



TECS | VISION 2.0

Chillers, air and water cooled, featuring centrifugal compressors with magnetic levitation, from 200 to 1.949 kW

UNBEATABLE EFFICIENCY
AT PART LOAD

EXTREMELY SILENT
OPERATION

SIMPLIFIED LOGISTICS

LOW IN RUSH
CURRENT

TECHNOLOGICAL CHOICES

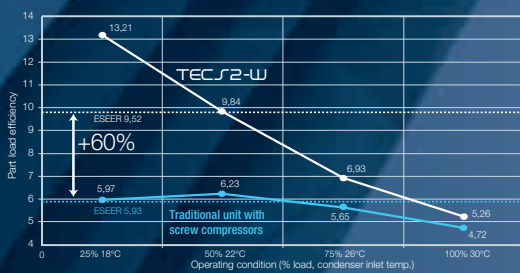


Centrifugal compressor with magnetic levitation

This is a miniaturized, highly innovative compressor, with magnetic levitation device and digital control of the rotor's speed. The efficiencies achieved are far superior to those with traditional volumetric compressors. Inverter controls with inlet guide vanes extend the compressor's operational limit: building requirements are precisely met, even at very low conditions.

A solution that, besides the reduction of weight and dimensions with respect to traditional compressors, permits the compressor to operate completely without oil allowing an improvement of its performance, through the heat exchange process. Vibrations are virtually eliminated together with possible jolts due to inrush current in the start up phase: the unit's wear is minimized.

Part load efficiency - TEC S2-W vs Traditional unit with screw compressors

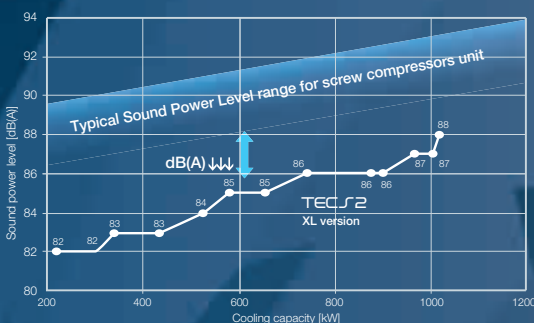


EC Fans

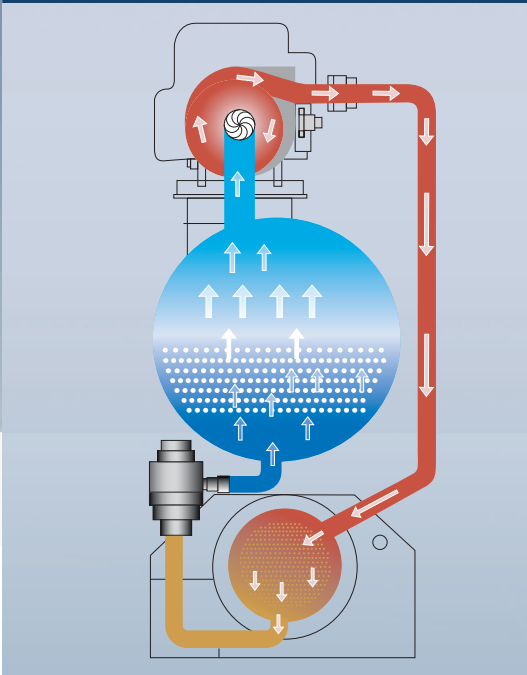
On TEC S2 units, the technology of EC electronic switching fans is introduced, as standard on SL-CA-E versions and optional on the other models.

The superior energy efficiency of the DC brushless motor further improves the chiller's performance, that reaches the highest ESEER level in the market.

More advantages are low inrush current and the ability to continuously modulate the rotational speed with an immediate gain in both silence and energy consumption.



Efficiency, silent operation and reliability. And also compact dimensions and reduced weight. These are the main features that make TECS units the best result of Climaveneta's know-how. Advantages that result from technological choices, involving each aspect of these units.

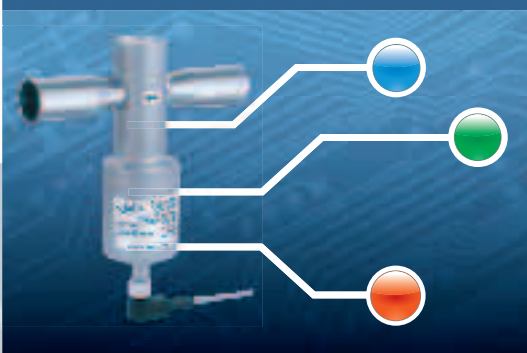


Flooded evaporator

The technology of flooded evaporator, further enhanced the absence of oil in the refrigerant circuits, realises a substantial increase of cooling capacity and an optimization in the compressor's operational mode. The unit's overall efficiency further increases thanks to:

- compression ratio reduction thanks to a smaller approach
- theoretic absence of refrigerant superheat at the compressor's suction stage
- minimization of refrigerant pressure drop on the evaporator's shell side
- optimization of the exchange surfaces, also at part loads, thanks to the complete control of the refrigerant level in all operating conditions.

To comply with the security requirements of the "F-gas Regulation" (CE 842//2006), factory calibrated leak detection systems are available upon request.



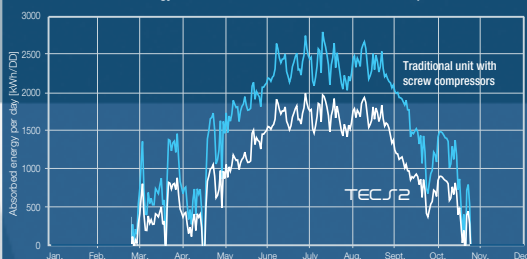
Electronic valve

The electronic valve is adopted to grant the ideal operation of the evaporator in all conditions.

In the water cooled unit TECS2-W, the complete flooding of tubes is granted with a sophisticated detection of the refrigerant level in the heat exchangers, while in the air cooled unit the control is made with a precise measurement of the subcooling in the condenser coil.

The fast processing of the acquired data allow a quick, fluctuation-free regulation, and therefore a highly accurate adjustment to the swings of load and ambient conditions.

Total absorbed energy - TECS2 vs Traditional unit with screw compressors



THE RANGE



Units for outdoor installation characterized by an extremely compact lay-out. Thanks to our extensive research and product development the Vision 2.0 has been conceived. The capacity range is now extended up to 1.325 kW, with 26 sizes featuring unbeatable efficiencies and noise levels.

Air cooled units



TECS2 units are available in 2 functions: base and with desuperheater, for applications in which thermal energy is used for auxiliary uses,

and in 2 acoustic versions: SL-CA, Super Low Noise, Class A and XL-CA, eXtra Low Noise, Class A to satisfy even the most demanding noise level targets.

High efficiency versions SL-CA-E are available, for an even higher efficiency thanks to the adoption of EC fans and to generous heat exchanger surfaces.

Oasis cooling kit. The perfect solution for air-conditioning beyond the units' operating limits.

Especially in harsh climates, with requirements of prolonged operation at high ambient air temperatures, units can benefit from devices offering additional cooling whenever outdoor conditions become critical.



The ideal solution in these situations is to lower the condenser coil entering air temperature when it becomes too high, causing the condensing temperature to go over the compressors operating limits. This is obtained by Climaveneta with the Oasis kit option.

How the Oasis kit works

When the condensing conditions reach a pre-defined set point, the controller open a solenoid valve and water is sprayed over a plastic net. The contact between the airflow forced through the wet plastic net, reduces the condenser coil inlet air temperature. This allows:



- 1 A further extension of the operating limits by 5-6°C, depending on the relative humidity.
- 2 A benefit for the silenced version (because the high condensing control can be postponed to higher temperature).
- 3 Increased efficiency of the unit when the system is active.

TECS VISION 2.0



Units for indoor installation characterized by a minimum footprint which allows a significant cost saving, both in terms of logistic aspects and plantroom cost per square meter in modern buildings. The adoption of different compressor sizes permits the optimization of the TECS2-W range, which now comprises 20 sizes covering a capacity range between 242 and 1.949 kW.

Water cooled units



TECS2-W units are available in 2 functions: base and H, heat pump reversible on hydraulic side

and in 2 versions:

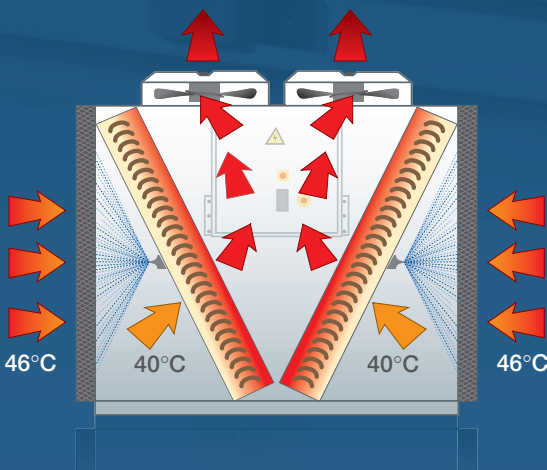
LC, Low Condensing. For applications in which the water cooled unit is coupled with medium temperature external source, for example groundsource or cooling towers

HC, High Condensing. For application in which the unit is expected to work at high condensing levels, as for example in some critical dry-cooler installations or in all situations in which reversibility in heat pump mode is requested.

Climaveneta's system advantages vs traditional solutions

The Climaveneta Oasis solution offers many advantages even if compared to systems with pressurized atomizers which spray water directly to the coil:

- No dedicated pumps: the water is taken directly from tap water.
- No limescale on the coil: the water is sprayed toward the plastic net, and not toward the coil.
- Easy application - it's possible to use common supply water, no need for special water treatment.
- Minimized risk of bacterial population increase: recirculated water loop does not exist; water immediately evaporates when sprayed on the net.
- Optimal control of water consumption: thanks to effective spray regulation.





Air cooled unit with magnetic levitation centrifugal compressors.
From 220 to 1.325 kW.

TECS2 'Class A'			Version	0211	0251	0351	0452	0512	0552	0652	0712	0853	0913	1013	1054	1154
Compressors number			SL-CA / XL-CA	1	1	1	2	2	2	2	2	3	3	3	4	4
Circuits number			SL-CA / XL-CA	1	1	1	1	1	1	1	1	2	2	2	2	2
Cooling performances																
Cooling capacity	(1)	kW	SL-CA	233	258	346	442	509	574	650	742	848	904	977	1.065	1.183
			XL-CA	220	254	341	435	526	579	640	739	874	900	972	1.049	1.174
Total absorbed power	(1)	kW	SL-CA	70,2	81,1	110	138	161	174	208	225	269	287	310	336	374
			XL-CA	68,5	79,8	109	137	166	173	206	226	279	290	312	331	377
EER	(1)		SL-CA	3,31	3,18	3,13	3,20	3,16	3,30	3,13	3,30	3,15	3,15	3,15	3,17	3,17
			XL-CA	3,21	3,19	3,12	3,19	3,17	3,35	3,11	3,27	3,13	3,11	3,12	3,17	3,11
ESEER			SL-CA	4,77	4,87	4,72	5,07	5,17	5,09	5,04	5,16	5,12	5,13	5,09	5,06	5,14
			XL-CA	4,75	4,99	4,84	5,19	5,23	5,17	5,19	5,24	5,24	5,30	5,24	5,19	5,23
Sound power level	(2)	dB(A)	SL-CA	88	88	90	90	90	91	92	92	93	93	93	94	94
			XL-CA	82	82	83	83	84	85	85	86	86	86	87	87	88
Maximum external air temperature		°C		42	42	42	42	42	42	42	42	42	42	42	42	42
Dimensions																
A	mm	SL-CA	3.100	3.100	4.000	4.900	4.900	5.800	7.000	7.000	8.500	9.700	10.600	11.200	11.500	
		XL-CA	3.100	3.100	4.000	4.900	5.800	7.000	7.000	7.900	9.400	9.700	10.600	11.200	12.400	
B	mm	SL-CA / XL-CA	2.260	2.260	2.260	2.260	2.260	2.260	2.260	2.260	2.260	2.260	2.260	2.260	2.260	
H	mm	SL-CA / XL-CA	2.430	2.430	2.430	2.430	2.430	2.430	2.430	2.430	2.430	2.430	2.430	2.430	2.430	

TECS2 'Class A' Enhanced			Version	0211	0251	0351	0452	0512	0552	0652	0712	0853	0913	1013	1054	1154
Compressors number			SL-CA-E	1	1	1	2	2	2	2	2	3	3	3	4	4
Circuits number			SL-CA-E	1	1	1	1	1	1	1	1	2	2	2	2	2
Cooling performances																
Cooling capacity	(1)	kW	SL-CA-E	229	285	385	455	527	590	703	796	902	969	1.086	1.177	1.325
Total absorbed power	(1)	kW	SL-CA-E	67,1	81,4	113	134	155	169	204	233	269	279	317	336	383
EER	(1)		SL-CA-E	3,41	3,50	3,40	3,41	3,41	3,50	3,45	3,41	3,35	3,48	3,42	3,50	3,46
ESEER			SL-CA-E	5,29	5,52	5,43	5,79	5,71	5,64	5,77	5,77	5,62	5,79	5,71	5,87	5,75
Sound power level	(2)	dB(A)	SL-CA-E	88	88	90	90	90	91	92	92	93	93	93	94	95
Maximum external air temperature		°C		42	42	42	42	42	42	42	42	42	42	42	42	42
Dimensions																
A	mm	SL-CA-E	3.100	3.100	4.000	4.900	4.900	5.800	7.000	7.900	8.500	9.700	10.600	11.200	12.400	
B	mm	SL-CA-E	2.260	2.260	2.260	2.260	2.260	2.260	2.260	2.260	2.260	2.260	2.260	2.260	2.260	
H	mm	SL-CA-E	2.430	2.430	2.430	2.430	2.430	2.430	2.430	2.430	2.430	2.430	2.430	2.430	2.430	

Note

- (1) Evaporator water (in/out) = 12/7°C; condenser air (in) = 35°C
- (2) Sound power based on measurements taken in accordance with standard ISO 3744 and Eurovent

Oasis kit performance

The table on the right shows the effects of Oasis kit in relation to outside air temperature and relative humidity. It is clear that, the higher the air temperature and lower the air humidity, the higher the system's effectiveness: in these conditions in fact, as higher waterflow is sprayed to the net, and most of it evaporate thanks to the energy given by the airflow through the net, water evaporates and air is cooled.

Water consumption comparison.

Another point to highlight is the water consumption, which is less than 30% of that requested by a cooling tower coupled to a water cooled unit of the same cooling capacity.



Adiabatic cooling kit coupled with an air cooled chiller (260 kW @ 12/7°C, 35°C, 50% RH)



Cooling tower coupled with a water cooled chiller (260 kW @ 12/7°C, 30/35°C, 50% RH)



**Water cooled unit with magnetic levitation centrifugal compressors.
From 241 to 1.949 kW.**

TECS-HF/HC		Version	0251	0311	0351	0411	0512	0612	0712	0812	0913	1053	1213	1414	1614	
Compressors number		HC	1	1	1	1	2	2	2	2	3	3	3	4	4	
Circuits number		HC	1	1	1	1	1	1	1	1	1	1	1	1	1	
Cooling performances																
Cooling capacity	(1)	kW	HC	241	294	359	405	497	588	716	811	881	1.045	1.213	1.405	1.618
Total absorbed power	(1)	kW	HC	46,0	57,0	69,2	78,9	94,8	114	139	156	171	203	237	269	316
EER	(1)		HC	5,24	5,15	5,19	5,13	5,24	5,16	5,14	5,14	5,15	5,15	5,12	5,23	5,13
ESEER			HC	8,70	8,83	8,84	8,95	9,08	9,16	9,04	9,21	9,13	8,96	9,12	9,16	9,20
Heating performances																
Heating capacity	(2)	kW	HC/H	287	351	439	500	592	703	877	1.000	1.053	1.279	1.496	1.718	1.995
Total absorbed power	(2)	kW	HC/H	57	70	89	101	118	140	178	203	210	261	304	346	405
COP	(2)		HC/H	5,00	5,01	4,95	4,93	5,01	5,02	4,92	4,94	5,02	4,91	4,92	4,96	4,92
Sound power level	(3)	dB(A)	HC	91	93	92	94	94	95	94	96	96	96	97	97	98
Maximum condenser outlet temperature		°C	HC	50	50	50	50	50	50	50	50	50	50	50	50	50
Dimensions																
A		mm	HC	2.990	2.990	2.990	2.990	3.490	3.490	3.490	3.490	4.990	4.990	4.990	5.450	5.450
B		mm	HC	950	950	950	950	1.300	1.300	1.300	1.300	1.300	1.300	1.300	1.300	1.300
H		mm	HC	1.900	1.900	1.900	1.900	1.800	1.800	1.800	1.800	1.800	1.800	1.800	1.990	1.990

TECS-HF/LC		Version	0511	0912	1012	1353	1453	1854	1954	
Compressors number		LC	1	2	2	3	3	4	4	
Circuits number		LC	1	1	1	1	1	1	1	
Cooling performances										
Cooling capacity	(1)	kW	LC	488	879	978	1.359	1.461	1.809	1.949
Total absorbed power	(1)	kW	LC	93,5	172	187	258	280	344	373
EER	(1)		LC	5,24	5,12	5,24	5,27	5,22	5,26	5,23
ESEER			LC	9,37	9,19	9,45	9,43	9,41	9,52	9,42
Sound power level	(3)	dB(A)	LC	95	96	97	97	98	99	99
Maximum condenser outlet temperature		°C	LC	40	40	40	40	40	40	40
Dimensions										
A		mm	LC	2.990	3.490	3.490	4.990	4.990	5.450	5.450
B		mm	LC	950	1.300	1.300	1.300	1.300	1.300	1.300
H		mm	LC	1.900	1.800	1.800	1.800	1.800	1.990	1.990

Note

(1) Evaporator water (in/out) = 12/7°C; condenser water (in/out) = 30/35°C

(2) Condenser water (in/out) = 40/45°C; evaporator water (in/out) = 14/7°C

(3) Sound power based on measurements taken in accordance with standard ISO 3744 and Eurovent

Impact of Oasis on the condensation and operational limits

Relative Humidity outdoor air [%]	Ambient air temperature, dry bulb [°C]	Delta T inlet condenser coil temperature [°C]	Water consumption for 1000m³/h air flow [l/h]
30	35	6	5,1
	40	6,5	5,6
	45	7,5	6,1
40	35	5	4,0
	40	5,5	4,6
	45	6	5,2
50	35	4,5	3,3
	40	5	3,7
	45	5	4,1
60	35	3,5	2,3
	40	4	2,6
	45	4,5	2,8
70	35	3	1,4
	40	4	1,6
	45	4	1,7

Main accessories

- Several serial card for protocols ModBus, Bacnet, Echelon IonTalk for supervisory systems both in BMS resources and Climaveneta devices (FWS3000, Manager3000)
- Remote keyboard; it offers access up to 10 units from a single point, with the possibility to set the main plant variables
- DEMETRA system to have an hourly complete report of the main variables: temperatures, energy given and absorbed
- Integrated hydronic group, with the possibility to select different pumps. Available also as VPF (Variable Primary Flow)
- EC fans (already standard in TECS2/SL-CA-E versions) (only for TECS2)
- Acoustical enclosure 'base' and 'plus' for a sound power level reduction of 14 and 18 dB(A) respectively (only for TECS-HF)
- Leak detector; devices to detect refrigerant leakage in close ambient