

Liebert
HIROSS



MATRIX

HIGH PERFORMANCE AIR CONDITIONING



TELECOMMUNICATIONS INDUSTRY
AND TECHNOLOGICAL FACILITIES
APPLICATIONS

Today we are one of the largest suppliers of equipment for telecommunications and computer room installations, dealing rooms, clean rooms, high security and other critical installations, with an impressive customer list which includes thousands of companies, large and small, around the world. We place a high priority on using the most advanced technology, designed and built to stringent ISO9000 standards, and we continue to invest heavily in research and development.

MATRIX is the new **Liebert HIROSS** product line of air-cooled chillers designed to combine the best performance in terms of efficiency and reliability with the lowest impact on the environment.

Utilising semi-hermetic screw compressors specifically designed for air conditioning applications, the new series stands out for its unrivalled efficiency and low sound emissions.

The 'Superchiller' execution, with built-in freecooling section, and '**Supersaver**' system, providing complete integration with indoor air conditioning units, allow the achievement of extraordinary energy savings and increased system lifetime and reliability.

With **@connectivity**, a highly sophisticated way to let the system components communicate, **MATRIX** is part of the network created for an improved operations management system.

The **@connectivity** plug-in allows the setting of different working modes for **MATRIX** models in different situations, from heat load variation to unbalanced heat load distribution.

MATRIX
solutions committed to your business.

- TELECOMMUNICATIONS INDUSTRY
- COMPUTER ROOMS
- INTERNET SERVICE PROVIDERS
- CO-LOCATION CENTRES
- DEALER ROOMS
- PROCESS COOLING



Welcome
Total reliability

MATRIX
Newest Technology
Maximum Reliability



MATRIX

SOLUTION





CONNECTIVITY



COMMITTED TO YOUR BUSINESS



MATRIX solutions

Integration with indoor air conditioners

A special working mode can be set up in combination with Liebert HIROSS HPAC indoor units to obtain the "Supersaver" system, that enhances the energy saving capabilities and thus optimises the SEER [Seasonal Energy Efficiency Ratio] of the system. Through a simple 2-wire connection information on the cooling needs of the air conditioners is available to the MATRIX units, that will manage their resources (compressors and free cooling) in the most efficient way in order to save additional energy. This solution does not require any modification, thus avoiding additional components which could undermine the reliability of the system.

@ Connectivity



When the room units are equipped with Microface Evolution, it is possible to maximise the energy savings and improve the total operation management.

The solution is @connectivity, which is a highly sophisticated way to let the system components (the Air-Conditioners as well as the MATRIX units, Chiller and Superchiller executions) talk to each other. The @connectivity plug-in allows the setting of different working modes for different situations, such as: higher water temperature in low load operation (energy saving); lower water temperature for dehumidification (better performance); special "night" Setpoint (energy saving & noise reduction); lower water temperature if one or more Air Conditioners fail (keep capacity in emergency situations); . . . and much more!

Unequaled efficiency and energy saving

The use of semi-hermetic screw compressors of the latest generation; shell and tube evaporators selected for R407C application; aerodynamic profiled blade fans with high efficiency nozzles and continuous speed regulation; large surface W-shaped condenser coils with integrated sub-cooling circuits and the advanced features of the microprocessor control ensure the achievement of unequalled efficiency figures.

Freecooling Module

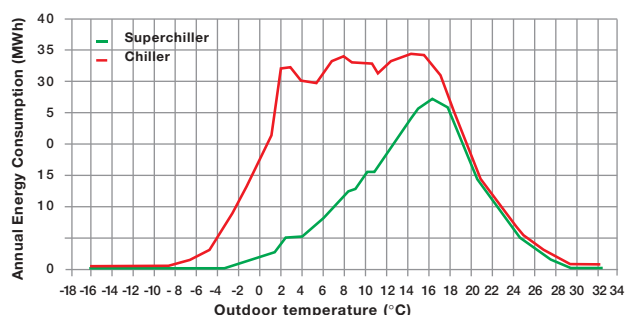
The 'Superchiller' execution, with built-in free cooling section, allows MATRIX to take advantage of low outdoor air temperatures in the water cooling process in order to save energy, by avoiding compressor operation.

A three-way valve arrangement permits the coolant to be diverted via the additional heat exchangers before being fed into the cooling evaporator. This means that even if the outside ambient temperature is not low enough to provide the complete cooling load, a significant reduction in the running costs of the system can be made whenever the ambient temperatures falls below the coolant inlet temperature.

Reduced space requirements in comparison with a conventional chiller plus a dry-cooler, are obtained through the Superchiller execution's compact design and the reduction of the compressors' working hours offers exceptional savings both in the long and short term.

The different strategies adopted by Liebert HIROSS' microprocessor control in managing the various components, - fans, compressors, regulation valves - and operating modes - mechanical and/or freecooling-together with the compressors' continuous partialisation ensure typical energy savings greater than 35%.

ANNUAL ENERGY CONSUMPTION: Chiller vs. Superchiller



Seasonal efficiency

The Superchiller execution finds its best application in combination with the Supersaver system which regulates the coolant temperatures according to the variation of the thermal load, increasing the numbers of hours during which free cooling is possible. The percentage of energy saving can thus be greater than 45%.

Reliability

The MATRIX series is equipped with two or four semi-hermetic screw compressors which represent state-of-the-art technology in this sector. They have been designed and optimised for air-cooled water chillers within air conditioning applications.

Extremely low noise operation and the absence of vibrations aid the installation of the unit in city sites requiring strict noise limits.

Furthermore, MATRIX multi-compressor design with two/four independent refrigeration circuits allows maximum internal redundancy and thus system reliability.

High outdoor temperature

The oversizing of heat exchangers and the wide operating range of the screw compressors permit the use of MATRIX units in high temperature environments as well. - Up to 47°C at 100% full load.

Low sound emission

The MATRIX series is characterised by unrivalled low sound emissions, in particular the Quiet 'Q' version models. A sound-proofed compressors enclosure, special flexible piping instead of traditional dampers and mufflers on the discharge line and a sickle-shaped fan blade design contribute to the achievement of such performance.

MATRIX



Microface Evolution

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

Full management of the MATRIX units is allowed by the on-board control, Microface Evolution, which allows the programming of temperature and pressure thresholds as well as the teamwork functionality through the proprietary Hirobus system. The complete set-up can be carried out using the simple Operating Display that, through symbols and codes, ensures a reliable and flexible man-machine interface.

Immediate set-up can be available through the "Unit Code" system. In case of re-configuration needs, the full configuration of the unit and recalculation of all the thresholds levels (which depend on the refrigerant type) are available by simply enabling the configuration by Unit Code.

Sequential auto-restart timer allows the phased restart of units after a power failure.

Pumps' durability is granted by a special auto-rotation start-up function.

The record of the working hours of compressors, pumps and freecooling is easily available via the local Microface display.

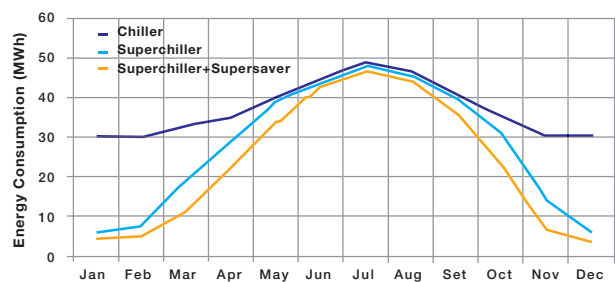
Auto-selection of the best control strategy at different ambient temperatures is implemented in order to assure optimised usage of the compressors and condensers fans.

The "Ambient compensation" function can be enabled to make the unit set-point rise automatically during warm periods, permitting energy savings.

For low noise versions with fan speed control there is a special algorithm which, together with the compressor management, enables the fan speed to always be kept to the minimum.

Compressors' Run/Stop time management is implemented in order to optimise the compressors' operations either within the unit, or, in case of networking via Hirobus, within the whole of the MATRIX units system.

Supersaver working mode.



All settings are protected through a 3-Level Password system. An Input for Remote on-off control and Volt-free contacts for simple remote monitoring of alarms and warnings are available.

Up to 16 MATRIX can be easily linked together on a network to provide teamwork mode, stand-by operation and duty cycling without additional hardware. Reliability is not affected if there are problems on the data communication buses, because the units return automatically to the stand-alone mode.

MATRIX controls



Hiromatic Evolution

All Liebert HIROSS MATRIX units are equipped with the latest electronic technology; one of the highlights is the new HIROMATIC EVOLUTION, with 32 Kbyte of buffered RAM to store data and with an integrated RS-422/485 for the Hirolink communication manager connection.

The new ergonomic design also allows its use as a portable device for, start-up and "flying connections" by service personnel. Hiromatic Evolution can locally manage up to 16 MATRIX units (or up to 8 when linked to supervision systems) connected via the high speed communication Hirobus cable.

A multi-language menu with on-the-fly language selection is available. Hiromatic Evolution offers the possibility to access all the units connected on the Microface LAN system from one point.

Hiromatic System Window: Displays the system operation status at a glance.

Self-explanatory Icons: Used for the Menu-Layout of the Hiromatic Evolution.



Online Help: Every single parameter has its own multi-page explanation.

Status Report: The latest 200 event-messages are stored for the system (which represent the summary of the reports of all the connected units) and 200 event-messages are available for each single unit. By connecting one Hiromatic equipped with MATRIX software, or Hirovisor 2000/IP it is possible to upload all the information present in each Microface.

Four different Graphic Data Records: These are provided for each unit, showing the temperature and humidity trends for the last 24 hours and 8 days. (Each unit's record remains stored in the Microface E and is visible by Hiromatic E or by Hirovisor 2000/IP). Hiromatic Evolution creates and saves its own Graphic Data Record with the average of all the units connected.

Timer Mode: Electronic timer included in the Software to select the time-related functionality of the system.

Semi or Full Manual Mode software management including all safety devices.

4-Level Passwords system: To safely protect all the settings.



MATRIX Connectivity

Microface and Hiromatic Evolution allow Connectivity with superior levels of control and supervision systems:

Hirolink SMM: can send SMS messages of Microface and system alarms, also indicating the number of units connected in the network. On receipt of a message request the unit will answer in one sms-message with the most important values, such as: actual temperatures, setpoints, number of compressors in operation, condensing pressure & alarm status.

Hirovisor 2000/IP software: Allows distance monitoring and telemaintenance plus data storing. The IP version allows the use of the IP protocol for web visualization and connection via ethernet on a personal computer, for archiving purposes.

Hirolink for BMSs: The communication manager which allows the integration of the MATRIX Chillers into the most diffused Building Management Systems.

Technical features

MATRIX - Chiller execution

STANDARD		Performance ⁽¹⁾								
Model		CBS037	CBS042	CBS051	CBS059	CBS069	CBS084	CBS102	CBS118	
Cooling capacity	kW	361	421	517	598	702	842	1,035	1,196	
Compressors power input	kW	126	142	167	192	217	284	334	384	
Compressors COP		2.87	2.96	3.10	3.12	3.24	2.96	3.10	3.12	
Unit EER		2.65	2.69	2.85	2.85	2.95	2.69	2.85	2.85	
Airflow rate	m ³ /h	122,800	160,800	156,800	196,000	235,200	321,600	313,600	392,000	
SPL (Sound Pressure Level) ⁽²⁾	dB(A)	77	77	77	78	79	80	80	81	
PWL (Sound Power Level) ⁽³⁾	dB(A)	97	97	97	98	99	101	101	103	
Capacity control		25 → 100% stepless					12.5 → 100% stepless			
Operating weight	kg	4,205	4,492	5,357	5,950	6,651	8,794	10,524	11,695	

LOW NOISE		Performance ⁽¹⁾								
Model		CLS037	CLS042	CLS051	CLS059	CLS069	CLS074	CLS084	CLS102	
Cooling capacity	kW	361	418	522	596	670	722	836	1,043	
Compressors power input	kW	126	143	165	192	229	251	287	331	
Compressors COP		2.87	2.92	3.15	3.10	2.92	2.87	2.92	3.15	
Unit EER		2.71	2.77	2.98	2.92	2.79	2.71	2.77	2.98	
Air flow rate	m ³ /h	123,200	119,000	148,750	178,500	178,500	246,400	238,000	297,500	
SPL (Sound Pressure Level) ⁽²⁾	dB(A)	69	69	70	71	71	72	72	73	
PWL (Sound Power Level) ⁽³⁾	dB(A)	89	89	90	91	91	93	93	95	
Capacity control		25 → 100% stepless					12.5 → 100% stepless			
Operating weight	kg	4,329	4,712	5,952	6,533	6,717	8,468	9,234	11,699	

QUIET		Performance ⁽¹⁾								
Model		CQS037	CQS042	CQS051	CQS059	CQS069	CQS074	CQS084	CQS102	
Cooling capacity	kW	346	399	496	569	637	692	797	992	
Compressors power input	kW	131	152	175	203	245	263	305	349	
Compressors COP		2.63	2.62	2.84	2.81	2.60	2.63	2.62	2.84	
Unit EER		2.52	2.52	2.73	2.69	2.52	2.52	2.52	2.73	
Air flow rate	m ³ /h	101,600	98,000	122,500	147,000	147,000	203,200	196,000	245,000	
SPL (Sound Pressure Level) ⁽²⁾	dB(A)	64	64	65	66	66	67	67	68	
PWL (Sound Power Level) ⁽³⁾	dB(A)	84	84	85	86	86	88	88	90	
Capacity control		25 → 100% stepless					12.5 → 100% stepless			
Operating weight	kg	4,329	4,712	5,952	6,533	6,717	8,468	9,234	11,699	

(1) At the following standard conditions: power supply 400V/3ph/50Hz; outdoor temperature 35°C; water inlet/outlet temperature 12/7°C; ethylene glycol 0%; 0m a.s.l.; 0.43 x 10⁻⁴m²°C/W evaporator fouling factor; rated in accordance with EN12055

(2) Measured with outdoor temperature 35°C; 1m from the unit; free field conditions; according to ISO 3744

(3) With outdoor temperature 35°C; calculated according to ISO 3744

Technical features

MATRIX - Superchiller execution

STANDARD		Performance ⁽¹⁾							
Model		SBS040	SBS045	SBS054	SBS063	SBS073	SBS090	SBS108	SBS126
Cooling capacity	kW	389	452	528	613	725	903	1,056	1,225
Freecooling capacity ⁽²⁾	kW	261	299	308	385	466	599	616	770
Compressors power input	kW	131	149	185	211	239	298	370	422
Compressors COP		2.96	3.03	2.86	2.90	3.03	3.03	2.86	2.90
Unit EER		2.72	2.75	2.64	2.66	2.77	2.75	2.64	2.66
Unit EER at Z.E.T.		34.11	29.71	34.73	32.25	31.80	29.71	34.73	32.25
Air flow rate	m ³ /h	118,800	146,400	146,400	183,000	219,600	292,800	292,800	366,000
SPL (Sound Pressure Level) ⁽³⁾	dB(A)	77	77	77	78	79	80	80	81
PWL (Sound Power Level) ⁽⁴⁾	dB(A)	97	97	97	98	99	101	101	103
Capacity control		25 → 100% stepless					12.5 → 100% stepless		
Operating weight	kg	4,953	5,240	5,970	6,694	7,522	10,290	11,750	13,183

LOW NOISE		Performance ⁽¹⁾							
Model		SLS040	SLS045	SLS054	SLS063	SLS073	SLS080	SLS090	SLS108
Cooling capacity	kW	385	428	534	615	687	771	856	1,068
Freecooling capacity ⁽²⁾	kW	253	258	326	392	399	506	516	653
Compressors power input	kW	133	159	183	211	256	265	318	365
Compressors COP		2.91	2.70	2.93	2.92	2.69	2.91	2.70	2.93
Unit EER		2.74	2.57	2.77	2.76	2.57	2.74	2.57	2.77
Unit EER at Z.E.T.		48.18	53.53	53.42	51.23	57.24	48.18	53.53	53.42
Air flow rate	m ³ /h	112,800	112,800	141,000	169,200	169,200	225,600	225,600	282,000
SPL (Sound Pressure Level) ⁽³⁾	dB(A)	69	69	70	71	71	72	72	73
PWL (Sound Power Level) ⁽⁴⁾	dB(A)	89	89	90	91	91	93	93	95
Capacity control		25 → 100% stepless					12.5 → 100% stepless		
Operating weight	kg	5,077	5,300	6,696	7,404	7,588	9,964	10,410	13,187

QUIET		Performance ⁽¹⁾							
Model		SQS040	SQS045	SQS054	SQS063	SQS073	SQS080	SQS090	SQS108
Cooling capacity	kW	365	403	501	580	643	730	805	1,002
Freecooling capacity ⁽²⁾	kW	221	224	282	340	344	441	448	564
Compressors power input	kW	140	170	194	224	275	281	340	388
Compressors COP		2.60	2.37	2.58	2.59	2.34	2.60	2.37	2.58
Unit EER		2.49	2.28	2.49	2.49	2.26	2.49	2.29	2.49
Unit EER at Z.E.T.		60.82	67.09	66.82	64.41	71.46	60.82	67.09	66.82
Air flow rate	m ³ /h	91,000	91,000	113,750	136,500	136,500	182,000	182,000	227,500
SPL (Sound Pressure Level) ⁽³⁾	dB(A)	64	64	65	66	66	67	67	68
PWL (Sound Power Level) ⁽⁴⁾	dB(A)	84	84	85	86	86	88	88	90
Capacity control		25 → 100% stepless					12.5 → 100% stepless		
Operating weight	kg	5,077	5,300	6,696	7,404	7,588	9,964	10,410	13,187

(1) At the following standard conditions: power supply 400V/3ph/50Hz; outdoor temperature 35°C; coolant inlet/outlet temperature 15/10°C; ethylene glycol 30%; 0m a.s.l.; $0.43 \times 10^{-4} \text{m}^2\text{C/W}$ evaporator fouling factor; rated in accordance with EN12055

(2) At the following standard conditions: power supply 400V/3ph/50Hz; outdoor temperature 5°C; coolant inlet temperature 15°C ethylene glycol 30%

(3) Measured with outdoor temperature 35°C; 1m from the unit; free field conditions; according to ISO 3744

(4) With outdoor temperature 35°C; calculated according to ISO 3744

Options and Accessories

Feature	CBS	CLS	CQS	SBS	SLS	SQS
Continuous capacity control	STD	STD	STD	STD	STD	STD
Condensing temperature control with fans' speed regulation	STD	STD	STD	STD	STD	STD
High pressure warning - compressor capacity unloading	STD	STD	STD	STD	STD	STD
High Temperature Device	OPT	OPT	STD	OPT	OPT	STD
Configuration according to PED standards	STD	STD	STD	STD	STD	STD
Hydraulic kit [expansion vessel, safety valve]	OPT	OPT	OPT	OPT	OPT	OPT
Pumps set						
- two 2-pole pumps with standard head pressure	OPT	OPT	--	OPT	OPT	--
- two 2-pole pumps with standard head pressure + sound attenuation enclosure	OPT	OPT	OPT	OPT	OPT	OPT
- two 2-pole pumps with high head pressure	OPT	OPT	--	OPT	OPT	--
- two 2-pole pumps with high head pressure + sound attenuation enclosure	OPT	OPT	OPT	OPT	OPT	OPT
Flow switch mounted on board	STD	STD	STD	STD	STD	STD
Compressor shut off valve	OPT	OPT	OPT	OPT	OPT	OPT
Refrigerant high/low pressure gauges	OPT	OPT	OPT	OPT	OPT	OPT
Electrical panel heating resistor	OPT	OPT	OPT	OPT	OPT	OPT
Partial heat recovery [20%] with freezing-protection	OPT	OPT	OPT	OPT	OPT	OPT
Condenser coils metal filters	OPT	OPT	OPT	OPT	OPT	OPT
Protection grids	OPT	OPT	OPT	OPT	OPT	OPT
Cu/Cu finned coils	OPT	OPT	OPT	OPT	OPT	OPT
ALUCOAT treatment for finned coils	OPT	OPT	OPT	OPT	OPT	OPT
Evaporator electric heaters	OPT	OPT	OPT	OPT	OPT	OPT
Anti-vibration mounts (rubber/springs)	OPT	OPT	OPT	OPT	OPT	OPT
Refrigerant R22	OPT	OPT	OPT	OPT	OPT	OPT

Dimensions

Model	Length		Model	Length		Model	Length	
	CBS	mm.		CLS	mm.		CQS	mm.
CBS037	5,220		CLS037	5,220		CQS037	5,220	
CBS042	5,220		CLS042	5,220		CQS042	5,220	
CBS051	5,220		CLS051	6,320		CQS051	6,320	
CBS059	6,320		CLS059	7,420		CQS059	7,420	
CBS069	7,420		CLS069	7,420		CQS069	7,420	
CBS084	11,100		CLS074	11,100		CQS074	11,100	
CBS102	11,100		CLS084	11,100		CQS084	11,100	
CBS118	13,300		CLS102	13,300		CQS102	13,300	

Model	Length		Model	Length		Model	Length	
	SBS	mm.		SLS	mm.		SQS	mm.
SBS040	5,220		SLS040	5,220		SQS040	5,220	
SBS045	5,220		SLS045	5,220		SQS045	5,220	
SBS054	5,220		SLS054	6,320		SQS054	6,320	
SBS063	6,320		SLS063	7,420		SQS063	7,420	
SBS073	7,420		SLS073	7,420		SQS073	7,420	
SBS090	11,100		SLS080	11,100		SQS080	11,100	
SBS108	11,100		SLS090	11,100		SQS090	11,100	
SBS126	13,300		SLS108	13,300		SQS108	13,300	



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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 9001:2000.



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