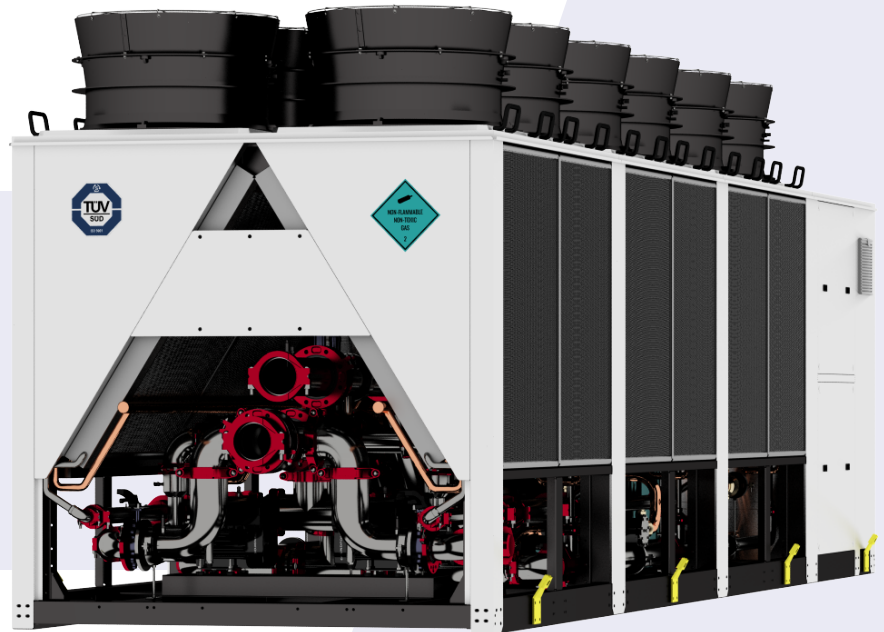


Lightstream Freecool

FREE COOLING CHILLERS WITH INVERTER COMPRESSORS



- ▶ SUPERIOR ENERGY EFFICIENCY
- ▶ CAPACITY ON DEMAND
- ▶ HI-END FREE COOLING SYSTEM
- ▶ R1234ZE, R513A AND R134A



450-1200kW

TOTAL 36 MODELS IN 4 FRAME SIZES AVAILABLE, WITH A WIDE SELECTION OF OPTIONS AND ACCESSORIES



Superior energy efficiency

LIGHTSTREAM FREECOOL IS A FAMILY OF FREE COOLING CHILLERS EQUIPPED WITH FREQUENCY-CONTROLLED SCREW COMPRESSORS AND ADOPTED MICROCHANNEL TECHNOLOGY FOR FREE COOLING AND CONDENSING COILS, WHICH OFFER OUTSTANDING ENERGY EFFICIENCY WITH EER VALUES OF UP TO 4.10*

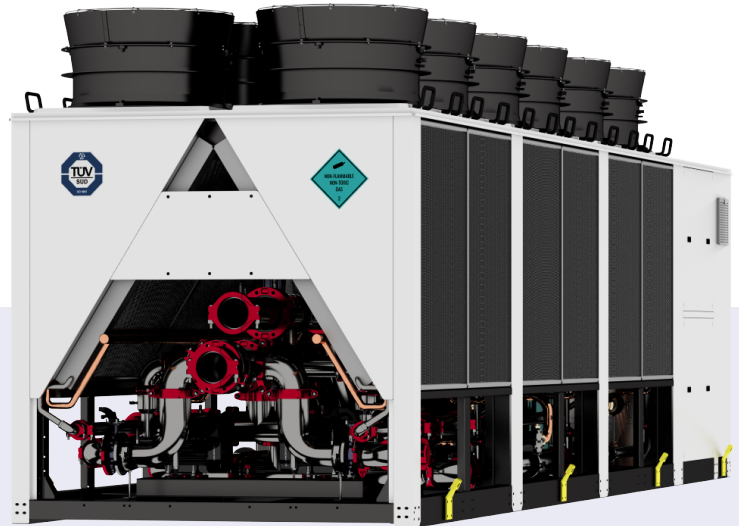
* referring to R1234ze unit with 18/13°C water temperatures

Advantages and benefits:

- ▶ EFFICIENT AT FULL AND PART LOADS
- ▶ PRECISE CAPACITY CONTROL
- ▶ EXCEEDS ERP 2021 REQUIREMENTS
- ▶ MAXIMUM FREE COOLING HOURS
- ▶ ECO-FRIENDLY REFRIGERANTS

Lightstream Freecool synthesizes Kaltra's experience and knowledge in screw compressor technology into high performing solution that fits ideally to the requirements of almost any application, from air conditioning to industrial cooling and beyond.

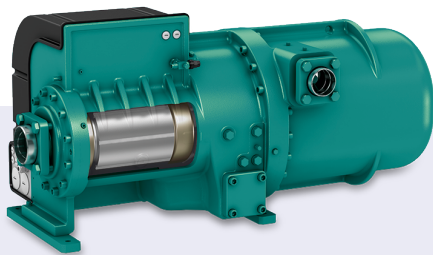
EER UP TO
4.10



High part load efficiency

Chillers are usually selected based on their efficiency when providing 100 percent of their cooling capability, but most rarely operate at this condition. In most facilities, efficient operation under average conditions (across the spectrum of the load from 20 to 80 percent) is more important than chiller operation under extreme but rare weather conditions.

Lightstream Freecool chillers with inverter-driven compressors provide the opportunity to dramatically improve part load efficiency and give the facility operator substantial energy savings.



Exact capacity match

Frequency-controlled screw compressors

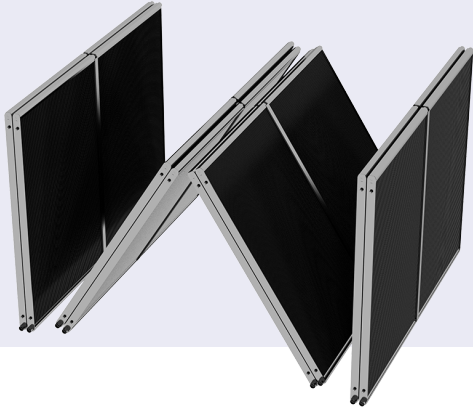
The compact frequency-controlled screw compressors of Lightstream Freecool series chillers are especially suitable for systems that frequently operated under part-load.

These compressors also achieve impressively high full-load efficiency and significantly improved ESEER and SCOP values. Advanced oil management system enhances the oil circulation, thus delivering a remarkable increase in the compressor efficiency at partial loads.

The compressors monitor its own application limits and communicate via Modbus with the master system controls. The integrated data log can be used at any time to analyze operation over the running time and optimize the system settings.

Microchannel heat transfer technology

Higher free cooling performance. Reduced condensing temperatures. Extended lifespan.



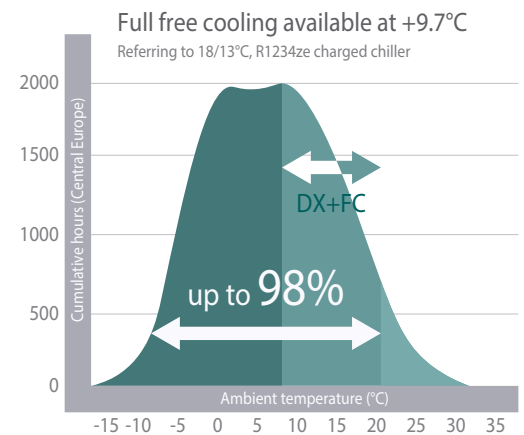
Microchannel technology adopted in Lighstream Freecool design for both condenser and free cooling coils gives a number of advantages, including higher heat transfer rate, low airside pressure drops, and closer approach temperatures. The end result is up to 40% higher energy efficiency in comparison to finned tube coil design.

The chillers characterized by noticeably reduced refrigerant charge as microchannel coils have reduced internal volume, and this translates to lower initial and maintenance costs. High heat transfer ratios lead to considerable lower condensing temperatures, which in turn enables the savings on compressor energy.

For installations in aggressive or highly-polluted environments, as well as for seashore installations, we recommend e-coated coils with high corrosion resistance to ensure long service life.

Higher microchannel condenser performance results in a reduced condensing temperature, which in turn reduces compressor power consumption and increases the overall chiller efficiency, while allowable operating envelope of the compressors gets widened to a higher ambient temperature.

Superior performance of the microchannel free cooling coil translates to higher free cooling capacity and increased free cooling hours, thus increasing the overall system efficiency. In the same time, the microchannel free cooling coils do not impact the fan power consumption due to the low airside pressure drop.



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.

Intelligent fan system

High performing and quiet EC-type fans



EC motors use commutation electronics to sense the rotor position and adjust supply current, thus eliminating the need for mechanical brushes to deliver current to the motor windings. Elimination of physical contact reduces internal wear within the fan motor and significantly increases reliability.

Our new generation fan system not only reduces power consumption by up to 30% while efficiently managing the extraordinarily high volume flows – it also works at much reduced operating noise.

The smart fan system includes the unique fan impellers with bionic wing concept, the most advanced EC motor technology, and multifunctional air diffusers, resulting in an extra economic efficiency for the customers.

EC motor technology does not provide savings only during full-load operation - it is exactly when operating under partial load that EC motors lose much less of their efficiency compared to AC fans.

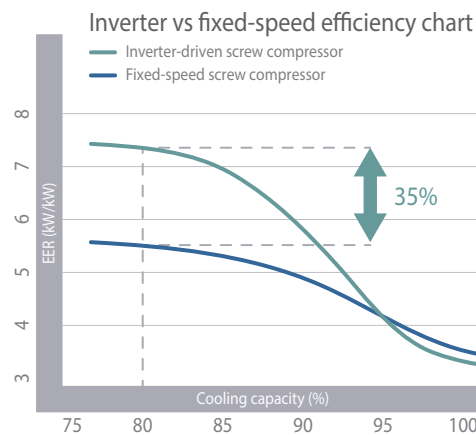
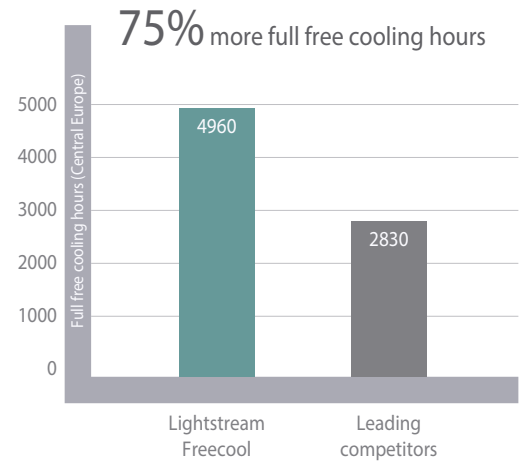
Versatile and powerful solution

Application range

Lightstream Freecool has been designed for continuous, year-round operation with attention to every detail to maximize its efficiency and reliability and fits ideally to the requirements of mission-critical applications, industrial process cooling, commercial applications, data center cooling, and in every area where efficiency and reliability are the key factors.

Due to its excellent efficiency at part-load conditions, Lightstream Freecool is a brilliant economy solution for applications where the heat load is not constant or expected to grow.

Lightstream Freecool chillers are intended for all-year operation in any environmental condition, be it cold or hot climate zone, highly populated urban areas, or seashore installation, or installation in high-polluted industrial sites. The vast number of optional components and accessories provides the application flexibility and enables tailored solutions for both single-unit facilities and large-capacity chilled water plants.



RoboClean™ – automatic coil cleaning system

Lightstream Freecool chillers are equipped with RoboClean™ – an automatic coil cleaning system which determines the need for cleaning by reading from air differential pressure transmitters and initiates coil cleaning procedure when the pressure difference rises above a set point. Cleaning is performed by spraying water onto the coils by rotating nozzles.

Automatic heat exchanger cleaning technique allow for maintenance to be performed without shutting down the chiller and disassembly, thus reducing the system downtime incurred by manual cleaning method.

Economizer

By using economizers in Lightstream Freecool range (available as an option), the COP (coefficient of performance) of the compressor increases by 10 to 20% depending on working conditions and refrigerant used, thus resulting in lower energy consumption of the compressor. At the same time, the evaporator receives a larger percentage of refrigerant liquid, which gives an increased cooling capacity in both full and part load operation.

Eco-friendly refrigerants

Low-GWP refrigerant option

The portfolio of Lightstream Freecool chillers includes the models that use low-GWP alternatives to R134a. The customers may choose from zero ozone depletion potential refrigerants R1234ze and R513a with the GWP values of less than 1 and 573, respectively.

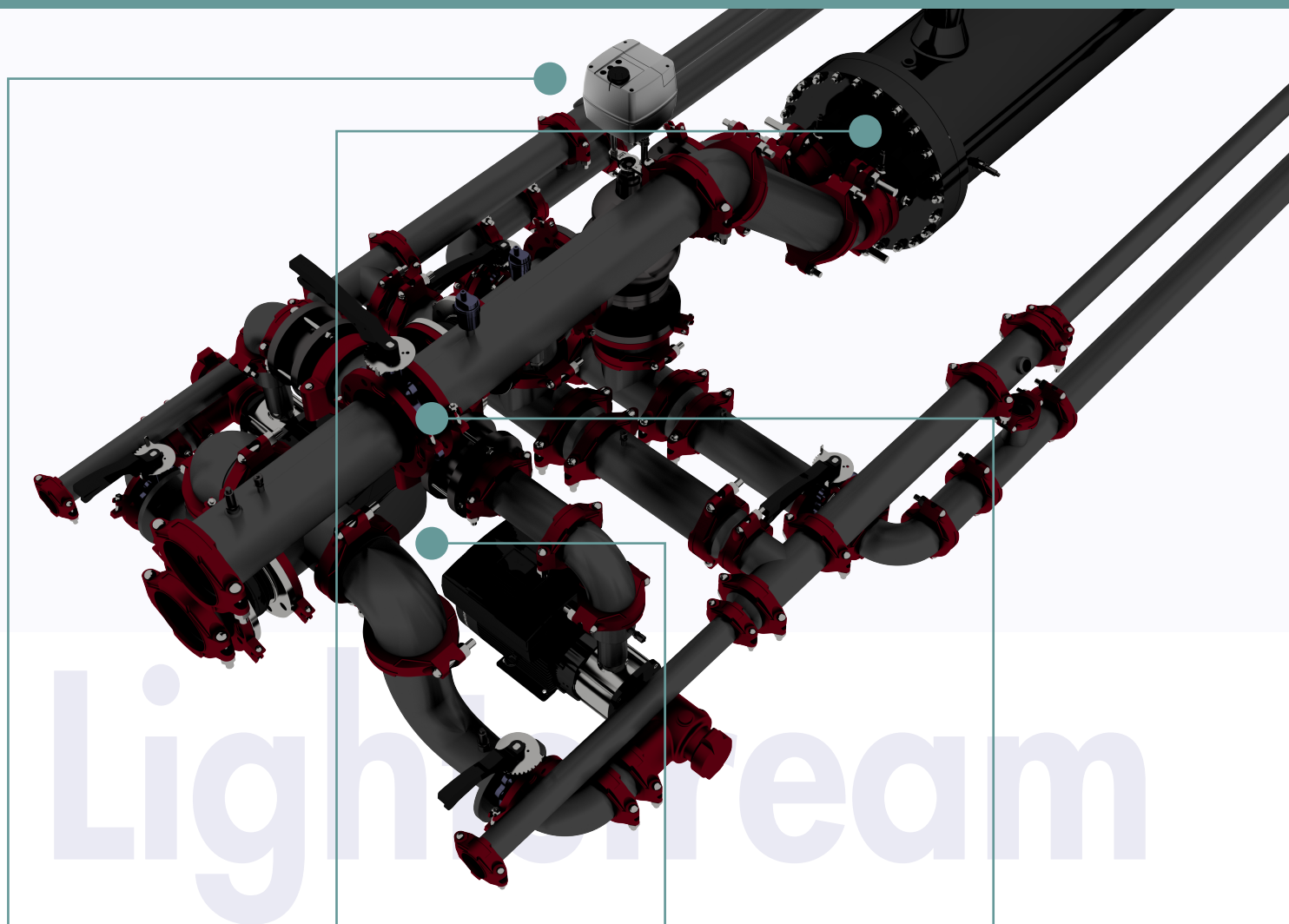
Recently developed R1234ze refrigerant features low global warming potential and zero ozone depletion potential and fulfills EU regulatory requirements for reducing the use of high global warming potential (GWP) substances. At the same time, R1234ze almost exactly matches the efficiency of R134a. R513a 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, Lightstream Freecool chiller is the environmentally-friendly leader of the range, while achieving the best energy performance levels for applications.



Waterside system

Lightstream Freecool chiller equipped with premium quality, high-performance waterside components, enabling it to cover every application scenario



MOTORIZED 3-WAY MIXING VALVE

Actuated 3-way mixing valve controls the supply water temperature at the reduced fan speed conditions. 2-way regulating valves are available as an option.



FLOODED EVAPORATOR

The flooded evaporator provides optimum system efficiency at both full and partial load operation. The tubes in flooded evaporator are 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. As a result, the compressors operate at higher evaporation temperature and generate more cooling with the same power input.



INVERTER-DRIVEN PUMPS

Compact, flexible and reliable inline pumps with integrated frequency converters help to maintain the exact volumetric water flow while keeping the energy consumption at an optimum level. Electro-coated cast iron pump body provides high corrosion resistance and ensures long lifespan.



BUTTERFLY SHUT-OFF VALVES

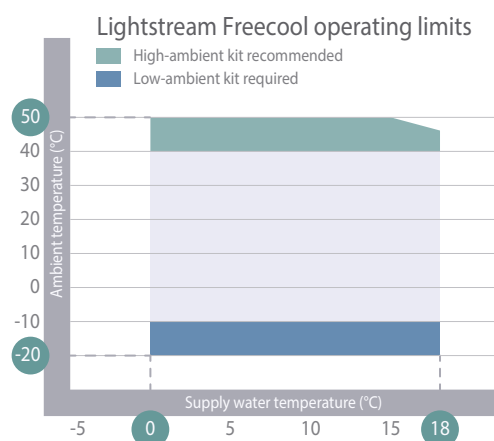
Lightstream Freecool chillers feature butterfly shut-off valves with spherically machined valve discs and the matching moulded liner ensure perfectly tight shutoff, even if the valve is actuated frequently.



Package, options and accessories

Description			
General			
RoboClean™ automatic coil cleaning system	<input type="checkbox"/>	Anti-vibration mounts	<input type="checkbox"/>
ClimateProfile™	<input type="checkbox"/>	Anti-vibration springs	<input type="checkbox"/>
Soundproof compressor compartment	<input checked="" type="checkbox"/>	High-ambient kit	<input type="checkbox"/>
Low noise design (grades 1 to 3)	<input type="checkbox"/>	Low-ambient kit	<input type="checkbox"/>
E-coated condenser coils	<input type="checkbox"/>	Corrosion-resistant frame	<input type="checkbox"/>
E-coated free cooling coils	<input type="checkbox"/>	High-sided paneling	<input checked="" type="checkbox"/>
Mesh guards for coils	<input type="checkbox"/>	Weatherproof hood	<input type="checkbox"/>
R134a refrigerant	<input checked="" type="checkbox"/>	R513a refrigerant	<input type="checkbox"/>
R1234ze refrigerant	<input type="checkbox"/>	Thermal insulation	<input checked="" type="checkbox"/>
Waterside			
Free cooling system	<input checked="" type="checkbox"/>	1x 3-way mixing valve	<input checked="" type="checkbox"/>
Strainer 20 mesh	<input checked="" type="checkbox"/>	2x 2-way regulating valve	<input type="checkbox"/>
Strainer 60 mesh	<input type="checkbox"/>	Manual shut-off butterfly valves	<input checked="" type="checkbox"/>
Manual balancing valve	<input type="checkbox"/>	Motorized shut-off butterfly valves	<input type="checkbox"/>
Bypass	<input type="checkbox"/>	Automatic air vents	<input checked="" type="checkbox"/>
External pump control	<input type="checkbox"/>	Flowmeter	<input type="checkbox"/>
Pump 1x fixed-speed, 2-pole motor, low head	<input type="checkbox"/>	Pump 2x fixed-speed, 2-pole motor, low head	<input type="checkbox"/>
Pump 1x fixed-speed, 2-pole motor, high head	<input type="checkbox"/>	Pump 2x fixed-speed, 2-pole motor, high head	<input type="checkbox"/>
Pump 1x variable-speed, 2-pole motor, low head	<input type="checkbox"/>	Pump 2x variable-speed, 2-pole motor, low head	<input type="checkbox"/>
Pump 1x variable-speed, 2-pole motor, high head	<input type="checkbox"/>	Pump 2x variable-speed, 2-pole motor, high head	<input type="checkbox"/>
Flanged water connections	<input type="checkbox"/>	Grooved water connections	<input checked="" type="checkbox"/>
Temperature transducers/gauges	<input type="checkbox"/>	Pressure transducers	<input checked="" type="checkbox"/>
Differential pressure transducer	<input checked="" type="checkbox"/>	Pressure gauges	<input type="checkbox"/>
Pump 2x fixed-speed, 4-pole motor, low head	<input type="checkbox"/>	Pump 2x fixed-speed, 4-pole motor, high head	<input type="checkbox"/>
Pump 2x fixed-speed, 4-pole motor, high head	<input type="checkbox"/>	Pump 2x variable-speed, 4-pole motor, low head	<input type="checkbox"/>
Pump 2x variable-speed, 4-pole motor, low head	<input type="checkbox"/>	Pump 2x variable-speed, 4-pole motor, high head	<input type="checkbox"/>
Refrigerant side			
Oil cooling system	<input type="checkbox"/>	Condenser bypass	<input type="checkbox"/>
Oil pumping system	<input type="checkbox"/>	Evaporator immersion heater	<input checked="" type="checkbox"/>
Electronic expansion valves	<input checked="" type="checkbox"/>	Flooded shell-and-tube evaporator (2-pass)	<input checked="" type="checkbox"/>
Pressure indication on high/low sides	<input checked="" type="checkbox"/>	Gas and liquid shut-off valves	<input checked="" type="checkbox"/>
Safety valves on high/low sides	<input checked="" type="checkbox"/>	Liquid level control valve	<input checked="" type="checkbox"/>
Service valves (compressor suction/discharge)	<input checked="" type="checkbox"/>	Gas and liquid pressure transducers	<input checked="" type="checkbox"/>
Economizer	<input type="checkbox"/>	Gas leakage detection	<input checked="" type="checkbox"/>
Discharge non-return valves	<input checked="" type="checkbox"/>	Motorized suction ball valves	<input checked="" type="checkbox"/>
Enlarged liquid receivers	<input type="checkbox"/>	Compressor backflow prevention valves	<input checked="" type="checkbox"/>
Airside			
EC fans	<input checked="" type="checkbox"/>	High-efficient fan diffusers	<input type="checkbox"/>
Differential pressure transducers	<input checked="" type="checkbox"/>		
Electric and controls			
Touch screen HMI	<input checked="" type="checkbox"/>	Dual power supply w/ ATS	<input type="checkbox"/>
Electric panel heater	<input type="checkbox"/>	BMS connectivity	<input checked="" type="checkbox"/>
Compressor compartment ventilation	<input checked="" type="checkbox"/>	SNMP connectivity	<input checked="" type="checkbox"/>
Energy monitoring	<input type="checkbox"/>	GSM connectivity	<input type="checkbox"/>
Automatic circuit breakers on loads	<input checked="" type="checkbox"/>	Quick restart	<input type="checkbox"/>
Phase sequence control	<input checked="" type="checkbox"/>	Electric heater for pump(s)	<input type="checkbox"/>
Sequence management	<input type="checkbox"/>	Compressor operation indication	<input checked="" type="checkbox"/>
Remote monitoring software	<input checked="" type="checkbox"/>	Controller power backup	<input checked="" type="checkbox"/>
Electrical panel lighting w/ 230V socket	<input checked="" type="checkbox"/>	Electrical panel heater	<input type="checkbox"/>

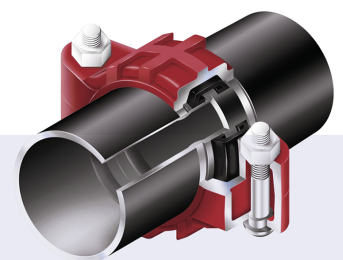
- Standard feature
- Optional feature



Extended operating range

Lightstream Freecool chillers are equipped with sophisticated capacity control based on a combination of chiller hardware and software that extends the chiller operating range for both ambient and plant water temperatures and improves chiller performance.

With the optional kits specially engineered for high- and low-ambient temperature operations, Lightstream Freecool chiller is suitable for running in climate conditions from -20°C to 50°C, while plant water temperatures may vary from 0°C to 18°C. Moreover, a condenser bypass option is suitable for chiller operation in extreme cold environments (to -30°C).



Grooved connections

We use a piping system with grooved couplings because of its rigidity, flexibility, noise and vibration attenuation, and ease 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 - R134a

Lightstream Freecool Screw Inverter		V600 F2/2-125 F1		V700 F3/2-125 F2		V800 F3/2-160 F2		V900 F4/2-160 F3		V1000 F4/2-200 F3		V1200 F5/2-200 F4	
Frame size													
Compressor frequency		80%	100%	80%	100%	80%	100%	80%	100%	80%	100%	80%	100%
Cooling capacity ¹	kW	580	690	608	724	738	902	758	932	924	1126	944	1152
100% free cooling temp	°C	4.7	2.8	7.8	6.5	6.3	4.4	8.3	6.8	6.8	5.0	8.3	6.8
Energy efficiency (EER)	kW/kW	3.71	3.51	3.89	3.75	3.69	3.58	3.73	3.70	3.64	3.50	3.67	3.56
Power input	kW	156.4	196.4	156.5	193.1	200.3	251.7	203.3	251.7	253.7	321.9	256.9	323.5
Absorbed current	A	261	322	261	317	328	406	332	406	409	512	414	515
Minimum capacity	%	17.5	15.0	17.5	15.0	15.0	10.0	15.0	10.0	10.0	10.0	10.0	10.0
Operating weight	kg	7240	7240	9380	9380	9630	9630	9820	9820	10460	10460	14840	14840
Compressors		Inverter-driven screw compressors											
Quantity		2	2	2	2	2	2	2	2	2	2	2	2
Power input	kW	134.0	174.0	122.8	159.4	166.6	218.0	158.4	206.8	208.8	277.0	200.8	267.4
Absorbed current	A	227	288	210	266	276	354	264	337	340	444	328	430
Fans		EC-motor axial fans											
Quantity		8	8	12	12	12	12	16	16	16	16	20	20
Airflow	m³/h	224000	224000	336000	336000	336000	336000	448000	448000	448000	448000	560000	560000
Power input	kW	22.4	22.4	33.7	33.7	33.7	33.7	44.9	44.9	44.9	44.9	56.1	56.1
Absorbed current	A	34	34	51	51	51	51	68	68	68	68	85	85
Evaporator		Flooded shell-and-tube											
Water flow	m³/h	100.2	119.2	105.0	125.1	127.5	155.8	130.9	161.0	159.6	194.5	163.1	199.0
Pressure drop	kPa	43	48	42	52	45	56	47	58	43	50	44	53
Refrigeration circuits		R134a											
Quantity		2	2	2	2	2	2	2	2	2	2	2	2

(1) Fluid: water 100%; Fluid inlet/outlet temperatures: 18/13°C; Ambient temperature: 35°C

Technical specifications - R513a

Lightstream Freecool Screw Inverter		V600 F2/2-125 F1		V700 F3/2-125 F2		V800 F3/2-160 F2		V900 F4/2-160 F3		V1000 F4/2-200 F3		V1200 F5/2-200 F4	
Frame size													
Compressor frequency		80%	100%	80%	100%	80%	100%	80%	100%	80%	100%	80%	100%
Cooling capacity ¹	kW	590	704	624	744	756	916	782	954	944	1138	970	1172
100% free cooling temp	°C	4.6	2.6	7.6	6.2	6.1	4.2	8.1	6.5	6.7	4.9	8.1	6.7
Energy efficiency (EER)	kW/kW	3.67	3.51	3.88	3.75	3.66	3.54	3.73	3.68	3.62	3.50	3.68	3.58
Power input	kW	160.6	200.4	160.7	198.7	206.7	258.9	209.5	259.1	260.5	325.5	263.9	327.5
Absorbed current	A	268	328	267	325	337	417	342	417	419	518	414	521
Minimum capacity	%	17.5	15.0	15.0	15.0	15.0	10.0	15.0	10.0	10.0	10.0	10.0	10.0
Operating weight	kg	7260	7260	9430	9430	9680	9680	10020	10020	10570	10570	15030	15030
Compressors		Inverter-driven screw compressors											
Quantity		2	2	2	2	2	2	2	2	2	2	2	2
Power input	kW	138.2	178.0	127.0	165.0	173.0	225.2	164.6	214.2	215.6	280.6	207.8	271.4
Absorbed current	A	233	294	216	274	286	365	273	349	351	450	328	436
Fans		EC-motor axial fans											
Quantity		8	8	12	12	12	12	16	16	16	16	20	20
Airflow	m³/h	224000	224000	336000	336000	336000	336000	448000	448000	448000	448000	560000	560000
Power input	kW	22.4	22.4	33.7	33.7	33.7	33.7	44.9	44.9	44.9	44.9	56.1	56.1
Absorbed current	A	34	34	51	51	51	51	68	68	68	68	85	85
Evaporator		Flooded shell-and-tube											
Water flow	m³/h	101.9	121.6	107.8	128.5	130.6	158.2	135.1	164.8	163.1	196.6	167.6	202.5
Pressure drop	kPa	43	48	42	52	45	56	47	58	43	50	44	53
Refrigeration circuits		R513a											
Quantity		2	2	2	2	2	2	2	2	2	2	2	2

(1) Fluid: water 100%; Fluid inlet/outlet temperatures: 18/13°C; Ambient temperature: 35°C

Technical specifications - R1234ze

Lightstream Freecool Screw Inverter		V600 F2/2-125 F1		V700 F3/2-125 F2		V800 F3/2-160 F2		V900 F4/2-160 F3		V1000 F4/2-200 F3		V1200 F5/2-200 F4	
Compressor frequency		80%	100%	80%	100%	80%	100%	80%	100%	80%	100%	80%	100%
Cooling capacity ¹	kW	462	550	478	582	586	710	594	730	722	874	732	888
100% free cooling temp	°C	6.8	5.3	9.3	8.1	8.1	6.6	9.7	8.5	8.6	7.3	9.7	8.7
Energy efficiency (EER)	kW/kW	4.01	3.82	3.99	4.10	3.94	3.84	3.81	3.86	3.79	3.72	3.71	3.69
Power input	kW	115.2	143.8	119.9	142.1	148.7	184.9	155.9	188.9	190.7	235.1	197.1	240.9
Absorbed current	A	198	242	205	239	249	304	260	310	313	381	323	390
Minimum capacity	%	22.5	20.0	22.5	17.5	17.5	15.0	17.5	15.0	15.0	12.5	15.0	12.5
Operating weight	kg	7320	7320	9490	9490	9750	9750	9930	9930	10570	10570	14950	14950
Compressors		Inverter-driven screw compressors											
Quantity		2	2	2	2	2	2	2	2	2	2	2	2
Power input	kW	92.8	121.4	86.2	108.4	115.0	151.2	111.0	144.0	145.8	190.2	141.0	184.8
Absorbed current	A	164	208	154	188	198	253	192	242	245	312	238	304
Fans		EC-motor axial fans											
Quantity		8	8	12	12	12	12	16	16	16	16	20	20
Airflow	m³/h	224000	224000	336000	336000	336000	336000	448000	448000	448000	448000	560000	560000
Power input	kW	22.4	22.4	33.7	33.7	33.7	33.7	44.9	44.9	44.9	44.9	56.1	56.1
Absorbed current	A	34	34	51	51	51	51	68	68	68	68	85	85
Evaporator		Flooded shell-and-tube											
Water flow	m³/h	79.8	95.0	82.6	100.5	101.2	122.6	102.6	126.1	124.7	151.0	126.4	153.4
Pressure drop	kPa	43	48	42	52	45	56	47	58	43	50	44	53
Refrigeration circuits		R1234ze											
Quantity		2	2	2	2	2	2	2	2	2	2	2	2

(1) Fluid: water 100%; Fluid inlet/outlet temperatures: 18/13°C; Ambient temperature: 35°C

Model identification and frame sizes

Lightstream Freecool Screw Inverter

V 600 F 2 / 2 - FC - 125 - N - R1234ze

Type of compressors	V	Variable-speed compact screw
Nominal cooling capacity		kW
Type of evaporator	F	Flooded-type
Condenser size		Number of W-banks
Number of refrigeration circuits		
Free cooling system	FC	
Model specific info		Compressors model
Noise level	N	Normal
	L	Low
	U	Ultra-low
Refrigerant type		ASHRAE number

Frame size	Length	Width	Height
	mm	mm	mm
F1	6115	2170	2500
F2	8265	2170	2500
F3	10415	2170	2500
F4	12565	2170	2500

¹ - for units without fan diffusers

TOTAL
108
MODELS



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.