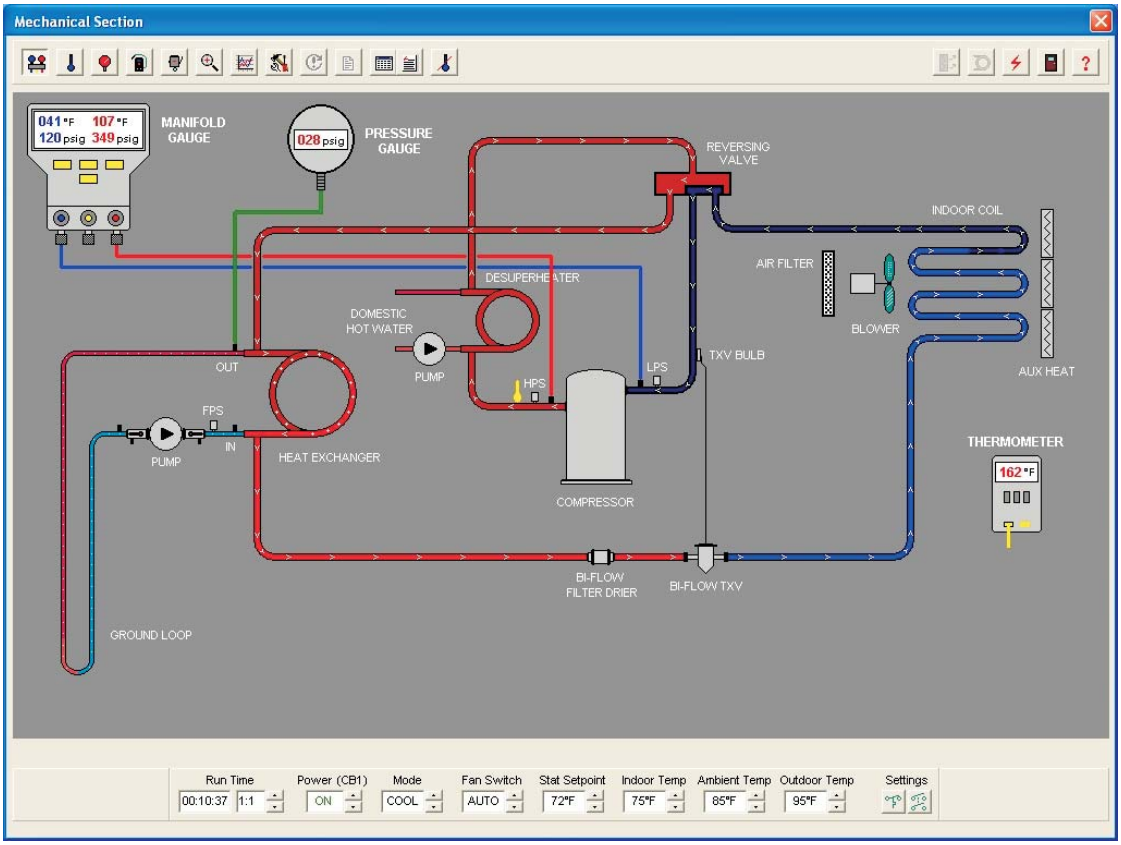
IMUECH®

Simulator Training Systems



SIMULATION SOFTWARE FOR HVACR TRAINING

Simutech—the leader in "hands-on" HVAC/R service training software—offers a wide array of computer-based simulators for Heating, Ventilation, Air Conditioning, and Refrigeration. ***Simutech*** *simulators* use animated graphics and sophisticated computer-modeling to emulate faults in HVACR systems. The simulators allow the trainee to measure various mechanical and electrical values to determine the cause of the fault, then perform repairs to return the system to normal operation.

Computer simulation has been proven to be the *ideal* method of training students and technicians in the servicing of HVACR equipment. A trainee can quickly learn operating characteristics, and proper troubleshooting and repair methods for faults commonly encountered during service calls. Simulators are also useful when studying for technician certification exams, including *NATE* and *ICE*.

All levels of users – from the entry-level student to the most seasoned technician – will greatly benefit by using ***Simutech*** "*hands-on*" simulators. That's why our simulators are used extensively by vocational schools, colleges, trade unions, correctional institutions, contractors, and facilities, worldwide! The simulators are easy to use, even for novice computer users!

Instructors quickly discover that ***Simutech*** simulators are invaluable *tools* in teaching HVACR troubleshooting and theory-of-operation. Prior to their hands-on exposure to the real equipment, students learn proper troubleshooting and repair methods, refrigerant handling, safety practices, and use of test equipment. Plus, simulators provide training at a fraction of the cost of purchasing and maintaining mechanical HVACR equipment and facilities! Besides the cost factor, computer-based training has been proven to *greatly* enhance the retention level and interest of students! ***Simutech*** simulators meet the accreditation standards of *PAHRA and HVAC Excellence*.

Service technicians can use the simulators to improve their troubleshooting skills, or cross-train on different types of equipment. Training can be scheduled at any time, and with minimal supervision. Simulators are a great alternative to costly and time-consuming training seminars!

Employers find ***Simutech*** simulators to be useful in testing and evaluating technicians during the hiring process. Poorly skilled technicians or "part swappers" are easily identified, simply by reviewing the repair logs and other reports that are automatically generated by the software.

You'll find ***Simutech*** simulators are easy to use, even for novice computer users! The software runs on any Windows based PC, tablet, iPad, or mobile device.

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GENERAL INFORMATION

REALISTIC SIMULATION

Simutech training simulators are designed to represent *generic* HVACR systems that a service technician would commonly encounter in the field. Extremely accurate and realistic pressures, temperatures, and electrical values are maintained during the system's operation, under both *normal* and *fault* conditions.

FAULT INSERTION

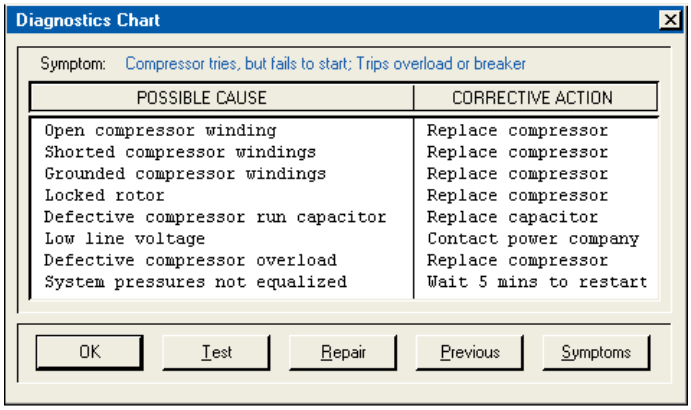
Up to 40 commonly encountered mechanical and electrical faults may be preselected by the instructor or randomly selected by the computer. Once a fault is inserted, the simulator will operate according to predetermined fault conditions.

INSTRUMENTATION

Realistic and accurate instrument readings can be taken at numerous locations throughout the simulated system. These readings correspond to the simulator's current operating state and fault condition. They include *pressure*, *temperature*, *voltage*, *current*, *resistance,* and *combustion components*.

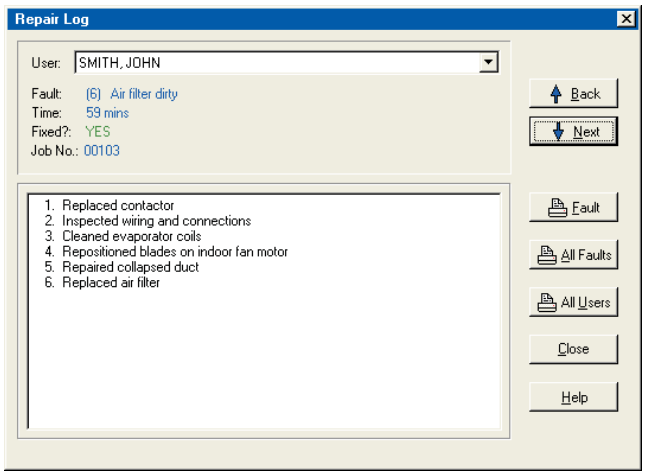
DIAGNOSTIC CHARTS

After taking readings with the test instruments, the trainee can refer to *on-screen* **diagnostic charts** to isolate the "faulty" component and repair the system. *On-screen* **test procedures** provide proper industry-standard methods to check a suspect component, and provide typical instrument readings.



INSTRUCTOR REPORTS

To monitor the performance of each trainee, **Activity Reports**, **Fault Status Reports**, **Instrument Logs**, and **Repair Logs** are generated for the instructor. Each user's log-on time, troubleshooting time, fault insertions, instrument usage, and repair attempts are tracked and permanently stored in the database. The *Repair Log* lists all repairs and parts replacements made by a user during a fault insertion. This provides the instructor an excellent means of evaluating the users' troubleshooting skills.



EXTENSIVE HELP MENUS & MANUALS

Context-sensitive help menus guide the trainee and instructor at every step and command. Even a *computer-novice* can easily use *Simutech* simulators! In addition, both a comprehensive printed **User's Manual** and **Instructor's Manual** are included.

NETWORKABLE

The simulators may be installed on most local-area network (LAN) servers. *Network licenses* must be purchased for the maximum users that will be logged-on simultaneously.

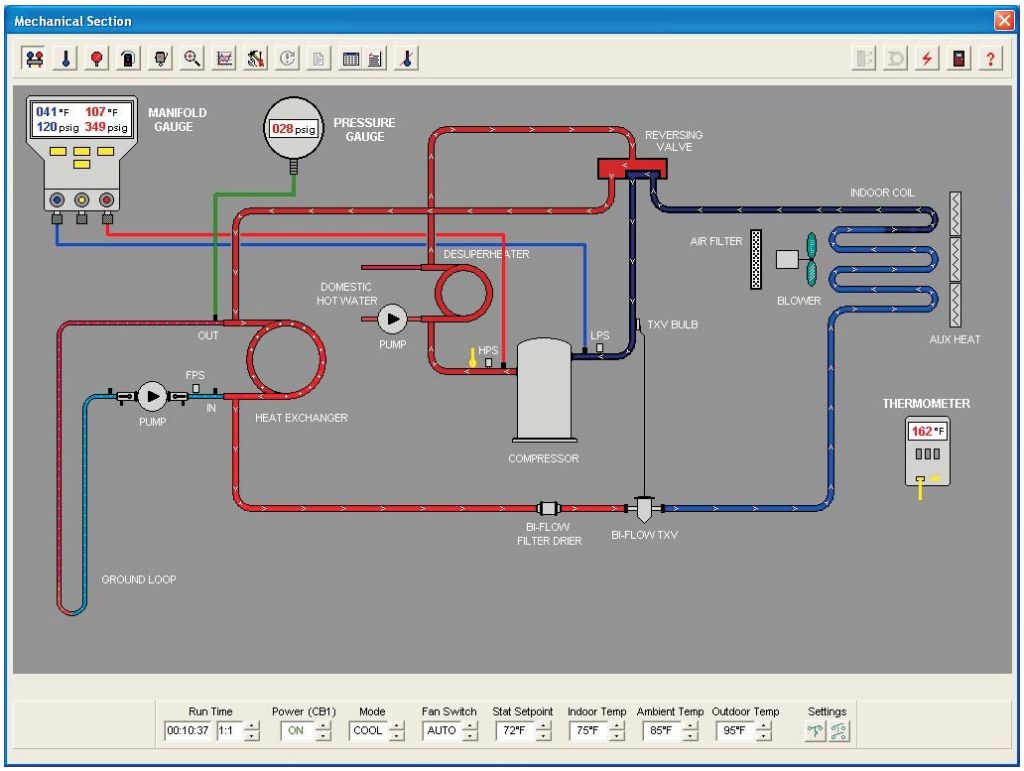
MULTI-USER CAPABILITY

Up to *99* users can be assigned per stand-alone computer or network. Repair logs, fault selections, and other data is saved for each user on the hard drive of each workstation or server.

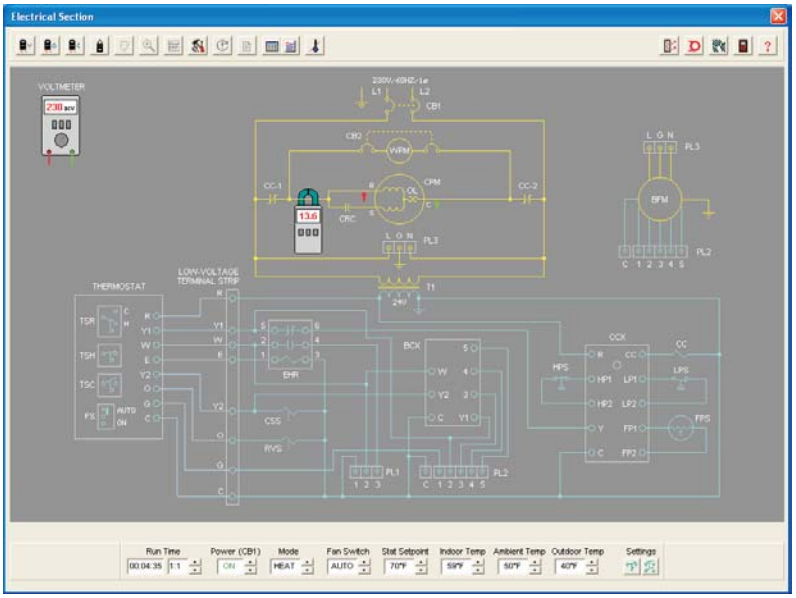
ONLINE USE

Network-licensed simulators can be accessed from a tablet, iPad, or compatible mobile device, using a server configured for a remote access environment and Windows Remote Desktop™. If this is not available, then Simutech can provide a cloud-based portal for these devices. Contact Simutech Technical Support for additional information.

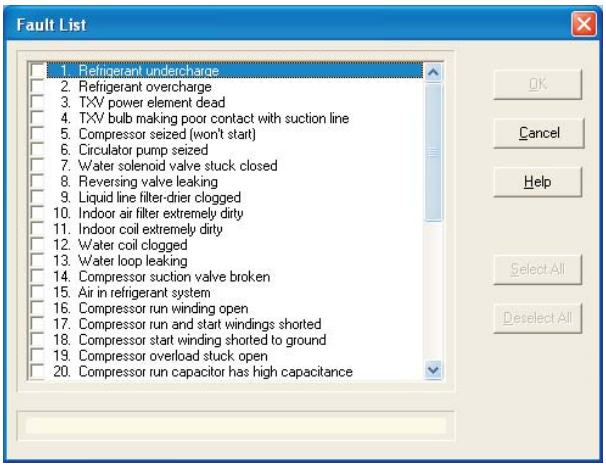
GEOTHERMAL HEAT PUMP SIMULATOR *SIMUGEO*™

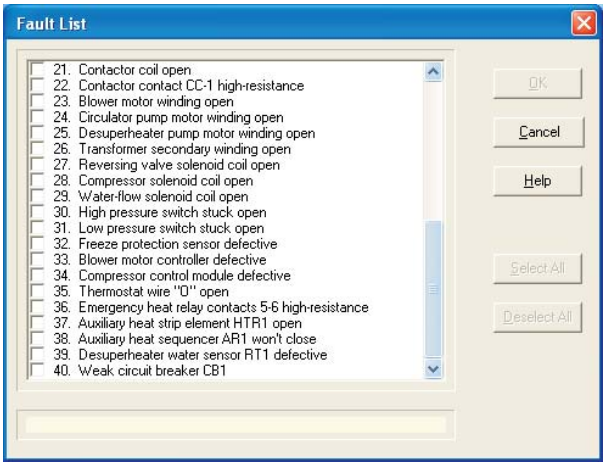


SIMUGEO™ simulates a *generic water-to-air* geothermal heat pump (GHP) that uses R-410A refrigerant. Both closed-loop and open-loop ground-source installations can be simulated, including vertical and horizontal ground loops, and a water well system. *SIMUGEO* includes a desuperheater for domestic hot water and an electric auxiliary-heat unit. An ECM blower motor, 2-stage scroll compressor, and electronic modules are simulated. Environmental temperatures are adjustable, and heating and cooling capacities are continuously displayed. Set points for the thermostat, pressure controls, and TXV are also adjustable. With the capability of changing operating temperatures and other parameters, a geothermal heat pump may be observed operating under various environmental conditions; something very difficult to do with real mechanical systems.



GEOTHERMAL HEAT PUMP SIMULATOR *SIMUGEO*™





Up to 40 commonly encountered mechanical and electrical faults may be selected, as shown in the Fault Lists above.

SIMUGEO provides troubleshooting of the devices listed below, which are commonly found in geothermal heat pumps. An animated mechanical diagram and three electrical schematic diagrams of the simulated geothermal heat pump are provided in "*real-time*". The ***mechanical diagram*** shows refrigerant and water flow, as well as the *liquid, liquid/vapor,* and *superheated vapor* states of the refrigerant. In the four ***electrical ladder diagrams***, the controls and switch contacts constantly change state as the system operates. Providing a means of visually tracing refrigerant, water, and current flow during operation, makes it much easier for the trainee to understand how a geothermal heat pump is supposed to work. Pressure-temperature charts, performance charts, specifications, and nomenclature are available on-screen. In addition, the trainee can "zoom" into the system to visually inspect various components, including the indoor coil, and a dirty air filter.

Compressor	Reversing valve solenoid
Evaporator coil	Compressor solenoid
Heat exchanger	Water-flow solenoid
TXV valve	Low-pressure switch
Filter-drier	High-pressure switch
Air filter	Freeze-protection sensor
Circulation pump	Run capacitor
Blower	Thermistor
ECM Motor	Auxiliary heater element
Reversing valve	Room thermostat
Compressor contactor	Auxiliary heat sequencer
Compressor control module	Desuperheater pump
Blower control module	Desuperheater module
Emergency heat relay	Transformer

SIMUGEO provides easy-to-use "point-and-click" selection of meters and test points, and are saved to an *Instrument Log* to monitor the users' troubleshooting skill. Temperatures may be displayed in either *Fahrenheit* (°F) or *Celsius* (°C), and pressures may be displayed in either *imperial* (psig) or *metric* (kPa/barg). The on-screen test instruments include:

- Gauge manifold set
- Thermometer
- Pressure gauge
- Leak detector
- Voltmeter
- Ohmmeter
- Ammeter
- Capacitance meter

SYSTEM REQUIREMENTS

SIMUGEO requires the following minimum IBM compatible computer:

- Pentium, Core, or equivalent processor (32 or 64-bit)
- Windows XP, Vista, 7, 8, 8.1, and 10
- Hard drive, 21MB available disk space

SIMUGEO network version is compatible with Novell and Windows Server 2003, Server 2008, and Server 2012

IMUTECH®

ORDERING INFORMATION

SIMUGEO™ Geothermal Heat Pump Simulator

Standalone Licenses

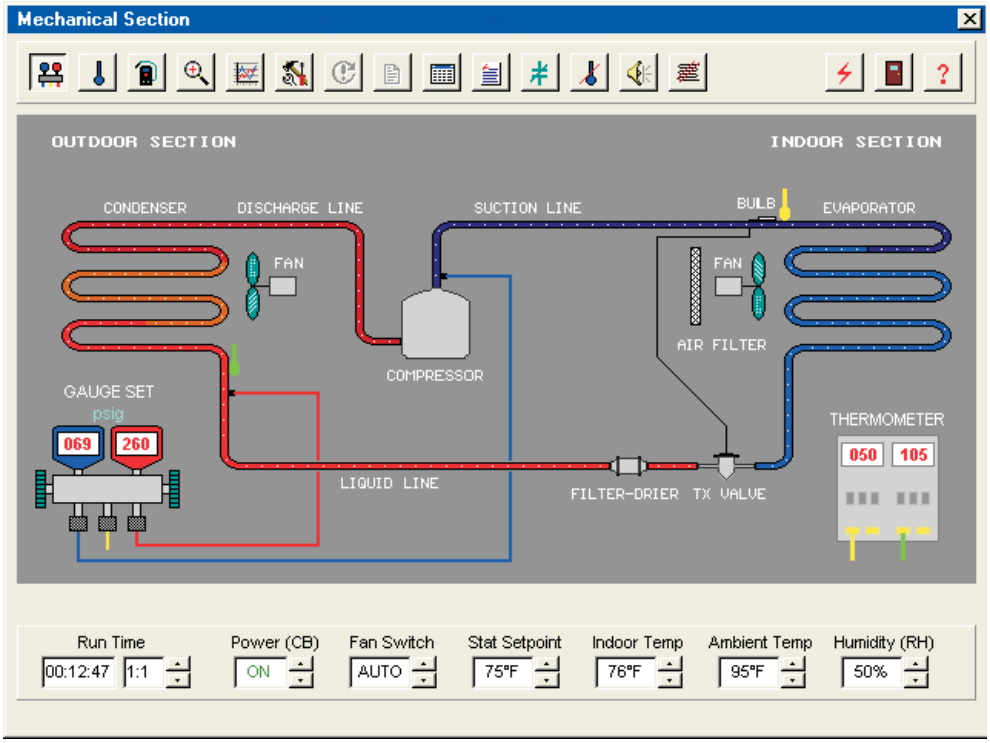
MG-500	1 computer license	$895.00
MG-505	5 computer licenses	$1,595.00
MG-511	10 computer licenses	$1,995.00
MG-515	15 computer licenses	$2,295.00
MG-520	20 computer licenses	$2,595.00

Network Licenses

MG-540	10 seats	$1,895.00
MG-560	25 seats	$2,095.00
MG-570	50 seats	$2,895.00

For further prices and ordering information, please see Page 20

AIR CONDITIONER SIMULATOR *SIMUAIR*™



SIMUAIR™ simulates two generic versions of residential and light-commercial air conditioning systems, using either R-22 or R-410A refrigerant. These systems include a ***packaged unit*** with a capillary tube and PSC motor circuit, and a ***split-system*** with a thermostatic expansion valve and CSR motor circuit.

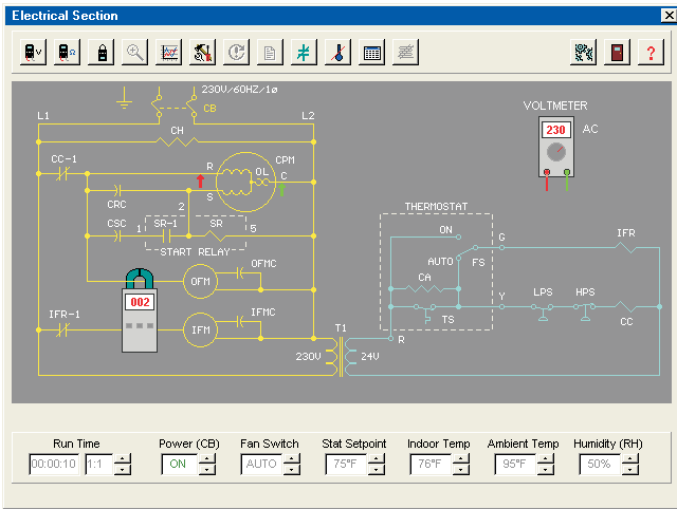
Animated mechanical and electrical schematic diagrams of the simulated system are provided in "real-time". The ***mechanical diagram*** shows refrigerant flow, as well as the *liquid, vapor, liquid/vapor,* and *superheated vapor* states of the refrigerant. In the ***electrical ladder diagram***, the controls and switch contacts constantly change state as the system operates. Providing a means of visually tracing refrigerant and current flow during operation, makes it much easier for the trainee to understand how an air conditioner is supposed to work.

Indoor and ambient temperatures, and relative humidity are adjustable and continuously updated and displayed on the screen. Settings for thermostat setpoint, limit switches, TXV, circuit breakers, and other controls may be changed by the trainee. With the capability of changing operating temperatures and relative humidity, a system may be observed under various environmental conditions; something very difficult to do with real mechanical equipment.

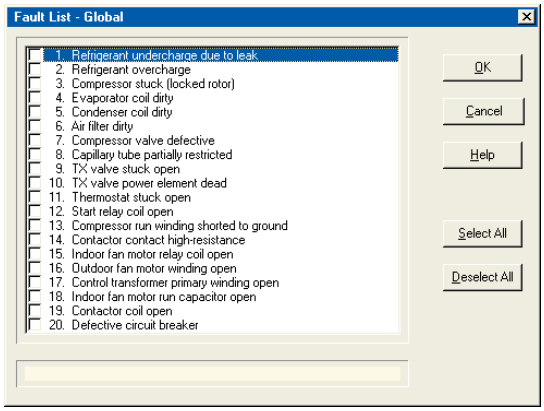
Pressure-temperature charts, performance charts, specifications, and an electrical nomenclature, are available on-screen.

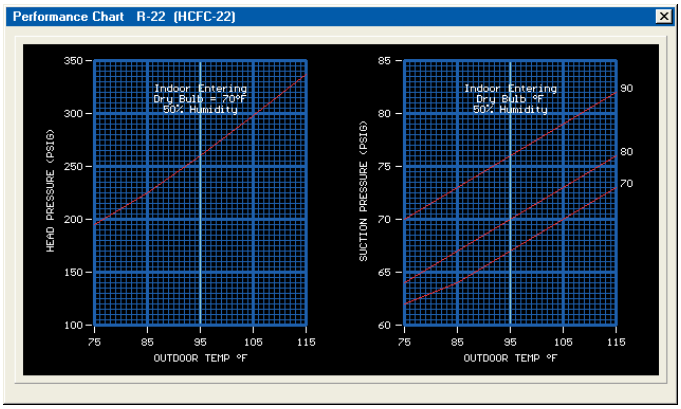
The trainee can "zoom" into the system to visually inspect various components, including dirt or ice on coils, and a dirty air filter. He can also "listen" to the compressor running.

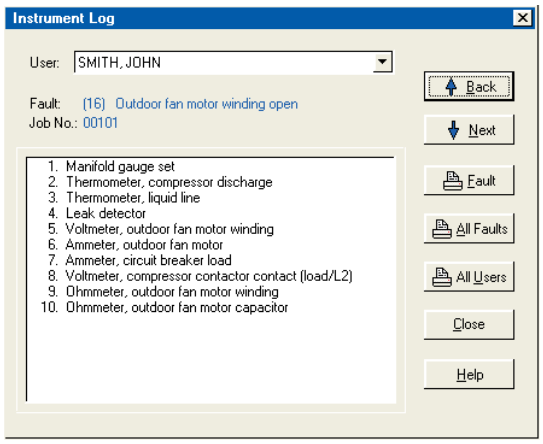
SIMUAIR provides easy-to-use "point-and-click" selection of meters and test points, and are saved to an *Instrument Log* to monitor the users' troubleshooting skill. Temperatures may be displayed in either *Fahrenheit* (°F) or *Celsius* (°C), and pressures may be displayed in either *imperial* (psig) or *metric*



AIR CONDITIONER SIMULATOR *SIMUAIR*™







SYSTEM REQUIREMENTS

SIMUAIR requires the following minimum IBM compatible computer:

- Pentium, Core, or equivalent processor (32 or 64-bit)
- Windows XP, Vista, 7, or 8, 8.1, 10
- Hard drive, 18MB available disk space

SIMUAIR network version is compatible with Novell and Windows Server 2003, Server 2008, Server 2012

(kPa/barg). The on-screen test instruments include:

- Gauge manifold set
- Thermometers
- Leak detector
- Voltmeter
- Ohmmeter
- Clamp-on ammeter

Up to 20 commonly encountered mechanical and electrical faults may be selected, as shown in the *Fault List* above.

SIMUAIR provides testing and troubleshooting of the devices listed below, which are commonly found in air conditioners.

Compressor	Start relay
Condenser coil	Indoor fan relay
Evaporator coil	Crankcase heater
TX valve (TXV/TEV)	Compressor run capacitor
Capillary tube	Compressor start capacitor
Filter-drier	Fan motor capacitor
Air filter	Room thermostat
Outdoor fan motor	Low pressure switch
Indoor fan motor	High pressure switch
Transformer	Fan switch
Contactor	Circuit breaker

IMUTECH®

ORDERING INFORMATION

SIMUAIR™ Air Conditioner Simulator

Standalone Licenses

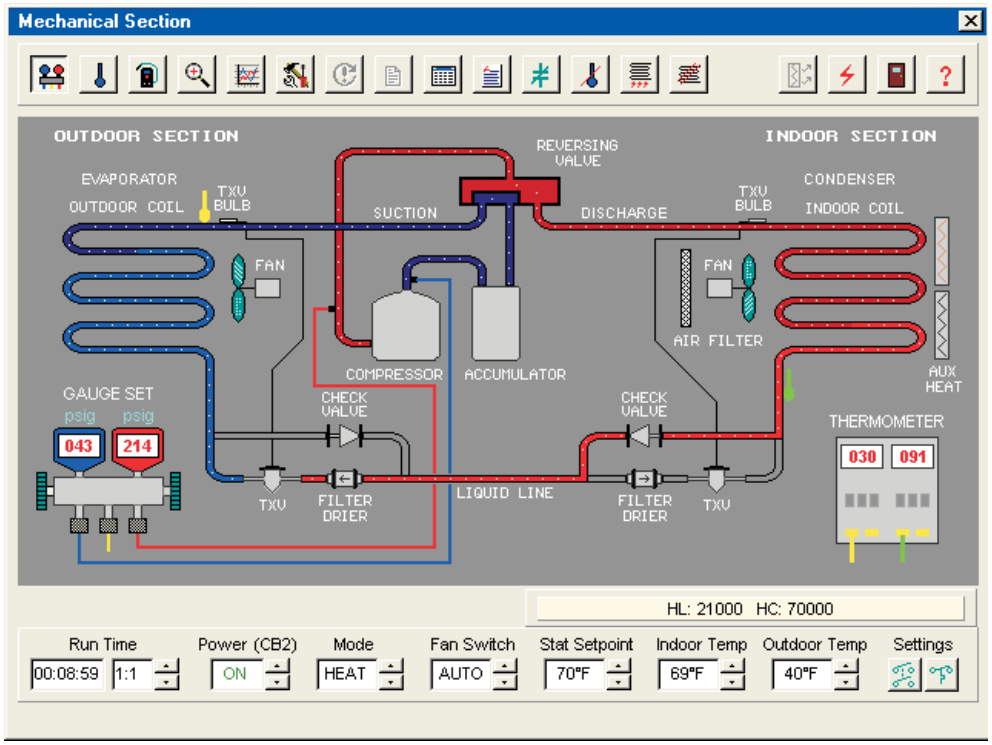
MA-500	1 computer license	$595.00
MA-505	5 computer licenses	$1,195.00
MA-511	10 computer licenses	$1,595.00
MA-515	15 computer licenses	$1,895.00
MA-520	20 computer licenses	$2,195.00

Network Licenses

MA-540	10 seats	$1,495.00
MA-560	25 seats	$1,795.00
MA-570	50 seats	$2,595.00

For further prices and ordering information, please see Page 20

HEAT PUMP SIMULATOR *SIMUPUMP™*



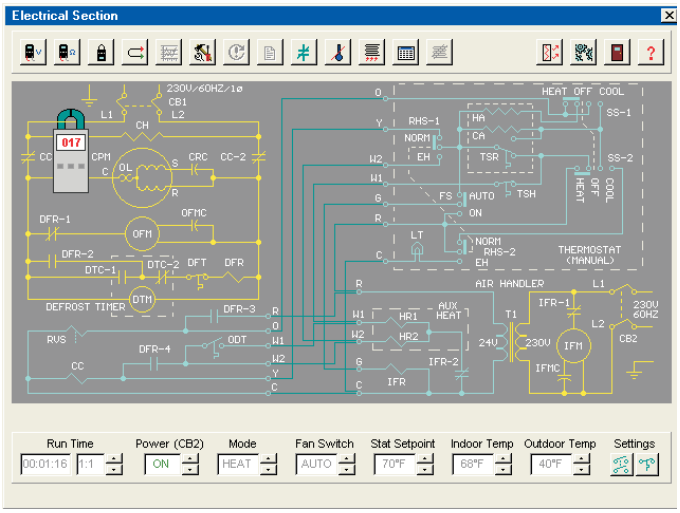
SIMUPUMP™ simulates a *generic* residential/light-commercial type *air-to-air* split-system heat pump, using either R-22 or R-410A refrigerant. The trainee may select heating, cooling, or emergency heat modes. Indoor and outdoor temperatures are adjustable, and continuously updated and displayed on the screen. Settings for thermostats, TXVs, defrost frequency, and building heatloss are also adjustable. With the capability of changing operating temperatures, a heat pump may be observed under various environmental conditions; something very difficult to do with real mechanical equipment.

Animated mechanical and electrical schematic diagrams of the simulated heat pump are provided in "*real-time*". The ***mechanical diagram*** shows refrigerant flow, as well as the *liquid, liquid/vapor,* and *superheated vapor* states of the refrigerant. In the ***electrical ladder diagrams***, the controls and switch contacts constantly change state as the system operates. Providing a means of visually tracing refrigerant and current flow during operation, makes it much easier for the trainee to understand how a heat pump is supposed to work.

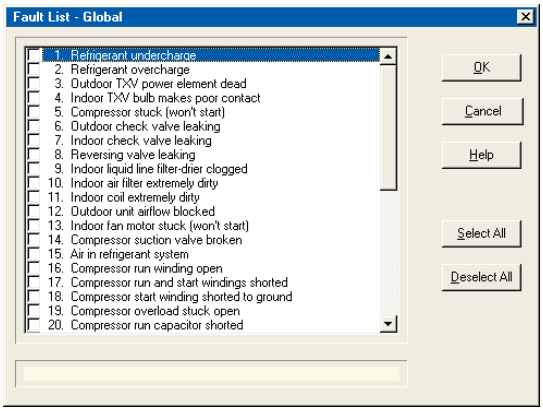
Pressure-temperature charts, performance charts, specifications, and an electrical nomenclature are available on-screen. In addition, the trainee can "zoom" into the system to visually inspect various components, including dirt or ice on the coils, a dirty air filter, and a blocked outdoor unit.

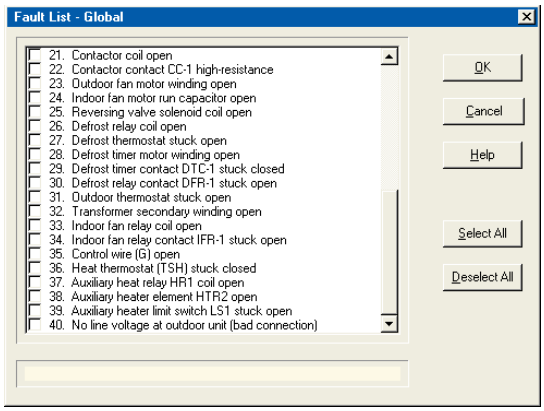
SIMUPUMP provides easy-to-use "point-and-click" selection of meters and test points, and are saved to an *Instrument Log* to monitor the users' troubleshooting skill. Temperatures may be displayed in either *Fahrenheit* (°F) or *Celsius* (°C), and pressures may be displayed in either *imperial* (psig) or *metric* (kPa/barg). The on-screen test instruments include:

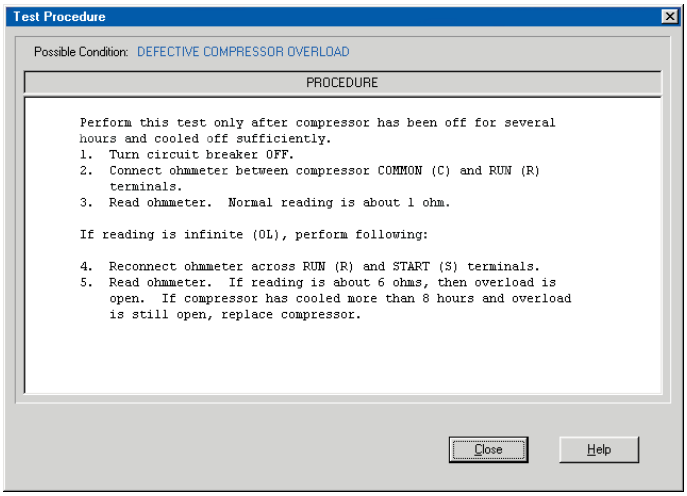
- Gauge manifold set
- Thermometers
- Leak detector
- Voltmeter
- Ohmmeter
- Clamp-on ammeter



HEAT PUMP SIMULATOR *SIMUPUMP*™







Up to 40 commonly encountered mechanical and electrical faults may be selected, as shown in the *Fault Lists* above.

SIMUPUMP provides testing and troubleshooting of the devices shown below, which are commonly found in heat pumps.

Compressor	Transformer
Condenser coil	Defrost timer
Evaporator coil	Auxiliary heater element
Accumulator	Crankcase heater
TX valve (TXV/TEV)	Run capacitor
Check valve	Fan motor capacitor
Filter-drier	Room thermostat
Air filter	Heat thermostat
Outdoor fan	Outdoor thermostat
Indoor fan	Defrost thermostat
Reversing valve	Emergency heat switch
Compressor contactor	Fan switch
Indoor fan relay	Limit switch
Defrost relay	Fused link
Heater relay	Circuit breaker
Reversing valve solenoid	

SYSTEM REQUIREMENTS

SIMUPUMP requires the following minimum IBM compatible computer:

- Pentium, Core, or equivalent processor (32 or 64-bit)
- Windows XP, Vista, 7, 8, 8.1, 10
- Hard drive, 18MB available disk space

SIMUPUMP network version is compatible with Novell and Windows Server 2003, Server 2008, Server 2012

IMUTECH®

ORDERING INFORMATION

SIMUPUMP™ Heat Pump Simulator

Standalone Licenses

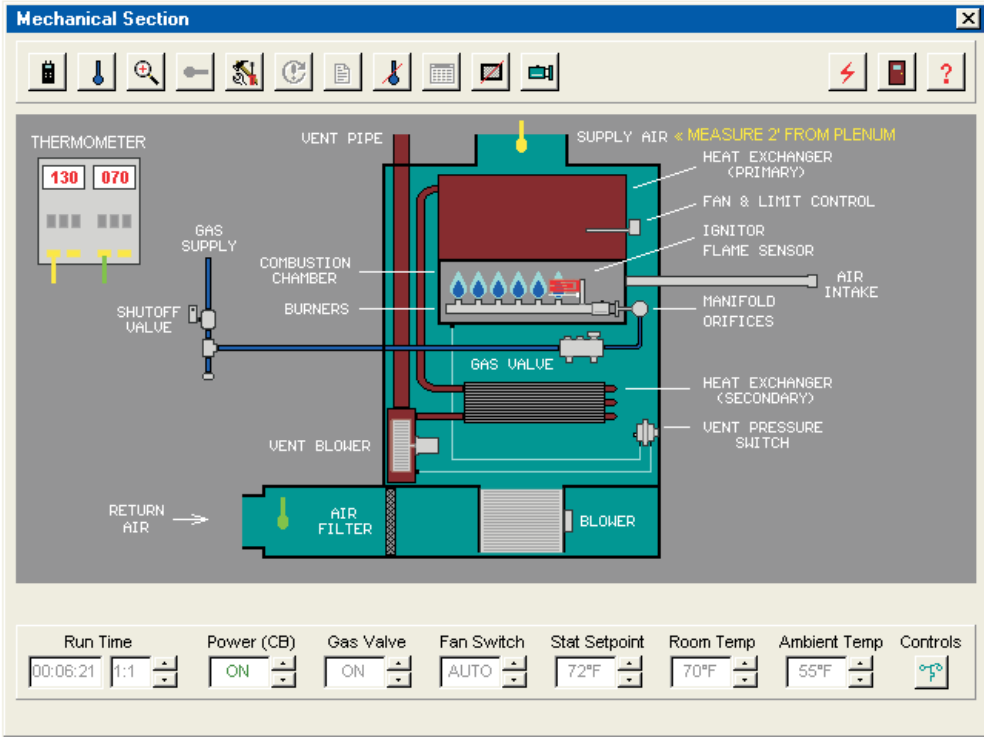
MP-500	1 computer license	$695.00
MP-505	5 computer licenses	$1,295.00
MP-511	10 computer licenses	$1,695.00
MP-515	15 computer licenses	$1,995.00
MP-520	20 computer licenses	$2,295.00

Network Licenses

MP-540	10 seats	$1,595.00
MP-560	25 seats	$1,895.00
MP-570	50 seats	$2,695.00

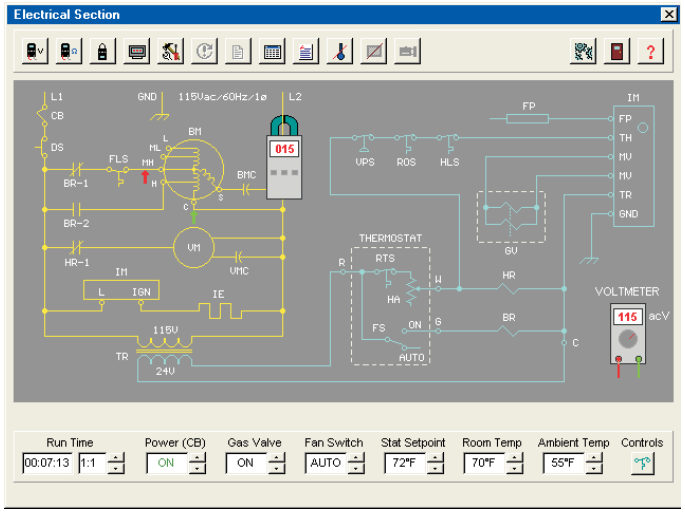
For further prices and ordering information, please see Page 20

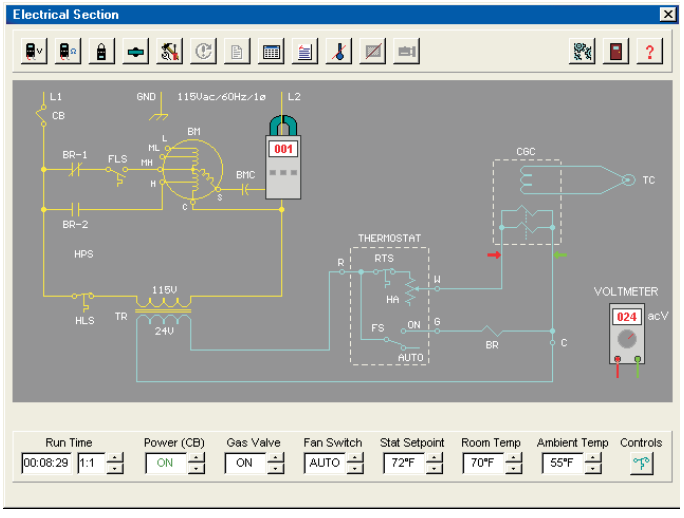
GAS FURNACE SIMULATOR *SIMUGAS*™



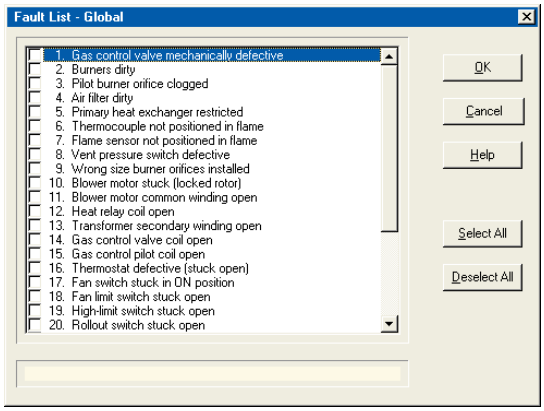
SIMUGAS™ simulates two *generic* versions of gas furnaces. These include a **high-efficiency condensing furnace** with *hot-surface ignition (HSI),* and a **standard-efficiency furnace** with **standing pilot ignition**. Either *natural gas* or *liquid-petroleum* (*LP) gas* may be selected for simulation. Room and ambient temperatures, room thermostat, burner air-shutters, fan limit, high limit, heat anticipator, and manifold pressure are all adjustable. The room and ambient temperatures, in either *Fahrenheit* or *Celsius,* are constantly updated and displayed.

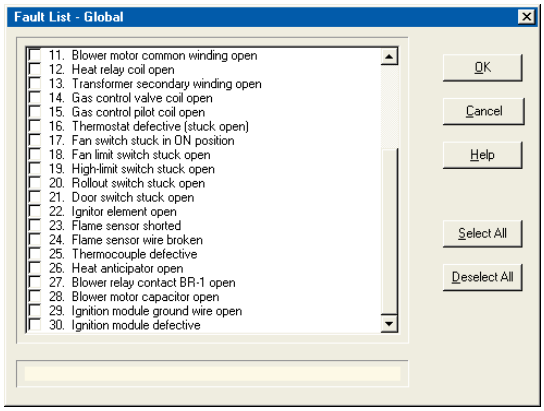
Animated mechanical and electrical schematic diagrams of the simulated gas furnace are provided in "real-time". The ***mechanical diagrams*** show the burner flames, gas flow, and blower rotation. In the ***electrical ladder diagrams***, the controls and switch contacts constantly change state as the system operates. The trainee can "zoom" into the furnace to visually inspect various components, including checking for a dirty air filter or heat exchanger, and the position of the flame sensor. Typical types of burner flames are also shown. Up to 30 commonly





GAS FURNACE SIMULATOR *SIMUGAS*™

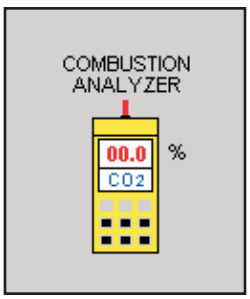




encountered mechanical and electrical faults may be selected, as shown in the *Fault Lists* above.

SIMUGAS provides easy-to-use "point-and-click" selection of meters and test points, which are saved to an *Instrument Log* to monitor the users' troubleshooting skill. Temperatures may be displayed in either *Fahrenheit* (°F) or *Celsius* (°C), and pressures may be displayed in either *imperial* (in. w.c.) or *metric* (kPa). The on-screen test instruments include:

- Manometer
- Thermometers
- Combustion analyzer
- Ignition module tester
- Voltmeter
- Millivoltmeter
- Ohmmeter
- Clamp-on ammeter
- Microammeter



Primary heat exchanger	Blower relay
Secondary heat exchanger	Heat relay
Combustion chamber	Gas control valve
Manifold	Ignitor element
Burners	Ignition module
Orifices	Gas control coil
Air filter	Flame sensor
Gas valve	Run capacitor
Vent pipe	Room thermostat
Draft hood	High limit switch
Pilot burner	Fan switch
Thermocouple	Vent pressure switch
Blower motor	Rollout switch
Vent blower motor	Door switch
Transformer	Circuit breaker

SIMUGAS provides testing and troubleshooting of the devices listed above, which are commonly found in gas furnaces.

SYSTEM REQUIREMENTS

SIMUGAS requires the following minimum IBM compatible computer:

- Pentium, Core, or equivalent processor (32 or 64-bit)
- Windows XP, Vista, 7, 8, 8.1, 10
- Hard drive, 17MB available disk space

SIMUGAS network version is compatible with Novell and Windows Server 2003, Server 2008, Server 2012

IMUTECH®

ORDERING INFORMATION

SIMUGAS™ Gas Furnace Simulator

Standalone Licenses

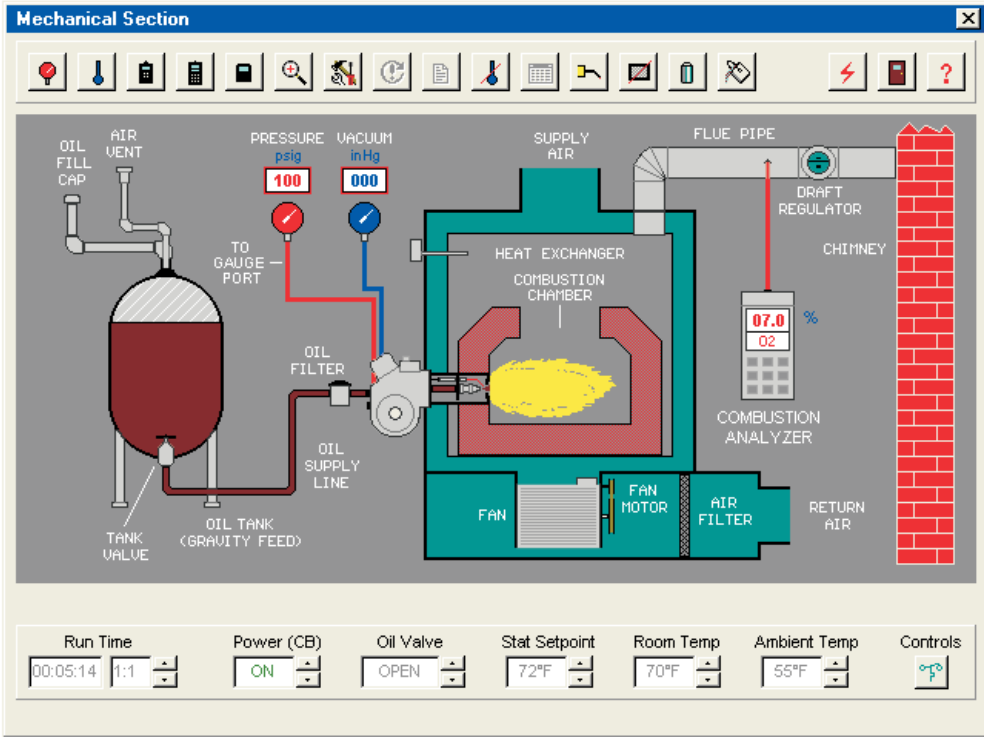
MF-500	1 computer license	$695.00
MF-505	5 computer licenses	$1,295.00
MF-511	10 computer licenses	$1,695.00
MF-515	15 computer licenses	$1,995.00
MF-520	20 computer licenses	$2,295.00

Network Licenses

MF-540	10 seats	$1,595.00
MF-560	25 seats	$1,895.00
MF-570	50 seats	$2,695.00

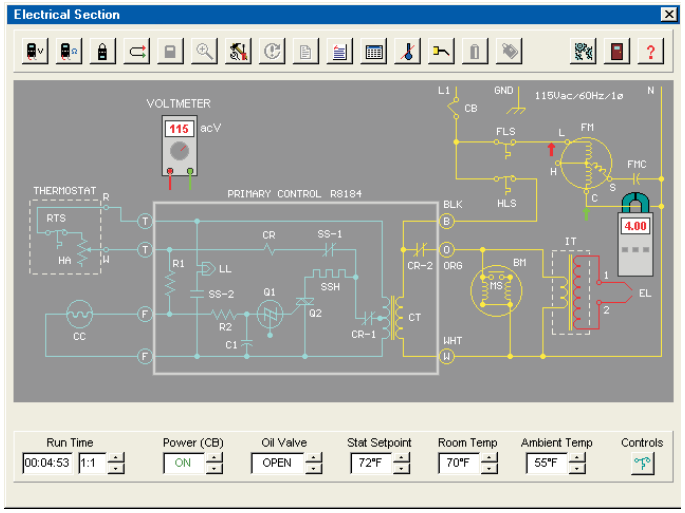
For further prices and ordering information, please see Page 20

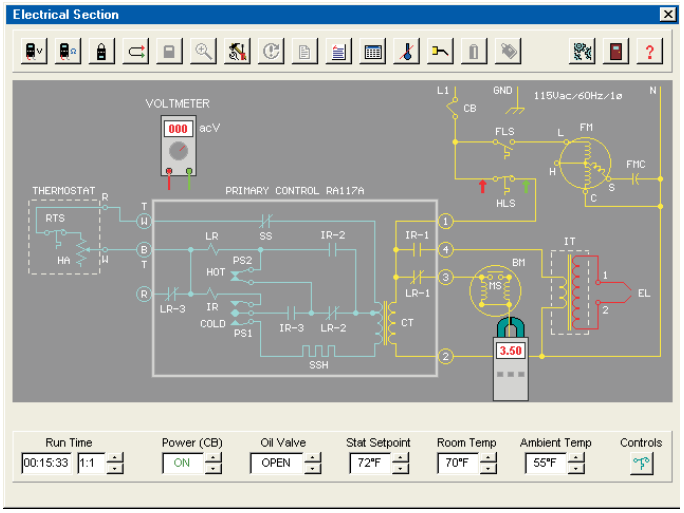
OIL FURNACE SIMULATOR *SIMUOIL*™



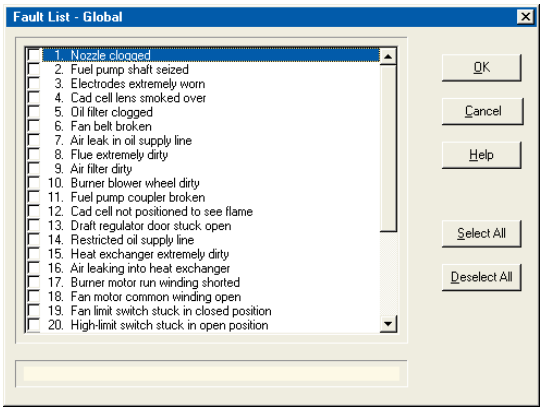
SIMUOIL™ simulates four common configurations of *generic* oil furnaces. These include two types of **primary controls**, *cad cell* and *stack-mounted*, as well as two types of **oil supply systems**, *one-pipe gravity feed* and *2-pipe buried tank.*

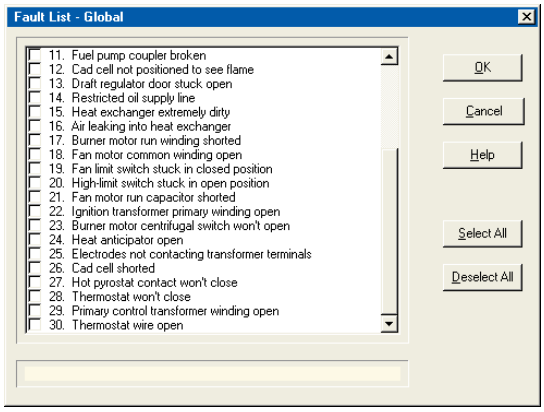
Animated mechanical and electrical schematic diagrams of the simulated oil furnace are provided in "real-time". The ***mechanical diagrams*** show the flame, fuel flow, and blower rotation. In the ***electrical ladder diagrams***, the controls and switch contacts constantly change state as the furnace operates. The trainee can "zoom" into the furnace to visually inspect various components, including the electrodes, cad cell, and fan belt, and check for dirty filters, heat exchanger, and flue pipe. Room and ambient temperatures, room thermostat, limit switches, burner air shutter, draft regulator, fuel pump pressure, and electrodes are all adjustable. Room and ambient temperatures, in either *Fahrenheit* or *Celsius,* are constantly updated and displayed. Up to 30 commonly encountered





OIL FURNACE SIMULATOR *SIMUOIL*™

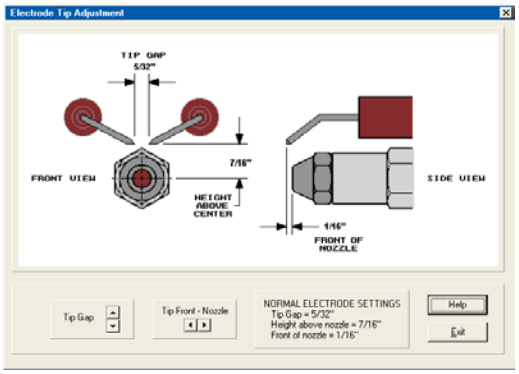




mechanical and electrical faults may be selected, as shown in the *Fault Lists* above.

SIMUOIL provides easy-to-use "point-and-click" selection of meters and test points, which are saved to an *Instrument Log* to monitor the users' troubleshooting skill. Temperatures may be displayed in either *Fahrenheit* (°F) or *Celsius* (°C), and pressures may be displayed in either *imperial* (psig/in. w.c.) or *metric* (kPa). The on-screen instruments include:

- Draft gauge
- Fuel gauge
- Pressure gauge
- Vacuum gauge
- Thermometers
- Combustion analyzer
- Smoke tester
- Voltmeter
- Ohmmeter
- Clamp-on ammeter



Burner	Ignition transformer
Fuel pump	Control transformer
Nozzle	Electrodes
Combustion chamber	Cad cell
Heat exchanger	Pyrostat
Draft regulator	Safety switch
Flue pipe	Fan limit switch
Oil filter	High-limit switch
Air filter	Centrifugal switch
Oil tank valve	Room thermostat
Primary control	Heat anticipator
Fan motor	Motor run capacitor
Burner motor	Circuit breaker

SIMUOIL provides testing and troubleshooting of the devices listed above, which are commonly found in oil furnaces.

SYSTEM REQUIREMENTS

SIMUOIL requires the following minimum IBM compatible computer:

- Pentium, Core, or equivalent processor (32 or 64-bit)
- Windows XP, Vista, 7, 8, 8.1, 10
- Hard drive, 18MB available disk space

SIMUOIL network version is compatible with Novell and Windows Server 2003, Server 2008, Server 2012

IMUECH®

ORDERING INFORMATION

SIMUOIL™ Oil Furnace Simulator

Standalone Licenses

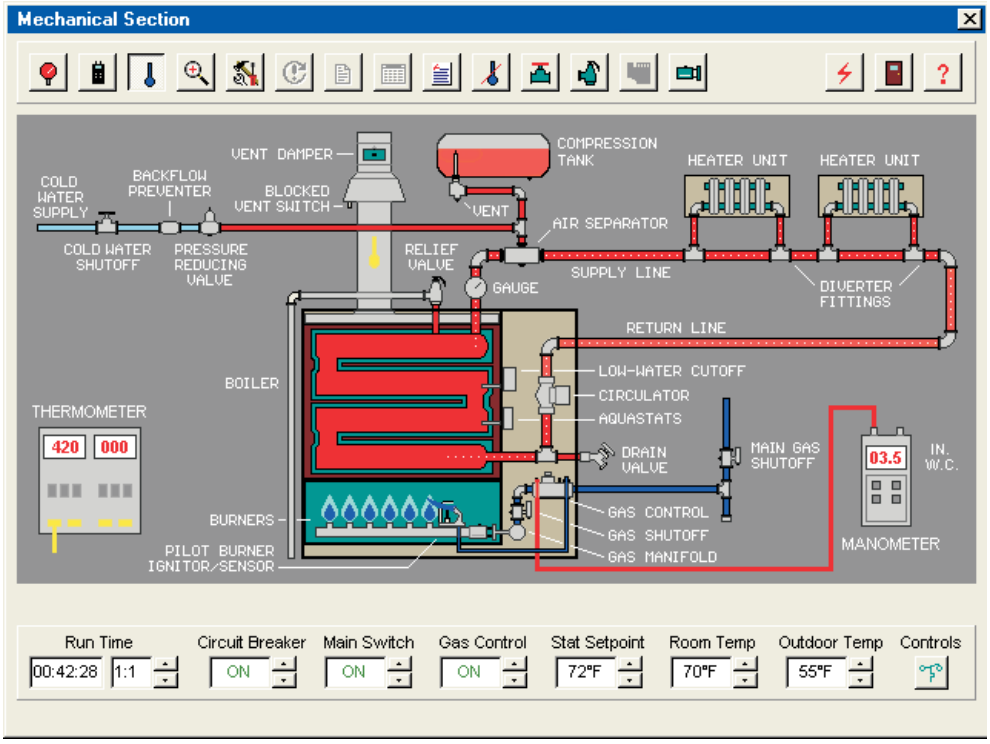
MO-500	1 computer license	$795.00
MO-505	5 computer licenses	$1,395.00
MO-511	10 computer licenses	$1,795.00
MO-515	15 computer licenses	$2,095.00
MO-520	20 computer licenses	$2,395.00

Network Licenses

MO-540	10 seats	$1,695.00
MO-560	25 seats	$1,995.00
MO-570	50 seats	$2,795.00

For further prices and ordering information, please see Page 20

HOT WATER BOILER SIMULATOR *SIMUHYDRO™*



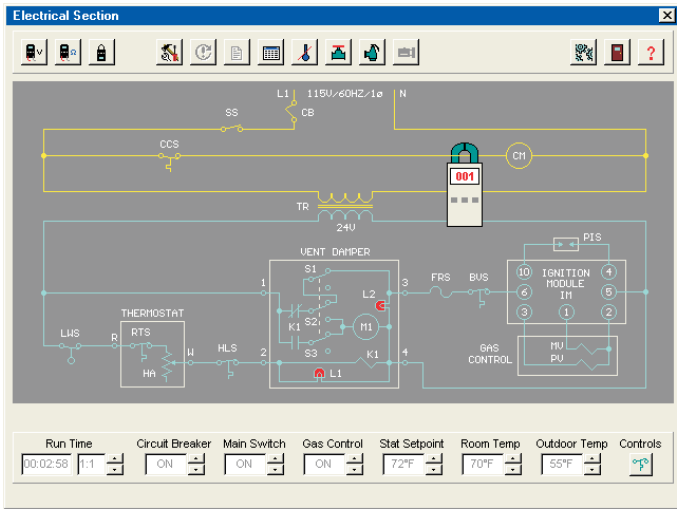
SIMUHYDRO™ simulates a *generic* gas-fired *low-pressure hot water boiler*. This residential/light commercial hydronic system uses a cast-iron boiler, a compression tank, and continuous circulation. Room and outdoor temperatures, thermostats, high-limit cut-out, circulator cut-in, gas manifold pressure, cold water pressure, and burner primary air are fully adjustable. The gas and water valves, and compression tank vent may be opened and closed by just a click of the mouse. Having the capability of changing operating temperatures, pressures, and water levels, allows the trainee to observe the boiler system under various conditions; something very difficult to do with real hydronic equipment.

Animated mechanical and electrical schematic diagrams of the simulated hot water boiler are provided in "real-time". The ***mechanical diagram*** shows gas and water flow, water temperatures, boiler and compression tank water levels, and valve positions. In the ***electrical ladder diagrams***, controls and switch contacts constantly change state as the system operates.

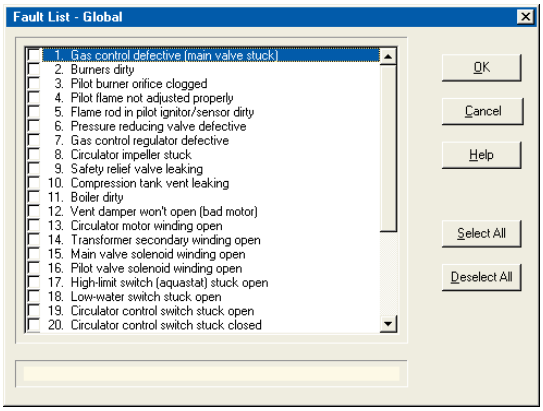
The trainee may "zoom" into the system to visually inspect various components, including checking for a dirty combustion chamber, clogged burner and pilot burner orifices, vent damper operation, and proper pilot ignitor position. The trainee can also drain and fill the boiler and compression tank, while observing water levels.

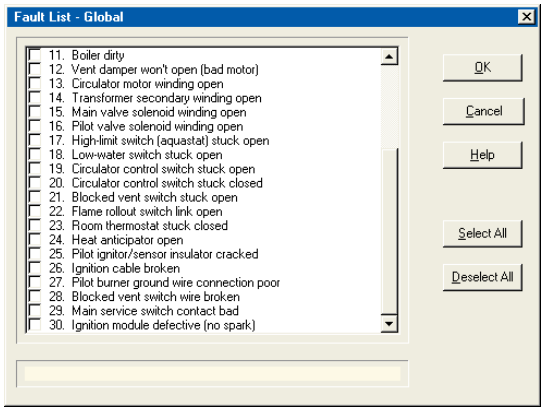
SIMUHYDRO provides easy-to-use "point-and-click" selection of meters and test points, which are saved to an *Instrument Log* to monitor the users' troubleshooting skill. Temperatures may be displayed in either *Fahrenheit* (°F) or *Celsius* (°C), and pressures may be displayed in either *imperial (psig/*in. w.c.) or *metric* (kPa). The on-screen instruments include:

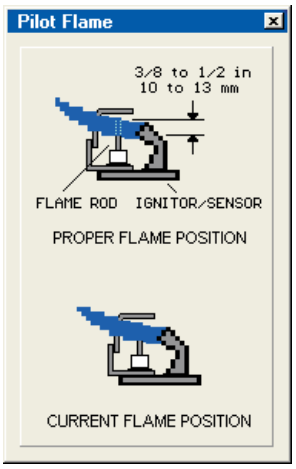
- Pressure gauges
- Manometer
- Thermometers
- Voltmeter
- Ohmmeter
- Microammeter
- Clamp-on ammeter



HOT WATER BOILER SIMULATOR *SIMUHYDRO*™







SYSTEM REQUIREMENTS

SIMUHYDRO requires the following minimum IBM compatible computer:

- Pentium, Core, or equivalent processor (32 or 64-bit)
- Windows XP, Vista, 7, 8, 8.1, 10
- Hard drive, 17MB available disk space

SIMUHYDRO network version is compatible with Novell and Windows Server 2003, Server 2008, Server 2012

Up to 30 commonly encountered mechanical and electrical faults may be selected, as shown in the *Fault Lists* above.

SIMUHYDRO provides testing and troubleshooting of the devices listed below, which are commonly found in hot water boilers.

Cast-iron boiler	Transformer
Compression tank	Gas control valve
Air separator	Circulator
Compression tank vent	Heater units
Backflow preventer	Ignition module
Pressure reducing valve	Circulator motor
Pressure relief valve	Vent damper motor
Pressure gauge	Main valve solenoid
Temperature gauge	Pilot valve solenoid
Gas manifold	Pilot ignitor/sensor
Gas burners	Room thermostat
Burner orifices	Heat anticipator
Pilot burner	Low water switch (LWCO)
Gas shutoff valves	High-limit aquastat
Cold water shutoff valve	Blocked vent switch
Vent damper	Flame rollout switch
Vent pipe	Circulator control aquastat
Draft hood	Main service switch
Diverter fittings	Circuit breaker

IMUTECH®

ORDERING INFORMATION

SIMUHYDRO™ Hot Water Boiler Simulator

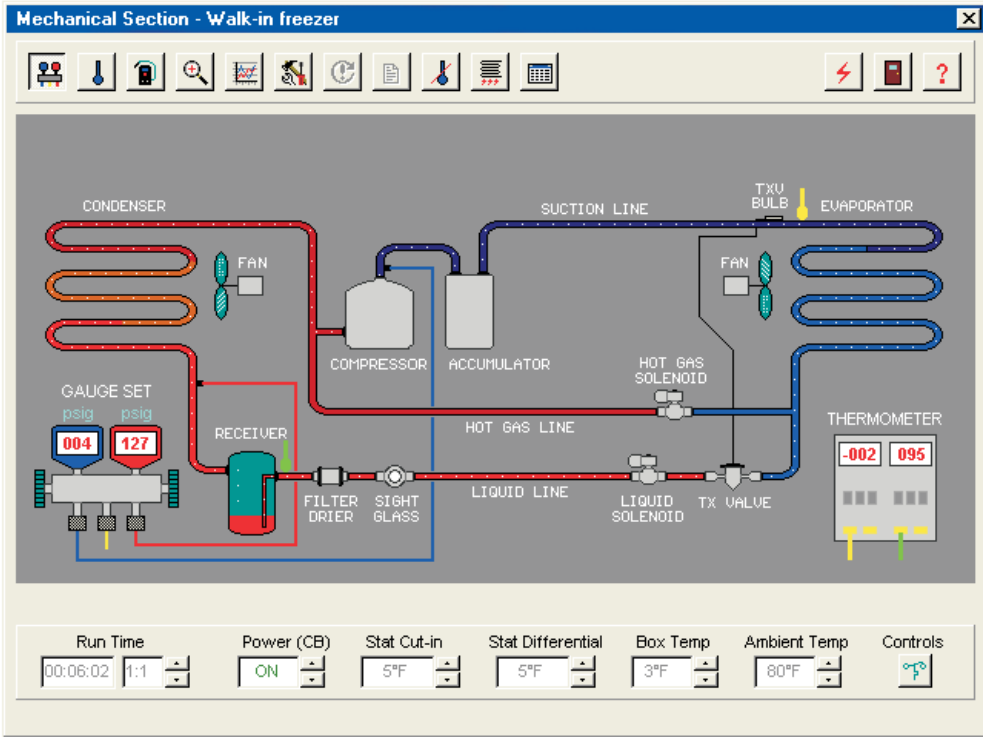
Standalone Licenses

MB-500	1 computer license	$795.00
MB-505	5 computer licenses	$1,395.00
MB-511	10 computer licenses	$1,795.00
MB-515	15 computer licenses	$2,095.00
MB-520	20 computer licenses	$2,395.00

Network Licenses

MB-540	10 seats	$1,695.00
MB-560	25 seats	$1,995.00
MB-570	50 seats	$2,795.00

For further prices and ordering information, please see Page 20



SIMUREFR™ simulates three *generic* versions of *low-temperature* and *medium-temperature* refrigeration systems. These include a **reach-in case** with *random defrost,* a **reach-in freezer** with *electric defrost*, and a **walk-in freezer** with *hot-gas defrost.* The trainee may select the type of refrigerant for the simulated system. Box and ambient temperatures are adjustable and continuously updated and displayed on the screen. The cut-in and differential settings for the pressurestat, thermostat, and low-pressure switch are also adjustable, as well as the defrost and TXV settings.

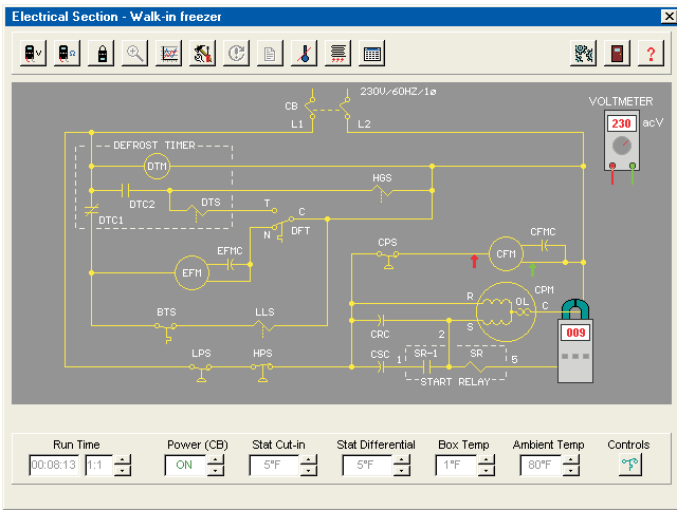
Animated mechanical and electrical schematic diagrams of the simulated refrigeration system are provided in "real-time". The ***mechanical diagrams*** show refrigerant flow, as well as the *liquid, vapor, liquid/vapor,* and *superheated vapor* states of the refrigerant. Also, the liquid level in the receiver is shown. In the ***electrical ladder diagrams,*** the controls and switch contacts constantly change state as the system operates. Providing a means of visually tracing the refrigerant and current flow during system operation, makes it much easier for the trainee to understand how a refrigeration system is supposed to work.

Pressure-temperature charts, specifications, and an electrical nomenclature are available on-screen. In addition, the trainee can "zoom" into the system to visually inspect various components, including dirt or ice on coils, and bubbles in the liquid sight glass.

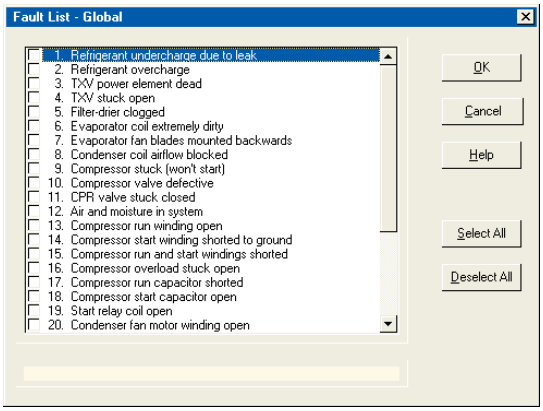
Eight common refrigerants may be selected for the simulated system. These include:

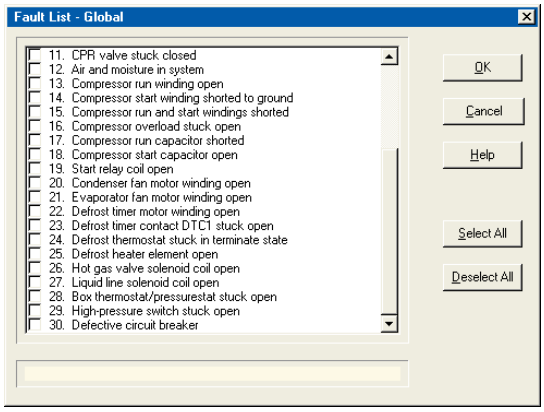
- R-12
- R-22
- R-134a
- R-402A
- R-404A
- R-409A
- R-502
- R-507

SIMUREFR provides easy-to-use "point-and-click" selection of meters and test points, and are saved to an *Instrument Log* to monitor the users' troubleshooting skill. Temperatures may be



COMMERCIAL REFRIGERATION SIMULATOR *SIMUREFR*™





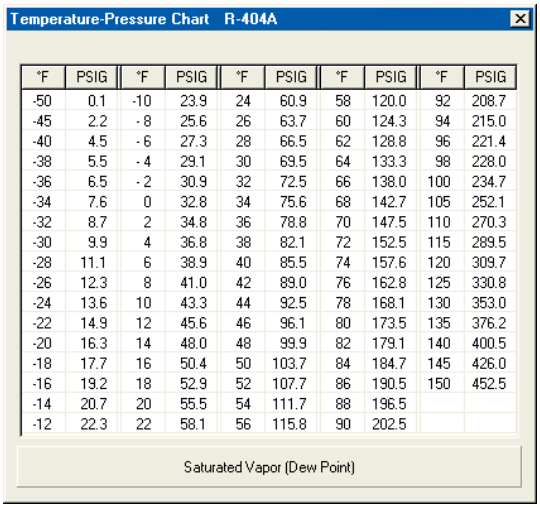
displayed in either *Fahrenheit* (°F) or *Celsius* (°C), and pressures may be displayed in either *imperial* (psig) or *metric* (kPa/barg). The on-screen test instruments include:

- Gauge manifold set
- Thermometers
- Leak detector
- Voltmeter
- Ohmmeter
- Clamp-on ammeter

Up to 30 commonly encountered mechanical and electrical faults may be selected, as shown in the *Fault Lists* above.

SIMUREFR provides testing and troubleshooting of the devices listed below, commonly found in refrigeration systems.

Compressor	Run capacitor
Condenser coil	Start capacitor
Evaporator coil	Defrost heater
Receiver	Defrost timer motor
TX valve (TXV/TEV)	Defrost timer solenoid
CPR valve	Defrost thermostat
Filter-drier	Box thermostat
Sight glass	Box pressurestat
Condenser fan motor	Low pressure switch
Evaporator fan motor	High pressure switch
Start relay	Heater limit switch
Liquid line solenoid	Condenser fan switch
Hot gas solenoid	Circuit breaker



°F	PSIG	°F	PSIG	°F	PSIG	°F	PSIG	°F	PSIG
-50	0.1	-10	23.9	24	60.9	58	120.0	92	208.7
-45	2.2	- 8	25.6	26	63.7	60	124.3	94	215.0
-40	4.5	- 6	27.3	28	66.5	62	128.8	96	221.4
-38	5.5	- 4	29.1	30	69.5	64	133.3	98	228.0
-36	6.5	- 2	30.9	32	72.5	66	138.0	100	234.7
-34	7.6	0	32.8	34	75.6	68	142.7	105	252.1
-32	8.7	2	34.8	36	78.8	70	147.5	110	270.3
-30	9.9	4	36.8	38	82.1	72	152.5	115	289.5
-28	11.1	6	38.9	40	85.5	74	157.6	120	309.7
-26	12.3	8	41.0	42	89.0	76	162.8	125	330.8
-24	13.6	10	43.3	44	92.5	78	168.1	130	353.0
-22	14.9	12	45.6	46	96.1	80	173.5	135	376.2
-20	16.3	14	48.0	48	99.9	82	179.1	140	400.5
-18	17.7	16	50.4	50	103.7	84	184.7	145	426.0
-16	19.2	18	52.9	52	107.7	86	190.5	150	452.5
-14	20.7	20	55.5	54	111.7	88	196.5		
-12	22.3	22	58.1	56	115.8	90	202.5		

SYSTEM REQUIREMENTS

SIMUREFR requires the following minimum IBM compatible computer:

- Pentium, Core, or equivalent processor (32 or 64-bit)
- Windows XP, Vista, 7, 8, 8.1, 10
- Hard drive, 18MB available disk space

SIMUREFR network version is compatible with Novell and Windows Server 2003, Server 2008, Server 2012

IMUTECH®

ORDERING INFORMATION

SIMUREFR™ Commercial Refrigeration Simulator

Standalone Licenses

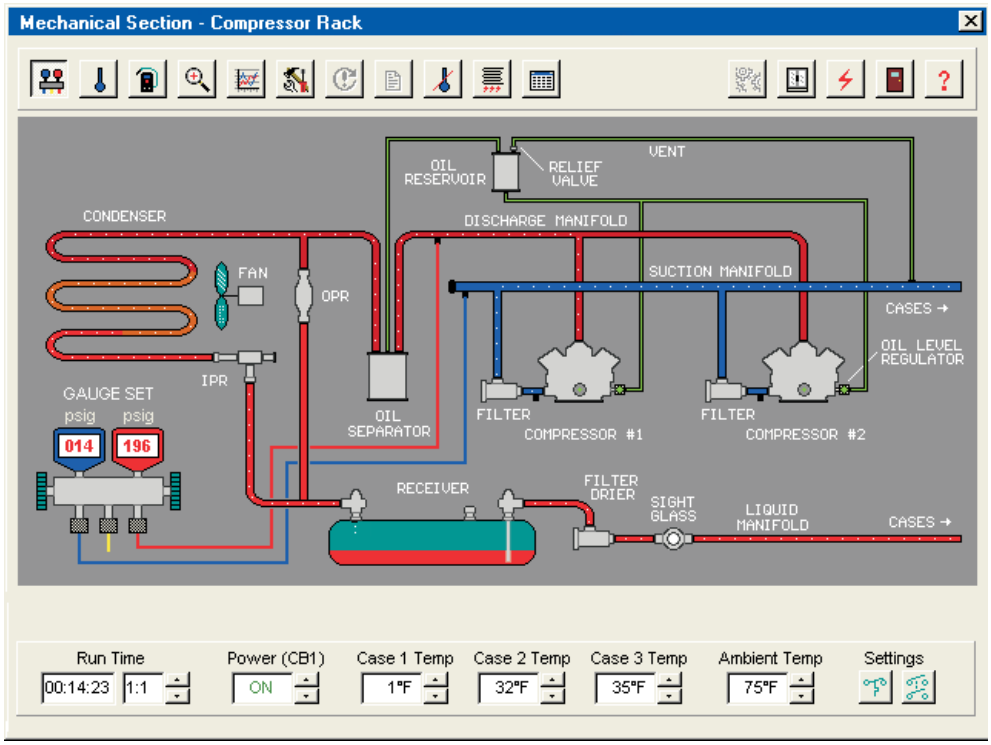
MR-500	1 computer license	$695.00
MR-505	5 computer licenses	$1,295.00
MR-511	10 computer licenses	$1,695.00
MR-515	15 computer licenses	$1,995.00
MR-520	20 computer licenses	$2,295.00

Network Licenses

MR-540	10 seats	$1,595.00
MR-560	25 seats	$1,895.00
MR-570	50 seats	$2,695.00

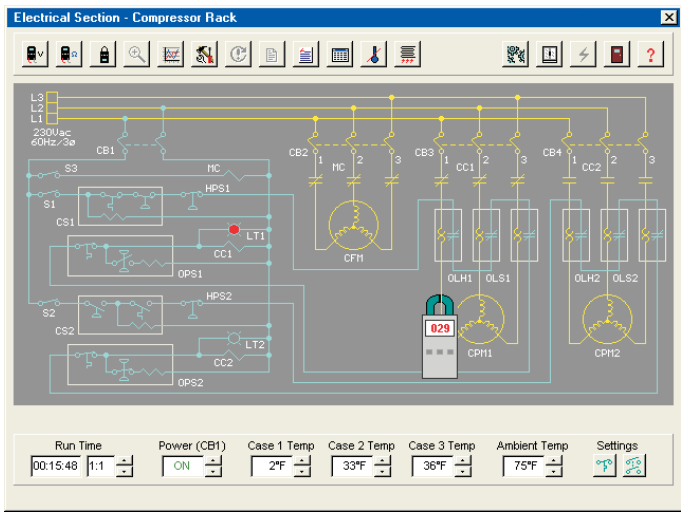
For further prices and ordering information, please see Page 20

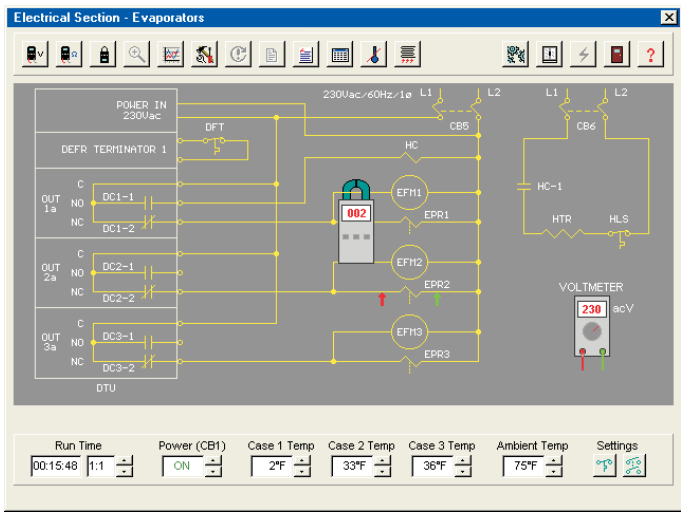
SUPERMARKET REFRIGERATION SIMULATOR *SIMUMKT*™



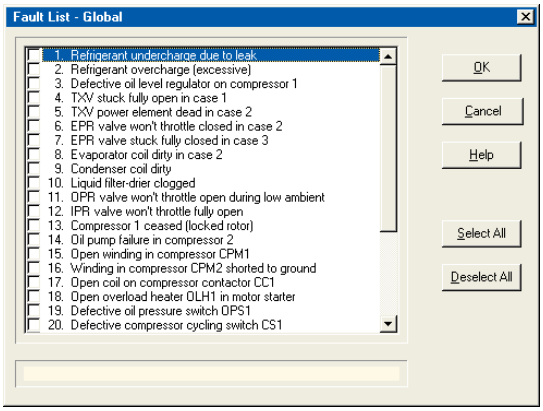
SIMUMKT™ simulates a typical parallel-type multi-evaporator supermarket refrigeration system. Normally, a parallel system contains many display cases and walk-in coolers, but for simplicity, *SIMUMKT* contains three display cases. One case is **low-temperature** with *electric defrost,* the others are **medium-temperature** with *off-cycle defrost.* Two 3-phase semi-hermetic compressors, with capacity cycling, are included. A specific refrigerant may be selected for simulation, which includes **R-22**, **R-402A**, **R-404A**, **R-422D**, **R-502**, and **R-507**.

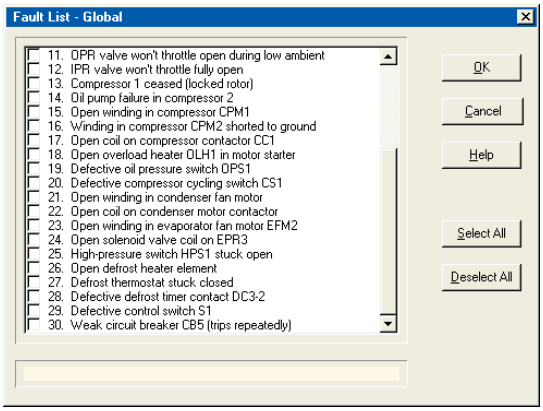
Animated mechanical and electrical schematic diagrams of the simulated refrigeration system are provided in "real-time". The ***mechanical diagrams*** show refrigerant flow and the *liquid, vapor, liquid/vapor,* and *superheated vapor* states of the refrigerant. Also, the liquid level in the receiver is shown. In the ***electrical ladder diagrams,*** the controls and switch contacts constantly change state as the system operates. Providing a means of visually tracing the refrigerant and current flow during system operation, makes it much easier for the trainee





SUPERMARKET REFRIGERATION SIMULATOR *SIMUMKT*™





to understand how the system is supposed to work. Up to 30 commonly encountered mechanical and electrical faults may be selected, as shown in the *Fault Lists* above.

Setpoints for the EPR valves and TXVs can be adjusted for each case, as well as the compressor-cycling control and defrost settings. Case and ambient temperatures are adjustable, and continuously updated and displayed on the screen. All temperature and pressure values can be set and displayed in either *imperial* or *metric*.

Pressure-temperature charts for the refrigerants, specifications, and an electrical nomenclature are available *on-screen*. In addition, the trainee can "zoom" into the system to visually inspect various components, including dirty or iced-up coils, and liquid and compressor oil level sight glasses.

SIMUMKT provides easy-to-use "point-and-click" selection of meters and test points, which are saved to an *Instrument Log* to monitor the users' troubleshooting skill. Temperatures may be displayed in either *Fahrenheit* (°F) or *Celsius* (°C), and pressures may be displayed in either *imperial* (psig) or *metric* (kPa/barg). The on-screen test instruments include:

- Gauge manifold set
- Thermometers
- Leak detector
- Voltmeter
- Ohmmeter
- Clamp-on ammeter

Compressor	Compressor motor (3-phase)
Condenser coil	Condenser fan motor
Evaporator coil	Evaporator fan motor
Liquid receiver	Contactor
Oil reservoir	Defrost timer unit
Oil separator	Motor starter
Oil level regulator	Defrost heater
Oil level sight glass	Defrost thermostat
Filter-drier	Compressor-cycling switch
Liquid-line sight glass	High-pressure switch
OPR valve	Oil pressure switch
IPR valve	Heater limit switch
EPR valve	Control switch
TX valve (TXV/TEV)	Circuit breaker

SIMUMKT provides testing and troubleshooting of the devices listed above, commonly found in refrigeration systems.

SYSTEM REQUIREMENTS

SIMUMKT requires the following minimum IBM compatible computer:

- Pentium, Core, or equivalent processor (32 or 64-bit)
- Windows XP, Vista, 7, 8, 8.1, 10
- Hard drive, 18MB available disk space

SIMUMKT network version is compatible with Novell and Windows Server 2003, Server 2008, Server 2012

IMUTECH®

ORDERING INFORMATION

SIMUMKT™ Supermarket Refrigeration Simulator

Standalone Licenses

MS-500	1 computer license	$895.00
MS-505	5 computer licenses	$1,595.00
MS-511	10 computer licenses	$1,995.00
MS-515	15 computer licenses	$2,295.00
MS-520	20 computer licenses	$2,595.00

Network Licenses

MS-540	10 seats	$1,895.00
MS-560	25 seats	$2,095.00
MS-570	50 seats	$2,895.00

For further prices and ordering information, please see Page 20

ORDERING INFORMATION

METHODS OF ORDERING

MAIL

Simutech Systems, Inc.
PO Box 7212
Beaverton OR 97007 (U.S.A.)

PHONE

(800) 648-6209 (USA & Canada)
(503) 649-9076
Hours: 8:00 am to 5:00 pm Pacific Time

FAX

(503) 649-8972

ON-LINE STORE / E-MAIL

www.simutechsystems.com
sales@simutechsystems.com

METHODS OF PAYMENT

U.S. CUSTOMERS

- Purchase Order from government agency, school, or corporation (OAC), Net 30-days
- Visa, MasterCard, or American Express
- Prepaid by check

CANADA & INTERNATIONAL CUSTOMERS

- Purchase Order from government agency or school, Net 30-days, payable in U.S. funds
- Visa, MasterCard, or American Express
- Prepaid by International Bank Check, payable in U.S. funds

SHIPPING

All orders are shipped *FOB shipping point* and a shipping charge is added to invoice. Shipment is normally via *UPS ground* in USA and *UPS Air* to Canada and international. *Next-day* or *second-day air* is available upon request. For Canada and international orders, GST, local taxes, and duty are not included in our prices.

Orders are normally shipped within 24-hours

SYSTEM CONTENTS

Each simulator system includes the following:

- CD-ROM
- User's Manual
- Instructor's Manual
- Technical Support, unlimited, with toll-free number (USA and Canada)

(1) Additional licenses are required if simulators are installed and used on more than one standalone computer at same campus or training facility
(2) Network versions are valid for installation on a LAN server at one campus or training facility, for concurrent use by maximum licensed users
(3) Network versions for more than 50 users are also available
(4) May be used on tablets and iPads when a remote access server is used

Prices are subject to change without notice

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INSTRUCTOR INTERFACE MODULES

These *optional* programs are installed on the instructor's computer to *preselect faults* for all users at one time. Using a CD or flash drive, the faults are then uploaded to each workstation. In addition, when a printer isn't available at each workstation, these interfaces can be used to download reports, for display and printout at the instructor's computer. **These are recommended when six or more workstations are utilized without a network.** Prices are shown below:

DESCRIPTION	PART NO.	UNIT PRICE
ACINST™ Version 5.1	TA-500	$ 195.00
HPINST™ Version 5.1	TP-500	$ 195.00
REFRINST™ Version 5.1	TR-500	$ 195.00
MKTINST™ Version 5.1	TS-500	$ 195.00
GASINST™ Version 5.1	TF-500	$ 195.00
OILINST™ Version 5.1	TO-500	$ 195.00
HYDROINST™ Version 1.1	TB-500	$ 195.00
GEOINST™ Version 1.0	TG-500	$ 195.00

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