

# AIR COOLED CHILLERS WITH SCROLL COMPRESSORS AND AXIAL FANS

REFRIGERANT R407C



RAE 41 K



RAE 181 K



## Series RAE ...K / RAE ...PS.K

Cooling capacity from 4,7 to 17,2 kW - 1 circuit

The air cooled chillers of **RAE K / RAE PS K series** are designed for outdoor installation and are particularly suitable for small and medium sized air conditioning systems, in residential and commercial applications. Therefore during their design, it has been given a particular care for dimensions and sound level, so to have compact and silent units at the same time. They can also be matched to fancoils or terminal units or for water cooling in small industrial processes. They are all available with 1 refrigerant circuit.

Thanks to their compact dimensions and to the several options available, these units are particularly easy to install in small spaces.

They are completely assembled and tested in the factory and supplied with refrigerant and non-freezing oil charge. Therefore, once on site, also with pump and hydraulic tank, the units only need to be positioned and electrically and hydraulically connected.

The following versions are available:

**RAE...K** standard version

Horizontal air flow for models from 41M to 101

Vertical air flow for models from 131 to 181

**RAE...PS K** with hydraulic kit

**Operation limits** (standard units):

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

### Main components:

**Frame made** of galvanized steel plate, suitably treated to resist to external agents and then painted in RAL 7035 colour. The compressor section is completely closed and suitably isolated from the air flow; inside of it, the compressor and the main components are placed so to facilitate also the service operations. The external panels, easy to be dismantled, allow the full access in case of service. For size from 41 to 101, the compressor section is still insulated with close-cell polyurethane foam material. For PS version, the hydraulic kit is installed at the bottom of the unit for size from 41 to 101 and it is composed of: circulation pump, buffer tank, safety valve, pressure gauge, water filling and discharge valves, purging valve, expansion vessel. For other sizes, there is no change in dimensions.

High-efficiency **scroll compressor** (EER 3.37 under ARI conditions), with low sound level, internal heat protection, installed on rubber vibration dampers, supplied with crankcase heater when necessary. Sizer 41M is provided with hermetic piston compressor.

**Heat-exchange external coil** with copper tube and specially corrugated aluminium fins for a better efficiency. It is suitably sized with a wide exchange surface, so to 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.

**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 (option BT).

**Weld-brazed plate evaporator** in AISI 316 stainless steel, with pipes and patented manifold so to reach a high heat exchange coefficient. Its design allows a uniform water distribution, compatibly with pressure drops. The exchanger is provided with close-cell insulating material.

**Cooling circuit** composed of thermostatic expansion valve, dehydrating filter, sight glass, safety device, antifreeze thermostat, high and low pressure switches.

**Electric board** in compliance with CE norms, contained in a suitable partition protected by the internal safety panel, provided with a main switch and an external panel to be opened. It is complete with remote switches, overload protections, transformer for auxiliaries and terminal board. In case of PS version, the electrical control of the pump group is provided.

**Unit management microprocessor** installed on the internal safety panel of the electrical board, complete with compressors hour counter.

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## Accessories

- AE** **Electrical power supply** different from standard: mainly, 230V triphase, 460V triphase. Frequency 50/60 Hz.
- BT** **Low temperature operation (-20°C):** electronic device for the continuous modulating voltage control of the condensing pressure through the variation of the fan rotation speed.
- GP** **Condensing coil protection grid:** metal protection grid against accidental impacts.
- HG** **Hot gas by-pass** (from model 131): mechanical device for modulating cooling capacity.
- 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.
- MF** **Phase monitor:** electronic device controlling the correct sequence and/or the eventual lack of one of the 3 phases, switching off the unit if necessary.
- MT** **High and low pressure gauges** (from size 131) for measuring circuit pressure.
- PA** **Rubber-type vibration dampers:** bell-shaped vibration dampers supports for insulating the unit (supplied in kit), made of base and bell in galvanized steel and natural rubber mixture.

- PF** **Safety water flow switch:** installed on evaporator, it switches off the unit in case of lack of water flow rate through the evaporator.
- PQ** **Remote microprocessor:** remote terminal, allowing to display the temperature and humidity values detected by probes, the alarm digital inputs, the outputs and the remote ON/OFF of the unit, to change and program of the parameters, the sound signal and the display of the present alarms.
- RA** **Anti-freeze heater on evaporator:** electrical heater installed on the evaporator, in order to prevent freezing and provided with thermostat.
- RL** **Compressors overload relays:** electromechanical protection devices against compressor's overload.
- RM** **Condensing coil with pre-painted fins:** superficial treatment of the condensing coils with epoxy coating.
- RR** **Copper/copper condensing coils:** special execution of the condensing coils with copper pipe and fins.
- RV** **Personalized frame painting in RAL colour**
- VB** **Brine version:** unit suitable for working with evaporator outlet water temperatures lower than 0°C. A 20 mm evaporator insulation will be provided.
- VS** **Solenoid valve:** electromagnetic solenoid valve on each cooling circuit to prevent refrigerant migrations and consequent flooding of compressors.



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## Technical data

RAE		41 M K	71 M K	101 M K	101 K	131 K	151 K	161 K	181 K
<b>Cooling capacity</b>									
Cooling capacity	kW	4,7	7,1	8,0	8,1	10,7	12,6	16,3	17,2
Nominal input power	kW	1,6	2,5	3,1	3,2	3,4	4,4	5,3	5,9
EER		2,93	2,84	2,58	2,53	3,14	2,86	3,07	2,91
<b>Axial fans</b>									
Quantity	n.	1				2			
Rotation speed	rpm	900							
Air flow	m <sup>3</sup> /h	3'600	3'850			7'500		6'984	
Air flow	l/s	1'000	1'069			2'083		1'940	
Motor input power	kW	0,15				0,29			
Input current	A	0,6				1,3			
<b>Scroll compressors</b>									
Type		Piston hermetic				Scroll			
Quantity	n.	1							
Circuits	n.	1							
Standard capacity steps	%	0 / 100							
Nominal input current	A	7,8	10,0	12,5	5,2	5,3	6,7		9,3
Maximum input current	A	17,0	19,0	22,0	10,0	12,0	14,0	16,0	18,0
Inrush current	A	54,0	76,0	8,6	46,0	56,0	68,0	77,0	81,0
<b>Evaporator</b>									
Type		Braze plate							
Quantity	n.	1							
Water flow	m <sup>3</sup> /h	0,80	1,20	1,40		1,80	2,20	2,80	3,00
Water flow	l/s	0,22	0,33	0,39		0,50	0,61	0,78	0,83
Pressure drop	kPa	19	36	18		31	41	33	36
<b>Electrical data</b>									
Total input power	kW	1,7	2,6	3,2		3,7	4,7	5,6	6,2
<b>Sound pressure level</b>									
Sound pressure at 1 m	dB(A)	50				54	55		56
<b>PS Version</b>									
Available pressure	kPa	61	52	55		67	54	65	56
Pump group motor power	kW	0,08				0,18			
Capacity of buffer tank	l	30							
<b>Dimensions</b>									
Length	mm	980				1'100			
Width	mm	325				750			
Height	mm	715				1'100			
Transport weight	kg	122	125	128		205	209	226	228
Refrigerant charge per circuit	kg	1,5	2,0	2,1		3,3		5,1	
<b>Dimensions for PS version</b>									
Length	mm	980				1'100			
Width	mm	325				750			
Height	mm	1'000				1'100			
Transport weight with empty buffer tank	kg	158	161	164		238	241	259	260
<b>Electrical power supply</b>									
Electrical power supply	V / ph / Hz	230 / 1 / 50 + N + T				400 / 3 / 50 + N + T			

REMARKS:  
 - Operating conditions: External air temperature 35°C; water temperature 7/12°C  
 - Sound pressure level at 1 m in open field (ISO 3744).

# AIR COOLED CHILLERS WITH SCROLL COMPRESSORS AND AXIAL FANS

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## R407C - Correction factors for cooling capacity (scroll compressors)

External air temperature °C	28	30	32	35	38	40	42	45	48	
Temperature of water leaving from evaporator °C	17	1,522	1,492	1,463	1,416	1,370	1,339	1,304	1,252	1,212
	16	1,477	1,448	1,419	1,374	1,330	1,330	1,265	1,213	1,174
	15	1,433	1,404	1,376	1,333	1,289	1,260	1,226	1,175	1,137
	14	1,388	1,360	1,333	1,291	1,249	1,221	1,187	1,137	1,099
	13	1,343	1,317	1,290	1,250	1,209	1,182	1,148	1,099	1,062
	12	1,298	1,273	1,247	1,208	1,169	1,142	1,110	1,060	1,024
	11	1,253	1,229	1,204	1,166	1,128	1,103	1,071	1,022	0,987
	10	1,028	1,185	1,161	1,125	1,088	1,064	1,032	0,984	0,949
	9	1,163	1,141	1,118	1,087	1,048	1,025	0,993	0,946	0,912
	8	1,118	1,097	1,075	1,041	1,008	0,985	0,954	0,907	0,874
	7	1,073	1,053	1,032	1	0,968	0,946	0,915	0,869	0,837
	6	1,027	1,007	0,986	0,956	0,925	0,904	0,873	0,827	0,800
	5	0,981	0,961	0,941	0,911	0,882	0,862	0,831	0,785	0,763
	4	0,948	0,928	0,909	0,880	0,851	0,831	0,802	0,759	0,735
	3	0,915	0,896	0,877	0,848	0,820	0,801	0,773	0,732	0,708
	2	0,881	0,863	0,845	0,817	0,789	0,770	0,744	0,706	0,681
	1	0,848	0,830	0,813	0,785	0,757	0,739	0,715	0,680	0,654
	0	0,815	0,798	0,781	0,753	0,726	0,708	0,686	0,653	0,626
	-1	0,781	0,765	0,749	0,722	0,695	0,677	0,657	0,627	0,599
	-2	0,748	0,732	0,717	0,690	0,664	0,647	0,628	0,601	0,572
-3	0,715	0,700	0,685	0,659	0,633	0,616	0,599	0,575	0,544	
-4	0,681	0,667	0,653	0,627	0,602	0,585	0,570	0,548	0,517	
-5	0,648	0,634	0,621	0,596	0,571	0,554	0,541	0,522	0,490	

### REMARKS:

- The above coefficients correspond to the mean of the values for the different units, therefore the performances calculated using this chart could be different up to 5% from the data of a specific unit
- If the unit works with an evaporator water temperature below 5 °C, it is absolutely necessary to use a mixture of water and glycol in the percentages listed in the suitable chart.
- Emicon AC SpA disclaims all responsibilities in case of damages deriving from violation of this instructions.
- For further clarifications or information, you are kindly request to contact our sales department.

## R407C - Correction factors for input power (scroll compressors)

External air temperature °C	28	30	32	35	38	40	42	45	48	
Temperature of water leaving from evaporator °C	17	1,007	1,039	1,071	1,126	1,180	1,217	1,257	1,316	1,366
	16	0,994	1,026	1,058	1,113	1,168	1,204	1,244	1,304	1,355
	15	0,981	1,013	1,046	1,100	1,155	1,192	1,232	1,292	1,345
	14	0,968	1,001	1,033	1,088	1,143	1,179	1,219	1,279	1,335
	13	0,955	0,988	1,020	1,075	1,130	1,167	1,207	1,267	1,324
	12	0,942	0,975	1,008	1,063	1,118	1,154	1,194	1,255	1,314
	11	0,929	0,962	0,995	1,050	1,105	1,142	1,182	1,242	1,304
	10	0,916	0,949	0,982	1,037	1,093	1,129	1,170	1,230	1,294
	9	0,903	0,936	0,970	1,025	1,080	1,117	1,157	1,218	1,283
	8	0,890	0,924	0,957	1,012	1,067	1,104	1,145	1,206	1,273
	7	0,877	0,911	0,944	1	1,055	1,092	1,132	1,193	1,263
	6	0,872	0,904	0,937	0,987	1,037	1,071	1,110	1,169	1,232
	5	0,866	0,898	0,929	0,974	1,020	1,050	1,088	1,145	1,201
	4	0,853	0,884	0,915	0,961	1,006	1,036	1,074	1,132	1,189
	3	0,839	0,870	0,901	0,947	0,992	1,023	1,061	1,119	1,177
	2	0,825	0,856	0,888	0,933	0,979	1,009	1,048	1,106	1,166
	1	0,812	0,843	0,874	0,919	0,965	0,996	1,034	1,093	1,154
	0	0,798	0,829	0,860	0,906	0,951	0,982	1,020	1,080	1,142
	-1	0,784	0,815	0,846	0,892	0,938	0,968	1,008	1,067	1,130
	-2	0,770	0,801	0,832	0,878	0,924	0,955	0,994	1,054	1,118
-3	0,757	0,787	0,818	0,864	0,911	0,941	0,981	1,041	1,060	
-4	0,743	0,774	0,804	0,850	0,897	0,928	0,968	1,028	1,094	
-5	0,729	0,760	0,790	0,837	0,883	0,914	0,954	1,015	1,082	

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