

# SOLAR THERMAL OPEN-LOOP TROUBLESHOOTING LEARNING SYSTEM

950-STOL1



Shown with  
optional sun simulator

Installing and maintaining solar thermal open-loop systems require hands-on skills and troubleshooting ability across both drainback and pressurized systems. Likewise, engineers and designers need to understand the technologies used in these systems as well.

Amatrol's 950-STOL1 Solar Thermal Open-Loop Troubleshooting Learning System allows students to develop the specialized skills and knowledge needed for working with open-loop system configurations and situations. The 950-STOL1 teaches students connection, programming, and troubleshooting problems system wide. The curriculum is PC-based multimedia that is highly interactive. It allows students to use the learning style best for them – reading, listening, visual. The 950-STOL1 supports the NABCEP (North American Board of Certified Energy Practitioners) test for Certified Solar Thermal System Installer.

The 950-STOL1 includes all components needed to develop hands-on, job-ready skills: all solar specific components as well as balance of system items. The learning system contains a mobile workstation, multiple component circuit panels, a solar collector unit, fault insertion, PC-based multimedia student curriculum, and instructor's assessment guide. An optional sun simulator is available to facilitate classes indoors when outdoor conditions do not support solar heating.



**CURRICULUM IS THE KEY TO LEARNING**

## Learning Topics:

- Collectors
- Open-Loop Solar Thermal Systems
- Output Measurement
- Solar Collector Specifications
- Pumps
- Solar Storage Tanks
- Air Vent & Vacuum Valves
- Check Valves
- System Charging
- System Operation and Performance
- Freeze Protection
- System Troubleshooting
- Analog Controllers
- Draindown System Operation

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# DESIGNED FOR LEARNING

## Fault Insertion For Both Electrical and Fluid Systems

At the heart of a technician's skill set is the ability to troubleshoot a system. The 950-STOL1 is equipped with a wide array of both electrical and fluid faults that allow instructors to replicate realistic system and component failures students. Students will learn to independently solve the many common types of situations they will encounter on the job.



Student Reacting to Electrical Fault

## Balance of System Components – Replicates Real World Thermal Systems

Developing installation and troubleshooting skills for solar thermal systems requires all the components commonly found in these systems. Amatrol includes 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 allow students to learn how to program the more sophisticated thermal systems they are likely to encounter.



Flow Meter

Vacation By-Pass

Tempering Valve

Differential Controller

## Optional Sun Simulator (95-ST51)

Amatrol offers an optional sun simulator, the 95-ST51, for use indoors with the 950-STOL1. The Solar Thermal Open-Loop Learning System's two thermal collectors work either outside with direct sunlight or inside with the sun simulator.

## TECHNICAL DATA

### Mobile Workstation

- Dimensions 72" (183 cm) L x 72" (183 cm) H x 34" (86 cm) W
- Swivel casters (4) with 2 locking
- Square tube steel, welded and braced

### Component Circuit Panels

- Silk-screened sheet steel
- Pre-mounted and pre-connected fluid components
- Copper and plastic fluid piping, insulated as needed
- Auto-drain capability
- AC disconnect switch with breaker
- Ground fault circuit interrupter
- Centrifugal pump, AC-motor powered
- Centrifugal pump, DC-motor powered
- Electrical power switch, PV
- Heat exchanger, plate type
- Differential controller
  - Digital
  - Multiple outputs allowing independent pump control
  - Multiple temperature inputs
  - Large LCD graphic display
  - Animated control circuits
  - Specialty control functions
- Solar storage tanks, insulated with boiler drain valve
- Thermister probes
- Tempering valve
- Boiler Drain valves
- Ball valves
- Relief valves, temperature and pressure
- Check valve
- Schrader valve
- Flow control valve
- Flow meter
- 3-way valve
- Dole valves
- Vacuum breaker valve
- Solenoid operated valves
- Pressure and temperature gauges
- Charge system
- Emergency stop pushbutton, hard-wired
- Connector lead set
- Multimeter

### Solar Collector Unit

- Multiple solar collectors
- PV panel
- Adjustable frame to permit variation of solar angle of incidence
- Can use optional sun simulator for indoor use

### Fault Insertion System

- Component and system level faults
- Realistic troubleshooting test points
- Fluid and electrical fault types

Multimedia, PC-Based Student Curriculum, M20101  
Instructor's Assessment Guide, C20101  
Installation Guide, D20101

