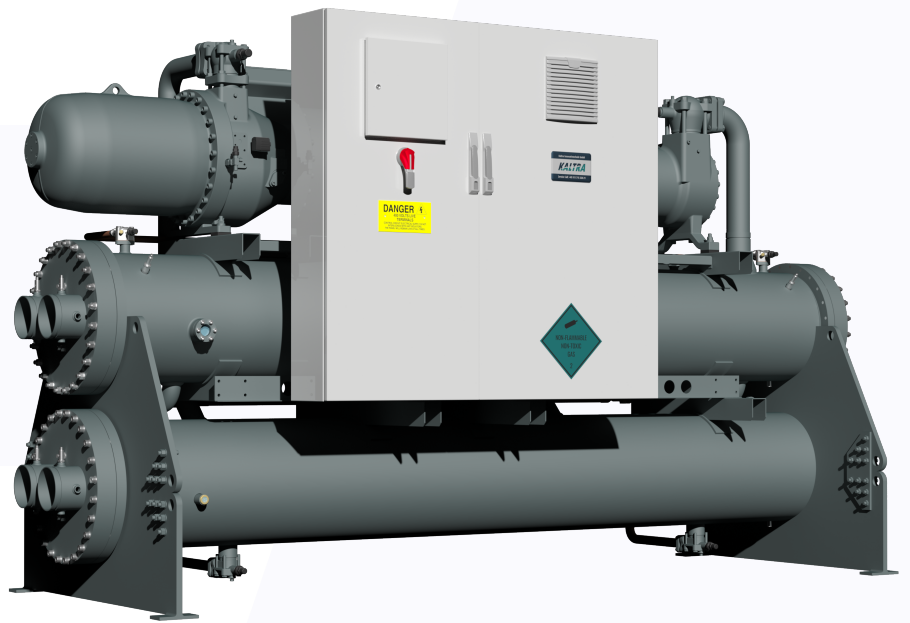


Powerstream Screw

WATER-COOLED CHILLERS WITH SCREW COMPRESSORS



- ▶ PRECISE WATER TEMPERATURE CONTROL
- ▶ INDUSTRY BENCHMARKING COMPRESSORS
- ▶ SEASONAL EFFICIENCY UP TO 7.68
- ▶ LOW OVERALL TCO



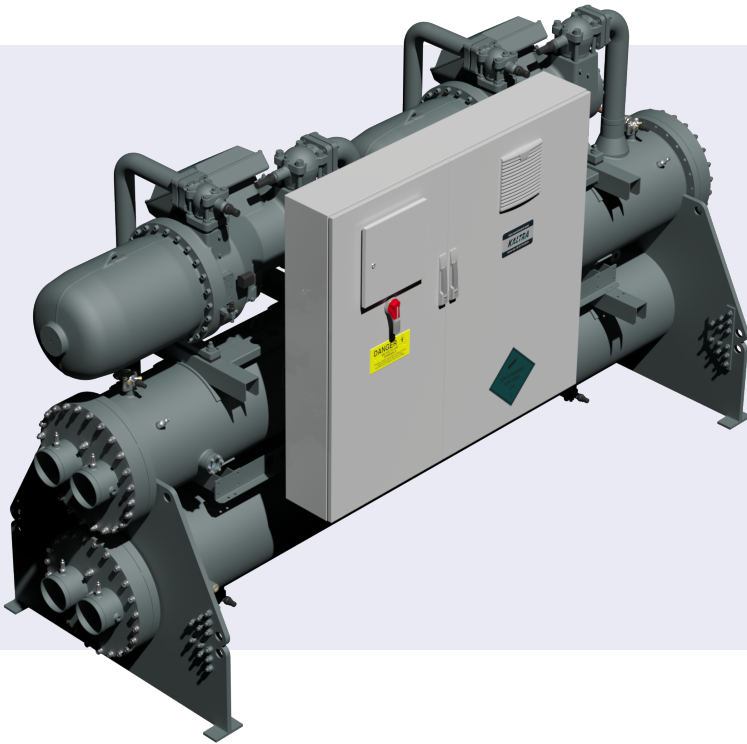
250-1700kW R134a



Reliable and flexible cooling solution

POWERSTREAM SCREW IS A KIND OF SOLUTION IN WHICH WE SYNERGIZED THE MOST RELIABLE COMPRESSOR TECHNOLOGY, LATEST CLOSE APPROACH HEAT EXCHANGERS, HIGH-GRADE REFRIGERATION COMPONENTS, AND STATE-OF-THE-ART CONTROL SOFTWARE TOGETHER.

Whether the facility is an industrial plant, commercial building, or data center, Powerstream Screw water chiller fits your unique needs. Engineered to deliver top performance and combined a set of benefits like sustainable design and low maintenance cost, Powerstream Screw chillers are proven performers with unsurpassed energy efficiency and time-proven reliability.



Powerstream FEATURES & ADVANTAGES

- PRECISE WATER TEMPERATURE CONTROL
- EXCELLENT SEASONAL ENERGY EFFICIENCY
- FEATURE-RICH CONTROL SOFTWARE
- SLIDER CAPACITY CONTROL
- LOW OPERATING COSTS
- PROVEN RELIABILITY

Heat rejection units

High-performance dry coolers

We recommend using Bora or Mistral series dry coolers with Powerstream chillers. These dry coolers are optimized for water-cooled chillers, offer high performance and enable low water temperature difference.

Bora series is well-suited for urban locations due to their low sound emission, as well as for high-polluted areas and coastal installation due to the high corrosion resistance of microchannel heat exchangers used in the unit design. For the installations in hot climate zones, we recommend Bora dry coolers with evaporative pads. Evaporative dry coolers lower temperature of the air entering cooling coils, thus enabling lower condenser water temperatures and providing energy savings on compressors of up to 35%.

Mistral series dry coolers equipped with finned tube heat exchangers with internally grooved copper tubes and are ideal for any kind of industrial and commercial applications.

Both dry cooler series feature low operating costs and superb efficiency.



A Compressors

Screw compressors with capacity control

Powerstream's compact semi-hermetic screw compressors are distinguished by a further improvement in energy efficiency at full and part load conditions. Accordingly, these compressors exceed the international efficiency standard of compact screws with respect to the seasonally weighted energy requirements to an even higher degree than before. This results in particularly high ESEER/IPLV and SCOP values.

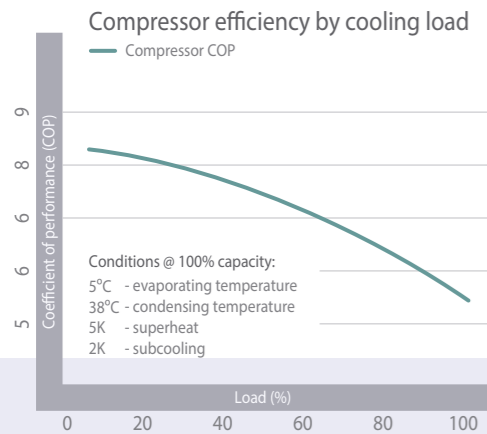
The cooling capacity of the compressor is controlled by a slider which allows an adaptation of the compressor displacement to the power requirement by shifting the start of the compression process through an axial movements of the control slider. The slider, starting from the full load position (100%) can be positioned to nominal 75%, 50%, and 25% cooling capacity.



Future-proof solution

Energy savings and environmental matters have been a significant concern during the past years, today more crucial than ever. In this context, the European Union introduced regulations for energy-related products, whose implementation takes place in several tiers.

EU Regulation 2016/2281 which came into effect on 01.01.2018, defines minimum energy efficiency rates for air conditioning and refrigeration equipment in European Union. Furthermore, more stringent limits will be set in 2021. Kaltra is already prepared for the future ErP (Energy-related products) regulations with its new future-proof chiller lineups, including Powerstream Screw range which exceeds these requirements.



B Controls

Centralized chilled water plant control

The control hub of Powerstream chillers is a sophisticated controller with advanced software developed for efficient operation of water-cooled chillers. It manages and optimizes the chiller's performance, giving the complete control over the system for plant operator.

Control software can be directly linked to the existing building management system. Integration with a BMS allows collecting and analyzing operating data of chilled water plant and helps to maintain optimal equipment settings, saves energy, identifies trouble-prone areas, provides maintenance schedules and generate safety and security alarms. For the efficient operation of multiple units on a single chilled water plant, the sequencing software permits interlinked operation of the complete system, thus providing optimal temperature control and minimal energy consumption.

C Evaporator

Flooded-type evaporator optimized for HFC and HFO fluids

The design of the Powerstream's evaporators provides optimum system efficiency at both full and partial load operation. The tubes in flooded evaporator are fully immersed in liquid refrigerant and enable a smaller approach temperature between the refrigerant temperature in its shell and chilled water temperature in the tubes to be achieved. The refrigerant pool behaves as a flywheel, allowing the controls of the flooded evaporator to track the varying load of a batch process, while optimized tube geometry ensures optimal refrigerant distribution.

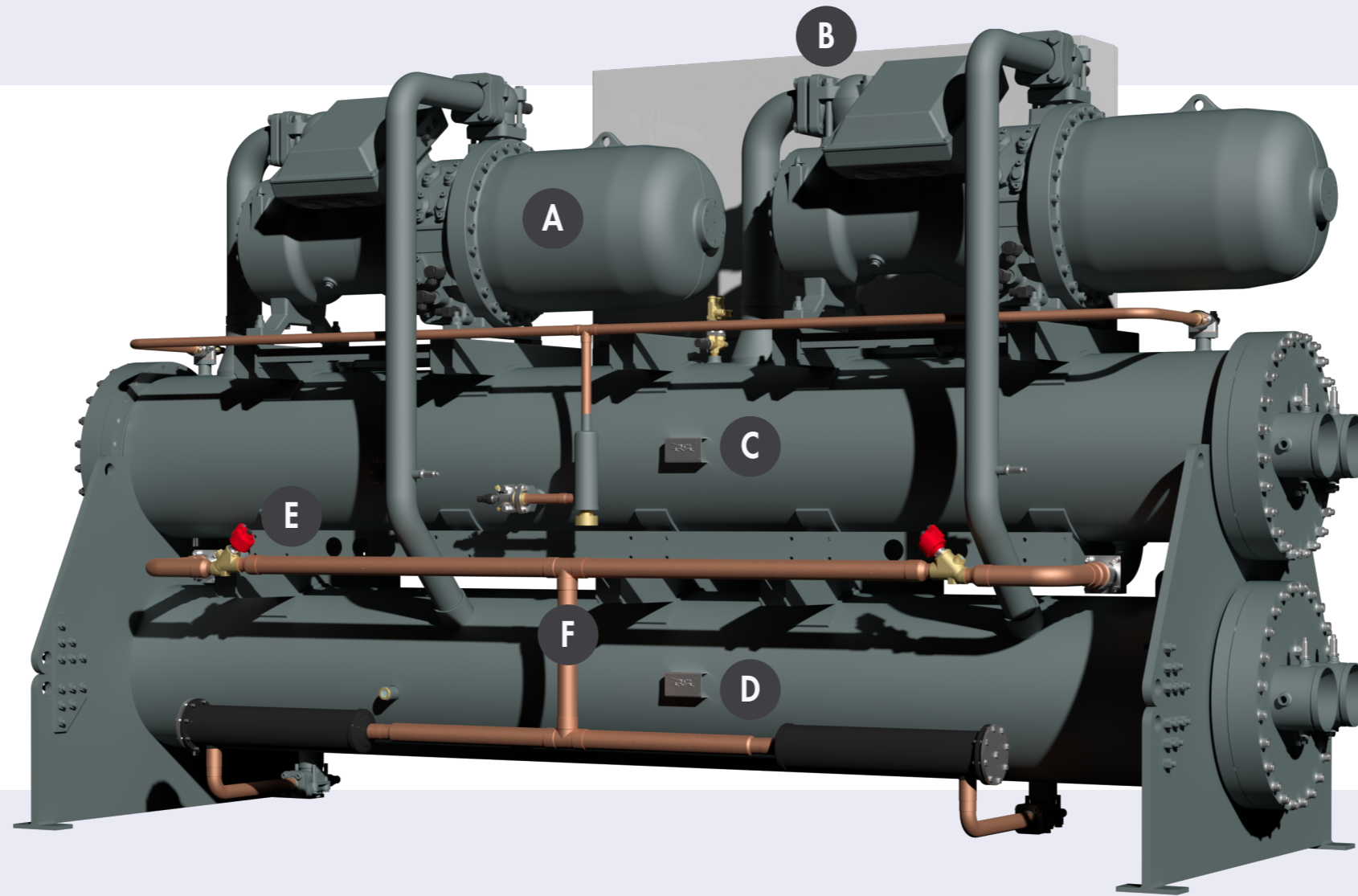
With flooded evaporator, the compressors operate at higher saturated evaporation temperature and generate more cooling capacity with the same power input. Evaporators are optimized to use with HFC-based refrigerants (R134a), low global warming potential HFO fluids, and mixtures of HFC and HFO.



Eco-friendly refrigerants

Recently developed R1234ze refrigerant features low global warming potential and zero ozone depletion potential and fulfills EU regulatory requirements for reducing the use of high global warming potential (GWP) substances. At the same time, R1234ze almost exactly matches the efficiency of R134a. R513a is an azeotropic low-GWP, and non-ozone depleting refrigerant based on hydrofluoro-olefin (HFO), developed to replace R134a. Its energy efficiency and capacity match those for R134a, while its environmental impact significantly reduced.

With low-GWP refrigerants, Powerstream chiller is the environmentally-friendly leader of the range, while achieving the best energy performance levels for applications.



ESEER 7.68

D Condenser

Shell-and-tube water-cooled condenser

Powerstream chillers feature newly developed shell-and-tube water-cooled condensers optimized for R134a refrigerant to provide the best possible efficiency. With high-grade finned tubes, the new design of the internal baffles and shell, these condensers provide lower condensing temperatures and maximum efficiency with a low cost per kW, as well as the shorter length and reduced weight. Optimized water flow also reduces the risks of fouling and erosion of the heat exchanger, while reduced pressure drop enables savings on pump energy. New heat exchangers allow the extended range of condensation temperatures, making the chiller suitable for almost any kind of applications.

E Expansion valves

Energy-saving EEVs

The electronic expansion valve (EEV) reduces the need for high head pressure when running at lower than nominal cooling demands. EEV is controlled by a driver which regulates its opening according to the performance levels required by the system and guarantees the minimal overheating under all operating conditions. Due to superior control characteristics of expansion valves, Powerstream chillers demonstrate the energy savings of up to 25%.

F Refrigeration circuit

Engineered for maximum performance

Powerstream chillers are designed with one refrigeration circuit per compressor to provide reliable cooling, optimum part-load operation, and the overall system redundancy. Each circuit includes its own compressor, electronic expansion valve, high-grade refrigerant filter, pressure-relief valves, and components for monitoring and servicing the machine. Optionally, each refrigerant circuit can be equipped with leak detectors. The product range includes the models that use low-GWP alternatives to R134a: customers may choose from zero ozone depletion potential refrigerants R1234ze and R513a with the GWP values of less than 1 and 573, respectively.

Package, options and accessories

Description			
General			
Anti-vibration rubber-type mounts	<input type="checkbox"/>	Soundproof compressor shells	<input type="checkbox"/>
		Soundproof unit enclosure	<input type="checkbox"/>
Electric and controls			
Automatic circuit breakers on loads	<input type="checkbox"/>	Remote monitoring and management	<input type="checkbox"/>
BMS connectivity	<input checked="" type="checkbox"/>	SNMP connectivity	<input type="checkbox"/>
Energy monitoring	<input type="checkbox"/>	Sequence management system (SMS)	<input type="checkbox"/>
Phase sequence control	<input checked="" type="checkbox"/>	Soft starter	<input type="checkbox"/>
		Touch screen HMI	<input checked="" type="checkbox"/>
		Energy monitoring	<input type="checkbox"/>
		Quick restart w/ UPS	<input type="checkbox"/>
		High water temperature kit	<input type="checkbox"/>
Waterside			
Flow switch	<input type="checkbox"/>	Standard-grade thermal insulation	<input checked="" type="checkbox"/>
2-way modulating valve	<input type="checkbox"/>	High-grade thermal insulation	<input type="checkbox"/>
3-way modulating valve	<input type="checkbox"/>	Temperature sensors	<input checked="" type="checkbox"/>
		Grooved connections	<input checked="" type="checkbox"/>
		Flanged connections	<input type="checkbox"/>
		Flow control	<input type="checkbox"/>
Refrigerant side			
Refrigerant leakage detection	<input type="checkbox"/>	Twin pressure relief valve w/ switch	<input type="checkbox"/>
Electronic expansion valves	<input checked="" type="checkbox"/>	Compressor discharge/suction service valves	<input checked="" type="checkbox"/>
		Condensing pressure control	<input type="checkbox"/>
		Pressure transducers on high/low pressure sides	<input checked="" type="checkbox"/>

Standard feature
 Optional feature

Model identification

Powerstream Screw

F 800 S F 1 / 1 - R134a

Compressors type	F	Compact screw compressors
Nominal capacity		kW
Efficiency grade	S	Standard
	H	High
Evaporator type	F	Flooded shell-and-tube
Compressors		No. of compressors
Refrigerant circuits		No. of refrigerant circuits
Refrigerant type		ASHRAE number

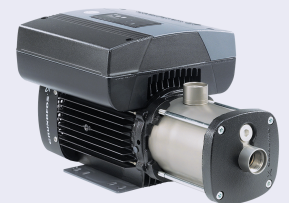
Frame sizes

Frame size ¹		F1	F2	F3	F4	F5	F6
Width	mm	2995	2995	2995	4495	4495	5295
Depth	mm	1195	1195	1195	1295	1295	1325
Height	mm	1875	1995	2195	2195	2295	2395

¹ - data for base units w/o soundproof enclosures

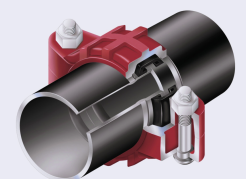
Flow control

Chillers can be configured for constant or variable flow depending on a configuration of chilled water system. For the systems with a primary-only circuit, constant pressure differential or constant temperature differential flow control can be selected, while constant temperature differential control is available for primary/secondary systems. Flow control logic dynamically adjusts the pump speed based on the actual load, thus optimizing pump energy consumption and ensuring the stable operation of the chilled water plant. The control system is able to operate with single chiller or multiple chillers.



Grooved connections

We use grooved end connections because of their rigidity, flexibility, noise and vibration attenuation, and easy of installation and maintenance. The groove is made by cold forming or machining a groove into the end of a pipe. A gasket encompassed by the coupling housing is wrapped around the two grooved pipe ends, and the key sections of the coupling housing engage the grooves. The bolts and nuts are tightened with a socket wrench or impact wrench.



Technical Specifications

Model		F300S	F300H	F400S	F400H	F500S	F500H	F600S	F600H	F800S	F800H
Frame size		F1/1	F1/1	F1/1	F1/1	F1/1	F1/1	F1/1	F1/1	F1/1	F1/1
		F1	F1	F1	F1	F2	F2	F2	F3	F3	F3
Cooling capacity ¹	kW	250	308	340	385	460	525	592	682	743	838
Power input	kW	45.9	56.1	61.2	69.8	82.5	93.1	103.8	122.0	133.1	149.3
Energy efficiency (EER)	kW/kW	5.45	5.49	5.56	5.52	5.58	5.64	5.70	5.59	5.58	5.61
Seasonal efficiency (ESEER)	kW/kW	7.29	6.70	6.97	6.93	6.73	7.32	7.00	7.06	7.06	6.95
Operating weight	kg	1790	2170	2200	2260	2940	3020	3150	3270	3570	3960
Compressors Compact screw compressors											
Quantity		1	1	1	1	1	1	1	1	1	1
Power input	kW	45.9	56.1	61.2	69.8	82.5	93.1	103.8	122.0	133.1	149.3
Max absorbed power	kW	66	81	89	101	122	138	155	175	196	216
Max absorbed current	A	109	130	147	168	197	223	247	286	318	351
Evaporator Flooded shell-and-tube											
Water flow	m ³ /h	43.0	52.7	58.1	66.0	79.2	90.2	101.9	117.3	127.6	144.1
Pressure drop	kPa	48	49	52	52	47	40	50	42	43	43
Water volume	L	32	40	40	50	67	80	90	100	110	120
Condenser Shell-and-tube											
Water flow	m ³ /h	50.8	62.1	68.4	77.8	93.1	105.9	119.4	137.9	150.1	169.3
Pressure drop	kPa	57	56	58	58	54	44	55	60	45	48
Water volume	L	40	40	50	60	73	80	90	90	120	130
Refrigerant circuit R134a											
Quantity		1	1	1	1	1	1	1	1	1	1
Refrigerant charge	kg	86	95	95	86	100	110	115	122	147	183

(1) Water 100%; Chilled water temperatures: 7/12°C; Condenser water temperatures: 30/35°C

Model		F1000S	F1000H	F1200S	F1200H	F1400S	F1400H	F1600S	F1600H	F1800S	F1800H
Frame size		F2/2	F2/2	F2/2	F2/2	F2/2	F2/2	F2/2	F2/2	F2/2	F2/2
		F4	F4	F4	F4	F5	F5	F5	F5	F6	F6
Cooling capacity ¹	kW	916	1062	1140	1218	1305	1382	1450	1522	1614	1693
Power input	kW	164.3	187.1	196.0	214.0	224.8	241.6	252.7	267.8	284.2	292.0
Energy efficiency (EER)	kW/kW	5.58	5.68	5.82	5.69	5.81	5.72	5.74	5.68	5.68	5.80
Seasonal efficiency (ESEER)	kW/kW	7.12	7.44	7.68	7.25	7.55	7.28	7.27	7.13	7.32	7.65
Operating weight	kg	6200	6430	7080	7160	7560	7280	7850	7940	8420	8950
Compressors Compact screw compressors											
Quantity		2	2	2	2	2	2	2	2	2	2
Power input	kW	164.3	187.1	196.0	214.0	224.8	241.6	252.7	267.8	284.2	292.0
Max absorbed power	kW	244	276	293	310	330	350	371	392	412	432
Max absorbed current	A	394	446	470	494	533	572	604	636	669	702
Evaporator Flooded shell-and-tube											
Water flow	m ³ /h	157.7	182.9	196.3	209.6	224.4	238.0	249.6	262.0	277.9	291.4
Pressure drop	kPa	40	52	36	52	40	50	47	51	42	46
Water volume	L	190	220	250	250	280	280	300	300	330	330
Condenser Shell-and-tube											
Water flow	m ³ /h	185.4	214.4	229.4	245.7	262.3	278.8	292.2	307.2	325.8	340.7
Pressure drop	kPa	44	54	32	56	34	53	49	55	53	58
Water volume	L	210	240	300	270	240	300	340	340	450	450
Refrigerant circuit R134a											
Quantity		2	2	2	2	2	2	2	2	2	2
Refrigerant charge	kg	210	248	270	270	280	280	288	297	340	340

(1) Water 100%; Chilled water temperatures: 7/12°C; Condenser water temperatures: 30/35°C



The development of Kaltra products and services is continuous and the information in this document may not be up to date. Please check the current position with Kaltra.

