User Guide

Portable Chiller

Series 3 Water-Cooled (W3) and Air-Cooled (A3) Models with PLC Control

Installation

Operation

Maintenance

Troubleshooting

Instant Access
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CONAIR™

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UGH019/1200

⚠ **WARNING - Reliance on this Manual Could Result in Severe Bodily Injury or Death!**

This manual is out-of-date and is provided only for its technical information, data and capacities. Portions of this manual detailing procedures or precautions in the operation, inspection, maintenance and repair of the product forming the subject matter of this manual may be inadequate, inaccurate, and/or incomplete and cannot be used, followed, or relied upon. Contact Conair at info@conairgroup.com or 1-800-654-6661 for more current information, warnings, and materials about more recent product manuals containing warnings, information, precautions, and procedures that may be more adequate than those contained in this out-of-date manual.

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: UGH019/1200
Serial number(s): ....
Model number(s): ....
Power specifications: **Amps** ..... **Volts** ..... **Phase** ..... **Cycle** .....

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TABLE OF CONTENTS

TABLE OF CONTENTS

INTRODUCTION

PURPOSE OF THE USER GUIDE

This User Guide describes Conair's Series 3 Water-cooled and Air-cooled Portable Chillers and explains step-by-step how to install, operate, maintain and repair this equipment.

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

HOW THE GUIDE IS ORGANIZED

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

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

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

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

❒ An open box marks items in a checklist.

● A shaded circle marks items in a list.

YOUR RESPONSIBILITY AS A USER

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

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

⚠ATTENTION: READ THIS SO NO ONE GETS HURT

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

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

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

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

WARNING: Electrical hazard

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

CAUTION: Hot Surfaces

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

CAUTION: Ventilation hazard

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

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

WARNING: Hazardous substance

When burned, Forane R22 refrigerant forms Phosgene gas. If the chiller is placed in the vicinity of equipment with combustible systems, the combustion air intake must be ducted in from the outside and sealed in such a manner as to prevent any refrigerant from entering the combustion chamber. Refer to the Material Safety Data Sheet for Forane R22 included in the appendix. This sheet explains the potential hazards and how to avoid them.

DESCRIPTION

WHAT IS THE PORTABLE CHILLER?

The Conair Series 3 Portable Chillers provide self-contained sources of chilled water and are available in either water- or air-cooled models with ranges from 3.5 Hp to 30 Hp (approximate capacities of 3.5 tons to 30 tons of refrigeration). Pump selections are available to match most process flow and pressure requirements.

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

The Air-cooled Portable Chiller A3 Models and Water-cooled Portable Chiller W3 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, moveable cooling unit. Nominal capacities range from 3.5 to 30 tons for the both the water-cooled and 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.

Brazed plate condensers are standard equipment on all water-cooled models. Air-cooled models use all-aluminum bar and plate condensers.

All standard voltages are available.

TYPICAL APPLICATIONS

The Conair A3 and W3 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 model next to the heat source, connect it, and plug it in. They can operate almost anywhere.

The water-cooled 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

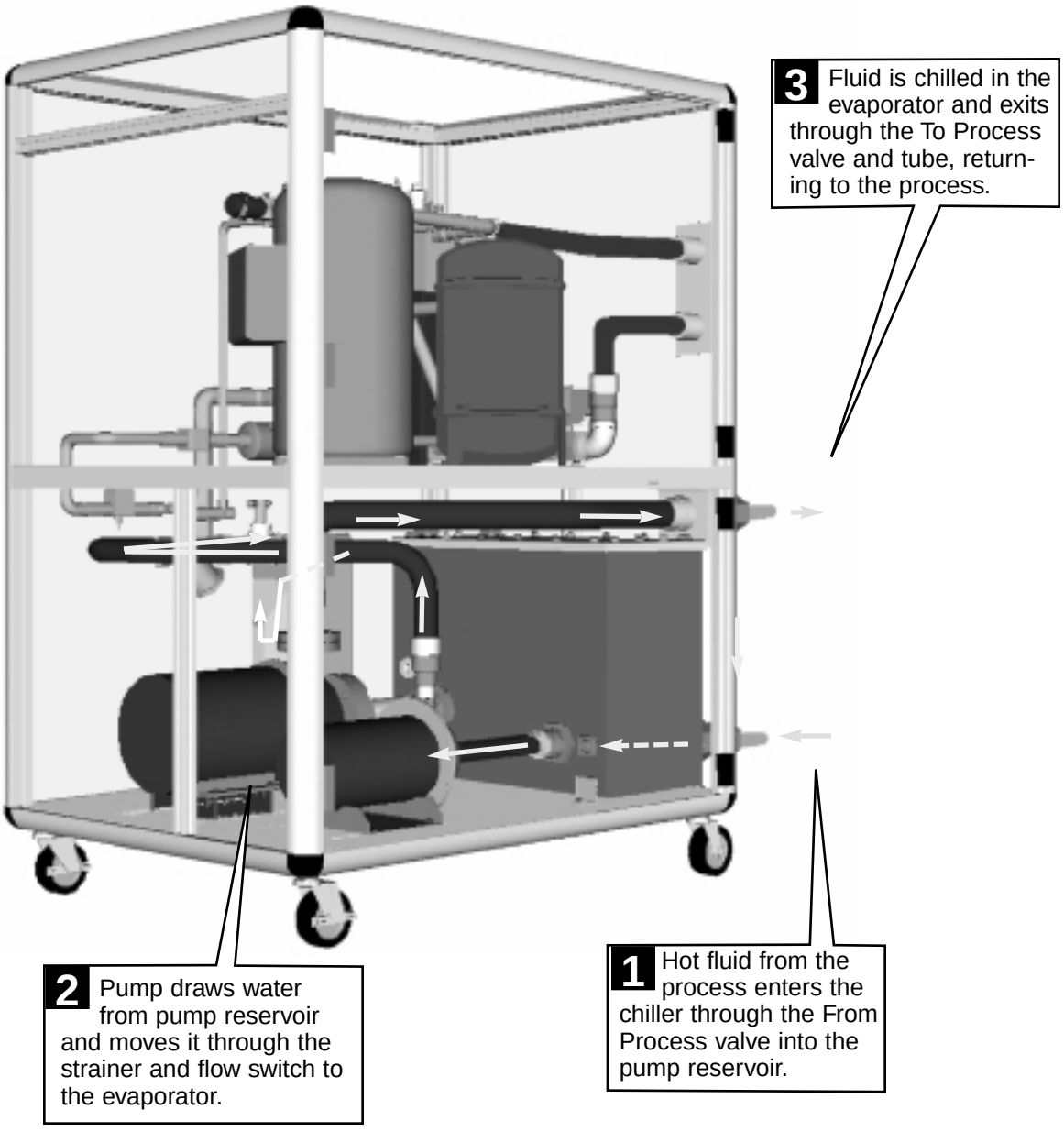
Conair Series 3 Portable Chillers are designed to provide chilled water for industrial applications requiring 24-hour-a-day performance. Units are self-contained and easy to install and maintain. Choose the Conair Series 3 Portable Chillers based on the cooling load and the capacity of the unit. Pick your Conair Series 3 Portable Chillers based on:

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

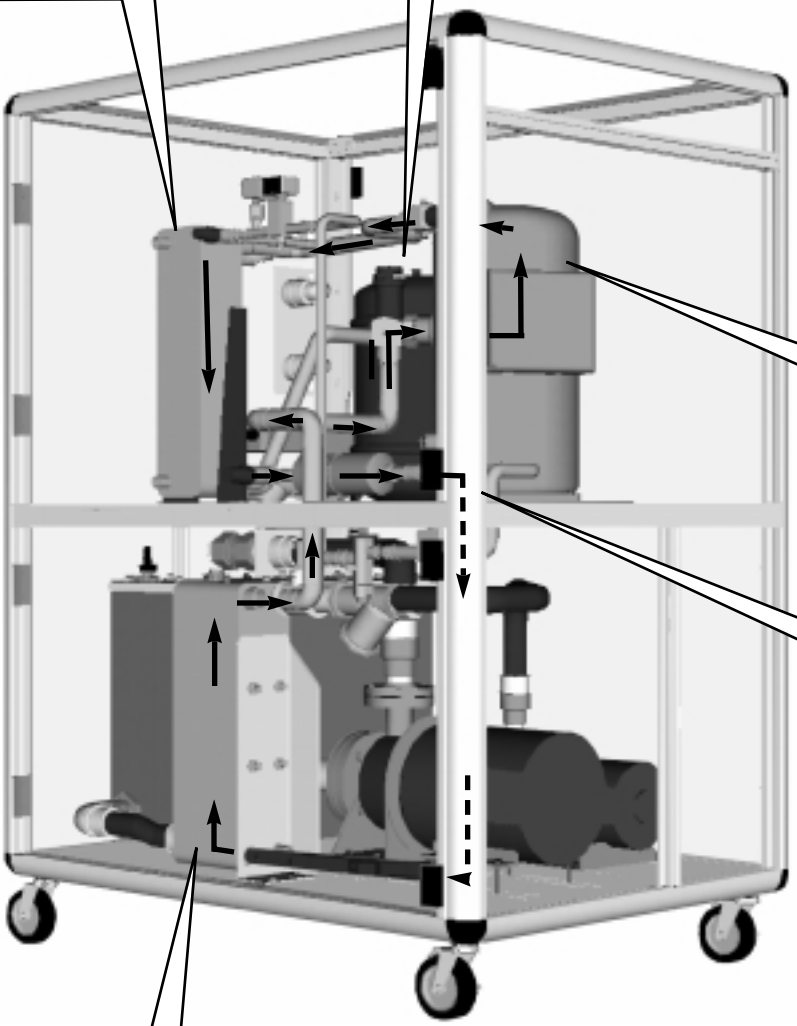
Use this information as a general guide. Consult your Conair representative for assistance when choosing a Conair Portable Chiller.

HOW IT WORKS: WATER-COOLED PORTABLE CHILLER

Process circulation



Refrigerant circulation



3 The high pressure vapor travels from the compressor through the condenser. Water tower or city water removes heat from the vapor, condensing it to a high-pressure liquid.

4 The high-pressure, high-temperature vapor from the condenser is stored in the receiver.

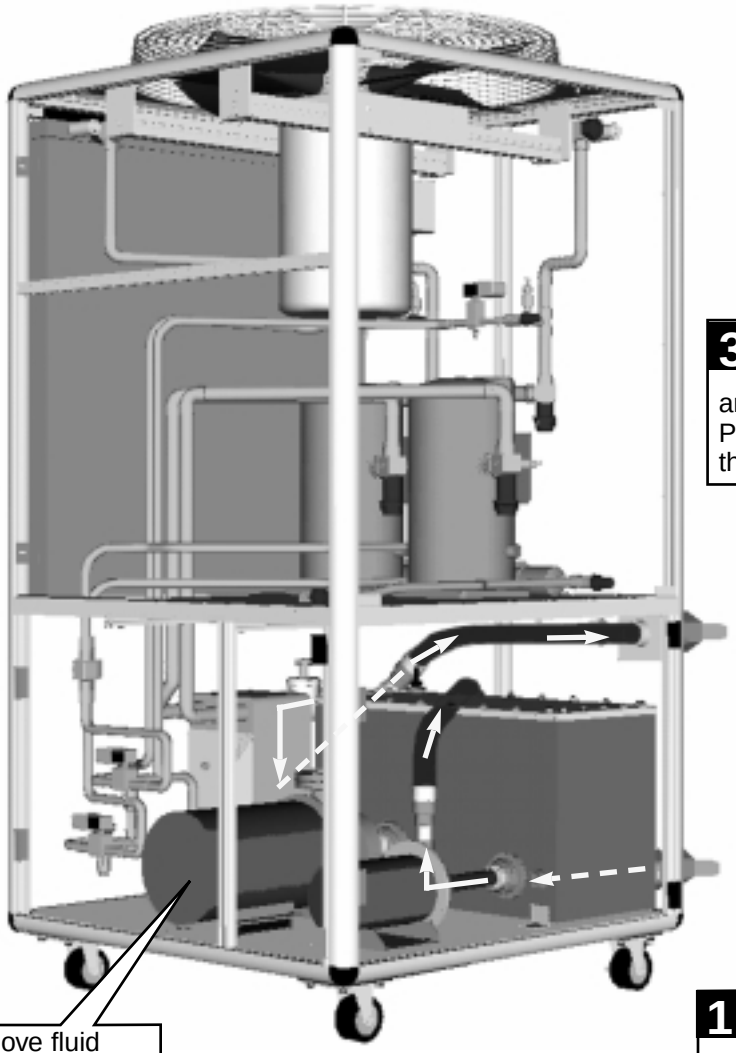
2 Vaporized refrigerant travels from the evaporator to the compressor, where the low pressure vapor is compressed into a high-pressure, high-temperature vapor.

5 High-pressure liquid is metered back to the evaporator by the expansion valve (TXV), changing it to a low-pressure, low-temperature liquid.

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



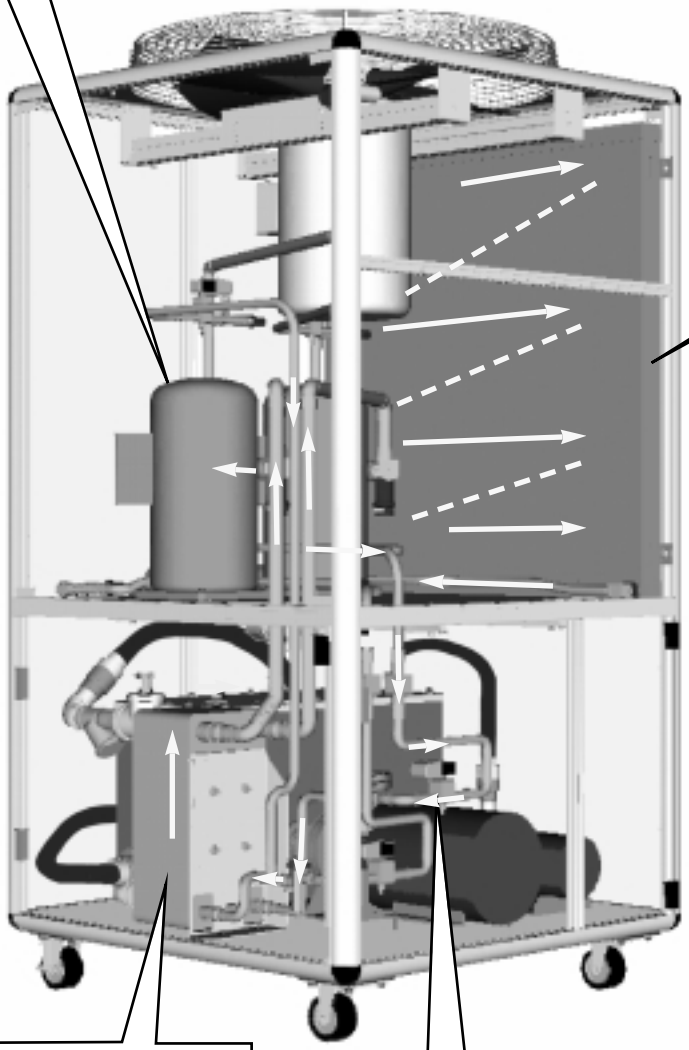
3 Chilled fluid is pumped out of the evaporator and exits through the To Process valve, returning to the process.

2 Pumps move fluid from pump reservoir through evaporator where it is chilled.

1 Hot fluid from the process enters the chiller through the From Process valve into the pump reservoir.

Shown with one condenser removed for clarity.

Refrigerant circulation



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

3 The high pressure vapor travels from the compressor through the condenser, where the fan cools and condenses the vapor into a high-pressure liquid.

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

4 High-pressure, high-temperature vapor is metered back to the evaporator by the expansion valve (TXV), changing it to a low-pressure, low-temperature liquid.

Shown with one condenser removed for clarity.

PORTABLE CHILLER FEATURES

Water-cooled Models

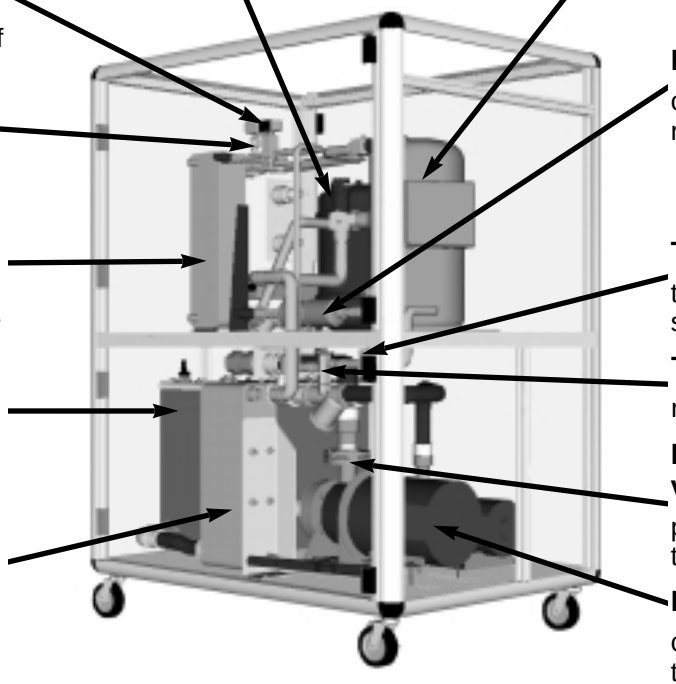
Hot Gas Bypass valve
balances the load on the chiller to meet the needs of the process.

Relief valve
acts as a safety device for refrigerant pressure.

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

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

Evaporator
cools the To Process fluid.



Receiver
holds liquid refrigerant.

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

Filter dryer
cleans and dries the refrigerant.

Temperature sensor
transmits temperature signals to the control

TX valve
regulates refrigerant flow

Liquid line solenoid valve
pumps down refrigerant to the receiver.

Dual pumps
circulate fluid through the chiller.

Options include:

- 60 Hz process pump
  2 Hp for W3-3.5
  3 Hp for W3-3.5, W3-5, W3-7.5, W3-10
  5 Hp for W3-5, W3-7.5, W3-10, W3-15
  7.5 Hp for W3-7.5, W3-10, W3-15, W3-20
  10 Hp for W3-10, W3-15, W3-20, W3-25, W3-30
  15 Hp for W3-15, W3-20, W3-25, W3-30
- 50 Hz process pump
  2 Hp for W3-3.5
  3 Hp for W3-3.5, W3-5, W3-7.5, W3-10
  5 Hp for W3-5, W3-7.5, W3-10, W3-15
  7.5 Hp for W3-7.5, W3-10, W3-15, W3-20
  10 Hp for W3-10, W3-15, W3-20, W3-25, W3-30
- Process bypass line and valve
- No reservoir/pump
- Auto fill reservoir
- Visual/audible alarm
- Remote/redundant hand control with 30 ft. or 50 ft. cable
- UL labeled controls

Air-cooled Models

PORTABLE CHILLER FEATURES

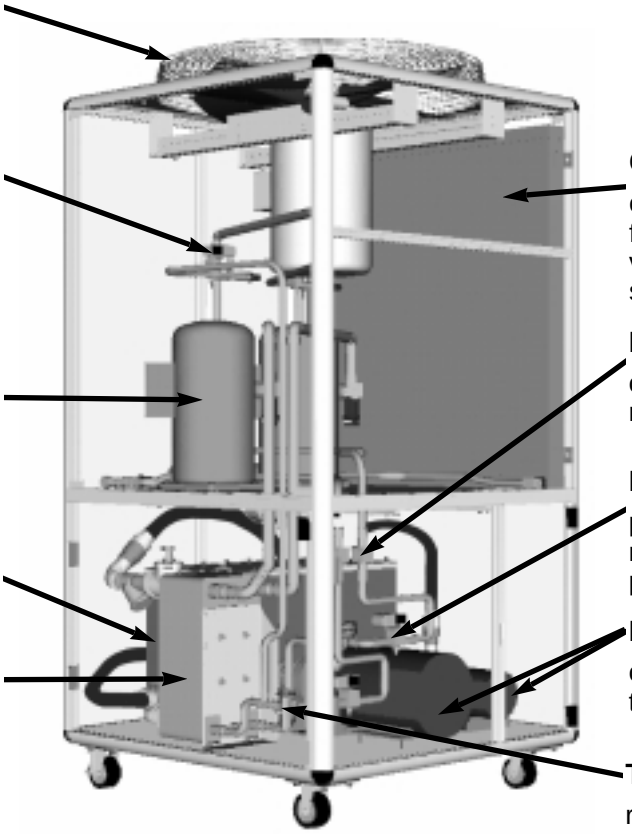
Fan
circulates air across the condenser to cool refrigerant

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

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

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

Evaporator
cools the To Process fluid



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

Filter dryer
cleans and dries the refrigerant.

Liquid Line Solenoid
prevents refrigerant migration when compressor is off.

Dual pumps
circulate fluids through the chiller.

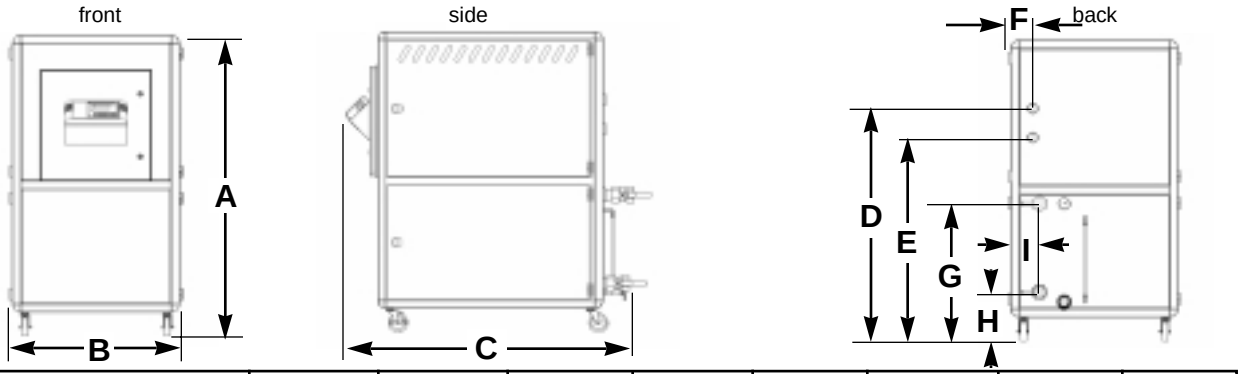
TX valve
regulates refrigerant flow

Options include:

- 60 Hz process pump
  2 Hp for A3-3.5
  3 Hp for A3-3.5, A3-5, A3-7.5, A3-10
  5 Hp for A3-5, A3-7.5, A3-10, A3-15
  7.5 Hp for A3-7.5, A3-10, A3-15, A3-20
  10 Hp for A3-10, A3-15, A3-20, A3-25, A3-30
  15 Hp for A3-15, A3-20, A3-25, A3-30
- 50 Hz process pump
  2 Hp for A3-3.5
  3 Hp for A3-3.5, A3-5, A3-7.5, A3-10
  5 Hp for A3-5, A3-7.5, A3-10, A3-15
  7.5 Hp for A3-7.5, A3-10, A3-15, A3-20
  10 Hp for A3-10, A3-15, A3-20, A3-25, A3-30
- Process bypass line and valve
- No reservoir/pump
- Auto fill reservoir
- Visual/audible alarm
- Remote/redundant hand control with 30 ft. or 50 ft. cable
- UL labeled controls

SPECIFICATIONS

Water-cooled Models

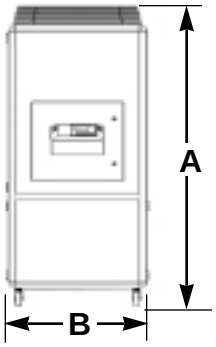


MODEL	W3-3.5		W3-5		W3-7.5		W3-10		W3-15		W3-20*		W3-25*		W3-30*	
Performance characteristics																
Capacity† tons	3.1		4.8		7.1		10.2		14.9		20.4		25.3		29.7	
Compressor Hp {kW}	3.5 {2.6}		5 {3.7}		7.5 {5.6}		10 {7.5}		15 {11}		20 {15}		25 {19}		30 {22}	
Process pump Hp {kW}																
60 Hz	1 {0.8}		1.5 {1.1}		1.5 {1.1}		1.5 {1.1}		2 {1.5}		3 {2.2}		3 {2.2}		5 {3.7}	
50 Hz	1.5 {1.1}		1.5 {1.1}		1.5 {1.1}		2 {1.5}		2 {1.5}		3 {2.2}		3 {2.2}		5 {3.7}	
Recirculation ump Hp {kW}																
60 Hz	0.5 {0.4}		0.5 {0.4}		0.5 {0.4}		0.5 {0.4}		0.75 {0.6}		1.5 {1.1}		1.5 {1.1}		1.5 {1.1}	
50 Hz	0.5 {0.4}		0.5 {0.4}		0.5 {0.4}		0.5 {0.4}		0.75 {0.6}		1.5 {1.1}		1.5 {1.1}		1.5 {1.1}	
Process flow‡ gpm {lpm}	16.4 {62}		23.9 {90}		34.5 {131}		49.1 {186}		71.5 {271}		98.1 {371}		120.6 {457}		143.0 {541}	
Recirculation flow gpm {lpm}	7.9 {30}		11.5 {44}		17.0 {64}		24.5 {93}		35.8 {136}		49.1 {186}		60.6 {229}		71.2 {270}	
Process pressure§ psi {bar}	36.1 {2.5}		37.4 {2.6}		31.3 {2.2}		31.9 {2.2}		41.6 {2.9}		35.6 {2.5}		32.8 {2.3}		48.8 {3.4}	
Reservoir capacity gal {l}	15 {57}		15 {57}		25 {95}		25 {95}		25 {95}		46 {174}		46 {174}		46 {174}	
Condenser water flow gpm {lpm}	10.2 {38.6}		14.8 {56.0}		21.6 {81.0}		30.6 {116}		44.7 {169}		61.2 {232}		75.3 {285}		89.3 {338}	
Dimensions in {mm}																
A - Height	57 {1448}				65 {1651}						71 {1803}					
B - Width	36 {914}				36 {914}						48 {1219}					
C - Length	48 {1219}				48 {1219}						48 {1219}					
D - Height to condenser out	41.8 {1062]				50 {1270}						53.8 {1367}					
E - Height to condenser in	35.5 {902}				43.75 {1111}						46 {1168}					
F - Distance to valve	4.5 {114}				4.75 {121}						3.75 {95}					
G - Height to To Process valve	21 {533}				29.5 {749}						35 {889}					
H - Height to From Process valve	10.5 {267}				10.5 {267}						11 {279}					
I - Distance to valves	6 {152}				6 {152}						6 {152}					
Weight lb {kg}																
Installed	1047 {475}		1180 {535}		1420 {644}		1430 {649}		1480 {671}		1580 {717}		1680 {762}		1780 {807}	
Shipped	877 {398}		1010 {458}		1250 {567}		1260 {576}		1300 {590}		1400 {635}		1500 {680}		1600 {726}	
Utility requirements																
Process connections NPT in	1.5		2		2		2		2		2.5		2.5		3	
Condenser water NPT in	1		1.5		1.5		1.5		2		2		2		2	
Power consumption amps	run	full	run	full	run	full	run	full	run	full	run	full	run	full	run	full
230V/3 phase/60hz**	14.4	20.5	18.1	27.9	27.1	35.8	33.1	47.2	43.7	59.3	66.0	94.4	74.6	104.8	89.4	121
220V/3 phase/50hz	17.5	23.4	21.0	29.1	31.4	37.3	39.8	50.0	50.6	61.7	76.4	98.2	86.3	109.0	104	126
460V/3 phase/60hz**	7.2	10.2	9.0	13.9	13.5	17.8	16.5	23.5	21.8	29.5	32.9	46.9	37.2	46.9	44.6	60.3
3380-420V/3 phase/50hz**	8.7	11.5	10.5	14.2	15.6	18.1	19.8	24.3	25.2	29.9	38.1	47.7	43.0	52.9	51.7	61.4
575V/3 phase/60hz**	5.7	8.1	7.2	11.1	10.8	14.2	13.2	18.8	17.4	23.6	26.3	37.5	29.7	41.7	35.7	48.3
380V/3 phase/60hz**	8.7	12.3	10.9	16.8	16.3	21.6	20.0	28.5	26.4	35.7	39.8	56.8	45.0	63.0	54.0	73.0

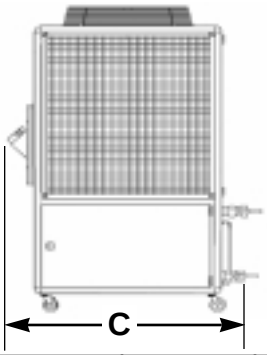
SPECIFICATION NOTES

* Have dual refrigeration circuits with two compressors.
† 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.
§ Pressure at pump discharge. See Pressure Tables in the Appendix for Evaporator and Condenser pressure drops.
** Optional

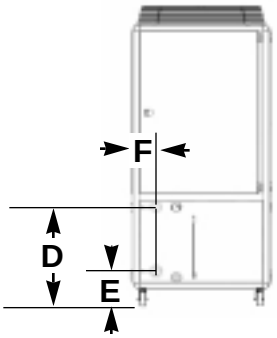
front



side



back

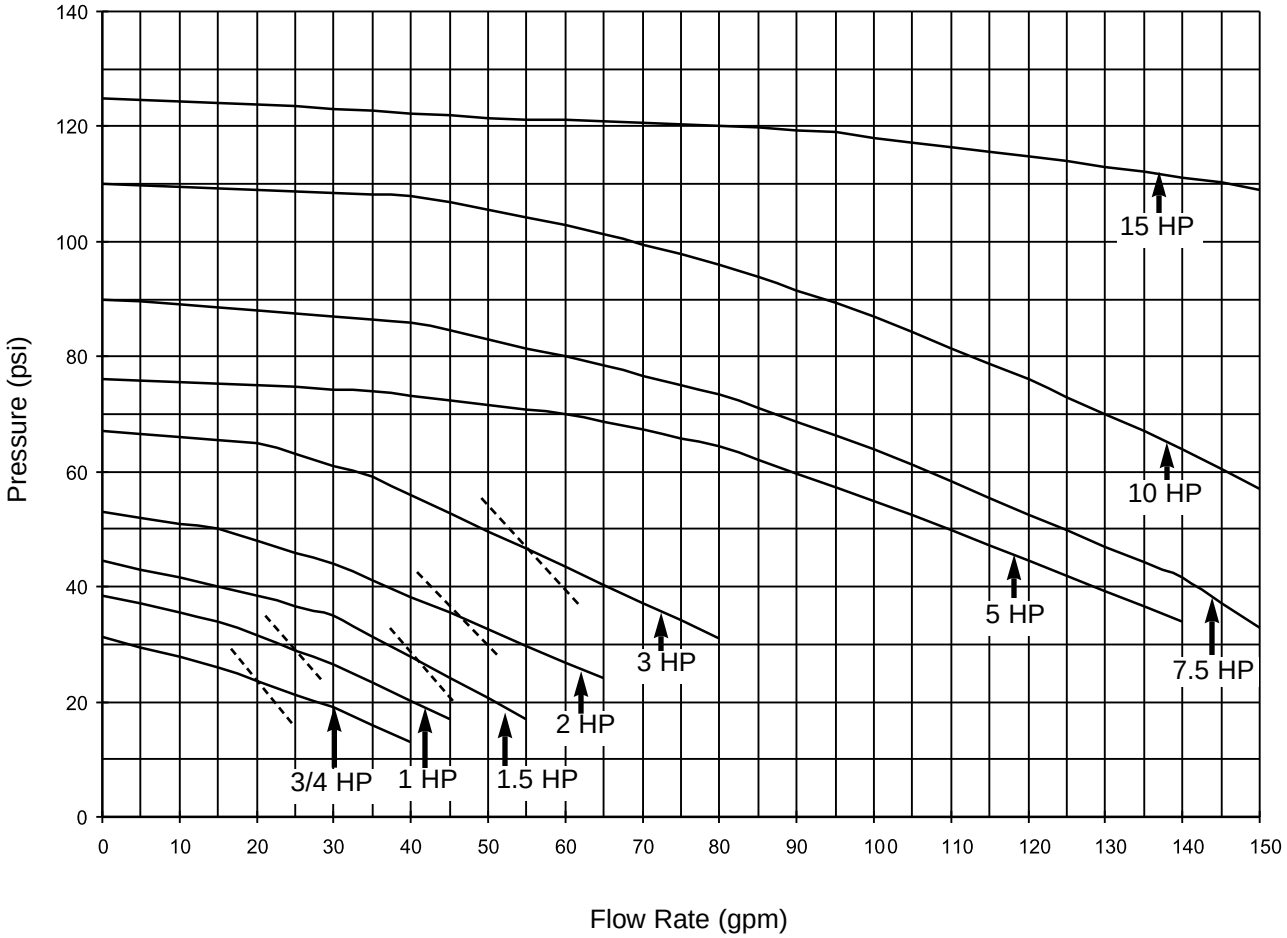


MODEL	A3-3.5		A3-5		A3-7.5		A3-10		A3-15		A3-20*		A3-25*		A3-30*	
Performance characteristics																
Capacity† tons	3.0		4.4		6.6		9.5		14.0		19.0		23.5		27.7	
Compressor Hp {kW}	3.5 {2.6}		5 {3.7}		7.5 {5.6}		10 {7.5}		15 {11.2}		20 {14.9}		25 {18.6}		30 {22.4}	
Process pump Hp {kW}																
60 Hz	1 {0.7}		1.5 {1.1}		1.5 {1.1}		1.5 {1.1}		2 {1.5}		3 {2.2}		3 {2.2}		5 {3.7}	
50 Hz	1.5 {1.1}		1.5 {1.1}		1.5 {1.1}		2 {1.5}		2 {1.5}		3 {2.2}		3 {2.2}		5 {3.7}	
Recirculation pump Hp {kW}																
60 Hz	0.5 {0.4}		0.5 {0.4}		0.5 {0.4}		0.5 {0.4}		0.75 {0.6}		1.5 {1.1}		1.5 {1.1}		1.5 {1.1}	
50 Hz	0.5 {0.4}		0.5 {0.4}		0.5 {0.4}		0.5 {0.4}		0.75 {0.6}		1.5 {1.1}		1.5 {1.1}		1.5 {1.1}	
Process flow‡ gpm {lpm}	16.0 {61}		23.3 {88}		33.6 {127}		47.8 {181}		69.8 {264}		95.6 {362}		117.5 {445}		139.5 {528}	
Recirculation flow gpm {lpm}	7.7 {29}		11.2 {42}		16.5 {62}		23.9 {90}		34.9 {132}		47.7 {181}		59.1 {224}		69.1 {262}	
Process pressure§ psi {bar}	36.6 {139}		37.7 {143}		31.8 {120}		37.0 {40}		42.8 {162}		36.5 {138}		33.6 {127}		49.8 {189}	
Reservoir capacity gal {l}	15 {57}		15 {57}		25 {95}		25 {95}		25 {95}		46 {174}		46 {174}		46 {174}	
Condenser fans	1		1		1		1		1		1		1		1	
Condenser fan power Hp {kW}	1		1.5		1		1.5		5		7.5		7.5		10	
Condenser air flow	2546		3697		5402		7640		11160		15679		18800		22321	
ft³/min {liters/min}	{72095}		{104688}		{152968}		{216341}		{316016}		{443980}		{532357}		{632060}	
Dimensions in {mm}																
A - Height	64 {1626}				90 {2286}						94 {2388}					
B - Width	36 {914}				36 {914}						48 {1219}					
C - Length	48 {1219}				48 {1219}						48 {1219}					
D - Height to To Process valve	21 {533}				29.5 {749}						35 {889}					
E - Height to From Process valve	10.5 {267}				10.5 {267}						11 {279}					
F - Distance to valves	6 {152}				6 {152}						6 {152}					
Weight lb {kg}																
Installed	1270 {576}		1370 {621}		1570 {712}		1680 {762}		1730 {785}		1780 {807}		1880 {853}		1980 {898}	
Shipped	1100 {499}		1200 {544}		1400 {635}		1500 {680}		1550 {703}		1600 {726}		1700 {771}		1800 {816}	
Utility requirements																
Process connections NPT in	1.5		2		2		2		2		2.5		2.5		3	
Power consumption amps	run	full	run	full	run	full	run	full	run	full	run	full	run	full	run	full
230V/3 phase/60hz**	18.8	25.1	23.2	34.5	32.4	40.4	38.6	53.8	58.4	76.0	87.2	118.6	95.6	129.0	117	152
220V/3 phase/50hz**	23.4	30.3	28.7	36.9	38.4	44.2	50.3	61.0	68.3	79.2	101.5	123.5	111	134.3	137	159
460V/3 phase/60hz	9.4	12.5	11.6	17.2	16.1	20.1	19.2	26.8	29.1	37.9	43.5	59.0	47.7	64.2	58.3	75.7
380-420V/3 phase/50hz**	11.7	14.9	14.3	18.1	19.1	21.6	25.1	29.8	34.1	38.7	50.7	60.4	55.5	65.6	68.1	77.5
575V/3 phase/60hz**	7.5	10.1	9.2	13.7	12.9	16.1	15.4	21.4	23.3	30.0	34.8	47.2	38.1	51.3	46.6	60.6
380V/3 phase/60hz**	11.3	15.1	14.0	20.8	19.6	24.3	23.3	32.4	35.3	45.8	52.7	71.4	57.7	77.7	70.6	91.7

SPECIFICATION NOTES

* Have dual refrigeration circuits with two compressors.
† 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.
§ Pressure at pump discharge. See Pressure Tables in the Appendix for Evaporator and Condenser pressure drops.
** Optional

PUMP CURVES



These pump curves are non-overloading using the service factor of the motors.
Dotted line ------- shows the optional TEFC pump overload.

INSTALLATION

UNPACKING THE BOXES

The portable chiller comes fully assembled in a single crate.

CAUTION: Lifting
The Series 3 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 at the chillers' center of gravity. Do not try to lift the unit manually.

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

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

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

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

WARNINGS AND CAUTIONS

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

All wiring, disconnects and fuses should be installed by qualified electrical technicians in accordance with electrical codes in your region. Always maintain a safe ground. Do not operate the equipment at power levels other than what is specified on the machine 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 require enough clearance around the perimeter for access doors to open completely. Air-cooled units require a minimum of two feet clearance around the perimeter for proper air flow.

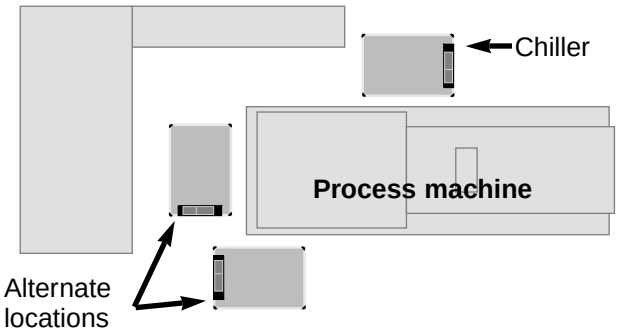
WARNING: Refrigerant hazard
Only certified refrigerant technicians should examine and correct problems involving the refrigerant circuit.

WARNING: Hazardous substance
When burned, Forane R22 refrigerant forms Phosgene gas. If the chiller is placed in the vicinity of equipment with combustible systems, the combustion air intake must be ducted in from the outside and sealed in such a manner as to prevent any refrigerant from entering the combustion chamber. Refer to the Material Safety Data Sheet for Forane R22 included in the Appendix. This sheet explains the potential hazards and how to avoid them.

PREPARING FOR INSTALLATION

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

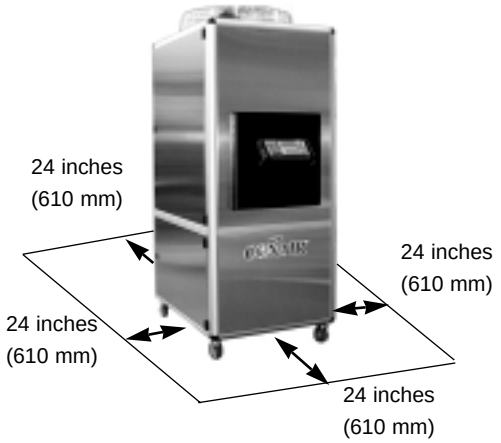
Position the Chiller as close to the process machine as possible. Place the chiller in position near the process machine so that fluid lines can be connected from the process machine to the chiller and back.



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. After positioning lock casters to prevent chiller from moving. For maintenance and servicing, be sure there is enough clearance to open access doors completely.



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

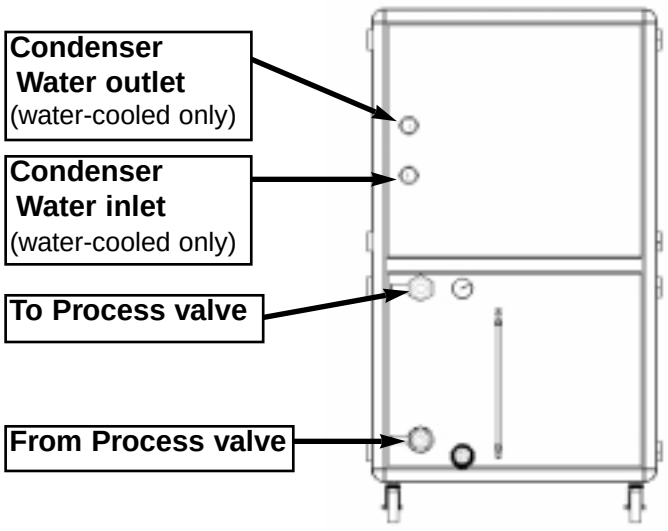
MAKING PROCESS PLUMBING CONNECTIONS

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

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

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

back view



For overhead piping installations, see Overhead Plumbing Details, in the Appendix.

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.

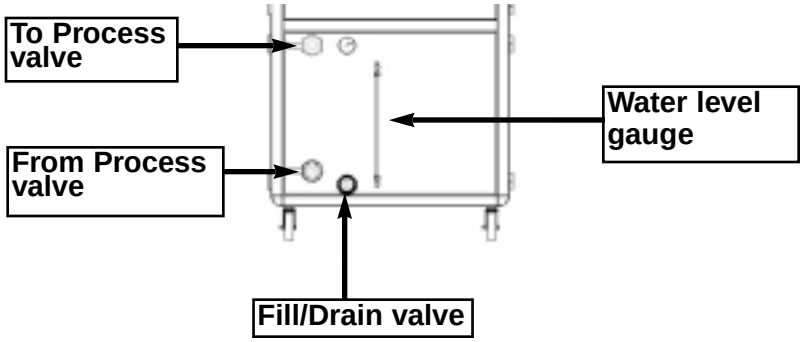
3 Open the Fill/Drain valve and fill chiller
to the fill mark on the Water Level gauge. If the chiller is overfilled, the excess water spills out the vent tube. DO NOT OVERFILL.

4 Close the Fill/Drain valve.

5 Check the coolant level.
When the chiller is turned on the coolant level drops 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. Add more if needed.

NOTE: If your chiller has the optional auto-fill reservoir, the level switch will automatically fill the reservoir with water as needed.

6 Disconnect water hose from Fill/Drain valve.

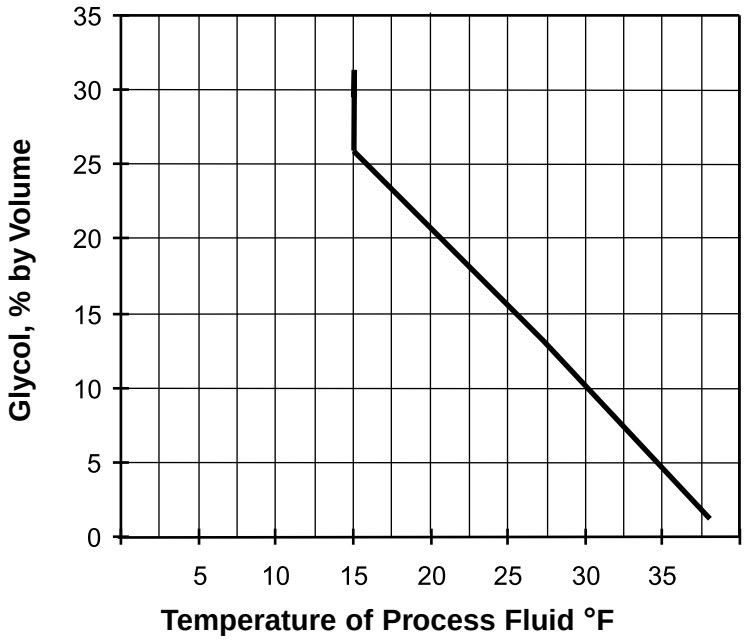


FILLING THE CHILLER

CONT'D

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.



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.**
The coolant level drops as the coolant begins to circulate and fill 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. Add more if needed.

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.

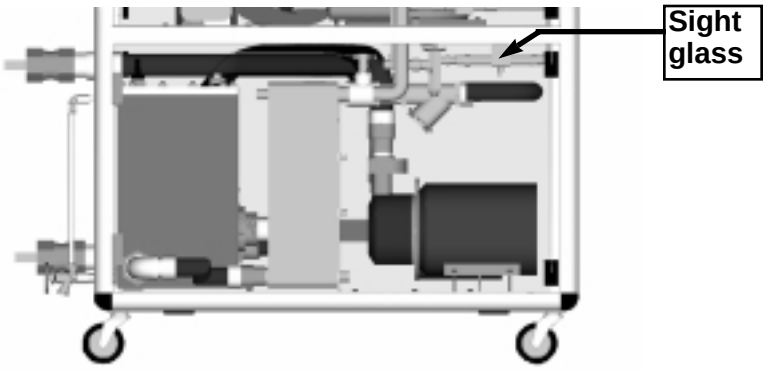
Check refrigerant charge while the chiller is running. Check the refrigerant charge through the sight glass. For water-cooled models open the side panel for a short period of time (15 seconds maximum) and check the sight glass; for air-cooled models, locate the sight glass through the wire mesh side panel. Use a flashlight, if necessary, and check the 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 and the unit is under warranty, contact Conair service. Otherwise 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.

WARNING: Hazardous substance
When burned, Forane R22 refrigerant forms Phosgene gas. If the chiller is placed in the vicinity of equipment with combustible systems, the combustion air intake must be ducted in from the outside and sealed in such a manner as to prevent any refrigerant from entering the combustion chamber. Refer to the Material Safety Data Sheet for Forane R22 included in the Appendix. This sheet explains the potential hazards and how to avoid them.



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.

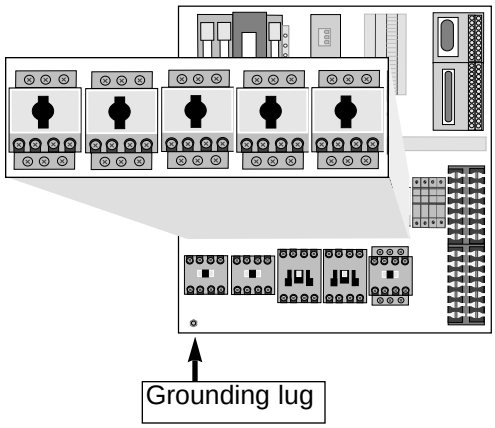
WARNING: Electrical hazard
Before performing any work on this item, disconnect and lock out electrical power sources to prevent injury from unexpected energization or startup.

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.

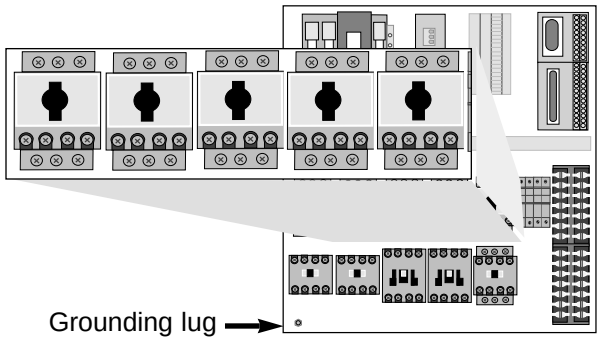


CHECKING ELECTRICAL CONNECTIONS

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 minimum resistance to ground should be 1 megohm. If it resistance is less that 1 megohm there is a leak in the system.



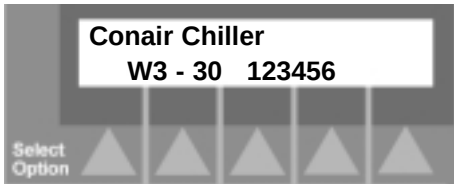
3 **Close the electrical enclosure.**

The Chiller is now ready for initial startup.

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.

INITIALLY WARMING THE CHILLER

1 **Turn on main power source.**
The control boots up and when finished, the screen displays the Portable Chiller model number and the six-digit serial number.



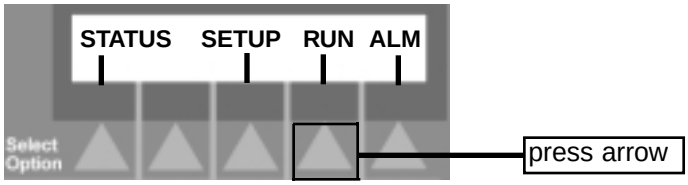
WARNING: Initial startup
Do not press any buttons after initially applying power to the Chiller. Let the Chiller set, undisturbed, for a minimum of 8 hours before starting the Chiller. This is necessary to allow the crankcase heater to warm properly, and to prevent the refrigerant from pooling in the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

CHECKING PUMP ROTATION

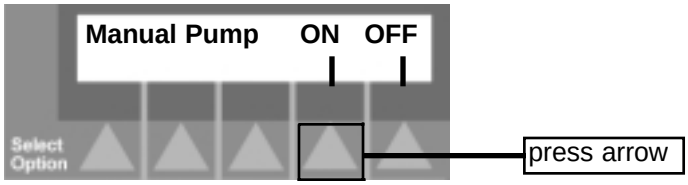
After the chiller has warmed up, check for proper pump rotation. If the pump rotation is correct, all other 3-phase components will be in the proper rotation and do not need checked.

Manually turn on the pump from the main screen:

1 Press the arrow pointing to Run on the screen.



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



3 Press the ON arrow.
The pump should begin running. Open the chiller cabinet and check the rotation of the pump. The pump should be turning clockwise. If the pump is not turning or is turning counterclockwise, press the Stop Chiller button, disconnect the main power to the chiller and swap any two wires to the pump. Reapply main power to the unit, scroll to the Manual pump screen and again turn on the pump. Pump should now be turning clockwise. If an alarm occurs, see Answering Alarms, in the Troubleshooting section. If alarm continues or reoccurs, call your Conair Service representative.

When the Stop Chiller button is pressed the compressor 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.

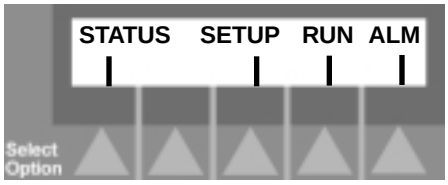
4 Press the Escape/Previous Screen button.
The control returns to the main screen.

CHECKING FOR LEAKS

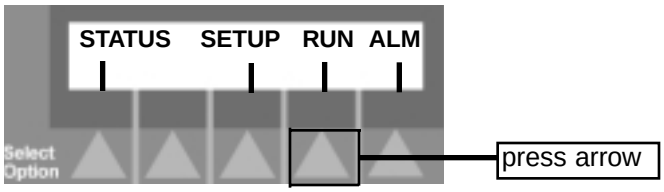
After checking for pump rotation, continue startup by checking the chiller for leaks. Do this by turning on only the pump from the control and letting the pump run while checking the inside of the chiller.

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

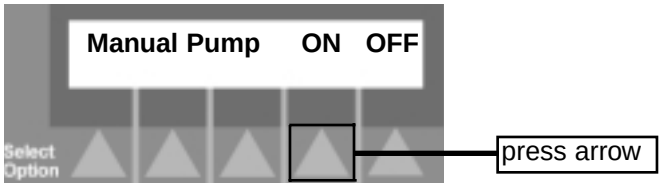
The Main screen displays:



2 **Press the Run arrow on the screen.**



3 **Press the Scroll arrows to scroll to the Manual** Pump screen. The Manual Pump screen displays:



4 **Press the Pump ON arrow.**
With the pump running check inside the chiller for leaks.

If you find leaks:

1 **Press the Stop Chiller button on the** control panel.

2 **Press the Manual Pump OFF arrow.**

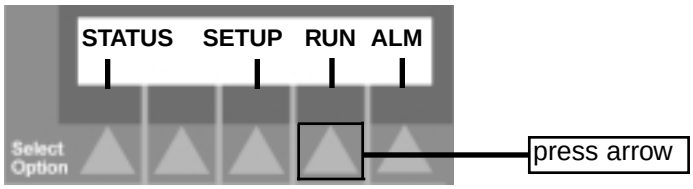
3 **Disconnect the Chiller from the** main power supply and repair any leaks. Dry any moisture inside the chiller

4 **Reconnect the main power supply.**

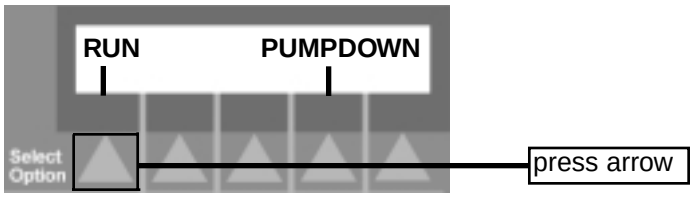
INITIALLY RUNNING THE CHILLER

Only after you have warmed the chiller properly, checked for leaks and checked for pump rotation should you run the chiller. To initially run the chiller, from the main screen:

1 Press the Run arrow.



The Run screen displays:



2 Press the RUN arrow.
Verify that the Chiller begins to run. Check that the Compressor, Process Pump, and Recirculation Pump lights on the control panel are lit. (The Process Pump light does not light until the evaporator outlet temperature is less than 75 °F (24 °C).

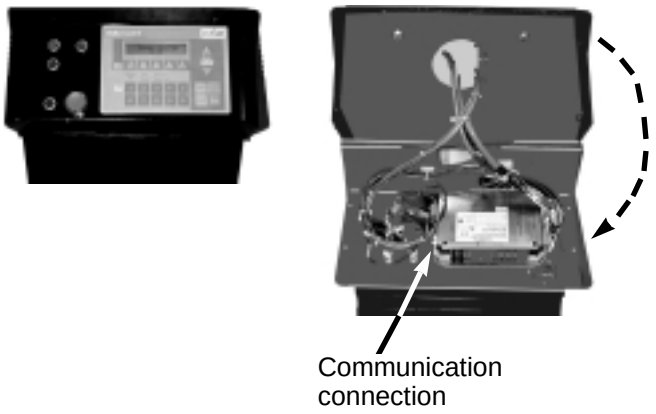
3 If you get an alarm message on the display:
If you get a ***Compressor1, 2 Rotation Error*** message, press the Stop Chiller button, unplug Chiller from main power supply, and switch any two compressor leads. Reapply main power supply. Wait for the needed warmup time and then press Run arrow.

4 Press the Escape/Previous button to
return to the Main screen.

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.

CONNECTING THE REMOTE CONTROL

If your chiller has the optional remote interface, you need to connect it to the chiller control. The control 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.

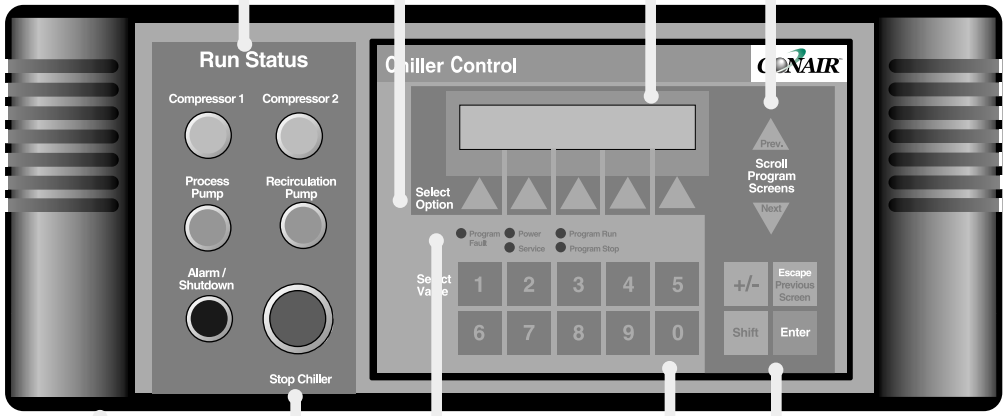
The compressor shuts off after a few seconds and the pump shuts off a few seconds later. This allows the chiller to pump down the refrigerant system and store the refrigerant in the receiver (water-cooled models) or condenser (air-cooled models. This prolongs the life of the chiller.

NOTE: If you want to restart the chiller immediately after stopping it, pressing the Run arrow on the display starts the process and recirculation pumps (the Process Pump and Recirculation Pump lights on the control panel light) 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 status of the compressors, process pump, recirculating 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, reset alarms 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.

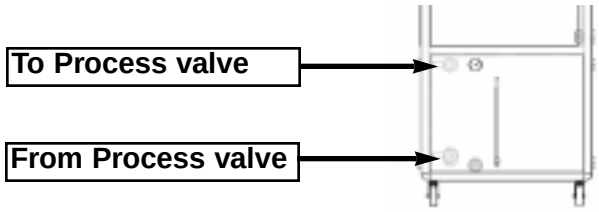
Daily maintenance includes:

- **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 annual maintenance procedures are detailed in the Maintenance section. Go there for the detailed maintenance descriptions.

Before starting the Chiller be sure to:

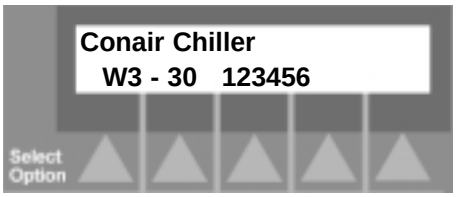
- **Open the To Process valve**
  to the full open position.
- **Open the From Process valve**
  to the 3/4 open position. You will need to adjust this valve when the chiller is running to obtain the desired pump discharge pressure. To find the approximate water flow, refer to the pump curves in Description section.
- **Open the supply valve**
  if the chiller has the optional Auto-fill reservoir.



POWERING UP

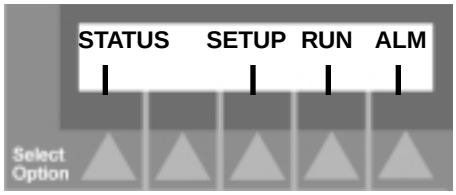
Plug in the power cord to restore power after any required maintenance. The Chiller requires 15 minutes warmup time after it is plugged in for the crankcase heater to warm up.

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:

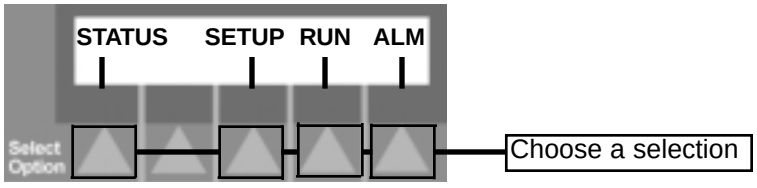


The main screen lets you:

- **view the status** of the water level, process temperature, process setpoint, 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**

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.

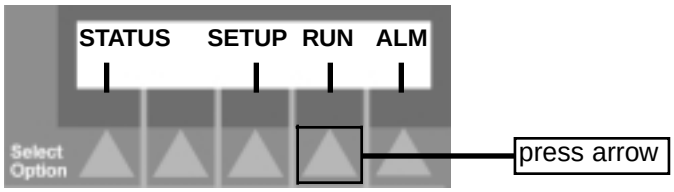
3 **Press the arrow pointing to the selection**
you want displayed on the screen.



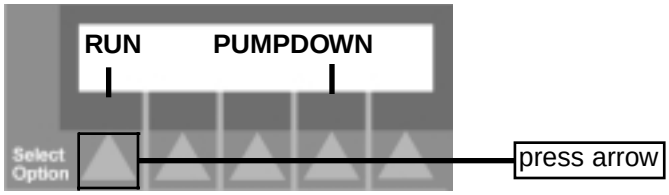
RUNNING/ STOPPING THE CHILLER

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 Run arrow.



In Run mode the compressor cycles off at 4° below the setpoint if the load is too low for the hot gas to keep the compressor from shutting down. If the compressor shuts down it will not restart until after 3 minutes and only if temperature is at least 1 °F above setpoint.

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.

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

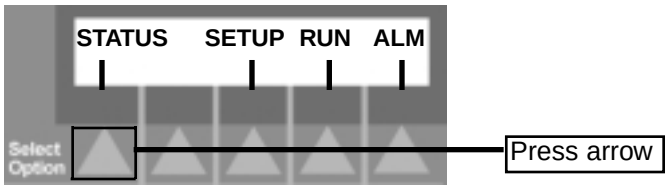
If you want to restart immediately, the pump will turn on but the compressor will not turn on for three minutes. The Process Pump Recirculation Pump lights on the control panel will light immediately. After three minutes the compressor turns on and the Compressor light on the control panel lights.

VIEWING STATUS SCREENS

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

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.

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:

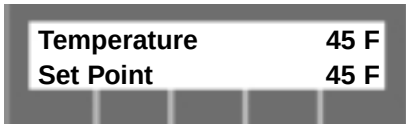
- **Setpoint temperature**
- **Percent Ethylene Glycol by volume**

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.

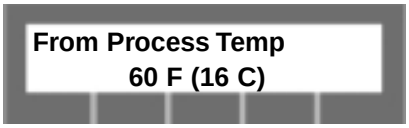
NOTE: Normal setpoint operating range is 40 - 70 F. If glycol is added to the Chiller and the percent glycol is entered into the control, the PLC automatically adjusts the setpoint operating range.

Status screens include:



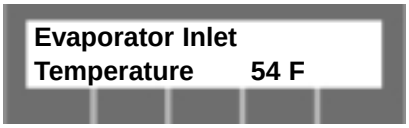
Temperature

Displays the To Process temperature and the Setpoint temperature. To change the Setpoint temperature, go to Changing Setpoint Temperature, in the Operation section.



From Process Temp

Shows the temperature of the fluid entering the chiller. Can display in degrees Fahrenheit or Celsius.

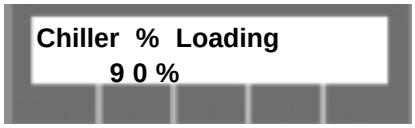


Evaporator Inlet Temperature

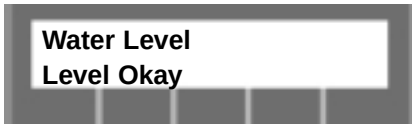
Displays the temperature at the inlet of the evaporator in degrees Fahrenheit.

VIEWING STATUS SCREENS
CONT'D

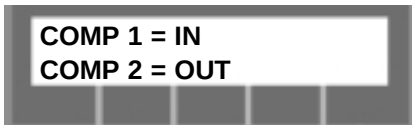
Chiller Percent Loading
Shows the current percent of chiller capacity being used. This percentage is a read-only value and changes as the chiller cycles.



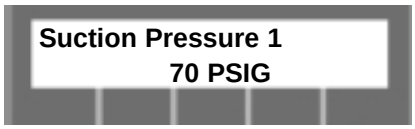
Water Level
Displays the current water level status. Screen displays Level Okay, or Level Low. If the level is low, see Filling the Chiller, in the Installation section.



Compressors (for units with dual compressors, 20 ton+)
Displays the activated or inactivated status of the two refrigeration circuits, compressor 1 and compressor 2. IN is activated; OUT is disabled.

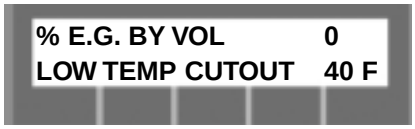


Refrigerant Suction Pressure
Shows the status of the refrigerant suction pressure in PSIG for both compressor(s) 1 and 2, if chiller has dual compressors. NOTE: Typical refrigerant suction pressure is between 55 PSIG and 95 PSIG.



Refrigerant Discharge Pressure
View the status of the refrigerant discharge pressure in PSIG for both compressor(s) 1 and 2, if chiller has dual compressors. 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.



PROGRAMMING SETTINGS

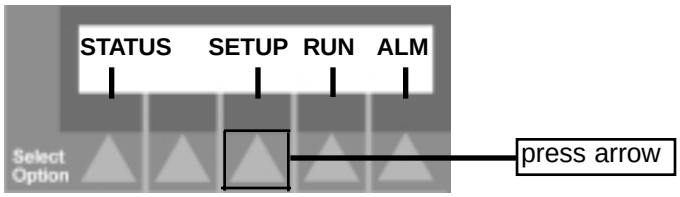
If you do not need to change any settings on the control, go to Running the Chiller.

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

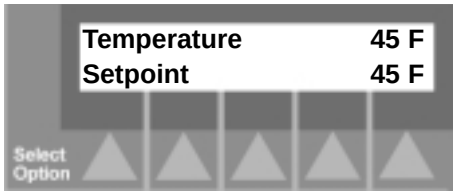
- **Temperature Setpoint**
  The temperature you want the To Process liquid.
- **Auto Tune PID**
  Helps maintain the temperature setpoint without overshooting.
- **High Temperature Deviation**
  Set the number of degrees the temperature can rise above the setpoint temperature without an alarm.
- **Percent 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.
- **Fan** (Air-cooled only)
  Set the upper and lower temperatures for the fan 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:



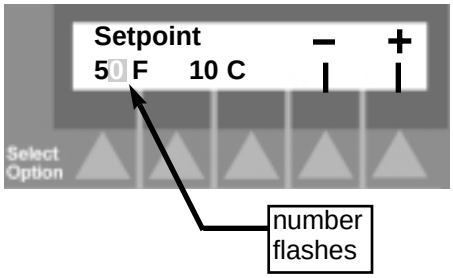
2 Press the Up and Down Scroll arrows to

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

CHANGING SETPOINT TEMPERATURE

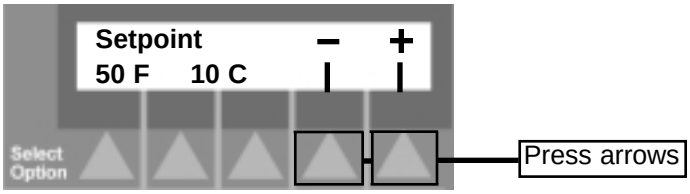
Use the Temperature Setpoint to set the temperature you want the water to be exiting the chiller at the To Process valve.

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 set the temperature setpoint. Press the numbers for the temperature you want, then press the Enter button to save.

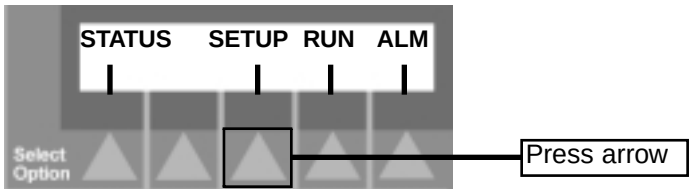
2 **Press the scroll arrows to move to the next** setup screen, or press Escape/ Previous Screen button to return to the main screen.

RESETTING PID SETTINGS

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

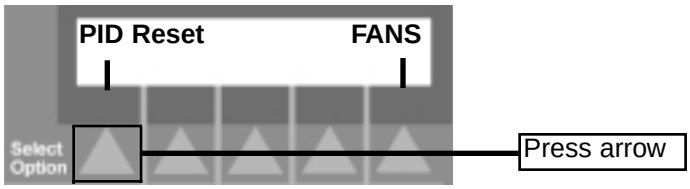
To reset PID from the main screen:

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.



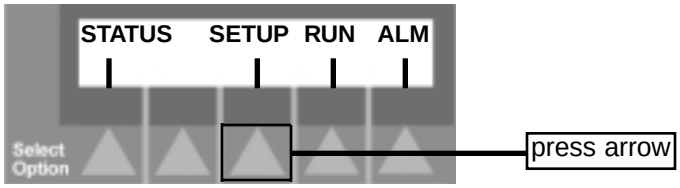
4 Press the scroll arrows to move to the next setup screen, or press Escape/ Previous Screen button to return to the main screen.

CHANGING HIGH TEMPERATURE DEVIATION

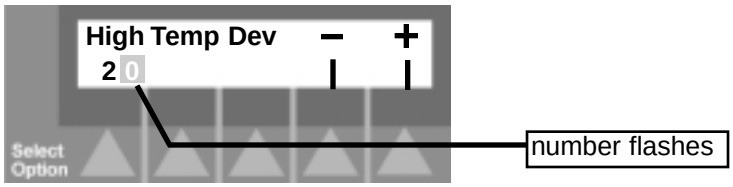
Decide how many degrees above the setpoint you want the chiller to deviate before an alarm occurs.

To set the high temperature deviation:

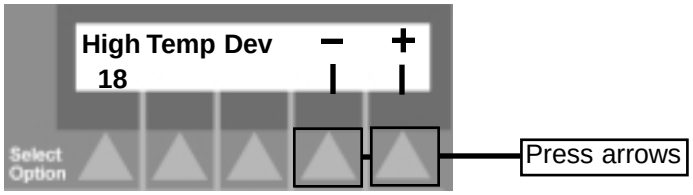
1 **Press the Setup arrow.**



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 number you want. The allowable range is 3 - 20 °F.



OR

Use the numeric keypad to enter the number for the high deviation. After using the keypad press the Enter button to save.

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

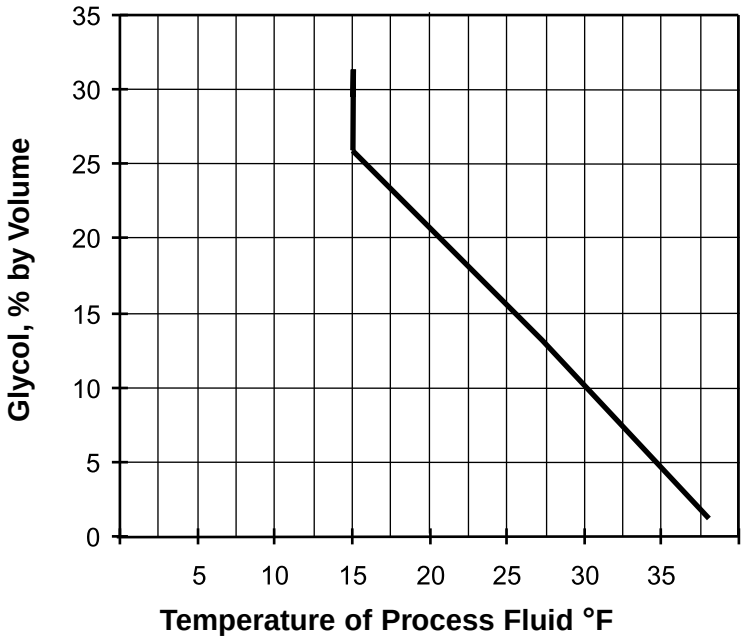
To set the percent ethylene glycol or propylene glycol solution determine the temperature of the process fluid you want.

Use water as the coolant for chilling the process fluid down to 40 °F (4 °C). Below 40 °F and down to 20 °F (-7 °C), use a glycol solution.

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.

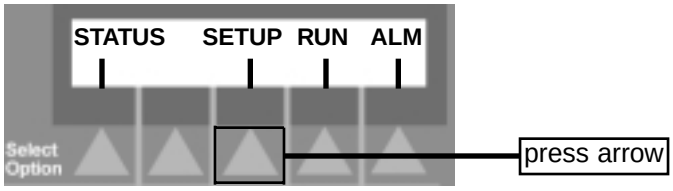
This screen is password protected. You must have clearance to enter and change this setting.



After choosing the temperature you want, 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:

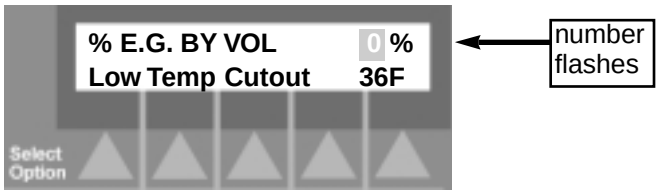
1 Press the Setup arrow.



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 the Chiller, in the Installation section.

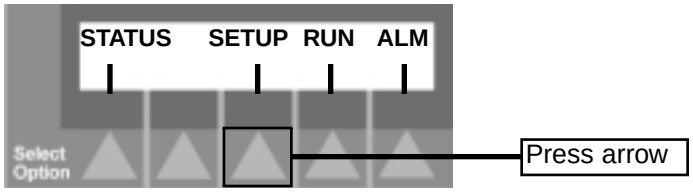
NOTE: This screen has password protection. You can change the percent glycol only if you have clearance. A screen displays: ***$316 Password level invalid...***
The password screen then displays, asking for the password. Enter the password (999). You now have password access for five minutes. Otherwise, press the Escape button to return to the Main screen.

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

SETTING FAN SETPOINTS

For the Air-cooled Portable Chillers you can choose the temperatures at which the fans cycle. To set the Fan Setpoints from the main screen:

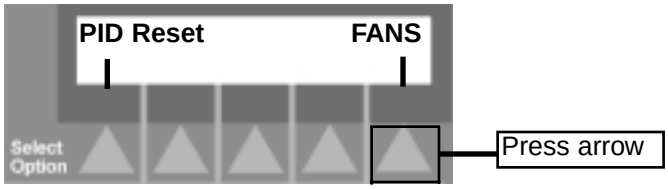
1 Press the Setup arrow.



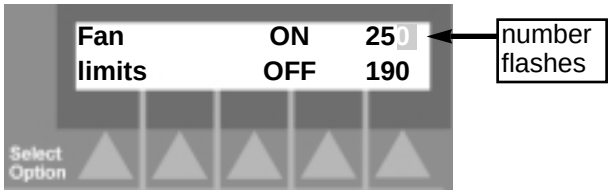
2 Press the Scroll arrows to scroll through the Setup screens. Stop when you get to the PID Reset screen.

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

3 Press the Fans arrow.

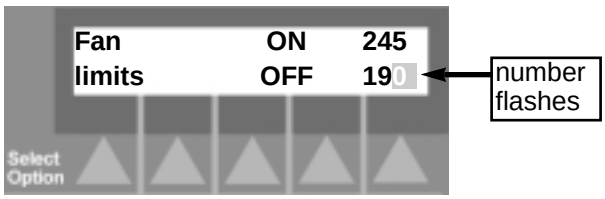


A screen displays asking for the password. Use the Keypad to enter the password (999) and then press the Enter button. The Fan Setpoint screen displays:



The screen shows the upper and lower condenser pressures in PSIG for the fan (the pressures when the fans turn on and off). The ON pressure flashes. Use the keypad to change this number. Then press Enter button to save the new number.

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

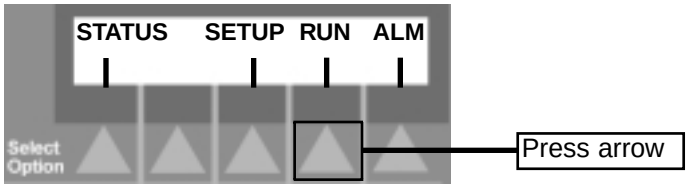
5 **Press Enter to save the change.**

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

SETTING AUTO TUNE MODE

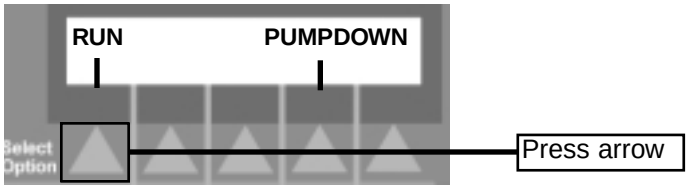
Use the Auto Tune Mode to maintain the temperature setpoint and minimize overshooting it. To set Auto Tune the chiller must be in Run mode. To run the Chiller from the main screen:

1 Press the Run arrow on the Main screen.



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

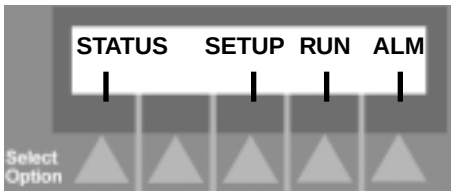
2 Press the RUN arrow.



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

To display the Auto Tune Mode from the main screen:

1 Press the Setup arrow.



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.**
The factory-set password is 999.

5 **Press the Enter button to enter the password.**

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

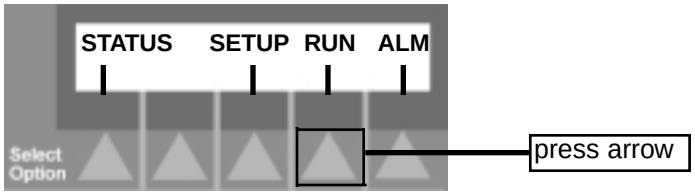
7 **Press the Tune arrow.**
The control begins tuning. This takes about 15 seconds. When tuning is complete the screen displays the 'TUNE Tuning' message. When tuning is complete, the screen displays 'TUNE Normal' message.

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

MANUALLY STARTING/ STOPPING THE PUMPS

To manually run or stop the process pump or the recirculation pump from the main screen:

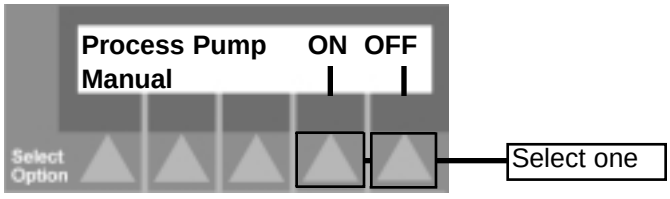
1 Press the arrow pointing to Run on the screen.

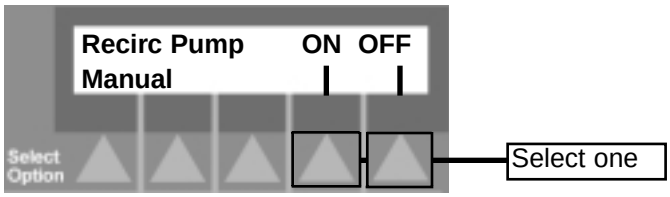


The first Run screen displays.

2 Use the Scroll arrows to scroll through Run screens.

Stop at either the Process Pump screen or the Recirc 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 3 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, condenser filter strainer at inlet
- caster locks
- temperature and pressure readings
- process fluid level
- efficiency
- evaporator, filter strainer at evaporator inlet
- cooling water treatment system (if used)
- flushing reservoir

WARNING AND CAUTIONS

Follow all cautions and warnings when working on the equipment.

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

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

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

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

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

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

WARNING: Hazardous substance
When burned, Forane R22 refrigerant forms Phosgene gas. If the chiller is placed in the vicinity of equipment with combustible systems, the combustion air intake must be ducted in from the outside and sealed in such a manner as to prevent any refrigerant from entering the combustion chamber. Refer to the Material Safety Data Sheet for Forane R22 included in the Appendix. This sheet explains the potential hazards and how to avoid them.

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

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

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

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

● Weekly, or as often as needed

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

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

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

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

● 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.

PREVENTATIVE MAINTENANCE SCHEDULE

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

❒ **Checking electrical connections, amps, volts**
Make sure electrical connections are properly seated. See Checking Electrical Connections, in the Maintenance section. Check fan, compressor, and pump amps and volts.

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

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

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

❒ **Checking refrigerant charge**
With the compressor running, check the sight glass between the receiver and evaporator for proper refrigerant condition. See Checking Refrigerant Charge, in the Maintenance section.

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

● Annually

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

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

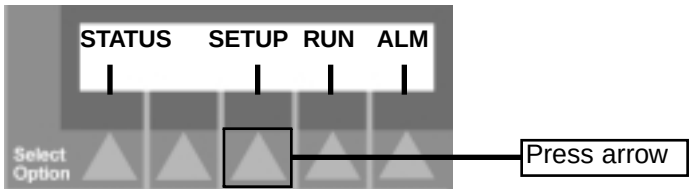
ENTERING MAINTENANCE SCREENS

The Maintenance screens are password protected. You must have clearance to enter and change settings on these screens.

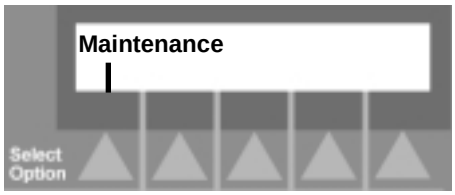
If the control buttons are not used for 5 minutes, the PLC defaults to the Temperature/ Setpoint screen. You must then re-enter the password to use the Maintenance screens.

Use the Maintenance screens to view cycling information.

1 Press the Setup arrow.

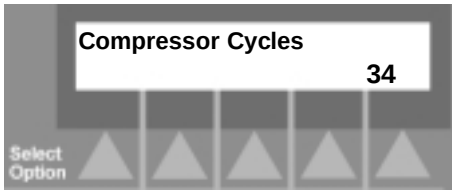


2 Press the Scroll arrows to scroll through the Setup screens. Stop when you get to the Maintenance screen:



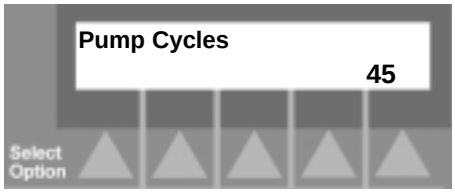
3 Press the Maintenance arrow.
The password screen displays. Use the keypad to enter the maintenance password, 999, then press the Enter button.

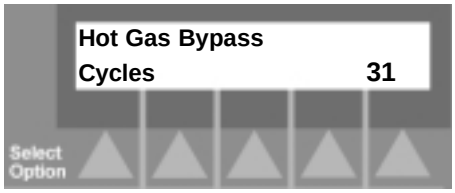
4 Press the CYL arrow.
The first Cycle screen displays. Use the Scroll arrows to scroll through the Cycle screens. These screens show cycle times (in hours). You can also choose the lead compressor (1 by default), and take a compressor in or out of service (IN by default). The Conair screen can only be entered by Conair Service personnel.

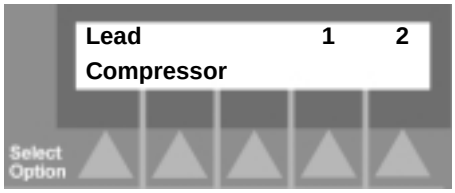


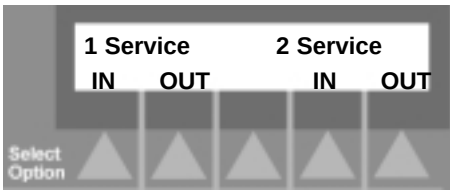
ENTERING MAINTENANCE SCREENS

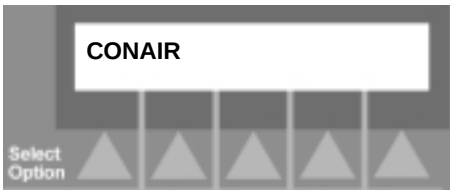
CONT'D











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

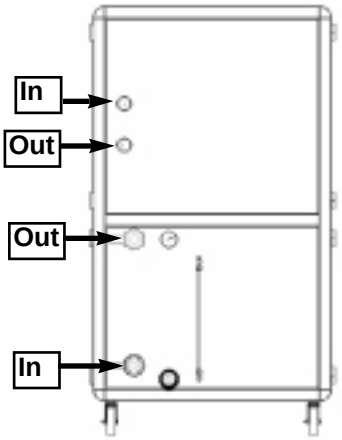
Minerals and other contaminants produce deposits, scales, slime, or algae on the heat transfer surfaces exposed to water. Fouled surfaces result in decreased cooling capacity. Implement a water treatment program to slow the fouling.

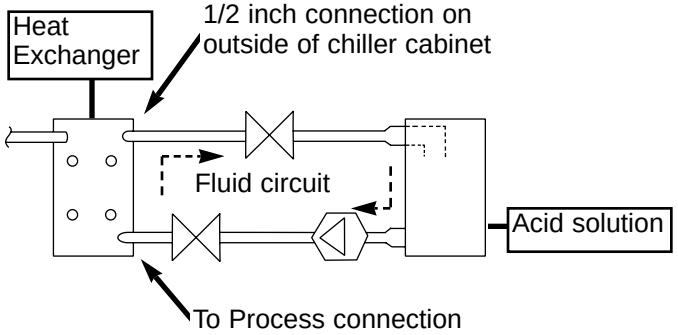
CAUTION: Hot Surfaces
Always protect yourself from hot surfaces when working on the Portable Chiller, especially when working on or around the compressor and condenser. These devices can reach up to 160 °F (71 °C). Allow these devices to cool before performing any maintenance or troubleshooting.

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 that is compatible with aluminum alloys.

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.

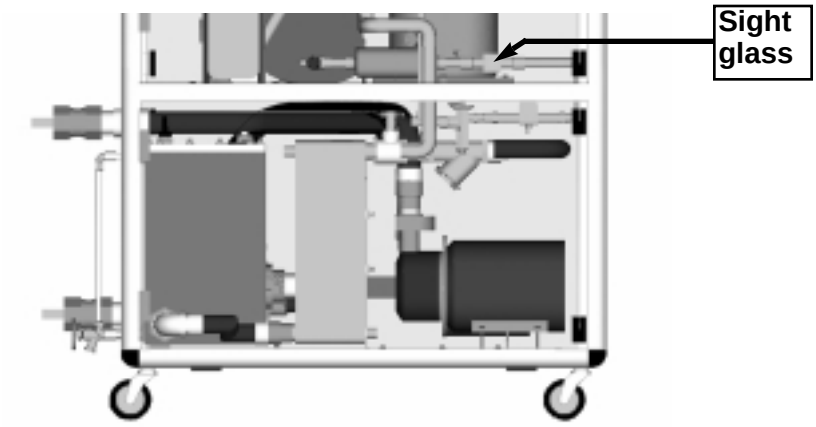
WARNING: Refrigerant hazard
Only certified refrigerant technicians should examine and correct problems involving the refrigerant circuit.

WARNING: Hazardous substance
When burned, Forane R22 refrigerant forms Phosgene gas. If the chiller is placed in the vicinity of equipment with combustible systems, the combustion air intake must be ducted in from the outside and sealed in such a manner as to prevent any refrigerant from entering the combustion chamber. Refer to the Material Safety Data Sheet for Forane R22 included in the Appendix. This sheet explains the potential hazards and how to avoid them.

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

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

If the charge is low and the Chiller is under warranty, contact Conair service; or have a local, certified refrigeration technician 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.

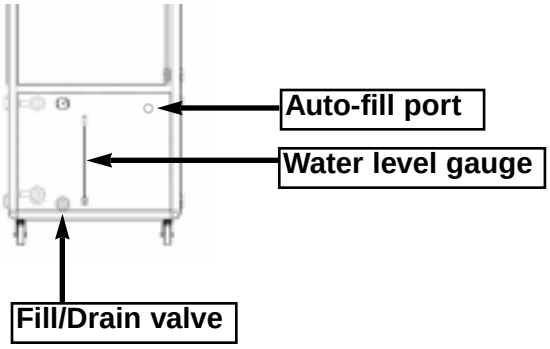
Check the fluid level in the reservoir. The meniscus in the sight glass on the back of the chiller should be in line with the mark on the sight glass.

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 manuals for other equipment connected in the system. Troubleshooting may require investigating other equipment attached to, or connected with the chiller.

A Few Words of Caution

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

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

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

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

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

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

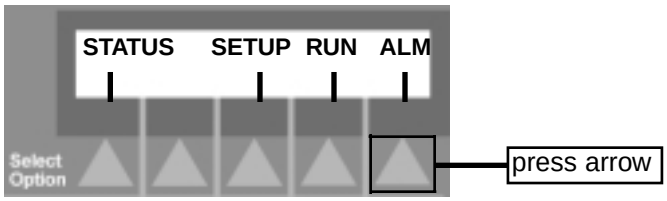
The Troubleshooting section covers problems directly related to the operation and maintenance of the Portable Chiller. Additional troubleshooting help can be found in the documentation manuals included with this User Guide.

Types of conditions you may see include control problems (not lighting, or lighting and not running), and alarm conditions.

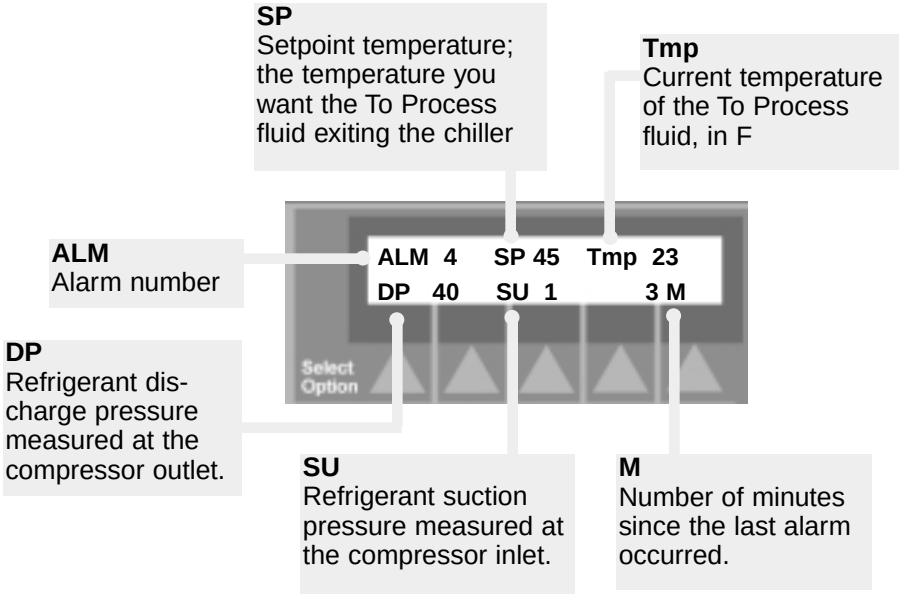
ANSWERING ALARMS

When an alarm condition occurs, the Alarm light on the control panel lights and the control screen displays a flashing message. Press the Alarm Silence/ Reset button to acknowledge the alarm and turn off the optional audible alarm.

To see information about the alarm, press the Alarm arrow on the Main screen:



The most recent alarm displays on the screen. For example:



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). The alarm information remains until you fix the alarm condition. Press the Alarm Silence/Reset button to acknowledge.

Refer to the Alarm table and 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.

Use the Alarm table for a description of each alarm:

ALARM TABLE

Alarm No.	Alarm Message	Description
01	Low Water Tank Level	The fluid level in the pump tank is low.
02	Flow Fault	There is low process fluid flow at the pump discharge.
03	Low Suction Pressure	The refrigerant pressure, as measured at the inlet of compressor 1 is low.
04	High Discharge Pressure	The refrigerant pressure, as measured at compressor 1 outlet is high.
05	Comp 1 Rotation Error	Compressor 1 is wired backwards. Two of the lead wires need switched.
06	Pump Overload	There is a high amperage condition; the pump is drawing too much current.
07	High Temperature Safety Temp >95 °F	The To Process fluid temperature is above 95 °F (measured at the evaporator outlet).
08	Low Temperature Cutout	If the To Process fluid temperature falls 5° below the minimum setpoint (measured at the evaporator outlet) the compressor shuts off to allow the temperature to rise.
09	Compressor Overload	High amperage condition; compressor 1 is drawing too much current.
10	High Temperature Temp > 75 °F for 5 min	To Process fluid temperature is above 75°F (measured at the evaporator outlet) after the compressor has been running for five minutes at startup.
11	High Discharge Temperature	For A/W3-3.5 and A/W3-5 models the high discharge refrigerant temperature switch actuates if there is a high discharge temperature, shutting off the compressor.
12	Evaporator Filter fault	The filter in the process water line is clogged.
13	Condenser Filter fault	The filter in the condenser water line is clogged (water-cooled models only.)
14	High Discharge Pressure 2	The refrigerant pressure, as measured at compressor 2 outlet, is high.
15	Low Suction Pressure 2	The refrigerant pressure, as measured at the inlet of compressor 2 is low.
16	Compressor fault	For A/W3-7.5 and larger models, the high temperature protection module trips when the internal temperature is high, compressor 1 is drawing too much current or there is a phase imbalance. The compressor shuts off and will not restart for 30 minutes if temperature falls.
17	Compressor 2 fault	For A/W3-7.5 and larger models, the high temperature protection module trips when the internal temperature is high, compressor 2 is drawing too much current or there is a phase imbalance. The compressor shuts off and will not restart for 30 minutes if temperature falls.
18	Compressor 2 Overload	High amperage condition; compressor 2 is drawing too much current.
19	Compressor 2 Rotation fault	Compressor 2 is wired backwards. Two of the lead wires need switched.
20	Fan Overload	High amperage condition; the fan motor is drawing too much current.
21	Discharge Pressure Sensor Failure	The sensor is incorrectly reading discharge pressure.
22	Discharge Pressure 2 Sensor Failure	Sensor 2 is incorrectly reading discharge pressure.
23	Fan VFD alarm	The variable frequency drive on the fan failed.
24	Recirc Pump Overload	High amperage condition; the recirculation pump is drawing too much current.
25	Remote Comm Error	Loss of communications to optional remote communications device.

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: Power and Program Run lights should be lit. 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. See Replacing Fuses, in the Troubleshooting section. ❒ Check the phase-to-phase voltages. ❒ Check phase continuity through the compressor contactor. ❒ Check the wiring at the compressor.

ALARM CONDITIONS

Alarm	Possible cause	Solution
ALM 01 Low Water Tank Level alarm	**Water level in tank is low.**	Fill tank to proper level. See Checking Reservoir Level, in the Maintenance section. Inspect for leaks in the process piping. Repair as necessary. See Making Plumbing Connections, in the Installation section.
	Failed Level switch.	Check level gauge and compare it to status of the level switch by checking continuity of switch in electrical enclosure. Refer to wiring diagrams. Clean switch; replace as needed
	IF CHILLER HAS AUTO-FILL OPTION:	
	Solenoid valve faulty.	Check level gauge and compare it to status of the level switch by checking continuity of switch in electrical enclosure. Refer to wiring diagrams. Clean switch; replace as needed.
	Water supply valve closed.	Open supply valve.
	Input wiring to PLC incorrect.	Check wiring diagrams and compare to wiring to PLC; correct as needed.

ALARM CONDITIONS CONT'D

Alarm	Possible cause	Solution
ALM 02 Flow Fault alarm	**The To Process and From Process valves are closed.**	Open valve(s).
	The Process fluid strainer is clogged.	Clean the strainer.
	Water level in reservoir is low 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 the 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.
	Evaporator is frozen.	Apply warm air to the evaporator to thaw.

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.
	The Evaporator is fouled.	Clean Evaporator. See Cleaning the Evaporator or Water-cooled Condenser, in the Maintenance section.
	Evaporator 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. Add glycol if needed.
	Faulty TXV solenoid.	Check wiring, voltage, coil and relay (see electrical drawings); replace as needed.
	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.
	Condenser air or water too cold.	Check air/water temperature. Water should be 65 F or higher; air temperature should be 60 F or higher.
	Wiring incorrect.	Use wiring diagrams and check wiring. Correct as needed.

ALARM CONDITIONS CONT'D

Alarm	Possible cause	Solution
ALM 04 High 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. Check and clean filter strainer.
	Condenser fouled.	Clean the condenser. See Cleaning the Air-cooled Condenser, and Cleaning the Evaporator or Water-cooled Condenser, in the Maintenance section.
	Fan motor not running.	Check fan cycling operation settings. Motor may be bad. See Drive manual electrical information accompaning this user guide.
	Faulty liquid line solenoid valve.	Check voltage. Replace valve as needed.
	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.
	Input wiring to PLC incorrect.	Check wiring diagrams and compare to wiring to PLC; correct as needed.

ALARM CONDITIONS

Alarm	Possible cause	Solution
ALM 05 Comp 1 Rotation Error alarm	**Compressor 1 is wired incorrectly.**	Shut off chiller supply voltage. Switch any two leads: ● at compressor if it was replaced. ● at main terminal block if new unit installation. Turn chiller on.
	High pressure transducer is faulty.	Check discharge pressure on the Status screen. See Checking the Pressure Transducer, 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 (FLA) draw. Adjust overload accordingly.
	Low supply voltage.	❑ Check supply voltage. Supply voltage to contactor should be +- 10% of name-plate voltage. ❑ Check wire terminations and connections. Tighten if loose.
	Faulty contactor	Check line and load side of contactor. It should be less than 5 volt drop across the contactor. If it is not, replace the contactor. See Replacing the Contactor in the Troubleshooting section.
	Faulty overload module.	Check amp draw of circuit. If it is under the rated setting, replace the overload module. See Replacing Overload Modules, in the Troubleshooting section.
	Control voltage is incorrect.	Check 24VDC required for contactor auxiliary input. If control voltage is OK replace PLC.

ALARM CONDITIONS

Alarm	Possible cause	Solution
ALM 07 High Temperature Safety Temp >95 F 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.
	Load is too high for the chiller.	Remove some load from the 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. Check voltage to coil; replace coil if needed.
	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.
	Hot Gas Bypass valve relay failed.	Replace as needed (see electrical drawings.)

ALARM CONDITIONS

Alarm	Possible cause	SOLUTION
ALM 09 Compressor Overload alarm	**Overload set incorrectly.**	Check table on wiring diagram for correct rated load amperage (RLA) draw. Adjust overload accordingly.
	Low supply voltage.	❑ Check supply voltage. Supply voltage to contactor should be +- 10% of name-plate voltage. ❑ Check wire terminations and connections. Tighten if loose.
	Faulty contactor	Check line and load side of contactor. It should be less than 5 volt drop across the contactor. If it is not, replace the contactor. See Replacing the Contactor in the Troubleshooting section.
	Faulty overload module.	Check amp draw of circuit. If it is under the rated setting, replace the overload module. See Replacing Overload Modules, in the Troubleshooting section.

ALARM CONDITIONS CONT'D

Alarm	Possible cause	Solution
ALM 10 High Temperature Temp > 75 F for 5 min alarm	**Load too high for chiller.**	Reduce load on chiller; if not able to reduce load, choose a chiller with more capacity.
	Refrigeration circuit not working properly.	Check refrigerant circuit. See Checking Refrigerant Charge, in the Installation section.
ALM 11 High Discharge Temperature alarm	**Compressor malfunctioned.**	Check voltage to compressor. Check contact points on contactor. Replace if needed.
	Refrigeration charge low.	Check temperature on suction line; it should be less than 60 °F. Check refrigerant sight glass for bubbles. Charge with refrigerant if needed.
	Temperature sensor is faulty (for A/W2-3.5 and A/W2-5 models only).	Replace temperature sensor mounted on the discharge side of the compressor (trip point is 260 °F).

ALARM CONDITIONS

Alarm	Possible cause	Solution
ALM 12 Evaporator Filter Fault alarm	**Clogged strainer.**	Clean strainer; replace as needed.
	Evaporator fouled.	Clean Evaporator. See Cleaning the Evaporator or Water-cooled Condenser, in the Maintenance section.
	A valve is closed in the process water flow piping.	Check valves; open if closed.
	There is a PLC voltage problem.	Check voltage (see electrical drawings).
	The differential pressure switch is faulty.	Check wiring and voltage; replace switch as needed.
	Other piping obstruction.	Check that all piping is large enough to carry fluid. Replace any piping or conduit that is too small. Clean any clogs.

Alarm	Possible cause	Solution
ALM 13 Condenser Filter Fault alarm	**Clogged strainer.**	Clean strainer; replace as needed.
	The differential pressure switch is faulty.	Check wiring and voltage; replace switch as needed.
	Other piping obstruction.	Check that all piping is large enough to carry fluid. Replace any piping or conduit that is too small. Clean any clogs.
	Condenser fouled.	Clean Evaporator. See Cleaning the Evaporator or Water-cooled Condenser, or Cleaning the Air Cooled Condenser, in the Maintenance section.

ALARM CONDITIONS

Alarm	Possible cause	Solution
ALM 14 High Discharge Pressure 2 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. Check and clean filter strainer.
	Condenser fouled.	Clean the condenser. See Cleaning the Air-cooled Condenser, and Cleaning the Evaporator or Water-cooled Condenser, in the Maintenance section.
	Fan motor not running.	Check fan cycling operation settings. Motor may be bad. See Drive manual electrical information accompaning this user guide.
	Faulty liquid line solenoid valve.	Check voltage. Replace valve as needed.
	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 Adjusting the Pressure Transducer, in the Troubleshooting section.

Alarm	Possible cause	Solution
ALM 15 Low Suction Pressure 2 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.
	The Evaporator is fouled.	Clean Evaporator. See Cleaning the Evaporator or Water-cooled Condenser, in the Maintenance section.
	Evaporator 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. Add glycol if needed.
	Faulty TXV solenoid.	Check wiring, voltage, coil and relay (see electrical drawings); replace as needed.
	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.
	Condenser air or water too cold.	Check air/water temperature. Water should be 65 F or higher; air temperature should be 60 F or higher.
	Wiring incorrect.	Use wiring diagrams and check wiring. Correct as needed.

ALARM CONDITIONS

Alarm	Possible cause	SOLUTION
ALM 16 Compressor Fault alarm	**Compressor module protector fault.**	See compressor manual accompanying this user guide. If necessary, call your Conair Service Representative.
ALM 17 Compressor 2 Fault alarm	**Compressor malfunctioned.**	Call your Conair Service Representative.

Alarm	Possible cause	SOLUTION
ALM 18 Compressor 2 Overload alarm	**Overload set incorrectly.**	Check table on wiring diagram for correct rated load amperage (RLA) 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. It should be less than 5 volt drop across the contactor. If it is not, replace the contactor. See Replacing the Contactor in the Troubleshooting section.
	Faulty overload module.	Check amp draw of circuit. If it is under the rated setting, replace the overload module. See Replacing Overload Modules, in the Troubleshooting section.
	Control voltage is incorrect.	Check 24VDC required for contactor auxiliary input. If control voltage is OK replace PLC.

ALARM CONDITIONS

Alarm	Possible cause	Solution
ALM 19 Compressor 2 Rotation Fault alarm	**Compressor 2 is wired incorrectly.**	Shut off chiller supply voltage. Switch any two leads: ● at main terminal block if new unit installation. ● at compressor if it was replaced. Turn chiller on.
	High pressure transducer is faulty.	Check discharge pressure on the Status screen. See Checking the Pressure Transducer, in the Troubleshooting section.

ALARM CONDITIONS CONT'D

Alarm	Possible cause	Solution
ALM 20 Fan Overload alarm	**Access door is open.**	Close access door.
	Overload switch has been manually shut off.	Reset overload switch.
	Overload set incorrectly.	Check table on wiring diagram for correct full load amperage (FLA) 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. It should be less than 5 volt drop across the contactor. If it is not, replace the contactor. See Replacing the Contactor in the Troubleshooting section.
	Faulty overload module.	Check amp draw of circuit. If it is under the rated setting, replace the overload module. See Replacing Overload Modules, in the Troubleshooting section.
	Control voltage is incorrect.	Check 24VDC required for contactor auxiliary input. If control voltage is OK replace PLC.

ALARM CONDITIONS

Alarm	Possible cause	SOLUTION
ALM 21 Discharge Pressure Sensor Failure alarm	**Wiring bad.**	Check wiring; correct as needed.
	There is RF interference.	Check for any electromagnetic interference (for example, from radios). Remove any objects causing the problem.
	The sensor has been damaged.	Check discharge pressure status. See Checking the Pressure Transducer, in the Maintenance section. Repair or replace the sensor.
ALM 22 Discharge Pressure Sensor 2 Failure alarm	**Wiring bad.**	Check wiring; correct as needed.
	There is RF interference.	Check for any electromagnetic interference (for example, from radios). Remove any objects causing the problem.
	The sensor has been damaged.	Check discharge pressure status. See Checking the Pressure Transducer, in the Maintenance section. Repair or replace the sensor.
ALM 23 Fan VFD alarm	**Variable frequency drive failed.**	Check the Seimens Drive manual that accompanies this user guide.

Alarm	Possible cause	Solution
ALM 24 Recirc Pump Overload alarm	**Overload set incorrectly.**	Check table on wiring diagram for correct full load amperage (FLA) draw. Adjust overload accordingly.
	Low supply voltage.	❑ Check supply voltage. Supply voltage to contactor should be +- 10% of name-plate voltage. ❑ Check wire terminations and connections. Tighten if loose.
	Faulty contactor	Check line and load side of contactor. It should be less than 5 volt drop across the contactor. If it is not, replace the contactor. See Replacing the Contactor in the Troubleshooting section.
	Faulty overload module.	Check amp draw of circuit. If it is under the rated setting, replace the overload module. See Replacing Overload Modules, in the Troubleshooting section.
	Control voltage is incorrect.	Check 24VDC required for contactor auxiliary input. If control voltage is OK replace PLC.

ALARM CONDITIONS

Alarm	Possible cause	SOLUTION
ALM 25 Remote Comm Error alarm	**Wiring bad.**	Check wiring between chiller and optional remote communications device; correct as needed.
	Remote device failed.	Check the manual that accompanies the remote device to troubleshoot.

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.

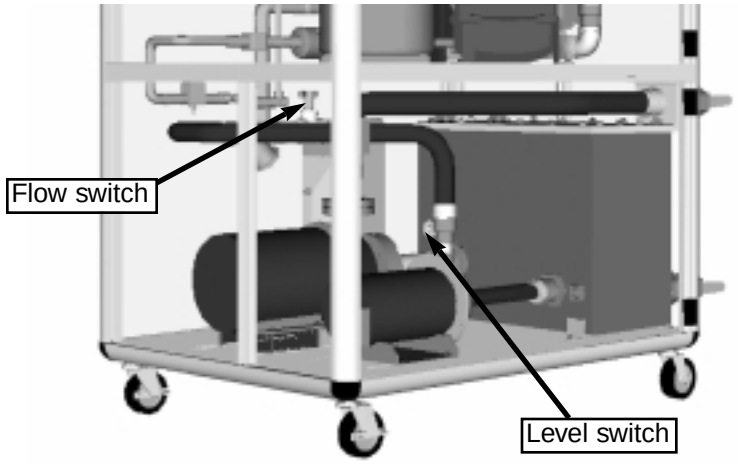
To replace a level or flow switch:

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).

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

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

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

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:

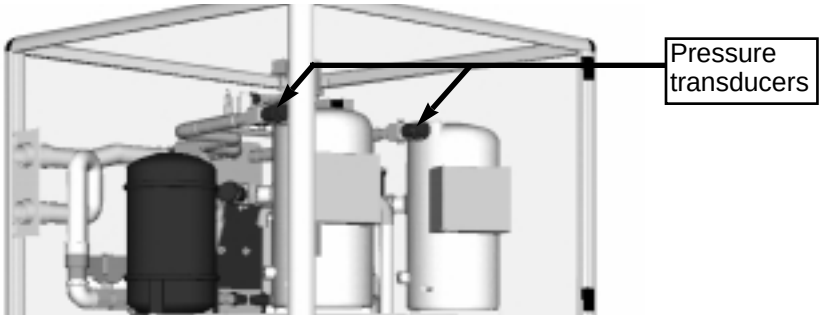
1 Locate the pressure transducer.
Use the piping diagrams that came with your chiller for exact location. Location varies depending on size of your chiller.

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.

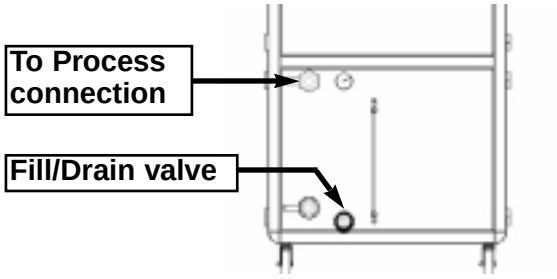


REPLACING THE RTD

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.

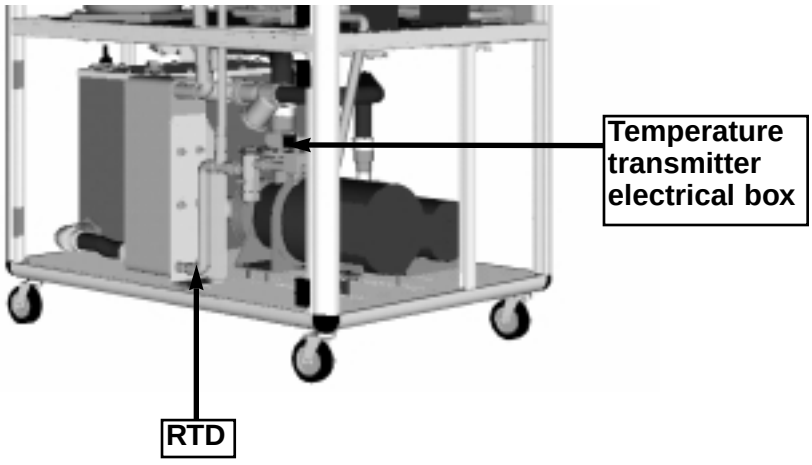
4 **Open the side of the chiller.**

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.



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

CHECKING THE TEMPERATURE TRANSMITTER AND RTD

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

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.

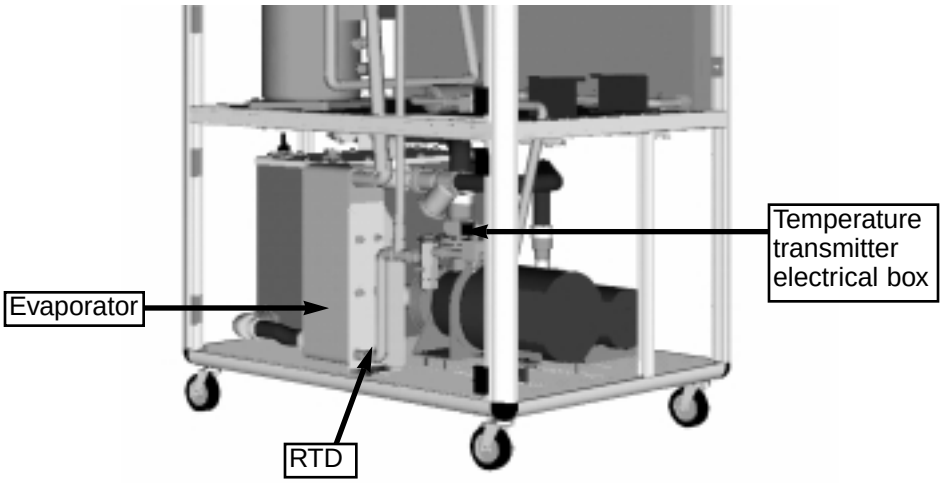
2 Open the electrical enclosure.
Check wire connections at the terminals. Refer to the wiring diagram.

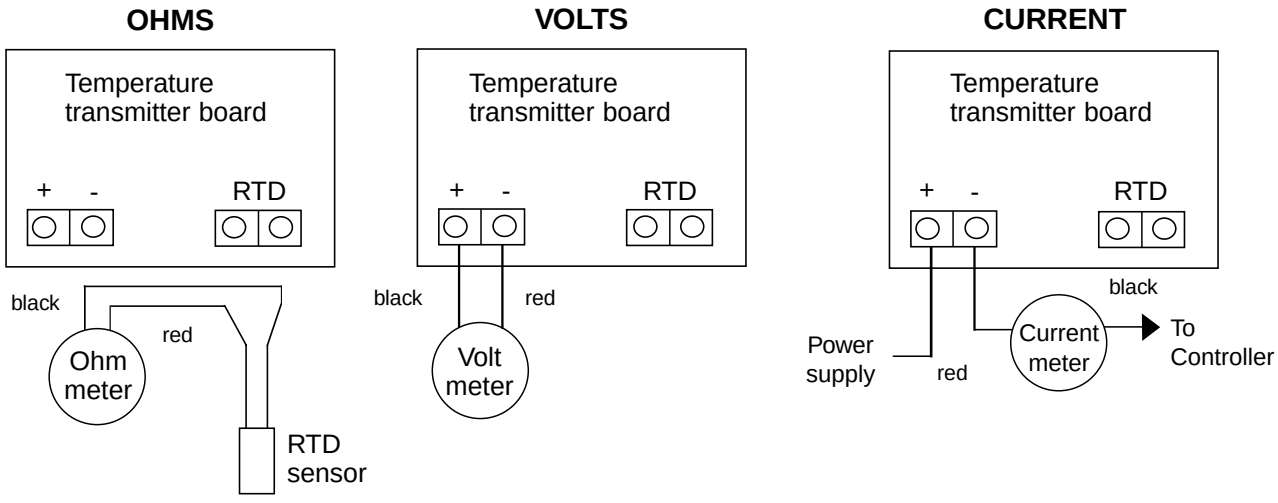
3 Find the temperature sensor in the evaporator.

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

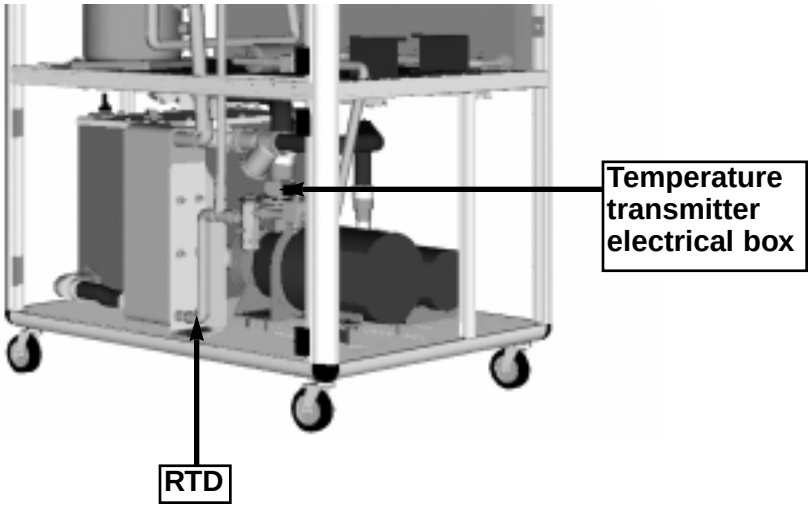
Problem	Possible cause	Solution
No reading	No power to board.	Check voltage at power supply. Measure volts across the + and - of the power wires. Voltage should be 8 - 35 VDC.
Reading too low	RTD wires shorted.	Disconnect RTD before testing sensor resistance. Check RTD with ohmmeter. Should be close 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 TEMPERATURE TRANSMITTER

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

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).

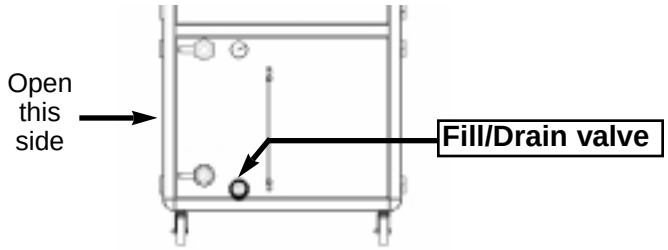


REMOVING PUMP COMPONENTS

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 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:

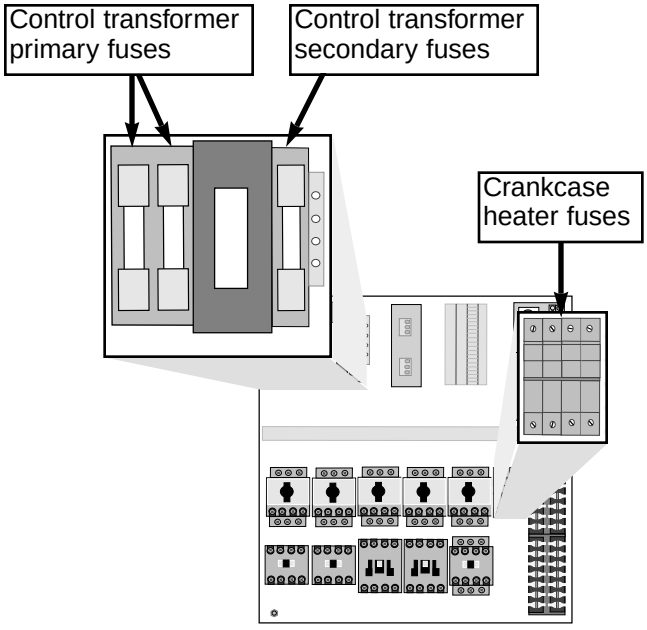
1 **Disconnect and lockout power to the chiller.**

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

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

3 **Remove and replace fuses.**

4 **Restore power to the chiller.**



REPLACING OVERLOAD MODULES

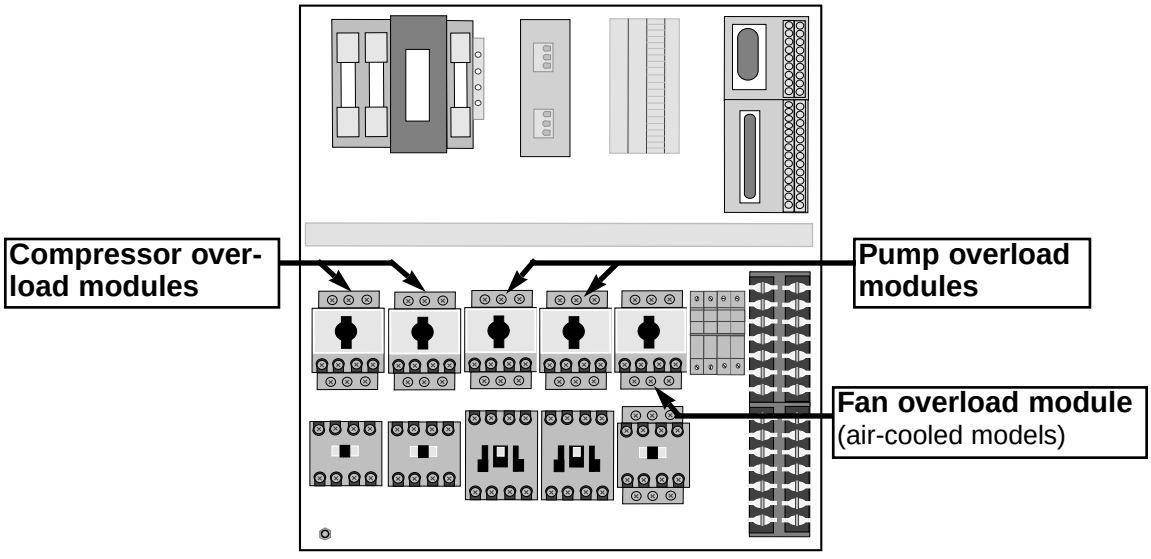
WARNING: Electrical hazard
Before performing any work on this unit, disconnect and lock out electrical power sources to prevent injury from unexpected energization or startup.

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.



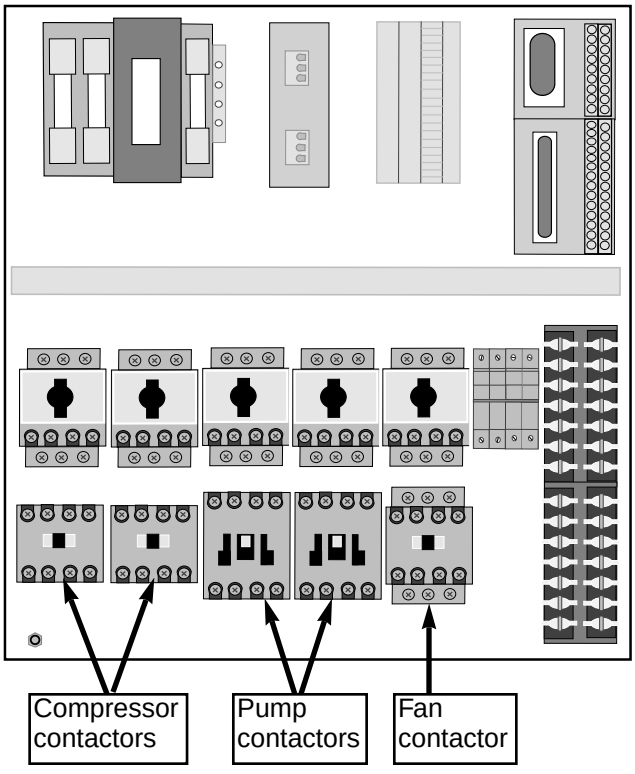
REPLACING THE CONTACTOR

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.

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

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.
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.

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.**

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

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

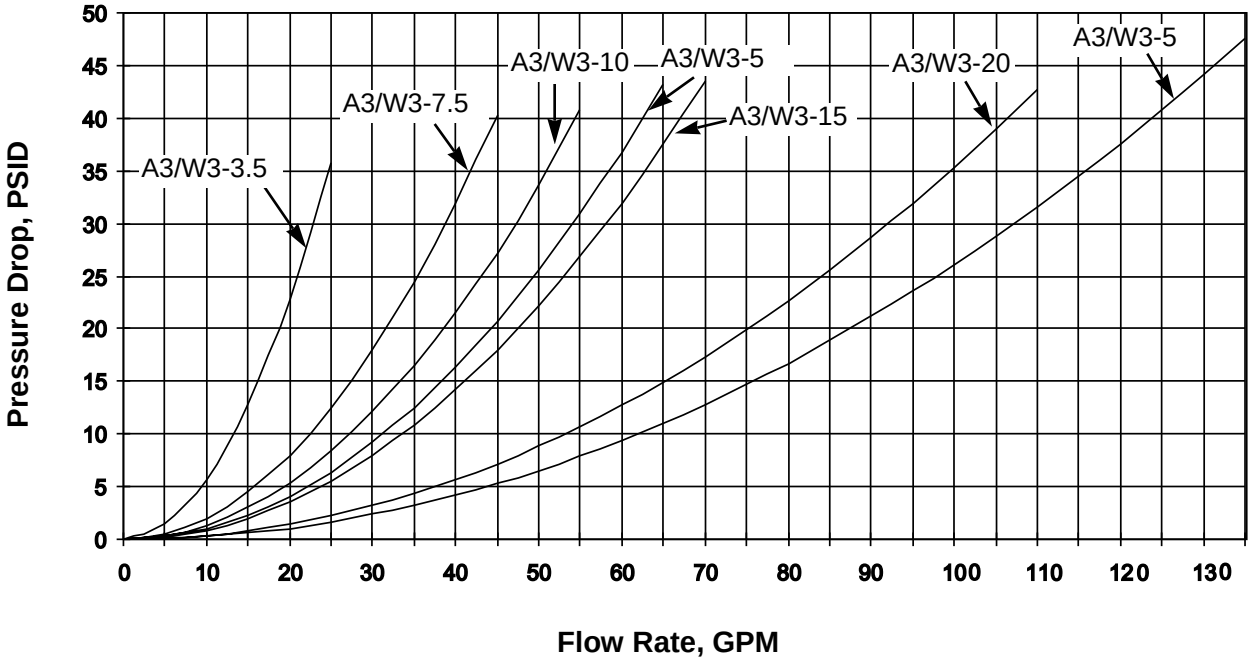
Except for the Equipment Guarantee and Performance Warranty stated above, Conair disclaims all other warranties with respect to the equipment, express or implied, arising by operation of law, course of dealing, usage of trade or otherwise, including but not limited to the implied warranties of merchantability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

MAINTENANCE LOG

Date	Reading								
Maintenance Item									
Compressor 1, 2 Amps, 100% loaded									
Discharge Pressure 1, 2									
Suction pressure 1, 2									
Evaporator water out temperature									
Process Water Pressure									
Condenser Water Temperature, In/Out									
Condenser Water Pressure, In/Out									
Condenser Fan Amps									
Process Pump Amps									
Recirc Pump Amps									
Unit Volts Primary Secondary									
Condenser Air Temp In									
Condenser Air Temp Out									
Oil Level									
Super Heat									
Temperature Setpoint									
RTD Temperatures (4)									

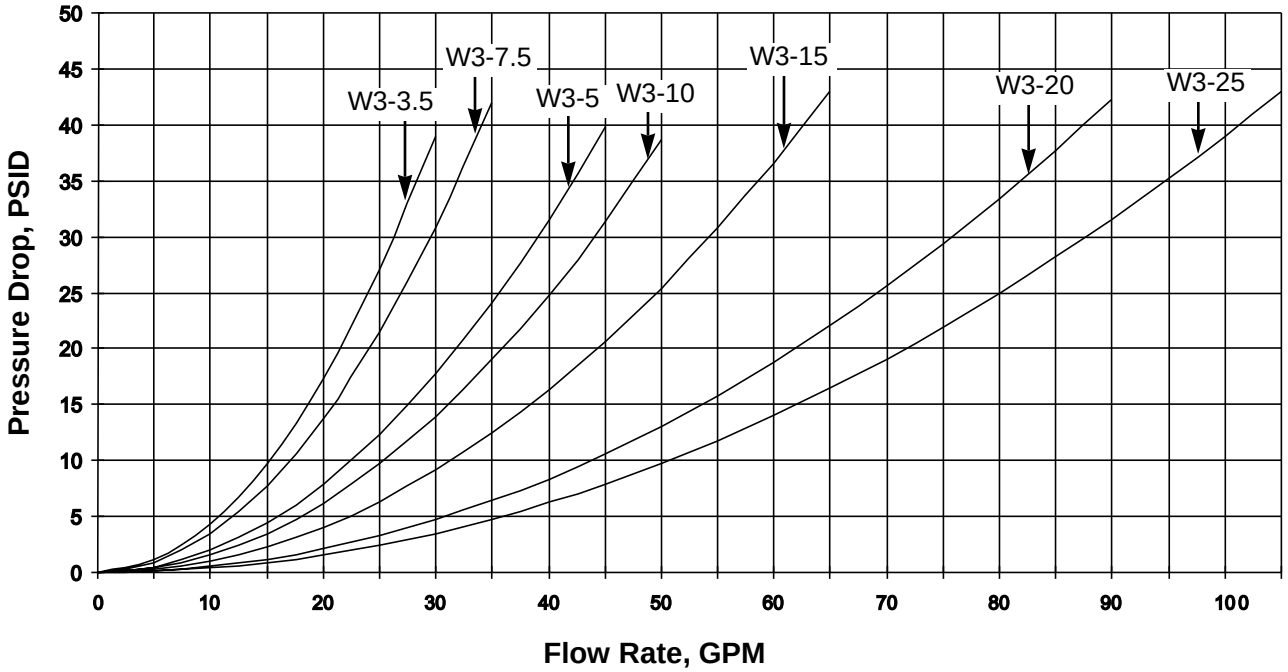
Evaporator and Piping Pressure Drops

PRESSURE TABLES



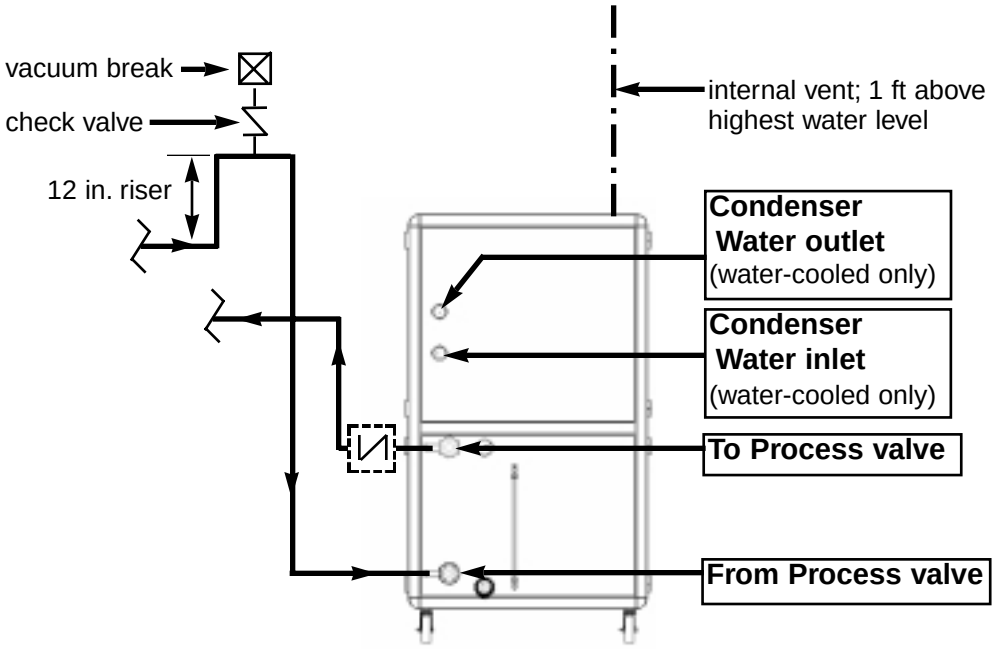
PRESSURE TABLES

Condenser and Piping Pressure Drops



OVERHEAD PLUMBING DETAILS

Overhead piping installations above process connections require installing a check valve in the To Process line and a 12 inch (305 mm) riser with check valve and vacuum break in the From Process line to prevent siphoning when shutting down. Install a vent tube to 12 inches (305 mm) above the highest system point to prevent over pressurization. Maximum height of piping above process connections is 10 ft (3 m).



back view

PARTS & DIAGRAMS

RECOMMENDED SPARE PARTS

Part Number	Description
	C7-621 PLC/ Operator Panel-Custom black 24VDC, 3A power supply 120VAC 4” Alarm Bell 20VAC White Strobe 24VDC Single Pole Relay, (DIN) w end plate
	22 mm Red extended pushbutton operator 28VDC Green indicator light 28VDC Red indicator light 22 gauge, 15 Conductor cable, w/ Sub D 15 pin female connection
	22 gauge, 37 Conductor cable, w/ Sub D 15 pin female connection MSP-to-Contactor connecting module, 3RA3921-1A MSP-to-Contactor connecting module, 3RA3921-1B MSP-to-Contactor connecting module, 3RA3921-1D
	MSP-to-Contactor connecting module, 3RA3931-1A MSP-to-Contactor connecting module, 3RA3931-1B MSP-to-Contactor connecting module, 3RA3941-1A MSP-to-Contactor connecting module, 3RA3941-1B 3 Pole Contactor w/ 24VDC coil, 7A (AC-3)
	3 Pole Contactor w/ 24VDC coil, 9A (AC-3) 3 Pole Contactor w/ 24VDC coil, 12A (AC-3) 3 Pole Contactor w/ 24VDC coil, 17A (AC-3) 3 Pole Contactor w/ 24VDC coil, 25A (AC-3) 3 Pole Contactor w/ 24VDC coil, 28A (AC-3)
	3 Pole Contactor w/ 24VDC coil, 32A (AC-3) 3 Pole Contactor w/ 24VDC coil, 40A (AC-3) 3 Pole Contactor w/ 24VDC coil, 50A (AC-3) 3 Pole Contactor w/ 24VDC coil, 65A (AC-3) Motor Starter Protector (1.8-2.5A)
	Motor Starter Protector (2.2-3.2A) Motor Starter Protector (3.5-5.0A) Motor Starter Protector (4.5-6.3A) Motor Starter Protector (5.5-8.0A) Motor Starter Protector (7.0-10.0A)

RECOMMENDED SPARE PARTS

Part Number	Description
	Motor Starter Protector (28.0-40.0A) Motor Starter Protector (40.0-50.0A) Motor Starter Protector (45.0-63.0A) Motor Starter Protector (57.0-75.0A) Motor Starter Protector (20.0-25.0A)
	Motor Starter Protector (18.0-25.0A) Motor Starter Protector (22.0-32.0A) Motor Starter Protector (9.0-12.5A) Motor Starter Protector (11.0-16.0A) Motor Starter Protector (14.0-20.0A)
	Motor Starter Protector (17.0-22.0A) MSP Auxiliary Contact Block (2n.o.) MSP Line Side Feeder MSP Feeder Lug (3RV101, 3RV102) MSP Feeder Lug (3RV103)
	Normally Open contact block Normally Closed contact block 3 Pole SIMICONT Contactor w 24VDC Coil (9A) Control Terminal Block, Size 4 Terminal Block End Bracket
	Terminal Block Barrier Littlefuse 0.5A Fuse, 250VAC Littlefuse 3.0A Fuse, 250VAC Littlefuse 5.0A Fuse, 250VAC Littlefuse 0.25A Fuse, 600VAC
	Littlefuse 2.0A Fuse, 600VAC 1 Pole Fuseblock Cover Lit Transformer Touch Safe Cover Lit 1 Pole Secondary Fuseblock 2 Pole Primary Fuseblock
	Littlefuse 2 Pole Ultrasafe Fuseblock Motorola 5 VDC Voltage Regulator 250VA Control Transformer 230x460, 110/115/120 250VA Control Transformer 550/575/600, 110/115/120 250VA Control Transformer 380/400/415, 110x120

RECOMMENDED SPARE PARTS

Part Number	Description
	250VA Control Transformer 208/230/460, 24/115
	Pump Seal Kit, pump type 231
	Pump Seal Kit, Pump type 233, 3HP
	Pump Seal Kit, Pump type 233, 5HP
	Pump Seal Kit, Pump type 234, 7.5HP
	Pump Seal Kit, Pump type 233, 7.5HP and 10HP
	Pump Seal Kit, Pump type 234, 10HP and 15HP
20973003	Flowtect, Flow Switch, Evap Circuit
26636101	Gems, Float Switch, Process Tank
26629901	Pressure Gauge, Dual Scale, 0-160PSIG
26636001	Suction Pressure Transducer, 0-300 PSIA
26636002	Discharge Pressure Transducer, 0-500 PSIA
20966801	Temperature Transmitter w/ 8”x14’ 100ohm RTD
20966802	8”x14’ 100ohm RTD
331021051	Differential Pressure Switch, 0-45 PSID
2920580201	Refrigerant Pressure Relief Valve, 400PSIG, Air-cooled Chiller (1-4 ton)
2920581001	Refrigerant Pressure Relief Valve, 400PSIG, Air-cooled Chiller (5-7.5 ton)
2920581301	Refrigerant Pressure Relief Valve, 400PSIG, Air-cooled Chiller (10 and 13 ton)
2920580202	Refrigerant Pressure Relief Valve, 350PSIG, Water-cooled Chiller (1.5-5 ton)
2920581302	Refrigerant Pressure Relief Valve, 350PSIG, Water-cooled Chiller (7.5-15 ton)
2920940902	Filter Dryer, 1.5-3 ton
2920941302	Filter Dryer, 4-7.5 ton
2920941802	Filter Dryer, 10-15 ton
29213103	TXV 1.5 ton Water-cooled
29213104	TXV 1.5 ton Air-cooled, 2 ton Water- and Air-cooled
29213105	TXV 2 ton Water- and Air-cooled
29213106	TXV 3 ton Water- and Air-cooled
29213107	TXV 5 ton Water- and Air-cooled
29213108	TXV 7.5 ton Water- and Air-cooled
29213109	TXV 10 ton Water- and Air-cooled

RECOMMENDED SPARE PARTS

Part Number	Description
292131110	TXV 13 ton Water-cooled and 15 ton Air-cooled
20958401	Liquid Line Solenoid Valve, 1-5 ton
20958402	Liquid Line Solenoid Valve, 7.5-10 ton
20958403	Liquid Line Solenoid Valve, 13-15 ton
20958404	Hot Gas Bypass Solenoid, 1.5-4 ton
20958405	Hot Gas Bypass Solenoid, 5-10 ton
20958406	Hot Gas Bypass Solenoid, 13 and 15 ton
3331302204	Air Filter, 1.5 ton Air-cooled
3331302202	Air Filter, 2 and 3 ton Air-cooled
3331302201	Air Filter, 4 and 5 ton Air-cooled
3331302203	Air Filter, 7.5 and 10 ton Air-cooled
33313022	Air Filter, 13 ton Air-cooled
	Condenser Fan Motor, 50 watts, 400/460V, 50/60Hz, for A3-2.25 unit
	Condenser Fan Motor, 0.166HP, 400/460V, 50/60Hz, for A3-1.5 and A3-3 units
	Condenser Fan Motor, 1/4HP, 400/460V, 50/60Hz, for A3-4 and A3-5 units
	Condenser Fan Motor, 1/2HP, 400/460V, 50/60Hz, for A3-7.5, A3-10 and A3-13 units
	Condenser Fan Motor, 50 watts, 200/230V, 50/60Hz, for A3-2.25 unit
	Condenser Fan Motor, 0.166HP, 200/230V, and 575V, 50/60Hz, for A3-1.5 and A3-3 units
	Condenser Fan Motor, 1/4HP, 200/230V, 50/60Hz, for A3-4 and A3-5 units, and 575V, for A3-4 unit
	Condenser Fan Motor, 1/2HP, 200/230V, 50/60Hz, for A3-7.5, A3-10 and A3-13 units
	Condenser Fan Motor, 1/4HP, 575V, 60 Hz for A3-5 unit
	Condenser Fan Motor, 1/2HP, 575V, 60Hz, for A3-7.5, A3-10 and A3-13 units
	Condenser Fan Blade, A3-1.5
	Condenser Fan Blade, A3-2.25

RECOMMENDED SPARE PARTS

Part Number	Description
	Condenser Fan Blade, A3-3.25
	Condenser Fan Blade, A3-4 and A3-5
	Condenser Fan Blade, A3-7.5, A3-10, A3-13
26642001	Water Regulating Valve, W3-1.5, W3-2, W3-3
26642002	Water Regulating Valve, W3-4, W3-5
26642004	Water Regulating Valve, W3-7.5, W3-10
26642005	Water Regulating Valve, W3-15