

# Lightstream Screw V

VARIABLE-SPEED CHILLERS WITH SCREW COMPRESSORS



- ▶ SUPERIOR ENERGY EFFICIENCY
- ▶ AVAILABLE WITH R1234ZE AND R134A
- ▶ OPTIONAL FREE COOLING SYSTEM
- ▶ OPTIONAL HEAT RECOVERY



# 500-1500kW

AVAILABLE IN 8 FRAME SIZES, TOTAL 30 MODELS WITH A BROAD SELECTION OF OPTIONS AND ACCESSORIES



# Highly efficient, future-proof solution

HIGHLY VERSATILE, ENVIRONMENT-FRIENDLY, EFFICIENT ON FULL AND PART LOADS SOLUTION SUITABLE FOR ALL KINDS OF APPLICATIONS, INCLUDING AIR CONDITIONING, PROCESS COOLING, AND MISSION-CRITICAL TASKS. LIGHTSTREAM SCREW V INVERTER CHILLERS OFFER HIGH LEVEL OF RELIABILITY AND FLEXIBILITY, REDUCED MAINTENANCE COSTS, AND EXTENDED OPERATING RANGE.

## Cornerstone advantages:

- ▶ EFFICIENT AT FULL AND PART LOADS
- ▶ PRECISE CAPACITY CONTROL
- ▶ ECODESIGN 2021 COMPLIANT
- ▶ REDUCED REFRIGERANT CHARGE
- ▶ ENVIRONMENT-FRIENDLY

Lightstream Screw V Inverter 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.

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**5.32**

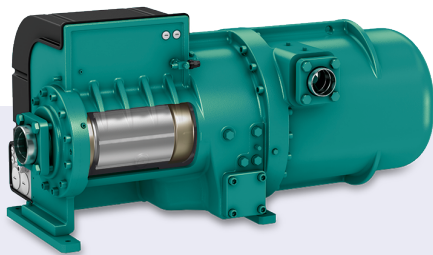


## Smart evaporators

### Innovative shell-and-tube heat exchangers

For shell-and-tube evaporators, thermal performance and pressure drop are considered as major factors which are directly related to operating costs and overall chiller efficiency. Both thermal performance and pressure drop are dependent on the flow paths and types of baffles used to increase the fluid velocity - by diverting the flow across the tube bundle to obtain higher heat transfer coefficient.

The shell-and-tube evaporators used in Lightstream Screw V Inverter chillers feature both high heat transfer performance, close approach temperatures, as well as low pressure drops, as it combines an innovative tube bundle design and optimized baffle geometry. The net result is improved system performance, as well as tight control of return water temperatures.



## Precise capacity control

### Frequency-controlled screw compressors

The compact frequency-controlled screw compressors of Lightstream Screw V Inverter 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 condensing coils

Improved heat transfer. Low refrigerant charge. Extended service life.



For Lightstream Screw V Inverter chillers we use microchannel condenser coils of a new design - with optimized louvered fin geometry and microchannel tubes with reduced port size - both made from long-life aluminium alloys. This new design enhances the overall heat transfer while reducing airside pressure drop as compared to coils of the previous generation, thus enabling fan energy savings.

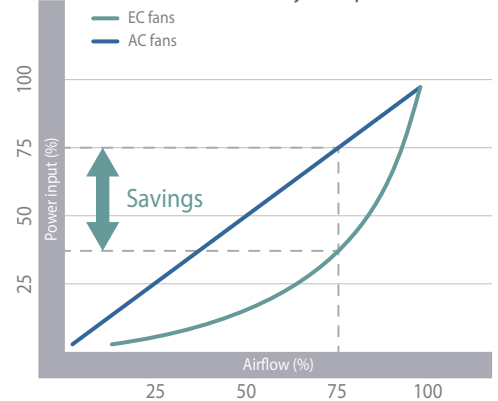
The chillers characterized by noticeably reduced refrigerant charge as new coils have reduced internal volume, and this translates to lower initial and maintenance costs. High heat transfer ratios lead to considerable lower condensing temperatures, which in turn enables the savings on compressor energy.

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.

## 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. The valve in-line design includes balanced cage and regulating slider operated by the direct driven motor. This ensures tight solenoid shut-off in both flow directions, thus providing smooth operation of the system. The slider controls valve opening in accordance to the performance levels required by the system.

Fan motors efficiency comparison



The control hub of Lightstream Screw V Inverter chillers is a sophisticated controller and advanced software developed for efficient operation of the chillers based on screw compressors. It manages and optimizes the chiller's performance, giving the complete control over the system for plant operator.

## 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.

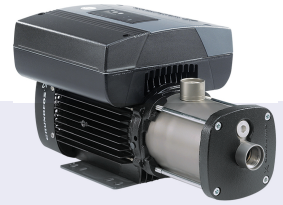
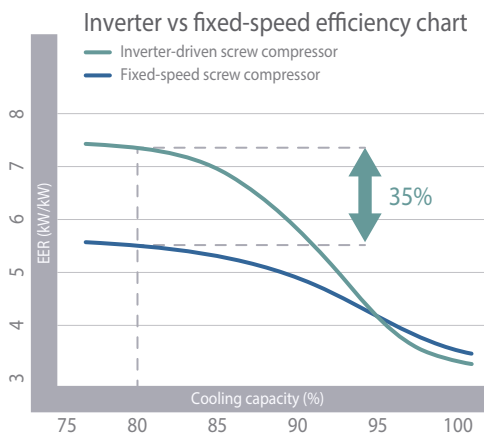
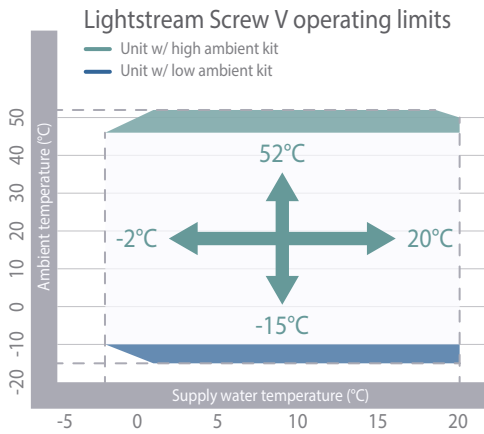
EC motor technology does not provide savings only during full-load operation - it is exactly when operating under partial load that EC motors lose much less of their efficiency compared to AC fans.

# Versatile and powerful solution

## Extended operating range

Lightstream Screw V Inverter 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 Screw V Inverter chiller is suitable for running in climate conditions from -15°C to 52°C, while plant water temperatures may vary from -2°C to 20°C. Moreover, a condenser bypass option is suitable for chiller operation in extreme cold environments (to -30°C).



## Pumps

Lightstream Screw V Inverter chillers can be equipped with factory-installed variable or fixed-speed pumps. The pumps feature reduced life-cycle costs, optimized efficiency, and high standard of corrosion protection thanks to cathodic coating. Variable-speed pumps have a broad performance range, which enables them to perform efficiently under widely varied conditions and to meet a wide range of requirements.

Based on the required performance, customers may select from inline - single or twin - or end-suction pumps installed in 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.

# Eco-friendly refrigerants

## Low-GWP refrigerant option

The portfolio of Lightstream Screw V Inverter 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 Screw V Inverter chiller is the environmentally-friendly leader of the range, while achieving the best energy performance levels for applications.



# Package, options and accessories

Description					
General					
Anti-vibration rubber-type mounts	<input type="checkbox"/>	Anti-vibration springs	<input type="checkbox"/>	Evaporator freeze protection	<input checked="" type="checkbox"/>
High-sided paneling	<input type="checkbox"/>	Partial heat recovery system	<input type="checkbox"/>	Full heat recovery system	<input type="checkbox"/>
E-coating for condenser coils	<input type="checkbox"/>	Mesh guards for condenser coils	<input type="checkbox"/>	Microchannel coils made from long-life alloys	<input checked="" type="checkbox"/>
Free cooling system <sup>1</sup>	<input type="checkbox"/>	Low noise design (grades 1 to 3)	<input type="checkbox"/>	Rain screen	<input type="checkbox"/>
High ambient kit (+52°C)	<input type="checkbox"/>	Low ambient kit (-15°C)	<input type="checkbox"/>	Extreme-low ambient kit (-30°C)	<input type="checkbox"/>
Electric and controls					
Dual power supply w/ ATS	<input type="checkbox"/>	Dual power supply w/ changeover	<input type="checkbox"/>	Touch screen HMI	<input checked="" type="checkbox"/>
Automatic circuit breakers on loads	<input type="checkbox"/>	Remote monitoring and management	<input type="checkbox"/>	Electrical panel lighting	<input type="checkbox"/>
BMS connectivity	<input checked="" type="checkbox"/>	SNMP connectivity	<input type="checkbox"/>	Electrical panel heater	<input type="checkbox"/>
Energy monitoring	<input type="checkbox"/>	Sequence management system (SMS)	<input type="checkbox"/>	Quick restart w/ UPS	<input type="checkbox"/>
Phase sequence control	<input checked="" type="checkbox"/>	Electric heater for pump(s)	<input type="checkbox"/>	Power socket 230V	<input type="checkbox"/>
Waterside					
Flow switch	<input type="checkbox"/>	Flow meter	<input type="checkbox"/>	Grooved connections	<input checked="" type="checkbox"/>
Pipework heating kit	<input type="checkbox"/>	Fixed-speed inline pump(s) - single/twin	<input type="checkbox"/>	Variable-speed inline pump(s) - single/twin	<input type="checkbox"/>
Standard thermal insulation	<input checked="" type="checkbox"/>	High-grade thermal insulation	<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"/>	Pressure indication on high/low pressure sides	<input type="checkbox"/>
Electronic expansion valves	<input checked="" type="checkbox"/>	Compressor liquid injection	<input type="checkbox"/>	Pressure transducers on high/low pressure sides	<input checked="" type="checkbox"/>
Compressor discharge valves	<input checked="" type="checkbox"/>	Economizer(s)	<input type="checkbox"/>	Service valves on compressor suction	<input type="checkbox"/>
Airside					
EC-motor fans	<input checked="" type="checkbox"/>	High-efficient fan diffusers	<input type="checkbox"/>	Low-ambient EC-motor fans	<input type="checkbox"/>

Standard feature  
 Optional feature  
<sup>1</sup> - options specific to free cooling system available on request

## Model identification

Lightstream Screw V Inverter

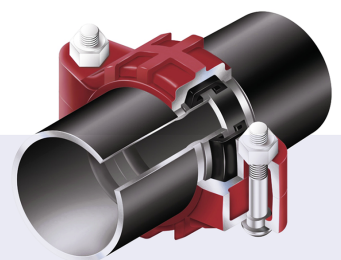
V 800 V 6 2 - FC - HP - N - R1234ze

Type of compressors	V	Variable-speed compact screw
Nominal cooling capacity	800	kW
Type of condenser	V	V-bank microchannel condensers
Condenser size	6	Number of condenser banks
Refrigerant circuits	2	Number of circuits
Optional	FC	Free cooling system
Optional	HP	Partial heat recovery
	HT	Full heat recovery
Noise level	N	Normal
	L	Low
	U	Ultra-low
Refrigerant type		ASHRAE number

## Frame sizes

Frame size		F3	F4	F5	F6	F7	F8	F9	F10
Length	mm	4145	5395	6645	7895	9145	10395	11645	12895
Width	mm	2250	2250	2250	2250	2250	2250	2250	2250
Height <sup>1</sup>	mm	2495	2495	2495	2495	2495	2495	2495	2495

<sup>1</sup> - for units without fan diffusers



## 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.

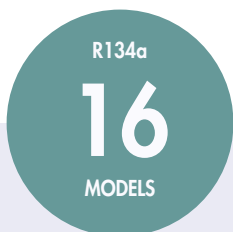
# Technical specifications - R134a

Lightstream Screw V Inverter		V500	V550	V600	V650	V700	V750	V800	V850
Frame size		V4/2	V4/2	V5/2	V5/2	V5/2	V6/2	V6/2	V7/2
Frame size		F4	F4	F5	F5	F5	F6	F6	F7
Cooling capacity <sup>1</sup>	kW	510.6	552.0	590.0	627.0	684.3	767.2	839.8	899.5
Total power input	kW	157.0	170.7	181.8	195.0	213.4	246.8	274.6	291.3
EER	kW/kW	3.25	3.23	3.25	3.22	3.21	3.11	3.06	3.09
ESEER	kW/kW	5.19	5.32	5.26	5.17	5.17	5.15	5.17	5.17
Operating weight	kg	5180	5230	5720	5800	6200	6630	6680	7080
Compressor(s)		Inverter-driven compact screw							
Quantity		2	2	2	2	2	2	2	2
Power input	kW	143.4	157.1	166.5	178.0	196.4	228.1	254.2	269.2
Fan(s)		EC-motor axial fans							
Airflow	m <sup>3</sup> /h	156000	156000	175500	195000	195000	214500	234000	253500
Power input	kW	13.6	13.6	15.3	17.0	17.0	18.7	20.4	22.1
Evaporator		Dry expansion shell-and-tube							
Water flow	m <sup>3</sup> /h	87.8	95.0	101.6	107.9	117.8	132.0	144.6	154.8
Pressure drop	kPa	36	34	39	44	42	37	45	45
Water volume	L	120	125	125	125	220	230	230	230
Refrigeration circuit(s)		R134a							
Quantity		2	2	2	2	2	2	2	2
Refrigerant charge	kg	78	80	86	92	100	112	123	133
Sound data									
Sound power (ISO 9614)	dB(A)	98	99	99	99	100	100	100	102
Refrigerant charge	dB(A)	67	68	67	67	68	68	68	69

(1) Fluid: water 100%; Fluid temperatures: 7/12°C; Ambient temperature: 35°C

Lightstream Screw V Inverter		V900	V950	V1000	V1100	V1200	V1300	V1400	V1500
Frame size		V7/2	V8/2	V8/2	V8/2	V9/2	V10/3	V10/3	V10/3
Frame size		F7	F8	F8	F8	F9	F10	F10	F10
Cooling capacity <sup>1</sup>	kW	959.5	1028.2	1099.5	1162.0	1230.0	1334.4	1467.2	1520.0
Total power input	kW	307.8	326.5	343.9	373.0	385.0	434.5	473.6	498.0
EER	kW/kW	3.12	3.15	3.20	3.12	3.19	3.07	3.10	3.05
ESEER	kW/kW	5.19	5.20	5.17	5.14	5.16	5.13	5.10	5.12
Operating weight	kg	7120	8120	8560	8800	9290	10870	11630	11900
Compressor(s)		Inverter-driven compact screw							
Quantity		2	2	2	2	2	3	3	3
Power input	kW	284.0	301.0	316.7	345.8	354.4	402.2	439.6	464.0
Fan(s)		EC-motor axial fans							
Airflow	m <sup>3</sup> /h	273000	292500	312000	312000	351000	370500	390000	390000
Power input	kW	23.8	25.5	27.2	27.2	30.6	32.3	34.0	34.0
Evaporator		Dry expansion shell-and-tube							
Water flow	m <sup>3</sup> /h	165.2	177.2	189.3	200.0	211.8	229.6	252.6	261.7
Pressure drop	kPa	52	46	50	41	46	41	35	38
Water volume	L	230	275	275	310	310	550	575	575
Refrigeration circuit(s)		R134a							
Quantity		2	2	2	2	2	3	3	3
Refrigerant charge	kg	140	150	160	173	182	198	225	225
Sound data									
Sound power (ISO 9614)	dB(A)	102	102	103	104	104	105	105	105
Refrigerant charge	dB(A)	69	69	70	72	72	72	72	72

(1) Fluid: water 100%; Fluid temperatures: 7/12°C; Ambient temperature: 35°C



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# Technical specifications - R1234ze

Lightstream Screw V Inverter		V350	V400	V450	V500	V600	V700	V800
Frame size		V3/2	V4/2	V4/2	V4/2	V5/2	V6/2	V6/2
		F3	F4	F4	F4	F5	F6	F6
Cooling capacity <sup>1</sup>	kW	382.8	418.0	487.0	534.8	642.0	726.0	843.3
Total power input	kW	117.6	130.2	147.6	168.4	210.6	236.8	280.7
EER	kW/kW	3.26	3.21	3.30	3.18	3.05	3.07	3.00
ESEER	kW/kW	5.01	5.17	5.13	5.03	4.98	5.00	4.96
Operating weight	kg	4780	5220	5360	5430	6050	6830	7810
Compressor(s)		Inverter-driven compact screw						
Quantity		2	2	2	2	2	2	2
Power input	kW	107.4	118.3	134.0	154.8	193.6	216.4	260.3
Fan(s)		EC-motor axial fans						
Airflow	m <sup>3</sup> /h	117000	136500	156000	156000	195000	234000	234000
Power input	kW	10.2	11.9	13.6	13.6	17.0	20.4	20.4
Evaporator		Dry expansion shell-and-tube						
Water flow	m <sup>3</sup> /h	65.9	72.0	83.8	92.2	110.5	125.0	145.3
Pressure drop	kPa	35	42	30	36	46	47	31
Water volume	L	115	115	135	135	125	230	275
Refrigeration circuit(s)		R1234ze						
Quantity		2	2	2	2	2	2	2
Refrigerant charge	kg	63	70	70	86	108	124	134
Sound data								
Sound power (ISO 9614)	dB(A)	98	99	99	100	100	102	104
Refrigerant charge	dB(A)	67	68	68	69	69	70	72

(1) Fluid: water 100%; Fluid temperatures: 7/12°C; Ambient temperature: 35°C

Lightstream Screw V Inverter		V900	V1000	V1100	V1200	V1300	V1400	V1500
Frame size		V7/2	V8/2	V8/2	V9/3	V9/3	V10/3	V10/3
		F7	F8	F8	F9	F9	F10	F10
Cooling capacity <sup>1</sup>	kW	915.7	994.2	1039.0	1146.0	1280.0	1400.6	1465.5
Total power input	kW	305.2	322.0	340.5	378.8	422.7	467.6	489.2
EER	kW/kW	3.00	3.09	3.05	3.03	3.03	3.00	3.00
ESEER	kW/kW	4.92	4.99	4.94	4.95	4.93	4.93	4.90
Operating weight	kg	8240	8780	8890	11180	11800	12440	12440
Compressor(s)		Inverter-driven compact screw						
Quantity		2	2	2	3	3	3	3
Power input	kW	281.4	294.8	313.3	348.2	392.1	435.3	455.2
Fan(s)		EC-motor axial fans						
Airflow	m <sup>3</sup> /h	273000	312000	312000	351000	351000	370500	390000
Power input	kW	23.8	27.2	27.2	30.6	30.6	32.3	34.0
Evaporator		Dry expansion shell-and-tube						
Water flow	m <sup>3</sup> /h	157.6	171.1	178.7	197.2	220.4	240.8	252.0
Pressure drop	kPa	47	43	44	40	41	48	53
Water volume	L	210	275	265	310	550	550	550
Refrigeration circuit(s)		R1234ze						
Quantity		2	2	2	3	3	3	3
Refrigerant charge	kg	140	167	167	189	195	203	218
Sound data								
Sound power (ISO 9614)	dB(A)	104	104	104	105	105	106	106
Refrigerant charge	dB(A)	72	72	72	72	72	73	73

(1) Fluid: water 100%; Fluid temperatures: 7/12°C; Ambient temperature: 35°C



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