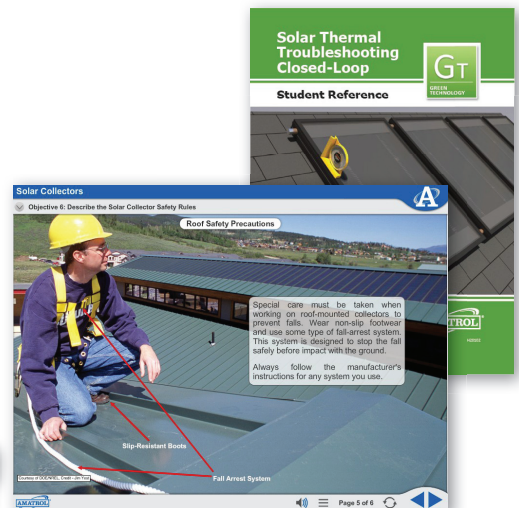


Solar Thermal Troubleshooting – Closed-Loop Learning System

950-STCL1



FAULTPRO
COMPUTER-BASED FAULT INSERTION SOFTWARE



Interactive Multimedia Curriculum and Student Reference Guide

Learning Topics:

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

Amatrol's Solar Thermal Troubleshooting – Closed-Loop Learning System (950-STCL1) allows learners to develop the specialized skills and knowledge needed for working with the two common types of thermal closed-loop systems: drainback and pressurized. The 950-STCL1 teaches learners about connecting, operating, programming, and troubleshooting both of these crucial systems. The curriculum is presented in a highly-interactive, multimedia format that allows learners to use the learning style best for them: reading, listening, or visual. Solar Thermal Troubleshooting supports the NABCEP (North American Board of Certified Energy Practitioners) test for Certified Solar Thermal System Installer.

Solar Thermal Troubleshooting includes all components needed to develop hands-on, job-ready skills. The learning system contains a mobile workstation, multiple component circuit panels, two solar collectors, and fault insertion, using Fault Pro. An optional sun simulator is available to facilitate classes indoors when outdoor conditions do not support solar heating. The required 95-SPA1 two-panel array provides a complete solar PV troubleshooting experience. Amatrol uses components that learners will find on-the-job in order to give the best opportunity to build confidence and industrial competencies.



Technical Data

Complete technical specifications available upon request.

Mobile Technology Workstation
Amatrol recommends Component Circuit Panel
Centrifugal Pumps (2)
Heat Exchanger
Differential Controller
Temperature Probe
Solar Storage Tank
Drainback Tank
Expansion Tank
Valve Package
Instrumentation Set
Solar Collectors (2)
Fault Insertion System
20152 Sheathed Banana Lead Set
Multimedia Curriculum (M20102)
Teacher's Assessment Guide (C20102)
Installation Guide (D20102)
Student Reference Guide (H20108)
Additional Requirements:

Computer, see requirements: <http://www.amatrol.com/support/computer-requirements>

95-ST51 Solar Thermal Sun Simulator

95-STCS1 Solar Thermal Charging Station

Additional Recommendations:

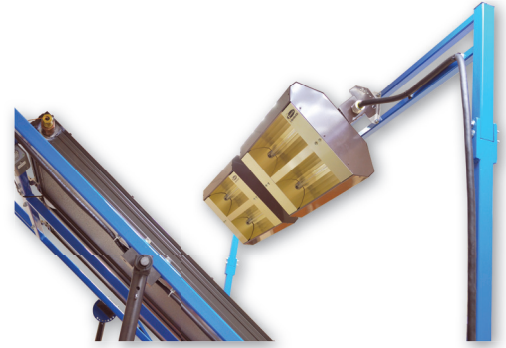
95-STW1 Solar Thermal Cold Water Supply
Station for water cooling where utility supply
not available

950-SC1 Solar Concepts for basic concept
preparation.

For outside use, Amatrol recommends the 95-SIP
Solar Instruments Package.

Flawless Integration of Components to Teach Drainback and Pressurized Systems

This Solar Thermal Troubleshooting – Closed-Loop System includes all components commonly found in these systems. Elements such as vacation bypass, check valves, relief valves, flow meters, and tempering valves are essential to create realistic systems and troubleshooting situations. Amatrol also includes a digital differential controller that features many programming capabilities which allows learners to practice programming the more sophisticated thermal systems that they are likely to encounter. The required 5-SPA1 two-panel array provides a complete solar thermal troubleshooting experience.



Strong Curriculum for Hands-On Skills in System Programming and Troubleshooting

This learning system also offers Amatrol's world-class Multimedia curriculum, which combines strong theoretical knowledge and concepts with hands-on skills for the best industrial competency-building on the market. This thorough, exceptionally detailed curriculum starts with the basics and steadily advances to more complex concepts and skills. Solar Thermal Troubleshooting is equipped with a wide array of both electrical and fluid faults, using Fault Pro, that allow instructors to replicate realistic system and component failures. Learners will practice independently solving the many common types of situations they will encounter on the job. Solar technicians will encounter both drainback and pressurized closed-loop solar thermal systems. Amatrol includes the components needed to configure either system, including both an expansion tank and drainback tank.

Solar Collectors
Objective 5: Describe the Thermal Characteristics of a Solar Collector

Measures of Thermal Output

Solar Thermal Components
Objective 1: Describe How to Connect and Operate an AC Solar Circulator Pump

Operation of an AC Solar Circulator Pump

Heat output is determined by both the design of the collector and environmental factors. These include cloud cover, ambient temperature, wind, snow, and inlet fluid temperature.

Solar circulator pumps are typically centrifugal pumps that pump heat transfer fluid and water through the thermal system. Pump type and size will vary depending on the amount of fluid the pump has to move and the distance the fluid has to travel.

The centrifugal pump consists of an impeller inside a volute-shaped casing. Fluid enters the pump inlet at the center of the impeller. The spinning action of the impeller creates a centrifugal force that forces the fluid from the center of the impeller along the vanes to the outer edges of the impeller, where it is thrown against the volute-shaped casing. It travels along the casing until it exits the pump.

Impeller
Volute-Shaped Casing
Pump Inlet
Pump Discharge

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Interactive Multimedia Curriculum

Student Reference Guide

A sample copy of the Solar Thermal Troubleshooting – Closed-Loop Student Reference Guide is also included with the system for your evaluation, along with Interactive Multimedia. Sourced from the system's curriculum, the Student Reference Guide takes the entire series' technical content contained in the learning objectives and combines them into one perfectly-bound book. Student Reference Guides supplement this course by providing a condensed, inexpensive reference tool that learners will find invaluable once they finish their training making it the perfect course takeaway.

