



VERTIV™

Liebert®

CRV

from 10 to 60 kW

Efficient Cooling for IT Equipment



Vertiv™

Vertiv designs, builds and services mission critical technologies that enable the vital applications for data centers, communication networks, and commercial and industrial environments. We support today's growing mobile and cloud computing markets with our portfolio of power, thermal, infrastructure management products, software and solutions, all complemented by our global service network. Bringing together global reach and local knowledge, and our decades-long heritage including brands like ASCO®, Chloride®, Liebert®, NetSure™ and *Trellis*™, our team of experts is ready to take on your most complex challenges, creating solutions that keep your systems running—and your business moving. Together, we're building the future of a world where critical technologies always work.

YOUR VISION, OUR PASSION.

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Liebert® CRV Row-Based Cooling

The Liebert CRV, row-based cooling unit is optimized to ensure maximum cooling capacity in a minimal footprint. Targeted for small and medium data centers, the unit provides cooling at the server rack level.

The Liebert CRV has been designed to deliver the highest efficiency and availability, by removing heated air from the data center hot aisles, using it to return cooled air to the servers (cold aisle). The Liebert CRV is available in Direct Expansion, as well as Chilled Water versions and in two frame widths - 600 mm and a compact 300 mm. Providing full capacity and airflow modulation to match the servers' load, the unit is able to deliver energy savings via Scroll Compressor with capacity modulation, Electronic Expansion Valve and variable speed EC Fans. The Liebert CRV is a

comprehensive row-based solution that includes all of the main functions fundamental to cooling units, such as cooling, humidification, dehumidification, re-heating, air filtration, condensation management, temperature and humidity control, alarm functions and data communications.

Furthermore, the unit enhances its performances and energy efficiency through the Liebert ICOM™ Control, capable of optimizing unit operations by leveraging on its intelligent management of system components. All components are easily accessible from the front and the rear of the unit, granting simplified service intervention.

The unit also allows ease of installation, through simplified cable and pipes routing from top and bottom of the unit.



Liebert CRV 300 mm DX



Data center cooling infrastructure for small and large applications.

Designed to Optimize IT Performance

The Liebert® CRV, self-contained Thermal Management unit is ideal for the cooling of data center rack rows.

The Liebert CRV is a multi-option, precision air conditioner that delivers temperature and humidity control, as well as filtration and notification management, ensuring that data center temperatures are maintained at an optimum level.

The unit is designed to continuously monitor variations in heat loads and instantly deliver the most efficient and effective cooling necessary.

Liebert CRV: Simple, Safe, Adaptable.

The Liebert CRV is a plug-and-play unit with the capability of addressing the needs of both open and contained applications.

Cooling is provided at the server rack level rather than the room level. The Liebert CRV removes and filters hot air from the data center aisles, using it to return cooled air to the servers.

The integrated air diffusers accurately direct the airflow towards the necessary direction of the heat load.

Furthermore, Liebert CRV is designed to comply with mission-critical requirements and ensure that servers are maintained at the correct temperature and humidity levels.

The Liebert CRV provides the exact level of cooling required by servers, modulating the airflow and cooling capacity.

The unit is available in two versions to meet various installation demands:

- A stand-alone, direct expansion system with variable capacity up to 36 kW, available in both 300 mm and 600 mm versions, complete with roof or wall-mounted condenser
- A chilled water system with up to 60 kW of capacity available in both 300 mm and 600 mm versions.

FEATURES AND PERFORMANCE

- Units ranging from 10 to 60 kW with chilled water and direct expansion versions
- Industry's highest energy saving levels achieved - increase of up to 50% when the Liebert CRV is combined with Vertiv™ SmartAisle™ cold aisle containment
- Best-in-class Thermal Management unit for row-based applications
- On-site adjustment capability of air diffuser distribution direction maximizes cooling results
- Integrated ICOM™ Control for management of capacity and airflow through EC Fans and variable capacity Scroll Compressor
- Ideal for scalable IT infrastructure - increased cooling capacity, reduced noise levels and enhanced efficiency when compared with similar chilled water and direct expansion configurations.

Ensuring Availability Under All Working Conditions

Maintaining IT Infrastructure Availability

With integrated Vertiv™ ICOM™ Control, the Liebert CRV is able to monitor variations in temperature and humidity, instantly adapting its performance to meet variations in load conditions.

This furthermore ensures increased availability and safety of protected IT equipment.

The Liebert CRV's constant temperature monitoring and control capabilities ensure the availability of servers in all working conditions.

Furthermore, its parallel load sharing functionality enables the management of N+1 configurations.

Meeting Primary IT Requirements

The Liebert CRV's ability to modulate capacity allows for constant, accurate room temperature and humidity levels to be maintained.

The variable capacity capability of the Liebert CRV, contributes to increasing data center availability during both standard operations and in the event of load variations.

A reduction in its start/stop cycling function further contributes to increasing data center availability, as well as lengthening the life of critical components.

The integrated compressors with cooling capacity modulation are designed to avoid peaks in absorbed power, thus reducing the stress placed on components. The Liebert CRV uses a dedicated control that also enables the compressor to operate when the external air temperature increases above standard limits.



The Liebert CRV 600 mm, self-contained Thermal Management unit is ideal for the cooling of row-based applications.

Extreme Flexibility for Open and Closed Architectures

Suitable For a Wide Range of Installations

The Liebert® CRV addresses the cooling needs of both new and existing data center space, regardless of raised floor availability. It is ideally suited to data centers with up to 50 racks, irrespective of heat load.

Configuration Flexibility

The Liebert CRV can be configured to perform temperature as well as humidity control. The Liebert CRV 300 mm and 600 mm width versions have been designed to specifically meet the requirements of data centers in need of optimizing space occupancy, as well as capital and running costs.



The Ideal Airflow

EC Fans and compressors with variable cooling capacity, managed through integrated Vertiv™ ICOM™ Control, achieve flexible capacity and airflow for the ideal operating conditions of IT equipment.

The Liebert CRV, designed using advanced, computer-aided dynamic fluid technology, delivers optimum air distribution across rack installations. The exceptional levels of air distribution have been proven as a result of wide-scale laboratory and field testing.

Optimizing Total Cost of Ownership

Delivering Optimized Results

Ideally suited for rack-level cooling and specifically designed for high return air temperatures, the Liebert CRV optimizes air distribution and maximizes efficiency, delivering both cost and energy-related savings.

Efficiency is further enhanced through the use of the environmentally friendly R410A refrigerant which ensures constant operation at the highest efficiency levels.

The Liebert CRV is also designed to optimize installation and minimize start up, connection and labor investments. Total cost of ownership advantages are also achieved as a result of the Liebert CRV configuration flexibility. The unit is available for integration with existing racks or as a bundled solution combined with racks, UPS and monitoring capabilities.

Energy Efficient Cooling

The integrated Vertiv ICOM Control, equipped with up to 20 rack temperature sensors, continuously monitors the heat load of the racks and regulates the Liebert CRV, ensuring it provides the most effective level of cooling while at the same time delivering energy savings. Variable capacity compressors modulate the cooling capacity, thus reducing input power with partial loads. EC Fan technology regulates airflow and reduces fan input power.



The integrated Vertiv™ ICOM™ Control monitors variations in temperature and humidity, instantly adapting Liebert® CRV performance to meet changes in load conditions.

Vertiv™ LIFE™ Services Remote Diagnostic and Preventive Monitoring

Vertiv's service program is designed to ensure that your critical power protection system is maintained in an optimum state of readiness at all times.



The **Vertiv™ LIFE™ Services** Remote Diagnostic and Preventive Monitoring provides early warning of UPS conditions and out of tolerances. This allows effective proactive maintenance, fast incident response and remote trouble shooting, giving customers complete security and peace of mind. With **Vertiv LIFE Services** you will benefit from:

Uptime Assurance

Constant monitoring of UPS parameters, thus maximizing the system's availability.

First Time Fix Rate

Pro-active monitoring and data measuring ensure that when our customer engineers are dispatched on-site, they arrive prepared for first time resolution.

Proactive Analysis

From Vertiv LIFE Services centers, our experts proactively analyze the data and trends of your equipment, to recommend actions to ensure their best performance.

Minimized Total Cost of Ownership of Your Equipment

The continuous monitoring of all relevant parameters in turn maximizes unit performance, reduces on-site maintenance and extends the life of your equipment.

Fast Incident Response

Vertiv LIFE Services allows for immediate definition of the best course of action, as a result of the regular communication between your **Liebert® CRV** system and our **Vertiv LIFE Services** centers.

Reporting

You will receive a comprehensive report detailing the working order of your equipment and its operational performance.

Customer Monitoring Interfaces

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® CRV system can be fitted with a Vertiv IntelliSlot Unity 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, by installing the optional Unity card, the Liebert CRV can be monitored and controlled by an existing Building Management System. The Unity card provides Modbus, Bacnet and SNMP protocol support, other than the Web monitoring capability.

Vertiv 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.

Vertiv Nform leverages the network connectivity capabilities of Liebert CRV to provide centralized monitoring of the distributed equipment.

Utilizing the SNMP and Web technologies integrated in the Vertiv IntelliSlot communication card, Vertiv Nform centrally manages alarm notifications and provides an intuitive interface to access critical status information. Vertiv 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.

Vertiv 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, Vertiv SiteScan Web will centrally manage critical equipment and give the power to move beyond the event responsive service paradigm.

Vertiv SiteScan Web does it all

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

Vertiv 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.

Data Center Application Scenarios

Data Center Rooms with up to 10 Racks

The Liebert® CRV is installed in close proximity to servers for installations relating to network access cabinets and small computer rooms, regardless of the presence of a raised floor. The cooling unit, equipped with ten temperature sensors, modulates the airflow to match the real-time cooling requirements of the server.

Direct Expansion Solution

When a chilled water system and physical building limitations restrict the installation of chillers, a direct expansion solution is the ideal choice.

In the event that internal and external units are installed in close proximity, direct expansion units are able to deliver significant reductions in installation-related time and costs. One of the

advantages of the Liebert CRV with a direct expansion solution is the eco-friendly refrigerant R410A. The unit also offers variable capacity scroll compressor, which has the capability of immediately modulating and adapting its operation according to server cooling requirements. It significantly minimizes start/stop cycling, extending the life cycle of your cooling equipment. The

Liebert CRV, operates with a significant return air temperature, which contributes to maximizing cooling capacity and increasing efficiency without placing additional stress on compressors.

Scenario 1	N° of Racks	1 to 4
	Heat Load	Up to 20 kW
	Space	From 5 m ² and 15 m ²
	Raise Floor	-
	Recommended Solution	Direct Expansion



Scenario 2	N° of Racks	Up to 10
	Heat Load	Up to 100 kW
	Space	Up to 30 m ²
	Raise Floor	-
	Recommended Solution	Direct Expansion



Data Center Rooms with up to 50 Racks

The Liebert® CRV's integration with SmartAisle™ proves to be the ideal cold aisle containment approach for small data centers requiring heat density increases. This solution has the added advantage of avoiding the installation of raised floors or heightening roof levels.

Chilled Water Solution with Vertiv™ SmartAisle™

The Vertiv SmartAisle separates hot returning air and cold supply air, optimizing the entire cooling solution. By increasing the room temperature, the floor-mounted cooling units can be significantly downsized, reducing the overall level of investment. The higher Energy Efficiency Ratio also improves energy savings and dramatically reduces running costs. The solution delivers the best results when combined with the Liebert HPC - maximizing the freecooling effect and reducing running costs.

Combining the Liebert CRV with the Liebert® HPC Freecooling Chiller for Increased Advantages

Chilled water solutions are optimized to reduce energy consumption:

- With the use of EC Fans and the unit's close proximity to the racks, the Liebert CRV minimizes fan power input and can be regulated based on server load levels
- As it is specifically designed for high return air temperatures, the Liebert CRV can operate at high chilled water temperatures while maintaining capacity, thus maximizing the chiller freecooling effect.

Scenario 3	N° of Racks	10 to 20
	Heat Load	Up to 200 kW
	Space	Up to 50 m ²
	Raise Floor	-
	Recommended Solution	Chilled Water



Scenario 4	N° of Racks	Up to 50
	Heat Load	Up to 300 kW
	Space	Up to 100 m ²
	Raise Floor	-
	Recommended Solution	Chilled Water



Liebert® CRV Technical Data

		CR011RA	CR021RA	CR020 RA/W	CR035RA/W	CR038RC	CR060RC	CR040	CR050
Net Sensible Cooling Capacity	[kW]	11.7	20.7	24.2	37.7	38.4	57.0	46.6	57.9
Nominal Airflow	m³/h	2700	4050	4170	5540	5420	7758	5650	7410
Weight	[kg]	220	230	335 / 350	365 / 385	220	230	330	365
Humidity Control		Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Dimensions H x W x D	[mm]	2000x300x1100		2000x600x1175		2000x300x1100 (*)		2000x600x1175	

Note: The performances shown above refer to an air inlet temperature of 38°C, condensing temperature for air and water-glycol cooled units of 45°C and a chilled water temperature of 7/12°C. (*) Unit available also with a 2200 mm height and 1200 mm depth.



STANDARD FEATURES AND OPTIONS

DX Version

- High efficiency scroll compressor with capacity modulation
- Electronic expansion valve
- EC plug fans
- R410A Refrigerant
- Adjustable modular baffle system
- Top and bottom connections
- Casters and levelling feet
- Filters with up to F5 filtration class and clog filter switch
- Electrode humidifier
- Electric reheat 1-stage
- Internal condensate pump
- Vertiv™ ICOM™ Control large graphic display
- (6) remote rack temperature sensors
- Monitoring card for WEB, Modbus and BACnet
- 5 port ethernet switch.

CW Version

- EC plug fans
- 3-way or 2-way valve with 0-10 V actuator
- Adjustable modular baffle system
- Top and bottom connections
- Casters and levelling feet
- Filters with up to F5 filtration class and clog filter switch
- Electrode humidifier
- Electric reheat 1-stage
- Internal condensate pump
- Vertiv ICOM Control large graphic display
- (6) remote rack temperature sensors
- Monitoring card for WEB, Modbus and BACnet
- 5 port ethernet switch.

ADDITIONAL OPTIONS

DX Version

- Extra Vertiv ICOM Control display
- Additional remote rack temperature sensors
- Compressor jacket (600 mm models)
- Dual power supply with ATS
- Vertiv Sitescan® monitoring card.

CW Version

- Extra Vertiv ICOM Control display
- Additional remote rack temperature sensors
- Dual power supply with ATS
- Sitescan monitoring card
- Cooling capacity meter.

Coupling Air Cooled Liebert® CRV Units with Air Cooled Condensers

Model	Ambient Temperature up to 35° C		Ambient Temperature up to 40° C		Ambient Temperature up to 46° C	
	Standard Noise	Low Noise	Standard Noise	Low Noise	Standard Noise	Low Noise
CR011RA	1 x HCR17	1 x HCR33	1 x HCR33	1 x HCR43	1 x HCR43	1 x HCR51
CR021RA	1 x HCR33	1 x HCR43	1 x HCR43	1 x HCR51	1 x HCR51	1 x HCR59
CR020RA	1 x HCR33	1 x HCR43	1 x HCR43	1 x HCR51	1 x HCR51	1 x HCR59
CR035RA	1 x HCR51	1 x HCR59	1 x HCR51	1 x HCR59	1 x HCR76	1 x HCR88

Condensers Dimensions

		Width	Depth	Height	Weight
HCR17	[mm] / [kg]	896	1053	980	49
HCR33	[mm] / [kg]	1112	1340	910	75
HCR43	[mm] / [kg]	1112	2340	910	92
HCR51	[mm] / [kg]	1112	2340	910	93
HCR59	[mm] / [kg]	1112	2340	910	102
HCR76	[mm] / [kg]	1112	3340	910	136
HCR88	[mm] / [kg]	1112	3340	910	165

Coupling Water/Glycol Cooled Liebert CRV Units with Drycoolers

Model	Ambient Temperature up to 30° C		Ambient Temperature up to 35° C		Ambient Temperature up to 40° C	
	Standard Noise	Low Noise	Standard Noise	Low Noise	Standard Noise	Low Noise
CR20RW	1 x ESM018	1 x ELM018	1 x EST028	1 x ELM027	1 x EST050	1 x ELT047
CR35RW	1 x EST028	1 x ELM027	1 x EST050	1 x ELT055	1 x EST070	1 x ELT065

Dry Cooler Dimensions

		Width	Depth	Height	Weight
ESM018	[mm]	2236	820	1030	82
EST028	[mm]	2866	1250	1070	133
EST050	[mm]	2866	1250	1070	193
EST070	[mm]	4066	1250	1070	283
ELM018	[mm]	2236	820	1030	94
ELM027	[mm]	3136	820	1030	139
ELT047	[mm]	4066	1250	1070	225
ELT055	[mm]	4066	1250	1070	254
ELT065	[mm]	5266	1250	1070	302

CHILLED WATER COOLING

Chilled water cooling units may be coupled with Vertiv™ chillers (Liebert HPC or Liebert AFC series). The Liebert HPC chiller series offers a wide range of air cooled or water cooled solutions. Available with various noise thresholds and with freecooling modes, these units significantly enhance the system's energy saving capabilities. Liebert HPC freecooling chillers are available from 40 kW to 1600 kW. The Liebert AFC, Adiabatic Freecooling Chillers, are available from 500 kW to 1450 kW and are designed to maximize data center efficiency and availability.



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 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.



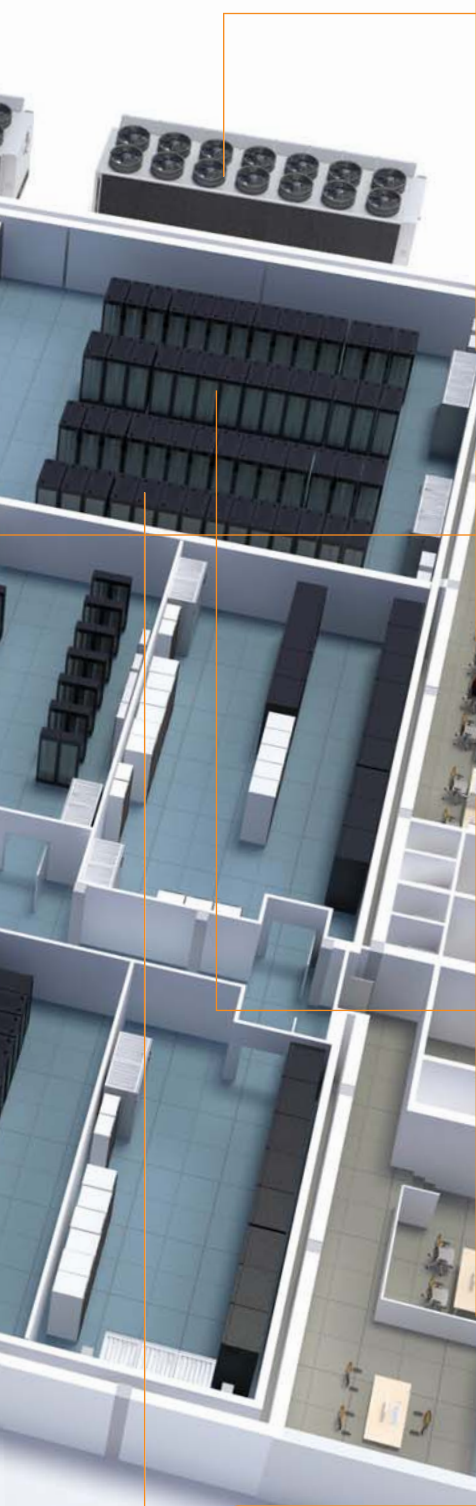
Liebert EFC

Indirect evaporative freecooling unit leveraging on data center know-how. Available from 100 to 350 kW

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

Vertiv™ Trellis™ Platform

Vertiv's *Trellis*™ platform is a real-time infrastructure optimization platform that enables the unified management of data centre IT and facilities infrastructure. The Vertiv *Trellis* platform software can manage capacity, track inventory, plan changes, visualize configurations, analyze and calculate energy usage, and optimize cooling and power equipment. The Vertiv *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.

Vertiv SmartAisle™

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



Liebert CRV

Row-based high efficiency cooling units available from 10-60 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 DCL

Closed loop rack cooling

- Two different architectures:
Closed Loop
Hybrid Loop
- Multiple combinations for up to 4 server racks
- Dual CW coil version for redundancy.

SERVICES

Vertiv 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 Vertiv which includes access to Vertiv LIFE™ Services.

VERTIV™ LIFE™ SERVICES

Vertiv LIFE Services provides Remote Diagnostics and Preventive Monitoring for UPS and thermal management equipment.

Vertiv LIFE Services 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 Vertiv LIFE Services, our Remote 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.



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