Lightstream Screw

AIR-COOLED CHILLERS WITH INVERTER COMPRESSORS

500-1400kW

- HIGH FULL AND PART LOAD EFFICIENCY
- DEMAND-RESPONSIVE INVERTER COMPRESSORS
- REFRIGERANTS R134A, LOW-GWP R1234ZE

SCREW | INVERTER | R134a/R1234ze | EC-FANS | MICROCHANNEL | HEAT RECOVERY

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In the midst of innovative technologies

LIGHTSTREAM SCREW INVERTER CHILLERS OFFER AN ULTIMATE PERFORMANCE AND EFFICIENCY AT BOTH FULL AND PARTIAL LOADS BY COMBINING A SET OF INNOVATIVE TECHNOLOGIES: INTELLIGENT CONTROLS, INVERTER-CONTROLLED SCREW COMPRESSORS, EC FANS, MICROCHANNEL HEAT EXCHANGERS, AND CLOSE APPROACH EVAPORATORS.

The benefits at a glance:

- ENERGY EFFICIENCY RATIO UP TO 3.56
- ESEER UP TO 5.75
- CAPACITY ON DEMAND
- INTELLIGENT HEAD PRESSURE CONTROL
- HIGH EVAPORATION TEMPERATURES
- ECO-FRIENDLY ERFRIGERANT R1234ZE

ESEER OF UP TO

5.75

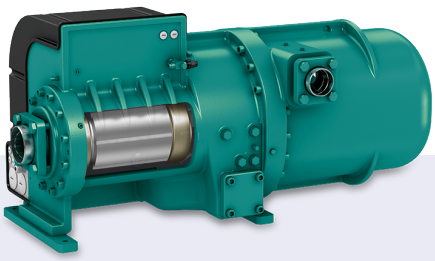
Intelligent controls

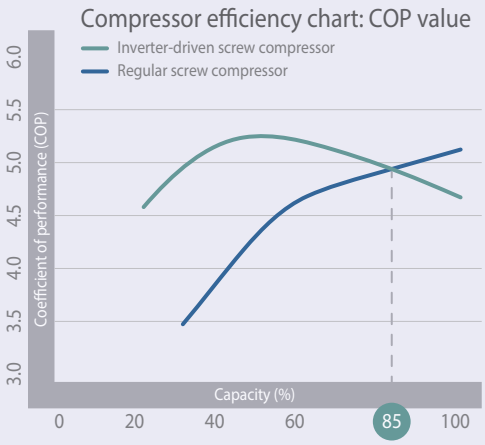
Centralized, accurate thermal control

The control hub of Lightstream Screw Inverter chillers is a sophisticated controller with advanced software developed for efficient operation of air-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, save 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.





Exact capacity match

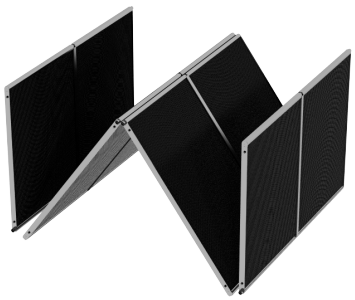
Frequency-controlled screw compressors

The compressors of Lightstream Screw Inverter series chillers is a unique development in the field of compact screw compressors, designed for capacity control and optimized for use in air-cooled liquid chillers. These compressors are especially suitable for systems that repeatedly operated under part-load and feature an integrated frequency inverter which controls the motor speed – enabling infinite capacity control for customers and optimal energy use for applications.

These compressors also achieve impressively high full-load efficiency and significantly improved ESEER and SCOP values: with an average ESEER value of 5.62, Lightstream Screw Inverter chillers are setting new benchmarks in the industry.

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.

Condensing coils



Microchannel heat exchangers

Microchannel condensers used in Lighstream Screw Inverter design give 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 traditional fin/tube heat exchanger design.

Smaller coil face, thin design, up to 50% less weight, and less refrigerant charge translate to lower system cost. Microchannel condensers used in Lightstream Screw Inverter chillers are true HVAC coils developed and optimized especially for refrigeration applications and enable remarkable low condensing temperatures.

Evaporators

Flooded-type heat exchangers

The design of the Lightstream Screw Inverter 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.

Low-GWP refrigerant option

Refrigerants with low global warming potential (GWP) are becoming more and more important in the refrigeration and air conditioning industry in Europe and beyond.

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.

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

25% energy savings through the use of EEV

The electronic expansion valve (EEV) reduces the need for high head pressure when running at part load and lower ambient conditions. 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.

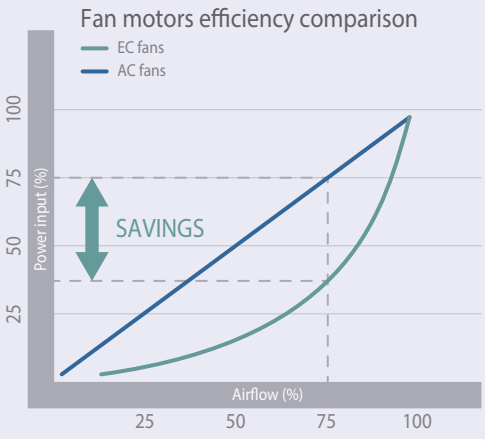
Intelligent fan system

EC-type fans with reduced power consumption

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.

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.

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.



Package, options and accessories

Description					
General					
Soundproof compressor enclosures	■	Anti-vibration mounts	□	Mesh guards for coils	□
Low noise design (grades 1 to 3)	□	Anti-vibration springs	□	Partial heat recovery system	□
E-coated condenser coils	□	High-ambient kit	□	Total heat recovery system	□
Hi-sided paneling	□	Brine kit (to -10°C)	□	Thermal insulation	■
Waterside					
External pump control	□	Flowmeter	□	Grooved water connections	■
Pump 1x fixed-speed, 2-pole motor, low head	□	Pump 2x fixed-speed, 2-pole motor, low head	□	Pump 2x fixed-speed, 4-pole motor, low head	□
Pump 1x fixed-speed, 2-pole motor, high head	□	Pump 2x fixed-speed, 2-pole motor, high head	□	Pump 2x fixed-speed, 4-pole motor, high head	□
Pump 1x variable-speed, 2-pole motor, low head	□	Pump 2x variable-speed, 2-pole motor, low head	□	Pump 2x variable-speed, 4-pole motor, low head	□
Pump 1x variable-speed, 2-pole motor, high head	□	Pump 2x variable-speed, 2-pole motor, high head	□	Pump 2x variable-speed, 4-pole motor, high head	□
Refrigerant side					
Oil cooling system	□	Evaporator immersion heater	■	Gas leakage detection	■
Oil pumping system	□	Flooded shell-and-tube evaporator	■	Pressure indication on high/low sides	■
Electronic expansion valves	■	Safety valves on high/low sides	■	Compressor backflow prevention valves	■
Airside					
AC fans	■	EC fans	□	High-efficient fan diffusers	□
Electric and controls					
Touch screen HMI	■	Dual power supply w/ ATS	□	Sequence management	□
Electric panel heater	□	BMS connectivity	■	Compressor operation indication	■
Compressor power factor capacitor	□	SNMP connectivity	■	Remote monitoring software	■
Energy monitoring	□	GSM connectivity	□	Controller power backup	□
Automatic circuit breakers on loads	■	Quick restart	□	Electrical panel lighting w/ 230V socket	□
Phase sequence control	■	Electric heater for pump(s)	□	Electrical panel heater	□

■ Standard feature
□ Optional feature

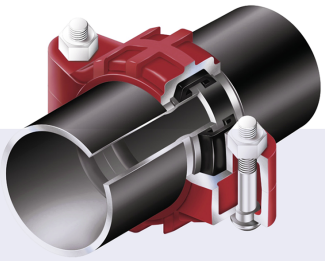
Model identification

Lightstream Screw Inverter **V 600 W 6 / 2 - N - R134a**

Type of compressors	V	Inverter-driven screw compressor
Nominal cooling capacity		kW
Type of condensing coils	W	W-bank microchannel coils
Condenser size		Number of W-banks
Number of refrigeration circuits		
Noise level	N	Normal
	L	Low
	U	Ultra-low
Refrigerant type		ASHRAE number

Frame sizes

Frame size		F5	F6	F7	F8	F9	F10	F11	F12
Length	mm	5655	6825	7740	8910	9825	10995	11910	13080
Width	mm	2250	2250	2250	2250	2250	2250	2250	2250
Height	mm	2550	2550	2550	2550	2550	2550	2550	2550



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

Lightstream Screw Inverter		V450 W5/2	V500 W5/2	V550 W5/2	V550 W6/2	V600 W6/2	V650 W6/2	V700 W6/2	V750 W6/2	V800 W7/2
Frame size		F5	F5	F5	F6	F6	F6	F6	F6	F7
Cooling capacity[1]	kW	475	495	535	565	615	645	675	710	780
Energy efficiency (EER)	kW/kW	3.49	3.49	3.44	3.50	3.46	3.52	3.48	3.42	3.50
ESEER	kW/kW	5.45	5.47	5.56	5.42	5.52	5.60	5.65	5.75	5.62
Power input	kW	133.0	139.0	153.0	157.8	173.8	180.8	190.8	203.8	218.6
Absorbed current	A	221	230	250	264	288	298	313	333	360
Net weight	kg	4420	4590	5085	5100	5425	5605	5610	6605	6800
Compressors		Inveter-driven screw compressors								
Quantity		2	2	2	2	2	2	2	2	2
Power input	kW	114.0	120.0	134.0	135.0	151.0	158.0	168.0	181.0	192.0
Absorbed current	A	173	182	202	206	230	240	255	275	293
Fans		AC-motor axial fans								
Quantity		10	10	10	12	12	12	12	12	14
Airflow	m^3/h	240000	240000	240000	288000	288000	288000	288000	288000	336000
Power input	kW	19.0	19.0	19.0	22.8	22.8	22.8	22.8	22.8	26.6
Absorbed current	A	48.0	48.0	48.0	57.6	57.6	57.6	57.6	57.6	67.2
Evaporator		Flooded shell-and-tube								
Water flow	m^3/h	82	85	92	97	105	112	116	122	134
Water volume	L	87.7	92.6	99.2	107.2	115.2	121.8	130.0	130.0	142.8
Refrigeration circuits		R134a								
Quantity		1	1	1	1	1	1	1	1	1
Charge	kg	246	312	312	312	312	306	382	382	382

(1) Fluid: water 100%; Fluid inlet/outlet temperatures: 15/10°C; Ambient temperature: 35°C

Lightstream Screw Inverter		V850 W7/2	V900 W8/2	V950 W8/2	V1000 W9/2	V1100 W10/2	V1150 W10/2	V1200 W11/2	V1300 W11/2	V1350 W12/2
Frame size		F7	F8	F8	F9	F10	F10	F11	F11	F12
Cooling capacity[1]	kW	820	890	950	1025	1100	1150	1225	1285	1355
Energy efficiency (EER)	kW/kW	3.46	3.49	3.47	3.50	3.56	3.44	3.44	3.40	3.46
ESEER	kW/kW	5.72	5.64	5.72	5.67	5.63	5.70	5.65	5.72	5.65
Power input	kW	232.6	250.4	265.4	287.2	303.0	330.0	351.8	371.8	385.6
Absorbed current	A	381	411	435	471	500	540	578	609	632
Net weight	kg	6800	7425	8025	8650	9000	9200	9425	9425	9765
Compressors		Inveter-driven screw compressors								
Quantity		2	2	2	2	2	2	2	2	2
Power input	kW	206.0	220.0	235.0	253.0	265.0	292.0	310.0	330.0	340.0
Absorbed current	A	314	334	358	385	404	444	472	503	517
Fans		AC-motor axial fans								
Quantity		14	16	16	18	20	20	22	22	24
Airflow	m^3/h	336000	384000	384000	432000	480000	480000	528000	528000	576000
Power input	kW	26.6	30.4	30.4	34.2	38.0	38.0	41.8	41.8	45.6
Absorbed current	A	67.2	76.8	76.8	86.4	96.0	96.0	105.6	105.6	115.2
Evaporator		Flooded shell-and-tube								
Water flow	m^3/h	142	154	162	176	190	198	210	220	233
Water volume	L	156.0	164.0	172.0	190.0	199.8	216.0	225.6	235.5	245.2
Refrigeration circuits		R134a								
Quantity		1	1	1	1	1	1	1	1	1
Charge	kg	460	460	460	460	460	535	535	530	530

(1) Fluid: water 100%; Fluid inlet/outlet temperatures: 15/10°C; Ambient temperature: 35°C

TOTAL
108
MODELS

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