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

IT COOLING

CHILLERS

FRCS3-W-Z

WATER SOURCE CHILLERS FOR INDOOR INSTALLATION

- High efficiency
- Flexible installation
- Easy adaptability
- Advanced control

rcitcooling.com

FRCS3-W-Z

LIQUID CHILLER, WATER SOURCE
188-1693 kW

Chilled water unit for indoor installation featuring: semi-hermetic screw compressors optimized to operate with low compression ratio and R134a, shell and tube condenser, flooded evaporator and electronic expansion valve.

Thanks to its precise and accurate thermoregulation, this extremely flexible and reliable unit easily adapts to different thermal load conditions. The high performance level and the premium efficiency is achieved thanks to the accurate sizing of all the components, such as the heat exchangers and the innovative optimized compressors.

CA Version
Class A efficiency

Unparalleled efficiency

Thanks to the choice of high performing components, the FRCS3-W-Z units are characterized by really competitive efficiency levels both at full and part loads (EER 5.8, ESEER 7.4, IPLV 7.7), which ensure minimum running costs and a quick return on investment.

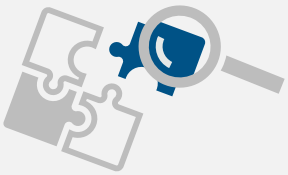
Flexible installation

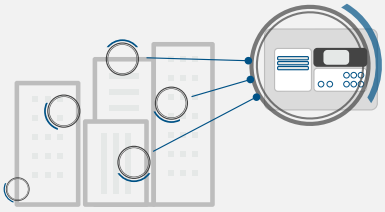
The compact and essential design leads to more flexibility during the design phase, both in the case of new plants and preexisting ones. It also ensures higher ease of handling and on site positioning in plants with reduced space.

Easy adaptability

Maximum adaptability to the needs of the plant thanks to the continuous modulation of the cooling capacity and the precision in the control logics.

EUROVENT CERTIFIED PERFORMANCE
www.eurovent-certification.com

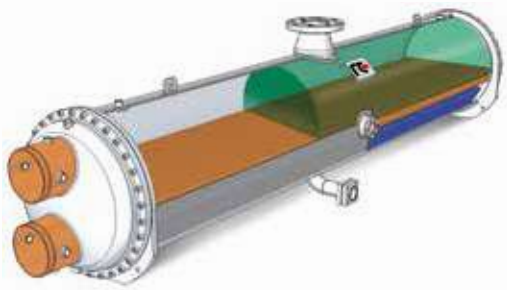




INNOVATIVE DESIGN OF THE HEAT EXCHANGERS

The flooded evaporator and the shell and tube condenser, both fully designed and built internally, present an exclusive design aimed to maximize the cooling power and optimize the operation of the compressors.

In the evaporator the complete flooding of the tubes is guaranteed also during partial load conditions by an electronic expansion valve, managed by proprietary control logics. The shell and tube condenser is designed in order to guarantee reduced pressure drops on the water side and to decrease the pumping costs as much as possible.



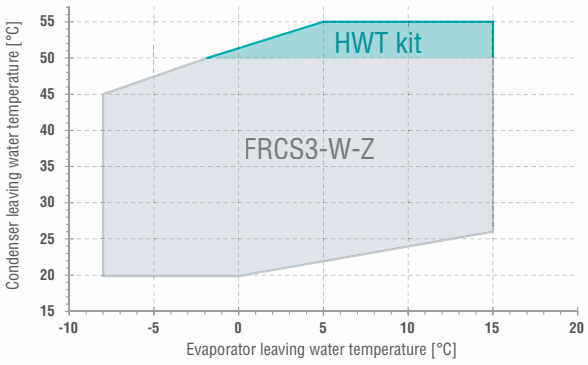
In both the exchangers the presence of refrigerant fluid in the shell side and water in the tube side allows:

- **Minimization of pressure drops**
- **Perfect unified temperature as well as complete refrigerant evaporation**
- **Elimination of a surface dedicated to super-heating**
- **Facilitation of cleaning operation**

LARGE OPERATING RANGE

FRCS3-W-Z is characterized by a huge operating range, even in the standard configuration.

The operating limits can be further enlarged with dedicated accessories, such as the High Water Temperature (HWT) kit, available for every size.

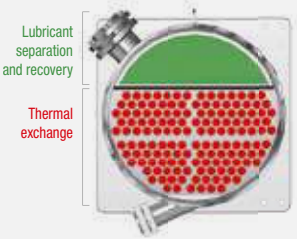


Optimized compressors

Screw compressors intentionally designed to work with low compression ratios, allowing them to reach efficiency values, both at part and full loads, considerably higher than those possible for units with traditional screw compressors.

Perfect lubricant recovery

Unique design of the heat exchangers that provides the perfect separation and complete recovery of the lubricants in order to guarantee proper lubrication of the compressors and the relevant cleaning of the shell and tube exchanging surfaces.



High quality components

FRCS3-W-Z is provided with an electronic expansion valve managed by proprietary control logics which guarantees the proper refrigerant charge and the complete flooding of the tubes, also when the compressors work in part load conditions.

FRCS3-W-Z 0551 - 4752

LIQUID CHILLER, WATER SOURCE 188-1693 kW

FRCS3-W-Z

Model			0551	0701	0851	0951	1101	1301	1401	1651	1901	2101	2501
Power supply		V/phHz	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	188	250	306	338	384	460	524	592	682	741	837
Total power input	(1)	kW	34,9	45,9	56,1	61,2	69,8	82,5	93,0	104	122	133	149
EER	(1)	kW/kW	5,39	5,45	5,45	5,52	5,49	5,57	5,63	5,70	5,59	5,57	5,61
ESEER	(1)	kW/kW	6,84	7,09	6,55	6,85	6,80	6,73	6,90	7,00	6,90	6,89	6,94
COOLING ONLY (EN14511 VALUE)													
Cooling capacity	(1)(2)	kW	187	249	305	336	382	458	522	590	679	739	834
EER	(1)(2)	kW/kW	5,09	5,14	5,16	5,21	5,20	5,30	5,40	5,41	5,33	5,34	5,37
Cooling energy class			A	A	A	A	A	A	A	A	A	A	A
SEPR	(3)(4)		7,97	8,07	7,69	7,74	7,71	7,51	7,68	7,53	7,53	7,85	7,86
COOLING ONLY (GROSS VALUE)													
16°C/10°C													
Cooling capacity	(5)	kW	210	279	340	375	426	513	584	660	759	826	933
Total power input	(5)	kW	35,3	46,3	56,6	61,9	70,6	83,6	94,3	106	124	135	152
EER	(5)	kW/kW	5,94	6,02	6,02	6,06	6,04	6,13	6,20	6,25	6,12	6,11	6,15
23°C/15°C													
Cooling capacity	(6)	kW	247	328	400	441	501	605	689	777	895	975	1101
Total power input	(6)	kW	35,8	46,9	57,2	62,8	71,7	85,1	96,1	108	127	138	155
EER	(6)	kW/kW	6,90	7,00	7,00	7,02	6,99	7,11	7,17	7,21	7,06	7,06	7,12
EXCHANGERS													
HEAT EXCHANGER USER SIDE IN REFRIGERATION													
Water flow	(1)	l/s	9,00	11,95	14,63	16,15	18,34	21,99	25,06	28,30	32,59	35,45	40,03
Pressure drop	(1)(2)	kPa	42,0	48,7	49,1	52,4	52,8	47,5	39,9	50,9	42,0	42,7	42,8
HEAT EXCHANGER SOURCE SIDE IN REFRIGERATION													
Water flow	(1)	l/s	10,64	14,10	17,26	19,01	21,61	25,86	29,42	33,17	38,31	41,69	47,02
Pressure drop	(1)(2)	kPa	56,7	57,2	56,0	58,6	57,4	54,5	44,3	55,2	59,7	45,3	47,6
REFRIGERANT CIRCUIT													
Compressors nr.		N°	1	1	1	1	1	1	1	1	1	1	1
No. Circuits		N°	1	1	1	1	1	1	1	1	1	1	1
Refrigerant charge		kg	75,0	86,0	95,0	94,0	86,0	100	110	112	121	147	182
NOISE LEVEL													
Sound Pressure	(7)	dB(A)	77	77	80	80	80	80	80	80	80	82	82
Sound power level in cooling	(8)(9)	dB(A)	95	95	98	98	98	98	98	98	98	100	100
SIZE AND WEIGHT													
A	(10)	mm	2920	2920	2920	2920	2920	2900	2900	2900	2930	2980	2990
B	(10)	mm	1180	1180	1180	1180	1180	1180	1180	1180	1180	1190	1280
H	(10)	mm	1870	1870	1870	1870	1870	1960	1970	1960	2050	2100	2200
Operating weight	(10)	kg	1740	1790	2170	2200	2260	2940	3020	3150	3270	3570	3960

NOTES
Certified data in EUROVENT

ADVANCED CONTROL

The new controller featuring proprietary settings
to ensure faster adaptive responses to different dynamics.

The new user interface features:

LED icons that allow a full and immediate status display of the various circuits, including circulation pumps and condensing circuits. (for air cooled units only)

Controls and display that allow easy and safe access to the unit's settings.

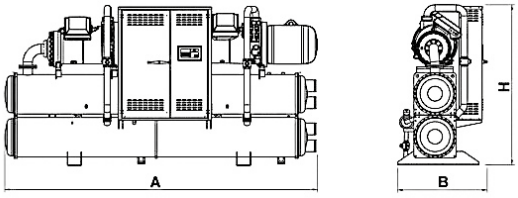
FL FLOODED | R HFC R134a | A ENERG.CL. | SCREW | COOLING | VPF | EUROVENT CERTIFIED PERFORMANCE

FRCS3-W-Z

Model			2602	3002	3152	3502	3652	4002	4102	4502	4602	4752
Power supply		V/phHz	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	916	1062	1140	1218	1303	1382	1450	1522	1614	1693
Total power input	(1)	kW	164	187	196	214	225	242	253	268	284	292
EER	(1)	kW/kW	5,58	5,68	5,82	5,69	5,80	5,72	5,74	5,68	5,68	5,80
ESEER	(1)	kW/kW	7,35	7,43	7,46	7,24	7,32	7,28	7,27	7,12	7,39	7,39
COOLING ONLY (EN14511 VALUE)												
Cooling capacity	(1)(2)	kW	913	1058	1137	1214	1299	1377	1445	1517	1609	1688
EER	(1)(2)	kW/kW	5,37	5,42	5,63	5,43	5,60	5,46	5,50	5,42	5,45	5,54
Cooling energy class			A	A	A	A	A	A	A	-	-	-
SEPR	(3)(4)		7,61	7,57	7,96	7,57	7,92	7,62	7,69	8,00	8,04	8,14
COOLING ONLY (GROSS VALUE)												
16°C/10°C												
Cooling capacity	(5)	kW	1021	1184	1272	1357	1454	1541	1617	1697	1801	1888
Total power input	(5)	kW	166	189	199	217	228	246	256	272	288	296
EER	(5)	kW/kW	6,14	6,25	6,40	6,24	6,38	6,28	6,31	6,23	6,24	6,38
23°C/15°C												
Cooling capacity	(6)	kW	1205	1397	1502	1600	1715	1817	1907	2001	2125	2229
Total power input	(6)	kW	169	193	202	222	232	251	261	278	294	301
EER	(6)	kW/kW	7,12	7,23	7,42	7,21	7,38	7,25	7,29	7,21	7,23	7,42
EXCHANGERS												
HEAT EXCHANGER USER SIDE IN REFRIGERATION												
Water flow	(1)	l/s	43,80	50,79	54,53	58,23	62,33	66,11	69,33	72,76	77,20	80,94
Pressure drop	(1)(2)	kPa	40,0	51,5	37,4	51,4	39,8	50,4	46,7	51,5	42,5	46,7
HEAT EXCHANGER SOURCE SIDE IN REFRIGERATION												
Water flow	(1)	l/s	51,49	59,55	63,73	68,26	72,87	77,45	81,18	85,33	90,51	94,64
Pressure drop	(1)(2)	kPa	44,0	53,8	31,6	56,2	33,7	52,9	49,5	54,7	53,1	58,0
REFRIGERANT CIRCUIT												
Compressors nr.		N°	2	2	2	2	2	2	2	2	2	2
No. Circuits		N°	2	2	2	2	2	2	2	2	2	2
Refrigerant charge		Kg	210	249	270	270	280	280	288	297	341	341
NOISE LEVEL												
Sound Pressure	(7)	dB(A)	81	81	81	81	81	81	82	82	82	82
Sound power level in cooling	(8)(9)	dB(A)	100	100	100	100	100	100	101	102	102	102
SIZE AND WEIGHT												
A	(10)	mm	4430	4430	4440	4470	4470	4470	4565	4650	5270	5270
B	(10)	mm	1270	1270	1270	1270	1320	1270	1320	1320	1320	1320
H	(10)	mm	2210	2210	2280	2250	2330	2280	2380	2380	2380	2380
Operating weight	(10)	Kg	6200	6430	7080	7160	7560	7280	7850	7940	8420	8950

NOTES:
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 EN14511-3:2013.
3 Seasonal space heating energy index
4 Seasonal energy efficiency of high temperature process cooling [REGULATION (EU) N. 2016/2281]
5 User side heat exchanger water temperature (in/out) 16°C/10°C; source side heat exchanger water temperature (in/out) 30°C/35°C.
6 User side heat exchanger water temperature (in/out) 23°C/15°C; source side heat exchanger water temperature (in/out) 30°C/35°C.
7 Average sound pressure level at 1m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
8 Sound power on the basis of measurements made in compliance with ISO 9614.
9 Sound power level in cooling, indoors.
10 Unit in standard configuration/execution, without optional accessories.
The units highlighted in this publication contain HFC R134a [GWP_{100} 1430] fluorinated greenhouse gases.

Certified data in EUROVENT



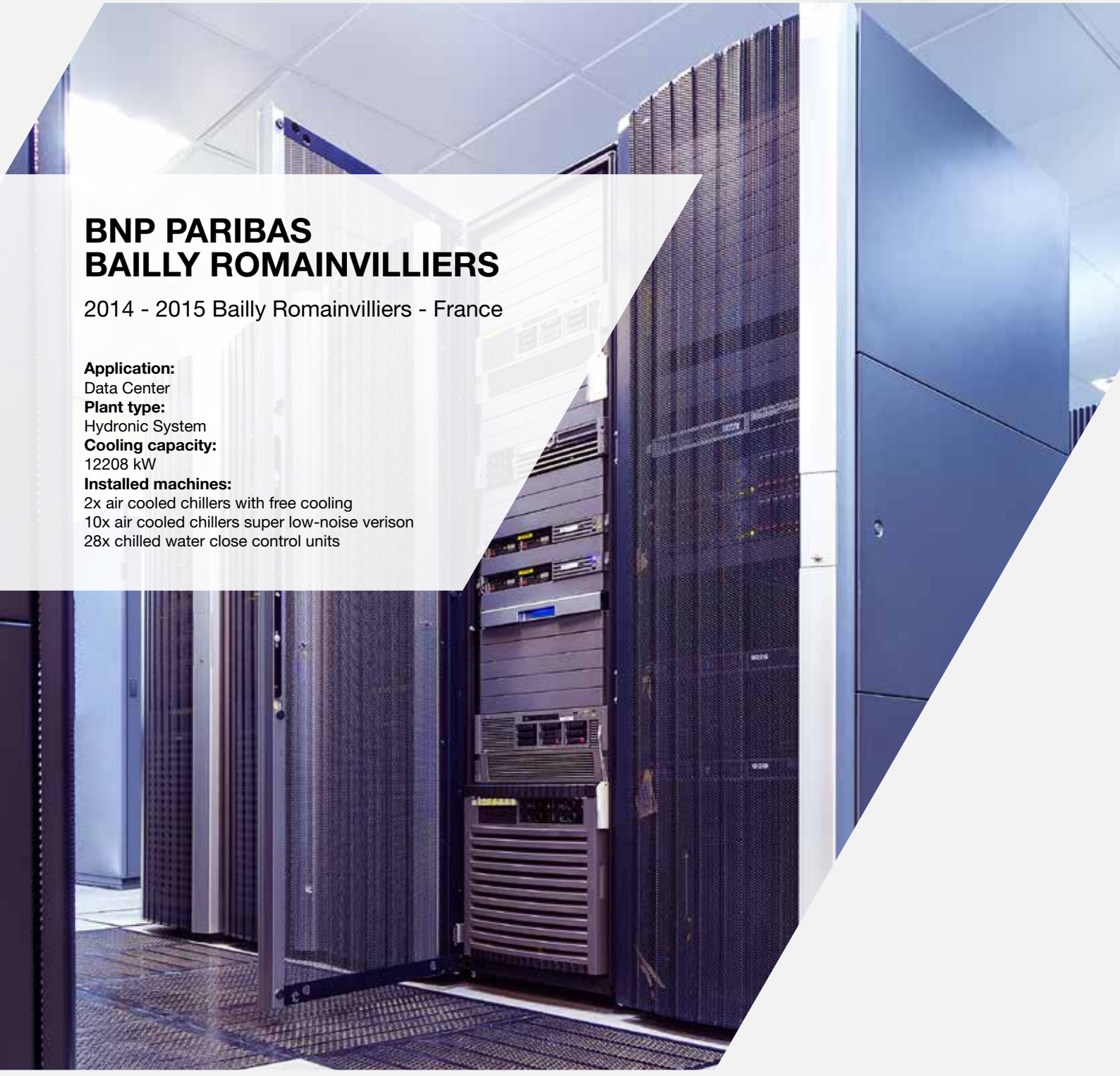
As an option a new touch screen interface is available

7“ color display that allows intuitive navigation between the different screens.

the presence of a USB port allows quick and easy application updates, as well as downloading the registered variables in graphical form.

MORE THAN 1000 PROJECTS ALL OVER THE WORLD

Every project is characterised by different usage conditions and system specifications for many different latitudes. All these projects share high energy efficiency, maximum integration and total reliability of the RC IT Cooling brand.



BNP PARIBAS BAILLY ROMAINVILLIERS

2014 - 2015 Bailly Romainvilliers - France

Application:
Data Center
Plant type:
Hydronic System
Cooling capacity:
12208 kW
Installed machines:
2x air cooled chillers with free cooling
10x air cooled chillers super low-noise verison
28x chilled water close control units

PROJECT

Val d'Europe was built in conjunction with The Walt Disney Company, which wanted to create a town near the Resort.

In this modern and fast-moving context BNP Paribas decided to establish their new data center.

CHALLENGE

The new project consists of two buildings of 1630 and 9990 m^2, located on a 74,965 m^2 piece of land aimed at combining the landscaping requirements with the company's environmental responsibility policy, that is, to reduce their own ecological footprint as much as possible.

The new buildings contain offices and 4 data centers that will host and enable IR + Networks + telecom operations of most of the bank's IT production.

SOLUTION

At BNPP Val d'Europe Mitsubishi Electric supplied a complete system able to combine the reliability and continuous cooling in the data center with sustainability and the perfect level of comfort in the offices.

The system consists of 12 high efficiency chillers and 28 close control units for a total of 12,200 kW and is worth more than one million euros.

Going into depth 2 air cooled chillers in a super low noise version with a 100% positive free-cooling temperature are able to grant an energy cost very close to zero.

Furthermore, 10 air source chillers in a compact and super low-noise version serve the indoor close control equipment.
Inside the data center, 28 close control units have been installed for the precise temperature and humidity control.

FRCS3-W-Z_ENG_05-2018

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 Roma 5 - 27010 Valle Salimbene (PV) - Italy
Tel +39 (0) 382 433 811 - Fax +39 (0) 382 587 148
www.rcitcooling.com
www.melcohit.com