





# AIR-SOURCE MODULAR CHILLERS PRODUCT CATALOG

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Chillers, Heat Pumps, SHC Heat Pumps, & Free Cooling UA Models: 20-60 Tons | 60 Hz – R-454B





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# Introduction



# 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!** 

### **Features and Benefits**

### Compact

Small footprint reduces installation cost and restrictions on placement.

### CoolLogic Touch™ Control System



The CoolLogic Touch Control System 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 Control System governs all toplevel 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<sup>®</sup> 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<sup>®</sup> CATEGORIES SATISFIED BY CLIMACOOL SYSTEMS:

# Enhanced Commissioning and Measurement and Verification

CoolLogic Touch Control System 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.

### **Features and Benefits**





### **AIR-SOURCE CHILLERS 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. 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:
    - 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:
    - o 83.8" w x 112.5" h x 80.5" d
    - (212.85 cm x 285.65 cm x 204.47 cm)

### **AIR-SOURCE HEAT PUMPS UAT**

Designed to provide a quiet, serviceable and extremely efficient system that will offer years of reliable operation. Includes high-efficiency, variablespeed EC condenser fans with integral headpressure 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:
    - o 83.8" w x 112.5" h x 80.5" d
    - (212.85 cm x 285.65 cm x 204.47 cm)

## Features and Benefits UA Models



### **AIR-SOURCE SHC HEAT PUMPS UAU**

The SHC onDEMAND system eliminates the need to have separate equipment for heating, cooling, and heat recovery while saving installation costs, reducing the physical footprint and overall operating costs. Includes high-efficiency, variable-speed EC condenser fans with integral head-pressure control and acoustical design providing low operating-noise levels.

- **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:
    - 0 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** 



### UA Models

### 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 Control System 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





ASSEMBLED VIEW

ASSEMBLED VIEW

### Figure 5: Bank with modules ON and header bypass CLOSED



### 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 6: True Wet-to-Wet Differential Pressure Transducer: With 3-Valve Manifold Assembly

2.15





### 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 7: Flow Switch**



### **TEMPERATURE SENSORS**

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

### Figure 8: Well Temperature Sensor Kit



D. 19B001N01 Conduit Box

### Automatic CS Series Strainer Package

Field installed, high quality, low maintenance stainless steel filtration systems with 60- or 80- mesh (minimum 40-mesh required) 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 9: 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 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

### **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 13: Pressure Differential Alarm (PDA) Option



- 110 Volt/12 Vold DC Wall
  - K. PSID Low
    - with Alarm Red & Black)
- F. Cover-Plate (4) in Corners of Box (DO NOT REMOVE)
- G. Alarm Reset Button

D. Pressure Differential Switch-Gauge

E. Differential Setpoint

Contact

Transformer L. AUX Contacts (On or Off M. PSID High

### **Manual Strainers**

Field installed to utilize Y-style and basket strainers of cast iron 200 psi or carbon 275 psi with 40-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 14: WYE Strainer - Flanged Ends



Figure 15: Installed Basket Strainer with Bolted Cover Basket Strainer Cover **Pipeline Flow Basket Strainer Screen** 

### **Free Cooling Modules**

Directly couples to chiller bank. Includes: freecooling 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

### SHC Heat Pump (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 8 modules when mounted back-to-back (4 end-to-end) on a single skid.

### Sound Blankets

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

### **Table 1: Sound Reduction Table**



— No Blanket — Deluxe

### **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 system 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 Control System.

# **Additional Options**

### **Power Distribution Panel**

The ship-loose bank power distribution panel (PDP) can be provided with 5- or 65-KA SCCR. The PDP 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 PDP option also includes a single-phase 120V transformer for the CoolLogic Touch Control System.

### Figure 16: 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.





 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.

Conductive Core

- Incorporate rugged, non-metallic construction rated for IP66/NEMA 4X.
- Designed with corrosion-resistant, anti-static enclosures and components.

### Figure 18: Power Connection Kit





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



#### COMPRESSOR

S = Standard<sup>1</sup>

 $T = VFD Lead^{1}$ 

N = No Compressor for UAF<sup>2</sup>

1. Option not available for Free Cooling applications

2. Option required on Free Cooling applications 3. Option not available for 50 or 60 Ton modules

Option not available for 20 or 30 Ton modules 4.

5.

Option only available for Cooling Only and Heat Pump applications

6. Option not available for 575V-3Ph-60Hz Continued on next page.



1. Option only available for Cooling Only applications

Option not available for Free Cooling applications
 Digit 29 is used to indicate a unit special that does not fall into any other model key digits, e.g. paint color

# Physical Data Small Cabinet (20-30T) – IP

**UA Models** 

MadalUA	Chille	rs UAC	Heat Pu	mps UAT	SHC <sup>1</sup> Heat	Pumps UAU	Free Cooling UAF
Model UA	20	30	20	30	20	30	30
Refrigerant Circuits (quantity)	2	2	2	2	2	2	-
Compressor Type	SC	roll	SC	roll	SC	roll	-
Compressor Quantity	2	2	2	2	2	2	-
Refrigerant Charge 454B (Ib)	54	55	54	55	54	55	-
Module Operating Weight w/Water (lb) <sup>2</sup>	2,849	2,849	2,657	2,849	3,014	3,014	2,318
Module Shipping Weight (lb) <sup>3</sup>	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
Quantity	2	2	2	2	2	2	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)	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	Alum	ninum	Alum	ninum	Alum	inum	Aluminum
Tube Material	Сор	oper	Cop	oper	Cop	oper	Copper
Dimensions – in. (quantity)	36.00 x 4	44.00 (4)	36.00 x 4	44.00 (4)	36.00 x 4	44.00 (4)	42.50 x 32.25 (4)
Water-side Heat Exchanger	20	30	20	30	20	30	30
Heat Exchanger (type)	Brazed	d Plate	Brazed	d Plate	Brazeo	d 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	22.205
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.) <sup>4</sup>	6	6	6	6	6	6	6

### Table 2: UA Series (Imperial Units)

NOTES:

SHC - Simultaneous Heating and Cooling. Module operational weight includes water, compressor oil, and refrigerant charge. Multiply times the number of modules for a total system operational weight. Unit shipping weight includes refrigerant charge, compressor oil and packaging; based on transportation. 1. 2.

3.

4. Main header water/fluid connections are ASME, 6-inch scheduled 40 pipe with grooved couplings, 300 psig maximum working pressure.

5. Free Cool volume includes all four hydronic coils

### **Table Continued on Next Page**

# Physical Data Large Cabinet (50-60T) – IP

**UA Models** 

Madel IIA	Chille	rs UAC	Heat Pu	mps UAT	SHC <sup>1</sup> Heat	Pumps UAU	Free Cooling UAF
Model UA	50	60	50	60	50	60	60
Refrigerant Circuits (quantity)	2	2	2	2	2	2	-
Compressor Type	SC	roll	sc	roll	sc	roll	-
Compressor Quantity	2	2	2	2	2	2	-
Refrigerant Charge 454B (Ib)	114	120	114	120	114	120	-
Module Operating Weight w/Water (lb) <sup>2</sup>	4,921	5,130	4,921	5,130	5,647	5,856	4,636
Module Shipping Weight (Ib) <sup>3</sup>	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.
Quantity	4	4	4	4	4	4	4
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	Alum	ninum	Alum	ninum	Alum	ninum	Aluminum
Tube Material	Cop	oper	Cop	oper	Cop	oper	Copper
Dimensions – in. (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	d Plate	Brazed	d Plate	Brazeo	d 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	44.445
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.) <sup>4</sup>	6 or 8	6 or 8	6 or 8	6 or 8	6 or 8	6 or 8	6 or 8

### **Table Continued from Previous Page**

NOTES:

1. 2. 3. SHC - Simultaneous Heating and Cooling. Module operational weight includes water, compressor oil, and refrigerant charge. Multiply times the number of modules for a total system operational weight. Unit shipping weight includes refrigerant charge, compressor oil and packaging; based on transportation.

4. Main header water/fluid connections are ASME, 6-inch scheduled 40 pipe with grooved couplings, 300 psig maximum working pressure.

5. Free Cool volume includes all four hydronic coils

# Physical Data Small Cabinet (20-30T) – SI

**UA Models** 

### Table 3: UA Series (Metric Units)

	Chille	rs UAC	Heat Pu	mps UAT	SHC <sup>1</sup> Heat	Pumps UAU	Free Cooling UAF
Model UA	20	30	20	30	20	30	30
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	-
Refrigerant Charge 454B (kg)	24.49	24.95	22.68	24.49	22.68	24.49	-
Module Operating Weight w/Water (kg) <sup>2</sup>	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) <sup>3</sup>	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.
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 (m³s per fan)	4.96	4.96	4.96	4.96	4.96	4.96	4.96
Nominal Airflow (total m <sup>3</sup> s)	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	Alum	ninum	Alum	ninum	Alum	ninum	Aluminum
Tube Material	Сор	oper	Cop	oper	Cop	oper	Copper
Dimensions – cm (quantity)	91.44 x 1	11.80 (4)	91.44 x 1	11.80 (4)	91.44 x 1	11.80 (4)	108.00 x 81.92 (4)
Water-side Heat Exchanger	20	30	20	30	20	30	30
Heat Exchanger (type)	Brazed	d Plate	Brazeo	d Plate	Brazeo	d 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	84.15
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) <sup>4</sup>	15.24	15.24	15.24	15.24	15.24	15.24	15.24

NOTES:

1. 2. 3. SHC - Simultaneous Heating and Cooling. Module operational weight includes water, compressor oil, and refrigerant charge. Multiply times the number of modules for a total system operational weight. Unit shipping weight includes refrigerant charge, compressor oil and packaging; based on transportation.

4. Main header water/fluid connections are ASME, 15.24 cm scheduled 40 pipe with grooved couplings, 2068.43 kPa maximum working pressure.

5. Free Cool volume includes all four hydronic coils.

### **Table Continued on Next Page**

# Physical Data Large Cabinet (50-60T) – SI

UA Models

	Chille	rs UAC	Heat Pu	mps UAT	SHC <sup>1</sup> Heat	Pumps UAU	Free Cooling <sup>3</sup> UAF
ModelUA	50	60	50	60	50	60	60
Refrigerant Circuits (quantity)	2	2	2	2	2	2	-
Compressor Type	SC	roll	SC	roll	SC	roll	-
Compressor Quantity	2	2	2	2	2	2	-
Refrigerant Charge 454B (kg)	51.71	54.43	51.71	54.43	51.71	54.43	-
Module Operating Weight w/Water (kg) <sup>2</sup>	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) <sup>3</sup>	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.
Quantity	4	4	4	4	4	4	4
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 (m³s per fan)	4.96	4.96	4.96	4.96	4.96	4.96	4.96
Nominal Airflow (total m <sup>3</sup> s)	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	Alum	iinum	Alum	ninum	Alum	ninum	Aluminum
Tube Material	Сор	oper	Cop	oper	Cop	oper	Copper
Dimensions – cm (quantity)	91.44 x 1	11.80 (4)	91.44 x 1	11.80 (4)	91.44 x 1	11.80 (4)	108.00 x 81.92 (4)
Water-side Heat Exchanger	50	60	50	60	50	60	60
Heat Exchanger (type)	Brazeo	d Plate	Brazeo	d Plate	Brazeo	d 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	84.15
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) <sup>4</sup>	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

### **Table Continued from Previous Page**

NOTES:

SHC - Simultaneous Heating and Cooling. 1.

2. Module operational weight includes water, compressor oil, and refrigerant charge. Multiply times the number of modules for a total system operational weight.

3.

Unit shipping weight includes refrigerant charge, compressor oil and packaging; based on transportation. Main header water/fluid connections are ASME, 15.24 cm scheduled 40 pipe with grooved couplings, 2068.43 kPa maximum working pressure. Free Cool volume includes all 4 hydronic coils. 4. 5.

### 2-Pipe, 20-30 Ton, Chillers UAC & Heat Pumps UAT



Model UAT & UAC	Voltages	Frame Width >	Unit Height 🛛	Frame O Height O	Unit Depth	Header <sub>M</sub> Location	Header <sub>4</sub> Location	Header O Location	Unit Width 🛪	Header 7 Inset 7	Header S Extrusion	Depth Z with VFD Z	VFD Depth	Header D Connection
20	208-3-60	83.75	112.46	101.22	39.75	5.88	11.31	22.31	93.44	4.09	4.84	55.65	15.90	6.00
30	460-3-60	[212.73]	[285.65]	[257.10]	[100.97]	[14.94]	[28.73]	[56.68]	[237.34]	[10.39]	[12.29]	[141.35]	[40.39]	[15.24]

NOTES:

1. Measurement only applies to units with VFD

• Dimensions shown in inches [centimeters].

Kick guard removed for clarity.

### 2-Pipe, 50-60 Ton, Chillers UAC & Heat Pumps UAT



• Dimensions shown in inches [centimeters]

• Kick guard removed for clarity.

### 4-Pipe, 20 & 30 Ton, SHC Heat Pumps UAU



Model UAU	Voltages	Frame Width >	Unit Height 🛛	Frame O Height O	Unit Depth 🛛	Header <sub>M</sub> Location	Header <sub>4</sub> Location	Header O Location	Header H Location	Header L Location	Unit Width 🛪	Header 7 Inset 7	Header S Extrusion	Depth Z with VFD	VFD Depth	Header D Connection
20	208-3-60	83.75	112.46	101.22	39.75	5.88	11.31	22.31	33.31	44.31	93.44	4.09	4.84	55.65	15.90	6.00
30	460-3-60	[212.73]	[285.65]	[257.10]	[100.97]	[14.94]	[28.73]	[56.68]	[84.61]	[112.55]	[237.34]	[10.39]	[12.29]	[141.35]	[40.39]	[15.24]

#### NOTES:

Measurement only applies to units with VFD

• Dimensions shown in inches [centimeters].

Kick guard removed for clarity.

### 4-Pipe, 50 & 60 Ton, SHC Heat Pumps UAU



• Dimensions shown in inches [centimeters]

• Kick guard removed for clarity.

### 2-Pipe, 30 Ton, Free Cooling UAF



SIDE ELEVATION

FRONT ELEVATION

Model UAF	Voltages	Frame Width >	Unit Height 🐱	Frame O Height O	Unit Depth	Header <sub>M</sub> Location	Header <sub>4</sub> Location	Header O Location	Unit Width 🛪	Header Inset 7	Header S Extrusion	Header D Connection
30	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]

NOTES:

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

# Dimensional Data and Drawings UA Models

### 2-Pipe, 60 Ton, Free Cooling UAF



**UA Models** 

### Figure 19: Field Piping Direct Return – 1 to 5 Modules







### NOTES:

- 1. 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.
- 4. Refer to Dimensional Data and Drawings for water header inlet/outlet dimensions.
- 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, 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 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 the bank.
- 11. For more than twelve (12) modules, two (2) CoolLogic Touch control systems are required. Please consult the factory.

### Hydronics UA Models

#### Figure 21: 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 22: 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 23: 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 24: 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 Treatment & Temperature Requirements

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 <sub>3</sub> Alkalinity	30 - 500 mg/l
CaCO <sub>3</sub> Hardness	30 - 500 mg/l
Chlorides	Less than 200 mg/l
Chlorine (free)	Less than 0.5 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
рН	7.0 - 9.0
Sulphate	Less than 200 mg/l

### 

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 <sup>4</sup>	Maximum LWT⁴
Chilled Water	20°F [-6.67°C]1	65°F [18.33°C]
Hot Water	65°F [18.33°C]	140°F [60.00°C]

NOTES: 1. Operating in ambient temperatures below 36°F (2.2°F) requires suitable freeze restances

protection. 2. All modules can operate in this range without the need of special controls.

 A glycol solution additive is required at lower operating suction temperatures (water temperatures below 40°F [4.44°C]) in order to protect the heat exchanger from freeze-ups.

4. LWT: Leaving Water Temperature.

5. When the chiller is exposed to ambient temperatures of 36°F (2.2 °C) or below, freeze protection is required using heat trace or an inhibited ethylene or propylene glycol solution. 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.

### 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	S			
Cooling Mode	20	30	50	60
Minimum Load Water Flow – gpm [m3/min] <sup>1</sup>	25 [0.09]	38 [0.14]	45 [0.17]	57 [0.22]
Maximum Load Water Flow – gpm [m3/min] <sup>1</sup>	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] <sup>5</sup>	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] <sup>6</sup>	20 [-6.67]	20 [-6.67]	20 [-6.67]	20 [-6.67]
Maximum Entering Condenser Air Temperature – °F [°C] <sup>3</sup>	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] <sup>1</sup>	22 [0.08]	23 [0.09]	48 [0.18]	47 [0.18]
Maximum Load Water Flow – gpm [m3/min] <sup>1</sup>	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 Chillers				
Cooling Mode	20	30	50	60
Minimum Load Water Flow – gpm [m3/min] <sup>1</sup>	25 [0.09]	38 [0.14]	45 [0.17]	57 [0.22]
Maximum Load Water Flow – gpm [m3/min] <sup>1</sup>	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) – ${}^{\circ}F$ [ ${}^{\circ}C$ ] <sup>5</sup>	40 [4.44]	40 [4.44]	40 [4.44]	40 [4.44]
Minimum Leaving Chilled Water Temperature (with Glycol) – $^{\circ}F$ [ $^{\circ}C$ ]	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] <sup>3</sup>	120 [48.89]	120 [48.89]	120 [48.89]	120 [48.89]

NOTES:

Minimum flows are based on maximum ΔT's and Maximum flows are based on minimum ΔT's. Operating in ambient temperatures below 36°F (2.22°C) requires a suitable antifreeze solution. Operating in ambient temperatures above 115°F (46.11°C) requires a suitable sunshade. 1.

2.

3.

4. 5.

If project operating parameters are needed outside of the above values, please contact your local sales representative. Each refrigerant circuit is capable of providing reliable operation down to 20°F [-6.67°C] ambient with proper freeze protection. Contact factory for performance down to 0°F ambient

6.

### Refrigeration Circuit Diagram Chillers UAC

UA Models



# Refrigeration Circuit Diagram Heat Pumps UAT





## Refrigeration Circuit Diagram SHC Heat Pumps UAU





### Refrigeration Circuit Diagram Free Cooling UAF

UA Models



### GENERAL

Furnish ClimaCool UA Air-Source Modular Chillers as indicated on the plans. Equipment shall be completely assembled, piped, and internally wired–capacities and characteristics as listed in the schedule and the following specifications.

Units shall be supplied entirely factory-built, capable of operating over an outdoor air temperature range from 20° to 120°F (-6.7° to 48.9°C) for cooling mode, 17° to 100°F (-8.5° to 37.8°C) for heating mode as standard. All equipment listed in this section must be rated and certified per the Air-Conditioning, Heating, and Refrigeration Institute (ASHRAE 550/590) regulations. All equipment must be tested, investigated, and determined to comply with the requirements of the standards for Heating and Cooling Equipment UL 60335-2-40 4th Edition, UL 60335-1 6th Edition for the United States and Can/CSA C22.2 No. 60335-2-40:22, CAN/CSA C22.2 No 60335-1:16 for Canada, by Intertek Testing Laboratories (ETL). The units shall have AHRI and ETL-US-C labels.

All units shall pass a factory acceptance test. The quality control system shall automatically perform the factory acceptance test on a computer.

Note: If a unit fails the factory acceptance test, it shall not be allowed to ship.

### **UNIT DESCRIPTION**

Factory-assembled and wired air-cooled water chiller. The chiller shall incorporate scroll compressors and consist of multiple refrigerant circuits. Each module contains a high-efficiency, dual-circuited, type 316 stainless-steel brazed-plate evaporator. Each refrigerant circuit includes a scroll compressor, reversing valve (for UAT and UAU modules only), electronic expansion valve, sight glass, filter drier, crankcase heater, and operating and safety controls. Each circuit is independent from other circuits in terms of both refrigeration and electrical redundancy. The evaporator, air-cooled condenser, chilled water piping, chilled water headers, hot water headers, and all low-temperature refrigerant tubing shall be wrapped with closed-cell insulation (NBR closed cell foam, <sup>3</sup>/<sub>4</sub>-inch thick, and 3.0 R-value) to prevent condensation. All operating components for each

module, including compressors, heat exchangers, piping, and controls, shall be securely fastened to a unitized heavy-gauge steel frame with an electrostatically applied powder and oven-baked enamel finish (1000 hr. rating per ASTM B117-97). Compressor motor contactors, control transformer, and primary and secondary fuses are in the control panel. Each chiller module has two (2) equal steps of control (100%, 50%, and off) by cycling off the equally sized compressors. All electrical controls, contactors, and relays for each module shall be mounted within that module and be of the low-voltage type.

Headers—Each module shall include supply and return mains for chilled and hot water. For interconnection to 6-inch standard piping with grooved couplings and end caps, grooved end connections are provided.

The multiple-module chiller shall be capable of producing chilled and/or hot water even if one or more refrigerant circuits fail.

### **OPERATION**

### Straight Cool (UAC)

Each refrigerant circuit shall use R-454B and include an electronic expansion valve and an accumulator. Two (2) headers shall be provided-supply and return for the cooling loop. Motorized isolation valves shall be provided with ¾-inch flush port connections-two (2) motorized proportional valves shall be provided between the evaporator and chilled supply and return headers. The whole bank is in cooling mode.

### Air Source Heat Pump (UAT)

Each refrigerant circuit shall use R-454B and include a reversing valve, an electronic expansion valve, and an accumulator. Controls shall consist of a variable flow defrost cycle controlled by head and suction pressure. Two (2) headers shall be provided–supply/ return for the heating/cooling loop. Motorized isolation valves shall be provided with <sup>3</sup>/<sub>4</sub>-inch flush port connections–two (2) motorized proportional valves shall be provided between the evaporator and shared chilled/hot water supply and return headers. The whole bank is either in cooling or heating mode.

### SHC Heat Pump (UAU)

Each refrigerant circuit shall use R-454B and include a reversing valve, an electronic expansion valve, and an accumulator. Controls shall consist of a variable flow defrost cycle controlled by head and suction pressure. Four (4) headers shall be provided– supply/return for the heating loop and supply/return for the cooling loop. Motorized isolation valves shall be provided with ¾-inch flush port connections – four (4) motorized proportional valves shall be provided between the evaporator and heating and cooling supply and return headers. CoolLogic Touch Control System will index modules to heating or cooling based on building load requirements, leaving hot and chilled water set points.

### **BASIC CONSTRUCTION**

The frame design shall consist of heavy-gauge galvanized steel with a 3 mm powder coat paint finish baked at 350° for resilience in transport and installation. The module must have a low center of gravity and schedule 40 carbon-steel pipe water headers, each insulated with <sup>3</sup>/<sub>4</sub>-inch closed cell insulation. The headers are designed to connect to adjacent modules through 300-psi-rated grooved couplings, and the base has cutouts for forklift or pallet jack.

### WATER-SIDE HEAT EXCHANGER

The evaporator shall be dual-circuited, brazed plate heat exchangers constructed of stainless steel; UL listed and labeled.

Evaporator brazed-plate heat exchangers shall have a waterside flush connection with a ball valve on each module to permit back flushing or cleaning of the heat exchanger without removing chiller headers or other in-place components.

### **AIR-SIDE HEAT EXCHANGER**

Coils shall include aluminum fins mechanically bonded to enhanced copper tubes and be rated for 650 psig (4,481 kPa). Cooling-only equipment will also include integral subcooling circuits. Condenser fans shall be ultra-quiet, direct-drive axial type with EC variable-speed motors.

### COMPRESSORS

The unit shall contain two hermetic scroll compressors independently circuited with internal isolation mounted with rubber-in-shear isolators. Each compressor system includes high discharge pressure manual reset safety cut-out. Each compressor system includes low suction pressure safety cut-out. The compressors are direct-drive, hermetic, 3600 rpm (@ 60Hz), fixed-compression scroll compressors. Each compressor has an integral centrifugal oil pump, oil level sight glass, oil charging valve, and an internal check valve on the scroll discharge port. The motor is suction gascooled, hermetically sealed, two-pole, squirrel cage induction type.

### FACTORY INSULATED SURFACES

All internal water piping and refrigeration piping (except discharge line), cooling and heating headers, and load heat exchangers are factory insulated with NBR closed cell foam, <sup>3</sup>/<sub>4</sub>-inch thick, and 3.0 R-value.

### STARTER/CONTROL PANEL

Module controls shall be provided for individual control as well as system integration. Field-provided & installed home run STP Cat 6 cabling connections will allow communication between modules and the CoolLogic Touch Control System. Weatherproof NEMA 4 enclosure panel shall consist of a power distribution block, control transformer, compressor and condenser fan contactors and fusing, isolation relays, microprocessor control, and two toggle switches to turn off each compressor during startup or troubleshooting. The panel shall swing out for complete access to internal components for servicing.

# Engineering Specifications

### WEATHERPROOF BANK CONTROL PANEL

- The Bank Control System (CoolLogic Touch) shall be fully compatible with the Building Automation System via native BACnet communication. The control system provides advanced algorithms for maintaining precise chilled and hot water temperatures. The bank microprocessor-based controller shall schedule the various compressors. A module/compressor run time equalization sequence ensures an even distribution of module/compressor run time. A load-limit control shall be available to limit the number of compressors that can be energized at any time.
- 2. Multiple-Module Chillers
  - Each chiller shall be equipped with a dedicated standalone direct digital control (DDC) system, including a bank control system and display, which shall perform the numerous functions discussed in this section. The LCD shall access all chiller operations and computer features. A BAS interface shall be provided for BACnet communication.
  - An RS485 port shall be provided for optional remote Windows-based monitoring and control software via hardwire or telephone modem.
  - Each module control panel shall communicate with the bank controller via STP Cat 6 or higher ethernet cable connected via homerun back to the control panel. The module control panel shall monitor and control each refrigeration system in response to commands by the bank controller. The bank controller shall have a terminal strip to accept field-wired low-voltage system interlocks such as flow switches, remote start/stop, standard alarm output, etc. The unit manufacturer shall provide the bank controller and field mounted in the equipment room by others.

3. Safeguarding Operation of Refrigeration System

**UA Models** 

- Each module is equipped to control all alarm and fault conditions, protect the compressor, and provide feedback input and output conditions to the bank controller to monitor individual chiller module status. The bank controller shall continually monitor all the following areas for each module's refrigeration circuit, including:
  - High discharge pressure cutout.
  - Low suction pressure cutout.
  - Suction pressure via pressure transducers.
  - Discharge pressure via pressure transducers.
  - Solid-state compressor motor protection.
  - Leaving chilled water temperature (for module freeze protection).
  - Leaving hot water temperature (for module protection).
  - Phase loss (each phase), phase imbalance, phase reversal, and over-/ under-voltage protection.
- The bank controller shall additionally monitor the following bank-level inputs:
  - Leaving chilled water temperature (for capacity control).
  - Entering chilled water temperature.
  - Leaving hot water temperature (for capacity control).
  - Entering hot-water temperature.
  - Entering source temperature.
  - Leaving source temperature.
  - Chilled water flow status.
  - Heating water flow status.
  - Source water flow status.

- A potentially unsafe (out of tolerance) condition from any of these controls or sensors shall cause a "fault" shutdown of that compressor with an automatic transfer of load requirements to another available compressor. A running history of the complete fault occurrence conditions shall be automatically maintained. All details will be retained for the last ten failures, should they be needed for troubleshooting.
- Continuous individual monitoring of leaving chilled water temperature from each module's refrigeration system shall protect against freeze-up in the event of unusual, unexpected operating conditions.
- The bank controller must lead/lag the dual scroll 4. compressors, balance the run time, prevent short cycling of compressors, and register all failure occurrences in the last 30 days. Fault conditions must alarm so the compressor can be taken offline. Alarmed and failed conditions must be displayed on a digital display on the front of the bank control panel. An alarm relay must be supplied to indicate faults remotely and failed conditions with a normally open and normally closed dry contact. The Bank Control System must be able to be controlled by and monitored by the central BAS. The chilled and hot water temperature operating control must be reset remotely with a 4-20ma input signal. Staging of the scroll compressors, lead/lag of the compressors, equalizing the runtime of compressors, and preventing compressor short cycling will be done by the bank controller. Compressor staging is accomplished through PID control logic, which adjusts response times and settings for chilled and hot water control. The system shall provide for variable time between compressor sequencing and temperature sensing. Inputs/Outputs to the Bank Control System include:
  - Remote Start/Stop.
  - Chiller Failure Output Each module will indicate its failure at the chiller. The "Chiller Failure" indication is a remote signal sent remotely to indicate that the chiller has had sufficient modules fail that operation of the

chiller will not be beneficial. This failure signal shall be capable of adjusting to provide a failure signal according to the percentage of failed capacity.

- Chilled Water Flow Status (via differential pressure transducer, provided by chiller manufacturer and field installed by others).
- Hot Water Flow Status (via differential pressure transducer, provided by chiller manufacturer and field installed by others).
- Source Water Flow Status (via differential pressure transducer, provided by chiller manufacturer and field installed by others)
- Four (4) temperature sensors and thermal wells shall be provided with the chiller for others to field install and wire to the bank control panel. These sensors monitor the load's entering and leaving water temperatures and source water connected to the chiller bank.
- BAS Interface BACnet interface shall be provided for communication to the Building Automation System

### **POWER CONNECTIONS**

Each module shall have its electrical power panel mounted to the unit frame. Each module will be independently powered by a field-installed fused disconnect switch or equivalent module circuit breaker (supplied by others) so that any module can be shut down for repair without interrupting the remaining chiller modules' operation. The panel shall swing out for complete access to internal components for servicing. The power panel for each module shall contain:

- 1. Main input terminal block
- 2. Compressor motor contractors
- 3. Motor overload protection per compressor
- 4. Individual compressor motor fusing or breakers
- 5. Local manual "ON" / "OFF" compressor switch to allow service or repair to individual modules and compressors without interrupting service of the entire chiller.

ClimaCool works continually to improve its products. As a result, the design and specifications of each product at the time of order may be changed without notice and may not be as described herein. Please contact ClimaCool's Customer Service Department at 405-815-3000 for specific information on the current design and specifications. Statements and other information contained herein are not express warranties and do not form the basis of any bargain between the parties, but are merely ClimaCool's opinion or commendation of its products. The latest version of this document is available at www.climacoolcorp.com.

# Engineering Specifications

### WATER ISOLATION VALVES

Motorized Water Isolation/Regulating Valves for Evaporator and Condenser

Each chiller module shall include standard factoryinstalled motorized isolation valves in the chilled water branch line to the module's evaporator and a manual valve from the evaporator for heat exchanger isolation.

Modulating valves shall have built-in water regulation and control to maintain proper module head pressure.

### **MODEL CONFIGURATION OPTIONS**

- Option: 8-inch Headers: 6-inch Headers are standard for all models thru 60-ton. 8-inch headers are available for 50+ ton modules.
- Option: 65 kA SCCR: The maximum short-circuit current level the chiller can withstand is 65 kA. An external, field-installed circuit breaker or fuse must be installed upstream of the chiller.
- Option: 'Auto Stand Alone': The chiller module will continue to operate if the Bank Control System loses communication with it or if a critical sensor fails. Auto Stand Alone allows the chiller module to be switched into manual mode, automatically keeping the chiller online until the errors of the Bank Control System can be resolved.
- Option: Air-Cooled Coil Protection: The air-cooled coil is coated with a harsh environmental coating that is NSF-51 certified and can withstand 6000+ salt spray hours, per ASTM G85 A3.
- Option: Heat Trace: This option protects all wetted components in the equipment to be protected down to X ambient. The selfregulating heat trace cable is factory-applied to HXs, copper pipe, and headers. The heat trace cable requires one field-provided 120/1 emergency power connection per unit.

- Option: Header End Caps: Header Bank End Cap Kit – 2 Per Bank
- Option: Module Touchscreen: Each chiller module has a smaller touchscreen installed in addition to standard CoolLogic Touch Control System controls.
- Option: Sound Blankets: Sound Blankets for compressors to lower noise levels.

### FIELD-INSTALLED OPTIONS

- Option: Bypass Header Kit (BHK): The bypass header kit (BHK) is shipped loose for field installation and wiring by others. The CoolLogic Touch Control System controls the BHK and acts as the chiller bank and pump bypass when the internal module's water valves are closed one per water loop.
- Option: Strainers: Strainers shall be installed on the chiller bank's inlet headers. For ease of service, they must be field-installed externally to the chiller. Strainers inside headers, which require disassembly for cleaning, are not recommended.
- Option: Strainers 40-mesh, "Y" or "Basket" style, and 125 or 300 psig rated.

### WARRANTY

ClimaCool shall warranty equipment for 12 months from the date of unit start-up or 18 months from the date of shipment, whichever occurs first.

- Option: Extended Parts Only Warranty Extension (1–4-year extension, for 2-5 years total). The warranty covers all parts except for the compressors and refrigerant. Labor is not included.
- Option: Extended 4-year compressor warranty covers the compressor for 5 years.

# **Electrical Data**

### **Electrical Data: No Lead VFD**

					Compres	sor	Fan Standard Co		andard Cor	ompressor		
ClimaCool Base Model	Voltage Code	Rated Voltage	Voltage Min./Max	QTY	RLA	LRA	QTY	RLA	Other Load Amp	Total Unit FLA	Min. Circuit Ampacity (MCA)	Max Overcurrent Protection (MOP)
UACS20	Н	208/230V-3PH-60Hz	187/252	2	33.3	255.0	2	9.1	2.4	87.2	95.5	125
UATS20	F	460V-3PH-60HZ	432/504	2	15.4	140.0	2	4.0	1.1	39.9	43.7	50
UAUS20	N	575V-3PH-60Hz	540/630	2	12.9	107.6	2	3.3	0.9	33.3	36.5	45
UAC\$30	Н	208/230V-3PH-60Hz	187/252	2	49.0	386.3	2	9.1	2.4	118.6	130.9	175
UATS30	F	460V-3PH-60HZ	432/504	2	24.0	182.0	2	4.0	1.1	57.1	63.1	80
UAUS30	N	575V-3PH-60Hz	540/630	2	19.2	131.0	2	3.3	0.9	45.9	50.7	60
UACS50	F	460V-3PH-60HZ	432/504	2	38.8	280.7	4	4.0	1.1	94.7	104.4	125
UAIS50 UAUS50	Ν	575V-3PH-60Hz	540/630	2	28.4	250.0	4	3.3	0.9	70.9	78.0	100
UACS60	F	460V-3PH-60HZ	432/504	2	48.0	310.0	4	4.0	1.1	113.1	125.1	150
UAIS60 UAUS60	Ν	575V-3PH-60Hz	540/630	2	43.1	239.0	4	3.3	0.9	100.3	111.0	150
	Н	208/230V-3PH-60Hz	187/252				2	9.1	2.4	20.6	22.9	30
UAFS30	F	460V-3PH-60HZ	432/504				2	4.0	1.1	9.1	10.1	15
	N	575V-3PH-60Hz	540/630	N/A				3.3	0.9	7.5	8.3	15
	F	460V-3PH-60HZ	432/504	1				4.0	1.1	17.1	18.1	20
UAL300	N	575V-3PH-60Hz	540/630				4	3.3	0.9	14.1	14.9	15

### **Electrical Data: With Lead VFD**

					Compres	sor <sub>1</sub>	Fo	in		Lead VFD		
ClimaCool Base Model	Voltage Code	Rated Voltage	Voltage Min./Max	QTY	RLA	LRA	QTY	RLA	Other Load Amp	Total Unit FLA	Min. Circuit Ampacity (MCA)	Max Overcurrent Protection (MOP)
UACS20	Н	208/230V-3PH-60Hz	187/252	2	54.0 / 33.3	54.0 / 255.0	2	9.1	2.4	107.9	121.4	175
UATS20	F	460V-3PH-60Hz	432/504	2	25.0 / 15.4	25.0 / 140.0	2	4.0	1.1	49.5	55.7	80
UAUS20	N	575V-3PH-60Hz	540/630	2	20.9 / 12.9	20.9 / 107.6	2	3.3	0.9	41.3	46.5	60
	Н	208/230V-3PH-60Hz	187/252	2	80.0 / 49.0	80.0 / 386.3	2	9.1	2.4	149.6	169.6	225
UATS30	F	460V-3PH-60Hz	432/504	2	36.0 / 24.0	36.0 / 182.0	2	4.0	1.1	69.1	78.1	110
UAUS30	N	575V-3PH-60Hz	540/630	2	32.7 / 19.2	32.7 / 131.0	2	3.3	0.9	59.4	67.5	90
UACS50	F	460V-3PH-60Hz	432/504	2	59.0 / 38.8	59.0 / 280.7	4	4.0	1.1	114.9	129.6	175
UATS50 UAUS50	N	575V-3PH-60Hz	540/630	2	49.0 / 28.4	49.0 / 250.0	4	3.3	0.9	91.5	103.7	150
UACS60	F	460V-3PH-60Hz	432/504	2	73.0 / 48.0	73.0 / 310.0	4	4.0	1.1	138.1	156.3	225
UATS60 UAUS60	N	575V-3PH-60Hz	540/630	2	59.0 / 43.1	59.0 / 239.0	4	3.3	0.9	116.2	130.9	175

NOTES:

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

# Power Distribution Drawing

UA Models



### Figure 25: Power Distribution Drawing

### NOTES:

- 1. 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, 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 control system and the modules.
- 4. Disconnects NOT included.
- 5. All voltages available, 460V used as example only.

# **Revision History**

UA	Models
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Date	ltem	Action	
02/10/25	All	Updated requirements for Cat 5e to shielded, twisted pair (STP) Cat 6. Updated requirement for 60-mesh strainers to 40-mesh strainers.	
	Module Nomenclature	Updated options and notes	
	Features and Benefits	Updated product descriptions	
	Additional Options	Updated Bank Breaker Panel to Power Distribution Panel	
	Physical Data	Updated data for sizes 30 and 60 tons. Updated Notes. Removed Capacity, EER, and COP data. Corrected Large Cabinet Fan Quantity.	
	Dimensional Data and Drawings	Removed incompatible voltages for Free Cooling UAF size 60.	
	Water Piping Configurations	Updated note 9 concerning Bypass header kits	
	Water Treatment & Temperature Requirements	Added Chlorine Water Quality Parameters	
	Engineering Specifications	Updated and expanded Engineering Specifications	
	Refrigeration Circuit Diagrams	Updated Refrigeration Circuit Diagrams	
	Electrical Data	Updated data. Added new table for units with Lead VFD	
	Power Distribution Drawing	Added note clarifying use of sample voltage	
10/07/24	All	Updated naming conventions for units and the CoolLogic Touch Control System	
	Head-Pressure Control Valve	Removed option and information	
	Dimensional Data	Corrected UAF Size offerings	
09/01/24	Created		



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