

# TROUBLESHOOTING INDUSTRIAL CONTROLS 2

## SIMULATION

**Troubleshooting Industrial Controls 2 (TIC2)** combines the TIC1 simulation with a PLC control, providing a more complex industrial system to troubleshoot. A simulation of an industrial PLC controlled fluid processing system, it is an excellent tool for developing and practicing advanced troubleshooting skills.

This module brings together the techniques learned in the PLC module and is designed to teach professionals to troubleshoot complex electrical equipment containing industrial control systems, frequently found in industrial and fluid processing applications, typically in food and beverage and chemical manufacturing.

### THE SIMULATION FEATURES

- **Realistic fluid processing system scenario**
- Detailed **3D environment**
- A **system using a three-phase AC supply for its power portion**, consisting of a pump, an agitator, motors, heaters, contactors, overloads, and fuses
- The **control portion of the system consists of a variety of components** typically found in industrial control systems, such as:
  - Pushbuttons
  - Temperature, float and selector switches
  - A PLC consisting of a CPU, a 16-port digital input module, and a 16-port digital output module
  - Wiring, terminal block, wire connectors
  - Transformers
  - Solenoid valves
  - Fuses
  - Indicators
- **Adaptive learning** that assesses users' skill level and customizes the program to the individual's performance
- **Printable resources**, including wiring and ladder diagrams, schematics, datasheets, worksheets, a flowchart, and a system operation manual
- Conformance to **NEMA standards**
- **North American** and **International** versions



### Tool Workout

In addition to the standard tools (voltmeter, ohmmeter, ammeter, and screwdriver) found in other simulations, your professionals will use a virtual laptop to:

- Go online and change modes
- Select and adjust the PLC program to provide the required behavior
- Monitor the operation of the ladder program in real time
- Change settings in the ladder program



### Mastering the PLC

This simulation teaches users how PLCs are used in a variety of processes, including:

- Level Controls
- Mixing/agitating controls
- Heating controls
- Pump and drain controls
- Timers and counters
- Alarms and emergency stop controls



### Solving Faults

Your professionals will be exposed to simulated electrical, mechanical, and PLC failures. Users' performance solving faults is assessed early on, and then used to customize a path through the program, maximizing the quality of each user's learning experience. Each fault contains one or more of the following malfunctions:

- Defective input module, output module, or CPU
- Incorrect program running in CPU
- Incorrect counter or timer settings
- Motor problems including open windings, shorted windings, and seized bearings
- Defects within component including open coils, faulty contacts, stuck mechanisms
- Mechanical problems
- Loose connection
- Open wire
- Wire shorted to ground