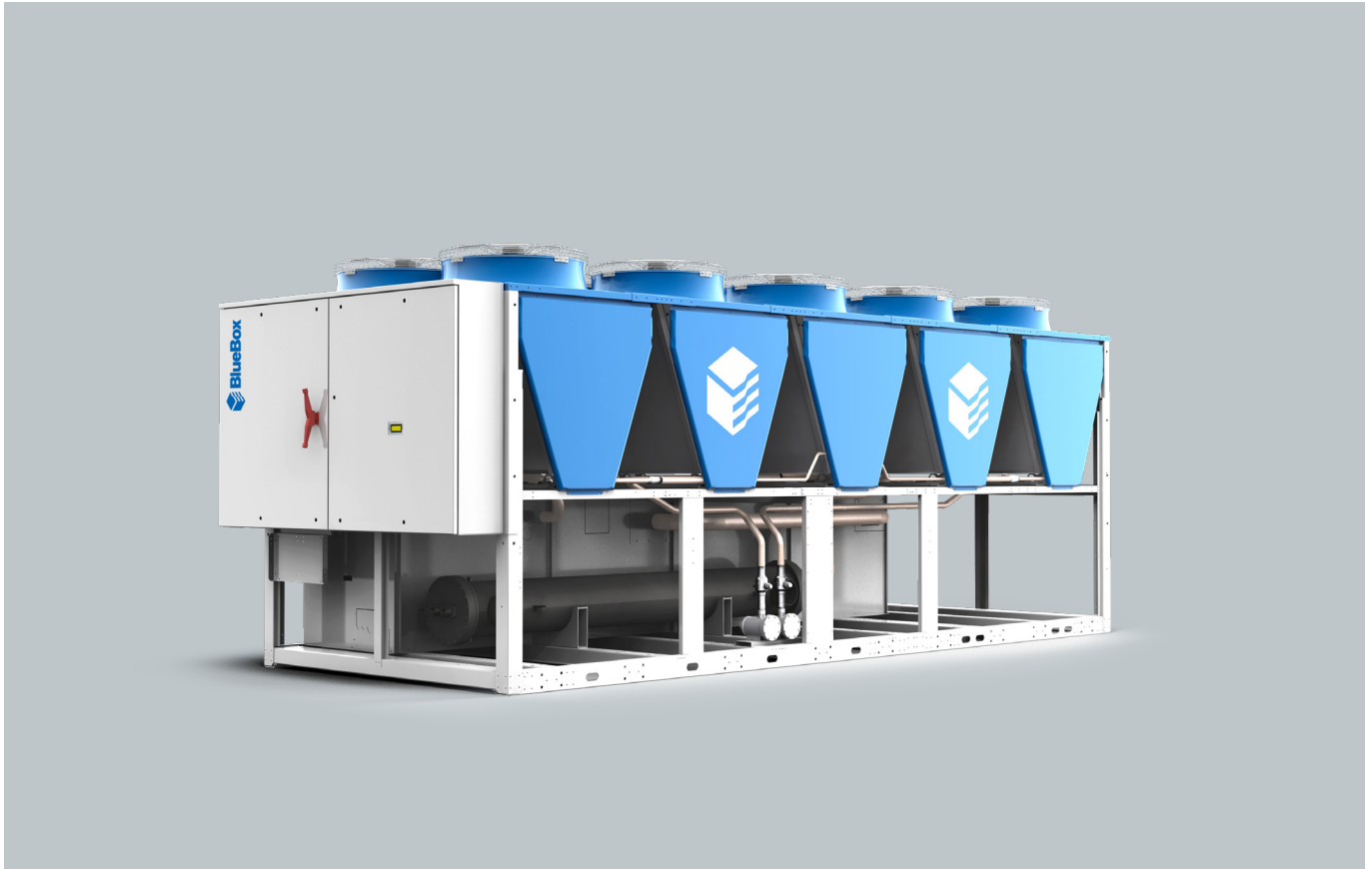


Kappa Rev FC

353÷1291 kW



General

Modular free-cooling chillers for large systems. KAPPA REV RANGE Selectable independent free-cooling module.

Configurations

HE : version high efficiency

SLN : version super low noise

/LN : silenced unit

/DS : execution featuring a desuperheater

/DC : execution with recovery condenser

Configurable free-cooling section: Basic, Custom, Extra

Strengths

- ▶ 3 free-cooling configurations available
- ▶ Chiller with low refrigerant charge
- ▶ Operating in a wide range of external ambient conditions
- ▶ 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)



Kappa Rev FC

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Kappa Rev FC

Modular free-cooling chillers for large systems. KAPPA REV RANGE Selectable independent free-cooling module.

PRODUCT DESCRIPTION

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.

Depending on version and customization the units with cooling capacity above 800 kW can present the chiller section separated from the free-cooling section. For more information refer to "Technical specifications" section.

REFRIGERANT

Refrigerant R134a (GWP=1430) standard.

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

COMPRESSORS

FC, HE FC and SLN FC version

For the FC, HE FC and SLN FC version units, the compressors are semi-hermetic screw compressors with continuous capacity reduction of output capacity 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.

Version HEi FC

The HEi FC version units have a semi-hermetic screw compressor (one compressor per section for units with 4 circuits) controlled by AC inverter fully integrated in the compressor. In addition to capacity modulation management (from about 20% up to 100%), the electronics also manages all the safety devices and therefore ensures that the compressor always works within its operating limits to preserve its operation and reliability. Each compressor is fitted with an automatic control of the compression ratio and an optoelectronic control of oil level.

The other compressors of the unit are semi-hermetic screw compressors with stepped capacity reduction. 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% difference between delivery and suction.

Version XEi FC

The XEi FC version units all use semi-hermetic screw compressors controlled by AC inverter fully integrated in the compressor. In addition to capacity modulation management (from about 20% up to 100%), the electronics also manages all the safety devices and therefore ensures that the compressor always works within its operating limits to preserve its operation and reliability. Each compressor is fitted with an automatic control of the compression ratio and an optoelectronic control of oil level.

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% 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.

Starting of the inverter-controlled compressors is of the "Direct On Line" type with an acceleration ramp managed by the inverter that allows inrush currents of the compressor below 5A to be obtained. This allows the maximum inrush current to be always lower than the maximum current absorbed by the machine.

In addition to the obvious energy savings arising from greater efficiency, the use of a full inverter unit also brings advantages in terms of installation:

- For these units, the $\cos\phi$ (power factor) is always greater than 0.95, therefore making external power factor correction systems unnecessary.
- The maximum inrush current of the unit is always lower than its maximum absorbed current (calculated in the worst operating condition), therefore making the power cables and line protection devices less onerous.

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.

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 SilFLUX 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%.

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.

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 fans of the chiller section are controlled as standard with phase cutting speed governor depending on the condensing pressure.

The fans of the free cooling section are managed as standard with stepped control depending on the temperature of the outgoing water.

EC fans are available as accessory for both sections and, in this case, continuous fan speed modulation is managed for both sections.

REFRIGERANT CIRCUIT

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

- shut-off valve in the liquid line
- 5/16" 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

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.

Where separated from the chiller module, the free-cooling section is provided with its own electrical 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
- 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.

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 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.

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, for a limited number of occurrences, 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
- Mechanical paddle flow switch factory-mounted, except for single-circuit units. For these units, flow switch is supplied as kit; mounting support (1" female fitting) and installation are care of customer
- overtemperature protection for compressors and fans

TESTING

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

VERSIONS

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

Kappa Rev HE FC

The HE FC version unit uses oversized 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 FC

The SLN FC version unit uses a soundproofed compressor compartment (see description of the /LN option), oversized 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 FC version.

Kappa Rev HEi FC

The HEi FC version unit uses an inverter-controlled compressor together with one or more compressors with stepped capacity reduction. The control can manage the mix of these compressors to guarantee continuous management of capacity reduction from the minimum step up to 100% of capacity. For units with 4 circuits, there are always 2 inverter-controlled compressors and two conventional compressors.

The HEi FC version unit is high efficiency, with ESEER levels that exceed 4.60. The coupling of EC fans (accessory) to this version allows the efficiency level of the unit to be further improved.

Kappa Rev XEi FC

The XEi FC version unit uses only inverter-controlled compressors. The control manages capacity reduction of the compressors so as to always guarantee maximum efficiency of the unit in all load conditions, to achieve ESEER levels that, in combination with EC fans (accessory), exceed 5.00.

OPTIONS

/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.

/DS: unit with desuperheater

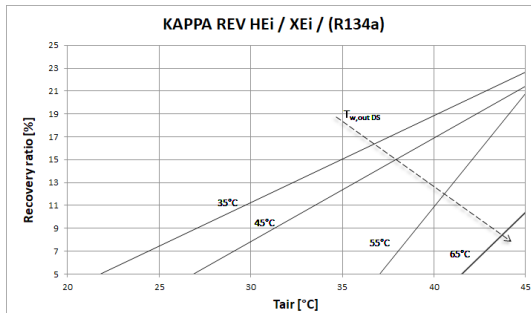
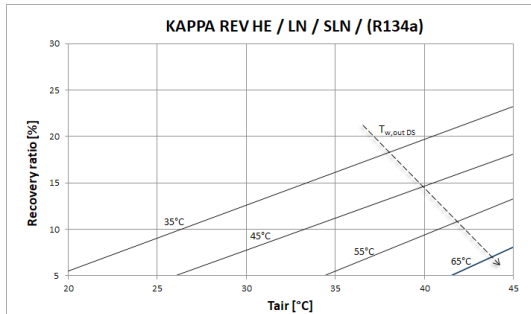
In addition to the set-up of a chiller only unit, /DS units comprise (for each refrigerant circuit) an exchanger for condensation heat recovery of up to 20% (depending on size, version and operating conditions), placed in series with the condensing coils. The exchanger is a braze-welded plate heat exchanger.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

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.

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.

For units that are made in two separate sections, the hydraulic module is intended as a single section. The water inlet and outlet of each section are to be manifolded in parallel outside the units (by the customer).

TECHNICAL SPECIFICATIONS

KAPPA REV FC

			33.2	35.2	37.2	40.2	43.2	51.2	54.2	58.2
Cooling (A30°C; W10°C; e.g.30%)										
Refrigeration capacity	(1)	kW	353	387	425	466	526	551	611	696
Total absorbed power	(1)	kW	102	106	122	141	158	164	185	214
EER	(1)		3,45	3,64	3,47	3,32	3,32	3,36	3,31	3,25
User-side heat exchanger										
Quantity		n°	1	1	1	1	1	1	1	1
Water flow rate (A30°C; W10°C; e.g.30%)	(1)	m³/h	67,7	74,3	81,6	89,6	100,8	105,8	117,4	133,6
FC BASIC (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	1 ½	2	2	2	2	2	2 ½	3
Refrigeration capacity only FC	(2)	kW	160	212	221	228	235	242	291	344
Absorbed power only FC	(2)	kW	5	7	7	7	7	7	9	11
TFT	(3)	°C	-6,1	-2,4	-3,5	-4,7	-6,6	-7,2	-5,3	-4,5
Total head losses	(7)	kPa	84,9	115,5	138,6	163,8	131,7	165,2	164,8	137,2
Total internal volume	(4)	l	145	145	145	140	140	140	280	225
FC CUSTOM (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	2	3	3	3	3	3	3	4
Refrigeration capacity only FC	(2)	kW	207	274	286	296	305	316	332	396
Absorbed power only FC	(2)	kW	7	11	11	11	11	11	11	14
TFT	(3)	°C	-1,3	1,3	0,7	-0,1	-1,4	-1,7	-2,7	-1,8
Total head losses	(7)	kPa	95,4	87,9	105,2	125	87	113	141,3	105,7
Total internal volume	(4)	l	145	210	210	200	200	200	200	305
FC EXTRA (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	3	4	4	4	4	4	4	5
Refrigeration capacity only FC	(2)	kW	274	321	335	347	359	371	391	497
Absorbed power only FC	(2)	kW	11	14	14	14	14	14	14	18
TFT	(3)	°C	2,4	3,1	2,6	1,9	0,9	0,7	0	1,5
Total head losses	(7)	kPa	72,6	77,6	92,9	110,7	70,6	93,8	117,2	90,4
Total internal volume	(4)	l	210	290	290	280	280	280	280	305
Fans										
Chiller fans		n°	5	6	6	6	6	7	8	9
Fans FC BASIC		n°	3	4	4	4	4	4	5	6
Fans FC CUSTOM		n°	4	6	6	6	6	6	6	8
Fans FC EXTRA		n°	6	8	8	8	8	8	8	10
Compressors										
Compressors/Circuits		n°/n°	2/2	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%	12%
Refrigerant charge (MCHX)		kg	39	44	44	46	43	48	52	63
Refrigerant charge (Cu/Al)		kg	54	62	62	64	61	69	76	90
Noise levels										
Chiller: Sound power level	(5)	dB(A)	94	95	95	96	96	97	98	98
Chiller: Sound power level of LN version	(5)	dB(A)	89	90	90	91	91	92	93	93
Chiller: Sound pressure level	(6)	dB(A)	62	63	63	64	64	65	66	66
Chiller: Sound pressure level of LN version	(6)	dB(A)	57	58	58	59	59	59	61	60
FC BASIC: Sound power level	(5)	dB(A)	76	77	77	77	77	77	78	79
FC CUSTOM: Sound power level	(5)	dB(A)	77	79	79	79	79	79	79	80
FC EXTRA: Sound power level	(5)	dB(A)	79	80	80	80	80	80	80	81
FC BASIC: Sound pressure level	(6)	dB(A)	44	45	45	45	45	45	46	47
FC CUSTOM: Sound pressure level	(6)	dB(A)	45	47	47	47	47	47	47	48
FC EXTRA: Sound pressure level	(6)	dB(A)	47	48	48	48	48	48	48	49

(MCHX: unit with microchannel coils ; CuAl: unit with copper/aluminium tube/fin coils)

(1) Outside air temperature 30°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

(2) Outside air temperature 5°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

(3) The TFT (Total Free-cooling Temperature) is the outside air temperature at which the cooling performance of the water coils is the same as the performance of the chiller section under the condition of A30°C; E.G.30% 15/10°C

(4) Volume of water contained in the unit when it is working in free cooling mode. If present, the volume contained in the tank should also be considered.

(5) Unit operating at rated engine speed, without any accessory, with external air temperature 30 ° C and inlet / outlet water temperature for user exchanger 15/10 ° C. Binding values. Values obtained from measurements carried out according to ISO 3744. evaporator 15/10 ° C.

(6) Values obtained from the sound power level (conditions: note 5), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.

(7) Data refers to the unit with free-cooling ON

(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 FC

			67.2	73.2	80.2	85.2	90.2	95.2	100.2	105.2	115.2
Cooling (A30°C; W10°C; e.g.30%)											
Refrigeration capacity	(1)	kW	783	838	899	954	1006	1075	1121	1181	1264
Total absorbed power	(1)	kW	233	242	252	279	307	327	345	364	383
EER	(1)		3,36	3,46	3,56	3,42	3,28	3,29	3,25	3,24	3,3
User-side heat exchanger											
Quantity		n°	1	1	1	1	1	1	1	1	1
Water flow rate (A30°C; W10°C; e.g.30%)	(1)	m³/h	150,5	160,9	172,4	183,2	193,2	206,6	215,8	227,2	242,7
FC BASIC (A5°C; W10°C; e.g.30%)											
Free-cooling mudules		n°	3	4	4	4	4	5	5	6	6
Refrigeration capacity only FC	(2)	kW	356	417	431	439	447	553	568	645	656
Absorbed power only FC	(2)	kW	11	14	14	14	14	18	18	21	21
TFT	(3)	°C	-6,4	-4,2	-5	-6	-6,8	-3,7	-4,1	-2,6	-3,5
Total head losses	(7)	kPa	160,2	143,6	129	140,5	156,1	147,2	166,1	137,6	101,9
Total internal volume	(4)	l	215	300	410	410	400	385	385	430	545
FC CUSTOM (A5°C; W10°C; e.g.30%)											
Free-cooling mudules		n°	4	5	5	5	5	6	6	7	7
Refrigeration capacity only FC	(2)	kW	411	511	528	538	549	629	646	720	733
Absorbed power only FC	(2)	kW	14	18	18	18	18	21	21	25	25
TFT	(3)	°C	-3,2	-0,7	-1,3	-2	-2,6	-1,4	-1,7	-0,7	-1,5
Total head losses	(7)	kPa	122,8	122,3	104,2	113,3	126,5	128,1	144,3	123,2	86,2
Total internal volume	(4)	l	300	300	410	410	400	385	385	430	545
FC EXTRA (A5°C; W10°C; e.g.30%)											
Free-cooling mudules		n°	5	6	6	7	7	8	8	9	9
Refrigeration capacity only FC	(2)	kW	517	595	616	687	700	779	801	873	889
Absorbed power only FC	(2)	kW	18	21	21	25	25	28	28	32	32
TFT	(3)	°C	0,4	1,4	0,9	1,5	1,1	1,6	1,4	1,8	1,3
Total head losses	(7)	kPa	104,7	110,2	90,1	88,5	99,4	108,8	122,5	107,8	69,6
Total internal volume	(4)	l	300	300	410	410	400	385	385	430	545
Fans											
Chiller fans		n°	10	11	12	12	12	13	14	15	16
Fans FC BASIC		n°	6	8	8	8	8	10	10	12	12
Fans FC CUSTOM		n°	8	10	10	10	10	12	12	14	14
Fans FC EXTRA		n°	10	12	12	14	14	16	16	18	18
Compressors											
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)	%	13%	12%	13%	12%	13%	12%	13%	13%	13%
Refrigerant charge (MCHX)		kg	70	75	83	83	87	98	102	115	122
Refrigerant charge (Cu/Al)		kg	100	108	119	119	123	137	144	160	170
Noise levels											
Chiller: Sound power level	(5)	dB(A)	99	100	100	100	100	101	101	102	102
Chiller: Sound power level of LN version	(5)	dB(A)	94	95	95	95	95	96	96	97	97
Chiller: Sound pressure level	(6)	dB(A)	67	67	67	68	68	68	68	69	69
Chiller: Sound pressure level of LN version	(6)	dB(A)	62	63	63	63	62	63	63	64	64
FC BASIC: Sound power level	(5)	dB(A)	79	80	80	80	80	81	81	82	82
FC CUSTOM: Sound power level	(5)	dB(A)	80	81	81	81	81	82	82	82	82
FC EXTRA: Sound power level	(5)	dB(A)	81	82	82	82	82	83	83	84	84
FC BASIC: Sound pressure level	(6)	dB(A)	47	48	48	48	48	49	49	50	50
FC CUSTOM: Sound pressure level	(6)	dB(A)	48	49	49	49	49	50	50	50	50
FC EXTRA: Sound pressure level	(6)	dB(A)	49	50	50	50	50	51	51	52	52

(MCHX: unit with microchannel coils ; CuAl: unit with copper/aluminium tube/fin coils)

(1) Outside air temperature 30°C; evaporator inlet/outlet temperature 15/10°C; glycol at 30%.

(2) Outside air temperature 5°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

(3) The TFT (Total Free-cooling Temperature) is the outside air temperature at which the cooling performance of the water coils is the same as the performance of the chiller section under the condition of A30°C; E.G.30% 15/10°C

(4) Volume of water contained in the unit when it is working in free cooling mode. If present, the volume contained in the tank should also be considered.

(5) Unit operating at rated engine speed, without any accessory, with external air temperature 30 ° C and inlet / outlet water temperature for user exchanger 15/10 ° C. Binding values. Values obtained from measurements carried out according to ISO 3744. evaporator 15/10 ° C.

(6) Values obtained from the sound power level (conditions: note 5), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.

(7) Data refers to the unit with free-cooling ON

(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 FC

		33.2	35.2	37.2	40.2	43.2	51.2	54.2	58.2	
Dimensions and weights**										
FC BASIC										
Modules	n°	1	1	1	1	1	1	1	1	
Length	mm	6162	6162	6162	6162	6162	7312	8460	9605	
Length chiller module	mm	-	-	-	-	-	-	-	-	
Length free-cooling module	mm	-	-	-	-	-	-	-	-	
FC CUSTOM										
Modules	n°	1	1	1	1	1	1	1	1	
Length	mm	6162	7310	7310	7310	7310	8460	8460	10753	
Length chiller module	mm	-	-	-	-	-	-	-	-	
Length free-cooling module	mm	-	-	-	-	-	-	-	-	
FC EXTRA										
Modules	n°	1	1	1	1	1	1	1	1	
Length	mm	7310	8458	8458	8458	8458	9608	9608	11902	
Length chiller module	mm	-	-	-	-	-	-	-	-	
Length free-cooling module	mm	-	-	-	-	-	-	-	-	
Depth	mm	2260	2260	2260	2260	2260	2260	2260	2260	
Height	mm	2440	2440	2440	2440	2440	2440	2440	2440	
		67.2	73.2	80.2	85.2	90.2	95.2	100.2	105.2	115.2
Dimensions and weights**										
FC BASIC										
Modules	n°	1	1	1	1	1	2	2	2	
Length	mm	9605	11898	11898	11898	11898	14202	14202	16495	
Length chiller module	mm	-	-	-	-	-	8465	8465	9610	
Length free-cooling module	mm	-	-	-	-	-	5737	5737	6885	
FC CUSTOM										
Modules	n°	1	1	1	1	1	2	2	2	
Length	mm	10753	13047	13047	13047	13047	15350	15350	17644	
Length chiller module	mm	-	-	-	-	-	8465	8465	9610	
Length free-cooling module	mm	-	-	-	-	-	6885	6885	8034	
FC EXTRA										
Modules	n°	1	2	2	2	2	2	2	2	
Length	mm	11902	14195	14195	15344	15344	17648	17648	19940	
Length chiller module	mm	-	7310	7310	7310	7310	8465	8465	9610	
Length free-cooling module	mm	-	6885	6885	8034	8034	9183	9183	10330	
Depth	mm	2260	2260	2260	2260	2260	2260	2260	2260	
Height	mm	2440	2440	2440	2440	2440	2440	2440	2440	

KAPPA REV HE FC

			33.2	35.2	37.2	40.2	43.2	51.2	54.2	58.2
Cooling (A30°C; W10°C; e.g.30%)										
Refrigeration capacity	(1)	kW	376	420	444	505	562	592	652	767
Total absorbed power	(1)	kW	100	112	117	133	149	156	174	205
EER	(1)		3,8	3,7	3,8	3,8	3,8	3,8	3,7	3,7
User-side heat exchanger										
Quantity		n°	1	1	1	1	1	1	1	1
Water flow rate (A30°C; W10°C; e.g.30%)	(1)	m³/h	72,2	80,5	85,1	96,9	107,9	113,5	125,1	147,2
FC BASIC (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	1 ½	2	2	2	2	2 ½	3	3
Refrigeration capacity only FC	(2)	kW	161	221	228	236	244	287	338	356
Absorbed power only FC	(2)	kW	5	7	7	7	7	9	11	11
TFT	(3)	°C	-7,2	-3,2	-3,8	-5,7	-7,6	-4,9	-3,6	-5,9
Total head losses	(7)	kPa	92	107	124	147	171	121	126	133
Total internal volume	(4)	l	145	140	140	170	170	305	225	330
FC CUSTOM (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	2	3	3	3	3	3	4	4
Refrigeration capacity only FC	(2)	kW	210	286	296	307	318	327	388	411
Absorbed power only FC	(2)	kW	7	11	11	11	11	11	14	14
TFT	(3)	°C	-2,1	0,9	0,6	-0,7	-1,9	-2,3	-1	-2,8
Total head losses	(7)	kPa	104	74	85	101	117	99	97	95
Total internal volume	(4)	l	145	200	200	230	230	225	305	410
FC EXTRA (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	3	4	4	4	4	4	5	5
Refrigeration capacity only FC	(2)	kW	279	336	347	361	374	385	488	517
Absorbed power only FC	(2)	kW	11	14	14	14	14	14	18	18
TFT	(3)	°C	1,9	2,7	2,5	1,5	0,6	0,3	2	0,7
Total head losses	(7)	kPa	79	62	71	84	97	76	83	77
Total internal volume	(4)	l	210	280	280	315	315	305	305	410
Fans										
Chiller fans		n°	6	7	8	8	8	9	11	12
Fans FC BASIC		n°	3	4	4	4	4	5	6	6
Fans FC CUSTOM		n°	4	6	6	6	6	6	8	8
Fans FC EXTRA		n°	6	8	8	8	8	8	10	10
Compressors										
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(8)	%	12%	12%	13%	12%	13%	12%	12%	12%
Refrigerant charge (MCHX)		kg	46	52	52	56	56	68	77	83
Refrigerant charge (Cu/Al)		kg	64	73	76	80	80	95	110	119
Noise levels										
Chiller: Sound power level	(5)	dB(A)	94	95	95	96	96	97	98	98
Chiller: Sound power level of LN version	(5)	dB(A)	89	90	90	91	91	92	93	93
Chiller: Sound pressure level	(6)	dB(A)	62	62	62	63	63	65	66	66
Chiller: Sound pressure level of LN version	(6)	dB(A)	57	58	58	59	59	59	61	60
FC BASIC: Sound power level	(5)	dB(A)	76	77	77	77	77	78	79	79
FC CUSTOM: Sound power level	(5)	dB(A)	77	79	79	79	79	79	80	80
FC EXTRA: Sound power level	(5)	dB(A)	79	80	80	80	80	80	81	81
FC BASIC: Sound pressure level	(6)	dB(A)	44	45	45	45	45	46	47	47
FC CUSTOM: Sound pressure level	(6)	dB(A)	45	47	47	47	47	47	48	48
FC EXTRA: Sound pressure level	(6)	dB(A)	47	48	48	48	48	48	49	49

Dimensions and weights**

FC BASIC MCHX: unit with microchannel coils ; CuAl: unit with copper/aluminium tube/fin coils)

Modules Outside air temperature 30°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

Length Outside air temperature 5°C; fluid temperature at outlet from free-cooling coils 10°C; glycol at 30%.

Length chiller module The TFT (Total Free-cooling Temperature) is the outside air temperature at which the cooling performance of the water coils is the same as the performance of the chiller section under the condition of A30°C; E.G.30% 15/10°C

Length free-coling module Volume of water contained in the unit when it is working in free cooling mode. If present, the volume contained in the tank should also be considered.

FC CUSTOM Unit operating at rated engine speed, without any accessory, with external air temperature 30 ° C and inlet / outlet water temperature for user exchanger 15/10 ° C. Binding values. Values obtained from measurements carried out according to ISO 3744. evaporator 15/10 ° C.

Modules Values obtained from the sound power level (conditions: note 5), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.

Length Data refers to the unit with free-cooling ON

Length chiller module 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.

Length free-coling module Basic CH unit without included accessories

KAPPA REV HE FC

			67.2	73.2	80.2	85.2	90.2	95.2	100.2	105.2
Cooling (A30°C; W10°C; e.g.30%)										
Refrigeration capacity	(1)	kW	835	879	928	1005	1075	1155	1223	1291
Total absorbed power	(1)	kW	223	235	248	270	291	312	331	349
EER	(1)		3,8	3,7	3,7	3,7	3,7	3,7	3,7	3,7
User-side heat exchanger										
Quantity		n°	1	1	1	1	1	1	1	1
Water flow rate (A30°C; W10°C; e.g.30%)	(1)	m³/h	160,1	168,6	178,2	193	206,8	222,2	235,5	248,1
FC BASIC (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	4	4	4	4	5	5	6	6
Refrigeration capacity only FC	(2)	kW	413	427	440	451	558	572	654	665
Absorbed power only FC	(2)	kW	14	14	14	14	18	18	21	21
TFT	(3)	°C	-4,3	-4,7	-5,4	-6,6	-3,6	-4,5	-3	-3,7
Total head losses	(7)	kPa	107	124	143	164	153	154	147	108
Total internal volume	(4)	l	410	410	410	400	385	430	430	545
FC CUSTOM (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	5	5	5	5	6	6	7	7
Refrigeration capacity only FC	(2)	kW	506	524	540	555	634	651	731	743
Absorbed power only FC	(2)	kW	18	18	18	18	21	21	25	25
TFT	(3)	°C	-0,8	-1,1	-1,5	-2,4	-1,3	-2	-1,1	-1,6
Total head losses	(7)	kPa	87	100	115	133	133	132	132	92
Total internal volume	(4)	l	410	410	410	400	385	430	430	545
FC EXTRA (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	6	6	7	7	8	8	9	9
Refrigeration capacity only FC	(2)	kW	590	611	689	709	786	807	887	902
Absorbed power only FC	(2)	kW	21	21	25	25	28	28	32	32
TFT	(3)	°C	1,3	1,1	1,9	1,3	1,7	1,1	1,6	1,2
Total head losses	(7)	kPa	75	87	90	104	113	109	115	74
Total internal volume	(4)	l	410	410	410	400	385	430	430	545
Fans										
Chiller fans		n°	12	13	14	15	16	17	18	19
Fans FC BASIC		n°	8	8	8	8	10	10	12	12
Fans FC CUSTOM		n°	10	10	10	10	12	12	14	14
Fans FC EXTRA		n°	12	12	14	14	16	16	18	18
Compressors										
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(8)	%	13%	12%	13%	12%	13%	12%	13%	12%
Refrigerant charge (MCHX)		kg	83	92	92	105	111	128	128	141
Refrigerant charge (Cu/Al)		kg	119	131	134	150	159	179	182	198
Noise levels										
Chiller: Sound power level	(5)	dB(A)	99	100	100	100	100	101	101	102
Chiller: Sound power level of LN version	(5)	dB(A)	94	95	95	95	95	96	96	97
Chiller: Sound pressure level	(6)	dB(A)	67	67	67	67	67	68	68	69
Chiller: Sound pressure level of LN version	(6)	dB(A)	62	62	62	62	62	63	63	64
FC BASIC: Sound power level	(5)	dB(A)	80	80	80	80	81	81	82	82
FC CUSTOM: Sound power level	(5)	dB(A)	81	81	81	81	82	82	82	82
FC EXTRA: Sound power level	(5)	dB(A)	82	82	82	82	83	83	84	84
FC BASIC: Sound pressure level	(6)	dB(A)	48	48	48	48	49	49	50	50
FC CUSTOM: Sound pressure level	(6)	dB(A)	49	49	49	49	50	50	50	50
FC EXTRA: Sound pressure level	(6)	dB(A)	50	50	50	50	51	51	52	52

Dimensions and weights**

FC BASIC MCHX: unit with microchannel coils ; CuAl: unit with copper/aluminium tube/fin coils)

Modules Outside air temperature 30°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

Length Outside air temperature 5°C; fluid temperature at outlet from free-cooling coils 10°C; glycol at 30%.

Length chiller module The TFT (Total Free-cooling Temperature) is the outside air temperature at which the cooling performance of the water coils is the same as the performance of the chiller section under the condition of A30°C; E.G.30% 15/10°C

Length free-coling module Volume of water contained in the unit when it is working in free cooling mode. If present, the volume contained in the tank should also be considered.

FC CUSTOM Unit operating at rated engine speed, without any accessory, with external air temperature 30 ° C and inlet / outlet water temperature for user exchanger 15/10 ° C. Binding values. Values obtained from measurements carried out according to ISO 3744. evaporator 15/10 ° C.

Modules Values obtained from the sound power level (conditions: note 5), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.

Length Data refers to the unit with free-cooling ON

Length chiller module 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.

Length free-coling module Basic CH unit without included accessories

KAPPA REV HE FC

		33.2	35.2	37.2	40.2	43.2	51.2	54.2	58.2
Dimensions and weights**									
FC BASIC									
Modules	n°	1	1	1	1	1	1	1	1
Length	mm	6162	7312	7312	7312	7312	9605	10750	10750
Length chiller module	mm	-	-	-	-	-	-	-	-
Length free-cooling module	mm	-	-	-	-	-	-	-	-
FC CUSTOM									
Modules	n°	1	1	1	1	1	1	1	1
Length	mm	6162	8460	8460	8460	8460	9605	11898	11898
Length chiller module	mm	-	-	-	-	-	-	-	-
Length free-cooling module	mm	-	-	-	-	-	-	-	-
FC EXTRA									
Modules	n°	1	1	1	1	1	1	1	1
Length	mm	7310	9608	9608	9608	9608	10753	13047	13047
Length chiller module	mm	-	-	-	-	-	-	-	-
Length free-cooling module	mm	-	-	-	-	-	-	-	-
Depth	mm	2260	2260	2260	2260	2260	2260	2260	2260
Height	mm	2440	2440	2440	2440	2440	2440	2440	2440
		67.2	73.2	80.2	85.2	90.2	95.2	100.2	105.2
Dimensions and weights**									
FC BASIC									
Modules	n°	1	1	1	2	2	2	2	2
Length	mm	11898	13053	13053	14198	15347	16492	17640	18850
Length chiller module	mm	-	-	-	9610	9610	10755	10755	11965
Length free-cooling module	mm	-	-	-	4588	5737	5737	6885	6885
FC CUSTOM									
Modules	n°	1	2	2	2	2	2	2	2
Length	mm	13047	14202	14202	15347	16495	17640	18789	19999
Length chiller module	mm	-	8465	8465	9610	9610	10755	10755	11965
Length free-cooling module	mm	-	5737	5737	5737	6885	6885	8034	8034
FC EXTRA									
Modules	n°	2	2	2	2	2	2	2	2
Length	mm	14195	15350	16499	17644	18793	19938	21085	22295
Length chiller module	mm	7310	8465	8465	9610	9610	10755	10755	11965
Length free-cooling module	mm	6885	6885	8034	8034	9183	9183	10330	10330
Depth	mm	2260	2260	2260	2260	2260	2260	2260	2260
Height	mm	2440	2440	2440	2440	2440	2440	2440	2440

KAPPA REV SLN FC

			33.2	35.2	37.2	40.2	43.2	51.2	54.2	58.2
Cooling (A30°C; W10°C; e.g.30%)										
Refrigeration capacity	(1)	kW	362	405	431	487	540	570	631	738
Total absorbed power	(1)	kW	104	117	121	139	156	163	181	214
EER	(1)		3,5	3,5	3,6	3,5	3,5	3,5	3,5	3,5
User-side heat exchanger										
Quantity		n°	1	1	1	1	1	1	1	1
Water flow rate (A30°C; W10°C; e.g.30%)	(1)	m³/h	133	125	125	157	157	149	149	255
FC BASIC (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	1 ½	2	2	2	2	2	2 ½	3
Refrigeration capacity only FC	(2)	kW	161,0	218	225,1	232,9	240,2	246,6	298,4	351,4
Absorbed power only FC	(2)	kW	5,25	7	7	7	7	7	8,75	10,5
TFT	(3)	°C	-6,5	-2,8	-3,4	-5,2	-6,9	-7,7	-5,6	-5,4
Total head losses	(7)	kPa	91,2	93,2	108	136,7	158,3	149,4	144,9	124,1
Total internal volume	(4)	l	145	140	140	170	170	160	305	330
FC CUSTOM (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	2	3	3	3	3	3	3	4
Refrigeration capacity only FC	(2)	kW	209,7	281,8	291,6	302,4	312,5	321,6	340	404,6
Absorbed power only FC	(2)	kW	7	10,5	10,5	10,5	10,5	10,5	10,5	14
TFT	(3)	°C	-1,5	1,1	0,8	-0,4	-1,5	-1,9	-2,8	-2,4
Total head losses	(7)	kPa	102,4	61,9	71,5	93,8	108,3	92,3	118,4	89,3
Total internal volume	(4)	l	145	200	200	230	230	225	225	410
FC EXTRA (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	3	4	4	4	4	4	4	5
Refrigeration capacity only FC	(2)	kW	277,9	330,5	342,3	355,4	367,7	378,8	401,4	508,7
Absorbed power only FC	(2)	kW	10,5	14	14	14	14	14	14	17,5
TFT	(3)	°C	2,3	2,9	2,7	1,7	0,9	0,6	-0,1	1
Total head losses	(7)	kPa	78,4	50,3	58,1	78	90	71,5	91,4	72,4
Total internal volume	(4)	l	210	280	280	315	315	305	305	410
Fans										
Chiller fans		n°	6	7	8	8	8	9	11	12
Fans FC BASIC		n°	3	4	4	4	4	4	5	6
Fans FC CUSTOM		n°	4	6	6	6	6	6	6	8
Fans FC EXTRA		n°	6	8	8	8	8	8	8	10
Compressors										
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(8)	%	12%	12%	12,5%	11%	12,5%	12%	12%	12%
Refrigerant charge (MCHX)		kg	46	52	52	56	56	68	77	83
Refrigerant charge (Cu/Al)		kg	64	73	76	80	80	95	110	119
Noise levels										
Chiller: Sound power lev. SLN vers.	(5)	dB(A)	86	87	87	88	88	89	90	90
Chiller: Sound pressure lev. SLN vers.	(5)	dB(A)	54	55	54	56	56	57	58	58
FC BASIC: Sound power lev.	(5)	dB(A)	76	77	77	77	77	77	78	79
FC CUSTOM: Sound power lev.	(5)	dB(A)	77	79	79	79	79	79	79	80
FC EXTRA: Sound power lev.	(5)	dB(A)	79	80	80	80	80	80	80	81
FC BASIC: Sound pressure lev.	(6)	dB(A)	44	45	45	45	45	45	46	47
FC CUSTOM: Sound pressure lev.	(6)	dB(A)	45	47	47	47	47	47	47	48
FC EXTRA: Sound pressure lev.	(6)	dB(A)	47	48	48	48	48	48	48	49

Dimensions and weights**

FC BASIC MCHX: unit with microchannel coils ; CuAl: unit with copper/aluminium tube/fin coils)

Modules Outside air temperature 30°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

Length Outside air temperature 5°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

Length chiller module The TFT (Total Free-cooling Temperature) is the outside air temperature at which the cooling performance of the water coils is the same as the performance of the chiller section under the condition of A30°C; E.G.30% 15/10°C

Length free-cooling module Volume of water contained in the unit when it is working in free cooling mode. If present, the volume contained in the tank should also be considered.

FC CUSTOM Unit operating at rated engine speed, without any accessory, with external air temperature 30 ° C and inlet / outlet water temperature for user exchanger 15/10 ° C. Binding values. Values obtained from measurements carried out according to ISO 3744. evaporator 15/10 ° C.

Modules Values obtained from the sound power level (conditions: note 5), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.

Length Data refers to the unit with free-cooling ON

Length chiller module 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.

Length free-cooling module Basic CH unit without included accessories

KAPPA REV SLN FC

			67.2	73.2	80.2	85.2	90.2	95.2	100.2	105.2
Cooling (A30°C; W10°C; e.g.30%)										
Refrigeration capacity	(1)	kW	802	845	894	968	1038	1113	1179	1246
Total absorbed power	(1)	kW	233	244	257	280	303	325	345	364
EER	(1)		3,4	3,5	3,5	3,5	3,4	3,4	3,4	3,4
User-side heat exchanger										
Quantity		n°	1	1	1	1	1	1	1	1
Water flow rate (A30°C; W10°C; e.g.30%)	(1)	m³/h	255	255	255	246	228	276	276	390
FC BASIC (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	3	4	4	4	5	5	6	6
Refrigeration capacity only FC	(2)	kW	359,7	420,5	433,5	444,8	549,4	563,9	644,3	655
Absorbed power only FC	(2)	kW	10,5	14	14	14	17,5	17,5	21	21
TFT	(3)	°C	-6,7	-4,2	-4,9	-6,1	-3,1	-4	-2,6	-3,2
Total head losses	(7)	kPa	138,8	115,7	132,9	153,1	142,7	144,1	137,2	101,3
Total internal volume	(4)	l	330	410	410	400	385	430	430	545
FC CUSTOM (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	4	5	5	5	6	6	7	7
Refrigeration capacity only FC	(2)	kW	414,8	515,2	531,7	546,2	624,2	641,2	719,6	731,8
Absorbed power only FC	(2)	kW	14	17,5	17,5	17,5	21	21	24,5	24,5
TFT	(3)	°C	-3,4	-0,7	-1,1	-2	-0,9	-1,6	-0,7	-1,3
Total head losses	(7)	kPa	99,7	93,5	107,3	124,1	124,1	123,1	122,9	85,7
Total internal volume	(4)	l	410	410	410	400	385	430	430	545
FC EXTRA (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	5	6	6	7	8	8	9	9
Refrigeration capacity only FC	(2)	kW	521,9	600,4	620,2	697,1	773,1	794,9	872,5	887,8
Absorbed power only FC	(2)	kW	17,5	21	21	24,5	28	28	31,5	31,5
TFT	(3)	°C	0,2	1,4	1,1	1,5	1,9	1,4	1,8	1,4
Total head losses	(7)	kPa	80,7	80,9	92,8	97,5	105,4	102	107,5	69,2
Total internal volume	(4)	l	410	410	410	400	385	430	430	545
Fans										
Chiller fans		n°	12	13	14	15	16	17	18	19
Fans FC BASIC		n°	6	8	8	8	10	10	12	12
Fans FC CUSTOM		n°	8	10	10	10	12	12	14	14
Fans FC EXTRA		n°	10	12	12	14	16	16	18	18
Compressors										
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(8)	%	13%	12%	13%	12%	13%	12%	13%	12%
Refrigerant charge (MCHX)		kg	83	92	92	105	111	128	128	141
Refrigerant charge (Cu/Al)		kg	119	131	134	150	159	179	182	198
Noise levels										
Chiller: Sound power lev. SLN vers.	(5)	dB(A)	91	92	92	92	92	93	93	94
Chiller: Sound pressure lev. SLN vers.	(5)	dB(A)	59	59	59	59	59	60	60	61
FC BASIC: Sound power lev.	(5)	dB(A)	79	80	80	80	81	81	82	82
FC CUSTOM: Sound power lev.	(5)	dB(A)	80	81	81	81	82	82	82	82
FC EXTRA: Sound power lev.	(5)	dB(A)	81	82	82	82	83	83	84	84
FC BASIC: Sound pressure lev.	(6)	dB(A)	47	48	48	48	49	49	50	50
FC CUSTOM: Sound pressure lev.	(6)	dB(A)	48	49	49	49	50	50	50	50
FC EXTRA: Sound pressure lev.	(6)	dB(A)	49	50	50	50	51	51	52	52

Dimensions and weights**

FC BASIC MCHX: unit with microchannel coils ; CuAl: unit with copper/aluminium tube/fin coils)

Modules Outside air temperature 30°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

Length Outside air temperature 5°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

Length chiller module The TFT (Total Free-cooling Temperature) is the outside air temperature at which the cooling performance of the water coils is the same as the performance of the chiller section under the condition of A30°C; E.G.30% 15/10°C

Length free-cooling module Volume of water contained in the unit when it is working in free cooling mode. If present, the volume contained in the tank should also be considered.

FC CUSTOM Unit operating at rated engine speed, without any accessory, with external air temperature 30 ° C and inlet / outlet water temperature for user exchanger 15/10 ° C. Binding values. Values obtained from measurements carried out according to ISO 3744. evaporator 15/10 ° C.

Modules Values obtained from the sound power level (conditions: note 5), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.

Length Data refers to the unit with free-cooling ON

Length chiller module 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.

Length free-cooling module Basic CH unit without included accessories

KAPPA REV SLN FC

		33.2	35.2	37.2	40.2	43.2	51.2	54.2	58.2
Dimensions and weights**									
FC BASIC									
Modules	n°	1	1	1	1	1	1	1	1
Length	mm	6162	7312	7312	7312	7312	8457	10750	10750
Length chiller module	mm	-	-	-	-	-	-	-	-
Length free-cooling module	mm	-	-	-	-	-	-	-	-
FC CUSTOM									
Modules	n°	1	1	1	1	1	1	1	1
Length	mm	6162	8460	8460	8460	8460	9605	10750	11898
Length chiller module	mm	-	-	-	-	-	-	-	-
Length free-cooling module	mm	-	-	-	-	-	-	-	-
FC EXTRA									
Modules	n°	1	1	1	1	1	1	1	1
Length	mm	7310	9608	9608	9608	9608	10753	11898	13047
Length chiller module	mm	-	-	-	-	-	-	-	-
Length free-cooling module	mm	-	-	-	-	-	-	-	-
Depth	mm	2260	2260	2260	2260	2260	2260	2260	2260
Height	mm	2440	2440	2440	2440	2440	2440	2440	2440
		67.2	73.2	80.2	85.2	90.2	95.2	100.2	105.2
Dimensions and weights**									
FC BASIC									
Modules	n°	1	1	1	2	2	2	2	2
Length	mm	10750	13053	13053	14198	15347	16492	17640	18850
Length chiller module	mm	-	-	-	9610	9610	10755	10755	11965
Length free-cooling module	mm	-	-	-	4588	5737	5737	6885	6885
FC CUSTOM									
Modules	n°	1	2	2	2	2	2	2	2
Length	mm	11898	14202	14202	15347	16495	17640	18789	19999
Length chiller module	mm	-	8465	8465	9610	9610	10755	10755	11965
Length free-cooling module	mm	-	5737	5737	5737	6885	6885	8034	8034
FC EXTRA									
Modules	n°	1	2	2	2	2	2	2	2
Length	mm	13047	15350	15350	17644	18793	19938	21085	22295
Length chiller module	mm	-	8465	8465	9610	9610	10755	10755	11965
Length free-cooling module	mm	-	6885	6885	8034	9183	9183	10330	10330
Depth	mm	2260	2260	2260	2260	2260	2260	2260	2260
Height	mm	2440	2440	2440	2440	2440	2440	2440	2440

KAPPA REV HEI FC

		58.2	67.2	73.2	80.2	85.2	90.2	100.3	105.3	
Cooling (A30°C; W10°C; e.g.30%)										
Refrigeration capacity	(1)	kW	643	742	826	889	1010	1070	1171	1242
Total absorbed power	(1)	kW	166	196	220	235	271	289	308	333
EER	(1)		3,9	3,8	3,8	3,8	3,7	3,7	3,8	3,7
User-side heat exchanger										
Quantity		n°	1	1	1	1	1	1	1	1
Water flow rate (A30°C; W10°C; e.g.30%)	(1)	m³/h	123	142	159	171	194	206	225	239
FC BASIC (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	3	3	4	4	5	5	6	6
Refrigeration capacity only FC	(2)	kW	309	360	422	436	546	562	653	670
Absorbed power only FC	(2)	kW	11	11	14	14	18	18	21	21
TFT	(3)	°C	-4,6	-5,1	-3,8	-4,7	-2,8	-3,4	-2,2	-2,9
Total head losses	(7)	kPa	106	141	123	143	124	139	99	111
Total internal volume	(4)	l	330	320	385	385	435	545	525	525
FC CUSTOM (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	4	4	5	5	6	6	7	7
Refrigeration capacity only FC	(2)	kW	354	415	518	535	620	639	730	749
Absorbed power only FC	(2)	kW	14	14	18	18	21	21	25	25
TFT	(3)	°C	-2,1	-2,2	-0,3	-1	-0,6	-1,1	-0,4	-1
Total head losses	(7)	kPa	77	102	100	116	106	118	84	94
Total internal volume	(4)	l	410	400	385	385	435	545	525	525
FC EXTRA (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	5	5	6	6	8	8	9	9
Refrigeration capacity only FC	(2)	kW	443	522	603	625	768	792	886	909
Absorbed power only FC	(2)	kW	18	18	21	21	28	28	32	32
TFT	(3)	°C	1,1	1,2	1,7	1,2	2,2	1,8	2,1	1,7
Total head losses	(7)	kPa	62	83	87	101	88	98	68	76
Total internal volume	(4)	l	410	400	385	385	435	545	525	525
Fans										
Chiller fans		n°	12	13	14	15	16	18	20	21
Fans FC BASIC		n°	6	6	8	8	10	10	12	12
Fans FC CUSTOM		n°	8	8	10	10	12	12	14	14
Fans FC EXTRA		n°	10	10	12	12	16	16	18	18
Compressors										
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	3/3	3/3
Minimum capacity reduction step	(8)	%	12,5%	11%	10%	9%	8%	8%	7%	7%
Refrigerant charge (MCHX)		kg	83	91	102	107	119	132	178	182
Refrigerant charge (Cu/Al)		kg	119	130	144	152	167	186	238	245
Noise levels										
Chiller: Sound power level	(5)	dB(A)	99	100	101	101	101	103	102	103
Chiller: Sound pressure level	(6)	dB(A)	67	67	68	68	68	70	69	69
Chiller: Sound power level of LN version	(5)	dB(A)	95	96	97	97	97	99	98	99
Chiller: Sound pressure level of LN version	(6)	dB(A)	63	63	64	64	64	66	65	65
FC BASIC: Sound power level	(5)	dB(A)	79	79	80	80	81	81	82	82
FC CUSTOM: Sound power level	(5)	dB(A)	80	80	81	81	82	82	82	82
FC EXTRA: Sound power level	(5)	dB(A)	81	81	82	82	83	83	84	84
FC BASIC: Sound pressure level	(6)	dB(A)	47	47	48	48	49	49	50	50
FC CUSTOM: Sound pressure level	(6)	dB(A)	48	48	49	49	50	50	50	50
FC EXTRA: Sound pressure level	(6)	dB(A)	49	49	50	50	51	51	52	52

Dimensions and weights**

FC BASIC MCHX: unit with microchannel coils ; CuAl: unit with copper/aluminium tube/fin coils)

Modules Outside air temperature 30°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

Length Outside air temperature 5°C; fluid temperature at outlet from free-cooling coils 10°C; glycol at 30%.

Length chiller module The TFT (Total Free-cooling Temperature) is the outside air temperature at which the cooling performance of the water coils is the same as the performance of the chiller section under the condition of A30°C; E.G.30% 15/10°C

Length free-cooling module Volume of water contained in the unit when it is working in free cooling mode. If present, the volume contained in the tank should also be considered.

FC CUSTOM Unit operating at rated engine speed, without any accessory, with external air temperature 30 ° C and inlet / outlet water temperature for user exchanger 15/10 ° C. Binding values. Values obtained from measurements carried out according to ISO 3744. evaporator 15/10 ° C.

Modules Values obtained from the sound power level (conditions: note 5), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.

Length Data refers to the unit with free-cooling ON

Length chiller module 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.

Length free-cooling module Basic CH unit without included accessories

KAPPA REV HEi FC

		58.2	67.2	73.2	80.2	85.2	90.2	100.3	105.3
Dimensions and weights**									
FC BASIC									
Modules	n°	1	1	1	2	2	2	2	2
Length	mm	10750	11905	13053	14198	15347	16492	18850	19995
Length chiller module	mm	-	-	-	9610	9610	10755	11965	13110
Length free-cooling module	mm	-	-	-	4588	5737	5737	6885	6885
FC CUSTOM									
Modules	n°	1	1	2	2	2	2	2	2
Length	mm	11898	13053	14202	15347	16495	17640	19999	21144
Length chiller module	mm	-	-	8465	9610	9610	10755	11965	13110
Length free-cooling module	mm	-	-	5737	5737	6885	6885	8034	8034
FC EXTRA									
Modules	n°	1	2	2	2	2	2	2	2
Length	mm	13047	14202	15350	16495	18793	19938	22295	23440
Length chiller module	mm	-	8465	8465	9610	9610	10755	11965	13110
Length free-cooling module	mm	-	5737	6885	6885	9183	9183	10330	10330
Depth	mm	2260	2260	2260	2260	2260	2260	2260	2260
Height	mm	2440	2440	2440	2440	2440	2440	2440	2440

KAPPA REV XEi FC

			30.1	35.1	45.1	55.2	65.2	70.2	80.2	90.2	100.3
Cooling (A30°C; W10°C; e.g.30%)											
Refrigeration capacity	(1)	kW	322	402	504	640	723	817	902	1003	1140
Total absorbed power	(1)	kW	85	109	141	169	194	218	251	285	304
EER	(1)		3,8	3,7	3,6	3,8	3,7	3,7	3,6	3,5	3,7
User-side heat exchanger											
Quantity		n°	1	1	1	1	1	1	1	1	1
Water flow rate (A30°C; W10°C; e.g.30%)	(1)	m³/h	61,8	77,2	96,5	122,7	138,9	156,7	173,2	192,7	218,8
FC BASIC (A5°C; W10°C; e.g.30%)											
Free-cooling mudules		n°	1 ½	2	2	3	3	4	4	4	5
Refrigeration capacity only FC	(2)	kW	159	222	241	340	356	421	441	459	579
Absorbed power only FC	(2)	kW	5	7	7	11	11	14	14	14	18
TFT	(3)	°C	-4,4	-2,5	-5,3	-3,1	-4,8	-3,6	-4,8	-6,4	-4,1
Total head losses	(7)	kPa	82	143	135	106	134	120	149	166	118
Total internal volume	(4)	l	145	140	160	330	320	385	385	435	525
FC CUSTOM (A5°C; W10°C; e.g.30%)											
Free-cooling mudules		n°	2	3	3	4	4	5	5	5	6
Refrigeration capacity only FC	(2)	kW	206	287	314	391	411	516	541	564	659
Absorbed power only FC	(2)	kW	7	11	11	14	14	18	18	18	21
TFT	(3)	°C	0	1,4	-0,4	-0,7	-1,9	-0,2	-1	-2,1	-1,6
Total head losses	(7)	kPa	92	109	83	77	97	98	122	132	94
Total internal volume	(4)	l	145	200	225	410	400	385	385	435	525
FC EXTRA (A5°C; W10°C; e.g.30%)											
Free-cooling mudules		n°	3	4	4	5	5	6	7	7	8
Refrigeration capacity only FC	(2)	kW	272	336	370	491	517	601	690	721	817
Absorbed power only FC	(2)	kW	11	14	14	18	18	21	25	25	28
TFT	(3)	°C	3,3	3,2	1,8	2,3	1,4	1,8	2,2	1,5	1,5
Total head losses	(7)	kPa	70	97	65	62	79	86	96	101	70
Total internal volume	(4)	l	210	280	305	410	400	385	385	435	525
Fans											
Chiller fans		n°	6	8	10	12	14	16	18	20	22
Fans FC BASIC		n°	3	4	4	6	6	8	8	8	10
Fans FC CUSTOM		n°	4	6	6	8	8	10	10	10	12
Fans FC EXTRA		n°	6	8	8	10	10	12	14	14	16
Compressors											
Compressors/Circuits		n°/n°	1/1	1/1	1/1	2/2	2/2	2/2	2/2	2/2	3/3
Minimum capacity reduction step	(8)	%	25%	20%	16%	12,5%	11,2%	10%	8%	8%	5,6%
Refrigerant charge (MCHX)		kg	44	56	68	83	96	111	140	160	187
Refrigerant charge (Cu/Al)		kg	62	80	98	119	138	159	194	220	253
Noise levels											
Chiller: Sound power level	(5)	dB(A)	99	100	101	102	103	103	104	104	105
Chiller: Sound pressure level	(6)	dB(A)	67	68	69	69	70	70	71	71	71
Chiller: Sound power level of LN version	(5)	dB(A)	95	96	97	98	99	99	100	100	101
Chiller: Sound pressure level of LN version	(6)	dB(A)	63	64	65	65	66	66	67	67	67
FC BASIC: Sound power level	(5)	dB(A)	76	77	77	79	79	80	80	80	81
FC CUSTOM: Sound power level	(5)	dB(A)	77	79	79	80	80	81	81	81	82
FC EXTRA: Sound power level	(5)	dB(A)	79	80	80	81	81	82	82	82	83
FC BASIC: Sound pressure level	(6)	dB(A)	44	45	45	47	47	48	48	48	49
FC CUSTOM: Sound pressure level	(6)	dB(A)	45	47	47	48	48	49	49	49	50
FC EXTRA: Sound pressure level	(6)	dB(A)	47	48	48	49	49	50	50	50	51

Dimensions and weights**

FC BASIC MCHX: unit with microchannel coils ; CuAl: unit with copper/aluminium tube/fin coils)

Modules Outside air temperature 30°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

Length Outside air temperature 5°C; fluid temperature at outlet from free-cooling coils 10°C; glycol at 30%.

Length chiller module The TFT (Total Free-cooling Temperature) is the outside air temperature at which the cooling performance of the water coils is the same as the performance of the chiller section under the condition of A30°C; E.G.30% 15/10°C

Length free-coling module Volume of water contained in the unit when it is working in free cooling mode. If present, the volume contained in the tank should also be considered.

FC CUSTOM Unit operating at rated engine speed, without any accessory, with external air temperature 30 ° C and inlet / outlet water temperature for user exchanger 15/10 ° C. Binding values. Values obtained from measurements carried out according to ISO 3744. evaporator 15/10 ° C.

Modules Values obtained from the sound power level (conditions: note 5), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values.

Length Data refers to the unit with free-cooling ON

Length chiller module 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.

Length free-coling module Basic CH unit without included accessories

KAPPA REV XEi FC

		30.1	35.1	45.1	55.2	65.2	70.2	80.2	90.2	100.3
Dimensions and weights**										
FC BASIC										
Modules	n°	1	1	1	1	1	2	2	2	2
Length	mm	6162	7312	7457	10750	11905	14198	15343	16553	18847
Length chiller module	mm	-	-	-	-	-	9610	10755	11965	13110
Length free-cooling module	mm	-	-	-	-	-	4588	4588	4588	5737
FC CUSTOM										
Modules	n°	1	1	1	1	1	2	2	2	2
Length	mm	6162	8460	8605	11898	13053	15347	16492	17702	19995
Length chiller module	mm	-	-	-	-	-	9610	10755	11965	13110
Length free-cooling module	mm	-	-	-	-	-	5737	5737	5737	6885
FC CUSTOM										
Modules	n°	1	1	1	1	2	2	2	2	2
Length	mm	7310	9608	9753	13047	14202	16495	18789	19999	22293
Length chiller module	mm	-	-	-	-	8465	9610	10755	11965	13110
Length free-cooling module	mm	-	-	-	-	5737	6885	8034	8034	9183
Depth	mm	2260	2260	2260	2260	2260	2260	2260	2260	2260
Height	mm	2440	2440	2440	2440	2440	2440	2440	2440	2440

KAPPA REV FC (R513A)

			33.2	35.2	37.2	40.2	43.2	51.2	54.2	58.2	67.2
Cooling (A30°C; W10°C; e.g.30%)											
Refrigeration capacity	(1)	kW	356	399	425	468	516	559	641	686	777
Total absorbed power	(1)	kW	110	109	131	151	166	178	203	225	245
EER	(1)		3,32	3,78	3,35	3,2	3,18	3,23	3,28	3,14	3,28
User-side heat exchanger											
Quantity		n°	1	1	1	1	1	1	1	1	1
Water flow rate (A30°C; W10°C; e.g.30%)	(1)	m³/h	68	77	82	90	99	107	123	132	149
FC BASIC (A5°C; W10°C; e.g.30%)											
Free-cooling mudules		n°	1 ½	2	2	2	2	2	2 ½	3	3
Refrigeration capacity only FC	(2)	kW	160	212	221	228	235	242	291	344	356
Absorbed power only FC	(2)	kW	5	7	7	7	7	7	9	11	11
TFT	(3)	°C	-6,2	-2,7	-3,5	-4,7	-6,4	-7,4	-5,8	-4,4	-6,3
Total head losses	(7)	kPa	86	123	139	165	127	170	182	133	158
Total internal volume	(4)	l	145	145	145	140	140	140	280	225	215
FC CUSTOM (A5°C; W10°C; e.g.30%)											
Free-cooling mudules		n°	2	3	3	3	3	3	3	4	4
Refrigeration capacity only FC	(2)	kW	207	274	286	296	305	316	332	396	411
Absorbed power only FC	(2)	kW	7	11	11	11	11	11	11	14	14
TFT	(3)	°C	-1,4	1,2	0,7	-0,1	-1,3	-1,8	-3,1	-1,7	-3,1
Total head losses	(7)	kPa	97	94	106	126	84	116	156	103	121
Total internal volume	(4)	l	145	210	210	200	200	200	200	305	300
FC EXTRA (A5°C; W10°C; e.g.30%)											
Free-cooling mudules		n°	3	4	4	4	4	4	4	5	5
Refrigeration capacity only FC	(2)	kW	274	321	335	347	359	371	391	497	517
Absorbed power only FC	(2)	kW	11	14	14	14	14	14	14	18	18
TFT	(3)	°C	2,4	3	2,6	1,9	1	0,7	-0,2	1,5	0,4
Total head losses	(7)	kPa	74	83	93	111	68	97	129	88	103
Total internal volume	(4)	l	210	290	290	280	280	280	280	305	300
Fans											
Chiller fans		n°	5	6	6	6	6	7	8	9	10
Fans FC BASIC		n°	3	4	4	4	4	4	5	6	6
Fans FC CUSTOM		n°	4	6	6	6	6	6	6	8	8
Fans FC EXTRA		n°	6	8	8	8	8	8	8	10	10
Compressors											
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%	13%	11%	13%	12%	12%	12%	13%
Refrigerant charge (MCHX)		kg	39	44	44	46	43	48	52	63	70
Refrigerant charge (Cu/Al)		kg	54	62	62	64	61	69	76	90	100
Noise levels											
Chiller: Sound power level	(5)	dB(A)	94	95	95	96	96	97	98	98	99
Chiller: Sound power level of LN version	(5)	dB(A)	89	90	90	91	91	92	93	93	94
Chiller: Sound pressure level	(6)	dB(A)	62	63	63	64	64	65	66	66	67
Chiller: Sound pressure level of LN version	(6)	dB(A)	57	58	58	59	59	59	61	60	62
FC BASIC: Sound power level	(5)	dB(A)	76	77	77	77	77	77	78	79	79
FC CUSTOM: Sound power level	(5)	dB(A)	77	79	79	79	79	79	79	80	80
FC EXTRA: Sound power level	(5)	dB(A)	79	80	80	80	80	80	80	81	81
FC BASIC: Sound pressure level	(6)	dB(A)	44	45	45	45	45	45	46	47	47
FC CUSTOM: Sound pressure level	(6)	dB(A)	45	47	47	47	47	47	47	48	48
FC EXTRA: Sound pressure level	(6)	dB(A)	47	48	48	48	48	48	48	49	49

Dimensions and weights**

Length FC BASIC ; CuAl: unit with copper/aluminium tube/fin coils)

Length FC CUSTOM

Length FC EXTRA

Depth The TFT (Total Free-cooling Temperature) is the outside air temperature at which the cooling performance of the water coils is the same as the performance of the chiller section under the condition of A30°C; E.G.30% 15/10°C

Height Volume of water contained in the unit when it is working in free cooling mode. If present, the volume contained in the tank should also be considered.

Unit operating at rated engine speed, without any accessory, with external air temperature 30 ° C and inlet / outlet water temperature for user exchanger 15/10 ° C. Binding values. Values obtained from measurements carried out according to ISO 3744. evaporator 15/10 ° C.

(MCHX: unit with microchannel coils

(1) Outside air temperature 30°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

(2) Outside air temperature 5°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

(3) The TFT (Total Free-cooling Temperature) is the outside air temperature at which the cooling performance of the water coils is the same as the performance of the chiller section under the condition of A30°C; E.G.30% 15/10°C

KAPPA REV FC (R513A)

			67.2	73.2	80.2	85.2	90.2	95.2	100.2	105.2	115.2
Cooling (A30°C; W10°C; e.g.30%)											
Refrigeration capacity	(1)	kW	777	831	878	936	1010	1055	1103	1171	1246
Total absorbed power	(1)	kW	245	257	267	294	329	347	365	380	398
EER	(1)		3,28	3,33	3,38	3,27	3,16	3,14	3,13	3,2	3,22
User-side heat exchanger											
Quantity		n°	1	1	1	1	1	1	1	1	1
Water flow rate (A30°C; W10°C; e.g.30%)	(1)	m³/h	149	160	168	180	194	203	212	225	239
FC BASIC (A5°C; W10°C; e.g.30%)											
Free-cooling mudules		n°	3	4	4	4	4	5	5	6	6
Refrigeration capacity only FC	(2)	kW	356	417	431	439	447	553	568	645	656
Absorbed power only FC	(2)	kW	11	14	14	14	14	18	18	21	21
TFT	(3)	°C	-6,3	-4,1	-4,8	-5,8	-6,9	-3,5	-3,9	-2,5	-3,3
Total head losses	(7)	kPa	158	141	123	135	157	142	161	135	99
Total internal volume	(4)	l	215	300	410	410	400	385	385	430	545
FC CUSTOM (A5°C; W10°C; e.g.30%)											
Free-cooling mudules		n°	4	5	5	5	5	6	6	7	7
Refrigeration capacity only FC	(2)	kW	411	511	528	538	549	629	646	720	733
Absorbed power only FC	(2)	kW	14	18	18	18	18	21	21	25	25
TFT	(3)	°C	-3,1	-0,7	-1,2	-1,9	-2,6	-1,3	-1,6	-0,7	-1,4
Total head losses	(7)	kPa	121	120	99	109	127	124	140	121	84
Total internal volume	(4)	l	300	300	410	410	400	385	385	430	545
FC EXTRA (A5°C; W10°C; e.g.30%)											
Free-cooling mudules		n°	5	6	6	7	7	8	8	9	9
Refrigeration capacity only FC	(2)	kW	517	595	616	687	700	779	801	873	889
Absorbed power only FC	(2)	kW	18	21	21	25	25	28	28	32	32
TFT	(3)	°C	0,4	1,4	1	1,6	1,1	1,7	1,5	1,9	1,3
Total head losses	(7)	kPa	103	108	86	85	100	105	119	106	68
Total internal volume	(4)	l	300	300	410	410	400	385	385	430	545
Fans											
Chiller fans		n°	10	11	12	12	12	13	14	15	16
Fans FC BASIC		n°	6	8	8	8	8	10	10	12	12
Fans FC CUSTOM		n°	8	10	10	10	10	12	12	14	14
Fans FC EXTRA		n°	10	12	12	14	14	16	16	18	18
Compressors											
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)	%	13%	12%	13%	12%	13%	12%	13%	13%	13%
Refrigerant charge (MCHX)		kg	70	75	83	83	87	98	102	115	122
Refrigerant charge (Cu/Al)		kg	100	108	119	119	123	137	144	160	170
Noise levels											
Chiller: Sound power level	(5)	dB(A)	99	100	100	100	100	101	101	102	102
Chiller: Sound power level of LN version	(5)	dB(A)	94	95	95	95	95	96	96	97	97
Chiller: Sound pressure level	(6)	dB(A)	67	67	67	68	68	68	68	69	69
Chiller: Sound pressure level of LN version	(6)	dB(A)	62	63	63	63	62	63	63	64	64
FC BASIC: Sound power level	(5)	dB(A)	79	80	80	80	80	81	81	82	82
FC CUSTOM: Sound power level	(5)	dB(A)	80	81	81	81	81	82	82	82	82
FC EXTRA: Sound power level	(5)	dB(A)	81	82	82	82	82	83	83	84	84
FC BASIC: Sound pressure level	(6)	dB(A)	47	48	48	48	48	49	49	50	50
FC CUSTOM: Sound pressure level	(6)	dB(A)	48	49	49	49	49	50	50	50	50
FC EXTRA: Sound pressure level	(6)	dB(A)	49	50	50	50	50	51	51	52	52

Dimensions and weights**

Length FC BASIC ; CuAl: unit with copper/aluminium tube/fin coils)

Length FC CUSTOM

Length FC EXTRA

Depth The TFT (Total Free-cooling Temperature) is the outside air temperature at which the cooling performance of the water coils is the same as the performance of the chiller section under the condition of A30°C; E.G.30% 15/10°C

Height Volume of water contained in the unit when it is working in free cooling mode. If present, the volume contained in the tank should also be considered.

Unit operating at rated engine speed, without any accessory, with external air temperature 30 ° C and inlet / outlet water temperature for user exchanger 15/10 ° C. Binding values. Values obtained from measurements carried out according to ISO 3744. evaporator 15/10 ° C.

(MCHX: unit with microchannel coils

(1) Outside air temperature 30°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

(2) Outside air temperature 5°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

(3) The TFT (Total Free-cooling Temperature) is the outside air temperature at which the cooling performance of the water coils is the same as the performance of the chiller section under the condition of A30°C; E.G.30% 15/10°C

KAPPA REV FC (R513A)

		33.2	35.2	37.2	40.2	43.2	51.2	54.2	58.2	
Dimensions and weights**										
FC BASIC										
Modules	n°	1	1	1	1	1	1	1	1	
Length	mm	6162	6162	6162	6162	6162	7312	8460	9605	
Length chiller module	mm	-	-	-	-	-	-	-	-	
Length free-cooling module	mm	-	-	-	-	-	-	-	-	
FC CUSTOM										
Modules	n°	1	1	1	1	1	1	1	1	
Length	mm	6162	7310	7310	7310	7310	8460	8460	10753	
Length chiller module	mm	-	-	-	-	-	-	-	-	
Length free-cooling module	mm	-	-	-	-	-	-	-	-	
FC EXTRA										
Modules	n°	1	1	1	1	1	1	1	1	
Length	mm	7310	8458	8458	8458	8458	9608	9608	11902	
Length chiller module	mm	-	-	-	-	-	-	-	-	
Length free-cooling module	mm	-	-	-	-	-	-	-	-	
Depth	mm	2260	2260	2260	2260	2260	2260	2260	2260	
Height	mm	2440	2440	2440	2440	2440	2440	2440	2440	
		67.2	73.2	80.2	85.2	90.2	95.2	100.2	105.2	115.2
Dimensions and weights**										
FC BASIC										
Modules	n°	1	1	1	1	1	2	2	2	
Length	mm	9605	11898	11898	11898	11898	14202	14202	16495	
Length chiller module	mm	-	-	-	-	-	8465	8465	9610	
Length free-cooling module	mm	-	-	-	-	-	5737	5737	6885	
FC CUSTOM										
Modules	n°	1	1	1	1	1	2	2	2	
Length	mm	10753	13047	13047	13047	13047	15350	15350	17644	
Length chiller module	mm	-	-	-	-	-	8465	8465	9610	
Length free-cooling module	mm	-	-	-	-	-	6885	6885	8034	
FC EXTRA										
Modules	n°	1	2	2	2	2	2	2	2	
Length	mm	11902	14195	14195	15344	15344	17648	17648	19940	
Length chiller module	mm	-	7310	7310	7310	7310	8465	8465	9610	
Length free-cooling module	mm	-	6885	6885	8034	8034	9183	9183	10330	
Depth	mm	2260	2260	2260	2260	2260	2260	2260	2260	
Height	mm	2440	2440	2440	2440	2440	2440	2440	2440	

KAPPA REV HE FC (R513A)

			33.2	35.2	37.2	40.2	43.2	51.2	54.2	58.2
Cooling (A30°C; W10°C; e.g.30%)										
Refrigeration capacity	(1)	kW	382	438	461	526	582	591	655	765
Total absorbed power	(1)	kW	106	122	127	146	163	167	185	218
EER	(1)		3,7	3,72	3,73	3,71	3,69	3,62	3,66	3,61
User-side heat exchanger										
Quantity		n°	1	1	1	1	1	1	1	1
Water flow rate (A30°C; W10°C; e.g.30%)	(1)	m³/h	73	84	88	101	112	113	126	147
FC BASIC (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	1 ½	2	2	2	2	2 ½	3	3
Refrigeration capacity only FC	(2)	kW	161	221	228	236	244	287	338	356
Absorbed power only FC	(2)	kW	5	7	7	7	7	9	11	11
TFT	(3)	°C	-7,4	-3,6	-4,1	-6,2	-8	-4,9	-3,6	-5,9
Total head losses	(7)	kPa	95	117	134	159	183	120	127	132
Total internal volume	(4)	l	145	140	140	170	170	305	225	330
FC CUSTOM (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	2	3	3	3	3	3	4	4
Refrigeration capacity only FC	(2)	kW	210	286	296	307	318	327	388	411
Absorbed power only FC	(2)	kW	7	11	11	11	11	11	14	14
TFT	(3)	°C	-2,2	0,7	0,4	-0,9	-2,1	-2,3	-1	-2,8
Total head losses	(7)	kPa	107	80	92	109	125	98	98	95
Total internal volume	(4)	l	145	200	200	230	230	225	305	410
FC EXTRA (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	3	4	4	4	4	4	5	5
Refrigeration capacity only FC	(2)	kW	279	336	347	361	374	385	488	517
Absorbed power only FC	(2)	kW	11	14	14	14	14	14	18	18
TFT	(3)	°C	1,9	2,6	2,4	1,4	0,4	0,3	2	0,7
Total head losses	(7)	kPa	82	67	76	91	104	76	84	77
Total internal volume	(4)	l	210	280	280	315	315	305	305	410
Fans										
Chiller fans		n°	6	7	8	8	8	9	11	12
Fans FC BASIC		n°	3	4	4	4	4	5	6	6
Fans FC CUSTOM		n°	4	6	6	6	6	6	8	8
Fans FC EXTRA		n°	6	8	8	8	8	8	10	10
Compressors										
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(8)	%	12%	12%	13%	12%	13%	12%	12%	12%
Refrigerant charge (MCHX)		kg	46	52	52	56	56	68	77	83
Refrigerant charge (Cu/Al)		kg	64	73	76	80	80	95	110	119
Noise levels										
Chiller: Sound power level	(5)	dB(A)	94	95	95	96	96	97	98	98
Chiller: Sound power level of LN version	(5)	dB(A)	89	90	90	91	91	92	93	93
Chiller: Sound pressure level	(6)	dB(A)	62	62	62	63	63	65	66	66
Chiller: Sound pressure level of LN version	(6)	dB(A)	57	58	58	59	59	59	61	60
FC BASIC: Sound power level	(5)	dB(A)	76	77	77	77	77	78	79	79
FC CUSTOM: Sound power level	(5)	dB(A)	77	79	79	79	79	79	80	80
FC EXTRA: Sound power level	(5)	dB(A)	79	80	80	80	80	80	81	81
FC BASIC: Sound pressure level	(6)	dB(A)	44	45	45	45	45	46	47	47
FC CUSTOM: Sound pressure level	(6)	dB(A)	45	47	47	47	47	47	48	48
FC EXTRA: Sound pressure level	(6)	dB(A)	47	48	48	48	48	48	49	49

Dimensions and weights**

Length FC BASIC ; CuAl: unit with copper/aluminium tube/fin coils)

Length FC CUSTOM

Length FC EXTRA

Depth The TFT (Total Free-cooling Temperature) is the outside air temperature at which the cooling performance of the water coils is the same as the performance of the chiller section under the condition of A30°C; E.G.30% 15/10°C

Height Volume of water contained in the unit when it is working in free cooling mode. If present, the volume contained in the tank should also be considered.

Unit operating at rated engine speed, without any accessory, with external air temperature 30 ° C and inlet / outlet water temperature for user exchanger 15/10 ° C. Binding values. Values obtained from measurements carried out according to ISO 3744. evaporator 15/10 ° C.

(MCHX: unit with microchannel coils

(1) Outside air temperature 30°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

(2) Outside air temperature 5°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

(3) The TFT (Total Free-cooling Temperature) is the outside air temperature at which the cooling performance of the water coils is the same as the performance of the chiller section under the condition of A30°C; E.G.30% 15/10°C

KAPPA REV HE FC (R513A)

			67.2	73.2	80.2	85.2	90.2	95.2	100.2	105.2
Cooling (A30°C; W10°C; e.g.30%)										
Refrigeration capacity	(1)	kW	833	876	921	1003	1079	1142	1209	1291
Total absorbed power	(1)	kW	236	247	261	285	309	329	348	365
EER	(1)		3,61	3,64	3,63	3,65	3,63	3,61	3,62	3,66
User-side heat exchanger										
Quantity		n°	1	1	1	1	1	1	1	1
Water flow rate (A30°C; W10°C; e.g.30%)	(1)	m³/h	160	168	177	193	207	220	233	248
FC BASIC (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	4	4	4	4	5	5	6	6
Refrigeration capacity only FC	(2)	kW	413	427	440	451	558	572	654	665
Absorbed power only FC	(2)	kW	14	14	14	14	18	18	21	21
TFT	(3)	°C	-4,3	-4,7	-5,3	-6,6	-3,6	-4,4	-2,9	-3,7
Total head losses	(7)	kPa	107	123	140	164	154	151	143	108
Total internal volume	(4)	l	410	410	410	400	385	430	430	545
FC CUSTOM (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	5	5	5	5	6	6	7	7
Refrigeration capacity only FC	(2)	kW	506	524	540	555	634	651	731	743
Absorbed power only FC	(2)	kW	18	18	18	18	21	21	25	25
TFT	(3)	°C	-0,8	-1,1	-1,4	-2,4	-1,3	-1,9	-1	-1,6
Total head losses	(7)	kPa	86	100	113	133	134	129	128	92
Total internal volume	(4)	l	410	410	410	400	385	430	430	545
FC EXTRA (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	6	6	7	7	8	8	9	9
Refrigeration capacity only FC	(2)	kW	590	611	689	709	786	807	887	902
Absorbed power only FC	(2)	kW	21	21	25	25	28	28	32	32
TFT	(3)	°C	1,3	1,1	1,9	1,3	1,7	1,1	1,6	1,2
Total head losses	(7)	kPa	75	86	88	104	114	106	112	74
Total internal volume	(4)	l	410	410	410	400	385	430	430	545
Fans										
Chiller fans		n°	12	13	14	15	16	17	18	19
Fans FC BASIC		n°	8	8	8	8	10	10	12	12
Fans FC CUSTOM		n°	10	10	10	10	12	12	14	14
Fans FC EXTRA		n°	12	12	14	14	16	16	18	18
Compressors										
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(8)	%	13%	12%	13%	12%	13%	12%	13%	12%
Refrigerant charge (MCHX)		kg	83	92	92	105	111	128	128	141
Refrigerant charge (Cu/Al)		kg	119	131	134	150	159	179	182	198
Noise levels										
Chiller: Sound power level	(5)	dB(A)	99	100	100	100	100	101	101	102
Chiller: Sound power level of LN version	(5)	dB(A)	94	95	95	95	95	96	96	97
Chiller: Sound pressure level	(6)	dB(A)	67	67	67	67	67	68	68	69
Chiller: Sound pressure level of LN version	(6)	dB(A)	62	62	62	62	62	63	63	64
FC BASIC: Sound power level	(5)	dB(A)	80	80	80	80	81	81	82	82
FC CUSTOM: Sound power level	(5)	dB(A)	81	81	81	81	82	82	82	82
FC EXTRA: Sound power level	(5)	dB(A)	82	82	82	82	83	83	84	84
FC BASIC: Sound pressure level	(6)	dB(A)	48	48	48	48	49	49	50	50
FC CUSTOM: Sound pressure level	(6)	dB(A)	49	49	49	49	50	50	50	50
FC EXTRA: Sound pressure level	(6)	dB(A)	50	50	50	50	51	51	52	52

Dimensions and weights**

Length FC BASIC ; CuAl: unit with copper/aluminium tube/fin coils)

Length FC CUSTOM

Length FC EXTRA

Depth The TFT (Total Free-cooling Temperature) is the outside air temperature at which the cooling performance of the water coils is the same as the performance of the chiller section under the condition of A30°C; E.G.30% 15/10°C

Height Volume of water contained in the unit when it is working in free cooling mode. If present, the volume contained in the tank should also be considered.

Unit operating at rated engine speed, without any accessory, with external air temperature 30 ° C and inlet / outlet water temperature for user exchanger 15/10 ° C. Binding values. Values obtained from measurements carried out according to ISO 3744. evaporator 15/10 ° C.

(MCHX: unit with microchannel coils

(1) Outside air temperature 30°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

(2) Outside air temperature 5°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

(3) The TFT (Total Free-cooling Temperature) is the outside air temperature at which the cooling performance of the water coils is the same as the performance of the chiller section under the condition of A30°C; E.G.30% 15/10°C

KAPPA REV HE FC (R513A)

		33.2	35.2	37.2	40.2	43.2	51.2	54.2	58.2
Dimensions and weights**									
FC BASIC									
Modules	n°	1	1	1	1	1	1	1	1
Length	mm	6162	7312	7312	7312	7312	9605	10750	10750
Length chiller module	mm	-	-	-	-	-	-	-	-
Length free-cooling module	mm	-	-	-	-	-	-	-	-
FC CUSTOM									
Modules	n°	1	1	1	1	1	1	1	1
Length	mm	6162	8460	8460	8460	8460	9605	11898	11898
Length chiller module	mm	-	-	-	-	-	-	-	-
Length free-cooling module	mm	-	-	-	-	-	-	-	-
FC EXTRA									
Modules	n°	1	1	1	1	1	1	1	1
Length	mm	7310	9608	9608	9608	9608	10753	13047	13047
Length chiller module	mm	-	-	-	-	-	-	-	-
Length free-cooling module	mm	-	-	-	-	-	-	-	-
Depth	mm	2260	2260	2260	2260	2260	2260	2260	2260
Height	mm	2440	2440	2440	2440	2440	2440	2440	2440
		67.2	73.2	80.2	85.2	90.2	95.2	100.2	105.2
Dimensions and weights**									
FC BASIC									
Modules	n°	1	1	1	2	2	2	2	2
Length	mm	11898	13053	13053	14198	15347	16492	17640	18850
Length chiller module	mm	-	-	-	9610	9610	10755	10755	11965
Length free-cooling module	mm	-	-	-	4588	5737	5737	6885	6885
FC CUSTOM									
Modules	n°	1	2	2	2	2	2	2	2
Length	mm	13047	14202	14202	15347	16495	17640	18789	19999
Length chiller module	mm	-	8465	8465	9610	9610	10755	10755	11965
Length free-cooling module	mm	-	5737	5737	5737	6885	6885	8034	8034
FC EXTRA									
Modules	n°	2	2	2	2	2	2	2	2
Length	mm	14195	15350	16499	17644	18793	19938	21085	22295
Length chiller module	mm	7310	8465	8465	9610	9610	10755	10755	11965
Length free-cooling module	mm	6885	6885	8034	8034	9183	9183	10330	10330
Depth	mm	2260	2260	2260	2260	2260	2260	2260	2260
Height	mm	2440	2440	2440	2440	2440	2440	2440	2440

KAPPA REV SLN FC (R513A)

			33.2	35.2	37.2	40.2	43.2	51.2	54.2	58.2
Cooling (A30°C; W10°C; e.g.30%)										
Refrigeration capacity	(1)	kW	377	423	451	519	569	587	644	761
Total absorbed power	(1)	kW	108	121	127	146	162	166	183	217
EER	(1)		3,60	3,57	3,64	3,65	3,62	3,63	3,63	3,61
User-side heat exchanger										
Quantity		n°	1	1	1	1	1	1	1	1
Water flow rate (A30°C; W10°C; e.g.30%)	(1)	m³/h	72	81	86	100	109	112	124	146
FC BASIC (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	1 ½	2	2	2	2	2	2 ½	3
Refrigeration capacity only FC	(2)	kW	161	218	225	233	240	247	298	351
Absorbed power only FC	(2)	kW	5	7	7	7	7	7	9	11
TFT	(3)	°C	-7	-3,1	-3,8	-5,9	-7,5	-8,1	-5,8	-5,7
Total head losses	(7)	kPa	99	101	119	156	176	158	151	132
Total internal volume	(4)	l	145	140	140	170	170	160	305	330
FC CUSTOM (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	2	3	3	3	3	3	3	4
Refrigeration capacity only FC	(2)	kW	210	282	292	302	313	322	340	405
Absorbed power only FC	(2)	kW	7	11	11	11	11	11	11	14
TFT	(3)	°C	-1,8	0,9	0,6	-0,8	-1,9	-2,1	-3	-2,6
Total head losses	(7)	kPa	111	67	79	107	120	98	124	95
Total internal volume	(4)	l	145	200	200	230	230	225	225	410
FC EXTRA (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	3	4	4	4	4	4	4	5
Refrigeration capacity only FC	(2)	kW	278	331	342	355	368	379	401	509
Absorbed power only FC	(2)	kW	11	14	14	14	14	14	14	18
TFT	(3)	°C	2,2	2,8	2,6	1,5	0,7	0,5	-0,2	0,9
Total head losses	(7)	kPa	85	55	64	89	100	76	95	77
Total internal volume	(4)	l	210	280	280	315	315	305	305	410
Fans										
Chiller fans		n°	6	7	8	8	8	9	11	12
Fans FC BASIC		n°	3	4	4	4	4	4	5	6
Fans FC CUSTOM		n°	4	6	6	6	6	6	6	8
Fans FC EXTRA		n°	6	8	8	8	8	8	8	10
Compressors										
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(8)	%	12%	12%	12,5%	11%	12,5%	12%	12%	12%
Refrigerant charge (MCHX)		kg	46	52	52	56	56	68	77	83
Refrigerant charge (Cu/Al)		kg	64	73	76	80	80	95	110	119
Noise levels										
Chiller: Sound power lev. SLN vers.	(5)	dB(A)	86	87	87	88	88	89	90	90
Chiller: Sound pressure lev. SLN vers.	(5)	dB(A)	54	55	54	56	56	57	58	58
FC BASIC: Sound power lev.	(5)	dB(A)	76	77	77	77	77	77	78	79
FC CUSTOM: Sound power lev.	(5)	dB(A)	77	79	79	79	79	79	79	80
FC EXTRA: Sound power lev.	(5)	dB(A)	79	80	80	80	80	80	80	81
FC BASIC: Sound pressure lev.	(6)	dB(A)	44	45	45	45	45	45	46	47
FC CUSTOM: Sound pressure lev.	(6)	dB(A)	45	47	47	47	47	47	47	48
FC EXTRA: Sound pressure lev.	(6)	dB(A)	47	48	48	48	48	48	48	49

Dimensions and weights**

Length FC BASIC ; CuAl: unit with copper/aluminium tube/fin coils)

Length FC CUSTOM

Length FC EXTRA

Depth The TFT (Total Free-cooling Temperature) is the outside air temperature at which the cooling performance of the water coils is the same as the performance of the chiller section under the condition of A30°C; E.G.30% 15/10°C

Height Volume of water contained in the unit when it is working in free cooling mode. If present, the volume contained in the tank should also be considered.

Unit operating at rated engine speed, without any accessory, with external air temperature 30 ° C and inlet / outlet water temperature for user exchanger 15/10 ° C. Binding values. Values obtained from measurements carried out according to ISO 3744. evaporator 15/10 ° C.

(MCHX: unit with microchannel coils

(1) Outside air temperature 30°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

(2) Outside air temperature 5°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

(3) The TFT (Total Free-cooling Temperature) is the outside air temperature at which the cooling performance of the water coils is the same as the performance of the chiller section under the condition of A30°C; E.G.30% 15/10°C

KAPPA REV SLN FC (R513A)

			67.2	73.2	80.2	85.2	90.2	95.2	100.2	105.2
Cooling (A30°C; W10°C; e.g.30%)										
Refrigeration capacity	(1)	kW	833	862	908	993	1076	1148	1222	1268
Total absorbed power	(1)	kW	239	247	262	290	311	334	355	368
EER	(1)		3,60	3,59	3,56	3,54	3,59	3,58	3,60	3,56
User-side heat exchanger										
Quantity		n°	1	1	1	1	1	1	1	1
Water flow rate (A30°C; W10°C; e.g.30%)	(1)	m³/h	160	165	174	191	207	221	235	244
FC BASIC (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	3	4	4	4	5	5	6	6
Refrigeration capacity only FC	(2)	kW	360	421	434	445	549	564	644	655
Absorbed power only FC	(2)	kW	11	14	14	14	18	18	21	21
TFT	(3)	°C	-7,2	-4,4	-5	-6,4	-3,4	-4,3	-2,9	-3,3
Total head losses	(7)	kPa	150	120	137	161	153	153	148	105
Total internal volume	(4)	l	330	410	410	400	385	430	430	545
FC CUSTOM (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	4	5	5	5	6	6	7	7
Refrigeration capacity only FC	(2)	kW	415	515	532	546	624	641	720	732
Absorbed power only FC	(2)	kW	14	18	18	18	21	21	25	25
TFT	(3)	°C	-3,7	-0,8	-1,2	-2,2	-1,1	-1,8	-0,9	-1,4
Total head losses	(7)	kPa	108	97	110	130	133	131	132	89
Total internal volume	(4)	l	410	410	410	400	385	430	430	545
FC EXTRA (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	5	6	6	7	8	8	9	9
Refrigeration capacity only FC	(2)	kW	522	600	620	697	773	795	873	888
Absorbed power only FC	(2)	kW	18	21	21	25	28	28	32	32
TFT	(3)	°C	0	1,3	1	1,4	1,8	1,3	1,7	1,3
Total head losses	(7)	kPa	87	84	96	103	113	109	116	72
Total internal volume	(4)	l	410	410	410	400	385	430	430	545
Fans										
Chiller fans		n°	12	13	14	15	16	17	18	19
Fans FC BASIC		n°	6	8	8	8	10	10	12	12
Fans FC CUSTOM		n°	8	10	10	10	12	12	14	14
Fans FC EXTRA		n°	10	12	12	14	16	16	18	18
Compressors										
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(8)	%	13%	12%	13%	12%	13%	12%	13%	12%
Refrigerant charge (MCHX)		kg	83	92	92	105	111	128	128	141
Refrigerant charge (Cu/Al)		kg	119	131	134	150	159	179	182	198
Noise levels										
Chiller: Sound power lev. SLN vers.	(5)	dB(A)	91	92	92	92	92	93	93	94
Chiller: Sound pressure lev. SLN vers.	(5)	dB(A)	59	59	59	59	59	60	60	61
FC BASIC: Sound power lev.	(5)	dB(A)	79	80	80	80	81	81	82	82
FC CUSTOM: Sound power lev.	(5)	dB(A)	80	81	81	81	82	82	82	82
FC EXTRA: Sound power lev.	(5)	dB(A)	81	82	82	82	83	83	84	84
FC BASIC: Sound pressure lev.	(6)	dB(A)	47	48	48	48	49	49	50	50
FC CUSTOM: Sound pressure lev.	(6)	dB(A)	48	49	49	49	50	50	50	50
FC EXTRA: Sound pressure lev.	(6)	dB(A)	49	50	50	50	51	51	52	52

Dimensions and weights**

Length FC BASIC ; CuAl: unit with copper/aluminium tube/fin coils)

Length FC CUSTOM

Length FC EXTRA

Depth The TFT (Total Free-cooling Temperature) is the outside air temperature at which the cooling performance of the water coils is the same as the performance of the chiller section under the condition of A30°C; E.G.30% 15/10°C

Height Volume of water contained in the unit when it is working in free cooling mode. If present, the volume contained in the tank should also be considered.

Unit operating at rated engine speed, without any accessory, with external air temperature 30 ° C and inlet / outlet water temperature for user exchanger 15/10 ° C. Binding values. Values obtained from measurements carried out according to ISO 3744. evaporator 15/10 ° C.

(MCHX: unit with microchannel coils

(1) Outside air temperature 30°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

(2) Outside air temperature 5°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

(3) The TFT (Total Free-cooling Temperature) is the outside air temperature at which the cooling performance of the water coils is the same as the performance of the chiller section under the condition of A30°C; E.G.30% 15/10°C

KAPPA REV SLN FC (R513A)

		33.2	35.2	37.2	40.2	43.2	51.2	54.2	58.2
Dimensions and weights**									
FC BASIC									
Modules	n°	1	1	1	1	1	1	1	1
Length	mm	6162	7312	7312	7312	7312	8457	10750	10750
Length chiller module	mm	-	-	-	-	-	-	-	-
Length free-cooling module	mm	-	-	-	-	-	-	-	-
FC CUSTOM									
Modules	n°	1	1	1	1	1	1	1	1
Length	mm	6162	8460	8460	8460	8460	9605	10750	11898
Length chiller module	mm	-	-	-	-	-	-	-	-
Length free-cooling module	mm	-	-	-	-	-	-	-	-
FC EXTRA									
Modules	n°	1	1	1	1	1	1	1	1
Length	mm	7310	9608	9608	9608	9608	10753	11898	13047
Length chiller module	mm	-	-	-	-	-	-	-	-
Length free-cooling module	mm	-	-	-	-	-	-	-	-
Depth	mm	2260	2260	2260	2260	2260	2260	2260	2260
Height	mm	2440	2440	2440	2440	2440	2440	2440	2440
		67.2	73.2	80.2	85.2	90.2	95.2	100.2	105.2
Dimensions and weights**									
FC BASIC									
Modules	n°	1	1	1	2	2	2	2	2
Length	mm	10750	13053	13053	14198	15347	16492	17640	18850
Length chiller module	mm	-	-	-	9610	9610	10755	10755	11965
Length free-cooling module	mm	-	-	-	4588	5737	5737	6885	6885
FC CUSTOM									
Modules	n°	1	2	2	2	2	2	2	2
Length	mm	11898	14202	14202	15347	16495	17640	18789	19999
Length chiller module	mm	-	8465	8465	9610	9610	10755	10755	11965
Length free-cooling module	mm	-	5737	5737	5737	6885	6885	8034	8034
FC EXTRA									
Modules	n°	1	2	2	2	2	2	2	2
Length	mm	13047	15350	15350	17644	18793	19938	21085	22295
Length chiller module	mm	-	8465	8465	9610	9610	10755	10755	11965
Length free-cooling module	mm	-	6885	6885	8034	9183	9183	10330	10330
Depth	mm	2260	2260	2260	2260	2260	2260	2260	2260
Height	mm	2440	2440	2440	2440	2440	2440	2440	2440

KAPPA REV HEi FC (R513A)

			58.2	67.2	73.2	80.2	85.2	90.2	100.3	105.3
Cooling (A30°C; W10°C; e.g.30%)										
Refrigeration capacity	(1)	kW	643	737	824	875	1000	1056	1125	1185
Total absorbed power	(1)	kW	174	204	230	247	284	301	314	342
EER	(1)		3,80	3,72	3,67	3,65	3,64	3,64	3,69	3,58
User-side heat exchanger										
Quantity		n°	1	1	1	1	1	1	1	1
Water flow rate (A30°C; W10°C; e.g.30%)	(1)	m³/h	123	142	158	168	192	203	216	228
FC BASIC (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	3	3	4	4	5	5	6	6
Refrigeration capacity only FC	(2)	kW	309	360	422	436	546	562	653	670
Absorbed power only FC	(2)	kW	11	11	14	14	18	18	21	21
TFT	(3)	°C	-4,6	-5	-3,8	-4,5	-2,7	-3,3	-1,9	-2,5
Total head losses	(7)	kPa	106	139	122	138	122	135	91	101
Total internal volume	(4)	l	330	320	385	385	435	545	525	525
FC CUSTOM (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	4	4	5	5	6	6	7	7
Refrigeration capacity only FC	(2)	kW	354	415	518	535	620	639	730	749
Absorbed power only FC	(2)	kW	14	14	18	18	21	21	25	25
TFT	(3)	°C	-2,1	-2,2	-0,3	-0,9	-0,5	-1	-0,2	-0,7
Total head losses	(7)	kPa	77	100	99	112	104	115	77	85
Total internal volume	(4)	l	410	400	385	385	435	545	525	525
FC EXTRA (A5°C; W10°C; e.g.30%)										
Free-cooling mudules		n°	5	5	6	6	8	8	9	9
Refrigeration capacity only FC	(2)	kW	443	522	603	625	768	792	886	909
Absorbed power only FC	(2)	kW	18	18	21	21	28	28	32	32
TFT	(3)	°C	1,1	1,2	1,7	1,3	2,2	1,8	2,2	1,9
Total head losses	(7)	kPa	62	82	87	98	86	95	62	69
Total internal volume	(4)	l	410	400	385	385	435	545	525	525
Fans										
Chiller fans		n°	12	13	14	15	16	18	20	21
Fans FC BASIC		n°	6	6	8	8	10	10	12	12
Fans FC CUSTOM		n°	8	8	10	10	12	12	14	14
Fans FC EXTRA		n°	10	10	12	12	16	16	18	18
Compressors										
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	3/3	3/3
Minimum capacity reduction step	(8)	%	12,5%	11%	10%	9%	8%	8%	7%	7%
Refrigerant charge (MCHX)		kg	83	91	102	107	119	132	178	182
Refrigerant charge (Cu/Al)		kg	119	130	144	152	167	186	238	245
Noise levels										
Chiller: Sound power level	(5)	dB(A)	99	100	101	101	101	103	102	103
Chiller: Sound pressure level	(6)	dB(A)	67	67	68	68	68	70	69	69
Chiller: Sound power level of LN version	(5)	dB(A)	95	96	97	97	97	99	98	99
Chiller: Sound pressure level of LN version	(6)	dB(A)	63	63	64	64	64	66	65	65
FC BASIC: Sound power level	(5)	dB(A)	79	79	80	80	81	81	82	82
FC CUSTOM: Sound power level	(5)	dB(A)	80	80	81	81	82	82	82	82
FC EXTRA: Sound power level	(5)	dB(A)	81	81	82	82	83	83	84	84
FC BASIC: Sound pressure level	(6)	dB(A)	47	47	48	48	49	49	50	50
FC CUSTOM: Sound pressure level	(6)	dB(A)	48	48	49	49	50	50	50	50
FC EXTRA: Sound pressure level	(6)	dB(A)	49	49	50	50	51	51	52	52

Dimensions and weights**

Length FC BASIC ; CuAl: unit with copper/aluminium tube/fin coils)

Length FC CUSTOM

Length FC EXTRA

Depth The TFT (Total Free-cooling Temperature) is the outside air temperature at which the cooling performance of the water coils is the same as the performance of the chiller section under the condition of A30°C; E.G.30% 15/10°C

Height Volume of water contained in the unit when it is working in free cooling mode. If present, the volume contained in the tank should also be considered.

Unit operating at rated engine speed, without any accessory, with external air temperature 30 ° C and inlet / outlet water temperature for user exchanger 15/10 ° C. Binding values. Values obtained from measurements carried out according to ISO 3744. evaporator 15/10 ° C.

(MCHX: unit with microchannel coils

(1) Outside air temperature 30°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

(2) Outside air temperature 5°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

(3) The TFT (Total Free-cooling Temperature) is the outside air temperature at which the cooling performance of the water coils is the same as the performance of the chiller section under the condition of A30°C; E.G.30% 15/10°C

KAPPA REV HEi FC (R513A)

		58.2	67.2	73.2	80.2	85.2	90.2	100.3	105.3
Dimensions and weights**									
FC BASIC									
Modules	n°	1	1	1	2	2	2	2	2
Length	mm	10750	11905	13053	14198	15347	16492	18850	19995
Length chiller module	mm	-	-	-	9610	9610	10755	11965	13110
Length free-cooling module	mm	-	-	-	4588	5737	5737	6885	6885
FC CUSTOM									
Modules	n°	1	1	2	2	2	2	2	2
Length	mm	11898	13053	14202	15347	16495	17640	19999	21144
Length chiller module	mm	-	-	8465	9610	9610	10755	11965	13110
Length free-cooling module	mm	-	-	5737	5737	6885	6885	8034	8034
FC EXTRA									
Modules	n°	1	2	2	2	2	2	2	2
Length	mm	13047	14202	15350	16495	18793	19938	22295	23440
Length chiller module	mm	-	8465	8465	9610	9610	10755	11965	13110
Length free-cooling module	mm	-	5737	6885	6885	9183	9183	10330	10330
Depth	mm	2260	2260	2260	2260	2260	2260	2260	2260
Height	mm	2440	2440	2440	2440	2440	2440	2440	2440

KAPPA REV XEi FC (R513A)

			30.1	35.1	45.1	55.2	65.2	70.2	80.2	90.2	100.3
Cooling (A30°C; W10°C; e.g.30%)											
Refrigeration capacity	(1)	kW	319	399	500	635	713	806	884	978	1093
Total absorbed power	(1)	kW	88	114	147	177	202	227	261	297	313
EER	(1)		3,71	3,64	3,46	3,69	3,63	3,64	3,49	3,40	3,54
User-side heat exchanger											
Quantity		n°	1	1	1	1	1	1	1	1	1
Water flow rate (A30°C; W10°C; e.g.30%)	(1)	m³/h	61	77	96	122	137	154	170	188	209
FC BASIC (A5°C; W10°C; e.g.30%)											
Free-cooling modules		n°	1 ½	2	2	3	3	4	4	4	5
Refrigeration capacity only FC	(2)	kW	159	222	241	340	356	421	441	459	579
Absorbed power only FC	(2)	kW	5	7	7	11	11	14	14	14	18
TFT	(3)	°C	-4,3	-2,5	-5,2	-3	-4,7	-3,5	-4,6	-6,1	-3,7
Total head losses	(7)	kPa	80	141	133	105	130	117	143	158	107
Total internal volume	(4)	l	145	140	160	330	320	385	385	435	525
FC CUSTOM (A5°C; W10°C; e.g.30%)											
Free-cooling modules		n°	2	3	3	4	4	5	5	5	6
Refrigeration capacity only FC	(2)	kW	206	287	314	391	411	516	541	564	659
Absorbed power only FC	(2)	kW	7	11	11	14	14	18	18	18	21
TFT	(3)	°C	0	1,4	-0,4	-0,7	-1,8	-0,1	-0,9	-1,9	-1,3
Total head losses	(7)	kPa	91	108	82	75	94	96	117	125	86
Total internal volume	(4)	l	145	200	225	410	400	385	385	435	525
FC EXTRA (A5°C; W10°C; e.g.30%)											
Free-cooling modules		n°	3	4	4	5	5	6	7	7	8
Refrigeration capacity only FC	(2)	kW	272	336	370	491	517	601	690	721	817
Absorbed power only FC	(2)	kW	11	14	14	18	18	21	25	25	28
TFT	(3)	°C	3,3	3,2	1,8	2,3	1,5	1,8	2,3	1,6	1,7
Total head losses	(7)	kPa	69	96	64	61	77	83	92	96	64
Total internal volume	(4)	l	210	280	305	410	400	385	385	435	525
Fans											
Chiller fans		n°	6	8	10	12	14	16	18	20	22
Fans FC BASIC		n°	3	4	4	6	6	8	8	8	10
Fans FC CUSTOM		n°	4	6	6	8	8	10	10	10	12
Fans FC EXTRA		n°	6	8	8	10	10	12	14	14	16
Compressors											
Compressors/Circuits		n°/n°	1/1	1/1	1/1	2/2	2/2	2/2	2/2	2/2	3/3
Minimum capacity reduction step	(8)	%	25%	20%	16%	12,5%	11,2%	10%	8%	8%	5,6%
Refrigerant charge (MCHX)		kg	44	56	68	83	96	111	140	160	187
Refrigerant charge (Cu/Al)		kg	62	80	98	119	138	159	194	220	253
Noise levels											
Chiller: Sound power level	(5)	dB(A)	99	100	101	102	103	103	104	104	105
Chiller: Sound pressure level	(6)	dB(A)	67	68	69	69	70	70	71	71	71
Chiller: Sound power level of LN version	(5)	dB(A)	95	96	97	98	99	99	100	100	101
Chiller: Sound pressure level of LN version	(6)	dB(A)	63	64	65	65	66	66	67	67	67
FC BASIC: Sound power level	(5)	dB(A)	76	77	77	79	79	80	80	80	81
FC CUSTOM: Sound power level	(5)	dB(A)	77	79	79	80	80	81	81	81	82
FC EXTRA: Sound power level	(5)	dB(A)	79	80	80	81	81	82	82	82	83
FC BASIC: Sound pressure level	(6)	dB(A)	44	45	45	47	47	48	48	48	49
FC CUSTOM: Sound pressure level	(6)	dB(A)	45	47	47	48	48	49	49	49	50
FC EXTRA: Sound pressure level	(6)	dB(A)	47	48	48	49	49	50	50	50	51

Dimensions and weights**

Length FC BASIC ; CuAl: unit with copper/aluminium tube/fin coils)

Length FC CUSTOM

Length FC EXTRA

Depth The TFT (Total Free-cooling Temperature) is the outside air temperature at which the cooling performance of the water coils is the same as the performance of the chiller section under the condition of A30°C; E.G.30% 15/10°C

Height Volume of water contained in the unit when it is working in free cooling mode. If present, the volume contained in the tank should also be considered.

Unit operating at rated engine speed, without any accessory, with external air temperature 30 ° C and inlet / outlet water temperature for user exchanger 15/10 ° C. Binding values. Values obtained from measurements carried out according to ISO 3744. evaporator 15/10 ° C.

(MCHX: unit with microchannel coils

(1) Outside air temperature 30°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

(2) Outside air temperature 5°C; evaporator inlet/outlet fluid temperature 15/10°C; glycol at 30%.

(3) The TFT (Total Free-cooling Temperature) is the outside air temperature at which the cooling performance of the water coils is the same as the performance of the chiller section under the condition of A30°C; E.G.30% 15/10°C

KAPPA REV XEi FC (R513A)

		30.1	35.1	45.1	55.2	65.2	70.2	80.2	90.2	100.3
Dimensions and weights**										
FC BASIC										
Modules	n°	1	1	1	1	1	2	2	2	2
Length	mm	6162	7312	7457	10750	11905	14198	15343	16553	18847
Length chiller module	mm	-	-	-	-	-	9610	10755	11965	13110
Length free-cooling module	mm	-	-	-	-	-	4588	4588	4588	5737
FC CUSTOM										
Modules	n°	1	1	1	1	1	2	2	2	2
Length	mm	6162	8460	8605	11898	13053	15347	16492	17702	19995
Length chiller module	mm	-	-	-	-	-	9610	10755	11965	13110
Length free-cooling module	mm	-	-	-	-	-	5737	5737	5737	6885
FC EXTRA										
Modules	n°	1	1	1	1	2	2	2	2	2
Length	mm	7310	9608	9753	13047	14202	16495	18789	19999	22293
Length chiller module	mm	-	-	-	-	8465	9610	10755	11965	13110
Length free-cooling module	mm	-	-	-	-	5737	6885	8034	8034	9183
Depth	mm	2260	2260	2260	2260	2260	2260	2260	2260	2260
Height	mm	2440	2440	2440	2440	2440	2440	2440	2440	2440

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

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

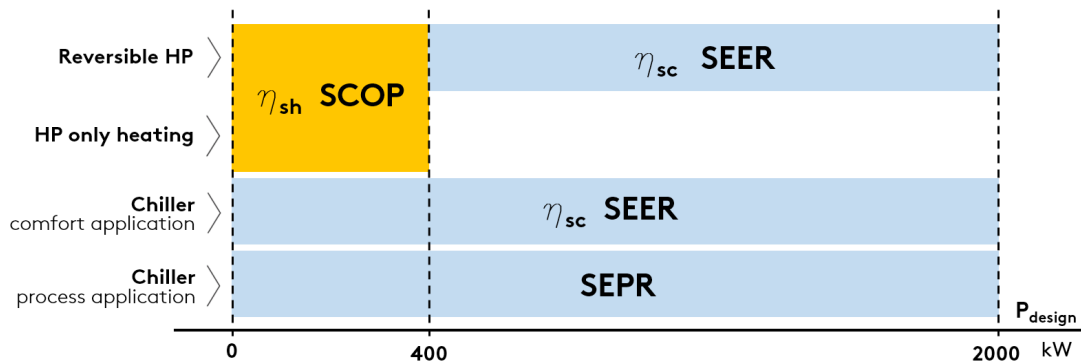
The other two regulations (2013/813 and 2016/2281) set seasonal efficiency targets that the products must comply with to be sold and installed in the European Union (essential requirement for CE marking).

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

- η_{sh} (SCOP), with reference to regulation 2013/813
- η_{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 η_{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 _{design}	η_{sc} [%]	SEER	η_{sc} [%]	SEER
air	< 400kW	149	3,8	161	4,1
air	\geq 400kW	161	4,1	179	4,55
water	< 400kW	196	5,1	200	5,2
water	\geq 400kW and < 1500kW	227	5,875	252	6,5
water	\geq 1500kW	245	6,325	272	7

REGULATION 2016/2281, process application

TYPE OF UNIT		MINIMUM REQUIREMENT	
		Tier 1	Tier 2 (2021)
SOURCE	P _{design}	SEPR	SEPR
air	< 400kW	4,5	5
air	\geq 400kW	5	5,5
water	< 400kW	6,5	7
water	\geq 400kW and < 1500kW	7,5	8
water	\geq 1500kW	8	8,5

REGULATION 2013/813

SOURCE	APPLICATION	MINIMUM REQUIREMENT	
		η_{sh} [%]	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
Chiller	< 18°C	SEER/η _{sc} low temperature application	2016/2281
	≥ 18°C	SEER/η _{sc} medium temperature application	2016/2281
Heat pumps (reversible and only heating) P_{design} ≤ 400kW		SCOP/η _{sh}	2013/813
Reversible heat pumps P_{design} > 400kW	< 18°C	SEER/η _{sc} low temperature application	2016/2281
	≥ 18°C	SEER/η _{sc} medium temperature application	2016/2281
Heat pumps only heating P_{design} > 400kW		-	-

- = exemption from Ecodesign

PROCESS APPLICATION

PRODUCT	OUTLET WATER TEMPERATURE	COMPLIANCE INDEX	REGULATION
Chiller	≥ +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_{sc}) than the configuration with standard fans.

KAPPA REV FC RANGE

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

Kappa Rev FC /HE FC /SLN FC /HEi FC /XEi FC:

- chiller version: 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.

For each size, the possible set-ups (BASIC, CUSTOM, EXTRA) are included for conformity assessments.

KAPPA REV FC

			33.2	35.2	37.2	40.2	43.2	51.2
REGULATION 2016/2281								
Pdesign	(1)	kW	353	387	425	466	526	551
Compliance 12/7								
Compliance	(1)		N	N	N	N	N	N
η_{sc}	(1)	%	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N
Compliance 12/7 unit with EC fans								
Compliance	(1)		Y	Y	Y	N	N	N
η_{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
Compliance 23/18								
Compliance	(2)		Y	Y	Y	Y	Y	Y
η_{sc}	(2)	%	172,4	172,5	165,3	167,4	165,3	166,2
SEER	(2)		4,39	4,39	4,21	4,26	4,21	4,23
Compliance SEPR								
Compliance	(3)		Y	Y	Y	Y	Y	Y
SEPR	(3)		5,18	5,46	5,37	5,13	5,05	5,02
			54.2	58.2	67.2	73.2	80.2	85.2
REGULATION 2016/2281								
Pdesign	(1)	kW	611	696	783	838	899	954
Compliance 12/7								
Compliance	(1)		N	N	N	N	N	N
η_{sc}	(1)	%	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N
Compliance 12/7 unit with EC fans								
Compliance	(1)		N	N	N	N	N	N
η_{sc}	(1)	%	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N
Compliance 23/18								
Compliance	(2)		Y	Y	Y	Y	Y	Y
η_{sc}	(2)	%	166,4	168,3	168,2	167,8	171	168,7
SEER	(2)		4,24	4,28	4,28	4,27	4,35	4,29
Compliance SEPR								
Compliance	(3)		Y	Y	Y	Y	Y	Y
SEPR	(3)		5,03	5,1	5,13	5,1	5	5,13

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 FC

			90.2	95.2	100.2	105.2	115.2
REGULATION 2016/2281							
Pdesign	(1)	kW	1006	1075	1121	1181	1264
Compliance 12/7							
Compliance	(1)		N	N	N	N	N
η_{sc}	(1)	%	-	-	-	-	-
SEER	(1)		-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N
Compliance 12/7 unit with EC fans							
Compliance	(1)		N	N	N	N	N
η_{sc}	(1)	%	-	-	-	-	-
SEER	(1)		-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N
Compliance 23/18							
Compliance	(2)		Y	Y	Y	Y	Y
η_{sc}	(2)	%	169,3	171,4	170,8	165,2	165,9
SEER	(2)		4,31	4,36	4,35	4,21	4,22
Compliance SEPR							
Compliance	(3)		Y	Y	Y	Y	Y
SEPR	(3)		5,07	5,1	5,06	5,02	5,02

			33.2	35.2	37.2	40.2	43.2	51.2
REGULATION 2016/2281								
Pdesign	(1)	kW	376	420	444	505	562	592
Compliance 12/7								
Compliance	(1)		Y	Y	Y	Y	Y	Y
η_{sc}	(1)	%	156,6	159,1	155,7	162,6	162,2	162,2
SEER	(1)		3,99	4,05	3,97	4,14	4,13	4,13
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N
Compliance 12/7 unit with EC fans								
Compliance	(1)		Y	Y	Y	Y	Y	Y
η_{sc}	(1)	%	162,7	167,3	164,4	168,8	167,5	169,5
SEER	(1)		4,14	4,25	4,18	4,29	4,26	4,31
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N
Compliance 23/18								
Compliance	(2)		Y	Y	Y	Y	Y	Y
η_{sc}	(2)	%	172,4	172,5	165,3	167,4	165,3	166,2
SEER	(2)		4,39	4,39	4,21	4,26	4,21	4,23
Compliance SEPR								
Compliance	(3)		Y	Y	Y	Y	Y	Y
SEPR	(3)		5,56	5,52	5,56	5,52	5,44	5,43

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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 FC

			54.2	58.2	67.2	73.2	80.2
REGULATION 2016/2281							
Pdesign	(1)	kW	652	767	835	879	928
Compliance 12/7							
Compliance	(1)		Y	Y	Y	Y	Y
η_{sc}	(1)	%	163,4	161,8	162,6	162,6	162,2
SEER	(1)		4,16	4,12	4,14	4,14	4,13
Compliance Tier 2 (2021)	(1)		N	N	N	N	N
Compliance 12/7 unit with EC fans							
Compliance	(1)		Y	Y	Y	Y	Y
η_{sc}	(1)	%	169,8	168,2	167,7	167,9	167,4
SEER	(1)		4,32	4,28	4,26	4,27	4,25
Compliance Tier 2 (2021)	(1)		N	N	N	N	N
Compliance 23/18							
Compliance	(2)		Y	Y	Y	Y	Y
η_{sc}	(2)	%	166,4	168,3	168,2	167,8	171
SEER	(2)		4,24	4,28	4,28	4,27	4,35
Compliance SEPR							
Compliance	(3)		Y	Y	Y	Y	Y
SEPR	(3)		5,41	5,57	5,57	5,5	5,43
			85.2	90.2	95.2	100.2	105.2
REGULATION 2016/2281							
Pdesign	(1)	kW	1005	1075	1155	1223	1291
Compliance 12/7							
Compliance	(1)		Y	Y	Y	Y	Y
η_{sc}	(1)	%	163,4	162,2	162,2	162,6	163
SEER	(1)		4,16	4,13	4,13	4,14	4,15
Compliance Tier 2 (2021)	(1)		N	N	N	N	N
Compliance 12/7 unit with EC fans							
Compliance	(1)		Y	Y	Y	Y	Y
η_{sc}	(1)	%	169,6	168	168,6	168,7	169,2
SEER	(1)		4,31	4,27	4,29	4,29	4,3
Compliance Tier 2 (2021)	(1)		N	N	N	N	N
Compliance 23/18							
Compliance	(2)		Y	Y	Y	Y	Y
η_{sc}	(2)	%	168,7	169,3	171,4	170,8	165,2
SEER	(2)		4,29	4,31	4,36	4,35	4,21
Compliance SEPR							
Compliance	(3)		Y	Y	Y	Y	Y
SEPR	(3)		5,48	5,47	5,53	5,63	5,56

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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 FC

			33.2	35.2	37.2	40.2	43.2	51.2
REGULATION 2016/2281								
Pdesign	(1)	kW	362	405	431	487	540	570
Compliance 12/7								
Compliance	(1)		Y	Y	Y	Y	Y	Y
η_{sc}	(1)	%	150,5	154	154,5	162,2	161,8	161,8
SEER	(1)		3,84	3,93	3,94	4,13	4,12	4,12
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N
Compliance 12/7 unit with EC fans								
Compliance	(1)		Y	Y	Y	Y	Y	Y
η_{sc}	(1)	%	161,8	166,4	163,5	167,9	166,7	167,8
SEER	(1)		4,12	4,23	4,16	4,27	4,24	4,27
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N
Compliance 23/18								
Compliance	(2)		Y	Y	Y	Y	Y	Y
η_{sc}	(2)	%	-	-	-	-	-	-
SEER	(2)		-	-	-	-	-	-
Compliance SEPR								
Compliance	(3)		Y	Y	Y	Y	Y	Y
SEPR	(3)		5,56	5,52	5,56	5,52	5,44	5,43
			54.2	58.2	67.2	73.2	80.2	100.2
REGULATION 2016/2281								
Pdesign	(1)	kW	631	738	802	845	894	1179
Compliance 12/7								
Compliance	(1)		Y	Y	Y	Y	Y	Y
η_{sc}	(1)	%	163	161,4	162,2	162,2	161,8	161,7
SEER	(1)		4,15	4,11	4,13	4,13	4,12	4,12
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N
Compliance 12/7 unit with EC fans								
Compliance	(1)		Y	Y	Y	Y	Y	Y
η_{sc}	(1)	%	168,9	167,4	166,9	167,1	166,5	167,9
SEER	(1)		4,29	4,26	4,24	4,25	4,23	4,27
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N
Compliance 23/18								
Compliance	(2)		Y	Y	Y	Y	Y	Y
η_{sc}	(2)	%	-	-	-	-	-	-
SEER	(2)		-	-	-	-	-	-
Compliance SEPR								
Compliance	(3)		Y	Y	Y	Y	Y	Y
SEPR	(3)		5,41	5,57	5,57	5,5	5,43	5,63

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

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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 FC

			85.2	90.2	95.2	100.2	105.2
REGULATION 2016/2281							
Pdesign	(1)	kW	968	1038	1113	1179	1246
Compliance 12/7							
Compliance	(1)		Y	Y	Y	Y	Y
η_{sc}	(1)	%	163	161,3	161,3	161,7	162,1
SEER	(1)		4,15	4,11	4,11	4,12	4,13
Compliance Tier 2 (2021)	(1)		N	N	N	N	N
Compliance 12/7 unit with EC fans							
Compliance	(1)		Y	Y	Y	Y	Y
η_{sc}	(1)	%	168,4	167,2	167,7	167,9	168,4
SEER	(1)		4,28	4,25	4,26	4,27	4,28
Compliance Tier 2 (2021)	(1)		N	N	N	N	N
Compliance 23/18							
Compliance	(2)		Y	Y	Y	Y	Y
η_{sc}	(2)	%	-	-	-	-	-
SEER	(2)		-	-	-	-	-
Compliance SEPR							
Compliance	(3)		Y	Y	Y	Y	Y
SEPR	(3)		5,48	5,47	5,53	5,63	5,56

			58.2	67.2	73.2	80.2	
REGULATION 2016/2281							
Pdesign	(1)	kW	643	742	826	889	
Compliance 12/7							
Compliance	(1)		Y	Y	Y	Y	
η_{sc}	(1)	%	181,3	181,6	180,5	179,9	
SEER	(1)		4,61	4,62	4,59	4,57	
Compliance Tier 2 (2021)	(1)		N	N	N	N	
Compliance 12/7 unit with EC fans							
Compliance	(1)		Y	Y	Y	Y	
η_{sc}	(1)	%	188,8	189	187,9	187,3	
SEER	(1)		4,79	4,8	4,77	4,75	
Compliance Tier 2 (2021)	(1)		N	N	N	N	
Compliance 23/18							
Compliance	(2)		Y	Y	Y	Y	
η_{sc}	(2)	%	-	-	-	-	
SEER	(2)		-	-	-	-	
Compliance SEPR							
Compliance	(3)		Y	Y	Y	Y	
SEPR	(3)		5,81	5,82	5,73	5,65	

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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.

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

KAPPA REV HEi FC

			85.2	90.2	100.3	105.3
REGULATION 2016/2281						
Pdesign	(1)	kW	1010	1070	1171	1242
Compliance 12/7						
Compliance	(1)		Y	Y	Y	Y
η_{sc}	(1)	%	181,1	181,9	181,2	180,2
SEER	(1)		4,6	4,62	4,61	4,58
Compliance Tier 2 (2021)	(1)		N	N	N	N
Compliance 12/7 unit with EC fans						
Compliance	(1)		Y	Y	Y	Y
η_{sc}	(1)	%	188,5	189,4	188,6	187,6
SEER	(1)		4,78	4,8	4,79	4,76
Compliance Tier 2 (2021)	(1)		N	N	N	N
Compliance 23/18						
Compliance	(2)		Y	Y	Y	Y
η_{sc}	(2)	%	-	-	-	-
SEER	(2)		-	-	-	-
Compliance SEPR						
Compliance	(3)		Y	Y	Y	Y
SEPR	(3)		5,74	5,59	5,82	5,69

			30.1	35.1	45.1	55.2	65.2
REGULATION 2016/2281							
Pdesign	(1)	kW	322	402	504	640	723
Compliance 12/7							
Compliance	(1)		N	N	N	N	N
η_{sc}	(1)	%	181,9	181,9	182,3	189,5	188
SEER	(1)		4,62	4,62	4,63	4,81	4,78
Compliance Tier 2 (2021)	(1)		N	N	N	N	N
Compliance 12/7 unit with EC fans							
Compliance	(1)		Y	Y	Y	N	N
η_{sc}	(1)	%	193	191,2	191,6	199,1	197,6
SEER	(1)		4,9	4,85	4,86	5,05	5,01
Compliance Tier 2 (2021)	(1)		N	N	N	N	N
Compliance 23/18							
Compliance	(2)		Y	Y	Y	Y	Y
η_{sc}	(2)	%	-	-	-	-	-
SEER	(2)		-	-	-	-	-
Compliance SEPR							
Compliance	(3)		Y	Y	Y	Y	Y
SEPR	(3)		6,12	5,86	5,78	6,19	5,98

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KAPPA REV XEi FC

			70.2	80.2	90.2	100.3
REGULATION 2016/2281						
Pdesign	(1)	kW	817	902	1003	1140
Compliance 12/7						
Compliance	(1)		N	N	N	N
η_{sc}	(1)	%	187,1	187,5	187,5	189,7
SEER	(1)		4,75	4,76	4,76	4,82
Compliance Tier 2 (2021)	(1)		N	N	N	N
Compliance 12/7 unit with EC fans						
Compliance	(1)		N	N	N	N
η_{sc}	(1)	%	196,6	197,1	197,1	199,4
SEER	(1)		4,99	5	5	5,06
Compliance Tier 2 (2021)	(1)		N	N	N	N
Compliance 23/18						
Compliance	(2)		Y	Y	Y	Y
η_{sc}	(2)	%	-	-	-	-
SEER	(2)		-	-	-	-
Compliance SEPR						
Compliance	(3)		Y	Y	Y	Y
SEPR	(3)		5,9	5,85	5,84	5,96

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KAPPA REV FC (R513A)

			33.2	35.2	37.2	40.2	43.2	51.2	54.2	58.2	
REGULATION 2016/2281											
Pdesign	(1)	kW	311	350	372	409	452	488	562	605	
Compliance 12/7											
Compliance	(1)		N	N	N	N	N	N	N	N	
η_{sc}	(1)	%	-	-	-	-	-	-	-	-	
SEER	(1)		-	-	-	-	-	-	-	-	
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N	N	
Compliance 12/7 unit with EC fans											
Compliance	(1)		Y	Y	Y	N	N	N	N	N	
η_{sc}	(1)	%	-	-	-	-	-	-	-	-	
SEER	(1)		-	-	-	-	-	-	-	-	
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N	N	
Compliance 23/18											
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y	Y	
η_{sc}	(2)	%	166	177	172	162	161	165	164	162	
SEER	(2)		4,2	4,5	4,4	4,1	4,1	4,2	4,2	4,1	
Compliance SEPR											
Compliance	(3)		Y	Y	Y	Y	Y	Y	Y	Y	
SEPR	(3)		5,14	5,58	5,14	5,05	5,08	5,04	5,11	5,05	
			67.2	73.2	80.2	85.2	90.2	95.2	100.2	105.2	115.2
REGULATION 2016/2281											
Pdesign	(1)	kW	680	734	773	825	890	935	977	1037	1110
Compliance 12/7											
Compliance	(1)		N	N	N	N	N	N	N	N	N
η_{sc}	(1)	%	-	-	-	-	-	-	-	-	
SEER	(1)		-	-	-	-	-	-	-	-	
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N	N	
Compliance 12/7 unit with EC fans											
Compliance	(1)		N	N	N	N	N	N	N	N	
η_{sc}	(1)	%	-	-	-	-	-	-	-	-	
SEER	(1)		-	-	-	-	-	-	-	-	
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N	N	
Compliance 23/18											
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y	Y	
η_{sc}	(2)	%	161	163	167	168	164	167	166	170	
SEER	(2)		4,1	4,1	4,2	4,3	4,2	4,2	4,2	4,3	
Compliance SEPR											
Compliance	(3)		Y	Y	Y	Y	Y	Y	Y	Y	
SEPR	(3)		5,07	5,03	5,01	5,01	5,05	5,03	5,02	5,08	

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KAPPA REV HE FC (R513A)

			33.2	35.2	37.2	40.2	43.2	51.2	54.2	58.2
REGULATION 2016/2281										
Pdesign	(1)	kW	336	385	405	462	511	522	581	676
Compliance 12/7										
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y	Y
η_{sc}	(1)	%	152	156	161	161	161	162	162	161
SEER	(1)		3,9	4	4,1	4,1	4,1	4,1	4,1	4,1
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N	N
Compliance 12/7 unit with EC fans										
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y	Y
η_{sc}	(1)	%	-	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N	N
Compliance 23/18										
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y	Y
η_{sc}	(2)	%	-	-	-	-	-	-	-	-
SEER	(2)		-	-	-	-	-	-	-	-
Compliance SEPR										
Compliance	(3)		Y	Y	Y	Y	Y	Y	Y	Y
SEPR	(3)		5,4	5,7	5,7	5,6	5,5	5,5	5,5	5,6
			67.2	73.2	80.2	85.2	90.2	95.2	100.2	105.2
REGULATION 2016/2281										
Pdesign	(1)	kW	732	773	815	889	960	1014	1076	1148
Compliance 12/7										
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y	Y
η_{sc}	(1)	%	162	161	161	162	162	161	162	163
SEER	(1)		4,1	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	N
Compliance 12/7 unit with EC fans										
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y	Y
η_{sc}	(1)	%	-	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N	N
Compliance 23/18										
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y	Y
η_{sc}	(2)	%	-	-	-	-	-	-	-	-
SEER	(2)		-	-	-	-	-	-	-	-
Compliance SEPR										
Compliance	(3)		Y	Y	Y	Y	Y	Y	Y	Y
SEPR	(3)		5,6	5,5	5,4	5,5	5,5	5,5	5,5	5,7

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- (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 FC (R513A)

			33.2	35.2	37.2	40.2	43.2	51.2	54.2	58.2
REGULATION 2016/2281										
Pdesign	(1)	kW	329	372	395	456	498	513	566	669
Compliance 12/7										
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y	Y
η_{sc}	(1)	%	165	156	153	161	161	162	162	161
SEER	(1)		3,9	4	3,9	4,1	4,1	4,1	4,1	4,1
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N	N
Compliance 12/7 unit with EC fans										
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y	Y
η_{sc}	(1)	%	-	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N	N
Compliance 23/18										
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y	Y
η_{sc}	(2)	%	-	-	-	-	-	-	-	-
SEER	(2)		-	-	-	-	-	-	-	-
Compliance SEPR										
Compliance	(3)		Y	Y	Y	Y	Y	Y	Y	Y
SEPR	(3)		5,6	5,8	5,6	5,8	5,7	5,7	5,7	5,8
			67.2	73.2	80.2	85.2	90.2	95.2	100.2	105.2
REGULATION 2016/2281										
Pdesign	(1)	kW	732	773	815	889	960	1014	1076	1148
Compliance 12/7										
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y	Y
η_{sc}	(1)	%	162	161	161	162	162	161	162	163
SEER	(1)		4,1	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	N
Compliance 12/7 unit with EC fans										
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y	Y
η_{sc}	(1)	%	-	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N	N
Compliance 23/18										
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y	Y
η_{sc}	(2)	%	-	-	-	-	-	-	-	-
SEER	(2)		-	-	-	-	-	-	-	-
Compliance SEPR										
Compliance	(3)		Y	Y	Y	Y	Y	Y	Y	Y
SEPR	(3)		5,6	5,5	5,4	5,5	5,5	5,5	5,5	5,7

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KAPPA REV HEi FC (R513A)

			58.2	67.2	73.2	80.2	85.2	90.2	100.3	105.3
REGULATION 2016/2281										
Pdesign	(1)	kW	568	654	729	777	879	937	1001	1056
Compliance 12/7										
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y	Y
η_{sc}	(1)	%	180	180	179	179	180	180	180	179
SEER	(1)		4,6	4,6	4,6	4,6	4,6	4,6	4,6	4,6
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N	N
Compliance 12/7 unit with EC fans										
Compliance	(1)		Y	Y	Y	Y	Y	Y	Y	Y
η_{sc}	(1)	%	-	-	-	-	-	-	-	-
SEER	(1)		-	-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N	N
Compliance 23/18										
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y	Y
η_{sc}	(2)	%	-	-	-	-	-	-	-	-
SEER	(2)		-	-	-	-	-	-	-	-
Compliance SEPR										
Compliance	(3)		Y	Y	Y	Y	Y	Y	Y	Y
SEPR	(3)		5,8	5,5	5,7	5,7	5,7	5,6	5,6	5,6

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KAPPA REV XEi FC (R513A)

			30.1	35.1	45.1	55.2	65.2	70.2	80.2	90.2	100.3
REGULATION 2016/2281											
Pdesign	(1)	kW	322	402	504	640	723	817	902	1003	1140
Compliance 12/7											
Compliance	(1)		N	N	N	N	N	N	N	N	N
η_{sc}	(1)	%	182	182	182	190	188	187	188	188	190
SEER	(1)		4,62	4,62	4,63	4,81	4,78	4,75	4,76	4,76	4,82
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N	N	N
Compliance 12/7 unit with EC fans											
Compliance	(1)		Y	Y	Y	N	N	N	N	N	N
η_{sc}	(1)	%	193	191,2	191,6	199,1	197,6	196,6	197,1	197,1	199,4
SEER	(1)		4,9	4,85	4,86	5,05	5,01	4,99	5	5	5,06
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N	N	N
Compliance 23/18											
Compliance	(2)		Y	Y	Y	Y	Y	Y	Y	Y	Y
η_{sc}	(2)	%	-	-	-	-	-	-	-	-	-
SEER	(2)		-	-	-	-	-	-	-	-	-
Compliance SEPR											
Compliance	(3)		Y	Y	Y	Y	Y	Y	Y	Y	Y
SEPR	(3)		-	-	-	-	-	-	-	-	-

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- (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:

Total hardness	2,0 ÷ 6,0 °f
Langelier index	- 0,4 ÷ 0,4
pH	7,5 ÷ 8,5
Electrical conductivity	10÷500 µS/cm
Organic elements	-
Hydrogen carbonate (HCO₃⁻)	70 ÷ 300 ppm
Sulphates (SO₄²⁻)	< 50 ppm
Hydrogen carbonate / Sulphates (HCO₃⁻/SO₄²⁻)	> 1
Chlorides (Cl⁻)	< 50 ppm
Nitrates (NO₃⁻)	< 50 ppm
Hydrogen sulphide (H₂S)	< 0,05 ppm
Ammonia (NH₃)	< 0,05 ppm
Sulphites (SO₃), free chlorine (Cl₂)	< 1 ppm
Carbon dioxide (CO₂)	< 5 ppm
Metal cations	< 0,2 ppm
Manganese ions (Mn⁺⁺)	< 0,2 ppm
Iron ions (Fe²⁺ , Fe³⁺)	< 0,2 ppm
Iron + Manganese	< 0,4 ppm
Phosphates (PO₄³⁻)	< 2 ppm
Oxygen	< 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.

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

The quantity of antifreeze should be considered as % on weight

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.

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.

$$V_{min} = \frac{P_{tot} \cdot 1.000}{N} \cdot \frac{300}{\Delta T \cdot \rho \cdot c_p} + P_{tot} \cdot 0,25$$

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

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

ρ : 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:

$$V_{min} = \frac{P_{tot}}{N} \cdot 17,2 + P_{tot} \cdot 0,25$$

N is equal to the number of compressors installed in the unit.

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.

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 for condensing section
- coils with anti-corrosion treatment for condensing section (option available only for Cu/Al coil)
- Coil treated with anti-corrosion paints for freecooling section

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 units with a microchannel coil for the condensing section to be installed between 1 and 20 km from the coast, the use of the option "E-coated microchannel coils" and the option "Coil treated with anti-corrosion paints" for freecooling section is strongly recommended.
- For units with Cu/Al coils to be installed between 1 and 20 km from the coast, the use of the option "Coil treated with anti-corrosion paints" for both the condensing and the freecooling sections is strongly recommended.
- for distances within one kilometer from the coast it is strongly recommended to use the "Battery treated with anti-corrosion paints" accessory both for the condensing section and for the freecooling section

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.

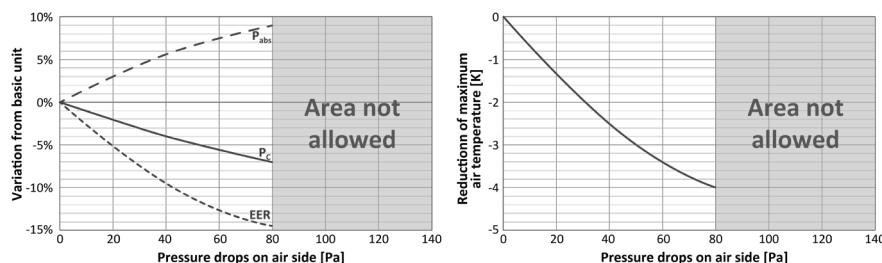
Aeraulic head losses and options available for the ventilating section

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.

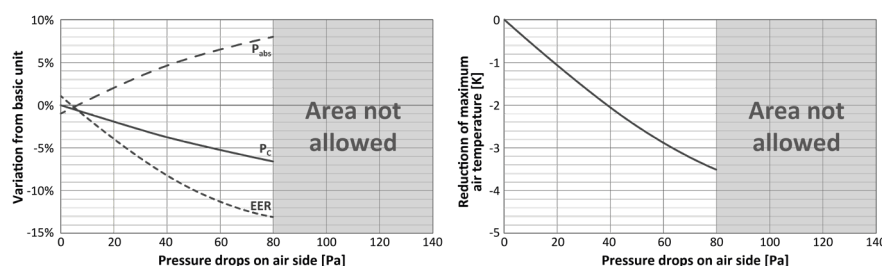
If there are obstacles to free air flow, you should consider the additional aeraulic head losses that will cause a reduction of the air flow rate and a consequent deterioration of performance.

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.

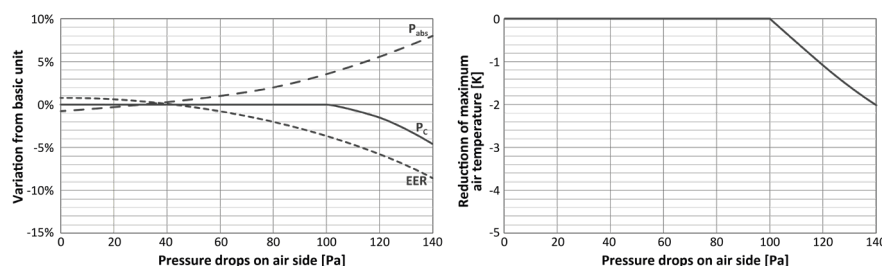
AC fans (Ø 800)



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.

It is emphasized that, as indicated in the diagrams and based on the diameter and type of fan, for aeraulic head losses higher than 60 or 80Pa, only the use of oversize EC fan is allowed.

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