

Precision Cooling
For *Business-Critical Continuity™*

Liebert® CRV™ Row-Based Cooling

Intelligent Precision Cooling For Data Center Equipment



The Intelligent Data Center Cooling Solution: Liebert CRV

Trust the industry leader in Precision Cooling to deliver the right solution for your data center:

In 2002, Emerson Network Power's Liebert XD family was the industry's first row-based cooling system. Now, we have taken more than 40 years of engineering experience and the most advanced technologies to design the Liebert CRV row-based precision cooling system.

Always informed:

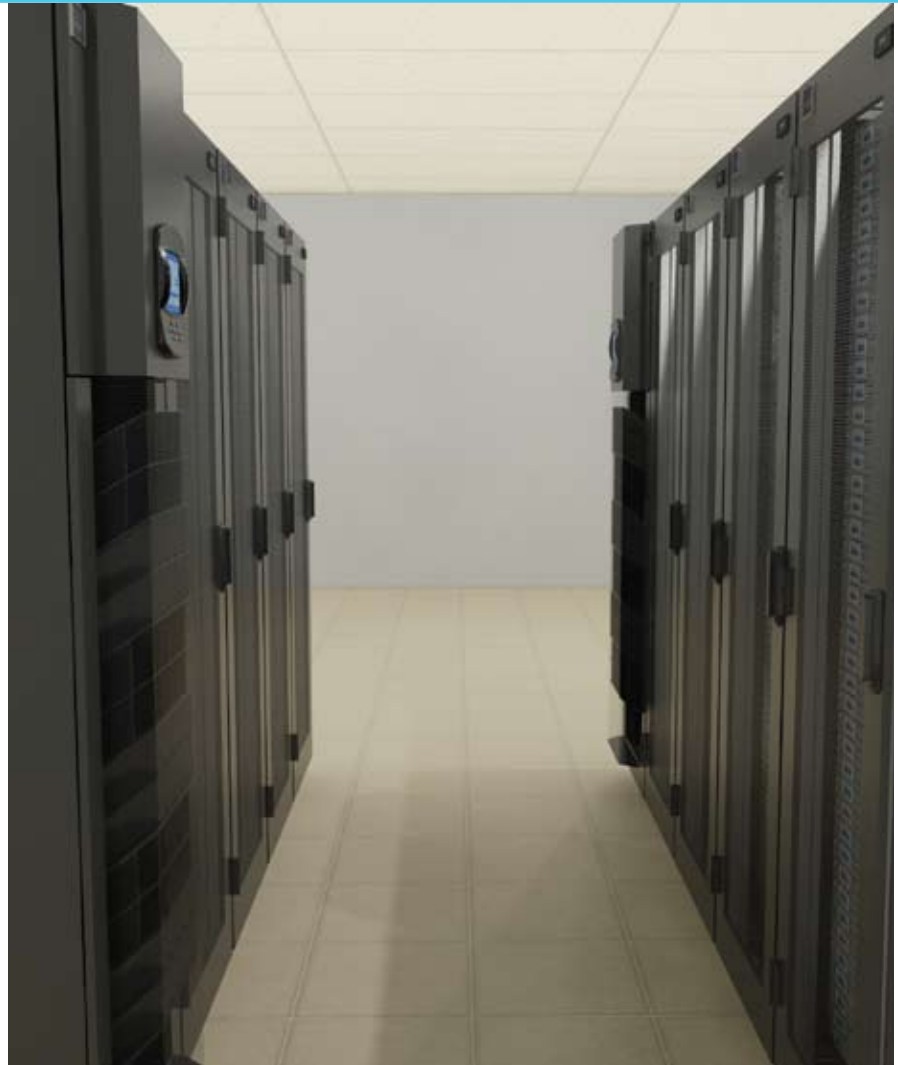
The Liebert iCOM display shows the inlet temperature of the protected racks, tracks other critical information that keeps IT personnel up to date on system operation, and allows the Liebert CRV to optimize cooling for the rack-based equipment.

Easy to deploy and maintain:

Row-based placement puts cooling at the heat source, with adjustable baffles that ensure cool air reaches the servers, while logical placement of reliable components results in ease of service.

Intelligently efficient:

Variable speed fans, variable capacity digital scroll compressor and the advanced Liebert iCOM system control all work together to provide energy savings over traditional perimeter cooling systems.



Liebert CRV delivers Efficiency Without Compromise™

Efficiency Without Compromise provides a path to optimize data center infrastructure around design, operating and management efficiencies – while maintaining or improving availability. This is achieved through the proper selection and utilization of cooling, power and monitoring technologies, supported by key services and local expertise.



INFRASTRUCTURE MANAGEMENT
Improving performance of the IT infrastructure and environment



ECO AVAILABILITY
Balancing high levels of availability and efficiency



FLEX CAPACITY
Adapting to IT changes for continuous optimization and design flexibility



HIGH DENSITY
Delivering architectures from 10–60 kW/Rack to minimize space and cost

Put Precision Cooling In The Row To Reduce Energy Consumption and Optimize Operating Conditions For IT Equipment

The Liebert CRV is a self-contained precision cooling system that installs within a row of data center racks—close to the server heat source—for the most efficient cooling of critical IT equipment.

The rack-sized Liebert CRV provides high capacity cooling in a small footprint and features the Liebert iCOM Control System that modulates unit performance in real-time, based on conditions in the row. Monitoring up to 10 racks with 20 sensors, the Liebert CRV precisely controls air temperature, humidity and filtration in the surrounding racks.

Variable EC Fans regulate airflow and reduce the fan input power; resulting in up to 50% less power used by the fans compared to traditional perimeter cooling.

High Performance Air Filters are easily accessed through the back of the unit.

Digital Scroll Compressor enables the variable cooling capacity to precisely match changing cooling demand without cycling on and off, reducing energy consumption and extending compressor life.

Liebert iCOM® Control presents up to 11 temperature measurements and unit performance in an easy to understand graphical summary.

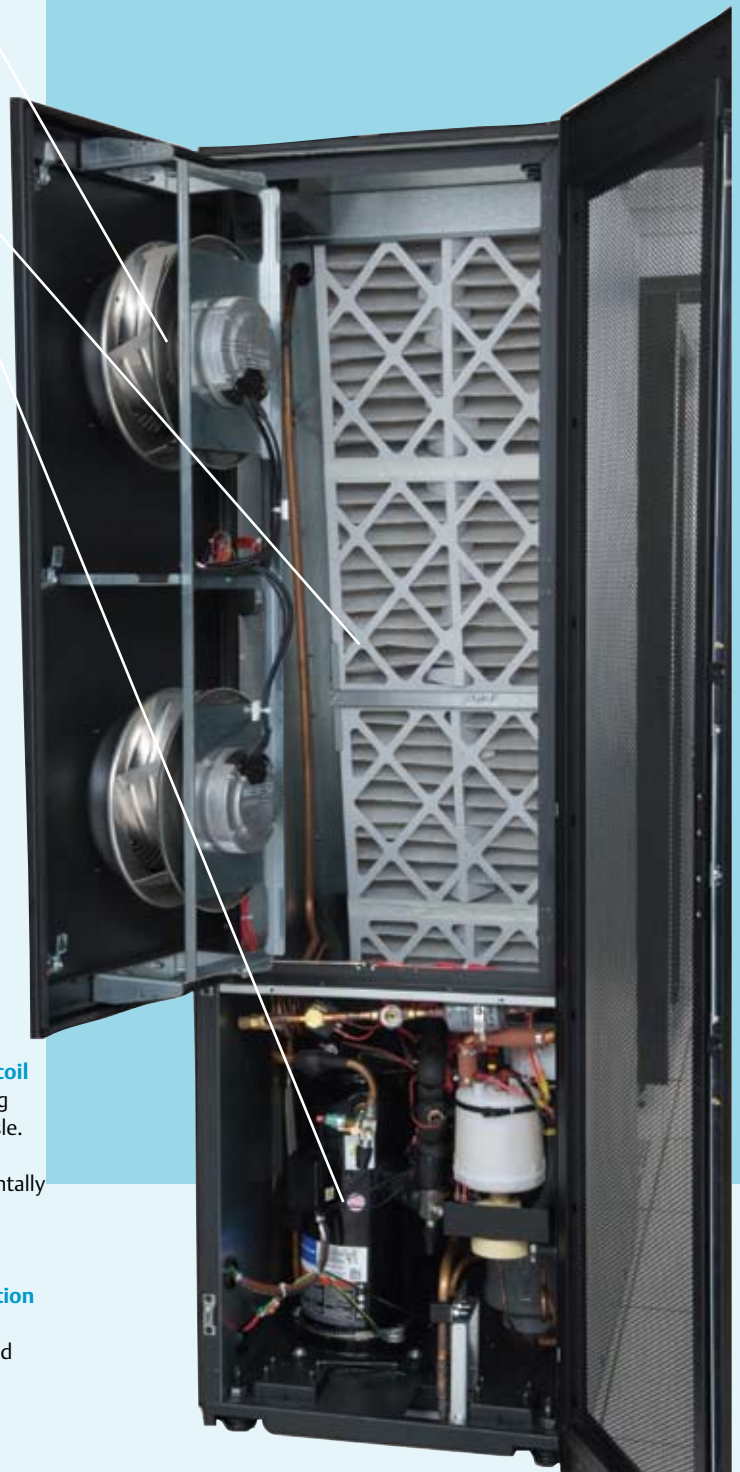
2T Rack Sensors provide two temperature readings per rack to ensure the proper amount of cold air is provided to eliminate hot spots.

Adjustable Baffles direct airflow right, left or both directions, allowing you to easily change the airflow distribution as your cooling needs change.

Blue-tinted hydrophilic cooling coil disbursts water quickly, preventing carryover of water into the cold aisle.

R-410A Refrigerant is environmentally friendly and meets the latest government standards.

Liebert IntelliSlot™ Communication Cards can be accessed without entering the high voltage panel and allow the system to communicate with remote infrastructure management systems.



Liebert iCOM Controls: Optimized Performance, Reliability, and Efficiency

The Liebert iCOM control system provides advanced control and monitoring capabilities to Liebert CRV units, allowing up to 32 cooling units to work together as a single system to optimize room performance and improve energy efficiency. Liebert iCOM controls offer a variety of advantages, including icon-based navigation, adjustable control algorithms, and data center monitoring capabilities.

Control

- **Advanced control algorithms** allow the airflow and cooling to be modulated independently, eliminating excessive operations.
- **Temperature sensors** attached to server racks allow the optimal amount of air and cooling to be provided without any increased risk for hot spots.
- **Multiple Liebert CRV units communicate with each other** to optimize system performance while reducing noise and airflow, to provide a work-friendly environment.
- **Six control modes of operation** allow the Liebert CRV to be customized for any application.

Monitoring

- **Six selectable status screens** allow you to customize how system information is presented.
- **Up to 20 rack temperatures may be summarized** using bar graphs or a drawing of the data center on the local display, or all data may be reported remotely, providing users with a built-in mini-monitoring system.
- **All unit information may be reported remotely** through a variety of protocols, including HTTP, SNMP, and RS-485 Modbus.

Predictive Wellness/Maintenance

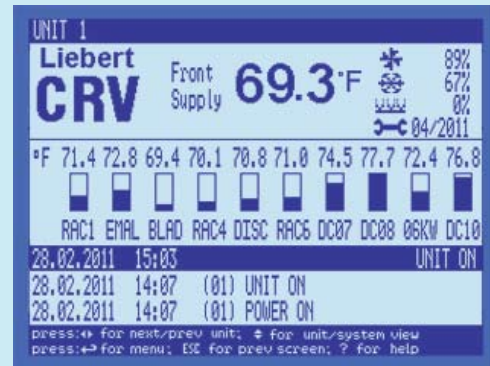
- **Enhances reliability with predictive analysis** of components and performance – advance notice allows proactive management of system maintenance.
- **Event logs store the last 400 messages** to enrich unit history and enhance support.

Service and Spare Parts History

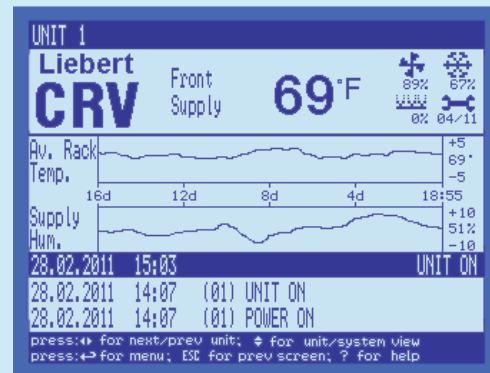
- **On-board service history** allows prompt access to records for service personnel.
- **On-board spare parts list** provides convenient identification of the appropriate unit spare parts and part numbers for faster service and support.



The Large Graphic Display features a 320x240 dot matrix screen operates with intuitive images rather than pages of text. This display can be used to control a single cooling unit or any cooling unit on a network.



Bar graphs show the inlet temperature of every rack with a 2T temperature sensor.



Line graphs show the historical temperature and humidity conditions for the past 8 minutes to 16 days.



A single view shows the average, minimum, and maximum temperature of every 2T rack sensor in a single- or multi-unit system.



Designed For Reliability and Energy Efficient Operation

Reduce operating costs and energy consumption

Through the use of advanced control algorithms, the Liebert iCOM control system is able to leverage the energy efficiency of the EC plug fans and digital scroll compressor to provide greater energy savings at the system level than other row-based units.

The 2T Rack Sensors provide two temperature readings per rack. A single Liebert CRV reads the sensors for up to 10 racks.

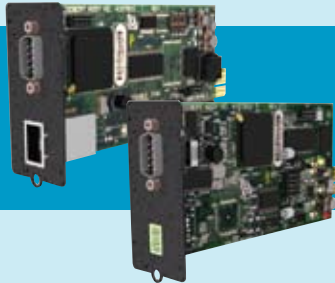
Rack Sensors

Two temperature sensors are placed at the inlet of up to 10 racks. Liebert CRV reads the sensors and adjusts airflow and temperature to ensure the proper operating conditions for the rack equipment.

Liebert IntelliSlot Communication Cards

The Liebert CRV includes two Liebert IntelliSlot card slots for easy plug-in of optional communication cards:

- **Liebert IntelliSlot Web Card**—delivers SNMP and HTTP web-management communications capabilities for monitoring and control through your existing network with no additional software required.
- **Liebert IntelliSlot 485 Communication Card**—allows remote monitoring and control of Liebert CRV using RS-485 Modbus through Liebert SiteScan Web or your existing Building Management System.



Digital Scroll Compressor

The exclusive Digital Scroll Compressor uses the latest control technology to deliver precise operation and significantly higher energy efficiency than other compressor technologies. In addition to the advantage of the dependable scroll design, Digital Scroll technology provides infinitely variable capacity modulation between 20–100% to enable the output to precisely match the changing cooling demands of the room.

- More efficient than traditional hot-gas bypass approach.
- Improved reliability by reducing compressor cycling and component wear.
- Improved performance because the compressor can easily adapt to changing load conditions and provide precise temperature control.
- Superior oil return compared to inverter-driven compressors.
- No harmonic noise issues, unlike inverter-driven compressors.



EC Plug Fans

EC fan technology works to regulate airflow and reduce fan input power. You can have confidence that the EC Fans, managed through Liebert iCOM controls, deliver airflow for the optimal operating conditions for IT equipment.

- Speed controllers on each motor eliminates a single point of failure.
- Additional airflow available for emergency conditions and elevation correction.



Adjustable Baffles

Modular air supply baffles direct the cold air to the servers, and may be adjusted anytime cooling needs change. When Liebert CRV is installed at the end of a row, the air is directed down the aisle toward the servers – not lost to the room.



Liebert CRV: Reliable, Flexible and Economical

Key Benefits

Flexibility

- Horizontal airflow cooling design is suitable for non-raised or raised floors.
- Adjustable airflow baffles maximize cooling to rack equipment, allowing the system to be positioned within the row or at the end of the row.
- Air, water, glycol, and chilled water systems available.
- Caster mounted for easy placement.
- Multiple units communicate with each other to improve system performance and reduce energy consumption.
- Can be used with Liebert SmartAisle™ containment system.

Lowest Total Cost of Ownership

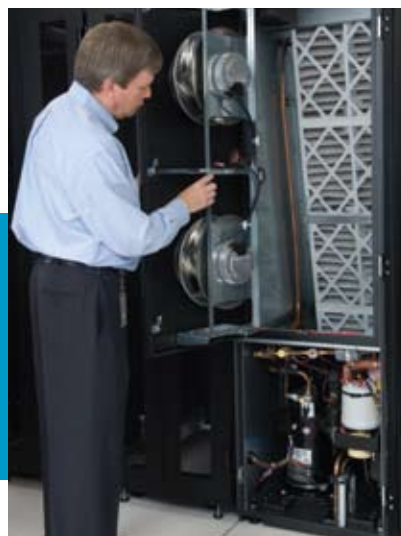
- Designed for higher return air temperature to maximize cooling capacity and increase efficiency.
- Only front and back access required, resulting in minimized installation and service time.
- Digital Scroll compressor and variable speed EC fans operate efficiently to reduce energy consumption and provide longer component life.
- Compact cabinet minimizes floor space requirements.

High Availability

- Self-adapts to changing conditions to provide 24/7 precision environmental control: cooling, humidity control and air filtration.
- Liebert iCOM control provides alerts for preventive maintenance before issues occur.
- Variable capacity Digital Scroll compressor adapts to load and eliminates compressor cycling, greatly increasing compressor life.

Ideal Applications

- Small to medium-sized data centers
 - From 2 to 24 racks
 - Optimal for cold/hot aisle configurations
- Heat density up to 10 kW/rack without containment.
- Raised and non-raised floors.
- Rooms with a low ceiling where air cannot be ducted.
- SmartAisle™ containment system.
- Spot cooling in large data centers.



All row-based cooling systems are not created equal. Compare Liebert CRV features to other technologies:

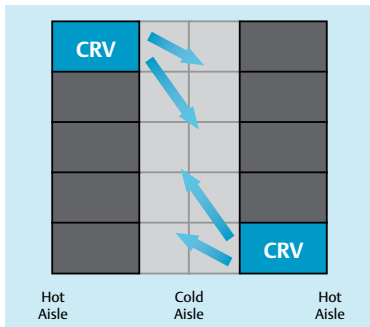
| Feature | Lifecycle Efficiency Benefit |
|---|---|
| Liebert iCOM control | Reliability, energy savings, serviceability, ease of use |
| Digital Scroll Compressor | Energy savings, reliability |
| Redundant EC Plug Fans | Energy savings, serviceability, reliability |
| Adjustable Air Supply Baffles | Effective air delivery, flexibility, ease of deployment |
| Install at the end of row or within the row | Flexibility, ease of deployment |
| Rack Sensors – 2T temperature and humidity | Reliability, energy savings, effective air delivery, improved performance |
| Front and Rear Access Only | Ease of installation, serviceability, ease of deployment |
| Low audible noise | User comfort, safety |
| Designed to resist water carryover | Reliability |
| Reheat and humidifier | Reliability |
| Elevation correction capability | Flexibility |
| Convenient component access | Serviceability |
| Separate component and airstream sections | Serviceability |
| Electrical panel at shoulder height | Serviceability |
| Liebert IntelliSlot card housings | Serviceability, flexibility |

The Liebert CRV is built for both ease of installation and speed of maintenance. All components are easily accessible from the front and rear of unit, eliminating side access. Extra top component access is provided as well via the superior service access panel.

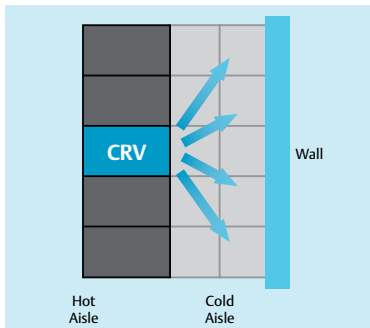
The Right Cooling Choice for a Range of Data Center Applications



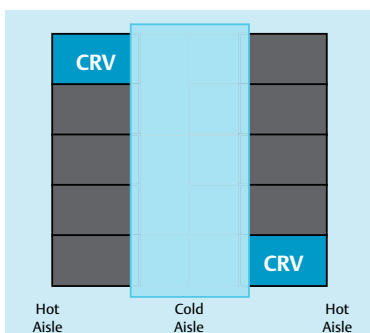
How It Works. Used in a hot aisle/cold aisle layout, the Liebert CRV pulls air from the hot aisle, filters and conditions it, and then delivers cool air to the front of equipment racks. Adjustable supply air baffles direct cool air to the left, right, or both sides as needed.



Liebert CRV systems operating in hot aisle/cold aisle configuration.



Liebert CRV adapts to obstructions, such as walls and racks.



For data centers where heat density needs to be increased without installing a raised floor or a higher roof, the Liebert CRV and Emerson Network Power SmartAisle cold aisle containment is the ideal solution.

Liebert CRV installs at the ends or within the row of racks on non-raised or raised floor applications.

- Ideal for hot/cold aisle configurations.
- Rows should have full height racks, no missing racks and minimal cold aisle obstructions.
- Ensure obstruction exists (rack, wall, etc.) directly across from cooling unit.
- Blowing air one direction, versus both, is best.
- Optimal performance when used with an Emerson Network Power SmartAisle containment system.

Liebert CRV is available in Direct Expansion or Chilled Water Models

- Direct Expansion Models are air cooled, water cooled or glycol cooled.
- Chilled Water Models require connection to a chilled water source.

Specifications

| | |
|-------------------------------|---|
| Nominal Capacity, 50 or 60 Hz | 20 or 35kW, Air cooled 20 or 35kW, Water/Glycol cooled 40kW, Chilled water cooled |
| Input Voltage | 208V, 3ph, 60Hz 460V, 3ph, 60Hz 400V, 3ph, 50Hz |
| Refrigerant | R410A |
| Compressor | Digital Scroll, variable capacity 20–100% |
| Fans | Variable Speed EC Fans |
| Options | Electric reheat Humidification Condensate pump |
| Controls | Liebert iCOM |
| Communications | Liebert IntelliSlot Web Card: HTTP and SNMP Liebert IntelliSlot 485 Card: RS-485 Modbus |
| Dimensions | Height: 78.74 in. (2000mm) Width: 23.6 in. (600mm) Depth: 43.3 in. (1100mm) |
| Weight | Air: 20kW – 744 lbs (337kg) 35kW – 811 lbs (368kg) Water/Glycol: 20kW – 778 lbs (353kg) 35kW – 856 lbs (388kg) Chilled Water: 40kW – 733 lbs (332kg) |

Emerson Network Power, a business of Emerson (NYSE:EMR), is the global leader in enabling *Business-Critical Continuity™* from grid to chip for telecommunication networks, data centers, health care and industrial facilities. Emerson Network Power provides innovative solutions and expertise in areas including AC and DC power and precision cooling systems, embedded computing and power, integrated racks and enclosures, power switching and controls, monitoring, and connectivity. All solutions are supported globally by local Emerson Network Power service technicians. Liebert AC power, precision cooling and monitoring products and services from Emerson Network Power deliver *Efficiency Without Compromise™* by helping customers optimize their data center infrastructure to reduce costs and deliver high availability.

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