4-Variable Advanced Process Control Training System Plus



Model: 603-PACEH

Process control systems maintain precise control of liquid and gas variables, such as liquid level, flow rate, pressure, temperature, and pH level. These multifaceted systems are a critical part of major industries like power generation, refineries, petrochemicals, chemical manufacturing, pharmaceuticals, biotechnology, and food processing and bottling.

DAC Worldwide's 4-Variable Advanced Process Control Training System Plus (603-PACEH) is a fully-functional, industrial-quality fluid process system that provides hands-on training in the measurement and control of four of the most common process variables: level, pressure, temperature, and flow. Learners using the trainer can create simple to advanced process loops using industrial-grade components and instruments they'll find in the workplace.

The 603-PACEH includes the following:

- #603 Advanced Process Control Training System
- #603-001EH Standard Instrument & Control Package
- #600-006A Standard Test and Calibration Equipment Package
- #600-007 PLC Control Interface Panel
- #600-010 AC Variable Speed Drive Upgrade

- #600-022 Economy Ultrasonic Level Detector
- #600-027A Level Switch Assembly, Economy
- #600-132 Gauge and Meter Panel

The 4-Variable Advanced Process Control Training System Plus can be used to establish realistic and dynamic feed-forward, feedback, split range, and ratio control loops. With an optional dual-loop PID, learners can also practice cascade and three-element control loops. Compatible with a wide range of instruments and controls, the trainer also allows for convenient controller tuning and transmitter calibration.

Clear PVC piping allows learners to visually monitor process changes based on control parameters or intentional disturbances inserted using solenoid valves in combination with metered ball valves. The temperature measurement and control variable uses a dynamic shell and tube heat exchanger process.

Up to six learners can use the trainer, which can be configured to create one complex process loop or — with an optional dual-loop PID — two independent process systems. The trainer's "open architecture" design also allows for integration of alternate instrumentation, as needed, to meet local training needs or incorporate new technologies.

Industry-Standard Components Provide Realistic, Hands-On Training

Technical training is most effective when learners can gain hands-on practice with industry-standard components they'll encounter on the job. The 4-Variable Advanced Process Control Training System Plus features a wide variety of common, industrial-quality components and instruments to provide learners with a realistic training experience that will build skills that translate easily to the workplace.

The 4-Variable Advanced Process Control Training System Plus is a sturdy unit with a tubular steel frame and instrument mounting racks with modular instrument and controller panels. Some of the industrial-quality components learners will find on the trainer include: centrifugal pumps; solenoid valves; air supplies with gauges and connectors; heat exchanger; water heater; thermowells; thermometers; thermocouples; RTDs; rotameters; control valves; flow meters; clear acrylic tanks; and transparent PVC piping.

Courseware & Hands-On Exercises

The 4-Variable Advanced Process Control Training System Plus's courseware consists of one of several optional textbooks, a course guide, and hands-on exercises. These can be used as part of either an instructor-led course or self-directed study.

Learners will explore a wide variety of fundamental process control topics, including: process instrumentation terms; process control theory; thermocouple and RTD operating characteristics; pressure gauge and transmitter calibration; installation and calibration of a level measurement channel; flow transmitter calibration; closed loop integral and proportional control in temperature, pressure, level, and flow processes; and notch, ultimate, and open loop tuning of temperature, pressure, level, and flow processes.

Hands-on exercises include industry-relevant process control skills, such as: setting and adjusting pressure switches; installation and calibration of an electronic flow measurement channel; and determining a temperature, pressure, level, and flow process' operation characteristics.

Expand Training Capabilities with Custom Options

The 4-Variable Advanced Process Control Training System Plus can be customized with a wide array of options to create a training system that matches a particular industry's or user's specific needs. In industry, one size rarely fits all and this trainer can be tailor-made to your exact needs.

For example, the trainer can be expanded with more than 90 different options. Some of the available options include: choice of programmable logic controllers (PLCs); programming software; touchscreen HMI panels; data acquisition interface panels; industrial PID controllers; SCADA distributed control and supervisory systems; AC variable speed drives; chiller systems; different types of calibrators, detectors, and transmitters; vortex-type and Coriolis Effect flow meters; paddle-type, turbine-type, and magnetic flow measurement assemblies; and a variety of textbooks and instructional videos.

FEATURES & SPECIFICATIONS

- Service requirements: 208-230 VAC, 3-phase, 5-wire, 50/60 Hz electric; water source; instrument air source; (other voltages available, contact factory)
- Two-piece, welded, 1/8" wall, tubular steel frame (allows for disassembly into two sections).
- Four 4" diameter casters (two with locks) provided on each section.
- Two integral 19" x 70" high instrument mounting racks with silk-screened modular instrument and controller panels.
- Rack-mounted, locking storage box for accessories.
- Front panel faces with high-durability laminate.
- Clear 3/4" diameter PVC piping components throughout (high-temperature piping in area of heat exchanger, opaque).
- Two clear acrylic tanks (9 gallon and 14 gallon capacities).
- Primary reservoir, polyethylene, 44 gallons.
- Two 1/2 HP centrifugal pumps.
- 24 VDC Power supply.
- GFI circuit protection.
- Four solenoid valves allowing for the creation of manual or externally-controlled flow supply and demand disturbances at the tank discharges and in bypasses surrounding control valves.
- Power distribution panel mounted in instrument rack, including: power switch; GFI devices; and fuses for pumps, solenoid valves, and heater.

- Utility distribution panel mounted in instrument rack, including: a regulated 0 to 30 psi air supply with gauge and connectors; a regulated 0-60 psi air supply with gauge and connectors; a 0-30 psi instrument air supply with gauge; 25 electric and 9 pneumatic “free line” connections allowing connection to the front panel face and second rack; and 24 VDC power connections.
- Additional instrument air supply regulator.
- Front panel-mounted operator control panel, including: switches and pilot lights for two pumps; four solenoid valves; system heater; control relay connections for all equipment; 24 VDC power supply terminals; and electric and pneumatic free line connections.
- Industrial-quality, multi-pass, shell and tube heat exchanger.
- One 5.5 KW in-line water heater.
- Six brass thermowells accommodating thermometers, thermocouples, and RTDs.
- Four bi-metal thermometers.
- Quick-disconnect fittings located throughout, allowing for attachment of instruments.
- Two rotameters.
- Two orifice assemblies.
- One pitot tube assembly.
- Three industrial-quality Fisher pneumatically-operated control valves (two supplied normally closed and one supplied normally open).
- Two pipe stanchions, allowing for attachment of differential pressure transmitters, pressure transmitters, and pressure switches at varying heights.
- Multi-loop piping system allowing loops to be used independently or in combination (accommodates two work groups) with additional optional dual-loop PID.
- Provision for attachment to a calibration bench or workstation via electrical and pneumatic tether.
- Twenty-one 24in. test leads (10 red, 10 black, 1 green).
- Twenty-two 60in. test leads (10 red, 10 black, 2 green).
- 1/4in. Diameter instrument connection tubing, of two colors (200').
- Fifteen quick-disconnect nipples.
- Ten tubing tees.
- Ten tubing couplers.
- Test Lead Holder (14-slot).

- Use/Exercise Guide.
- Packaging for shipment via motor freight.

PRODUCT DIMENSIONS

DISCLAIMER: Product Dimensions are approximate. Shipping Dimensions and Weights are for directional use only and may change based on manufacturer variables. For the most accurate Shipping Dimensions and Weights, please contact the manufacturer.

- Product Dimensions

  (L x W x H)

  33 1/2" x 98" x 78 7/8" (860 x 2480 x 1982 mm)

  750 lbs (340 kg)
- Shipping Dimensions

  (L x W x H)

  (2) - 58" x 42.5" x 88" (147 x 108 x 223 mm)

  1500 lbs (680kg)

OPTIONS

- #464-037 - PLC Package, AB Micro850
- #581-007 - Instrumentation, 5th Ed.
- #600-011A - Economy Chiller System
- #600-105 Differential Pressure Gauge, 0-400” H2O (Required)
- #600-110 - Resistance Decade Box w/Leads
- #600-111 - Dry Well Temperature Calibrator
- #460-115 - Supplemental Touchscreen HMI Panel, 15" (A-B, PanelView)
- #460-1151 - Articulated Support Arm, Chassis-Mount, 15"
- #600-032 - Venturi tube flow assembly.
- #600-036EH - Magnetic Flow Meter Assembly, Endress & Hauser Preference
- #600-036R - Magnetic Flow Meter Assembly, Rosemount Preference
- #600-040 - Valve Positioner, Pneumatic
- #600-041 - Control valve positioner, electro-pneumatic
- #600-041F - Valve Positioner, Digital, FIELDVIEW
- #600-051 - Strip chart recorder, 2-pen (Yokogawa, SR 1000) (additional)
- #600-056 - Differential pressure transmitter, supplemental

- **#600-059 - 3-Valve manifold (supplemental)**
- **#600-060 - Industrial PID controller w/panel (Honeywell, 1/4 DIN)**
- **#600-102 - Function generator, (optional test instrument)**
- **#600-205 - Digital multimeter/process calibrator (alternate calibration instrument)**
- **#603-500 - Use/Exercise Guide, two-part (additional)**
- **#7901-1110 - Dual-Loop PID Controller**

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