



**2024**  
**CATALOG**

**Engineering Solutions  
for Universities**



## Who is Amatrol?

Amatrol is the world leader in technical training education. Based in Jeffersonville, Indiana, our mission is to transform the global workforce one life at a time. We accomplish this by providing clients with the technical education solutions they need to prepare the next generation for successful careers in a variety of industries.

Our simulators offer a hands-on approach to learning through numerous experiments and cover a broad spectrum of topics. Students can learn topics from industrial maintenance to more advanced areas like process instrumentation, mechatronics, and Industry 4.0 applications.



## History

Amatrol has a rich history beginning in 1964, when Don and Roberta Perkins founded its original parent company, Dynafluid, Inc. Dynafluid was an industrial automation systems manufacturer that designed systems for many Fortune 500 companies including Coca-Cola, General Electric, Alcoa, Ford, Chrysler, and others.



Amatrol was created as the educational division of Dynafluid to provide training to industrial clients for new technologies like those being implemented in Dynafluid's systems. Amatrol, short for Automated Machine Controls, was formally incorporated as a separate company in 1981.

Since that time, Amatrol has grown significantly. We have expanded our workforce and premises, acquired and collaborated with multiple other industry leading companies, developed the first computer-based fault insertion system, introduced computer-based instruction and virtual simulators to our product line, and much more.



### Table of Contents

Introduction	2
Electrical-Electronics	6
Fluid Power	12
Thermal	16
Instrumentation and Process Control	20
Manufacturing Materials and Processes	29
Mechanical	30
Smart Automation and Robotics	32
Solar and Wind Energy	42

## The Amatrol Difference

### Reliable

Amatrol has been making technical education simulators since 1981. We've spent decades growing alongside technological advancements, honing our expertise, and pioneering many Industry 4.0 educational endeavors.

### Locally Manufactured & Supported

Not only are all our products manufactured in the USA, but we also offer unparalleled client service straight out of our headquarters in Jeffersonville, Indiana.

### Engineering-Focused

We have an amazing team of engineering talent that strives to design and develop the best educational simulators available. They ensure our products meet society's increasing technological needs.

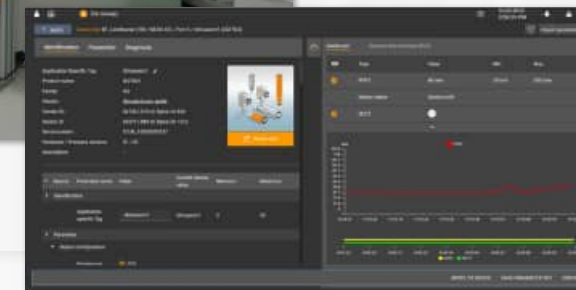


## Amatrol is the U.S. leader in Industry 4.0 learning!



### Using our various high-tech simulators, students can study:

- Cloud-based **data acquisition** by utilizing iGear Squeaks software to retrieve and assess data from sensors.
- The fundamentals of **cybersecurity**, including basic operation of a virtual LAN, configuration of the port security of a managed Ethernet switch, and the function of industrial network security.
- How to use both wired and wireless sensors, edge gateways, and a variety of on-premise and cloud-based infrastructure for **energy usage monitoring** for energy optimization.
- The basics of **wireless communication** by using a radio, a PLC, integrated switches, and various antenna types to build and test their own wireless communication system.
- How to program **mobile robots** and track their performance in sorting packages via a barcode reader and configuring the robot's vision settings.
- How **system integration** works by using a multi-station automated manufacturing system that integrates mechatronics, robotics, conveyors, autonomous robots, and a variety of other Smart Factory technologies.





## Notable Awards & Acquisitions

- 2014 - Amatrol selected for President's "E" Award for Export Excellence – U.S. Dept. of Commerce
- 2019 - Amatrol becomes an Educational Partner of the Smart Automation Certification Alliance (SACA) for the development of Industry 4.0 Certification framework
- 2019 - Amatrol becomes a Level 3 – Systems Integrator with FANUC Robotics
- 2019 - Amatrol acquires DAC Worldwide (Swedesboro, NJ)
- 2020 - Amatrol becomes a Gold OEM Partner of Rockwell Automation
- 2021 - Amatrol acquires Bayport Technical (Bayport, Texas)



## Amatrol Sister Companies



DAC Worldwide creates realistic, industrial-grade educational simulators, cutaways, dissectibles, and scale models that address a broad range of both fundamental and comprehensive industry topics.



Bayport Technical specializes in building working industrial demonstrators, glass and acrylic training models, and customized educational equipment primarily in the areas of instrumentation and process control.

## Amatrol Simulators

### High-Tech & Durable

Amatrol's educational simulators have been designed in partnership with major companies to ensure that all technology is cutting edge and relevant to learners. Every simulator is heavy duty and built to last, using real industry components.



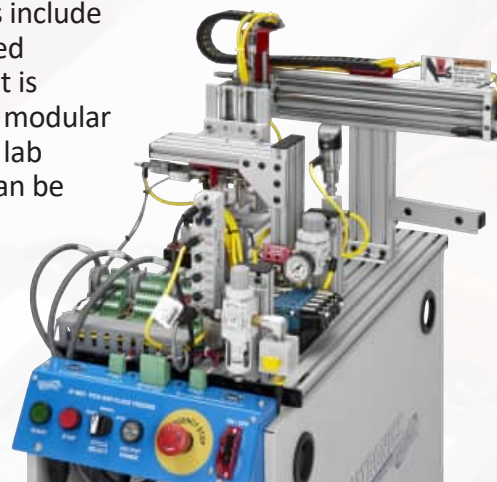
### Comprehensive Lab Activities

Every simulator features multiple comprehensive lab activities designed to encourage learning and retention through hands-on experiments.



### Flexible

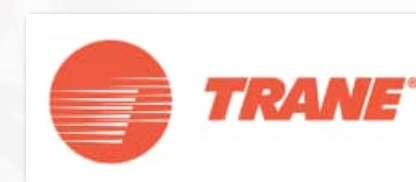
Our simulators include computer-based instruction that is presented in a modular format so that lab experiments can be modified or augmented for ease of classroom use.



## Our Partners



Amatrol has a long history of collaboration with industry and government partners to aid our mission of "changing the global workforce one life at a time." We are a Gold OEM Partner with Rockwell Automation and a Level 3 Integrator for FANUC and integrate their products into a wide variety of our systems. We also work with partners like MSSC to develop simulators for specific industry partners and LIFT to create programs like IGNITE to develop the next generation of the manufacturing workforce.





## ELECTRONIC DRIVES

### AC Electronic Drives ▶ 970-DRV1F

- Inverter-Rated and Servo AC Motors
- Inverter and Vector (Spindle) Drives
- Servo Axis Drives
- Resolvers and Encoders
- Velocity and Position Servo Control
- Torque Control
- Parameters and Configuration
- Drive Troubleshooting



970-DRV1F



990-DRV1F

### Portable Variable Frequency AC Drives Diagnostics ▶ 990-DRV1F

- AC Variable Frequency Drive Operation
- 2 & 3 Wire Motor Control
- Jogging Control
- Motor Ramping
- Drive Input Troubleshooting
- Motor Input Troubleshooting
- Drive Relay Troubleshooting
- Parameters and Configuration

## INDUSTRIAL ELECTRONICS

### Portable Power & Control Electronics ▶ 990-ELE1

- Oscilloscopes
- Power Supply Filtration & Regulation
- Discrete Sensing Devices
- Thermal Sensing Devices
- Analog Sensing
- Amplifiers and Op Amps



990-ELE1

## ELECTRONIC SENSORS

990-SN1



### Electronic Sensors

- ▶ 990-SN1 Portable
  - ▶ 85-SN1
- (85-SN1 may be used with 850-P1 and 850-H1)

- Sensor Applications
- Inductive and Capacitive Sensors
- Magnetic Reed and Hall Effect Sensors
- Photoelectric Sensors

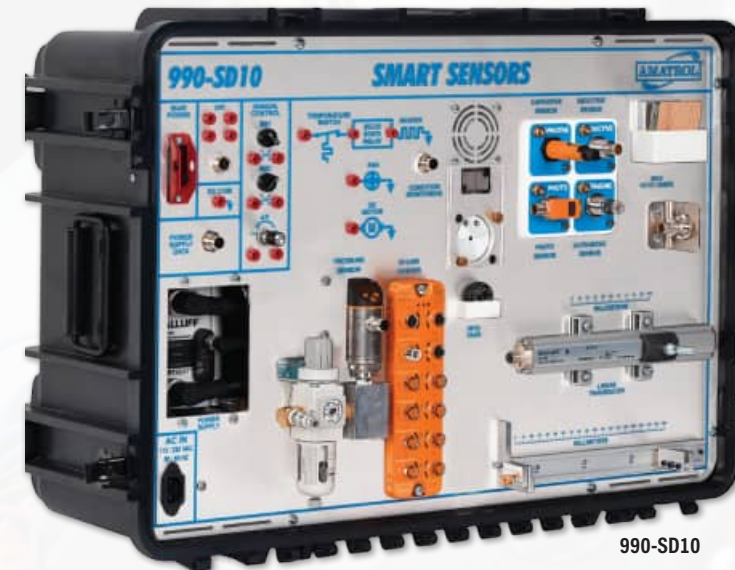
### Portable Smart Manufacturing ▶ 990-SM10

- Smart Manufacturing System
- Wireless Temperature / Humidity Sensor
- Current Transformer Sensor
- Vibration Monitoring Application
- PLC I/O Application
- Cybersecurity
- Production Monitoring



990-SM10

## SMART SENSORS



990-SD10

### Portable Smart Machine Sensors ▶ 990-SD10

- Industrial Internet of Things
- Cloud Computing
- Smart Photoelectric Sensor Configuration
- Bluetooth Sensor Communication
- Smart Analog Pressure & Position Sensors
- Smart Condition Monitoring Sensors
- Smart RFID Readers

### Portable Smart Process Sensors ▶ 990-SD20

- Smart Pressure Sensor
- Smart Flow Sensor
- Smart Liquid Level Sensor
- Ethernet Data Transfer
- Fluid Circulation System



990-SD20





85-MT5, 85-MT5-A and Options

**Fault Troubleshooting System ▶ 890-FTS**

- Adds Electronic Fault Insertion to 85-MT5
- Performance Tracking

**Level 1 Electrical Motor Control**

▶ **85-MT5**

- Ladder Diagrams
- Control Relay Circuits
- Control Relays / Manual Switches
- Float, Limit, Pressure, Liquid Level Switches
- Magnetic Motor Starters
- Control Transformers
- Lockout / Tagout
- Reversing Motor Control

**Level 2 Electrical Motor Control**

- Motor Braking > 85-MT5-A
- Reduced Voltage Starting > 85-MT5-B
- Variable Frequency AC Drive > 85-MT5-C
- Electronic Sensors > 85-MT5-D
- Electronic Counter > 85-MT5-E
- DC Drive with SCR Speed Control > 85-MT5-F
- Latching Stop Pushbutton > 85-MT5HSL

**PLC Motor Control ▶ 85-MT5AB8**

- PLC Orientation
- PLC Operation
- Motor Control Basics
- Timer Instructions
- Time-Driven Sequencing
- Count Up Instructions

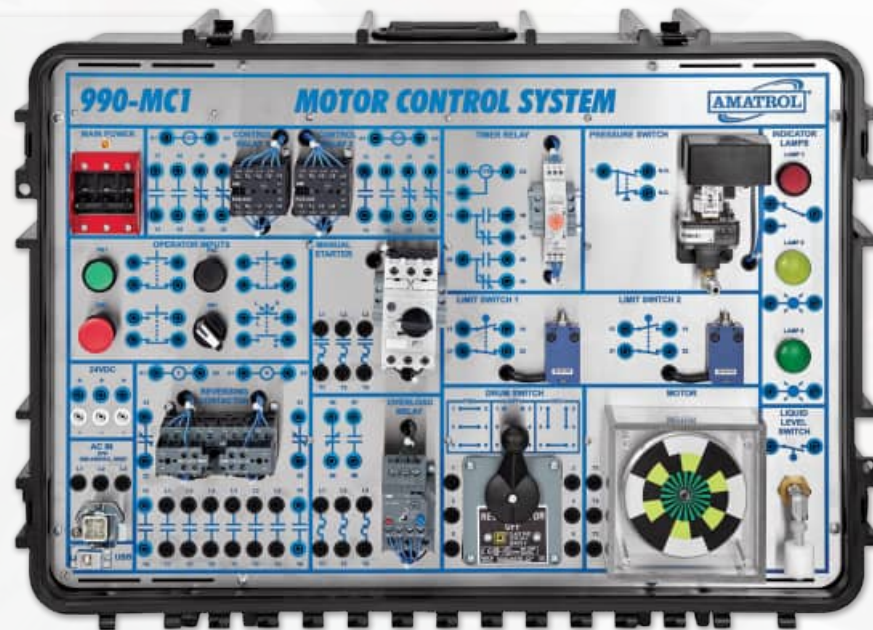


85-MT5AB8 Adds to 85-MT5

**Portable Electrical Motor Control Diagnostics**

▶ **990-MC1F**

- Ladder Diagrams
- Control Relay Circuits
- Control Relays / Manual Switches
- Float, Limit, Pressure, Liquid Level Switches
- Magnetic Motor Starters
- Control Transformers
- Lockout / Tagout
- Reversing Motor Control



990-MC1F



990-PAB53AF (Includes 990-PAB53A and 99-FTSAB53A)

**Portable PLC Diagnostics**

**Siemens S7-1200 ▶ 99-FTSS712**

**Allen-Bradley AB5300 ▶ 99-FTSAB53**

- Introduction to PLC Troubleshooting
- PLC Systems Troubleshooting
- Analog Input / Output Troubleshooting
- Analog Application Troubleshooting

**Portable PLC Diagnostics - Allen-Bradley CompactLogix**

▶ **990-PAB53AF**

- Introduction to PLCs
- PanelView Plus
- Terminal Operation
- PLC Programming
- PLC Motor Control
- Event Sequencing

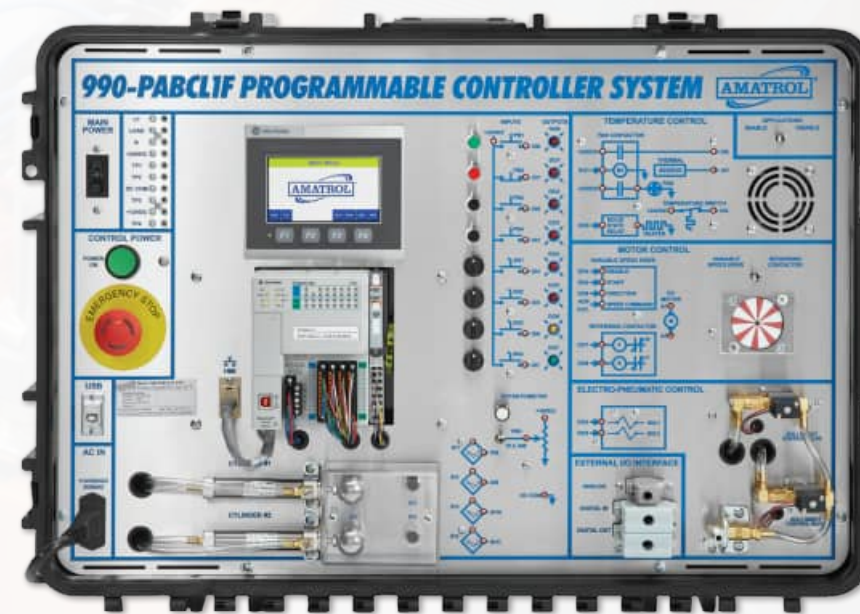
**Portable PLC Diagnostics - Siemens S7-1200**

▶ **990-S712F**

- Introduction to PLCs
- Basic HMI Panel Operation
- PLC Programming
- PLC Motor Control
- Event Sequencing
- PLC Motion Control



990-PS712F (Includes 990-PS712 & 99-FTSS712)

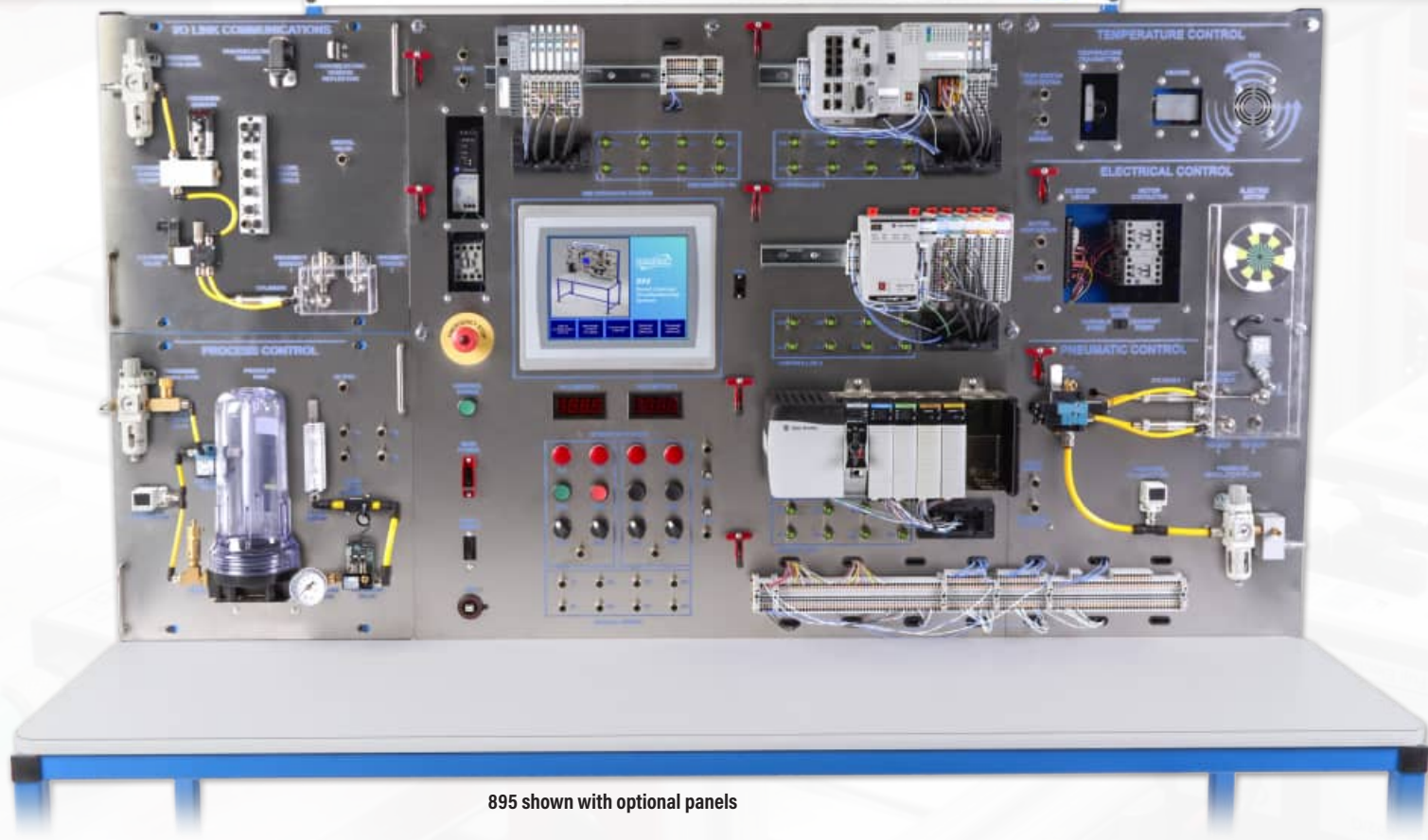


990-PABCL1F

**Portable PLC Diagnostics ▶ 990-PABCL1F**

- Controller Operations
- PLC Program Operations
- PLC I/O Testing
- Event Sequencing
- Processor Troubleshooting





895 shown with optional panels

**PLC Applications and Diagnostics ▶ 895 Smart Controls Diagnostics System**

- PLC Troubleshooting
- PLC Programming
- ControlLogix Configuration
- CompactLogix Configuration
- Analog I/O Control
- PLC Motor Control
- Math and Data Instructions
- PID Temperature Control
- Ethernet/IP Communication
- IIoT Smart Sensors with IO-Link
- Distributed I/O

**ROTATING MACHINES**



85-MT2-B



85-MT2-C



85-MT2-D



85-MT2-E

**Level 1 Rotating Machines ▶ 85-MT2**

- DC Series, Shunt, & Compound Motors
- Split Capacitor 1-Phase AC Motors
- Two Capacitor 1-Phase AC Motors
- Three-Phase AC Motors

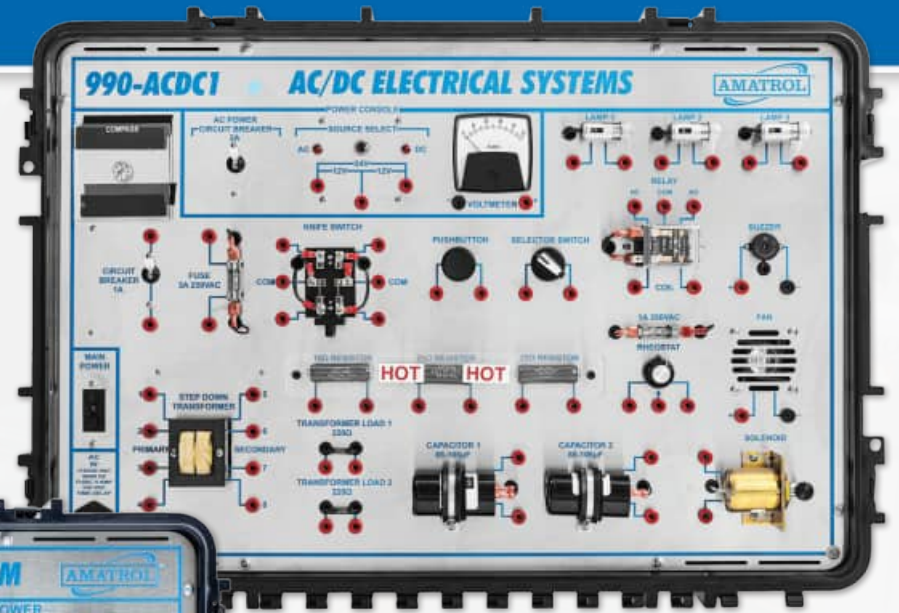
**Level 2 Rotating Machines**

- DC Generators > 85-MT2-B
- Alternators / Synchronous Motors > 85-MT2-C
- Wound Rotor Motors > 85-MT2-D
- Electric Motor Troubleshooting > 85-MT2-E

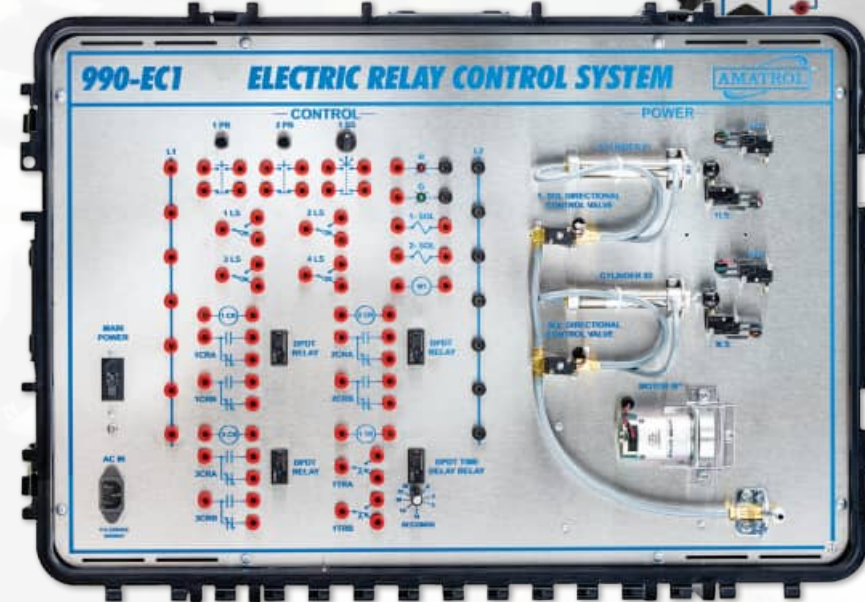
**BASIC ELECTRICITY**

**Portable AC / DC Electrical ▶ 990-ACDC1**

- AC / DC Voltage and Current Principles
- Resistance, Inductance, and Capacitance
- Series and Parallel Circuits
- Multimeters / Manual Switches
- Circuit Protection, Breakers, and Testers
- Fuses / Resistors / Capacitors / Inductors
- Potentiometers / Solenoids / Control Relays



990-ACDC1



990-EC1F

**Portable Electrical Relay Control ▶ 990-EC1F**

- Digital Logic / Relay Control
- Ladder Diagrams / Control Circuit Design
- Seal-in Holding, Relay Sequence, and Timer Relay Circuits
- Electric Motor and Electro-Fluid Power Control
- Input / Output Troubleshooting (990-EC1F)
- Relay Troubleshooting (990-EC1F)



**490-000 | Electrical Generation Fundamentals Training System**

- True electrical generation simulator depicting multiple power plants on a grid
- Internal computer with analog and digital I/O



**408-000 | Transformer Wiring Training System**

- Conditions and circumstances of making common transformer connections
- Includes two complete sets of three-phase transformers for paralleling training



## HYDRAULICS



850-HD1 with 85-EF and 85-BP



### Basic Hydraulics – Double-Sided

#### ► 850-HD1

(Single-Sided 850-H1 model also available)

- Pumps / Cylinders / Motors
- Directional Control Valves
- Check, Relief, and Pressure Reducing Valves
- Sequence and Flow Control Valves
- Hydraulic Circuit Applications

### Electro-Hydraulics

#### ► 85-EH

- Basic Control Devices
- Power Devices
- Control Relays
- Multiple Cylinder Control
- Sensor Applications
- Circuit Protection

### Intermediate Hydraulics

#### ► 85-IH

- Accumulators
- Pilot-Operated DCVs and Check Valves
- Direct-Operated Relief Valves
- Rapid Traverse Slow Feed Circuits
- Cylinder Sequencing  
CAM-Operated DCVs
- Remote Pressure Control / Pump Unloading Circuits

### Advanced Hydraulics

#### ► 85-AH

- Motor Applications
- Hydraulic Pump and Motor Performance
- Fluids and Conditioning
- Heat Exchangers
- Motor Circuits



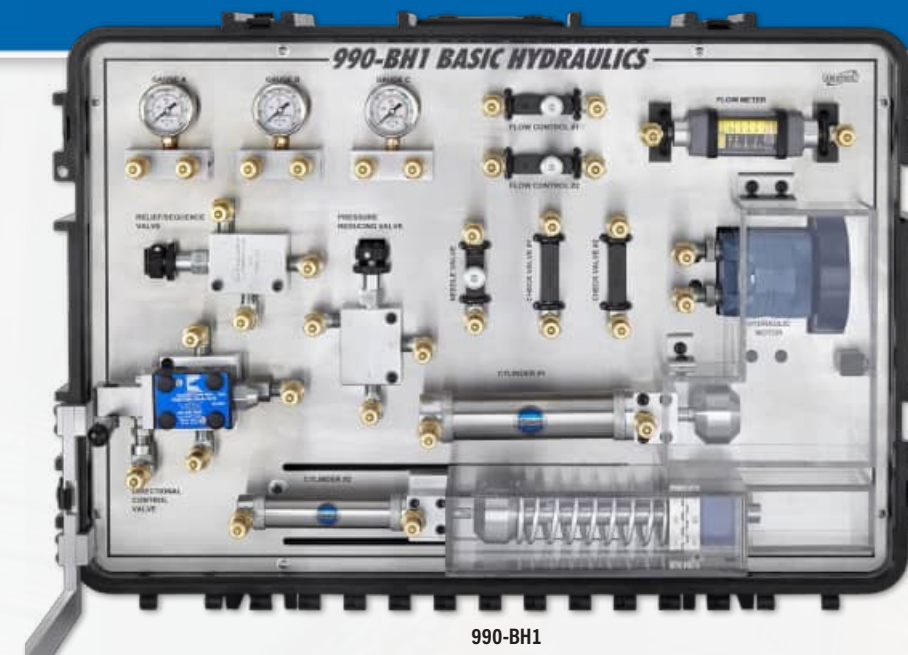
85-IH

## HYDRAULICS

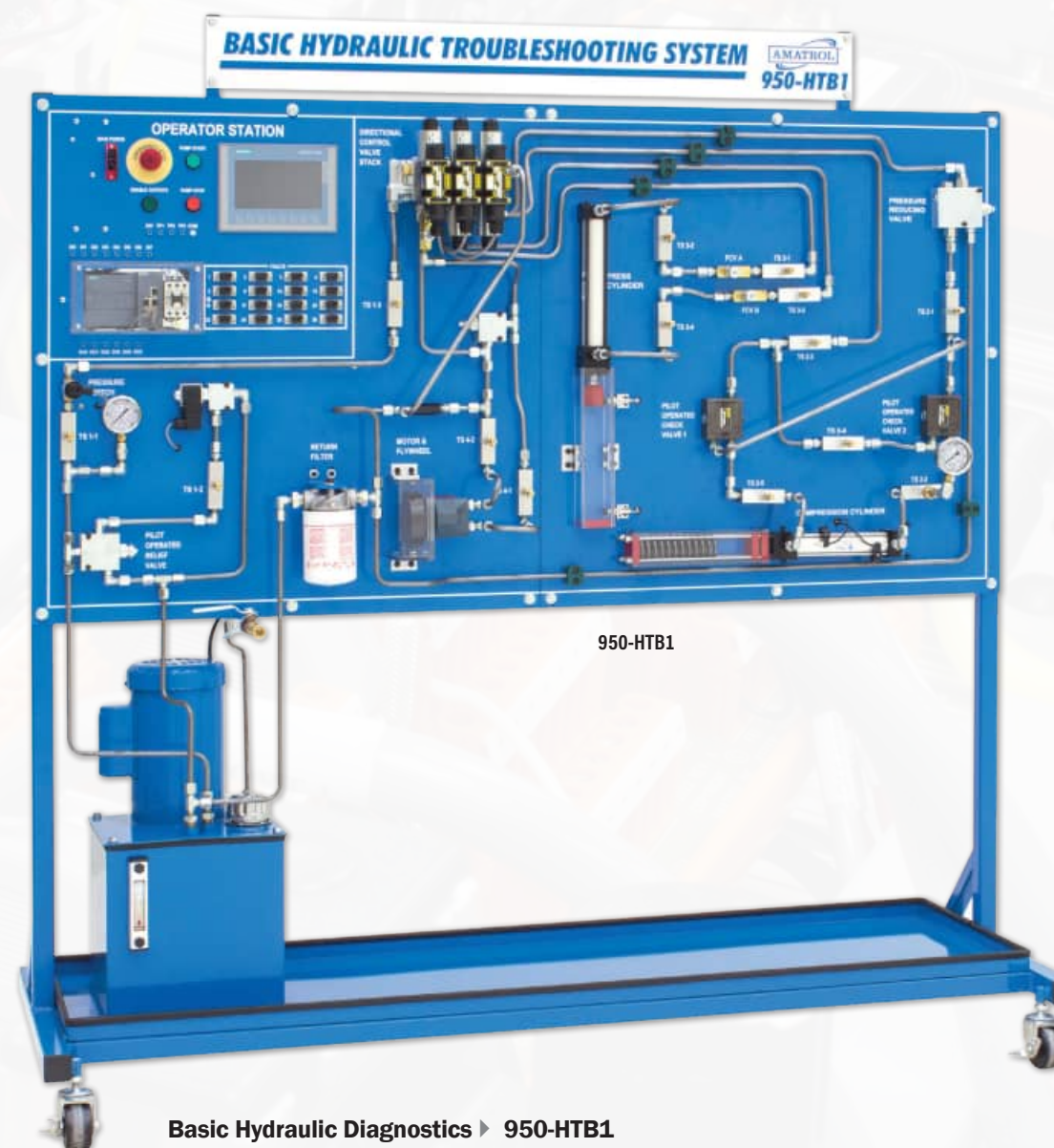
### Portable Basic Hydraulics

#### ► 990-BH1

- Pumps / Cylinders / Motors
- Directional Control Valves
- Check, Relief, and Pressure Reducing Valves
- Sequence and Flow Control Valves
- Hydraulic Circuit Applications



990-BH1



950-HTB1

### Basic Hydraulic Diagnostics ► 950-HTB1

- Hydraulic Pump Troubleshooting
- Hydraulic Actuator Troubleshooting
- DCV Troubleshooting
- Hydraulic System Troubleshooting
- Machine Sequence Troubleshooting
- Machine Performance Troubleshooting



## PUMPS

### Centrifugal Pump Systems ▶ 950-PM1

- Pump Operation and Troubleshooting
- Flow Meters and Measurement
- Pressure / Flow Characteristics
- Pump Head
- Performance, Efficiency, Priming
- Cavitation and Pseudo-Cavitation

### Pump Learning System Options

- Multiple Pump > 95-PM1-A
- Turbine Pump > 95-PM1-B
- Diaphragm Pump > 95-PM1-C
- Peristaltic Pump > 95-PM1-D
- Piston Pump > 95-PM1-E
- Gear Pump > 95-PM1-F
- Magnetic Pump > 95-PM1-G
- Centrifugal Pump > 95-PM1-H



Diaphragm Pump



Turbine Pump

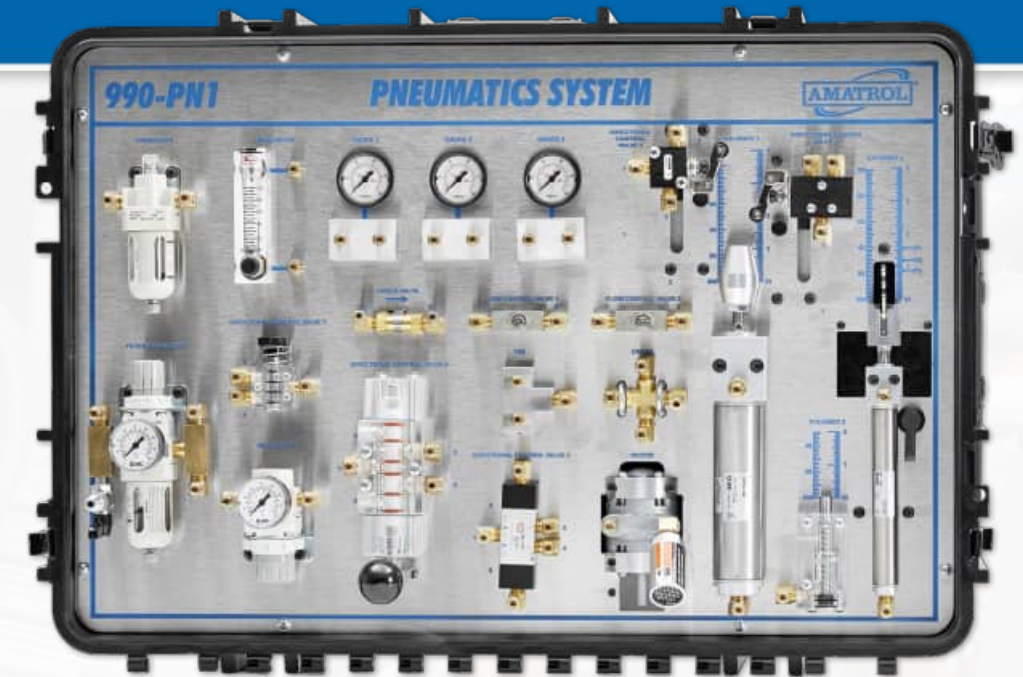


950-PM1

## PNEUMATICS

### Portable Pneumatics ▶ 990-PN1

- Pneumatic Power Systems
- Pneumatic Circuits
- Pressure and Flow Principles
- Speed Control Circuits
- Air Logic
- Schematics
- Pneumatic Maintenance



990-PN1

### Basic Pneumatics ▶ 850-PD1

(Single-Sided 850-P1 model also available)

- Pressure, Force, Power, Work
- Pascal's and Gas Laws
- Cylinders / Motors
- Directional, Check, Pressure, & Flow Control Valves

### Intermediate Pneumatics ▶ 85-IP

- Cam and Pilot Operated Check Valves
- Cylinders / Shuttle Valves / Air Logic
- Water Removal Techniques
- Air Dryers / After-Coolers
- Water Traps / Air Lubricators

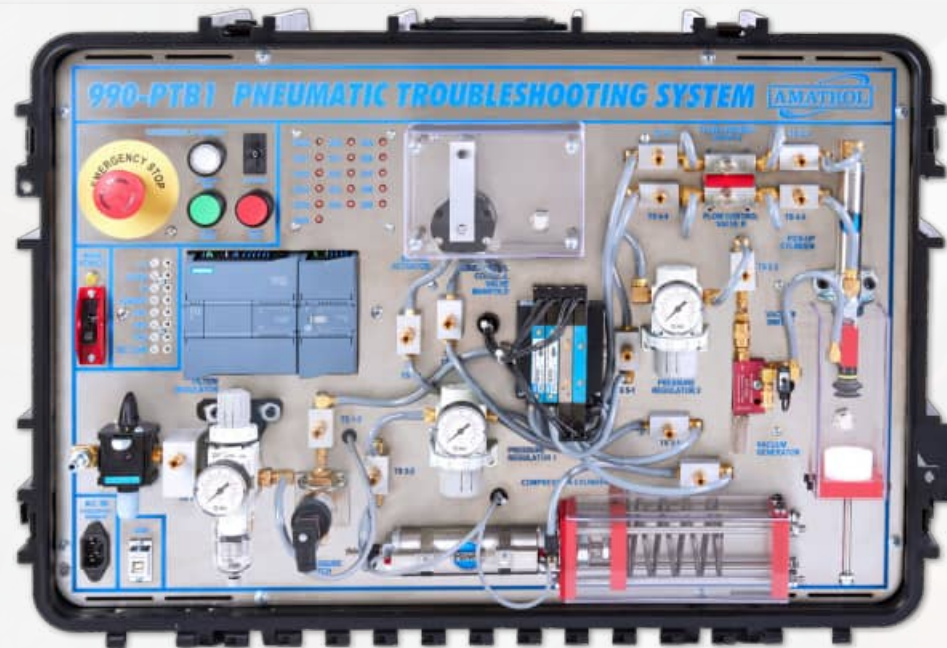
### Advanced Pneumatics ▶ 85-AP

- Pneumatic Cylinder Loads and Applications
- Quick Exhaust Valves
- Motor Loads / Air Bearings / Filtration
- Flow Measurement

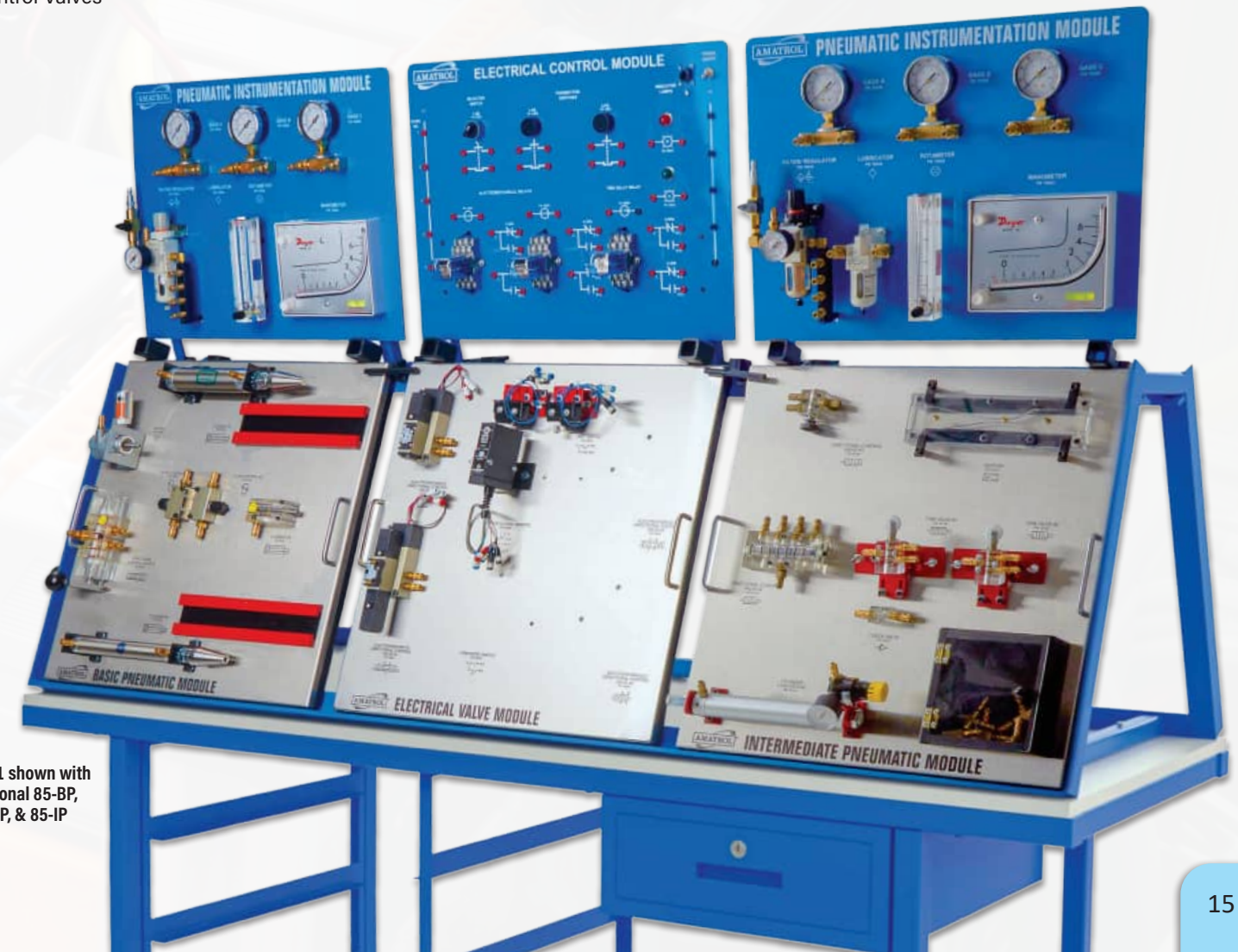
## PNEUMATICS

### Portable Basic Pneumatic Diagnostics ▶ 990-PTB1

- In-Circuit Pneumatic Component Testing
- Air Preparation Troubleshooting
- Regulator Troubleshooting
- Vacuum System Troubleshooting
- Quick Exhaust Valves



990-PTB1



850-PD1 shown with additional 85-BP, 85-EP, & 85-IP



## HEAT PUMPS AND REFRIGERATION



T7082-A

T7083  
adds to T7082-A

### Environmental Applications ▶ T7083

- Insulation
- Psychrometrics
- Residential Heating and Cooling
- Thermal System Performance

### Heat Pump Diagnostics ▶ T7082-A

(Also available as a T7082 without Troubleshooting)

- Thermal Energy and Heat Transfer
- Thermodynamic Laws and Properties
- Refrigeration Thermodynamics
- Heat Pump Operations
- Thermal System Troubleshooting
- Phase Diagrams
- Property Tables
- Refrigerant Types



T7082-A

## INDUSTRIAL REFRIGERATION

### Industrial Refrigeration ▶ T7500

- Semi-Hermetic Compressors
- Smart Refrigeration Controllers
- Defrost and Hot Gas Bypass
- Multi-Zone Industrial Refrigeration
- Systems Troubleshooting



T7500

## GEOHERMAL



95-GE03  
Shown with  
950-GEO2D

### Geothermal Diagnostics ▶ 950-GEO2D

- Geothermal Heat Pump Systems
- System Performance
- Components and Operation
- Component Troubleshooting
- System Troubleshooting
- Coefficient of Performance
- Source Circuit Piping and Components
- Energy Units of Measure
- Phase Change Effects
- Heat Transfer

### Geothermal Flush Cart ▶ 95-GE03

(Adds to 950-GEO for Pressurized Operation)

- Circulator Pump
- Control Unit
- Control Valves
- Hose Set
- Water Tank



## BASIC REFRIGERATION

### Basic Refrigeration ▶ T7045

- Temperature and Pressure Measurement
- Refrigeration Energy
- Compressors
- Heat Transfer
- Phase Change Effects
- Condensers and Evaporators
- Auxiliary Refrigeration Components
- Refrigeration System Performance



T7045

## THERMAL SCIENCE

### Thermal Science ▶ T7081

- Temperature and Pressure Measurement
- Thermal Expansion
- Enthalpy, Phase Change
- Heat Transfer, Thermodynamic Laws
- Gas Laws and Phase Equilibrium



T7081

## COMMERCIAL REFRIGERATION



T7400

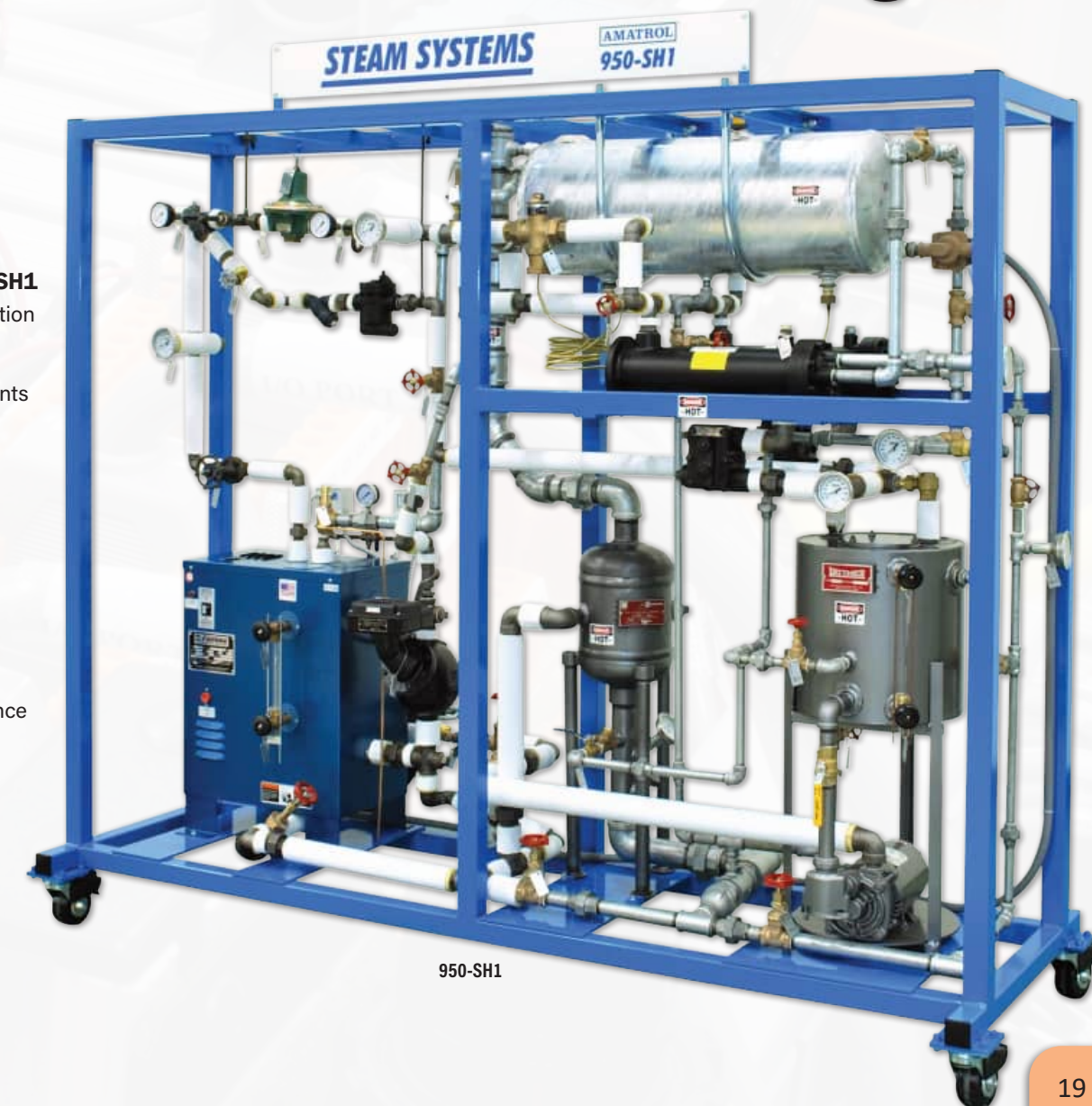
### Commercial Refrigeration ▶ T7400

- Mechanical and Electrical Control Components & Connection
- Semi-Hermetic Compressors
- Smart Controllers
- Electronic Expansion Valves
- Multi-Zone Refrigeration
- Defrost Control
- Programming Commercial Refrigeration Systems
- Troubleshooting Commercial Refrigeration Systems

## STEAM

### Steam Systems ▶ 950-SH1

- Steam System Operation
- Temperature Measurements
- Pressure Measurements
- Thermal Expansion
- Steam States
- Internal Energy & Enthalpy
- Steam Tables & Diagrams
- Boiler Operation
- Boiler Subsystems
- Stem & Yoke Valve Operation
- Strainer Inspection
- Preventive Maintenance



950-SH1



# INSTRUMENTATION & PROCESS CONTROL

## LEVEL & FLOW

### Level / Flow Process Control Diagnostics

#### ► T5552FA

- P&I Diagrams
- Flow & Liquid Level Measurements
- Transducers / Transmitters
- Component Level Troubleshooting
- System Level Troubleshooting
- In-Circuit Testing
- Out-of-Circuit Testing



T5552FA



89-PC-AB5500 PID Control

### ControlLogix Process Control ► 89-PC-AB5500 (Connects to the T5552FA and T5553)

- On / Off Control with Discrete and Analog Input
- Open Loop PLC Control
- Closed Loop PLC Control

## PLC PROCESS CONTROL

### PLC Process Control

#### ► 99-PCAB53A ► 99-PCS712

- On / Off Control with Discrete & Analog Input
- Open & Closed Loop Control
- Closed Loop Performance
- Closed Loop Tuning



99-PCAB53A shown with T5552FA and 990-PAB53A Portable

## T5552FA ADD-ONS



T5552-S1 and Software

### Visualization Process Control

#### ► T5552-S1

- Introduction to Process Visualization
- UDC Controller Configuration
- Application Editing
- Input & Output Objects
- Two-State Output Objects
- Symbolic I/O Field Output
- Alarms



T5552-H1



T5552-F1

### Smart Flow Transmitter ► T5552-F1

- Differential Pressure Type
- Digital Display, LCD
- Calibration
- Zero and Span Adjustments
- Manifold Bleeding
- Orifice Plate Meters (T5552-F1C)
- Venturi Meters (T5552-F1B)
- Pitot Flow Meters (T5552-F1A)

### HART ► T5552-H1

- HART Components
- HART Networks
- System Integration
- HART Device Calibration
- Monitoring Current Loops
- Process Control Loop Operation
- Burst Mode on a Parked Field Device

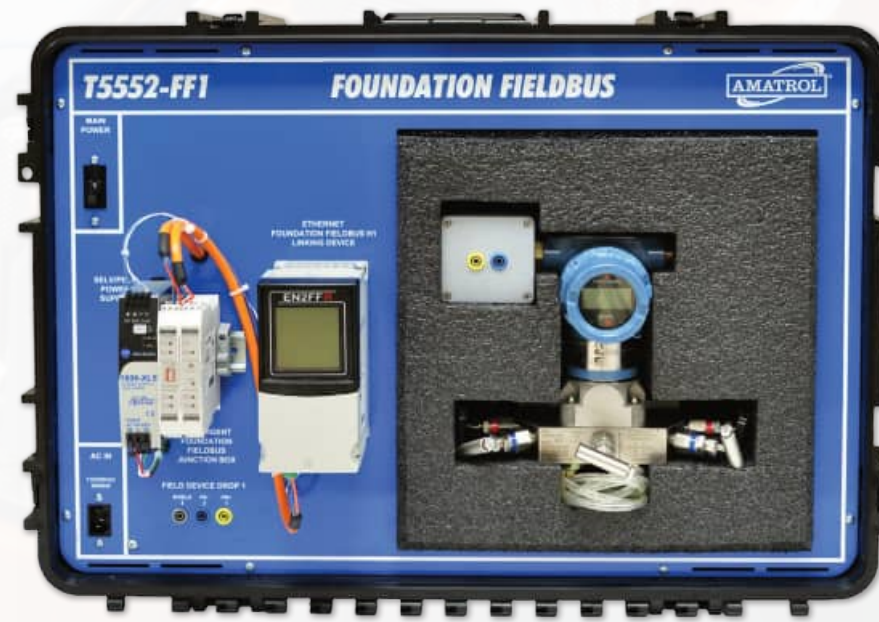
### Ultrasonic Liquid Level System

#### ► T5552-L1

- Ultrasonic Transducer
- Transmitter Connection
- Ultrasonic Level Measurement
- Sensor Calibration



T5552-L1



T5552-FF1A

### Foundation Fieldbus

#### ► T5552-FF1A

- Foundation Fieldbus Technology
- Fieldbus DCS Operation
- Communication Protocols
- Foundation Fieldbus Wiring
- Device Configuration
- Fieldbus Diagnostic & Maintenance Capability



## TEMPERATURE PROCESS CONTROL

### Temperature Process Control ▶ T5553

- Process Safety / P and I Diagrams
- Temperature Measurement
- Heat Transfer / Temperature Control
- PID Operating and Tuning
- 3-Way Control Valves
- Heat Exchangers and Chillers
- RTD, Thermocouples, Thermistors
- Controller / Axis Calibration



T5553



T5553-R1A

### Three-Channel Data Acquisition for T5553 ▶ T5553-R1A

- Chart Recorder Applications
- Managing Chart Recorder Data
- Special Chart Recorder Functions
- Chart Recorder Software

## ANALYTICAL PROCESS CONTROL

### Analytical Process Control ▶ T5554

- Analytical Control Concepts
- Chemical Pumps / pH Measurement
- Loop Controllers / Control Loop Performance
- Discrete and Closed Loop pH Control
- Alarms / Discrete Inputs
- Batch and Continuous pH Control Systems
- Proportional, Integrative, and Derivative Automatic Control



T5554



T5554-R1A

### Three-Channel Data Acquisition for T5554 ▶ T5554-R1A

- Electronic Data Recorder
- Touchscreen LCD Monitor
- Paperless Chart Recording

## PRESSURE PROCESS CONTROL

### Pressure Process Control

#### ▶ T5555

- Simultaneous Liquid Level and Tank Pressure Control
- Electric Proportional Valve
- Piezoelectric Pressure Sensor
- Open and Closed Loop Tuning
- HMI Panel Operation
- Block Diagrams
- Automatic Control Methods
- Control Loop Performance
- Process Systems Alarms



T5555

## Connect All Four Systems to Create an Entire Process Plant!



T5552FA  
Level / Flow Process Control  
Troubleshooting

T5554  
Analytical Process Control

T5555  
Pressure Process Control

T5553  
Temperature Process Control



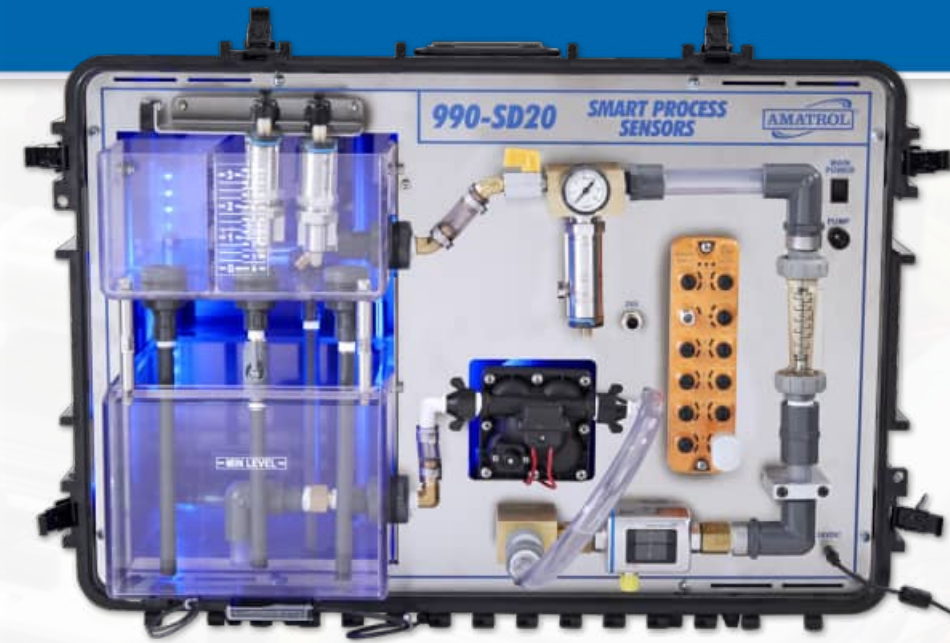
## PORTABLE PROCESS CONTROL



990-PC1F

### Portable Process Control Troubleshooting ▶ 990-PC1F

- Level & Flow Sensor Troubleshooting
- Flow Transmitter Troubleshooting
- I/P Converter Troubleshooting
- Diaphragm-Actuator Valve Troubleshooting
- Controller Troubleshooting
- On / Off & Closed Loop Control System Troubleshooting



990-SD20

### Portable Smart Process Sensors ▶ 990-SD20

- Smart Pressure Sensor
- Smart Flow Sensor
- Smart Liquid Level Sensor
- Ethernet Data Transfer
- Fluid Circulation System

## INSTRUMENTATION



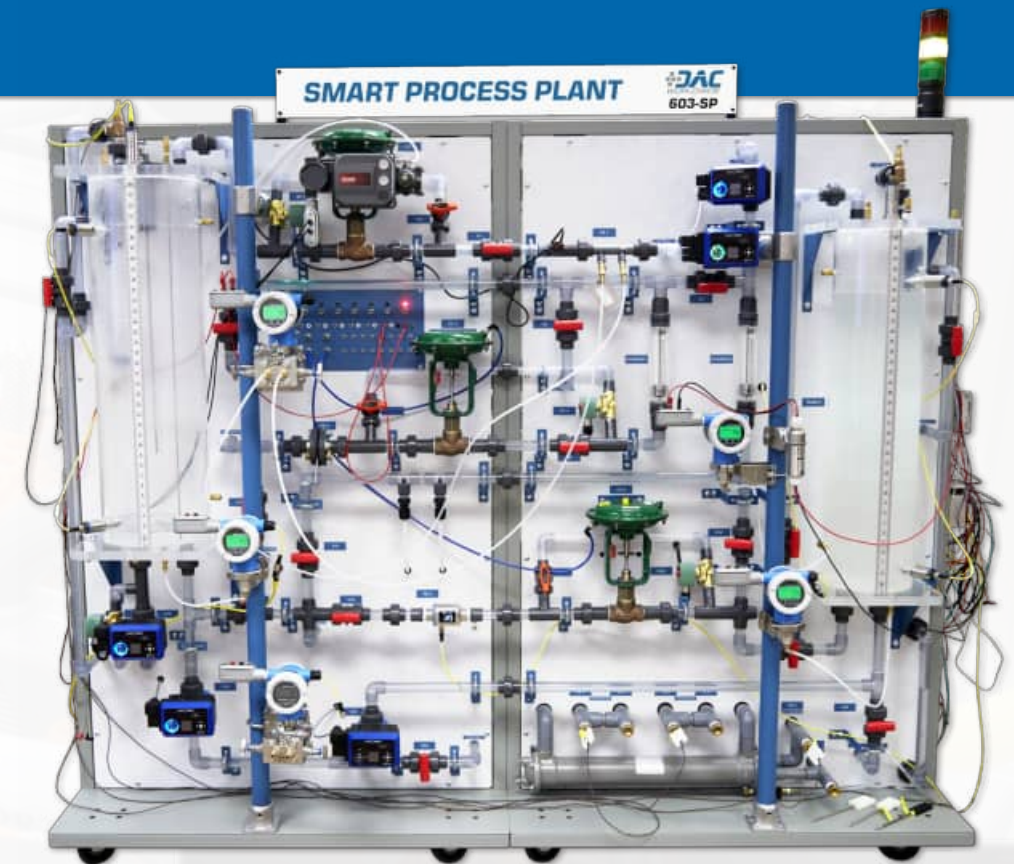
T5600

### Instrumentation Panel Workstation with Coriolis Flow Meter ▶ T5600

- Process Control Operation Safety
- Process Documentation
- Level Measurement with Free Space & Guided Wave Radar Level Transmitters
- Level Detection with Point Level Vibronic Switch
- Pressure Measurement with Single-Ended & Differential Pressure Transmitters
- Temperature Measurement with RTD Temperature Sensor with HART Transmitter
- Flow Measurement with Coriolis Flow Meter
- Ethernet & Transmitter Communications

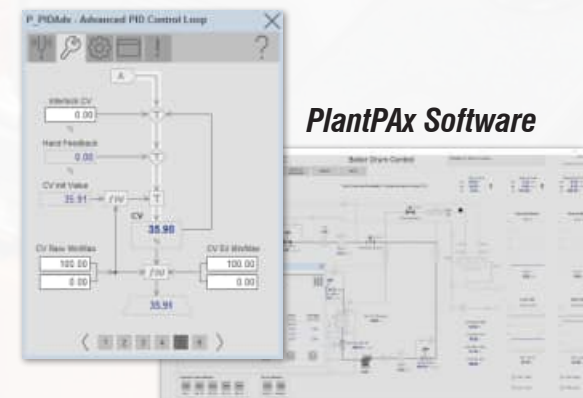


910 Life Sciences Process Extension



### 603-SP | Smart Process Plant

- Offers a world-class modern process plant simulator
- Features Industry 4.0 technologies like PlantPax supervisory control and monitoring, HART wireless, network security, cloud-based data analytics, and SCADA process application modeling
- Supports training for operators, technicians, and engineers







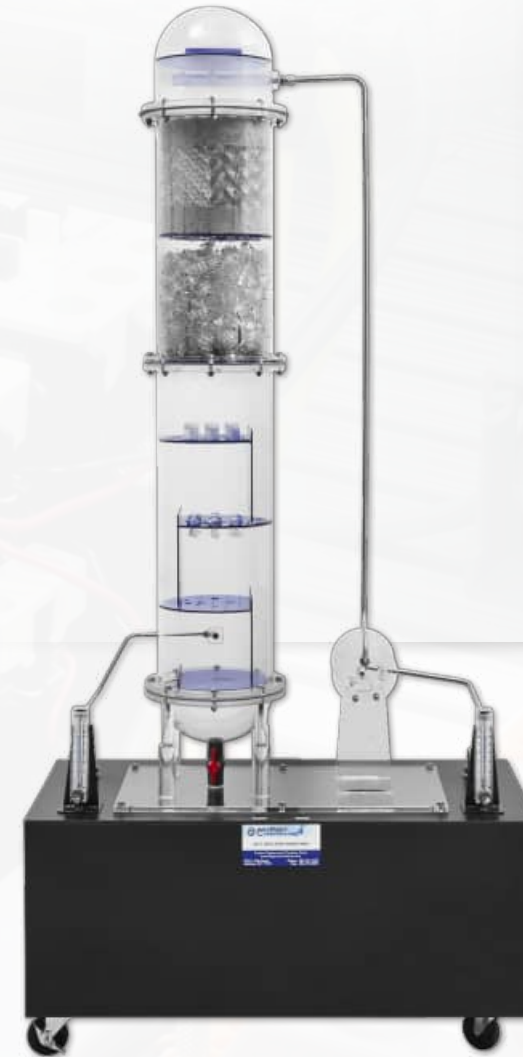
**616-000 | Portable Calibration**



**617-000 | Level Measurement Training System Plus, Control Package**



**Tabletop Heat Exchanger Circulation Trainer (110-HECT1)**



**Distillation Tower Working Demonstrator w/ Reboiler (132-DTT5)**



**203E-PAC | Advanced Vibration Analysis**



**290 | Distillation Column Model**



**285 | U-Tube Heat Exchanger Training Model**

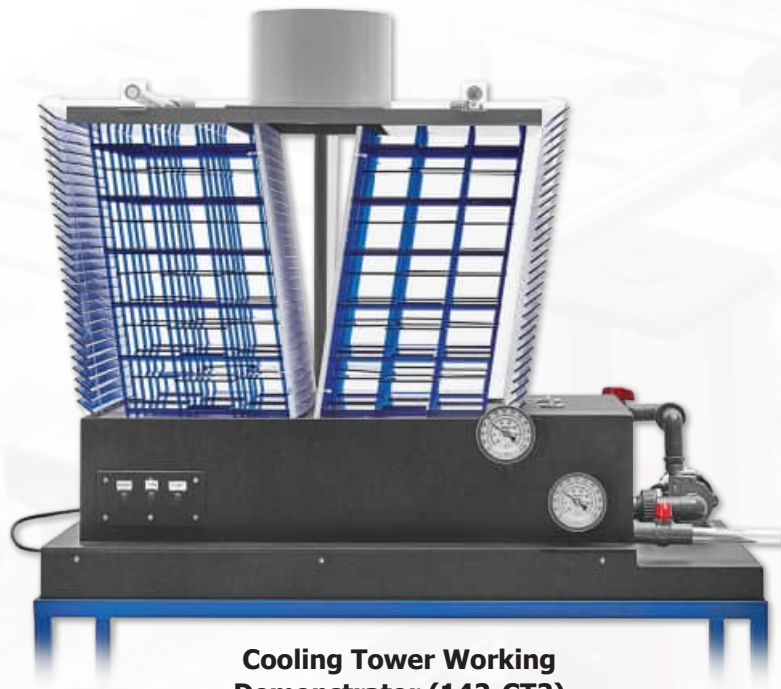


**Waste Water Working Demonstrator (102-WWT)**



**Fluid Catalytic Cracking Working Demonstrator (132-FCCU)**

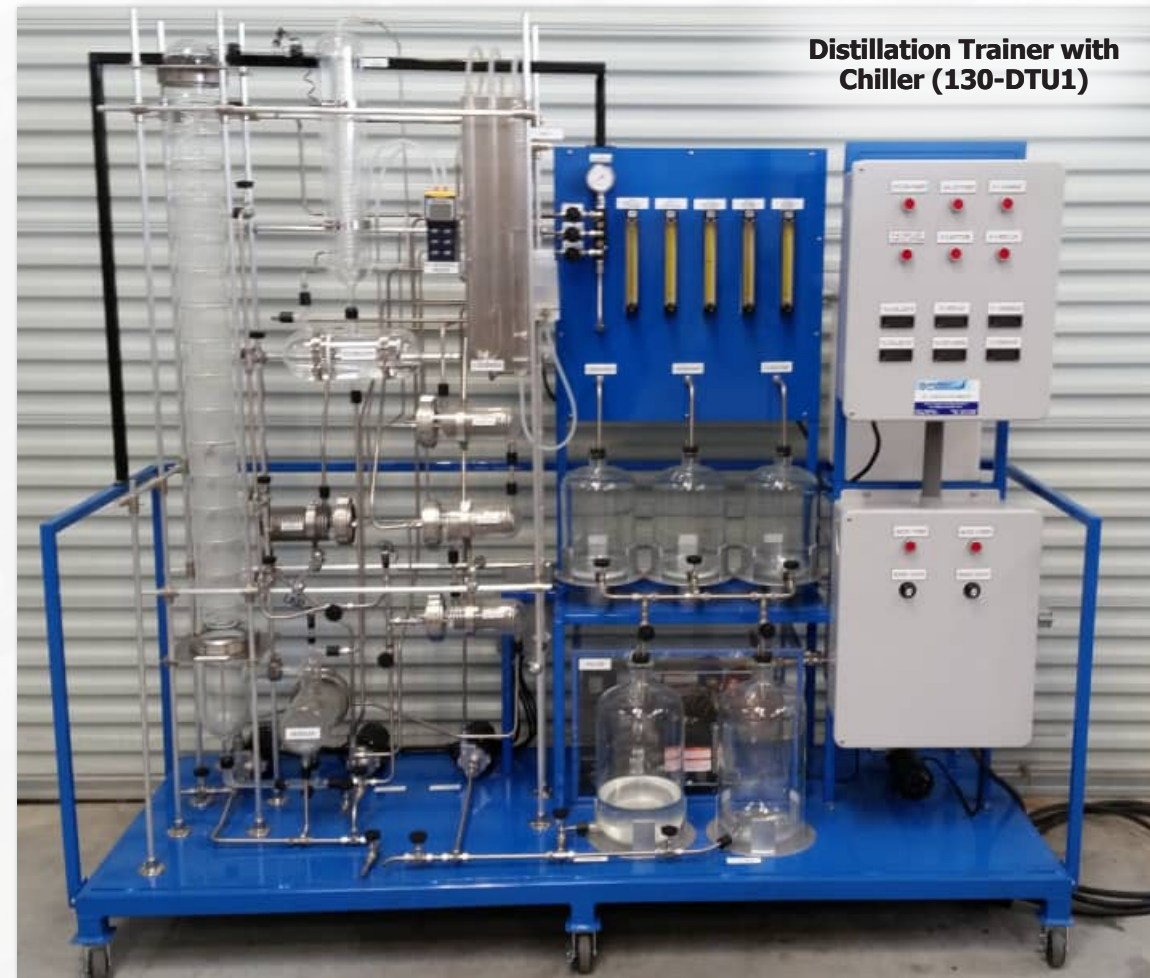




**Cooling Tower Working Demonstrator (142-CT2)**



**Portable Distillation Trainer with Chiller (130-DTU2)**



**Distillation Trainer with Chiller (130-DTU1)**

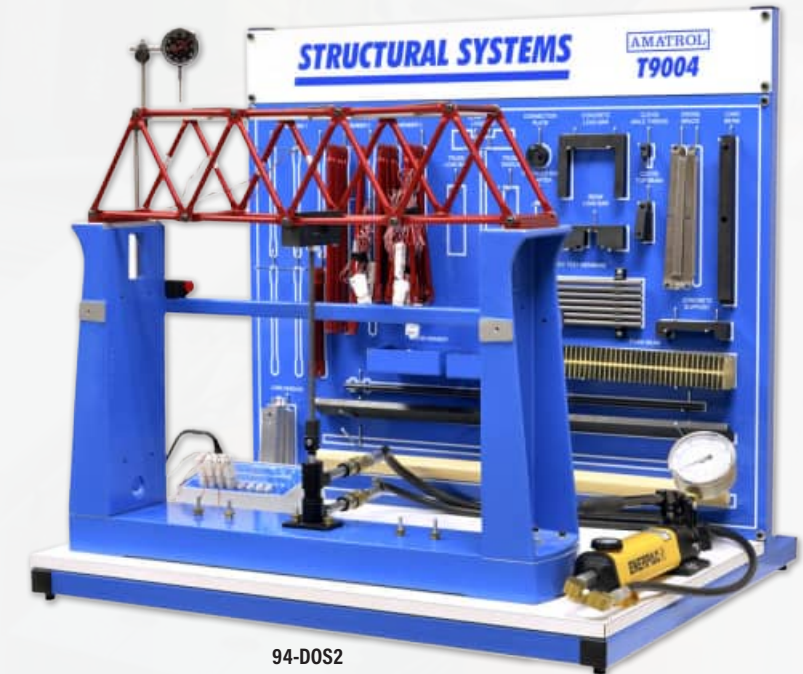
## STRUCTURAL DESIGN

### Design of Structures 1 ▶ 94-DOS1

- Moments and Bending Stress
- Bridge Design and Construction
- Structural Types, Elements, and Stability
- Properties of Materials and Design



94-DOS1



94-DOS2

### Design of Structures 2 ▶ 94-DOS2

- Beam Deflection
- Column Buckling
- Building Construction
- Concrete Testing

## MATERIALS ENGINEERING

### Materials Engineering ▶ 94-MT1

- Tensile Strength Analysis
- Data Acquisition Systems
- Compression Testing and Analysis
- Shear Testing & Analysis
- Hardness Testing & Analysis



94-MT1



## MECHANICAL DRIVES

### Mechanical Drives 1

#### ▶ 970-ME1

- Motor Mounting
- Soft Foot
- Chain and Belt Drives
- Spur Gear Drives
- Gear Trains
- Basic Shaft Alignment



970-ME1



### Mechanical Drives 2

#### ▶ 97-ME2

- Bushings, Idler Systems
- Heavy-Duty Chain and Belt Drives
- Timing / HTD Belt Drives
- Variable Pitch Sheaves
- Reverse Indicator Shaft Alignment
- Lubrication



### Mechanical Drives 3

#### ▶ 97-ME3

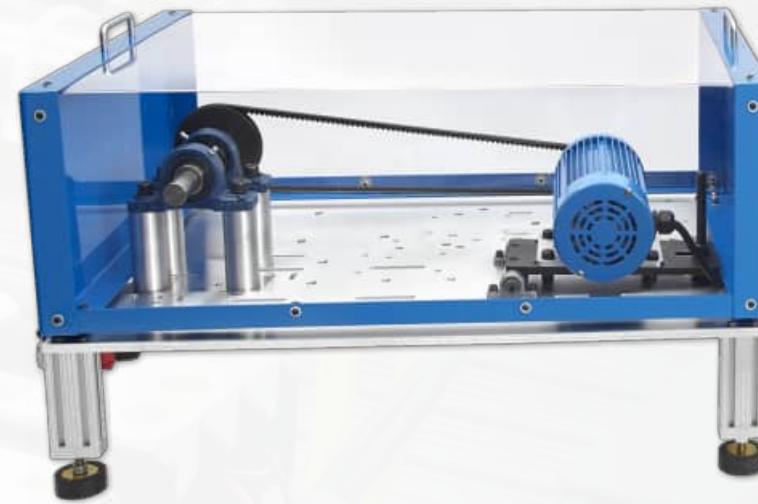
- Plain, Ball, Roller, Tapered Bearings
- Angular Contact Bearings
- Seals and Gaskets
- Miter, Helical, and Worm Gears
- Gearboxes



### Mechanical Drives 4 ▶ 97-ME4

- Precision Ball Screws
- Linear Ball Bearings
- Linear Axis Slides
- Cam Clutches
- Electric Clutches
- Electric Brakes

## PORTABLE MECHANICAL DRIVES



### Portable Mechanical Drives 1 ▶ 990-ME1M

- Introduction to Mechanical Drives
- Shaft Speed Measurement
- Shaft Alignment
- V-Belt Drives
- Chain Drives
- Gear Drives



990-ME1M

### Portable Mechanical Drives 2 ▶ 99-ME2M

- Bushings
- Heavy-Duty Chain & Belt Drives
- Timing / HTD Belt Drives
- Reverse Indicator Shaft Alignment

### Portable Laser Shaft Alignment ▶ 99-ME2AM

- Introduction to Laser Alignment Systems
- Rough Alignment
- Laser Shaft Alignment Installation, Operation, & Analysis
- Soft Foot Correction

## VIBRATION ANALYSIS



97-ME5A

### Vibration Analysis ▶ 97-ME5A

(97-ME5A adds to 970-ME1)

- Vibration Concepts & Analysis
- Resonant Frequency
- Sympathetic Vibration
- Velocity, Acceleration, Spike Energy
- Vibration Dampening, Isolation
- Severity Charts, Troubleshooting



Vibration Measurement



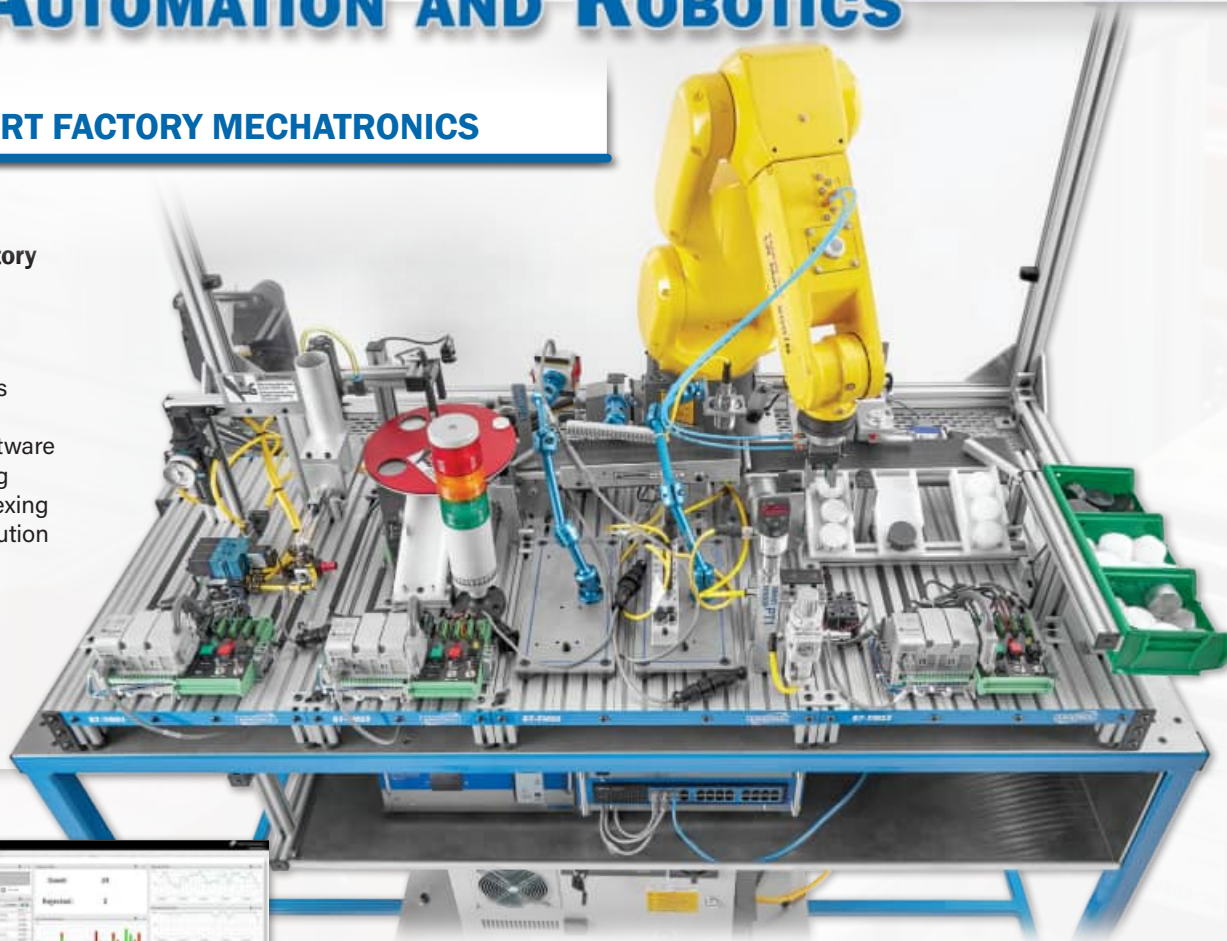
# SMART AUTOMATION AND ROBOTICS

## TABLETOP SMART FACTORY MECHATRONICS

### Tabletop Smart Factory Mechatronics

- ▶ 870-PTAB82
- ▶ 87-TMS4C

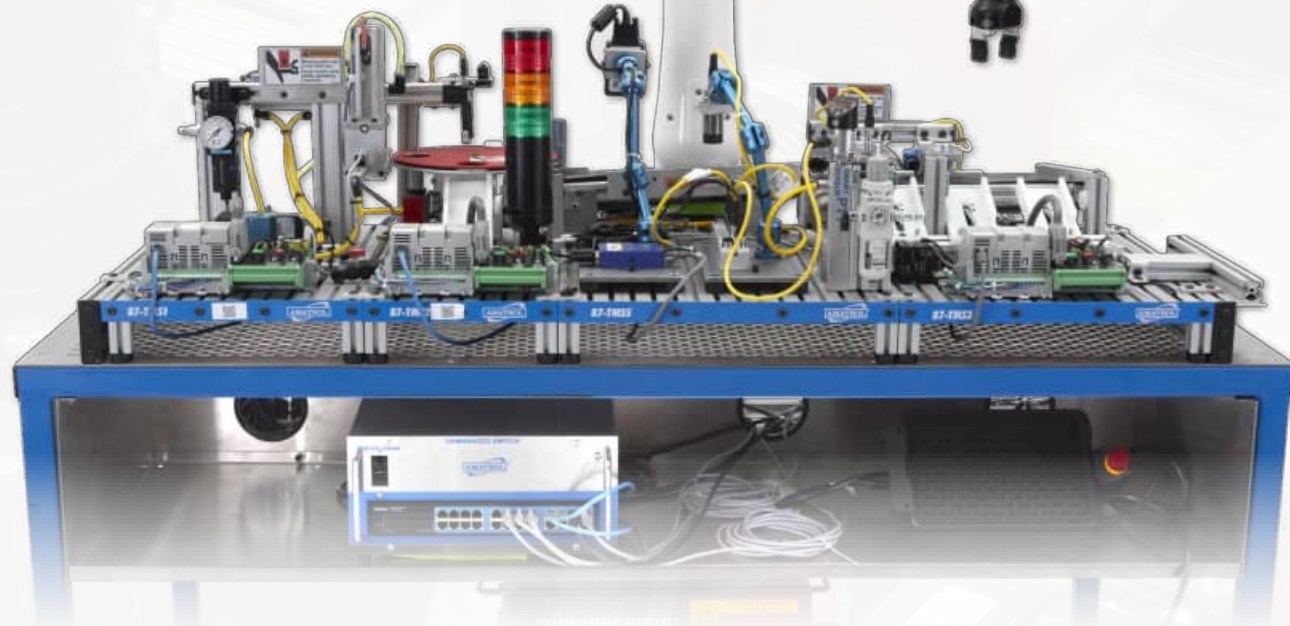
- Industrial Sensors
- I/O Link
- Cloud-Based Software
- Inventory Feeding
- Inspection & Indexing
- Sorting & Distribution



870-PTAB82, 87-TMS1, 87-TMS2, 87-TMS3, 87-TMS4F, & 87-TMS5



87-TMS4C



The 87-TMS4C features a FANUC CRX-5iA Collaborative Robot ("cobot"), which offers an all-new FANUC programming interface with simple drag-and-drop technology on a touchscreen pendant, making it the perfect solution for users with little to no robotic experience.

### Portable PLC Diagnostics

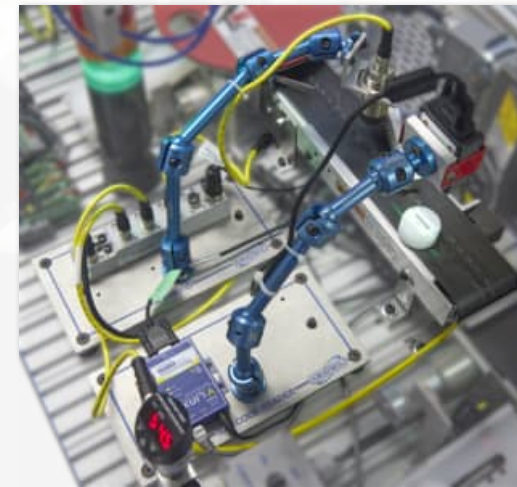
#### ▶ 990-PABCL1F

- Controller Operations
- PLC Program Operations
- PLC I/O Testing
- Event Sequencing
- Processor Troubleshooting

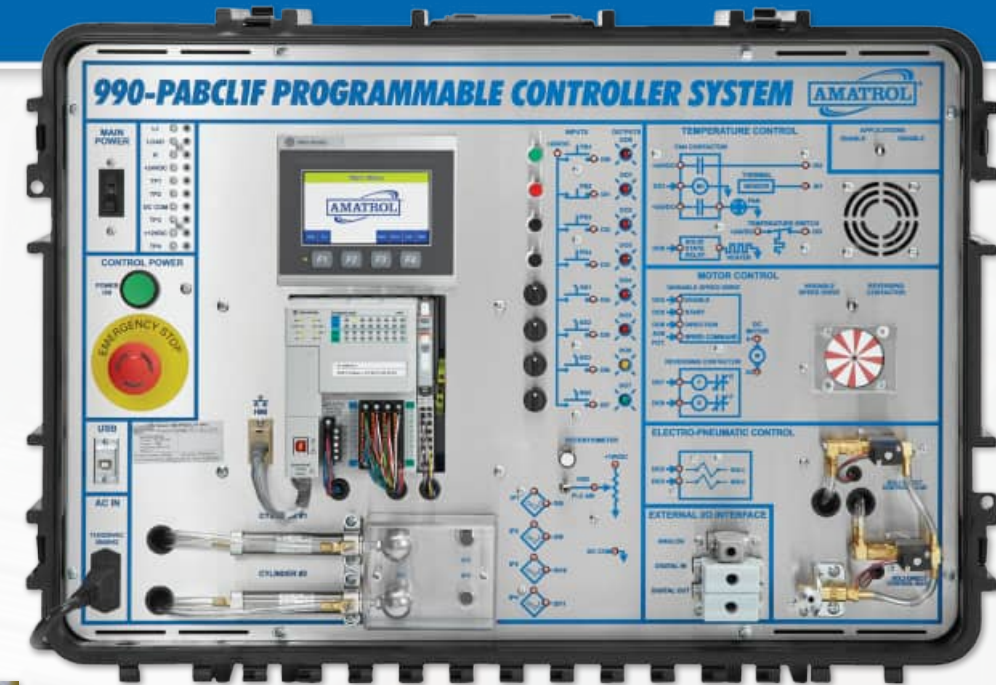
### Smart Sensors

#### ▶ 87-TMS5AB1

- RFID Programming
- RFID Operation
- Photoelectric Sensors
- Pressure / Vacuum Sensors



87-TMS5AB1 & 87-TBR1AB



990-PABCL1F

### Barcode Reader

#### ▶ 87-TBR1AB

- Barcode Operation
- Scan Accuracy
- Ethernet-to-Serial Interface
- Barcode Programming
- Function Blocks



Visual Communication Software

### Manufacturing Execution

#### ▶ 87-TMEAB

- Order Entry
- Scheduling
- Schedule Status
- Production Statistics
- Alarms



Manufacturing Execution Software

### Visual Communication ▶ 87-TVCAB

- Cloud-Based Data Acquisition
- SCADA Operation
- Configuring Cloud-Based SCADA
- Maintenance Management Operation
- Configuring Maintenance Management

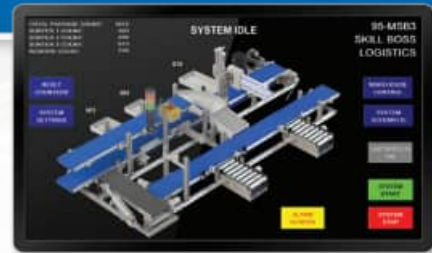


87-TENAB82

### Ethernet ▶ 87-TENAB82

- Industrial Networks
- Ethernet IP Addresses
- Network Performance
- Managed Switch Ethernet
- Switch Diagnostics





Warehouse Control Software  
PC Based - Human Machine Interface (HMI)

95-MSB3 with 87-SWPF1V & 87-MRL1



**Skill Boss Logistics ▶ 95-MSB3**

- Preventive Maintenance
- System Monitoring & Operation
- PLCs & VFDs
- Barcode Readers
- System Troubleshooting

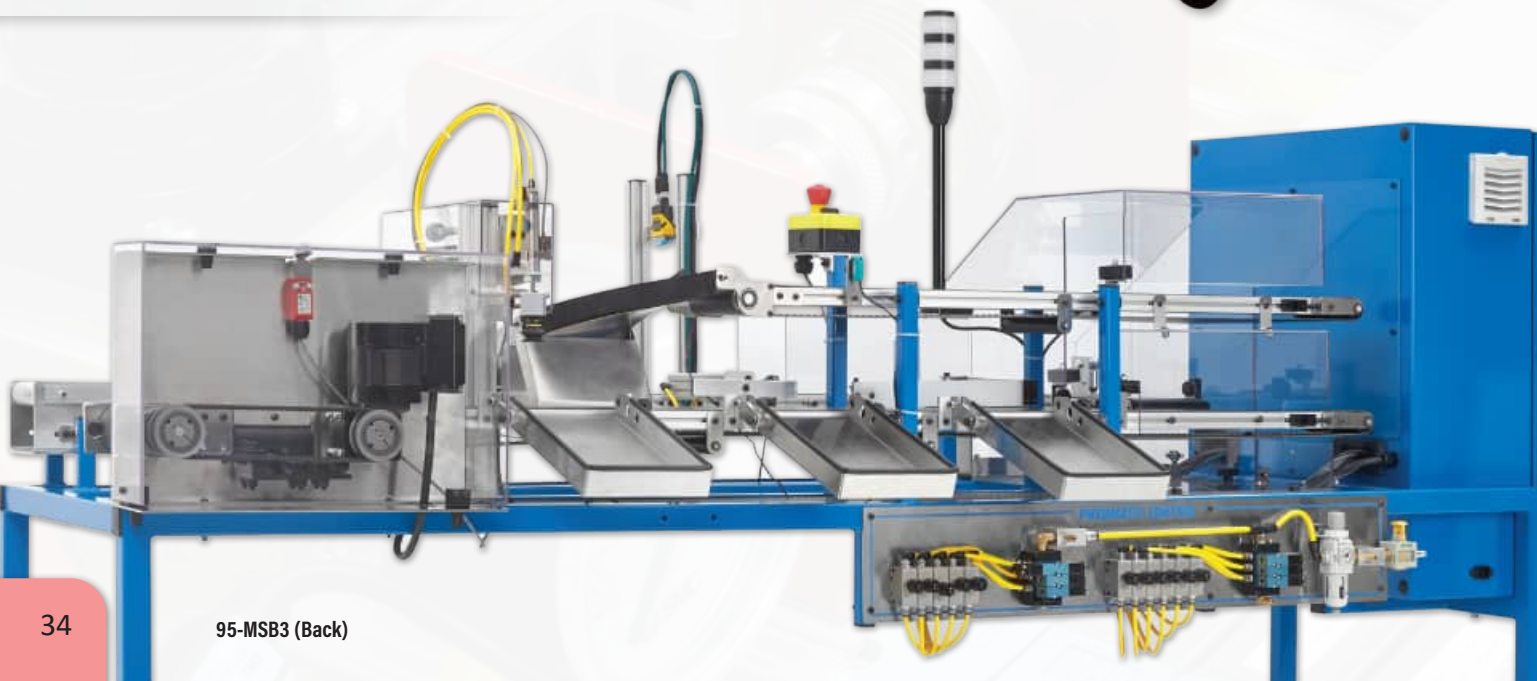
**Smart Robot Logistics Palletizing Workcell ▶ 87-SWPF1V**

- Logistics Palletizing Operation
- Robot Workcell Operation and Programming
- Safety PLCs
- Robot Vision Guidance
- Robot Vision Barcode



**Mobile Robot Logistics System ▶ 87-MRL1**

- Autonomous Mobile Robotics (AMR)
- Robot Startup
- Manual & Automatic Robot Operation
- AMR Mapping & Programming Missions



95-MSB3 (Back)



**Skill Boss is the required assessment device for the following MSSC's Certified Technician – Supply Chain Automation (CT-SCA) certifications:**

**CTSCA-EM - Equipment Maintenance**  
Maintaining, Operating, & Adjusting Equipment

**CTSCA-ER - Equipment Repair**  
Installing, Troubleshooting, & Repairing Equipment

**CTSCA-NR - Network Repair**  
Installing, Troubleshooting, & Repairing Basic Controllers & Networks



## INDUSTRIAL SMART FACTORY MECHATRONICS



870 Series with AB & Siemens PLCs

### Level 1 Mechatronics

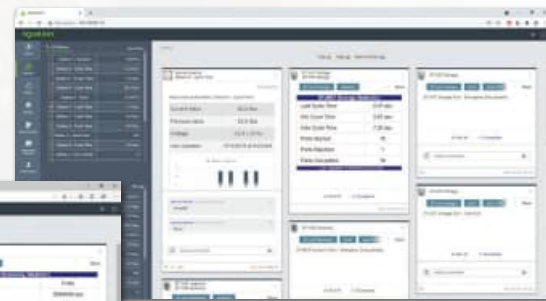
- ▶ **870 Series**
  - Introduction to Mechatronics / System Concepts
  - Safety / Machine Operation
  - Sequencing and Programming
  - Sensors / Discrete I/O Handshaking
  - Pneumatic / Electrical Pick & Place
  - Integration Skills
  - System Start-up / Halt, Stop / Reset
  - FMS Programming
  - Available with Siemens or Allen Bradley Processors or a Combination



Visual Communications & SCADA Software (87-TVCAB)



Manufacturing Execution Software (87-TMEAB)



## SMART FACTORY OPTIONS

### HMI Terminal

#### ▶ 87-HMIS7A, 87-HMIAB53, 87-HMIAB53A

- HMI Configuration
- HMI Operation
- Project Transfer
- Application Editing
- Field Objects
- Multi-Point Network Applications

Available for all Stations



### Vision Inspection

#### ▶ 87-VS1

- Vision Camera
- Vision Programming
- Output Discrete Signals
- Part Inspection



Available for all Stations

### Barcode Learning System

#### ▶ 87-BR2AB53A, 87-BR2S715

- Barcode Reader Operation
- Serial Communications
- PLC Data Instructions
- Barcode Reader Interface
- PLC Programming

Available for Individual Stations 4, 7 or Combination of 3 & 5



### RFID Learning System

#### ▶ 87-RF1AB53B, 87-RF1S715

- RFID Function
- RFID Operation
- RFID Applications
- RFID Components

Available for Individual Station 5 or Combinations of 3 & 4, 5 & 7, or 6 & 7



### PLC Learning System

#### ▶ 87-IOSS715, 87-IOSAB53A

- Introduction to Programmable Controllers
- Basic Programming
- PLC Motor Control
- PLC Timer Control
- Event Sequencing

Available for all Stations



### MechaSIM

#### ▶ 87-MSSAB53A

- PLC CIM Simulation
- MechaSIM Software Navigation
- Multiple Station Simulation

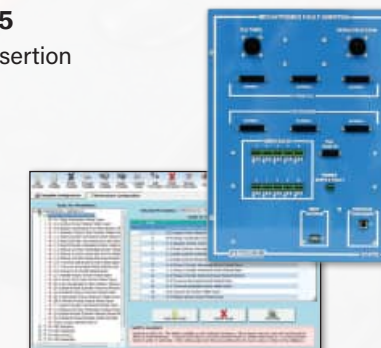


### Electronic Fault Insertion: FaultPro

#### ▶ 87-FTSAB53A, 87-FTSS715

- FaultPro Electronic Fault Insertion
- Single Fault Mode
- Random Fault Mode
- Data Tracking

Available for all Stations



### Ethernet Communications and Networks

#### ▶ 87-ENAB53A, 87-ENAB53B, 87-ENS715

- Network Operation
- Network Installation
- Configuration
- Produced / Consumed Data & Messages
- Data Transfer





# SMART FACTORY ENTERPRISE

Smart Factory Enterprise teaches hands-on Industry 4.0 skills at the enterprise level via a fully-functional smart manufacturing system with secure communications and data analysis capabilities.



**Manufacturing Execution Software**

**Smart Production & Maintenance Software**

**Network Communications & Security**

**Machining Center**

**Smart Conveyor System**

**Smart Robot Workcells**

**Visual Communications & SCADA Software**

**Autonomous Mobile Robot System**

**Smart Product ID RFID/Barcode**

**Smart Sensors**

**Laser Scanner System**

**Smart Factory Assembly**

## Enterprise-Level Industry 4.0 Training







## SOLAR PHOTOVOLTAIC SYSTEMS

### Solar PV Diagnostics ▶ 950-SPT1

- PV Module Construction, Operation, and Performance
- I-V Characteristics
- PV Array Connection and Inverters
- Solar Batteries
- Charge Controllers
- AC / DC Solar PV Systems
- Stand-Alone PV Systems
- Grid-Connected PV Systems
- Troubleshooting Components
- System Troubleshooting



## SOLAR THERMAL SYSTEMS



### Solar Thermal Diagnostics (Closed-Loop) ▶ 950-STCL1

(Also Available as Open-Loop)

- Balance of System Components
- Digital Differential Controllers
- Collectors
- Pressurized Closed-Loop Solar Thermal Systems
- System Operation and Adjustment
- Drainback Solar Thermal Systems
- Solar Storage Tanks
- Heat Exchanger and Pumps
- System Charging, Programming, and Troubleshooting

## SOLAR AND WIND SYSTEM PRINCIPLES



### Alternative Energy ▶ 850-AEC

- Solar Panel Operation and Performance
- PV Array Connection
- Wind Turbine Operation, Performance, and Connection
- Solar and Wind Batteries
- Charge Controllers
- Inverters

- Balance of System Components
- AC / DC Solar Systems
- AC / DC Wind Systems
- Energy Conservation and Demand
- System Performance

## SOLAR AND WIND CONCEPTS SOFTWARE

### Solar Concepts ▶ 950-SC1

- Introduction to Photovoltaic Systems
- Introduction to Solar Thermal Systems
- Solar Radiation Fundamentals
- Sun Path Characteristics
- Solar Panel Orientation

### Wind Concepts ▶ 950-WC1

- Introduction to Wind Power Systems
- Wind Turbine Production
- Wind Turbine Siting



## Not sure where to start? Here are some options:

- ▶ Visit [Amatrol.com](http://Amatrol.com) for additional product information and fill out a contact form
- ▶ Request a 30-day eLearning demo
- ▶ Visit Jeffersonville, Indiana to tour Amatrol's manufacturing facility and meet the curriculum developers
- ▶ Inquire about Amatrol's In-House or On-Site Instructor Training courses

## Contact Amatrol Today

**Email: [Contact@amatrol.com](mailto:Contact@amatrol.com)**  
**Phone: 800-264-8285**



2400 Centennial Blvd. Jeffersonville, IN 47130 USA  
800.264.8285 812.288.8285 [www.amatrol.com](http://www.amatrol.com)

Printed in the USA Copyright © 2024 Form No. 6748-A







INDIA DISTRIBUTOR



R K Pillai  
President and CEO

**AIPL Tech. Pvt. Ltd.**  
**Corporate Office**

Akshar Business Park, Z1 Wing,  
Office No. 1089 and 1090, Plot  
No.03, Sector 25, Vashi, Navi  
Mumbai - 400703, Maharashtra,  
INDIA.

**M: +91 9867368076**

**E: [rkpillai@aiipltech.com](mailto:rkpillai@aiipltech.com)**

**W: [www.aiipltech.com](http://www.aiipltech.com)**

**LinkedIn**