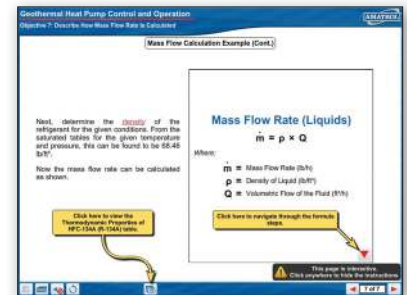


# Geothermal Learning System

950-GEO1



Geothermal Learning System



Interactive Multimedia Curriculum

## Learning Topics:

- Introduction to Geothermal Heat Pump Systems
- Geothermal Source and Load Circuits
- Geothermal Safety
- Geothermal Closed-Loop Piping and Start-Up
- Geothermal Closed-Loop Source Circuit Operation
- Compressor Theory and Operation
- Heat Transfer
- Phase Change Effects
- Refrigerants
- Geothermal Heat Pump Control and Operation
- Geothermal Heat Pump Start-Up
- Geothermal Heat Pump System Performance

Amatrol's 950-GEO1 Geothermal Learning System enables learners to understand and apply skills in the ever-growing area of geothermal energy. This system builds knowledge as well as skills across a broad spectrum, ranging from system startup and operation to shut down and maintenance, in a readily accessible, compact vertical trainer. Harnessing geothermal energy is rapidly increasing in importance as a tool in broadening the energy supply. Designed as a teaching system, this learning system showcases components, often not visible in actual installations, on a vertical panel that permits easy access for hands-on skills and observation. Amatrol includes a ground simulator so that learners gain realistic experience using a continuously operational system like they will experience on an installed system.

Amatrol's Geothermal Learning System packs a residential-sized system into a 6-ft. (1.83 M) long mobile system that easily fits through a standard door. Major components include a 2-stage compressor with a 2-ton heat pump, ground simulator, air duct with ECM blower, ground source loop, and industrial grade geothermal controller. These components and many more are standard on the 950-GEO1.



## Technical Data

Complete technical specifications available upon request.

### Mobile Workstation

30" W x 72" H x 72" L  
Casters (4)

### 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

#### Multimedia Curriculum (M12305)

#### Instructor's Guide (C12305)

#### Install Guide (D12305)

#### Student Reference Guide (H12305)

#### Additional Requirements:

95-GEO3 Geothermal Flush Cart Learning System  
Computer: See <http://www.amatrol.com/support/computer-requirements>

#### Required Utilities:

240 VAC/60 Hz Split Phase  
Water Supply

## 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, Amatrol's 950-GEO1 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 geothermal.



Industry Standard Components

## Ground Simulator Allows Continuous Training



Simulates Ground Source/Sink

Amatrol's 950-GEO2's ground simulator is a temperature-controlled system that creates a constant temperature which allows the system to operate continuously. A digital, programmable temperature control unit is used to set and maintain the ground simulator at the desired temperature, resulting in both accurate data collection and continuous operation.

## Integrated Multimedia Curriculum – A Jump Start Towards an IGSHPA Certification

Amatrol's 950-GEO1 Geothermal Learning System includes feature-rich interactive multimedia curriculum that enables learners to move from an introduction about geothermal energy to overall system performance evaluation. Learners begin with an introduction to geothermal heat pump systems and move rapidly into the concepts and components that make a geothermal system operate; these include closed-loop circuits, compressors, condensers, evaporators, metering devices, refrigerants, suction line accumulators, receivers, dryers, moisture indicators, thermostats, controllers, blowers, heat-pump system start-up and operation, and overall system performance. Through partnerships with key industry leaders and leading edge educators in the area of geothermal energy, Amatrol has developed a system that puts learners on a solid path to obtaining the International Ground Source Heat Pump Association (IGSHPA) certification.



950-GEO1 Multimedia Curriculum

## Pressurized Operation for Realistic Field Conditions

While the 950-GEO1 can operate in an unpressurized state, technicians often encounter pressurized systems. Amatrol requires the 95-GEO3 Geothermal Flush Cart Learning System to ensure job-ready skills.

## Enhance Your Training with the Optional Desuperheater Learning System

The 950-GEO1's learning can be further expanded by adding the optional 95-GEO4 Geothermal Desuperheater Learning System. The 95-GEO4 easily attaches to the 950-GEO1 and covers the operation, startup, shutdown, troubleshooting, and maintenance of a desuperheater system.

## Need To Teach Troubleshooting? Consider Amatrol's 950-GEO2 Geothermal Troubleshooting Learning System

Powered by FaultPro, Amatrol's premier electronic fault insertion software for teaching hands-on troubleshooting skills, the 950-GEO2 Geothermal Troubleshooting Learning System comes equipped with all of the material in the 950-GEO1 plus 28 electronic troubleshooting faults. These faults include electrical, mechanical, and fluid-based faults designed to help the learners practice applicable industry skills and troubleshooting any problems that may occur in a geothermal system. Hands-on troubleshooting is essential for job-ready application.

