


Precision Cooling for
Business-Critical Continuity

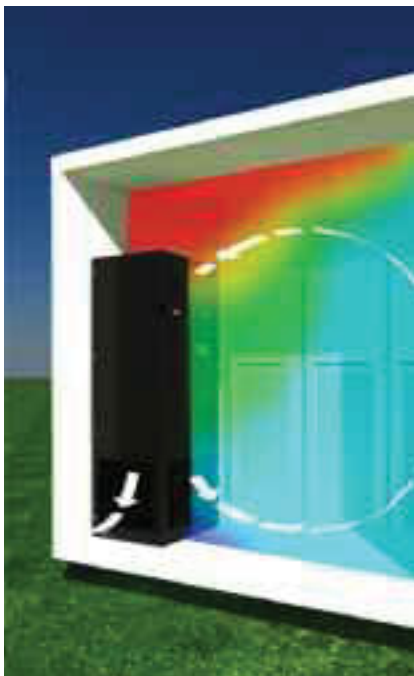
Liebert HPF
The High Performance Floormount Indoor Package Cooling Solution




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We're **Emerson Network Power**, backed by Emerson, a global company that brings technology and engineering together to provide innovative solutions for the benefit of our customers.

We're the world leader in providing **Business-Critical Continuity™** to organizations like yours, enabled by our product and service centres of expertise.



Telecom sites / Technological environments

For wireless telecom applications, we provide control of remote access node environmental conditions. Our product portfolio includes a wide range of configurable solutions; outdoor packaged wall-mounting cooling system for shelters, when there's not enough space available inside the site; indoor packaged floor standing cooling system, to remotely reject, the heat generated by electronic equipment from IT rooms inside buildings; split system, to adapt the cooling solution to whatever site position, dimension and layout.



Product overview

The Liebert HPF represents the most complete package indoor cooling system product family specifically designed to control the environmental conditions in technological or industrial rooms as well as inside Fixed and Mobile Telecom Network sites.

The Liebert HPF units are designed for indoor and floor-mount application with over under or displacement air delivery.

In direct expansion mode the priority is given to the energy saving that is reached through the attention given at design level to all processes that realize the cooling effect: high fan efficiency, perfect unit insulation, performing heat exchange, smart logic control.

The use of direct free-cooling mode is tuned to enhance the respect of the environment through the setting of the control that aim to minimize the waste of energy in every condition.

The possibility to switch in emergency cooling mode, through the use of 48VDC or 230VAC plug fan, assure the continuity of protection from the risk of working in improper climatic conditions

Availability

Site protection continuity despite of the application threats

Providing the needed quality to the cooling effect

Protecting the site from the attacks of the external environment it's not a game.

Liebert HPF cleans the air trough an efficient filtering system easy to be serviced and maintained; Liebert HPF cools the air through the lowest energy consumption thanks to the use of high class components; Liebert HPF avoids the waste of the obtained cooling effect through the high care of the unit panels insulation.

Riding any critical conditions

When the external temperature rises to the unexpected temperature, when the environment hazard the air filtering system, when the indoor

temperature, for any reason creates the hot start condition, the cooling system can't abandon your application. The availability of high ESP fan means capacity to react to the unwilled situation that could jeopardize your business.

Continuity of revenue from the site

Liebert HPF can be powered by 48VDC emergency power source in case of mains failure. Continued ventilation and the maximized free-cooling mode assure constant operation of the telecommunications equipment. The 230V AC emergency supply is also available for applications offering the assistance of UPS or AC generator systems.





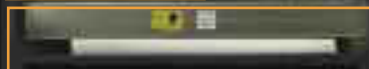
Refrigerant circuit

- High efficiency compressor
- Dryer filter
- Sight glass
- Insulation from air stream



Air filtration

- EU3 class standard filter
- Up to EU7 high filtration
- Full frontal access



Condenser fan

- Plug type fan
- High ESP availability
- Speed control



Flexibility

Cooling the application has no impact on the project

Always delivering cooling to its target

The delivery of the treated air is fundamental to cool the site with efficiency and effectiveness. Cooled air must be supplied where it is needed: depending from the site layout the application could require the air distribution from grilles through a false floor, from top ducts or through the ceiling, directly at floor level to cool the electronic equipment. This is exactly what Liebert HPF is asked to do and does in the under, the over and the displacement version.

Suitable to critical indoor installations

Technological environments inside historical buildings as well as telecom sites in high rise buildings are often located in sites where the supply of the external air is critical and it is not allowed to install external units. The heart of the communication needs a cooling system for indoor application

able to guarantee the most effective air intake system through the use of high ESP fans, self adapting to the pressure drops of the site ducting, in order to provide efficiency of the cooling cycle when working in direct expansion and highest energy saving when working in free-cooling mode.

Providing freedom of site layout at the design stage

The use of an indoor package cooling system can't prevent from letting the right space and position to the electronic rack. At this purpose Liebert HPF gives the possibility of being installed wherever it is allowed: in the middle of the room with rear connection to the remote wall or in a corner with lateral connection directly to the side of the building. The Liebert HPF compactness and configurability don't limit the user freedom of drawing the most suitable site layout.





under floor air delivery



over air delivery



floor level (displacement) air delivery



back outdoor air connections



lateral outdoor air connection

Total Cost of Ownership

Attention to costs and care of the environment

Easy of installation and fast start up

The cooling circuit is pre-charged, fine tuned and fully tested before the delivery. No pressure test is required on site. Installation is furthermore speeded up by using the fast plug electrical connections (on request) and the automatic commissioning software: installation and commissioning are completed in less than 25 mins. without need of specialized personnel on site.

Generating high energy saving with cooling lifetime extension

A close control cooling system is required to work 24 hours a day, 365 days a year: the must is to minimize the demand of energy supply in order to be cheaper to run and to prevent the impact on climate change. Liebert HPF aims to maximize the energy saving without compromising its effectiveness. The EC fan version reduces by 30% the energy consumption of the evaporating fan, compared to the traditional AC fan motors. To the

results obtained with its high cooling efficiency, Liebert HPF adds the savings guaranteed by the free-cooling mode and maximized through the use of modulating fans either AC or DC supplied; when the fresh air is available the compressor and the condenser fan stop as well as the evaporator fan limits its speed in order to adapt the cooling capacity to the application heat load, with highest energy saving when working at partial loads conditions. As consequence the lifetime of the cooling unit is extended with delay of its replacement time.

Facilitating the service

Liebert HPF guarantees easy and speed of access to all main components during the ordinary maintenance increasing the effectiveness of the service action worked out in perfect safety conditions. The need of extraordinary maintenance is reduced to a minimum thanks to the quality of the components selected at the design level.





Control

- Team-working with up to 16 units
- Stand by, rotation and cascade modes
- Standard 3 digit display
- Optional graphic display with storage of last 200 events

Free-cooling system

- From 0 to 100% damper modulation
- 48V DC or 24V AC power supplied
- Free-cooling fan modulation

Evaporator fan

- Plug type fan
- High ESP availability
- 48V DC or 230V AC power supplied
- High efficiency EC fan version

Technical Data

Displacement (D Version)

48 VDC Version

EC FAN Version

Model		5	7	10	12	15	5	7	10	12	15
Performances											
Main power supply		230/1N/50		400/3N/50			230/1N/50		400/3N/50		
Emergency power supply		48V DC					230 V AC				
Total cooling capacity ⁽¹⁾	kW	5,0	7,3	12,3	14,4	16,3	5,0	7,3	12,3	14,4	16,3
Sensible cooling capacity ⁽¹⁾	kW	5,0	7,3	12,3	14,2	16,0	5,0	7,2	12,3	14,2	16,1
SHR ⁽¹⁾	-	1	1	1	0,99	0,98	1,00	0,99	1,00	0,99	0,99
Compressor AC power input ⁽¹⁾	kW	1,19	2,10	2,88	3,62	4,69	1,19	2,10	2,88	3,62	4,69
Evaporator fan power input ⁽¹⁾	kW	0,21	0,28	0,44	0,54	0,66	0,21	0,26	0,42	0,50	0,60
Condenser fan AC power input ⁽¹⁾	kW	0,70	0,72	0,97	1,06	1,19	0,70	0,72	0,97	1,06	1,19
Evaporator airflow ⁽⁴⁾	m ³ /h	1800	1800	3060	3350	3580	1710	1800	2850	3080	3390
Z.E.T (100% Cooling Capacity) ⁽⁵⁾	°C	21,8	17,8	15,8	16,3	15,6	22,5	19,0	15,4	17,5	15,8
Z.E.T (50% Cooling Capacity) ⁽⁵⁾	°C	25,9	23,9	22,9	23,1	22,8	26,2	24,5	22,7	23,7	22,9
Condenser max. airflow ⁽⁴⁾	m ³ /h	2740	2740	4830	4830	4830	2740	2740	4830	4830	4830
Outdoor SPL ⁽²⁾	dB(A)	57,0	58,0	59,5	61,0	62,5	57,0	58,0	59,5	61,0	62,5
Indoor SPL ⁽²⁾	dB(A)	50,0	51,0	62,5	62,5	63,0	50,0	51,0	63,0	61,0	63,0
Max. ambient temperature ⁽³⁾	°C	52,0	46,5	50,0	48,0	45,0	52,0	46,5	50,0	48,0	45,0

Technical Data

Under (U Version)

48 VDC VERSION

EC FAN VERSION

Model		5	7	10	12	15	5	7	10	12	15
Performances											
Main power supply		230/1N/50		400/3N/50			230/1N/50		400/3N/50		
Emergency power supply		48 V DC					230 V AC				
Total cooling capacity ⁽¹⁾	kW	4,9	7,2	11,1	12,9	15,3	4,9	7,2	11,1	12,9	15,7
Sensible cooling capacity ⁽¹⁾	kW	4,9	6,6	10,5	12,0	13,4	4,9	6,6	10,5	12,0	13,7
SHR ⁽¹⁾	-	1,00	0,92	0,95	0,93	0,88	1,00	0,92	0,95	0,93	0,87
Compressor AC power input ⁽¹⁾	kW	1,20	2,10	2,91	3,64	4,67	1,20	2,10	2,91	3,64	4,69
Evaporator fan power input ⁽¹⁾	kW	0,28	0,34	0,45	0,56	0,66	0,26	0,30	0,42	0,50	0,60
Condenser fan AC power input ⁽¹⁾	kW	0,70	0,72	0,95	1,03	1,17	0,70	0,72	0,95	1,03	1,19
Evaporator air flow ⁽⁴⁾	m ³ /h	1890	2020	2850	3110	3310	1800	2000	2740	3100	3280
Z.E.T (100% Cooling Capacity) ⁽⁵⁾	°C	18,1	15,1	14,9	14,3	14,0	19,0	16,3	14,7	16,8	15,2
Z.E.T (50% Cooling Capacity) ⁽⁵⁾	°C	22,5	21,0	21,0	20,7	20,5	23,0	21,6	20,7	21,9	21,1
Condenser max. airflow ⁽⁴⁾	m ³ /h	2740	2740	4830	4830	4830	2740	2740	4830	4830	4830
Outdoor SPL ⁽²⁾	dB(A)	57,0	58,0	57,5	61,0	62,5	57,0	58,0	57,5	61,0	62,5
Indoor SPL ⁽²⁾	dB(A)	49,5	50,5	54,5	54,5	57,5	45,0	48,0	52,5	52,5	55,5
Max. ambient temperature ⁽³⁾	°C	52,0	46,5	50,5	48,5	45,0	52,0	46,5	50,5	48,5	45,0



Liebert HPF Under



Liebert HPF Over



Liebert HPF Displacement

Technical Data

Over (O Version)

48 VDC VERSION

EC FAN VERSION

Model		5	7	10	12	15	5	7	10	12	15
Performances											
Main power supply		230/1N/50		400/3N/50			230/1N/50		400/3N/50		
Emergency power supply		48V AC					230 V DC				
Total cooling capacity ⁽¹⁾	kW	4,9	7,1	11,3	13,2	15,7	4,9	7,1	11,3	13,2	15,9
Sensible cooling capacity ⁽¹⁾	kW	4,9	6,4	10,5	11,6	13,1	4,9	6,4	10,5	11,6	13,4
SHR ⁽¹⁾	-	1,00	0,90	0,93	0,88	0,83	1,00	0,90	0,93	0,88	0,84
Compressor AC power input ⁽¹⁾	kW	1,20	2,10	2,90	3,63	4,67	1,20	2,10	2,90	3,63	4,68
Evaporator fan power input ⁽¹⁾	kW	0,28	0,33	0,45	0,54	0,64	0,26	0,30	0,42	0,52	0,60
Condenser fan AC power input ⁽¹⁾	kW	0,70	0,72	0,96	1,04	1,18	0,70	0,72	0,96	1,04	1,18
Evaporator airflow ⁽⁴⁾	m ³ /h	1780	1910	2710	2870	3070	1730	1960	2780	3190	3320
Z.E.T (100% Cooling Capacity) ⁽⁵⁾	°C	16,9	14,7	14,0	13,5	12,7	18,6	16,5	14,0	17,1	14,9
Z.E.T (50% Cooling Capacity) ⁽⁵⁾	°C	21,9	20,8	20,5	20,2	19,9	22,8	21,8	20,5	22,1	21,0
Condenser max. airflow ⁽⁴⁾	m ³ /h	2740	2740	4830	4830	4830	2740	2740	4830	4830	4830
Outdoor SPL ⁽²⁾	dB(A)	57,0	58,0	58,0	61,0	62,5	57,0	58,0	58,0	61,0	62,5
Indoor SPL ⁽²⁾	dB(A)	58,5	60,5	62,0	60,5	62,0	58,0	60,5	62,0	60,5	62,5
Max. ambient temperature ⁽³⁾	°C	52,0	46,5	50,5	48,5	45,0	52,0	46,5	50,5	48,5	45,0

Technical Data

Unit description

Model		5	7	10	12	15
Compressor type / quantity		Scroll / 1				
Refrigerant		R407C				
Expansion device		Thermostatic valve				
Evaporator fan type / quantity AC		Plug / 1				
Evaporator fan type / quantity DC		Plug / 1				
Condenser fan type / quantity		Plug / 1				
Condenser fan speed control		Continuously variable speed				
Filter type / efficiency		Pleated / G3				
Electrical heating (option) kW		1,5	3	4,5	6	6
Frame		Galvanized steel				
Painting		Polyester - Charcoal grey/RAL7035				
Insulation type		Polyethylene / polyurethane foam, class 1				
Width / Depth / Height (D version)	mm	650 / 650 / 1990			900 / 750 / 2300	
Width / Depth / Height (O-U)	mm	650 / 650 / 1990			900 / 750 / 2050	
Weight (D version)	kg	197	200	288	315	320
Weight (U version)	kg	197	200	288	290	295
Weight (O version)	kg	197	200	288	290	295

(1) Values are referred to 35°C outdoor temperature, to nominal power supply and the following indoor conditions: -

30°C/39,5%R.H. at the evaporating air intake side for Displacement models - 27°C/47%R.H. at the evaporating air intake side for Under and Over models

(2) Measured with 35°C outdoor temperature, at 2m from the unit, in free field conditions

(3) Referred to: - 30°C/39,5%R.H. at the evaporating air intake side for Displacement models - 27°C/47%R.H. at the evaporating air intake side for Under and Over models

(4) - Referred to 50 Pa as External Static Pressure (ESP).

(5) - Z.E.T.: Zero Energy Temperature, air temperature at which the freecooling mode is able to supply 100% or 50% of the Direct Expansion sensible cooling capacity.

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