

**MITSUBISHI ELECTRIC
HYDRONICS & IT COOLING SYSTEMS S.p.A.**

COMFORT

CHILLERS

TECS-FC

TECS-FC-G05

**AIR COOLED CHILLERS WITH
OIL-FREE COMPRESSORS AND
FREE-COOLING TECHNOLOGY,
FROM 302 TO 1649 kW**

R513A



TECS-FC

TECS-FC-G05

**“THE GREATER PART
OF PROGRESS IS THE
DESIRE TO PROGRESS”**

Lucio Anneo Seneca

Latin Philosopher
(4 BC - 64 AC)

High efficiency air cooled chiller with oil-free compressors and free-cooling, 302-1693 kW

Resulting from the recognised prestige of Climaveneta brand products utilizing magnetic levitation technology, TECS-FC air cooled chillers match the advantages of oil-free technology with a free-cooling system.

TECS-FC is also available as TECS-FC-G05 with the innovative R513A refrigerant, which represents a low GWP alternative to R134a units.



COMFORT APPLICATIONS

- ✓ Hotels
- ✓ Shopping centres
- ✓ Office buildings
- ✓ Museums
- ✓ Education centres
- ✓ Sport facilities
- ✓ Banks
- ✓ Institutions

TOP-LEVEL EFFICIENCY

Strict energy consumption and environmental impact regulations continually push towards ever more efficient units. Achieving the greatest energy savings and ensuring long-term sustainability are challenges that modern cooling systems need to tackle.

TECS-FC range of chillers adopts an advanced free-cooling system that has been conceived to reduce the compressor work and maximize the use of the outdoor air.

2 REFRIGERANT OPTIONS

Climaveneta oil-free compressor chillers are now available with two refrigerants, both dedicated to comfort applications:

- **TECS-FC:** High efficiency air cooled chiller with free-cooling and R134a high performing refrigerant.

- **TECS-FC-G05:** High efficiency air cooled chiller with free-cooling and R513A high performing and low GWP refrigerant.

VERSIONS

K

Key efficiency, compact version

CA

High energy efficiency

CONFIGURATIONS

-

Standard free-cooling

NG

Function for free-cooling without glycol

**SOME PROJECTS DON'T ACCEPT COMPROMISES,
THEY SIMPLY DEMAND THE BEST TECHNOLOGY.**

TECS-FC

THE FOREFRONT OF PROGRESS

The power of ultimate technological solutions and a massive use of renewable resources have been merged to create TECS-FC.

WIDEST USE OF FREE-COOLING



Capitalizing on the energy of the environment to cut operating costs.

Thanks to special heat exchangers featuring a large surface area and advanced logics for free-cooling management, the liquid is cooled by outdoor air, thus lowering the load of the compressors to zero. This already occurs at positive outdoor temperatures.

HIGHEST MANUFACTURING QUALITY



Climaveneta has over ten years of experience with magnetic levitation compressors and extensive expertise in free-cooling technology.

The Climaveneta brand oil-free chiller range takes advantage of this profound experience in order to achieve the highest quality standards in every single detail.

UNBEATABLE PERFORMANCE



Top-level seasonal efficiencies thanks to technological solutions that are at the forefront of innovation: magnetic levitation compressors, flooded evaporator, and EC fans for the highest energy savings.

NOW EVEN WITH R513A REFRIGERANT



Combining brilliant annual efficiency with the use of a low GWP refrigerant, the Climaveneta branded range of chillers with R513A tackles both indirect (due to primary energy consumption) and direct global warming, thus resulting in the perfect choice for any new, forward-looking cooling system.

EER: over 4,0 (1)

EER: over 5,0 (2)

(1) Water (in/out) 15°C/10°C; Air (in) 30°C; Et. glycol 30%.
(2) Water (in/out) 27°C/20°C; Air (in) 30°C; Et. glycol 30%.

TFC*: over 2,0 °C (3)

TFC*: over 10,0 °C (4)

(3) Water (in/out) 15°C/10°C; Et. glycol 30%.
(4) Water (in/out) 27°C/20°C; Et. glycol 30%.

*TFC: Total Free-cooling

FREE-COOLING TECHNOLOGY



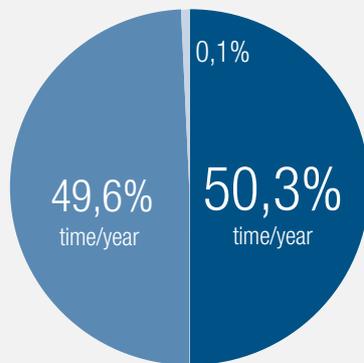
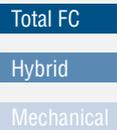
Free-cooling potential: temperature occurrence distribution

Wherever cooling demand is constant all year round, free-cooling provides significant energy saving opportunities.

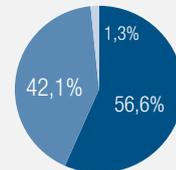
In a cooling system located in London, working with favorable levels of water temperature (such as 27-20°C), the outdoor air alone can satisfy the cooling demand

50,3% of the time. 49,6% of the time, the outdoor air cooling capacity allows the chiller's compressors to run at part loads, with a significant increase in efficiency. For only 0,1% of the time, the unit works as an ordinary chiller.

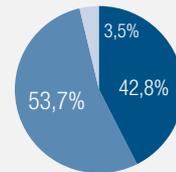
London



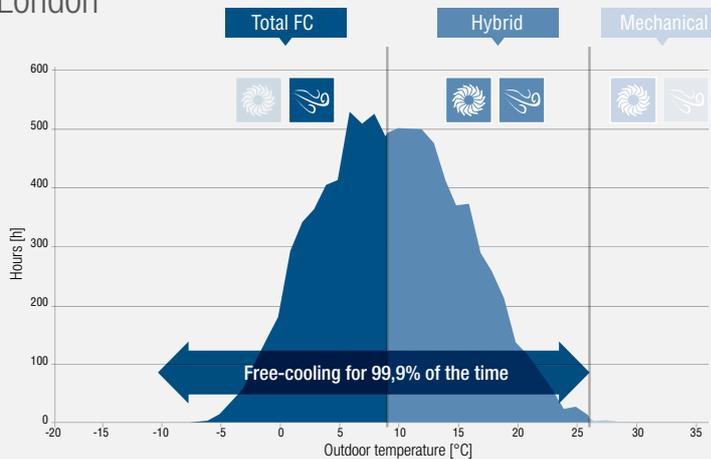
Munich



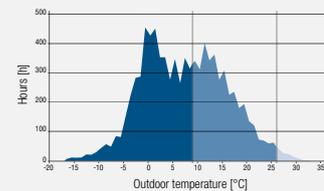
Milan



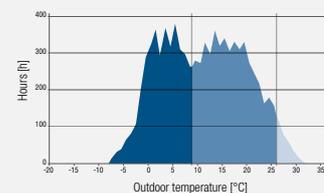
London



Munich



Milan



How Climaveneta masters free-cooling

Climaveneta's free-cooling chillers work in three different modes: Total free-cooling, Hybrid cooling, Mechanical cooling, according to outdoor air conditions and operating water temperature. As the outdoor air temperature drops 1 degree below the returning water temperature, a valve system redirects the water to special coils and the benefits of the free-cooling begin.



Total free-cooling

- ▶ The outdoor air temperature is low enough to satisfy the entire cooling demand.
- ▶ Total cooling capacity is provided by the outdoor air in the free-cooling coils while the compressors are off.

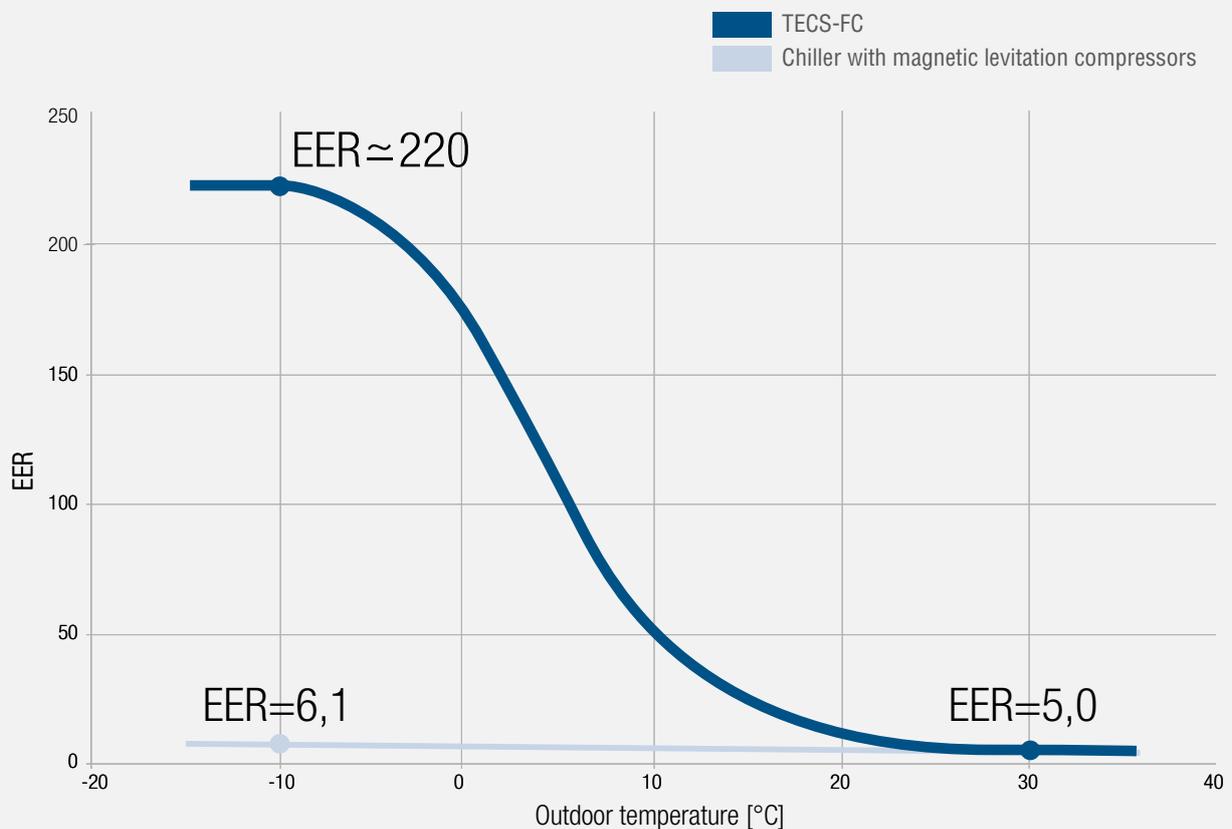
Maximum Energy Savings

THE ULTIMATE SOLUTION TO HARNESS THE FULL POTENTIAL OF RENEWABLE SOURCES

Efficiency comparison: traditional chillers vs free-cooling chillers

To understand how free-cooling can cut the energy bill of your cooling system, it is sufficient to compare the efficiency of a TECS-FC unit with the efficiency of a comparable technology chiller without free-cooling. When the outdoor air temperature is too high to provide free-cooling, the EER (Energy Efficiency Ratio) of the two units are aligned.

But as the air temperature decreases, the gap between the units' efficiency becomes clear and even huge. In total free-cooling mode, the compressors are off and very little energy is needed to provide the whole cooling capacity.



Note: Plant (side) cooling exchanger water (in/out) 27°C/20°C; Ethylene glycol 30%.

Hybrid cooling

- ▶ The outdoor air temperature is lower than the returning water temperature but not cold enough to achieve total free-cooling.
- ▶ Part of the cooling capacity is provided by the outdoor air while the rest is provided by the compressors.

Optimised Source Management

Mechanical cooling

- ▶ The outdoor air temperature is equal to or higher than the returning water temperature.
- ▶ Total cooling capacity is provided by the compressors, in the evaporator.

Conventional Chiller Operation

TECHNOLOGICAL CHOICES

EC fans

Hold the reins on air flow rate

Managing both free-cooling and condensation with rough air flow regulation would mean a significant energy loss due to unfavourable condensation pressure or not capitalising on free-cooling.

EC fans are efficient and silent and have the capability to adjust their rotational speed continuously. Their accurate and quick air flow regulation allows Climaveneta's control functions to perform at their best, granting the best possible unit operation in any condition.

Special coils

Keep the efficiency up over time

Free-cooling efficacy is strictly related to the effectiveness of the air/water direct heat exchange. Nevertheless, an efficient air/refrigerant coil is necessary for proper condensation.

A special coil, made of both refrigerant and water tubes, achieves both goals. This particular configuration, instead of two separate finned coils, also prevents fin spacing misalignment and dust and dirt accumulation. Hence low pressure drops and high heat exchange efficiency will last.



ADVANCED CONTROL

The controller features proprietary settings that ensure fast adaptive responses to different dynamics, in all operating modes.

The interface is intuitive and user-friendly thanks to the adoption of LED icons for a full and immediate status display of the various circuits.



Standard interface

- ✓ Easy-to read LED icons
- ✓ Controls for easy and safe access to the unit's settings

**Climaveneta brand manufacturing quality in every detail.
Extreme efficiency and absolute reliability: the secret formula is
cutting-edge technologies and deep know-how.**



Flooded evaporator

Excellence in the heat exchange

Designed and built internally, the geometry of the flooded evaporator grants optimum temperature distribution along the shell, hence highly efficient heat exchange and low refrigerant pressure drops.

Allowing the over-heating surface to be eliminated, the flooded evaporation delivers unbeatable heat exchange efficiency, but it also requires maximum care in keeping the exact liquid refrigerant level. This could become tricky in case of wide variations of the evaporator cooling load, which in these units happens again and again due to free-cooling contribution. Climaveneta units ensure a fully reliable way out thanks to specific design solutions and proprietary electronic expansion valve control algorithms.

Centrifugal compressor with magnetic levitation technology

The expertise makes the difference

These top level technology compressors bring enormous benefits in terms of efficiency, adjustments, vibrations and weight. Magnetic levitation eliminates the need for lubricant, its delicate management and heat exchange penalisation. Partial load efficiency, which is crucial during the hybrid operation, is therefore strongly increased.

A profound knowledge is necessary to harness such a concentration of technology and here is where the Climaveneta brand really makes the difference thanks to its 10-year experience in oil-free compressors units and thousands of projects all over the world.

THE BRAIN BEHIND THE SUCCESS

As an option, a 7" color touch screen display interface is available with a USB port, for quick and easy application updates and downloading of all registered variables in graphic form.



Optional touch screen interface

- ✓ 7" color display
- ✓ USB Port

TECS-FC-G05

TECS-FC-G05 0211 - 1204

High efficiency air cooled chiller with free-cooling, 302 kW -1649 kW



Fully committed to supporting the creation of a greener tomorrow, Mitsubishi Electric Hydronics & IT Cooling Systems designed TECS-FC-G05, a complete large capacity chiller range with reduced environmental impact, optimized for R513A refrigerant.

Combining brilliant annual efficiency with the use of a low GWP refrigerant, TECS-FC-G05 tackles both the indirect (due to primary energy consumption) and the direct global warming, thus resulting in the perfect choice for any new, forward-looking cooling system.



LOW GWP

-56% GWP vs R134a



Non-flammable

Safety Class A1

REFRIGERANT BENCHMARK

SCROLL			SCREW		
Refrigerant	GWP*	Flammability**	Refrigerant	GWP*	Flammability**
R410A	2088	NON flammable	R134a	1430	NON flammable
R32	675	MILDLY flammable	R513A	631	NON flammable
R454B	466	MILDLY flammable	R1234ze	7	MILDLY flammable
R452B	698	MILDLY flammable	R1234yf	4	MILDLY flammable

*IPCC AR4

**ASHRAE 34 - ISO 817

New regulations like the EU F-gas and the Kigali Amendment to the Montreal Protocol, are driving the industry towards new eco-friendly refrigerants, with reduced greenhouse effect.

Unfortunately, the majority of low GWP refrigerants raises another critical issue: flammability.

The new refrigerant R513A, chosen for TECS-FC-G05, is a brilliant exception: it offers a -56% GWP reduction compared to R134a's while ensuring complete non-toxicity and non-flammability (Class A1 of ASHRAE 34, ISO 817).



TECS-FC-G05/K			0211	0351	0452	0552	0652	0712	0903	0953	1003	1164	1204
Power supply	V/Ph/Hz		400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
PERFORMANCE													
COOLING ONLY (GROSS VALUE)													
Cooling capacity	(1)	kW	299,2	479,3	590,0	682,1	932,1	969,4	1173	1238	1409	1558	1627
Total power input	(1)	kW	87,50	140,4	177,9	180,1	284,6	275,0	319,5	372,8	425,0	456,2	459,3
EER	(1)	kW/kW	3,419	3,414	3,316	3,787	3,275	3,525	3,671	3,321	3,315	3,415	3,542
COOLING ONLY (EN14511 VALUE)													
Cooling capacity	(1)(2)	kW	297,1	475,7	586,0	677,0	925,4	962,2	1166	1231	1399	1547	1615
EER	(1)(2)	kW/kW	3,310	3,300	3,220	3,650	3,180	3,410	3,570	3,240	3,220	3,310	3,430
TOTAL FREE-COOLING (GROSS VALUE)													
Cooling capacity	(3)	kW	299,2	479,3	590,0	682,1	932,1	969,4	1173	1238	1409	1558	1627
EER	(3)	kW/kW	58,67	49,93	49,17	66,87	55,48	50,49	48,88	51,58	53,37	49,94	52,15
Total free-cooling temperature	(3)	°C	-1,8	-2,4	-1,8	-1,3	-2,5	-1,3	-1,1	-2,5	-2,4	-1,5	-1,6
ENERGY EFFICIENCY													
SEASONAL EFFICIENCY IN COOLING (Reg. EU 2016/2281)													
Ambient refrigeration													
Prated,c	(8)	kW	258	411	504	602	790	842	1035	1056	1201	1343	1416
SEER	(8)(9)		4,88	4,63	4,64	5,20	4,70	4,74	4,59	4,42	4,50	4,33	4,37
Performance ηs	(8)(10)	%	192	182	183	205	185	186	181	174	177	170	172
EXCHANGERS													
HEAT EXCHANGER USER SIDE IN REFRIGERATION													
Water flow	(1)	l/s	15,85	25,39	31,26	36,14	49,38	51,36	62,16	65,59	74,62	82,52	86,21
Pressure drop	(1)	kPa	84,3	97,2	88,0	102	101	105	90,0	78,3	101	103	112
REFRIGERANT CIRCUIT													
Compressors nr.		N°	1	1	2	2	2	3	3	3	4	4	4
No. Circuits		N°	1	1	1	1	1	2	2	2	2	2	2
Refrigerant charge		kg	120	140	260	260	320	320	430	520	520	540	540
NOISE LEVEL													
Sound Pressure	(4)	dB(A)	56	61	62	58	63	63	64	64	65	65	65
Sound power level in cooling	(5)(6)	dB(A)	88	93	94	91	96	96	97	97	98	98	98
SIZE AND WEIGHT													
A	(7)	mm	4000	4000	4900	6400	7000	7900	10600	11200	11200	13000	13600
B	(7)	mm	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260
H	(7)	mm	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500
Operating weight	(7)	kg	3430	3850	5080	5820	6340	6900	9750	10260	10530	12290	12350

TECS-FC-G05/CA			0211	0251	0351	0452	0552	0712	0803	0903	1003
Power supply	V/Ph/Hz		400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
PERFORMANCE											
COOLING ONLY (GROSS VALUE)											
Cooling capacity	(1)	kW	306,5	351,4	492,6	609,7	705,6	979,4	1058	1195	1433
Total power input	(1)	kW	85,80	89,50	133,8	172,4	176,9	268,1	266,3	308,1	412,7
EER	(1)	kW/kW	3,572	3,926	3,682	3,537	3,989	3,653	3,973	3,879	3,472
COOLING ONLY (EN14511 VALUE)											
Cooling capacity	(1)(2)	kW	304,2	348,7	488,7	605,3	700,0	972,0	1052	1187	1423
EER	(1)(2)	kW/kW	3,450	3,780	3,550	3,420	3,840	3,530	3,870	3,760	3,370
TOTAL FREE-COOLING (GROSS VALUE)											
Cooling capacity	(3)	kW	306,5	351,4	492,6	609,7	705,6	979,4	1058	1195	1433
EER	(3)	kW/kW	60,10	51,68	57,95	59,77	51,88	57,61	51,86	54,07	64,84
Total free-cooling temperature	(3)	°C	0,0	-0,1	-0,9	-0,4	0,5	-0,8	0,3	0,1	-1,5
ENERGY EFFICIENCY											
SEASONAL EFFICIENCY IN COOLING (Reg. EU 2016/2281)											
Ambient refrigeration											
Prated,c	(8)	kW	268	317	431	529	642	857	962	1073	1233
SEER	(8)(9)		5,02	4,94	5,04	5,17	5,22	5,13	5,18	5,01	4,90
Performance ηs	(8)(10)	%	198	195	199	204	206	202	204	198	193
EXCHANGERS											
HEAT EXCHANGER USER SIDE IN REFRIGERATION											
Water flow	(1)	l/s	16,24	18,62	26,10	32,30	37,38	51,89	56,04	63,28	75,91
Pressure drop	(1)	kPa	88,5	94,9	103	94,0	109	107	73,1	93,3	105
REFRIGERANT CIRCUIT											
Compressors nr.		N°	1	1	1	2	2	2	3	3	3
No. Circuits		N°	1	1	1	1	1	1	2	2	2
Refrigerant charge		kg	120	120	140	260	280	320	430	430	520
NOISE LEVEL											
Sound Pressure	(4)	dB(A)	56	57	58	58	59	60	61	61	61
Sound power level in cooling	(5)(6)	dB(A)	88	89	90	91	92	93	94	94	94
SIZE AND WEIGHT											
A	(7)	mm	4000	4000	4900	6400	7900	10000	12100	13000	13000
B	(7)	mm	2260	2260	2260	2260	2260	2260	2260	2260	2260
H	(7)	mm	2500	2500	2500	2500	2500	2500	2500	2500	2500
Operating weight	(7)	kg	3660	3790	4380	5720	6770	8870	10530	11370	11730



TECS-FC 0211 - 1204

High efficiency air cooled chiller with free-cooling
302 kW -1649 kW

TECS-FC /K			0211	0351	0452	0552	0652	0712	0903	0953	1003	1164	1204
Power supply		V/ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
PERFORMANCE													
COOLING ONLY (GROSS VALUE)													
Cooling capacity	(1)	kW	302	483	594	689	943	980	1185	1253	1421	1578	1649
Total power input	(1)	kW	87,1	141	179	181	285	275	320	373	425	455	461
EER	(1)	kW/kW	3,47	3,43	3,33	3,81	3,31	3,56	3,70	3,36	3,35	3,47	3,58
COOLING ONLY (EN14511 VALUE)													
Cooling capacity	(1)(2)	kW	300	479	590	684	936	973	1177	1246	1411	1567	1637
EER	(1)(2)	kW/kW	3,36	3,31	3,23	3,67	3,21	3,44	3,59	3,28	3,25	3,36	3,46
TOTAL FREE-COOLING (GROSS VALUE)													
Cooling capacity	(3)	kW	302	483	594	689	943	980	1185	1253	1421	1578	1649
EER	(3)	kW/kW	59,25	50,28	49,52	67,55	56,15	51,05	49,38	52,21	53,83	50,58	52,85
Total free-cooling temperature	(3)	°C	-1,9	-2,5	-1,9	-1,4	-2,7	-1,4	-1,2	-2,7	-2,5	-1,6	-1,8
ENERGY EFFICIENCY													
SEASONAL EFFICIENCY IN COOLING (Reg. EU 2016/2281)													
Ambient refrigeration													
Prated,c	(8)	kW	261	414	507	608	800	851	1045	1069	1212	1361	1435
SEER	(8)(9)		4,91	4,62	4,66	5,23	4,73	4,77	4,62	4,46	4,53	4,38	4,41
Performance ηs	(8)(10)	%	193	182	184	206	186	188	182	175	178	172	173
EXCHANGERS													
HEAT EXCHANGER USER SIDE IN REFRIGERATION													
Water flow	(1)	l/s	16,01	25,57	31,48	36,50	49,98	51,93	62,78	66,38	75,30	83,61	87,35
Pressure drop	(1)	kPa	86,0	98,6	89,3	104	104	107	91,8	80,2	103	106	115
REFRIGERANT CIRCUIT													
Compressors nr.		N°	1	1	2	2	2	2	3	3	3	4	4
No. Circuits		N°	1	1	1	1	1	1	2	2	2	2	2
Refrigerant charge		kg	120	140	260	260	320	320	430	520	520	540	540
NOISE LEVEL													
Sound Pressure	(4)	dB(A)	56	61	62	58	63	63	64	64	65	65	65
Sound power level in cooling	(5)(6)	dB(A)	88	93	94	91	96	96	97	97	98	98	98
SIZE AND WEIGHT													
A	(7)	mm	4000	4000	4900	6400	7000	7900	10600	11200	11200	13000	13600
B	(7)	mm	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260
H	(7)	mm	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500
Operating weight	(7)	kg	3430	3850	5080	5820	6340	6900	9750	10260	10530	12290	12350

Notes:

1 Plant (side) cooling exchanger water (in/out) 15°C/10°C; Source (side) heat exchanger air (in) 30°C; Ethylene glycol 30%.

2 Values in compliance with EN14511-3:2013.

3 Plant (side) cooling exchanger water (in/out) 15°C/10°C; Ethylene glycol 30%.

4 Average sound pressure level at 10m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.

5 Sound power on the basis of measurements made in compliance with ISO 9614.

6 Sound power level in cooling, outdoors.

7 Unit in standard configuration/execution, without optional accessories.

8 Seasonal energy efficiency of the cooling environment in AVERAGE climatic conditions [REGULATION (EU) N. 2016/2281]

9 Seasonal space heating energy index

10 Seasonal energy efficiency of the space cooling

TECS-FC-G05 on page 9: The units highlighted in this publication contain R513A [GWP100 631] fluorinated greenhouse gases.

TECS-FC on pages 10 and 11: The units highlighted in this publication contain HFC R134a [GWP1001430] fluorinated greenhouse gases.



TECS-FC /CA			0211	0251	0351	0452	0552	0712	0803	0903	1003
Power supply		V/ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
PERFORMANCE											
COOLING ONLY (GROSS VALUE)											
Cooling capacity	(1)	kW	310	354	496	616	714	990	1068	1209	1446
Total power input	(1)	kW	85,4	89,8	134	173	177	268	267	308	412
EER	(1)	kW/kW	3,63	3,94	3,69	3,56	4,03	3,69	4,00	3,92	3,51
COOLING ONLY (EN14511 VALUE)											
Cooling capacity	(1)(2)	kW	307	351	492	611	708	983	1062	1201	1436
EER	(1)(2)	kW/kW	3,50	3,79	3,56	3,44	3,87	3,56	3,90	3,80	3,40
TOTAL FREE-COOLING (GROSS VALUE)											
Cooling capacity	(3)	kW	310	354	496	616	714	990	1068	1209	1446
EER	(3)	kW/kW	60,71	52,04	58,36	60,37	52,51	58,25	52,35	54,71	65,43
Total free-cooling temperature	(3)	°C	-0,1	-0,2	-1,0	-0,5	0,4	-0,9	0,2	0,0	-1,6
ENERGY EFFICIENCY											
SEASONAL EFFICIENCY IN COOLING (Reg. EU 2016/2281)											
Ambient refrigeration											
Prated,c	(8)	kW	271	319	434	535	650	867	972	1086	1244
SEER	(8)(9)		5,04	4,95	5,05	5,18	5,26	5,16	5,21	5,06	4,94
Performance ηs	(8)(10)	%	199	195	199	204	207	204	205	199	195
EXCHANGERS											
HEAT EXCHANGER USER SIDE IN REFRIGERATION											
Water flow	(1)	l/s	16,40	18,75	26,28	32,63	37,83	52,47	56,60	64,05	76,60
Pressure drop	(1)	kPa	90,3	96,3	104	95,9	111	109	74,6	95,6	107
REFRIGERANT CIRCUIT											
Compressors nr.		N°	1	1	1	2	2	2	3	3	3
No. Circuits		N°	1	1	1	1	1	1	2	2	2
Refrigerant charge		kg	120	120	140	260	280	320	430	430	520
NOISE LEVEL											
Sound Pressure	(4)	dB(A)	56	57	58	58	59	60	61	61	61
Sound power level in cooling	(5)(6)	dB(A)	88	89	90	91	92	93	94	94	94
SIZE AND WEIGHT											
A	(7)	mm	4000	4000	4900	6400	7900	10000	12100	13000	13000
B	(7)	mm	2260	2260	2260	2260	2260	2260	2260	2260	2260
H	(7)	mm	2500	2500	2500	2500	2500	2500	2500	2500	2500
Operating weight	(7)	kg	3660	3790	4380	5720	6770	8870	10530	11370	11730

Notes:

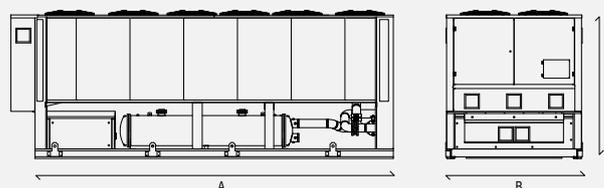
- 1 Plant (side) cooling exchanger water (in/out) 15°C/10°C; Source (side) heat exchanger air (in) 30°C; Ethylene glycol 30%.
- 2 Values in compliance with EN14511-3:2013.
- 3 Plant (side) cooling exchanger water (in/out) 15°C/10°C; Ethylene glycol 30%.
- 4 Average sound pressure level at 10m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
- 5 Sound power on the basis of measurements made in compliance with ISO 9614.
- 6 Sound power level in cooling, outdoors.
- 7 Unit in standard configuration/execution, without optional accessories.
- 8 Seasonal energy efficiency of the cooling environment in AVERAGE climatic conditions [REGULATION (EU) N. 2016/2281]
- 9 Seasonal space heating energy index
- 10 Seasonal energy efficiency of the space cooling

TECS-FC-G05 on page 9: The units highlighted in this publication contain R513A [GWP100 631] fluorinated greenhouse gases.

TECS-FC on pages 10 and 11: The units highlighted in this publication contain HFC R134a [GWP1001430] fluorinated greenhouse gases.

ACCESSORIES

- ▶ Leak detector with automatic refrigerant migration
- ▶ Energy meter with BMS interface
- ▶ Electromagnetic compatibility (EMC) - EN6100-6-3 for residential environments

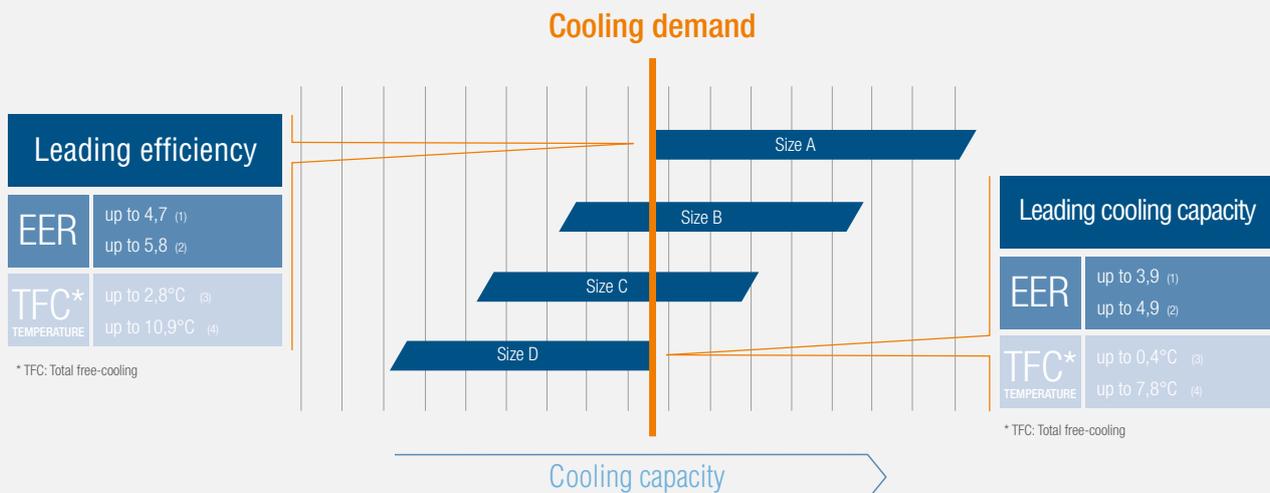


POWERFUL FLEXIBILITY

A MIGHTY CORE TAILORED TO A PROJECT'S NEEDS

Every job has its own specific needs. Because of the skillful use of component technical features, the TECS-FC range perfectly tailors the actual specifications and priorities of any project.

A definite cooling demand can in fact be provided giving priority to reducing the initial investment cost (leading cooling capacity), or putting a premium on annual energy savings and payback time (leading efficiency).



(1) Water (in/out) 15°C/10°C; Air (in) 30°C; Et. glycol 30%. (2) Water (in/out) 27°C/20°C; Air (in) 30°C; Et. glycol 30%. (3) Water (in/out) 15°C/10°C; Et. glycol 30%. (4) Water (in/out) 27°C/20°C; Et. glycol 30%.

THDI AND POWER FACTOR



The accurate design of electrical and electronic components and the use of specific solutions, such as compressor line reactors (std) and power factor correction capacitors (opt), reduce the THDi (Total Harmonic Distortion of current) and increase unit's Power Factor. To fit even the most demanding requirements, modular active harmonic filters can be added to cut the THDi down to values below 5%.

HFO REFRIGERANT



In line with the most severe environmental regulations, TECS-FC is also available with the new green HFO 1234ze refrigerant. A solution that complies with the highest efficiency targets required by modern projects, whilst offering an eco-friendly alternative to HFCs.

ClimaPRO



According to the units' actual efficiency curves, ClimaPRO continuously optimises plant working conditions by promptly adjusting equipment staging and sequencing, managing operating set-points and controlling water flows throughout the entire system. ClimaPRO can be natively interfaced with any BMS or it can successfully perform all functions on its own.

“EXPERIENCE IS BY FAR THE BEST PROOF”

Sir Francis Bacon
British philosopher (1561-1626)

RINASCENTE STORE

2015 - 2018 - ROME (ITALY)

Application:
Retail

Plant type:
Hydronic System

Cooling capacity:
2200 kW

Heating capacity:
800 kW

Installed machines:
**1x TECS-FC / K 1204,
1x ERACS2-Q / SL-CA 3222**



PROJECT

Mitsubishi Electric Hydronics & IT Cooling Systems, through its brand Climaveneta, has supplied the air conditioning units for the new La Rinascente department store located in Tritone Street, Rome.

CHALLENGE

To grant the best internal comfort to the customers throughout the year, offering a unique and irreplaceable shopping experience, the M&E designer planned efficient and reliable technical plants for the store.

SOLUTION

The HVAC system is based on Climaveneta units:
One TECS-FC / K oil-free compressor chiller combined with one 4-pipe heat pump ERACS2-Q / SL-CA 3222 for a total cooling capacity of almost 2,200 kW.

MORE THAN 1000 PROJECTS ALL OVER THE WORLD

Cornegliani Spa

2019 Mantova - Italy

Application: Office Buildings

Plant type: Hydronic System

Cooling Capacity: 1184 kW

Installed machines: 1x TECS-FC
oil-free compressor chiller



InfoCamere

2015 Italy - Padua

Application: Data centre

Cooling Capacity: 1000 kW

Installed machines: 2x TECS2-FC oil-free
compressor chillers with free-cooling technology,
1x MANAGER 3000 Control system



Hammerbrookhöfe

2012 Hamburg - Germany

Application: Office buildings
Cooling Capacity: 750 kW
Installed machines: 2x TECS2/XL/CA
 high efficiency oil-free compressor chillers,
 2x NECS/FC scroll compressor chillers
 with free-cooling technology



KAD Building European Parliament

2018 Luxembourg

Application: Institutions
Plant type: Hydronic System - HPAC System
Cooling Capacity: 7488 kW
Installed machines: 1x TECS2/SL-CA-E
 high efficiency oil-free compressor chiller,
 70x ACU Indoor close control units





for a greener tomorrow

Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.



MITSUBISHI ELECTRIC HYDRONICS & IT COOLING SYSTEMS S.p.A.

Head Office: Via Sarson 57/c - 36061 Bassano del Grappa (VI) - Italy

Tel (+39) 0424 509 500 - Fax (+39) 0424 509 509

www.climaveneta.com

www.melcohit.com