Liebert HIROSS

High Performance Air Conditioning

Himod

4-80 kW Indoor Room Cooling Units

EMERSON™ Network Power

High Performance Air Conditioning

Himod

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. Today's world requires more than just environmental control and reliability; it requires nevertheless high levels of overall performances. HIMOD is the Room Cooling range of Liebert Hiross from Emerson Network Power. While still offering unmatched environmental control and reliability, the HIMOD range raises the bar of performance in Precision Air Conditioning setting new standards in terms of Energy Efficiency, Compactness and Sound Emissions.





High Efficiency Standards

The plug fan technology with generously dimensioned heat exchanger, scroll compressors and optimised cooling circuits, maximises 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 30%.

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.

Compact Footprint

The HIMOD range has been designed to have the smallest possible overall footprint across the all range. 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.

Quietness

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

Maintainability

Attention to design details 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.

Wide range available

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

Fan Section

Plug-In Fan

All HIMOD units are equipped with plug in 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 optimal power absorption across the whole airflow range, therefore there is no risk of motor overheating. The fans don't need a minimum back pressure, as is the case with most centrifugal direct driven fans with forward curved blades.
Thanks to the use of plug in fans the External Static Pressure is adjustable on site during commissioning, from 0 to up to 300 Pa,according to the required airflow.

560mm diameter backward curved blades plug-in fan

Electronically Commutated Fan (EC Fan)

HIMOD units can be supplied with an exclusive fan type, which 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 45% higher than three phase and 65% higher than single phase motors. 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.
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.

Higher efficiency with EC fans technology

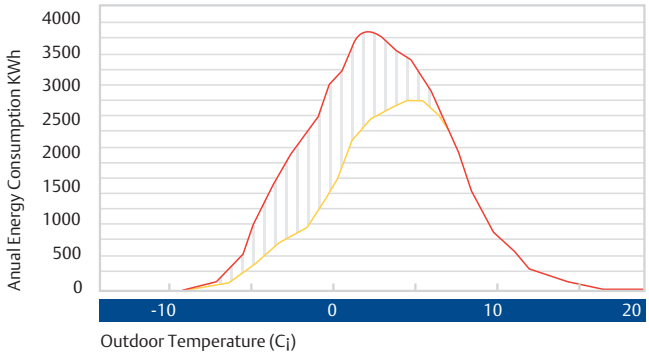
Heat Exchanger Section

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.
Sophisticated design and development tools, such as Particle Image Velocimetry and Computational Fluid Dynamics are used in all Liebert HIROSS products to identify the best components layout in order to achieve an even and pressureequalised airflow distribution within the case which optimises the entire coil surface area in the heat exchanging process.

Cooling Version & Airflow Pattern

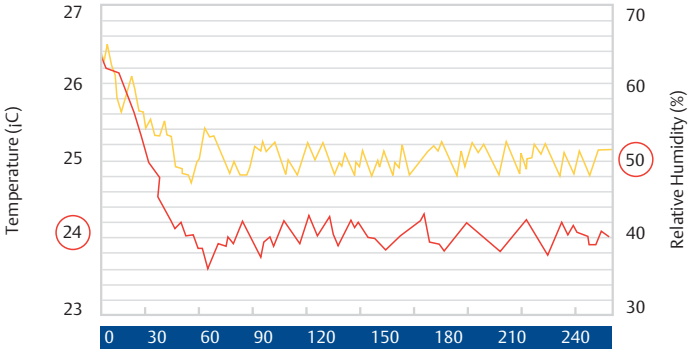
Saving energy and minimizing operating costs. Simple but effective criteria distinguish HIMOD design. It is available in a wide range of cooling versions: air cooled, self-contained water cooled, with integrated freecooling allowing power input savings whenever the outdoor temperature is 5 degrees below 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.



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

Constant Version

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 ±0.3°C and ±2%R.H. respectively. This important result is achieved through an accurate and continuous variation of both cooling capacity and steam production.



HIMOD Constant: application with set point 24°C, 50% R.H.
Relative Humidity Temperature

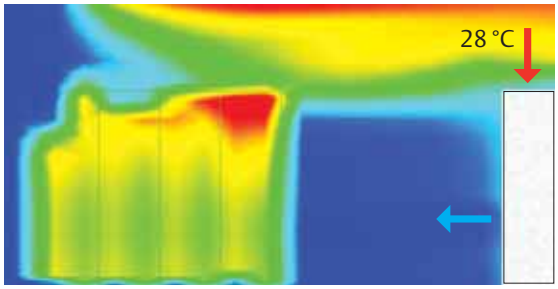
Displacement Version

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

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



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 onboard 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 Control

- Hirovisor Software: allows distance monitoring and telemaintenance
- 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 wide spread Building Management Systems including LonWorks
- Communication over IP: (HTTP, SNMP, TCPIP)

A Wide Range Of Option And Accessories

Standard

- High efficiency fans with 7 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 bypass (with constant pressure drops in the hydraulic circuit)
- Liebert HIROSS Microprocessor control

Options

- 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 - Direct Expansion Version Air Cooled and Water Cooled

Air Delivery: Upflow and Downflow

Model		S04	S05	S07	S10	S12	S13	S17	S20	S23
Performances[1]										
Total cooling capacity	kW	4,6	5,7	8,2	10,6	12,5	14,5	17,3	20,5	26,6
Sensible cooling capacity	kW	4,3	5,3	7,7	10,1	11,0	13,8	16,4	19,2	23,6
SHR		0,93	0,93	0,94	0,95	0,88	0,95	0,95	0,94	0,89
EER		3,29	3,35	3,28	3,66	3,57	3,82	3,68	3,42	3,41
Number of compressors	n°	1	1	1	1	1	1	1	1	1
Number of fans	n°	1	1	1	1	1	1	1	1	1
Airflowrate	m^3/h	1150	1350	2100	2600	2700	4200	4950	5200	5750
Maximum ESP Downflow/Upflow[2]	Pa	200/250	170/180	240	130	80	280	220	400	270
Sound Pressure Level[3] downflow	dB(A)	45,5	46,4	47,3	48,2	50,5	49,0	51,3	51,5	54,4
Width	mm	750	750	750	750	750	750	750	750	750
Depth	mm	400	400	500	500	500	750	750	750	750
Net Weight	kg	160	170	195	210	215	240	250	260	270

Model		M25	M29	M31	M34	M35	M41	M42	M47	M50	M58	M66
Performances[1]												
Total cooling capacity	kW	26,5	29,7	31,3	36,2	37,0	45,8	42,8	53,7	54,9	60,1	70,3
Sensible cooling capacity	kW	24,2	27,2	30,3	34,1	35,1	43,4	41,5	49,0	49,3	52,7	58,5
SHR		0,91	0,92	0,97	0,94	0,95	0,95	0,97	0,91	0,90	0,88	0,83
EER		3,58	3,35	3,51	3,62	3,58	3,52	3,63	3,45	3,59	3,40	3,49
Number of compressors	n°	1	1	1	2	1	1	2	1	2	2	2
Number of fans	n°	1	1	1	1	1	2	2	2	2	2	2
Airflowrate	m^3/h	6340	7080	9440	10120	10430	11230	11370	12250	12240	12910	13470
Maximum ESP Downflow/Upflow [2	Pa	360	240	360	280	240	380	380	300	300	240	170
Sound Pressure Level [3] downflow	dB(A)	53	55	58	61	61	58	58	60	59	61	63
Width	mm	1000	1000	1750	1750	1750	1750	1750	1750	1750	1750	1750
Depth	mm	850	850	850	850	850	850	850	850	850	850	850
Net Weight	kg	425	430	575	590	580	600	600	620	635	650	670

Air Delivery: Displacement

Model		S04	S05	S07	S10	S12	S13	S17	S20	S23	M25	M29
Performances[1]												
Total cooling capacity	kW	4,4	5,5	7,7	10,4	12,2	14,3	17,0	20,2	26,5	26,4	29,5
Sensible cooling capacity	kW	3,9	4,8	6,6	9,3	10,3	13,1	15,4	17,9	22,6	23,6	26,5
SHR		0,89	0,87	0,86	0,89	0,84	0,92	0,91	0,89	0,85	0,89	0,90
EER		3,33	3,21	3,14	3,61	3,53	3,84	3,70	3,52	3,48	3,56	3,39
Number of compressors	n°	1	1	1	1	1	1	1	1	1	1	1
Number of fans	n°	1	1	1	1	1	1	1	1	1	1	1
Airflowrate	m^3/h	970	1160	1630	2280	2430	3790	4430	4490	5330	6020	6730
External Static Pressure ESP	Pa	0	0	0	0	0	0	0	0	0	0	0
Sound Pressure Level[3] downflow	dB(A)	47,2	48,3	55,0	57,5	58,2	58,5	59,3	59,5	62,8	62	64
Width	mm	750	750	750	750	750	750	750	750	750	1000	1000
Depth	mm	400	400	500	500	500	750	750	750	750	850	850
Net Weight	kg	160	170	195	210	215	240	250	260	270	425	430

S models and M25 are also available in "Constant Version" with Upflow Delivery

Technical Data D/H - Dual Fluid Version Air Cooled and Water Cooled

Air Delivery: Upflow and Downflow

Model		S17	S20	S23	M25	M31	M34	M35	M41	M42	M47	M50	M58
DX Performances[1]													
Total cooling capacity	kW	17,2	20,2	25,5	25,7	31,1	34,2	35,3	43,9	41,1	51,6	51,7	57,1
Sensible cooling capacity	kW	15,6	18,0	21,5	22,7	29,4	31,0	32,4	40,2	38,0	45,7	45	48,6
SHR		0,91	0,89	0,84	0,88	0,95	0,91	0,92	0,92	0,92	0,88	0,87	0,85
EER		3,66	3,37	3,31	3,31	3,33	3,30	3,30	3,27	3,36	3,25	3,33	3,16
Chilled Water Performances[1]													
Total cooling capacity	kW	12,20	16,70	18,20	29,3	42,5	44,8	45,0	56,3	56,8	60,1	60,1	62,5
Sensible cooling capacity	kW	12,20	16,20	17,70	24,8	35,4	37,6	37,8	46,1	46,6	49,6	49,6	51,9
SHR		1,00	0,97	0,97	0,85	0,83	0,84	0,84	0,82	0,82	0,83	0,83	0,83
Number of compressors	n°	1	1	1	1	1	2	1	1	2	1	2	2
Number of fans	n°	1	1	1	1	1	1	1	2	2	2	2	2
Airflowrate	m^3/h	4680	4930	5470	6340	8850	9490	9540	11230	11370	12250	12240	12910
Maximum ESP Downflow/Upflow[2]	Pa	190/220	300	235/220	270/300	390/400	320/300	310/320	340	330	250	250	190
Sound Pressure Level[3] downflow	dB(A)	51,4	52,2	54,4	55,0	59,6	61,1	61,2	59,1	59,0	60,9	60,8	62,9
Width	mm	750	750	750	1000	1750	1750	1750	1750	1750	1750	1750	1750
Depth	mm	750	750	750	850	850	850	850	850	850	850	850	850
Net Weight	kg	290	310	320	510	715	725	720	730	745	740	755	770

Technical Data F - Freecooling Version

Air Delivery: Upflow and Downflow

Model		S17	S20	S23	M25	M31	M34	M35	M41	M42	M47	M50	M58
Performance[1]													
Total cooling capacity	kW	15,8	18,7	23,1	24,0	28,8	31,9	32,7	40,4	38,2	47,8	47,8	53,2
Sensible cooling capacity	kW	15,0	17,3	20,5	22,0	28,4	30,0	31,2	38,6	36,8	43,9	43,2	46,9
SHR		0,95	0,93	0,89	0,92	0,99	0,94	0,95	0,96	0,96	0,92	0,90	0,88
EER		2,93	2,71	2,52	2,72	2,66	2,74	2,67	2,63	2,75	2,60	2,66	2,55
Number of compressors	n°	1	1	1	1	1	2	1	1	2	1	2	2
Number of fans	n°	1	1	1	1	1	1	1	2	2	2	2	2
Airflowrate	m^3/h	4685	4940	5460	6340	8850	9490	9540	11230	11370	12250	12240	12910
Maximum ESP Downflow/Upflow[2]	Pa	210/230	300	250/270	270/300	390/400	320/300	310/320	340	330	250	250	190
Sound Pressure Level[3] downflow	dB(A)	51,4	52,2	54,4	55	59,6	61,1	61,2	59,1	59,0	60,9	60,8	62,9
Width	mm	750	750	750	1000	1750	1750	1750	1750	1750	1750	1750	1750
Depth	mm	750	750	750	850	850	850	850	850	850	850	850	850
Net Weight	kg	290	310	320	510	715	725	720	730	745	740	755	770

(1) At the following standard conditions:
20 Pa Available External Static Pressure for Downflow units, 50 Pa for Upflow units
- Direct Expansion Performances: 24°Cdb-17°Cwb-, 50% R.H. indoor conditions; 45°C condensing temperature; refrigerant R407C
- Chilled Water Performances: 24°Cdb-17°Cwb-, 50% R.H. indoor conditions; 7/12°C inlet/outlet water temperature
- Free Cooling Performances: 24°Cdb-17°Cwb-, 50% R.H. indoor conditions;30% glycol; 35°C outdoor temperature with suggested outdoor drycooler; refrigerant R407C

(2) Maximum Available External Static Pressure for the indicated airflow
(3) At 1,5m height, 2m front distance; free field; compressor(s) and fan(s) operating.
(4) At 1,5m height, 2m front distance; free field; fan(s) operating.

Technical Data C - Chilled Water Version

Air Delivery: Upflow and Downflow

Model		S06	S08	S11	S15	S18	S29	M44	M55	M66	M77
Performance[1]											
Total cooling capacity[1]	kW	6,2	9,2	12,6	17,5	22,4	28,8	43,6	58,6	68,8	83,5
Sensible cooling capacity[1]	kW	5,6	8,5	11,2	16,7	20,3	25,0	34,7	49,7	56,2	64,8
SHR		0,90	0,92	0,89	0,95	0,91	0,87	0,80	0,85	0,82	0,78
Water flow	l/s	0,30	0,44	0,60	0,83	1,07	1,38	2,08	2,79	3,28	3,71
Number of fans	n°	1	1	1	1	1	1	1	2	2	2
Airflowrate	m^3/h	1395	2200	2800	4500	5200	6150	8150	12740	13650	14220
Maximum ESP Downflow/Upflow[1]	Pa	30/50	190/210	40/70	210	380	200	170	340	245	170
Sound Pressure Level[4]	dB(A)	46,1	48,3	50,5	50,4	51,4	54,5	55	58	60	62
Width	mm	750	750	750	750	750	750	1000	1750	1750	1750
Depth	mm	400	500	500	750	750	750	850	850	850	850
Net Weight	kg	135	150	165	190	210	230	330	480	550	600

Air Delivery: Displacement

Model		S06	S08	S11	S15	S18	S29	M44
Performance[1]								
Total cooling capacity[1]	kW	5,6	8,5	11,9	16,2	20,6	26,5	40,6
Sensible cooling capacity[1]	kW	4,8	7,7	10,4	15,2	18,3	22,6	32
SHR		0,86	0,91	0,87	0,94	0,89	0,85	0,79
Number of fans	n°	1	1	1	1	1	1	1
Airflowrate	m^3/h	1190	1980	2575	4050	4590	5445	7400
External Static Pressure ESP	Pa	0	0	0	0	0	0	0
Sound Pressure Level[4]	dB(A)	48,1	56,2	57,1	58,8	59,0	62,7	63
Width	mm	750	750	750	750	750	750	1000
Depth	mm	400	500	500	750	750	750	850
Net Weight	Kg	135	150	165	190	210	230	330

S Models

M Models with one door opening:

M25 - M29
- *Direct expansion;*
- *Dual Fluid;*
- *freecooling*

M44
- Chilled water

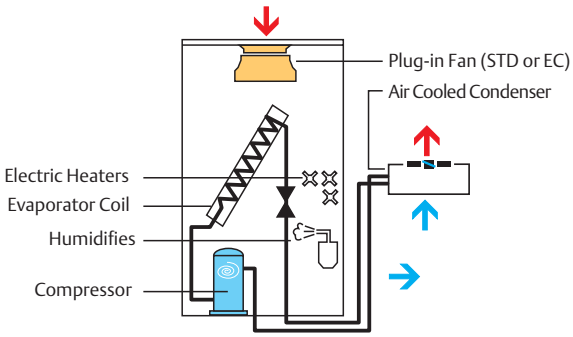
M Models with two doors opening:

M31 / M66
- *Direct expansion;*
- *Dual Fluid;*
- *freecooling*

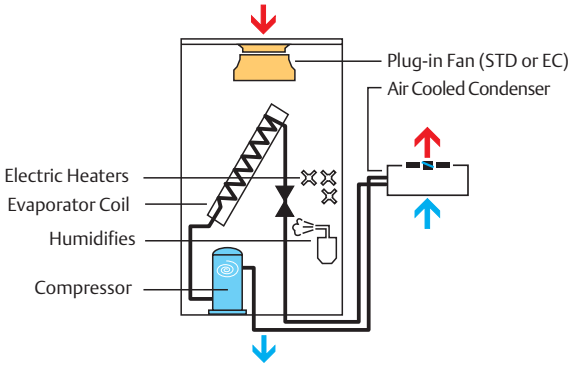
M55 - M66 - M77
- Chilled water

Operational Schemes

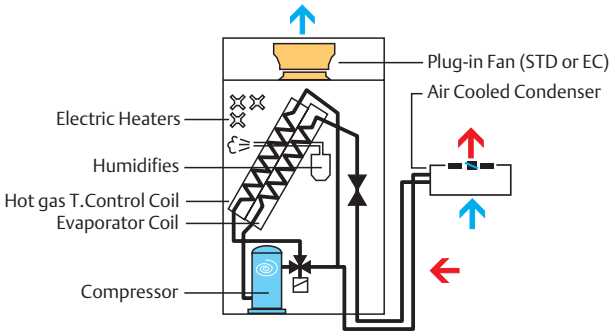
A - Air cooled Displacement



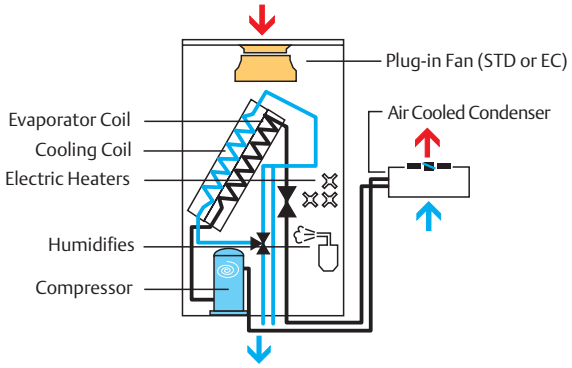
A - Air cooled Downflow (Under)



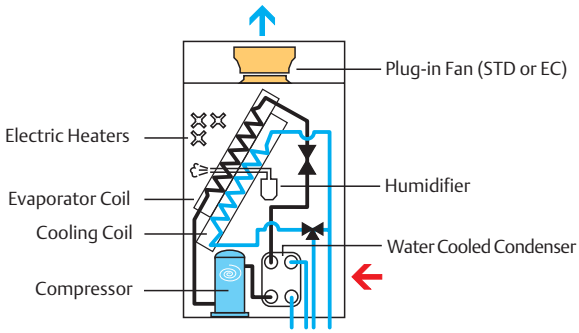
F - Freecooling Upflow (Over)



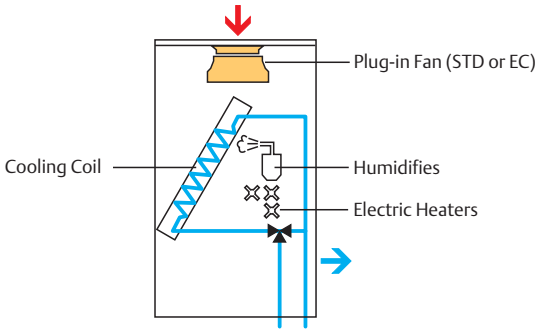
D - Dualfluid Air cooled Downflow (Under)



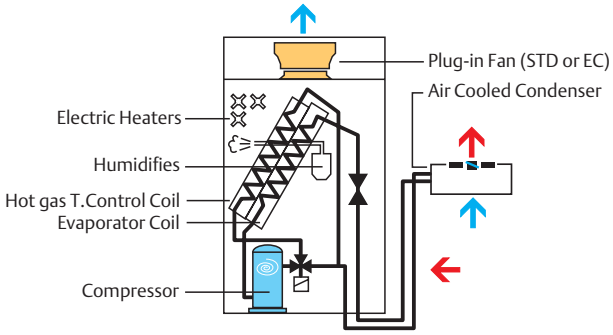
H - Dualfluid Water cooled Upflow (Over)



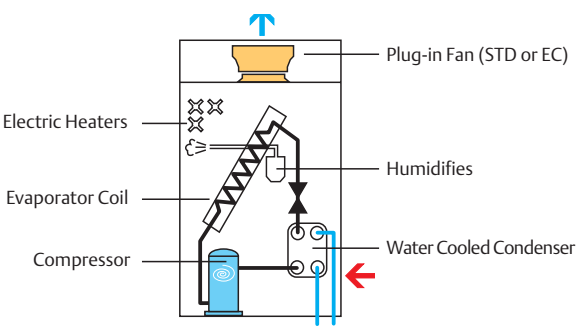
C - Chilled Water Displacement



A - Constant Air cooled Upflow (Over)



W - Water cooled Upflow (Over)



103333 E/ 09-04/Conte+Oggioni+Partners/Printed in Italy

Emerson Network Power

Liebert HIROSS is a brand of **Emerson Network Power.** A part of Emerson Co., **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. St.Louis-based **Emerson Co**. is a global leader in bringing technology and engineering together to provide innovative solutions to customers in electronics and telecommunications, process control, industrial automation, heating, ventilating and air conditioning, appliance and tools. Emerson Co. has more than 60 divisions selling products in more than 150 countries, employing over 120,000 people.

Liebert HIROSS Headquarters
Via Leonardo da Vinci, 8
35028 - Piove di Sacco (PD)- Italy
tel. +39 049 9719111 fax +39 0495841257
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 0495841257
info.hpac@liebert-hiross.com

Uninterruptible Power Supply (UPS)
Via Gioacchino Rossini, 6
20098 - San Giuliano Milanese (MI)
tel. +39 02 98250 1 fax +39 02 98250337
info.ups@liebert-hiross.com

Liebert HIROSS Services
Via Leonardo da Vinci, 8
35028 - Piove di Sacco (PD)- Italy
tel. +39 049 9719111 fax +39 0499719045
service@liebert-hiross.com

Liebert HIROSS in Europe

Emerson Network Power GesmbH - Austria
Handelskai 102-112 - 1200 Wien
tel. +43 1 331890 fax +43 1 331892450

Emerson Network Power NV - Belgium
Interleuvenlaan 50 B-3001 LEUVEN
tel. +32 16 380222 fax. +31 16 380227

Liebert HIROSS - Czech Republic
Na Pricce 72/6 – 14200 Praha 4
tel. +42 02 41727954
fax +42 02 41718717

Emerson Network Power S.A. - France
124 Avenue Gallieni - 93170 Bagnolet
tel. +33 1 43600177 fax +33 1 43607007

Emerson Network Power GmbH- Germany
Liebigstrasse 9 - 85551 Kirchheim
tel. +49 89 9050070 fax +49 89 90500710

Emerson Network Power Kft. - Hungary
1146 Budapest
Erzsébet királyné útja 1/c
tel. + 36 1 273 3890 fax. +36 1 422 0621, +36 1 273 3897

Liebert HIROSS Italia S.r.L. - Italy
Via Gioacchino Rossini, 6
20098 - San Giuliano Milanese - Milano
tel. +39 02 982501 fax +39 02 98250273

Emerson Network Power B.V. - Netherlands
Rooseindsestraat 29
5705 BP HELMOND
tel. +31 492 508520 fax. +31 492 508525

Emerson Network Power Sp z.o.o. Poland
Ul. Konstruktorska, 11A - PL - 02-673 Warszawa
tel. +48 22 5485260 fax +48 22 5485261

Emerson Network Power and Liebert HIROSS – RUSSIA, CIS
Malaya Trubetskaya Str. 8
Korp. B, 11th floor - 119881 Moscow
tel. +7 095 2329473 fax +7 0952320358

Emerson Network Power SA- Spain
Eduardo Torroja, 23
Poligono Ind. Leganes - 28914 Leganes - Madrid
tel. +34 91 4957700 fax + 34 9149578 49

Emerson Network Power AG Switzerland
Raeffelstrasse 29 - 8045 Zürich
tel. +41 1 456 50 60 fax +41 1 456 50 70

Emerson Network Power Ltd United Kingdom
Fourth Avenue, Globe Park - Marlow
Buckinghamshire - SL71YG
tel. +44 1628 403200 fax +44 1628 403203

www.liebert-hiross.com

The Quality Management System of the High Performance Air Conditiong Division of Liebert HIROSS SpA is certified by Lloyd's Register Quality Assurance to ISO 9001:2000