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

IT COOLING

CHILLERS

FR-Z

AIR SOURCE CHILLERS WITH SCREW COMPRESSORS, FROM 289 TO 1710 kW

rcitcooling.com

FR-Z

KEEP YOUR DATA CENTER RUNNING AT PEAK EFFICIENCY

Air source chiller for outdoor installation
289 - 1710 kW

EUROVENT CERTIFIED PERFORMANCE www.eurovent-certification.com

FR-Z features screw compressors optimized for R134a refrigerant, axial fans, micro-channel full-aluminum condensing coils, electronic expansion valve, and single-pass shell and tube evaporator designed by Mitsubishi Electric Hydronics and IT Cooling Systems.

The controller, specifically developed in-house, offers advanced thermoregulation and energy saving functions. The innovative user interface, called KIPlink, is based on Wi-Fi technology and allows you to operate on the unit directly from a mobile device.

COUNTLESS VERSIONS FOR THE MOST CHALLENGING NEEDS

K	**Key efficiency**	Cost effective units that grant the best combination between cooling capacity and footprint.	**EER*:** 2,89 **ESEER*:** 4,28
CA	**High efficiency**	High performing units with generous heat exchanger surfaces which reduce energy expenses and cut running costs.	**EER*:** 3,19 **ESEER*:** 4,39
E	**Very high efficiency**	Extremely efficient units for the best energy savings and the minimum investment payback time. The oversized condensing section ensures an appropriate heat exchange even in case of high outdoor air temperature, making this unit also suitable for the hottest regions.	**EER*:** 3,33 **ESEER*:** 4,46

* Average values

ACOUSTIC VERSIONS

-	**Standard**	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)**
SL	**Super low noise**	The highest level of noise reduction which cuts noise emissions by 10 to 12 dB(A), without compromising the unit's efficiency.	**-12 dB(A)**

HEAT RECOVERY CONFIGURATIONS

-	**Standard unit**	Unit for the production of chilled water.	**Baseline**
D	**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**
R	**Total heat recovery**	A devoted refrigerant water heat exchanger recovers all the condensation heat. **Suitable far DHW production or air treatment in applications with AHU.**	**55°C** **60°C with HT kit**

FR-Z brings advanced technology and know-how together in customizable packages to aid design, specification, installation, and on-going operations.

PROFOUND EXPERTISE

With thousands of units installed worldwide since 2003, RC air-cooled screw chillers have evolved into the third generation: FR-Z. The highest manufacturing quality, proven reliability, and full configurability are the reasons behind the success of this range. Today FR-Z combines extensive expertise with the latest technology to deliver you the best value.

TAILORED EFFICIENCY

Fully customizable with a range of efficiency and acoustic versions, FR-Z allows custom-made application design for individual projects. Thanks to devoted technological solutions and accurate design, each FR-Z configuration brings high full load performance and brilliant part load efficiency together, thus helping individuals and businesses reduce the energy consumption of their HVAC systems and cut their running costs.

POWERFUL ADAPTABILITY

Driven by exponential growth of data exchange and rising power densities, data center design is rapidly changing, always striving to reducing their running costs while ensuring complete infrastructure dependability.

The awareness of the most demanding mission critical application requirements and the commitment to improve the HVAC system efficiency has led to the development of the new FR-Z range.

Cooling dependability and extended lifetime

Designed for continuous operation, FR-Z meets the needs of the uninterruptible industry. Devoted devices and functions maximize the unit's uptime even in case of emergency circumstances.

Reduced operating costs

FR-Z is optimized to efficiently work with high temperature IT environments, delivering consistent cooling to the most advanced IT infrastructures.
This, combined with the chiller's outstanding performance, brings a significant PUE reduction and helps to keep the OPEX (Operating Expenditure) under control.

IT COOLING APPLICATIONS

- Data centers and server rooms
- Technological hubs
- Telecommunication installations
- Laboratories and technical rooms

ASHRAE 90.1 compliant

Compliant with the minimum energy performance set by ASHRAE 90.1-2013, FR-Z helps you meet LEED requirements, which adds value to your buildings.

ECODESIGN COMPLIANT

FR-Z chillers deliver the seasonal energy efficiency targets for comfort cooling (SEER) and process cooling (SEPR) required by the latest European regulations.

TECHNOLOGICAL CHOICES

W3000TE CONTROL

Fully in-house developed management software.

- Efficient and reliable operation in all conditions
- Connectivity with the most commonly used BMS protocols (Opt.)

KIPlink USER INTERFACE

Innovative Wi-Fi interface for an easy and enhanced unit management.

Comunication based on Wi-Fi technology (no internet connection needed)

Hardware Industrial characteristics, tolerates temperatures from -20 to +65°C

An exclusive product of Mitsubishi Electric Hydronics & IT Cooling Systems

Built-in pump group (Opt.)

Factory-mounted pumps and pre-plumbed hydraulic components, for the minimum on-site installation time, work and cost.

- Fix speed and variable speed pumps available, with low or high head
- Electronic primary flow controls for constant pressure or constant temperature

Casing

Base and frame made of hot-galvanized steel, all parts polyester-painted.

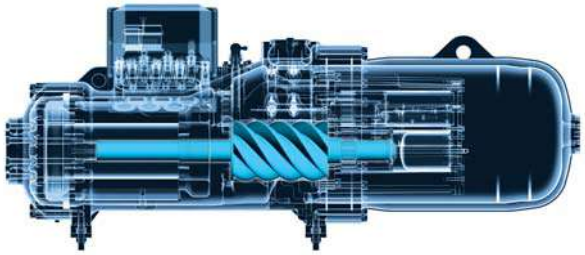
- Easy access to all inner components
- Simple transport, lifting, and handling
- Total weather resistance

Refrigerant circuits

Dedicated and independent refrigerant circuits to grant non-stop operation and easy maintenance.

CSC screw compressors

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

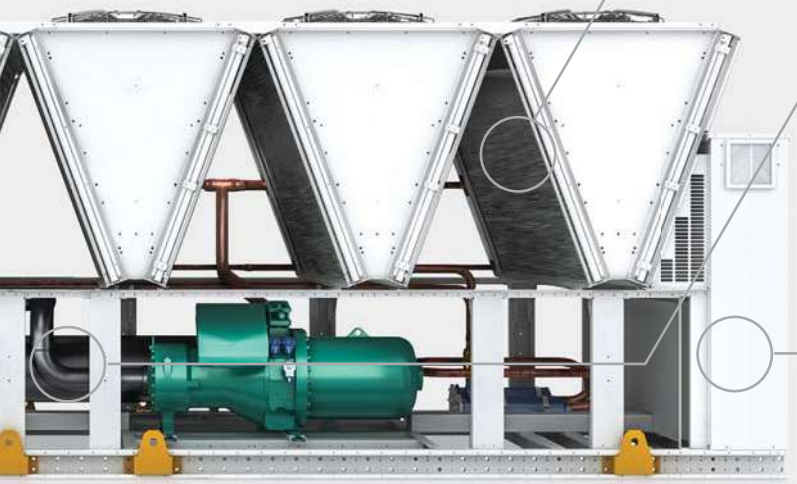


Trusted reliability, simplified installation, maximized performance: FR-Z improves the already high performance of the RC chiller range adding new exceptional features.

Variable speed fans

High performing axial fans equipped with autotransformer for speed adjustment.

- Precise air-flow management, reduced power consumption and lower sound levels at part load
- Totally independent ventilation system for each refrigerant circuit
- EC fans available with proprietary algorithm for energy savings and very low ambient operation (Opt.)



Micro-channel coils

New generation full aluminum micro-channel coils, ideally positioned on a “V” block structure to optimize airflow and heat transfer.

- Up to 30% of refrigerant charge reduction vs. traditional tube and fin coils.
- Long Life Alloy (LLA) for higher corrosion resistance and longer life cycle
- Protective coating available for harsh industrial and marine evironments (Opt.)

Shell and tube evaporator

Dry expansion, single pass shell and tube evaporator, fully developed by Mitsubishi Electric Hydronics & IT Cooling Systems.

- Internally grooved copper tubes for enhanced heat exchange
- Low pressure drops
- Fully protected against ice formation

Electrical panel

Large electrical panel with power circuit components and control main board.

- Forced-air cooling system
- ATS available for double power supply set-up (Opt.)

Innovative internal geometry

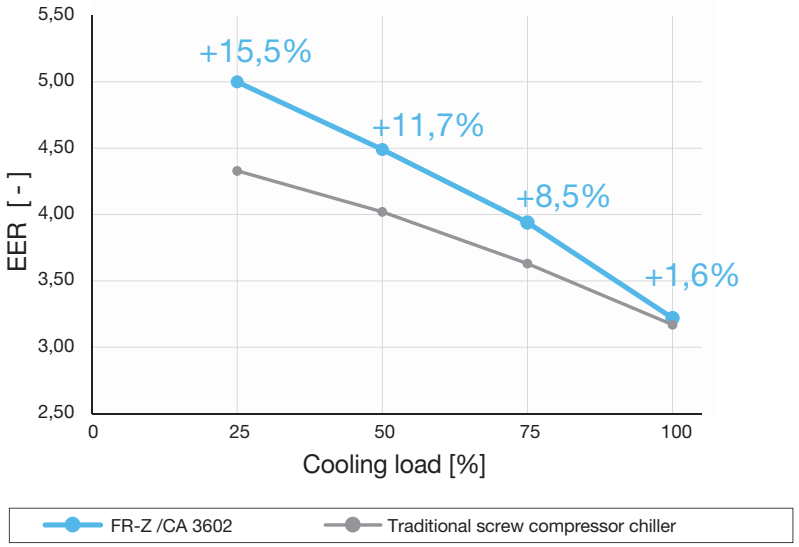
Thanks to its specific design, aimed at optimizing the internal volumes for partial load operation, the CSC compressors deliver excellent performance in all the different operating conditions.

Enhanced lubrication system

A special oil management valve calibrates the oil circulation and delivers a remarkable increase of the compressor efficiency at partial loads.

Extreme durability

The brilliantly engineered mechanics include carbon steel bearings guaranteed for a lifetime of 150.000 hours.



The graph shows the chiller efficiency with the variation of the load rate and air temperature (ESEER operating conditions).

CORE FEATURES FOR ALL YOUR EQUIPMENT NEEDS

W3000TE control and KIPlink innovative interface

The logic behind FR-Z is the W3000TE control software. Characterized by advanced functions and algorithms, **W3000TE features proprietary settings** that ensure faster adaptive responses to different dynamics, in all operating modes. Direct control over the unit comes through the innovative KIPlink interface.
Based on Wi-Fi technology, **KIPlink** gets rid of the standard keyboard and **allows one to operate on the unit directly from a mobile device** (smartphone, tablet, notebook).

Easier on-site operation

Monitor each component while moving around the unit for maintenance operations. View and change all parameters with easy-to-understand screenshots and dedicated tooltips.
Get devoted “help” message for alarm reset and trouble shooting.

Real-time graphs and trends

Monitor the immediate labor status of the compressors, heat exchangers, cooling circuits and pumps.
View the real-time graphs of the key operating variable trends.

Data logger function

View history of events and use the filter for a simple search.
Enhance diagnostics with data and graphs of 10 minutes before and after each alarm.
Download all the data for detailed analysis.

How to access the unit with KIPlink

Direct access to the W3000TE control is achieved by scanning the QR-code positioned on the front side of the FR-Z unit.

LED switch

The three-colour LED button positioned on the electrical board allows the user to switch the unit on/off and visualize the genaral status of the equipment without using any mobile device.

In addition (Opt. 1442, 1444) or in substitution (Opt. 6194, 6195) to the KIPlink, FR-Z can be provided with: a 7” color touch screen interface or with a keyboard with large display and LED icons.
In these cases, the LED switch is not provided. Remote keyboard is possible (Opt. C9261063, C9261064, C926108911, C926108913).

HFO green refrigerants

In line with the most severe environmental regulations, FR-Z 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.

* Average values

A full range of air cooled chillers optimized for using the HFO refrigerants:

HFO 1234ze
GREENEFFICIENCY

16 sizes	From 286 to 1458 kW
CA efficiency	EER*: 3,17 ESEER*: 4,33
SL version	Up to -12 dB(A)

RC brand products have been always synonymous for best in class performance and high versatility. That's particularly true for FR-Z, the innovative chiller where all the features have been designed for the complete customer peace of mind.

Hydronic modules and flow controls

The FR-Z units can be equipped with a factory-mounted complete pump group, which **optimizes hydraulic and electrical installation** space, time and costs, or simply with terminals to control the external pumps with the unit control logic.

Factory-mounted pump group

2 pumps (duty/standby) provide low or high head (available head approx. 100 or 200 kPa).

Fixed speed pumps
2-pole motor: Opt. 4711 (LH) / 4712 (HH)
4-pole motor: Opt. 4708 (LH) / 4709 (HH)

Variable speed pumps
2-pole motor: Opt. 4722 (LH) / 4723 (HH)
4-pole motor: Opt. 4719 (LH) / 4721 (HH)

Terminals for external pump control

The unit controls the activation or the activation and speed of 1 or 2 external pumps.

ON/OFF signal
Opt. 4702 (1 pump) / 4703 (2 pumps)

Modulating signal
Opt. 4713 (1 pump) / 4714 (2 pumps)

For a quick and easy commissioning, it is possible to set the speed of the inverter driven pumps directly from the control of the unit and adjust the flow rate according to the actual plant head losses (Opt. 4862).

Close-coupled pumps by Grundfos

SiC/SiC (silicon carbide) primary seal pairing, extremely resistant against wear, abrasive particles and wear.

EPDM bellows seal prevent the risk of deposits, such as rust, on the shaft.

Pull-out design: during maintenance the power head can be pulled out without removing the pump housing from the pipework.

In-line or end-suction models were chosen based on dimensions and performances

VPF control logic

The VPF control series (Variable Primary Flow) doesn't only **adjust the pump speed on the basis of the plant's thermal load**, but also **dynamically optimizes the unit's thermoregulation** for variable flow operation, thus ensuring both the highest pump energy savings and chiller stable operation.

VPF: constant ΔP on the plant side
For systems with only the primary circuit.
Opt. 4864 or 4865 for single unit system
Opt. 4866 for multi-unit system

VPF.D: constant ΔT on the plant side
For systems with primary and secondary circuits separated by a hydraulic decoupler.
Opt. 4867 for single unit system
Opt. 4868 for multi-unit system

Operating limits

- ☐ Standard unit
- ■ Required: Kit HT (Opt. 1955)
- ■ Required: EC fans (Opt. 808)
- ■ Required: DBA device (coil flooding) (Opt. 813)
  EC fans (Opt. 808)

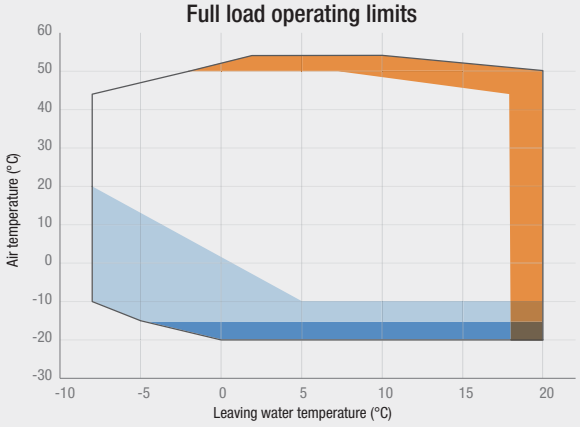
Air temp. < -10°C: Double insulation on heat exchangers (Opt. 2631)
LWT < 0°C: Compressor liquid injection (Opt. 871)

Partial load operating limits

In case of higher outdoor air temperature, FR-Z automatically partializes its resources to ensure uninterrupted operation (HPTC function).

Operating limits when working partialized (water */7°C):

FR-Z /K, FR-Z /SL-K	53°C
FR-Z /E, FR-Z /SL-E	55°C
FR-Z /CA, FR-Z /SL-CA	55°C
+kit HT (all versions)	57°C



The diagram shows the operating limits of versions /E, /SL-E
For versions /K, /SL-K, the max outdoor temperature is lowered by 4°C
For versions /CA, /SL-CA, the max outdoor temperature is lowered by 2°C

ACCESSORIES AND SERVICES

EC fans

EC fans (Opt. 808): Electronically commutated fans with brushless motor to continuously adjust the speed in order to minimise energy consumption and noise emissions, especially at part loads (+1% of EER, +4-5% of ESEER).

+5%
ESEER

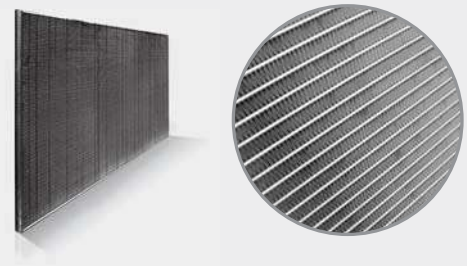
Noise reduction

Compressor acoustical enclosure (Opt. 2301): Enclosure realised with painted sheet metal panels lined with an acoustic insulation.
Sound power reduction: -2 dB(A).

Noise Reducer kit (Opt. 2315):
The kit includes dedicated fans' speed calibration together with the soundproofing of the most critical components in order to minimise sound emissions as much as possible. Sound power reduction: -7 dB(A).

COILS AND COATINGS

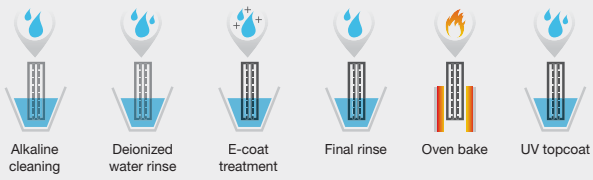
MICROCHANNEL COILS



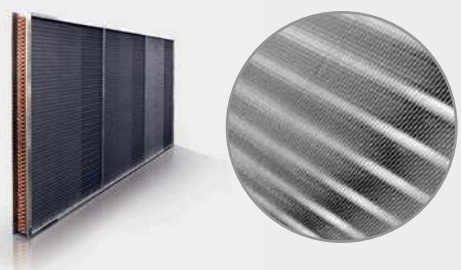
Al - Regular (std)

Al - E-coating (Opt. 876)

E-coating process



TUBE & FIN COILS



Cu/Al - Regular (Opt. 879)

Cu/Al - Pre-painted fins (Opt. 894)

Cu/Al - High pressure spray coating (Opt. 895 / RFQ)

Fin Guard Silver SB * Opt. 895	PoluAl XT * RFQ	Heresite P-413C * RFQ
Polyurethane resin with aluminum fillers	Polyurethane resin with aluminum fillers	Phenolic resin
✓ **3000 h** ASTM B117	✓ **4000 h** ASTM B117	✓ **6000 h** ASTM B117
✓ **UV** rays - excellent	✓ **UV** rays - excellent	✓ **UV** rays - good
* Thermoguard	* Blygold	* Heresite Protective Coating, LLC

Cu/Cu - Tube & fin coil (Opt. 881)

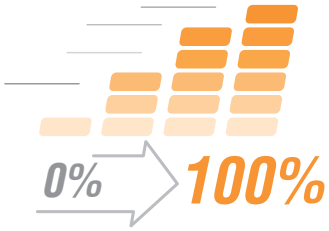
EQUIPMENT FOR MISSION CRITICAL APPLICATIONS

Committed to ensure the highest standards of reliability, FR-Z includes a full range of devices and functions that maximize unit's uptime in case of emergency circumstances.

FAST RESTART

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

Ensure immediate cooling start-up within 25”



Have the unit running at full load in a shorter time

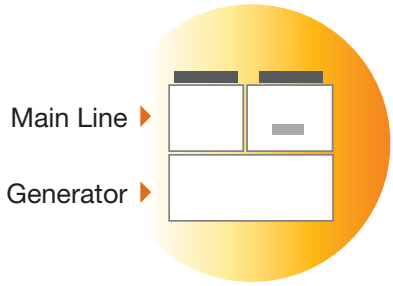
A 2-cpr unit in standard working conditions delivers 100% of cooling capacity within 180” after power is restored.

Fast restart - UPS excluded (Opt.4501)
This option requires an external 230V AC UPS, not supplied with the unit, to keep the on-board controller functional and ensure fast restart after a power outage.

Fast restart - UPS included (Opt. 4502)
This option includes an electric device capable of keeping the controller power supply uninterrupted during a power failure. The capacity of this device is selected on the basis of the needs of a specific project.

DOUBLE POWER SUPPLY

Redundancy increases uptime. FR-Z extends this concept also 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 FR-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.

Double power supply (ATS) (Opt. 1561)
The ATS, installed within the electrical board, automatically senses if one of the sources has lost or gained power.
The switching is completely automatic (line priority and frequency of checking are selectable).

Double power supply (Motorized changeover) (Opt. 1562)
The motorized changeover, installed within the electrical board, is with remote control (i.e. signal of generator start-up).

ENERGY METER

You can't manage what you don't measure.

PUE (Power usage effectiveness) is the ratio that determines how energy efficient data centers are comparing the power currently used for the IT equipment with the power used by the infrastructure which keeps that IT equipment working, including the cooling system.
Energy meter option allows to acquire the electrical data and the power absorbed by the unit and send them to the supervisor for energy metering.

AIR SOURCE CHILLERS WITH SCREW COMPRESSORS

FR-Z

1502 - 7223
Chiller, air source for outdoor installation, from 289 to 1710 kW.

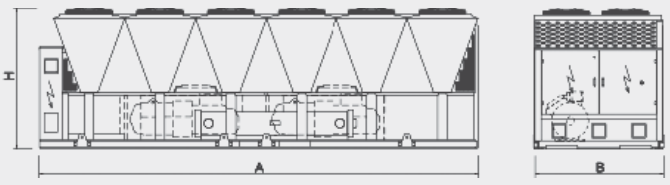
EUROVENT CERTIFIED PERFORMANCE
www.eurovent-certification.com

R HFC R-134a | COOLING | A ENERGY CLASS
VPF VAR.PRIM.FLOW | T SHELL & TUBES | AXIAL | SCREW

FR-Z /K			1502	1702	1902	1922	2202	2602	2652	2702	2722
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	300	326	383	432	481	533	559	601	658
Total power input	(1)	kW	101	117	131	143	169	185	194	204	235
EER	(1)	kW/kW	2,98	2,78	2,93	3,01	2,84	2,88	2,88	2,95	2,80
COOLING ONLY (EN14511 VALUE)											
Cooling capacity	(1)(2)	kW	299	325	382	430	479	532	557	599	656
EER	(1)(2)	kW/kW	2,95	2,76	2,90	2,97	2,81	2,85	2,85	2,91	2,77
Cooling energy class			B	C	B	B	C	C	C	B	C
SEPR HT	(3)(4)		5,23	5,46	5,34	5,24	5,43	5,39	5,36	5,33	5,19
COOLING ONLY											
16°C/10°C											
Cooling capacity	(5)	kW	328	356	418	470	525	583	611	658	716
Total power input	(5)	kW	105	122	136	149	177	193	203	213	246
EER	(5)	kW/kW	3,13	2,91	3,06	3,15	2,96	3,01	3,01	3,09	2,91
23°C/15°C											
Cooling capacity	(6)	kW	376	406	475	533	597	665	699	753	763
Total power input	(6)	kW	112	131	145	158	190	207	218	228	229
EER	(6)	kW/kW	3,36	3,10	3,27	3,36	3,14	3,21	3,21	3,31	3,33
EXCHANGERS											
HEAT EXCHANGER USER SIDE IN REFRIGERATION											
Water flow	(1)	l/s	14,33	15,58	18,32	20,66	22,98	25,51	26,72	28,73	31,48
Pressure drop	(1)(2)	kPa	23,9	28,3	33,6	42,7	32,3	39,8	34,9	40,3	38,5
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	44,0	47,0	55,0	63,0	69,0	76,0	80,0	88,0	94,0
NOISE LEVEL											
Sound Pressure	(7)	dB(A)	67	67	67	68	68	68	68	68	70
Sound power level in cooling	(8)(9)	dB(A)	99	99	99	100	100	100	100	100	102
SIZE AND WEIGHT											
A	(10)	mm	2750	2750	4000	4000	4000	5250	5250	5250	5250
B	(10)	mm	2260	2260	2260	2260	2260	2260	2260	2260	2260
H	(10)	mm	2500	2500	2500	2500	2500	2500	2500	2500	2500
Operating weight	(10)	kg	3160	3170	3720	3810	4610	5060	5060	5130	5520

Accessories:

- Noise reducer (only on not silenced versions)
- EC fans with electronic DC brushless motor
- Microchannel coils with e-coating protection
- Traditional coils with copper tubes and alluminium fins, also available with prepainted fins or Fin Guard Silver protective treatment.
- Compressor enclosure (standard on silenced versions)
- Leak detector
- Kit HT to increase the unit operating conditions range
- Compressor power factor correction
- Soft start
- Fast restart
- Double power supply with automatic changeover (ATS) or motorized changeover
- Hydronic group
- VPF (Variable Primary Flow) system
- Set-up for remote connectivity with ModBus, Echelon, Bacnet, Bacnet over-IP.
- Remote control keyboard (distance to 200m and to 500m)



FR-Z /K			3152	3602	3902	4202	4502	4802	4812	4822	5412
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	725	803	872	926	982	1021	1059	1146	1176
Total power input	(1)	kW	250	267	290	310	337	363	348	389	415
EER	(1)	kW/kW	2,90	3,00	3,01	2,99	2,92	2,82	3,04	2,95	2,83
COOLING ONLY (EN14511 VALUE)											
Cooling capacity	(1)(2)	kW	723	800	869	923	979	1018	1055	1142	1172
EER	(1)(2)	kW/kW	2,86	2,97	2,97	2,95	2,88	2,78	3,00	2,90	2,80
Cooling energy class			C	B	B	B	C	C	B	B	C
SEPR HT	(3)(4)		5,30	5,40	5,39	5,37	5,39	5,39	5,40	5,32	5,40
COOLING ONLY											
16°C/10°C											
Cooling capacity	(5)	kW	790	875	952	1013	1073	1114	1158	1247	1282
Total power input	(5)	kW	261	279	302	323	352	379	362	406	434
EER	(5)	kW/kW	3,03	3,14	3,15	3,14	3,05	2,94	3,20	3,07	2,95
23°C/15°C											
Cooling capacity	(6)	kW	896	995	1087	1157	1225	1269	1324	1353	1428
Total power input	(6)	kW	278	296	322	344	376	406	386	390	442
EER	(6)	kW/kW	3,22	3,36	3,38	3,36	3,26	3,13	3,43	3,47	3,23
EXCHANGERS											
HEAT EXCHANGER USER SIDE IN REFRIGERATION											
Water flow	(1)	l/s	34,69	38,39	41,70	44,31	46,98	48,82	50,65	54,81	56,25
Pressure drop	(1)(2)	kPa	46,8	40,9	42,6	48,1	41,8	45,1	48,5	53,3	42,2
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	104	117	127	135	140	146	151	164	168
NOISE LEVEL											
Sound Pressure	(7)	dB(A)	69	69	70	70	71	71	71	71	72
Sound power level in cooling	(8)(9)	dB(A)	102	102	103	103	104	104	104	104	105
SIZE AND WEIGHT											
A	(10)	mm	6500	6500	7750	7750	7750	7750	9000	9000	9150
B	(10)	mm	2260	2260	2260	2260	2260	2260	2260	2260	2260
H	(10)	mm	2500	2500	2500	2500	2500	2500	2500	2500	2500
Operating weight	(10)	kg	6450	6940	7440	7560	7790	7820	8250	8370	8660

FR-Z /K			6002	6022	6303	6903	7203	7213	7223
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	1239	1303	1401	1481	1547	1654	1710
Total power input	(1)	kW	426	466	466	514	547	570	594
EER	(1)	kW/kW	2,91	2,80	3,00	2,88	2,83	2,90	2,88
COOLING ONLY (EN14511 VALUE)									
Cooling capacity	(1)(2)	kW	1235	1298	1397	1476	1543	1649	1704
EER	(1)(2)	kW/kW	2,87	2,76	2,97	2,85	2,80	2,87	2,84
Cooling energy class			C	C	B	C	C	C	C
SEPR HT	(3)(4)		5,43	5,31	5,34	5,37	5,42	5,29	5,29
COOLING ONLY									
16°C/10°C									
Cooling capacity	(5)	kW	1355	1417	1532	1616	1689	1801	1860
Total power input	(5)	kW	444	487	486	536	572	595	622
EER	(5)	kW/kW	3,05	2,91	3,15	3,01	2,95	3,03	2,99
23°C/15°C									
Cooling capacity	(6)	kW	1550	1550	1752	1843	1925	1985	2015
Total power input	(6)	kW	474	474	518	573	613	591	595
EER	(6)	kW/kW	3,27	3,27	3,38	3,22	3,14	3,36	3,38
EXCHANGERS									
HEAT EXCHANGER USER SIDE IN REFRIGERATION									
Water flow	(1)	l/s	59,26	62,29	67,01	70,81	74,00	79,11	81,79
Pressure drop	(1)(2)	kPa	46,9	51,8	45,4	50,7	39,0	44,6	51,2
REFRIGERANT CIRCUIT									
Compressors nr.		N°	2	2	3	3	3	3	3
No. Circuits		N°	2	2	3	3	3	3	3
Refrigerant charge		kg	181	186	205	212	221	237	250
NOISE LEVEL									
Sound Pressure	(7)	dB(A)	73	73	73	73	73	73	73
Sound power level in cooling	(8)(9)	dB(A)	106	106	106	106	106	106	106
SIZE AND WEIGHT									
A	(10)	mm	10400	10400	11650	11650	11650	12900	12900
B	(10)	mm	2260	2260	2260	2260	2260	2260	2260
H	(10)	mm	2500	2500	2500	2500	2500	2500	2500
Operating weight	(10)	kg	9200	9310	11880	11940	11950	12490	12570

Notes:

1 Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger air (in) 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 Plant (side) cooling exchanger water (in/out) 16°C/ 10°C; Source (side) heat exchanger air (in) 35°C.
6 Acqua scambiatore freddo lato utenza (in/out) 23°C/15°C; Aria scambiatore lato sorgente (in) 35°C.
7 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.
8 Sound power on the basis of measurements made in compliance with ISO 9614.
9 Sound power level in cooling, outdoors.
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

AIR SOURCE CHILLERS WITH SCREW COMPRESSORS

FR-Z 1502 - 7223

Chiller, air source for outdoor installation,
from 289 to 1710 kW.

FR-Z /SL-K			1502	1702	1902	1922	2202	2602	2652	2702	2722
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	289	333	382	419	476	519	556	578	663
Total power input	(1)	kW	101	113	126	146	161	175	192	207	223
EER	(1)	kW/kW	2,85	2,95	3,03	2,87	2,95	2,97	2,90	2,79	2,98
COOLING ONLY (EN14511 VALUE)											
Cooling capacity	(1)(2)	kW	288	332	380	417	475	517	554	577	661
EER	(1)(2)	kW/kW	2,82	2,92	3,00	2,83	2,92	2,93	2,87	2,76	2,94
Cooling energy class			C	B	B	C	B	B	C	C	B
SEPR HT	(3)(4)		5,23	5,32	5,45	5,27	5,25	5,20	5,27	5,33	5,27
COOLING ONLY											
16°C/10°C											
Cooling capacity	(5)	kW	316	365	418	455	520	568	609	632	722
Total power input	(5)	kW	106	118	131	152	168	182	201	217	232
EER	(5)	kW/kW	2,98	3,09	3,19	2,98	3,08	3,11	3,03	2,91	3,11
23°C/15°C											
Cooling capacity	(6)	kW	361	418	480	514	593	651	697	739	821
Total power input	(6)	kW	113	126	140	162	180	195	215	230	248
EER	(6)	kW/kW	3,19	3,32	3,43	3,17	3,30	3,34	3,24	3,22	3,32
EXCHANGERS											
HEAT EXCHANGER USER SIDE IN REFRIGERATION											
Water flow	(1)	l/s	13,80	15,94	18,25	20,02	22,76	24,80	26,59	27,66	31,72
Pressure drop	(1)(2)	kPa	22,2	29,6	33,3	40,1	31,7	37,6	34,5	37,4	39,1
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	44,0	51,0	58,0	63,0	72,0	79,0	84,0	88,0	101
NOISE LEVEL											
Sound Pressure	(7)	dB(A)	55	55	56	56	57	57	57	57	57
Sound power level in cooling	(8)(9)	dB(A)	87	87	88	88	89	89	89	89	90
SIZE AND WEIGHT											
A	(10)	mm	2750	4000	4000	4000	5250	5250	5250	5250	6500
B	(10)	mm	2260	2260	2260	2260	2260	2260	2260	2260	2260
H	(10)	mm	2500	2500	2500	2500	2500	2500	2500	2500	2500
Operating weight	(10)	kg	3420	4160	4230	4230	5200	5560	5580	5620	6610

FR-Z /SL-K			3152	3602	3902	4202	4502	4802	4812	4822	5412
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	717	771	839	893	965	1021	1052	1137	1169
Total power input	(1)	kW	247	272	295	315	335	353	341	381	407
EER	(1)	kW/kW	2,90	2,84	2,85	2,83	2,88	2,89	3,09	2,99	2,87
COOLING ONLY (EN14511 VALUE)											
Cooling capacity	(1)(2)	kW	714	769	836	890	962	1018	1048	1133	1166
EER	(1)(2)	kW/kW	2,87	2,81	2,82	2,80	2,84	2,85	3,04	2,94	2,84
Cooling energy class			C	C	C	C	C	C	B	B	C
SEPR HT	(3)(4)		5,32	5,41	5,42	5,40	5,39	5,38	5,36	5,30	5,35
COOLING ONLY											
16°C/10°C											
Cooling capacity	(5)	kW	781	839	915	975	1054	1116	1151	1238	1275
Total power input	(5)	kW	258	284	308	329	351	369	355	397	425
EER	(5)	kW/kW	3,03	2,96	2,97	2,96	3,01	3,02	3,24	3,12	3,00
23°C/15°C											
Cooling capacity	(6)	kW	886	977	1067	1136	1229	1300	1317	1405	1452
Total power input	(6)	kW	275	299	325	347	370	389	377	423	429
EER	(6)	kW/kW	3,22	3,27	3,29	3,27	3,32	3,34	3,49	3,32	3,39
EXCHANGERS											
HEAT EXCHANGER USER SIDE IN REFRIGERATION											
Water flow	(1)	l/s	34,27	36,86	40,11	42,70	46,14	48,85	50,30	54,38	55,91
Pressure drop	(1)(2)	kPa	45,7	37,7	39,4	44,7	40,3	45,2	47,9	52,5	41,7
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	109	117	127	135	146	155	159	172	177
NOISE LEVEL											
Sound Pressure	(7)	dB(A)	58	58	59	59	60	60	61	61	61
Sound power level in cooling	(8)(9)	dB(A)	91	91	92	92	93	93	94	94	94
SIZE AND WEIGHT											
A	(10)	mm	6500	6500	7750	7750	9000	9000	10250	10250	10400
B	(10)	mm	2260	2260	2260	2260	2260	2260	2260	2260	2260
H	(10)	mm	2500	2500	2500	2500	2500	2500	2500	2500	2500
Operating weight	(10)	kg	7080	7550	8090	8200	9000	8870	9360	9470	9780

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FR-Z /SL-K			6002	6022	6303	6903	7203	7213	7223
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	1194	1289	1350	1463	1530	1595	1649
Total power input	(1)	kW	433	459	474	510	540	583	609
EER	(1)	kW/kW	2,76	2,81	2,85	2,87	2,83	2,74	2,71
COOLING ONLY (EN14511 VALUE)									
Cooling capacity	(1)(2)	kW	1190	1285	1346	1458	1526	1590	1644
EER	(1)(2)	kW/kW	2,73	2,77	2,81	2,83	2,80	2,71	2,67
Cooling energy class			C	C	C	C	C	C	D
SEPR HT	(3)(4)		5,43	5,36	5,38	5,37	5,40	5,34	5,31
COOLING ONLY									
16°C/10°C									
Cooling capacity	(5)	kW	1305	1403	1474	1598	1671	1735	1729
Total power input	(5)	kW	452	480	496	533	565	610	563
EER	(5)	kW/kW	2,89	2,93	2,97	3,00	2,96	2,84	3,07
23°C/15°C									
Cooling capacity	(6)	kW	1522	1593	1720	1861	1949	1949	1978
Total power input	(6)	kW	479	513	523	562	596	596	601
EER	(6)	kW/kW	3,18	3,10	3,29	3,31	3,27	3,27	3,29
EXCHANGERS									
HEAT EXCHANGER USER SIDE IN REFRIGERATION									
Water flow	(1)	l/s	57,11	61,64	64,56	69,97	73,16	76,27	78,86
Pressure drop	(1)(2)	kPa	43,5	50,7	42,1	49,5	38,2	41,5	47,6
REFRIGERANT CIRCUIT									
Compressors nr.		N°	2	2	3	3	3	3	3
No. Circuits		N°	2	2	3	3	3	3	3
Refrigerant charge		kg	181	195	205	222	232	242	250
NOISE LEVEL									
Sound Pressure	(7)	dB(A)	61	61	61	61	61	61	62
Sound power level in cooling	(8)(9)	dB(A)	94	94	94	94	94	94	95
SIZE AND WEIGHT									
A	(10)	mm	10400	11650	11650	12900	12900	12900	12900
B	(10)	mm	2260	2260	2260	2260	2260	2260	2260
H	(10)	mm	2500	2500	2500	2500	2500	2500	2500
Operating weight	(10)	kg	9860	10420	12810	13340	13340	13420	13500

FR-Z /CA			1502	1702	1902	1922	2202	2602	2652
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	302	350	395	462	513	551	591
Total power input	(1)	kW	95,4	109	125	144	160	175	184
EER	(1)	kW/kW	3,17	3,22	3,16	3,21	3,21	3,15	3,20
COOLING ONLY (EN14511 VALUE)									
Cooling capacity	(1)(2)	kW	302	349	394	460	512	550	589
EER	(1)(2)	kW/kW	3,14	3,18	3,12	3,17	3,17	3,12	3,16
Cooling energy class			A	A	A	A	A	A	A
SEPR HT	(3)(4)		5,42	5,52	5,56	5,56	5,53	5,38	5,42
COOLING ONLY									
16°C/10°C									
Cooling capacity	(5)	kW	333	384	433	507	563	605	648
Total power input	(5)	kW	99,2	113	130	150	166	182	192
EER	(5)	kW/kW	3,35	3,41	3,33	3,38	3,39	3,32	3,38
23°C/15°C									
Cooling capacity	(6)	kW	384	443	498	584	647	696	746
Total power input	(6)	kW	105	119	138	159	177	194	204
EER	(6)	kW/kW	3,65	3,71	3,61	3,66	3,67	3,59	3,66
EXCHANGERS									
HEAT EXCHANGER USER SIDE IN REFRIGERATION									
Water flow	(1)	l/s	14,46	16,72	18,89	22,08	24,54	26,37	28,25
Pressure drop	(1)(2)	kPa	24,4	32,6	35,7	29,8	36,8	34,0	39,0
REFRIGERANT CIRCUIT									
Compressors nr.		N°	2	2	2	2	2	2	2
No. Circuits		N°	2	2	2	2	2	2	2
Refrigerant charge		kg	48,0	54,0	58,0	68,0	79,0	81,0	87,0
NOISE LEVEL									
Sound Pressure	(7)	dB(A)	66	66	67	67	68	68	68
Sound power level in cooling	(8)(9)	dB(A)	98	98	99	99	100	100	101
SIZE AND WEIGHT									
A	(10)	mm	4000	4000	4000	5250	5250	5250	6500
B	(10)	mm	2260	2260	2260	2260	2260	2260	2260
H	(10)	mm	2500	2500	2500	2500	2500	2500	2500
Operating weight	(10)	kg	3660	3720	3760	4660	5040	5090	5830

1 Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger air (in) 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 Plant (side) cooling exchanger water (in/out) 16°C/ 10°C; Source (side) heat exchanger air (in) 35°C.
6 Acqua scambiatore freddo lato utenza (in/out) 23°C/15°C; Aria scambiatore lato sorgente (in) 35°C.
7 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.
8 Sound power on the basis of measurements made in compliance with ISO 9614.
9 Sound power level in cooling, outdoors.
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

AIR SOURCE CHILLERS WITH SCREW COMPRESSORS

FR-Z 1502 - 7223

Chiller, air source for outdoor installation,
from 289 to 1710 kW.

FR-Z /CA			2702	2722	3152	3602	3902	4202	4502
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	629	684	766	838	905	956	1031
Total power input	(1)	kW	196	218	242	260	280	299	320
EER	(1)	kW/kW	3,21	3,14	3,17	3,22	3,24	3,19	3,22
COOLING ONLY (EN14511 VALUE)									
Cooling capacity	(1)(2)	kW	627	682	764	835	902	952	1028
EER	(1)(2)	kW/kW	3,16	3,10	3,13	3,18	3,19	3,14	3,18
Cooling energy class			A	A	A	A	A	A	A
SEPR HT	(3)(4)		5,43	5,34	5,42	5,49	5,48	5,46	5,47
COOLING ONLY									
16°C/10°C									
Cooling capacity	(5)	kW	690	745	838	917	991	1047	1129
Total power input	(5)	kW	204	226	251	270	290	311	332
EER	(5)	kW/kW	3,39	3,29	3,34	3,39	3,41	3,37	3,40
23°C/15°C									
Cooling capacity	(6)	kW	794	848	957	1051	1136	1200	1295
Total power input	(6)	kW	216	240	266	286	308	329	352
EER	(6)	kW/kW	3,67	3,53	3,59	3,67	3,69	3,64	3,68
EXCHANGERS									
HEAT EXCHANGER USER SIDE IN REFRIGERATION									
Water flow	(1)	l/s	30,07	32,70	36,64	40,06	43,26	45,72	49,29
Pressure drop	(1)(2)	kPa	44,2	41,6	37,2	44,5	45,8	51,2	46,0
REFRIGERANT CIRCUIT									
Compressors nr.		N°	2	2	2	2	2	2	2
No. Circuits		N°	2	2	2	2	2	2	2
Refrigerant charge		kg	92,0	100	113	123	133	141	151
NOISE LEVEL									
Sound Pressure	(7)	dB(A)	68	68	68	69	69	70	70
Sound power level in cooling	(8)(9)	dB(A)	101	101	101	102	102	103	103
SIZE AND WEIGHT									
A	(10)	mm	6500	6500	7750	7750	9000	9000	10400
B	(10)	mm	2260	2260	2260	2260	2260	2260	2260
H	(10)	mm	2500	2500	2500	2500	2500	2500	2500
Operating weight	(10)	kg	5690	6110	6970	7440	7890	8000	8700

FR-Z /CA			4802	4822	5412	5703	6303	6603
Power supply		V/ph/Hz	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	1098	1177	1236	1342	1460	1521
Total power input	(1)	kW	339	375	391	414	459	485
EER	(1)	kW/kW	3,23	3,14	3,16	3,24	3,18	3,14
COOLING ONLY (EN14511 VALUE)								
Cooling capacity	(1)(2)	kW	1094	1173	1232	1338	1456	1517
EER	(1)(2)	kW/kW	3,19	3,10	3,12	3,20	3,15	3,10
Cooling energy class			A	A	A	A	A	A
SEPR HT	(3)(4)		5,48	5,46	5,49	5,47	5,46	5,47
COOLING ONLY								
16°C/10°C								
Cooling capacity	(5)	kW	1203	1283	1352	1471	1600	1666
Total power input	(5)	kW	353	390	406	431	478	505
EER	(5)	kW/kW	3,41	3,29	3,33	3,41	3,35	3,30
23°C/15°C								
Cooling capacity	(6)	kW	1381	1458	1545	1687	1836	1911
Total power input	(6)	kW	374	413	431	457	507	538
EER	(6)	kW/kW	3,70	3,53	3,59	3,69	3,62	3,55
EXCHANGERS								
HEAT EXCHANGER USER SIDE IN REFRIGERATION								
Water flow	(1)	l/s	52,53	56,31	59,13	64,17	69,81	72,73
Pressure drop	(1)(2)	kPa	50,1	42,3	46,7	41,6	34,7	37,7
REFRIGERANT CIRCUIT								
Compressors nr.		N°	2	2	2	3	3	3
No. Circuits		N°	2	2	2	3	3	3
Refrigerant charge		kg	161	173	182	197	226	224
NOISE LEVEL								
Sound Pressure	(7)	dB(A)	70	70	71	71	71	71
Sound power level in cooling	(8)(9)	dB(A)	103	103	104	104	104	104
SIZE AND WEIGHT								
A	(10)	mm	10400	10400	11650	12900	12900	12900
B	(10)	mm	2260	2260	2260	2260	2260	2260
H	(10)	mm	2500	2500	2500	2500	2500	2500
Operating weight	(10)	kg	8780	9040	10120	12160	12330	12640

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FR-Z /SL-CA			1502	1702	1902	1922	2202	2602	2652
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	304	345	394	450	501	561	583
Total power input	(1)	kW	94,7	108	122	144	159	178	182
EER	(1)	kW/kW	3,21	3,20	3,24	3,13	3,14	3,14	3,21
COOLING ONLY (EN14511 VALUE)									
Cooling capacity	(1)(2)	kW	303	344	393	449	499	559	581
EER	(1)(2)	kW/kW	3,18	3,16	3,20	3,10	3,10	3,11	3,17
Cooling energy class			A	A	A	A	A	A	A
SEPR HT	(3)(4)		5,51	5,58	5,52	5,58	5,53	5,49	5,41
COOLING ONLY									
16°C/10°C									
Cooling capacity	(5)	kW	334	379	432	494	549	615	640
Total power input	(5)	kW	98,7	112	127	150	166	186	189
EER	(5)	kW/kW	3,39	3,38	3,41	3,29	3,30	3,31	3,38
23°C/15°C									
Cooling capacity	(6)	kW	385	436	494	567	629	707	737
Total power input	(6)	kW	105	119	134	160	177	198	201
EER	(6)	kW/kW	3,67	3,66	3,69	3,55	3,55	3,56	3,66
EXCHANGERS									
HEAT EXCHANGER USER SIDE IN REFRIGERATION									
Water flow	(1)	l/s	14,55	16,49	18,85	21,53	23,94	26,81	27,87
Pressure drop	(1)(2)	kPa	24,7	31,7	35,6	28,3	35,1	35,1	38,0
REFRIGERANT CIRCUIT									
Compressors nr.		N°	2	2	2	2	2	2	2
No. Circuits		N°	2	2	2	2	2	2	2
Refrigerant charge		kg	48,0	54,0	62,0	71,0	79,0	88,0	92,0
NOISE LEVEL									
Sound Pressure	(7)	dB(A)	55	56	56	57	57	57	58
Sound power level in cooling	(8)(9)	dB(A)	87	88	88	89	89	90	91
SIZE AND WEIGHT									
A	(10)	mm	4000	4000	5250	5250	5250	6500	6500
B	(10)	mm	2260	2260	2260	2260	2260	2260	2260
H	(10)	mm	2500	2500	2500	2500	2500	2500	2500
Operating weight	(10)	kg	4130	4190	4680	5140	5520	6140	6390

FR-Z /SL-CA			2702	2722	3152	3602	3902	4202	4502
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	616	681	754	819	899	948	1020
Total power input	(1)	kW	196	212	237	252	274	294	314
EER	(1)	kW/kW	3,14	3,21	3,18	3,25	3,28	3,23	3,25
COOLING ONLY (EN14511 VALUE)									
Cooling capacity	(1)(2)	kW	614	678	752	817	896	944	1017
EER	(1)(2)	kW/kW	3,10	3,16	3,15	3,21	3,24	3,18	3,20
Cooling energy class			A	A	A	A	A	A	A
SEPR HT	(3)(4)		5,45	5,34	5,40	5,50	5,50	5,46	5,47
COOLING ONLY									
16°C/10°C									
Cooling capacity	(5)	kW	676	743	825	898	986	1038	1118
Total power input	(5)	kW	205	220	246	262	284	305	326
EER	(5)	kW/kW	3,30	3,37	3,35	3,43	3,47	3,41	3,43
23°C/15°C									
Cooling capacity	(6)	kW	777	846	943	1031	1132	1191	1284
Total power input	(6)	kW	218	233	262	277	301	322	345
EER	(6)	kW/kW	3,56	3,63	3,60	3,72	3,76	3,69	3,72
EXCHANGERS									
HEAT EXCHANGER USER SIDE IN REFRIGERATION									
Water flow	(1)	l/s	29,44	32,55	36,06	39,18	43,00	45,33	48,80
Pressure drop	(1)(2)	kPa	33,7	41,2	36,1	42,6	45,3	50,3	45,1
REFRIGERANT CIRCUIT									
Compressors nr.		N°	2	2	2	2	2	2	2
No. Circuits		N°	2	2	2	2	2	2	2
Refrigerant charge		kg	97,0	107	118	129	141	149	160
NOISE LEVEL									
Sound Pressure	(7)	dB(A)	58	59	59	59	59	60	60
Sound power level in cooling	(8)(9)	dB(A)	91	92	92	92	92	93	93
SIZE AND WEIGHT									
A	(10)	mm	6500	7750	7750	9000	10250	10250	11650
B	(10)	mm	2260	2260	2260	2260	2260	2260	2260
H	(10)	mm	2500	2500	2500	2500	2500	2500	2500
Operating weight	(10)	kg	6520	7150	7610	8500	8990	9280	9810

1 Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger air (in) 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 Plant (side) cooling exchanger water (in/out) 16°C/ 10°C; Source (side) heat exchanger air (in) 35°C.
6 Acqua scambiatore freddo lato utenza (in/out) 23°C/15°C; Aria scambiatore lato sorgente (in) 35°C.
7 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.
8 Sound power on the basis of measurements made in compliance with ISO 9614.
9 Sound power level in cooling, outdoors.
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

AIR SOURCE CHILLERS WITH SCREW COMPRESSORS

FR-Z 1502 - 7223

Chiller, air source for outdoor installation,
from 289 to 1710 kW.

FR-Z /SL-CA			4802	4822	5412	5703	6303
Power supply		V/ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
PERFORMANCE							
COOLING ONLY (GROSS VALUE)							
Cooling capacity	(1)	kW	1086	1163	1219	1310	1442
Total power input	(1)	kW	334	369	385	410	460
EER	(1)	kW/kW	3,25	3,15	3,16	3,20	3,13
COOLING ONLY (EN14511 VALUE)							
Cooling capacity	(1)(2)	kW	1082	1160	1215	1306	1439
EER	(1)(2)	kW/kW	3,21	3,11	3,12	3,16	3,10
Cooling energy class			A	A	A	A	A
SEPR HT	(3)(4)		5,50	5,47	5,50	5,48	5,52
COOLING ONLY							
16°C/10°C							
Cooling capacity	(5)	kW	1190	1268	1333	1435	1579
Total power input	(5)	kW	347	384	400	426	480
EER	(5)	kW/kW	3,43	3,30	3,33	3,37	3,29
23°C/15°C							
Cooling capacity	(6)	kW	1367	1442	1525	1645	1809
Total power input	(6)	kW	367	407	425	453	512
EER	(6)	kW/kW	3,72	3,55	3,59	3,63	3,53
EXCHANGERS							
HEAT EXCHANGER USER SIDE IN REFRIGERATION							
Water flow	(1)	l/s	51,94	55,63	58,31	62,64	68,95
Pressure drop	(1)(2)	kPa	48,9	41,3	45,4	39,7	33,9
REFRIGERANT CIRCUIT							
Compressors nr.		N°	2	2	2	3	3
No. Circuits		N°	2	2	2	3	3
Refrigerant charge		kg	171	183	191	206	226
NOISE LEVEL							
Sound Pressure	(7)	dB(A)	60	60	62	62	62
Sound power level in cooling	(8)(9)	dB(A)	93	93	95	95	95
SIZE AND WEIGHT							
A	(10)	mm	11650	11650	12900	12900	12900
B	(10)	mm	2260	2260	2260	2260	2260
H	(10)	mm	2500	2500	2500	2500	2500
Operating weight	(10)	kg	9890	10230	10760	13130	13260

FR-Z /E			1502	1702	1902	1922	2202	2602	2652	2702	2722
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	317	363	414	451	531	576	613	650	703
Total power input	(1)	kW	94,6	108	123	137	156	171	181	192	213
EER	(1)	kW/kW	3,35	3,35	3,36	3,30	3,39	3,37	3,38	3,38	3,30
COOLING ONLY (EN14511 VALUE)											
Cooling capacity	(1)(2)	kW	316	362	413	450	529	574	611	648	702
EER	(1)(2)	kW/kW	3,31	3,31	3,33	3,26	3,35	3,34	3,34	3,34	3,26
Cooling energy class			A	A	A	A	A	A	A	A	A
SEPR HT	(3)(4)		5,45	5,55	5,57	5,59	5,55	5,41	5,44	5,45	5,42
COOLING ONLY											
16°C/10°C											
Cooling capacity	(5)	kW	349	400	456	493	584	634	675	715	768
Total power input	(5)	kW	98,2	112	128	142	162	177	188	199	221
EER	(5)	kW/kW	3,55	3,57	3,57	3,48	3,61	3,58	3,59	3,59	3,48
23°C/15°C											
Cooling capacity	(6)	kW	404	464	529	564	676	733	780	826	877
Total power input	(6)	kW	104	118	135	149	171	188	199	210	233
EER	(6)	kW/kW	3,88	3,93	3,92	3,78	3,95	3,90	3,92	3,93	3,77
EXCHANGERS											
HEAT EXCHANGER USER SIDE IN REFRIGERATION											
Water flow	(1)	l/s	15,14	17,34	19,79	21,58	25,37	27,54	29,31	31,07	33,63
Pressure drop	(1)(2)	kPa	22,9	30,1	24,0	28,5	35,8	29,5	33,4	37,5	31,4
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	49,0	56,0	64,0	71,0	82,0	89,0	95,0	101	109
NOISE LEVEL											
Sound Pressure	(7)	dB(A)	66	67	67	67	67	67	68	68	68
Sound power level in cooling	(8)(9)	dB(A)	98	99	99	99	100	100	101	101	101
SIZE AND WEIGHT											
A	(10)	mm	4000	5250	5250	5250	6500	6500	7750	7750	7750
B	(10)	mm	2260	2260	2260	2260	2260	2260	2260	2260	2260
H	(10)	mm	2500	2500	2500	2500	2500	2500	2500	2500	2500
Operating weight	(10)	kg	3720	4240	4360	4420	5590	5920	6400	6490	6600

R HFC R-134a | COOLING | A ENERGY CLASS | VPF VAR.PRIM.FLOW | T SHELL & TUBES | AXIAL | SCREW

FR-Z /E			3152	3602	3902	4202	4502	4802	4822	5412
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
PERFORMANCE										
COOLING ONLY (GROSS VALUE)										
Cooling capacity	(1)	kW	786	854	931	987	1054	1123	1219	1277
Total power input	(1)	kW	236	256	277	298	317	337	373	391
EER	(1)	kW/kW	3,33	3,33	3,36	3,32	3,32	3,33	3,27	3,26
COOLING ONLY (EN14511 VALUE)										
Cooling capacity	(1)(2)	kW	784	851	928	984	1051	1119	1216	1274
EER	(1)(2)	kW/kW	3,29	3,29	3,31	3,27	3,28	3,28	3,23	3,22
Cooling energy class			A	A	A	A	A	A	A	A
SEPR HT	(3)(4)		5,47	5,51	5,50	5,49	5,52	5,52	5,51	5,53
COOLING ONLY										
16°C/10°C										
Cooling capacity	(5)	kW	862	938	1023	1083	1156	1232	1332	1399
Total power input	(5)	kW	245	265	287	308	329	350	387	406
EER	(5)	kW/kW	3,52	3,54	3,56	3,51	3,51	3,52	3,44	3,44
23°C/15°C										
Cooling capacity	(6)	kW	990	1081	1178	1246	1330	1418	1519	1606
Total power input	(6)	kW	258	280	303	325	347	369	409	430
EER	(6)	kW/kW	3,83	3,86	3,89	3,83	3,83	3,84	3,71	3,73
EXCHANGERS										
HEAT EXCHANGER USER SIDE IN REFRIGERATION										
Water flow	(1)	l/s	37,58	40,84	44,54	47,18	50,39	53,70	58,31	61,05
Pressure drop	(1)(2)	kPa	34,6	40,9	53,0	42,1	46,1	51,2	34,4	37,7
REFRIGERANT CIRCUIT										
Compressors nr.		N°	2	2	2	2	2	2	2	2
No. Circuits		N°	2	2	2	2	2	2	2	2
Refrigerant charge		kg	122	132	144	153	163	174	189	198
NOISE LEVEL										
Sound Pressure	(7)	dB(A)	68	69	69	70	70	70	70	71
Sound power level in cooling	(8)(9)	dB(A)	101	102	102	103	103	103	103	104
SIZE AND WEIGHT										
A	(10)	mm	9000	9000	10250	10250	11650	11650	11650	12900
B	(10)	mm	2260	2260	2260	2260	2260	2260	2260	2260
H	(10)	mm	2500	2500	2500	2500	2500	2500	2500	2500
Operating weight	(10)	kg	7400	7880	8420	8660	9190	9270	10330	11170

FR-Z /SL-E			1502	1702	1902	1922	2202	2602	2652	2702	2722
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	313	359	409	447	524	568	605	642	697
Total power input	(1)	kW	93,2	106	121	136	154	169	179	190	212
EER	(1)	kW/kW	3,36	3,39	3,37	3,29	3,40	3,36	3,38	3,39	3,28
COOLING ONLY (EN14511 VALUE)											
Cooling capacity	(1)(2)	kW	312	358	408	446	523	567	604	640	695
EER	(1)(2)	kW/kW	3,32	3,35	3,34	3,26	3,36	3,33	3,34	3,34	3,25
Cooling energy class			A	A	A	A	A	A	A	A	A
SEPR HT	(3)(4)		5,56	5,66	5,67	5,68	5,62	5,50	5,55	5,56	5,55
COOLING ONLY											
16°C/10°C											
Cooling capacity	(5)	kW	344	396	451	489	577	625	666	706	761
Total power input	(5)	kW	97,0	110	126	141	160	176	186	197	220
EER	(5)	kW/kW	3,55	3,60	3,58	3,47	3,60	3,55	3,57	3,59	3,45
23°C/15°C											
Cooling capacity	(6)	kW	398	459	522	558	666	722	768	815	867
Total power input	(6)	kW	103	116	134	149	170	187	198	209	233
EER	(6)	kW/kW	3,87	3,95	3,91	3,75	3,92	3,86	3,88	3,90	3,72
EXCHANGERS											
HEAT EXCHANGER USER SIDE IN REFRIGERATION											
Water flow	(1)	l/s	14,96	17,17	19,56	21,39	25,06	27,18	28,94	30,70	33,31
Pressure drop	(1)(2)	kPa	22,4	29,5	23,4	28,0	34,9	28,7	32,6	36,6	30,8
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	49,0	56,0	64,0	71,0	82,0	89,0	95,0	101	109
NOISE LEVEL											
Sound Pressure	(7)	dB(A)	56	57	57	57	57	58	58	59	59
Sound power level in cooling	(8)(9)	dB(A)	88	89	89	89	90	91	91	92	92
SIZE AND WEIGHT											
A	(10)	mm	4000	5250	5250	5250	6500	6500	7750	7750	7750
B	(10)	mm	2260	2260	2260	2260	2260	2260	2260	2260	2260
H	(10)	mm	2500	2500	2500	2500	2500	2500	2500	2500	2500
Operating weight	(10)	kg	3960	4460	4620	4680	6120	6460	6940	7040	7140

1 Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger air (in) 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 Plant (side) cooling exchanger water (in/out) 16°C/ 10°C; Source (side) heat exchanger air (in) 35°C.
6 Acqua scambiatore freddo lato utenza (in/out) 23°C/15°C; Aria scambiatore lato sorgente (in) 35°C.
7 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.
8 Sound power on the basis of measurements made in compliance with ISO 9614.
9 Sound power level in cooling, outdoors.
10 Unit in standard configuration/execution, without optional accessories.

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

Certified data in EUROVENT

AIR SOURCE CHILLERS WITH SCREW COMPRESSORS

FR-Z 1502 - 7223

Chiller, air source for outdoor installation, from 289 to 1710 kW.

EUROVENT CERTIFIED PERFORMANCE www.eurovent-certification.com

VPF VAR.PRIM.FLOW
T SHELL & TUBES
R HFC R-134a
COOLING
A ENERGY CLASS
AXIAL
SCREW

FR-Z /SL-E			3152	3602	3902	4202	4502	4802	4822	5412
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
PERFORMANCE										
COOLING ONLY (GROSS VALUE)										
Cooling capacity	(1)	kW	776	842	918	973	1040	1108	1205	1260
Total power input	(1)	kW	234	254	275	296	315	335	373	390
EER	(1)	kW/kW	3,31	3,32	3,34	3,29	3,30	3,31	3,23	3,23
COOLING ONLY (EN14511 VALUE)										
Cooling capacity	(1)(2)	kW	774	839	915	971	1037	1104	1202	1257
EER	(1)(2)	kW/kW	3,27	3,28	3,29	3,25	3,25	3,26	3,19	3,20
Cooling energy class			A	A	A	A	A	A	A	A
SEPR HT	(3)(4)		5,56	5,56	5,56	5,56	5,60	5,59	5,58	5,60
COOLING ONLY										
16°C/10°C										
Cooling capacity	(5)	kW	850	924	1008	1067	1140	1215	1315	1380
Total power input	(5)	kW	244	264	286	307	328	348	388	406
EER	(5)	kW/kW	3,49	3,50	3,53	3,47	3,48	3,49	3,39	3,40
23°C/15°C										
Cooling capacity	(6)	kW	975	1062	1158	1227	1310	1396	1499	1582
Total power input	(6)	kW	258	279	303	325	347	369	412	431
EER	(6)	kW/kW	3,78	3,80	3,83	3,77	3,78	3,78	3,64	3,67
EXCHANGERS										
HEAT EXCHANGER USER SIDE IN REFRIGERATION										
Water flow	(1)	l/s	37,11	40,26	43,92	46,55	49,72	52,98	57,62	60,28
Pressure drop	(1)(2)	kPa	33,7	39,7	51,5	41,0	44,9	49,8	33,6	36,7
REFRIGERANT CIRCUIT										
Compressors nr.		N°	2	2	2	2	2	2	2	2
No. Circuits		N°	2	2	2	2	2	2	2	2
Refrigerant charge		kg	122	132	144	153	163	174	189	198
NOISE LEVEL										
Sound Pressure	(7)	dB(A)	59	59	59	60	60	60	60	62
Sound power level in cooling	(8)(9)	dB(A)	92	92	92	93	93	93	93	95
SIZE AND WEIGHT										
A	(10)	mm	9000	9000	10250	10250	11650	11650	11650	12900
B	(10)	mm	2260	2260	2260	2260	2260	2260	2260	2260
H	(10)	mm	2500	2500	2500	2500	2500	2500	2500	2500
Operating weight	(10)	kg	7990	8500	8990	9290	9830	9910	10900	11530

1 Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger air (in) 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 Plant (side) cooling exchanger water (in/out) 16°C/ 10°C; Source (side) heat exchanger air (in) 35°C.
6 Acqua scambiatore freddo lato utenza (in/out) 23°C/15°C; Aria scambiatore lato sorgente (in) 35°C.
7 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.
8 Sound power on the basis of measurements made in compliance with ISO 9614.
9 Sound power level in cooling, outdoors.
10 Unit in standard configuration/execution, without optional accessories.

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

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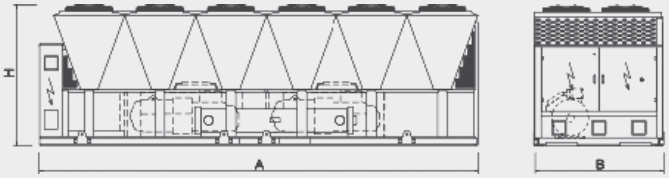

FURTHER OPTIONS

Auxiliary input

4-20 mA (Opt. 6161): Enables remote set-point adjustments (analog input).

Double set-point (Opt. 6162): Enables the remote switch between 2 set-points (digital input).

Demand limit (Opt. 6171): Limits the unit's power absorption for safety reasons or in temporary situations (digital input).

Electrical

Compressor rephasing (Opt. 3301): The capacitors on the compressors' line increase the unit's power factor.

Automatic circuit breakers for compressors (Opt. 3411) or all major electrical loads (Opt. 3412): Protects the compressors or the compressors and fans from possible current peaks, over-current switches are provided in place of the standard fuses.

Soft-starter (Opt. 1511): Manages the inrush current enabling lower motor windings' mechanical wear, avoidance of mains voltage fluctuations during starting and favorable sizing for the electrical system.

BMS connection

Serial card interface module to allow integration with BMS protocols:
Modbus (Opt. 4181) / **LonWorks (Opt. 4182)** / **BACnet MS/TP (Opt. 4184)** / **BACnet over IP (Opt. 4185)**

Energy Meter

Energy meter for BMS (Opt. 5924): Acquires electrical data and the power absorbed by the unit and send them the BMS for energy metering (Modbus RS485).

Refrigerant circuit

Dual pressure relief valves with switch (Opt. 1961): 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.

Compressor suction valve (Opt. 1901): Installed on each compressor suction line, it simplifies maintenance activity (discharge valves are present as per standard).

Refrigerant leak detector

Leak detector (Opt. 3431): Factory installed device. In case of a gas leak detection it raises an alarm.

Leak detector + compressor off (Opt. 3433): Factory installed device. In case of a gas leak detection it raises an alarm and stops the units.

Hydraulic

Water flow switch (Opt. 1801): Designed to protect the unit where the water flow across the evaporator is not sufficient and falls outside of the operating parameters.

Delta T > 8°C (Opt. 2881): Evaporator designed to operate with low primary circuit water flow.

Flanged hydraulic connections (Opt. 2911): Grooved coupling with flanged counter-pipe.

Structure

Anti-intrusion grilles (Opt. 2021): Perimeter metal grilles to protect against the intrusion of solid bodies into the unit structure.

Rubber type (Opt. 2101) or spring type (Opt. 2102) anti-vibration mountings: Reduce vibrations, keeping noise transmission to a minimum.

Packing

Reinforcing bars (Opt. 1971): Steel brackets used to strengthen the unit structure. Suggested in case of long truck transport.

Nylon packing (Opt. 9966): FR-Z is covered with a protective nylon layer and provided with the lifting eye-plates, to load the unit into a truck.

Container packing (Opt. 9979): FR-Z is covered with a protective nylon layer, provided with structural reinforcing bars and equipped with both lifting eye-plates and handling devices to load it on a container (metal slides, front handling bar).

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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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