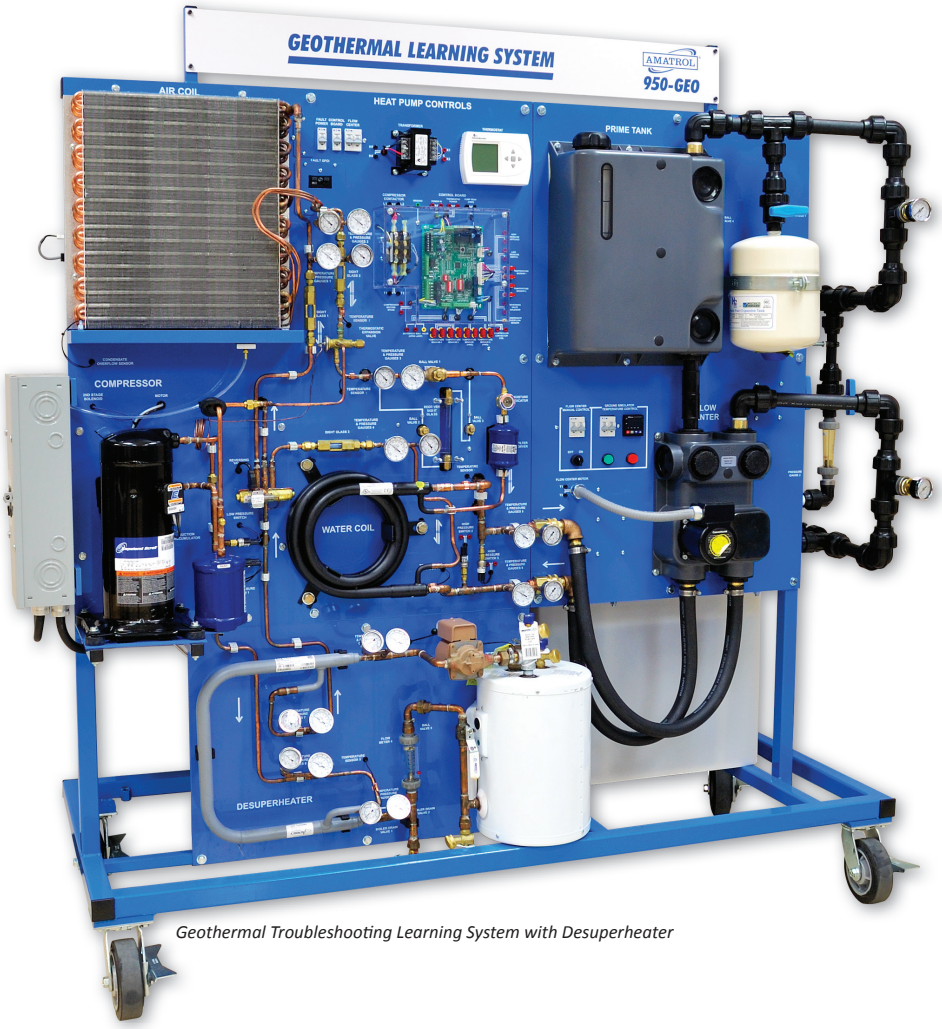
Geothermal Troubleshooting Learning System with Desuperheater

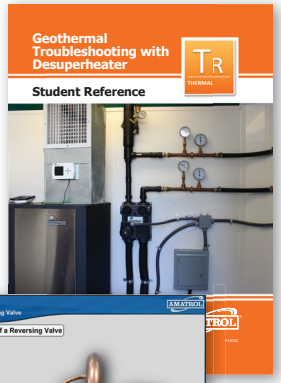
950-GEO2D

THERMAL



Geothermal Troubleshooting Learning System with Desuperheater

Student Reference Guide



Interactive Multimedia





Amatrol's Electronic FaultPro Troubleshooting

Learning Topics:

- Desuperheater Component-Level Troubleshooting
- Desuperheater System-Level Troubleshooting
- Component Troubleshooting
- System Troubleshooting
- Desuperheater Hot Water Generation
- Desuperheater Operation
- Geothermal Heat Pump Systems
- Geothermal Source Circuits
- Closed-Loop Source Circuit Operation
- Source Circuit Piping and Components
- Compressors
- Energy Units of Measure
- Condensers
- Heat Transfer
- Phase Change Effects
- Heat Pump Components
- Heat Pump Control
- Heat Pump Operation
- Heat Pump System Performance
- Heat Duty
- Coefficient of Performance

Amatrol's 950-GEO2D Geothermal Troubleshooting Learning System with Desuperheater is equipped with FaultPro, Amatrol's premier electronic fault insertion program for teaching troubleshooting skills. Using FaultPro, learners troubleshoot electrical, mechanical, and fluid-based faults to become effective real-world experts on residential and commercial geothermal systems. In addition to troubleshooting, the interactive multimedia curriculum and hands-on skills will teach startup, operation, shutdown, and maintenance of a geothermal system. Further, the 950-GEO2D includes a geothermal desuperheater, which utilizes excess energy from the geothermal system to heat water for little or no additional cost.

The 950-GEO2D uses an exposed component layout so that learners can see each component's role in a geothermal system. Learners can easily observe, monitor, and test each component mounted and labeled on a vertical panel. Sight glasses installed in the 950-GEO2 allow the learner to see the refrigerant's changing state as it passes through the system. Amatrol also includes pressure and temperature gauges at key points to show the system's performance at a glance. Additionally, the system includes a custom designed, temperature-controlled ground simulator so the system can run continuously.

AMATROL®

Technical Data

Complete technical specifications available upon request.

Mobile Workstation
- 30" W x 72" H x &2" L
- Casters (4)

Desuperheater

Heat Pump
- Water-to-air
- R410A refrigerant
- 2-stage compressor (20,000 BtuH)
- Air-duct system
- Flow meter
- Pressure and temperature gauges
- Condensate sensor
- Pressure switches
- Receiver
- Manual valves
- Filter/dryer
- Suction accumulator
- Thermostatic expansion valve
- Reversing valve
- Moisture indicator
- Load side heat exchanger
- Water coil
- Tubing
- Air flow control

Ground Source Loop
- Flow center
- Header loop circuit
- Expansion tank
- Header tank
- Pressure gauges
- Flow center manual control

Ground Simulator

Geothermal Control Section
- Main power control
- Geothermal controller
- Thermostat
- Fault power control

Handheld Instrumentation

Curriculum (M12305, M12306, M12308)

Instructor's Guide (C12308)

Install Guide (D12308)

Student Reference Guide (H19762, H19763)

Additional Requirements:
- See http://www.amatrol.com/support/computer-requirements

Required Utilities:
- 115/230 VAC, 60/50 Hz

FaultPro: Electronic Fault Insertion Software!



Using Amatrol's world-class troubleshooting program, FaultPro, the user can insert over 25 electronic faults on the 950-GEO2D! Covering electrical, mechanical, and fluid-based faults, Amatrol designed the 950-GEO2D's troubleshooting capabilities to allow learners to practice applicable industry skills and prepare them for real-world geothermal system problems. Amatrol's troubleshooting systems are unmatched in their ability to simulate real-world system failures!

Industry Standard System Components and Features

From its 2-stage compressor and 2-ton heat pump to the ground source loop that includes a flow center and a header loop to the pre-installed desuperheater with temperature and pressure gauges, Amatrol's 950-GEO2D delivers features commonly found in installed geothermal systems but often excluded from training systems. These include a variable speed ECM air blower, water coil heat exchanger, sight-glasses at many points in the system for observing the refrigerant cycle, ample temperature and pressure monitoring, electrical test points, ground simulation, and even the high-density polyethylene pipe specified for use in installed geothermal systems. These components are clearly labeled and mounted for easy observation on a vertical panel, allowing learners to easily observe and evaluate system operation and performance.

Ground Simulator Allows Continuous Training!

Amatrol's 950-GEO2D's ground simulator is a temperature-controlled system that creates a constant temperature to act as a realistic heat source/sink. A digital, programmable temperature control unit is used to set and maintain the ground simulator to the desired temperature, resulting in both accurate data collection and continuous operation.

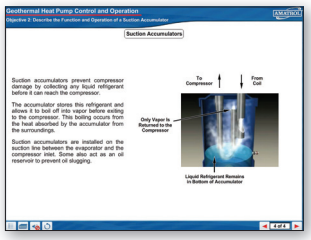
950-GEO2D: Geothermal Troubleshooting with Desuperheater Learning System

The Geothermal Troubleshooting Learning System with Desuperheater (950-GEO2D) allows learners to study how a desuperheater heats water by using the geothermal system's excess energy. All of the skills and curriculum of the 950-GEO2 are included with the addition of topics including the operation, startup, shutdown, troubleshooting, and maintenance of a desuperheater system. As an example, learners will study how to test a geothermal desuperheater temperature sensor, and then practice a hands-on skill of testing a sensor on the 950-GEO2D.



World-Class Geothermal Multimedia

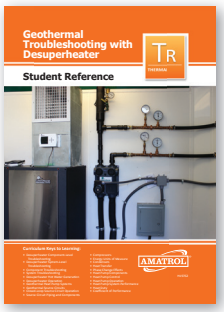
The 950-GEO2D's multimedia curriculum is highly interactive and features audio, text, and 3D graphics. The depth and breadth of knowledge offered, especially in the troubleshooting area, is simply unmatched in the industry. The 950-GEO2D's curriculum is so thoughtfully and carefully put together that it can be used in a traditional classroom setting or by learners following along at a self-pace. Learners begin with an introduction to geothermal heat pump systems and move rapidly into the concepts and components that make a geothermal system operate. Amatrol's 950-GEO2D curriculum is a strong starting point toward obtaining International Ground Source Heat Pump Association (IGSHPA) certification. Foundational knowledge and skills provided by Amatrol, such as startup and checkout procedures, flushing, purging, and charging the system, will be familiar topics to learners earning their certificates.



Interactive Multimedia

Student Reference Guide

Sample copies of the Geothermal Learning System with Desuperheater Student Reference Guide and Geothermal Troubleshooting Learning System with Desuperheater Student Reference Guide are also included with the system for your evaluation. Sourced from the system's multimedia curriculum, these Student Reference Guides takes the entire series' technical content contained in the learning objectives and combines them into one perfect-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.



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