ECONOCHILL

PRODUCT INFORMATION
RCU SERIES AIR-COOLED TANDEM SCROLL WATER CHILLERS
10 TONS TO 20 TONS – DUAL R-410A SCROLL COMPRESSORS

PRINCIPLE OF OPERATION

The ECONOCHILL RCU Series Air-Cooled Process Water Chiller is designed to provide a continuous flow of chilled water in commercial and industrial applications.

It operates by means of a closed-loop refrigeration system, coupled through a high-efficiency heat exchanger to a chilled water loop. The heart of the refrigeration system, the tandem scroll compressors, compress refrigerant gas, which is then air-cooled by means of vertically-discharging fans blowing ambient air over a specially designed fin-tube condenser. The compressed refrigerant condenses into a liquid as it cools, which flows under pressure through a special modulating valve. The liquid refrigerant expands and cools dramatically as it passes through this valve (referred to as a thermo-expansion valve) into the cold side of a plate heat exchanger; on the other side of the plate heat exchanger circulates a continuous counter-flow of chilled water, which is cooled by the refrigerant. This water circulates through the closed chilled water loop external to the chiller, where it picks up heat, and is returned to the expansion tank to repeat the process. The refrigerant, now a gas, returns to the compressor to repeat the refrigeration cycle.

KEY FEATURES

Our focus on efficiency in design has resulted in a machine that is mechanically simple and easy to operate, yet capable of superior heat removal at an efficient electrical consumption rate as low as 0.98 kW/Ton[1]. The RCU Series is assembled with the highest efficiency components available, such as compliant scroll compressors, high efficiency brazed plate evaporators, high surface area condensers, and efficient stainless steel centrifugal pumps. The simplicity in the design of the RCU Series yields a machine with fewer components, greater reliability, and a layout that is easy to service. Virtually every part we use is from a major U.S. manufacturer and is readily available from our parts stock or the refrigeration after-market.

The heart of every RCU Series chiller is a reliable and efficient Copeland compliant scroll compressor. The scroll compressor is quieter, more efficient, and significantly more reliable than a similar reciprocating compressor.

Additionally, great care has been taken to eliminate potential sources of corrosion from the system and help ensure a long service life. Our evaporators, pumps, metal fittings and process connections are of stainless steel and our expansion tank is constructed of heavy-duty fiberglass with a gel coat.

Finally, we have taken great care to provide robust safety features, including phase-loss protection, lock-out protection against short-cycling, adjustable pressure switches, industrial – spec mechanical flow switches, independent bulb-actuated thermostats, and more.

Every aspect of the RCU Series has been evaluated with an eye toward durability, reliability, and economy, making it possible for us to offer you what we consider to be a rugged machine and a remarkable value. We hope that you will agree.

MECHANICAL SPECIFICATIONS

General

Unit shall be assembled on a heavy gauge tubular steel base with bolt-down clips. Unit shall include tandem hermetic scroll compressors, plate fin condenser coils, fans and motors, brazed plate evaporator, water tank, circulation pump, controls, and a complete factory-installed charge of oil and R-22 refrigerant. The ambient temperature operating range shall be between 45°F and 115°F (lower ambient temperatures possible with optional head pressure controls). The chilled water temperature set point range shall be between 45°F and 75°F (lower temperatures possible with optional factory modifications).

Cabinet

The condensing unit casing shall be constructed of zinc-coated galvanized steel with a weather resistant gloss powder coat finish. Condensing unit exterior surfaces shall be capable of

[1] Based on 75°F ambient air temperature and 60°F leaving water temperature; 1 Ton = 12,000 Btu/Hr. Actual performance may vary.

withstanding a 1000-hour salt spray test per ASTM B117. The condensing unit shall be of the frame and panel type of construction which provides complete protection to the condenser coils, and which allows all access panels to be opened or removed without affecting the structural strength of the unit. Fastening screws shall also be of the 1000-hour type.

The structural steel base shall be of heavy gauge structural steel, fully welded, cleaned, primed, and finished with a durable, corrosion-inhibiting polyurethane enamel gloss finish coat.

Refrigeration System

The tandem compressor set shall be of the single-speed, 3450 rpm, suction gas cooled, hermetic scroll type. A refrigerant filter-drier, sight-glass, liquid line solenoid valve and bulb-actuated thermo-expansion device shall be standard. A compressor crankcase heater and internal thermal overload protection shall be standard. The compressor shall have a voltage utilization range of plus or minus 10 percent of the nameplate voltage. External high and low pressure cutout devices shall be provided. Suction lines shall be fully insulated with closed-cell foam.

Condenser Coil

The condenser coil shall be constructed of copper tubes mechanically bonded to engineered aluminum fins. The coil shall be pressure-tested to 600 PSIG internal pressure.

Evaporator

The evaporator shall be of the counter-flow brazed plate design, with 316 grade stainless steel plates and copper brazing, pressure tested to 600 PSIG, fully insulated with ½" closed-cell foam.

Condenser Fans and Motors

Direct-drive, statically and dynamically balanced propeller fans with aluminum blades and electro-coated steel hubs shall be used in draw-thru vertical discharge position. Single-phase, direct drive, permanently lubricated permanent split capacitor motors with inherent thermal overload shall be used. Motors shall be of the ball bearing type.

Water Tank

The water tank shall be of seamless design in heavy-duty FRP with a chemically resistant gel-coat, with a removable lid, sight-glass visible with the machine panels in place, float level sensor, bottom drain with valve, and supply and return connections. The tank shall be fully-insulated in 1/2" closed-cell foam.

Pump

The water circulation pump shall be of the centrifugal type, in 304 stainless steel, with carbon/silicon carbide/Viton slip ring seals, close-coupled to a direct-drive AC 3450 rpm open drip-proof motor with over-current protection.

Controls

The chiller shall be completely factory wired with necessary controls and contactor pressure lugs or terminal blocks for power wiring. Control wiring shall be on an independently-fused 24-volt control circuit, which includes a control transformer. A 1/32 DIN microprocessor digital LED temperature controller with a dual lead/lag relays and special solid-state timers shall be standard. Control shall be based on chiller tank temperature.

An electronic phase-loss/voltage monitor to protect against phase loss, reversal or voltage imbalance will be standard.

Independent on/off switches will be provided for the pump and the tandem compressor set, and a manual push-to-start button will be provided to initiate the pump.

A unit-installed mechanical flow switch with a stainless steel paddle shall be included to interrupt the condensing unit in the event of a loss of flow or flow below 2 gallons/ton.

A unit-installed bulb-actuated adjustable thermostat which opens on low temperature shall be included (standard temperature systems only).

Bright, long-life, LED indicator lights will be provided to indicate the following conditions: mains power status (white), pump run (green), (2) compressor run lights (blue), flow fault condition (red), low tank level (yellow), high refrigerant pressure (red), low refrigerant pressure (red), low chilled water/suction line temperature (yellow – standard temp units only).

OPTIONS

Other Capacities/Alternate Voltages/Water-Cooled

The RCU Series is available in water and air-cooled sizes from 1.5 to 20 Nominal Tons and in a variety of international voltages.

[cont.]

Low Ambient Operation

Two types of low ambient head pressure control are available: pressure-based fan speed control and flooded condenser head pressure control, depending upon the ambient conditions.

Low-Temperature Chilled Fluid

The RCU Series can be optionally configured to operate at reduced capacity down to 15°F chilled fluid temperature.

Casters

Heavy-duty, serviceable casters are available instead of the standard bolt-down clips to provide mobility to the chiller. Two casters shall be freewheeling, and two shall be fixed and locking.

Dual-Display Controller

A larger, 1/4 DIN digital temperature controller provides continuous display of set point and actual water temperature values.

Communications

The unit can be equipped with a micro-PLC with touch-screen user interface capable of Modbus over TCP/IP or DirectNet over RS-485.

High Pressure Pump

A variety of optional water pump pressure/flow options are available.

Ultra-Pure Water Circuit

A completely non-ferrous and non-cuprous (iron and copper free) coolant circuit is available to handle high purity fluids such as de-ionized water.

STANDARD WARRANTY

We warrant the Econochill RCU Series Chiller to be free from defects in material and workmanship under normal use and service, and we will, within one year from date of initial operation or 18 months from date of shipment, whichever is earlier, repair or replace without cost to the original customer any part, assembly or portion thereof which shall be returned to our factory, transportation charges prepaid, and which our inspection shall show to be thus defective. This warranty does not include labor, material and other costs related to the removal, replacement and transportation of defective parts or components.

Full details of our standard warranty, including optional extended warranty plans, are available upon request.

NOTES

Specifications contained herein are complete and accurate at the time of printing. However, as a result of our program of continuous improvement, these specifications may be subject to change without notice.

Although we can certify the heat removal capacity of our chillers, we cannot certify the heat load placed on the chiller; therefore, it is important to determine this heat load with a high degree of certainty prior to the selection of a chiller. We can offer some assistance in this regard.

Electrical and process mechanical diagrams are available for our chillers upon request.

CONTACT INFORMATION

Product Manager:

Mr. Christian D. Antalics
Econochill, LLC
P.O. Box 65112
Baltimore, Maryland 21209
USA

Telephone: 800-942-9249 (outside U.S.: +1-443-992-7655)
Fax: 877-314-7851 (outside U.S.: +1-215-243-7765)
Email: sales@econochill.com

ECONOCHILL

RCU SERIES TANDEM AIR-COOLED SCROLL WATER CHILLERS
TECHNICAL SPECIFICATIONS

Model	RCU-100TA	RCU-125TA	RCU-150TA	RCU-200TA
Nom. Capacity (KBTU/Hr, [kW]) [1]	**10 TONS**	**12.5 TONS**	**15 TONS**	**20 TONS**
50°F [10°C]	107.4 [31.5]	141.6 [41.5]	172.9 [50.7]	258.4 [75.7]
55°F [12.7°C]	118.7 [34.8]	155.8 [45.7]	189.0 [55.4]	283.1 [83.0]
60°F [15.5°C]	131.1 [38.4]	170.0 [49.8]	206.1 [60.4]	342.1 [100.3]
Dry Wgt (lbs., [kg])	991 [450]	1079 [490]	1287 [585]	1515 [689]
Operating Wgt (lbs., [kg])	1613 [733]	1701 [773]	2273 [1033]	2507 [1140]
Shipping Wgt (lbs., [kg])	1383 [629]	1553 [706]	1823 [829]	2051 [932]
Overall Length	60 5/8 [1541]	72 3/8 [1839]	87 3/8 [2219]	87 3/8 [2219]
Overall Width	42 1/8 [1070]	42 1/8 [1070]	42 1/8 [1070]	42 1/8 [1070]
Overall Height (with clips)	71 5/8 [1822]	71 5/8 [1822]	70 1/8 [1782]	70 1/8 [1782]
Compressor	Copeland Scroll	Copeland Scroll	Copeland Scroll	Copeland Scroll
Compressor Qty.	2	2	2	2
Refrigerant/Oil	R-410A/POE	R-410A/POE	R-410A/POE	R-410A/POE
Condenser Fan Design/Qty	Axial/2	Axial/2	Axial/3	Axial/3
Total CFM [L/s]	8000 [3775]	8000 [3775]	12000 [5663]	12000 [5663]
Fan Diameter (in., [mm])	24 [610]	24 [610]	24 [610]	24 [610]
Fan Drive	Direct	Direct	Direct	Direct
Fan Motor Size, ea. (hp, [W])	1/3 [249]	1/3 [249]	1/3 [249]	1/3 [249]
Fan Motor Type	PSC	PSC	PSC	PSC
Fan Motor RPM	1075	1075	1075	1075
Condenser Coil	Air-Cooled	Air-Cooled	Air-Cooled	Air-Cooled
Fins Per Inch	18	22	18	18
Fin Material	Aluminum	Aluminum	Aluminum	Aluminum
Tube Material	Copper	Copper	Copper	Copper
Evaporator Design	Brazed Plate	Brazed Plate	Brazed Plate	Brazed Plate
Evaporator Plate Material	316 Stainless	316 Stainless	316 Stainless	316 Stainless
Evaporator Brazing Material [2]	Copper	Copper	Copper	Copper
Pump Design	Centrifugal	Centrifugal	Centrifugal	Centrifugal
Pump Wetted Material	304 Stainless	304 Stainless	304 Stainless	304 Stainless
Pump Seal Material	Car/Sil-Car/Viton	Car/Sil-Car/Viton	Car/Sil-Car/Viton	Car/Sil-Car/Viton
Pump Motor Size (hp, [kW])	2 [1.5]	2 [1.5]	3 [2.2]	3 [2.2]
Pump Motor Type	ODP	ODP	ODP	ODP
Pump Flow Rate (gpm, [lpm])	30 [114]	38 [144]	45 [171]	60 [228]
Pump Pressure (psi, [bar]) [3]	35 [2.41]	35 [2.41]	35 [2.41]	35 [2.41]
Water Tank Capacity (gal., [L])	73 [277]	73 [277]	116 [441]	116 [441]
Process Water Supply Connection	1.5" FNPT	1.5" FNPT	1.5" FNPT	2" FNPT
Process Water Return Connection	1.5" FNPT	1.5" FNPT	1.5" FNPT	2" FNPT
Comp. Motor FLA, Ea., 230-3/460-3	17.6/9.6	22.4/10.6	25/12.2	33.3/17.9
Comp. Motor LRA, Ea., 230-3/460-3	123/62	149/75	164/100	239/125
Cond. Fan Motor, Ea., 230-3/460-3	2.4/1.4	2.4/1.4	2.4/1.4	2.4/1.1
Pump Motor FLA, 230-3/460-3	6.0/3.0	6.0/3.0	8.2/4.1	8.2/4.1
Unit System Totals, 230-3/460-3	47.0/25.6	56.6/27.5	66.4/33.2	83.0/43.7
Max. Fuse, 230-3/460-3 [4]	70/40	85/45	100/50	125/70
Condensing Unit Construction	Galvanized Steel	Galvanized Steel	Galvanized Steel	Galvanized Steel
Condensing Unit Coating	Powder Coat	Powder Coat	Powder Coat	Powder Coat
Structural Base Construction	Mild Steel	Mild Steel	Mild Steel	Mild Steel
Structural Base Coating	Urethane Enamel	Urethane Enamel	Urethane Enamel	Urethane Enamel
Chilled Water Piping	Reinforced Nitrile	Reinforced Nitrile	Reinforced Nitrile	Reinforced Nitrile
Chilled Water Tank	Heavy-Duty FRP	Heavy-Duty FRP	Heavy-Duty FRP	Heavy-Duty FRP

[1] Nominal heat removal capacity is rated at 90°F [32.2°C] ambient air temperature at sea level, cooling plain water, at various set points.
[2] Nickel-brazed and all-stainless evaporator designs are available whenever copper is not compatible.
[3] Available pump pressure is measured at the water supply connection of the chiller. Piping and process pressure losses from not included.
[4] These values are recommendations only; always consult N.E.C. guidelines and local codes before sizing a fuse or circuit breaker.