



## Vertiv™ Liebert® PDX with Variable Speed Compressors

From 15 to 120 kW

Air Cooled Direct Expansion  
Solution for Data Centers



# Vertiv™ Liebert® PDX with Variable Speed Compressors

*Liebert® PDX, equipped with variable speed compressors and iCOM™ control, has been designed to be the most efficient, reliable, flexible and smart direct expansion cooling solution for data centers.*



## Efficiency

Liebert PDX maximizes part load efficiency, compared to most common DX cooling systems, therefore significantly reducing running costs, resulting in the most energy efficient DX technology available on the market.



## Cooling continuity

Liebert PDX ensures precise and constant control of airflow, temperature and humidity. Thanks to its innovative design and use of advanced technologies, it matches requirements for cooling continuity coming from the most trusted and adopted certification authorities for data center design and operation.



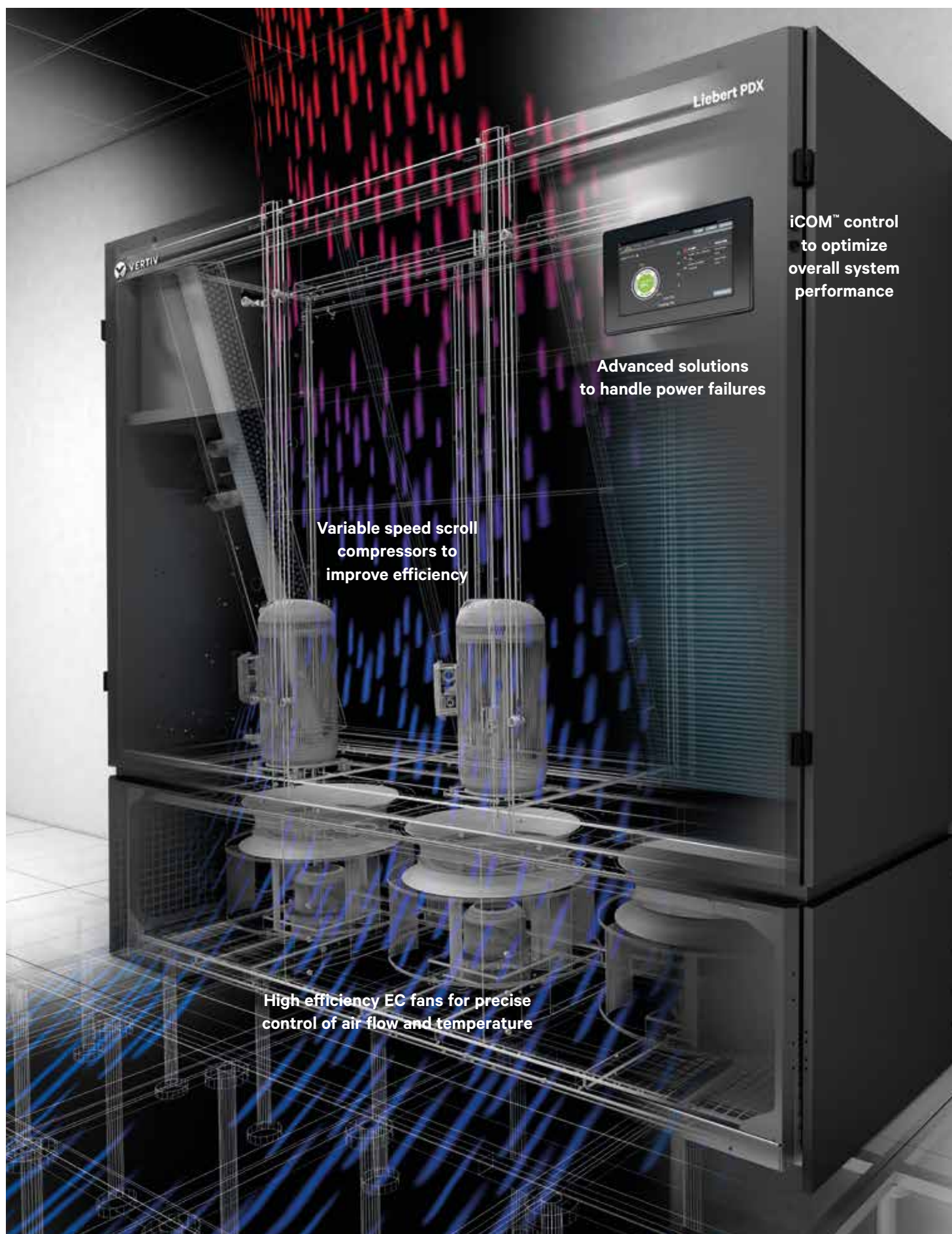
## Unique flexibility

Liebert PDX enhances the inherent scalability of direct expansion systems, even on those data centers where the initial heat load is very low or subject to fluctuation. A wider operating range provides a step ahead of new challenges posed by data center requirements and climate change.



## Smart control

Liebert PDX smart control manages and optimizes the overall system, is fully-programmable via an advanced and user-friendly touch display and can be linked with common BMS protocols, allowing remote supervision.



iCOM™ control  
to optimize  
overall system  
performance

Advanced solutions  
to handle power failures

Variable speed scroll  
compressors to  
improve efficiency

High efficiency EC fans for precise  
control of air flow and temperature



# Vertiv™ Liebert® PDX with Variable Speed Compressors

## Efficiency

Liebert® PDX increases full and part load efficiency through variable speed compressor, evaporator and coupled condenser EC fans, electronic expansion valve and staged coil design, so power consumption and energy bills are considerably lowered.

Liebert PDX, thanks to variable speed drive compressors, reduces starting current and improves power factor, with a consequent benefit on running costs.

Liebert PDX cooling density has been maximized, allowing for reduced footprint and leaving more space for customers to install their IT equipment.



### Variable Speed Scroll Technology

The best solution in terms of variable cooling capacity, with a minimum compressor speed down to 25% of maximum value



### Partial Load Efficiency

Variable speed compressors and new generation EC fans contribute to achieve the highest efficiency level at partial load.



### Energy Efficiency

First-class energy efficiency achieved through the combination of market leading technologies.



### Liebert EC Fan 2.0

New fan generation with extended speed modulation range, minimum speed down to 30% of maximum value.



### 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 relevant valve management software is also embedded in the unit's Vertiv™ iCOM™ control function.



### Aeraulic Design

Innovative staged coil design maximizes part load efficiency.

## Cooling continuity

Liebert® PDX guarantees enhanced availability; it can automatically manage a power failure for 60 seconds, keeping alive the iCOM™ control board and the BMS communication and permitting system supervision during a power outage event.

When power is restored, the intelligent iCOM™ control adopts a fast restart, recovering in less than 30 seconds at the requested operating condition.

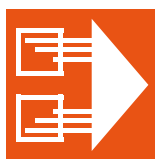
Downtime is also minimized through prevention of alarms and failures and real-time optimization and adaptation of working parameters.

Up to 32 Liebert PDX units can be connected together in a common network, sharing information on status with each other and managing critical operating situations with combined action.



### Fast Start Ramp

A software solution ensuring fast unit restoration after a power outage.



### Dual Power Supply

Parallel and alternate dual power supply configuration deliver maximum redundancy.



### Precise Temperature and Humidity Control

Close monitoring and control of room temperature and humidity for constant conditions all year round.



### Multiple Sensor Logic

Choices for redundant sensor control logic.



### Teamwork

Networking software solution to create a common network from up to 32 Liebert PDX units.

# Vertiv™ Liebert® PDX with Variable Speed Compressors

## Unique flexibility

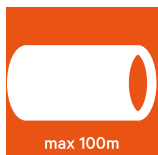
Liebert® PDX remains the product with the widest range of air configurations available in the market and a full set of accessories to adapt to any type of data center design.

Liebert PDX is fit for extreme working conditions and environments; the extended working range allows a maximum external temperature of 55°C and a minimum of -30°C, with an internal return air temperature up to 40°C.

Liebert PDX extended compressor's and evaporator fan's speed modulation range improves system scalability, particularly in case of variable datacenter load.

Liebert PDX units adapt perfectly to all kinds of installations; maximum equivalent piping length between unit and condenser can reach 100 m.

Two different coil treatments (epoxy coating and electrofin) are available for the entire range of Liebert® condensers, making their installation possible also in critical conditions.



### 100m Piping

Equivalent piping length between unit and remote condenser up to 100 m.



### Extreme Environments Ready

Liebert PDX is the ideal solution for extreme working conditions environments (-30°C/+55°C).



### Modularity

Multiple configurations for each model with 4 different airflow configuration and wide range of options and accessories.

## Smart control

Integrated systems maximize efficiency. Liebert® iCOM™ control is the heart of the direct expansion cooling system, managing not only Liebert PDX units but also outdoor heat rejection components (Liebert MC or Liebert HCR condensers). The control set up can be done through an HD touch screen display; its functions can be even replicated in a web browser (virtual display). A full range of smart networking solutions are available: the unit can communicate with the user's BMS system with extended parameter availability, and it can also be connected to Vertiv™ LIFE™ remote diagnostic and preventive monitoring Services. If multiple PDX units are connected together in a network, a single display can be used as a 'team display' to manage up to 32 units, optimizing and harmonizing the parameters of all systems through one single display.



### Teamwork

Networking software solution to create a common network from up to 32 Liebert PDX units.



### Vertiv™ iCOM™ 7" Touch Display

Vertiv™ iCOM™ Control ensures high level management of the units to work together as a single system, thus optimizing room temperature and airflow. Furthermore, it features a new 7" touch screen display for quicker and easier data readability.



### Integrated System

All main components are connected on a Modbus chain. Condensers are controlled directly from the unit's iCOM™ control.



### Remote Monitoring

Extended parameter availability to customer BMS through different protocols (Modbus IP, BACnet IP, SNMP and HTTP).

# Vertiv™ Liebert® PDX with Variable Speed Compressors

## Performance

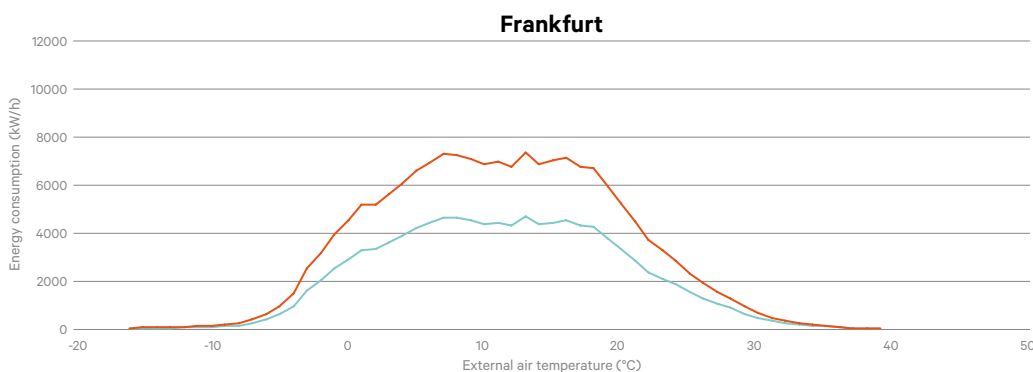
The reduction of IT cooling system pPUE (partial Power Usage Effectiveness) gives a fundamental contribution to the reduction of the data center PUE. The cooling efficiency is mainly influenced by the unit capacity modulation and by the external air temperature.

The unit cooling capacity modulation depends on redundancy and IT load, which can be very low in the early stage of a data center life or when the IT equipment usage is subject to big fluctuations.

Improving annual efficiency even at partial load, permits to reduce the cooling equipment's total cost of ownership and payback time.

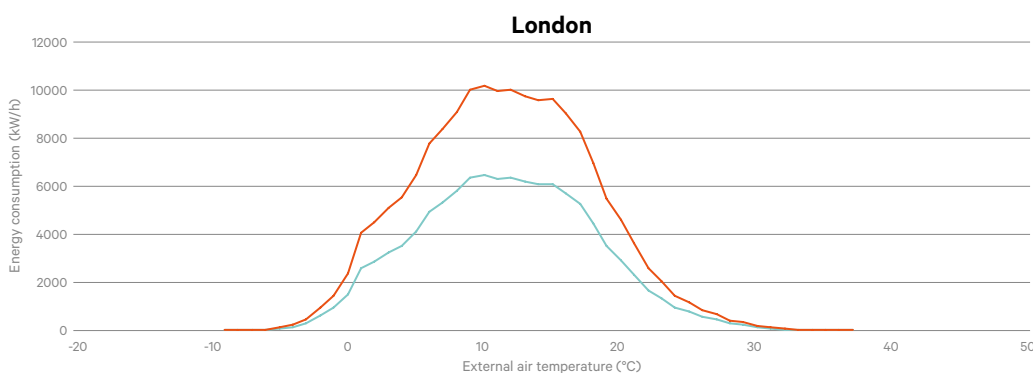
Liebert® PDX can reach an annual pPUE value lower than 1.20 when coupled with Liebert MC microchannel condensers, setting new standards for air cooled direct expansion systems efficiency. This means power consumption is reduced by up to 35% and the extra cost compared to a fixed speed compressor unit can be recovered in less than one year; data for 1000 kW system are shown below\*.

The performance of all models and related rating conditions are shown in the following page.



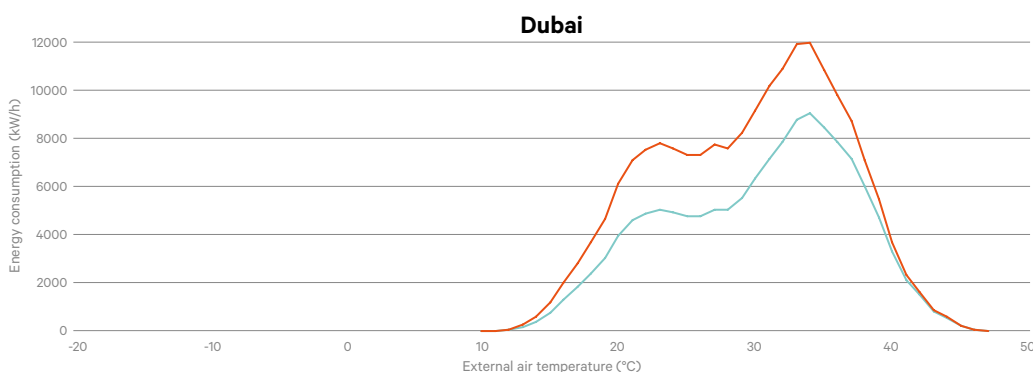
**Variable speed compressor:**

annual pPUE = 1.16  
annual power consumptions  
reduced by 36%



**Variable speed compressor:**

annual pPUE = 1.16  
annual power consumptions  
reduced by 36%















**Variable speed compressor:**













annual pPUE = 1.21  
annual power consumptions  
reduced by 28%

\*Performance at RAT 30°C / RH 35%  
Downflow up air configuration  
Unit coupled with MC remote condenser  
ESP 20 Pa  
9+1 Liebert PDX units  
Total IT Power 1000 kW  
IT power usage 75%  
Electricity cost 0.15 €/kWh

— Variable speed compressor  
— Fixed speed compressor



Single circuit models			PI015	PI021	PI025	PI031	PI033	PI041	PI045	PI047	PI051	PI057	PI075
Compressor modulation 80% (*)	Maximum net sensible cooling capacity - (*)	kW	19,2	23,9	29,1	32,7	37,0	50,9	56,4	52,5	60,9	62,4	77,5
	Minimum net sensible cooling capacity - (*)	kW	5,9	7,0	8,5	9,6	11,8	15,4	18,1	15,8	18,2	17,5	23,3
	Nom. ESP	Pa	20	20	20	20	20	20	20	20	20	20	20
	Net Total Cooling Capacity	kW	15,8	19,8	24,5	27,8	31,9	43,2	49,3	43,7	51,1	52,0	65,4
	Net Sensible Cooling Capacity	kW	15,8	19,8	24,5	27,8	31,9	43,2	49,3	43,7	51,1	52,0	65,4
	nSHR		1	1	1	1	1	1	1	1	1	1	1
	Unit Net Sensible EER		4,63	4,49	4,11	3,54	3,36	3,91	3,66	4,02	3,86	4,17	3,71
Compressor modulation 40% (*)	Airflow	m³/h	4049	5040	6217	7126	8163	11080	12608	11199	13104	13273	16745
	Net Total Cooling Capacity	kW	8,3	10,5	13,4	15,3	18,2	23,8	27,8	23,7	28,1	27,8	36,2
	Net Sensible Cooling Capacity	kW	8,3	10,5	13,4	15,3	18,2	23,8	27,8	23,7	28,1	27,8	36,2
	nSHR		1	1	1	1	1	1	1	1	1	1	1
	Unit Net Sensible EER		5,46	5,20	5,17	4,77	4,76	5,25	5,05	4,95	4,92	5,25	4,99
	Airflow	m³/h	2112	2669	3372	3911	4665	6086	7099	6047	7166	7118	9222
Dimensions (W x D)			840x890					1200x890			1750x890		
Height (H)								1970					
Weight			315	316	336	358	358	471	472	640	641	688	754
Aiflow Delivery													
 Down Flow UP - Fans Over the Raised Floor													
 Up Flow													
 Frontal													
 Down Flow Down - Fans Over the Raised Floor													

Double circuit models			PI044	PI054	PI062	PI074	PI068	PI082	PI094	PI104	PI120
Compressor modulation 80% (*)	Maximum net sensible cooling capacity - (*)	kW	56,0	62,0	73,1	82,9	78,5	97,4	105,1	112,8	136,2
	Minimum net sensible cooling capacity - (*)	kW	8,6	9,4	11,3	13,1	12,5	13,5	15,1	16,8	22,2
	Nom. ESP	Pa	20	20	20	20	20	20	20	20	20
	Net Total Cooling Capacity	kW	45,2	51,1	60,4	70,5	64,8	79,2	87,1	95,4	119,8
	Net Sensible Cooling Capacity	kW	45,2	51,1	60,4	70,5	64,8	79,2	87,1	95,4	119,8
	nSHR		1	1	1	1	1	1	1	1	1
	Unit Net Sensible EER		4,42	4,32	3,99	3,66	4,71	4,15	4,04	3,91	3,35
Airflow	m³/h	11546	13093	15414	18134	16921	20667	22769	24854	31292	
Compressor modulation 40% (*)	Net Total Cooling Capacity	kW	21,8	23,8	28,6	32,8	31,2	45,2	49,5	55,1	69,8
	Net Sensible Cooling Capacity	kW	21,8	23,8	28,6	32,8	31,2	45,2	49,5	55,1	69,8
	nSHR		1	1	1	1	1	1	1	1	1
	Unit Net Sensible EER		4,14	4,20	4,03	3,94	4,53	5,10	5,10	5,04	4,66
	Airflow	m³/h	5590	6113	7311	8490	8129	11686	12881	13984	18157
Dimensions (W x D)		mm	1750x890				2550x890				
Height (H)		mm					1970				
Weight		kg	671	682	723	708	935	957	967	987	1006
Aiflow Delivery											
	Down Flow UP - Fans Over the Raised Floor										
	Up Flow										
	Frontal										
	Down Flow Down - Fans Over the Raised Floor										



## Eurovent Certified

Eurovent certification guarantees that Liebert PDX undergoes independent testing, thus delivering rating accuracy and enhancing the unit's reliability. Check ongoing validity of certificate: [www.eurovent-certification.com](http://www.eurovent-certification.com)

# Vertiv™ Liebert® PDX with Variable Speed Compressors

## 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 Vertiv™ SmartAisle™
- Premium energy efficiency version
- Unique control capabilities with the Vertiv™ iCOM™ Control.



### Liebert® AFC

The Adiabatic Freecooling Chiller available from 500-1700 kW

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



### Liebert® PDX

### Liebert® PCW

Available from 5-220 kW

- Premium energy efficiency
- Eurovent certified performance
- Unique control capabilities with the Vertiv iCOM™ Control
- Liebert EconoPhase™ available for the direct expansion system.

### Liebert® HPM

Room cooling air conditioners available from 4 to 30 kW



### Vertiv™ SmartAisle™

- Aisle containment
- Provides highest energy efficiency
- Works with any Liebert Thermal Management unit.



### Liebert® EFC

Indirect evaporative freecooling unit leveraging on data center know-how. Available from 100 to 400 kW

- Unique control capabilities optimizing water and energy costs
- Substantial reductions and savings in terms of electrical infrastructure.

## Service and Software Solutions

Vertiv™ supports any application with an extensive service offering including installation, start-up, commissioning, maintenance, replacements, 24/7 remote monitoring and diagnostics and much more. Our remote diagnostics and preventive monitoring LIFE Service is adding value providing actual information to take decisions, as it allows early detection of anomalies and immediate reaction in case of alarms.

## Vertiv™ LIFE™ Services Remote Diagnostic and Preventive Monitoring

Vertiv™ service programs are designed to ensure that your critical infrastructure is maintained in an optimum state of readiness at all times. Vertiv™ LIFE Services leverages the embedded intelligence in your equipment, IoT technology, and the expertise and resources of our service organisation to deliver a connected service experience that optimises equipment performance and reliability, reduces downtime and minimises overhead costs.



### Maintain optimum performance:

Continuous data-driven expert analysis of critical power and cooling systems enables ongoing maximisation of equipment reliability and efficiency.

### Reduce downtime:

Remote diagnostics and direct connection to field service provide the fastest possible reaction and resolution, improving first-time fix rates and time-to-repair.

### Minimize overhead:

LIFE Services is a cost-effective approach to ensuring the availability and performance of critical systems, providing deep expertise and fast response without having to dedicate on-site personnel to monitor and manage equipment service.

The future of service is connected and it's available today through Vertiv LIFE Services.

