



Water-cooled Magnetic Levitation Variable Frequency Centrifugal Chiller **TECS™ Series**



TECS-W/L-E Series
277-2151kW(79-612RT)



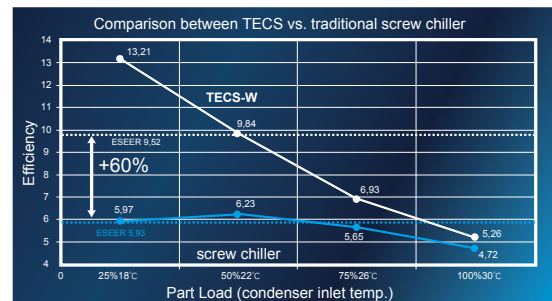
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High efficiency

The entire TECS range differs from chillers with screw compressor because of its high performance at partial loads, with an average increase of 60% in ESEER. This result is achieved by using an oil-free magnetic levitation centrifugal compressor combined with a dedicated flooded evaporator.



Integrated part load value (ESEER)

Increasingly closer attention is being paid towards the power consumption of air-conditioning equipments.

In air-conditioning systems, the chiller only works in full load for a few hours a year. For this reason, "reason efficiency" is the truly determining consumption factor.

The valuation indices have been adopted that consider usage in part load conditions as IPLV in the United States and ESEER in Europe.



ESEER up to 9.58, and IPLV up to 10

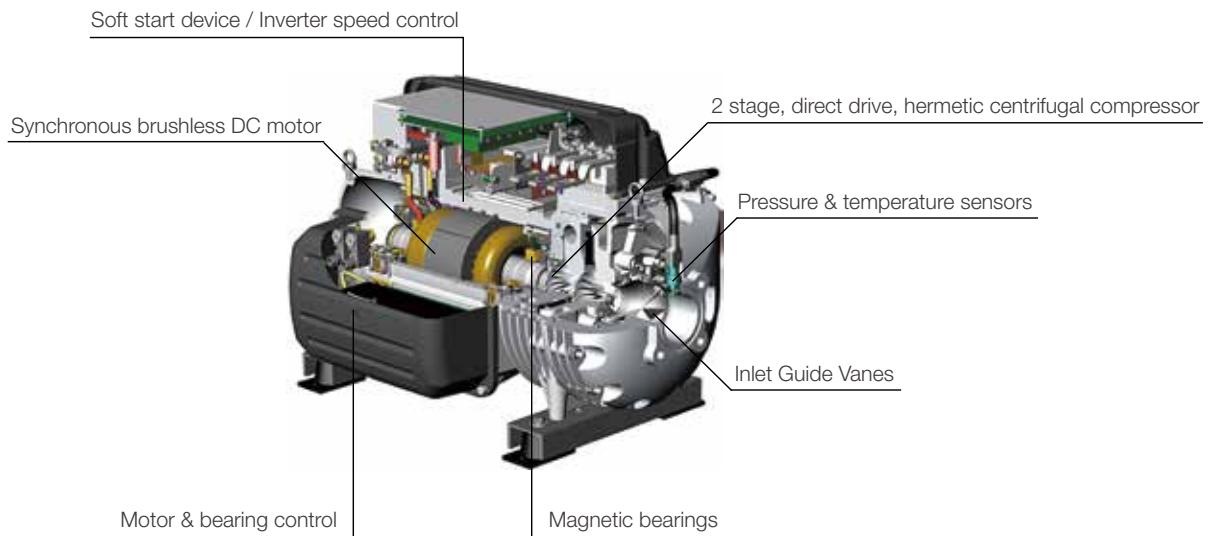
ESEER (European Seasonal Energy Efficiency Ratio): $0.03 \times A + 0.33 \times B + 0.41 \times C + 0.23 \times D$

Evaporator temp. leaving at 7°C (constant), condenser water (inlet) at 30°C (100% load—A), 26°C (75% load—B), 22°C (50% load—C), 18°C (25% load—D).

Features and Benefits

A revolutionary heart

Centrifugal compressor with magnetic levitation



A leading-edge miniaturized compressor, featuring magnetic bearings and digital impeller speed control, partial load efficiency levels that have never been obtained up till now.

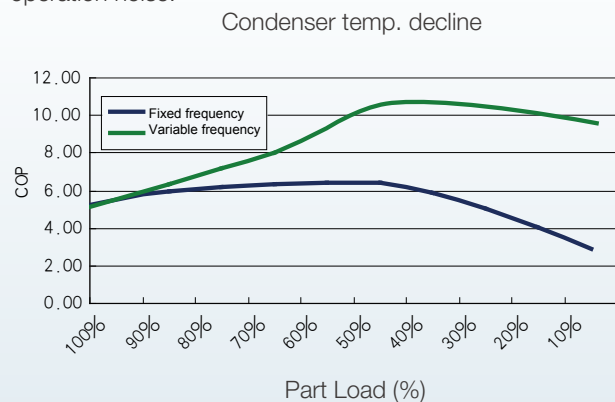
Compression is obtained by two high-speed impellers, driven by a continuously variable frequency motor, which deliver the exact cooling capacity required by the system. Magnetic bearings keep the high-speed shaft suspended in the air and frictionless. This technology, derived from aerospace applications, has many advantages:

- Outstanding part load efficiency thanks to the inbuilt inverter speed control.
- Oil-free, offering improved performance of the heat exchangers thanks to the elimination of the film of oil which, in other types of compressor, lies between the coolant and the exchange surface.
- Low vibrations under all operating conditions, and super low operation noise.
- Centrifugal compressor with built-in continuous impeller speed adjustment up to 48000 rpm.
- Thanks to their high speed, the impellers have been miniaturized, thereby reducing the size and weight of the compressor to just 120 kg.
- Very low current during starting (soft start), 2A instead of the 500-600 A of a screw compressor with the same cooling capacity.



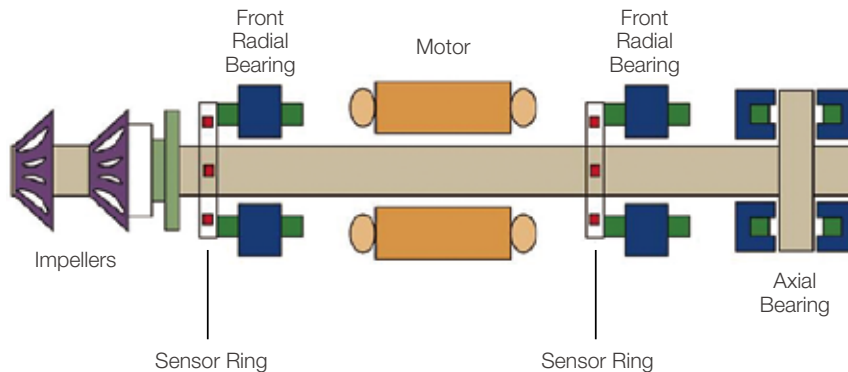
1st stage impeller

2nd stage impeller



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Magnetic Bearings



Magnetic bearings and sensors keep the shaft properly centered and positioned at all times.

- The magnetic bearings have less than .2% the friction loss compared to conventional bearings
- Eliminates the ability of the oil to contaminate the refrigerant
- Eliminates cost of oil management systems (hardware and controls)
- Increases equipment life through elimination of wear surfaces

Does this Integrated Compressor Design handle a Power Outage? **Yes.**

- Motor becomes a generator
- After the compressor comes to a complete stop, the rotor de-levitates normally onto touchdown bearings.
- Touchdown bearings are used as a back up bearing system

Dedicated Flooded Evaporator/Condenser

Flooded evaporator/condenser with integral rippled tube are modified to enhance the initiation of nucleate boiling sites and surface area, improving turbulent flow, resulting in increasingly overall heat transfer coefficient and high unit efficiency.

The evaporator is characterized by low pressure drops on both the gas side and the water side. The level of refrigerant inside the flooded evaporator is guaranteed by dedicate sensor level and modulating electronic valve.

Single circuit design even for multiple compressor improves unit part load efficiency.



Electronic Valve(EXV)

- The electronic valve is adopted to grant the ideal operation of the evaporator in all conditions.
- The complete flooding of tubes is granted with a sophisticated detection of the refrigerant level in the heat exchangers.
- 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.

Touch Screen LCD

- Full graphical interface, display all operating parameters.
- Full and effective control of the compressor and unit operation
- Comprehensive operation and alarm records, keeping the "black box" function.
- Compatible with the Climaveneta group controller such as Manager3000, Sequencer and BMS.



Extremely silent operation

Thanks to the adoption of the centrifugal compressor with magnetic levitation, TECS sound power and pressure are the lowest on the market, without peaks in any of the sound frequency spectrum.

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Performance Data

TECS-W/L-E		0801	0921	1051	1401	1421	1802	2152	2452	2802	3253	3903	4504	5204	6004	
Cooling capacity(1)	kW	277.6	325.9	371.4	507.1	510.7	645.3	757.0	878.6	1009.0	1149.0	1391.0	1613.0	1854.0	2151.0	
Power Input	kW	50.8	60.0	61.7	93.2	86.5	107.4	127.1	146.9	170.1	189.2	228.1	265.6	305.3	357.3	
EER		5.46	5.43	6.02	5.44	5.90	6.01	5.96	5.98	5.93	6.07	6.10	6.07	6.07	6.02	
IPLV		9.89	9.79	9.69	10.05	10.28	10.12	10.32	10.11	10.35	10.41	10.29	10.42	10.29	10.81	
EVAP. Water flow	m ³ /h	47.8	56.1	63.9	87.3	87.9	111.1	130.3	151.3	173.6	197.8	239.4	277.7	319.2	370.3	
EVAP. Water pressure drop	kPa	41.8	40.9	37.7	42.3	42.9	52.3	41.4	55.8	42.2	41.1	44.1	41.6	43.8	48.0	
COND. Water flow	m ³ /h	56.4	66.2	74.4	103.0	102.5	129.3	151.8	176.1	202.4	229.8	278.0	322.6	370.8	430.7	
COND. Water pressure drop	kPa	38.4	37.3	34.5	39.1	38.8	47.9	38.0	50.2	38.9	31.2	33.2	31.2	33.0	44.5	
Cooling capacity(2)	kW	276.3	327.3	374.9	495.0	501.8	639.0	750.7	861.2	991.3	1135.0	1366.0	1591.0	1820.0	2122.0	
Power Input	kW	53.7	63.6	66.6	95.9	89.6	113.6	133.7	153.2	176.4	198.9	237.9	278.7	318.2	370.7	
EVAP. Water flow	m ³ /h	43.2	51.2	58.7	77.5	78.5	100.0	117.5	134.8	155.2	177.7	213.8	249.0	284.9	332.1	
EVAP. Water pressure drop	kPa	34.2	34.1	31.4	33.3	34.2	42.4	33.7	44.3	33.7	33.2	35.2	33.5	34.9	38.6	
COND. Water flow	m ³ /h	56.6	67.1	75.8	101.4	101.6	129.3	151.9	174.2	200.5	229.2	275.5	321.2	367.3	428.1	
COND. Water pressure drop	kPa	38.8	38.2	35.8	38.0	38.1	47.9	38.1	49.2	38.2	31.0	32.6	30.9	32.4	44.0	
Cooling capacity(3)	kW	275.4	323.7	369.2	502.2	506.6	640.4	751.4	871.2	1001.0	1140.0	1379.0	1600.0	1839.0	2135.0	
Power Input	kW	50.8	60.1	61.9	93.1	86.6	107.7	127.4	147.2	170.3	189.7	228.5	266.2	305.8	357.8	
EVAP. Water flow	m ³ /h	43.1	50.7	57.8	78.6	79.3	100.2	117.6	136.4	156.6	178.5	215.9	250.4	287.8	334.1	
EVAP. Water pressure drop	kPa	34.0	33.4	30.5	34.3	34.9	42.6	33.7	45.4	34.3	33.4	35.9	33.9	35.6	39.1	
COND. Water flow	m ³ /h	50.0	58.8	66.1	91.2	90.9	114.7	134.7	156.1	179.5	203.9	246.5	286.1	328.8	382.1	
COND. Water pressure drop	kPa	30.2	29.4	27.2	30.7	30.5	37.7	29.9	39.5	30.6	24.5	26.1	24.6	26.0	35.0	
Microprocessor		W3000 Touch														
No. of compressors	n	1	1	1	1	1	2	2	2	2	3	3	4	4	4	
Refrigerant circuits	n	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Regulation range(stepless)		20%-100%					15%-100%				10%-100%			8%-100%		
Sound level	dB(A)	73	75	74	77	77	77	78	78	79	78	79	78	80	80	
Operation weight	kg	1,835	1,895	1,930	2,115	2,150	2,787	3,100	3,112	3,262	5,169	5,347	6,320	6,428	6,670	
Dimensions																
Length	mm	2,930	2,930	2,930	2,930	2,930	2,990	2,990	2,990	2,990	4,440	4,440	4,470	4,470	3,550	
Width	mm	1,210	1,210	1,210	1,210	1,210	1,480	1,480	1,480	1,480	1,450	1,450	1,580	1,580	2,820	
Height	mm	1,800	1,800	1,800	1,800	1,800	1,960	1,960	1,960	1,960	1,990	1,990	2,130	2,130	1,960	

Note

- (1) Cooling mode: evaporator inlet/outlet water temp. 12/7 °C ; Condenser inlet/outlet water temp. 30/35 °C ;
- (2) Cooling mode: evaporator inlet/outlet water temp. 12.5/7 °C ; Condenser inlet/outlet water temp. 32/37 °C ;
- (3) Cooling mode: evaporator inlet/outlet water temp. 12.2/6.7 °C ; Condenser inlet/outlet water temp. 29.4/35 °C ;
- (4) The working pressure of evaporators and condensers is 1.0MPa; 1.6MPa is optional;
 Differential pressure switches have been equipped on the units;
 The harmonic filters shall be fixed on the units as option, please contact CLIMAVENETA for detail;

Electric Parameter

Model	Max.Data				
	n	Comp.(single)		Unit	
		F.L.I(kW)	F.L.A(A)	F.L.I(kW)	F.L.A(A)
TECS-W/L-E					
0801	1	85	135	85	135
0921	1	85	135	85	135
1051	1	130	210	130	210
1401	1	105	170	170	105
1421	1	105	170	170	105
1802	2	85/105	135/170	190	305
2152	2	85/105	135/170	190	305
2452	2	105	170	210	340
2802	2	105	170	210	340
3253	3	85/105	135/170	295	475
3903	3	105	170	315	510
4504	4	85/105	135/170	400	645
5204	4	105	170	420	680
6004	4	105	170	420	680

Note

F.L.I Fullload power input at max admissible condition

F.L.A Fullload current ampere at max admissible condition

Supply power 380V-3Ph-50Hz

Range of voltage fluctuation: 10%

Range of voltage unbalance: 3%

The rated power and current are based on the rated working condition

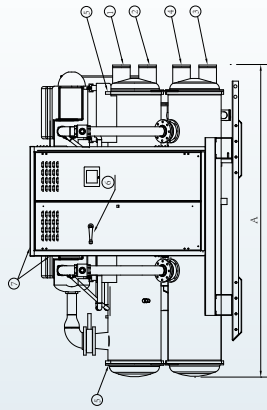
The maximum data is the theoretical limit value. When making wiring and power distribution, the data in the table are as reference.

The energy limit function shall be selected as option while the power supply is insufficient.

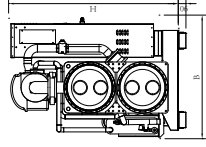
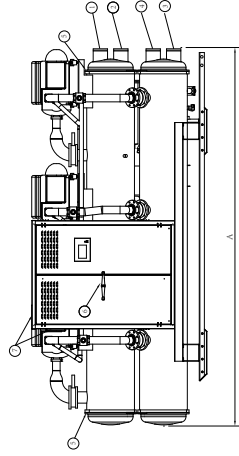
Water-cooled Magnetic Levitation Variable Frequency Centrifugal Chiller

Dimension Drawing

TECS-W0801-2802L-E



TECS-W3252-3903L-E



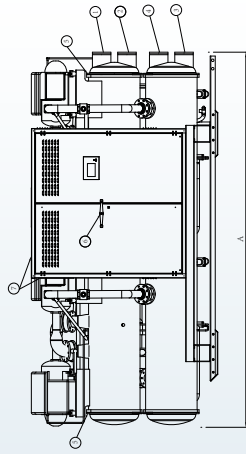
1. Evaporator inlet
2. Evaporator outlet
3. Condenser inlet
4. Condenser outlet
5. Suspending lugs
6. Main power switch
7. Wire connection hole

Information in the drawing are used for reference, please consult CLIMAVENETA office for detail

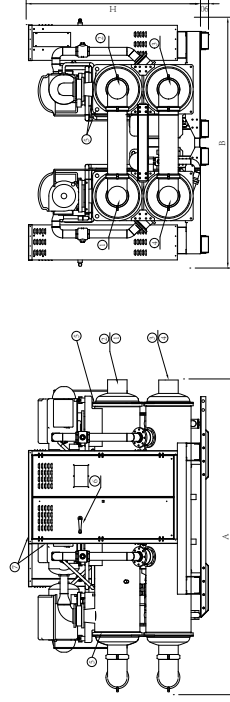
TECS-W/L-E	A		B		H		P.W.		Pipe Size			Clearance			
	mm	mm	mm	mm	mm	mm	kg	mm	①/②	③/④	R1(mm)	R2(mm)	R3(mm)	R4(mm)	
0801	2930	1210	1800	1835	3"	③/④	3"	2500	1000	900	500				
0921	2930	1210	1800	1895	3"	③/④	3"	2500	1000	900	500				
1051	2930	1210	1800	1930	3"	③/④	3"	2500	1000	900	500				
1401	2930	1210	1800	2115	4"	③/④	4"	2500	1000	900	500				
1421	2930	1210	1800	2150	4"	③/④	4"	2500	1000	900	500				
1802	2990	1480	1960	2787	5"	③/④	5"	2500	1000	900	900				
2152	2990	1480	1960	3100	6"	③/④	6"	2500	1000	900	900				
2452	2990	1480	1960	3112	6"	③/④	6"	2500	1000	900	900				
2802	2990	1480	1960	3262	6"	③/④	6"	2500	1000	900	900				
3253	4440	1450	1990	5169	6"	③/④	6"	4000	1000	900	900				
3903	4440	1450	1990	5347	6"	③/④	6"	4000	1000	900	900				

Dimension Drawing

TECS-W4504-5204L-E



TECS-W6004L-E



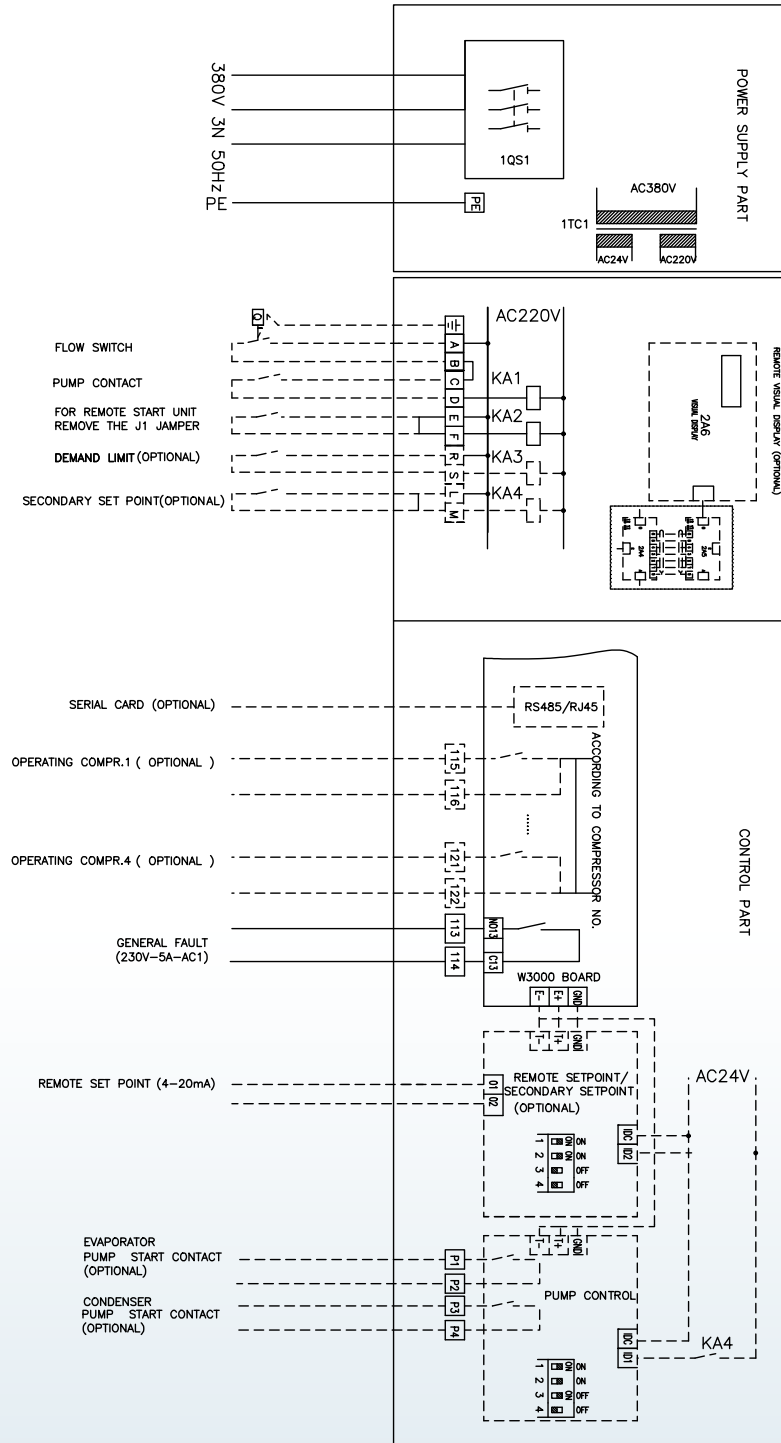
- 1. Evaporator inlet
- 2. Evaporator outlet
- 3. Condenser inlet
- 4. Condenser outlet
- 5. Suspending lugs
- 6. Main power switch
- 7. Wire connection hole

Information in the drawing are used for reference, please consult CLIMAVENETA office for detail

TECS-W/L-E	A		B		H		P/W.		Pipe Size			Clearance		
	mm		mm		mm		kg		①/②	③/④	R1(mm)	R2(mm)	R3(mm)	R4(mm)
4504	4470		1580		2130		6320		8"	8"	4000	1000	900	900
5204	4470		1580		2130		6428		8"	8"	4000	1000	900	900
6004	3550		2820		1960		6670		8"	8"	2500	1000	900	900

Water-cooled Magnetic Levitation Variable Frequency Centrifugal Chiller

Wiring Diagram



Representative consumer all over the world



Wan Chai Police Station HQ-Hong Kong

Hydronic system- 8,000kW total capacity
For over Provided by 4 TECS water cooled chillers TECS



European Parliament Strasbourg – France

Geothermal application – total capacity 3,300kW
Provided by 3 TECS water cooled chillers



Sports Hub-Singapore

Hydronic system, 24000kW total capacity
Provided by 8 TECS water cooled chillers



Advance Pharmaceutical-Hong Kong

Hydronic system, 3,000kW total capacity
Provided by 3 TECS water cooled chillers



Sino-Italy Ecological and Energy Efficient Building (SIEEB) Tsinghua University – China

Hydronic system, 800kW total capacity provided by 1 TECS
water cooled chiller.



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