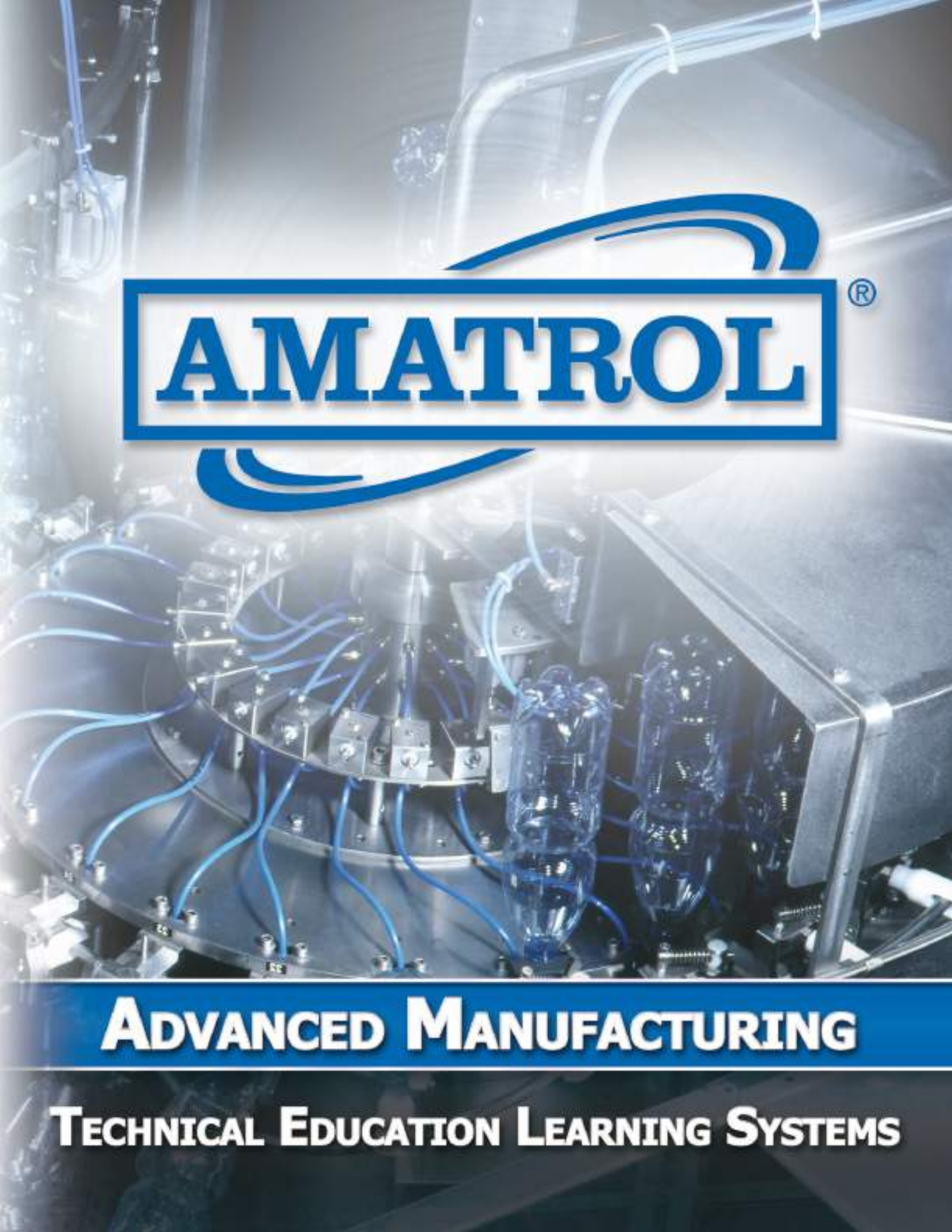
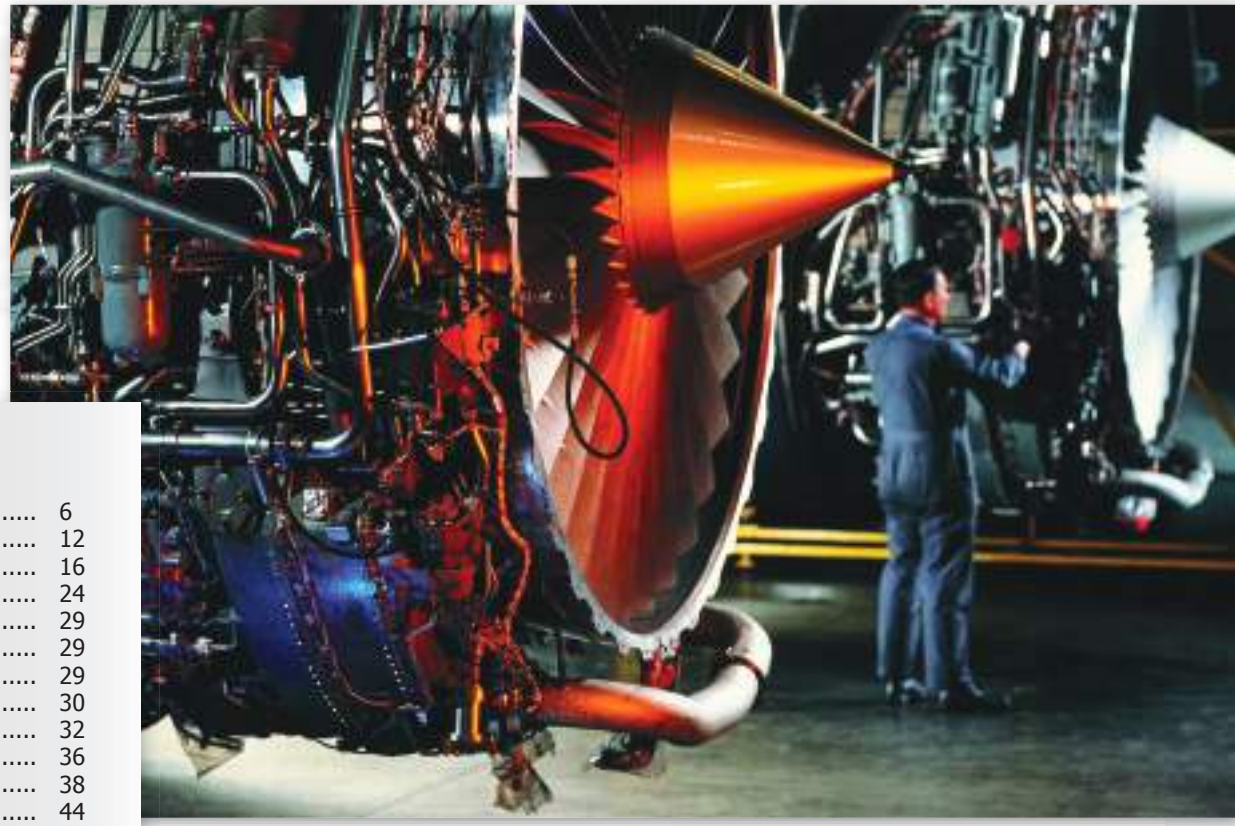

AMATROL®
ADVANCED MANUFACTURING
TECHNICAL EDUCATION LEARNING SYSTEMS

Amatrol Delivers Total Learning Solutions for Advanced Manufacturing!

Your success is our success. That's our philosophy and commitment to all of our customers. We provide total learning solutions for the ever growing critical problem of skill shortages in manufacturing. You will find that our many learning systems cover the full range of needed skills – from basics to advanced across every technology used in industry today. Our focus is job ready and we provide the tools you need to make that happen.

As your learning partner, we back up our commitment with outstanding support, from instructor training to customer service to technical support.



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Amatrol provides skill development across a broad range of both basic and advanced technologies. For example, we offer training in safety PLC, pressure compensated hydraulic pumps, multi-axis motion control, and PLC PID control to name a few.

Highly Demanded Industry Skills: Hands-On, Job-Ready!

Individualized Self-Paced or Group Learning Flexibility

Extensive Curriculum Spanning Basics through Advanced

Authentic Industrial Troubleshooting

Durable, Industrial Equipment Designed for Effective Teaching

Superior Multimedia Interactivity Connects with Learners

eAssessment to Accelerate Learning, Improve Effectiveness

Learning Anywhere, Anytime – 24/7

Outstanding Support

Learners are everywhere, and access to education needs to be everywhere as well. Amatrol offers portable learning solutions for many technologies. Below is our portable AC motor drives learning system. To see others, check out Electrical, Electronics, Mechanical, Fluid Power, and Quality Assurance.

Authentic Industrial Troubleshooting, Durable Industrial Equipment

Troubleshooting is one of the most seriously deficient skills in advanced manufacturing today and yet the most critically needed. Amatrol builds troubleshooting excellence through:

- **FAULTPRO** – Amatrol's proprietary computer-based fault insertion system that automates tracking the student troubleshooting experience
- Equipment with **integrated electronic fault troubleshooting** across a wide array of technologies
- **Electronic ability to insert both electronic and mechanical faults** for realistic industry troubleshooting situations
- **Easy student monitoring** to see where each individual is challenged and needs more practice
- Incorporation of **typical industrial components** found on the plant floor today so learners troubleshoot what they will see on the job
- Use of a **wide variety of brands** and component types so students learn to apply troubleshooting broadly

Amatrol offers a wide array of elearning solutions to fit the ever changing landscape of today's technical education needs. These fit seamlessly with our learning systems or can be used separately.

Multimedia

Genuinely interactive multimedia with vivid 3D graphics designed to teach as well as engage, checking for understanding and providing feedback – not the common quiz question so often claimed as "interactive." Frequently includes virtual skills that allow students to perform the same activities in simulation they would perform with hands-on equipment. Available via the Web or to own.

eAssessment

Amatrol's eAssessment establishes a knowledge baseline that can be used to tailor an effective, efficient learning plan for the individual customized to their needs. Assessment results are directly comparable to post course quiz results. Available via the Web.

Key Industry Skill Areas Integrated Into Amatrol's Learning Solutions:

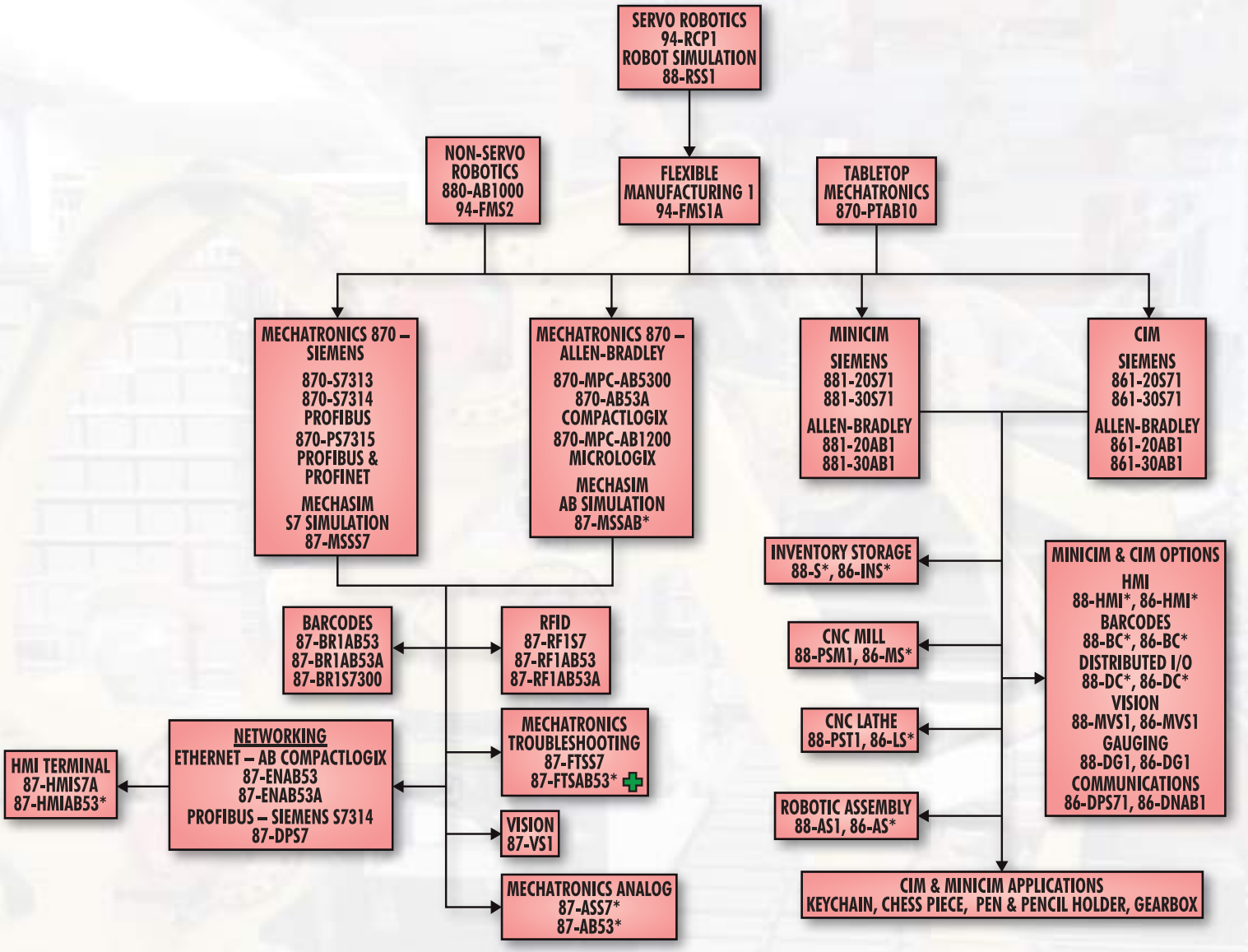
- ✔ Foundation Skills
- ✔ Problem Solving & Analysis
- ✔ Troubleshooting
- ✔ Operation
- ✔ Tuning & Adjustment
- ✔ Installation
- ✔ Maintenance & Repair
- ✔ Application

Comprehensive Curriculum For Individual Self-Paced or Group Learning Flexibility

Curriculum is, indeed, the key to learning. Great equipment alone is not enough. Excellent teaching materials is our promise and commitment to you:

- **Foundation skills** for entry level learners suitable for those who have no knowledge of the subject area
- **Progressively advanced skills** across each technology – for example, five levels of training in mechanical drives and six types of electronic motor drives
- **Complete** – Includes all text material and hands-on lab instructions. No other supplemental materials required
- **Emphasizes problem solving** and analysis skills throughout to develop learners' ability to think, not just memorize
- **Extremely detailed** enabling consistent outcomes for either individual self-paced or group learning
- **Short learning segments:** job task focused, active
- **Hands-on exercises** are presented as job tasks for learning the skills needed on the job
- **Text material and hands-on skills are interwoven** for immediate application of knowledge

Automation Systems



+ Includes Troubleshooting Skills

Maintain Real-World Automation Skills with Expansive Training Options

Amatrol's automation learning systems are constantly evolving to allow learners to gain hands-on experience with the technology that they will see on the plant floor.

Technology continues to advance and Amatrol's incredible range of learning solutions ensures that you will be able to provide a seamless learning experience.

ROBOTICS & AUTOMATION

Robotics and Computer Programming
▸ 94-RCP-1-A

- Basic Robot Operation and Programming
- Interfacing and Material Handling
- Application Development
- Flexible Manufacturing Cells
- Quality Control
- Production Control

Flexible Manufacturing
▸ 94-FMS-1-A

- Robotic Assembly/Linear Motion
- Point Arrays/Palletizing
- World & Tool Coordinates
- Servo Traverse Axes
- CNC/FMS I/O Interfacing
- Serial Communications
- Barcode Readers
- ASCII Data Manipulation
- Digital Indicators/Automated Gauging
- Multitasking/Program Interrupts

94-RCP-1-A and 94-FMS-1-A

94-RCP-1-A Optional Multimedia

Robotics Simulation ▸ 88-RSS1

- Basic Robot Operation
- Movement & End Effector Commands
- Interfacing
- Flexible Manufacturing Cells
- Cartesian Coordinate Programming

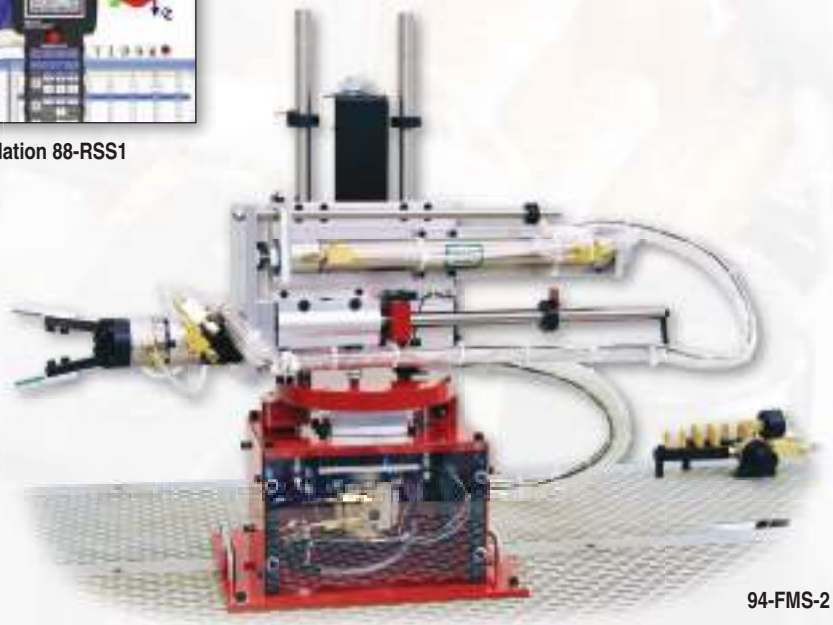
Robotics Simulation 88-RSS1

Flexible Manufacturing ▸ 94-FMS-2

- Pneumatic Robot Systems
- Cylindrical Coordinates
- Maintenance and Troubleshooting
- Pneumatic Robot Control
- Robot Programming

Robot Control ▸ 880-AB1000

- PLC Program Design
- Discrete I/O Interfacing
- PLC Sequence Instructions
- PLC Program Applications



94-FMS-2 shown with 880-AB1000

Automation Systems

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 Cominbation

Fanuc Servo Robot Integration

Fanuc Robot Integration

87-500F, 25098

- User Supplied Fanuc Robot
- Fanuc Robot Interface and Cabling Package
- Custom Gripper Set
- Safety Enclosure

Available for Station 5

Fanuc 200iD/4S

Fanuc 200iC

Electronic Fault Insertion: FaultPro

87-FTSS7, 87-FTSAB53, 87-FTSAB53A

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

Available for all Stations

FAULTPRO
COMPUTER-BASED FAULT INSERTION

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

87-VS1 Multimedia Included

Available for all Stations

Mechatronics Barcode Learning System

87-BR1S7300, 87-BR1AB53

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

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

87-BR1 Multimedia Included

RFID Learning System

87-RF1S7300, 87-RF1AB53

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

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

87-RF Multimedia Included

PLC Learning System

87-IOSS7, 87-IOS-AB5300

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

Available for all Stations

MechaSIM

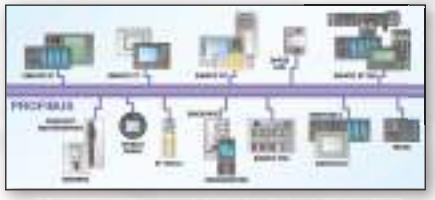
87-MSSS7, 87-MSSAB53

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

Mechatronics Profibus –Siemens S7314

87-DPS7

- Communication Network
- Data Exchange
- Network Configuration
- Multiple Station Control
- System Stop/Reset

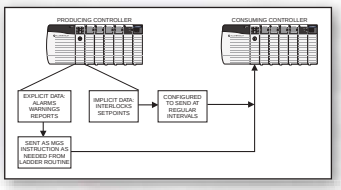


Use with any two Stations having Siemens S7314 processors

Mechatronics Ethernet

87-ENAB53

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



Use with any two Stations having AB 5300 series processors

AUTOMATION SYSTEMS

TABLETOP MECHATRONICS

870-PTAB10, 87-TMS1,
87-TMS2, 87-TMS3, 87-TMS4,
Pegasus Servo Robot & 88-200 Table

Inventory Feeding
87-TMS1
- Powered Parts Feeder
- Electro-Pneumatic Valve Adjustment
- Event Sequencing

Inspection & Indexing
87-TMS2
- Index Station Operation
- Stepper Motor Programming
- Sensor Adjustments

Sorting & Distribution
87-TMS3
- Sorting Operation
- Parts Storage
- Thru-Beam Photoelectric Adjustment

Servo Robot Station
87-TMS4
- Servo Robot Programming
- Robot Interfacing
- Robot Work Envelope

870-PTAB10 Multimedia Included

MiniCIM ▸ 881 Series

- PLC Operation
- Servo Robots
- CNC Machining
- Assembly Operations
- Work Cells
- Ethernet Network

881 Series Multimedia Included

881 Series MiniCIM shown with options

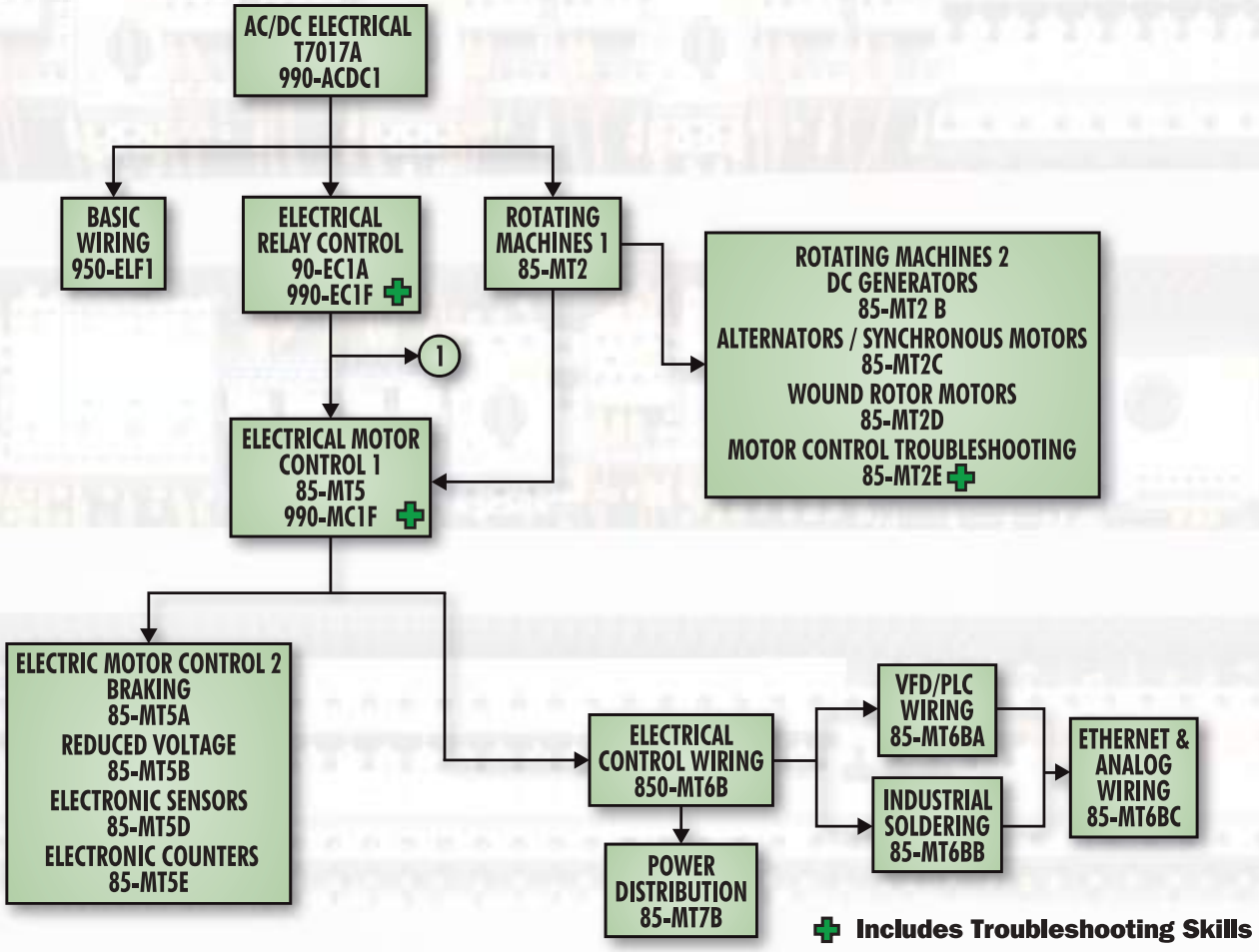
MiniCIM

Available Processors
Allen Bradley AB5300 L16
SIEMENS S712

Optional Inventory Stations
86-INS1 ▸ Pegasus Robot, Workstation, Gravity Feeder
86-INS2 ▸ Pegasus Robot, Linear Traverse, Palletized Grid Storage
86-INS3 ▸ Fanuc Robot Integration Package, Gravity Feeders

Optional Application Modules
Keychain ▸ 88-700
Chess Piece ▸ 88-701
Pen & Pencil Holder Assembly ▸ 88-702
Pen & Pencil Holder with Machining ▸ 88-702-A
Gearbox Assembly ▸ 88-703
Gearbox with Machining ▸ 88-703-A

881 Series MiniCIM
shown with optional CNC Mill



Knowledge Building & Hands-On Electrical Skills

Amatrol's electrical training solutions start with basic electricity and continue to more advanced topics such as power distribution and motor control.

Hands-on electrical skills are also a key element in manufacturing's overall need for multi-skilled individuals. Only Amatrol offers a full range of multi-discipline, hands-on skill training and a plan for implementation.

BASIC ELECTRICITY

T7017A

T7017A Optional Multimedia

AC / DC Electrical
- **T7017A**
- **990-ACDC1 Portable**
  - 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-ACDC1 Multimedia Included

90-EC1A

90-EC1A Optional Multimedia

Electrical Relay Control
- **90-EC1A**
- **990-EC1 Portable**
  - 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

990-EC1

990-EC1 Multimedia Included

ROTATING MACHINES

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

85-MT2 shown with 85-MT2-B

85-MT2-C

85-MT2-D

85-MT2-E

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

Multimedia Optional for 85-MT2 & All Options

MOTOR CONTROL

85-MT5, 85-MT5-A and Options

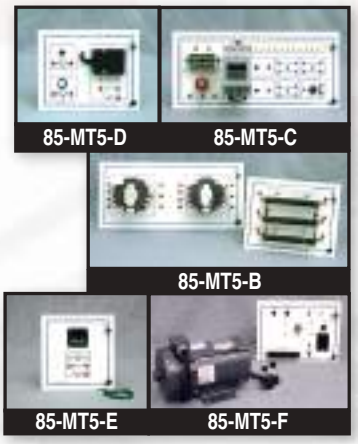
Multimedia Optional for
85-MT5 & All Options

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

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
- SCR Speed Control > 85-MT5-F



Fault Troubleshooting System
890-FTS

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

890-FTS

FAULTPRO
COMPUTER-BASED FAULT INSERTION

990-MC1F

990-MC1F Multimedia Included

Electrical Motor Control Troubleshooting
990-MC1F

- Reversing Motor Control
- Control Ladder Logic
- Component Troubleshooting
- Automatic Input Devices

FAULTPRO
COMPUTER-BASED FAULT INSERTION

WIRING

Electrical Fabrication 1 ▸ 950-ELF1

- Introduction to Electrical System Wiring
- Residential Wiring System Components
- Service Connection and Circuit Protection

950-ELF1

950-ELF1 Optional Multimedia

Industrial Electrical Wiring ▸ 850-MT6B

- Electrical Control Wiring
- Electrical Prints
- Panel Wiring
- Pneumatic Control Circuit Wiring
- Overcurrent Protection

Multimedia Optional for
850-MT6B & All Options

850-MT6B shown with
85-MT6BA & 85-MT6BC

VFD/PLC Wiring ▸ 85-MT6BA

- PLC Installation
- VFD Installation
- VFD Motor Control
- VFD/PLC Communication

85-MT6BA

85-MT6BC

Ethernet & Analog Wiring ▸ 85-MT6BC

- Ethernet Installation Wiring
- Ethernet Switch Installation
- HMI Installation
- Analog Transmitter/
  Thermocouple Installation

85-MT7B

85-MT7B Optional Multimedia

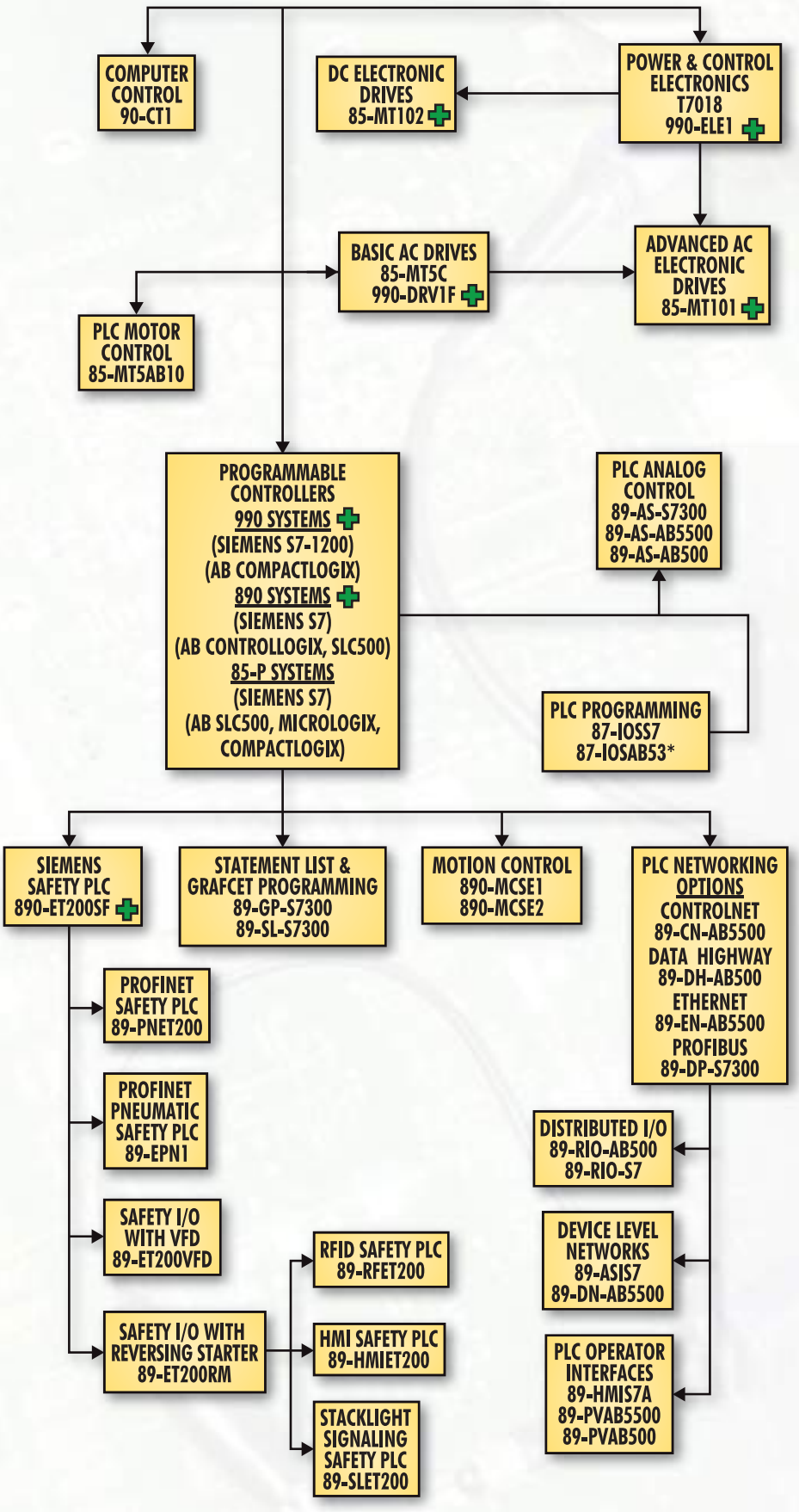
Electrical Power Distribution ▸ 85-MT7B

- Raceways
- Conduit Bending and Sizing
- Conductors; Disconnects
- Circuit Protection
- Wire Pulling Techniques

Industrial Soldering ▸ 85-MT6BB

- Soldering Basics
- Soldering Inspection
- Solder Wick
- Electrical Panel Soldering Applications

85-MT6BB



Electronics Skills from Basics to Advanced

Amatrol's electronics training solutions are unmatched in their ability to provide hands-on training with the widest range available of PLCs, sensors, and other technologies, such as RFID and barcode readers.

Need a portable solution to teach electronics? Check out the 990-ELE1 Portable Power & Control Electronics Learning System. Need a PLC trainer that will allow your program to grow? Check out the 890-based PLC Systems. The 890 PLC series is available with various Siemens or Allen Bradley PLCs and depending on the PLC selected, there are over 20 add-ons, including HMI, VFD, and RFID.

If you need the ability to teach electronics troubleshooting, look for the FaultPro logo that indicates the system is compatible with Amatrol's computer-based fault insertion system. FaultPro is the industry's only realistic fault troubleshooting system.

Includes Troubleshooting Skills

POWER & CONTROL

990-ELE1 Multimedia Included

Power & Control Electronics ▸ 990-ELE1

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

990-ELE1

T7018

Power & Control Electronics ▸ T7018

- Oscilloscopes
- Power Supplies, Diodes, Rectifiers
- Power Supply Filtration and Regulation
- Solid State Relays
- Discrete Sensing Devices
- Thermal Sensing Devices
- Amplifiers and OP Amps
- Analog Sensing Devices
- Solid State Switching
- Solid State Speed and Power Control

T7018 Optional Multimedia

Easy Panel Changeover

FAULTPRO
COMPUTER-BASED FAULT INSERTION

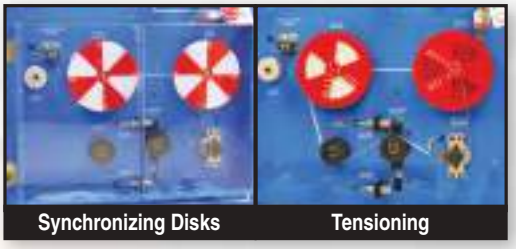
MOTION CONTROL

890-MCSE1

Level 1 Motion Control - 1-Axis ▸ 890-MCSE1

- Motion Control System Operation
- Drive Configuration & Tuning
- Drive Operation
- Project Configuration
- Function Blocks & Programming
- Position Control
- CANOPEN Bus & Programming
- Velocity & Current Control

890-MCSE2



Synchronizing Disks | Tensioning

Level 2 Motion Control - 2-Axis ▸ 890-MCSE2

- Multi-Axis Configuration and Gearing
- Gearing Function Blocks and Applications
- Camming
- Camming Function Blocks and Tappets
- Registration
- Rotary Knife
- Unwind/Wind

ELECTRONICS

PROGRAMMABLE CONTROLLERS

PLC Workstation and Fault Troubleshooting System
▸ 890-PECB Plus Controller
(Requires 890 Controller and Panels)

- Operation
- Programming
- System Troubleshooting
- PLC Motor Control
- Boolean Algebra/Logic
- Ladder Logic
- Discrete I/O Interfacing
- Timer Instructions
- Counter Instructions
- Event Sequencing
- Application Development
- Program Control

890-PECB with 890-AB5500, 890-S7300, 89-HMI and 890 Application Panels

FAULTPRO
COMPUTER-BASED FAULT INSERTION

Computer not included

OPTIONS FOR 890 BASED PLC SYSTEMS

Siemens S7 300 Series (313 – 315)

Analog Application ▸ 89-AS-S7300
ASI Bus ▸ 89-ASI-S7*
Profibus ▸ 89-DP-S7300
Graph Programming ▸ 89-GP-S7300*
HMI Touch Screen ▸ 89-HMI-S7-A*
Distributed I/O ▸ 89-RIO-S7*
Statement List ▸ 89-SL-S7300*

Allen-Bradley ControlLogix (AB5500)

Analog Application ▸ 89-AS-AB5500
ControlNet ▸ 89-CN-AB5500*
DeviceNet ▸ 89-DNAB5500
EtherNet ▸ 89-EN-AB5500
Process Control ▸ 89-PC-AB5500*
PanelView Plus ▸ 89-PVAB5500*

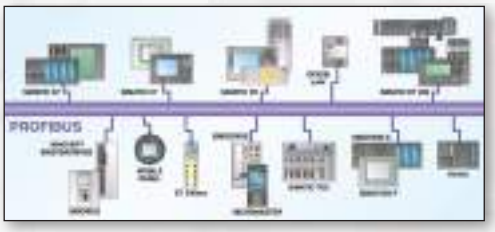
Allen-Bradley SLC500

Analog Application ▸ 89-AS-AB500
Data Highway, SLC502 ▸ 89-DH-AB500*
Data Highway, SLC503 ▸ 89-DH-AB500-A*
PanelView ▸ 89-PV-AB500-A*
Distributed I/O ▸ 89-RIO-AB500*

*Not Shown

Profibus
▸ 89-DP-S7300

- Network Operation
- Profibus DP Network Construction
- Network Configuration
- Data Exchange
- System Functions



89-DP-S7300

89-PVAB5500

PanelView Operator ▸ 89-PVAB5500

- Application Editing
- PanelView Construction and Configuration
- Tags and Communications
- Input and Output Objects

89-AS-S7300

89-EN-AB5500

89-DNAB5500

PLC Analog Application
▸ 89-AS-S7300
▸ 89-AS-AB5500
▸ 89-AS-AB500

- Analog Input Modules
- Input Configuration and Troubleshooting
- Output Configuration and Troubleshooting
- Output Devices and Installation

PLC EtherNet ▸ 89-EN-AB5500

- Remote I/O
- Industrial Communications Networks
- Produced/Consumed Data and Messages
- Troubleshooting Ethernet/IP

DeviceNet ▸ 89-DNAB5500

- Input/Output
- Industrial Communications Networks
- Troubleshooting

Siemens Safety PLC ▸ 890-ET200SF

- Safety System Components
- Safety Programming
- PLC Connections & Operations
- PLC Programming
- PLC System Troubleshooting
- Event Sequencing
- Application Development
- Program Control Instructions
- Math & Date Move Instructions

FAULTPRO
COMPUTER-BASED FAULT INSERTION

Supply Voltage Test

890-PECB shown with Siemens ET200 PRO Safety PLC & Options

890-ET200SF shown with 89-ET200VFD

OPTIONS FOR 890 SAFETY PLC WORKSTATION

Siemens Safety PLC (ET200PRO)

Profinet ▸ 89-PNET200*
Profinet Pneumatic ▸ 89-EPN1*
Safety I/O with VFD ▸ 89-ET200VFD
Safety I/O with Reversing Starter ▸ 89-ET200RM*
RFID Safety PLC ▸ 89-RFET200
HMI Safety PLC ▸ 89-HMIET200
Stacklight Signaling Safety PLC ▸ 89-SLET200

89-HMIET200

HMI Safety PLC
▸ 89-HMIET200

- HMI Construction
- HMI Configuration
- Application Editing
- WINCC Flexible Software
- Project Screens
- Input & Output Objects
- I/O Field Objects

89-ET200VFD

Safety I/O with VFD
▸ 89-ET200VFD

- Reversing Motor Starter Operation
- Reversing Motor Starter Programming
- Motor Starter Construction
- Disconnect Module Operation
- STEP 7 Project Component Configuration

Stacklight Signaling Safety PLC
▸ 89-SLET200

- Stack Light Function
- Siemens 8WD44 Signal Column components
- Memory Clock Bits Function
- Stack Light Operation
- Control Stack Light via PLC

89-SLET200

RFID Safety PLC
▸ 89-RFET200

- RFID Function
- RFID Components
- RFID Interface Module Configuration
- RFID System Selection
- Read/Write Device
- Data Exchange

89-RFET200

85-P Shown with Siemens S7312
& Motor Application Panel 17205

Tabletop 85-P PLC Workstation Plus Controller

Allen Bradley
- **85-P-AB1000**
- **85-P-AB503**
- **85-P-AB5300**

Siemens
- **85-PS7312**
- **85-PS7315**

- Programmable Control Operation
- Controller Programming Languages
- Basic PLC Programming
- Numbering Systems
- PLC Motor Control
- Seal-In Program Logic
- Event Sequencing
- Application Development

85-P-AB1000 & 85-P-AB503
Optional Multimedia

Options for 85-P PLC Workstation

Pneumatic Application Panel ▸ 17200

Electric Motors Application Panel ▸ 17205

Discrete Wiring Application Panel ▸ 17250

87-IOS

870-PS7317

87-IOSS7 Shown with 870-PS7317
Adds to any 870 series Mechatronics Cart

PLC Programming

- **87-IOSS7**
- **87-IOSAB53**

- PLC Operation
- Basic Programming
- PLC Motor Control
- Program Control Instructions
- Math & Data Move Instructions
- Event Sequencing

Portable PLC Troubleshooting - Allen-Bradley CompactLogix ▸ 990-PAB53AF

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

FaultPro Computer-Based Fault Insertion

990-PAB53 Multimedia Included

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

Portable PLC Troubleshooting Siemens S7-1200 ▸ 99-FTSS712 Allen-Bradley AB5300 ▸ 99-FTSAB53

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

FaultPro Computer-Based Fault Insertion

Electronic Fault Troubleshooting System for Portable 990 PLC Systems

Portable PLC Troubleshooting - 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)

85-MT5AB10 Adds to 85-MT5

PLC Motor Control ▸ 85-MT5AB10

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

85-MT5AB10 Multimedia Included

ELECTRONIC DRIVES

85-MT10-1 (Back Storage)

85-MT10-1 (Front)

AC Electronic Drives ▸ 85-MT10-1

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

Panels Included

- **AC Vector Spindle Drive**
- **AC General Purpose Drive**
- **AC Servo Axis Drive**

85-MT10-1 Optional Multimedia

Quick Panel Connection

Easy Panel Removal

DC Electronic Drives ▸ 85-MT10-2

- Servo Axis, Spindle, PWM and SCR Drives
- DC Permanent Magnet Motors
- Inner Loop Compensation
- Torque Control
- Position and Velocity Servo Control
- Tachometers, Resolvers and Encoders

Panels Included

- **DC Spindle Drive**
- **DC PWM Drive**
- **DC Servo Axis Drive**

85-MT10-2 (Back Storage)

85-MT10-2 (Front)

85-MT5C Adds to 85-MT5

Basic AC Electrical Drives ▸ 85-MT5C

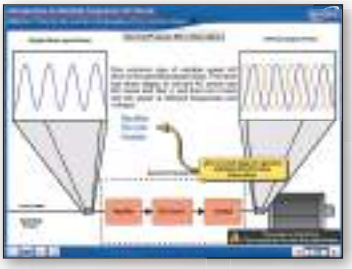
- Variable Frequency AC Drives
- 2 & 3 Wire Motor Control
- Jogging
- Speed Control
- Torque Control
- Acceleration & Deceleration
- Braking
- Troubleshooting

85-MT5C Optional Multimedia

Portable AC Frequency Drives Troubleshooting ▸ 990-DRV1F

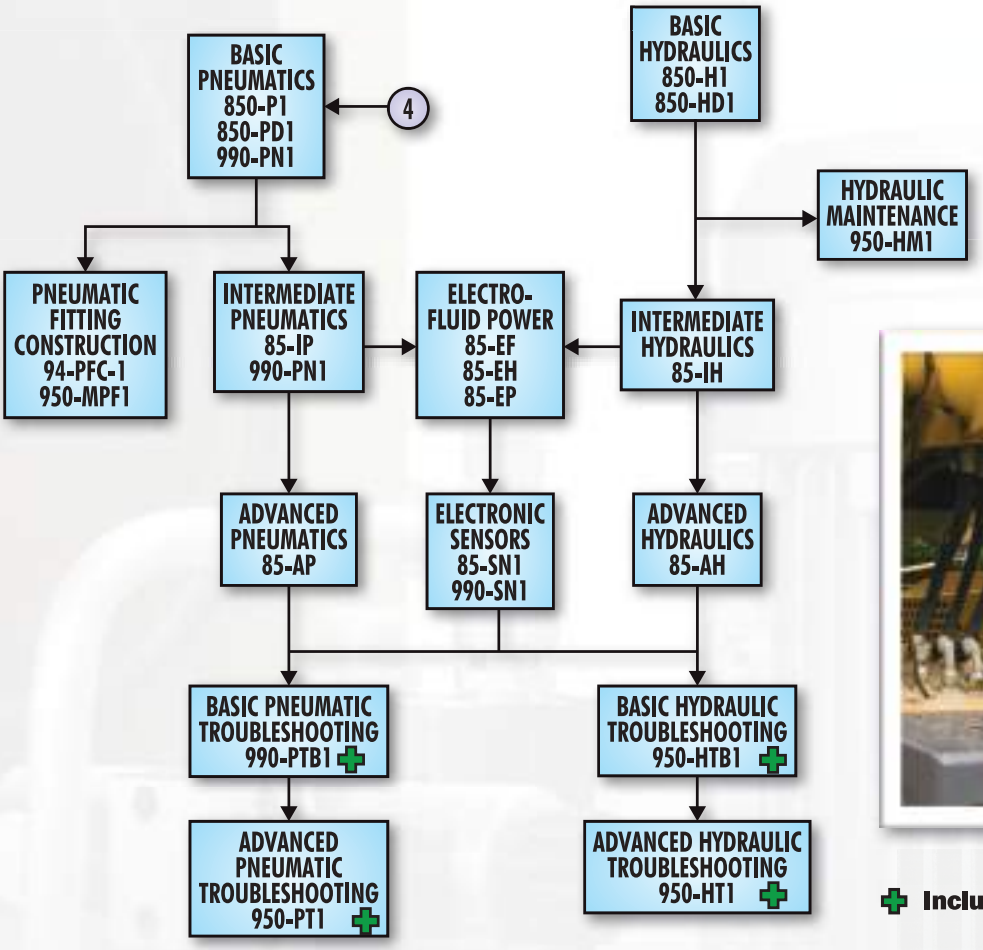
- Introduction to AC Drives
- 2 & 3 Wire Motor Control
- Jogging Control
- Motor Ramping
- Drive Input Troubleshooting
- Motor Input Troubleshooting
- Drive Relay Troubleshooting

FAULTPRO
COMPUTER-BASED FAULT INSERTION



990-DRV1F Multimedia Included

990-DRV1F



✚ **Includes Troubleshooting Skills**

Fluid Power Training for Every Need

Amatrol's first product was based on fluid power and decades later these learning systems continue to provide training opportunities that are unavailable anywhere else. This is because Amatrol continuously evaluates and updates its product offerings to ensure that the hands-on skills being taught are industry-relevant and that the curriculum uses proven learning methodologies.

990-SN1

Electronic Sensors

- **990-SN1 Portable**
- **85-SN1**

(85-SN1 May Be Used with 850-H1)

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

Multimedia Included for 990-SN1
Optional Multimedia for 85-SN1

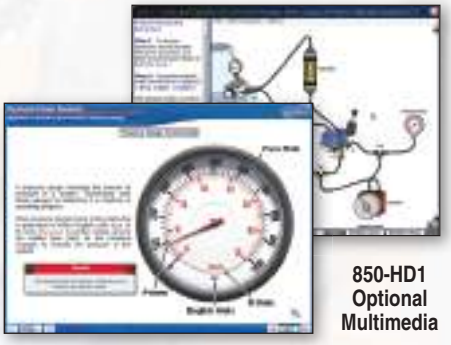
HYDRAULICS

850-HD1 with 85-EF, 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



850-HD1 Optional Multimedia

850-HD1

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

85-IH Optional Multimedia

Electro-Hydraulics
85-EH

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

85-EH Optional Multimedia

Advanced Hydraulics
85-AH

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

85-AH Optional Multimedia

Fluid Power

HYDRAULIC MAINTENANCE

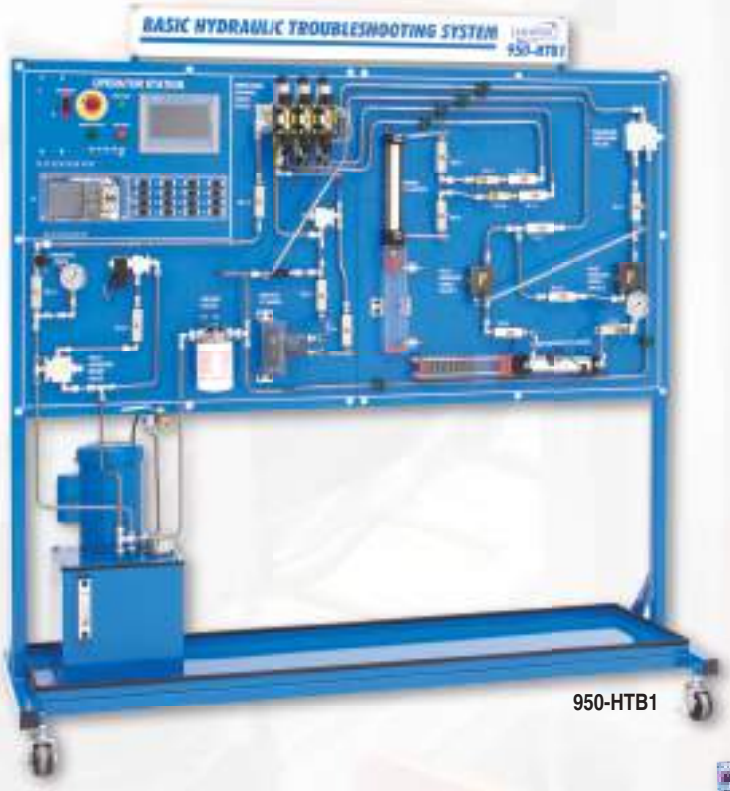
Hydraulic Maintenance ▸ 950-HM1

- Hydraulic Filter Maintenance
- Hydraulic Fluid Maintenance
- Flushing Hydraulic Fluid
- Fittings & Seals
- O-Ring Seals
- Hose & Clamping Devices
- Cylinder Bleeding
- Tubing & Component Inspection
- Component Replacement

950-HM1 Multimedia Included

950-HM1

HYDRAULIC TROUBLESHOOTING



950-HTB1

Basic Hydraulic Troubleshooting ▸ 950-HTB1

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

950-HTB1 Multimedia Included

Hydraulic Troubleshooting ▸ 950-HT1

- Valves: Unloader, Pilot-Operated, Counterbalance, Subplate Mounted, Pressure Compensated Flow Control
- Pilot-Operated DCVs
- Pressure-Compensated Pump
- Gear Pump
- JIC Tie-Rod Cylinders
- Maintenance
- Troubleshooting

Unloader Valve on 950-HT1

2-Stage Directional Control Valve on 950-HT1

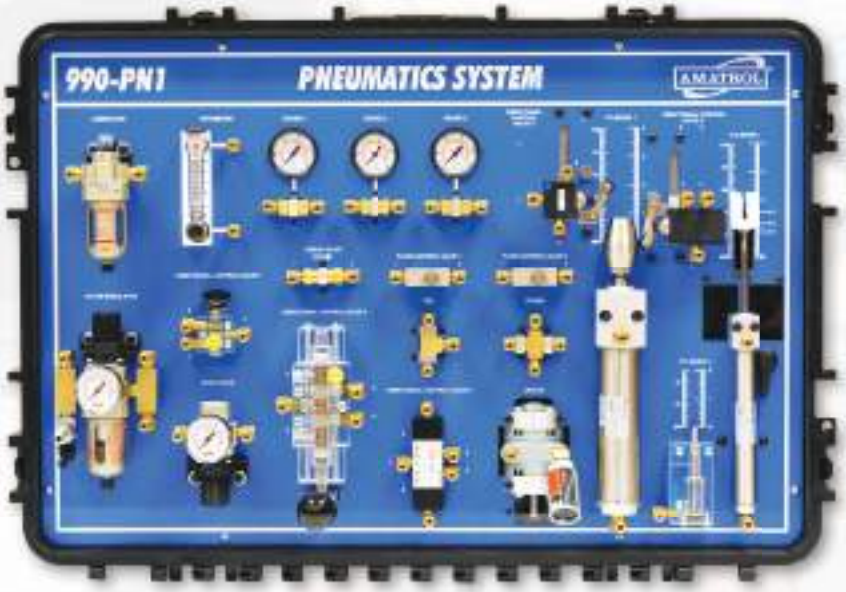
950-HT1

PNEUMATICS

Portable Pneumatics ▸ 990-PN1

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

990-PN1 Multimedia Included



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

850-PD1 Optional Multimedia

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

85-IP Optional Multimedia

Advanced Pneumatics ▸ 85-AP

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

85-AP Optional Multimedia

850-P1 Shown with 85-IP & 85-AP

850-PD1 Shown with Additional 85-BP & 85-IP

PNEUMATIC CONSTRUCTION

94-PFC-1 Fitting Panel (manifold, bracket, cylinder, DCV, and FCV)

Pneumatic Fitting Construction ▸ 94-PFC-1

- Air Supply Installation
- Control Air Connections
- Power Air Installation

94-PFC-1 Optional Multimedia

Component Kit includes pressure gauge, fittings, tubing, hose, & tape

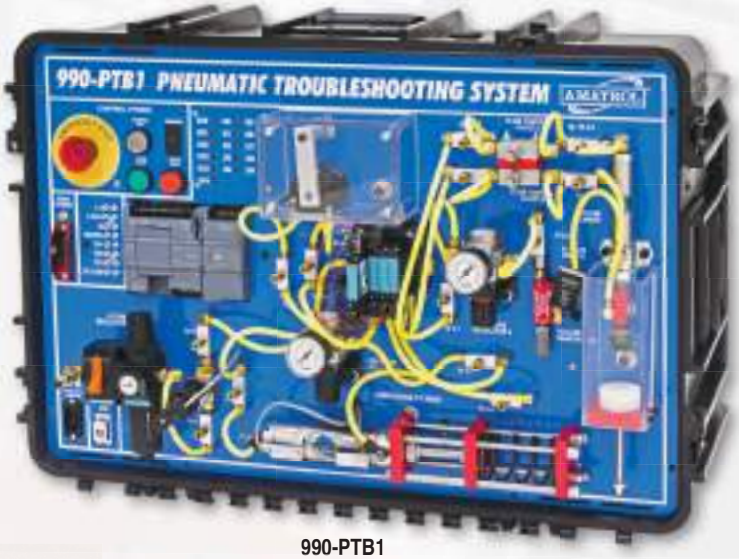
PNEUMATIC TROUBLESHOOTING

Portable Basic Pneumatic Troubleshooting ▸ 990-PTB1

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

FAULTPRO
COMPUTER-BASED FAULT INSERTION

990-PTB1 Multimedia Included



990-PTB1

950-PT1

Pneumatic Troubleshooting ▸ 950-PT1

- Air-Over-Oil systems
- Pilot-Operated DCVs
- Rodless and JIC Tie-Rod Cylinders
- Subplate-Mounted and Sandwich valves
- Cylinders
- Shock Absorbers
- Vacuum Systems
- Lockout/Tagout

FAULTPRO
COMPUTER-BASED FAULT INSERTION

Lean Manufacturing

12 Courses Ranging from Introductory to Set-Up Reduction

Lean Overview ▸ LM100

Visual Workplace ▸ LM205

5S ▸ LM102

Kaizen ▸ LM307

LEAN MANUFACTURING

LEAN OVERVIEW, LM100
INTRODUCTION TO LEAN, LM101
5S, LM102
TOTAL PRODUCTIVE MAINTENANCE, LM103
POKA-YOKE, LM104
LEAN THEORY, LM203
LEAN PROCESS FLOW, LM204
VISUAL WORKPLACE, LM205
STANDARDIZED WORK, LM206
KAIZEN, LM307
VALUE STREAM MAPPING, LM308
SET-UP REDUCTION, LM409

Safety

7 Courses Covering Basic Safety in Manufacturing Operations

SAFETY

SAFETY PRACTICES & REGULATIONS, SA101
PERSONAL PROTECTIVE EQUIPMENT, SA102
HAZARDOUS COMMUNICATION, SA103
CONFINED SPACES, SA104
LOCKOUT/TAGOUT, SA105
ACCIDENT RESPONSE, SA106
OVERHEAD CRANE SAFETY, SA206

Safety Practices & Regulations ▸ SA101

Accident Response ▸ SA106

Lockout/Tagout ▸ SA105

Hazardous Communication ▸ SA103

Workplace Effectiveness

9 Courses Focused on Essential Skills for All Manufacturing Employees

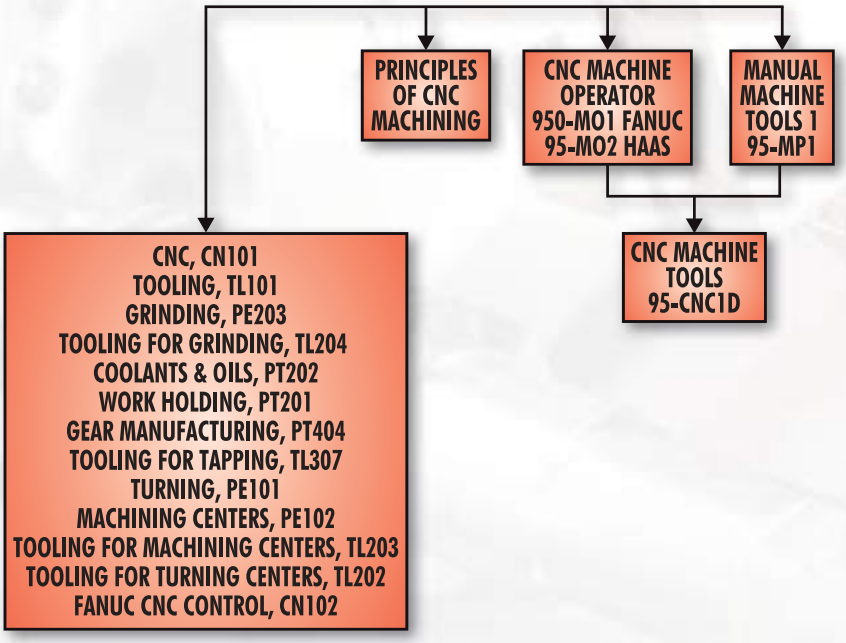
Mathematics ▸ MA101

Communications Skills ▸ PD101

WORKPLACE EFFECTIVENESS

PRINCIPLES OF ADVANCED MANUFACTURING, AM101
MATHEMATICS, MA101
TRIGONOMETRY, MA304
COMMUNICATION SKILLS, PD101
CONFLICT RESOLUTION, PD102
WORKING IN GROUPS, PD103
TEAM CONCEPTS, WX11109-02
PRODUCT DESIGN, WX11109-03
BUSINESS PRESENTATIONS 1, WX11109-04

MACHINING



Amatrol has the Machining Program you Need!

Machining parts to today's high standards requires a solid grasp of a wide range of machines from manual machines to CNCs. Amatrol provides the knowledge and hands-on training individuals need.

95-CNC1-D Micromill and Tooling

95-CNC1-D Optional Multimedia

CNC Machine Tools ▸ 95-CNC1-D

- CNC Setup
- CNC Operation and Programming
- Circular Interpolation
- Speeds and Feeds
- CNC Mill Canned Cycle
- CNC Mill Cutter Compensation

CNC Machine Operator
- **950-MO1 (FANUC)**
- **95-MO2 (HAAS)**

- CNC Mill, Lathe, and Grinder Set-up and Operation
- Tool Identification, Set-up, Use and Management
- Fixture Set-up and Operation
- CNC Troubleshooting and Maintenance for Operators
- Precision Measurement and Gauging
- Print Reading
- Geometric Dimensioning and Tolerancing
- Machining Processes
- Statistical Process Control
- Quality and Cycle Time Optimization
- CNC Program Operation

950-MO1 & 95-MO2 Multimedia Included

Machine Tools ▸ 95-MP1

- Bandsaws
- Drill Presses
- Hand Tools
- Manual Mills
- Manual Lathe

95-MP1
Optional Multimedia

PRINCIPLES OF CNC MACHINING

13 Courses Ranging from Work Holding to CNC Control

Principles of CNC ▸ CNC101

Coolants & Oils ▸ PT202

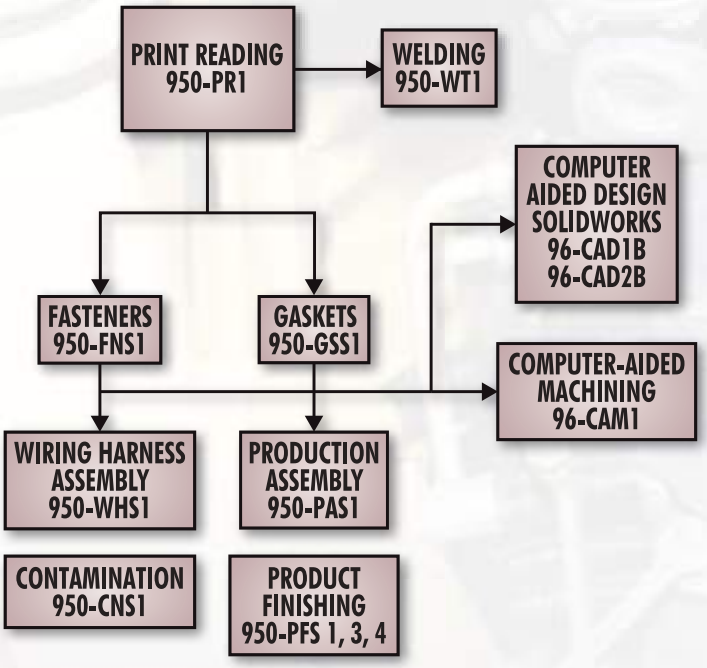
Tooling for Turning Centers ▸ TL202

Tooling for Grinding ▸ TL204

PRINCIPLES OF CNC MACHINING

CNC, CN101
TOOLING, TL101
GRINDING, PE203
TOOLING FOR GRINDING, TL204
COOLANTS & OILS, PT202
WORK HOLDING, PT201
GEAR MANUFACTURING, PT404
TOOLING FOR TAPPING, TL307
TURNING, PE101
MACHINING CENTERS, PE102
TOOLING FOR MACHINING CENTERS, TL203
TOOLING FOR TURNING CENTERS, TL202
FANUC CNC CONTROL, CN102

Manufacturing Processes



Widest Range of Manufacturing Processes Covered

Manufacturing Skills vary depending on a company's specific products. Amatrol's learning systems emphasize the hands-on skills common to almost every industry including assembly, welding, and product finishing.

Computer Aided Design 1
96-CAD1B

(Includes SolidWorks software)

- Solid Modeling Introduction
- Solid Model Features
- Creating a Solid Model
- Extruded Boss/Base
- Drawing Planes
- Fillets and Chamfers
- Revolved Features
- Multi-View Drawings

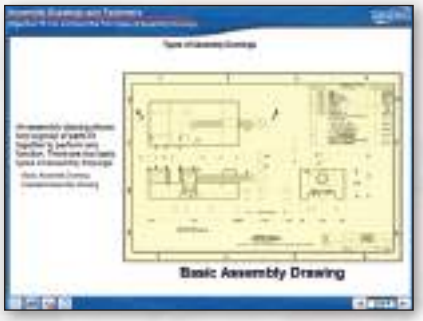
96-CAD1B CAD Software & Multimedia Included

Computer Aided Design 2
96-CAD2B

- 3D Assembly Model Creation
- Standard Mates and Component Manipulation
- Exploded Assemblies
- Exploded Assembly Animation

Print Reading 1
950-PR1

- Print Reading Introduction
- Multi-View Drawings
- Basic Dimensioning
- First-Angle Projection
- Assembly Drawings and Fasteners
- GD&T Fundamentals
- Feature and Control Frame



Production Assembly ▸ 950-PAS1

- Torque Basics and Click-type and Air Impulse Tools
- O-Ring and Lip Seals
- Hydraulic Fittings
- Hose and Coupling Assembly
- Hydraulic Fittings and Tubing

950-PAS1 Shown with 95-PAS2, 95-PAS3, 95-PAS4, 95-PAS5

Front Side (Torque Tools)

Back Side (Hoses, Tubing, & Fittings)

Multimedia Included for 950-PAS1 & All Options

OPTIONS FOR THE 950-PAS1 PRODUCTION ASSEMBLY

Split Flange Couple ▸ 95-PAS2
Electric Torque Wrench ▸ 95-PAS3
Stall Bar ▸ 95-PAS4
Instrumented DC Electric Torque Wrench ▸ 95-PAS5

Gaskets ▸ 950-GSS1

- Gasket Types
- Gasket Handling and Storage
- Installation
- T-Joints and RTV Sealant

Fasteners ▸ 950-FNS1

- Threaded and Non-threaded Fasteners
- Bolt Construction and Sizes
- Bolt Grades
- Screws
- Washers
- Locking Nuts
- Pins and Keys

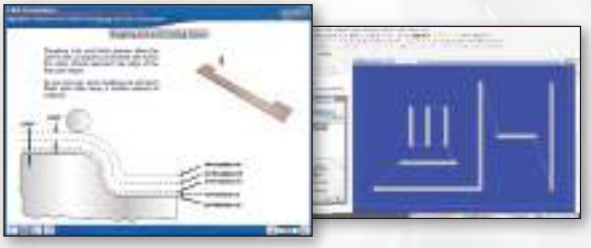
Contamination ▸ 950-CNS1

- Contamination Control
- Types of Contaminants
- Component Handling

Computer-Aided Machining ▸ 96-CAM1

(Includes MasterCAM software)

- Introduction to CAD/CAM
- CAD/CAM Part Geometry
- Contour CAM Toolpath
- Cycle Time Estimation
- Tool & Material Selection
- CAM Parameters
- Roughing & Finishing
- Drill & Pocket Toolpaths



96-CAM1 CAM Software & Multimedia Included

Manufacturing Processes

Wiring Harness ▸ 950-WHS1

- Wiring Harness Function
- Wiring Harness Support
- Wiring Harness Installation
- Wiring Harness Inspection
- Handling and Storage
- Harness Connectors and Routing
- Battery Cable Installation
- Battery Cable Routing

950-WHS1 Optional Multimedia

Hand Tools Included

Welding Technology ▸ 950-WT1

- Welding Safety/Metal Preparation
- Basic Welding/Welding Symbols
- Welded Joints: Lap, Butt, T, and Corner
- Welding Analysis
- Destructive and Non-Destructive Testing

950-WT1

950-PFS1

Sanding/Scuffing (Front)

950-PFS1 Multimedia Included

Product Finishing ▸ 950-PFS1

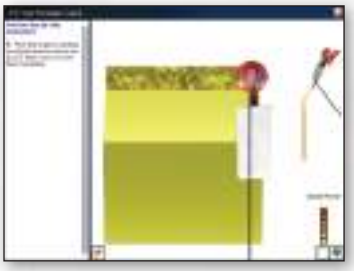
- Product Finishing Inspection
- Sanding and Scuffing
- Washing and Pretreatment
- Masking and De-Masking
- Liquid Spray Paint Processes
- Powder Paint Processes
- Protective Equipment
- Electrostatic Spray Equipment

Masking (Back)

Virtual Product Finishing Environments Included!

Sanding & Scuffing

- Inspect Parts for Defects
- Select Proper Sandpaper
- Orbital Sander Set Up Procedures
- Remove Defects
- Properly Scuff Paint on Variable Surfaces
- Proper Procedure Evaluation Report



Washing & Pretreatment

- Standard Work Instructions
- Proper Wash/Pretreatment/ Rinse Spray Patterns
- Proper Procedure Evaluation Report

Dry Off

- Air Blow Off Procedure
- Drying Variable Surfaces
- Vacuum Drying
- Drying Blind Holes

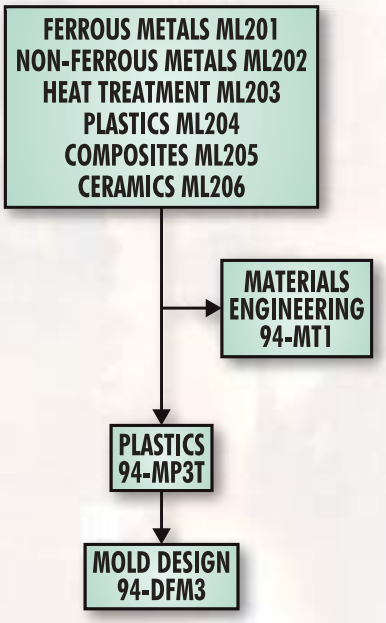
Powder Coating

- System Start Up
- Mode Selection
- Multiple Surface Scenarios
- Proper Procedure Evaluation Report

Liquid Spray Painting

- Load an Electrostatic Spray Gun
- Adjust Paint Flow Rate & Spray Pattern
- Proper Spray Gun Distance& Angle
- Adjust Electrostatic Control
- Proper Painting Sequences/ Multiple Parts
- Proper Procedure Evaluation Report

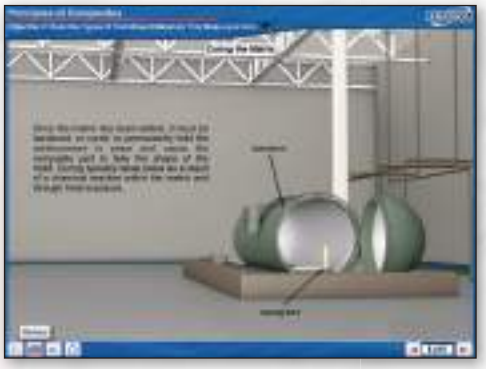
MATERIALS



Expand Your Material Knowledge!

Plastics ▸ ML204

- Thermoplastics & Thermosets
- Polymer & Polymerization
- Injection Molding
- Blow Molding
- Extrusion



Composites ▸ ML205

- Fiber-Reinforced Materials
- Hand Lay-Up Process
- Spray-Up Process
- Filament Winding
- Resin Transfer
- Curing

Ferrous Metals ▸ ML201

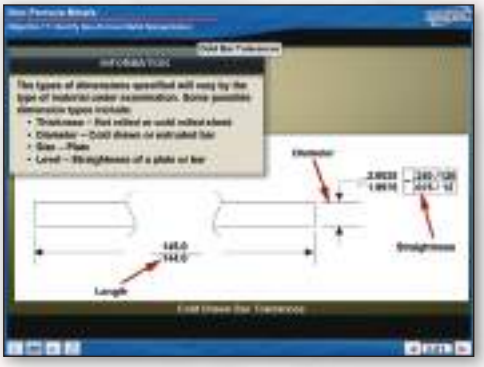
- Injection Mold Design/Part Design
- Multi-Cavity Molds
- Inserts & Undercuts
- Thermoplastics Molding Materials
- Blow Molding Design

Ceramics ▸ ML206

- Ceramic Types
- Thermal & Physical Properties
- Milling, Batching, & Mixing
- Ceramic Forming Processes
- Post-Manufacturing Processes

Heat Treatment ▸ ML203

- Hardening
- Quenching
- Annealing
- Tempering
- Normalizing
- Stress Relieving



Non-Ferrous Metals ▸ ML202

- Non-Ferrous Metals
- Extraction Processes of Copper & Aluminum
- Tempering
- Formation Techniques

Level 1 Plastics Technology ▸ 94-MP3T

- Chemistry and Properties
- Manufacturing Characteristics of Plastics
- Injection Molding
- Blow Molding
- Extrusion

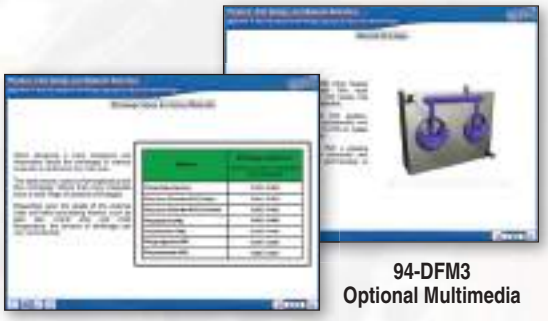
94-MP3T Optional Multimedia

94-MP3T

94-MP3T Accessories

Level 1 Plastics Technology ▸ 94-DFM3

- Injection Mold Design/Part Design
- Multi-Cavity Molds
- Inserts & Undercuts
- Thermoplastics Molding Materials
- Blow Molding Design



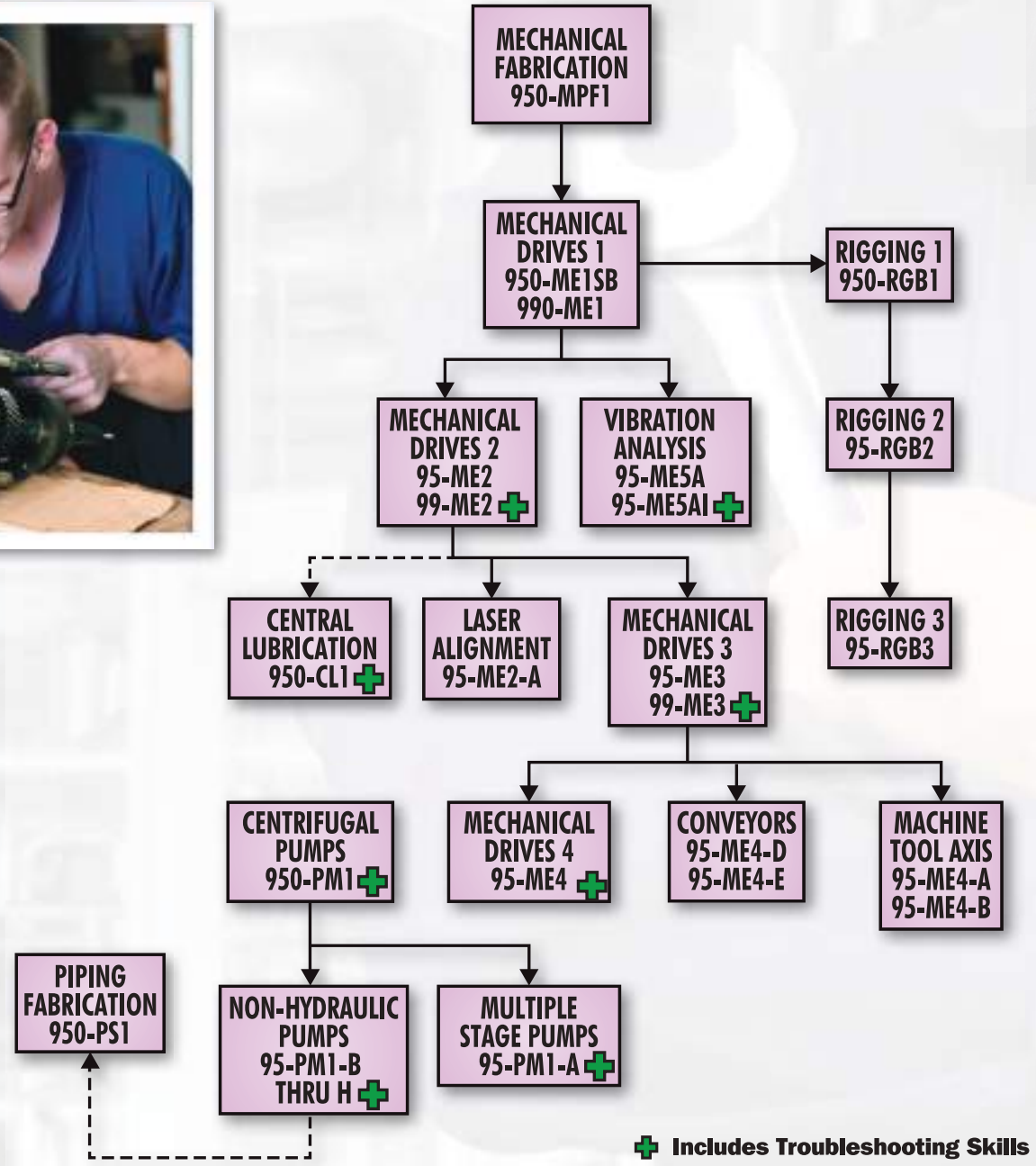
94-DFM3
Optional Multimedia

94-MT1A

Materials Engineering ▸ 94-MT1A

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

94-MT1A
Optional Multimedia



Mechanical Skills are Essential to Manufacturing

Amatrol's mechanical learning systems are truly unique in that they provide knowledge and hands-on skill building opportunities. The skills taught in these systems, whether how to assemble a belt drive or rig a load, are derived from task analyses that identify skill sets desperately needed by employers.

As an example, Amatrol's 950 Mechanical Drives Level 1 Learning System contains seven modules providing approximately 30 hours of hands-on training. Moreover, this base learning system can be expanded to a staggering 34 modules providing over 130 hours of step-by-step, hands-on training to make learners job-ready on Day 1.

MECHANICAL DRIVES

Mechanical Drives 1 ▸ 950-ME1

(Also Available as 950-ME1SB)

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

950-ME1 Optional Multimedia

950-ME1 shown with 95-ME2, 95-ME3

Mechanical Drives 2 ▸ 95-ME2

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

95-ME2 Optional Multimedia

Mechanical Drives 3 ▸ 95-ME3

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

95-ME3 Optional Multimedia

Mechanical Drives 4 ▸ 95-ME4

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

95-ME4's Linear Ball Screw Drive Assembly

Portable Mechanical Drives 1 ▸ 990-ME1

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

990-ME1 Multimedia Included

990-ME1

Portable Mechanical Drives 2 ▸ 99-ME2

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

99-ME2 Multimedia Included

Portable Mechanical Drives 3 ▸ 99-ME3

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

99-ME3 Multimedia Included

MECHANICAL

MACHINE TOOL SLIDES

RollerPack Machine Tool Axis ▸ 95-ME4-A

- Linear Roller Bearings Operation
- Roller Pack Installation
- Tapered Gib Adjustment
- Preload Setting

95-ME4-A
Adds to 950-ME

Plain Bearing Machine Tool Axis ▸ 95-ME4-B

- Dovetail Slide Operation
- Tapered Gibs Installation
- Dovetail Slide Maintenance
- Micrometer Dial/Slide Operation

95-ME4A Roller Pack Installation

95-ME4-B
Adds to 950-ME

MACHINE TOOL SLIDES

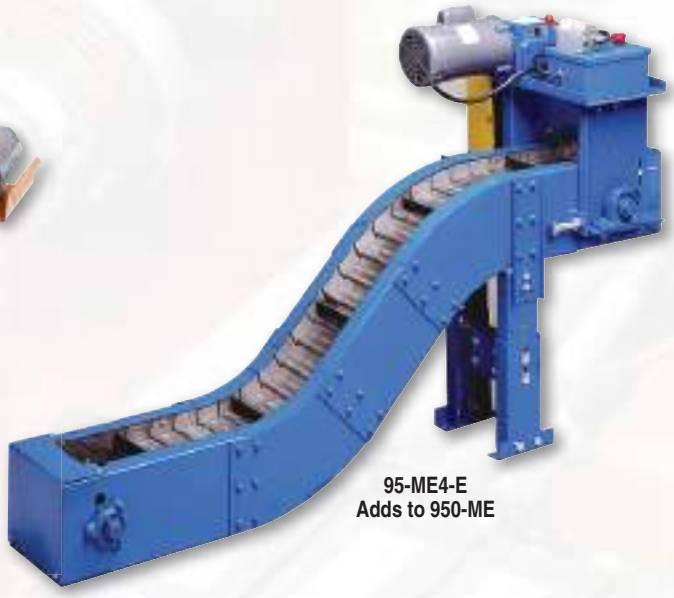
Floor Standing Belt Conveyor ▸ 95-ME4-D

- Belt Installation
- Belt Speed Calculation
- Belt Length Calculation
- Belt Maintenance

95-ME4-D
Adds to 950-ME

Machine Tool Chip Conveyor ▸ 95-ME4-E

- Chip Conveyor Operation
- Install Chip Conveyor Belt
- Chip Conveyor Start and Run-In
- Maintenance



95-ME4-E
Adds to 950-ME

VIBRATION ANALYSIS

95-ME5AI

Vibration Analysis
- **95-ME5AI**
- **95-ME5A**

(95-ME5A Adds to 950-ME1)
- Vibration Concepts & Analysis
- Resonant Frequency
- Sympathetic Vibration
- Velocity, Acceleration, Spike Energy
- Vibration Dampering, Isolation
- Severity Charts, Troubleshooting

Vibration Measurement

LASER ALIGNMENT

Laser Alignment ▸ **95-ME2A**

(Adds to 950-ME1)
- Principles, Operation, Setup
- Soft-Foot Correction
- Parallel and Angular Alignment
- Data Collection, Error Analysis
- Laser Safety
- Motor Base Adjustments

95-ME2A Shown with 950-ME

MECHANICAL FABRICATION

950-MPF1

Mechanical Fabrication ▸ 950-MPF1

- Assembly Concepts
- Pipe Thread Components
- Torque Wrenches
- Portable Power Tools
- Threaded Fasteners
- Wrenches
- Pneumatic System Fabrication
- Screwdrivers
- Pliers and Locking Devices

Optional Multimedia for 950-MPF1

RIGGING

Rigging 1 ▸ 950-RGB1

- Rigging Concepts
- Load Weight Calculations
- Hoists
- Slings & Lifts

Rigging 2 ▸ 95-RGB2

- Synthetic Slings
- Sling Operation
- Sling Maintenance
- Equipment Movement
- Cranes

Rigging 3 ▸ 95-RGB3

- Wire Mesh Slings
- Fiber Rope
- Load Turning
- Wire Rope Termination
- Rigging Knots

950-RGB1

95-RGB2

95-RGB3

PUMPS

950-PM1

Centrifugal Pump ▸ 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

CENTRAL LUBRICATION

Central Lubrication ▸ 950-CL1

- Central Lubrication System Operation
- Maxi-Monitor Controller Operation
- Viscometer Operation
- Divider Valve Servicing
- Troubleshooting

Includes These Panels

- **Series Progressive Valve**
- **Piston Distributor**
- **Fluid Recovery**
- **Pneumatic Lubrication Pump**

950-CL1

PIPING

Piping Systems ▸ 950-PS1

- Plastic Piping Installation
- Iron Piping Installation
- Hose Installation
- Tubing Installation
- Sloan Valve Maintenance
- Fitting & Piping ID
- Schematic Reading
- Cutting & Bending

950-PS1

Process Control

- PRESSURE PROCESS CONTROL T5555
- ANALYTICAL PROCESS CONTROL T5554
  - DATA ACQUISITION T5554-R1A
- THERMAL PROCESS CONTROL T5553
  - DATA ACQUISITION T5553-R1A
- LEVEL & FLOW PROCESS CONTROL T5552F ✚
  - PLC PROCESS CONTROL COMPACTLOGIX 99-PCAB53* SIEMENS 99-PCS712 CONTROLLOGIX 89-PC-AB5500
  - SMART FLOW TRANSMITTER T5552-F1
    - HART T5552-H1
    - FOUNDATION FIELDBUS T5552-FF1
  - VISUALIZATION PROCESS CONTROL T5552-S1
  - ULTRASONIC LIQUID LEVEL T5552-L1

✚ **Includes Troubleshooting Skills**

Process Control/Instrumentation Skills for Rewarding Jobs

Process control is a versatile and vital part of major industries such as power generation, petrochemicals, food processing and bottling, chemical manufacturing, bio-technology, pharmaceuticals, and refineries.

Amatrol has developed the largest and most in-depth offering of process control training options available including level and flow, temperature, analytical, and pressure.

Foundation Fieldbus

T5552-FF1

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

T5552-FF1

T5552-FF1 Multimedia Included

Level / Flow Process Control Troubleshooting

T5552F

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

T5552 Optional Multimedia

T5552F

Smart Flow Transmitter

T5552-F1

- Differential Pressure Type
- Digital Display, LCD
- Calibration
- Zero and Span Adjustments
- Manifold Bleeding

T5552-F1

Ultrasonic Liquid Level System

T5552-L1

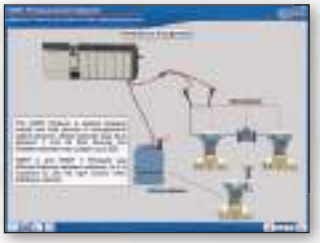
- Ultrasonic Transducer
- Transmitter Connection
- Ultrasonic Level Measurement
- Sensor Calibration

T5552-L1

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-S1 Multimedia Included

T5552-S1

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

T5552-H1

T5552-H1 Multimedia Included

Process Control

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

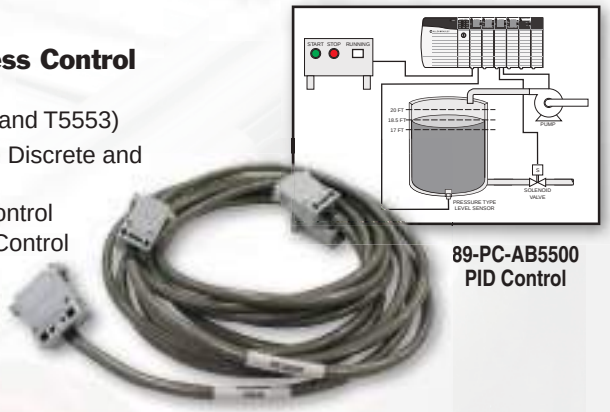
Temperature Process Control ▸ T5553

- 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

ControlLogix Process Control ▸ 89-PC-AB5500

(Connects the T5552 and T5553)

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


89-PC-AB5500
PID 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

Three-Channel Data Acquisition for T5554
▸ T5554-R1A

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

T5554-R1A

T5554

T5555

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 Multimedia Included

Connect All Four Systems to Create an Entire Process Plant!

T5552 T5554 T5555 T5553

PLC PROCESS CONTROL

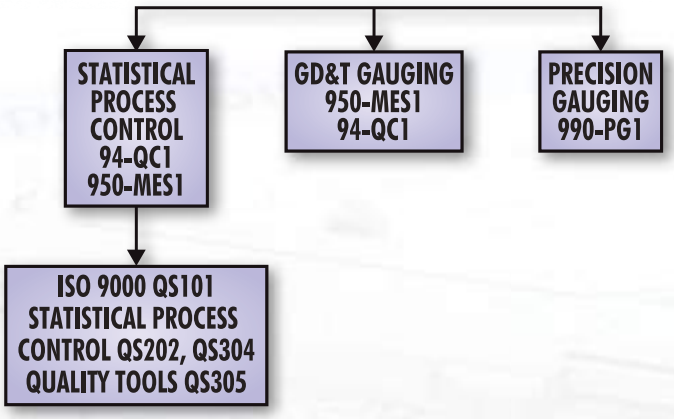
99-PAB53A shown with T5552 & 990-PAB53A

PLC Process Control

- **99-PCAB53***
- **99-PCS712**

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

Quality Assurance



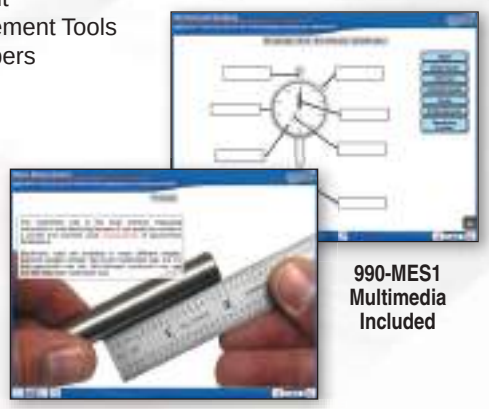
Quality Assurance Requires Solid Skill Sets

Amatrol's learning systems provide the opportunity to develop hands-on measurement skills as well as the knowledge to apply those skills in support of a quality assurance program.

990-MES

Portable Measurement Tools ▸ 990-MES1

- Basic Measurement
- Tape Measurement
- Precision Measurement Tools
- Dial & Digital Calipers
- Micrometers
- Data Collection



990-MES1 Multimedia Included

990-MES1 Tools & Components

Portable Precision Gauging ▸ 990-PG1

- Basic Measurement
- Dial and Digital Calipers
- US and SI Metric Micrometers
- Introduction to Gauging
- Indicator Measurement
- Go/No-Go Gauging Tools
- Indicator-Type Gauging Tools

990-PG1 Multimedia Included

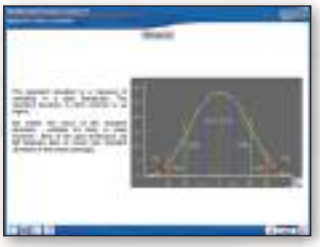
990-PG1 shown with Optional 99-PG2

ISO 9000 ▸ QS101

- Covers ISO 9000 and TS 16949
- Explains International Standards
- Documentation Requirements
- Identifies Various Types of Quality Management Systems (QMS)

Statistical Process Control 1 ▸ QS202

- Identify Sources of Variation
- Histograms
- Control Charts
- X-Bar Charts
- R Charts



Statistical Process Control 2 ▸ QS304

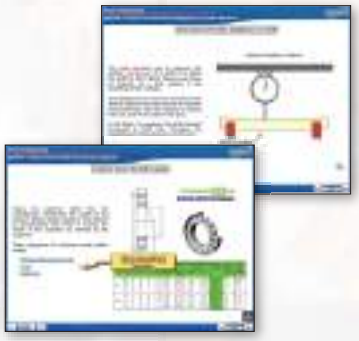
- Statistical Control Limits
- Assignable Causes and System Causes
- Calculate Capability Index
- Interpret Cpk

Quality Tools ▸ QS305

- Cause and Effect Diagrams
- Brainstorming Process
- Pareto Diagrams
- Six Sigma
- Quality Audits

Quality Assurance 1 ▸ 94-QC1

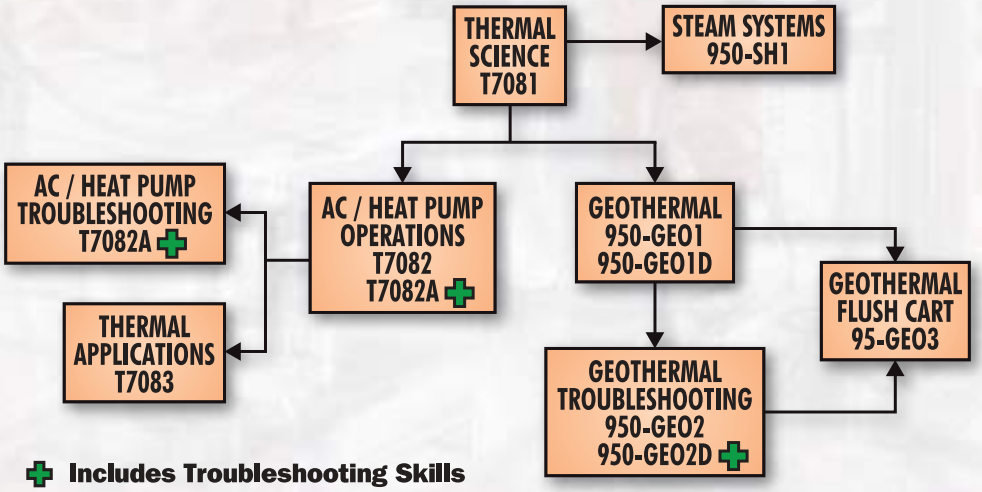
- Basic Measurement
- Dimensional Gauging
- Introduction to SPC
- Control Chart Operation & Analysis
- SPC Problem Solving
- GD & T
- Location, Orientation, & Form Tolerances



94-QC1 Optional Multimedia

910-QC3
Also Available

94-QC1



Thermal Skills Are Vital for Industrial & Residential Applications

Thermal skills, whether HVAC or steam power, are a unique skill set that demands a firm understanding of the principles involved. Amatrol's thermal learning systems start with the basics, such as phase change, and continue into more advanced concepts such as enthalpy and the laws of thermodynamics. These systems teach hands-on skills related to pressure measurements, preventive maintenance, and troubleshooting.

THERMAL SCIENCE

Thermal Science ▸ T7081

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

T7081

T7081 Optional Multimedia

HVAC

T7082-A

T7083

T7082-A Includes FaultPro Electronic Fault Insertion

Heat Pump Troubleshooting ▸ 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

Environmental Applications ▸ T7083

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

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

GEOTHERMAL

Geothermal Troubleshooting
950-GEO2

(Also Available as a 950-GEO1 without Troubleshooting)

- 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

950-GEO2 Multimedia Included

950-GEO2D

95-GEO3 Shown with 950-GEO2D

Geothermal Flush Cart
95-GEO3

(Adds to 950-GEO for Pressurized Operation)

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

95-GEO3 Multimedia Included

eLearning Solutions!

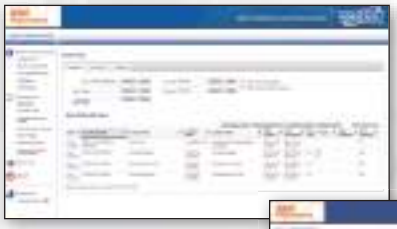
LearnAmatrol

- Complete electronic access to all of Amatrol's eLearning material, 455 Courses containing 1,844 Modules. That's over 5,500 hours of training materials!
  - Interactive Multimedia
  - eBooks
- Available 24/7 for total learning flexibility
- Includes free content management system to administer quizzes, tracking, reporting, & much more
- Create tailored courses using any of the 1,844 modules for endless possibilities

Rigging Systems eBook

Process Control Interactive Multimedia

eAssessment



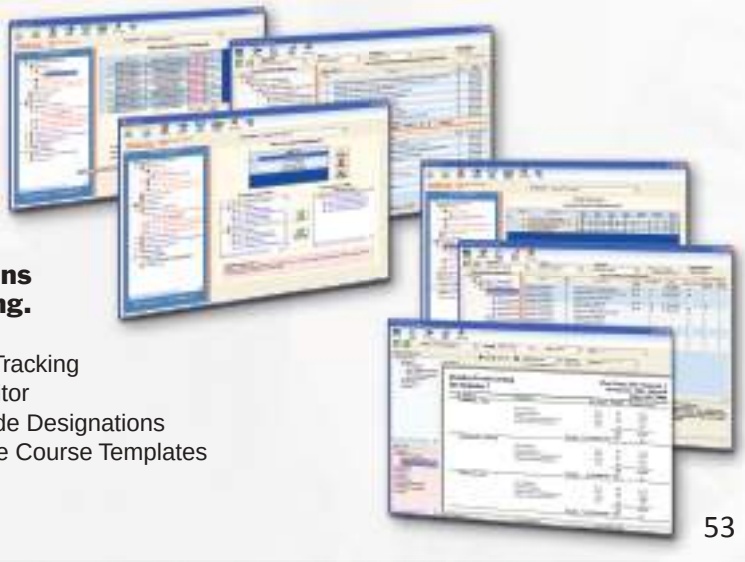
Communicate Goals and Direction with Administrator Messaging!

Amatrol's eAssessment takes the guess work out of identifying training most needed for different situations. The results let you choose how to spend your limited time and resources.

- Evaluate individuals, departments, or entire organizations
- Reveal strengths and identify weaknesses
- Reduce training time and costs by targeting knowledge gaps
- Create tailored assessments from any of Amatrol's 1,844 modules or use standard assessments for any of the 455 courses

SkillACE

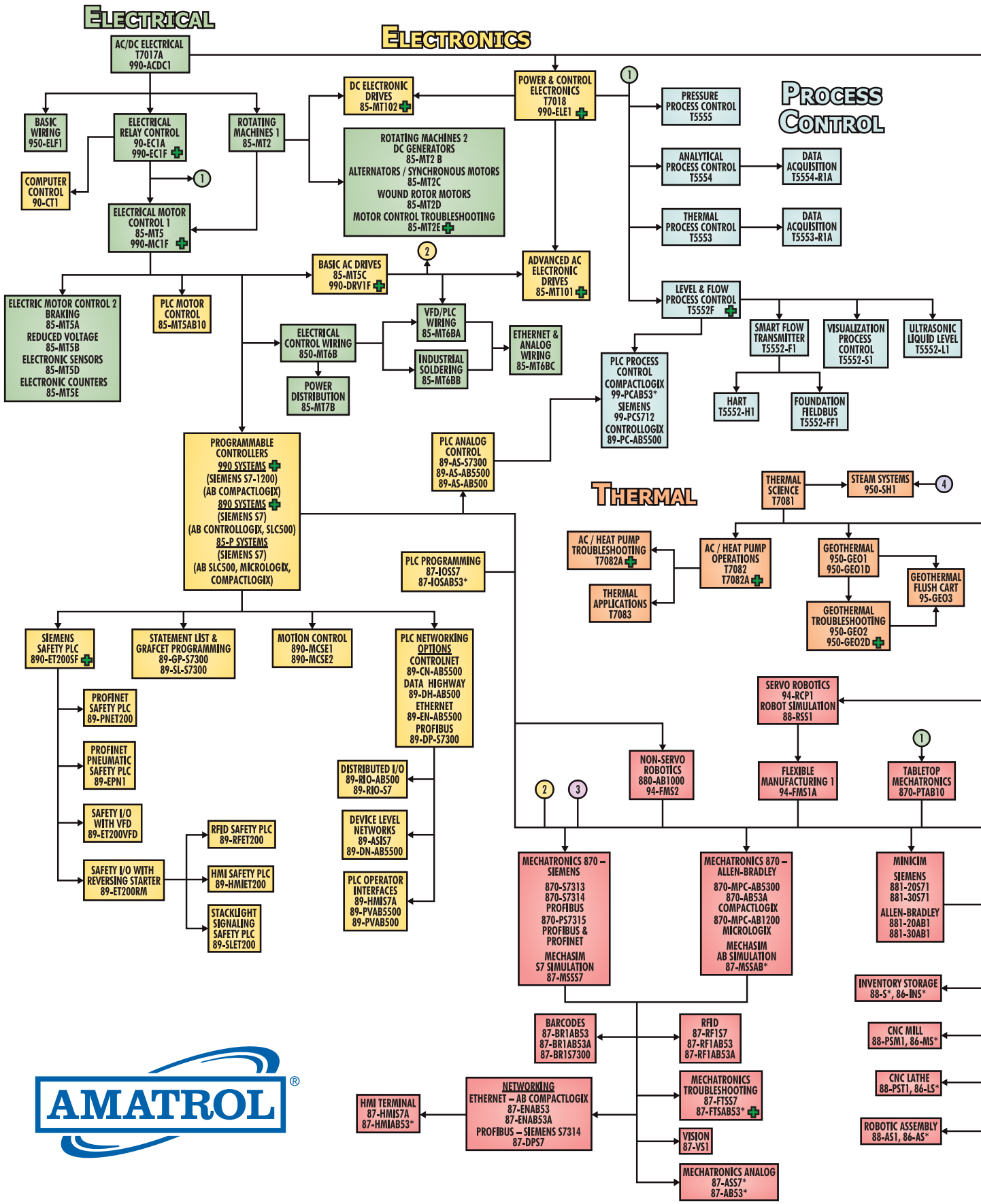
CLASS MANAGEMENT SOFTWARE



SkillACE, Amatrol's class management software, contains all the features you need when working in a class setting.

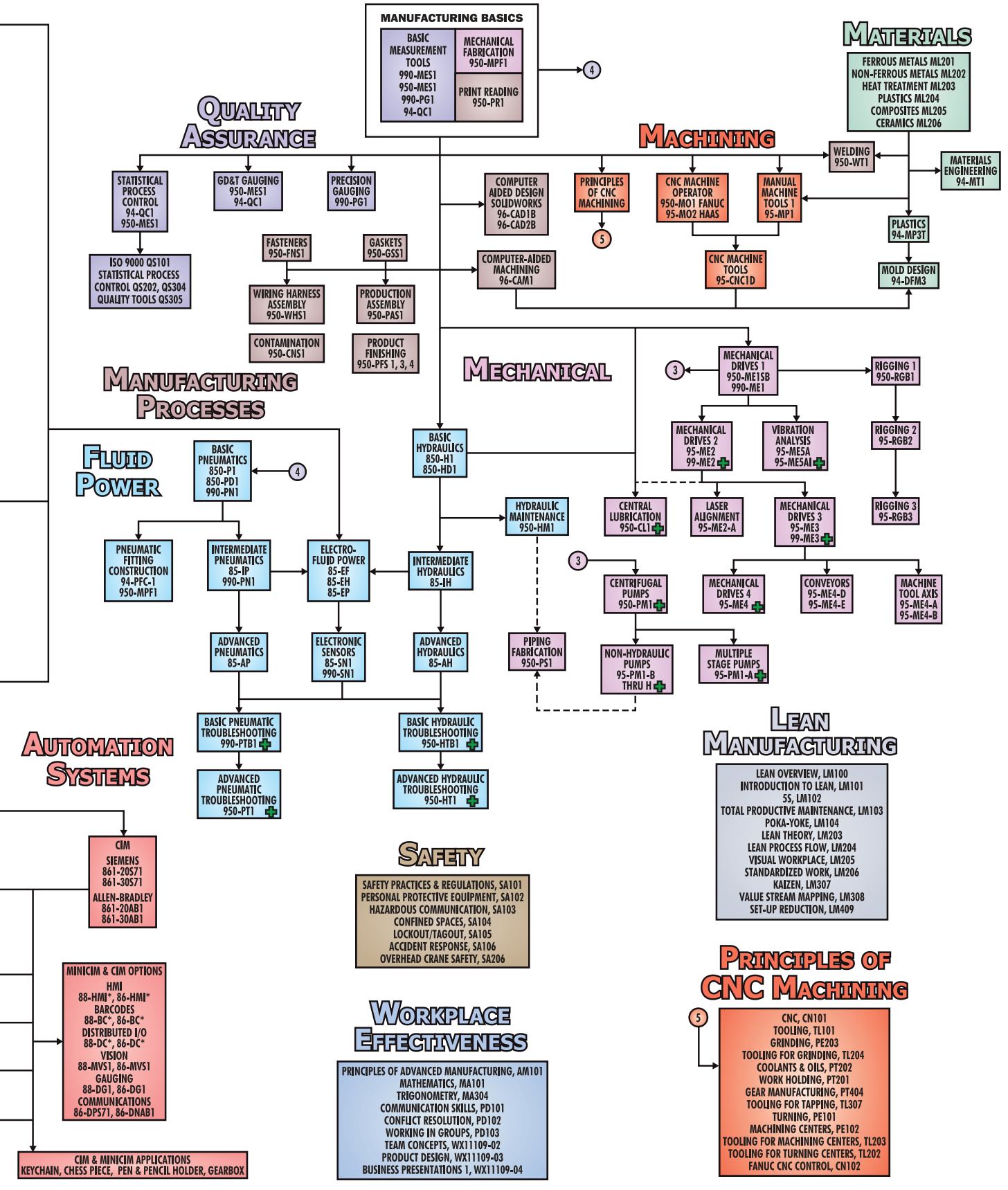
- Easy Class/Student Enrollment and Tracking
- Authentic Assessment
- Automated Pre-Quiz and Quizzes
- Class and Student Reports/Analysis
- Automated Grading
- Attendance Tracking
- Question Editor
- Custom Grade Designations
- Customizable Course Templates

ADVANCED MANUF



Interactive Chart Available on Amatrol.com!

ACTURING SKILLS



✚ Includes Troubleshooting Skills

We believe in manufacturing's bright future. Come join us in transforming the global workforce, one life at a time.

As a manufacturer, we at Amatrol know first-hand about the serious technical skill shortage in our industry. Finding machinists, maintenance technicians, assemblers, electricians, and all the rest with the troubleshooting and problem-solving skills needed in modern manufacturing grows more difficult every day.

As a technical training company, we bring effective learning solutions to industry and education for advanced manufacturing skills. We work directly with such industry partners as Ford, General Motors, Freeport McMoRan, Siemens, Miller Coors, Caterpillar, Toyota, General Mills, and others to ensure our learning systems meet the high standard of job-ready skills in such short supply for industry today. We invite you to visit us any time to experience the Amatrol difference for yourself. We offer:

- In Demand Hands-On, Job-Ready Skills
- Exceptional Curriculum Quality and Depth
- Superior Multimedia to Engage and Teach
- Durable, Industrial Equipment Designed for Effective Teaching
- Real Industry Troubleshooting
- Individualized and Group Learning Flexibility
- Web Solutions Designed to Accelerate Learning
- Outstanding Support

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