RAH VS F Ke/Kh

AIR COOLED CHILLERS FOR OUTDOOR INSTALLATION WITH INTEGRATED FREE COOLING

EQUIPPED WITH SCREW INVERTER COMPRESSORS AND AXIAL FANS

Cooling capacity from 308 kW to 1837 kW

VERSIONS

RAH VS F - standard version
RAH VS F HE - high efficiency version
RAH VS F S e U - silenced and ultra-silenced version **on request**

Packaged air cooled chillers of RAH VS F eries with integrated free cooling section are suitable for outdoor installation and can be used to cool glycol fluid solutions for air conditioning or in industrial applications.

Semi-hermetic screw inverter technology allows to reach great efficiency improvements at part load, if compared to the other traditional systems for cooling capacity control.

The integrated free cooling section allows to partially or totally recover cooling capacity from external air without big consumption of energy. Units are equipped with an additional coil crossed by the liquid to be chilled and invested by the complete air flow generated by the condenser fans.

The combination of high efficiency finned exchangers with the thermophysical purity of refrigerant used, almost glide-free during the changes of state, allows having nominal EER near 3 with ESEER above 5 in mechanical operation.

These units have been designed considering limited space requirements and keeping, at the same time, high cooling performances. Such result has been attained with high-quality and up-to-date components.
All units are completely assembled and tested in the factory with specific quality procedures and are already equipped with all necessary hydraulic, refrigerant and electrical connections for a quick installation on site.

Before factory testing, cooling circuits are tested under pressure and then supplied with refrigerant and a non-freezing oil charge.

Units CE certified in compliance with the European regulation 2016/2281 ERP 2021.

COMPONENTS

STRUCTURE
Structure made of a base and a chassis manufactured in high-thickness galvanised steel, assembled with stainless steel rivets. All galvanised steel surfaces are powder-coated with colour RAL 7035.

COMPRESSORS semi-hermetic screw type with INVERTER
Compressors of semi-hermetic screw type, controlled by integrated frequency inverter, allowing to adapt the power to the load variations ensuring at the same time the maximum efficiency at different operating conditions. The compressors are provided with motor thermal protection, rotation direction control, crankcase heater, oil filter, oil service valve, POE oil charge and vibration dumpers kit. Compressors lubrication is of forced type without pump, to avoid excessive oil migrations to the cooling circuit, compressors are equipped with an oil separator on discharge side. Both compressors are equipped with an oil flow safety switch, an optoelectronic device operating in case the oil flow inside the compressor falls below the minimum threshold.

SHELL & TUBE EXCHANGER
Shell & tube exchanger of dry expansion type with pure electrolytic copper tubes and plate carbon steel shell. The exchanger is equipped with a condensation-proof insulation, made by close cell polyurethane foam material as well as an external UV ray-resistant and scratch-proof cover. Inside the shell some plastic corrosion-proof baffles are suitably placed. They favourite a right water distribution and make the tube bundle particularly strong and vibration-free, even with very high water flows. The exchanger design pressure (waterside) is 10 bar.

EXTERNAL CONDENSING COIL
Multisection type, with micro-finned copper tubes, positioned in staggered rows and mechanically expanded into an aluminum finned pack. Fins are designed with such a shape providing the highest heat exchange efficiency (turbo-fin).The max operating pressure refrigerant side is 45 relative bar.

EXTERNAL FREE COOLING COILS
Made of copper tubes with optimized section so to reduce the pressure drops glycol side and aluminum finned pack. Fins are designed with such a shape providing the highest heat exchange efficiency (turbo-fin).The max operating pressure fluid side of free cooling coils is 10 relative bar. As soon as the temperature of the air entering the freecooling coil is lower than the temperature of the return flow, the free-cooling system is activated, allowing the ventilated system to obtain the maximum refrigerant recovery at those conditions. The benefit obtained by the free-cooling system is much bigger as much lower is the external temperature respect the the temperature value of fluid to be chilled. That's why such kind of units are suitable to be installed on air conditioning and refrigeration plants located on places where the weather annual profile is characterized by medium and low external temperatures and where the cooling demand is significant and for long periods of time.. Is almost always indispensable that free-cooling coils are supplied with glycol mixtures to prevent the freezing of the fluid to be chilled and to avoid relevant breakages of exchangers. On applications where is not possible to use directly glycol mixture, is possible to added at unit a "GLYCOL LOOP" circuit (GYL option) with which an hydraulic separation is obtained between the free-cooling coils and the whole remaining part of the hydronic plant.
That circuit provides the separation thanks to an additional water/glycol heat exchanger and is complete of a water pump for the internal fluid circulation. That pump is switched on only during free cooling operation.

AXIAL FANS
Of directly coupled type, with wing-profile aluminium blades, are designed not to create air turbulence. This ensures the max efficiency with the lowest sound level. Each fan is provided with a galvanized steel protection grid, which is painted after construction. The IP54 fans motors are completely closed and provided with in-built overload protection thermostat, incorporated to the motor windings. These fans, thanks to a more accurate regulation of the airflow, allow the unit to operate with an external air temperature up to - 20 °C.

INDEPENDENT COOLING CIRCUITS
Independent cooling circuits, each provided with a shut-off valve for refrigerant charge, antifreeze sensor, shut-off valves on liquid lines, sight glass, dehydrating filter, high-pressure safety device on high pressure refrigerant side and electronic thermostatic expansion valve, as well as high and low pressure switches and gauges.

ELECTRICAL BOARD
Built in compliance with CE Norms, inside of which are placed the control system and the components for motors starting, wired and tested in the factory. It is made by a cabinet suitable for outdoor installation, containing power and control devices, microprocessor electronic board complete with keypad and display, for visualizing the several functions available, main switch of lock-door type, isolation transformer for auxiliary circuits, automatic switches, fuses and protection switches for compressors and fans, terminals for general alarm and remote ON/OFF, terminal board and possibility to interface to BMS systems.

STANDARD HYDRONIC CIRCUIT
Provided with three-way water valve ON/OFF to activate the free-cooling mode, automatic air vent valves on plate coils and exchangers, glycol solution charge and/or discharge valves, anti-freeze probe.

ACCESSORIES

RAH VS F Ke		352	402	452	552	622	702	852	952	1102	1252	1352	1502
Amperometer	A	o	o	o	o	o	o	o	o	o	o	o	o
Electrical power supply different than standard	AE	□	□	□	□	□	□	□	□	□	□	□	□
Operation in cooling mode down to -20°C	BF	o	o	o	o	o	o	o	o	o	o	o	o
Operation in cooling mode down to -10°C	BT	•	•	•	•	•	•	•	•	•	•	•	•
Soundproofed compressors cabinet with standard material	CF	•	•	•	•	•	•	•	•	•	•	•	•
Soundproofed compressors cabinet with higher thickness material	CFU	o	o	o	o	o	o	o	o	o	o	o	o
Axial fans with electronic commutated motor	EC	o	o	o	o	o	o	o	o	o	o	o	o
Condensing coil protection grid	GP	o	o	o	o	o	o	o	o	o	o	o	o
Anti-intrusion grid	GP3	o	o	o	o	o	o	o	o	o	o	o	o
Glycol loop	GYL	□	□	□	□	□	□	□	□	□	□	□	□
Victaulic insulation on pump side	I1	o	o	o	o	o	o	o	o	o	o	o	o
Victaulic insulation buffer tank side	I2	o	o	o	o	o	o	o	o	o	o	o	o
Watch card	IG	o	o	o	o	o	o	o	o	o	o	o	o
RS 485 Serial interface	IH	o	o	o	o	o	o	o	o	o	o	o	o
LON Protocol serial interface	IH-LON	o	o	o	o	o	o	o	o	o	o	o	o
Seawood packing	IM	o	o	o	o	o	o	o	o	o	o	o	o
TCP/IP Protocol serial interface	IWG	o	o	o	o	o	o	o	o	o	o	o	o
Liquid injection	LI	o	o	o	o	o	o	o	o	o	o	o	o
Phase monitor	MF	•	•	•	•	•	•	•	•	•	•	•	•
Buffer tank module	MV	□	□	□	□	□	□	□	□	□	□	□	□
Oil flow safety switch	OS	o	o	o	o	o	o	o	o	o	o	o	o
Pump group	P1	o	o	o	o	o	o	o	o	o	o	o	o
Higher available pressure pump group	P1H	o	o	o	o	o	o	o	o	o	o	o	o
Variable flow Single pump	P1VS	o	o	o	o	o	o	o	o	o	o	o	o
Double pump group	P2	o	o	o	o	o	o	o	o	o	o	o	o
Higher available pressure double pump group	P2H	o	o	o	o	o	o	o	o	o	o	o	o
Double pump variable flow	P2VS	o	o	o	o	o	o	o	o	o	o	o	o
Rubber-type vibration dampers	PA	o	o	o	o	o	o	o	o	o	o	o	o
Safety water flow switch	PF	•	•	•	•	•	•	•	•	•	•	•	•
Spring-type vibration dampers	PM	o	o	o	o	o	o	o	o	o	o	o	o
Remote display	PQ	o	o	o	o	o	o	o	o	o	o	o	o
In-line twin pump group (only one working)	PT	o	o	o	o	o	o	o	o	o	o	o	o
Anti-freeze heater on evaporator	RA	o	o	o	o	o	o	o	o	o	o	o	o
Shut-off valve on compressors discharge side	RD	•	•	•	•	•	•	•	•	•	•	•	•
Shut-off valve on compressors suction side	RH	o	o	o	o	o	o	o	o	o	o	o	o
Compressor overload relays	RL	o	o	o	o	o	o	o	o	o	o	o	o
Condensing coil with pre-painted fins	RM	o	o	o	o	o	o	o	o	o	o	o	o
Partial heat recovery	RP	o	o	o	o	o	o	o	o	o	o	o	o
Copper/Copper coil	RR	o	o	o	o	o	o	o	o	o	o	o	o
Total heat recovery	RT	□	□	□	□	□	□	□	□	□	□	□	□
Personalized frame painting	RV	o	o	o	o	o	o	o	o	o	o	o	o
Coil with double layer treatment	TDS	o	o	o	o	o	o	o	o	o	o	o	o
Electronic thermostatic valve	TE	•	•	•	•	•	•	•	•	•	•	•	•
Voltmeter	V	o	o	o	o	o	o	o	o	o	o	o	o
Brine Version	VB	o	o	o	o	o	o	o	o	o	o	o	o
Solenoid valve	VS	o	o	o	o	o	o	o	o	o	o	o	o

• Standard, o Optional, -- Not available

RAH VS F HE Ke		352	402	452	552	622	702	852	952	1102	1252	1352	1502
Amperometer	A	o	o	o	o	o	o	o	o	o	o	o	o
Electrical power supply different than standard	AE	□	□	□	□	□	□	□	□	□	□	□	□
Soundproofed compressors cabinet with standard material	CF	•	•	•	•	•	•	•	•	•	•	•	•
Soundproofed compressors cabinet with higher thickness material	CFU	o	o	o	o	o	o	o	o	o	o	o	o
Axial fans with electronic commutated motor	EC	•	•	•	•	•	•	•	•	•	•	•	•
Condensing coil protection grid	GP	o	o	o	o	o	o	o	o	o	o	o	o
Anti-intrusion grid	GP3	o	o	o	o	o	o	o	o	o	o	o	o
Glycol loop	GYL	□	□	□	□	□	□	□	□	□	□	□	□
Victaulic insulation on pump side	I1	o	o	o	o	o	o	o	o	o	o	o	o
Victaulic insulation buffer tank side	I2	o	o	o	o	o	o	o	o	o	o	o	o
Watch card	IG	o	o	o	o	o	o	o	o	o	o	o	o
RS 485 Serial interface	IH	o	o	o	o	o	o	o	o	o	o	o	o
LON Protocol serial interface	IH-LON	o	o	o	o	o	o	o	o	o	o	o	o
Seawood packing	IM	o	o	o	o	o	o	o	o	o	o	o	o
TCP/IP Protocol serial interface	IWG	o	o	o	o	o	o	o	o	o	o	o	o
Liquid injection	LI	o	o	o	o	o	o	o	o	o	o	o	o
Phase monitor	MF	•	•	•	•	•	•	•	•	•	•	•	•
Buffer tank module	MV	□	□	□	□	□	□	□	□	□	□	□	□
Oil flow safety switch	OS	o	o	o	o	o	o	o	o	o	o	o	o
Pump group	P1	o	o	o	o	o	o	o	o	o	o	o	o
Higher available pressure pump group	P1H	o	o	o	o	o	o	o	o	o	o	o	o
Variable flow Single pump	P1VS	o	o	o	o	o	o	o	o	o	o	o	o
Double pump group	P2	o	o	o	o	o	o	o	o	o	o	o	o
Higher available pressure double pump group	P2H	o	o	o	o	o	o	o	o	o	o	o	o
Double pump variable flow	P2VS	o	o	o	o	o	o	o	o	o	o	o	o
Rubber-type vibration dampers	PA	o	o	o	o	o	o	o	o	o	o	o	o
Safety water flow switch	PF	•	•	•	•	•	•	•	•	•	•	•	•
Spring-type vibration dampers	PM	o	o	o	o	o	o	o	o	o	o	o	o
Remote display	PQ	o	o	o	o	o	o	o	o	o	o	o	o
In-line twin pump group (only one working)	PT	o	o	o	o	o	o	o	o	o	o	o	o
Anti-freeze heater on evaporator	RA	o	o	o	o	o	o	o	o	o	o	o	o
Shut-off valve on compressors discharge side	RD	•	•	•	•	•	•	•	•	•	•	•	•
Shut-off valve on compressors suction side	RH	o	o	o	o	o	o	o	o	o	o	o	o
Compressor overload relays	RL	o	o	o	o	o	o	o	o	o	o	o	o
Condensing coil with pre-painted fins	RM	o	o	o	o	o	o	o	o	o	o	o	o
Partial heat recovery	RP	o	o	o	o	o	o	o	o	o	o	o	o
Copper/Copper coil	RR	o	o	o	o	o	o	o	o	o	o	o	o
Total heat recovery	RT	□	□	□	□	□	□	□	□	□	□	□	□
Personalized frame painting	RV	o	o	o	o	o	o	o	o	o	o	o	o
Coil with double layer treatment	TDS	o	o	o	o	o	o	o	o	o	o	o	o
Electronic thermostatic valve	TE	•	•	•	•	•	•	•	•	•	•	•	•
Voltmeter	V	o	o	o	o	o	o	o	o	o	o	o	o
Brine Version	VB	o	o	o	o	o	o	o	o	o	o	o	o
Solenoid valve	VS	o	o	o	o	o	o	o	o	o	o	o	o

• Standard, o Optional, -- Not available

RAH VS F Kh		282	322	352	452	502	562	652	752	852	982	1102	1202
Amperometer	A	o	o	o	o	o	o	o	o	o	o	o	o
Electrical power supply different than standard	AE	□	□	□	□	□	□	□	□	□	□	□	□
Operation in cooling mode down to -20°C	BF	o	o	o	o	o	o	o	o	o	o	o	o
Operation in cooling mode down to -10°C	BT	•	•	•	•	•	•	•	•	•	•	•	•
Soundproofed compressors cabinet with standard material	CF	•	•	•	•	•	•	•	•	•	•	•	•
Soundproofed compressors cabinet with higher thickness material	CFU	o	o	o	o	o	o	o	o	o	o	o	o
Axial fans with electronic commutated motor	EC	o	o	o	o	o	o	o	o	o	o	o	o
Condensing coil protection grid	GP	o	o	o	o	o	o	o	o	o	o	o	o
Anti-intrusion grid	GP3	o	o	o	o	o	o	o	o	o	o	o	o
Glycol loop	GYL	□	□	□	□	□	□	□	□	□	□	□	□
Victaulic insulation on pump side	I1	o	o	o	o	o	o	o	o	o	o	o	o
Victaulic insulation buffer tank side	I2	o	o	o	o	o	o	o	o	o	o	o	o
Watch card	IG	o	o	o	o	o	o	o	o	o	o	o	o
RS 485 Serial interface	IH	o	o	o	o	o	o	o	o	o	o	o	o
LON Protocol serial interface	IH-LON	o	o	o	o	o	o	o	o	o	o	o	o
Seawood packing	IM	o	o	o	o	o	o	o	o	o	o	o	o
TCP/IP Protocol serial interface	IWG	o	o	o	o	o	o	o	o	o	o	o	o
Liquid injection	LI	o	o	o	o	o	o	o	o	o	o	o	o
Phase monitor	MF	•	•	•	•	•	•	•	•	•	•	•	•
Buffer tank module	MV	□	□	□	□	□	□	□	□	□	□	□	□
Oil flow safety switch	OS	o	o	o	o	o	o	o	o	o	o	o	o
Pump group	P1	o	o	o	o	o	o	o	o	o	o	o	o
Higher available pressure pump group	P1H	o	o	o	o	o	o	o	o	o	o	o	o
Variable flow Single pump	P1VS	o	o	o	o	o	o	o	o	o	o	o	o
Double pump group	P2	o	o	o	o	o	o	o	o	o	o	o	o
Higher available pressure double pump group	P2H	o	o	o	o	o	o	o	o	o	o	o	o
Double pump variable flow	P2VS	o	o	o	o	o	o	o	o	o	o	o	o
Rubber-type vibration dampers	PA	o	o	o	o	o	o	o	o	o	o	o	o
Safety water flow switch	PF	•	•	•	•	•	•	•	•	•	•	•	•
Spring-type vibration dampers	PM	o	o	o	o	o	o	o	o	o	o	o	o
Remote display	PQ	o	o	o	o	o	o	o	o	o	o	o	o
In-line twin pump group (only one working)	PT	o	o	o	o	o	o	o	o	o	o	o	o
Anti-freeze heater on evaporator	RA	o	o	o	o	o	o	o	o	o	o	o	o
Shut-off valve on compressors discharge side	RD	•	•	•	•	•	•	•	•	•	•	•	•
Shut-off valve on compressors suction side	RH	o	o	o	o	o	o	o	o	o	o	o	o
Compressor overload relays	RL	o	o	o	o	o	o	o	o	o	o	o	o
Condensing coil with pre-painted fins	RM	o	o	o	o	o	o	o	o	o	o	o	o
Partial heat recovery	RP	o	o	o	o	o	o	o	o	o	o	o	o
Copper/Copper coil	RR	o	o	o	o	o	o	o	o	o	o	o	o
Total heat recovery	RT	□	□	□	□	□	□	□	□	□	□	□	□
Personalized frame painting	RV	o	o	o	o	o	o	o	o	o	o	o	o
Coil with double layer treatment	TDS	o	o	o	o	o	o	o	o	o	o	o	o
Electronic thermostatic valve	TE	•	•	•	•	•	•	•	•	•	•	•	•
Voltmeter	V	o	o	o	o	o	o	o	o	o	o	o	o
Brine Version	VB	o	o	o	o	o	o	o	o	o	o	o	o
Solenoid valve	VS	o	o	o	o	o	o	o	o	o	o	o	o

• Standard, o Optional, -- Not available

RAH VS F HE Kh		282	322	352	452	502	562	652	752	852	982	1102	1202
Amperometer	A	o	o	o	o	o	o	o	o	o	o	o	o
Electrical power supply different than standard	AE	□	□	□	□	□	□	□	□	□	□	□	□
Soundproofed compressors cabinet with standard material	CF	●	●	●	●	●	●	●	●	●	●	●	●
Soundproofed compressors cabinet with higher thickness material	CFU	o	o	o	o	o	o	o	o	o	o	o	o
Axial fans with electronic commutated motor	EC	●	●	●	●	●	●	●	●	●	●	●	●
Condensing coil protection grid	GP	o	o	o	o	o	o	o	o	o	o	o	o
Anti-intrusion grid	GP3	o	o	o	o	o	o	o	o	o	o	o	o
Glycol loop	GYL	□	□	□	□	□	□	□	□	□	□	□	□
Victaulic insulation on pump side	I1	o	o	o	o	o	o	o	o	o	o	o	o
Victaulic insulation buffer tank side	I2	o	o	o	o	o	o	o	o	o	o	o	o
Watch card	IG	o	o	o	o	o	o	o	o	o	o	o	o
RS 485 Serial interface	IH	o	o	o	o	o	o	o	o	o	o	o	o
LON Protocol serial interface	IH-LON	o	o	o	o	o	o	o	o	o	o	o	o
Seawood packing	IM	o	o	o	o	o	o	o	o	o	o	o	o
TCP/IP Protocol serial interface	IWG	o	o	o	o	o	o	o	o	o	o	o	o
Liquid injection	LI	o	o	o	o	o	o	o	o	o	o	o	o
Phase monitor	MF	●	●	●	●	●	●	●	●	●	●	●	●
Buffer tank module	MV	□	□	□	□	□	□	□	□	□	□	□	□
Oil flow safety switch	OS	o	o	o	o	o	o	o	o	o	o	o	o
Pump group	P1	o	o	o	o	o	o	o	o	o	o	o	o
Higher available pressure pump group	P1H	o	o	o	o	o	o	o	o	o	o	o	o
Variable flow Single pump	P1VS	o	o	o	o	o	o	o	o	o	o	o	o
Double pump group	P2	o	o	o	o	o	o	o	o	o	o	o	o
Higher available pressure double pump group	P2H	o	o	o	o	o	o	o	o	o	o	o	o
Double pump variable flow	P2VS	o	o	o	o	o	o	o	o	o	o	o	o
Rubber-type vibration dampers	PA	o	o	o	o	o	o	o	o	o	o	o	o
Safety water flow switch	PF	●	●	●	●	●	●	●	●	●	●	●	●
Spring-type vibration dampers	PM	o	o	o	o	o	o	o	o	o	o	o	o
Remote display	PQ	o	o	o	o	o	o	o	o	o	o	o	o
In-line twin pump group (only one working)	PT	o	o	o	o	o	o	o	o	o	o	o	o
Anti-freeze heater on evaporator	RA	o	o	o	o	o	o	o	o	o	o	o	o
Shut-off valve on compressors discharge side	RD	●	●	●	●	●	●	●	●	●	●	●	●
Shut-off valve on compressors suction side	RH	o	o	o	o	o	o	o	o	o	o	o	o
Compressor overload relays	RL	o	o	o	o	o	o	o	o	o	o	o	o
Condensing coil with pre-painted fins	RM	o	o	o	o	o	o	o	o	o	o	o	o
Partial heat recovery	RP	o	o	o	o	o	o	o	o	o	o	o	o
Copper/Copper coil	RR	o	o	o	o	o	o	o	o	o	o	o	o
Total heat recovery	RT	□	□	□	□	□	□	□	□	□	□	□	□
Personalized frame painting	RV	o	o	o	o	o	o	o	o	o	o	o	o
Coil with double layer treatment	TDS	o	o	o	o	o	o	o	o	o	o	o	o
Electronic thermostatic valve	TE	●	●	●	●	●	●	●	●	●	●	●	●
Voltmeter	V	o	o	o	o	o	o	o	o	o	o	o	o
Brine Version	VB	o	o	o	o	o	o	o	o	o	o	o	o
Solenoid valve	VS	o	o	o	o	o	o	o	o	o	o	o	o

• Standard, o Optional, -- Not available

TECHNICAL DATA

RAH VS F Ke		352	402	452	552	622	702	852	952	1102	1252	1352	1502
Cooling mode (R513A) (1)													
Cooling capacity	kW	390,0	450,5	514,8	631,3	710,5	813,0	957,5	1092,6	1279,0	1449,0	1567,8	1728,6
Compressor input power	kW	110,7	126,5	142,3	179,3	196,6	223,4	260,0	293,5	341,9	384,4	423,7	460,3
Total input power	kW	129,1	146,8	165,3	204,6	224,2	253,8	292,2	328,9	378,7	424,9	469,7	510,9
Nominal input current	A	227,5	258,6	291,3	360,5	395,1	447,1	514,8	579,5	667,1	748,6	827,5	900,1
EER Gross	W/W	3,52	3,56	3,62	3,52	3,61	3,64	3,68	3,72	3,74	3,77	3,70	3,76
EER Net	W/W	3,02	3,07	3,11	3,09	3,17	3,20	3,28	3,32	3,38	3,41	3,34	3,38
Flow rate (4)	m^3/h	72,5	83,8	95,7	117,4	132,1	151,2	178,1	203,2	237,9	269,5	291,6	321,5
Pressure drop	kPa	54,8	54,2	54,9	56,0	56,9	53,5	51,2	52,6	54,0	55,0	56,2	56,2
Circuits	n°	2	2	2	2	2	2	2	2	2	2	2	2
Compressors	n°	2	2	2	2	2	2	2	2	2	2	2	2
Free Cooling (2)													
Cooling capacity	kW	383,2	391,3	478,6	485,4	576,6	587,5	674,3	679,7	766,4	782,6	957,2	970,8
Input power	kW	18,4	20,2	23,0	25,3	27,6	30,4	32,2	35,4	36,8	40,5	46,0	50,6
Input current	A	35,3	38,8	44,1	48,5	52,9	58,2	61,8	67,9	70,6	77,6	88,2	97,0
EER	W/W	20,8	19,3	20,8	19,2	20,9	19,4	20,9	19,2	20,8	19,3	20,8	19,2
Flow rate (4)	m^3/h	72,6	74,1	90,7	91,9	109,2	111,3	127,7	128,7	145,2	148,2	181,3	183,9
Pressure drop	kPa	152,9	140,4	147,2	132,3	136,9	127,0	124,3	119,1	118,1	114,7	119,7	116,4
Free Cooling (3)													
Cooling capacity	kW	264,28	269,86	330,07	334,76	397,66	405,17	465,03	468,76	528,55	539,72	660,14	669,52
Input power	kW	18,4	20,2	23,0	25,3	27,6	30,4	32,2	35,4	36,8	40,5	46,0	50,6
Input current	A	35,3	38,8	44,1	48,5	52,9	58,2	61,8	67,9	70,6	77,6	88,2	97,0
EER	W/W	14,4	13,3	14,4	13,2	14,4	13,3	14,4	13,2	14,4	13,3	14,4	13,2
Flow rate (4)	m^3/h	50,1	51,1	62,5	63,4	75,3	76,7	88,1	88,8	100,1	102,2	125,0	126,8
Pressure drop	kPa	72,7	66,8	70,0	62,9	65,1	60,4	59,1	56,6	56,2	54,5	57,0	55,4
Axial fans													
Quantity	n°	8	8	10	10	12	12	14	14	16	16	20	20
Total air flow	m^3/h	149600	157080	187000	196350	224400	235620	261800	274890	299200	314160	374000	392700
Total power input	kW	18,4	20,2	23,0	25,3	27,6	30,4	32,2	35,4	36,8	40,5	46,0	50,6
Total input current	A	35,3	38,8	44,1	48,5	52,9	58,2	61,8	67,9	70,6	77,6	88,2	97,0
Weight													
Transport weight	kg	4865	5012	6131	6283	7978	8157	8667	8823	9810	9974	10895	11068
Operating weight	kg	5049	5199	6361	6515	8254	8437	8990	9148	10178	10348	11354	11532
Dimensions													
Length	mm	4750	4750	5720	5720	6700	6700	7670	7670	9800	9800	10770	10770
Width	mm	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300
Height	mm	2560	2560	2560	2560	2560	2560	2560	2560	2560	2560	2560	2560
Sound data													
Total LWA (5)	dB(A)	103,7	104,1	104,6	105,1	105,6	106,1	106,6	107,1	107,6	108,2	108,7	109,2
Total SPL 1m (6)	dB(A)	83,1	83,5	84,0	84,5	85,0	85,5	86,0	86,5	87,0	87,6	88,1	88,6
Power supply													
Voltage/phase/frequency	V/ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
General electrical data													
Maximum input power	[A]	281	319	364	439	495	566	644	734	837	798	1000	1117
Maximum input current	[A]	**	**	**	**	**	**	**	**	**	**	**	**

(1) Water in/out: 15/10°C - Ambient air temperature 30°C
(2) Water in/out: 15/10°C - Ambient air temperature 0°C
(3) Water in/out: 15/10°C - Ambient air temperature 5°C
(4) Hydraulic data referred to fluid Glycol 30%
(5) Sound power level in accordance with ISO 3744.
(6) Sound pressure level at 1m from the unit in free field conditions, in accordance with ISO 3744

RAH VS F HE Ke		352	402	452	552	622	702	852	952	1102	1252	1352	1502
Cooling mode (R513A) (1)													
Cooling capacity	kW	435,8	502,6	579,0	704,0	792,7	906,7	1066,4	1217,0	1415,8	1604,8	1740,6	1837,7
Compressor input power	kW	108,1	122,3	142,9	175,5	199,4	226,1	267,9	304,5	351,7	395,5	436,0	471,6
Total input power	kW	124,3	142,6	165,2	199,8	226,2	254,5	299,2	336,9	387,4	436,1	484,7	525,2
Nominal input current	A	219,0	251,2	291,0	352,0	398,6	448,4	527,1	593,6	682,6	768,3	854,0	925,3
EER Gross	W/W	4,03	4,11	4,05	4,01	3,97	4,01	3,98	4,00	4,03	4,06	3,99	3,90
EER Net	W/W	3,51	3,53	3,51	3,52	3,50	3,56	3,56	3,61	3,65	3,68	3,59	3,50
Flow rate (4)	m^3/h	81,0	93,5	107,7	130,9	147,4	168,6	198,3	226,3	263,3	298,5	323,7	341,8
Pressure drop	kPa	50,6	50,1	50,7	51,7	52,5	49,4	47,3	48,6	49,9	50,8	51,9	51,9
Circuits	n°	2	2	2	2	2	2	2	2	2	2	2	2
Compressors	n°	2	2	2	2	2	2	2	2	2	2	2	2
Free Cooling (2)													
Cooling capacity	kW	389,7	482,4	494,6	585,3	591,4	674,2	681,1	779,4	786,5	964,8	1170,6	1182,8
Input power	kW	16,2	20,3	22,3	24,4	26,8	28,4	31,3	32,5	35,7	40,6	48,7	53,6
Input current	A	31,1	38,9	42,8	46,7	51,4	54,5	60,0	62,3	68,5	77,9	93,4	102,8
EER	W/W	24,0	23,8	22,1	24,0	22,1	23,7	21,8	24,0	22,0	23,8	24,0	22,1
Flow rate (4)	m^3/h	73,8	91,4	93,7	110,9	112,0	127,7	129,0	147,6	149,0	182,8	221,7	224,0
Pressure drop	kPa	140,0	145,9	136,4	135,1	128,3	126,3	118,0	118,7	114,0	117,1	122,4	120,3
Free Cooling (3)													
Cooling capacity	kW	268,76	332,69	341,10	403,66	407,86	464,97	469,72	537,52	542,41	665,38	807,31	815,72
Input power	kW	16,2	20,3	22,3	24,4	26,8	28,4	31,3	32,5	35,7	40,6	48,7	53,6
Input current	A	31,1	38,9	42,8	46,7	51,4	54,5	60,0	62,3	68,5	77,9	93,4	102,8
EER	W/W	16,5	16,4	15,3	16,6	15,2	16,4	15,0	16,5	15,2	16,4	16,6	15,2
Flow rate (4)	m^3/h	50,9	63,0	64,6	76,5	77,3	88,1	89,0	101,8	102,7	126,0	152,9	154,5
Pressure drop	kPa	66,6	69,4	64,9	64,2	61,0	60,1	56,1	56,4	54,2	55,7	58,2	57,2
Axial fans													
Quantity	n°	8	10	10	12	12	14	14	16	16	20	24	24
Total air flow	m^3/h	158800	198500	208425	238200	250110	277900	291795	317600	333480	397000	476400	500220
Total power input	kW	16,2	20,3	22,3	24,4	26,8	28,4	31,3	32,5	35,7	40,6	48,7	53,6
Total input current	A	31,1	38,9	42,8	46,7	51,4	54,5	60,0	62,3	68,5	77,9	93,4	102,8
Weight													
Transport weight	kg	4993	6109	6267	7976	8142	8673	8824	9800	9963	10855	12004	12177
Operating weight	kg	5185	6348	6510	8265	8433	9006	9160	10185	10350	11332	12581	12759
Dimensions													
Length	mm	4750	5720	5720	6700	6700	7670	7670	9800	9800	10770	13200	13200
Width	mm	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300
Height	mm	2560	2560	2560	2560	2560	2560	2560	2560	2560	2560	2560	2560
Sound data													
Total LWA (5)	dB(A)	103,0	103,5	104,0	104,5	105,0	105,5	106,0	106,5	107,0	107,5	108,0	108,5
Total SPL 1m (6)	dB(A)	82,4	82,9	83,4	83,9	84,4	84,9	85,4	85,9	86,4	86,9	87,4	87,9
Power supply													
Voltage/phase/frequency	V/ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
General electrical data													
Maximum input power	[A]	277	319	363	437	494	563	643	729	835	799	1006	1124
Maximum input current	[A]	**	**	**	**	**	**	**	**	**	**	**	**

(1) Water in/out: 15/10°C - Ambient air temperature 30°C
(2) Water in/out: 15/10°C - Ambient air temperature 0°C
(3) Water in/out: 15/10°C - Ambient air temperature 5°C
(4) Hydraulic data referred to fluid Glycol 30%
(5) Sound power level in accordance with ISO 3744.
(6) Sound pressure level at 1m from the unit in free field conditions, in accordance with ISO 3744

RAH VS F Kh		282	322	352	452	502	562	652	752	852	982	1102	1202
Cooling mode (R1234Ze) (1)													
Cooling capacity	kW	308,6	353,0	404,4	495,6	565,7	638,2	745,7	850,9	986,5	1117,4	1222,6	1367,5
Compressor input power	kW	80,9	92,1	102,1	128,1	144,1	158,1	182,1	206,1	242,2	272,2	300,2	332,2
Total input power	kW	98,9	111,9	123,4	150,6	168,8	185,1	211,8	237,6	276,8	308,2	343,7	377,2
Nominal input current	A	174,2	197,1	217,5	265,3	297,5	326,1	373,2	418,7	487,7	542,9	605,6	664,6
EER Gross	W/W	3,82	3,83	3,96	3,87	3,93	4,04	4,09	4,13	4,07	4,11	4,07	4,12
EER Net	W/W	3,12	3,16	3,28	3,29	3,35	3,45	3,52	3,58	3,56	3,63	3,56	3,63
Flow rate (4)	m^3/h	57,4	65,6	75,2	92,2	105,2	118,7	138,7	158,2	183,5	207,8	227,4	254,3
Pressure drop	kPa	55,8	55,2	55,2	55,9	57,0	57,9	54,4	52,1	53,5	54,9	56,0	56,0
Circuits	n°	2	2	2	2	2	2	2	2	2	2	2	2
Compressors	n°	2	2	2	2	2	2	2	2	2	2	2	2
Free Cooling (2)													
Cooling capacity	kW	383,2	391,3	391,3	478,6	485,4	576,6	587,5	674,3	679,7	766,4	782,6	956,2
Input power	kW	18,0	19,8	21,4	22,5	24,8	27,0	29,7	31,5	34,7	36,0	43,6	45,0
Input current	A	34,5	38,0	41,0	43,2	47,5	51,8	57,0	60,4	66,5	69,0	83,5	86,3
EER	W/W	21,3	19,8	18,3	21,3	19,6	21,4	19,8	21,4	19,6	21,3	18,0	21,2
Flow rate (4)	m^3/h	72,6	74,1	74,1	90,7	91,9	109,2	111,3	127,7	128,7	145,2	148,2	181,1
Pressure drop	kPa	187,2	168,4	151,6	152,1	141,5	147,0	133,0	131,9	124,4	124,8	121,8	126,4
Free Cooling (3)													
Cooling capacity	kW	264,28	269,86	269,86	330,07	334,76	397,66	405,17	465,03	468,76	528,55	539,72	659,45
Input power	kW	18,0	19,8	21,4	22,5	24,8	27,0	29,7	31,5	34,7	36,0	43,6	45,0
Input current	A	34,5	38,0	41,0	43,2	47,5	51,8	57,0	60,4	66,5	69,0	83,5	86,3
EER	W/W	14,7	13,6	12,6	14,7	13,5	14,7	13,6	14,8	13,5	14,7	12,4	14,7
Flow rate (4)	m^3/h	50,1	51,1	51,1	62,5	63,4	75,3	76,7	88,1	88,8	100,1	102,2	124,9
Pressure drop	kPa	89,0	80,1	72,1	72,3	67,3	69,9	63,3	62,8	59,1	59,4	57,9	60,1
Axial fans													
Quantity	n°	8	8	8	10	10	12	12	14	14	16	16	20
Total air flow	m^3/h	156800	164640	169579	196000	205800	235200	246960	274400	288120	313600	302526	392000
Total power input	kW	18,0	19,8	21,4	22,5	24,8	27,0	29,7	31,5	34,7	36,0	43,6	45,0
Total input current	A	34,5	38,0	41,0	43,2	47,5	51,8	57,0	60,4	66,5	69,0	83,5	86,3
Weight													
Transport weight	kg	4960	5107	6226	6398	8093	8297	8807	9003	9990	10194	11115	11308
Operating weight	kg	5144	5294	6413	6628	8325	8573	9087	9326	10315	10562	11489	11767
Dimensions													
Length	mm	4750	4750	4750	5720	5720	6700	6700	7670	7670	9800	9800	10770
Width	mm	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300
Height	mm	2560	2560	2560	2560	2560	2560	2560	2560	2560	2560	2560	2560
Sound data													
Total LWA (5)	dB(A)	104,3	104,8	104,8	105,3	105,8	106,2	106,7	107,3	107,8	108,3	108,8	109,8
Total SPL 1m (6)	dB(A)	83,7	84,2	84,2	84,7	85,2	85,6	86,1	86,7	87,2	87,7	88,2	89,2
Power supply													
Voltage/phase/frequency	V/ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
General electrical data													
Maximum input power	[A]	281	318	361	433	489	560	639	726	832	789	996	1106
Maximum input current	[A]	**	**	**	**	**	**	**	**	**	**	**	**

(1) Water in/out: 15/10°C - Ambient air temperature 30°C
(2) Water in/out: 15/10°C - Ambient air temperature 0°C
(3) Water in/out: 15/10°C - Ambient air temperature 5°C
(4) Hydraulic data referred to fluid Glycol 30%
(5) Sound power level in accordance with ISO 3744.
(6) Sound pressure level at 1m from the unit in free field conditions, in accordance with ISO 3744

RAH VS F HE Kh		282	322	352	452	502	562	652	752	852	982	1102	1202
Cooling mode (R1234Ze) (1)													
Cooling capacity	kW	325,8	379,8	424,1	519,7	593,0	668,6	779,6	888,3	1030,0	1155,8	1275,7	1412,4
Compressor input power	kW	76,8	87,9	99,7	125,3	142,0	154,8	178,1	202,7	241,2	273,2	297,1	331,8
Total input power	kW	93,2	108,4	120,2	152,4	166,6	186,4	206,8	238,8	274,0	318,3	346,3	385,9
Nominal input current	A	164,1	191,1	211,8	268,4	293,5	328,4	364,3	420,8	482,7	560,7	610,1	679,9
EER Gross	W/W	4,24	4,32	4,25	4,15	4,18	4,32	4,38	4,38	4,27	4,23	4,29	4,26
EER Net	W/W	3,50	3,50	3,53	3,41	3,56	3,59	3,77	3,72	3,76	3,63	3,68	3,66
Flow rate (4)	m^3/h	60,6	70,6	78,9	96,7	110,3	124,3	145,0	165,2	191,6	214,9	237,3	262,7
Pressure drop	kPa	51,2	50,7	50,7	51,3	52,3	53,2	50,0	47,9	49,2	50,5	51,5	51,5
Circuits	n°	2	2	2	2	2	2	2	2	2	2	2	2
Compressors	n°	2	2	2	2	2	2	2	2	2	2	2	2
Free Cooling (2)													
Cooling capacity	kW	391,5	486,6	499,2	591,2	598,4	679,8	681,1	783,0	786,5	973,2	1182,4	1196,8
Input power	kW	16,4	20,5	20,5	27,1	24,6	31,6	28,7	36,1	32,8	45,1	49,2	54,1
Input current	A	31,5	39,3	39,3	51,9	47,2	60,5	55,0	69,2	62,9	86,5	94,4	103,8
EER	W/W	23,9	23,7	24,4	21,8	24,3	21,5	23,7	21,7	24,0	21,6	24,0	22,1
Flow rate (4)	m^3/h	74,2	92,2	94,6	112,0	113,3	128,8	129,0	148,3	149,0	184,3	224,0	226,7
Pressure drop	kPa	174,7	184,4	170,9	166,9	153,3	155,0	137,6	136,6	127,7	135,1	143,9	136,3
Free Cooling (3)													
Cooling capacity	kW	270,00	335,59	344,28	407,72	412,69	468,83	469,72	540,00	542,41	671,17	815,45	825,38
Input power	kW	16,4	20,5	20,5	27,1	24,6	31,6	28,7	36,1	32,8	45,1	49,2	54,1
Input current	A	31,5	39,3	39,3	51,9	47,2	60,5	55,0	69,2	62,9	86,5	94,4	103,8
EER	W/W	16,5	16,4	16,8	15,1	16,8	14,9	16,4	15,0	16,5	14,9	16,6	15,3
Flow rate (4)	m^3/h	51,1	63,6	65,2	77,2	78,2	88,8	89,0	102,3	102,7	127,1	154,5	156,3
Pressure drop	kPa	83,1	87,7	81,3	79,4	72,9	73,7	65,4	65,0	60,8	64,3	68,4	64,8
Axial fans													
Quantity	n°	8	10	10	12	12	14	14	16	16	20	24	24
Total air flow	m^3/h	160200	200250	210263	240300	252315	280350	294368	320400	336420	400500	480600	504630
Total power input	kW	16,4	20,5	20,5	27,1	24,6	31,6	28,7	36,1	32,8	45,1	49,2	54,1
Total input current	A	31,5	39,3	39,3	51,9	47,2	60,5	55,0	69,2	62,9	86,5	94,4	103,8
Weight													
Transport weight	kg	5113	6239	6407	8136	8302	8853	9014	9995	10163	11065	12224	12407
Operating weight	kg	5306	6479	6652	8427	8596	9189	9350	10381	10550	11545	12806	12995
Dimensions													
Length	mm	4750	5720	5720	6700	6700	7670	7670	9800	9800	10770	13200	13200
Width	mm	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300
Height	mm	2560	2560	2560	2560	2560	2560	2560	2560	2560	2560	2560	2560
Sound data													
Total LWA (5)	dB(A)	103,2	103,7	104,2	104,7	105,2	105,7	106,2	106,7	107,2	107,7	108,2	108,7
Total SPL 1m (6)	dB(A)	82,6	83,1	83,6	84,1	84,6	85,1	85,6	86,1	86,6	87,1	87,6	88,1
Power supply													
Voltage/phase/frequency	V/ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
General electrical data													
Maximum input power	[A]	277	319	359	442	489	569	637	735	829	806	1006	1124
Maximum input current	[A]	**	**	**	**	**	**	**	**	**	**	**	**

(1) Water in/out: 15/10°C - Ambient air temperature 30°C
(2) Water in/out: 15/10°C - Ambient air temperature 0°C
(3) Water in/out: 15/10°C - Ambient air temperature 5°C
(4) Hydraulic data referred to fluid Glycol 30%
(5) Sound power level in accordance with ISO 3744.
(6) Sound pressure level at 1m from the unit in free field conditions, in accordance with ISO 3744