General catalogue
Civil and Industrial Air Conditioning

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FAN COILS

ICONS LEGENDA


scroll compressors


screw compressors

air cooled unit

water cooled unit


unit with remote condenser


only cooling units


only cooling and heat pump units

R407C ecological refrigerant

R134a ecological refrigerant

R410A ecological refrigerant

R22 refrigerant


unit with centrifugal fans


high efficiency and energy saving units


Units available in low noise versions and/or with options for reduction of sound level

units with free-cooling

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. Sizel 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 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.

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.

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.

Technical data

RAE		41 M K	71 M K	101 M K	101 K	131 K	151 K	161 K	181 K
Cooling capacity									
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
Axial fans									
Quantity	n.	1				2			
Rotation speed	rpm	900							
Air flow	m^3/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			
Scroll compressors									
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
Evaporator									
Type		Brazed plate							
Quantity	n.	1							
Water flow	m^3/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
Electrical data									
Total input power	kW	1,7	2,6	3,2		3,7	4,7	5,6	6,2
Sound pressure level									
Sound pressure at 1 m	dB(A)	50				54	55		56
PS Version									
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							
Dimensions									
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	
Dimensions for PS version									
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
Electrical power supply									
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).

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 the 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 desclaims all responsabilities in case of damages deriving from violation of this instructions.
- For further clarifications or information, you are kindly request to contact our sales departement.

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	0,142
	-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

REMARKS:
- The above coefficients correspond to the mean of the values for the different units, therefore the performances calculated using this the 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 desclaims all responsabilities in case of damages deriving from violation of this instructions.
- For further clarifications or information, you are kindly request to contact our sales departement.

AIR COOLED CHILLERS
WITH SCROLL COMPRESSORS AND AXIAL FANS

REFRIGERANT R407C

RAE 421 K+MV+P1

RAE 482 K+MV+PT

Series RAE ... K

Cooling capacity from 19 to 82 kW - 1 and 2 circuits

The aircooled chillers of **RAE K series** are designed for outdoor installation and are particularly suitable for small and medium sized air conditioning systems, in residential and commercial applications.
Depending on the cooling capacity, they are available with 1 and 2 cooling circuits.
Thanks to their compact dimensions and to the several options available, these units are particularly easy to install in small spaces, also when supplied with the hydraulic kit.
All sizes are standard provided with an isolated compressors section and the external frame is completely closed.
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 following versions are available:
RAE...K standard version
RAE...U K ultrasilenced version

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. For ultrasilenced version, it is insulated with soundproofing material. The external panels, easy to be dismantled, allow the full access in case of service. When required, the hydraulic kit (buffer tank and pump group) are installed inside the unit, with no change in overall dimensions.

High-efficiency scroll compressor (EER 3,7 at ARI conditions), with low sound level, internal heat protection, installed on rubber vibration dampers, supplied with crankcase heater when necessary. In case of 2 circuit units, in case of problem on one of the circuit, the 50% operation of the unit is anyway granted.

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 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.

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 and hinged panel to be opened. It is complete with remote switches, overload protections, transformer for auxiliaries and terminal board. In case of hydraulic kit on board, 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.

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.

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

GP **Condensing coil protection grid**: metal protection grid against accidental impacts.

HG **Hot gas by-pass**: mechanical device for modulating cooling capacity (only for 1-circuit sizes).

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** for measuring circuit pressure.

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

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 pole centrifugal packaged type.

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.

PT **Twin pump group**: chilled water pump group composed of twin pump, expansion vessel, safety valve, water gauge, water charge and discharge valves, air purging valves, electrical control of the pump, automatic switch in case of failure of the working pump. The pump is of 2 pole centrifugal packaged type. (Available from size 482).

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.

RP **Partial heat recovery** (about 20%) of the condensing heat, by means of a refrigerant/water plate exchanger (desuperheater), always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity.

RR **Copper/copper condensing coils**: special execution of the condensing coils with copper pipe and fins.

RT **Total heat recovery** (100%) of the condensing heat, by means of a refrigerant/water plate exchanger, always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity, and /or for dehumidification.

RV **Personalized frame painting in RAL colour**

SC **Insulated compressors housing** with sound proofing material (included on ultra-silenced version).

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.

Technical data - Standard version - 1 circuit

RAE		201 K	241 K	281 K	361 K	421 K
Cooling capacity						
Cooling capacity	kW	18,7	22,2	26,4	34,1	40,4
Nominal input power	kW	6,5	8,4	9,3	10,6	13,3
EER		2,88	2,64	2,84	3,22	3,04
Axial fans						
Quantity	n.			2		
Rotation speed	rpm		900		860	
Air flow	m^3/h		11`200	10`200	16`000	
Air flow	l/s		3`111	2`833	4`445	
Motor input power	kW		0,74		1,26	
Input current	A		3,4		6,0	
Scroll compressors						
Quantity	n.			1		
Circuits	n.			1		
Standard capacity steps	%			0 – 100		
Nominal input current	A	12,2	14,9	16,7	18,5	23,3
Maximum input current	A	17,0	20,0	22,0	27,0	32,0
Inrush current	A	99,0	123,0	127,0	167,0	198,0
Evaporator						
Type				Brazed plate		
Quantity	n.			1		
Water flow	m^3/h	3,20	3,80	4,50	5,90	6,90
Water flow	l/s	0,89	1,06	1,25	1,64	1,92
Pressure drop	kPa	38	43	44	48	68
Pumps						
P1 – Available pressure	kPa	162	149	127	144	134
P1 – Motor input power	kW			0,55		
P1H – Available pressure	kPa	207	194	167	184	169
P1H – Motor input power	kW		0,55		0,75	
Capacity of buffer tank	l		80		180	
Electrical data						
Total input power	kW	7,2	9,1	10,0	11,9	14,6
Sound pressure level						
Sound pressure at 1 m	dB(A)		62		67	
Dimensions						
Length	mm		1`600		2`000	
Width	mm		750		850	
Height	mm		1`260		1`650	
Transport weight	kg	250	255	295	400	415
Transport weight with empty buffer tank	kg	300	305	345	465	480
Refrigerant charge per circuit	kg	4,2	4,3	6,3	10	11
Electrical power supply						
Electrical power supply	V / ph / Hz			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).

Technical data - Ultrasilenced version - 1 circuit

RAE U		201 K	241 K	281 K	361 K	421 K
Cooling capacity						
Cooling capacity	kW	18,2	22,4	27,4	33,1	39,4
Nominal input power	kW	6,8	8,3	8,7	11,2	13,9
EER		2,68	2,70	3,15	2,95	2,83
Axial fans						
Quantity	n.	2				3
Rotation speed	rpm	680		650		
Air flow	m^3/h	8`000	7`000	11`200		17`400
Air flow	l/s	2`222	1`944	3`111		4`833
Motor input power	kW	0,44		0,62		0,93
Input current	A	2,2		3,1		4,7
Scroll compressors						
Quantity	n.	1				
Circuits	n.	1				
Standard capacity steps	%	0 – 100				
Nominal input current	A	12,5	14,8	16,0	19,3	24,1
Maximum input current	A	17,0	20,0	22,0	27,0	32,0
Inrush current	A	99,0	123,0	127,0	167,0	198,0
Evaporator						
Type		Brazed plate				
Quantity	n.	1				
Water flow	m^3/h	3,10	3,80	4,70	5,70	6,80
Water flow	l/s	0,86	1,06	1,31	1,58	1,89
Pressure drop	kPa	36	44	47	45	65
Pumps						
P1 – Available pressure	kPa	162	149	127	144	134
P1 – Motor input power	kW	0,55				
P1H – Available pressure	kPa	207	194	167	184	169
P1H – Motor input power	kW	0,55			0,75	
Capacity of buffer tank	l	80		180		
Electrical data						
Total input power	kW	7,2	8,7	9,3	11,8	14,8
Sound pressure level						
Sound pressure at 1 m	dB(A)	55		59		61
Dimensions						
Length	mm	1`600		2`000		2`130
Width	mm	750		850		1`100
Height	mm	1`260		1`650		1`760
Transport weight	kg	256	261	370	400	570
Transport weight with empty buffer tank	kg	305	310	435	465	635
Refrigerant charge per circuit	kg	4,2	6,2	10		9,4
Electrical power supply						
Electrical power supply	V / ph / Hz	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).

Technical data - Standard version - 2 circuits

RAE		482 K	562 K	702 K	822 K
Cooling capacity					
Cooling capacity	kW	45,2	51,0	66,2	77,7
Nominal input power	kW	16,3	19,6	22,2	28,0
EER		2,77	2,60	2,98	2,77
Axial fans					
Quantity	n.	3			
Rotation speed	rpm	860			
Air flow	m^3/h	25˙200		21˙300	
Air flow	l/s	7˙000		5˙917	
Motor input power	kW	1,9			
Input current	A	9,0			
Scroll compressors					
Quantity	n.	2			
Circuits	n.	2			
Standard capacity steps	%	0 – 50 – 100			
Nominal input current	A	29,0	35,0	38,0	49,0
Maximum input current	A	40,0	44,0	54,0	64,0
Inrush current	A	143,0	149,0	194,0	230,0
Evaporator					
Type		Brazed plate			
Quantity	n.	2			
Water flow	m^3/h	7,80	8,80	11,40	13,30
Water flow	l/s	2,17	2,44	3,17	3,69
Pressure drop	kPa	44	41	45	63
Pumps					
P1 – Available pressure	kPa	137	130	122	108
P1 – Motor input power	kW	0,75		1,1	
P1H – Available pressure	kPa	187	185	172	158
P1H – Motor input power	kW	1,1		1,5	
PT – Available pressure	kPa	137	140	137	120
PT – Motor input power	kW	1,5			
Capacity of buffer tank	l	180			
Electrical data					
Total input power	kW	18,2	21,5	24,1	29,9
Sound pressure level					
Sound pressure at 1 m	dB(A)	69			
Dimensions					
Length	mm	2˙130			
Width	mm	1˙100			
Height	mm	1˙760			
Transport weight	kg	607	611	682	693
Transport weight with empty buffer tank	kg	672	676	747	758
Refrigerant charge per circuit	kg	4,8	4,9	9,2	9,4
Electrical power supply					
Electrical power supply	V / ph / Hz	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).

Technical data - Ultrasilenced version - 2 circuits

RAE U		482 K	562 K	702 K
Cooling capacity				
Cooling capacity	kW	43,7	52,9	62,6
Nominal input power	kW	17,2	18,5	21,0
EER		2,54	2,86	2,98
Axial fans				
Quantity	n.		3	
Rotation speed	rpm		650	
Air flow	m^3/h	17˙700	14˙200	
Air flow	l/s	4˙917	3˙945	
Motor input power	kW		0,93	
Input current	A		4,7	
Scroll compressors				
Quantity	n.		2	
Circuits	n.		2	
Standard capacity steps	%		0 – 50 – 100	
Nominal input current	A	30,0	33,0	41,0
Maximum input current	A	40,0	44,0	54,0
Inrush current	A	143,0	149,0	194,0
Evaporator				
Type			Brazed plate	
Quantity	n.		2	
Water flow	m^3/h	7,50	9,10	10,70
Water flow	l/s	2,08	2,53	2,97
Pressure drop	kPa	42	44	41
Pumps				
P1 – Available pressure	kPa	140	127	
P1 – Motor input power	kW	0,75		1,1
P1H – Available pressure	kPa	190	177	172
P1H – Motor input power	kW	1,1		1,5
PT – Available pressure	kPa	140	137	142
PT – Motor input power	kW		1,5	
Capacity of buffer tank	l		180	
Electrical data				
Total input power	kW	18,1	19,4	21,9
Sound pressure level				
Sound pressure at 1 m	dB(A)		61	
Dimensions				
Length	mm		2˙130	
Width	mm		1˙100	
Height	mm		1˙760	
Transport weight	kg	614	618	689
Transport weight with empty buffer tank	kg	680	684	754
Refrigerant charge per circuit	kg	4,8	9,0	9,2
Electrical power supply				
Electrical power supply	V / ph / Hz		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).

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 the 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 desclaims all responsabilities in case of damages deriving from violation of this instructions.
- For further clarifications or information, you are kindly request to contact our sales departement.

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	0,142
	-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

REMARKS:
- The above coefficients correspond to the mean of the values for the different units, therefore the performances calculated using this the 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 desclaims all responsabilities in case of damages deriving from violation of this instructions.
- For further clarifications or information, you are kindly request to contact our sales departement.

RAE 1352 F.K + MV

Series RAE .... F.K

Cooling capacity from 77 to 289 kW - 2 circuits

The air cooled chillers of **RAE... F.K series**, are designed for outdoor installation and are particularly suitable for air conditioning systems, in residential and commercial applications. They can also be matched to fancoils or terminal units or for water cooling in industrial processes.
They are all available with 2 refrigerant circuits.
Thanks to their compact dimensions and to the several options available, these units are particularly easy to install in small spaces and easily accessible on all sides for ordinary and extraordinary service operations.
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... F.K standard free-cooling version
RAE... FS.K silenced free-cooling version with soundproofing insulation of compressors section
RAE... FU.K ultrasilenced free-cooling version with soundproofing insulation of compressors section by means of a bituminous rubber coating

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, isolated from the air flow, is completely open; for silenced and ultra-silenced versions, the compressors are protected by a suitable soundproofing cabinet. When required, the hydraulic kit (buffer tank and pump group) are installed inside the unit, with no change in overall dimensions.

High-efficiency scroll compressor (EER 3,7 at ARI conditions), with low sound level, internal heat protection, installed on rubber vibration dampers, supplied with crankcase heater. Being 2 circuit units, in case of problem on one of the circuit, the 50% operation of the unit is anyway granted.

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 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.

Additional free-cooling water coil with copper tube and aluminium fins, for production of chilled water by means of the very low external air temperatures. This allow a remarkable reduction of the compressor's working hours and their operation under capacity steps, with a consequent energy saving. The coil is complete of mixing valve.

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. The fans speed control is standard provided.

Depending on the cooling capacity, **weld-brazed plate evaporator**, with two refrigerant circuits and one water circuit so to make installation easier (when possible), made of AISI 316 steel corrugated plates, with pipes and patented manifold so to reach a high heat exchange coefficient; it is provided with Y-shaped water filter. its design allows a uniform water distribution, compatibly with pressure drops and it is coated with close-cell insulating material. For bigger sizes, the evaporator is of **dry expansion shell and tube type** with two refrigerant circuits, in carbon steel and copper tubes, insulated by close-cell polyurethane foam material.

Cooling circuit composed of thermostatic expansion valve, dehydrating filter, sight glass, high pressure safety device, antifreeze thermostat, high and low pressure switches, 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 main switch and an external and hinged panel to be opened. It is complete with remote switches, overload protections, transformer for auxiliaries and terminal board. In case of hydraulic kit on board, 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. It allows a multilanguage display reading, a detailed description of parameters, the possibility to manage up to 8 units, to manage non standard communication protocols and a quickest access to the program.

Accessories

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

AE **Electrical power supply** different from standard: mainly, 230V triphase, 460V triphase. Frequency 50/60 Hz.

CF **Soundproofed compressors cabinet with standard material**: Insulation of compressors by a cabinet coated with soundproofing material and vibration dampers under compressors (already included in S version).

CFU **Soundproofed compressors cabinet with bituminous rubber coated material**: Insulation of compressors by a suitably coated cabinet, vibration dampers under compressors, mufflers on compressors discharge pipes (already included in U version).

CI **Soundproofing jacket on compressors** made of soundproofing material, wrapped all around compressors so to further reduce the overall sound level of the unit (not available for S and U versions).

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

GP **Condensing coil protection grid**: metal protection grid against accidental impacts.

GP1 **Protection grid for compressors section**: metal protection grid against accidental impacts (not available for 2-fan sizes with CF/CFU option).

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 to 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.

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** for measuring circuit pressure.

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

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 pole centrifugal packaged type.

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.

PM **Spring-type vibration dampers**: spring-type vibration dampers support, for insulating the unit (supplied in kit), mainly indicated for installation in difficult and aggressive environments. Made of two steel plates containing a suitable quantity of harmonic steel springs.

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.

PT **Twin pump group**: chilled water pump group composed of twin pump, expansion vessel, safety valve, water gauge, water charge and discharge valves, air purging valves, electrical control of the pump, automatic switch in case of failure of the working pump. The pump is of 2 pole centrifugal packaged type.

RA **Anti-freeze heater on evaporator**: electrical heater installed on the evaporator, in order to prevent freezing and provided with thermostat.

RF **Power factor correction system cosfi >0,9**: Electrical device made of suitable condensers for compressors rephasing, ensuring a cosfi value ≥0,9 , so to reduce the power absorption from the electrical network.

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.

RP **Partial heat recovery** (about 20%) of the condensing heat, by means of a refrigerant/water plate exchanger (desuperheater), always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity.

RR **Copper/copper condensing coils**: special execution of the condensing coils with copper pipe and fins.

RT **Total heat recovery** (100%) of the condensing heat, by means of a refrigerant/water plate exchanger, always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity, and /or for dehumidification.

RV **Personalized frame painting in RAL colour**

V **Voltmeter**: Electrical device measuring the electrical tension in the power supply of the unit.

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.

Technical data - Standard version

RAE F		752 K	892 K	982 K	1062 K	1332 K	1352 K	1482 K	1622 K	1922 K	1972 K	2292 K	2542 K	2702 K
Cooling capacity														
Cooling capacity	kW	76,9	87,8	100,4	107	137,0	133,0	154,0	164,0	197,0	211,0	235,0	259,0	289,0
Nominal input power	kW	28,2	31,1	37,3	37,2	47,4	45,1	54,7	57,0	69,2	74,2	83,4	91,8	102,0
EER		2,73	2,82	2,69	2,88	2,89	2,95	2,81	2,88	2,85	2,84	2,82		2,83
Free-cooling capacity	kW	60,9	61,7	64,2	63,8	92,2	91,2	93,0	94,7	129,0	128,0	132,0	165,0	166,0
Axial fans														
Quantity	n.	2				3				4			5	
Rotation speed	rpm	880												
Air flow	m³/h	36˙000	33˙840		32˙040	51˙120		47˙880		68˙040	64˙080		84˙960	79˙920
Air flow	l/s	10˙000	9˙400		8˙900	14˙200		13˙300		18˙900	17˙800		23˙600	22˙200
Motor input power	kW	4				6				8			10	
Input current	A	8				12				16			20	
Scroll compressors														
Quantity	n.	2	4		2	4	2	4	2	6	4			
Circuits	n.	2												
Standard capacity steps	n.	2	4		2	4	2	4	2	4				
Nominal input current	A	49	58	68	63	81	76	97	96	117	125	140	154	173
Maximum input current	A	64	80	88	82	108	104	128	125	162	164	208		250
Inrush current	A	230	183	193	266	248	324	294	373	302	348	428		498
Evaporator														
Type		Brazed plate												Shell and tube
Quantity	n.	1												
Water flow	m³/h	13,2	15,1	17,3	18,4	23,6	22,9	26,5	28,2	33,9	36,3	40,4	44,5	49,7
Water flow	l/s	3,7	4,2	4,8	5,1	6,5	6,4	7,4	7,8	9,4	10,1	11,2	12,4	13,8
Pressure drop	kPa	80	98	99	112	89	83	89	100	115	116	118	145	130
Pressure drop in free-cooling	kPa	94	116	123	139	98	92	100	113	136	141	149	186	182
Water volume	l	33		34		50		51		67	68	71	85	119
Pumps														
P1 – Available pressure	kPa	136	108	131	113	137	147	125	106	138	129	111	167	152
P1 – Motor input power	kW	1,9		3,0	3	3,0				5,5			7,5	
P1H – Available pressure	kPa	299	419	407	388	422	413	401	382	249	238	217	211	202
P1H – Motor input power	kW	5,5	7,5										9,2	
PT – Available pressure	kPa	161	135	122	103	124	134	109	89	135	129	119	125	119
PT – Motor input power	kW	3,0			3	3,0				5,5			7,5	
Capacity of buffer tank	l	300								750				
Electrical data														
Total input power	kW	32,2	35,1	41,3	41,2	53,4	51,1	60,7	63	77,2	82,2	91,4	101,8	112
Total nominal input current	A	57	65	76	71	93	88	109	108	133	141	156	174	193
Maximum total input current	A	72	88	96	90	120	116	140	137	178	180	224	228	270
Total inrush current	A	238	191	201	274	260	336	306	385	318	364	444	448	518
Sound pressure level														
Sound pressure at 1 m	dB(A)	69	70		72	74			75	76		77		
Dimensions														
Length	mm	2˙715				3˙740				4˙765			5˙790	
Width	mm	1˙370												
Height	mm	2˙140												
Transport weight	kg	1˙322	1˙522	1˙528	1˙549	1˙981	1˙891	2˙087	2˙048	2˙795	2˙777	2˙795	3˙114	3˙532
Transport weight with empty buffer tank	kg	1˙432	1˙632	1˙638	1˙659	2˙201	2˙111	2˙307	2˙268	3˙015	2˙997	3˙015	3˙334	3˙752
Weight in operation	kg	1˙355	1˙555	1˙562	1˙584	2˙031	1˙941	2˙138	2˙099	2˙862	2˙846	2˙867	3˙199	3˙651
Weight in operation with buffer tank	kg	1˙765	1˙965	1˙972	1˙994	3˙001	2˙911	3˙108	3˙069	3˙832	3˙816	3˙837	4˙169	4˙621
Refrigerant charge per circuit	kg	8	11	12	15	17		23			30	31	29	40
Electrical power supply														
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T + N												

REMARKS:
- Operating conditions: External air temperature 35°C; water temperature 7/12°C
- For free-cooling operation: Air 5°C; Inlet water temperature 15°C, ethylenic glycol 20% .
- Sound pressure level at 1 m in open field (ISO 3744).

Technical data - Silenced version

RAE F.S		752 K	892 K	982 K	1062 K	1332 K	1352 K	1482 K	1622 K	1922 K	1972 K	2292 K
Cooling capacity												
Cooling capacity	kW	77,7	86,9	100,5	107,0	137,0	132,0	154,0	163,0	197,0	210,0	234,0
Nominal input power	kW	27,6	31,8	37,3	36,6	48,0	45,7	54,9	57,2	69,0	75,0	83,6
EER		2,81	2,73	2,69	2,92	2,85	2,89	2,80	2,85		2,80	
Free-cooling capacity	kW	51,8	51,4	75,7	74,6	77,2	76,4	103,9	105,8	131,9	134,4	133,7
Axial fans												
Quantity	n.	2		3				4		5		
Rotation speed	rpm	660										
Air flow	m^3/h	24˙840	23˙040	40˙680	37˙440	34˙560		50˙040		62˙640		57˙600
Air flow	l/s	6˙900	6˙400	11˙300	10˙400	9˙600		13˙900		17˙400		16˙000
Motor input power	kW	2,5		3,8				5		6,3		
Input current	A	4,6		6,9	6,4	6,9		9,2		11,5		
Scroll compressors												
Quantity	n.	2	4		2	4	2	4	2	6	4	
Circuits	n.	2										
Standard capacity steps	n.	2		4	2	4	2	4	2	4		
Nominal input current	A	49	58	68	62	81	77	97	96	116	126	140
Maximum input current	A	64	80	88	82	108	104	128	125	162	164	208
Inrush current	A	230	183	193	266	248	324	294	373	302	348	428
Evaporator												
Type		Brazed plate										
Quantity	n.	1										
Water flow	m^3/h	13,4	14,9	17,3	18,4	23,6	22,7	26,5	28	33,9	36,1	40,2
Water flow	l/s	3,7	4,1	4,8	5,1	6,5	6,3	7,4	7,8	9,4	10	11,2
Pressure drop	kPa	82	96	97	111	88	82	89	100	116	115	119
Pressure drop in free-cooling	kPa	96	114	102	117	98	91	102	115	141	143	154
Water volume	l	33		48		50		65		81	82	85
Pumps												
P1 – Available pressure	kPa	133	110	152	134	138	148		104	134	127	106
P1 – Motor input power	kW	1,9		3,0						5,5		
P1H – Available pressure	kPa	296	421	428	411	425	415		382	246	238	215
P1H – Motor input power	kW	5,5		7,5								
PT – Available pressure	kPa	158	137	143	124	137	128		91	131	127	114
PT – Motor input power	kW	3,0								5,5		
Capacity of buffer tank	l	300						750				
Electrical data												
Total input power	kW	30,1	34,3	41,1	40,4	51,8	49,5	59,9	62,2	75,3	81,3	89,9
Total nominal input current	A	53	62	75	69	88	84	106	105	128	138	152
Maximum total input current	A	69	85	95	89	115	111	137	134	174	176	220
Total inrush current	A	235	188	200	273	255	331	303	382	314	360	440
Sound pressure level												
Sound pressure at 1 m	dB(A)	66		67	70			71		72	73	
Dimensions												
Length	mm	2˙715		3˙740				4˙765		5˙790		
Width	mm	1˙370										
Height	mm	2˙140										
Transport weight	kg	1˙363	1˙563	1˙850	1˙879	2˙033	1˙943	2˙402	2˙362	3˙180	3˙096	3˙198
Transport weight with empty buffer tank	kg	1˙473	1˙673	1˙960	1˙989	2˙143	2˙053	2˙622	2˙582	3˙400	3˙316	3˙418
Weight in operation	kg	1˙396	1˙596	1˙898	1˙927	2˙083	1˙993	2˙467	2˙428	3˙261	3˙178	3˙283
Weight in operation with buffer tank	kg	1˙806	2˙006	2˙308	2˙337	2˙493	2˙403	3˙437	3˙398	4˙231	4˙148	4˙253
Refrigerant charge per circuit	kg	11	15	12	17	23				29		38
Electrical power supply												
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T + N		400 / 3 / 50 + T + N								

REMARKS:
- Operating conditions: External air temperature 35°C; water temperature 7/12°C
- For free-cooling operation: Air 5°C; Inlet water temperature 15°C, ethylenic glycol 20% .
- Sound pressure level at 1 m in open field (ISO 3744).

Technical data - Ultrasilenced version

RAE F.U		752 K	892 K	982 K	1062 K	1332 K	1352 K	1482 K	1622 K	1922 K
Cooling capacity										
Cooling capacity	kW	77,0	86,4	101,0	106,0	137,0	132,0	153,0	164,0	196,0
Nominal input power	kW	28,0	32,1	36,9	37,9	47,7	45,4	55,4	56,8	69,6
EER		2,75	2,69	2,74	2,80	2,87	2,91	2,76	2,89	2,82
Free-cooling capacity	kW	45,3	65,9	66,0	66,9	90,2	89,3	91,0	112,3	116,0
Axial fans										
Quantity	n.	2	3			4			5	
Rotation speed	rpm	530								
Air flow	m^3/h	19˙080	33˙120	29˙880		39˙960		38˙160	50˙040	47˙520
Air flow	l/s	5˙300	9˙200	8˙300		11˙100		10˙600	13˙900	13˙200
Motor input power	kW	1,5	2,3			3,1			3,9	
Input current	A	3,0	4,5			6,0			7,5	
Scroll compressors										
Quantity	n.	2	4		2	4	2	4	2	6
Circuits	n.	2								
Standard capacity steps	n.	2		4	2	4	2	4	2	4
Nominal input current	A	49	58	67	63	81	77	97	96	117
Maximum input current	A	64	80	88	82	108	104	128	125	162
Inrush current	A	230	183	193	266	248	324	294	373	302
Evaporator										
Type		Brazed plate								
Quantity	n.	1								
Water flow	m^3/h	13,2	14,9	17,4	18,2	23,6	22,7	26,3	28,2	33,7
Water flow	l/s	3,7	4,1	4,8	5,1	6,5	6,3	7,3	7,8	9,4
Pressure drop	kPa	81	93	98	107	89	83	88	101	115
Pressure drop in free-cooling	kPa	95	97	103	113	100	93	102	119	141
Water volume	l	33	47	48		64		65	79	81
Pumps										
P1 – Available pressure	kPa	134	128	151	139	136	145	125	101	134
P1 – Motor input power	kW	1,9				3,0				5,5
P1H – Available pressure	kPa	297	439	427	415	422	413	402	378	247
P1H – Motor input power	kW	5,5				7,5				
PT – Available pressure	kPa	159	154	141	129	122	133	109	83	92
PT – Motor input power	kW	3,0								5,5
Capacity of buffer tank	l	300				750				
Electrical data										
Total input power	kW	29,5	34,4	39,2	40,2	50,8	48,5	58,5	60,7	73,5
Total nominal input current	A	52	63	72	68	87	83	104	103	125
Maximum total input current	A	67	85	93	87	114	110	134	133	170
Total inrush current	A	233	188	198	271	254	330	300	381	310
Sound pressure level										
Sound pressure at 1 m	dB(A)	63			65	66		65	68	
Dimensions										
Length	mm	2˙715	3˙740			4˙765			5˙790	
Width	mm	1˙370								
Height	mm	2˙140								
Transport weight	kg	1˙394	1˙829	1˙884	1˙864	2˙328	2˙238	2˙449	2˙724	3˙240
Transport weight with empty buffer tank	kg	1˙504	1˙939	1˙994	1˙974	2˙548	2˙458	2˙699	2˙944	3˙460
Weight in operation	kg	1˙427	1˙876	1˙932	1˙913	2˙392	2˙302	2˙514	2˙803	3˙321
Weight in operation with buffer tank	kg	1˙837	2˙286	2˙342	2˙323	3˙362	3˙272	3˙484	3˙773	4˙291
Refrigerant charge per circuit	kg	15	11	17		23		30	28	37
Electrical power supply										
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T + N				400 / 3 / 50 + T + N				

REMARKS:
- Operating conditions: External air temperature 35°C; water temperature 7/12°C
- For free-cooling operation: Air 5°C; Inlet water temperature 15°C, ethylenic glycol 20% .
- Sound pressure level at 1 m in open field (ISO 3744).

R407C - Correction factors for cooling capacity (free-cooling units with scroll compressors)

External air temperature °C		25	28	30	32	35	38	40	42
Temperature of water leaving from evaporator °C	15	1,475	1,433	1,404	1,376	1,333	1,289	1,260	1,226
	14	1,428	1,388	1,360	1,333	1,291	1,249	1,221	1,187
	13	1,382	1,343	1,317	1,290	1,250	1,209	1,182	1,148
	12	1,336	1,298	1,273	1,247	1,208	1,169	1,142	1,110
	11	1,290	1,253	1,229	1,204	1,166	1,128	1,103	1,071
	10	1,243	1,028	1,185	1,161	1,125	1,088	1,064	1,032
	9	1,197	1,163	1,141	1,118	1,087	1,048	1,025	0,993
	8	1,151	1,118	1,097	1,075	1,041	1,008	0,985	0,954
	7	1,105	1,073	1,053	1,032	1	0,968	0,946	0,915
	6	1,058	1,027	1,007	0,986	0,956	0,925	0,904	0,873
	5	1,011	0,981	0,961	0,941	0,911	0,882	0,862	0,831

REMARKS:
- The above coefficients correspond to the mean of the values for the different units, therefore the performances calculated using this the 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 desclaims all responsabilities in case of damages deriving from violation of this instructions.
- For further clarifications or information, you are kindly request to contact our sales departement.

R407C - Correction factors for input power (free-cooling units with scroll compressors)

External air temperature °C		25	28	30	32	35	38	40	42
Temperature of water leaving from evaporator °C	15	0,933	0,981	1,013	1,046	1,100	1,155	1,192	1,232
	14	0,920	0,968	1,001	1,033	1,088	1,143	1,179	1,219
	13	0,906	0,955	0,988	1,020	1,075	1,130	1,167	1,207
	12	0,893	0,942	0,975	1,008	1,063	1,118	1,154	1,194
	11	0,880	0,929	0,962	0,995	1,050	1,105	1,142	1,182
	10	0,867	0,916	0,949	0,982	1,037	1,093	1,129	1,170
	9	0,854	0,903	0,936	0,970	1,025	1,080	1,117	1,157
	8	0,840	0,890	0,924	0,957	1,012	1,067	1,104	1,145
	7	0,827	0,877	0,911	0,944	1	1,055	1,092	1,132
	6	0,823	0,872	0,904	0,937	0,987	1,037	1,071	1,110
	5	0,819	0,866	0,898	0,929	0,974	1,020	1,050	1,088

REMARKS:
- The above coefficients correspond to the mean of the values for the different units, therefore the performances calculated using this the 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 desclaims all responsabilities in case of damages deriving from violation of this instructions.
- For further clarifications or information, you are kindly request to contact our sales departement.

Operation with water and glycol mixture

	Glycol percentage							
	5%	10%	15%	20%	25%	30%	35%	40%
Freezing temperature °C	-2,1	-3,2	-7	-10	-13	-17	-21	-25
Correction factors:	–	–	–	–	–	–	–	–
Cooling capacity	0,993	0,988	0,982	0,978	0,973	0,968	0,958	0,948
Water flow	1,006	1,015	1,025	1,040	1,060	1,080	1,113	1,142
Pressure drop	1,040	1,090	1,125	1,187	1,250	1,312	1,375	1,460

REMARKS:
- 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 desclaims all responsabilities in case of damages deriving from violation of this instructions.
- For further clarifications or information, you are kindly request to contact our sales departement.

Correction factors of the free-cooling capacity

	Glycol percentage								
		5	10	15	20	25	30	35	40
DT IN-OUT water temperature	3	1,128	1,122	1,115	1,107	1,098	1,087	1,075	1,065
	4	1,082	1,073	1,063	1,053	1,040	1,025	1,010	0,993
	5	1,036	1,025	1,012	1	0,983	0,963	0,943	0,920
	6	0,991	0,978	0,963	0,947	0,926	0,901	0,874	0,844
	7	0,945	0,931	0,912	0,894	0,869	0,839	0,805	0,765
	8	0,902	0,884	0,862	0,841	0,811	0,773	0,733	0,682

REMARKS:
- To be used for the dimensioning of circulating pump according to glycol percentage and DT value between the inlet and the outlet water temperature.

Correction factors of the free-cooling capacity

		Water temperature IN °C											
		6	7	8	9	10	11	12	13	14	15	16	17	18
External air temperature °C	- 5	1,057	1,158	1,260	1,356	1,459	1,563	1,667	1,772	1,877	1,982	2,088	2,194	2,300
	- 4	0,961	1,062	1,163	1,260	1,363	1,466	1,571	1,674	1,779	1,884	1,989	2,095	2,201
	- 3	0,866	0,966	1,066	1,163	1,266	1,370	1,475	1,577	1,681	1,786	1,891	1,996	2,102
	- 2	0,770	0,869	0,970	1,067	1,169	1,273	1,378	1,479	1,583	1,688	1,792	1,898	2,003
	- 1	0,674	0,773	0,873	0,971	1,073	1,177	1,282	1,381	1,485	1,589	1,694	1,799	1,904
	0	0,578	0,677	0,777	0,875	0,976	1,080	1,186	1,284	1,387	1,491	1,595	1,700	1,805
	1	0,482	0,580	0,680	0,778	0,879	0,983	1,089	1,186	1,289	1,393	1,497	1,601	1,706
	2	0,386	0,484	0,584	0,682	0,783	0,887	0,993	1,089	1,191	1,295	1,398	1,502	1,607
	3	0,290	0,388	0,487	0,586	0,686	0,790	0,897	0,991	1,094	1,196	1,300	1,404	1,508
	4	0,194	0,291	0,390	0,489	0,590	0,693	0,801	0,893	0,996	1,098	1,201	1,305	1,408
	5	–	0,195	0,294	0,393	0,493	0,593	0,694	0,796	0,898	1	1,103	1,206	1,309
	6	–	–	0,196	0,295	0,395	0,495	0,595	0,696	0,798	0,900	1,003	1,106	1,209
	7	–	–	–	0,197	0,296	0,396	0,496	0,597	0,699	0,800	0,903	1,005	1,108
	8	–	–	–	–	0,198	0,297	0,397	0,498	0,599	0,701	0,803	0,905	1,008
	9	–	–	–	–	–	0,199	0,298	0,399	0,499	0,601	0,702	0,805	0,907
	10	–	–	–	–	–	–	0,199	0,299	0,400	0,501	0,602	0,704	0,807
	11	–	–	–	–	–	–	–	0,200	0,300	0,401	0,502	0,604	0,707
	12	–	–	–	–	–	–	–	–	0,201	0,301	0,402	0,504	0,606
	13	–	–	–	–	–	–	–	–	–	0,201	0,302	0,403	0,506
	14	–	–	–	–	–	–	–	–	–	–	0,202	0,303	0,405
	15	–	–	–	–	–	–	–	–	–	–	–	0,203	0,305

EXAMPLE:
You want to know the free-cooling capacity of one unit at the following conditions : 35% ethylenic glycol , inlet temperature 12 °C, DT of 6 °C between the inlet and the outlet temperature and 2 °C of external air temperature.
Supposed 100 kW as nominal free cooling capacity at nominal condition, correction factors to be applied are 0,874 and 0,993, so the real capacity will be 100 x 0,874 x 0,993 = 86,788 kW
N.B.
The above coefficients correspond to the mean of the values for the different units, therefore the performances calculated using this the chart could be different up to 5% from the data of a specific unit.

AIR COOLED CHILLERS
WITH SCROLL COMPRESSORS AND CENTRIFUGAL FANS

REFRIGERANT R407C

RAE 131 C K

Series RAE ... C K

Cooling capacity from 11 to 18 kW - 1 circuit

The air cooled chillers of **RAE C K series**, with centrifugal fans, are designed for indoor 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, the units only need to be positioned and electrically and hydraulically connected.

The following versions are available with vertical air flow:
RAE...C K standard version
RAE...C 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 PS version, the hydraulic kit is installed at the bottom of the unit, with no change in dimensions and it is composed of: circulation pump, buffer tank, safety valve, pressure gauge, water filling and discharge valves, purging valve, expansion vessel.

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.

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 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.

Centrifugal fans of double suction type with electrical motor directly joined to the wheel, with a low sound level and provided with short circuit and overload protections and external safety protection grid.

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.

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**: 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** 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.

Technical data

RAE		131 C K	151 C K	161 C K	181 C K
Cooling capacity					
Cooling capacity	kW	10,7	12,6	16,3	17,2
Nominal input power	kW	3,4	4,4	5,3	5,9
EER		3,15	2,86	3,07	2,91
Centrifugal fans					
Quantity	n.	2			
Air flow	m^3/h	7˙500		6˙700	
Air flow	l/s	2˙083		1˙861	
Rotation speed	rpm	1˙250			
Motor input power	kW	1,0		2,2	
Input current	A	13,6			
Available pressure	Pa	40		165	
Scroll compressors					
Quantity	n.	1			
Circuits	n.	1			
Standard capacity steps	%	0 – 100			
Nominal input current	A	5,4	6,3	9,0	10,4
Maximum input current	A	12,0	14	16,0	18,0
Inrush current	A	56,0	68	77,0	81,0
Evaporator					
Type		Brazed plate			
Quantity	n.	1			
Water flow	m^3/h	1,80	2,20	2,80	3,00
Water flow	l/s	0,50	0,61	0,78	0,83
Pressure drop	kPa	32	43	34	38
Electrical data					
Total input power	kW	3,4	4,4	5,3	5,9
Sound pressure level					
Sound pressure at 1 m	dB(A)	60			
PS Version					
Available pressure	kPa	65	48	52	47
Pump group motor power	kW	0,18			
Capacity of buffer tank	l	30			
Dimensions					
Length	mm	1˙100			
Width	mm	750			
Height	mm	1˙100			
Transport weight	kg	217	221	238	240
Refrigerant charge per circuit	kg	3,3		5,1	
Dimensions for PS version					
Length	mm	1˙100			
Width	mm	750			
Height	mm	1˙100			
Transport weight with empty buffer tank	kg	238	241	259	260
Electrical power supply					
Electrical power supply	V / ph / Hz	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).

RAE 201 C K

RAE 482 C K

Series RAE ... C K

Cooling capacity from 19 to 83 kW - 1 and 2 circuits

The air cooled chillers of **RAE ... C K series**, with centrifugal fans, are designed for indoor installation and are particularly suitable for small and medium sized air conditioning systems, in residential and commercial applications. They can also be matched to fancoils or terminal units or for water cooling in small industrial processes.
They are all available with 1 or 2 refrigerant circuits.
During their design, it has been given a particular care for dimensions and compactness, so to facilitate their handling and positioning in site. In order to further reduce weight and dimensions, in case of particular applications, when the units are provided with buffer tank and pump group, on request it is possible to separately supply the hydraulic kit, usually included in the frame of the unit itself.
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 following versions are available:
Vertical air flow
RAE...C K standard version
RAE...C U K ultrasilenced version
Horizontal air flow
RAE...C.O K standard version
RAE...C.O U K ultrasilenced version

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. When required, the hydraulic kit (buffer tank and pump group) are installed at the bottom of the unit, in a suitable section.

High-efficiency scroll compressor (EER 3,7 at ARI conditions), with low sound level, internal heat protection, installed on rubber vibration dampers, supplied with crankcase heater when necessary. In case of 2 circuit units, in case of problem on one of the circuit, the 50% operation of the unit is anyway granted.

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 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.

Centrifugal fans of double suction type with electrical motor directly joined and balanced blades, suitably isolated with rubber vibration dampers and sealing on discharge. They are provided with short circuit and overload protections and external safety protection grid. The motor is of 4-pole triphase type, with belt transmission and variable pulleys, placed on slide so to speed up the pulley tension. As a standard, the unit has a vertical airflow or, on request, you can ask for an horizontal airflow (coil side).

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 and hinged panel to be opened. It is complete with remote switches, overload protections, transformer for auxiliaries and terminal board. In case of hydraulic kit on board, 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.

Accessories

AE **Electrical power supply different from standard:** mainly, 230V three-phase, 460V three-phase. Frequency 50/60 Hz.

BF **Low temperature operation (-20°C) with inverter fan speed regulation**: electronic device controlling the condensing pressure through an inverter, modulating the frequency of the fans electrical supply.

BFa-BFb **Low temperature operation (-20°C) with inverter fan speed regulation (with option 1M and 2M)**: electronic device controlling the condensing pressure through an inverter, modulating the frequency of the fans electrical supply.

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 (not available for size 822).

BTa **Low temperature operation (-20°C with option 1M)**: electronic device for the continuous modulating voltage control of the condensing pressure through the variation of the fan rotation speed (not available for size 822).

CF **Soundproofed compressors cabinet**: Insulation of compressors by a cabinet coated with soundproofing material and vibration dampers under compressors (included on ultrasilenced version).

CI **Soundproofing jacket on compressors:** made of soundproofing material, wrapped all around compressors so to further reduce the overall sound level of the unit (already included on ultrasilenced version).

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

GP **Condensing coil protection grid**: metal protection grid against accidental impacts.

HG **Hot gas by-pass**: mechanical device for modulating cooling capacity (only for 1-circuit sizes).

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** for measuring circuit pressure.

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

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 pole centrifugal packaged type.

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.

PT **Twin pump group**: chilled water pump group composed of twin pump, expansion vessel, safety valve, water gauge, water charge and discharge valves, air purging valves, electrical control of the pump, automatic switch in case of failure of the working pump. The pump is of 2 pole centrifugal packaged type. (Available from size 482).

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.

RP **Partial heat recovery** (about 20%) of the condensing heat, by means of a refrigerant/water plate exchanger (desuperheater), always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity.

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.

Technical data - Standard version - 1 circuit

RAE		201 C K	241 C K	281 C K	361 C K	421 C K
Cooling capacity						
Cooling capacity	kW	19,6	24,1	27,9	33,9	41,8
Nominal input power	kW	6,6	7,7	8,8	11,0	13,2
EER		2,97	3,13	3,17	3,08	3,17
Centrifugal fans						
Quantity	n.	1			2 (*)	
Air flow	m^3/h	8`800	8`650	9`000	11`200	13`000
Air flow	l/s	2`444	2`403	2`500	3`111	3`611
STD Version						
Available pressure	Pa	80				
Rotation speed	rpm	896	915	975	746	858
Motor input power	kW	2,2		3,0	2,2	3,0
Nominal input current	A	5,3		6,7	5,3	6,7
Sound pressure level	dB(A)	66		67	64	65
1M Version						
Available pressure	Pa	120				
Rotation speed	rpm	935	955	1`014	811	914
Motor input power	kW	3,0			2,2	3,0
Nominal input current	A	6,7			5,3	6,7
Sound pressure level	dB(A)	67		68	65	66
2M Version						
Available pressure	Pa	200				
Rotation speed	rpm	1`014	1`036	1`091	938	1`025
Motor input power	kW	3,0				4,0
Nominal input current	A	6,7				9,4
Sound pressure level	dB(A)	68		69	66	67
Scroll compressors						
Quantity	n.	1				
Circuits	n.	1				
Standard capacity steps	%	0 – 100				
Nominal input current	A	12,9	15,1	16,0	18,7	22,7
Maximum input current	A	17,0	20,0	22,0	27,0	32,0
Inrush current	A	99,0	123,0	127,0	167,0	198,0
Evaporator						
Type		Brazed plate				
Quantity	n.	1				
Water flow	m^3/h	3,4	4,1	4,8	5,8	7,2
Water flow	l/s	0,94	1,14	1,33	1,61	2,00
Pressure drop	kPa	41	50	48	47	72
Pumps						
P1 – Available pressure	kPa	179	152	148	155	132
P1 – Motor input power	kW	0,55			0,75	
P1H – Available pressure	kPa	239	207	198	210	262
P1H – Motor input power	kW	0,55		0,75		1,1
Capacity of buffer tank	l	180				
Electrical data						
Total input power	kW	8,8	9,9	11,8	13,2	16,2
Dimensions						
Length	mm	1`320			1`665	
Width	mm	750				
Height	mm	1`250			1`460	
Length with MV option	mm	1`665				
Width with MV option	mm	750				
Height with MV option	mm	1`675			1`885	
Transport weight	kg	395	406	417	499	522
Transport weight with empty buffer tank	kg	575	586	597	679	702
Refrigerant charge per circuit	kg	4,6	6,0	7,4	9,3	12,0
Electrical power supply						
Electrical power supply	V / ph / Hz	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) with ducted air suction and discharge
- (*) 2 fans in tandem, driven by 1 motor.
- In case of a different available pressure, included between the standard pressure and the values indicated for 1M or 2M options, however not higher 2M, it is necessary to order the higher pressure option, clearly stating the pressure value effectively requested on site. In the factory we will adjust the motor's pulley accordingly.

Technical data - Ultrasilenced version - 1 circuit

RAE		201 C.U K	241 C.U K	281 C.U K	361 C.U K	421 C.U K
Cooling capacity						
Cooling capacity	kW	19,9	23,6	27,9	34,8	41,2
Nominal input power	kW	6,5	8,0	8,8	11,1	13,4
EER		3,06	2,95	3,17	3,13	3,07
Centrifugal fans						
Quantity	n.	1		2 (*)		2
Air flow	m^3/h	6`300	7`200	6`950	9`600	13`900
Air flow	l/s	1`750	2`000	1`930	2`666	3`861
STD Version						
Available pressure	Pa	80		50	80	
Rotation speed	rpm	720	818	637	711	696
Motor input power	kW	1,5				3,0
Nominal input current	A	3,7				7,4
Sound pressure level	dB(A)	62	64	61	63	
1M Version						
Available pressure	Pa	120				
Rotation speed	rpm	776	866	728	785	752
Motor input power	kW	1,5	2,2	1,5		3,0
Nominal input current	A	3,7	5,3	3,7		7,4
Sound pressure level	dB(A)	62	64	61	64	
2M Version						
Available pressure	Pa	200				
Rotation speed	rpm	886	963	891	925	858
Motor input power	kW	1,5	2,2	1,5	2,2	4,4
Nominal input current	A	3,7	5,3	3,7	5,3	10,6
Sound pressure level	dB(A)	63	65	62	64	
Scroll compressors						
Quantity	n.	1				
Circuits	n.	1				
Standard capacity steps	%	0 – 100				
Nominal input current	A	12,7	15,4	16,1	18,9	23,0
Maximum input current	A	17,0	20,0	22,0	27,0	32,0
Inrush current	A	99,0	123,0	127,0	167,0	198,0
Evaporator						
Type		Brazed plate				
Quantity	n.	1				
Water flow	m^3/h	3,4	4,0	4,8	6,0	7,1
Water flow	l/s	1,94	1,11	1,33	1,67	1,97
Pressure drop	kPa	42	48		50	71
Pumps						
P1 – Available pressure	kPa	178	154	148	155	133
P1 – Motor input power	kW	0,55			0,75	
P1H – Available pressure	kPa	238	209	198	210	263
P1H – Motor input power	kW	0,55	0,75			1,1
Capacity of buffer tank	l	180				240
Electrical data						
Total input power	kW	8,0	9,5	10,3	12,6	16,4
Dimensions						
Length	mm	1`320		1`665		2`120
Width	mm	750				778
Height	mm	1`250		1`460		1`570
Length with MV option	mm	1`665				2`280
Width with MV option	mm	750				996
Height with MV option	mm	1`675		1`885		1`995
Transport weight	kg	396	407	501	511	642
Transport weight with empty buffer tank	kg	576	587	681	691	872
Refrigerant charge per circuit	kg	5,9	7,3	11,0	11	12
Electrical power supply						
Electrical power supply	V / ph / Hz	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) with ducted air suction and discharge
- (*) 2 fans in tandem, driven by 1 motor.
- In case of a different available pressure, included between the standard pressure and the values indicated for 1M or 2M options, however not higher 2M, it is necessary to order the higher pressure option, clearly stating the pressure value effectively requested on site. In the factory we will adjust the motor's pulley accordingly.

Technical data - Standard version - 2 circuits

RAE		482 C K	562 C K	702 C K	822 C K
Cooling capacity					
Cooling capacity	kW	48,1	55,6	67,9	83,5
Nominal input power	kW	15,4	17,5	22,2	26,6
EER		3,12	3,18	3,06	3,14
Centrifugal fans					
Quantity	n.	2			
Air flow	m^3/h	16˙700	20˙900	24˙600	28˙400
Air flow	l/s	4˙639	5˙806	6˙834	7˙889
STD Version					
Available pressure	Pa	80			
Rotation speed	rpm	782	919	640	745
Motor input power	kW	4,4	8,0	6,0	11,0
Nominal input current	A	10,6	18,8	13,4	24,0
Sound pressure level	dB(A)	65	66	68	
1M Version					
Available pressure	Pa	120			
Rotation speed	rpm	830	959	669	769
Motor input power	kW	4,4	8,0		11,0
Nominal input current	A	10,6	18,8		24,0
Sound pressure level	dB(A)	66	68	71	72
2M Version					
Available pressure	Pa	200			
Rotation speed	rpm	923	1˙037	725	819
Motor input power	kW	6,0	8,0		11,0
Nominal input current	A	13,4	18,8		24,0
Sound pressure level	dB(A)	67		71	74
Scroll compressors					
Quantity	n.	2			
Circuits	n.	2			
Standard capacity steps	%	0 – 50 – 100			
Nominal input current	A	30,0	32,0	38,0	46,0
Maximum input current	A	40,0	44,0	54,0	64,0
Inrush current	A	143,0	149,0	194,0	230,0
Evaporator					
Type		Brazed plate			
Quantity	n.	2			
Water flow	m^3/h	8,3	9,6	11,7	14,4
Water flow	l/s	2,30	2,6	3,2	3,99
Pressure drop	kPa	49	48	47	72
Pumps					
P1 – Available pressure	kPa	132	113	180	107
P1 – Motor input power	kW	0,75		1,1	
P1H – Available pressure	kPa	237	223	250	157
P1H – Motor input power	kW	1,1		1,5	
PT – Available pressure	kPa	132	133	135	127
PT – Motor input power	kW	1,5			
Capacity of buffer tank	l	240			
Electrical data					
Total input power	kW	20,0	26,0	28,0	38,0
Total nominal input current	A	41,0	51,0		70,0
Maximum total input current	A	51,0	63,0	67,0	88,0
Total inrush current	A	154,0	168,0	213,0	254,0
Dimensions					
Length	mm	2˙120		2˙280	
Width	mm	778		990	
Height	mm	1˙570		1˙845	
Length with MV option	mm	2˙280			
Width with MV option	mm	990			
Height with MV option	mm	1˙995		2˙270	
Transport weight	kg	752	782	856	929
Transport weight with empty buffer tank	kg	982	1˙012	1˙086	1˙159
Refrigerant charge per circuit	kg	5,8	5,9	7,8	9,7
Electrical power supply					
Electrical power supply	V / ph / Hz	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) with ducted air suction and discharge
- In case of a different available pressure, included between the standard pressure and the values indicated for 1M or 2M options, however not higher 2M, it is necessary to order the higher pressure option, clearly stating the pressure value effectively requested on site. In the factory we will adjust the motor's pulley accordingly.

Technical data - Ultrasilenced version - 2 circuits

RAE		482 C.U K	562 C.U K	702 C.U K
Cooling capacity				
Cooling capacity	kW	47,9	55,4	67,9
Nominal input power	kW	15,5	17,7	22,2
EER		3,09	3,13	3,06
Centrifugal fans				
Quantity	n.		2	
Air flow	m^3/h	14˙700	18˙000	20˙700
Air flow	l/s	4˙083	5˙000	5˙750
STD Version				
Available pressure	Pa		80	
Rotation speed	rpm	460	509	585
Motor input power	kW	3,0		4,4
Nominal input current	A	7,4		10,6
Sound pressure level	dB(A)	60	58	
1M Version				
Available pressure	Pa		120	
Rotation speed	rpm	508	548	616
Motor input power	kW	3,0		4,4
Nominal input current	A	7,4		10,6
Sound pressure level	dB(A)	61	63	66
2M Version				
Available pressure	Pa		200	
Rotation speed	rpm	599	626	684
Motor input power	kW	3,0	4,4	6,0
Nominal input current	A	7,4	10,6	13,4
Sound pressure level	dB(A)	62	64	66
Scroll compressors				
Quantity	n.		2	
Circuits	n.		2	
Standard capacity steps	%		0 – 50 – 100	
Nominal input current	A	30,0	32,0	38,0
Maximum input current	A	40,0	44,0	54,0
Inrush current	A	143,0	149,0	194,0
Evaporator				
Type			Brazed plate	
Quantity	n.		2	
Water flow	m^3/h	8,2	9,5	11,7
Water flow	l/s	2,29	2,65	3,24
Pressure drop	kPa	49	48	47
Pumps				
P1 – Available pressure	kPa	132	114	180
P1 – Motor input power	kW	0,75		1,10
P1H – Available pressure	kPa	237	224	250
P1H – Motor input power	kW	1,1		1,5
PT – Available pressure	kPa	132	134	135
PT – Motor input power	kW		1,5	
Capacity of buffer tank	l		240	
Electrical data				
Total input power	kW	19,0	21,0	27,0
Total nominal input current	A	38,0	40,0	48,0
Maximum total input current	A	47,0	51,0	65,0
Total inrush current	A	150,0	156,0	205,0
Dimensions				
Length	mm		2˙280	
Width	mm		990	
Height	mm		1˙845	
Length with MV option	mm		2˙280	
Width with MV option	mm		990	
Height with MV option	mm		2˙270	
Transport weight	kg	825		869
Transport weight with empty buffer tank	kg	1˙055		1˙099
Refrigerant charge per circuit	kg	7,5	7,6	9,5
Electrical power supply				
Electrical power supply	V / ph / Hz		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) with ducted air suction and discharge
- In case of a different available pressure, included between the standard pressure and the values indicated for 1M or 2M options, however not higher 2M, it is necessary to order the higher pressure option, clearly stating the pressure value effectively requested on site. In the factory we will adjust the motor's pulley accordingly.

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 the 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 desclaims all responsabilities in case of damages deriving from violation of this instructions.
- For further clarifications or information, you are kindly request to contact our sales departement.

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	0,142
	-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

REMARKS:
- The above coefficients correspond to the mean of the values for the different units, therefore the performances calculated using this the 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 desclaims all responsabilities in case of damages deriving from violation of this instructions.
- For further clarifications or information, you are kindly request to contact our sales departement.

AIR COOLED CHILLERS
WITH SCROLL COMPRESSORS AND CENTRIFUGAL FANS

REFRIGERANT R407C

RAE 1402 C O K

Series RAE .... C K

Cooling capacity from 81 to 250 kW - 2 circuits

The air cooled chillers of **RAE C K series**, with centrifugal fans, are designed for indoor installation and are particularly suitable for small and medium sized air conditioning systems, in residential and commercial applications. They can also be matched to fancoils or terminal units or for water cooling in industrial processes.
They are all available with 2 refrigerant circuits.
Thanks to their compact dimensions and to the several options available, these units are particularly easy to install in small spaces.
The whole range is complete of a compressors section, allowing a quick and easy ordinary service to the units.
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 following versions are available:
Vertical air flow
RAE...C K standard version
RAE...C U K ultrasilenced version
Horizontal air flow
RAE...C.O K standard version
RAE...C.O U K ultrasilenced version

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 installed. The external panels, easy to be dismantled with a quick ¾ key turn, allow the full access to all components in case of service. When required, the hydraulic kit (buffer tank and pump group) are installed inside the unit.

High-efficiency scroll compressor (EER 3,7 at ARI conditions), with low sound level, internal heat protection, installed on rubber vibration dampers, supplied with crankcase heater. Being 2 circuit units, in case of problem on one of the circuit, the 50% operation of the unit is anyway granted.

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 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.

Centrifugal fans of double suction type with electrical motor directly joined and balanced blades, suitably isolated with rubber vibration dampers and sealing on discharge. They are provided with short circuit and overload protections and external safety protection grid. The motor is of 4-pole triphase type, with belt transmission and variable pulleys, placed on slide so to speed up the pulley tension. As a standard, the unit has a vertical airflow or, on request, you can ask for an horizontal airflow (coil side).

Dry expansion **shell and tube evaporator** with two refrigerant circuits, in carbon steel and copper tubes, insulated by close-cell polyurethane foam material.

Cooling circuit composed of thermostatic expansion valve, dehydrating filter, sight glass, high pressure safety device, antifreeze thermostat, high and low pressure switches, 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 main switch and an external and hinged panel to be opened. It is complete with remote switches, overload protections, transformer for auxiliaries and terminal board. In case of hydraulic kit on board, 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.

Accessories

1M–2M **Higher available pressure for fan**: bigger electrical motor, so to have a higher available pressure to fans to be ducted.

AE **Electrical power supply different from standard:** mainly, 230V three-phase, 460V three-phase. Frequency 50/60 Hz.

BF **Low temperature operation (-20°C) with inverter fan speed regulation**: electronic device controlling the condensing pressure through an inverter, modulating the frequency of the fans electrical supply.

BFa-BFb **Low temperature operation (-20°C) with inverter fan speed regulation (with option 1M and 2M)**: electronic device controlling the condensing pressure through an inverter, modulating the frequency of the fans electrical supply.

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.

BTa **Low temperature operation (-20°C with option 1M)**: electronic device for the continuous modulating voltage control of the condensing pressure through the variation of the fan rotation speed.

CF **Soundproofed compressors cabinet**: Insulation of compressors by a cabinet coated with soundproofing material and vibration dampers under compressors (included on ultrasilenced version).

CI **Soundproofing jacket on compressors:** made of soundproofing material, wrapped all around compressors so to further reduce the overall sound level of the unit (already included on ultrasilenced version).

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

GP **Condensing coil protection grid**: metal protection grid against accidental impacts.

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.

MP **Oversized microprocessor**: compared to the standard microprocessor, it allows a multi-language display reading, a more detailed description of parameters, the possibility to manage up to 8 units, to manage non standard communication protocols, a better access to the program.

MT **High and low pressure gauges** for measuring circuit pressure.

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

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 pole centrifugal packaged type.

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.

PM **Spring-type vibration dampers**: spring-type vibration dampers support, for insulating the unit (supplied in kit), mainly indicated for installation in difficult and aggressive environments. Made of two steel plates containing a suitable quantity of harmonic steel springs.

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.

PT **Twin pump group**: chilled water pump group composed of twin pump, expansion vessel, safety valve, water gauge, water charge and discharge valves, air purging valves, electrical control of the pump, automatic switch in case of failure of the working pump. The pump is of 2 pole centrifugal packaged type.

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.

RP **Partial heat recovery** (about 20%) of the condensing heat, by means of a refrigerant/water plate exchanger (desuperheater), always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity.

RR **Copper/copper condensing coils**: special execution of the condensing coils with copper pipe and fins.

RT **Total heat recovery** (100%) of the condensing heat, by means of a refrigerant/water plate exchanger, always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity, and /or for dehumidification. It is necessary to consider option BT.

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.

Technical data - Standard version

RAE		842 C K	962 C K	1102 C K	1402 C K	1502 C K	1602 C K	2302 C K	2402 C K	2602 C K
Cooling capacity										
Cooling capacity	kW	80,8	86,1	96,0	126,0	133,0	149,0	199,8	215,0	229,0
Nominal input power	kW	27,1	31,8	38,0	44,4	50,2	56,0	69,6	73,4	80,0
EER		2,98	2,71	2,53	2,84	2,65	2,66	2,87	2,93	2,86
Centrifugal fans										
Quantity	n.	3			4			6		
Air flow	m^3/h	40˙000	37˙500		50˙000		48˙000	73˙200		
Air flow	l/s	11˙110	10˙415		13˙890		13˙300	20˙330		
STD Version										
Available pressure	Pa	50	70				100	80		
Rotation speed	rpm	920	900		915		935	920		
Motor input power	kW	12,0			16,0			24,0		
Nominal input current	A	28,2			37,6			56,4		
Sound pressure level	dB(A)	70			72		73	74		
1M Version										
Available pressure	Pa	100	180		190		240	220		
Rotation speed	rpm	970	1˙030				1˙065	1˙050		
Motor input power	kW	12,0			16,0			24,0		
Nominal input current	A	28,2			37,6			56,4		
Sound pressure level	dB(A)	72	71	72	74		75	78		
2M Version										
Available pressure	Pa	260	270		350		355	350		
Rotation speed	rpm	1˙110	1˙100		1˙170					
Motor input power	kW	15,5			22,0			33,0		
Nominal input current	A	36,0			48,0			72,0		
Sound pressure level	dB(A)	75			76			77		78
Scroll compressors										
Quantity	n.	2	4							
Circuits	n.	2								
Standard capacity steps	n.	2								
Optional capacity steps	n.	–	4							
Nominal input current	A	48,0	57,0	68,0	77,0	89,0	93,0	117,0	126,0	139,0
Maximum input current	A	64,0	80,0	88,0	108,0	118,0	128,0	164,0	186,0	208,0
Inrush current	A	230,0	183,0	193,0	248,0	284,0	294,0	348,0	406,0	428,0
Evaporator										
Type		Shell and tube								
Quantity	n.	1								
Water flow	m^3/h	13,9	14,8	16,5	21,7	22,9	25,6	34,4	36,9	39,4
Water flow	l/s	3,86	4,11	4,59	6,02	6,35	7,12	9,55	10,27	10,94
Pressure drop	kPa	21	27	30	49	55	69	47	74	80
Pumps										
P1 – Available pressure	kPa	124	118	110	116	100	76	133	101	86
P1 – Motor input power	kW	1,1				1,5			3,0	
P1H – Available pressure	kPa	159	153	145	161	145	121	183	151	136
P1H – Motor input power	kW	1,5				2,2			4,0	
PT – Available pressure	kPa	149	138	130	131	110	86	123	86	71
PT – Motor input power	kW	1,5				2,2			3,0	
Capacity of buffer tank	l	720								
Electrical data										
Total input power	kW	39,0	44,0	50,0	60,0	66,0	72,0	94,0	97,0	104,0
Total nominal input current	A	78,0	88,0	98,0	118,0	131,0	135,0	178,0	187,0	200,0
Maximum total input current	A	94,0	110,0	118,0	150,0	156,0	170,0	225,0	242,0	269,0
Total inrush current	A	260,0	213,0	223,0	286,0	322,0	336,0	409,0	462,0	489,0
Dimensions										
Length	mm	2˙610			3˙460			5˙150		
Width	mm	1˙245								
Height	mm	1˙995								
Length with MV option	mm	3˙460			4˙305			5˙995		
Width with MV option	mm	1˙245								
Height with MV option	mm	1˙995								
Transport weight	kg	1˙334	1˙449	1˙456	1˙800	1˙840	1˙940	2˙400	2˙450	2˙540
Transport weight with empty buffer tank	kg	1˙564	1˙679	1˙686	2˙030	2˙070	2˙170	2˙630	2˙680	2˙770
Refrigerant charge per circuit	kg	9,0	12,0	13,0	17,0	22,0		34,0	35,0	
Refrigerant charge per circuit with option 0	kg	9,4			20,0			31,0		
Electrical power supply										
Electrical power supply	V / ph / Hz	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) with ducted air suction and discharge
- In case of a different available pressure, included between the standard pressure and the values indicated for 1M or 2M options, however not higher 2M, it is necessary to order the higher pressure option, clearly stating the pressure value effectively requested on site. In the factory we will adjust the motor's pulley accordingly.

Technical data - Ultrasilenced version

RAE U		842 C K	962 C K	1102 C K	1402 C K	1502 C K	1602 C K	2302 C K	2402 C K	2602 C K
Cooling capacity										
Cooling capacity	kW	74,6	84,0	94,5	126,0	137,0	147,0	204,0	212,0	225,0
Nominal input power	kW	28,2	32,8	38,2	43,8	49,1	57,2	67,6	75,2	81,2
EER		2,64	2,56	2,47	2,88	2,79	2,57	3,02	2,82	2,77
Centrifugal fans										
Quantity	n.	3		4		6			8	
Air flow	m^3/h	21˙300	28˙800			43˙800			54˙400	
Air flow	l/s	5˙920	8˙000			12˙170			15˙110	
STD Version										
Available pressure	Pa	60			70				100	
Rotation speed	rpm	590	760	590		610			650	
Motor input power	kW	3,3	6,6	4,4		6,6			8,8	
Nominal input current	A	8,4	15,9	11,2		16,8			22,4	
Sound pressure level	dB(A)	60	64	60		61			64	
1M Version										
Available pressure	Pa	160	190	160		250				
Rotation speed	rpm	750	890	720		880			870	
Motor input power	kW	3,3	6,6	4,4		9,0			12,0	
Nominal input current	A	8,4	15,9	11,2		22,2			29,6	
Sound pressure level	dB(A)	65		66	68		69		74	
2M Version										
Available pressure	Pa	250	270			360			370	
Rotation speed	rpm	870	975	870		1˙015				
Motor input power	kW	4,5	9,0	6,0		13,2			17,6	
Nominal input current	A	11,1	20,1	14,8		31,8			42,4	
Sound pressure level	dB(A)	67	68			69		74		75
Scroll compressors										
Quantity	n.	2				4				
Circuits	n.					2				
Standard capacity steps	n.					2				
Optional capacity steps	n.	–				4				
Nominal input current	A	48,8	58,8	68,0	75,8	87,0	95,0	115,0	129,0	141,0
Maximum input current	A	64,0	80,0	88,0	108,0	118,0	128,0	164,0	186,0	208,0
Inrush current	A	230,0	183,0	193,0	248,0	284,0	294,0	348,0	406,0	428,0
Evaporator										
Type		Shell and tube								
Quantity	n.	1								
Water flow	m^3/h	12,8	14,4	16,2	21,7	23,5	25,3	35,1	36,5	38,7
Water flow	l/s	3,56	4,01	4,52	6,02	6,55	7,02	9,75	10,13	10,75
Pressure drop	kPa	20	26	29	49	58	67	48	72	81
Pumps										
P1 – Available pressure	kPa	124	118	110	120	97	83	133	101	86
P1 – Motor input power	kW		1,1			1,5			3,0	
P1H – Available pressure	kPa	159	153	145	175	142	133	183	151	136
P1H – Motor input power	kW		1,5			2,2			4,0	
PT – Available pressure	kPa	149	138	130	135	107	93	123	86	71
PT – Motor input power	kW		1,5			2,2			3,0	
Capacity of buffer tank	l					720				
Electrical data										
Total input power	kW	32,0	39,0	43,0	50,0	56,0	64,0	76,0	84,0	90,0
Total nominal input current	A	58,0	75,0	81,0	95,6	106,0	114,0	141,0	155,0	167,0
Maximum total input current	A	74,0	96,0	99,0	125,0	135,0	147,0	190,0	208,0	234,0
Total inrush current	A	240,0	199,0	204,0	265,0	301,0	313,0	374,0	428,0	454,0
Dimensions										
Length	mm	2˙610		3˙460		5˙150			6˙840	
Width	mm					1˙245				
Height	mm					1˙995				
Length with MV option	mm	3˙460		4˙305		5˙995			6˙840	
Width with MV option	mm					1˙245				
Height with MV option	mm					1˙995				
Transport weight	kg	1˙352	1˙467	1˙757	2˙485	2˙525	2˙535	2˙980	3˙000	3˙020
Transport weight with empty buffer tank	kg	1˙582	1˙697	1˙987	2˙715	2˙775	2˙765	3˙210	3˙230	3˙250
Refrigerant charge per circuit	kg	12,0		17,0		26,0		45,5	46,0	46,5
Refrigerant charge per circuit with option O	kg	9,4		20,0		30,0		40,0	41,0	
Electrical power supply										
Electrical power supply	V / ph / Hz	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) with ducted air suction and discharge
- In case of a different available pressure, included between the standard pressure and the values indicated for 1M or 2M options, however not higher 2M, it is necessary to order the higher pressure option, clearly stating the pressure value effectively requested on site. In the factory we will adjust the motor's pulley accordingly.

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 the 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 desclaims all responsabilities in case of damages deriving from violation of this instructions.
- For further clarifications or information, you are kindly request to contact our sales departement.

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	0,142
	-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

REMARKS:
- The above coefficients correspond to the mean of the values for the different units, therefore the performances calculated using this the 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 desclaims all responsabilities in case of damages deriving from violation of this instructions.
- For further clarifications or information, you are kindly request to contact our sales departement.

RAE 41 Kc

RAE 182 Kc

RAE ... Kc Series

Cooling capacity from 5 to 24 kW - 1 and 2 circuits

The air cooled chillers of **RAE Kc 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.
Depending on the cooling capacity, they are available with 1 and 2 cooling circuits.
Thanks to their compact dimensions and to the several options available, these units are particularly easy to install in small spaces, also when supplied with the hydraulic kit.
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 following versions are available:
RAE...Kc standard version
Horizontal air flow for models from 41 to 111
Vertical air flow for models from 182 to 222
RAE...PS Kc 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 111, 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 111 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, when required, the hydraulic kit is installed inside the unit.

High-efficiency scroll compressor (EER 3,7 at ARI conditions), with low sound level, internal heat protection, installed on rubber vibration dampers, supplied with crankcase heater when necessary. In case of 2 circuit units, in case of problem on one of the circuit, the 50% operation of the unit is anyway granted.

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 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.

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 and hinged panel to be opened. It is complete with remote switches, overload protections, transformer for auxiliaries and terminal board. In case of hydraulic kit on board, 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.

Accessories

AE **Electrical power supply different from standard:** mainly, 230V three-phase, 460V three-phase. 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.

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** for measuring circuit pressure (from size 182).

MV **Buffer tank** of suitable capacity complete with expansion vessel, safety valve, water gauge, water charge and discharge valves, air purging valves (from size 182).

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 (from size 182).

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 pole centrifugal packaged type (from size 182).

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.

Technical data

RAE		41 Kc	51 Kc	61 Kc	81 Kc	111 Kc	182 Kc	222 Kc	182.PS Kc	222.PS Kc
Cooling capacity										
Cooling capacity	kW	5,5	5,8	7,0	8,9	11,5	17,3	22,4	19,4	24,0
Nominal input power	kW	1,7	1,9	2,6	3,3	4,3	6,3	9,0	5,3	8,1
EER		3,23	3,05	2,69	2,70	2,67	2,75	2,49	3,66	2,96
Axial fans										
Quantity	n.	1					2			
Rotation speed	rpm	900								
Air flow	m^3/h	3`470			3`850	3`600	7`580	7`068	11`990	
Air flow	l/s	964			1`069	1`000	2`106	1`963	3`331	
Motor input power	kW	0,15					0,29		0,74	
Input current	A	0,64					1,28		3,4	
Scroll compressors										
Quantity	n.	1					2			
Circuits	n.	1					2			
Standard capacity steps	%	0 – 100					0 – 50 – 100			
Nominal input current	A	8,1	8,7	12,3	16,1	27,0	12,0	16,0	5,2	7,5
Maximum input current	A	17,0		20,0	24,0	32,0	17,0	21,0	19,0	23,0
Inrush current	A	59,0	62,0	83,0	98,0	65,0	106,0	140,0	109	143,0
Evaporator										
Type		Brazed plate								
Quantity	n.	1					2			
Water flow	m^3/h	0,94	1,01	1,19	1,51	1,98	2,99	3,85	3,35	4,14
Water flow	l/s	0,26	0,28	0,33	0,42	0,55	0,83	1,07	0,93	1,15
Pressure drop	kPa	39	45	36	38	39	36	37	45	43
Electrical data										
Total input power	kW	2,0		3,0		4,0	7,0	9,0	6,0	9,0
Total nominal input current	A	9,0		13,0	17,0	28,0	12,0	17,0	9,0	11,0
Maximum total input current	A	18,0		21,0	25,0	33,0	18,0	22,0		26,0
Total inrush current	A	60,0	63,0	84,0	99,0	66,0	107,0	141,0	112,0	146,0
Sound pressure level										
Sound pressure at 1 m	dB(A)	51		52		53	55	56	62	
PS Version										
Available pressure	kPa	31	24	33	29	24	–		145	88
Pump group motor power	kW	0,08					–		0,55	
Input current	A	0,92					–		4,0	
Higher available pressure pump group	kPa	–							195	95
Motor input power	kW	–							0,55	0,75
Input current	A	–							4,0	5,5
Capacity of buffer tank	l	30					–		80	
Expansion vessel	l	2					–		5	
Dimensions										
Length	mm	980					1`100		1`600	
Width	mm	325					750			
Height	mm	715					1`100		1`250	
Transport weight	kg	114		115	121	138	278	320	318	343
Refrigerant charge per circuit	kg	1,5			2,0	2,9	2,1	2,5	4,4	2,1
Dimensions for PS version										
Length	mm	980					–		1`600	
Width	mm	325					–		750	
Height	mm	1`000					–		1`250	
Transport weight with empty buffer tank	kg	156		158	164	138	–		376	400
Weight in operation	kg	186		188	194	139	–		456	480
Electrical power supply										
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

REFRIGERANT R410A

RAE 2702 Kc + CF

RAE ... Kc Series

Cooling capacity from 77,5 to 467 kW - 2 circuits

The air cooled chillers of **RAE .... Kc series**, are designed for outdoor installation and are particularly suitable for cooling water in air conditioning systems or in industrial processes for cooling glycol water.
Each group has two independent cooling circuits provided with R410A scroll compressors.
The units have been designed to reduce their footprint as much as possible, keeping high cooling performances, thanks to the use of excellent quality and new technology components.
All units are completely assembled and tested in the factory in compliance with specific quality procedures; they are still provided with all cooling, water and electrical connections so to quickly install them, once on site.
Before the factory test, the cooling circuits are tested under pressure and then supplied with refrigerant and non-freezing oil charge.

The following versions are available:
RAE .... Kc standard version
RAE .... S Kc – silenced version
RAE .... U Kc – ultrasilenced version

For versions S and U, the reduction of the sound level is due to the use of refrigerant/air exchangers with wider surfaces than the standard units, to a soundproofed compressor cabinet and to the control of the fans speed by means of an electronic regulation.

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

Main components:

Structure made of base and frame realized in high thickness galvanized steel, assembled by means of stainless steel rivets. All the galvanized steel surfaces are coated with powder painting of RAL 7035 colour.

Scroll compressor for refrigerant R410A, operating on two independent cooling circuits, in tandem or trio version. Compressors are installed on rubber vibration dampers, provided with direct start motors, cooled by the intaken refrigerant, and equipped with overload protections and crankcase heater. They are charged with polyester oil and their compressors terminal board is IP54. The microprocessor on board enables or disenables the compressors, regulating in this way also the cooling capacity.

Stainless steel plate evaporator of "dual circuit" type, coated with close-cell insulating and of high thickness material. The max operating pressure limits are 10 bar for water side and 32 bar for refrigerant side.

Heat-exchange external coils with micro-finned copper tubes, positioned in staggered rows and mechanichally expanded into an aluminium finned pack. Fins are designed with such a shape so to give the highest heat exchange efficiency (turbo-fin). The max operating pressure refrigerant side is 45 bar rel.

Axial fans, of directly coupled type, with wing-profile aluminium blades, suitably designed not to create air turbulence. They are therefore ensuring the max efficiency with the lowest sound level. Each fan is provided with galvanized steel protection grid, painted after construction. The IP54 fans motors are completely closed and provided with in-built overload protection thermostat, incorporated to the motor windings.

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

Electric board realized in compliance with 60204-1/IEC 204-1 standards, 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 fonctions 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, relais for phase sequencing, possibility to interface to EMS/BMS systems.

Accessories

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

AE **Electrical power supply different from standard:** mainly, 230V three-phase, 460V three-phase. 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, allowing the unit operation down to -20°C.

CF **Soundproofed compressors cabinet with standard material**: Insulation of compressors by a cabinet coated with soundproofing material and vibration dampers under compressors (already included in S version).

CFU **Soundproofed compressors cabinet with bituminous rubber coated material**: Insulation of compressors by a suitably coated cabinet, vibration dampers under compressors, mufflers on compressors discharge pipes (already included in U version).

CI **Soundproofing jacket on compressors** made of soundproofing material, wrapped all around compressors so to further reduce the overall sound level of the unit (not available for S and U versions).

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

GP **Condensing coil protection grid**: metal protection grid against accidental impacts.

GP1 **Protection grid for compressors section**: metal protection grid against accidental impacts.

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.

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** for measuring circuit pressure.

MV **Buffer tank** of suitable capacity complete with expansion vessel, safety valve, water gauge, water charge and discharge valves, air purging valves, check valves for filter service operations. (Not available for 1-fan units).

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 pole centrifugal packaged type.

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.

PM **Spring-type vibration dampers**: spring-type vibration dampers support, for insulating the unit (supplied in kit), mainly indicated for installation in difficult and aggressive environments. Made of two steel plates containing a suitable quantity of harmonic steel springs.

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.

PT **Twin pump group**: chilled water pump group composed of twin pump, expansion vessel, safety valve, water gauge, water charge and discharge valves, air purging valves, electrical control of the pump, automatic switch in case of failure of the working pump. The pump is of 2 pole centrifugal packaged type.

RA **Anti-freeze heater on evaporator**: electrical heater installed on the evaporator, in order to prevent freezing and provided with thermostat.

RF **Power factor correction system cosfi >0,9**: Electrical device made of suitable condensers for compressors rephasing, ensuring a cosfi value ≥0,9 , so to reduce the power absorption from the electrical network.

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.

RP **Partial heat recovery** (about 20%) of the condensing heat, by means of a refrigerant/water plate exchanger (desuperheater), always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity.

RR **Copper/copper condensing coils**: special execution of the condensing coils with copper pipe and fins.

RT **Total heat recovery** (100%) of the condensing heat, by means of a refrigerant/water plate exchanger, always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity, and /or for dehumidification. It is necessary to consider option BT.

RV **Personalized frame painting in RAL colour.**

V **Voltmeter**: Electrical device measuring the electrical tension in the power supply of the unit.

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.

1M **High pressure fans**: installed in the factory, they are available only for standard units, with an available pressure of 60 Pa.

Technical data - Standard version

RAE		772 Kc	852 Kc	1412 Kc	1532 Kc	1642 Kc	2002 Kc	2302 Kc	2702 Kc	3002 Kc	3402 Kc	3802 Kc	4202 Kc	4502 Kc
Cooling capacity														
Cooling capacity	kW	77,5	92,7	140,6	152,5	163,9	207,5	241,0	269,0	300,0	322,0	406,0	424,0	467,0
Nominal input power	kW	25,6	30,2	43,4	47,3	51,2	68,0	75,4	84,8	91,8	101,7	125,0	131,3	158,7
EER		3,03	3,07	3,24	3,22	3,20	3,05	3,20	3,17	3,27	3,17	3,25	3,23	2,94
Axial fans														
Quantity	n.	1		2			3			4		5		
Rotation speed	rpm	915												
Air flow	m^3/h	26˙100	23˙960	51˙200	48˙530	47˙140	78˙800	75˙400	72˙800	100˙200	91˙200	124˙200	120˙400	113˙000
Air flow	l/s	7˙250	6˙656	14˙222	13˙481	13˙094	21˙889	20˙944	20˙222	27˙833	25˙333	34˙500	33˙444	31˙389
Motor input power	kW	2,48		4,96			6,9			9,2	9,8	11,8		
Input current	A	5,15		10,3			14,7			19,6	20,0	25,0		
Scroll compressors														
Quantity	n.	2					4					6	4	6
Circuits	n.	2												
Standard capacity steps	n.	2					4							
Nominal input current	A	49,9	56,2	80,6	84,3	88,0	145,5	163,4	181,5	190,0	198,0	275,0	280,0	302,0
Maximum input current	A	76,0	89,0	130,0	144,0	158,0	204,0	222,0	248,0	268,0	288,0	372,0	392,0	432,0
Inrush current	A	205,0	240,0	300,3	360,3	364,0	215,0	365,0	385,0	446,0	453,0	468,0	530,0	550,0
Evaporator														
Type		Brazed plate												
Quantity	n.	1												
Water flow	m^3/h	13,3	15,9	24,2	26,2	28,2	35,6	41,4	46,1	51,5	55,1	69,5	72,7	79,9
Water flow	l/s	3,7	4,4	6,7	7,3	7,8	9,9	11,5	12,8	14,3	15,3	19,3	20,2	22,2
Pressure drop	kPa	35	28	36	42		59	76	72	82	77	70	69	74
Water connections	DN	1″½					2″½			3″				
Pumps														
P1 – Available pressure	kPa	152	147	151		131	132	120	153	138	125	140	175	163
P1 – Motor input power	kW	1,1		1,9			3,0		4,0		5,5		7,5	
P1H – Available pressure	kPa	192	202		195	186	205	202	200	188	225	220	300	280
P1H – Motor input power	kW	1,9		3,0			5,5			7,5		11,0		
PT – Available pressure	kPa	152	157	122	115	166	186	118	81	64	73	136	165	124
PT – Motor input power	kW	2,2					5,5		4,0			7,5		
Capacity of buffer tank	l	–		300			400			800		1˙100		
Electrical data														
Total input power	kW	28,1	32,7	48,4	52,3	56,2	74,9	82,3	91,7	101,0	111,5	136,8	143,1	170,5
Total nominal input current	A	55,1	61,4	90,9	94,6	98,3	142,2	161,3	181,5	190,0	197,6	274,6	280,0	301,6
Maximum total input current	A	81,2	94,2	140,3	154,3	168,3	218,7	236,7	262,7	287,6	308,0	397,0	417,0	457,0
Total inrush current	A	210,1	245,1	310,6	370,6	374,3	229,7	379,7	399,7	465,6	473,0	493,0	555,0	575,0
Sound pressure level														
Sound pressure at 1 m	dB(A)	75			77				79			80	83	80
Sound pressure at 10 m	dB(A)	59			61				63			64	67	64
Dimensions														
Length	mm	1˙620		2˙660			3˙700			4˙740		5˙780		
Width	mm	1˙370												
Height	mm	2˙420												
Transport weight	kg	985	1˙080	1˙230	1˙340	1˙390	1˙810	2˙180	2˙330	2˙532	2˙760	2˙875	2˙944	3˙720
Weight in operation	kg	1˙010	1˙105	1˙255	1˙365	1˙415	1˙885	2˙275	2˙435	2˙640	2˙835	2˙952	3˙022	3˙795
Electrical power supply														
Electrical power supply	V / ph / Hz	400V / 3 / 50 + T + N												

REMARKS:
- Operating conditions: External air temperature 35°C; water temperature 12/7°C.
- Sound pressure levels calculated according to ISO 3744.

Technical data - Silenced version

RAE S		772 Kc	852 Kc	1412 Kc	1532 Kc	1642 Kc	2002 Kc	2302 Kc	2702 Kc	3002 Kc	3402 Kc	3802 Kc
Cooling capacity												
Cooling capacity	kW	74,9	91,0	133,6	144,9	155,7	208,8	234,0	270,0	291,0	321,0	406,0
Nominal input power	kW	27,1	32,0	46,0	50,1	52,0	70,2	82,1	89,4	98,0	102,3	133,5
EER		2,76	2,84	2,90	2,89	2,99	2,97	2,85	3,02	2,97	3,14	3,04
Axial fans												
Quantity	n.	1	2			3			4		5	
Rotation speed	rpm	720										
Air flow	m^3/h	19˙575	52˙600	38˙400	36˙397	58˙800		51˙200	78˙800	68˙400	97˙900	87˙000
Air flow	l/s	5˙438	14˙611	10˙667	10˙110	16˙333		14˙222	21˙889	19˙000	27˙194	24˙167
Motor input power	kW	1,74	4,96			4,8			6,4		8,0	
Input current	A	3,60	10,3			8,7			11,6		14,5	
Scroll compressors												
Quantity	n.	2					4					6
Circuits	n.	2										
Standard capacity steps	n.	2					4					
Nominal input current	A	53,4	60,1	86,2	90,2	94,2	128,0	150,0	166,8	170,4	177,6	249,0
Maximum input current	A	76,0	89,0	130,0	144,0	158,0	204,0	222,0	248,0	268,0	288,0	372,0
Inrush current	A	205,0	240,0	300,3	360,3	364,0	215,0	365,0	385,0	446,0	453,0	468,0
Evaporator												
Type		Brazed plate										
Quantity	n.	1										
Water flow	m^3/h	12,9	15,7	23,0	24,9	26,8	35,8	40,2	46,4	50,0	55,1	69,7
Water flow	l/s	3,6	4,3	6,4	6,9	7,4	10,0	11,2	12,9	13,9	15,3	19,4
Pressure drop	kPa	34	27	37	41		61	71	76		79	72
Water connections	DN	1″½					2″½			3″		
Pumps												
P1 – Available pressure	kPa	152	147	151		131	130	125	149	144	123	138
P1 – Motor input power	kW	1,1		1,9			3,0		4,0			5,5
P1H – Available pressure	kPa	192	202		195	186	203	207	196	194	223	218
P1H – Motor input power	kW	1,9		3,0			4,0		7,5			
PT – Available pressure	kPa	152	157	122	115	166	118	92	78	73	71	134
PT – Motor input power	kW	2,2					3,0		4,0			7,5
Capacity of buffer tank	l	–	300			400			800		1˙100	
Electrical data												
Total input power	kW	28,9	37,0	51,0	55,1	56,8	75,0	86,9	95,8	104,4	110,3	141,5
Total nominal input current	A	57,0	70,4	96,5	100,5	102,9	136,7	158,7	178,4	182,0	192,1	263,5
Maximum total input current	A	79,6	99,3	140,3	154,3	166,7	212,7	230,7	259,6	279,6	302,5	386,5
Total inrush current	A	208,6	250,3	310,6	370,6	372,7	223,7	373,7	396,6	457,6	467,5	482,5
Sound pressure level												
Sound pressure at 1 m	dB(A)	72		74			73		75		76	77
Sound pressure at 10 m	dB(A)	56		58			57		59		60	61
Dimensions												
Length	mm	1˙620	2˙660			3˙700			4˙740		5˙780	
Width	mm	1˙370										
Height	mm	2˙420										
Transport weight	kg	1˙050	1˙280	1˙320	1˙410	2˙730	1˙995	2˙245	2˙460	2˙672	2˙970	3˙168
Weight in operation	kg	1˙075	1˙305	1˙345	1˙435	2˙755	2˙040	2˙342	2˙570	2˙790	3˙048	3˙252
Electrical power supply												
Electrical power supply	V / ph / Hz	400V / 3 / 50 + T + N										

REMARKS:
- Operating conditions: External air temperature 35°C; water temperature 12/7°C.
- Sound pressure levels calculated according to ISO 3744.

Technical data - Ultrasilenced version

RAE U		772 Kc	852 Kc	1412 Kc	1532 Kc	1642 Kc	2002 Kc	2302 Kc	2702 Kc	3002 Kc	3402 Kc	3802 Kc
Cooling capacity												
Cooling capacity	kW	69,7	87,3	128,0	139,3	147,5	202,5	227,0	261,8	282,5	311,4	393,6
Nominal input power	kW	27,6	32,6	46,9	51,1	55,4	72,0	84,2	91,6	100,5	104,9	136,8
EER		2,53	2,68	2,73		2,66	2,81	2,70	2,86	2,81	2,97	2,88
Max ext. air temp. FOR ULTRASILENCED OPERATION	°C	36			35	36			37	36		35
Axial fans												
Quantity	n.	1	2			3			4		5	
Rotation speed	rpm	670										
Air flow	m^3/h	14˙616	28˙672		27˙177	42˙100		36˙400	54˙800	48˙400	67˙600	59˙600
Air flow	l/s	4˙060	7˙964		7˙549	11˙694		10˙111	15˙222	13˙444	18˙778	16˙556
Motor input power	kW	1,4	2,87			3,5			4,6		5,8	
Input current	A	2,9	5,9			8,4			11,2		14,0	
Scroll compressors												
Quantity	n.	2					4					6
Circuits	n.	2										
Standard capacity steps	n.	2					4					
Nominal input current	A	57,1	64,3	92,2	96,5	100,8	130,4	152,8	169,8	173,5	180,8	268,2
Maximum input current	A	76,0	89,0	130,0	144,0	158,0	204,0	222,0	248,0	268,0	288,0	372,0
Inrush current	A	205,0	240,0	300,3	360,3	364,0	215,0	365,0	385,0	446,0	453,0	468,0
Evaporator												
Type		Brazed plate										
Quantity	n.	1										
Water flow	m^3/h	12,0	15,0	22,0	24,0	25,4	34,8	39,0	44,9	48,5	53,5	67,6
Water flow	l/s	3,3	4,2	6,1	6,7	7,0	9,7	10,8	12,5	13,5	14,8	18,8
Pressure drop	kPa	33	26	34	40		59	68	74		75	68
Water connections	DN	1"½					2"½			3"		
Pumps												
P1 – Available pressure	kPa	152	147	151		131	132	128	151	146	127	142
P1 – Motor input power	kW	1,1		1,9			3,0		4,0		5,5	
P1H – Available pressure	kPa	192	202		195	186	205	210	198	196	227	222
P1H – Motor input power	kW	1,9		3,0			5,5				7,5	
PT – Available pressure	kPa	152	157	122	115	166	115	95	82	79	71	139
PT – Motor input power	kW	2,2					3,0		4,0			7,5
Capacity of buffer tank	l	–	300			400			800		1˙100	
Electrical data												
Total input power	kW	29,0	35,5	49,8	54,0	58,9	75,5	87,7	96,2	105,1	110,7	142,6
Total nominal input current	A	60,0	70,2	98,1	102,4	109,2	138,8	161,2	181,0	184,7	194,8	282,2
Maximum total input current	A	78,9	94,9	135,9	149,9	166,4	212,4	230,4	259,2	279,2	302,0	386,0
Total inrush current	A	207,9	245,9	306,2	366,2	372,4	223,4	373,4	396,2	457,2	467,0	482,0
Sound pressure level												
Sound pressure at 1 m	dB(A)	68		69						70		71
Sound pressure at 10 m	dB(A)	52		53						54		55
Dimensions												
Length	mm	1˙620	2˙660			3˙700			4˙740		5˙780	
Width	mm	1˙370										
Height	mm	2˙420										
Transport weight	kg	1˙120	1˙330	1˙380	1˙490	2˙790	2˙020	2˙270	2˙485	2˙697	2˙995	3˙193
Weight in operation	kg	1˙145	1˙355	1˙405	1˙515	2˙815	2˙065	2˙367	2˙595	2˙815	3˙073	3˙277
Electrical power supply												
Electrical power supply	V / ph / Hz	400V / 3 / 50 + T + N										

REMARKS:
- Operating conditions: External air temperature 35°C; water temperature 12/7°C.
- Sound pressure levels calculated according to ISO 3744.

R410A - Operation limits - Mod. 772 - 1642 Kc

	772		852		1412		1532		1642	
Range of outlet water temperature	from + 5°C to +15°C									
Range of outlet water+glycol temperature	from -8 °C to +15°C									
Range of temperature difference	from 4 to 8 °C									
	min	**max**	**min**	**max**	**min**	**max**	**min**	**max**	**min**	**max**
Water flow – Lt/sec (1)	3,3	4,1	4,0	4,8	6,0	7,4	6,6	8,0	7,0	8,6
Water flow – mc/h (1)	12,0	14,6	14,3	17,5	21,8	26,6	23,6	28,8	25,4	31,0
Pressure drop kPa (1)	28	42	22	34	29	43	34	50	34	50
Max operating pressure water side	10 Bar									
Inlet air temperature – STD	5,0	45,0	5,0	45,0	5,0	45,0	5,0	45,0	5,0	45,0
Inlet air temperature – S	5,0	45,0	5,0	45,0	5,0	45,0	5,0	45,0	5,0	45,0
Inlet air temperature – U (for ULTRASIL. operation)	-5,0	36,0	-5,0	36,0	-5,0	36,0	-5,0	35,0	-5,0	36,0
Minimum control capacity regulation	50%		50%		50%		50%		50%	

(1) Water 12/7°C - External air temperature 35°C

R410A - Operation limits - Mod. 2002 - 4502 Kc

	2002		2302		2702		3002		3402		3802		4202		4502	
Range of outlet water temperature	from + 5°C to +15°C															
Range of outlet water+glycol temperature	from -8 °C to +15°C															
Range of temperature difference	from 4 to 8 °C															
	min	**max**	**min**	**max**	**min**	**max**	**min**	**max**	**min**	**max**	**min**	**max**	**min**	**max**	**min**	**max**
Water flow – Lt/sec (1)	5,9	13,9	6,9	15,3	7,7	15,3	8,9	15,3	9,9	15,9	11,3	25,3	12,6	29,4	13,5	29,4
Water flow – mc/h (1)	21,2	50,0	24,8	55,1	27,7	55,1	32,0	55,1	35,6	57,2	40,7	91,1	45,4	105,8	48,6	105,8
Pressure drop kPa (1)	38	140	41	132	42	112	17	92	45	85	46	131	46	140	46	136
Max operating pressure water side	10 Bar															
Inlet air temperature – STD	5,0	44,8	5,0	45,8	5,0	45,5	5,0	46,4	5,0	46,2	5,0	46,0	5,0	45,7	5,0	44,4
Inlet air temperature – S	5,0	44,7	5,0	43,4	5,0	45,8	5,0	44,2	5,0	45,3	5,0	44,1	–	–	–	–
Inlet air temperature – U (for ULTRASIL. operation)	-5,0	36,0	-5,0	32,0	-5,0	37,0	-5,0	36,0	-5,0	36,0	-5,0	35,0	–	–	–	–
Optimum water content (lt)	650		700		800		900		1.020		1.150		1.300		1.380	
Minimum control capacity regulation	25%		25%		25%		25%		25%		25%		25%		33%	

(1) Water 12/7°C - External air temperature 35°C

AIR COOLED CHILLERS
WITH SCREW COMPRESSORS AND AXIAL FANS

REFRIGERANT R407C - R134A

RAH T 2102 K

Series RAH .... T

Cooling capacity from 190 to 737 kW - 2 circuits

The air cooled chillers of **RAH.T 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 both R407C (K) and R134a (Ka) refrigerants are the following:
K/ Ka - standard version
S.K/ Ka - silenced version: oversized coil, reduced air flow, fans with a lower rotation speed, technical partition insulated by means of soundproofing material.
U.K/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.K/Ka - standard version with free-cooling coil
FS.K/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.K/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 components:

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 aluminium 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 aluminium 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 (option BT).

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 (-20°C)**: electronic device for the continuous modulating voltage control of the condensing pressure through the variation of the fan rotation speed (already included in version F).

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 aluminium 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 to 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 (standard for R407C).

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 pole centrifugal packaged type.

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 (not available when option MV is required).

PF **Safety water flow switch**: installed on evaporator, it switches off the unit in case of lack of water flow rate through the evaporator.

PM **Spring-type vibration dampers**: spring-type vibration dampers support, for insulating the unit (supplied in kit), mainly indicated for installation in difficult and aggressive environments. Made of two steel plates containing a suitable quantity of harmonic steel springs.

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.

PT **Twin pump group**: chilled water pump group composed of twin pump, expansion vessel, safety valve, water gauge, water charge and discharge valves, air purging valves, electrical control of the pump, automatic switch in case of failure of the working pump. The pump is of 2 pole centrifugal packaged type.

PW **Part-winding**: equipment for step compressors starting, reducing of about 35% the inrush current of each compressor.

RA **Anti-freeze heater on evaporator**: electrical heater installed on the evaporator, in order to prevent freezing and provided with thermostat.

RF **Power factor correction system cosfi >0,9**: Electrical device made of suitable condensers for compressors rephasing, ensuring a cosfi value ≥0,9, so to reduce the power absorption from the electrical network.

RH **Shut-off valve on suction side**: they are use to isolate compressors during service operations.

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.

RP **Partial heat recovery** (about 20%) of the condensing heat, by means of a refrigerant/water plate exchanger (desuperheater), always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity.

RR **Copper/copper condensing coils:** special execution of the condensing coils with copper pipe and fins.

RT **Total heat recovery** (100%) of the condensing heat, by means of a refrigerant/water plate exchanger, always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity, and /or for dehumidification. It is necessary to consider option BT and it is not available on free-cooling.

RV **Personalized frame painting in RAL colour**

SC **Insulated compressors housing** with sound proofing material (included on silenced version).

SU **Insulated compressors housing with bituminous rubber sound proofing material**, muffler on discharge pipe and vibration dampers for compressors (included on ultra-silenced version).

TE **Electronic thermostatic valve**: it is requested to make a very accurate regulation of the refrigerant flow and to limit variations of cooling capacity and evaporator leaving temperature water during operation in transitions and for a better performance with fixed superheating.

V **Voltmeter**: Electrical device measuring the electrical tension in the power supply of the unit.

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.

Technical data - R407C - Standard version

RAH		2102 T K	2502 T K	2802 T K	3302 T K	3902 T K	4802 T K	5502 T K
Cooling capacity								
Cooling capacity	kW	205,0	255,0	276,0	345,0	377,0	472,0	550,0
Nominal input power	kW	73,0	92,0	114,0	123,0	148,0	180,0	196,0
EER		2,81	2,77	2,42	2,80	2,55	2,62	2,81
Axial fans								
Quantity	n.		6		8		10	12
Rotation speed	rpm				880			
Air flow	m^3/h	126˙000	117˙000		156˙000		195˙000	234˙000
Air flow	l/s	35˙000	32˙500		43˙333		54˙167	65˙000
Motor input power	kW		12,0		16,0		20,0	24,0
Input current	A		24,0		32,0		40,0	48,0
Screw compressors								
Quantity	n.				2			
Cooling circuits	n.				2			
Standard capacity steps	n.				6			
Modulating capacity steps (option)	%				0 – 12 ÷ 100			
Nominal input current	A	124,0	155,0	188,0	204,0	238,0	296,0	327,0
Maximum input current	A	172,0	216,0	256,0	288,0	324,0	360,0	432,0
Inrush current	A	497,0	616,0	613,0	729,0	848,0	981,0	1˙159,0
Inrush current with options PW/DS	A	304,0	377,0	418,0	494,0	585,0	700,0	828,0
Evaporator								
Type					Shell and tube			
Quantity	n.				1			
Water flow	m^3/h	35,28	43,92	47,52	59,40	64,80	81,36	94,68
Water flow	l/s	9,8	12,2	13,2	16,5	18,0	22,6	26,3
Pressure drop	kPa	70	56	60	58	46	35	49
Water volume	l	39	49	56	93	88	133	125
P1 Pump group								
Available pressure	kPa	107	120	114	111	121	123	98
Motor input power	kW				5,5			
Input current	A				11,0			
Inrush current	A				70,0			
Weight	kg				91			
P1H pump group								
Available pressure	kPa	157	170	164	162	172	174	149
Motor input power	kW				7,5			
Input current	A				15,0			
Inrush current	A				105,0			
Weight	kg				99			
PT pump group								
Available pressure	kPa	155	166	160	154	163	161	131
Motor input power	kW				7,5			
Input current	A				15,0			
Inrush current	A				105,0			
Weight	kg				196			
Hydraulic kit								
Expansion vessel capacity	l				25			
Quantity	n.				2			
Buffer tank 900 l					•			
Buffer tank 1˙500 l			–			•		
Buffer tank 1˙800 l				–			•	
Buffer tank 2˙400 l					–			•
Electrical data								
Total input power	kW	85,0	104,0	126,0	139,0	164,0	200,0	220,0
Total nominal input current	A	148,0	179,0	212,0	236,0	270,0	336,0	375,0
Maximum total input current	A	196,0	240,0	280,0	320,0	356,0	400,0	480,0
Total inrush current	A	521,0	640,0	637,0	761,0	880,0	1˙021,0	1˙207,0
Inrush current with options PW/DS	A	328,0	401,0	442,0	526,0	617,0	740,0	876,0
Sound pressure level								
Sound pressure at 1 m	dB(A)	77	78		79		80	82
Dimensions								
Length	mm		5˙082		6˙120		7˙158	8˙196
Width	mm				2˙244			
Height	mm				2˙370			
Transport weight	kg	2˙944	3˙073	3˙510	4˙056	4˙090	5˙302	5˙769
Weight in operation	kg	2˙983	3˙122	3˙566	4˙159	4˙177	5˙435	5˙894
Refrigerant charge per circuit	kg	35,0	46,0	47,0	63,0		80,0	95,0
Electrical power supply								
Electrical power supply	V / ph / Hz				400 / 3 / 50 + 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).
- Unit weight including oil and refrigerant charge.

Technical data - R407C - Silenced version

RAH		2102 T.S K	2502 T.S K	2802 T.S K	3302 T.S K	3902 T.S K	4802 T.S K
Cooling capacity							
Cooling capacity	kW	196,0	241,0	274,0	326,0	387,0	480,0
Nominal input power	kW	76,0	97,0	115,0	130,0	144,0	177,0
EER		2,58	2,48	2,38	2,51	2,69	2,71
Axial fans							
Quantity	n.	6		8		10	12
Rotation speed	rpm	660					
Air flow	m^3/h	96˙000	90˙000	128˙000	120˙000	150˙000	180˙000
Air flow	l/s	26˙667	25˙000	35˙556	33˙333	41˙667	50˙000
Motor input power	kW	7,5		10,0		12,5	15,0
Input current	A	14,0		18,0		23,0	28,0
Screw compressors							
Quantity	n.	2					
Cooling circuits	n.	2					
Standard capacity steps	n.	6					
Modulating capacity steps (option)	%	0 – 12 ÷ 100					
Nominal input current	A	129,0	162,0	189,0	214,0	233,0	292,0
Maximum input current	A	172,0	216,0	256,0	288,0	324,0	360,0
Inrush current	A	497,0	616,0	613,0	729,0	848,0	981,0
Inrush current with options PW/DS	A	304,0	377,0	418,0	494,0	585,0	700,0
Evaporator							
Type		Shell and tube					
Quantity	n.	1					
Water flow	m^3/h	33,84	41,40	47,16	56,16	66,60	82,44
Water flow	l/s	9,4	11,5	13,1	15,6	18,5	22,9
Pressure drop	kPa	64	50	60	52	48	36
Water volume	l	39	49	56	93	88	133
P1 Pump group							
Available pressure	kPa	115	127	115	119	117	120
Motor input power	kW	5,5					
Input current	A	11,0					
Inrush current	A	70,0					
Weight	kg	91					
P1H pump group							
Available pressure	kPa	165	177	165	170	168	172
Motor input power	kW	7,5					
Input current	A	15,0					
Inrush current	A	105,0					
Weight	kg	99					
PT pump group							
Available pressure	kPa	163	174	161	164	159	158
Motor input power	kW	7,5					
Input current	A	15,0					
Inrush current	A	105,0					
Weight	kg	196					
Hydraulic kit							
Expansion vessel capacity	l	25					
Quantity	n.	2					
Buffer tank 900 l		•					
Buffer tank 1˙500 l		–		•			
Buffer tank 1˙800 l		–				•	
Buffer tank 2˙400 l		–					•
Electrical data							
Total input power	kW	84,0	105,0	125,0	140,0	157,0	192,0
Total nominal input current	A	143,0	176,0	207,0	232,0	256,0	320,0
Maximum total input current	A	186,0	230,0	274,0	306,0	347,0	388,0
Total inrush current	A	511,0	630,0	631,0	747,0	871,0	1˙009,0
Inrush current with options PW/DS	A	318,0	391,0	436,0	512,0	608,0	728,0
Sound pressure level							
Sound pressure at 1 m	dB(A)	74	75		76		77
Dimensions							
Length	mm	5˙082		6˙120		7˙158	8˙196
Width	mm	2˙244					
Height	mm	2˙370					
Transport weight	kg	2˙944	3˙073	3˙818	4˙056	4˙515	5˙728
Weight in operation	kg	2˙983	3˙122	3˙874	4˙159	4˙602	5˙861
Refrigerant charge per circuit	kg	35,0	46,0	47,0	63,0	77,0	94,0
Electrical power supply							
Electrical power supply	V / ph / Hz	400 / 3 / 50 + 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).
- Unit weight including oil and refrigerant charge.

Technical data - R407C - Ultra-silenced version

RAH		2102 T.U K	2502 T.U K	2802 T.U K	3302 T.U K	3902 T.U K	4802 T.U K
Cooling capacity							
Cooling capacity	kW	195,0	240,0	271,0	331,0	389,0	444,0
Nominal input power	kW	77,0	97,0	116,0	128,0	143,0	190,0
EER		2,53	2,47	2,34	2,59	2,72	2,34
Axial fans							
Quantity	n.	6	8		10	12	
Rotation speed	rpm	530					
Air flow	m^3/h	69˙000	100˙000	92˙000	115˙000	138˙000	
Air flow	l/s	19˙167	27˙778	25˙556	31˙944	38˙333	
Motor input power	kW	4,6	6,2		7,7	9,2	
Input current	A	9,0	12,0		15,0	18,0	
Screw compressors							
Quantity	n.	2					
Cooling circuits	n.	2					
Standard capacity steps	n.	6					
Modulating capacity steps (option)	%	0 – 12 ÷ 100					
Nominal input current	A	130,0	163,0	191,0	212,0	232,0	311,0
Maximum input current	A	172,0	216,0	256,0	288,0	324,0	360,0
Inrush current	A	497,0	616,0	613,0	729,0	848,0	981,0
Inrush current with options PW/DS	A	304,0	377,0	418,0	494,0	585,0	700,0
Evaporator							
Type		Shell and tube					
Quantity	n.	1					
Water flow	m^3/h	33,48	41,40	46,80	56,88	66,96	76,32
Water flow	l/s	9,3	11,5	13,0	15,8	18,6	21,2
Pressure drop	kPa	64	50	58	53	49	31
Water volume	l	39	49	56	93	88	133
P1 Pump group							
Available pressure	kPa	115	127	116	117		131
Motor input power	kW	5,5					
Input current	A	11,0					
Inrush current	A	70,0					
Weight	kg	91					
P1H pump group							
Available pressure	kPa	165	178	167	168		182
Motor input power	kW	7,5					
Input current	A	15,0					
Inrush current	A	105,0					
Weight	kg	99					
PT pump group							
Available pressure	kPa	163	174	162		158	170
Motor input power	kW	7,5					
Input current	A	15,0					
Inrush current	A	105,0					
Weight	kg	196					
Hydraulic kit							
Expansion vessel capacity	l	25					
Quantity	n.	2					
Buffer tank 900 l		•					
Buffer tank 1˙500 l		–	•				
Buffer tank 1˙800 l		–			•		
Buffer tank 2˙400 l		–				•	
Electrical data							
Total input power	kW	82,0	103,0	122,0	136,0	152,0	199,0
Total nominal input current	A	139,0	175,0	203,0	227,0	250,0	329,0
Maximum total input current	A	181,0	228,0	268,0	303,0	342,0	378,0
Total inrush current	A	506,0	628,0	625,0	744,0	866,0	999,0
Inrush current with options PW/DS	A	313,0	389,0	430,0	509,0	603,0	718,0
Sound pressure level							
Sound pressure at 1 m	dB(A)	69	71	72	73		74
Dimensions							
Length	mm	5˙082	6˙120		7˙158	8˙196	
Width	mm	2˙244					
Height	mm	2˙370					
Transport weight	kg	3˙010	3˙346	3˙906	4˙438	4˙890	5˙676
Weight in operation	kg	3˙049	3˙396	3˙962	4˙532	4˙977	5˙810
Refrigerant charge per circuit	kg	45,0	46,0	61,0	77,0	91,0	94,0
Electrical power supply							
Electrical power supply	V / ph / Hz	400 / 3 / 50 + 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).
- Unit weight including oil and refrigerant charge.

Technical data - R134a - Standard version

RAH		2502 T Ka	2802 T Ka	3202 T Ka	3602 T Ka	4602 T Ka	5202 T Ka	6002 T Ka	6802 T Ka	8002 T Ka
Cooling capacity										
Cooling capacity	kW	260,0	290,0	320,0	348,0	432,0	465,0	568,0	608,0	737,0
Nominal input 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
Axial fans										
Quantity	n.	6						8		10
Rotation speed	rpm	880								
Air flow	m^3/h	126´000				117´000		156´000		195´000
Air flow	l/s	35´000				32´500		43´333		54´167
Motor input power	kW	12,0						16,0		20,0
Input current	A	24,0						32,0		40,0
Screw compressors										
Quantity	n.	2								
Cooling circuits	n.	2								
Standard capacity steps	n.	6								
Modulating capacity steps (option)	%	0 – 12 ÷ 100								
Nominal input current	A	125,0	148,0	174,0	206,0	275,0	314,0	332,0	398,0	451,0
Maximum input 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	1´158,0	1´254,0	1´644,0	1´752,0
Inrush current with options PW/DS	A	365,0	414,0	494,0	585,0	702,0	827,0	895,0	1´235,0	1´319,0
Evaporator										
Type		Shell and tube								
Quantity	n.	1								
Water flow	m^3/h	44,72	49,88	55,04	59,86	74,30	79,98	97,70	104,58	126,76
Water flow	l/s	12,4	13,9	15,3	16,6	20,6	22,2	27,1	29,0	35,2
Pressure drop	kPa	55	59	72	43	52	28	42	40	38
Water volume	l	63	80		90	114	162		184	452
P1 Pump group										
Available pressure	kPa	121	114	98	127	108	131	102	196	190
Motor input power	kW	5,5							15,0	
Input current	A	11,0							27,0	
Inrush current	A	70,0							194,0	
Weight	kg	91							160	
P1H pump group										
Available pressure	kPa	171	165	148	178	160	183	154	305	297
Motor input power	kW	7,5							22,0	
Input current	A	15,0							39,0	
Inrush current	A	105,0							273,0	
Weight	kg	99							192	
PT pump group										
Available pressure	kPa	167	160	142	170	148	170	135	298,0	288
Motor input power	kW	7,5							22,0	
Input current	A	15,0							39,0	
Inrush current	A	105,0							273,0	
Weight	kg	196							379	
Hydraulic kit										
Expansion vessel capacity	l	25								
Quantity	n.	2								
Buffer tank 900 l		•								
Buffer tank 1´500 l		–						•		
Buffer tank 1´800 l		–								•
Electrical data										
Total input power	kW	85,0	100,0	115,0	138,0	178,0	200,0	214,0	260,0	302,0
Total nominal input current	A	149,0	172,0	198,0	230,0	299,0	338,0	364,0	430,0	491,0
Maximum total input 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
Inrush current with options 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 at 1 m	dB(A)	78				79		80		82
Dimensions										
Length	mm	5´082						6´120	6´960	7´997
Width	mm	2´244								
Height	mm	2´370								
Transport weight	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 per circuit	kg	38,0	40,0		41,0	55,0	61,0	75,0	78,0	88,0
Electrical power supply										
Electrical power supply	V / ph / Hz	400 / 3 / 50 + 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).
- Unit weight including oil and refrigerant charge.

Technical data - R134a - Silenced version

RAH		2202 T.S Ka	2502 T.S Ka	2802 T.S Ka	3202 T.S Ka	3602 T.S Ka	4602 T.S Ka	5202 T.S Ka	6002 T.S Ka	6802 T.S Ka	8002 T.S Ka
Cooling capacity											
Cooling capacity	kW	218,0	252,0	279,0	306,0	329,0	431,0	464,0	534,0	633,0	747,0
Nominal input power	kW	63,0	77,0	92,0	110,0	134,0	166,0	188,0	212,0	234,0	277,0
EER		3,46	3,27	3,03	2,78	2,46	2,60	2,47	2,52	2,71	2,70
Axial fans											
Quantity	n.	6					8			10	12
Rotation speed	rpm	660									
Air flow	m^3/h	96˙000					128˙000		120˙000	150˙000	180˙000
Air flow	l/s	26˙667					35˙556		33˙333	41˙667	50˙000
Motor input power	kW	7,5					10,0			12,5	15,0
Input current	A	13,8					18,4			23,0	27,6
Screw compressors											
Quantity	n.	2									
Cooling circuits	n.	2									
Standard capacity steps	n.	6									
Modulating capacity steps (option)	%	0 – 12 ÷ 100									
Nominal input current	A	108,0	131,0	156,0	184,0	218,0	276,0	315,0	353,0	382,0	445,0
Maximum input current	A	158,0	196,0	248,0	288,0	324,0	364,0	430,0	462,0	560,0	620,0
Inrush current	A	434,0	547,0	609,0	729,0	848,0	983,0	1˙158,0	1˙254,0	1˙644,0	1˙752,0
Inrush current with options PW/DS	A	285,0	365,0	414,0	494,0	585,0	702,0	827,0	895,0	1˙235,0	1˙319,0
Evaporator											
Type		Shell and tube									
Quantity	n.	1									
Water flow	m^3/h	37,50	43,34	47,99	52,63	56,59	74,13	79,81	91,85	108,88	128,48
Water flow	l/s	10,4	12,0	13,3	14,6	15,7	20,6	22,2	25,5	30,2	35,7
Pressure drop	kPa	39	52	55	65	39	52	28	37	44	39
Water volume	l	63		80		90	114	162		184	452
P1 Pump group											
Available pressure	kPa	141	125	120	106	133	109	131	112	191	188
Motor input power	kW	5,5								15,0	
Input current	A	11,0								27,0	
Inrush current	A	70,0								194,0	
Weight	kg	91								160	
P1H pump group											
Available pressure	kPa	192	175	170	156	184	160	183	164	299	296
Motor input power	kW	7,5								22,0	
Input current	A	15,0								39,0	
Inrush current	A	105,0								273,0	
Weight	kg	99								192	
PT pump group											
Available pressure	kPa	189	172	166	151	178	149	170	147	292	286
Motor input power	kW	7,5								22,0	
Input current	A	15,0								39,0	
Inrush current	A	105,0								273,0	
Weight	kg	196								379	
Hydraulic kit											
Expansion vessel capacity	l	25									
Quantity	n.	2									
Buffer tank 900 l		•									
Buffer tank 1˙500 l		–					•				
Buffer tank 1˙800 l		–								•	
Buffer tank 2˙400 l		–									•
Electrical data											
Total input power	kW	71,0	85,0	100,0	118,0	142,0	176,0	198,0	222,0	247,0	292,0
Total nominal input current	A	122,0	145,0	170,0	198,0	232,0	294,0	333,0	371,0	405,0	473,0
Maximum total input current	A	172,0	210,0	262,0	302,0	338,0	382,0	448,0	480,0	583,0	648,0
Total inrush current	A	448,0	561,0	623,0	743,0	861,0	1˙001,0	1˙176,0	1˙272,0	1˙667,0	1˙780,0
Inrush current with options PW/DS	A	299,0	379,0	428,0	508,0	598,0	720,0	845,0	913,0	1˙258,0	1˙347,0
Sound pressure level											
Sound pressure at 1 m	dB(A)	73			74	75	76	77		78	79
Dimensions											
Length	mm	5˙082					6˙120			7˙997	9˙035
Width	mm	2˙244									
Height	mm	2˙370									
Transport weight	kg	3˙513	3˙535	3˙554	3˙576	3˙648	4˙800	4˙997	5˙140	6˙534	7˙139
Weight in operation	kg	3˙576	3˙598	3˙634	3˙656	3˙737	4˙914	5˙158	5˙302	6˙718	7˙591
Refrigerant charge per circuit	kg	38,0		40,0		41,0	55,0	61,0	75,0	92,0	101,0
Electrical power supply											
Electrical power supply	V / ph / Hz	400 / 3 / 50 + 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).
- Unit weight including oil and refrigerant charge.

Technical data - R134a - Ultra-silenced version

RAH		1802 T.U Ka	2202 T.U Ka	2502 T.U Ka	2802 T.U Ka	3202 T.U Ka	3602 T.U Ka	4602 T.U Ka	5202 T.U Ka	6002 T.U Ka	6802 T.U Ka
Cooling capacity											
Cooling capacity	kW	199,0	211,0	242,0	267,0	289,0	326,0	427,0	483,0	547,0	633,0
Nominal input power	kW	53,0	66,0	81,0	98,0	117,0	136,0	168,0	180,0	207,0	234,0
EER		3,75	3,20	2,99	2,72	2,47	2,40	2,54	2,68	2,64	2,71
Axial fans											
Quantity	n.	6						8	10		12
Rotation speed	rpm	530									
Air flow	m^3/h	75˙000					69˙000	92˙000	125˙000	115˙000	138˙000
Air flow	l/s	20˙833					19˙167	25˙556	34˙722	31˙944	38˙333
Motor input power	kW	4,6						6,2	7,7		9,2
Input current	A	9,0						12,0	15,0		18,0
Screw compressors											
Quantity	n.	2									
Cooling circuits	n.	2									
Standard capacity steps	n.	6									
Modulating capacity steps (option)	%	0 – 12 ÷ 100									
Nominal input current	A	91,0	113,0	138,0	165,0	195,0	220,0	278,0	302,0	345,0	382,0
Maximum input current	A	112,0	158,0	196,0	248,0	288,0	324,0	364,0	430,0	462,0	560,0
Inrush current	A	361,0	434,0	547,0	609,0	729,0	848,0	983,0	1˙158,0	1˙254,0	1˙644,0
Inrush current with options PW/DS	A	209,0	285,0	365,0	414,0	494,0	585,0	702,0	827,0	895,0	1˙235,0
Evaporator											
Type		Shell and tube									
Quantity	n.	1									
Water flow	m^3/h	34,23	36,29	41,62	45,92	49,71	56,07	73,44	83,08	94,08	108,88
Water flow	l/s	9,5	10,10	11,6	12,8	13,8	15,6	20,04	23,1	26,1	30,2
Pressure drop	kPa	32	36	48	50	58	38	51	30	39	44
Water volume	l	63			80		90	114	162		184
P1 Pump group											
Available pressure	kPa	149	144	130	126	115	135	110	126	109	191
Motor input power	kW	5,5									15,0
Input current	A	11,0									27,0
Inrush current	A	70,0									194,0
Weight	kg	91									160
P1H pump group											
Available pressure	kPa	199	194	180	177	165	185	161	178	160	299
Motor input power	kW	7,5									22,0
Input current	A	15,0									39,0
Inrush current	A	105,0									273,0
Weight	kg	99									192
PT pump group											
Available pressure	kPa	197	192	177	172	160	179	150	164	142	292
Motor input power	kW	7,5									22,0
Input current	A	15,0									39,0
Inrush current	A	105,0									273,0
Weight	kg	196									379
Hydraulic kit											
Expansion vessel capacity	l	25									
Quantity	n.	2									
Buffer tank 900 l		•									
Buffer tank 1˙500 l		–						•			
Buffer tank 1˙800 l		–							•		
Buffer tank 2˙400 l		–									•
Electrical data											
Total input power	kW	58,0	71,0	86,0	103,0	122,0	141,0	174,0	188,0	215,0	243,0
Total nominal input current	A	100,0	122,0	147,0	174,0	204,0	229,0	290,0	317,0	360,0	400,0
Maximum total input current	A	121,0	167,0	205,0	257,0	297,0	333,0	376,0	445,0	477,0	578,0
Total inrush current	A	370,0	443,0	556,0	618,0	738,0	857,0	995,0	1˙173,0	1˙269,0	1˙662,0
Inrush current with options PW/DS	A	218,0	294,0	374,0	423,0	503,0	594,0	714,0	842,0	910,0	1˙253,0
Sound pressure level											
Sound pressure at 1 m	dB(A)	70				71	72	73	74		75
Dimensions											
Length	mm	5˙082						6˙120	7˙158		9˙035
Width	mm	2˙244									
Height	mm	2˙370									
Transport weight	kg	3˙085	3˙488	3˙509	3˙529	3˙550	3˙714	4˙888	5˙350	5˙522	7˙524
Weight in operation	kg	3˙148	3˙551	3˙572	3˙609	3˙630	3˙803	5˙002	5˙512	5˙684	7˙709
Refrigerant charge per circuit	kg	38,0			40,0		52,0	69,0	71,0	89,0	105,0
Electrical power supply											
Electrical power supply	V / ph / Hz	400 / 3 / 50 + 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).
- Unit weight including oil and refrigerant charge.

Technical data - R407C - Free-cooling Standard version

RAH		2102 T F K	2502 T F K	2802 T F K	3302 T F K	3902 T F K	4802 T F K	5502 T F K
Cooling capacity								
Cooling capacity	kW	193,0	239,0	270,0	325,0	385,0	478,0	515,0
Nominal input power	kW	76,0	95,8	114,0	128,0	148,0	174,0	204,0
EER		2,54	2,49	2,37	2,54	2,60	2,75	2,52
Free-cooling capacity	kW	216,0	208,0	282,0	270,0	344,0	416,0	
Axial fans								
Quantity	n.	6		8		10	12	
Rotation speed	rpm	880						
Air flow	m^3/h	105˙000	99˙000	140˙000	132˙000	165˙000	198˙000	
Air flow	l/s	29˙167	27˙500	38˙889	36˙667	45˙833	55˙000	
Motor input power	kW	12,0		16,0		20,0	24,0	
Input current	A	24,0		32,0		40,0	48,0	
Screw compressors								
Quantity	n.	2						
Cooling circuits	n.	2						
Standard capacity steps	n.	6						
Modulating capacity steps (option)	%	0 – 12 ÷ 100						
Nominal input current	A	129,0	160,0	188,0	212,0	230,0	288,0	339,0
Maximum input current	A	172,0	216,0	256,0	288,0	324,0	360,0	432,0
Inrush current	A	497,0	616,0	613,0	729,0	848,0	981,0	1˙159,0
Inrush current with options PW/DS	A	304,0	377,0	418,0	494,0	585,0	700,0	828,0
Evaporator								
Type		Shell and tube						
Quantity	n.	1						
Water flow	m^3/h	35,46	43,92	49,68	59,76	70,92	87,84	94,68
Water flow	l/s	9,9	12,2	13,8	16,6	19,7	24,4	26,3
Pressure drop	kPa	78	62	73	64	60	45	54
Pressure drop in free-cooling	kPa	178	174	126	127	149	144	161
Water volume	l	163	173	222	259	296	383	375
P1 Pump group								
Available pressure	kPa	132	134	180	175	147	142	120
Motor input power	kW	11,0						
Input current	A	20,0						
Inrush current	A	170,0						
Weight	kg	134						
P1H pump group								
Available pressure	kPa	218	220	265	261	234	229	208
Motor input power	kW	15,0						
Input current	A	27,0						
Inrush current	A	194,0						
Weight	kg	147						
PT pump group								
Available pressure	kPa	215	216	261	254	224	215	191
Motor input power	kW	15,0						
Input current	A	27,0						
Inrush current	A	194,0						
Weight	kg	294						
Hydraulic kit								
Expansion vessel capacity	l	25						
Quantity	n.	2						
Buffer tank 900 l		•						
Buffer tank 1˙500 l		–				•		
Buffer tank 1˙800 l				–			•	
Buffer tank 2˙400 l					–			•
Electrical data								
Total input power	kW	88,0	108,0	130,0	144,0	168,0	198,0	228,0
Total nominal input current	A	153,0	184,0	220,0	244,0	270,0	336,0	387,0
Maximum total input current	A	196,0	240,0	288,0	320,0	364,0	408,0	480,0
Total inrush current	A	521,0	640,0	645,0	761,0	888,0	1˙029,0	1˙207,0
Inrush current with options PW/DS	A	328,0	401,0	450,0	526,0	625,0	748,0	876,0
Sound pressure level								
Sound pressure at 1 m	dB(A)	77	78	79		80	81	82
Dimensions								
Length	mm	5˙082		6˙120		7˙158	8˙196	
Width	mm	2˙244						
Height	mm	2˙370						
Transport weight	kg	3˙257	3˙385	4˙276	4˙514	5˙084	6˙406	6˙447
Weight in operation	kg	3˙420	3˙558	4˙498	4˙773	5˙380	6˙789	6˙822
Refrigerant charge per circuit	kg	35,0	46,0	47,0	63,0	77,0	94,0	95,0
Electrical power supply								
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T						

REMARKS:
- Operating conditions: External air temperature 35°C; water temperature 7/12°C
- For free-cooling operation: Air 5°C; Inlet water temperature 15°C, ethylenic glycol 20% .
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - R407C - Free-cooling Silenced version

RAH		2102 T F.S K	2502 T F.S K	2802 T F.S K	3302 T F.S K	3902 T F.S K	4802 T F.S K
Cooling capacity							
Cooling capacity	kW	195,0	235,0	272,0	332,0	360,0	447,0
Nominal input power	kW	75,0	97,3	113,2	125,4	150,7	185,1
EER		2,60	2,42	2,40	2,65	2,39	2,41
Free-cooling capacity	kW	171,0	229	223,0	283,0		342,0
Axial fans							
Quantity	n.	6	8		10		12
Rotation speed	rpm	660					
Air flow	m^3/h	75˙000	104˙000	100˙000	125˙000		150˙000
Air flow	l/s	20˙833	28˙889	27˙778	34˙722		41˙667
Motor input power	kW	8,0	10,0		13,0		15,0
Input current	A	14,0	18,0		23,0		28,0
Screw compressors							
Quantity	n.	2					
Cooling circuits	n.	2					
Standard capacity steps	n.	6					
Modulating capacity steps (option)	%	0 – 12 ÷ 100					
Nominal input current	A	127,0	162,0	187,0	208,0	243,0	304,0
Maximum input current	A	172,0	216,0	256,0	288,0	324,0	360,0
Inrush current	A	497,0	616,0	613,0	729,0	848,0	981,0
Inrush current with options PW/DS	A	304,0	377,0	418,0	494,0	585,0	700,0
Evaporator							
Type		Shell and tube					
Quantity	n.	1					
Water flow	m^3/h	35,46	43,31	50,04	61,02	66,28	82,22
Water flow	l/s	9,9	12,0	13,9	17,0	18,4	22,8
Pressure drop	kPa	80	60	74	67	53	40
Pressure drop in free-cooling	kPa	161	130	121	135	125	117
Water volume	l	163	215	222	301	296	383
P1 Pump group							
Available pressure	kPa	149	178	184	166	174	172
Motor input power	kW	11,0					
Input current	A	20,0					
Inrush current	A	170,0					
Weight	kg	134					
P1H pump group							
Available pressure	kPa	235	264	270	252	260	
Motor input power	kW	15,0					
Input current	A	27,0					
Inrush current	A	194,0					
Weight	kg	147					
PT pump group							
Available pressure	kPa	232	260	265	245	252	247
Motor input power	kW	15,0					
Input current	A	27,0					
Inrush current	A	194,0					
Weight	kg	294					
Hydraulic kit							
Expansion vessel capacity	l	25					
Quantity	n.	2					
Buffer tank 900 l		•					
Buffer tank 1˙500 l		–	•				
Buffer tank 1˙800 l		–			•		
Buffer tank 2˙400 l		–					•
Electrical data							
Total input power	kW	83,0	107,0	123,0	138,0	164,0	200,0
Total nominal input current	A	141,0	180,0	205,0	231,0	266,0	332,0
Maximum total input current	A	186,0	234,0	274,0	311,0	347,0	388,0
Total inrush current	A	511,0	634,0	631,0	752,0	871,0	1˙009,0
Inrush current with options PW/DS	A	318,0	395,0	436,0	517,0	608,0	728,0
Sound pressure level							
Sound pressure at 1 m	dB(A)	73	75		76		77
Dimensions							
Length	mm	5˙082	6˙120		7˙158		8˙196
Width	mm	2˙244					
Height	mm	2˙370					
Transport weight	kg	3˙348	3˙839	4˙399	5˙050	5˙084	6˙406
Weight in operation	kg	3˙511	4˙054	4˙621	5˙352	5˙380	6˙789
Refrigerant charge per circuit	kg	45,0	46,0	61,0	77,0		94,0
Electrical power supply							
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T					

REMARKS:
- Operating conditions: External air temperature 35°C; water temperature 7/12°C
- For free-cooling operation: Air 5°C; Inlet water temperature 15°C, ethylenic glycol 20% .
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - R407C - Free-cooling Ultra-silenced version

RAH		2102 T F.U K	2502 T F.U K	2802 T F.U K	3302 T F.U K	3902 T F.U K
Cooling capacity						
Cooling capacity	kW	194,0	243,0	275,0	333,0	362,0
Nominal input power	kW	75,5	94,5	112,1	125,0	150,2
EER		2,57		2,45	2,66	2,41
Free-cooling capacity	kW	194,0	247	234,0	283,0	
Axial fans						
Quantity	n.	8	10		12	
Rotation speed	rpm	530				
Air flow	m^3/h	82˙000	102˙500	95˙000	114˙000	
Air flow	l/s	22˙778	28˙472	26˙389	31˙667	
Motor input power	kW	6,0	8,0		9,0	
Input current	A	12,0	15,0		18,0	
Screw compressors						
Quantity	n.	2				
Cooling circuits	n.	2				
Standard capacity steps	n.	6				
Modulating capacity steps (option)	%	0 – 12 ÷ 100				
Nominal input current	A	128,0	158,0	185,0	207,0	242,0
Maximum input current	A	172,0	216,0	256,0	288,0	324,0
Inrush current	A	497,0	616,0	613,0	729,0	848,0
Inrush current with options PW/DS	A	304,0	377,0	418,0	494,0	585,0
Evaporator						
Type		Shell and tube				
Quantity	n.	1				
Water flow	m^3/h	35,75	44,71	50,58	61,24	66,56
Water flow	l/s	9,9	12,4	14,1	17,0	18,5
Pressure drop	kPa	79	64	75	68	53
Pressure drop in free-cooling	kPa	133	141	126	137	128
Water volume	l	205	257	264	343	338
P1 Pump group						
Available pressure	kPa	178	167	179	164	171
Motor input power	kW	11,0				
Input current	A	20,0				
Inrush current	A	170,0				
Weight	kg	134				
P1H pump group						
Available pressure	kPa	263	252	265	250	257
Motor input power	kW	15,0				
Input current	A	27,0				
Inrush current	A	194,0				
Weight	kg	147				
PT pump group						
Available pressure	kPa	260	249	260	243	249
Motor input power	kW	15,0				
Input current	A	27,0				
Inrush current	A	194,0				
Weight	kg	294				
Hydraulic kit						
Expansion vessel capacity	l	25				
Quantity	n.	2				
Buffer tank 900 l		•				
Buffer tank 1˙500 l		•				
Buffer tank 1˙800 l		–	•			
Buffer tank 2˙400 l		–			•	
Electrical data						
Total input power	kW	82,0	103,0	120,0	134,0	159,0
Total nominal input current	A	140,0	173,0	200,0	225,0	260,0
Maximum total input current	A	184,0	231,0	271,0	306,0	342,0
Total inrush current	A	509,0	631,0	628,0	747,0	866,0
Inrush current with options PW/DS	A	316,0	392,0	433,0	512,0	603,0
Sound pressure level						
Sound pressure at 1 m	dB(A)	70	72		73	
Dimensions						
Length	mm	6˙120	7˙158		8˙196	
Width	mm	2˙244				
Height	mm	2˙370				
Transport weight	kg	3˙768	4˙304	4˙892	5˙534	5˙568
Weight in operation	kg	3˙973	4˙561	5˙156	5˙878	5˙905
Refrigerant charge per circuit	kg	45,0	57,0	75,0	90,0	91,0
Electrical power supply						
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T				

REMARKS:
- Operating conditions: External air temperature 35°C; water temperature 7/12°C
- For free-cooling operation: Air 5°C; Inlet water temperature 15°C, ethylenic glycol 20% .
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - R134a - Free-cooling Standard version

RAH		2202 T F Ka	2502 T F Ka	2802 T F Ka	3202 T F Ka	3602 T F Ka	4602 T F Ka	5202 T F Ka	6002 T F Ka	6802 T F Ka	8002 T F Ka
Cooling capacity											
Cooling capacity	kW	215,0	248,0	275,0	301,0	324,0	423,0	492,0	529,0	628,0	738,0
Nominal input power	kW	62,7	76,4	91,9	108,9	133,6	165,8	172,6	209,2	230,2	273,9
EER		3,43	3,25	2,99	2,76	2,43	2,55	2,85	2,53	2,73	2,69
Free-cooling capacity	kW	216,0					282,0	270,0		344,0	416,0
Axial fans											
Quantity	n.	6					8	6	8	10	12
Rotation speed	rpm	880									
Air flow	m^3/h	105´000					140´000	132´000		165´000	198´000
Air flow	l/s	29´167					38´889	36´667		45´833	55´000
Motor input power	kW	12,0					16,0			20,0	24,0
Input current	A	24,0					32,0			40,0	48,0
Screw compressors											
Quantity	n.	2									
Cooling circuits	n.	2									
Standard capacity steps	n.	6									
Modulating capacity steps (option)	%	0 – 12 ÷ 100									
Nominal input current	A	108,0	130,0	155,0	183,0	217,0	275,0	291,0	348,0	377,0	440,0
Maximum input current	A	158,0	196,0	248,0	288,0	324,0	364,0	430,0	462,0	560,0	620,0
Inrush current	A	434,0	547,0	609,0	729,0	848,0	983,0	1´158,0	1´254,0	1´644,0	1´752,0
Inrush current with options PW/DS	A	285,0	365,0	414,0	494,0	585,0	702,0	827,0	895,0	1´235,0	1´319,0
Evaporator											
Type		Shell and tube									
Quantity	n.	1									
Water flow	m^3/h	39,57	45,64	50,61	55,40	59,63	77,85	90,55	97,36	115,58	135,82
Water flow	l/s	11,0	12,7	14,1	15,4	16,6	21,6	25,2	27,0	32,1	37,7
Pressure drop	kPa	48	63	67	80	47	63	40	46	54	56
Pressure drop in free-cooling	kPa	150	181	158	178	145	125	110	92	123	145
Water volume	l	187		204		214	280	328		392	702
P1 Pump group											
Available pressure	kPa	159	127	148	126	157	168	175	189	143	103
Motor input power	kW	11,0									
Input current	A	20,0									
Inrush current	A	170,0									
Weight	kg	134									
P1H pump group											
Available pressure	kPa	245	212	223	212	243	255	263	277	232	193
Motor input power	kW	15,0									
Input current	A	27,0									
Inrush current	A	194,0									
Weight	kg	147									
PT pump group											
Available pressure	kPa	242	208	229	206	237	244	248	259	208	184
Motor input power	kW	15,0									22,0
Input current	A	27,0									39,0
Inrush current	A	194,0									273,0
Weight	kg	294									192
Hydraulic kit											
Expansion vessel capacity	l	25									
Quantity	n.	2									
Buffer tank 900 l		•									
Buffer tank 1´500 l		–						•			
Buffer tank 1´800 l		–								•	
Buffer tank 2´400 l		–									•
Electrical data											
Total input power	kW	75,0	88,0	104,0	121,0	146,0	182,0	189,0	225,0	250,0	298,0
Total nominal input current	A	132,0	154,0	179,0	207,0	241,0	307,0	323,0	380,0	417,0	488,0
Maximum total input current	A	182,0	220,0	272,0	312,0	348,0	396,0	462,0	494,0	600,0	668,0
Total inrush current	A	458,0	571,0	633,0	753,0	872,0	1´015,0	1´190,0	1´286,0	1´684,0	1´800,0
Inrush current with options PW/DS	A	309,0	389,0	438,0	518,0	609,0	734,0	859,0	927,0	1´275,0	1´367,0
Sound pressure level											
Sound pressure at 1 m	dB(A)	78				79		80		82	
Dimensions											
Length	mm	5´082						6´120		7´158	9´035
Width	mm	2´244									
Height	mm	2´370									
Transport weight	kg	3´826	3´847	3´867	3´888	3´960	5´258	5´577	5´598	7´103	7´817
Weight in operation	kg	4´013	4´034	4´071	4´092	4´174	5´538	5´905	5´926	7´495	8´520
Refrigerant charge per circuit	kg	38,0		40,0		41,0	55,0	75,0		92,0	101,0
Electrical power supply											
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T									

REMARKS:
- Operating conditions: External air temperature 35°C; water temperature 7/12°C
- For free-cooling operation: Air 5°C; Inlet water temperature 15°C, ethylenic glycol 20% .
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - R134a - Free-cooling Silenced version

RAH		1802 T F.S Ka	2202 T F.S Ka	2502 T F.S Ka	2802 T F.S Ka	3202 T F.S Ka	3602 T F.S Ka	4602 T F.S Ka	5202 T F.S Ka	6002 T F.S Ka	6802 T F.S Ka
Cooling capacity											
Cooling capacity	kW	197,0	208,0	237,0	261,0	282,0	326,0	428,0	462,0	549,0	633,0
Nominal input power	kW	53,0	66,2	81,3	98,2	117,0	132,7	163,5	185,3	201,2	228,0
EER		3,72	3,14	2,92	2,66	2,41	2,46	2,62	2,49	2,73	2,78
Free-cooling capacity	kW			176,0			171,0		223,0	283,0	342,0
Axial fans											
Quantity	n.				6				8	10	12
Rotation speed	rpm					660					
Air flow	m^3/h				78˙000		75˙000		100˙000	125˙000	150˙000
Air flow	l/s				21˙667		20˙833		27˙778	34˙722	41˙667
Motor input power	kW				8,0				10,0	13,0	15,0
Input current	A				14,0				18,0	23,0	27,6
Screw compressors											
Quantity	n.					2					
Cooling circuits	n.					2					
Standard capacity steps	n.					6					
Modulating capacity steps (option)	%					0 – 12 ÷ 100					
Nominal input current	A	91,0	113,0	138,0	165,0	196,0	216,0	272,0	311,0	336,0	373,0
Maximum input current	A	130,0	158,0	196,0	248,0	288,0	324,0	364,0	430,0	462,0	560,0
Inrush current	A	403,0	434,0	547,0	609,0	729,0	848,0	983,0	1˙158,0	1˙254,0	1˙644,0
Inrush current with options PW/DS	A	234,0	285,0	365,0	414,0	494,0	585,0	702,0	827,0	895,0	1˙235,0
Evaporator											
Type						Shell and tube					
Quantity	n.					1					
Water flow	m^3/h	36,26	38,28	43,62	48,03	51,90	60,00	78,77	85,03	101,04	116,50
Water flow	l/s	10,1	10,6	21,1	13,3	14,4	16,7	21,9	22,2	28,1	32,4
Pressure drop	kPa	40	45	58	60	70	48	64	35	49	55
Pressure drop in free-cooling	kPa	115	125	151	129	144	126	121	93	101	127
Water volume	l		187		204		214	280	328	370	434
P1 Pump group											
Available pressure	kPa	195	185	157	177	161	176	171	195	177	138
Motor input power	kW					11,0					
Input current	A					20,0					
Inrush current	A					170,0					
Weight	kg					134					
P1H pump group											
Available pressure	kPa	280	270	242	263	247	262	258	282	265	227
Motor input power	kW					15,0					
Input current	A					27,0					
Inrush current	A					194,0					
Weight	kg					147					
PT pump group											
Available pressure	kPa	278	268	239	259	242	256	247	269	247	202
Motor input power	kW					15,0					
Input current	A					27,0					
Inrush current	A					194,0					
Weight	kg					294					
Hydraulic kit											
Expansion vessel capacity	l					25					
Quantity	n.					2					
Buffer tank 900 l						•					
Buffer tank 1˙500 l					–				•		
Buffer tank 1˙800 l						–				•	
Buffer tank 2˙400 l						–					•
Electrical data											
Total input power	kW	61,0	74,0	89,0	106,0	125,0	141,0	174,0	195,0	214,0	243,0
Total nominal input current	A	105,0	127,0	152,0	179,0	210,0	230,0	290,0	329,0	359,0	401,0
Maximum total input current	A	144,0	172,0	210,0	262,0	302,0	338,0	382,0	448,0	485,0	588,0
Total inrush current	A	417,0	448,0	561,0	623,0	743,0	862,0	1˙001,0	1˙176,0	1˙277,0	1˙672,0
Inrush current with options PW/DS	A	248,0	299,0	379,0	428,0	508,0	599,0	720,0	845,0	918,0	1˙263,0
Sound pressure level											
Sound pressure at 1 m	dB(A)		73		74		75		76		78
Dimensions											
Length	mm				5˙082				6˙120	7˙158	9˙035
Width	mm					2˙244					
Height	mm					2˙370					
Transport weight	kg	3˙423	3˙826	3˙847	3˙867	3˙888	4˙052	5˙381	5˙577	6˙134	7˙638
Weight in operation	kg	3˙610	4˙013	4˙034	4˙071	4˙092	4˙266	5˙660	5˙905	6˙504	8˙073
Refrigerant charge per circuit	kg		38,0		40,0		52,0	69,0	75,0	89,0	105,0
Electrical power supply											
Electrical power supply	V / ph / Hz					400 / 3 / 50 + T					

REMARKS:
- Operating conditions: External air temperature 35°C; water temperature 7/12°C
- For free-cooling operation: Air 5°C; Inlet water temperature 15°C, ethylenic glycol 20% .
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - R134a - Free-cooling Ultra-silenced version

RAH		1502 T F.U Ka	1802 T F.U Ka	2202 T F.U Ka	2502 T F.U Ka	2802 T F.U Ka	3202 T F.U Ka	3602 T F.U Ka	4602 T F.U Ka	5202 T F.U Ka	6002 T F.U Ka
Cooling capacity											
Cooling capacity	kW	155,0	191,0	201,0	227,0	248,0	281,0	324,0	414,0	472,0	547,0
Nominal input power	kW	41,4	55,6	69,7	86,0	104,5	117,6	133,4	169,4	181,2	201,7
EER		3,74	3,44	2,88	2,64	2,37	2,39	2,43	2,44	2,60	2,71
Free-cooling capacity	kW			149,0			141,0	194,0	247,0	234,0	283,0
Axial fans											
Quantity	n.			6				8	10		12
Rotation speed	rpm					530					
Air flow	m^3/h			61´500			57´000	82´000	102´500	95´000	114´000
Air flow	l/s		17´083		21´667	17´083	15´833	22´778	28´472	26´389	31´667
Motor input power	kW			5,0				6,0	8,0		9,0
Input current	A			9,0				12,0	15,0		18,0
Screw compressors											
Quantity	n.					2					
Cooling circuits	n.					2					
Standard capacity steps	n.					6					
Modulating capacity steps (option)	%					0 – 12 ÷ 100					
Nominal input current	A	74,0	95,0	119,0	145,0	175,0	197,0	217,0	281,0	304,0	337,0
Maximum input current	A	112,0	130,0	158,0	196,0	248,0	288,0	324,0	364,0	430,0	462,0
Inrush current	A	361,0	403,0	434,0	547,0	609,0	729,0	848,0	983,0	1´158,0	1´254,0
Inrush current with options PW/DS	A	209,0	234,0	285,0	365,0	414,0	494,0	585,0	702,0	827,0	895,0
Evaporator											
Type						Shell and tube					
Quantity	n.					1					
Water flow	m^3/h	28,53	35,15	36,99	41,78	45,64	51,72	59,63	76,19	86,87	100,67
Water flow	l/s	7,9	9,8	10,3	11,6	12,7	14,4	16,6	–	24,1	28,0
Pressure drop	kPa	71	37	42	53	54	69	47	60	36,0	49
Pressure drop in free-cooling	kPa	128	100	109	131	109	130	98	118	99,0	102
Water volume	l	173		187		204		256	322	370	412
P1 Pump group											
Available pressure	kPa	184	210	201	178	198	175	204	176	188	176
Motor input power	kW					11,0					
Input current	A					20,0					
Inrush current	A					170,0					
Weight	kg					134					
P1H pump group											
Available pressure	kPa	269	295	287	263	284	261	290	263	276	264
Motor input power	kW					15,0					
Input current	A					27,0					
Inrush current	A					194,0					
Weight	kg					147					
PT pump group											
Available pressure	kPa	267	293	284	260	280	256	284	252	262	246
Motor input power	kW					15,0					
Input current	A					27,0					
Inrush current	A					194,0					
Weight	kg					294					
Hydraulic kit											
Expansion vessel capacity	l					25					
Quantity	n.					2					
Buffer tank 900 l						•					
Buffer tank 1´500 l					–			•			
Buffer tank 1´800 l						–				•	
Buffer tank 2´400 l							–				•
Electrical data											
Total input power	kW	46,0	61,0	75,0	91,0	110,0	123,0	139,0	177,0	189,0	211,0
Total nominal input current	A	83,0	104,0	128,0	154,0	184,0	206,0	229,0	296,0	319,0	355,0
Maximum total input current	A	121,0	139,0	167,0	205,0	257,0	297,0	336,0	379,0	445,0	480,0
Total inrush current	A	370,0	412,0	443,0	556,0	618,0	738,0	860,0	998,0	1´173,0	1´272,0
Inrush current with options PW/DS	A	218,0	243,0	294,0	374,0	423,0	503,0	597,0	717,0	842,0	913,0
Sound pressure level											
Sound pressure at 1 m	dB(A)	69		70		71	72		73		74
Dimensions											
Length	mm				5´082			6´120	7´158		8´196
Width	mm					2´244					
Height	mm					2´370					
Transport weight	kg	3´251	3´398	3´800	3´821	3´841	3´954	4´471	5´723	6´070	6´618
Weight in operation	kg	3´424	3´585	3´987	4´008	4´045	4´158	4´727	6´045	6´440	7´030
Refrigerant charge per circuit	kg	36,0		38,0		40,0	51,0	52,0	66,0	89,0	102,0
Electrical power supply											
Electrical power supply	V / ph / Hz					400 / 3 / 50 + T					

REMARKS:
- Operating conditions: External air temperature 35°C; water temperature 7/12°C
- For free-cooling operation: Air 5°C; Inlet water temperature 15°C, ethylenic glycol 20% .
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

R407C - Correction factors for cooling capacity

External air temperature °C		28	30	32	35	38	40	42	45	48
Temperature of water leaving from evaporator °C	17	1,401	1,371	1,347	1,306	1,265	1,241	1,217	1,185	1,138
	16	1,366	1,336	1,313	1,272	1,231	1,208	1,185	1,154	1,107
	15	1,330	1,301	1,279	1,238	1,198	1,176	1,154	1,123	1,077
	14	1,295	1,266	1,245	1,205	1,167	1,146	1,125	1,094	1,047
	13	1,260	1,232	1,212	1,171	1,136	1,116	1,096	1,065	1,019
	12	1,221	1,195	1,177	1,138	1,104	1,070	1,052	1,021	0,975
	11	1,183	1,158	1,143	1,106	1,072	1,042	1,027	0,997	0,951
	10	1,145	1,121	1,109	1,073	1,040	1,014	1,002	0,965	0,927
	9	1,113	1,090	1,076	1,049	1,009	0,988	0,966	0,935	0,890
	8	1,081	1,060	1,044	1,024	0,979	0,961	0,942	0,912	0,867
	7	1,050	1,030	1,011	1	0,948	0,934	0,918	0,888	0,843
	6	1,017	0,997	0,979	0,964	0,917	0,903	0,885	0,855	0,809
	5	0,984	0,965	0,946	0,928	0,886	0,871	0,851	0,820	0,774
	4	0,951	0,932	0,914	0,892	0,854	0,840	0,818	0,778	0,736
	3	0,919	0,898	0,882	0,855	0,823	0,808	0,785	0,758	0,718
	2	0,889	0,870	0,850	0,827	0,797	0,781	0,760	0,734	0,696
	1	0,859	0,842	0,819	0,799	0,770	0,754	0,735	0,711	0,659
	0	0,829	0,813	0,788	0,771	0,744	0,726	0,711	0,689	0,656
	-1	0,800	0,784	0,757	0,743	0,717	0,699	0,686	0,666	0,636
	-2	0,771	0,756	0,731	0,717	0,692	0,673	0,660	0,641	0,612
	-3	0,743	0,728	0,706	0,691	0,666	0,647	0,633	0,626	0,600
	-4	0,715	0,700	0,680	0,665	0,640	0,621	0,607	0,592	0,568
	-5	0,687	0,672	0,654	0,639	0,614	0,596	0,581	0,567	0,547

REMARKS:
- The above coefficients correspond to the mean of the values for the different units, therefore the performances calculated using this the 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 desclaims all responsabilities in case of damages deriving from violation of this instructions.
- For further clarifications or information, you are kindly request to contact our sales departement.

R407C - Correction factors for input power

External air temperature °C		28	30	32	35	38	40	42	45	48
Temperature of water leaving from evaporator °C	17	1,054	1,093	1,125	1,175	1,225	1,257	1,289	1,330	1,393
	16	1,036	1,082	1,104	1,155	1,206	1,228	1,250	1,292	1,354
	15	1,018	1,071	1,084	1,135	1,187	1,200	1,213	1,253	1,314
	14	0,999	1,059	1,063	1,115	1,164	1,188	1,201	1,241	1,302
	13	0,981	1,048	1,043	1,096	1,142	1,177	1,189	1,229	1,290
	12	0,965	1,020	1,024	1,077	1,122	1,166	1,178	1,219	1,281
	11	0,948	0,993	1,004	1,059	1,102	1,145	1,166	1,207	1,269
	10	0,932	0,966	0,985	1,041	1,082	1,124	1,154	1,195	1,257
	9	0,915	0,946	0,970	1,027	1,071	1,107	1,142	1,182	1,245
	8	0,898	0,927	0,955	1,014	1,060	1,090	1,126	1,167	1,229
	7	0,882	0,907	0,940	1	1,049	1,073	1,106	1,147	1,209
	6	0,868	0,895	0,926	0,980	1,030	1,054	1,087	1,127	1,186
	5	0,854	0,882	0,910	0,961	1,011	1,036	1,069	1,107	1,165
	4	0,840	0,870	0,895	0,941	0,992	1,017	1,051	1,090	1,148
	3	0,826	0,857	0,880	0,922	0,973	0,999	1,032	1,071	1,129
	2	0,813	0,844	0,866	0,910	0,958	0,986	1,015	1,054	1,112
	1	0,800	0,831	0,852	0,898	0,943	0,973	0,998	1,038	1,096
	0	0,788	0,818	0,837	0,885	0,929	0,960	0,981	1,020	1,079
	-1	0,775	0,805	0,823	0,873	0,914	0,947	0,964	1,002	1,059
	-2	0,763	0,792	0,813	0,858	0,900	0,933	0,952	0,991	1,050
	-3	0,750	0,779	0,802	0,842	0,885	0,918	0,941	0,980	1,039
	-4	0,738	0,766	0,791	0,827	0,871	0,903	0,929	0,969	1,095
	-5	0,726	0,753	0,781	0,811	0,857	0,889	0,918	0,959	1,020

REMARKS:
- The above coefficients correspond to the mean of the values for the different units, therefore the performances calculated using this the 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.
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R134a - Correction factors for cooling capacity

External air temperature °C		28	30	32	35	38	40	42	45	48
Temperature of water leaving from evaporator °C	17	1,518	1,475	1,446	1,417	1,372	1,327	1,297	1,263	1,213
	16	1,474	1,432	1,404	1,375	1,332	1,288	1,259	1,226	1,176
	15	1,429	1,388	1,361	1,334	1,292	1,249	1,221	1,188	1,139
	14	1,384	1,345	1,318	1,292	1,251	1,210	1,183	1,151	1,102
	13	1,339	1,301	1,276	1,250	1,211	1,171	1,145	1,113	1,065
	12	1,294	1,258	1,233	1,209	1,170	1,132	1,107	1,075	1,027
	11	1,250	1,214	1,191	1,167	1,130	1,093	1,069	1,038	0,990
	10	1,205	1,171	1,148	1,125	1,090	1,054	1,031	0,992	0,953
	9	1,160	1,127	1,105	1,083	1,049	1,015	0,993	0,962	0,916
	8	1,115	1,084	1,063	1,042	1,009	0,977	0,955	0,925	0,879
	7	1,070	1,040	1,020	1	0,969	0,938	0,917	0,887	0,842
	6	1,025	0,995	0,976	0,956	0,926	0,896	0,876	0,846	0,801
	5	0,980	0,951	0,931	0,912	0,883	0,855	0,836	0,806	0,761
	4	0,947	0,918	0,899	0,881	0,852	0,824	0,806	0,777	0,735
	3	0,914	0,886	0,868	0,850	0,822	0,794	0,776	0,749	0,710
	2	0,880	0,854	0,836	0,818	0,791	0,764	0,746	0,721	0,684
	1	0,847	0,822	0,805	0,787	0,761	0,734	0,716	0,693	0,659
	0	0,814	0,789	0,773	0,756	0,730	0,704	0,686	0,665	0,633
	-1	0,781	0,757	0,741	0,725	0,700	0,674	0,656	0,637	0,608
	-2	0,748	0,725	0,710	0,694	0,669	0,643	0,627	0,609	0,582
	-3	0,715	0,693	0,678	0,663	0,638	0,613	0,597	0,581	0,557
	-4	0,681	0,660	0,646	0,632	0,608	0,583	0,567	0,553	0,531
	-5	0,648	0,628	0,615	0,601	0,577	0,553	0,537	0,524	0,506

REMARKS:
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R134a - Correction factors for input power

External air temperature °C		28	30	32	35	38	40	42	45	48
Temperature of water leaving from evaporator °C	17	1,016	1,067	1,100	1,134	1,192	1,250	1,289	1,331	1,394
	16	1,002	1,053	1,087	1,121	1,179	1,237	1,275	1,318	1,381
	15	0,988	1,039	1,073	1,107	1,165	1,223	1,262	1,304	1,368
	14	0,974	1,025	1,060	1,094	1,152	1,210	1,249	1,291	1,355
	13	0,960	1,012	1,046	1,080	1,139	1,197	1,236	1,278	1,342
	12	0,946	0,998	1,032	1,067	1,125	1,184	1,222	1,265	1,329
	11	0,932	0,984	1,019	1,054	1,112	1,170	1,209	1,252	1,316
	10	0,918	0,970	1,005	1,040	1,099	1,157	1,196	1,239	1,303
	9	0,904	0,957	0,992	1,027	1,085	1,144	1,183	1,225	1,290
	8	0,890	0,943	0,978	1,013	1,072	1,130	1,169	1,212	1,277
	7	0,876	0,929	0,965	1	1,059	1,117	1,156	1,199	1,264
	6	0,872	0,923	0,958	0,992	1,045	1,098	1,134	1,176	1,238
	5	0,867	0,917	0,951	0,984	1,032	1,080	1,112	1,152	1,212
	4	0,853	0,903	0,936	0,969	1,017	1,065	1,097	1,138	1,199
	3	0,839	0,888	0,922	0,955	1,003	1,051	1,083	1,124	1,185
	2	0,824	0,874	0,907	0,940	0,988	1,036	1,069	1,110	1,171
	1	0,810	0,859	0,892	0,925	0,974	1,022	1,054	1,096	1,157
	0	0,796	0,845	0,878	0,910	0,959	1,008	1,040	1,081	1,144
	-1	0,781	0,830	0,863	0,896	0,944	0,993	1,026	1,067	1,130
	-2	0,767	0,816	0,848	0,881	0,930	0,979	1,011	1,053	1,116
	-3	0,753	0,801	0,834	0,866	0,915	0,964	0,997	1,039	1,102
	-4	0,738	0,787	0,819	0,851	0,901	0,950	0,983	1,025	1,158
	-5	0,723	0,772	0,805	0,837	0,886	0,935	0,968	1,011	1,075

REMARKS:
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- 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.
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AIR COOLED CHILLERS
WITH SCREW COMPRESSORS AND AXIAL FANS

REFRIGERANT R407C AND R134A

RAH 913 K

Series RAH ...

Cooling capacity from 307 to 1879 kW - from 1 to 4 circuits

The air cooled chillers of **RAH series** are extremely compact units so to reduce the installation spaces and weights.
They 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.
Depending on the cooling capacity, they are available from 1 to 4 cooling circuits.
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 both R407C (K) and R134a (Ka) refrigerants are the following:
K/ Ka - standard version
S.K/Ka - silenced version: oversized coil, reduced air flow, fans with a lower rotation speed, cabinet on compressors, insulated by means of soundproofing material.
U.K/Ka - ultra-silenced version: oversized coil, reduced air flow, fans with a very low rotation speed, cabinet on compressors 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 components:

Modular frame made of galvanized and RAL 7035 painted steel profiles and base-frame in painted steel, suitably treated to resist to external agents. The compressors and the main components are suitably placed in the technical partition, completely at sight.

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).

Dry expansion **shell and tube evaporator**, 100% counter-current type with two refrigerant circuits and one water circuit, with very low pressure drops. Shell and tubes plate made in carbon steel and copper tubes, insulated by close-cell polyurethane foam material. 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.

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 the allow the unit operation also at very high external air temperatures. Thanks to their "V" positioning, also increasing the total efficiency, the overall dimensions are particularly compact. 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).

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.

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.

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

CF **Soundproofed compressors cabinet with standard material**: Insulation of compressors by a cabinet coated with soundproofing material and vibration dampers under compressors (already included in S version).

CFU **Soundproofed compressors cabinet with bituminous rubber coated material**: Insulation of compressors by a suitably coated cabinet, vibration dampers under compressors, mufflers on compressors discharge pipes (already included in U version).

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.

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

GP1 **Protection grid for compressors section**: metal protection grid against accidental impacts.

IG **Watch card:** Electronic card to program the switch-over and rotation between to 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 (standard for R407C).

M6-M25 **Modulating capacity control**: by means of some valves installed on compressors, depending on their quantity, the capacity is modulated from 6 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.

PF **Safety water flow switch**: installed on evaporator, it switches off the unit in case of lack of water flow rate through the evaporator.

PM **Spring-type vibration dampers**: spring-type vibration dampers support, for insulating the unit (supplied in kit), mainly indicated for installation in difficult and aggressive environments. Made of two steel plates containing a suitable quantity of harmonic steel springs.

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.

PW **Part-winding**: equipment for step compressors starting, reducing of about 35% the inrush current of each compressor.

RA **Anti-freeze heater on evaporator**: electrical heater installed on the evaporator, in order to prevent freezing and provided with thermostat.

RF **Power factor correction system cosfi >0,9**: Electrical device made of suitable condensers for compressors rephasing, ensuring a cosfi value ≥0,9, so to reduce the power absorption from the electrical network.

RH **Shut-off valve on suction side**: they are use to isolate compressors during service operations.

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.

TE **Electronic thermostatic valve**: it is requested to make a very accurate regulation of the refrigerant flow and to limit variations of cooling capacity and evaporator leaving temperature water during operation in transitions and for a better performance with fixed superheating.

V **Voltmeter**: Electrical device measuring the electrical tension in the power supply of the unit.

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.

Technical data - R407C - Standard version - 1 circuit

RAH		301 K	391 K	451 K
Cooling capacity				
Cooling capacity	kW	306,6	397,9	459,0
Nominal input power	kW	122,5	153,2	181,9
EER		2,50	2,60	2,52
Axial fans				
Quantity	n.	4		6
Rotation speed	rpm	850		
Air flow	m^3/h	112˙000	104˙000	168˙000
Air flow	l/s	31˙111	28˙889	46˙667
Motor input power	kW	13,2		19,8
Input current	A	25,2		37,8
Screw compressors				
Quantity	n.	1		
Cooling circuits	n.	1		
Standard capacity steps	n.	3		
Modulating capacity steps (option)	%	0 – 25 ÷ 100		
Nominal input current	A	183,0	224,0	268,0
Maximum input current	A	246,0	330,0	370,0
Inrush current	A	1˙023,0	1˙442,0	1˙853,0
Inrush current with options PW/DS	A	665,0	1˙009,0	1˙297,0
Evaporator				
Type		Shell and tube		
Quantity	n.	1		
Water flow	m^3/h	52,6	68,0	78,8
Water flow	l/s	14,6	18,9	21,9
Pressure drop	kPa	48	38	35
Water volume	l	93	80	133
Electrical data				
Total input power	kW	136,0	166,0	202,0
Total nominal input current	A	208,0	249,0	306,0
Maximum total input current	A	271,0	355,0	408,0
Total inrush current	A	1˙048,2	1˙467,0	1˙891,0
Inrush current with options PW/DS	A	690,2	1˙034,0	1˙335,0
Sound pressure level				
Sound pressure at 1 m	dB(A)	81		
Dimensions				
Length	mm	3˙350		4˙850
Width	mm	2˙300		
Height	mm	2˙700		
Transport weight	kg	2˙993	3˙626	4˙236
Refrigerant charge per circuit	kg	68,0	90,0	102,0
Electrical power supply				
Electrical power supply	V / ph / Hz	400 / 3 / 50 + 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).
- Unit weight including oil and refrigerant charge.

Technical data - R407C - Standard version - 2 circuits

RAH		272 K	312 K	372 K	462 K	522 K	592 K	782 K	892 K	1042 K	1162 K
Cooling capacity											
Cooling capacity	kW	286,3	330,6	368,7	442,9	532,5	600,9	800,0	911,7	1`069,1	1`187,1
Nominal input power	kW	115,0	133,0	156,0	191,0	211,7	247,9	306,6	366,0	408,2	468,4
EER		2,50		2,40	2,30	2,50	2,40	2,60	2,50	2,60	2,50
Axial fans											
Quantity	n.	4			6			8	10	12	
Rotation speed	rpm	850									
Air flow	m^3/h	112`000	104`000		168`000	156`000		208`000	260`000	312`000	
Air flow	l/s	31`111	28`889		46`667	43`333		57`778	72`222	86`667	
Motor input power	kW	13,2			19,8			26,4	33,0	39,6	
Input current	A	25,2			37,8			50,4	63,0	75,6	
Screw compressors											
Quantity	n.	2									
Cooling circuits	n.	2									
Standard capacity steps	n.	6									
Modulating capacity steps (option)	%	0 – 12 ÷ 100									
Nominal input current	A	189,0	219,0	249,0	311,0	323,0	371,0	448,0	543,0	605,0	667,0
Maximum input current	A	256,0	288,0	324,0	360,0	432,0	492,0	660,0	740,0	840,0	900,0
Inrush current	A	613,0	729,0	848,0	981,0	1`159,0	1`269,0	1`772,0	2`223,0	2`449,0	2`970,0
Inrush current with options PW/DS	A	418,0	494,0	585,0	700,0	828,0	811,0	1`339,0	1`667,0	1`840,0	2`214,0
Evaporator											
Type		Shell and tube									
Quantity	n.	1									
Water flow	m^3/h	49,3	56,9	63,4	76,0	91,1	103,0	137,2	156,6	183,2	203,4
Water flow	l/s	13,7	15,8	17,6	21,1	25,3	28,6	38,1	43,5	50,9	56,5
Pressure drop	kPa	38	50	41	29	47	52	51	66	97	104
Water volume	l	93		88	133	125	114	207	184	444	435
Electrical data											
Total input power	kW	128,0	146,0	169,0	211,0	232,0	268,0	333,0	399,0	448,0	508,0
Total nominal input current	A	214,0	244,0	274,0	349,0	361,0	409,0	499,0	606,0	680,0	743,0
Maximum total input current	A	281,0	313,0	349,0	398,0	470,0	530,0	710,0	803,0	916,0	976,0
Total inrush current	A	638,0	754,0	873,0	1`019,0	1`197,0	1`307,0	1`822,0	2`286,0	2`525,0	3`046,0
Inrush current with options PW/DS	A	443,0	519,0	610,0	738,0	866,0	849,0	1`389,0	1`730,0	1`916,0	2`290,0
Sound pressure level											
Sound pressure at 1 m	dB(A)	81			82			84	85	86	
Dimensions											
Length	mm	3`350			4`850			6`350	7`850	9`350	
Width	mm	2`300									
Height	mm	2`700									
Transport weight	kg	3`303	3`432	3`468	4`800	5`020	5`070	6`868	7`632	8`442	8`589
Refrigerant charge per circuit	kg	34,0	43,0	44,0	51,0	66,0	68,0	90,5	112,0	128,0	129,0
Electrical power supply											
Electrical power supply	V / ph / Hz	400 / 3 / 50 + 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).
- Unit weight including oil and refrigerant charge.

Technical data - R407C - Standard version - multicircuit

RAH		913 K	1193 K	1184 K	1544 K
Cooling capacity					
Cooling capacity	kW	905,4	1˙180,8	1˙245,5	1˙634,8
Nominal input power	kW	383,0	476,0	496,2	612,4
EER		2,40	2,50		2,70
Axial fans					
Quantity	n.		12		16
Rotation speed	rpm		850		
Air flow	m^3/h	336˙000	312˙000		416˙000
Air flow	l/s	93˙333	86˙667		115˙556
Motor input power	kW		39,6		52,8
Input current	A		75,6		100,8
Screw compressors					
Quantity	n.	3		4	
Cooling circuits	n.	3		4	
Standard capacity steps	n.	9		12	
Modulating capacity steps (option)	%	0 – 8 ÷ 100		0 – 6 ÷ 100	
Nominal input current	A	620,0	749,0	746,0	891,0
Maximum input current	A	738,0	990,0	984,0	1˙320,0
Inrush current	A	1˙515,0	2˙102,0	1˙761,0	2˙432,0
Inrush current with options PW/DS	A	1˙157,0	1˙669,0	1˙403,0	1˙999,0
Evaporator					
Type			Shell and tube		
Quantity	n.		1		
Water flow	m^3/h	155,5	203,0	213,8	280,1
Water flow	l/s	43,2	56,4	59,4	77,8
Pressure drop	kPa	55	60	87	120
Water volume	l	184	252	295	423
Electrical data					
Total input power	kW	423,0	516,0	536,0	665,0
Total nominal input current	A	696,0	825,0	822,0	992,0
Maximum total input current	A	814,0	1˙066,0	1˙060,0	1˙421,0
Total inrush current	A	1˙591,0	2˙178,0	1˙837,0	2˙533,0
Inrush current with options PW/DS	A	1˙233,0	1˙745,0	1˙479,0	2˙100,0
Sound pressure level					
Sound pressure at 1 m	dB(A)		86		87
Dimensions					
Length	mm		9˙350		12˙350
Width	mm		2˙300		
Height	mm		2˙700		
Transport weight	kg	7˙988	10˙141	9˙830	13˙343
Refrigerant charge per circuit	kg	69,0	92,0	72,0	96,0
Electrical power supply					
Electrical power supply	V / ph / Hz		400 / 3 / 50 + 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).
- Unit weight including oil and refrigerant charge.

Technical data - R407C - Silenced version - 1 circuit

RAH S		301 K	391 K	451 K
Cooling capacity				
Cooling capacity	kW	309,8	403,0	417,7
Nominal input power	kW	121,1	151,6	179,8
EER		2,56	2,66	2,32
Axial fans				
Quantity	n.	4	6	
Rotation speed	rpm		880	
Air flow	m^3/h	82˙000	132˙000	123˙000
Air flow	l/s	22˙778	36˙667	34˙167
Motor input power	kW	8,0	12,0	
Input current	A	16,0	24,0	
Screw compressors				
Quantity	n.		1	
Cooling circuits	n.		1	
Standard capacity steps	n.		3	
Modulating capacity steps (option)	%		0 – 25 ÷ 100	
Nominal input current	A	184,0	221,0	269,0
Maximum input current	A	246,0	330,0	370,0
Inrush current	A	1˙023,0	1˙442,0	1˙853,0
Inrush current with options PW/DS	A	665,0	1˙009,0	1˙297,0
Evaporator				
Type			Shell and tube	
Quantity	n.		1	
Water flow	m^3/h	53,2	69,1	71,8
Water flow	l/s	14,8	19,2	19,9
Pressure drop	kPa	49	39	35
Water volume	l	93	80	133
Electrical data				
Total input power	kW	129,0	164,0	192,0
Total nominal input current	A	200,0	245,0	293,0
Maximum total input current	A	262,0	354,0	394,0
Total inrush current	A	1˙039,0	1˙466,0	1˙877,0
Inrush current with options PW/DS	A	681,0	1˙033,0	1˙321,0
Sound pressure level				
Sound pressure at 1 m	dB(A)	74		75
Dimensions				
Length	mm	3˙350	4˙850	
Width	mm		2˙300	
Height	mm		2˙700	
Transport weight	kg	3˙041	4˙009	4˙309
Refrigerant charge per circuit	kg	86,0	99,0	129,0
Electrical power supply				
Electrical power supply	V / ph / Hz		400 / 3 / 50 + 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).
- Unit weight including oil and refrigerant charge.

Technical data - R407C - Silenced version - multicircuit

RAH S		272 K	312 K	372 K	462 K	522 K	592 K	782 K	892 K	1042 K	1162 K	913 K	1184 K
Cooling capacity													
Cooling capacity	kW	291,5	318,3	373,9	451,0	530,5	615,4	795,7	928,3	1˙073,3	1˙191,8	896,1	1˙234,9
Nominal input power	kW	113,0	139,0	154,0	187,0	212,2	242,0	307,9	359,6	406,4	466,3	375,0	483,9
EER		2,58	2,29	2,43	2,41	2,50	2,54	2,58		2,64	2,56	2,39	2,55
Axial fans													
Quantity	n.	4		6		8		10	12	14		12	16
Rotation speed	rpm	880											
Air flow	m^3/h	82˙000		132˙000	123˙000	176˙000	164˙000	205˙000	246˙000	287˙000		246˙000	328˙000
Air flow	l/s	22˙778		36˙667	34˙167	48˙889	45˙556	56˙944	68˙333	79˙722		68˙333	91˙111
Motor input power	kW	8,0		12,0		16,0		20,0	24,0	28,0		24,0	32,0
Input current	A	16,0		24,0		32,0		40,0	48,0	56,0		48,0	64,0
Screw compressors													
Quantity	n.	2										3	4
Cooling circuits	n.	2										3	4
Standard capacity steps	n.	6										9	12
Modulating capacity steps (option)	%	0 – 12 ÷ 100										0 – 8 ÷ 100	0 – 6 ÷ 100
Nominal input current	A	186,0	227,0	246,0	306,0	322,0	365,0	449,0	539,0	604,0	691,0	610,0	734,0
Maximum input current	A	256,0	288,0	324,0	360,0	432,0	492,0	660,0	740,0	840,0	900,0	738,0	984,0
Inrush current	A	613,0	729,0	848,0	981,0	1˙159,0	1˙269,0	1˙772,0	2˙223,0	2˙449,0	2˙970,0	1˙515,0	1˙761,0
Inrush current with options PW/DS	A	418,0	494,0	585,0	700,0	828,0	811,0	1˙339,0	1˙667,0	1˙840,0	2˙214,0	1˙157,0	1˙403,0
Evaporator													
Type		Shell and tube											
Quantity	n.	1											
Water flow	m^3/h	50,0	54,7	64,4	77,4	91,1	105,5	136,4	159,1	184,3	204,1	154,1	211,7
Water flow	l/s	13,9	15,2	17,9	21,5	25,3	29,3	37,9	44,2	51,2	56,7	42,8	58,8
Pressure drop	kPa	39	47	43	30	47	55	50	68	97	71	58	91
Water volume	l	93		88	133	125	114	207	184	444	435	184	295
Electrical data													
Total input power	kW	121,0	147,0	166,0	199,0	228,0	258,0	328,0	384,0	434,0	494,0	399,0	516,0
Total nominal input current	A	202,0	243,0	270,0	330,0	354,0	397,0	489,0	587,0	660,0	747,0	658,0	798,0
Maximum total input current	A	272,0	304,0	348,0	384,0	464,0	524,0	700,00	788,0	896,0	956,0	786,0	1˙048,0
Total inrush current	A	629,0	745,0	872,0	1˙005,0	1˙191,0	1˙301,0	1˙812,0	2˙271,0	2˙505,0	3˙026,0	1˙563,0	1˙825,0
Inrush current with options PW/DS	A	434,0	510,0	609,0	724,0	860,0	843,0	1˙379,0	1˙715,0	1˙896,0	2˙270,0	1˙205,0	1˙467,0
Sound pressure level													
Sound pressure at 1 m	dB(A)	75			76			77	79	80			
Dimensions													
Length	mm	3˙350		4˙850		6˙350		7˙850	9˙350	10˙850		9˙350	12˙350
Width	mm	2˙300											
Height	mm	2˙700											
Transport weight	kg	3˙352	3˙363	3˙851	4˙872	5˙252	5˙539	7˙358	8˙030	8˙805	8˙952	8˙133	10˙822
Refrigerant charge per circuit	kg	43,0		48,0	65,0	66,0	86,0	109,0	130,0	146,0	147,0	87,0	90,0
Electrical power supply													
Electrical power supply	V / ph / Hz	400 / 3 / 50 + 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).
- Unit weight including oil and refrigerant charge.

Technical data - R407C - Ultrasilenced version - 1 circuit

RAH U		301 K	391 K	451 K
Cooling capacity				
Cooling capacity	kW	319,6	408,2	481,7
Nominal input power	kW	116,4	149,5	173,2
EER		2,75	2,73	2,78
Axial fans				
Quantity	n.	6		8
Rotation speed	rpm	660		
Air flow	m^3/h	99˙000	93˙000	124˙000
Air flow	l/s	27˙500	25˙833	34˙444
Motor input power	kW	7,5		10,0
Input current	A	13,8		18,4
Screw compressors				
Quantity	n.	1		
Cooling circuits	n.	1		
Standard capacity steps	n.	3		
Modulating capacity steps (option)	%	0 – 25 ÷ 100		
Nominal input current	A	179,0	227,0	263,0
Maximum input current	A	246,0	330,0	370,0
Inrush current	A	1˙023,0	1˙442,0	1˙853,0
Inrush current with options PW/DS	A	665,0	1˙009,0	1˙297,0
Evaporator				
Type		Shell and tube		
Quantity	n.	1		
Water flow	m^3/h	54,8	70,2	82,8
Water flow	l/s	15,2	19,5	23,0
Pressure drop	kPa	51	40	38
Water volume	l	93	80	133
Electrical data				
Total input power	kW	124,0	157,0	183,0
Total nominal input current	A	193,0	241,0	282,0
Maximum total input current	A	260,0	344,0	388,0
Total inrush current	A	1˙037,0	1˙456,0	1˙871,0
Inrush current with options PW/DS	A	679,0	1˙023,0	1˙315,0
Sound pressure level				
Sound pressure at 1 m	dB(A)	67		68
Dimensions				
Length	mm	4˙850		6˙350
Width	mm	2˙300		
Height	mm	2˙700		
Transport weight	kg	3˙493	4˙185	4˙879
Refrigerant charge per circuit	kg	95,0	126,0	165,0
Electrical power supply				
Electrical power supply	V / ph / Hz	400 / 3 / 50 + 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).
- Unit weight including oil and refrigerant charge.

Technical data - R407C - Ultrasilenced version - multicircuit

RAH U		272 K	312 K	372 K	462 K	522 K	592 K	782 K	892 K	1042 K
Cooling capacity										
Cooling capacity	kW	306,9	318,3	362,6	481,0	538,8	621,6	820,6	911,7	1˙081,5
Nominal input power	kW	106,0	139,0	159,0	174,0	209,4	238,1	299,2	366,0	402,8
EER		2,90	2,30		2,80	2,60		2,70	2,50	2,70
Axial fans										
Quantity	n.	6			8		10	12	14	16
Rotation speed	rpm	660								
Air flow	m^3/h	99˙000		93˙000	124˙000		155˙000	186˙000	217˙000	248˙000
Air flow	l/s	27˙500		25˙833	34˙444		43˙056	51˙667	60˙278	68˙889
Motor input power	kW	7,5			10,0		12,5	15,0	17,5	20,0
Input current	A	13,8			18,4		23,0	27,6	32,2	36,8
Screw compressors										
Quantity	n.	2								
Cooling circuits	n.	2								
Standard capacity steps	n.	6								
Modulating capacity steps (option)	%	0 – 12 ÷ 100								
Nominal input current	A	176,0	227,0	253.0	288,0	331,0	362,0	454,0	544,0	619,0
Maximum input current	A	256,0	288,0	324,0	360,0	432,0	492,0	660,0	740,0	840,0
Inrush current	A	613,0	729,0	848,0	981,0	1˙159,0	1˙269,0	1˙772,0	2˙223,0	2˙449,0
Inrush current with options PW/DS	A	418,0	494,0	585,0	700,0	828,0	811,0	1˙339,0	1˙667,0	1˙840,0
Evaporator										
Type		Shell and tube								
Quantity	n.	1								
Water flow	m^3/h	52,7	54,6	62,4	82,7	92,4	106,7	140,8	156,8	185,4
Water flow	l/s	14,6	15,2	17,3	23,0	25,7	29,6	39,1	43,6	51,5
Pressure drop	kPa	43	46	40	34	48	56	53	66	99
Water volume	l	93		88	133	125	114	207	184	444
Electrical data										
Total input power	kW	114,0	147,0	167,0	184,0	219,0	251,0	314,0	384,0	423,0
Total nominal input current	A	190,0	241,0	267,0	306,0	349,0	385,0	481,0	577,0	656,0
Maximum total input current	A	270,0	302,0	338,0	378,0	450,0	515,0	688,0	772,0	877,0
Total inrush current	A	627,0	743,0	862,0	999,0	1˙177,0	1˙292,0	1˙800,0	2˙255,0	2˙486,0
Inrush current with options PW/DS	A	432,0	508,0	599,0	718,0	846,0	834,0	1˙367,0	1˙699,0	1˙877,0
Sound pressure level										
Sound pressure at 1 m	dB(A)	67			69				70	71
Dimensions										
Length	mm	4˙850			6˙350		7˙850	9˙350	10˙850	12˙350
Width	mm	2˙300								
Height	mm	2˙700								
Transport weight	kg	3˙804	3˙815	4˙027	5˙443,0	5˙487	6˙167	7˙928	8˙600	9˙433
Refrigerant charge per circuit	kg	48	48,0	62,0	83,0	84,0	104,0	127,0	148,0	164,0
Electrical power supply										
Electrical power supply	V / ph / Hz	400 / 3 / 50 + 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).
- Unit weight including oil and refrigerant charge.

Technical data - R134a - Standard version - 1 circuit

RAH		341 Ka	381 Ka	431 Ka	491 Ka
Cooling capacity					
Cooling capacity	kW	308,0	383,0	403,0	472,0
Nominal input power	kW	122,0	139,0	158,0	178,0
EER		2,52	2,76	2,55	2,65
Axial fans					
Quantity	n.	4			
Rotation speed	rpm	850			
Air flow	m^3/h	119˙000	112˙000		104˙000
Air flow	l/s	33˙056	31˙111		28˙889
Motor input power	kW	13,2			
Input current	A	25,2			
Screw compressors					
Quantity	n.	1			
Cooling circuits	n.	1			
Standard capacity steps	n.	3			
Modulating capacity steps (option)	%	0 – 25 ÷ 100			
Nominal input current	A	199,0	222,0	260,0	292,0
Maximum input current	A	280,0	310,0	320,0	360,0
Inrush current	A	1˙364,0	1˙442,0	1˙853,0	2˙029,0
Inrush current with options PW/DS	A	955,0	1˙010,0	1˙297,0	1˙420,0
Evaporator					
Type		Shell and tube			
Quantity	n.	1			
Water flow	m^3/h	53,0	65,9	69,3	81,2
Water flow	l/s	14,7	18,3	19,3	22,6
Pressure drop	kPa	33	47	45	28
Water volume	l	90	130	114	162
Electrical data					
Total input power	kW	135,2	152,2	171,2	191,2
Total nominal input current	A	224,0	247,0	285,0	317,0
Maximum total input current	A	305,0	335,0	345,0	385,0
Total inrush current	A	1˙389,0	1˙467,0	1˙878,0	2˙054,0
Inrush current with options PW/DS	A	980,0	1˙035,0	1˙322,0	1˙445,0
Sound pressure level					
Sound pressure at 1 m	dB(A)	81			
Dimensions					
Length	mm	3˙350			
Width	mm	2˙300			
Height	mm	2˙700			
Transport weight	kg	3˙445	3˙595	3˙727	4˙055
Refrigerant charge per circuit	kg	56,0	78,0	82,0	111,0
Electrical power supply					
Electrical power supply	V / ph / Hz	400 / 3 / 50 + 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).
- Unit weight including oil and refrigerant charge.

Technical data - R134a - Standard version - 2 circuits

RAH		312 Ka	342 Ka	372 Ka	452 Ka	502 Ka	582 Ka	652 Ka	772 Ka	862 Ka	982 Ka
Cooling capacity											
Cooling capacity	kW	299,0	360,0	393,0	447,0	523,0	580,0	614,0	746,0	809,0	930,0
Nominal input power	kW	116,0	125,0	128,0	166,0	165,0	200,0	246,0	287,0	317,0	356,0
EER		2,60	2,90	3,10	2,70	3,20	3,0	2,90	2,80	2,90	2,60
Axial fans											
Quantity	n.	4		6						8	
Rotation speed	rpm	850									
Air flow	m^3/h	119˙000	112˙000	178˙500		168˙000			156˙000	224˙000	208˙000
Air flow	l/s	33˙056	31˙111	49˙583		46˙667			43˙333	62˙222	57˙778
Motor input power	kW	13,2		19,8						26,4	
Input current	A	25,2		37,8						50,4	
Screw compressors											
Quantity	n.	2									
Cooling circuits	n.	2									
Standard capacity steps	n.	6									
Modulating capacity steps (option)	%	0 – 12 ÷ 100									
Nominal input current	A	194,0	204,0	208,0	275,0	279,0	334,0	401,0	459,0	520,0	583,0
Maximum input current	A	288,0	324,0	310,0	364,0	430,0	462,0	560,0	620,0	640,0	720,0
Inrush current	A	729,0	848,0	830,0	983,0	1˙158,0	1˙254,0	1˙644,0	1˙752,0	2˙173,0	2˙389,0
Inrush current with options PW/DS	A	494,0	585,0	594,0	702,0	827,0	895,0	1˙235,0	1˙319,0	1˙617,0	1˙780,0
Evaporator											
Type		Shell and tube									
Quantity	n.	1									
Water flow	m^3/h	51,5	61,9	67,7	77,0	90,0	99,7	105,5	128,5	139,3	159,8
Water flow	l/s	14,3	17,2	18,8	21,4	25,0	27,7	29,3	35,7	38,7	44,4
Pressure drop	kPa	31	41	49	25	35	36	48	46	60	39
Water volume	l	90	130		162		184	452	435	426	417
Electrical data											
Total input power	kW	129,2	138,2	147,8	185,8	184,8	219,8	266,0	307,0	343,0	382,4
Total nominal input current	A	219,0	229,0	246,0	313,0	317,0	372,0	439,0	497,0	570,0	633,0
Maximum total input current	A	313,0	349,0	348,0	402,0	468,0	500,0	598,0	658,0	690,0	770,0
Total inrush current	A	754,0	873,0	868,0	1˙021,0	1˙196,0	1˙292,0	1˙682,0	1˙790,0	2˙223,0	2˙439,0
Inrush current with options PW/DS	A	519,0	610,0	632,0	740,0	865,0	933,0	1˙273,0	1˙357,0	1˙667,0	1˙830,0
Sound pressure level											
Sound pressure at 1 m	dB(A)	81		82					83	84	
Dimensions											
Length	mm	3˙350		4˙850						6˙350	
Width	mm	2˙300									
Height	mm	2˙700									
Transport weight	kg	3˙307	3˙457	4˙856	4˙860	5˙059	5˙179	6˙292	6˙509	7˙026	7˙356
Refrigerant charge per circuit	kg	28,0	39,0		46,0	60,0	63,0	59,0	75,0	77,0	96,0
Electrical power supply											
Electrical power supply	V / ph / Hz	400 / 3 / 50 + 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).
- Unit weight including oil and refrigerant charge.

Technical data - R134a - Standard version - multicircuit

RAH		753 Ka	863 Ka	1023 Ka	1183 Ka	1313 Ka	1154 Ka	1304 Ka	1494 Ka	1624 Ka	1884 Ka
Cooling capacity											
Cooling capacity	kW	782,0	863,0	927,0	1˙155,0	1˙280,0	1˙157,0	1˙228,0	1˙493,0	1˙618,0	1˙879,0
Nominal input power	kW	246,0	298,0	367,0	416,0	444,0	400,0	492,0	574,0	634,0	713,0
EER		3,20	2,90	2,50	2,80	2,90		2,50		2,60	
Axial fans											
Quantity	n.	12								16	
Rotation speed	rpm	850									
Air flow	m³/h	357˙000			336˙000	312˙000	336˙000		312˙000	448˙000	416˙000
Air flow	l/s	99˙167			93˙333	86˙667	93˙333		86˙667	124˙444	115˙556
Motor input power	kW	39,6								52,8	
Input current	A	75,6								100,8	
Screw compressors											
Quantity	n.	3					4				
Cooling circuits	n.	3					4				
Standard capacity steps	n.	9					12				
Modulating capacity steps (option)	%	0 – 8 ÷ 100					0 – 6 ÷ 100				
Nominal input current	A	416,0	498,0	598,0	668,0	733,0	668,0	802,0	918,0	1˙040,0	1˙167
Maximum input current	A	588,0	642,0	840,0	930,0	960,0	856,0	1˙120,0	1˙240,0	1˙280,0	1˙440,0
Inrush current	A	1˙335,0	1˙451,0	1˙924,0	2˙062,0	2˙493,0	1˙665,0	2˙204,0	2˙372,0	2˙813,0	3˙109,0
Inrush current with options PW/DS	A	1˙004,0	1˙093,0	1˙515,0	1˙630,0	1˙937,0	1˙307,0	1˙795,0	1˙940,0	2˙257,0	2˙500,0
Evaporator											
Type		Shell and tube									
Quantity	n.	1					2				
Water flow	m³/h	134,6	148,3	159,5	198,7	220,3	199,1	211,3	256,7	278,3	323,3
Water flow	l/s	37,4	41,2	44,3	55,2	61,2	55,3	58,7	71,3	77,3	89,8
Pressure drop	kPa	46	62	53	66	82	51	48	46	60	55
Water volume	l	444	431	421	599		923	905	869	852	423
Electrical data											
Total input power	kW	286,0	338,0	407,0	456,0	484,0	440,0	532,0	614,0	687,0	766,0
Total nominal input current	A	492,0	574,0	674,0	744,0	809,0	744,0	878,0	994,0	1˙141,0	1˙268,0
Maximum total input current	A	664,0	718,0	916,0	1˙006,0	1˙036,0	932,0	1˙196,0	1˙316,0	1˙381,0	1˙541,0
Total inrush current	A	1˙411,0	1˙527,0	2˙000,0	2˙138,0	2˙569,0	1˙741,0	2˙280,0	2˙448,0	2˙914,0	3˙210,0
Inrush current with options PW/DS	A	1˙080,0	1˙169,0	1˙591,0	1˙706,0	2˙013,0	1˙383,0	1˙871,0	2˙016,0	2˙358,0	2˙600,8
Sound pressure level											
Sound pressure at 1 m	dB(A)	86							87	88	
Dimensions											
Length	mm	9˙350								12˙350	
Width	mm	2˙300									
Height	mm	2˙700									
Transport weight	kg	7˙783	7˙828	9˙738	10˙231	10˙790	10˙221	12˙125	12˙558	13˙650	15˙091
Refrigerant charge per circuit	kg	49,0	51,0	68,0	83,0	101,0	57,0	59,0	75,0	77,0	96,0
Electrical power supply											
Electrical power supply	V / ph / Hz	400 / 3 / 50 + 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).
- Unit weight including oil and refrigerant charge.

Technical data - R134a - Silenced version - 1 circuit

RAH S		341 Ka	381 Ka	431 Ka	491 Ka
Cooling capacity					
Cooling capacity	kW	328,0	384,0	405,0	500,0
Nominal input power	kW	114,0	138,0	158,0	167,0
EER		2,88	2,78	2,56	2,99
Axial fans					
Quantity	n.	4			6
Rotation speed	rpm	880			
Air flow	m^3/h	88˙000	82˙000		132˙000
Air flow	l/s	24˙444	22˙778		36˙667
Motor input power	kW	8,0			12,0
Input current	A	16,0			24,0
Screw compressors					
Quantity	n.	1			
Cooling circuits	n.	1			
Standard capacity steps	n.	3			
Modulating capacity steps (option)	%	0 – 25 ÷ 100			
Nominal input current	A	186,0	222,0	259,0	274,0
Maximum input current	A	280,0	310,0	320,0	360,0
Inrush current	A	1˙364,0	1˙442,0	1˙853,0	2˙029,0
Inrush current with options PW/DS	A	955,0	1˙010,0	1˙297,0	1˙420,0
Evaporator					
Type		Shell and tube			
Quantity	n.	1			
Water flow	m^3/h	56,5	66,2	69,5	86,0
Water flow	l/s	15,7	18,4	19,3	23,9
Pressure drop	kPa	38	47	45	32
Water volume	l	90	130	114	162
Electrical data					
Total input power	kW	122,0	146,0	166,0	179,0
Total nominal input current	A	202,0	238,0	275,0	298,0
Maximum total input current	A	296,0	326,0	336,0	384,0
Total inrush current	A	1˙380,0	1˙458,0	1˙869,0	2˙053,0
Inrush current with options PW/DS	A	971,0	1˙026,0	1˙313,0	1˙444,0
Sound pressure level					
Sound pressure at 1 m	dB(A)	76			78
Dimensions					
Length	mm	3˙350			4˙850
Width	mm	2˙300			
Height	mm	2˙700			
Transport weight	kg	3˙494	3˙643	3˙776	4˙438
Refrigerant charge per circuit	kg	74,0	96,0	100,0	120,0
Electrical power supply					
Electrical power supply	V / ph / Hz	400 / 3 / 50 + 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).
- Unit weight including oil and refrigerant charge.

Technical data - R134a - Silenced version - 2 circuits

RAH S		312 Ka	342 Ka	372 Ka	452 Ka	502 Ka	582 Ka	652 Ka	772 Ka	862 Ka	982 Ka
Cooling capacity											
Cooling capacity	kW	318,0	344,0	380,0	473,0	502,0	551,0	617,0	771,0	813,0	966,0
Nominal input power	kW	108,0	132,0	134,0	155,0	174,0	212,0	245,0	276,0	316,0	341,0
EER		2,90	2,60	2,80	3,10	2,90	3,0	2,80	2,90	2,80	
Axial fans											
Quantity	n.	4			6				8		10
Rotation speed	rpm	880									
Air flow	m^3/h	88´000	82´000	141´000	132´000			123´000	164´000		205´000
Air flow	l/s	24´444	22´778	39´167	36´667			34´167	45´556		56´944
Motor input power	kW	8,0			12,0				16,0		20,0
Input current	A	16,0			24,0				32,0		40,0
Screw compressors											
Quantity	n.	2									
Cooling circuits	n.	2									
Standard capacity steps	n.	6									
Modulating capacity steps (option)	%	0 – 12 ÷ 100									
Nominal input current	A	181,0	215,0	217,0	258,0	283,0	353,0	399,0	443,0	518,0	560,0
Maximum input current	A	288,0	324,0	310,0	364,0	430,0	462,0	560,0	620,0	640,0	720,0
Inrush current	A	729,0	848,0	830,0	983,0	1´158,0	1´254,0	1´644,0	1´752,0	2´173,0	2´389,0
Inrush current with options PW/DS	A	494,0	585,0	594,0	702,0	827,0	895,0	1´235,0	1´319,0	1´617,0	1´780,0
Evaporator											
Type		Shell and tube									
Quantity	n.	1									
Water flow	m^3/h	54,7	59,0	65,4	81,4	86,4	94,7	106,2	132,8	139,7	166,3
Water flow	l/s	15,2	16,4	18,1	22,6	24,0	26,3	29,5	36,9	38,8	46,2
Pressure drop	kPa	35	38	46	29	32	33	49		61	42
Water volume	l	90	130		162		184	452	435	426	417
Electrical data											
Total input power	kW	116,0	140,0	146,0	167,0	186,0	224,0	257,0	292,0	332,0	361,0
Total nominal input current	A	197,0	231,0	241,0	282,0	317,0	377,0	423,0	475,0	550,0	600,0
Maximum total input current	A	304,0	340,0	348,0	388,0	454,0	486,0	584,0	652,0	672,0	760,0
Total inrush current	A	745,0	864,0	868,0	1´007,0	1´182,0	1´278,0	1´668,0	1´784,0	2´205,0	2´429,0
Inrush current with options PW/DS	A	510,0	601,0	609,0	726,0	851,0	919,0	1´259,0	1´351,0	1´649,0	1´820,0
Sound pressure level											
Sound pressure at 1 m	dB(A)	76		78		79			80	81	
Dimensions											
Length	mm	3´350		4´850					6´350		7´850
Width	mm	2´300									
Height	mm	2´700									
Transport weight	kg	3´356	3´388	4´483	4´932	4´955	5´076	6´365	6´976	7´123	7´846
Refrigerant charge per circuit	kg	37,0	39,0		60,0		63,0	72,0	93,0	95,0	114,0
Electrical power supply											
Electrical power supply	V / ph / Hz	400 / 3 / 50 + 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).
- Unit weight including oil and refrigerant charge.

Technical data - R134a - Silenced version - multicircuit

RAH S		753 Ka	863 Ka	1023 Ka	1183 Ka	1313 Ka	1154 Ka	1304 Ka	1494 Ka	1624 Ka
Cooling capacity										
Cooling capacity	kW	756,0	828,0	988,0	1`159,0	1`211,0	1`099,0	1`234,0	1`543,0	1`625,0
Nominal input power	kW	257,0	312,0	341,0	415,0	473,0	424,0	490,0	553,0	631,0
EER		2,90	2,70	2,90	2,80	2,60		2,50	2,80	2,60
Axial fans										
Quantity	n.	12							16	
Rotation speed	rpm	880								
Air flow	m^3/h	282`000		264`000	246`000		264`000	246`000	328`000	
Air flow	l/s	78`333		73`333	68`333		73`333	68`333	91`111	
Motor input power	kW	24,0							32,0	
Input current	A	48,0							64,0	
Screw compressors										
Quantity	n.	3					4			
Cooling circuits	n.	3					4			
Standard capacity steps	n.	9					12			
Modulating capacity steps (option)	%	0 – 8 ÷ 100					0 – 6 ÷ 100			
Nominal input current	A	434,0	520,0	559,0	665,0	777,0	705,0	799,0	887,0	1`036,0
Maximum input current	A	588,0	642,0	840,0	930,0	960,0	856,0	1`120,0	1`240,0	1`280,0
Inrush current	A	1`335,0	1`451,0	1`924,0	2`062,0	2`493,0	1`665,0	2`204,0	2`372,0	2`813,0
Inrush current with options PW/DS	A	1`004,0	1`093,0	1`515,0	1`630,0	1`937,0	1`307,0	1`795,0	1`940,0	2`257,0
Evaporator										
Type		Shell and tube								
Quantity	n.	1					2			
Water flow	m^3/h	130,0	142,2	169,9	199,4	208,4	189,0	212,0	265,3	279,4
Water flow	l/s	36,1	39,5	47,2	55,4	57,9	52,5	58,9	73,7	77,6
Pressure drop	kPa	43	57	61	67	73	46	49		61
Water volume	l	444	431	421	599		923	905	869	852
Electrical data										
Total input power	kW	281,0	336,0	365,0	439,0	497,0	448,0	514,0	585,0	663,0
Total nominal input current	A	482,0	568,0	607,0	713,0	825,0	753,0	847,0	951,0	1`100,0
Maximum total input current	A	636,0	690,0	888,0	978,0	1`008,0	904,0	1`216,0	1`304,0	1`344,0
Total inrush current	A	1`383,0	1`499,0	1`972,0	2`110,0	2`541,0	1`713,0	2`252,0	2`436,0	2`877,0
Inrush current with options PW/DS	A	1`052,0	1`141,0	1`563,0	1`678,0	1`985,0	1`355,0	1`843,0	2`004,0	2`321,0
Sound pressure level										
Sound pressure at 1 m	dB(A)	81	82						83	84
Dimensions										
Length	mm	9`350							12`350	
Width	mm	2`300								
Height	mm	2`700								
Transport weight	kg	7`576	7`621	9`883	10`376	10`583	10`014	12`270	13`550	13`843
Refrigerant charge per circuit	kg	49,0	51,0	86,0	101,0		57,0	72,0	93,0	95,0
Electrical power supply										
Electrical power supply	V / ph / Hz	400 / 3 / 50 + 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).
- Unit weight including oil and refrigerant charge.

Technical data - R134a - Ultrasilenced version - 1 circuit

RAH U		341 Ka	381 Ka	431 Ka	491 Ka
Cooling capacity					
Cooling capacity	kW	321,0	364,0	423,0	489,0
Nominal input power	kW	117,0	147,0	150,0	171,0
EER		2,74	2,48	2,82	2,86
Axial fans					
Quantity	n.	4		6	
Rotation speed	rpm	660			
Air flow	m^3/h	62˙000		99˙000	93˙000
Air flow	l/s	17˙222		27˙500	25˙833
Motor input power	kW	5,0		7,5	
Input current	A	9,2		13,8	
Screw compressors					
Quantity	n.	1			
Cooling circuits	n.	1			
Standard capacity steps	n.	3			
Modulating capacity steps (option)	%	0 – 25 ÷ 100			
Nominal input current	A	191,0	234,0	247,0	281,0
Maximum input current	A	280,0	310,0	320,0	360,0
Inrush current	A	1˙364,0	1˙442,0	1˙853,0	2˙029,0
Inrush current with options PW/DS	A	955,0	1˙009,0	1˙297,0	1˙420,0
Evaporator					
Type		Shell and tube			
Quantity	n.	1			
Water flow	m^3/h	55,1	62,6	72,7	83,9
Water flow	l/s	15,3	17,4	20,2	23,3
Pressure drop	kPa	36	42	49	30
Water volume	l	90	130	114	162
Electrical data					
Total input power	kW	122,0	152,0	158,0	179,0
Total nominal input current	A	200,0	243,0	261,0	295,0
Maximum total input current	A	289,0	319,0	334,0	388,0
Total inrush current	A	1˙373,0	1˙451,0	1˙867,0	2˙043,0
Inrush current with options PW/DS	A	964,0	1˙018,0	1˙311,0	1˙434,0
Sound pressure level					
Sound pressure at 1 m	dB(A)	71		72	
Dimensions					
Length	mm	3˙350		4˙850	
Width	mm	2˙300			
Height	mm	2˙700			
Transport weight	kg	3˙611	3˙643	4˙228	4˙614
Refrigerant charge per circuit	kg	92,0	86,0	109,0	147,0
Electrical power supply					
Electrical power supply	V / ph / Hz	400 / 3 / 50 + 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).
- Unit weight including oil and refrigerant charge.

Technical data - R134a - Ultrasilenced version - 2 circuits

RAH U		312 Ka	342 Ka	372 Ka	452 Ka	502 Ka	582 Ka	652 Ka	772 Ka	862 Ka	982 Ka
Cooling capacity											
Cooling capacity	kW	297,0	335,0	356,0	444,0	490,0	552,0	644,0	731,0	825,0	914,0
Nominal input power	kW	117,0	136,0	144,0	167,0	179,0	211,0	234,0	294,0	310,0	362,0
EER		2,50			2,70		2,60	2,80	2,50	2,70	2,50
Axial fans											
Quantity	n.	4		6				8		10	
Rotation speed	rpm	660									
Air flow	m^3/h	66˙000	62˙000	102˙000	99˙000	93˙000		124˙000		155˙000	
Air flow	l/s	18˙333	17˙222	28˙333	27˙500	25˙833		34˙444		43˙056	
Motor input power	kW	5,0		7,5				10,0		12,5	
Input current	A	9,2		13,8				18,4		23,0	
Screw compressors											
Quantity	n.	2									
Cooling circuits	n.	2									
Standard capacity steps	n.	6									
Modulating capacity steps (option)	%	0 – 12 ÷ 100									
Nominal input current	A	195,0	220,0	232,0	277,0	301,0	352,0	382,0	469,0	510,0	593,0
Maximum input current	A	288,0	324,0	310,0	364,0	430,0	462,0	560,0	620,0	640,0	720,0
Inrush current	A	729,0	848,0	830,0	983,0	1˙158,0	1˙254,0	1˙644,0	1˙752,0	2˙173,0	2˙389,0
Inrush current with options PW/DS	A	494,0	585,0	594,0	702,0	827,0	895,0	1˙235,0	1˙319,0	1˙617,0	1˙780,0
Evaporator											
Type		Shell and tube									
Quantity	n.	1									
Water flow	m^3/h	51,1	57,6	61,2	76,3	84,2	95,0	110,9	125,6	141,8	157,3
Water flow	l/s	14,2	16,0	17,0	21,2	23,4	26,4	30,8	34,9	39,4	43,7
Pressure drop	kPa	31	36	41	25	31	33	53	44	63	38
Water volume	l	90	130		162		184	452	435	426	417
Electrical data											
Total input power	kW	122,0	141,0	152,0	175,0	187,0	219,0	244,0	304,0	323,0	375,0
Total nominal input current	A	204,0	229,0	246,0	291,0	315,0	366,0	400,0	487,0	533,0	618,0
Maximum total input current	A	297,0	333,0	338,0	378,0	444,0	476,0	578,0	638,0	663,0	743,0
Total inrush current	A	738,0	857,0	862,0	997,0	1˙172,0	1˙268,0	1˙662,0	1˙770,0	2˙196,0	2˙391,0
Inrush current with options PW/DS	A	503,0	594,0	599,0	716,0	841,0	909,0	1˙253,0	1˙337,0	1˙640,0	1˙803,0
Sound pressure level											
Sound pressure at 1 m	dB(A)	71		72	73		74	75		76	
Dimensions											
Length	mm	3˙350			4˙850			6˙350		7˙850	
Width	mm	2˙300									
Height	mm	2˙700									
Transport weight	kg	3˙356	3˙505	4˙483	4˙932	5˙131	5˙252	6˙935	6˙976	7˙751	7˙846
Refrigerant charge per circuit	kg	37,0	48,0	39,0	60,0	73,0	76,0	90,0	93,0	113,0	114,0
Electrical power supply											
Electrical power supply	V / ph / Hz	400 / 3 / 50 + 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).
- Unit weight including oil and refrigerant charge.

Technical data - R134a - Ultrasilenced version - multicircuit

RAH U		753 Ka	863 Ka	1023 Ka	1154 Ka	1304 Ka
Cooling capacity						
Cooling capacity	kW	709,0	858,0	966,0	1`101,0	1`288,0
Nominal input power	kW	277,0	300,0	351,0	423,0	457,0
EER		2,56	2,86	2,75	2,60	2,76
Axial fans						
Quantity	n.	12				16
Rotation speed	rpm	660				
Air flow	m^3/h	204`000	198`000	186`000		248`000
Air flow	l/s	56`667	55`000	51`667		68`889
Motor input power	kW	15,0				20,0
Input current	A	27,6				36,8
Screw compressors						
Quantity	n.	3			4	
Cooling circuits	n.	3			4	
Standard capacity steps	n.	9			12	
Modulating capacity steps (option)	%	0 – 8 ÷ 100			0 – 6 ÷ 100	
Nominal input current	A	464,0	501,0	573,0	704,0	764,0
Maximum input current	A	588,0	642,0	840,0	856,0	1`120,0
Inrush current	A	1`335,0	1`451,0	1`924,0	1`665,0	2`204,0
Inrush current with options PW/DS	A	1`004,0	1`093,0	1`515,0	1`307,0	1`795,0
Evaporator						
Type		Shell and tube				
Quantity	n.	1			2	
Water flow	m^3/h	122,0	147,6	166,3	189,4	221,4
Water flow	l/s	33,9	41,0	46,2	52,6	61,5
Pressure drop	kPa	38	61	58	46	53
Water volume	l	444	431	421	923	905
Electrical data						
Total input power	kW	292,0	315,0	366,0	438,0	487,0
Total nominal input current	A	492,0	529,0	601,0	732,0	801,0
Maximum total input current	A	616,0	670,0	868,0	884,0	1`157,0
Total inrush current	A	1`363,0	1`479,0	1`952,0	1`693,0	2`241,0
Inrush current with options PW/DS	A	1`032,0	1`121,0	1`543,0	1`335,0	1`832,0
Sound pressure level						
Sound pressure at 1 m	dB(A)	76			77	78
Dimensions						
Length	mm	9`350				12`350
Width	mm	2`300				
Height	mm	2`700				
Transport weight	kg	7`576	7`973	10`235	10`366	13`468
Refrigerant charge per circuit	kg	49,0	69,0	104,0	71,0	90,0
Electrical power supply						
Electrical power supply	V / ph / Hz	400 / 3 / 50 + 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).
- Unit weight including oil and refrigerant charge.

R407C - Correction factors for cooling capacity

External air temperature °C		28	30	32	35	38	40	42	45	48
Temperature of water leaving from evaporator °C	17	1,401	1,371	1,347	1,306	1,265	1,241	1,217	1,185	1,138
	16	1,366	1,336	1,313	1,272	1,231	1,208	1,185	1,154	1,107
	15	1,330	1,301	1,279	1,238	1,198	1,176	1,154	1,123	1,077
	14	1,295	1,266	1,245	1,205	1,167	1,146	1,125	1,094	1,047
	13	1,260	1,232	1,212	1,171	1,136	1,116	1,096	1,065	1,019
	12	1,221	1,195	1,177	1,138	1,104	1,070	1,052	1,021	0,975
	11	1,183	1,158	1,143	1,106	1,072	1,042	1,027	0,997	0,951
	10	1,145	1,121	1,109	1,073	1,040	1,014	1,002	0,965	0,927
	9	1,113	1,090	1,076	1,049	1,009	0,988	0,966	0,935	0,890
	8	1,081	1,060	1,044	1,024	0,979	0,961	0,942	0,912	0,867
	7	1,050	1,030	1,011	1	0,948	0,934	0,918	0,888	0,843
	6	1,017	0,997	0,979	0,964	0,917	0,903	0,885	0,855	0,809
	5	0,984	0,965	0,946	0,928	0,886	0,871	0,851	0,820	0,774
	4	0,951	0,932	0,914	0,892	0,854	0,840	0,818	0,778	0,736
	3	0,919	0,898	0,882	0,855	0,823	0,808	0,785	0,758	0,718
	2	0,889	0,870	0,850	0,827	0,797	0,781	0,760	0,734	0,696
	1	0,859	0,842	0,819	0,799	0,770	0,754	0,735	0,711	0,659
	0	0,829	0,813	0,788	0,771	0,744	0,726	0,711	0,689	0,656
	-1	0,800	0,784	0,757	0,743	0,717	0,699	0,686	0,666	0,636
	-2	0,771	0,756	0,731	0,717	0,692	0,673	0,660	0,641	0,612
	-3	0,743	0,728	0,706	0,691	0,666	0,647	0,633	0,626	0,600
	-4	0,715	0,700	0,680	0,665	0,640	0,621	0,607	0,592	0,568
	-5	0,687	0,672	0,654	0,639	0,614	0,596	0,581	0,567	0,547

REMARKS:
- The above coefficients correspond to the mean of the values for the different units, therefore the performances calculated using this the 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 desclaims all responsabilities in case of damages deriving from violation of this instructions.
- For further clarifications or information, you are kindly request to contact our sales departement.

R407C - Correction factors for input power

External air temperature °C		28	30	32	35	38	40	42	45	48
Temperature of water leaving from evaporator °C	17	1,054	1,093	1,125	1,175	1,225	1,257	1,289	1,330	1,393
	16	1,036	1,082	1,104	1,155	1,206	1,228	1,250	1,292	1,354
	15	1,018	1,071	1,084	1,135	1,187	1,200	1,213	1,253	1,314
	14	0,999	1,059	1,063	1,115	1,164	1,188	1,201	1,241	1,302
	13	0,981	1,048	1,043	1,096	1,142	1,177	1,189	1,229	1,290
	12	0,965	1,020	1,024	1,077	1,122	1,166	1,178	1,219	1,281
	11	0,948	0,993	1,004	1,059	1,102	1,145	1,166	1,207	1,269
	10	0,932	0,966	0,985	1,041	1,082	1,124	1,154	1,195	1,257
	9	0,915	0,946	0,970	1,027	1,071	1,107	1,142	1,182	1,245
	8	0,898	0,927	0,955	1,014	1,060	1,090	1,126	1,167	1,229
	7	0,882	0,907	0,940	1	1,049	1,073	1,106	1,147	1,209
	6	0,868	0,895	0,926	0,980	1,030	1,054	1,087	1,127	1,186
	5	0,854	0,882	0,910	0,961	1,011	1,036	1,069	1,107	1,165
	4	0,840	0,870	0,895	0,941	0,992	1,017	1,051	1,090	1,148
	3	0,826	0,857	0,880	0,922	0,973	0,999	1,032	1,071	1,129
	2	0,813	0,844	0,866	0,910	0,958	0,986	1,015	1,054	1,112
	1	0,800	0,831	0,852	0,898	0,943	0,973	0,998	1,038	1,096
	0	0,788	0,818	0,837	0,885	0,929	0,960	0,981	1,020	1,079
	-1	0,775	0,805	0,823	0,873	0,914	0,947	0,964	1,002	1,059
	-2	0,763	0,792	0,813	0,858	0,900	0,933	0,952	0,991	1,050
	-3	0,750	0,779	0,802	0,842	0,885	0,918	0,941	0,980	1,039
	-4	0,738	0,766	0,791	0,827	0,871	0,903	0,929	0,969	1,095
	-5	0,726	0,753	0,781	0,811	0,857	0,889	0,918	0,959	1,020

REMARKS:
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- 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.
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R134a - Correction factors for cooling capacity

External air temperature °C		28	30	32	35	38	40	42	45	48
Temperature of water leaving from evaporator °C	17	1,518	1,475	1,446	1,417	1,372	1,327	1,297	1,263	1,213
	16	1,474	1,432	1,404	1,375	1,332	1,288	1,259	1,226	1,176
	15	1,429	1,388	1,361	1,334	1,292	1,249	1,221	1,188	1,139
	14	1,384	1,345	1,318	1,292	1,251	1,210	1,183	1,151	1,102
	13	1,339	1,301	1,276	1,250	1,211	1,171	1,145	1,113	1,065
	12	1,294	1,258	1,233	1,209	1,170	1,132	1,107	1,075	1,027
	11	1,250	1,214	1,191	1,167	1,130	1,093	1,069	1,038	0,990
	10	1,205	1,171	1,148	1,125	1,090	1,054	1,031	0,992	0,953
	9	1,160	1,127	1,105	1,083	1,049	1,015	0,993	0,962	0,916
	8	1,115	1,084	1,063	1,042	1,009	0,977	0,955	0,925	0,879
	7	1,070	1,040	1,020	1	0,969	0,938	0,917	0,887	0,842
	6	1,025	0,995	0,976	0,956	0,926	0,896	0,876	0,846	0,801
	5	0,980	0,951	0,931	0,912	0,883	0,855	0,836	0,806	0,761
	4	0,947	0,918	0,899	0,881	0,852	0,824	0,806	0,777	0,735
	3	0,914	0,886	0,868	0,850	0,822	0,794	0,776	0,749	0,710
	2	0,880	0,854	0,836	0,818	0,791	0,764	0,746	0,721	0,684
	1	0,847	0,822	0,805	0,787	0,761	0,734	0,716	0,693	0,659
	0	0,814	0,789	0,773	0,756	0,730	0,704	0,686	0,665	0,633
	-1	0,781	0,757	0,741	0,725	0,700	0,674	0,656	0,637	0,608
	-2	0,748	0,725	0,710	0,694	0,669	0,643	0,627	0,609	0,582
	-3	0,715	0,693	0,678	0,663	0,638	0,613	0,597	0,581	0,557
	-4	0,681	0,660	0,646	0,632	0,608	0,583	0,567	0,553	0,531
	-5	0,648	0,628	0,615	0,601	0,577	0,553	0,537	0,524	0,506

REMARKS:
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R134a - Correction factors for input power

External air temperature °C		28	30	32	35	38	40	42	45	48
Temperature of water leaving from evaporator °C	17	1,016	1,067	1,100	1,134	1,192	1,250	1,289	1,331	1,394
	16	1,002	1,053	1,087	1,121	1,179	1,237	1,275	1,318	1,381
	15	0,988	1,039	1,073	1,107	1,165	1,223	1,262	1,304	1,368
	14	0,974	1,025	1,060	1,094	1,152	1,210	1,249	1,291	1,355
	13	0,960	1,012	1,046	1,080	1,139	1,197	1,236	1,278	1,342
	12	0,946	0,998	1,032	1,067	1,125	1,184	1,222	1,265	1,329
	11	0,932	0,984	1,019	1,054	1,112	1,170	1,209	1,252	1,316
	10	0,918	0,970	1,005	1,040	1,099	1,157	1,196	1,239	1,303
	9	0,904	0,957	0,992	1,027	1,085	1,144	1,183	1,225	1,290
	8	0,890	0,943	0,978	1,013	1,072	1,130	1,169	1,212	1,277
	7	0,876	0,929	0,965	1	1,059	1,117	1,156	1,199	1,264
	6	0,872	0,923	0,958	0,992	1,045	1,098	1,134	1,176	1,238
	5	0,867	0,917	0,951	0,984	1,032	1,080	1,112	1,152	1,212
	4	0,853	0,903	0,936	0,969	1,017	1,065	1,097	1,138	1,199
	3	0,839	0,888	0,922	0,955	1,003	1,051	1,083	1,124	1,185
	2	0,824	0,874	0,907	0,940	0,988	1,036	1,069	1,110	1,171
	1	0,810	0,859	0,892	0,925	0,974	1,022	1,054	1,096	1,157
	0	0,796	0,845	0,878	0,910	0,959	1,008	1,040	1,081	1,144
	-1	0,781	0,830	0,863	0,896	0,944	0,993	1,026	1,067	1,130
	-2	0,767	0,816	0,848	0,881	0,930	0,979	1,011	1,053	1,116
	-3	0,753	0,801	0,834	0,866	0,915	0,964	0,997	1,039	1,102
	-4	0,738	0,787	0,819	0,851	0,901	0,950	0,983	1,025	1,158
	-5	0,723	0,772	0,805	0,837	0,886	0,935	0,968	1,011	1,075

REMARKS:
- The above coefficients correspond to the mean of the values for the different units, therefore the performances calculated using this the 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.
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- For further clarifications or information, you are kindly request to contact our sales departement.

AIR PERFORMA R134A

HIGH EFFICIENCY AIR COOLED CHILLERS

WITH SCREW COMPRESSORS AND AXIAL FANS

EAH 292 Ka

EAH ... Ka Series

Cooling capacity from 289 to 1166 kW - 2 circuits

The air cooled chillers of **Air Performa EAH series** are extremely compact units so to reduce the installation spaces and weights.
They are designed for outdoor installation and are particularly suitable for cooling water in air conditioning systems or industrial applications and, thanks to the refrigerant and to special manufacturing arrangements, they can achieve average values of EER around 4,0.
They are all available with 2 refrigerant circuits.
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 following versions are available:
EAH... Ka standard version

Operation limits (standard units):
AIR: from 15 to 45°C
WATER (out from evaporator): from 5 to 15°C - not suitable for glycol

Main components:

Modular frame made of galvanized and RAL 7035 painted steel profiles and base-frame in painted steel, suitably treated to resist to external agents. The compressors and the main components are suitably placed in the technical partition, completely at sight.

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).

Dry expansion **shell and tube evaporator**, 100% counter-current type with two refrigerant circuits and one water circuit, with very low pressure drops. Shell and tubes plate made in carbon steel and copper tubes, insulated by close-cell polyurethane foam material. 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.

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 the allow the unit operation also at very high external air temperatures. Thanks to their "V" positioning, also increasing the total efficiency, the overall dimensions are particularly compact. 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).

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.

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.

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

CF **Soundproofed compressors cabinet with standard material**: Insulation of compressors by a cabinet coated with soundproofing material and vibration dampers under compressors.

CFU **Soundproofed compressors cabinet with bituminous rubber coated material**: Insulation of compressors by a suitably coated cabinet, vibration dampers under compressors, mufflers on compressors discharge pipes.

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.

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

GP1 **Protection grid for compressors section**: metal protection grid against accidental impacts.

IG **Watch card:** Electronic card to program the switch-over and rotation between to 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.

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

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

PF **Safety water flow switch**: installed on evaporator, it switches off the unit in case of lack of water flow rate through the evaporator.

PM **Spring-type vibration dampers**: spring-type vibration dampers support, for insulating the unit (supplied in kit), mainly indicated for installation in difficult and aggressive environments. Made of two steel plates containing a suitable quantity of harmonic steel springs.

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.

PW **Part-winding**: equipment for step compressors starting, reducing of about 35% the inrush current of each compressor.

RA **Anti-freeze heater on evaporator**: electrical heater installed on the evaporator, in order to prevent freezing and provided with thermostat.

RF **Power factor correction system cosfi >0,9**: Electrical device made of suitable condensers for compressors rephasing, ensuring a cosfi value ≥0,9, so to reduce the power absorption from the electrical network.

RH **Shut-off valve on suction side**: they are use to isolate compressors during service operations.

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.

TE **Electronic thermostatic valve**: it is requested to make a very accurate regulation of the refrigerant flow and to limit variations of cooling capacity and evaporator leaving temperature water during operation in transitions and for a better performance with fixed superheating.

V **Voltmeter**: Electrical device measuring the electrical tension in the power supply of the unit.

VS **Solenoid valve**: electromagnetic solenoid valve on each cooling circuit to prevent refrigerant migrations and consequent flooding of compressors.

Technical data

EAH		292 Ka	332 Ka	392 Ka	442 Ka	562 Ka	632 Ka	722 Ka	832 Ka	972 Ka	1092 Ka	1172 Ka
Cooling capacity												
Cooling capacity	kW	289,0	335,0	390,0	433,0	568,0	631,0	720,0	832,0	970,0	1˙089,0	1˙166,0
Nominal input power	kW	71,4	84,6	99,2	111,2	135,6	151,2	172,6	197,6	229,4	262,4	288,0
EER		4,05	3,96	3,93	3,89	4,19	4,17		4,21	4,23	4,15	4,05
Axial fans												
Quantity	n.	6			8	10		12	14	16		
Rotation speed	rpm	850										
Air flow	m³/h	168˙000			224˙000	280˙000	260˙000	312˙000	364˙000	416˙000		
Air flow	l/s	46˙667			62˙222	77˙778	72˙222	86˙667	101˙111	115˙556		
Motor input power	kW	20,0			26,0	33,0		40,0	46,0	53,0		
Input current	A	38,0			50,0	63,0		76,0	89,0	101,0		
Screw compressors												
Quantity	n.	2										
Cooling circuits	n.	2										
Standard capacity steps	n.	6										
Modulating capacity steps (option)	%	0 – 12,5 ÷ 100										
Nominal input current	A	126,0	147,0	170,0	184,0	231,0	260,0	295,0	327,0	372,0	440,0	478,0
Maximum input current	A	216,0	248,0	288,0	324,0	364,0	430,0	428,0	560,0	620,0	640,0	720,0
Inrush current	A	616,0	609,0	729,0	848,0	983,0	1˙158,0	1˙237,0	1˙644,0	1˙752,0	2˙173,0	2˙389,0
Inrush current with options PW/DS	A	377,0	414,0	484,0	585,0	702,0	827,0	879,0	1˙235,0	1˙319,0	1˙617,0	1˙780,0
Evaporator												
Type		Shell and tube										
Quantity	n.	1										
Water flow	m³/h	50,0	58,0	67,0	74,0	98,0	108,0	124,0	143,0	167,0	187,0	206,0
Water flow	l/s	14,2	16,5	20,5	23,3	27,2	30,7	34,9	40,8	46,6	54,4	57,2
Pressure drop	kPa	57	59		54	59	42	74	81	52	81	51
Electrical data												
Total input power	kW	91,0	104,0	119,0	138,0	169,0	184,0	212,0	244,0	282,0	315,0	341,0
Total nominal input current	A	164,0	185,0	208,0	234,0	281,0	323,0	370,0	416,0	473,0	541,0	579,0
Maximum total input current	A	254,0	286,0	326,0	374,0	414,0	493,0	504,0	649,0	721,0	741,0	821,0
Total inrush current	A	654,0	647,0	767,0	898,0	1˙046,0	1˙221,0	1˙313,0	1˙733,0	1˙853,0	2˙274,0	2˙490,0
Inrush current with options PW/DS	A	415,0	452,0	522,0	635,0	765,0	890,0	955,0	1˙324,0	1˙420,0	1˙718,0	1˙881,0
Sound pressure level												
Sound pressure at 1 m	dB(A)	83			84	85		86	87	88		
Dimensions												
Length	mm	4˙850			6˙350	7˙850		9˙350	10˙850	12˙350		
Width	mm	2˙300										
Height	mm	2˙700										
Transport weight	kg	3˙150	3˙420	3˙690	4˙540	5˙490	5˙790	6˙740	7˙840	8˙840	9˙340	9˙910
Electrical power supply												
Electrical power supply	V / ph / Hz	400 / 3 / 50 + 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).
- Unit weight including oil and refrigerant charge.

RWE 111 K

Series RWE ...

Cooling capacity from 6 to 87 kW - 1 circuit

The water cooled chillers of **RWE series** are designed for indoor installation and are particularly suitable for small and medium sized air conditioning systems, in residential and commercial applications. For this reason, they are made of a housing in painted steel plate.
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, the units only need to be positioned and electrically and hydraulically connected.

The following versions are available:
RWE...K with R407C ecological refrigerant charge
RWE...Ka with R134a ecological refrigerant charge

Operation limits (standard units):
EVAPORATOR (OUT): from 5 to 15°C
CONDENSER (OUT): from 30 to 50°C for R407C – from 30 to 55°C for R134a

Main components:

Strong and compact frame, with a housing made of galvanized and RAL 7035 painted steel plate. The front and the access panels to the electrical board are easy to be opened. The main components are installed inside the housing, which can be isolated with standard soundproofing material (option CL) or with bituminous rubber soundproofing material (option CM). When required, the hydraulic kit (buffer tank and hydraulic kit) is installed into an additional section at the bottom of the unit, so not change the overall 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. Higher capacity units are equipped with two scroll compressors in tandem.

Weld-brazed plate **evaporator** and **condenser** 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 hinged internal safety panel, provided with protection fuses and safety transformer. In case of hydraulic kit on board, the electrical control of the pump group is provided.

Unit management **microprocessor** installed on the external panel, easily accessible, complete with compressors hour counter.

Accessories

AE **Electrical power supply different from standard:** mainly, 230V three-phase, 460V three-phase. Frequency 50/60 Hz.

CL **Soundproofing insulation with standard material**: insulation of the compressor housing by means of soundproofing material.

CM **Soundproofing insulation with bituminous rubber material**: insulation of the compressor housing by means of bituminous rubber coated material.

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

HG **Hot gas by-pass**: mechanical device for modulating cooling capacity, preventing frequent compressor' stops.

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** for measuring circuit pressure.

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

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 pole centrifugal packaged type.

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.

RV **Personalized frame painting in RAL colour**

SN **Main switch**: manual switch of lock-door type, switching off the unit.

VB **Brine version**: unit suitable for working with evaporator outlet water temperatures lower than 0°C. A 20 mm evaporator insulation will be provided.

VP **Pressostatic valve**: it is placed on condenser and controls the water flow rate according to the unit condensing pressure.

VS **Solenoid valve**: electromagnetic solenoid valve on each cooling circuit to prevent refrigerant migrations and consequent flooding of compressors.

Technical data - Refrigerant R407C

RWE		61 K	111 K	171 K	201 K	221 K	251 K	301 K	381 K	461 K	501 K	571 K	751 K	901 K
Cooling capacity														
Cooling capacity	kW	5,9	10,8	16,5	19,3	20,9	24,8	29,4	37,8	45,3	49,3	57,0	74,6	87,2
Nominal input power	kW	1,2	2,1	2,9	3,4	4,6	5,6	6,2	8,4	9,9	11,1	12,7	16,9	19,6
EER		4,92	5,14	5,69	5,68	4,54	4,43	4,74	4,50	4,57	4,44	4,49	4,41	4,45
Heating capacity	kW	7,1	12,8	19,3	22,7	25,5	30,4	35,7	46,3	55,1	60,4	69,7	91,4	106,9
Scroll compressors														
Quantity	n.	1									2			
Circuits	n.	1												
Standard capacity steps	%	0 / 100									0 / 50 / 100			
Nominal input current	A	6,1	11,2	7,2	7,5	10,7	12,5	14,3	16,3	20,0	24,6	28,1	33,7	40,7
Maximum input current	A	11,0	23,0	11,0	13,0	17,0	20,0	22,0	27,0	32,0	40,0	44,0	54,0	64,0
Inrush current	A	47,0	100,0	66,0	72,0	99,0	123,0	127,0	167,0	198,0	143,0	149,0	194,0	230,0
Evaporator														
Type		Weld-brazed plate												
Quantity	n.	1												
Circuits	n.	1												
Water flow	m^3/h	1,0	1,8	2,8	3,3	3,6	4,3	5,1	6,5	7,8	8,5	9,8	12,8	15,0
Water flow	l/s	0,3	0,5	0,8	0,9	1,0	1,2	1,4	1,8	2,2	2,4	2,7	3,6	4,2
Pressure drop	kPa	24	69	46	61	59	61	55	64	41	21	20	25	27
Water cooled condenser														
Type		Weld-brazed plate												
Quantity	n.	1												
Water flow	m^3/h	1,2	2,2	3,4	3,9	4,4	5,3	6,2	8,0	9,6	10,5	12,1	15,9	18,5
Water flow	l/s	0,3	0,6	0,9	1,1	1,2	1,5	1,7	2,2	2,7	2,9	3,4	4,4	5,1
Pressure drop	kPa	26	31	37	44	46	52	53	58	84	22	25	23	24
Pumps														
P1 – Available pressure	kPa	64	43	58	79	72	64	94	85	76	85	67	49	37
P1 – Motor input power	kW	0,18		0,55				0,75						1,1
P1H – Available pressure	kPa	84	70	90	111	104	98	138	128	120	142	123	112	100
P1H – Motor input power	kW	0,18		0,75				1,1						1,5
Capacity of buffer tank	l	80									110			
Sound pressure level														
Sound pressure at 1 m	dB(A)	58	59	58	60		61		62		63		64	
Dimensions														
Length	mm	800									1`600			
Width	mm	500									750			
Height	mm	960												
Height with MV option	mm	1`430									1`340			
Transport weight	kg	119	126	142	145	189	199	204	231	247	339	345	406	434
Transport weight with empty buffer tank	kg	169	176	192	195	239	249	254	281	297	499	505	566	594
Refrigerant charge per circuit	kg	2,4	2,5	2,8	2,9	4,5	4,7	5,6	6,4	8,1	5,8	7,0	8,0	19,6
Electrical power supply														
Electrical power supply	V / ph / Hz	230 / 1 / 50 + N + T		400 / 3 / 50 + N + T										

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 30/35°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - Refrigerant R134a

RWE		151 Ka	181 Ka	211 Ka	271 Ka	311 Ka	351 Ka	421 Ka	521 Ka	601 Ka
Cooling capacity										
Cooling capacity	kW	14,6	17,6	20,3	26,7	30,2	34,5	41,4	51,6	58,9
Nominal input power	kW	3,2	3,8	4,4	5,8	6,6	7,6	8,9	11,7	13,7
EER		4,56	4,63	4,61	4,60	4,57	4,54	4,65	4,41	4,30
Heating capacity	kW	17,8	21,4	24,7	32,6	36,8	42,1	50,3	63,3	72,6
Scroll compressors										
Quantity	n.	1					2			
Circuits	n.	1								
Standard capacity steps	%	0 / 100					0 / 50 / 100			
Nominal input current	A	8,8	10,0	11,4	14,0	15,8	20,4	23,4	26,4	32,1
Maximum input current	A	17,0	20,0	22,0	27,0	32,0	40,0	44,0	54,0	64,0
Inrush current	A	99,0	123,0	127,0	167,0	198,0	143,0	149,0	194,0	230,0
Evaporator										
Type		Weld-brazed plate								
Quantity	n.	1								
Circuits	n.	1								
Water flow	m^3/h	2,5	3,0	3,5	4,6	5,2	5,9	7,1	8,9	10,1
Water flow	l/s	0,7	0,8	1,0	1,3	1,4	1,6	2,0	2,5	2,8
Pressure drop	kPa	58	52	54	70	59	27	22	21	27
Water cooled condenser										
Type		Weld-brazed plate								
Quantity	n.	1								
Water flow	m^3/h	3,1	3,7	4,0	5,7	6,4	7,3	8,7	11,0	12,5
Water flow	l/s	0,9	1,0	1,1	1,6	1,8	2,0	2,4	3,1	3,0
Pressure drop	kPa	24	37	38	29	25	19	21	31	27
Pumps										
P1 – Available pressure	kPa	72	87	75	71	110	111	110	96	92
P1 – Motor input power	kW	0,55				0,75				
P1H – Available pressure	kPa	103	118	107	104	152	164	165	152	150
P1H – Motor input power	kW	0,75				1,1	0,75		1,1	
Capacity of buffer tank	l	80					110			
Sound pressure level										
Sound pressure at 1 m	dB(A)	56	57		58		59		60	
Dimensions										
Length	mm	800					1˙600			
Width	mm	500					750			
Height	mm	960								
Height with MV option	mm	1˙430					1˙340			
Transport weight	kg	175	185	193	212	227	315	312	368	389
Transport weight with empty buffer tank	kg	225	235	243	262	277	475	472	528	549
Refrigerant charge per circuit	kg	2,0					3,0		4,0	
Electrical power supply										
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T								

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 30/35°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

RWE 762 K+CFU

Series RWE ...

Cooling capacity from 36 to 393 kW - 1 and 2 circuits

The water cooled chillers of **RWE series** are designed for indoor installation and are particularly suitable for small and medium sized air conditioning systems, in residential and commercial applications.
They are all available with 1 or 2 refrigerant circuits.
They have been designed to be extremely compact, with an easy access for both ordinary and extraordinary service operations.
Thanks to their dimensions (for the whole range, the width is 750 mm) and to the several options available, these units are particularly easy to install also in small spaces, with no building works.
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 following versions are available:
RWE...K with R407C ecological refrigerant charge
RWE...Ka with R134a ecological refrigerant charge

Water operation limits (standard units):
EVAPORATOR (OUT): from 5 to 15°C
CONDENSER (OUT): from 30 to 50°C for R407C – from 30 to 55°C for R134a

Main components:

Strong and compact frame, made of bended and RAL 7035 coloured steel profiles, supporting all the main components, installed at sight. On request, the compressors can be isolated by a soundproofing cabinet with standard material (option CF) or with bituminous rubber coated material (option CFU), so to further reduce the overall sound level of the unit itself.

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. Higher capacity units, with both 1 and 2 cooling circuits, are equipped with two scroll compressors in tandem.

Weld-brazed plate **evaporator** and **condenser** 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, high and low pressure gauges.

Electric board in compliance with CE norms, contained in a suitable partition protected by the hinged internal safety panel, provided with protection fuses and safety transformer.

Unit management **microprocessor** installed on the external panel, easily accessible, complete with compressors hour counter.

Accessories

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

AE **Electrical power supply different from standard:** mainly, 230V three-phase, 460V three-phase. Frequency 50/60 Hz.

CF **Soundproofed compressors cabinet with standard material**: Insulation of compressors by a cabinet made of extruded anodized aluminium profiles, with panels in aluminium alloy, coated with soundproofing material and vibration dampers under compressors.

CFU **Soundproofed compressors cabinet with bituminous rubber coated material**: Insulation of compressors by a cabinet made of extruded anodized aluminium profiles, with panels in aluminium alloy, coated with bituminous rubber soundproofing material and vibration dampers under compressors, mufflers on compressors discharge pipes.

CI **Soundproofing jacket on compressors:** made of soundproofing material, wrapped all around compressors so to further reduce the overall sound level of the unit.

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

HG **Hot gas by-pass**: mechanical device for modulating cooling capacity (only for 1-circuit sizes).

IE **Fumigated wooden crate packing:** available on request for critical transports, so to assure a suitable protection to the unit.

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.

IR **Packing with fumigated wooden pallet and transparent film**: minimal packing made of wooden pallet and transparent film wrapped all around the unit.

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.

MP **Oversized microprocessor**: compared to the standard microprocessor, it allows a multi-language display reading, a more detailed description of parameters, the possibility to manage up to 8 units, to manage non standard communication protocols, a better access to the program.

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.

PM **Spring-type vibration dampers**: spring-type vibration dampers support, for insulating the unit (supplied in kit), mainly indicated for installation in difficult and aggressive environments. Made of two steel plates containing a suitable quantity of harmonic steel springs.

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.

RP **Partial heat recovery** (about 20%) of the condensing heat, by means of a refrigerant/water plate exchanger (desuperheater), always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity.

RT **Total heat recovery** (100%) of the condensing heat, by means of a refrigerant/water plate exchanger, always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity, and /or for dehumidification.

V **Voltmeter**: Electrical device measuring the electrical tension in the power supply of the unit.

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.

Technical data - Refrigerant R407C - 1 circuit - tandem compressors

RWE		541 K	631 K	761 K	931 K	1201 K	1501 K	1901 K
Cooling capacity								
Cooling capacity	kW	54,3	62,9	77,1	94,8	125,0	158,0	196,0
Nominal input power	kW	11,8	13,4	17,1	19,9	27,0	33,7	40,3
EER		4,60	4,69	4,51	4,76	4,63	4,69	4,86
Heating capacity	kW	66,1	76,3	94,2	115,0	152,0	191,0	237,0
Scroll compressors								
Quantity	n.	2 (1 tandem)						
Circuits	n.	1						
Standard capacity steps	%	0 / 50 / 100						
Nominal input current	A	26,3	27,1	31,3	37,8	48,2	61,9	72,7
Maximum input current	A	40,0	44,0	54,0	64,0	82,0	104,0	125,0
Inrush current	A	143,0	149,0	194,0	230,0	266,0	324,0	373,0
Evaporator								
Type		Weld-brazed plate						
Quantity	n.	1						
Circuits	n.	1						
Water flow	m^3/h	9,3	10,8	13,3	16,3	21,5	27,2	33,7
Water flow	l/s	2,6	3,0	3,7	4,5	6,0	7,5	9,4
Pressure drop	kPa	40	43	33	39	38	41	43
Water cooled condenser								
Type		Weld-brazed plate						
Quantity	n.	1						
Water flow	m^3/h	11,4	13,1	16,2	19,8	26,1	32,9	40,8
Water flow	l/s	3,2	3,6	4,5	5,5	7,3	9,1	11,3
Pressure drop	kPa	57	61	47	40	54	58	68
Sound pressure level								
Sound pressure at 1 m	dB(A)	70		72		75	77	79
Dimensions								
Length	mm	1˙500						
Width	mm	750						
Height	mm	1˙600				1˙800		
Transport weight	kg	505	521	555	603	715	795	881
Weight in operation	kg	511	528	565	614	731	815	908
Refrigerant charge per circuit	kg	4,4	5,0	7,0	7,3	10,0	13,0	18,0
Electrical power supply								
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T						

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 30/35°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - Refrigerant R407C - 2 circuits - single compressors

RWE		442 K	532 K	612 K	762 K	922 K	1262 K	1552 K	1912 K
Cooling capacity									
Cooling capacity	kW	45,3	55,1	62,7	77,4	94,4	126,0	158,0	195,0
Nominal input power	kW	9,7	11,6	13,5	16,9	20,1	27,0	33,6	40,6
EER		4,67	4,75	4,64	4,58	4,69	4,67	4,70	4,80
Heating capacity	kW	55,0	66,7	76,2	94,3	114,5	153,0	191,6	235,6
Scroll compressors									
Quantity	n.	2							
Circuits	n.	2							
Standard capacity steps	%	0 / 50 / 100							
Nominal input current	A	22,0	26,0	27,0	31,0	38,0	48,0	62,0	73,0
Maximum input current	A	34,0	40,0	44,0	54,0	64,0	82,0	104,0	125,0
Inrush current	A	116,0	143,0	149,0	194,0	230,0	266,0	324,0	373,0
Evaporator									
Type		Weld-brazed plate							
Quantity	n.	2					1		
Circuits	n.	2							
Water flow	m^3/h	7,8	9,5	10,8	13,3	16,2	21,7	27,2	33,5
Water flow	l/s	2,2	2,6	3,0	3,7	4,5	6,0	7,5	9,3
Pressure drop	kPa	27	29	38	37	40	38	42	49
Water cooled condenser									
Type		Weld-brazed plate							
Quantity	n.	2					1		
Water flow	m^3/h	9,4	11,5	13,1	16,2	19,7	26,3	32,9	40,5
Water flow	l/s	2,6	3,2	3,6	4,5	5,5	7,3	9,1	11,3
Pressure drop	kPa	38	41	53		56	46		56
Sound pressure level									
Sound pressure at 1 m	dB(A)	70		74	76	73		77	
Dimensions									
Length	mm	1˙500							
Width	mm	750							
Height	mm	1˙600					1˙800		
Transport weight	kg	496	516	525	545	596	721	795	859
Weight in operation	kg	502	523	533	555	608	738	815	883
Refrigerant charge per circuit	kg	2,0	2,4		3,1	3,7	5,5	6,7	7,9
Electrical power supply									
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T							

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 30/35°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - Refrigerant R407C - 2 circuits - tandem compressors

RWE		892 K	1082 K	1212 K	1512 K	1852 K	2462 K	3102 K	3822 K
Cooling capacity									
Cooling capacity	kW	90,4	108,0	125,0	155,0	190,0	250,0	315,0	393,0
Nominal input power	kW	19,3	23,7	27,0	33,8	40,4	54,0	67,4	80,6
EER		4,68	4,56	4,63	4,58	4,70	4,63	4,67	4,87
Heating capacity	kW	109,7	131,7	152,0	188,8	230,4	304,0	382,4	473,6
Scroll compressors									
Quantity	n.	4 (2 tandem)							
Circuits	n.	2							
Standard capacity steps	%	0 / 25 / 50 / 75 / 100							
Nominal input current	A	44,0	53,0	54,0	62,0	76,0	96,0	124,0	145,0
Maximum input current	A	68,0	80,0	88,0	108,0	128,0	164,0	208,0	250,0
Inrush current	A	150,0	183,0	193,0	244,0	294,0	348,0	428,0	498,0
Evaporator									
Type		Weld-brazed plate							
Quantity	n.	1					2		
Circuits	n.	2							
Water flow	m^3/h	15,5	18,6	21,5	26,7	32,7	43,0	54,2	67,6
Water flow	l/s	4,3	5,2	6,0	7,4	9,1	11,9	15,0	18,8
Pressure drop	kPa	41	44	46	48	38		41	43
Water cooled condenser									
Type		Weld-brazed plate							
Quantity	n.	1					2		
Water flow	m^3/h	18,9	22,6	26,1	32,5	39,6	52,3	65,8	81,5
Water flow	l/s	5,2	6,3	7,3	9,0	11,0	14,5	18,3	22,6
Pressure drop	kPa	35	41	45		54		58	68
Sound pressure level									
Sound pressure at 1 m	dB(A)	72	73		75		78	80	82
Dimensions									
Length	mm	2˙500				3˙000			
Width	mm	750							
Height	mm	1˙800							
Transport weight	kg	862	884	916	956	1˙096	1˙338	1˙498	1˙670
Weight in operation	kg	873	897	931	974	1˙124	1˙370	1˙539	1˙725
Refrigerant charge per circuit	kg	3,7	4,3	4,9	6,1	9,2	10,0	13,0	18,0
Electrical power supply									
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T							

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 30/35°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - Refrigerant R134a - 1 circuit - tandem compressors

RWE		341 Ka	401 Ka	491 Ka	591 Ka	711 Ka	971 Ka	1201 Ka
Cooling capacity								
Cooling capacity	kW	35,6	41,5	50,4	60,1	80,3	99,0	124,0
Nominal input power	kW	8,1	9,2	11,3	13,5	17,5	22,0	27,1
EER		4,39	4,51	4,46	4,45	4,59	4,50	4,57
Heating capacity	kW	43,7	50,7	61,7	73,6	97,8	121,0	151,1
Scroll compressors								
Quantity	n.	2 (1 tandem)						
Circuits	n.	1						
Standard capacity steps	%	0 / 50 / 100						
Nominal input current	A	19,8	22,5	27,7	31,3	37,3	46,8	58,7
Maximum input current	A	40,0	44,0	54,0	64,0	82,0	104,0	125,0
Inrush current	A	143,0	149,0	194,0	230,0	266,0	324,0	373,0
Evaporator								
Type		Weld-brazed plate						
Quantity	n.	1						
Circuits	n.	1						
Water flow	m^3/h	6,1	7,1	8,7	10,3	13,8	17,0	21,3
Water flow	l/s	1,7	2,0	2,4	2,9	3,8	4,7	5,9
Pressure drop	kPa	23	24	28		20	24	25
Water cooled condenser								
Type		Weld-brazed plate						
Quantity	n.	1						
Water flow	m^3/h	7,5	8,7	10,6	12,7	16,8	20,8	26,0
Water flow	l/s	2,1	2,4	2,9	3,5	4,7	5,8	7,2
Pressure drop	kPa	70	62	65	71	51	62	70
Sound pressure level								
Sound pressure at 1 m	dB(A)	70		72		75	77	79
Dimensions								
Length	mm	1˙500						
Width	mm	750						
Height	mm	1˙600				1˙800		
Transport weight	kg	498	514	528	579	699	763	833
Weight in operation	kg	504	521	535	588	713	779	854
Refrigerant charge per circuit	kg	3,7	4,4	5,0	6,3	9,0	10,0	13,0
Electrical power supply								
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T						

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 30/35°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - Refrigerant R134a - 2 circuits - single compressors

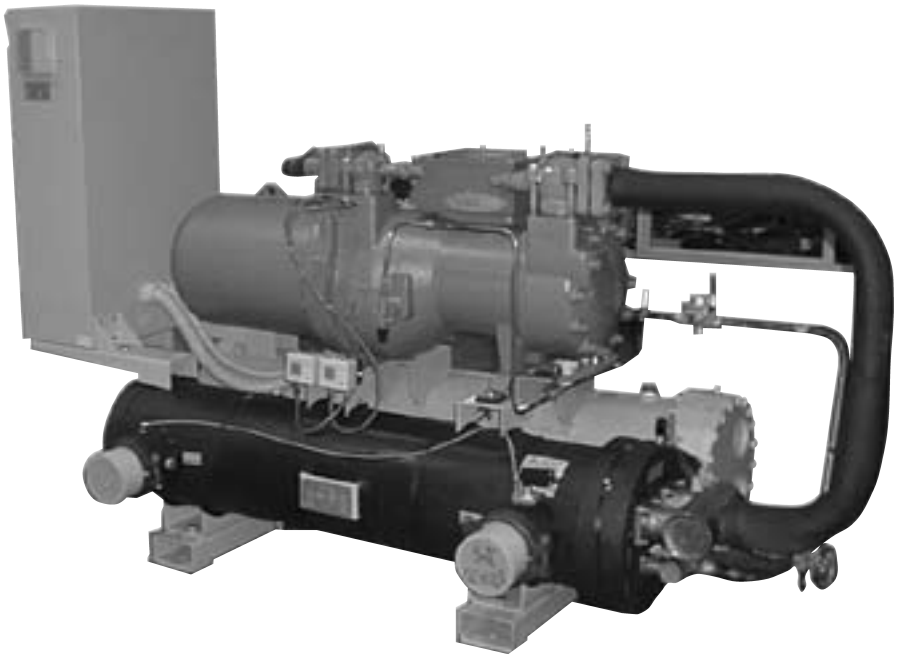
RWE		282 Ka	352 Ka	402 Ka	492 Ka	592 Ka	772 Ka	972 Ka	1222 Ka
Cooling capacity									
Cooling capacity	kW	29,1	36,0	41,2	50,7	60,8	79,3	99,5	125,0
Nominal input power	kW	6,7	8,1	9,3	11,3	13,4	17,5	21,8	27,0
EER		4,34	4,51	4,43	4,48	4,54	4,53	4,56	4,63
Heating capacity	kW	35,8	44,1	50,5	62,0	74,2	96,8	121,3	152,0
Scroll compressors									
Quantity	n.	2							
Circuits	n.	2							
Standard capacity steps	%	0 / 50 / 100							
Nominal input current	A	18,0	20,0	23,0	28,0	31,0	37,0	47,0	59,0
Maximum input current	A	34,0	40,0	44,0	54,0	64,0	82,0	102,0	125,0
Inrush current	A	116,0	143,0	149,0	194,0	230,0	266,0	324,0	373,0
Evaporator									
Type		Weld-brazed plate							
Quantity	n.	2							
Circuits	n.	2							
Water flow	m^3/h	5,01	6,21	7,09	8,7	10,5	13,6	17,1	21,5
Water flow	l/s	1,39	1,72	1,97	2,4	2,9	3,8	4,7	5,9
Pressure drop	kPa	18	17	22	25	23	32	29	31
Water cooled condenser									
Type		Weld-brazed plate							
Quantity	n.	2							
Water flow	m^3/h	6,15	7,58	8,68	10,7	12,8	16,6	20,9	26,1
Water flow	l/s	1,71	2,11	2,41	2,9	3,5	4,6	5,8	7,3
Pressure drop	kPa	50	39	51	48	50	46	43	54
Sound pressure level									
Sound pressure at 1 m	dB(A)	69	70		72		75	77	79
Dimensions									
Length	mm	1˙500							
Width	mm	750							
Height	mm	1˙600					1˙800		
Transport weight	kg	488	500	510	532	584	683	757	821
Weight in operation	kg	492	507	516	570	593	694	772	839
Refrigerant charge per circuit	kg	1,5	2,0		2,4	3,1	3,7	4,9	6,1
Electrical power supply									
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T							

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 30/35°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - Refrigerant R134a - 2 circuits - tandem compressors

RWE		572 Ka	702 Ka	802 Ka	992 Ka	1192 Ka	1522 Ka	1952 Ka	2442 Ka
Cooling capacity									
Cooling capacity	kW	58,0	71,0	83,0	101,0	121,0	161,0	198,0	250,0
Nominal input power	kW	13,2	16,2	18,6	22,6	27,1	35,0	44,0	53,5
EER		4,39	4,38	4,46	4,47	4,46	4,60	4,5	4,67
Heating capacity	kW	71,2	87,4	101,7	123,9	148,1	196,0	242,0	303,5
Scroll compressors									
Quantity	n.	4 (2 tandem)							
Circuits	n.	2							
Standard capacity steps	%	0 / 25 / 50 / 75 / 100							
Nominal input current	A	35,0	40,0	45,0	55,0	63,0	75,0	94,0	117,0
Maximum input current	A	68,0	80,0	88,0	108,0	128,0	164,0	208,0	250,0
Inrush current	A	150,0	183,0	193,0	244,0	294,0	348,0	428,0	498,0
Evaporator									
Type		Weld-brazed plate							
Quantity	n.	2		1			2		
Circuits	n.	2							
Water flow	m^3/h	9,9	12,2	14,3	17,4	20,8	27,7	34,1	43,0
Water flow	l/s	2,8	3,4	3,9	4,8	5,8	7,7	9,5	11,9
Pressure drop	kPa	27	23	26	30	29	20	24	26
Water cooled condenser									
Type		Weld-brazed plate							
Quantity	n.	2		1			2		
Water flow	m^3/h	12,2	15,0	17,5	21,3	25,5	33,7	41,6	52,2
Water flow	l/s	3,4	4,2	4,9	5,9	7,1	9,4	11,6	14,5
Pressure drop	kPa	35	41	45		54		58	68
Sound pressure level									
Sound pressure at 1 m	dB(A)	72	73		75		78	80	82
Dimensions									
Length	mm	2˙500				3˙000			
Width	mm	750							
Height	mm	1˙800							
Transport weight	kg	835	865	903	930	1˙033	1˙306	1˙434	1˙575
Weight in operation	kg	843	876	916	945	1˙051	1˙334	1˙466	1˙616
Refrigerant charge per circuit	kg	2,7	3,7	4,3	4,9	6,1	9,0	10,0	13,0
Electrical power supply									
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T							

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 30/35°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.



RWH 241 Ka

Series RWH

Cooling capacity from 87 to 2440 kW - from 1 to 3 circuits

The water cooled chillers of **RWH series** are designed for indoor installation and are particularly suitable for industrial processes and air conditioning systems.
Depending on the cooling capacity, they are available with 1, 2 or 3 cooling circuits.
Thanks to their compact dimensions and to the several options available, these units are particularly easy to install also in small spaces, with no building works.
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 following versions are available:
RWH...K with R407C ecological refrigerant charge
RWH...Ka with R134a ecological refrigerant charge

Water operation limits (standard units):
EVAPORATOR (OUT): from 5 to 15°C
CONDENSER (OUT): from 30 to 50°C for R407C - from 30 to 55°C for R134a

Main components:

Strong and compact frame, made of bended and coloured steel profiles (colour RAL 9005-black), supporting the exchangers of the evapo-condensers group and on which all the main components are installed at sight. On request, the compressors can be isolated by a soundproofing cabinet with standard material (option CF) or with bituminous rubber coated material (option CFU), so to further reduce the overall sound level of the unit itself.

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).

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.

Shell and tube condensers with copper pipes, externally grooved to increase the heating exchange coefficient and tube bundle in carbon steel. On request, the condenser is also available in cupro-nichel suitable for sea water use (option CA).

Each compressor works on an independent **cooling circuit**, assuring a remarkable reliability to multi-compressor units. Each circuit, made of copper or carbon steel tube, is 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.

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.

AE **Electrical power supply** different from standard: mainly, 230V triphase, 460V triphase. Frequency 50/60 Hz.

CA **Condensers suitable for seawater**: made in cupro-nichel or titanium, to be selected on request, suitable for working with seawater.

CC **Insulated condensers**: insulation on condensers heads and side (10 mm thickness).

CF **Soundproofed compressors cabinet with standard material**: Insulation of compressors by a cabinet made of extruded anodized aluminium profiles, with panels in aluminium alloy, coated with soundproofing material and vibration dampers under compressors.

CFU **Soundproofed compressors cabinet with bituminous rubber coated material**: Insulation of compressors by a cabinet made of extruded anodized aluminium profiles, with panels in aluminium alloy, coated with bituminous rubber soundproofing material and vibration dampers under compressors, mufflers on compressors discharge pipes.

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

DQ **Additional box** for connection of power supply cables

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

IE **Fumigated wooden crate packing:** available on request for critical transports, so to assure a suitable protection to the unit.

IG **Watch card:** Electronic card to program the switch-over and rotation between to 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.

IR **Packing with fumigated wooden pallet and transparent film**: minimal packing made of wooden pallet and transparent film wrapped all around the unit.

LI **Liquid injection**: mechanical device allowing a better cooling of compressors at very high compression level (standard for R407C).

KS **Lifting kit**: made of belts and brackets to be inserted into the holes present in the unit base-frame. It is used for moving and positioning the unit on site.

M8-M25 **Modulating capacity control**: by means of some valves installed on compressors, depending on their quantity, the capacity is modulated from 8 to 100%.

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

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.

PM **Spring-type vibration dampers**: spring-type vibration dampers support, for insulating the unit (supplied in kit), mainly indicated for installation in difficult and aggressive environments. Made of two steel plates containing a suitable quantity of harmonic steel springs.

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.

PW **Part-winding**: equipment for step compressors starting, reducing of about 35% the inrush current of each compressor.

RA **Anti-freeze heater on evaporator**: electrical heater installed on the evaporator, in order to prevent freezing and provided with thermostat.

RF **Power factor correction system cosfi >0,9**: Electrical device made of suitable condensers for compressors rephasing, ensuring a cosfi value ≥0,9, so to reduce the power absorption from the electrical network.

RH **Shut-off valve on suction side**: they are use to isolate compressors during service operations.

RL **Compressors overload relays**: electromechanical protection devices against compressor's overload.

RP **Partial heat recovery** (about 20%) of the condensing heat, by means of a refrigerant/water plate exchanger (desuperheater), always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity.

RT **Total heat recovery** (100%) of the condensing heat, by means of a refrigerant/water plate exchanger, always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity, and /or for dehumidification.

TC **Victaulic joints** and welding coupling for condenser connection to water circuit.

TE **Electronic thermostatic valve**: it is requested to make a very accurate regulation of the refrigerant flow and to limit variations of cooling capacity and evaporator leaving temperature water during operation in transitions and for a better performance with fixed superheating.

V **Voltmeter**: Electrical device measuring the electrical tension in the power supply of the unit.

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.

Technical data - Refrigerant R407C - 1 circuit

RWH		131 K	161 K	191 K	211 K	241 K	301 K	341 K	391 K	531 K	611 K	691 K	731 K	831 K
Cooling capacity														
Cooling capacity	kW	116,0	145,0	169,0	196,0	224,0	281,0	323,0	371,0	487,0	554,0	635,0	726,0	815,0
Nominal input power	kW	32,2	39,9	46,7	54,0	60,8	73,3	84,1	94,5	125,0	143,0	161,0	184,0	205,0
EER		3,60		3,62	3,63	3,68	3,83	3,84	3,92	3,89	3,87	3,94		3,97
Heating capacity	kW	149,0	185,0	216,0	250,0	285,0	355,0	407,0	465,0	611,0	698,0	795,0	910,0	1˙020,0
Screw compressors														
Quantity	n.	1												
Cooling circuits	n.	1												
Standard capacity steps	n.	3												
Modulating capacity steps (option)	%	0 – 25 ÷ 100												
Nominal input current	A	56,0	69,0	80,0	91,0	100,0	124,0	142,0	159,0	201,0	238,0	265,0	301,0	335,0
Maximum input current	A	86,0	108,0	128,0	144,0	162,0	180,0	216,0	246,0	330,0	370,0	420,0	450,0	
Inrush current	A	411,0	508,0	485,0	585,0	686,0	801,0	943,0	1˙023,0	1˙442,0	1˙853,0	2˙029,0	2˙520,0	
Inrush current with options PW/DS	A	218,0	269,0	290,0	350,0	423,0	520,0	612,0	665,0	1˙009,0	1˙297,0	1˙420,0	1˙764,0	
Evaporator														
Type		Shell and tube												
Quantity	n.	1												
Circuits	n.	1												
Water flow	m^3/h	20,0	24,9	29,1	33,7	38,5	48,3	55,6	63,8	83,8	95,3	109,2	124,9	140,2
Water flow	l/s	5,5	6,9	8,1	9,4	10,7	13,4	15,4	17,7	23,3	26,5	30,3	34,7	38,9
Pressure drop	kPa	61	67	58	52	41	71			52	68	69	72	55
Water volume	l	44	42	39		37	86	82	79	185		179	294	
Water cooled condenser														
Type		Shell and tube												
Quantity	n.	1												
Water flow	m^3/h	25,6	31,8	37,2	43,0	49,0	61,1	70,0	80,0	105,1	120,1	136,7	156,5	175,4
Water flow	l/s	7,1	8,8	10,3	11,9	13,6	17,0	19,4	22,2	29,2	33,3	38,0	43,5	48,7
Pressure drop	kPa	80	85		87	89	77	80	78	82	81	79	84	80
Water volume	l	21	25	29	36	39	45	50	60	76	86	102	113	128
Sound pressure level														
Sound pressure at 1 m	dB(A)	70	76			77		80	81	82	83	84	85	87
Dimensions														
Length	mm	2˙430					3˙310		3˙340	3˙700				
Width	mm	800			850		800		850	1˙300				
Height	mm	1˙525			1˙610		1˙525		1˙610	1˙900				
Length with CF/CFU	mm	2˙430					3˙310		3˙340	3˙700				
Width with CF/CFU	mm	800			850					1˙300				
Height with CF/CFU	mm	1˙525			1˙610		1˙525		1˙610	1˙900				
Transport weight	kg	909	926	1˙168	1˙265	1˙288	1˙688	1˙716	1˙900	3˙464	3˙503	3˙696	3˙898	3˙979
Weight in operation	kg	974	993	1˙237	1˙340	1˙365	1˙819	1˙849	2˙040	3˙724	3˙774	3˙978	4˙304	4˙401
Refrigerant charge per circuit	kg	25,0	24,0	23,0	45,0	44,0	50,0	48,0	94,0	91,0	86,0	63,0	77,0	91,0
Electrical power supply														
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T												

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 30/35°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - Refrigerant R407C - 2 and 3 circuits

RWH		252 K	312 K	372 K	422 K	472 K	592 K	672 K	772 K	1062 K	1222 K	1392 K	1462 K	1652 K	1933 K	2203 K	2493 K
Cooling capacity																	
Cooling capacity	kW	241,0	291,0	342,0	394,0	453,0	561,0	642,0	743,0	970,0	1˙116,0	1˙271,0	1˙432,0	1˙632,0	1˙915,0	2˙161,0	2˙440,0
Nominal input power	kW	64,0	79,8	92,4	108,0	120,0	147,0	168,0	189,0	245,0	287,0	321,0	366,0	411,0	482,0	550,0	616,0
EER		3,76	3,65	3,70	3,65	3,78	3,82		3,93	3,96	3,89	3,96	3,91	3,97		3,93	3,96
Heating capacity	kW	306,0	371,0	435,0	502,0	573,0	708,0	810,0	932,0	1˙215,0	1˙403,0	1˙592,0	1˙798,0	2˙043,0	2˙397,0	2˙711,0	3˙056,0
Screw compressors																	
Quantity	n.	2													3		
Cooling circuits	n.	2													3		
Standard capacity steps	n.	6													9		
Modulating capacity steps (option)	%	0 – 12 ÷ 100													0 – 8 ÷ 100		
Nominal input current	A	111,0	137,0	158,0	182,0	198,0	247,0	285,0	319,0	396,0	476,0	530,0	602,0	670,0	795,0	903,0	1˙005,0
Maximum input current	A	172,0	216,0	256,0	288,0	324,0	360,0	432,0	492,0	660,0	740,0	840,0	900,0		1˙260,0	1˙350,0	
Inrush current	A	497,0	616,0	613,0	729,0	848,0	981,0	1˙159,0	1˙269,0	1˙772,0	2˙223,0	2˙449,0	2˙970,0		2˙869,0	3˙420,0	
Inrush current with options PW/DS	A	304,0	377,0	418,0	494,0	585,0	700,0	828,0	911,0	1˙339,0	1˙667,0	1˙840,0	2˙214,0		2˙260,0	2˙664,0	
Evaporator																	
Type		Shell and tube															
Quantity	n.	1															
Circuits	n.	2													3		
Water flow	m^3/h	41,5	50,1	58,8	67,8	77,9	96,5	110,4	127,8	166,8	192,0	218,6	246,3	280,7	329,4	371,7	419,7
Water flow	l/s	11,5	13,9	16,3	18,8	21,6	26,8	30,7	35,5	46,3	53,3	60,7	68,4	78,0	91,5	103,2	116,6
Pressure drop	kPa	62	71	66	61	49	70	71	46	52	36	64	44	87	68	87	36
Water volume	l	134		129		124	185	179	294	286	271	264	461	444	648	632	615
Water cooled condenser																	
Type		Shell and tube															
Quantity	n.	2													3		
Water flow	m^3/h	52,6	63,8	74,8	86,3	98,6	121,8	139,3	160,3	209,0	241,3	273,8	309,3	351,4	412,3	466,3	525,6
Water flow	l/s	14,6	17,7	20,8	24,0	27,4	33,8	38,7	44,5	58,1	67,0	76,1	85,9	97,6	114,5	129,5	146,0
Pressure drop	kPa	69	79	71	79	75	77	80	78	70	82	79	82	80		83	80
Water volume	l	43	49	59	64	75	90	101	121	162	173	205	226	257	307	338	385
Sound pressure level																	
Sound pressure at 1 m	dB(A)	73	79			80		83	84	85	86	87	88	90	89	90	92
Dimensions																	
Length	mm	3˙750		3˙860			3˙900			5˙200							
Width	mm	750		900			1˙000			1˙300					2˙000		
Height	mm	1˙790					1˙990			2˙370							
Length with CF/CFU	mm	3˙750		3˙860			3˙990			5˙200							
Width with CF/CFU	mm	750		900			1˙000			1˙300					2˙000		
Height with CF/CFU	mm	1˙790		1˙840			1˙990			2˙450							
Transport weight	kg	1˙828	1˙838	2˙348	2˙376	2˙425	3˙376	3˙426	3˙895	6˙026	6˙104	6˙483	7˙006	7˙184	9˙834	10˙195	10˙523
Weight in operation	kg	2˙005	2˙020	2˙535	2˙569	2˙623	3˙651	3˙706	4˙309	6˙475	6˙548	6˙952	7˙693	7˙884	10˙789	11˙165	11˙523
Refrigerant charge per circuit	kg	58,0	57,0	55,0	54,0	52,0	50,0	48,0	96,0	87,0	86,0	63,0	73,0	90,0	69,0	80,0	95,0
Electrical power supply																	
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T															

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 30/35°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - Refrigerant R134a - 1 circuit

RWH		91 Ka	111 Ka	131 Ka	151 Ka	171 Ka	211 Ka	241 Ka	271 Ka	321 Ka	361 Ka	421 Ka	481 Ka	541 Ka	621 Ka	721 Ka	771 Ka
Cooling capacity																	
Cooling capacity	kW	86,6	107,0	127,0	150,0	165,0	195,0	213,0	278,0	311,0	352,0	411,0	476,0	534,0	589,0	667,0	718,0
Nominal input power	kW	19,2	23,9	29,5	32,4	36,6	42,8	47,8	58,8	65,8	75,2	86,0	98,6	114,0	125,0	144,0	154,0
EER		4,51	4,48	4,30	4,63	4,51	4,56	4,46	4,73		4,68	4,78	4,83	4,68	4,71	4,63	4,66
Heating capacity	kW	106,0	131,0	156,0	182,0	201,0	238,0	261,0	337,0	377,0	427,0	497,0	575,0	648,0	713,0	811,0	871,0
Screw compressors																	
Quantity	n.	1															
Cooling circuits	n.	1															
Standard capacity steps	n.	3															
Modulating capacity steps (option)	%	0 – 25 ÷ 100															
Nominal input current	A	37,0	43,0	52,0	59,0	65,0	75,0	81,0	102,0	116,0	131,0	145,0	162,0	194,0	211,0	243,0	265,0
Maximum input current	A	56,0	65,0	79,0	98,0	124,0	144,0	155,0	182,0	215,0	231,0	280,0	310,0	320,0	360,0	450,0	566,0
Inrush current	A	305,0	338,0	355,0	449,0	485,0	585,0	675,0	801,0	943,0	1˙023,0	1˙364,0	1˙442,0	1˙853,0	2˙029,0	2˙520,0	2˙870,0
Inrush current with options PW/DS	A	153,0	169,0	206,0	267,0	290,0	350,0	439,0	520,0	612,0	664,0	955,0	1˙009,0	1˙297,0	1˙420,0	1˙764,0	2˙009,0
Evaporator																	
Type		Shell and tube															
Quantity	n.	1															
Circuits	n.	1															
Water flow	m^3/h	14,9	18,4	21,8	25,8	28,4	33,5	36,6	47,8	53,5	60,5	70,7	81,9	91,8	101,3	114,8	123,5
Water flow	l/s	4,1	5,1	6,1	7,2	7,9	9,3	10,2	13,3	14,9	16,8	19,6	22,7	25,5	28,1	31,9	34,3
Pressure drop	kPa	58	53	65	57	53	54	64	59	57	47	48	58	59	60	48	58
Water volume	l	42	39	37	86		56		129	124	119	179	173	294	286	141	262
Water cooled condenser																	
Type		Shell and tube															
Quantity	n.	1															
Water flow	m^3/h	18,2	22,5	26,8	31,3	34,6	40,9	44,9	58,0	64,8	73,4	85,5	98,9	111,5	122,6	139,3	149,8
Water flow	l/s	5,1	6,3	7,4	8,7	9,6	11,4	12,5	16,1	18,0	20,4	23,7	27,5	31,0	34,1	38,7	41,6
Pressure drop	kPa	23	27	30	32		26	23	24	30	32	30			29	60	46
Water volume	l	9	11	13	15	16	19	22	27		30	35	40	45	50	83	84
Sound pressure level																	
Sound pressure at 1 m	dB(A)	68	74			75	76	77	79	80	81		82	83	84	83	84
Dimensions																	
Length	mm	2˙430					3˙350					3˙700					
Width	mm	800										1˙200					
Height	mm	1˙525										1˙890					
Length with CF/CFU	mm	2˙430					3˙350					3˙700					
Width with CF/CFU	mm	800					850					1˙200					
Height with CF/CFU	mm	1˙525										1˙890					
Transport weight	kg	674	683	1˙113	1˙187	1˙197	1˙254	1˙264	1˙707	1˙732	1˙755	2˙845	3˙010	3˙133	3˙196	3˙324	3˙573
Weight in operation	kg	725	733	1˙164	1˙288	1˙299	1˙329	1˙342	1˙863	1˙882	1˙903	2˙996	3˙221	3˙342	3˙411	3˙531	3˙913
Refrigerant charge per circuit	kg	15,0	14,0	30,0	31,0	30,0	62,0	60,0		61,0		41,0	53,0	59,0	60,0	61,0	90,0
Electrical power supply																	
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T															

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 30/35°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - Refrigerant R134a - 2 circuits

RWH		182 Ka	222 Ka	252 Ka	292 Ka	332 Ka	412 Ka	472 Ka	542 Ka	642 Ka	732 Ka
Cooling capacity											
Cooling capacity	kW	174,0	213,0	254,0	301,0	330,0	385,0	427,0	560,0	622,0	702,0
Nominal input power	kW	38,4	47,8	58,9	64,6	73,1	85,6	96,0	118,0	132,0	150,0
EER		4,53	4,46	4,31	4,66	4,51	4,50	4,45	4,74	4,71	4,68
Heating capacity	kW	213,0	261,0	313,0	366,0	403,0	470,0	522,0	677,0	753,0	852,0
Screw compressors											
Quantity	n.	2									
Cooling circuits	n.	2									
Standard capacity steps	n.	6									
Modulating capacity steps (option)	%	0 – 12 ÷ 100									
Nominal input current	A	73,0	86,0	104,0	117,0	131,0	151,0	162,0	204,0	232,0	262,0
Maximum input current	A	112,0	130,0	158,0	196,0	248,0	288,0	310,0	364,0	430,0	462,0
Inrush current	A	361,0	403,0	434,0	547,0	609,0	729,0	830,0	983,0	1˙158,0	1˙254,0
Inrush current with options PW/DS	A	209,0	234,0	285,0	365,0	414,0	578,0	594,0	702,0	827,0	895,0
Evaporator											
Type		Shell and tube									
Quantity	n.	1									
Circuits	n.	2									
Water flow	m^3/h	29,9	36,6	43,7	51,8	56,8	66,2	73,4	96,3	107,0	120,7
Water flow	l/s	8,3	10,2	12,1	14,4	15,8	18,4	20,4	26,8	29,7	33,5
Pressure drop	kPa	48	64	50	54	42	56	51	54	40	56
Water volume	l	59	56	129	124		119	113	168	286	279
Water cooled condenser											
Type		Shell and tube									
Quantity	n.	2									
Water flow	m^3/h	36,6	44,9	53,8	63,0	69,3	80,8	89,8	116,4	129,5	146,5
Water flow	l/s	10,2	12,5	15,0	17,5	19,3	22,5	24,9	32,3	36,0	40,7
Pressure drop	kPa	18	27	23	21	26	25	23	24	30	32
Water volume	l	20		25	30		38	43	54		59
Sound pressure level											
Sound pressure at 1 m	dB(A)	71		77		78	79	80	82	83	84
Dimensions											
Length	mm	3˙750		3˙860					3˙900		
Width	mm	750		900					1˙000		
Height	mm	1˙710		1˙790					1˙990	2˙030	
Length with CF/CFU	mm	3˙750		3˙860					3˙990		
Width with CF/CFU	mm	750		900					1˙000		
Height with CF/CFU	mm	1˙710		1˙790			1˙840		1˙990	2˙030	
Transport weight	kg	1˙255	1˙261	1˙807	1˙851	1˙863	2˙386	2˙414	3˙329	3˙516	3˙556
Weight in operation	kg	1˙334	1˙337	1˙961	2˙005	2˙016	2˙542	2˙571	3˙551	3˙856	3˙894
Refrigerant charge per circuit	kg	30,0	31,0	30,0	29,0		61,0	60,0		62,0	61,0
Electrical power supply											
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T									

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 30/35°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - Refrigerant R134a - 2 and 3 circuits

RWH		842 Ka	972 Ka	1092 Ka	1232 Ka	1442 Ka	1542 Ka	1633 Ka	1793 Ka	2163 Ka	2313 Ka
Cooling capacity											
Cooling capacity	kW	815,0	947,0	1˙069,0	1˙173,0	1˙341,0	1˙434,0	1˙592,0	1˙746,0	2˙015,0	2˙154,0
Nominal input power	kW	172,0	197,0	228,0	250,0	288,0	307,0	342,0	374,0	431,0	461,0
EER		4,74	4,81	4,69		4,66	4,67	4,65		4,67	
Heating capacity	kW	987,0	1˙144,0	1˙297,0	1˙423,0	1˙629,0	1˙741,0	1˙934,0	2˙121,0	2˙446,0	2˙615,0
Screw compressors											
Quantity	n.	2						3			
Cooling circuits	n.	2						3			
Standard capacity steps	n.	6						9			
Modulating capacity steps (option)	%	0 – 12 ÷ 100						0 – 8 ÷ 100			
Nominal input current	A	290,0	323,0	389,0	422,0	486,0	530,0	583,0	632,0	729,0	795,0
Maximum input current	A	560,0	620,0	640,0	720,0	900,0	1˙132,0	960,0	1˙080,0	1˙350,0	1˙698,0
Inrush current	A	1˙644,0	1˙752,0	2˙173,0	2˙389,0	2˙970,0	3˙436,0	2˙493,0	2˙749,0	3˙420,0	4˙002,0
Inrush current with options PW/DS	A	1˙235,0	1˙319,0	1˙617,0	1˙780,0	2˙214,0	2˙575,0	1˙937,0	2˙140,0	2˙664,0	3˙141,0
Evaporator											
Type		Shell and tube									
Quantity	n.	1									
Circuits	n.	2						3			
Water flow	m³/h	140,2	162,9	183,9	201,8	230,8	246,6	273,8	300,3	346,7	370,8
Water flow	l/s	38,9	45,2	51,1	56,0	64,1	68,5	76,1	83,4	96,3	103,0
Pressure drop	kPa	44	45	87	50	55	62	47	57	55	62
Water volume	l	271	461	444	435	398		648	632	764	
Water cooled condenser											
Type		Shell and tube									
Quantity	n.	2						3			
Water flow	m³/h	169,8	196,8	223,1	244,8	280,1	299,5	332,6	364,8	421,2	450,0
Water flow	l/s	47,2	54,7	62,0	68,0	77,8	83,2	92,4	101,3	117,0	125,0
Pressure drop	kPa	30			28	61	46	29	28	61	46
Water volume	l	69	80	90	101	132	155	135	151	198	232
Sound pressure level											
Sound pressure at 1 m	dB(A)	84	85	86	87	86	87	88	89	88	89
Dimensions											
Length	mm	5˙300						5˙100			
Width	mm	1˙300						2˙400			
Height	mm	2˙420						2˙480			
Length with CF/CFU	mm	5˙300						5˙100			
Width with CF/CFU	mm	1˙300						2˙400			
Height with CF/CFU	mm	2˙500						2˙560			
Transport weight	kg	5˙327	5˙522	5˙757	5˙898	6˙392	6˙521	8˙860	9˙077	9˙855	10˙049
Weight in operation	kg	5˙679	5˙873	6˙111	6˙258	6˙922	7˙074	9˙565	9˙788	10˙817	11˙045
Refrigerant charge per circuit	kg	50,0	64,0	70,0	72,0	82,0	107,0	90,0	94,0	106,0	132,0
Electrical power supply											
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T									

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 30/35°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

R407C - Correction factors for cooling capacity

Temperature of water leaving from evaporator °C		15	14	13	12	11	10	9	8	7	6	5
Temperature of water leaving from condenser °C	30	1.396	1.351	1.309	1.265	1.221	1.172	1.133	1.095	1.063	0.961	0.930
	31	1.384	1.338	1.295	1.251	1.208	1.161	1.122	1.085	1.053	0.950	0.919
	32	1.371	1.325	1.281	1.238	1.194	1.149	1.111	1.076	1.039	0.939	0.909
	33	1.358	1.311	1.267	1.224	1.181	1.138	1.099	1.067	1.025	0.927	0.898
	34	1.347	1.298	1.253	1.210	1.168	1.127	1.088	1.053	1.011	0.916	0.888
	35	1.326	1.284	1.239	1.196	1.154	1.116	1.077	1.039	1	0.958	0.877
	36	1.310	1.268	1.224	1.182	1.140	1.102	1.064	1.025	0.987	0.946	0.865
	37	1.294	1.252	1.208	1.167	1.125	1.088	1.050	1.012	0.974	0.934	0.853
	38	1.278	1.236	1.193	1.152	1.110	1.074	1.036	0.999	0.961	0.922	0.841
	39	1.262	1.220	1.178	1.137	1.095	1.060	1.022	0.985	0.948	0.910	0.829
	40	1.246	1.204	1.163	1.122	1.081	1.046	1.009	0.972	0.935	0.898	0.818
	41	1.227	1.186	1.145	1.105	1.065	1.029	0.993	0.956	0.920	0.884	0.804
	42	1.208	1.168	1.127	1.087	1.050	1.013	0.977	0.941	0.905	0.869	0.791
	43	1.189	1.149	1.109	1.070	1.034	0.997	0.961	0.926	0.890	0.854	0.778
	44	1.170	1.131	1.092	1.052	1.019	0.981	0.946	0.910	0.875	0.839	0.764
	45	1.151	1.112	1.074	1.035	1.004	0.965	0.930	0.895	0.860	0.825	0.751
	46	1.133	1.093	1.055	1.018	0.985	0.947	0.912	0.878	0.844	0.809	0.737
	47	1.114	1.074	1.037	1.000	0.967	0.930	0.895	0.861	0.827	0.794	0.723
	48	1.096	1.055	1.019	0.982	0.949	0.912	0.877	0.844	0.911	0.778	0.710
	49	1.078	1.036	1.001	0.965	0.931	0.895	0.860	0.827	0.795	0.763	0.696
	50	1.060	1.018	0.982	0.947	0.912	0.877	0.842	0.811	0.779	0.747	0.682

REMARKS:
- The above coefficients correspond to the mean of the values for the different units, therefore the performances calculated using this the 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 desclaims all responsabilities in case of damages deriving from violation of this instructions.
- For further clarifications or information, you are kindly request to contact our sales departement.

R407C - Correction factors for input power

Temperature of water leaving from evaporator °C		15	14	13	12	11	10	9	8	7	6	5
Temperature of water leaving from condenser °C	30	1.035	1.012	0.995	0.982	0.970	0.956	0.942	0.925	0.916	0.895	0.881
	31	1.050	1.029	1.013	1.00	0.986	0.973	0.959	0.942	0.933	0.910	0.898
	32	1.065	1.046	1.031	1.017	1.003	0.989	0.976	0.959	0.948	0.925	0.915
	33	1.079	1.063	1.048	1.034	1.020	1.006	0.992	0.976	0.965	0.941	0.931
	34	1.098	1.079	1.066	1.051	1.037	1.023	1.009	0.994	0.983	0.956	0.948
	35	1.113	1.102	1.084	1.069	1.053	1.040	1.021	1.011	1	0.988	0.965
	36	1.132	1.121	1.103	1.088	1.072	1.058	1.041	1.030	1.019	1.007	0.984
	37	1.152	1.139	1.122	1.107	1.091	1.076	1.060	1.049	1.038	1.026	1.003
	38	1.171	1.158	1.141	1.126	1.110	1.094	1.079	1.068	1.056	1.045	1.022
	39	1.191	1.176	1.160	1.145	1.129	1.112	1.098	1.087	1.075	1.063	1.041
	40	1.210	1.195	1.179	1.163	1.148	1.130	1.118	1.106	1.094	1.082	1.059
	41	1.233	1.217	1.200	1.185	1.169	1.152	1.140	1.128	1.116	1.105	1.082
	42	1.255	1.238	1.221	1.207	1.190	1.175	1.163	1.151	1.139	1.127	1.105
	43	1.278	1.260	1.243	1.228	1.211	1.197	1.185	1.173	1.161	1.149	1.127
	44	1.301	1.282	1.264	1.250	1.232	1.220	1.208	1.196	1.183	1.171	1.150
	45	1.323	1.304	1.285	1.271	1.253	1.242	1.230	1.218	1.206	1.194	1.172
	46	1.348	1.330	1.311	1.297	1.280	1.269	1.256	1.244	1.232	1.220	1.198
	47	1.372	1.356	1.337	1.323	1.307	1.295	1.282	1.270	1.258	1.247	1.224
	48	1.396	1.381	1.363	1.349	1.334	1.321	1.308	1.296	1.285	1.273	1.250
	49	1.421	1.407	1.389	1.375	1.360	1.347	1.334	1.322	1.311	1.300	1.276
	50	1.445	1.433	1.415	1.401	1.387	1.373	1.360	1.349	1.337	1.326	1.302

REMARKS:
- The above coefficients correspond to the mean of the values for the different units, therefore the performances calculated using this the chart could be different up to 5% from the data of a specific unit
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R134a - Correction factors for cooling capacity

Temperature of water leaving from evaporator °C		15	14	13	12	11	10	9	8	7	6	5
Temperature of water leaving from condenser °C	30	1.395	1.341	1.298	1.256	1.209	1.171	1.124	1.089	1.047	1.012	0.977
	31	1.383	1.333	1.288	1.245	1.199	1.160	1.114	1.079	1.037	1.002	0.967
	32	1.371	1.326	1.277	1.234	1.189	1.149	1.104	1.069	1.028	0.993	0.958
	33	1.358	1.314	1.266	1.223	1.179	1.138	1.094	1.059	1.019	0.984	0.949
	34	1.346	1.300	1.255	1.212	1.169	1.127	1.084	1.049	1.009	0.974	0.940
	35	1.333	1.287	1.244	1.202	1.159	1.116	1.074	1.039	1	0.965	0.930
	36	1.320	1.275	1.231	1.189	1.146	1.104	1.062	1.028	0.989	0.955	0.920
	37	1.306	1.262	1.218	1.176	1.134	1.091	1.058	1.016	0.978	0.944	0.910
	38	1.295	1.250	1.205	1.163	1.121	1.079	1.047	1.005	0.967	0.934	0.900
	39	1.283	1.237	1.191	1.150	1.108	1.067	1.033	0.994	0.957	0.923	0.890
	40	1.267	1.223	1.178	1.137	1.096	1.054	1.019	0.983	0.946	0.913	0.880
	41	1.253	1.209	1.165	1.124	1.083	1.043	1.007	0.971	0.934	0.901	0.868
	42	1.240	1.196	1.152	1.112	1.071	1.031	0.996	0.959	0.922	0.890	0.857
	43	1.226	1.182	1.139	1.099	1.059	1.019	0.984	0.947	0.911	0.878	0`845
	44	1.212	1.169	1.126	1.086	1.047	1.008	0.972	0.936	0.899	0.866	0.833
	45	1.198	1.155	1.112	1.074	1.035	0.996	0.960	0.924	0.888	0.855	0.822
	46	1.184	1.141	1.098	1.060	1.022	0.984	0.948	0.912	0.876	0.843	0.811
	47	1.171	1.128	1.084	1.046	1.009	0.971	0.936	0.900	0.864	0.832	0.800
	48	1.158	1.114	1.071	1.032	0.995	0.959	0.924	0.888	0.853	0.821	0.788
	49	1.145	1.101	1.057	1.018	0.982	0.947	0.911	0.876	0.841	0.809	0.777
	50	1.132	1.087	1.043	1.004	0.969	0.934	0.899	0.864	0.839	0.798	0.766

REMARKS:
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R134a - Correction factors for input power

Temperature of water leaving from evaporator °C		15	14	13	12	11	10	9	8	7	6	5
Temperature of water leaving from condenser °C	30	0.979	0.971	0.957	0.950	0.943	0.934	0.927	0.915	0.912	0.904	0.896
	31	0.998	0.986	0.975	0.968	0.961	0.953	0.945	0.933	0.929	0.922	0.915
	32	1.016	1.000	0.993	0.986	0.979	0.971	0.963	0.951	0.947	0.940	0.933
	33	1.034	1.019	1.012	1.004	0.997	0.989	0.981	0.969	0.965	0.958	0.951
	34	1.053	1.037	1.030	1.023	1.015	1.008	0.999	0.987	0.982	0.976	0.970
	35	1.071	1.055	1.048	1.041	1.033	1.026	1.017	1.005	1	0.994	0.988
	36	1.092	1.081	1.070	1.062	1.055	1.047	1.036	1.026	1.021	1.015	1.009
	37	1.112	1.102	1.091	1.084	1.076	1.068	1.045	1.047	1.042	1.035	1.029
	38	1.131	1.122	1.113	1.105	1.097	1.089	1.073	1.069	1.062	1.056	1.050
	39	1.151	1.142	1.134	1.126	1.118	1.110	1.095	1.090	1.083	1.077	1.071
	40	1.171	1.163	1.156	1.148	1.140	1.131	1.118	1.111	1.104	1.098	1.092
	41	1.196	1.188	1.180	1.171	1.163	1.154	1.142	1.134	1.127	1.121	1.115
	42	1.220	1.212	1.203	1.195	1.187	1.177	1.166	1.158	1.151	1.145	1.139
	43	1.244	1.236	1.227	1.219	1.210	1.200	1.190	1.182	1.174	1.168	1.162
	44	1.268	1.260	1.251	1.243	1.234	1.223	1.214	1.206	1.198	1.192	1.186
	45	1.292	1.284	1.275	1.266	1.258	1.246	1.238	1.230	1.221	1.215	1.209
	46	1.320	1.311	1.302	1.293	1.284	1.272	1.264	1.256	1.248	1.242	1.236
	47	1.347	1.338	1.329	1.320	1.310	1.299	1.291	1.282	1.274	1.268	1.262
	48	1.374	1.365	1.356	1.346	1.336	1.326	1.317	1.309	1.300	1.294	1.288
	49	1.402	1.392	1.383	1.373	1.362	1.352	1.344	1.335	1.327	1.321	1.315
	50	1.429	1.420	1.410	1.400	1.388	1.379	1.370	1.362	1.353	1.347	1.341

REMARKS:
- The above coefficients correspond to the mean of the values for the different units, therefore the performances calculated using this the 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 desclaims all responsabilities in case of damages deriving from violation of this instructions.
- For further clarifications or information, you are kindly request to contact our sales departement.

WATER PERFORMA R134A

HIGH EFFICIENCY WATER COOLED CHILLERS WITH SCREW COMPRESSORS

EWH 292 Ka

Series EWH ... Ka

Cooling capacity from 314 to 1590 kW - 2 circuits

The water cooled chillers of **Water Performa EWH series** are designed for indoor installation and are particularly suitable for industrial processes and air conditioning systems. Thanks to the refrigerant and to the particular construction arrangements, these units are able to reach an average EER values of 5,5.
They are all available with 2 refrigerant circuits.
Thanks to their compact dimensions and to the several options available, these units are particularly easy to install also in small spaces, with no building works.
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 following versions are available:
EWH... Ka standard version

Water operation limits (standard units):
WATER (out from evaporator): from 5 to 15°C - not suitable for glycol
CONDENSER (OUT): from 30 to 55°C for R134a - not suitable for glycol

Main components:

Strong and compact frame, made of bended and coloured steel profiles (colour RAL 9005-black), supporting the exchangers of the evapo-condensers group and on which all the main components are installed at sight. On request, the compressors can be isolated by a soundproofing cabinet with standard material (option CF) or with bituminous rubber coated material (option CFU), so to further reduce the overall sound level of the unit itself.

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).

Dry expansion **shell and tube evaporator**, 100% counter-current type with two refrigerant circuits and one water circuit, insulated by close-cell polyurethane foam material. Shell and tubes plate made in carbon steel and copper tubes, with a high heat exchange coefficient. The evaporator is provided with Victaulic joints and welding coupling for connection to the water circuit.

Shell and tube condensers with copper pipes, externally grooved to increase the heating exchange coefficient and tube bundle in carbon steel.

Each compressor works on an independent **cooling circuit**, assuring a remarkable reliability to multi-compressor units. Each circuit, made of copper or carbon steel tube, is 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.

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.

AE **Electrical power supply** different from standard: mainly, 230V triphase, 460V triphase. Frequency 50/60 Hz.

CC **Insulated condensers**: insulation on condensers heads and side (10 mm thickness).

CF **Soundproofed compressors cabinet with standard material**: Insulation of compressors by a cabinet made of extruded anodized aluminium profiles, with panels in aluminium alloy, coated with soundproofing material and vibration dampers under compressors.

CFU **Soundproofed compressors cabinet with bituminous rubber coated material**: Insulation of compressors by a cabinet made of extruded anodized aluminium profiles, with panels in aluminium alloy, coated with bituminous rubber soundproofing material and vibration dampers under compressors, mufflers on compressors discharge pipes.

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

DQ **Additional box** for connection of power supply cables

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

IE **Fumigated wooden crate packing:** available on request for critical transports, so to assure a suitable protection to the unit.

IG **Watch card:** Electronic card to program the switch-over and rotation between to 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.

IR **Packing with fumigated wooden pallet and transparent film**: minimal packing made of wooden pallet and transparent film wrapped all around the unit.

KS **Lifting kit**: made of belts and brackets to be inserted into the holes present in the unit base-frame. It is used for moving and positioning the unit on site.

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

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

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.

PM **Spring-type vibration dampers**: spring-type vibration dampers support, for insulating the unit (supplied in kit), mainly indicated for installation in difficult and aggressive environments. Made of two steel plates containing a suitable quantity of harmonic steel springs.

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.

PW **Part-winding**: equipment for step compressors starting, reducing of about 35% the inrush current of each compressor.

RA **Anti-freeze heater on evaporator**: electrical heater installed on the evaporator, in order to prevent freezing and provided with thermostat.

RF **Power factor correction system cosfi >0,9**: Electrical device made of suitable condensers for compressors rephasing, ensuring a cosfi value ≥0,9, so to reduce the power absorption from the electrical network.

RH **Shut-off valve on suction side**: they are use to isolate compressors during service operations.

RL **Compressors overload relays**: electromechanical protection devices against compressor's overload.

TC **Victaulic joints** and welding coupling for condenser connection to water circuit.

TE **Electronic thermostatic valve**: it is requested to make a very accurate regulation of the refrigerant flow and to limit variations of cooling capacity and evaporator leaving temperature water during operation in transitions and for a better performance with fixed superheating.

V **Voltmeter**: Electrical device measuring the electrical tension in the power supply of the unit.

VS **Solenoid valve**: electromagnetic solenoid valve on each cooling circuit to prevent refrigerant migrations and consequent flooding of compressors.

Technical data

EWH		312 Ka	372 Ka	432 Ka	472 Ka	622 Ka	692 Ka	782 Ka	912 Ka	1052 Ka	1182 Ka	1292 Ka	1492 Ka	1592 Ka
Cooling capacity														
Cooling capacity	kW	314,0	368,0	428,0	470,0	617,0	691,0	779,0	909,0	1˙050,0	1˙178,0	1˙294,0	1˙487,0	1˙592,0
Nominal input power	kW	57,6	69,6	81,6	90,4	110,4	126,0	142,4	162,6	183,6	214,6	234,2	270,6	288,4
EER		5,45	5,29	5,24	5,20	5,59	5,48	5,47	5,59	5,72	5,49	5,52	5,49	5,52
Screw compressors														
Quantity	n.	2												
Cooling circuits	n.	2												
Standard capacity steps	n.	6												
Modulating capacity steps (option)	%	0 – 12 ÷ 100												
Nominal input current	A	108,0	126,0	145,0	154,0	195,0	225,0	251,0	276,0	304,0	370,0	400,0	462,0	504,0
Maximum input current	A	216,0	248,0	288,0	324,0	364,0	430,0	248,0	560,0	620,0	640,0	720,0	900,0	1˙132,0
Inrush current	A	616,0	609,0	729,0	848,0	983,0	1˙158,0	1˙237,0	1˙644,0	1˙752,0	2˙173,0	2˙389,0	2˙970,0	3˙436,0
Inrush current with options PW/DS	A	377,0	414,0	494,0	585,0	702,0	827,0	879,0	1˙235,0	1˙319,0	1˙617,0	1˙780,0	2˙214,0	2˙575,0
Evaporator														
Type		Shell and tube												
Quantity	n.	1												
Water / refrigerant circuits	n.	1 / 2												
Water flow	m^3/h	53,9	63,0	73,5	80,8	105,9	118,5	133,8	156,0	180,2	202,0	222,0	255,1	273,2
Water flow	l/s	14,9	17,5	20,4	22,4	29,4	32,9	37,2	43,3	50,1	56,1	61,7	70,9	75,9
Pressure drop	kPa	43	57	49	47	46	72	46	51	49	46	51	64	49
Water cooled condenser														
Type		Shell and tube												
Quantity	n.	2												
Water flow	m^3/h	63,9	75,3	87,6	96,4	125,1	140,5	158,5	184,3	212,2	239,5	262,8	302,3	323,4
Water flow	l/s	17,7	20,9	24,3	26,8	34,7	39,0	44,0	51,2	58,9	66,5	73,0	83,9	89,8
Pressure drop	kPa	52	73	43	54	82	57	48	67	54	70	64	86	81
Sound pressure level														
Sound pressure at 1 m	dB(A)	77	78	79	80	82	83	84		85	86	87	89	
Dimensions														
Length	mm	3˙750	3˙860			3˙900			5˙200				5˙500	
Width	mm	750	900			1˙000			1˙300					
Height	mm	1˙710	1˙790		1˙990	2˙030			2˙370					
Length with CF/CFU	mm	3˙750	3˙860			3˙990			5˙200				5˙500	
Width with CF/CFU	mm	750	900			1˙000			1˙300					
Height with CF/CFU	mm	1˙710	1˙790	1˙840		1˙990	2˙030		2˙450					
Transport weight	kg	1˙265	1˙865	2˙390	2˙425	3˙340	3˙520	3˙560	5˙565	5˙960	6˙135	6˙230	8˙550	8˙950
Transport weight with CF/CFU	kg	1˙280	1˙880	2˙405	2˙440	3˙355	3˙535	3˙575	5˙580	5˙975	6˙150	6˙245	8˙565	8˙965
Weight in operation	kg	1˙341	1˙977	2˙533	2˙571	3˙540	3˙731	3˙774	5˙899	6˙318	6˙503	6˙604	9˙063	9˙487
Weight in operation with CF/CFU	kg	1˙357	1˙993	2˙549	2˙586	3˙556	3˙747	3˙790	5˙915	6˙334	6˙519	6˙620	9˙079	9˙503
Refrigerant charge per circuit	kg	29,0	61,0	60,0		62,0	61,0	60,0	59,0		58,0	65,0	63,0	
Electrical power supply														
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T												

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 30/35°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

PAE 41 M K

PAE 181 K

Series PAE ...K / PAE ...PS.K

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

The air cooled heat pumps of **PAE 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 circuits.
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:
PAE...K standard version
Horizontal air flow for models from 41M to 101
Vertical air flow for models from 131 to 181
PAE...PS K with hydraulic kit

Operation limits (standard units):
SUMMER OPERATION: **air** from 15 to 45°C – **water** (out from evaporator) from 5 to 15°C.
WINTER OPERATION: **air** from 20 to -4°C – **water** (out from evaporator) max 50°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. Sizel 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 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.

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 - for summer operation only).

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 4-way valve for refrigerant cycle inversion, thermostatic expansion valve, dehydrating filter, sight glass, safety device, antifreeze thermostat, high and low pressure switches, high and low pressure gauges.

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, controlling the automatic defrost system based on a time/temperature logics, complete with compressors hour counter.

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 (for summer operation only).

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.

Technical data

PAE		41 M K	71 M K	101 M K	101 K	131 K	151 K	161 K	181 K
Cooling capacity									
Cooling capacity	kW	4,7	7,1	8,0	8,1	10,7	12,6	16,3	17,2
Nominal input power	kW	1,5	2,5	3,1	3,2	3,4	4,4	5,3	5,9
EER		3,13	2,84	2,58	2,53	3,14	2,86	3,07	2,91
Heating capacity									
Heating capacity	kW	5,6	8,9	10,4	10,6	13,1	15,9	20,2	21,7
Input power (heating)	kW	1,4	2,4	3,1		3,2	4,3	5,2	5,8
COP		4,0	3,71	3,35	3,42	4,09	3,69	3,88	3,74
Axial fans									
Quantity	n.	1				2			
Rotation speed	rpm	900							
Air flow	m^3/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			
Scroll compressors									
Type		Piston hermetic	Scroll						
Quantity	n.	1							
Circuits	n.	1							
Standard capacity steps	%	0 / 100							
Nominal input current	A	6,7	10,6	14,3	5,6	5,4	6,3	9,0	10,4
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
Evaporator									
Type		Brazed plate							
Quantity	n.	1							
Water flow	m^3/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
Sound pressure level									
Sound pressure at 1 m	dB(A)	50				54	55		56
PS Version									
Available pressure	kPa	55	49	52		65	48	52	47
Pump group motor power	kW	0,08				0,18			
Capacity of buffer tank	l	30							
Dimensions									
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	2,1	2,5	3,0	2,7	4,3		6,2	
Dimensions for PS version									
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
Electrical power supply									
Electrical power supply	V / ph / Hz	230 / 1 / 50 + N + T				400 / 3 / 50 + N + T			

REMARKS:
- Operating conditions:
Summer operation external air temperature 35°C; water temperature 7/12°C
Winter operation external air temperature 10°C; water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Option BT allows summer operation (therefore with chilled water production) with external temperature lower than 15 °C.

R407C - Correction factors for cooling capacity

External air temperature °C		28	30	32	35	38	40	42	45	48
Temperature of water leaving from evaporator °C	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

R407C - Correction factors for input power

External air temperature °C		28	30	32	35	38	40	42	45	48
Temperature of water leaving from evaporator °C	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

R407C - Correction factors for heating capacity

Temperature of water leaving from evaporator °C		30	35	40	45	48
External air temperature °C	20	1,415	1,392	1,367	1,315	1,284
	16	1,261	1,241	1,220	1,195	1,180
	14	1,195	1,176	1,155	1,127	1,110
	12	1,127	1,108	1,088	1,068	1,056
	10	1,066	1,047	1,026	1	0,984
	8	1,005	0,986	0,987	0,947	0,923
	7	0,976	0,985	0,939	0,919	0,907
	6	0,904	0,893	0,870	0,852	0,841
	4	0,802	0,793	0,772	0,761	0,754
	2	0,741	0,732	0,712	0,701	0,694
	0	0,690	0,677	0,659	0,649	0,643
	-2	0,655	0,639	0,630	0,611	0,600
	-4	0,627	0,614	0,609	0,599	0,593

R407C - Correction factors for input power (heating)

Temperature of water leaving from evaporator °C		30	35	40	45	48
External air temperature °C	20	0,909	0,994	1,076	1,160	1,210
	16	0,861	0,938	1,015	1,091	1,137
	14	0,843	0,916	0,898	1,061	1,159
	12	0,826	0,895	0,963	1,030	1,070
	10	0,807	0,872	0,936	1	1,038
	8	0,789	0,850	0,910	0,969	1,004
	7	0,780	0,839	0,897	0,953	0,987
	6	0,770	0,826	0,883	0,938	0,971
	4	0,749	0,803	0,856	0,906	0,936
	2	0,729	0,778	0,828	0,874	0,902
	0	0,706	0,753	0,799	0,843	0,869
	-2	0,687	0,728	0,768	0,810	0,785
	-4	0,663	0,701	0,738	0,775	0,753

REMARKS:
- The above coefficients correspond to the mean of the values for the different units, therefore the performances calculated using this the 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 desclaims all responsabilities in case of damages deriving from violation of this instructions.
- For further clarifications or information, you are kindly request to contact our sales departement.

PAE 421 K+MV+P1

PAE 482 K+MV+PT

Series PAE ...K

Cooling capacity from 19 to 82 kW - 1 and 2 circuits

The air cooled heat pumps of **PAE K series** are designed for outdoor installation and are particularly suitable for small and medium sized air conditioning systems, in residential and commercial applications.
Depending on the cooling capacity, they are available with 1 and 2 cooling circuits.
Thanks to their compact dimensions and to the several options available, these units are particularly easy to install in small spaces, also when supplied with the hydraulic kit.
All sizes are standard provided with an isolated compressors section and the external frame is completely closed.
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 following versions are available:
PAE...K standard version
PAE...U K ultrasilenced version

Operation limits (standard units):
SUMMER OPERATION: **air** from 15 to 45°C – **water** (out from evaporator) from 5 to 15°C.
WINTER OPERATION: **air** from 20 to -4°C – **water** (out from evaporator) max 50°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. For ultrasilenced version, it is insulated with soundproofing material. The external panels, easy to be dismantled, allow the full access in case of service. When required, the hydraulic kit (buffer tank and pump group) are installed inside the unit, with no change in overall dimensions.

High-efficiency scroll compressor (EER 3,7 at ARI conditions), with low sound level, internal heat protection, installed on rubber vibration dampers, supplied with crankcase heater when necessary. In case of 2 circuit units, in case of problem on one of the circuit, the 50% operation of the unit is anyway granted.

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 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.

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 - for summer operation only).

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 4-way valve for refrigerant cycle inversion, 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 and hinged panel to be opened. It is complete with remote switches, overload protections, transformer for auxiliaries and terminal board. In case of hydraulic kit on board, the electrical control of the pump group is provided.

Unit management microprocessor installed on the internal safety panel of the electrical board, controlling the automatic defrost system based on a time/temperature logics, complete with compressors hour counter.

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 (for summer operation only).

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

GP **Condensing coil protection grid**: metal protection grid against accidental impacts.

HG **Hot gas by-pass**: mechanical device for modulating cooling capacity (only for 1-circuit sizes).

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** for measuring circuit pressure.

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

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 pole centrifugal packaged type.

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.

PT **Twin pump group**: chilled water pump group composed of twin pump, expansion vessel, safety valve, water gauge, water charge and discharge valves, air purging valves, electrical control of the pump, automatic switch in case of failure of the working pump. The pump is of 2 pole centrifugal packaged type. (Available from size 482).

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.

RP **Partial heat recovery** (about 20%) of the condensing heat, by means of a refrigerant/water plate exchanger (desuperheater), always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity.

RR **Copper/copper condensing coils**: special execution of the condensing coils with copper pipe and fins.

RT **Total heat recovery** (100%) of the condensing heat, by means of a refrigerant/water plate exchanger, always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity, and /or for dehumidification.

RV **Personalized frame painting in RAL colour**

SC **Insulated compressors housing** with sound proofing material (included on ultra-silenced version).

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.

Technical data - Standard version - 1 circuit

PAE		201 K	241 K	281 K	361 K	421 K
Cooling capacity						
Cooling capacity	kW	18,1	21,5	25,6	33,1	39,2
Nominal input power	kW	6,5	8,4	9,3	10,6	13,3
EER		2,78	2,56	2,75	3,12	2,95
Heating capacity						
Heating capacity	kW	22,9	27,9	32,5	40,8	49,0
Input power (heating)	kW	6,8	8,8	9,8	11,1	14,0
COP		3,37	3,17	3,32	3,67	3,50
Axial fans						
Quantity	n.			2		
Rotation speed	rpm		900		860	
Air flow	m^3/h		11˙200	10˙200	16˙000	
Air flow	l/s		3˙111	2˙833	4˙445	
Motor input power	kW		0,74		1,26	
Input current	A		3,4		6,0	
Scroll compressors						
Quantity	n.			1		
Circuits	n.			1		
Standard capacity steps	%			0 – 100		
Nominal input current	A	12,2	14,9	16,7	18,5	23,3
Maximum input current	A	17,0	20,0	22,0	27,0	32,0
Inrush current	A	99,0	123,0	127,0	167,0	198,0
Evaporator						
Type				Brazed plate		
Quantity	n.			1		
Water flow	m^3/h	3,1	3,7	4,4	5,7	6,7
Water flow	l/s	0,9	1,0	1,2	1,6	1,9
Pressure drop	kPa	35	40	41	45	65
Pumps						
P1 – Available pressure	kPa	162	149	127	144	134
P1 – Motor input power	kW			0,55		
P1H – Available pressure	kPa	207	194	167	184	169
P1H – Motor input power	kW		0,55		0,75	
Capacity of buffer tank	l		80		180	
Electrical data						
Total input power	kW	7,7	9,7	10,6	12,4	15,1
Sound pressure level						
Sound pressure at 1 m	dB(A)		62		67	
Dimensions						
Length	mm		1˙600		2˙000	
Width	mm		750		850	
Height	mm		1˙260		1˙650	
Transport weight	kg	250	255	295	400	415
Transport weight with empty buffer tank	kg	300	305	345	465	480
Refrigerant charge per circuit	kg	5,5	5,6	8,2	13,0	14,3
Electrical power supply						
Electrical power supply	V / ph / Hz			400 / 3 / 50 + N + T		

REMARKS:
- Operating conditions:
Summer operation external air temperature 35°C; water temperature 7/12°C
Winter operation external air temperature 10°C; water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Option BT allows summer operation (therefore with chilled water production) with external temperature lower than 15 °C.

Technical data - Ultrasilenced version - 1 circuit

PAE		201 U K	241 U K	281 U K	361 U K	421 U K
Cooling capacity						
Cooling capacity	kW	17,6	21,7	26,6	32,1	38,2
Nominal input power	kW	6,4	8,3	8,7	11,0	14,0
EER		2,75	2,61	3,06	2,92	2,73
Heating capacity						
Heating capacity	kW	23,0	28,0	33,0	40,0	48,0
Input power (heating)	kW	6,7	8,7	9,1	11,6	14,7
COP		3,43	3,22	3,63	3,45	3,26
Axial fans						
Quantity	n.	2				3
Rotation speed	rpm	680		650		
Air flow	m^3/h	8˙000	7˙000	11˙200		17˙400
Air flow	l/s	2˙222	1˙944	3˙111		4˙833
Motor input power	kW	0,44		0,62		0,93
Input current	A	2,2		3,1		4,7
Scroll compressors						
Quantity	n.	1				
Circuits	n.	1				
Standard capacity steps	%	0 – 100				
Nominal input current	A	12,5	14,8	16,0	19,0	24,0
Maximum input current	A	17,0	20,0	22,0	27,0	32,0
Inrush current	A	99,0	123,0	127,0	167,0	198,0
Evaporator						
Type		Brazed plate				
Quantity	n.	1				
Water flow	m^3/h	3,0	3,7	4,6	5,5	6,6
Water flow	l/s	0,9	1,0	1,3	1,5	1,8
Pressure drop	kPa	34	41	44	43	62
Pumps						
P1 – Available pressure	kPa	162	149	127	144	134
P1 – Motor input power	kW	0,55				
P1H – Available pressure	kPa	207	194	167	184	169
P1H – Motor input power	kW	0,55			0,75	
Capacity of buffer tank	l	80		180		
Electrical data						
Total input power	kW	7,4	9,3	9,9	12,2	15,5
Sound pressure level						
Sound pressure at 1 m	dB(A)	55		59		61
Dimensions						
Length	mm	1˙600		2˙000		2˙130
Width	mm	750		850		1˙100
Height	mm	1˙260		1˙650		1˙760
Transport weight	kg	256	261	370	400	570
Transport weight with empty buffer tank	kg	305	310	435	465	635
Refrigerant charge per circuit	kg	5,5	8,0	13,0		12,2
Electrical power supply						
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T				

REMARKS:
- Operating conditions:
Summer operation external air temperature 35°C; water temperature 7/12°C
Winter operation external air temperature 10°C; water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Option BT allows summer operation (therefore with chilled water production) with external temperature lower than 15 °C.

Technical data - Standard version - 2 circuits

PAE		482 K	562 K	702 K	822 K
Cooling capacity					
Cooling capacity	kW	45,9	53,0	65,9	77,3
Nominal input power	kW	16,1	18,9	22,9	29,7
EER		2,85	2,80	2,88	2,60
Heating capacity					
Heating capacity	kW	56,0	65,0	81,0	97,0
Input power (heating)	kW	16,9	19,8	24,0	31,2
COP		3,31	3,28	3,37	3,11
Axial fans					
Quantity	n.	3			
Rotation speed	rpm	860			
Air flow	m^3/h	25˙200		21˙300	
Air flow	l/s	7˙000		5˙917	
Motor input power	kW	1,9			
Input current	A	9,0			
Scroll compressors					
Quantity	n.	2			
Circuits	n.	2			
Standard capacity steps	%	0 – 50 – 100			
Nominal input current	A	29,0	35,0	38,0	49,0
Maximum input current	A	40,0	44,0	54,0	64,0
Inrush current	A	143,0	149,0	194,0	230,0
Evaporator					
Type		Brazed plate			
Quantity	n.	2			
Water flow	m^3/h	7,9	9,1	11,3	13,3
Water flow	l/s	2,2	2,5	3,1	3,7
Pressure drop	kPa	45	44	45	63
Pumps					
P1 – Available pressure	kPa	137	130	122	108
P1 – Motor input power	kW	0,75		1,1	
P1H – Available pressure	kPa	187	185	172	158
P1H – Motor input power	kW	1,1		1,5	
PT – Available pressure	kPa	137	140	137	120
PT – Motor input power	kW	1,5			
Capacity of buffer tank	l	180			
Electrical data					
Total input power	kW	18,8	21,6	25,6	32,4
Sound pressure level					
Sound pressure at 1 m	dB(A)	69			
Dimensions					
Length	mm	2˙130			
Width	mm	1˙100			
Height	mm	1˙760			
Transport weight	kg	607	611	682	693
Transport weight with empty buffer tank	kg	787	791	862	873
Refrigerant charge per circuit	kg	6,2	6,4	12,0	12,2
Electrical power supply					
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T			

REMARKS:
- Operating conditions:
Summer operation external air temperature 35°C; water temperature 7/12°C
Winter operation external air temperature 10°C; water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Option BT allows summer operation (therefore with chilled water production) with external temperature lower than 15 °C.

Technical data - Ultrasilenced version - 2 circuits

PAE		482 U K	562 U K	702 U K
Cooling capacity				
Cooling capacity	kW	42,4	51,3	60,7
Nominal input power	kW	17,2	18,5	21,0
EER		2,46	2,77	2,89
Heating capacity				
Heating capacity	kW	56,0	65,0	76,0
Input power (heating)	kW	18,1	19,4	22,0
COP		3,09	3,35	3,45
Axial fans				
Quantity	n.		3	
Rotation speed	rpm		650	
Air flow	m^3/h	17˙700	14˙200	
Air flow	l/s	4˙917	3˙945	
Motor input power	kW		0,93	
Input current	A		4,7	
Scroll compressors				
Quantity	n.		2	
Circuits	n.		2	
Standard capacity steps	%		0 – 50 – 100	
Nominal input current	A	30,0	33,0	40,0
Maximum input current	A	40,0	44,0	54,0
Inrush current	A	143,0	149,0	194,0
Evaporator				
Type			Brazed plate	
Quantity	n.		2	
Water flow	m^3/h	7,3	8,8	10,4
Water flow	l/s	2,0	2,4	2,9
Pressure drop	kPa	39	42	39
Pumps				
P1 – Available pressure	kPa	140	127	
P1 – Motor input power	kW	0,75		1,1
P1H – Available pressure	kPa	190	177	172
P1H – Motor input power	kW	1,1		1,5
PT – Available pressure	kPa	140	137	142
PT – Motor input power	kW		1,5	
Capacity of buffer tank	l		180	
Electrical data				
Total input power	kW	18,9	20,2	22,7
Sound pressure level				
Sound pressure at 1 m	dB(A)		61	
Dimensions				
Length	mm		2˙130	
Width	mm		1˙100	
Height	mm		1˙760	
Transport weight	kg	614	618	689
Transport weight with empty buffer tank	kg	794	798	869
Refrigerant charge per circuit	kg	6,2	11,7	12,0
Electrical power supply				
Electrical power supply	V / ph / Hz		400 / 3 / 50 + N + T	

REMARKS:
- Operating conditions:
Summer operation external air temperature 35°C; water temperature 7/12°C
Winter operation external air temperature 10°C; water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Option BT allows summer operation (therefore with chilled water production) with external temperature lower than 15 °C.

R407C - Correction factors for cooling capacity

External air temperature °C		28	30	32	35	38	40	42	45	48
Temperature of water leaving from evaporator °C	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

R407C - Correction factors for input power

External air temperature °C		28	30	32	35	38	40	42	45	48
Temperature of water leaving from evaporator °C	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

R407C - Correction factors for heating capacity

Temperature of water leaving from evaporator °C		30	35	40	45	48
External air temperature °C	20	1,415	1,392	1,367	1,315	1,284
	16	1,261	1,241	1,220	1,195	1,180
	14	1,195	1,176	1,155	1,127	1,110
	12	1,127	1,108	1,088	1,068	1,056
	10	1,066	1,047	1,026	1	0,984
	8	1,005	0,986	0,987	0,947	0,923
	7	0,976	0,985	0,939	0,919	0,907
	6	0,904	0,893	0,870	0,852	0,841
	4	0,802	0,793	0,772	0,761	0,754
	2	0,741	0,732	0,712	0,701	0,694
	0	0,690	0,677	0,659	0,649	0,643
	-2	0,655	0,639	0,630	0,611	0,600
	-4	0,627	0,614	0,609	0,599	0,593

R407C - Correction factors for input power (heating)

Temperature of water leaving from evaporator °C		30	35	40	45	48
External air temperature °C	20	0,909	0,994	1,076	1,160	1,210
	16	0,861	0,938	1,015	1,091	1,137
	14	0,843	0,916	0,898	1,061	1,159
	12	0,826	0,895	0,963	1,030	1,070
	10	0,807	0,872	0,936	1	1,038
	8	0,789	0,850	0,910	0,969	1,004
	7	0,780	0,839	0,897	0,953	0,987
	6	0,770	0,826	0,883	0,938	0,971
	4	0,749	0,803	0,856	0,906	0,936
	2	0,729	0,778	0,828	0,874	0,902
	0	0,706	0,753	0,799	0,843	0,869
	-2	0,687	0,728	0,768	0,810	0,785
	-4	0,663	0,701	0,738	0,775	0,753

REMARKS:
- The above coefficients correspond to the mean of the values for the different units, therefore the performances calculated using this the 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 desclaims all responsabilities in case of damages deriving from violation of this instructions.
- For further clarifications or information, you are kindly request to contact our sales departement.

AIR COOLED HEAT PUMPS FOR LOW AMBIENT TEMPERATURES

WITH SCROLL COMPRESSORS AND AXIAL FANS

PAE 51 K.LT

PAE 141 K.LT+MV

Series PAE ... K.LT

Cooling capacity from 5 to 15 kW - 1 circuit

The air cooled heat pumps of **PAE K.LT 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, apart from the accurate sizing of components allowing their winter operation down to very low external temperatures, 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:
PAE...M K.LT single phase standard version
PAE...K.LT three phase standard version

Operation limits (standard units):
SUMMER OPERATION: **air** from 15 to 45°C – **water** (out from evaporator) from 5 to 15°C - WINTER OPERATION: **air** from 20 to -15°C – **water** (out from evaporator) max 50°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.
When required, the hydraulic kit is installed on board of the unit with no change in the overall dimensions and it is composed of: circulation pump, buffer tank, safety valve, pressure gauge, water filling and discharge valves, purging valve, expansion vessel.

High efficiency scroll compressor of last generation suitable for heat pumps requiring high performances at low ambient temperatures and outlet water temperature of 50°C, with low sound level, internal heat protection, installed on rubber vibration dampers, supplied with crankcase heater, when necessary.

Heat-exchange external coil with copper tube and specially corrugated aluminium fins for a better efficiency. It is suitably designed for optimization of defrosting cycles. 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. The fans speed control is standard provided.

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 and it is complete with antifreeze heater and differential water flow switch.

Cooling circuit composed of 4-way valve for refrigerant cycle inversion, thermostatic expansion valve, dehydrating filter, sight glass, safety device, antifreeze thermostat, high and low pressure switches, high and low pressure gauges.

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 hydraulic kit on board, the electrical control of the pump group is provided.

Unit management microprocessor installed on the internal safety panel of the electrical board, controlling the automatic defrost system based on a time/temperature logics, complete with compressors hour counter.

Accessories

AE **Electrical power supply different from standard:** mainly, 230V three-phase, 460V three-phase. Frequency 50/60 Hz.

GP **Condensing coil protection grid**: metal protection grid against accidental impacts.

HG **Hot gas by-pass**: 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** for measuring circuit pressure.

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

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 pole centrifugal packaged type.

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.

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.

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**

VS **Solenoid valve**: electromagnetic solenoid valve on each cooling circuit to prevent refrigerant migrations and consequent flooding of compressors.

Technical data

PAE		51 M K	61 M K	81 M K	91 M K	51 K	61 K	81 K	91 K	111 K	141 K
Cooling capacity											
Cooling capacity	kW	5,0	6,3	7,1	8,7	5,0	6,3	8,9	10,4	12,9	15,0
Nominal input power	kW	1,9	2,3	2,4	3,1	1,8	2,2	2,8	3,3	4,1	4,8
EER		2,63	2,74	2,96	2,81	2,78	2,86	3,18	3,15		3,12
Heating capacity											
Heating capacity (air 7°C – water 45/50°C)	kW	5,9	7,2	7,7	9,7	5,8	7,1	9,6	11,4	13,9	16,4
Heating capacity (air -5°C – water 45/50°C)	kW	4,5	5,6	5,9	7,5	4,5	5,5	7,4	8,8	10,7	12,6
Input power (heating) (air -5°C – water 45/50°C)	kW	2,1	2,4	2,6	3,2	2,0	2,3	3,1	3,8	4,4	5,2
COP (air -5°C – water 45/50°C)		2,09	2,30	2,29	2,35	2,25	2,39		2,31	2,43	2,42
Axial fans											
Quantity	n.	2								3	
Rotation speed	rpm	900							860		
Air flow	m^3/h	7˙499	6˙700	11˙200	10˙199	7˙499	6˙700	10˙199	16˙002	21˙301	
Air flow	l/s	2˙083	1˙861	3˙111	2˙833	2˙083	1˙861	2˙833	4˙445	5˙917	
Motor input power	kW	0,29		0,74		0,29		0,74	1,26	1,9	
Input current	A	1,3		3,4		1,3		3,4	6,0	9,0	
Scroll compressors											
Quantity	n.	1									
Circuits	n.	1									
Standard capacity steps	%	0 / 100									
Nominal input current	A	10,0	12,0		15,0	4,0		6,0		8,0	9,0
Maximum input current	A	15,0	17,0	19,0	24,0	5,0	6,0	9,0	10,0	14,0	18,0
Inrush current	A	58,0	74,0	76,0	97,0	26,0	32,0	46,0	52,0	64,0	74,0
Evaporator											
Type		Brazed plate									
Quantity	n.	1									
Water flow	m^3/h	0,9	1,1	1,2	1,5	0,9	1,1	1,5	1,8	2,2	2,6
Water flow	l/s	0,2	0,3		0,4	0,2	0,3	0,4	0,5	0,6	0,7
Pressure drop	kPa	31	34	33	35	31	34	35	37	39	40
Pumps											
P1 – Available pressure	kPa	61	55	57	55	61	55		50	65	56
P1 – Motor input power	kW	0,08		0,18		0,08		0,18			
P1 – Input current	A	0,15		0,34		0,15		0,34			
P1H – Available pressure	kPa	135	127	124	118	135	127	118	117	175	166
P1H – Motor input power	kW	0,18		0,55		0,18		0,55			
P1H – Input current	A	0,34		1,05		0,34		1,05			
Capacity of buffer tank	l	30		80		30		80	180		
Electrical data											
Total input power	kW	2,0	3,0		4,0	2,0	3,0	4,0	5,0	6,0	7,0
Total nominal input current	A	11,0	13,0	16,0	19,0	5,0		9,0	12,0	17,0	18,0
Maximum total input current	A	16,0	18,0	22,0	27,0	6,0	7,0	12,0	16,0	23,0	27,0
Total inrush current	A	59,0	75,0	79,0	100,0	27,0	33,0	4,9	58,0	73,0	83,0
Sound pressure level											
Sound pressure at 1 m	dB(A)	54		60	62	54	55	61	67	69	
Dimensions											
Length	mm	1˙100		1˙600		1˙100		1˙600	2˙000	2˙130	
Width	mm	750							850	1˙100	
Height	mm	1˙100		1˙260		1˙100		1˙260	1˙650	1˙760	
Transport weight	kg	195		327		195		327	400	607	618
Transport weight with empty buffer tank	kg	225		407		225		407	589	801	810
Electrical power supply											
Electrical power supply	V / ph / Hz	230 / 1 / 50 + N + T				400 / 3 / 50 + N + T					

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

R407C - Correction factors for cooling capacity

External air temperature °C		28	30	32	35	38	40	42	45	48
Temperature of water leaving from evaporator °C	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

REMARKS:
- The above coefficients correspond to the mean of the values for the different units, therefore the performances calculated using this the 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 desclaims all responsabilities in case of damages deriving from violation of this instructions.
- For further clarifications or information, you are kindly request to contact our sales departement.

R407C - Correction factors for input power

External air temperature °C		28	30	32	35	38	40	42	45	48
Temperature of water leaving from evaporator °C	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

REMARKS:
- The above coefficients correspond to the mean of the values for the different units, therefore the performances calculated using this the 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.
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R407C - Correction factors for heating capacity

External air temperature °C		-15	-10	-5	0	5	10
Temperature of water leaving from evaporator °C	45	0,765	0,882	1,034	1,202	1,286	1,412
	50	0,740	0,854	1	1,163	1,244	1,366
	55	0,739	0,840	0,966	1,109	1,176	1,286
	60	/	0,824	0,965	1,059	1,126	1,218

REMARKS:
- The above coefficients correspond to the mean of the values for the different units, therefore the performances calculated using this the 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 desclaims all responsabilities in case of damages deriving from violation of this instructions.
- For further clarifications or information, you are kindly request to contact our sales departement.

R407C - Correction factors for input power (heating)

External air temperature °C		-15	-10	-5	0	5	10
Temperature of water leaving from evaporator °C	45	0,840	0,880	0,910	0,950	0,960	0,990
	50	0,930	0,970	1	1,040	1,050	1,080
	55	1,040	1,080	1,110	1,150	1,160	1,180
	60	/	1,210	1,120	1,270	1,290	1,310

REMARKS:
- The above coefficients correspond to the mean of the values for the different units, therefore the performances calculated using this the 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 desclaims all responsabilities in case of damages deriving from violation of this instructions.
- For further clarifications or information, you are kindly request to contact our sales departement.

PAE 131 C K

Serie PAE C ... K

Cooling capacity from 11 to 17 kW - 1 circuit

The air cooled heat pumps of **PAE C K series**, with centrifugal fans, are designed for indoor 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, the units only need to be positioned and electrically and hydraulically connected.

The following versions are available with vertical air flow:
PAE...C K standard version
PAE...C PS K with hydraulic kit

Operation limits (standard units):
SUMMER OPERATION: **air** from 15 to 45°C – **water** (out from evaporator) from 5 to 15°C - WINTER OPERATION: **air** from 20 to -4°C – **water** (out from evaporator) max 50°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 PS version, the hydraulic kit is installed at the bottom of the unit, with no change in dimensions and it is composed of: circulation pump, buffer tank, safety valve, pressure gauge, water filling and discharge valves, purging valve, expansion vessel.

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.

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 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.

Centrifugal fans of double suction type with electrical motor directly joined to the wheel, with a low sound level and provided with short circuit and overload protections and external safety protection grid.

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 4-way valve for refrigerant cycle inversion, 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, controlling the automatic defrost system based on a time/temperature logics, complete with compressors hour counter.

Accessories

AE **Electrical power supply different from standard:** mainly, 230V three-phase, 460V three-phase. 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 (for summer operation only).

GP **Condensing coil protection grid**: metal protection grid against accidental impacts.

HG **Hot gas by-pass**: 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** 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.

Technical data

PAE C		131 K	151 K	161 K	181 K
Cooling capacity					
Cooling capacity	kW	10,7	12,6	16,3	17,2
Nominal input power	kW	3,4	4,4	5,3	5,9
EER		3,15	2,86	3,07	2,91
Heating capacity					
Heating capacity	kW	13,2	16,0	20,3	21,7
Input power (heating)	kW	3,2	4,3	5,2	5,8
COP		4,12	3,72	3,90	3,74
Centrifugal fans					
Quantity	n.	2			
Air flow	m^3/h	7˙500		6˙700	
Air flow	l/s	2˙083		1˙861	
Rotation speed	rpm	1˙250			
Motor input power	kW	1,0		2,2	
Input current	A	13,6			
Available pressure	Pa	40		165	
Scroll compressors					
Quantity	n.	1			
Circuits	n.	1			
Standard capacity steps	%	0 – 100			
Nominal input current	A	5,4	6,3	9,0	10,4
Maximum input current	A	12,0	14,0	16,0	18,0
Inrush current	A	56,0	68,0	77,0	81,0
Evaporator					
Type		Brazed plate			
Quantity	n.	1			
Water flow	m^3/h	1,8	2,2	2,8	3,0
Water flow	l/s	0,5	0,6	0,8	
Pressure drop	kPa	32	43	34	38
Electrical data					
Total input power	kW	3,4	4,4	5,3	5,9
Sound pressure level					
Sound pressure at 1 m	dB(A)	60			
PS Version					
Available pressure	kPa	65	48	52	47
Pump group motor power	kW	0,18			
Capacity of buffer tank	l	30			
Dimensions					
Length	mm	1˙100			
Width	mm	750			
Height	mm	1˙100			
Transport weight	kg	217	221	238	240
Refrigerant charge per circuit	kg	4,3		6,2	
Dimensions for PS version					
Length	mm	1˙100			
Width	mm	750			
Height	mm	1˙100			
Transport weight with empty buffer tank	kg	238	241	259	260
Electrical power supply					
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T			

REMARKS:
- Operating conditions:
Summer operation external air temperature 35°C; water temperature 7/12°C
Winter operation external air temperature 10°C; water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Option BT allows summer operation (therefore with chilled water production) with external temperature lower than 15 °C.

PAE 281 C K

Serie PAE ...C K

Cooling capacity from 19 to 83 kW - 1 and 2 circuits

The air cooled heat pumps of **PAE C K series**, with centrifugal fans, are designed for indoor installation and are particularly suitable for small and medium sized air conditioning systems, in residential and commercial applications.
They can also be matched to fancoils or terminal units or for water cooling in small industrial processes.
They are all available with 1 or 2 refrigerant circuits.
During their design, it has been given a particular care for dimensions and compactness, so to facilitate their handling and positioning in site. In order to further reduce weight and dimensions, in case of particular applications, when the units are provided with buffer tank and pump group, on request it is possible to separately supply the hydraulic kit, usually included in the frame of the unit itself.
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 following versions are available:
Vertical air flow
PAE...C K standard version
PAE...C U K ultrasilenced version
Horizontal air flow
PAE...C.O K standard version
PAE...C.O U K ultrasilenced version

Operation limits (standard units):
SUMMER OPERATION: **air** from 15 to 45°C – **water** (out from evaporator) from 5 to 15°C.
WINTER OPERATION: **air** from 20 to -4°C – **water** (out from evaporator) max 50°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. When required, the hydraulic kit (buffer tank and pump group) are installed at the bottom of the unit, in a suitable section.

High-efficiency scroll compressor (EER 3,7 at ARI conditions), with low sound level, internal heat protection, installed on rubber vibration dampers, supplied with crankcase heater when necessary. In case of 2 circuit units, in case of problem on one of the circuit, the 50% operation of the unit is anyway granted.

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 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.

Centrifugal fans of double suction type with electrical motor directly joined and balanced blades, suitably isolated with rubber vibration dampers and sealing on discharge. They are provided with short circuit and overload protections and external safety protection grid. The motor is of 4-pole triphase type, with belt transmission and variable pulleys, placed on slide so to speed up the pulley tension. As a standard, the unit has a vertical airflow or, on request, you can ask for an horizontal airflow (coil side).

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 4-way valve for refrigerant cycle inversion, 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 and hinged panel to be opened. It is complete with remote switches, overload protections, transformer for auxiliaries and terminal board. In case of hydraulic kit on board, the electrical control of the pump group is provided.

Unit management microprocessor installed on the internal safety panel of the electrical board, controlling the automatic defrost system based on a time/temperature logics, complete with compressors hour counter.

Accessories

1M–2M **Higher available pressure for fan**: bigger electrical motor, so to have a higher available pressure to fans to be ducted.

AE **Electrical power supply different from standard:** mainly, 230V three-phase, 460V three-phase. Frequency 50/60 Hz.

BF **Low temperature operation (-20°C) with inverter fan speed regulation**: electronic device controlling the condensing pressure through an inverter, modulating the frequency of the fans electrical supply (only for summer operation).

BFa-BFb **Low temperature operation (-20°C) with inverter fan speed regulation** (with option 1M and 2M): electronic device controlling the condensing pressure through an inverter, modulating the frequency of the fans electrical supply (only for summer operation).

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 (not available for size 822 and only for summer operation).

BTa **Low temperature operation (-20°C with option 1M)**: electronic device for the continuous modulating voltage control of the condensing pressure through the variation of the fan rotation speed (not available for size 822 and only for summer operation).

CF **Soundproofed compressors cabinet**: Insulation of compressors by a cabinet coated with soundproofing material and vibration dampers under compressors (included on ultrasilenced version).

CI **Soundproofing jacket on compressors:** made of soundproofing material, wrapped all around compressors so to further reduce the overall sound level of the unit (already included on ultrasilenced version).

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

GP **Condensing coil protection grid**: metal protection grid against accidental impacts.

HG **Hot gas by-pass**: mechanical device for modulating cooling capacity (only for 1-circuit sizes and for summer operation).

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** for measuring circuit pressure.

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

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 pole centrifugal packaged type.

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.

PT **Twin pump group**: chilled water pump group composed of twin pump, expansion vessel, safety valve, water gauge, water charge and discharge valves, air purging valves, electrical control of the pump, automatic switch in case of failure of the working pump. The pump is of 2 pole centrifugal packaged type. (Available from size 482).

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.

Technical data - Standard version - 1 circuit

PAE C		201 K	241 K	281 K	361 K	421 K
Cooling capacity						
Cooling capacity	kW	19,6	24,1	27,9	33,9	41,8
Nominal input power	kW	6,6	7,7	8,8	11,0	13,2
EER		2,97	3,13	3,17	3,08	3,17
Heating capacity						
Heating capacity	kW	24,0	29,0	33,4	40,9	50,1
Input power (heating)	kW	6,8	7,9	9,1	11,5	13,8
COP		3,53	3,67		3,56	3,63
Centrifugal fans						
Quantity	n.	1			2 (*)	
Air flow	m^3/h	8˙800	8˙650	9˙000	11˙200	13˙000
Air flow	l/s	2˙444	2˙403	2˙500	3˙111	3˙611
STD Version						
Available pressure	Pa	80				
Rotation speed	rpm	896	915	975	746	858
Motor input power	kW	2,2		3,0	2,2	3,0
Nominal input current	A	5,3		6,7	5,3	6,7
Sound pressure level	dB(A)	66		67	64	65
1M Version						
Available pressure	Pa	120				
Rotation speed	rpm	935	955	1˙014	811	914
Motor input power	kW	3,0			2,2	3,0
Nominal input current	A	6,7			5,3	6,7
Sound pressure level	dB(A)	67		68	65	66
2M Version						
Available pressure	Pa	200				
Rotation speed	rpm	1˙014	1˙036	1˙091	938	1˙025
Motor input power	kW	3,0				4,0
Nominal input current	A	6,7				9,4
Sound pressure level	dB(A)	68		69	66	67
Scroll compressors						
Quantity	n.	1				
Circuits	n.	1				
Standard capacity steps	%	0 – 100				
Nominal input current	A	12,9	15,1	16,0	18,7	22,7
Maximum input current	A	17,0	20,0	22,0	27,0	32,0
Inrush current	A	99,0	123,0	127,0	167,0	198,0
Evaporator						
Type		Brazed plate				
Quantity	n.	1				
Water flow	m^3/h	3,4	4,1	4,8	5,8	7,2
Water flow	l/s	0,9	1,1	1,3	1,6	2,0
Pressure drop	kPa	41	50	48	47	72
Pumps						
P1 – Available pressure	kPa	179	152	148	155	132
P1 – Motor input power	kW	0,55			0,75	
P1H – Available pressure	kPa	239	207	198	210	262
P1H – Motor input power	kW	0,55		0,75		1,1
Capacity of buffer tank	l	180				
Electrical data						
Total input power	kW	8,8	9,9	11,8	13,2	16,2
Dimensions						
Length	mm	1˙320			1˙665	
Width	mm	750				
Height	mm	1˙250			1˙460	
Length with MV option	mm	1˙665				
Width with MV option	mm	750				
Height with MV option	mm	1˙675			1˙885	
Transport weight	kg	395	406	417	499	522
Transport weight with empty buffer tank	kg	575	586	597	679	702
Refrigerant charge per circuit	kg	6,5	7,9	9,3	11,0	14,0
Electrical power supply						
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T				

REMARKS:
- Operating conditions:
Summer operation external air temperature 35°C; water temperature 7/12°C
Winter operation external air temperature 10°C; water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- (*) 2 fans in tandem, driven by 1 motor.
- In case of a different available pressure, included between the standard pressure and the values indicated for 1M or 2M options, however not higher 2M, it is necessary to order the higher pressure option, clearly stating the pressure value effectively requested on site. In the factory we will adjust the motor's pulley accordingly.
- Option BT allows summer operation (therefore with chilled water production) with external temperature lower than 15 °C.

Technical data - Ultrasilenced version - 1 circuit

PAE		201 C.U K	241 C.U K	281 C.U K	361 C.U K	421 C.U K
Cooling capacity						
Cooling capacity	kW	19,9	23,6	27,9	34,8	41,2
Nominal input power	kW	6,5	8,0	8,8	11,1	13,4
EER		3,06	2,95	3,17	3,13	3,07
Heating capacity						
Heating capacity	kW	23,9	28,9	33,5	41,1	49,0
Input power (heating)	kW	6,7	8,3	9,1	11,5	14,0
COP		3,57	3,48	3,68	3,57	3,50
Centrifugal fans						
Quantity	n.	1		2 (*)		2
Air flow	m^3/h	6`300	7`200	6`950	9`600	13`900
Air flow	l/s	1`750	2`000	1`930	2`666	3`861
STD Version						
Available pressure	Pa	80		50	80	
Rotation speed	rpm	720	818	637	711	696
Motor input power	kW	1,5				3,0
Nominal input current	A	3,7				7,4
Sound pressure level	dB(A)	62	64	61	63	
1M Version						
Available pressure	Pa	120				
Rotation speed	rpm	776	866	728	785	752
Motor input power	kW	1,5	2,2	1,5		3,0
Nominal input current	A	3,7	5,3	3,7		7,4
Sound pressure level	dB(A)	62	64	61	64	
2M Version						
Available pressure	Pa	200				
Rotation speed	rpm	886	963	891	925	858
Motor input power	kW	1,5	2,2	1,5	2,2	4,4
Nominal input current	A	3,7	5,3	3,7	5,3	10,6
Sound pressure level	dB(A)	63	65	62	64	
Scroll compressors						
Quantity	n.	1				
Circuits	n.	1				
Standard capacity steps	%	0 – 100				
Nominal input current	A	12,7	15,4	16,1	18,9	23,0
Maximum input current	A	17,0	20,0	22,0	27,0	32,0
Inrush current	A	99,0	123,0	127,0	167,0	198,0
Evaporator						
Type		Brazed plate				
Quantity	n.	1				
Water flow	m^3/h	3,4	4,0	4,8	6,0	7,1
Water flow	l/s	1,9	1,1	1,3	1,7	1,9
Pressure drop	kPa	42	48		50	71
Pumps						
P1 – Available pressure	kPa	178	154	148	155	133
P1 – Motor input power	kW	0,55			0,75	
P1H – Available pressure	kPa	238	209	198	210	263
P1H – Motor input power	kW	0,55	0,75			1,1
Capacity of buffer tank	l	180				240
Electrical data						
Total input power	kW	8,0	9,5	10,3	12,6	16,4
Dimensions						
Length	mm	1`320		1`665		2`120
Width	mm	750				778
Height	mm	1`250		1`460		1`570
Length with MV option	mm	1`665				2`280
Width with MV option	mm	750				996
Height with MV option	mm	1`675		1`885		1`995
Transport weight	kg	396	407	501	511	642
Transport weight with empty buffer tank	kg	576	587	681	691	872
Refrigerant charge per circuit	kg	7,8	9,2		13,0	
Electrical power supply						
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T				

REMARKS:
- Operating conditions:
Summer operation external air temperature 35°C; water temperature 7/12°C
Winter operation external air temperature 10°C; water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- (*) 2 fans in tandem, driven by 1 motor.
- In case of a different available pressure, included between the standard pressure and the values indicated for 1M or 2M options, however not higher 2M, it is necessary to order the higher pressure option, clearly stating the pressure value effectively requested on site. In the factory we will adjust the motor's pulley accordingly.
- Option BT allows summer operation (therefore with chilled water production) with external temperature lower than 15 °C.

Technical data - Standard version - 2 circuits

PAE C		482 K	562 K	702 K	822 K
Cooling capacity					
Cooling capacity	kW	48,1	55,6	67,9	82,7
Nominal input power	kW	15,4	17,5	22,2	26,6
EER		3,12	3,18	3,06	3,11
Heating capacity					
Heating capacity	kW	57,9	66,6	81,9	100,1
Input power (heating)	kW	16,1	18,2	23,1	27,6
COP		3,59	3,66	3,54	3,63
Centrifugal fans					
Quantity	n.	2			
Air flow	m^3/h	16˙700	20˙900	24˙600	28˙400
Air flow	l/s	4˙639	5˙806	6˙834	7˙889
STD Version					
Available pressure	Pa	80			
Rotation speed	rpm	782	919	640	745
Motor input power	kW	4,4	8,0	6,0	11,0
Nominal input current	A	10,6	18,8	13,4	24,0
Sound pressure level	dB(A)	65	66	68	
1M Version					
Available pressure	Pa	120			
Rotation speed	rpm	830	959	669	769
Motor input power	kW	4,4	8,0		11,0
Nominal input current	A	10,6	18,8		24,0
Sound pressure level	dB(A)	66	68	71	72
2M Version					
Available pressure	Pa	200			
Rotation speed	rpm	923	1˙037	725	819
Motor input power	kW	6,0	8,0		11,0
Nominal input current	A	13,4	18,8		24,0
Sound pressure level	dB(A)	67		71	74
Scroll compressors					
Quantity	n.	2			
Circuits	n.	2			
Standard capacity steps	%	0 – 50 – 100			
Nominal input current	A	30,0	32,0	38,0	46,0
Maximum input current	A	40,0	44,0	54,0	64,0
Inrush current	A	143,0	149,0	194,0	230,0
Evaporator					
Type		Brazed plate			
Quantity	n.	2			
Water flow	m^3/h	8,3	9,6	11,7	14,2
Water flow	l/s	2,3	2,7	3,2	3,9
Pressure drop	kPa	49	48	47	71
Pumps					
P1 – Available pressure	kPa	132	113	180	107
P1 – Motor input power	kW	0,75		1,1	
P1H – Available pressure	kPa	237	223	250	157
P1H – Motor input power	kW	1,1		1,5	
PT – Available pressure	kPa	132	133	135	127
PT – Motor input power	kW	1,5			
Capacity of buffer tank	l	240			
Electrical data					
Total input power	kW	20,0	26,0	28,0	38,0
Total nominal input current	A	41,0	51,0		70,0
Maximum total input current	A	51,0	63,0	67,0	88,0
Total inrush current	A	154,0	168,0	213,0	254,0
Dimensions					
Length	mm	2˙120		2˙280	
Width	mm	778		990	
Height	mm	1˙570		1˙845	
Length with MV option	mm	2˙280			
Width with MV option	mm	990			
Height with MV option	mm	1˙995		2˙270	
Transport weight	kg	789	821	898	976
Transport weight with empty buffer tank	kg	1˙019	1˙051	1˙128	1˙206
Refrigerant charge per circuit	kg	7,7	7,8	9,7	12,0
Electrical power supply					
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T			

REMARKS:
- Operating conditions:
Summer operation external air temperature 35°C; water temperature 7/12°C
Winter operation external air temperature 10°C; water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- In case of a different available pressure, included between the standard pressure and the values indicated for 1M or 2M options, however not higher 2M, it is necessary to order the higher pressure option, clearly stating the pressure value effectively requested on site. In the factory we will adjust the motor's pulley accordingly.
- Option BT allows summer operation (therefore with chilled water production) with external temperature lower than 15 °C.

Technical data - Ultrasilenced version - 2 circuits

PAE		482 C.U K	562 C.U K	702 C.U K
Cooling capacity				
Cooling capacity	kW	48,1	55,6	67,9
Nominal input power	kW	15,4	17,5	22,2
EER		3,12	3,18	3,06
Heating capacity				
Heating capacity	kW	57,9	66,6	81,9
Input power (heating)	kW	16,1	18,2	23,1
COP		3,60	3,66	3,54
Centrifugal fans				
Quantity	n.		2	
Air flow	m^3/h	14˙700	18˙000	20˙700
Air flow	l/s	4˙083	5˙000	5˙750
STD Version				
Available pressure	Pa		80	
Rotation speed	rpm	460	509	585
Motor input power	kW	3,0		4,4
Nominal input current	A	7,4		10,6
Sound pressure level	dB(A)	60	58	
1M Version				
Available pressure	Pa		120	
Rotation speed	rpm	508	548	616
Motor input power	kW	3,0		4,4
Nominal input current	A	7,4		10,6
Sound pressure level	dB(A)	61	63	66
2M Version				
Available pressure	Pa		200	
Rotation speed	rpm	599	626	684
Motor input power	kW	3,0	4,4	6,0
Nominal input current	A	7,4	10,6	13,4
Sound pressure level	dB(A)	62	64	66
Scroll compressors				
Quantity	n.		2	
Circuits	n.		2	
Standard capacity steps	%		0 – 50 – 100	
Nominal input current	A	30,0	32,0	38,0
Maximum input current	A	40,0	44,0	54,0
Inrush current	A	143,0	149,0	194,0
Evaporator				
Type			Brazed plate	
Quantity	n.		2	
Water flow	m^3/h	8,3	9,5	11,7
Water flow	l/s	2,3	2,6	3,2
Pressure drop	kPa	49	48	47
Pumps				
P1 – Available pressure	kPa	132	113	180
P1 – Motor input power	kW	0,75		1,10
P1H – Available pressure	kPa	237	223	250
P1H – Motor input power	kW	1,1		1,5
PT – Available pressure	kPa	132	133	135
PT – Motor input power	kW		1,5	
Capacity of buffer tank	l		240	
Electrical data				
Total input power	kW	19,8	21,0	27,0
Total nominal input current	A	38,0	40,0	48,0
Maximum total input current	A	47,0	51,0	65,0
Total inrush current	A	150,0	156,0	205,0
Dimensions				
Length	mm		2˙280	
Width	mm		990	
Height	mm		1˙845	
Length with MV option	mm		2˙280	
Width with MV option	mm		990	
Height with MV option	mm		2˙270	
Transport weight	kg	862	894	911
Transport weight with empty buffer tank	kg	1˙165	1˙124	1˙141
Refrigerant charge per circuit	kg	9,4	9,5	11,0
Electrical power supply				
Electrical power supply	V / ph / Hz		400 / 3 / 50 + N + T	

REMARKS:
- Operating conditions:
Summer operation external air temperature 35°C; water temperature 7/12°C
Winter operation external air temperature 10°C; water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- In case of a different available pressure, included between the standard pressure and the values indicated for 1M or 2M options, however not higher 2M, it is necessary to order the higher pressure option, clearly stating the pressure value effectively requested on site. In the factory we will adjust the motor's pulley accordingly.
- Option BT allows summer operation (therefore with chilled water production) with external temperature lower than 15 °C.

R407C - Correction factors for cooling capacity

External air temperature °C		28	30	32	35	38	40	42	45	48
Temperature of water leaving from evaporator °C	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

R407C - Correction factors for input power

External air temperature °C		28	30	32	35	38	40	42	45	48
Temperature of water leaving from evaporator °C	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

R407C - Correction factors for heating capacity

Temperature of water leaving from evaporator °C		30	35	40	45	48
External air temperature °C	20	1,415	1,392	1,367	1,315	1,284
	16	1,261	1,241	1,220	1,195	1,180
	14	1,195	1,176	1,155	1,127	1,110
	12	1,127	1,108	1,088	1,068	1,056
	10	1,066	1,047	1,026	1	0,984
	8	1,005	0,986	0,987	0,947	0,923
	7	0,976	0,985	0,939	0,919	0,907
	6	0,904	0,893	0,870	0,852	0,841
	4	0,802	0,793	0,772	0,761	0,754
	2	0,741	0,732	0,712	0,701	0,694
	0	0,690	0,677	0,659	0,649	0,643
	-2	0,655	0,639	0,630	0,611	0,600
	-4	0,627	0,614	0,609	0,599	0,593

R407C - Correction factors for input power (heating)

Temperature of water leaving from evaporator °C		30	35	40	45	48
External air temperature °C	20	0,909	0,994	1,076	1,160	1,210
	16	0,861	0,938	1,015	1,091	1,137
	14	0,843	0,916	0,898	1,061	1,159
	12	0,826	0,895	0,963	1,030	1,070
	10	0,807	0,872	0,936	1	1,038
	8	0,789	0,850	0,910	0,969	1,004
	7	0,780	0,839	0,897	0,953	0,987
	6	0,770	0,826	0,883	0,938	0,971
	4	0,749	0,803	0,856	0,906	0,936
	2	0,729	0,778	0,828	0,874	0,902
	0	0,706	0,753	0,799	0,843	0,869
	-2	0,687	0,728	0,768	0,810	0,785
	-4	0,663	0,701	0,738	0,775	0,753

REMARKS:
- The above coefficients correspond to the mean of the values for the different units, therefore the performances calculated using this the 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 desclaims all responsabilities in case of damages deriving from violation of this instructions.
- For further clarifications or information, you are kindly request to contact our sales departement.

AIR COOLED HEAT PUMPS
WITH SCROLL COMPRESSORS AND CENTRIFUGAL FANS

REFRIGERANT R407C

PAE 1402 C O K

Series PAE ... C K

Cooling capacity from 73 to 225 kW - 2 circuits

The air cooled heat pumps of **PAE C K series**, with centrifugal fans, are designed for indoor installation and are particularly suitable for small and medium sized air conditioning systems, in residential and commercial applications. They can also be matched to fancoils or terminal units or for water cooling in industrial processes.
They are all available with 2 refrigerant circuits.
Thanks to their compact dimensions and to the several options available, these units are particularly easy to install in small spaces.
The whole range is complete of a compressors section, allowing a quick and easy ordinary service to the units.
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 following versions are available:
Vertical air flow
PAE...C K standard version
PAE...C U K ultrasilenced version
Horizontal air flow
PAE...C.O K standard version
PAE...C.O U K ultrasilenced version

Operation limits (standard units):
SUMMER OPERATION: **air** from 15 to 45°C – **water** (out from evaporator) from 5 to 15°C.
WINTER OPERATION: **air** from 20 to -4°C – **water** (out from evaporator) max 50°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 installed. The external panels, easy to be dismantled with a quick ¾ key turn, allow the full access to all components in case of service. When required, the hydraulic kit (buffer tank and pump group) are installed inside the unit.

High-efficiency scroll compressor (EER 3,7 at ARI conditions), with low sound level, internal heat protection, installed on rubber vibration dampers, supplied with crankcase heater, when necessary. Being 2 circuit units, in case of problem on one of the circuit, the 50% operation of the unit is anyway granted.

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 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.

Centrifugal fans of double suction type with electrical motor directly joined and balanced blades, suitably isolated with rubber vibration dampers and sealing on discharge. They are provided with short circuit and overload protections and external safety protection grid. The motor is of 4-pole triphase type, with belt transmission and variable pulleys, placed on slide so to speed up the pulley tension. As a standard, the unit has a vertical airflow or, on request, you can ask for an horizontal airflow (coil side).

Dry expansion **shell and tube evaporator** with two refrigerant circuits, in carbon steel and copper tubes, insulated by close-cell polyurethane foam material.

Cooling circuit composed of 4-way valve for refrigerant cycle inversion, thermostatic expansion valve, dehydrating filter, sight glass, safety device, antifreeze thermostat, high and low pressure switches, shut-off valves on liquid line, shut-off valves 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 main switch and an external and hinged panel to be opened. It is complete with remote switches, overload protections, transformer for auxiliaries and terminal board. In case of hydraulic kit on board, the electrical control of the pump group is provided.

Unit management microprocessor installed on the internal safety panel of the electrical board, controlling the automatic defrost system based on a time/temperature logics, complete with compressors hour counter.

Accessories

1M–2M **Higher available pressure for fan**: bigger electrical motor, so to have a higher available pressure to fans to be ducted.

AE **Electrical power supply different from standard:** mainly, 230V three-phase, 460V three-phase. Frequency 50/60 Hz.

BF **Low temperature operation (-20°C) with inverter fan speed regulation**: electronic device controlling the condensing pressure through an inverter, modulating the frequency of the fans electrical supply (only for summer operation).

BFa-BFb **Low temperature operation (-20°C) with inverter fan speed regulation** (with option 1M and 2M): electronic device controlling the condensing pressure through an inverter, modulating the frequency of the fans electrical supply (only for summer operation).

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 (for summer operation only).

BTa **Low temperature operation (-20°C) (with option 1M)**: electronic device for the continuous modulating voltage control of the condensing pressure through the variation of the fan rotation speed (not available for standard version and only for summer operation).

CF **Soundproofed compressors cabinet**: Insulation of compressors by a cabinet coated with soundproofing material and vibration dampers under compressors (included on ultrasilenced version).

CI **Soundproofing jacket on compressors:** made of soundproofing material, wrapped all around compressors so to further reduce the overall sound level of the unit (already included on ultrasilenced version).

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

GP **Condensing coil protection grid**: metal protection grid against accidental impacts.

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** for measuring circuit pressure.

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

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 pole centrifugal packaged type.

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.

PM **Spring-type vibration dampers**: spring-type vibration dampers support, for insulating the unit (supplied in kit), mainly indicated for installation in difficult and aggressive environments. Made of two steel plates containing a suitable quantity of harmonic steel springs.

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.

PT **Twin pump group**: chilled water pump group composed of twin pump, expansion vessel, safety valve, water gauge, water charge and discharge valves, air purging valves, electrical control of the pump, automatic switch in case of failure of the working pump. The pump is of 2 pole centrifugal packaged type.

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.

RP **Partial heat recovery** (about 20%) of the condensing heat, by means of a refrigerant/water plate exchanger (desuperheater), always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity.

RR **Copper/copper condensing coils**: special execution of the condensing coils with copper pipe and fins.

RT **Total heat recovery** (100%) of the condensing heat, by means of a refrigerant/water plate exchanger, always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity, and /or for dehumidification. It is necessary to consider option BT.

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.

Technical data - Standard version

PAE C		842 K	962 K	1102 K	1402 K	1502 K	1602 K	2302 K	2402 K	2602 K
Cooling capacity										
Cooling capacity	kW	73,3	83,5	92,7	122,0	129,0	145,0	200,9	209,0	222,0
Nominal input power	kW	27,6	31,8	38,0	44,4	50,2	56,0	66,0	73,4	80,0
EER		2,65	2,62	2,44	2,75	2,57	2,59	3,04	2,85	2,77
Heating capacity										
Heating capacity	kW	94,0	108,0	122,0	156,0	168,0	187,0	251,0	263,0	282,0
Input power (heating)	kW	28,7	33,0	39,5	46,2	52,2	58,2	68,6	76,3	83,2
COP		3,27		3,09	3,38	3,22	3,21	3,66	3,45	3,39
Centrifugal fans										
Quantity	n.	3			4			6		
Air flow	m^3/h	40˙000	37˙500		50˙000		48˙000	73˙200		
Air flow	l/s	11˙110	10˙415		13˙890		13˙300	20˙330		
STD Version										
Available pressure	Pa	50	70				100	80		
Rotation speed	rpm	920	900		915		935	920		
Motor input power	kW	12,0			16,0			24,0		
Nominal input current	A	28,2			37,6			56,4		
Sound pressure level	dB(A)	70			72		73	74		
1M Version										
Available pressure	Pa	100	180		190		240	220		
Rotation speed	rpm	970	1˙030				1˙065	1˙050		
Motor input power	kW	12,0			16,0			24,0		
Nominal input current	A	28,2			37,6			56,4		
Sound pressure level	dB(A)	72	71	72	74		75	78		
2M Version										
Available pressure	Pa	260	270		350		355	350		
Rotation speed	rpm	1˙110	1˙100				1˙170			
Motor input power	kW	15,5			22,0			33,0		
Nominal input current	A	36,0			48,0			72,0		
Sound pressure level	dB(A)	75			76			77		78
Scroll compressors										
Quantity	n.	2	4							
Circuits	n.	2								
Standard capacity steps	n.	2								
Optional capacity steps	n.	–	4							
Nominal input current	A	47,8	59,8	69,8	77,0	89,0	97,4	121,6	130,6	143,6
Maximum input current	A	64,0	80,0	88,0	108,0	118,0	128,0	164,0	186,0	208,0
Inrush current	A	230,0	183,0	193,0	248,0	284,0	294,0	348,0	406,0	428,0
Evaporator										
Type		Shell and tube								
Quantity	n.	1								
Water flow	m^3/h	12,6	14,4	15,9	21,0	22,2	24,9	34,5	35,9	38,2
Water flow	l/s	3,5	4,1	4,4	5,8	6,2	6,9	9,6	10,0	10,6
Pressure drop	kPa	21	27	30	49	55	69	45	74	84
Pumps										
P1 – Available pressure	kPa	124	118	110	116	100	76	133	101	86
P1 – Motor input power	kW	1,1				1,5			3,0	
P1H – Available pressure	kPa	159	153	145	161	145	121	183	151	136
P1H – Motor input power	kW	1,5				2,2			4,0	
PT – Available pressure	kPa	149	138	130	131	110	86	123	86	71
PT – Motor input power	kW	1,5				2,2			3,0	
Capacity of buffer tank	l	720								
Electrical data										
Total input power	kW	40,0	44,0	50,0	60,0	66,0	72,0	90,0	97,0	104,0
Total nominal input current	A	78,0	88,0	98,0	118,0	131,0	135,0	178,0	187,0	200,0
Maximum total input current	A	94,0	110,0	118,0	150,0	156,0	170,0	225,0	242,0	269,0
Total inrush current	A	260,0	213,0	223,0	286,0	322,0	336,0	409,0	462,0	489,0
Dimensions										
Length	mm	2˙610			3˙460			5˙150		
Width	mm	1˙245								
Height	mm	1˙995								
Length with MV option	mm	3˙460			4˙305			5˙995		
Width with MV option	mm	1˙245								
Height with MV option	mm	1˙995								
Transport weight	kg	1˙334	1˙450	1˙456	1˙800	1˙840	1˙940	2˙360	2˙450	2˙540
Transport weight with empty buffer tank	kg	1˙564	1˙680	1˙686	2˙030	2˙070	2˙170	2˙590	2˙680	2˙770
Refrigerant charge per circuit	kg	14,0	17,0		26,0	31,0			35,0	
Refrigerant charge per circuit with option 0	kg	14,0			29,0				40,0	
Electrical power supply										
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T								

REMARKS:
- Operating conditions:
Summer operation external air temperature 35°C; water temperature 7/12°C
Winter operation external air temperature 10°C; water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- In case of a different available pressure, included between the standard pressure and the values indicated for 1M or 2M options, however not higher 2M, it is necessary to order the higher pressure option, clearly stating the pressure value effectively requested on site. In the factory we will adjust the motor's pulley accordingly.
- Option BT allows summer operation (therefore with chilled water production) with external temperature lower than 15 °C.

Technical data - Ultrasilenced version

PAE C		842 U K	962 U K	1102 U K	1402 U K	1502 U K	1602 U K	2302 U K	2402 U K	2602 U K
Cooling capacity										
Cooling capacity	kW	74,6	84,0	94,5	126,0	137,0	147,0	204,0	212,0	225,0
Nominal input power	kW	28,2	32,8	38,2	43,8	49,1	57,2	67,6	75,2	81,2
EER		2,64	2,56	2,47	2,88	2,79	2,57	3,02	2,82	2,77
Heating capacity										
Heating capacity	kW	95,5	107,5	121,0	161,3	175,4	188,2	255,2	271,4	336,0
Input power (heating)	kW	29,3	34,1	39,7	45,5	51,5	60,0	70,3	78,2	85,5
COP		3,26	3,15	3,05	3,54	3,40	3,14	3,63	3,47	3,93
Centrifugal fans										
Quantity	n.	3		4		6			8	
Air flow	m^3/h	21`300	28`800			43`800			54`400	
Air flow	l/s	5`920	8`000			12`170			15`110	
STD Version										
Available pressure	Pa	60			70				100	
Rotation speed	rpm	590	760	590		610			650	
Motor input power	kW	3,3	6,6	4,4		6,6			8,8	
Nominal input current	A	8,4	15,9	11,2		16,8			22,4	
Sound pressure level	dB(A)	60	64	60		61			64	
1M Version										
Available pressure	Pa	160	190	160			250			
Rotation speed	rpm	750	890	720		880			870	
Motor input power	kW	3,3	6,6	4,4		9,0			12,0	
Nominal input current	A	8,4	15,9	11,2		22,2			29,6	
Sound pressure level	dB(A)	65		66	68		69		74	
2M Version										
Available pressure	Pa	250	270			360			370	
Rotation speed	rpm	870	975	870			1`015			
Motor input power	kW	4,5	9,0	6,0		13,2			17,6	
Nominal input current	A	11,1	20,1	14,8		31,8			42,4	
Sound pressure level	dB(A)	67	68			69		74		75
Scroll compressors										
Quantity	n.	2				4				
Circuits	n.					2				
Standard capacity steps	n.					2				
Optional capacity steps	n.	–				4				
Nominal input current	A	49,6	59,1	69,8	78,8	89,2	97,2	118,6	132,6	144,6
Maximum input current	A	64,0	80,0	88,0	108,0	118,0	128,0	164,0	186,0	208,0
Inrush current	A	230,0	183,0	193,0	248,0	284,0	294,0	348,0	406,0	428,0
Evaporator										
Type		Shell and tube								
Quantity	n.	1								
Water flow	m^3/h	12,8	14,4	16,2	21,7	23,5	25,3	35,1	36,5	38,5
Water flow	l/s	3,6	4,0	4,5	6,0	6,5	7,0	9,7	10,1	10,7
Pressure drop	kPa	20	26	29	49	58	67	46	72	81
Pumps										
P1 – Available pressure	kPa	124	118	110	120	97	83	133	101	86
P1 – Motor input power	kW		1,1			1,5			3,0	
P1H – Available pressure	kPa	159	153	145	175	142	133	183	151	136
P1H – Motor input power	kW		1,5			2,2			4,0	
PT – Available pressure	kPa	149	138	130	135	107	93	123	86	71
PT – Motor input power	kW		1,5			2,2			3,0	
Capacity of buffer tank	l					720				
Electrical data										
Total input power	kW	32,0	39,0	43,0	50,0	56,0	64,0	76,0	84,0	90,0
Total nominal input current	A	58,0	75,0	81,0	95,6	106,0	114,0	141,0	155,0	167,0
Maximum total input current	A	74,0	96,0	99,0	125,0	135,0	147,0	190,0	208,0	234,0
Total inrush current	A	240,0	199,0	204,0	265,0	301,0	313,0	374,0	428,0	454,0
Dimensions										
Length	mm	2`610		3`460		5`150			6`840	
Width	mm					1`245				
Height	mm					1`995				
Length with MV option	mm	3`460		4`305		5`995			6`840	
Width with MV option	mm					1`245				
Height with MV option	mm					1`995				
Transport weight	kg	1`352	1`467	1`757	2`485	2`525	2`535	2`980	3`000	3`020
Transport weight with empty buffer tank	kg	1`582	1`697	1`987	2`715	2`755	2`765	3`210	3`230	3`250
Refrigerant charge per circuit	kg	17,0		26,0		44,0			45,0	
Refrigerant charge per circuit with option O	kg	14,0		29,0		48,0			45,0	
Electrical power supply										
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T								

REMARKS:
- Operating conditions:
Summer operation external air temperature 35°C; water temperature 7/12°C
Winter operation external air temperature 10°C; water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- In case of a different available pressure, included between the standard pressure and the values indicated for 1M or 2M options, however not higher 2M, it is necessary to order the higher pressure option, clearly stating the pressure value effectively requested on site. In the factory we will adjust the motor's pulley accordingly.
- Option BT allows summer operation (therefore with chilled water production) with external temperature lower than 15 °C.

R407C - Correction factors for cooling capacity

External air temperature °C		28	30	32	35	38	40	42	45	48
Temperature of water leaving from evaporator °C	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

R407C - Correction factors for input power

External air temperature °C		28	30	32	35	38	40	42	45	48
Temperature of water leaving from evaporator °C	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

R407C - Correction factors for heating capacity

Temperature of water leaving from evaporator °C		30	35	40	45	48
External air temperature °C	20	1,415	1,392	1,367	1,315	1,284
	16	1,261	1,241	1,220	1,195	1,180
	14	1,195	1,176	1,155	1,127	1,110
	12	1,127	1,108	1,088	1,068	1,056
	10	1,066	1,047	1,026	1	0,984
	8	1,005	0,986	0,987	0,947	0,923
	7	0,976	0,985	0,939	0,919	0,907
	6	0,904	0,893	0,870	0,852	0,841
	4	0,802	0,793	0,772	0,761	0,754
	2	0,741	0,732	0,712	0,701	0,694
	0	0,690	0,677	0,659	0,649	0,643
	-2	0,655	0,639	0,630	0,611	0,600
	-4	0,627	0,614	0,609	0,599	0,593

R407C - Correction factors for input power (heating)

Temperature of water leaving from evaporator °C		30	35	40	45	48
External air temperature °C	20	0,909	0,994	1,076	1,160	1,210
	16	0,861	0,938	1,015	1,091	1,137
	14	0,843	0,916	0,898	1,061	1,159
	12	0,826	0,895	0,963	1,030	1,070
	10	0,807	0,872	0,936	1	1,038
	8	0,789	0,850	0,910	0,969	1,004
	7	0,780	0,839	0,897	0,953	0,987
	6	0,770	0,826	0,883	0,938	0,971
	4	0,749	0,803	0,856	0,906	0,936
	2	0,729	0,778	0,828	0,874	0,902
	0	0,706	0,753	0,799	0,843	0,869
	-2	0,687	0,728	0,768	0,810	0,785
	-4	0,663	0,701	0,738	0,775	0,753

REMARKS:
- The above coefficients correspond to the mean of the values for the different units, therefore the performances calculated using this the 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 desclaims all responsabilities in case of damages deriving from violation of this instructions.
- For further clarifications or information, you are kindly request to contact our sales departement.

PAE 41 Kc

PAE 182 Kc + MV

Series PAE ... Kc

Cooling capacity from 5,5 to 24 kW - 1 and 2 circuits

The air cooled heat pumps of **PAE Kc 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.
Depending on the cooling capacity, they are available with 1 and 2 cooling circuits.
Thanks to their compact dimensions and to the several options available, these units are particularly easy to install in small spaces, also when supplied with the hydraulic kit.
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 following versions are available:
PAE...Kc standard version
Horizontal air flow for models from 41 to 111
Vertical air flow for models from 182 to 222
PAE...PS Kc with hydraulic kit

Operation limits (standard units):
SUMMER OPERATION: **air** from 15 to 45°C – **water** (out from evaporator) from 5 to 15°C - WINTER OPERATION: **air** from 20 to -4°C – **water** (out from evaporator) max 50°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 111, 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 111 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, when required, the hydraulic kit is installed inside the unit.

High-efficiency scroll compressor (EER 3,7 at ARI conditions), with low sound level, internal heat protection, installed on rubber vibration dampers, supplied with crankcase heater when necessary. In case of 2 circuit units, in case of problem on one of the circuit, the 50% operation of the unit is anyway granted.

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 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.

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 4-way valve for refrigerant cycle inversion, 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 and hinged panel to be opened. It is complete with remote switches, overload protections, transformer for auxiliaries and terminal board. In case of hydraulic kit on board, the electrical control of the pump group is provided.

Unit management microprocessor installed on the internal safety panel of the electrical board, controlling the automatic defrost system based on a time/temperature logics, complete with compressors hour counter.

Accessories

AE **Electrical power supply different from standard:** mainly, 230V three-phase, 460V three-phase. 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.

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** for measuring circuit pressure (from size 182).

MV **Buffer tank** of suitable capacity complete with expansion vessel, safety valve, water gauge, water charge and discharge valves, air purging valves (from size 182).

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 (from size 182).

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 pole centrifugal packaged type (from size 182).

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.

Technical data

PAE		41 Kc	51 Kc	61 Kc	81 Kc	111 Kc	182 Kc	222 Kc	182.PS Kc	222.PS Kc
Cooling capacity										
Cooling capacity	kW	5,5	5,8	7,0	8,9	11,5	17,3	22,4	19,4	24,0
Nominal input power	kW	1,7	1,9	2,6	3,3	4,3	6,3	9,0	5,3	8,1
EER		3,23	3,05	2,69	2,70	2,67	2,75	2,49	3,66	2,96
Heating capacity										
Heating capacity	kW	7,1	7,7	9,4	12,0	15,6	23,3	39,9	24,3	31,6
Input power (heating)	kW	2,0	2,3	2,6	3,3	4,0	5,9	8,3	5,0	7,5
COP		3,55	3,35	3,61	3,64	3,9	3,95	4,81	4,86	4,21
Axial fans										
Quantity	n.	1					2			
Rotation speed	rpm	900								
Air flow	m³/h	3˙470			3˙850	3˙600	7˙580	7˙068	11˙990	
Air flow	l/s	964			1˙069	1˙000	2˙106	1˙963	3˙331	
Motor input power	kW	0,15					0,29		0,74	
Input current	A	0,64					1,28		3,4	
Scroll compressors										
Quantity	n.	1					2			
Circuits	n.	1					2			
Standard capacity steps	%	0 – 100					0 – 50 – 100			
Nominal input current	A	8,1	8,7	12,3	16,1	27,0	12,0	16,0	10,0	15,0
Nominal input current (heating)	A	10,0		12,5	16,5	28,0	12,0	16,0	10,0	15,0
Maximum input current	A	17,0		20,0	24,0	32,0	17,0	21,0	19,0	23,0
Inrush current	A	59,0	62,0	83,0	98,0	65,0	106,0	140,0	109,0	143,0
Evaporator										
Type		Brazed plate								
Quantity	n.	1					2			
Water flow	m³/h	0,94	1,0	1,2	1,5	2,0	3,0	3,9	3,3	4,1
Water flow	l/s	0,26	0,3		0,4	0,5	0,8	1,1	0,9	1,1
Pressure drop	kPa	39	45	36	38	39	36	37	45	43
Water flow (heating)	m³/h	1,22	1,3	1,6	2,0	2,7	2,0	2,7	2,1	2,7
Water flow (heating)	l/s	0,34	0,4		0,6	0,7	0,6	0,7	0,6	0,8
Pressure drop (heating)	kPa	65	78	65	68	72	64	70		74
Electrical data										
Total input power	kW	2,0		3,0		4,0	7,0	9,0	6,0	9,0
Total nominal input current	A	11,0	12,0	13,0	17,0	29,0	13,0	17,0	13,0	18,0
Maximum total input current	A	18,0		21,0	25,0	33,0	18,0	22,0		26,0
Total inrush current	A	60,0	63,0	84,0	99,0	66,0	107,0	141,0	112,0	146,0
Sound pressure level										
Sound pressure at 1 m	dB(A)	51		52		53	55	56	62	
PS Version										
Available pressure	kPa	31	24	33	29	24	–		145	88
Pump group motor power	kW	0,08					–		0,55	
Input current	A	0,92					–		4,0	
Higher available pressure pump group	kPa	–							195	95
Motor input power	kW	–							0,55	0,75
Input current	A	–							4,0	5,5
Capacity of buffer tank	l	30					–		80	
Expansion vessel	l	2					–		5	
Dimensions										
Length	mm	980					1˙100		1˙600	
Width	mm	325					750			
Height	mm	715					1˙100		1˙250	
Transport weight	kg	117		119	124	142	288	330	329	354
Refrigerant charge per circuit	kg	2,9			3,4	4,3	4,2	5,1	4,6	6,6
Dimensions for PS version										
Length	mm	980					–		1˙600	
Width	mm	325					–		750	
Height	mm	1˙000					–		1˙250	
Transport weight with empty buffer tank	kg	159		162	167	185	–		386	412
Weight in operation	kg	189		192	197	215	–		467	492
Electrical power supply										
Electrical power supply	V / ph / Hz	230 / 1 / 50 + N + T					400 / 3 / 50 + N + T			

REMARKS:
- Operating conditions:
Summer operation external air temperature 35°C; water temperature 7/12°C
Winter operation external air temperature 10°C; water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).

AIR COOLED HEAT PUMPS WITH SCROLL COMPRESSORS

REFRIGERANT R410A

PAE 2302 S Kc + CF

PAE .... Kc Series

Cooling capacity from 70 to 420 kW - 2 circuits

The air cooled heat pumps of **PAE .... Kc series**, are designed for outdoor installation and are particularly suitable for cooling water in air conditioning systems.
Each group has two independent cooling circuits provided with R410A scroll compressors.
The units have been designed to reduce their footprint as much as possible, keeping high cooling performances, thanks to the use of excellent quality and new technology components.
All units are completely assembled and tested in the factory in compliance with specific quality procedures; they are still provided with all cooling, water and electrical connections so to quickly install them, once on site.
Before the factory test, the cooling circuits are tested under pressure and then supplied with refrigerant and non-freezing oil charge.

The following versions are available:
PAE .... Kc – standard version
PAE .... S Kc – silenced version
PAE .... U Kc – ultrasilenced version

For versions S and U, the reduction of the sound level is due to the use of refrigerant/air exchangers with wider surfaces than the standard units, to a soundproofed compressor cabinet and to the control of the fans speed by means of an electronic regulation.

Operation limits (standard units):
SUMMER OPERATION: **air** from 15 to 45°C – **water** (out from evaporator) from 5 to 15°C.
WINTER OPERATION: **air** from 20 to -4°C – **water** (out from evaporator) max 50°C

Main components:

Structure made of base and frame realized in high thickness galvanized steel, assembled by means of stainless steel rivets. All the galvanized steel surfaces are coated with powder painting of RAL 7035 colour.

Scroll compressor for refrigerant R410A, operating on two independent cooling circuits, in tandem or trio version. Compressors are installed on rubber vibration dampers, provided with direct start motors, cooled by the intaken refrigerant, and equipped with overload protections and crankcase heater. They are charged with polyester oil and their compressors terminal board is IP54. The microprocessor on board enables or disenables the compressors, regulating in this way also the cooling capacity.

Stainless steel plate evaporator of "dual circuit" type, coated with close-cell insulating and of high thickness material. The max operating pressure limits are 10 bar for water side and 32 bar for refrigerant side.

Heat-exchange external coils with micro-finned copper tubes, positioned in staggered rows and mechanichally expanded into an aluminium finned pack. Fins are designed with such a shape so to give the highest heat exchange efficiency (turbo-fin). The max operating pressure refrigerant side is 45 bar rel.

Axial fans, of directly coupled type, with wing-profile aluminium blades, suitably designed not to create air turbulence. They are therefore ensuring the max efficiency with the lowest sound level. Each fan is provided with galvanized steel protection grid, painted after construction. The IP54 fans motors are completely closed and provided with in-built overload protection thermostat, incorporated to the motor windings.

Independent cooling circuits, each one with a 4-way valve for refrigerant cycle inversion, shut-off valve for refrigerant charge, antifreeze sensor, shut-off valves on discharge and liquid lines, sight glass, dehydrating filter, high pressure safety device on high pressure refrigerant side, electronic thermostatic expansion valve, high and low pressure switches.

Electric board realized in compliance with 60204-1/IEC 204-1 standards, 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 fonctions 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, relais for phase sequencing, possibility to interface to EMS/BMS systems.

Accessories

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

AE **Electrical power supply different from standard:** mainly, 230V three-phase, 460V three-phase. 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 allowing the unit operation down to -20°C (for summer operation only).

CF **Soundproofed compressors cabinet with standard material**: Insulation of compressors by a cabinet coated with soundproofing material and vibration dampers under compressors (already included in S version).

CFU **Soundproofed compressors cabinet with bituminous rubber coated material**: Insulation of compressors by a suitably coated cabinet, vibration dampers under compressors, mufflers on compressors discharge pipes (already included in U version).

CI **Soundproofing jacket on compressors** made of soundproofing material, wrapped all around compressors so to further reduce the overall sound level of the unit (not available for S and U versions).

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

GP **Condensing coil protection grid**: metal protection grid against accidental impacts.

GP1 **Protection grid for compressors section**: metal protection grid against accidental impacts.

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.

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** for measuring circuit pressure.

MV **Buffer tank** of suitable capacity complete with expansion vessel, safety valve, water gauge, water charge and discharge valves, air purging valves. (Not available for 1-fan units).

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 pole centrifugal packaged type.

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.

PM **Spring-type vibration dampers**: spring-type vibration dampers support, for insulating the unit (supplied in kit), mainly indicated for installation in difficult and aggressive environments. Made of two steel plates containing a suitable quantity of harmonic steel springs.

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.

PT **Twin pump group**: chilled water pump group composed of twin pump, expansion vessel, safety valve, water gauge, water charge and discharge valves, air purging valves, electrical control of the pump, automatic switch in case of failure of the working pump. The pump is of 2 pole centrifugal packaged type.

RA **Anti-freeze heater on evaporator**: electrical heater installed on the evaporator, in order to prevent freezing and provided with thermostat.

RF **Power factor correction system cosfi >0,9**: Electrical device made of suitable condensers for compressors rephasing, ensuring a cosfi value ≥0,9 , so to reduce the power absorption from the electrical network.

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.

RP **Partial heat recovery** (about 20%) of the condensing heat, by means of a refrigerant/water plate exchanger (desuperheater), always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity.

RR **Copper/copper condensing coils**: special execution of the condensing coils with copper pipe and fins.

RT **Total heat recovery** (100%) of the condensing heat, by means of a refrigerant/water plate exchanger, always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity, and /or for dehumidification. It is necessary to consider option BT.

RV **Personalized frame painting in RAL colour.**

V **Voltmeter**: Electrical device measuring the electrical tension in the power supply of the unit.

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.

1M **High pressure fans**: installed in the factory, they are available only for standard units, with an available pressure of 60 Pa.

Technical data - Standard version

PAE		772 Kc	852 Kc	1412 Kc	1532 Kc	1642 Kc	2002 Kc	2302 Kc	2702 Kc	3002 Kc	3402 Kc	3802 Kc	4202 Kc	4502 Kc
Cooling capacity														
Cooling capacity	kW	69,8	83,4	126,6	137,2	147,5	186,8	216,9	242,1	270,0	289,8	365,4	381,6	420,3
Nominal input power	kW	25,6	30,2	43,4	47,3	51,2	68,0	75,4	84,8	91,8	101,7	125,0	131,3	158,7
EER		2,73	2,76	2,92	2,90	2,88	2,75	2,88	2,85	2,94	2,85	2,92	2,91	2,65
Heating capacity														
Heating capacity	kW	90,0	107,6	163,3	177,0	190,3	240,9	279,8	312,3	348,3	373,8	471,4	492,3	542,2
Input power (heating)	kW	24,0	28,4	40,8	44,5	48,1	63,9	70,9	79,7	86,3	95,6	117,5	123,4	149,2
COP		3,74	3,79	4,00	3,98	3,95	3,77	3,95	3,92	4,04	3,91	4,01	3,99	3,63
Axial fans														
Quantity	n.	1		2			3			4		5		
Rotation speed	rpm	915												
Air flow	m^3/h	26˙100	23˙960	51˙200	48˙530	47˙140	78˙800	75˙400	72˙800	100˙200	91˙200	124˙200	120˙400	113˙000
Air flow	l/s	7˙250	6˙656	14˙222	13˙481	13˙094	21˙889	20˙944	20˙222	27˙833	25˙333	34˙500	33˙444	31˙389
Motor input power	kW	2,48		4,96			6,9			9,2	9,8	11,8		
Input current	A	5,15		10,3			14,7			19,6	20,0	25,0		
Scroll compressors														
Quantity	n.	2					4					6	4	6
Circuits	n.	2												
Standard capacity steps	n.	2					4							
Nominal input current	A	49,9	56,2	80,6	84,3	88,0	145,5	163,4	181,5	190,0	198,0	275,0	280,0	302,0
Maximum input current	A	76,0	89,0	130,0	144,0	158,0	204,0	222,0	248,0	268,0	288,0	372,0	392,0	432,0
Inrush current	A	205,0	240,0	300,3	360,3	364,0	215,0	365,0	385,0	446,0	453,0	468,0	530,0	550,0
Evaporator														
Type		Brazed plate												
Quantity	n.	1												
Water flow	m^3/h	12,0	14,3	21,8	23,6	25,4	32,1	37,3	41,6	46,4	49,8	62,8	65,6	72,3
Water flow	l/s	3,3	4,0	6,0	6,6	7,0	8,9	10,4	11,6	12,9	13,8	17,5	18,2	20,1
Pressure drop	kPa	35	28	36	42		59	76	72	82	77	70	69	74
Water connections	DN	1″½					2″½			3″				
Pumps														
P1 – Available pressure	kPa	152	147	151		131	132	120	153	138	125	140	175	163
P1 – Motor input power	kW	1,1		1,9			3,0		4,0		5,5		7,5	
P1H – Available pressure	kPa	192	202		195	186	205	202	200	188	225	220	300	280
P1H – Motor input power	kW	1,9		3,0			5,5			7,5		11,0		
PT – Available pressure	kPa	152	157	122	115	166	186	118	81	64	73	136	165	124
PT – Motor input power	kW	2,2					5,5		4,0			7,5		
Capacity of buffer tank	l	–		300			400			800		1˙100		
Electrical data														
Total input power	kW	28,1	32,7	48,4	52,3	56,2	74,9	82,3	91,7	101,0	111,5	136,8	143,1	170,5
Total nominal input current	A	55,1	61,4	90,9	94,6	98,3	142,2	161,3	181,5	190,0	197,6	274,6	280,0	301,6
Maximum total input current	A	81,2	94,2	140,3	154,3	168,3	218,7	236,7	262,7	287,6	308,0	397,0	417,0	457,0
Total inrush current	A	210,1	245,1	310,6	370,6	374,3	229,7	379,7	399,7	465,6	473,0	493,0	555,0	575,0
Sound pressure level														
Sound pressure at 1 m	dB(A)	75			77				79			80	83	80
Sound pressure at 10 m	dB(A)	59			61				63			64	67	64
Dimensions														
Length	mm	1˙620		2˙660			3˙700			4˙740		5˙780		
Width	mm	1˙370												
Height	mm	2˙420												
Transport weight	kg	1˙005	1˙100	1˙250	1˙360	1˙410	1˙940	2˙310	2˙460	2˙662	2˙890	3˙005	3˙074	3˙720
Weight in operation	kg	1˙030	1˙125	1˙275	1˙385	1˙435	2˙015	2˙385	2˙535	2˙737	2˙965	3˙080	3˙149	3˙795
Electrical power supply														
Electrical power supply	V / ph / Hz	400V / 3 / 50 + T + N												

REMARKS:
- Operating conditions:
Summer operation external air temperature 35°C; water temperature 12/7°C
Winter operation external air temperature 10°C; water temperature 40/45°C
- Sound pressure levels calculated according to ISO 3744.
- Option BT allows summer operation (therefore with chilled water production) with external temperature lower than 15 °C.

Technical data - Silenced version

PAE		772 S Kc	852 S Kc	1412 S Kc	1532 S Kc	1642 S Kc	2002 S Kc	2302 S Kc	2702 S Kc	3002 S Kc	3402 S Kc	3802 S Kc
Cooling capacity												
Cooling capacity	kW	67,4	81,9	120,2	130,4	140,2	187,9	210,6	243,0	261,9	288,9	365,4
Nominal input power	kW	27,1	32,0	46,0	50,1	52,0	70,2	82,1	89,4	98,0	102,3	133,5
EER		2,49	2,56	2,61	2,60	2,70	2,68	2,57	2,72	2,67	2,82	2,74
Heating capacity												
Heating capacity	kW	87,0	105,7	155,1	168,2	180,8	242,4	271,7	313,5	337,9	372,7	471,4
Input power (heating)	kW	25,5	30,1	43,2	47,1	48,9	66,0	77,2	84,0	92,1	96,2	125,5
COP		3,41	3,51	3,59	3,57	3,70	3,67	3,52	3,73	3,67	3,88	3,76
Axial fans												
Quantity	n.	1	2			3			4		5	
Rotation speed	rpm	720										
Air flow	m^3/h	19˙575	52˙600	38˙400	36˙397	58˙800		51˙200	78˙800	68˙400	97˙900	87˙000
Air flow	l/s	5˙438	14˙611	10˙667	10˙110	16˙333		14˙222	21˙889	19˙000	27˙194	24˙167
Motor input power	kW	1,74	4,96			4,8			6,4		8,0	
Input current	A	3,60	10,3			8,7			11,6		14,5	
Scroll compressors												
Quantity	n.	2					4					6
Circuits	n.	2										
Standard capacity steps	n.	2					4					
Nominal input current	A	53,4	60,1	86,2	90,2	94,2	128,0	150,0	166,8	170,4	177,6	249,0
Maximum input current	A	76,0	89,0	130,0	144,0	158,0	204,0	222,0	248,0	268,0	288,0	372,0
Inrush current	A	205,0	240,0	300,3	360,3	364,0	215,0	365,0	385,0	446,0	453,0	468,0
Evaporator												
Type		Brazed plate										
Quantity	n.	1										
Water flow	m^3/h	11,6	14,1	20,7	22,4	24,1	32,3	36,2	41,8	45,0	49,7	62,8
Water flow	l/s	3,2	3,9	5,7	6,2	6,7	9,0	10,1	11,6	12,5	13,8	17,5
Pressure drop	kPa	34	27	37	41		61	71	76		79	72
Water connections	DN	1"½					2"½			3"		
Pumps												
P1 – Available pressure	kPa	152	147	151		131	130	125	149	144	123	138
P1 – Motor input power	kW	1,1		1,9			3,0		4,0			5,5
P1H – Available pressure	kPa	192	202		195	186	203	207	196	194	223	218
P1H – Motor input power	kW	1,9		3,0			4,0		7,5			
PT – Available pressure	kPa	152	157	122	115	166	118	92	78	73	71	134
PT – Motor input power	kW	2,2					3,0		4,0			7,5
Capacity of buffer tank	l	–	300			400			800		1˙100	
Electrical data												
Total input power	kW	28,9	37,0	51,0	55,1	56,8	75,0	86,9	95,8	104,4	110,3	141,5
Total nominal input current	A	57,0	70,4	96,5	100,5	102,9	136,7	158,7	178,4	182,0	192,1	263,5
Maximum total input current	A	79,6	99,3	140,3	154,3	166,7	212,7	230,7	259,6	279,6	302,5	386,5
Total inrush current	A	208,6	250,3	310,6	370,6	372,7	223,7	373,7	396,6	457,6	467,5	482,5
Sound pressure level												
Sound pressure at 1 m	dB(A)	72		74			73		75		76,0	77
Sound pressure at 10 m	dB(A)	56		58			57		59		60,0	61
Dimensions												
Length	mm	1˙620	2˙660			3˙700			4˙740		5˙780	
Width	mm	1˙370										
Height	mm	2˙420										
Transport weight	kg	1˙070	1˙300	1˙340	1˙430	2˙750	2˙125	2˙375	2˙590	2˙802	3˙100	3˙298
Weight in operation	kg	1˙095	1˙325	1˙365	1˙455	2˙775	2˙200	2˙450	2˙665	2˙877	3˙175	3˙373
Electrical power supply												
Electrical power supply	V / ph / Hz	400V / 3 / 50 + T + N										

REMARKS:
- Operating conditions:
Summer operation external air temperature 35°C; water temperature 12/7°C
Winter operation external air temperature 10°C; water temperature 40/45°C
- Sound pressure levels calculated according to ISO 3744.
- Option BT allows summer operation (therefore with chilled water production) with external temperature lower than 15 °C.

Technical data - Ultrasilenced version

PAE		772 U Kc	852 U Kc	1412 U Kc	1532 U Kc	1642 U Kc	2002 U Kc	2302 U Kc	2702 U Kc	3002 U Kc	3402 U Kc	3802 U Kc
Cooling capacity												
Cooling capacity	kW	62,7	78,6	115,2	125,4	132,8	182,3	204,3	235,6	254,3	280,3	354,2
Nominal input power	kW	27,6	32,6	46,9	51,1	55,4	72,0	84,2	91,6	100,5	104,9	136,8
EER		2,27	2,41	2,46	2,45	2,40	2,53	2,43	2,57	2,53	2,67	2,59
Max ext. air temp. FOR ULTRASILENCED OPERATION	°C	36			35	36			37	36		35
Heating capacity												
Heating capacity	kW	80,9	101,4	148,6	161,7	171,2	235,1	263,5	303,9	328,0	361,5	457,0
Input power (heating)	kW	25,9	30,6	44,1	48,0	52,1	67,7	79,1	86,1	94,5	98,6	128,6
COP		3,12	3,31	3,37		3,29	3,47	3,33	3,53	3,47	3,67	3,55
Axial fans												
Quantity	n.	1	2			3			4		5	
Rotation speed	rpm	670										
Air flow	m³/h	14˙616	28˙672		27˙177	42˙100		36˙400	54˙800	48˙400	67˙600	59˙600
Air flow	l/s	4˙060	7˙964		7˙549	11˙694		10˙111	15˙222	13˙444	18˙778	16˙556
Motor input power	kW	1,4	2,87			3,5			4,6		5,8	
Input current	A	2,9	5,9			8,4			11,2		14,0	
Scroll compressors												
Quantity	n.	2					4					6
Circuits	n.	2										
Standard capacity steps	n.	2					4					
Nominal input current	A	57,1	64,3	92,2	96,5	100,8	130,4	152,8	169,8	173,5	180,8	268,2
Maximum input current	A	76,0	89,0	130,0	144,0	158,0	204,0	222,0	248,0	268,0	288,0	372,0
Inrush current	A	205,0	240,0	300,3	360,3	364,0	215,0	365,0	385,0	446,0	453,0	468,0
Evaporator												
Type		Brazed plate										
Quantity	n.	1										
Water flow	m³/h	10,8	13,5	19,8	21,6	22,8	31,3	35,1	40,5	43,7	48,2	60,9
Water flow	l/s	3,0	3,8	5,5	6,0	6,3	8,7	9,8	11,3	12,1	13,4	16,9
Pressure drop	kPa	33	26	34	40		59	68	74		75	68
Water connections	DN	1"½					2"½			3"		
Pumps												
P1 – Available pressure	kPa	152	147	151		131	132	128	151	146	127	142
P1 – Motor input power	kW	1,1		1,9			3,0		4,0		5,5	
P1H – Available pressure	kPa	192	202		195	186	205	210	198	196	227	222
P1H – Motor input power	kW	1,9		3,0			5,5				7,5	
PT – Available pressure	kPa	152	157	122	115	166	115	95	82	79	71	139
PT – Motor input power	kW	2,2					3,0		4,0			7,5
Capacity of buffer tank	l	–	300			400			800		1˙100	
Electrical data												
Total input power	kW	29,0	35,5	49,8	54,0	58,9	75,5	87,7	96,2	105,1	110,7	142,6
Total nominal input current	A	60,0	70,2	98,1	102,4	109,2	138,8	161,2	181,0	184,7	194,8	282,2
Maximum total input current	A	78,9	94,9	135,9	149,9	166,4	212,4	230,4	259,2	279,2	302,0	386,0
Total inrush current	A	207,9	245,9	306,2	366,2	372,4	223,4	373,4	396,2	457,2	467,0	482,0
Sound pressure level												
Sound pressure at 1 m	dB(A)	68		69						70		71
Sound pressure at 10 m	dB(A)	52		53						54		55
Dimensions												
Length	mm	1˙620	2˙660			3˙700			4˙740		5˙780	
Width	mm	1˙370										
Height	mm	2˙420										
Transport weight	kg	1˙140	1˙350	1˙400	1˙510	2˙810	2˙150	2˙400	2˙615	2˙827	3˙125	3˙323
Weight in operation	kg	1˙165	1˙375	1˙425	1˙535	2˙835	2˙225	2˙475	2˙690	2˙902	3˙200	3˙398
Electrical power supply												
Electrical power supply	V / ph / Hz	400V / 3 / 50 + T + N										

REMARKS:
- Operating conditions:
Summer operation external air temperature 35°C; water temperature 12/7°C
Winter operation external air temperature 10°C; water temperature 40/45°C
- Sound pressure levels calculated according to ISO 3744.
- Option BT allows summer operation (therefore with chilled water production) with external temperature lower than 15 °C.

R410A - Operation limits - Mod. 772 - 1642 Kc

	772		852		1412		1532		1642	
Range of outlet water temperature	from + 5°C to +15°C									
Range of outlet water+glycol temperature	from -8 °C to +15°C									
Range of temperature difference	from 4 to 8 °C									
	min	**max**	**min**	**max**	**min**	**max**	**min**	**max**	**min**	**max**
Water flow – Lt/sec (1)	3,3	4,1	4,0	4,8	6,0	7,4	6,6	8,0	7,0	8,6
Water flow – mc/h (1)	12,0	14,6	14,3	17,5	21,8	26,6	23,6	28,8	25,4	31,0
Pressure drop kPa (1)	28	42	22	34	29	43	34	50	34	50
Max operating pressure water side	10 Bar									
Inlet air temperature – STD	5,0	45,0	5,0	45,0	5,0	45,0	5,0	45,0	5,0	45,0
Inlet air temperature – S	5,0	45,0	5,0	45,0	5,0	45,0	5,0	45,0	5,0	45,0
Inlet air temperature – U (for ULTRASIL. operation)	-5,0	36,0	-5,0	36,0	-5,0	36,0	-5,0	35,0	-5,0	36,0
Minimum control capacity regulation	50%		50%		50%		50%		50%	

(1) Water 12/7°C - External air temperature 35°C

R410A - Operation limits - Mod. 2002 - 4502 Kc

	2002		2302		2702		3002		3402		3802		4202		4502	
Range of outlet water temperature	from + 5°C to +15°C															
Range of outlet water+glycol temperature	from -8 °C to +15°C															
Range of temperature difference	from 4 to 8 °C															
	min	**max**	**min**	**max**	**min**	**max**	**min**	**max**	**min**	**max**	**min**	**max**	**min**	**max**	**min**	**max**
Water flow – Lt/sec (1)	5,9	13,9	6,9	15,3	7,7	15,3	8,9	15,3	9,9	15,9	11,3	25,3	12,6	29,4	13,5	29,4
Water flow – mc/h (1)	21,2	50,0	24,8	55,1	27,7	55,1	32,0	55,1	35,6	57,2	40,7	91,1	45,4	105,8	48,6	105,8
Pressure drop kPa (1)	38	140	41	132	42	112	17	92	45	85	46	131	46	140	46	136
Max operating pressure water side	10 Bar															
Inlet air temperature – STD	5,0	44,8	5,0	45,8	5,0	45,5	5,0	46,4	5,0	46,2	5,0	46,0	5,0	45,7	5,0	44,4
Inlet air temperature – S	5,0	44,7	5,0	43,4	5,0	45,8	5,0	44,2	5,0	45,3	5,0	44,1	–	–	–	–
Inlet air temperature – U (for ULTRASIL. operation)	-5,0	36,0	-5,0	32,0	-5,0	37,0	-5,0	36,0	-5,0	36,0	-5,0	35,0	–	–	–	–
Optimum water content (lt)	650		700		800		900		1.020		1.150		1.300		1.380	
Minimum control capacity regulation	25%		25%		25%		25%		25%		25%		25%		33%	

(1) Water 12/7°C - External air temperature 35°C

AIR COOLED HEAT PUMPS
WITH SCREW COMPRESSORS AND AXIAL FANS

REFRIGERANT R407C - R134A

PAH 2802 T K

Series PAH ... T K

Cooling capacity from 205 to 778 kW - 2 circuits

The air cooled heat pumps of **PAH.T 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 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 both R407C (K) and R134a (Ka) refrigerants are the following:
K/ Ka - standard version
S.K/ Ka - silenced version: oversized coil, reduced air flow, fans with a lower rotation speed, technical partition insulated by means of soundproofing material.
U.K/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.

Operation limits (standard units):
SUMMER OPERATION: **air** from 15 to 45°C – **water** (out from evaporator) from 5 to 15°C.
WINTER OPERATION: **air** from 20 to -4°C – **water** (out from evaporator) max 50°C for R407C - max 55°C for R134a.

Main components:

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 aluminium 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.

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).

Dry expansion **shell and tube evaporator**, 100% counter-current type with two refrigerant circuits and one water circuit, with very low pressure drops. Shell and tubes plate made in carbon steel and copper tubes, insulated by close-cell polyurethane foam material. 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: 4-way valve for refrigerant cycle inversion, 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, automatic defrosting system based on a time/ temperature logics, 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 (-20°C)**: electronic device for the continuous modulating voltage control of the condensing pressure through the variation of the fan rotation speed (for summer operation only).

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 aluminium 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.

IG **Watch card:** Electronic card to program the switch-over and rotation between to 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 (standard for R407C).

M12 **Modulating capacity control for 2-circuit units**: by means of some valves installed on compressors, the capacity is modulated from 12 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 pole centrifugal packaged type.

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 (not available when option MV is required).

PF **Safety water flow switch**: installed on evaporator, it switches off the unit in case of lack of water flow rate through the evaporator.

PM **Spring-type vibration dampers**: spring-type vibration dampers support, for insulating the unit (supplied in kit), mainly indicated for installation in difficult and aggressive environments. Made of two steel plates containing a suitable quantity of harmonic steel springs.

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.

PT **Twin pump group**: chilled water pump group composed of twin pump, expansion vessel, safety valve, water gauge, water charge and discharge valves, air purging valves, electrical control of the pump, automatic switch in case of failure of the working pump. The pump is of 2 pole centrifugal packaged type.

PW **Part-winding**: equipment for step compressors starting, reducing of about 35% the inrush current of each compressor.

RA **Anti-freeze heater on evaporator**: electrical heater installed on the evaporator, in order to prevent freezing and provided with thermostat.

RF **Power factor correction system cosfi >0,9**: Electrical device made of suitable condensers for compressors rephasing, ensuring a cosfi value ≥0,9, so to reduce the power absorption from the electrical network.

RH **Shut-off valve on suction side**: they are use to isolate compressors during service operations.

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.

RP **Partial heat recovery** (about 20%) of the condensing heat, by means of a refrigerant/water plate exchanger (desuperheater), always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity.

RR **Copper/copper condensing coils:** special execution of the condensing coils with copper pipe and fins.

RV **Personalized frame painting in RAL colour**

SC **Insulated compressors housing** with sound proofing material (included on silenced version).

SU **Insulated compressors housing with bituminous rubber sound proofing material**, muffler on discharge pipe and vibration dampers for compressors (included on ultra-silenced version).

TE **Electronic thermostatic valve**: it is requested to make a very accurate regulation of the refrigerant flow and to limit variations of cooling capacity and evaporator leaving temperature water during operation in transitions and for a better performance with fixed superheating.

V **Voltmeter**: Electrical device measuring the electrical tension in the power supply of the unit.

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.

Technical data - R407C - Standard version

PAH T		2102 K	2502 K	2802 K	3302 K	3902 K	4802 K	5502 K
Cooling capacity								
Cooling capacity	kW	205,0	255,0	276,0	345,0	377,0	472,0	550,0
Nominal input power	kW	73,0	92,0	114,0	123,0	148,0	180,0	196,0
EER		2,81	2,77	2,42	2,80	2,55	2,62	2,81
Heating capacity								
Heating capacity	kW	283,0	352,0	396,0	476,0	533,0	662,0	758,0
Input power (heating)	kW	70,0	89,0	110,0	119,0	143,0	174,0	190,0
COP		4,04	3,95	3,60	4,00	3,73	3,80	3,99
Axial fans								
Quantity	n.		6		8		10	12
Rotation speed	rpm				880			
Air flow	m^3/h	126˙000	117˙000		156˙000		195˙000	234˙000
Air flow	l/s	35˙000	32˙500		43˙333		54˙167	65˙000
Motor input power	kW		12,0		16,0		20,0	24,0
Input current	A		24,0		32,0		40,0	48,0
Screw compressors								
Quantity	n.				2			
Cooling circuits	n.				2			
Standard capacity steps	n.				6			
Modulating capacity steps (option)	%				0 – 12 ÷ 100			
Nominal input current	A	124,0	155,0	188,0	204,0	238,0	296,0	327,0
Nominal input current (heating)	A	120,0	150,0	182,0	198,0	231,0	288,0	317,0
Maximum input current	A	172,0	216,0	256,0	288,0	324,0	360,0	432,0
Inrush current	A	497,0	616,0	613,0	729,0	848,0	981,0	1˙159,0
Inrush current with options PW/DS	A	304,0	377,0	418,0	494,0	585,0	700,0	828,0
Evaporator								
Type					Shell and tube			
Quantity	n.				1			
Water flow	m^3/h	35,3	43,9	47,5	59,4	64,8	81,4	94,7
Water flow	l/s	9,8	12,2	13,2	16,5	18,0	22,6	26,3
Pressure drop	kPa	70	56	60	58	46	35	49
Water flow (heating)	m^3/h	48,6	60,5	68,0	81,7	91,8	113,8	227,5
Water flow (heating)	l/s	13,5	16,8	18,9	22,7	25,5	31,6	63,2
Pressure drop (heating)	kPa	133	108	124	110	92	69	92
Water volume	l	39	49	56	93	88	133	125
P1 Pump group								
Available pressure	kPa	107	120	114	111	121	123	98
Motor input power	kW				5,5			
Input current	A				11,0			
Inrush current	A				70,0			
Weight	kg				91			
P1H pump group								
Available pressure	kPa	157	170	164	162	172	174	149
Motor input power	kW				7,5			
Input current	A				15,0			
Inrush current	A				105,0			
Weight	kg				99			
PT pump group								
Available pressure	kPa	155	166	160	154	163	161	131
Motor input power	kW				7,5			
Input current	A				15,0			
Inrush current	A				105,0			
Weight	kg				196			
Hydraulic kit								
Expansion vessel capacity	l				25			
Quantity	n.				2			
Buffer tank 900 l					•			
Buffer tank 1˙500 l			–			•		
Buffer tank 1˙800 l				–			•	
Buffer tank 2˙400 l					–			•
Electrical data								
Total input power	kW	85,0	104,0	126,0	139,0	164,0	200,0	220,0
Total nominal input current	A	148,0	179,0	212,0	236,0	270,0	336,0	375,0
Total nominal input current (heating)	A	144,0	174,0	206,0	230,0	263,0	328,0	365,0
Maximum total input current	A	196,0	240,0	280,0	320,0	356,0	400,0	480,0
Total inrush current	A	521,0	640,0	637,0	761,0	880,0	1˙021,0	1˙207,0
Inrush current with options PW/DS	A	328,0	401,0	442,0	526,0	617,0	740,0	876,0
Sound pressure level								
Sound pressure at 1 m	dB(A)	77	78		79		80	82
Dimensions								
Length	mm		5˙082		6˙120		7˙158	8˙196
Width	mm				2˙244			
Height	mm				2˙370			
Transport weight	kg	3˙187	3˙314	3˙765	4˙320	4˙355	5˙596	6˙071
Weight in operation	kg	3˙226	3˙364	3˙821	4˙413	4˙443	5˙729	6˙195
Refrigerant charge per circuit	kg	61,0	70,0	71,0	84,0	85,0	100,0	113,0
Electrical power supply								
Electrical power supply	V / ph / Hz				400 / 3 / 50 + T			

REMARKS:
- Operating conditions:
Summer operation external air temperature 35°C; water temperature 7/12°C
Winter operation external air temperature 10°C; water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - R407C - Silenced version

PAH T.S		2102 K	2502 K	2802 K	3302 K	3902 K	4802 K
Cooling capacity							
Cooling capacity	kW	196,0	241,0	274,0	326,0	387,0	480,0
Nominal input power	kW	76,0	97,0	115,0	130,0	144,0	177,0
EER		2,58	2,48	2,38	2,51	2,69	2,71
Heating capacity							
Heating capacity	kW	277,0	343,0	395,0	463,0	540,0	667,0
Input power (heating)	kW	74,0	94,0	111,0	125,0	139,0	171,0
COP		3,75	3,65	3,56	3,70	3,88	3,90
Axial fans							
Quantity	n.	6		8		10	12
Rotation speed	rpm	660					
Air flow	m^3/h	96˙000	90˙000	128˙000	120˙000	150˙000	180˙000
Air flow	l/s	26˙667	25˙000	35˙556	33˙333	41˙667	50˙000
Motor input power	kW	7,5		10,0		12,5	15,0
Input current	A	14,0		18,0		23,0	28,0
Screw compressors							
Quantity	n.	2					
Cooling circuits	n.	2					
Standard capacity steps	n.	6					
Modulating capacity steps (option)	%	0 – 12 ÷ 100					
Nominal input current	A	129,0	162,0	189,0	214,0	233,0	292,0
Nominal input current (heating)	A	126,0	157,0	183,0	208,0	226,0	283,0
Maximum input current	A	172,0	216,0	256,0	288,0	324,0	360,0
Inrush current	A	497,0	616,0	613,0	729,0	848,0	981,0
Inrush current with options PW/DS	A	304,0	377,0	418,0	494,0	585,0	700,0
Evaporator							
Type		Shell and tube					
Quantity	n.	1					
Water flow	m^3/h	33,8	41,4	47,2	56,2	66,6	82,4
Water flow	l/s	9,4	11,5	13,1	15,6	18,5	22,9
Pressure drop	kPa	64	50	60	52	48	36
Water flow (heating)	m^3/h	47,5	16,4	68,0	79,6	92,9	114,8
Water flow (heating)	l/s	13,2	59,0	18,9	22,1	25,8	31,9
Pressure drop (heating)	kPa	128	102	124	104	94	70
Water volume	l	39	49	56	93	88	133
P1 Pump group							
Available pressure	kPa	115	127	115	119	117	120
Motor input power	kW	5,5					
Input current	A	11,0					
Inrush current	A	70,0					
Weight	kg	91					
P1H pump group							
Available pressure	kPa	165	177	165	170	168	172
Motor input power	kW	7,5					
Input current	A	15,0					
Inrush current	A	105,0					
Weight	kg	99					
PT pump group							
Available pressure	kPa	163	174	161	164	159	158
Motor input power	kW	7,5					
Input current	A	15,0					
Inrush current	A	105,0					
Weight	kg	196					
Hydraulic kit							
Expansion vessel capacity	l	25					
Quantity	n.	2					
Buffer tank 900 l		•					
Buffer tank 1˙500 l		–		•			
Buffer tank 1˙800 l		–				•	
Buffer tank 2˙400 l		–					•
Electrical data							
Total input power	kW	84,0	105,0	125,0	140,0	157,0	192,0
Total nominal input current	A	143,0	176,0	207,0	232,0	256,0	320,0
Total nominal input current (heating)	A	140,0	171,0	201,0	226,0	249,0	311,0
Maximum total input current	A	186,0	230,0	274,0	306,0	347,0	388,0
Total inrush current	A	511,0	630,0	631,0	747,0	871,0	1˙009,0
Inrush current with options PW/DS	A	318,0	391,0	436,0	512,0	608,0	728,0
Sound pressure level							
Sound pressure at 1 m	dB(A)	74	75		76		77
Dimensions							
Length	mm	5˙082		6˙120		7˙158	8˙196
Width	mm	2˙244					
Height	mm	2˙370					
Transport weight	kg	3˙187	3˙314	4˙081	4˙320	4˙786	6˙028
Weight in operation	kg	3˙226	3˙364	4˙137	4˙413	4˙873	6˙161
Refrigerant charge per circuit	kg	61,0	70,0	71,0	84,0	97,0	111,0
Electrical power supply							
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T					

REMARKS:
- Operating conditions:
Summer operation external air temperature 35°C; water temperature 7/12°C
Winter operation external air temperature 10°C; water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - R407C - Ultra-silenced version

PAH T.U		2102 K	2502 K	2802 K	3302 K	3902 K	4802 K
Cooling capacity							
Cooling capacity	kW	195,0	240,0	271,0	331,0	389,0	444,0
Nominal input power	kW	77,0	97,0	116,0	128,0	143,0	190,0
EER		2,53	2,47	2,34	2,59	2,72	2,34
Heating capacity							
Heating capacity	kW	276,0	343,0	393,0	466,0	541,0	643,0
Input power (heating)	kW	74,0	94,0	112,0	124,0	138,0	183,0
COP		3,73	3,65	3,51	3,76	3,92	3,51
Axial fans							
Quantity	n.	6	8		10	12	
Rotation speed	rpm	530					
Air flow	m^3/h	69˙000	100˙000	92˙000	115˙000	138˙000	
Air flow	l/s	19˙167	27˙778	25˙556	31˙944	38˙333	
Motor input power	kW	4,6	6,2		7,7	9,2	
Input current	A	9,0	12,0		15,0	18,0	
Screw compressors							
Quantity	n.	2					
Cooling circuits	n.	2					
Standard capacity steps	n.	6					
Modulating capacity steps (option)	%	0 – 12 ÷ 100					
Nominal input current	A	130,0	163,0	191,0	212,0	232,0	311,0
Nominal input current (heating)	A	126,0	158,0	185,0	206,0	225,0	301,0
Maximum input current	A	172,0	216,0	256,0	288,0	324,0	360,0
Inrush current	A	497,0	616,0	613,0	729,0	848,0	981,0
Inrush current with options PW/DS	A	304,0	377,0	418,0	494,0	585,0	700,0
Evaporator							
Type		Shell and tube					
Quantity	n.	1					
Water flow	m^3/h	33,5	41,4	46,8	56,9	67,0	76,3
Water flow	l/s	9,3	11,5	13,0	15,8	18,6	21,2
Pressure drop	kPa	64	50	58	53	49	31
Water flow (heating)	m^3/h	47,5	59,0	67,7	80,3	93,2	110,5
Water flow (heating)	l/s	13,2	16,4	18,8	22,3	25,9	30,7
Pressure drop (heating)	kPa	127	102	122	106	94	65
Water volume	l	39	49	56	93	88	133
P1 Pump group							
Available pressure	kPa	115	127	116	117		131
Motor input power	kW	5,5					
Input current	A	11,0					
Inrush current	A	70,0					
Weight	kg	91					
P1H pump group							
Available pressure	kPa	165	178	167	168		182
Motor input power	kW	7,5					
Input current	A	15,0					
Inrush current	A	105,0					
Weight	kg	99					
PT pump group							
Available pressure	kPa	163	174	162		158	170
Motor input power	kW	7,5					
Input current	A	15,0					
Inrush current	A	105,0					
Weight	kg	196					
Hydraulic kit							
Expansion vessel capacity	l	25					
Quantity	n.	2					
Buffer tank 900 l		•					
Buffer tank 1˙500 l		–	•				
Buffer tank 1˙800 l			–			•	
Buffer tank 2˙400 l			–			•	
Electrical data							
Total input power	kW	82,0	103,0	122,0	136,0	152,0	199,0
Total nominal input current	A	139,0	175,0	203,0	227,0	250,0	329,0
Total nominal input current (heating)	A	135,0	170,0	197,0	221,0	243,0	319,0
Maximum total input current	A	181,0	228,0	268,0	303,0	342,0	378,0
Total inrush current	A	506,0	628,0	625,0	744,0	866,0	999,0
Inrush current with options PW/DS	A	313,0	389,0	430,0	509,0	603,0	718,0
Sound pressure level							
Sound pressure at 1 m	dB(A)	69	71	72	73		74
Dimensions							
Length	mm	5˙082	6˙120		7˙158	8˙196	
Width	mm	2˙244					
Height	mm	2˙370					
Transport weight	kg	3˙250	3˙596	4˙165	4˙707	5˙165	5˙975
Weight in operation	kg	3˙289	3˙645	4˙221	4˙800	5˙252	6˙108
Refrigerant charge per circuit	kg	69,0	70,0	82,0	96,0	107,0	111,0
Electrical power supply							
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T					

REMARKS:
- Operating conditions:
Summer operation external air temperature 35°C; water temperature 7/12°C
Winter operation external air temperature 10°C; water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - R134a - Standard version

PAH T		2502 Ka	2802 Ka	3202 Ka	3602 Ka	4602 Ka	5202 Ka	6002 Ka	6802 Ka	8002 Ka
Cooling capacity										
Cooling capacity	kW	259,0	286,0	319,0	364,0	478,0	508,0	610,0	696,0	778,0
Nominal input power	kW	76,0	90,0	107,0	121,0	150,0	169,0	183,0	211,0	267,0
EER		3,41	3,18	2,98	3,01	3,19	3,01	3,33	3,30	2,91
Heating capacity										
Heating capacity	kW	317,0	356,0	405,0	461,0	596,0	643,0	752,0	860,0	994,0
Input power (heating)	kW	73,0	86,0	103,0	117,0	144,0	163,0	176,0	203,0	257,0
COP		4,34	4,14	3,93	3,94	4,14	3,94	4,82	4,24	3,87
Axial fans										
Quantity	n.	6				8		10	12	
Rotation speed	rpm	880								
Air flow	m^3/h	126˙000			117˙000	156˙000		195˙000	234˙000	
Air flow	l/s	35˙000			32˙500	43˙333		54˙167	65˙000	
Motor input power	kW	12,0				16,0		20,0	24,0	
Input current	A	24,0				32,0		40,0	48,0	
Screw compressors										
Quantity	n.	2								
Cooling circuits	n.	2								
Standard capacity steps	n.	6								
Modulating capacity steps (option)	%	0 – 12 ÷ 100								
Nominal input current	A	130,0	153,0	181,0	199,0	252,0	287,0	309,0	348,0	429,0
Nominal input current (heating)	A	126,0	147,0	175,0	192,0	243,0	277,0	299,0	336,0	414,0
Maximum input 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	1˙158,0	1˙254,0	1˙644,0	1˙752,0
Inrush current with options PW/DS	A	365,0	414,0	494,0	585,0	702,0	827,0	895,0	1˙235,0	1˙319,0
Evaporator										
Type		Shell and tube								
Quantity	n.	1								
Water flow	m^3/h	44,5	49,2	54,9	62,6	82,2	87,4	104,9	119,7	133,8
Water flow	l/s	12,4	13,7	15,2	17,4	22,8	24,3	29,1	33,3	37,2
Pressure drop	kPa	55	57	36	43	30	33	41	61	51
Water flow (heating)	m^3/h	54,5	61,2	69,7	79,3	102,5	110,6	129,3	147,9	171,0
Water flow (heating)	l/s	15,1	17,0	19,4	22,0	28,5	30,7	35,9	41,1	47,5
Pressure drop (heating)	kPa	82	89	58	69	46	54	62	93	84
Water volume	l	63	80	90	130	162		184	222	435
P1 Pump group										
Available pressure	kPa	121	117	137	125	128	120	97	168	172
Motor input power	kW	5,5							15,0	
Input current	A	11,0							27,0	
Inrush current	A	70,0							194,0	
Weight	kg	91							160	
P1H pump group										
Available pressure	kPa	172	167	187	176	179	171	149	276	279
Motor input power	kW	7,5							22,0	
Input current	A	15,0							39,0	
Inrush current	A	105,0							273,0	
Weight	kg	99							192	
PT pump group										
Available pressure	kPa	168	162	181	168	165	156	127	267,0	268
Motor input power	kW	7,5							22,0	
Input current	A	15,0							39,0	
Inrush current	A	105,0							273,0	
Weight	kg	196							379	
Hydraulic kit										
Expansion vessel capacity	l	25								
Quantity	n.	2								
Buffer tank 900 l		•								
Buffer tank 1˙500 l		–				•				
Buffer tank 1˙800 l		–						•		
Buffer tank 2˙400 l		–							•	
Electrical data										
Total input power	kW	88,0	102,0	119,0	133,0	166,0	185,0	203,0	235,0	291,0
Total nominal input current	A	154,0	177,0	205,0	223,0	284,0	319,0	349,0	396,0	477,0
Total nominal input current (heating)	A	150,0	171,0	199,0	216,0	275,0	309,0	339,0	384,0	462,0
Maximum total input current	A	220,0	272,0	312,0	348,0	396,0	462,0	502,0	608,0	668,0
Total inrush current	A	571,0	633,0	753,0	872,0	1˙015,0	1˙190,0	1˙294,0	1˙692,0	1˙800,0
Inrush current with options PW/DS	A	389,0	438,0	518,0	609,0	734,0	859,0	935,0	1˙283,0	1˙367,0
Sound pressure level										
Sound pressure at 1 m	dB(A)	79				80		81	82	
Dimensions										
Length	mm	5˙082				6˙120		7˙158	9˙035	
Width	mm	2˙244								
Height	mm	2˙370								
Transport weight	kg	3˙815	3˙835	3˙920	4˙045	5˙420	5˙442	5˙993	7˙429	7˙534
Weight in operation	kg	3˙878	3˙915	4˙010	4˙174	5˙581	5˙603	6˙178	7˙651	7˙969
Refrigerant charge per circuit	kg	69,0	71,0	72,0	85,0	106,0		123,0	140,0	135,0
Electrical power supply										
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T								

REMARKS:
- Operating conditions:
Summer operation external air temperature 35°C; water temperature 7/12°C
Winter operation external air temperature 10°C; water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - R134a - Silenced version

PAH T.S		2202 Ka	2502 Ka	2802 Ka	3202 Ka	3602 Ka	4602 Ka	5202 Ka	6002 Ka	6802 Ka
Cooling capacity										
Cooling capacity	kW	219,0	249,0	274,0	321,0	364,0	469,0	524,0	616,0	664,0
Nominal input power	kW	66,0	79,0	94,0	106,0	122,0	153,0	163,0	181,0	223,0
EER		3,32	3,15	2,91	3,03	2,98	3,07	3,21	3,40	2,98
Heating capacity										
Heating capacity	kW	270,0	312,0	350,0	406,0	461,0	591,0	652,0	755,0	842,0
Input power (heating)	kW	63,0	76,0	91,0	102,0	117,0	147,0	157,0	174,0	214,0
COP		4,28	4,10	3,85	3,98	3,94	4,02	4,15	4,34	3,93
Axial fans										
Quantity	n.	6				8	10		12	
Rotation speed	rpm	660								
Air flow	m^3/h	96˙000			90˙000	128˙000	160˙000	150˙000	180˙000	
Air flow	l/s	26˙667			25˙000	35˙556	44˙444	41˙667	50˙000	
Motor input power	kW	7,5				9,2	12,5		15,0	
Input current	A	14,0				18,0	23,0		28,0	
Screw compressors										
Quantity	n.	2								
Cooling circuits	n.	2								
Standard capacity steps	n.	6								
Modulating capacity steps (option)	%	0 – 12 ÷ 100								
Nominal input current	A	113,0	136,0	160,0	180,0	199,0	257,0	277,0	306,0	366,0
Nominal input current (heating)	A	109,0	131,0	154,0	174,0	192,0	248,0	268,0	296,0	353,0
Maximum input current	A	158,0	196,0	248,0	288,0	324,0	364,0	430,0	462,0	560,0
Inrush current	A	434,0	547,0	609,0	729,0	848,0	983,0	1˙158,0	1˙254,0	1˙644,0
Inrush current with options PW/DS	A	285,0	365,0	414,0	494,0	585,0	702,0	827,0	895,0	1˙235,0
Evaporator										
Type		Shell and tube								
Quantity	n.	1								
Water flow	m^3/h	37,7	42,8	47,1	55,2	62,6	80,7	90,1	106,0	114,2
Water flow	l/s	10,5	11,9	13,1	15,3	17,4	22,4	25,0	29,4	31,7
Pressure drop	kPa	39	51	52	37	43	28	36	42	55
Water flow (heating)	m^3/h	46,4	53,7	60,2	69,8	79,3	101,7	112,1	129,9	144,8
Water flow (heating)	l/s	12,9	14,9	16,7	19,4	22,0	28,2	31,2	36,1	40,2
Pressure drop (heating)	kPa	60	80	86	59	69	45	55	62	55
Water volume	l	63		80	90	130	162		184	222
P1 Pump group										
Available pressure	kPa	141	126	123	136	125	130	115	95	176
Motor input power	kW	5,5								15,0
Input current	A	11,0								27,0
Inrush current	A	70,0								194,0
Weight	kg	91								160
P1H pump group										
Available pressure	kPa	191	177	173	187	176	182	167	148	284
Motor input power	kW	7,5								22,0
Input current	A	15,0								39,0
Inrush current	A	105,0								273,0
Weight	kg	99								192
PT pump group										
Available pressure	kPa	188	173	169	181	168		150	125	276
Motor input power	kW	7,5								22,0
Input current	A	15,0								39,0
Inrush current	A	105,0								273,0
Weight	kg	196								379
Hydraulic kit										
Expansion vessel capacity	l	25								
Quantity	n.	2								
Buffer tank 900 l		•								
Buffer tank 1˙500 l		–				•				
Buffer tank 1˙800 l		–					•			
Buffer tank 2˙400 l		–							•	
Electrical data										
Total input power	kW	74,0	87,0	102,0	114,0	132,0	166,0	176,0	196,0	238,0
Total nominal input current	A	127,0	150,0	174,0	194,0	217,0	280,0	300,0	334,0	394,0
Total nominal input current (heating)	A	123,0	145,0	168,0	188,0	210,0	271,0	291,0	324,0	381,0
Maximum total input current	A	172,0	210,0	262,0	302,0	342,0	387,0	453,0	490,0	588,0
Total inrush current	A	448,0	561,0	623,0	743,0	866,0	1˙006,0	1˙181,0	1˙282,0	1˙672,0
Inrush current with options PW/DS	A	299,0	379,0	428,0	508,0	603,0	725,0	850,0	923,0	1˙263,0
Sound pressure level										
Sound pressure at 1 m	dB(A)	73				76	78		79	
Dimensions										
Length	mm	5˙082				6˙120	7˙158		8˙196	9˙035
Width	mm	2˙244								
Height	mm	2˙370								
Transport weight	kg	3˙793	3˙815	3˙835	4˙014	4˙362	5˙702	5˙878	6˙431	7˙429
Weight in operation	kg	3˙856	3˙878	3˙915	4˙103	4˙491	5˙864	6˙039	6˙615	7˙651
Refrigerant charge per circuit	kg	69,0		71,0	83,0	85,0	103,0	120,0	136,0	140,0
Electrical power supply										
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T								

REMARKS:
- Operating conditions:
Summer operation external air temperature 35°C; water temperature 7/12°C
Winter operation external air temperature 10°C; water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - R134a - Ultra-silenced version

PAH T.U		1802 Ka	2202 Ka	2502 Ka	2802 Ka	3202 Ka	3602 Ka	4602 Ka	5202 Ka
Cooling capacity									
Cooling capacity	kW	197,0	212,0	238,0	271,0	321,0	361,0	464,0	524,0
Nominal input power	kW	55,0	69,0	84,0	95,0	106,0	123,0	155,0	163,0
EER		3,58	3,07	2,83	2,85	3,03	2,93	2,99	3,21
Heating capacity									
Heating capacity	kW	238,0	266,0	306,0	349,0	406,0	460,0	589,0	652,0
Input power (heating)	kW	53,0	66,0	80,0	91,0	102,0	118,0	149,0	157,0
COP		4,49	4,03	3,82	3,83	3,98	3,90	3,95	4,15
Axial fans									
Quantity	n.	6				8	6	10	12
Rotation speed	rpm	530							
Air flow	m^3/h	75˙000			69˙000	100˙000	92˙000	115˙000	138˙000
Air flow	l/s	20˙833			19˙167	27˙778	25˙556	31˙944	38˙333
Motor input power	kW	4,6				6,2		7,5	9,2
Input current	A	9,0				12,0		15,0	18,0
Screw compressors									
Quantity	n.	2							
Cooling circuits	n.	2							
Standard capacity steps	n.	6							
Modulating capacity steps (option)	%	0 – 12 ÷ 100							
Nominal input current	A	94,0	118,0	143,0	161,0	180,0	201,0	260,0	277,0
Nominal input current (heating)	A	91,0	114,0	138,0	156,0	174,0	194,0	251,0	268,0
Maximum input current	A	112,0	158,0	196,0	248,0	288,0	324,0	364,0	430,0
Inrush current	A	361,0	434,0	547,0	609,0	729,0	848,0	983,0	1˙158,0
Inrush current with options PW/DS	A	209,0	285,0	365,0	414,0	494,0	585,0	702,0	827,0
Evaporator									
Type		Shell and tube							
Quantity	n.	1							
Water flow	m^3/h	33,9	36,5	40,9	46,6	55,2	62,1	79,8	30,1
Water flow	l/s	9,4	10,1	11,4	12,9	15,3	17,2	22,2	25,0
Pressure drop	kPa	32	37	46	52	37	42	28	36
Water flow (heating)	m^3/h	40,9	45,8	52,6	60,0	69,8	79,1	101,3	112,1
Water flow (heating)	l/s	11,4	12,7	14,6	16,7	19,4	22,0	28,1	31,2
Pressure drop (heating)	kPa	47	58	77	85	59	69	45	55
Water volume	l	63			80	90	130	162	
P1 Pump group									
Available pressure	kPa	150	144	132	124	136	126	131	115
Motor input power	kW	5,5							
Input current	A	11,0							
Inrush current	A	70,0							
Weight	kg	91							
P1H pump group									
Available pressure	kPa	200	194	182	174	187	177	183	167
Motor input power	kW	7,5							
Input current	A	15,0							
Inrush current	A	105,0							
Weight	kg	99							
PT pump group									
Available pressure	kPa	198	192	179	170	181	169	170	150
Motor input power	kW	7,5							
Input current	A	15,0							
Inrush current	A	105,0							
Weight	kg	196							
Hydraulic kit									
Expansion vessel capacity	l	25							
Quantity	n.	2							
Buffer tank 900 l		•							
Buffer tank 1˙500 l		–				•			
Buffer tank 1˙800 l		–						•	
Buffer tank 2˙400 l		–							•
Electrical data									
Total input power	kW	61,0	75,0	90,0	101,0	114,0	131,0	165,0	175,0
Total nominal input current	A	103,0	127,0	152,0	170,0	192,0	213,0	275,0	295,0
Total nominal input current (heating)	A	100,0	123,0	147,0	165,0	186,0	206,0	266,0	286,0
Maximum total input current	A	121,0	167,0	205,0	257,0	300,0	336,0	379,0	448,0
Total inrush current	A	370,0	443,0	556,0	618,0	741,0	860,0	998,0	1˙176,0
Inrush current with options PW/DS	A	218,0	294,0	374,0	423,0	506,0	597,0	717,0	845,0
Sound pressure level									
Sound pressure at 1 m	dB(A)	70				73		74	75
Dimensions									
Length	mm	5˙082				6˙120		7˙158	8˙196
Width	mm	2˙244							
Height	mm	2˙370							
Transport weight	kg	3˙353	3˙767	3˙789	3˙902	4˙295	4˙451	5˙812	6˙262
Weight in operation	kg	3˙416	3˙830	3˙852	3˙983	4˙385	4˙581	5˙973	6˙424
Refrigerant charge per circuit	kg	69,0			82,0	83,0	99,0	120,0	134,0
Electrical power supply									
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T							

REMARKS:
- Operating conditions:
Summer operation external air temperature 35°C; water temperature 7/12°C
Winter operation external air temperature 10°C; water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

GPE 421 K

Series GPE ... K

Cooling capacity from 34 to 78 kW - 1 circuit

The units of **GPE.K series** can be installed in all the applications where there is the need to produce at the same time cold and warm water. The peculiarity of this "Polyvalent Groups" is to suit all the needs of the system, independently from weather conditions.
These units are 4-pipes heat pumps with separate and not interchangeable circuits, supplied with an additional water/refrigerant condenser/recovery on each cooling circuit, able to entirely replace the air/refrigerant condensing coil and to produce "free" warm water, when needed.

OPERATION MODES
MODE 1: Only Cooling Mode
When warm water production is not required, the unit runs as a water chiller and only produces chilled water. With such a running mode and in order to complete the cooling process, the exchangers in use are the evaporator and the finned air cooled condensing coil.
MODE 2: Cooling Mode with heat recovery
When warm water is required as well, the unit can operate as water chiller with heat recovery and produce warm water at the same time, without additional costs and exploiting the heating power of the condensing process. In this way, in order to complete the cooling process, the evaporator and the water cooled condenser/recovery, where the condensing process takes place, are the exchangers in use.
MODE 3: Heat Pump Mode
The unit runs as an heat pump and therefore produces warm water. With such a running mode and in order to complete the cooling process, the finned condensing coil (as evaporator) and the water cooled condenser/recovery, where the condensing process takes place, are the exchangers in use

Operation limits (standard units):
SUMMER OPERATION: **air** from 15 to 45°C – **water** (out from evaporator) from 5 to 15°C.
WINTER OPERATION: **air** from 20 to -4°C – **water** (out from evaporator) max 50°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. For ultra-silenced version, it is insulated with soundproofing material. The external panels, easy to be dismantled, allow the full access in case of service. When required, the hydraulic kit (buffer tank and pump group) are installed inside the unit, with no change in overall 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.

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 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.

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 and it is complete with anti-freeze heater and water flow switch.

Weld-brazed plate heat recovery / condenser 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.

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. The fans speed control is standard provided.

Cooling circuit realized with copper or steel pipes, composed of thermostatic expansion valve, solenoid valves for automatic changeover of the different operation modes, dehydrating filter, sight glass, check valves on the liquid line, safety valves, shut off valves, high and low pressure switches and gauges.

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 and hinged panel to be opened. It is complete with remote switches, overload protections, transformer for auxiliaries and terminal board. In case of hydraulic kit on board, 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.

Accessories

AE **Electrical power supply** different from standard: mainly, 230V triphase, 460V triphase. Frequency 50/60 Hz.

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

G2 **Cooling capacity control with 2 steps** (standard from size 481)

GP **Condensing coil protection grid**: metal protection grid against accidental impacts.

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.

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.

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

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 pole centrifugal packaged type.

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.

PT **Twin pump group**: chilled water pump group composed of twin pump, expansion vessel, safety valve, water gauge, water charge and discharge valves, air purging valves, electrical control of the pump, automatic switch in case of failure of the working pump. The pump is of 2 pole centrifugal packaged type. (Available from size 481).

RL **Compressors overload relays**: electromechanical protection devices against compressor's overload.

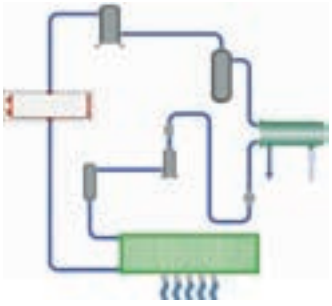
RM **Condensing coil with pre-painted fins**: superficial treatment of the condensing coils with epoxy coating.

RR **Copper/copper condensing coils**: special execution of the condensing coils with copper pipe and fins.

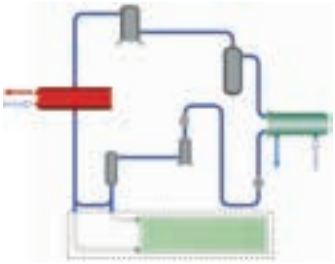
SC **Insulated compressors housing** with sound proofing material.

VB **Brine version**: unit suitable for working with evaporator outlet water temperatures lower than 0°C. A 20 mm evaporator insulation will be provided.

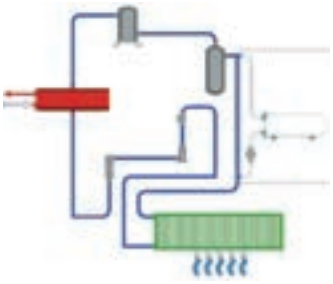
Modo 1
Mode 1



Modo 2
Mode 2



Modo 3
Mode 3



Technical data

GPE		361 K	421 K	481 K	561 K	701 K	821 K
Only cooling mode							
Cooling capacity	kW	34,3	40,3	47,7	54,8	66,2	78,0
Compressors input power	kW	10,5		14,8	17,5	22,2	29,3
Compressors input current	A	16,2	23,3	27,4	32,1	33,9	48,4
Cooling mode with heat recovery							
Cooling capacity	kW	33,8	41,1	47,1	54,9	67,3	81,8
Heating capacity (heat recovery)	kW	44,5	54,6	62,3	72,4	89,0	108,9
Compressors input power	kW	10,7	13,5	15,2	17,05	21,6	27,1
Compressors input current	A	16,5	22,6	27,9	32,0	33,2	45,4
Heat pump mode							
Heating capacity	kW	43,0	50,6	57,2	64,3	82,4	97,2
Compressors input power	kW	10,7	13,5	15,2	17,3	21,5	26,9
Compressors input current	A	16,5	22,6	27,8	31,8	33,1	45,0
Axial fans							
Quantity	n.	2		3			
Rotation speed	rpm	860					
Air flow	m^3/h	16˙992		24˙300		23˙256	
Air flow	l/s	4˙720		6˙750		6˙460	
Motor input power	kW	1,26		1,9			
Scroll compressors							
Quantity	n.	1		2			
Circuits	n.	1					
Standard capacity steps	%	0 / 100		0 / 50 / 100			
Optional capacity steps	n.	G2		–			
Inrush current	A	148,0	167,0	140,0	148,0	184,0	217,0
Evaporator							
Type		Brazed plate					
Quantity	n.	1					
Water flow	m^3/h	5,9	6,9	8,2	9,4	11,4	13,4
Water flow	l/s	1,6	1,9	2,3	2,6	3,2	3,7
Pressure drop	kPa	42	40	17	15		17
Heat recovery – Condenser							
Type		Brazed plate					
Quantity	n.	1					
Water flow	m^3/h	7,7	9,4	10,7	12,4	15,3	18,7
Water flow	l/s	2,1	2,6	3,0	3,5	4,2	5,2
Pressure drop	kPa	45	15	18	17	20	
Pumps							
P1 – Available pressure	kPa	144	134	137	130	122	108
P1 – Motor input power	kW	0,55		0,75			
P1H – Available pressure	kPa	184	169	187	185	172	158
P1H – Motor input power	kW	0,75		1,1			
PT – Available pressure	kPa	–		137	140	137	166
PT – Motor input power	kW	–		1,5			
Capacity of buffer tank	l	180					
Electrical data							
Total input power	kW	15,6	16,8	21,8	23,5	30,6	17,5
Total nominal input current	A	29,0	31,0	41,0	43,6	55,1	34,0
Sound pressure level							
Sound pressure at 1 m	dB(A)	64		65			
Dimensions							
Length	mm	2˙000		2˙130			
Width	mm	850		1˙100			
Height	mm	1˙650		1˙770			
Length with MV option	mm	2˙000		2˙130			
Width with MV option	mm	850		1˙100			
Height with MV option	mm	1˙650		1˙770			
Transport weight	kg	520	555	745	782	834	885
Transport weight with empty buffer tank	kg	585	620	810	847	899	950
Refrigerant charge per circuit	kg	13,0	16,0	20,0	22,0	24,0	25,0
Electrical power supply							
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T					

REMARKS:
- Operating conditions:
Only cooling mode: external air temperature 35°C; water temperature 7/12°C 0% glycol
Cooling mode with heat recovery: water temperature 7/12°C 0% glycol; condensing water temperature 40/45°C
Heat pump mode: condensing water temperature 40/45°C; external air temperature 10°C 80% r.h.
- Sound pressure level at 1 m in open field (ISO 3744).

GPE 1402 K

Series GPE ... K

Cooling capacity from 83 to 157 kW - 2 circuits

The units of **GPE.K series** can be installed in all the applications where there is the need to produce at the same time cold and warm water. The peculiarity of this "Polyvalent Groups" is to suit all the needs of the system, independently from weather conditions. These units are 4-pipes heat pumps with separate and not interchangeable circuits, supplied with an additional water/refrigerant condenser/recovery on each cooling circuit, able to entirely replace the air/refrigerant condensing coil and to produce "free" warm water, when needed.

OPERATION MODES

MODE 1: Only Cooling Mode

When warm water production is not required, the unit runs as a water chiller and only produces chilled water. With such a running mode and in order to complete the cooling process, the exchangers in use are the evaporator and the finned air cooled condensing coil.

MODE 2: Cooling Mode with heat recovery

When warm water is required as well, the unit can operate as water chiller with heat recovery and produce warm water at the same time, without additional costs and exploiting the heating power of the condensing process. In this way, in order to complete the cooling process, the evaporator and the water cooled condenser/recovery, where the condensing process takes place, are the exchangers in use.

MODE 3: Heat Pump Mode

The unit runs as an heat pump and therefore produces warm water. With such a running mode and in order to complete the cooling process, the finned condensing coil (as evaporator) and the water cooled condenser/recovery, where the condensing process takes place, are the exchangers in use

Being 2-circuit unit, it is possible to have all the above mentioned running modes at the same time on different circuits (i.e. the circuit 1 can be on Mode 1 and the circuit 2 can be on Mode 2 or 3).

Operation limits (standard units):
SUMMER OPERATION: **air** from 15 to 45°C – **water** (out from evaporator) from 5 to 15°C.
WINTER OPERATION: **air** from 20 to -4°C – **water** (out from evaporator) max 50°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 installed. The external panels, easy to be dismantled with a quick ¾ key turn, allow the full access to all components in case of service. When required, the hydraulic kit (buffer tank and pump group) are installed inside the unit.

High-efficiency scroll compressor (EER 3,7 at ARI conditions), with low sound level, internal heat protection, installed on rubber vibration dampers, supplied with crankcase heater, when necessary. Being 2 circuit units, in case of problem on one of the circuit, the 50% operation of the unit is anyway granted.

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 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.

Dry expansion shell and tube evaporator with two refrigerant circuits, in carbon steel and copper tubes, insulated by close-cell polyurethane foam material. It is complete with electric heater and water flow switch.

Shell and tube heat recovery / condenser in carbon steel and copper tubes.

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. The fans speed control is standard provided.

Cooling circuit realized with copper or steel pipes, composed of thermostatic expansion valve, solenoid valves for automatic changeover of the different operation modes, dehydrating filter, sight glass, check valves on the liquid line, safety valves, shut off valves, high and low pressure switches and gauges.

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 and hinged panel to be opened. It is complete with remote switches, overload protections, transformer for auxiliaries and terminal board. In case of hydraulic kit on board, 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.

Accessories

AE **Electrical power supply different from standard:** mainly, 230V three-phase, 460V three-phase. Frequency 50/60 Hz.

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

G4 **Cooling capacity control** with 4 steps (available from size 962)

GP **Condensing coil protection grid**: metal protection grid against accidental impacts.

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.

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.

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

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 pole centrifugal packaged type.

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.

PM **Spring-type vibration dampers**: spring-type vibration dampers support, for insulating the unit (supplied in kit), mainly indicated for installation in difficult and aggressive environments. Made of two steel plates containing a suitable quantity of harmonic steel springs.

PT **Twin pump group**: chilled water pump group composed of twin pump, expansion vessel, safety valve, water gauge, water charge and discharge valves, air purging valves, electrical control of the pump, automatic switch in case of failure of the working pump. The pump is of 2 pole centrifugal packaged type.

RL **Compressors overload relays**: electromechanical protection devices against compressor's overload.

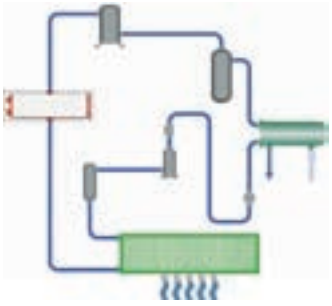
RM **Condensing coil with pre-painted fins**: superficial treatment of the condensing coils with epoxy coating.

RR **Copper/copper condensing coils**: special execution of the condensing coils with copper pipe and fins.

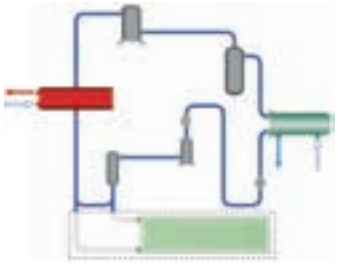
SC **Insulated compressors housing** with sound proofing material.

VB **Brine version**: unit suitable for working with evaporator outlet water temperatures lower than 0°C. A 20 mm evaporator insulation will be provided.

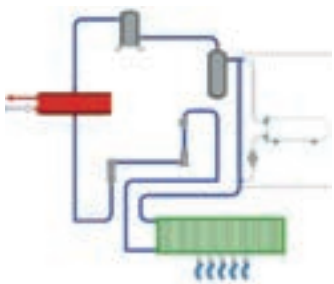
Modo 1
Mode 1



Modo 2
Mode 2



Modo 3
Mode 3



Technical data

GPE		842 K	962 K	1102 K	1402 K	1602 K
Only cooling mode						
Cooling capacity	kW	83,5	92,9	105,1	133,2	157,1
Compressors input power	kW	27,1	31,5	37,6	44,0	58,1
Compressors input current	A	45,4	57,0	67,2	78,0	96,0
Cooling mode with heat recovery						
Cooling capacity	kW	83,9	94,6	109,9	135,9	164,4
Heating capacity (heat recovery)	kW	110,8	125,1	144,8	178,5	218,5
Compressors input power	kW	26,9	30,6	34,9	42,6	54,1
Compressors input current	A	45,1	55,9	64,0	75,5	90,5
Heat pump mode						
Heating capacity	kW	101,4	114,3	121,7	163,1	189,1
Compressors input power	kW	26,8	30,4	34,5	42,1	53,6
Compressors input current	A	44,9	55,7	63,4	74,7	89,6
Axial fans						
Quantity	n.		3		4	
Rotation speed	rpm			900		
Air flow	m^3/h		35˙406		45˙612	
Air flow	l/s		9˙835		12˙670	
Motor input power	kW		2,94		3,92	
Input current	A		5,3		7,0	
Scroll compressors						
Quantity	n.			4		
Circuits	n.			2		
Standard capacity steps	n.			2		
Optional capacity steps	n.	–		4		
Inrush current	A	188,0	150,0	162,0	197,0	237,0
Evaporator						
Type				Shell and tube		
Quantity	n.			1		
Water flow	m^3/h	14,4	15,9	18,1	22,9	27,0
Water flow	l/s	4,0	4,4	5,0	6,4	7,5
Pressure drop	kPa	18	19	21	47	
Heat recovery – Condenser						
Type			Brazed plate		Shell and tube	
Quantity	n.			2		
Water flow	m^3/h	14,7	21,5	24,8	30,7	37,4
Water flow	l/s	5,3	5,9	6,9	8,5	10,4
Pressure drop	kPa	60	63	59	37	43
Pumps						
P1 – Available pressure	kPa	124	118	110	116	76
P1 – Motor input power	kW		1,1		1,5	
P1H – Available pressure	kPa	159	153	145	161	121
P1H – Motor input power	kW		1,5		2,2	
PT – Available pressure	kPa	149	138	130	131	86
PT – Motor input power	kW		1,5		2,2	
Capacity of buffer tank	l			720		
Electrical data						
Total input power	kW	34,1	42,8	46,0	61,4	66,3
Total nominal input current	A	55,3	69,3	74,4	99,2	107,0
Sound pressure level						
Sound pressure at 1 m	dB(A)		68		69	
Dimensions						
Length	mm		2˙610		3˙460	
Width	mm			1˙245		
Height	mm			2˙085		
Length with MV option	mm		3˙460		4˙305	
Width with MV option	mm			1˙245		
Height with MV option	mm			2˙085		
Transport weight	kg	1˙185	1˙325	1˙410	1˙780	1˙850
Transport weight with empty buffer tank	kg	1˙415	1˙555	1˙640	2˙010	2˙080
Refrigerant charge per circuit	kg	38,0	42,0	46,0	49,0	53,0
Electrical power supply						
Electrical power supply	V / ph / Hz			400 / 3 / 50 + N + T		

REMARKS:
- Operating conditions:
Only cooling mode: external air temperature 35°C; water temperature 7/12°C 0% glycol
Cooling mode with heat recovery: water temperature 7/12°C 0% glycol; condensing water temperature 40/45°C
Heat pump mode: condensing water temperature 40/45°C; external air temperature 10°C 80% r.h.
- Sound pressure level at 1 m in open field (ISO 3744).

WATER COOLED HEAT PUMPS
WITH HOUSING AND SCROLL COMPRESSORS

REFRIGERANT R407C - R134A

PWE 111 K

Series PWE ... K

Cooling capacity from 5 to 78 kW - 1 circuit

The water cooled heat pumps of **PWE series** are designed for indoor installation and are particularly suitable for small and medium sized air conditioning systems, in residential and commercial applications. For this reason, they are made of a housing in painted steel plate.
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, the units only need to be positioned and electrically and hydraulically connected.

WARNING: units with inversion on water side (and not on refrigerant side) to be realized at customer's care during installation

The following versions are available:
PWE...K with R407C ecological refrigerant charge
PWE...Ka with R134a ecological refrigerant charge

Water operation limits (standard units):
EVAPORATOR (OUT): from 5 to 15°C
CONDENSER (OUT): from 30 to 50°C for R407C - from 30 to 55°C for R134a

Main components:

Strong and compact frame, with a housing made of galvanized and RAL 7035 painted steel plate. The front and the access panels to the electrical board are easy to be opened. The main components are installed inside the housing, which can be isolated with standard soundproofing material (option CL) or with bituminous rubber soundproofing material (option CM). When required, the hydraulic kit (buffer tank and hydraulic kit) is installed into an additional section at the bottom of the unit, so not change the overall 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. Higher capacity units are equipped with two scroll compressors in tandem.

Weld-brazed plate **evaporator** and **condenser** 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 hinged internal safety panel, provided with protection fuses and safety transformer. In case of hydraulic kit on board, the electrical control of the pump group is provided.

Unit management **microprocessor** installed on the external panel, easily accessible, complete with compressors hour counter.

Accessories

AE **Electrical power supply different from standard:** mainly, 230V three-phase, 460V three-phase. Frequency 50/60 Hz.

CL **Soundproofing insulation with standard material**: insulation of the compressor housing by means of soundproofing material.

CM **Soundproofing insulation with bituminous rubber material**: insulation of the compressor housing by means of bituminous rubber coated material.

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

HG **Hot gas by-pass**: mechanical device for modulating cooling capacity, preventing frequent compressor' stops.

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** for measuring circuit pressure.

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

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 pole centrifugal packaged type.

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.

RV **Personalized frame painting in RAL colour**

SN **Main switch**: manual switch of lock-door type, switching off the unit.

VB **Brine version**: unit suitable for working with evaporator outlet water temperatures lower than 0°C. A 20 mm evaporator insulation will be provided.

VP **Pressostatic valve**: it is placed on condenser and controls the water flow rate according to the unit condensing pressure.

VS **Solenoid valve**: electromagnetic solenoid valve on each cooling circuit to prevent refrigerant migrations and consequent flooding of compressors.

Technical data - Refrigerant R407C

PWE		61 K	111 K	171 K	201 K	221 K	251 K	301 K	381 K	461 K	501 K	571 K	751 K	901 K
Cooling capacity														
Cooling capacity	kW	5,2	9,4	14,6	17,2	18,7	22,3	26,3	33,7	40,4	44,3	51,3	66,7	77,6
Nominal input power	kW	1,5	2,7	3,6	4,3	5,7	6,7	7,9	10,4	12,6	13,9	15,9	21,0	24,8
EER		3,47	3,48	4,05	4,00	3,28	3,33		3,24	3,21	3,19	3,23	3,18	3,13
Heating capacity	kW	6,7	12,1	18,2	21,4	24,4	29,3	34,2	44,1	53,0	58,1	67,2	87,7	102,4
Scroll compressors														
Quantity	n.	1									2			
Circuits	n.	1												
Standard capacity steps	%	0 / 100									0 / 50 / 100			
Nominal input current	A	6,1	14,3	8,2	9,1	12,2	14,4	16,5	19,2	23,8	28,2	32,2	39,5	47,7
Maximum input current	A	11,0	23,0	11,0	13,0	17,0	20,0	22,0	27,0	32,0	40,0	44,0	54,0	64,0
Inrush current	A	47,0	100,0	66,0	72,0	99,0	123,0	127,0	167,0	198,0	143,0	149,0	194,0	230,0
Evaporator														
Type		Weld-brazed plate												
Quantity	n.	1												
Circuits	n.	1												
Water flow	m^3/h	0,9	1,6	2,5	3,0	3,2	3,8	4,5	5,8	6,9	7,6	8,8	11,5	13,4
Water flow	l/s	0,2	0,4	0,7	0,8	0,9	1,1	1,2	1,6	1,9	2,1	2,4	3,2	3,7
Pressure drop	kPa	22	62	41	55		57	51	59	39	20	19	24	25
Water cooled condenser														
Type		Weld-brazed plate												
Quantity	n.	1												
Water flow	m^3/h	1,2	2,1	3,2	3,7	4,3	5,1	6,0	7,7	9,2	10,1	11,7	15,3	17,9
Water flow	l/s	0,3	0,6	0,9	1,0	1,2	1,4	1,7	2,1	2,6	2,8	3,2	4,2	4,9
Pressure drop	kPa	20	24	30	36	37	43	44	47	68	18	21	19	20
Pumps														
P1 – Available pressure	kPa	64	43	58	79	72	64	94	85	76	85	67	49	37
P1 – Motor input power	kW	0,18		0,55				0,75						1,1
P1H – Available pressure	kPa	84	70	90	111	104	98	138	128	120	142	123	112	100
P1H – Motor input power	kW	0,18		0,75				1,1						1,5
Capacity of buffer tank	l	80									110			
Sound pressure level														
Sound pressure at 1 m	dB(A)	58	59	58	60		61		62		63		64	
Dimensions														
Length	mm	800									1˙600			
Width	mm	500									750			
Height	mm	960												
Height with MV option	mm	1˙430									1˙340			
Transport weight	kg	119	126	142	145	189	199	204	231	247	339	345	406	434
Transport weight with empty buffer tank	kg	169	176	192	195	239	249	254	281	297	499	505	566	594
Refrigerant charge per circuit	kg	2,4	2,5	2,8	2,9	4,5	4,7	5,6	6,4	8,1	5,8	7,0	8,0	10,1
Electrical power supply														
Electrical power supply	V / ph / Hz	230 / 1 / 50 + N + T		400 / 3 / 50 + N + T										

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - Refrigerant R134a

PWE		151 Ka	181 Ka	211 Ka	271 Ka	311 Ka	351 Ka	421 Ka	521 Ka	601 Ka
Cooling capacity										
Cooling capacity	kW	13,2	15,9	18,4	24,2	27,3	31,6	37,5	51,6	53,5
Nominal input power	kW	4,0	4,7	5,4	7,3	8,3	9,6	11,3	11,7	17,0
EER		3,30	3,38	3,41	3,31	3,29		3,32	4,41	3,15
Heating capacity	kW	17,2	20,5	23,8	31,5	35,6	41,2	48,5	61,5	70,4
Scroll compressors										
Quantity	n.	1					2			
Circuits	n.	1								
Standard capacity steps	%	0 / 100					0 / 50 / 100			
Nominal input current	A	9,6	11,0	12,6	15,3	17,5	22,3	25,8	29,5	35,6
Maximum input current	A	17,0	20,0	22,0	27,0	32,0	40,0	44,0	54,0	64,0
Inrush current	A	99,0	123,0	127,0	167,0	198,0	143,0	149,0	194,0	230,0
Evaporator										
Type		Weld-brazed plate								
Quantity	n.	1								
Circuits	n.	1								
Water flow	m^3/h	2,3	2,7	3,2	4,1	4,7	5,4	6,4	8,1	9,2
Water flow	l/s	0,6	0,7	0,9	1,1	1,3	1,5	1,8	2,2	2,6
Pressure drop	kPa	55	49	51	67	56	26	21		26
Water cooled condenser										
Type		Weld-brazed plate								
Quantity	n.	1								
Water flow	m^3/h	3,0	3,6	4,1	5,5	6,2	7,2	8,5	10,7	12,3
Water flow	l/s	0,8	1,0	1,1	1,5	1,7	2,0	2,4	2,9	3,4
Pressure drop	kPa	20	31	32	24	21	17		26	22
Pumps										
P1 – Available pressure	kPa	72	87	75	71	110	111	110	96	92
P1 – Motor input power	kW	0,55				0,75				
P1H – Available pressure	kPa	103	118	107	104	152	164	165	152	150
P1H – Motor input power	kW	0,75				1,1	0,75		1,1	
Capacity of buffer tank	l	80					110			
Sound pressure level										
Sound pressure at 1 m	dB(A)	56	57		58		59		60	
Dimensions										
Length	mm	800					1˙600			
Width	mm	500					750			
Height	mm	960								
Height with MV option	mm	1˙430					1˙340			
Transport weight	kg	175	185	193	212	227	315	312	368	389
Transport weight with empty buffer tank	kg	225	235	243	262	277	475	472	528	549
Refrigerant charge per circuit	kg	2,0					3,0		4,0	
Electrical power supply										
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T								

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

WATER COOLED HEAT PUMPS
WITH SCROLL COMPRESSORS (SINGLE AND TANDEM)

REFRIGERANT R407C - R134A

PWE 352 Ka+CF

Series PWE ...

Cooling capacity from 32 to 350 kW - 1 and 2 circuits

The water cooled heat pumps of **PWE series** are designed for indoor installation and are particularly suitable for small and medium sized air conditioning systems, in residential and commercial applications.
They are all available with 1 or 2 refrigerant circuits.
They have been designed to be extremely compact, with an easy access for both ordinary and extraordinary service operations.
Thanks to their dimensions (for the whole range, the width is 750 mm) and to the several options available, these units are particularly easy to install also in small spaces, with no building works.
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.

WARNING: units with inversion on water side (and not on refrigerant side) to be realized at customer's care during installation

The following versions are available:
PWE...K with R407C ecological refrigerant charge
PWE...Ka with R134a ecological refrigerant charge

Water operation limits (standard units):
EVAPORATOR (OUT): from 5 to 15°C
CONDENSER (OUT): from 30 to 50°C for R407C - from 30 to 55°C for R134a

Main components:

Strong and compact frame, made of bended and RAL 7035 coloured steel profiles, supporting all the main components, installed at sight. On request, the compressors can be isolated by a soundproofing cabinet with standard material (option CF) or with bituminous rubber coated material (option CFU), so to further reduce the overall sound level of the unit itself.

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. Higher capacity units, with both 1 and 2 cooling circuits, are equipped with two scroll compressors in tandem.

Weld-brazed plate **evaporator** and **condenser** 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, high and low pressure gauges.

Electric board in compliance with CE norms, contained in a suitable partition protected by the hinged internal safety panel, provided with protection fuses and safety transformer.

Unit management **microprocessor** installed on the external panel, easily accessible, complete with compressors hour counter.

Accessories

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

AE **Electrical power supply different from standard:** mainly, 230V three-phase, 460V three-phase. Frequency 50/60 Hz.

CF **Soundproofed compressors cabinet with standard material**: Insulation of compressors by a cabinet made of extruded anodized aluminium profiles, with panels in aluminium alloy, coated with soundproofing material and vibration dampers under compressors.

CFU **Soundproofed compressors cabinet with bituminous rubber coated material**: Insulation of compressors by a cabinet made of extruded anodized aluminium profiles, with panels in aluminium alloy, coated with bituminous rubber soundproofing material and vibration dampers under compressors, mufflers on compressors discharge pipes.

CI **Soundproofing jacket on compressors:** made of soundproofing material, wrapped all around compressors so to further reduce the overall sound level of the unit.

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

HG **Hot gas by-pass**: mechanical device for modulating cooling capacity (only for 1-circuit sizes).

IE **Fumigated wooden crate packing:** available on request for critical transports, so to assure a suitable protection to the unit.

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.

IR **Packing with fumigated wooden pallet and transparent film**: minimal packing made of wooden pallet and transparent film wrapped all around the unit.

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.

MP **Oversized microprocessor**: compared to the standard microprocessor, it allows a multi-language display reading, a more detailed description of parameters, the possibility to manage up to 8 units, to manage non standard communication protocols, a better access to the program.

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.

PM **Spring-type vibration dampers**: spring-type vibration dampers support, for insulating the unit (supplied in kit), mainly indicated for installation in difficult and aggressive environments. Made of two steel plates containing a suitable quantity of harmonic steel springs.

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.

RP **Partial heat recovery** (about 20%) of the condensing heat, by means of a refrigerant/water plate exchanger (desuperheater), always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity.

RT **Total heat recovery** (100%) of the condensing heat, by means of a refrigerant/water plate exchanger, always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity, and /or for dehumidification.

V **Voltmeter**: Electrical device measuring the electrical tension in the power supply of the unit.

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.

Technical data - Refrigerant R407C - 1 circuit - tandem compressors

PWE		541 K	631 K	761 K	931 K	1201 K	1501 K	1901 K
Cooling capacity								
Cooling capacity	kW	48,4	56,0	68,6	84,4	111,0	140,0	175,0
Nominal input power	kW	14,6	16,6	21,2	24,6	33,5	41,8	50,0
EER		3,31	3,37	3,23	3,43	3,31	3,35	3,50
Heating capacity	kW	63,0	72,6	89,8	109,0	144,2	181,8	225,0
Scroll compressors								
Quantity	n.	2 (1 tandem)						
Circuits	n.	1						
Standard capacity steps	%	0 / 50 / 100						
Nominal input current	A	30,5	31,4	36,3	43,8	55,9	71,8	84,3
Maximum input current	A	40,0	44,0	54,0	64,0	82,0	104,0	125,0
Inrush current	A	143,0	149,0	194,0	230,0	266,0	324,0	373,0
Evaporator								
Type		Weld-brazed plate						
Quantity	n.	1						
Circuits	n.	1						
Water flow	m^3/h	8,3	9,6	11,8	14,5	19,1	24,1	30,1
Water flow	l/s	2,3	2,7	3,3	4,0	5,3	6,7	8,4
Pressure drop	kPa	32	34	26	31	30	32	34
Water cooled condenser								
Type		Weld-brazed plate						
Quantity	n.	1						
Water flow	m^3/h	10,8	12,5	15,4	18,7	24,9	31,3	38,7
Water flow	l/s	3,0	3,5	4,3	5,2	6,9	8,7	10,8
Pressure drop	kPa	52	55	43	36	49	53	62
Sound pressure level								
Sound pressure at 1 m	dB(A)	70		72		75	77	79
Dimensions								
Length	mm	1˙500						
Width	mm	750						
Height	mm	1˙600				1˙800		
Transport weight	kg	505	521	555	603	715	795	881
Weight in operation	kg	511	528	565	614	731	815	908
Refrigerant charge per circuit	kg	4,4	5,0	7,0	7,3	10,0	13,0	18,0
Electrical power supply								
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T						

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - Refrigerant R407C - 2 circuits - single compressors

PWE		442 K	532 K	612 K	762 K	922 K	1262 K	1552 K	1912 K
Cooling capacity									
Cooling capacity	kW	40,3	49,1	55,8	68,9	84,0	112,0	141,0	174,0
Nominal input power	kW	12,0	14,4	16,7	20,9	24,9	33,5	41,7	50,3
EER		3,36	3,41	3,34	3,30	3,37	3,34	3,38	3,46
Heating capacity	kW	52,3	63,5	72,5	89,8	108,9	145,5	182,7	224,3
Scroll compressors									
Quantity	n.	2							
Circuits	n.	2							
Standard capacity steps	%	0 / 50 / 100							
Nominal input current	A	26,0	30,0	32,0	36,0	44,0	56,0	72,0	85,0
Maximum input current	A	34,0	40,0	44,0	54,0	64,0	82,0	104,0	125,0
Inrush current	A	116,0	143,0	149,0	194,0	230,0	266,0	324,0	373,0
Evaporator									
Type		Weld-brazed plate							
Quantity	n.	2					1		
Circuits	n.	2							
Water flow	m^3/h	6,9	8,4	9,6	11,8	14,4	19,3	24,2	29,9
Water flow	l/s	1,9	2,3	2,7	3,3	4,0	5,3	6,7	8,3
Pressure drop	kPa	21	23	30		32	30	34	39
Water cooled condenser									
Type		Weld-brazed plate							
Quantity	n.	2					1		
Water flow	m^3/h	9,0	10,9	12,5	15,4	18,7	25,0	31,4	38,6
Water flow	l/s	2,5	3,0	3,5	4,3	5,2	6,9	8,7	10,7
Pressure drop	kPa	34	37	48		51	41	42	51
Sound pressure level									
Sound pressure at 1 m	dB(A)	70		74	76	73		77	
Dimensions									
Length	mm	1˙500							
Width	mm	750							
Height	mm	1˙600					1˙800		
Transport weight	kg	496	516	525	545	596	721	795	859
Weight in operation	kg	502	523	533	555	608	738	815	883
Refrigerant charge per circuit	kg	2,0	2,4		3,1	3,7	5,5	6,7	7,9
Electrical power supply									
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T							

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - Refrigerant R407C - 2 circuits - tandem compressors

PWE		892 K	1082 K	1212 K	1512 K	1852 K	2462 K	3102 K	3822 K
Cooling capacity									
Cooling capacity	kW	80,4	97,0	111,0	138,0	169,0	223,0	281,0	350,0
Nominal input power	kW	24,0	29,4	33,5	41,9	50,1	67,0	83,6	100,0
EER		3,35	3,30	3,31	3,29	3,37	3,33	3,36	3,50
Heating capacity	kW	104,4	125,9	144,5	179,9	219,1	290,0	364,6	450,0
Scroll compressors									
Quantity	n.	4 (2 tandem)							
Circuits	n.	2							
Standard capacity steps	%	0 / 25 / 50 / 75 / 100							
Nominal input current	A	51,0	61,0	63,0	72,0	89,0	112,0	144,0	169,0
Maximum input current	A	68,0	80,0	88,0	108,0	128,0	164,0	208,0	250,0
Inrush current	A	150,0	183,0	193,0	244,0	294,0	348,0	428,0	498,0
Evaporator									
Type		Weld-brazed plate							
Quantity	n.	1					2		
Circuits	n.	2							
Water flow	m^3/h	13,8	16,6	19,1	23,7	29,1	38,4	48,3	60,2
Water flow	l/s	3,8	4,6	5,3	6,6	8,1	10,6	13,4	16,7
Pressure drop	kPa	32	35	37	38	30		32	34
Water cooled condenser									
Type		Weld-brazed plate							
Quantity	n.	1					2		
Water flow	m^3/h	17,9	21,6	24,8	30,9	37,6	49,9	62,7	77,4
Water flow	l/s	5,0	6,0	6,9	8,6	10,5	13,9	17,4	21,5
Pressure drop	kPa	32	37	41		48	49	53	62
Sound pressure level									
Sound pressure at 1 m	dB(A)	72	73		75		78	80	82
Dimensions									
Length	mm	2˙500				3˙000			
Width	mm	750							
Height	mm	1˙800							
Transport weight	kg	862	884	916	956	1˙096	1˙338	1˙498	1˙670
Weight in operation	kg	873	897	931	974	1˙124	1˙370	1˙539	1˙725
Refrigerant charge per circuit	kg	3,7	4,3	4,9	6,1	9,2	10,0	13,0	18,0
Electrical power supply									
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T							

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - Refrigerant R134a - 1 circuit - tandem compressors

PWE		341 Ka	401 Ka	491 Ka	591 Ka	711 Ka	971 Ka	1201 Ka
Cooling capacity								
Cooling capacity	kW	32,0	37,4	45,3	54,1	72,3	89,1	112,0
Nominal input power	kW	10,0	11,4	14,1	16,8	21,7	27,3	33,6
EER		3,20	3,29	3,21	3,22	3,33	3,26	3,33
Heating capacity	kW	42,0	48,8	59,4	70,9	94,0	116,4	145,6
Scroll compressors								
Quantity	n.	2 (1 tandem)						
Circuits	n.	1						
Standard capacity steps	%	0 / 50 / 100						
Nominal input current	A	22,0	25,0	30,8	34,8	41,4	52,0	65,2
Maximum input current	A	40,0	44,0	54,0	64,0	82,0	104,0	125,0
Inrush current	A	143,0	149,0	194,0	230,0	266,0	324,0	373,0
Evaporator								
Type		Weld-brazed plate						
Quantity	n.	1						
Circuits	n.	1						
Water flow	m^3/h	5,5	6,4	7,8	9,3	12,4	15,3	19,3
Water flow	l/s	1,5	1,8	2,2	2,6	3,5	4,3	5,4
Pressure drop	kPa	18	19	22		16	19	20
Water cooled condenser								
Type		Weld-brazed plate						
Quantity	n.	1						
Water flow	m^3/h	7,2	8,4	10,2	12,2	16,2	20,0	25,0
Water flow	l/s	2,0	2,3	2,8	3,4	4,5	5,6	7,0
Pressure drop	kPa	65	57	61	66	47	57	65
Sound pressure level								
Sound pressure at 1 m	dB(A)	70		72		75	77	79
Dimensions								
Length	mm	1˙500						
Width	mm	750						
Height	mm	1˙600				1˙800		
Transport weight	kg	498	514	528	579	699	763	833
Weight in operation	kg	504	521	535	588	713	779	854
Refrigerant charge per circuit	kg	3,7	4,4	5,0	6,3	9,0	10,0	13,0
Electrical power supply								
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T						

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - Refrigerant R134a - 2 circuits - single compressors

PWE		282 Ka	352 Ka	402 Ka	492 Ka	592 Ka	772 Ka	972 Ka	1222 Ka
Cooling capacity									
Cooling capacity	kW	26,2	32,5	37,0	45,6	54,7	71,4	89,6	112,0
Nominal input power	kW	8,3	9,9	11,5	14,0	16,7	21,8	27,0	33,5
EER		3,16	3,28	3,22	3,26	3,27		3,32	3,34
Heating capacity	kW	34,5	42,4	48,5	59,6	71,4	93,2	116,6	145,5
Scroll compressors									
Quantity	n.	2							
Circuits	n.	2							
Standard capacity steps	%	0 / 50 / 100							
Nominal input current	A	20,0	22,0	25,0	31,0	35,0	42,0	52,0	65,0
Maximum input current	A	34,0	40,0	44,0	54,0	64,0	82,0	102,0	125,0
Inrush current	A	116,0	143,0	149,0	194,0	230,0	266,0	324,0	373,0
Evaporator									
Type		Weld-brazed plate							
Quantity	n.	2							
Circuits	n.	2							
Water flow	m^3/h	4,5	5,6	6,4	7,8	9,4	12,3	15,4	19,3
Water flow	l/s	1,2	1,5	1,8	2,2	2,6	3,4	4,3	5,3
Pressure drop	kPa	14		18	20	19	26	24	25
Water cooled condenser									
Type		Weld-brazed plate							
Quantity	n.	2							
Water flow	m^3/h	5,9	7,3	8,3	10,2	12,3	16,0	20,1	25,0
Water flow	l/s	1,6	2,0	2,3	2,8	3,4	4,4	5,6	6,9
Pressure drop	kPa	46	36	47	44	47	42	40	50
Sound pressure level									
Sound pressure at 1 m	dB(A)	69	70		72		75	77	79
Dimensions									
Length	mm	1˙500							
Width	mm	750							
Height	mm	1˙600					1˙800		
Transport weight	kg	488	500	510	532	584	683	757	821
Weight in operation	kg	492	507	516	570	593	694	772	839
Refrigerant charge per circuit	kg	1,5	2,0		2,4	3,1	3,7	4,9	6,1
Electrical power supply									
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T							

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

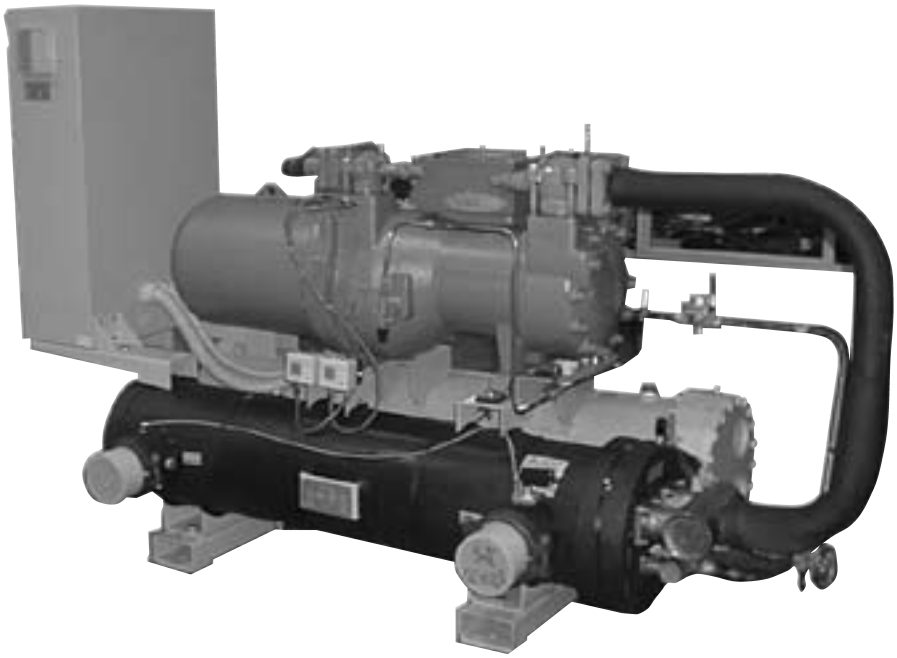
Technical data - Refrigerant R134a - 2 circuits - tandem compressors

PWE		572 Ka	702 Ka	802 Ka	992 Ka	1192 Ka	1522 Ka	1952 Ka	2442 Ka
Cooling capacity									
Cooling capacity	kW	52,2	64,0	75,0	91,0	109,0	145,0	178,0	225,0
Nominal input power	kW	16,3	20,1	23,0	28,1	33,6	43,4	54,6	66,4
EER		3,20	3,18	3,26	3,24		3,34	3,26	3,39
Heating capacity	kW	68,5	84,1	97,8	119,3	142,6	188,4	232,6	291,4
Scroll compressors									
Quantity	n.	4 (2 tandem)							
Circuits	n.	2							
Standard capacity steps	%	0 / 25 / 50 / 75 / 100							
Nominal input current	A	39,0	44,0	50,0	62,0	70,0	83,0	104,0	129,0
Maximum input current	A	68,0	80,0	88,0	108,0	128,0	164,0	208,0	250,0
Inrush current	A	150,0	183,0	193,0	244,0	294,0	348,0	428,0	498,0
Evaporator									
Type		Weld-brazed plate							
Quantity	n.	2		1			2		
Circuits	n.	2							
Water flow	m^3/h	8,9	11,0	12,9	15,7	18,7	24,9	30,6	38,7
Water flow	l/s	2,5	3,1	3,6	4,4	5,2	6,9	8,5	10,7
Pressure drop	kPa	22	18	21	25	24	16	19	21
Water cooled condenser									
Type		Weld-brazed plate							
Quantity	n.	2		1			2		
Water flow	m^3/h	11,8	14,5	16,8	20,5	24,5	32,4	40,0	50,1
Water flow	l/s	3,3	4,0	4,7	5,7	6,8	9,0	11,1	13,9
Pressure drop	kPa	43	65	47	41	48	47	57	50
Sound pressure level									
Sound pressure at 1 m	dB(A)	72	73		75		78	80	82
Dimensions									
Length	mm	2˙500				3˙000			
Width	mm	750							
Height	mm	1˙800							
Transport weight	kg	835	865	903	930	1˙033	1˙306	1˙434	1˙575
Weight in operation	kg	843	876	916	945	1˙051	1˙334	1˙466	1˙616
Refrigerant charge per circuit	kg	2,7	3,7	4,3	4,9	6,1	9,0	10,0	13,0
Electrical power supply									
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T							

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

WATER COOLED HEAT PUMPS WITH SCREW COMPRESSORS

REFRIGERANT R407C - R134A



PWH 241 Ka

Series PWH

Cooling capacity from 74 to 2098 kW - from 1 to 3 circuits

The water cooled heat pumps of **PWH series** are designed for indoor installation and are particularly suitable for industrial processes and air conditioning systems.
Depending on the cooling capacity, they are available with 1, 2 or 3 cooling circuits.
Thanks to their compact dimensions and to the several options available, these units are particularly easy to install also in small spaces, with no building works.
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.

WARNING: units with inversion on water side (and not on refrigerant side) to be realized at customer's care during installation

The following versions are available:
PWH...K with R407C ecological refrigerant charge
PWH...Ka with R134a ecological refrigerant charge

Water operation limits (standard units):
EVAPORATOR (OUT): from 5 to 15°C
CONDENSER (OUT): from 30 to 50°C for R407C - from 30 to 55°C for R134a

Main components:

Strong and compact frame, made of bended and coloured steel profiles (colour RAL 9005-black), supporting the exchangers of the evapo-condensers group and on which all the main components are installed at sight. On request, the compressors can be isolated by a soundproofing cabinet with standard material (option CF) or with bituminous rubber coated material (option CFU), so to further reduce the overall sound level of the unit itself.

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).

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.

Shell and tube condensers with copper pipes, externally grooved to increase the heating exchange coefficient and tube bundle in carbon steel. On request, the condenser is also available in cupro-nichel suitable for sea water use (option CA).

Each compressor works on an independent **cooling circuit**, assuring a remarkable reliability to multi-compressor units. Each circuit, made of copper or carbon steel tube, is 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.

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.

AE **Electrical power supply** different from standard: mainly, 230V triphase, 460V triphase. Frequency 50/60 Hz.

CA **Condensers suitable for seawater**: made in cupro-nichel or titanium, to be selected on request, suitable for working with seawater.

CC **Insulated condensers**: insulation on condensers heads and side (10 mm thickness).

CF **Soundproofed compressors cabinet with standard material**: Insulation of compressors by a cabinet made of extruded anodized aluminium profiles, with panels in aluminium alloy, coated with soundproofing material and vibration dampers under compressors.

CFU **Soundproofed compressors cabinet with bituminous rubber coated material**: Insulation of compressors by a cabinet made of extruded anodized aluminium profiles, with panels in aluminium alloy, coated with bituminous rubber soundproofing material and vibration dampers under compressors, mufflers on compressors discharge pipes.

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

DQ **Additional box** for connection of power supply cables

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

IE **Fumigated wooden crate packing:** available on request for critical transports, so to assure a suitable protection to the unit.

IG **Watch card:** Electronic card to program the switch-over and rotation between to 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.

IR **Packing with fumigated wooden pallet and transparent film**: minimal packing made of wooden pallet and transparent film wrapped all around the unit.

LI **Liquid injection**: mechanical device allowing a better cooling of compressors at very high compression level (standard for R407C).

KS **Lifting kit**: made of belts and brackets to be inserted into the holes present in the unit base-frame. It is used for moving and positioning the unit on site.

M8-M25 **Modulating capacity control**: by means of some valves installed on compressors, depending on their quantity, the capacity is modulated from 8 to 100%.

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

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.

PM **Spring-type vibration dampers**: spring-type vibration dampers support, for insulating the unit (supplied in kit), mainly indicated for installation in difficult and aggressive environments. Made of two steel plates containing a suitable quantity of harmonic steel springs.

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.

PW **Part-winding**: equipment for step compressors starting, reducing of about 35% the inrush current of each compressor.

RA **Anti-freeze heater on evaporator**: electrical heater installed on the evaporator, in order to prevent freezing and provided with thermostat.

RF **Power factor correction system cosfi >0,9**: Electrical device made of suitable condensers for compressors rephasing, ensuring a cosfi value ≥0,9, so to reduce the power absorption from the electrical network.

RH **Shut-off valve on suction side**: they are use to isolate compressors during service operations.

RL **Compressors overload relays**: electromechanical protection devices against compressor's overload.

RP **Partial heat recovery** (about 20%) of the condensing heat, by means of a refrigerant/water plate exchanger (desuperheater), always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity.

RT **Total heat recovery** (100%) of the condensing heat, by means of a refrigerant/water plate exchanger, always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity, and /or for dehumidification.

TC **Victaulic joints** and welding coupling for condenser connection to water circuit.

TE **Electronic thermostatic valve**: it is requested to make a very accurate regulation of the refrigerant flow and to limit variations of cooling capacity and evaporator leaving temperature water during operation in transitions and for a better performance with fixed superheating.

V **Voltmeter**: Electrical device measuring the electrical tension in the power supply of the unit.

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.

Technical data - Refrigerant R407C - 1 circuit

PWH		131 K	161 K	191 K	211 K	241 K	301 K	341 K	391 K	531 K	611 K	691 K	731 K	831 K
Cooling capacity														
Cooling capacity	kW	100,1	125,0	146,0	169,0	193,0	242,0	278,0	319,0	419,0	477,0	546,0	625,0	701,0
Nominal input power	kW	39,0	48,3	56,5	65,3	73,5	88,7	102,0	114,0	151,0	173,0	194,0	222,0	248,0
EER		2,60	2,59	2,58	2,59	2,62	2,73	2,72	2,80	2,77	2,76	2,81		2,83
Heating capacity	kW	139,0	173,0	202,0	234,0	266,0	331,0	379,0	433,0	569,0	650,0	740,0	847,0	949,0
Screw compressors														
Quantity	n.	1												
Cooling circuits	n.	1												
Standard capacity steps	n.	3												
Modulating capacity steps (option)	%	0 – 25 ÷ 100												
Nominal input current	A	67,0	82,0	95,0	109,0	119,0	147,0	170,0	190,0	239,0	283,0	315,0	359,0	399,0
Maximum input current	A	86,0	108,0	128,0	144,0	162,0	180,0	216,0	246,0	330,0	370,0	420,0	450,0	
Inrush current	A	411,0	508,0	485,0	585,0	686,0	801,0	943,0	1˙023,0	1˙442,0	1˙853,0	2˙029,0	2˙520,0	
Inrush current with options PW/DS	A	218,0	269,0	290,0	350,0	423,0	520,0	612,0	665,0	1˙009,0	1˙297,0	1˙420,0	1˙764,0	
Evaporator														
Type		Shell and tube												
Quantity	n.	1												
Circuits	n.	1												
Water flow	m^3/h	17,2	21,5	25,1	29,1	33,2	41,6	47,8	54,9	72,1	82,0	93,9	107,5	120,6
Water flow	l/s	4,8	6,0	7,0	8,1	9,2	11,6	13,3	15,2	20,0	22,3	26,1	29,9	33,5
Pressure drop	kPa	45	50	43	38	30	53	52	53	39	50	51	53	41
Water volume	l	44	42	39		37	86	82	79	185		179	294	
Water cooled condenser														
Type		Shell and tube												
Quantity	n.	1												
Water flow	m^3/h	23,9	29,8	34,7	40,2	45,8	56,9	65,2	74,5	97,9	111,8	127,3	145,7	163,2
Water flow	l/s	6,6	8,3	9,6	11,2	12,7	15,8	18,1	20,7	27,2	31,1	35,4	40,5	45,3
Pressure drop	kPa	71	75	74	76	77	67	70	67	71		68	53	69
Water volume	l	21	25	29	36	39	45	50	60	76	86	102	113	128
Sound pressure level														
Sound pressure at 1 m	dB(A)	70	76			77		80	81	82	83	84	85	87
Dimensions														
Length	mm	2˙430					3˙310		3˙340	3˙700				
Width	mm	800			850		800		850	1˙300				
Height	mm	1˙525			1˙610		1˙525		1˙610	1˙900				
Length with CF/CFU	mm	2˙430					3˙310		3˙340	3˙700				
Width with CF/CFU	mm	800			850					1˙300				
Height with CF/CFU	mm	1˙525			1˙610		1˙525		1˙610	1˙900				
Transport weight	kg	909	926	1˙168	1˙265	1˙288	1˙688	1˙716	1˙900	3˙464	3˙503	3˙696	3˙898	3˙979
Weight in operation	kg	974	993	1˙237	1˙340	1˙365	1˙819	1˙849	2˙040	3˙724	3˙774	3˙978	4˙304	4˙401
Refrigerant charge per circuit	kg	25,0	24,0	23,0	45,0	44,0	50,0	48,0	94,0	91,0	86,0	63,0	77,0	91,0
Electrical power supply														
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T												

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - Refrigerant R407C - 2 and 3 circuits

PWH		252 K	312 K	372 K	422 K	472 K	592 K	672 K	772 K	1062 K	1222 K	1392 K	1462 K	1652 K	1933 K	2203 K	2493 K
Cooling capacity																	
Cooling capacity	kW	208,0	250,0	294,0	339,0	390,0	483,0	552,0	639,0	835,0	960,0	1`093,0	1`231,0	1`404,0	1`647,0	1`858,0	2`098,0
Nominal input power	kW	77,5	96,6	112,0	130,0	146,0	177,0	203,0	229,0	297,0	347,0	389,0	443,0	497,0	583,0	665,0	745,0
EER		2,68	2,59	2,62	2,61	2,67	2,73	2,72	2,79	2,81	2,77	2,81	2,78	2,82		2,79	2,82
Heating capacity	kW	285,0	347,0	406,0	469,0	535,0	660,0	755,0	868,0	1`131,0	1`307,0	1`482,0	1`674,0	1`901,0	2`231,0	2`524,0	2`843,0
Screw compressors																	
Quantity	n.	2													3		
Cooling circuits	n.	2													3		
Standard capacity steps	n.	6													9		
Modulating capacity steps (option)	%	0 – 12 ÷ 100													0 – 8 ÷ 100		
Nominal input current	A	133,0	163,0	187,0	217,0	235,0	294,0	339,0	379,0	471,0	566,0	630,0	716,0	797,0	946,0	1`075,0	1`196,0
Maximum input current	A	172,0	216,0	256,0	288,0	324,0	360,0	432,0	492,0	660,0	740,0	840,0	900,0		1`260,0	1`350,0	
Inrush current	A	497,0	616,0	613,0	729,0	848,0	981,0	1`159,0	1`269,0	1`772,0	2`223,0	2`449,0	2`970,0		2`869,0	3`420,0	
Inrush current with options PW/DS	A	304,0	377,0	418,0	494,0	585,0	700,0	828,0	911,0	1`339,0	1`667,0	1`840,0	2`214,0		2`260,0	2`664,0	
Evaporator																	
Type		Shell and tube															
Quantity	n.	1															
Circuits	n.	2													3		
Water flow	m^3/h	35,8	43,0	50,6	58,3	67,1	83,1	94,9	109,9	143,6	165,1	188,0	211,7	241,5	283,3	319,7	360,9
Water flow	l/s	9,9	11,9	14,0	16,2	18,6	23,1	26,4	30,5	39,9	45,9	52,2	58,8	67,1	78,7	88,8	100,2
Pressure drop	kPa	46	52	49	45	36	51	52	34	39	26	47	33	65	50	64	26
Water volume	l	134		129		124	185	179	294	286	271	264	461	444	648	632	615
Water cooled condenser																	
Type		Shell and tube															
Quantity	n.	2													3		
Water flow	m^3/h	49,0	59,7	69,8	80,7	92,0	113,5	129,9	149,3	194,5	224,8	254,9	287,9	327,0	383,7	434,1	489,0
Water flow	l/s	13,6	16,6	19,4	22,4	25,6	31,5	36,1	41,5	54,0	62,4	70,8	80,0	90,8	106,6	120,6	135,8
Pressure drop	kPa	60	69	62	69	65	67	69	68	61	72	68	71	69		72	69
Water volume	l	43	49	59	64	75	90	101	121	162	173	205	226	257	307	338	385
Sound pressure level																	
Sound pressure at 1 m	dB(A)	73	79			80		83	84	85	86	87	88	90	89	90	92
Dimensions																	
Length	mm	3`750		3`860			3`900			5`200							
Width	mm	750		900			1`000			1`300					2`000		
Height	mm	1`790					1`990			2`370							
Length with CF/CFU	mm	3`750		3`860			3`990			5`200							
Width with CF/CFU	mm	750		900			1`000			1`300					2`000		
Height with CF/CFU	mm	1`790		1`840			1`990			2`450							
Transport weight	kg	1`828	1`838	2`348	2`376	2`425	3`376	3`426	3`895	6`026	6`104	6`483	7`006	7`184	9`834	10`195	10`523
Weight in operation	kg	2`005	2`020	2`535	2`569	2`623	3`651	3`706	4`309	6`475	6`548	6`952	7`693	7`884	10`789	11`165	11`523
Refrigerant charge per circuit	kg	58,0	57,0	55,0	54,0	52,0	50,0	48,0	96,0	87,0	86,0	63,0	73,0	90,0	69,0	80,0	95,0
Electrical power supply																	
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T															

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - Refrigerant R134a - 1 circuit

PWH		91 Ka	111 Ka	131 Ka	151 Ka	171 Ka	211 Ka	241 Ka	271 Ka	321 Ka	361 Ka	421 Ka	481 Ka	541 Ka	621 Ka	721 Ka	771 Ka
Cooling capacity																	
Cooling capacity	kW	74,5	92,4	109,0	129,0	142,0	168,0	184,0	239,0	267,0	303,0	353,0	409,0	459,0	506,0	573,0	617,0
Nominal input power	kW	23,1	28,6	35,4	38,9	43,9	51,4	57,3	70,5	79,0	90,0	103,0	118,0	137,0	150,0	173,0	184,0
EER		3,22	3,23	3,08	3,32	3,23	3,27	3,21	3,39	3,38	3,37	3,43	3,47	3,35	3,37	3,31	3,35
Heating capacity	kW	97,6	121,0	144,0	168,0	186,0	219,0	241,0	310,0	346,0	393,0	456,0	528,0	596,0	656,0	746,0	801,0
Screw compressors																	
Quantity	n.	1															
Cooling circuits	n.	1															
Standard capacity steps	n.	3															
Modulating capacity steps (option)	%	0 – 25 ÷ 100															
Nominal input current	A	43,0	50,0	61,0	69,0	77,0	88,0	95,0	120,0	136,0	154,0	170,0	189,0	227,0	247,0	284,0	310,0
Maximum input current	A	56,0	65,0	79,0	98,0	124,0	144,0	155,0	182,0	215,0	231,0	280,0	310,0	320,0	360,0	450,0	566,0
Inrush current	A	305,0	338,0	355,0	449,0	485,0	585,0	675,0	801,0	943,0	1˙023,0	1˙364,0	1˙442,0	1˙853,0	2˙029,0	2˙520,0	2˙870,0
Inrush current with options PW/DS	A	153,0	169,0	206,0	267,0	290,0	350,0	439,0	520,0	612,0	664,0	955,0	1˙009,0	1˙297,0	1˙420,0	1˙764,0	2˙009,0
Evaporator																	
Type		Shell and tube															
Quantity	n.	1															
Circuits	n.	1															
Water flow	m^3/h	12,8	15,9	18,7	22,2	24,4	28,9	31,6	41,1	45,9	52,1	60,7	70,3	78,9	87,0	98,6	106,2
Water flow	l/s	3,6	4,4	5,2	6,2	6,8	8,0	8,8	11,4	12,8	14,5	16,9	19,5	21,9	24,2	27,4	29,5
Pressure drop	kPa	43	39	48	42	39	40	48	44	42	35		43	44		51	39
Water volume	l	42	39	37	86		56		129	124	119	179	173	294	286	141	262
Water cooled condenser																	
Type		Shell and tube															
Quantity	n.	1															
Water flow	m^3/h	16,8	20,8	24,8	28,9	32,0	37,7	41,5	53,3	59,5	67,6	78,4	90,8	102,5	112,8	128,2	137,9
Water flow	l/s	4,7	5,8	6,9	8,0	8,9	10,5	11,5	14,8	16,5	18,8	21,8	25,2	28,5	31,3	35,6	38,3
Pressure drop	kPa	20	23	25	27		22	20		26	27	26	25		24	51	39
Water volume	l	9	11	13	15	16	19	22	27		30	35	40	45	50	83	84
Sound pressure level																	
Sound pressure at 1 m	dB(A)	68	74			75	76	77	79	80	81		82	83	84	83	84
Dimensions																	
Length	mm	2˙430					3˙350					3˙700					
Width	mm	800										1˙200					
Height	mm	1˙525										1˙890					
Length with CF/CFU	mm	2˙430					3˙350					3˙700					
Width with CF/CFU	mm	800					850					1˙200					
Height with CF/CFU	mm	1˙525										1˙890					
Transport weight	kg	674	683	1˙113	1˙187	1˙197	1˙254	1˙264	1˙707	1˙732	1˙755	2˙845	3˙010	3˙133	3˙196	3˙324	3˙573
Weight in operation	kg	725	733	1˙164	1˙288	1˙299	1˙329	1˙342	1˙863	1˙882	1˙903	2˙996	3˙221	3˙342	3˙411	3˙531	3˙913
Refrigerant charge per circuit	kg	15,0	14,0	30,0	31,0	30,0	62,0	60,0		61,0		41,0	53,0	59,0	60,0	61,0	90,0
Electrical power supply																	
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T															

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - Refrigerant R134a - 2 circuits

PWH		182 Ka	222 Ka	252 Ka	292 Ka	332 Ka	412 Ka	472 Ka	542 Ka	642 Ka	732 Ka
Cooling capacity											
Cooling capacity	kW	150,0	184,0	218,0	259,0	284,0	331,0	367,0	481,0	535,0	603,0
Nominal input power	kW	46,1	57,3	70,7	77,5	87,8	103,0	115,0	141,0	158,0	180,0
EER		3,25	3,21	3,08	3,34	3,23	3,21	3,19	3,41	3,39	3,35
Heating capacity	kW	196,0	241,0	289,0	337,0	371,0	434,0	482,0	623,0	692,0	784,0
Screw compressors											
Quantity	n.	2									
Cooling circuits	n.	2									
Standard capacity steps	n.	6									
Modulating capacity steps (option)	%	0 – 12 ÷ 100									
Nominal input current	A	85,0	101,0	122,0	137,0	153,0	176,0	189,0	239,0	272,0	307,0
Maximum input current	A	112,0	130,0	158,0	196,0	248,0	288,0	310,0	364,0	430,0	462,0
Inrush current	A	361,0	403,0	434,0	547,0	609,0	729,0	830,0	983,0	1˙158,0	1˙254,0
Inrush current with options PW/DS	A	209,0	234,0	285,0	365,0	414,0	578,0	594,0	702,0	827,0	895,0
Evaporator											
Type		Shell and tube									
Quantity	n.	1									
Circuits	n.	2									
Water flow	m^3/h	25,8	31,6	37,5	44,5	48,8	56,9	63,1	82,7	92,0	103,7
Water flow	l/s	7,2	8,8	10,4	12,4	13,6	15,8	17,5	23,0	25,6	28,8
Pressure drop	kPa	35	48	37	40	31	42	38	40	30	41
Water volume	l	59	56	129	124		119	113	168	286	279
Water cooled condenser											
Type		Shell and tube									
Quantity	n.	2									
Water flow	m^3/h	33,7	41,5	49,7	58,0	63,8	74,6	82,9	107,2	119,0	134,8
Water flow	l/s	9,4	11,5	13,8	16,1	17,7	20,7	23,0	29,8	33,1	37,5
Pressure drop	kPa	15	23	20	18	22	21	20	21	26	27
Water volume	l	20		25	30		38	43	54		59
Sound pressure level											
Sound pressure at 1 m	dB(A)	71		77		78	79	80	82	83	84
Dimensions											
Length	mm	3˙750		3˙860					3˙900		
Width	mm	750		900					1˙000		
Height	mm	1˙710		1˙790					1˙990	2˙030	
Length with CF/CFU	mm	3˙750		3˙860					3˙990		
Width with CF/CFU	mm	750		900					1˙000		
Height with CF/CFU	mm	1˙710		1˙790			1˙840		1˙990	2˙030	
Transport weight	kg	1˙255	1˙261	1˙807	1˙851	1˙863	2˙386	2˙414	3˙329	3˙516	3˙556
Weight in operation	kg	1˙334	1˙337	1˙961	2˙005	2˙016	2˙542	2˙571	3˙551	3˙856	3˙894
Refrigerant charge per circuit	kg	30,0	31,0	30,0	29,0		61,0	60,0		62,0	61,0
Electrical power supply											
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T									

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

Technical data - Refrigerant R134a - 2 and 3 circuits

PWH		842 Ka	972 Ka	1092 Ka	1232 Ka	1442 Ka	1542 Ka	1633 Ka	1793 Ka	2163 Ka	2313 Ka
Cooling capacity											
Cooling capacity	kW	701,0	814,0	920,0	1`009,0	1`153,0	1`233,0	1`369,0	1`502,0	1`733,0	1`853,0
Nominal input power	kW	206,0	237,0	274,0	299,0	345,0	368,0	410,0	449,0	518,0	553,0
EER		3,40	3,43	3,36	3,37	3,34	3,35		3,34		3,35
Heating capacity	kW	907,0	1`051,0	1`193,0	1`308,0	1`499,0	1`602,0	1`779,0	1`951,0	2`251,0	2`405,0
Screw compressors											
Quantity	n.	2						3			
Cooling circuits	n.	2						3			
Standard capacity steps	n.	6						9			
Modulating capacity steps (option)	%	0 – 12 ÷ 100						0 – 8 ÷ 100			
Nominal input current	A	339,0	378,0	455,0	493,0	569,0	620,0	682,0	740,0	853,0	930,0
Maximum input current	A	560,0	620,0	640,0	720,0	900,0	1`132,0	960,0	1`080,0	1`350,0	1`698,0
Inrush current	A	1`644,0	1`752,0	2`173,0	2`389,0	2`970,0	3`436,0	2`493,0	2`749,0	3`420,0	4`002,0
Inrush current with options PW/DS	A	1`235,0	1`319,0	1`617,0	1`780,0	2`214,0	2`575,0	1`937,0	2`140,0	2`664,0	3`141,0
Evaporator											
Type		Shell and tube									
Quantity	n.	1									
Circuits	n.	2						3			
Water flow	m^3/h	120,6	140,0	158,2	173,5	198,4	212,1	235,5	258,3	298,1	318,6
Water flow	l/s	33,5	38,9	44,0	48,2	55,1	58,9	65,4	71,8	82,8	88,5
Pressure drop	kPa	33		64	37	51	39	38	44	41	46
Water volume	l	271	461	444	435	398		648	632	764	
Water cooled condenser											
Type		Shell and tube									
Quantity	n.	2						3			
Water flow	m^3/h	156,0	180,8	205,2	225,0	257,8	275,4	306,0	335,6	388,8	414,0
Water flow	l/s	43,3	50,2	57,0	62,5	71,6	76,5	85,0	93,2	108,0	115,0
Pressure drop	kPa	25			24	51	39	40	42	51	39
Water volume	l	69	80	90	101	132	155	135	151	198	232
Sound pressure level											
Sound pressure at 1 m	dB(A)	84	85	86	87	86	87	88	89	88	89
Dimensions											
Length	mm	5`300						5`100			
Width	mm	1`300						2`400			
Height	mm	2`420						2`480			
Length with CF/CFU	mm	5`300						5`100			
Width with CF/CFU	mm	1`300						2`400			
Height with CF/CFU	mm	2`500						2`560			
Transport weight	kg	5`327	5`522	5`757	5`898	6`392	6`521	8`860	9`077	9`855	10`049
Weight in operation	kg	5`679	5`873	6`111	6`258	6`922	7`074	9`565	9`788	10`817	11`045
Refrigerant charge per circuit	kg	50,0	64,0	70,0	72,0	82,0	107,0	90,0	94,0	106,0	132,0
Electrical power supply											
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T									

REMARKS:
- Operating conditions: evaporator water temperature 7/12°C; condenser water temperature 40/45°C
- Sound pressure level at 1 m in open field (ISO 3744).
- Unit weight including oil and refrigerant charge.

MCE 181 K

Series MCE ... K

Cooling capacity from 4 to 39 kW - 1 circuit

The air cooled condensing units of **MCE K series**, to be matched to remote evaporating units, 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 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 nitrogen and oil charge.

The following versions are available:
MCE...K standard version
Horizontal air flow for models from 41 to 101
Vertical air flow for models from 131 to 421
MCE...U K ultrasilenced version (from size 201)

Operation limits: (standard units): external air temperature from 15 to 45°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.

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. Sizel 41 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 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.

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).

Cooling circuit composed of dehydrating filter, sight glass, safety device, high and low pressure switches, shut-off valve on discharge side, liquid receiver.

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.

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

Accessories

AE **Electrical power supply different from standard:** mainly, 230V three-phase, 460V three-phase. 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.

CS **Compressors inrush counter**: Electromechanical device positioned inside the electrical board, recording the total inrush starts of compressors (from size 201).

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.

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.

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**

SC **Insulated compressors housing** with sound proofing material (available form size 201 and included on ultrasilenced version).

VS **Solenoid valve**: electromagnetic solenoid valve on each cooling circuit to prevent refrigerant migrations and consequent flooding of compressors.

Technical data - Standard version

MCE		41 K	71 K	101 K	131 K	151 K	161 K	181 K	201 K	241 K	281 K	361 K	421 K
Cooling capacity													
Cooling capacity	kW	4,4	6,7	7,7	10,3	12,2	15,8	16,6	18,0	21,4	25,4	32,9	39,0
Nominal input power	kW	1,6	2,7	3,2	3,6	4,7	5,6	6,2	6,9	8,9	9,9	11,2	14,2
EER		2,75	2,48	2,41	2,86	2,59	2,82	2,68	2,61	2,40	2,56	2,94	2,75
Axial fans													
Quantity	n.	1			2								
Rotation speed	rpm	900										860	
Air flow	m³/h	3`600	3`850		7`500		6`984		11`200		10`200	16`000	
Air flow	l/s	1`000	1`069		2`083		1`940		3`111		2`833	4`445	
Motor input power	kW	0,15			0,29				0,74			1,26	
Input current	A	0,6			1,3				3,4			6,0	
Scroll compressors													
Quantity	n.	1											
Circuits	n.	1											
Standard capacity steps	%	0 / 100											
Nominal input current	A	3,0	6,2	5,5	5,4	6,3	9,0	10,3	12,2	14,9	16,7	18,5	23,3
Maximum input current	A	6,0	7,0	10,0	12,0	14,0	16,0	18,0	17,0	20,0	22,0	27,0	32,0
Inrush current	A	18,0	26,0	46,0	56,0	68,0	77,0	81,0	99,0	123,0	127,0	167,0	198,0
Electrical data													
Total input power	kW	1,7	2,8	3,3	3,9	5,0	5,9	6,5	7,6	9,6	10,6	12,5	15,5
Sound pressure level													
Sound pressure at 1 m	dB(A)	50			54	55		56	62			67	
Dimensions													
Length	mm	980			1`100				1`600			2`000	
Width	mm	325			750							850	
Height	mm	715			1`100				1`260			1`650	
Transport weight	kg	122	125	128	205	209	226	228	250	255	295	400	415
Electrical power supply													
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T											

REMARKS:
- Operating conditions: External air temperature 35°C; evaporating temperature 2°C
- Sound pressure level at 1 m in open field (ISO 3744).

Technical data - Ultrasilenced version

MCE		201 U K	241 U K	281 U K	361 U K	421 U K
Cooling capacity						
Cooling capacity	kW	17,5	21,6	26,4	31,9	38,0
Nominal input power	kW	7,2	8,8	9,3	11,8	14,8
EER		2,43	2,45	2,84	2,70	2,57
Axial fans						
Quantity	n.	2				3
Rotation speed	rpm	680		650		
Air flow	m³/h	8`000	7`000	11`200		17`400
Air flow	l/s	2`222	1`944	3`111		4`833
Motor input power	kW	0,44		0,62		0,93
Input current	A	2,2		3,1		4,7
Scroll compressors						
Quantity	n.	1				
Circuits	n.	1				
Standard capacity steps	%	0 / 100				
Nominal input current	A	12,5	14,8	16,0	19,3	24,1
Maximum input current	A	17,0	20,0	22,0	27,0	32,0
Inrush current	A	99,0	123,0	127,0	167,0	198,0
Electrical data						
Total input power	kW	7,6	9,2	9,9	12,4	15,7
Sound pressure level						
Sound pressure at 1 m	dB(A)	55		59		61
Dimensions						
Length	mm	1`600		2`000		2`130
Width	mm	750		850		1`100
Height	mm	1`260		1`650		1`760
Transport weight	kg	256	261	370	400	570
Electrical power supply						
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T				

REMARKS:
- Operating conditions: External air temperature 35°C; evaporating temperature 2°C
- Sound pressure level at 1 m in open field (ISO 3744).

AIR COOLED CONDENSING UNITS WITH SCROLL COMPRESSORS AND AXIAL FANS

REFRIGERANT R407C

MCE 482 K

Series MCE ... K

Cooling capacity from 44 to 75 kW - 2 circuits

The air cooled condensing units of **MCE K series**, to be matched to remote evaporating units, are designed for outdoor installation and are particularly suitable for small and medium sized air conditioning systems, in residential and commercial applications.
They are all available with 2 refrigerant circuits.
All sizes are standard provided with an isolated compressors section and the external frame is completely closed.
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 nitrogen and oil charge.

The following versions are available:
MCE...K standard version
MCE...U K ultrasilenced version

Operation limits: (standard units): external air temperature from 15 to 45°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. For ultrasilenced version, it is insulated with soundproofing material. The external panels, easy to be dismantled, allow the full access in case of service.

High-efficiency scroll compressor (EER 3,7 at ARI conditions), with low sound level, internal heat protection, installed on rubber vibration dampers, supplied with crankcase heater, when necessary. Being 2 circuit units, in case of problem on one of the circuit, the 50% operation of the unit is anyway granted.

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 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.

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).

Cooling circuit composed of dehydrating filter, sight glass, safety device, high and low pressure switches, shut-off valve on discharge side, liquid receiver.

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.

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

Accessories

AE **Electrical power supply different from standard:** mainly, 230V three-phase, 460V three-phase. 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.

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

GP **Condensing coil protection grid**: metal protection grid against accidental impacts.

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** 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.

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.

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**

SC **Insulated compressors housing** with sound proofing material (included on ultra-silenced version).

VS **Solenoid valve**: electromagnetic solenoid valve on each cooling circuit to prevent refrigerant migrations and consequent flooding of compressors.

Technical data - Standard version

MCE		482 K	562 K	702 K	822 K
Cooling capacity					
Cooling capacity	kW	43,6	49,1	63,8	75,0
Nominal input power	kW	17,3	20,8	23,5	29,9
EER		2,52	2,36	2,71	2,51
Axial fans					
Quantity	n.	3			
Rotation speed	rpm	860			
Air flow	m^3/h	25˙200		21˙300	
Air flow	l/s	7˙000		5˙917	
Motor input power	kW	1,9			
Input current	A	9,0			
Scroll compressors					
Quantity	n.	2			
Circuits	n.	2			
Standard capacity steps	%	0 – 50 – 100			
Nominal input current	A	29,0	35,0	38,0	49,0
Maximum input current	A	40,0	44,0	54,0	64,0
Inrush current	A	143,0	149,0	194,0	230,0
Electrical data					
Total input power	kW	19,2	22,7	25,4	31,8
Sound pressure level					
Sound pressure at 1 m	dB(A)	69			
Dimensions					
Length	mm	2˙130			
Width	mm	1˙100			
Height	mm	1˙760			
Transport weight	kg	607	611	682	693
Electrical power supply					
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T			

REMARKS:
- Operating conditions: External air temperature 35°C; evaporating temperature 2°C
- Sound pressure level at 1 m in open field (ISO 3744).

Technical data - Ultrasilenced version

MCE		482 U K	562 U K	702 U K
Cooling capacity				
Cooling capacity	kW	42,1	51,0	60,2
Nominal input power	kW	18,2	19,7	22,2
EER		2,31	2,59	2,71
Axial fans				
Quantity	n.	3		
Rotation speed	rpm	650		
Air flow	m^3/h	17˙700	14˙200	
Air flow	l/s	4˙917	3˙945	
Motor input power	kW	0,93		
Input current	A	4,7		
Scroll compressors				
Quantity	n.	2		
Circuits	n.	2		
Standard capacity steps	%	0 – 50 – 100		
Nominal input current	A	30,0	33,0	41,0
Maximum input current	A	40,0	44,0	54,0
Inrush current	A	143,0	149,0	194,0
Electrical data				
Total input power	kW	19,1	20,6	21,9
Sound pressure level				
Sound pressure at 1 m	dB(A)	61		
Dimensions				
Length	mm	2˙130		
Width	mm	1˙100		
Height	mm	1˙760		
Transport weight	kg	614	618	689
Electrical power supply				
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T		

REMARKS:
- Operating conditions: External air temperature 35°C; evaporating temperature 2°C
- Sound pressure level at 1 m in open field (ISO 3744).

MCE 1482 K

Series MCE ... K

Cooling capacity from 73 to 288 kW - 2 circuits

The air cooled condensing units of **MCE K series**, to be matched to remote evaporating units, are designed for outdoor installation and are particularly suitable for small and medium sized air conditioning systems, in residential and commercial applications.
They are all available with 2 refrigerant circuits.
Thanks to their compact dimensions and to the several options available, these units are particularly easy to install in small spaces and easily accessible on all sides for ordinary and extraordinary service operations.
They are completely assembled and tested in the factory and supplied with refrigerant and oil charge.

The following versions are available:
MCE...K standard version
MCE... S.K silenced version with soundproofing insulation of compressors section
MCE... U.K ultrasilenced version with soundproofing insulation of compressors section by means of a bituminous rubber coating

Operation limits: external air temperature from 15 to 45°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, isolated from the air flow, is completely open; for silenced and ultra-silenced versions, the compressors are protected by a suitable soundproofing cabinet.

High-efficiency scroll compressor (EER 3,7 at ARI conditions), with low sound level, internal heat protection, installed on rubber vibration dampers, supplied with crankcase heater. Being 2 circuit units, in case of problem on one of the circuit, the 50% operation of the unit is anyway granted.

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 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.

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).

Cooling circuit composed of dehydrating filter, sight glass, safety device, high and low pressure switches, shut-off valve on discharge side, liquid receiver.

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.

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

Accessories

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

AE **Electrical power supply different from standard:** mainly, 230V three-phase, 460V three-phase. 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.

CF **Soundproofed compressors cabinet with standard material**: Insulation of compressors by a cabinet coated with soundproofing material and vibration dampers under compressors (already included in S version).

CFU **Soundproofed compressors cabinet with bituminous rubber coated material**: Insulation of compressors by a suitably coated cabinet, vibration dampers under compressors, mufflers on compressors discharge pipes (already included in U version).

CI **Soundproofing jacket on compressors** made of soundproofing material, wrapped all around compressors so to further reduce the overall sound level of the unit (not available for S and U versions).

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

GP **Condensing coil protection grid**: metal protection grid against accidental impacts.

GP1 **Protection grid for compressors section**: metal protection grid against accidental impacts (not available for 2-fan sizes with CF/CFU option).

IG **Watch card:** Electronic card to program the switch-over and rotation between to 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.

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.

MP **Oversized microprocessor**: compared to the standard microprocessor, it allows a multi-language display reading, a more detailed description of parameters, the possibility to manage up to 8 units, to manage non standard communication protocols, a better access to the program.

MT **High and low pressure gauges** 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.

PM **Spring-type vibration dampers**: spring-type vibration dampers support, for insulating the unit (supplied in kit), mainly indicated for installation in difficult and aggressive environments. Made of two steel plates containing a suitable quantity of harmonic steel springs.

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.

RF **Power factor correction system cosfi >0,9**: Electrical device made of suitable condensers for compressors rephasing, ensuring a cosfi value ≥0,9 , so to reduce the power absorption from the electrical network.

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**

V **Voltmeter**: Electrical device measuring the electrical tension in the power supply of the unit.

VS **Solenoid valve**: electromagnetic solenoid valve on each cooling circuit to prevent refrigerant migrations and consequent flooding of compressors.

Technical data - Standard version

MCE		752 K	892 K	982 K	1062 K	1332 K	1352 K	1482 K	1622 K	1922 K	1972 K	2292 K	2542 K	2702 K	2962 K
Cooling capacity															
Cooling capacity	kW	72,8	85,0	94,1	101,7	128,0	129,0	142,0	156,0	185,0	189,0	220,0	245,0	268,0	288,0
Nominal input power	kW	27,0	29,2	36,2	35,7	44,0	42,0	54,0	54,7	66,6	72,8	81,2	89,4	100,0	116,0
EER		2,69	2,91	2,60	2,85	2,91	3,07	2,59	2,85	2,78	2,60	2,71	2,74	2,68	2,48
Axial fans															
Quantity	n.	2				3				4			5		
Rotation speed	rpm	880													
Air flow	m^3/h	42˙840	38˙880		36˙000	59˙040			54˙000	79˙920		74˙160	99˙360	92˙520	
Air flow	l/s	11˙900	10˙800		10˙000	16˙400			15˙000	22˙200		20˙600	27˙600	25˙700	
Motor input power	kW	4				6				8			10		
Input current	A	8				12				16			20		
Scroll compressors															
Quantity	n.	2	4		2	4	2	4	2	6	4				
Circuits	n.	2													
Standard capacity steps	n.	2	4		2	4	2	4	2	4					
Nominal input current	A	48,0	54,0	66,0	61,0	77,0	72,0	96,0	93,0	113,0	123,0	137,0	151,0	171,0	198,0
Maximum input current	A	64,0	80,0	88,0	82,0	108,0	104,0	128,0	125,0	162,0	164,0	208,0		250,0	
Inrush current	A	230,0	183,0	193,0	266,0	248,0	324,0	294,0	373,0	302,0	348,0	428,0		498,0	
Electrical data															
Total input power	kW	31,0	33,2	40,2	39,7	50,2	48,0	60,7		74,6	80,8	89,2	99,4	110,0	126,0
Total nominal input current	A	56,0	62,0	74,0	69,0	89,0	84,0	108,0	105,0	129,0	139,0	153,0	171,0	191,0	218,0
Maximum total input current	A	72,0	88,0	96,0	90,0	120,0	116,0	140,0	137,0	178,0	180,0	224,0	228,0	270,0	
Total inrush current	A	238,0	191,0	201,0	274,4	260,0	336,0	306,0	385,0	318,0	364,0	444,0	448,0	518,0	
Sound pressure level															
Sound pressure at 1 m	dB(A)	69	70		72	74			75	76		77			
Dimensions															
Length	mm	2˙715				3˙740				4˙765			5˙790		
Width	mm	1˙370													
Height	mm	2˙140													
Transport weight	kg	1˙144	1˙327	1˙328	1˙356	1˙707	1˙621	1˙753	1˙766	2˙497	2˙410	2˙476	2˙708	3˙037	3˙161
Refrigerant charge per circuit	kg	16,0	20,0		23,0	25,0			30,0	39,0		46,0	45,0	53,0	
Electrical power supply															
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T + N													

REMARKS:
- Operating conditions: External air temperature 35°C; evaporating temperature 2°C (dew)
- Sound pressure level at 1 m in open field (ISO 3744).

Technical data - Silenced version

MCE		752 S K	892 S K	982 S K	1062 S K	1332 S K	1352 S K	1482 S K	1622 S K	1922 S K	1972 S K	2292 S K	2542 S K
Cooling capacity													
Cooling capacity	kW	69,4	81,0	93,2	97,1	121,9	123,7	140,4	149,1	176,8	186,6	213,6	245,1
Nominal input power	kW	28,7	31,3	36,8	38,1	44,7	47,2	55,4	58,2	71,9	74,4	84,7	89,4
EER		2,42	2,59	2,53	2,55	2,73	2,62	2,53	2,56	2,46	2,51	2,52	2,74
Axial fans													
Quantity	n.	2				3				4		5	
Rotation speed	rpm	660											
Air flow	m^3/h	32˙760	29˙520	27˙360		44˙280	44˙200	40˙680		59˙040	54˙720	74˙160	68˙400
Air flow	l/s	9˙100	8˙200	7˙600		12˙300		11˙300		16˙400	15˙200	20˙600	19˙000
Motor input power	kW	2,5				3,7				5,0		6,2	
Input current	A	4,6				6,9				9,2		11,5	
Scroll compressors													
Quantity	n.	2	4		2	4	2	4		6	4		
Circuits	n.	2											
Standard capacity steps	n.	2	4		2	4	2	4	2	4			
Nominal input current	A	50,0	57,0	67,0	64,0	81,0	75,0	97,0		119,0	125,0	141,0	151,0
Maximum input current	A	64,0	80,0	88,0	82,0	108,0	104,0	128,0	125,0	162,0	164,0	208,0	
Inrush current	A	230,0	183,0	193,0	266,0	248,0	324,0	294,0	373,0	302,0	348,0	428,0	
Electrical data													
Total input power	kW	31,2	33,8	39,3	40,6	48,5	51,0	59,2	62,0	76,9	79,4	91,0	95,7
Total nominal input current	A	55,0	61,0	71,0	68,0	88,0	82,0	104,0		128,0	134,0	153,0	162,0
Maximum total input current	A	69,0	85,0	93,0	87,0	115,0	111,0	135,0	132,0	171,0	173,0	224,0	220,0
Total inrush current	A	235,0	188,0	198,0	271,0	255,0	331,0	301,0	380,0	311,0	357,0	444,0	440,0
Sound pressure level													
Sound pressure at 1 m	dB(A)	66			69	70			71		73		77
Dimensions													
Length	mm	2˙715				3˙740				4˙765		5˙790	
Width	mm	1˙370											
Height	mm	2˙140											
Transport weight	kg	1˙144	1˙355	1˙430	1˙440	1˙847	1˙733	1˙971	1˙962	3˙017	3˙060	3˙358	3˙504
Refrigerant charge per circuit	kg	16,0	20,0	23,0		25,0		30,0		39,0	46,0	45,0	53,0
Electrical power supply													
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T + N											

REMARKS:
- Operating conditions: External air temperature 35°C; evaporating temperature 2°C (dew)
- Sound pressure level at 1 m in open field (ISO 3744).

Technical data - Ultrasilenced version

MCE		752 U K	892 U K	982 U K	1062 U K	1332 U K	1352 U K	1482 U K	1622 U K	1922 U K	1972 U K	2292 U K
Cooling capacity												
Cooling capacity	kW	71,8	79,8	91,2	102,5	120,3	124,7	142,8	154,2	181,1	191,3	213,6
Nominal input power	kW	27,5	31,9	37,8	36,9	48,0	49,0	54,2	60,7	68,9	79,5	91,4
EER		2,61	2,50	2,41	2,78	2,51	2,54	2,63	2,54	2,63	2,41	2,34
Axial fans												
Quantity	n.	2			3			4		5		
Rotation speed	rpm	530										
Air flow	m^3/h	24˙000	22˙000	38˙880	36˙000	33˙000		47˙880		60˙120		55˙080
Air flow	l/s	6˙670	6˙110	10˙800	10˙000	9˙170		13˙300		16˙700		15˙300
Motor input power	kW	1,5			2,3			3,1		3,9		
Input current	A	3,0			4,5			6,0		7,5		
Scroll compressors												
Quantity	n.	2	4		2	4	2	4	2	6	4	
Circuits	n.	2										
Standard capacity steps	n.	2	4		2	4	2	4	2	4		
Nominal input current	A	48,0	58,0	68,0	66,0	82,0	86,0	96,0	107,0	116,0	139,0	159,0
Maximum input current	A	64,0	80,0	88,0	82,0	108,0	104,0	128,0	125,0	162,0	164,0	208,0
Inrush current	A	230,0	183,0	193,0	266,0	248,0	324,0	294,0	373,0	302,0	348,0	428,0
Electrical data												
Total input power	kW	29,0	33,4	40,1	39,2	50,3	51,3	57,3	63,8	72,8	83,4	95,3
Total nominal input current	A	51,0	61,0	73,0	70,0	87,0	91,0	102,0	113,0	124,0	146,0	167,0
Maximum total input current	A	67,0	83,0	93,0	87,0	113,0	109,0	134,0	131,0	170,0	172,0	216,0
Total inrush current	A	233,0	186,0	198,0	271,0	253,0	329,0	300,0	379,0	310,0	356,0	436,0
Sound pressure level												
Sound pressure at 1 m	dB(A)	63			65			66	67		69	
Dimensions												
Length	mm	2˙715			3˙740			4˙765		5˙790		
Width	mm	1˙370										
Height	mm	2˙140										
Transport weight	kg	1˙167	1˙392	1˙623	1˙689	1˙884	1˙770	2˙502	2˙529	3˙290	3˙269	3˙416
Refrigerant charge per circuit	kg	20,0	23,0	20,0	25,0	30,0		39,0		45,0		53,0
Electrical power supply												
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T + N										

REMARKS:
- Operating conditions: External air temperature 35°C; evaporating temperature 2°C (dew)
- Sound pressure level at 1 m in open field (ISO 3744).

AIR COOLED CONDENSING UNITS
WITH SCROLL COMPRESSORS AND CENTRIFUGAL FANS

REFRIGERANT R407C

MCE 201 C K

Series MCE ... C K

Cooling capacity from 10 to 40 kW - 1 circuit

The air cooled condensing units with centrifugal fans of **MCE C K series**, to be matched to remote evaporating units, are designed for indoor 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 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 oil charge.

The following versions are available:
Vertical air flow
MCE...C K standard version
MCE...C U K ultrasilenced version (from size 201)
Vertical air flow (from size 201)
MCE...C.O K standard version
MCE...C.O U K ultrasilenced version

Operation limits: (standard units): external air temperature from 15 to 45°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.

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.

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 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.

Centrifugal fans of double suction type with electrical motor directly joined and balanced blades, suitably isolated with rubber vibration dampers and sealing on discharge. They are provided with short circuit and overload protections and external safety protection grid. The motor is of 4-pole triphase type, with belt transmission and variable pulleys, placed on slide so to speed up the pulley tension. As a standard, the unit has a vertical airflow or, on request, you can ask for an horizontal airflow, coil side (from size 201).

Cooling circuit composed of dehydrating filter, sight glass, safety device, high and low pressure switches, shut-off valve on discharge side, liquid receiver.

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.

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

Accessories

1M-2M **Higher available pressure for fan**: bigger electrical motor, so to have a higher available pressure to fans to be ducted (from size 201).

AE **Electrical power supply different from standard:** mainly, 230V three-phase, 460V three-phase. Frequency 50/60 Hz.

BF **Low temperature operation (-20°C) with inverter fan speed regulation**: electronic device controlling the condensing pressure through an inverter, modulating the frequency of the fans electrical supply (from size 201).

BFa-BFb **Low temperature operation (-20°C) with inverter fan speed regulation** (with option 1M and 2M): electronic device controlling the condensing pressure through an inverter, modulating the frequency of the fans electrical supply (from size 201).

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.

BTa-BTb **Low temperature operation (-20°C) (with option 1M-2M)**: electronic device for the continuous modulating voltage control of the condensing pressure through the variation of the fan rotation speed (from size 201).

CF **Soundproofed compressors cabinet**: Insulation of compressors by a cabinet coated with soundproofing material and vibration dampers under compressors (from size 201 and included on ultrasilenced version).

CI **Soundproofing jacket on compressors:** made of soundproofing material, wrapped all around compressors so to further reduce the overall sound level of the unit (from size 201 and already included on ultrasilenced version).

CS **Compressors inrush counter**: Electromechanical device positioned inside the electrical board, recording the total inrush starts of compressors (from size 201).

GP **Condensing coil protection grid**: metal protection grid against accidental impacts.

HG **Hot gas by-pass**: 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** 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.

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.

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**

VS **Solenoid valve**: electromagnetic solenoid valve on each cooling circuit to prevent refrigerant migrations and consequent flooding of compressors.

Technical data

MCE		131 C K	151 C K	161 C K	181 C K
Cooling capacity					
Cooling capacity	kW	10,3	12,2	15,8	16,6
Nominal input power	kW	3,6	4,7	5,6	6,2
EER		2,86	2,59	2,82	2,62
Centrifugal fans					
Quantity	n.	2			
Air flow	m^3/h	7˙500		6˙700	
Air flow	l/s	2˙083		1˙861	
Rotation speed	rpm	1˙250			
Motor input power	kW	1,0		2,2	
Input current	A	13,6			
Available pressure	Pa	40		165	
Scroll compressors					
Quantity	n.	1			
Circuits	n.	1			
Standard capacity steps	%	0 – 100			
Nominal input current	A	5,4	6,3	9,0	10,3
Maximum input current	A	12,0	14,0	16,0	18,0
Inrush current	A	56,0	68,0	77,0	81,0
Electrical data					
Total input power	kW	4,1	5,2	6,7	7,3
Sound pressure level					
Sound pressure at 1 m	dB(A)	60			
Dimensions					
Length	mm	1˙100			
Width	mm	750			
Height	mm	1˙100			
Transport weight	kg	217	221	238	240
Electrical power supply					
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T			

REMARKS:
- Operating conditions: External air temperature 35°C; evaporating temperature 2°C
- Sound pressure level at 1 m in open field (ISO 3744).

Technical data - Standard version

MCE		201 C K	241 C K	281 C K	361 C K	421 C K
Cooling capacity						
Cooling capacity	kW	18,9	23,3	26,9	32,7	40,4
Nominal input power	kW	7,0	8,2	9,4	11,6	14,1
EER		2,70	2,84	2,86	2,82	2,86
Centrifugal fans						
Quantity	n.	1			2 (*)	
Air flow	m^3/h	8˙800	8˙650	9˙000	11˙200	13˙000
Air flow	l/s	2˙444	2˙403	2˙500	3˙111	3˙611
STD Version						
Available pressure	Pa	80				
Rotation speed	rpm	896	915	975	746	858
Motor input power	kW	2,2		3,0	2,2	3,0
Nominal input current	A	5,3		6,7	5,3	6,7
Sound pressure level	dB(A)	66		67	64	65
1M Version						
Available pressure	Pa	120				
Rotation speed	rpm	935	955	1˙014	811	914
Motor input power	kW	3,0			2,2	3,0
Nominal input current	A	6,7			5,3	6,7
Sound pressure level	dB(A)	67		68	65	66
2M Version						
Available pressure	Pa	200				
Rotation speed	rpm	1˙014	1˙036	1˙091	938	1˙025
Motor input power	kW	3,0				4,0
Nominal input current	A	6,7				9,4
Sound pressure level	dB(A)	68		69	66	67
Scroll compressors						
Quantity	n.	1				
Circuits	n.	1				
Standard capacity steps	%	0 – 100				
Nominal input current	A	12,9	15,1	16,0	18,7	22,7
Maximum input current	A	17,0	20,0	22,0	27,0	32,0
Inrush current	A	99,0	123,0	127,0	167,0	198,0
Electrical data						
Total input power	kW	9,2	10,4	12,4	13,8	17,1
Dimensions						
Length	mm	1˙320			1˙665	
Width	mm	750				
Height	mm	1˙250			1˙460	
Transport weight	kg	395	406	417	499	522
Electrical power supply						
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T				

REMARKS:
- Operating conditions: External air temperature 35°C; evaporating temperature 2°C
- Sound pressure level at 1 m in open field (ISO 3744) with ducted air suction and discharge
- (*) 2 fans in tandem, driven by 1 motor.
- In case of a different available pressure, included between the standard pressure and the values indicated for 1M or 2M options, however not higher 2M, it is necessary to order the higher pressure option, clearly stating the pressure value effectively requested on site. In the factory we will adjust the motor's pulley accordingly.

Technical data - Ultrasilenced version

MCE C.U		201 K	241 K	281 K	361 K	421 K
Cooling capacity						
Cooling capacity	kW	19,2	22,8	26,9	33,6	39,8
Nominal input power	kW	6,9	8,5	9,4	11,7	14,3
EER		2,78	2,68	2,86	2,87	2,78
Centrifugal fans						
Quantity	n.	1		2 (*)		2
Air flow	m^3/h	6˙300	7˙200	6˙950	9˙600	13˙900
Air flow	l/s	1˙750	2˙000	1˙930	2˙666	3˙861
STD Version						
Available pressure	Pa	80		50	80	
Rotation speed	rpm	720	818	637	711	696
Motor input power	kW	1,5				3,0
Nominal input current	A	3,7				7,4
Sound pressure level	dB(A)	62	64	61	63	
1M Version						
Available pressure	Pa	120				
Rotation speed	rpm	776	866	728	785	752
Motor input power	kW	1,5	2,2	1,5		3,0
Nominal input current	A	3,7	5,3	3,7		7,4
Sound pressure level	dB(A)	62	64	61	64	
2M Version						
Available pressure	Pa	200				
Rotation speed	rpm	886	963	891	925	858
Motor input power	kW	1,5	2,2	1,5	2,2	4,4
Nominal input current	A	3,7	5,3	3,7	5,3	10,6
Sound pressure level	dB(A)	63	65	62	64	
Scroll compressors						
Quantity	n.	1				
Circuits	n.	1				
Standard capacity steps	%	0 – 100				
Nominal input current	A	12,7	15,4	16,1	18,9	23,0
Maximum input current	A	17,0	20,0	22,0	27,0	32,0
Inrush current	A	99,0	123,0	127,0	167,0	198,0
Electrical data						
Total input power	kW	8,4	10,0	10,9	13,2	17,3
Dimensions						
Length	mm	1˙320		1˙665		2˙120
Width	mm	750				778
Height	mm	1˙250		1˙460		1˙570
Transport weight	kg	396	407	501	511	642
Electrical power supply						
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T				

REMARKS:
- Operating conditions: External air temperature 35°C; evaporating temperature 2°C
- Sound pressure level at 1 m in open field (ISO 3744) with ducted air suction and discharge
- (*) 2 fans in tandem, driven by 1 motor.
- In case of a different available pressure, included between the standard pressure and the values indicated for 1M or 2M options, however not higher 2M, it is necessary to order the higher pressure option, clearly stating the pressure value effectively requested on site. In the factory we will adjust the motor's pulley accordingly.

AIR COOLED CONDENSING UNITS
WITH SCROLL COMPRESSORS AND CENTRIFUGAL FANS

REFRIGERANT R407C

MCE 482 C K

Series MCE ... C K

Cooling capacity from 46 to 219 kW - 2 circuits

The air cooled condensing units with centrifugal fans of **MCE C K series**, to be matched to remote evaporating units, are designed for indoor installation and are particularly suitable for small and medium sized air conditioning systems, in residential and commercial applications.
They are all available with 2 refrigerant circuits.
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 nitrogen and oil charge.

The following versions are available:
Vertical air flow
MCE...C K standard version
MCE...C U K ultrasilenced version
Horizontal air flow
MCE...C.O K standard version
MCE...C.O U K ultrasilenced version

Operation limits: (standard units): external air temperature from 15 to 45°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 installed. The external panels, easy to be dismantled with a quick ¾ key turn, allow the full access to all components in case of service.

High-efficiency scroll compressor (EER 3,7 at ARI conditions), with low sound level, internal heat protection, installed on rubber vibration dampers, supplied with crankcase heater. Being 2 circuit units, in case of problem on one of the circuit, the 50% operation of the unit is anyway granted.

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 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.

Centrifugal fans of double suction type with electrical motor directly joined and balanced blades, suitably isolated with rubber vibration dampers and sealing on discharge. They are provided with short circuit and overload protections and external safety protection grid. The motor is of 4-pole triphase type, with belt transmission and variable pulleys, placed on slide so to speed up the pulley tension. As a standard, the unit has a vertical airflow or, on request, you can ask for an horizontal airflow (coil side).

Cooling circuit composed of dehydrating filter, sight glass, safety device, high and low pressure switches, shut-off valve on discharge side, liquid receiver.

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.

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

Accessories

1M-2M **Higher available pressure for fans**: bigger electrical motor, so to have a higher available pressure to fans to be ducted.

AE **Electrical power supply different from standard:** mainly, 230V three-phase, 460V three-phase. Frequency 50/60 Hz.

BF **Low temperature operation (-20°C) with inverter fan speed regulation**: electronic device controlling the condensing pressure through an inverter, modulating the frequency of the fans electrical supply.

BFa-BFb **Low temperature operation (-20°C) with inverter fan speed regulation (with option 1M and 2M)**: electronic device controlling the condensing pressure through an inverter, modulating the frequency of the fans electrical supply.

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 (not available for size 822).

BTa **Low temperature operation (-20°C) (with option 1M)**: electronic device for the continuous modulating voltage control of the condensing pressure through the variation of the fan rotation speed (not available for size 822).

CF **Soundproofed compressors cabinet**: Insulation of compressors by a cabinet coated with soundproofing material and vibration dampers under compressors (included on ultrasilenced version).

CI **Soundproofing jacket on compressors:** made of soundproofing material, wrapped all around compressors so to further reduce the overall sound level of the unit (already included on ultrasilenced version).

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

G4 **Cooling capacity control** with 4 steps (available from size 962).

GP **Condensing coil protection grid**: metal protection grid against accidental impacts.

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.

MP **Oversized microprocessor**: compared to the standard microprocessor, it allows a multi-language display reading, a more detailed description of parameters, the possibility to manage up to 8 units, to manage non standard communication protocols, a better access to the program (available from size 842).

MT **High and low pressure gauges** 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.

PM **Spring-type vibration dampers**: spring-type vibration dampers support, for insulating the unit (supplied in kit), mainly indicated for installation in difficult and aggressive environments. Made of two steel plates containing a suitable quantity of harmonic steel springs (available from size 842).

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.

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**

VS **Solenoid valve**: electromagnetic solenoid valve on each cooling circuit to prevent refrigerant migrations and consequent flooding of compressors.

Technical data - Standard version

MCE		482 C K	562 C K	702 C K	822 C K	842 C K	962 C K	1102 C K	1402 C K	1502 C K	1602 C K	2302 C K	2402 C K	2602 C K
Cooling capacity														
Cooling capacity	kW	46,5	53,6	65,4	80,7	78,0	83,1	92,5	121,4	128,3	143,9	191,8	206,5	219,2
Nominal input power	kW	16,4	18,6	23,5	28,4	28,9	33,8	40,4	47,0	53,4	59,7	73,8	78,0	85,0
EER		2,83	2,88	2,78	2,84	2,70	2,46	2,29	2,58	2,40	2,41	2,60	2,65	2,58
Centrifugal fans														
Quantity	n.	2				3			4			6		
Air flow	m^3/h	16˙700	20˙900	24˙600	28˙400	40˙000	37˙500		50˙000		48˙000	73˙200		
Air flow	l/s	4˙639	5˙806	6˙834	7˙889	11˙110	10˙415		13˙890		13˙300	20˙330		
STD Version														
Available pressure	Pa	80				50	70				100	80		
Rotation speed	rpm	782	919	640	745	920	900		915		935	920		
Motor input power	kW	4,4	8,0	6,0	11,0	12,0			16,0			24,0		
Nominal input current	A	10,6	18,8	13,4	24,0	28,2			37,6			56,4		
Sound pressure level	dB(A)	65	66	68		70			72		73	74		
1M Version														
Available pressure	Pa	120				100	180		190		240	220		
Rotation speed	rpm	830	959	669	769	970	1˙030				1˙065	1˙050		
Motor input power	kW	4,4	8,0		11,0	12,0			16,0			24,0		
Nominal input current	A	10,6	18,8		24,0	28,2			37,6			56,4		
Sound pressure level	dB(A)	66	68	71	72		71	72	74		75	78		
2M Version														
Available pressure	Pa	200				260	270		350		355	350		
Rotation speed	rpm	923	1˙037	725	819	1˙110	1˙100		1˙170					
Motor input power	kW	6,0	8,0		11,0	15,5			22,0			33,0		
Nominal input current	A	13,4	18,8		24,0	36,0			48,0			72,0		
Sound pressure level	dB(A)	67		71	74	75			76			77		78
Scroll compressors														
Quantity	n.	2					4							
Circuits	n.	2												
Standard capacity steps	n.	2												
Optional capacity steps	n.	–					4							
Nominal input current	A	30,0	32,0	38,0	46,0	48,0	57,0	68,0	77,0	89,0	93,0	117,0	126,0	139,0
Maximum input current	A	40,0	44,0	54,0	64,0		80,0	88,0	108,0	118,0	128,0	164,0	186,0	208,0
Inrush current	A	143,0	149,0	194,0	230,0		183,0	193,0	248,0	284,0	294,0	348,0	406,0	428,0
Electrical data														
Total input power	kW	20,8	26,6	29,5	39,4	40,9	45,8	52,4	63,0	69,4	75,7	97,8	102,0	109,0
Dimensions														
Length	mm	2˙120		2˙280			2˙610			3˙460			5˙150	
Width	mm	778		990						1˙245				
Height	mm	1˙570		1˙845						1˙995				
Transport weight	kg	752	782	856	929	1˙334	1˙449	1˙456	1˙800	1˙840	1˙940	2˙400	2˙450	2˙540
Electrical power supply														
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T												

REMARKS:
- Operating conditions: External air temperature 35°C; evaporating temperature 2°C
- Sound pressure level at 1 m in open field (ISO 3744) with ducted air suction and discharge
- In case of a different available pressure, included between the standard pressure and the values indicated for 1M or 2M options, however not higher 2M, it is necessary to order the higher pressure option, clearly stating the pressure value effectively requested on site. In the factory we will adjust the motor's pulley accordingly.

Technical data - Ultrasilenced version

MCE C.U		482 K	562 K	702 K	842 K	962 K	1102 K	1402 K	1502 K	1602 K	2302 K	2402 K	2602 K
Cooling capacity													
Cooling capacity	kW	46,2	53,5	65,4	72,0	81,0	91,0	122,0	132,0	142,0	196,0	203,4	215,5
Nominal input power	kW	16,5	18,9	23,5	30,1	34,8	40,6	46,3	52,1	61,0	71,7	80,0	86,2
EER		2,80	2,83	2,78	2,39	2,33	2,24	2,63	2,53	2,33	2,73	2,54	2,50
Centrifugal fans													
Quantity	n.	2			3		4	6			8		
Air flow	m^3/h	14˙700	18˙000	20˙700	21˙300	28˙800		43˙800			54˙400		
Air flow	l/s	4˙083	5˙000	5˙750	5˙920	8˙000		12˙170			15˙110		
STD Version													
Available pressure	Pa	80			60	70					100		
Rotation speed	rpm	460	509	585	590	760	590	610			650		
Motor input power	kW	3,0		4,4	3,3	6,6	4,4	6,6			8,8		
Nominal input current	A	7,4		10,6	8,4	15,9	11,2	16,8			22,4		
Sound pressure level	dB(A)	60	58		60	64	60	61			64		
1M Version													
Available pressure	Pa	120			160	190	160	250					
Rotation speed	rpm	508	548	616	750	890	720	880			870		
Motor input power	kW	3,0		4,4	3,3	6,6	4,4	9,0			12,0		
Nominal input current	A	7,4		10,6	8,4	15,9	11,2	22,2			29,6		
Sound pressure level	dB(A)	61	63	66	65		66	68		69	74		
2M Version													
Available pressure	Pa	200			250	270		360			370		
Rotation speed	rpm	599	626	684	870	975	870	1˙015					
Motor input power	kW	3,0	4,4	6,0	4,5	9,0	6,0	13,2			17,6		
Nominal input current	A	7,4	10,6	13,4	11,1	20,1	14,8	31,8			42,4		
Sound pressure level	dB(A)	62	64	66	67	68		69			74		75
Scroll compressors													
Quantity	n.	2			4								
Circuits	n.	2											
Standard capacity steps	n.	2											
Optional capacity steps	n.	–			4								
Nominal input current	A	30,0	32,0	38,0	49,6	59,1	69,8	78,8	89,2	97,2	118,6	132,6	144,6
Maximum input current	A	40,0	44,0	54,0	64,0	80,0	88,0	108,0	118,0	128,0	164,0	186,0	208,0
Inrush current	A	143,0	149,0	194,0	230,0	183,0	193,0	248,0	284,0	294,0	348,0	406,0	428,0
Electrical data													
Total input power	kW	19,5	21,9	27,9	33,4	41,4	45,0	52,9	58,7	67,6	80,5	88,8	95,0
Dimensions													
Length	mm	2˙280			2˙610		3˙460	5˙150			6˙840		
Width	mm	990			1˙245								
Height	mm	1˙845			1˙995								
Transport weight	kg	825		869	1˙352	1˙467	1˙757	2˙485	2˙525	2˙535	2˙980	3˙000	3˙020
Electrical power supply													
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T											

REMARKS:
- Operating conditions: External air temperature 35°C; evaporating temperature 2°C
- Sound pressure level at 1 m in open field (ISO 3744) with ducted air suction and discharge
- In case of a different available pressure, included between the standard pressure and the values indicated for 1M or 2M options, however not higher 2M, it is necessary to order the higher pressure option, clearly stating the pressure value effectively requested on site. In the factory we will adjust the motor's pulley accordingly.

EVAPORATING UNITS WITH HOUSING AND SCROLL COMPRESSORS

REFRIGERANT R407C - R134A

MEE 391 K

Series MEE ... K / Ka

Cooling capacity from 5 to 81 kW - 1 circuit

The evaporating units of **MEE K/Ka series**, to be matched to remote condensers, are designed for indoor installation and are particularly suitable for small and medium sized air conditioning systems, in residential and commercial applications. For this reason, they are made of a housing in painted steel plate.
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 oil charge.

The following versions are available:
MEE...K with R407C ecological refrigerant charge
MEE...Ka with R134a ecological refrigerant charge

Water operation limits (standard units):
EVAPORATOR (OUT): from 5 to 15°C

Main components:

Strong and compact frame, with a housing made of galvanized and RAL 7035 painted steel plate. The front and the access panels to the electrical board are easy to be opened. The main components are installed inside the housing, which can be isolated with standard soundproofing material (option CL) or with bituminous rubber soundproofing material (option CM). When required, the hydraulic kit (buffer tank and hydraulic kit) is installed into an additional section at the bottom of the unit, so not change the overall 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. Higher capacity units are equipped with two scroll compressors in tandem.

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, high and low pressure switches, shut-off valve on the liquid line, shut-off valve on compressor discharge, solenoid valve, safety valve.

Electric board in compliance with CE norms, contained in a suitable partition protected by the hinged internal safety panel, provided with protection fuses and safety transformer. In case of hydraulic kit on board, the electrical control of the pump group is provided.

Unit management **microprocessor** installed on the external panel, easily accessible, complete with compressors hour counter.

Accessories

AE **Electrical power supply different from standard:** mainly, 230V three-phase, 460V three-phase. Frequency 50/60 Hz.

AC **Electrical control for condensers**: in case the remote condenser is included in our supply, its control (regulation and power) is provided in the electrical board of the evaporating unit. On the other hand, if the remote condenser is supplied by the customer, we suggest to inform about the absorbed current of the condenser, so to provide the electric control in the electric board of the indoor unit.

CL **Soundproofing insulation with standard material**: insulation of the compressor housing by means of soundproofing material.

CM **Soundproofing insulation with bituminous rubber material**: insulation of the compressor housing by means of bituminous rubber coated material.

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

HG **Hot gas by-pass**: mechanical device for modulating cooling capacity, preventing frequent compressor' stops.

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.

LR **Liquid receiver** suitably sized to contain the exceeding quantity of liquid refrigerant.

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** for measuring circuit pressure.

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

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 pole centrifugal packaged type.

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.

RV **Personalized frame painting in RAL colour**

SN **Main switch**: manual switch of lock-door type, switching off the unit.

VB **Brine version**: unit suitable for working with evaporator outlet water temperatures lower than 0°C. A 20 mm evaporator insulation will be provided.

Technical data - Refrigerant R407C

MEE		61 K	111 K	171 K	201 K	221 K	251 K	301 K	381 K	461 K	501 K	571 K	751 K	901 K
Cooling capacity														
Cooling capacity	kW	5,5	10,0	15,2	17,9	19,3	23,1	27,2	35,1	42,0	45,5	52,8	69,1	80,9
Nominal input power	kW	1,2	2,1	2,9	3,4	4,6	5,6	6,3	8,5	9,9	11,2	12,8	17,0	19,8
EER		4,58	4,76	5,24	5,26	4,19	4,12	4,32	4,13	4,24	4,06	4,12	4,06	4,08
Scroll compressors														
Quantity	n.	1									2			
Circuits	n.	1												
Standard capacity steps	%	0 / 100									0 / 50 / 100			
Nominal input current	A	5,6	9,9	6,6		9,6	11,7	13,4	18,3	19,4	23,4	24,5	36,5	38,7
Maximum input current	A	11,0	23,0	11,0	13,0	17,0	20,0	22,0	27,0	32,0	40,0	44,0	54,0	64,0
Inrush current	A	47,0	100,0	66,0	72,0	99,0	123,0	127,0	167,0	198,0	143,0	149,0	194,0	230,0
Evaporator														
Type		Weld-brazed plate												
Quantity	n.	1												
Circuits	n.	1												
Water flow	m^3/h	0,9	1,7	2,6	3,1	3,3	4,0	4,7	6,0	7,2	7,8	9,1	11,9	13,9
Water flow	l/s	0,2	0,5	0,7	0,9		1,1	1,3	1,7	2,0	2,2	2,5	3,3	3,9
Pressure drop	kPa	23	27	32	38	40	46		50	73	19	22	20	21
Pumps														
P1 – Available pressure	kPa	64	43	58	79	72	64	94	85	76	85	67	49	37
P1 – Motor input power	kW	0,18		0,55				0,75						1,1
P1H – Available pressure	kPa	84	70	90	111	104	98	138	128	120	142	123	112	100
P1H – Motor input power	kW	0,18		0,75				1,1						1,5
Capacity of buffer tank	l	80									110			
Sound pressure level														
Sound pressure at 1 m	dB(A)	58	59	58	60		61		62		63		64	
Dimensions														
Length	mm	800									1˙600			
Width	mm	500									750			
Height	mm	960												
Height with MV option	mm	1˙430									1˙340			
Transport weight	kg	113	120	133	135	170	180	181	198	210	290		337	358
Transport weight with empty buffer tank	kg	163	170	183	185	220	230	231	248	260	450		497	518
Electrical power supply														
Electrical power supply	V / ph / Hz	230 / 1 / 50 + N + T		400 / 3 / 50 + N + T										

REMARKS:
- Operating conditions: Evaporator water temperature 7/12°C; condensing temperature 49°C (dew)
- Sound pressure level at 1 m in open field (ISO 3744).

Technical data - Refrigerant R134a

MEE		151 Ka	181 Ka	211 Ka	271 Ka	311 Ka	351 Ka	421 Ka	521 Ka	601 Ka
Cooling capacity										
Cooling capacity	kW	13,5	16,3	18,8	24,7	28,0	31,9	38,3	47,8	54,5
Nominal input power	kW	3,2	3,8	4,4	5,9	6,7	7,7	9,0	11,8	13,8
EER		4,22	4,29	4,27	4,19	4,18	4,14	4,25	4,05	3,95
Scroll compressors										
Quantity	n.	1					2			
Circuits	n.	1								
Standard capacity steps	%	0 / 100					0 / 50 / 100			
Nominal input current	A	8,1	9,9	11,4	13,2	15,7	20,0	19,5	26,5	31,7
Maximum input current	A	17,0	20,0	22,0	27,0	32,0	40,0	44,0	54,0	64,0
Inrush current	A	99,0	123,0	127,0	167,0	198,0	143,0	149,0	194,0	230,0
Evaporator										
Type		Weld-brazed plate								
Quantity	n.	1								
Circuits	n.	1								
Water flow	m^3/h	2,3	2,8	3,2	4,2	4,8	5,5	6,6	8,2	9,4
Water flow	l/s	0,6	0,8	0,9	1,2	1,3	1,5	1,8	2,3	2,6
Pressure drop	kPa	21	32	33	25	22	17	18	27	23
Pumps										
P1 – Available pressure	kPa	72	87	75	71	110	111	110	96	92
P1 – Motor input power	kW	0,55				0,75				
P1H – Available pressure	kPa	103	118	107	104	152	164	165	152	150
P1H – Motor input power	kW	0,75				1,1	0,75		1,1	
Capacity of buffer tank	l	80					110			
Sound pressure level										
Sound pressure at 1 m	dB(A)	56	57		58		59		60	
Dimensions										
Length	mm	800					1`600			
Width	mm	500					750			
Height	mm	960								
Height with MV option	mm	1`430					1`340			
Transport weight	kg	170	180	181	198	210	290	287	337	358
Transport weight with empty buffer tank	kg	220	230	231	248	260	450	437	497	518
Electrical power supply										
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T								

REMARKS:
- Operating conditions: Evaporator water temperature 7/12°C; condensing temperature 47°C (dew)
- Sound pressure level at 1 m in open field (ISO 3744).

EVAPORATING UNITS
WITH SCROLL COMPRESSORS (SINGLE AND TANDEM)

REFRIGERANT R407C - R134A

MEE 1082 K

Series MEE ... K / Ka

Cooling capacity from 27 to 360 kW - 1 and 2 circuits

The evaporating units of **MEE K/Ka series**, to be matched to remote condensers, are designed for indoor installation and are particularly suitable for small and medium sized air conditioning systems, in residential and commercial applications.
They are all available with 1 or 2 refrigerant circuits.
They have been designed to be extremely compact, with an easy access for both ordinary and extraordinary service operations.
Thanks to their dimensions (for the whole range, the width is 750 mm) and to the several options available, these units are particularly easy to install also in small spaces, with no building works.
They are completely assembled and tested in the factory and supplied with refrigerant and oil charge.

The following versions are available:
MEE...K with R407C ecological refrigerant charge
MEE...Ka with R134a ecological refrigerant charge

Water operation limits (standard units):
EVAPORATOR (OUT): from 5 to 15°C

Main components:

Strong and compact frame, made of bended and RAL 7035 coloured steel profiles, supporting all the main components, installed at sight. On request, the compressors can be isolated by a soundproofing cabinet with standard material (option CF) or with bituminous rubber coated material (option CFU), so to further reduce the overall sound level of the unit itself.

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. Higher capacity units, with both 1 and 2 cooling circuits, are equipped with two scroll compressors in tandem.

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, high and low pressure switches, high and low pressure gauges, shut-off valve on liquid line, solenoid valve, shut-off valve on compressor discharge side, safety valve.

Electric board in compliance with CE norms, contained in a suitable partition protected by the hinged internal safety panel, provided with protection fuses and safety transformer.

Unit management **microprocessor** installed on the external panel, easily accessible, complete with compressors hour counter.

Accessories

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

AE **Electrical power supply different from standard:** mainly, 230V three-phase, 460V three-phase. Frequency 50/60 Hz.

AC **Electrical control for condensers**: in case the remote condenser is included in our supply, its control (regulation and power) is provided in the electrical board of the evaporating unit. On the other hand, if the remote condenser is supplied by the customer, we suggest to inform about the absorbed current of the condenser, so to provide the electric control in the electric board of the indoor unit.

CF **Soundproofed compressors cabinet with standard material**: Insulation of compressors by a cabinet made of extruded anodized aluminium profiles, with panels in aluminium alloy, coated with soundproofing material and vibration dampers under compressors.

CFU **Soundproofed compressors cabinet with bituminous rubber coated material**: Insulation of compressors by a cabinet made of extruded anodized aluminium profiles, with panels in aluminium alloy, coated with bituminous rubber soundproofing material and vibration dampers under compressors, mufflers on compressors discharge pipes.

CI **Soundproofing jacket on compressors:** made of soundproofing material, wrapped all around compressors so to further reduce the overall sound level of the unit.

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

HG **Hot gas by-pass**: mechanical device for modulating cooling capacity (only for 1-circuit sizes).

IE **Fumigated wooden crate packing:** available on request for critical transports, so to assure a suitable protection to the unit.

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.

IR **Packing with fumigated wooden pallet and transparent film**: minimal packing made of wooden pallet and transparent film wrapped all around the unit.

LR **Liquid receiver** suitably sized to contain the exceeding quantity of liquid refrigerant.

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.

MP **Oversized microprocessor**: compared to the standard microprocessor, it allows a multi-language display reading, a more detailed description of parameters, the possibility to manage up to 8 units, to manage non standard communication protocols, a better access to the program.

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.

PM **Spring-type vibration dampers**: spring-type vibration dampers support, for insulating the unit (supplied in kit), mainly indicated for installation in difficult and aggressive environments. Made of two steel plates containing a suitable quantity of harmonic steel springs.

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.

RP **Partial heat recovery** (about 20%) of the condensing heat, by means of a refrigerant/water plate exchanger (desuperheater), always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity.

RT **Total heat recovery** (100%) of the condensing heat, by means of a refrigerant/water plate exchanger, always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity, and /or for dehumidification.

V **Voltmeter**: Electrical device measuring the electrical tension in the power supply of the unit.

VB **Brine version**: unit suitable for working with evaporator outlet water temperatures lower than 0°C. A 20 mm evaporator insulation will be provided.

Technical data - Refrigerant R407C - 1 circuit - tandem compressors

MEE		541 K	631 K	761 K	931 K	1201 K	1501 K	1901 K
Cooling capacity								
Cooling capacity	kW	49,9	57,8	71,2	86,9	115,0	143,0	180,0
Nominal input power	kW	14,0	16,0	20,0	24,0	31,8	39,4	47,0
EER		3,56	3,61	3,56	3,62		3,63	3,83
Scroll compressors								
Quantity	n.	2 (1 tandem)						
Circuits	n.	1						
Standard capacity steps	%	0 / 50 / 100						
Nominal input current	A	28,6	30,0	35,0	42,6	54,4	68,8	82,0
Maximum input current	A	40,0	44,0	54,0	64,0	82,0	104,0	125,0
Inrush current	A	143,0	149,0	194,0	230,0	266,0	324,0	373,0
Evaporator								
Type		Weld-brazed plate						
Quantity	n.	1						
Circuits	n.	1						
Water flow	m^3/h	8,6	9,9	12,2	14,9	19,8	24,6	30,9
Water flow	l/s	2,4	2,8	3,4	4,1	5,5	6,8	8,6
Pressure drop	kPa	34	36	28	33	32	33	36
Water volume	l	3,3	3,8	5,0	5,7	7,9	10,2	13,6
Sound pressure level								
Sound pressure at 1 m	dB(A)	70		72		75	77	79
Dimensions								
Length	mm	1˙500						
Width	mm	750						
Height	mm	1˙600				1˙800		
Transport weight	kg	478	490	510	553	648	710	770
Electrical power supply								
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T						

REMARKS:
- Operating conditions: Evaporator water temperature 7/12°C; condensing temperature 49°C (dew)
- Sound pressure level at 1 m in open field (ISO 3744).

Technical data - Refrigerant R407C - 2 circuits - single compressors

MEE		442 K	532 K	612 K	762 K	922 K	1262 K	1552 K	1912 K
Cooling capacity									
Cooling capacity	kW	41,3	50,2	57,8	71,1	87,0	116,0	143,0	179,0
Nominal input power	kW	11,6	14,0	16,0	20,0	24,0	31,8	39,4	47,0
EER		3,56	3,58	3,61	3,55	3,62	3,65	3,63	3,81
Scroll compressors									
Quantity	n.	2							
Circuits	n.	2							
Standard capacity steps	%	0 / 50 / 100							
Nominal input current	A	24,0	29,0	30,0	35,0	43,0	54,0	69,0	82,0
Maximum input current	A	34,0	40,0	44,0	54,0	64,0	82,0	104,0	125,0
Inrush current	A	116,0	143,0	149,0	194,0	230,0	266,0	324,0	373,0
Evaporator									
Type		Weld-brazed plate							
Quantity	n.	2					1		
Circuits	n.	2							
Water flow	m^3/h	7,1	8,6	9,9	12,3	14,9	19,9	24,6	30,8
Water flow	l/s	1,9	2,4	2,8	3,4	4,2	5,5	6,8	8,5
Pressure drop	kPa	22	24	32		34	32	35	41
Water volume	l	3,0	4,0		5,0	6,0	8,0	10,0	12,0
Sound pressure level									
Sound pressure at 1 m	dB(A)	70		74	76	73		77	
Dimensions									
Length	mm	1˙500							
Width	mm	750							
Height	mm	1˙600					1˙800		
Transport weight	kg	471	483	492	505	550	651	710	760
Electrical power supply									
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T							

REMARKS:
- Operating conditions: Evaporator water temperature 7/12°C; condensing temperature 49°C (dew)
- Sound pressure level at 1 m in open field (ISO 3744).

Technical data - Refrigerant R407C - 2 circuits - tandem compressors

MEE		892 K	1082 K	1212 K	1512 K	1852 K	2462 K	3102 K	3822 K
Cooling capacity									
Cooling capacity	kW	82,4	99,7	115,0	141,8	175,0	230,0	287,0	360,0
Nominal input power	kW	23,2	28,0	32,0	40,0	48,0	63,6	78,8	94,0
EER		3,55	3,56	3,61	3,54	3,64	3,62	3,64	3,83
Scroll compressors									
Quantity	n.	4 (2 tandem)							
Circuits	n.	2							
Standard capacity steps	%	0 / 25 / 50 / 75 / 100							
Nominal input current	A	48,0	57,0	60,0	70,0	85,0	109,0	138,0	164,0
Maximum input current	A	68,0	80,0	88,0	108,0	128,0	164,0	208,0	250,0
Inrush current	A	150,0	183,0	193,0	244,0	294,0	348,0	428,0	498,0
Evaporator									
Type		Weld-brazed plate							
Quantity	n.	1					2		
Circuits	n.	2							
Water flow	m^3/h	14,2	17,1	19,9	24,4	30,1	39,6	49,3	61,9
Water flow	l/s	3,9	4,8	5,5	6,8	8,4	11,0	13,7	17,2
Pressure drop	kPa	34	38	40		32		33	36
Water volume	l	5,7	6,6	7,5	–	13,8	15,8	20,3	27,1
Sound pressure level									
Sound pressure at 1 m	dB(A)	72	73		75		78	80	82
Dimensions									
Length	mm	2˙500				3˙000			
Width	mm	750							
Height	mm	1˙800							
Transport weight	kg	812	827	852	878	984	1˙204	1˙328	1˙448
Electrical power supply									
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T							

REMARKS:
- Operating conditions: Evaporator water temperature 7/12°C; condensing temperature 49°C (dew)
- Sound pressure level at 1 m in open field (ISO 3744).

Technical data - Refrigerant R134a - 1 circuit - tandem compressors

MEE		341 Ka	401 Ka	491 Ka	591 Ka	711 Ka	971 Ka	1201 Ka
Cooling capacity								
Cooling capacity	kW	32,9	38,1	46,4	55,5	74,3	91,1	115,7
Nominal input power	kW	9,6	11,0	13,5	16,1	20,8	26,0	31,8
EER		3,43	3,46	3,44	3,45	3,57	3,50	3,64
Scroll compressors								
Quantity	n.	2 (1 tandem)						
Circuits	n.	1						
Standard capacity steps	%	0 / 50 / 100						
Nominal input current	A	21,2	24,2	29,8	33,8	40,8	51,2	64,0
Maximum input current	A	40,0	44,0	54,0	64,0	82,0	104,0	125,0
Inrush current	A	143,0	149,0	194,0	230,0	266,0	324,0	373,0
Evaporator								
Type		Weld-brazed plate						
Quantity	n.	1						
Circuits	n.	1						
Water flow	m^3/h	5,7	6,5	7,9	9,5	12,8	15,7	19,9
Water flow	l/s	1,6	1,8	2,2	2,6	3,5	4,3	5,5
Pressure drop	kPa	19	20	23	24	17	20	22
Water volume	l	2,9	3,3	3,8	4,8	6,8	7,9	10,2
Sound pressure level								
Sound pressure at 1 m	dB(A)	70		72		75	77	79
Dimensions								
Length	mm	1˙500						
Width	mm	750						
Height	mm	1˙600				1˙800		
Transport weight	kg	475	487	497	541	640	696	748
Electrical power supply								
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T						

REMARKS:
- Operating conditions: Evaporator water temperature 7/12°C; condensing temperature 47°C (dew)
- Sound pressure level at 1 m in open field (ISO 3744).

Technical data - Refrigerant R134a - 2 circuits - single compressors

MEE		282 Ka	352 Ka	402 Ka	492 Ka	592 Ka	772 Ka	972 Ka	1222 Ka
Cooling capacity									
Cooling capacity	kW	26,8	33,1	37,8	46,6	55,9	73,5	91,2	115,7
Nominal input power	kW	7,9	9,6	11,0	13,5	16,1	20,8	26,0	31,8
EER		3,39	3,45	3,44	3,45	3,47	3,53	3,51	3,64
Scroll compressors									
Quantity	n.	2							
Circuits	n.	2							
Standard capacity steps	%	0 / 50 / 100							
Nominal input current	A	19,0	21,0	24,0	30,0	34,0	41,0	51,0	64,0
Maximum input current	A	34,0	40,0	44,0	54,0	64,0	82,0	102,0	125,0
Inrush current	A	116,0	143,0	149,0	194,0	230,0	266,0	324,0	373,0
Evaporator									
Type		Weld-brazed plate							
Quantity	n.	2							
Circuits	n.	2							
Water flow	m^3/h	4,6	5,7	6,5	8,0	9,6	12,6	15,7	19,9
Water flow	l/s	1,3	1,6	1,8	2,2	2,7	3,5	4,4	5,5
Pressure drop	kPa	15	14	19	21	19	27	25	27
Water volume	l	1,2	1,5		1,9	2,4	5,7	7,5	9,3
Sound pressure level									
Sound pressure at 1 m	dB(A)	69	70		72		75	77	79
Dimensions									
Length	mm	1˙500							
Width	mm	750							
Height	mm	1˙600					1˙800		
Transport weight	kg	459	465	475	486	527	633	693	743
Electrical power supply									
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T							

REMARKS:
- Operating conditions: Evaporator water temperature 7/12°C; condensing temperature 47°C (dew)
- Sound pressure level at 1 m in open field (ISO 3744).

Technical data - Refrigerant R134a - 2 circuits - tandem compressors

MEE		572 Ka	702 Ka	802 Ka	992 Ka	1192 Ka	1522 Ka	1952 Ka	2442 Ka
Cooling capacity									
Cooling capacity	kW	53,1	65,7	76,4	93,2	111,6	148,6	182,3	231,4
Nominal input power	kW	15,8	19,1	22,0	27,0	32,2	41,6	52,0	63,7
EER		3,36	3,44	3,47	3,45	3,47	3,57	3,50	3,63
Scroll compressors									
Quantity	n.	4 (2 tandem)							
Circuits	n.	2							
Standard capacity steps	%	0 / 25 / 50 / 75 / 100							
Nominal input current	A	38,0	42,0	48,0	60,0	68,0	82,0	102,0	128,0
Maximum input current	A	68,0	80,0	88,0	108,0	128,0	164,0	208,0	250,0
Inrush current	A	150,0	183,0	193,0	244,0	294,0	348,0	428,0	498,0
Evaporator									
Type		Weld-brazed plate							
Quantity	n.	2		1			2		
Circuits	n.	2							
Water flow	m^3/h	9,1	11,3	13,1	16,0	19,2	25,6	31,4	39,8
Water flow	l/s	2,5	3,1	3,6	4,4	5,3	7,1	8,7	11,1
Pressure drop	kPa	22	19	22	26	25	17	20	22
Water volume	l	2,1	2,9	6,6	7,5	9,3	6,8	7,9	10,2
Sound pressure level									
Sound pressure at 1 m	dB(A)	72	73		75		78	80	82
Dimensions									
Length	mm	2˙500				3˙000			
Width	mm	750							
Height	mm	1˙800							
Transport weight	kg	784	798	846	867	955	1˙139	1˙243	1˙334
Electrical power supply									
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T							

REMARKS:
- Operating conditions: Evaporator water temperature 7/12°C; condensing temperature 47°C (dew)
- Sound pressure level at 1 m in open field (ISO 3744).

MEH 161 K + CFU

Series MEH ... K / Ka

Cooling capacity from 76 to 1543 kW - 1 and 2 circuits

The evaporating units of **MEH K/Ka** series, to be matched to remote condensers, are designed for indoor installation and are particularly suitable for industrial processes and air conditioning systems.
They are all available with 1 or 2 refrigerant circuits.
Thanks to their compact dimensions and to the several options available, these units are particularly easy to install also in small spaces, with no building works.
They are completely assembled and tested in the factory and supplied with refrigerant and oil charge.

The following versions are available:
MEH...K with R407C ecological refrigerant charge
MEH...Ka with R134a ecological refrigerant charge

Water operation limits (standard units):
EVAPORATOR (OUT): from 5 to 15°C

Main components:

Strong and compact frame, made of bended and coloured steel profiles (colour RAL 9005-black), supporting the evaporator and on which all the main components are installed at sight. On request, the compressors can be isolated by a soundproofing cabinet with standard material (option CF) or with bituminous rubber coated material (option CFU), so to further reduce the overall sound level of the unit itself.

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).

Dry expansion **shell and tube evaporator** with one or 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.

Each compressor works on an independent **cooling circuit**, assuring a remarkable reliability to multi-compressor units. Each circuit, made of copper or carbon steel tube, is 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, solenoid valve.

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.

AC **Electrical control for condensers**: in case the remote condenser is included in our supply, its control (regulation and power) is provided in the electrical board of the evaporating unit. On the other hand, if the remote condenser is supplied by the customer, we suggest to inform about the absorbed current of the condenser, so to provide the electric control in the electric board of the indoor unit.

AE **Electrical power supply** different from standard: mainly, 230V triphase, 460V triphase. Frequency 50/60 Hz.

CF **Soundproofed compressors cabinet with standard material**: Insulation of compressors by a cabinet made of extruded anodized aluminium profiles, with panels in aluminium alloy, coated with soundproofing material and vibration dampers under compressors.

CFU **Soundproofed compressors cabinet with bituminous rubber coated material**: Insulation of compressors by a cabinet made of extruded anodized aluminium profiles, with panels in aluminium alloy, coated with bituminous rubber soundproofing material and vibration dampers under compressors, mufflers on compressors discharge pipes.

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

DQ **Additional box** for connection of power supply cables.

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

IE **Fumigated wooden crate packing:** available on request for critical transports, so to assure a suitable protection to the unit.

IG **Watch card:** Electronic card to program the switch-over and rotation between to 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.

IR **Packing with fumigated wooden pallet and transparent film**: minimal packing made of wooden pallet and transparent film wrapped all around the unit.

LI **Liquid injection**: mechanical device allowing a better cooling of compressors at very high compression level (standard for R407C).

KS **Lifting kit**: made of belts and brackets to be inserted into the holes present in the unit base-frame. It is used for moving and positioning the unit on site.

M12-M25 **Modulating capacity control**: by means of some valves installed on compressors, the capacity is modulated from 12 to 100%.

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

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.

PM **Spring-type vibration dampers**: spring-type vibration dampers support, for insulating the unit (supplied in kit), mainly indicated for installation in difficult and aggressive environments. Made of two steel plates containing a suitable quantity of harmonic steel springs.

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.

PW **Part-winding**: equipment for step compressors starting, reducing of about 35% the inrush current of each compressor.

RA **Anti-freeze heater on evaporator**: electrical heater installed on the evaporator, in order to prevent freezing and provided with thermostat.

RF **Power factor correction system cosfi >0,9**: Electrical device made of suitable condensers for compressors rephasing, ensuring a cosfi value ≥0,9, so to reduce the power absorption from the electrical network.

RH **Shut-off valve on suction side**: they are use to isolate compressors during service operations.

RL **Compressors overload relays**: electromechanical protection devices against compressor's overload.

RP **Partial heat recovery** (about 20%) of the condensing heat, by means of a refrigerant/water plate exchanger (desuperheater), always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity.

RT **Total heat recovery** (100%) of the condensing heat, by means of a refrigerant/water plate exchanger, always in series to the compressors. It is requested when you need to produce sanitary water, by recovering condensing heat capacity, and /or for dehumidification.

TE **Electronic thermostatic valve**: it is requested to make a very accurate regulation of the refrigerant flow and to limit variations of cooling capacity and evaporator leaving temperature water during operation in transitions and for a better performance with fixed superheating.

V **Voltmeter**: Electrical device measuring the electrical tension in the power supply of the unit.

VB **Brine version**: unit suitable for working with evaporator outlet water temperatures lower than 0°C. A 20 mm evaporator insulation will be provided.

Technical data - Refrigerant R407C - 1 circuit

MEH		131 K	161 K	191 K	211 K	241 K	301 K	341 K	391 K	451 K	521 K	611 K	691 K	781 K
Cooling capacity														
Cooling capacity	kW	108,0	135,0	158,0	183,0	206,0	265,0	297,0	338,0	458,0	519,0	596,0	685,0	770,0
Nominal input power	kW	35,5	43,8	49,3	58,8	66,3	78,0	91,8	103,7	136,0	155,0	176,0	199,0	224,0
EER		3,04	3,08	3,20	3,11		3,40	3,23	3,26	3,37	3,35	3,39	3,44	
Screw compressors														
Quantity	n.	1												
Cooling circuits	n.	1												
Standard capacity steps	n.	3												
Modulating capacity steps (option)	%	0 – 25 ÷ 100												
Nominal input current	A	60,8	74,1	83,2	98,4	108	130,0	154,0	173,0	218,0	256,0	287,0	325,0	364,0
Maximum input current	A	86,0	108,0	128,0	144,0	162,0	180,0	216,0	246,0	330,0	370,0	420,0	450,0	
Inrush current	A	411,0	508,0	485,0	585,0	686,0	801,0	943,0	1`023,0	1`442,0	1`853,0	2`029,0	2`520,0	
Inrush current with options PW/DS	A	218,0	269,0	290,0	350,0	423,0	520,0	612,0	665,0	1`009,0	1`297,0	1`420,0	1`764,0	
Evaporator														
Type		Shell and tube												
Quantity	n.	1												
Circuits	n.	1												
Water flow	m^3/h	18,6	23,2	27,2	31,4	35,5	45,5	51,1	58,1	78,8	89,3	102,5	117,8	132,4
Water flow	l/s	5,2	6,4	7,5	8,7	9,9	12,6	14,2	16,1	21,9	24,8	28,5	32,7	36,8
Pressure drop	kPa	42	44	60	46	59	23	30	38	45	58	60	38	48
Water volume	l	44	42		39		134			185		179	294	
Sound pressure level														
Sound pressure at 1 m	dB(A)	70	76			77		80	81	82	83	84	85	87
Dimensions														
Length	mm	2`900		2`950			3`400			3`450				
Width	mm	680					750			800				
Height	mm	1`445					1`585			1`630		1`720		
Width with CF/CFU	mm	750					850			920				
Transport weight	kg	650		860	870	880	1`370		1`390	2`002	2`024	2`041	2`211	2`233
Electrical power supply														
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T												

REMARKS:
- Operating conditions: Evaporator water temperature 7/12°C; condensing temperature 49°C (dew)
- Sound pressure level at 1 m in open field (ISO 3744).

Technical data - Refrigerant R407C - 2 circuits

MEH		252 K	312 K	372 K	422 K	472 K	592 K	672 K	772 K	902 K	1062 K	1212 K	1382 K	1562 K
Cooling capacity														
Cooling capacity	kW	214,0	271,0	317,0	358,0	413,0	517,0	588,0	676,0	912,0	1`047	1`194,0	1`362,0	1`543,0
Nominal input power	kW	71,0	87,6	98,8	117,2	132,6	155,2	183,2	207,4	273,0	311,0	351,0	397,0	448,0
EER		3,01	3,09	3,21	3,05	3,11	3,33	3,21	3,26	3,34	3,37	3,40	3,43	3,44
Screw compressors														
Quantity	n.	2												
Cooling circuits	n.	2												
Standard capacity steps	n.	6												
Modulating capacity steps (option)	%	0 – 12 ÷ 100												
Nominal input current	A	122,0	148,0	166,0	196,0	216,0	260,0	307,0	346,0	437,0	513,0	574,0	649,0	728,0
Maximum input current	A	172,0	216,0	256,0	288,0	324,0	360,0	432,0	492,0	660,0	740,0	840,0	900,0	
Inrush current	A	497,0	616,0	613,0	729,0	848,0	981,0	1`159,0	1`269,0	1`772,0	2`223,0	2`449,0	2`970,0	
Inrush current with options PW/DS	A	304,0	377,0	418,0	494,0	585,0	700,0	828,0	911,0	1`339,0	1`667,0	1`840,0	2`214,0	
Evaporator														
Type		Shell and tube												
Quantity	n.	1												
Circuits	n.	2												
Water flow	m^3/h	36,7	46,6	54,5	61,5	71,0	88,9	101,4	116,3	156,9	180,1	205,4	234,3	265,4
Water flow	l/s	10,2	12,9	15,1	17,1	19,7	24,7	28,1	32,3	43,6	50,0	57,0	65,1	73,7
Pressure drop	kPa	43	25	34	43	46	66	48	44	50	71	56	55	77
Water volume	l	63	134		129	124	185		179	279	271	264	452	444
Sound pressure level														
Sound pressure at 1 m	dB(A)	73	79			80		83	84	85	86	87	88	90
Dimensions														
Length	mm	3`800	3`850	3`900			3`990			5`200				
Width	mm	680		810			1`000			1`200				
Height	mm	1`445				1`645	1`670			2`020				
Width with CF/CFU	mm	750		850			1`000			1`200				
Transport weight	kg	1`100	1`190	1`630	1`640	1`670	2`480	2`670	2`700	4`367	4`417	4`444	4`912	4`961
Electrical power supply														
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T												

REMARKS:
- Operating conditions: Evaporator water temperature 7/12°C; condensing temperature 49°C (dew)
- Sound pressure level at 1 m in open field (ISO 3744).

Technical data - Refrigerant R134a - 1 circuit

MEH		91 Ka	111 Ka	131 Ka	151 Ka	171 Ka	211 Ka	241 Ka	271 Ka	281 Ka	331 Ka	381 Ka	441 Ka	501 Ka	561 Ka
Cooling capacity															
Cooling capacity	kW	76,2	95,4	111,0	131,0	148,0	175,0	212,0	246,0	283,0	328,0	375,0	439,0	489,0	558,0
Nominal input power	kW	21,9	26,9	33,0	36,8	41,6	47,2	57,5	67,2	74,2	82,5	97,7	114,0	127,0	140,0
EER		3,48	3,55	3,36	3,56		3,71	3,69	3,66	3,81	3,97	3,84	3,85		3,98
Screw compressors															
Quantity	n.	1													
Cooling circuits	n.	1													
Standard capacity steps	n.	3													
Modulating capacity steps (option)	%	0 – 25 ÷ 100													
Nominal input current	A	40,0	47,0	57,0	65,0	73,0	82,0	94,0	115,0	128,0	142,0	162,0	185,0	214,0	234,0
Maximum input current	A	56,0	65,0	79,0	98,0	124,0	144,0	155,0	182,0	215,0	231,0	280,0	310,0	320,0	360,0
Inrush current	A	305,0	338,0	355,0	449,0	485,0	585,0	675,0	801,0	943,0	1˙023,0	1˙364,0	1˙442,0	1˙853,0	2˙029,0
Inrush current with options PW/DS	A	153,0	169,0	206,0	267,0	290,0	350,0	439,0	520,0	612,0	664,0	955,0	1˙009,0	1˙297,0	1˙420,0
Evaporator															
Type		Shell and tube													
Quantity	n.	1													
Circuits	n.	1													
Water flow	m^3/h	13,1	16,4	19,0	22,5	25,4	30,0	36,4	42,2	48,6	56,5	64,4	75,6	84,2	96,1
Water flow	l/s	3,6	4,6	5,3	6,2	7,1	8,3	10,1	11,7	13,5	15,7	17,9	21,0	23,4	26,7
Pressure drop	kPa	58		59	81	61	45	65	87	44	51	60	49		53
Water volume	l	44	42	39		37	59	56		191	185	179	173	294	286
Sound pressure level															
Sound pressure at 1 m	dB(A)	68	74			75	76	77	79	80	81		82	83	84
Dimensions															
Length	mm	2˙900		2˙950			3˙400			3˙450					
Width	mm	680					750			680		800			
Height	mm	1˙445					1˙505			1˙610		1˙630		1˙720	
Width with CF/CFU	mm	750					850					920			
Transport weight	kg	640		850	860	870	1˙280	1˙300	1˙310	1˙518	1˙540	1˙997	2˙013	2˙718	2˙206
Electrical power supply															
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T													

REMARKS:
- Operating conditions: Evaporator water temperature 7/12°C; condensing temperature 47°C (dew)
- Sound pressure level at 1 m in open field (ISO 3744).

Technical data - Refrigerant R134a - 2 circuits

MEH		182 Ka	222 Ka	252 Ka	292 Ka	332 Ka	412 Ka	472 Ka	542 Ka	572 Ka	662 Ka	762 Ka	892 Ka	992 Ka	1132 Ka
Cooling capacity															
Cooling capacity	kW	153,0	192,0	223,0	266,0	295,0	347,0	419,0	491,0	569,0	654,0	745,0	873,0	980,0	1˙112,0
Nominal input power	kW	43,8	53,8	66,0	73,8	83,2	94,2	114,8	134,4	149,0	165,0	195,0	228,0	225,0	281,0
EER		3,49	3,57	3,38	3,60	3,54	3,68	3,65		3,82	3,96	3,82	3,83	3,84	3,96
Screw compressors															
Quantity	n.	2													
Cooling circuits	n.	2													
Standard capacity steps	n.	6													
Modulating capacity steps (option)	%	0 – 12 ÷ 100													
Nominal input current	A	81,0	95,0	114,0	129,0	145,0	163,0	188,0	229,0	257,0	283,0	324,0	370,0	428,0	468,0
Maximum input current	A	112,0	130,0	158,0	196,0	248,0	288,0	310,0	364,0	430,0	462,0	560,0	620,0	640,0	720,0
Inrush current	A	361,0	403,0	434,0	547,0	609,0	729,0	830,0	983,0	1˙158,0	1˙254,0	1˙644,0	1˙752,0	2˙173,0	2˙389,0
Inrush current with options PW/DS	A	209,0	234,0	285,0	365,0	414,0	578,0	594,0	702,0	827,0	895,0	1˙235,0	1˙319,0	1˙617,0	1˙780,0
Evaporator															
Type		Shell and tube													
Quantity	n.	1													
Circuits	n.	2													
Water flow	m^3/h	26,3	32,9	38,3	45,6	50,6	59,5	71,9	84,2	97,2	112,3	128,2	150,1	168,5	191,2
Water flow	l/s	7,3	9,1	10,6	12,7	14,1	16,5	19,9	23,4	27,2	31,2	35,6	41,7	46,8	53,1
Pressure drop	kPa	57	54	71	45	55	49	51	70	55	48	68	70	72	44
Water volume	l	63	59	56	129		124	119	179	286	279	271	461	444	435
Sound pressure level															
Sound pressure at 1 m	dB(A)	71	77			78	79	80	82	83	84		85	86	87
Dimensions															
Length	mm	3˙900		3˙850	3˙900		3˙990			5˙200					
Width	mm	680		810			1˙000			1˙200					
Height	mm	1˙445					1˙645		1˙670	2˙020					
Width with CF/CFU	mm	750		850			1˙000			1˙200					
Transport weight	kg	1˙080	1˙090	1˙520	1˙620	1˙640	2˙460	2˙490	2˙680	2˙838	4˙351	4˙708	4˙851	4˙901	
Electrical power supply															
Electrical power supply	V / ph / Hz	400 / 3 / 50 + T													

REMARKS:
- Operating conditions: Evaporator water temperature 7/12°C; condensing temperature 47°C (dew)
- Sound pressure level at 1 m in open field (ISO 3744).

CRS 13 + FV

CR 11

CR... – CRS... – CRU... Series

1 refrigerant circuit - capacities from 6 to 99 kW

Packaged air condensers with axial fans for external installation, especially designed to satisfy many refrigeration and air conditioning applications, so to reduce the overall noise level.
The following versions are available:
CR...K standard suitable for R407C ecological refrigerant (6-pole axial fans)
CRS...K silenced suitable for R407C ecological refrigerant (6/8-pole axial fans)
CRU...K ultra silenced suitable for R407C ecological refrigerant (6/8-pole axial fans)

Operation limits: external air temperature from 15 to 42°C.

Main components:

Casing designed to allow an easy access to the internal components, realized from pre-painted galvanized sheet steel. It is particularly resistant to corrosion and is completely covered by a protective plastic film.

High efficiency heat exchange coil, made from aluminium fins and inner grooved copper tube, suitable for new refrigerants.

Axial fans with external rotor motor, with die cast aluminium shaped fan blades, IP 54 protection grade, class F insulation, in-built thermal protection, epoxy coated steel fan guard.

Accessories

BW	**Low temperature operation down to -40 °C:** in order to allow operation down to such external air temperature, we install an additional liquid receiver with pressure control and regulation of the fans.
C2	**2 circuits coil**
CV	**Fans wiring:** carried out in junction boxes with access holes equipped with tear-proof cable supports.
FV	**Kit of supports for vertical air flow** to change the airflow from horizontal to vertical.
IM	**Seawood packing:** fumigated seawood case and protection bag with hygroscopic salts, suitable for long sea transports.
RM	**Condensing coil with pre-painted fins:** superficial treatment of the condensing coils realized in epoxy pre-painted aluminium material.
RR	**Copper/copper condensing coils:** special execution of the condensing coils with copper pipe and fins.

Standard version - Technical data for R407C

CR K		8	11	14	18	27	30	36	46	49	53	59	71	90	97
Cooling capacity															
Cooling capacity	kW	6,5	9,2	12,0	14,9	22,2	24,7	29,9	38,0	41,1	44,2	49,4	59,9	76,0	82,0
Axial fans															
Quantity	n.	1		2		1					2				
Rotation speed	rpm	1˙400				1˙210		900			1˙210		900		
Air flow	m³/h	2˙570	2˙300	5˙000	4˙600	7˙500	7˙350	10˙600	10˙400	9˙800	15˙000	14˙700	21˙200	20˙800	19˙600
Air flow	l/s	714	639	1˙389	1˙278	2˙083	2˙042	2˙944	2˙889	2˙722	4˙167	4˙083	5˙889	5˙778	5˙445
Motor input power	kW	0,2		0,4		0,8					1,5		1,6		
Input current	A	0,96		1,92		3,4		3,5			6,8		7		
Diameter	mm	350				500		630			500		630		
Sound pressure level															
Sound pressure at 10 m	dB(A)	45		48		44		46			47		49		
Dimensions															
Length	mm	764		1˙220		1˙175		1˙325			2˙125		2˙425		
Width	mm	314				510		630	1˙098	630	510		630		
Height	mm	410				797		1˙098	630	1˙098	797		1˙098		
Length (vertical air flow)	mm	808		1˙258		1˙175		1˙325			2˙125		2˙425		
Width (vertical air flow)	mm	505				797		1˙098			797		1˙098		
Height (vertical air flow)	mm	534				895		1˙020			895		1˙020		
Weight	kg	13	16	22	24	45	50	74	79	94	78	87	132	145	176
IN/OUT connections	Ø	16 / 16		18 / 16		22 / 16	28 / 16	28 / 22		35 / 28				42 / 28	
Electrical power supply															
Electrical power supply	V / ph / Hz	220 V / 1 Ph / 50 Hz + T													

REMARKS:
- Capacity referred to DT 16 between inlet coil air temperature and condensing temperature.
- Sound pressure level measured at 10 m in open field (ISO 3744).

Silenced Version - Technical data for R407C

CRS K		7	10	13	22	25	29	35	42	57	67	85	99
Cooling capacity													
Cooling capacity	kW	6,2	9,2	10,9	17,5	20,7	23,9	29,0	35,1	47,6	56,3	71,7	84,7
Axial fans													
Quantity	n.	1	2		1				2			3	
Rotation speed	rpm	945			890		650		890	650			
Air flow	m³/h	1˙400	3˙200	2˙900	5˙700	5˙200	6˙700	6˙000	11˙400	13˙400	13˙000	20˙000	19˙500
Air flow	l/s	389	889	806	1˙583	1˙444	1˙861	1˙667	3˙167	3˙722	3˙611	5˙556	5˙417
Motor input power	kW	0,1	0,2		0,3		0,4		0,6	0,8		1,2	
Input current	A	0,37	0,74		1,3		1,8		2,6	3,6		5,4	
Diameter	mm	350			500		630		500	630			
Sound pressure level													
Sound pressure at 10 m	dB(A)	33	36		34		37			40		42	
Dimensions													
Length	mm	764	1˙220	1˙200	1˙175		1˙325		2˙125	2˙425		3˙525	
Width	mm	314			510		630		510	630			
Height	mm	410			797		1˙098		797	1˙098			
Length (vertical air flow)	mm	808	1˙258		1˙175		1˙325		2˙125	2˙425		3˙525	
Width (vertical air flow)	mm	505			797		1˙098		797	1˙098			
Height (vertical air flow)	mm	534			895		1˙020		895	1˙020			
Weight	kg	13	22	24	45	50	74	79	78	145	191	205	
IN/OUT connections	Ø	16 / 16	18 / 16		22 / 16	28 / 22			35 / 28	42 / 28		54 / 35	
Electrical power supply													
Electrical power supply	V / ph / Hz	220 V / 1 Ph / 50 Hz + T											

REMARKS:
- Capacity referred to DT 16 between inlet coil air temperature and condensing temperature.
- Sound pressure level measured at 10 m in open field (ISO 3744).

Ultrasilenced version - Technical data for R407C

CRU K		18	20	23	28	32	43	51	68	74	87	98
Cooling capacity												
Cooling capacity	kW	13,9	16,0	18,6	21,2	27,9	37,5	42,3	56,3	63,7	75,0	85,0
Axial fans												
Quantity	n.	1				2			3		4	
Rotation speed	rpm	650	890	430		650	430					
Air flow	m^3/h	4˙000	5˙200	4˙750	4˙400	8˙000	9˙500	8˙800	14˙250	13˙200	19˙000	17˙600
Air flow	l/s	1˙111	1˙444	1˙319	1˙222	2˙222	2˙639	2˙445	3˙958	3˙667	5˙278	4˙889
Motor input power	kW	0,1	0,3	0,1		0,3			0,4		0,5	
Input current	A	0,7	1,3	0,36		1,4	0,72		1,08		1,4	
Diameter	mm	500		630		500	630					
Sound pressure level												
Sound pressure at 10 m	dB(A)	25		29		28	32		34			35
Dimensions												
Length	mm	1˙175		1˙325		2˙125	2˙425		3˙525		4˙625	
Width	mm	510		630		510	630					
Height	mm	797		1˙098		797	1˙098					
Length (vertical air flow)	mm	1˙175		1˙325		2˙125	2˙425		3˙525		4˙625	
Width (vertical air flow)	mm	797		1˙098		797	1˙098					
Height (vertical air flow)	mm	895		1˙020		895	1˙020					
Weight	kg	45	50	74	79	78	132	145	191	205	256	273
IN/OUT connections	Ø	22 / 16	28 / 16	28 / 22		35 / 28		42 / 28		54 / 35	54 / 42	
Electrical power supply												
Electrical power supply	V / ph / Hz	220 V / 1 Ph / 50 Hz + T		400 V / 3 Ph / 50 Hz + T		220 V / 1 Ph / 50 Hz + T	400 V / 3 Ph / 50 Hz + T					

REMARKS:
- Capacity referred to DT 16 between inlet coil air temperature and condensing temperature.
- Sound pressure level measured at 10 m in open field (ISO 3744).

CRC 75

CRC... Series

1 refrigerant circuit - capacities from 7 to 122 kW

Packaged air condensers with centrifugal fans for internal installation, especially designed for a wide range of applications both in refrigeration and air conditioning, where you need to reduce the overall sound level.

All sizes have been designed for ducted installations for a max available pressure of 150 Pa. In the case the condenser will not be ducted, it is necessary to fit a protection grid on the air discharge, in compliance with the local regulations in force.

The following versions are available:
CRC... K standard version suitable for R407C refrigerant charge

Operation limits: external air temperature from 15 to 42°C.

Main components:

Casing designed to allow an easy access to the internal components, realized from smooth finish aluminium alloy. It is particularly resistant to corrosion and is completely covered by a protective plastic film. In order to modify the air flow and facilitate the service and cleaning operations, the side panels and the fan shroud are removable. All sizes are provided with mobile protective panels on the return curves and manifolds.

High efficiency heat exchange coil, made from aluminium fins and inner grooved copper tube, suitable for new refrigerants.

Centrifugal fans of direct driven type, fixed to the unit by anti-vibration system, IP 44 protection grade, class F insulation, in-built thermal protection. They are designed for ducted installations for a maximum available pressure of 150 Pa.

Accessories

1M-2M	**Higher available pressure to the fans:** for an available pressure from 50 to 150 Pa maximum
BW	**Low temperature operation down to -40 °C:** in order to allow operation down to such external air temperature, we install an additional liquid receiver with pressure control and regulation of the fans.
C2	**2 circuits coil**
FO	**Horizontal air flow version:** support bracket kit to change the airflow from vertical to horizontal.
PK	**On/off pressostatic control kit:** installed inside the indoor unit, it allows the control of the condensing pressure by a pressure switch controlled by the microprocessor.
RM	**Condensing coil with pre-painted fins:** superficial treatment of the condensing coils realized in epoxy pre-painted aluminium material.
RR	**Copper/copper condensing coils:** special execution of the condensing coils with copper pipe and fins.
SN	**Wired main switch:** used to cut off the electrical supply and carry out the extraordinary service operations.

CRC - Standard version

CRC K		8	10	12	15	20	24	33	50	62	75	94	125	134
Cooling capacity														
Cooling capacity	kW	6,8	9,3	11,5	13,7	18,6	22,8	30,5	45,7	57,1	68,5	85,8	114,2	122,3
Centrifugal fans														
Quantity	n.	1			2		1		2		3		4	
Air flow	m^3/h	2˙640	2˙370	3˙860	5˙280	4˙740	6˙315	6˙880	12˙630	14˙080	18˙945	21˙120	28˙160	26˙720
Air flow	l/s	733	658	1˙072	1˙467	1˙317	1˙754	1˙911	3˙508	3˙911	5˙263	5˙867	7˙822	7˙422
Rotation speed	rpm	1˙200		910	1˙200		900							
Standard available pressure	Pa	50												
Standard motor input power	kW	0,6		0,5	1,1		1,4		2,8		4,1		5,5	
Standard motor input current	A	4,1		4	8,2		5,5		11	1,1	16,5		22	
Sound pressure level														
Sound pressure at 10 m	dB(A)	35		36	38		45		47		49		50	
Dimensions														
Length	mm	590		760	1˙020		760	1˙110	1˙360	2˙060	1˙960	3˙010	3˙960	
Width	mm	800		950	800		950							
Height	mm	520		845	520		845							
Length (vertical air flow)	mm	590		760	1˙020		760	1˙110	1˙360	2˙060	1˙960	3˙010	3˙960	
Width (vertical air flow)	mm	490		815	490		815							
Height (vertical air flow)	mm	1˙150		1˙300	1˙150		1˙300							
Weight	kg	152	52	80	75	83	98	123	157	188	216	266	344	378
IN/OUT connections	Ø	22 / 16				28 / 22	35 / 28			42 / 35	35 / 28	42 / 35	54 / 42	
Electrical power supply														
Electrical power supply	V / ph / Hz	230 V / 1 Ph / 50 Hz + T					400 V / 3 Ph / 50 Hz + T							

REMARKS:
- Capacity referred to DT 16 between inlet coil air temperature and condensing temperature.
- Sound pressure level measured at 10 m in open field (ISO 3744).

CRC - Version 1M (100 Pa)

CRC K		8 – 1M	10 – 1M	12 – 1M	15 – 1M	20 – 1M	24 – 1M	33 – 1M	50 – 1M	62 – 1M	75 – 1M	94 – 1M	125 – 1M	134 – 1M
Cooling capacity														
Cooling capacity	kW	6,7	9,1	11,3	13,5	18,2	22,4	29,9	44,8	55,9	67,1	84,1	112	119,9
Centrifugal fans														
Quantity	n.	1			2		1		2		3		4	
Air flow	m^3/h	2˙560	2˙280	3˙520	5˙120	4˙560	5˙830	6˙190	11˙660	13˙120	17˙490	19˙680	26˙240	24˙760
Air flow	l/s	711	633	978	1˙422	1˙267	1˙619	1˙719	3˙239	3˙644	4˙858	5˙467	7˙289	6˙878
Rotation speed	rpm	1˙200		910	1˙200		900							
1M higher available pressure	Pa	100												
1M motor input power	kW	0,6		0,5	1,1		1,4		2,8		4,1		5,5	
1M motor input current	A	4,1		4	8,2		5,5		11		16,5		22	
Sound pressure level														
Sound pressure at 10 m	dB(A)	35		34	38		43		45		46		47	
Dimensions														
Length	mm	590		760	1˙020		760	1˙110	1˙360	2˙060	1˙960	3˙010	3˙960	
Width	mm	800		950	800		950							
Height	mm	520		845	520		845							
Length (vertical air flow)	mm	590		760	1˙020		760	1˙110	1˙360	2˙060	1˙960	3˙010	3˙960	
Width (vertical air flow)	mm	490		815	490		815							
Height (vertical air flow)	mm	1˙150		1˙300	1˙150		1˙300							
Weight	kg	48	52	80	75	83	98	123	157	188	216	266	344	378
IN/OUT connections	Ø	22 / 16				28 / 22	35 / 28			42 / 35	35 / 28	42 / 35	54 / 42	
Electrical power supply														
Electrical power supply	V / ph / Hz	230 V / 1 Ph / 50 Hz + T					400 V / 3 Ph / 50 Hz + T							

REMARKS:
- Capacity referred to DT 16 between inlet coil air temperature and condensing temperature.
- Sound pressure level measured at 10 m in open field (ISO 3744).

CRC - Version 2M (150 Pa)

CRC K		8 – 2M	10 – 2M	12 – 2M	15 – 2M	20 – 2M	24 – 2M	33 – 2M	50 – 2M	62 – 2M	75 – 2M	94 – 2M	125 – 2M	134 – 2M
Cooling capacity														
Cooling capacity	kW	6,4	8,7	10,8	12,9	17,5	21,5	28,7	42,9	53,7	64,4	80,7	107,4	115
Centrifugal fans														
Quantity	n.	1			2		1		2		3		4	
Air flow	m^3/h	2˙375	2˙090	3˙090	4˙750	4˙180	4˙060	5˙710	8˙120	11˙920	12˙180	17˙880	23˙840	22˙840
Air flow	l/s	660	581	858	1˙319	1˙161	1˙128	1˙586	2˙256	3˙311	3˙383	4˙967	6˙622	6˙344
Rotation speed	rpm	1˙200		910	1˙200		900							
2M higher available pressure	Pa	150												
2M motor input power	kW	0,6		0,5	1,1		1,4		2,8		4,1		5,5	
2M motor input current	A	4,1		4	8,2		5,5		11	1,1	16,5		22	
Sound pressure level														
Sound pressure at 10 m	dB(A)	35		32	38		41		44		45		46	
Dimensions														
Length	mm	590		760	1˙020		760	1˙110	1˙360	2˙060	1˙960	3˙010	3˙960	
Width	mm	800		950	800		950							
Height	mm	520		845	520		845							
Length (vertical air flow)	mm	590		760	1˙020		760	1˙110	1˙360	2˙060	1˙960	3˙010	3˙960	
Width (vertical air flow)	mm	490		815	490		815							
Height (vertical air flow)	mm	1˙150		1˙300	1˙150		1˙300							
Weight	kg	48	52	80	75	83	98	123	157	188	216	266	344	378
IN/OUT connections	Ø	22 / 16				28 / 22	35 / 28			42 / 35	35 / 28	42 / 35	54 / 42	
Electrical power supply														
Electrical power supply	V / ph / Hz	230 V / 1 Ph / 50 Hz + T					400 V / 3 Ph / 50 Hz + T							

REMARKS:
- Capacity referred to DT 16 between inlet coil air temperature and condensing temperature.
- Sound pressure level measured at 10 m in open field (ISO 3744).

ARW

Series ARW

Capacity from 22 to 663 kW

Packaged dry coolers with axial fans suitable for external installation. To be matched to the units series: RWE – RWH – PWE – PWH – ED.H – EDW.F.
These units are used to cool the condensing water and for units EDW.F, they have a double use, for condensing in the summer period or for free-cooling in the winter period.
Four different versions are available, depending on the sound pressure level:
ARW standard version
ARW.S silenced version
ARW.U ultrasilenced version
ARW.XU extra-ultrasilenced version
They can be installed both with horizontal and vertical air flow; in this last case option FV must be required.

Main components:

Housing: it is designed to ensure the best acess to the internal components and it is made of pre-painted galvanized steel panels (RAL 9002) of suitable thickness, with plastic protection film.

Fans: Of axial type with external motor, complete with protection grid and manufactured by certified and qualified European companies, in compliance with the most updated safety standards. The motors are 3 Phases, for supply 400V/50Hz, in compliance with VDE 0530/11.84 standards, IP 54 protection according to DIN 400 50 standards and complete with built-in thermostat.

Coils: Made, in the standard version, with copper pipes and special ruled aluminium fins to improve the heat exchange. On request they are available with aluminium fins pre-painted with epoxy powders, suitably resistant to the sea environment, or with copper fins and are complete with purge and draining valves. Each coil is pressure tested at 30 Bar.

In the basic version the fans are not wired.

Accessories

CQ	Wired fans and electrical panel
CV	Fans wired in a suitable terminal board
EC	Three-phase EC high reliability axial fans with radial fastening guard grill, electronically commutated motor and low electrical absorptions
FV	Kit of supports for vertical air flow
IS	Switches for each fan
RG	Electronic and modulating fans speed regulation so to keep the liquid temperature constant
RM	Epoxy treatments of the coils
RR	Coils with copper/copper fins

Technical data - Standard version

ARW		20	35	50	80	90	100	120	150	180	210	230	260	280	300	350	400	450	500	550	600	650
Capacity																						
Power	kW	22,0	37,3	49,0	81,0	94,5	100,5	121,4	149,9	182,5	216,0	235,5	255,0	289,0	309,0	352,0	392,0	442,0	504,0	571,0	590,0	663,0
Axial fans																						
Quantity	n.	2				3	4	3	4	6				8	10		8	12		14	16	
Rotation speed	rpm	1˙390	880				1˙380	880					890	880			890	880	895			
Air flow	m³/h	13˙380	19˙800	40˙320	35˙960	58˙500	50˙480	53˙940	74˙640	115˙065	109˙620	105˙915	171˙340	146˙160	191˙775	182˙700	213˙305	219˙240	235˙200	274˙400	328˙800	313˙600
Motor input power	kW	1,30	1,68	3,28		4,92	5,76	4,92	6,56	9,84			21,60	13,12	16,4		28,8	19,68		22,96	26,24	
Input current	A	2,82	3,48	7,80		11,70	12,4	11,70	15,60	23,4	23,40		43,20	31,20	39,0		57,6	46,80		54,60	62,40	
Diameter	mm	500	710	800			630	800					910	800			910	800				
Coil																						
Water flow	m³/h	4,00	6,95	8,95	15,01	17,61	18,69	22,58	27,94	34,00	40,40	43,82	47,47	53,86	57,63	65,74	72,9	83,17	93,91	106,43	109,95	123,62
Pressure drop	kPa	41	76	41	59	36	22	53	73	40	68	61	48	83	77	37	44	65	76	38	82	54
Water volume	dm³	11	22	24	58	54	46	86	91	98	129	161	130	172	163	218		262	392	448	390	504
Sound pressure level																						
Sound pressure at 10 m	dB(A)	53	48	51		53	58	53	54	56			63	57	58		64	58	59		60	
Dimensions																						
Length	mm	2˙120	2˙960	3˙340		4˙815	4˙360	4˙815	6˙290	4˙815			6˙290		7˙765		9˙240	–				
Width	mm	580	680	965			653	965										–				
Height	mm	814	114	1˙328			1˙114	1˙328		2˙393								–				
Length (vertical air flow)	mm	2˙120	2˙960	3˙340		4˙815	4˙360	4˙815	6˙290	4˙815			6˙290		7˙765		9˙240	6˙920		8˙020	9˙120	
Width (vertical air flow)	mm	764	1˙064	1˙248			1˙067	1˙290		2˙354					2˙361			2˙350				
Height (vertical air flow)	mm	954	1˙150	1˙386			1˙153	1˙386				1˙511	1˙386			1˙511	1˙386	2˙450				
Weight	kg	111	198	304	394	520	396	574	696	910	960	1˙010	1˙290	1˙324	1˙598	1˙688	1˙724	2˙250	3˙390	3˙890	3˙960	4˙380
Water connections IN	"	1	1 ¼	1 ½	2	2 ½	3	2 ½		4					2 x 4			4 x 3		2 x 4		4 x 3
Water connections OUT	"	1	1 ¼	1 ½	2	2 ½	3	2 ½		4					2 x 4			4 x 3		2 x 4		4 x 3
Electrical power supply																						
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T																				

REMARKS:
- Nominal conditions referred to: external air temperature 35; water 45/40°C and glycol 35%.
- Sound pressure level measured at 10 m in open field (ISO 3744) for fans with 400 V/3 Ph/50 Hz power supply.

Technical data - Silenced version

ARW		35 S	50 S	65 S	100 S	120 S	150 S	180 S	230 S	300 S	350 S	400 S	450 S	500 S	550 S
Capacity															
Power	kW	37,3	55,6	63,7	97,7	126,5	148,6	183,0	244,0	298,0	366,0	401,0	442,0	502,0	547,5
Axial fans															
Quantity	n.	2				4	5	6	8	10	12			14	16
Rotation speed	rpm	880	670	880		670									
Air flow	m³/h	19˙800	30˙120	44˙700	39˙940	59˙080	75˙300	85˙995	114˙660	143˙325	171˙990	156˙750	179˙100	208˙950	238˙800
Motor input power	kW	1,68	1,50	3,28		3,00	3,75	4,50	6,00	7,50	9,00			10,50	12,00
Input current	A	3,48	3,90	7,80			9,75	11,70	15,60	19,50	23,40			27,30	31,20
Diameter	mm	710	800												
Coil															
Water flow	m³/h	6,95	10,36	11,95	18,00	23,70	26,06	34,10	45,47	55,58	68,21	74,76	82,26	93,60	101,34
Pressure drop	kPa	76	71	39	35	54	42	50	61	27	45	39	59	30	38
Water volume	dm³	22	36		86	91	87	129	172	218	262	328	392	448	504
Sound pressure level															
Sound pressure at 10 m	dB(A)	48	43	51		45	46	47	48	49				50	
Dimensions															
Length	mm	2˙960	3˙340	4˙815		6˙290	7˙765	–	6˙290	7˙765	9˙240			–	
Width	mm	680	965					–	965					–	
Height	mm	1˙114	1˙328					–	2˙393					–	
Length (vertical air flow)	mm	2˙960	3˙340	4˙815		6˙290	7˙765	4˙815	6˙290	7˙765	9˙240		6˙920	8˙020	9˙120
Width (vertical air flow)	mm	1˙067	1˙248	1˙290			1˙297	2˙354		2˙361			2˙350		
Height (vertical air flow)	mm	1˙150	1˙386										2˙450		
Weight	kg	198	358	408	544	696	734	960	1˙324	1˙688	2˙250	2˙558	3˙390	3˙890	4˙380
Water connections IN	"	1 ¼	1 ½	2 ½			3	4		2 x 4				4 x 3	
Water connections OUT	"	1 ¼	1 ½	2 ½			3	4		2 x 4				4 x 3	
Electrical power supply															
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T													

REMARKS:
- Nominal conditions referred to: external air temperature 35; water 45/40°C and glycol 35%.
- Sound pressure level measured at 10 m in open field (ISO 3744) for fans with 400 V/3 Ph/50 Hz power supply.

Technical data - Ultrasilenced version

ARW		20 U	35 U	50 U	65 U	90 U	100 U	150 U	180 U	260 U	280 U	300 U	350 U
Capacity													
Power	kW	19,1	38,9	49,8	63,4	88,5	99,5	150,3	178,5	258,5	278,6	301,0	348,0
Axial fans													
Quantity	n.	2		3		4		8	10	12		16	
Rotation speed	rpm	660	435										
Air flow	m³/h	11˙700	17˙760	28˙320	25˙020	38˙400	36˙250	70˙300	99˙510	98˙100	113˙400	163˙600	151˙200
Motor input power	kW	0,58	0,76	1,14		1,52		3,04	3,80	4,56		6,08	
Input current	A	1,66	2,30	3,45		4,60		9,20	11,50	13,80		18,40	18,4
Diameter	mm	800											
Coil													
Water flow	m³/h	3,55	7,18	9,08	11,83	16,24	18,48	27,99	32,62	48,41	51,73	55,15	63,77
Pressure drop	kPa	81	36	54	22	18	75	35	45	24	50	52	30
Water volume	dm³	12	36		68	87	116	130		262	306	292	390
Sound pressure level													
Sound pressure at 10 m	dB(A)	37	35	36		37		40	41			42	
Dimensions													
Length	mm	2˙360	3˙340	4˙815		7˙765		6˙290	9˙240		–		
Width	mm	630	965								–		
Height	mm	1˙114	1˙328					2˙393			–		
Length (vertical air flow)	mm	2˙360	3˙340	4˙815		7˙765		6˙290	9˙240		6˙920	9˙120	
Width (vertical air flow)	mm	1˙067	1˙248	1˙290				2˙354			2˙350		
Height (vertical air flow)	mm	1˙080	1˙386								2˙450		
Weight	kg	137	358	438	547	704	744	1˙254	1˙552	2˙250	3˙060	3˙540	3˙960
Water connections IN	"	1	1 ½		2 ½	3	2 ½	4		2 x 4	2 x 3		2 x 4
Water connections OUT	"	1	1 ½		2 ½	3	2 ½	4		2 x 4	2 x 3		2 x 4
Electrical power supply													
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T											

REMARKS:
- Nominal conditions referred to: external air temperature 35; water 45/40°C and glycol 35%.
- Sound pressure level measured at 10 m in open field (ISO 3744) for fans with 400 V/3 Ph/50 Hz power supply.

Technical data - Extra-Ultrasilenced version

ARW		20 XU	35 XU	50 XU	65 XU	80 XU	90 XU	100 XU	120 XU	180 XU	210 XU	230 XU	260 XU
Capacity													
Power	kW	20,9	35,5	53,2	64,1	78,9	89,9	101,0	122,5	180,0	211,0	228,0	258,1
Axial fans													
Quantity	n.	2		3		4		6		12			16
Rotation speed	rpm	500	400										
Air flow	m³/h	11˙920	15˙880	23˙820	26˙322	31˙760	50˙085	45˙638	51˙642	100˙170	91˙275	83˙262	137˙600
Motor input power	kW	0,46	0,50	0,75		1,00	1,50			3,00			4,00
Input current	A	0,96	1,12	1,68		2,48	3,36			6,72			8,96
Diameter	mm	710	800										
Coil													
Water flow	m³/h	3,90	6,61	9,91	11,75	14,68	16,87	18,88	22,82	33,74	39,37	42,05	48,58
Pressure drop	kPa	56	31	29	49	74	49	39	65	48	42	69	88
Water volume	dm³	15	36	54	68		65	98	130		196	262	390
Sound pressure level													
Sound pressure at 10 m	dB(A)	30	29	31		32	34		33	36			38
Dimensions													
Length	mm	2˙960	3˙340	4˙815	6˙290		4˙815		6˙290	9˙240			–
Width	mm	680	965										–
Height	mm	1˙114	1˙328				2˙393						–
Length (vertical air flow)	mm	2˙960	3˙340	4˙815	6˙290		4˙815		6˙290	9˙240			9˙120
Width (vertical air flow)	mm	1˙067	1˙248	1˙245	1˙290		2˙354		2˙361	261			2˙350
Height (vertical air flow)	mm	1˙150	1˙386										2˙450
Weight	kg	178	358	520	631	661	704	910	1˙194	1˙612	1˙942	2˙250	3˙960
Water connections IN	"	1	1 ½	2			2 ½			4			2 x 3
Water connections OUT	"	1	1 ½	2			2 ½			4			2 x 3
Electrical power supply													
Electrical power supply	V / ph / Hz	400 / 3 / 50 + N + T											

REMARKS:
- Nominal conditions referred to: external air temperature 35; water 45/40°C and glycol 35%.
- Sound pressure level measured at 10 m in open field (ISO 3744) for fans with 400 V/3 Ph/50 Hz power supply.

VCL 22

SCK 42

Series VC ... - SC ...

Capacity from 0,87 to 11 kW

The wide range of **VC and SC series** is able to meet the several and different requirements of conditioning market.
These units are equipped with centrifugal fans and are planned for on sight (VC…) or built-in installation (SC…).
The following versions are available:
VERTICAL, ON SIGHT WITH HOUSING
VCL...vertical bottom air intake

VCZ...horizontal air intake with socle
VCY...horizontal air intake
HORIZONTAL, ON SIGHT WITH HOUSING
VCK...rear air intake
VCW...horizontal air intake with socle
VCH...horizontal air intake
VERTICAL, BUILT-IN VERSION WITHOUT HOUSING
SCL...vertical air flow
SCW...horizontal air flow
HORIZONTAL, BUILT-IN VERSION WITHOUT HOUSING
SCK...horizontal air intake

Main components:

CABINET
Made in galvanized steel plate, covered by a white polyvinyl chloride film, combining an excellent solidity and functionality with a simple but elegant design. The cabinet is internally covered by sound-proofing and thermo protective material of very good quality.

GRID
It is placed on the upper side of the housing, and, thanks to a careful design and innovative fluid dynamic qualities, allows an effective and noiseless air diffusion. It is made up of grey pressure-printed ABS, as well as the panels to enter the control board and the connections room, it is fine fitted to.

HEAT EXCHANGER COIL
With copper pipes and aluminium fins, fixed on pipes through mechanical expansion, with special and innovative profile for a higher exchanging power. Manifolds are on the left side of the unit (considering a frontal point of view) and made up of brass casting with female gas screwed connections and completed with two air vent valves 1/8" gas. If required, it is possible to have the manifolds on the right side. The coil is provided with a drain pan underneath.

FAN
Centrifugal fan with horizontally developed impellers and double intake, 1 Ph direct connected motor with overcharge protection.

AIR FILTER
Made up of honeycomb polypropylene filtering material, supported by a metal frame.

REGULATION SYSTEM
In the vertical version with cabinet, the fan coils are supplied with a basic board with ON/OFF switch and switch for the three fan speeds (TA).

Accessories

AD	Hydraulic connections / manifolds on the right side
BC	Auxiliary hot water coil for 4-pipe installation
BR	Additional drain pan
CPI	Built-in steel plate feet
CPV	On sight, painted steel plate feet
CPZ	Painted steel plate feet for back panel LP
FR	Spare air filter
GA	Aluminium fixed air inlet grid with filter for SCL, SCW, SCK versions
GB	Griglia di aspirazione fissa in ABS con filtro per versioni SCL, SCW, SCK
GC	Aluminium fixed air inlet grid without filter for SCL, SCW, SCK versions
GD	ABS fixed air inlet grid without filter for SCL, SCW, SCK versions
GO	Adjustable air discharge grids
JA	Straight plenum on air discharge
JB	Insulated 90° plenum on air discharge
JC	90° plenum on air inlet
JD	Telescopic extension for straight and 90° plenums
JE	Plenum on air inlet with spigots and air filter
JF	Plenum on air discharge with spigots
K22	ON/OFF 2-way valves for 2-pipe systems
K32	ON/OFF 3-way valves for 2-pipe systems
K24	ON/OFF 2-way valves for 4-pipe systems
K34	ON/OFF 3-way valves for 4-pipe systems
LA	White pre-painted steel panel + 90° plenum on air inlet for SCW version
LB	White pre-painted steel panel 90° plenum on air inlet and discharge for SCL, SCK versions
LC	White painted wood panel 90° plenum on air inlet for SCW version
LD	White painted wood panel 90° plenum on air inlet and discharge for SCL and SCK versions
LE	Painted lower closing panel without grid
LF	Painted lower closing panel with grid and filter
LP	Painted back closing panel (for fancoil installation on sight, far from the wall)
MS	Motorized fresh air louver
PB	Condensing water pump
RCV	Continuous regulation of the fan speed in relation to the temperature
RE	Electric heaters
SI	Interface card for the control of max 4 units with only one thermostat (one card and one thermostat every 4 units)
SP	Fresh air inlet louver (option CPV already included for VCL version)
TA	Base control panel on board with: manual ON/OFF switch, summer/winter manual switch, 3 speed manual selection switch (already included on VCL, VCZ, VCY versions)
TB	TA base control panel with additional bulb room thermostat
T1	TA base control with additional electronic thermostat with NTC probe for control of room temperature (for VCL, VCZ, VCY versions it can replace standard TA)
T2	Additional water low temperature thermostat with probe for TA, TB and T1, in order to permit the starting of the fan only when the hot water is on the right temperature
T3	Remote control with: manual ON/OFF switch, summer/winter manual switch, 3 speed manual selection switch (in replacement of TA)
T4	Programmable remote electronic control (in replacement of on-board control) for control of temperature, fan, valves, electric heater, heat/cool cycle, filter
T5	Programmable electronic control with infrared distant control, not usable with RE (in replacement of on-board control) for control of: temperature, fan, valves, condensing water pump, heat/cool cycle, fresh air louver, air/water probes, clock, ON/OFF timer)
V2	Valvole di intercettazione a sfera per impianti a 2 tubi
V4	Shut-off valves for 4-pipe systems

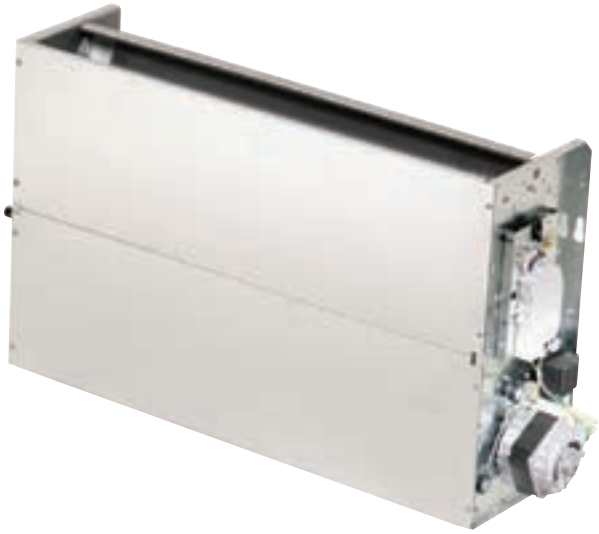
Technical data

VC-SC		12/4	22/4	32/4	42/4	52/4	62/4	72/4	82/4	92/4	102/4 (*)	112/4 (*)	122/4 (*)
2-PIPE Version													
Total cooling capacity (1)	kW	0,87	1,28	2,07	2,53	3,11	3,85	4,69	5,59	6,88	7,98	10,02	11,01
Sensible cooling capacity (1)	kW	0,74	1,02	1,51	2,17	2,18	2,66	3,11	3,96	4,81	6,06	7,91	8,48
Water flow (1)	l/s	0,041	0,061	0,099	0,121	0,149	0,184	0,225	0,268	0,329	0,382	0,480	0,527
Heating capacity (2)	kW	1,25	1,87	2,59	3,28	3,66	4,48	5,13	6,69	8,11	10,66	13,08	14,15
Water flow (2)	l/s	0,041	0,061	0,099	0,121	0,149	0,184	0,225	0,268	0,329	0,382	0,480	0,527
Pressure drop in cooling (1)	kPa	1	2	6	9	16	26	56	28	43	27	21	27
Pressure drop in heating (2)	kPa	1	2	5	7	14	22	48	24	37	23	19	22
Heating capacity (3)	kW	2,12	3,19	4,33	5,51	6,08	7,44	8,47	11,14	13,49	16,87	22,02	23,77
Water flow (3)	l/s	0,051	0,076	0,104	0,132	0,146	0,178	0,203	0,267	0,323	0,413	0,539	0,582
Pressure drop in heating (3)	kPa	1	2	5	8	12	18	35	21	31	24	21	25
Electric heater capacity (4)	kW	–	1			2			3		–		
Input current (4)	A	–	4,35			8,70			13,04		–		
Air flow MAX (5)	m^3/h	227	289	404	453	575	685	708	1˙058	1˙242	1˙356	2˙012	2˙003
Air flow MED (5)	m^3/h	189	244	352	344	495	578		950	1˙014	1˙093	1˙370	1˙590
Air flow MIN (5)	m^3/h	136	209	269	262	362	429	486	788	770	969	988	1˙056
Fan speed (5)	rpm	710	671	595	680	646	775	746	920	1˙125	820	962	1˙085
Sound pressure level – MAX speed (6)	dB(A)	33	36	33		37	38	42	51		55	50	51
Sound pressure level – MED speed (6)	dB(A)	41	40			43	47	46	56	58	57	58	61
Sound pressure level – MIN speed (6)	dB(A)	46	44		47		52		58	64	63	67	66
4-PIPE Version													
Total cooling capacity (1)	kW	0,84	1,23	2,08	2,38	2,96	3,68	4,47	5,33	6,57	7,71	9,70	10,66
Sensible cooling capacity (1)	kW	0,81	1,12	1,69	1,93	2,49	2,91	3,35	4,32	5,26	5,86	7,67	8,21
Water flow (1)	l/s	0,040	0,059	0,099	0,114	0,142	0,176	0,214	0,255	0,315	0,369	0,465	0,510
Heating capacity (2)	kW	1,26	1,89	2,73	2,89	3,49	4,13	5,04	6,19	7,67	8,39	10,11	11,43
Water flow (2)	l/s	0,030	0,045	0,065	0,069	0,084	0,099	0,121	0,148	0,184	0,205	0,248	0,280
Pressure drop in cooling (1)	kPa	1	2	6	8	14	23	50	24	38	25	22	25
Pressure drop in heating (2)	kPa	0,3	2			3	4	7	14	22	48	27	34
Heating capacity (3)	kW	0,77	1,16	1,67	1,76	2,13	2,52	3,08	3,79	4,68	5,13	6,18	6,99
Water flow (3)	l/s	0,037	0,055	0,080	0,085	0,102	0,121	0,148	0,181	0,225	0,248	0,300	0,339
Pressure drop in heating (3)	kPa	0,5	1	3		6	7	12	23	36	80	45	56
Air flow MAX (5)	m^3/h	216	275	384	430	546	651	673	1˙005	1˙180	1˙291	1˙916	1˙908
Air flow MED (5)	m^3/h	180	232	334	327	470	549		902	963	1˙041	1˙305	1˙514
Air flow MIN (5)	m^3/h	129	199	256	249	344	408	462	749	732	928	942	1˙006
Fan speed (5)	rpm	720	685	615	700	665	805	730	917	1˙070	855	815	1˙045
Sound pressure level – MAX speed (6)	dB(A)	34	38	34	35		41	43	51		55	51	52
Sound pressure level – MED speed (6)	dB(A)	40	43	40	42		48	47	57	59	58		62
Sound pressure level – MIN speed (6)	dB(A)	45	47	44	48	46	53		59	65	63	67	
General data													
Fan motor input power (7)	W	38	54	60	61	99		97	210	207	213	277	273
Input current (7)	A	0,18	0,25	0,28		0,45		0,44	0,96	0,95	0,97	1,27	1,25
Cooling coil water connections	ØgasF	¾"											
Heating coil water connections	ØgasF	½"											
Cooling coil water volume	l	0,59	0,93	1,27		1,61		2,42	2,93		3,28	4,04	
Heating coil water volume	l	0,19	0,31	0,42		0,53			1,29		1,09	1,35	
Dimensions – VC Versions													
Length	mm	660	860	1˙060		1˙260			1˙460		1˙660	1˙960	
Width	mm	225									260		
Height (VCL-VCY-VCK-VCH)	mm	480							580		602		
Height (VCZ-VCW)	mm	610							710		732		
Dimensions – SC Versions													
Length	mm	420	620	820		1˙020			1˙220		1˙385	1˙685	
Width	mm	220									252		
Height	mm	460							565		585		
Weight													
2-Pipe unit	kg	14	17	22	23	27	28	30	35	36	46	55	57
4-Pipe unit	kg	15	18	23	24	28	29	32	38	39	49	58	60
Electrical power supply													
Electrical power supply	V / ph / Hz	230 / 1 / 50 + N + T											

REMARKS:
1) Ambient temperature 27°C b.s. and 19°C b.u. - water 7/12°C
2) Ambient temperature 20°C - inlet water 50°C
3) Ambient temperature 20°C - IN/OUT water to the coil 70/60°C
4) Electric heaters are optionals and are not available on 4 pipes version
5) With clean filter
6) Measured according to ISO 23741
7) Maximum absorbed value

* Sizes not available for VCY e VCH series

VTL 22



STL 42

Series VT ... - ST ...

Capacity from 1,05 to 3,88 kW

The wide range of **VT and ST series** is able to meet the several and different requirements of conditioning market.
These units are equipped with tangential fans and are planned for on sight (VT…) or built-in installation (ST…).
The following versions are available:
VERTICAL, ON SIGHT WITH HOUSING
VTL...vertical bottom air intake
VTZ...horizontal air intake with socle
VTY...horizontal air intake
HORIZONTAL, ON SIGHT WITH HOUSING
VTK...rear air intake
VTW...horizontal air intake with socle
VERTICAL, BUILT-IN VERSION WITHOUT HOUSING
STL...vertical air flow
STW...horizontal air flow
HORIZONTAL, BUILT-IN VERSION WITHOUT HOUSING
STK...horizontal air intake

Main components:

CABINET
Made in galvanized steel plate, covered by a white polyvinyl chloride film, combining an excellent solidity and functionality with a simple but elegant design. The cabinet is internally covered by sound-proofing and thermo protective material of very good quality.

GRID
It is placed on the upper side of the housing, and, thanks to a careful design and innovative fluid dynamic qualities, allows an effective and noiseless air diffusion. It is made up of grey pressure-printed ABS, as well as the panels to enter the control board and the connections room, it is fine fitted to.

HEAT EXCHANGER COIL
With copper pipes and aluminium fins, fixed on pipes through mechanical expansion, with special and innovative profile for a higher exchanging power. Manifolds are on the left side of the unit (considering a frontal point of view) and made up of brass casting with female gas screwed connections and completed with two air vent valves 1/8" gas. It is not possible to have the manifolds on the right side. The coil is provided with a drain pan underneath.

FAN
Tangential fan with horizontally developed impellers, 1 Ph direct connected motor with overcharge protection.

AIR FILTER
Made up of honeycomb polypropylene filtering material, supported by a metal frame.

REGULATION SYSTEM
In the vertical version with cabinet, the fan coils are supplied with a basic board with ON/OFF switch and switch for the three fan speeds (TA).

Accessories

AD Hydraulic connections / manifolds on the right side
BC Auxiliary hot water coil for 4-pipe installation
BR Additional drain pan
CPI Built-in steel plate feet
CPV On sight, painted steel plate feet
CPZ Painted steel plate feet for back panel LP
FR Spare air filter
GB Griglia di aspirazione fissa in ABS con filtro per versioni STL, STW, STK
GD ABS fixed air inlet grid without filter for STL, STW, STK versions
GO Adjustable air discharge grids
JA Straight plenum on air discharge
JB Insulated 90° plenum on air discharge
JC 90° plenum on air inlet
JD Telescopic extension for straight and 90° plenums
K22 ON/OFF 2-way valves for 2-pipe systems
K32 ON/OFF 3-way valves for 2-pipe systems
K24 ON/OFF 2-way valves for 4-pipe systems
K34 ON/OFF 3-way valves for 4-pipe systems
LA White pre-painted steel panel 90° plenum on air inlet for STW version
LB White pre-painted steel panel 90° plenum on air inlet and discharge for STL and STK versions
LC White painted wood panel 90° plenum on air inlet for STW version
LD White painted wood panel 90° plenum on air inlet and discharge for STL and STK versions
LE Painted lower closing panel without grid
LF Painted lower closing panel with grid and filter
LP Painted back closing panel (for fancoil installation on sight, far from the wall)
PB Condensing water pump
RCV Continuous regulation of the fan speed in relation to the temperature
RE Electric heaters
SI Interface card for the control of max 4 units with only one thermostat (one card and one thermostat every 4 units)
TA Base control panel on board with: manual ON/OFF switch, summer/winter manual switch, 3 speed manual selection switch (already included on VTL, VTZ, VTY versions)
TB TA base control panel with additional bulb room thermostat
T1 TA base control with additional electronic thermostat with NTC probe for control of room temperature (for VTL, VTZ, VTY versions it can replace standard TA)
T2 Additional water low temperature thermostat with probe for TA, TB and T1, in order to permit the starting of the fan only when the hot water is on the right temperature
T3 Remote control with: manual ON/OFF switch, summer/winter manual switch, 3 speed manual selection switch (in replacement of TA)
T4 Programmable remote electronic control (in replacement of on-board control) for control of temperature, fan, valves, electric heater, heat/cool cycle, filter
T5 Programmable electronic control with infrared distant control, not usable with RE (in replacement of on-board control) for control of: temperature, fan, valves, condensing water pump, heat/cool cycle, fresh air louver, air/water probes, clock, ON/OFF timer)
V2 Valvole di intercettazione a sfera per impianti a 2 tubi
V4 Shut-off valves for 4-pipe systems

Technical data

VT-ST		12/4	22/4	32/4	42/4	62/4
2-PIPE Version						
Total cooling capacity (1)	kW	1,05	1,40	2,76	3,53	3,88
Sensible cooling capacity (1)	kW	0,86	1,28	2,21	2,73	3,34
Water flow (1)	l/s	0,050	0,067	0,132	0,169	0,186
Heating capacity (2)	kW	1,75	2,30	3,75	4,47	5,78
Water flow (2)	l/s	0,050	0,67	0,132	0,169	0,186
Pressure drop in cooling (1)	kPa	2		7	13	4
Pressure drop in heating (2)	kPa	2		6	11	3
Heating capacity (3)	kW	3,06	4,00	6,34	7,50	9,89
Water flow (3)	l/s	0,075	0,098	0,155	0,184	0,242
Pressure drop in heating (3)	kPa	4	3	7	12	5
Electric heater capacity (4)	kW		1		2	3
Input current (4)	A		4,35		8,70	13,04
Air flow MAX (5)	m^3/h	255	310	473	621	872
Air flow MED (5)	m^3/h	220	258	400	525	707
Air flow MIN (5)	m^3/h	185	215	332	422	555
Fan speed (5)	rpm	747	893	993	973	1˙075
Sound pressure level – MAX speed (6)	dB(A)	39	45	51	43	47
Sound pressure level – MED speed (6)	dB(A)	43	49	55	48	52
Sound pressure level – MIN speed (6)	dB(A)	48	53	57	52	57
4-PIPE Version						
Total cooling capacity (1)	kW	1,03	1,30	2,54	3,10	3,19
Sensible cooling capacity (1)	kW	0,83	1,12	2,03	2,36	2,72
Water flow (1)	l/s	0,049	0,062	0,121	0,148	0,153
Heating capacity (2)	kW	2,00	2,15	3,14	3,99	4,98
Water flow (2)	l/s	0,049	0,053	0,077	0,098	0,122
Pressure drop in cooling (1)	kPa	2,2	2	6	10	3
Pressure drop in heating (2)	kPa	6,3	7	13	38	16
Heating capacity (3)	kW	1,22	1,32	1,92	2,44	3,04
Water flow (3)	l/s	0,059	0,064	0,093	0,118	0,147
Pressure drop in heating (3)	kPa	10	12	22	62	26
Air flow MAX (5)	m^3/h	242	295	449	590	828
Air flow MED (5)	m^3/h	209	245	380	498	673
Air flow MIN (5)	m^3/h	176	204	315	400	528
Fan speed (5)	rpm	760	905	1˙005	995	1˙110
Sound pressure level – MAX speed (6)	dB(A)	39	46	51	44	47
Sound pressure level – MED speed (6)	dB(A)	43	50	55	49	52
Sound pressure level – MIN speed (6)	dB(A)	48	54	58	53	57
General data						
Fan motor input power (7)	W	30	45	62	56	66
Input current (7)	A	0,13	0,20	0,28	0,25	0,29
Cooling coil water connections	ØgasF			½“		
Heating coil water connections	ØgasF			½“		
Cooling coil water volume	l	0,56	0,83	1,17	1,51	1,85
Heating coil water volume	l	0,28		0,39	0,50	0,62
Dimensions – VT Versions						
Length	mm	760		960	1˙160	1˙360
Width	mm			206		
Height	mm			477		
Dimensions – ST Versions						
Length	mm	640		840	1˙040	1˙240
Width	mm			202		
Height	mm			460		
Weight						
2-Pipe unit	kg	15	16	21	26	30
4-Pipe unit	kg	15	16	21	26	30
Electrical power supply						
Electrical power supply	V / ph / Hz	230 / 1 / 50 + N + T				

REMARKS:
1) Ambient temperature 27°C b.s. and 19°C b.u. - water 7/12°C
2) Ambient temperature 20°C - inlet water 50°C
3) Ambient temperature 20°C - IN/OUT water to the coil 70/60°C
4) Electric heaters are optionals and are not available on 4 pipes version
5) With clean filter
6) Measured according to ISO 3741
7) Maximum absorbed value

CWG 22

Series CWP ... - CWG ...

Capacity from 1,98 to 10,54 kW

The water cassettes of **CWP and CWG series** are able to meet the several and different requirements of conditioning and heating market.
Intended for ceiling installation.
The following versions are available:
PANEL 60 x 60 cm
CWP2T... 2 pipes with infrared remote control
CWP2P... 2 pipes with prearrangement for control on the wall
CWP4T... 4 pipes with infrared remote control
CWP4P... 4 pipes with prearrangement for control on the wall

PANEL 90 x 90 cm
CWG2T... 2 pipes with infrared remote control
CWG2P... 2 pipes with prearrangement for control on the wall
CWG4T... 4 pipes with infrared remote control
CWG4P... 4 pipes with prearrangement for control on the wall

Main components:

FRAME
Made in galvanized steel plate, of high thickness for an excellent solidity and functionality, including external bracket for a safe and simple fixing, prearrangements for possible duct of treated and external air. It is internally covered by sound-proofing and thermo- protective material of very good quality.

COVERING PANEL
Made of white die-pressed plastic ABS material, with a simple and elegant design, right for every kind of room. Central intake grid with 4 adjustable fins on the discharge. It is possible to install it on the water cassette in a simple and quick way through a patented device.

HEAT EXCHANGER COIL
With copper pipes and aluminium fins, fixed on pipes through mechanical expansion, with special and innovative profile for a higher exchanging power. Manifolds with male gas screwed connections and air vent valve and of easy way in. Under the coil it is installed the drain pan and the condensing discharge pump.

FAN
Centrifugal fan with single intake, with impeller of ABS balanced both statically and dynamically, and 1 Ph direct connected motor with overcharge protection. 7 rotation speeds.

AIR FILTER
Made up of honeycomb polypropylene filtering material, supported by a metal frame.

Accessories

JM	Straight plenum on air discharge in another room
K22	ON/OFF 2-way valves for 2-pipe systems
K32	ON/OFF 3-way valves for 2-pipe systems
K24	ON/OFF 2-way valves for 4-pipe systems
K34	ON/OFF 3-way valves for 4-pipe systems
PR	Fresh air inlet
SI	Interface card for the control of max 4 units with only one thermostat (one card and one thermostat every 4 units)
T3	Remote control with: manual ON/OFF switch, summer/winter manual switch, 3 speed manual selection switch
T4	Programmable electronic control for versions without radio control
T6	Programmable electronic control with infra-red distant control for version with infra-red radio control
V2	Valvole di intercettazione a sfera per impianti a 2 tubi
V4	Shut-off valves for 4-pipe systems

Technical data - 2-PIPE Version

CW		21 P	22 P	23 P	24 P	31 G	32 G	33 G	34 G
2-PIPE Version									
Total cooling capacity (1)	kW	1,98	2,87	3,26	4,49	5,73	6,76	8,08	10,54
Sensible cooling capacity (1)	kW	1,50	2,00	2,35	3,23	4,18	4,93	5,98	7,59
Water flow (1)	l/s	0,095	0,137	0,156	0,215	0,274	0,323	0,386	0,504
Heating capacity (2)	kW	2,72	3,83	4,94	6,15	6,55	7,79	9,31	12,01
Water flow (2)	l/s	0,095	0,137	0,156	0,215	0,274	0,323	0,386	0,504
Pressure drop in cooling (1)	kPa	21	26	40	50	35	34	37	54
Pressure drop in heating (2)	kPa	17	21	33	41	30	29	32	46
Heating capacity (3)	kW	4,54	6,39	8,24	10,25	10,79	12,82	15,31	19,89
Water flow (3)	l/s	0,109	0,153	0,197	0,245	0,258	0,306	0,366	0,475
Pressure drop in heating (3)	kPa	17	22	34	43	29	28	31	44
Air flow MAX (5)	m^3/h	543	611	680	815	832	1`087		1`274
Air flow MED (5)	m^3/h	348	397	442	530	699	913	935	1`070
Air flow MIN (5)	m^3/h	255	281	299	350	624	772	794	930
Sound pressure level – MAX speed (6)	dB(A)	51	53	57	62	54	58		62
Fan motor input power (7)	W	56	70	83	94	58	126		124
Input current (7)	A	0,24	0,30	0,36	0,41		0,57		0,66
Cooling coil water connections	ØgasF	¾"					1"		
Peso unità	kg	23,5	24,5			37	43		45
Dimensions									
Hole length	mm	580				835			
Hole width	mm	580				835			
Panel length	mm	720				950			
Panel width	mm	720				950			
Height	mm	320				385			
Electrical power supply									
Electrical power supply	V / ph / Hz	230 / 1 / 50 + N + T							

REMARKS:
1) Ambient temperature 27°C b.s. and 19°C b.u. - water 7/12°C
2) Ambient temperature 20°C - inlet water 50°C
3) Ambient temperature 20°C - IN/OUT water to the coil 70/60°C
5) With clean filter
6) Measured according to ISO 3741
7) Maximum absorbed value

Technical data - 4-PIPE Version

CW		41 P	42 P	43 P	44 P	51 G	52 G	53 G	54 G
4-PIPE Version									
Total cooling capacity (1)	kW	1,45	2,02	2,86	3,46	4,79	5,91	7,04	9,30
Sensible cooling capacity (1)	kW	1,20	1,51	2,17	2,66	3,50	4,31	5,21	6,69
Water flow (1)	l/s	0,069	0,097	0,137	0,165	0,229	0,282	0,336	0,445
Heating capacity (2)	kW	0,97	1,64	1,84	2,31	4,19	5,14	6,13	7,45
Water flow (2)	l/s	0,023	0,039	0,044	0,055	0,10	0,123	0,146	0,178
Pressure drop in cooling (1)	kPa	22	26	41	45	27	42		49
Pressure drop in heating (2)	kPa	31	29	34	40	36	22	30	41
Heating capacity (3)	kW	2,28	2,95	4,36	5,31	6,88	8,48	10,11	12,34
Water flow (3)	l/s	0,054	0,070	0,104	0,127	0,164	0,203	0,242	0,295
Pressure drop in heating (3)	kPa	33	31	37	43	38	24	32	44
Air flow MAX (5)	m^3/h	543	611	680	815	832	1`087		1`274
Air flow MED (5)	m^3/h	342	385	435	513	691	902	924	1`057
Air flow MIN (5)	m^3/h	250	269	286	342	616	761	783	917
Sound pressure level – MAX speed (6)	dB(A)	51	53	57	62	54	58		62
Fan motor input power (7)	W	56	66	74	94	58	126		124
Input current (7)	A	0,24	0,29	0,32	0,41		0,57		0,66
Cooling coil water connections	ØgasF	¾"							
Heating coil water connections	ØgasF	½"							
Peso unità	kg	23,5	24,5			37	43		45
Dimensions									
Hole length	mm	580				835			
Hole width	mm	580				835			
Panel length	mm	720				950			
Panel width	mm	720				950			
Height	mm	320				385			
Electrical power supply									
Electrical power supply	V / ph / Hz	230 / 1 / 50 + N + T							

REMARKS:
1) Ambient temperature 27°C b.s. and 19°C b.u. - water 7/12°C
2) Ambient temperature 20°C - inlet water 50°C
3) Ambient temperature 20°C - IN/OUT water to the coil 70/60°C
5) With clean filter
6) Measured according to ISO 3741
7) Maximum absorbed value

ETD 52

Series ETD ...

Capacity from 4 to 51 kW

The ductable air handling units of **ETD series** are able to meet the several and different requirements of conditioning market.
These units are equipped with centrifugal fans and are planned for the direct installation on duct.

The following versions are available:
ETD...standard version

Main components:

FRAME
Made in galvanized steel plate, of high thickness for an excellent solidity and functionality, including external bracket for a safe and simple fixing. It is internally covered by sound-proofing and thermo- protective material of very good quality.

HEAT EXCHANGER COIL
With copper pipes and aluminium fins, fixed on pipes through mechanical expansion, with special and innovative profile for a higher exchanging power. Manifolds are on the left side of the unit (considering the air discharge side) and made up of copper with male gas screwed connections and completed with two air vent valves. If required, it is possible to have the manifolds on the right side. The coil is provided with a drain pan underneath.

FAN
Centrifugal fan with double intake, horizontally developed impellers of aluminium, balanced both statically and dynamically, and 1 Ph direct connected motor with overcharge protection. 3 rotation speeds.

Accessories

AD	Hydraulic connections / manifolds on the right side
BC	Auxiliary hot water coil for 4-pipe installation
BR	Additional drain pan
FX	Air filter
FXa	Air filter with activated carbon
JA	Straight plenum on air discharge
JB	Insulated 90° plenum on air discharge
JC	90° plenum on air inlet
JE	Plenum on air inlet with spigots and air filter
JF	Plenum on air discharge with spigots
JG	Antivibration joint
JH	Straight plenum on air inlet
JI	Connection flange
K22	ON/OFF 2-way valves for 2-pipe systems
K32	ON/OFF 3-way valves for 2-pipe systems
K24	ON/OFF 2-way valves for 4-pipe systems
K34	ON/OFF 3-way valves for 4-pipe systems
PB	Condensing water pump
PR	Fresh air inlet (max 33%)
RE	Electric heaters
SI	Interface card for the control of max 4 units with only one thermostat (one card and one thermostat every 4 units)
T0	Water low temperature thermostat
T3	Remote control with: manual ON/OFF switch, summer/winter manual switch, 3 speed manual selection switch
T4	Programmable remote electronic control
T5	Programmable electronic control with infra-red remote control (not for RE)
V2	Valvole di intercettazione a sfera per impianti a 2 tubi
V4	Shut-off valves for 4-pipe systems

Technical data

ETD		12/4	22/4	32/4	42/4	52/4	62/4	72/4
2-PIPE Version								
Total cooling capacity (1)	kW	4,01	7,05	9,20	10,56	13,09	27,81	50,64
Sensible cooling capacity (1)	kW	3,25	5,64	7,36	8,63	11,02	21,13	39,50
Water flow (1)	l/s	0,192	0,337	0,441	0,508	0,627	1,332	2,425
Heating capacity (2)	kW	4,97	8,51	11,21	12,80	16,82	32,43	60,11
Water flow (2)	l/s	0,192	0,337	0,441	0,508	0,627	1,332	2,425
Pressure drop in cooling (1)	kPa	20	31	34	32	36	34	40
Pressure drop in heating (2)	kPa	17	27	29	28	31	29	34
Heating capacity (3)	kW	8,32	14,20	18,72	21,35	28,25	53,88	100,07
Water flow (3)	l/s	0,199	0,340	0,448	0,511	0,677	1,290	2,396
Pressure drop in heating (3)	kPa	16	24	27	25	32	24	30
Electric heater capacity (4)	kW	4,5	9,0		12,0		18,0	24,0
Input current (4)	A	6,84	13,67		18,23		27,35	36,46
Air flow MAX (5)	m^3/h	837	1˙423	1˙951	2˙131	3˙002	4˙678	9˙250
Air flow MED (5)	m^3/h	780	1˙214	1˙775	1˙889	2˙394	3˙945	7˙890
Air flow MIN (5)	m^3/h	678	898	1˙346	1˙350	1˙675	3˙215	6˙450
Fan speed (5)	rpm	1˙360		1˙200	1˙207	1˙382	806	822
Sound pressure level – MAX speed (6)	dB(A)	63	58	61	58	62	69	71
Sound pressure level – MED speed (6)	dB(A)	67	65	68	65	69	73	76
Sound pressure level – MIN speed (6)	dB(A)	68	69	70	69	74	78	81
Available pressure – STD	Pa	0						
Available pressure – 1M	Pa	50						
Available pressure – 2M	Pa	100						
4-PIPE Version								
Total cooling capacity (1)	kW	3,60	6,35	8,29	9,55	12,26	24,99	45,56
Sensible cooling capacity (1)	kW	3,11	5,33	7,05	8,02	10,56	20,19	37,79
Water flow (1)	l/s	0,173	0,304	0,397	0,457	0,587	1,197	2,182
Heating capacity (2)	kW	4,18	7,00	9,15	10,54	13,99	38,83	70,20
Water flow (2)	l/s	0,100	0,168	0,219	0,252	0,335	0,930	1,681
Pressure drop in cooling (1)	kPa	16	24	28	25	31	27	32
Pressure drop in heating (2)	kPa	27	23	36	21	34	33	36
Heating capacity (3)	kW	2,56	4,28	5,59	6,44	8,55	23,73	42,90
Water flow (3)	l/s	0,124	0,207	0,271	0,312	0,414	1,150	2,079
Pressure drop in heating (3)	kPa	46	39	62	36	58	56	62
Air flow MAX (5)	m^3/h	795	1˙352	1˙853	2˙024	2˙852	4˙444	8˙788
Air flow MED (5)	m^3/h	741	1˙153	1˙686	1˙795	2˙274	3˙748	7˙496
Air flow MIN (5)	m^3/h	644	853	1˙279	1˙282	1˙591	3˙054	6˙128
Fan speed (5)	rpm	1˙365		1˙205	1˙214	1˙387	810	832
Sound pressure level – MAX speed (6)	dB(A)	63	58	61	59	61	69	71
Sound pressure level – MED speed (6)	dB(A)	67	65	68	66	68	73	76
Sound pressure level – MIN speed (6)	dB(A)	68	69	70		73	78	81
Available pressure – STD	Pa	0						
Available pressure – 1M	Pa	50						
Available pressure – 2M	Pa	100						
General data								
Fan motor input power (7)	W	162	218	322	340	582	1˙320	2˙600
Input current (7)	A	0,72	0,97	1,43	1,51	2,58	5,86	11,54
Cooling coil water connections	ØgasF	½"		¾"		1"	1 ¼"	1 ½"
Heating coil water connections	ØgasF	½"				¾"	1"	1 ¼"
Cooling coil water volume	l	1,36	2,18	2,63	3,25	3,79	9,38	14,44
Heating coil water volume	l	0,45	0,73	0,88	1,08	1,26	4,69	7,22
Dimensions								
Length	mm	738	1˙088	1˙188	1˙428		1˙481	2˙168
Width	mm	591					910	
Height	mm	299		323		373	674	
Weight								
2-Pipe unit	kg	28	36	41	46	57	117	192
4-Pipe unit	kg	30	38	44	49	61	130	210
Electrical power supply								
Electrical power supply	V / ph / Hz	230 / 1 / 50 + N + T						

REMARKS:
1) Ambient temperature 27°C b.s. and 19°C b.u. - water 7/12°C
2) Ambient temperature 20°C - inlet water 50°C
3) Ambient temperature 20°C - IN/OUT water to the coil 70/60°C
4) Electric heaters are optionals and are not available on 4 pipes version
5) With clean filter
6) Measured according to ISO 3741
7) Maximum absorbed value