RAH T Ka

AIR COOLED CHILLERS WITH SCREW COMPRESSORS AND AXIAL FANS

COOLING CAPACITY FROM 155 TO 747 kW 1 AND 2 COOLING CIRCUITS

RAH 2502 T Ka

Above picture is only indicative and is not binding.

AIR R-134a FC

The air cooled chillers of **RAH T Ka series** are designed for outdoor installation and are particularly suitable for industrial applications. They can also be used for medium and big air conditioning systems and to be matched to fancoils or terminal units. These units are standard provided by a technical housing, always protected by panels. They are all available with 2 independent refrigerant circuits, with free-cooling coil (version F) and, when required, provided with buffer tanks of remarkable capacity, with no change in the overall dimensions. Thanks to the several options available, these units are particularly flexible and can be easily adapted to all installation sites. They are completely assembled and tested in the factory and supplied with refrigerant and non-freezing oil charge. Therefore, once on site, the units only need to be positioned and electrically and hydraulically connected.

The available versions with R134a (Ka) refrigerants are the following:

- **Ka - standard version**
- **S.Ka - silenced version:** Oversized coil, reduced air flow, fans with a lower rotation speed, technical partition insulated by means of soundproofing material.
- **U.Ka - ultra-silenced version:** Oversized coil, reduced air flow, fans with a very low rotation speed, technical partition insulated by means of soundproofing material with bituminous rubber coating, vibration dampers on compressors suction and discharge pipes, mufflers on discharge pipes, compressors fixed on spring-type vibration dampers.
- **F.Ka - standard version with free-cooling coil**
- **FS.Ka - silenced version with free-cooling coil:** Oversized coil, reduced air flow, fans with a lower rotation speed, technical partition insulated by means of soundproofing material.
- **FU.Ka - ultra-silenced version with free-cooling coil:** Oversized coil, reduced air flow, fans with a very low rotation speed, technical partition insulated by means of soundproofing material with bituminous rubber coating, vibration dampers on compressors suction and discharge pipes, mufflers on discharge pipes, compressors fixed on spring-type vibration dampers.

Operation limits (standard units):
AIR: from 15 to 45°C; WATER (out from evaporator): from 5 to 15°C.

MAIN COMPONETS

Strong and compact **frame** made of pressed and bended galvanized steel profiles, panels and base-frame of high thickness galvanized and painted steel and coated by rust-proof paint, suitable to resist to external agents.

The technical housing, completely closed and suitably isolated from the air flow, is containing the compressors and the main components. The external panels, easily to be dismantled, allow the complete access in case of service, without compromising the operation of the unit itself. When required, the hydraulic kit (buffer tank and pump group) are installed inside the unit, with no change in overall dimensions.

Semi-hermetic screw compressors equipped with capacity steps, motor thermal protection, oil crankcase heater and phase monitor. The compressors lubrication is of forced type, with no pump and in order to prevent many oil migrations to the cooling circuit, the compressors are provided with an oil separator, in-built to the discharge side. The electrical motor is foreseen for lower inrush current and, in this is case, the unit is equipped with an automatic partial load inrush device and mechanical interlock of the inrush control switches, to prevent accidental short circuits (options DS and PW).

Heat-exchange external coil with copper tube and turbo aluminum fins for a better efficiency. It is suitably sized with a wide exchange surface, so to the allow the unit operation also at very high external air temperatures. On request, in case of installation in aggressive environments, several coil protection treatments are available.

For free-cooling version (F) only, **additional free-cooling water coil** with copper tube and aluminum fins, complete with mixing valve, for production of chilled water by means of the very low external air temperatures. This allow a remarkable reduction of the compressors working hours with a consequent energy saving, also considering that each circuit is completely independent.

Low rpm axial fans, of directly coupled type, with 6-8 pole electrical motor complete with in-built overload protection, electronic balance, low sound level blades with wing profile and safety protection grid. On request, it is available the modulating fans speed regulation.

Dry expansion **shell and tube evaporator** with two refrigerant circuits and one water circuit, with very low pressure drops. Shell and tubes plate made in carbon steel and copper tubes. Some plastic and corrosion-proof baffles are suitably placed inside the shell, allowing a correct water distribution and making the tube bundle particularly strong and vibration-free, also in case of very high water flows.

Cooling circuit composed of thermostatic expansion valve, dehydrating filter, sight glass, high pressure safety device, antifreeze thermostat, high and low pressure switches, high and low pressure gauges, non-return valve on discharge side, shut-off valve on liquid line, shut-off valve on compressor discharge side.

Electric board in compliance with CE norms, contained in a suitable partition protected by the internal safety panel, provided with a lock-door main switch. Inside, it is complete with all control and protection switches, the terminal board and auxiliaries. The electrical board also includes the control device for power supply phases, to prevent the compressor to turn in the wrong sense. The microprocessor, complete with display, is also placed inside the electrical board.

Unit management microprocessor installed on the internal safety panel of the electrical board, controlling the chilled water temperature regulation, the working parameters, auto-detection failure system, remote management and supervision, complete with compressors hour counter.

ACCESSORIES

A **Amperometer:** Electrical device for measuring the intensity of electrical current absorbed by the unit.

BT **Low temperature operation** (down to -8°C): Electronic device for the continuous modulating voltage control of the condensing pressure through the variation of the fan rotation speed (Alternative to BF).

BF **Low ambient temperature operation** (down to -20°C): Electronic device, frequency converter type, for the continuous modulating control of the condensing pressure through the variation of the fan rotation speed (Alternative to BT).

CE **UV protection on water insulation:** Particular coat of the evaporator and of water insulations with UV ray proof material.

CS **Compressors inrush counter:** Electromechanical device positioned inside the electrical board, recording the total inrush starts of compressors.

DS **Star/delta:** Electric device of close transition type to reduce the inrush current, complete with short circuit safety by mechanical interlock.

FA **Condensing coil protection filters:** Washable metal filters with very low pressure drop, protecting the condensing coils from dirt, with aluminum mesh against dust and leaves.

GP **Condensing coil protection grid:** Metal protection grid against accidental impacts, made of 50x50 4-mesh wire.

I1 **Victaulic insulation on pump side:** Insulation of the joints by close-cell polyurethane material, to prevent condense, pump side.

I2 **Victaulic insulation on buffer tank side:** Insulation of the joints by close-cell polyurethane material, to prevent condense, buffer tank side.

I3 **Victaulic insulation for the free-cooling version:** Insulation of the joints by close-cell polyurethane material, to prevent condense, free-cooling side.

IG **Watch card:** Electronic card to program the switch-over and rotation between units, after a pre-set time.

IH **RS 485 serial interface:** Electronic card to be connected to microprocessor, to allow communication between the units and a Carel supervision system. It is possible to fully control the unit from remote. For connection to other supervision systems, the protocol of the controlled parameters is available on request.

IM **Seawood packing:** Fumigated seawood case and protection bag with hygroscopic salts, suitable for long sea transports.

LI **Liquid injection:** Mechanical device allowing a better cooling of compressors at very high compression level.

M12 **Modulating capacity control for 2-circuit units:** By means of some valves installed on compressors, the capacity is modulated from 12,5 to 100%.

MV **Buffer tank** of suitable capacity complete with expansion vessel, safety valve, water gauge, water charge and discharge valves, air purging valves.

OS **Oil flow safety switch:** In-built in the compressor oil separator, it indicates the eventual decrease of the oil level.

P1 **Single pump group:** Chilled water pump group composed of single pump, expansion vessel, safety valve, water gauge, water charge and discharge valves, air purging valves, electrical control of the pump. The pump is of 2 pole centrifugal packaged type.

P1H **Higher available pressure pump group:** Chilled water higher available pressure pump group composed of single pump, expansion vessel, safety valve, water gauge, water charge and discharge valves, air purging valves, electrical control of the pump. The pump is of 2

Technical data sheet - RAH 2502-8002 T Ka

RAH		2502 Ka	2802 Ka	3202 Ka	3602 Ka	4602 Ka	5202 Ka	6002 Ka	6802 Ka	8002 Ka
Cooling capacity										
Cooling capacity 1)	kW	260,0	290,0	320,0	348,0	432,0	465,0	568,0	608,0	737,0
Absorbed power	kW	73,0	88,0	103,0	126,0	166,0	188,0	198,0	244,0	282,0
EER		3,56	3,30	3,11	2,76	2,60	2,47	2,87	2,49	2,61
Screw compressors										
Quantity	n	2	2	2	2	2	2	2	2	2
Standard steps capacity	n	6	6	6	6	6	6	6	6	6
Continuous control capacity (option)	%					0 - 12 ÷ 100				
Circuits	n	2	2	2	2	2	2	2	2	2
Nominal absorbed current	A	133,2	150,3	177,9	195,3	276,1	305,8	319,6	370,8	433,2
Maximum absorbed current	A	196,0	248,0	288,0	324,0	364,0	430,0	462,0	560,0	620,0
Inrush current	A	547,0	609,0	729,0	848,0	983,0	1158,0	1254,0	1644,0	1752,0
Inrush current with opt. PW/DS	A	365,0	414,0	494,0	585,0	702,0	827,0	895,0	1235,0	1319,0
Axial fans										
Quantity	n	6	6	6	6	6	6	8	8	10
Rotation speed	rpm	880	880	880	880	880	880	880	880	880
Motors power	kW	12,0	12,0	12,0	12,0	12,0	12,0	16,0	16,0	20,0
Total air flow	m^3/h	126.000	126.000	126.000	126.000	117.000	117.000	156.000	156.000	195.000
Total air flow	l/s	35.000	35.000	35.000	35.000	32.500	32.500	43.333	43.333	54.167
Nominal absorbed current	A	24,0	24,0	24,0	24,0	24,0	24,0	32,0	32,0	40,0
Shall and tube evaporator										
Quantity	n	1	1	1	1	1	1	1	1	1
Water flow rate	m^3/h	44,7	49,9	55,0	59,9	74,3	80,0	97,7	104,6	126,8
Water flow rate	l/s	12,4	13,9	15,3	16,6	20,6	22,2	27,1	29,0	35,2
Pressure drop	kPa	61	66	79	48	59	33	47	46	36
Water volume	l	63	80	80	90	114	162	162	184	452
Pump Group P1										
Available pressure	kPa	121	114	98	127	108	131	102	196	190
Motor power	kW	5,5	5,5	5,5	5,5	5,5	5,5	5,5	15,0	15,0
Absorbed current	A	11,1	11,1	11,1	11,1	11,1	11,1	11,1	26,5	26,5
Inrush current	A	70,0	70,0	70,0	70,0	70,0	70,0	70,0	194,0	194,0
Weight	kg	91	91	91	91	91	91	91	160	160
Pump group P1H										
Available pressure	kPa	171	165	148	178	160	183	154	305	297
Motor power	kW	7,5	7,5	7,5	7,5	7,5	7,5	7,5	22,0	22,0
Absorbed current	A	14,7	14,7	14,7	14,7	14,7	14,7	14,7	39,0	39,0
Inrush current	A	105,0	105,0	105,0	105,0	105,0	105,0	105,0	273,0	273,0
Weight	kg	99	99	99	99	99	99	99	192	192
Pump group PT										
Available pressure	kPa	167	160	142	170	148	170	135	298	288
Motor power	kW	7,5	7,5	7,5	7,5	7,5	7,5	7,5	22,0	22,0
Absorbed current	A	14,7	14,7	14,7	14,7	14,7	14,7	14,7	39,0	39,0
Inrush current	A	105,0	105,0	105,0	105,0	105,0	105,0	105,0	273,0	273,0
Weight	Kg	196	196	196	196	196	196	196	379	379
Hydraulic kit										
Expansion vessel	l	25	25	25	25	25	25	25	25	25
Quantity	n	2	2	2	2	2	2	2	2	2
Buffer tanks 900 l		•	•	•	•	•	•	•	•	•
Buffer tanks 1500 l		---	---	---	---	---	---	•	•	•
Buffer tanks 1800 l		---	---	---	---	---	---	---	---	•
Buffer tanks 2400 l		---	---	---	---	---	---	---	---	---
Electrical data										
Total absorbed power	kW	85,0	100,0	115,0	138,0	178,0	200,0	214,0	260,0	302,0
Total nominal absorbed current	A	157,2	174,3	201,9	219,3	300,1	329,8	351,6	402,8	473,2
Maximum absorbed current	A	220,0	272,0	312,0	348,0	388,0	454,0	494,0	592,0	660,0
Total inrush current	A	571,0	633,0	753,0	872,0	1.007,0	1.182,0	1.286,0	1.676,0	1.792,0
Total inrush current with opt. PW/DS	A	389,0	438,0	518,0	609,0	726,0	851,0	927,0	1.267,0	1.359,0
Sound pressure level										
Sound pressure level 2)	dB(A)	78	78	78	78	79	79	80	80	82
Dimensions										
Lenght	mm	5.082	5.082	5.082	5.082	5.082	5.082	6.120	6.960	7.997
Width	mm	2.244	2.244	2.244	2.244	2.244	2.244	2.244	2.244	2.244
Height	mm	2.370	2.370	2.370	2.370	2.370	2.370	2.370	2.370	2.370
Transport weight 3)	kg	3.535	3.554	3.576	3.648	4.492	4.689	5.140	6.109	6.713
Weight in operation	kg	3.598	3.634	3.656	3.737	4.606	4.850	5.302	6.293	7.165
Refrigerant charge for each circuit	kg	38	40	40	41	55	61	75	78	88
Power supply										
Power supply	V / ph / Hz					400 V / 50 Hz / 3 Ph + T				
NOTES										

1) Nominal condition referred to: air 35 °C - chilled water 12/7 °C.
2) Measured at 1 m in open field (ISO 3746).
3) Oil and refrigerant charge included.