CLIMA COOL®

A NIBE GROUP MEMBER

WATER-SOURCE MODULAR CHILLERS

INSTALLATION, OPERATION & MAINTENANCE MANUAL

Part#: C97B0004N05 | Revised: March 18, 2026

Chillers, Heat Pumps, and Heat Recovery

PW Models: 20-80 Tons

60Hz – R-454B

CoolLogic Touch™

PW Models

Table of Contents

Model Nomenclature

PW Models

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P	W	C	3	0	A	H	S	0	S	6	0	0	0	S

PRODUCT LINE
P = Chiller Line

SOURCE
W = Water

APPLICATION
C = Cooling Only
H = Heat Recovery
T = Heat Pump

TONNAGE
20 = 20 Ton [1]
30 = 30 Ton [2, 3]
50 = 50 Ton [4]
65 = 65 Ton [5]
80 = 80 Ton [8, 7]

REVISION LEVEL
A = Current
B = Current (30 Ton) [2]

VOLTAGE - PHASE - FREQUENCY
H = 208/230-3-60 [3, 7]
F = 460-3-60 [5, 6]
N = 575-3-60

CONTROL OPTIONS
S = Standard
1 = Single Module Control
A = Auto Stand Alone

SCCR
0 = 5 kAIC
1 = 65 kAIC

COMPRESSOR
S = Standard[1]
T = VFD Lead Only [3, 4, 5, 6]

HYDRONIC OPTIONS
6 = 6-inch Headers
8 = 8-inch Headers
1 = Headerless w/ Isolation Valves

COMPRESSOR SOUND BLANKETS
0 = No
1 = Yes

REFRIGERANT DETECTION SENSOR
0 = None
P = Pressure Relief Valves

FUTURE USE
0 = None

SPECIAL
S = Standard

1. The 20 ton option is only avaialble for Heat Pump Configurations with a Standard Compressor.
2. The 30 option is only available for Revision B.
3. Size 30 ton Heat Pump and Heat Recovery with VFD Lead Only selections cannot be configured with 208/230-3-60 Voltage.
4. Size 50 ton configurations with VFD Lead Only selected must select either Cooling Only at any voltage or Heat Recovery with 460-3-60 voltage.
5. Size 65 ton configurations with VFD Lead Only selected must select either Cooling Only or Heat Recovery and must select 460-3-60 voltage.
6. Size 80 ton configurations with VFD Lead Only selected must select Cooling Only with 460-3-60 voltage.
7. Size 80 ton selections cannot be configured with 208/230-3-60 Voltage.

PW Models

Introduction

GENERAL DESCRIPTION

ClimaCool's Water-source Modular Chillers, models PWC, PWH, PWT are available in 20, 30, 50, 65, and 80 tons. They can be configured in banks of 1 (one) to 12 (twelve) units (20-960 tons), and can satisfy future incremental growth needs by simply adding modules. These models are quiet, serviceable and extremely efficient systems that will provide years of reliable operation

SAFETY

Danger, Warning, Caution, and Attention notices appear throughout this manual. Read these items carefully before attempting any installation, service, or troubleshooting of the equipment.

DANGER: Indicates an immediate hazardous situation which, if not avoided, will result in death or serious injury. DANGER labels on unit access panels must be observed.

WARNING: Indicates potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION: Indicates a potentially hazardous situation or an unsafe practice which, if not avoided, could result in minor or moderate injury or product or property damage.

ATTENTION: Notification of installed, operation or maintenance information which is important, but not hazard related.

⚠ WARNING

- Do not use means to accelerate the defrosting process to clean, other than those recommended by the manufacturer.
- Do not pierce or burn.
- Be aware that refrigerants may not contain an odor.

⚠ WARNING

WATER AND REFRIGERANT SYSTEMS UNDER PRESSURE

- Isolate/Lockout source and relieve pressure BEFORE servicing equipment.
- Failure to relieve pressure may result in property damage, serious bodily injury or death!

⚠ WARNING

An unventilated area where the appliance using FLAMMABLE REFRIGERANTS is installed shall be so constructed that should any refrigerant leak, it will not stagnate so as to create a fire or explosion hazard.

⚠ WARNING

An unventilated area where a water source heat pump is installed and surpasses a R-454B refrigerant charge of 62 oz (1.76 kg), shall be without continuously operating open flames (for example an operating gas appliance) or other POTENTIAL IGNITION SOURCES (for example, an operating electric heater, hot surfaces).

⚠ WARNING

Auxiliary devices which may be a POTENTIAL IGNITION SOURCE shall not be installed in the duct work. Examples of such POTENTIAL IGNITION SOURCES are hot surfaces with a temperature exceeding 1,292°F (700°C)

⚠ WARNING

Only auxiliary electric heaters approved by ClimaCool shall be installed in connecting ductwork. The installation of any other auxiliary devices is beyond ClimaCool's responsibility.

⚠ WARNING

For mechanical ventilation, the lower edge of the air extraction opening where air is exhausted from the room shall not be more than 3.94 inches (100 mm) above the floor. The location where the mechanical ventilation air extracted from the space is discharged shall be separated by a sufficient distance, but not less than 9.84 feet (3 m), from mechanical ventilation air intake openings, to prevent recirculation to the space.

⚠ WARNING

VERY HOT WATER!

⚠ WARNING

Disconnect power supply(ies) before servicing. Refer servicing to qualified service personnel. Electric shock hazard. May result in injury or death!

⚠ WARNING

All refrigerant discharged from this unit must be recovered WITHOUT EXCEPTION. Technicians must follow industry accepted guidelines and all local, state, and federal statutes for the recovery and disposal of refrigerants. If a compressor is removed from this unit, refrigerant circuit oil will remain in the compressor. To avoid leakage of compressor oil, refrigerant lines of the compressor must be sealed after it is removed.

⚠ WARNING

Children being supervised are NOT to play with the appliance.

⚠ WARNING

This appliance is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

Introduction

PW Models

⚠ CAUTION

Unit to be serviced by qualified personnel only. Refrigerant system under pressure. Relieve pressure before using torch. Recover refrigerant and store or dispose of properly.

⚠ CAUTION

Single wall heat exchanger, not suitable for potable water connection.

⚠ CAUTION

Excessive chlorine, undissolved solids and other improper water conditions **WILL DAMAGE** the internal heat exchanger and **WILL VOID YOUR WARRANTY!**

⚠ CAUTION

Use only copper conductors for field installed wiring. Unit terminals are not designed to accept other types of conductors.

⚠ CAUTION

3-PHASE SCROLL COMPRESSOR UNIT

If this unit uses a 3-Phase Scroll Compressor, the following instructions must be followed:

- Unit power supply must be wired in the proper sequence to avoid damage to the 3-Phase Scroll Compressor;
- Scroll Compressors with incorrect rotation show the following characteristics:
  - High sound level;
  - High suction pressure and low discharge pressure;
  - Low current draw.

If any of the three above characteristics exist, swap two of the three supply wires at the disconnect and recheck compressor for incorrect rotation.

⚠ CAUTION

DO NOT store or install units in corrosive environments or in locations subject to temperature or humidity extremes (e.g., attics, garages, rooftops, etc.). Corrosive conditions and high temperature or humidity can significantly reduce performance, reliability, and service life. Always move and store units in an upright position. Tilting units on their sides will cause equipment damage.

⚠ CAUTION

CUT HAZARD - Failure to follow this caution may result in personal injury. Sheet metal parts may have sharp edges or burrs. Use care and wear appropriate protective clothing, safety glasses and gloves when handling parts and servicing heat pumps.

⚠ CAUTION

To avoid equipment damage, DO NOT use these units as a source of heating or cooling during the construction process. The mechanical components and filters can quickly become clogged with construction dirt and debris, which may cause system damage and void product warranty.

⚠ CAUTION

All three phase scroll compressors must have direction of rotation verified at startup. Verification is achieved by checking compressor Amp draw. Amp draw will be substantially lower compared to nameplate values. Additionally, reverse rotation results in an elevated sound level compared to correct rotation. Reverse rotation will result in compressor internal overload trip within several minutes. Verify compressor type before proceeding.

⚠ ATTENTION

To avoid the release of refrigerant into the atmosphere, the refrigerant circuit of this unit must be serviced only by technicians who meet local, state and federal proficiency requirements.

All refrigerant discharged from this unit must be recovered WITHOUT EXCEPTION. Technicians must follow industry accepted guidelines and all local, state and federal statues for the recovery and disposal of refrigerants.

If a compressor is removed from the unit, system refrigerant circuit oil will remain in the compressor. To avoid leakage of compressor oil, the refrigerant lines of the compressor must be sealed after it is removed.

⚠ ATTENTION

This chiller is configured for brine duty with a minimum LWT of 20°F (6.7 C).

It is the facility's responsibility to maintain the brine freeze-point adequately below the lowest water and ambient temperatures that the chiller will see.

⚠ ATTENTION

Confirm all panels and electrical covers are properly installed/sealed, including the condenser fan motor cover.

⚠ ATTENTION

Do not tamper with, modify, or defeat the functionality of the pressure relief valve in any way.

⚠ ATTENTION

Installations where direct sun may cause the module and bank control panels to reach temperatures above 104°F require a sunshade.

⚠ ATTENTION

Servicing shall be performed only as recommended by the manufacturer.

⚠ ATTENTION

REFRIGERANT SENSORS for REFRIGERANT DETECTION SYSTEMS shall only be replaced with sensors specified by the appliance manufacturer.

⚠ ATTENTION

An unconditioned attic is not considered natural ventilation.

⚠ ATTENTION

This unit is equipped with electrically powered safety measures. To be effective, the unit must be electrically powered at all times after installation, other than when servicing.

⚠ ATTENTION

For Installation Only in Locations Not Accessible to the General Public.

⚠ ATTENTION

Maximum external statics must be adhered to in order to maintain minimum CFM.

⚠ ATTENTION

LEAK DETECTION SYSTEM installed. Unit must be powered except for service.

PW Models

Physical Data
Cooling Only PWC

Model PWC	30	50	65	80
Refrigerant Circuits (quantity)	2	2	2	2
Compressor Type	Scroll	Scroll	Scroll	Scroll
Compressor Quantity	2	2	2	2
Refrigerant Charge R-454B (lbs) [kg]	10.0 [4.5]	14.5 [6.6]	18.5 [8.4]	22.5 [10.2]
Module Shipping Weight[1] (lbs) [kg]- headerless	999 [453]	1,288 [584]	1,739 [789]	1,908 [865]
Module Shipping Weight[1] (lbs) [kg] - 6" headers	1,218 [552]	1,513 [686]	1,963 [891]	2,133 [967]
Module Shipping Weight[1] (lbs) [kg] - 8" headers	1,296 [588]	1,603 [727]	2,053 [931]	2,223 [1,008]
Module Operating Weight[2] (lbs) [kg] - headerless	1,037 [471]	1,369 [621]	1,840 [835]	2,036 [923]
Module Operating Weight[2] (lbs) [kg] - 6" headers	1,357 [616]	1,719 [780]	2,190 [993]	2,386 [1,082]
Module Operating Weight[2] (lbs) [kg] - 8" headers	1,513 [686]	1,906 [865]	2,377 [1,078]	2,573 [1,167]
Source Heat Exchanger	**30**	**50**	**65**	**80**
Heat Exchanger (type) Brazed Plate	Brazed Plate	Brazed Plate	Brazed Plate	Brazed Plate
Independent Refrigerant Circuits (quantity)	2	2	2	2
Water Storage Volume headerless (gals) [L]	4.3 [16.1]	6.5 [24.4]	7.7 [29.2]	9.3 [35.2]
Water Storage Volume & Headers (gals) [L] - 6" headers	16.4 [62.0]	21.5 [81.5]	22.8 [86.2]	24.4 [92.2]
Water Storage Volume & Headers (gals) [L] - 8" headers	25.8 [97.7]	33.2 [125.8]	34.5 [130.5]	36.1 [136.5]
Minimum System Volume[3] (gal) [L]	180 [681]	300 [1,136]	390 [1,476]	480 [1,817]
Maximum Design Working Pressure - Water Side (psi) [kPa]	300 [2,068]	300 [2,068]	300 [2,068]	300 [2,068]
Header Water Connections - Inlet/Outlet (in.) [cm]	6 [15.24] or 8 [20.32]	6 [15.24] or 8 [20.32]	6 [15.24] or 8 [20.32]	6 [15.24] or 8 [20.32]
Load Heat Exchanger	**30**	**50**	**65**	**80**
Heat Exchanger (type) Brazed Plate	Brazed Plate	Brazed Plate	Brazed Plate	Brazed Plate
Independent Refrigerant Circuits (quantity)	2	2	2	2
Water Storage Volume headerless (gals) [L]	3.3 [12.4]	6.5 [24.4]	7.7 [29.2]	9.3 [35.2]
Water Storage Volume & Headers (gals) [L] - 6" headers	15.4 [58.3]	21.5 [81.5]	22.8 [86.2]	24.4 [92.2]
Water Storage Volume & Headers (gals) [L] - 8" headers	24.8 [94.0]	33.2 [125.8]	34.5 [130.5]	36.1 [136.5]
Minimum System Volume[3] (gal) [L]	025 [094]	033 [126]	034 [131]	036 [137]
Maximum Design Working Pressure - Water Side (psi) [kPa]	180 [681]	300 [1,136]	390 [1,476]	480 [1,817]
Header Water Connections - Inlet/Outlet (in.) [cm]	6 [15.24] or 8 [20.32]	6 [15.24] or 8 [20.32]	6 [15.24] or 8 [20.32]	6 [15.24] or 8 [20.32]

NOTES:
1. Module shipping weight includes refrigerant charge and packaging
2. Module operating weight includes water and refrigerant charge. Multiply times the number of modules for a total system operational weight.
3. Minimum system volume is required to provide stable operation. Storage/buffer tanks may be utilized in return piping to meet the minimum volume requirements. For bank level calculation contact ClimaCool

Physical Data
Heat Pumps PWT

PW Models

Model PWT	20	30	50	65	80
Refrigerant Circuits (quantity)	2	2	2	2	2
Compressor Type	Scroll	Scroll	Scroll	Scroll	Scroll
Compressor Quantity	2	2	2	2	2
Refrigerant Charge R-454B (lbs) [kg]	6.0 [2.7]	10.5 [4.8]	15.5 [7.0]	20.0 [9.1]	24.0 [10.9]
Module Shipping Weight[1] (lbs) [kg]- headerless	917 [416]	1,100 [499]	1,429 [648]	1,988 [902]	2,350 [1,066]
Module Shipping Weight[1] (lbs) [kg] - 6" headers	1,139 [517]	1,322 [600]	1,651 [749]	2,210 [1,002]	2,572 [1,167]
Module Shipping Weight[1] (lbs) [kg] - 8" headers	1,279 [580]	1,462 [663]	1,791 [812]	2,350 [1,066]	2,712 [1,230]
Module Operating Weight[2] (lbs) [kg] - headerless	942 [427]	1,148 [521]	1,509 [685]	2,089 [948]	2,478 [1,124]
Module Operating Weight[2] (lbs) [kg] - 6" headers	1,043 [473]	1,423 [645]	1,776 [806]	2,335 [1,059]	2,697 [1,223]
Module Operating Weight[2] (lbs) [kg] - 8" headers	1,458 [661]	1,641 [744]	2,014 [913]	2,573 [1,167]	2,935 [1,331]
Source Heat Exchanger	**20**	**30**	**50**	**65**	**80**
Heat Exchanger (type) Brazed Plate	Brazed Plate	Brazed Plate	Brazed Plate	Brazed Plate	Brazed Plate
Independent Refrigerant Circuits (quantity)	2	2	2	2	2
Water Storage Volume headerless (gals) [L]	2.7 [10.2]	4.1 [15.4]	6.0 [22.9]	7.3 [27.6]	8.9 [33.6]
Water Storage Volume & Headers (gals) [L] - 6" headers	8.8 [33.2]	10.1 [38.4]	13.6 [51.4]	14.8 [56.1]	16.4 [62.1]
Water Storage Volume & Headers (gals) [L] - 8" headers	13.5 [51.0]	14.9 [56.2]	19.4 [73.5]	0.0 [0.0]	22.3 [84.3]
Minimum System Volume[3] (gal) [L]	120 [454]	180 [681]	300 [1,136]	390 [1,476]	480 [1,817]
Maximum Design Working Pressure - Water Side (psi) [kPa]	300 [2,068]	300 [2,068]	300 [2,068]	300 [2,068]	300 [2,068]
Header Water Connections - Inlet/Outlet (in.) [cm]	6 or 8 [15.24 or 20.32]	6 or 8 [15.24 or 20.32]	6 or 8 [15.24 or 20.32]	6 or 8 [15.24 or 20.32]	6 or 8 [15.24 or 20.32]
Load Heat Exchanger	**20**	**30**	**50**	**65**	**80**
Heat Exchanger (type) Brazed Plate	Brazed Plate	Brazed Plate	Brazed Plate	Brazed Plate	Brazed Plate
Independent Refrigerant Circuits (quantity)	2	2	2	2	2
Water Storage Volume headerless (gals) [L]	2.7 [10.2]	4.1 [15.4]	6.0 [22.9]	7.3 [27.6]	8.9 [33.6]
Water Storage Volume & Headers (gals) [L] - 6" headers	8.8 [33.2]	10.1 [38.4]	13.6 [51.4]	14.8 [56.1]	16.4 [62.1]
Water Storage Volume & Headers (gals) [L] - 8" headers	13.5 [51.0]	14.9 [56.2]	19.4 [73.5]	0.0 [0.0]	22.3 [84.3]
Minimum System Volume[3] (gal) [L]	120 [454]	180 [681]	300 [1,136]	390 [1,476]	480 [1,817]
Maximum Design Working Pressure - Water Side (psi) [kPa]	300 [2,068]	300 [2,068]	300 [2,068]	300 [2,068]	300 [2,068]
Header Water Connections - Inlet/Outlet (in.) [cm]	6 or 8 [15.24 or 20.32]	6 or 8 [15.24 or 20.32]	6 or 8 [15.24 or 20.32]	6 or 8 [15.24 or 20.32]	6 or 8 [15.24 or 20.32]

NOTES:
1. Module shipping weight includes refrigerant charge and packaging
2. Module operating weight includes water and refrigerant charge. Multiply times the number of modules for a total system operational weight.
3. Minimum system volume is required to provide stable operation. Storage/buffer tanks may be utilized in return piping to meet the minimum volume requirements. For bank level calculation contact ClimaCool

PW Models

Physical Data
Heat Recovery PWH

Model PWH	30	50	65	80
Refrigerant Circuits (quantity)	2	2	2	2
Compressor Type	Scroll	Scroll	Scroll	Scroll
Compressor Quantity	2	2	2	2
Refrigerant Charge R-454B (lbs) [kg]	10.0 [4.5]	14.5 [6.6]	18.5 [8.4]	22.0 [10.0]
Module Shipping Weight[1] (lbs) [kg]- headerless	1,026 [465]	1,345 [610]	1,890 [857]	2,110 [957]
Module Shipping Weight[1] (lbs) [kg] - 6" headers	1,248 [566]	1,567 [711]	2,112 [958]	2,332 [1,058]
Module Shipping Weight[1] (lbs) [kg] - 8" headers	1,388 [630]	1,707 [774]	2,252 [1,021]	2,472 [1,121]
Module Operating Weight[2] (lbs) [kg] - headerless	1,074 [487]	1,929 [875]	1,991 [903]	2,238 [1,015]
Module Operating Weight[2] (lbs) [kg] - 6" headers	1,349 [612]	1,692 [768]	2,237 [1,015]	2,457 [1,115]
Module Operating Weight[2] (lbs) [kg] - 8" headers	1,567 [711]	1,930 [875]	2,475 [1,122]	2,695 [1,222]
Source Heat Exchanger	**30**	**50**	**65**	**80**
Heat Exchanger (type) Brazed Plate	Brazed Plate	Brazed Plate	Brazed Plate	Brazed Plate
Independent Refrigerant Circuits (quantity)	2	2	2	2
Water Storage Volume headerless (gals) [L]	4.1 [15.4]	6.0 [22.9]	7.3 [27.6]	8.9 [33.6]
Water Storage Volume & Headers (gals) [L] - 6" headers	10.1 [38.4]	13.6 [51.4]	14.8 [56.1]	16.4 [62.1]
Water Storage Volume & Headers (gals) [L] - 8" headers	14.9 [56.2]	19.4 [73.5]	20.7 [78.3]	22.3 [84.3]
Minimum System Volume[3] (gal) [L]	180 [681]	300 [1,136]	390 [1,476]	480 [1,817]
Maximum Design Working Pressure - Water Side (psi) [kPa]	300 [2,068]	300 [2,068]	300 [2,068]	300 [2,068]
Header Water Connections - Inlet/Outlet (in.) [cm]	6 or 8 [15.24 or 20.32]	6 or 8 [15.24 or 20.32]	6 or 8 [15.24 or 20.32]	6 or 8 [15.24 or 20.32]
Load Heat Exchanger	**30**	**50**	**65**	**80**
Heat Exchanger (type) Brazed Plate	Brazed Plate	Brazed Plate	Brazed Plate	Brazed Plate
Independent Refrigerant Circuits (quantity)	2	2	2	2
Water Storage Volume headerless (gals) [L]	4.1 [15.4]	6.0 [22.9]	7.3 [27.6]	8.9 [33.6]
Water Storage Volume & Headers (gals) [L] - 6" headers	10.1 [38.4]	13.6 [51.4]	14.8 [56.1]	16.4 [62.1]
Water Storage Volume & Headers (gals) [L] - 8" headers	14.9 [56.2]	19.4 [73.5]	20.7 [78.3]	22.3 [84.3]
Minimum System Volume[3] (gal) [L]	180 [681]	300 [1,136]	390 [1,476]	480 [1,817]
Maximum Design Working Pressure - Water Side (psi) [kPa]	300 [2,068]	300 [2,068]	300 [2,068]	300 [2,068]
Header Water Connections - Inlet/Outlet (in.) [cm]	6 or 8 [15.24 or 20.32]	6 or 8 [15.24 or 20.32]	6 or 8 [15.24 or 20.32]	6 or 8 [15.24 or 20.32]

NOTES:
1. Module shipping weight includes refrigerant charge and packaging
2. Module operating weight includes water and refrigerant charge. Multiply times the number of modules for a total system operational weight.
3. Minimum system volume is required to provide stable operation. Storage/buffer tanks may be utilized in return piping to meet the minimum volume requirements. For bank level calculation contact ClimaCool

Operating Limits

PW Models

Table 1: Flow and Water Temperature Data – PW Series

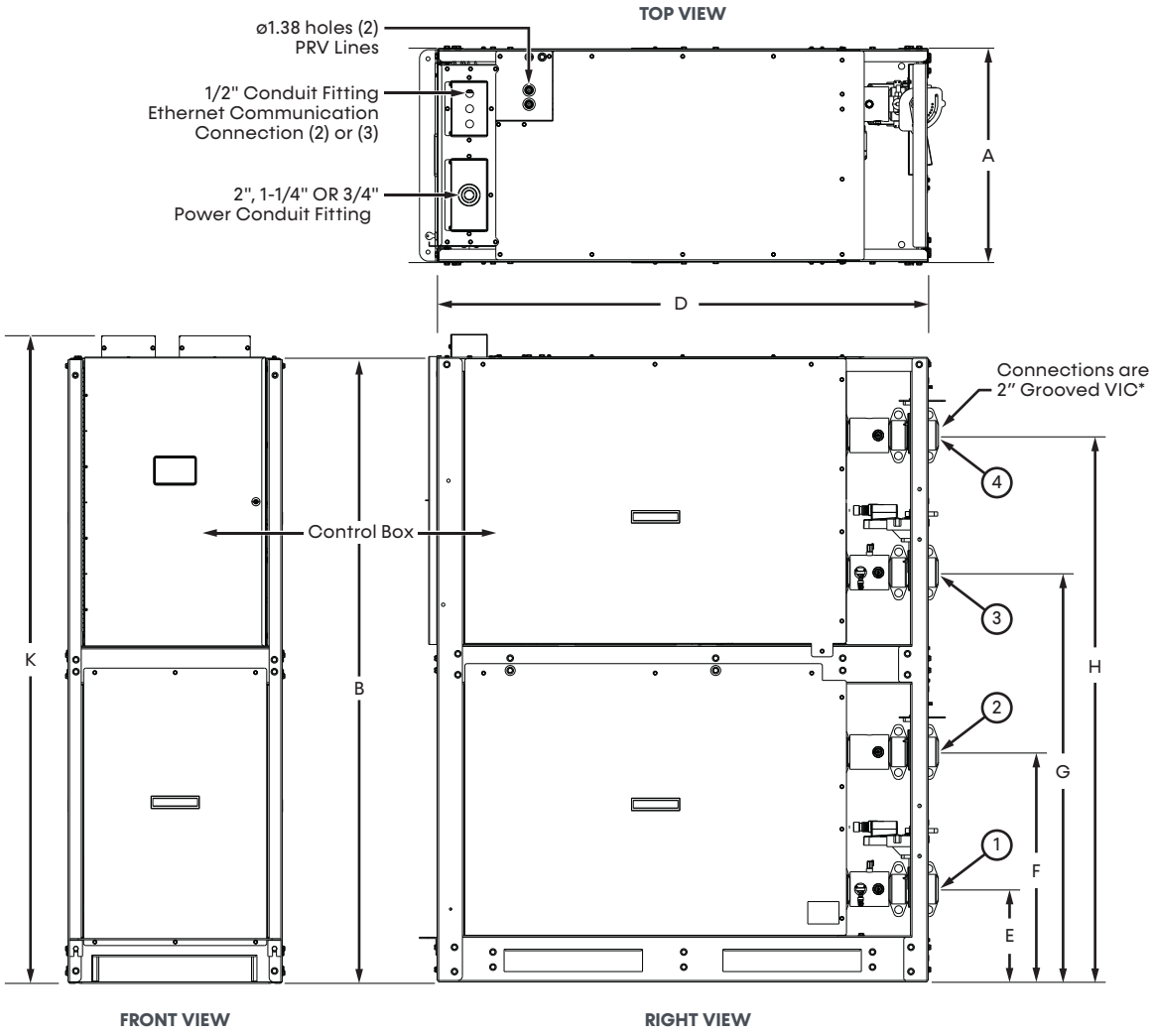
Cooling Mode	Chillers PWC	Heat Pumps PWT	Heat Recovery PWH
Minimum ambient temperature - °F	20	20	20
Maximum ambient temperature - °F	100	100	100
Minimum Leaving Chilled Water Temperature (No Glycol) - °F	40	40	40
Minimum Leaving Chilled Water Temperature (with Glycol) - °F	20	20	20
Maximum Leaving Chilled Water Temperature - °F	65	65	65
Minimum Chilled Water Differential Temperature - °F [1]	5	5	5
Maximum Chilled Water Differential Temperature - °F	23	23	23
Minimum Leaving Source Water Temperature - °F	65	65	65
Maximum Leaving Source Water Temperature - °F	105	130	140
Minimum Source Water Differential Temperature - °F [1]	10	10	10
Maximum Source Water Differential Temperature - °F	20	30	30
Heating Mode			
Minimum ambient temperature - °F		20	20
Maximum ambient temperature - °F		100	100
Minimum Leaving Hot Water Temperature - °F		65	65
Maximum Leaving Hot Water Temperature - °F		130	140
Minimum Chilled Water Differential Temperature - °F [1]		10	10
Maximum Chilled Water Differential Temperature - °F		30	30
Minimum Leaving Source Water Temperature - °F		40	40
Maximum Leaving Source Water Temperature - °F		65	65
Minimum Source Water Differential Temperature - °F [1]		5	5
Maximum Source Water Differential Temperature - °F		23	23

NOTES:
1. Minimum ΔT's are based on minimum ΔP's (0.5 PSI)
2. Water temperatures below 40°F (4.44°C) require a suitable antifreeze solution.

PW Models

Dimensional Data and Drawings
Module Chassis - 20-30 Ton

Chillers PWC, Heat Pumps PWT, and Heat Recovery PWH, 20-30 Ton, with no Header Rack



NOTES

* Optional grooved-to-MPT adapter available for transitioning to a hose kit or other piping arrangements.

Model Size	A Chassis Width	B Chassis Height	D Chassis Depth	E Header Location	F Header Location	G Header Location	H Header Location	K Height with Electrical Connections	Connection Size (Grooved VIC)
020 030	24.00 (60.96)	70.00 (177.8)	55.00 (139.7)	10.35 (26.29)	25.71 (65.30)	45.80 (116.33)	61.16 (155.35)	72.51 (184.18)	2 in.

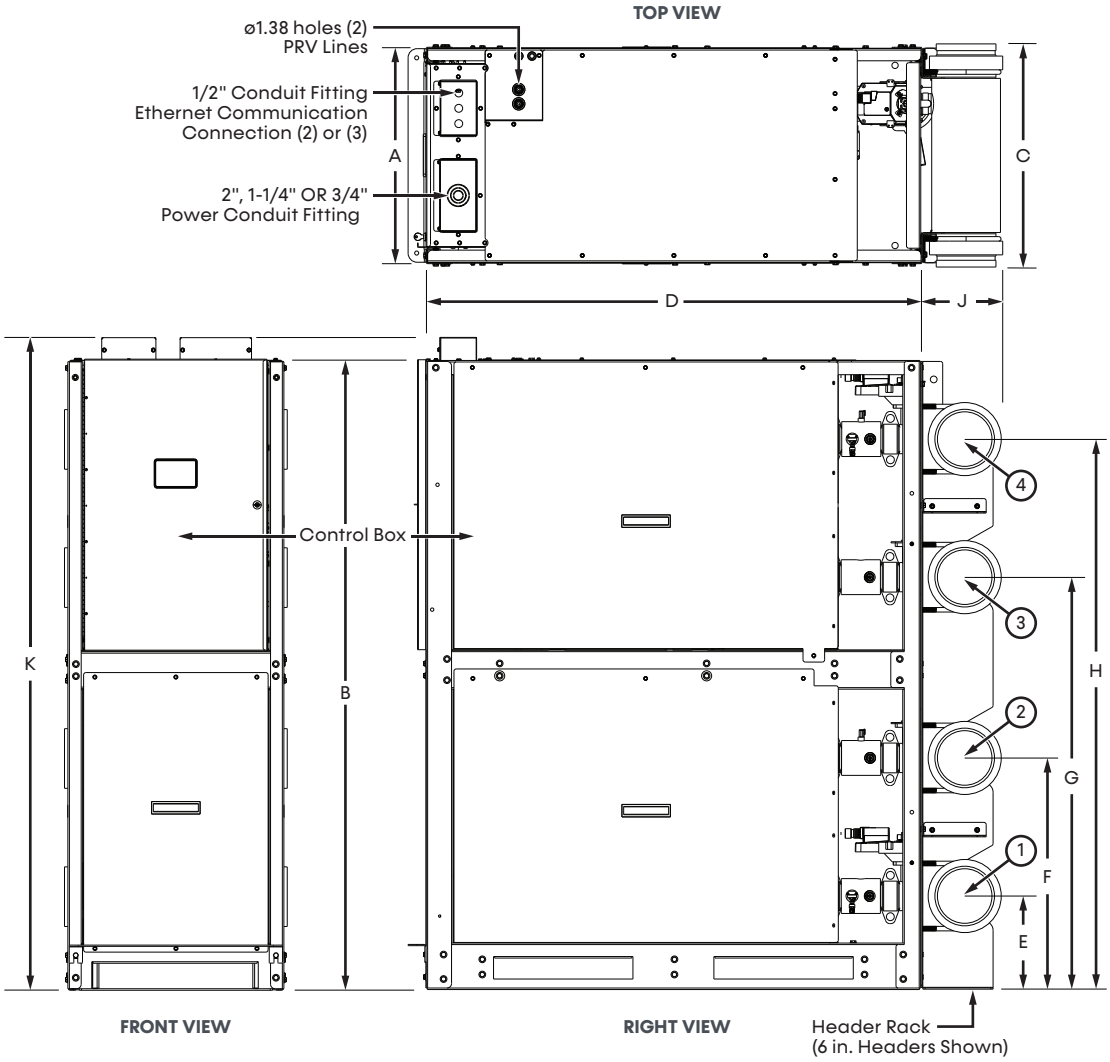
Model	1	2	3	4
PWC	Chilled Water Outlet	Chilled Water Inlet	Source Water Inlet	Source Water Outlet
PWH	Chilled Water Outlet	Chilled Water Inlet	Hot Water Inlet	Hot Water Outlet
PWT	Load Water Outlet	Load Water Inlet	Source Water Outlet	Source Water Inlet

NOTES:
1. Dimensions shown in inches (centimeters).

Dimensional Data and Drawings
Module Chassis - 20-30 Ton

PW Models

Chillers PWC, Heat Pumps PWT, and Heat Recovery PWH, 20-30 Ton, with Header Rack



Model Size	Header Connection Size	A Chassis Width	B Chassis Height	C Width with Headers	D Chassis Depth	E Header Location	F Header Location	G Header Location	H Header Location	J Header Rack Depth	K Height with Electrical Connections
020	6.00 (15.27)	24.00 (60.96)	70.00 (177.8)	24.75 (62.87)	55.00 (139.7)	10.35 (26.29)	25.71 (65.30)	45.80 (116.33)	61.16 (155.35)	8.76 (22.25)	72.51 (184.18)
030	8.00 (20.32)									10.80 (27.43)	

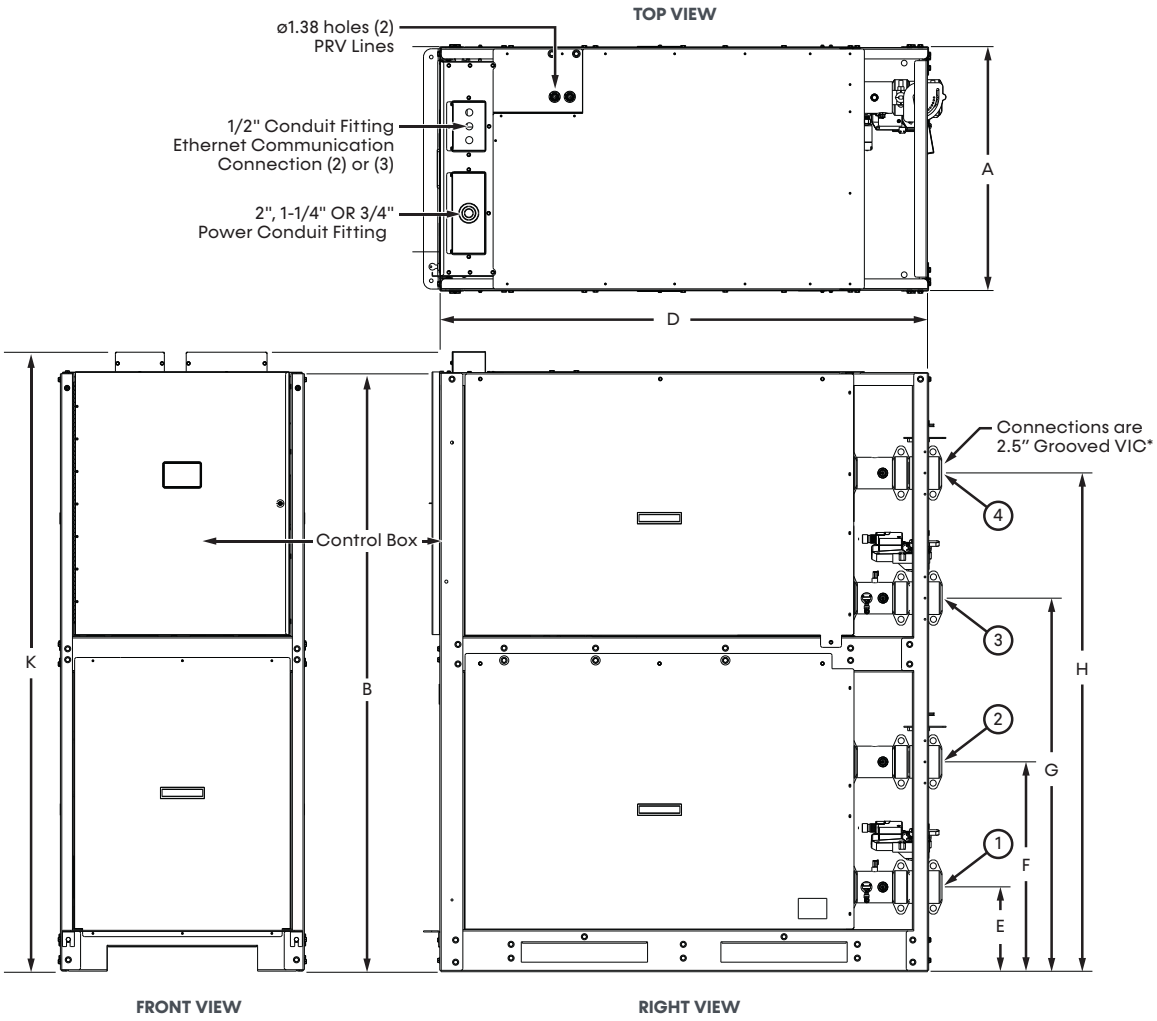
Model	1	2	3	4
PWC	Chilled Water Outlet	Chilled Water Inlet	Source Water Inlet	Source Water Outlet
PWH	Chilled Water Outlet	Chilled Water Inlet	Hot Water Inlet	Hot Water Outlet
PWT	Load Water Outlet	Load Water Inlet	Source Water Outlet	Source Water Inlet

NOTES:
1. Dimensions shown in inches [centimeters].

PW Models

Dimensional Data and Drawings
Module Chassis - 50-80 Ton

Chillers PWC, Heat Pumps PWT, and Heat Recovery PWH, 50-80 Ton, with no Header Rack



NOTES

* Optional grooved-to-MPT adapter available for transitioning to a hose kit or other piping arrangements.

Model Size	A Chassis Width	B Chassis Height	D Chassis Depth	E Header Location	F Header Location	G Header Location	H Header Location	K Height with Electrical Connections	Connection Size (Grooved VIC)
050 065 080	30.00 (76.20)	73.54 (186.79)	60.00 (152.40)	10.39 (26.39)	25.75 (65.41)	45.85 (116.46)	61.20 (155.45)	76.10 (193.30)	2.5 in.

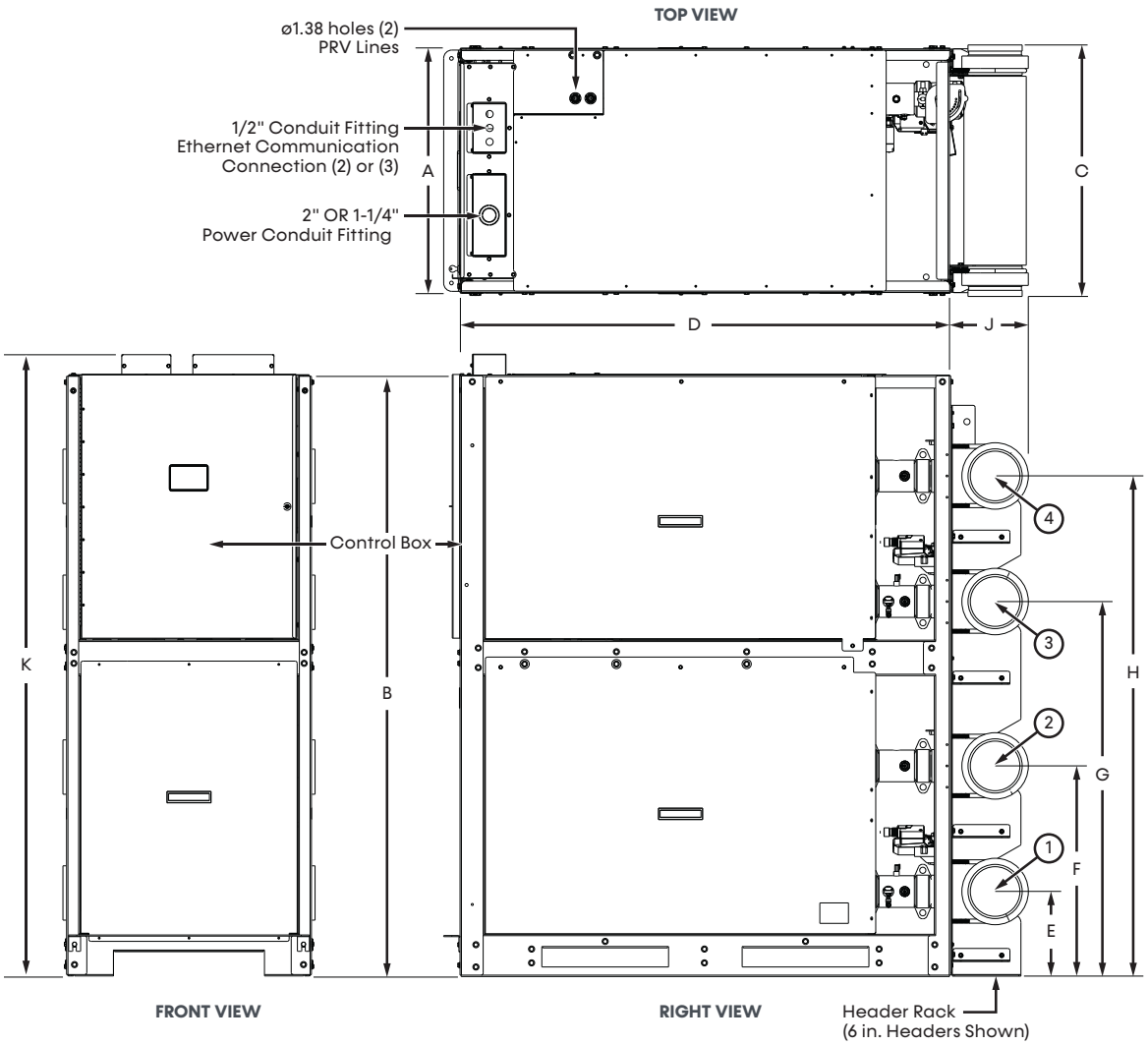
Model	1	2	3	4
PWC	Chilled Water Outlet	Chilled Water Inlet	Source Water Inlet	Source Water Outlet
PWH	Chilled Water Outlet	Chilled Water Inlet	Hot Water Inlet	Hot Water Outlet
PWT	Load Water Outlet	Load Water Inlet	Source Water Outlet	Source Water Inlet

NOTES:
1. Dimensions shown in inches (centimeters).

Dimensional Data and Drawings
Module Chassis - 50-80 Ton

PW Models

Chillers PWC, Heat Pumps PWT, and Heat Recovery PWH, 50-80 Ton, with Header Rack



Model Size	Header Connection Size	A Chassis Width	B Chassis Height	C Width with Headers	D Chassis Depth	E Header Location	F Header Location	G Header Location	H Header Location	J Header Rack Depth	K Height with Electrical Connections
050 065 080	6.00 (15.27) 8.00 (20.32)	30.00 (76.20)	73.54 (186.79)	30.75 (78.11)	60.00 (152.40)	10.35 (26.29)	25.71 (65.30)	45.80 (116.33)	61.16 (155.35)	9.50 (24.13) 11.46 (29.11)	76.10 (193.29)

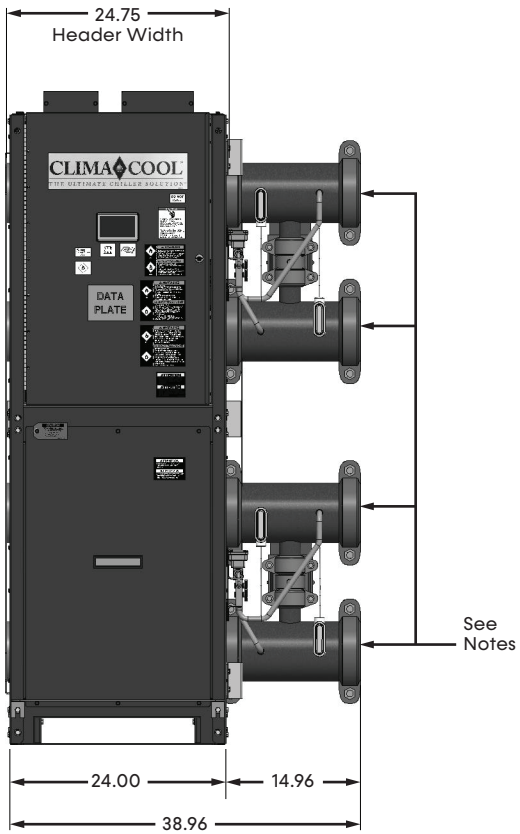
Model	1	2	3	4
PWC	Chilled Water Outlet	Chilled Water Inlet	Source Water Inlet	Source Water Outlet
PWH	Chilled Water Outlet	Chilled Water Inlet	Hot Water Inlet	Hot Water Outlet
PWT	Load Water Outlet	Load Water Inlet	Source Water Outlet	Source Water Inlet

NOTES:
1. Dimensions shown in inches [centimeters].

PW Models

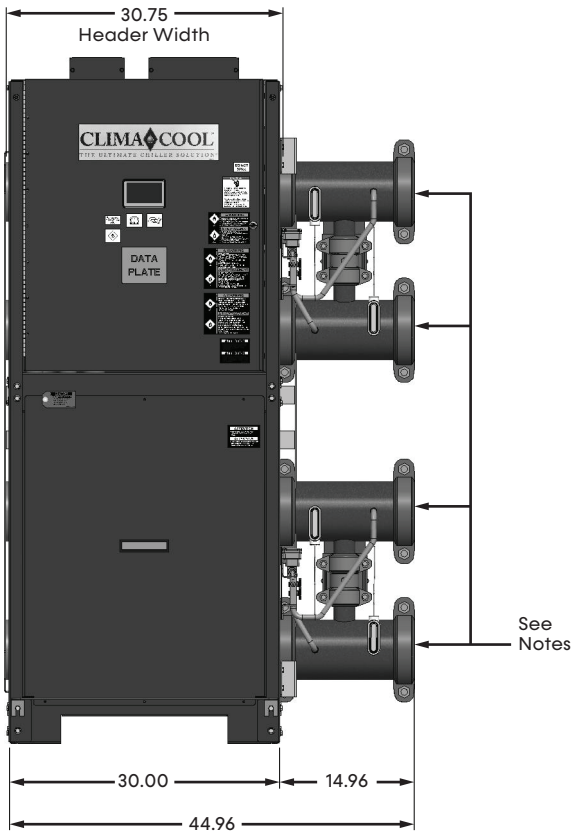
Dimensional Data and Drawings
Header Bypass Kits

20 & 30 TON



FRONT VIEW

50, 65, & 80 TON



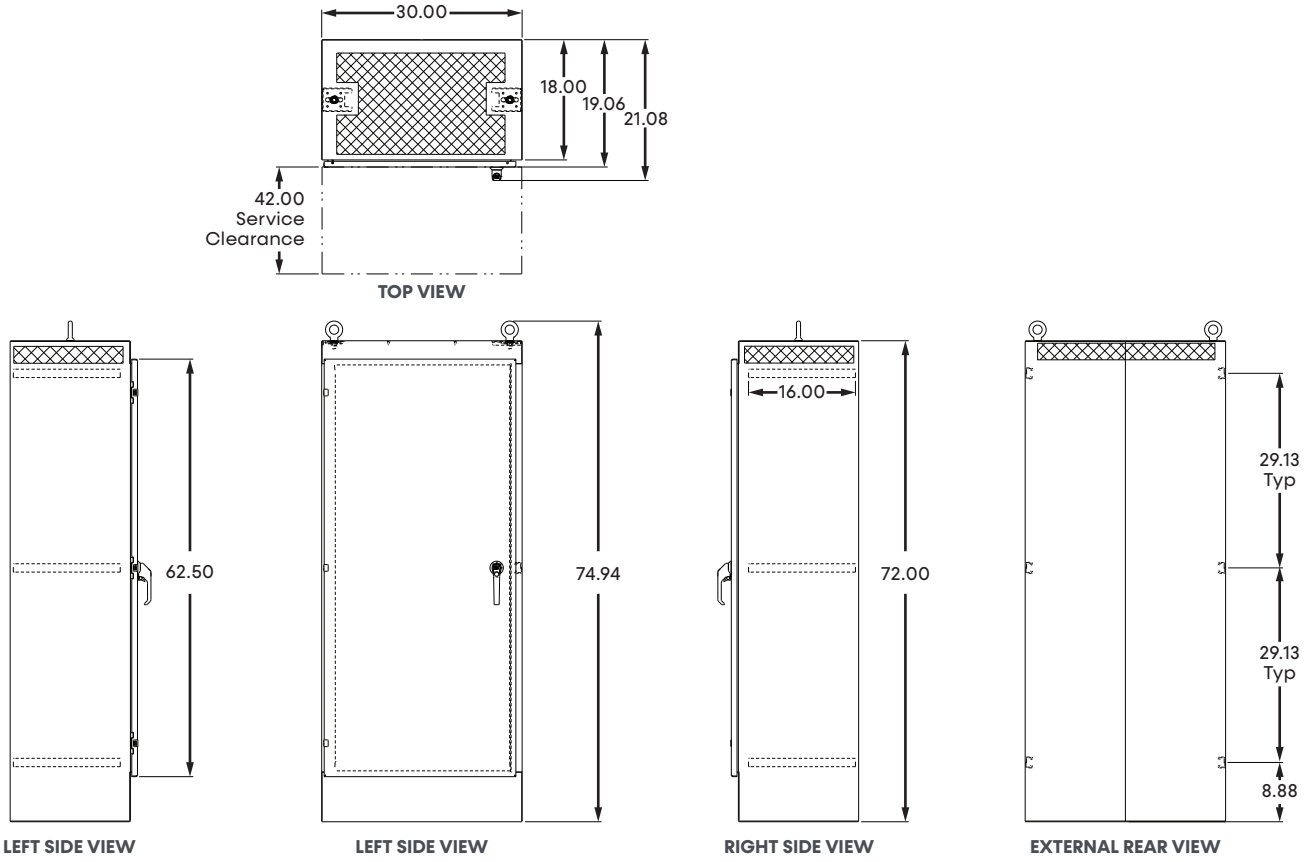
FRONT VIEW

NOTES

1. 6" Headers shown.
2. The 6" or 8" end caps can be installed on either end of the bank. The illustration shown is one possible installation location.
3. See primary model dimensional diagrams for center points on piping inlets.

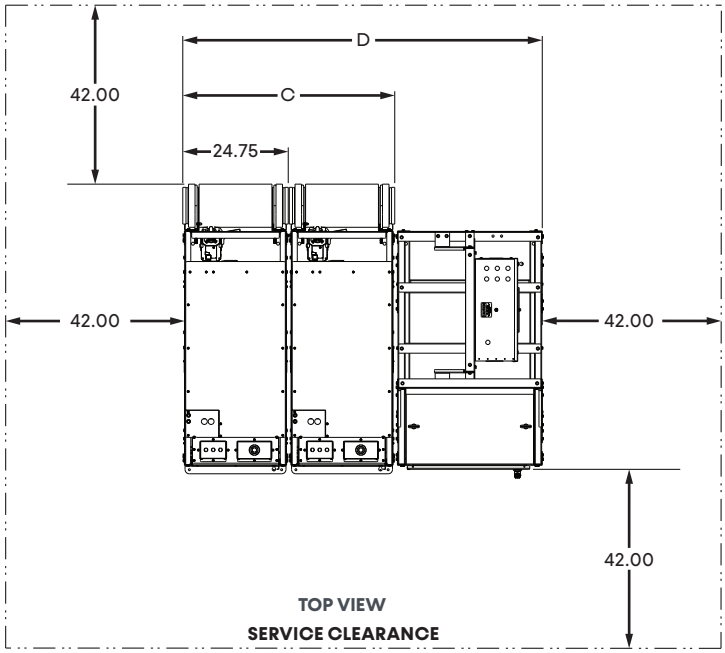
Single Point Power
Power Module

PW Models

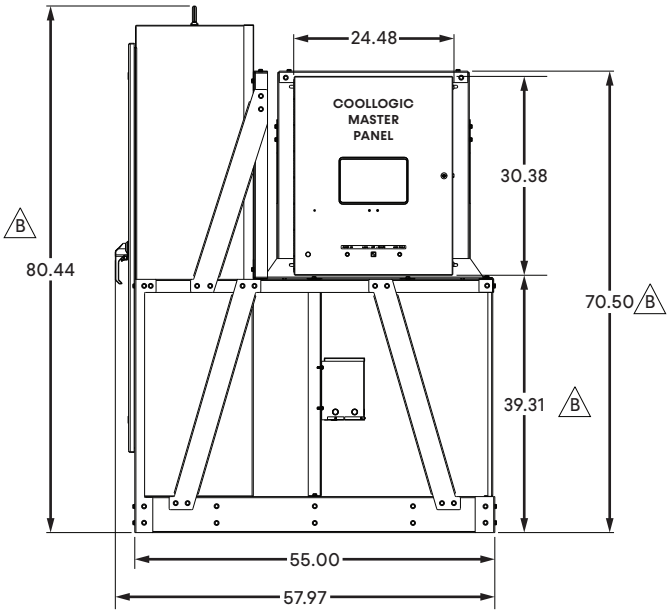


PW Models

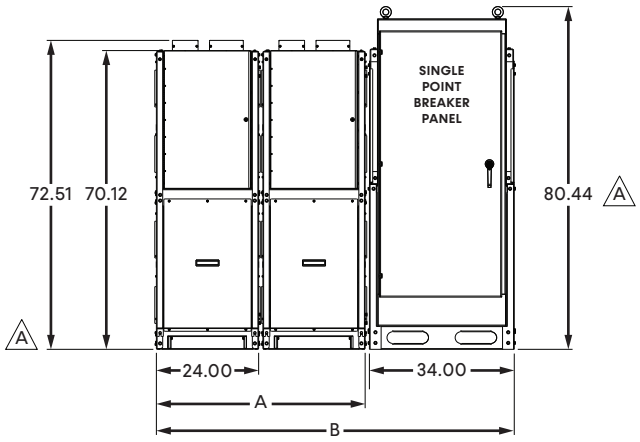
Single Point Power
Power Chassis - 20, 30 Ton



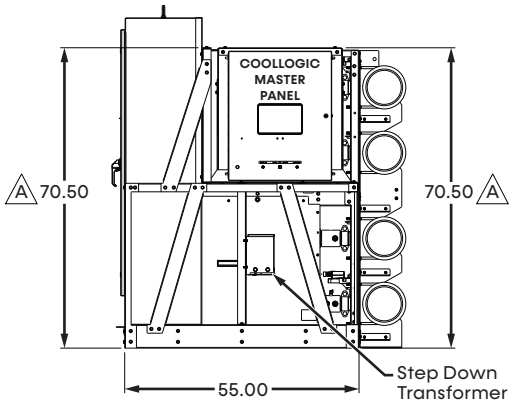
TOP VIEW
SERVICE CLEARANCE



COOLLOGIC PANEL CHASSIS



FRONT VIEW



RIGHT VIEW

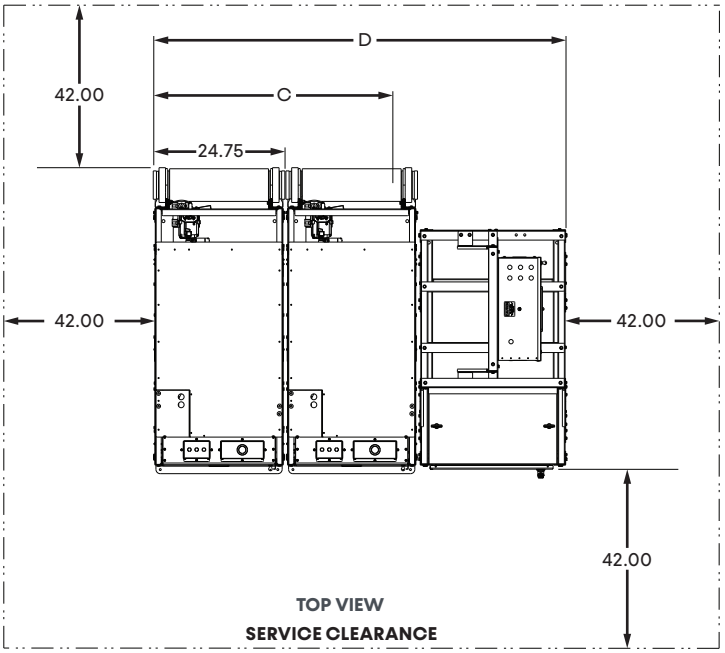
Quantity of Modules	A (inch)	B (inch)	C (inch)	D (inch)	E 6" Header (inch)	E 8" Header (inch)
1	24.00	59.00	24.75	59.38	66.92	68.96
2	49.00	84.00	49.75	84.38		
3	74.00	109.00	74.75	109.38		
4	99.00	134.00	99.75	134.38		
5	124.00	159.00	124.75	159.38		
6	149.00	184.00	149.75	184.38		
7	174.00	209.00	174.75	209.38		
8	199.00	234.00	199.75	234.38		
9	224.00	259.00	224.75	259.38		
10	249.00	284.00	249.75	284.38		
11	274.00	309.00	274.75	309.38		
12	299.00	334.00	299.75	334.38		

LEGEND

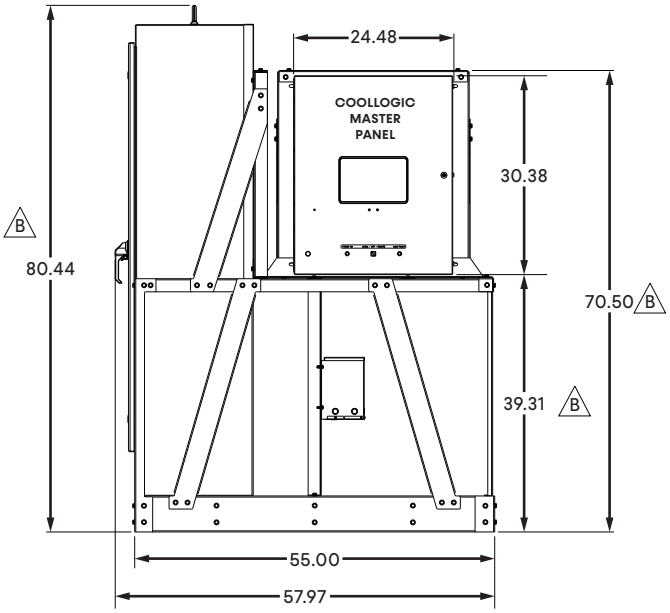
- **A** MODULE CORNER POST TO CORNER POST LENGTH
- **B** OVERALL CORNER POST TO PANEL CHASSIS LENGTH
- **C** HEADER END TO HEADER END LENGTH
- **D** OVERALL HEADER TO PANEL CHASSIS LENGTH
- **E** OVERALL DEPTH

Single Point Power
Power Chassis - 50, 65, 80 Ton

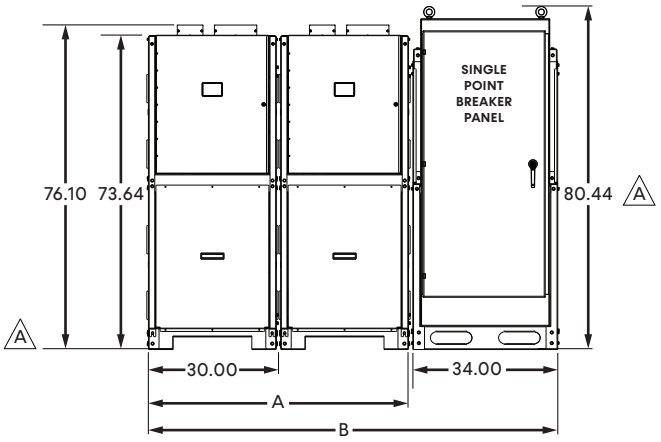
PW Models



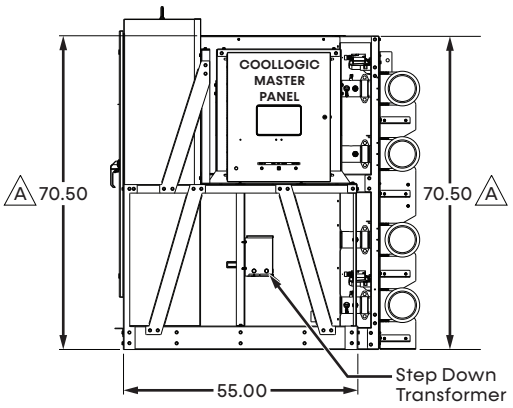
TOP VIEW
SERVICE CLEARANCE



COOLLOGIC PANEL CHASSIS



FRONT VIEW



RIGHT VIEW

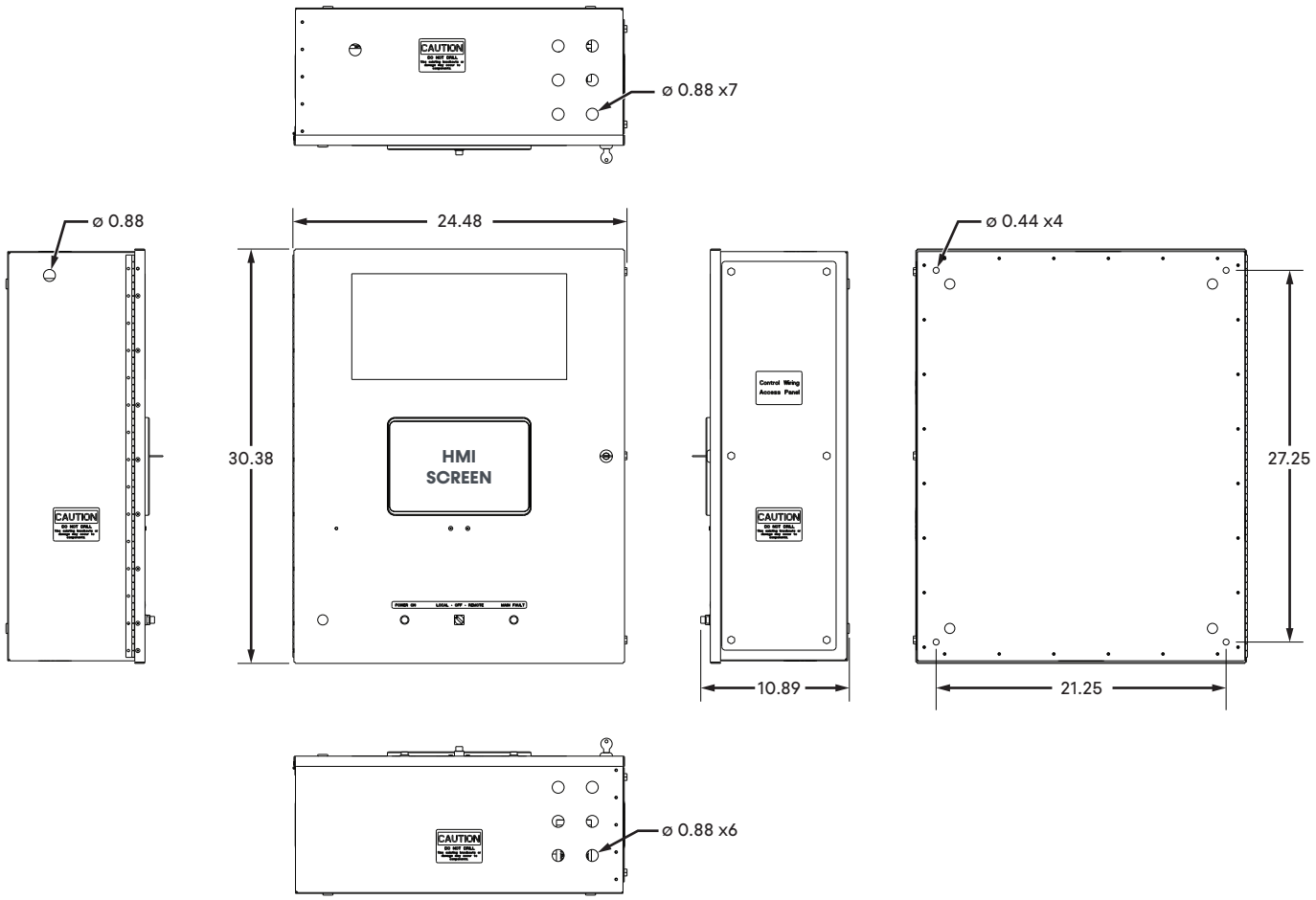
Quantity of Modules	A (inch)	B (inch)	C (inch)	D (inch)	E 6" Header (inch)	E 8" Header (inch)
1	30.00	65.00	30.75	65.38	66.92	68.96
2	61.00	96.00	61.75	96.38		
3	92.00	127.00	92.75	127.38		
4	123.00	158.00	123.75	158.38		
5	154.00	189.00	154.75	189.38		
6	185.00	220.00	185.75	220.38		
7	216.00	251.00	216.75	251.38		
8	247.00	282.00	247.75	282.38		
9	278.00	313.00	278.75	313.38		
10	309.00	344.00	309.75	344.38		
11	340.00	375.00	340.75	375.38		
12	371.00	406.00	371.75	406.38		

LEGEND

A	MODULE CORNER POST TO CORNER POST LENGTH
B	OVERALL CORNER POST TO PANEL CHASSIS LENGTH
C	HEADER END TO HEADER END LENGTH
D	OVERALL HEADER TO PANEL CHASSIS LENGTH
E	OVERALL DEPTH

PW Models

Dimensional Data and Drawings
CoolLogic Touch Bank Controller Module



RDS Installation

PW Models

Each module has a Refrigerant Detection System (RDS) and alarm output from the module control. The RDS monitors the status of the refrigerant sensor in the unit. If refrigerant is detected above the maximum threshold, the unit control disables the compressors and enables a pilot relay (R15). A leak mitigation strategy must be determined at the module and bank level, meeting one of the following:

UNVENTILATED ROOM

Each module is factory charged with a pre-determined amount of refrigerant as marked on the equipment dataplate and in the Physical Data section. The equipment must be installed in a room with a minimum room area (A_{min}) equal to or larger than the value given in **Required Minimum Room Area** table for that specific module. If the specific unit size is marked with an N/A, the module contains refrigerant over a specified level, and a different mitigation method must be employed. When the altitude (H_{alt}) of the installed location is above 1,969 feet (600 m), the A_{min} shall be corrected for the installation altitude by multiplying A_{min} by the applicable altitude adjustment factor (AF) as shown in **Required Minimum Airflow** table.

Table 2: Required minimum floor area A_{min} per UL 60335-2-40 4th ed, GG.4DV[1]

Minimum Installation Area			
Model		Charge oz (kg)	A_{min} ft² (m²)
PWC PWH	30 Ton	160 (4.54)	2,065 (192)
	50 Ton	232 (6.58)	4,341 (403)
	65 Ton	296 (8.39)	7,067 (657)
	80 Ton	352 (9.98)	9,994 (928)
PWT	20 Ton	96 (2.72)	743 (69)
	30 Ton	168 (4.76)	2,276 (211)
	50 Ton	248 (7.03)	4,961 (461)
	65 Ton	312 (8.85)	7,852 (729)
	80 Ton	384 (10.89)	11,894 (1105)

1. The above ventilation and room area are calculated based on equipment mounted to the floor. The minimum room area requirement reduces if the installation height exceeds 2 feet (0.6 m). If mounted higher, speak with a factory representative to determine new requirements.

Table 3: Altitude Adjustment

H_{alt} ft (m)	AF
0 (0)	1.00
656 (200)	1.00
1,312 (400)	1.00
1,968 (600)	1.00
2,624 (800)	1.02
3,280 (1,000)	1.05
3,937 (1,200)	1.07
4,593 (1,400)	1.10
5,249 (1,600)	1.12
5,905 (1,800)	1.15
6,561 (2,000)	1.18

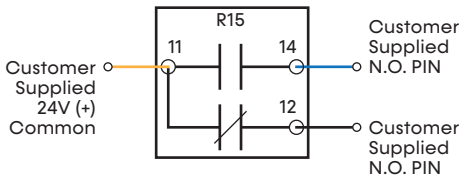
MACHINE ROOM

Modules may be installed in a machinery room that complies with applicable sections of ANSI/ASHRAE 15 (USA) or CSA B52 (Canada). To integrate the mitigation control at the room level, refer to the CoolLogic Touch IOM. If the machinery room does not contain a CoolLogic Touch panel, the relay (R15) can be used to open external dampers and/or activate external mechanical ventilation. The relay and Normally Open (NO) and Normally Closed (NC) contacts can control a signal with a maximum of 6A at 250VAC or 30VDC.

Modules may be installed in a machinery room that complies with applicable sections of ANSI/ASHRAE 15 (USA) or CSA B52 (Canada). Use the relay (R15) to open external dampers and/or activate external mechanical ventilation. The relay and Normally Open (NO) and Normally Closed (NC) contacts can control a signal with a maximum of 6A at 250VAC or 30VDC.

See the **RDS Mitigation Fan Relay** figure for required field wiring instructions.

Figure 1: RDS Mitigation Fan Relay



R15 Data Info:
Input Voltage Rating: 24 VAC / 12 VDC, max 28 VAC / 14 VDC
Contact Rating: 6A, 250 VAC / 30 VDC

PW Models

RDS Installation

MECHANICAL VENTILATION

Mechanical ventilation can be used for mitigation to the outdoors or another area or room. The equipment must be installed in a room with the minimum room area (A_1), and the ventilation rate Q_{min} must be equal to or greater than the airflow in the **Required Minimum Airflow** table. The area requirement for the room where the ventilation is exhausted must be equal to or larger than the minimum room area (EA_{min}) for the selected minimum room area A_1.

The requirements for openings in the mechanical ventilation system shall meet the following:

- The lower edge of openings extracting air from the room shall not exceed 4.0 inches (100 mm) above the floor.
- The openings supplying makeup air to the room shall be located such that the supplied makeup air mixes with the leaked refrigerant.
- Exhaust outlets shall be separated by a minimum of 9.9 feet (3 m) from the air intake for makeup air to prevent recirculation to the space.

Table 4: Required floor area A_{min} and Q_{min} and secondary room area per UL 60335-2-40 4th ed, GG.3DV, GG.13DV, GG.14DV[1]

Minimum Installation Area, Airflow, Exhaust Room Area						
Units		Charge oz (kg)	A_1 ft² (m²)	m_{max} oz (kg)	Q_{min} ft³/min (m³/h)	EA_{min} ft² (m²)
PWC PWH	30 Ton	160 (4.54)	323 (30)	63.3 (1.79)	164 (278)	181 (17)
			753 (70)	96.7 (2.74)	107 (182)	119 (11)
			1,184 (110)	121.2 (3.43)	66 (112)	73 (7)
			1,615 (150)	141.5 (4.01)	31 (53)	35 (3)
			1,938 (180)	155 (4.39)	8 (14)	9 (1)
	50 Ton	232 (6.58)	323 (30)	63.3 (1.79)	285 (485)	316 (29)
			1,163 (108)	120.1 (3.4)	189 (322)	210 (19)
			1,991 (185)	157.1 (4.45)	127 (215)	140 (13)
			2,831 (263)	187.3 (5.31)	76 (128)	84 (8)
			3,660 (340)	213 (6.04)	32 (55)	36 (3)
	65 Ton	296 (8.39)	323 (30)	63.3 (1.79)	394 (669)	436 (41)
			1,593 (148)	140.5 (3.98)	263 (447)	291 (27)
			2,852 (265)	188.1 (5.33)	183 (310)	202 (19)
			4,123 (383)	226.1 (6.41)	118 (201)	131 (12)
			5,382 (500)	258.3 (7.32)	64 (108)	71 (7)
	80 Ton	352 (9.98)	323 (30)	63.3 (1.79)	488 (830)	541 (50)
			2,400 (223)	172.5 (4.89)	304 (516)	336 (31)
			4,467 (415)	235.3 (6.67)	197 (335)	219 (20)
			6,544 (608)	284.8 (8.08)	114 (193)	126 (12)
			8,611 (800)	326.7 (9.26)	43 (73)	47 (4)

1. The above ventilation and room area are calculated based on equipment mounted to the floor. The minimum room area requirement reduces if the installation height exceeds 2 feet (0.6 m). If mounted higher, speak with a factory representative to determine new requirements.

Minimum Installation Area, Airflow, Exhaust Room Area						
Units		Charge oz (kg)	A_1 ft² (m²)	m_{max} oz (kg)	Q_{min} ft³/min (m³/h)	EA_{min} ft² (m²)
PWT	20 Ton	96 (2.72)	215 (20)	51.7 (1.46)	75 (127)	83 (8)
			323 (30)	63.3 (1.79)	55 (94)	61 (6)
			431 (40)	73.1 (2.07)	39 (66)	43 (4)
			538 (50)	81.7 (2.32)	24 (41)	27 (2)
			646 (60)	89.5 (2.54)	11 (19)	12 (1)
	30 Ton	168 (4.76)	323 (30)	63.3 (1.79)	177 (301)	196 (18)
			646 (60)	89.5 (2.54)	133 (226)	147 (14)
			969 (90)	109.6 (3.11)	99 (168)	109 (10)
			1,292 (120)	126.5 (3.59)	70 (119)	78 (7)
			1,561 (145)	139.1 (3.94)	49 (83)	54 (5)
	50 Ton	248 (7.03)	323 (30)	63.3 (1.79)	312 (531)	346 (32)
			1,163 (108)	120.1 (3.4)	216 (368)	240 (22)
			1,991 (185)	157.1 (4.45)	154 (261)	170 (16)
			2,831 (263)	187.3 (5.31)	103 (174)	114 (11)
			3,660 (340)	213 (6.04)	59 (101)	66 (6)
	65 Ton	312 (8.85)	323 (30)	63.3 (1.79)	421 (715)	466 (43)
			1,593 (148)	140.5 (3.98)	290 (493)	321 (30)
			2,852 (265)	188.1 (5.33)	210 (356)	232 (22)
			4,123 (383)	226.1 (6.41)	145 (247)	161 (15)
			5,382 (500)	258.3 (7.32)	91 (154)	101 (9)
	80 Ton	384 (10.89)	323 (30)	63.3 (1.79)	542 (922)	601 (56)
			2,400 (223)	172.5 (4.89)	358 (608)	396 (37)
			4,467 (415)	235.3 (6.67)	251 (427)	279 (26)
			6,544 (608)	284.8 (8.08)	168 (285)	186 (17)
			8,611 (800)	326.7 (9.26)	97 (165)	107 (10)

1. The above ventilation and room area are calculated based on equipment mounted to the floor. The minimum room area requirement reduces if the installation height exceeds 2 feet (0.6 m). If mounted higher, speak with a factory representative to determine new requirements.

NATURAL VENTILATION TO THE INDOORS

Natural ventilation can be achieved by ensuring that there is a connected space to the room housing the equipment. The total area of the space in which the equipment is installed and the adjacent space(s) connected by natural ventilation shall have an area greater than A_{min}, as shown in the **Required Minimum Room Area** table. The equipment must be installed in a room with a minimum room area (A) of no less than 20% of the minimum room area (A_{min}).

There must be a permanent opening between the spaces, and the minimum opening size (Anv_{min}) for the specified equipment room area (A) is found in the **Required Minimum Opening Size for Natural Ventilation to Indoor Space** table. Permanent openings, such as louvers, must utilize their free opening area. In addition, the following requirements must also be met:

- The area of any opening above 11.8 inches (300 mm) from the floor shall not be considered in determining compliance with Anv_{min}.
- At least 50% of the required opening area Anv_{min} shall be below 7.8 inches (200 mm) from the floor.
- The bottom of the lowest openings shall not be higher than the point of release when the unit is installed and not more than 3.9 inches (100 mm) from the floor.
- Openings are permanent openings that cannot be closed.
- For openings extending to the floor, the height shall not be less than 0.78 inches (20 mm) above the surface of the floor covering.
- A second higher opening shall be provided. The total size of the second opening shall not be less than 50% of the minimum opening area for Anv_{min} and shall be at least 3.4 feet (1.5 m) above the floor.

Note: The requirement for the second opening can be met by drop ceilings, ventilation ducts, or similar arrangements that provide an airflow path between the connected rooms.

Table 5: Required floor area and minimum opening size for natural ventilation to an indoor room per UL 60335-2-40 4th ed, GG.7[1]

Minimum Installation Area and Natural Ventilation to Indoor Space				
Units		Charge oz (kg)	A ft² (m²)	Anv_{min} in² (m²)
PWC PWH	30 Ton	160 (4.54)	413 (38)	239 (0.15)
			826 (77)	189 (0.12)
			1,239 (115)	128 (0.08)
			1,652 (153)	65 (0.04)
	50 Ton	232 (6.58)	868 (81)	418 (0.27)
			1,737 (161)	330 (0.21)
			2,605 (242)	224 (0.14)
			3,473 (323)	113 (0.07)
	65 Ton	296 (8.39)	1,413 (131)	602 (0.39)
			2,827 (263)	476 (0.31)
			4,240 (394)	323 (0.21)
			5,654 (525)	163 (0.1)
	80 Ton	352 (9.98)	1,999 (186)	781 (0.5)
			3,998 (371)	617 (0.4)
			5,996 (557)	419 (0.27)
			7,995 (743)	211 (0.14)
PWT	20 Ton	96 (2.72)	149 (14)	111 (0.07)
			297 (28)	88 (0.06)
			446 (41)	60 (0.04)
			595 (55)	30 (0.02)
	30 Ton	168 (4.76)	455 (42)	257 (0.17)
			911 (85)	204 (0.13)
			1,366 (127)	138 (0.09)
			1,821 (169)	70 (0.04)
	50 Ton	248 (7.03)	992 (92)	462 (0.3)
			1,984 (184)	365 (0.24)
			2,976 (277)	248 (0.16)
			3,969 (369)	125 (0.08)
	65 Ton	312 (8.85)	1,570 (146)	652 (0.42)
			3,141 (292)	515 (0.33)
			4,711 (438)	350 (0.23)
			6,281 (584)	176 (0.11)
	80 Ton	384 (10.89)	2,379 (221)	890 (0.57)
			4,757 (442)	703 (0.45)
			7,136 (663)	477 (0.31)
			9515 (884)	240 (0.16)

1. The above ventilation and room area are calculated based on equipment mounted to the floor. The minimum room area requirement reduces if the installation height exceeds 2 feet (0.6 m). If mounted higher, speak with a factory representative to determine new requirements.

PW Models

RDS Installation

NATURAL VENTILATION TO OUTDOORS

Natural ventilation can be achieved by ensuring that there is a space connected to the outdoors from the room housing the equipment. If natural ventilation is applied, then all of the following must be met:

- Natural ventilation to the outdoors is not allowed when the room housing the equipment is below ground level.
- Natural ventilation must not be from an occupied space.
- As shown in the **Required Minimum Opening Size for Natural Ventilation to Outdoor Space** table, permanent openings such as louvers must meet the following requirements and have a free area greater than Anv_{min}.
- The room housing the equipment must maintain ambient temperatures above the listed requirements in the table, **Ambient Temperature Operational Limits**.

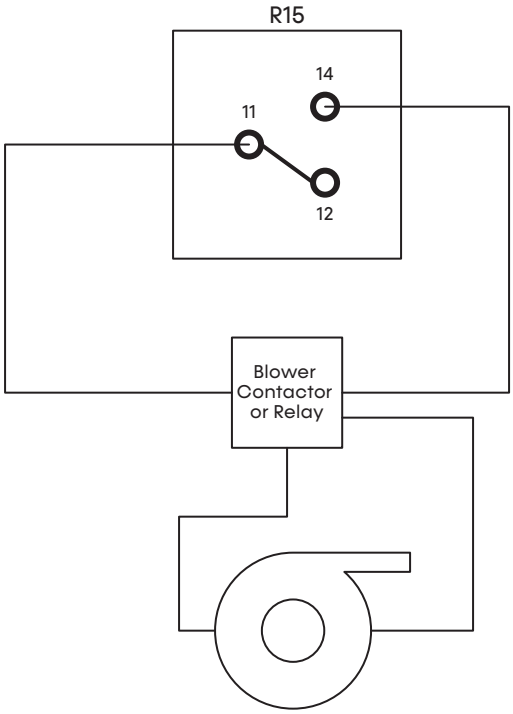
Table 6: Required minimum opening for natural ventilation to an outdoor space per UL 60335-2-40 4th ed, GG.12DV

Natural Ventilation to Outdoor Space			
Units		Charge oz (kg)	Anv_{min} in² (m²)
PWC PWH	30 Ton	160 (4.54)	170 (0.11)
	50 Ton	232 (6.58)	205 (0.13)
	65 Ton	296 (8.39)	231 (0.15)
	80 Ton	352 (9.98)	252 (0.16)
PWT	20 Ton	96 (2.72)	132 (0.08)
	30 Ton	168 (4.76)	174 (0.11)
	50 Ton	248 (7.03)	212 (0.14)
	65 Ton	312 (8.85)	237 (0.15)
	80 Ton	384 (10.89)	263 (0.17)

SAMPLE MITIGATION WIRING

Utilize the relay (R15) provided on each module to open external dampers and/or activate external mechanical ventilation. The relay and Normally Open (NO) and Normally Closed (NC) contacts can control a signal with a maximum of 6A at 250VAC or 30VDC. The relay will enable when the individual module enters mitigation mode due to refrigerant being detected by the onboard RDS or if enabled from the CoolLogic Touch controller. An example of wiring can be seen in the **Example RDS Mitigation Wiring** figure below:

Figure 2: Example RDS Mitigation Wiring



11. COM Relay Input
12. N.C. Relay Output
14. N.O. Relay Output

Pre-Installation

PW Models

INSPECTION

Upon receipt of equipment, carefully check the shipment against the bill of lading and inspect each chiller for any damage incurred during shipment. Verify all components and loose parts immediately upon receipt. Note any damage on the bill of lading immediately and in the presence of the freight carrier's delivering agent. Report the damage to the freight carrier and file appropriate claim documents in accordance with International Chamber of Commerce (ICC) regulations. It is the responsibility of the recipient to contact ClimaCool Corp.

Thoroughly check for any visible damage of control panels, electrical and/or refrigeration components or broken copper lines. Be sure the nameplate voltage agrees with the site voltage. The carrier must make proper notation of any damages or shortages on all copies of the bill of lading and complete a common carrier inspection report prior to your final acceptance of the shipment.

NOTE: It is the responsibility of the purchaser to file all necessary claims with the carrier. In addition, please notify the ClimaCool Customer Service Department of all damage immediately at 1-800-299-9747, Option 1, or customersupport@climacoolcorp.com.

STORAGE

A suitable antifreeze solution will be required to store Modular Water-Cooled chillers in locations with ambient temperatures below 36°F (2.22°C).

Fill the chiller with at least 2 (two) gallons (7.6 L) of inhibited propylene glycol or other suitable inhibited antifreeze solution to prevent any residual water in the chiller from freezing.

HANDLING OF MODULES

Carefully remove the module's packaging. The chiller's steel base cutouts provide maneuverability by forklift or pallet jack into its final position. Verify that all header grooved couplings and mounting hardware kits are on site prior to connecting the modules.

RIGGING AND LIFTING

Each module should be lifted by using a fork lift. If it is necessary to utilize a crane for rigging or lifting, each module shall be lifted by using lifting straps and spreader bars using rigging points. Refer to Rigging and Lifting Procedures on next page.

WARRANTY

To ensure proper equipment longevity, design, performance, and reliability, all ClimaCool chillers must be installed, operated, and maintained per ClimaCool IOM manuals. Water quality is of the utmost importance for the proper care and maintenance of your modular chiller system, and regular water treatment will increase your system's longevity. If an open loop is used, there must be a secondary heat exchanger installed between the open loop and the chiller loop. Failure to provide adequate filtration or treatment of evaporator water will void the ClimaCool module's warranty.

A factory-authorized technician is required to start up your ClimaCool chiller. Please contact the ClimaCool Technical Service Department to schedule startup at 1-800-299-9747, Option 3, or technicalsupport@climacoolcorp.com. A minimum of (two) 2-weeks' notice is required to schedule your factory startup.

⚠ WARNING

Equipment not accessible to General public.

⚠ ATTENTION

This chiller is configured for brine duty with a minimum LWT of 20°F (6.7 C).

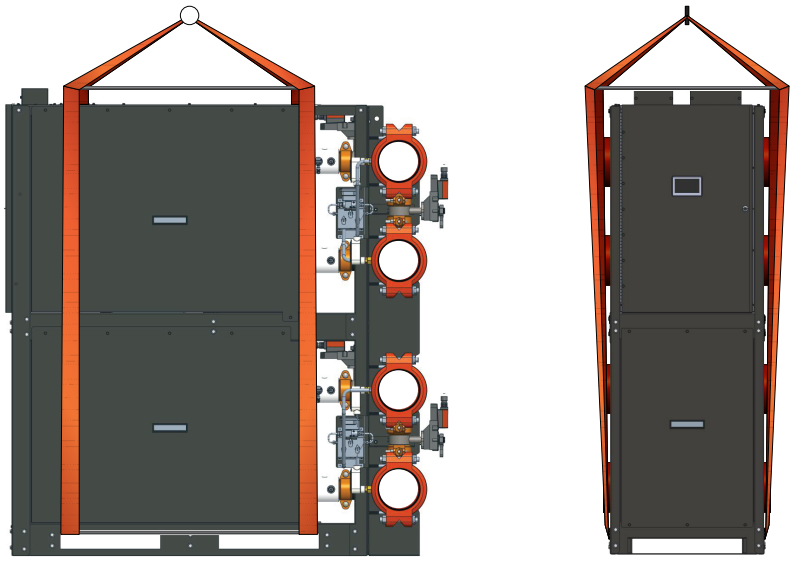
It is the facility's responsibility to maintain the brine freeze-point adequately below the lowest water and ambient temperatures that the chiller will see.

PW Models

Rigging and Lifting Procedures

RIGGING

Each module should be lifted by using lift straps threaded through the steel base cutouts and the use of a spreader bar. **NOTE: If no spreader bar is used, damage to the unit may occur.**



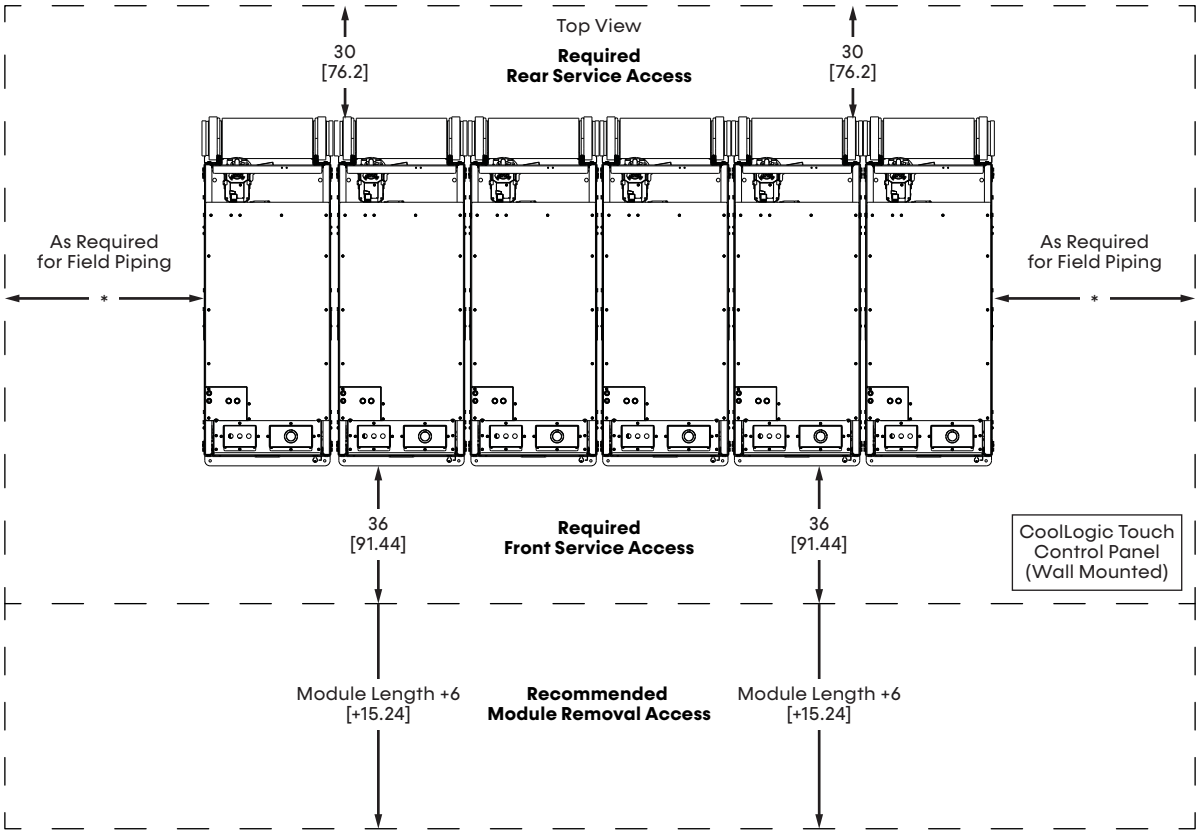
LIFTING AND TRANSPORTING MODULES

Pallet jacks or forklifts are required for lifting and transporting the module. Each module has base cutouts provided for ease of maneuverability. 60-inch forks are recommended to prevent damage to chiller base.

Recommended Service Clearances

PW Models

Figure 3: Recommended Service Clearance



NOTES

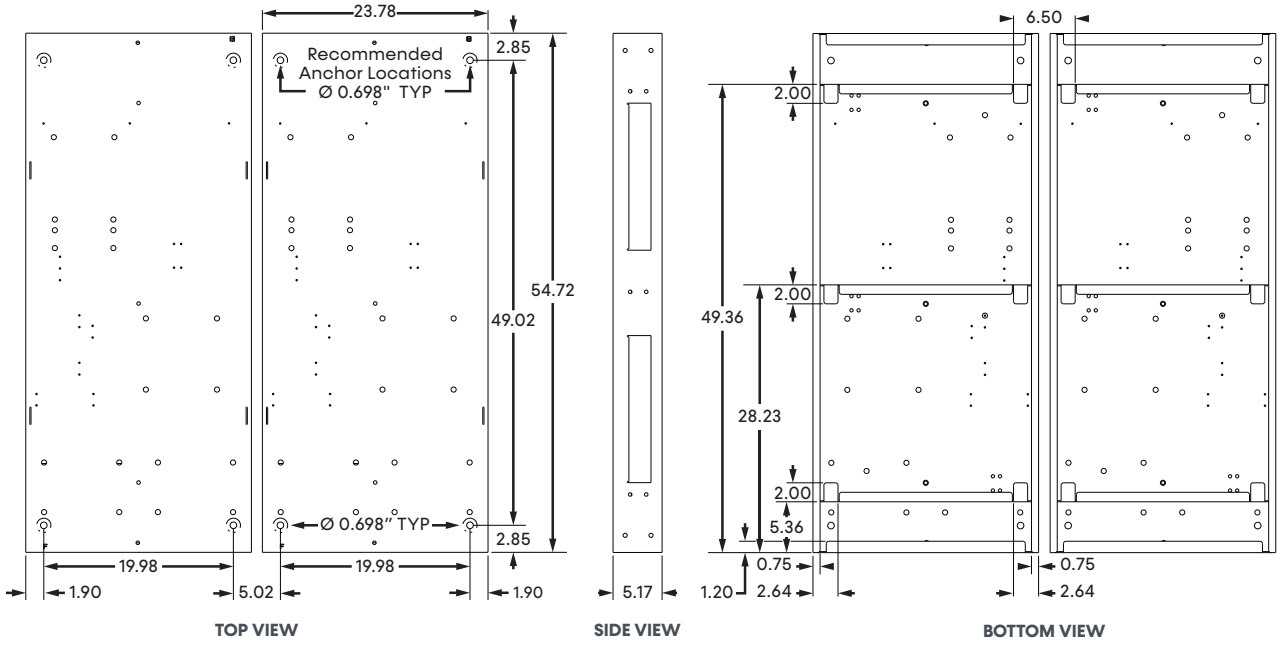
- Allow 36-inch (91.44 cm) clearance for electrical panels and 30-inch (76.2 cm) clearance for rear service access to modules.
- Allow a minimum of 18-inch (45.72 cm) height clearance for service for all modules.
- Minimum service clearances adhere to high-voltage code requirements. Local building or electrical codes may require additional clearance. Consult applicable codes.
- Measurements are shown in inches and (centimeters).

PW Models

Mounting Rails

ClimaCool recommends bolting the chiller to a concrete base or two (2) 4-inch (10.16 cm) base mounting rails using the four (4) bolt holes in each base pan. Due to the modules' low vibration, ClimaCool does not require the application of spring isolators or pads. Should isolators or pads be desired, install them in accordance with the following figures.

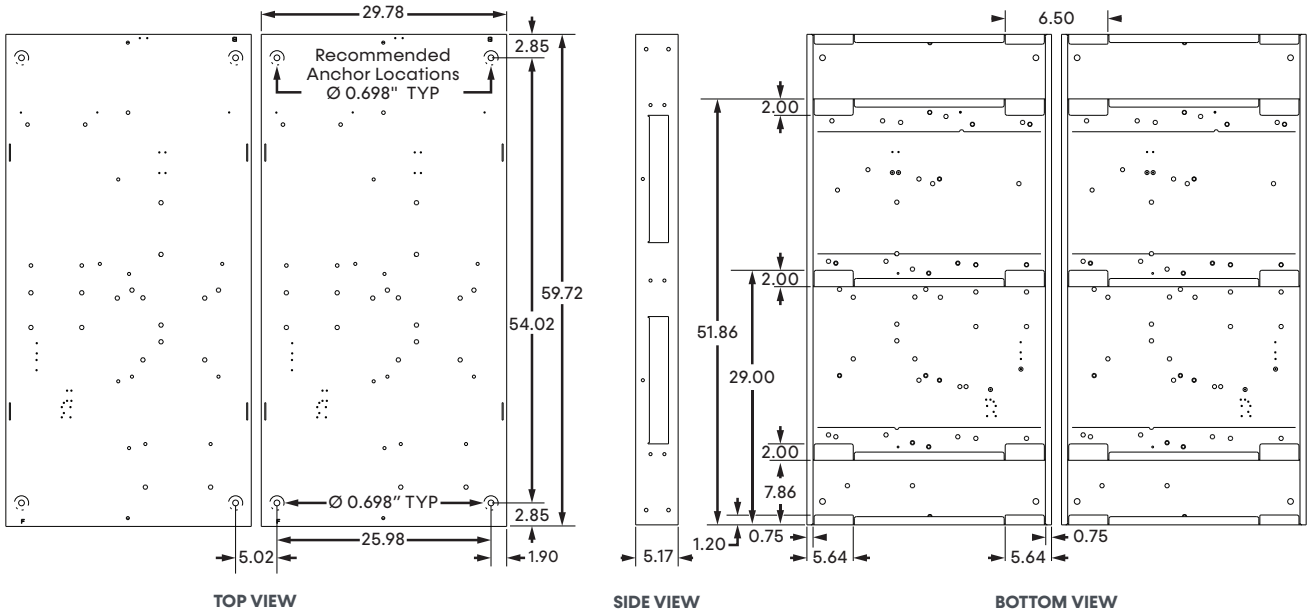
Figure 4: Anchor Locations PW* 20, 30



NOTES

Recommend Bolt 1/2"-13 x 6.5"L

Figure 5: Anchor Locations PW* 50, 65, 80



NOTES

Recommend Bolt 1/2"-13 x 6.5"L

Vibration Isolation

Figure 6: Spring Vibration Isolators Option

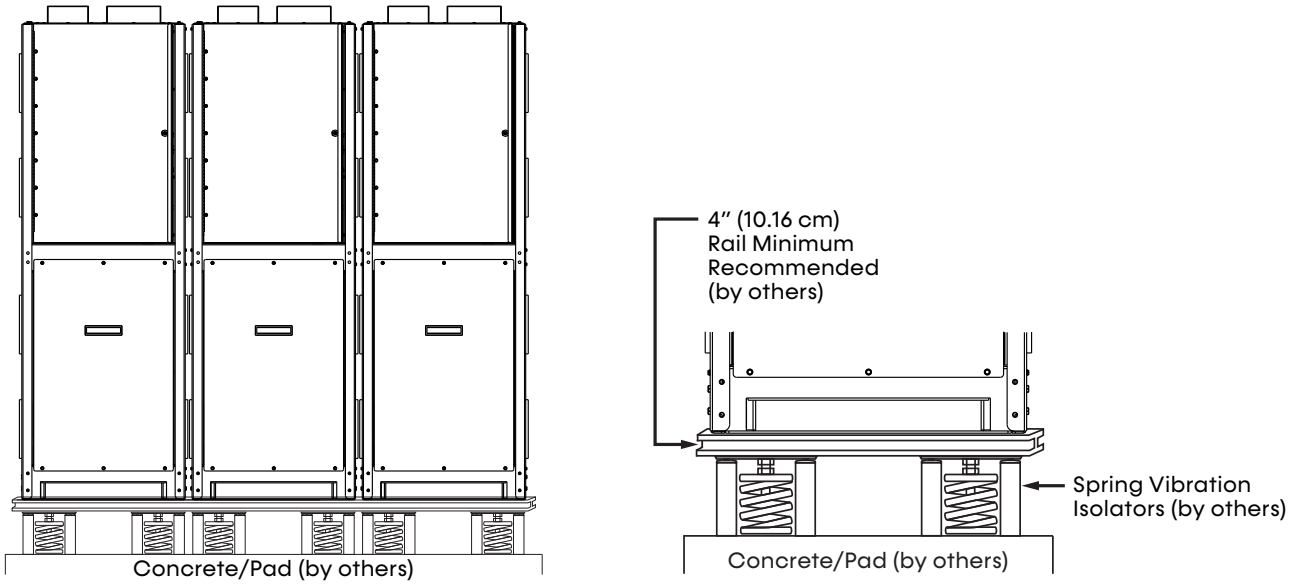
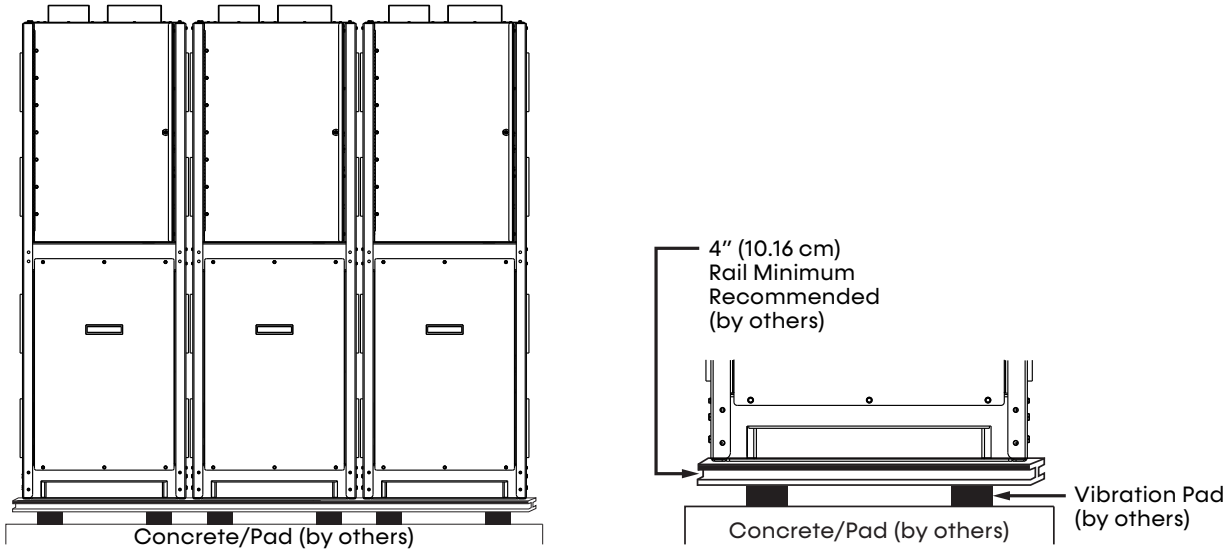


Figure 7: Vibration Isolation Pads Option



NOTES

Size and weight distribution is to be determined by a qualified structural engineer per individual job requirements.

PW Models

Unit Installation

FOUNDATION FOR UNIT PLACEMENT

The minimum foundation requirement for the ClimaCool water-source chiller is a level surface capable of bearing the combined operating weight of the modules.

DRAINING

When performing standard maintenance procedures such as flushing a heat exchanger, it is necessary to close off any relevant module sections. Each ClimaCool chiller module includes standard motorized water isolation valves for this purpose.

ASSEMBLING MODULES

ClimaCool recommends bolting the unit to a concrete base or two (2) 4-inch (10.16 cm) base mounting rails using the bolt holes in the unit base. Although the compressors are installed on anti-vibration mountings, vibration-eliminating springs or pads under the base rails on which the unit will rest can further isolate the unit from the structure. One end of the modules should be chosen as the reference module and carefully located.

Field-installed mounting accessories are provided to adjoin each module:

- **Header grooved coupling kits** contain four (4) mechanical grooved couplings per module for standard applications and six (6) for simultaneous heat pump applications.
- **Mounting hardware kit** contains necessary bolts, spacers, nuts and washers.
- **Header bank end cap kit** contains four (4) header bank end caps each for standard applications and six (6) each for simultaneous heat pump applications.

Field installing the mounting hardware kit will assist in aligning the modules in a bank and eliminate offset inconsistencies.

1. Inspect the pipe ends to ensure they are free from indentations, projections, roll marks, or other harmful surface defects such as loose paint, scale, dirt, chips, grease, and rust.
2. Inspect the grooved coupling gasket for defects.
3. Install gaskets on the pipe ends of one of the two modules to be mated. **Be sure the gasket is completely on the pipe so damage will not occur in the next step.**
4. Move the second module into position and line up the piping. Be sure to maintain piping alignment for any additional modules that may be added. When pipe ends are aligned, slide the gasket over the ends and center it between the grooves. No part of the gasket should protrude into the groove of either pipe end.
5. Place the coupling halves over the gasket and ensure that the coupling keys (the part that goes into the groove) are engaged in the grooves.
6. Insert the bolts and install nuts to hand tight. Ensure that the oval neck of the bolt engages into the bolt hole of the housing. **Tighten nuts alternately and equally until the bolt pads meet and make metal-to-metal contact.**
7. Tighten nuts by another ¼ to ½ turn to ensure the nuts and bolts are snug and secure; using a torque wrench is usually not required. **Uneven tightening of bolts may cause the gasket to be pinched resulting in immediate or delayed leaks.**

HEADER INSULATION

Chilled water piping is pre-insulated on each module at the factory with ¾-inch (1.91 cm) closed-cell insulation. **After bolting all modules together and leak testing, the installing contractor will need to insulate the entire coupling connection.**

⚠ WARNING

Equipment not accessible to General public.

BANK WATER ISOLATION VALVES

It is recommended to provide bank water isolation valves for proper isolation and maintenance of the chiller, pump and strainer.

STRAINERS – MINIMUM 20 MESH SCREEN REQUIRED

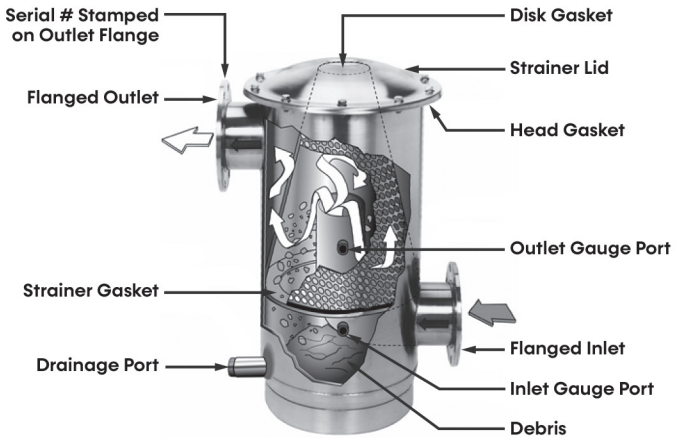
ClimaCool chillers utilize brazed plate heat exchangers which are extremely sensitive to debris. **Therefore, it is mandatory that all chilled water systems include a strainer with a minimum of 20 mesh screen for proper filtration.** The strainer must be installed as shown in the *Water Piping Configurations* section and be in place at all times when the chiller is operating.

ClimaCool's warranty does not cover and does not apply to products which have defects or damages due to freezing of the water supply, an inadequate or interrupted water supply, corrosives or abrasives in the water supply, or improper or inadequate filtration or treatment of the water supply.

PW Models

Options
Stainless Steel Strainer

Figure 8: Stainless Steel Strainer



STRAINER INSTALLATION RECOMMENDATIONS

Follow the recommended guidelines below for strainer installation:

1. The Carbon Steel strainer should be placed on a firm, supporting surface. Failure to do so can cause stress on the weld joints. It is recommended that a concrete pad be poured under the base of the strainer. The weight of the CS strainer should not be supported by the main water lines connecting it.
2. The inlet and outlet connections should be securely fastened. The arrows in the figure, **Stainless Steel Strainer** depict flow direction.
3. The back-mount pressure gauges should be installed in the gauge ports located on the front of the strainer body. These gauges will allow you to monitor the pressure differential across the strainer screen providing an indication when the strainer element is clogged and requires cleaning.
4. The CS strainer lid must be securely fastened according to the following torque specifications to ensure product safety and an adequate seal.

TORQUE SPECIFICATIONS

Clamped Lid Models: CS strainer models 3CS and 4CS have "over-center latch clamp" lid designs. The over-center clamp does not require adjustment when installing or removing the lid. The lock washer is set at the factory for proper clamp compression and normally requires no field adjustment. Minor tightening may be necessary over time. The lids are installed as follows:

1. Place the clamp around the strainer lid.
2. Latch the T-bolt with the receiver and push the latch handle towards the strainer body until the safety catch engages.

Bolted Lid Models: CS strainer models 6CS, 8CS and 10CS have "bolted" lid designs. Grade 5 zinc-plated bolts, nuts and washers are used to attach the lids to these strainers. See the table on the next page for proper lid bolt size and torque rating for each strainer. (Exercise care when tightening the lid bolts so as not to damage the strainer lid or housing).

Follow the torque specifications in the **Bolt Size and Recommended Torque** table as over-tightening may result in premature failure of the bolts. Also, follow a star wheel torque pattern when tightening the lid bolts as shown in the figure, **Recommended Torquing Sequence**. The strainer lid may not be seated down completely after the first torque sequence. A second torque sequence should be adequate to seat the lid securely to the body.

Table 7: Bolt Size and Recommended Torque

Strainer	Bolt Size (inches)	Recommended Torque (ft. lbs.)
3 CS	5/16 - 18	60 - 80
4 CS	3/8 - 16	15 - 25
6 CS	1/2 - 13	45 - 55
8 CS	1/2 - 13	45 - 55
10 CS	5/8 - 11	80 - 100

Options
Stainless Steel Strainer

STRAINER OPERATION

Periodically, it will be necessary to flush out the debris that is collected and settled at the bottom of the strainer reservoir. CS-3 strainers must have a valve installed on the drainage port. The larger CS strainers (4CS, 6CS, 8CS and 10CS) are equipped with a flush port (or drainage port) extending inside the strainer. When it becomes time to clean the strainer, the flush port valve should be opened while the strainer is in operation (while pressurized and with water flowing). A thorough flushing of the strainer reservoir will depend upon the length of time the flush valve remains opened. This flush time will typically range from 15 to 60 seconds depending on the flow, inlet water pressure and the amount of debris collected by the strainer. As a general rule, the larger strainers will require higher inlet water pressures in order to achieve a complete flushing. For example, the 4CS model can be flushed with inlet water pressures as low as 15-20 psi, while the 6CS can be flushed with 30-35 psi. The 8CS and 10CS models should be flushed with inlet water pressures greater than 40 psi.

NOTE: When shutting down the chiller for extended periods of time, the strainer should be isolated and completely drained.

STRAINER ELEMENT CLEANING

If your strainer assembly is equipped with optional pressure gauges, you will be able to monitor the pressure differential between the inlet and outlet sides of the strainer. When this pressure differential reaches 5-10 psi the strainer element may require cleaning.

⚠ CAUTION

Prior to dismantling the strainer for cleaning, it is imperative that the strainer assembly is isolated and completely depressurized.

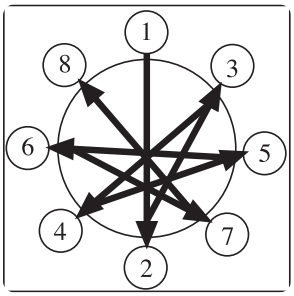
Follow the steps below when cleaning the CS strainer element:

Step 1. **For Bolted Lid Models:** Remove the top of the strainer by removing the Grade 5 Zinc plated bolts from the lid.

For Clamped Lid Models: Remove the top of the strainer by taking off the band-clamp assembly.*

Step 2. Lift the strainer element (conical screen) out of the strainer body.

Figure 9: Recommended Torquing Sequence



Step 3. Carefully scrub down the strainer element with a rigid nylon brush until all matter is loosened.

Do not use a steel brush.

Step 4. Wash the strainer element off with clean water. It is preferable to use a hose with a significant amount of water pressure.

Do not use a pressure washer.

Step 5. Wash all matter from the strainer gaskets and clean the inner-ring where the bottom of the strainer element rests.

Step 6. Make sure the U-shaped gasket is fitted securely to the bottom of the strainer element. Reposition the strainer element into the body of the strainer.

Step 7. Make sure the strainer head gasket is secure on top of the strainer body. On V-band models, O-rings should be seated completely in the body flange. Reposition the strainer lid back on the strainer body. **Tighten the lid securely either with the bolts or with the band-clamp.**

* For clamped models, opening and closing is achieved without adjusting the lock nut. It is tightened at the factory to the correct compression. (Minor tightening may be necessary if the gasket loses memory over time.) To open the clamp, depress the safety latch and pull the over-center lever outward. To close the clamp, make sure the T-bolt is seated in its receiver and push the over-center lever back toward the strainer housing. Be sure that the safety latch is engaged before putting the unit to use.

PW Models

Options
Flush Valve

Figure 10: Timer Based Valve Controller

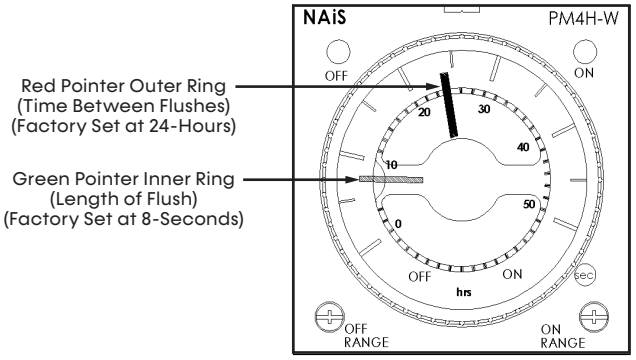


Figure 11: Electric Ball Valve

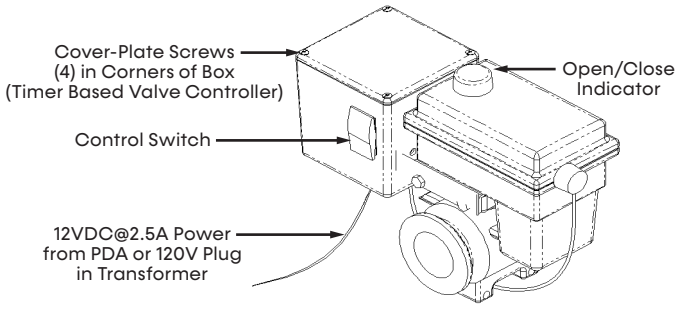
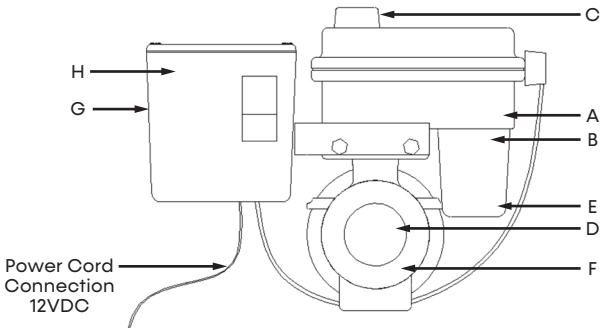


Figure 12: Valve Specifications



LEGEND

A. Water-resistant polypropylene motor case
B. High torque motors with perma-lub gears
C. Open and close indicator
D. Stainless steel ball valve and hardware
E. Auto reset circuit breaker
F. 90° bi-directional rotation
G. Controller case

ATF OPERATION INSTRUCTIONS

Flush valve line must be piped to atmospheric pressure such as an open floor drain. The flush line should not undergo any changes in elevation and should be sloped downward in the direction of drainage. **Do not pipe the flush or drain line into a pressurized line.**

NOTE: The Automatic Timer Flush Package needs to be programmed when it is received by the end-user. The programming is simple and takes only a few moments. However, because every application has different parameters that affect the required frequency between flushes and the duration of the flush, the end-user must choose the controller's settings (refer to your specific strainer manual).

PROGRAMMING THE ATF CONTROLLER

1. Plug the transformer into a 120-VAC outlet.
2. Insert the 12-VDC plug coming from the transformer into the jack on the underside of the ATF box.
3. Test for power by pressing the manual flush side of the control switch (lower switch light should come on then the valve will start to open).
4. Adjust the "ON TIME" (Valve Open) by turning the inner timer ring with the GREEN POINTER clockwise to increase duration. The ON TIME RANGE is factory set at eight seconds (see figure, **Timer Based Valve Controller**).
5. Adjust the "OFF TIME" (Valve Close) by turning the outer ring with the RED POINTER clockwise to increase duration. The OFF TIME RANGE is factory set at twenty-four (24) hours (see figure, **Timer Based Valve Controller**).
6. Set the control switch to auto flush. The red off light on the timer will come on and the upper light on the switch will come on and stay on. During the flush cycle the on light on the timer and the lower switch light will come on.

Options
Flush Valve

PW Models

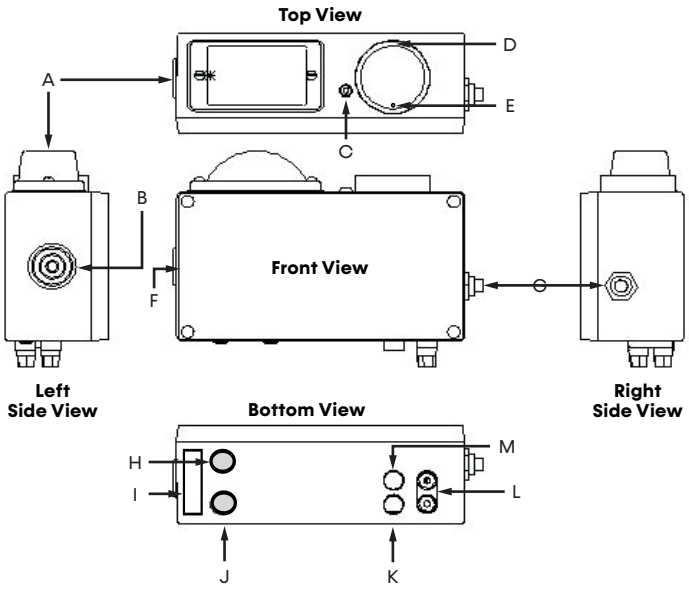
CONTROL SWITCH

Control switch flushing is initiated by pressing and holding down the manual control switch located on the front of the controller (see figure, **Electric Ball Valve**). The manual flush control switch can also be used to conveniently drain the water out of the strainer before removing the conical screen element from the strainer housing. A yellow indicator arrow on top of the ATF valve will rotate in sync with the ball valve to show the valve position (open or closed). When the manual flush control switch is released, the valve will automatically close.

⚠ WARNING

Keep fingers away from valve opening to avoid getting caught in the moving parts. The electric motor supplies a sufficient amount of power to cause personal injury. Take precaution when handling.

Figure 13: Pressure Differential Alarm (PDA) Option



LEGEND

A. Visual Alarm
B. Audible Alarm
C. LED Power Indicator
D. Pressure Differential Switch-Gauge
E. Differential Setpoint Contact
F. Cover-Plate (4) in Corners of Box (DO NOT REMOVE)
G. Alarm Reset Button
H. Power to ATF
I. Cable Retainer
J. 110 Volt/12 Vold DC Wall Transformer
K. PSID Low
L. AUX Contacts (On or Off with Alarm Red & Black)
M. PSID High

ATF WATER RESISTANCE

The valve and controller are water-resistant, not water-proof. Do not install below ground level where the component can be submerged in water. Only remove the cover plate from the valve controller when setting or changing the flush settings. Keep the cover tightly sealed on the unit during normal operation.

PDA OPERATION INSTRUCTIONS

Remove the power supply and insert the connector end into the socket on the bottom of the PDA housing (see figure, **Pressure Differential Alarm (PDA) Option**) and plug the transformer into the power source. Standard systems are supplied with a 120V power supply to the primary of the transformer, with an output secondary of 12VDC. The pressure differential switch-gauge is factory set to 7-8 psi. The CS strainer operates at a pressure differential slightly less than 1 psi during maximum flow when the strainer screen is clean. By the time the differential pressure reaches 7-8 psi, the strainer element will be significantly clogged and require immediate removal and cleaning. To adjust the pressure differential switch-gauge setting, insert a 1⁄16-inch Allen wrench and rotate the differential set point contact to the desired location (see figure, **Pressure Differential Alarm (PDA) Option**).

NOTE: It is not recommended to set the differential switch-gauge higher than 10 psi. Disabling the alarm or increasing the alarm set point could result in damage to the strainer element and allow debris to pass into the system.

When the differential set point is reached, both the audible and visual alarms will be triggered and will remain engaged until both the alarm condition is corrected and the alarm-reset button is pressed (if the alarm-reset button is pressed but the differential pressure is beyond the set point, the alarms will reengage immediately). After the strainer is cleaned and put back in service, the differential pressure should return to 1 psi Electric Ball Valve.

PW Models

Options
Flush Valve

PDA WATER RESISTANCE

The Pressure Differential Alarm Controller is water-resistant, not water proof. Do not install below ground level where the box can be submerged in water. **Do not remove** the cover plate from the PDA controller. Keep the cover tightly sealed on the module during normal operation.

AUXILIARY CONTACTS

The PDA option is equipped with a remote alarm feature. The remote alarm contacts are located at the two black and red banana clip posts (see figure, **Pressure Differential Alarm (PDA) Option**). The alarm can be set up in one of two ways:

1. A remote alarm signal of 12VDC can be sent to a central monitoring station.
2. A set of auxiliary contacts will indicate a "closed" condition when the alarm activates (Locate the "Auxiliary Contact Schematic" inside the PDA box by removing the four screws on the cover plate).

Table 8: Troubleshooting for ATF Package

Problem	Description	Solution
Valve is leaking past ball	Seals damaged or worn out	Install repair kit
	Valve is not stopping at proper closed position	Adjust limit switches
Valve stem leaks	Worn stem seals	On metal valves: tighten stem packing nut 1/2 turn. CAUTION! Over tightening stem nut could cause drag on motor and trip internal circuit breaker. May require repair kit or new valve.
Valve body leaks	Loose body bolts or excessive operation pressure	Check bolts and observe recommended pressure ratings
	Defective seals	Install repair kits or new valve
Valve hard to turn	Swollen seals or product buildup in valve chamber	Check valve for compatibility with product, may require valve cleaning or new valve
	Valve bolts too tight	Loosen bolts slightly
	Stem nut too tight	Loosen stem nut slightly

Options
WYE Strainer

PW Models

The correct size of the WYE Strainer is determined by its job function, not by the size of the pipeline.

PRE INSTALLATION CHECKLIST

1. Ensure working conditions (pressure/temperature) are within the specified capacity of the product being installed. Please refer to the certified drawings to assist in determining these values.
2. Inspect all sealing surfaces to ensure gasket surfaces are free of defects (no nicks or cuts). The pipeline should also be checked for proper alignment. WYE strainers should never be utilized to realign an existing piping system.
3. Ensure that the pipeline's mating flanges are the same type as the WYE strainer being installed. Raised face flange ends cannot be mated to flat face flange ends.
4. Ensure strainer end-to-end length and installation gap are within a ¼-inch (0.64 cm) gap for gasket, and have sufficient clearance for easy opening of cover and screen removal.
5. If the WYE strainer is to be located on the discharge side of a pump, then a safety release valve must be installed between the WYE strainer and the pump.

Figure 15: WYE Strainer Straining Illustration

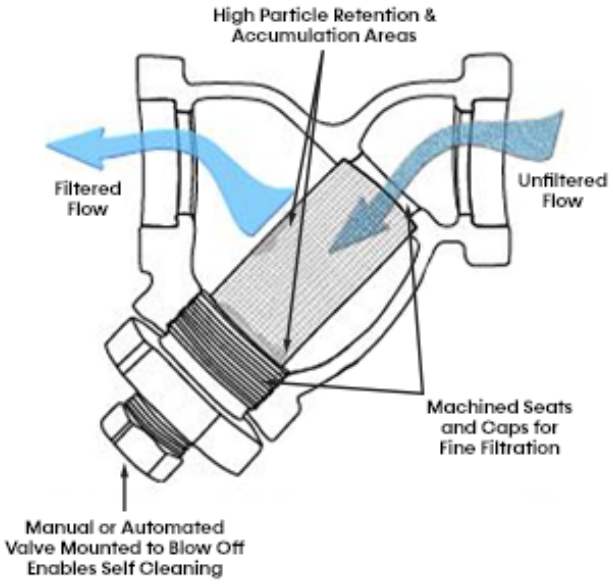


Figure 16: WYE Strainer - Flanged Ends

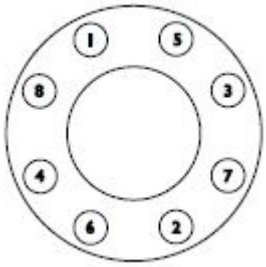
INSTALLATION PROCEDURE

1. Also, for maximum efficiency, install a differential pressure gauge at inlet and outlet connections or at the strainer gauge tap (if provided).
2. WYE strainers must be positioned in the pipeline ahead of the equipment requiring protection.
3. To provide for easier maintenance, the WYE strainer should be located where the drain plug can be removed. Additionally, ensure the drain is located at the lowest position when installed. **If installed in the vertical position, the WYE side of the strainer must be pointing downward.**
4. Ensure there is ample space at the WYE side of the strainer for screen removal.
5. Before placing the WYE strainer into place, support the existing pipeline with pipe supports near the inlet and outlet connections.
6. Place the WYE strainer into the pipeline ensuring that the flow arrow on the body of the WYE strainer is pointing in the direction of the pipeline flow. For large or heavy strainers, appropriate material handling equipment must be used.
7. Install a standard ANSI (⅛-inch-thick) flange gasket between the WYE strainer and pipeline flanges, on both sides. Install lubricated flange bolts and hand tighten. Flange bolts should then be tightened, using a star or crisscross pattern to evenly load the bolts, in accordance with established piping standards. Refer to **WYE Strainer Bolting Sequence Pattern** figure.

PW Models

Options
WYE Strainer

Figure 17: WYE Strainer Bolting Sequence Pattern



NOTE: Excessive bolt torque may damage flanges. Please refer to established flange bolt torques for guidelines.

OPERATION

Once proper installation has been successfully completed, start the system gradually, at start up as well as after shut down. This eliminates sudden shock to the strainer and other equipment in the line. This is extremely important for steam service.

STARTUP PROCEDURE

1. To remove all fluid from the strainer belly, a drip-leg can be installed or the piping can be placed at a ¼-inch (0.64 cm) slope. **NOTE: With piping systems that contain fluids other than water or when the working temperature is above 120°F (48.89°C), fluid must be drained to safe area, away from the operator.** Operators should always be fitted with appropriate equipment (goggles, gloves, vests etc.) when venting or servicing is performed.
2. Start the piping system by opening the outlet valve nearest the WYE strainer's outlet first. Then gradually open the inlet valve nearest the WYE strainer's inlet, approximately 25% of normal operational flow. It is important to start the system gradually to avoid displacing or damaging the WYE strainer.
3. Continue to open the inlet valve until the desired service flow has been reached.

MAINTENANCE

WYE strainers require little monitoring once they are properly installed. The pressure differential across the strainer should be checked periodically to determine if the screen needs to be cleaned or replaced. If the pressure differential goes unchecked and the screen becomes completely clogged, the screen will break and require replacing. **Note: Strainer screens are not designed to withstand the same pressure ratings as the housings.** If the screen becomes completely clogged, it will be exposed to the same pressure as the housing. In most cases, this will cause the screen to fail and potentially damage downstream equipment.

Regular maintenance involves:

- Timely cleaning or replacement of screen
- Periodically checking for leaks

During normal use, the screen will become clogged with foreign matter, causing the differential pressure to increase. Once the differential pressure has increased to an unacceptable value, typically by 5 psi to 10 psi, it is time to clean or replace the screen. It is not advisable to let the differential pressure increase by 20 psi. This may cause the screen to fail and possibly damage downstream equipment.

A convenient and safe way to determine when the screen needs to be replaced is to install pressure gauges on the inlet and outlet sides of the strainer. The maximum acceptable pressure drop across the strainer will indicate when the screen needs to be replaced. Screen size and construction determine the maximum pressure drop that a strainer screen can withstand.

SCREEN REMOVAL/ CLEANING/REPLACEMENT

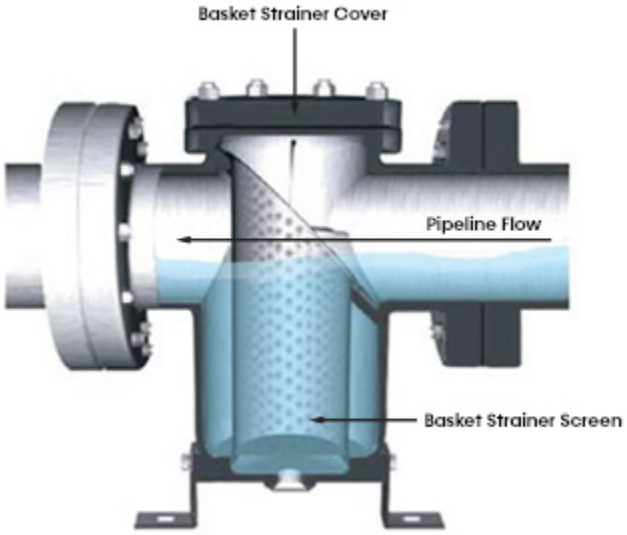
1. Isolate the strainer by closing the inlet and outlet valve connections on either side of the WYE strainer. Make sure valves are bubble tight.
2. Open vent to relieve pressure inside and drain fluid from the strainer.
3. Once pressure is relieved, remove the WYE side cap or cover.
4. Remove screen and clean. Do not permit screen to dry as it will be difficult to remove debris after it has hardened. Avoid banging or hitting the screen to remove stubborn debris.
5. Inspect screen and cover gasket for damage. If either is damaged, replace. Always ensure there is a spare gasket and screen on hand prior to maintenance.
6. Remove any debris or sludge from within the strainer.
7. Replace cleaned or new screen into its original position, ensuring it is squarely positioned on the screen.
8. Replace cover gasket and cap or cover. Tighten cap or cover to specified torque rating.

PW Models

Options
Basket Strainer

The correct size of Basket Strainer is determined by its job function, not by the size of the pipeline.

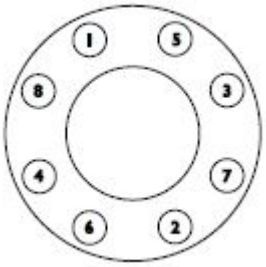
Figure 18: Installed Basket Strainer with Bolted Cover



INSTALLATION PROCEDURE

1. To provide for easier maintenance, the basket strainer should be located where the drain plug can be removed and where there is ample space above the basket strainer for screen removal.
2. Before placing the basket strainer into place, support the existing pipeline with pipe supports near the inlet and outlet connections of the basket strainer.
3. Place the basket strainer into the pipeline ensuring that the flow arrow on the body of the basket strainer is pointing in the direction of the pipeline flow. For large or heavy strainers, lift the basket strainer into place using slings positioned underneath the inlet and outlet connections.
4. Install a standard ANSI (⅛-inch-thick (0.3175 cm)) flange gasket between the basket strainer and pipeline flanges, on both sides. Install lubricated flange bolts and hand tighten. Flange bolts should then be tightened, using a star or crisscross pattern to evenly load the bolts, in accordance with established piping standards. This is illustrated in the figure, **Basket Strainer Bolting Sequence Pattern**.

Figure 19: Basket Strainer Bolting Sequence Pattern



NOTE: Excessive bolt torque may damage flanges. Please refer to established flange bolt torques for guidelines.

OPERATION

Once proper installation has been successfully completed, start the system gradually, at start up as well as after shut down. This eliminates sudden shock to the strainer and other equipment in the line. This is extremely important for steam service.

START-UP PROCEDURE

1. Remove air from the pipeline by opening the vent near the basket strainer. **NOTE: With piping systems that contain fluids other than water or when the working temperature is above 120°F (48.89°C), fluid must be drained to safe area, away from the operator.** Operators should always be fitted with appropriate equipment (goggles, gloves, vests etc.) when venting or servicing is performed.
2. Start the piping system by opening the outlet valve nearest the basket strainer's outlet first. Then gradually open the inlet valve nearest the basket strainer's inlet, approximately 25% of normal operational flow. It is important to start the system gradually to avoid displacing or damaging the basket strainer.
3. Continue to open the inlet valve until the desired service flow has been reached.

Options
Basket Strainer

PW Models

MAINTENANCE

Basket strainers require little monitoring once they are properly installed. The pressure differential across the strainer should be checked periodically to determine if the screen needs to be cleaned or replaced. If the pressure differential goes unchecked and the screen becomes completely clogged, the screen will break and require replacing. **NOTE: Strainer screens are not designed to withstand the same pressure ratings as the housings.** If the basket becomes completely clogged, it will be exposed to the same pressure as the housing. In most cases, this will cause the basket to fail and potentially damage downstream equipment.

Regular maintenance involves:

- Periodically checking for leaks
- Timely cleaning or replacement of screen

During normal use, the basket will become clogged with foreign matter, causing the differential pressure to increase. Once the differential pressure has increased to an unacceptable value, typically by 5 psi to 10 psi, it is time to clean or replace the screen. It is not advisable to let the differential pressure increase by 20 psi. This may cause the screen to fail and possibly damage downstream equipment.

A convenient and safe way to determine when the screen needs to be replaced is to install pressure gauges on the inlet and outlet sides of the strainer. The maximum acceptable pressure drop across the strainer will indicate when the screen needs to be replaced. Screen size and construction determine the maximum pressure drop that a strainer screen can withstand. Please consult factory for exact pressure ratings.

STRAINER ELEMENT CLEANING

Before removing the cover of the basket strainer, the pressure inside the vessel must be reduced to atmospheric via suction or venting. Failure to do so may result in serious bodily injury.

1. Isolate the basket strainer by closing the inlet and outlet valve connections on either side of the basket strainer.
2. Open vent or drain plug to relieve pressure inside the basket strainer. Drain fluid up to screen seat level.
3. Once pressure is relieved, remove the cover.
4. Remove baskets and clean. Avoid banging or hitting the screen to remove stubborn debris.
5. Inspect basket and cover gasket for damage. If either is damaged, replace. Always ensure there is a spare gasket and basket on hand prior to maintenance.
6. Remove any debris or sludge from within the basket strainer.
7. Replace clean basket into its original position, ensuring it is squarely positioned on the screen seat.
8. Replace cover gasket and replace and tighten cover.

PW Models

Chiller Header Bypass Kits

CHILLER/HEATER SYSTEM WATER HEADER BYPASS

A bypass is required for any for any variable flow application per loop. The chiller-bank bypass must be piped in such a way that the temperature and pressure differential flow sensors are still sensing active flow. The purpose of the chiller/heater system bypass is to prevent deadheading of the pumps when all of the internal unit valves go closed as well as allow temperature and differential pressure sensors to sense active flow. The bypass should be sized for an absolute minimum of one module's worth of design flow. (Please refer to selection submittals for design flow rates).

Header bypass kits can be installed on either end of the bank for any return configuration. The same kit is used for all 3 loops and can be installed with the flex hose running above or below the headers. It is recommended to install the bypass for the Load/ Chilled Water headers (bottom set of pipes) with the flex hose above the headers so service access is not impeded.

Modules can be designated for fixed bypass for heating, cooling, however, this limits the number of modules remaining for that duty. Also, with a module acting as a bypass, increased wear of heat exchangers may be caused by abrasion from bypass flow.

Figure 20: Water Header Bypass Assembly

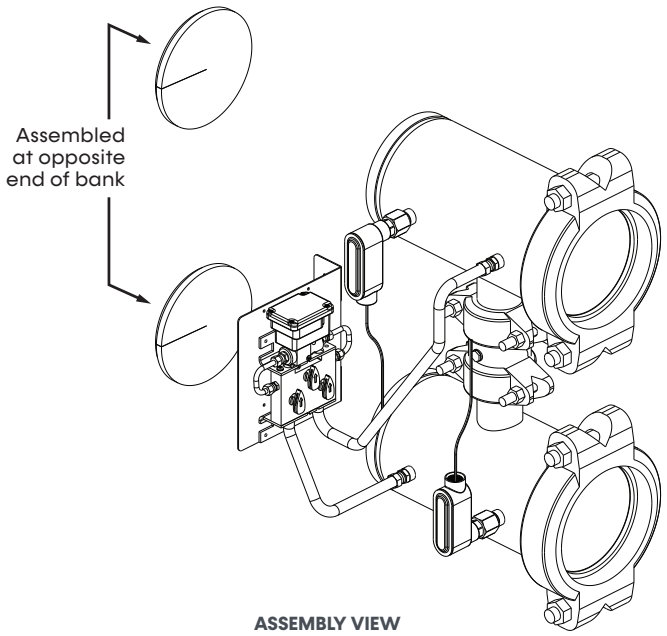
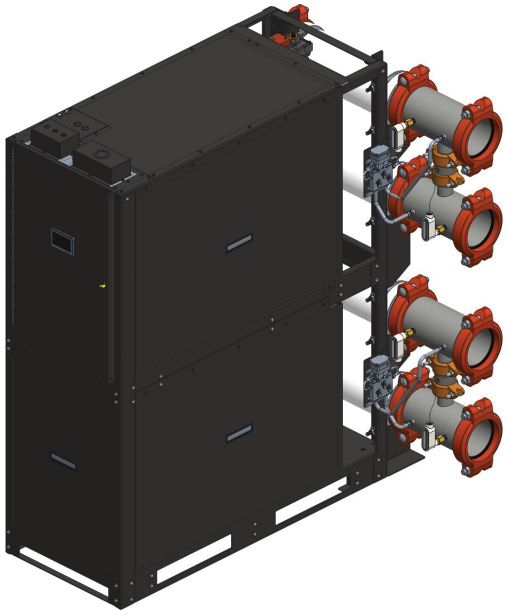


Figure 21: Water Header Bypass Arrangement



Chiller Header Bypass Kits

PW Models

6" Bypass Installation

1. Connect both Header tees(29B0060N16) with the main assembly using 6" coupling (C29B0015N02).
2. Attach the MWV butterfly valve (C23B0006N62) in between the Header tees (29B0060N16) using 2" coupling (C29B0015N04).
3. Attach the Swivel fitting (C57B0013N05) and temp sensor (29S003N02) to the Header tees (29B0060N16).
4. Connect the 24" flex hose(29B0010N13) to the top Header tee (29B0060N16) and 12" flex hose (29B0010N12) to the bottom Header tee (29B0060N16) using Swivel fitting (C57B0013N05).
5. Attach the DPT mounting panel (47F9266) on to the corner post (44F5001) and mount the DPT (C17B0041N05) on the panel.
6. Attach an 6-inch coupling (C29B0015N02) to the Header tees (29B0060N16) facing the opposite end of the bank.
7. Connect the other end of 24" flex hose (29B0010N13) to the Low pressure port at the DPT (C17B0041N05) and Connect the other end of 12" flex hose (29B0010N12) to the High pressure port at the DPT (C17B0041N05).
8. Attach an end cap (29B0047N02) to the 6-inch pipe at the opposite end of the bank using an 6-inch coupling (C29B0015N02).

Repeat the above steps for all headers.

8" Bypass Installation

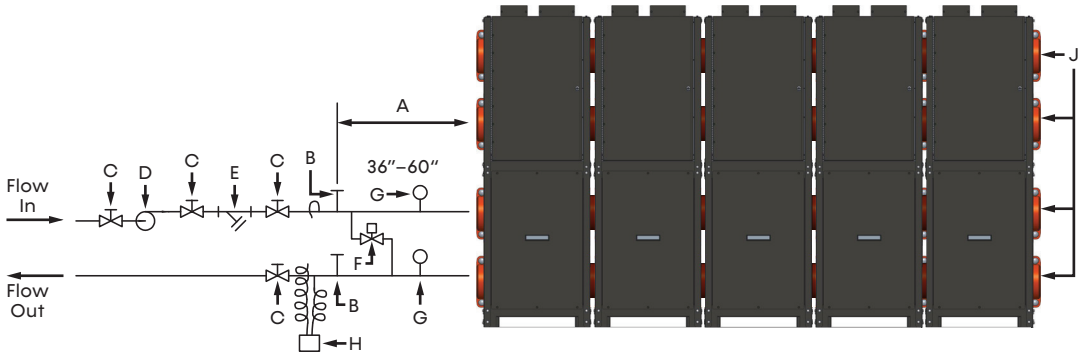
1. Connect both Header tees(29B0060N18) with the main assembly using 8" coupling (C29B0015N01).
2. Attach the MWV butterfly valve (C23B0006N62) in between the Header tees (29B0060N18) using 2" coupling (C29B0015N04).
3. Attach the Swivel fitting (C57B0013N05) and temp sensor (29S003N02) to the Header tees (29B0060N18).
4. Connect the 24" flex hose (29B0010N13) to the top Header tee (29B0060N18) and 12" flex hose (29B0010N12) to the bottom Header tee (29B0060N18) using Swivel fitting (C57B0013N05).
5. Attach the DPT mounting panel (47F9266) on to the corner post (44F5001) and mount the DPT (C17B0041N05) on the panel.
6. Attach an 8-inch coupling (C29B0015N01) to the Header tees (29B0060N18) facing the opposite end of the bank.
7. Connect the other end of 24" flex hose (29B0010N13) to the Low pressure port at the DPT (C17B0041N05) and Connect the other end of 12" flex hose (29B0010N12) to the High pressure port at the DPT (C17B0041N05).
8. Attach an end cap (29B041N01) to the 8-inch pipe at the opposite end of the bank using an 8-inch coupling (C29B0015N01).

Repeat the above steps for all headers.

PW Models

Water Piping Configurations

Figure 22: Field Piping Direct Return – 1 to 5 Modules



LEGEND

A. Sensor Location
B. Temp Sensor Well
C. Isolation Valve
D. Pump
E. Strainer
F. Header Bypass Valve
G. Pressure Taps with Shut-Off Valves & Gauges (Optional)
H. Pressure Differential Flow Sensor
J. End Caps

Figure 23: Field Piping Reverse Return – Preferred Piping Arrangement

LEGEND

A. Sensor Location
B. Temp Sensor Well
C. Isolation Valve
D. Pump
E. Strainer
F. End Caps
G. Header Bypass Valve
H. Pressure Taps with Shut-Off Valves & Gauges (Optional)
J. Pressure Differential Flow Sensor

Notes:

- The above are required piping for proper water regulation and distribution through ClimaCool modular chillers.
- ClimaCool Standard Bank Package includes shipped-loose items to be installed in the field: strainer, temp sensors and wells, DP proof-of-flow sensors, bypass header kit, end caps and couplings for all water loops. The shown pump, isolation valves, and pressure taps with shut-off valves, and gauges are provided by others/NOT included.
- Module order and incoming/outgoing water flow, as shown above, can be set up as either a left-to-right or right-to-left configuration.
- Source Hydronic Circuit shown. Piping configurations are identical for chilled- and hot-water hydronic circuits.
- Refer to *Dimensional Data and Drawings* for water header inlet/outlet dimensions.
- The differential-flow sensor provided as part of the ClimaCool Bank Package is a required proof-of-flow safety device on all water loops. Install the DP Sensor between the strainer and the entering side of the chiller as well as before the first water take off on the leaving side of the chiller. **This sensor is NOT for pump control. The BAS should provide their own DP for VFD/pump control.**
- A minimum first-pass, 40-mesh strainer is required on each water loop. The 40-mesh strainer must be installed at time of start-up for valid warranty commencement. Installing dual strainers per water loop avoids bank shut down and is recommended for better redundancy.
- Maximum water flow rates per bank with 6-inch (15.24 cm) headers is 1,100 gpm and 2,400 gpm per bank with 8-inch (20.32 cm) headers.
- Bank-level bypass header kits are available and controlled for each water loop for all applications with motorized valves. System bypasses are provided and controlled by others.
- Header bypass valve may be installed at either end of the bank.
- For over twelve (12) modules, two (2) CoolLogic Touch control systems are required. Please consult the factory.

Filling the Water System

PW Models

It is imperative that the water systems are free from debris prior to initial operation. See *Water Quality Parameters* for a comprehensive list of precautions.

FILLING, PURGING AND LEAK TESTING THE SYSTEM

After the water systems have been properly installed, visually inspect all joints for tightness. If the chiller is to be installed in an existing system, the cleanliness of the existing system can be judged from the operating conditions of the present machines. It is good practice to flush and, ideally, to acid wash the existing system **before** connecting a new chiller.

The following method is recommended to fill and leak check the water system for modules **WITH** Water Isolation Valves:

1. Close all water isolation valves inside each module which isolate the individual heat exchangers.
2. Ensure that all drain valves are closed and that all water main isolation valves are opened.
3. The system should be filled with clean water sent through the strainers and the system checked for leaks.
4. Once the main water lines and the chiller headers are filled with clean water, purge and repeat the filling process at least three times.
5. All modules are equipped with ¾-inch fill and flush valves with lines that tee into the inlet and outlet connections into and out of each heat exchanger. Ensure these ¾-inch valves are **CLOSED**. (PWT Excluded)
6. Open the water isolation valves inside each modular chiller and repeat the filling process, this time also checking for leaks inside each module.
7. Following the final filling and leak checking procedure, air should be purged from the system.

CLEANING THE SYSTEM

The following method is recommended to properly clean the water systems:

1. Before cleaning the system, install a temporary bypass line between the main supply and return water headers of both chilled and condenser water systems when possible. Open the main header bypass lines to divert the initial water flow around the module heat exchangers until you are confident the circulating water is mostly pure.
2. Provided main header bypass lines are installed, close all water isolation valves inside all modular chillers equipped with manual or automatic water isolation valves. If the modules are **NOT** equipped with water isolation valves, we recommend installing 3-way main header bypass valves so the initial water flow bypasses all module heat exchangers.
3. It is mandatory to run the pumps with the strainers in place (see Starting the Pumps section below for proper pump startup). All external hydronic branches should be open to all devices in the system.
4. Pressure drop across the strainer must be observed and as pressure change reaches 50% of the initial read, strainers must be isolated and cleaned.
5. Open all water isolation valves inside each module equipped with manual or automatic water isolation valves (see step 6 for modules **NOT** equipped with water valves). If bypass lines are not installed (described in step 1) it is recommended to drain out the initial fill of water to help flush out debris. Close off the main header bypass lines referred to in step 1 and open the flow to the main water headers. Repeat steps 3 and 4 until there is no more debris being collected by the strainers.
6. If bypass lines are not installed (described in step 1) and the modules are **NOT** equipped with water isolation valves, it is recommended to drain out the initial fill of water to help flush out debris. Remove and clean the strainers before refilling and purging the system again. Repeat steps 3 and 4 until there is no more debris being collected by the strainers.

PW Models

Filling the Water System

STARTING THE PUMPS

Follow the manufacturer's recommendations when starting the pumps for the first time. The system should be checked for leaks and air purged with the pumps in operation. The pressure drop across the heat exchangers will give a good indication of flow through the system (see project selection print-out or contact local representative). This should be immediately checked against the expected pressure drop for the flow rate required. **If the pressure drop begins to fall and the flow rate is falling, this could indicate the need to clean the strainers.**

Water Quality Requirements

PW Models

Table 9: Water Quality Requirements

Clean water is essential to the performance and life span of water-source heat pumps. Contaminants, chemicals, and minerals all have the potential to cause damage to the water heat exchanger if not treated properly. All closed-loop water systems should undergo water quality testing and be maintained to the water quality standards listed in this table. All open-loop water systems shall be tested upon installation and periodically to ensure water quality standard in the table below are met.

Water Quality Requirements
For Closed-Loop and Open-Loop Systems

	Description	Symbol	Units	Heat Exchanger Type			
				Closed Loop Recirculating		Open Loop, Tower, Ground Source Well	
				All Heat Exchanger Types	Coaxial HX Copper Tube in Tube	Coaxial HX Cupronickel	Brazed-Plate HX 316 SS
Scaling Potential	pH - Chilled Water <85°F			7.0 to 9.0	7.0 to 9.0	7.0 to 9.0	7.0 to 9.0
	pH - Chilled Water >85°F			8.0 to 10.0	8.0 to 10.0	8.0 to 10.0	8.0 to 10.0
	Alkalinity	($HCO3^-$)	ppm - $CaC0_3$ equivalent	50 to 500	50 to 500	50 to 500	50 to 500
	Calcium	(Ca)	ppm	<100	<100	<100	<100
	Magnesium	(Mg)	ppm	<100	<100	<100	<100
	Total Hardness	($CaCO_3$)	ppm - $CaC0_3$ equivalent	30 to 150	150 to 450	150 to 450	150 to 450
	Langelier Saturation Index	LSI		-0.5 to +0.5	-0.5 to +0.5	-0.5 to +0.5	-0.5 to +0.5
	Ryznar Stability Index	RSI		6.5 to 8.0	6.5 to 8.0	6.5 to 8.0	6.5 to 8.0
Corrosion Prevention	Total Dissolved Solids	(TDS)	ppm - $CaC0_3$ equivalent	<1000	<1000	<1000	<1000
	Sulfate	(SO_4^{2-})	ppm	<200	<200	<200	<200
	Nitrate	(NO_3^-)	ppm	<100	<100	<100	<100
	Chlorine (free)	(Cl)	ppm	<0.5	<0.5	<0.5	<0.5
	Chloride (water < 80°F)	(Cl^-)	ppm	<20	<20	<150	<150
	Chloride (water > 120°F)	(Cl^-)	ppm	<20	<20	<125	<125
	Hydrogen Sulfide[α]	(H_2S)	ppb	<0.5	<0.5	<0.5	<0.5
	Carbon Dioxide	(CO_2)	ppm	0	<50	10 to 50	10 to 50
	Iron Oxide	(Fe)	ppm	<1.0	<1.0	<1.0	<0.2
	Manganese	(Mn)	ppm	<0.4	<0.4	<0.4	<0.4
	Ammonia	(NH_3)	ppm	<0.05	<0.1	<0.1	<0.1
	Chloramine	(NH_2CL)	ppm	0	0	0	0
Fouling & Biological	Iron bacteria		cells/mL	0	0	0	0
	Slime-forming bacteria		cells/mL	0	0	0	0
	Sulfate-reducing bacteria		cells/mL	0	0	0	0
	Suspended Solids[β]	(TSS)	ppm	<10	<10	<10	<10
Electrolysis All HX types	Earth Ground Resistance[χ]		Ohms	Consult NEC and local electrical codes for grounding requirements			
	Electrolysis Voltage[δ]		mV	Measure voltage and internal water loop to HP ground			
	Leakage Current[δ]		mA	Measure current in water loop pipe			
	Building Primary Electrical Ground to unit, must meet local diameter and penetration length requirements. Do not connect heat pump to steel pipe unless dissimilar materials are separated by using Di-electric unions. Galvanic corrosion of heat pump water pipe will occur						

PW Models

Water Quality Requirements

1. The **Water Quality Requirements** table provides water quality requirements for coaxial and brazed-plate heat exchangers.
2. The water must be evaluated by an independent testing facility comparing site samples against this table. When water properties are outside of these parameters, the water must either be treated by a professional water treatment specialist to bring the water quality within the boundaries of this specification, or an external secondary heat exchanger must be used to isolate the heat pump water system from the unsuitable water. Failure to do so will void the warranty of the heat pump system and will limit liability for damage caused by leaks or system failure.
3. Regular sampling, testing and treatment of the water is necessary to assure that the water quality remains within acceptable levels thereby allowing the heat pump to operate at optimum levels.
4. If closed-loop systems are turned off for extended periods, water samples must be tested prior to operating the system.
5. For optimal performance, it is recommended that the closed-loop piping systems are initially filled with deionized water.
6. Well water with chemistry outside of these boundaries, and salt water or brackish water requires an external secondary heat exchanger. Surface/Pond water should not be used.
7. If water temperature is expected to fall below 40°F (4.4°C), antifreeze is required. Refer to the heat pump IOM for the correct solution ratios to prevent freezing.

Strainer / Filter Sizing

Mesh Size	Particle Size		
	Microns	Millimeter	Inch
20	840	0.840	0.0340
30	533	0.533	0.0210
60	250	0.250	0.0100
100	149	0.149	0.0060
150	100	0.100	0.0040
200	74	0.074	0.0029

- ppm = parts per million
- ppb = parts per billion

α Hydrogen sulfide has an odor of rotten eggs. If one detects this smell, a test for H_2S must be performed. If H_2S is detected above the limit indicated, remediation is necessary. Consult with your water testing/treatment professional. If a secondary heat exchanger is required, use appropriate materials as recommended by the heat exchanger supplier.

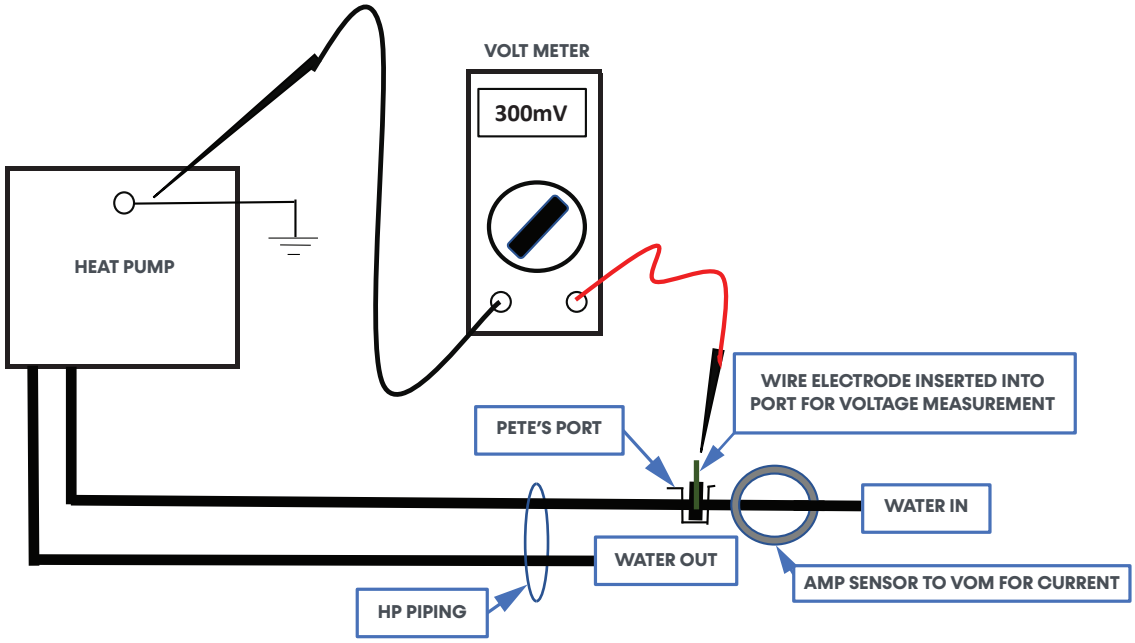
β Suspended solids and particulates must be filtered to prevent fouling and failure of heat exchangers. Strainers or particulate filters must be installed to provide a maximum particle size of 600 micron (0.60 mm, 0.023 inch) using a 20 to 30 mesh screen size. When a loop is installed in areas with fine material such as sand or clay, further filtration is required to a maximum of 100 micron. Refer to the Strainer / Filter Sizing Chart to capture the particle sizes encountered on the site.

χ The WSHP piping system or other plumbing pipes must not be used as the building ground. An electrical grounding system using a dedicated ground rod meeting NEC and local electrical codes must be installed.

δ Refer to the **Antifreeze Percentages by Volume** table for instructions on measuring resistance and leakage currents within water loops.

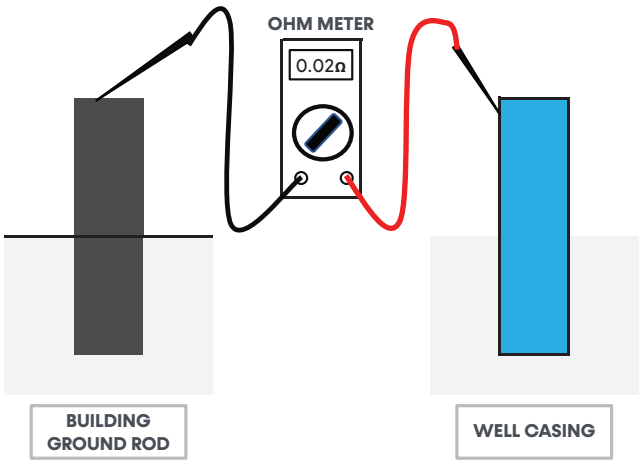
Water Quality Requirements

Measuring Electrolysis, Voltage, and Current for Ground-Water Applications



- Measure the electrolysis voltage using a volt meter between the heat pump ground and a #14 AWG solid copper wire electrode inserted into the water using a Pete's style access port.
- The heat pump must be operating and the water stream flowing.
- The voltage measured should be less than 300mV (0.300V). If the voltage is higher than 500mV, electrolysis occurs resulting in corrosion.
- If voltage is measured, the cause is a high-resistance earth ground or current on the neutral conductor. Remedial measures should be performed.
- Measure the current flowing through the piping system by using an amp clamp probe on the water-in line. The heat pump must be operating and the water stream flowing.
- There should be zero amps measured. If current is present, there is leakage current to the plumbing system and it must be rectified to prevent pipe corrosion.

Measuring Earth Ground Resistance



- Measure the earth ground bond using an Ohm meter between the building's ground rod and the steel well casing.
- The resistance measured should be zero Ohms. The NEC allows a resistance to ground up to 20 Ohms. Any resistance above zero indicates a poor earth ground, which may be the result of a hot neutral line or that conductive water is present. Both of these may lead to electrolysis and corrosion of the heat pump piping. A check for both should be performed and resolved.

NOTE: If the well casing is plastic, create a conductive path by inserting a #6 AWG bare copper wire into the well water. Remove the temporary conductor when finished.

PW Models

Electrical Connections

The power for all modules is taken from a suitable circuit breaker/fused disconnect power supply within the main panel. Proper grounding of the module is mandatory. **Before carrying out any electrical work, confirm that the main supply is isolated.** Knockout drawings are provided. **Do not drill into cabinet;** shavings can damage electronic components. The power for all individual modules shall be in compliance with all local and national codes.

COOLLOGIC TOUCH™ CONTROL SYSTEM WIRING

A separate 115 volt power supply is required to power the CoolLogic Touch Control System. Communication between the CoolLogic Touch Control System and chiller modules requires a shielded, twisted pair (STP) Cat 6 or higher Ethernet cable home run connection. **Control wiring cannot be installed in the same conduit as line voltage wiring or with wires that switch highly inductive loads such as contactor and relay coils.** All wiring shall be in compliance with all local and national codes.

FIELD CONNECTIONS BETWEEN COOLLOGIC TOUCH CONTROL SYSTEM AND MODULE CONTROLLER

- STP Cat 6 or higher Ethernet cable.
- Over 50 feet (15.24 meters), contact factory.

NOTE: Use the same polarity throughout the network segment.

⚠ WARNING

Disconnect power supply(ies) before servicing. Refer servicing to qualified service personnel. Electric shock hazard. May result in injury or death!

⚠ CAUTION

Use only copper conductors for field installed wiring. Unit terminals are not designed to accept other types of conductors.

⚠ ATTENTION

Installations where direct sun may cause the module and bank control panels to reach temperatures above 104°F require a sunshade.

FIELD CONNECTIONS TO THE COOLLOGIC TOUCH CONTROL SYSTEM

Field integration with CoolLogic Touch Control System is simplified by the use of the following minimum input devices:

- A remote start/stop input for scheduling.
- Differential pressure flow sensors for heating and cooling water flows.
- Chilled water inlet and outlet temperature sensors and wells.
- Heating water inlet and outlet temperature sensors and wells.

COOLLOGIC TOUCH CONTROL SYSTEM

Refer to separate CoolLogic Touch IOM for more details.

FIELD CONNECTIONS TO THE MODULES

The CoolLogic Touch Control System connects to the modules using STP Cat 6 or higher Ethernet cable. Refer to the Power Distribution drawing. All wiring shall be in compliance with all local and national codes.

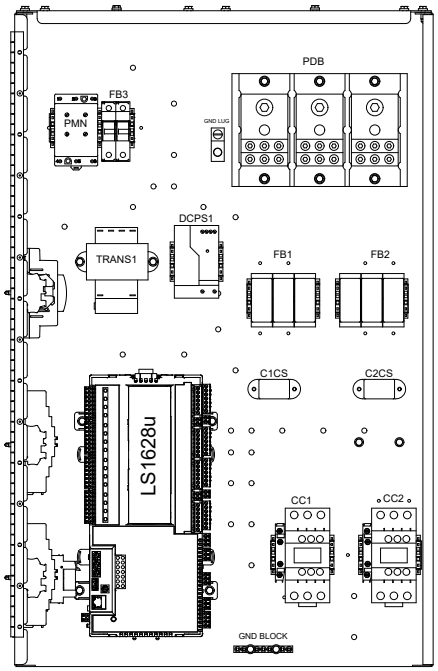
Electrical Connections

PW Models

MODULE CONTROLLER

The module controller LS1628 directly senses the control parameters that govern the specific module's operation, such as evaporator and condenser leaving temperatures, suction and discharge temperatures and pressures.

Figure 24: Module Control Panel



⚠ CAUTION

Unit to be serviced by qualified personnel only. Refrigerant system under pressure. Relieve pressure before using torch. Recover refrigerant and store or dispose of properly.

ELECTRICAL PHASE SEQUENCING

Proper clockwise rotation for scroll compressor motors is important to prevent damage to the compressors. ClimaCool recommends the use of a phase sequence indicating instrument following the manufacturers directions. An alternative is to "bump test" the compressors one at a time with pressure gauges attached to the high and low gauge ports of the compressors to check for proper rotation. Energize the compressor for a few seconds to ensure the discharge pressure gauge increases significantly. If the discharge pressure does not increase, proper rotation is reversed. Compressor rotation can be reversed by opening the main electrical disconnect and switching any two of the main power supply leads feeding that compressor's contactor.

PROPER VOLTAGE BALANCE

Occasionally, in three phase circuits, a voltage imbalance occurs between phases. It is not recommended to operate equipment when an imbalance greater than 4% occurs. This causes motors to run at high temperatures and may affect their longevity. The following example describes how to calculate the average voltage of the three phases to see if the imbalance is greater than 4%.

Example: Line 1 = 226V, Line 2 = 230V, Line 3 = 228V
The average is: (226+230+228)/3 = 228V

Next, [100(228-226)]/228 = 0.9%

The voltage imbalance of the three phase circuit is 0.9%. This is well under the 4% range.

⚠ CAUTION

3-PHASE SCROLL COMPRESSOR UNIT

If this unit uses a 3-Phase Scroll Compressor, the following instructions must be followed:

- Unit power supply must be wired in the proper sequence to avoid damage to the 3-Phase Scroll Compressor;
- Scroll Compressors with incorrect rotation show the following characteristics:
  - High sound level;
  - High suction pressure and low discharge pressure;
  - Low current draw.

If any of the three above characteristics exist, swap two of the three supply wires at the disconnect and recheck compressor for incorrect rotation.

PW Models

Electrical Communications Wiring

AVOIDING NOISE

Avoid running communication wires or sensor input wires next to AC power wires or the controller's relay output wires. These can be sources of noise that can affect signal quality. Common sources of noise are:

- Spark igniters
- Radio transmitters
- Variable speed drives
- Electric motors (> 1hp)
- Transformers
- Large contactors, (i.e., motor starters)
- Relays
- Video display devices
- Lamp dimmers
- Fluorescent lights
- Induction heaters
- Generators
- Parallel runs with power lines
- Other electronic modules

STP CAT 6 ETHERNET CABLE

Shielded, twisted pair category 6 (STP Cat 6) Ethernet cable is a twisted-pair cable comprised of eight copper wires twisted into four pairs. Each pair is then shielded with aluminum foil or braided wire strands before being jacketed. The cable standard provides performance of up to 250 MHz and runs at 1 Gbps up to 328 ft. (100 m) in length. If the length of the cable is 121 ft. (37 m) or less, then the speed increases to 10 Gbps.

This cable is commonly connected using punch-down blocks and modular connectors. Cable shielding reduces interference (both electromagnetic and radio frequency) and improves signal quality.

Category 6 is currently defined in ISO/IEC 11801, IEC 61156, and EN 50173. These documents specify performance characteristics and test requirements for frequencies up to 250 MHz.

The cable is available in both stranded- and solid-conductor forms. The stranded form is more flexible and withstands more bending without breaking. In situations where a cable is repeatedly flexed or connected and disconnected, choose a stranded cable. For horizontal cable runs not subject to repeated movement, or for outdoor applications, use STP Cat 6 CMP solid-copper conductor cable with individual shielding applied to each of the four wired pairs. The category and type of cable can be identified by the printing on the jacket.

The Category 6 specification requires conductors to be pure copper.

CHARACTERISTICS OF STP CAT 6

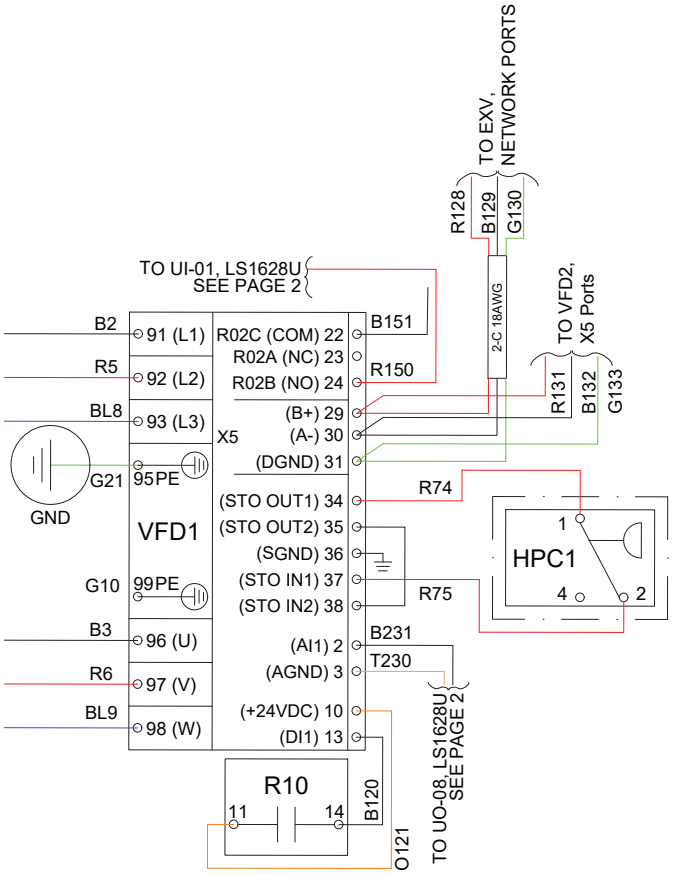
The use of balanced lines helps preserve a high signal-to-noise ratio despite interference from both external sources and crosstalk from other pairs.

Table 10: Electrical Characteristics for a Commercially Available Cat 6 UTP Cable Product

Property	Nominal	Tolerance	Unit
Characteristic Impedance, 1-250 MHz	100	± 15	Ω
Characteristic Impedance @ 250 MHz	100	± 5	Ω
DC Loop Resistance	≤ 0.05		Ω/m
Propagation Speed Relative to the Speed of Light	0.69		1
Propagation Delay	4.60		ns/m
Delay Skew < 100 MHz	< 0.45		ns/m
Capacitance @ 100 Hz	56		pF/m
Max Tensile Load, During Installation	110		N
Wire Diameter (24 AWG; 0.205 mm^2)	0.51		mm
Operating Temperature	-20 to +70		°C
Maximum DC Operating Voltage (PoE uses max 57 V)	90		V

OPTIONAL VFD INSTALLATION WITH STO FUNCTION

The optional VFD installation on the lead compressor circuit has wiring details as shown below:

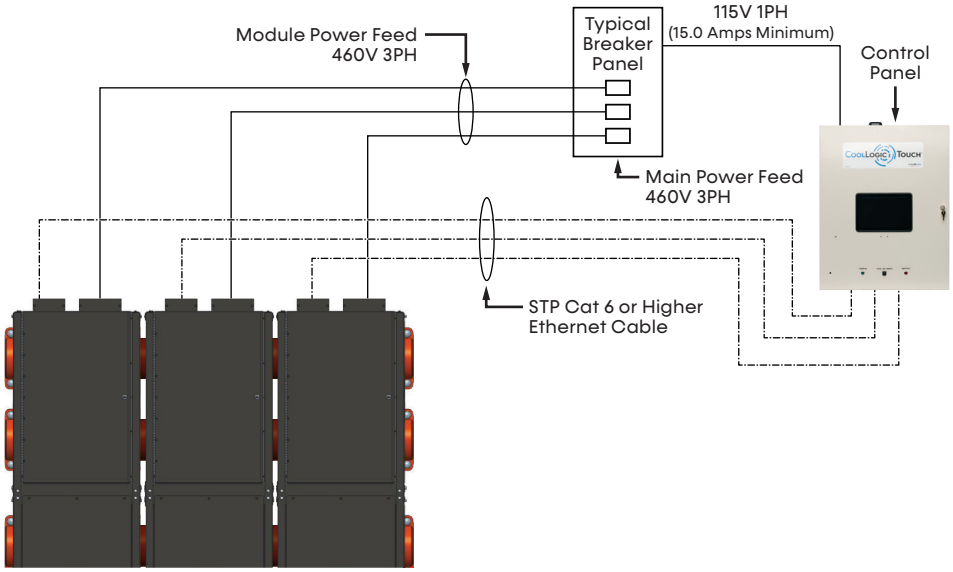


In the unlikely event that the HPC1 (head pressure control cut-out switch, manual reset) is tripped, the VFD is temporarily placed in a lock-out state (STO, "Safe Torque Off"). To recover from such an STO event, it is necessary that the HPC1 control is reset by depressing the red button switch on the control, and you will need to clear the VFD alarm using the VFD user keypad.

PW Models

Electrical Power Distribution

Figure 25: Power Distribution Drawing



NOTES

- Communication wiring is home run set up with STP Cat 6 or higher Ethernet cable.
- ClimaCool Standard Bank Package includes ship-loose items: 1–CoolLogic Touch Control System per bank and 2–temperature sensors and wells, 1–DP proof of flow sensor and 1–bypass header kit for each water loop. These items are to be installed, powered, and control-wired in the field by others.
- The shown breaker panel may be purchased through ClimaCool Corp, but is typically provided by the project electrical contractor.
- Breaker panel represents field power supply and is to be installed by others. Not provided as part of the ClimaCool modular chiller system.
- Control wiring by others.
- Disconnects are NOT Included.
- All voltages available, 460V used as example only.

Electrical Data

PW Models

Standard Compressor

Base Model	Voltage Code	Rated Voltage	Voltage Min/Max	Compressor			Total Unit FLA	Min Circuit Ampacity (MCA)	Max Overcurrent Protection (MOP)
				QTY	RLA	LRA			
PW*20	H	208/230V-3PH-60Hz	187/252	2.0	33.3	255.0	66.6	74.9	100
	F	460V-3PH-60HZ	432/504	2.0	15.4	140.0	30.8	34.7	50
	N	575V-3PH-60Hz	540/630	2.0	12.9	107.6	25.8	29.0	40
PW*30	H	208/230V-3PH-60Hz	187/252	2.0	49.0	386.3	98.0	110.3	150
	F	460V-3PH-60HZ	432/504	2.0	24.0	182.0	48.0	54.0	70
	N	575V-3PH-60Hz	540/630	2.0	19.2	131.0	38.4	43.2	60
PW*50	H	208/230V-3PH-60Hz	187/252	2.0	74.4	578.1	148.8	167.4	225
	F	460V-3PH-60HZ	432/504	2.0	38.8	280.7	77.6	87.3	125
	N	575V-3PH-60Hz	540/630	2.0	28.4	250.0	56.8	63.9	90
PW*65	H	208/230V-3PH-60Hz	187/252	2.0	102.8	599.0	205.6	231.3	300
	F	460V-3PH-60HZ	432/504	2.0	48.0	310.0	96.0	108.0	150
	N	575V-3PH-60Hz	540/630	2.0	43.1	239.0	86.2	97.0	125
PW*80	F	460V-3PH-60HZ	432/504	2.0	67.5	442.0	135.0	151.9	200
	N	575V-3PH-60Hz	540/630	2.0	45.2	375.0	90.4	101.7	125

Compressor with Lead VFD

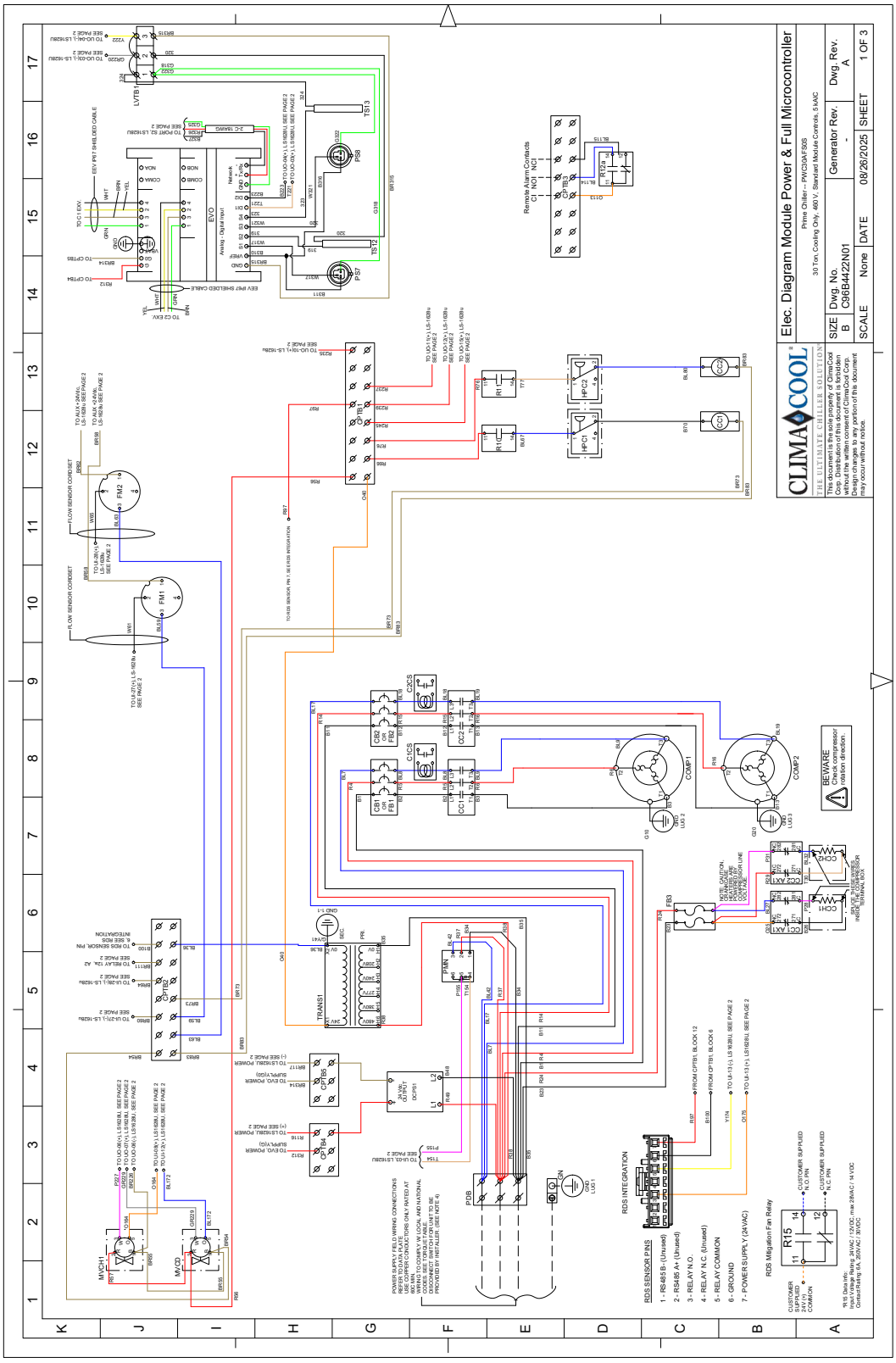
Base Model	Voltage Code	Rated Voltage	Voltage Min/Max	Compressor			Total Unit FLA	Min Circuit Ampacity (MCA)	Max Overcurrent Protection (MOP)
				QTY	RLA	LRA			
PWC30	F	460V-3PH-60Hz	432/504	2.0	44.0 / 24.0	44.0 / 182.0	68.0	79.0	110
	N	575V-3PH-60Hz	540/630	2.0	32.0 / 19.2	32.0 / 131.0	51.2	59.2	90
PWT30 PWH30	F	460V-3PH-60Hz	432/504	2,0	44.0 / 24.0	44.0 / 182.0	68,0	79,0	110
	N	575V-3PH-60Hz	540/630	2,0	32.0 / 19.2	32.0 / 131.0	51,2	59,2	90
PWC50	F	460V-3PH-60Hz	432/504	2.0	65.0 / 38.8	65.0 / 280.7	103.8	120.1	175
PWH50	F	460V-3PH-60Hz	432/504	2,0	65.0 / 38.8	65.0 / 280.7	103,8	120,1	175
PWC65	F	460V-3PH-60Hz	432/504	2.0	65.0 / 48.0	65.0 / 310.0	113.0	129.3	175
PWH65	F	460V-3PH-60Hz	432/504	2,0	65.0 / 48.0	65.0 / 310.0	113	129,3	175
PWC80	F	460V-3PH-60Hz	432/504	2,0	65.0 / 67.5	65.0 / 442.0	132,5	149,4	200

Note: Lead compressor RLA and LRA values based upon rated VFD input current.

PW Models

Example Wiring Diagrams

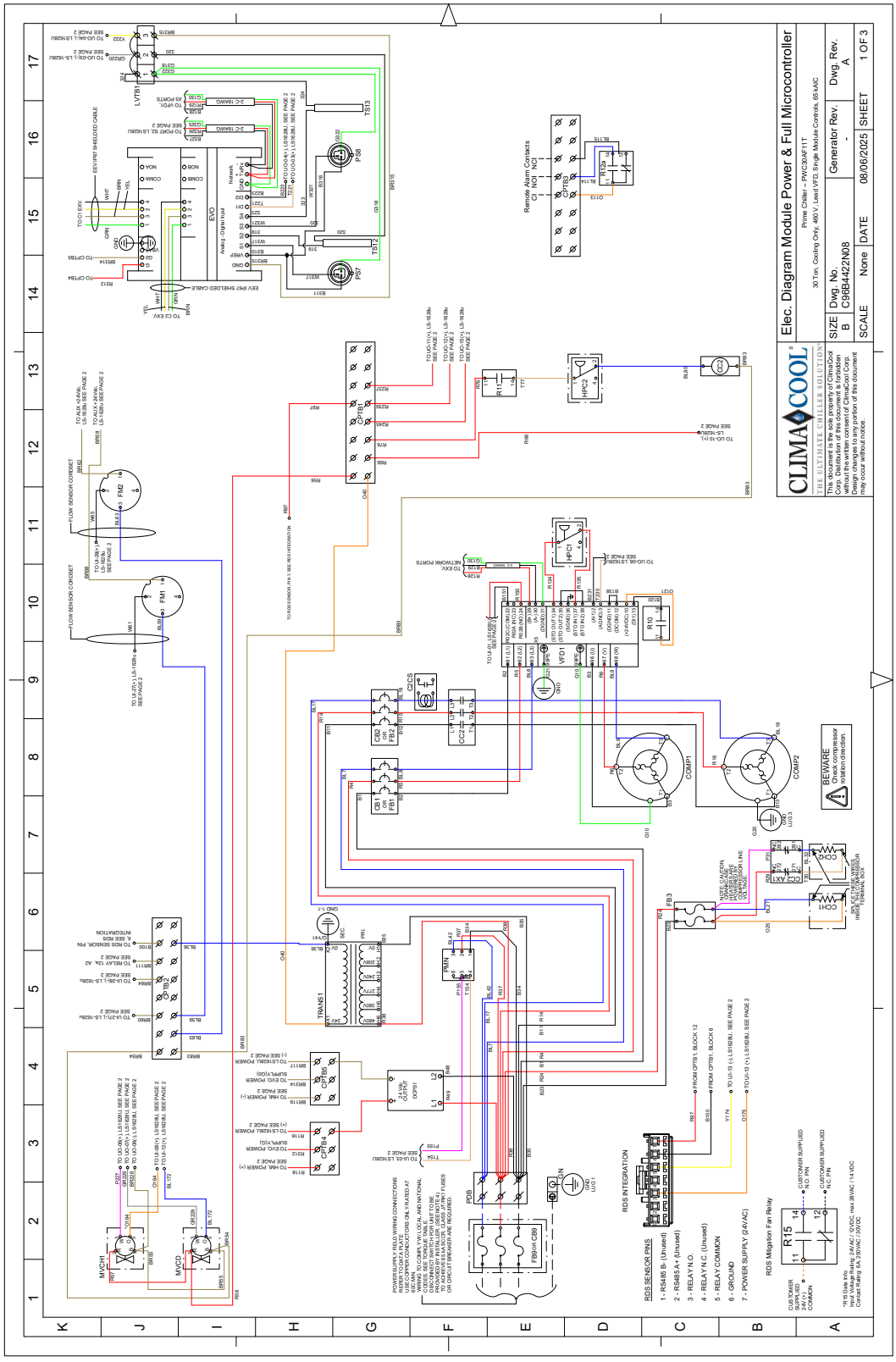
Chiller PWC, 460V-3PH



Example Wiring Diagrams

PW Models

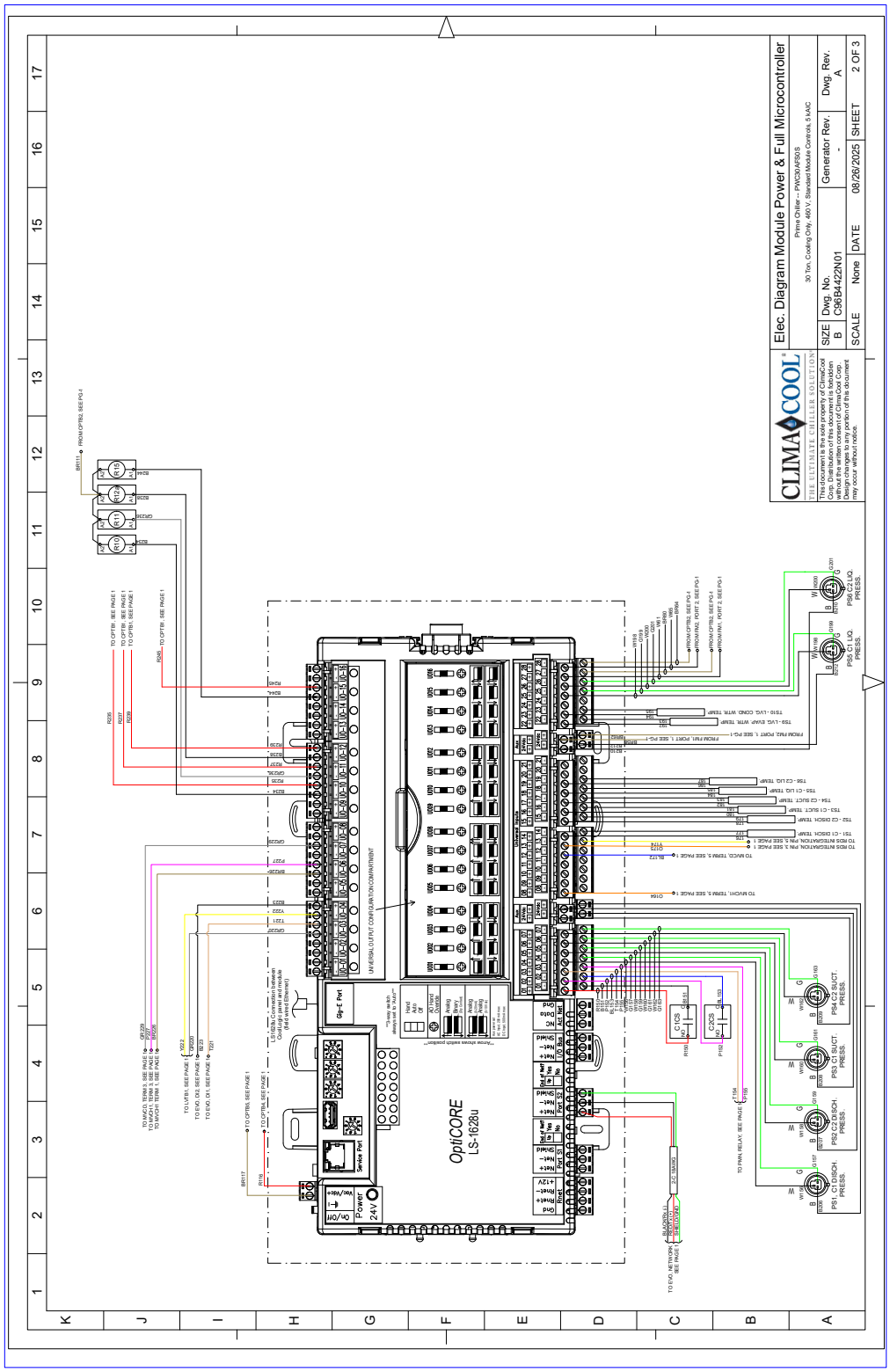
Chiller with Lead VFD PWC, 460V-3PH



PW Models

Example Wiring Diagrams

Module Controller



Pre-Startup

PW Models

All startups must be performed by ClimaCool factory trained personnel. Prior to chiller startup, there are certain essential checks which must be completed. Failure to carry out these checks could result in damage to the chiller voiding the modules warranty.

ELECTRICAL

It is imperative to turn off the main electrical power supply and follow proper lock-out/tag-out procedures prior to servicing any of the chiller's electrical components. The following procedures can be performed only after the electrical power is confirmed to be off:

1. The installation must be inspected and approved by the respective agent and be in compliance with all local and national electrical codes.
2. Check and tighten as required all electrical terminal connections on each module. Utilize any lock-out/tag-out procedures required for your project location when performing this operation. If no procedure exists take all precautions necessary to prevent the power from being turned on. A systematic tightening of all terminals inside the electrical control panel on each module should be carried out. This will include the compressor motor terminals, which would require removal of the compressor terminal cover. Check connections at each safety and every termination in the panel.
3. Verify that a separate 115 volt power supply is used to power the CoolLogic Touch Control System. Field connections are a home run STP Cat 6 or higher Ethernet cable connection.
4. All field connections should be checked for tightness.
5. Check all fuses for proper sizing as indicated on the chiller data plate and/or the electrical diagram on the inside door of the electrical panel.
6. Verify proper operation of the **mandatory** field installed pressure differential flow sensor.
7. Verify proper installation of the mandatory factory provided field installed voltage/ phase monitor.
8. **Confirm all panels and electrical covers are properly installed/sealed, including the condenser fan motor cover.**
9. **Check that all cabling (inside and outside of electrical panel) is not subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. These effects should also consider continual vibration from such sources as the compressors.**

REFRIGERATION

1. Refrigerant piping and components should be inspected for damage.
2. Place refrigerant gauges on the discharge and suction access ports of each refrigerant circuit to ensure a refrigerant charge is present. Leave the gauges on for compressor rotation check.
3. Confirm the settings on all pressure switches.

PW Models

Pre-Startup

WATER SYSTEM

1. Confirm installation of the mandatory field installed chilled water strainer with minimum of 20-mesh screen.
2. Confirm that leak testing has been carried out.
3. Confirm that the system is clean.
4. Confirm that necessary water treatment systems are in place with the heat exchanger water systems.
5. Confirm the chilled water circulating pumps are operational and water is flowing through the exchanger.
6. Shut the entering water valve and blow out some water from the lower flush port to check for particles or coloration from suspended particles. Record the pressure differential across the chiller heat exchanger measured at the pete's ports at each module.
7. Confirm correct water flow rates through the heat exchanger. Acquire the design parameters for the chiller bank from the ClimaCool Selection Program data (available from your local representative). Compare the measured differential pressures from step 5 above with the predicted flow rates to ensure proper correlation to the flow results.
8. Verify proper installation of the temperature sensors and wells (sensors should be fully inserted in the well and the well must be installed such that it is fully immersed into the flowing water of the field piping) and verify calibration of sensors read through CoolLogic Touch Control System.

⚠ WARNING

Disconnect power supply(ies) before servicing. Refer servicing to qualified service personnel. Electric shock hazard. May result in injury or death!

⚠ WARNING

Polyolester Oil, commonly known as POE oil, is a synthetic oil used in many refrigeration systems including those with R-454B refrigerant. POE oil, if it ever comes in contact with PVC or CPVC piping, may cause failure of the PVC/CPVC. PVC/CPVC piping should never be used as supply or return water piping with water source heat pump products containing R-454B as system failures and property damage may result.

⚠ CAUTION

Unit to be serviced by qualified personnel only. Refrigerant system under pressure. Relieve pressure before using torch. Recover refrigerant and store or dispose of properly.

⚠ CAUTION

3-PHASE SCROLL COMPRESSOR UNIT

If this unit uses a 3-Phase Scroll Compressor, the following instructions must be followed:

- Unit power supply must be wired in the proper sequence to avoid damage to the 3-Phase Scroll Compressor;
- Scroll Compressors with incorrect rotation show the following characteristics:
  - High sound level;
  - High suction pressure and low discharge pressure;
  - Low current draw.

If any of the three above characteristics exist, swap two of the three supply wires at the disconnect and recheck compressor for incorrect rotation.

Model: UW

Pre-Startup Checklist
Water-Source Modular Chillers

CLIMACOOL®
A NIBE GROUP MEMBER

E-mail: technicalsupport@climacoolcorp.com • Phone: 800.299.9747, Option 2, then Option 3

Project Name: **Date:**

Address/Phone:

		YES	NO
1.	Are modules connected properly per Codes and Installation Manual? (Installation, Operation & Maintenance (IOM) Manual is available at www.climacoolcorp.com.)	☐	☐
2.	Is there a minimum of 40-mesh strainer on the inlet water of each loop? (three (3) for SHC units; two (2) for all others) (Fill the chiller with water, passing through–at minimum–40-mesh strainers.)	☐	☐
3.	Is condenser water system filled and flushed? See "Filling the Water System" in IOM.	☐	☐
4.	Is chilled water system filled, flushed and all air purged from system? (Air must be purged from system prior to startup. See "Filling the Water System" in IOM.)	☐	☐
5.	Is source water system (6-pipe only) filled, flushed and all air purged from system? (Air must be purged from system prior to startup. See "Filling the Water System" in IOM.)	☐	☐
6.	Are all pumps tested and operational?	☐	☐
7.	Is required GPM/Pressure Differential supplied to the chilled water side? See project specifications or selection and performance sheets available from ClimaCool Sales Rep.	☐	☐
8.	Is required GPM/Pressure Differential being supplied to the condenser? See project specifications or selection and performance sheets available from ClimaCool Sales Rep.	☐	☐
9.	Is required GPM/Pressure Differential being supplied to the source loop (6-pipe only)? See project specifications or selection and performance sheets available from ClimaCool Sales Rep.	☐	☐
10.	Are the pressure differential flow sensors properly installed and wired to the CoolLogic Touch™ Control System?	☐	☐
11.	Have all chiller coupling connections been leak tested?	☐	☐
12.	Is water presently circulating through chiller?	☐	☐
13.	Have temperature sensors been installed?	☐	☐
14.	Does the power supply match the chiller nameplate?	☐	☐
15.	Are power and communication wiring complete to each module?	☐	☐
16.	Do wiring and devices match the approved electrical submittal drawings?	☐	☐
17.	Is required load available to run multiple compressors at startup?	☐	☐
18.	Is control functional to maintain condenser water temperature? Includes maintaining "minimum" inlet temperature. See "Operational Limitations" in ClimaCool IOM.	☐	☐
19.	Is a water header bypass installed at the chiller? *(Check One)* ☐ ClimaCool provided ☐ Field Provided ☐ Smart Bypass (4-pipe only)		
20.	Glycol Added? If Yes, Glycol % _____	☐	☐

If you checked "No" to any question above, provide the line reference number and the date of scheduled completion below. Please note **all conditions must be complete prior to the start-up date:**

* This form must be completed and submitted to ClimaCool Corp. **three (3) weeks** prior to final scheduling of any Startup.
NOTE: If any of the above items are not complete at time of startup, back charges will be assessed for additional costs.

Contractor Name:

Address:

(Authorized Signature)

Phone: **Date:**

PW Models

Mechanical Startup

All startups must be performed by ClimaCool factory trained personnel.

STARTUP DOCUMENTATION

All startup paperwork and documentation must be submitted to ClimaCool. Future warranty claims cannot be processed without a completed Startup and Warranty Registration form on file.

WATER TESTING

Extract three (3) water samples from each water side, evaporator/chilled for a cooling only application or evaporator/chilled and hot water/condenser for Simultaneous Heating and Cooling application using the bottles provided (three bags; each bag containing three bottles) from the Water Sample test kit. **Confirm that the sample bottles are filled to the top leaving no air in the bottles.** All the sample bottles must have labels completed per instructions included with the bottles. Ship the bottles immediately to the appropriate water testing laboratory per the instructions.

MECHANICAL STARTUP

1. Review all items are complete from the Pre-Startup Checklist.
2. Cross reference model number with submittal sheet to verify that the units are the correct model type and voltage requirements.
3. Confirm all panels and electrical covers are properly installed/sealed.
4. Inspect all refrigerant piping for oil leaks which may have occurred during shipment which might indicate a refrigerant leak. Check the high-pressure cutout setting of the pressure controls. The setting should be 575 psig for all PW models.
5. Use refrigerant gauge set suitable for the high pressure R-454B, and hook up to the suction and discharge ports of each module's compressor stages separately. Bump start the compressors by depressing the contactor manually. Bump the compressor only for 1-2 seconds to ensure the correct rotation of the scroll compressors (indicated by a rising highside pressure and a falling suction pressure).
6. Check for proper line- or high-voltage values at each module-input power block, and the 24VAC low-voltage values for correctness (± 10% of nominal values).
7. Tighten every screw and lug connection inside the *CoolLogic Touch* Control System and inside each module control panel high-voltage section. Check auxiliary contacts on contactors and ensure #1 auxiliary is wired on the #1 contactor. Open up the compressor junction box located on the front of each compressor and verify main electrical terminal lug tightness and the low-voltage wires on protection module.
8. Confirm the jumper locations for all control systems and module controllers as shown on the wiring diagrams provided on the inside electrical door panels.
9. Verify that EXV controller is wired to the LS1628.
10. Verify motorized water-isolation valves auxiliary-switch dial settings, to ensure they close near:
    - 30% for evaporator/chilled water valves for cooling-only units and hot-water/condenser valves for Simultaneous Heating and Cooling units.
11. Power up each module control panel, turn OFF the two toggle switches located on the inside bottom of the low-voltage side of the module electrical panel. Refer to separate CoolLogic Touch IOM for more details.
12. Verify that evaporator header inlets (hot-water side if simultaneous application) include strainer assemblies equipped with 40-mesh screens.

Controller Startup

PW Models

CONTROL SYSTEM STARTUP

1. Verify the communication with the STP Cat 6 or higher Ethernet home run cabling is wired to each unit to and from the CoolLogic Touch Control System. Verify the cable's outer jacket is not stripped more than one inch. If so, the wires may have become untwisted, causing signal reflections.
2. Verify Controller hand/off/auto switches and I/O dip switches per wiring diagram.
3. Verify the location and wiring connections of all main header temperature sensors (should be a minimum of 36 inches but no more than 60 inches from the chiller bank). Confirm that all sensors are **fully inserted** into their sensor wells and wired back to the correct terminals in the bank control panel.
4. Verify the location and ports for all water differential pressure sensors used for flow detection (+) port piped to the inlet headers and the (–) ports piped to the outlet headers).
   - Verify the correct wiring using the +5 VDC power supply to the differential sensor inputs.
   - Verify the correct output wiring from the differential sensors back to the control system universal input (UI) channels 8 and 11. Confirm inputs 8 and 11 jumpers are set to 'volts'.

     Note: The differential sensor ports should not be piped to a location which includes strainer pressure drops.
5. For Variable Flow applications, confirm that the main water pumps are driven by VFD's, and that all VFD's are controlling the pump speeds to produce a nominal differential pressure drop across the chiller bank headers, per project design temperatures and approved submittal. precisely at the differential pressure sensor locations in step 6.

   Nominal differential pressure ranges are from 1 to 8 psid.
6. For Constant Flow Cooling applications, set modules to CV Cooling and confirm that valves travel to 100% open. Confirm that the main water pumps produce a nominal differential pressure drop across the chiller bank headers, per project design temperatures and approved submittal.
7. To activate Auto Stand Alone mode,
   a. On the Home page select *Service*
   b. Enter the provided unlock code to the Unlock Code field of the service page then select *Auto Stand Alone Mode*
   c. In the *Enable Auto Stand Alone Mode Function* dropdown list, select *ON.*

   Note: Auto Stand Alone mode and setpoints are automatically derived from the CoolLogic panel.

   During Auto Stand Alone mode, active mode and setpoints can be temporarily overridden at the module level. These selections transition to Bank settings when the Bank exits Auto Stand Alone mode.
8. Verify proper communications from each module back to the control system using the "status" menu, then indexing down to the desired compressor data screen.
9. Verify that module-status parameters such as temperatures and pressures coincide with actual readings.
10. Power-up the bank control panel and verify settings per the Controls Quick-start guide.

COOLLOGIC TOUCH CONTROL SYSTEM

Refer to separate CoolLogic Touch IOM for Quick Start Guide and more details.

Model: UW

Startup and Warranty Registration

Water-Source Modular Chillers

CLIMACOOL® A NIBE GROUP MEMBER

Sign date and E-mail to: technicalsupport@climacoolcorp.com • For any questions, call 800.299.9747, Option 2, then Option 3

NOTE: Please fill out this form and include the required screenshots for each module in the bank.

Project Name:
Address:
City/State/Zip:
Startup Date:

Ambient Temp:
Contractor Name:
Address:
City/State/Zip:
Phone No.:

Module

Model No.:
Serial No.:
Chiller No.: Bank No.:

Compressor

Model No.:
Serial No. 1:
Serial No. 2:

Water Samples Taken: (Mark "X")

Cooling Loop: ☐ Yes
Heating Loop: ☐ Yes ☐ N/A
Source Loop: ☐ Yes ☐ N/A
Glycol Added: ☐ Yes ☐ No If Yes: Glycol %:

Bank Water Pressure Entering/Leaving

Cooling: / Δ P
Heating: / Δ P
Source: / Δ P

NOTE: Failure to collect and send water samples from each loop will void any promise of warranty.
For initial MANDATORY water samples, bottles are provided. Follow instructions on label and mail the same day sample is taken.

- ▶ All wiring terminations in module panel, safeties, and compressors tightened: ☐ Yes
- ▶ Rotation of scroll compressor is correct: ☐ Yes

Voltage/Ground

Phase-Phase: L1-L2: L2-L3: L1-L3:
Transformer: L1-L2: 24V:

Compressor Circuit #1

Amperage: L1: L2: L3:

Compressor Circuit #2

Amperage: L1: L2: L3:

Insert a USB drive into the USB port on the back of the touchscreen.
Go to the screens noted on this page and press the camera icon to take screenshots of each screen.
Submit the screenshots with your startup form.

System Screenshots[1]

Home: ☐
System Setup: ☐
Cool & Heat Setpoints: ☐
Controller Configuration: ☐
Module Configuration: ☐

NOTES:
1. All System Screenshots are required.
2. Provide screenshots from each module in the bank.

Module Screenshots[2]

Module 1	☐	Module 2	☐
Module 3	☐	Module 4	☐
Module 5	☐	Module 6	☐
Module 7	☐	Module 8	☐
Module 9	☐	Module 10	☐
Module 11	☐	Module 12	☐

Rep Signature: Print Name:
E-Signature: ☐ Check Box (Authorized Signature)

Access a form-fillable version of this form by following this QR Code

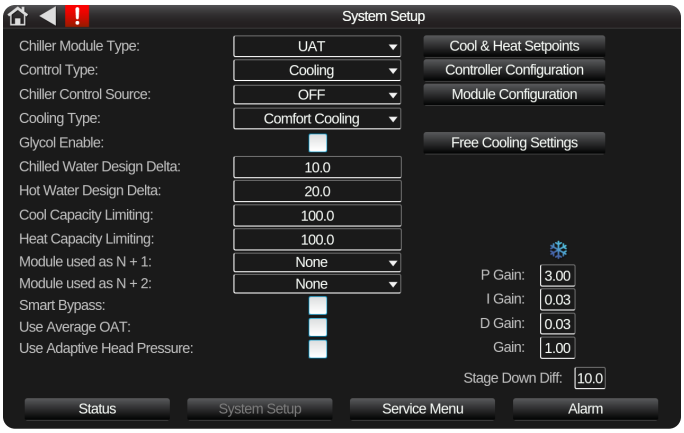
Startup and Warranty Registration

PW Models

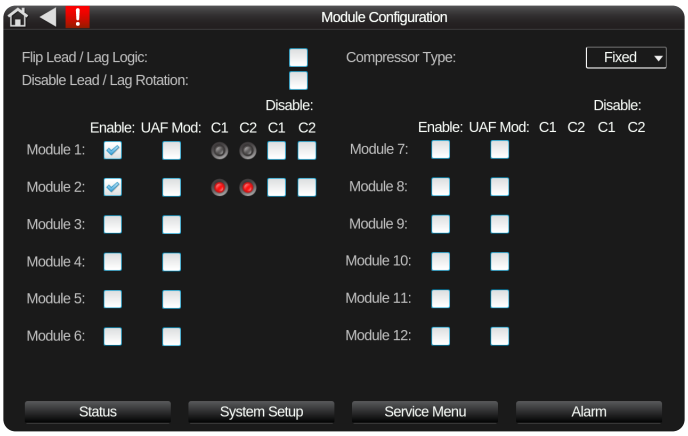
TAKING SCREENSHOTS ON THE COOLLOGIC TOUCH

Insert a USB drive into the USB port on the back of the touchscreen. Go to the screens displayed on this page and press the Camera icon to take screenshots of each screen. Submit the screenshots with your startup form.

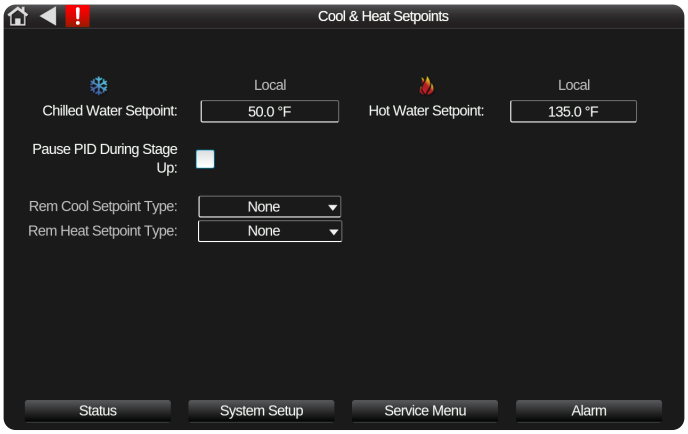
System Setup



Module Configuration

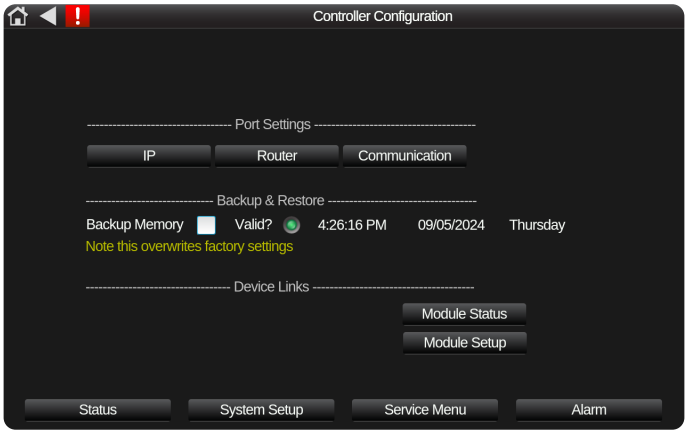


Cool & Heat Setpoints

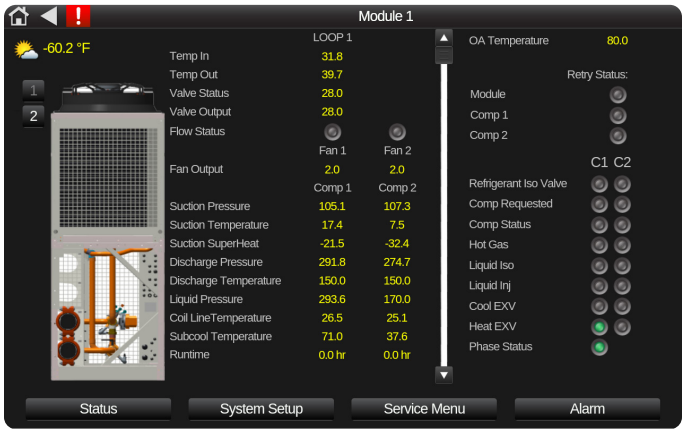


Home Screen

Controller Configuration



Module Screen



NOTE: Provide a screenshot of each module in the bank.

PW Models

Operation and Maintenance

PRESSURE AND TEMPERATURE LOG

A log of temperatures and pressures should be taken regularly. Periodically conduct a visual inspection of the chiller to identify problems before they reach the point of failure. As with any mechanical system, it is necessary to conduct a series of checks to the ClimaCool chiller to confirm correct operation.

MAINTAINING A DAILY LOG

Date							
Chilled No.							
Technician							
	Sun.	**Mon.**	**Tue.**	**Wed.**	**Thur.**	**Fri.**	**Sat.**
Chilled Water Entering Temperature							
Chilled Water Leaving Temperature							
Chilled Water Pressure Drop							
Faults: Note by Module Number							

DAILY

- A daily operational log should be kept.
- Perform visual inspection.
- Record entering and leaving chilled water temperatures and pressures.
- Note any problems that may exist and immediately plan for further investigation. If repair is necessary, schedule for earliest possible date.
- Properly document all data taken.

WEEKLY

- Review daily log from previous week.
- Perform visual inspection.
- Properly document all data taken.
- Note any problems that may exist. Immediately plan for further investigation. If repair is necessary, schedule for earliest possible date.

QUARTERLY

Check controller operating parameters and setpoints.

- Check temperature drop/rise on heat exchanger.*
- Check water flow rates and pressure drops across heat exchanger.
- Check all electrical connections for tightness.
- Properly document all data taken.

* The temperature drop/rise on a fully loaded (both compressors) heat exchanger is generally 10°F (-12.22°C). If only one compressor is running the temperature drop/rise will be approximately 5°F (-15°C). Some projects are designed to have a higher or lower temperature drop on the evaporator depending on application. Consult the bank performance sheet for your specific project for these values. If the temperature drop/rise is greater than the design, your heat exchanger may need to be back flushed or the strainer may need to be cleaned.

⚠ WARNING

WATER AND REFRIGERANT SYSTEMS UNDER PRESSURE

- Isolate/Lockout source and relieve pressure BEFORE servicing equipment.
- Failure to relieve pressure may result in property damage, serious bodily injury or death!

⚠ WARNING

VERY HOT WATER!

Visually inspect inner and outer condenser coil slab and remove surface loaded fibers as needed. Use a vacuum cleaner. If a vacuum cleaner is not available, a soft non metallic brush may be used. In either case, brush in the direct of the fin as they can be easily bent over and damaged.

A periodic clean water rinse is very beneficial for coils applied in coastal or industrial environments. It is very important the water rinse is made with a low velocity stream to avoid damage to the coil fins. **Use only environmentally sound coil cleaners. Avoid the use of: coil brighteners, high pressure washers and poor water quality for cleaning.**

WINTER SHUTDOWN: AT THE END OF THE COOLING SEASON

Drain the fluid from the cooler, hydronic package (if installed) and internal piping.

Fill the cooler and hydronic package with a sufficient amount of antifreeze solution to prevent any residual water in the cooler and hydronic package/piping from freezing. It is the facility's responsibility to maintain the working-fluid freeze-point adequately below the lowest water temperatures for freeze protection during off-state.

At the beginning of the next cooling season, refill the cooler and add the recommended inhibitor.

ANNUAL

- Back flush all heat exchangers. If fouling is suspected, use only ClimaCool recommended de-scalers (see *Chemical Clean In Place Washing* section).
- Remove and clean all waterside strainers.
- Manually operate all waterside isolation valves, if provided, on each module.
- Check all electrical connections for tightness.
- Perform leak check on all refrigerant circuits.
- Check all header piping couplings for tightness.
- Check oil level and color on each compressor.
- Check and test all refrigerant safeties for proper operation.
- Check all peripheral systems for proper operation.
- Check and test CoolLogic Touch Control System.
- Verify setpoints, sensors and general control configuration.
- Properly document all data taken.

PW Models

Heat Exchangers

DRAINING

When performing standard maintenance procedures such as flushing a heat exchanger, it will be necessary to close off a section of a module. This can easily be done if factory mounted water isolation valves are provided. Access to a floor drain is helpful when performing standard maintenance procedures.

BACK FLUSHING

Weekly log data records may eventually indicate that the chiller performance is gradually degrading. This could be due to a buildup of debris or sludge obstructing the free passage of flow through the heat exchangers. This debris can be removed by a back washing process which involves the introduction of a forced violent backwards flow through the heat exchanger using a carefully formulated flushing solution. To be effective, this back flow should be slightly higher than the normal flow, and in the opposite direction. The difficulties and practicality of this method depends on the back wash pumping system itself.

Another method is to back flush each heat exchanger using city water as opposed to system water. The back washing procedure is accomplished by isolating each individual heat exchanger and introducing the city water using a connection hose to the ¾-inch (1.91 cm) service port to flow in an opposite direction from the normal heat exchanger flow direction. On the opposite ¾-inch service port, connect a drain hose continuing back flow until all debris is removed.

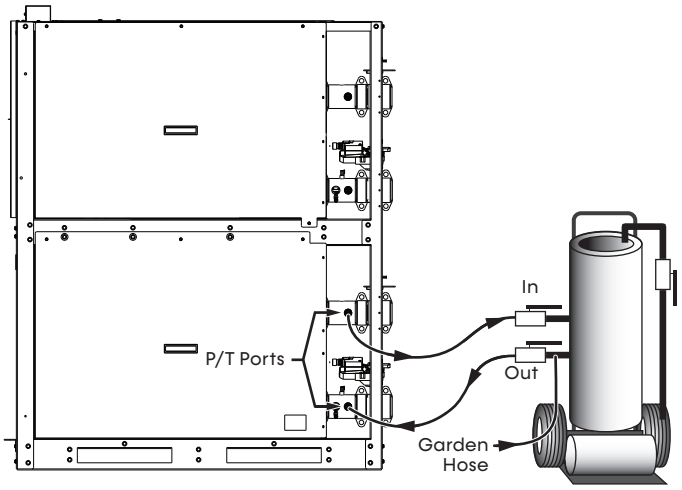
⚠ WARNING

WATER VALVES MUST BE REOPENED AFTER FLUSHING IS COMPLETE

CHEMICAL CLEAN-IN-PLACE WASHING WITH WATER ISOLATION VALVES

Chemical Clean-in-place washing will typically provide the best debris removal, even from severely clogged heat exchangers. It is only necessary to mechanically and electrically isolate one heat pump module at a time. The rest of the heat pump modules can continue to operate to satisfy the cooling load required. The cleaning tank, pump, and pump strainer should be arranged as shown in the figure, **Chemical Cleaning the Unit Heat Exchangers**.

Figure 26: Chemical Cleaning the Unit Heat Exchangers



Connection points are provided using the ¾-inch (1.91 cm) service ports at each heat exchanger. The cleaning solution should flow through the bottom on the heat exchanger to the top to ensure the area to be cleaned was flooded, allowing ScaleBreak-MP to come in contact with all the deposits. A minimum of a 20 mesh strainer or filter bag must be used to capture any debris removed from the heat exchanger.

Goodway® Technologies ScaleBreak-MP, is the recommended descaler which will quickly and effectively dissolve calcium, lime, rust and other water formed deposits from water cooled/ heated equipment. The solutions should only be allowed to circulate within the heat exchanger for 10 to 15 minutes or as recommended by the solution instructions.

Once the washing is complete, the solution should be flushed out completely by pumping clean, fresh water through the heat pump. To achieve a reasonable level of dilution, it may be required to change the water several times. After cleaning, the water quality and water treatment should be confirmed.

Troubleshooting Guide

PW Models

⚠ WARNING

The troubleshooting guidelines recommended in this section could result in exposure to electrical safety hazards. Please refer to the safety warnings provided in this manual. Failure to follow all of the recommended safety warnings provided could result in death or serious injury. When possible, disconnect all electrical power including remote disconnects before servicing. Follow proper lockout/tagout procedures. Only a qualified, licensed electrician or persons trained to handle live electrical components should be allowed to work with energized electrical components.

⚠ WARNING

Disconnect power supply(ies) before servicing. Refer servicing to qualified service personnel. Electric shock hazard. May result in injury or death!

⚠ CAUTION

Unit to be serviced by qualified personnel only. Refrigerant system under pressure. Relieve pressure before using torch. Recover refrigerant and store or dispose of properly.

Issue	Possible Cause
Compressor high discharge temperature alarm	Discharge Temp > 250 psi and compressor output is ON
Local flow alarm	Both valves fully open, module flow is OFF and a compressor has been requested
Load high leaving water temperature alarm	In heat mode if leaving temp > 90°F, otherwise if temp > 144°F
High suction pressure software shutdown	Suction pressure > 185 psi, Motorized Water Valve is > minimum position , and compressor output is ON
Low discharge pressure software shutdown	Discharge pressure < 200 psi and compressor output is ON
Compressor no-run alarm	Compressor input status is OFF and compressor output status is ON

Issue	
Compressor Low Suction Pressure Alarm: Suction Pressure < 89 psi	
Possible Cause	**Solution**
Main chilled water valve closed or restricted	Open valve to full open position.
Module chilled water isolation valves, if provided, closed or restricted	Open valves to full open position.
Low refrigerant volume	Check for leaks – add refrigerant.
No load on water chiller	Check water pump operation.
Restriction in liquid line	Plugged liquid line drier – replace liquid line drier.
Inoperable EEV	Repair the expansion valve.
Low water flow through the cooler	Check water flow through the cooler.
Chilled water temperature too cold	Raise water temperature setpoint.
Fouled brazed plate heat exchanger	Clean-in-place heat exchanger as described in IOM.
Faulty suction pressure transducer	Verify transducer calibration using a calibrated manifold gauge and replace if defective.
Wrong suction pressure cutout setpoint	Verify suction pressure cutout setpoint to be set equal to the corresponding leaving chilled solution freeze temperature equivalent pressure on a PT chart. (i.e. If the solution freeze point is 32°F, the equivalent pressure setpoint will be 101 psig).
Improper chilled water circulation	Use an ample sized cleanable strainer in the chilled water circuit; make certain the strainer is clean to ensure full flow of chilled water (strainer screen must be 40-mesh minimum).
Faulty suction pressure transducer	Verify transducer calibration using a calibrated manifold gauge and replace if defective.
Wrong suction pressure cutout setpoint	Verify suction pressure cutout setpoint to be set equal to the corresponding leaving chilled solution freeze temperature equivalent pressure on a PT chart. (i.e. If the solution freeze point is 32°F, the equivalent pressure setpoint will be 101 psig.).
Low discharge pressure	Raise and control discharge pressure within design limits.

Table continued on next page.

PW Models

Troubleshooting Guide

Table continued from previous page.

Issue	
Compressor High Discharge Pressure Alarm: Discharge pressure > 575 psi	
Possible Cause	**Solution**
Improper condenser water circulation	Use an ample sized cleanable strainer in the condenser water circuit; make certain the strainer is clean to ensure full flow of condenser water (strainer must be 40 mesh minimum). It may sometimes be necessary to treat water to prevent formation of deposits.
Insufficient water flow through the condenser	Check water flow through condenser against design requirements.
Fouled brazed plate heat exchanger	Clean-in-place heat exchanger as described in IOM.
Main condenser water valve closed or restricted	Open valves to full open position.
Module condenser water isolation valves closed or restricted	Open valves to full open position.
Water regulating valve incorrectly set or defective	Reset or replace valve.
Defective high pressure switch	Replace high pressure switch.
Compressor discharge valve partially closed	Open valve to full open position.
Non-condensable gases in hydronic system	Recover non-condensable gases from bleed valve on condenser or at bleed valve of the building condenser water system.
Condenser water temperature high	Check water supply temperature against requirements; if cooling tower is used, check spray nozzles on cooling tower.
Overcharge of refrigeration	Recover refrigerant from system while in operation until the first sign of bubbles are shown in the sight glass. Add back refrigerant just until bubbles clear.
Issue	
Module Lockout: Unlock code does not match factory lock code	
Possible Cause	**Solution**
Incorrect unlock code	Contact factory to verify unlock code
Issue	
Phase Loss Alarm: Chiller Requested and Phase Status is OFF	
Possible Cause	**Solution**
No signal from phase loss monitor	Check power wiring and fuses.
Phase loss monitor not operational	Replace Phase loss monitor.
Issue	
Communication Loss Alarm: Module Communication Lost from CoolLogic for > 2 minutes and 30 seconds	
Possible Cause	**Solution**
Incorrect network configuration	Verify device instance, home network selected, and network number used on both CoolLogic Touch and module controllers.
No power to the CoolLogic Touch controller	Verify power and power wiring to the CoolLogic Touch controller.
Incorrect wiring	Verify ethernet connection between Gig-E port on both module and CoolLogic Touch controllers.
Bad ethernet switch	Replace ethernet switch.
No power to the ethernet switch	Verify power and power wiring to the ethernet switch.
Issue	
EEV Communication Loss Alarm: EEV Communication Status is OFF	
Possible Cause	**Solution**
No power to the controller	Verify power and power wiring to the controller.
Incorrect wiring	Verify ethernet connection between the S2 port on the module and network on the Controller.
Incorrect network configuration	Verify and update network address
Issue	
Invalid OAT Out of Range Alarm: Sensor is reading a value outside of its operating range, while operating inside range	
Possible Cause	**Solution**
Bad OAT Sensor	Replace sensor.
Incorrect wiring to OAT sensor	Verify sensor wiring.

Table continued on next page.

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Issue	
Invalid Compressor Discharge Temperature Out of Range Alarm: Sensor is reading a value outside of its operating range, while operating inside range	
Possible Cause	**Solution**
Bad discharge temp sensor	Replace sensor.
Incorrect wiring to discharge temp sensor	Verify sensor wiring.
Issue	
Invalid Compressor Suction Temperature Out of Range Alarm: Sensor is reading a value outside of its operating range, while operating inside range	
Possible Cause	**Solution**
Bad suction temp sensor	Replace sensor.
Incorrect wiring to the suction temp sensor	Verify sensor wiring.
Issue	
Invalid Air Coil Line Temperature out of Range Alarm: Sensor is reading a value outside of its operating range, while operating inside range	
Possible Cause	**Solution**
Bad air coil line temp sensor	Replace sensor.
Incorrect wiring to the air coil line temp sensor	Verify sensor wiring.
Issue	
Invalid Liquid Line Temperature out of Range Alarm: Sensor is reading a value outside of its operating range, while operating inside range	
Possible Cause	**Solution**
Bad air coil line temp sensor	Replace sensor.
Incorrect wiring to the air coil line temp sensor	Verify sensor wiring.
Issue	
Invalid Loop Entering Water Temperature out of Range Alarm: Sensor is reading a value outside of its operating range, while operating inside range	
Possible Cause	**Solution**
Bad loop entering water temp sensor	Replace Sensor
Incorrect wiring to the loop entering water temp sensor	Verify sensor wiring
Issue	
Invalid Compressor Suction Pressure out of Range Alarm: Sensor is reading a value outside of its operating range, while operating inside range	
Possible Cause	**Solution**
Bad suction pressure sensor	Replace sensor.
Incorrect wiring to suction pressure sensor	Verify sensor wiring.
Issue	
Invalid Loop Leaving Water Temperature out of Range Alarm: Sensor is reading a value outside of its operating range, while operating inside range	
Possible Cause	**Solution**
Bad loop leaving water temp sensor	Replace sensor.
Incorrect wiring to the loop leaving water temp sensor	Verify sensor wiring.
Issue	
Invalid Compressor Discharge Pressure out of Range Alarm: Sensor is reading a value outside of its operating range, while operating inside range	
Possible Cause	**Solution**
Bad discharge pressure sensor	Replace sensor.
Incorrect wiring to discharge pressure sensor	Verify sensor wiring.
Issue	
Invalid Compressor Liquid Pressure out of Range Alarm: Sensor is reading a value outside of its operating range, while operating inside range	
Possible Cause	**Solution**
Bad liquid pressure sensor	Replace sensor.
Incorrect wiring to liquid pressure sensor	Verify sensor wiring.

Table continued on next page.

PW Models

Troubleshooting Guide

Table continued from previous page.

Issue	
Refrigerant Detection System	
Possible Cause	**Solution**
Refrigerant Leak	Check refrigerant charge. If the charge is low, identify and repair the leak.
Faulty RDS Sensor	Check refrigerant charge. If the charge is not low, replace the RDS sensor.

General Information - Servicing

PW Models

WORK PROCEDURE

Work shall be undertaken under a controlled procedure to minimize the risk of a flammable gas or vapor being present while the work is being performed.

GENERAL WORK AREA

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

Check for presence of refrigerant - The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

Presence of fire extinguisher - If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO_2 fire extinguisher adjacent to the charging area.

No ignition sources - No person carrying out work in relation to a REFRIGERATION SYSTEM which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing, and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

Ventilated area - Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

CHECKS TO REFRIGERATION EQUIPMENT

The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS:

- The actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant-containing parts are installed;
- The ventilation machinery and outlets are operating adequately and are not obstructed;
- If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;
- Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
- Refrigerant piping or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

CHECKS TO ELECTRICAL DEVICES

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.

Initial safety checks shall include:

- Capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
- That no live electrical components and wiring are exposed while charging, recovering, or purging the system;
- That there is continuity of earth bonding.

PW Models

Refrigerant Recovery, Evacuation, and Charging

RECOVERY AND EVACUATION

When breaking into the refrigerant circuit to make repairs - or for any other purpose - conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:

- Safely remove refrigerant following local and national regulations;
- Recover;
- Purge the circuit with Nitrogen;
- Evacuate;
- Continuously flush or purge with inert gas when using flame to open circuit; and
- Open the circuit.

The refrigerant charge shall be recovered into the proper recovery cylinders. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. The outlet for the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.

CHARGING PROCEDURES

In addition to conventional charging procedures, the following requirements shall be followed.

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the refrigerating system is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the refrigerating system.

Prior to recharging the system, it shall be pressure-tested with Nitrogen to 300 psi. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

LEAK DETECTION

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

The following leak detection methods are deemed acceptable for all refrigerant systems.

Electronic leak detectors may be used to detect refrigerant leaks but, in the case of FLAMMABLE REFRIGERANTS, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25% maximum) is confirmed. Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine may react with the refrigerant and corrode the copper pipe-work. **NOTE: Examples of leak detection fluids are: bubble method or fluorescent method agents.**

If a leak is suspected, all naked flames shall be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut-off valves) in a part of the system remote from the leak. Removal of refrigerant shall be according to the section, "Recovery and Evacuation" above.

Refrigerant Recovery, Evacuation, and Charging

PW Models

DECOMMISSIONING

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

1. Become familiar with the equipment and its operation.
2. Isolate system electrically.
3. Before attempting the procedure, ensure that:
   - Mechanical handling equipment is available, if required, for handling refrigerant cylinders;
   - All personal protective equipment is available and being used correctly;
   - The recovery process is supervised at all times by a competent person;
4. Pump down refrigerant system, if possible.
5. If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
6. Make sure that cylinder is situated on the scales before recovery takes place.
7. Start the recovery machine and operate in accordance with instructions.
8. Do not overfill cylinders (no more than 80% volume liquid charge).
9. Do not exceed the maximum working pressure of the cylinder, even temporarily.
10. When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
11. Recovered refrigerant shall not be charged into another refrigerating system unless it has been cleaned and checked.

Labeling

Equipment shall be labeled stating that it has been decommissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing FLAMMABLE REFRIGERANTS, ensure that there are labels on the equipment stating that the equipment contains FLAMMABLE REFRIGERANTS.

RECOVERY

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labeled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

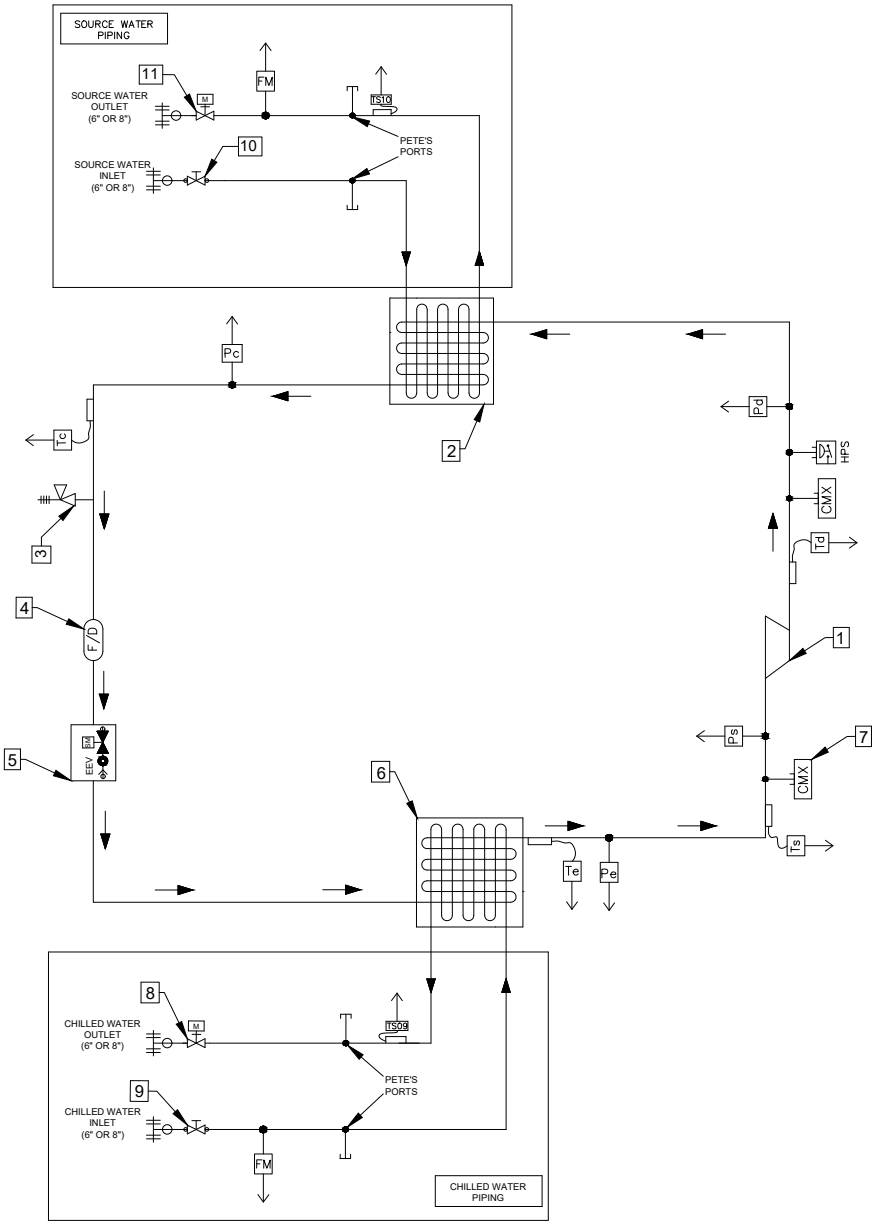
The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of the flammable refrigerant. If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition.

The recovered refrigerant shall be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely.

PW Models

Refrigeration Circuit Diagrams Cooling Only PWC



COMPONENT LEGEND

1. COMPRESSOR
2. BRAZED PLATE HEAT EXCHANGER - SOURCE
3. PRESSURE RELIEF VALVE
4. COOLING FILTER DRIER
5. ELECTRONIC EXPANSION VALVE COOLING
6. BRAZED PLATE HEAT EXCHANGER - CHILLED
7. CORMAX VALVE
8. CHILLER MOTORIZED WATER OUTLET VALVE
9. CHILLER MANUAL WATER INLET VALVE
10. CONDENSER MANUAL WATER INLET VALVE
11. CONDENSER MOTORIZED WATER OUTLET VALVE

ABBREVIATIONS

PRESSURE TRANSDUCER

Pe = ELECTRONIC EXPANSION VALVE
Ps = SUCTION PRESSURE
Pd = DISCHARGE PRESSURE
Pc = LIQUID PRESSURE

TEMPERATURE SENSOR

Te = ELECTRONIC EXPANSION VALVE
Ts = SUCTION TEMPERATURE
Td = DISCHARGE TEMPERATURE
Tc = LIQUID TEMPERATURE

TS09 = CHILLED WATER OUTLET
TS10 = SOURCE WATER OUTLET

OTHERS

HPS = HIGH PRESSURE SWITCH
FM = FLOW METER
= COOLING

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TITLE: REFRIGERATION CIRCUIT DIAGRAM (CIRCUIT #1 SHOWN)

DRAWING NUMBER: C99D1020N01

DESCRIPTION: PRIME CHILLER LINE COOLING ONLY (4-PIPE) CLIMACOOL MODEL # PWC (030/050/070/080)

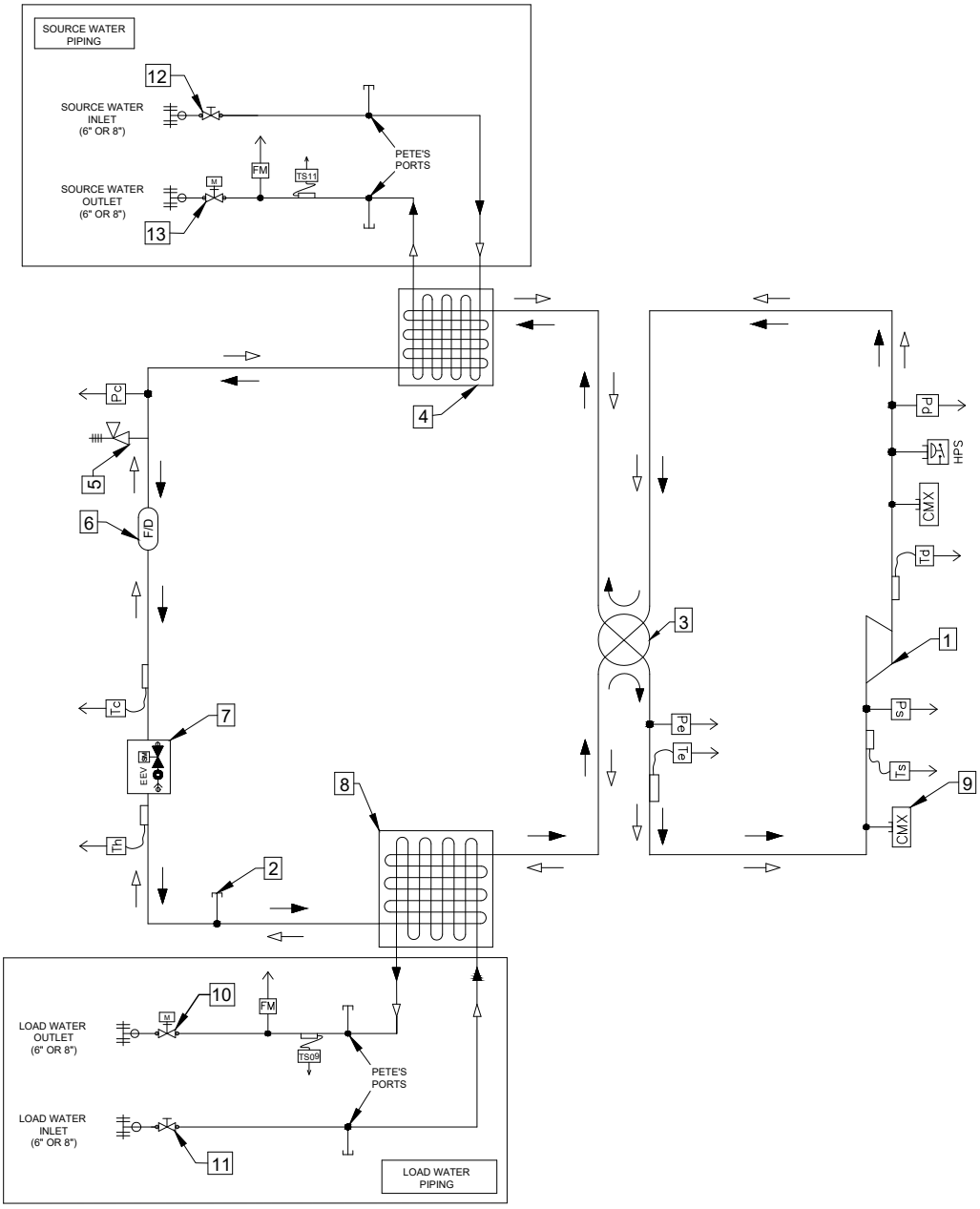
SIZE: A
SCALE: -
DRAWN BY: CCC-ENG

REVISION BY: CCC
DATE: JUN-12-2025
SHEET: 1 OF 1

REV: -

Refrigeration Circuit Diagram
Heat Pump PWT

PW Models



COMPONENT LEGEND

1. COMPRESSOR
2. PRESSURE ACCESS FITTING
3. REVERSING VALVE SOLENOID
4. BRAZED PLATE HEAT EXCHANGER - SOURCE
5. PRESSURE RELIEF VALVE (OPTIONAL)
6. FILTER DRIER
7. ELECTRONIC EXPANSION VALVE
8. BRAZED PLATE HEAT EXCHANGER - LOAD
9. CORMAX VALVE
10. LOAD MOTORIZED WATER OUTLET VALVE
11. LOAD MANUAL WATER INLET VALVE
12. SOURCE MANUAL WATER INLET VALVE
13. SOURCE MOTORIZED WATER OUTLET VALVE

ABBREVIATIONS

PRESSURE TRANSDUCER

Pe = ELECTRONIC EXPANSION VALVE
Ps = SUCTION PRESSURE
Pd = DISCHARGE PRESSURE
Pc = LIQUID PRESSURE

TEMPERATURE SENSOR

Te = ELECTRONIC EXPANSION VALVE
Ts = SUCTION TEMPERATURE
Td = DISCHARGE TEMPERATURE
Tc = COOL MODE LIQUID TEMPERATURE
Th = HEAT MODE LIQUID TEMPERATURE
TS09 = LOAD WATER OUTLET
TS11 = SOURCE WATER OUTLET

OTHERS

HPS = HIGH PRESSURE SWITCH
FM = FLOW METER
= HEATING
= COOLING

CLIMACOOL®

TITLE: REFRIGERATION CIRCUIT DIAGRAM (CIRCUIT #1 SHOWN)

DRAWING NUMBER: C99D1020N03:

DESCRIPTION: PW HEAT PUMP (4-PIPE) CLIMACOOL MODEL PWT(20/30/50/70/80)-HP

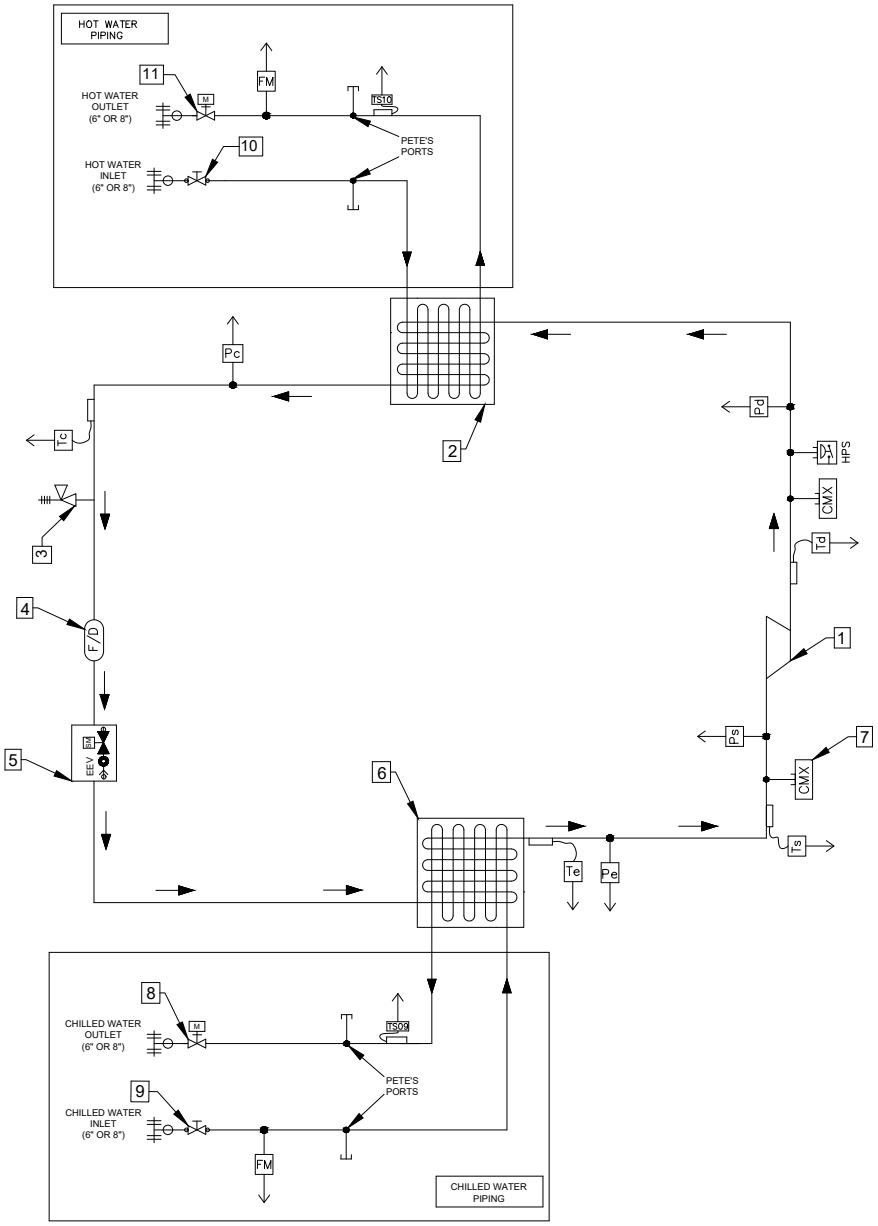
SIZE: A
SCALE: -
DRAWN BY: CCC-ENG

REVISION BY: CCC
DATE: SEP-04-2025
SHEET: 1 OF 1

REV: -

PW Models

Refrigeration Circuit Diagram
Heat Recovery PWH



COMPONENT LEGEND

1. COMPRESSOR
2. BRAZED PLATE HEAT EXCHANGER - SOURCE
3. PRESSURE RELIEF VALVE
4. COOLING FILTER DRIER
5. ELECTRONIC EXPANSION VALVE COOLING
6. BRAZED PLATE HEAT EXCHANGER - CHILLED
7. CORMAX VALVE
8. CHILLER MOTORIZED WATER OUTLET VALVE
9. CHILLER MANUAL WATER INLET VALVE
10. CONDENSER MANUAL WATER INLET VALVE
11. CONDENSER MOTORIZED WATER OUTLET VALVE

ABBREVIATIONS

PRESSURE TRANSDUCER

Pe = ELECTRONIC EXPANSION VALVE
Ps = SUCTION PRESSURE
Pd = DISCHARGE PRESSURE
Pc = LIQUID PRESSURE

TEMPERATURE SENSOR

Te = ELECTRONIC EXPANSION VALVE
Ts = SUCTION TEMPERATURE
Td = DISCHARGE TEMPERATURE
Tc = LIQUID TEMPERATURE

TS09 = CHILLED WATER OUTLET
TS10 = SOURCE WATER OUTLET

OTHERS

HPS = HIGH PRESSURE SWITCH
FM = FLOW METER

= COOLING

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TITLE: REFRIGERATION CIRCUIT DIAGRAM (CIRCUIT #1 SHOWN)

DRAWING NUMBER: C99D1020N02

DESCRIPTION: PRIME CHILLER LINE HEAT RECOVERY (4-PIPE) CLIMACOOL MODEL # PWH (030/050/070/080) - HR

SIZE: A
SCALE: -
DRAWN BY: CCC-ENG

REVISION BY: CCC
DATE: JUN-12-2025
SHEET: 1 OF 1

REV: -

CLIMACOOL®

A NIBE GROUP MEMBER

CLIMACOOL CORPORATION
LIMITED EXPRESS WARRANTY/LIMITATION OF REMEDIES AND LIABILITY WITH EXTENDED COMPRESSOR WARRANTY

WARRANTY DISCLAIMER

It is expressly understood that unless a statement is specifically identified as a warranty, statements made by ClimaCool Corp., an Oklahoma corporation ("CC"), or its representatives, relating to CC's products, whether oral, written or contained in any quote, sales literature, catalog or any agreement, are not express warranties and do not form a part of the basis of the bargain, but are merely CC's opinion or commendation of CC's products. **EXCEPT AS SPECIFICALLY SET FORTH HEREIN, THERE IS NO EXPRESS WARRANTY AS TO ANY OF CC'S PRODUCTS. CC MAKES NO WARRANTY AGAINST LATENT DEFECTS. CC MAKES NO WARRANTY OF MERCHANTABILITY OF THE GOODS OR OF THE FITNESS OF THE GOODS FOR ANY PARTICULAR PURPOSE.**

GRANT OF LIMITED EXPRESS WARRANTY

CC warrants CC's products purchased and retained in the United States of America and Canada to be free from defects in material and workmanship under normal use and maintenance only as follows:

FOR MODULAR CHILLERS: (a) All modular chillers built or sold by CC for twelve (12) months from the date of unit start-up or eighteen (18) months from date of shipment (from CC's warehouse), whichever comes first; and (b) Any repair and replacement parts, which are not supplied under warranty, for ninety (90) days from date of shipment (from CC's warehouse) and (c) If such extended warranty is purchased, the compressors in all modular chillers built or sold by CC shall extend for sixty (60) months from the date of shipment (from CC's warehouse).

All parts must be returned to CC's warehouse in Oklahoma City, Oklahoma, freight prepaid, no later than sixty (60) days after the date of the failure of the part. If CC determines the part to be defective and within CC's Limited Express Warranty, CC shall, when such part has been either replaced or repaired, return such to a CC recognized dealer, contractor or service organization, F.O.B. CC's warehouse, Oklahoma City, Oklahoma, freight prepaid. The warranty on any part repaired or replaced under warranty expires at the end of the original warranty period.

This warranty does not cover and does not apply to: (1) Fuses, refrigerant, fluids, oil; (2) Products relocated after initial installation; (3) Any portion or component of the system that is not supplied by CC, regardless of the cause of the failure of such portion or component; (4) Products on which the units identification tags or labels have been removed or defaced; (5) Products on which payment to CC is or has been in default; (6) Products which have defects or damage which result from improper installation, wiring, electrical imbalance characteristics or maintenance (including, without limitation, defects or damages caused by voltage surges, inadequate voltage conditions, phase imbalance, any form of electrical disturbances, inadequate or improper electrical circuit installation or protection, failure to perform common maintenance, etc.); or are caused by accident, misuse or abuse, fire, flood, alteration or misapplication of the product; (7) Products which have defects or damage which result from a contaminated or corrosive air or liquid supply, operation at abnormal temperatures, or unauthorized opening of refrigerant circuit; (8) Products subjected to corrosion or abrasion or chemicals; (9) Mold, fungus or bacteria damage; (10) Products manufactured or supplied by others; (11) Products which have been subjected to misuse, negligence or accidents; (12) Products which have been operated in a manner contrary to CC's printed instructions; (13) Products which have defects, damage or insufficient performance as a result of insufficient or incorrect system design or the improper application of CC's products; (14) Products which have defects or damages due to freezing of the water supply, an inadequate or interrupted water supply, corrosives or abrasives in the water supply, or improper or inadequate filtration or treatment of the water or air supply: (15) Products which are defects caused by overfiring, use of incorrect fuel, or improper burn or control adjustments; or (16) Products which have incomplete or inadequate combustion.

CC is not responsible for: (1) The costs of any fluids, refrigerant or other system components, or the associated labor to repair or replace the same, which is incurred as a result of a defective part covered by CC's Limited Express Warranty; (2) The costs of labor, refrigerant, materials or service incurred in removal of the defective part, or in obtaining and replacing the new or repaired part; or, (3) Transportation costs of the defective part from the installation site to CC or the return of any part not covered by CC's Limited Express Warranty.

LIMITATION: This Limited Express Warranty is given in lieu of all other warranties. If, notwithstanding the disclaimers contained herein, it is determined that other warranties exist, any such warranty, including without limitation, any express warranties or any implied warranties of fitness for any particular purpose and merchantability, shall be limited to the duration of the Limited Express Warranty.

LIMITATION OF REMEDIES

In the event of a breach of this Limited Express Warranty, CC will only be obligated at CC's option to repair the failed part or module or to furnish a new or rebuilt part or module in exchange for the part or module which has failed. If, after written notice to CC's Head Office in Oklahoma City, Oklahoma of each defect, malfunction or other failure and a reasonable number of attempts by CC to correct the defect, malfunction or other failure and the remedy fails of its essential purpose, CC shall refund the purchase price paid to CC in exchange for the return of the sold good(s). Said refund shall be the maximum liability of CC. **THIS REMEDY IS THE SOLE AND EXCLUSIVE REMEDY AGAINST CC FOR BREACH OF CONTRACT, FOR THE BREACH OF ANY WARRANTY OR FOR CC'S OWN NEGLIGENCE OR IN STRICT LIABILITY.**

LIMITATION OF LIABILITY

CC shall have no liability for any damages if CC's performance is delayed for any reason or is prevented to any extent by any event such as, but not limited to any, war, civil unrest, government restrictions or restraints, strikes, or work stoppages, fire, flood, accident, allocation, shortages of transportation, fuel, material or labor, acts of God or any other reason beyond the sole control of CC. **CC EXPRESSLY DISCLAIMS AND EXCLUDES ANY LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGE IN CONTRACT, FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY, OR IN TORT, WHETHER FOR CC'S OWN NEGLIGENCE OR AS STRICT LIABILITY.**

OBTAINING WARRANTY PERFORMANCE

Normally, the contractor or service organization who installed the products will provide warranty performance for the owner. Should the installer be unavailable, contact any CC recognized contractor or service organization. If assistance is required in obtaining warranty performance, write:

ClimaCool Corp. • 15 South Virginia Ave. • Oklahoma City, Oklahoma 73106 • (405) 815-3000 • e-mail: customersupport@climacoolcorp.com

NOTE: Some states or Canadian provinces do not allow limitations on how long an implied warranty lasts, or the limitation or exclusion of consequential or incidental damages, so the foregoing exclusion and limitations may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state and from Canadian province to Canadian province.

Please refer to the CC Installation, Operation and Maintenance Manual for operating and maintenance instructions.

Revised: 04-27-22

PW Models

Notes

Notes

PW Models

Revision History

Date	Section	Description
03/18/26	All	Added support for size 30 ton revision B and new sizes 20, 50, 65, and 80 ton
		Updated filter requirement mesh size
	Physical Data	Updated to include connection type and size for headerless configurations
	Dimensional Data	
	RDS Installation	Updated rating parameter references
	Water Piping Configurations	Corrected piping routing
	Filling the Water System	Noted an exclusion for PWT in a step for the fill and leak test procedure
	Water Quality Requirements	Replaced section with new content and information.
	Electrical Connections	Updated voltage balance allowance
	Electrical Data	Removed inapplicable voltage limitations table and condensed sections
	Pre-Startup	Removed inapplicable instructions in verification step
	Heat Exchangers	Updated chemical clean-in-place procedures, added supporting graphic
12/08/25	All	Removed inapplicable sections: EEV
	Dimensional Data and Drawings	Updated drawing for top connections
	Recommended Service Clearances	Added recommended module removal clearance
	Mounting Rails and Vibration Isolation	Updated Anchor location drawing
	Operation and Maintenance	Removed unnecessary maintenance instructions.
09/26/25	All	Published

AHRI CERTIFIED® www.ahridirectory.org Water-Cooled Chillers AHRI Standard 550/590

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