Water-Cooled and Condenserless
HVAC Guide Specifications

Size Range: 75 to 265 Nominal Tons

(264 to 931 kW**)**

Carrier Model Number: 30HXA — Condenserless

 30HXC — Water-Cooled

* General
* SYSTEM DESCRIPTION

Microprocessor controlled water-cooled (30HXC) or condenserless (30HXA) liquid chiller utilizing screw compressors and electronic expansion valves.

* QUALITY ASSURANCE
* Unit shall be rated in accordance with AHRI Standard 550/590, latest edition (U.S.A.). The 60 Hz 30HXC units shall be AHRI certified for performance.
* Unit construction shall comply with ASHRAE 15 Safety Code, NEC, and ASME applicable codes (U.S.A. codes), latest version.
* The management system governing the manufacture of this product is ISO (International Organization for Standardization) 9001:2008 certified.
* 208/230 v, 230 v, 460 v, 575 v, 60 Hz units shall be constructed in accordance with UL or UL Canada standards and shall be tested and listed by ETL or ETL, Canada, as conforming to those standards. Units shall carry the ETL and ETL, Canada, labels.
* DELIVERY, STORAGE, AND HANDLING
* Unit controls shall be capable of withstanding 150°F (66°C) storage temperatures in the control compartment.
* When delivered, machine and starter should be stored indoors, protected from construction dirt and moisture. Inspect under shipping tarps, bags, or crates to be sure water has not collected during transit. Protective shipping covers should be kept in place until machine is ready for installation.
* Products
* EQUIPMENT
* General:

Factory assembled, single-piece, water-cooled (30HXC) or condenserless (30HXA) liquid chiller with dual (2) independent refrigerant circuits. Contained within the unit cabinet shall be all factory wiring, piping, controls, refrigerant charge (HFC-134a) (30HXA units shipped with holding charge only), and special features required prior to field start-up. Unit must fit through a standard door.

* Compressors:
* Semi-hermetic twin-screw compressors with internal muffler and check valve.
* Each compressor shall be equipped with a discharge shutoff valve.
* Cooler (Evaporator):
* Shall be tested and stamped in accordance with ASME Code (U.S.A.) for a refrigerant working-side pressure of 220 psig (1408 kPa). Water-side pressure rating shall be 300 psig (2068 kPa). In Canada, maximum water-side pressure shall be 250 psig (1725 kPa), per the Canadian National Registry.
* Shall be mechanically cleanable shell-and-tube type with removable heads.
* Tubes shall be internally enhanced, seamless-copper type and shall be rolled into tube sheets. Tube wall thickness shall be 0.025 inches.
* Shall be equipped with Victaulic fluid connections.
* Shell shall be insulated with 3/4-in. (19-mm) closed-cell, polyvinyl chloride foam with a maximum K factor of 0.28. Heads may require field insulation.
* Shall have a cooler drain and vent.
* Design shall incorporate 2 independent refrigerant circuits.
* Shall include isolation valves to allow isolation of the refrigerant charge in either the evaporator or the condenser.
* Shall be equipped with factory-installed thermal dispersion chilled fluid flow switch.
* Condenser (30HXC units):
* Shall be tested and stamped in accordance with ASME code (U.S.A.) for a refrigerant working-side pressure of 220 psig (1408 kPa). Water-side pressure rating shall be 300 psig (2068 kPa). In Canada, maximum water-side pressure shall be 250 psig (1725 kPa), per the Canadian National Registry.
* Shall be mechanically cleanable shell-and-tube type with removable heads.
* Tubes shall be internally enhanced, seamless-copper type, and shall be rolled into tube sheets. Tube wall thickness shall be 0.025 inches.
* Shall be equipped with Victaulic water connections.
* Design shall incorporate 2 independent refrigerant circuits.
* Oil Separator (30HXA Units):
* Shall be tested and stamped in accordance with ASME Code (U.S.A.) for a refrigerant working-side pressure of 320 psig (2206 kPa).
* Design shall incorporate 2 independent refrigerant circuits.
* Refrigeration Components:

Refrigerant circuit components shall include oil separator, high and low side pressure relief devices, discharge and liquid line shutoff valves, filter drier (on 30HXC unit only), moisture-indicating sight glass, expansion valve, refrigerant economizer (unit sizes 161-271), and complete charge of compressor oil. The 30HXC units shall have a complete operating charge of refrigerant HFC-134a; 30HXA units shall have a holding charge of nitrogen.

* Controls, Safeties, and Diagnostics:
* Controls:
* Unit controls shall include the following minimum components:
* Microprocessor with non-volatile memory. Battery backup system shall not be accepted.
* Power and control circuit terminal blocks.
* ON/OFF control switch.
* Replaceable solid-state relay panels.
* Thermistor installed to measure saturated condensing temperature, cooler saturation temperature, compressor return gas temperature, and cooler entering and leaving fluid temperatures.
* Chilled fluid thermal dispersion flow switch.
* Unit controls shall include the following functions as standard:
* Automatic circuit lead/lag.
* Capacity control based on leaving chilled fluid temperature and compensated by rate of change of return-fluid temperature with temperature set point accuracy to 0.1°F (0.06°C).
* Limiting the chilled fluid temperature pull-down rate at start-up to an adjustable range of 0.2°F to 2°F (0.11° C to 1.1°C) per minute to prevent excessive demand spikes at start-up.
* Seven-day time schedule.
* Leaving chilled fluid temperature reset from return fluid, outdoor-air temperature, space temperature, or 4 to 20 mA input.
* Demand limit control with 2-stage control (0 to 100% each) or through 4 to 20 mA input (0 to 100%).
* Chilled and condenser water pump start/stop control.
* Dual chiller control for series chiller applications without addition of hardware modules or additional thermistors.
* Dual chiller control for parallel flow applications use one additional sensor.
* Amperage readout per compressor with %MTA (must trip amps) per compressor.
* NEMA 1 control panel shall include, as standard, a portable hand held display module with a minimum of 4 lines and 20 characters per line, of clear English, Spanish, Portuguese or French language. Display menus shall provide clear language descriptions of all menu items, operating modes, configuration points and alarm diagnostics. Reference to factory codes shall not be accepted. An industrial grade coiled extension cord shall allow the display module to be moved around the chiller. Magnets shall hold the display module to any sheet metal panel to allow hands-free operation. Display module shall have NEMA 4x housing suitable for use in outdoor environments. Display shall have back light and contrast adjustment for easy viewing in bright sunlight or night conditions. The display module shall have raised surface buttons with positive tactile response.
* The chiller controller shall include multiple connection ports for communicating with the local equipment network and the Carrier Comfort Network® (CCN) system, and the ability to access all chiller control functions from any point on the chiller.
* The control system shall allow software upgrade without the need for new hardware modules.
* Safeties:

Unit shall be equipped with thermistors and all necessary components in conjunction with the control system to provide the unit with the following protections:

* Loss of refrigerant charge.
* Reverse rotation.
* Low chilled fluid temperature.
* Low oil pressure (each compressor circuit).
* Ground current fault.
* Thermal overload.
* High pressure.
* Electrical overload.
* Loss of phase.
* Current imbalance.
* Loss of flow.
* Diagnostics:
* The display module shall be capable of indicating the safety lockout condition by displaying the information in clear language at the display. Information included for display shall be:
* Compressor lockout.
* Loss of charge.
* Low fluid flow.
* Low oil pressure.
* Cooler freeze protection.
* High or low suction superheat.
* Thermistor malfunction.
* Entering and leaving-fluid temperature.
* Evaporator and condenser pressure.
* Electronic expansion valve positions.
* All set points.
* Time of day.
* Display module, in conjunction with the microprocessor, must also be capable of displaying the output results of a service test. Service test shall verify operation of every switch, thermistor, and compressor before chiller is started. User shall be able to force each output device.
* Diagnostics shall include the ability to review a list of the 20 most recent alarms with clear language descriptions of the alarm event. Display of alarm codes without the ability for clear language descriptions shall be prohibited.
* An alarm history buffer shall allow the user to store no fewer than 20 alarm events with clear language descriptions and time and date stamp event entry.
* Operating Characteristics:

Unit shall be capable of starting up with 95°F (35°C) entering fluid temperature to the cooler.

* Electrical Requirements:
* Unit primary electrical power supply shall enter the unit at a single location (some units have multiple power poles).
* Unit shall operate on 3-phase power at the voltage shown in the equipment schedule.
* Control voltage shall be 115-v (60 Hz) or 230-v (50 Hz), single-phase, separate power supply.
* Unit shall be shipped with factory control and power wiring installed.
* Special Features:

Certain standard features are not applicable when the features designated by \* are specified. For assistance in amending the specifications, contact your local Carrier Sales office.

* Wye-Delta Starter:

Unit shall have a factory-installed, Wye-Delta starter to minimize electrical inrush current.

* Sound Reduction Enclosure:

Unit shall have field-installed sound reduction enclosure which covers the entire unit to muffle compressor noise.

* Vibration Isolation:

Chiller manufacturer shall furnish neoprene isolator pads for mounting equipment on a level, concrete surface.

* Control Power Transformer:

Unit shall be supplied with a field-installed transformer that will supply control circuit power from the main unit power supply.

* Temperature Reset Sensor:

Unit shall reset leaving chilled fluid temperature based on outdoor ambient temperature or space temperature when this sensor is installed.

* Brine Option:

Unit shall be factory modified to start and operate at leaving chilled fluid temperatures of between 15°F (–9°C) and 40°F (4.4°C).

* Minimum Load Control:

Unit shall be equipped with factory (or field) installed, microprocessor-controlled, minimum load control that shall permit unit operation down to 10% of full capacity.

* Chillerviser System Manager:

Control shall enable management of multiple parallel chillers (up to 8) or two (2) chillers in series in a single system.

* Minus-One-Pass Cooler:

Factory-installed option shall reduce pressure drop for high flow applications. Shall also provide same end inlet and outlet for 076-106 sizes and opposite end inlet for 116-271 sizes.

* Plus-One-Pass Cooler:

Factory-installed option shall enhance low temperature brine performance.

* Suction Service Valves:

Unit shall be supplied with factory-installed suction service valves to isolate compressor from evaporator and condenser.

* Cooler Head Insulation:

Unit shall be supplied with field-installed cooler insulation that shall cover the cooler heads.

* Energy Management Module:

A factory or field-installed module shall provide the following energy management capabilities: 4 to 20 mA signals for leaving fluid temperature reset, cooling set point reset or demand limit control; 2-point demand limit control (from 0 to 100%) activated by a remote contact closure; and discrete input for “Ice Done” indication for ice storage system interface.

* BACnet[[1]](#footnote-1) Communication Option:

Shall provide factory-installed communication capability with a BACnet MS/TP network. Allows integration with i-Vu® Open control system or a BACnet building automation system.

1. BACnet is a registered trademark of ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers). [↑](#footnote-ref-1)