

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

IT COOLING

CHILLERS

TRCS2-Z

**CHILLERS, AIR AND WATER COOLED,
FEATURING CENTRIFUGAL COMPRESSORS
WITH MAGNETIC LEVITATION,
FROM 200 TO 1949 KW**



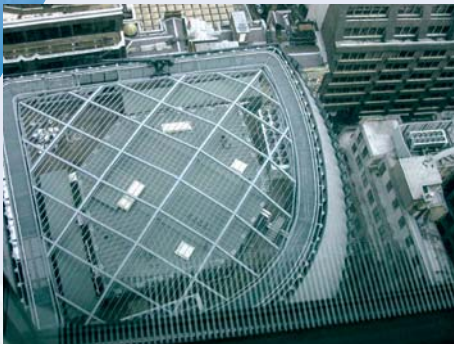
STRIVING FOR HIGHEST EFFICIENCY

Today's mission-critical projects require leading edge solutions to meet extremely demanding challenges:



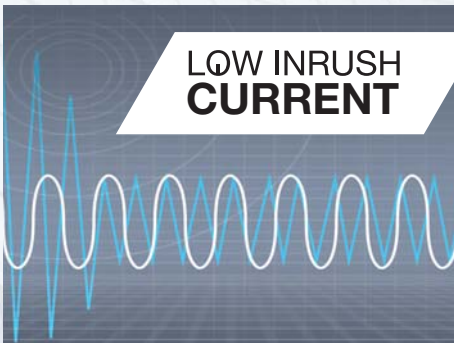
VERY STRICT ENERGY EFFICIENCY AND SUSTAINABILITY REQUIREMENTS

Reduced initial investment and running costs, compliance with increasingly strict energy consumption and environmental impact regulations, are becoming more and more crucial factors not only for real estate valuation, but also in deciding if the project should proceed.



COMPLEX ARCHITECTURE AND LOGISTICS

The search for prestigious central locations together with regulations and incentives for requalification of urban areas increase the building site logistical complexity and the challenge of moving the system's components.



INFRASTRUCTURE AND TECHNICAL SPACE OPTIMIZATION

The real estate value, especially with expensive, prestigious investment in urban environments may be determined also by the quality of the electrical system installed. Hence, choices that do not overload electrical infrastructure are more and more desirable.

TRCS2-Z

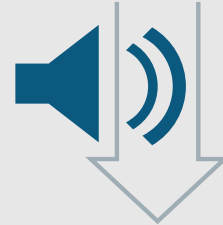
IS THE MOST ADVANCED SOLUTION

Resulting from the recognised prestige of RC brand products utilising magnetic levitation technology, TRCS2-Z air and water source chillers are the most efficient and reliable solution available in the market today.



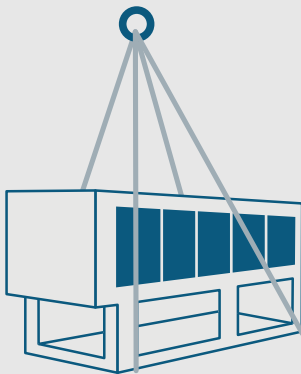
ESEER 9.52 for TRCS2-W-Z with all the advantages in terms of reliability and technical support, due to RC's unbeatable know-how of this technology, for a truly ideal answer to the challenge of the most demanding applications:

**E.S.E.E.R.
9,52**



UNBEATABLE EFFICIENCY AT PART LOAD

At partial load, TRCS2-Z units are far more efficient than traditional scroll/screw units, with ESEER values up to 60% higher. Running cost savings are evident and consistent, especially when all year round operation is required.



SIMPLIFIED LOGISTICS

Turbocor compressors feature an extremely advantageous capacity / weight ratio. The considerable weight reduction allows simplified site operations. Moreover, for water source units this goes together with reduced dimensions, thus enabling also a reduction of plantroom space.

EXTREMELY SILENT OPERATION

Thanks to the adoption of the centrifugal compressor with magnetic levitation, and, in air source units, of fans with reduced noise emission, TRCS2-Z sound power and pressure are the lowest on the market, without peaks in any of the sound frequency spectrum. Vibrations are dramatically reduced as well, with considerable advantages in terms of transmission to the building.

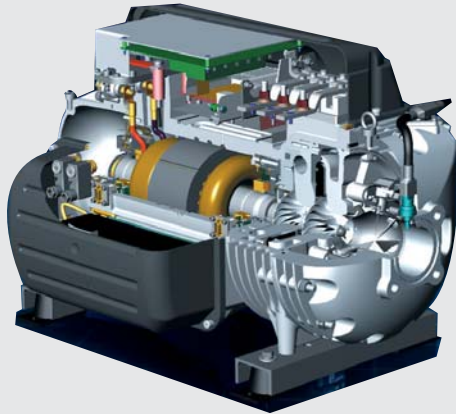
SoftSTART



LOW IN RUSH CURRENT

A further benefit is the very low inrush current, obtained thanks to the characteristics of the compressor and to the "inverter" starting. This is a crucial factor, as it allows a more favourable selection of the protection devices to be placed on the power supply between transformer and unit.

TECNOLOGICAL 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.

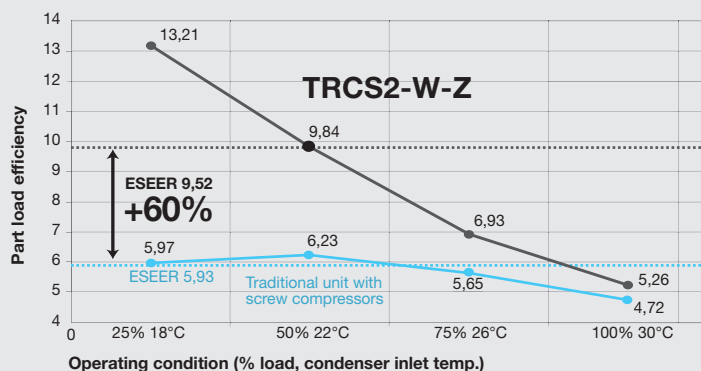


EC FANS

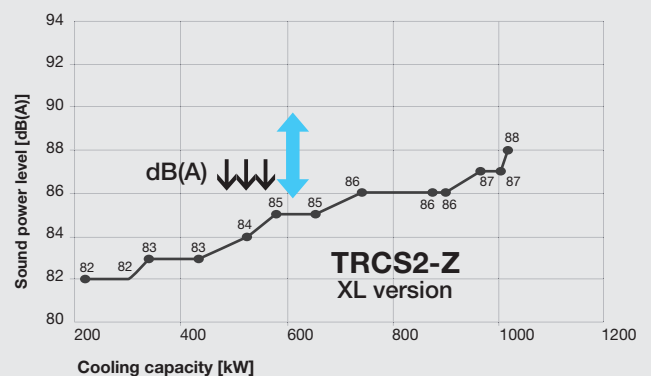
On TRCS2-Z units, the technology of EC electronic switching fans is introduced, as standard on SL-CA-E versions and optional on the other models.

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.

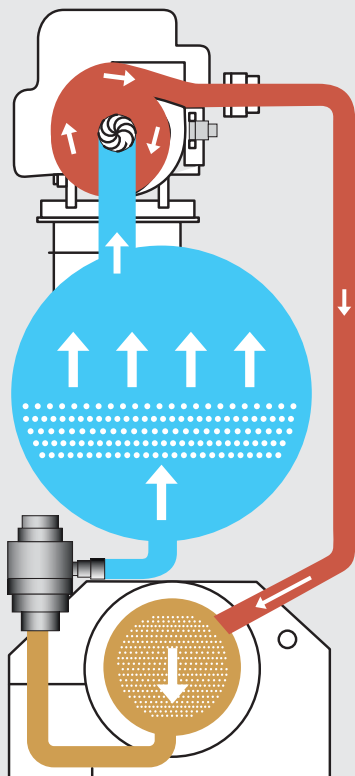
Part load efficiency - TRCS2-Z-W vs Traditional unit with screw compressors



Typical Sound Power Level range for screw compressors unit



Efficiency, silent operation and reliability. But also compact dimensions and reduced weight. These are the main features that make TRCS2 units the best result of RC's know-how. Advantages that result from technological choices, involving each aspect of these units.

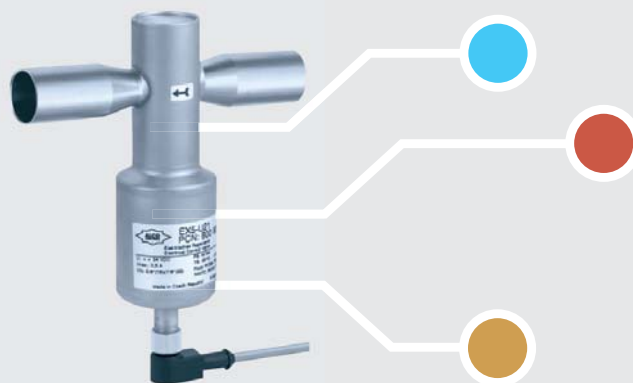


FLOODED EVAPORATOR

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.

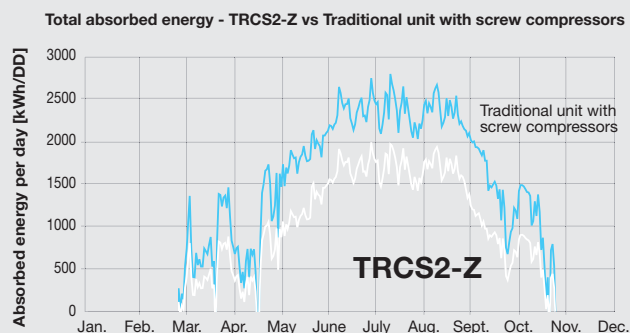
To comply with the security requirements of the "F-gas Regulation" (CE 842//2006), factory calibrated leak detection systems are available upon request.



ELECTRONIC VALVE

The electronic valve is adopted to grant the ideal operation of the evaporator in all conditions. In the water cooled unit TRCS2-W-Z, 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.



TRCS2-Z THE RANGE

AIR COOLED UNITS

 AIR COOLED

Units for outdoor installation characterized by an extremely compact lay-out.

Thanks to our extensive research and product development, TRCS2-Z range has been conceived extended up to 1325 kW, with 26 sizes featuring unbeatable efficiencies and noise levels.

TRCS2-Z 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 opens 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.

WATER COOLED UNITS

 WATER COOLED

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 TRCS2-W-Z range, which now comprises 20 sizes covering a capacity range between 242 and 1949 kW.

TRCS2-W-Z 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

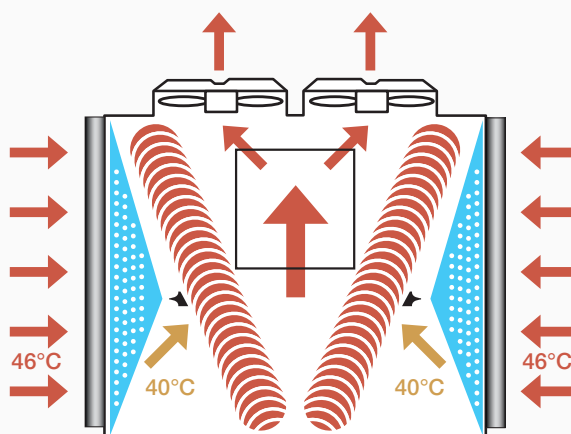
For application in which the unit is expected to work at high condensing levels, as for example in some critical dry-cooler installations or in all situations in which reversibility in heat pump mode is requested.



RC's system advantages vs traditional solutions

The RC 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.



TRCS2-Z

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

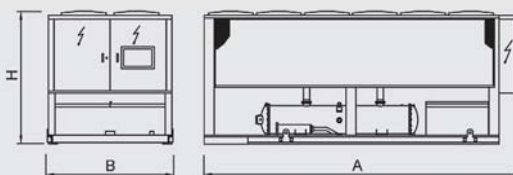


TRCS2-Z / SL-CA		0211	0251	0351	0452	0512	0552	0652	0712	0853	0913	1013	1054	1154	
Power supply	V/ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	
Performance															
Cooling only (Gross Value)															
Cooling capacity	(1)	kW	233	258	346	442	509	574	650	742	848	903	977	1065	1183
Total power input	(1)	kW	70,5	81,1	110	138	161	174	208	225	269	286	310	336	374
EER	(1)		3,30	3,18	3,13	3,20	3,16	3,30	3,13	3,30	3,15	3,15	3,15	3,17	3,17
ESEER	(1)		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
Cooling only (EN14511 Value)															
Cooling capacity	(1) (2)	kW	232	257	345	441	507	572	648	740	846	901	975	1062	1180
EER	(1) (2)		3,25	3,14	3,10	3,16	3,13	3,26	3,11	3,26	3,12	3,12	3,12	3,13	3,13
ESEER	(1) (2)		4,61	4,73	4,57	4,88	4,97	4,87	4,89	4,97	4,92	4,90	4,90	4,85	4,92
Cooling energy class			A	A	A	A	A	A	A	A	A	A	A	A	A
Exchangers															
Heat exchanger user side in refrigeration															
Water flow	(1)	m ³ /h	40,1	44,4	59,5	76,1	87,6	98,8	112	128	146	156	168	183	204
Pressure drop	(1)	kPa	36,4	27,4	28,5	27,6	27,7	35,2	21,1	27,6	31,8	36,0	29,7	35,3	37,3
Compressors															
Compressors nr.	N°		1	1	1	2	2	2	2	2	3	3	3	4	4
No. Circuits	N°		1	1	1	1	1	1	1	1	2	2	2	2	2
Noise level															
Noise Pressure	(3)	dB(A)	56	56	58	58	58	59	59	59	60	60	60	61	61
Noise Power	(4)	dB(A)	88	88	90	90	90	91	92	92	93	93	93	94	94
Size and weight															
A	(5)	mm	3100	3100	4000	4900	4900	5800	7000	7000	8500	9700	10600	11200	11500
B	(5)	mm	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260
H	(5)	mm	2430	2430	2430	2430	2430	2430	2430	2430	2430	2430	2430	2430	2430
Operating weight	(5)	kg	2320	2370	3050	4000	4240	4530	5800	6150	6940	7370	8150	8700	9020

Note

- Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger air (in) 35°C
- Values in compliance with EN14511-3:2011
- Average sound pressure level, at 10m distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level.
- Sound power on the basis of measurements made in compliance with ISO 9614 and Eurovent 8/1 for Eurovent certified units; in compliance with ISO 3744 for non-certified units.
- Unit in standard configuration/execution, without optional accessories.

The units highlighted in this publication contain HFC R134a [GWP₁₀₀ 1430] fluorinated greenhouse gases.



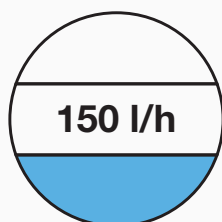
Oasis kit performance

The table on the right shows the effects of Oasis kit in relation to outside air temperature and relative humidity.

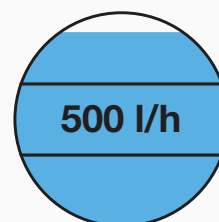
It is clear that, the higher the air temperature and lower the air humidity, the higher the system's effectiveness: in these conditions in fact, as higher waterflow is sprayed to the net, and most of it evaporates thanks to the energy given by the airflow through the net, water evaporates and air is 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)

TRCS2-Z / XL-CA		0211	0251	0351	0452	0512	0552	0652	0712	0853	0913	1013	1054	1154
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	400/3/50	400/3/50
Performance														
Cooling only (Gross Value)														
Cooling capacity	(1) kW	220	254	341	435	525	579	640	739	874	900	972	1049	1174
Total power input	(1) kW	68,5	79,8	109	137	166	171	206	226	279	290	312	331	377
EER	(1)	3,21	3,19	3,12	3,19	3,17	3,38	3,11	3,27	3,13	3,11	3,12	3,17	3,11
ESEER	(1)	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
Cooling only (EN14511 Value)														
Cooling capacity	(1) (2) kW	219	254	340	434	524	578	639	737	872	897	970	1046	1171
EER	(1) (2)	3,17	3,15	3,08	3,16	3,14	3,34	3,08	3,24	3,10	3,07	3,09	3,13	3,08
ESEER	(1) (2)	4,61	4,84	4,69	5,02	5,03	4,94	5,03	5,05	5,03	5,06	5,04	4,96	5,01
Cooling energy class		A	A	B	A	A	A	B	A	A	B	B	A	B
Exchangers														
Heat exchanger user side in refrigeration														
Water flow	(1) m ³ /h	37,9	43,8	58,7	74,9	90,5	99,7	110	127	150	155	167	181	202
Pressure drop	(1) kPa	32,6	26,7	27,7	26,7	29,5	35,9	20,5	27,3	33,7	35,7	29,4	34,2	36,8
Compressors														
Compressors nr.	N°	1	1	1	2	2	2	2	2	3	3	3	4	4
No. Circuits	N°	1	1	1	1	1	1	1	1	2	2	2	2	2
Noise level														
Noise Pressure	(3) dB(A)	50	50	51	51	52	52	52	53	53	53	54	54	55
Noise Power	(4) dB(A)	82	82	83	83	84	85	85	86	86	86	87	87	88
Size and weight														
A	(5) mm	3100	3100	4000	4900	5800	7000	7000	7900	9400	9700	10600	11200	12400
B	(5) mm	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260
H	(5) mm	2430	2430	2430	2430	2430	2430	2430	2430	2430	2430	2430	2430	2430
Operating weight	(5) kg	2370	2420	3200	4240	4690	5350	6150	6650	7520	7770	8650	9150	9960

TRCS2-Z / SL-CA-E		0211	0251	0351	0452	0512	0552	0652	0712	0853	0913	1013	1054	1154
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	400/3/50	400/3/50
Performance														
Cooling only (Gross Value)														
Cooling capacity	(1) kW	229	285	385	455	527	590	703	796	902	969	1086	1177	1324
Total power input	(1) kW	67,1	81,3	113	134	154	168	204	233	263	279	317	336	383
EER	(1)	3,41	3,50	3,40	3,41	3,41	3,50	3,45	3,41	3,43	3,48	3,42	3,50	3,46
ESEER	(1)	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
Cooling only (EN14511 Value)														
Cooling capacity	(1) (2) kW	228	284	383	454	526	588	701	794	900	966	1083	1173	1320
EER	(1) (2)	3,36	3,45	3,35	3,37	3,38	3,46	3,42	3,37	3,39	3,43	3,38	3,45	3,41
ESEER	(1) (2)	5,09	5,31	5,19	5,55	5,46	5,34	5,57	5,51	5,37	5,48	5,44	5,55	5,42
Cooling energy class		A	A	A	A	A	A	A	A	A	A	A	A	A
Exchangers														
Heat exchanger user side in refrigeration														
Water flow	(1) m ³ /h	39,4	49,0	66,2	78,3	90,7	102	121	137	155	167	187	203	228
Pressure drop	(1) kPa	35,2	33,5	35,2	29,2	29,7	37,2	24,7	31,7	35,9	41,5	36,7	43,1	46,8
Compressors														
Compressors nr.	N°	1	1	1	2	2	2	2	2	3	3	3	4	4
No. Circuits	N°	1	1	1	1	1	1	1	1	2	2	2	2	2
Noise level														
Noise Pressure	(3) dB(A)	56	56	58	58	58	59	59	59	60	60	60	61	62
Noise Power	(4) dB(A)	88	88	90	90	90	91	92	92	93	93	93	94	95
Size and weight														
A	(5) mm	3100	3100	4000	4900	4900	5800	7000	7900	8500	9700	10600	11200	12400
B	(5) mm	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260
H	(5) mm	2430	2430	2430	2430	2430	2430	2430	2430	2430	2430	2430	2430	2430
Operating weight	(5) kg	2270	2350	3130	4070	4230	4570	6040	6450	7020	7610	8510	8660	9720

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 1000m ³ /h air flow [l/m]
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 singlepoint, 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 TRCS2-Z/SL-CA-E versions) (only for TRCS2-Z)
- ▶ Acoustical enclosure 'base' and 'plus' for a sound power level reduction of 14 and 18 dB(A) respectively (only for TRCS2-W-Z)
- ▶ Leak detector; devices to detect refrigerant leakage in close ambient



TRCS2-W-Z

Water cooled unit with magnetic levitation centrifugal compressors.
From 241 to 1949 kW

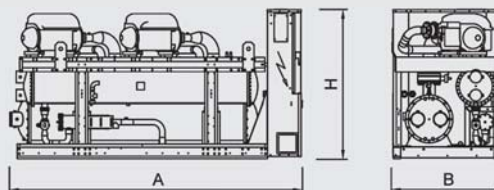


TRCS2-W-Z / HC / H			0251	0311	0351	0411	0512	0612	0712	0812	0913	1053	1213	1414	1614
Power supply		V/ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Performance															
Cooling Only (Gross Value)															
Cooling capacity	(1)	kW	241	293	359	405	497	588	716	811	881	1045	1213	1405	1618
Total power input	(1)	kW	46,0	57,0	69,2	78,9	94,8	114	139	158	171	203	237	269	316
EER	(1)		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	(1)		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
Cooling Only (EN14511 Value)															
Cooling capacity	(1) (2)	kW	240	292	358	404	496	586	714	809	879	1042	1210	1402	1615
EER	(1) (2)		5,05	4,94	4,97	4,96	5,08	4,97	4,96	4,98	5,02	5,00	5,01	5,09	5,01
ESEER	(1) (2)		7,72	7,64	7,59	7,82	7,94	7,80	7,75	8,04	8,12	7,88	8,22	8,18	8,32
Cooling energy class			A	B	B	B	A	B	B	B	B	B	B	A	B
Heating Only (Gross Value)															
Total heating capacity	(3)	kW	267	326	408	465	551	654	814	931	979	1189	1393	1599	1858
Total power input	(3)	kW	57,1	69,7	88,9	102	117	139	179	204	209	261	306	347	408
COP			4,68	4,68	4,59	4,57	4,69	4,69	4,56	4,57	4,68	4,55	4,56	4,61	4,56
Heating Only (EN14511 Value)															
Total heating capacity	(3) (2)	kW	268	327	410	467	552	655	817	934	981	1192	1395	1602	1861
COP	(3) (2)		4,54	4,53	4,45	4,45	4,56	4,54	4,44	4,46	4,57	4,45	4,47	4,51	4,48
Cooling energy class			A	A	A	A	A	A	A	A	A	A	A	A	A
Exchangers															
Heat Exchanger User Side in Refrigeration															
Water flow	(1)	m ³ /h	41,5	50,5	61,8	69,7	85,6	101	123	140	152	180	209	242	279
Pressure drop	(1)	kPa	35,7	38,6	36,7	28,6	38,0	42,8	32,5	28,6	36,6	33,0	27,9	35,1	27,2
Water flow	(1)	m ³ /h	49,2	60,1	73,4	83,0	102	120	147	166	180	214	249	287	332
Pressure drop	(1)	kPa	25,4	38,5	46,0	37,1	24,2	38,0	45,0	39,2	21,5	34,4	23,5	24,7	24,2
Heat Exchanger User Side In Heating															
Water flow	(3)	m ³ /h	46,4	56,7	71,0	80,8	95,7	114	142	162	170	207	242	278	323
Pressure drop	(3)	kPa	22,5	34,2	43,0	35,2	21,5	33,8	41,9	37,2	19,1	32,0	22,3	23,2	22,9
Water flow	(3)	m ³ /h	49,2	60,1	73,4	83,0	102	120	147	166	180	214	249	287	332
Pressure drop	(3)	kPa	50,3	54,6	51,8	40,6	53,5	60,5	46,1	40,6	51,8	46,7	39,6	49,5	38,5
Compressors															
Compressors nr.		N°	1	1	1	1	2	2	2	2	3	3	3	4	4
No. Circuits		N°	1	1	1	1	1	1	1	1	1	1	1	1	1
Noise Level															
Noise Pressure	(4)	dB(A)	73	75	74	76	76	77	76	78	77	77	78	78	79
Noise Power	(5)	dB(A)	91	93	92	94	94	95	94	96	96	96	97	97	98
Size and Weight															
A	(6)	mm	2990	2990	2990	2990	3490	3490	3490	3490	4990	4990	4990	5450	5450
B	(6)	mm	950	950	950	950	1300	1300	1300	1300	1300	1300	1300	1300	1300
H	(6)	mm	1900	1900	1900	1900	1800	1800	1800	1800	1800	1800	1800	1990	1990
Operating weight	(6)	kg	1485	1485	1640	1810	2715	2695	3095	3245	3815	4500	4910	5400	6130

Note

- 1) Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger water (in/out) 30°C/35°C
- 2) Values in compliance with EN14511-3:2011
- 3) Plant (side) heating exchanger water (in/out) 40°C/45°C; Source (side) heat exchanger water (in/out) 10°C/°C (flow rate as in cooling)
- 4) Average sound pressure level, at 1m distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level.
- 5) Sound power on the basis of measurements made in compliance with ISO 9614 and Eurovent 8/1 for Eurovent certified units; in compliance with ISO 3744 for non-certified units.
- 6) Unit in standard configuration/execution, without optional accessories.

The units highlighted in this publication contain HFC R134a [GWP₁₀₀ 1430] fluorinated greenhouse gases.



TRCS2-W-Z / HC			0251	0311	0351	0411	0512	0612	0712	0812	0913	1053	1213	1414	1614	
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	400/3/50	400/3/50	400/3/50
Performance																
Cooling Only (Gross Value)																
Cooling capacity	(1)	kW	241	293	359	405	497	588	716	811	881	1045	1213	1405	1618	
Total power input	(1)	kW	46,0	57,0	69,2	78,9	94,8	114	139	158	171	203	237	269	316	
EER	(1)		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	(1)		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	
Cooling Only (EN14511 Value)																
Cooling capacity	(1) (2)	kW	240	292	358	404	496	586	714	809	879	1042	1210	1402	1615	
EER	(1) (2)		5,05	4,94	4,97	4,96	5,08	4,97	4,96	4,98	5,02	5,00	5,01	5,09	5,01	
ESEER	(1) (2)		7,72	7,64	7,59	7,82	7,94	7,80	7,75	8,04	8,12	7,88	8,22	8,18	8,32	
Cooling energy class			A	B	B	B	A	B	B	B	B	B	B	A	B	
Exchangers																
Heat Exchanger User Side in Refrigeration																
Water flow	(1)	m ³ /h	41,5	50,5	61,8	69,7	85,6	101	123	140	152	180	209	242	279	
Pressure drop	(1)	kPa	35,7	38,6	36,7	28,6	38,0	42,8	32,5	28,6	36,6	33,0	27,9	35,1	27,2	
Water flow	(1)	m ³ /h	49,2	60,1	73,4	83,0	102	120	147	166	180	214	249	287	332	
Pressure drop	(1)	kPa	25,4	38,5	46,0	37,1	24,2	38,0	45,0	39,2	21,5	34,4	23,5	24,7	24,2	
Compressors																
Compressors nr.		N°	1	1	1	1	2	2	2	2	3	3	3	4	4	
No. Circuits		N°	1	1	1	1	1	1	1	1	1	1	1	1	1	
Noise Level																
Noise Pressure	(4)	dB(A)	59	61	60	62	62	63	62	64	64	64	65	65	66	
Noise Power	(5)	dB(A)	91	93	92	94	94	95	94	96	96	96	97	97	98	
Size and Weight																
A	(6)	mm	2990	2990	2990	2990	3490	3490	3490	3490	4990	4990	4990	5450	5450	
B	(6)	mm	950	950	950	950	1300	1300	1300	1300	1300	1300	1300	1300	1300	
H	(6)	mm	1900	1900	1900	1900	1800	1800	1800	1800	1800	1800	1800	1990	1990	
Operating weight	(6)	kg	1450	1450	1570	1740	2640	2620	3010	3160	3720	4380	4790	5240	5970	

Note

- 1) Plant (side) cooling exchanger water (in/out) = 12°C/7°C; Source (side) heat exchanger water (in/out) = 30°C/35°C; Based on Eurovent Standard
- 2) Values in compliance with EN14511-3:2011
- 3) Average sound pressure level, at 10m distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level.
- 4) Sound power on the basis of measurements made in compliance with ISO 9614 and Eurovent 8/1 for Eurovent certified units; in compliance with ISO 3744 for non-certified units.
- 5) Unit in standard configuration/execution, without optional accessories.

The units highlighted in this publication contain HFC R134a [GWP₁₀₀ 1430] fluorinated greenhouse gases.

TRCS2-W-Z / LC			0511	0912	1012	1353	1453	1854	1954
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
Performance									
Cooling Only (Gross Value)									
Cooling capacity	(1)	kW	488	879	978	1359	1461	1809	1949
Total power input	(1)	kW	93,2	172	186	258	280	344	373
EER	(1)		5,24	5,12	5,24	5,27	5,22	5,26	5,23
ESEER	(1)		9,37	9,19	9,45	9,43	9,41	9,52	9,42
Cooling Only (EN14511 Value)									
Cooling capacity	(1) (2)	kW	487	876	975	1356	1457	1802	1944
EER	(1) (2)		5,01	4,91	5,03	5,07	5,06	5,08	5,07
ESEER	(1) (2)		7,85	7,66	7,87	7,97	8,16	8,13	8,21
Cooling energy class			B	B	B	A	A	A	A
Exchangers									
Heat Exchanger User Side in Refrigeration									
Water flow	(1)	m ³ /h	84,1	151	168	234	252	311	336
Pressure drop	(1)	kPa	41,6	49,0	41,7	35,0	40,5	58,2	39,4
Water flow	(1)	m ³ /h	99,8	180	200	277	299	369	398
Pressure drop	(1)	kPa	53,6	47,1	56,6	57,7	33,9	30,0	34,9
Compressors									
Compressors nr.		N°	1	2	2	3	3	4	4
No. Circuits		N°	1	1	1	1	1	1	1
Noise Level									
Noise Pressure	(4)	dB(A)	63	64	65	65	66	67	67
Noise Power	(5)	dB(A)	95	96	97	97	98	99	99
Size and Weight									
A	(6)	mm	2990	3490	3490	4990	4990	5450	5450
B	(6)	mm	950	1300	1300	1300	1300	1300	1300
H	(6)	mm	1900	1800	1800	1800	1800	1990	1990
Operating weight	(6)	kg	1740	3100	3160	4620	4790	5430	5970

Note

- 1) Plant (side) cooling exchanger water (in/out) = 12°C/7°C; Source (side) heat exchanger water (in/out) = 30°C/35°C; Based on Eurovent Standard
- 2) Values in compliance with EN14511-3:2011
- 3) Average sound pressure level, at 10m distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level.
- 4) Sound power on the basis of measurements made in compliance with ISO 9614 and Eurovent 8/1 for Eurovent certified units; in compliance with ISO 3744 for non-certified units.
- 5) Unit in standard configuration/execution, without optional accessories.

The units highlighted in this publication contain HFC R134a [GWP₁₀₀ 1430] fluorinated greenhouse gases.

“ BY FAR THE BEST PROOF IS EXPERIENCE ”

Sir Francis Bacon
British philosopher
(1561 - 1626)



DATA CENTER UNIPOL PILASTRO, TIER IV

Bologna - Italy
2015-2016

Application:
Data Center

Plant type:
Hydronic System

Cooling capacity:
2000 kW

Installed machines:
4x air cooled chillers with turbocor compressors

PROJECT

To optimise the Group organization they have planned to gather all the IT services in one data center located in Bologna, on Pilastro Street. The new facility is an example of efficiency, not only in terms of energy consumption but also of reduced space, cooling and CO₂ emissions.

CHALLENGE

The new building has been TierIV. certified. That is to say these facilities have multiple, independent, physically isolated systems that provide redundant capacity components and multiple, independent, diverse, active distribution paths simultaneously serving the critical environment, being fully Fault Tolerant Site Infrastructures.

SOLUTION

At Unipol Data Center Pilastro Climaveneta supplied 4 x air cooled chillers with turbocor compressors, high efficiency version selected, that easily adapt themselves to different thermal load conditions thanks to their precise thermoregulation together with the use of inverter technology.

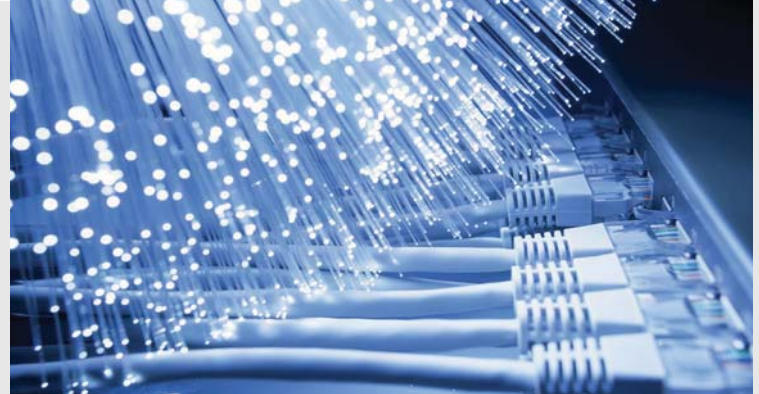
The compressor is radically innovative: magnetic bearings and digital rotor speed control allow it to guarantee energy efficiency at partial loads, which represents more than 75% of a datacenter's working time.

Every project is characterised by different needs and system specifications for various climates. All these projects share high energy efficiency, maximum integration, and total reliability resulting from the RC brand experience.



**GALILEO CONNECT
LONDON CENTRAL**
2012 London (Great Britain)
Application: Data Center
Plant type: HPAC System

Cooling capacity: 4852 kW
Installed machines:
3x air cooled chillers with turbocor compressors,
29x chilled water Close Control units



ECMWF
European Centre for Medium range
Weather Forecasts
2008-2013 Reading - Great Britain
Application: Data Center - Offices
Plant type: Hydronic System

Cooling capacity: 4596 kW
Installed machines:
6x air cooled chillers with turbocor compressors,
2x high efficiency air cooled chillers with turbocor compressors



NOS DATA CENTRE
2016-2018 Carnaxide (Portugal)
Application: Data Center

Plant type: Hydronic System
Cooling capacity: 510 kW
Installed machines:
1x high efficiency air cooled chiller with turbocor compressors



**TELECOM DATA CENTER
ACILIA, TIER IV**
2016 Rome (Italy)
Application: Data Center
Plant type: Hydronic System

Cooling capacity: 7804 kW
Installed machines:
3x high efficiency air cooled chillers with turbocor compressors,
5x high efficiency air cooled chiller with inverter technology



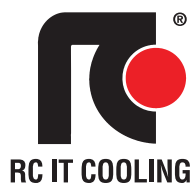
VODAFONE BUCCINASCIO
2015 Buccinasco (Italy)
Application: Data Center
Plant type: Hydronic System

Installed machines:
4x high efficiency air cooled chillers with turbocor compressors,
1 high efficiency air cooled chiller with inverter technology and free cooling,
29x chilled water Close C. Units



**FASTWEB DATACENTER,
TIER IV**
2014 Milan (Italy)
Application: Data Center

Plant type: Hydronic System
Cooling capacity: 2800 kW
Installed machines:
4x high efficiency air cooled chillers with turbocor compressors



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.



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