

## Liebert HIROSS Profile

Liebert HIROSS is the European leading provider of advanced solutions and services for electronic systems protection. It manufactures and sells High Precision Air Conditioning (HPAC) equipment under Liebert HIROSS and HIROSS brands, and a full range of Uninterruptible Power Supply (UPS) systems, power conditioning and surge suppression products, specifically designed to supply clean, continuous power for critical applications, under the Liebert brand. A strong Service network supports customers and partners all over the world.

Liebert HIROSS cooling systems range from Thermal Management for outdoor enclosures and small footprint units for cellular networks, to larger systems for Telecom Switching Centers, Data Centers and Computer Rooms. Liebert HIROSS core competence in heat management and enclosure technology has resulted in the development of system integration solutions for outdoor BTS.

Power protection products include standalone small UPS units up to larger systems, designed to provide protection and continuity for servers, routers and hubs.

Comprehensive technical support and service are guaranteed 24 hours a day, 365 days a year, wherever customers' units are located. Exclusive remote communication and monitoring techniques ensure significant advantages in terms of reliability and savings on maintenance costs.

Liebert HIROSS belongs to Emerson Network Power, brand group of Emerson. Emerson Network Power provides integrated solutions and can design, build and support customers' entire network power from grid to chip. The global reach, combined with the industry expertise and the technological know-how, allows Emerson Network Power to ensure "high nines" reliability to its clients anywhere in the world. From power components to climate and power systems, Emerson Network Power solves all power reliability needs.

### Liebert HIROSS Headquarters

Via Leonardo da Vinci, 8  
35028 - Piove di Sacco (PD) - Italy  
tel. +39 049 9719111 fax +39 049 5841257  
www.liebert-hiross.com - info@liebert-hiross.com

### High Performance Air Conditioning

Via Leonardo da Vinci, 8  
35028 - Piove di Sacco (PD)  
tel. +39 049 9719111 fax +39 02 9825037  
info.hpac@liebert-hiross.com

### Uninterruptible Power Supply (UPS)

Via Gioacchino Rossini, 6  
20098 - San Giuliano Milanese (MI)  
tel. +39 02 982501 fax +39 02 9825037  
info.ups@liebert-hiross.com

### Liebert HIROSS Services

Via Leonardo da Vinci, 8  
35028 - Piove di Sacco (PD)- Italy  
tel. +39 049 971911 fax +39 049 9719045  
service@liebert-hiross.com

### Liebert HIROSS Austria

Handelskai 102 -112 - 1200 Wien  
tel. +43 1 33189 fax +43 1 33189245

### Liebert HIROSS Czech Republic

Na Pricce 72/6 - 14200 Praha 4  
tel. +42 02 4727954 fax +42 02 4718717

### Emerson Network Power France

124 Avenue Gallieni - 93170 Bagnolet  
tel. +33 1 43600177 fax +33 1 43607007

### Liebert HIROSS Germany

Liebigstrasse 9 - 85551 Kirchheim  
tel. +49 89 9050070 fax +49 89 90500710

### Emerson Network Power Hungary

Etele ut. 68-1115 Budapest  
tel. + 36 1 203 0304 fax. +36 1 203 0308

### Liebert HIROSS Italy

Via Gioacchino Rossini, 6  
20098 - San Giuliano Milanese - Milano  
tel. +39 02 982501 fax +39 02 98250273

### Emerson Network Power Poland

Ul. Konstruktorska, 11A - PL - 02-673 Warszawa  
tel. +48 22 5485260 fax +48. 22 5485261

### Liebert HIROSS Russia

Malaya Trubetskaya Str. 8  
Korp. B, 11th floor - 119881 Moscow  
tel. +7 095 2329473 fax +7 095 2320358

### Liebert HIROSS Spain

Eduardo Torroja, 23  
Poligono Ind. Leganes - 28914 Leganes - Madrid  
tel. +34 902 100494 fax +34 902 181955

### Liebert HIROSS Switzerland

Raefelstrasse 29 - 8045 Zürich  
tel. +41 1 456 50 60 fax +41 1 456 50 70

### Liebert HIROSS United Kingdom

Fourth Avenue, Globe Park - Marlow  
Buckinghamshire - SL71YG  
tel. +44 1628 403200 fax +44 1628 403203

[www.liebert-hiross.com](http://www.liebert-hiross.com)



The Quality Management System of the High Performance Air Conditioning Division of Liebert HIROSS SpA is certified by Lloyd's Register Quality Assurance to ISO 9001:1994.



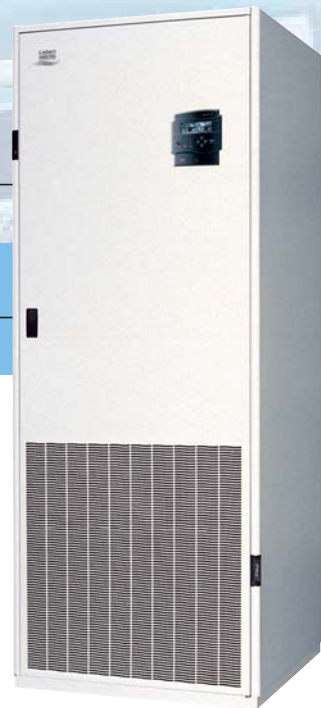
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**Liebert**  
**HIROSS**



**HIMOD Range S**

HIGH PERFORMANCE AIR CONDITIONING



## HIMOD Range S

Complete environmental control and reliability are paramount to ensure faultless operation of computer rooms, telecom installations, data centres and technical applications. Liebert HIROSS products have traditionally set the industry standards. But today's world requires more than just environmental control and reliability; it requires increasingly higher levels of overall performances. While still offering unmatched environmental control and reliability, the new HIMOD range raises the bar of performance in Precision Air Conditioning setting new standards in terms of Energy Efficiency, Compactness and Sound emissions.

### The New HIMOD Range From Liebert HIROSS

The plug fan technology with generously dimensioned heat exchanger, scroll compressors and optimised cooling circuits, maximise efficiency by operating at low levels of energy consumption. This can be further enhanced by the use of Electronically Commutated Fans (EC Fan) reducing power input by 35%.

The down-flow version achieves the highest levels of efficiency (20% better than industry average). The fan in this case is positioned upstream of the evaporator optimising airflow over the coil. Silencer cartridges can be used to further reduce the sound pressure level by up to 5dBA.

The new HIMOD range has been designed to have the smallest possible overall footprint. The compactness of the unit is taken to the extremes in the smaller sizes (4 and 5 kW) where the air outlet plenum is integrated in the unit body in a depth of only 400 mm.

Low sound levels are the result of fan design, optimised airflows and doubled skin insulated panels.

Attention to design detail means low operational costs including product maintenance through high levels of reliability and a service friendly design. As an example, all the crucial parts of the refrigeration circuit (i.e.: thermostatic valves, sight glasses and liquid line driers) are grouped together and accessible simply by opening the front door.

The new HIMOD range is available in a number of airflow versions: with upflow, downflow and displacement airflow patterns across a full range of cooling modes: direct expansion, chilled water, freecooling, dual fluid and constant (for an ultra high temperature and humidity control).



**HIMOD Is Used For Conditioning Critical  
Systems In A Variety Of Key Applications**

## Energy Efficient

### Plug-In Fan

All HIMOD units are equipped with plug fans: direct driven centrifugal fans with backward curved blades and an asynchronous external rotor motor. The new generation of these fans with specifically shaped blades, designed especially for the use in air conditioning cabinets, features a very high mechanical efficiency over a wide operating range. In addition sound radiation is free of tonal noise at the impeller suction and discharge sides.

These fans are designed to have the maximum power consumption at an intermediate operating point therefore there is no risk of motor overloading. The fans are not dependent on a minimum back pressure, as is the case with most centrifugal direct driven fans with forward curved blades. Thanks to the use of plug fans the External Static Pressure is adjustable on site during commissioning, with a range of 0 to 200Pa, according to the installation requirements.



→ 560mm diameter backward curved blades plug-in fan

### Electronically Commutated Fan (EC Fan)

HIMOD units can be supplied with an exclusive fan type, this enables you to greatly increase the unit's efficiency and therefore significantly reduce operating costs. EC fans [Electronically Commutated DC motors] have the added advantage of higher motor efficiencies, up 65% higher than three phase and 45% higher than single phase motors. With an overall improvement of 90% over traditional fan types. As an example a chilled water HIMOD requires 50% lower power input with this option.

The internal electronics of the EC fan are integrated into Liebert HIROSS' controls.

The EC fan design allows a new approach in regulating environmental parameters within HPAC applications. To name a few: constant air volume, constant external static pressure, sound emission optimisation, power input optimisation, cooling capacity regulation. This enables each system to be optimised for the installation. To further emphasise the performance of EC motor compared against an AC motor with frequency converter, the power input required by the EC motor is 13 to 38% lower.



→ HIMOD: Higher efficiency with EC fans technology

### Heat Exchanger Section: Net Sensible Capacity Matters

Efficiency is a fundamental requirement in all applications today. Even more so for technological applications where the operational costs are by far the most significant consideration. Sensible Heat Ratio (SHR) values of greater than 0.90 are required to reduce to a minimum the energy spent controlling humidity during normal operating conditions. Heat exchanger design and a correct air distribution within the unit are two of the most important factors required to achieve optimum performance. HIMOD

units feature up to 55mm<sup>2</sup> coil heat exchanger surface area per Watt of cooling capacity. Sophisticated design and development tools, such as Particle Image Velocimetry and Computational Fluid Dynamics are used by Liebert HIROSS to identify the best components layout in order to achieve an even and pressure-equalised airflow distribution within the case which optimises the entire coil surface area in the heat exchanging process.

## Cooling Version & Airflow Patterns

Saving energy and Minimizing operating costs. Simple but effective design criteria for HIMOD which is available in a wide range of cooling versions: air cooled, self-contained water cooled, with integrated freecooling allowing power input savings whenever the outdoor temperature is 5 degrees below the indoor return temperature, chilled water, dualfluid with both mechanical and chilled water circuits.

Matching remote condensers and dry coolers are available in standard and low noise configuration.

All environmental functions -cooling, reheat, dehumidification, humidification and filtration- are available and all factory tested at normal and extreme conditions to provide the maximum protection of equipment.

### Constant

HIMOD Constant is the solution for systems requiring extremely precise control of temperature and humidity for the most demanding installations and stringent standards.

Typical installations are metrological rooms, laboratories, textile, pharmaceutical, tobacco, paper and precision mechanical industries.

HIMOD Constant, with ducted air delivery, allows temperature and humidity tolerances of  $\pm 0.3^{\circ}\text{C}$  and  $\pm 2\%\text{R.H.}$  respectively. This important result is achieved through an accurate and continuous variation of both cooling capacity and steam production.

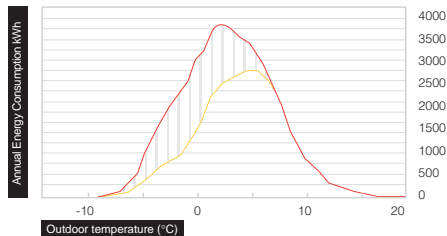
### Displacement

The term 'displacement' defines an air distribution method in which the cool air is supplied with low velocity at the floor level. Room air movement is a result of 'convection' driven by the thermal sources into the room. This stratification creates even temperature gradients throughout the room.

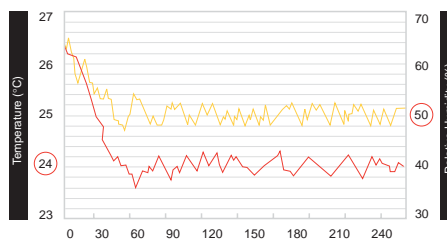
HIMOD Displacement units design and concept allows

- 10% higher cooling capacity per square meter
- lower installation costs
- lower operating costs

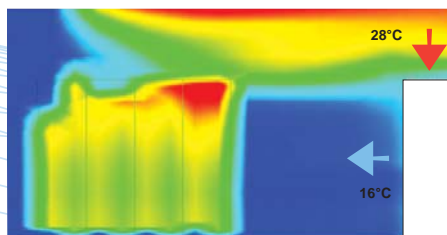
Liebert HIROSS can put its experience and simulation tools at your service to verify how the displacement concept can improve the performance of your system.



→ HIMOD Freecooler: Annual energy savings may be up to 45%  
 Annual Energy Consumption: Freecooler unit (—)  
 Water Cooled unit (—)



→ HIMOD Constant: application with set point  $24^{\circ}\text{C}$ , 50% R.H.  
 Temperature (—)  
 Relative Humidity (—)








→ 16kW heat load room: air temperature distribution of Displacement configuration

## Control



Thanks to the know-how gathered through many years of continuous innovations, Himod is endowed with the most advanced control features. Networking is easy and grants unrivalled system optimisation and energy savings.

-  System temperature & humidity self-adapting to load conditions
-  Networked Multi-Master System with smart stand-by & rotation
-  Data Record in each unit and Graphic Data Record through Hiromatic
-  Intelligent phased start and working hours equalization
-  Wellness calculation to lengthen the unit's life

## Microface Evolution

Microface Evolution is the standard on-board control and its advanced features ensure energy savings and system optimisation.



- Microface Display
- Network up to 16 air conditioners
- Autosetting
- Sequential auto-restart timer
- Volt-free contact
- Real Time Clock data record

## Hiromatic Evolution

Hiromatic Evolution allows configuration and graphic data record access to all of the connected units (up to 8 or 16 Microface in LAN).



- System window & self-explanatory Icons Menu
- On-line Help & Set-up Assistant
- Automatic set-up & commissioning
- Two intelligent teamwork modes
- Wellness calculation

## Supervision Interface Systems-Connectivity

- Hirovisor Software: allows distance monitoring and tele-maintenance
- Hirolink SMM system: SMS messages are sent whenever Microface Alarms take place; temperature and humidity status of the unit are always available on demand via SMS
- Hirolink for BMSs: represents the gateway to the most widespread Building Management Systems including LonWorks
- Communication over IP: (HTTP, SNMP, TCP/IP)

## A Wide Range Of Option And Accessories

### Standard

High efficiency fans with 8 speeds of regulation  
External Static Pressure (ESP) up to 200Pa  
Doubled skin panels, class A0 fireproof  
Scroll compressors  
G4 (EU4) efficiency filters  
C: Constant fluid pressure drop with capacity modulation  
W/H: condensation temperature control through refrigerant by-pass (with constant pressure drops in the hydraulic circuit)  
Liebert HIROSS Microprocessor control

### Option

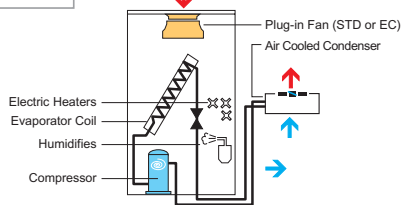
EC fan with integrated digital speed control  
60Hz power supply  
Electric heating  
Hot water & Hot gas re-heating  
Cleanable Electrode Boiler Humidifier  
High Efficiency Filters up to F9 (EU9)  
Silent Cartridges for reduction of PWL & SPL  
Modulating water valve  
Refrigerant non-return valve  
Top and Right hand water connections  
Fresh air inlet  
Inlet & Discharge extension hoods  
Plenum with front discharge grille  
Base frame  
Base module  
Back draught damper  
Bottom air inlet (upflow units)  
Smoke/Fire, Water detections Alarms  
Additional Temperature-Humidity microprocessor-based sensor  
Hiromatic Evolution

## Technical Data

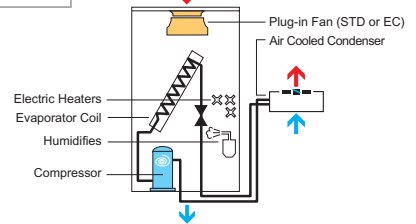
A/W		S04	S05	S07	S10	S12	S13	S17	S20	S23
<b>Performance</b>										
Airflow rate	m <sup>3</sup> /h	1.150	1.350	2.100	2.585	2.695	4.200	4.935	5.200	5.750
Maximum ESP <sup>(1)</sup>	Pa	50	50	100	100	100	150	150	150	150
Sound Pressure Level <sup>(2)</sup>	dB(A)	45,0	46,0	47,0	48,0	50,0	49,0	51,0	51,0	54,0
Total cooling capacity <sup>(3)</sup>	kW	4,6	5,7	8,2	10,6	12,5	14,5	17,3	20,5	26,6
Sensible cooling capacity <sup>(3)</sup>	kW	4,3	5,3	7,7	10,1	11,0	13,8	16,4	19,3	23,6
SHR		0,93	0,93	0,94	0,95	0,88	0,95	0,95	0,94	0,89
EER		3,62	3,61	3,31	3,64	3,56	3,98	3,68	3,63	3,54
Coil Front surface/Rows	m <sup>2</sup> /n°	0,28 / 4	0,28 / 4	0,48 / 3	0,48 / 4	0,48 / 5	0,65 / 3	0,65 / 3	0,65 / 4	0,65 / 5
Number of compressor	n°	1	1	1	1	1	1	1	1	1
Number of fans	n°	1	1	1	1	1	1	1	1	1

## Operational Schemes

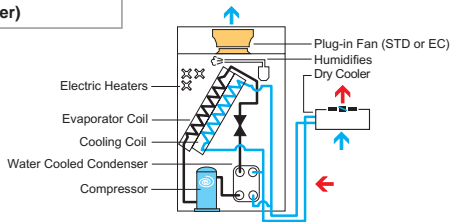
**A - Air cooled Displacement**



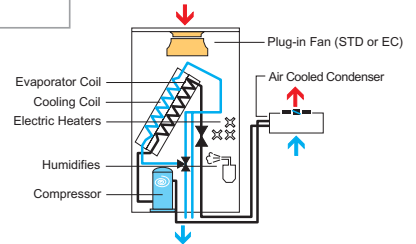
**A - Air cooled Downflow (Under)**



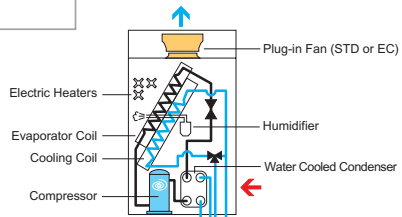
**F - Freecooler Upflow (Over)**



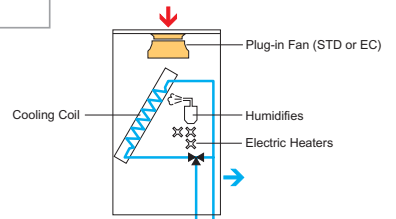
**D - Dualfluid Air cooled Downflow (Under)**



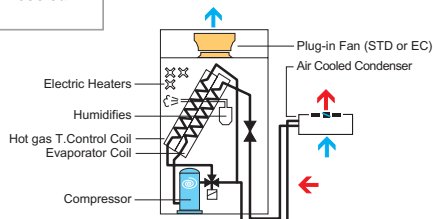
**H - Dualfluid Water cooled Upflow (Over)**



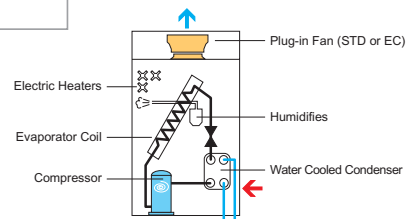
**C - Chilled Water Displacement**



**A - Constant Air cooled Upflow (Over)**



**W - Water cooled Upflow (Over)**



C		S06	S08	S11	S15	S18	S29
<b>Performance</b>							
Airflow rate	m <sup>3</sup> /h	1,395	2,200	2,800	4,500	5,200	6,150
Maximum ESP <sup>(1)</sup>	Pa	50	100	100	150	150	150
Sound Pressure Level <sup>(4)</sup>	dB(A)	46,0	48,0	50,0	50,5	51,0	54,0
Total cooling capacity <sup>(6)</sup>	kW	6,2	9,2	12,6	17,4	22,4	28,8
Sensible cooling capacity <sup>(6)</sup>	kW	5,6	8,5	11,2	16,7	20,3	25,0
Water flow	l/s	0,3	0,5	0,6	0,9	1,1	1,4
Coil Front surface/Rows	m <sup>2</sup> /n°	0.28 / 5	0.47 / 3	0.47 / 4	0.63 / 3	0.63 / 4	0.63 / 5
Number of fans	n°	1	1	1	1	1	1

F		S17	S20	S23
<b>Performance</b>				
Airflow rate	m <sup>3</sup> /h	4,685	4,940	5,460
Maximum ESP <sup>(1)</sup>	Pa	120	120	120
Sound Pressure Level <sup>(2)</sup>	dB(A)	51,0	52,0	54,0
Sound Pressure Level <sup>(4)</sup>	dB(A)	50,5	51,5	54,0
Total cooling capacity <sup>(6)</sup>	kW	17,7	20,6	25,9
Sensible cooling capacity <sup>(6)</sup>	kW	16,1	18,6	22,1
SHR		0,91	0,90	0,85
EER		3,59	3,66	3,47
ZET (Zero Energy Temp.)	°C	3,5	3,5	3,5
Coil Front surface/Rows	m <sup>2</sup> /n°	0.56 / 3+4	0.56 / 4+5	0.56 / 4+5
Number of compressor	n°	1	1	1
Number of fans	n°	1	1	1

D/H		S17	S20	S23
<b>Performance</b>				
Airflow rate	m <sup>3</sup> /h	4,685	4,940	5,460
Maximum ESP <sup>(1)</sup>	Pa	120	120	120
Sound Pressure Level <sup>(2)</sup>	dB(A)	51,0	52,0	54,0
Sound Pressure Level <sup>(4)</sup>	dB(A)	50,5	51,5	54,0
Total cooling capacity <sup>(6)</sup>	kW	17,7	20,6	25,9
Sensible cooling capacity <sup>(3)</sup>	kW	16,1	18,6	22,1
SHR		0,91	0,90	0,85
EER		3,59	3,66	3,47
Total cooling capacity <sup>(6)</sup>	kW	14,2	19,0	20,3
Coil Front surface/Rows	m <sup>2</sup> /n°	0.56 / 3+4	0.56 / 4+5	0.56 / 4+5
Number of compressor	n°	1	1	1
Number of fans	n°	1	1	1

- 1) Maximum available External Static Pressure for the indicated airflow
- 2) At 1m height, 2m front distance; free field; compressor(s) and fan(s) operating
- 3) At the following standard conditions: 400V/3ph/50Hz (208-230-380-460V/3ph/60Hz) power supply; 24°Cdb-17°Cwb-, 50% R.H. indoor conditions; 20Pa available External Static Pressure; 45°C condensing temperature; refrigerant R407C
- 4) At 1m height, 2m front distance; free field; fan(s) operating
- 5) At the following standard conditions: 400V/3ph/50Hz (208-230-380-460V/3ph/60Hz) power supply; 24°Cdb-17°Cwb-, 50% R.H. indoor conditions; 30% glycol; 20Pa available External Static Pressure; 35°C outdoor temperature (50°C condensing temperature, 38°C inlet mixture temperature); refrigerant R407C
- 6) At the following standard conditions: 400V/3ph/50Hz (208-230-380-460V/3ph/60Hz) power supply; 24°Cdb-17°Cwb-, 50% R.H. indoor conditions; 20Pa available External Static Pressure; 7/12°C inlet/outlet water temperature

## Dimensions And Weights

Model	Depth	Net Weights(A)	Net Weights(F)
A	mm	kg	kg
S04	400	160	
S05	400	170	
S07	500	195	
S10	500	210	
S12	500	215	
S13	750	240	
S17	750	250	290
S20	750	260	310
S23	750	270	320

Model	Depth	Weights
C	mm	kg
S06	400	135
S08	500	150
S11	500	165
S15	700	190
S18	750	210
S29	750	230

