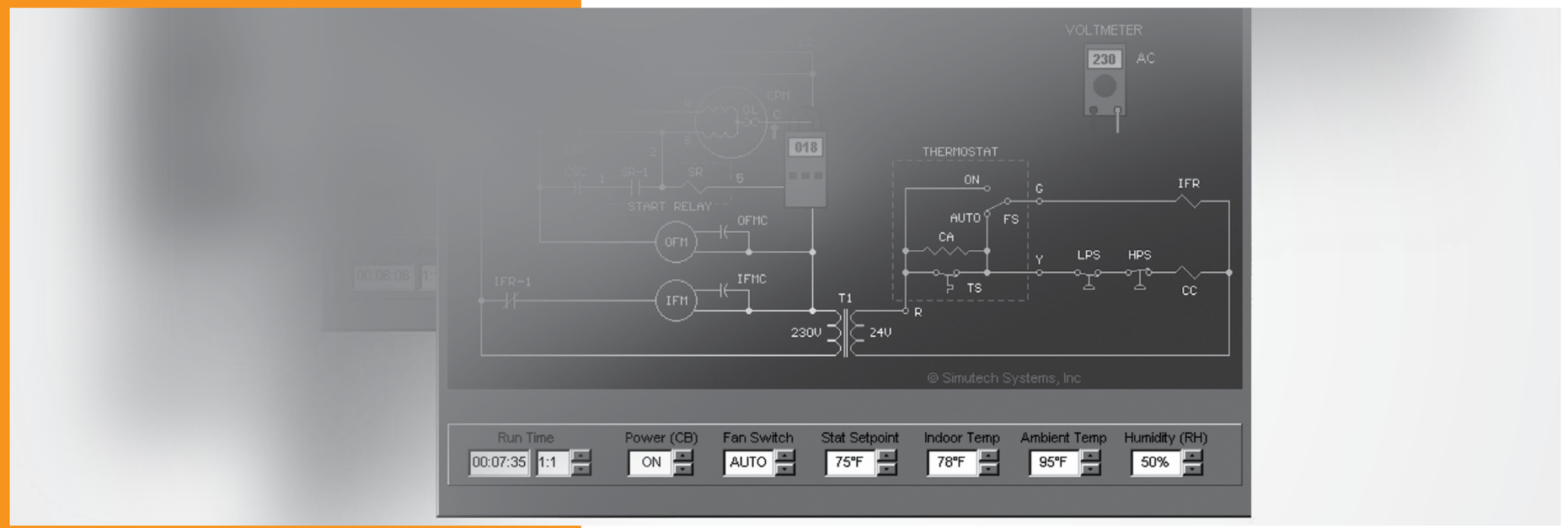
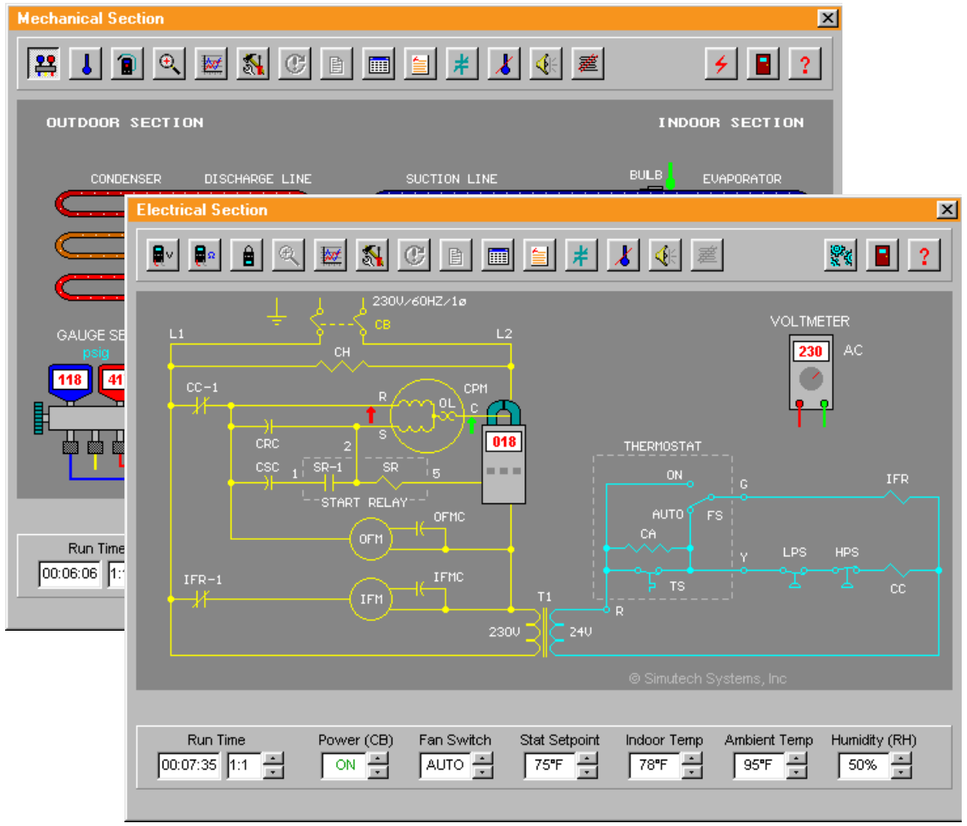


VIRTUAL LABS.

Model: REF 02101

AIR CONDITIONER SIMULATOR



INTRODUCTION

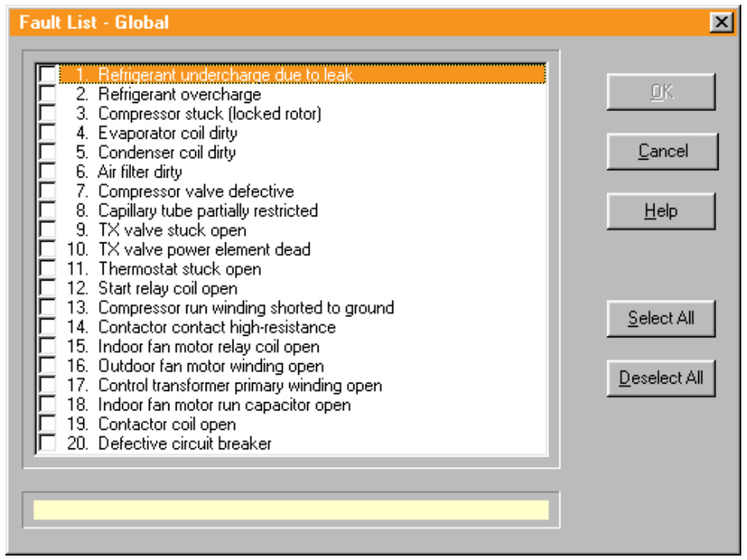
simulates two generic versions of residential and light-commercial air conditioning systems, using either R-22 or R-410A refrigerant. These systems include a packaged unit with a capillary tube and PSC motor circuit, and a split-system with a thermostatic expansion valve (TXV) and CSR motor circuit.
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 diagram, the controls and switch contacts constantly change state as the system operates.
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 as it starts and runs (normal or abnormal).

Up to 20 different mechanical and electrical faults may be inserted into the simulator, as shown in the Fault List below.

GENERAL FEATURES OF THE UNIT

provides easy-to-use "point-and-click" selection of components, meters, and test points. Temperatures may be displayed in either °F or °C, and pressures in either imperial (psig) or SI/metric (kPa, barg). The following on-screen test instruments and charts are included in the simulator:

- Gauge manifold set
- Digital thermometer
- Leak detector
- Clamp-on ammeter
- Voltmeter
- Ohmmeter
- Temperature/pressure charts
- Performance charts



EXPERIMENTS

provides testing and troubleshooting of components and devices commonly found in actual air conditioning systems, including the following:

- Compressor
- Condenser coil
- Evaporator coil
- Capillary tube
- Thermostatic expansion valve
- Filter-drier
- Air filter
- Outdoor fan motor
- Indoor fan motor
- Compressor contactor
- Start relay
- Indoor fan relay
- Transformer
- Crankcase heater
- Compressor run capacitor
- Compressor start capacitor
- Fan motor capacitor
- Room thermostat
- Low pressure switch
- High pressure switch
- Circuit breaker

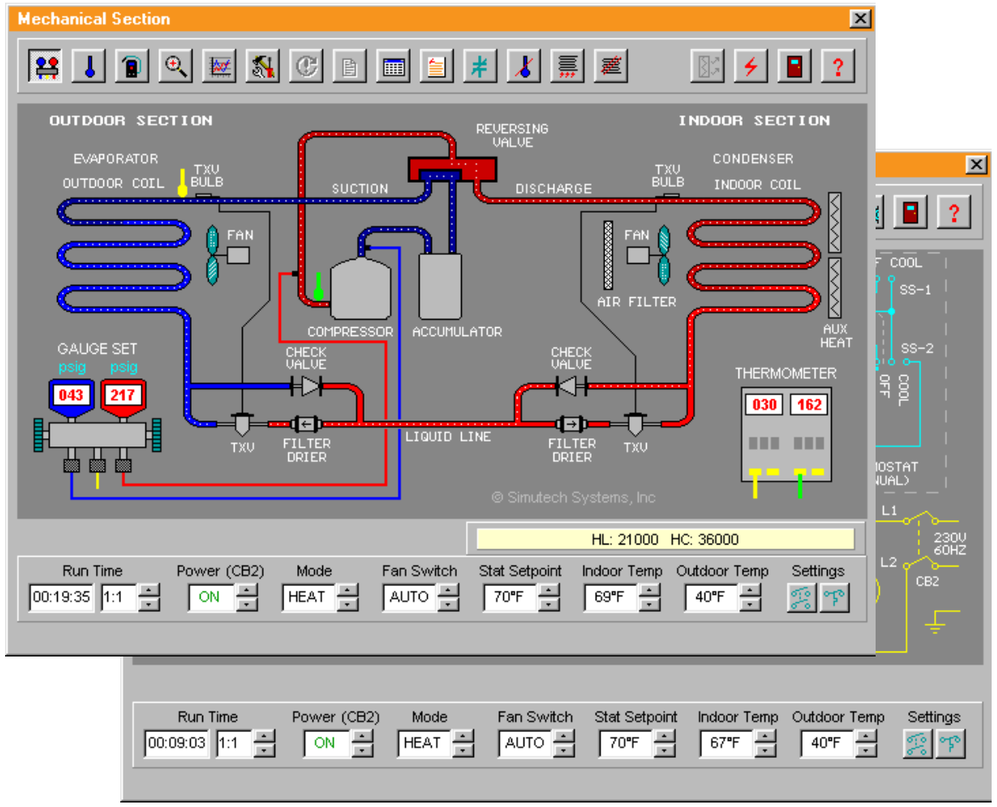
REQUIREMENTS

requires the following minimum computer system to operate:

- Windows XP, Vista, 7, 8, 8.1, and 10 (32 or 64-bit)
- VGA/SVGA display
- Hard drive, 18MB available disk space (12.5MB if other Simutech simulators are also installed)

Model: REF 02102

HEAT PUMP SIMULATOR



INTRODUCTION

simulates a generic residential and 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, room and outdoor thermostats, defrost frequency, and heatloss are all adjustable. Up to 40 different mechanical and electrical faults may be inserted into the simulator, as shown in the Fault Lists below.

GENERAL FEATURES OF THE UNIT

both R-22 and R-410A refrigerants. Provides easy-to-use “point-and-click” selection of components, meters, and test points. Temperatures may be displayed in either °F or °C, and pressures in either imperial (psig) or SI/metric (kPa/barg). For troubleshooting, the following on-screen test instruments and charts are included in the simulator:

- Gauge manifold set
- Digital thermometer
- Leak detector
- Clamp-on ammeter
- Voltmeter
- Ohmmeter
- Temperature/pressure charts
- Performance charts

EXPERIMENTS

provides testing and troubleshooting of components and devices commonly found in actual heat pump systems, including the following:

- Compressor
- Condenser coil
- Evaporator coil
- Accumulator
- Thermostatic expansion valve
- Check valve
- Filter-drier
- Air filter
- Outdoor fan motor
- Indoor fan motor
- Reversing valve
- Compressor contactor
- Indoor fan relay
- Defrost relay
- Heater relay
- Reversing valve solenoid
- Transformer
- Defrost timer
- Auxiliary heater element
- Crankcase heater
- Run capacitor
- Fan motor capacitor
- Room thermostat
- Heat thermostat
- Outdoor thermostat
- Defrost thermostat
- Emergency heat switch
- Fan & limit switches
- Fused link
- Circuit breaker

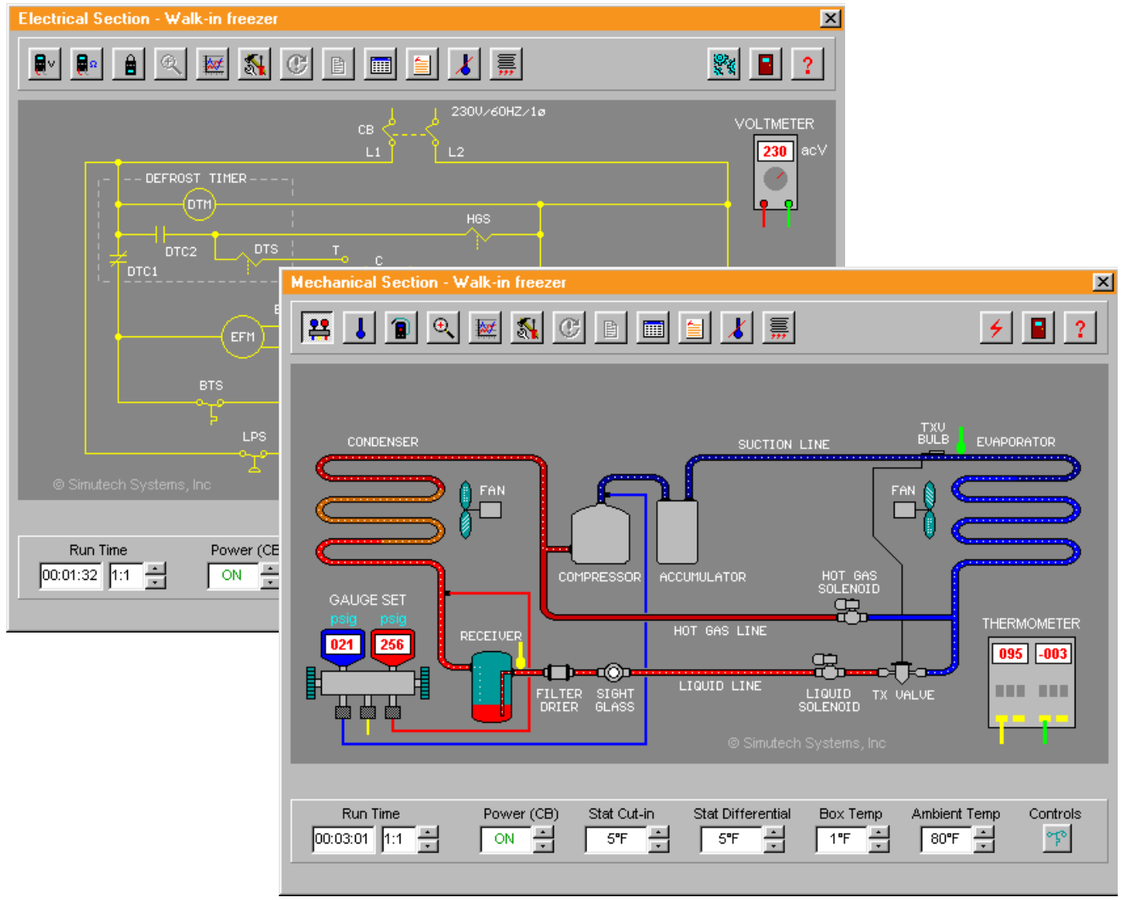
REQUIREMENTS

requires the following minimum computer system to operate:

- Windows XP, Vista, 7, 8, 8.1, and 10 (32 or 64-bit)
- VGA/SVGA display
- Hard drive, 18MB available disk space (12.5MB if other Simutech simulators are also installed)

Model: REF 02103

REFRIGERATION SIMULATOR



INTRODUCTION

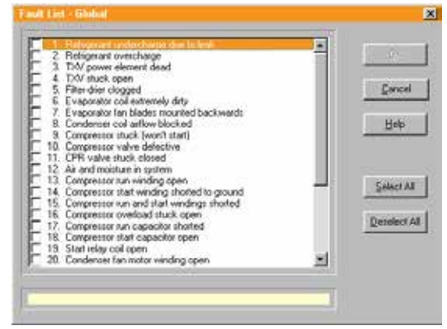
is a commercial refrigeration simulator and troubleshooting training system, designed for students and HVAC/R service technicians. The simulator is an invaluable tool for teaching students the basics of commercial refrigeration operation and troubleshooting, as well as improving the service skills of experienced technicians.

GENERAL FEATURES OF THE UNIT

SIMUREFR simulates three generic versions of low-temperature and medium- temperature refrigeration systems that a service technician would commonly encounter in the field. They include:

- **Reach-in case** with random defrost
- **Reach-in freezer** with electric defrost
- **Walk-in freeze**r with hot-gas defrost

Pressurestat and thermostat cut-in and differential, box and ambient temperatures, defrost frequency and timeout, and TXV setpoint are all adjustable. Up to 30 different mechanical and electrical faults may be inserted into the simulator, as shown in the Fault Lists below.



Eight common refrigerants, including non-CFC/HCFC types, may be selected for the simulated system. An on-screen temperature/pressure chart is available for each refrigerant. The selectable refrigerants 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 components, meters, and test points. Temperatures may be displayed in either °F or °C, and pressures in either imperial (psig) or SI/metric (kPa/barg). The following on-screen test instruments and charts are included in the simulator:

- Gauge manifold set
- Digital thermometer
- Leak detector
- Clamp-on ammeter
- Voltmeter
- Ohmmeter
- Temperature/pressure charts

EXPERIMENTS

provides testing and troubleshooting of components and devices commonly found in actual commercial refrigeration systems, including the following:

- Compressor
- Condenser coil
- Evaporator coil
- Receiver
- Thermostatic expansion valve
- CPR valve
- Filter-drier
- Condenser fan motor
- Evaporator fan motor
- Start relay
- Liquid-line solenoid
- Hot-gas solenoid
- Run and start capacitors
- Defrost heater
- Defrost timer motor
- Defrost timer solenoid
- Box thermostat
- Defrost thermostat
- Box pressurestat
- Low pressure switch
- High pressure switch
- Heater limit switch
- Condenser fan switch

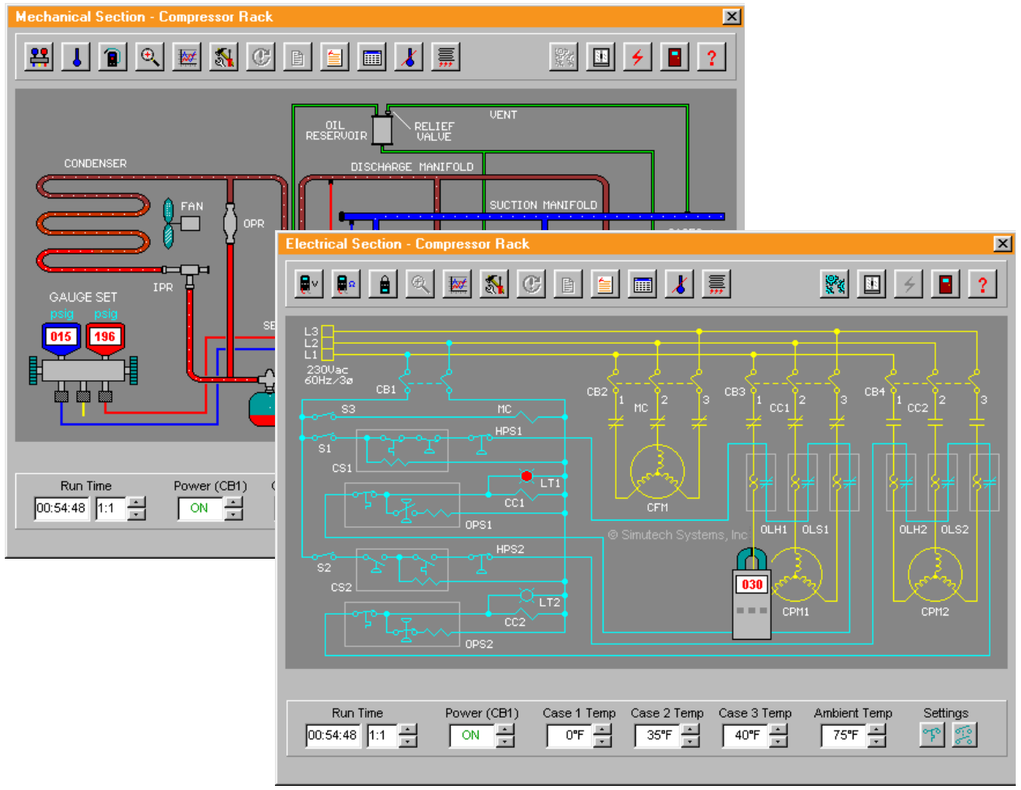
REQUIREMENTS

requires the following minimum computer system to operate:

- Windows XP, Vista, 7, 8, 8.1, and 10 (32 or 64-bit)
- VGA/SVGA display
- Hard drive, 18MB available disk space (12.5MB if other Simutech simulators are also installed)

Model: REF 02104

SUPERMARKET REFRIGERATION SIMULATOR



INTRODUCTION

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 just 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.

Six common refrigerants may be selected for the simulated system. An on-screen temperature/pressure chart is available for each refrigerant. The selectable refrigerants include:

R-22	R-422D
R-402A	R-502
R-404A	R-507

GENERAL FEATURES OF THE UNIT

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 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 below

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	Voltmeter
Leak detector	Ohmmeter
Thermometer	Clamp-on ammeter

EXPERIMENTS

provides testing and troubleshooting of components and devices commonly found in actual supermarket refrigeration systems, including the following:

Compressor (semi-hermetic)	Motor contactor
Condenser coil	Defrost timer unit
Evaporator coil	Motor starter
Liquid reservoir	Defrost heater and limit switch
Oil reservoir	Defrost thermostat
Oil separator	Compressor-cycling switch
Oil level regulator	High-pressure switch
Head pressure regulator valves	Oil pressure switch
Thermostatic expansion valve	
EPR valve	
Compressor motor (3-phase)	
Condenser fan motor	
Evaporator fan motor	

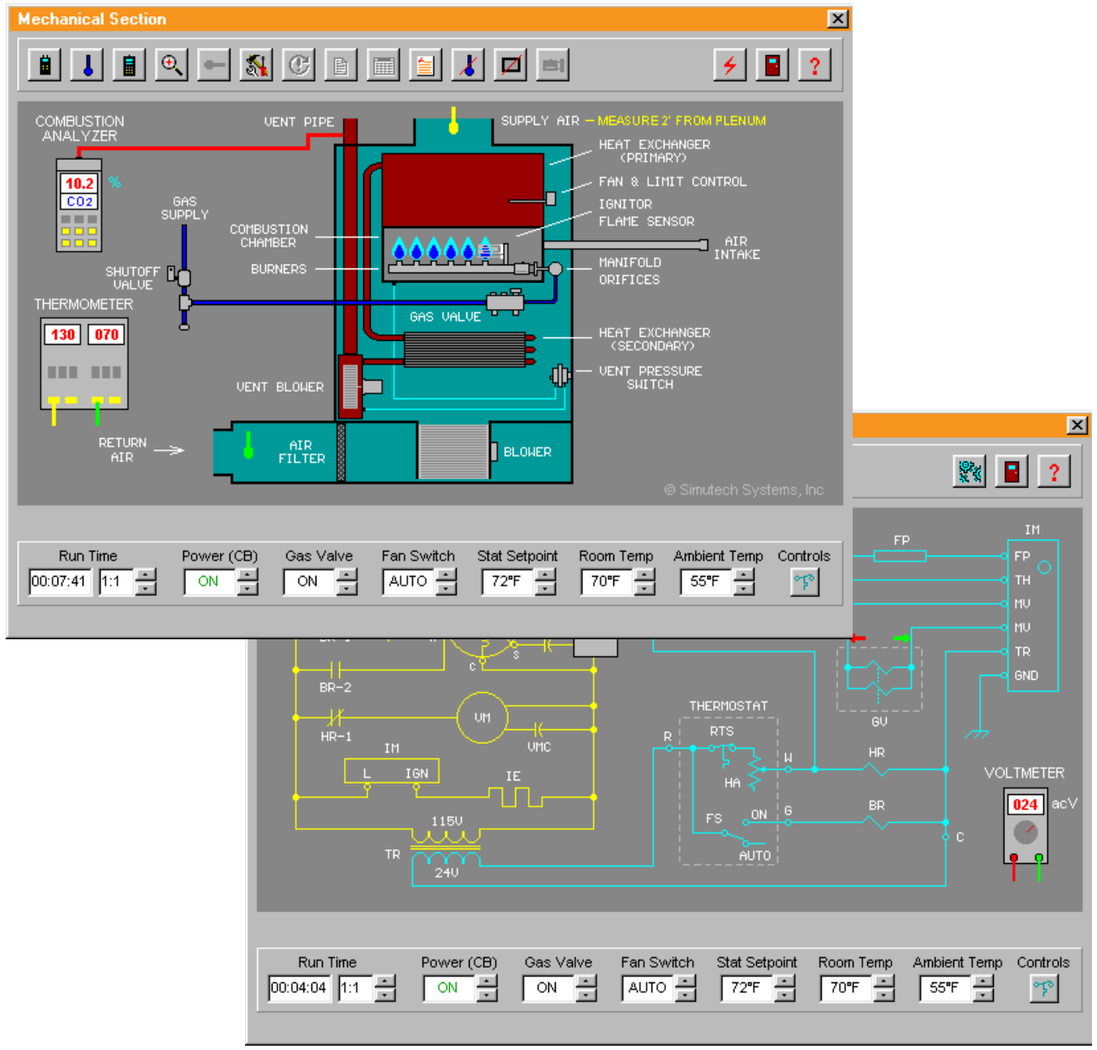
REQUIREMENTS

requires the following minimum computer system to operate:

- IBM compatible PC with a Pentium®, Core®, or equivalent processor
- Windows XP, Vista, 7, 8, 8.1, and 10 (32 or 64-bit)
- VGA/SVGA display
- Hard disk drive, 17.5MB available disk space (12MB if other Simutech simulators are also installed

Model: REF 02105

GAS FURNACE SIMULATOR

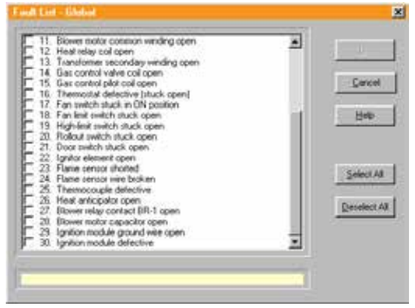


INTRODUCTION

SIMUGAS TM is a gas furnace simulator and troubleshooting training system, designed for HVAC students and service technicians. The simulator is an invaluable tool for teaching students the basics of gas furnace operation and troubleshooting, as well as improving the service skills of experienced technicians.

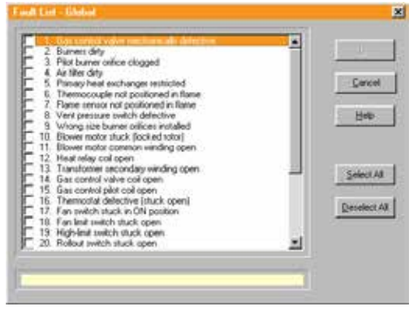
GENERAL FEATURES OF THE UNIT

simulates two generic versions of gas furnaces that a service technician would commonly encounter in the field. They include a high-efficiency condensing furnace, using hot-surface ignition (HSI), and a standard-efficiency furnace, using standing pilot ignition. Indoor and outdoor temperatures, room thermostat, burner air-shutters, fan limit, high limit, heat anticipator, and manifold pressure are all adjustable. Up to 30 different mechanical and electrical faults may be inserted into the simulator, as shown in the Fault Lists below.



provides “point-and-click” selection of meters and test points, and display of temperatures and pressures in either imperial or metric. For troubleshooting the simulator, the following on-screen test instruments are included:

- Manometer
- Digital thermometer
- Combustion analyzer
- Microammeter
- Clamp-on ammeter
- Voltmeter
- Millivoltmeter
- Ohmmeter



An on-screen combustion analyzer displays the following values:

- O2
- CO2
- CO
- Excess Air
- Combustion Efficiency
- Stack Temperature
- Draft

EXPERIMENTS

provides testing and troubleshooting of components and devices commonly found in gas furnaces, including the following:

- Primary heat exchanger
- Secondary heat exchanger
- Combustion chamber
- Burners
- Gas valve
- Pilot burner
- Thermocouple
- Blower and vent blower motors
- Control transformer
- Blower and heat relays
- Gas control valve
- Hot-surface ignitor element
- Hot-surface ignition module
- Gas control coil
- Flame sensor
- Run capacitor
- Room thermostat
- High-limit switch
- Vent pressure switch
- Rollout switch
- Circuit breaker

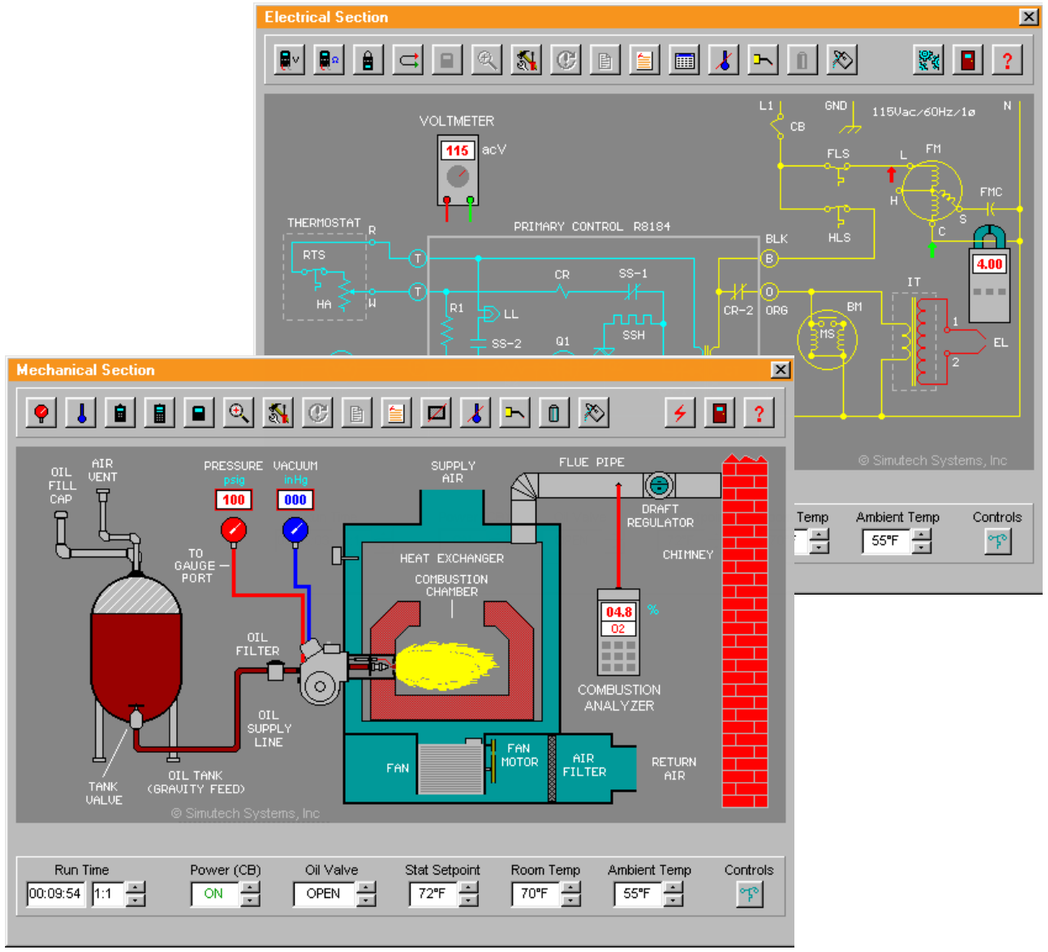
REQUIREMENTS

requires the following minimum computer system to operate:

- IBM compatible PC with a Pentium®, Core®, or equivalent processor
- Windows XP, Vista, 7, 8, 8.1, and 10 (32 or 64-bit)
- VGA/SVGA display
- Hard disk drive, 17MB available disk space (11.5MB if other Simutech simulators are also installed)

Model: REF 02106

OIL FURNACE SIMULATOR



INTRODUCTION

SIMUOIL TM is an oil furnace simulator and troubleshooting training system, designed for HVAC students and service technicians. The simulator is an invaluable tool for teaching the basics of oil furnace operation and troubleshooting, as well as improving the service skills of experienced technicians.

GENERAL FEATURES OF THE UNIT

simulates four different configurations of generic oil furnaces that a service technician would commonly encounter in the field. The configurations include:

- Cad cell primary control with one-pipe gravity feed tank
- Cad cell primary control with 2-pipe buried tank
- Stack-mounted primary control with one-pipe gravity feed tank
- Stack-mounted primary control with 2-pipe buried tank

Indoor and outdoor temperatures, room thermostat, burner air shutter, draft regulator, fuel pump pressure, and electrodes are all adjustable in the simulator. Up to 30 different mechanical and electrical faults may be inserted into the simulator, as shown in the Fault Lists below.

SIMUOIL provides “point-and-click” selection of meters and test points, and display of temperatures and pressures in either imperial or metric. For troubleshooting the simulator, the following on-screen test instruments are included:

- Draft gauge
- Fuel gauge
- Pressure gauge
- Vacuum gauge
- Thermometer
- Combustion analyzer
- Clamp-on ammeter
- Voltmeter
- Ohmmete

EXPERIMENTS

SIMUOIL provides testing and troubleshooting of components and devices commonly found in actual oil furnaces, including the following:

- Burner
- Fuel pump
- Nozzle
- Combustion chamber
- Heat exchanger
- Draft regulator
- Oil and air filters
- Primary control
- Fan and burner motors
- Motor run capacitor
- Ignition and control transformers
- Ignition electrodes
- Cad cell
- Pyrostat
- Safety switch
- Fan-limit and high-limit switches
- Centrifigal switch
- Room thermostat

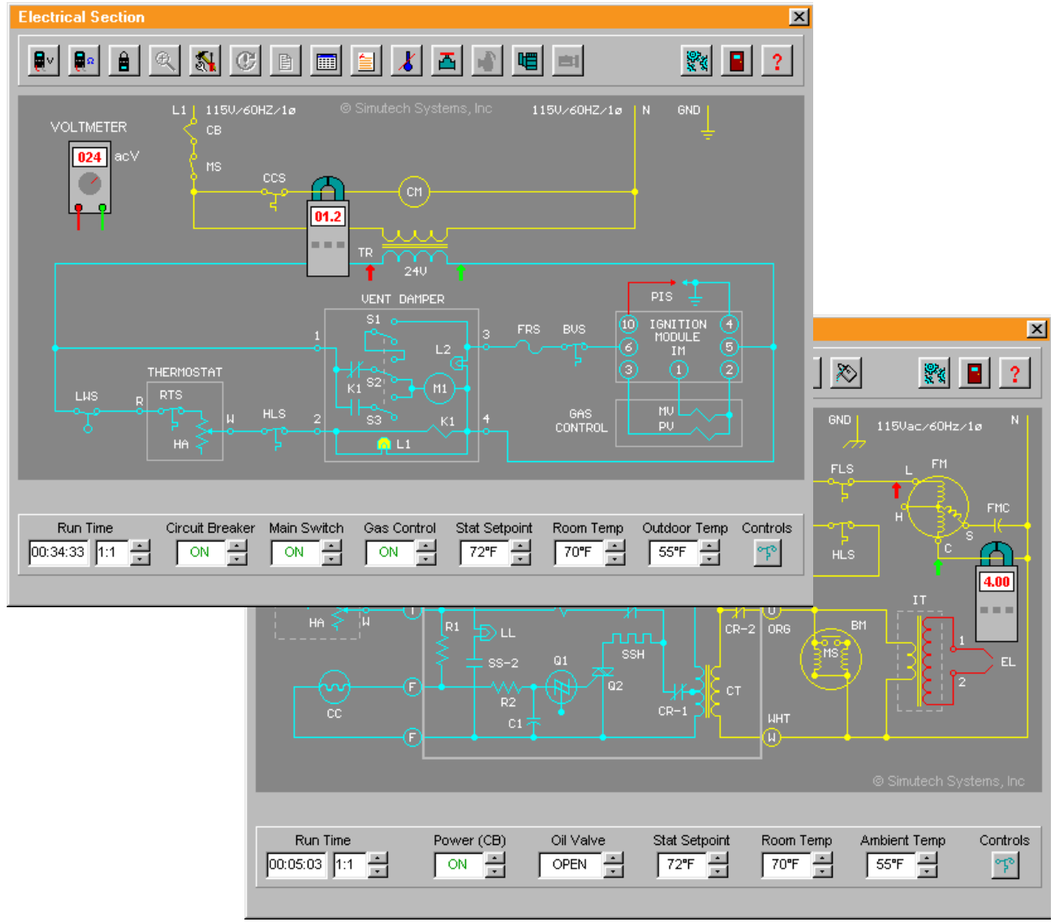
REQUIREMENTS

requires the following minimum computer system to operate:

IBM compatible PC with a Pentium®, Core®, or equivalent processor
Windows XP, Vista, 7, 8, 8.1, and 10 (32 or 64-bit)
VGA/SVGA display
Hard disk drive, 17.5MB available disk space (12MB if other Simutech simulators are also installed)

Model: REF 02107

HOT WATER BOILER SIMULATOR

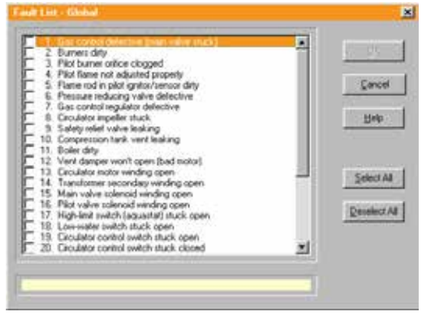


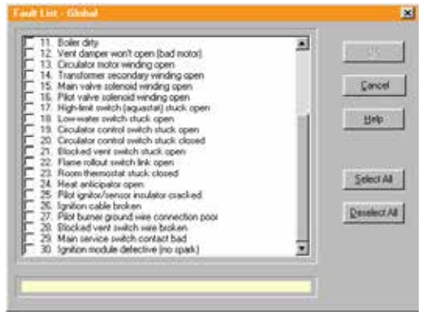
INTRODUCTION

SIMUHYDRO TM is a hot water boiler simulator and troubleshooting training system, designed for students and HVAC service technicians. The simulator is an invaluable tool for teaching students the basics of hydronics/hot water boiler operation and troubleshooting, as well as improving the service skills of experienced technicians.

GENERAL FEATURES OF THE UNIT

SIMUHYDRO simulates a generic gas-fired hot water boiler that a service technician would commonly encounter in the field. Indoor and outdoor temperatures, room thermostat, burner air-shutter, cold water and manifold pressure, and controls are all adjustable. Up to 30 different mechanical and electrical faults may be inserted into the simulator, as shown in the Fault Lists below.





For troubleshooting the simulator, the following on-screen test instruments are included:

- Manometer
- Pressure gauges
- Digital thermometer
- Clamp-on ammeter
- Voltmeter
- Ohmmeter
- Microammeter

EXPERIMENTS

SIMUHYDRO provides testing and troubleshooting of components and devices commonly found in hot water boilers and hydronic systems, including the following:

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

REQUIREMENTS

requires the following minimum computer system to operate:

IBM compatible PC with a Pentium®, Core®, or equivalent processor
Windows XP, Vista, 7, 8, 8.1, and 10 (32 or 64-bit)
VGA/SVGA display
Hard disk drive, 16.5MB available disk space (11.0MB if other Simutech simulators are also installed)