


Liebert® HPC Freecooling Chiller

Data Center Freecooling with 100% Compressor Back Up





Whether a Data Center houses three or 1000 IT racks, deployment of new technologies with high power densities are impacting the power and cooling systems that business-critical servers and communication devices depend on for their performance and reliability.

■ **The critical infrastructure systems from Emerson Network Power allow customers to respond to changes** in density, capacity and availability while achieving greater operating flexibility, higher system availability and lower total costs of ownership.

■ **Emerson Network Power delivers innovative solutions through 12 Centers of Expertise**, distinct areas of breakthrough products and services that help determine what is needed in relation to the application. Supported by a global network in more than 150 countries, backed by local service and support from more than 2,000 certified professionals, Emerson Network Power is uniquely positioned to provide systems and integrated solutions wherever our customers are located.

Emerson Network Power understands the challenges of setting up the right infrastructure to support business-critical data center operations and helps respond to any demand by providing innovative solutions, allowing customers to concentrate on their business requirements.

■ **Liebert® HPC Freecooling Chiller** is the ultimate chilled water-based solution for delivering efficiency and reliability. Its freecooling and compressor functioning options make it ideal for data center applications with cooling needs ranging from 350 kW to above 20 MW. The unit's maximum efficiency is reached through the leveraging of its freecooling capability and iCOM® control function, which ensures the efficient management of system load sharing, further maximizing performance.

Emerson Network Power
innovative solutions
for data center applications.



■ Liebert® HPM / Liebert® PCW

From 4 kW to 240 kW, DX-Digital Scroll-CW

- Premium energy efficiency
- Eurovent certified performance
- Unique control capabilities with iCOM®

■ Liebert® HPC

Wide range of high efficiency Freecooling

Chillers from 50 kW to 1600 kW

- Designed specifically for data center applications and to work with SmartAisle™
- Premium energy efficiency version
- iCOM® control featured

■ SmartAisle™

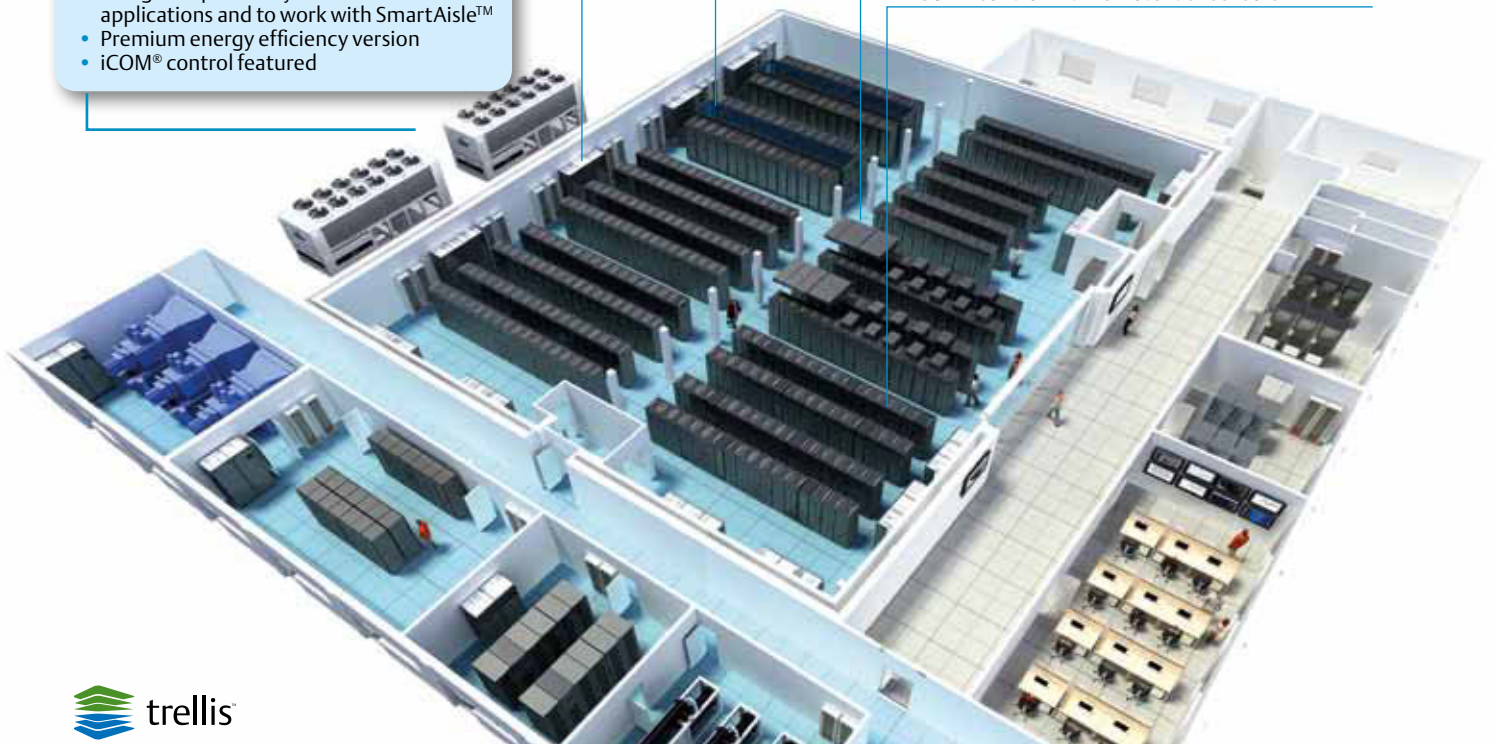
- Aisle containment
- Provides highest energy efficiency
- Works with all Emerson Network Power cooling units

■ Liebert® XD

- Refrigerant based high density cooling installed close to the server
- Hot spot management for up to 30 kW per rack
- On-demand upgrade with plug and play
- High efficiency and 100% sensible cooling

■ Liebert® CRV

- Row-based high efficiency precision cooling units available in DX or CW versions
- Decoupled control for airflow and cooling capacity
- Modulating cooling capacity with digital scroll
- iCOM® control with remote rack sensors



Trellis™ Platform

Emerson Network Power's Trellis™ platform is a real-time infrastructure optimization platform that enables the unified management of data centre IT and facilities infrastructure. The Trellis™ platform software can manage capacity, track inventory, plan changes, visualize configurations, analyze and calculate energy usage, and optimize cooling and power equipment as well as enable for virtualization. The Trellis™ platform monitors the data center, providing a thorough understanding of system dependencies to help IT and facilities organizations keep the data center running at peak performance. This unified and complete solution, delivers the power to see the real situation in your data center, make the right decision and take action with confidence.

Liebert® HPC Freecooling Chiller with Continuous Capacity Control: When Reliability and High Efficiency Count

Key Features and Performances

- Unique design features allow the Liebert® HPC to efficiently leverage its freecooling capability when external air temperatures exceed 20°C, thus ensuring a significant reduction in annual energy consumption
- Fast Start Ramp ensures immediate restoration of chiller availability within 20 seconds of a power restart
- Year-long leveraging of freecooling is achieved also at partial load, with overall system efficiency increase as a result of the embedded Supersaver function
- Silent solutions ideal for noise-sensitive environments

When it comes to evaluating cooling solutions for data center applications, efficiency and reliability prove to be the most significant drivers. Reliability is fundamental to guaranteeing optimum system availability, while efficiency impacts data center operating costs. Liebert® HPC freecooling chiller has thus been designed to reach ultimate levels of energy efficiency and reliability by utilizing the cooling power of the external air, via its freecooling function. The unit's heat exchangers and hydraulic circuit are responsible for extracting heat from the data center by means of high efficiency fans and pumps. The efficiency of this system is further maximized when the freecooling chiller operates at inlet water temperatures which are higher than standard levels. Having been designed to operate at high water temperatures of up to 26°C, Liebert® HPC

perfectly integrates with high efficiency floor mount units such as the Liebert® PCW and with SmartAisle™ cold aisle containment, guaranteeing outstanding energy savings and longer year-round freecooling. With this integrated configuration, freecooling is therefore achieved also when external air temperatures exceed 20°C. In addition to providing enhanced energy savings, Liebert® HPC also delivers extreme reliability as a result of efficient screw compressor-related mechanical cooling. The compressor functioning mode is designed to operate as a back up when external temperatures exceed freecooling limits. These features, together with advanced components and iCOM® control logic, provide a complete cooling system solution, ensuring unparalleled data center energy savings and reliability.



EMERSON
Network Power

*Liebert® HPC: the ultimate freecooling
solution for data center applications.*



Superior Freecooling and Energy Savings for Data Centers and Industrial Applications

The Liebert® HPC freecooling chiller achieves excellent energy savings for data centers as a result of its freecooling-oriented design. The main source of cooling is drawn from the outside air temperature, which is then transferred to the data center floor mount units by means of high efficiency fans and pumps. Liebert® HPC further utilizes in-built compressors for operation when outside air temperatures exceed freecooling limits. The design, optimized for data center applications, allows operation with inlet water temperatures up to 26°C, thus increasing both freecooling and mechanical cooling efficiencies. These features hence ensure optimum operation in a vast range of environments, from the cool climate of Northern and Central Europe to warmer locations in Southern Europe. Furthermore, the high inlet water temperature capability of the Liebert® HPC also leads to optimizations in chiller sizing. This is the result of the unit's ability to manage the requested cooling capacity efficiently within an optimized footprint, thus minimizing capital investment costs.

Enhanced Freecooling at all Latitudes with SmartAisle™ Containment

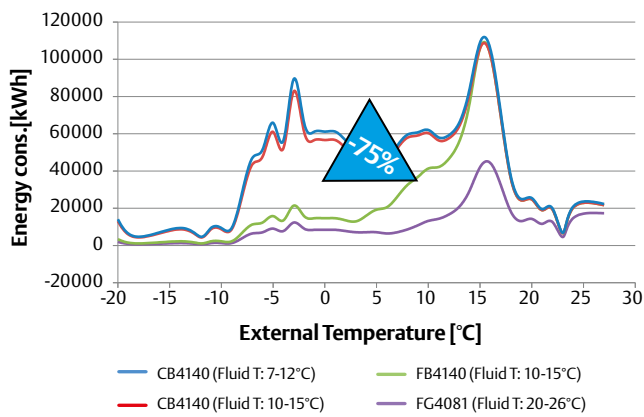
The Liebert® HPC freecooling chiller reaches its peak performance when operated in conjunction with floor mount units such as Liebert® PCW and with SmartAisle™ containment. The combination of these systems allow chilled water temperatures to reach up to 20-26°C Leaving Water Temperature (LWT) - Entering Water Temperature (EWT), further driving performance to its peak. As shown in the following graphs, **a data center located in Oslo with a 1000 kW cooling load is able to deliver energy savings worth more 160,000 €/year through the use of a freecooling chiller.** These savings have been proven comparing the operation of the Liebert® HPC FG4-081 model freecooling chiller at 20-26°C (LWT-EWT), to a CB4-140 model chiller (60% larger) working at conventional temperatures from 7-12°C (LWT-EWT), with the same load. Energy savings are substantial also in warmer climates, considering a 1000 kW Athens-based data center delivers savings of **130,000 €/year!**

Emerson Network Power's
Liebert® HPC freecooling chiller combined
with SmartAisle™ containment delivers
optimized operating costs.



Liebert® HPC Freecooling Chiller with SmartAisle™ Vs Standard Installation

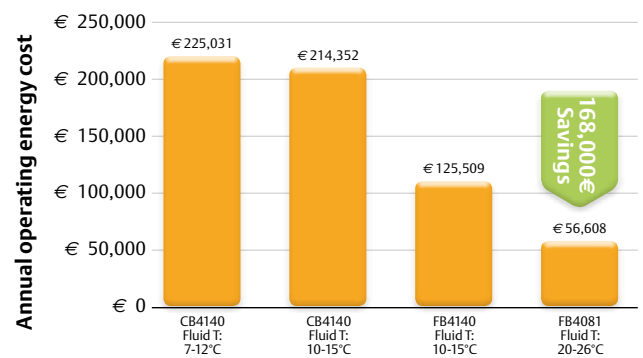
1000 kW load - Oslo



Liebert® HPC Freecooling Chiller with SmartAisle™ Annual Operating Costs and Savings

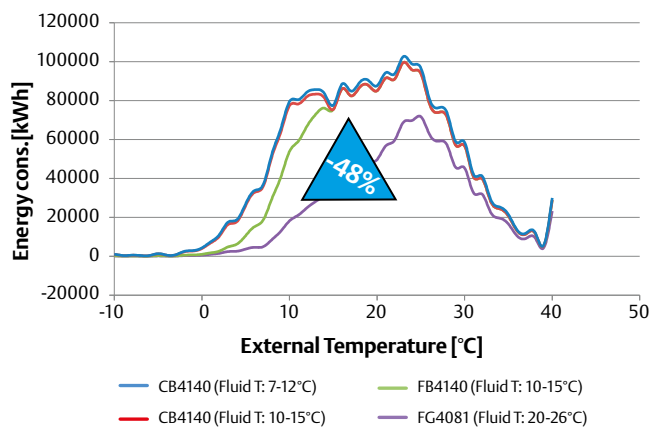
1000 kW load - Oslo

energy cost considered 0.12 €/kW



Liebert® HPC Freecooling Chiller with SmartAisle™ Vs Standard Installation

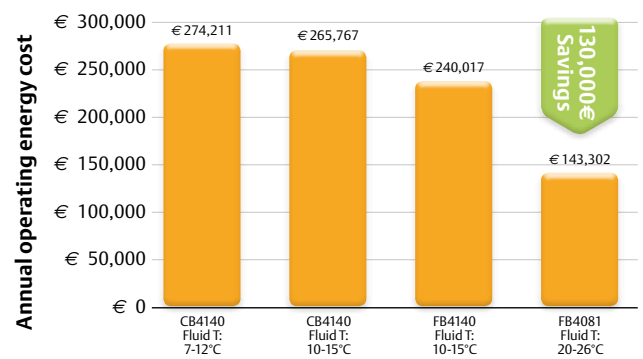
1000 kW load - Athens



Liebert® HPC Freecooling Chiller with SmartAisle™ Annual Operating Costs and Savings

1000 kW load - Athens

energy cost considered 0.12 €/kW

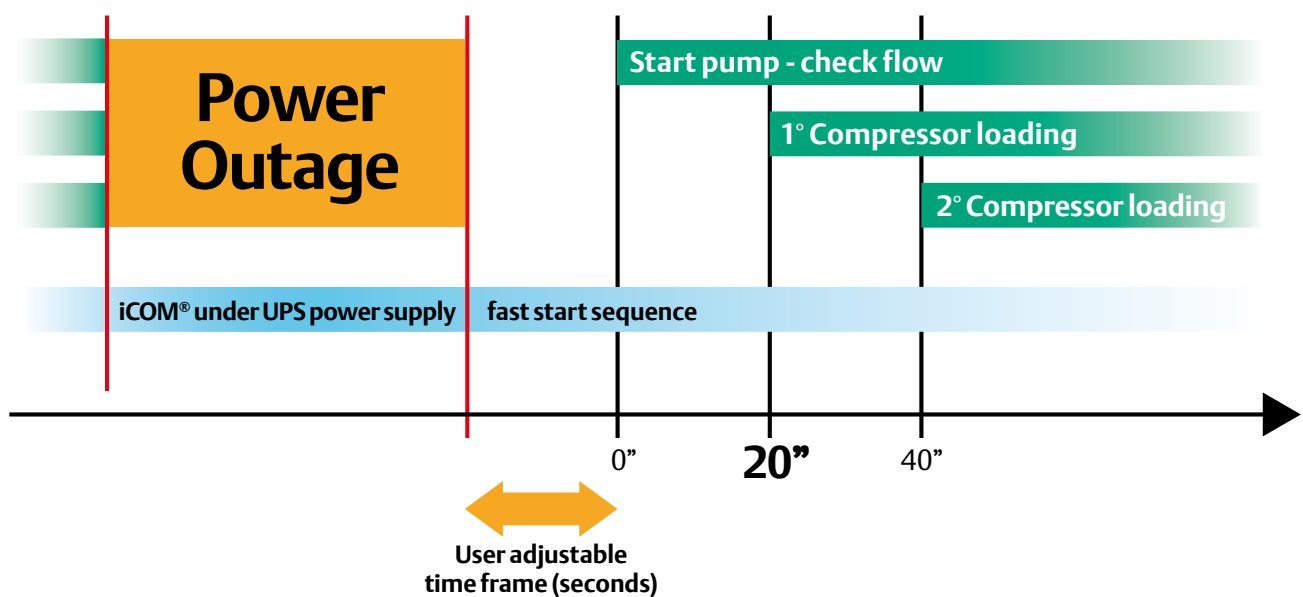




Immediate Availability with Fast Start Ramp



Fast Start Ramp is the innovative technology which ensures immediate restoration of chiller operation following a power restart. This reliable technology allows the activation sequence to begin 20 seconds after power restoration, ensuring water temperatures remain stable.



Liebert® HPC Fast Start Ramp sequence

Liebert® HPC freecooling chiller technology delivers first-class, environmentally friendly performance.



Liebert® HPC Freecooling Chiller Technology Maximizes Benefits for Data Centers



Energy Efficiency

Maximized as a result of:

- Optimized freecooling system, achieved with integrated freecooling coils, hydraulic circuits and iCOM® control logic management
- New, advanced DX evaporator optimized for R134a, with counter current configuration:
 - PHE (6-8 fan models)
 - Shell & Tube (10 - 20 fan models)
- Electronic Expansion Valve (EEV) guaranteeing stability and efficiency in all conditions
- Compressor design optimization guaranteeing high efficiency particularly at partial load.

Among the Liebert® HPC range, the “G” version freecooling chiller delivers the highest efficiency at elevated inlet water temperatures, making it ideal for data centers and industrial applications in which water temperatures are higher than standard. The Liebert® HPC “G” version is also optimized for applications with extreme external environmental conditions, such as the tropical temperatures found in areas similar to the Middle East.



EC Fans (Air cooled models)

High efficiency EC motors guarantee a 25% saving in energy consumption compared to traditional AC motors.

EC fans are further optimized for operation, eliminating electromagnetic-related noise and minimizing overall sound emission.



Screw Compressors

Each freecooling chiller features two semi-hermetic screw compressors, specifically designed and optimized for water chillers used in air conditioning applications. Excellent performance is ensured both at full and partial load as a result of the continuous capacity control system integrated within the iCOM® control logic. The screw compressors further ensure operation with minimized noise, making the unit ideal for noise-sensitive installations.



Minimized Noise Levels

Audible noise is minimized for silent operation as a result of HyBlade EC Fans and customized acoustic insulation.



Electronic Expansion Valve

This valve is designed to constantly optimize the refrigeration circuit's performance in order to achieve the highest efficiency also at partial load.

The Liebert® HPC freecooling chiller range features the Electronic Expansion Valve as standard. The relevant valve management software is also embedded in the iCOM® control function.



Increased Reliability with Double Electrical Panel

From 700 kW nominal capacity upwards, the freecooling chiller is equipped with two electrically independent control panels, both of which are supplied with dedicated iCOM® electronic control boards. This allows the optimization of electrical supply line sizing and further ensures intelligent management of maintenance operations. The dedicated electronic control boards guarantee one functioning chiller line continues to operate while the other is being serviced.



Dynamic Demand Limit for Absorbed Power Control

With the optional energy meter,

Liebert® HPC is able to control the amount of power absorbed and avoid levels exceeding the user-defined power limits. This further allows for the optimization of electrical supply lines and the generator sizing.



Embedded Supersaver Function

This unique functioning mode may be set up in combination with the Liebert® PCW in order to additionally enhance energy savings, thus optimizing the Seasonal Energy Efficiency Ratio (SEER). This function allows the floor mount units to communicate via LAN with the freecooling chiller, automatically increasing water temperature when the thermal load decreases. This in turn enhances the system's seasonal efficiency and freecooling operating time.

*iCOM® electronic control.
Developed by Emerson Network
Power to address the specific
needs of the data center.*



iCOM®

iCOM® electronic control delivers extreme flexibility of both system and working conditions.

The iCOM® software has been developed by Emerson Network Power to specifically ensure the intelligent control of units within dynamic data center environments via:

- Dedicated algorithm ensuring minimized fan speed for both low noise (L) and silent (Q) versions
- Networking of up to 16 freecooling chillers through teamwork mode, stand-by and cascade operation.



Freecooling No Glycol Solution

For specific installations in which glycol is not permitted, Emerson Network Power has developed a dedicated No Glycol Freecooling version which restricts the glycol fluid to the external unit only. The entire system, from thermal insulation to the optimized sizing of pumps and heat exchangers, ensures the highest reliability and energy saving.



Dual Power Supply

Units can be supplied with dual electrical power connections in which one is powered by the mains line or generator and the other by a UPS, both guaranteeing continuous supply to the electronic controller in all conditions.

This configuration allows the Fast Start Ramp to be initiated following a power restart. The dual supply can further include the pumps and fans operating under the UPS line, enabling freecooling operation also when the UPS is the sole power source.

Liebert® HPC Freecooling and Aircooled Versions

Standard Features

- Integrated freecooling system (Freecooling models)
- EC Fans (standard with “G” and “Q” version)
- Intelligent fan control based on external temperature or time frame
- Electronic expansion valve
- Semi-hermetic screw compressors
- R134a refrigerant
- Evaporator water flow switch
- Part winding / Star delta (depending on compressor size)
- Double set point
- Shifting set point
- Auto unit Delta T setting
- Advanced low condensing pressure control
- Demand limit
- Intelligent inrush current control (air cooled)
- Remote on/off relay
- Voltage free contact:
 - chiller/pump operation
 - compressors operation
 - general alarm
 - general warning
 - freecooling status (configurable)

Additional Options

- Star delta starting method
- Economizer
- On board pump group - inverter pumps
- Hydraulic kit
- Double power supply and Fast Start Ramp
- Compressor suction shut off valve
- Evaporator-pipes-pumps trace heating
- No-Glycol
- Heat Recovery
- Electrical panel heaters
- Energy meter
- Condensing coil filters
- Protection grid
- Compressors power factor correction
- Anti vibration mount kit, rubber or spring type
- Full range monitoring possibilities: BMS, NMS, web, Modbus, Bacnet, Lan, Sitiescan.



Liebert® HPC can be configured according to individual installation requirements.



Liebert® HPC Water Cooled Version

Reliability

Liebert® HPC-W water cooled chillers are equipped with two independent refrigerant circuits and highly reliable components, accurately managed by the microprocessor. Prior to shipment, each chiller also undergoes full testing in a dedicated test cabin to ensure on-site reliability.

High Efficiency

The Liebert® HPC-W has an energy efficiency ratio (EER) of above 5 as a result of high efficiency components and large heat exchangers.

High efficiency delivers:

- Reduced electrical consumption and consequent cost savings
- A 700 kW chiller with a 20% higher EER than a similar unit of the same capacity can provide a saving of up to 23,000 €/year!

Silent Operation

Liebert® HPC-W's innovative design makes it the most silent chiller in the market, ensuring minimized vibration transmission throughout the installation site.

Main Features

- High performance shell and tube evaporator/condenser
- Easy maintenance and component accessibility as a result of its innovative design
- High precision water outlet with compressor-microprocessor integration $\pm 0.2^{\circ}\text{C}$

- Economizer for enhanced efficiency and cooling capacity
- Electronic expansion valve for high performance and reliability
- Additional functions:
 - Heat Pump
 - Heat Recovery (20%-100%)





Liebert® HPC: Remote Monitoring Service and Connectivity

■ LIFE™.net Remote Monitoring and Diagnostic Service

Proactive equipment maintenance reduces downtime and extends equipment life which in turn maximizes return on investment and increases system availability. Emerson Network Power supports entire critical infrastructures with an extensive service offering, guaranteeing network availability and total peace of mind 24/7. Our approach to servicing critical infrastructure covers all aspects of

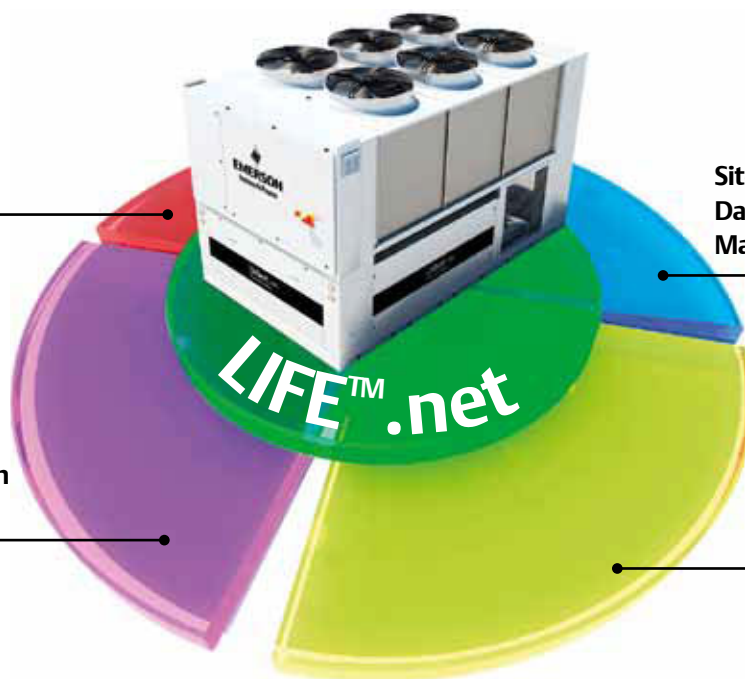
availability and performance, from single units to entire mission critical systems, providing customers with tailored services to meet their individual business needs and further guaranteeing Business-Critical Continuity™. Emerson Network Power's service program is designed to ensure that your critical cooling system is maintained in an optimum state of readiness at all times. The LIFE™.net remote monitoring and diagnostic service provides early warning of unit conditions

Basic Web Access

Advanced Access with
Intellislot Web Card

SiteScan® Web Control,
Data Capture, Energy
Management and Planning

Monitoring and
Alarm Notification
through Liebert®
Nform™





and out of tolerances. This allows effective proactive maintenance, fast incident response and remote trouble shooting, giving customers complete security and peace of mind.

■ **Basic Web Access**

Basic operational information can be made available through the monitoring feature offered by the iCOM® Control over Ethernet. A web browser is the only requirement needed for the unit to communicate directly with the local or remote web interface.

■ **Monitoring and Control Through Existing Network Via your Web Browser**

The Liebert® HPC system can be fitted with a Liebert® IntelliSlot Web Card allowing full advantage to be taken of the Ethernet network and remote monitoring from your computer desktop, network operations center or any network access simply utilizing a standard web browser. A standard web browser, via HTTP protocol or Network Management System software via SNMP protocol, can be used to access the unit information.

■ **Monitoring Integration with Existing Building Management System**

If required, Liebert® HPC can be monitored through an existing Building Management System using one of the many open

protocols supported: Modbus, Bacnet, SNMP, HTTP, LonWorks. Depending on the protocol adopted, the communication hardware can be either an internal card (Intellislot) or an external adapter.

■ **Liebert® Nform™ Software Centralized Management**

As business grows, critical equipment infrastructure expands, thus the need for centralized management of any equipment is key to business success. Connecting to equipment in the distributed critical space is only part of the monitoring challenge. Liebert® Nform™ leverages the network connectivity capabilities of Liebert® HPC and Liebert® PCW to provide centralized monitoring of the distributed equipment. Utilizing the SNMP and Web technologies integrated in each Liebert® IntelliSlot Web Card, Liebert® Nform™ centrally manages alarm notifications and provides an intuitive interface to access critical status information. Liebert® Nform™ allows critical system information to be readily available to support personnel wherever they are, increasing responsiveness to alarm-event conditions, thus allowing IT organizations to maximize their system availability.

Liebert SiteScan® Web Control, Data Capture, Energy Management and Planning

For customers who require extensive management of critical system equipment spanning multiple locations in an ever-moving global enterprise, Liebert SiteScan® Web will centrally manage critical equipment and give the power to move beyond the event responsive service paradigm.

Liebert SiteScan® Web does it all

- Real-Time Monitoring and Control
- Event Management and Reporting
- Data Analysis and Trending
- Building Management Integration

Liebert SiteScan® Web is a comprehensive critical system management solution dedicated to ensuring reliability through graphics, event management and data export. The standard web interface allows users easy access from anywhere, anytime.



Liebert® HPC Witness Test Facilities are designed to provide customers with pre-installation testing through the simulation of field conditions. The dedicated testing cabins reproduce the severest of operating conditions in order to demonstrate the units' true performance.

Functional Test

The Liebert® HPC production plant based in Piove di Sacco, near Venice, Italy, features two multi-purpose precision cooling test cabins.

Each Liebert® HPC unit undergoes stringent end of line testing in these specialized cabins prior to shipment.

The state-of-the-art equipment and features of the cabins ensure high precision measurement of a wide range of testing conditions. The main testing cabin has an internal volume of 650 m³ and is designed to perform high precision tests with simulated ambient temperatures of up to 55°C.

Customer Witness Tests

Emerson Network Power customers are given the possibility of witnessing unit testing first-hand in our dedicated witness testing facility. The range of witness tests offered include:

■ **Performance Test:**

cooling capacity, power absorption and efficiency are measured at requested working conditions. These tests adhere to the procedures outlined in the EN 14511 standard.

■ **Dry Run Test:**

all end of line functional testing is repeated with the customer.

■ **Sound Test:**

the acoustic emissions of the unit are measured following the ISO 3744 standard procedure.



Witness test cabins have been designed to optimize the reliability of unit testing, ensuring that real installation conditions are simulated in order to confirm the unit's guaranteed performance.

G Models		FG4036		FG4039		FG4046		FG4052		FG4058		FG4066		
R134a Refrigerant														
Cooling Capacity ¹	kW	507		575		667		751		835		945		
Freecooling Capacity ¹	kW	471		483		587		601		719		743		
Total Power Input ¹	kW	134		155		165		191		210		245		
Unit EER ¹		3.78		3.72		4.05		3.92		3.97		3.86		
Cooling Capacity ²	kW	371		424		479		543		595		679		
Freecooling Capacity ²	kW	277		287		344		354		422		440		
Total Power Input ²	kW	119		136		145		167		184		213		
Unit EER ²		3.12		3.12		3.3		3.25		3.23		3.19		
SPL (Sound Pressure Level) ³	dB(A)	79.5		79.5		80		80		81		81		
PWL (Sound Power Level) ⁴	dB(A)	100		100		101		101		102		102		
Evaporator Type		Plate Heat Exchanger					Shell & Tube							
Dimensions - L x D x H	mm	5017x2260x2570					6013x2260x2570				7009x2260x2570			
Operating Weight	kg	5236		5282		7278		7301		8008		8089		

Q Models		FQ4031		FQ4036		FQ4039		FQ4046		FQ4052		FQ4058		FQ4066	
R134a Refrigerant															
Cooling Capacity ²	kW	298		349		396		449		506		567		628	
Freecooling Capacity ²	kW	165		216		223		268		275		329		335	
Total Power Input ²	kW	104		112		134		139		164		180		213	
Unit EER ²		2.88		3.12		2.97		3.22		3.08		3.15		2.95	
SPL (Sound Pressure Level) ³	dB(A)	65		65.5		65.5		66		66		67		67	
PWL (Sound Power Level) ⁴	dB(A)	85		86		86		87		87		88		88	
Evaporator Type		Plate Heat Exchanger						Shell & Tube							
Dimensions - L x D x H	mm	4021x2260x2570		5017x2260x2570		6013x2260x2570				7009x2260x2570					
Operating Weight	kg	4371		5046		5092		7012		7032		7728		7807	

L Models		FL4031		FL4036		FL4039		FL4046		FL4052		FL4058		FL4066		FL4078	
R134a Refrigerant																	
Cooling Capacity ²	kW	312		342		413		439		528		569		658		746	
Freecooling Capacity ²	kW	191		194		256		257		316		320		387		394	
Total Power Input ²	kW	103		120		133		146		165		188		213		270	
Unit EER ²		3.02		2.86		3.1		3		3.2		3.02		3.09		2.76	
SPL (Sound Pressure Level) ³	dB(A)	70		70		70.5		70.5		71		71		72		72	
PWL (Sound Power Level) ⁴	dB(A)	90		90		91		91		92		92		93		93	
Evaporator Type		Plate Heat Exchanger								Shell & Tube							
Dimensions - L x D x H	mm	4021x2260x2570				5017x2260x2570				6013x2260x2570				7009x2260x2570			
Operating Weight	kg	4262		4310		4982		5742		6920		6941		7697		7892	

B Models		FB4031		FB4036		FB4039		FB4046		FB4052		FB4058		FB4066		FB4078	
R134a Refrigerant																	
Cooling Capacity ²	kW	318		348		396		447		506		578		644		762	
Freecooling Capacity ²	kW	202		206		212		273		280		341		348		421	
Total Power Input ²	kW	105		121		143		148		171		191		221		271	
Unit EER ²		3.02		2.89		2.78		3.03		2.85		3.03		2.91		2.81	
SPL (Sound Pressure Level) ³	dB(A)	78		78		78		78.5		78.5		79		79		80	
PWL (Sound Power Level) ⁴	dB(A)	98		98		98		99		99		100		100		101	
Evaporator Type		Plate Heat Exchanger										Shell & Tube					
Dimensions - L x D x H	mm	4021x2260x2570				5017x2260x2570				6013x2260x2570				7009x2260x2570			
Operating Weight	ka	4322		4371		4416		5852		5946		7100		7154		8104	

¹ Cooling capacity at the following conditions: power supply 400V/3ph/50Hz; outdoor temperature 35°C; coolant inlet/outlet temperature 26/20°C; ethylene glycol 30%

Freecooling capacity at the following standard conditions: power supply 400V/3ph/50Hz; outdoor temperature 10°C; coolant inlet temperature 26°C; ethylene glycol 30%;

² Cooling capacity at the following standard conditions: power supply 400V/3ph/50Hz; outdoor temperature 35°C; coolant inlet/outlet temperature 15/10 °C; ethylene glycol 30%

³ Measured at outdoor temperature of 35°C; 1m from the unit; free field conditions; according to ISO 3744

⁴ At outdoor temperature of 35°C; calculated according to ISO 3744

G Models		CG4036	CG4039	CG4046	CG4052	CG4058	CG4066
R134a Refrigerant							
Cooling Capacity ¹	kW	528	614	679	780	866	982
Total Power Input ¹	kW	132	150	161	184	202	234
Unit EER ¹		3.99	4.1	4.21	4.24	4.28	4.21
Cooling Capacity ²	kW	353	412	447	516	563	644
Total Power Input ²	kW	115	129	140	157	173	197
Unit EER ²		3.08	3.2	3.2	3.3	3.25	3.26
SPL (Sound Pressure Level) ³	dB(A)	79.5	79.5	80	80	81	81
PWL (Sound Power Level) ⁴	dB(A)	100	100	101	101	102	102
Evaporator Type		Plate Heat Exchanger		Shell & Tube			
Dimensions - L x D x H	mm	5017x2260x2570		6013x2260x2570		7009x2260x2570	
Operating Weight	kg	4476	4522	6268	6288	6837	6854

Q Models		CQ4031	CQ4036	CQ4039	CQ4046	CQ4052	CQ4058	CQ4066
R134a Refrigerant								
Cooling Capacity ²	kW	292	334	387	421	483	542	603
Total Power Input ²	kW	97	107	124	131	152	166	196
Unit EER ²		3.03	3.13	3.13	3.21	3.18	3.26	3.07
SPL (Sound Pressure Level) ³	dB(A)	65	65.6	65.6	66	66	67	67
PWL (Sound Power Level) ⁴	dB(A)	85	86	86	87	87	88	88
Evaporator Type		Plate Heat Exchanger			Shell & Tube			
Dimensions - L x D x H	mm	4021x2260x2570	5017x2260x2570		6013x2260x2570		7009x2260x2570	
Operating Weight	kg	3742	4286	4332	5996	6020	6557	6579

L Models		CL4031	CL4036	CL4039	CL4046	CL4052	CL4058	CL4066	CL4078
R134a Refrigerant									
Cooling Capacity ²	kW	299	334	396	426	494	544	631	721
Total Power Input ²	kW	99	112	129	136	156	174	196	249
Unit EER ²		3.02	2.98	3.08	3.13	3.16	3.12	3.22	2.9
SPL (Sound Pressure Level) ³	dB(A)	70	70	70.5	70.5	71	71	72	72
PWL (Sound Power Level) ⁴	dB(A)	90	90	91	91	92	92	93	93
Evaporator Type		Plate Heat Exchanger				Shell & Tube			
Dimensions - L x D x H	mm	4021x2260x2570		5017x2260x2570		6013x2260x2570		7009x2260x2570	
Operating Weight	kg	3633	3679	4222	4930	5910	5928	6469	6674

B Models		CB4031	CB4036	CB4039	CB4046	CB4052	CB4058	CB4066	CB4078
R134a Refrigerant									
Cooling Capacity ²	kW	303	334	388	426	494	544	618	736
Total Power Input ²	kW	101	115	131	141	159	180	205	251
Unit EER ²		3	2.89	2.96	3.02	3.1	3.03	3.02	2.93
SPL (Sound Pressure Level) ³	dB(A)	78	78	78	78.5	78.5	79	79	80
PWL (Sound Power Level) ⁴	dB(A)	98	98	98	99	99	100	100	101
Evaporator Type		Plate Heat Exchanger					Shell & Tube		
Dimensions - L x D x H	mm	4021x2260x2570			5017x2260x2570		6013x2260x2570		7009x2260x2570
Operating Weight	kg	3691	3740	3785	5040	5132	6089	6112	6884

¹ Cooling capacity at the following conditions: power supply 400V/3ph/50Hz; outdoor temperature 35°C; water inlet/outlet temperature 26/20°C; ethylene glycol 0%

² Cooling capacity at the following standard conditions: power supply 400V/3ph/50Hz; outdoor temperature 35°C; water inlet/outlet temperature 12/7°C; ethylene glycol 0%

³ Measured at outdoor temperature of 35°C; 1m from the unit; free field conditions; according to ISO 3744

⁴ At outdoor temperature of 35°C; calculated according to ISO 3744

G Models		FG4069	FG4075	FG4081	FG4087	FG4093	FG4100	FG4107	FG4122
R134a Refrigerant									
Cooling Capacity ¹	kW	1044	1098	1166	1207	1247	1424	1502	1555
Freecooling Capacity ¹	kW	849	857	876	870	872	1154	1161	1170
Total Power Input ¹	kW	272	1044	335	362	388	381	408	525
Unit EER ¹		3.84	3.65	3.48	3.33	3.21	3.73	3.68	2.96
Cooling Capacity ²	kW	766	810	867	899	929	1046	1107	1165
Freecooling Capacity ²	kW	506	511	515	519	521	689	696	705
Total Power Input ²	kW	237	260	286	306	326	327	349	437
Unit EER ²		3.23	3.12	3.03	2.93	2.85	3.2	3.17	2.66
SPL (Sound Pressure Level) ³	dB(A)	84	84	84	84	84	85	85	85
PWL (Sound Power Level) ⁴	dB(A)	106	106	106	106	106	107.5	107.5	107.5
Evaporator Type		Shell & Tube							
Dimensions - L x D x H	mm	9586x2308x2581					11578x2308x2581		
Operating Weight	kg	116627	11639	11718	11790	11991	13544	13808	14591
Q Models									
R134a Refrigerant									
Cooling Capacity ²	kW	695	731	776	882	910	951	1003	1211
Freecooling Capacity ²	kW	389	391	394	518	519	522	525	644
Total Power Input ²	kW	246	277	312	299	319	345	377	472
Unit EER ²		2.82	2.64	2.49	2.95	2.85	2.76	2.66	2.56
SPL (Sound Pressure Level) ³	dB(A)	65.5	65.5	65.5	66	66	66	66	67
PWL (Sound Power Level) ⁴	dB(A)	87.5	87.5	87.5	88.5	88.5	88.5	88.5	90
Evaporator Type		Shell & Tube							
Dimensions - L x D x H	mm	9586x2308x2543			11578x2308x2543				13570x2308x2543
Operating Weight	kg	11508	11517	11595	13104	13300	13328	13588	15671
L Models									
R134a Refrigerant									
Cooling Capacity ²	kW	737	778	830	929	963	1008	1067	1287
Freecooling Capacity ²	kW	460	464	469	611	614	619	624	762
Total Power Input ²	kW	243	269	298	296	315	336	362	459
Unit EER ²		3.04	2.9	2.79	3.14	3.06	3	2.95	2.89
SPL (Sound Pressure Level) ³	dB(A)	73	73	73	74	74	74	74	75
PWL (Sound Power Level) ⁴	dB(A)	95	95	95	96.5	96.5	96.5	96.5	98
Evaporator Type		Shell & Tube							
Dimensions - L x D x H	mm	9586x2308x2571			11578x2308x2571				13570x2308x2571
Operating Weight	kg	11508	11517	11595	13104	13300	13328	13588	15671
B Models									
R134a Refrigerant									
Cooling Capacity ²	kW	752	795	849	880	908	1028	1089	1308
Freecooling Capacity ²	kW	485	490	494	497	499	661	668	818
Total Power Input ²	kW	243	267	295	316	336	337	360	461
Unit EER ²		3.09	2.98	2.88	2.78	2.7	3.05	3.03	2.59
SPL (Sound Pressure Level) ³	dB(A)	80	80	80	80	80	81	81	82
PWL (Sound Power Level) ⁴	dB(A)	102	102	102	102	102	103,5	103,5	105
Evaporator Type		Shell & Tube							
Dimensions - L x D x H	mm	9586x2308x2571					11578x2308x2571		13570x2308x2571
Operating Weight	kg	11627	11639	11718	11790	11991	13544	13808	14551

¹ Cooling capacity at the following conditions: power supply 400V/3ph/50Hz; outdoor temperature 35°C; coolant inlet/outlet temperature 26/20 °C; ethylene glycol 30%

Freecooling capacity at the following standard conditions: power supply 400V/3ph/50Hz; outdoor temperature 10°C; coolant inlet temperature 26°C; ethylene glycol 30%;

² Cooling capacity at the following standard conditions: power supply 400V/3ph/50Hz; outdoor temperature 35°C; coolant inlet/outlet temperature 15/10 °C; ethylene glycol 30%

Freecooling capacity at the following standard conditions: power supply 400V/3ph/50Hz; outdoor temperature 5°C; coolant inlet temperature 15°C; ethylene glycol 30%;

³ Measured at outdoor temperature of 35 °C; 1m from the unit; free field conditions; according to ISO 3744

⁴ At outdoor temperature of 35°C; calculated according to ISO 3744

G Models		CG4069	CG4075	CG4081	CG4087	CG4093	CG4100	CG4107	CG4122
R134a Refrigerant									
Cooling Capacity ¹	kW	1107	1167	1242	1289	1355	1419	1557	1699
Total Power Input ¹	kW	258	285	316	341	362	386	395	486
Unit EER ¹		4.29	4.1	3.93	3.78	3.75	3.68	3.94	3.49
Cooling Capacity ²	kW	745	790	846	881	926	972	1063	1159
Total Power Input ²	kW	219	239	262	280	297	324	327	396
Unit EER ²		3.40	3.31	3.23	3.15	3.12	3.08	3.25	2.93
SPL (Sound Pressure Level) ³	dB(A)	83.5	83.5	83.5	83.5	84	84	84.5	85
PWL (Sound Power Level) ⁴	dB(A)	105.5	105.5	105.5	105.5	106	106	106.5	107.5
Evaporator Type		Shell & Tube							
Dimensions - L x D x H	mm	8590x2308x2581					9586x2308x2581	11578x2308x2581	
Operating Weight	kg	9100	9108	9187	9264	9446	9477	10282	11911

Q Models		CQ4068	CQ4074	CQ4080	CQ4086	CQ4092	CQ4099	CQ4106	CQ4121	CQ4139
R134a Refrigerant										
Cooling Capacity ²	kW	693	732	812	842	903	948	1001	1124	1201
Total Power Input ²	kW	223	249	264	282	289	310	334	386	426
Unit EER ²		3.12	2.9	3.08	2.98	3.13	3.06	3.00	2.91	2.82
SPL (Sound Pressure Level) ³	dB(A)	65	65	65.5	65.5	66	66	66	67	67
PWL (Sound Power Level) ⁴	dB(A)	87	87	87.5	87.5	88.5	88.5	88.5	90	90
Evaporator Type		Shell & Tube								
Dimensions - L x D x H	mm	8590x2308x2571		9586x2308x2571		11578x2308x2571			13570x2308x2543	
Operating Weight	kg	9086	9098	9674	9746	10632	10660	10920	12604	12706

L Models		CL4068	CL4074	CL4080	CL4086	CL4092	CL4099	CL4106	CL4121	CL4139
R134a Refrigerant										
Cooling Capacity ²	kW	728	772	851	886	947	995	1054	1178	1262
Total Power Input ²	kW	221	243	260	278	288	305	325	382	418
Unit EER ²		3.29	3.17	3.28	3.19	3.29	3.26	3.24	3.08	3.02
SPL (Sound Pressure Level) ³	dB(A)	73	73	73.5	73.5	74	74	74	75	75
PWL (Sound Power Level) ⁴	dB(A)	95	95	95.5	95.5	96.5	96.5	96.5	98	98
Evaporator Type		Shell & Tube								
Dimensions - L x D x H	mm	8590x2308x2571		9586x2308x2571		11578x2308x2571			13570x2308x2571	
Operating Weight	kg	9086	9098	9674	9746	10632	10660	10920	12604	12706

B Models		CB4069	CB4075	CB4081	CB4087	CB4093	CB4100	CB4107	CB4122	CB4140
R134a Refrigerant										
Cooling Capacity ²	kW	732	776	829	862	905	950	1041	1143	1287
Total Power Input ²	kW	223	244	268	287	305	325	336	400	420
Unit EER ²		3.28	3.18	3.09	3	2.97	2.93	3.1	2.86	3.07
SPL (Sound Pressure Level) ³	dB(A)	79.5	79.5	79.5	79.5	80	80	80.5	81	82
PWL (Sound Power Level) ⁴	dB(A)	101.5	101.5	101.5	101.5	102	102	102.5	103.5	105
Evaporator Type		Shell & Tube								
Dimensions - L x D x H	mm	8590x2308x2571					9586x2308x2571	11578x2308x2571		
Operating Weight	kg	9100	9108	9187	9264	9446	9477	10282	11911	11871

¹ Cooling capacity at the following conditions: power supply 400V/3ph/50Hz; outdoor temperature 35°C; water inlet/outlet temperature 26/20°C; ethylene glycol 0%

² Cooling capacity at the following standard conditions: power supply 400V/3ph/50Hz; outdoor temperature 35°C; water inlet/outlet temperature 12/7°C; ethylene glycol 0%

³ Measured at outdoor temperature of 35°C; 1m from the unit; free field conditions; according to ISO 3744

⁴ At outdoor temperature of 35°C; calculated according to ISO 3744

Models		WS1027	WS1031	WS1035	WS1040	WS1047	WS1052	WS1060	WS2033	WS2039	WS2043	WS2048
R134a Refrigerant												
Cooling Capacity ¹	kW	283	319	362	419	480	541	602	341	402	445	485
Compressor Power Input ¹	kW	58	66	72	85	97	113	124	73	83	96	101
Unit EER ¹		4.88	4.84	5.04	4.91	4.94	4.78	4.87	4.67	4.83	4.62	4.80
Cooling Capacity ²	kW	301	345	382	456	511	581	638	361	434	471	528
Compressor Power Input ²	kW	59	69	73	89	99	118	127	74	87	98	106
Unit EER ²		5.11	5.03	5.24	5.13	5.18	4.94	5.04	4.86	4.98	4.81	4.96
Number of Refrig Circuits	#	1	1	1	1	1	1	1	2	2	2	2
Base version SPL ³	dB(A)	76.5	77.0	77.5	76.5	76.0	77.0	77.0	73.0	74.0	74.0	77.0
Base version PWL ⁴	dB(A)	94.0	94.5	95.0	94.5	94.0	95.0	95.0	91.0	92.0	92.0	95.5
Low-Noise version SPL ³	dB(A)	68.0	69.0	69.0	69.0	69.0	69.0	69.0	65.0	65.0	66.0	68.0
Low-Noise version PWL ⁴	dB(A)	86.0	87.0	87.0	87.0	86.0	87.0	87.0	83.0	83.0	84.0	86.5
Operating Weight	kg	2403	2509	2570	3530	3557	3741	3761	3238	3463	3601	4311

Models		WS2054	WS2061	WS2065	WS2070	WS2080	WS2087	WS2093	WS2099	WS2105	WS2111	WS2119
R134a Refrigerant												
Cooling Capacity ¹	kW	560	635	675	724	839	893	963	1024	1081	1143	1203
Compressor Power Input ¹	kW	115	132	138	144	171	184	195	213	227	236	247
Unit EER ¹		4.85	4.82	4.89	5.04	4.92	4.86	4.95	4.82	4.77	4.85	4.87
Cooling Capacity ²	kW	596	685	721	765	908	958	1022	1096	1162	1220	1275
Compressor Power Input ²	kW	118	137	142	146	178	190	197	219	235	243	253
Unit EER ²		5.07	4.99	5.07	5.25	5.10	5.05	5.19	5.01	4.94	5.03	5.04
Number of Refrig Circuits	#	2	2	2	2	2	2	2	2	2	2	2
Base version SPL ³	dB(A)	77.0	78.0	78.0	79.0	78.0	77.5	77.0	77.5	78.0	78.5	78.5
Base version PWL ⁴	dB(A)	95.5	96.5	96.5	97.5	96.5	96.0	95.5	96.0	96.5	97.0	97.0
Low-Noise version SPL ³	dB(A)	69.0	70.0	70.0	70.0	70.0	70.0	69.0	70.0	70.0	70.5	70.5
Low-Noise version PWL ⁴	dB(A)	87.5	88.5	88.5	88.5	88.5	88.5	87.5	88.5	88.5	89.0	89.0
Operating Weight	kg	4483	4816	4829	5048	6793	6802	6921	7114	7237	7257	7277

For Heat Pump and Heat Recovery performances, please refer to Product Documentation

Models	length [mm]	depth [mm]	height [mm]	Model	length [mm]	depth [mm]	height [mm]
WS1027	4350	890	2000	WS2054	4350	1750	2000
WS1031	4350	890	2000	WS2061	4350	1750	2000
WS1035	4350	890	2000	WS2065	4350	1750	2000
WS1040	4650	890	2000	WS2070	4350	1750	2000
WS1047	4650	890	2000	WS2080	4650	1750	2040
WS1052	4650	890	2000	WS2087	4650	1750	2040
WS1060	4650	890	2000	WS2093	4650	1750	2040
WS2033	4100	1750	2000	WS2099	4650	1750	2130
WS2039	4100	1750	2000	WS2105	4650	1750	2130
WS2043	4100	1750	2000	WS2111	4650	1750	2130
WS2048	4350	1750	2000	WS2119	4650	1750	2130

¹ At the following standard conditions: power supply 400V/3ph/50Hz; refrigerant R134a; evaporator water inlet/outlet 12/7 °C; condenser water inlet/outlet 30/35 °C;

² At the following standard conditions: power supply 400V/3ph/50Hz; refrigerant R134a; with Economizer evaporator water inlet/outlet 12/7 °C; condenser water inlet/outlet 30/35 °C;

³ Measured at 1m from the unit; free field conditions; according to ISO 3744; nominal working conditions

⁴ Calculated according to ISO 3744; nominal working conditions



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