User Guide

Portable Chillers

Series 1 Water-Cooled (W1) and Air-Cooled Models (A1) with TIC Control

Installation

Operation

Maintenance

Troubleshooting

Instant Access
Parts and Service
(800) 458-1960
(814) 437-6861

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Pittsburgh, PA 15202
Phone: (412) 312-6000
Fax: (412) 312-6227

UGH016/0500

Please record your equipment's model and serial number(s) and the date you received it in the spaces provided.

It's a good idea to record the model and serial number(s) of your equipment and the date you received it in the User Guide. Our service department uses this information, along with the manual number, to provide help for the specific equipment you installed.

Please keep this User Guide and all manuals, engineering prints and parts lists together for documentation of your equipment.

Date:
Manual Number: UGH016/0500
Serial number(s): ....
Model number(s): ....
Power specifications: **Amps** ..... **Volts** ..... **Phase** ..... **Cycle** .....

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INTRODUCTION

PURPOSE OF THE USER GUIDE

This User Guide describes Conair's Series 1 Water-cooled and Air-cooled Portable Chillers and explains step-by-step how to install, operate, maintain and repair this equipment.

Before installing this product, please take a few moments to read the User Guide and review the diagrams and safety information in the instruction packet. You also should review manuals covering associated equipment in your system. This review won't take long, and it could save you valuable installation and operating time later.

HOW THE GUIDE IS ORGANIZED

Symbols have been used to help organize the User Guide and call your attention to important information regarding safe installation and operation.

⚠ Symbols within triangles warn of conditions that could be hazardous to users or could damage equipment. Read and take precautions before proceeding.

1 Numbers within shaded squares indicate tasks or steps to be performed by the user.

◆ A diamond indicates the equipment's response to an action performed by the user.

❒ An open box marks items in a checklist.

● A shaded circle marks items in a list.

YOUR RESPONSIBILITY AS A USER

You must be familiar with all safety procedures concerning installation, operation and maintenance of this equipment. Responsible safety procedures include:

- Thorough review of this User Guide, paying particular attention to hazard warnings, appendices and related diagrams.
- Thorough review of the equipment itself, with careful attention to voltage sources, intended use and warning labels.
- Thorough review of instruction manuals for associated equipment.
- Step-by-step adherence to instructions outlined in this User Guide.

⚠ATTENTION: READ THIS SO NO ONE GETS HURT

We design equipment with the user's safety in mind. You can avoid the potential hazards identified on this machine by following the procedures outlined below and elsewhere in the User Guide.

WARNING: Improper installation, operation, or servicing may result in equipment damage or personal injury.

This equipment should only be installed, adjusted, and serviced by qualified technical personnel who are familiar with the construction, operation, and potential hazards of this type of machine.

All wiring, disconnects and fuses should be installed by qualified electrical technicians in accordance with electrical codes in your region. Always maintain a safe ground. Do not operate the equipment at power levels other than what is specified on the machine serial tag and data plate.

WARNING: Electrical hazard

Before performing any work on this item, disconnect and lock out electrical power sources to prevent injury from unexpected energization or startup.

CAUTION: Hot Surfaces

Always protect yourself from hot surfaces when working on the Portable Chiller, especially when working on or around the compressor and condenser. These devices can reach up to 160 °F (71 °C). Allow these devices to cool before performing any maintenance or troubleshooting.

CAUTION: Ventilation hazard

The unit requires a clean and well ventilated operating environment. Do not place anything on top of the unit while operating. Units with fans require unrestricted outlet air flow.

Water-cooled units require a minimum of one foot clearance around the perimeter for serviceability. Air-cooled units require a minimum of two feet clearance around the perimeter for serviceability and proper air flow.

DESCRIPTION

WHAT IS THE PORTABLE CHILLER?

The Conair Series 1 Portable Chillers provide self-contained sources of chilled water and are available in either water- or air-cooled models, ranging in sizes from 3.5 Hp to 40 Hp (approximate capacities of 3.5 tons of refrigeration to 40 tons of refrigeration). Pump selections are available to match most process flow and pressure requirements.

The normal temperature range of discharge chilled water is 20 °F to 70 °F. For applications requiring 40 °F and lower mix glycol with the water to the correct percentage.

The Air-cooled Portable Chiller A1 Models and Water-cooled Portable Chiller W1 Models are designed to provide chilled water for industrial applications requiring 24-hour-a-day performance. Units are totally self-contained for easy, economical installation. All parts wetted by the process are non-ferrous.

To operate, simply connect the power source, process piping and fill with water or ethylene or propylene glycol (but not automotive antifreeze).

These chillers are ideal for machine-side cooling to maintain process temperatures in an injection molding machine or extruder and wherever you need a small, moveable cooling unit. Nominal capacities range from 1.44 to 14.68 tons for the water-cooled models and from 1.18 to 10.95 tons for the air-cooled models. Capacities are based on standard pump sizes and delivering 50 °F water.

Operation of these units differ only in the medium used to remove heat from the refrigerant in the condensers. Water-cooled models use 85 °F (29 °C) or lower cooling water from a tower, well, or city service; air-cooled models use 95 °F (35 °C) maximum ambient air.

Choose water-cooled portable chillers where tower water or another inexpensive water source is available. Choose air-cooled models for maximum portability of the unit. Water-cooled models are equipped with brazed plate or tube-in-tube condensers. Air-cooled models use aluminum-fin, copper-tube condensers.

All standard voltages are available.

TYPICAL APPLICATIONS

The Conair A1 and W1 Portable Chillers can be used anywhere a reliable source of process cooling water - with stable temperature control - is required.

These portable chillers are available for cooling injection molding, blow molding, thermoforming, extrusion, air compressors, metal plating, anodizing, degreasing, heatset/web offset printing presses, and dryer after-coolers.

Roll the air-cooled condenser models next to the heat source connect it and plug it in. They can operate almost anywhere.

The water-cooled condenser models require a source of condenser water. Normally used in conjunction with a recirculating evaporative cooling tower system, the units have slightly better operating energy efficiencies.

LIMITATIONS

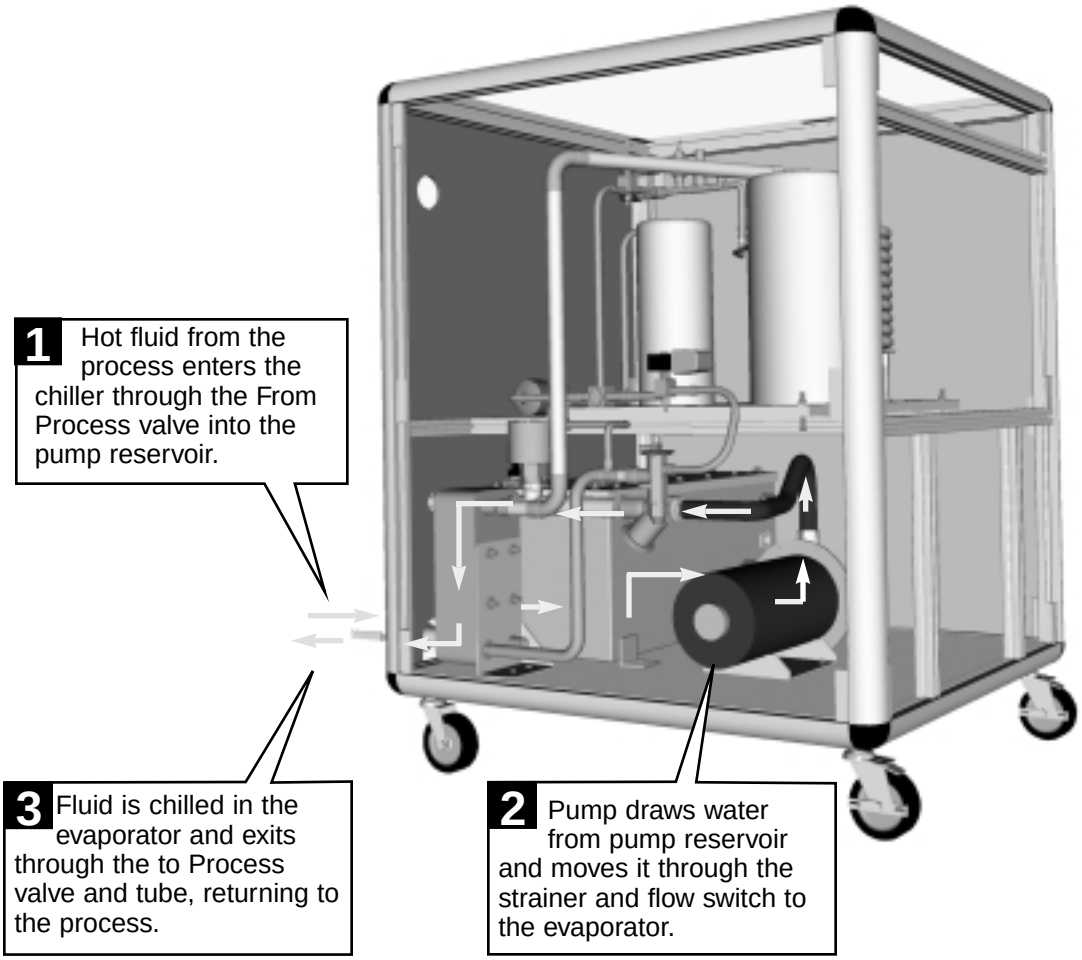
Conair Series 1 Portable Chillers are designed to provide chilled water for industrial applications requiring 24-hour-a-day performance. Units are self-contained and easy to install and maintain. Choose the Conair Series 1 Portable Chillers based on the cooling load and the capacity of the unit. Pick your Conair Series 1 Portable Chillers based on:

- **Cooling load**
  Choose a portable chiller that has 20% more capacity than the process load.
- **Location**
  Choose a water-cooled model if the unit will be located in an air-conditioned area. Choose the water-cooled model if a source of condenser water is readily available (i.e. cooling tower water). Do not locate the portable chiller outside unless the unit is specially modified.
- **Temperature**
  The portable chiller needs to provide a cooling temperature less than 70 °F (21°C).

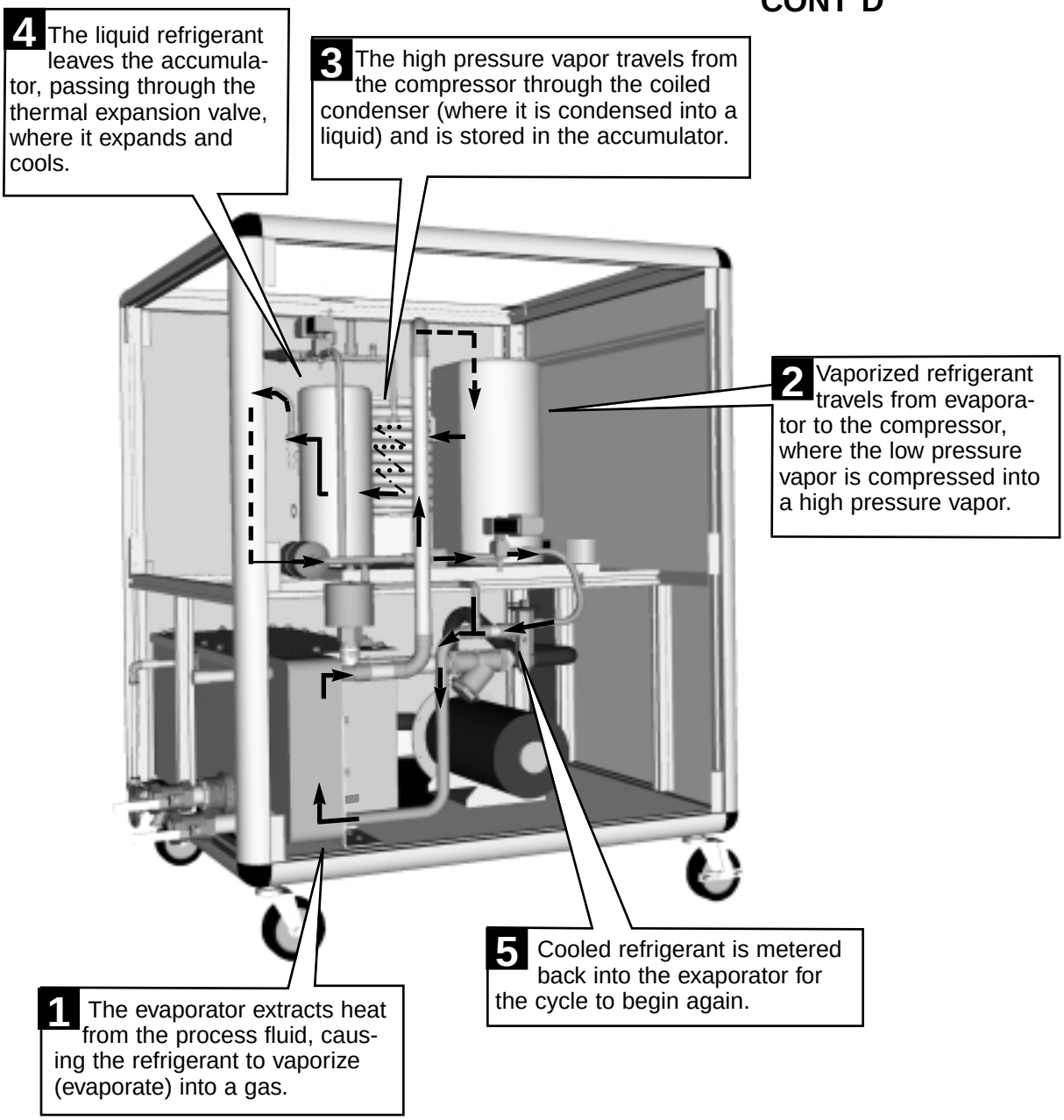
Use this information as a general guide. Consult your Conair representative for assistance when choosing a Conair Portable Chiller.

HOW IT WORKS: WATER-COOLED PORTABLE CHILLER

Process circulation

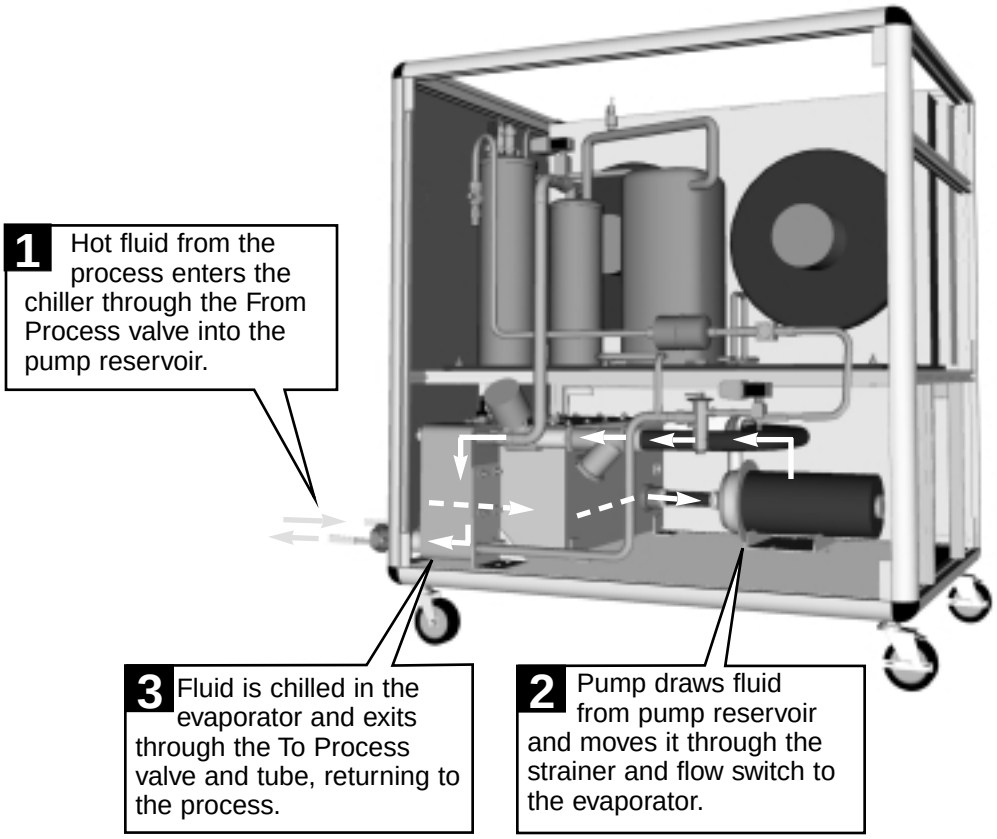


Refrigerant circulation



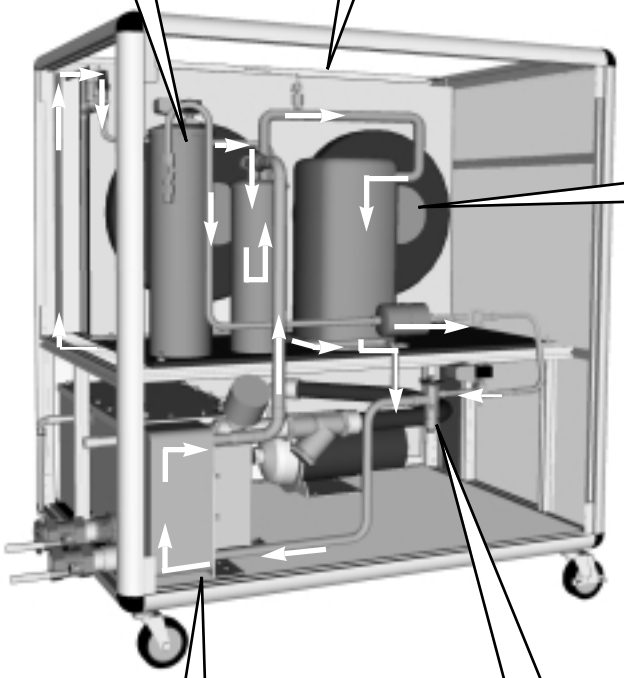
HOW IT WORKS: AIR-COOLED PORTABLE CHILLER

Process circulation



How it Works: Air-cooled Portable Chiller

Refrigerant circulation



4 The liquid refrigerant leaves the accumulator, passing through the thermal expansion valve, where it expands and cools.

3 The high pressure vapor travels from the compressor through the condenser (where fans cool vapor into a liquid) and liquid is stored in the accumulator.

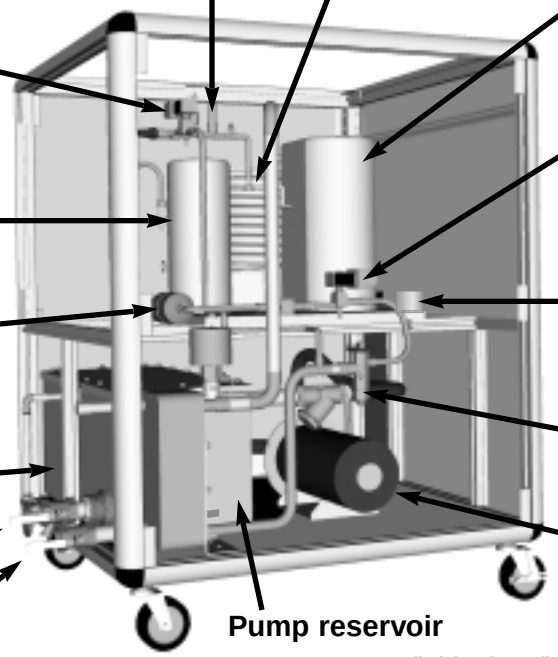
2 Vaporized refrigerant travels from evaporator to the compressor, where the low pressure vapor is compressed into a high pressure vapor.

1 The evaporator extracts heat from the process fluid, causing the refrigerant to vaporize (evaporate) into a gas.

5 Cooled refrigerant is metered back into the exaporator for the cycle to begin again.

PORTABLE CHILLER FEATURES

Water-cooled Models



Relief valve
acts as a safety device for refrigerant pressure.

Condenser
compresses the refrigerant from a high pressure vapor into a high pressure liquid.

Compressor
compresses the refrigerant from a low pressure vapor into a high pressure vapor.

Hot Gas Bypass valve
balances the load on the chiller to meet the needs of the process.

Liquid line solenoid valve
pumps down refrigerant to the receiver.

Receiver
stores the liquid refrigerant.

Temperature transmitter electrical box
transmits temperature signals to the control

Filter dryer
cleans and dries the refrigerant.

TX valve
regulates refrigerant flow

Evaporator
cools the To Process fluid

Process pump
circulates fluid through the chiller.

From Process valve

To Process valve

Pump reservoir
stores process fluid. View fluid level on water level gauge

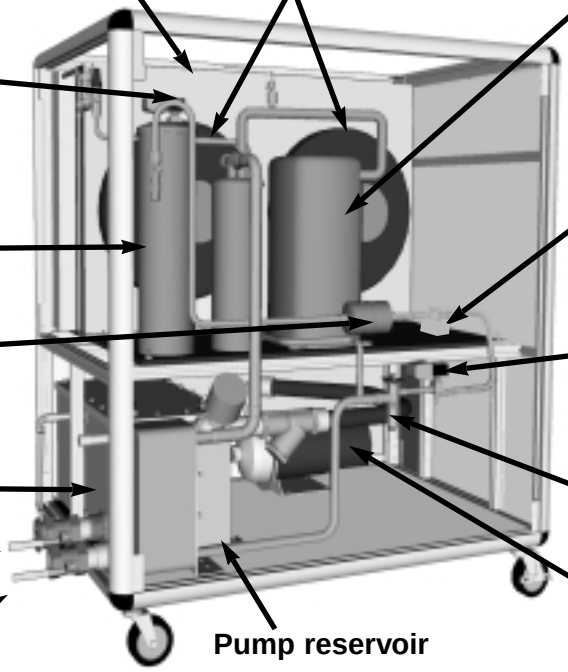
Options include:

- 60 Hz process pump
  1 1/2 Hp for W1-1.5, W1-2
  2 Hp for W1-3, W1-4
  3 Hp for W1-5, W1-7.5, W1-10, W1-15

- To Process and From Process valves
- Process bypass line and valve
- No reservoir/pump
- No reservoir
- Auto fill reservoir
- Condenser water differential pressure switch (W1-7.5 to W1-15 only)
- Visual alarm
- Audible alarm
- Remote/redundant hand control with 30 ft. cable
- Remote/redundant hand control with 50 ft. cable
- UL labeled controls

Air-cooled Models

PORTABLE CHILLER FEATURES



Condenser
compresses the refrigerant from a high pressure vapor into a high pressure liquid.

Fans
circulate air across the condenser to cool refrigerant

Compressor
compresses the refrigerant from a low pressure vapor into a high pressure vapor.

Hot Gas Bypass valve
balances the load on the chiller to meet the needs of the process.

Temperature transmitter electrical box
transmits temperature signals to the control

Receiver
stores the liquid refrigerant.

Liquid line solenoid valve
pumps down refrigerant to the receiver.

Filter dryer
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TX valve
regulates refrigerant flow

Evaporator
cools the To Process fluid

From Process valve

To Process valve

Process pump
circulates fluid through the chiller.

Pump reservoir
stores process fluid. View fluid level on water level gauge

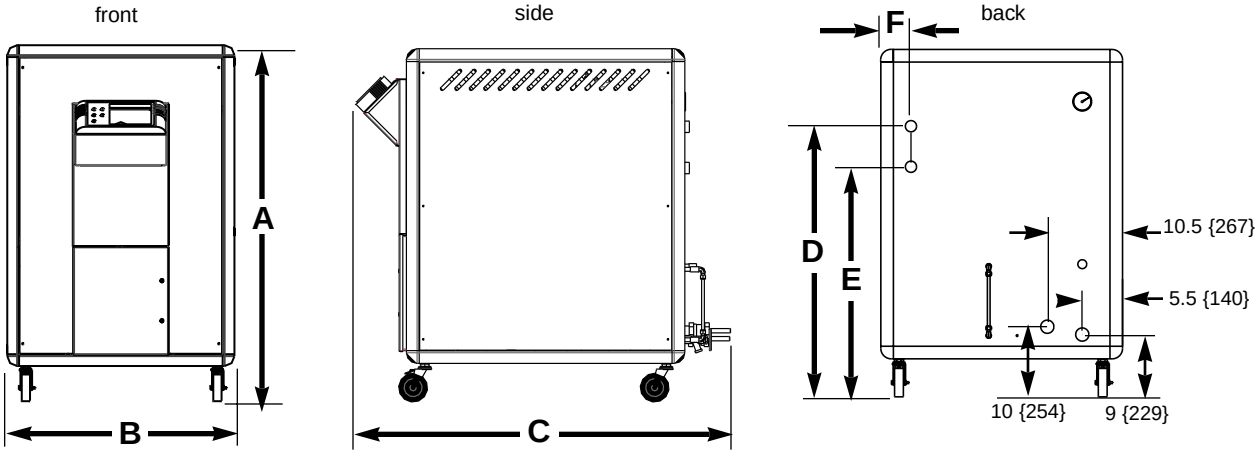
Options include:

- 60 Hz process pump
  1 1/2 Hp for A1-1.5, A1-2.25
  2 Hp for A1-3.25, A1-4
  3 Hp for A1-5, A1-7.5, A1-10, A1-13

- To Process and From Process valves
- Process bypass line and valve
- Condenser air filters
- No reservoir/pump
- No reservoir
- Auto fill reservoir
- Visual alarm
- Audible alarm
- Remote/redundant hand control with 30 ft. cable
- Remote/redundant hand control with 50 ft. cable
- UL labeled controls

SPECIFICATIONS

Water-cooled Models



MODEL	W1-1.5		W1-2		W1-3		W1-4		W1-5		W1-7.5		W1-10		W1-15	
Performance characteristics																
Capacity† tons	1.44		1.93		3.23		4.44		5.00		7.09		10.22		14.68	
Compressor Hp {kW}	1.5 {1.1}		2 {1.5}		3 {2.2}		4 {3}		5 {3.7}		7.5 {5.6}		10 {7.5}		15 {11}	
Pump Hp {kW}																
60 Hz	0.75 {0.6}		0.75 {0.6}		1 {.8}		1 {.8}		1.5 {1.1}		1.5 {1.1}		1.5 {1.1}		2 {1.5}	
50 Hz	1.5 {1.1}		1.5 {1.1}		1.5 {1.1}		2 {1.5}		2 {1.5}		2 {1.5}		2 {1.5}		2 {1.5}	
Chilled water flow‡ gpm {lpm}	6.9 {25.1}		4.6 {17.4}		7.8 {29.5}		10.7 {40.5}		12.0 {45.4}		17.0 {64.3}		24.5 {92.7}		35.2 {133.2}	
Chilled water pressure§ psi {bar}	27.8 {1.9}		29.9 {2.1}		32.9 {2.3}		31.8 {2.2}		41.6 {2.9}		34.8 {2.4}		29.3 {2.0}		32.3 {2.2}	
Reservoir capacity gal {l}	8.0 {30.3}		15 {57}		15 {57}		15 {57}		15 {57}		25 {95}		25 {95}		25 {95}	
Condenser water flow gpm {lpm}	5.0 {18.9}		6.4 {24.2}		10.3 {39.0}		14.2 {53.7}		16.7 {63.2}		24.1 {91.2}		31.7 {120}		45.4 {172}	
Dimensions in {mm}																
A-Height	49 {1245}				49 {1245}						61 {1549}					
B-Width	34 {864}				34 {864}						34 {864}					
C-Length	39.5 {1003}				45.5 {1156}						55 {1397}					
D-Height to condenser out	37 {940}		38.5 {978}		38.5 {978}		38.5 {978}		38 {965}		41.3 {1049}		41.3 {1049		41.3 {1049}	
E-Height to condenser in	31 {787}		32.5 {826}		32.5 {826}		32.5 {826}		32 {813}		35 {889}		35 {889}		35 {889}	
F-Distance to valve	4 {102}								4.5 {114}							
Weight lb {kg}																
Installed	420 {190}		585 {265}		585 {265}		840 {381}		840 {381}		1080 {490}		1090 {494}		1095 {497}	
Shipped	550 {249}		755 {342}		755 {342}		1010 {458}		1010 {458}		1250 {567}		1260 {572}		1265 {574}	
Utility requirements																
Process connections NPT in	1								1.5							
Condenser water NPT in	1								1.5							
Power consumption amps	run	full	run	full	run	full	run	full	run	full	run	full	run	full	run	full
230V/3 phase/60hz*	9.5	15.3	10.2	15.6	15.1	24.4	18.7	29.4	22.5	36.3	29.2	44.7	35.0	56.0	44.8	79.0
220V/3 phase/50hz	13.1	19.1	13.8	19.4	17.8	27.5	22.5	33.6	24.3	38.6	31.3	47.4	37.4	59.1	46.8	82.1
460V/3 phase/60hz*	4.5	6.9	4.9	7.1	7.3	11.1	9.1	13.3	10.9	16.4	14.2	20.2	17.1	25.3	22.0	35.7
575V/3 phase/60hz*	3.6	5.5	3.9	5.7	5.8	8.9	7.3	10.7	8.7	13.1	11.4	16.2	13.7	20.2	17.6	28.5

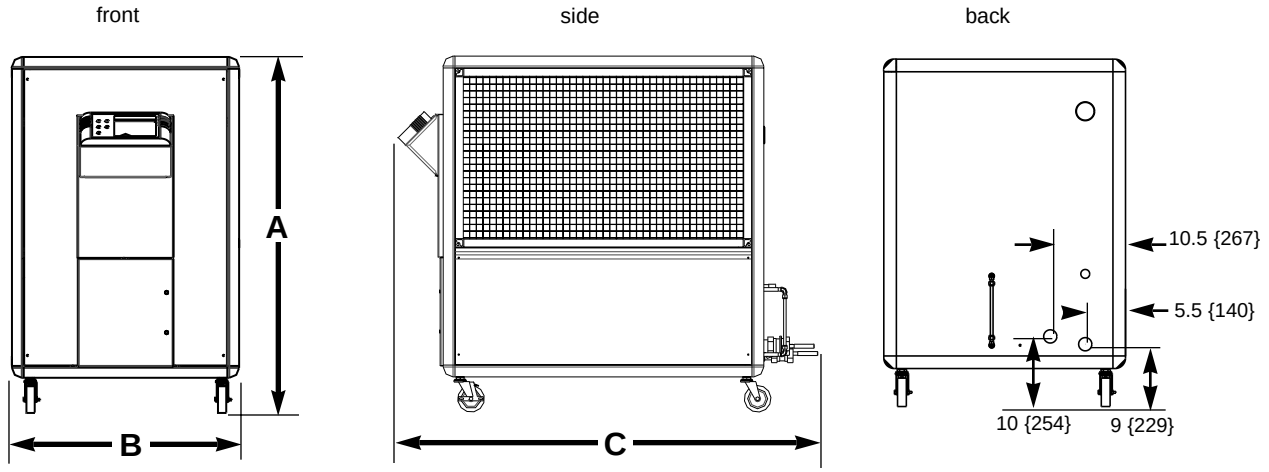
SPECIFICATION NOTES

† Based on 50 °F (10 °C) water temperature (100% water) leaving the chiller, standard pump selections, 85 °F (27 °C) condenser water supply @ 25 psi minimum, for the 60 Hz units. For the 50 Hz units, multiply the capacity by 0.8 Consult factory for other conditions. Capacity ratings are (+-) 5% based on compressor manufacturer's ratings and are subject to change without notice.

‡ Based on 50° F (10 °C) water temperature leaving the chiller and 60 °F (16 °C) water temperature returning to the chiller (except W1-1.5 which has 55 °F (13 °C) water temperature returning to the chiller).

§ Pressure at pump discharge. See Pressure Tables in the Appendix for Evaporator and Condenser pressure drops.

* Optional



MODEL	A1-1.5		A1-2.25		A1-3.25		A1-4		A1-5		A1-7.5		A1-10		A1-13	
Performance characteristics																
Capacity†, tons	1.18		1.79		2.77		3.62		4.27		6.06		8.75		10.95	
Compressor Hp{kW}	1.5 {1.1}		2.25 {1.7}		3.25 {2.4}		4 {3}		5 {3.7}		7.5 {5.6}		10 {7.5}		13 {}	
Pump Hp {kW}																
60 Hz	0.75 {0.6}		0.75 {0.6}		1 {.8}		1 {.8}		1.5 {1.1}		1.5 {1.1}		1.5 {1.1}		2 {1.5}	
50 Hz	1.5 {1.1}		1.5 {1.1}		1.5 {1.1}		2 {1.5}		2 {1.5}		2 {1.5}		2 {1.5}		2 {1.5}	
Chilled water flow‡, gpm {lpm}	5.7 {21.6}		8.6 {32.6}		6.7 {25.4}		8.7 {32.9}		10.2 {38.6}		14.5 {54.9}		21.0 {79.5}		26.3 {99.6}	
Chilled water pressure§, psi {bar}	29.6 {2.0}		28.5 {2.0}		35.9 {2.5}		33.9 {2.3}		42.4 {2.9}		36.9 {2.5}		31.6 {2.2}		36.1 {2.5}	
Reservoir capacity, gal {l}	8.8 {33.3}		15 {57}		15 {57}		15 {57}		15 {57}		25 {95}		25 {95}		25 {95}	
Condenser fans	1		2		2		2		2		2		2		4	
Condenser fan power Hp {kW}	0.17 {0.13}		0.17 {0.13}		0.17 {0.13}		0.25 {0.19}		0.25 {0.19}		0.5 {0.4}		0.5 {0.4}		0.5 {0.4}	
Condenser air flow	1050		1704		2420		4237		4237		5300		5300		9800	
ft3/min {liters/min}	{29,732}		{48,250}		{68,525}		{119,975}		{119,975}		{150,075}		{150,075}		{277,505}	
Dimensions in {mm}																
A-Height	49 {1245}		49 {1245}				53.5 {1359}				71 {1524}				75 {1905}	
B-Width	34 {864}		34 {864}				34 {864}				34 {864}				34 {864}	
C-Length	39.5 {1003}		45.5 {1156}				55 {1397}				55 {1397}				55 {1397}	
Weight lb {kg}																
Installed	610 {277}		830 {376}		830 {376}		1030 {467}		1030 {467}		1230 {558}		1230 {558}		1440 {653}	
Shipped	750 {340}		1000 {454}		1000 {454}		1200 {544}		1200 {544}		1400 {635}		1600 {726}		1800 {816}	
Utility requirements																
Process connections in	1								1.5							
Power consumption amps	run	full	run	full	run	full	run	full	run	full	run	full	run	full	run	full
230V/3 phase/60hz*	11.0	19.6	13.3	20.8	18.6	32.2	23.7	33.3	27.8	40.1	38.6	47.2	47.2	62.7	57.4	76.9
220V/3 phase/50hz*	14.7	23.6	17.1	24.8	21.5	35.5	27.7	37.6	29.9	42.6	41.2	50.0	50.2	66.1	60.0	79.9
460V/3 phase/60hz	5.3	8.9	6.5	9.4	9.0	14.6	11.6	15.1	13.5	18.2	18.9	21.4	23.2	28.4	28.3	34.8
400v/3 phase/50hz*	7.7	11.8	9.0	12.4	11.4	17.8	14.8	18.8	16.0	21.3	22.2	25.0	27.2	33.0	32.6	40.0
575V/3 phase/60hz*	4.2	7.1	5.2	7.5	7.2	11.7	9.3	12.1	10.8	14.5	15.1	17.1	18.6	22.7	22.6	27.8

SPECIFICATION NOTES

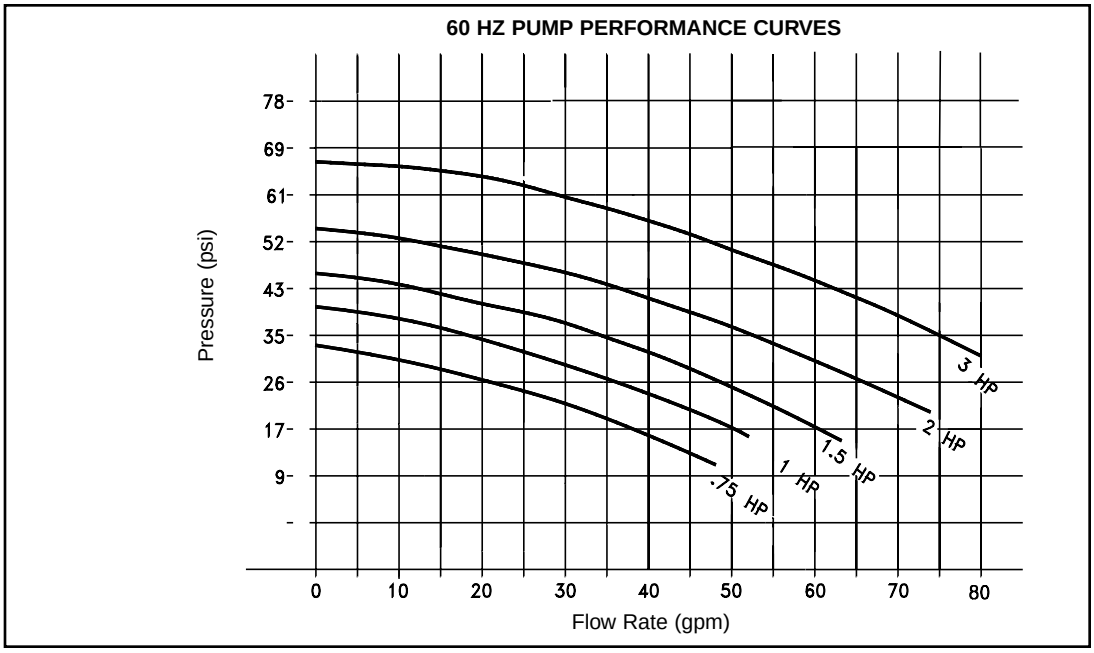
† Based on 50 °F (10 °C) water temperature (100% water) leaving the chiller, standard pump selections, 95 °F (35 °C) ambient air conditions for the 60 Hz units. For the 50 Hz units, multiply the capacity by 0.8. Consult factory for other conditions. Capacity ratings are (+-) 5% based on compressor manufacturer's ratings and are subject to change without notice.

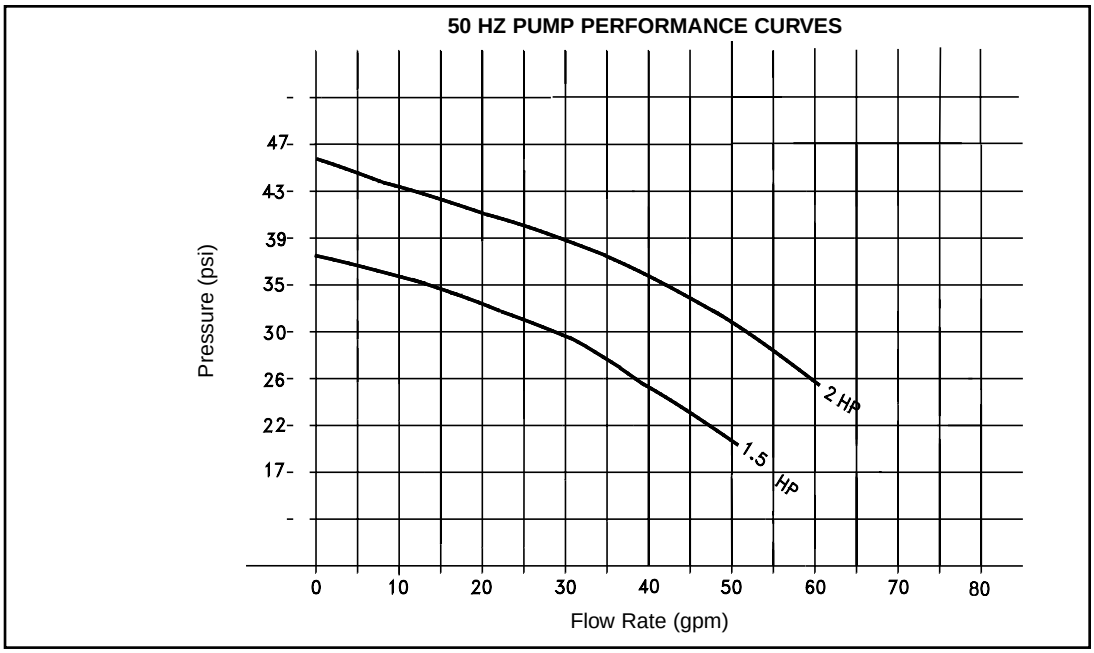
‡ Based on 50 °F (10 °C) water temperature leaving the chiller and 60 °F (16 °C) water temperature returning to the chiller (except A1-1.5 and A1-2.25 which have 55 °F (13 °C) water temperature returning to the chiller).

§ Pressure at pump discharge. See Pressure Tables in the Appendix for Evaporator and Condenser pressure drops.

* Optional

PUMP CURVES


60 HZ PUMP PERFORMANCE CURVES
Pressure (psi)
78
69
61
52
43
35
26
17
9
-
0
10
20
30
40
50
60
70
80
Flow Rate (gpm)
3 HP
2 HP
1.5 HP
1 HP
.75 HP


50 HZ PUMP PERFORMANCE CURVES
Pressure (psi)
-
47
43
39
35
30
26
22
17
-
0
10
20
30
40
50
60
70
80
Flow Rate (gpm)
2 HP
1.5 HP

INSTALLATION

UNPACKING THE BOXES

The portable chiller comes fully assembled in a single crate.

CAUTION: Lifting hazard
The Series 1 Portable Chillers are designed to easily roll on casters. If, for some reason you need to lift the chiller, take all precautions to avoid personal injury or damage to the chiller. Lift the chiller using a forklift or hoist with straps that have peen positioned at the chillers' center of gravity. Do not try to lift the unit manually.

1 **Carefully uncrate the chiller** and its components.

2 **Remove all packing material, protective paper,** tape, and plastic. compare contents to the shipping papers to ensure that you have all the parts.

3 **Carefully inspect all components to make sure** no damage occurred during shipping. If any damage is found, notify the shipping agent immediately. Check all wire terminal connections, bolts, and any other electrical connections, which may have come loose during shipping. Check for pinched wires and kinked hoses.

3 **Record serial numbers and specifications** in the blanks provided on the back of the User Guide's title page. This information will be helpful if you ever need service or parts.

WARNINGS AND CAUTIONS

WARNING: Improper installation, operation, or servicing may result in equipment damage or personal injury.
This equipment should only be installed, adjusted, and serviced by qualified technical personnel who are familiar with the construction, operation, and potential hazards of this type of machine.

All wiring, disconnects and fuses should be installed by qualified electrical technicians in accordance with electrical codes in your region. Always maintain a safe ground. Do not operate the equipment at power levels other than what is specified on the machine serial tag and data plate.

CAUTION: Hot Surfaces
Always protect yourself from hot surfaces when working on the Portable Chiller, especially when working on or around the compressor and condenser. These devices can reach up to 160 °F (71 °C). Allow these devices to cool before performing any maintenance or troubleshooting.

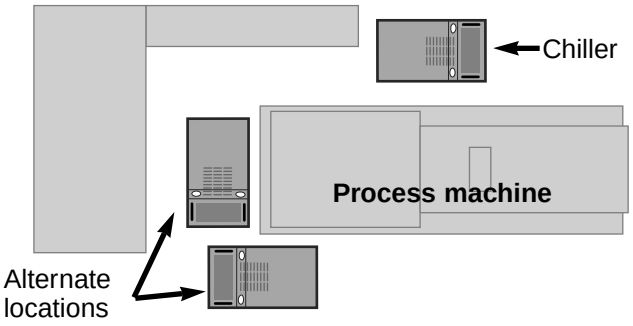
CAUTION: Ventilation hazard
The unit requires a clean and well ventilated operating environment. Do not place anything on top of the unit while operating. Units with fans require unrestricted outlet air flow.

Water-cooled units require a minimum of one foot clearance around the perimeter for serviceability. Air-cooled units require a minimum of two feet clearance around the perimeter for serviceability and proper air flow.

PREPARING FOR INSTALLATION

Plan the location for the chiller and prepare the area properly.

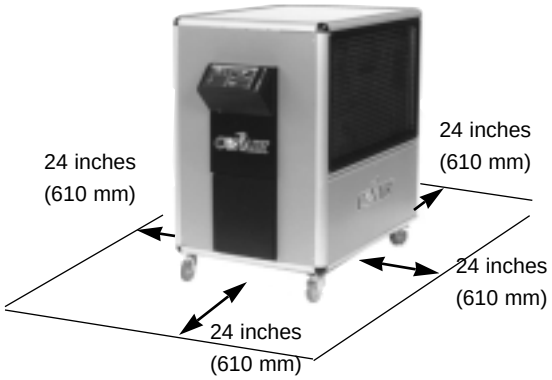
Position the Chiller as close to the process machine as possible. Place the chiller in position near the process machine so that fluid lines can be connected from the process machine to the chiller and back.



Make sure the area where the chiller is installed has:

- **A grounded power source.**
  Check the chiller's serial tag for the correct amps, voltage, phase, and cycle. All wiring should be completed by qualified personnel and comply with your region's electrical codes.

- **Clearance for safe operation and maintenance.**
  Make sure there is two feet clearance around the chiller for proper operation, maintenance, and servicing. After positioning, lock casters to prevent chiller from moving.



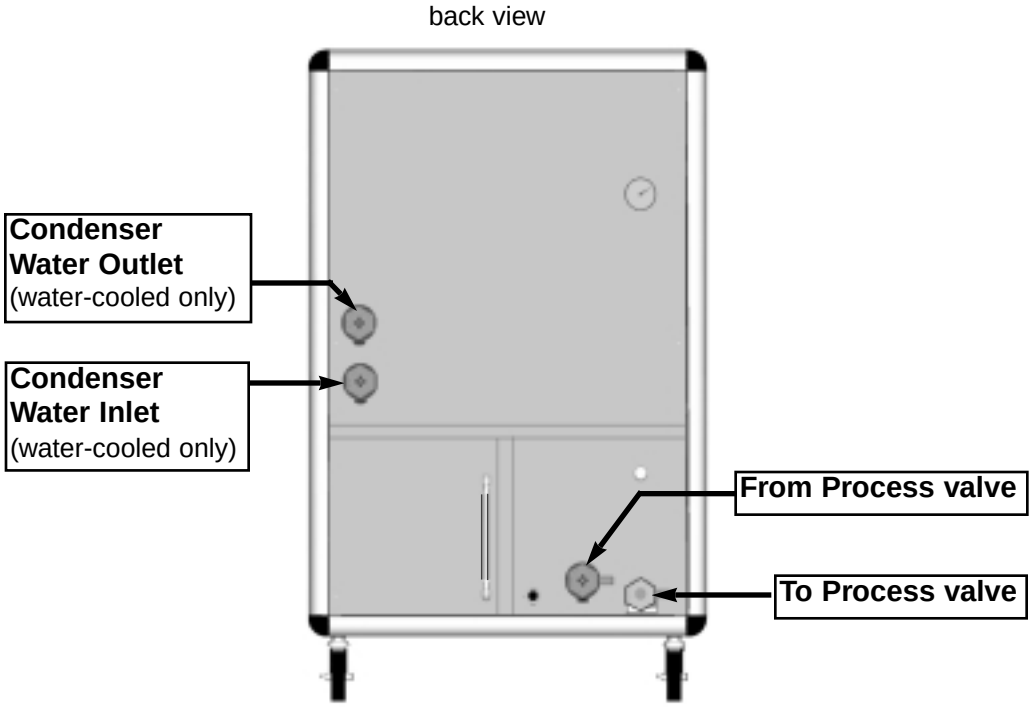
- **Available water source.**
  If installing a water-cooled unit, makes sure water source is plumbed to chiller installation location. High points in plumbing require vent valves; low points require drain valves.

MAKING PROCESS PLUMBING CONNECTIONS

Warm fluid from your process enters the chiller at the From Process valve and chilled fluid returns to the process equipment through the To Process valve.

1. **Remove the shipping plastic pipe plug from** the female connections on the back of the portable chiller.
2. **Make sure the male pipe threads are clean** and new.
3. **Wrap threads with Mylar or Teflon tape.**
4. **Connect the From Process valve and tubing** on the back of the chiller to the From Process tubing. Start by hand until the threads engage and then tighten with a pipe wrench. Tighten only enough to prevent leaks; do not over-tighten!
5. **Connect the To Process valve and tubing on** the back of the chiller to the return tubing. Start by hand until the threads engage and then tighten with a pipe wrench. Tighten only enough to prevent leaks; do not over-tighten!

For the Water-cooled Chillers connect the water source for cooling to the Condenser Water inlet on the back of the chiller. Connect the Condenser Water outlet for returning water.



FILLING THE CHILLER

The Chiller is shipped without coolant. The chiller is filled manually during installation. Use water as the coolant down to 40 °F (4 °C). Below 40 °F and down to 20 °F (-7 °C), use an ethylene glycol or propylene glycol solution.

To fill with water:

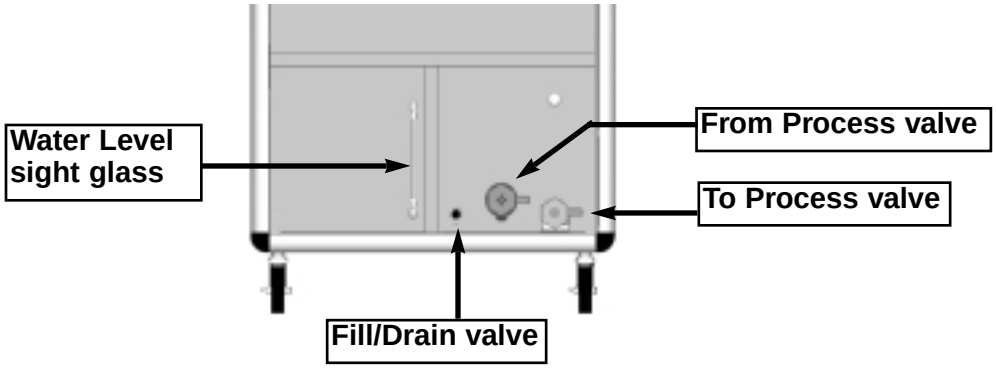
1 Attach water hose to Fill/Drain valve.

2 Close the To Process and From Process valves.

3 Open the Fill/Drain valve and fill chiller to the fill mark on the Water Level sight glass. If the chiller is overfilled, the excess water spills out the vent tube. DO NOT OVERFILL.

4 Close the Fill/Drain valve.

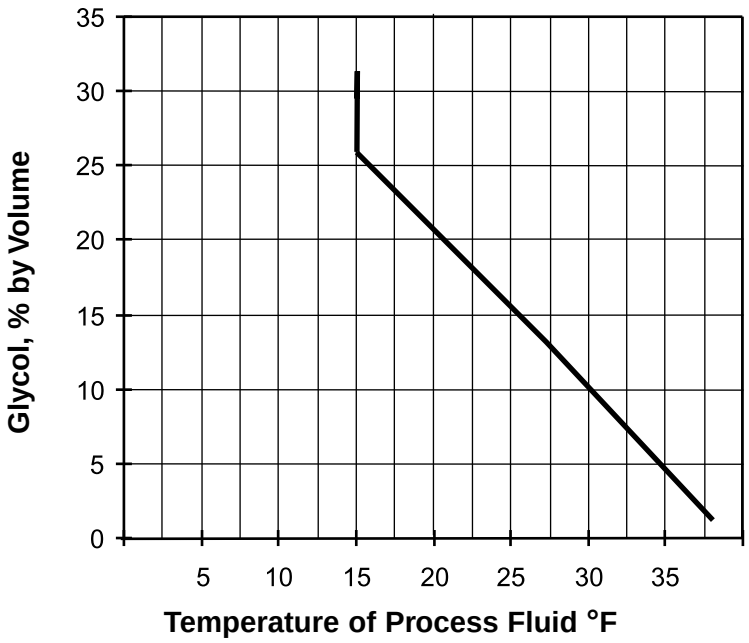
5 Disconnect water hose from Fill/Drain valve.



To fill with glycol solution:

1 Mix the glycol to the proper percentage. Use the table to determine the percentage (by volume) of glycol needed for the process temperature (in °F) you require. Do not choose a temperature below 15 °F (-9 °C). Mix the proper percentage of glycol with water.

WARNING: Refrigerant hazard
Only certified refrigerant technicians should examine and correct problems involving the refrigerant circuit.



2 **Close the To Process and From Process valves.**

3 **Open the Fill/Drain valve and fill chiller** to the fill mark on the Water Level gauge. If the chiller is overfilled, the excess fluid spills out the vent tube. DO NOT OVERFILL.

4 **Close the Fill/Drain valve.**

5 **Check the coolant level.**
Once the chiller is turned on, the coolant level may drop as the coolant begins to circulate, filling the connected plumbing. Check the coolant level on the back of the chiller. The water level shows on the water level gauge. Make sure water level is filled to the mark on the gauge.

6 **Change the minimum operating temperature** range to the correct setting for the percent glycol used. See Setting the To Process Low Limit, in the Operations section.

CHECKING REFRIGERANT CHARGE

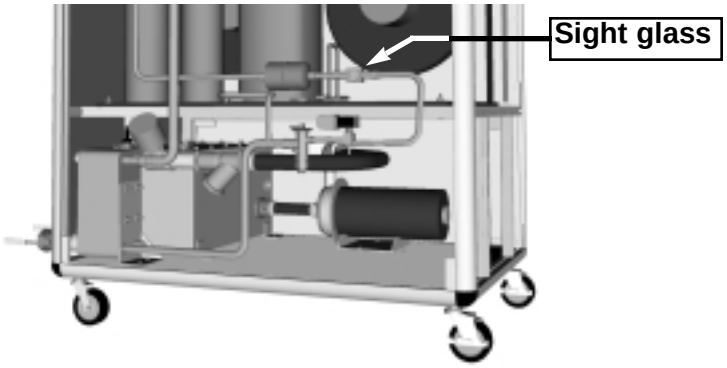
All chillers are fully charged with refrigerant at the factory. Your chiller's model nameplate identifies the type and amount of total refrigerant charge required.

Check refrigerant charge while the chiller is running. Check the refrigerant charge through the sight glass. Open the side door of the Chiller. Use a flashlight, if necessary, and check the liquid-line sight glass:

- **Under normal load conditions,** the refrigerant should be clear.
- **Under low load conditions,** when the hot-gas bypass valves are operating, bubbles may be visible in the sight glass. This is normal.

If the charge is low contact Conair service or have a local, certified refrigeration technician add refrigerant to the system.

WARNING: Refrigerant hazard
Only certified refrigerant technicians should examine and correct problems involving the refrigerant circuit.



CONNECTING THE MAIN POWER SOURCE

WARNING: Improper installation, operation, or servicing may result in equipment damage or personal injury.
This equipment should only be installed, adjusted, and serviced by qualified technical personnel who are familiar with the construction, operation, and potential hazards of this equipment

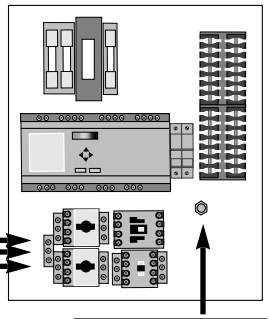
All wiring, disconnects and fuses should be installed by qualified electrical technicians in accordance with electrical codes in your region. Always maintain a safe ground. Do not operate the equipment at power levels other than what is specified on the machine serial tag and data plate.

WARNING: Electrical hazard
Before performing any work on this item, disconnect and lock out electrical power sources to prevent injury from unexpected energization or startup.

1 Open the chiller's electrical enclosure.

2 Connect the power wires to the terminals as indicated on the wiring diagrams that came with your machine. Route the power cable through the hole in the side of the chiller to the electrical enclosure.

3 Check terminal screws to make sure wires are secure. Gently tug each wire; if wire is loose, use a screwdriver to tighten the terminal.



4 Connect the ground wire to grounding lug.

The 575V, 1 1/2 - 4 Hp units utilize a transformer; power wires must be connected to the line side of the transformer.

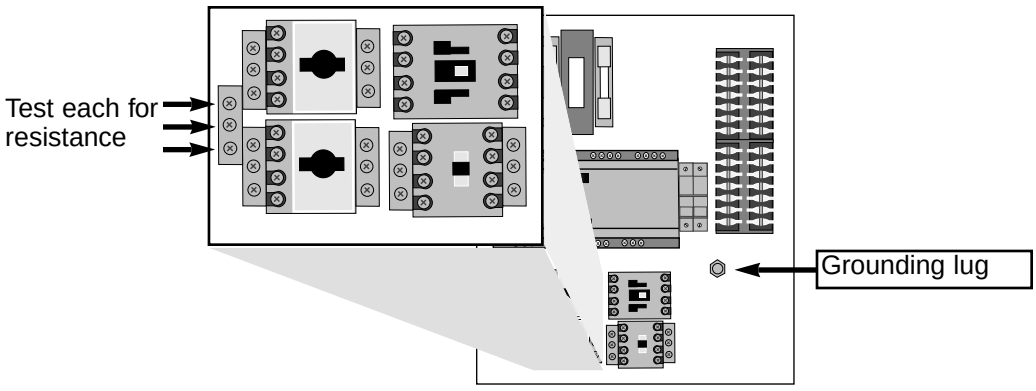
CHECKING ELECTRICAL CONNECTIONS

WARNING: Electrical hazard
Before performing any work on this item, disconnect and lock out electrical power sources to prevent injury from unexpected energization or startup.

1 **Open electrical enclosure.**

2 **Connect the power cable**
to the main line connection.

3 **Check the short-to-ground with an ohm meter.**
Connect the ohm meter to each of the three terminal screws and to the grounding lug. Test all three for resistance. The minimum resistance to ground should be 1megohm. If it resistance is less that 1 megohm, there is a leak in the system.



4 **Close the electrical enclosure.**

5 **Turn on main power source.**

INITIALLY STARTING THE CHILLER

1 **Turn on main power source.**
The control boots up and the screen displays the temperature of the fluid going to the process.

WARNING: Initial startup
Do not press any buttons after initially applying power to the Chiller. Let the Chiller set, undisturbed, for a minimum of 8 hours before starting the Chiller. This is necessary to allow the crankcase heater to warm properly, and to prevent the refrigerant from pooling in the compressor.

After the initial 8-hour minimum warmup, continue with startup:

2 **Press the Start Chiller button.**
Check the Pump and Compressor lights on the control panel; they should turn on and off as the pump and compressor cycle on and off. The To Process temperature displays on the control. The To Process temperature is real-time temperature. It should change as the chiller runs and cools the fluid.

3 **Check the rotation of the pump.**
If pump is not turning, disconnect main power to chiller, swap any two incoming power wires; reapply main power. Check for leaks inside the chiller cabinet; fix any leaks and dry the inside of the chiller before proceeding.

4 **Check the compressor.**
If the compressor is running backwards, disconnect the Chiller from the main power supply, switch any two incoming main power leads, and reapply main power supply. Wait three minutes. The compressor should now be running in the proper direction.

When the compressor is shut off it cannot be turned on again for three minutes. This allows temperatures and pressure in the chiller to equalize, making restart easier, and prolonging the life of the chiller.

5 **Check the sight glass on the back of the chiller.**
If the fluid level is low, follow the steps to add fluid. See Filling the Chiller in the Installation section.

If the chiller is not working properly at any time, press the red Stop button to turn off the chiller.

STOPPING THE CHILLER

To stop the chiller, press the Stop Chiller button on the control panel.

NOTE: When you press the Stop Chiller button, the pump and compressor both stop. If you want to restart immediately by pressing the Start Chiller button, the pump will turn on but the compressor will not turn on for three minutes. The Process Pump light on the control panel will light immediately. After three minutes the compressor turns on and the Compressor light on the control panel lights. This allows temperatures and pressure to equalize, making restart easier, and prolonging the life of the chiller.

If the chiller is not working properly at any time, stop the chiller and refer to the Troubleshooting section. If you do not encounter any problems, proceed to the Operation section.

OPERATION

TIC Control Features

The TIC control lets you view the status of the chiller and change settings.

System lights
Light when compressor, pump or alarm activates

Display
4-digit LED screen shows To Process temperature, new settings and run modes. Indicator light shows hot gas unloading.

System buttons
Press to start and stop chiller and to silence optional audible alarm

Quick text
Follow steps to change setpoints

Control buttons
Press to access menus, enter data, and to scroll

Unloading indicator
Lights when the hot gas bypass is unloading.

4-Digit LED display
Shows status, settings and run modes.

Menu Access button
Press to enter or change setpoint, to exit the menu, and to index to the next menu.

Mode/Enter button
Press to enter parameter selections, access operating modes, silence alarms, and index through menu items.

Raise button
Increases values, hold for fast-step progression.

Lower button
Decreases values; hold for fast-step progression.

BEFORE STARTING

Before you start daily operation of the chiller, you need to perform scheduled preventative maintenance. Necessary maintenance is describe in the Maintenance section of this Users Guide.

WARNING: Electrical hazard
Be sure that power to the chiller is OFF when doing any maintenance on the chiller. Follow all safety rules when performing any maintenance on this equipment.

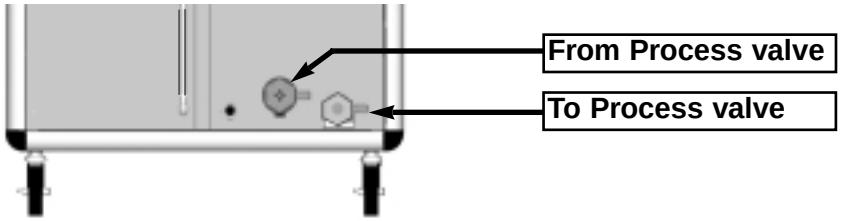
Daily maintenance includes:

- **Checking electrical connections**
- **Checking process fluid level in the pump tank**
- **Checking the condenser coil for debris**
- **Verifying pump discharge pressure**
- **Inspecting piping for leaks**

NOTE: The daily, weekly, monthly, and semi-annual maintenance procedures are detailed in the Maintenance section. Go there for detailed preventative maintenance.

Before starting the Chiller be sure to:

- **Open the To Process valve**
  to the full open position.
- **Open the From Process valve**
  to the 3/4 open position. You will need to adjust this valve when the chiller is running to obtain the desired pump discharge pressure. To find the approximate water flow, refer to the Pump Curves in Description section.



- **Check that the casters are locked.**

STARTING/ STOPPING THE CHILLER

Plug in the power cord to restore power after any required maintenance.

The chiller control automatically performs its bootup routine. When bootup is complete, the screen displays the To Process temperature. The chiller is ready to run.

Press the Start Chiller button.
Check the Pump and Compressor lights on the control panel; they should turn on and off as the pump and compressor cycle on and off. The To Process temperature displays on the control. The To Process temperature is real-time temperature. It should change as the chiller runs and cools the fluid.

If you disconnect the Chiller from the main power supply and reconnect it, the Chiller needs 15 minutes for the crankcase heater to warm up. You can not use the Chiller during this time.

To safely stop the chiller at any time, press the red Stop Chiller button on the control panel.

The chiller remains on, but stopped. The display screen on the control remains on.

NOTE: When you press the Stop Chiller button, the pump and compressor both stop. If you want to restart immediately by pressing the Start Chiller button, the pump will turn on but the compressor will not turn on for three minutes. The Process Pump light on the control panel will light immediately. After three minutes the compressor turns on and the Compressor light on the control panel lights.

CHANGING SETTINGS

The control allows you to change four settings:

- **Temperature Setpoint**
  The temperature you want the To Process liquid
- **Temperature Scale**
  Choose to display temperature in degrees Fahrenheit or Celsius.
- **Auto Tune**
  Helps maintain the temperature setpoint without overshooting.
- **To Process Low Limit**
  Set when need to chill fluid below 40 °F (4 °C) and down to 20 °F (-7 °C). Set this limit when using glycol to chill.

All other settings are set at the factory. You should not change any other settings. If you accidentally change any other setting, refer to the control manual that you received with your chiller and see Control Settings, in the Appendix. If you have any problems or questions, call your Conair Service representative.

CHANGING THE SETPOINT TEMPERATURE

The current To Process temperature displays on the screen when the chiller is turned on. As the temperature changes, the number on the display changes.

The setpoint temperature is the temperature you want the water to be exiting the chiller at the To Process valve.

To set the temperature setpoint:

1 **Press Menu button once.**
The display flashes SP, and the current setpoint temperature.

2 **Press the Up/Down arrows**
to raise and lower the setpoint temperature. Each time you press the arrow the temperature changes one unit. Stop when you reach the temperature you want.

3 **Press the Mode/Enter button**
to accept the new setpoint temperature. The display returns to the actual process temperature.

To return to the To Process Temperature screen from any other screen, press and hold the button for at least 5 seconds until the temperature displays.

CHANGING TEMPERATURE SCALE

The default temperature scale for the control is Fahrenheit (F). You can change the scale to Celsius (C):

1 **Press Menu button until DISP shows** on the screen.

2 **Press the Enter button.**
The current temperature scale displays (F or C) and is flashing.

3 **Press the Up/Down arrows**
to move to the other scale. If the current temperature scale is Fahrenheit, pressing the arrow moves you to C; if the current temperature scale is Celsius, pressing the arrow moves you to F.

4 **Press the Menu button**
to accept the new temperature scale and displays the process temperature.

CHANGING TO AUTO TUNE MODE

Use the Auto Tune Mode to maintain the temperature setpoint without overshooting it. When initiating Auto Tune Mode the actual temperature (temperature of the water exiting the Chiller) must at least 20° warmer than the current setpoint temperature. In order to guarantee this, run the chiller for several minutes until the To Process temperature is 40 °F with no load on the Chiller.

To initiate the Auto Tune mode:

1 **Press Enter button and hold**
for 3 seconds. FOP displays on the screen.

To return to the To Process Temperature screen from any other screen, press and hold the button for at least 5 seconds until the temperature displays.

2 **Use the Up/Down arrows to scroll**
until STBY (standby) displays.

3 **Press the Enter button.**
STBY flashes on the screen alternately with the current To Process temperature.

CHANGING AUTO TUNE MODE

CONT'D

4 **Press the Menu button.**
SP displays, flashing alternately with the current setpoint temperature.

5 **Use the Up/Down arrows to change**
the setpoint temperature. Each time you press an arrow, the displayed number changes one unit.

6 **Press Enter button.**
The screen displays STBY and the new number.

7 **Press Enter button and hold**
for 3 at least seconds until FOP displays on the screen.

8 **Apply a load to the Chiller.**

9 **Use the Up/Down arrows to scroll**
until ATUN displays on the screen.

10 **Press the Enter/Mode button once.**
The screen flashes ATUN. When auto tuning is done the screen displays STBY.

11 **Press Enter button and hold**
for 3 at least seconds until FOP displays on the screen.

12 **Use the Up/Down arrows to scroll**
to NOR on the screen.

13 **Press Enter button.**
Initiating Auto Tune is complete.

To return to the To Process Temperature screen from any other screen, press and hold the button for at least 5 seconds until the temperature displays.

SETTING THE TO PROCESS LOW LIMIT

The default low temperature limit for the To Process fluid is set at the factory at 40 °F. This temperature limit is the lowest temperature for the chilled fluid leaving the Chiller. If you want to cool fluid below 40 °F (4 °C) and down to 20 °F (-7 °C), you need to fill the chiller with the proper percentage of glycol solution. See Filling the Chiller, in the Installation section.

After the Chiller is filled with the proper percentage of glycol solution, you need to set the minimum operating temperature on the control. Use the temperature you chose when selecting the percent glycol.

To set the To Process low limit on the control:

1. **Press Menu button until INP shows** on the screen.

2. **Press the Enter button until SPLL** displays on the screen. SPLL flashes, along with the current low limit temperature.

3. **Press the Up/Down arrows** to change the temperature to the required number.

4. **Press the Menu button** to accept the new temperature.

If you want to change from using a glycol solution back to using water in your chiller, you need to change the low limit temperature to 40 °F (4 °C). Follow the steps listed here to set the To Process low limit to 40.

To return to the To Process Temperature screen from any other screen, press and hold the button for at least 5 seconds until the temperature displays.

MAINTENANCE

MAINTENANCE FEATURES

Conair Series 1 Portable Chillers need regular, scheduled maintenance for peak performance.

To maintain the best performance of the chiller, it must be cleaned and inspected regularly. Maintenance includes a daily, monthly, and semi-annual schedule.

Use this maintenance schedule as a guide. You may need to shorten the time of the maintenance schedule, depending on how often you use the chiller. Among the features that require preventative maintenance are:

- the refrigerant system
- electrical cables, terminals, and control lights
- the condenser
- process fluid level
- evaporator
- Cooling water treatment system (if used)

WARNING AND CAUTIONS

Follow all cautions and warnings when working on the equipment.

WARNING: Improper installation, operation, or servicing may result in equipment damage or personal injury.

This equipment should only be installed, adjusted, and serviced by qualified technical personnel who are familiar with the construction, operation, and potential hazards of this type of machine.

All wiring, disconnects, and fuses should be installed by qualified electrical technicians in accordance with electrical codes in your region.

WARNING: Electrical hazard

Before performing any work on this item, disconnect and lock out electrical power sources to prevent injury from unexpected energization or startup. Be sure that power to the chiller is OFF when doing any maintenance on the chiller. Follow all safety rules when performing any maintenance on this equipment.

CAUTION: Hot Surfaces

Always protect yourself from hot surfaces when working on the Portable Chiller, especially when working on or around the compressor and condenser. These devices can reach up to 160 °F (71 °C). Allow these devices to cool before performing any maintenance or troubleshooting.

WARNING: Refrigerant hazard

Only certified refrigerant technicians should examine and correct problems involving the refrigerant circuit.

PREVENTATIVE MAINTENANCE SCHEDULE

To maintain the best performance, follow the maintenance schedule and record information in the Maintenance Log in the Appendix.

● Daily, or as often as needed

❒ **Checking electrical connections**
Make sure electrical connections are properly seated. See Checking Electrical Connections, in the Maintenance section.

❒ **Checking process fluid level in the pump tank**
Check the process fluid level in the water level gauge on the back of the chiller. If low, see Filling the Chiller, in the Installation section.

❒ **Verifying pump discharge pressure**
While the pump is running, check that the pump pressure gauges are within range. To change the pressure open or close the From Process valve.

❒ **Inspecting piping for leaks**
Check to see that pipes are not leaking. Look for standing water on the floor or inside the chiller cabinet.

❒ **Inspecting the condenser coil for debris**
(air-cooled models only) Remove the wire mesh side panel in front of the condenser coil. Remove any debris from the coils.

● Weekly, or as often as needed

❒ **Checking temperature and pressure readings**
Check that the temperature and pressure display on the control screen, and that the pressure gauge indicates normal operation.

❒ **Checking efficiency**
Review the performance data on the Maintenance Log found in the Appendix. If you notice a decrease in efficiency over time, check all heat transfer surfaces of the evaporator and condenser for fouling. Clean as needed.

❒ **Checking refrigerant site glass**
There should not be any bubbles. See Checking Refrigerant Charge, in the Maintenance section.

❒ **Checking reservoir level**
Check the water level gauge on the back of the chiller. If fluid level is low, fill. See Checking Reservoir Level, in the Maintenance section.

PREVENTATIVE MAINTENANCE SCHEDULE

To maintain the best performance, follow the maintenance schedule and record information in the Maintenance Log in the Appendix.

● Monthly

❒ **Inspecting cooling water treatment system**
If your chiller uses a cooling water treatment system, maintain proper chemical levels and follow the recommendations of your water treatment specialist. Change water in the reservoir tank monthly.

❒ **Cleaning**
Wipe all external surfaces to maintain performance.

❒ **Inspecting condenser**
Check the condenser for adequate air flow or water flow. Check the condenser face for dirt and clogging. If dirt or clogs are present, clean the condenser. See Cleaning the Evaporator or Water-cooled Condenser, and Cleaning the Air-cooled Condenser, in the Maintenance section. If your unit has an optional filter at the air inlet of the Air-cooled condenser coil, check, clean, and replace as needed.

❒ **Inspecting the control panel**
Check for loose wires, burned contacts, and signs of overheated wires. Check that all panel lights illuminate. See Checking Electrical Connections in the Maintenance section.

❒ **Checking refrigerant charge**
Check the sight glass between the receiver and evaporator for proper refrigerant pressure. See Checking Refrigerant Charge, in the Maintenance section.

❒ **Cleaning process fluid strainer**
Remove cap and clean any debris out of strainer. Replace cap.

● Semi-annual (every 6 months)

❒ **Cleaning the evaporator or water-cooled condenser**
See Cleaning the Evaporator or Water-cooled Condenser, in the Maintenance section.

❒ **Cleaning the tank and float switch**
Drain the reservoir. Disconnect all piping from tank reservoir. Remove the float switch by loosening the nut on the float switch. Remove switch and clean. Unbolt the tank from the chiller base. Take off the tank cover and clean the reservoir. Reinstall the tank cover; reinstall tank. Reinsert float switch, holding firmly against reservoir and tighten nut. Fill reservoir and check for leaks.

CHECKING THE REFRIGERANT CHARGE

All chillers are fully charged with refrigerant at the factory. Your chiller's model nameplate identifies the type and amount of total refrigerant charge required.

WARNING: Refrigerant hazard
Only certified refrigerant technicians should examine and correct problems involving the refrigerant circuit.

Check refrigerant charge while the chiller is running:

Check the refrigerant charge through the sight glass.

Use a flashlight, if necessary, and check the liquid-line sight glass:

- **Under full load conditions,** the refrigerant should be clear (no bubbles).
- **Under low load conditions,** when the hot-gas bypass valves are operating, bubbles may be visible in the sight glass. This is normal.

If the charge is low contact Conair service or have a local, certified refrigeration technician to add refrigerant to the system.

CLEANING THE EVAPORATOR OR WATER-COOLED CONDENSER

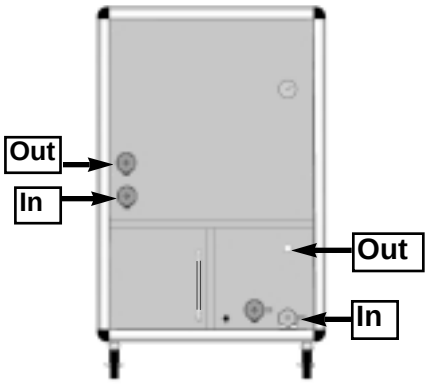
Minerals and other contaminants produce deposits, scales, slime, or algae on the heat transfer surfaces exposed to water. Fouled surfaces result in decreased cooling capacity. Implement a water treatment program to slow the fouling.

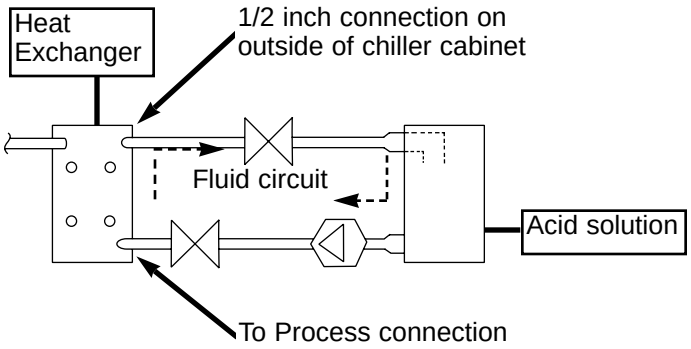
CAUTION: Hot Surfaces
Always protect yourself from hot surfaces when working on the Portable Chiller, especially when working on or around the compressor and condenser. These devices can reach up to 160 °F (71 °C). Allow these devices to cool before performing any maintenance or troubleshooting.

Water quality should be maintained at a pH of 7.4, but not less that 6.0 for proper heat exchanger life.

To clean:

1. **Prepare a 5% solution of Phosphoric acid** or Oxalic acid. Do not heat the acid solution.
2. **Shut the From Process valve.**
3. **Disconnect the pump from the heat exchanger.** Install a cap in the opening of the heat exchanger where the pump was connected.
4. **Connect 1/2-inch tubing to the 1/2-inch** connections of the heat exchanger.
5. **Back-flush the solution through the** heat exchanger and the chiller.
6. **Flush the heat exchanger and the chiller** piping with fresh water after cleaning.
7. **Reconnect the chiller pump to the** heat exchanger. Remove the cap in the heat exchanger and reconnect the hose from the pump.





CLEANING THE AIR-COOLED CONDENSER

WARNING: Electrical hazard
Before performing any work on this item, disconnect and lock out electrical power sources to prevent injury from unexpected energization or startup.

CAUTION: Hot Surfaces
Always protect yourself from hot surfaces when working on the Portable Chiller, especially when working on or around the compressor and condenser. These devices can reach up to 160 °F (71 °C). Allow these devices to cool before performing any maintenance or troubleshooting.

The air-cooled condenser can accumulate dirt and clog quickly if it is run in a dusty or dirty environment. A clogged condenser increases refrigerant discharge pressure, lowers performance, and may cause the fan motors and compressor to overheat.

1. **Inspect the coils.**
   Use a flashlight to check between coil surfaces.
2. **Clean the dirty coils with a soft brush.**
3. **Flush with cool water or a commercial** coil cleaner.

If your unit has the optional air filter supplied by Conair, clean it using water or air. Replace as needed.

CHECKING ELECTRICAL CONNECTIONS

WARNING: Electrical hazard
Before performing any work on this item, disconnect and lock out electrical power sources to prevent injury from unexpected energization or startup.

WARNING: Improper installation, operation, or servicing may result in equipment damage or personal injury.

This equipment should only be installed, adjusted, and serviced by qualified technical personnel who are familiar with the construction, operation, and potential hazards of this type of machine.

All wiring, disconnects, and fuses should be installed by qualified electrical technicians in accordance with electrical codes in your region.

1 Be sure the main power is disconnected and the chiller is locked out. Always disconnect and lockout the main power source before opening the unit for servicing.

2 Open the electrical enclosure.

3 Inspect all wires and connections.
Look for loose wires, burned contacts, and signs of overheated wires. Compare the control wiring to the wiring diagrams you received with your chiller. Have a qualified electrician make any necessary repairs or replacements.

4 Close the electrical enclosure door.

5 Inspect the exterior power cords.
Cords should not be crimped, exposed, or rubbing against the frame. If the main power cord runs along the floor, make sure it is not positioned where it could rest in pooling water or could be run over and cut by wheels or casters.

Always refer to the wiring diagrams you received with your chiller to locate specific electrical components.

CHECKING RESERVOIR LEVEL

WARNING: Electrical hazard
Before performing any work on this item, disconnect and lock out electrical power sources to prevent injury from unexpected energization or startup.

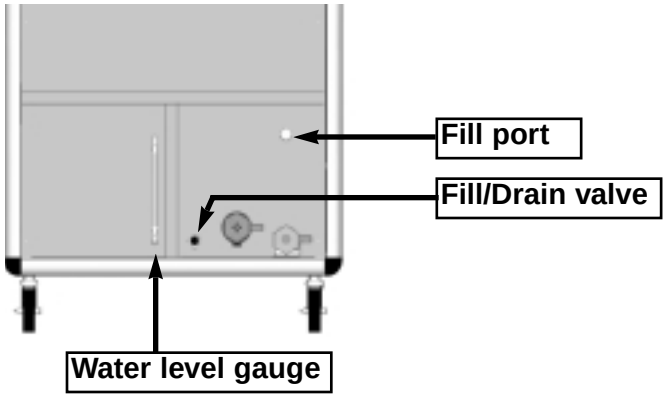
Check the fluid level in the reservoir. The meniscus in the sight glass on the back of the chiller should be in line with the mark on the sight glass.

To manually fill the reservoir:

1 Disconnect and lockout power to the chiller.

2 Locate the fill port on the back of the chiller.

3 Refill the reservoir.
Monitor the level using the water level gauge on the back of the chiller. Because the Portable Chiller can use either pure water or a glycol solution, make sure your are adding the correct fluid for your application.



If you have the optional make-up water level float switch, it will automatically control the fluid level.

TROUBLESHOOTING

BEFORE BEGINNING

You can avoid most problems by following the recommended installation, operation and maintenance procedures outlined in this User Guide. If you have a problem, this section will help you determine the cause and tell you how to fix it.

Before you begin troubleshooting:

- ❒ Find any wiring, piping, and assembly diagrams that were shipped with your equipment. These are the best reference for correcting a problem. The diagrams will note any custom features or options not covered in this User Guide.
- ❒ Verify that you have all instructional materials related to the chiller. Additional details about troubleshooting and repairing specific components are found in these materials.
- ❒ Check that you have manual for other equipment connected in the system. Troubleshooting may require investigating other equipment attached to, or connected with the chiller.

A FEW WORDS OF CAUTION

WARNING: Improper installation, operation, or servicing may result in equipment damage or personal injury.

This equipment should only be installed, adjusted, and serviced by qualified technical personnel who are familiar with the construction, operation, and potential hazards of this type of machine.

All wiring, disconnects, and fuses should be installed by qualified electrical technicians in accordance with electrical codes in your region.

WARNING: Electrical hazard
Before performing any work on this item, disconnect and lock out electrical power sources to prevent injury from unexpected energization or startup.

WARNING: Refrigerant hazard
Only certified refrigerant technicians should examine and correct problems involving the refrigerant circuit.

IDENTIFYING THE CAUSE OF A PROBLEM

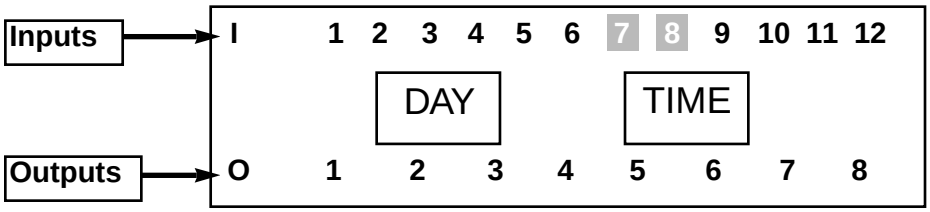
The Troubleshooting section covers problems directly related to the operation and maintenance of the portable chiller. This section does not provide solutions to problems that originate with other equipment. Additional troubleshooting help can be found in manual supplied with the other equipment.

Conditions you may see are:

- **electrical** - a fuse is out, a switch has tripped
- **mechanical** - pump, condenser not working
- **physical** - water flow incorrect

Always refer to the wiring diagrams you received with your chiller to locate specific electrical components.

As part of troubleshooting you need to know the status of the inputs and outputs. Open the electrical enclosure and check the status of the inputs and outputs. When they are in normal range, the numbers are highlighted. If the number is not highlighted, it is out of range.



In this example, inputs 7 and 8 are highlighted; they are in normal position. The unhighlighted numbers are out of range.

Refer to the wiring diagram and the following table for the switch status:

Input	Description	Output	Description
1	Chiller Stop	1	Compressor Starter
2	Chiller Start	2	Compressor Run Lamp
3	Level Switch	3	Pump Starter
4	Flow Switch	4	Pump Run Lamp
5	Compressor Running	5	Alarm Lamp
6	Pump Running	6	Optional Auto-Fill Solenoid
7	Suction Pressure Switch	7	Optional Alarm Bell
8	Discharge Pressure Switch	8	Optional Alarm Strobe
9	Low Temperature Deviation		
10	Optional Auto-Fill Level Switch		
11	Pressure Differential Switch (7.5, 10, 15 ton only)		
12	Optional Alarm Silence		

ANSWERING AN ALARM

When an alarm condition occurs, the alarm light on the control panel lights. It stays lit until the alarm condition is corrected. If you have the optional audible alarm, pressing the Enter button silences the audible alarm.

To find out what is causing the alarm, check the indicator lights on the control panel for the pump and compressor status. If the pump and compressor are both off, check the water tank level, flow valves, and the pump. If the pump is on and the compressor is off, check the compressor, suction pressure and discharge pressure.

Alarm Condition	Description	Pump Status	Compressor Status
Low Water Tank Level	The water level in the pump tank is low.	OFF	OFF
Flow Fault	There is no flow of the process fluid at the pump discharge.	OFF	OFF
Pump Overload	There is a high amperage condition; the pump is drawing too much current.	OFF	OFF
Compressor Overload	There is a high amperage condition; the compressor is drawing too much current.	ON	OFF
High Discharge Pressure	The refrigerant pressure, as measured at the compressor outlet is high.	ON	OFF
Low Suction Pressure	The refrigerant pressure, as measured at the inlet of the compressor is low.	ON	OFF

Refer to the Troubleshooting tables and the wiring diagrams to correct the alarm condition.

Look here if the control panel is not lit, or if the power is on and the Portable Chiller will not run.

CONTROL PROBLEMS

Symptom	Possible cause	Solution
The control is not lit and the chiller is not working.	**Power is not reaching the chiller.**	❒ Check the power cord and plug. Make sure the cord and plug are properly connected. ❒ Make sure the main disconnect switch is on. ❒ Check fuses and breakers. Replace or reset as required.
	The correct power is not reaching the unit	Check the voltage specification on the chiller nameplate.
	There is a problem with the TIC control.	❒ Check fuses and replace as needed. ❒ Check the power to the temperature controller. Reconnect or replace as needed. ❒ Check the TIC indicator lights and replace as needed.
	There is a problem with the control panel.	The control panel may have failed. Contact Conair Service.

CONTROL PROBLEMS

CONT'D

Symptom	Possible cause	Solution
The control is lit and there is no alarm condition. The compressor hums, but does not run.	**The input voltage is incorrect**	Check the main supply voltage. It must be within 10% of the nameplate rating.
	There is a phase loss.	❒ Check the fuses on the main power supply. ❒ Check the phase-to-phase voltages. ❒ Check phase continuity through the compressor contactor. ❒ Check the wiring at the compressor. Replace or repair as needed.

Look here when the Alarm/Shutdown light on the control panel is lit. See Answering an Alarm, in the Troubleshooting section before going to these tables.

MECHANICAL CONDITIONS

Alarm	Possible cause	Solution
Low Water Tank Level (pump and compressor are off)	**Water level in tank is low.**	Fill tank to proper level. See Checking Reservoir Level, in the Maintenance section. Inspect for leaks in the process piping. Repair as necessary. See Making Plumbing Connections, in the Installation section.
	Failed Level switch.	Check level gauge and compare it to status of the level switch by checking continuity of switch in electrical enclosure. Refer to wiring diagrams.

MECHANICAL CONDITIONS

Alarm	Possible cause	Solution
Flow fault (pump and compressor are off)	**The To Process and From Process valves are closed.**	Open valve(s).
	The Process Fluid strainer is clogged.	Clean the strainer.
	Water level in reservoir is low.	Fill the reservoir. See Making Process Plumbing Connections, in the Installation section.
	The evaporator is fouled.	Clean Evaporator. See Cleaning the Evaporator or Water-cooled Condenser, in the Maintenance section.
	Pump is not running.	Check overload module. Replace as needed. See Replacing Overload Modules, in the Troubleshooting section.
	Pump is running backwards.	Switch any two of the three main power leads to the pump.

Alarm	Possible cause	Solution
Pump Overload (pump and compressor are off)	**Overload set incorrectly.**	Check table on wiring diagram for correct amperage. Adjust overload accordingly.
	Low supply voltage.	❑ Check supply voltage. Supply voltage to contactor should be +- 10% of nameplate voltage. ❑ Check wire terminations and connections. Tighten if loose.
	Faulty contactor	Check line and load side of contactor. It should be less than 5 volt drop across the contactor. If it is not, replace the contactor. See Replacing the Contactor in the Troubleshooting section.
	Faulty overload module.	Check amp draw of circuit. If it is under the rated setting, replace the overload module. See Replacing Overload Modules, in the Troubleshooting section.

MECHANICAL CONDITIONS

CONT'D

Alarm	Possible cause	SOLUTION
Compressor Overload (pump is running and compressor is off)	**Overload set incorrectly.**	Check table on wiring diagram for correct amperage. Adjust overload accordingly.
	Low supply voltage.	❑ Check supply voltage. Supply voltage to contactor should be +- 10% of nameplate voltage. ❑ Check wire terminations and connections. Tighten if loose.
	Faulty contactor.	Check line and load side of contactor. It should be less than 5 volt drop across the contactor. If it is not, replace the contactor. See Replacing the Contactor in the Troubleshooting section.
	Faulty overload module.	Check amp draw of circuit. If it is under the rated setting, replace the overload module. See Replacing Overload Modules, in the Troubleshooting section.

Alarm	Possible cause	Solution
High Discharge Pressure (pump is running, compressor is off)	**Clogged/dirty air-cooled condenser.**	Clean the coil. See Cleaning the Air-cooled Condenser, in the Maintenance section.
	Blocked air flow to air-cooled condenser.	Move chiller or unblock air passageway.
	Low condenser water flow or water too warm to water-cooled condenser.	Check required flow; see Specifications in the Description section.
	Blocked condenser water line or valve closed.	Unblock line; open valve.
	Water-cooled condenser fouled.	Clean the condenser. See Cleaning the Air-cooled Condenser, and Cleaning the Evaporator or Water-cooled Condenser, in the Maintenance section.

MECHANICAL CONDITIONS

CONT'D

Alarm	Possible cause	Solution
High Discharge Pressure, cont'd	**Compressor discharge valve closed.**	Open valve.
	Overcharged with refrigerant.	See Checking the Refrigerant Charge in the Maintenance section.
	Faulty water regulating valve.	Repair or replace the valve.
	Faulty pressure switch.	See Checking the Pressure Switches, in the Troubleshooting section.

Alarm	Possible cause	Solution
Low Suction Pressure (pump is running and compressor is off)	**No or low flow with a failed flow switch and RTD.**	❑ Check To Process and From Process valves to see if they are open. ❑ Check Flow switch and RTD. Replace as needed.
	Compressor suction valve is closed.	Open valve.
	No load on the Chiller.	Check process load for required load. Chiller may be oversized.
	The Evaporator is fouled.	Clean Evaporator. See Cleaning the Evaporator or Water-cooled Condenser, in the Maintenance section.
	The Evaporator is frozen.	❑ Check RTD; Replace as needed. ❑ Check minimum allowable setpoint for percent glycol used.
	There is a refrigerant leak.	Check for oil in chiller cabinet and bubbles in refrigerant site glass. Consult Conair Service for repair.
	The pressure switch is faulty.	See Checking Pressure Switches, in the Troubleshooting section.

MECHANICAL CONDITIONS

CONT'D

Symptom	Possible cause	Solution
Compressor fault.	**Leads are backwards.**	Swap any two of the three main power leads to the compressor.
	The compressor failed.	Contact Conair Service.

CHECKING AND REPLACING SWITCHES

WARNING: Electrical hazard
Before performing any work on this unit, disconnect and lock out electrical power sources to prevent injury from unexpected energization or startup.

The pump tank has one or two float switches. The float switch (low level cutout) activates an alarm. There is also a flow switch in the process fluid line to verify flow.

To replace a switch:

1 Disconnect and lockout power to the chiller.

2 Open the electrical enclosure and locate the connection for the correct switch on the terminal switch. Refer to the wiring diagrams you received with your chiller to find the correct terminals.

3 Check the switch.
Check continuity within the switch and make sure it corresponds to the condition of the switch. Clean the switch if needed.

4 Replace the switches as needed.
Drain the tank to replace the switch(es).

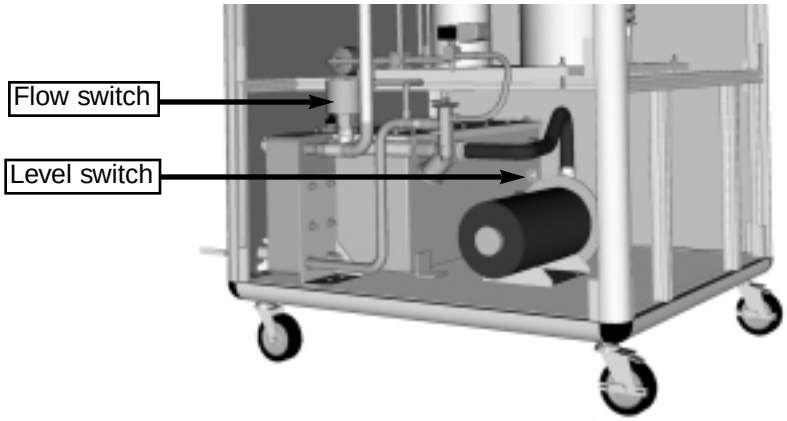
To check a flow switch:

1 Remove the electrical cover on the flow switch.

2 Slide the top of the switch housing over until the N.O. (normally open) shows when electrical cover is placed back on.

3 Replace electrical cover on flow switch.

Always refer to the wiring diagrams that came with your chiller to locate specific electrical components.



REPLACING THE CONTACTOR

WARNING: Electrical hazard
Before performing any work on this unit, disconnect and lock out electrical power sources to prevent injury from unexpected energization or startup.

To replace contactor for the pump or compressor:

Always refer th the wiring diagrams that came with your chiller to locate specific electrical components.

1 Disconnect and lockout power to the chiller.

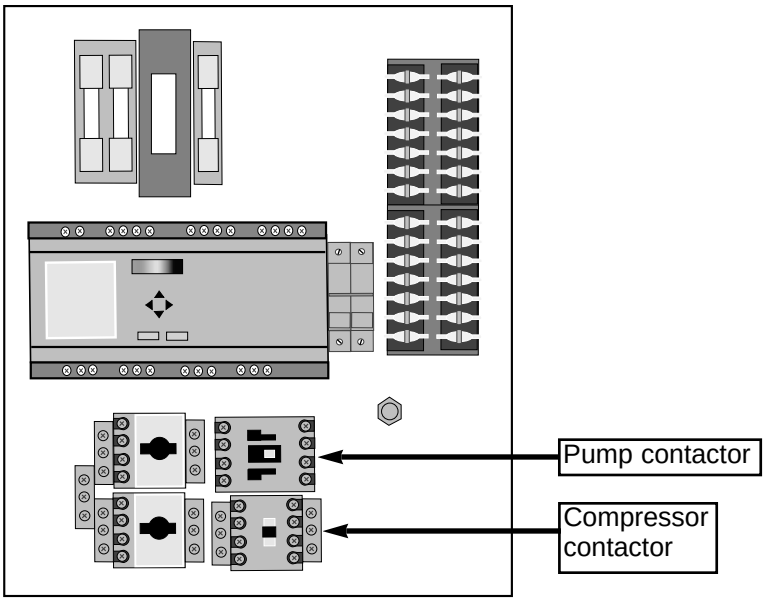
2 Open the electrical enclosure and locate the correct contactor. Refer to the wiring diagrams you received with your chiller.

3 Disconnect the wiring from the contactor. Make sure you label each wire so you can correctly install the new unit.

4 Remove the contactor by snapping off the DIN rail mounting.

5 Snap in the new contactor.

6 Reconnect the wiring and reconnect power to the chiller.



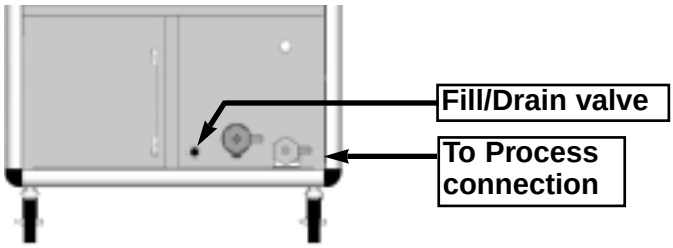
CHECKING AND REPLACING THE RTD

The Conair Portable Chiller uses a standard 100 ohm RTD to monitor process temperature. Disconnect the RTD leads and measure the resistance through the RTD. It should read 95 - 110 ohms. If it does not, the RTD is bad and needs replaced.

To replace the RTD:

1 **Disconnect and lockout power to the chiller.**

2 **Disconnect the To Process tubing from the** To Process connection.



3 **Open the Drain/Fill valve and drain water** from the unit so the water level is lower that the RTD.

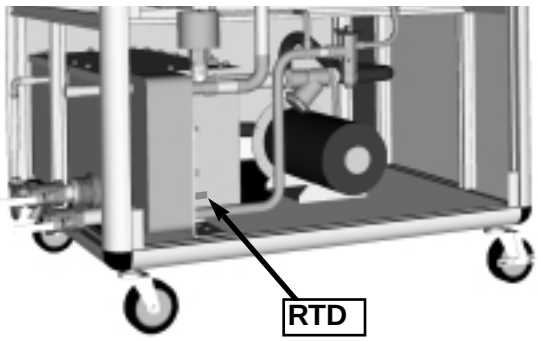
4 **Open the side of the chiller.**

5 **Disconnect the RTD wiring from the** temperature controller in the top electrical panel. Refer to the wiring diagram.

6 **Remove the RTD.**
Loosen the compression nut to slide the RTD out of the evaporator.

7 **Install the new RTD.**
The new RTD should be inserted in the evaporator so that the tip is extended completely through the evaporator.

8 **Wire the RTD to the controller** in the top electrical enclosure.



Always refer th the wiring diagrams that came with your chiller to locate specific electrical components.

REPLACING THE TEMPERATURE CONTROLLER (TIC)

Always refer to the wiring diagrams you received with your chiller to locate specific electrical components.

WARNING: Electrical hazard
Before performing any work on this unit, disconnect and lock out electrical power sources to prevent injury from unexpected energization or startup.

1 **Disconnect and lockout power to the chiller.**

2 **Snap the Temperature Controller board out** of the mounting case by pressing the snaps on both sides of the controller, and pulling outward at the same time.

3 **Slide the new controller in until** it snaps into place.

4 **Contact Conair Service for the temperature** setup list. This list tells you the correct settings for the controller parameters.

REPLACING OVERLOAD MODULES

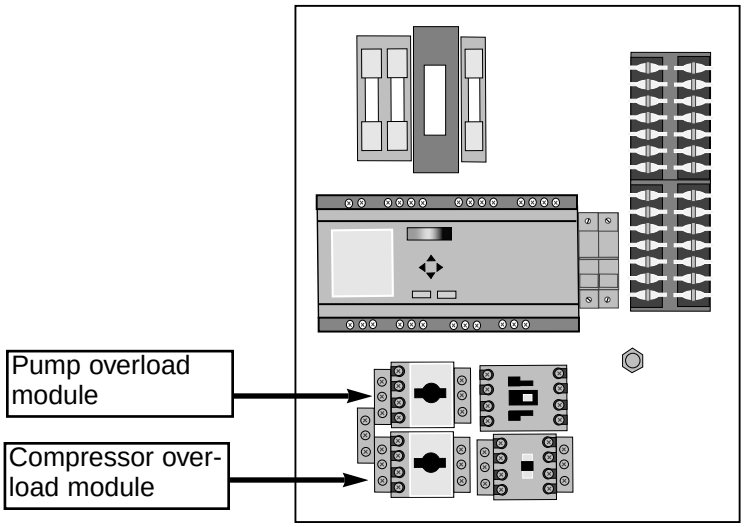
WARNING: Electrical hazard
Before performing any work on this unit, disconnect and lock out electrical power sources to prevent injury from unexpected energization or startup.

Normally if the overload trips, resetting the overload and correcting the cause is typically all that is needed. However, if the overload continues to trip, it may be necessary to replace the overload module.

To replace the overload module:

1. **Disconnect and lockout power to the chiller.**
2. **Open the electrical enclosure.**
3. **Locate the overload module and disconnect** the power leads from the module to the device. Refer to the wiring diagram for the exact location. Note the placement of each lead and label as needed.
4. **Disconnect auxiliary wiring to the module.**
5. **Loosen the screws and remove the module.**
6. **Install the new module** and tighten in place with the screws.
7. **Reconnect wires and leads.**
8. **Adjust setting to correct Full Load Amps** rating of compressor, fan or pump.
9. **Restore power to the chiller.**

Always refer to the wiring diagrams you received with your chiller to locate specific electrical components.



REPLACING FUSES

WARNING: Electrical hazard
Before performing any work on this unit, disconnect and lock out electrical power sources to prevent injury from unexpected energization or startup.

To replace fuses:

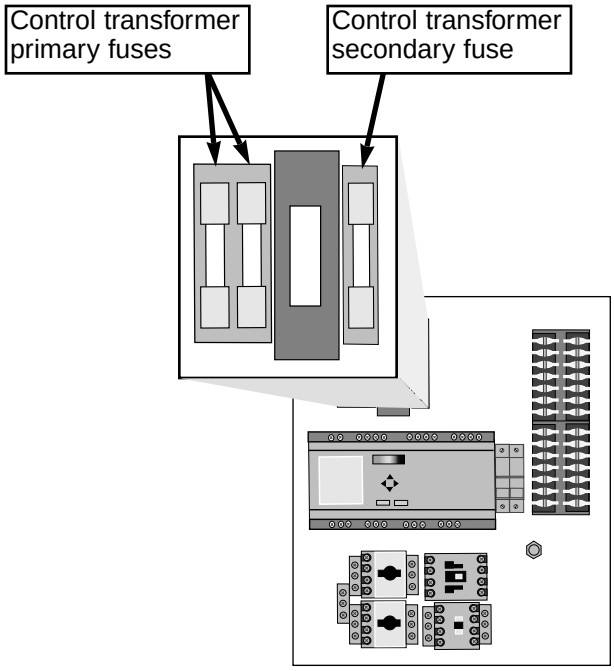
1 **Disconnect and lockout power to the chiller.**

2 **Open the electrical enclosure and locate** the fuses. Refer to the wiring diagram for the exact location.

3 **Remove and replace fuses.**

4 **Restore power to the chiller.**

Always refer to the wiring diagrams you received with your chiller to locate specific electrical components.

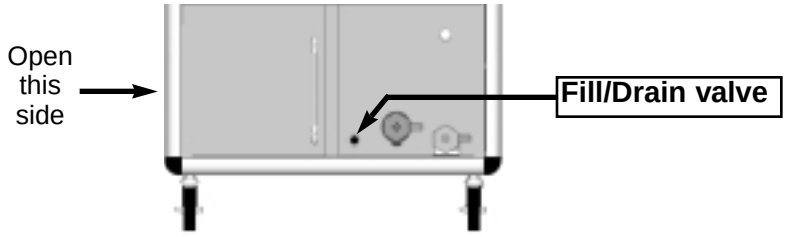


REMOVING PUMP COMPONENTS

The pump's wet end (impeller, motor, and seal assembly) can be removed for service.

1 **Disconnect and lockout power to the chiller.**

2 **Open the drain/fill valve.**
Drain the water from the chiller.



3 **Open the side of the chiller.**

4 **Remove the bolts connecting the pump** assembly to the pump housing.

5 **Remove the pump assembly.**
Carefully slide it sideways away from the pump tank to avoid damage.

6 **Inspect, clean, and replace pump parts** as needed. Separate the pump assembly form the pump volute (casing) by prying the flanges and pulling apart. Follow the disassembly and reassembly procedures in the pump manufacturer's manual that accompanies this User Guide.

CHECKING PRESSURE SWITCHES

WARNING: Coolant hazard
Coolant can cause freezing of skin. All proper precautions should be taken any time the cooling system is worked on. Any adjustment that involves the coolant should only be performed by a certified refrigeration technician.

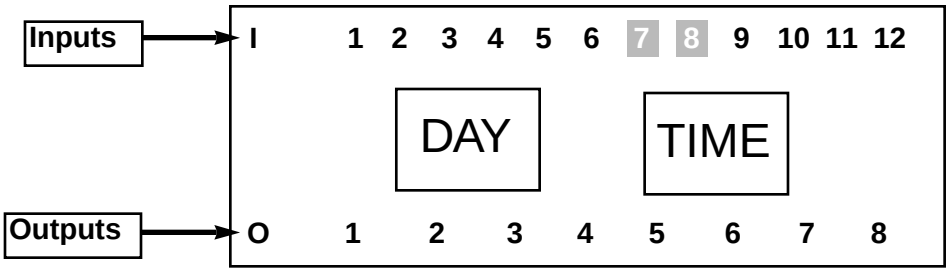
The pressure switch is a non-adjustable switch. To check the pressure switch:

Always refer to the wiring diagrams you received with your chiller to locate specific electrical components.

1 Locate the pressure switch.
Use the wiring diagrams that came with your chiller for exact location. Location varies depending on size of unit.

2 Check the connections.
Make sure all connections to the switch are secure. Tighten as needed.

3 Check the control signal in the electrical panel.
Refer to the wiring diagram and the following table for the switch status:



In this example, inputs 7 and 8 are highlighted; they are in normal position. If they are not highlighted the input is out of range.

Input	Description	Output	Description
1	Chiller Stop	1	Compressor Starter
2	Chiller Start	2	Compressor Run Lamp
3	Level Switch	3	Pump Starter
4	Flow Switch	4	Pump Run Lamp
5	Compressor Running	5	Alarm Lamp
6	Pump Running	6	Optional Auto-Fill Solenoid
7	Suction Pressure Switch	7	Optional Alarm Bell
8	Discharge Pressure Switch	8	Optional Alarm Strobe
9	Low Temperature Deviation		
10	Optional Auto-Fill Level Switch		
11	Pressure Differential Switch (7.5, 10, 15 ton only)		
12	Optional Alarm Silence		

CHECKING PRESSURE SWITCHES

CONT'D

4 **Check the continuity within the switch** and make sure it corresponds to the following conditions:

Item	Description
High Pressure Switches (PS-2)	Cut out @ 300 PSIG on rise
Low Pressure Switches (PS-1)	Cut out at 28 PSIG on fall Cut in at 43 PSIG on rise

If required, check the switch with a refrigeration gauge. If the switch does not change, as listed in this table, when compared to a refrigeration pressure gauge, the switch is faulty. Replace the switch.

We're Here to Help

Conair has made the largest investment in customer support in the plastics industry. Our service experts are available to help with any problem you might have installing and operating your equipment. Your Conair sales representative also can help analyze the nature of your problem, assuring that it did not result from misapplication or improper use.

How to Contact Customer Service

To contact Customer Service personnel, call:

From outside the United States, call: 814-437-6861

You can commission Conair service personnel to provide on-site service by contacting the Customer Service Department. Standard rates include an on-site hourly rate, with a one-day minimum plus expenses.

Before You Call ...

If you do have a problem, please complete the following checklist before calling Conair:

- ❒ Make sure you have all model, serial and parts list numbers for your particular equipment. Service personnel will need this information to assist you.
- ❒ Make sure power is supplied to the equipment.
- ❒ Make sure that all connectors and wires within and between control systems and related components have been installed correctly.
- ❒ Check the troubleshooting guide of this manual for a solution.
- ❒ Thoroughly examine the instruction manual(s) for associated equipment, especially controls. Each manual may have its own troubleshooting guide to help you.
- ❒ Check that the equipment has been operated as described in this manual.
- ❒ Check accompanying schematic drawings for information on special considerations.

Additional manuals and prints for your Conair equipment may be ordered through the Customer Service or Parts Departments for a nominal fee.

EQUIPMENT GUARANTEE

Conair guarantees the machinery and equipment on this order, for a period as defined in the quotation from date of shipment, against defects in material and workmanship under the normal use and service for which it was recommended (except for parts that are typically replaced after normal usage, such as filters, liner plates, etc.). Conair's guarantee is limited to replacing, at our option, the part or parts determined by us to be defective after examination. The customer assumes the cost of transportation of the part or parts to and from the factory.

PERFORMANCE WARRANTY

Conair warrants that this equipment will perform at or above the ratings stated in specific quotations covering the equipment or as detailed in engineering specifications, provided the equipment is applied, installed, operated and maintained in the recommended manner as outlined in our quotation or specifications.

Should performance not meet warranted levels, Conair at its discretion will exercise one of the following options:

- Inspect the equipment and perform alterations or adjustments to satisfy performance claims. (Charges for such inspections and corrections will be waived unless failure to meet warranty is due to misapplication, improper installation, poor maintenance practices or improper operation.)
- Replace the original equipment with other Conair equipment that will meet original performance claims at no extra cost to the customer.
- Refund the invoiced cost to the customer. Credit is subject to prior notice by the customer at which time a Return Goods Authorization Number (RGA) will be issued by Conair's Service Department. Returned equipment must be well crated and in proper operating condition, including all parts. Returns must be prepaid.

Purchaser must notify Conair in writing of any claim and provide a customer receipt and other evidence that a claim is being made.

WARRANTY LIMITATIONS

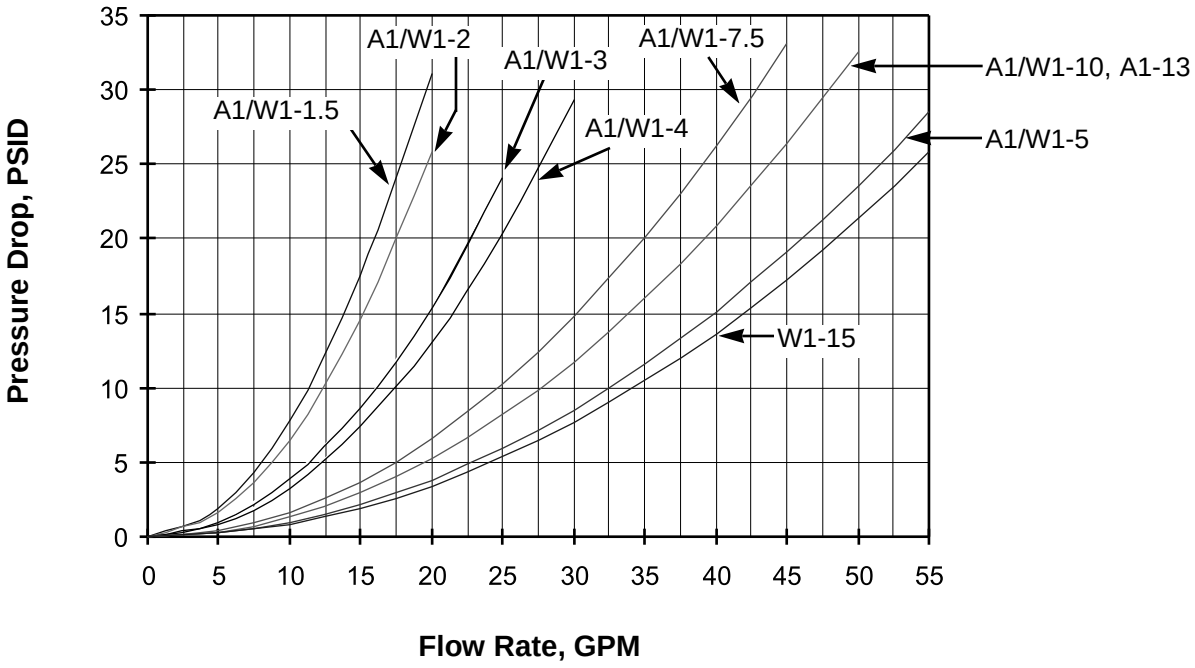
Except for the Equipment Guarantee and Performance Warranty stated above, Conair disclaims all other warranties with respect to the equipment, express or implied, arising by operation of law, course of dealing, usage of trade or otherwise, including but not limited to the implied warranties of merchantability and fitness for a particular purpose.

MAINTENANCE LOG

Date	Reading								
Maintenance Item									
Compressor Amps, 100% loaded									
Discharge Pressure									
Suction pressure									
Evaporator water out temperature									
Process Water Pressure, In/Out									
Condenser Water Temperature, In/Out									
Condenser Water Pressure, In/Out									
Condenser Fan Amps (1)									
Condenser Fan Amps (2)									
Pump Amps									

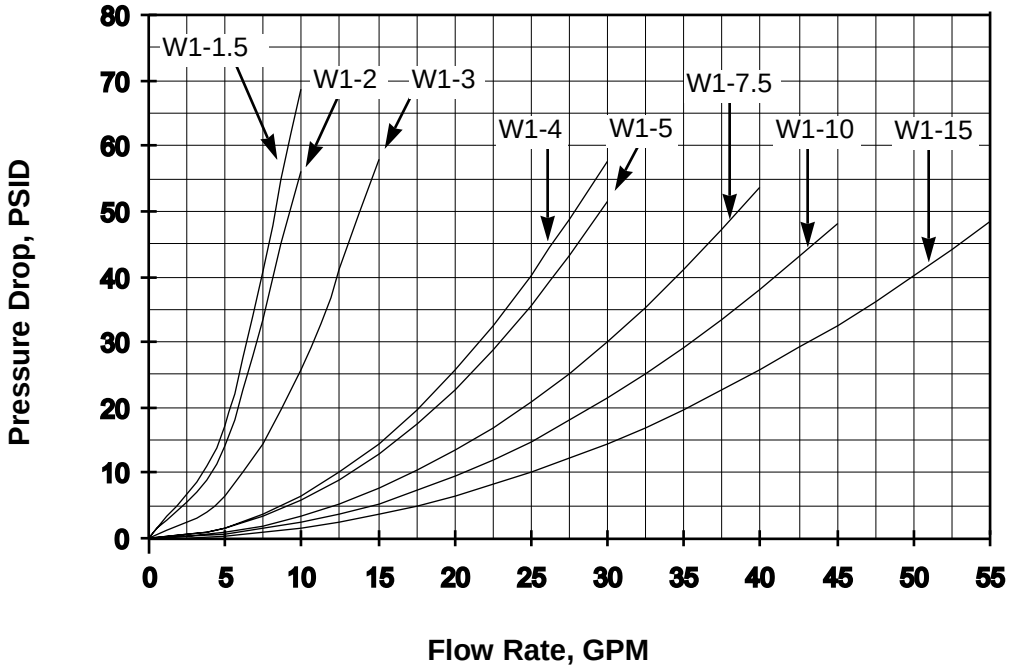
Evaporator and Piping Pressure Drops

PRESSURE TABLES



PRESSURE TABLES

Condenser and Piping Pressure Drops



CONTROL SETTINGS

Use this table when configuring the temperature controller. Refer to the manufacturer's manual that accompanies this User Guide for detailed information.

When the control displays the text listed in the Display column, you can scroll to, and change, the settings listed in the Parameter column.

Display	Parameter	Description	Setting	Units
InP	SP.LL	Lower Setpoint limit	40	°F
	SP.HL	Upper Setpoint Limit	70	°F
	TyPE	Input sensor type	rtd	100 ohm rtd
DSPL	dspl	Display menu	----	-----
	Unit	Temperature units	F	°F or °C
OutP	O1.ty	Output 1 Type	PID	-----
	O1.ac	Output 1 action	re	Reverse action
	O1.cy	Output 1 cycle type	5	Seconds
	O1.hl	Output 1 High limit	80%	% time HGV is on
	O2.ty	Output 2 Control Type	ALr	-----
	O2.aa	Output 2 Alarm 1 Action	nor	-----
	O2.ao	Output 2 process	DE.L	Alarm set to low deviation
	O2.ih	Output 2 alarm inhibit	En	Enabled
	O2.SP	Output 2 alarm setpoint	4	°F Low deviation
Cnrl	Pb1	Proportional Band-gain	1	-----
	der	Derivative Action - rate	0	-----
	OFFS	Manual reset	OFF	-----
	Int	Integral Action - reset	0	-----

PARTS & DIAGRAMS

RECOMMENDED SPARE PARTS

Part Number	Description
	Athena 1/32 DIN Temperature Controller 120VAC LOGO! Long 120VAC 4” Alarm Bell 20VAC White Strobe 22 mm Red extended pushbutton operator
	22 mm Green flush pushbutton operator 120VAC Green Indicator light 120VAC Red indicator light MSP-to-Contactor connecting module, 3RA1921-1A MSP-to-Contactor connecting module, 3RA1921-1B
	MSP-to-Contactor connecting module, 3RA1921-1D MSP-to-Contactor connecting module, 3RA1931-1A MSP-to-Contactor connecting module, 3RA1931-1B MSP-to-Contactor connecting module, 3RA1941-1A MSP-to-Contactor connecting module, 3RA1941-1B
	3 Pole Contactor w/ 120VAC coil, 7A (AC-3) 3 Pole Contactor w/ 120VAC coil, 9A (AC-3) 3 Pole Contactor w/ 120VAC coil 12A (AC-3) 3 Pole Contactor w/ 120VAC coil, 17A (AC-3) 3 Pole Contactor w/ 120VAC coil, 25A (AC-3)
	3 Pole Contactor w/ 120VAC coil, 28A (AC-3) 3 Pole Contactor w/ 120VAC coil, 32A (AC-3) 3 Pole Contactor w/ 120VAC coil, 40A (AC-3) 3 Pole Contactor w/ 120VAC coil, 50A (AC-3) 3 Pole Contactor w/ 120VAC coil, 65A (AC-3)
	Motor Starter Protector (1.8-2.5A) Motor Starter Protector (2.2-3.2A) Motor Starter Protector (3.5-5.0A) Motor Starter Protector (4.5-6.3A) Motor Starter Protector (5.5-8.0A)
	Motor Starter Protector (7.0-10.0A) Motor Starter Protector (9.0-12.5A) Motor Starter Protector (11.0-16.0A) Motor Starter Protector (14.0-20.0A) Motor Starter Protector (17.0-22.0A)

RECOMMENDED SPARE PARTS

Part Number	Description
	Motor Starter Protector (20.0-25.0A)
	Motor Starter Protector (18.0-25.0A)
	Motor Starter Protector (22.0-32.0A)
	Motor Starter Protector (28.0-40.0A)
	Motor Starter Protector (40.0-50.0A)
	Motor Starter Protector (45.0-63.0A)
	Motor Starter Protector (57.0-75.0A)
	MSP Auxiliary Contact Block (2 N.O.)
	MSP Line Side Feeder
	MSP Feeder Lug (3RV101, 3RV102)
	MSP Feeder Lug (3RV103)
	Normally Open contact block
	Normally Closed contact block
	Control Terminal Block, Size 4
	Terminal Block End Bracket
	Terminal Block Barrier
	Littlefuse 0.5A Fuse, 250VAC
	Littlefuse 3.0A Fuse, 250VAC
	Littlefuse 5.0A Fuse, 250VAC
	Littlefuse 0.25A Fuse, 600VAC
	Littlefuse 2.0A Fuse, 600VAC
	1 Pole Fuseblock Cover Lit
	Transformer Touch Safe Cover Lit
	1 Pole Secondary Fuseblock
	2 Pole Primary Fuseblock
	Littlefuse 2 Pole Ultrasafe Fuseblock
	Motorola 5 VDC Voltage Regulator
	250VA Control Transformer 230x460, 110/115/120
	250VA Control Transformer 550/575/600, 110/115/120
	250VA Control Transformer 380/400/415, 110x120
	250VA Control Transformer 208/230/460, 24/115
	Pump Seal Kit, pump type 231
	Pump Seal Kit, Pump type 233, 3HP
	Pump Seal Kit, Pump type 233, 5HP
	Pump Seal Kit, Pump type 234, 7.5HP

RECOMMENDED SPARE PARTS

Part Number	Description
	Pump Seal Kit, Pump type 233, 7.5HP and 10HP
	Pump Seal Kit, Pump type 234, 10HP and 15HP
20973003	Flowtect, Flow Switch, Evap Circuit
26636101	Gems, Float Switch, Process Tank
26629901	Pressure Gauge, Dual Scale, 0-160PSIG
26638902	Discharge pressure switch, cut out at 300 PSIG on rise, cut in at 275 PSIG on fall, 1/4” with Schreader depressor
26638901	Suction pressure cut out at 28 PSIG on fall, cut in at 43 PSIG on rise, 1/4” with Schreader depressor
26638903	Fan Cycling Switch #1, Air-cooled Chiller, cut out at 190 PSIG on fall, Cut in at 250 PSIG on rise, 1/4” with Schreader depressor
2663890	Fan Cycling Switch #2, Air-cooled Chiller, cut out at 200 PSIG on fall, Cut in at 270 PSIG on rise, 1/4 with Schreader depressor
20966802	8”x14’ 100ohm RTD
331021051	Differential Pressure Switch, 0-45 PSID
2920580201	Refrigerant Pressure Relief Valve, 400PSIG, Air-cooled Chiller (1-4 ton)
2920581001	Refrigerant Pressure Relief Valve, 400PSIG, Air-cooled Chiller (5-7.5 ton)
2920581301	Refrigerant Pressure Relief Valve, 400PSIG, Air-cooled Chiller (10 and 13 ton)
2920580202	Refrigerant Pressure Relief Valve, 350PSIG, Water-cooled Chiller (1.5-5 ton)
2920581302	Refrigerant Pressure Relief Valve, 350PSIG, Water-cooled Chiller (7.5-15 ton)
2920940902	Filter Dryer, 1.5-3 ton
2920941302	Filter Dryer, 4-7.5 ton
2920941802	Filter Dryer, 10-15 ton
29213103	TXV 1.5 ton Water-cooled
29213104	TXV 1.5 ton Air-cooled, 2 ton Water- and Air-cooled

RECOMMENDED SPARE PARTS

Part Number	Description
29213105	TXV 2 ton Water- and Air-cooled
29213106	TXV 3 ton Water- and Air-cooled
29213107	TXV 5 ton Water- and Air-cooled
29213108	TXV 7.5 ton Water- and Air-cooled
29213109	TXV 10 ton Water- and Air-cooled
292131110	TXV 13 ton Water-cooled and 15 ton Air-cooled
20958401	Liquid Line Solenoid Valve, 1-5 ton
20958402	Liquid Line Solenoid Valve, 7.5-10 ton
20958403	Liquid Line Solenoid Valve, 13-15 ton
20958404	Hot Gas Bypass Solenoid, 1.5-4 ton
20958405	Hot Gas Bypass Solenoid, 5-10 ton
20958406	Hot Gas Bypass Solenoid, 13 and 15 ton
3331302204	Air Filter, 1.5 ton Air-cooled
3331302202	Air Filter, 2 and 3 ton Air-cooled
3331302201	Air Filter, 4 and 5 ton Air-cooled
3331302203	Air Filter, 7.5-10 ton Air-cooled
3331302	Air Filter, 13 ton Air-cooled
	Condenser Fan Motor, 50 watts, 400/460V, 50/60Hz, for A1-2.25 unit
	Condenser Fan Motor, 0.166HP, 400/460V, 50/60Hz, for A1-1.5 and A1-3 units
	Condenser Fan Motor, 1/4HP, 400/460V, 50/60Hz, for A1-4 and A1-5 units
	Condenser Fan Motor, 1/2HP, 400/460V, 50/60Hz, for A1-7.5, A1-10 and A1-13 units
	Condenser Fan Motor, 50 watts, 200/230V, 50/60Hz, for A1-2.25 unit
	Condenser Fan Motor, 0.166HP, 200/230V, and 575V, 50/60Hz, for A1-1.5 and A1-3 units
	Condenser Fan Motor, 1/4HP, 200/230V, 50/60Hz, for A1-4 and A1-5 units, and 575V, for A1-4 unit
	Condenser Fan Motor, 1/2HP, 200/230V, 50/60Hz, for A1-7.5, A1-10 and A1-13 units

RECOMMENDED SPARE PARTS

Part Number	Description
	Condenser Fan Motor, 1/4HP, 575V, 60 Hz for A1-5 unit
	Condenser Fan Motor, 1/2HP, 575V, 60Hz, for A1-7.5, A1-10 and A1-13 units
	Condenser Fan Blade, A1-1.5
	Condenser Fan Blade, A1-2.25
	Condenser Fan Blade, A1-3.25
	Condenser Fan Blade, A1-4 and A1-5
	Condenser Fan Blade, A1-7.5, A1-10, A1-13
26642001	Water Regulating Valve, W1-1.5, W1-2, W1-3
26642002	Water Regulating Valve, W1-4, W1-5
26642102	Water Regulating 1 1/4” Control Ball Valve, W1-7.5, W1-10, W1-15 units