

Nano Process Control Trainers

The JobMaster Nano Process Control Trainers are a series of four desktop units, designed to simulate the control and measurement of fluid and gas based processes. These systems are cost-effective, entry level classroom units, with industrial-grade components, focused on teaching the key parameters common to many industrial, scientific, and commercial process plants: liquid level, liquid flow, air temperature, and air pressure.

Each system features sensors and transmitters that collect and send real-time readings to a Programmable Logic Controller (PLC). The PLC comes with serial communication features, allowing all of the process variables, set points, and manipulated values to be accessed and monitored by the SCADA system via the HMI panel.

The **Nano Liquid Level Control Trainer** simulates the level control and measurement features of fluid-based processing in a closed loop system. It allows trainees to understand and address the impact of other process variables on liquid levels and experience the critical steps of configuration, calibration and commissioning of a process plant.

The **Nano Liquid Flow Control Trainer** is designed for studying the principles, processes, and theory of industrial-based liquid flow operations, simulating the liquid flow processes of a real world process plant. The system instructs students in the tasks and requirements related to calibrating, configuring, maintaining, and optimizing flow processes.

The **Nano Air Temperature Control Trainer** simulates real world gas-based processing where temperature is a critical element. By focusing primarily on air temperature, students learn to appreciate the significance of air temperature as it relates to process plant operations in a safe and controlled environment.

The **Nano Air Pressure Control Trainer** is designed for studying control and tuning of air pressure within industrial systems. This model features a central pressurized tank and a proportional control release valve which manages the release of air as it becomes pressurized inside the tank.



Standard Features

- Industrial Processes scaled down for training Labs
- Modular, easy to install and dismantle
- Ideal for cost effective, entry level study of Process Control technology
- Manual parameter input via PLC control system (HMI/SCADA)
- Uses safe and non-corrosive process medium (Water & Air)

Curriculum

Fundamental to Process Control

- Basics of Control Theory
- Process Control Terms
- Controller and Tuning
- Process Control Loop
- Process Specific Module

Instrumentation and Control Systems

- Process Flow Diagrams
- Piping & Instrument Diagrams
- Instruments' details

Plant Operation and Process Tuning

- Plant Optimization
- Characteristic of Proportional (P), Integral (I), and Derivative (D)
- PID Tuning using Various Methods
 - Ziegler-Nichols
 - Cohen Coon

System Includes:

- Nano Desktop Trainer
- Equipment Installation Manual
- Plant Operation Manual
- Instructor Training/Experiment Manual
- Student Experiment Manual

Skills to Prepare students for In-Demand Professions:

- Process Engineer & Operator
- Instrument Engineer & Technician
- Control System Engineer
- Agricultural Engineer
- Health, Safety and Environment Executive

JobMaster Nano Air Pressure Trainer



Specifications

Pressure Transmitter

- Output: 4 – 20 mA
- Measurement Range: 0 – 3 bar

Proportional Control Valve

- Input: 4 – 20 mA
- Control Output: 0 – 100%
- Power Supply: 24 VDC
- Connection Type: Threaded

Pressure Tank

- Capacity: 3.7 Liters
- Dimensions: 100 x 400 mm
- Material: Stainless Steel
- Operating Pressure: 0 – 1.5 bar
- Max Pressure: 2 bar

Pressure Gauge

- Measurement Range: 0 – 5 bar

JobMaster Nano Liquid Flow Trainer



Specifications

Flow Transmitter

- Output: 4 – 20 mA
- Measurement Range: 5 – 20 Liters/min

Proportional Control Valve

- Input: 4 – 20 mA
- Control Output: 0 – 100%
- Power Supply: 24 VDC
- Connection Type: Threaded

Feedwater Tank

- Capacity: 7 Liters
- Material: Stainless Steel

Feedwater Pump

- Type: Centrifugal
- Power Supply: 24 DC
- Flow Rate: 2 – 5 m³/hr.

JobMaster Nano Liquid Level Trainer



Specifications

Level Transmitter

- Output: 4 – 20 mA
- Measurement Range: 0 – 300 mm H2O

Proportional Control Valve

- Input: 4 – 20 mA
- Control Output: 0 – 100%
- Power Supply: 24 VDC
- Connection Type: Threaded

Level Tank

- Capacity: 5 Liters
- Measurement Range: 0 – 300 mm H2O
- Material: Acrylic

Feedwater Tank

- Capacity: 9 Liters
- Material: Stainless Steel

Feedwater Pump

- Type: Centrifugal
- Power Supply: 24 DC
- Flow Rate: 2 – 5 m³/hr

JobMaster Nano Air Temperature Trainer



Specifications

Temperature Transmitter

- Type: RTD, PT100
- Output: 4 – 20 mA
- Measurement Range: 0 – 100° C

Electrical Heater

- Power Supply: 24 VDC

Air Buffer Vessel

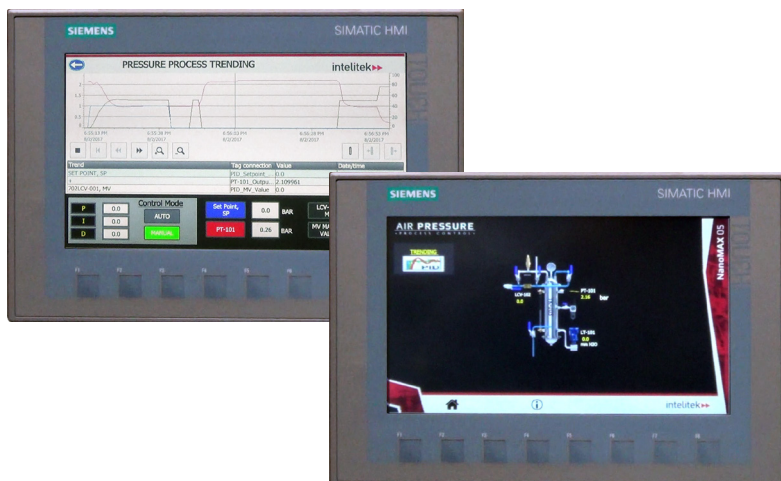
- Capacity: 3.7 Liters
- Dimensions: 100 x 400 mm
- Material: Stainless Steel

Air Regulator

- Capacity: 0 – 8 bar

Trainer Specifications

- Dimensions: 31.5 L x 19.7 W x 25.6 H (in) / 800 L x 500 W x 650 H (mm)
- Weight: 110 ~ 155 lb. / 50 ~ 70 kg
- Process Pipeline: 1/4", Stainless Steel
- Power: 120/240 VAC 50Hz/60Hz
- Air Supply: 50 psig/10 sfc



Ordering Information

Hardware

Nano Air Temperature Trainer, 110V	00-0309-0110
Nano Air Temperature Trainer, 220V	00-0309-0220
Nano Air Pressure Trainer, 110V	00-0304-0110
Nano Air Pressure Trainer, 220V	00-0304-0220
Nano Liquid Level Trainer, 110V	00-0303-0110
Nano Liquid Level Trainer, 220V	00-0303-0220
Nano Liquid Flow Trainer, 110V	00-0310-0110
Nano Liquid Flow Trainer, 220V	00-0310-0220

Curriculum

Temperature Process Control Curriculum for Nano	77-3041-0002
Pressure Process Control Curriculum for Nano	77-3044-0002
Level Process Control Curriculum for Nano	77-3045-0002
Flow Process Control Curriculum for Nano	77-3043-0002

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