

Precision Cooling for  
*Business-Critical Continuity™*

# Liebert HPM Digital

*Improved Performance to Boost Efficiency*



optimized  
for  
**R410A**

  
**EMERSON**  
Network Power



**Emerson Network Power**, a division of Emerson Electric Co., is a global company that combines technology with design to supply innovative solutions for the benefit of its customers.

Emerson Network Power is the leader in the “**business-critical continuity**” field, thanks to the company’s products and services.

Emerson Network Power’s broad technology base and global expertise supports a full spectrum of enterprise-wide solutions for today’s vital business needs.



Regardless of your size, you can’t afford for your critical business systems to go down and you can’t waste time recovering your IT infrastructure after a disruption.

**Leave that to us**, the experts in *business-critical continuity*: from grid to chip, from the biggest to the smallest data centers, we are ready to serve your needs with the solutions we have developed.

More standardization, so you don’t need further budget allocations to install it. More simplification so you don’t need to be a specialist to get the best for your business. More support, so while you are enjoying doing business, we are protecting you.

**That’s why we can say we OptimizeIT!**





*Liebert HPM Digital offers a cooling solution with all the best technologies on the market.*



# Liebert HPM Digital: the Superior Cooling Technology

The advanced and continuously evolving IT market is one of the fastest growing high tech industries.

Data center cooling needs the most sophisticated ambient control to maintain very precise room conditions, limit energy consumption and enhance the performance of customers' electronic equipment.

Liebert HPM Digital is an air-conditioned cabinet, equipped with the top industry technologies, for precise cooling of data centers and server rooms.

## Key Features:

- Digital Scroll: provides capacity modulation.
- iCOM control and integrated Ethernet connections, to ensure top reliability in all conditions.
- EC Fan - Electronic Commutated Fan and EXV - Electronic Expansion Valve are available to provide the best energy-saving results.

## Liebert HPM Digital: Adaptability for Your Business

Liebert HPM Digital is the ideal solution for those customers looking for a scalable system that can grow with their business: a 50 kW unit can be used as if it were a 10 kW unit thanks to the digital scroll modulation capabilities that range from 20% to 100%.

## Liebert HPM Digital High Efficiency Version: the Best for Your Business!

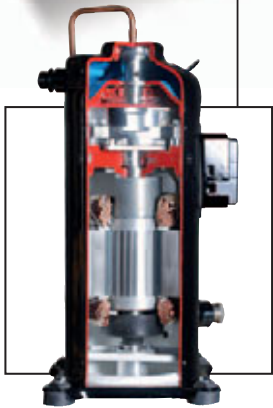
In addition to the benefits of the basic version, Liebert HPM Digital EXV is the ideal solution for customers looking for the lowest operating costs: their infrastructure will be operating in optimum environmental conditions.

## Liebert HPM Digital: a Building Block of SmartAisle™:

a complete solution to address all customers' needs, minimizing the entire data center consumption.



*Liebert HPM with Copeland Digital Scroll and Alco Electronic Expansion Valve: Emerson Network Power cooling solution to achieve the highest efficiency for a direct expansion application.*



*Copeland Digital Scroll™ is an exclusive of Emerson Network Power in Data Center cooling.*



# Liebert HPM Digital: Offers More, Requires Less

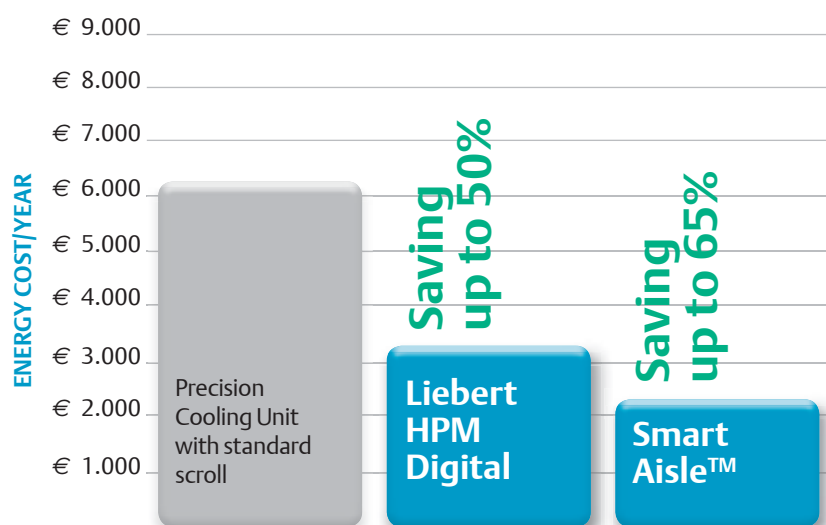
## Key Benefits Offered by Liebert HPM Digital Scroll:

- Secure your IT investment: with Digital Scroll, achieve more performance at a greater value for money, reducing energy demand.
- Just-in-time cooling: Digital Scroll delivers adaptive cooling depending on the heat load to always keep the precise temperature level required.
- Scalability and efficiency: endless balance. Increasing the dimensions or density of your data center will not force you to invest further: the unit can adapt its performance accordingly as your data center grows.
- Unique technology, for competitive advantages beyond compare: limitless protection for IT infrastructure with energy savings maximized.

## Saving Up to 65%

Example: a 20kW Unit Working at 80% of Heat Load.

Annual Saving for Liebert HPM Digital System fitted with all the most advanced technologies in the market (Digital Scroll Compressor, Electronic Expansion Valve, EC Fan) with and without cold aisle containment compared to standard Precision Cooling unit fitted with standard scroll.



Data center Set Point: 24°C - 50 rH%  
Energy Cost: 0,12/kWh

- + **EC Fan Effect**  
Higher motor efficiency
- + **EXV Effect**  
Lowest condensing temperature & better use of evaporator
- + **Humidifier Effect**  
SHR=1 means no need to run humidifier
- + **COP & SHR Effect**  
Liebert HPM Digital has higher COP & SHR at modulated capacity

- + **SmartAisle™ Effect**  
Through its patented Software, Liebert HPM Digital modulates fan speed and cooling capacity in order to match the required airflow at the required temperature to perfectly satisfy the servers' needs, without wasting a single Watt.



Digital Scroll Technology:  
achieves more performance  
at a greater value for money,  
reducing energy cost.



## Key Advantages of Liebert HPM Digital

- **Modulation**

Liebert HPM Digital works at variable partial loads without the use of an external Inverter. Thanks to its unique technological solution, **Digital Scroll immediately reacts to every change in load requirements. Its modulation is achieved through mechanical actions, so Digital Scroll is completely free of electromagnetic interference.**

- **The Capacity Required, Every Time**

Liebert HPM Digital perfectly follows site needs, which means that it doesn't waste any energy once the cooling requirement is met. Another important advantage is that, **at partial load, a Digital Scroll doesn't work with an ON - OFF configuration. This avoids peaks in adsorbed power, and reduces stress on components. This increases the life of the unit, greatly reducing failure due to fatigue.** Liebert HPM Digital has a very high precision temperature control; in fact, by perfectly coupling its capacity to the heat load, the control is always able to keep an extremely constant temperature.

## Liebert HPM Digital



Optimized for R410A Refrigerant



Copeland Digital Scroll Technology: the best solution in terms of variable cooling capacity



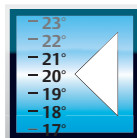
EC Fan to optimize the airflow distribution



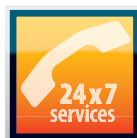
Top Class energy efficient thanks to the best technologies on the market



Perfect ability to follow heat load without wasting a single kW in unnecessary cooling



Room temperature always under extremely precise control thanks to the digital scroll solution



Whenever you need support, Emerson Network Power is there for you

# Liebert HPM Digital Application Scenarios

## Liebert HPM Digital Downflow

Downflow units are used when a raised floor is present and available for air distribution. This is the most common case for data center applications. Liebert HPM Digital optimizes all such applications, offering the highest efficiency thanks to cooling modulation, which always allows it to perfectly follow IT Load requirements.

Suitable for:

- Raised Floor Application
- SmartAisle™ Application



## Liebert HPM Digital Upflow

Upflow units are designed to be used on those applications with air distribution from the top, with or without the presence of a ducting system. The presence of an EC Fan as standard on Liebert HPM Digital means that this unit can give the highest External Static Pressure (ESP) while limiting power input. So Liebert HPM Digital can optimize cooling requirements, while at the same time giving the most suitable airflow and ESP in order to fulfill all the site's different needs.

Suitable for:

- Ducted Application
- Application without raised floor or with raised floor not suitable for air distribution
- Technical rooms



## Liebert HPM Digital Displacement

Displacement units take their name from the displacement effect. It consists of the stratification of cold air in the bottom part of the room, and hot air on top. This is achieved by delivering cooled air at a very low speed. The displacement effect contributes considerably to system efficiency. Liebert HPM Digital Displacement is the perfect unit for small applications where scalability and growth capacity are key points.

Suitable for:

- Application without raised floor
- Technical rooms
- Small data rooms with cooling unit in front of the racks





# Liebert HPM Digital Cooling Versions

## Liebert HPM Digital Air Cooled

An air cooled direct expansion solution optimizes condensing temperature in the simplest installation configuration and with minimum impact on the site, avoiding having water inside the data center.

Liebert HPM Digital Air Cooled is the right solution to optimize all of these applications.



## Liebert HPM Digital Water Cooled

This is the perfect way to exploit all digital benefits for all applications where the Air Cooled solution is not applicable due to specific site limitations: i.e. long distances between internal and external units, large geodetic height difference.



## Liebert HPM Digital Dual Fluid Air Cooled

This is the right choice for all applications where chilled water is the primary cooling source, but is not constantly available (i.e. alternative usage between Air Conditioning and Precision Cooling); in fact, it offers an efficient direct expansion solution that works as redundant cooling for the chilled water coil.



## Liebert HPM Digital Dual Fluid Water Cooled

Suitable for applications where site limitations don't allow the use of air cooled solutions. This cooling configuration perfectly adapts to any site layout, therefore chillers and dry coolers can be placed wherever necessary in the site.



## Liebert HPM Digital Freecooling

For all applications where efficiency is a prime concern, Liebert HPM Digital offers the possibility to exploit the Freecooling effect for the longest period, thanks to Digital capacity modulation. Furthermore, even when external conditions don't allow the use of Freecooling, Liebert HPM Digital guarantees top efficiency, also in pure DX mode.



# SmartAisle™: Emerson Network Power Solution

1

## SmartAisle™ Cold Aisle Containment

Physical separation of cold and warm air zones using Knürr CoolFlex® technology. Cold Aisle Containment ensures that the cold air distributed through the raised floor is delivered directly to IT cabinets.

2

## iCOM with SmartAisle Control Logic

A cooling unit with SmartAisle control logic ensures the proper airflow, air temperature and humidity required by IT equipment. Dynamic fan speed and cooling capacity control provides maximum cooling efficiency.

3

## Liebert HPM

Liebert HPM Digital, thanks to the continuous modulation of a digital scroll compressor, delivers the air at exactly the temperature required by the server, and an EC Fan delivers exactly the airflow used.

This prevents a single kW of power input not required for cooling being wasted. When the system includes the Alco Electronic Expansion Valve, the full system can maximize its efficiency, reducing the condensing temperature

	Standard unit Traditional Approach	Digital Unit Traditional Approach	With Cold Aisle Containment	With SmartAisle
Compressor	61.1%	35.4%	30.3%	27.2%
Condenser	4.9%	4.9%	4.9%	4.9%
Evaporator Fan	18.6%	9.7%	6.8%	2.1%
Humidifier	15.4%	1.2%	1.2%	1.2%
<b>Total</b>	<b>100%</b>	<b>51.2%</b>	<b>43.2%</b>	<b>35.4%</b>

### Total Saving

Saving  
48.8%

Saving  
56.8%

Saving  
64.6%

*SmartAisle solution can offer up to 65% saving compared to a standard cooling unit with common technologies, thanks to intelligent control of Digital Scroll Compressor capacity and accurate fan speed management, driven by cold aisle conditions.*

during the cold season without sacrificing SHR as happens with units with a standard scroll.

4

## Liebert HPA

Remote air cooled condenser for precision room cooling units equipped with variable fan speed control specifically developed for digital scroll solutions. This energy efficient solution maximizes system efficiency, reducing consumption all year long.

5

## Knürr Racks

The Knürr server racks allow for flexible mounting of accessories,

as well as a complete cable management system. The server rails guarantee easy mounting of all types of 19" servers and Liebert/Knürr accessories.

6

## SmartAisle™ Equipment

The SmartAisle solution also incorporates additional improvements in cooling efficiency which can be achieved using the following equipment:

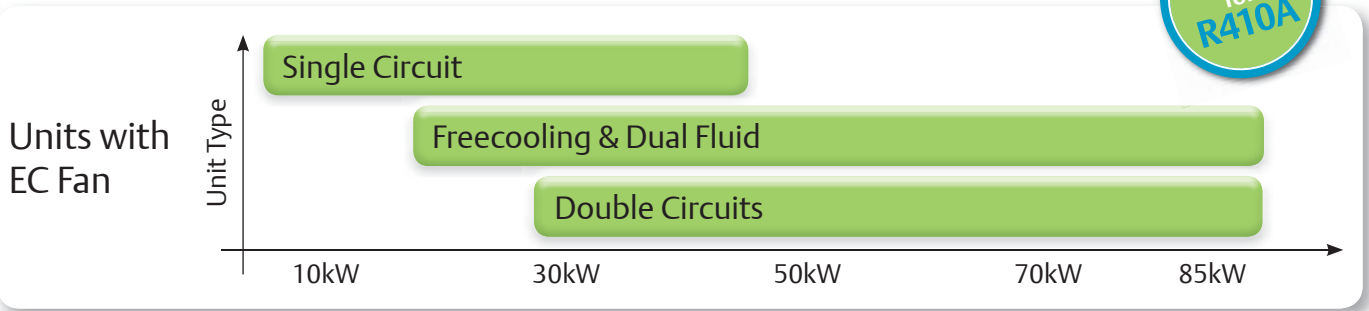
- Cable entry sealing systems
- Cabinet sealing with trims and blanking panels
- High Airflow Perforated Floor Tiles with perforation up to 85%





# Liebert HPM Digital Range and Performance

## Liebert HPM Digital Range



## Liebert HPM Digital Performance

Room Unit Model	Single Circuit						Double Circuits					
	D1E	D1G	D2E	D3A	D3G	D4E	D3F	D4H	D5D	D7L	D8F	
Condenser Model	HCR24	HCR24	HCR43	HCR43	HCR43	HCR59	2xHCR24	2xHCR33	2xHCR43	2xHCR43	2xHCR51	
Total gross cooling capacity	kW	15,8	17,4	23,9	29,0	34,9	44,1	36,3	45,1	58,4	65,2	81,3
Net sensible cooling capacity	kW	13,9	15,9	20,5	25,2	33,0	40,4	34,0	41,5	49,4	53,4	71,0
SHR at full load		0,92	0,95	0,92	0,92	0,98	0,96	0,97	0,96	0,90	0,87	0,93
SHR at 80% load		1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	0,95	1,00
Net sensible EER at full load		3,2	3,1	3,0	3,1	3,4	3,2	3,4	3,2	3,0	2,8	2,7
Net sensible EER at 80% load		3,4	3,2	3,1	3,1	3,4	3,2	3,6	3,4	3,2	3,1	2,8
Airflow	m <sup>3</sup> /h	4.200	4.930	5.750	7.080	9.540	11.230	9.490	11.370	12.910	13.470	20.020
Max. ESP	Pa	400	380	190	200	400	320	400	310	200	150	120
Sound pressure level at 2 meters in f.f. conditions	dB(A)	48,8	49,2	50,0	55,4	55,8	57,4	56,0	58,3	58,7	58,5	67,4
Minimum net sensible capacity during modulation	kW	3,2	4,1	5,1	6,2	8,6	9,9	3,5	4,2	4,8	5,3	6,8
Internal Unit Dimensions (W x D)	mm	750x750	750x750	750x750	1000x850	1750x850	1750x850	1750x850	1750x850	1750x850	1750x850	2550x890
External Unit Dimensions (W x D)	mm	1112x1340	1112x1340	1112x1340	1112x2340	1112x2340	1112x2340	2x (1112x1340)	2x (1112x1340)	2x (1112x2340)	2x (1112x2340)	2x (1112x2340)
Weight Internal Unit	kg	240	250	270	415	570	600	580	585	620	645	950
Weight External Unit	kg	75	75	92	92	92	102	2x75	2x80	2x92	2x92	2x93
Airflow Delivery (downflow, upflow, displacement/frontal)		D,U,F	D,U,F	D,U,F	D,U,F	D,U	D,U	D,U	D,U	D,U	D,U	D

\*Performance at 24°C 50%  
Nominal ESP 20 Pa  
External Temperature 35°C

System able to work up to 40°C external temperature with condenser models as shown; higher ambient operating temperatures available with alternative condenser selections.  
Internal Unit Height 1950 mm; External Unit Height 907 mm\*



In data center applications, the load is represented by sensible heating sources, which means that what a precision cooling unit is really required to give is a **net sensible capacity**.

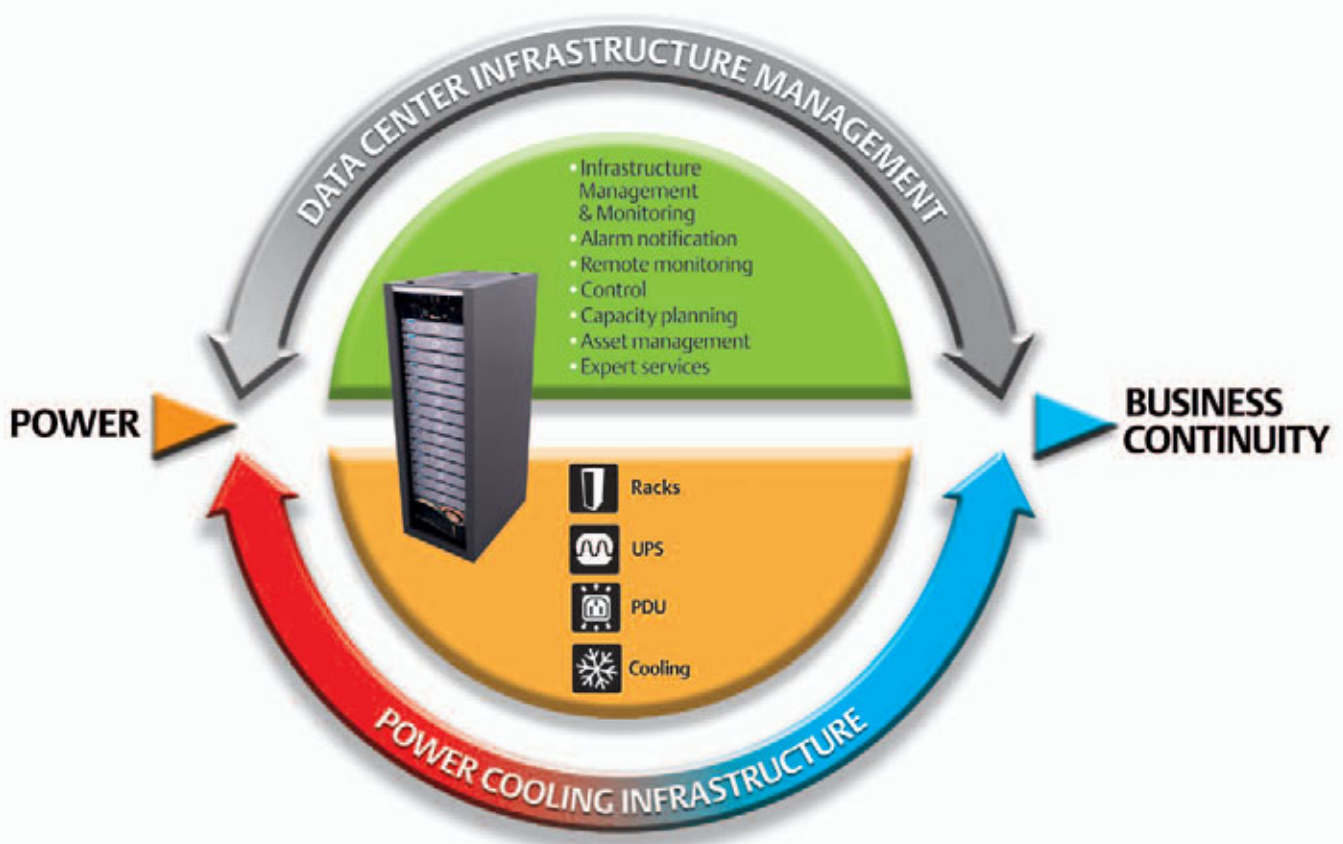
As clearly shown on the table above, Liebert HPM Digital at partial load increases both its SHR and its Net Sensible Efficiency (the ratio between Net Sensible Capacity and unit power input, providing a real measurement of **unit efficiency**).

**Liebert HPM Digital is therefore the best solution to handle data center cooling, giving additional benefits thanks to its unique characteristic of directly addressing the sensible load given by the servers.**





# Emerson Network Power Business-Critical Continuity™ Expert



Today's successful businesses depend on adaptable technologies to help them respond quickly to market demands. Your data center must be built on a support infrastructure designed to match the power and cooling needs of rapidly changing IT initiatives such as virtualization and consolidation. Each IT change, move or addition will affect the entire support infrastructure so you need products and support that ensure your IT systems will operate reliably in these environments.





*More than 35,000 organizations in 70 countries depend on our Business - Critical Continuity™ Promise: your IT infrastructure stays up to support your Business!*

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

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For more information, visit:  
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## Emerson Network Power

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mixture and equipment for high precision air conditioning.  
Sales of small uninterruptible power supply (UPS Small and Micro)



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