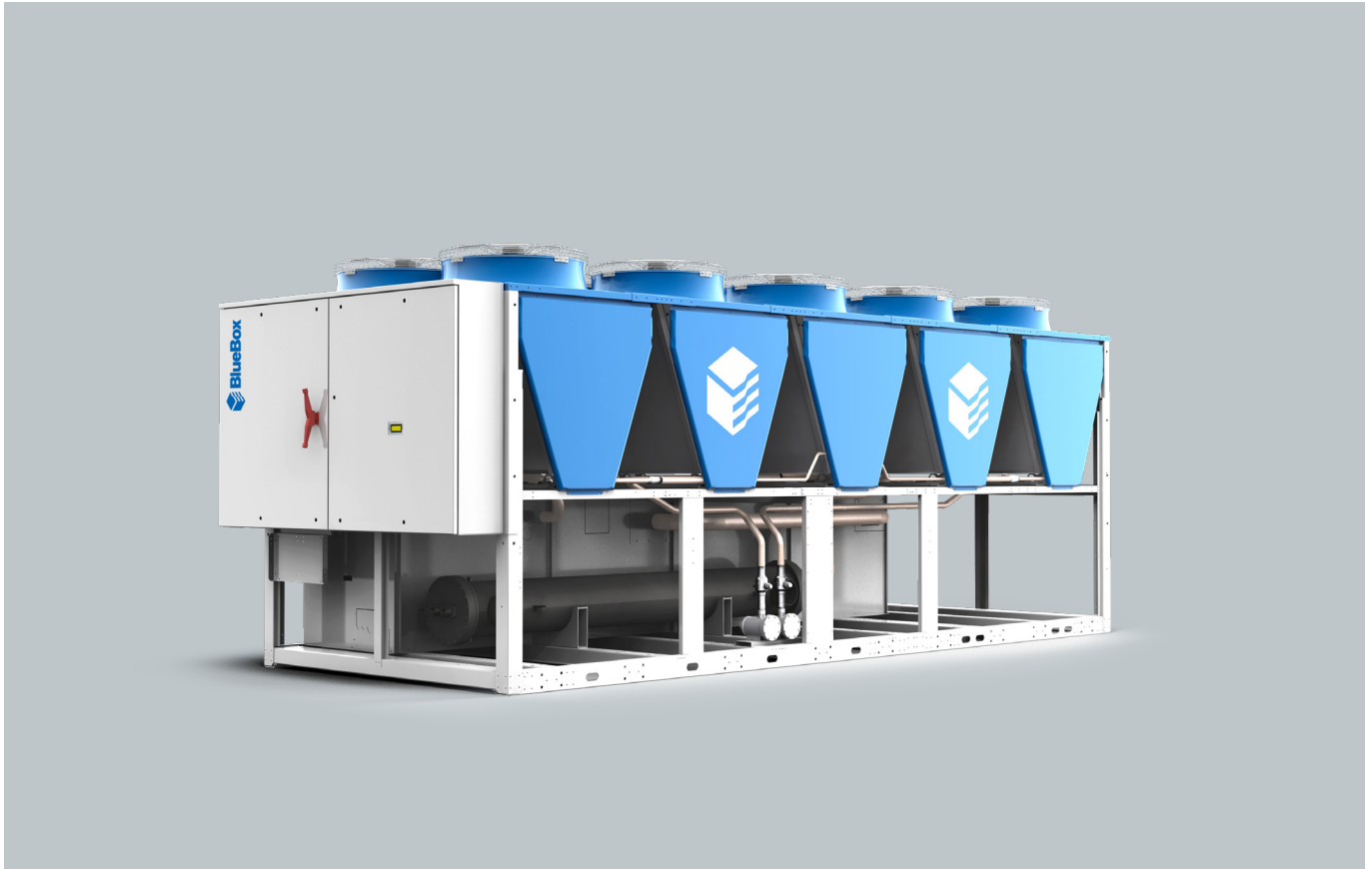


# Kappa Rev

296÷1983 kW



## General

Modulated chillers and reversible units for large systems. Wide range: multiple high efficiency combinations and low noise version

## Configurations

HE: High efficiency unit

LN: low noise unit

SLN: super low noise unit

HP: reversible heat pump

DS: unit with desuperheaters

DC: unit with recovery condenser

HAT: unit for high external air temperature

HWT: unit for production of water at high temperature

## Strengths

- ▶ Chiller with low refrigerant charge
- ▶ Operating in a wide range of external ambient conditions
- ▶ Intelligent management of defrost cycles: Anti-Ice Circuit
- ▶ Night Shift function for noise control (option)
- ▶ Dual power supply with automatic switching and Fast restart function (options)
- ▶ BlueThink advanced control with integrated web server. Multilogic function and Blueeye® supervision system. (options)
- ▶ Flowzer: inverter driven pumps (options)





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## **Kappa Rev**

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# Kappa Rev

Modulated chillers and reversible units for large systems Wide range: multiple high efficiency combinations and low noise version

## PRODUCT DESCRIPTION

### REFRIGERANT

Refrigerant R134a (GWP=1430) standard.

The model can be supplied with refrigerant R513A as an option.

### BODY

The body is modular with a load-bearing frame, made of galvanized sheet-iron coated with polyester powder RAL 5017/7035 which makes it highly resistant to weather conditions. All screws and bolts are stainless steel.

There are yellow lifting brackets at the base of the unit to allow lifting with lifting beam.

All units are of the monoblock type with the exception of units with 4 circuits which are always made in two sections delivered separately. The two sections must be hydraulically manifolded and fed by two separate power supplies in the field (by the customer).

### COMPRESSORS

#### Basic, HE and SLN version

For the basic, HE and SLN version units, the compressors are semi-hermetic screw compressors with continuous capacity reduction of output power from 25 to 100%, which allows the energy efficiency of the unit to be maximized in all operating conditions.

The capacity reduction of the entire unit is always continuous, from the minimum capacity reduction step, based on the number of compressors, up to 100%. Lubrication of the compressors is ensured by the pressure difference between delivery and suction.

All the compressors are fitted with check valve on delivery side, metal mesh filter on suction side and electronic protection with temperature sensors directly inserted in the windings and on the delivery pipe.

The machine is started and switched off with a forced 25% capacity reduction of each compressor and starting is of the "star-delta" type.

All the compressors are fitted as standard with crankcase heater and discharge valve.

### SOURCE-SIDE HEAT EXCHANGER

The V-shaped arrangement of the coils enables them to be protected from hail and makes the unit compact. It also guarantees an increase in the air intake surface, and leaves ample space for distribution of the components of the refrigerant circuit and the hydraulic circuit.

To protect the exchangers from corrosion and ensure optimal operation of the unit, we advise following the recommendations given in the user, installation and maintenance manual for cleaning the coils. For installations within a kilometre of the coast, use of the accessory is strongly recommended Coil treated with anti-corrosion paints.

#### (excluding HP units)

The exchangers are made with microchannel aluminium coils. Finned pack coils with copper tubes and aluminium fins can be requested as accessory.

Thanks to continuous research in the alloys field, and sophisticated production methods, microchannel coils are made using specific aluminium alloys for the tubes and for the fins. This allows the effects of galvanic corrosion to be drastically reduced to always ensure protection of the tubes that confine the refrigerant. Tubes and fins are also subjected to SiFLUX coating processes (or equivalent) or have zinc added to further increase their corrosion resistance.

If the unit has to be installed in an environment with a particularly aggressive atmosphere, e-coated microchannel coils are available as an option. This option is strongly recommended for applications in coastal or highly industrialized areas.

The use of microchannel coils compared to conventional copper/aluminium coils reduces the total weight of the unit by about 10% and gives a reduction in refrigerant charge of at least 30%.

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### **(only for HP units)**

The exchangers are made with finned pack coils with copper tubes and aluminium fins.

At the base of each coil, there is an Anti-Ice Circuit: this prevents ice formation in the lower part of the coil and therefore allows the unit to operate even with extremely harsh temperatures and with high humidity levels.

### **FANS**

The fans are axial fans, directly coupled to a three-phase 6-pole electric motor, with integrated thermal overload protection (Klixon®) and IP 54 protection rating.

The fan includes the shroud, designed to optimize its efficiency and reduce noise emission to a minimum, and the safety guard.

The control manages the speed of the fans through a phase cutting speed adjuster, in order to optimize the operating conditions and efficiency of the unit.

This control also has the effect of reducing the noise level of the unit: in fact, the typical conditions under which the control will be modulating the speed of the fans are those of the night, spring and autumn.

For units equipped with EC fans, the same function is carried out using the electronically commutated motor of the fans and is supplied as standard.

### **USER-SIDE HEAT EXCHANGER**

The exchanger is a dry-expansion shell-and-tube exchanger.

It is sized to maximize the efficiency of the unit, by keeping the overall dimensions and the refrigerant charge down to a minimum.

The exchanger consists of a steel shell insulated with a shell made of closed-cell foam material, while the tube bundle is made with copper tubes.

On the hydraulic connections of the exchanger, there are also pipe taps for the differential pressure switch and wells for the temperature probes.

### **REFRIGERANT CIRCUIT**

Each refrigerant circuit of the basic unit (cooling only) comprises:

- discharge valve for each compressor
- shut-off valve in the liquid line
- charging valves
- liquid sight glass
- replaceable solid cartridge dehydrator filter
- electronic expansion valve
- pressure transducers for reading the high and low pressure values and relevant evaporating and condensing temperatures
- high pressure switches and safety valves.

The pipes of the circuit and the exchanger are insulated with extruded closed-cell expanded elastomer that is resistant to UV rays.

Compared to the mechanical expansion valve, the electronic expansion valve allows machine stability to be reached more quickly and better superheating control to maximize the use of the evaporator in all load conditions. This also acts as shut-off valve on the liquid line, as it closes during compressor stops, so preventing dangerous refrigerant migration.

### **ELECTRICAL CONTROL PANEL**

The electrical control panel is made in a painted galvanized sheet-iron box with forced ventilation and IP54 protection rating. The electrical control panel of the basic unit comprises:

- main disconnect switch
- fuses to protect the compressors, fans and auxiliary circuits
- compressor contactors
- fan contactors
- phase monitor
- potential-free general alarm contacts
- single potential free operating contacts
- external air temperature probe
- microprocessor controller with display accessible from the outside
- Capacitive backup battery for electronic expansion valve

All the electrical cables inside the panel are numbered and the terminal board dedicated to the customer's connections is coloured orange so that it can be quickly identified in the panel.

### **CONTROL BLUETHINK**

#### **Main controller functions**

The microprocessor control allows the following functions:

- water temperature control, with control of the water leaving the user-side exchanger
- freeze protection
- compressor timings
- automatic rotation of compressor starting sequence
- recording of the log of all machine inputs, outputs and states
- automatic rotation of compressor starting sequence
- recording of the alarm log
- sliding defrost management
- digital input for general ON/OFF
- digital input for Summer/Winter selection (only for HP units)
- RS485 serial port with Modbus protocol
- Ethernet serial port with Modbus protocol and integrated web server preloaded web page

For further details on available functions and on displayed information, you can refer to the specific documentation of the control.

By default, the serial connections present as standard are enabled only for reading from BMS. Enabling of writing from BMS is to be requested when ordering.

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### **Main functions of the webserver (only for units with advanced control)**

As standard, the Bluethink controller integrates a webserver with a preloaded web page that is accessed via password.

The web page allows the following functions to be carried out (some of these are available only for users with advanced level rights):

- display of the main functions of the unit such as unit serial n°, size, refrigerant
- display of the general status of the machine: water inlet and outlet temperatures, external air temperature, mode (chiller or heat pump), evaporating and condensing pressures, suction and discharge temperatures
- display of the status of compressors, fans, pumps, electronic expansion valves
- display in real time of the graphs of the main quantities
- display of the graphs of logged quantities
- display of alarm log
- management of users on several levels
- remote summer winter mode selection
- remote ON/OFF
- remote set point change
- remote time band change
- remote summer winter mode selection

### **Human-Machine Interface**

The control has a graphic display that allows the following information to be displayed:

- water inlet and outlet temperature
- set temperature and differential set points
- description of alarms
- hour meter of operation and number of start-ups of the unit, the compressors and the pumps (if present)
- high and low pressure values, and relevant condensing and evaporating temperatures
- external air temperature
- superheating at compressor suction.

### **Management of defrost cycles**

For defrost management, the control of the unit uses a sliding intervention threshold, depending on the pressures inside the unit and the external air temperature. By putting together all this information, the control can identify the presence of ice on the coil and activates the defrosting sequence only when necessary, so as to maximize the energy efficiency of the unit.

Sliding management of the defrost threshold ensures that, as the absolute humidity of outdoor air decreases, the frequency of the defrost cycles gradually decreases because they are carried out only when the ice formed on the coil actually penalizes performance.

The defrost cycle is fully automatic and is carried out using a patented defrost system (patent n° 1335232): during the initial stage, a defrost is carried out by cycle reversal with fans stopped. When the frost on the coil has melted sufficiently, reverse ventilation is activated, that is, with air flow in the opposite direction to that of normal operation, so as to facilitate the ejection of condensed water and detached ice. When the coil is clean, ventilation is reversed again and the unit resumes operation in heat pump mode.

The combination of the sliding intervention threshold and the patented defrost system allows the number and duration of defrost cycles to be optimized and reduced to the minimum.

### **TESTING**

All the units are factory-tested and supplied complete with oil and refrigerant.

### **CONTROLS AND SAFETY DEVICES**

All the units are fitted with the following control and safety components:

- high pressure switch with manual reset
- high pressure safety device with automatic reset and limited tripping managed by the controller
- low pressure safety device with automatic reset and limited tripping managed by the controller
- high pressure safety valve
- antifreeze probe at outlet of each evaporator
- water differential pressure switch installed at the factory
- overtemperature protection for compressors and fans

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## VERSIONS

Alongside the basic version of the unit, there are various versions that differ in efficiency and noise levels.

### **Kappa Rev HE**

The HE version unit uses oversize coils, in order to increase the ratio between exchange surfaces and capacity of the compressors. This allows all models to achieve Eurovent Class A for both EER and COP and consequently also high ESEER values.

### **Kappa Rev SLN**

The SLN version unit uses a soundproofed compressor compartment (see description of the /LN option), oversize coils compared to the standard efficiency unit and fans with speed adjuster and reduced air flow rate. The speed reduction of the fans is such that, under nominal operating conditions, the air flow rate and noise level are lower than those of the basic version of the unit. In any case, the speed adjuster allows rotation of the fans at maximum speed when external air temperature conditions are particularly critical so as to guarantee the same operating limits as the HE version.

## OPTIONS

### **/HP: reversible heat pump**

In addition to the set-up of a chiller only unit, /HP units comprise (for each refrigerant circuit):

- 4-way reversing valve
- suction separator
- fluid accumulator
- second electronic expansion valve
- Anti-Ice Circuit at the base of each coil

Summer / winter switching can be made from the control keypad, digital input or BMS (requires write enable).

### **/DC: unit with total recovery condenser**

In addition to the set-up of a chiller only unit, /DC units comprise:

- a heat recovery condenser for recovering 100% of the condensation heat on each refrigerant circuit. The exchanger is a brazed plate heat exchanger; for multi-circuit units, the heat exchangers are to be manifolded outside the unit (by the customer)
- temperature probe at the inlet of each recovery exchanger
- liquid receiver for each refrigerant circuit with system for emptying the refrigerant from the condensing coil
- potential free contact in the electrical control panel for activation of recovery.

When required by the system, through the closing of a contact, the control automatically manages activation of recovery. Recovery management is carried out through a control on the temperature of the return water. The control also automatically manages safety deactivation of recovery if the condensing pressure becomes too high, and changes to using the condensing coils.

This option is not available for /HP units

### **/DS: unit with desuperheater**

In addition to the set-up of a chiller only unit, /DS units comprise (for each refrigerant circuit) an exchanger for condensation heat recovery of up to 20% (depending on size, version and operating conditions), placed in series with the condensing coils. The exchanger is a braze-welded plate heat exchanger. For multi-circuit units, the exchangers are to be manifolded outside the unit (by the customer).

To maximize the use of the accessory and optimize machine operation, combination with the speed adjuster of the fans or with the EC fans is recommended.

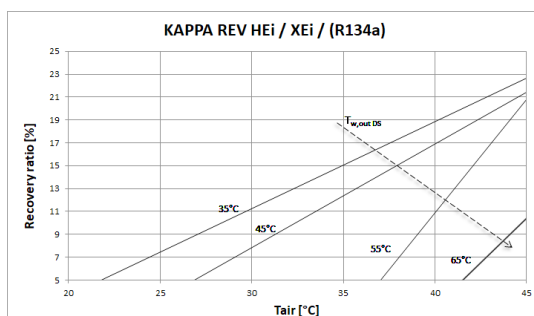
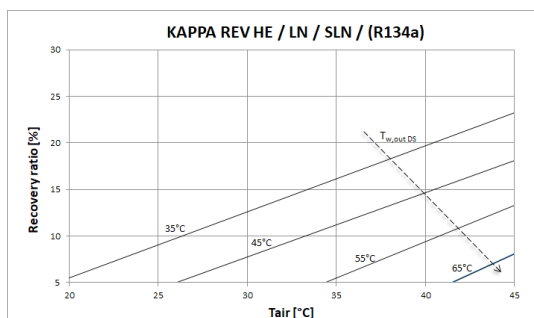
This option is also available for /HP units, but in this case, in the installation, it must have provision for shutting off the recovery water circuit during operation in heat pump mode to avoid taking power from the user-side heat exchanger.

Two illustrative graphs are shown below in which, as the ambient temperature changes, ( $T_{air}$ ) and as the temperature of the water leaving the heat recovery heat exchanger changes, ( $T_{w,out DS}$ ), the percentage of recovered heat is shown as an indication (Recovery ratio).

The percentage of recovered heat is calculated as the ratio between recovered thermal power to the desuperheater and the thermal power released by the condenser under nominal conditions, that is, evaporator inlet/outlet water temperature 12/7°C.



In the following graphs, a constant temperature delta of 5°C between water inlet and outlet at the heat recovery heat exchanger has been considered.



To maximize the use of the accessory and optimize machine operation, combination with the speed adjuster of the fans or with the EC fans is recommended.

### /LN: silenced unit

In the unit with /LN option, all the compressors are enclosed in a compartment that is fully soundproofed with sound absorbing material and soundproofing material.

### /HAT: unit for high external air temperatures

The unit fitted with this accessory adopts an electrical control panel made using specific components to withstand high temperatures, special cables and oversize protection parts.

The accessory enables the unit to work with external air temperatures of over 46°C as indicated in the section on operating limits.

With this accessory, operation is guaranteed with external air temperature up to 52°C.

For higher temperatures up to about 55°C, a set-up with air conditioning of the electrical control panel is necessary; the unit works in capacity reduction mode. The feasibility of this set-up must be assessed: please contact our sales department.

### /HWT: unit for high temperatures of produced water

Units with /HWT option use compressors with oversize electric motor for production of water at high temperature. This option is available for /HP units or for cold only units with /DC option.

### HYDRAULIC MODULES

All units can be fitted with hydraulic module in various configurations:

- /1P: hydraulic module with one pump
- /2P: hydraulic module with two pumps
- /1PS: hydraulic module with one pump and buffer tank
- /2PS: hydraulic module with two pumps and buffer tank

All the above-mentioned modules have pumps with standard discharge head.

The following are also available:

- modules /1PM, /2PM, /1PMS and /2PMS that have pumps with increased available discharge head
- modules /1PG, /2PG, /1PGS and /2PGS that have pumps suitable for operating with glycol up to 50%

Hydraulic modules with one pump have:

- one pump
- a gate valve on the delivery side of the pump
- an expansion vessel

Hydraulic modules with two pumps have:

- two pumps
- a check valve on the delivery side of each pump
- a gate valve on the outlet of the delivery manifold
- an expansion vessel

In the version with 2 pumps, these are always with one on standby while the other is working. Switching over between the pumps is automatic and is done by time (to balance the hours of operation of each one) or in the event of failure.

Hydraulic modules with tank also have:

- a gate valve at the inlet of the pump or the suction manifold
- a tank with drain valve and air valve

Refer to the table of configurations that are not possible to check for availability of specific set-ups.

# TECHNICAL SPECIFICATIONS

## KAPPA REV

			33.2	35.2	37.2	40.2	43.2	51.2	54.2	58.2
<b>KAPPA REV</b>										
<b>Cooling (A35; W7)</b>										
Refrigeration capacity	(1)	kW	307	339	371	408	458	482	537	611
Total absorbed power	(1)	kW	108	111	129	150	169	175	195	226
EER	(1)		2,85	3,05	2,88	2,73	2,70	2,75	2,75	2,70
EER energy class (Eurovent)	(1)		C	B	C	C	C	C	C	C
ESEER			3,60	3,82	3,71	3,65	3,64	3,66	3,67	3,65
<b>KAPPA REV /HP</b>										
<b>Cooling (A35; W7)</b>										
Refrigeration capacity	(1)	kW	296	328	358	392	439	463	517	586
Total absorbed power	(1)	kW	110	113	132	153	173	179	199	231
EER	(1)		2,69	2,90	2,72	2,57	2,53	2,59	2,60	2,54
EER energy class (Eurovent)	(1)		D	B	C	D	D	D	D	D
ESEER			3,48	3,72	3,59	3,52	3,49	3,53	3,55	3,51
<b>Heating (A7/87%; W45)</b>										
Heating capacity	(2)	kW	303	334	370	403	436	473	535	616
Total absorbed power	(2)	kW	97	105	117	130	141	151	172	198
COP	(2)		3,11	3,19	3,15	3,11	3,10	3,12	3,11	3,11
COP energy class (Eurovent)	(2)		B	B	B	B	B	B	B	B
<b>Compressors</b>										
Compressors/Circuits	(8)	n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step		%	12%	12%	12%	11%	12%	12%	12%	12%
Refrigerant charge (CH + MCHX)		kg	39	44	44	46	43	48	52	63
Refrigerant charge (CH + CuAl)		kg	74	86	86	88	85	97	108	126
Refrigerant charge (HP)		kg	108	128	128	130	127	147	166	190
<b>Fans</b>										
Quantity		n°	5	6	6	6	6	7	8	9
Total air flow rate		m³/h	105.000	126.000	126.000	126.000	126.000	147.000	168.000	189.000
<b>User-side heat exchanger</b>										
Quantity		n°	1	1	1	1	1	1	1	1
Water flow rate (CH) (A35; W7)	(1)	m³/h	53,0	58,5	64,1	70,5	78,9	83,1	92,7	105,3
Head loss (CH) (A35; W7)	(1)	kPa	32	38	44	54	28	40	48	35
Water flow rate (HP) (A35; W7)	(1)	m³/h	51,0	56,5	61,7	67,7	75,7	79,8	89,2	101,1
Water flow rate (HP) (A7/87%; W45)	(2)	m³/h	51,9	57,3	63,4	69,0	74,9	81,2	91,7	105,6
Head loss (HP) (A35; W7)	(1)	kPa	30	35	41	50	26	30	36	33
Head loss (HP) (A7/87%; W45)	(2)	kPa	33	39	47	57	30	34	43	39
<b>Noise levels</b>										
Sound power level cooling	(3)	dB(A)	94	95	95	96	96	97	98	98
Sound power level heating	(6)	dB(A)	94	95	95	-	-	-	-	-
Sound pressure level cooling	(4)	dB(A)	62	63	63	64	64	65	66	66
Sound power level of vers. LN cooling	(3)	dB(A)	89	90	90	91	91	92	93	93
Sound power level of vers. LN heating	(6)	dB(A)	89	90	90	-	-	-	-	-
Sound pressure level of vers. LN cooling	(4)	dB(A)	57	58	58	59	59	59	61	60
<b>Dimensions and weights**</b>										
Length		mm	3.870	3.870	3.870	3.870	3.870	5.020	5.020	6.165
Depth		mm	2.260	2.260	2.260	2.260	2.260	2.260	2.260	2.260
Height		mm	2.440	2.440	2.440	2.440	2.440	2.440	2.440	2.440
Operating weight CH (MCHX)	(5)	kg	3.040	3.060	3.070	3.390	3.700	4.140	4.150	5.090

(1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511

(2) Outside air temperature 7°C DB, 6°C WB; condenser inlet/outlet water temperature 40/45°C. Values compliant with standard EN 14511

(3) Unit operating at nominal operating capacity, without any accessories, with external air temperature of 35°C and user-side heat exchanger water inlet/outlet temperature of 12/7°C. Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(4) Values obtained from the sound power level (conditions: note 2), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.

(5) The weight refers to the unit without any accessory. The introduction of a few accessories such as copper/aluminum coils, hydraulic modules or the recovery exchangers can lead to weight increased that can exceed 10%. For further details refer to the specific drawing of the selected configuration.

(6) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.

(8) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

\*\* Basic CH unit without included accessories

## KAPPA REV

			67.2	73.2	80.2	85.2	90.2	95.2	100.2	105.2
<b>KAPPA REV</b>										
<b>Cooling (A35; W7)</b>										
Refrigeration capacity	(1)	kW	687	734	785	837	887	949	991	1.043
Total absorbed power	(1)	kW	245	255	266	295	325	346	364	384
EER	(1)		2,80	2,87	2,95	2,84	2,73	2,74	2,72	2,72
EER energy class (Eurovent)	(1)		C	C	B	C	C	C	C	C
ESEER			3,61	3,61	3,60	3,61	3,62	3,62	3,62	3,62
<b>KAPPA REV /HP</b>										
<b>Cooling (A35; W7)</b>										
Refrigeration capacity	(1)	kW	660	705	756	805	853	912	953	-
Total absorbed power	(1)	kW	250	260	271	301	332	353	371	-
EER	(1)		2,64	2,71	2,79	2,67	2,57	2,59	2,57	-
EER energy class (Eurovent)	(1)		D	C	C	D	D	D	D	-
ESEER			3,48	3,49	3,49	3,48	3,50	3,49	3,50	-
<b>Heating (A7/87%; W45)</b>										
Heating capacity	(2)	kW	670	724	777	813	872	938	1.004	-
Total absorbed power	(2)	kW	215	229	241	258	275	295	314	-
COP	(2)		3,12	3,17	3,22	3,15	3,17	3,18	3,20	-
COP energy class (Eurovent)	(2)		B	B	A	B	B	B	A	-
<b>Compressors</b>										
Compressors/Circuits	(8)	n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step		%	12%	12%	12%	12%	12%	12%	12%	12%
Refrigerant charge (CH + MCHX)		kg	70	75	83	83	87	98	102	115
Refrigerant charge (CH + CuAl)		kg	140	152	167	167	171	189	200	220
Refrigerant charge (HP)		kg	211	230	253	253	255	279	298	-
<b>Fans</b>										
Quantity		n°	10	11	12	12	12	13	14	15
Total air flow rate		m³/h	210.000	231.000	252.000	252.000	252.000	273.000	294.000	315.000
<b>User-side heat exchanger</b>										
Quantity		n°	1	1	1	1	1	1	1	1
Water flow rate (CH) (A35; W7)	(1)	m³/h	118,5	126,6	135,3	144,4	153,0	163,7	171,1	180,0
Head loss (CH) (A35; W7)	(1)	kPa	43	48	33	36	42	50	55	49
Water flow rate (HP) (A35; W7)	(1)	m³/h	113,8	121,7	130,3	138,8	147,2	157,4	164,6	-
Water flow rate (HP) (A7/87%; W45)	(2)	m³/h	114,9	124,1	133,3	139,4	149,5	160,8	172,0	-
Head loss (HP) (A35; W7)	(1)	kPa	40	45	30	34	39	46	51	-
Head loss (HP) (A7/87%; W45)	(2)	kPa	44	51	35	37	45	53	60	-
<b>Noise levels</b>										
Sound power level cooling	(3)	dB(A)	99	100	100	100	100	101	101	102
Sound power level heating	(6)	dB(A)	-	-	-	-	-	-	-	-
Sound pressure level cooling	(4)	dB(A)	67	67	67	68	68	68	68	69
Sound power level of vers. LN cooling	(3)	dB(A)	94	95	95	95	95	96	96	97
Sound power level of vers. LN heating	(6)	dB(A)	-	-	-	-	-	-	-	-
Sound pressure level of vers. LN cooling	(4)	dB(A)	62	63	63	63	62	63	63	64
<b>Dimensions and weights**</b>										
Length		mm	6.165	7.310	7.310	7.310	7.310	8.465	8.465	9.610
Depth		mm	2.260	2.260	2.260	2.260	2.260	2.260	2.260	2.260
Height		mm	2.440	2.440	2.440	2.440	2.440	2.440	2.440	2.440
Operating weight CH (MCHX)	(5)	kg	5.520	6.070	6.430	6.480	6.560	6.900	6.940	7.490

(1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511

(2) Outside air temperature 7°C DB, 6°C WB; condenser inlet/outlet water temperature 40/45°C. Values compliant with standard EN 14511

(3) Unit operating at nominal operating capacity, without any accessories, with external air temperature of 35°C and user-side heat exchanger water inlet/outlet temperature of 12/7°C. Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(4) Values obtained from the sound power level (conditions: note 2), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.

(5) The weight refers to the unit without any accessory. The introduction of a few accessories such as copper/aluminum coils, hydraulic modules or the recovery exchangers can lead to weight increased that can exceed 10%. For further details refer to the specific drawing of the selected configuration.

(6) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.

(8) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

\*\* Basic CH unit without included accessories

## KAPPA REV

			115.2	120.2	130.2	140.3	150.3	160.3	108.4	116.4
<b>KAPPA REV</b>										
<b>Cooling (A35; W7)</b>										
Refrigeration capacity	(1)	kW	1,113	1,201	1,288	1,438	1,496	1,542	-	-
Total absorbed power	(1)	kW	405	431	455	527	548	566	-	-
EER	(1)		2,75	2,79	2,83	2,73	2,73	2,72	-	-
EER energy class (Eurovent)	(1)		C	C	C	C	C	C	-	-
ESEER			3,63	3,61	3,62	3,61	3,61	3,61	-	-
<b>KAPPA REV /HP</b>										
<b>Cooling (A35; W7)</b>										
Refrigeration capacity	(1)	kW	-	-	-	-	-	-	1,034	1,173
Total absorbed power	(1)	kW	-	-	-	-	-	-	397	461
EER	(1)		-	-	-	-	-	-	2,60	2,54
EER energy class (Eurovent)	(1)		-	-	-	-	-	-	D	D
ESEER			-	-	-	-	-	-	3,56	3,54
<b>Heating (A7/87%; W45)</b>										
Heating capacity	(2)	kW	-	-	-	-	-	-	1,069	1,231
Total absorbed power	(2)	kW	-	-	-	-	-	-	343	396
COP	(2)		-	-	-	-	-	-	3,11	3,11
COP energy class (Eurovent)	(2)		-	-	-	-	-	-	B	B
<b>Compressors</b>										
Compressors/Circuits	(8)	n°/n°	2/2	2/2	2/2	3/3	3/3	3/3	4/4	4/4
Minimum capacity reduction step		%	12%	12%	12%	8%	8%	8%	6%	6%
Refrigerant charge (CH + MCHX)		kg	122	132	136	149	160	165	-	-
Refrigerant charge (CH + CuAl)		kg	234	258	262	289	307	319	-	-
Refrigerant charge (HP)		kg	-	-	-	-	-	-	332	380
<b>Fans</b>										
Quantity		n°	16	18	18	20	21	22	16	18
Total air flow rate		m³/h	336.000	378.000	378.000	420.000	441.000	462.000	336.000	378.000
<b>User-side heat exchanger</b>										
Quantity		n°	1	1	1	1	1	1	2	2
Water flow rate (CH) (A35; W7)	(1)	m³/h	191,8	207,0	222,1	247,9	258,0	265,9	-	-
Head loss (CH) (A35; W7)	(1)	kPa	25	29	32	39	34	36	-	-
Water flow rate (HP) (A35; W7)	(1)	m³/h	-	-	-	-	-	-	178,3	202,2
Water flow rate (HP) (A7/87%; W45)	(2)	m³/h	-	-	-	-	-	-	183,3	211,2
Head loss (HP) (A35; W7)	(1)	kPa	-	-	-	-	-	-	36	33
Head loss (HP) (A7/87%; W45)	(2)	kPa	-	-	-	-	-	-	43	39
<b>Noise levels</b>										
Sound power level cooling	(3)	dB(A)	102	102	103	104	105	106	101	101
Sound power level heating	(6)	dB(A)	-	-	-	-	-	-	-	-
Sound pressure level cooling	(4)	dB(A)	69	69	70	71	71	72	69	69
Sound power level of vers. LN cooling	(3)	dB(A)	97	97	98	99	100	101	96	96
Sound power level of vers. LN heating	(6)	dB(A)	-	-	-	-	-	-	-	-
Sound pressure level of vers. LN cooling	(4)	dB(A)	64	64	65	66	67	68	64	63
<b>Dimensions and weights**</b>										
Length		mm	9.610	10.755	10.755	11.965	13.110	13.110	2 x 5.020	2 x 6.165
Depth		mm	2.260	2.260	2.260	2.260	2.260	2.260	2.260	2.260
Height		mm	2.440	2.440	2.440	2.440	2.440	2.440	2.440	2.440
Operating weight CH (MCHX)	(5)	kg	8.010	8.420	8.560				2 x 4.150	2 x 5.090

(1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511

(2) Outside air temperature 7°C DB, 6°C WB; condenser inlet/outlet water temperature 40/45°C. Values compliant with standard EN 14511

(3) Unit operating at nominal operating capacity, without any accessories, with external air temperature of 35°C and user-side heat exchanger water inlet/outlet temperature of 12/7°C. Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(4) Values obtained from the sound power level (conditions: note 2), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.

(5) The weight refers to the unit without any accessory. The introduction of a few accessories such as copper/aluminum coils, hydraulic modules or the recovery exchangers can lead to weight increased that can exceed 10%. For further details refer to the specific drawing of the selected configuration.

(6) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.

(8) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

\*\* Basic CH unit without included accessories

## KAPPA REV

			134.4	146.4	160.4	170.4	180.4	190.4	200.4
<b>KAPPA REV</b>									
<b>Cooling (A35; W7)</b>									
Refrigeration capacity	(1)	kW	-	-	-	1,675	1,774	1,898	1,983
Total absorbed power	(1)	kW	-	-	-	590	650	691	727
EER	(1)		-	-	-	2,84	2,73	2,75	2,73
EER energy class (Eurovent)	(1)		-	-	-	C	C	C	C
ESEER			-	-	-	3,62	3,64	3,62	3,64
<b>KAPPA REV /HP</b>									
<b>Cooling (A35; W7)</b>									
Refrigeration capacity	(1)	kW	1.320	1.412	1.512	1.610	1.707	1.825	1.907
Total absorbed power	(1)	kW	500	519	541	602	663	705	741
EER	(1)		2,64	2,72	2,79	2,67	2,57	2,59	2,57
EER energy class (Eurovent)	(1)		D	C	C	D	D	D	D
ESEER			3,49	3,52	3,50	3,49	3,53	3,50	3,53
<b>Heating (A7/87%; W45)</b>									
Heating capacity	(2)	kW	1.340	1.447	1.554	1.625	1.744	1.876	2.007
Total absorbed power	(2)	kW	430	455	482	515	550	589	627
COP	(2)		3,12	3,18	3,23	3,16	3,17	3,19	3,20
COP energy class (Eurovent)	(2)		B	B	A	B	B	B	A
<b>Compressors</b>									
Compressors/Circuits	(8)	n°/n°	4/4	4/4	4/4	4/4	4/4	4/4	4/4
Minimum capacity reduction step		%	6%	6%	6%	6%	6%	6%	6%
Refrigerant charge (CH + MCHX)		kg	-	-	-	167	174	195	205
Refrigerant charge (CH + CuAl)		kg	-	-	-	335	342	377	401
Refrigerant charge (HP)		kg	422	461	505	505	510	558	596
<b>Fans</b>									
Quantity		n°	20	22	24	24	24	26	28
Total air flow rate		m³/h	420.000	462.000	504.000	504.000	504.000	546.000	588.000
<b>User-side heat exchanger</b>									
Quantity		n°	2	2	2	2	2	2	2
Water flow rate (CH) (A35; W7)	(1)	m³/h	-	-	-	293,7	311,1	332,9	347,9
Head loss (CH) (A35; W7)	(1)	kPa	-	-	-	36	42	50	55
Water flow rate (HP) (A35; W7)	(1)	m³/h	227,7	243,4	260,7	277,6	294,3	314,9	329,2
Water flow rate (HP) (A7/87%; W45)	(2)	m³/h	229,7	248,2	266,7	278,8	299,1	321,5	344,0
Head loss (HP) (A35; W7)	(1)	kPa	40	45	30	34	39	46	51
Head loss (HP) (A7/87%; W45)	(2)	kPa	44	51	35	37	45	53	60
<b>Noise levels</b>									
Sound power level cooling	(3)	dB(A)	102	103	103	103	103	104	104
Sound power level heating	(6)	dB(A)	-	-	-	-	-	-	-
Sound pressure level cooling	(4)	dB(A)	70	70	70	71	71	71	71
Sound power level of vers. LN cooling	(3)	dB(A)	97	98	98	98	98	99	99
Sound power level of vers. LN heating	(6)	dB(A)	-	-	-	-	-	-	-
Sound pressure level of vers. LN cooling	(4)	dB(A)	65	66	66	66	65	66	66
<b>Dimensions and weights**</b>									
Length		mm	2 x 6.165	2 x 7.310	2 x 7.310	2 x 7.310	2 x 7.310	2 x 8.465	2 x 8.465
Depth		mm	2.260	2.260	2.260	2.260	2.260	2.260	2.260
Height		mm	2.440	2.440	2.440	2.440	2.440	2.440	2.440
Operating weight CH (MCHX)	(5)	kg	2 x 5.520	2 x 6.070	2 x 6.430	2 x 6.480	2 x 6.560	2 x 6.900	2 x 6.940

(1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511

(2) Outside air temperature 7°C DB, 6°C WB; condenser inlet/outlet water temperature 40/45°C. Values compliant with standard EN 14511

(3) Unit operating at nominal operating capacity, without any accessories, with external air temperature of 35°C and user-side heat exchanger water inlet/outlet temperature of 12/7°C. Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(4) Values obtained from the sound power level (conditions: note 2), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.

(5) The weight refers to the unit without any accessory. The introduction of a few accessories such as copper/aluminum coils, hydraulic modules or the recovery exchangers can lead to weight increased that can exceed 10%. For further details refer to the specific drawing of the selected configuration.

(6) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.

(8) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

\*\* Basic CH unit without included accessories

## KAPPA REV HE

			33.2	35.2	37.2	40.2	43.2	51.2	54.2	58.2	67.2
<b>KAPPA REV HE</b>											
<b>Cooling (A35; W7)</b>											
Refrigeration capacity	(1)	kW	328	366	387	441	491	516	572	672	730
Total absorbed power	(1)	kW	105	118	124	142	158	166	183	216	236
EER	(1)		3,12	3,11	3,12	3,11	3,10	3,11	3,12	3,12	3,10
EER energy class (Eurovent)	(1)		A	A	A	A	A	A	A	A	A
ESEER			3,89	3,85	3,94	3,85	3,81	3,74	3,75	3,84	3,73
<b>KAPPA REV HE /HP</b>											
<b>Cooling (A35; W7)</b>											
Refrigeration capacity	(1)	kW	316	354	374	426	474	499	554	649	705
Total absorbed power	(1)	kW	107	120	126	144	161	169	186	220	240
EER	(1)		2,96	2,96	2,97	2,95	2,95	2,96	2,98	2,95	2,94
EER energy class (Eurovent)	(1)		B	B	B	B	B	B	B	B	B
ESEER			3,84	3,80	3,90	3,80	3,77	3,69	3,72	3,78	3,68
<b>Heating (A7/87%; W45)</b>											
Heating capacity	(2)	kW	319	367	397	435	471	505	579	662	705
Total absorbed power	(2)	kW	99	112	121	133	144	155	177	203	217
COP	(2)		3,23	3,28	3,29	3,27	3,27	3,27	3,28	3,27	3,25
COP energy class (Eurovent)	(2)		A	A	A	A	A	A	A	A	A
<b>Compressors</b>											
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(8)	%	12%	12%	12%	11%	12%	12%	12%	12%	12%
Refrigerant charge (CH + MCHX)		kg	46	52	52	56	56	68	77	83	83
Refrigerant charge (CH + CuAl)		kg	88	101	108	112	112	131	154	167	167
Refrigerant charge (HP)		kg	130	147	166	169	169	190	229	253	253
<b>Fans</b>											
Quantity		n°	6	7	8	8	8	9	11	12	12
Total air flow rate		m³/h	126.000	147.000	168.000	168.000	168.000	189.000	231.000	252.000	252.000
<b>User-side heat exchanger</b>											
Quantity		n°	1	1	1	1	1	1	1	1	1
Water flow rate (CH) (A35; W7)	(1)	m³/h	56,5	63,2	66,6	76,0	84,7	89,0	98,6	115,8	125,9
Head loss (CH) (A35; W7)	(1)	kPa	37	21	24	36	41	27	32	25	28
Water flow rate (HP) (A35; W7)	(1)	m³/h	54,6	61,0	64,5	73,4	81,7	86,0	95,4	111,8	121,5
Water flow rate (HP) (A7/87%; W45)	(2)	m³/h	54,7	63,0	68,2	74,5	80,9	86,7	99,5	113,7	121,0
Head loss (HP) (A35; W7)	(1)	kPa	35	20	28	33	22	25	18	24	26
Head loss (HP) (A7/87%; W45)	(2)	kPa	37	21	30	36	24	27	20	26	29
<b>Noise levels</b>											
Sound power level cooling	(3)	dB(A)	94	95	95	96	96	97	98	98	99
Sound power level heating	(6)	dB(A)	94	95	95	-	-	-	-	-	-
Sound pressure level cooling	(4)	dB(A)	62	62	62	63	63	65	66	66	67
Sound power level of vers. LN cooling	(3)	dB(A)	89	90	90	91	91	92	93	93	94
Sound power level of vers. LN heating	(6)	dB(A)	89	90	90	-	-	-	-	-	-
Sound pressure level of vers. LN cooling	(4)	dB(A)	57	58	58	59	59	59	61	60	62
<b>Dimensions and weights**</b>											
Length		mm	3.870	5.020	5.020	5.020	5.020	6.165	7.310	7.310	7.310
Depth		mm	2.260	2.260	2.260	2.260	2.260	2.260	2.260	2.260	2.260
Height		mm	2.440	2.440	2.440	2.440	2.440	2.440	2.440	2.440	2.440
Operating weight CH (MCHX)	(5)	kg	3.070	3.500	3.510	3.830	4.140	4.660	5.210	6.000	6.410

(1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511

(2) Outside air temperature 7°C DB, 6°C WB; condenser inlet/outlet water temperature 40/45°C. Values compliant with standard EN 14511

(3) Unit operating at nominal operating capacity, without any accessories, with external air temperature of 35°C and user-side heat exchanger water inlet/outlet temperature of 12/7°C. Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(4) Values obtained from the sound power level (conditions: note 2), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.

(5) The weight refers to the unit without any accessory. The introduction of a few accessories such as copper/aluminum coils, hydraulic modules or the recovery exchangers can lead to weight increased that can exceed 10%. For further details refer to the specific drawing of the selected configuration.

(6) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.

(8) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

\*\* Basic CH unit without included accessories

# KAPPA REV HE

			73.2	80.2	85.2	90.2	95.2	100.2	105.2	115.2	120.2
<b>KAPPA REV HE</b>											
<b>Cooling (A35; W7)</b>											
Refrigeration capacity	(1)	kW	768	811	883	950	1.020	1.081	1.138	1.206	1.297
Total absorbed power	(1)	kW	248	261	284	306	329	348	366	388	418
EER	(1)		3,10	3,11	3,11	3,10	3,11	3,11	3,11	3,10	3,10
EER energy class (Eurovent)	(1)		A	A	A	A	A	A	A	A	A
ESEER			3,71	3,74	3,65	3,71	3,73	3,91	3,78	3,79	3,78
<b>KAPPA REV HE /HP</b>											
<b>Cooling (A35; W7)</b>											
Refrigeration capacity	(1)	kW	741	785	-	-	-	-	-	-	-
Total absorbed power	(1)	kW	252	265	-	-	-	-	-	-	-
EER	(1)		2,94	2,97	-	-	-	-	-	-	-
EER energy class (Eurovent)	(1)		B	B	-	-	-	-	-	-	-
ESEER			3,65	3,71	-	-	-	-	-	-	-
<b>Heating (A7/87%; W45)</b>											
Heating capacity	(2)	kW	759	814	-	-	-	-	-	-	-
Total absorbed power	(2)	kW	231	244	-	-	-	-	-	-	-
COP	(2)		3,29	3,33	-	-	-	-	-	-	-
COP energy class (Eurovent)	(2)		A	A	-	-	-	-	-	-	-
<b>Compressors</b>											
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(8)	%	12%	12%	12%	12%	12%	12%	12%	12%	12%
Refrigerant charge (CH + MCHX)		kg	92	92	105	111	128	128	141	145	154
Refrigerant charge (CH + CuAl)		kg	183	190	210	223	247	254	274	292	308
Refrigerant charge (HP)		kg	272	291	-	-	-	-	-	-	-
<b>Fans</b>											
Quantity		n°	13	14	15	16	17	18	19	21	22
Total air flow rate		m³/h	273.000	294.000	315.000	336.000	357.000	378.000	399.000	441.000	462.000
<b>User-side heat exchanger</b>											
Quantity		n°	1	1	1	1	1	1	1	1	1
Water flow rate (CH) (A35; W7)	(1)	m³/h	132,4	139,9	152,3	163,9	176,1	186,7	196,1	207,8	223,7
Head loss (CH) (A35; W7)	(1)	kPa	32	36	43	50	48	53	26	29	33
Water flow rate (HP) (A35; W7)	(1)	m³/h	127,7	135,3	-	-	-	-	-	-	-
Water flow rate (HP) (A7/87%; W45)	(2)	m³/h	130,3	139,5	-	-	-	-	-	-	-
Head loss (HP) (A35; W7)	(1)	kPa	30	35	-	-	-	-	-	-	-
Head loss (HP) (A7/87%; W45)	(2)	kPa	33	39	-	-	-	-	-	-	-
<b>Noise levels</b>											
Sound power level cooling	(3)	dB(A)	100	100	100	100	101	101	102	102	102
Sound power level heating	(6)	dB(A)	-	-	-	-	-	-	-	-	-
Sound pressure level cooling	(4)	dB(A)	67	67	67	67	68	68	69	69	69
Sound power level of vers. LN cooling	(3)	dB(A)	95	95	95	95	96	96	97	97	97
Sound power level of vers. LN heating	(6)	dB(A)	-	-	-	-	-	-	-	-	-
Sound pressure level of vers. LN cooling	(4)	dB(A)	62	62	62	62	63	63	64	64	64
<b>Dimensions and weights**</b>											
Length		mm	8.465	8.465	9.610	9.610	10.755	10.755	11.965	13.110	13.110
Depth		mm	2.260	2.260	2.260	2.260	2.260	2.260	2.260	2.260	2.260
Height		mm	2.440	2.440	2.440	2.440	2.440	2.440	2.440	2.440	2.440
Operating weight CH (MCHX)	(5)	kg	6.740	6.760	7.140	7.220	8.420	8.560	8.810	9.350	9.410

(1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511

(2) Outside air temperature 7°C DB, 6°C WB; condenser inlet/outlet water temperature 40/45°C. Values compliant with standard EN 14511

(3) Unit operating at nominal operating capacity, without any accessories, with external air temperature of 35°C and user-side heat exchanger water inlet/outlet temperature of 12/7°C. Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(4) Values obtained from the sound power level (conditions: note 2), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.

(5) The weight refers to the unit without any accessory. The introduction of a few accessories such as copper/aluminum coils, hydraulic modules or the recovery exchangers can lead to weight increased that can exceed 10%. For further details refer to the specific drawing of the selected configuration.

(6) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.

(8) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

\*\* Basic CH unit without included accessories

# KAPPA REV HE

			80.4	86.4	102.4	108.4	116.4	134.4	146.4	160.4
<b>KAPPA REV HE</b>										
<b>Cooling (A35; W7)</b>										
Refrigeration capacity	(1)	kW	-	-	-	-	-	1.461	1.536	1.623
Total absorbed power	(1)	kW	-	-	-	-	-	471	495	521
EER	(1)		-	-	-	-	-	3,10	3,10	3,11
EER energy class (Eurovent)	(1)		-	-	-	-	-	A	A	A
ESEER			-	-	-	-	-	3,73	3,72	3,75
<b>KAPPA REV HE /HP</b>										
<b>Cooling (A35; W7)</b>										
Refrigeration capacity	(1)	kW	851	948	998	1.108	1.297	1.410	1.482	1.570
Total absorbed power	(1)	kW	288	321	337	372	439	479	504	529
EER	(1)		2,96	2,95	2,96	2,98	2,95	2,94	2,94	2,97
EER energy class (Eurovent)	(1)		B	B	B	B	B	B	B	B
ESEER			3,80	3,78	3,71	3,72	3,79	3,69	3,66	3,73
<b>Heating (A7/87%; W45)</b>										
Heating capacity	(2)	kW	869	942	1.010	1.158	1.325	1.410	1.518	1.627
Total absorbed power	(2)	kW	265	288	309	353	406	434	461	488
COP	(2)		3,27	3,27	3,27	3,28	3,27	3,25	3,30	3,33
COP energy class (Eurovent)	(2)		A	A	A	A	A	A	A	A
<b>Compressors</b>										
Compressors/Circuits		n°/n°	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
Minimum capacity reduction step	(8)	%	6%	6%	6%	6%	6%	6%	6%	6%
Refrigerant charge (CH + MCHX)		kg	-	-	-	-	-	167	185	185
Refrigerant charge (CH + CuAl)		kg	-	-	-	-	-	335	367	381
Refrigerant charge (HP)		kg	337	337	380	457	505	505	544	583
<b>Fans</b>										
Quantity		n°	16	16	18	22	24	24	26	28
Total air flow rate		m³/h	336.000	336.000	378.000	462.000	504.000	504.000	546.000	588.000
<b>User-side heat exchanger</b>										
Quantity		n°	2	2	2	2	2	2	2	2
Water flow rate (CH) (A35; W7)	(1)	m³/h	-	-	-	-	-	251,8	264,9	279,8
Head loss (CH) (A35; W7)	(1)	kPa	-	-	-	-	-	28	32	36
Water flow rate (HP) (A35; W7)	(1)	m³/h	146,8	163,3	172,1	190,9	223,6	242,9	255,4	270,7
Water flow rate (HP) (A7/87%; W45)	(2)	m³/h	149,0	161,8	173,4	198,9	227,4	242,1	260,6	279,1
Head loss (HP) (A35; W7)	(1)	kPa	33	22	25	18	24	26	30	35
Head loss (HP) (A7/87%; W45)	(2)	kPa	36	24	27	20	26	29	33	39
<b>Noise levels</b>										
Sound power level cooling	(3)	dB(A)	99	99	100	101	101	102	103	103
Sound power level heating	(6)	dB(A)	-	-	-	-	-	-	-	-
Sound pressure level cooling	(4)	dB(A)	66	66	68	69	69	70	70	70
Sound power level of vers. LN cooling	(3)	dB(A)	94	94	95	96	96	97	98	98
Sound power level of vers. LN heating	(6)	dB(A)	-	-	-	-	-	-	-	-
Sound pressure level of vers. LN cooling	(4)	dB(A)	62	62	62	64	63	65	65	65
<b>Dimensions and weights**</b>										
Length		mm	2 x 5.020	2 x 5.020	2 x 6.165	2 x 7.310	2 x 7.310	2 x 7.310	2 x 8.465	2 x 8.465
Depth		mm	2.260	2.260	2.260	2.260	2.260	2.260	2.260	2.260
Height		mm	2.440	2.440	2.440	2.440	2.440	2.440	2.440	2.440
Operating weight CH (MCHX)	(5)	kg	2 x 3.830	2 x 4.140	2 x 4.660	2 x 5.210	2 x 6.000	2 x 6.410	2 x 6.740	2 x 6.760

(1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511

(2) Outside air temperature 7°C DB, 6°C WB; condenser inlet/outlet water temperature 40/45°C. Values compliant with standard EN 14511

(3) Unit operating at nominal operating capacity, without any accessories, with external air temperature of 35°C and user-side heat exchanger water inlet/outlet temperature of 12/7°C. Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(4) Values obtained from the sound power level (conditions: note 2), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.

(5) The weight refers to the unit without any accessory. The introduction of a few accessories such as copper/aluminum coils, hydraulic modules or the recovery exchangers can lead to weight increased that can exceed 10%. For further details refer to the specific drawing of the selected configuration.

(6) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.

(8) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

\*\* Basic CH unit without included accessories



## KAPPA REV SLN

			33.2	35.2	37.2	40.2	43.2	51.2	54.2	58.2	67.2
<b>KAPPA REV SLN</b>											
<b>Cooling (A35; W7)</b>											
Refrigeration capacity	(1)	kW	316	354	375	424	471	497	553	647	702
Total absorbed power	(1)	kW	106	119	124	143	161	168	185	218	239
EER	(1)		2,97	2,97	3,02	2,96	2,92	2,95	2,99	2,96	2,93
EER energy class (Eurovent)	(1)		B	B	B	B	B	B	B	B	B
ESEER			3,85	3,81	3,90	3,81	3,77	3,70	3,71	3,80	3,69
<b>KAPPA REV SLN /HP</b>											
<b>Cooling (A35; W7)</b>											
Refrigeration capacity	(1)	kW	305	342	363	411	455	481	536	626	678
Total absorbed power	(1)	kW	107	120	125	145	163	170	187	221	242
EER	(1)		2,86	2,85	2,91	2,84	2,79	2,82	2,87	2,84	2,80
EER energy class (Eurovent)	(1)		C	C	B	C	C	C	C	C	C
ESEER			3,79	3,75	3,85	3,75	3,70	3,64	3,66	3,74	3,62
<b>Heating (A7/87%; W45)</b>											
Heating capacity	(2)	kW	319	367	397	435	471	505	579	662	705
Total absorbed power	(2)	kW	99	112	121	133	144	155	177	203	217
COP	(2)		3,23	3,28	3,29	3,27	3,27	3,27	3,28	3,27	3,25
COP energy class (Eurovent)	(2)		A	A	A	A	A	A	A	A	A
<b>Compressors</b>											
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(8)	%	12%	12%	12%	11%	12%	12%	12%	12%	12%
Refrigerant charge (CH + MCHX)		kg	46	52	52	56	56	68	77	83	83
Refrigerant charge (CH + CuAl)		kg	88	101	108	112	112	131	154	167	167
Refrigerant charge (HP)		kg	130	147	166	169	169	190	229	253	253
<b>Fans</b>											
Quantity		n°	6	7	8	8	8	9	11	12	12
Total air flow rate		m³/h	96.000	112.000	128.000	128.000	128.000	144.000	176.000	192.000	192.000
<b>User-side heat exchanger</b>											
Quantity		n°	1	1	1	1	1	1	1	1	1
Water flow rate (CH) (A35; W7)	(1)	m³/h	54,4	60,9	64,6	73,2	81,2	85,7	95,3	111,5	121,0
Head loss (CH) (A35; W7)	(1)	kPa	34	20	22	33	38	25	30	24	26
Water flow rate (HP) (A35; W7)	(1)	m³/h	52,7	59,0	62,6	70,8	78,5	82,9	92,4	107,9	116,9
Water flow rate (HP) (A7/87%; W45)	(2)	m³/h	54,7	63,0	68,2	74,5	80,9	86,7	99,5	113,7	121,0
Head loss (HP) (A35; W7)	(1)	kPa	32	18	21	31	36	23	29	22	25
Head loss (HP) (A7/87%; W45)	(2)	kPa	37	21	30	36	24	27	20	26	29
<b>Noise levels</b>											
Sound power level cooling	(3)	dB(A)	86	87	87	88	88	89	90	90	91
Sound power level heating	(6)	dB(A)	94	95	95	-	-	-	-	-	-
Sound pressure level cooling	(4)	dB(A)	54	55	54	56	56	57	58	58	59
<b>Dimensions and weights**</b>											
Length		mm	3.870	5.020	5.020	5.020	5.020	6.165	7.310	7.310	7.310
Depth		mm	2.260	2.260	2.260	2.260	2.260	2.260	2.260	2.260	2.260
Height		mm	2.440	2.440	2.440	2.440	2.440	2.440	2.440	2.440	2.440
Operating weight CH (MCHX)	(5)	kg	3.460	3.960	3.970	4.290	4.600	5.160	5.730	6.520	6.930

(1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511

(2) Outside air temperature 7°C DB, 6°C WB; condenser inlet/outlet water temperature 40/45°C. Values compliant with standard EN 14511

(3) Unit operating at nominal operating capacity, without any accessories, with external air temperature of 35°C and user-side heat exchanger water inlet/outlet temperature of 12/7°C. Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(4) Values obtained from the sound power level (conditions: note 2), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.

(5) The weight refers to the unit without any accessory. The introduction of a few accessories such as copper/aluminum coils, hydraulic modules or the recovery exchangers can lead to weight increased that can exceed 10%. For further details refer to the specific drawing of the selected configuration.

(6) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.

(8) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

\*\* Basic CH unit without included accessories

## KAPPA REV SLN

			73.2	80.2	85.2	90.2	95.2	100.2	105.2	115.2	120.2
<b>KAPPA REV SLN</b>											
<b>Cooling (A35; W7)</b>											
Refrigeration capacity	(1)	kW	738	781	850	916	982	1,041	1,095	1,164	1,251
Total absorbed power	(1)	kW	251	263	287	311	334	353	372	391	423
EER	(1)		2,94	2,97	2,96	2,95	2,94	2,95	2,95	2,97	2,95
EER energy class (Eurovent)	(1)		B	B	B	B	B	B	B	B	B
ESEER			3,67	3,70	3,61	3,67	3,69	3,87	3,74	3,75	3,74
<b>KAPPA REV SLN /HP</b>											
<b>Cooling (A35; W7)</b>											
Refrigeration capacity	(1)	kW	714	757	-	-	-	-	-	-	-
Total absorbed power	(1)	kW	254	265	-	-	-	-	-	-	-
EER	(1)		2,81	2,85	-	-	-	-	-	-	-
EER energy class (Eurovent)	(1)		C	C	-	-	-	-	-	-	-
ESEER			3,61	3,65	-	-	-	-	-	-	-
<b>Heating (A7/87%; W45)</b>											
Heating capacity	(2)	kW	759	814	-	-	-	-	-	-	-
Total absorbed power	(2)	kW	231	244	-	-	-	-	-	-	-
COP	(2)		3,29	3,33	-	-	-	-	-	-	-
COP energy class (Eurovent)	(2)		A	A	-	-	-	-	-	-	-
<b>Compressors</b>											
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(8)	%	12%	12%	12%	12%	12%	12%	12%	12%	12%
Refrigerant charge (CH + MCHX)		kg	92	92	105	111	128	128	141	145	154
Refrigerant charge (CH + CuAl)		kg	183	190	210	223	247	254	274	292	308
Refrigerant charge (HP)		kg	272	291	-	-	-	-	-	-	-
<b>Fans</b>											
Quantity		n°	13	14	15	16	17	18	19	21	22
Total air flow rate		m³/h	208.000	224.000	240.000	256.000	272.000	288.000	304.000	336.000	352.000
<b>User-side heat exchanger</b>											
Quantity		n°	1	1	1	1	1	1	1	1	1
Water flow rate (CH) (A35; W7)	(1)	m³/h	127,3	134,7	146,7	158,1	169,5	179,7	188,8	200,6	215,6
Head loss (CH) (A35; W7)	(1)	kPa	30	33	40	47	45	49	24	27	30
Water flow rate (HP) (A35; W7)	(1)	m³/h	123,0	130,5	-	-	-	-	-	-	-
Water flow rate (HP) (A7/87%; W45)	(2)	m³/h	130,3	139,5	-	-	-	-	-	-	-
Head loss (HP) (A35; W7)	(1)	kPa	28	31	-	-	-	-	-	-	-
Head loss (HP) (A7/87%; W45)	(2)	kPa	33	39	-	-	-	-	-	-	-
<b>Noise levels</b>											
Sound power level cooling	(3)	dB(A)	92	92	92	92	93	93	94	94	94
Sound power level heating	(6)	dB(A)	-	-	-	-	-	-	-	-	-
Sound pressure level cooling	(4)	dB(A)	59	59	59	59	60	60	61	61	61
<b>Dimensions and weights**</b>											
Length		mm	8.465	8.465	9.610	9.610	10.755	10.755	11.965	13.110	13.110
Depth		mm	2.260	2.260	2.260	2.260	2.260	2.260	2.260	2.260	2.260
Height		mm	2.440	2.440	2.440	2.440	2.440	2.440	2.440	2.440	2.440
Operating weight CH (MCHX)	(5)	kg	7.260	7.280	7.700	7.770	8.350	8.410	9.370	9.900	9.970

(1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511

(2) Outside air temperature 7°C DB, 6°C WB; condenser inlet/outlet water temperature 40/45°C. Values compliant with standard EN 14511

(3) Unit operating at nominal operating capacity, without any accessories, with external air temperature of 35°C and user-side heat exchanger water inlet/outlet temperature of 12/7°C. Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(4) Values obtained from the sound power level (conditions: note 2), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.

(5) The weight refers to the unit without any accessory. The introduction of a few accessories such as copper/aluminum coils, hydraulic modules or the recovery exchangers can lead to weight increased that can exceed 10%. For further details refer to the specific drawing of the selected configuration.

(6) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.

(8) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

\*\* Basic CH unit without included accessories

## KAPPA REV SLN

			80.4	86.4	102.4	108.4	116.4	134.4	146.4	160.4
<b>KAPPA REV SLN</b>										
<b>Cooling (A35; W7)</b>										
Refrigeration capacity	(1)	kW	-	-	-	-	-	1.404	1.477	1.563
Total absorbed power	(1)	kW	-	-	-	-	-	478	502	526
EER	(1)		-	-	-	-	-	2,94	2,94	2,97
EER energy class (Eurovent)	(1)		-	-	-	-	-	B	B	B
ESEER			-	-	-	-	-	3,69	3,68	3,70
<b>KAPPA REV SLN /HP</b>										
<b>Cooling (A35; W7)</b>										
Refrigeration capacity	(1)	kW	821	911	962	1.072	1.253	1.357	1.427	1.514
Total absorbed power	(1)	kW	289	326	340	373	441	483	507	530
EER	(1)		2,84	2,79	2,83	2,88	2,84	2,81	2,82	2,86
EER energy class (Eurovent)	(1)		C	C	C	C	C	C	C	C
ESEER			3,75	3,71	3,66	3,66	3,75	3,63	3,62	3,67
<b>Heating (A7/87%; W45)</b>										
Heating capacity	(2)	kW	869	942	1.010	1.158	1.325	1.410	1.518	1.627
Total absorbed power	(2)	kW	265	288	309	353	406	434	461	488
COP	(2)		3,27	3,27	3,27	3,28	3,27	3,25	3,30	3,33
COP energy class (Eurovent)	(2)		A	A	A	A	A	A	A	A
<b>Compressors</b>										
Compressors/Circuits		n°/n°	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
Minimum capacity reduction step	(8)	%	6%	6%	6%	6%	6%	6%	6%	6%
Refrigerant charge (CH + MCHX)		kg	-	-	-	-	-	167	185	185
Refrigerant charge (CH + CuAl)		kg						335	367	381
Refrigerant charge (HP)		kg	337	337	380	457	505	505	544	583
<b>Fans</b>										
Quantity		n°	16	16	18	22	24	24	26	28
Total air flow rate		m³/h	256.000	256.000	288.000	352.000	384.000	384.000	416.000	448.000
<b>User-side heat exchanger</b>										
Quantity		n°	2	2	2	2	2	2	2	2
Water flow rate (CH) (A35; W7)	(1)	m³/h	-	-	-	-	-	241,9	254,5	269,5
Head loss (CH) (A35; W7)	(1)	kPa	-	-	-	-	-	26	30	33
Water flow rate (HP) (A35; W7)	(1)	m³/h	141,6	157,0	165,8	184,8	215,9	233,8	246,0	261,0
Water flow rate (HP) (A7/87%; W45)	(2)	m³/h	149,0	161,8	173,4	198,9	227,4	242,1	260,6	279,1
Head loss (HP) (A35; W7)	(1)	kPa	31	36	23	29	22	25	28	31
Head loss (HP) (A7/87%; W45)	(2)	kPa	36	24	27	20	26	29	33	39
<b>Noise levels</b>										
Sound power level cooling	(3)	dB(A)	91	91	92	93	93	94	95	95
Sound power level heating	(6)	dB(A)	-	-	-	-	-	-	-	-
Sound pressure level cooling	(4)	dB(A)	59	59	60	61	61	62	62	62
<b>Dimensions and weights**</b>										
Length		mm	2 x 5.020	2 x 5.020	2 x 6.165	2 x 7.310	2 x 7.310	2 x 7.310	2 x 8.465	2 x 8.465
Depth		mm	2.260	2.260	2.260	2.260	2.260	2.260	2.260	2.260
Height		mm	2.440	2.440	2.440	2.440	2.440	2.440	2.440	2.440
Operating weight CH (MCHX)	(5)	kg	2 x 4.290	2 x 4.600	2 x 5.160	2 x 5.730	2 x 6.520	2 x 6.930	2 x 7.260	2 x 7.280

(1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511

(2) Outside air temperature 7°C DB, 6°C WB; condenser inlet/outlet water temperature 40/45°C. Values compliant with standard EN 14511

(3) Unit operating at nominal operating capacity, without any accessories, with external air temperature of 35°C and user-side heat exchanger water inlet/outlet temperature of 12/7°C. Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(4) Values obtained from the sound power level (conditions: note 2), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.

(5) The weight refers to the unit without any accessory. The introduction of a few accessories such as copper/aluminum coils, hydraulic modules or the recovery exchangers can lead to weight increased that can exceed 10%. For further details refer to the specific drawing of the selected configuration.

(6) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.

(8) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

\*\* Basic CH unit without included accessories

## KAPPA REV (R513A)

			33.2	35.2	37.2	40.2	43.2	51.2
<b>KAPPA REV (R513A)</b>								
<b>Cooling (A35; W7)</b>								
Refrigeration capacity	(1)	kW	312	351	374	411	453	490
Total absorbed power	(1)	kW	113	113	135	156	174	185
EER	(1)		2,77	3,12	2,78	2,64	2,61	2,65
EER energy class (Eurovent)	(1)		C	B	C	D	D	D
<b>Compressors</b>								
Compressors/Circuits	(8)	n°/n°	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step		%	12%	13%	13%	11%	13%	12%
Refrigerant charge (CH + MCHX)		kg	39	44	44	46	43	48
Refrigerant charge (CH + CuAl)		kg	74	86	86	88	85	97
<b>Fans</b>								
Quantity		n°	5	6	6	6	6	7
Total air flow rate		m³/h	105000	126000	126000	126000	126000	147000
<b>User-side heat exchanger</b>								
Quantity		n°	1	1	1	1	1	1
Water flow rate (CH) (A35; W7)	(1)	m³/h	54	60	64	70	78	84
Head loss (CH) (A35; W7)	(1)	kPa	32	38	44	54	28	40
<b>Noise levels</b>								
Sound power level cooling	(3)	dB(A)	94	95	95	96	96	97
Sound pressure level cooling	(4)	dB(A)	62	63	63	64	64	65
Sound power level of vers. LN cooling	(3)	dB(A)	89	90	90	91	91	92
Sound pressure level of vers. LN cooling	(4)	dB(A)	57	58	58	59	59	59
<b>Dimensions and weights**</b>								
Length		mm	3.870	3.870	3.870	3.870	3.870	5.020
Depth		mm	2.260	2.260	2.260	2.260	2.260	2.260
Height		mm	2.440	2.440	2.440	2.440	2.440	2.440
Operating weight CH (MCHX)	(5)	kg	3.040	3.060	3.070	3.390	3.700	4.140

(CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Outside air temperature 7°C DB, 6°C WB; condenser inlet/outlet water temperature 40/45°C. Values compliant with standard EN 14511
- (3) Unit operating at nominal operating capacity, without any accessories, with external air temperature of 35°C and user-side heat exchanger water inlet/outlet temperature of 12/7°C. Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.
- (4) Values obtained from the sound power level (conditions: note 2), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.
- (5) The weight refers to the unit without any accessory. The introduction of a few accessories such as copper/aluminum coils, hydraulic modules or the recovery exchangers can lead to weight increased that can exceed 10%. For further details refer to the specific drawing of the selected configuration.
- (8) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

\*\* Basic CH unit without included accessories

## KAPPA REV (R513A)

			54.2	58.2	67.2	73.2	80.2	85.2
<b>KAPPA REV (R513A)</b>								
<b>Cooling (A35; W7)</b>								
Refrigeration capacity	(1)	kW	565	607	682	737	775	827
Total absorbed power	(1)	kW	209	234	253	265	274	303
EER	(1)		2,7	2,6	2,69	2,78	2,83	2,73
EER energy class (Eurovent)	(1)		D	D	D	C	C	D
<b>Compressors</b>								
Compressors/Circuits	(8)	n°/n°	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step		%	12%	12%	13%	12%	13%	12%
Refrigerant charge (CH + MCHX)		kg	52	63	70	75	83	83
Refrigerant charge (CH + CuAl)		kg	108	126	140	152	167	167
<b>Fans</b>								
Quantity		n°	8	9	10	11	12	12
Total air flow rate		m³/h	168000	189000	210000	231000	252000	252000
<b>User-side heat exchanger</b>								
Quantity		n°	1	1	1	1	1	1
Water flow rate (CH) (A35; W7)	(1)	m³/h	97	104	117	126	133	142
Head loss (CH) (A35; W7)	(1)	kPa	48	35	43	48	33	36
<b>Noise levels</b>								
Sound power level cooling	(3)	dB(A)	98	98	99	100	100	100
Sound pressure level cooling	(4)	dB(A)	66	66	67	67	67	68
Sound power level of vers. LN cooling	(3)	dB(A)	93	93	94	95	95	95
Sound pressure level of vers. LN cooling	(4)	dB(A)	61	60	62	63	63	63
<b>Dimensions and weights**</b>								
Length		mm	5.020	6.165	6.165	7.310	7.310	7.310
Depth		mm	2.260	2.260	2.260	2.260	2.260	2.260
Height		mm	2.440	2.440	2.440	2.440	2.440	2.440
Operating weight CH (MCHX)	(5)	kg	4.150	5.090	5.520	6.070	6.430	6.480

(CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Outside air temperature 7°C DB, 6°C WB; condenser inlet/outlet water temperature 40/45°C. Values compliant with standard EN 14511
- (3) Unit operating at nominal operating capacity, without any accessories, with external air temperature of 35°C and user-side heat exchanger water inlet/outlet temperature of 12/7°C. Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.
- (4) Values obtained from the sound power level (conditions: note 2), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.
- (5) The weight refers to the unit without any accessory. The introduction of a few accessories such as copper/aluminum coils, hydraulic modules or the recovery exchangers can lead to weight increased that can exceed 10%. For further details refer to the specific drawing of the selected configuration.
- (8) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

\*\* Basic CH unit without included accessories

## KAPPA REV (R513A)

			90.2	95.2	100.2	105.2	115.2	120.2	130.2
<b>KAPPA REV (R513A)</b>									
<b>Cooling (A35; W7)</b>									
Refrigeration capacity	(1)	kW	893	939	981	1041	1112	1186	1275
Total absorbed power	(1)	kW	339	355	374	388	407	440	461
EER	(1)		2,63	2,64	2,63	2,68	2,73	2,7	2,77
EER energy class (Eurovent)	(1)		D	D	D	D	C	D	C
<b>Compressors</b>									
Compressors/Circuits	(8)	n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step		%	13%	12%	12%	12%	12%	12%	7%
Refrigerant charge (CH + MCHX)		kg	87	98	102	115	122	132	136
Refrigerant charge (CH + CuAl)		kg	171	189	200	220	234	258	262
<b>Fans</b>									
Quantity		n°	12	13	14	15	16	18	18
Total air flow rate		m³/h	252000	273000	294000	315000	336000	378000	378000
<b>User-side heat exchanger</b>									
Quantity		n°	1	1	1	1	1	1	1
Water flow rate (CH) (A35; W7)	(1)	m³/h	153	161	168	178	191	204	219
Head loss (CH) (A35; W7)	(1)	kPa	42	50	55	49	25	29	32
<b>Noise levels</b>									
Sound power level cooling	(3)	dB(A)	100	101	101	102	102	102	103
Sound pressure level cooling	(4)	dB(A)	68	68	68	69	69	69	70
Sound power level of vers. LN cooling	(3)	dB(A)	95	96	96	97	97	97	98
Sound pressure level of vers. LN cooling	(4)	dB(A)	62	63	63	64	64	64	65
<b>Dimensions and weights**</b>									
Length		mm	7.310	8.465	8.465	9.610	9.610	10.755	10.755
Depth		mm	2.260	2.260	2.260	2.260	2.260	2.260	2.260
Height		mm	2.440	2.440	2.440	2.440	2.440	2.440	2.440
Operating weight CH (MCHX)	(5)	kg	6.560	6.900	6.940	7.490	8.010	8.420	8.560

(CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

(1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511

(2) Outside air temperature 7°C DB, 6°C WB; condenser inlet/outlet water temperature 40/45°C. Values compliant with standard EN 14511

(3) Unit operating at nominal operating capacity, without any accessories, with external air temperature of 35°C and user-side heat exchanger water inlet/outlet temperature of 12/7°C. Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(4) Values obtained from the sound power level (conditions: note 2), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.

(5) The weight refers to the unit without any accessory. The introduction of a few accessories such as copper/aluminum coils, hydraulic modules or the recovery exchangers can lead to weight increased that can exceed 10%. For further details refer to the specific drawing of the selected configuration.

(8) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

\*\* Basic CH unit without included accessories

## KAPPA REV (R513A)

			140.3	150.3	160.3	170.4	180.4	190.4	200.4
<b>KAPPA REV (R513A)</b>									
<b>Cooling (A35; W7)</b>									
Refrigeration capacity	(1)	kW	1399	1470	1513	1654	1785	1877	1962
Total absorbed power	(1)	kW	534	561	574	607	678	710	747
EER	(1)		2,62	2,62	2,64	2,73	2,63	2,64	2,63
EER energy class (Eurovent)	(1)		D	D	D	D	D	D	D
<b>Compressors</b>									
Compressors/Circuits	(8)	n°/n°	3/3	3/3	3/3	4/4	4/4	4/4	4/4
Minimum capacity reduction step		%	8%	8%	8%	6%	6%	6%	6%
Refrigerant charge (CH + MCHX)		kg	149	160	165	167	174	195	205
Refrigerant charge (CH + CuAl)		kg	289	307	319	335	342	377	401
<b>Fans</b>									
Quantity		n°	20	21	22	24	24	26	28
Total air flow rate		m³/h	420000	441000	462000	504000	504000	546000	588000
<b>User-side heat exchanger</b>									
Quantity		n°	1	1	1	2	2	2	2
Water flow rate (CH) (A35; W7)	(1)	m³/h	240	252	260	284	306	322	336
Head loss (CH) (A35; W7)	(1)	kPa	39	34	36	36	42	50	55
<b>Noise levels</b>									
Sound power level cooling	(3)	dB(A)	104	105	106	103	103	104	104
Sound pressure level cooling	(4)	dB(A)	71	71	72	71	71	71	71
Sound power level of vers. LN cooling	(3)	dB(A)	99	100	101	98	98	99	99
Sound pressure level of vers. LN cooling	(4)	dB(A)	66	67	68	66	65	66	66
<b>Dimensions and weights**</b>									
Length		mm	11.965	13.110	13.110	2 x 7.310	2 x 7.310	2 x 8.465	2 x 8.465
Depth		mm	2.260	2.260	2.260	2.260	2.260	2.260	2.260
Height		mm	2.440	2.440	2.440	2.440	2.440	2.440	2.440
Operating weight CH (MCHX)	(5)	kg				2 x 6.480	2 x 6.560	2 x 6.900	2 x 6.940

(CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

(1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511

(2) Outside air temperature 7°C DB, 6°C WB; condenser inlet/outlet water temperature 40/45°C. Values compliant with standard EN 14511

(3) Unit operating at nominal operating capacity, without any accessories, with external air temperature of 35°C and user-side heat exchanger water inlet/outlet temperature of 12/7°C. Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(4) Values obtained from the sound power level (conditions: note 2), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.

(5) The weight refers to the unit without any accessory. The introduction of a few accessories such as copper/aluminum coils, hydraulic modules or the recovery exchangers can lead to weight increased that can exceed 10%. For further details refer to the specific drawing of the selected configuration.

(8) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

\*\* Basic CH unit without included accessories

## KAPPA REV HE (R513A)

			33.2	35.2	37.2	40.2	43.2	51.2	54.2
<b>KAPPA REV HE (R513A)</b>									
<b>Cooling (A35; W7)</b>									
Refrigeration capacity	(1)	kW	336	385	405	462	511	522	581
Total absorbed power	(1)	kW	109	125	131	151	169	173	192
EER	(1)		3,04	3,06	3,08	3,03	2,99	2,98	2,99
EER energy class (Eurovent)	(1)		B	B	B	B	B	B	B
<b>Compressors</b>									
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(8)	%	12%	12%	13%	11%	13%	12%	12%
Refrigerant charge (CH + MCHX)		kg	58	66	70	79	88	90	100
Refrigerant charge (CH + CuAl)		kg	37	21	24	36	41	27	32
<b>Fans</b>									
Quantity		n°	6	7	8	8	8	9	11
Total air flow rate		m³/h	126000	147000	168000	168000	168000	189000	231000
<b>User-side heat exchanger</b>									
Quantity		n°	1	1	1	1	1	1	1
Water flow rate (CH) (A35; W7)	(1)	m³/h	58	66	70	79	88	90	100
Head loss (CH) (A35; W7)	(1)	kPa	37	21	24	36	41	27	32
<b>Noise levels</b>									
Sound power level cooling	(3)	dB(A)	94	95	95	96	96	97	98
Sound pressure level cooling	(4)	dB(A)	62	62	62	63	63	65	66
Sound power level of vers. LN cooling	(3)	dB(A)	89	90	90	91	91	92	93
Sound pressure level of vers. LN cooling	(4)	dB(A)	57	58	58	59	59	59	61
<b>Dimensions and weights**</b>									
Length		mm	3.870	5.020	5.020	5.020	5.020	6.165	7.310
Depth		mm	2.260	2.260	2.260	2.260	2.260	2.260	2.260
Height		mm	2.440	2.440	2.440	2.440	2.440	2.440	2.440
Operating weight CH (MCHX)	(5)	kg	3.070	3.500	3.510	3.830	4.140	4.660	5.210

(CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Outside air temperature 7°C DB, 6°C WB; condenser inlet/outlet water temperature 40/45°C. Values compliant with standard EN 14511
- (3) Unit operating at nominal operating capacity, without any accessories, with external air temperature of 35°C and user-side heat exchanger water inlet/outlet temperature of 12/7°C. Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.
- (4) Values obtained from the sound power level (conditions: note 2), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.
- (5) The weight refers to the unit without any accessory. The introduction of a few accessories such as copper/aluminum coils, hydraulic modules or the recovery exchangers can lead to weight increased that can exceed 10%. For further details refer to the specific drawing of the selected configuration.
- (8) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

\*\* Basic CH unit without included accessories



## KAPPA REV HE (R513A)

			58.2	67.2	73.2	80.2	85.2	90.2	95.2
<b>KAPPA REV HE (R513A)</b>									
<b>Cooling (A35; W7)</b>									
Refrigeration capacity	(1)	kW	676	732	773	815	889	960	1014
Total absorbed power	(1)	kW	226	246	256	270	293	315	338
EER	(1)		2,96	2,95	2,99	2,98	2,99	3,01	2,96
EER energy class (Eurovent)	(1)		B	B	B	B	B	B	B
<b>Compressors</b>									
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(8)	%	12%	13%	12%	13%	12%	13%	12%
Refrigerant charge (CH + MCHX)		kg	116	126	133	140	152	164	174
Refrigerant charge (CH + CuAl)		kg	25	28	32	36	43	50	48
<b>Fans</b>									
Quantity		n°	12	12	13	14	15	16	17
Total air flow rate		m³/h	252000	252000	273000	294000	315000	336000	357000
<b>User-side heat exchanger</b>									
Quantity		n°	1	1	1	1	1	1	1
Water flow rate (CH) (A35; W7)	(1)	m³/h	116	126	133	140	152	164	174
Head loss (CH) (A35; W7)	(1)	kPa	25	28	32	36	43	50	48
<b>Noise levels</b>									
Sound power level cooling	(3)	dB(A)	98	99	100	100	100	100	101
Sound pressure level cooling	(4)	dB(A)	66	67	67	67	67	67	68
Sound power level of vers. LN cooling	(3)	dB(A)	93	94	95	95	95	95	96
Sound pressure level of vers. LN cooling	(4)	dB(A)	60	62	62	62	62	62	63
<b>Dimensions and weights**</b>									
Length		mm	7.310	7.310	8.465	8.465	9.610	9.610	10.755
Depth		mm	2.260	2.260	2.260	2.260	2.260	2.260	2.260
Height		mm	2.440	2.440	2.440	2.440	2.440	2.440	2.440
Operating weight CH (MCHX)	(5)	kg	6.000	6.410	6.740	6.760	7.140	7.220	8.420

(CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

(1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511

(2) Outside air temperature 7°C DB, 6°C WB; condenser inlet/outlet water temperature 40/45°C. Values compliant with standard EN 14511

(3) Unit operating at nominal operating capacity, without any accessories, with external air temperature of 35°C and user-side heat exchanger water inlet/outlet temperature of 12/7°C. Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(4) Values obtained from the sound power level (conditions: note 2), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.

(5) The weight refers to the unit without any accessory. The introduction of a few accessories such as copper/aluminum coils, hydraulic modules or the recovery exchangers can lead to weight increased that can exceed 10%. For further details refer to the specific drawing of the selected configuration.

(8) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

\*\* Basic CH unit without included accessories

## KAPPA REV HE (R513A)

			100.2	105.2	115.2	120.2	134.4	146.4	160.4
<b>KAPPA REV HE (R513A)</b>									
<b>Cooling (A35; W7)</b>									
Refrigeration capacity	(1)	kW	1076	1148	1223	1322	1449	1525	1602
Total absorbed power	(1)	kW	358	374	389	428	488	512	537
EER	(1)		2,97	3,05	3,11	3,06	2,95	2,95	2,96
EER energy class (Eurovent)	(1)		B	B	A	B	B	B	B
<b>Compressors</b>									
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	4/4	4/4	4/4
Minimum capacity reduction step	(8)	%	13%	12%	13%	13%	6%	6%	6%
Refrigerant charge (CH + MCHX)		kg	184	197	210	227	249	262	275
Refrigerant charge (CH + CuAl)		kg	53	26	29	33	28	32	36
<b>Fans</b>									
Quantity		n°	18	19	21	22	24	26	28
Total air flow rate		m³/h	378000	399000	441000	462000	504000	546000	588000
<b>User-side heat exchanger</b>									
Quantity		n°	1	1	1	1	2	2	2
Water flow rate (CH) (A35; W7)	(1)	m³/h	184	197	210	227	249	262	275
Head loss (CH) (A35; W7)	(1)	kPa	53	26	29	33	28	32	36
<b>Noise levels</b>									
Sound power level cooling	(3)	dB(A)	101	102	102	102	102	103	103
Sound pressure level cooling	(4)	dB(A)	68	69	69	69	70	70	70
Sound power level of vers. LN cooling	(3)	dB(A)	96	97	97	97	97	98	98
Sound pressure level of vers. LN cooling	(4)	dB(A)	63	64	64	64	65	65	65
<b>Dimensions and weights**</b>									
Length		mm	10.755	11.965	13.110	13.110	2 x 7.310	2 x 8.465	2 x 8.465
Depth		mm	2.260	2.260	2.260	2.260	2.260	2.260	2.260
Height		mm	2.440	2.440	2.440	2.440	2.440	2.440	2.440
Operating weight CH (MCHX)	(5)	kg	8.560	8.810	9.350	9.410	2 x 6.410	2 x 6.740	2 x 6.760

(CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

(1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511

(2) Outside air temperature 7°C DB, 6°C WB; condenser inlet/outlet water temperature 40/45°C. Values compliant with standard EN 14511

(3) Unit operating at nominal operating capacity, without any accessories, with external air temperature of 35°C and user-side heat exchanger water inlet/outlet temperature of 12/7°C. Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.

(4) Values obtained from the sound power level (conditions: note 2), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.

(5) The weight refers to the unit without any accessory. The introduction of a few accessories such as copper/aluminum coils, hydraulic modules or the recovery exchangers can lead to weight increased that can exceed 10%. For further details refer to the specific drawing of the selected configuration.

(8) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

\*\* Basic CH unit without included accessories

## KAPPA REV SLN (R513A)

			33.2	35.2	37.2	40.2	43.2	51.2	54.2
<b>KAPPA REV SLN (R513A)</b>									
<b>Cooling (A35; W7)</b>									
Refrigeration capacity	(1)	kW	329	372	395	456	498	513	566
Total absorbed power	(1)	kW	111	126	132	152	169	174	191
EER	(1)		2,99	2,98	3,02	3,03	2,98	2,98	2,99
EER energy class (Eurovent)	(1)		B	B	B	B	B	B	B
<b>Compressors</b>									
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(8)	%	12%	12%	13%	11%	13%	12%	12%
Refrigerant charge (CH + MCHX)		kg	46	52	52	56	56	68	77
Refrigerant charge (CH + CuAl)		kg	88	101	108	112	112	131	154
<b>Fans</b>									
Quantity		n°	6	7	8	8	8	9	11
Total air flow rate		m³/h	96000	112000	128000	128000	128000	144000	176000
<b>User-side heat exchanger</b>									
Quantity		n°	1	1	1	1	1	1	1
Water flow rate (CH) (A35; W7)	(1)	m³/h	57	64	68	79	86	88	98
Head loss (CH) (A35; W7)	(1)	kPa	34	20	22	33	38	25	30
<b>Noise levels</b>									
Sound power level cooling	(3)	dB(A)	86	87	87	88	88	89	90
Sound pressure level cooling	(4)	dB(A)	54	55	54	56	56	57	58
<b>Dimensions and weights**</b>									
Length		mm	3.870	5.020	5.020	5.020	5.020	6.165	7.310
Depth		mm	2.260	2.260	2.260	2.260	2.260	2.260	2.260
Height		mm	2.440	2.440	2.440	2.440	2.440	2.440	2.440
Operating weight CH (MCHX)	(5)	kg	3.070	3.500	3.510	3.830	4.140	4.660	5.210

(CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Outside air temperature 7°C DB, 6°C WB; condenser inlet/outlet water temperature 40/45°C. Values compliant with standard EN 14511
- (3) Unit operating at nominal operating capacity, without any accessories, with external air temperature of 35°C and user-side heat exchanger water inlet/outlet temperature of 12/7°C. Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.
- (4) Values obtained from the sound power level (conditions: note 2), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.
- (5) The weight refers to the unit without any accessory. The introduction of a few accessories such as copper/aluminum coils, hydraulic modules or the recovery exchangers can lead to weight increased that can exceed 10%. For further details refer to the specific drawing of the selected configuration.
- (8) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

\*\* Basic CH unit without included accessories

## KAPPA REV SLN (R513A)

			58.2	67.2	73.2	80.2	85.2	90.2	95.2
<b>KAPPA REV SLN (R513A)</b>									
<b>Cooling (A35; W7)</b>									
Refrigeration capacity	(1)	kW	669	730	757	799	881	942	1010
Total absorbed power	(1)	kW	226	248	257	271	298	320	342
EER	(1)		2,99	2,97	2,97	2,98	3	2,99	2,99
EER energy class (Eurovent)	(1)		B	B	B	B	B	B	B
<b>Compressors</b>									
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(8)	%	12%	13%	12%	13%	12%	13%	12%
Refrigerant charge (CH + MCHX)		kg	83	83	92	92	105	111	128
Refrigerant charge (CH + CuAl)		kg	167	167	183	190	210	223	247
<b>Fans</b>									
Quantity		n°	12	12	13	14	15	16	17
Total air flow rate		m³/h	192000	192000	208000	224000	240000	256000	272000
<b>User-side heat exchanger</b>									
Quantity		n°	1	1	1	1	1	1	1
Water flow rate (CH) (A35; W7)	(1)	m³/h	115	126	130	138	152	163	174
Head loss (CH) (A35; W7)	(1)	kPa	24	26	30	33	40	47	45
<b>Noise levels</b>									
Sound power level cooling	(3)	dB(A)	90	91	92	92	92	92	93
Sound pressure level cooling	(4)	dB(A)	58	59	59	59	59	59	60
<b>Dimensions and weights**</b>									
Length		mm	7.310	7.310	8.465	8.465	9.610	9.610	10.755
Depth		mm	2.260	2.260	2.260	2.260	2.260	2.260	2.260
Height		mm	2.440	2.440	2.440	2.440	2.440	2.440	2.440
Operating weight CH (MCHX)	(5)	kg	6.000	6.410	6.740	6.760	7.140	7.220	8.420

(CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Outside air temperature 7°C DB, 6°C WB; condenser inlet/outlet water temperature 40/45°C. Values compliant with standard EN 14511
- (3) Unit operating at nominal operating capacity, without any accessories, with external air temperature of 35°C and user-side heat exchanger water inlet/outlet temperature of 12/7°C. Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.
- (4) Values obtained from the sound power level (conditions: note 2), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.
- (5) The weight refers to the unit without any accessory. The introduction of a few accessories such as copper/aluminum coils, hydraulic modules or the recovery exchangers can lead to weight increased that can exceed 10%. For further details refer to the specific drawing of the selected configuration.
- (8) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

\*\* Basic CH unit without included accessories

## KAPPA REV SLN (R513A)

			100.2	105.2	115.2	120.2	134.4	146.4	160.4
<b>KAPPA REV SLN (R513A)</b>									
<b>Cooling (A35; W7)</b>									
Refrigeration capacity	(1)	kW	1076	1125	1190	1285	1446	1521	1603
Total absorbed power	(1)	kW	364	376	392	432	496	513	541
EER	(1)		3	3,01	3,06	3	2,94	2,99	2,99
EER energy class (Eurovent)	(1)		B	B	B	B	B	B	B
<b>Compressors</b>									
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	4/4	4/4	4/4
Minimum capacity reduction step	(8)	%	13%	12%	13%	13%	6%	6%	6%
Refrigerant charge (CH + MCHX)		kg	128	141	145	154	167	185	185
Refrigerant charge (CH + CuAl)		kg	254	274	292	308	335	367	381
<b>Fans</b>									
Quantity		n°	18	19	21	22	24	26	28
Total air flow rate		m³/h	288000	304000	336000	352000	384000	416000	448000
<b>User-side heat exchanger</b>									
Quantity		n°	1	1	1	1	2	2	2
Water flow rate (CH) (A35; W7)	(1)	m³/h	186	194	205	222	249	262	276
Head loss (CH) (A35; W7)	(1)	kPa	49	24	27	30	26	30	33
<b>Noise levels</b>									
Sound power level cooling	(3)	dB(A)	93	94	94	94	94	95	95
Sound pressure level cooling	(4)	dB(A)	60	61	61	61	62	62	62
<b>Dimensions and weights**</b>									
Length		mm	10.755	11.965	13.110	13.110	2 x 7.310	2 x 8.465	2 x 8.465
Depth		mm	2.260	2.260	2.260	2.260	2.260	2.260	2.260
Height		mm	2.440	2.440	2.440	2.440	2.440	2.440	2.440
Operating weight CH (MCHX)	(5)	kg	8.560	8.810	9.350	9.410	2 x 6.410	2 x 6.740	2 x 6.760

(CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Outside air temperature 7°C DB, 6°C WB; condenser inlet/outlet water temperature 40/45°C. Values compliant with standard EN 14511
- (3) Unit operating at nominal operating capacity, without any accessories, with external air temperature of 35°C and user-side heat exchanger water inlet/outlet temperature of 12/7°C. Binding values. Values obtained from measures taken according to standard ISO 3744 and to the Eurovent certification programme where applicable.
- (4) Values obtained from the sound power level (conditions: note 2), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.
- (5) The weight refers to the unit without any accessory. The introduction of a few accessories such as copper/aluminum coils, hydraulic modules or the recovery exchangers can lead to weight increased that can exceed 10%. For further details refer to the specific drawing of the selected configuration.
- (8) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.

\*\* Basic CH unit without included accessories

# ECODESIGN

## INTRODUCTION

The Ecodesign/ErP Directive (2009/125/EC) lays down new standards for more efficient energy use.

The Directive contains various regulations; as regards chiller products and heat pumps, the regulations of interest are the following:

- Regulation 2013/813, for small heat pumps ( $P_{design} \leq 400$  kW)
- Regulation 2016/2281, for chillers and heat pumps with  $P_{design} > 400$  kW
- Regulation 2013/811, for heat pumps with  $P_{design} \leq 70$  kW.

The last-mentioned regulation (2013/811) regards the labelling (Ecolabel certification) of small heat pumps.

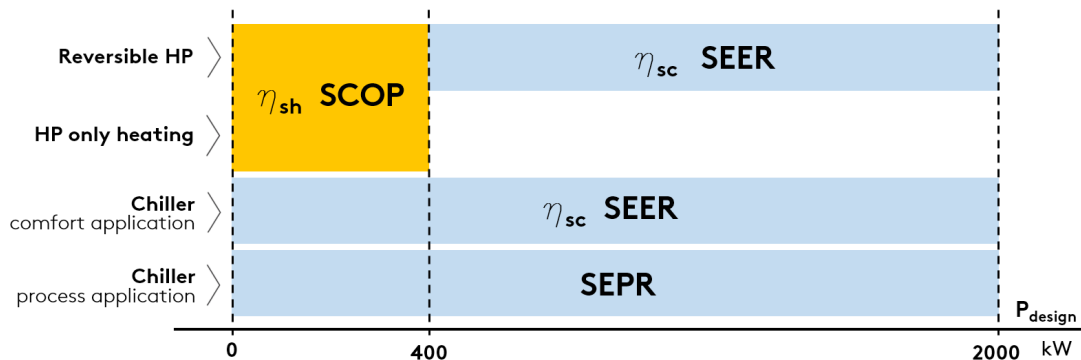
The other two regulations (2013/813 and 2016/2281) set seasonal efficiency targets that the products must comply with to be sold and installed in the European Union (essential requirement for CE marking).

These efficiency limits are defined through ratios, which are respectively:

- $\eta_{sh}$  (SCOP), with reference to regulation 2013/813
- $\eta_{sc}$  (SEER) for comfort applications and SEPR for process applications, with reference to regulation 2016/2281.

As regards regulation 2016/2281, with effect from 1st January 2021, the required minimum efficiency limit will be raised (Tier 2) from the current threshold (Tier 1).

The figure below schematically illustrates the correspondence between product and reference energy ratio.



Some notes and clarifications:

For comfort applications, regulation 2016/2281 sets the  $\eta_{sc}$  (SEER) ratio in two different operating conditions:

- SEER calculated with machine inlet/outlet water temperature of 12/7°C (low temperature application),
- SEER calculated with machine inlet/outlet water temperature of 23/18°C (medium temperature application).

The minimum efficiency requirement is the same, but can be met at condition 12/7°C or at condition 23/18°C, depending on the application envisaged for the machine.

Regulation 2013/813 distinguishes two different types: at low temperature and at medium temperature.

The following refer to the application at low temperature: (low temperature application) all heat pumps whose maximum delivery temperature for heating purposes is lower than 52°C with source at temperature of -7°C and -8°C wet bulb (air-water unit) or inlet 10°C (water-water unit), at the reference design conditions for an average climate. For these, the efficiency ratio is "low temperature application" (outlet water temperature 35°C).

For all the other heat pumps, the efficiency ratio is related to "medium temperature application" (outlet water temperature 55°C).

The ratios must be calculated according to the reference European heating season in average climatic conditions.

The minimum efficiency requirements set by the regulations are indicated below.

REGULATION 2016/2281, comfort application

TYPE OF UNIT		MINIMUM REQUIREMENT			
		Tier 1		Tier 2 (2021)	
SOURCE	P <sub>design</sub>	η <sub>sc</sub> [%]	SEER	η <sub>sc</sub> [%]	SEER
air	< 400kW	149	3,8	161	4,1
air	≥ 400kW	161	4,1	179	4,55
water	< 400kW	196	5,1	200	5,2
water	≥ 400kW and < 1500kW	227	5,875	252	6,5
water	≥ 1500kW	245	6,325	272	7

REGULATION 2016/2281, process application

TYPE OF UNIT		MINIMUM REQUIREMENT	
		Tier 1	Tier 2 (2021)
SOURCE	P <sub>design</sub>	SEPR	SEPR
air	< 400kW	4,5	5
air	≥ 400kW	5	5,5
water	< 400kW	6,5	7
water	≥ 400kW and < 1500kW	7,5	8
water	≥ 1500kW	8	8,5

REGULATION 2013/813

SOURCE	APPLICATION	MINIMUM REQUIREMENT	
		η <sub>sh</sub> [%]	SCOP
air	low temperature application	125	3,2
water	low temperature application	125	3,325
air	medium temperature application	110	2,825
water	medium temperature application	110	2,95

The conformity of the product must be checked according to the type of application, whether comfort or process, and at the required outlet water temperature.

The two schematic tables below, respectively for comfort application and for process application, indicate the reference of the required conformity according to the type of product and the set point temperature (reference to regulations 2016/2281 and 2013/813).

Important note: for mixed comfort and process applications, the reference application for conformity is the comfort application.

## COMFORT APPLICATION

PRODUCT	OUTLET WATER TEMPERATURE	COMPLIANCE INDEX	REGULATION
<b>Chiller</b>	< 18°C	SEER/η <sub>sc</sub> low temperature application	2016/2281
	≥ 18°C	SEER/η <sub>sc</sub> medium temperature application	2016/2281
<b>Heat pumps (reversible and only heating) P<sub>design</sub> ≤ 400kW</b>		SCOP/η <sub>sh</sub>	2013/813
<b>Reversible heat pumps P<sub>design</sub> &gt; 400kW</b>	< 18°C	SEER/η <sub>sc</sub> low temperature application	2016/2281
	≥ 18°C	SEER/η <sub>sc</sub> medium temperature application	2016/2281
<b>Heat pumps only heating P<sub>design</sub> &gt; 400kW</b>		-	-

## PROCESS APPLICATION

PRODUCT	OUTLET WATER TEMPERATURE	COMPLIANCE INDEX	REGULATION
<b>Chiller</b>	≥ +2°C , ≤ 12°C	SEPR	2016/2281
	> 12°C	-	-
	> -8°C , < +2°C	-	-

- = exemption from Ecodesign

Some specifications and notes follow.

**Partly completed machinery**

The term partly completed machinery refers to all units without a user-side or source-side heat exchanger, and therefore to all LC, LE, LC/HP and LE/HP versions. Since these are "non-complete" machines, conformity with Ecodesign depends on combination with the remote heat exchanger.

All the partly completed machinery is CE marked and accompanied by a declaration of conformity. Installation in European Union countries is therefore allowed; correct selection and installation of the remote heat exchanger must be ensured, in accordance with the above cases.

**EC fans:**

The only option that positively affects the performance of the unit, by increasing its seasonal energy efficiency ratio, is the VEC accessory.

A unit equipped with EC fans has a higher SEER (η<sub>sc</sub>) than the configuration with standard fans.



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## KAPPA REV RANGE

As specifically regards the Zeta Rev range, the regulations of interest for the various units in various configurations are indicated below.

### **Kappa Rev:**

- chiller version: regulation 2016/2281.
- /HP version: up to size 37.2 regulation 2013/813 from size 40.2 together with sizes 108.4, 116.4, 134.4, 146.4, 160.4, regulation 2016/2281.

### **Kappa Rev HE and Kappa Rev SLN:**

- chiller version: regulation 2016/2281
- /HP version: up to size 37.2 regulation 2013/813, from size 40.2 together with sizes 108.4, 116.4, 134.4, 146.4, 160.4, regulation 2016/2281.

The tables below give information on the conformity of the units and the seasonal energy performance ratios with regard to the reference regulation.

## KAPPA REV

			33.2	35.2	37.2	40.2	43.2	51.2	54.2
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW	308	340	373	410	459	483	539
<b>Compliance 12/7</b>									
Compliance	(1)		N	N	N	N	N	N	N
$\eta_{sc}$	(1)	%	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 12/7 unit with EC fans</b>									
Compliance	(1)		Y	Y	Y	N	N	N	N
$\eta_{sc}$	(1)	%	158	153,3	154,2	-	-	-	-
SEER	(1)		4,02	3,9	3,92	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 23/18</b>									
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(2)	%	172,4	172,6	165,4	167,4	165,3	166,2	166,5
SEER	(2)		4,39	4,39	4,21	4,26	4,21	4,23	4,24
<b>Compliance SEPR</b>									
Compliance	(3)		Y	Y	Y	Y	Y	Y	Y
SEPR	(3)		5,18	5,46	5,37	5,13	5,05	5,02	5,03
			<b>58.2</b>	<b>67.2</b>	<b>73.2</b>	<b>80.2</b>	<b>85.2</b>	<b>90.2</b>	<b>95.2</b>
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW	612	689	736	787	840	890	952
<b>Compliance 12/7</b>									
Compliance	(1)		N	N	N	N	N	N	N
$\eta_{sc}$	(1)	%	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 12/7 unit with EC fans</b>									
Compliance	(1)		N	N	N	N	N	N	N
$\eta_{sc}$	(1)	%	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 23/18</b>									
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(2)	%	168,3	168,2	167,8	171,1	168,8	169,4	171,4
SEER	(2)		4,28	4,28	4,27	4,35	4,29	4,31	4,36
<b>Compliance SEPR</b>									
Compliance	(3)		Y	Y	Y	Y	Y	Y	Y
SEPR	(3)		5,1	5,13	5,1	5	5,13	5,07	5,1

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

- = value not necessary: conformity is already provided at the most restrictive condition (1).

- (1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.
- (2) User-side heat exchanger water inlet/outlet temperature 23/18°C (medium temperature application), with reference to regulation 2016/2281 and standard EN 14825.
- (3) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA REV

			100.2	105.2	115.2	120.2	130.2	140.3	150.3	160.3		
<b>REGULATION 2016/2281</b>												
Pdesign	(1)	kW	995	1047	1115	1203	1291	1442	1500	1546		
<b>Compliance 12/7</b>												
Compliance	(1)		N	N	N	N	N	N	N	N		
$\eta_{sc}$	(1)	%	-	-	-	-	-	-	-	-		
SEER	(1)		-	-	-	-	-	-	-	-		
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N	N		
<b>Compliance 12/7 unit with EC fans</b>												
Compliance	(1)		N	N	N	N	N	N	N	N		
$\eta_{sc}$	(1)	%	-	-	-	-	-	-	-	-		
SEER	(1)		-	-	-	-	-	-	-	-		
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N	N		
<b>Compliance 23/18</b>												
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y	Y		
$\eta_{sc}$	(2)	%	170,9	165,3	166	170,3	173	169,3	170,9	171,6		
SEER	(2)		4,35	4,21	4,22	4,33	4,4	4,31	4,35	4,36		
<b>Compliance SEPR</b>												
Compliance	(3)		Y	Y	Y	Y	Y	Y	Y	Y		
SEPR	(3)		5,06	5,02	5,02	5,27	5,14	5,05	5,14	5,04		
			160.3	108.4	116.4	134.4	146.4	160.4	170.4	180.4	190.4	200.4
<b>REGULATION 2016/2281</b>												
Pdesign	(1)	kW	1546	-	-	-	-	-	1679	1779	1904	1990
<b>Compliance 12/7</b>												
Compliance	(1)		N	-	-	-	-	-	N	N	N	N
$\eta_{sc}$	(1)	%	-	-	-	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	-	-	-	-	-	N	N	N	N
<b>Compliance 12/7 unit with EC fans</b>												
Compliance	(1)		N	-	-	-	-	-	N	N	N	N
$\eta_{sc}$	(1)	%	-	-	-	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	-	-	-	-	-	-	-	-	-
<b>Compliance 23/18</b>												
Compliance	(2)		Y	-	-	-	-	-	Y	Y	Y	Y
$\eta_{sc}$	(2)	%	171,6	-	-	-	-	-	168,8	168,8	171,4	170,9
SEER	(2)		4,36	-	-	-	-	-	4,29	4,29	4,36	4,35
<b>Compliance SEPR</b>												
Compliance	(3)		Y	N	N	N	N	N	Y	Y	Y	Y
SEPR	(3)		5,04	-	-	-	-	-	5,13	5,07	5,1	5,06

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

- = value not necessary: conformity is already provided at the most restrictive condition (1).

- (1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.
- (2) User-side heat exchanger water inlet/outlet temperature 23/18°C (medium temperature application), with reference to regulation 2016/2281 and standard EN 14825.
- (3) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA REV /HP

			33.2	35.2	37.2	40.2	43.2	
<b>REGULATION 2013/813</b>								
Pdesign	(4)	kW	297	329	359	394	440	
Compliance	(4)		Y	Y	Y	Y	Y	
$\eta_{sh}$	(4)	%	125,2	125	125	125	129,4	
SCOP	(4)		3,21	3,2	3,2	3,2	3,31	

Y = unit in compliance with Ecodesign at the indicated condition.

(4) User-side heat exchanger water inlet/outlet temperature 30/35, Average climate profile, with reference to regulation 2013/813 and norm EN 14825.

## KAPPA REV /HP

			51.2	54.2	58.2	67.2	73.2	80.2	85.2
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW	464	518	588	662	708	758	807
<b>Compliance 12/7</b>									
Compliance	(1)		N	N	N	N	N	N	N
$\eta_{sc}$	(1)	%	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 12/7 unit with EC fans</b>									
Compliance	(1)		N	N	N	N	N	N	N
$\eta_{sc}$	(1)	%	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 23/18</b>									
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(2)	%	161,5	162,6	161,5	161,5	163	164,1	163,1
SEER	(2)		4,11	4,14	4,11	4,11	4,15	4,18	4,15

			90.2	95.2	100.2	105.2	115.2	120.2	130.2
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW	856	915	957	-	-	-	-
<b>Compliance 12/7</b>									
Compliance	(1)		N	N	N	-	-	-	-
$\eta_{sc}$	(1)	%	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	-	-	-	-
<b>Compliance 12/7 unit with EC fans</b>									
Compliance	(1)		N	N	N	-	-	-	-
$\eta_{sc}$	(1)	%	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	-	-	-	-
<b>Compliance 23/18</b>									
Compliance	(2)		Y	Y	Y	-	-	-	-
$\eta_{sc}$	(2)	%	163,2	162,9	162,5	-	-	-	-
SEER	(2)		4,15	4,15	4,14	-	-	-	-

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- (1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.
- (2) User-side heat exchanger water inlet/outlet temperature 23/18°C (medium temperature application), with reference to regulation 2016/2281 and standard EN 14825.
- (3) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA REV /HP

			140.3	150.3	160.3	108.4	116.4	134.4
<b>REGULATION 2016/2281</b>								
Pdesign	(1)	kW	-	-	-	1037	1175	1324
<b>Compliance 12/7</b>								
Compliance	(1)		-	-	-	N	N	N
$\eta_{sc}$	(1)	%	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		-	-	-	N	N	N
<b>Compliance 12/7 unit with EC fans</b>								
Compliance	(1)		-	-	-	N	N	N
$\eta_{sc}$	(1)	%	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		-	-	-	N	N	N
<b>Compliance 23/18</b>								
Compliance	(2)		-	-	-	Y	Y	Y
$\eta_{sc}$	(2)	%	-	-	-	161,1	139,4	146,5
SEER	(2)		-	-	-	4,1	3,56	3,74

			146.4	160.4	170.4	180.4	190.4	200.4
<b>REGULATION 2016/2281</b>								
Pdesign	(1)	kW	1415	1515	1614	1711	1831	1914
<b>Compliance 12/7</b>								
Compliance	(1)		N	N	N	N	N	N
$\eta_{sc}$	(1)	%	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N
<b>Compliance 12/7 unit with EC fans</b>								
Compliance	(1)		N	N	N	N	N	N
$\eta_{sc}$	(1)	%	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N
<b>Compliance 23/18</b>								
Compliance	(2)		Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(2)	%	147,9	154,6	149,4	149,4	150,6	150,2
SEER	(2)		3,77	3,94	3,81	3,81	3,84	3,83

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(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 23/18°C (medium temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(3) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA REV HE

			33.2	35.2	37.2	40.2	43.2	51.2	54.2	86.4
<b>REGULATION 2016/2281</b>										
Pdesign	(1)	kW	329	367	387	442	492	518	573	-
<b>Compliance 12/7</b>										
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y	-
$\eta_{sc}$	(1)	%	156,6	159,1	155,8	162,6	162,2	162,2	163,4	-
SEER	(1)		3,99	4,05	3,97	4,14	4,13	4,13	4,16	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N	-
<b>Compliance 12/7 unit with EC fans</b>										
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y	-
$\eta_{sc}$	(1)	%	162,7	167,3	164,4	168,8	167,5	169,5	169,8	-
SEER	(1)		4,14	4,25	4,18	4,29	4,26	4,31	4,32	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N	-
<b>Compliance 23/18</b>										
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y	-
$\eta_{sc}$	(2)	%	-	-	-	-	-	-	-	-
SEER	(2)		-	-	-	-	-	-	-	-
<b>Compliance SEPR</b>										
Compliance	(3)		Y	Y	Y	Y	Y	Y	Y	-
SEPR	(3)		5,56	5,52	5,56	5,52	5,44	5,43	5,41	-
			<b>58.2</b>	<b>67.2</b>	<b>73.2</b>	<b>80.2</b>	<b>85.2</b>	<b>90.2</b>	<b>95.2</b>	
<b>REGULATION 2016/2281</b>										
Pdesign	(1)	kW	674	732	770	813	886	953	1024	
<b>Compliance 12/7</b>										
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(1)	%	161,8	162,6	162,6	162,2	163,4	162,2	162,2	162,2
SEER	(1)		4,12	4,14	4,14	4,13	4,16	4,13	4,13	4,13
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N	N
<b>Compliance 12/7 unit with EC fans</b>										
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(1)	%	168,2	167,7	167,9	167,4	169,6	168	168,6	168,6
SEER	(1)		4,28	4,26	4,27	4,25	4,31	4,27	4,29	4,29
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N	N
<b>Compliance 23/18</b>										
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(2)	%	-	-	-	-	-	-	-	-
SEER	(2)		-	-	-	-	-	-	-	-
<b>Compliance SEPR</b>										
Compliance	(3)		Y	Y	Y	Y	Y	Y	Y	Y
SEPR	(3)		5,57	5,57	5,5	5,43	5,48	5,47	5,53	5,53

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- (1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.
- (2) User-side heat exchanger water inlet/outlet temperature 23/18°C (medium temperature application), with reference to regulation 2016/2281 and standard EN 14825.
- (3) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA REV HE

			100.2	105.2	115.2	120.2	80.4	86.4
<b>REGULATION 2016/2281</b>								
Pdesign	(1)	kW	1085	1140	1208	1300	-	-
<b>Compliance 12/7</b>								
Compliance	(1)		Y	Y	Y	Y	-	-
$\eta_{sc}$	(1)	%	162,6	163	163,4	162,6	-	-
SEER	(1)		4,14	4,15	4,16	4,14	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	-	-
<b>Compliance 12/7 unit with EC fans</b>								
Compliance	(1)		Y	Y	Y	Y	-	-
$\eta_{sc}$	(1)	%	168,7	169,2	169,2	169,7	-	-
SEER	(1)		4,29	4,3	4,3	4,31	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	-	-
<b>Compliance 23/18</b>								
Compliance	(2)		Y	Y	Y	Y	-	-
$\eta_{sc}$	(2)	%	-	-	-	-	-	-
SEER	(2)		-	-	-	-	-	-
<b>Compliance SEPR</b>								
Compliance	(3)		Y	Y	Y	Y	-	-
SEPR	(3)		5,63	5,56	5,49	5,43	-	-
			102.4	108.4	116.4	134.4	146.4	160.4
<b>REGULATION 2016/2281</b>								
Pdesign	(1)	kW	-	-	-	1464	1540	1627
<b>Compliance 12/7</b>								
Compliance	(1)		-	-	-	Y	Y	Y
$\eta_{sc}$	(1)	%	-	-	-	162,6	162,6	162,2
SEER	(1)		-	-	-	4,14	4,14	4,13
Compliance Tier 2 (2021)	(1)		-	-	-	N	N	N
<b>Compliance 12/7 unit with EC fans</b>								
Compliance	(1)		-	-	-	Y	Y	Y
$\eta_{sc}$	(1)	%	-	-	-	167,6	168,5	167,5
SEER	(1)		-	-	-	4,26	4,28	4,26
Compliance Tier 2 (2021)	(1)		-	-	-	N	N	N
<b>Compliance 23/18</b>								
Compliance	(2)		-	-	-	Y	Y	Y
$\eta_{sc}$	(2)	%	-	-	-	-	-	-
SEER	(2)		-	-	-	-	-	-
<b>Compliance SEPR</b>								
Compliance	(3)		-	-	-	Y	Y	Y
SEPR	(3)		-	-	-	5,4	5,59	5,59

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- (1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.
- (2) User-side heat exchanger water inlet/outlet temperature 23/18°C (medium temperature application), with reference to regulation 2016/2281 and standard EN 14825.
- (3) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA REV HE /HP

			33.2	35.2	37.2
<b>REGULATION 2013/813</b>					
Pdesign	(4)	kW	318	367	396
Compliance	(4)		Y	Y	Y
$\eta_{sh}$	(4)	%	126,9	125,2	-
SCOP	(4)		3,28	3,25	3,21

Y = unit in compliance with Ecodesign at the indicated condition.

(4) User-side heat exchanger water inlet/outlet temperature 30/35, Average climate profile, with reference to regulation 2013/813 and norm EN 14825.

## KAPPA REV HE /HP

			40.2	43.2	51.2	54.2	58.2	67.2	73.2
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW	433	470	504	578	661	704	757
<b>Compliance 12/7</b>									
Compliance	(1)		N	N	N	N	N	N	N
$\eta_{sc}$	(1)	%	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 12/7 unit with EC fans</b>									
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(1)	%	161,8	161,8	162,2	161,8	161,4	161	161
SEER	(1)		4,12	4,12	4,13	4,12	4,11	4,1	4,1
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 23/18</b>									
Compliance	(2)		N	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(2)	%	-	167	165,3	167,7	165,3	165,5	165
SEER	(2)		-	4,25	4,21	4,27	4,21	4,21	4,2
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW	811	-	-	-	-	-	-
<b>Compliance 12/7</b>									
Compliance	(1)		N	-	-	-	-	-	-
$\eta_{sc}$	(1)	%	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	-	-	-	-	-	-
<b>Compliance 12/7 unit with EC fans</b>									
Compliance	(1)		Y	-	-	-	-	-	-
$\eta_{sc}$	(1)	%	161	-	-	-	-	-	-
SEER	(1)		4,1	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	-	-	-	-	-	-
<b>Compliance 23/18</b>									
Compliance	(2)		Y	-	-	-	-	-	-
$\eta_{sc}$	(2)	%	166,8	-	-	-	-	-	-
SEER	(2)		4,24	-	-	-	-	-	-

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(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 23/18°C (medium temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(3) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.



## KAPPA REV HE /HP

			120.2	80.4	86.4	102.4	108.4	116.4
<b>REGULATION 2016/2281</b>								
Pdesign	(1)	kW	-	867	941	1008	1156	1322
<b>Compliance 12/7</b>								
Compliance	(1)		-	N	N	N	N	N
$\eta_{sc}$	(1)	%	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		-	N	N	N	N	N
<b>Compliance 12/7 unit with EC fans</b>								
Compliance	(1)		-	Y	Y	Y	Y	Y
$\eta_{sc}$	(1)	%	-	161,8	161,8	162,2	161,8	161,4
SEER	(1)		-	4,12	4,12	4,13	4,12	4,11
Compliance Tier 2 (2021)	(1)		-	N	N	N	N	N
<b>Compliance 23/18</b>								
Compliance	(2)		-	Y	Y	Y	Y	Y
$\eta_{sc}$	(2)	%	-	176,8	170,2	166,9	170,9	151,4
SEER	(2)		-	4,5	4,33	4,25	4,35	3,86
			134.4		146.4		160.4	
<b>REGULATION 2016/2281</b>								
Pdesign	(1)	kW	1407		1515		1623	
<b>Compliance 12/7</b>								
Compliance	(1)		N		N		N	
$\eta_{sc}$	(1)	%	-		-		-	
SEER	(1)		-		-		-	
Compliance Tier 2 (2021)	(1)		N		N		N	
<b>Compliance 12/7 unit with EC fans</b>								
Compliance	(1)		Y		Y		Y	
$\eta_{sc}$	(1)	%	161		161		161,8	
SEER	(1)		4,1		4,1		4,12	
Compliance Tier 2 (2021)	(1)		N		N		N	
<b>Compliance 23/18</b>								
Compliance	(2)		Y		Y		Y	
$\eta_{sc}$	(2)	%	149		149,8		150	
SEER	(2)		3,8		3,82		3,82	

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(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 23/18°C (medium temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(3) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA REV SLN

			33.2	35.2	37.2	40.2	43.2	51.2	54.2
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kw	317	354	376	425	472	498	554
<b>Compliance 12/7</b>									
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(1)	%	150,6	154	154,6	162,2	161,8	161,8	163
SEER	(1)		3,84	3,93	3,94	4,13	4,12	4,12	4,15
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 12/7 unit with EC fans</b>									
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(1)	%	161,8	166,4	163,5	167,9	166,7	167,8	168,9
SEER	(1)		4,12	4,23	4,16	4,27	4,24	4,27	4,29
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 23/18</b>									
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(2)	%	-	-	-	-	-	-	-
SEER	(2)		-	-	-	-	-	-	-
<b>Compliance SEPR</b>									
Compliance	(3)		Y	Y	Y	Y	Y	Y	Y
SEPR	(3)		5,56	5,52	5,56	5,52	5,44	5,43	5,41
			<b>58.2</b>	<b>67.2</b>	<b>73.2</b>	<b>80.2</b>	<b>85.2</b>	<b>90.2</b>	<b>95.2</b>
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kw	648	703	740	783	853	919	986
<b>Compliance 12/7</b>									
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(1)	%	161,4	162,2	162,2	161,8	163	161,4	161,4
SEER	(1)		4,11	4,13	4,13	4,12	4,15	4,11	4,11
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 12/7 unit with EC fans</b>									
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(1)	%	167,4	166,9	167,1	166,5	168,4	167,2	167,7
SEER	(1)		4,26	4,24	4,25	4,23	4,28	4,25	4,26
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 23/18</b>									
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(2)	%	-	-	-	-	-	-	-
SEER	(2)		-	-	-	-	-	-	-
<b>Compliance SEPR</b>									
Compliance	(3)		Y	Y	Y	Y	Y	Y	Y
SEPR	(3)		5,57	5,57	5,5	5,43	5,48	5,47	5,53

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(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 23/18°C (medium temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(3) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA REV SLN

			100.2	105.2	115.2	120.2	80.4	86.4	102.4
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW	1045	1097	1166	1254	-	-	-
<b>Compliance 12/7</b>									
Compliance	(1)		Y	Y	Y	Y	-	-	-
$\eta_{sc}$	(1)	%	161,8	162,2	162,6	161,8	-	-	-
SEER	(1)		4,12	4,13	4,14	4,12	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	-	-	-
<b>Compliance 12/7 unit with EC fans</b>									
Compliance	(1)		Y	Y	Y	Y	-	-	-
$\eta_{sc}$	(1)	%	167,9	168,4	168,4	168,8	-	-	-
SEER	(1)		4,27	4,28	4,28	4,29	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	-	-	-
<b>Compliance 23/18</b>									
Compliance	(2)		Y	Y	Y	Y	-	-	-
$\eta_{sc}$	(2)	%	-	-	-	-	-	-	-
SEER	(2)		-	-	-	-	-	-	-
<b>Compliance SEPR</b>									
Compliance	(3)		Y	Y	Y	Y	-	-	-
SEPR	(3)		5,63	5,56	5,49	5,43	-	-	-
			108.4	116.4	134.4	146.4	160.4		
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW	-	-	1407	1480	1567		
<b>Compliance 12/7</b>									
Compliance	(1)		-	-	Y	Y	Y		
$\eta_{sc}$	(1)	%	-	-	161,8	161,8	161,4		
SEER	(1)		-	-	4,12	4,12	4,11		
Compliance Tier 2 (2021)	(1)		-	-	N	N	N		
<b>Compliance 12/7 unit with EC fans</b>									
Compliance	(1)		-	-	Y	Y	Y		
$\eta_{sc}$	(1)	%	-	-	166,8	167,7	166,6		
SEER	(1)		-	-	4,24	4,26	4,24		
Compliance Tier 2 (2021)	(1)		-	-	N	N	N		
<b>Compliance 23/18</b>									
Compliance	(2)		-	-	Y	Y	Y		
$\eta_{sc}$	(2)	%	-	-	-	-	-		
SEER	(2)		-	-	-	-	-		
<b>Compliance SEPR</b>									
Compliance	(3)		-	-	Y	Y	Y		
SEPR	(3)		-	-	5,4	5,59	5,59		

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

- = value not necessary: conformity is already provided at the most restrictive condition (1).

- (1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.
- (2) User-side heat exchanger water inlet/outlet temperature 23/18°C (medium temperature application), with reference to regulation 2016/2281 and standard EN 14825.
- (3) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA REV SLN /HP

			33.2	35.2	37.2
<b>REGULATION 2013/813</b>					
Pdesign	(4)	kW	306	343	364
Compliance	(4)		Y	Y	Y
$\eta_{sh}$	(4)	%	128,3	126,9	125,2
SCOP	(4)		3,28	3,25	3,21

Y = unit in compliance with Ecodesign at the indicated condition.

(4) User-side heat exchanger water inlet/outlet temperature 30/35, Average climate profile, with reference to regulation 2013/813 and norm EN 14825.

## KAPPA REV SLN /HP

			40.2	43.2	51.2	54.2	58.2	67.2	73.2
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW	412	457	482	537	628	680	715
<b>Compliance 12/7</b>									
Compliance	(1)		N	N	N	N	N	N	N
$\eta_{sc}$	(1)	%	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 12/7 unit with EC fans</b>									
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(1)	%	161,8	161,8	162,2	161,8	161,4	161	161
SEER	(1)		4,12	4,12	4,13	4,12	4,11	4,1	4,1
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 23/18</b>									
Compliance	(2)		N	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(2)	%	-	167	165,3	167,7	165,3	165,5	165
SEER	(2)		-	4,25	4,21	4,27	4,21	4,21	4,2

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- = value not necessary: conformity is already provided at the most restrictive condition (1).

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 23/18°C (medium temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(3) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA REV SLN /HP

			80.2	85.2	90.2	95.2	100.2	105.2
<b>REGULATION 2016/2281</b>								
Pdesign	(1)	kW	759	-	-	-	-	-
<b>Compliance 12/7</b>								
Compliance	(1)		N	-	-	-	-	-
$\eta_{sc}$	(1)	%	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	-	-	-	-	-
<b>Compliance 12/7 unit with EC fans</b>								
Compliance	(1)		Y	-	-	-	-	-
$\eta_{sc}$	(1)	%	161	-	-	-	-	-
SEER	(1)		4,1	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	-	-	-	-	-
<b>Compliance 23/18</b>								
Compliance	(2)		Y	-	-	-	-	-
$\eta_{sc}$	(2)	%	166,8	-	-	-	-	-
SEER	(2)		4,24	-	-	-	-	-
			<b>115.2</b>	<b>120.2</b>	<b>80.4</b>	<b>86.4</b>	<b>102.4</b>	<b>108.4</b>
<b>REGULATION 2016/2281</b>								
Pdesign	(1)	kW	-	-	823	913	964	1075
<b>Compliance 12/7</b>								
Compliance	(1)		-	-	N	N	N	N
$\eta_{sc}$	(1)	%	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		-	-	N	N	N	N
<b>Compliance 12/7 unit with EC fans</b>								
Compliance	(1)		-	-	Y	Y	Y	Y
$\eta_{sc}$	(1)	%	-	-	161,8	161,8	162,2	161,8
SEER	(1)		-	-	4,12	4,12	4,13	4,12
Compliance Tier 2 (2021)	(1)		-	-	N	N	N	N
<b>Compliance 23/18</b>								
Compliance	(2)		-	-	Y	Y	Y	Y
$\eta_{sc}$	(2)	%	-	-	176,8	170,2	166,9	170,9
SEER	(2)		-	-	4,5	4,33	4,25	4,35
			<b>116.4</b>	<b>134.4</b>	<b>146.4</b>	<b>160.4</b>		
<b>REGULATION 2016/2281</b>								
Pdesign	(1)	kW	1255	1359	1430	1517		
<b>Compliance 12/7</b>								
Compliance	(1)		N	N	N	N		
$\eta_{sc}$	(1)	%	-	-	-	-		
SEER	(1)		-	-	-	-		
Compliance Tier 2 (2021)	(1)		N	N	N	N		
<b>Compliance 12/7 unit with EC fans</b>								
Compliance	(1)		Y	Y	Y	Y		
$\eta_{sc}$	(1)	%	161,4	161	161	161,8		
SEER	(1)		4,11	4,1	4,1	4,12		
Compliance Tier 2 (2021)	(1)		N	N	N	N		
<b>Compliance 23/18</b>								
Compliance	(2)		Y	Y	Y	Y		
$\eta_{sc}$	(2)	%	151,4	149	149,8	150		
SEER	(2)		3,86	3,8	3,82	3,82		

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(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 23/18°C (medium temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(3) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA REV (R513A)

			33.2	35.2	37.2	40.2	43.2	51.2	54.2
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW	311	350	372	409	452	488	562
<b>Compliance 12/7</b>									
Compliance	(1)		N	N	N	N	N	N	N
$\eta_{sc}$	(1)	%	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 12/7 unit with EC fans</b>									
Compliance	(1)		Y	Y	Y	N	N	N	N
$\eta_{sc}$	(1)	%	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 23/18</b>									
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(2)	%	166	177	172	162	161	165	164
SEER	(2)		4,2	4,5	4,4	4,1	4,1	4,2	4,2
<b>Compliance SEPR</b>									
Compliance	(3)		Y	Y	Y	Y	Y	Y	Y
SEPR	(3)		5,14	5,58	5,14	5,05	5,08	5,04	5,11
			<b>58.2</b>	<b>67.2</b>	<b>73.2</b>	<b>80.2</b>	<b>85.2</b>	<b>90.2</b>	<b>95.2</b>
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW	605	680	734	773	825	890	935
<b>Compliance 12/7</b>									
Compliance	(1)		N	N	N	N	N	N	N
$\eta_{sc}$	(1)	%	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 12/7 unit with EC fans</b>									
Compliance	(1)		N	N	N	N	N	N	N
$\eta_{sc}$	(1)	%	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 23/18</b>									
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(2)	%	162	161	163	167	168	164	167
SEER	(2)		4,1	4,1	4,1	4,2	4,3	4,2	4,2
<b>Compliance SEPR</b>									
Compliance	(3)		Y	Y	Y	Y	Y	Y	Y
SEPR	(3)		5,05	5,07	5,03	5,01	5,01	5,05	5,03

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- (1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.
- (2) User-side heat exchanger water inlet/outlet temperature 23/18°C (medium temperature application), with reference to regulation 2016/2281 and standard EN 14825.
- (3) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA REV (R513A)

			100.2	105.2	115.2	120.2	130.2	150.3
<b>REGULATION 2016/2281</b>								
Pdesign	(1)	kW	977	1037	1110	1183	1272	1466
<b>Compliance 12/7</b>								
Compliance	(1)		N	N	N	N	N	N
$\eta_{sc}$	(1)	%	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N
<b>Compliance 12/7 unit with EC fans</b>								
Compliance	(1)		N	N	N	N	N	N
$\eta_{sc}$	(1)	%	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N
<b>Compliance 23/18</b>								
Compliance	(2)		Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(2)	%	166	169	197	180	186	166
SEER	(2)		4,2	4,3	4,6	4,6	4,7	4,2
<b>Compliance SEPR</b>								
Compliance	(3)		Y	Y	Y	Y	Y	Y
SEPR	(3)		5,02	5,08	5,28	5,26	5,27	5,02
			160.3	170.4	180.4	190.4	200.4	
<b>REGULATION 2016/2281</b>								
Pdesign	(1)	kW	1509	1649	1780	1871	1955	
<b>Compliance 12/7</b>								
Compliance	(1)		N	N	N	N	N	N
$\eta_{sc}$	(1)	%	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N
<b>Compliance 12/7 unit with EC fans</b>								
Compliance	(1)		N	N	N	N	N	N
$\eta_{sc}$	(1)	%	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	-	-	-	-	-
<b>Compliance 23/18</b>								
Compliance	(2)		Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(2)	%	165	168	165	167	167	167
SEER	(2)		4,2	4,3	4,2	4,3	4,2	4,2
<b>Compliance SEPR</b>								
Compliance	(3)		Y	Y	Y	Y	Y	Y
SEPR	(3)		5,03	5,07	5,08	5,08	5,08	5,05

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- = value not necessary: conformity is already provided at the most restrictive condition (1).

- (1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.
- (2) User-side heat exchanger water inlet/outlet temperature 23/18°C (medium temperature application), with reference to regulation 2016/2281 and standard EN 14825.
- (3) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA REV HE (R513A)

			33.2	35.2	37.2	40.2	43.2	51.2	54.2
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW	335	384	404	461	510	521	579
<b>Compliance 12/7</b>									
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(1)	%	152	156	161	161	161	162	162
SEER	(1)		3,9	4	4,1	4,1	4,1	4,1	4,1
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 12/7 unit with EC fans</b>									
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(1)	%	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 23/18</b>									
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(2)	%	-	-	-	-	-	-	-
SEER	(2)		-	-	-	-	-	-	-
<b>Compliance SEPR</b>									
Compliance	(3)		Y	Y	Y	Y	Y	Y	Y
SEPR	(3)		5,4	5,7	5,7	5,6	5,5	5,5	5,5
			<b>58.2</b>	<b>67.2</b>	<b>73.2</b>	<b>80.2</b>	<b>85.2</b>	<b>90.2</b>	<b>95.2</b>
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW	674	731	771	812	886	956	1011
<b>Compliance 12/7</b>									
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(1)	%	161	162	161	161	163	161	161
SEER	(1)		4,1	4,1	4,1	4,1	4,1	4,1	4,1
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 12/7 unit with EC fans</b>									
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(1)	%	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 23/18</b>									
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(2)	%	-	-	-	-	-	-	-
SEER	(2)		-	-	-	-	-	-	-
<b>Compliance SEPR</b>									
Compliance	(3)		Y	Y	Y	Y	Y	Y	Y
SEPR	(3)		5,6	5,6	5,5	5,4	5,5	5,5	5,5

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- = value not necessary: conformity is already provided at the most restrictive condition (1).

- (1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.
- (2) User-side heat exchanger water inlet/outlet temperature 23/18°C (medium temperature application), with reference to regulation 2016/2281 and standard EN 14825.
- (3) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.



## KAPPA REV HE (R513A)

			100.2	105.2	115.2	120.2	134.4	146.4	160.4
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW	1072	1146	1220	1319	1446	1521	1598
<b>Compliance 12/7</b>									
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(1)	%	162	163	162	162	162	161	161
SEER	(1)		4,1	4,1	4,1	4,1	4,1	4,1	4,1
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 12/7 unit with EC fans</b>									
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(1)	%	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 23/18</b>									
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(2)	%	-	-	-	-	-	-	-
SEER	(2)		-	-	-	-	-	-	-
<b>Compliance SEPR</b>									
Compliance	(3)		Y	Y	Y	Y	Y	Y	Y
SEPR	(3)		5,5	5,7	5,9	5,7	5,5	5,4	5,3

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- (1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.
- (2) User-side heat exchanger water inlet/outlet temperature 23/18°C (medium temperature application), with reference to regulation 2016/2281 and standard EN 14825.
- (3) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA REV SLN (R513A)

			33.2	35.2	37.2	40.2	43.2	51.2	54.2
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW	329	372	395	456	498	513	566
<b>Compliance 12/7</b>									
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(1)	%	152	156	153	161	161	162	162
SEER	(1)		3,9	4	3,9	4,1	4,1	4,1	4,1
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 12/7 unit with EC fans</b>									
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(1)	%	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 23/18</b>									
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(2)	%	-	-	-	-	-	-	-
SEER	(2)		-	-	-	-	-	-	-
<b>Compliance SEPR</b>									
Compliance	(3)		Y	Y	Y	Y	Y	Y	Y
SEPR	(3)		5,6	5,8	5,6	5,8	5,7	5,7	5,7
			<b>58.2</b>	<b>67.2</b>	<b>73.2</b>	<b>80.2</b>	<b>85.2</b>	<b>90.2</b>	<b>95.2</b>
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW	669	730	757	799	881	942	1010
<b>Compliance 12/7</b>									
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(1)	%	161	161	162	161	162	162	161
SEER	(1)		4,1	4,1	4,1	4,1	4,1	4,1	4,1
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 12/7 unit with EC fans</b>									
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(1)	%	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 23/18</b>									
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(2)	%	-	-	-	-	-	-	-
SEER	(2)		-	-	-	-	-	-	-
<b>Compliance SEPR</b>									
Compliance	(3)		Y	Y	Y	Y	Y	Y	Y
SEPR	(3)		5,8	5,9	5,7	5,6	5,6	5,8	5,7

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N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

- = value not necessary: conformity is already provided at the most restrictive condition (1).

- (1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.
- (2) User-side heat exchanger water inlet/outlet temperature 23/18°C (medium temperature application), with reference to regulation 2016/2281 and standard EN 14825.
- (3) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

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			100.2	105.2	115.2	120.2	134.4	146.4	160.4
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW	1076	1125	1190	1285	1446	1521	1603
<b>Compliance 12/7</b>									
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(1)	%	162	163	162	162	161	162	161
SEER	(1)		4,1	4,1	4,1	4,1	4,1	4,1	4,1
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 12/7 unit with EC fans</b>									
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(1)	%	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
<b>Compliance 23/18</b>									
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y
$\eta_{sc}$	(2)	%	-	-	-	-	-	-	-
SEER	(2)		-	-	-	-	-	-	-
<b>Compliance SEPR</b>									
Compliance	(3)		Y	Y	Y	Y	Y	Y	Y
SEPR	(3)		5,8	5,8	5,9	5,8	5,9	5,7	5,6

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

- = value not necessary: conformity is already provided at the most restrictive condition (1).

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 23/18°C (medium temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(3) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## INSTALLATION ADVICE

The units described in this document are, by nature, strongly affected by the characteristics of the system, the working conditions and the installation site.

Remember that the unit must be installed by a qualified and skilled technician, and in compliance with the national legislation in force in the destination country.

The installation must be done in such a way that it will be possible to carry out all routine and non-routine maintenance operations.

Before starting any work, you must carefully read the "Installation, operation and maintenance manual" of the machine and do the necessary safety checks to prevent any malfunctioning or hazards.

We give some advice below that will allow you to increase the efficiency and reliability of the unit and therefore of the system into which it is inserted.

### Water characteristics

To preserve the life of the exchangers, the water is required to comply with some quality parameters and it is therefore necessary to make sure its values fall within the ranges indicated in the following table:

<b>Total hardness</b>	2,0 ÷ 6,0 °f
<b>Langelier index</b>	- 0,4 ÷ 0,4
<b>pH</b>	7,5 ÷ 8,5
<b>Electrical conductivity</b>	10 ÷ 500 µS/cm
<b>Organic elements</b>	-
<b>Hydrogen carbonate (HCO<sub>3</sub><sup>-</sup>)</b>	70 ÷ 300 ppm
<b>Sulphates (SO<sub>4</sub><sup>2-</sup>)</b>	< 50 ppm
<b>Hydrogen carbonate / Sulphates (HCO<sub>3</sub><sup>-</sup>/SO<sub>4</sub><sup>2-</sup>)</b>	> 1
<b>Chlorides (Cl<sup>-</sup>)</b>	< 50 ppm
<b>Nitrates (NO<sub>3</sub><sup>-</sup>)</b>	< 50 ppm
<b>Hydrogen sulphide (H<sub>2</sub>S)</b>	< 0,05 ppm
<b>Ammonia (NH<sub>3</sub>)</b>	< 0,05 ppm
<b>Sulphites (SO<sub>3</sub>), free chlorine (Cl<sub>2</sub>)</b>	< 1 ppm
<b>Carbon dioxide (CO<sub>2</sub>)</b>	< 5 ppm
<b>Metal cations</b>	< 0,2 ppm
<b>Manganese ions (Mn<sup>++</sup>)</b>	< 0,2 ppm
<b>Iron ions ( Fe<sup>2+</sup> , Fe<sup>3+</sup>)</b>	< 0,2 ppm
<b>Iron + Manganese</b>	< 0,4 ppm
<b>Phosphates (PO<sub>4</sub><sup>3-</sup>)</b>	< 2 ppm
<b>Oxygen</b>	< 0,1 ppm

Installation of water filters on all the hydraulic circuits is obligatory.

The supply of the most suitable filters for the unit can be requested as accessory. In this case, the filters are supplied loose and must be installed by the customer following the instructions given in the installation, operation and maintenance manual.

### Glycol mixtures

With temperatures below 5°C, it is mandatory to work with water and anti-freeze mixtures, and also change the safety devices (anti-freeze, etc.), which must be carried out by qualified authorised personnel or by the manufacturer.

<b>Liquid outlet temperature or minimum ambient temperature</b>	°C	0	-5	-10	-15	-20	-25	-30	-35	-40
<b>Freezing point</b>	°C	-5	-10	-15	-20	-25	-30	-35	-40	-45
<b>Ethylene glycol</b>	%	6	22	30	36	41	46	50	53	56
<b>Propylene glycol</b>	%	15	25	33	39	44	48	51	54	57

The quantity of antifreeze should be considered as % on weight

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## Minimum water content in the system

For correct operation of the unit, it is necessary to ensure a buffering on the system such as to comply with the minimum operating time considering the greater between the minimum OFF time and the minimum ON time. In short, these contribute to limiting the number of times the compressors are switched on per hour and to preventing undesired deviations from the set point of the delivered water temperature.

Larger amounts of water are in any case always preferable, because they allow a smaller number of starts and switch-offs of the compressors, less wear of them and an increase in the efficiency of the system as a consequence of a reduction in the number of transients.

It should also be pointed out that, for air-water units working in heat pump mode, the minimum amount of water must consider the need of the unit to carry out defrosting. Having an adequate buffering volume will allow prevention of too high drifts of the delivered water temperature at the end of the defrost cycle.

The following experimental formula allows to calculate the minimum water volume of the plant. The formula refers only to the operation of the unit in cooling mode.

$$V_{min} = \frac{P_{tot} \cdot 1.000}{N} \cdot \frac{300}{\Delta T \cdot \rho \cdot c_p} + P_{tot} \cdot 0,8$$

where

$V_{min}$  is the minimum water content of the system [l]

$P_{tot}$  is the total cooling capacity of the machine [kW]

N: number of capacity reduction steps

$\Delta T$ : differential allowed on the water temperature. Unless otherwise specified, this value is considered to be 2.5K

$\rho$ : density of the heat-carrying fluid. Unless otherwise specified, the density of water is considered

$c_p$ : specific heat of the heat-carrying fluid. Unless otherwise specified, the specific heat of water is considered

Considering the use of water and grouping together some terms, the formula can be re-written as follows:

$$V_{min} = \frac{P_{tot}}{N} \cdot 28,66 + P_{tot} \cdot 0,8$$

For the N values, consider the following convention:

- for units with 1 compressor N = 4
- for units with 2 compressors N = 8
- for units with 3 compressors N = 12
- for units with 4 compressors N = 16

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## Installation site

To determine the best installation site for the unit and its orientation, you should pay attention to the following points:

- compliance with the clearance spaces indicated in the official dimensional drawing of the unit must be guaranteed so as to ensure accessibility for routine and non-routine maintenance operations
- you should consider the origin of the hydraulic pipes and their diameters because these affect the radiuses of curvature and therefore the spaces needed for installing them
- you should consider the position of the cable inlet on the electrical control panel of the unit as regards the origin of the power supply
- if the installation includes several units side by side, you should consider the position and dimensions of the manifolds of the user-side exchangers and of any recovery exchangers
- if the installation includes several units side by side, you should consider that the minimum distance between units is 3 metres
- you should avoid all obstructions that can limit air circulation to the source-side exchanger or that can cause recirculation between air supply and intake
- you should consider the orientation of the unit to limit, as far as possible, exposure of the source-side exchanger to solar radiation
- if the installation area is particularly windy, the orientation and positioning of the unit must be such as to avoid air recirculation on the coils. If necessary, we advise making windbreak barriers in order to prevent malfunctioning.

Once the best position for the unit has been identified, you must check that the support slab has the following characteristics:

- its dimensions must be proportionate to those of the unit: if possible, longer and wider than the unit by at least 30 cm and 15/20cm higher than the surrounding surface
- it must be able to bear at least 4 times the operating weight of the unit
- it must allow level installation of the unit: although the unit is installed on a horizontal base, make slopes in the support surface to convey rain water or defrost water to drains, wells or in any case to places where it cannot generate an accident hazard due to ice formation. All heat pump version units are equipped with discharge manifolds for the condensed water; these can be manifolded to facilitate condensate discharge.

The units are designed and built to reduce to a minimum the level of vibration transmitted to the ground, but it is in any case advisable to use rubber or spring anti-vibration mounts, which are available as accessory and should be requested when ordering.

The anti-vibration mounts must be fixed on before positioning the unit on the ground.

In the event of installation on roofs or intermediate floors, the pipes must be isolated from the walls and ceilings.

It is advisable to avoid installation in cramped places, to prevent reverberations, reflections, resonances and acoustic interactions with elements outside the unit.

It is essential that any work done to soundproof the unit does not affect its correct installation or correct operation and, in particular, does not reduce the air flow rate to the source-side exchanger.

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## Installations that require the use of treated coils

If the unit has to be installed in an environment with a particularly aggressive atmosphere, coils with special treatments are available as options.

- e-coated microchannel coils (accessory not available for HP units)
- pre-painted aluminium coils (accessory available only for HP units)
- coils with anti-corrosion treatment (accessory available only for units with Cu/Al coil or HP units)

A description of the individual accessories is available in the "Description of accessories" section.

The type of coil treatment should be chosen with regard to the environment in which the unit is to be installed, through observation of other structures and machinery with exposed metal surfaces present in the destination environment.

The cross observation criterion is the most valid method of selection currently available without having to carry out preliminary tests or measurements with instruments. The identified reference environments are:

- coastal/marine
- industrial
- urban with a high housing density
- rural

Please note that in cases where different conditions co-exist, even for short periods, the choice must be suitable for preserving the exchanger in the harsher environmental conditions and not in conditions between the worst and best situation.

Particular attention must be given in cases where an environment that is not particularly aggressive becomes aggressive as a consequence of a concomitant cause, for example, the presence of a flue outlet or an extraction fan.

We strongly suggest choosing one of the treatment options if at least one of the points listed below is verified:

- there are obvious signs of corrosion of the exposed metal surfaces in the installation area
- the prevailing winds come from the sea towards the unit
- the environment is industrial with a significant concentration of pollutants
- the environment is urban with a high population density
- the environment is rural with the presence of organic discharges and effluents

In particular, for installations near the coast, the following instructions apply:

- for installations between 1 and 20 km from the coast of units with microchannel coil, we strongly recommend using the accessory "E-coated microchannel coils"
- for installations between 1 and 20 km from the coast of reversible units or units with Cu/Al coils, we strongly recommend using the accessory "Coil treated with anti-corrosion paints"
- for distances within a kilometre of the coast, we strongly recommend using the accessory "Coil treated with anti-corrosion paints" for all units.

To protect the exchangers from corrosion and ensure optimal operation of the unit, we advise following the recommendations given in the user, installation and maintenance manual for cleaning the coils.

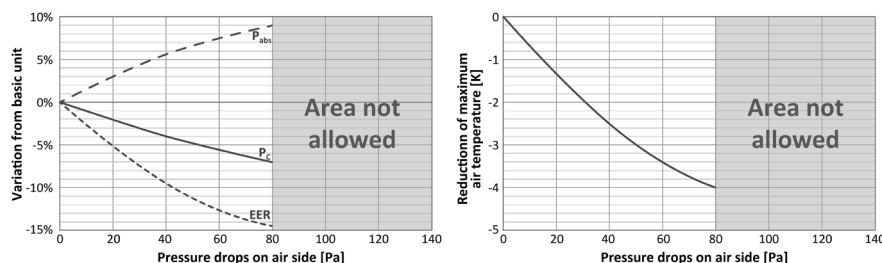
## Aeraulic head losses and options available for the ventilating section

With the exception of units for which oversize fans are required, as standard, the units are designed considering that, at the nominal air flow rate, the fans work with null available pressure.

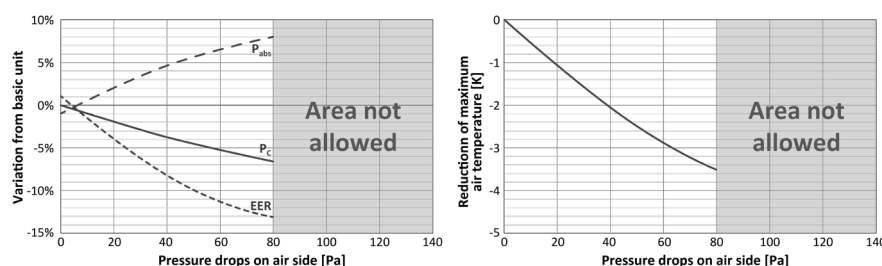
If there are obstacles to free air flow, you should consider the additional aeraulic head losses that will cause a reduction of the air flow rate and a consequent deterioration of performance.

The following diagrams show the trend of cooling capacity (PC), EER, total absorbed power (Pabs) and reduction of the maximum external air temperature in chiller operating mode, depending on the aeraulic head losses that the fans will have to overcome.

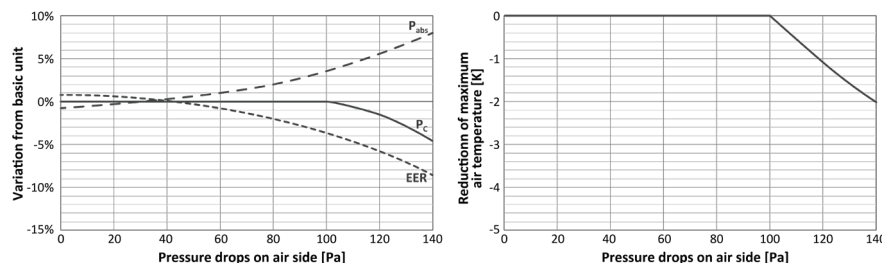
### AC fans (Ø 800)



### EC fans (Ø 800)



### Oversize EC fans (Ø 800)



The indicated values are for the standard machine, without accessories, with AC fans and in any case in the absence of air recirculation.

Example: supposing you expect there to be obstacles that will generate an estimated aeraulic head loss of 60Pa. In this case, there are 3 possibilities:

- use the unit with standard AC fans: compared to ideal conditions, the output power will be reduced by about 5.5%, the total absorbed power will increase by about 7.5%, the EER will be reduced by about 12.5% and the maximum allowed external air temperature for operation at 100% will be reduced by about 3.4K compared to the nominal limit
- use the unit with EC fans: compared to the unit with AC fans working in ideal conditions, the output power will be reduced by about 5%, the total absorbed power will increase by about 6.5%, the EER will be reduced by about 11.5% and the maximum allowed external air temperature for operation at 100% will be reduced by about 2.8K compared to the nominal limit
- use the unit with oversize EC fans: compared to the unit with AC fans working in ideal conditions, the output power of the unit will be unchanged, the total absorbed power will increase by about 1%, the EER will be reduced by about 2% and the maximum external air temperature will remain the one shown in the diagram of the operating limits.





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