly suitable basis for teaching process control are the use of a three stage heat exchanger (recycle, heating and cooling) and the use of a divert valve to reject inadequately treated product. Again these important industrial principles pose real process control problems and help maintain the studentsâ€™ interest.

Further process control problems are illustrated by the use of two feed tanks, with different level sensor types.

Solenoid driven valves control the filling and emptying of these tanks. These enable different level control strategies to be developed and provide startup and shutdown operational sequencing capability.

The unit includes a wide range of instrumentation for temperature and flow measurement. It also includes a conductivity sensor, enabling simple process concentration experiments to be performed.

The unit comprises:
Feed system with peristaltic pump
Water heating unit with peristaltic pump
Water cooling system
Plate heat exchanger with holding tube
Flow sensor in feed line
Conductivity sensor
Four temperature sensors
Level sensor in product tank
High/low level switches in washing/reagent tank
2-way solenoid valves for filling feed tanks and cooling water to exchanger
3-way solenoid valves for selecting feed tank and diverting waste product
Connections to the electrical console.

Technical Specifications
Flow rate ranges: Value
product stream: 0-480ml/min: 0-480ml/min
washing reagent: 0-480ml/min
heating fluid: 0-600ml/min
Max temperature of heating fluid: 80Â°C
Heat exchanger: plate type
Feed and reagent vessel capacities: 5.7 litres (each)
Heating vessel capacity: 3.7 litres 1 off
Signal voltages: 0-5V
Level sensor range: 0-250mm
Flow sensor range: 0-500ml/min
Temperature sensor range: 0-100Â°C

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