CLIMACOOL®

A NIBE GROUP MEMBER

AIR-SOURCE MODULAR CHILLERS

PRODUCT CATALOG

Part#: C97B0004N02 | Created: September 3, 2024

Chillers, Heat Pumps, SHC Heat Pumps, & Free Cooling

UA Models: 20-60 Tons | 60 Hz – R-454B

SHC on DEMAND® SIMULTANEOUS HEATING AND COOLING

CoolLogic Touch™

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WIDE VARIETY

of products and configurations to fulfill your application demands.

ClimaCool® is dedicated to providing flexible configurations to meet all your application needs, no compromises. These modular chillers are utilized in a wide variety of heating, cooling, and simultaneous heating and cooling applications in both commercial and industrial buildings. Whether the need is a dedicated chiller for off peak loads, comfort cooling, or a truly redundant simultaneous heating and cooling plant, the following fundamental design features are integral to providing a complete climate control solution.

No compromises!

Compact

Small footprint reduces installation cost and restrictions on placement.

CoolLogic Touch™ Bank Controller

The CoolLogic Touch Bank Controller provides complete system integration for ultimate chiller performance. It allows for control of modules via Ethernet cable and interfaces with native BACnet® communication. The CoolLogic Touch Bank Controller governs all top level events, timing and compressor staging and allows operator interface for all levels of setting and retrieving data. It maintains precise temperature control for cooling, heating, and simultaneous heating and cooling applications to ensure the highest building comfort for occupants.

ELECTRIC HEATING TO MEET YOUR BUILDINGS' DECARBONIZATION & ELECTRIFICATION REQUIREMENTS

Energy Efficient

All ClimaCool modules are designed to meet or exceed ASHRAE 90.1 minimum efficiency requirements.

Environmentally Friendly

A micro charge of low GWP R-454B refrigerant offers better efficiency and minimal performance derate. With a GWP of 466, it fits well within current requirements.

Expandable

Modular design allows for incremental system capacity to accommodate future growth.

Lower Installation Costs

Modules can be factory skidded to minimize crane lifts and decrease electrician time.

Service Friendly

Design allows easy access to major components making the models fully serviceable and maintainable without removal of a module from the chiller bank or disassembly of headers.

Simple

Easy connect design simplifies installation, service and controls.

Sustainable

Based on application, ClimaCool chillers can help meet LEED® prerequisites and contribute significant system points toward LEED building certification.

True Redundancy

Separate module electrical feeds and dual independent refrigeration circuits provide true system redundancy.

LEED® CATEGORIES SATISFIED BY CLIMACOOL SYSTEMS:

Enhanced Commissioning and Measurement and Verification

CoolLogic Touch Bank Controller provides maximum flexibility with BAS interface.

Enhanced Refrigerant Management

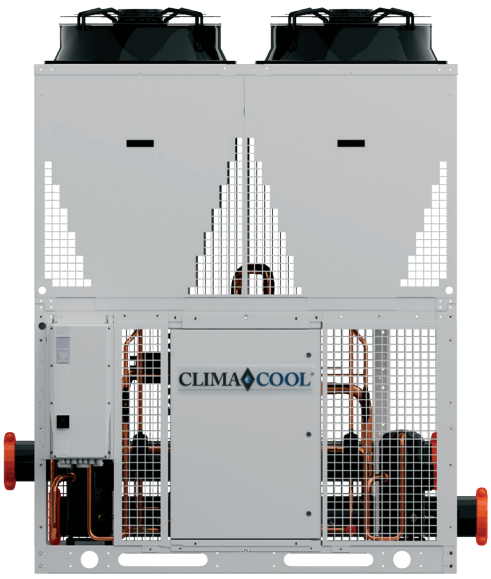
Micro charge of chlorine-free and non-ozone depleting refrigerant.

Optimized Energy Performance

Meets or exceeds ASHRAE 90.1 minimum efficiency requirements.

Thermal Comfort

Precise required heating and cooling ensures the highest comfort for building occupants.



AIR-SOURCE HEAT PUMP, MODEL UAT

Designed to provide a quiet, serviceable and extremely efficient system that will offer years of reliable operation. High efficiency design offers a minimum of 10.0 EER at full-load, exceeding ASHRAE 90.1 minimum efficiency requirements. Includes high efficiency, variable speed EC condenser fans with integral head pressure control and acoustical design providing low operating noise levels. Modules can be configured to provide project turn down and capacity requirements from 20–720 tons.

- **Tonnages:** 20, 30, 50, & 60
- **Configurations:** From 20–720 tons per bank
- **Voltages:** 208, 460, 575
- **Dimensions:**
  - 20, 30 tons:
    - 83.8" w x 112.5" h x 39.8" d
    - (212.73 cm x 285.65 cm x 100.97 cm)
  - 50, 60 tons:
    - 83.8" w x 112.5" h x 80.5" d
    - (212.85 cm x 285.65 cm x 204.47 cm)

AIR-SOURCE CHILLER, MODEL UAC

The ultimate in design flexibility with back-to-back and end-to-end configurations. This flexibility allows for the combination of tonnages to obtain a specific project turndown for the required bank capacity. The packaged air-source equipment offers a minimum efficiency of 10.0 EER at full load, exceeding ASHRAE 90.1 minimum requirements. These units provide low operating noise levels with high-efficiency, variable-speed EC condenser fans that include integral head pressure control.

- **Tonnages:** 20, 30, 50, & 60
- **Configurations:** From 20–720 tons per bank
- **Voltages:** 208, 460, 575
- **Dimensions:**
  - 20, 30 tons:
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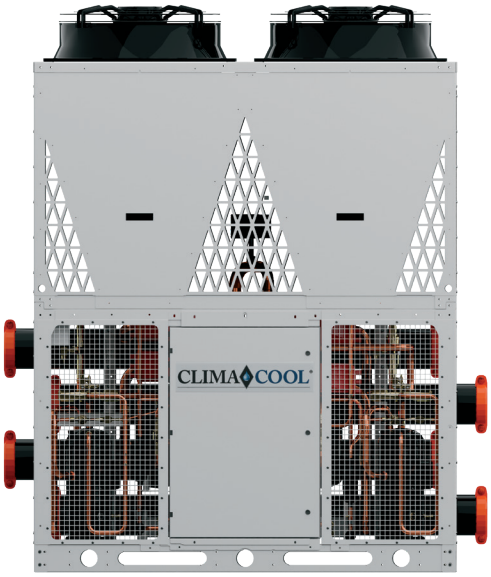
    - (212.85 cm x 285.65 cm x 204.47 cm)



SHC onDEMAND®
SIMULTANEOUS HEATING AND COOLING

AIR-SOURCE SIMULTANEOUS HEATING AND COOLING HEAT PUMP, MODEL UAU

Reduce energy consumption and the environmental impact of your heating and cooling equipment by harnessing energy that is already being produced but not used. Includes high efficiency, variable speed EC condenser fans with integral head pressure control and acoustical design providing low operating noise levels. The packaged air cooled SHC onDEMAND® provides hot water, as high as 140°F (60°C), while offering a minimum cooling efficiency of 10.0 EER with typical heating efficiencies around 3.0 COP.

- **Tonnages:** 20, 30, 50, & 60
- **Configurations:** From 20–720 tons per bank
- **Voltages:** 208, 460, 575
- **Dimensions:**
  - 20, 30 tons:
    - 83.8" w x 112.5" h x 39.8" d
    - (212.73 cm x 285.65 cm x 100.97 cm)
  - 50, 60 tons:
    - 83.8" w x 112.5" h x 80.5" d
    - (212.85 cm x 285.65 cm x 204.47 cm)

CONDENSER FANS

Highly efficient, variable speed electrically commutated (EC) condenser fans with integral head pressure control are provided as standard. Fans include electronically switched external rotor motors with permanent magnets and a speed that is controlled by an integrated controller. Fan speed is controlled by a 0-10 VDC signal.

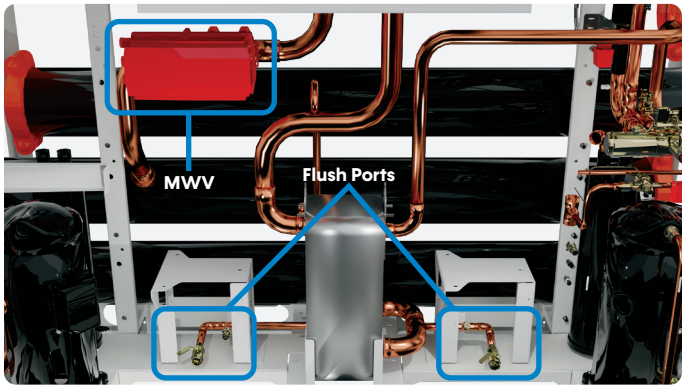
The integrated variable speed drives are equipped with a solid state motor overload protection and a solid state short circuit protection. The solid state motor overload protection protects the motor under overload conditions by reducing current flow to the internal motor output terminals. The overload protection circuitry is optimally configured to the specific motor and the specific final application of the integrated variable speed drive.

Figure 1: Condenser Fan

MOTORIZED ISOLATION VALVES AND INDIVIDUAL HEAT EXCHANGER FLUSH PORTS

Motorized water valves are factory installed, providing module isolation for maintenance and individual cleaning of evaporator and/or condenser heat exchangers. This is accomplished without increasing unit or bank dimensions. Motorized valves include ¾-inch (19.05 mm) fill and flush valves. Individual heat exchangers can be backflushed/cleaned while adjacent modules continue normal operation.

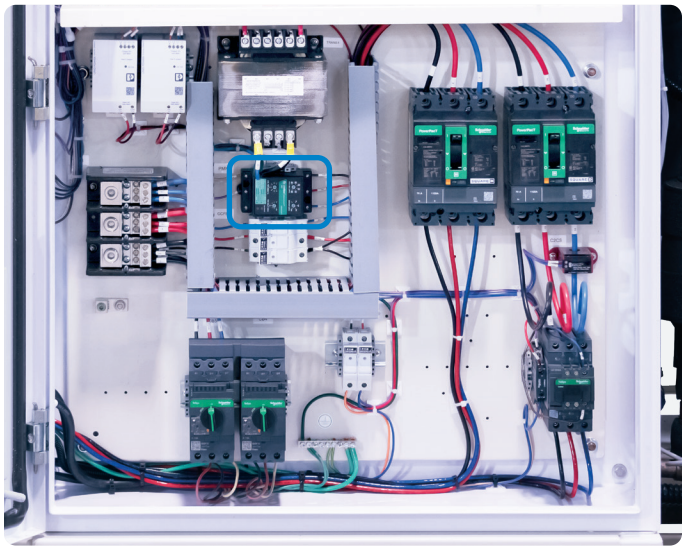
Figure 2: MWV & Flush Ports



VOLTAGE/PHASE MONITOR

Voltage/phase monitors are factory supplied with each unit. The voltage/phase monitor helps guard the chiller modules against voltage fluctuations, phase failure or phase reversal conditions which could void your warranty.

Figure 3: Phase Monitor



WATER HEADER BYPASS

A field installed water header bypass may be utilized to prevent deadheading the pump. The external bypass allows the chiller leaving water temperature sensor to monitor loop water temperature passing the chiller and reduces the wear on heat exchangers when they are not operating. The valve is controlled by the CoolLogic Touch controller and is always open when the modules are not in operation. The bypass valve closes when modules begin to stage on.

Figure 4: Water Header Bypass

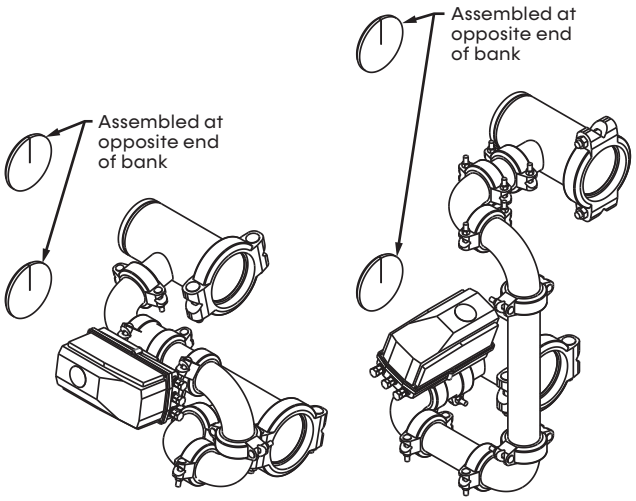


Figure 5: Bank with modules ON and header bypass CLOSED

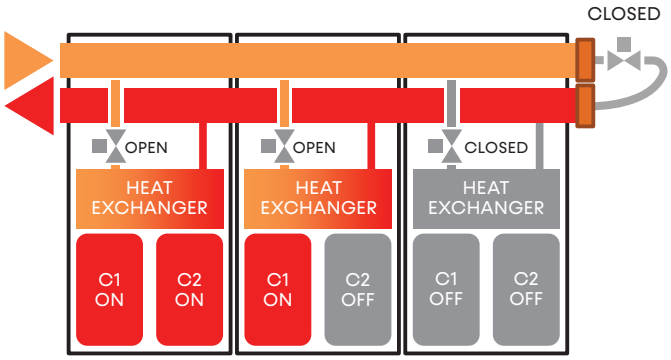
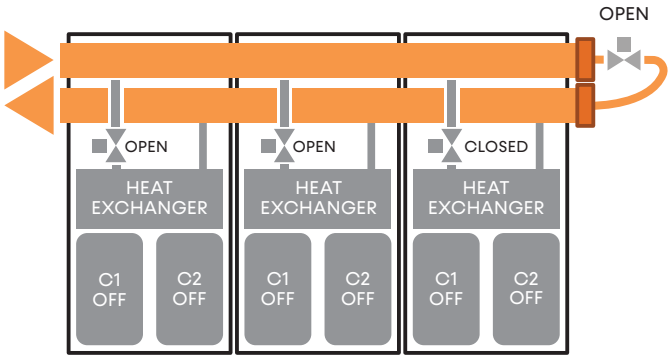


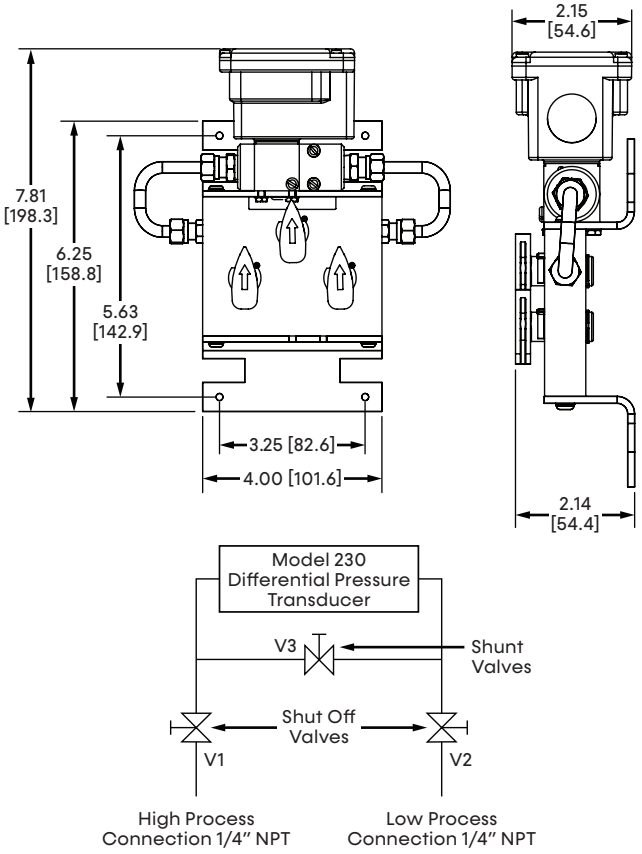
Figure 6: Bank with modules OFF and header bypass OPEN



Differential Pressure Transducer

Field installed to prevent operation of the chiller without sufficient water flow to the evaporator and/or condenser.

Figure 7: True Wet-to-Wet Differential Pressure Transducer: With 3-Valve Manifold Assembly



NOTE: Measurements are shown as inch [mm].

NOTE:
For differential pressure measurements at high line pressure (350 PSIG (2413.17 kPa) max), it is recommended that the pressure sensor be installed with a valve in each line, plus a shunt valve across the high and low (reference) pressure ports as shown.

DIFFERENTIAL PRESSURE FLOW SENSOR

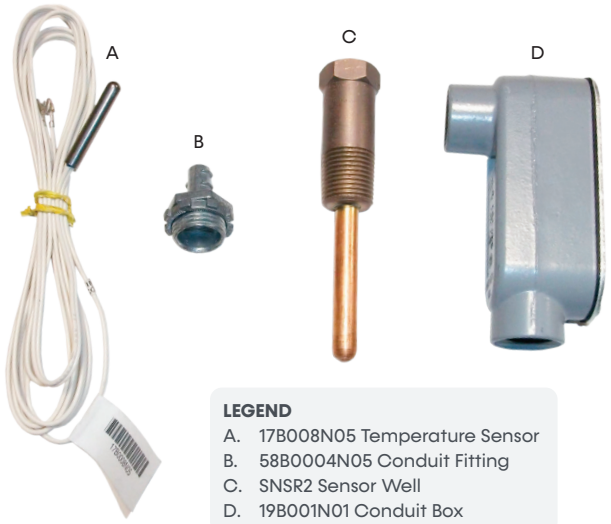
Field installed to prevent operation of the chiller without sufficient water flow to the evaporator and/or condenser.

Figure 8: Flow Switch

TEMPERATURE SENSORS

Two temperature sensor kits shipped per water loop – one for the inlet stream and one for the outlet stream.

Figure 9: Well Temperature Sensor Kit



LEGEND
A. 17B008N05 Temperature Sensor
B. 58B0004N05 Conduit Fitting
C. SNSR2 Sensor Well
D. 19B001N01 Conduit Box

HIGH AND LOW AMBIENT STABILITY

The design of air conditioning systems, utilizing air cooled condensing units, involves two main problems that must be solved if the system is to operate reliably and economically during **high ambient** and **low ambient** operation. If the condensing unit is properly sized, it will operate satisfactorily during extremely high ambient temperatures. However, some units will be required to operate at ambient temperatures below their design dry bulb temperature during most of the year; the solution to low ambient operation is more complex.

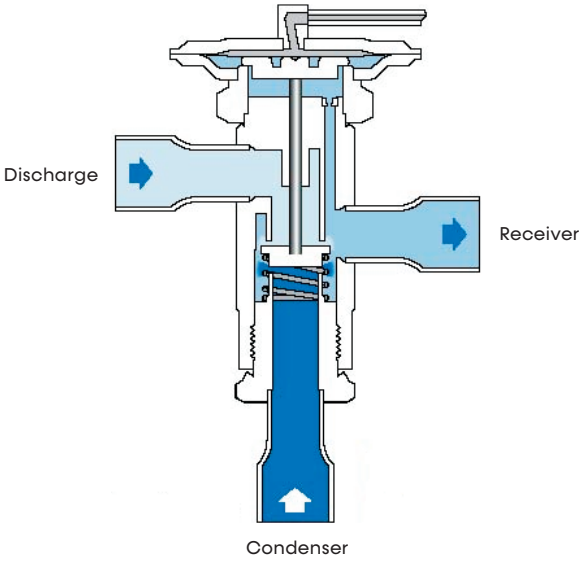
Without good head pressure control during low ambient operation, the system can experience both running cycle and off-cycle problems. Since the pressure differential across the thermostatic expansion valve port affects the rate of refrigerant flow, low head pressure generally causes insufficient refrigerant to be fed to the evaporator. Failure to have sufficient head pressure will result in low suction pressure and/or iced evaporator coils. The primary off-cycle problem is refrigerant migration to the condenser. Insufficient flow through the TXV will cause a low suction pressure.

The typical method of maintaining normal head pressure in a refrigeration system during periods of low ambient temperature is to restrict liquid flow from the condenser to the receiver, and at the same time divert hot gas to the inlet of the receiver. This backs liquid refrigerant up into the condenser reducing its capacity which in turn increases the condensing pressure. At the same time the hot gas raises liquid pressure in the receiver, allowing the system to operate normally.

LAC-10 VALVE OPERATION

The valve designation LAC stands for **Low Ambient Control**. The LAC is a three-way modulating valve that responds to receiver pressure. The receiver pressure acts under the diaphragm, as shown in the *LAC-10 Valve* figure below. As the receiver pressure drops below the valve setting, the seat moves away from the discharge port allowing discharge gas to bypass the condenser. This discharge gas warms the liquid in the receiver and raises the pressure to the valve setting. At the same time discharge gas is bypassing the condenser, liquid flow from the condenser is restricted, which allows liquid to back up in the condenser. Flooding the condenser reduces the area available for condensing thus raising the condensing pressure. During summer conditions, the seat closes the discharge port due to high pressure in the receiver. Therefore, there is full liquid flow from the condenser to the receiver.

Figure 10: LAC-10 Valve



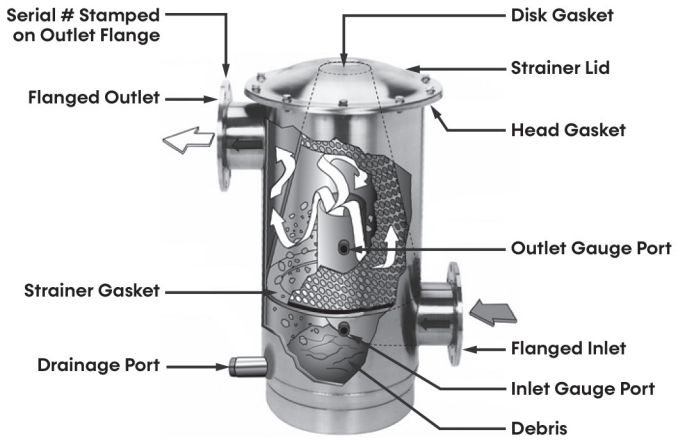
REFRIGERANT MIGRATION

During an off cycle there is a potential for refrigerant to migrate from the warm receiver to the cold condenser. An auxiliary check valve should be used in the liquid line between the LAC valves and the receiver to prevent this from occurring. See Refrigeration Circuit Diagrams for the list of components.

Automatic CS Series Strainer Package

Field installed, high quality, low maintenance stainless steel filtration systems with 60 or 80 mesh stainless steel screens will reduce operating costs and prevent nuisance condenser issues. Strainer package can be equipped with optional pressure differential alarm and automatic time flush.

Figure 11: Stainless Steel Strainer



Automatic Timer Flush (ATF) Package Option

The ATF-EA-1.5 flush valve package provides an automatic method for flushing away the debris collected in the strainer's reservoir. The power supply and timer controls for the valve package are housed inside the ATF control box. The ATF controls can be pre-programmed to set the flushing duration and the time interval between flushes.

System Components

1. Timer based valve controller: sets the flush duration (length of the flush) and the flush interval (time between flushes).
2. Electric Ball Valve: designed for dirty water use.

Figure 12: Timer Based Valve Controller

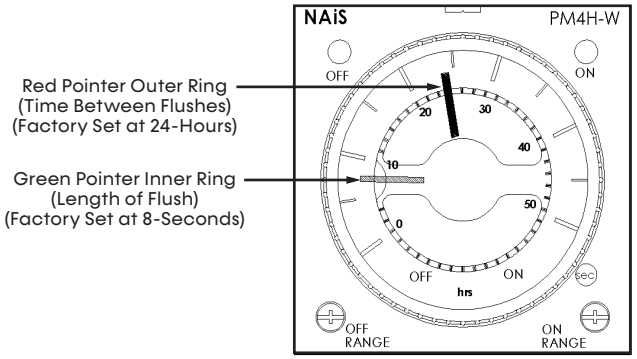


Figure 13: Electric Ball Valve

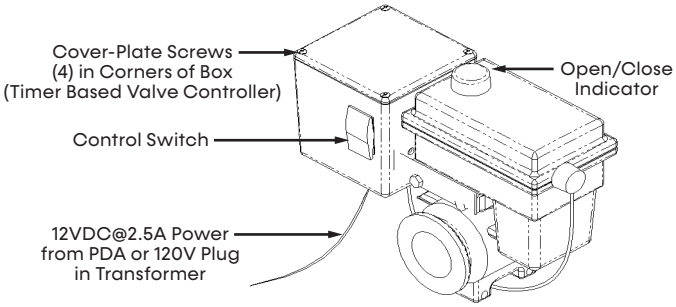
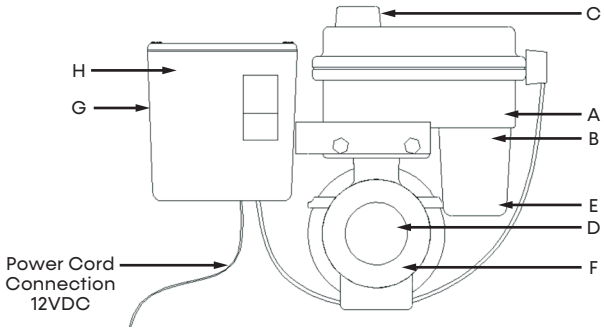


Figure 14: Valve Specifications



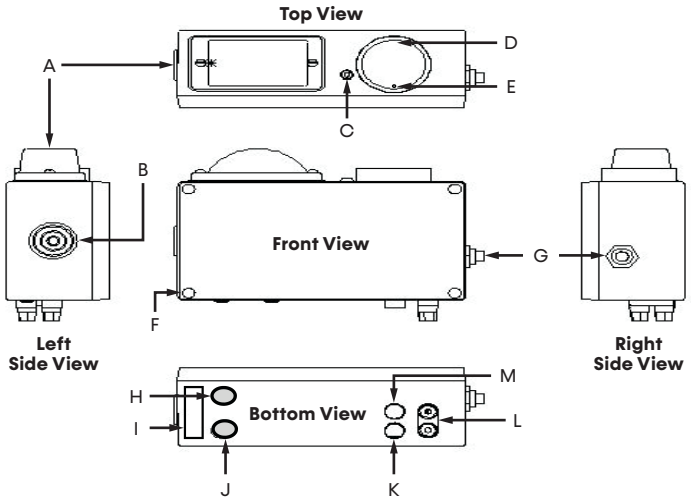
LEGEND

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

Pressure Differential Alarm Package Option

The pressure differential alarm (PDA) option continually monitors and displays the strainer's inlet and outlet differential pressure. When the strainer element (conical strainer basket) becomes significantly clogged, the pressure differential switch-gauge will trigger an audible siren and a visual flashing alarm light. These alarms are intended to alert maintenance personnel that the strainer element must be removed and cleaned (see *Strainer Element Cleaning* section).

Figure 15: Pressure Differential Alarm (PDA) Option



LEGEND

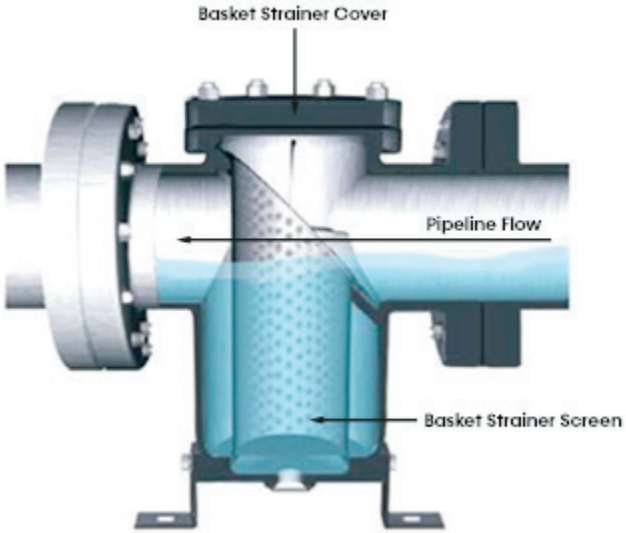
A. Visual Alarm
B. Audible Alarm
C. LED Power Indicator
D. Pressure Differential Switch-Gauge
E. Differential Setpoint Contact
F. Cover-Plate (4) in Corners of Box (DO NOT REMOVE)
G. Alarm Reset Button
H. Power to ATF
I. Cable Retainer
J. 110 Volt/12 Vold DC Wall Transformer
K. PSID Low
L. AUX Contacts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

Manual Strainers

Field installed to utilize Y-style and basket strainers of cast iron 200 psi or carbon 275 psi with 60 mesh stainless steel screens to increase efficiency and ensure long equipment life. All strainers are field installed external to the chiller bank for ease of service.

Figure 16: WYE Strainer - Flanged Ends

Figure 17: Installed Basket Strainer with Bolted Cover



Free Cooling Modules

Directly couples to chiller bank. Includes: free-cooling coils, high-efficiency, variable-speed EC condenser fans with integral head-pressure control with acoustical airfoil blade design providing low operating sound levels, two-position motorized water-isolation valve, three-way bypass valves and fully integrated controls

Simultaneous Heating & Cooling (UAU)

Air-Source SHC models include four (4) headers and integral motorized valves for indexing any module for heating or cooling regardless of its position in the bank. Provides up to 140°F (60°C) hot water at and above 45°F (7.22°C) ambient.

Hot Gas Bypass or VFDs

Factory installed to allow unit operation below the minimum step of unloading. VFDs unload to 45hz.

Coil Coating

Factory installed coil coating for outdoor element protection.

- **SWAAT Run to Fail:** 289 days (6,936 hrs)
- **Water Resistance:** Pass, 260 hrs. no flaking or chipping
- **UV & QUV Resistance:** Pass, 48 hr. #6 or better

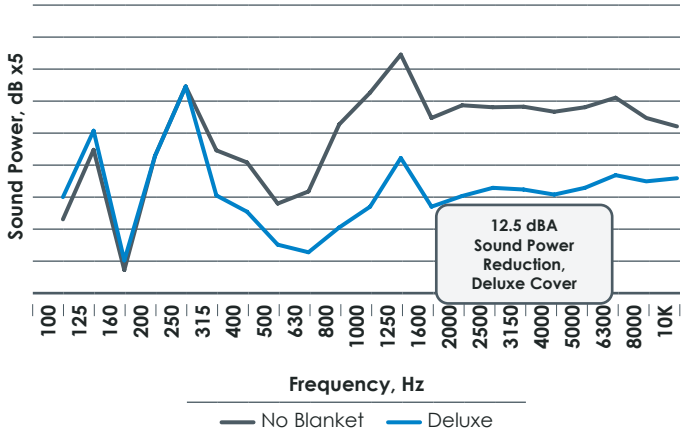
Skid Mounting

Modules factory mounted onto a skid to minimize crane lifts. Configurable with up to 10 modules when mounted back-to-back (5 end-to-end) on a single skid.

Sound Blankets

Reinforced vinyl envelope wrapped around a fiberglass blanket. Includes an extra layer of sound barrier material for additional noise absorption.

Table 1: Sound Reduction Table



ELECTRICAL

65 KA SCCR Electrical

The SCCR is the maximum short-circuit current an electrical component can safely withstand without causing a shock or fire hazard. ClimaCool module electrical panels have a default value of 5 KA SCCR. The SCCR for the control panel is determined the lowest SCCR value for any component or branch circuit. This option increases each electrical components' SCCR rating for the module's panel to 65 KA SCCR.

Outdoor Enclosure

NEMA 3R enclosures for CoolLogic Touch Bank Controller.

Bank Breaker Panel

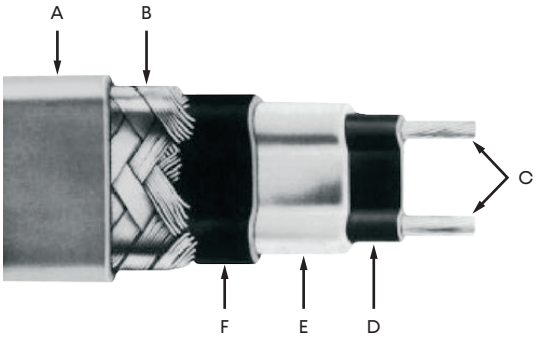
The ship loose bank breaker panel (BBP) can be provided with 5 or 65 KA SCCR. The BBP is rated for outdoor install and includes a main disconnect shutoff with lock out tag out (LOTO) capabilities. Each branch contains circuit breakers for individual branch circuit protection. The BBP option also includes a single phase 120V transformer for the CoolLogic Touch.

Figure 18: Bank Breaker Panel

Heat Trace for Freeze Protection

- *Self-regulating heater cable* is ideal for use in maintaining fluid flow under low ambient conditions.
  - As the core material temperature increases, the number of conductive paths in the core material decrease, automatically decreasing the heat output.
  - As the temperature decreases, the number of conductive paths increase, causing the heat output to increase.

Figure 19: Self-Regulating Heater Cable

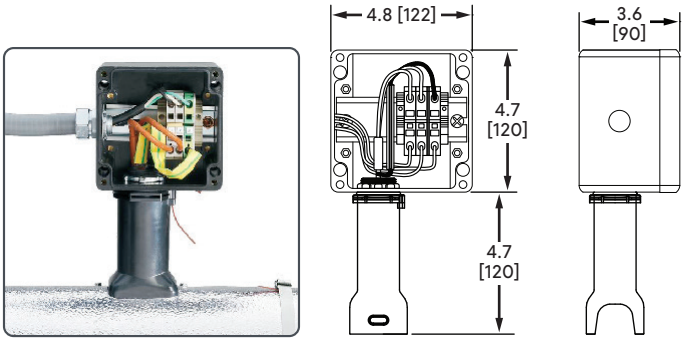


LEGEND

A. Optional Over Jacket
B. Standard Metal Braid
C. Stranded Plated Copper Conductors
D. Self-Regulating Conductive Core
E. Bonded Inner Thermoplastic Jacket
F. Outer Thermoplastic Elastomer Jacket

- *Power connection kits* are designed per NEC requirements and provide entries compatible with ¾-inch (19.05 mm) NPT conduit entry. Standard terminal blocks are sized for a maximum of 8 AWG power supply wiring.
  - Incorporate rugged, non-metallic construction rated for IP66/NEMA 4X.
  - Designed with corrosion resistant, anti-static enclosures and components.

Figure 20: Power Connection Kit



NOTE: Measurements are shown in inches and [millimeters].

Model Nomenclature Digits 1-15

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
U	A	T	S	2	0	A	H	S	0	0	0	S	0	0

PRODUCT LINE
U = Ultimate Chiller

SOURCE
A = Air

APPLICATION
C = Cooling Only
T = Heat Pump
U = SHC Heat Pump
F = Free Cooling

OPTIONS
S = Standard
M = Module Free Cooling for UAF

TONNAGE
20 50
30 60

REV LEVEL
A

VOLTAGE
H = 208V
F = 460V
N = 575V

COMPRESSOR
S = Standard
T = VFD Lead
N = No Compressor for UAF

WATER HEADER PIPE DIAMETER
0 = Headerless
6 = 6 inches
8 = 8 inches

MODULE PASS THROUGH HEADERS[1]
0 = No

BRINE
0 = No
1 = Yes

CONTROLS OPTIONS
S = Standard
1 = Single Module Controls
2 = Auto Stand Alone
3 = Module HMI Only

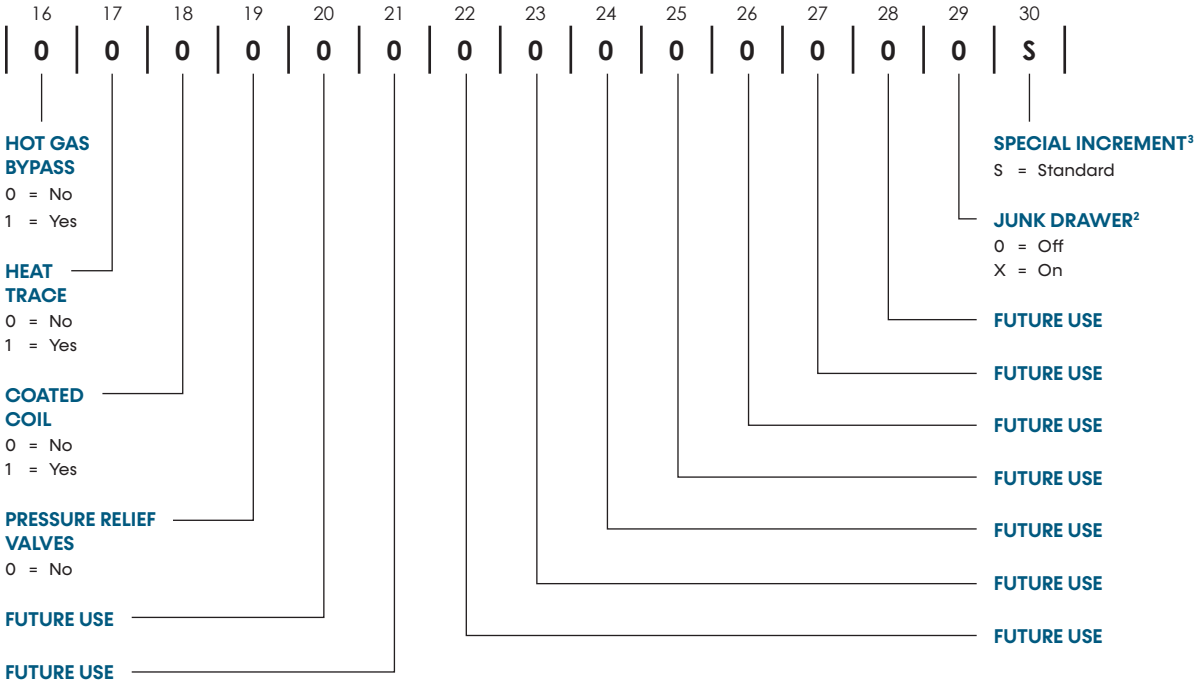
SCCR
0 = 5 kAIC
1 = 65 kAIC

COMPRESSOR SOUND BLANKETS
0 = No
1 = Yes

Continued on next page.

1. This option will be required if the module is intended to be banked with SHC units.

Model Nomenclature Digits 16-30



1. This option will be required if the module is intended to be banked with SHC units.
2. Digit 29 is used to indicate a unit special that does not fall into any other model key digits (ie, paint color).

Table 2: UA Series (Imperial Units)

Model UA	Chiller		Heat Pump		SHC[1] Heat Pump		Free Cooling[3]
	20	30	20	30	20	30	30
Capacity (tons)[2]	18.68	27.45	18.11	26.95	18.11	26.95	33.85
EER (Cooling Mode)	10.63	10.10	10.30	9.86	10.30	9.86	-
COP (Heating Mode)[4]	NA	NA	2.34	2.24	2.34	2.24	-
Refrigerant Circuits (quantity)	2	2	2	2	2	2	-
Compressor Type	scroll		scroll		scroll		-
Compressor Quantity	2	2	2	2	2	2	-
Compressor Nominal Hp (per circuit)	10	15	10	15	10	15	-
Refrigerant Charge 454B (lb)	54	55	54	55	54	55	-
Module Operating Weight w/Water (lb)[5]	2,849	2,849	2,657	2,849	3,014	3,014	2,318
Module Shipping Weight (lb)[6]	2,634	2,634	2,442	2,634	2,634	2,634	1,908
Air-side Heat Exchanger Fans	**20**	**30**	**20**	**30**	**20**	**30**	**30**
Motor Type	T.E.	T.E.	T.E.	T.E.	T.E.	T.E.	T.E
HP	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Quantity	2	2	2	2	2	2	2
Fan Type	Axial	Axial	Axial	Axial	Axial	Axial	Axial
Diameter (inches)	31.5	31.5	31.5	31.5	31.5	31.5	31.5
Nominal Airflow (CFM per fan)	10,500	10,500	10,500	10,500	10,500	10,500	10,500
Nominal Airflow (total CFM)	21,000	21,000	21,000	21,000	21,000	21,000	21,000
RPM	1,100	1,100	1,100	1,100	1,100	1,100	1,100
Maximum Design Working Pressure - refrigerant (psi)	650	650	650	650	650	650	-
Air-side Heat Exchanger	**20**	**30**	**20**	**30**	**20**	**30**	**30**
Fin Material	Aluminum		Aluminum		Aluminum		Aluminum
Tube Material	Copper		Copper		Copper		Copper
Dimensions – inches (quantity)	36.00 x 44.00 (4)		36.00 x 44.00 (4)		36.00 x 44.00 (4)		42.50 x 32.25 (4)
Water-side Heat Exchanger	**20**	**30**	**20**	**30**	**20**	**30**	**30**
Heat Exchanger (type)	Brazed Plate		Brazed Plate		Brazed Plate		Tube & Fin Hydraulic Coil
Independent Refrigerant Circuits (quantity)	2	2	2	2	2	2	-
Water Storage Volume HX Only (gal)	2.54	2.54	2.54	2.54	2.54	2.54	22.20[8]
Water Storage Volume HX and Module Piping & Headers (gal)	26.2	26.2	26.2	26.2	48.2	48.2	47.1
Maximum Design Working Pressure - Water Side (psi)	300	300	300	300	300	300	300
Header Water Connections - Inlet/Outlet (in.)[7]	6	6	6	6	6	6	6

NOTES:
1. SHC - Simultaneous Heating and Cooling Heat Pump.
2. Unit tonnage and efficiency at AHRI rating conditions: 44°F leaving chilled water temperature, 95°F entering condenser air temperature, flow rate is 2.4 GPM per ton through the evaporator with a 0.0001 fouling factor.
3. Free Cooling module rated at 54°F entering and 44°F leaving water, 15% propylene glycol, at 25°F ambient.
4. Measurements taken at 47°F Ambient and 140°F HW
5. Module operational weight includes water, compressor oil, and refrigerant charge. Multiply times the number of modules for a total system operational weight.
6. Unit shipping weight includes refrigerant charge, compressor oil and packaging; based on transportation.
7. Main header water/fluid connections are ASME, 6-inch scheduled 40 pipe with grooved couplings, 300 psig maximum working pressure.
8. Free Cool volume includes all four hydronic coils

Table Continued on Next Page

Table Continued from Previous Page

Model UA	Chiller		Heat Pump		SHC[1] Heat Pump		Free Cooling[3]
	50	60	50	60	50	60	60
Capacity (tons)[2]	42.22	53.63	41.47	52.67	41.47	52.67	67.7
EER (Cooling Mode)	9.98	10.08	9.78	9.83	9.78	9.83	-
COP (Heating Mode)[4]	NA	NA	2.35	2.44	2.35	2.44	-
Refrigerant Circuits (quantity)	2	2	2	2	2	2	-
Compressor Type	scroll		scroll		scroll		-
Compressor Quantity	2	2	2	2	2	2	-
Compressor Nominal Hp (per circuit)	25	30	25	30	25	30	-
Refrigerant Charge 454B (lb)	114	120	114	120	114	120	-
Module Operating Weight w/Water (lb)[5]	4,921	5,130	4,921	5,130	5,647	5,856	4,636
Module Shipping Weight (lb)[6]	4,626	4,806	4,626	4,806	5,106	5,286	3,810
Air-side Heat Exchanger Fans	**50**	**60**	**50**	**60**	**50**	**60**	**60**
Motor Type	T.E.	T.E.	T.E.	T.E.	T.E.	T.E.	T.E.
HP	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Quantity	4	4	4	4	4	4	2
Fan Type	Axial	Axial	Axial	Axial	Axial	Axial	Axial
Diameter (in.)	31.5	31.5	31.5	31.5	31.5	31.5	31.5
Nominal Airflow (CFM per fan)	10,500	10,500	10,500	10,500	10,500	10,500	10,500
Nominal Airflow (total CFM)	42,000	42,000	42,000	42,000	42,000	42,000	21,000
RPM	1,100	1,100	1,100	1,100	1,100	1,100	1,100
Maximum Design Working Pressure - refrigerant (psi)	650	650	650	650	650	650	-
Air-side Heat Exchanger	**50**	**60**	**50**	**60**	**50**	**60**	**60**
Fin Material	Aluminum		Aluminum		Aluminum		Aluminum
Tube Material	Copper		Copper		Copper		Copper
Dimensions – inches (quantity)	44.00 x 76.88 (4)		44.00 x 76.88 (4)		44.00 x 76.88 (4)		42.50 x 32.25 (8)
Water-side Heat Exchanger	**50**	**60**	**50**	**60**	**50**	**60**	**60**
Heat Exchanger (type)	Brazed Plate		Brazed Plate		Brazed Plate		Tube & Fin Hydraulic Coil
Independent Refrigerant Circuits (quantity)	2	2	2	2	2	2	-
Water Storage Volume HX Only (gal)	4.80	4.80	4.80	4.80	4.80	4.80	44.44[8]
Water Storage Volume HX and Module Piping & Headers (gal)	39.6	39.6	39.6	39.6	76.6	76.6	69.3
Maximum Design Working Pressure - Water Side (psi)	300	300	300	300	300	300	300
Header Water Connections - Inlet/Outlet (in.)[7]	6 or 8	6 or 8	6 or 8	6 or 8	6 or 8	6 or 8	6 or 8

NOTES:
1. SHC - Simultaneous Heating and Cooling Heat Pump.
2. Unit tonnage and efficiency at AHRI rating conditions: 44°F leaving chilled water temperature, 95°F entering condenser air temperature, flow rate is 2.4 GPM per ton through the evaporator with a 0.0001 fouling factor.
3. Free Cooling module rated at 54°F entering and 44°F leaving water, 15% propylene glycol, at 25°F ambient.
4. Measurements taken at 47°F Ambient and 140°F HW
5. Module operational weight includes water, compressor oil, and refrigerant charge. Multiply times the number of modules for a total system operational weight.
6. Unit shipping weight includes refrigerant charge, compressor oil and packaging; based on transportation.
7. Main header water/fluid connections are ASME, 6-inch scheduled 40 pipe with grooved couplings, 300 psig maximum working pressure.
8. Free Cool volume includes all four hydronic coils

Table 3: UA Series (Metric Units)

Model UA	Chiller		Heat Pump		SHC[1] Heat Pump		Free Cooling[3]
	20	30	20	30	20	30	30
Capacity (kW)[2]	65.69	96.54	63.69	94.78	63.69	94.78	119.04
EER (Cooling Mode)	10.63	10.10	10.30	9.86	10.30	9.86	-
COP (Heating Mode)[4]	NA	NA	2.34	2.24	2.34	2.24	-
Refrigerant Circuits (quantity)	2	2	2	2	2	2	-
Compressor Type	scroll	scroll	scroll	scroll	scroll	scroll	-
Compressor Quantity	2	2	2	2	2	2	-
Compressor Nominal kW (per circuit)	7.46	11.19	7.46	11.19	7.46	11.19	-
Refrigerant Charge 454B (kg)	24.49	24.95	22.68	24.49	22.68	24.49	-
Module Operating Weight w/Water (kg)[5]	1,292.3	1,292.3	1,205.2	1,292.3	1,367.1	1,367.1	1,051.40
Module Shipping Weight (kg)[6]	1,194.8	1,194.8	1,107.7	1,194.8	1,194.8	1,194.8	865.5
Air-side Heat Exchanger Fans	**20**	**30**	**20**	**30**	**20**	**30**	**30**
Motor Type	T.E.	T.E.	T.E.	T.E.	T.E.	T.E.	T.E.
kW	1.49	1.49	1.49	1.49	1.49	1.49	1.49
Quantity	2	2	2	2	2	2	2
Fan Type	Axial	Axial	Axial	Axial	Axial	Axial	Axial
Diameter (cm)	80.01	80.01	80.01	80.01	80.01	80.01	80.01
Nominal Airflow (m^3s per fan)	4.96	4.96	4.96	4.96	4.96	4.96	4.96
Nominal Airflow (total m^3s)	9.91	9.91	9.91	9.91	9.91	9.91	9.91
RPM	1,100	1,100	1,100	1,100	1,100	1,100	1,100
Maximum Design Working Pressure - refrigerant (kPa)	4,481.59	4,481.59	4,481.59	4,481.59	4,481.59	4,481.59	-
Air-side Heat Exchanger	**20**	**30**	**20**	**30**	**20**	**30**	**30**
Fin Material	Aluminum		Aluminum		Aluminum		Aluminum
Tube Material	Copper		Copper		Copper		Copper
Dimensions – cm (quantity)	91.44 x 111.80 (4)		91.44 x 111.80 (4)		91.44 x 111.80 (4)		108.00 x 81.92 (4)
Water-side Heat Exchanger	**20**	**30**	**20**	**30**	**20**	**30**	**30**
Heat Exchanger (type)	Brazed Plate		Brazed Plate		Brazed Plate		Tube & Fin Hydraulic Coil
Independent Refrigerant Circuits (quantity)	2	2	2	2	2	2	-
Water Storage Volume HX Only (L)	9.08	9.08	9.08	9.08	9.08	9.08	84.1[8]
Water Storage Volume HX and Module Piping & Headers (L)	53.75	53.75	53.75	53.75	94.26	94.26	178.20
Maximum Design Working Pressure - Water Side (kPa)	2,068.43	2,068.43	2,068.43	2,068.43	2,068.43	2,068.43	2,068.43
Header Water Connections - Inlet/Outlet (cm)[7]	15.24	15.24	15.24	15.24	15.24	15.24	15.24

NOTES:
1. SHC - Simultaneous Heating and Cooling Heat Pump.
2. Unit tonnage and efficiency at AHRI rating conditions: 6.67°C leaving chilled water temperature, 35°C entering condenser air temperature, flow rate is 0.01 m^3/min per ton through the evaporator with a 0.0001 fouling factor.
3. Free Cooling module rated at 12.22°C entering and 6.67°C leaving water, 15% propylene glycol, at -3.89°C ambient.
4. Measurements taken at 8.33°C Ambient and 60°C HW
5. Module operational weight includes water, compressor oil, and refrigerant charge. Multiply times the number of modules for a total system operational weight.
6. Unit shipping weight includes refrigerant charge, compressor oil and packaging; based on transportation.
7. Main header water/fluid connections are ASME, 15.24 cm scheduled 40 pipe with grooved couplings, 2068.43 kPa maximum working pressure.
8. Free Cool volume includes all four hydronic coils.

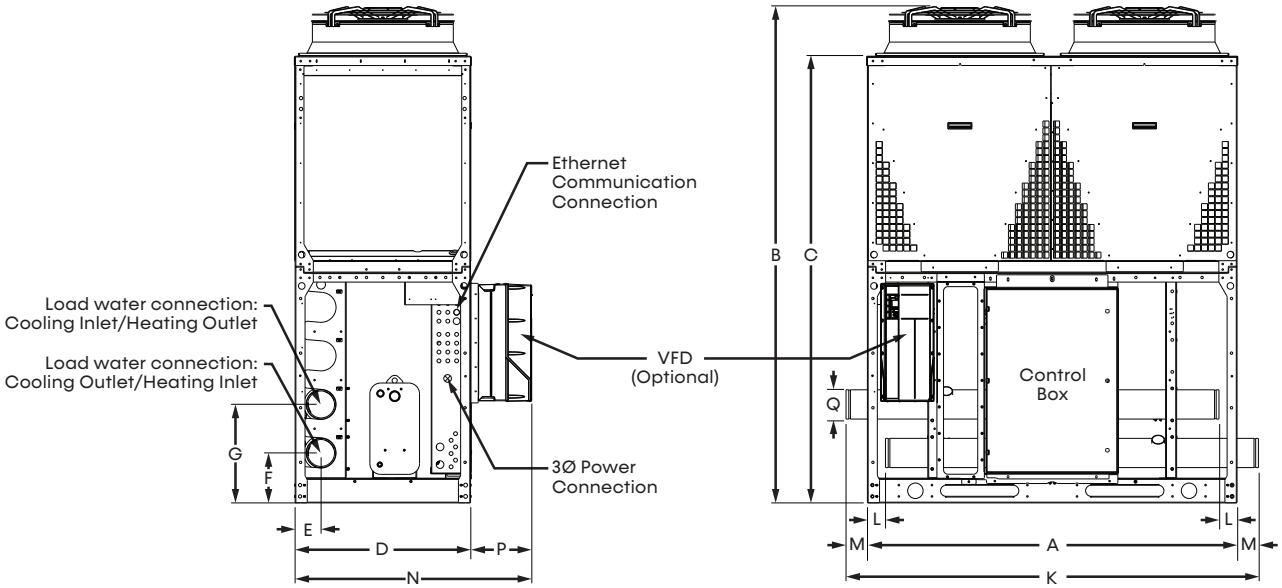
Table Continued on Next Page

Table Continued from Previous Page

Model UA	Chiller		Heat Pump		SHC[1] Heat Pump		Free Cooling[3]
	50	60	50	60	50	60	60
Capacity (kW)[2]	148.84	188.61	145.84	185.23	145.84	185.23	238.08
EER (Cooling Mode)	9.98	10.08	9.78	9.83	9.78	9.83	-
COP (Heating Mode)[4]	NA	NA	2.35	2.44	2.35	2.44	-
Refrigerant Circuits (quantity)	2	2	2	2	2	2	-
Compressor Type	scroll		scroll		scroll		-
Compressor Quantity	2	2	2	2	2	2	-
Compressor Nominal kW (per circuit)	18.64	22.37	18.64	22.37	18.64	22.37	-
Refrigerant Charge 454B (kg)	51.71	54.43	51.71	54.43	51.71	54.43	-
Module Operating Weight w/Water (kg)[5]	2,232.22	2,326.93	2,232.22	2,326.93	2,561.52	2,656.23	2,102.80
Module Shipping Weight (kg)[6]	2,098.32	2,179.96	2,098.32	2,179.96	2,316.04	2,394.69	1,731.00
Air-side Heat Exchanger Fans	**50**	**60**	**50**	**60**	**50**	**60**	**60**
Motor Type	T.E.	T.E.	T.E.	T.E.	T.E.	T.E.	T.E.
kW	1.49	1.49	1.49	1.49	1.49	1.49	1.49
Quantity	2	2	2	2	2	2	2
Fan Type	Axial	Axial	Axial	Axial	Axial	Axial	Axial
Diameter (cm)	80.01	80.01	80.01	80.01	80.01	80.01	80.01
Nominal Airflow (m^3s per fan)	4.96	4.96	4.96	4.96	4.96	4.96	4.96
Nominal Airflow (total m^3s)	19.82	19.82	19.82	19.82	19.82	19.82	19.82
RPM	1,100	1,100	1,100	1,100	1,100	1,100	1,100
Maximum Design Working Pressure - refrigerant (kPa)	4,481.59	4,481.59	4,481.59	4,481.59	4,481.59	4,481.59	4,481.59
Air-side Heat Exchanger	**50**	**60**	**50**	**60**	**50**	**60**	**60**
Fin Material	Aluminum		Aluminum		Aluminum		Aluminum
Tube Material	Copper		Copper		Copper		Copper
Dimensions – cm (quantity)	91.44 x 111.80 (4)		91.44 x 111.80 (4)		91.44 x 111.80 (4)		108.00 x 81.92 (4)
Water-side Heat Exchanger	**50**	**60**	**50**	**60**	**50**	**60**	**60**
Heat Exchanger (type)	Brazed Plate		Brazed Plate		Brazed Plate		Tube & Fin Hydraulic Coil
Independent Refrigerant Circuits (quantity)	2	2	2	2	2	2	-
Water Storage Volume HX Only (L)	18.17	18.17	18.17	18.17	18.17	18.17	84.1[9]
Water Storage Volume HX and Module Piping & Headers (L)	149.90	149.90	149.90	149.90	289.96	289.96	178.20
Maximum Design Working Pressure - Water Side (kPa)	2,068.43	2,068.43	2,068.43	2,068.43	2,068.43	2,068.43	2,068.43
Header Water Connections - Inlet/Outlet (cm)[7]	15.24 or 20.32	15.24 or 20.32	15.24 or 20.32	15.24 or 20.32	15.24 or 20.32	15.24 or 20.32	15.24

NOTES:
1. SHC - Simultaneous Heating and Cooling Heat Pump.
2. Unit tonnage and efficiency at AHRI rating conditions: 6.67°C leaving chilled water temperature, 35°C entering condenser air temperature, flow rate is 0.01 m^3/min per ton through the evaporator with a 0.0001 fouling factor.
3. Free Cooling module rated at 12.22°C entering and 6.67°C leaving water, 15% propylene glycol, at -3.89°C ambient.
4. Measurements taken at 8.33°C Ambient and 60°C HW
5. Module operational weight includes water, compressor oil, and refrigerant charge. Multiply times the number of modules for a total system operational weight.
6. Unit shipping weight includes refrigerant charge, compressor oil and packaging; based on transportation.
7. Main header water/fluid connections are ASME, 15.24 cm scheduled 40 pipe with grooved couplings, 2068.43 kPa maximum working pressure.
8. Each refrigerant circuit is capable of providing reliable operation down to 20°F ambient with proper freeze protection.
9. Free Cool volume includes all 4 hydronic coils.

2-Pipe, 20-30 Ton, UAT Heat Pump & UAC Chiller



SIDE ELEVATION

FRONT ELEVATION

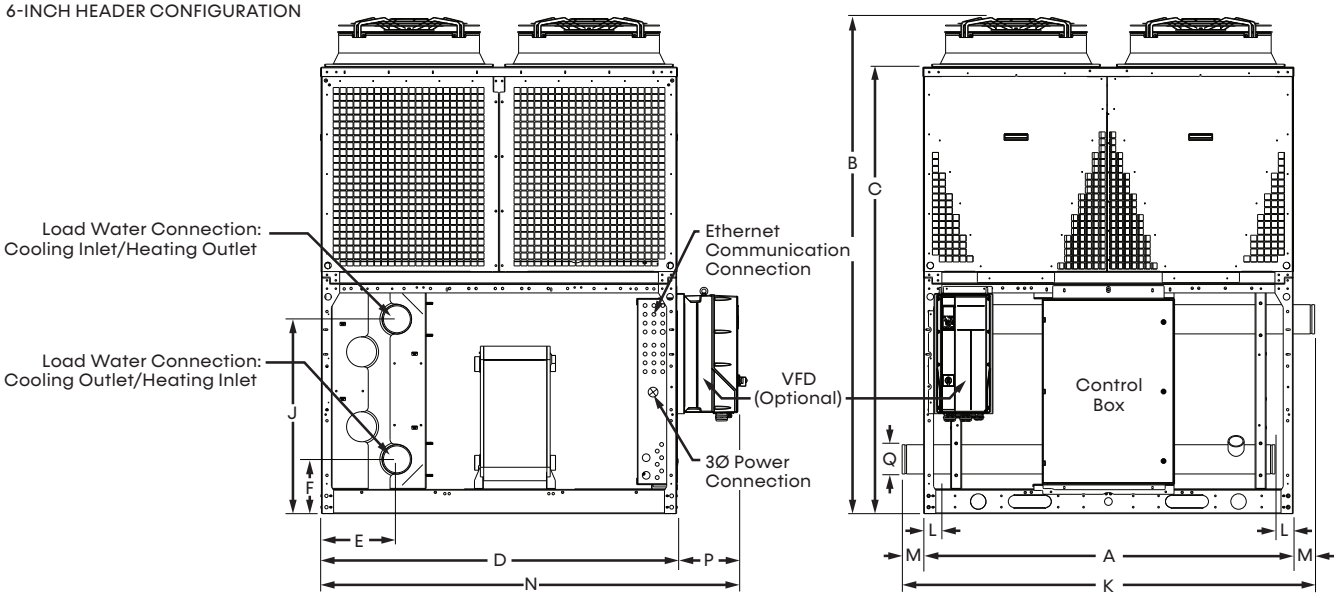
Model UAT & UAC	Voltages	A Frame Width	B Unit Height	C Frame Height	D Unit Depth	E Header Location	F Header Location	G Header Location	K Unit Width	L Header Inset	M Header Extrusion	N[1] Depth with VFD	P[1] VFD Depth	Q Header Connection
20	208-3-60 460-3-60 575-3-60	83.75 [212.73]	112.46 [285.65]	101.22 [257.10]	39.75 [100.97]	5.88 [14.94]	11.31 [28.73]	22.31 [56.68]	93.44 [237.34]	4.09 [10.39]	4.84 [12.29]	55.65 [141.35]	15.90 [40.39]	6.00 [15.24]
30														

NOTES:
1. Measurement only applies to units with VFD

- Dimensions shown in inches [centimeters].
- Kick guard removed for clarity.

2-Pipe, 50-60 Ton, UAT Heat Pump & UAC Chiller

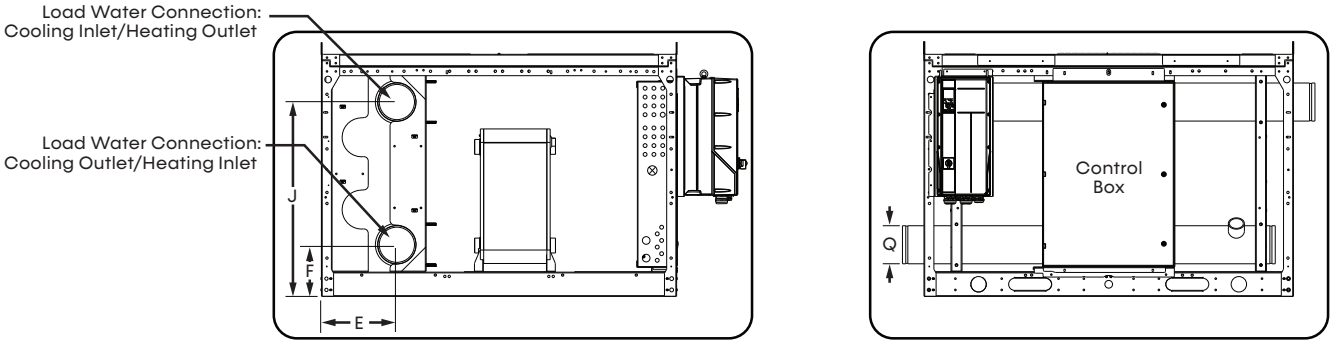
6-INCH HEADER CONFIGURATION



SIDE ELEVATION

FRONT ELEVATION

8-INCH HEADER CONFIGURATION



SIDE ELEVATION

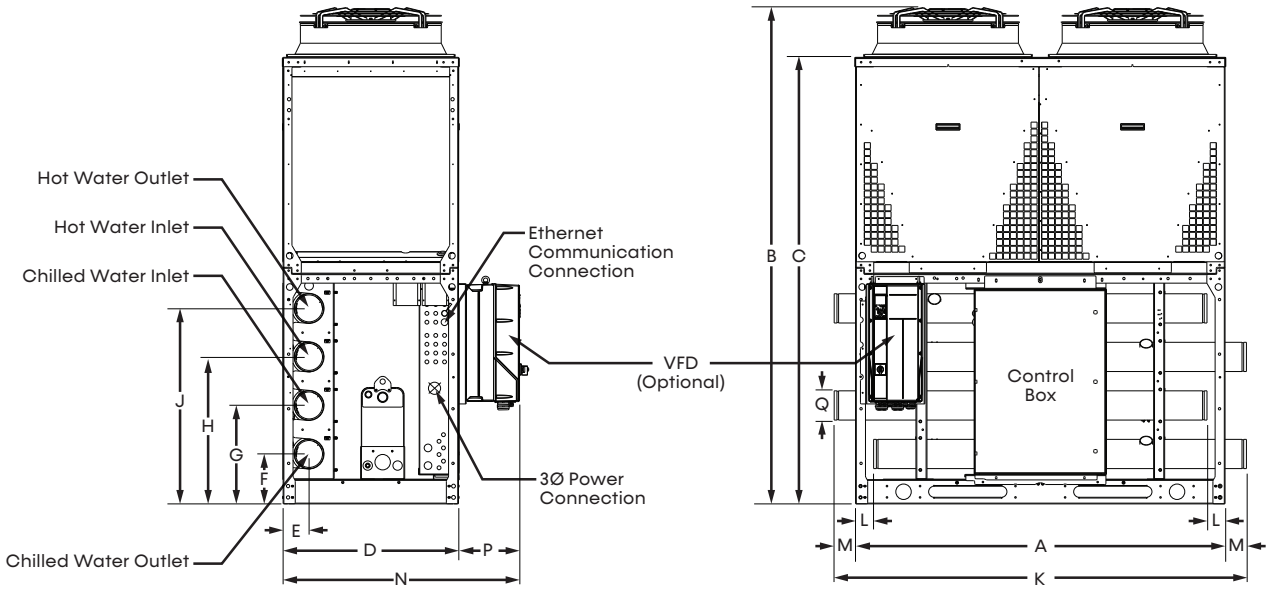
FRONT ELEVATION

Model UAT & UAC	Voltages	A Frame Width	B Unit Height	C Frame Height	D Unit Depth	E Header Location	F Header Location	J Header Location	K Unit Width	L Header Inset	M Header Extrusion	N[1] Depth with VFD	P[1] VFD Depth	Q Header Connection
50	208-3-60 460-3-60 575-3-60	83.75 [212.73]	112.46 [285.65]	101.22 [257.10]	80.50 [204.47]	17.09 [43.41]	12.31 [31.27]	44.06 [111.91]	93.44 [237.34]	4.09 [10.39]	4.84 [12.29]	96.45 [244.98]	15.95 [40.51]	6.00 [15.24]
60														
50	208-3-60 460-3-60 575-3-60	83.75 [212.73]	112.46 [285.65]	101.22 [257.10]	80.50 [204.47]	17.09 [43.41]	11.71 [29.74]	44.06 [111.91]	93.44 [237.34]	4.09 [10.39]	4.84 [12.29]	96.45 [244.98]	15.95 [40.51]	8.00 [20.32]
60														

NOTES:
1. Measurement only applies to units with VFD

- Dimensions shown in inches [centimeters].
- Kick guard removed for clarity.

4-Pipe, 20 & 30 Ton, UAU SHC Heat Pump



SIDE ELEVATION

FRONT ELEVATION

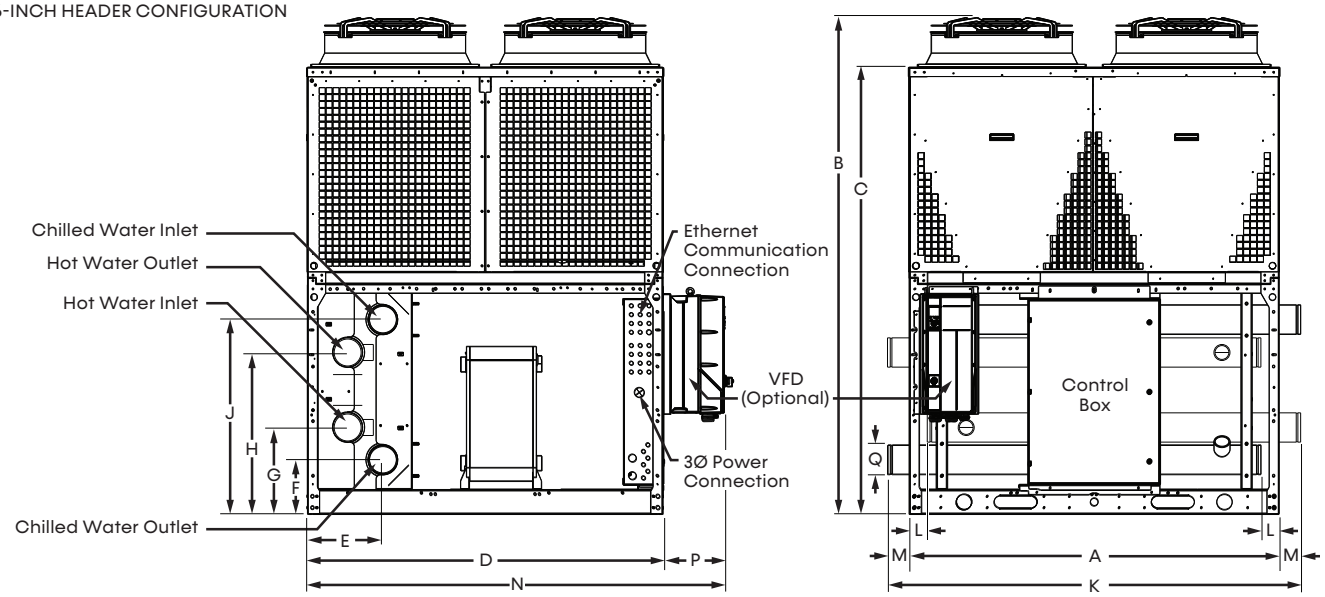
Model UAU	Voltages	A Frame Width	B Unit Height	C Frame Height	D Unit Depth	E Header Location	F Header Location	G Header Location	H Header Location	J Header Location	K Unit Width	L Header Inset	M Header Extrusion	N[1] Depth with VFD	P[1] VFD Depth	Q Header Connection
20	208-3-60 460-3-60 575-3-60	83.75 [212.73]	112.46 [285.65]	101.22 [257.10]	39.75 [100.97]	5.88 [14.94]	11.31 [28.73]	22.31 [56.68]	33.31 [84.61]	44.31 [112.55]	93.44 [237.34]	4.09 [10.39]	4.84 [12.29]	55.65 [141.35]	15.90 [40.39]	6.00 [15.24]
30																

NOTES:
1. Measurement only applies to units with VFD

- Dimensions shown in inches [centimeters].
- Kick guard removed for clarity.

4-Pipe, 50 & 60 Ton, UAU SHC Heat Pump

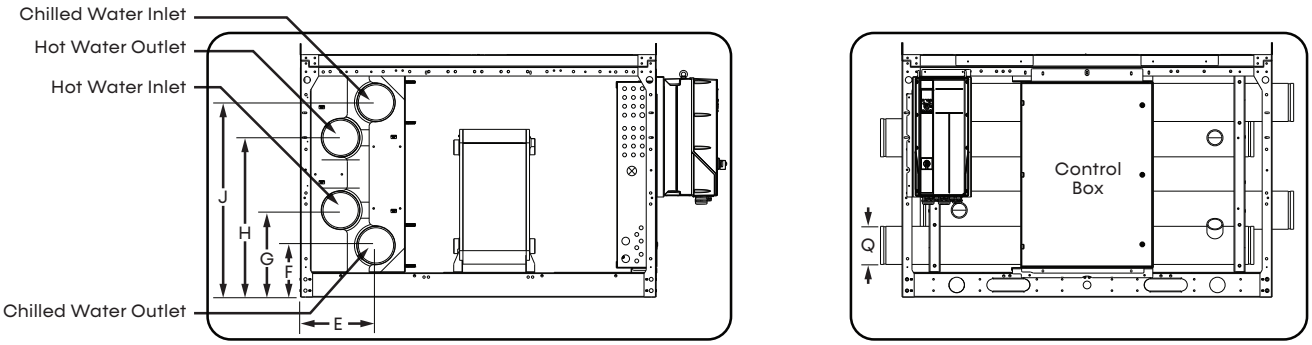
6-INCH HEADER CONFIGURATION



SIDE ELEVATION

FRONT ELEVATION

8-INCH HEADER CONFIGURATION



SIDE ELEVATION

FRONT ELEVATION

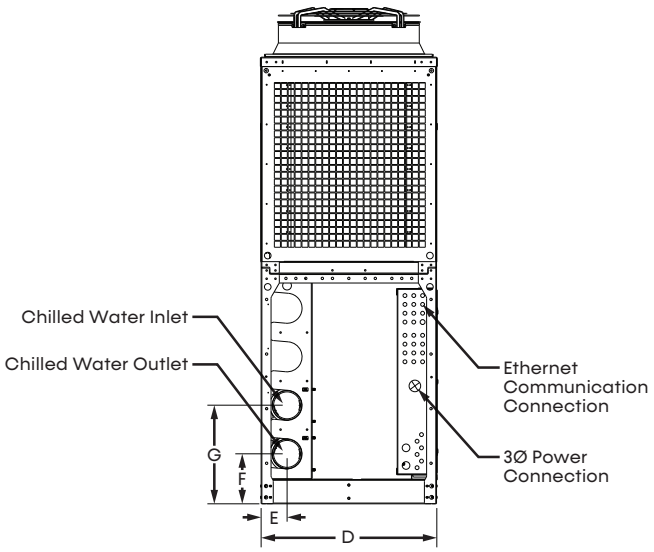
Model UAU	Voltages	A Frame Width	B Unit Height	C Frame Height	D Unit Depth	E Header Location	F Header Location	G Header Location	H Header Location	J Header Location	K Unit Width	L Header Inset	M Header Extrusion	N[1] Depth with VFD	P[1] VFD Depth	Q Header Connection
50	208-3-60 460-3-60 575-3-60	83.75 [212.73]	112.46 [285.65]	101.22 [257.10]	80.50 [204.47]	17.09 [43.41]	12.31 [31.27]	19.70 [50.04]	36.67 [93.14]	44.06 [111.91]	93.44 [237.34]	4.09 [10.39]	4.84 [12.29]	96.45 [244.98]	15.95 [40.51]	6.00 [15.24]
60																
50	208-3-60 460-3-60 575-3-60	83.75 [212.73]	112.46 [285.65]	101.22 [257.10]	80.50 [204.47]	17.09 [43.41]	11.71 [29.74]	19.67 [49.96]	36.06 [91.59]	44.06 [111.91]	93.44 [237.34]	4.09 [10.39]	4.84 [12.29]	96.45 [244.98]	15.95 [40.51]	8.00 [20.32]
60																

NOTES:

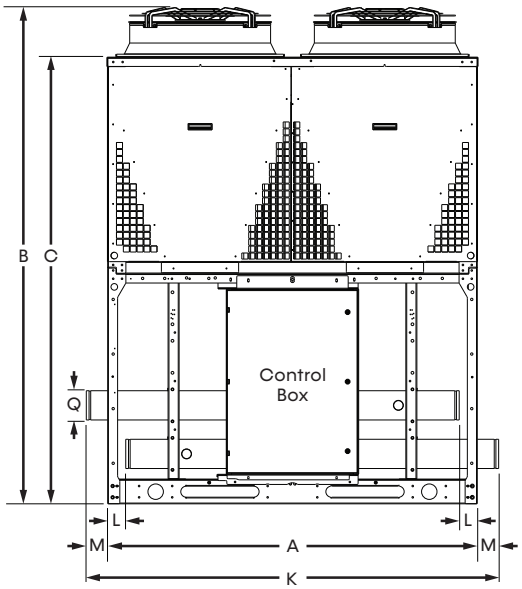
1. Measurement only applies to units with VFD

- Dimensions shown in inches [centimeters].
- Kick guard removed for clarity.

2-Pipe, 20 & 30 Ton, UAF Free Cooling



SIDE ELEVATION



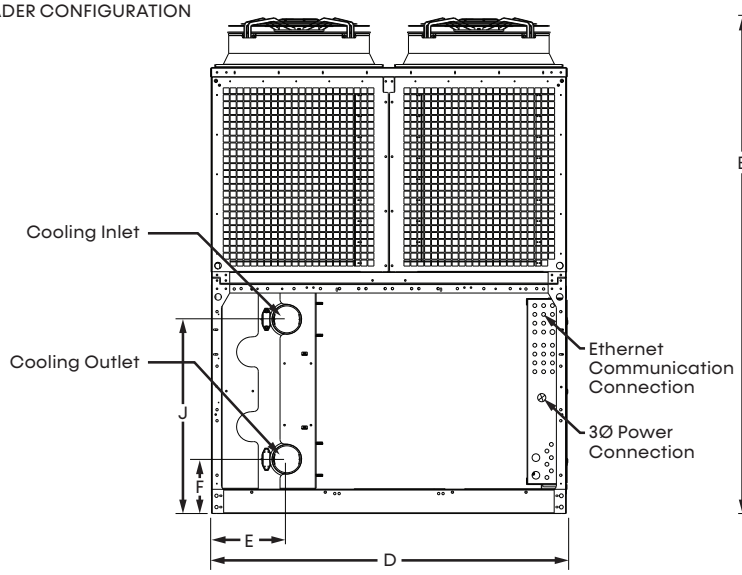
FRONT ELEVATION

Model UAF	Voltages	A Frame Width	B Unit Height	C Frame Height	D Unit Depth	E Header Location	F Header Location	G Header Location	K Unit Width	L Header Inset	M Header Extrusion	Q Header Connection
20	208-3-60 460-3-60 575-3-60	83.75 [212.73]	112.46 [285.65]	101.22 [257.10]	39.75 [100.97]	5.87 [14.91]	11.31 [28.73]	22.31 [56.68]	93.44 [237.34]	4.09 [10.39]	4.84 [12.29]	6.00 [15.24]
30												

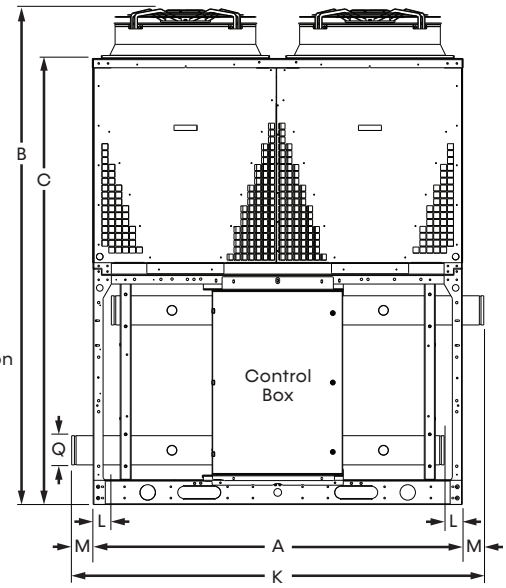
NOTES:
- Dimensions shown in inches [centimeters].
- Kick guard removed for clarity.

2-Pipe, 50 & 60 Ton, UAF Free Cooling

6-INCH HEADER CONFIGURATION

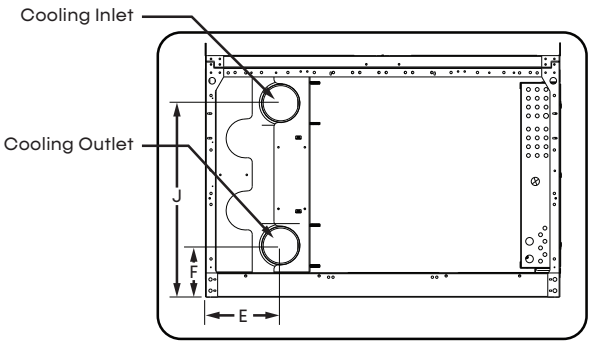


SIDE ELEVATION

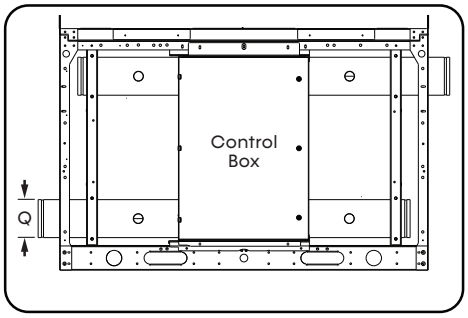


FRONT ELEVATION

8-INCH HEADER CONFIGURATION



SIDE ELEVATION

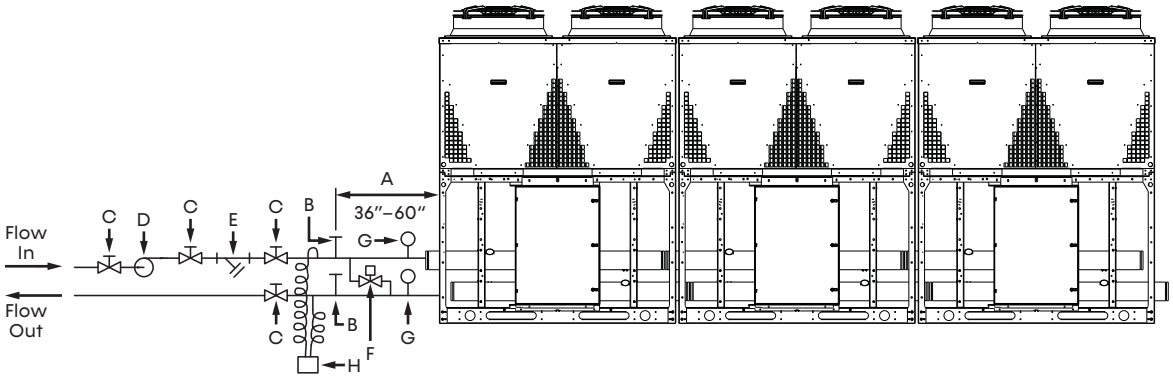


FRONT ELEVATION

Model UAF	Voltages	A Frame Width	B Unit Height	C Frame Height	D Unit Depth	E Header Location	F Header Location	J Header Location	K Unit Width	L Header Inset	M Header Extrusion	Q Header Connection
50	208-3-60 460-3-60 575-3-60	83.75 [212.73]	112.46 [285.65]	101.22 [257.10]	80.50 [204.47]	17.09 [43.41]	12.31 [31.27]	44.06 [111.91]	93.50 [237.49]	4.13 [10.39]	4.88 [12.40]	6.00 [15.24]
60												
50	208-3-60 460-3-60 575-3-60	83.75 [212.73]	112.46 [285.65]	101.22 [257.10]	80.50 [204.47]	17.09 [43.41]	11.71 [29.74]	44.06 [111.91]	93.50 [237.49]	4.13 [10.39]	4.88 [12.40]	8.00 [20.32]
60												

NOTES:
- Dimensions shown in inches [centimeters].
- Kick guard removed for clarity.

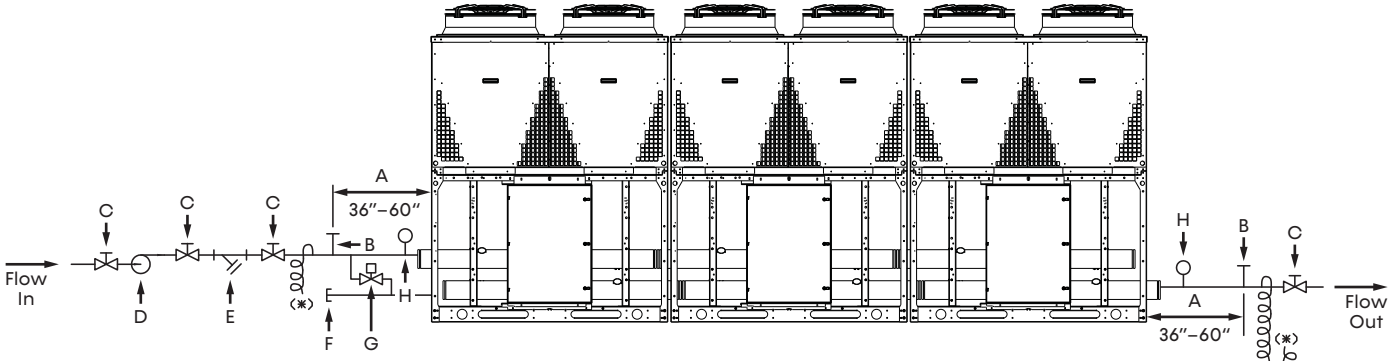
Figure 21: Field Piping Direct Return – 1 to 5 Modules



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

Figure 22: Field Piping Reverse Return – Preferred for 1-5 modules, required for 6 or more modules.



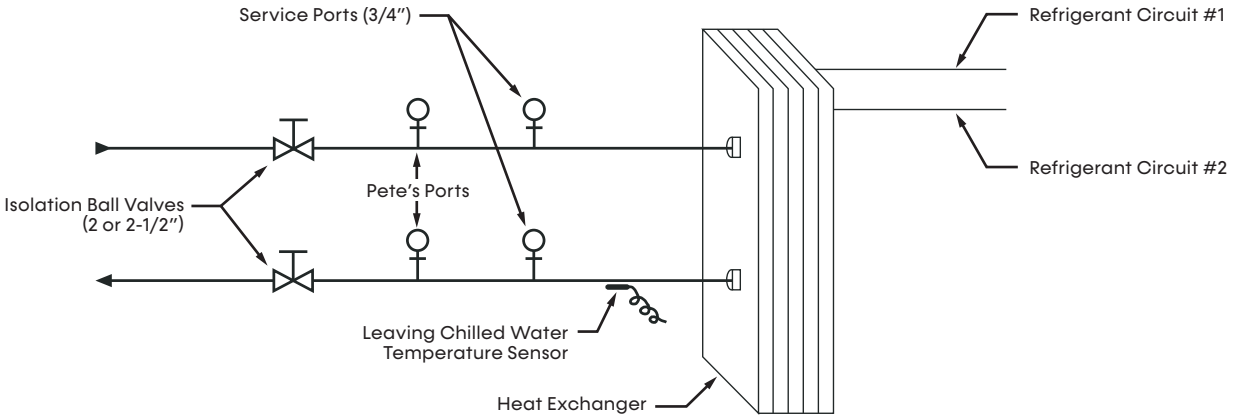
LEGEND

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

NOTES:

1. The above are required piping for proper water regulation and distribution through ClimaCool modular chillers.
2. 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.
3. 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.
4. For chilled water (evaporator and hot water on simultaneous heating and cooling) inlet/outlet location dimensions, refer to *Dimensional Data and Drawings*.
5. Chilled water hydronic circuit shown. Piping configurations are identical for the hot water hydronic circuit for SHC HP model.
6. 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.**
7. A minimum first pass, 60 mesh strainer is required on each water loop. The 60 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.
8. Maximum water flow rates for the evaporator water header system in one bank of modules is 1,100 gpm for 6-inch (15.24 cm) headers.
9. Bypass header kits are provided and controlled for each water loop for all applications with motorized valves. System bypasses are provided and controlled by others.
10. Header bypass valve may be installed at either end of bank.
11. For over twelve (12) modules, please consult the factory.

Figure 23: Chilled Water Circuit



NOTE: The figure above depicts hydronic piping in each ClimaCool chiller module and is shown with water isolation valves.

WHAT IS WATER HAMMER?

Water hammer is a phenomenon that can occur in fluid systems with long pipes. Water hammer is a rapid change of pressure caused by a rapid change in velocity. If the flow has been abruptly shut off downstream, the pressure in the entire system is raised very quickly.

What Causes Water Hammer?

Any action that can cause a rapid change in the velocity of the flow can set off a water hammer, such as closing a downstream valve, pump stoppage, etc. Typically, for short lengths of pipe (below 500 feet) downstream valves that are closed within 1/10 of a second can generate water hammer.

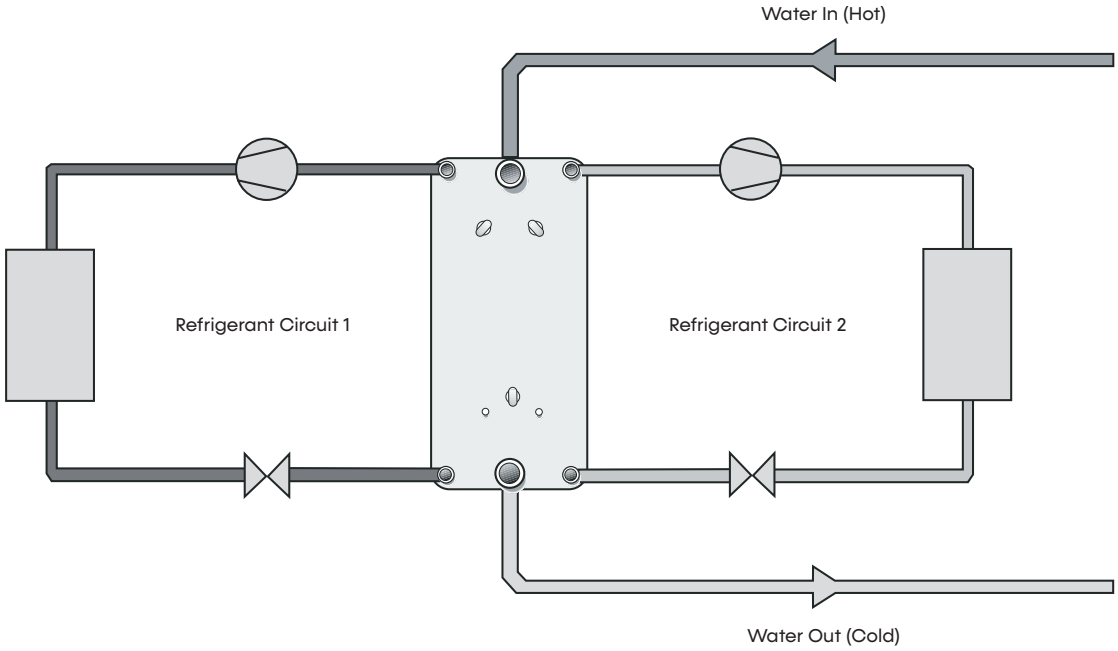
What Can Water Hammer Do?

Pressure spikes from water hammer can raise fluid pressures to dangerously high values. These pressure spikes can cause serious damage to valves, pipes, strainers, joints, etc. The CS strainer is rated to an absolute maximum pressure of 150 psi for bolted lid models, and 125 psi for clamped lid models. A water hammer pressure spike that raises the pressure higher than the maximum rated pressure may result in strainer damage, voiding the manufacturer's warranty.

What Can I Do to Prevent Water Hammer?

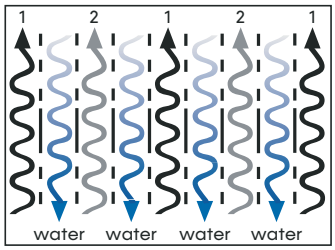
There are certain precautions that can be taken to prevent or decrease the effect of water hammer. The addition of a surge tank or accumulator fitted with a suitable pressure relief valve strategically located within the water system may provide adequate protection against the effects from water hammer. Careful attention should be given to the design and control strategy for valves and pumps so their actions do not invite a water hammer.

ClimaCool modular chillers employ reliable and highly efficient brazed plate heat exchangers. These compact exchangers are true dual-circuit heat exchangers in which each water channel is flanked by two refrigerant circuits. This design gives maximum performance, even at part-load.



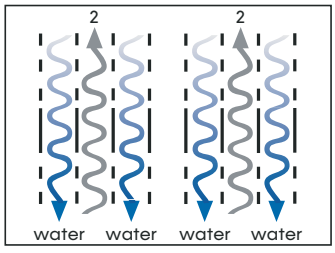
Coil design provides optimum performance in both Full and Partial Load.

Figure 24: Refrigerant Circuits 1 and 2



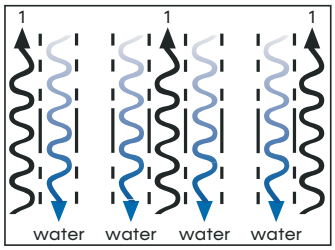
Of course, full performance is attained when the dual-circuit heat exchangers are run to full-load (i.e. with both refrigerant circuits).

Figure 25: Refrigerant Circuit 2 Only



If circuit 1 is cut, the unique design allows each water channel to remain in contact with refrigerant circuit 2, providing optimum heat transfer.

Figure 26: Refrigerant Circuit 1 Only



The same results are achieved if circuit 1 is ran and circuit 2 cut out; optimum heat transfer, even at part-load.

Water quality is of the utmost importance for the proper care and maintenance of the modular chiller system. Proper water treatment is a specialized industry and it is recommended to consult an expert in this field to analyze the water for compliance with the water quality parameters listed. The materials used in the ClimaCool chiller exposed to the water are type 316 stainless steel, pure copper and carbon steel. Other materials may exist external to the ClimaCool chiller. It is the user's responsibility to ensure these materials are compatible with the treated water. Regular treatment of the water will increase longevity of your system. **Failure to provide adequate filtration or treatment of brazed-plate heat exchanger water will void the ClimaCool module's warranty.**

HEAVILY CONTAMINATED WATER

In such instances whereby the particulates in the water are excessive, it is recommended to install an intermediate plate and frame heat exchanger to isolate the ClimaCool chiller from the building water system.

Table 4: Water Quality Parameters

Water Containing	Concentration
Ammonia	Less than 2.0 mg/l
$CaCO_3$ Alkalinity	30 - 500 mg/l
$CaCO_3$ Hardness	30 - 500 mg/l
Chlorides	Less than 200 mg/l
Dissolved Solids	Less than 1000 mg/l
Iron	Less than 5.0 mg/l
Manganese	Less than 0.4 mg/l
Nitrate	Less than 100 mg/l
pH	7.0 - 9.0
Sulphate	Less than 200 mg/l

⚠ CAUTION

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

Table 5: Water Temperature Requirements

Load Loops	Minimum LWT[4]	Maximum LWT[4]
Chilled Water	20°F [-6.67°C][1]	62°F [16.67°C]
Hot Water	75°F [2.39°C]	140°F [60.00°C] (at 40°F [4.44°C] ambient or above)

NOTES:

1. Operating in ambient temperatures below 36°F (2.2°F) requires a suitable antifreeze solution.
2. All modules can operate in this range without the need of special controls.
3. A glycol solution additive is required at a lower operating suction temperatures in order to protect the heat exchanger from freeze-ups.
4. LWT: Leaving Water Temperature.
5. **When the chiller is exposed to lower ambient temperatures of 36°F (2.2 °C) or below, freeze-up protection is required using inhibited ethylene or propylene glycol. 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 are not covered by ClimaCool warranty.**
6. The max LHWT will be limited in heating mode as the outdoor ambient falls.

⚠ ATTENTION

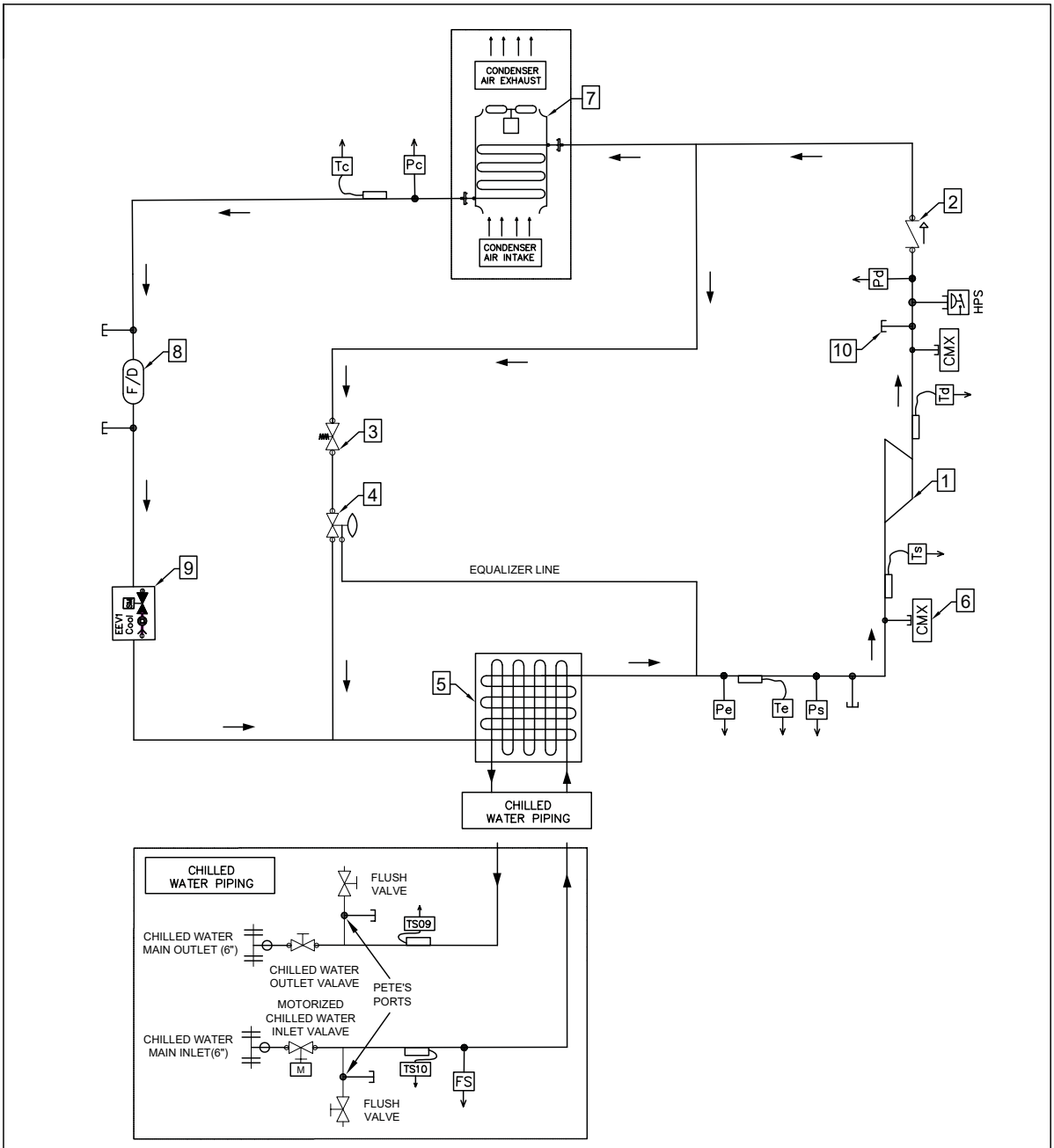
This chiller is configured for brine duty with a minimum LWT of 20°F (6.7 C).

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.

Table 6: Flow and Air Temperature Data

UA Heat Pump				
Cooling Mode	20	30	50	60
Minimum Load Water Flow – gpm [m3/min][1]	25 [0.09]	38 [0.14]	45 [0.17]	57 [0.22]
Maximum Load Water Flow – gpm [m3/min][1]	112 [0.42]	160 [0.61]	190 [0.72]	242 [.92]
Minimum Entering Chilled Water Temperature – °F [°C]	45 [7.22]	45 [7.22]	45 [7.22]	45 [7.22]
Maximum Entering Evaporator Water Temperature – °F [°C]	85 [29.44]	85 [29.44]	85 [29.44]	85 [29.44]
Minimum Leaving Chilled Water Temperature (No Glycol) – °F [°C][5]	40 [4.44]	40 [4.44]	40 [4.44]	40 [4.44]
Minimum Leaving Chilled Water Temperature (with Glycol) – °F [°C]	20 [-6.67]	20 [-6.67]	20 [-6.67]	20 [-6.67]
Maximum Leaving Chilled Water Temperature – °F [°C]	65 [18.33]	65 [18.33]	65 [18.33]	65 [18.33]
Minimum Chilled Water Differential Temperature – °F [°C]	5 [2.78]	5 [2.78]	5 [2.78]	5 [2.78]
Maximum Chilled Water Differential Temperature – °F [°C]	23 [12.78]	23 [12.78]	23 [12.78]	23 [12.78]
Minimum Entering Condenser Air Temperature – °F [°C]	20 [-6.67]	20 [-6.67]	20 [-6.67]	20 [-6.67]
Maximum Entering Condenser Air Temperature – °F [°C][3]	120 [48.89]	120 [48.89]	120 [48.89]	120 [48.89]
Heating Mode	20	30	50	60
Minimum Load Water Flow – gpm [m3/min][1]	22 [0.08]	23 [0.09]	48 [0.18]	47 [0.18]
Maximum Load Water Flow – gpm [m3/min][1]	97 [0.37]	140 [0.53]	218 [.83]	280 [1.06]
Minimum Entering Hot Water Temperature – °F [°C]	45 [7.22]	45 [7.22]	45 [7.22]	45 [7.22]
Maximum Entering Hot Water Temperature – °F [°C]	130 [54.44]	130 [54.44]	130 [54.44]	130 [54.44]
Minimum Leaving Hot Water Temperature – °F [°C]	65 [18.33]	65 [18.33]	65 [18.33]	65 [18.33]
Maximum Leaving Hot Water Temperature – °F [°C]	140 [60.00]	140 [60.00]	140 [60.00]	140 [60.00]
Minimum Hot Water Differential Temperature – °F [°C]	10 [5.56]	10 [5.56]	10 [5.56]	10 [5.56]
Maximum Hot Water Differential Temperature – °F [°C]	30 [16.67]	30 [16.67]	30 [16.67]	30 [16.67]
Minimum Entering Source Air Temperature – °F [°C]	17 [-8.33]	17 [-8.33]	17 [-8.33]	17 [-8.33]
Maximum Entering Source Air Temperature – °F [°C]	100 [37.78]	100 [37.78]	100 [37.78]	100 [37.78]
UA Chiller				
Cooling Mode	20	30	50	60
Minimum Load Water Flow – gpm [m3/min][1]	25 [0.09]	38 [0.14]	45 [0.17]	57 [0.22]
Maximum Load Water Flow – gpm [m3/min][1]	83 [0.32]	124 [0.47]	190 [0.72]	242 [0.92]
Minimum Entering Chilled Water Temperature – °F [°C]	45 [7.22]	45 [7.22]	45 [7.22]	45 [7.22]
Maximum Entering Chilled Water Temperature – °F [°C]	85 [29.44]	85 [29.44]	85 [29.44]	85 [29.44]
Minimum Leaving Chilled Water Temperature (No Glycol) – °F [°C][5]	40 [4.44]	40 [4.44]	40 [4.44]	40 [4.44]
Minimum Leaving Chilled Water Temperature (with Glycol) – °F [°C]	20 [-6.67]	20 [-6.67]	20 [-6.67]	20 [-6.67]
Maximum Leaving Chilled Water Temperature – °F [°C]	65 [18.33]	65 [18.33]	65 [18.33]	65 [18.33]
Minimum Chilled Water Differential Temperature – °F [°C]	5 [2.78]	5 [2.78]	5 [2.78]	5 [2.78]
Maximum Chilled Water Differential Temperature – °F [°C]	23 [12.78]	23 [12.78]	23 [12.78]	23 [12.78]
Minimum Condenser Air Temperature – °F [°C]	20 [-6.67]	20 [-6.67]	20 [-6.67]	20 [-6.67]
Maximum Entering Air Temperature – °F [°C][3]	120 [48.89]	120 [48.89]	120 [48.89]	120 [48.89]

NOTES:
1. Minimum flows are based on maximum ΔT's and Maximum flows are based on minimum ΔT's.
2. Operating in ambient temperatures below 36°F (2.22°C) requires a suitable antifreeze solution.
3. Operating in ambient temperatures above 115°F (46.11°C) requires a suitable sunshade.
4. If project operating parameters are needed outside of the above values, please contact your local sales representative.
5. Each refrigerant circuit is capable of providing reliable operation down to 20°F [-6.67°C] ambient with proper freeze protection.



COMPONENT LEGEND

1. COMPRESSOR
2. CHECK VALVE
3. SOLENOID VALVE
4. HOT GAS BYPASS VALVE
5. EVAPORATOR HX
6. COREMAX VALVE
7. CONDENSER HX
8. FILTER DRIER
9. ELECTRONIC EXPANSION VALVE
10. PRESSURE ACCESS FITTING

ABBREVIATIONS

PRESSURE TRANSDUCER

Pe = ELECTRONIC EXPANSION VALVE
Ps = SUCTION
Pd = DISCHARGE
Pc = COIL

TEMPERATURE SENSOR

Te = ELECTRONIC EXPANSION VALVE
Ts = SUCTION
Td = DISCHARGE
Tc = COIL

TS09 = OUTLET
TS10 = INLET

OTHERS

HPS = HIGH PRESSURE SWITCH
FS = FLOW SWITCH

← = COOLING

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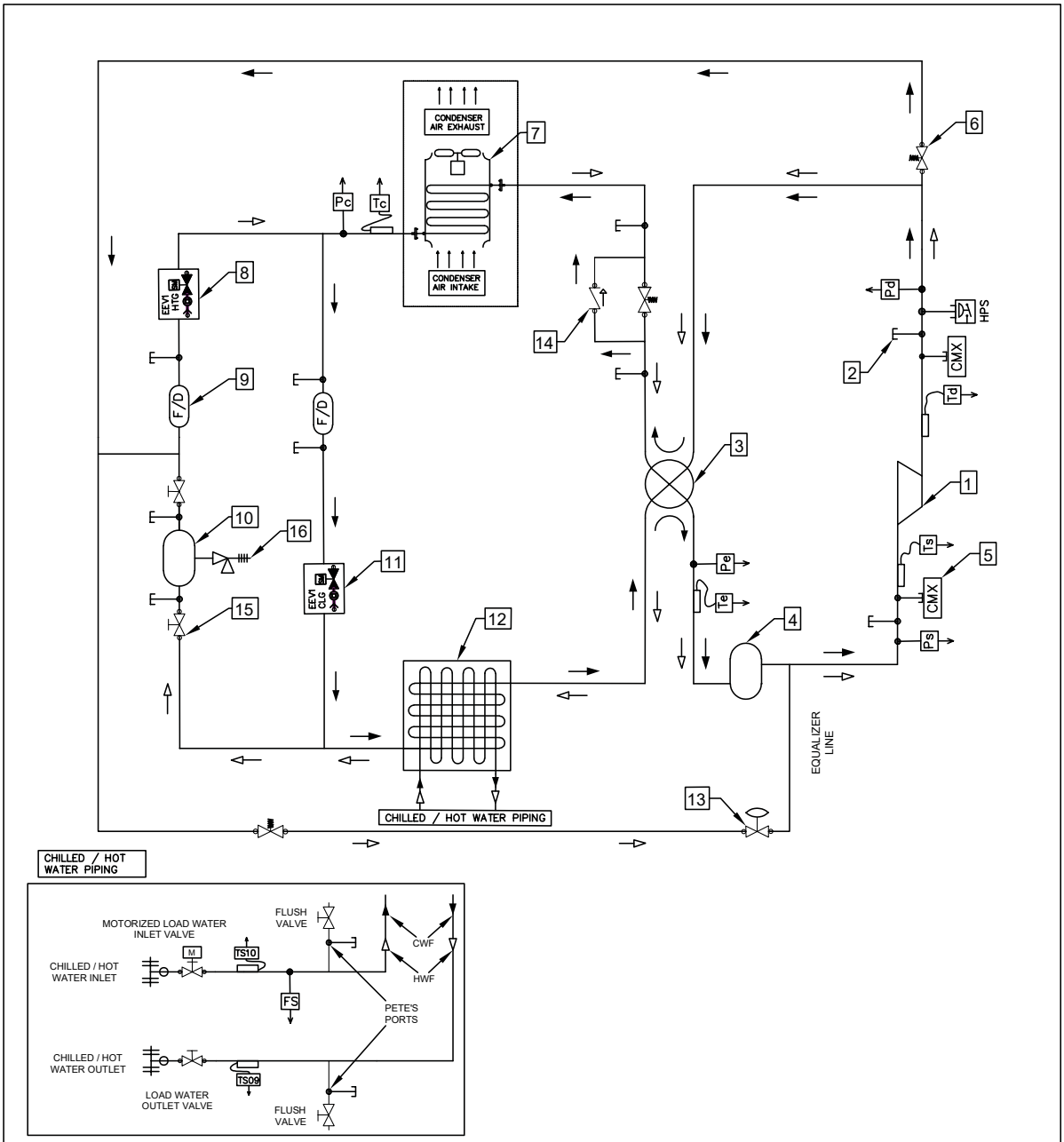
TITLE: REFRIGRATION CIRCUIT DIAGRAM (CIRCUIT #1 SHOWN)

DESCRIPTION: PACKAGED AIR - COOLED MODULAR COOLING ONLY CHILLER
CLIMACOOL MODEL # UAC (020/030/050/060)

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

REVISION BY: EA
DATE: AUG-2024
SHEET: 1 OF 1

REV: C



COMPONENT LEGEND

1. COMPRESSOR
2. PRESSURE ACCESS FITTING
3. REVERSING VALVE
4. SUCTION LINE ACCUMULATOR
5. COREMAX VALVE
6. SOLENOID VALVE
7. HEAT EXCHANGER
8. ELECTRONIC EXPANSION VALVE FOR HEATING
9. FILTER DRIER
10. LIQUID RECEIVER
11. ELECTRONIC EXPANSION VALVE FOR COOLING
12. HEAT EXCHANGER
13. LIQUID INJECTION TXV
14. CHECK VALVE
15. ISOLATION VALVE
16. PRESSURE RELIEF VALVE

ABBREVIATIONS

PRESSURE TRANSDUCER

Pe = ELECTRONIC EXPANSION VALVE
Ps = SUCTION
Pd = DISCHARE
Pc = COIL

TEMPERATURE SENSOR

Te = ELECTRONIC EXPANSION VALVE
Ts = SUCTION
Td = DISCHARGE
Tc = COIL
TS09 = WATER OUTLET
TS10 = WATER INLET

OTHERS

HPS = HIGH PRESSURE SWITCH
FS = FLOW SWITCH
CWF = CHILLED WATER FLOW
HWF = HOT WATER FLOW
= HEATING
= COOLING

CLIMACOOL®

TITLE: REFRIGERATION CIRCUIT DIAGRAM (CIRCUIT #1 SHOWN)

DESCRIPTION: PACKAGED AIR COOLED MODULAR HEAT PUMP CHILLER (2-PIPE)
CLIMACOOL MODEL # UAT(020/030/050/060)-HP

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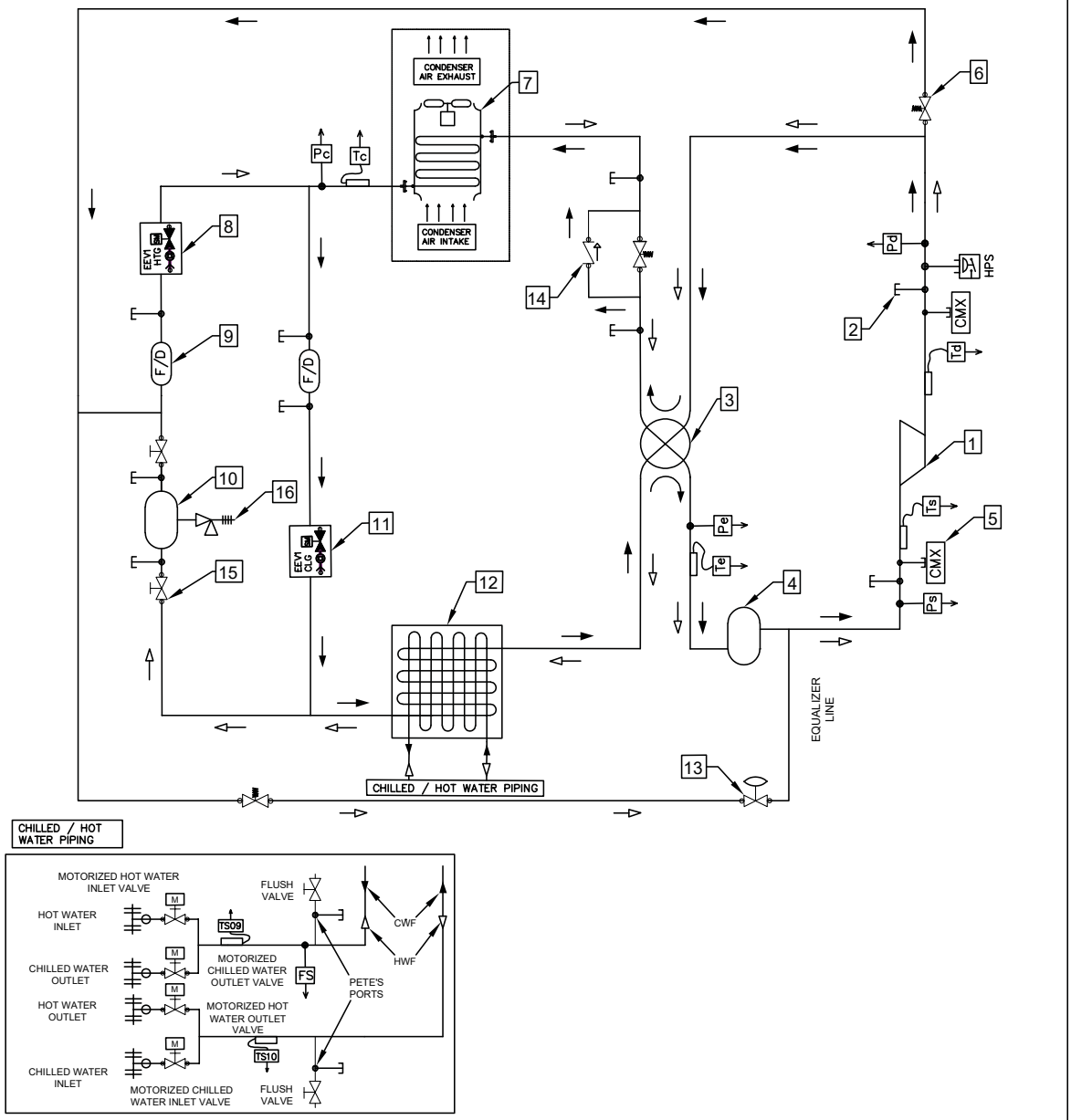
SCALE: -
DRAWN BY: CCC-ENG

REVISION BY: EA
DATE: AUG-2024
SHEET: 1 OF 1

REV: C



CHILLED / HOT WATER PIPING

COMPONENT LEGEND

1. COMPRESSOR
2. PRESSURE ACCESS FITTING
3. REVERSING VALVE
4. SUCTION LINE ACCUMULATOR
5. COREMAX VALVE
6. SOLENOID VALVE
7. HEAT EXCHANGER
8. ELECTRONIC EXPANSION VALVE FOR HEATING
9. HEATING FILTER DRIER
10. LIQUID RECEIVER
11. ELECTRONIC EXPANSION VALVE FOR COOLING
12. HEAT EXCHANGER
13. LIQUID INJECTION TXV
14. CHECK VALVE
15. ISOLATION VALVE
16. PRESSURE RELIEF VALVE

ABBREVIATIONS

PRESSURE TRANSDUCER

Pe = ELECTRONIC EXPANSION VALVE
Ps = SUCTION
Pd = DISCHARGE
Pc = COIL

TEMPERATURE SENSOR

Te = ELECTRONIC EXPANSION VALVE
Ts = SUCTION
Td = DISCHARGE
Tc = COIL
TS09 = WATER INLET
TS10 = WATER OUTLET

OTHERS

HPS = HIGH PRESSURE SWITCH
FS = FLOW SWITCH
CWF = CHILLED WATER FLOW
HWF = HOT WATER FLOW
→ = HEATING
← = COOLING

CLIMACOOL®

TITLE: REFRIGERATION CIRCUIT DIAGRAM (CIRCUIT #1 SHOWN)

DESCRIPTION: PACKAGED AIR COOLED MODULAR SHC HEAT PUMP CHILLER (4 PIPE)
CLIMACOOL MODEL # UAU(020/030/050/070)-SHC HP

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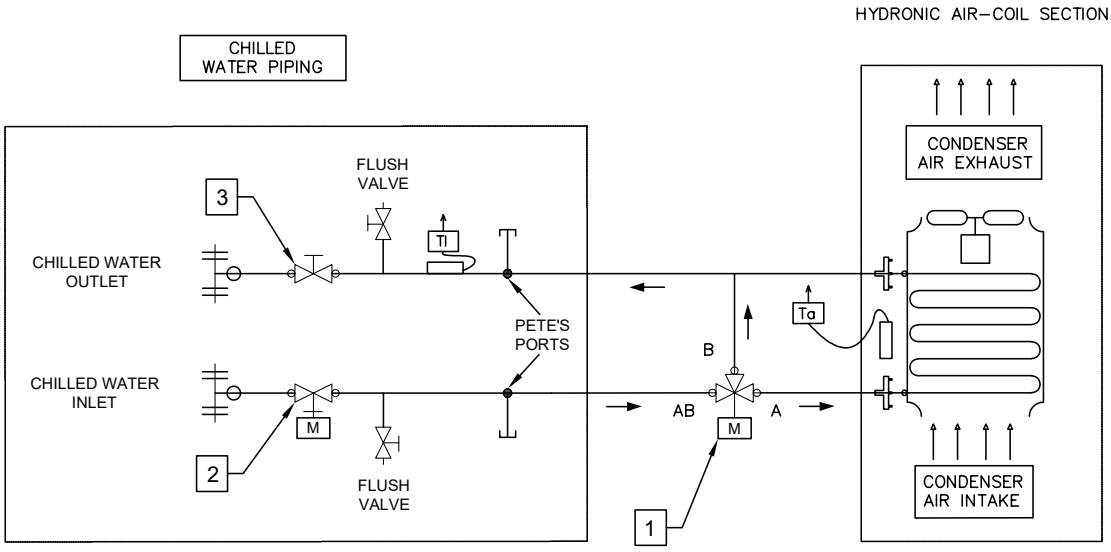
SCALE: -
DRAWN BY: CCC-ENG

REVISION BY: EA
DATE: JUN-2024
SHEET: 1 OF 1

REV: B



COMPONENT LEGEND

1. MOTORIZED 3 - POSITION WATER VALVE
2. MOTORIZED (ON/OFF) 2 - POSITION WATER VALVE
3. MANUAL WATER ISOLATION VALVE

ABBREVIATIONS

TEMPERATURE SENSOR

Ta = OUTSIDE AIR
TI = LEAVING CHILLED WATER

OTHERS

← = COOLING

NOTE

MOTORIZED (PROPORTIONAL) 3-POSITION WATER VALVE DETAIL:

AB-A: FULL FLOW TO HYDRONICS COIL, 10vdc control voltage to actuator
AB-B: BYPASS FLOW AROUND HYDRONICS COIL, 2vdc control voltage to acutator

CLIMACOOL®

TITLE: HYDRONICS CIRCUIT DIAGRAM (CIRCUIT #1 SHOWN)

DESCRIPTION: PACKAGED AIR COOLED MODULAR FREE COOL CHILLER MODEL # UAF (030/060)

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

REVISION BY: EA
DATE: JUN-2024
SHEET: 1 OF 1

REV: B

GENERAL

Factory-assembled and wired remote air cooled chiller. Chiller consists of two compressors, one evaporator, safety and operational controls. The modular remote air cooled chiller shall incorporate one or more modules with two independent refrigerant circuits. Modules shall be capable of independent operation powered by a field installed fused disconnect switch (or equivalent module circuit breaker) supplied by others, so that any one module can be shut down for repair without interrupting the remaining remote air cooled chiller modules in operation.

BASIC CONSTRUCTION

The frame design shall consist of heavy gauge galvanized steel with 3 mil powder coat paint finish baked at 350°F (176.67°C) for resilience in transport and installation and service access panels made of 18 gauge sheet metal with powder coat paint finish and quick release half turn latches. The module must have a low center of gravity, detachable schedule 40 carbon steel pipe water headers, designed to connect to adjacent modules through the use of 300 PSI rated grooved couplings, base with cutouts for forklifts or pallet jacks.

REFRIGERATION CIRCUIT

Each independent circuit shall consist of a scroll compressor, crankcase heater, and thermostatic expansion valve for refrigerant metering, sight glass, filter drier, solenoid valve, high and low pressure controls and safety controls. The modular chiller bank must be able to produce chilled water even in the event of a failure of one or more refrigerant circuits.

WATER-SIDE HEAT EXCHANGER

Each evaporator shall be dual-circuited, brazed plate heat exchangers constructed of stainless steel; UL Listed and Labeled. The evaporator heat exchanger shall be mounted to eliminate the effect of migration of refrigerant to the cold evaporation with consequent liquid slugging on start-up. The evaporator shall be mounted on two layers of noise attenuating rubber isolation pads which also acts as a thermal barrier. The evaporator shall be wrapped with ¾-inch closed cell insulated blanket and closed cell insulation shall be provided on suction side refrigerant tubing including refrigerant to chiller heat exchanger to prevent condensation.

AIR-SIDE HEAT EXCHANGER

Coils shall include aluminum fins mechanically bonded to enhanced copper tubes with integral subcooling circuits. Condenser fans shall be ultra-quiet, direct drive axial type with EC variable speed motors and integral head pressure control.

COMPRESSORS

Each module shall contain two scroll compressors independently circuited for redundancy. Each compressor shall be mounted with rubber isolated compressor mounts to the module base and each shall include compressor overload protection, high discharge pressure and low suction pressure cutouts.

MODULE CONTROLLERS

Module Controllers shall be provided for individual control as well as system integration. The control shall consist of a Cat 5e or higher Ethernet cable connected via home run back to the bank control panel. The packaged air cooled chiller control panel shall be a NEMA Type 3R enclosure including: power distribution block, compressor fusing, contactors, finger safe control fusing, transformer, isolation relays, status and alarm relay, 32-bit microprocessor bank controller with built in native Building Automation System (BAS) communication protocols, (BACnet), status indicating lights showing:

1. Compressor operation (on/off),
2. Unit alarm status,
3. Power on, two toggle switches to disable each individual compressor during start-up or troubleshooting.

COOLLOGIC TOUCH BANK CONTROLLER

The CoolLogic Touch Bank Controller shall be fully compatible with the Building Automation System via native BACnet communication. The microprocessor-based bank controller shall schedule the various compressors. A compressor run-time equalization sequence ensures an even distribution of compressor run time. A load limit control shall be available to limit the number of compressors that may be energized simultaneously. The CoolLogic Touch Bank Controller shall monitor and report the following for each refrigeration circuit in each module:

- Discharge pressure and temperature faults
- Suction pressure and temperature faults
- Low evaporator leaving chilled water temperature fault

The Bank Controller shall monitor and report the following system parameters for the chiller system:

- Chilled water entering and leaving temperature
- Evaporator water flow availability

Any module failure condition shall cause a system-fault indication at the Bank Controller and a shutdown of that compressor circuit by transferring the load requirements to the next available module. In the case of a "system fault," the entire chiller will be shut down. When any fault occurs, the Bank Controller shall record conditions at the time of fault and store the data for recall. This information shall be capable of recall through the Bank Controller interface and be displayed on the 10-inch (254 mm) touch-screen display. A history of faults shall be maintained, including the date and time of each fault (up to the last 100 occurrences). The Bank Controller monitors voltage/phase failure as well as internal leaving chilled-water reset control, which will ensure that the parallel evaporators are operated above the freezing point for part-load operation.

FACTORY TESTING

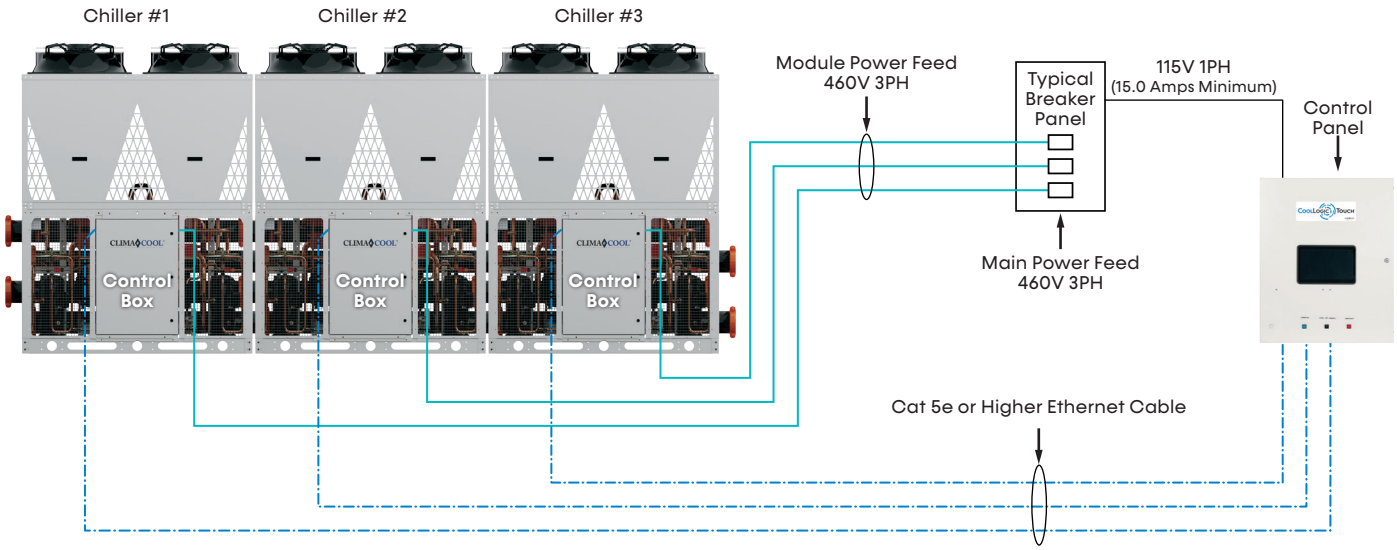
Each air-cooled chiller module shall be end-of-line tested before shipment.

Voltage Limitations		
The following voltage limitations are absolute and operation beyond these limitations may cause serious damage to the compressor.		
Nominal Voltage	**Minimum Voltage**	**Maximum Voltage**
208/230-3-60	187	253
460-3-60	414	506
575-3-60	518	632

ClimaCool Base Model	Voltage	Power Wiring per Module				
		Rated Load Amps	Min. Circuit Amps (MCA)	Max Fuse Size (MOP)	Max Breaker Size	Disconnect Switch Size
UACS20	208/230V-3PH-60Hz	103.6	113.9	125	150	150
	460V-3PH-60HZ	50.8	56.0	60	70	100
	575V-3PH-60Hz	40.6	44.8	50	60	60
UATS20 UAUS20	208/230V-3PH-60Hz	103.6	113.9	125	150	150
	460V-3PH-60HZ	50.8	56.0	60	70	100
	575V-3PH-60Hz	40.6	44.8	50	60	60
UACS30	208/230V-3PH-60Hz	148.1	164.0	175	225	200
	460V-3PH-60HZ	69.0	76.4	90	100	100
	575V-3PH-60Hz	51.8	57.3	60	70	100
UATS30 UAUS30	208/230V-3PH-60Hz	148.1	164.0	175	225	200
	460V-3PH-60HZ	69.0	76.4	90	100	100
	575V-3PH-60Hz	51.8	57.3	60	70	100
UACS50	460V-3PH-60HZ	100.4	110.8	125	150	200
	575V-3PH-60Hz	80.3	88.6	100	110	200
UATS50 UAUS50	460V-3PH-60HZ	100.4	110.8	125	150	200
	575V-3PH-60Hz	80.3	88.6	100	110	200
UACS60	460V-3PH-60HZ	121.9	135	150	175	200
	575V-3PH-60Hz	95.4	105.6	125	125	200
UATS60 UAUS60	460V-3PH-60HZ	121.9	135	150	175	200
	575V-3PH-60Hz	95.4	105.6	125	125	200
UAFS30	208/230V-3PH-60Hz	17.8	19.9	20	25	100
	460V-3PH-60HZ	8.0	9.0	15	15	100
	575V-3PH-60Hz	6.4	7.2	15	15	100
UAFS60	460V-3PH-60HZ	15.6	16.6	15	20	100
	575V-3PH-60Hz	12.5	13.3	15	15	100

NOTES:
1. RLA - Rated Load Amps are calculated as per UL1995.
2. MCA - Minimum Circuit Ampacity is: 125% of the RLA of the largest compressor motor plus 100% of the RLA of all other concurrent motors and/or electrical loads.
3. MOP - Maximum Overcurrent Protection or Max. Fuse Size is rounded down from: 225% of the RLA of the largest compressor motor plus 100% of the RLA of all other concurrent electrical loads.
4. Recommended Dual Element Fuse Sizing: Rounded up from 150% of the RLA of the largest compressor motor plus 100% of the RLA of all other concurrent electrical loads.
5. LRA - Locked Rotor Amps are instantaneous starting amperage per compressor.
6. Module internal wiring is per NEC.
7. MOP Device or Recommended Fusing Device for Module Power Wiring supplied by others. These are recommended values for electrical power protection of modules selected.
8. Disconnect Switch for Module Power Wiring supplied by others. These are recommended values for electrical power protection of modules selected.

Figure 27: Power Distribution Drawing



NOTES:

1. Communication wiring is home run set up with Cat 5e or higher Ethernet cable.
2. ClimaCool Standard Bank Package includes ship loose items: 1–CoolLogic Touch Control Panel, 1–DP Flow Sensor, 2–temperature sensors and wells, and 1–bypass header kit for each water loop. These items are to be installed, powered, and control wired in the field by others.
3. Control wiring is by others using Ethernet cables and home run connections between the bank controller and the modules.
4. Disconnects NOT included.

Date	Item	Action
09/01/24	First Published	

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