

# Liebert® AFC from 500 to 1450 kW

*The Adiabatic Freecooling Solution with Top-Tier Availability*



# *Liebert® AFC, the Ideal Adiabatic Chilled Water Solution for Top-Tier Data Centers*

■ **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® AFC** combines the outstanding levels of energy efficiency allowed by freecooling together with the endless availability guaranteed by the multi-scroll compressor back up and the highly efficient adiabatic wet pad system. The latter humidifies the air entering the freecooling and condensing coils, consequently increasing freecooling operation and mechanical efficiency. The unit is thus designed to guarantee 100% cooling availability even under the most critical conditions such as fluctuating power supplies, limited water availability and high ambient temperatures.



# Liebert® AFC ... Solves IT All!



Optimized Water Consumption



Ultra Silent  
two versions available

1.08

Top Energy  
Efficiency Levels  
pPUE down to 1.08

100%

100% Cooling  
Availability  
Even under extreme  
conditions



# Liebert® AFC: One Unit, Three Cooling Technologies



## Energy Efficiency

All year round adiabatic freecooling operation and minimized use of compressors deliver the highest efficiency, unreachable by a competitor's traditional freecooling chiller.



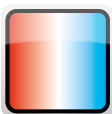
## Partial Load

Pure adiabatic freecooling manages 50% load up to 20°C ambient temperature.



## NEW iCOM Touch Display 7"

The iCOM® Control ensures the intelligent management of units within the dynamic data center environment, while the innovative 7" touch screen display presents advanced graphic functions.



## Supersaver

The Supersaver is the software logic embedded in the iCOM® Control leveraging on the communication with floor mount units to maximize efficiency at system level.



## Freecooling

Integrated freecooling modules deliver the cooling load required by the data center without the need of compressors.





### Adiabatic Cooling

Highly efficient adiabatic wet pads humidify air entering the freecooling and condensing coils, thus increasing freecooling operation and mechanical efficiency.



### 100% Compressor back up

Multiple scroll compressors ensure 100% cooling back up, up to 50°C ambient temperature also in the case of a water shortage.



### Fast Start Ramp

Fast recovery capacity: the unit ensures the re-establishment of the full cooling capacity in 70 seconds, following a power restart. The control remains operative without the need of an external single phase power supply.



### Ultra Silent

New generation super silent EC fans combined with the sound barrier provided by the adiabatic pads ensure an extremely silent operation.



### Electronic Expansion Valve

Minimized condensing pressure reduces power consumption, thus achieving high efficiency levels.



### Microchannel Condensing Coil

The full aluminum coil ensures extreme efficiency levels during the mechanical cooling mode and minimizes the refrigerant charge.

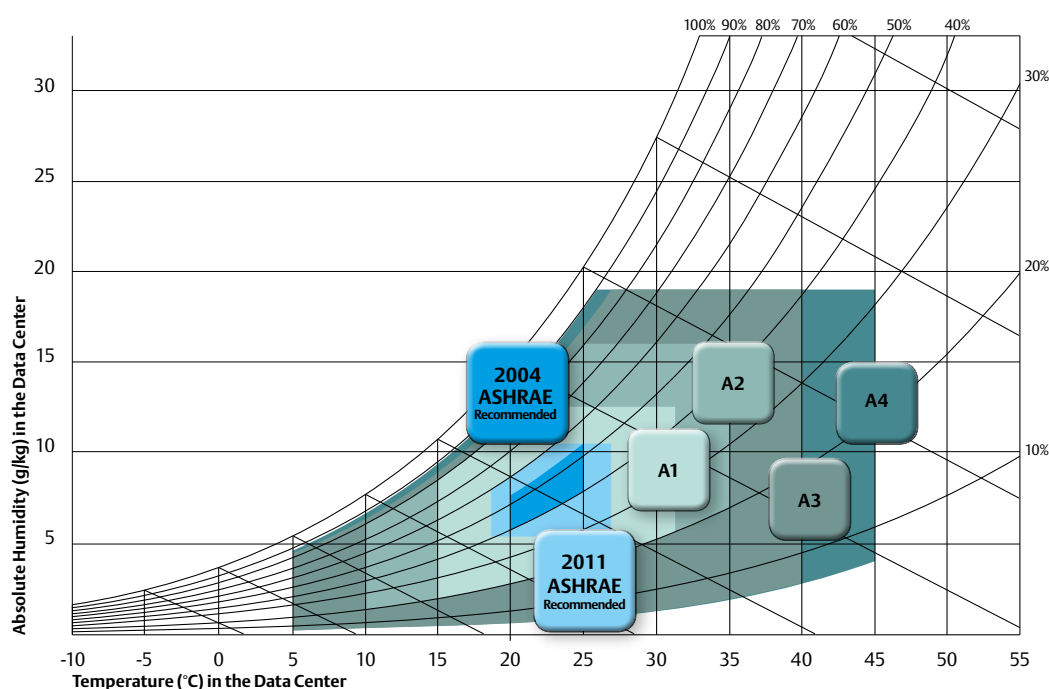




## *Data Centers are Heading for New Energy Efficiency Standards, Achievable with Adiabatic Freecooling*

Recent market trends have seen an increase in operating temperatures under which new IT equipment operates. This has led to the progress in adiabatic solutions, extending freecooling availability to higher ambient temperatures. Data center designs, in accordance with ASHRAE\* guidelines, have accepted to move out of the recommended envelop to the allowable ranges (A1-A4).

With the introduction of the Liebert® AFC adiabatic freecooling chiller, Emerson Network Power meets customer needs, offering a highly efficient solution which maximizes freecooling availability in warmer climates, for longer periods of time and guaranteeing continuous availability even under extreme ambient conditions.



\* The American Society of Heating, Refrigerating and Air Conditioning Engineers establishing guidelines relating to HVAC systems.



## 100% Cooling Availability Under All Conditions

Emerson Network Power Liebert® AFC has been designed to ensure maximum availability for data centers. A consolidated design and the integration of new technologies have led to the most reliable adiabatic cooler in the market, which provides 100% cooling also during extreme conditions.



### ■ 100% cooling in case of water shortages

No need of big water storage tanks, no need to worry about water shortages. The **compressors back up system** does not require the adiabatic system to be active in order to deliver the full cooling capacity.



### ■ 100% cooling at extreme ambient temperatures

Liebert® AFC delivers full capacity **up to 50° ambient temperature**. When the adiabatic system is active, higher temperatures can be reached without affecting the cooling performance.



### ■ 100% cooling guaranteed in 70 seconds, following a power restart

Featuring Fast Start Ramp, Liebert® AFC will restore 100% cooling in just 70 seconds, following a power restart and will ensure the unit's immediate activation. The control, moreover, will keep operating **without the need of an external single phase power supply**.



# All Year Round Adiabatic Freecooling is the Key to Unparalleled Levels of Energy Efficiency

Depending upon ambient temperature and humidity, Liebert® AFC constantly optimizes power and water consumption by combining its three embedded technologies: adiabatic, freecooling and mechanical cooling.

All operating modes deliver high levels of efficiency, relying on the triple adiabatic effect of:

- increasing freecooling capacity
- extending freecooling operation to higher ambient temperatures
- increasing mechanical cooling efficiency

Moreover, especially when operating at optimized levels of water temperature such as 26°-20°C, freecooling will be available up to around 32°C ambient temperature: all year round.

## Liebert AFC Operating Modes

### **FREECOOLING**

Only fans are needed to operate: direct exchange between water and air.



### **ADIABATIC FREECOOLING**

The adiabatic system allows freecooling to operate at higher ambient temperatures.



### **HYBRID COOLING**

Adiabatic freecooling is the primary cooling source, multiple scroll compressors are used as back up.



### **ADIABATIC MECHANICAL COOLING**

Compressor's efficiency is increased by the adiabatic system.



### **SAFE MODE**

100% availability also during water shortages; the sole mechanical cooling system will guarantee full load.



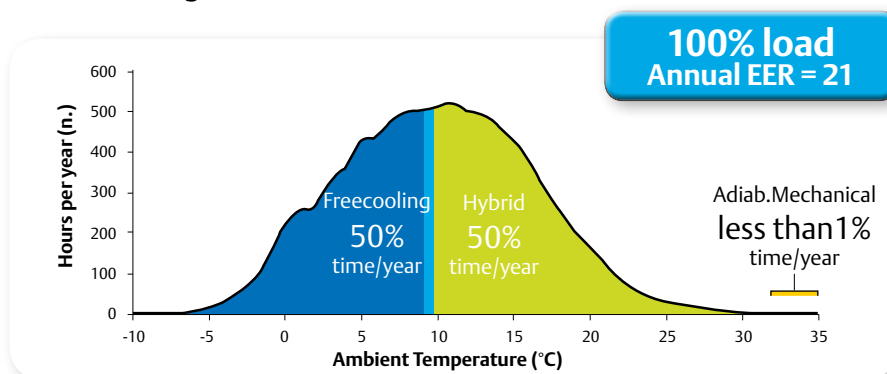




## A New Step Ahead in Energy Savings

### The Ideal Solution for Full and Partial Load Applications

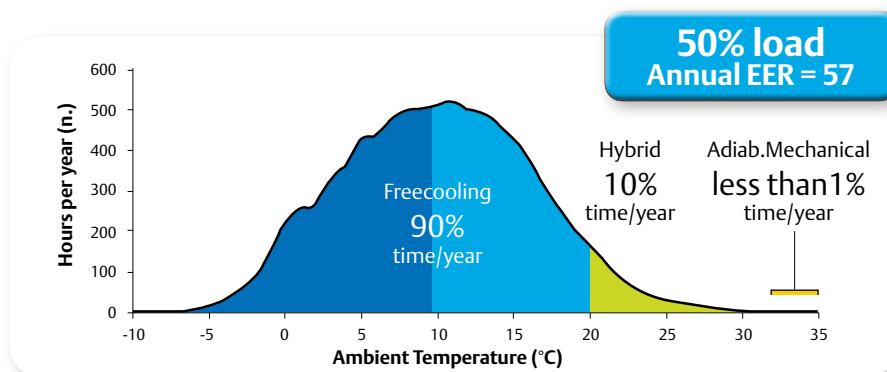
Liebert® AFC provides a significant increase in terms of energy savings when compared to any competitor's most efficient chilled water system available in the market. The graphs below show the operating modes of Liebert® AFC throughout the year and the resulting energy savings compared to a high efficiency freecooling chiller, cooling a 1.4 MW data center located in London.



Annual Energy Consumption	
Freecooling Chiller	759,000 kWh
<b>Liebert® AFC</b>	<b>577,000 kWh</b>

**29,000 €**  
Energy Cost Saving/Year

The advantages of the adiabatic and hybrid designs are even more effective at partial load, where the compressor operation throughout the year is further minimized.



Annual Energy Consumption	
Freecooling Chiller	281,000 kWh
Liebert® AFC	185,000 kWh
<b>Liebert® AFC with Supersaver</b>	<b>107,000 kWh</b>

**28,000 €**  
Energy Cost Saving/Year

The above graphs and values refer to an application in London with 30% glycol mixture and inlet-outlet liquid temperatures of 26°-20°C.

# *The State-of-the-Art iCOM® Control:*

## *Precise, User-Friendly Information at **Unit Level***



### **7" TOUCH SCREEN GRAPHIC DISPLAY**

- Quick and intuitive.
- Monitors the historical trend of key parameters: efficiency, adiabatic water usage, cooling capacity and temperatures.
- Straightforward visualization of diagnostics.
- Two versions available: **installed** in the unit or in **remote** for indoor installations.

### **The iCOM® Control features three key distinguishing characteristics**

#### **Intelligent Energy & Water Management**

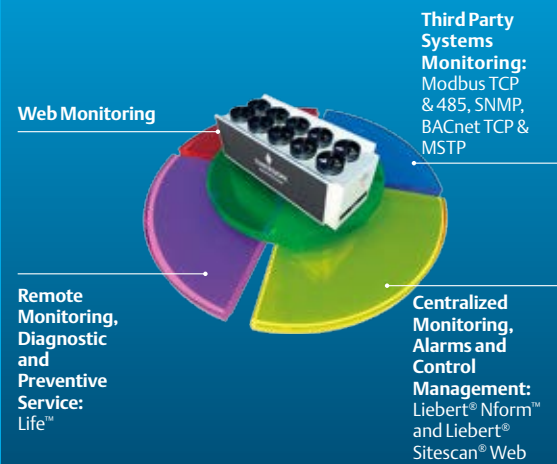
Monitoring of local temperature and humidity profiles optimizes the unit's operating costs.

#### **Advanced Logics to enhance Savings**

Optimized management of compressors and fans maximizes the hybrid mode usage and efficiency.

#### **Unceasing Control Operation**

Fast restoration capacity: 100% cooling available in 70 seconds.



## Perfect Synchronization at **Teamwork Level**



The user friendly control exploits the management of energy and water also at teamwork level. The system collects information from the different units' key parameters and operating modes (adiabatic, freecooling and mechanical cooling) while taking into account water and electricity costs. The control predictively calculates and then implements the combination which optimizes operating costs.

## Utmost Efficiency Even at the **Data Center System Level**



When considering the entire data center scenario, involving indoor and outdoor units, the Supersaver becomes the key driver in terms of delivered efficiency at the data center system level.

This software logic, embedded in the control, leverages on the LAN communication between all these units. This is to ensure the perfect coordination of the entire system, thus increasing freecooling operation and consequently leading to superior energy savings.





Adiabatic Freecooling Chiller  
available from 500 kW to 1450 kW

## Liebert® AFC - Adiabatic Freecooling Chiller

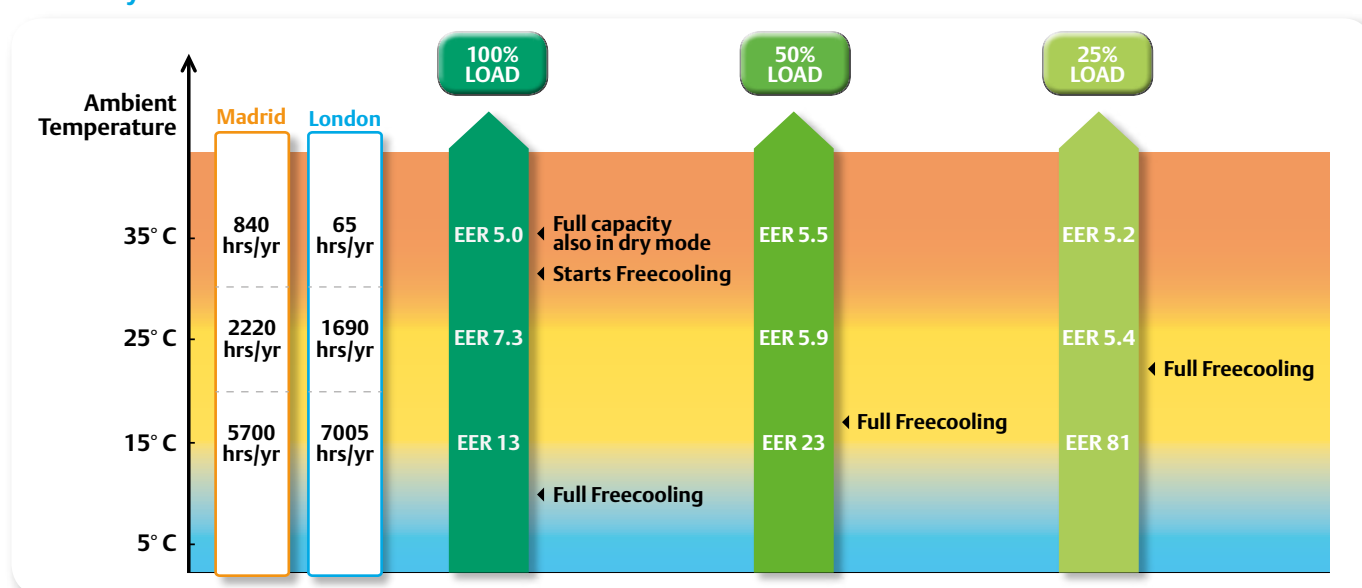
Standard										Ultra Silent							
Model FA0	046	053	059	073	087	102	117	130		046LN	053LN	059LN	073LN	087LN	102LN	117LN	130LN
<b>Dry Performance - ambient 35°C, adiabatic OFF</b>																	
Cooling capacity <sup>1</sup>	kW	518	573	655	803	948	1133	1288	1451	494	543	630	764	903	1073	1218	1385
<b>Wet Performance - ambient 35°C, relative humidity 45%, adiabatic ON</b>																	
Cooling capacity <sup>1</sup>	kW	562	622	708	869	1023	1228	1396	1572	540	594	686	835	981	1175	1335	1516
<b>Sound level</b>																	
SPL <sup>2</sup>	dB(A)	73.5	73.5	74	74.5	74.5	74.5	75.0	75	67.5	67.5	68	68.5	68.5	68.5	69.0	69
PWL <sup>3</sup>	dB(A)	94.7	94.7	95.5	96.3	97	97.6	98.1	98.5	88.9	88.9	89.5	90.3	91	91.5	92.0	92.5
<b>Dimensions</b>																	
Length	mm	5597	5597	6867	8137	9407	10677	11947	13217	5597	5597	6867	8137	9407	10677	11947	13217
Depth	mm	3043	3043	3043	3043	3043	3043	3043	3043	3043	3043	3043	3043	3043	3043	3043	3043
Height	mm	2669	2669	2669	2669	2669	2669	2669	2669	2669	2669	2669	2669	2669	2669	2669	2669

1 Performance data calculated at the following conditions: power supply 400V/3ph/50Hz; coolant inlet/outlet temperature 26/20°C; ethylene glycol 30%.

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

3 Measured at outdoor temperature of 35°C; calculated according to ISO 3744.

## Efficiency at Full and Part Load Condition



EER values for the FA0 Range at the following conditions: adiabatic function active (wet pads mode) and calculated according to the average humidity data obtained from Central Europe locations.

Freecooling Chiller  
available from 500 kW to 1450 kW



## Liebert® AFC - Freecooling Chiller

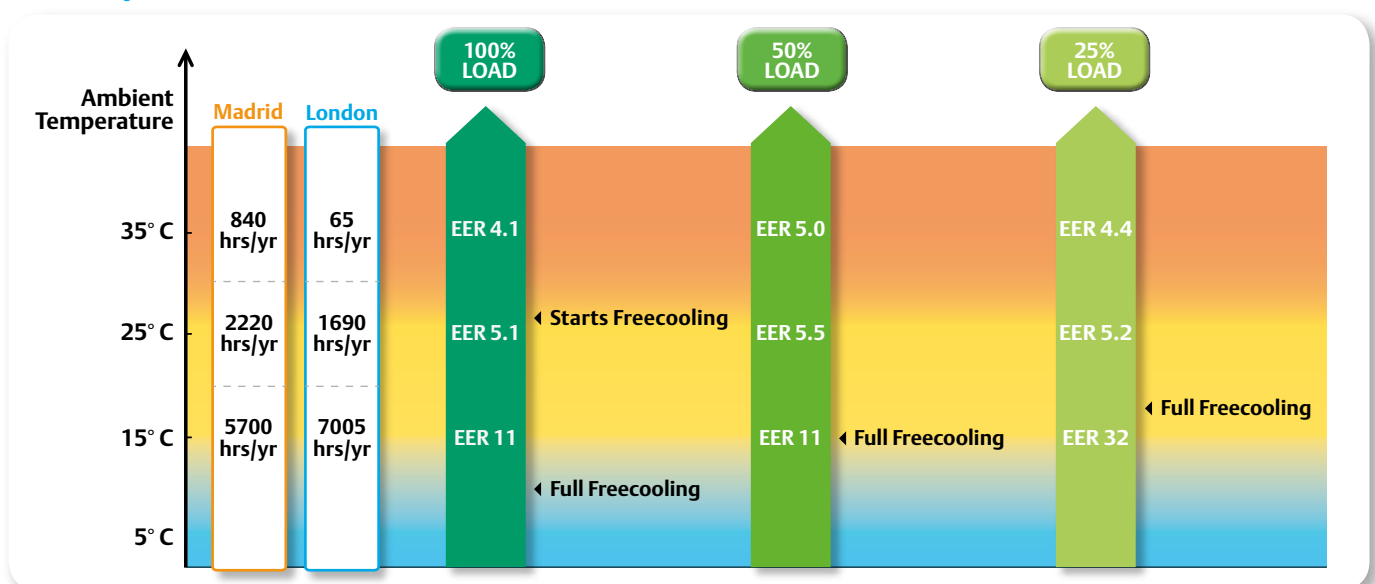
Standard										Ultra Silent							
Model FD0	046	053	059	073	087	102	117	130		046 LN	053 LN	059 LN	073 LN	087 LN	102 LN	117 LN	130 LN
Performance - ambient 35°C																	
Cooling capacity <sup>1</sup> kW	521	577	660	808	957	1141	1296	1463		497	547	636	769	915	1083	1229	1400
Sound level																	
SPL <sup>2</sup>	dB(A)	74.0	74.0	74.5	75.0	75	75.0	75.5	75.5	68.0	68.0	68.5	69.0	69	69.0	69.5	69.5
PWL <sup>3</sup>	dB(A)	94.8	94.8	95.5	96.4	97	97.7	98.2	98.5	88.9	88.9	89.5	90.5	91	91.7	92.2	92.5
Dimensions																	
Length	mm	5597	5597	6867	8137	9407	10677	11947	13217	5597	5597	6867	8137	9407	10677	11947	13217
Depth	mm	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260
Height	mm	2630	2630	2630	2630	2630	2630	2630	2630	2630	2630	2630	2630	2630	2630	2630	2630

1 Performance data calculated at the following conditions: power supply 400V/3ph/50Hz; coolant inlet/outlet temperature 26/20 °C; ethylene glycol 30%.

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

3 Measured at outdoor temperature of 35°C; calculated according to ISO 3744.

## Efficiency at Full and Part Load Condition



EER values for the FD0 Range

# Emerson Network Power

## Thermal Management Data Center Infrastructure for Small and Large Applications



### ■ Liebert® HPC

Wide range of high efficiency Freecooling Chillers from 40 kW to 1600 kW

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



### ■ Liebert® PDX - Liebert® PCW

Liebert PDX available from 15-120 kW

Liebert PCW available from 30-220 kW

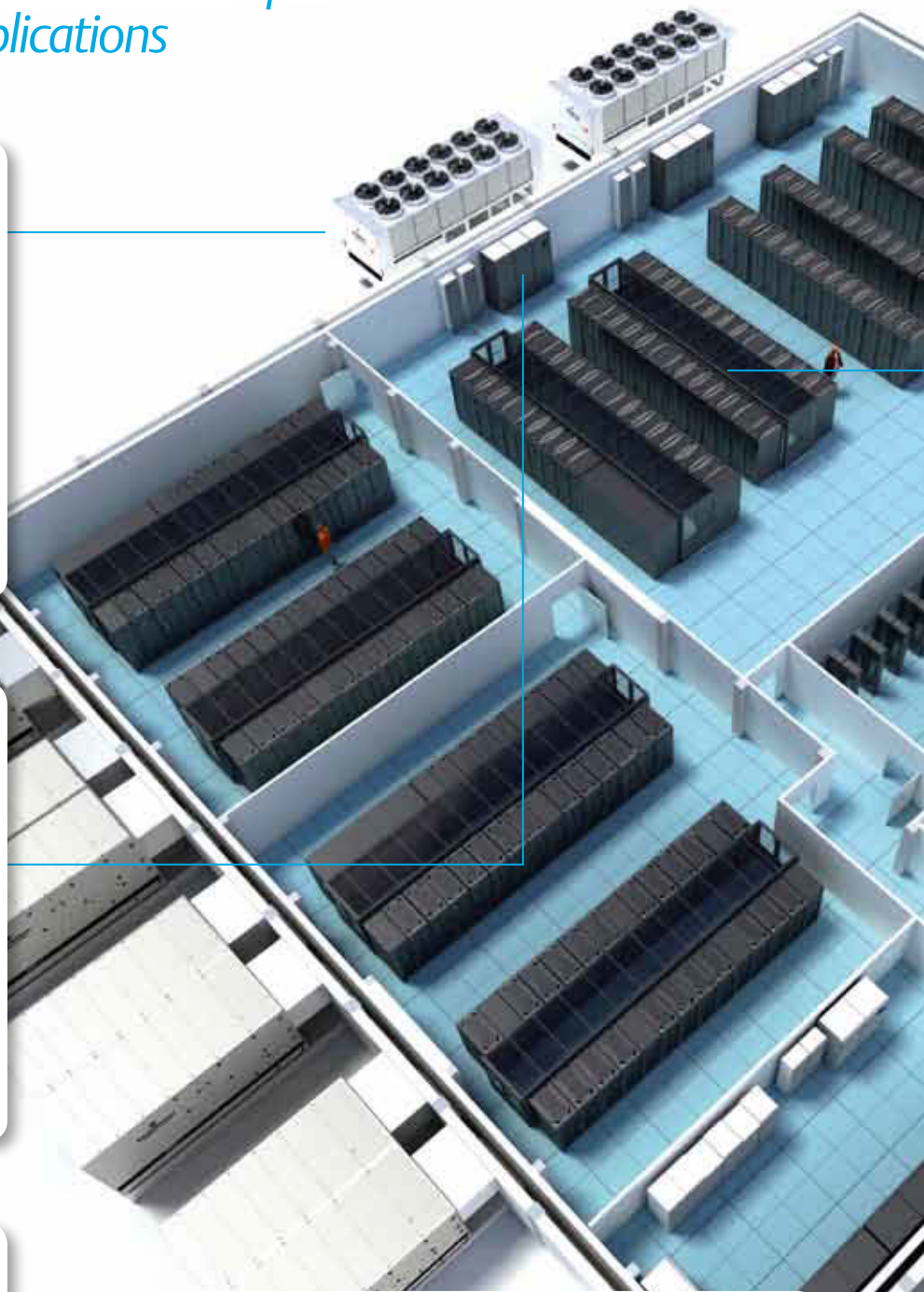
- Premium energy efficiency
- Eurovent certified performance
- Unique control capabilities with the iCOM Control



### ■ Liebert® EFC

Indirect evaporative air freecooling unit

- iCOM control featured
- New generation Liebert® EC Fans
- Eurovent certified heat exchanger



### 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® AFC

The Adiabatic Freecooling Chiller available from 500-1450 kW

- Integrated adiabatic pad system
- High freecooling capacity
- 100% compressor back up

### ■ SmartAisle™

- Aisle containment
- Provides highest energy efficiency
- Works with any Liebert® cooling unit



### ■ Liebert® CRV

Row-based high efficiency cooling units available from 10-50 kW in DX and CW versions

- Full airflow and cooling capacity modulation to match server load and to save energy
- Best footprint capacity with the highest efficiency
- Six different control modes to ensure greater flexibility



### ■ 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

## Service

Emerson Network Power supports entire critical infrastructures with the largest global service organization and an extensive service offering, enhancing network availability and ensuring total peace of mind 24/7. Our approach to servicing critical infrastructure covers all aspects of availability and performance: from single power and thermal management equipment to entire mission-critical systems.

The most comprehensive insurance for business protection can be obtained with a service program from Emerson Network Power which includes access to LIFE™.



### LIFE™

LIFE provides remote diagnostics and preventive monitoring service for UPS and thermal management equipment.

LIFE delivers increased uptime and operational efficiency by enabling continuous monitoring of your equipment, expert data analysis and field engineering expertise.

Through the data transferred from your equipment via LIFE, our remote service experts gain the real-time insight and information needed to quickly identify, diagnose, and resolve any irregularities that may arise in operation, ultimately taking responsibility for your critical assets 24/7.

## Ensuring The High Availability Of Mission-Critical Data And Applications.

### About Emerson Network Power

Emerson Network Power, a business of Emerson (NYSE:EMR), delivers software, hardware and services that maximize availability, capacity and efficiency for data centers, healthcare and industrial facilities. A trusted industry leader in smart infrastructure technologies, Emerson Network Power provides innovative data center infrastructure management solutions that bridge the gap between IT and facility management and deliver efficiency and uncompromised availability regardless of capacity demands. Our solutions are supported globally by local Emerson Network Power service technicians.

While every precaution has been taken to ensure accuracy and completeness herein, Emerson assumes no responsibility, and disclaims all liability, for damages resulting from use of this information or for any errors or omissions. Specifications subject to change without notice.

MKA4L0UKAFC Rev.3-11/2014

### Locations

#### Emerson Network Power Global Headquarters

1050 Dearborn Drive  
P.O. Box 29186  
Columbus, OH 43229, USA  
Tel: +1 614 8880246

#### Emerson Network Power Thermal Management EMEA

Via Leonardo Da Vinci, 16/18  
Zona Industriale Tognana  
35028 Piove di Sacco (PD) Italy  
Tel: +39 049 9719 111  
Fax: +39 049 5841 257

#### Emerson Network Power United Kingdom

George CurlWay  
Southampton  
SO18 2 RY, UK  
Tel: +44 (0)23 8061 0311  
Fax: +44 (0)23 8061 0852

Globe Park  
Fourth Avenue  
Marlow Bucks  
SL7 1YG

Tel: +44 1628403200  
Fax: +44 1628403203

Follow us on Social Media:



Emerson, Consider it Solved., Liebert®, SmartAisle™, Trellis™, Life™ and Emerson Network Power are trademarks of Emerson Electric Co. or one of its affiliated companies. ©2014 Emerson Electric Co.

EMERSON. CONSIDER IT SOLVED.™