User Guide

Portable Chillers

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

Installation

Operation

Maintenance

Troubleshooting

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

www.conairnet.com

The Conair Group, Inc.
One Conair Drive
Pittsburgh, PA 15202
Phone: (412) 312-6000
Fax: (412) 312-6227

UGH017/0500

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: UGH017/0500
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.

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.

⚠ATTENTION: READ THIS SO NO ONE GETS HURT

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 size from 1.5 Hp to 13 Hp in the air-cooled configuration and 1.5 Hp to 15 Hp in the water-cooled design [approximate capacities of 1.5 tons of refrigeration to 15 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 (7 °C) to 70 °F (21 °C). For applications requiring temperatures of 40 °F (4 °C) 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 fluid 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 with industrial grade ethylene glycol 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, portable 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 (10 °C) 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

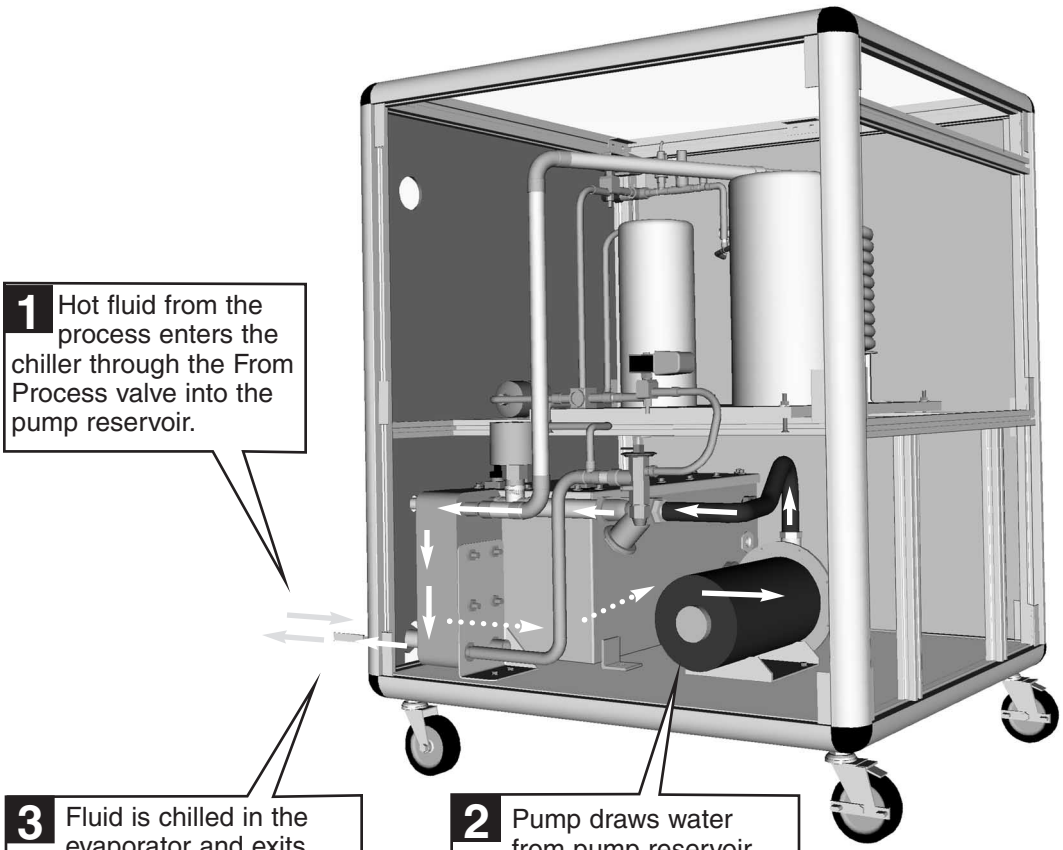
Conair Series 1 Portable Chillers are designed to provide chilled water for industrial applications requiring 24-hour-a-day performance. Units are self-contained and easy to install and maintain. Choose the Conair Series 1 Portable Chillers based on the cooling load and the capacity of the unit. Pick 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 and a source of condenser water is readily available (i.e. cooling tower water). Do not locate either portable chiller model outside unless the unit is specially modified.
- **Temperature**
  The portable chiller has a standard setpoint temperature range of 20 °F (7 °C) to 70 °F (21°C).

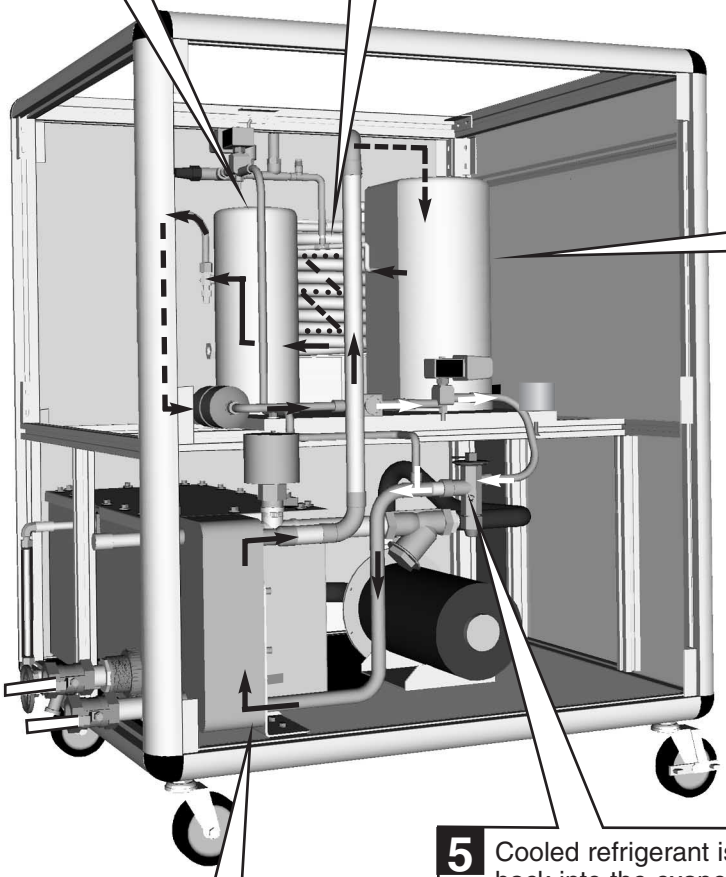
Use this information as a general guide. Consult your Conair representative for assistance when choosing a Conair Portable Chiller.

How it Works: Water-cooled Portable Chiller

Process circulation



Refrigerant circulation



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 coiled condenser (where it is condensed into a liquid) and is stored in the accumulator.

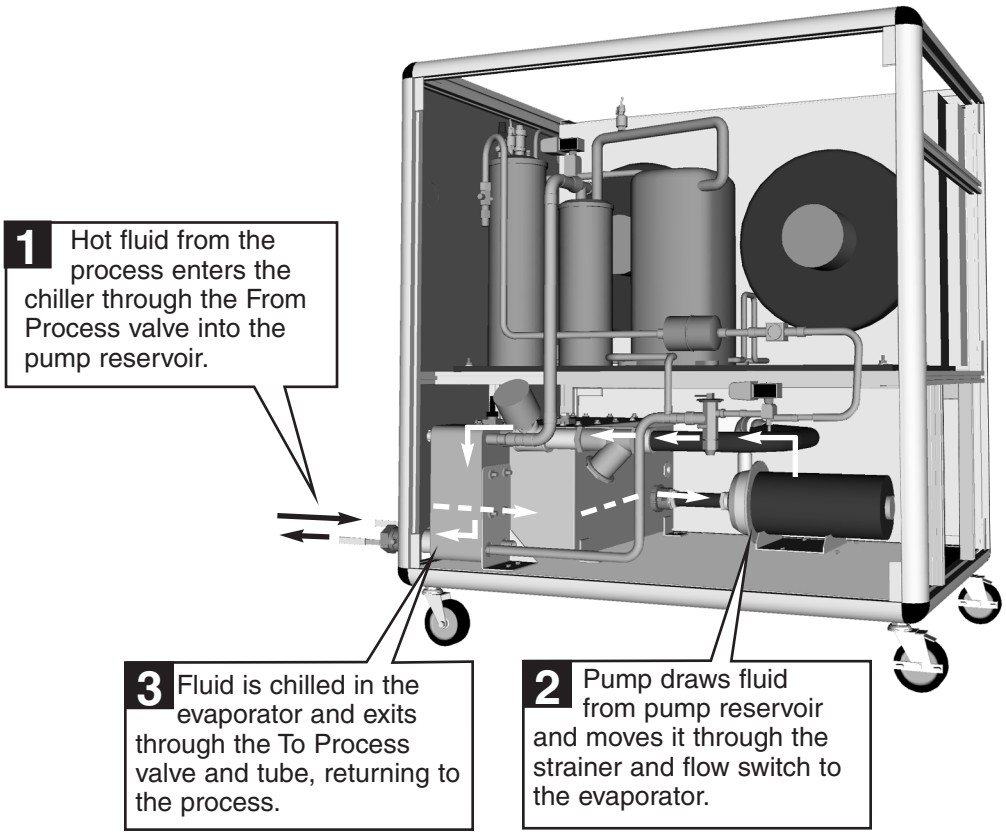
2 Vaporized refrigerant travels from evaporator to the compressor, where the low pressure vapor is compressed into a high pressure vapor.

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

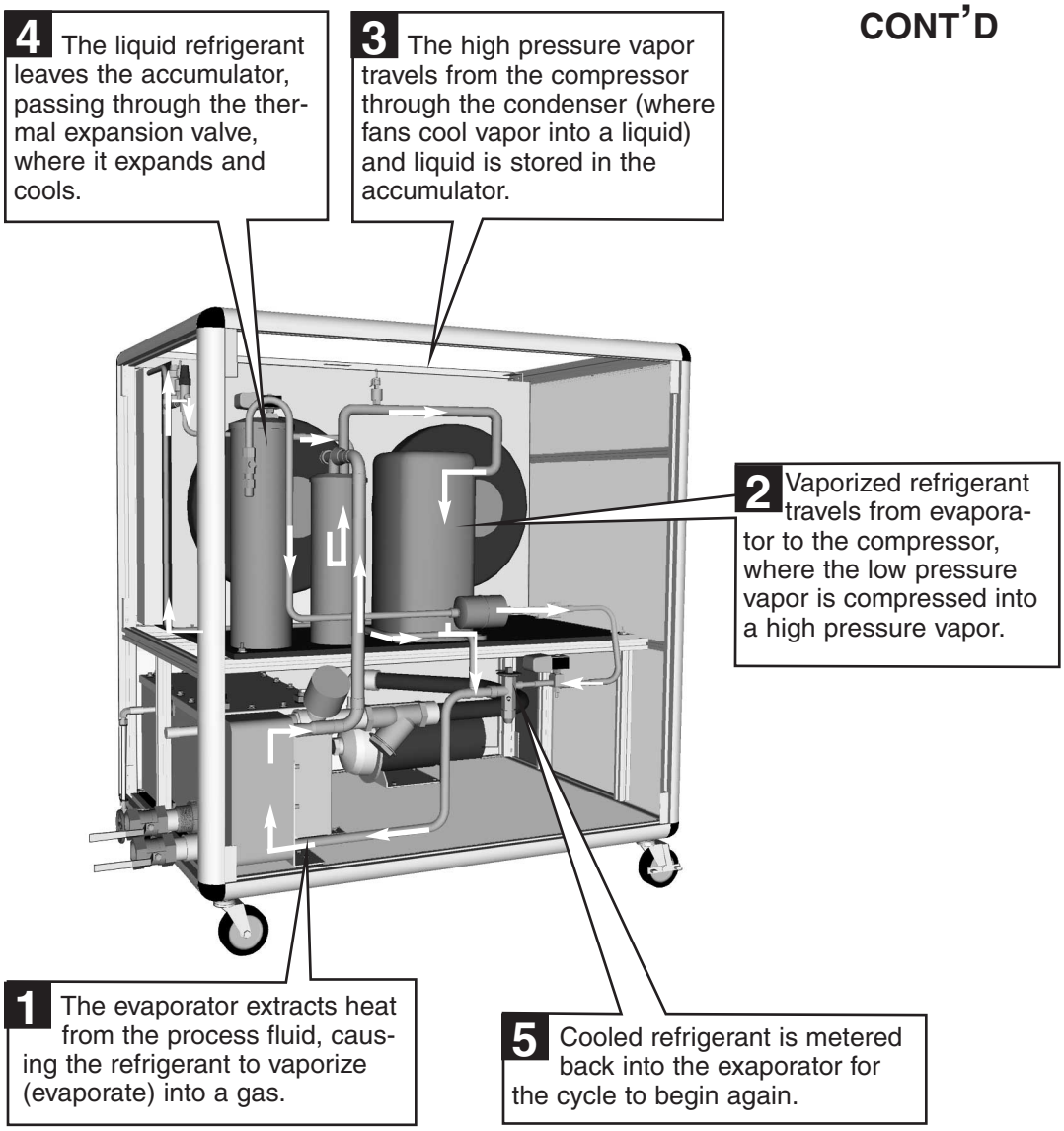
1 The evaporator extracts heat from the process fluid, causing the refrigerant to vaporize (evaporate) into a gas.

HOW IT WORKS: AIR-COOLED PORTABLE CHILLER

Process circulation

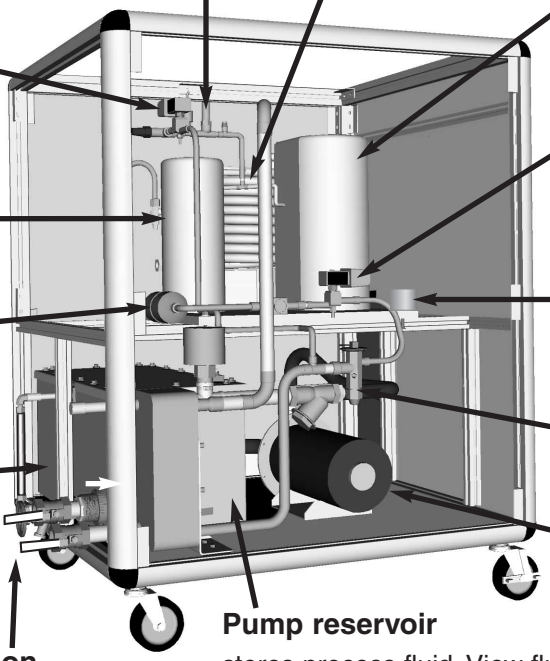


Refrigerant circulation



PORTABLE CHILLER FEATURES

Water-cooled Models



Relief valve
acts as a safety device for refrigerant pressure.

Condenser
condenses 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 process fluid

Process pump
circulates process fluid through the chiller.

From Process connection

To Process connection

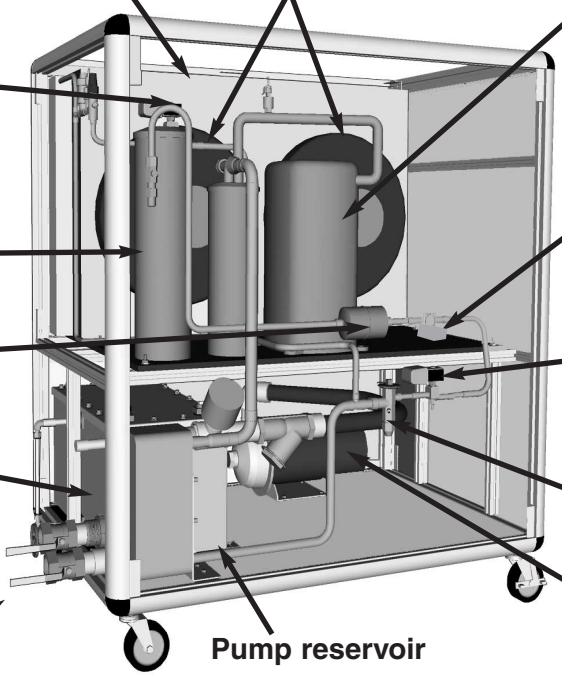
Pump reservoir
stores process fluid. View fluid level on water level gauge

Options include:

- 60 Hz process pump with:
  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 (for non-glycol systems)
- 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

PORTABLE CHILLER FEATURES

Air-cooled Models



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
cleans and dries the refrigerant.

Evaporator
cools the process fluid

TX valve
regulates refrigerant flow

From Process connection

To Process connection

Process pump
circulates process fluid through the chiller.

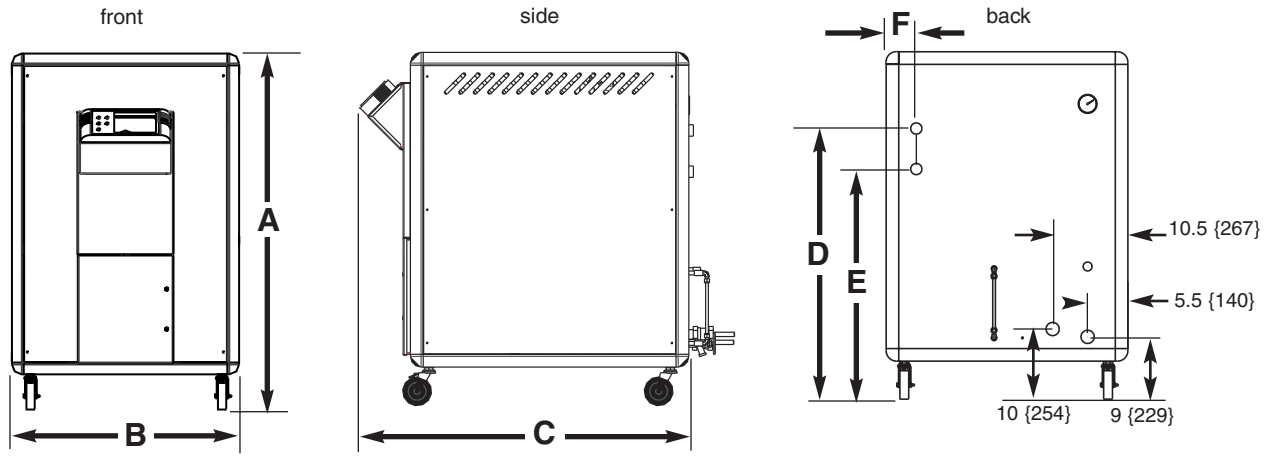
Pump reservoir
stores process fluid. View fluid level on water level gauge

Options include:

- 60 Hz process pump with:
  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 (for non-glycol systems)
- 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 {0.8}		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, in	1								1.5							
Condenser water, 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

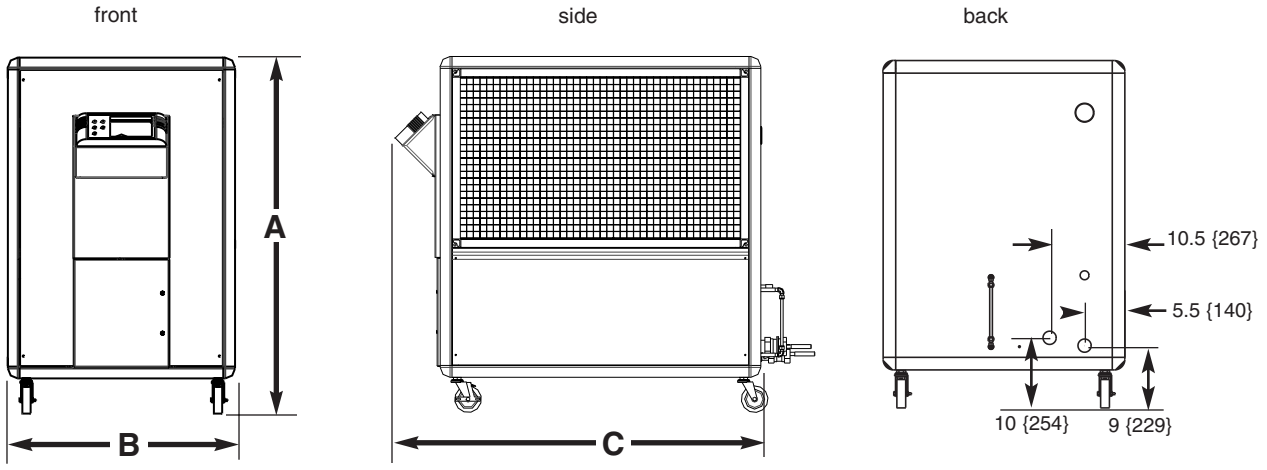
SPECIFICATION NOTES

† 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 {9.7}	
Pump Hp {kW}																
60 Hz	0.75 {0.6}		0.75 {0.6}		1 {.8}		1 {0.8}		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 {lpm}	{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

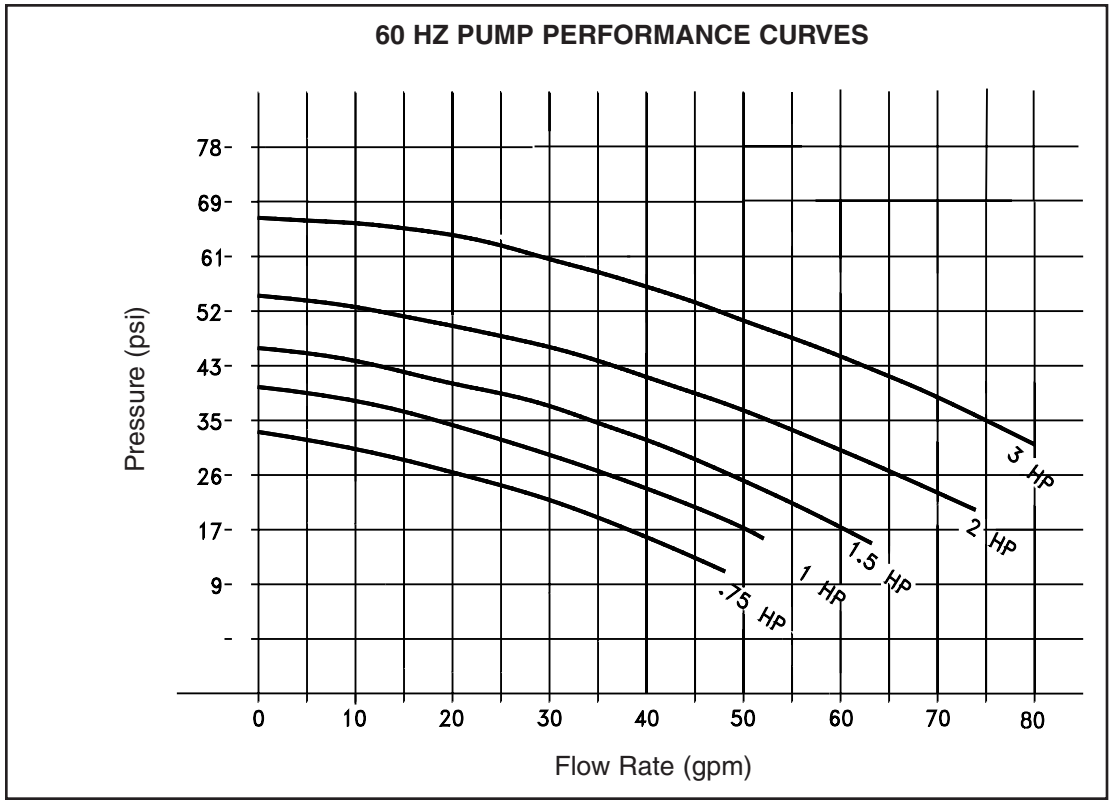
† Based on 50 °F (10 °C) water temperature (100% water) leaving the chiller, standard pump selections, 95 °F (35 °C) ambient air conditions for the 60 Hz units. For the 50 Hz units, multiply the capacity by 0.8. Consult factory for other conditions. Capacity ratings are (+-) 5% based on compressor manufacturer's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

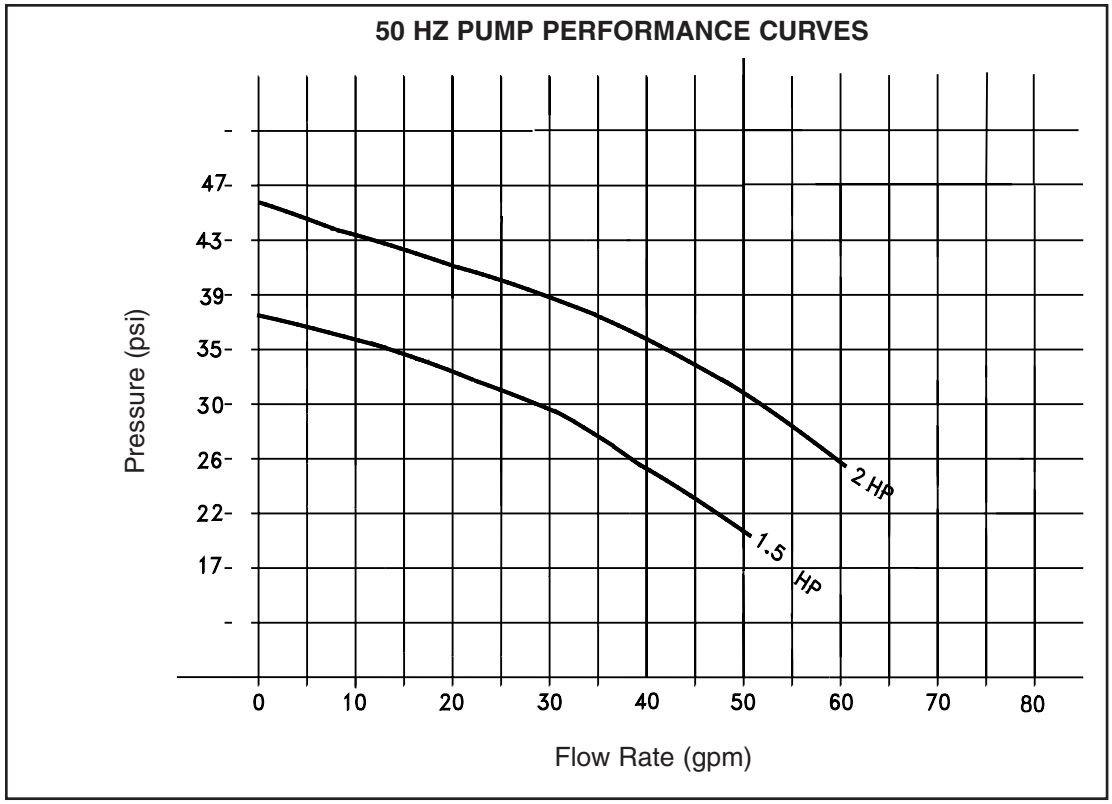
‡ Based on 50 °F (10 °C) water temperature leaving the chiller and 60 °F (16 °C) water temperature returning to the chiller (except A1-1.5 and A1-2.25 which have 55 °F (13 °C) water temperature returning to the chiller).

§ 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
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 been positioned about 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.

4 **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
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.

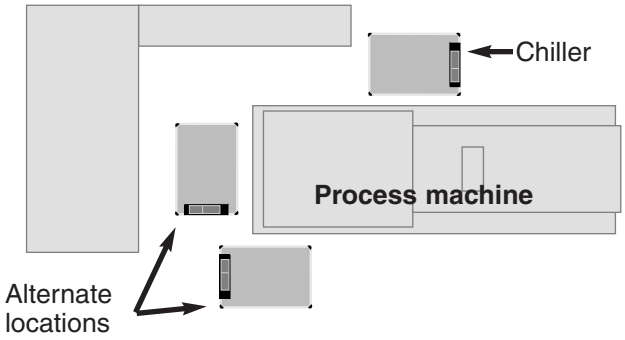
Water-cooled units require a minimum of one foot clearance around the perimeter for serviceability. Air-cooled units require a minimum of two feet clearance around the perimeter for serviceability and proper air flow.

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

PREPARING FOR INSTALLATION

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

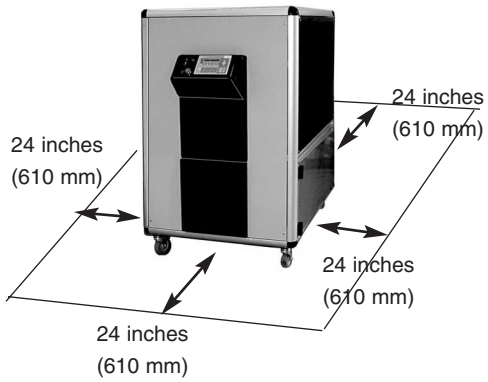
Position the Chiller as close to the process machine as possible. Place the chiller in position near the process machine so that fluid lines can be connected from the process machine to the chiller and back.



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, make sure condenser 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 process equipment enters the chiller at the From Process connection and chilled fluid returns to the process equipment through the To Process connection.

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.

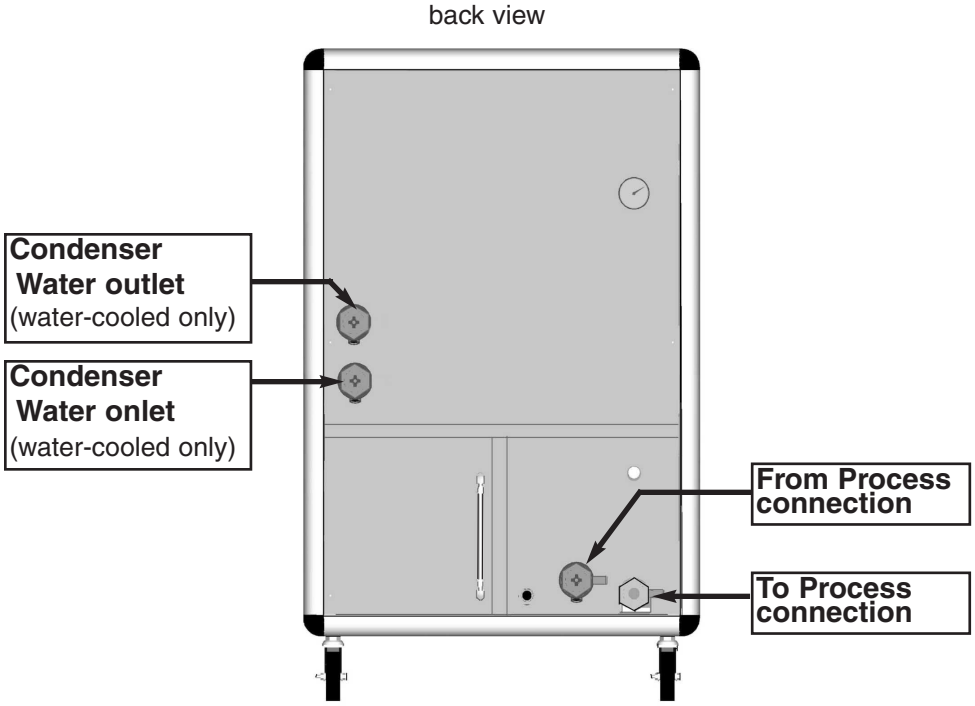
3 **Wrap threads with Mylar or Teflon tape.**

4 **Connect the From Process connection on the** back of the chiller to the From Process hose. 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 connection on the** back of the chiller to the return hose. 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 Water-cooled Chillers connect the cooling water source to the Condenser Water inlet on the back of the chiller. Connect the Condenser Water outlet to the cooling water source's return.

If you unit does not have the optional To Process valve and From Process valve, you may want to install valves on the To Process and From Process connections to more easily control process fluid into and out of the chiller.



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:

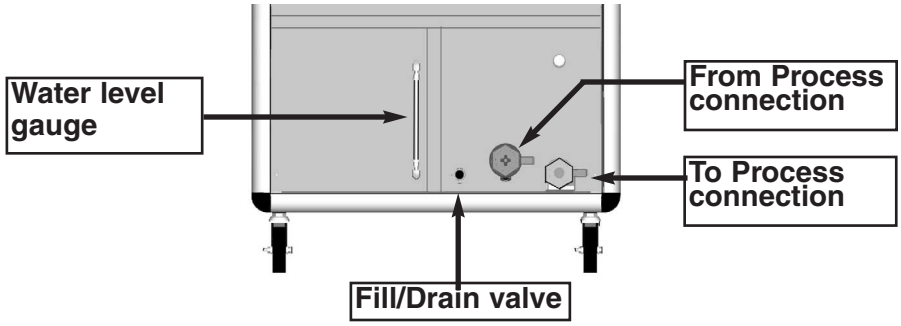
1 Attach water hose to Fill/Drain valve.

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 gauge. 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.

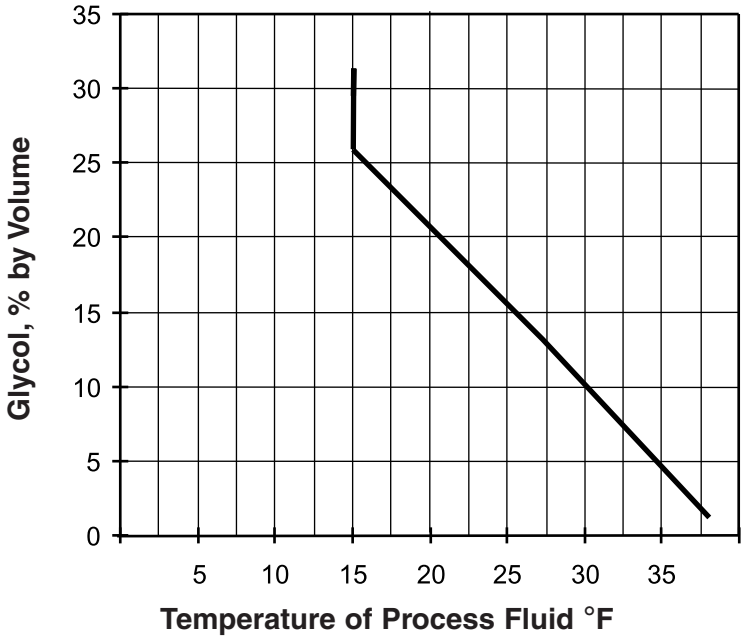


To fill with glycol solution:

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.

FILLING THE CHILLER

CONT'D



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 coolant level shows on the water level gauge. Make sure coolant level is filled to the mark on the gauge.

6 **Set the Chiller control for 'Percent Glycol'.**
Set the percent glycol using the PLC control (see Setting Percent Glycol, in the Operation section). Do this step after main power is connected to the chiller and initial startup has already been performed.

CHECKING REFRIGERANT CHARGE

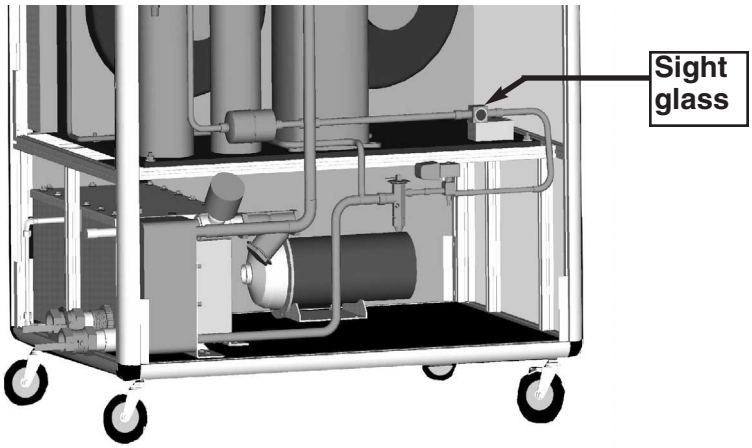
All chillers are fully charged with refrigerant at the factory. Your chiller's model nameplate identifies the type and amount of total refrigerant charge required.

Check refrigerant charge while the chiller is running. Check the refrigerant charge through the site glass. For water-cooled models open the side panel; for air-cooled models, locate the site glass through the wire mesh side panel. Use a flashlight, if necessary, and check the site 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 add refrigerant to the system.

WARNING: Refrigerant hazard
Only certified refrigerant technicians should examine and correct problems involving the refrigerant circuit.
If your Chiller is still under warranty you must Contact Conair Service before contacting a contractor to service your Chiller.



CONNECTING THE MAIN POWER SOURCE

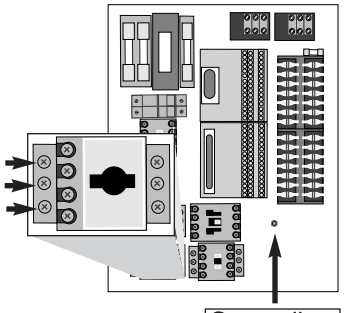
WARNING: Improper installation, operation, or servicing may result in equipment damage or personal injury.
This equipment should only be installed, adjusted, and serviced by qualified technical personnel who are familiar with the construction, operation, and potential hazards of this type of machine.

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.

1 Open the chiller's electrical enclosure.

2 Connect the power wires to the terminals (see 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.

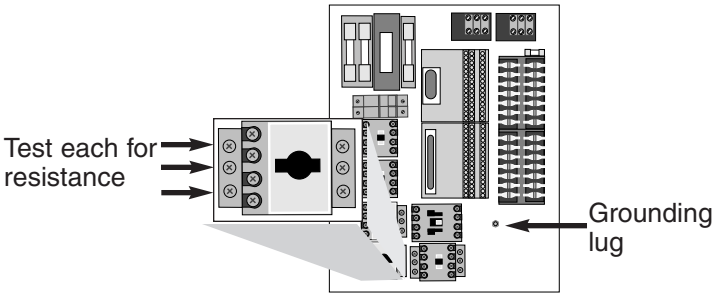
CHECKING ELECTRICAL CONNECTIONS

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 **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 maximum resistance to ground should be 1 megohm. If it resistance is more than 1 megohm there is a leak in the system.

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.



3 **Close the electrical enclosure.**

The Chiller is now ready for initial startup.

INITIALLY STARTING THE CHILLER

1 **Turn on main power source.**
The control boots up and the screen displays the Portable Chiller model number.

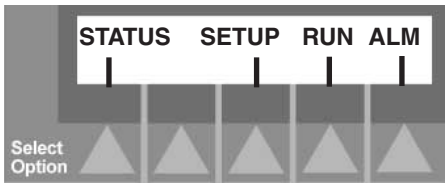
WARNING: Initial startup
Do not press any buttons after initially applying power to the Chiller. Let the Chiller set, undisturbed, for a minimum of 8 hours before starting the Chiller. This is necessary to allow the crankcase heater to warm properly, and to prevent the refrigerant from pooling in the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

INITIALLY STARTING THE CHILLER CONT'D

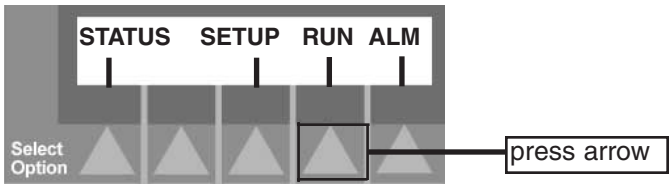
After the initial 8-hour minimum warmup, continue with start-up:

2 **Press the Next arrow on the control to move** to the Main screen.

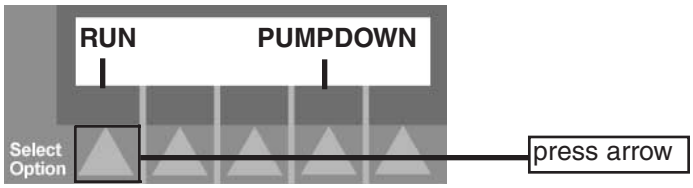
The Main screen displays:



3 **Press the Run arrow.**



The Run screen displays:



4 **Press the RUN arrow.**
Verify that the Chiller begins to run. Check that the Compress light and the Process Pump light on the control panel are lit.

5 **Check the rotation of the pump.**
If pump is not turning, disconnect main power to chiller, swap any two wires; reapply main power. Check for leaks.

6 **If you get an alarm message on the display:**
If you get a ***Compressor Backwards, Shut Off, Swap Leads*** message, press the Stop Chiller button, unplug Chiller from main power supply, switch any two compressor leads, and apply main power supply. Wait three minutes and then press Run arrow.

7 **Press the Escape/Previous button to** return to the Main screen.

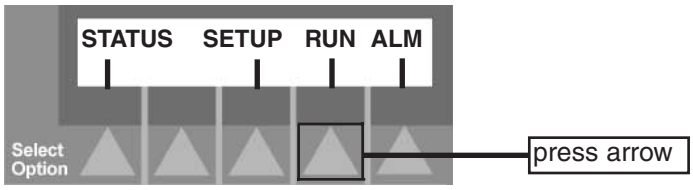
When the compressor is shut off it cannot be turned on again for three minutes. This allows temperatures and pressure in the chiller to equalize, making restart easier, and prolonging the life of the chiller.

CHECKING FOR LEAKS

Before placing the Chiller into operation you need to check for fluid leaks. Do this by turning on the pump from the control and letting it run while you check inside the chiller.

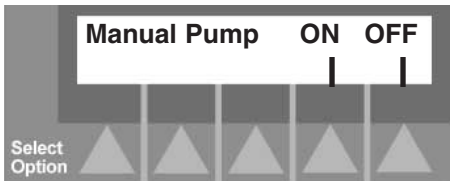
From the main screen:

1 Press the Run arrow on the screen.



2 Press the Scroll arrows to scroll
to the Manual Pump screen.

The Manual Pump screen displays:



3 Press the Pump ON arrow.
Check inside the chiller for any leaks.

If you find leaks:

1 Press the Stop Chiller button on the
control panel.

2 Press the Manual Pump OFF arrow.

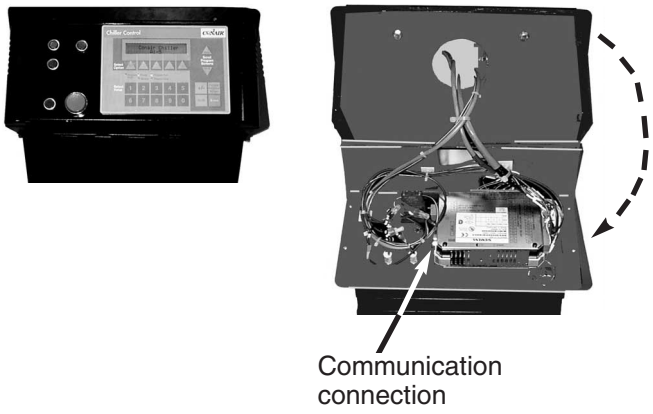
3 Disconnect the Chiller from the
main power supply.

4 Repair any leaks.
Dry any moisture inside the Chiller.

5 Reconnect the main power supply.

CONNECTING THE REMOTE CONTROL

If your chiller has the optional remote interface, you need to connect it to the chiller control. The chiller control panel is hinged on the bottom. Pull down on the top of the outer bezel of the control to expose the internal wiring. Plug the interface cable from the remote controller into the communication cable connection.



STOPPING THE CHILLER

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

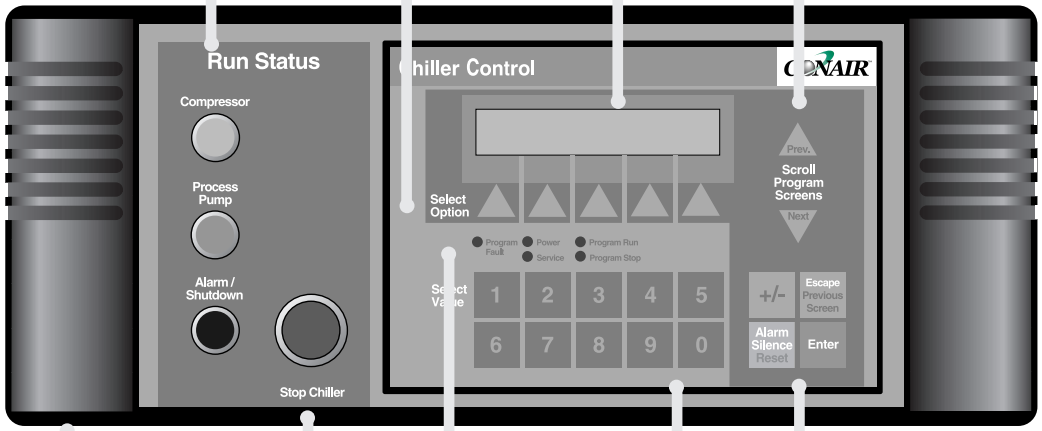
The compressor shuts off after a few seconds and the pump shuts off a few seconds later. This allows the chiller to pump down the refrigerant system and store the refrigerant in the receiver. This prolongs the life of the chiller.

NOTE: If you want to restart the chiller immediately after stopping it, pressing the Run arrow on the display starts the pump (the Process Pump light on the control panel lights) but the compressor will not turn on for three minutes. 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

PLC CONTROL FEATURES



Display screen
shows status, setup and run modes

Status lights
show the run status of compressor, process pump, and alarm/shutdown

Option arrows
choose parameters displayed on the screen

Up / Down Scroll arrows
scroll through the display screens

Drop-open bezel
allows access for maintenance

PLC Indicator lights
show power, program and service indications

Navigation buttons
save new settings and return to main screen

Stop Chiller button
press to stop chiller

Numerical keypad
choose and change numerical values

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.

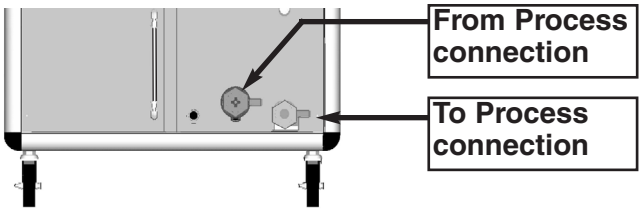
Daily maintenance includes:

- **Checking electrical connections**
- **Checking process fluid level in the pump tank**
- **Checking the condenser coil for debris** (air-cooled only)
- **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 the detailed maintenance descriptions.

Before starting the Chiller be sure to:

- **Open the To Process connection** to the full open position.
- **Open the From Process connection** 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.



POWERING UP

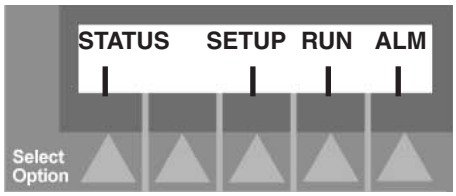
Plug in the power cord to restore power after any required maintenance. The Chiller requires 15 minutes warmup time after it is plugged in for the crankcase heater to warm up.

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.

1 **Turn on the main power.**
The chiller control automatically performs its bootup routine. the screen displays the Portable Chiller model number along with the Enter command.

2 **Press the Scroll arrow to move** to the Main screen.

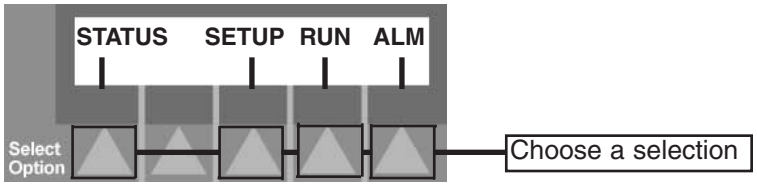
The main screen displays:



The main screen lets you:

- **view the status** of the water level, process temperature, suction pressure, percent glycol, low temperature cutout and discharge pressure.
- **view and change the setups** for temperature setpoint, Auto tune mode, high temperature deviation, and percent glycol solution
- **run or stop the chiller**
- **view alarm information**
- **perform maintenance with password clearance**

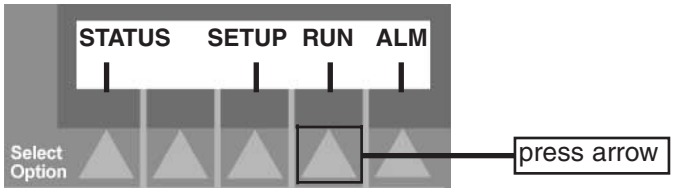
3 **Press the arrow pointing to the selection** you want displayed on the screen.



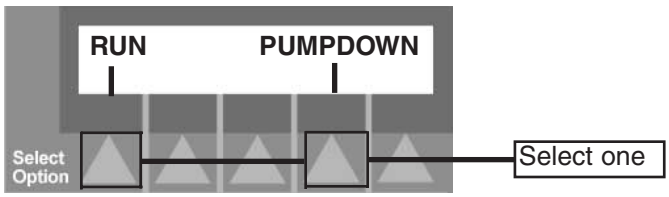
RUNNING/ STOPPING THE CHILLER

After you have viewed all the Status screens and made any necessary changes to the Setup screens, you are ready to run the Chiller. To run the Chiller from the main screen:

1 Press the Run arrow on the Main screen.



2 Press the arrow pointing to your choice.
If the Chiller is stopped and you want to run it, press the arrow pointing to RUN.



If you want to stop the chiller and continue to run the pump, choose PUMPDOWN.

3 Press the Escape/Previous Screen button.
The control returns to the main screen.

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

The chiller control and display screen remain on, but the pump and compressor stop.

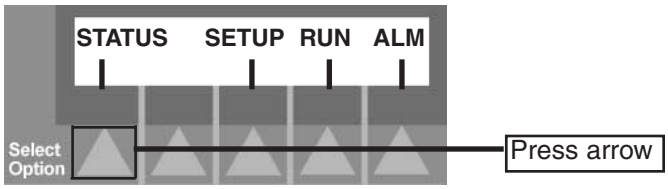
If you want to restart immediately, the pump will turn on but the compressor will not turn on for three minutes. The Process Pump light on the control panel will light immediately. After three minutes the compressor turns on and the Compressor light on the control panel lights.

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.

VIEWING CHILLER STATUS

The Status screens are read-only screens. You cannot make changes to these screens. To view the status screens:

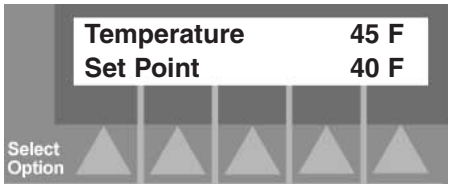
1 Press the Status arrow on the Main screen.



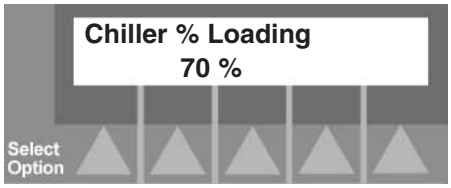
2 Use the scroll arrows to scroll through the status screens.

The Status button does not let you change the status, only view it.

● **Temperatures -** displays the To Process temperature and the Setpoint temperature. Check that the temperatures are the proper settings. To change the Setpoint temperature, go to Changing the Setpoint Temperature, in the Operation section.



● **Percent chiller load -** shows the current percent of chiller capacity being used. This percentage cannot be changed manually. It is a read-only value. This value changes as the chiller cycles.

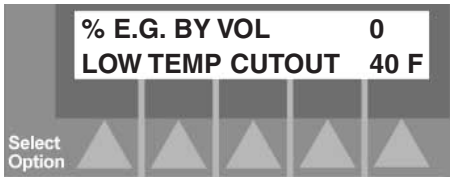


● **Water level -** displays the current status of the water level. Screen displays Level Okay, or Level Low. If the level is low, see Filling the Chiller, in the Installation section.

● **Refrigerant suction pressure -** shows the status of the refrigerant suction pressure in PSIG. NOTE: Typical refrigerant suction pressure is between 55 PSIG and 95 PSIG.

● **Refrigerant Discharge pressure -** View the status of the refrigerant discharge pressure in PSIG. Typical discharge pressure is between 190 PSIG and 325 PSIG.

● **Percent Ethylene Glycol by Volume and Low temperature Cutout -** displays the percentage of ethylene glycol or propylene glycol solution (by volume) in the chiller in degrees Fahrenheit. Changing the percent glycol automatically changes the low temperature cutout.



Verify that the readings each screen displays are the ones you want. You cannot change the readings of the screens from the Status screens. You can change to status of:

● **Setpoint temperature**
● **Percent Ethylene Glycol by volume**

by going to the Setup screens. You can not change the other readings; they are read-only screens, reporting environmental conditions.

3 **Press the Escape/Previous button at any time** to return to the main screen.

PROGRAMMING SETTINGS

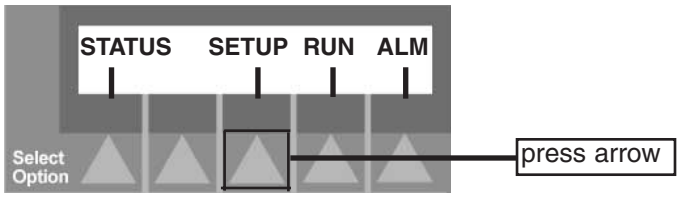
If you do not need to change any settings on the control, go to Running the Chiller.

The PLC control allows you to program various parameters for the Chiller:

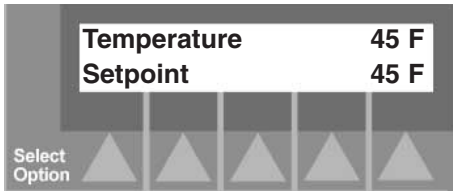
- **Temperature Setpoint**
  The desired To Process fluid temperature.
- **Auto Tune PID**
  Helps maintain the setpoint temperature without over-shooting.
- **High Temperature Deviation**
  Set the number of degrees the temperature can rise above the setpoint temperature without an alarm.
- **Percent Glycol by Volume**
  Use when you use an ethylene glycol or propylene glycol solution to lower the To Process temperature. Changing the percent glycol automatically changes and displays the low temperature cutout, in °F.
- **Fans** (Air-cooled only)
  Set the upper and lower pressure setpoints (in PSI) for the fans to cycle. This screen is password protected.
- **Maintenance**
  View times for compressor cycle, pump run time, pump cycle and hot gas bypass cycle. These screens are password protected.

To program settings from the Main screen:

1 Press the Setup arrow.



The first Setup screen displays:



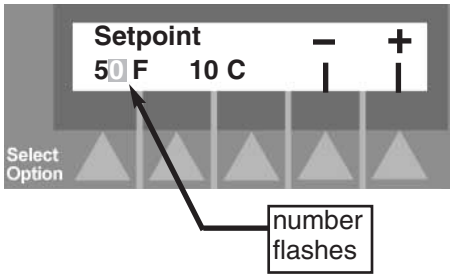
2 Press the Up and Down Scroll arrows to

scroll through the Setup screens. Stop at the one you want to change.

CHANGING SETPOINT TEMPERATURE

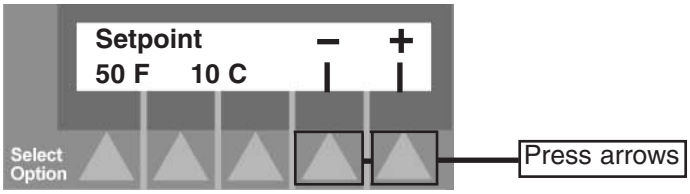
Use the Temperature Setpoint screen to set the desired temperature of the To Process fluid.

To display the Setpoint temperature from the Main screen, press the Setup arrow. The Setpoint screen displays:



The current setpoint temperature displays in both Fahrenheit (F) and Celsius (C). The temperature in F flashes.

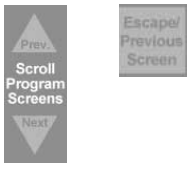
1 **Press the arrows to change the setpoint** temperature. Pressing the (-) arrow lowers the temperature by one degree; pressing the (+) arrow increases the temperature by one degree. Pressing the arrows automatically changes both scales.



OR

Use the numeric keypad to adjust the setpoint temperature. Press the appropriate numbers for the desired temperature, then press the Enter button to save.

2 **Press the scroll arrows to move to the next** setup screen, or press Escape/ Previous Screen button to return to the main screen.

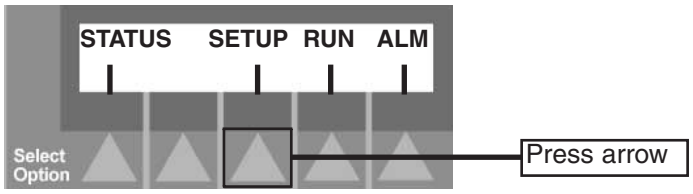


RESETTING PID SETTINGS

Use the PID reset to return the control to the factory settings.

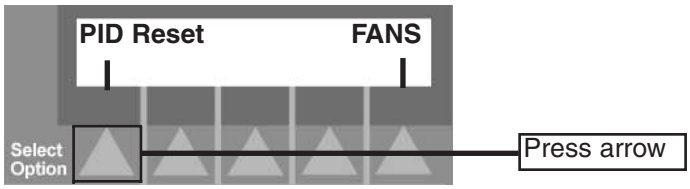
To reset PID from the main screen:

1 Press the Setup arrow.



2 Press the Scroll arrows to scroll through the Setup screens. Stop when you get to the PID Reset screen.

3 Press the PID Reset arrow.



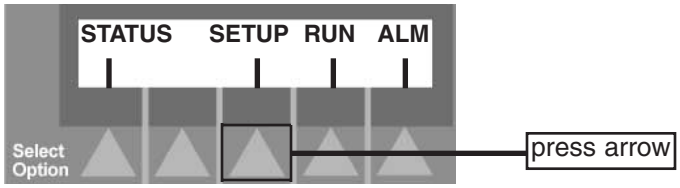
4 Press the scroll arrows to move to the next setup screen, or press Escape/ Previous Screen button to return to the main screen.

CHANGING HIGH TEMPERATURE DEVIATION

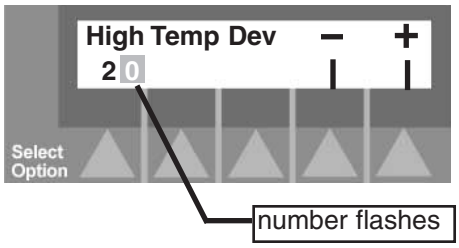
Decide how many degrees above the setpoint temperature you want the chiller to deviate before an alarm occurs.

To set the high temperature deviation:

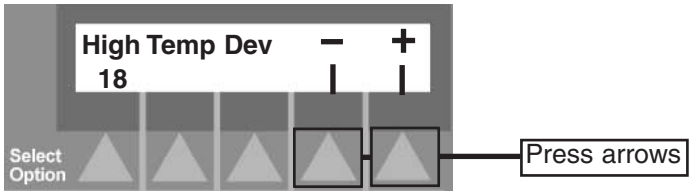
1 Press the Setup arrow.



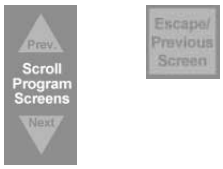
Continue to press the arrow to scroll through the Setup screens. Stop when you get to the Deviate High screen. The current high temperature deviation number displays along with the - and +. The number flashes on the screen.



2 Press the - or + arrows to set the high deviation to the appropriate number. Each press of the (-) arrow decreases the high deviation by one unit; each press of the (+) arrow increases the high deviation by one unit. Stop when you reach the desired temperature deviation. The allowable range is 3 to 20 units.



3 Press the Scroll arrows to scroll to the the next Setup screen, or press the Escape/Previous Screen button to return to the main screen.



SETTING PERCENT GLYCOL

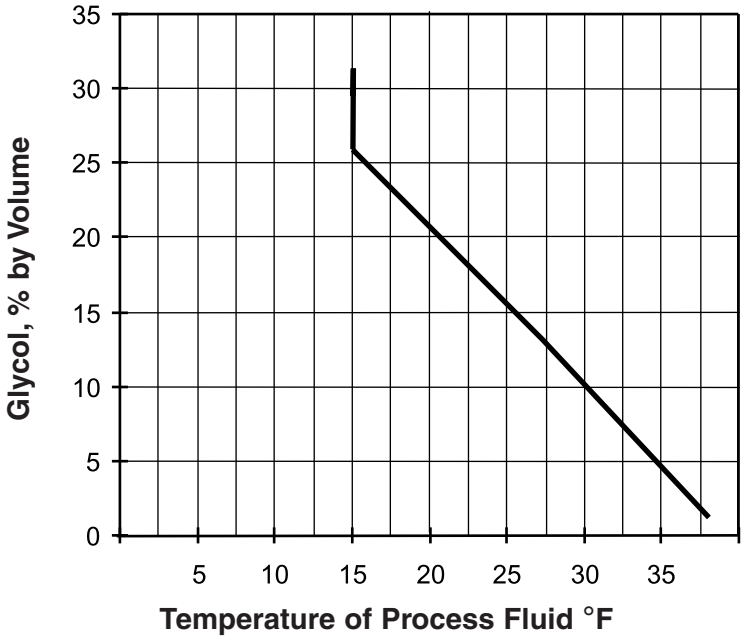
To set the percent ethylene glycol or propylene glycol solution determine the desired temperature of the process fluid leaving the chiller.

Use water as the coolant for a setpoint temperature of the process fluid down to 40 °F (4 °C). Below 40 °F and down to 20 °F (-7 °C), a glycol solution is required.

Use the table to choose the proper percentage of glycol solution for the required temperature.

NOTE: If you are using water as the coolant, set the Percent Glycol to zero on the control.

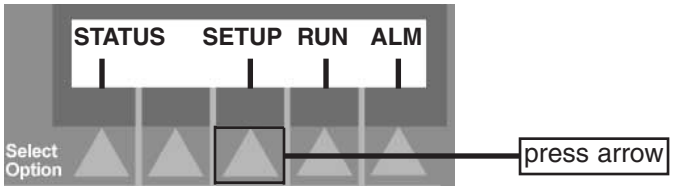
This screen is password protected. You must have clearance to enter and change this setting.



After choosing the desired setpoint temperature, mix the glycol solution to the proper percentage and fill the chiller according to the directions in Filling with Glycol Coolant, in the Installation section.

Program the percentage glycol solution into the control. From the main screen:

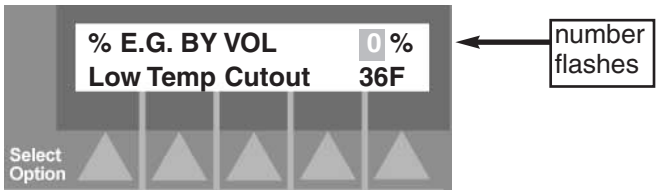
1 Press the Setup arrow.



SETTING PERCENT GLYCOL
CONT'D

2 Press the Up/Down Scroll arrows to scroll through the setup screens.

Stop when you get to the Percent Glycol screen:



The screen displays the percent of glycol by volume currently used. This number is flashing. The screen also displays the low temperature cutout (If the To Process fluid drops below this temperature, an alarm condition occurs and the compressor shuts off.)

NOTE: If you are using water as the coolant, set the Percent Glycol to zero on the control.

3 Use the numeric keypad to set the percent glycol. Make sure the percent you enter is the same as the percent mixture you added to the chiller. See Filling with Glycol Coolant, in the Installation section.

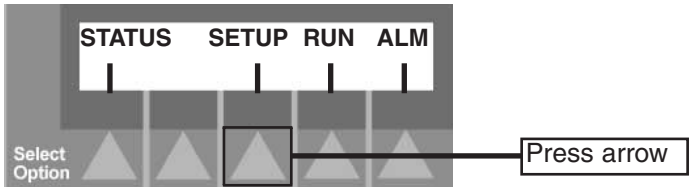
NOTE: This screen has password protection. You can change the percent glycol only if you have clearance. A screen displays: ***$316 Password level invalid...*** The password screen then displays, asking for the password. Enter the password, then press the Enter button. You now have password access for five minutes. Otherwise, press the Escape button to return to the Main screen.

4 Press the Scroll arrows to scroll to the next Setup screen, or press the Escape/Previous Screen button to return to the main screen.

SETTING FAN SETPOINTS

For the Air-cooled Chillers you can choose the pressure, in pounds per square inch, at which the fans cycle. To set the Fan Setpoints from the main screen:

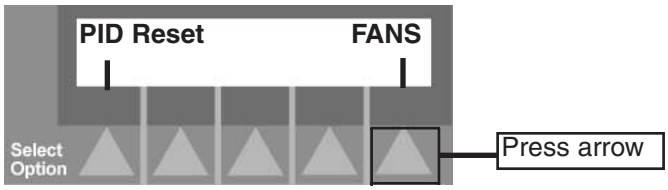
1 Press the Setup arrow.



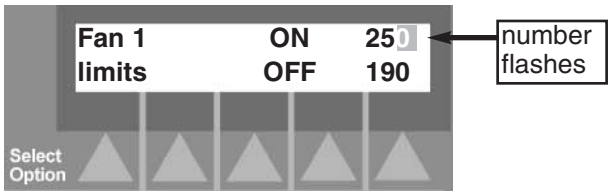
2 Press the Scroll arrows to scroll through the Setup screens. Stop when you get to the PID Reset screen.

This screen is password protected. You must have clearance to enter and change this setting.

3 Press the Fans arrow.

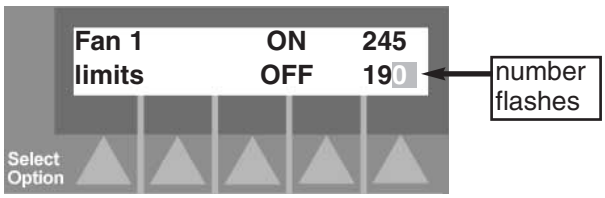


A screen displays asking for the password. Use the Keypad to enter the password and then press the Enter button. The Fan Setpoint screen displays:



The screen shows the upper and lower pressure limits for Fan 1 (the pressure, in PSI, when the fans turn on and off). The ON pressure flashes. Use the keypad to change this number. Then press the Enter button to save the new number. Set from 190 PSI to 300 PSI.

4 Press the Scroll arrow to move to the OFF setting. The OFF number flashes:



Use the keypad to change the OFF number.

SETTING FAN SETPOINTS

CONT'D

5 **Press Enter to save the change.**

6 **Press the scroll arrows to move to Fan 2.**

Repeat the steps for changing Fan 2 setpoint temperatures.

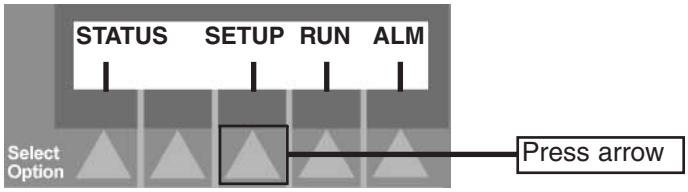
7 **Press the Escape/Previous Screen button** to return to the main screen.

SETTING AUTO TUNE MODE

Use the Auto Tune Mode to maintain good temperature control and minimize overshooting the setpoint temperature.

To display the Auto Tune Mode from the main screen:

1 Press the Setup arrow.



This screen is password protected. You must have clearance to enter and change settings on this screen.

2 Press the Scroll arrows to scroll to the Maintenance screen.

3 Press the Maintenance arrow.

The password screen displays.

4 Use the keypad to enter the password.

5 Press the Enter button.

SETTING AUTO TUNE MODE

CONT'D

6 **Press the Scroll arrows to scroll** to the Tune screen.

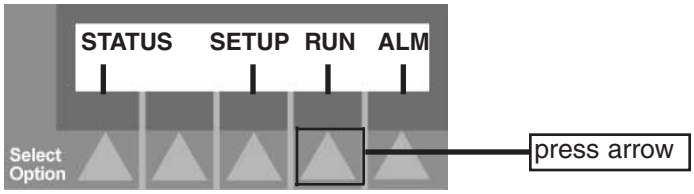
7 **Press the Auto Tune arrow.**
The control begins tuning. This takes about 15 seconds. When tuning, the screen displays 'TUNE Tuning' message. When tuning is complete, the screen displays 'TUNE Normal' message.

8 **Press the Escape/Previous Screen button** to exit the Maintenance screens and return to the main screen.

MANUALLY STARTING/ STOPPING THE PUMP

To run or stop the pump from the main screen:

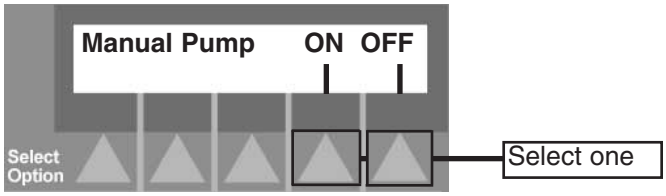
1 Press the arrow pointing to Run on the screen.



The first Run screen displays.

2 Use the Scroll arrows to scroll through
Run screens to the Manual Pump screen.

3 Press the arrow pointing to your choice.
If the pump is running and you want to stop it, press the arrow pointing to Off. If the pump is stopped and you want to run it, press the arrow pointing to On.



4 Press the Escape/Previous Screen button.
The control returns to the main screen.

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
- caster locks
- temperature and pressure readings
- process fluid level
- chiller efficiency
- evaporator
- cooling water treatment system (water-cooled models) if a cooling tower is used to cool the condensers

WARNINGS 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 performing 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 read the correct dischrge pressure. To change the pressure adjust 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. See Cleaning the Air-cooled Condensers, in the Maintenance section

● Weekly, or as often as needed

❒ **Checking temperature and pressure readings**
Check the temperature and pressure display on the control screen, and the pump pressure gauge to ensure they indicate 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 sight glass**
There should not be any bubbles unless the hot gas bypass is cycling. 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

CONT'D

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 of the Chiller.

❒ **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 to ensure it is clear with no bubbles. 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

❒ **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

ENTERING MAINTENANCE SCREENS

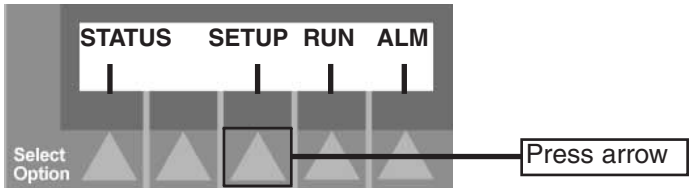
The Maintenance screens are password protected. You must have clearance to enter these screens.

To enter Maintenance screens requires security clearance. There are two security levels built into the control let you limit access to the some setup and maintenance screens. The two security levels are:

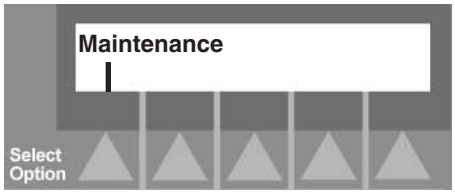
- **User**
  Allows user to view all Status screens, access the Run screens, and access the Setup screens for: temperature setpoint, high temperature deviation, and PID reset. The control arrives from the factory at this level.
- **Maintenance**
  Provides all User-level access as well as Fans screen, percent glycol screen, and Maintenance screens. These screens are password protected. You cannot enter these screens without the password (999). After the control is idle for 5 minutes, it automatically closes out of the Maintenance screens, returns to the User level, and displays the Temperatures status screen. To return to the Maintenance level you must re-enter the password.

Use the Maintenance screens to view cycling information.

1 Press the Setup arrow.



2 Press the Scroll arrows to scroll through the Setup screens. Stop when you get to the Maintenance screen:

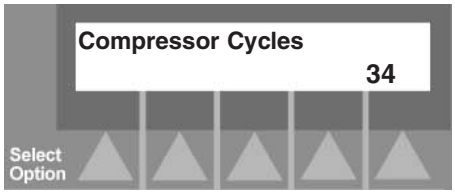


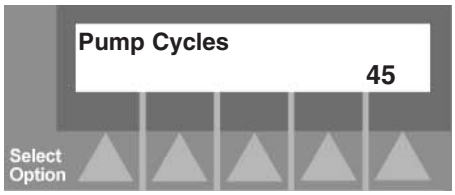
3 Press the Maintenance arrow.
The password screen displays. Use the keypad to enter the password, then press the Enter button.

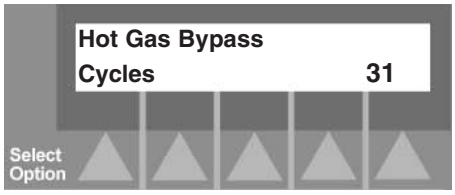
4 Press the CYL arrow.
The first Cycle screen displays. Use the Scroll arrows to scroll through the Cycle screens. These screens show the cycle time in hours:

ENTERING MAINTENANCE SCREENS

CONT'D







5 **Press the Escape/Previous Screen button** to exit the Maintenance screens and return to the main screen. The password stays in effect for 5 minutes after using it; after 5 minutes the screens return to the User level.

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.

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

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 PLC 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 positioned where it could not rest in pooling water or could not be run over and cut by wheels or casters.

CLEANING THE EVAPORATOR OR WATER-COOLED CONDENSER

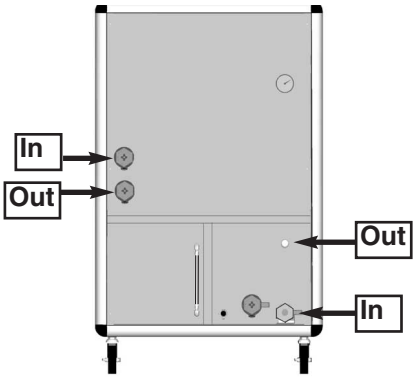
Minerals and other contaminants produce deposits, scales, slime, or algae on the heat transfer surfaces exposed to water. Fouled surfaces result in decreased cooling capacity. Implement a water treatment program to slow the fouling.

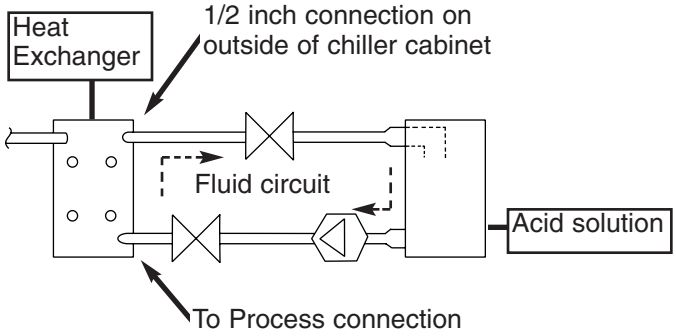
CAUTION: Hot Surfaces
Always protect yourself from hot surfaces when working on the Portable Chiller, especially when working on or around the compressor and condenser. These devices can reach up to 160 °F (71 °C). Allow these devices to cool before performing any maintenance or troubleshooting.

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 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.

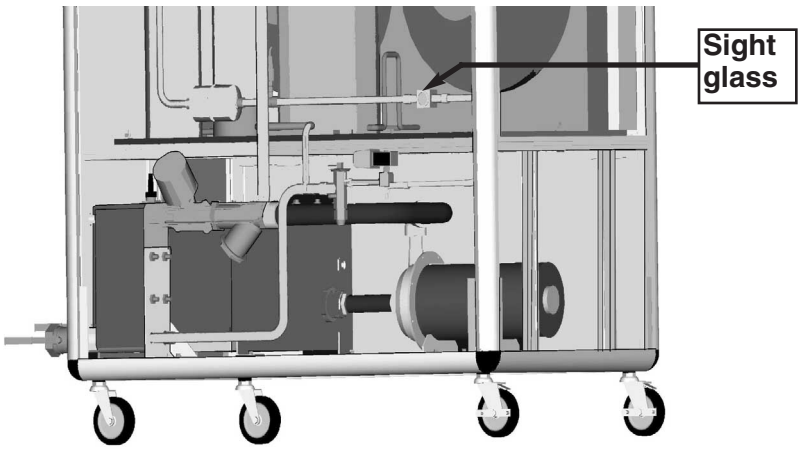
Check refrigerant charge while the chiller is running:

Check the refrigerant charge through the site 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.



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.

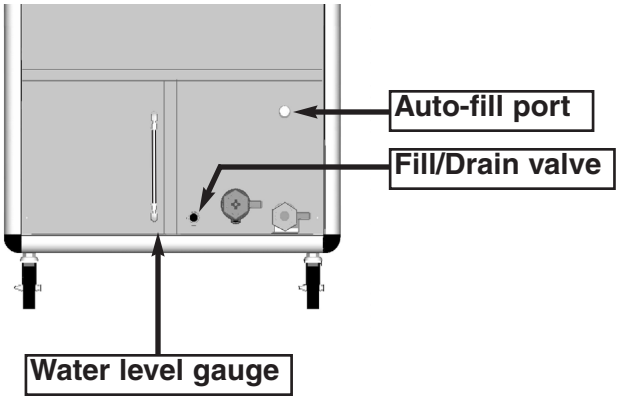
Check the fluid level in the reservoir. The meniscus in the sight glass on the back of the chiller should be in line with the mark on the sight glass.

To manually fill the reservoir:

1 Disconnect and lockout power to the chiller.

2 Locate the fill/drain valve
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 User Guides for the 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.

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.

Identifying the Cause of a Problem

The Troubleshooting section covers problems directly related to the operation and maintenance of the Portable Chiller. Additional troubleshooting help can be found in the documentation manuals included with this User Guide.

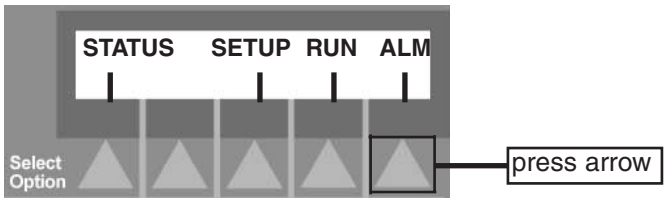
Conditions you may see are:

- **electrical** - a fuse out, a switch has tripped
- **mechanical** - pump, compressor, condenser fan(s) not working
- **physical** - water flow incorrect

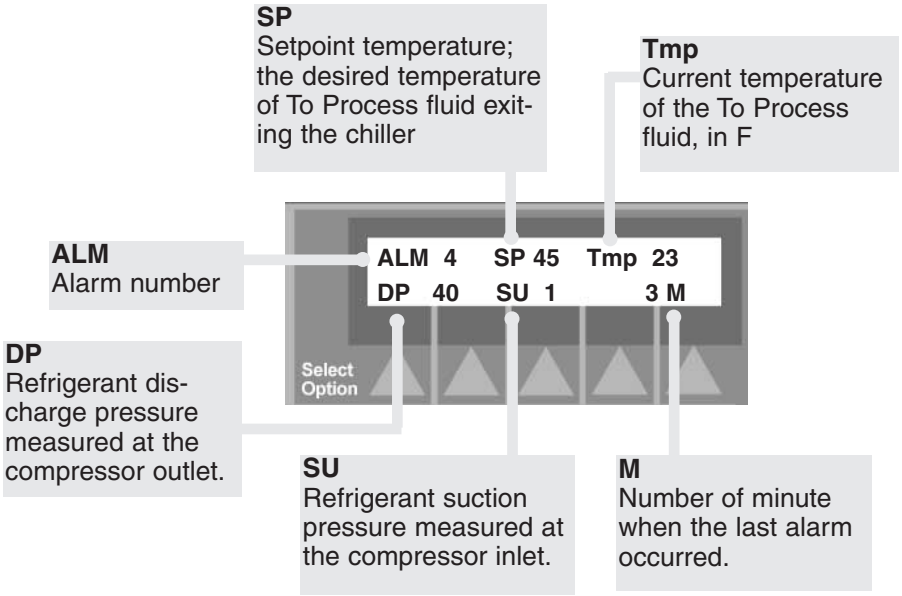
ANSWERING ALARMS

When an alarm condition occurs, the display flashes the alarm condition and the Alarm light on the control panel lights. Press the Alarm Silence/ Reset button to acknowledge the alarm and silence the optional audible alarm.

Press the Alarm arrow on the Main screen:



The most recent alarm displays on the screen.



To view any other alarms press the Scroll arrows.

A screen displays for each alarm. Alarms are listed in order of occurrence, starting with the most recent (check the Time information on display).

Use the Alarm table for a description of each alarm:

ANSWERING ALARMS CONT'D

Alarm No.	Alarm	Description
01	Low Tank Level	The fluid level in the pump tank is low.
02	Flow Fault	There is low flow of the process fluid at the pump discharge.
03	Low Suction Pressure	The refrigerant pressure, as measured at the inlet of the compressor is low.
04	High Discharge Pressure	The refrigerant pressure, as measured at the compressor outlet is high.
05	Compressor Overload	There is a high amperage condition; the compressor is drawing too much current.
06	Pump Overload	There is a high amperage condition; the pump is drawing too much current.
07	High Temperature Safety	The To Process fluid temperature is above 95 °F, or the To Process fluid temperature is above 75 °F after the compressor has been running for five minutes at startup.
08	Low Temperature Cutout	If the To Process fluid temperature falls below the low temperature cutout, the compressor shuts off to allow the temperature to rise.

The alarm information remains on the screen until the alarm condition is corrected. Press the Alarm Silence/Reset button to acknowledge the alarm condition and to turn off the optional audible alarm.

Refer to the Troubleshooting tables to troubleshoot the alarm condition(s). After correcting the condition, remove the alarm from the screen.

Press and hold the Alarm Silence/Reset button for a minimum of 3 seconds to remove alarm from screen.

CONTROL PROBLEMS

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

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. See Replacing Fuses, in the Troubleshooting section.
	The correct power is not reaching the unit	Check the voltage specification on the chiller nameplate.
	There is a problem with the PLC.	❒ Check fuses and replace as needed. See Replacing Fuses, in the Troubleshooting section. ❒ Check the cable between the control panel and the PLC; reconnect or replace as needed. ❒ Check the PLC indicator lights for normal status. Contact Conair Service if status is not normal.
	There is a problem with the control panel.	The control panel may have failed. Contact Conair Service.

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. Replace or reset as required. ❒ Check the phase-to-phase voltages. ❒ Check phase continuity through the compressor contactor. ❒ Check the wiring at the compressor. Repair or replace any of these as needed.

ALARM CONDITIONS

Alarm	Possible cause	Solution
ALM 01 Low Water Tank Level alarm	**Process fluid 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 pump level gauge on the back of the chiller and compare it to the status of the level switch by checking continuity of switch in electrical enclosure. Refer to wiring diagrams.

ALARM CONDITIONS CONT'D

Alarm	Possible cause	Solution
ALM 02 Flow Fault alarm	**The To Process and From Process valves are closed.**	Open/adjust valve(s).
	The Process Fluid strainer is clogged.	Clean the strainer.
	Process fluid level in reservoir is low and float switch failed.	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. Reset or replace as needed. See Replacing Overload Modules, in the Troubleshooting section.
	Pump is running backwards; no pump pressure is indicated on pump discharge pressure gauge.	Switch any two of the three main power leads to the pump.
	The evaporator is frozen.	Check for proper percentage of glycol mixture; adjust as needed (see Setting Percent Glycol, in the Operations section).

ALARM CONDITIONS

Alarm	Possible cause	Solution
ALM 03 Low Suction Pressure alarm	**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.	Compare process load to 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 flow switch, RTD, temperature transmitter and low temperature cutout on temperature controller. Replace as needed. ❒ Check PLC control for proper percent ethylene glycol or propylene glycol solution. Change percent glycol setpoint, if needed.
	There is a refrigerant leak.	Check for oil in chiller cabinet and bubbles in refrigerant sight glass. Consult Conair Service for repair.
	Faulty pressure transducer.	See Checking the Pressure Transducer, in the Troubleshooting section.

Alarm	Possible cause	Solution
ALM 04 High Refrigerant Discharge Pressure alarm	**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.
	Condenser fouled.	Clean the condenser. See Cleaning the Air-cooled Condenser, and Cleaning the Evaporator or Water-cooled Condenser, in the Maintenance section.
	Compressor discharge valve closed (if supplied).	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 transducer.	See Checking the Pressure Transducer, in the Troubleshooting section.
	Ambient air is over 95 °F.	

ALARM CONDITIONS

Alarm	Possible cause	SOLUTION
ALM 05 Compressor Overload alarm	**Overload set incorrectly.**	Check table on wiring diagram for correct full load amperage draw. 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. There should be less than a 5 volt drop across the contactor. If there 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
ALM 06 Pump Overload alarm	**Overload set incorrectly.**	Check table on wiring diagram for correct full load amperage draw. 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. There should be less than a 5 volt drop across the contactor. If there 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 CONDITIONS

CONT'D

Alarm	Possible cause	Solution
ALM 07 High Temperature Safety alarm	**The hot gas bypass valve is not working properly (possibly stuck open)**	Shut isolation valve to the Hot Gas Bypass solenoid. If the To Process temperature starts to go down, the solenoid valve is faulty. Have a certified refrigeration technician replace the solenoid valve.
	The high deviation temperature is set too close to the setpoint temperature.	Large swings in process load or temperature may cause this to happen. Check the settings for the high deviation; reset. See Changing High Deviation, in the Operation section.
	Process fluid is not flowing between the supply outlet and return outlet.	Check for plugged pipes, closed valves, or failed flow switch.
	The compressor is not running.	Check to see if Compressor light is lit on the control. If it is not, check compressor overload in compressor terminal box. Check power to compressor and power to compressor contactor.
	Failed RTD or Temperature Transmitter.	See Checking the Temperature Transmitter and RTD in the Troubleshooting section.

Alarm	Possible cause	Solution
ALM 08 Low Temperature Cutout alarm	**The hot gas bypass valve is not working properly (possibly stuck closed).**	If the To Process temperature starts to go down, the solenoid valve is faulty. Have a certified refrigeration technician replace the solenoid valve.
	Process fluid flow is insufficient.	Check for plugged pipes, closed valves, or failed flow switch.
	Failed RTD or Temperature Transmitter.	See Checking the Temperature Transmitter and RTD, in the Troubleshooting section.
	RFI interference may have altered PLC.	Install shielded thermocouples. Check for high frequency drives near Chiller or two-way radio use near Chiller. Remove these devices.

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 the Low Water Level alarm. There is also a flow switch in the process fluid line to verify flow.

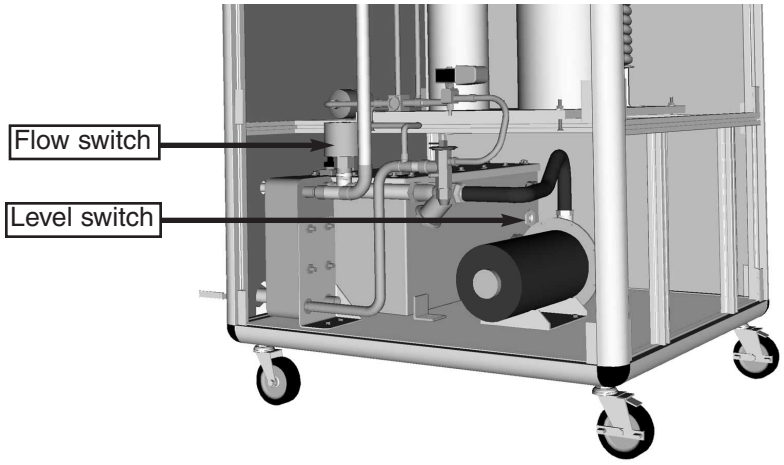
Always refer to the wiring diagrams that came with your chiller to locate specific electrical components.

To replace a level or flow 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.**



CHECKING THE PRESSURE TRANSDUCER

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

The transducer produces a 0.5-4.5 VDC analog signal that is read by the PLC, which relates it to a pressure, based on the range of the transducer. To check and adjust the pressure transducer:

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

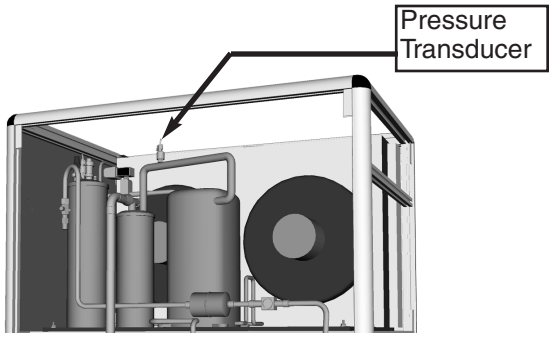
Always refer to the wiring diagrams you received with your chiller to locate specific electrical components.

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

3 Check the supply voltage to the transducer.
Voltage should be 5VDC. Refer to the wiring diagram for the exact location.

4 Check the control signal in the electrical panel if the supply voltage is correct (step 3). Refer to the wiring diagram for the exact location. If the signal is outside the 0.5-4.5 VDC range replace the transducer.

5 Check the transducer with a gauge.
If the reading is within the 0.5-4.5 VDC range, test the line with a refrigeration gauge. Compare this number with the reading on the Control screen. To get to the proper screen on the control, from the main screen, press Status. Use the scrolling arrows to move to the Suction Pressure or Discharge Pressure screen. If the gauge and PLC screen readings are not within 5% of each other, replace the transducer.



CHECKING THE TEMPERATURE TRANSMITTER AND RTD

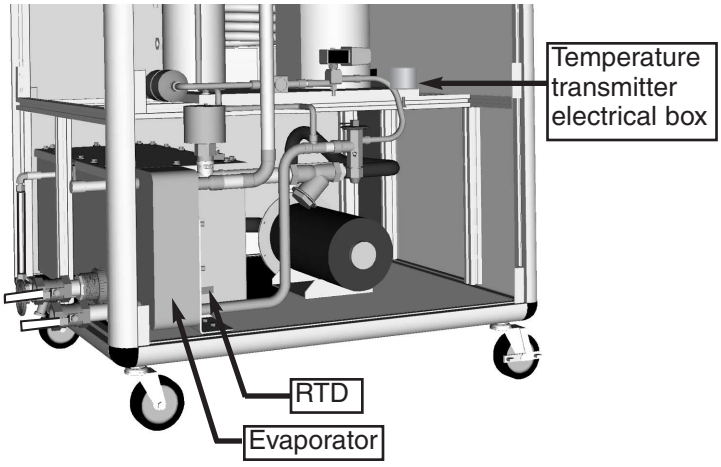
Always refer to the wiring diagrams that came with your chiller to locate specific electrical components.

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.

The Conair Portable Chiller uses a standard 100 ohm RTD to monitor process temperature. A transmitter is also included and is located in the temperature transmitter electrical box.

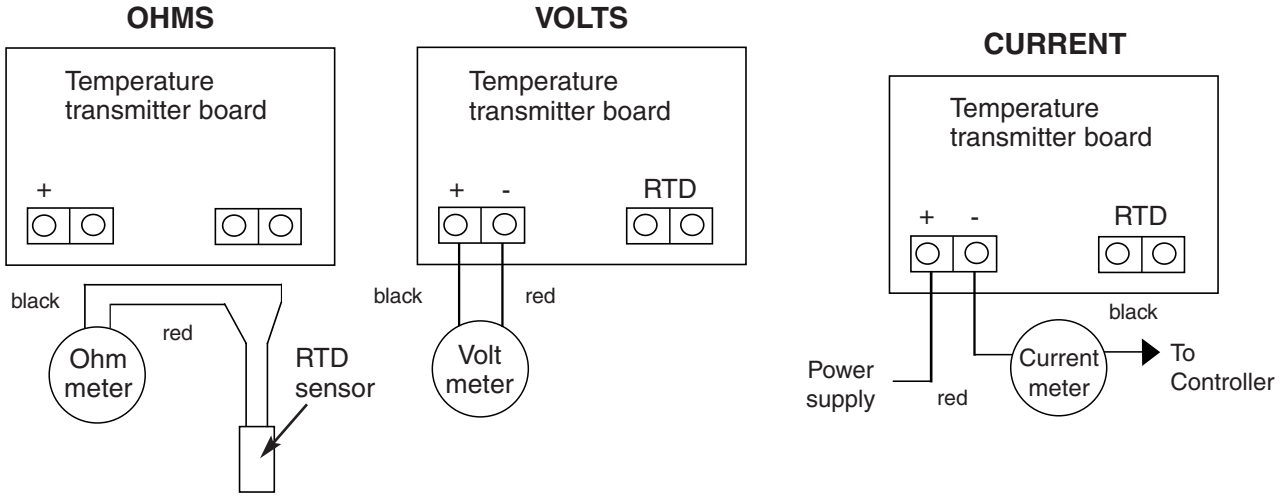
To check the temperature transmitter and RTD:

1. **Disconnect and lockout power to the chiller.**
2. **Open the electrical enclosure.**
   Check wire connections at the terminals. Refer to the wiring diagram.
3. **Find the temperature sensor in the evaporator.**
4. **Check the wiring and connections**
   from the sensor to the temperature transmitter electrical box.
5. **Turn the power on to the chiller control.**
6. **Check the voltage, resistance and amperage.**



CHECKING THE TEMPERATURE TRANSMITTER AND RTD

CONT'D



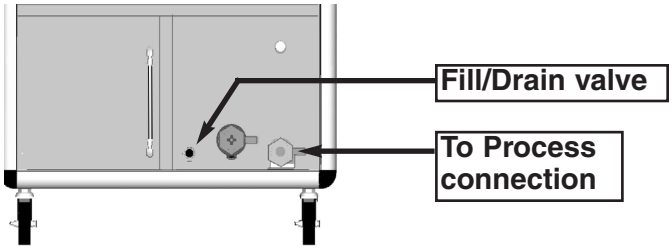
Problem	Possible cause	Solution
No reading	No power to board.	Check voltage at power supply. Measure volts across the + and - of the power wires. Voltage should be 8 - 35 VDC.
Reading too low	RTD wires shorted.	Disconnect RTD before testing sensor resistance. Check RTD with ohmmeter. Should be close to 100 ohms.
	Improper range of transmitter (too low).	Disconnect black lead (-) and place current meter in series. Check RTD with current meter. Current should be 4 -20 mA.
	Condensation on board.	Inspect for condensation. Dry with hot air.
Reading too high	RTD opened.	RTD opened. Disconnect RTD before testing sensor resistance. Check RTD with ohmmeter. Should be close to 100 ohms.
	Improper range of transmitter (too high).	Disconnect black lead (-) and place current meter in series. Check RTD with current meter. Current should be 4 -20 mA.
	Condensation on board.	Inspect for condensation. Dry with hot air.
RF Interference	Input power not clean.	Use twisted wires or shielded cable. RF resistant power supply. Use a shielded cable to connect the sensor. Connect the shield to ground. Encase the board in a RF shielded enclosure.

REPLACING THE RTD

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.

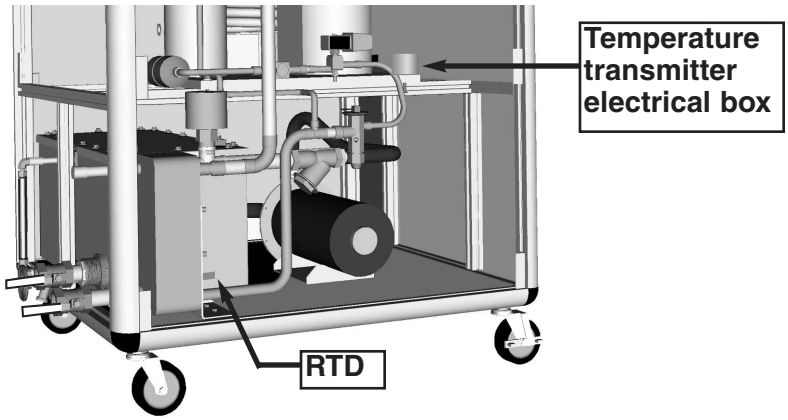
Always refer to the wiring diagrams you received with your chiller to locate specific electrical components.

5 Disconnect the RTD wiring from the transmitter electrical box. 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 temperature transmitter and to the electrical box.

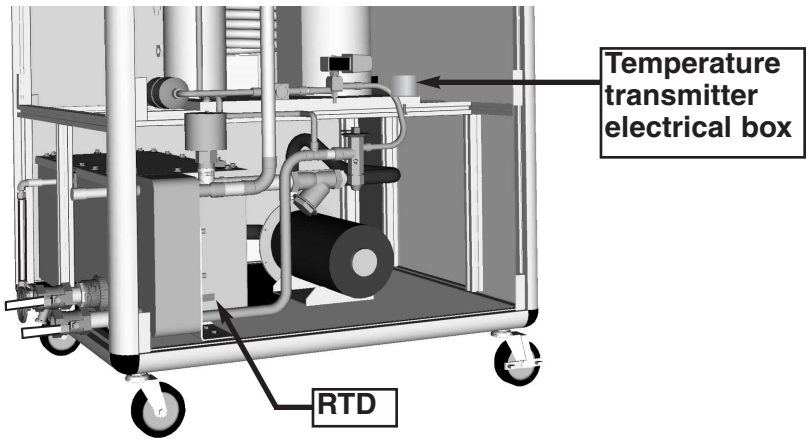


REPLACING THE TEMPERATURE TRANSMITTER

To replace the temperature transmitter:

1. **Disconnect and lockout power to the chiller.**
2. **Open the side of the chiller.**
3. **Disconnect the RTD wiring from the** transmitter electrical box. Refer to the wiring diagram.
4. **Disconnect transmitter wiring from main** electrical panel.
5. **Remove the temperature transmitter electrical** box and wiring.
6. **Install the new temperature transmitter.**
7. **Thread the leads of the temperature** transmitter through the cabinet leading to the temperature transmitter electrical box. Wire the temperature transmitter (see wiring diagram).

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

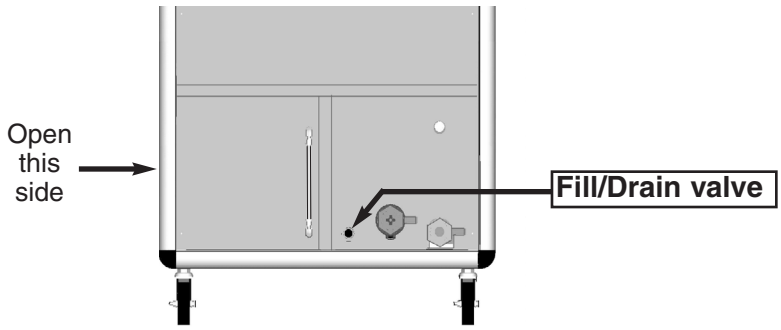


REMOVING PUMP COMPONENTS

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 and** 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 from 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.

REPLACING OVERLOAD MODULES

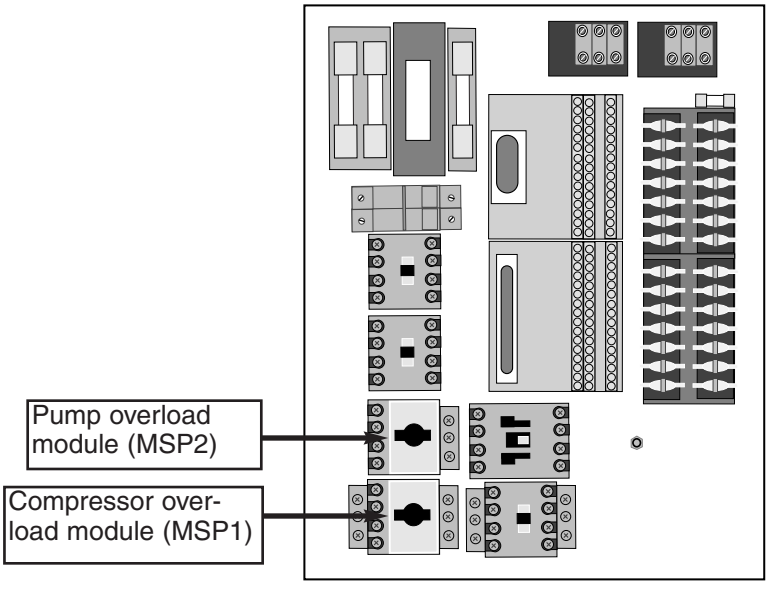
WARNING: Electrical hazard
Before performing any work on this unit, disconnect and lock out electrical power sources to prevent injury from unexpected energization or startup.

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.



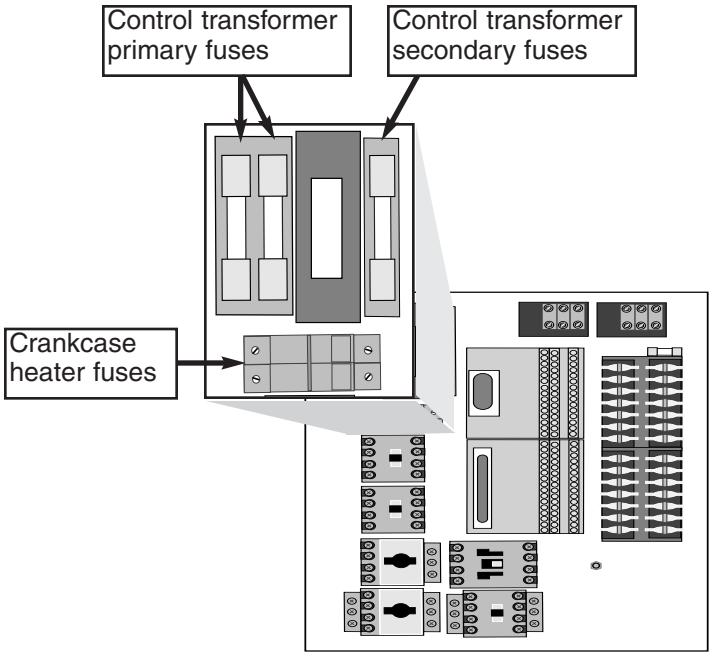
REPLACING FUSES

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.



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:

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.

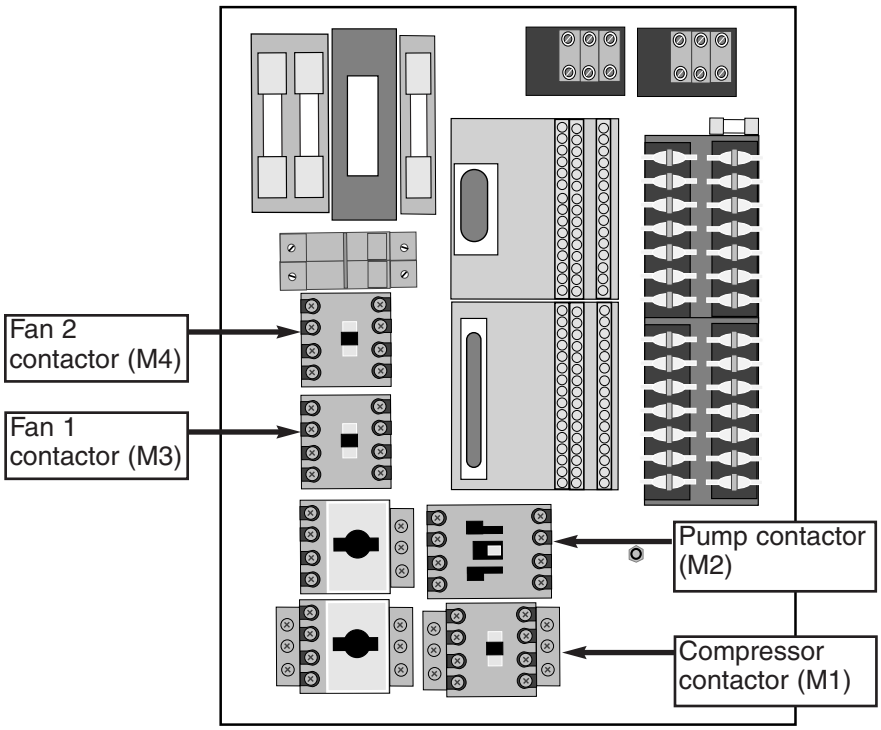
Always refer to the wiring diagrams that came with your chiller to locate specific electrical components.

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 on the DIN rail.**

6 **Reconnect the wiring and reconnect power** to the chiller.



REPLACING THE PLC

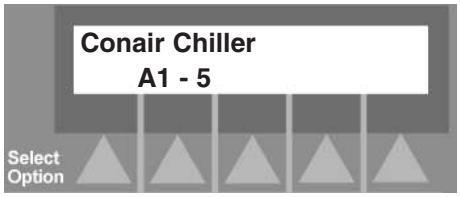
WARNING: Electrical hazard
Before performing any work on this unit, disconnect and lock out electrical power sources to prevent injury from unexpected energization or startup.

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

NOTE: Contact your Conair Service representative before replacing the PLC.

1. **Disconnect and lockout power to the chiller.**
2. **Open the top electrical enclosure.**
3. **Unplug connectors from the back of the PLC** by pulling them straight off.
4. **Loosen the screws holding the PLC**
5. **Remove the PLC and shield from the** enclosure as a single unit.
6. **Place new PLC into position.**
7. **Tighten the screws to hold the PLC in place.**
8. **Replace connectors.**

The PLC is preprogrammed at the factory. You can tell if the PLC is programmed if it displays the chiller model on the display screen when it powers up. If this does not happen, contact your Conair Service representative.



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

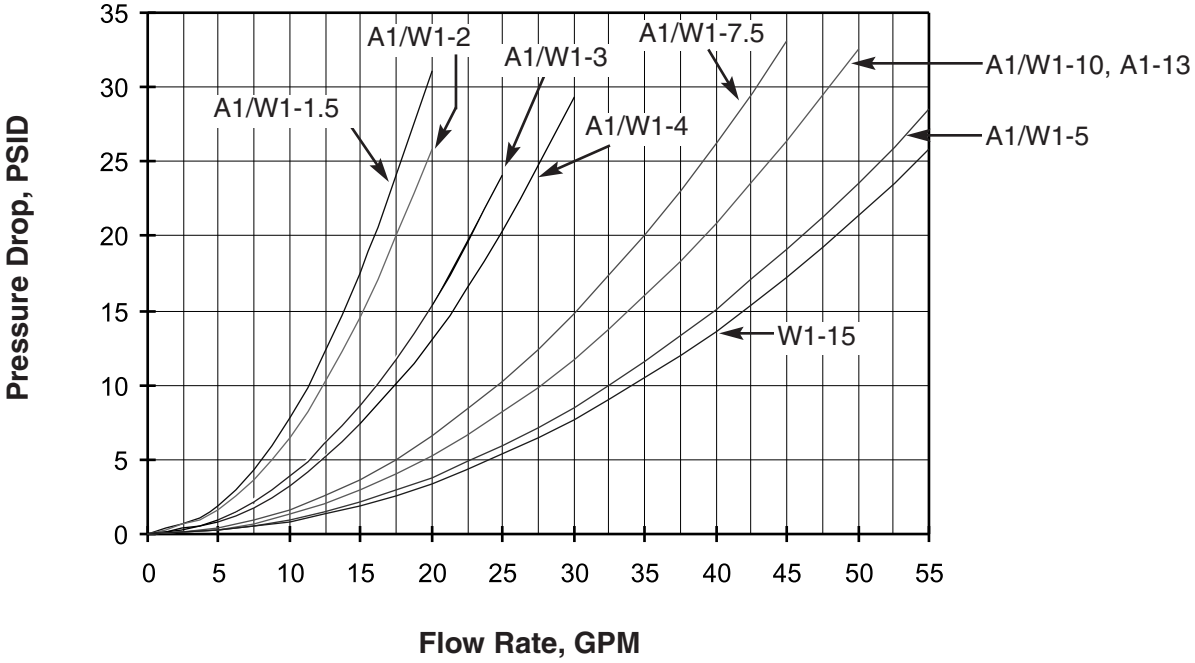
Except for the Equipment Guarantee and Performance Warranty stated above, Conair disclaims all other warranties with respect to the equipment, express or implied, arising by operation of law, course of dealing, usage of trade or otherwise, including but not limited to the implied warranties of merchantability 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									
Unit Volts									
Primary Secondary									
Condenser Air Temp In									
Condenser Air Temp Out									
Oil Level									
Super Heat									
Temperature Setpoint									

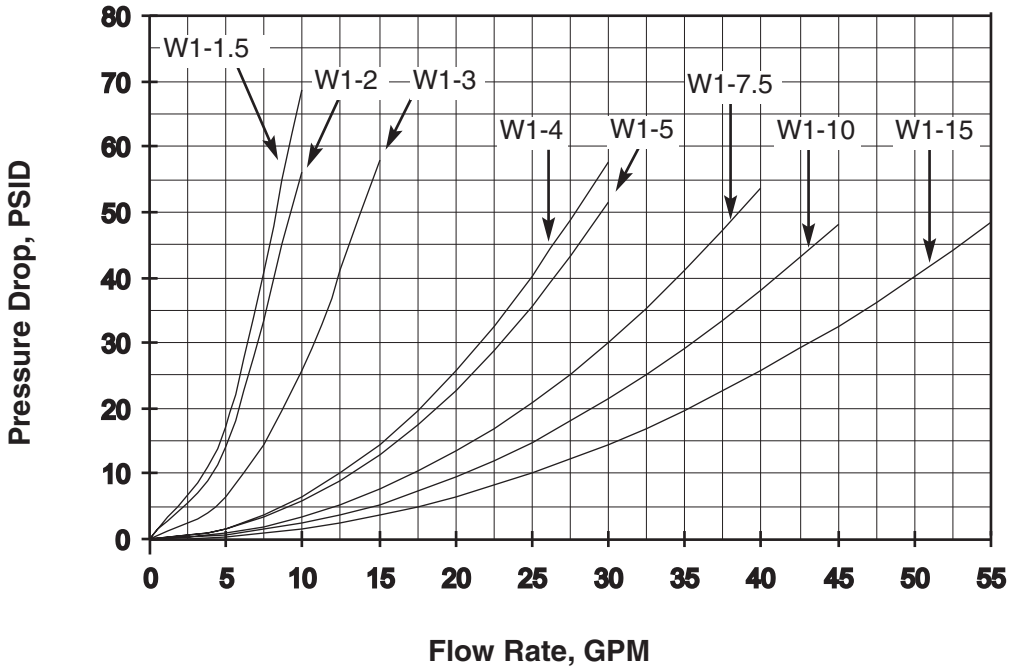
Evaporator and Piping Pressure Drops

PRESSURE TABLES



PRESSURE TABLES

Condenser and Piping Pressure Drops



SCOT | MOTORPUMP™

J56 & JM FRAME
STRAIGHT CENTRIFUGAL
304 STAINLESS STEEL

• INSTALLATION • OPERATION • MAINTENANCE

INCLUDES MECHANICAL SEAL REPLACEMENT

Check pump for shortage and damage immediately upon arrival. Note damage or shortage on freight bill (bill of lading); immediately file claim with carrier.

EXTERIOR — Pay particular attention to conduit box, external hardware and accessories. Touch up abrasions or scratches with approved paint.

INTERNAL — If extensive or serious external damage is noted, if impeller is damaged (look in ports), or if shaft binds or sticks, disassemble as required to permit internal inspection.

HANDLING

Handle with care. Dropping or jarring can seriously damage motor bearings or break pump parts. Lift with device having capacity for pump weight, and use lifting hooks or eye bolts (if provided) or rig double sling around motor frame and pump casing. Do not use sling through pump motor adapter nor around suction and discharge flanges.

INSTALLATION

Location — Pump location should provide the following:

1. **Install as close to suction supply as possible.**
2. **Shortest and most direct suction pipe practical. Suction lift must not exceed limit for pump. NPSH available must equal or exceed pump requirement.**
3. **Suction port below pumping level to provide priming.**
4. **Room for inspection and maintenance.**
5. **Correct power supply to motor; all wiring should meet National Electrical and Local Codes and Regulations.**
6. **If outdoors, protection from the elements, freezing and water damage due to flooding.**

Piping — Suction and discharge gauges are useful to check pump operation and are excellent trouble indicators. Install gauges in the lines if pump ports do not have gauge taps. Observe these precautions when installing piping:

1. **Support close to, but independently of pump.**
2. **Use the next larger pump size for suction and discharge.**
3. **Keep as straight as possible. Avoid bends and fittings.**
4. **Remove burrs, sharp edges, ream pipe cuts, and make joints air-tight.**
5. **Don't spring pipe to make connections. Strain must not be transmitted to pump.**
6. **Allow for pipe expansion with hot fluids; expansion joints are not recommended.**

Suction — Size and install suction piping to keep pressure loss at minimum and to provide correct NPSH by observing the following:

1. **The suction pipe should be equal in size or preferably one size larger than the suction connection of the pump. If pipe is larger than the pump suction, an eccentric pipe reducer should be used at the pump.**
2. **Pipe should slope upward to pump, even for horizontal run.**
3. **Use 45-degree or long-sweep 90-degree elbows.**
4. **A valve in the suction is necessary only on positive suction head installation and must not be used to throttle the pump. The suction valve should be installed for maintenance purposes only.**

Discharge — Pumps permit discharge port location at any of four positions, 90 degrees apart. Change by removing cover bolts, rotate casing, and replace bolts. Do not slice O-ring or tear fibre gasket. Scot does not recommend bottom vertical discharge due to erratic pump performance. Ensure there is adequate clearance with selected position between wall or tank, motor conduit box, and grease fittings. Casing may extend beyond base or feet.

1. **Short discharge lines may be the same size as the discharge port. Long runs require a pipe larger than the discharge port.**
2. **Long horizontal runs require a grade as even as possible. Avoid high spots and loops. Trapped air will throttle flow and may result in erratic pumping.**
3. **Install check and gate valves in discharge line; check valve (if used) between pump and gate valve.**

SCOT DIVISION OF ARDOX CORP. — HOME OFFICE

• Cedarburg, WI 53012 • P.O. Box 286 • 262-377-7000 • *FAX 262-377-7330*

FACTORY BRANCHES

• Irvine, CA 92614 • 1881 Kettering • 949-756-8076 • *FAX 949-756-9480*

• Ft. Lauderdale, FL 33315 • 77 SW 20th Street • 954-524-6776 • *FAX 954-764-3361*

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JANUARY 2000

OPERATION

Pre-Start — Before initial start of the pump, check as follows:

1. The rotation must be checked upon installation. Close, then break the contacts quickly and observe the rotation of the exposed portion of the rotating parts. Rotation must agree with the rotation arrow on the motor. For all pumps, the standard rotation is counterclockwise when viewed from the suction end. Motor wiring is easily changed in the field. Observe the wiring diagram on the inside of the terminal box cover, or on the motor nameplate.
2. Check voltage, phase and frequency of line circuit with motor nameplate.
3. Check suction and discharge piping and pressure gauges for proper operation.
4. Assure that pump is full of liquid (primed).

Priming — If pump is installed with a positive head on the suction, prime by opening suction valve and allowing liquid to enter the casing, at the same time venting all air out of the top of the casing.
If pump is installed with a suction lift, priming must be done by other methods, such as foot valves, ejectors, or by manually filling casing and suction line.
CAUTION - DO NOT RUN PUMP DRY. Serious damage may result if started dry.

Starting — Proceed as follows to start pump:

1. Close drain valves and valve in discharge line.
2. Open fully all valves in the suction line.
3. Prime the pump. If pump does not prime properly, or loses prime during start-up, shut down and correct condition before repeating procedure.
4. For pumps moving high temperature liquids, open warm-up valve to circulate liquid for preheating. Close valve after pump has warmed up.
5. Start the motor (pump).
6. When pump is operating at full speed, open discharge valve slowly.

Running — Periodically inspect pump while running, but especially after first start and following repair.

1. Check pump and piping for leaks. Repair immediately.
2. Record pressure gauge readings for future reference.
3. Record voltage, amperage per phase, and kW (if an indicating wattmeter is available).
4. Adjust pump output capacity with discharge valve. DO NOT throttle suction line.

Freezing Protection — Protect pumps shut down during freezing conditions by one of the following methods:

1. Drain pump; remove all liquid from the casing.
2. Keep fluid moving in pump and insulate or heat the pump to prevent freezing. If heated, do not let temperature go above 100 to 150 degrees F.
3. Fill pump completely with antifreeze solution.

MAINTENANCE

Cleaning — Remove oil , dust, dirt, water, chemicals from exterior or motor and pump. Keep motor air inlet and outlet open. Blow out interior of open motors with clean compressed air at low pressure. Regularly drain moisture from TEFC motors.

Temperature — Total temperature, not the rise, is the measure of safe operation for a motor. If temperature by thermometer exceeds limits for insulation class, investigate and change operating conditions.

Labeled Motors — It is imperative for repair of a motor with Underwriters' Laboratories label that original clearances be held; that all plugs, screws, other hardware be fastened securely, and that parts replacements be exact duplicates or approved equals. Violation of any of the above invalidates Underwriters' label.

Lubrication — Pumps should require no maintenance, other than the motor bearings, according to the following instructions:

DOUBLE SHIELDED. When double shielded prelubricated bearings are furnished, no lubrication is required for the life of the bearings. Inspect bearings periodically to determine the condition of the grease and replace the bearings if necessary.

SINGLE SHIELDED W/GREASE FITTING PROVISIONS. When single shield bearings are furnished, periodic inspection, cleaning and relubrication is required. See motor manufacturer's specific instructions for lubrication.

MECHANICAL SEAL REPLACEMENT

J56 FRAME MOTOR

A.) Disassembly:

1. Turn off power.
2. Close suction and discharge valves.
3. Drain pump.
4. Remove bolts holding base to foundation
5. Remove casing bolts.
6. Remove motor and rotating element from casing, leaving casing and piping undisturbed.
7. Insert a screwdriver in one of the impeller waterway passages and back off the impeller nut as shown in Figure 1.

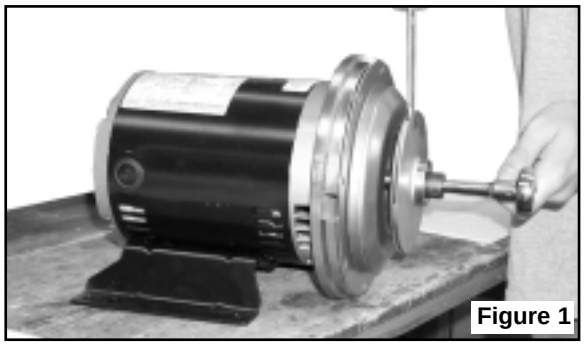

Figure 1

8. Remove motor shaft end cap. Insert a screwdriver in slot of motor shaft. While holding shaft against rotation, unscrew impeller from shaft by turning counterclockwise when facing impeller (Figure 2).
9. Pry off rotating member of mechanical seal from motor shaft by using (2) screwdrivers. Be careful not to damage the pump cover. See Figure 3.


Figure 2

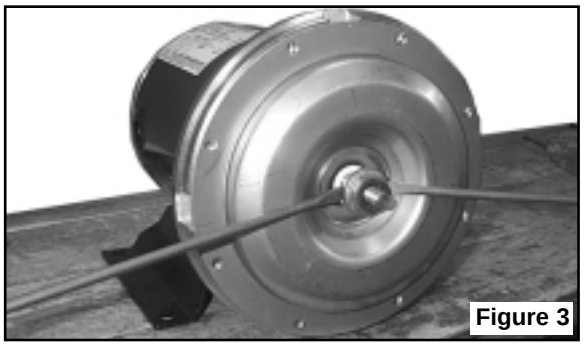
Figure 3

10. Remove pump cover from cast iron disc. (There is no hardware used to attach cover to disc.) Place cover on a flat surface with convex side down. Push out stationary member of mechanical seal. It is not necessary to remove the cast iron disc from the motor to replace the seal.

B.) Reassembly:

CAUTION: The mechanical seal is a precision product and should be handled accordingly. Use care when handling lapped running surfaces of the mechanical seal to ensure they remain clean and are free of chips or scratches.

1. Clean gasket and flange faces, seal seat cavity and shaft, in particular shaft shoulder fitting against impeller.
2. Lubricate the seal seat cavity of the cover and the rubber cup or O-ring of stationary seal seat with the lubricating fluid that comes with the mechanical seal or repair kit. Press the stationary seat in seal seat cavity in the cover squarely and evenly using a arbor press (if possible) and the cardboard disc supplied with the seal. Be certain that the lapped face (shiny side) is facing you.
3. Position the cover so that the convex side with the lapped seal seat is facing you. Place the cover on the motor disc and align the holes in the disc with the holes in the cover. (Note: There isn't any hardware required to attach the cover to the motor disc.)
4. Apply the lubricating fluid that comes with the mechanical seal or repair kit to the motor shaft and the rubber bellows of the rotary seal. Slide the seal head on the shaft, press the rubber drive band on the rotary head until the lapped face on the head seats firmly against the lapped face of the stationary seat. Install seal spring on head and seal spring retainer on spring. Do not chip or scratch faces during installation. Take extra care to make sure the lapped faces are clean.
5. Hold shaft against rotation as described in paragraph 8 of disassembly procedure, and thread impeller on shaft until it is tight against the shaft shoulder. The impeller will compress the seal spring to the proper length assuring correct pressure on lapped faces.
6. Replace D-washer and impeller nut holding impeller against rotation as indicated in paragraph 7 of disassembly procedure (2 & 3 HP 1PH, and all 3PH motors only).
7. Remove any burrs caused by screwdriver on the vane of impeller in waterway passage.
8. Replace motor and rotating element in casing. Be sure that any damaged O-ring is replaced.
9. Position case, cover and motor disc so that the holes line up. Install socket head cap screws through the case and cover, and thread into motor disc. Tighten all cap screws alternately and evenly until finger tight.
10. Finish tightening the cap screws alternately and evenly to approximately 20 ft. lbs. torque. Note: It is imperative that the screws be tightened alternately and evenly, as this action centers the cover in the casing, assuring proper alignment. Binding of the impeller in the case and adapter may occur if the cap screws are not tightened as listed above.
11. Replace hold-down bolts.
12. Check for free rotation after assembly is completed.
13. Replace motor shaft end cap.
14. Seal all drain openings using pipe sealant on threads.
15. Reprime before starting. Do not start until pump is completely filled with water.

MECHANICAL SEAL REPLACEMENT

JM FRAME MOTOR

A.) Disassembly:

1. Turn off power.
2. Close suction and discharge valves.
3. Drain pump.
4. Remove bolts holding down pump to mounting plate.
5. Remove casing bolts.
6. Remove motor and rotating element from casing, leaving casing and piping undisturbed.

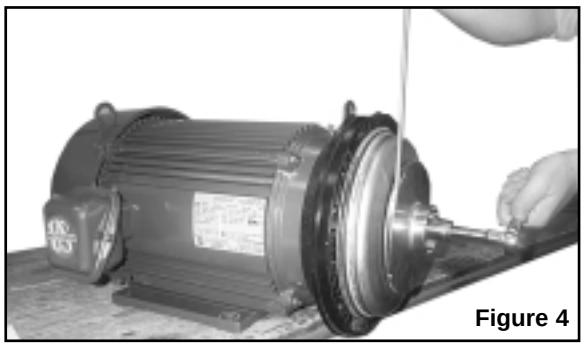
Figure 4

7. Insert a screwdriver in one of the impeller waterway passages and back off the impeller retaining assembly with a socket wrench, as shown in Figure 4.

8. **Remove impeller from shaft, being careful not to lose the impeller key, spring and gasket. If impeller is difficult to remove, it may be necessary to use a bearing puller to remove.**

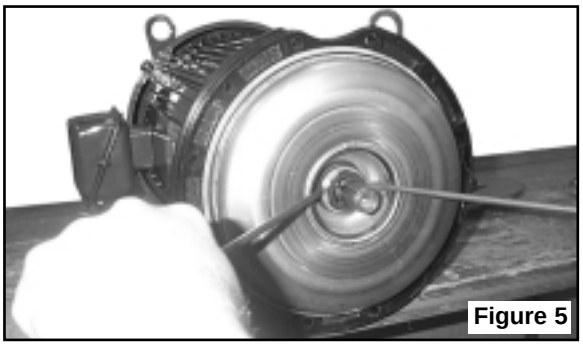

Figure 5

9. **Pry off rotating member of mechanical seal from sleeve by using two (2) screwdrivers. Be careful not to damage the pump cover. See Figure 5.**
10. **Remove pump cover from cast iron disc. (There isn't any hardware used to attach cover to disc. Place cover on flat surface with convex side down, and push out stationary member of mechanical seal. It is not necessary to remove cast iron disc from motor to replace seal.**
11. **Inspect shaft sleeve and nylon washers. If damaged or worn, remove from shaft and replace.**

A.) Reassembly:

CAUTION: The mechanical seal is a precision product and should be handled accordingly. Use care when handling lapped running surfaces of the mechanical seal to ensure they remain clean and are free of chips or scratches.

1. **Clean gasket and flange faces, seal seat cavity, shaft sleeve, and motor shaft.**
2. **Position cover so that the convex side is facing you. Lubricate the seal seat cavity of the cover and the rubber cup or O-ring of seal seat with the lubricating fluid that comes with the mechanical seal or repair kit. Press the stationary seat in seal seat cavity of the cover squarely and evenly using a arbor press (if possible) and the cardboard disc supplied with the seal. Be certain that the lapped face (shiny side) is facing you.**
3. **Install nylon washer on motor shaft until it bottoms on the motor shaft.**
4. **Install sleeve on motor shaft.**
5. **Position the cover so that the convex side is facing you and install on cast iron motor disc. (There isn't any hardward required to attach cover to motor disc.)**
6. **Apply the lubricating fluid that comes with the mechanical seal or repair kit to the motor sleeve and the rubber bellows of the rotary seal. Slide the seal head on the shaft sleeve, press the rubber drive band on the rotary head until the lapped face on the head seats firmly against the lapped face of the stationary seat. Do not chip or scratch faces during installation. Take extra care to make sure the lapped faces are clean.**
7. **Install nylon washer on shaft sleeve and seal spring on seal head.**
8. **Place key in key seat. Line up keyway in impeller with key on motor shaft, and slide impeller on motor shaft. Be certain that the key is positioned in the keyway of the motor and impeller. Slightly compress seal spring with impeller (making sure the seal spring is positioned over stud on back of impeller), and hold impeller while installing impeller retaining assembly in motor shaft. Make sure the nylon washer is installed on retaining nut.**
9. **Insert a screwdriver in a waterway passage of the impeller holding it against rotation and tighten impeller retaining assembly as discussed in paragraph 7.**
10. **Remove any burrs caused by screwdriver on the vane of impeller in waterway passage.**
11. **Slide motor and rotating element in casing. Be sure that any damaged O-ring or gasket is replaced.**
12. **Tighten casing bolts alternately and evenly.**
13. **Replace hold-down bolts.**
14. **Check for free rotation after assembly is completed.**
15. **Close all drain openings, using pipe sealant on threads.**
16. **Reprime before starting. Do not start unit until pump is completely filled with water.**

The approved lubricating fluid for seal installation is included with the mechanical seal or repair kit. DO NOT USE OTHER LUBRICATING LIQUIDS!

WE RECOMMEND STOCKING A SPARE MECHANICAL SEAL OR REPAIR KIT TO ELIMINATE DOWN TIME.

PRESSURE AND TEMPERATURE LIMITATION
STANDARD FITTED PUMPS

PUMP	PRESSURE		TEMPERATURE	
NO.	STANDARD	OPTIONAL	STANDARD	OPTIONAL
68, 69	75 PSI	N/A	220°F	275°F
51, 61, 74	75 PSI	150 PSI	220°F	275°F
71, 72, 77, 78, 79, 82	75 PSI	N/A	220°F	275°F
11, 13, 60	75 PSI	150 PSI	220°F	275°F
62	165 PSI	165 PSI	220°F	275°F
ALL OTHERS	175 PSI	175 PSI	220°F	275°F

N/A-NOT AVAILABLE

CAUTION

DO NOT ALLOW EITHER THE DISCHARGE PRESSURE OR THE TEMPERATURE OF THE LIQUID TO EXCEED THE LIMITATIONS LISTED ABOVE.