

RAH MC Ka + ECO

AIR COOLED CHILLERS WITH SCREW COMPRESSORS AND ECONOMIZER, AXIAL FANS AND MICROCHANNEL CONDENSING COILS



The images shown above are indicative and not binding.



AIR COOLED CHILLERS EQUIPPED WITH SCREW COMPRESSORS, AXIAL FANS AND MICROCHANNEL CONDENSING COILS

The modular air cooled chillers of RAH...MC Ka are designed for external installation and are particularly suitable for cooling liquid solutions in industrial applications or for air conditioning in commercial field, where excellent seasonal performances must be granted keeping at the same time a low environmental impact.

Micro channel condensing coils are totally made up of mechanically expanded aluminum alloy. In comparison to the traditional Copper-Aluminum coils, the micro channel geometry provides less resistance to the air passing. This allows to optimize the performances of the fans section and consequently to reduce dimensions keeping performances unchanged.

Moreover the micro channel technology permits to reduce the weight of the condensing section as well as the refrigerant charge.

The cross "V" arrangement of the condensing coils makes the units of this series perfectly each other modular, granting at the same time

the easiest access to the technical room both for checking operations required during the normal unit functioning and for maintenance.

All the units are totally factory assembled and tested, following specific quality procedures. Besides they are totally hydraulic, cooling and electrical connected permitting a quick installation once on site. Before the test the cooling circuits of each unit are subjected to a pressure test and then charged with Refrigerant R134a and non-freezing oil. So, once on site, the units must be only positioned and electrically and hydraulically connected.

Operation limits:

Unità per applicazione AM

Air: from +15 to +45°C ; **water** from 5°C to 15°C (outlet from the evaporator)

Structure

Structure realized with frame made up of hot galvanized steel sheet and RAL 7035 painted, suitable to resist to atmospheric agents. Compressors and main components are easily accessible and suitably placed in the technical room.

Compressors

Compressors, semi-hermetic type, provided with capacity steps, motor thermal protection, rotation direction control, crankcase heater, discharge side shut-off valve and anti-vibration kit.

Compressors lubrication is of forced type, without pump and to avoid excessive oil migration to the cooling circuits, they are provided with an in-built oil separator. In the standard configuration it is also included a discharge junction flange, as well as steps capacity control system, non-return and safety valve, oil heater, lubrication management system, oil filter, oil service valve, POE oil charge, integral motor protection with protection module, discharge side temperature control device.

The electrical motor of the compressors is provided with an inrush current reduction device obtained thanks to some interlocked contactors. Besides the capacity can be continuously modulated through option M12.

Economizer

Economizer of plate type exchanger that guarantees an additional subcooling of liquid leaving the condenser with a consequent significant increase in the cooling capacity supplied and therefore an improvement in the efficiency of the entire cooling cycle, especially at high condensing temperatures.

Evaporator

Shell & Tube Evaporator, dry expansion type with pure electrolytic copper tubes and shell and tubes plate made up of carbon steel. The exchanger is provided with anti-condensation insulation made up of a nitrile rubber and polyethylene foam with a thickness of 10 mm externally protected by a UV-ray proof, embossed scratchproof polyethylene film. The hydraulic connections are of Victaulic type. Inside the shell, some plastic and corrosion-proof baffles are suitably placed, allowing a correct water distribution and making the tube bundle particularly strong and vibration free, even with high water flows. Water side exchanger design pressures are 10 bar.

Coils

Micro channel condensing Coils totally made up of mechanically expanded aluminum alloy to grant a perfect and continuous contact among tubes and fins optimizing the thermal exchange and reducing dimensions.

The high passivation degree of the used alloy, besides the peculiar assembling way, avoids the possibility to have galvanic corrosion phenomena. On demand it is also possible to provide the units installed in particularly aggressive environments with surface treatments against exchangers environmental corrosion. (Option ACP and PCP)

Fans

Axial fans, with external rotor directly coupled to a three-phase electronically commutated motor (EC) they have the possibility of a continuous regulation of the speed by means of a 0-10V signal completely managed by the microprocessor. Aluminum blades with wings profile are suitably designed to avoid any turbulence in the air detachment zone, granting in this way the max efficiency with the minimum noise level. The fan is equipped with galvanized steel protection grid painted after the construction. Thanks to a more accurate adjustment of air flow, they allow operation of the unit with external temperature down to -20 °C.

Refrigerant circuit

Cooling circuit made up of electronic thermostatic expansion valve, sight glass, high pressure safety device, anti-freeze protection on evaporator, high and low pressure switches, non return valve in-built on compressors discharge side, dehydrating filter with replaceable cartridges, shut-off valve on liquid line. Each compressor operates on an independent circuit granting in this way, a considerable reliability.

Electrical board

Electrical board in compliance with CE Norms, contained in a suitable section protected by internal safety panel, provided with a lock-door main switch. Inside all the control and protection components are suitably placed, together with terminal board and auxiliaries. The electrical board also includes the control device for power supply phases to prevent the compressor wrong side rotation. Microprocessor and relevant display are also placed inside the electrical cabinet.

Microprocessor

Electronic Microprocessor for unit management installed inside the electrical cabinet, with double evaporator in/out control of the chilled water temperature, as well as control of working parameters and equalization of compressors working hours, failures auto-detection system, alarm log, start and set point timeslot programming, possibility of remote management and supervision by enabling standard communication protocols management, complete with compressors hour counter.

Applications

Abroad market version (AM)

Units in compliance with the European regulation whose sales is reserved to countries out of the European Union.

Technical data - RAH AM MC Ka serie

RAH AM MC Ka + ECO		412	452	532	612	702	732
Performance data							
Cooling capacity (EN14511)	kW	460,0	513,9	603,3	698,8	802,4	838,0
Total input power (EN14511)	kW	157,1	173,9	195,5	232,9	286,8	301,0
EER	W/W	2,93	2,96	3,09	3,00	2,80	2,78
Refrigerant data R134a							
Global warming potential	GWP	1430	1430	1430	1430	1430	1430
Equivalent CO ₂ charge	t	88,7	94,4	120,1	128,7	137,3	145,9
Refrigerant charge	Kg	62	66	84	90	96	102
Screw compressors							
Quantity/Circuits	n°/n°	2 / 2	2 / 2	2 / 2	2 / 2	2 / 2	2 / 2
Max. current consumption of the unit	A	290	360	396	442	566	598
Max. starting current of the unit	A	602	559	670	754	650	679
Axial fans							
Quantity	n°	6	6	8	8	8	10
Motors power input	kW	11,6	14,9	19,8	19,8	19,8	19,4
Total condensing air flow	m ³ /h	127500	162000	216000	216000	216000	212500
Electrical current consumption	A	23,4	30,9	41,2	41,2	41,2	39,0
Shell & Tube Evaporator							
Quantity	n°	1	1	1	1	1	1
Water flow	m ³ /h	79,1	88,4	103,8	120,2	138,0	144,1
Pressure drop	kPa	53,0	43,0	60,0	51,0	39,0	42,0
Sound power level ⁽²⁾	dB(A)	93,3	96,8	97,3	97,6	97,4	97,0
Power supply	V/Hz/Ph	400/50/3	400/50/3	400/50/3	400/50/3	400/50/3	400/50/3

RAH AM MC Ka + ECO		802	902	1012	1052	1152
Performance data						
Cooling capacity (EN14511)	kW	889,0	1027,8	1166,0	1200,0	1308,5
Total input power (EN14511)	kW	311,2	342,7	373,0	416,0	430,1
EER	W/W	2,86	3,00	3,13	2,88	3,04
Refrigerant data R134a						
Global warming potential	GWP	1430	1430	1430	1430	1430
Equivalent CO ₂ charge	t	154,4	185,9	197,3	205,9	237,4
Refrigerant charge	Kg	108	130	138	144	166
Screw compressors						
Quantity/Circuits	n°/n°	2 / 2	2 / 2	2 / 2	2 / 2	2 / 2
Max. current consumption of the unit	A	630	712	854	948	980
Max. starting current of the unit	A	686	837	919	1108	1116
Axial fans						
Quantity	n°	10	12	14	14	16
Motors power input	kW	24,8	29,8	34,7	34,7	39,7
Total condensing air flow	m ³ /h	270000	324000	378000	378000	432000
Electrical current consumption	A	51,5	61,8	72,1	72,1	82,4
Shell & Tube Evaporator						
Quantity	n°	1	1	1	1	1
Water flow	m ³ /h	152,9	176,8	200,6	206,4	225,0
Pressure drop	kPa	49,0	64,0	69,0	41,0	45,0
Sound power level ⁽²⁾	dB(A)	97,9	98,6	99,1	101,6	101,8
Power supply	V/Hz/Ph	400/50/3	400/50/3	400/50/3	400/50/3	400/50/3

Performances are referred to the following conditions: ambient air temperature 35°C - water 12/7°C

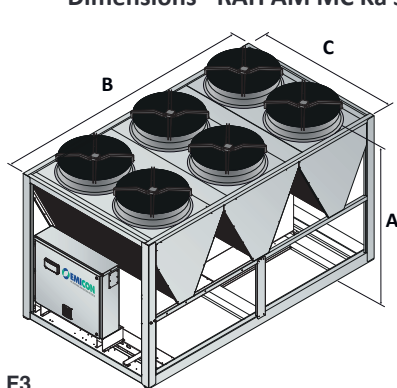
(2) Sound power level in accordance with ISO 3744.

Accessories - RAH AM MC Ka serie

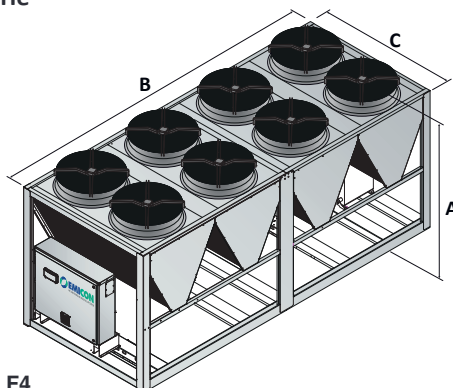
RAH AM MC Ka		412	452	532	612	702	732
Amperometer	A	o	o	o	o	o	o
Anti-corrosive protection of the condensing coils (AIAH coating)	ACP	o	o	o	o	o	o
Electrical power supply different than standard	AE	o	o	o	o	o	o
Low ambient temperature operation (down to -20°C)	BT	o	o	o	o	o	o
Low ambient temperature operation (down to -20°C)	BF	o	o	o	o	o	o
Soundproofed compressors cabinet with standard material	CF	o	o	o	o	o	o
Compressors inrush counter	CS	o	o	o	o	o	o
Star/Delta	DS	-	-	-	-	o	o
Axial fans with electronic commutated motor	EC	o	o	o	o	o	o
Condensing coil protection grid	GP	o	o	o	o	o	o
Anti-intrusion grid	GP1	o	o	o	o	o	o
RS 485 serial interface	IH	o	o	o	o	o	o
LON Serial interface for LON Protocol	IH (LON)	o	o	o	o	o	o
Seawood packing	IM	o	o	o	o	o	o
Serial interface for SNMP or TCP/IP Protocol	IWG	o	o	o	o	o	o
Modulating capacity control	M12	o	o	o	o	o	o
Buffer tank module	MV	-	-	-	-	-	-
Oil flow safety switch	OS	o	o	o	o	o	o
Pump group	P1	o	o	o	o	o	o
Higher available pressure pump group	P1H	o	o	o	o	o	o
Double pump group (only one working)	P2	o	o	o	o	o	o
Higher available pressure double pump group (only one working)	P2H	o	o	o	o	o	o
Rubber-type vibration dampers	PA	o	o	o	o	o	o
Anti-corrosive protection of the condensing coils (Powder coating)	PCP	o	o	o	o	o	o
Safety water flow switch	PF	o	o	o	o	o	o
Spring-type vibration dampers	PM	o	o	o	o	o	o
Remote display	PQ	o	o	o	o	o	o
In-line twin pump group (only one working)	PT	o	o	o	o	o	o
Anti-freeze heater on evaporator	RA	o	o	o	o	o	o
Power factor correction system cosφ ≥ 0,9	RF	o	o	o	o	o	o
Shut-off valve on suction side	RH	o	o	o	o	o	o
Voltmeter	V	o	o	o	o	o	o
Brine Version	VB	o	o	o	o	o	o
Solenoid valve	VS	o	o	o	o	o	o
Compressors overload relays	RL	o	o	o	o	o	o
Partial heat recovery	RP	o	o	o	o	o	o
Total heat recovery	RT	-	-	-	-	-	-
Electronic thermostatic valve	TE	•	•	•	•	•	•
Part-Winding	PW	•	•	•	•	-	-

• Standard o Optional - Not available

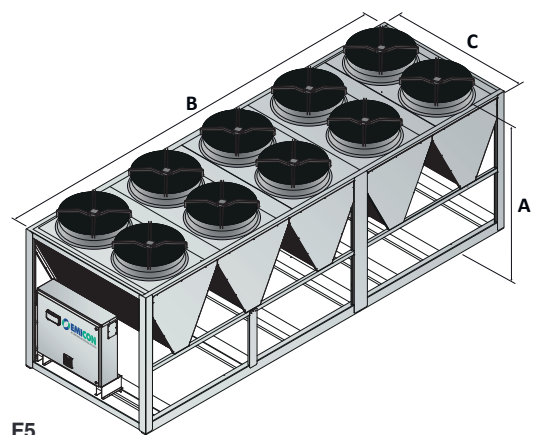
Dimensions - RAH AM MC Ka serie



F3



F4



F5

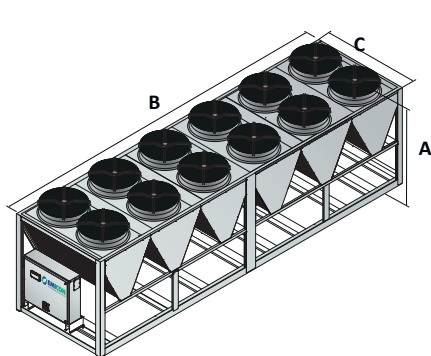
Mod.		A (mm)	B (mm)	C (mm)	Kg
412	F3	2470	4020	2260	3272
452	F3	2470	4020	2260	3972
532	F4	2470	5360	2260	4438
612	F4	2470	5360	2260	4618
702	F4	2470	5360	2260	5838
732	F5	2470	6700	2260	6186

Accessories - RAH AM MC Ka serie

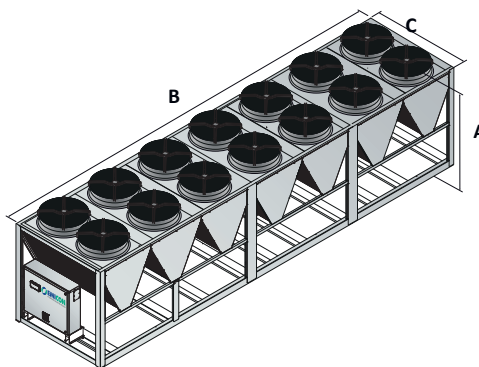
RAH AM MC Ka		802	902	1012	1052	1152
Amperometer	A	o	o	o	o	o
Anti-corrosive protection of the condensing coils (AIAX coating)	ACP	o	o	o	o	o
Electrical power supply different than standard	AE	o	o	o	o	o
Low ambient temperature operation (down to -20°C)	BT	o	o	o	o	o
Low ambient temperature operation (down to -20°C)	BF	o	o	o	o	o
Soundproofed compressors cabinet with standard material	CF	o	o	o	o	o
Compressors inrush counter	CS	o	o	o	o	o
Star/Delta	DS	o	o	o	o	o
Axial fans with electronic commutated motor	EC	o	o	o	o	o
Condensing coil protection grid	GP	o	o	o	o	o
Anti-intrusion grid	GP1	o	o	o	o	o
RS 485 serial interface	IH	o	o	o	o	o
LON Serial interface for LON Protocol	IH (LON)	o	o	o	o	o
Seawood packing	IM	o	o	o	o	o
Serial interface for SNMP or TCP/IP Protocol	IWG	o	o	o	o	o
Modulating capacity control	M12	o	o	o	o	o
Buffer tank module	MV		o	o	o	o
Oil flow safety switch	OS	o	o	o	o	o
Pump group	P1	o	o	o	o	o
Higher available pressure pump group	P1H	o	o	o	o	o
Double pump group (only one working)	P2	o	o	o	o	o
Higher available pressure double pump group (only one working)	P2H	o	o	o	o	o
Rubber-type vibration dampers	PA	o	o	o	o	o
Anti-corrosive protection of the condensing coils (Powder coating)	PCP	o	o	o	o	o
Safety water flow switch	PF	o	o	o	o	o
Spring-type vibration dampers	PM	o	o	o	o	o
Remote display	PQ	o	o	o	o	o
In-line twin pump group (only one working)	PT	o	o	o	o	o
Anti-freeze heater on evaporator	RA	o	o	o	o	o
Power factor correction system cosfi ≥ 0,9	RF	o	o	o	o	o
Shut-off valve on suction side	RH	o	o	o	o	o
Voltmeter	V	o	o	o	o	o
Brine Version	VB	o	o	o	o	o
Solenoid valve	VS	o	o	o	o	o
Compressors overload relays	RL	o	o	o	o	o
Partial heat recovery	RP	o	o	o	o	o
Total heat recovery	RT	-	-	-	-	-
Electronic thermostatic valve	TE	•	•	•	•	•
Part-Winding	PW	o	o	o	o	o

• Standard o Optional - Not available

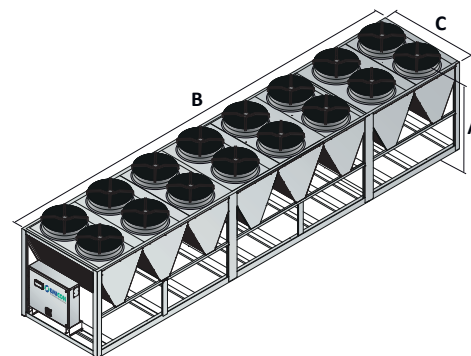
Dimensions - RAH AM MC Ka serie



F6



F7



F8

Mod.		A (mm)	B (mm)	C (mm)	Kg
802	F5	2470	6700	2260	6242
902	F6	2470	8040	2260	6654
1012	F7	2470	9380	2260	7312
1052	F7	2470	9380	2260	7340
1152	F8	2470	10720	2260	7756