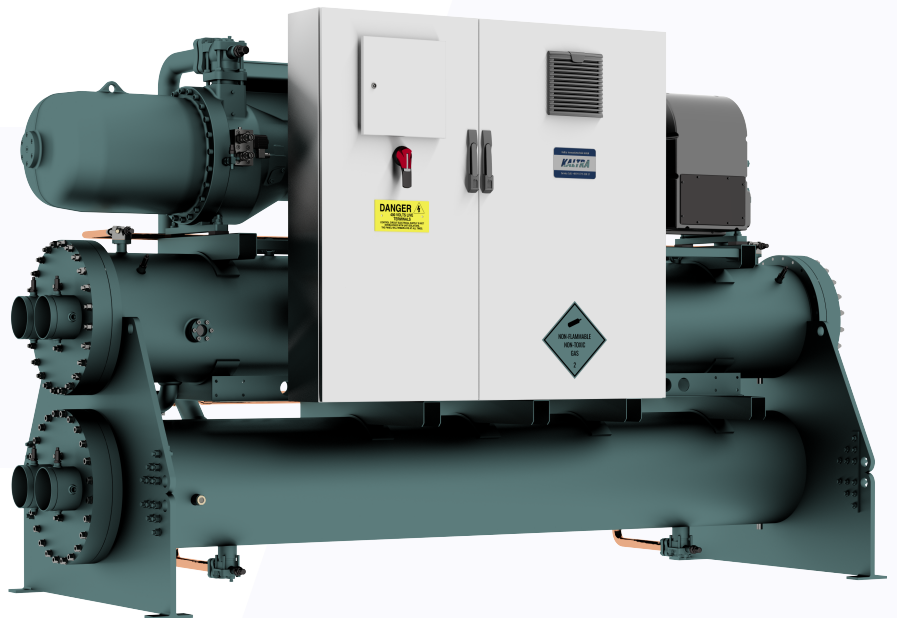


# Powerstream Screw

## INVERTER-DRIVEN WATER-COOLED SCREW CHILLERS



- ▶ PRECISE CAPACITY CONTROL
- ▶ EFFICIENT ON FULL AND PARTIAL LOADS
- ▶ SEASONAL EFFICIENCY UP TO 8.63
- ▶ LOW OVERALL TCO



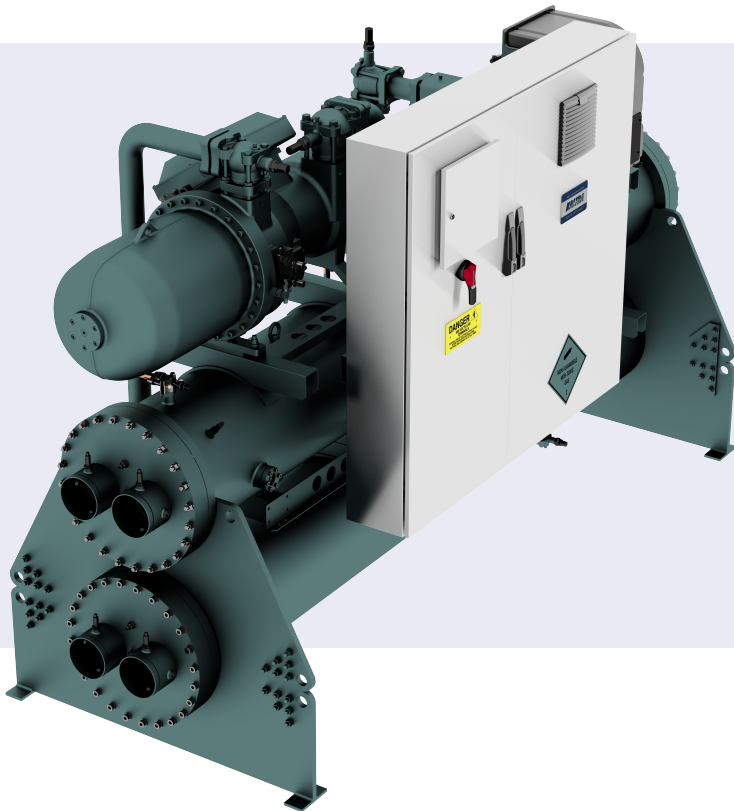
# 500-1800kW R134a



# Full-envelope efficiency

POWERSTREAM SCREW INVERTER IS A SOLUTION BEST MATCHED TO MEET A GROWING DEMAND FOR COOLING, AS WELL AS FOR COOLING PLANTS WITH VARYING LOAD. THESE WATER-COOLED CHILLERS ARE BUILT WITH ADVANCED, CAREFULLY SELECTED COMPONENTS, ENSURING CONTINUOUS TROUBLE-FREE OPERATION.

With inverter-driven and fixed-speed screw compressors piped to a single refrigeration circuit and regulated by the advanced control logic, Powerstream Screw Inverter chiller precisely matches the actual cooling load. Smooth capacity modulation enables substantial energy savings and provides precise thermal control. These chillers are particularly suitable for use in variable-flow applications.



## Powerstream FEATURES & ADVANTAGES

- PRECISE CAPACITY CONTROL
- EXCELLENT FULL AND PART LOAD EFFICIENCY
- FEATURE-RICH CONTROL SOFTWARE
- HIGH SEASONAL ENERGY EFFICIENCY
- LOW OPERATING COSTS
- PROVEN RELIABILITY

## Dry cooler selection

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

# B Controls

## Precise 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.

Each unit of the range equipped with a pair of compressors on a single circuit and starts with the one driven by the inverter-fed motor. As the cooling demand exceeds its capacity, the control system of the chiller starts up a fixed-speed compressor and adjusts the speed of an inverter-driven compressor accordingly to the actual load. When the cooling demand decreases, the control system stops a fixed-speed compressor and regulates the speed of an inverter compressor as required. Additionally, the chillers feature low in-rush current, hence lowering the installation costs.

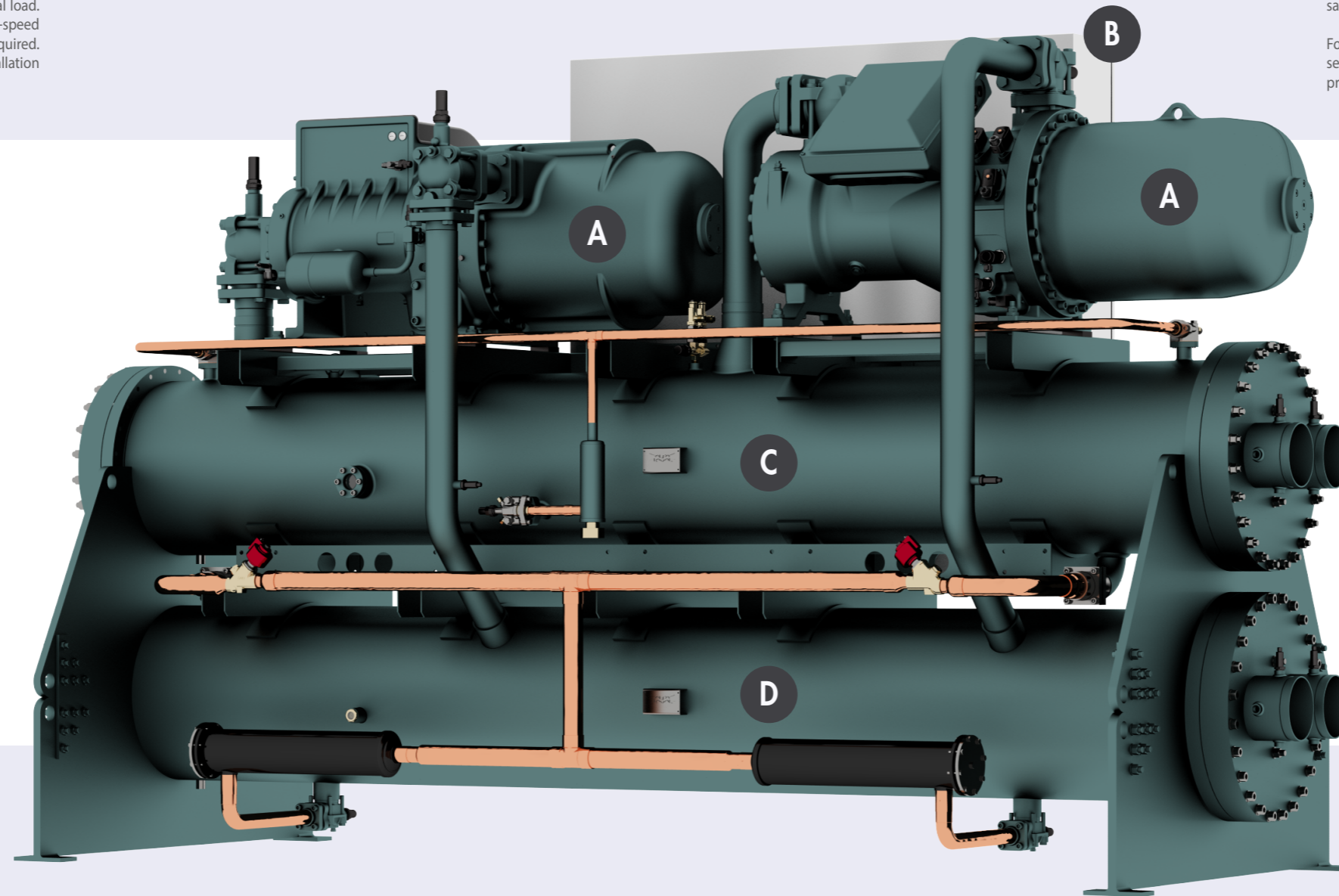
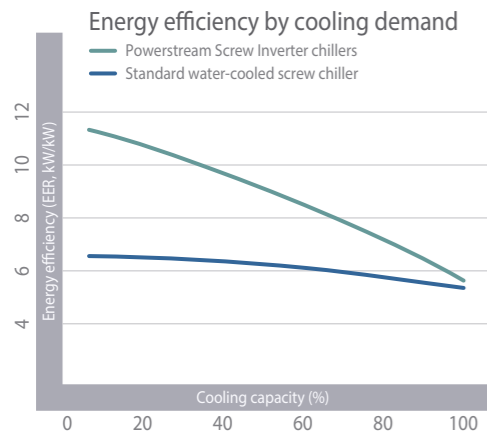


## Centralized chilled water plant control

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.



# ESEER 8.63

# C Evaporator

- ADOPTED FOR PART LOAD CONDITIONS
- ALLOWS HIGH EVAPORATION TEMPERATURES

The shell and tube evaporator used in Powerstream design offers extremely high evaporating temperatures for a given supply water temperature and optimized for R134a refrigerant. The heat transfer rate of the evaporator enhanced with internal refrigerant side tube grooving and optimally positioned baffles.

The tube bundle composed of a series of pre-modeled U-shaped tubes enabling the free expansion of the whole unit independently from the shell. Internal baffles in the water circuit optimize the flow whilst keeping pressure drop to a minimum. Reduced baffle spacing ensures high heat transfer at low flow rates, as well as for brine operation.

# D Condensers

- OPTIMIZED FOR R134A REFRIGERANT
- EASY OF MAINTENANCE

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.

# Powerstream

# Package, options and accessories

Description			
General			
Anti-vibration rubber-type mounts	<input type="checkbox"/>	Anti-vibration springs	<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"/>
Waterside			
Flow switch	<input type="checkbox"/>	Standard thermal insulation	<input checked="" type="checkbox"/>
3-way modulating valve	<input type="checkbox"/>	High-grade thermal insulation	<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"/>	2-pass condenser	<input checked="" type="checkbox"/>
Compressor discharge valves	<input checked="" type="checkbox"/>	4-pass condenser	<input type="checkbox"/>

- Standard feature
- Optional feature



## 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 Inverter range which exceeds these requirements.

On request, Powerstream Screw Inverter chillers are available with low global warming potential (GWP) and zero ozone-depletion potential (ODP) refrigerant R1234ze.

## Model identification

Powerstream Screw Inverter

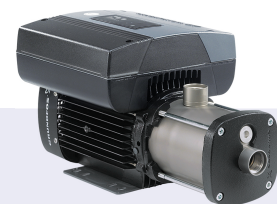
V 800 S F 2 / 1 - R134a

Compressors type	V	Variable-speed compact screw
Nominal capacity	800	kW
Efficiency grade	S	Standard
	H	High
Evaporator type	F	Flooded shell-and-tube
Compressors	2	No. of compressors
Refrigerant circuits	1	No. of refrigerant circuits
Refrigerant type	R134a	ASHRAE number

## Frame sizes

Frame size <sup>1</sup>	Length mm	Width mm	Height mm
F1	2950	1375	1795
F2	3350	1475	1995
F3	4550	1475	2295
F4	4750	1475	2495

<sup>1</sup> - data for base units w/o soundproof enclosures

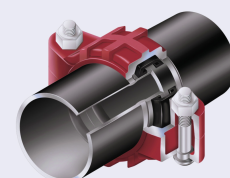


## Flow control

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		V500S	V500H	V600S	V600H	V700S	V700H	V800S	V800H	V900S	V900H
Frame size		F2/1	F2/1	F2/1	F2/1	F2/1	F2/1	F2/1	F2/1	F2/1	F2/1
		F1	F1	F2	F2	F2	F2	F2	F2	F3	F3
Cooling capacity <sup>1</sup>	kW	489	533	610	665	662	722	752	820	917	1000
Power input	kW	87.6	97.9	107.0	119.6	116.2	130.0	132.3	148.3	161.4	181.8
Energy efficiency (EER)	kW/kW	5.58	5.44	5.70	5.56	5.70	5.55	5.68	5.53	5.68	5.50
Seasonal efficiency (ESEER)	kW/kW	8.52	8.53	8.57	8.59	8.47	8.43	8.62	8.57	8.63	8.59
Operating weight	kg	3340	3350	4190	4280	4280	4410	4680	4830	6420	6630
Compressors Compact screw (variable-speed + fixed-speed)											
Quantity		2	2	2	2	2	2	2	2	2	2
Power input	kW	87.6	97.9	107.0	119.6	116.2	130.0	132.3	148.3	161.4	181.8
Max absorbed power	kW	134	134	163	163	180	180	204	204	246	246
Max absorbed current	A	218	218	269	269	298	298	335	335	400	400
Evaporator Flooded shell-and-tube											
Water flow	m <sup>3</sup> /h	84.0	91.6	105.0	114.5	113.8	124.1	129.5	141.1	157.8	172.0
Pressure drop	kPa	31	36	35	41	34	40	33	39	37	44
Water volume	L	105	105	115	115	125	125	145	145	235	235
Condenser Shell-and-tube											
Water flow	m <sup>3</sup> /h	98.8	108.1	123.0	134.6	133.4	146.0	151.8	166.1	185.1	202.6
Pressure drop	kPa	37	45	35	42	42	50	42	50	39	46
Water volume	L	115	115	150	150	150	150	170	170	260	260
Refrigerant circuit R134a											
Quantity		1	1	1	1	1	1	1	1	1	1
Refrigerant charge	kg	136	118	170	160	188	164	212	177	264	258

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

Model		V1000S	V1000H	V1200S	V1200H	V1400S	V1400H	V1600S	V1600H	V1800S	V1800H
Frame size		F2/1	F2/1	F2/1	F2/1	F2/1	F2/1	F2/1	F2/1	F2/1	F2/1
		F3	F3	F3	F3	F4	F4	F4	F4	F4	F4
Cooling capacity <sup>1</sup>	kW	1049	1144	1190	1296	1352	1473	1486	1608	1637	1786
Power input	kW	183.7	207.3	206.3	233.0	233.2	264.5	260.2	291.7	289.0	330.0
Energy efficiency (EER)	kW/kW	5.71	5.52	5.77	5.56	5.80	5.57	5.71	5.51	5.66	5.41
Seasonal efficiency (ESEER)	kW/kW	8.55	8.49	8.56	8.54	8.60	8.57	8.44	8.40	8.40	8.35
Operating weight	kg	7260	7470	7960	8220	8490	8800	8580	8930	8970	9340
Compressors Compact screw (variable-speed + fixed-speed)											
Quantity		2	2	2	2	2	2	2	2	2	2
Power input	kW	183.7	207.3	206.3	233.0	233.2	264.5	260.2	291.7	289.0	330.0
Max absorbed power	kW	279	279	313	313	354	354	395	395	436	436
Max absorbed current	A	449	449	503	503	576	576	641	641	700	700
Evaporator Flooded shell-and-tube											
Water flow	m <sup>3</sup> /h	180.5	196.8	204.8	223.1	232.7	253.5	255.8	276.7	281.9	307.2
Pressure drop	kPa	38	45	32	38	31	37	37	44	45	54
Water volume	L	260	260	330	330	370	370	370	370	370	370
Condenser Shell-and-tube											
Water flow	m <sup>3</sup> /h	211.6	231.7	239.6	262.4	272.1	298.1	299.8	325.9	330.7	362.7
Pressure drop	kPa	30	36	33	40	30	36	36	43	30	36
Water volume	L	335	335	360	360	430	430	430	430	545	545
Refrigerant circuit R134a											
Quantity		1	1	1	1	1	1	1	1	1	1
Refrigerant charge	kg	289	295	328	315	372	323	410	338	450	338

(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.

