PROCESS CONTROL

Qualified Process Control engineers, operators, and technicians are a key part of productive plants in both conventional and emerging technologies in many industrial fields like Oil & Gas, Chemical, Food & Beverage, Power & Water, Pharmaceuticals, Bio-Medical, Materials, and Environmental. These are all growing arenas in the job-market worldwide.

As the demand for Process Control technicians, operators, and engineers continues to grow, Intelitek's training systems help to prepare students to design, construct, and maintain effective plants in several industrial areas.

With the Nano Concept Learning Systems, Intelitek has developed a training system to bring real, industrial plant experience into the classroom making the learning hands-on, practical, and more effective, without risk to trainees and the plant.

The custom designed, practical learning exercises follow industrial engineering practices. Trainees develop a passion for engineering via project-based learning, as well as exposure to real-world environments.

NANOMAX MULTIVARIABLE PROCESS CONTROL TRAINER	CTA 3
NANO LIQUID LEVEL PROCESS CONTROL TRAINER	CTA 4
NANO LIQUID FLOW PROCESS CONTROL TRAINER	CTA 5
NANO AIR PRESSURE PROCESS CONTROL TRAINER	CTA 5
NANO AIR TEMPERATURE PROCESS CONTROL TRAINER	CTA 5
FUNDAMENTALS OF PROCESS CONTROL AND INSTRUMENTATION	CTA 6
PROCESSMOTION VIRTUAL PROCESS CONTROL TRAINER	CTA 7

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Nano Process Control Training Systems

At Intelitek we believe that for skills training to be effective, hands-on operational experience is critical. In particular, trainees can learn more if exposed to a real industry environment, rather than in hours of theory training in a classroom.

With the Nano Process Control Training System, we have developed a system to bring real-industrial plant experience into the classroom, making the learning more alive, more realistic, more interesting, more hands-on and more effective. The custom designed equipment, curriculum and exercises follow the industrial engineering practice and provide trainees exposure to an industrial environment.

MAIN FEATURES:

- Modular structure, easy to setup and operate.
- Low cost, entry-level study of Process Control technology.
- Designed for practical hands-on training on process control.
- Extensive range of Process Control experiments.
- Safe process medium (Water and Air) and low voltage power supply.
- Compact with industrially relevant processes, components and instrumentation.
- Integrated with State-of-the-Art process control training software.

BENEFITS OF JOBMASTER PROCESS CONTROL:

- Workforce-ready graduates - Experienced with multiple facets of process control and troubleshooting, graduates enter the workforce ready to contribute.
- Industry Skills Development. - Industry-standard hardware prepares students for real-world jobs.
- Self-directed Engaged Students. - Flexible and innovative JobMaster training develops a personalized learning process beyond just theory.
- Cost-effective Hardware. - Self-maintained industrial hardware can be used flexibly on a variety of configurations and skill lessons.

TARGET CAREER PATHS IN INDUSTRY:

- Oil and Gas.
- Food and Beverage.
- Paints and Coatings.
- Chemical Plants.
- Pharmaceuticals and Bio-medical.
- Nutraceuticals.
- Cosmeceuticals.
- Chemical, Tire, and Process Industries (CTP).
- Textiles.
- Steel and Aluminum Processing.
- Power and Water Plants.
- Environmental Processing.

NanoMAX Multivariable Process Control Training System for Level, Flow, Temperature, Pressure

The NanoMAX Multivariable Level, Flow, Temperature, Pressure Process Control Compact Training System focuses learning on the key parameters common to many industrial, scientific, and commercial process plants: liquid level, liquid flow, liquid temperature and air pressure. It simulates industrial plant systems found in Oil and Gas, Chemical, and Food Production plants around the world. Trainees are exposed to the relationship between the three liquid variables to better calculate process specifications and troubleshoot potential problems.

The trainer is delivered with a training program to enable educators to teach the theory and operation of process control and process instrumentation.

Industrial Processes scaled down for training labs

Designed for measuring multi variable parameters for study of **Level, Flow, Temperature and Pressure**

Manual parameter input via **control system (HMI/SCADA)**

Flexible programmability via standard **PLC control**

Uses **safe and non-corrosive process medium** (water & air)

Nano Desktop Trainers

Nano Desktop Process Control Trainers are teaching solutions designed to simulate the control and measurement of fluid and gas based processing. These trainers can be used as standalone units to understand a specific process or in groups for multi process training. The Nano trainers include hardware, software, and curriculum fully integrated to teach trainees to understand and address the impact of process variables and experience critical steps of installation, configuration, calibration and commissioning of a process plant.

NANO TRAINERS AVAILABLE:

- Liquid Level
- Liquid Flow
- Air Pressure
- Air Temperature

Nano Liquid Level Process Control Trainer

The Nano Liquid Level Control Trainer is a standalone training system designed to simulate the level control and measurement features of fluid-based processing in a closed loop system. This system allows trainees to understand and address the impact of other process variables on liquid Levels and experience critical steps of installation, configuration, calibration, and commissioning of a process plant.

CATALOG #:

00-0303-0110	NANO LIQUID LEVEL TRAINING SYSTEM, 110V
00-0303-0220	NANO LIQUID LEVEL TRAINING SYSTEM, 220V

Nano Liquid Flow Process Control Trainer

The Nano Liquid Flow Control Trainer is a standalone training system 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 self-assembly design actively instructs the tasks and requirements related to installing, calibrating configuring, maintaining, and optimizing flow processes.

CATALOG #:	
00-0310-0110	NANO LIQUID FLOW TRAINING SYSTEM; 110V
00-0310-0220	NANO LIQUID FLOW TRAINING SYSTEM; 220V

Nano Air Pressure Process Control Trainer

The Nano Air Pressure Control Trainer is designed for trainees to understand the control and tuning of air pressure within industrial systems. This model features a central pressurized tank and a proportional control release valve which releases air as it becomes pressurized inside the tank. Air pressure is measured by a pressure sensor installed at the base of the pressure tank. The pressure sensor transmits an electrical signal to the process variable (i.e. air pressure), which is detected by the Programmable Logic Controller (PLC) for closed loop feedback control.

CATALOG #:	
00-0304-0110	NANO AIR PRESSURE TRAINING SYSTEM; 110V
00-0304-0220	NANO AIR PRESSURE TRAINING SYSTEM; 220V

Nano Air Temperature Process Control Trainer

The Nano Air Temperature Control Trainer is a standalone product used to simulate real world gas-based processing where temperature is critical. Stainless steel tubing and stainless steel tanks are used to simulate a variety of conditions relevant to temperature sensitive operations. Temperature sensors and transmitters collect and send real-time temperature readings to a Programmable Logic Controller (PLC). By focusing primarily on air temperature, trainees learn to appreciate the basics of air temperature as it relates to process plant operations in a safe and controlled environment.

CATALOG #:	
00-0309-0110	NANO AIR TEMPERATURE TRAINING SYSTEM; 110V
00-0309-0220	NANO AIR TEMPERATURE TRAINING SYSTEM; 220V

Fundamentals of Process Control and Instrumentation

COURSE OUTLINE

Section #1: Fundamental to Process Control

- Basics of Control Theory
- Process Control Terms
- Controller and Tuning
- Process Control Loop
- Introduction to measurement
  - Level
  - Flow
  - Temperature
  - Pressure

Section #2: Process Measurement

- Properties of Matter
  - Liquid
  - Air
- Principle of Instrumentation
  - Level Measurement
    - ◊ Differential Pressure Transmitter
    - ◊ Level Gauge
  - Flow Measurement
    - ◊ Vortex Flowmeter
  - Temperature Measurement
    - ◊ Resistance Temperature Detector (RTD)
  - Pressure Measurement Study
    - ◊ Pressure Transmitter / Transducer
    - ◊ Pressure Gauge
- Final Control Elements

Section #3: Plant Commissioning and Optimization

- Plant Optimization
  - Process Control Loop
  - Process Behavior
  - Effect of disturbance in process
- Characteristic of Proportional (P), Integral (I), and Derivative (D)
- PID tuning using different methods
  - Ziegler-Nichols
  - Cohen Coon
- Activity
  - Plant start up and commissioning
  - Process Control Loop
  - Understand the process behavior
  - Proportional, Integral & Derivative
  - Control Loop tuning - Ziegler-Nichols and Cohen Coon

MATERIALS INCLUDED:

- Plant Operation Manual
- Process Plant Drawings
  - Plant Drawing
  - Piping and Instrumentation Drawing
  - General Arrangement Drawing
  - Full Assembly Drawing
  - 3D View Drawing
  - Electrical Drawing
- Instrument Datasheets

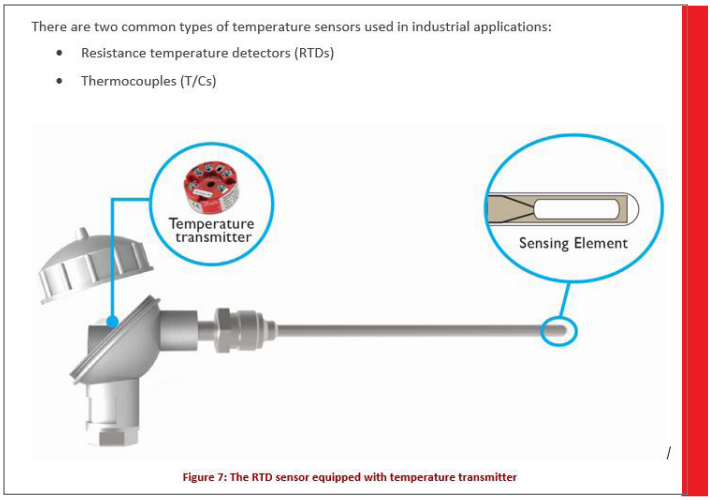
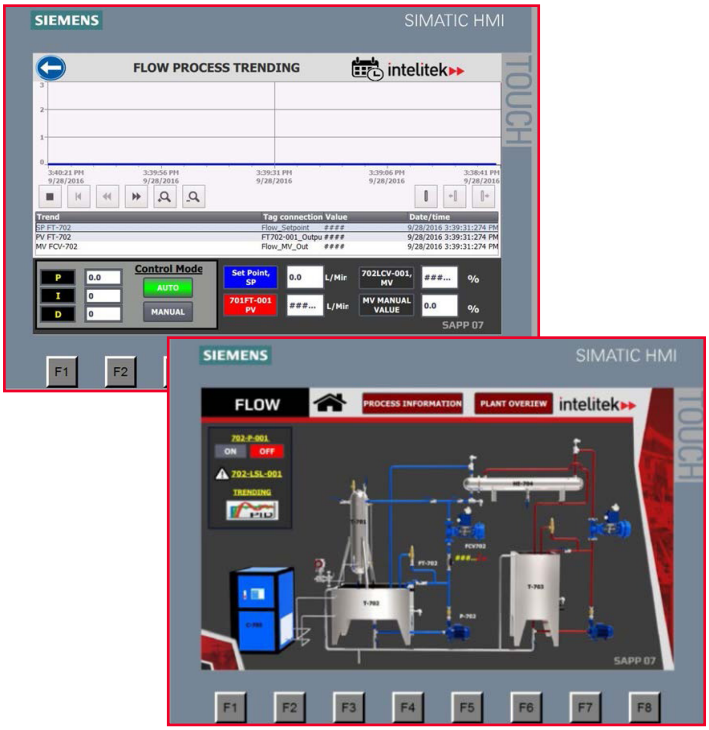


Figure 7: The RTD sensor equipped with temperature transmitter

CONTROL SYSTEMS

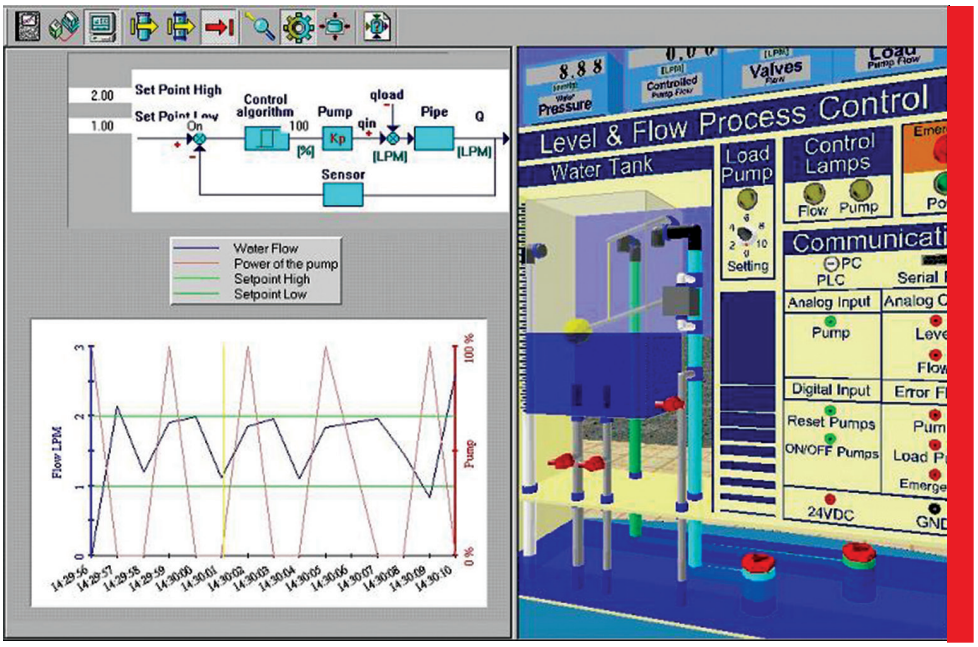
The NanoMAX' features multiple standard control systems including panel mounted HMI, SCADA & Programmable Logic Controller (PLC). The unit also features HART industry standard communication and automation protocol.



ProcessMotion

ProcessMotion simulation software is an effective virtual tool for demonstrating and understanding level, flow and temperature process control, with an emphasis on the process itself

Students learn how water can be heated or cooled and raised or lowered to a preset level through manual and automatic control. Students also learn how flow rate affects water level and temperature. Students can create variable demand and supply disturbances by manipulating the virtual panel's loading pump, and perform and verify controller tuning

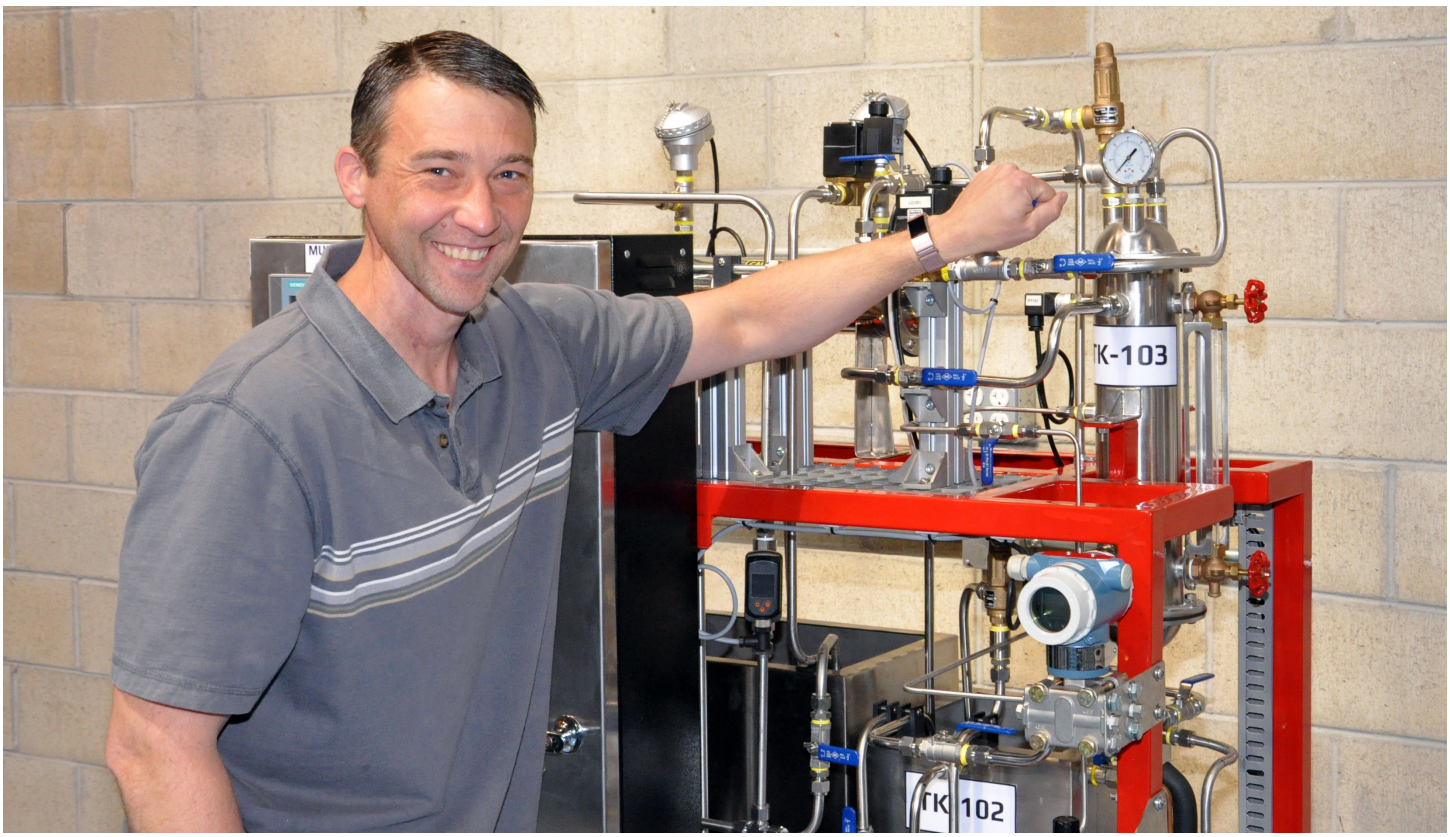


STANDARD FEATURES

LEVEL AND FLOW, TEMPERATURE & PRESSURE

- Define control variables: set-point, high and low limits, Kp, Ki, Kd
- Define control type: open loop, closed loop, P, PI or PID
- Define process variables: number of open valves, tank volume
- Provides real-time, dynamic simulation and measurement charting: Dynamic 3D solid model of the virtual Level and Flow panel
- Allows graphs and process data to be recorded, saved to file, replayed and exported to spreadsheet software for analysis
- Provides fully functional offline simulation of control processes
- Users can create their own process control applications in any standard programming language

CATALOG #: 63-9238-0000



Intelitek Learning Solutions

Intelitek transforms education across the globe with comprehensive technology learning solutions. Our innovative tools and technologies empower instructors and inspire students to improve the world around them. We understand the changing needs of your career and technology classrooms and design flexible solutions that meet those needs.

With sustainable support and professional development to ensure the continued success of your programs, Intelitek programs deliver the competencies needed for in-demand careers.

At Intelitek we are producing results for students, teachers, nations and economies.

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