

IT COOLING

CHILLERS

FR²Z **G04** 

AIR COOLED CHILLERS
FOR OUTDOOR
INSTALLATION,
FROM 252 TO 1572 kW

 HFO
1234ze



FR²Z G04

HIGH EFFICIENCY CHILLERS FOR SUSTAINABLE IT COOLING



Air cooled chillers with screw compressors and HFO green refrigerant. From 252 to 1572 kW.

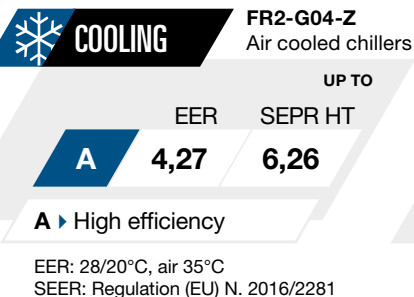


Designed to deliver a green approach to IT cooling applications, FR2-G04-Z are air cooled chillers with screw compressors optimized for R1234ze refrigerant.

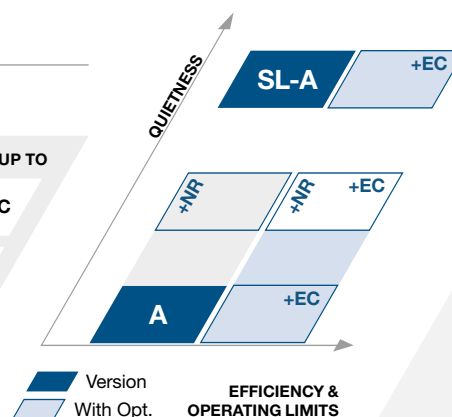
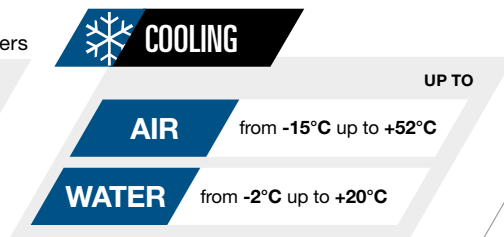
All the main hydraulic and mechanic components are integrated inside the unit, providing installers the ideal plug & play solution for any cooling plant. The complete range is Eurovent certified and all the sizes are completely ErP2021 compliant.

A COMPLETE NEW GENERATION OF CHILLERS

EFFICIENCY



OPERATING RANGE



ACOUSTIC VERSIONS

Version	Low noise	Baseline
-	Unit with standard soundproofing equipment.	Baseline
-	Unit with compressor acoustical enclosure (Opt. 2301)	-2 dB(A)
-	Unit with noise reducer kit (Opt. 2315)	-7 dB(A)

Version	Super low noise	Baseline
SL-A	The highest level of noise reduction without compromising the unit's efficiency.	-12 dB(A)

HEAT RECOVERY CONFIGURATIONS

Configuration	Description	Temperature
Standard	Unit without heat recovery.	-
Partial heat recovery	A desuperheater on the compressor discharge line recovers approximately 20% of the unit's capacity. Suitable for DHW production or other secondary uses, such as the integration of an existing boiler.	60°C

ALL-ROUND SUSTAINABILITY



FR2-G04-Z is the result of Mitsubishi Electric Hydronics & IT Cooling Systems' extensive approach to sustainability.

Achieving outstanding performance and ensuring long-term sustainability are challenges that modern HVAC systems need to tackle. Increasing concerns about the global warming impact of chillers and heat pumps is driving new regulatory policies

to push towards even more efficient units with the lowest carbon footprint. Today, an all-round approach is the only way to effectively reduce the Total Equivalent Warming Impact (TEWI).

Fully committed to supporting the creation of a greener tomorrow, Mitsubishi Electric Hydronics & IT Cooling Systems designed FR2-G04-Z, a complete chiller range optimized for HFO refrigerant R1234ze, with nearly zero environmental impact.

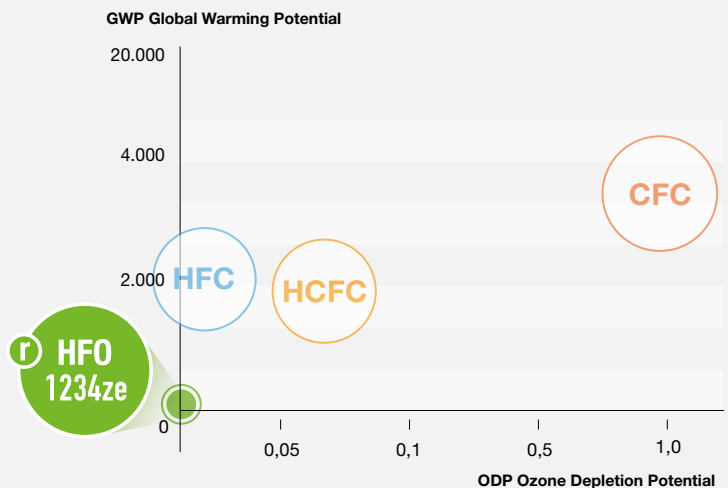
Combining brilliant annual efficiency with the use of a low GWP refrigerant, FR2-G04-Z tackles both the indirect (due to the primary energy consumption) and the direct global warming impact, thus resulting in the perfect choice for any new, forward-looking cooling system.

The environmental impact of the refrigerants is measured by two parameters:

- ▶ **ODP:** Ozone Depletion Potential
- ▶ **GWP:** Global Warming Potential

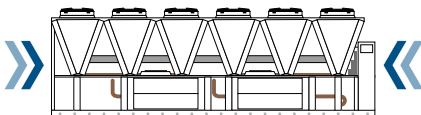
While in the past the focus was on reducing ODP values to 0, new regulations encourage Member States to work harder on GWP.

HFO R1234ze	ODP	0
	GWP	<1



HIGHER EFFICIENCY IN LESS SPACE

- +8% COOLING CAPACITY
- +10% EFFICIENCY



FR2-G04-Z delivers increased cooling capacity and efficiency compared to the previous generation, exceeding the most demanding efficiency thresholds.

SUPER SILENT OPERATION

THE MOST SILENT SCREW CHILLER ON THE MARKET



FR2-G04-Z chillers perfectly matches IT Cooling applications.

NR Kit is available for an outstanding sound levels while maintaining the same performance and footprint

as the standard version.

For the ultimate acoustical performance, FR2-G04-Z is available in Super Low Noise configuration.



TECHNOLOGICAL CHOICES

W3000+ CONTROL

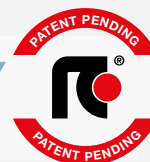
Management software developed fully in-house

- ▶ Proprietary settings for faster adaptive responses to different dynamics
- ▶ Enhanced diagnostics thanks to the black box function
- ▶ Connectivity with the most commonly used BMS protocols and M-Net Mitsubishi Electric proprietary protocol (Opt.)

KIPLink USER INTERFACE

An exclusive product of Mitsubishi Electric Hydraulics & IT Cooling System

Based on Wi-Fi technology, KIPLink allows one to operate the unit directly from a mobile device (smartphone, tablet, or notebook) by simply scanning the QR code positioned on the unit.



Patent-pending solution which optimizes the thermodynamic cycle

New generation full aluminum micro-channel coils for cooling only chillers

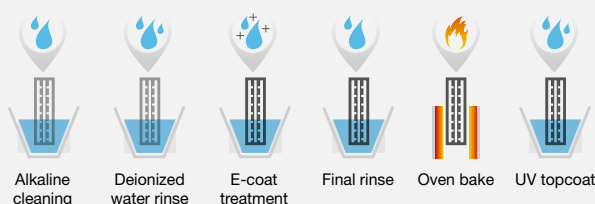
- ▶ Long Life Alloy (LLA) for higher corrosion resistance and longer life cycle
- ▶ Up to 30% of refrigerant charge reduction vs. traditional solutions
- ▶ Lower weight vs. traditional solutions

Al- E-coating treatment (opt.)

3120 h
SWAAT test
(ASTM G85-02 A3)

- ✓ Excellent resistance to UV rays.
- ✓ **over 6000 h resistance** as per ASTM B117
- ✓ **over 1000 h of surface protection against UV rays** as per ASTM G155-05a

E-coating process



r HFO
1234ze

HFO refrigerant

4th generation refrigerant HFO 1234ze, with negligible greenhouse effect and zero impact on the ozone layer.

Negligible GWP

HFO 1234ze GWP_{100 year} < 1
(R134a GWP_{100 year} = 1300)
GWP values according to IPCC rev. 5th

Rapid molecule disintegration in the atmosphere

HFO 1234ze = 2 weeks
(R134a = 14 years)

Approved by international standards

ASHRAE 34, ISO 817:
A2L classification (non toxic, mildly flammable)

Compatible with common construction materials

No special components
No extra cost

In-line with environmental regulation objectives

No future retrofit required



BEST-IN-CLASS TECHNOLOGICAL CHOICES FOR HIGH-LEVEL PERFORMANCE AND SUPER SILENT OPERATION.

FANS

High performing, axial fans:

- ▶ External bell mouth for the highest efficiency and best-in-class sound power levels
- ▶ Variable Speed control as standard (DVVF), for large operating limits

EXTENDED LIMITS UP TO -15°C



EC fans (opt. available for all versions)

- ▶ Continuous regulation of air flow
- ▶ Reduced power consumption and increased efficiencies at partial loads
- ▶ Extended operating limits
- ▶ High ESP EC fan option for up to 150 Pa of available static pressure



Shell&Tube heat exchanger

Dry expansion, single pass S&T evaporator, fully developed in-house.

- ▶ Internally grooved copper tubes
- ▶ Possibility of inspection and tube cleaning
- ▶ Low pressure drops

Screw compressors



Dual rotor screw compressors designed according to Mitsubishi Electric Hydronics & IT Cooling Systems specifications and for its exclusive use.

- ▶ Innovative internal geometry enhancing efficiency at part load operations
- ▶ Controlled lubrication system
- ▶ Extreme durability, with carbon steel bearings guaranteed for more than 150.000 hours

HYDRONIC MODULES

The units come with pump control relay + 0-10V modulating signal to control an external pump as standard. The hydronic module (opt.) includes the Grundfos' pumps and all the main hydraulic components, which provides the best pairing with new FR2-Z range of chillers.



Pumps

- ▶ In-line configuration
- ▶ Twin pumps
- ▶ Fixed or variable speed
- ▶ Low or high head (approx. 100 or 200 kPa).

Pumps + Inverter

- ▶ External inverter to adjust the waterflow
- ▶ Reduced energy consumption through speed regulation
- ▶ Available flow control logics: Constant flow parameter-set, variable flow with VPF and VPF.D systems

Grundfos' pumps

- ▶ SiC/SiC (silicon carbide) primary seal pairing
- ▶ EPDM bellows seal
- ▶ Pull-out design

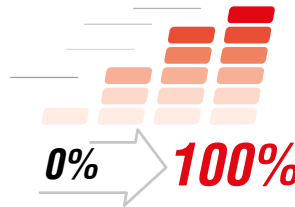
EQUIPMENT FOR MISSION CRITICAL APPLICATIONS

FAST RESTART

Ensures a **faster return to the necessary cooling** levels in the shortest time possible, while maintaining the **reliability** of the chiller.



Ensures immediate cooling start-up within 25"



Have the unit running at full load in a shorter time

A 2-cpr unit in standard working conditions delivers 100% of cooling capacity within 180" after power is restored.

DOUBLE POWER SUPPLY

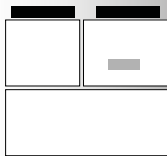
Redundancy increases uptime. FR2-G04-Z chillers also extend this concept to the electrical supply: the unit, equipped with an ATS*, can be connected to two separate power lines to enhance the system's dependability.

In case of a main line power outage, the ATS* automatically switches over to the backup line, granting uninterrupted power supply to the unit. The double power supply makes FR2-G04-Z suitable for Uptime Institute's TIER III and TIER IV** design topologies, the highest standards of reliability.

* ATS: Automatic Transfer Switch

** The Tier Classification System provides the data center industry with a consistent method to compare typically unique facilities based on expected site infrastructure performance, or uptime.

Main Line ▶



Generator ▶

MULTI MANAGER

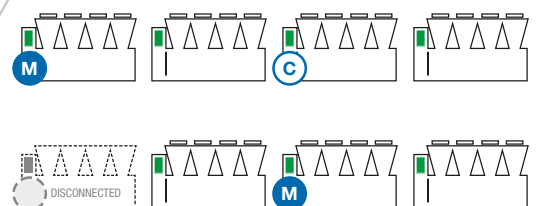
The FR2-Z ranges feature embedded LAN logics for an easy connection between a group of chillers.

- ▶ **Up to 8 chillers connected to the same group.**
- ▶ **Load sharing and Sequencing.**
Logics for the smart distribution of cooling loads among the units.
- ▶ **Selectable units' start-up sequence and group Fast Restart (with Fast Restart option).**
To avoid simultaneous start-ups of different unit's compressors in case of dangerous current peaks.
- ▶ **Stand by unit management with automatic unit rotation.**
- ▶ **Dynamic master with succession priority.**
One master unit is elected to coordinate the group and if it becomes disconnected the candidate unit takes full control.
- ▶ **Resource priority management.**
For a group of chillers, with different technologies, it is possible to set the usage priority of each unit, making the most of the available cooling resources.

SMART LAN FUNCTIONS

The entire cooling equipment works as one, with one master chiller that coordinates and optimizes the operation of the group.

MASTER SUCCESSION PRIORITY



M Master Unit C Candidate Master Unit

FURTHER OPTIONS

Set-point adjustment

4-20 mA: Enables remote set-point adjustments (analog input).

Double set-point: Enables the remote switch between 2 set-points (digital input).

Set-point compensation: Automatic adjustment of the set-point on the basis of the outdoor temperature.

Control functions

Night mode: Limits the unit sound level reducing the usage of the resources. Sound power reduction (with factory settings): -3 dB(A).

U.L.C. User Limit Control: Controls a mixing valve (not included) to ensure a safe start-up and operation of the unit even in critical conditions.

Remote probe: Controls the unit's and pump's activation on the base of the water temperature of the buffer tank or hydraulic decoupler.

Demand limit: Limits the unit's power absorption for safety reasons or in temporary situations (digital input).

Electrical

Compressor rephasing: The capacitors on the compressors' line increase the unit's power factor.

Soft-starter: Manages the inrush current enabling lower motor windings' mechanical wear, avoidance of mains voltage fluctuations during starting and favorable sizing for the electrical system.

Connectivity

Serial card interface module to allow integration with BMS protocols:

Modbus / LonWorks / BACnet MS/TP / BACnet over IP / Konnex / Modbus TCP/IP/ SNMP

M-Net interface kit: Interface module to allow the integration of the unit with Mitsubishi Electric proprietary communication protocol M-Net.

Multi Manager options to allow easy connection between a group of chillers

Energy Meter

Energy meter for BMS: Acquires electrical data and the power absorbed by the unit and sends them the BMS for energy metering (Modbus RS485).

Energy meter for W3000+: The electrical data acquired is available directly on the unit's control.

Refrigerant circuit

Compressor suction and discharge valves: Installed for each compressor tandem or trio, the valves simplify maintenance activities. The user can work on the isolated valve for periodic maintenance or replacement, without removing the refrigerant from the circuit.

Dual pressure relief valves with switch: One valve is isolated from the refrigerant circuit while the other is in service. The user can work on the isolated valve for periodic maintenance or replacement, without removing the refrigerant from the circuit.

Refrigerant leak detector

Leak detector: Factory installed device. In case of a gas leak detection it raises an alarm.

Leak detector + compressor off: Factory installed device. In case of a gas leak detection it raises an alarm and stops the units.

Hydraulic

Water flow switch: Designed to protect the unit when the water flow across the evaporator is not sufficient and falls outside of the operating parameters.

Structure

Anti-intrusion grilles: Perimeter metal grilles to protect against the intrusion of solid bodies into the unit structure.

Spring or rubber type anti-vibration mountings: Reduce vibrations, keeping noise transmission to a minimum.

Packing

Standard or nylon packing: The unit is provided with plastic supports, with or without a protective nylon layer.

Container packing: The unit is provided with metal slides and protective nylon layer for container loading.

FR²Z G04

0252 - 1593

Air cooled chillers
for outdoor installation
(from 252 to 1572 kW)



FR2-G04-Z / A

Model		0252	0302	0322	0352	0402	0452	0512	0572	0652	
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	255,3	289,9	315,1	365,0	405,4	445,9	519,7	573,4	679,0
Total power input	(1)	KW	75,98	87,26	94,43	106,7	121,7	135,2	156,8	172,2	204,8
EER	(1)	KW/KW	3.359	3.321	3.338	3.421	3.331	3.298	3.314	3.330	3.315
COOLING ONLY (EN14511 VALUE)											
Cooling capacity	(1)(2)	KW	255,0	289,5	314,7	364,7	405,0	445,4	519,2	572,9	678,4
EER	(1)(2)	KW/KW	3.320	3.280	3.310	3.390	3.290	3.250	3.280	3.290	3.270
Cooling energy class			-	-	-	-	-	-	-	-	-
SEPR HT	(3)(4)		5,71	5,95	6,08	5,78	5,83	5,63	5,91	5,74	6,03
COOLING ONLY (GROSS VALUE)											
16°C/10°C											
Cooling capacity	(5)	KW	282,1	319,3	347,0	398,9	445,2	489,3	571,3	625,9	745,9
Total power input	(5)	KW	78,67	90,65	98,27	110,3	126,0	139,8	162,4	177,8	211,5
EER	(5)	KW/KW	3.584	3.524	3.530	3.617	3.533	3.500	3.518	3.520	3.527
23°C/15°C											
Cooling capacity	(6)	KW	328,1	369,7	401,5	455,8	512,6	562,8	658,9	714,1	859,3
Total power input	(6)	KW	83,00	96,10	104,5	115,8	133,1	147,1	171,2	186,3	222,0
EER	(6)	KW/KW	3.953	3.847	3.842	3.936	3.851	3.826	3.849	3.833	3.871
EXCHANGERS											
HEAT EXCHANGER USER SIDE IN REFRIGERATION											
Water flow	(1)	l/s	12,21	13,86	15,07	17,46	19,39	21,32	24,85	27,42	32,47
Pressure drop at the heat exchanger	(1)(2)	kPa	38,1	36,3	23,9	32,1	39,7	48,0	34,3	41,8	51,5
REFRIGERANT CIRCUIT											
Compressors nr.		N°	2	2	2	2	2	2	2	2	2
No. Circuits		N°	2	2	2	2	2	2	2	2	2
Refrigerant charge		kg	51,0	55,0	59,0	67,0	72,0	81,0	93,0	98,0	123
NOISE LEVEL											
Sound Pressure	(7)	DB(A)	66	67	67	68	68	68	68	70	69
Sound power level in cooling	(8)(9)	dB(A)	98	99	99	100	100	100	100	102	102
SIZE AND WEIGHT											
A	(10)	mm	4000	4000	4000	4000	4000	5250	5250	5250	6500
B	(10)	mm	2260	2260	2260	2260	2260	2260	2260	2260	2260
H	(10)	mm	2640	2640	2640	2640	2640	2640	2640	2640	2640
Operating weight	(10)	kg	3540	3560	3660	3810	4470	4990	5190	5250	6710

Model		0772	0902	0972	1052	1152	1243	1373	1503	1593	
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	781,7	903,5	967,9	1058	1145	1239	1362	1488	1561
Total power input	(1)	KW	235,6	276,0	287,2	319,7	343,6	373,1	415,8	446,3	473,4
EER	(1)	KW/KW	3.318	3.274	3.370	3.309	3.332	3.321	3.276	3.334	3.297
COOLING ONLY (EN14511 VALUE)											
Cooling capacity	(1)(2)	KW	781,0	902,9	967,1	1057	1145	1238	1361	1487	1560
EER	(1)(2)	KW/KW	3.270	3.240	3.330	3.270	3.290	3.280	3.240	3.290	3.250
Cooling energy class			-	-	-	-	-	-	-	-	-
SEPR HT	(3)(4)		5,68	5,82	5,52	6,06	5,92	5,73	5,82	5,67	5,74
COOLING ONLY (GROSS VALUE)											
16°C/10°C											
Cooling capacity	(5)	KW	857,7	991,9	1055	1162	1251	1360	1496	1622	1703
Total power input	(5)	KW	243,3	286,2	295,9	330,8	355,1	385,9	431,2	461,3	489,7
EER	(5)	KW/KW	3.525	3.466	3.565	3.513	3.523	3.524	3.469	3.516	3.478
23°C/15°C											
Cooling capacity	(6)	KW	986,7	1142	1201	1338	1428	1565	1724	1845	1938
Total power input	(6)	KW	255,2	302,0	308,7	348,6	372,9	405,5	455,3	483,7	514,6
EER	(6)	KW/KW	3.866	3.781	3.891	3.838	3.829	3.859	3.787	3.814	3.766
EXCHANGERS											
HEAT EXCHANGER USER SIDE IN REFRIGERATION											
Water flow	(1)	l/s	37,38	43,21	46,28	50,57	54,77	59,24	65,14	71,14	74,65
Pressure drop at the heat exchanger	(1)(2)	kPa	54,3	35,3	52,5	48,4	53,3	46,9	46,2	55,1	60,7
REFRIGERANT CIRCUIT											
Compressors nr.		N°	2	2	2	2	2	3	3	3	3
No. Circuits		N°	2	2	2	2	2	3	3	3	3
Refrigerant charge		kg	142	152	160	191	195	216	222	232	248
NOISE LEVEL											
Sound Pressure	(7)	DB(A)	70	71	71	73	73	73	73	73	73
Sound power level in cooling	(8)(9)	dB(A)	103	104	104	106	106	106	106	106	106
SIZE AND WEIGHT											
A	(10)	mm	7750	7750	9000	10400	10400	11650	11650	12900	12900
B	(10)	mm	2260	2260	2260	2260	2260	2260	2260	2260	2260
H	(10)	mm	2640	2640	2640	2640	2640	2640	2640	2640	2640
Operating weight	(10)	kg	7650	7900	8340	9370	9440	11380	12070	12680	12930

Notes:

- Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger air (in) 35°C.
- Values in compliance with EN14511
- Seasonal energy efficiency ratio
- Seasonal energy efficiency of high temperature process cooling [REGULATION (EU) N. 2016/2281]
- Plant (side) cooling exchanger water (in/out) 16°C/10°C; Source (side) heat exchanger air (in) 35°C.

- Plant (side) cooling exchanger water (in/out) 23°C/15°C; Source (side) heat exchanger air (in) 35°C.
- 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.
- Sound power on the basis of measurements taken in compliance with ISO 9614.
- Sound power level in cooling, outdoors.
- Unit in standard configuration, without optional accessories.

The units highlighted in this publication contain HFO-1234ze [GWP₁₀₀ 7] fluorinated greenhouse gases.

Certified data in EUROVENT



FR2-G04-Z / SL-A

Model		0252	0302	0322	0352	0402	0452	0512	0572	0652
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	252,3	286,2	310,7	362,2	399,4	445,7	512,4	567,7	669,5
Total power input	(1) kW	74,66	86,37	93,79	106,2	121,3	132,5	156,1	173,0	203,9
EER	(1) kW/kW	3.378	3.312	3.312	3.411	3.293	3.364	3.283	3.282	3.283
COOLING ONLY (EN14511 VALUE)										
Cooling capacity	(1)(2) kW	252,0	285,9	310,4	361,8	399,0	445,2	512,0	567,2	668,9
EER	(1)(2) kW/kW	3.340	3.270	3.280	3.380	3.260	3.320	3.250	3.240	3.240
Cooling energy class		-	-	-	-	-	-	-	-	-
SEPR HT	(3)(4)	5,86	6,08	6,19	5,95	5,90	5,73	6,00	5,86	6,08
COOLING ONLY (GROSS VALUE)										
16°C/10°C										
Cooling capacity	(5) kW	278,6	315,0	341,9	395,5	438,2	489,2	562,8	619,4	734,9
Total power input	(5) kW	77,50	89,96	97,87	110,0	126,0	137,0	162,0	179,1	211,1
EER	(5) kW/kW	3.595	3.500	3.492	3.595	3.478	3.571	3.474	3.458	3.481
23°C/15°C										
Cooling capacity	(6) kW	323,7	364,2	395,0	451,3	503,8	563,2	648,4	706,4	845,5
Total power input	(6) kW	82,07	95,76	104,5	115,9	133,5	144,0	171,5	188,6	222,1
EER	(6) kW/kW	3.943	3.802	3.780	3.894	3.774	3.911	3.781	3.745	3.807
EXCHANGERS										
HEAT EXCHANGER USER SIDE IN REFRIGERATION										
Water flow	(1) l/s	12,07	13,69	14,86	17,32	19,10	21,31	24,50	27,15	32,02
Pressure drop at the heat exchanger	(1)(2) kPa	37,2	35,4	23,3	31,6	38,5	47,9	33,4	41,0	50,1
REFRIGERANT CIRCUIT										
Compressors nr.	N°	2	2	2	2	2	2	2	2	2
No. Circuits	N°	2	2	2	2	2	2	2	2	2
Refrigerant charge	kg	51,0	55,0	59,0	67,0	72,0	85,0	93,0	98,0	123
NOISE LEVEL										
Sound Pressure	(7) DB(A)	55	55	55	56	57	57	57	58	58
Sound power level in cooling	(8)(9) dB(A)	87	87	87	88	89	89	89	90	91
SIZE AND WEIGHT										
A	(10) mm	4000	4000	4000	4000	4000	5250	5250	5250	6500
B	(10) mm	2260	2260	2260	2260	2260	2260	2260	2260	2260
H	(10) mm	2640	2640	2640	2640	2640	2640	2640	2640	2640
Operating weight	(10) kg	3810	3830	3930	4080	4930	5620	5720	5780	7320

Model		0772	0902	0972	1052	1152	1243	1373	1503	1593
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	771,7	893,3	959,0	1044	1133	1222	1352	1482	1572
Total power input	(1) kW	234,8	265,2	287,9	318,4	344,3	372,8	411,5	442,8	479,8
EER	(1) kW/kW	3.287	3.368	3.331	3.279	3.291	3.278	3.286	3.347	3.276
COOLING ONLY (EN14511 VALUE)										
Cooling capacity	(1)(2) kW	771,1	892,6	958,2	1043	1133	1221	1351	1481	1572
EER	(1)(2) kW/kW	3.240	3.330	3.290	3.240	3.250	3.240	3.250	3.300	3.250
Cooling energy class		-	-	-	-	-	-	-	-	-
SEPR HT	(3)(4)	5,76	5,88	5,63	6,15	6,02	5,80	5,91	5,79	5,90
COOLING ONLY (GROSS VALUE)										
16°C/10°C										
Cooling capacity	(5) kW	846,2	980,5	1045	1146	1236	1340	1485	1615	1713
Total power input	(5) kW	243,1	274,5	297,4	330,2	356,8	386,5	427,3	458,3	497,9
EER	(5) kW/kW	3.481	3.572	3.514	3.471	3.464	3.467	3.475	3.524	3.440
23°C/15°C										
Cooling capacity	(6) kW	972,5	1129	1188	1318	1408	1541	1710	1836	1945
Total power input	(6) kW	255,9	288,9	311,7	349,1	376,2	407,9	452,0	481,5	525,6
EER	(6) kW/kW	3.800	3.908	3.811	3.775	3.743	3.778	3.783	3.813	3.701
EXCHANGERS										
HEAT EXCHANGER USER SIDE IN REFRIGERATION										
Water flow	(1) l/s	36,91	42,72	45,86	49,92	54,20	58,44	64,65	70,87	75,20
Pressure drop at the heat exchanger	(1)(2) kPa	53,0	44,7	51,5	47,2	52,2	45,6	45,5	54,7	35,9
REFRIGERANT CIRCUIT										
Compressors nr.	N°	2	2	2	2	2	3	3	3	3
No. Circuits	N°	2	2	2	2	2	3	3	3	3
Refrigerant charge	kg	142	155	160	191	195	216	233	243	253
NOISE LEVEL										
Sound Pressure	(7) DB(A)	59	60	61	61	61	61	61	62	62
Sound power level in cooling	(8)(9) dB(A)	92	93	94	94	94	94	94	95	95
SIZE AND WEIGHT										
A	(10) mm	7750	9000	9000	10400	10400	11650	12900	12900	12900
B	(10) mm	2260	2260	2260	2260	2260	2260	2260	2260	2260
H	(10) mm	2640	2640	2640	2640	2640	2640	2640	2640	2640
Operating weight	(10) kg	8270	8910	8980	10010	10080	12300	13620	13740	13880

Notes:

- Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger air (in) 35°C.
- Values in compliance with EN14511
- Seasonal energy efficiency ratio
- Seasonal energy efficiency of high temperature process cooling [REGULATION (EU) N. 2016/2281]
- Plant (side) cooling exchanger water (in/out) 16°C/ 10°C; Source (side) heat exchanger air (in) 35°C.

- Plant (side) cooling exchanger water (in/out) 23°C/ 15°C; Source (side) heat exchanger air (in) 35°C.
- 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.
- Sound power on the basis of measurements taken in compliance with ISO 9614.
- Sound power level in cooling, outdoors.
- Unit in standard configuration, without optional accessories.

The units highlighted in this publication contain HFO-1234ze [GWP₁₀₀ 7] fluorinated greenhouse gases.

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MORE THAN 1000 PROJECTS ALL OVER THE WORLD

FORTUM DISTRICT HEATING

KIRKKONUMMI - FINLAND

Period: 2017 - 2018

Heating capacity: 26486 kW

Application: Data Center

Installed machines:

2x FRCS2-W HFO/H/CA/S 5422,

8x Close control air conditioners

Cooling capacity: 27150 kW



PROJECT

Fortum, a Finnish energy company, utilizes the waste heat from a data center to supply the heat into a district heat network in a very innovative and sustainable way. The facility currently generates between 10,000-15,000 megawatt-hours of heat waste annually.

CHALLENGE

The heat pumps are used as a primary cooling method for the data center. Fortum's long-term goal is to serve all the district heating customers in Espoo, Kirkkonummi, and Kauniainen regions with carbon-neutral district heat by 2030. Using the heat waste of a data center is a good example of how it is actively possible to move towards low-carbon district heating. Furthermore, as demonstrated in several projects throughout Europe, heat pumps are an energy efficient and economical solution for district heating systems.

SOLUTION

To recover the heat waste of the Ericsson data center and serve the district heating in Kirkkonummi, 2 RC FRCS2-W HFO/H/CA/S 5422 heat pumps were supplied. The FRCS2-W HFO RC heat pumps were selected for their efficiency and sustainability as they use HFO-1234ze refrigerant (1,3,3,3-Tetrafluoropropene), which has a minimal greenhouse effect.

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.

RTS RADIO TELEVISION SUISSE

GENEVA – SWITZERLAND

Period: 2016 - 2017

Cooling capacity: 674 kW

Application: Telecommunications - Offices

Installed machines:
1x TRCS2-W HFO/HC 0712

Plant type: Hydronic System



PROJECT

RTS (Radio Television Suisse) is the company that handles production and broadcasting of radio and television programming in French for Switzerland. Its headquarters are in Geneva, behind the Hans Wilsdorf Bridge.

CHALLENGE

In recording studios, the air conditioning system plays a key role, in fact rooms are sound proof to avoid noise as much as possible while machines like, mixers, cameras, and lights cause very high internal heating loads.

SOLUTION

For the air conditioning of the station, a RC TRCS2-W HFO water cooled chiller with magnetic levitation compressors was installed. This unit was chosen because of its efficiency at partial loads and because indoor installation makes its noise emissions low. In addition the use of HFO green refrigerant, in compliance with the latest European regulations to tackle climate change, was considered a ideal choice to avoid anticipated retrofit of the plant.



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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