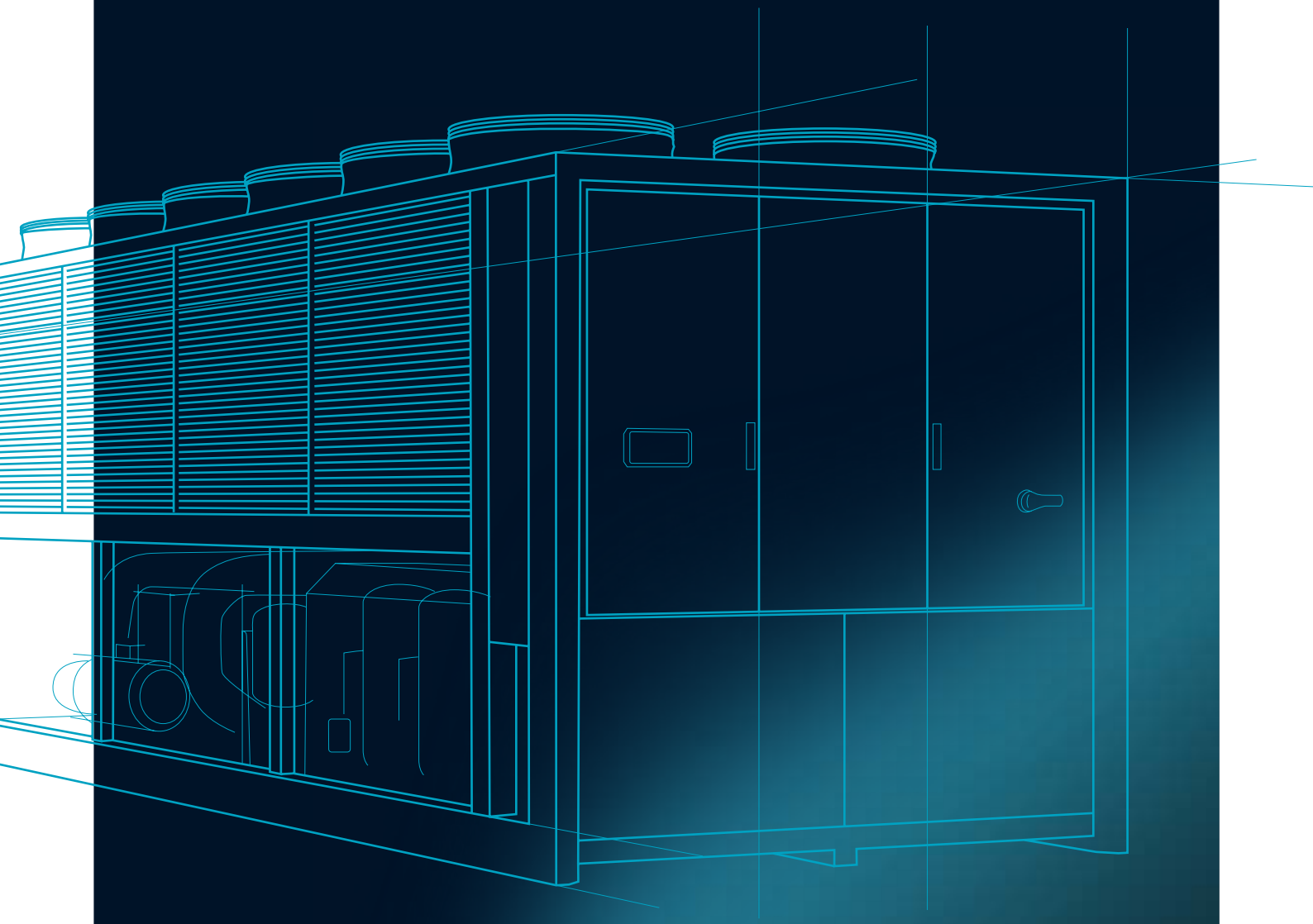
HiRef



CATALOGUE

INDUSTRY


HiRef

Perimeter-mounted units

	SYSTEM TYPE	VERSIONS	REFRIGERANT	RANGE	
	**CHILLED WATER PERIMETER MOUNTED UNITS FOR DATA CENTERS**				
TRF CW	CHILLED WATER	❄		33-257 (kW)	PAGE 18
	**CHILLED WATER UNITS FOR MEDIUM/SMALL SERVER ROOMS**				
HTI CW	CHILLED WATER	❄		8-45 (kW)	PAGE 20

Dry-Cooler

	**MODULAR DRY COOLER**				
HDC	AIR/WATER			372-1551 (kW)	PAGE 24

Rooftop

	**OUTSIDE AIR UNIT WITH ROTARY HEAT EXCHANGER**				
HRA	AIR/AIR	❄ ❄ ▤	R-410A	16-405 (kW)	PAGE 28
	**ROOFTOP IN CLASS A FOR AIR CONDITIONING. STAND-ALONE, MONOBLOC AND WITH HEAT PUMP**				
HRT	AIR/AIR	❄ ❄ ▤	R-410A	20-131 (kW)	PAGE 30

Technical data are subject to change without notice. Do not use these data in the design stage.

Liquid chillers

	SYSTEM TYPE	VERSIONS	REFRIGERANT	RANGE	
	**TSE**	AIR/WATER	R-410A R-454B	43-433 (kW)	PAGE 34
	**TVA**	AIR/WATER	R-134a R-1234ze R-513A R-515B	297-1367 (kW)	PAGE 36
	**TVD**	AIR/WATER	R-1234ze	512-1586 (kW)	PAGE 38
	**TTX**	AIR/WATER	R-1234ze	540-2120 (kW)	PAGE 40
	**XTW**	WATER/WATER	R-1234ze R-515B	500-2400 (kW)	PAGE 42
	**XVA**	WATER/WATER	R-134a R-1234ze R-513A R-515B	445-1494 (kW)	PAGE 44

CHILLERS WITH REMOTE CONDENSER WITH SCROLL COMPRESSORS

AIR CONDENSED CHILLERS WITH INVERTER DRIVEN SCREW COMPRESSORS

AIR CONDENSED CHILLERS WITH INVERTER DRIVEN SCREW COMPRESSORS

AIR CONDENSED CHILLERS WITH OIL-FREE CENTRIFUGAL COMPRESSORS

WATER-CONDENSED CHILLERS WITH OIL-FREE CENTRIFUGAL COMPRESSORS

WATER CONDENSED CHILLERS AND HEAT PUMPS WITH SCREW COMPRESSORS

Cooling Only | Heating Only | Reversible Heat Pump | Free-Cooling | Motoevaporating | Polyvalent for 2-pipe system | Polyvalent for 4-pipe system

Liquid chillers and reversible heat pumps

	SYSTEM TYPE	VERSIONS	REFRIGERANT	RANGE	
	**CDA**	AIR/WATER	R-744	75-706 (kW)	PAGE 48
	**NHA**	AIR/WATER	R-290 R-454C	92-688 (kW)	PAGE 50
	**HPS**	AIR/WATER	R-410A	36-176 (kW)	PAGE 52
	**TSS**	AIR/WATER	R-410A R-454B	120-265 (kW)	PAGE 54
	**TSL**	AIR/WATER	R-410A R-454B	277-1004 (kW)	PAGE 56
	**TAL**	AIR/WATER	R-410A R-454B	283-1166 (kW)	PAGE 58
	**TPL**	AIR/WATER	R-410A R-454B	365-1199 (kW)	PAGE 60
	**RSW**	WATER/WATER	R-1234ze R-515B	329-867 (kW)	PAGE 62
	**XSB**	WATER/WATER	R-410A R-454B	40-838 (kW)	PAGE 64

AIR-COOLED CHILLERS AND HEAT PUMPS WITH NATURAL REFRIGERANT R744 (CO_2) AND MODULATING COMPRESSORS

CHILLERS AND HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS

REVERSIBLE AIR CONDENSED HEAT PUMPS FOR LOW OUTDOOR TEMPERATURES

CLASS A CHILLERS AND HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS

CLASS A CHILLERS AND HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS

CLASS A CHILLERS AND HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS

AIR CONDENSED CHILLERS AND HEAT PUMPS WITH SCROLL COMPRESSORS

WATER-COOLED CHILLERS AND HEAT PUMPS WITH SCROLL COMPRESSORS

WATER CONDENSED CHILLERS AND HEAT PUMPS WITH SCROLL COMPRESSORS

Technical data are subject to change without notice. Do not use these data in the design stage.

Multipurpose

	SYSTEM TYPE	VERSIONS	REFRIGERANT	RANGE	
	**MULTIPURPOSE AIR CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS**				
NPA	AIR/WATER	2 4	R-290 R-454C	60-162 (kW)	PAGE 68
	**MULTIPURPOSE AIR CONDENSED HEAT PUMPS FOR LOW OUTDOOR TEMPERATURES**				
MPS	AIR/WATER	2 4	R-410A	39-248 (kW)	PAGE 70
	**MULTIPURPOSE CLASS A AIR CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS**				
MPA	AIR/WATER	2 4	R-410A R-454B	59-325 (kW)	PAGE 72
	**MULTIPURPOSE CLASS A HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS**				
MSL	AIR/WATER	4	R-410A R-454B	279-1425 (kW)	PAGE 74
	**MULTIPURPOSE CLASS A AIR CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS**				
MLA	AIR/WATER	2 4	R-410A R-454B	286-1431 (kW)	PAGE 76
	**MULTIPURPOSE WATER-CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS**				
MSW	WATER/WATER	2 4	R-410A R-454B	42-549 (kW)	PAGE 78
	**MULTIPURPOSE WATER-CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS**				
PSW	WATER/WATER	4	R-1234ze R-515B	294-867 (kW)	PAGE 80

Cooling Only | Heating Only | Reversible Heat Pump | Free-Cooling | Motoevaporating | Polyvalent for 2-pipe system | Polyvalent for 4-pipe system

High temperature heat pumps

	SYSTEM TYPE	VERSIONS	REFRIGERANT	RANGE	
	**WATER/WATER HEAT PUMPS FOR HIGH EVAPORATION AND CONDENSATION TEMPERATURES**				
KSW	WATER/WATER		R-134a R-513A	38-590 (kW)	PAGE 84
	**WATER/WATER HEAT PUMPS FOR HIGH EVAPORATION AND CONDENSATION TEMPERATURES**				
ZSW	WATER/WATER		R-1234ze R-515B	228-2304 (kW)	PAGE 86
	**HIGH TEMPERATURE HEAT PUMPS WITH TWO-STAGE COMPRESSORS**				
KVW	WATER/WATER		R-1234ze R-515B	324-2208 (kW)	PAGE 88
	**HEATING-ONLY WATER CONDENSED HEAT PUMPS WITH INVERTER DRIVEN SCREW COMPRESSORS**				
XVA K	WATER/WATER		R-1234ze R-515B	408-1679 (kW)	PAGE 90

Hydraulic modules

	**POLYMORPH HYDRONIC MODULES FOR WATER/WATER CHILLERS SYSTEMS**				
PLM	WATER/WATER	2 4			PAGE 94

Supervision

	**ADVANCED TECHNOLOGY AND FLEXIBILITY TO MANAGE AIR CONDITIONING AND PROCESS COOLING**				
HiNode					PAGE 98

Technical data are subject to change without notice. Do not use these data in the design stage.

HiRef

CATALOGUE
INDUSTRY

TECNOLOGIES

ADVISORS IN THE FIELD OF ADVANCED TECHNOLOGIES AND CUSTOMIZED SOLUTIONS FOR IT AND INDUSTRIAL COOLING

At HiRef, we love a challenge and constantly try to exceed limits and standards.

Our Research & Development hub is the innovative core of the company: here, we study new ideas and test innovative approaches to the development and application of technologies - so that they are at **the forefront of economic sustainability for data centres, for telecommunications and for the commercial and services sector, without ever compromising on environment-friendliness**.

In synergy with our in-house electrical, mechanical and software design department, we design full-custom air conditioning systems, which are customizable and adaptable to even the most critical environments, to be able to respond to any specific needs.

We are guided by **high quality engineering and the constant optimization of system efficiency, to mitigate its environmental impact**.

We are the acknowledged first adopters and flexible implementers of new technologies.

At HiRef, customer relations and tailor-made design are key to our success.

Free-Cooling

The Free-Cooling technology allows the unit to supply the required cooling capacity without any need for the compressors to be running. **The resulting advantages in terms of lower seasonal power absorption can reach 30%.**

High efficiency

The combined choice and weighted sizing of high-tech internal components **allows the units to operate at high levels of efficiency**.

Plate heat exchanger

The plate heat exchanger is characterised by high power density values: its geometry makes an efficient heat exchange possible, combined with minimal footprint.
The use of this type of exchanger on some chiller and heat pump ranges **allows for compact footprint units, with optimised internal spaces**.
The applied cross-channel technology also makes it possible to **operate efficiently even at partial loads**, without any impact on pressure drops at user end and therefore keeping pumping costs at reasonable levels.

Shell and tube heat exchanger

Some chiller and heat pump product ranges are supplied with a shell and tube exchanger. The high reliability and operating stability of this type of heat exchanger makes it particularly suitable for industrial and high-tech applications. **The generously sized volumes typical of shell and tube exchangers ensure stable unit operation and make the exchanger less sensitive to thermal stress**.
Where present, the dual-pass exchanger configuration allows both cooling and heat pump operation to be optimised.
According to the range considered, it is possible to have either **dry expansion tube exchangers or flooded shell and tube exchangers with spray technology**.

Fast Restart and dedicated microprocessor control

With the FAST Restart option the unit is equipped with separate dedicated low voltage (24 V) or 230 V power supply for microprocessor control separately from the main users' power supply. In this way, the control can be powered by a source external to the UPS or by a small source internal to the UPS (optional), **to ensure power supply continuity for the unit's microprocessor**.
With the FAST restart option the unit can reach 100% cooling capacity in maximum 120 s after power is restored, **ensuring maximised system cooling availability in a short time**.

AIR/WATER AND WATER/WATER CHILLERS TOP PERFORMANCE IN ALL CONDITIONS

HiRef's air/water and water/water liquid chillers meet the heating power requirements in the industrial, commercial, services and Data Centre sectors.

Designed for top performance, they can operate in Free-Cooling mode when outdoor conditions allow it, rationalising the use of the plant's electricity with lower operating costs and reduced environmental impact. Our painstakingly executed designs ensure correct sizing according to the specific requests of our customers, so that **each unit can be perfectly integrated into an existing system (retro-fitting) or installed in new systems, without wasting any power**.

Adiabatic Cooling

A set of panels equipped with a system of nozzles, located upstream of the finned pack heat exchangers, humidifies the incoming air, decreasing its temperature. **Consequently, an increase in the efficiency of the thermodynamic cycle and in the cooling capacity is obtained**.

Control and supervision

All the units are equipped with **proprietary software** modelled on the specific features of the range, to meet customer needs whatever the application requirements.
An optional feature is also available to connect several independent units together and control them as if they were a single machine, with freely selectable logics for switching individual units on or off. This **ensures maximum efficiency and, at the same time, maximum reliability within the plant**.
Each unit integrates perfectly with the most popular supervision systems available commercially.

Fans

In units with an air source, the fan is a key component for trouble-free operation in all operating conditions and at the same time - for unit energy absorption calculations. A**n efficient fan and motor play a significant role in reducing consumption**. All the fans used in the Hiref units are built according to the most innovative technologies; this is true both for versions with traditional motors and for versions with EC motors, **actively contributing to energy saving**.

Inverter driven compressors

Compressors with inverter electronics are able to vary their rotation speed and therefore provide variable cooling and heating capacity based on the actual system demand. Compressors with inverters are therefore suitable for applications with highly variable power demand over time and/or with reduced thermal inertia. **The possibility of modulating down to low RPMs allows units with inverter compressors to also reach higher seasonal efficiencies compared to units with scroll compressors only**.

Super low noise set-up

When low noise levels are required, it is possible to choose between two unit soundproofing configurations: the Low noise version and the higher-performance **Super Low noise** version. The latter, designed with panelling around not just the compressors but also the entire refrigeration circuit and hydraulic components (pumps, valves, etc.), **reduces any noise caused by valves, pipes and pumps**.
Combined with reduced ventilation speed, the Super Low Noise version **allows the lowest noise levels on the market to be achieved**.

SENSORS AND SAFETY COMPONENTS FOR AIR CONDITIONING UNITS WITH A2L REFRIGERANTS

HiRef, in compliance with the European "**F-Gas**" regulation which imposes gradual but increasingly stringent restrictions to the use of fluorinated greenhouse gases (79% reduction of tonnes of equivalent CO_2 by 2030). HiRef has been **promoting the development and use of the new A2L refrigerant gases**, which have a very low environmental impact, from the outset, with the aim of accelerating the transition to a more environmentally friendly class of refrigerants at a global level and ultimately promoting the decarbonisation process.

Safety

ASHRAE A2L class refrigerants are mildly flammable. This peculiarity requires certain precautions in terms of sensors and components in the air conditioning unit, **to prevent - through adequate designing - the risk of igniting fires**.
All HiRef chillers and heat pumps using this class of gases are equipped with an advanced system of sensors and components capable of detecting and managing any gas leakage: this guarantees normal operation of the unit in complete safety.

Alarm control and management systems

A centralised control system constantly monitors the values detected by the sensors and pressure switches.
Deviations from the safety levels are signalled as warnings if they fall within a first safety threshold (low alarm level).
If the second safety threshold is also exceeded, the alarm is classified as "severe" and the control system sends a **shutdown command to the components of the refrigeration circuit**.

Refrigerant leak sensor

A refrigerant leak sensor is installed inside each dependent section of the control panel and inside each separate compartment that contains one or more compressors **to detect any gas leaks**.

Pressure switch and fan of the compressor compartment and of the power control panel compartment

A ventilation system and a pressure switch are installed in the control panel compartment, to ensure **constant overpressure conditions thanks to air intake from outside the machine**.

Compressors and components

Compressors and components are specially designed and created to **work with A2L fluids**.

A3 REFRIGERANTS

HiRef, in compliance with the European "**F-Gas**" regulation which imposes gradual but increasingly stringent restrictions to the use of fluorinated greenhouse gases (79% reduction of tonnes of equivalent CO_2 by 2030). HiRef has been **promoting the development and use of the new A3 refrigerant gases**, which have a very low environmental impact, from the outset, with the aim of accelerating the transition to a more environmentally friendly class of refrigerants at a global level and ultimately promoting the decarbonisation process.

Emergency ventilation

It is installed, in the compartment that encloses the electrical cabinet and the refrigeration circuit, a ventilation **in order to ensure dilution, below the lower flammability limit, of any refrigerant leakage.**

Refrigerant leak sensor

The refrigerant leakage sensor is installed inside the front compartment containing the refrigerant circuit and the electrical cabinet, and one in the section below the condensing coils, **in order to detect any refrigerant leakage.**

Alarm control and management systems

A centralised control system constantly monitors the values detected by the sensors and pressure switches. Deviations from the safety levels are signalled as warnings if they fall within a first safety threshold (low alarm level). If the second safety threshold is also exceeded, the alarm is classified as "severe" and the control system sends a **shutdown command to the components of the refrigeration circuit**.

Safety power supply

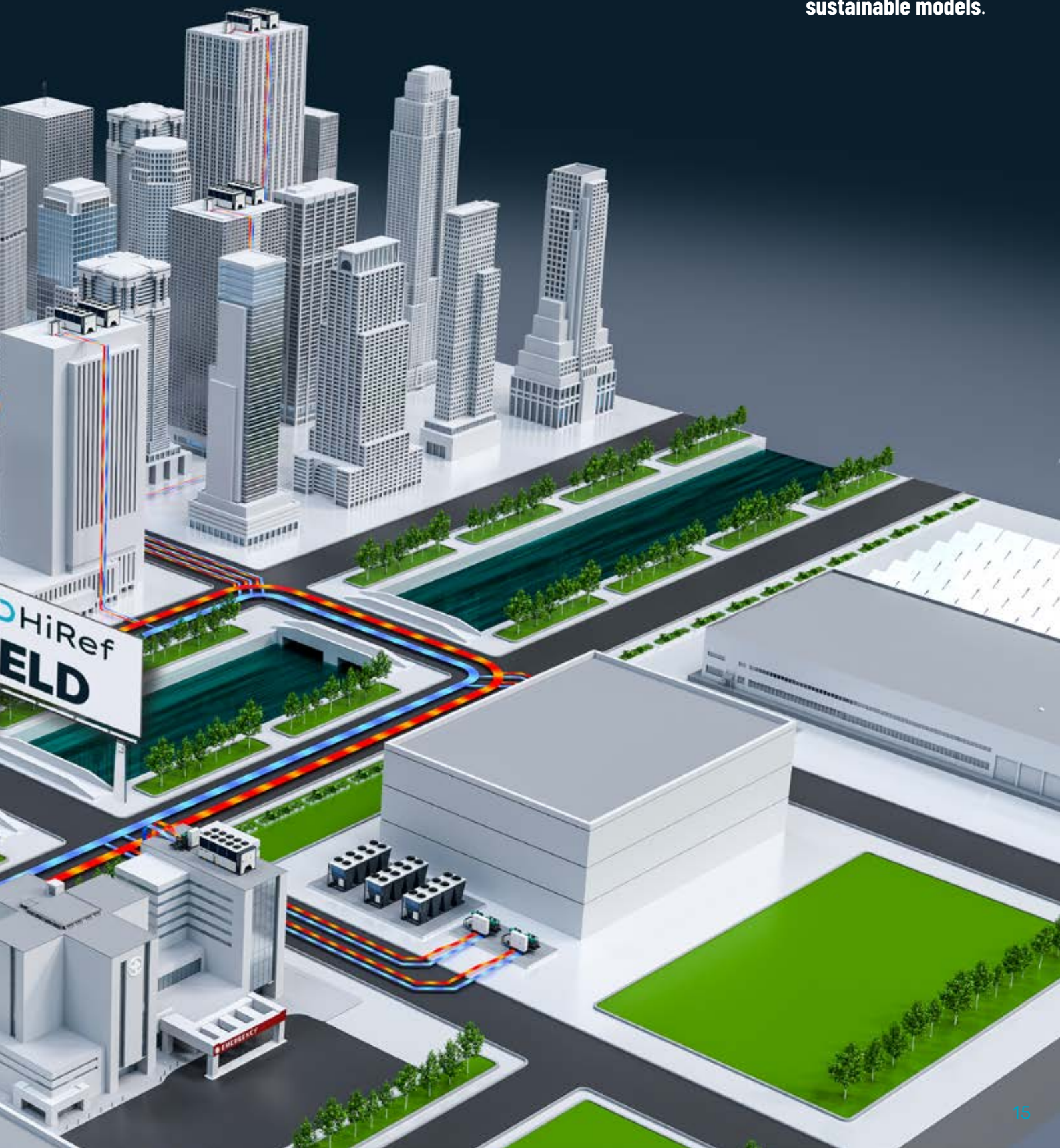
In order to ensure the operation of units operated with A3 refrigerants, **the emergency ventilation and refrigerant leakage sensors have a dedicated power supply.**

Compressors and components

Compressors and components are specially designed and created to **work with A3 fluids**.

Energy Loop District

HiRef's Energy Loop District **is an integrated heat recovery and valorization system that transforms wasted energy into a valuable resource**. Through high-temperature heat pumps and intelligent energy networks, heat generated by data centers, buildings, and industrial infrastructures is recovered and reused in urban and industrial applications. **A circular approach that reduces waste, improves energy efficiency, and supports the transition toward sustainable models**.



PERIMETER MOUNTED UNITS

Platform ***TRF Evolution***

TRF CW

CHILLED WATER PERIMETER MOUNTED UNITS FOR DATA CENTERS

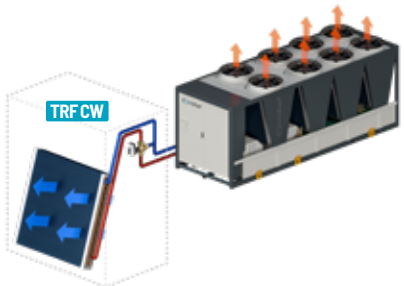
33–257 kW

- MULTI-PROTOCOL COMMUNICATION INTERFACE
- EC RADIAL FANS
- MODBUS CONTROLLED FANS
- PRESSURE INDEPENDENT VALVE (PICV)
- FAST RESTART
- ON-BOARD HUMIDIFIER
- VARIABLE GEOMETRY COIL (FLEXY)
- DOUBLE CIRCUIT

The chilled water air conditioners of the TRF CW series are particularly suitable for IT facilities where **temperature and air flow need to be continuously monitored**. The components of the TRF CW unit offer the most efficient solution for **Data Center cooling**, ensuring **reliability**, **precise control of thermo-hygrometric conditions** and the **flexibility** to adapt to different working conditions.

- Temperature control through heating and post-heating systems using electric heating elements, additional hot water coil or both
- Humidity control through dehumidification and humidification (optional)
- Fan speed modulation based on thermal load (constant ΔT)
- Hydraulic connections from the bottom of the unit
- Broad choice of accessories, including base modules and plenums for ducting
- Air filter class G3 as standard. Air Filters G4, M5, F7 (optional)
- Double power supply with automatic switch (optional)
- Double panelling only on the front doors or on the whole machine (optional)
- Instant reading of water flow rate, water inlet and outlet temperatures, or supplied cooling capacity (optional)
- Harmonic filters (optional)

CHILLED WATER

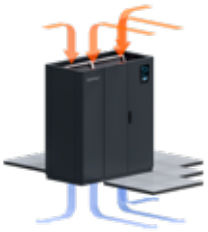


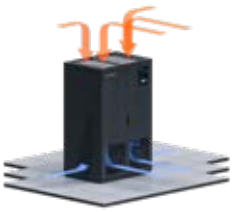
Guaranteed flexibility

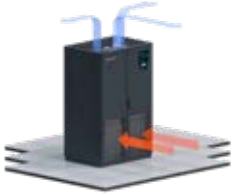
With three different types of heat exchangers, each optimised to a specific water ΔT value (difference in water temperature between inlet/outlet), we ensure **high flexibility in adapting to the system or liquid chillers already in operation,** without compromising cooling performance:

- **Geometry A** for ΔT = 5°C
- **Geometry B** or ΔT = 8°C
- **Geometry C** for ΔT = 12°C

AIRFLOW CONFIGURATIONS

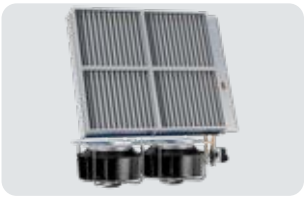

Upflow


Downflow


Displacement

New design: efficiency, flexibility and optimization of internal layout

Internal spaces have been completely redesigned for **a better distribution of components.** The new internal layout features a larger pack heat exchanger and a state-of-the-art fan **for maximum air flow and efficiency.** Following a **painstaking dynamic fluid study,** the filtering surface has also been expanded, now it is distributed over the entire coil **to further reduce air pressure drops.**



Ventilation EC 2.0

EC PLUG fans, standard throughout the range, are adjustable using different logics: flow rate, overpressure, constant ΔP and ΔT. Their accurate adjustment allows **an efficient use of power for ventilation and a consequent reduction of the system's PUE.** The speed, with extended range, is adjusted via the Modbus protocol. Finally, the "emergency speed" function allows for fan operation **even in the event of microprocessor malfunctions.**

Finned pack coil with hydrophilic coating

All models in the TRF CW range feature heat exchange coils with hydrophilic coating. This special coating - together with adequate adjustment of air through-flow speeds - **helps condensate collection and outflow during the dehumidification process, preventing any dripping on the inside and outside of the unit.**

Accurate regulation with multiple types of valves

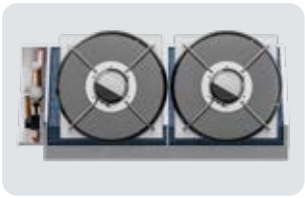
All units in the TRF CW range have as standard regulating valves fitted with 0-10V servo motor, selectable in 2-way execution, with variable or 3-way flow system or with servo motor with spring return. On request, pressure-independent valves or Energy Valves can also be installed. All these types of valves **ensure the utmost adjustment accuracy while maintaining the system's hydronic balance.**

Double circuit

Chilled water units are also available with a double circuit. In this version, the supply is via **two different hydraulic circuits** that can offer the **utmost operational continuity if one of the two circuits malfunctions.** Each circuit is equipped with a regulating valve.

TRF CW		040	060	070	080	090	100	110	130	150	170	180	210	240
Version A		Air temperature 24°C - 50% / Water temperature In 7°C Out 12°C												
Cooling capacity	kW	38.1	58	64.4	80.8	85.3	105.5	103.1	137.2	137.8	177.2	172	226.9	257.1
EER		31.07	39.97	33.28	37.31	34.93	40.41	33.65	40.43	30.81	36.02	33.3	39.51	34.82
SHR		0.86	0.79	0.82	0.78	0.81	0.77	0.83	0.77	0.82	0.77	0.82	0.76	0.74
Version A		Air temperature 30°C - 35% / Water temperature In 10°C Out 15°C												
Cooling capacity	kW	43.3	59.6	67.9	80.8	89.9	104	112.3	133.7	148.4	172.7	185.2	219.7	236.3
EER		35.36	41.06	35.05	37.33	36.82	39.84	36.66	39.41	33.18	35.11	35.86	38.25	32.01
SHR		1.00	0.99	1	0.99	1	0.97	1	0.99	1	0.99	1	0.98	0.94
Version B		Air temperature 30°C - 35% / Water temperature In 10°C Out 18°C												
Cooling capacity	kW	38.9	55.2	63.3	74.8	82.4	98.4	104.8	126.3	135.3	163.1	169	203.6	229.5
EER		31.69	38	32.69	34.54	33.73	37.69	34.19	37.2	30.27	33.15	32.71	35.45	31.08
SHR		1	1	1	1	1	1	1	1	1	1	1	1	0.96
Version C		Air temperature 30°C - 35% / Water temperature In 10°C Out 22°C												
Cooling capacity	kW	33.4	49.8	54.4	67.5	73.2	87.6	90.1	111.8	116.3	144.4	145.2	180.3	210.2
EER		27.23	34.32	28.1	31.2	30	33.55	29.39	32.94	26.02	29.35	28.12	31.39	28.47
SHR		1	1	1	1	1	1	1	1	1	1	1	1	1
Version A		Air temperature 35°C - 30% / Water temperature In 15°C Out 20°C												
Cooling capacity	kW	43.7	58.6	68.2	80.2	89.3	102.3	112.9	133.9	145.8	172.9	182	215.9	237.5
EER		35.65	40.36	35.22	37.03	36.57	39.16	36.84	39.46	32.61	35.16	35.24	37.6	32.17
SHR		1	1	1	1	1	1	1	1	1	1	1	1	1
Version B		Air temperature 35°C - 30% / Water temperature In 15°C Out 23°C												
Cooling capacity	kW	39.1	55	63.4	75.3	82.4	98.1	104.9	125.9	135.5	162.6	169.2	203	228.4
EER		31.89	37.91	32.74	34.8	33.74	37.56	34.24	37.1	30.31	33.06	32.76	35.36	30.94
SHR		1	1	1	1	1	1	1	1	1	1	1	1	1
Version C		Air temperature 35°C - 30% / Water temperature In 15°C Out 27°C												
Cooling capacity	kW	33.9	50.1	56.5	67.9	73.9	87.9	91	112.3	117.6	145.1	146.8	181.1	210.6
EER		27.67	34.49	29.17	31.35	30.24	33.68	29.7	33.1	26.29	29.49	28.41	31.54	28.52
SHR		1	1	1	1	1	1	1	1	1	1	1	1	1
Rated air flow	m³/h	10700	10700	14500	14500	18000	18000	24000	24000	18000	18000	24000	24000	31000
Total fan absorbed power	kW	1.2	1.5	1.9	2.2	2.4	2.6	3.1	3.4	4.5	4.9	5.2	5.7	7.4
Power supply	V/ph/Hz	400/3+N/50												
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	61		67		72		66	67	71	72	69	70	71
Dimensions [LxHxD]	mm	1010x2000x890		1270x2000x890		1760x2000x890		2020x2000x890		2510x2000x890		3160x2000x890		3160 x2000 x960

Performance data relating to Downflow versions. | Also available with 60 Hz power supply. | Units also available in the models Upflow and Displacement, with the exception of size 240. | Height of model Displacement 2250 mm.



Ventilation adjustment

Depending on the air distribution logic in the server room, it is possible to adjust the machine on-board ventilation system to ensure a **constant air flow rate** (airflow control) **or a constant available overpressure** (ΔP control). The latter is particularly useful if a floating floor is used.

Easier scheduled maintenance

The unit has been painstakingly designed to ensure frontal access to components. This makes **routine maintenance easier in full compliance with safety standards.**

HTI CW

CHILLED WATER UNITS FOR MEDIUM/SMALL SERVER ROOMS

8-45 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

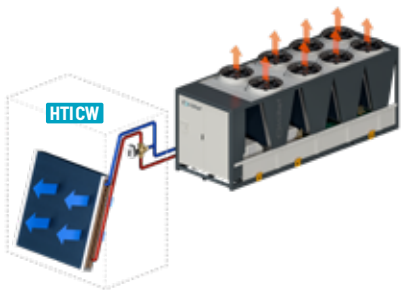
EC RADIAL FANS

MODBUS CONTROLLED FANS

HTI CW units are split-type air conditioners intended for small and medium-sized Data Centers. Designed for **ceiling or wall mounting**, they are suitable for air conditioning of control centres with limited internal space or space entirely taken up by technological equipment. Thanks to the **rational layout of components and wide range of available accessories**, these units are **easy to install and suitablefor different shelter configurations**.

- Temperature control through heating and post-heating systems with electric heating elements (optional)
- Humidity control through dehumidification and humidification with external humidifier (optional)
- Fan speed modulation based on thermal load (constant ΔT)
- Version available with dual power supply for emergencies: 230/400V network and 24/48VDC backup supply
- Epoxy powder painted structural metalwork supplied as standard
- Air filter class G3 as standard. Air Filters G4, M5, F7 (optional)
- Instant water inlet/outlet temperature reading function (optional)

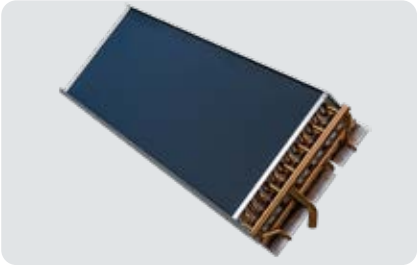
CHILLED WATER



INSTALLATION

wall-mounted

ceiling-mounted



Finned pack exchanger with hydrophilic coating.

All models in the HTI CW range feature heat exchange coils with hydrophilic coating. This special coating - together with adequate adjustment of air through-flow speeds - **helps condensate collection during the dehumidification process, preventing any dripping on the inside and outside of the unit.**

Ventilation EC

EC PLUG fans, standard on the entire range, make it possible to vary the air flow according to the thermal load. Their accurate adjustment allows an efficient use of power for ventilation and **a consequent reduction of the system's PUE.** Extended range speed adjustment is carried out via Modbus protocol. The "emergency speed" function allows for fan operation **even in the event of microprocessor malfunctions.**

Maximised Redundancy

In case of mains power + uninterruptible power supply in direct current (DUAL), the (optional) Free-Cooling mode ensures correct internal thermal conditions, **even in the event of blackouts.** This ensures the **continuity of service of the system.**

Simple and fast installation

The units can be installed, as needed, on the ceiling or on the wall. Thanks to the use of EC PLUG fans, air conditioners in the HTI CW series guarantee: **optimal air distribution, efficiency, energy savings, reliability and compactness,** whatever the configuration chosen.

Easier scheduled maintenance

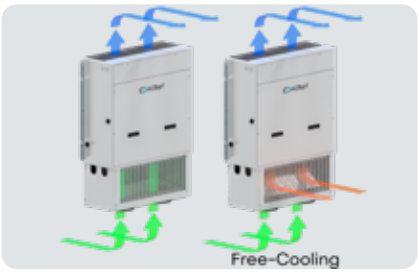
The unit has been painstakingly designed to ensure frontal access to components. This aspect, combined with the complete extractibility of filters and Free-Cooling damper (if present), **greatly facilitates routine maintenance operations.**

Accurate regulation with multiple types of valves

All units in the HTI CW range have as standard regulating valves fitted with 0-10V servo motor, selectable in 2-way execution, with variable or 3-way flow system. On request, pressure-independent valves or Energy Valves can also be installed. All these types of valves ensure **the utmost adjustment accuracy while maintaining the system's hydronic balance.**

HTI CW		0073	0105	0120	0145	0310	0380
Air temperature 27°C - Relative humidity 40% / Water temperature In 7°C Out 12°C							
Cooling capacity	kW	8.9	10.1	13.1	14.6	38.4	45.4
EER		52.88	51.03	52.11	49.35	33.25	36.78
SHR		0.82	0.78	0.83	0.79	0.92	0.85
Air temperature 30°C - 35% / Water temperature In 10°C Out 15°C							
Cooling capacity	kW	7.9	8.5	11.5	12.5	36.3	41.7
EER		47.07	43.27	45.54	42.39	31.37	33.78
SHR		0.94	0.9	0.96	0.91	1	0.95
Air temperature 35°C - 30% / Water temperature In 15°C Out 20°C							
Cooling capacity	kW	7.9	8.4	11.3	12.4	35.6	41.8
EER		46.69	42.89	44.76	42.02	30.84	33.82
SHR		0.98	0.96	1	0.96	1	0.99
Rated air flow	m^3/h	1300		1950		7000	
Total fan absorbed power	kW	0.2		0.3		1.2	
Power supply	V/ph/Hz	230/1/50				400/3+N/50	
Lp @ nominal rpm; dist.=2m Q=2	db(A)	53	55	54	56	66	66
Dimensions [LxHxD]	mm	1050x358x936		1150x408x1026		1500x685x1096	

Also available with 60 Hz power supply. | Units can only be installed on the ceiling for sizes 0310-0381.



Maximised energy saving with direct Free-Cooling

The units can, on request, be equipped with a direct Free-Cooling module. This system, which can also be installed inside an already operational unit, reduces the work of the chiller units in generating chilled water (partial Free-Cooling), and in a state of complete Free-Cooling can be switched off. **This naturally has an important effect on the system's PUE.**

DRY-COOLER

HDC

MODULAR DRY COOLER

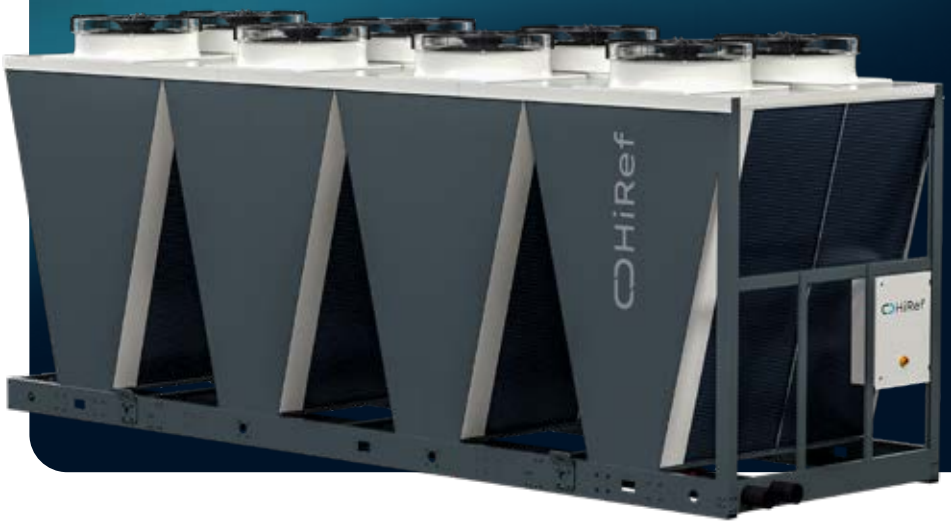
372–1551 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

CORROSION RESISTANT MATERIAL

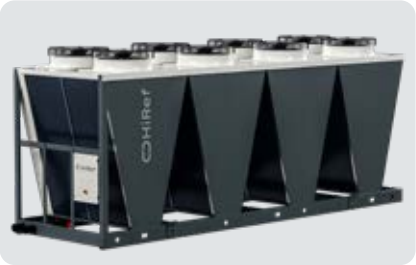
PATENTED SOLUTION

VARIABLE GEOMETRY COIL (FLEXY)



The Dry Cooler range from HiRef has been **specifically designed for data center applications.** It is ideally suited for use with liquid cooling systems or in any situation where free cooling can be utilized. HiRef Dry Coolers are outdoor units that can be combined with water-condensed indoor units such as cabinets in the W - F - K series. HiRef offers a **wide range** of Dry Coolers suitable for working with a **water-glycol mixture up to 60%.** They are made with frame in galvanized sheet steel that ensures **corrosion resistance, copper pipe protection and solidity.** The external panels are made of galvanized sheet metal finished with **corrosionand UV-resistant polyester paint.**

- Power supply 400V three phase
- HiRef Dry Coolers are outdoor units that can be combined with indoor water-cooled condensing units, such as the W – F – K series cabinets or the XSB and XVA chillers
- Modular solution "grows with the business"
- Larger heat exchangers
- Reduced foot print
- Water circuit optimized for variable flow rates
- Regulation on board the unit with integrated ATS
- Modbus interface for connection to CMS
- EC Fans



Finned coil

The finned-coil heat exchangers are made with copper tubes and wavy or corrugated aluminium fins. The standard spacing between the fins is 2 mm, **offering high heat exchange efficiency without affecting the ease of routine cleaning.**

Silent operation

The Dry Coolers are also available in **low noise emission versions,** ideal in areas where a **high level of acoustic comfort** must be maintained.

Customization

The units can be customized on request to meet the customer's design needs. Among the various options:

- **special treatment for the finned-coil exchanger,** including epoxy treatment, offering good resistance to corrosive environments, or copper fins for installation in marine environments;
- **increased fin spacing** to reduce soiling and facilitate cleaning in sandy environments.

Modular solution

HiRef's dry coolers have been designed with the concept of connecting an increasing number of heat exchangers to the master dry cooler to accommodate the growing power demand. This expansion is possible **without the need to modify the customer-side piping,** simply by planning for the additional space required for future expansions during the design phase.

HDC		04H057E	06H057E	08H057E
Air temperature 10°C / Ethylene glycol 30% / Fluid temperatures 30/20°C				
Cooling capacity	kW	775.6	1163.4	1551.2
Fluid flow	l/h	72000	108000	144000
Air temperature 35°C / Ethylene glycol 30% / Fluid temperatures 45/40°C				
Cooling capacity	kW	372.4	558.6	744.8
Fluid flow	l/h	69200	103800	138400
Lp @ nominal rpm; dist.=2m Q=2	db(A)	89	91	92
Power supply	V/ph/Hz		400/3+N/50	
Dimensions [LxHxD]	mm	3750x3135x2250	5625x3135x2250	7500x3135x2250

ROOFTOP

HRA

OUTSIDE AIR UNIT WITH ROTARY HEAT EXCHANGER

16-405 kW

HRA is the range of full-fresh-air units equipped with a rotary heat recovery wheel. The selection of components and their internal layout are primarily designed for **energy efficiency**: the modulating BLDC compressors, the hygroscopic rotary heat recovery wheel, and the modulating damper system allow t**he highest coefficients of performance** (COP) and **energy efficiency** (EER) to be achieved in all operating conditions. Finally, **advanced management software** designed and developed by HiRef ensures that the **required thermo-hygrometric conditions are maintained inside the controlled environments**.

- Refrigerant R410A
- Available versions: cool only or reversible heat pump
- G4 and F7 filtration
- Hot-gas pre-heating heat exchanger
- Electronically commutated EC fans
- Hydrophilic coated coils with wider fin pitch
- Condensate collection tray equipped with an electric heater to prevent defrost water from freezing
- Measurement of supply and return airflows
- Water exchanger for pre-cooling or pre-heating (optional)

Grater summer-time efficiency

Modulating dampers use some fresh air to increase the air flow rate through the condenser; **this reduces compressor consumption and improves the overall performance of the system.**

Smart Defrost System

To enhance occupant comfort, the on-board software manages different frost control methods, selected depending on the type of application.

Air quality probe

With the VOC/CO_2 probe, HRA monitors the amount of CO_2 and other pollutants in the indoor air and modulates air renewal accordingly. This ensures **excellent air quality at all times with the lowest energy expenditure.**

Efficiency and precision

Variable speed BLDC compressors and electronic expansion valves enable the unit to continuously modulate capacity and maximum efficiency at part loads, **controlling the supply of power with high precision.**

Ventilation 2.0

The supply and return fans are of the EC type with **brushless permanent magnet motor,second generation** integrated electronics and **fluid dynamics optimised** for installation.

Enthalpy recovery

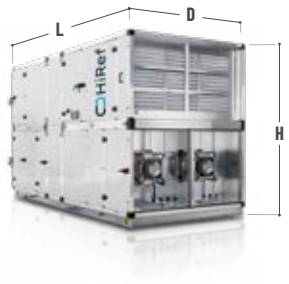
The on-board rotary heat exchanger **reduces the work of the compressor** by recovering thermal energy from the exhaust air flow. Its special material enables the recovery of both sensible and latent heat, **resulting in over 80% temperature and humidity efficiency.**

Thermodynamic recovery

In order to improve refrigeration circuit efficiency, active thermodynamic energy recovery is ensured in the exhaust air flow: in this way, the heat exchanger at source end operates at more favourable condensation and evaporation temperatures both in summer and in winter.

Perfectly balanced airflow

Airflows are measured both at the delivery end and the return end. This ensures that flows are **perfectly balanced and maintains a zero pressure difference in the environment.**



HRA		050	100	150	200	250
Cooling A-C 32°C - 60% u.r						
Cooling capacity	kW	66.5	134.9	194.1	255.8	302.5
Total absorbed power	kW	12.6	26.8	33.3	49.6	54.8
EER		5.28	5.03	5.83	5.16	5.52
Cooling B-C						
Cycle power consumption	kW	10	20.1	25.1	36.6	38.6
EER Cycle		3.1	3.22	3.48	3.32	3.95
Mechanical cooling capacity	kW	30.9	64.9	87.3	121.6	152.7
Cooling D-C 26°C, 50% u.r.						
Cooling capacity	kW	24.6	51.4	67	87.8	94.2
Inlet temperature	°C	14.1	13.9	14.9	15.3	16
Sensible cooling capacity	kW	19.4	39.5	54.2	69.6	81.2
Latent cooling capacity	kW	5.2	12.8	12.8	18.1	13.1
Heating A-C -10°C, 90% u.r.						
Thermal power	kW	86.2	173.7	256.5	330.3	404.5
Total absorbed power	kW	10.4	20.6	30.3	36	47.2
TER		8.29	8.43	8.46	9,17	8,57
COP Total		8.29	8.43	8.46	9,17	8,57
Heating B-C						
Cycle power consumption	kW	8	15	23.4	25.1	33.6
COP Cycle		2.82	3.24	2.8	3.42	3.09
Mechanical thermal power	kW	22.6	58.7	65.6	85.8	103.6
Heating D-C 20°C, 50% u.r						
Thermal power	kW	15.8	30.7	40.3	46.8	55.3
Inlet temperature	°C	29.8	29.5	28.3	27.2	26.8
Air flow	m^3/h	5000	10000	15000	20000	25000
Dimensions [LxHxD]	mm	4400x2030x1650	4620x2570x2065		4670x2980x2730	4770x3080x3000

HRT

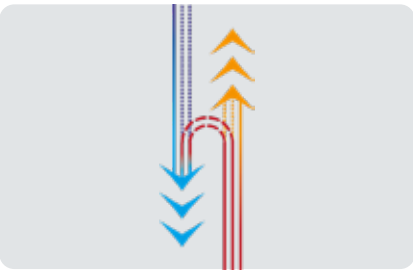
ROOFTOP
IN CLASS A FOR AIR CONDITIONING.
STAND-ALONE, MONOBLOC AND WITH HEAT PUMP

20–131 kW

- MULTI-PROTOCOL COMMUNICATION INTERFACE
- SCROLL COMPRESSORS
- EC RADIAL FANS
- AXIAL FANS
- INVERTER DRIVEN COMPRESSORS
- MODULATING HOT GAS POST-HEATING
- CORROSION RESISTANT MATERIAL
- ENTHALPIC ROTARY HEAT RECOVERY UNIT
- ON-BOARD HUMIDIFIER
- CLASS A

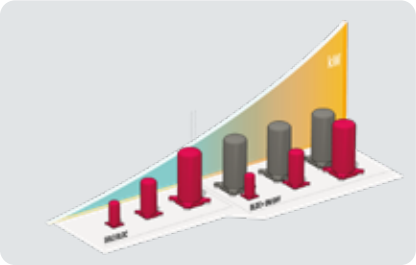
HRT RoofTop is a **plug & play** air/air monobloc air conditioner, suitable for controlling all climate parameters in medium to heavily crowded environments (cinemas, theatres, shopping malls, etc.) **for maximum comfort and energy efficiency**. HRT also complies with Regulation (EU) 2016/2281 - ERP 2021 and meets, for Italy, the technical requirements for access to tax deductions for the energy requalification of buildings - Ecobonus, Decree of 6 August 2020 (Annex F).

- Refrigerant R410A
- Direct Free-Cooling function
- Thermodynamic recovery on outlet air
- EC plug fan type delivery fan
- Air quality sensors
- Remote monitoring and control
- RS485 Protocol
- Flow modulation of EC plug-in fans via AirFlow Control (digital signal)
- Fan speed modulation based on thermal load (constant Δ t) and air flow demand (constant Δ p).



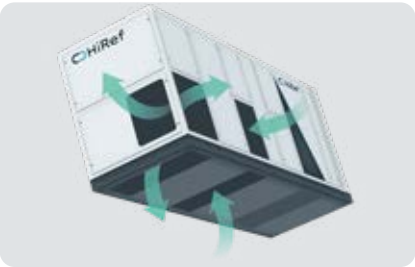
Enthalpic rotary heat recovery

Via heat recovery, the system ensures more favourable outside air intake conditions for the thermodynamic cycle, **expanding its field of application and improving energy performance.** On HRT units a rotary retriever of enthalpic type is used; this allows the air to be dehumidified and cooled in the summer months while, in winter months, it allows adjustment of the humidity and heating of the delivery air.



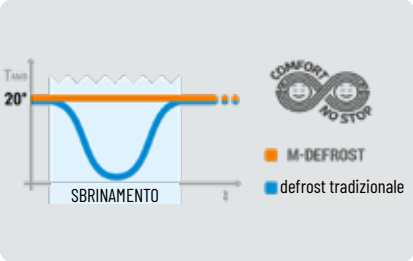
BLDC and on/off compressors join forces for maximised energy savings

The efficiency of on/off compressors at their rated operating point, integrated with BLDC compressors at partial loads, **results in maximised energy efficiency.**



Outstanding configurability for air delivery and return

The unit has air delivery and return connections on both the base and sides of the machine, **to meet all system requirements and ensure maximum configurability.**



"M-Defrost" system

Innovative defrosting technology using the thermal inertia of the controlled user **to reduce system downtime and ensure high levels of comfort.**

Jonix system for air purification

On request, the unit can be equipped with the Jonix air purification system which, using **Non Thermal Plasma (NTP) technology, reduces the bacterial load of air and makes it completely odourless.**

Thermodynamic heat recovery

Active thermodynamic recovery, with a dedicated battery, uses the exhaust air as a source, in order to achieve dissipation (condensation in summer and evaporation in winter) at a more favourable temperature than the outside air.
This guarantees the air renewal required by regulations and significant improvements in total efficiency.

Air quality probe

With the VOC/CO_2 probe, HRA monitors the amount of CO_2 and other pollutants in the indoor air and modulates air renewal accordingly. This ensures **excellent air quality at all times with the lowest energy expenditure.**

HRT		022H0	032H0	042H0	052H0	062H0	104H0	124H0	020HV	030HV	040HV	050HV	062HV
Summer working conditions - Dry bulb temperature 27°C - Relative humidity 47% / Outdoor air temperature 35°C - Relative humidity 50%													
Cooling capacity	kW	23.7	30	37.8	52.6	56.5	98.4	121.6	20.5	29	38.4	48.1	59
EER		3.51	3.41	3.68	3.4	3.43	3.44	3.12	3.35	3.25	3.43	3.31	3.23
Sensible cooling capacity	kW	18.3	23.7	29.6	36.4	42.4	76	88.8	17.6	24.5	30	36.4	44.9
Winter conditions – Dry-bulb temperature 20 °C – Relative humidity 50% / Outdoor temperature 7 °C – Relative humidity 87%													
Thermal power	kW	22.9	30.1	36.6	51	60.5	102	130.6	20	30	37	51.4	57.6
COP		4.2	4.18	4.23	3.85	4.02	3.91	3.53	3.62	3.75	3.62	3.35	3.47
Air flow	m^3/h	3900	5500	7000	8000	9000	19000	21500	4500	6000	7000	9000	11000

LIQUID CHILLERS

TSE

CHILLERS WITH REMOTE CONDENSER WITH SCROLL COMPRESSORS

43-433 kW

TSE is the HiRef range of liquid chillers with remote condenser and Scroll compressors. These units are available with different refrigerating set-ups (Efficiency Packs), numerous power ratings and two different noise emission set-ups, making them **particularly versatile for a number of system engineering applications**. Sizing, the choice of individual components and control of auxiliary units (circulation pumps, remote condenser fans) all aim to **reduce energy consumption and increase energy savings throughout the system**. The configurations available for the refrigeration circuit are:

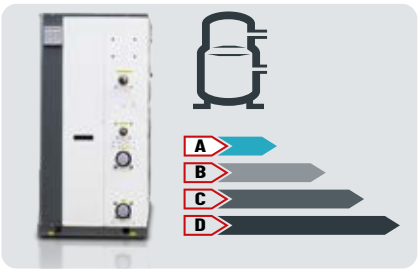
EFFICIENCY PACK 1: Dual compressor on dual circuit for high system redundancy. For units from 43 to 177 kW.

EFFICIENCY PACK 2: Dual compressor (tandem) on single circuit for greater efficiency at partial loads. For units from 43 to 177 kW.

EFFICIENCY PACK 4: Four compressors (dual tandem) on dual circuit, for a redundant system that is also efficient with low loads. For units from 146 to 433 kW.

Sizes above 433 kW are always of the dual refrigerating circuit type with five or six Scroll compressors.

- Refrigerant R410A: Available on request with R454B
- Electronic expansion valve
- Optional Vic-Taulic hydraulic couplings
- Remote condenser fan management for air flow modulation
- External pump control according to constant T or constant ΔT logic
- Partial heat recovery (desuperheater) (optional)
- Oil recovery kit for refrigeration lines up to 50 m long



Maximum efficiency at partial loads

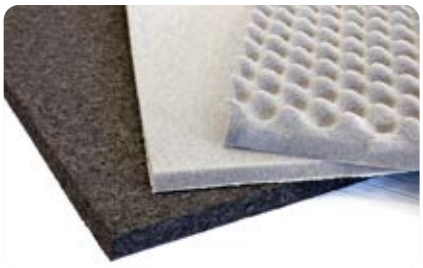
The TSE range features a multi-Scroll solution also on single circuits, electronically controlled expansion valves and the option of managing the circulation pumps and remote condenser fans via onboard software: all these features help **achieve high standards of energy efficiency, particularly at partial loads.**

Reduced footprint

The carefully arranged component layout, together with compact plate heat exchangers and the Scroll compressors, gives the machine a **compact configuration and makes it adaptable to any installation area.** Sizes with **EFFICIENCY PACK 1 and 2** also have a width compatible with that of most commercially available doors, **making transport and installation easier.**

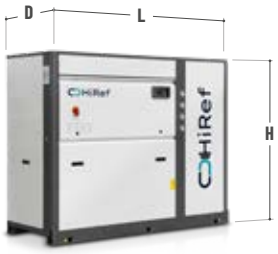
Efficiency and reliability in line with system requirements

The main strength of the TSE range is given by **its numerous configurations available for the refrigeration circuit,** which, depending on the size of the machine and system construction requirements (redundancy and/or efficiency at reduced load), can be available in the form of different **EFFICIENCY PACKS.** The management of the oil return through integrated software logic also helps **to increase the reliability of the compressors** - and consequently - of the unit.



Attention to detail and to low noise requirements

Scroll compressors, which are the main noise source in the unit, are fitted on rubber feet; these dampen vibration and therefore **attenuate the noise transmitted to the various system parts.** On request, the compressor enclosure can be lined with special sound absorbing material and the compressors can be enclosed in special insulating sheaths **to reduce airborne noise emission.**



TSE		041 CS	042 CS	051 CS	052 CS	061 CS	062 CS	071 CS	072 CS	081 CS	082 CS	091 CS	092 CS
User water values 12/7°C, condensing temperature 50°C													
Cooling capacity	kW	43.1	43.1	50.5	50.3	57.9	57.9	65.2	65.1	75.3	75.4	84.5	84.3
Total absorbed power	kW	13.2	13.2	15.5	15.5	17.5	17.5	19.5	19.5	22.4	22.4	25.2	25.2
EER		3.26	3.25	3.25	3.24	3.32	3.32	3.34	3.33	3.37	3.37	3.35	3.34
Weight	kg	372	362	432	422	442	432	452	442	472	462	512	492
Sound power [Standard]	dB(A)	76	76	78	78	78	78	79	79	79	79	81	81
Sound power [Low noise]	dB(A)	72	72	74	74	74	74	75	75	75	75	77	77
Dimensions [LxHxD]	mm	1174x1930x772											

TSE		111 CS	112 CS	131 CS	132 CS	141 CS	142 CS	144 CS	161 CS	162 CS	164 CS	181 CS	182 CS
User water values 12/7°C, condensing temperature 50°C													
Cooling capacity	kW	100.2	100.1	114.4	114.1	127.3	127.3	131.2	139.7	139.4	149.8	175.1	175.1
Total absorbed power	kW	29.8	29.8	34.6	34.6	37.8	37.8	39	41.2	41.2	44.8	53.1	53.1
EER		3.36	3.36	3.31	3.3	3.37	3.37	3.37	3.39	3.39	3.34	3.3	3.3
Weight	kg	563	553	573	563	633	618	723	673	653	743	713	693
Sound power [Standard]	dB(A)	84	84	85	85	85	85	82	85	85	82	90	90
Sound power [Low noise]	dB(A)	80	80	81	81	81	81	78	81	81	78	86	86
Dimensions [LxHxD]	mm	1644x1930x772						2374 x1990 x877	1644x1594x772		2374 x1854 x877	1644x1594x772	

TSE		184 CS	204 CS	214 CS	244 CS	284 CS	314 CS	344 CS	374 CS	424 CS	484 CS
User water values 12/7°C, condensing temperature 50°C											
Cooling capacity	kW	169.8	185.3	199.2	228	249.6	272	303.1	338.8	384.4	433.2
Total absorbed power	kW	50.4	55	59.7	68.8	75.5	82.2	94	105.7	118.9	132.1
EER		3.37	3.37	3.33	3.31	3.31	3.31	3.23	3.21	3.23	3.28
Weight	kg	853	873	923	983	1093	1253	1293	1333	1413	1520
Sound power [Standard]	dB(A)	84	85	86	88	88	88	91	93	94	95
Sound power [Low noise]	dB(A)	80	81	82	84	84	84	87	89	90	91
Dimensions [LxHxD]	mm	2374x1854x877									

Also available with 60 Hz power supply

TVA

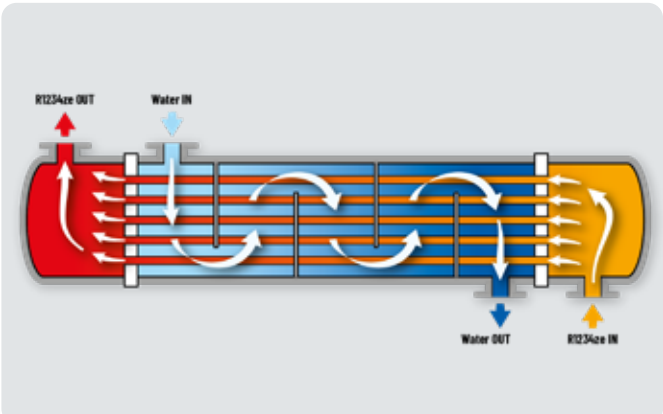
AIR CONDENSED CHILLERS WITH INVERTER DRIVEN SCREW COMPRESSORS

297–1367 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE
SCREW COMPRESSORS
SHELL AND TUBE HEAT EXCHANGER
FAST RESTART
CLASS A
INVERTER DRIVEN COMPRESSORS
CORROSION RESISTANT MATERIAL
AXIAL FANS
LOW GWP REFRIGERANT

TVA is the new range of air cooled chillers for energy-efficient and environment-friendly processes. Low environmental impact has been achieved by using **new HFO refrigerants** with low Global Warming Potential (GWP), while **higher efficiency/footprint ratios** are reached thanks to the special V-configuration of the heat exchange coils and their sizing, **the largest among the chillers currently available on the market**. The Free-Cooling version - where heat exchange surface areas are double the market average - **ensure outstanding performance**. In addition to high thermodynamic efficiency with a low Total Equivalent Warming Impact (TEWI), particular attention has also been given to maintainability and **easy access to the compressors.**

- Available refrigerants: R1234ze and R515B
- Electronic expansion valve
- Capacity modulation via inverter on both compressors or on a single compressor
- Monitoring and limitation of the maximum absorbed power
- Available with single or double pumping kit in timed rotation
- Glycol-Free kit available
- Optional EC fans



New concept of heat exchange

Single pass shell and tube evaporators provide **excellent levels of thermodynamic efficiency** thanks to full heat exchange counter-flow.

Inverter screw compressors

The screw compressors equipped with inverter ensure constant power modulation and high energy efficiency even at partial loads.

Modular and efficient

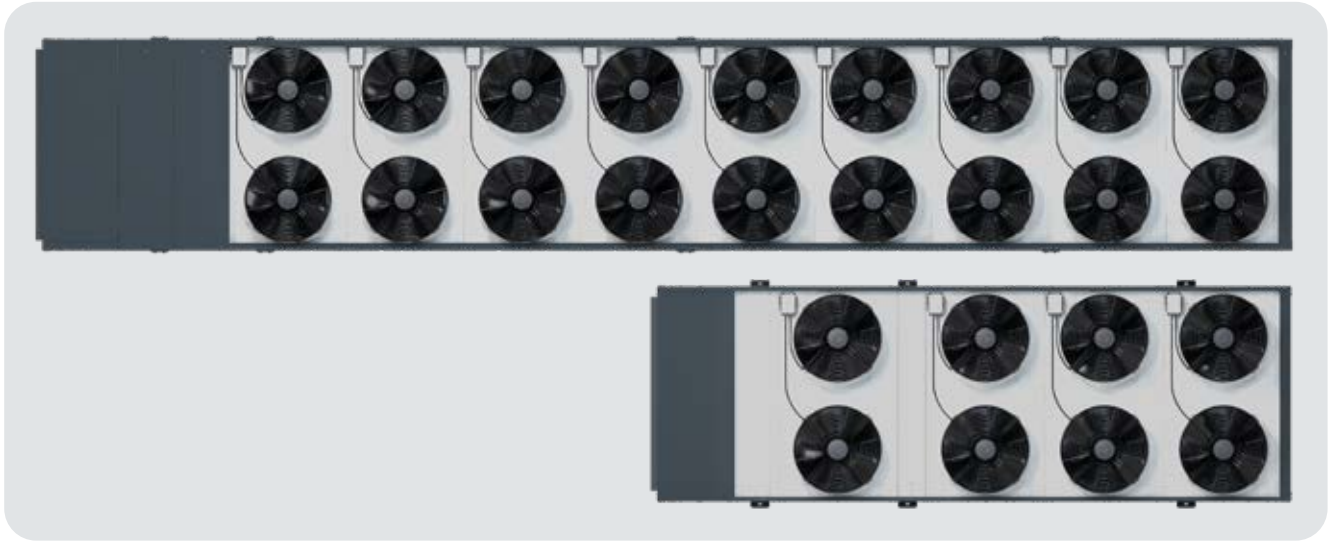
The configuration with very deep 'V' modular coils provides **an extensive heat exchange surface area and therefore excellent thermal efficiency in relation to the unit footprint.**

New refrigerant R1234ze

TVA air condensed chillers use **the new HFO refrigerant with low GWP** (GWPR1234ze=6) as part of a wider Green Technology approach. (Also available in version with R134a refrigerant and on request with R513A.)

Harmonic distortion reduction

Active filter for reducing voltage and current harmonic distortion THDi/v <5%.



TVA		0331F	0361F	0421F	0451F	0481F	0531F	0581F	0621F	0661F	0721F	0801F	0831F	0901F	0971F	1041F	1101F	1161F
User water temperature 12/7°C 20% ethylene glycol, outside air 35°C, 40% R.H.																		
Cooling capacity	kW	296.7	329.9	394.2	420.3	438.8	478.4	513	579	596.9	660.7	719.1	749.1	790.8	847.2	929.2	979.7	1059.1
Total absorbed power	kW	92.9	98.2	113.1	121.5	126.7	131.3	146.3	165.4	171.6	193.4	200.7	216.8	233.9	248.7	273.6	298.7	315.5
EER		3.19	3.36	3.49	3.46	3.46	3.64	3.51	3.5	3.48	3.42	3.58	3.46	3.38	3.41	3.4	3.28	3.36
Utility water temperature 12/7°C, ethylene glycol 20%																		
Full Free-Cooling temperature	°C	1	1.8	2	1.8	1.5	1.9	1.7	1.8	1.7	1.2	1.4	1.2	0.9	1.2	0.7	0.3	-1.3
Sound power [Standard]	dB(A)	92	93	94	94	94	95	96	97	97	98	99	99	99	99	99	100	100
Dimensions [LxHxD]	mm	5404 x2650 x2255	6655 x2650 x2255	7906x2650x2255			9722x2650x2255		11100x2650x2255			12854x2650x2255			13355x2650x2255			

TVA		0381C	0401C	0451C	0481C	0531C	0581C	0621C	0661C	0721C	0801C	0831C	0901C	0971C	1041C	1101C	1161C	1231C	1291C	1351C	1421C
Cooling: User water values 12/7°C, 35°C outside air, 40% U.R.																					
Cooling capacity	kW	354.5	386	423.1	464.1	500.3	520	568.3	609.4	699.7	751.7	802.4	865.5	877	958.3	1007	1065.1	1121.2	1178.4	1247.6	1367.1
Total absorbed power	kW	112.3	123.4	132.9	146.9	156.1	165.7	180.4	190.8	224.1	238.1	251.1	277.9	280.7	306.3	319.5	333.9	351	375.4	388.2	417.5
EER		3.16	3.13	3.18	3.16	3.21	3.14	3.15	3.19	3.12	3.16	3.2	3.11	3.12	3.13	3.15	3.19	3.19	3.14	3.21	3.27
SEER		4.43	4.43	4.53	4.57	4.53	4.52	4.5	4.62	4.51	4.5	4.65	4.57	4.44	4.52	4.59	4.64	4.66	4.65	4.54	4.92
SEPR		5.4	5.45	5.52	5.91	5.9	5.83	5.52	5.99	5.54	5.59	6.05	6.04	5.67	5.64	5.81	6.02	5.75	5.75	5.96	6.46
Sound power [Standard]	dB(A)	92	92	95	96	97	96	96	100	99	99	102	101	99	99	102	104	100	100	103	105
Dimensions [LxHxD]	mm	5404x2650x2255				6655x2650x2255				7906x2650x2255				9722x2650x2255				11100 x2650 x2255		12854 x2650 x2255	

Data declared with use of R134a refrigerant | Also available with 60 Hz power supply

TVD

AIR CONDENSED CHILLERS WITH INVERTER DRIVEN SCREW COMPRESSORS

512–1586 kW

- MULTI-PROTOCOL COMMUNICATION INTERFACE
- SCREW COMPRESSORS
- SHELL AND TUBE HEAT EXCHANGER
- FAST RESTART
- AXIAL FANS
- CORROSION RESISTANT MATERIAL
- CLASS A
- INVERTER DRIVEN COMPRESSORS
- LOW GWP REFRIGERANT

TVD is the new range of air cooled chillers for energy-efficient and environment-friendly processes. Low environmental impact has been achieved by using **new HFO refrigerants** with low Global Warming Potential (GWP), while **higher efficiency/footprint ratios** are reached thanks to the special V-configuration of the heat exchange coils and their sizing, **the largest among the chillers currently available on the market**. The Free-Cooling version - where heat exchange surface areas are double the market average - **ensure outstanding performance**. In addition to high thermodynamic efficiency with a low Total Equivalent Warming Impact (TEWI), particular attention has also been given to maintainability and **easy access to the compressors.**

- Available refrigerants: R1234ze and R515B
- Electronic expansion valve
- Capacity modulation via inverter on both compressors or on a single compressor
- Monitoring and limitation of the maximum absorbed power
- Available with single or double pumping kit in timed rotation
- Glycol-Free kit available
- EC Fans
- Dual power supply (optional)
- Active filter for harmonic distortion reduction (optional)

New refrigerant R1234ze

TVA air condensed chillers use **the new HFO refrigerant with low GWP** (GWPR1234ze=6) as part of a wider Green Technology approach. (Also available in version with R134a refrigerant and on request with R513A.)

Inverter screw compressors

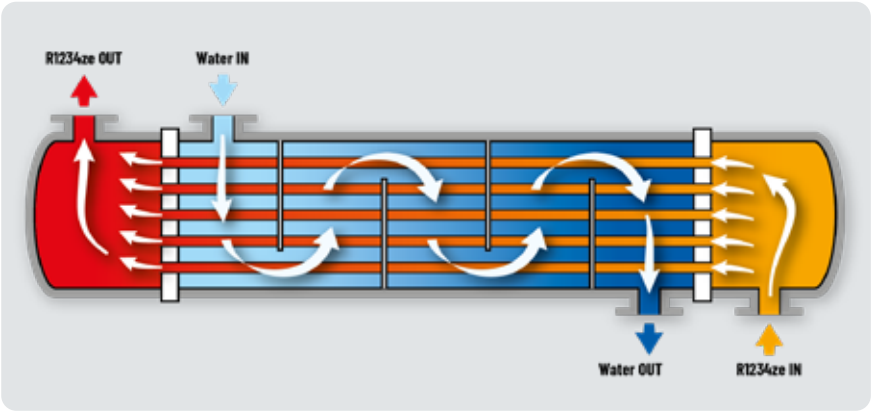
The screw compressors equipped with inverter ensure constant power modulation and high energy efficiency even at partial loads.

Modular and efficient

The configuration with very deep 'V' modular coils provides **an extensive heat exchange surface area and therefore excellent thermal efficiency in relation to the unit footprint.**

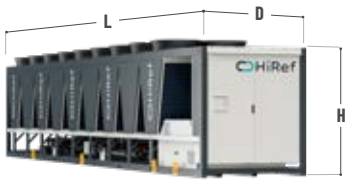
Harmonic distortion reduction

Active filter for reducing voltage and current harmonic distortion THDi/v <5%.



New concept of heat exchange

Single pass shell and tube evaporators provide **excellent levels of thermodynamic efficiency** thanks to full heat exchange counter-flow.



TVD		050F	074F	086F	100F	115F	130F	140F	153F
Cooling / Free Cooling: User water temperature 30/20 °C, 25% ethylene glycol, outdoor air 40 °C, 40% R.H.									
Cooling capacity	kW	512	744	849	988.6	1138	1271	1382	1540
Total absorbed power	kW	146.4	217	241.7	275	305.5	359	192	426
EER		3.5	3.4	3.5	3.5	3.7	3.5	3.5	3.7
Sound power [Standard]	dB(A)	97	99	99	99	100	101	102	102
Dimensions [LxHxD]	mm	4904x2650x2255	6155x2650x2255	7405x2650x2255	8655x2650x2255	10700x2650x2255		11950x2650x2255	13500x2650x2255

TVD		050C	074C	086C	100C	115C	130C	140C	153C
Cooling: User water temperature 30/20 °C, outdoor air 40 °C, 40% R.H.									
Cooling capacity	kW	529	768	881	1022	1172	1314	1430	1586
Total absorbed power	kW	142	211	235	270	298.3	348	381	415
EER		3.72	3.6	3.7	3.7	3.9	3.7	3.7	3.8
Sound power [Standard]	dB(A)	97	99	99	99	100	101	102	102
Dimensions [LxHxD]	mm	4904x2650x2255	6155x2650x2255	7405x2650x2255	8655x2650x2255	10700x2650x2255		11950x2650x2255	13500x2650x2255

Data declared with use of R134a refrigerant | Also available with 60 Hz power supply

TTX

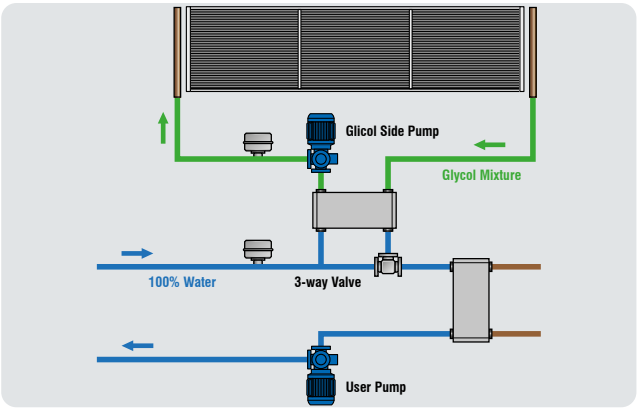
AIR CONDENSED CHILLERS WITH OIL-FREE CENTRIFUGAL COMPRESSORS

540-2120 kW

- MULTI-PROTOCOL COMMUNICATION INTERFACE
- OIL-FREE CENTRIFUGAL COMPRESSORS
- SPRAY FLOODED SHELL AND TUBE
- FAST RESTART
- AXIAL FANS
- CORROSION RESISTANT MATERIAL
- CLASS A
- SUPER LOW NOISE
- LOW GWP REFRIGERANT

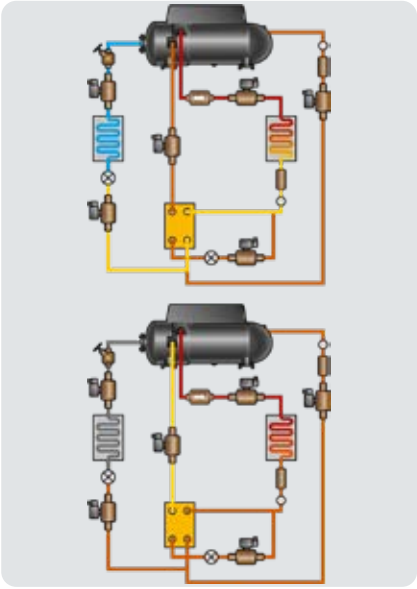
TTX is the most efficient range of air-cooled chillers specifically sized to meet the latest trends in the Data Center sector. The use of oil-free centrifugal compressors in combination with new flooded heat exchangers (minimum approach between water and refrigerant and reduced refrigerant charge compared to traditional flooded exchangers) allows the system **to fully exploit the highest efficiency levels,** especially at partial loads. Chillers in the TTX range can be selected with **HFO R1234ze refrigerant,** characterized by a very low **environmental impact,** minimizing the overall system TEWI.

- R1234ze refrigerant
- Water connections with Vic-Taulic quick couplings
- Dual day/night noise emission set-point
- EC Fans
- Electronic expansion valve
- Capacity modulation via inverter on both compressors or on a single compressor
- Monitoring and limitation of the maximum absorbed power
- Available with single or double pumping kit in timed rotation
- Glycol-Free kit available
- Dual power supply (optional)
- Active filter for harmonic distortion reduction (optional)



Glycol-Free kit

The Free-Cooling versions can be selected with the "Glycol- Free" kit (on board the unit) to confine the water-antifreeze mix inside the finned coils. This solution **maximises heat exchange efficiency at the evaporator** with the exclusive use of pure water; it also **dramatically reduces pumping costs.**



Top-class thermodynamic performance!

An effective combination of "oil-free" centrifugal compressor and flooded exchangers allows maximisation of thermal exchange efficiency; this is largely due to the absence of oil in the circuit and the reduced approach temperature between water and refrigerant (1K) as a result of no overheating in the evaporator. Cycle efficiency is enhanced by the centrifugal compressor, which provides **ultra-high efficiency at partial loads,** and by the economiser, which ensures **intermediate regenerative exchange in the circuit.**

Maximum efficiency at partial loads

Oil-free centrifugal compressors (up to 4 on a single refrigeration circuit), flooded heat exchangers, fan modulation, and variable flow management through circulation pumps: these are the main features that make the TTX range efficient at partial loads.

Acoustic comfort

Two different soundproofing systems are available: the most suitable one will depend on the importance of noise containment in the overall plant layout. Adopted technical solutions include fan speed control and compartmentalisation of compressors and pumping kits in a box internally lined with soundproofing material.

TTX		0500F	0600F	0902F	1202F	1403F	1603F	1904F	0500C	0600C	0902C	1202C	1403C	1603C	1904C
Cooling: User water temperature 30/20°C, outside air 40°C															
Cooling capacity	kW	540	642	1038	1273	1531	1800	2066	547	649	1064	1302	1600	1856	2120
Total absorbed power	kW	136	148.4	276	292	366	432	547	131	147	274	290	406	430	544
EER		3.9	4.3	3.7	4.3	4.1	4.1	3.7	4.1	4.4	3.9	4.4	3.9	4.32	3.9
Dimensions [LxHxD]	mm	4900 x2690 x2320	6430 x2690 x2320	7700 x2690 x2320	9160 x2690 x2320	12000 x2690 x2320	13420x2690x2320		4900 x2690 x2320	6340 x2690 x2320	7700 x2690 x2320	9160 x2690 x2320	12000 x2690 x2320	13420 x2690 x2320	13420 x2320 x2690

Also available with 60 Hz power supply | Declared data with R1234ze refrigerant

XTW

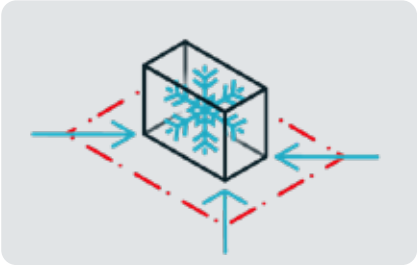
WATER-CONDENSED CHILLERS WITH OIL-FREE CENTRIFUGAL COMPRESSORS

500-2400 kW

- MULTI-PROTOCOL COMMUNICATION INTERFACE
- OIL-FREE CENTRIFUGAL COMPRESSORS
- SPRAY FLOODED SHELL AND TUBE
- FAST RESTART
- CORROSION RESISTANT MATERIAL
- CLASS A
- SUPER LOW NOISE
- LOW GWP REFRIGERANT

XTW offers the most innovative, efficient water condensed chiller solution. A meticulous choice of components and equipment layout has led to **a solution with numerous advantages as regards both energy performance and noise emissions**. The special component layout lets users maximise **the advantages provided by the oil-free centrifugal compressor** (maximum heat exchange efficiency, ultra-high efficiency at partial loads, reduced inrush current) and **the compact flooded exchangers** (minimal approach temperature between water and refrigerant, lower load compared to traditional flooded units).

- Available refrigerants: R1234ze and R515B
- Water connections with Vic-Taulic quick couplings
- Modulation and supervision managed by the software
- Low noise set-up with compressor insulation



Reduced footprint

Careful assessment of component layout and sizing **allows the system footprint to be reduced,** freeing up more space within the facility and during handling operations.

"Silent" layout

The piping layout is designed and sized to ensure low noise emissions under all working conditions and **mitigate Coriolis force acceleration.** The use of high performance sound absorbing material in the **Low Noise configuration** results in a further **reduction of the compressor noise emissions.**

Top-class thermodynamic performance!

An effective combination of "oil-free" centrifugal compressor and flooded exchangers **allows maximisation of thermal exchange efficiency;** this is largely due to the absence of oil in the circuit and the reduced approach temperature between water and refrigerant (1K) as a result of no overheating in the evaporator. Cycle efficiency is enhanced by the centrifugal compressor, **which features ultra-high efficiency at partial loads,** and by the economiser, which **ensures intermediate regenerative exchange in the circuit.**

Two-level evaporation

The evaporator with spray technology and single pass on the water side **guarantees up to 5% more efficiency than traditional shell and tube versions,** thanks to the permanently countercurrent heat exchange on two separate evaporation levels - and with a **smaller refrigerant charge than a standard flooded shell and tube model.**

24 hour operation

The configuration with dual refrigerant circuit and dual centrifugal compressor with permanent magnets **guarantees high operational reliability,** making the XTW range particularly suitable **for installation in Data Centers or wherever high-value, continuous cycle industrial processes are carried out.**

XTW		0511	0611	1021	1221	1531	1831	2041	2441
Cooling: User water temperature 30/20°C, source water temperature 40/45°C									
Cooling capacity	kW	500	600	1000	1200	1500	1800	2000	2400
Total power supply	kW	94.9	110.8	193.8	225.7	284.7	332.4	387.6	451.4
EER		5.27	5.42	5.16	5.32	5.27	5.42	5.16	5.32
Dimensions [LxHxD]	mm	4670x2520x1950				5665x2520x1950			

Also available with 60 Hz power supply | Declared data with R1234ze refrigerant

XVA

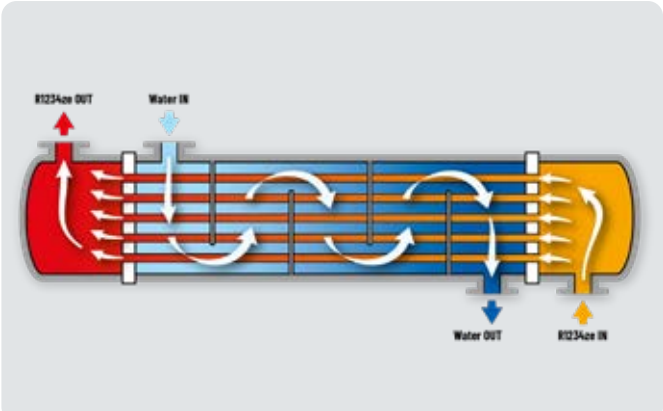
WATER CONDENSED CHILLERS AND HEAT PUMPS WITH SCREW COMPRESSORS

445–1494 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE
SCREW COMPRESSORS
SHELL AND TUBE HEAT EXCHANGER
FAST RESTART
CORROSION RESISTANT MATERIAL
CLASS A
LOW GWP REFRIGERANT

XVA is HiRef's range of water-cooled chillers with screw compressors and shell and tube heat exchangers. Use of the new R1234ze refrigerant, **with ultra-low GWP** (Global Warming Potential), and **achievement of high energy efficiency levels**, especially at partial loads, **ensures the system has a low TEWI** (Total Equivalent Warming Impact). The broad capacity range offered and the availability of different versions caters to a wide variety of needs. It's possible to choose operation in **chiller-only mode with evaporative tower or Dry Cooler** and **operation in heat pump mode** for high or low temperatures.

- Available refrigerants: R1234ze and R515B
- Available in versions: chilling only (with well water or evaporative tower), chilling only (with Dry Cooler), heating only heat pump
- Electronic expansion valve
- Monitoring and limitation of the maximum absorbed power
- Thermal insulating jackets on compressors
- Available with screw compressors driven by inverter

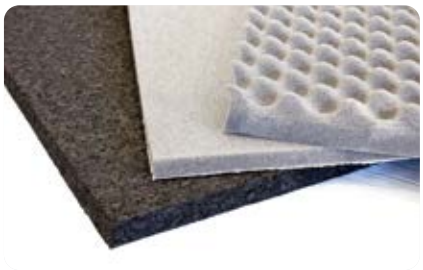


New concept of heat exchange

Single pass shell and tube evaporators provide **excellent levels of thermodynamic efficiency** thanks to full heat exchange counter-flow.

Power and flexibility

Screw compressor allows **high cooling capacities** to be achieved with load modulation via the special slide valve. On request, a version with inverter either on one or on both compressors is available, **for finer adjustment of cooling capacity and obvious advantages in terms of energy efficiency.**



Low Noise set-up

The screw compressors, the only source of noise on the machine, can be placed in a dedicated enclosure lined with sound-absorbing material **that reduces the overall noise emission.**

Suitable for coupling to Polymorph HiRef modules

The XVA range offers **great versatility when combined with PLM hydronic modules,** allowing for different system configurations. Thanks to this flexibility, it can be used as: a reversible heat pump, a chiller with total recovery, a multi-purpose heat pump for 2-pipe systems, a multi-purpose heat pump for 4-pipe systems or an air conditioning system with Free-Cooling.

XVA		491D	541D	601D	681D	801D	921D	1141D	1281D	451D	551D	641D	701D	821D	911D	1061D	1221D	1291D	1431D	1501D
Cooling: User water values 12/7°C, 30/35°C source water side																				
Cooling capacity	kW	488.5	563.7	648.5	729.4	871	953.7	1113.8	1289.1	444.6	542.3	618.2	709	811.6	903.4	1096.5	1215	1260	1419.9	1493.9
Total absorbed power	kW	90.4	101.5	119.3	135.1	158.2	177.9	190.5	220.2	80.8	97.8	115.8	133.2	154.4	170.3	205.6	230.1	248.2	279.4	291.5
EER		5.41	5.56	5.44	5.4	5.51	5.36	5.85	5.85	5.5	5.55	5.34	5.32	5.26	5.3	5.33	5.28	5.08	5.08	5.12
SEER		7.63	7.52	7.52	7.56	7.54	7.52	7.88	7.94	7.63	7	6.79	6.93	6.94	6.94	7.03	6.99	7.23	7.52	7.55
SEPR		8.15	8.01	8	8	8	8.16	8.03	8.01	8.15	8	8	8.06	8.04	8.04	8.12	8.05	8.13	8.55	8.55
Sound power [Standard]	dB(A)	95	97	97	98	99	100	102	103	95	92	95	96	97	98	99	100	101	102	103
Dimensions [LxHxD]	mm	4250x2050x1500			4800 x2250 x1500		5200 x2250 x1900		5200 x2250 x2050	4250x2050x1500					4800 x2250 x1500		5200x2250x1900			5400 x2250 x2050

LIQUID CHILLERS AND REVERSIBLE HEAT PUMPS

CDA

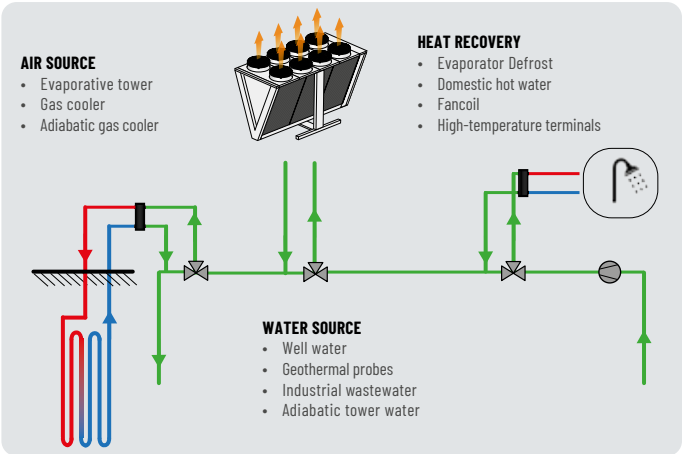
AIR-COOLED CHILLERS AND HEAT PUMPS WITH NATURAL REFRIGERANT R744 (CO_2) AND MODULATING COMPRESSORS

75-706 kW

- REFRIGERANT R744 (CO_2)
- MULTI-PROTOCOL COMMUNICATION INTERFACE
- PISTON COMPRESSORS
- CLASS A
- FAST RESTART
- CORROSION RESISTANT MATERIAL

CDA is the new range of water chillers designed by HiRef for applications that require **energy efficiency and environment-friendliness**. Low environmental impact is guaranteed by the use of CO_2 as a refrigerant fluid (R744) which is characterised by a unit GWP (Global Warming Potential) value equal to 1. High efficiency/footprint ratios are achieved thanks to the use of inverter-driven compressors and finned pack exchangers with a large exchange surface installed in a "V" configuration.

- Aisi 316L stainless steel refrigeration circuit
- Low pressure side PS: 85 bar
- EC Fans
- Available in the following versions: chiller, reversible heat pump, and Free-Cooling chiller



Very high temperature and multi-source heat recovery

CO_2 in the transcritical system allows several exchangers to be placed in series on the dissipation side. A typical configuration includes:

- **a partial or total heat recovery exchanger** that recovers the dissipated heat and produces instantaneous hot water at very high temperatures (over 90°C), without altering the operation of the unit. A typical application is the production of instantaneous hot water;
- **an exchanger with dissipation in water using well water or geothermal probes,** to further cool the CO_2 and guarantee greater efficiency and cooling performance during the most critical periods of operation.

Natural refrigerant

The refrigerant R744 is a natural gas, largely available in nature and without limitations of use. In addition, it is inert, non-toxic and, more importantly, non-flammable, all of which contributes **to reducing costs and the difficulties associated with installing the systems safely.** This refrigerant can be widely used in the field of commercial refrigeration; among other things, it offers good thermodynamic performance due to its inherently favourable chemical and physical properties.

Modular and efficient

The configuration with very deep modular 'V' coils provides an extensive heat exchange surface area and therefore **excellent thermal efficiency levels in relation to the unit footprint.** Another special feature is the material of the coil tubes (alloy of copper and steel) which ensures mechanical **strength to high pressures (up to 130 bar) and heat transfer coefficients greater than those of stainless steel-only tubes**. By connecting in parallel each CDA unit via special kits (on request) a modular configuration can be obtained capable of meeting high cooling capacity requirements and guaranteeing **high redundancy,** with full system management via the on-board electronics.

Maximum efficiency at partial loads

By choosing a single refrigeration circuit configuration with an inverter-driven compressor, by using EC electronically commutated fans (standard), and by managing variable flow through the circulation pumps (included), maximum partial-load efficiency of the CDA range is guaranteed.

CDA		060	091	111	121	141	201	241	303	353	384	404
Cooling: User water values 12/7°C, 35°C outside air, 40% U.R.												
Cooling capacity	kW	579	75.2	92.6	115.5	138.5	197.4	234.8	304.7	348.6	386.2	457.4
Total absorbed power	kW	23.1	29.3	37	48.3	52.9	83.9	98.6	126	147.8	160.6	183.1
EER		2.5	2.57	2.5	2.39	2.62	2.35	2.38	2.42	2.36	2.4	2.5
Sound power [Standard]	dB(A)	80	82	84	85	86	88	89	90	90	92	92
Sound power [Low noise]	dB(A)	77	79	81	82	83	85	86	87	87	89	89
Dimensions [LxHxD]	mm	1470x2715x2255				2940x2715x2255			4410x2715x2255		5880x2715x2255	
Heating: User water values 20/60°C, outside air 7°C, 87% U.R.												
Thermal power	kW	93.1	120.4	147.5	182.9	217	321.9	366	482.8	549	615.7	706.2
Total absorbed power	kW	22.8	32.4	39.1	48.3	52.9	86.9	99	130.4	148.5	167.9	183.7
COP		4.09	3.71	3.77	3.79	4.10	3.70	3.70	3.70	3.70	3.67	3.85
Sound power [Standard]	dB(A)	80	82	84	85	86	88	89	90	90	92	92
Sound power [Low noise]	dB(A)	77	79	81	82	83	85	86	87	87	89	89
Dimensions [LxHxD]	mm	1470x2715x2255				2940x2715x2255			4410x2715x2255		5880x2715x2255	

CDA-F		060	091	111	121	141	201	241	303	353	384	404
Cooling: User water values 12/7°C, 35°C outside air, 40% U.R.												
Cooling capacity	kW	57.9	75.2	92.6	115.5	138.5	197.4	234.8	304.7	348.6	386.2	457.4
Total absorbed power	kW	23.1	29.3	37	48.3	52.9	83.9	98.6	126	147.8	160.6	183.1
EER		2.5	2.57	2.5	2.39	2.62	2.35	2.38	2.42	2.36	2.4	2.5
Sound power [Standard]	dB(A)	80	82	84	85	86	88	89	90	90	92	92
Sound power [Low noise]	dB(A)	77	79	81	82	83	85	86	87	87	89	89
Dimensions [LxHxD]	mm	1470x2715x2255				2940x2715x2255			4410x2715x2255		5880x2715x2255	

Also available with 60 Hz power supply

NHA

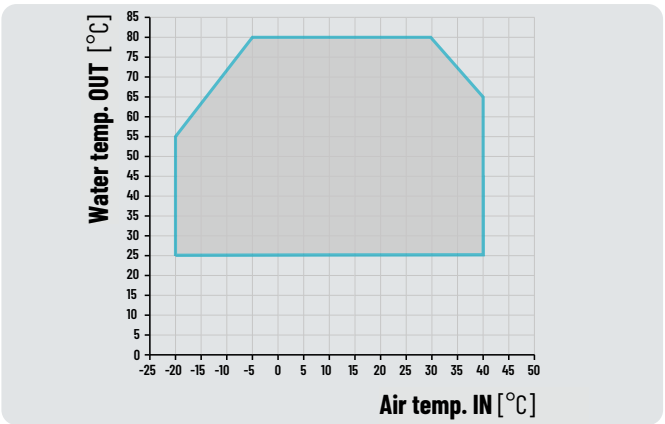
CHILLERS AND HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS

92-688 kW

- MULTI-PROTOCOL COMMUNICATION INTERFACE
- AXIAL FANS
- CORROSION RESISTANT MATERIAL
- SCROLL COMPRESSORS
- PLATE HEAT EXCHANGER
- NATURAL REFRIGERANT

NHA is the range of air/water units in chiller and reversible heat pump versions with natural refrigerant R290. The NHA range is designed to handle **the air conditioning of industrial plants and thermal loads in technological applications, where maximum system reliability is required in all operating conditions, 24/7.** The NHA range utilises state-of-the-art Scroll compressors, plate exchangers optimised for use with medium pressure refrigerants (R290) and low-noise axial fans. The unit lends itself to being installed in environments where it is essential to reduce noise emissions as much as possible; three soundproofing set-ups are available.

- Available in R290 or R454C
- 2 different soundproofing set-ups available: Standard and Low Noise
- Available versions: Chiller (C) and reversible heat pump (H)
- High power density units in both chiller and heat pump modes
- Electronic expansion valve
- Easy accessibility thanks to the optimisation of the internal space
- High-efficiency On-Off Scroll Compressors
- EC Fans



Production of hot water up to 80°C

The units of the range are capable of **producing water at 80°C** and operating at outside air temperatures as low as **-20°C.**

Easy shipping, everywhere!

Thanks to its small size, each unit in the NHA range can easily be placed in a High Cube container and shipped worldwide!

Precise control of the supply temperature

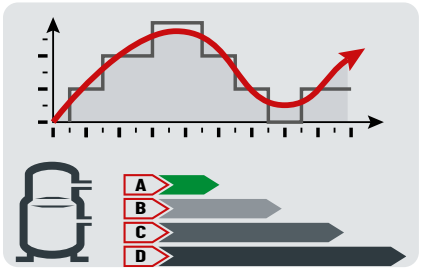
The units in the NHA range are equipped with 2-way motorized valves that ensure **precise control of the supply temperature even at partial loads,** preventing mixing that would compromise the unit's energy efficiency.

Plate heat exchangers

The NHA range uses brazed plate heat exchangers with asymmetrical channels, suitable for the use of high and medium pressure refrigerant gases. The asymmetrical channel configuration **allows high heat exchange efficiencies to be achieved** while maintaining low water-side pressure drops, **thus reducing pumping expenses,** both at full and partial load.

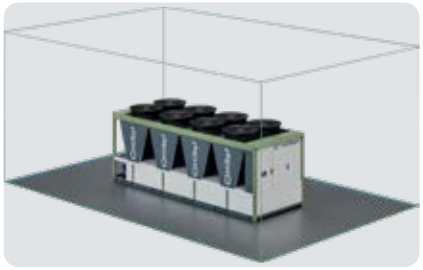
Modular design

The NHA range is designed with a high focus on efficiency and ease of use, features that are reflected **in the integration of a single pumping unit and a single electrical panel.** This configuration not only simplifies installation and maintenance, but also ensures reliable and continuous operation, minimising the risk of breakdowns and optimising system performance.



Modulation and redundancy

The units in the NHA range have 2 to 8 independent circuits, each with 2 high-efficiency On-Off Scroll compressors. This guarantees maximum redundancy and high efficiency at partial loads as well as precise control of the heating and cooling capacity delivered.



Safety first

Units loaded with **A3 (highly flammable) gas** must be installed away from drains, manholes, drainage channels and any other element that could act as a potential escape route for any leakage of said gases, **which must always be considered FLAMMABLE and heavier than air.** The minimum distance to be maintained with respect to these requirements is 2.5 metres. Within this safety zone, it is strictly forbidden to smoke, use open flames or carry out any work that may generate flames, arc discharges or sparks.

NHA		101	151	202	252	302	353	403	453	504	554	604
Cooling: User water values 12/7°C, 35°C outside air, 40% U.R.												
Cooling capacity	kW	91.8	163.3	183.5	228	272.5	319.8	364.3	408.8	456.1	500.6	545.1
Total absorbed power	kW	32.2	49.1	64.4	81.3	98.2	113.5	130.4	147.3	162.6	179.5	196.4
EER		2.85	2.78	2.85	2.8	2.78	2.82	2.79	2.78	2.8	2.79	2.78
Heating: User water values 30/35°C, 7°C outside air, 87% U.R.												
Thermal power	kW	116	172	232	288	344	404	460	516	576	632	688
Total absorbed power	kW	25.3	37.9	50.6	63.2	75.8	88.5	101.1	113.7	126.4	139	151.6
COP		4.58	4.54	4.58	4.56	4.54	4.56	4.55	4.54	4.56	4.55	4.54
Sound power [Standard]	dB(A)	83	84	86	87	87	88	89	89	90	90	90
Sound power [Low noise]	dB(A)	78	80	81	82	83	84	85	85	85	86	86
Dimensions [LxHxD]	mm	1905x2530x2256		3310x2530x2256			4715x2530x2256			6120x2530x2256		

Also available with 60 Hz power supply | Data referring to R290 versions

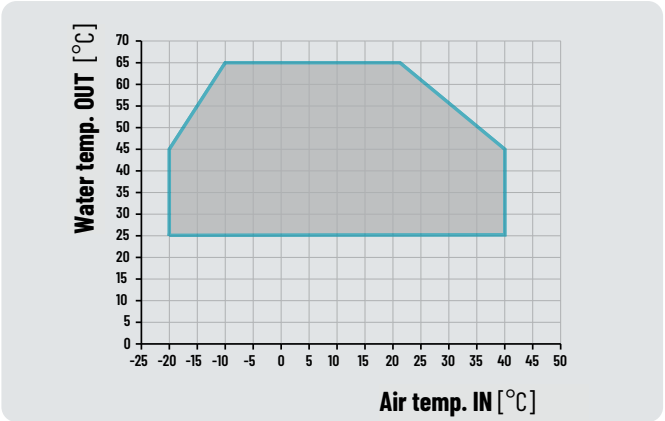
HPS

REVERSIBLE AIR CONDENSED HEAT PUMPS FOR LOW OUTDOOR TEMPERATURES

36–176 kW

HPS is the HiRef range of air-to-water reversible heat pumps designed for operation in very cold climates. **The use of compressors with EVI steam injection technology allows the production of hot water up to 65 °C and operation with outdoor temperatures down to -20 °C**. This is combined with special **focus on Low Noise** (the "Low-Noise" silenced version is supplied as standard) and the use of different refrigeration circuit architectures to meet the needs of many different system applications.

- Refrigerant R410A
- Electronic expansion valve
- EVI compressors with steam injection
- "Cold" start Smart Kit configurable on request, to manage any mixing systems
- Hydrophilic coated coils with wider fin pitch
- Condensate collection trays with heating resistances
- Optional EC fans



Production of hot water up to 65 °C

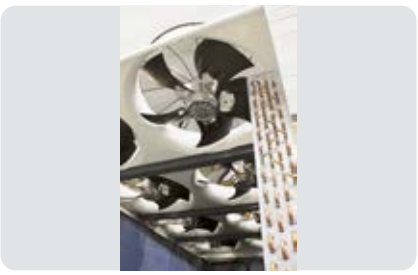
The units of the HPS range are capable of **producing water at 65°C**, as well as operating with outdoor air temperatures down **to -20°C.**

Efficiency and reliability in line with system requirements

The available refrigerating circuit configurations have been designed to ensure, also simultaneously, **redundancy and efficiency at partial loads.** More specifically, the units - depending on the size of the machine and on specific plant engineering requirements - consist of two compressors on two circuits **for high system redundancy** or four compressors (double tandem) on two circuits **for a system that is simultaneously redundant and efficient at partial loads.**

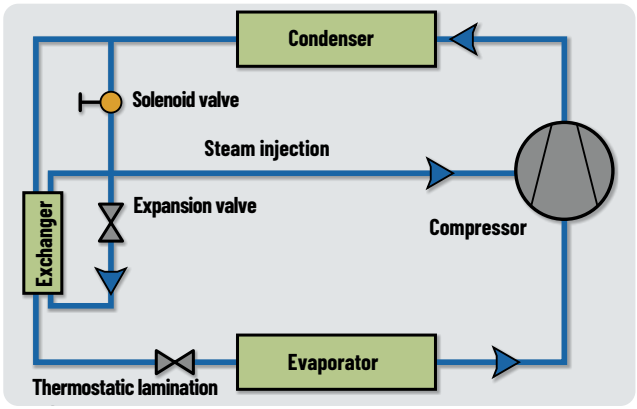
Smart Defrost System

A factor that heavily weighs on the costs of managing the entire plant is finned pack evaporator defrosting during wintertime operation. The (patented) Smart Defrost System by HiRef is able to identify a decline in the exchanger performance caused by the formation of ice and to **minimise the duration of the defrosting process.** The use of coils treated with hydrophilic surface coating **speeds up the defrosting process** so that melting of just the first, thin ice layer on the fins is only required for cleaning.



Extra low noise

All units in the HPS range are, as standard, **"Low Noise"**, which means fan speed is controlled, anti-vibration piping is used on the refrigeration circuit, and the compressors are compartmentalised in a box lined with soundproofing material. **All this ensures minimum noise emissions throughout the system.**



Units optimised for climates with T down to -20°C

The Scroll compressors of the HPS range use **steam injection technology:** a light flow of refrigerant in a medium-pressure vapour state is "injected" into the coils in the compression chamber. This system allows for both **an increase in the cooling** (and therefore, also the heating) **capacity and efficiency and, above all, an extension of the operating range of the heat pump;** this makes of the HPS range the ideal solution in case of extremely low outdoor temperatures.

HPS		041HL	051HL	071HL	081HL	101HL	134HL	164HL	204HL
Cooling: User water values 12/7°C, 35°C outside air, 40% U.R.									
Cooling capacity	kW	36.3	45.5	61.8	68.9	79.2	121.5	136.9	156
Total absorbed power	kW	12	15	19.7	23.3	25.4	40.2	48.9	52.6
EER		3.03	3.03	3.14	2.96	3.12	3.02	2.8	2.96
Heating: User water values 40/45°C, 7°C outside air, 89% U.R.									
Thermal power	kW	43.6	53.9	72.5	81.6	92.2	140.3	158	175.6
Total absorbed power	kW	13	15.7	21.2	24.4	26.8	41.1	48.6	50.9
COP		3.34	3.42	3.41	3.35	3.44	3.41	3.25	3.45
SCOP		2.83	2.96	2.91	2.9	2.91	3.2	2.85	3.05
Sound power [Standard]	dB(A)	79	78	80	81	81	80	82	82
Dimensions [LxHxD]	mm	2440x1735x1183		2792x1735x1183		3540x1679x1183	3538x1884x1653		3538x2284x1653

Also available with 60 Hz power supply

TSS

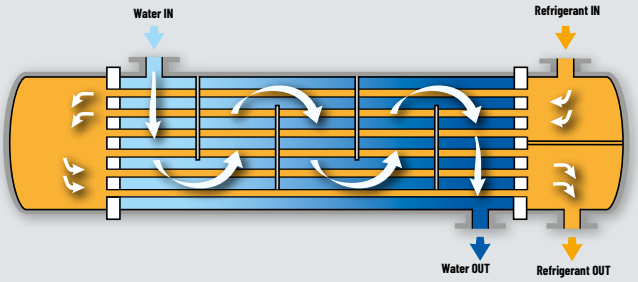
CLASS A CHILLERS AND HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS

120-265 kW

- MULTI-PROTOCOL COMMUNICATION INTERFACE
- SCROLL OMPRESSORS
- AXIAL FANS
- CORROSION RESISTANT MATERIAL
- A2L READY
- LOW GWP REFRIGERANT
- CLASS A
- SHELL AND TUBE HEAT EXCHANGER

The new TSS range chillers and heat pumps are air/water units in energy class A for both cooling and heating, available for use with R410A refrigerant or, in the "A2L" version, with low environmental impact R454B refrigerant. The TSS range is designed **to manage the conditioning of industrial plants and thermal loads in technological applications where 24/7 system reliability is required.**. The TSS range uses latest-generation Scroll compressors, shell and tube water heat exchangers optimised for use with **high pressure refrigerants** (R410A/R454B) and axial fans suitable for outdoor installation.

- 3 different soundproofing setups available: Standard, Low Noise and Super Low Noise
- High power density units in both chiller and heat pump modes
- Electronic expansion valve
- Optional EC fans
- Easy accessibility thanks to the optimisation of the internal space



Reliability: shell and tube

The use of shell and tube heat exchangers with exchange water flow on the shell side implies **a lower risk of blocking the flow** due to exchanger clogging compared to units with plate heat exchangers. This is thanks to **the larger throughsections,** the exchanged power being the same. Additionally, the dual-pass heat exchanger **ensures high heat exchange efficiency** both in "chiller" and in "heat pump" modes, with lower consumption figures for the user.

Acoustic comfort

It is possible to choose between **three different soundproofing configurations.** The solutions include fan speed management, the use of anti-vibration components on the refrigeration circuit, and the placement of the compressors in a box internally lined with sound-absorbing material.

Maximised energy efficiency

The units of the TSS range belong to the **energy efficiency class A,** both in the chilling only version and in the heat pump version. This is thanks to a careful selection of internal components, which also includes the adoption of **innovative high efficiency Scroll compressors with direct start, permanent magnet motor technology.** The high modulation range guaranteed by the multi-Scroll technology allows cooling/heating requirements **to be met at any time, minimising energy waste and increasing seasonal efficiency.**

TSS		114CS	124CS	144CS	164CS	194CS	214CS	244CS
Cooling: User water values 12/7°C, 35°C outside air, 40% U.R.								
Cooling capacity	kW	120.3	130.2	152.4	164.9	190.2	225.7	251.4
Total absorbed power	kW	34	36.2	43.6	47.5	56	71.1	80
EER		3.54	3.59	3.5	3.47	3.4	3.17	3.14
SEER		4.95	4.83	4.86	4.98	4.97	4.9	4.78
SEPR		5.66	5.7	5.7	5.82	5.86	5.7	5.74
Heating: User water values 40/45°C, 7°C outside air, 89% U.R.								
Thermal power	kW	123.9	130.8	149.9	163.1	186.9	227.5	265.2
Total absorbed power	kW	34.1	36.2	42.5	46.8	53.4	65.1	75.4
COP		3.63	3.61	3.53	3.49	3.5	3.49	3.52
SCOP		3.95	3.85	3.86	3.93	4.05	4.18	4.24
Sound power [Standard]	dB(A)	83	84	86	86	87	88	89
Sound power [Low noise]	dB(A)	80	81	83	83	84	85	86
Sound power [Super Low noise]	dB(A)	78	80	82	82	84	84	85
Dimensions [LxHxD]	mm	3540x1735x1183	3540x1846x1653			3540x2330x1653		4206x2330x1653

Also available with 60 Hz power supply | Data declared with use of R410A refrigerant

TSL

CLASS A CHILLERS AND HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS

277–1004 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

CORROSION RESISTANT MATERIAL

CLASS A

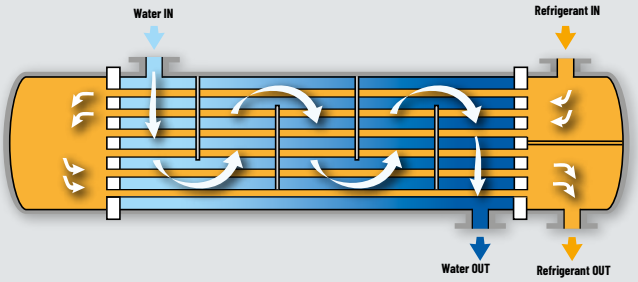
LOW GWP REFRIGERANT

SCROLL COMPRESSORS

SHELL AND TUBE HEAT EXCHANGER

The TSL range chillers and heat pumps are air/water units in energy class A for both cooling and heating, available for use with R410A refrigerant or, in the "A2L" version, with low environmental impact R454B refrigerant. The TSL range is designed to manage the **conditioning of industrial plants and thermal loads in technological applications, where 24/7 reliability in all working conditions, one of the assets of these units, is a critically important requirement**. The TSL range uses latest generation Scroll compressors, shell and tube water heat exchangers optimised for use with high pressure refrigerants (R410A/R454B) and axial fans suitable for outdoor installation.

- 3 different soundproofing setups available: Standard, Low Noise and Super Low Noise
- High power density units in both chiller and heat pump modes
- Optional EC fans
- Electronic expansion valve
- Easy accessibility thanks to the optimisation of the internal space



Reliability: shell and tube

The use of shell and tube heat exchangers with exchange water flow on the shell side implies **a lower risk of blocking the flow** due to exchanger clogging compared to units with plate heat exchangers. This is thanks to the **larger throughsections,** the exchanged power being the same. Additionally, the dual-pass heat exchanger **ensures high heat exchange efficiency** both in "chiller" and in "heat pump" modes, **with lower consumption figures for the user.**

Easy maintenance

To carry out maintenance of the condensing coil manifolds and refrigeration circuit components, which are located behind the electrical panel, the TSL range is supplied as standard with the Hi-Rail sliding guide. This allows **the control panel to be easily removed,** resulting in **extra space for unscheduled maintenance,** without impacting the footprint required for normal operation of the unit.

Maximised energy efficiency

The units of the TSL range belong to the energy **efficiency class A,** both in the chilling only version and in the heat pump version. This is thanks to a careful selection of internal components, which also includes the adoption **of innovative high efficiency Scroll compressors with direct start, permanent magnet motor technology.** The high modulation range guaranteed by the multi-Scroll technology allows cooling/heating requirements to be met at any time, **minimising energy waste and increasing seasonal efficiency.**

TSL		294FS	324FS	374FS	404FS	454FS	496FS	556FS	596FS	636FS	676FS	748FS	808FS	868FS	900FS
User water temperature 12/7°C 20% ethylene glycol, outside air 35°C, 40% R.H.															
Cooling capacity	kW	276.9	319.4	354.2	383.2	422.9	478.9	545.6	585.7	608.1	648.6	725.3	791.8	848.6	910.9
Total absorbed power	kW	89.7	105.8	118.3	129.2	150.4	155.8	179.4	195.8	205.4	221.1	235.4	258.1	270.8	299.7
EER		3.09	3.02	2.99	2.97	2.81	3.07	3.04	2.99	2.96	2.93	3.08	3.07	3.13	3.04
Utility water temperature 12/7°C, ethylene glycol 20%															
Full free-cooling temperature	°C	-8.7	-10.4	-6.4	-7.3	-8.6	-6.2	-8.1	-9.2	-6.7	-7.7	-6.8	-8.1	-7.1	-8
Sound power [Standard]	dB(A)	89	90	90	90	92	91	92	91	93	93	93	93	94	94
Sound power [Low noise]	dB(A)	86	87	87	87	89	87	89	88	90	90	90	90	91	91
Sound power [Super Low noise]	dB(A)	83	85	85	85	86	85	87	86	87	88	88	87	88	89
Dimensions [LxHxD]	mm	3865x2652x2256		4865x2652x2256			5860x2652x2256			6860x2652x2256		7865x2652x2256		8865x2652x2256	

TSL		294CS	324CS	374CS	404CS	454CS	496CS	556CS	596CS	636CS	676CS	748CS	808CS	868CS	900CS
Cooling: User water values 12/7°C, 35°C outside air, 40% U.R.															
Cooling capacity	kW	281.5	326.1	364.2	396.6	436.1	485.9	549.9	598.9	617.1	658.3	734.3	794.1	861.2	923.2
Total absorbed power	kW	88.7	104.2	117	127.6	148.6	153.7	176.9	193	202.7	218	232.5	254.7	267.6	295.7
EER		3.18	3.13	3.11	3.11	2.93	3.16	3.11	3.1	3.04	3.02	3.16	3.12	3.22	3.12
SEER		4.9	4.99	4.82	4.87	5.03	5.02	5.09	5.18	5.06	5.14	4.77	4.81	4.88	4.84
SEPR		5.46	5.62	5.38	5.49	5.74	5.56	5.64	5.79	5.67	5.75	5.53	5.58	5.65	5.71
Sound power [Standard]	dB(A)	89	90	90	90	92	91	92	91	93	93	93	93	94	94
Sound power [Low noise]	dB(A)	86	87	87	87	89	87	89	88	90	90	90	90	91	91
Sound power [Super Low noise]	dB(A)	83	85	85	85	86	85	87	86	87	88	88	87	88	89
Dimensions [LxHxD]	mm	3520x2652x2256		4520x2652x2256			5520x2652x2256			6520x2652x2256		7520x2652x2256		8520x2652x2256	

TSL		294HS	324HS	374HS	404HS	454HS	496HS	556HS	596HS	636HS	676HS	748HS	808HS	868HS	900HS
Heating: User water values 40/45°C, 7°C outside air, 89% U.R.															
Thermal power	kW	291.9	337	390.9	412.9	448.8	504.5	566	603.9	656.7	683.9	776.9	841	883.1	1003.8
Total absorbed power	kW	89.1	102.3	119.2	126	143.4	153.6	173.3	184.1	200.6	213.5	231.3	250.5	267.9	295.1
SEER		-	-	-	-	-	-	-	5.19	5.1	5.2	4.63	4.69	4.73	4.63
COP		3.27	3.29	3.28	3.28	3.13	3.28	3.27	3.28	3.27	3.2	3.36	3.36	3.3	3.4
SCOP		4.01	4.17	4.1	4.1	4.24	3.82	3.99	-	-	-	-	-	-	-
Sound power [Standard]	dB(A)	89	90	90	90	92	91	92	91	93	93	93	93	94	95
Sound power [Low noise]	dB(A)	86	87	87	87	89	87	88	87	89	89	90	89	90	91
Sound power [Super Low noise]	dB(A)	85	85	85	87	85	86	85	87	87	88	87	88	89	89
Dimensions [LxHxD]	mm	3520x2652x2256		4520x2652x2256			5520x2652x2256			6520x2652x2256		9085x2652x2256			11085 x2652 x2256

20% Ethylene glycol | Also available with 60 Hz power supply | Data declared with use of R410A refrigerant

TAL

CLASS A CHILLERS AND HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS

283–1166 kW

- MULTI-PROTOCOL COMMUNICATION INTERFACE
- SCROLL COMPRESSORS
- AXIAL FANS
- CORROSION RESISTANT MATERIAL
- A2L READY
- LOW GWP REFRIGERANT
- PLATE HEAT EXCHANGER
- CLASS A

The TAL range chillers and heat pumps are air/water units in energy class A for both cooling and heating, available for use with R410A refrigerant or, in the "A2L" version, with low environmental impact R454B refrigerant. The TAL range is designed to manage the **conditioning of industrial plants and thermal loads in technological applications, where 24/7 reliability in all working conditions, one of the assets of these units, is a critically important requirement**. The TAL range uses latest generation Scroll compressors, braze-welded plate exchangers optimised for use with high pressure refrigerants (R410A/R454B) and axial fans suitable for outdoor installation.

- 3 different soundproofing setups available: Standard, Low Noise and Super Low Noise
- High power density units in both chiller and heat pump modes
- Optional EC fans
- Electronic expansion valve
- Easy accessibility thanks to the optimisation of the internal space

Easy maintenance

To carry out maintenance of the condensing coil manifolds and refrigeration circuit components, which are located behind the electrical panel, the TAL range is supplied as standard with the Hi-Rail sliding guide. This allows **the control panel to be easily removed,** resulting in extra space for unscheduled maintenance, **without impacting the footprint required for normal operation of the unit.**

Plate heat exchangers

The TAL range uses braze-welded plate exchangers with asymmetrical channels, suitable for the use of high and medium pressure refrigerant gases. The configuration with asymmetrical channels **allows high exchange efficiencies to be reachedwhile maintaining pressure drops low** on the water side, **therefore reducing pumping costs** at both full and partial load.

Maximised energy efficiency

The units of the TAL range fall within the **energy efficiency class A,** in both the chilling only version and the heat pump version. This is thanks to a careful selection of internal components, which also includes the adoption of **innovative high efficiency Scroll compressors with direct start, permanent magnet motor technology.** The high modulation range guaranteed by the multi-Scroll technology allows cooling/heating requirements to be met at any time, **minimising energy waste and increasing seasonal efficiency.**

TAL		294FS	324FS	374FS	404FS	454FS	496FS	556FS	596FS	636FS	676FS	748FS	808FS	868FS	900FS	1072FS
User water temperature 12/7°C 20% ethylene glycol, outside air 35°C, 40% R.H.																
Cooling capacity	kW	283.2	316.9	366.2	392.9	433.7	476.3	532.1	580.3	621.3	642.9	738.9	781.8	831.4	900.4	1064.6
Total absorbed power	kW	87.3	102.9	115.1	126	147.4	152.7	176.6	193.6	201.1	216.6	229.7	251.8	264.5	293.2	352.7
EER		3.24	3.08	3.18	3.12	2.94	3.12	3.01	3	3.09	2.97	3.22	3.11	3.14	3.07	3.02
Utility water temperature 12/7°C, ethylene glycol 20%																
Full free-cooling temperature	°C	-8.9	-8.4	-4.6	-5.4	-7	-4.4	-6.1	-7.6	-5.3	-5.8	-5.3	-6.2	-4.6	-6.1	-6.1
Sound power [Standard]	dB(A)	89	90	90	90	92	91	92	91	93	93	93	93	94	94	95
Sound power [Low noise]	dB(A)	86	87	87	87	89	87	89	88	90	90	90	90	91	91	92
Sound power [Super Low noise]	dB(A)	83	85	85	85	86	85	87	86	87	88	88	87	88	89	90
Dimensions [LxHxD]	mm	3865x2652x2256		4865x2652x2256			5860x2652x2256			6860x2652x2256		7865x2652x2256		8865x2652x2256		11270 x2652 x2256

TAL		294CS	324CS	374CS	404CS	454CS	496CS	556CS	596CS	636CS	676CS	748CS	808CS	868CS	900CS	1072CS
Cooling: User water values 12/7°C, 35°C outside air, 40% U.R.																
Cooling capacity	kW	286.1	319.8	370.1	397.8	450	482.7	539.7	588.7	629.9	662.1	746.6	791.3	841.2	911.8	1079.7
Total absorbed power	kW	86.2	101.9	114	124.4	145.3	150.3	173.7	190.5	198	213.2	226.8	248.1	261.1	289.2	347.2
EER		3.32	3.14	3.25	3.2	3.1	3.21	3.11	3.09	3.18	3.1	3.29	3.19	3.22	3.15	3.11
SEER		5.18	4.96	5.08	5.05	4.96	5.25	5.22	5.32	5.3	5.18	5.08	5.01	4.97	4.98	5.12
SEPR		5.67	5.65	5.61	5.62	5.6	5.68	5.69	5.78	5.7	5.61	5.75	5.7	5.62	5.76	5.72
Sound power [Standard]	dB(A)	89	90	90	90	92	91	92	91	93	93	93	93	94	94	95
Sound power [Low noise]	dB(A)	86	87	87	87	89	87	89	88	90	90	90	90	91	91	92
Sound power [Super Low noise]	dB(A)	83	85	85	85	86	85	87	86	87	88	88	87	88	89	90
Dimensions [LxHxD]	mm	3520x2652x2256		4520x2652x2256			5520x2652x2256			6520x2652x2256		7520x2652x2256		8520x2652x2256		11085 x2652 x2256

TAL		294HS	324HS	374HS	404HS	454HS	496HS	556HS	596HS	636HS	676HS	748HS	808HS	868HS	900HS	1072HS
Heating: User water values 40/45°C, 7°C outside air, 89% U.R.																
Thermal power	kW	292.2	334.3	395.6	421.7	474.9	513.9	573.4	625.2	674.4	706.6	769.6	829.5	884.4	960.3	1165.9
Total absorbed power	kW	90.6	104.1	119.6	128.2	146.5	159.8	178.5	194.5	209.5	219.5	236.4	256.3	274.5	298.2	362.4
SEER		-	-	-	-	-	-	-	5.31	5.19	5.25	4.99	4.94	4.84	4.98	5.16
COP		3.22	3.21	3.31	3.29	3.24	3.22	3.21	3.21	3.22	3.22	3.26	3.24	3.22	3.22	3.22
SCOP		4.16	4.27	4.12	4.13	4.21	3.98	4.11	-	-	-	-	-	-	-	-
Sound power [Standard]	dB(A)	89	90	90	90	92	91	92	91	93	93	93	93	94	95	96
Sound power [Low noise]	dB(A)	86	87	87	87	89	87	88	87	89	89	90	89	90	91	92
Sound power [Super Low noise]	dB(A)	85	85	85	87	85	86	85	87	87	88	87	88	89	89	90
Dimensions [LxHxD]	mm	3520x2652x2256		4520x2652x2256			5520x2652x2256			6520x2652x2256		9085x2652x2256			11085 x2652 x2256	12930 x2652 x2256

20% Ethylene glycol | Also available with 60 Hz power supply | Data declared with use of R410A refrigerant

TPL

AIR CONDENSED CHILLERS AND HEAT PUMPS WITH SCROLL COMPRESSORS

365-1199 kW

- MULTI-PROTOCOL COMMUNICATION INTERFACE
- SCROLL COMPRESSORS
- AXIAL FANS
- CORROSION RESISTANT MATERIAL
- A2L READY
- LOW GWP REFRIGERANT
- PLATE HEAT EXCHANGER

The TPL range chillers and heat pumps are high power density air/water units available for use with R410A refrigerant or, in the "A2L" version, with low environmental impact R454B refrigerant. The TPL range is designed to manage **the conditioning of industrial plants and thermal loads in technological applications, where 24/7 reliability in all working conditions, one of the assets of these units, is a critically important requirement**. The TPL range uses latest generation Scroll compressors, braze-welded plate exchangers optimised for use with high pressure refrigerants (R410A/R454B) and axial fans suitable for outdoor installation.

- 3 different soundproofing setups available: Standard, Low Noise and Super Low Noise
- High power density units in both chiller and heat pump modes
- Optional EC fans
- Electronic expansion valve
- Easy accessibility thanks to the optimisation of the internal space

Plate heat exchangers

The TPL range uses braze-welded plate exchangers with asymmetrical channels, suitable for the use of high and medium pressure refrigerant gases. The configuration with asymmetrical channels allows **high exchange efficiencies to be reached while maintaining pressure drops low** on the water side - **reducing pumping costs** at both full and partial load.

Maximum efficiency at partial loads

The adoption of the multi-Scroll solution, the use of electronically controlled expansion valves, selection of plate heat exchangers, fan modulation and variable flow rate controlled with circulation pumps are all key features that make the **TPL range particularly efficient at partial loads.**

TPL		374F	414F	456F	486F	536F	616F	658F	748F	818F	900F	942F	1072F
User water temperature 12/7°C 20% ethylene glycol, outside air 35°C, 40% R.H.													
Cooling capacity	kW	365.3	421	451.4	507.5	556.6	613.7	683.1	752.4	824.9	940.1	1042.4	1097.7
Total absorbed power	kW	132.7	146.5	163.1	190.6	193.4	224.7	253.7	264.7	309.1	327.1	371.3	404.3
COP		2.75	2.87	2.77	2.66	2.88	2.73	2.69	2.84	2.67	2.87	2.81	2.72
Utility water temperature 12/7°C, ethylene glycol 20%													
Full free-cooling temperature	°C	-10.3	-6.6	-7.8	-9.8	-6.8	-8.3	-10.3	-8.5	-10.1	-9.4	-11.3	-9.4
Sound power [Standard]	dB(A)	90	92	91	92	91	93	93	93	95	93	95	94
Sound power [Low noise]	dB(A)	87	89	89	90	89	91	91	90	92	91	93	92
Sound power [Super Low noise]	dB(A)	86	87	87	88	88	89	89	89	90	89	90	90
Dimensions [LxHxD]	mm	3415 x2652 x2256	4415x2652x2256			5415 x2652 x2256	5415x2650x2256		6415x2650x2256		7415x2650x2256		8415 x2650 x2256
TPL		**374C**	**414C**	**456C**	**486C**	**536C**	**616C**	**658C**	**748C**	**818C**	**900C**	**942C**	**1072C**
Cooling: User water values 12/7°C, 35°C outside air, 40% U.R.													
Cooling capacity	kW	369.7	426	457.6	515.3	565.2	622	694.9	764.2	837.9	957.7	1062	1112.9
Total absorbed power	kW	131.2	144.9	161.1	187.9	190.2	221.1	249.8	261	305	320.9	364.8	398.5
EER		2.82	2.94	2.84	2.74	2.97	2.81	2.78	2.93	2.75	2.98	2.91	2.79
SEER		4.81	4.87	4.95	4.96	5.14	5.02	4.71	4.85	4.71	4.96	5.09	5.05
SEPR		5.66	5.69	5.75	5.67	5.87	5.7	5.71	5.9	5.73	6.01	5.95	6
Sound power [Standard]	dB(A)	90	92	91	92	91	93	93	93	95	93	95	94
Sound power [Low noise]	dB(A)	87	89	89	90	89	91	91	90	92	91	93	92
Sound power [Super Low noise]	dB(A)	86	87	87	88	88	89	89	89	90	89	90	90
Dimensions [LxHxD]	mm	3065 x2652 x2256	4065x2652x2256			5065 x2652 x2256	5065 x2650 x2256	5060 x2650 x2256	6060x2650x2256		7060x2650x2256		8060 x2650 x2256
TPL		**374H**	**414H**	**456H**	**486H**	**536H**	**616H**	**658H**	**748H**	**818H**	**900H**	**942H**	**1072H**
Heating: User water values 40/45°C, 7°C outside air, 89% U.R.													
Thermal power	kW	391.8	476.4	511.6	578.4	601	679.4	734.6	769.2	855.8	997.6	1114.5	1199.3
Total absorbed power	kW	130.8	150.6	161.7	181.8	199.6	226.1	236	254.3	286.2	322.5	358.4	394.1
SEER		-	-	-	-	5.14	5.02	4.71	4.81	4.67	4.71	4.85	5.13
COP		3	3.16	3.16	3.18	3.01	3	3.11	3.02	2.99	3.09	3.11	3.04
SCOP		4.03	4.06	3.98	4.05	-	-	-	-	-	-	-	-
Sound power [Standard]	dB(A)	90	92	91	92	91	93	93	93	95	94	95	94
Sound power [Low noise]	dB(A)	87	89	89	90	89	91	91	90	92	91	93	92
Sound power [Super Low noise]	dB(A)	86	87	87	88	88	89	89	89	90	90	91	91
Dimensions [LxHxD]	mm	3065 x2652 x2256	4065x2652x2256			5065 x2652 x2256	5065 x2650 x2256	5060 x2650 x2256	6635x2650x2256		8635x2650x2256		10635 x2650 x2256

20% Ethylene glycol | Also available with 60 Hz power supply | Data declared with use of R410A refrigerant

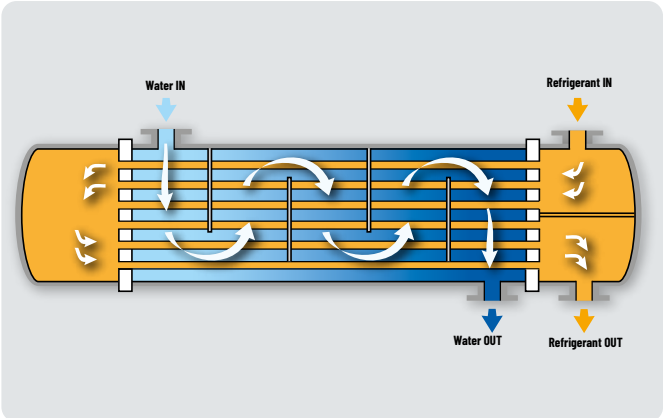
RSW

WATER-COOLED CHILLERS AND HEAT PUMPS WITH SCROLL COMPRESSORS

329-867 kW

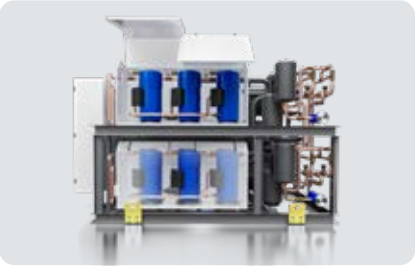
RSW is the range of chillers and heat pumps with multi-Scroll compressors, water-cooled. All units are available with two refrigerant circuits and shell-and-tube heat exchangers, **ensuring a high level of reliability.** The layout of the components provides easy access during maintenance operations, while **the hydraulic connections, all located on the same side,** reduce the required space and simplify installation.

- Available refrigerants: R1234ze and R515B
- Electronic expansion valve
- Vic-Taulic-type hydraulic connections (optional)
- Available in Standard and Low Noise versions
- Programmable electronic control as part of standard equipment
- Smart management of several units in parallel
- Easy access to components for routine maintenance



Reliability: shell and tube

The use of shell and tube exchangers with water flow on the shell side implies **a lower risk of blocking the flow due to exchanger clogging** - compared to units with plate heat exchangers. This is ascribable to larger throughsections - the exchanged power being the same. Additionally, the dual-pass heat exchanger ensures **high heat exchange efficiency** both in "chiller" and in "heat pump" modes, **with lower consumption figures for the user.**



Maximum efficiency at partial loads

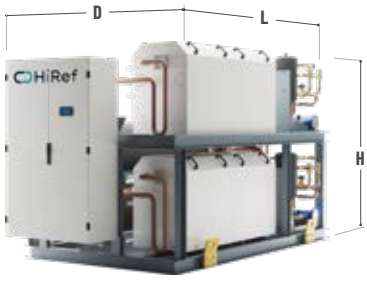
Accurate selection of the components allows **high efficiency to be obtained at partial loads;** this is thanks above all to the use of Scroll compressors and to the use of electronically controlled electric expansion valves (one for each circuit), **optimised to track refrigerant load trends in all conditions of use.** The shell and tube heat exchanger also ensures low water/refrigerant approach temperatures during operation, **all to the advantage of heat exchange efficiency.**

Reduced footprint

The RSW series has a **compact layout** thanks to the optimised arrangement of the compressors and heat exchangers. **The power density reaches very high values, exceeding 100kW/m².** The lower weight compared to units with screw compressors **facilitates installation and maintenance operations.**

Low noise levels

Thanks to the Scroll compressors used, the RSW units **feature lower noise levels** than other compressor technologies used for similar applications. Also, thanks to the use of multi-Scroll technology, at partial loads unnecessary compressors are turned off which results in **a further noise reduction.** For extra soundproofing, the **Low Noise version** is available with soundproofed sheet metal enclosures to compartmentalise the compressors.



RSW		324H	374H	444H	484H	506H	566H	646H	706H
Cooling: User water values 12/7°C, 30/35°C source water side									
Cooling capacity	kW	329.3	374.4	445.6	459.9	498.4	561.4	648.7	692
Total absorbed power	kW	61.9	72.1	84	87.2	92.9	108.3	121.1	130.9
EER		5.32	5.2	5.31	5.27	5.34	5.18	5.36	5.29
User water values 40/45°C, 12/7°C source water side									
Thermal power	kW	370.8	423.9	503.6	521.4	558.1	635.7	730.2	866.6
Total absorbed power	kW	77.1	89.9	105.1	109.4	115.7	135.1	151.2	190.3
COP		4.81	4.72	4.79	4.77	4.82	4.71	4.83	4.55
Sound power [Standard]	dB(A)	89	89	90	90	91	91	91	90
Sound power [Low noise]	dB(A)	85	85	86	86	87	87	87	86
Dimensions [LxHxD]	mm	3013x1950x1998				4013x1950x1998			

XSB

WATER CONDENSED CHILLERS AND HEAT PUMPS WITH SCROLL COMPRESSORS

40-838 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

SCROLL COMPRESSORS

CORROSION RESISTANT MATERIAL

LOW GWP REFRIGERANT

PLATE HEAT EXCHANGER

XSB is HiRef's range of water-condensed chillers and heat pumps with multi-scroll compressors. The many refrigerating configuration options, together with specific construction choices, make the ample choice of XSB units **suitable for a wide range of plant engineering requirements: redundancy, efficiency at partial loads, compactness to make the most of limited space in technical enclosures, low noise levels, auxiliary unit control, and easy installation**. The configurations available for the refrigeration circuit are:

EFFICIENCY PACK 1: Dual compressor on dual circuit for high system redundancy.

EFFICIENCY PACK 2: Dual compressor (tandem) on single circuit for greater efficiency at partial loads.

EFFICIENCY PACK 3: 3 compressors on single circuit for greater efficiency at partial loads.

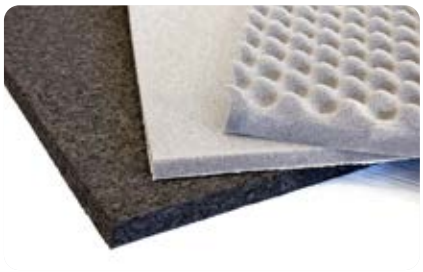
EFFICIENCY PACK 4: 4 compressors (dual tandem) on dual circuit, for a redundant system that is efficient with low loads.

Two refrigerating circuits with five or six Scroll compressors for capacities above 560 kW.

- Available with R454B or R410A refrigerant
- Electronic expansion valve
- Can be used with Polymorph hydronic modules by HiRef
- Versions: cooling-only chiller, reversible heat pump, and heating-only heat pump
- Easy connection with Vic-Taulic type couplings
- Partial heat recovery (desuperheater) (optional)
- Possibility for the software to natively manage the application of two 3-way valves to use the Free-Cooling option offered by the geothermal source

Maximum efficiency at partial loads

The XSB range adopts a multi-Scroll solution also on single circuits, electronically controlled expansion valves, plate heat exchangers and the option to control the (external) circulation pumps **via dedicated software:** all these characteristics allow **high energy efficiency to be achieved at partial loads.**



Attention to detail and low noise operation

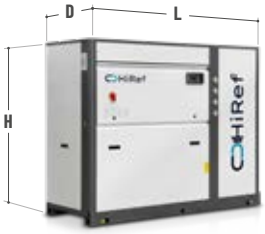
Scroll compressors, which are the main noise source in the unit, are fitted on rubber feet; these **dampen vibration and therefore attenuate the noise transmitted to the various system parts.** On request, the compressor compartment can be lined with special sound absorbing material and the compressors encased in special insulating hoods **to reduce airborne noise emissions.**

More space in the heating unit

The adoption of compact plate heat exchangers facing the unit right side panel **maximise the use of the available internal space thanks to reduced unit footprint.**

Efficiency and reliability in line with system requirements

The main strength of the XSB range lies in the numerous available configurations for the refrigeration circuit, depending on the unit size and the specific system requirements (redundancy and/or efficiency at partial load).



XSB		041H	042H	051H	052H	061H	062H	071H	072H	081H	082H	091H	092H	111H	112H	131H	132H	141H	142H	144H	161H
User water values 12/7°C, 40/45°C source water side																					
Cooling capacity	kW	39.8	40	45.8	46	53.3	53.5	59.5	59.8	69.7	69.7	77.1	77.4	92.7	93.1	104.8	104.9	117.7	118	121	128.9
Total absorbed power	kW	14.2	14.2	16.8	16.8	18.7	18.7	21	21.1	23.8	23.9	27.3	27.3	31.8	31.8	37.3	37.3	40.5	40.5	41.7	44.1
EER		2.81	2.82	2.72	2.73	2.86	2.86	2.83	2.83	2.92	2.92	2.83	2.84	2.91	2.93	2.81	2.81	2.9	2.91	2.9	2.92
User water values 40/45°C, 12/7°C source water side																					
Thermal power	kW	53.5	53.7	62.1	62.3	71.4	71.6	79.9	80.1	92.8	92.8	103.4	103.8	123.5	123.9	140.7	140.9	156.8	157	161.2	171.5
Total absorbed power	kW	14.2	14.2	16.8	16.9	18.7	18.7	21.1	21.1	23.9	23.9	27.3	27.3	31.8	31.8	37.3	37.4	40.5	40.5	41.7	44.2
COP		3.78	3.79	3.69	3.69	3.82	3.83	3.79	3.8	3.89	3.89	3.79	3.8	3.88	3.89	3.77	3.77	3.87	3.88	3.86	3.88
SCOP		5.35	5.82	5.17	5.65	5.42	5.9	5.31	5.79	5.53	5.99	5.4	5.88	5.48	5.82	5.36	5.82	5.47	5.91	6.11	5.53
Sound power [Standard]	dB(A)	76	76	78	78	78	78	79	79	79	79	81	81	83	83	85	85	85	85	82	85
Sound power [Low noise]	dB(A)	72	72	74	74	74	74	75	75	75	75	77	77	79	79	81	81	81	81	78	81
Dimensions [LxHxD]	mm	1174x1930x772												1644x1930x772						2374 x1990 x877	1644 x1930 x772
Frame		F1												F2						F3	F2

XSB		162H	164H	181H	182H	184H	204H	214H	243H	244H	283H	284H	314H	344H	374H	424H	484H	535H	576H	636H	706H
User water values 12/7°C, 40/45°C source water side																					
Cooling capacity	kW	129	137.5	164	164.3	158.4	170.5	186.4	203.1	224	248.4	240.2	259.9	294.2	328.9	376.3	423.5	471.7	523.6	552.6	626.7
Total absorbed power	kW	44.1	48.4	56.3	56.4	53.5	58.9	63.5	64.7	71.7	83.9	79.7	87.6	100	112.3	125.9	139.8	159.1	175.5	190.2	211.5
EER		2.92	2.84	2.91	2.91	2.96	2.89	2.94	3.14	3.12	2.96	3.01	2.97	2.94	2.93	2.99	3.03	2.96	2.98	2.91	2.96
User water values 40/45°C, 12/7°C source water side																					
Thermal power	kW	171.5	184.1	218.2	218.6	210.1	227.3	247.6	265.4	293.4	329.4	317.3	344.3	390.6	437	497.5	558	624.3	691.8	734.6	838.3
Total absorbed power	kW	44.2	48.4	56.3	56.3	53.6	59	63.5	64.7	71.7	83.9	79.8	87.6	100	112.3	126	139.8	159.2	175.6	190.3	216.5
COP		3.88	3.8	3.88	3.88	3.92	3.85	3.9	4.1	4.09	3.93	3.98	3.93	3.9	3.89	3.95	3.99	3.92	3.94	3.86	3.87
SCOP		5.98	6.09	5.43	5.84	6.26	6.1	6.11	6.4	6.39	6.1	6.37	6.33	6.08	6.12	6.17	6.24	6.21	3.94	3.86	3.87
Sound power [Standard]	dB(A)	85	82	90	90	84	85	86	87	88	92	88	88	91	93	94	95	91	91	90	93
Sound power [Low noise]	dB(A)	81	78	86	86	80	81	82	83	84	88	84	84	87	89	90	91	87	87	86	89
Dimensions [LxHxD]	mm	1644 x1930 x772	2374 x1990 x877	1644 x1930 x772		2374x1990x877												3820x2040x1085			
Frame		F2	F3	F2		F3												F4			

Performance figures refer to units with R410A refrigerant. Data subject to change without notice.

MULTIPURPOSE

NPA

MULTIPURPOSE AIR CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS

60–162 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

AXIAL FANS

CORROSION RESISTANT MATERIAL

SCROLL COMPRESSORS

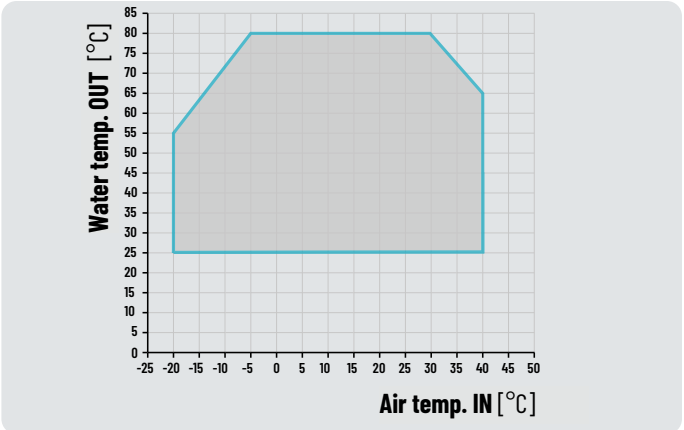
PLATE HEAT EXCHANGER

NATURAL REFRIGERANT

INVERTER DRIVEN COMPRESSORS

The NPA units are multipurpose air/water units available for use with R290 refrigerant with low environmental impact. The NPA range is designed to manage **the conditioning of industrial plants and thermal loads in technological applications where full 24/7 reliability in all working conditions is a requirement**. The NPA range uses latest-generation Scroll compressors, braze-welded plate exchangers optimised for use with medium pressure refrigerants (R290) and axial fans suitable for outdoor installation.

- Available in R290 or R454C
- 3 different soundproofing setups available: Standard, Low Noise and Super Low Noise
- Available versions: multi-purpose for 2-pipe system (M) and multi-purpose for 4-pipe system (P)
- High power density units in both chiller and heat pump modes
- Electronic expansion valve
- Easy accessibility thanks to the optimisation of the internal space
- EC Fans

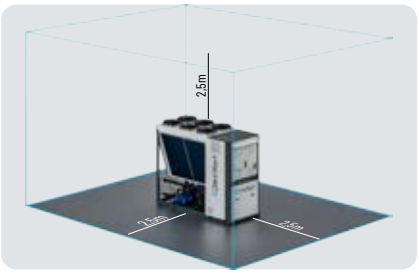


Production of hot water up to 80°C

The units of the range are capable of **producing water at 80°C** and operating at outside air temperatures as low as **-20°C.**

Plate heat exchangers

The NPA range uses braze-welded plate exchangers with asymmetrical channels, suitable for the use of high and medium pressure refrigerant gases. The configuration with asymmetrical channels allows **high heat exchange efficiencies to be reached while maintaining low pressure drops** on the water side - which results **in reduced pumping costs** at both full and partial load.



Safety first

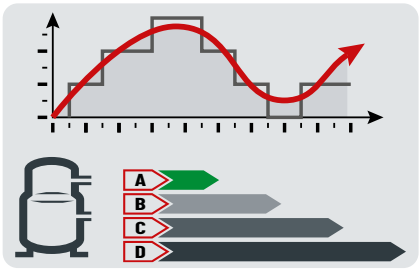
Units loaded with **A3 (highly flammable) gas** must be installed away from drains, manholes, drainage channels and any other element that could act as a potential escape route for any leakage of said gases, **which must always be considered FLAMMABLE and heavier than air.** The minimum distance to be maintained with respect to these requirements is 2.5 metres. Within this safety zone, it is strictly forbidden to smoke, use open flames or carry out any work that may generate flames, arc discharges or sparks.

Smart defrosting

A factor that heavily weighs on the costs of managing the entire plant is finned coil defrosting during wintertime operation. The special management of the defrosting cycle of **NPA units minimises the time to completion and ensures that defrosting is only performed when strictly necessary,guaranteeing greater heating efficiency.** The presence of two completely independent thermodynamic circuits ensures **uninterrupted operation** also during the defrosting phase, **with practically no thermal discomfort for the user.**

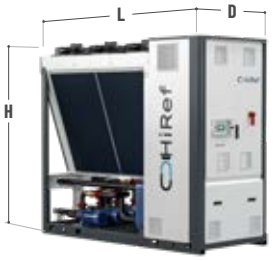
Redundancy and continuous operation in all weather conditions

The presence of two completely independent thermodynamic circuits ensures **continuous operation** even during the defrost phase, **eliminating any thermal discomfort for the user.**



Precise management of the delivered power

The integrated control software of the NPA range allows for the management of cooling and heating power output by adjusting the rotational speed of the **modulating BLDC compressors.**



NPA		061PS	081PS	111PS	131PS
Cooling: User water values 12/7°C, 35°C outside air, 40% U.R.					
Cooling capacity	kW	60.3	75	109.6	121.7
Total absorbed power	kW	20.2	24.8	38.7	44.1
EER		2.99	3.03	2.83	2.76
Cooling: Utility water temperature 12/7°C, Recovery water temperature 40/45°C					
Cooling capacity	kW	60.4	74.1	112.9	125.2
Thermal power	kW	77.5	96	144.6	162.3
Total absorbed power	kW	18.6	23.2	34.5	39.3
TER		7.43	7.35	7.46	7.31
COP Total		7.43	7.35	7.46	7.31
Heating: User water values 30/35°C, 7°C outside air, 89% U.R.					
Thermal power	kW	64.5	81	113.9	130.8
Total absorbed power	kW	16.3	20.6	29.7	34.2
COP		3.97	3.94	3.84	3.82
Sound power [Standard]	dB(A)	88	91	93	95
Sound power [Low noise]	dB(A)	81	85	86	89
Dimensions [LxHxD]	mm	2440x2425x1179		2763x2425x1179	

Also available with 60 Hz power supply | Data referring to R290 versions

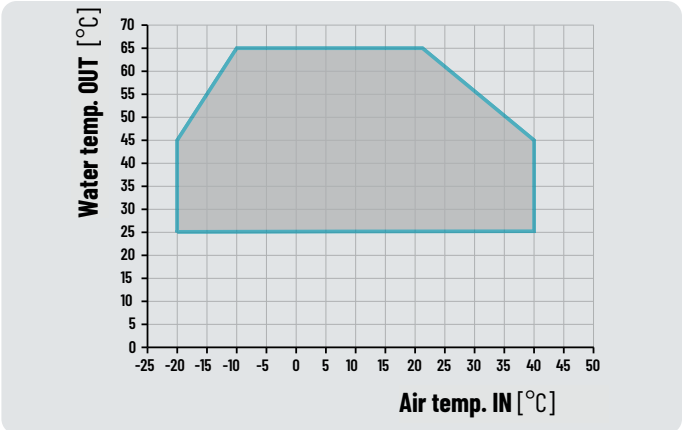
MPS

MULTIPURPOSE AIR CONDENSED HEAT PUMPS FOR LOW OUTDOOR TEMPERATURES

39-248 kW

MPS is the HiRef range of air-to-water multipurpose heat pumps designed for operation **in very cold climates**. The use of compressors with **EVI steam injection technologyallows the production of hot water up to 65 °C and operation with outdoor temperatures down to -20 °C**. This is combined with special **focus on Low Noise** as standard and the use of different refrigeration circuit architectures to meet the needs of many different system applications.

- Refrigerant R410A
- Electronic expansion valve
- EVI compressors with steam injection
- "Cold" start Smart Kit configurable on request, to manage any mixing systems
- Hydrophilic coated coils with wider fin pitch
- Condensate collection trays with heating resistances
- Available in multipurpose version for 2 and 4 pipe systems
- Optional EC fans



Production of hot water up to 65 °C

The units of the MPS range are capable of producing water at **65°C**, as well as operating with outdoor air temperatures **down to -20°C**.

Efficiency and reliability in line with system requirements

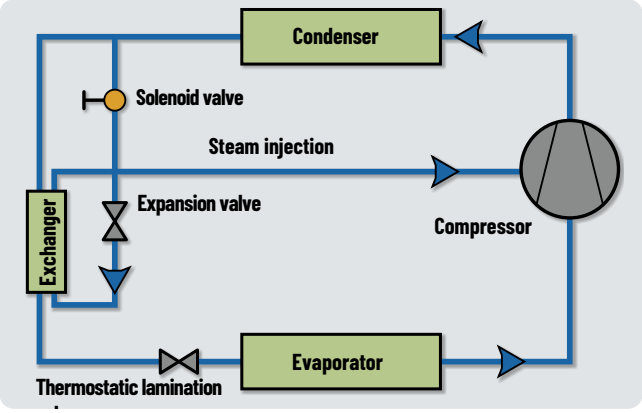
The available refrigerating circuit configurations have been designed to ensure, also simultaneously, **redundancy and efficiency at partial loads.** More specifically, the units - depending on the size of the machine and on specific plant engineering requirements - consist of two compressors on two circuits **for high system redundancy** or four compressors (double tandem) on two circuits **for a system that is simultaneously redundant and efficient at partial loads.**

Extra low noise

All units in the MPS range come standard in the **"Low Noise"** silent version, which includes fan speed management, the use of anti-vibration piping on the refrigeration circuit, and compressor compartmentalization in a box internally lined with sound-absorbing material **to ensure minimal noise emission at every operating point.**

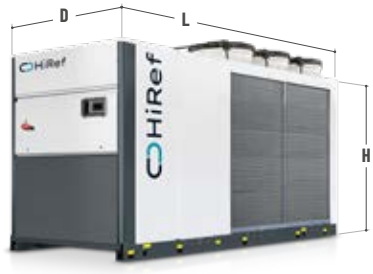
Smart Defrost System

A factor that heavily weighs on the costs of managing the entire plant is finned pack evaporator defrosting during wintertime operation. The (patented) Smart Defrost System by HiRef is able to identify a decline in the exchanger performance caused by the formation of ice and to **minimise the duration of the defrosting process.** The use of coils treated with hydrophilic surface coating **speeds up the defrosting process** so that melting of just the first, thin ice layer on the fins is only required for cleaning.



Units optimised for climates with T down to -20°C

The Scroll compressors of the MPS range **use steam injection technology:** a light flow of refrigerant in a medium-pressure vapour state is "injected" into the coils in the compression chamber. This system allows for both an **increase in the cooling** (thermal) **capacity** and an extension of the operating range of the heat pump; this makes of the MPS range the ideal solution in case **of extremely low outdoor temperatures.**



MPS		041PL	051PL	071PL	081PL	101PL	134PL	164PL	204PL
Cooling: User water values 12/7°C, 35°C outside air, 40% U.R.									
Cooling capacity	kW	39.5	49.1	66.7	73.9	86	131	148.8	188.1
Total absorbed power	kW	12	15.1	19.6	23.4	25.5	40.1	49	62.5
EER		3.29	3.24	3.41	3.16	3.37	3.27	3.03	3.01
Total Recovery: Utility water temperature 12/7°C, Recovery water temperature 40/45°C									
Cooling capacity	kW	38.5	47.8	64.9	72	83.7	127.3	144.4	182.2
Thermal power	kW	51.13	63.6	85.8	96.89	110.4	170.3	196.46	248.3
Total absorbed power	kW	13.3	16.7	22	26.2	28.2	45.3	54.8	69.6
TER		6.74	6.67	6.85	6.45	6.89	6.57	6.22	6.19
COP Total		6.74	6.67	6.85	6.45	6.89	6.57	6.22	6.19
Heating: User water values 40/45°C, 7°C outside air, 89% U.R.									
Thermal power	kW	43.6	53.9	72.5	81.6	92.2	140.3	158	202.2
Total absorbed power	kW	13	15.7	21.2	24.4	26.8	41.1	48.6	61.5
COP		3.34	3.42	3.41	3.35	3.44	3.41	3.25	3.29
SCOP		2.83	2.96	2.91	2.9	2.91	3.2	2.85	3.05
Sound power [Standard]	dB(A)	79	78	80	81	81	80	82	82
Dimensions [LxHxD]	mm	2440x1735x1183		2792x1735x1183		3540x1679x1183	3538x1884x1653		3538x2284x1653

Also available with 60 Hz power supply

MPA

MULTIPURPOSE CLASS A AIR CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS

59-325 kW

- MULTI-PROTOCOL COMMUNICATION INTERFACE
- AXIAL FANS
- CORROSION RESISTANT MATERIAL
- A2L READY
- LOW GWP REFRIGERANT
- SCROLL COMPRESSORS
- CLASS A
- PLATE HEAT EXCHANGER

The MPA units are multipurpose air/water units in energy class A for both cooling and heating, available for use with R410A refrigerant or, in the "A2L" version, with low environmental impact R454B refrigerant. The MPA range is designed to manage **the conditioning of industrial plants and thermal loads in technological applications where full 24/7 reliability in all working conditions is a requirement**. The MPA range uses latest-generation Scroll compressors, braze-welded plate exchangers optimised for use with high pressure refrigerants (R410A/R454B) and axial fans suitable for outdoor installation.

- 3 different soundproofing setups available: Standard, Low Noise and Super Low Noise
- Available versions: multi-purpose for 2-pipe system (M) and multi-purpose for 4-pipe system (P)
- High power density units in both chiller and heat pump modes
- Optional EC fans
- Electronic expansion valve
- Easy accessibility thanks to the optimisation of the internal space

Plate heat exchangers

The MPA range uses braze-welded plate exchangers with asymmetrical channels, suitable for the use of high and medium pressure refrigerant gases. The configuration with asymmetrical channels allows **high exchange efficiencies to be reached while maintaining pressure drops low** on the water side - **reducing pumping costs** at both full and partial load.

Maximised energy efficiency

The units of the MPA range fall within the **energy efficiency class A,** both in cooling and in heating mode. This is thanks to **a careful selection of internal components**, which also includes the adoption of **innovative high efficiency Scroll compressors with direct start, permanent magnet motor technology.** The high modulation range guaranteed by the multi-Scroll technology allows cooling/heating requirements to be met at any time, **minimising energy waste and increasing seasonal efficiency.** The high degree of partial load operation (**up to 20%** of the rated power), combined with water flow rate modulation (**up to 20%** of the nominal flow) allows **operating costs and system maintenance costs to be reduced.**

Smart defrosting

A factor that heavily weighs on the costs of managing the entire plant is finned coil defrosting during wintertime operation. The special management of the defrosting cycle of **NPA units minimises the time to completion and ensures that defrosting is only performed when strictly necessary,guaranteeing greater heating efficiency.** The presence of two completely independent thermodynamic circuits ensures **uninterrupted operation** also during the defrosting phase, **with practically no thermal discomfort for the user.**

MPA		061PS	071PS	081PS	101PS	114PS	124PS	144PS	164PS	194PS	214PS	244PS
Cooling: User water values 12/7°C, 35°C outside air, 40% U.R.												
Cooling capacity	kW	61.2	75.3	88.3	102.4	118.2	127	149.6	162.5	187.7	222.6	250.4
Total absorbed power	kW	16.9	21.4	25.6	29.7	33.8	35.9	43.3	47.2	55.9	71	80
EER		3.62	3.53	3.44	3.45	3.5	3.54	3.46	3.44	3.36	3.14	3.13
SEER		4.7	4.55	4.52	4.66	5.14	5.06	5.05	5.15	5.15	5	4.96
SEPR		5.99	5.93	5.99	5.83	6.03	6.07	6.01	6.1	6.18	5.92	6.09
Cooling: Utility water temperature 12/7°C, Recovery water temperature 40/45°C												
Cooling capacity	kW	59.1	74.5	89.2	101.2	116.9	124.2	150	162.5	191	227.2	258
Thermal power	kW	73.9	93	111	126.9	146.5	155.2	186.8	203.1	238.5	286.3	324.7
Total absorbed power	kW	15.6	19.5	23.1	27.2	31.5	32.8	39	43	50.6	62.9	71.1
TER		8.54	8.58	8.68	8.38	8.37	8.51	8.64	8.5	8.49	8.16	8.2
COP Totale		8.54	8.58	8.68	8.38	8.37	8.51	8.64	8.5	8.49	8.16	8.2
Heating: User water values 40/45°C, 7°C outside air, 89% U.R.												
Thermal power	kW	61.5	75.5	87.2	102.5	123.9	130.4	149.9	163	186.9	227.6	265.1
Total absorbed power	kW	17.5	21.1	24.8	29.2	33.8	36.7	42.1	46.3	53.2	64.8	75.3
COP		3.51	3.57	3.51	3.51	3.67	3.55	3.56	3.52	3.51	3.51	3.52
SCOP		4	4.27	4.19	4.33	4.26	4.16	4.19	4.22	4.37	4.41	4.51
Sound power [Standard]	dB(A)	81	83	83	86	83	84	86	86	87	88	89
Sound power [Low noise]	dB(A)	76	78	78	81	78	80	82	82	84	84	85
Dimensions [LxHxD]	mm	2792x1735x1183			3540x1735x1183		3540x1846x1653			3540x2330x1653		4206 x2330 x1653

Also available with 60 Hz power supply

MSL

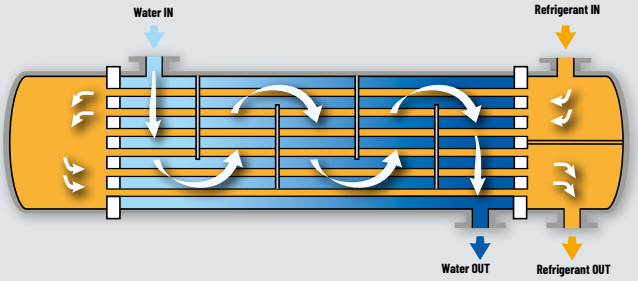
MULTIPURPOSE CLASS A HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS

279–1425 kW

- MULTI-PROTOCOL COMMUNICATION INTERFACE
- AXIAL FANS
- CORROSION RESISTANT MATERIAL
- A2L READY
- LOW GWP REFRIGERANT
- SHELL AND TUBE HEAT EXCHANGER
- SCROLL COMPRESSORS
- CLASS A

The new MSL range multipurpose units are air/water units in energy class A for both cooling and heating, available for use with R410A refrigerant or, in the "A2L" version, with low environmental impact R454B refrigerant. The MSL range is designed to manage **the conditioning of industrial plants and thermal loads in technological applications, where 24/7 reliability in all working conditions, one of the assets of these units, is a critically important requirement**. The MSL range uses latest generation Scroll compressors, shell and tube water heat exchangers optimised for use with **high pressure refrigerants (R410A/R454B)** and axial fans suitable for outdoor installation.

- 3 different soundproofing setups available: Standard, Low Noise and Super Low Noise
- High power density units in both chiller and heat pump modes
- Optional EC fans
- Electronic expansion valve
- Easy accessibility thanks to the optimisation of the internal space



Reliability: shell and tube

The use of shell and tube heat exchangers with exchange water flow on the shell side implies **a lower risk of blocking the flow due to exchanger clogging compared to units with plate heat exchangers.** This is thanks to the larger throughsections, the exchanged power being the same. Additionally, the dual-pass heat exchanger **ensures high heat exchange efficiency** both in "chiller" and in "heat pump" modes, with **lower consumption figures for the user and easier transport and installation.**

Maximised energy efficiency

The units of the MSL range fall within the **energy efficiency class A,** both in cooling and in heating mode. This is thanks to a **careful selection of internal components,** which also includes the adoption of innovative high efficiency Scroll compressors with direct start, permanent magnet motor technology. The high modulation range guaranteed by the multi-Scroll technology allows cooling/ heating requirements to be met at any time, **minimising energy waste and increasing seasonal efficiency.** The high degree of partial load operation (**up to 11%** of the rated power), combined with water flow rate modulation (**up to 20%** of the nominal flow) **allows operating costs and system maintenance costs to be reduced.**

Smart defrosting

A factor that heavily weighs on the costs of managing the entire plant is finned coil defrosting during wintertime operation. The special management of the defrosting cycle of MSL units **minimises the time to completion and ensures that defrosting is only performed when strictly necessary, guaranteeing greater heating efficiency.** The presence of two completely independent thermodynamic circuits ensures **uninterrupted operation** also during the defrosting phase, **with practically no thermal discomfort for the user.**

Easy maintenance

To carry out maintenance of the condensing coil manifolds and refrigeration circuit components, which are located behind the electrical panel, the MSL range is supplied as standard with the Hi-Rail sliding guide. This allows **the control panel to be easily removed,** resulting in **extra space for unscheduled maintenance, without impacting the footprint** required for normal operation of the unit.

Configurability of hydraulic connections

To facilitate installation, especially when replacing existing units, the MSL range is available **with different configurations of hydraulic connections.** They can be both on the right or left side, two on the right and two on the left side, or all on the back of the unit.

MSL		294PS	324PS	374PS	404PS	454PS	496PS	556PS	596PS	636PS	676PS	748PS	808PS	868PS	900PS	1072PS
Cooling: User water values 12/7°C, 35°C outside air, 40% U.R.																
Cooling capacity	kW	281.5	326.1	364.2	395.9	434.5	486.1	550	598.1	639.8	669.8	737.5	798.8	831.9	917.3	1146
Total absorbed power	kW	88.7	104.2	117	127.1	148	152.7	175.5	193	202.7	218.1	234.4	255.8	275.7	291	343.9
EER		3.18	3.13	3.11	3.12	2.94	3.18	3.13	3.1	3.16	3.07	3.15	3.12	3.02	3.15	3.33
SEER		4.91	4.9	4.82	4.88	4.77	5.01	5.12	5.19	5.08	5.08	4.91	4.96	4.83	4.98	4.76
SCOP		4.09	4.15	4.03	4.16	4.15	3.94	3.98	4.03	3.95	3.95	4.1	4.26	4.16	4.05	3.48
Cooling: Utility water temperature 12/7°C, Recovery water temperature 40/45°C																
Cooling capacity	kW	279.4	317.3	354.4	390	435.9	484.3	542.5	592	618.2	663.7	742	791.7	857.1	906	1129.4
Thermal power	kW	355.2	405.6	455.5	497.5	560.8	614.9	691.6	752.1	790.9	849	937.6	1004.1	1087.9	1156.4	1425.3
Total absorbed power	kW	81.5	95.4	109.8	115.1	134.1	139.4	159.6	172.2	186	200.2	212	230.8	248.6	270.3	319.5
SEER		4.91	4.9	4.82	4.88	4.77	5.01	5.12	5.19	5.08	5.08	4.91	4.96	4.83	4.98	4.76
TER		7.79	7.58	7.38	7.71	7.43	7.89	7.73	7.8	7.58	7.56	7.92	7.78	7.82	7.63	8
SCOP		4.09	4.15	4.03	4.16	4.15	3.94	3.98	4.03	3.95	3.95	4.1	4.26	4.16	4.05	3.48
COP Total		7.79	7.58	7.38	7.71	7.43	7.89	7.73	7.8	7.58	7.56	7.92	7.78	7.82	7.63	8
Heating: User water values 40/45°C, 7°C outside air, 89% U.R.																
Thermal power	kW	296.9	332.8	383.4	417.8	458.8	512.2	563.8	606.5	656.3	683.2	756.3	840.3	863.4	977.7	1183.2
Total absorbed power	kW	89.2	102.3	119.1	126	143.5	152.8	172.1	184.3	200.6	213.7	231.2	250.5	267.7	294.8	349.4
SEER		4.91	4.9	4.82	4.88	4.77	5.01	5.12	5.19	5.08	5.08	4.91	4.96	4.83	4.98	4.76
COP		3.33	3.25	3.22	3.32	3.2	3.35	3.28	3.29	3.27	3.2	3.27	3.35	3.22	3.32	3.39
SCOP		4.09	4.15	4.03	4.16	4.15	3.94	3.98	4.03	3.95	3.95	4.1	4.26	4.16	4.05	3.48
Sound power [Standard]	dB(A)	89	90	90	90	92	91	92	91	93	93	93	93	94	95	96
Sound power [Low noise]	dB(A)	86	87	87	87	89	87	88	87	89	89	90	89	90	91	92
Sound power [Super Low noise]	dB(A)	84	85	85	85	87	85	86	85	87	87	88	87	88	89	90
Dimensions [LxHxD]	mm	3520x2680x2256		4520x2680x2256			5520x2680x2256			6520x2680x2256		9085x2680x2256			11085 x2680 x2256	12930 x2680 x2256

MLA

MULTIPURPOSE CLASS A AIR CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS

286–1431 kW

- MULTI-PROTOCOL COMMUNICATION INTERFACE
- AXIAL FANS
- CORROSION RESISTANT MATERIAL
- A2L READY
- LOW GWP REFRIGERANT
- SCROLL COMPRESSORS
- CLASS A
- PLATE HEAT EXCHANGER

The MLA units are multipurpose air/water units in energy class A for both cooling and heating, available for use with R410A refrigerant or, in the "A2L" version, with low environmental impact R454B refrigerant. The MLA range is designed to manage **the conditioning of industrial plants and thermal loads in technological applications where full 24/7 reliability in all working conditions is a requirement**. The MLA range uses latest-generation Scroll compressors, braze-welded plate exchangers optimised for use with high pressure refrigerants (R410A/R454B) and axial fans suitable for outdoor installation.

- 3 different soundproofing setups available: Standard, Low Noise and Super Low Noise
- High power density units in both chiller and heat pump modes
- Optional EC fans
- Electronic expansion valve
- Easy accessibility thanks to the optimisation of the internal space

Plate heat exchangers

The MLA range uses braze-welded plate exchangers with asymmetrical channels, suitable for the use of high and medium pressure refrigerant gases. The configuration with asymmetrical channels **allows high heat exchange efficiencies to be reached while maintaining low pressure drops** on the water side - which results in **reduced pumping costs at both full and partial load.**

Easy maintenance

To carry out maintenance of the condensing coil manifolds and refrigeration circuit components, which are located behind the electrical panel, the MLA range is supplied as standard with the Hi-Rail sliding guide. This allows **the control panel to be easily removed,** resulting in **extra space for unscheduled maintenance,without impacting the footprint** required for normal operation of the unit.

Smart defrosting

A factor that heavily weighs on the costs of managing the entire plant is finned coil defrosting during wintertime operation. The special management of the defrosting cycle of MSL units **minimises the time to completion and ensures that defrosting is only performed when strictly necessary, guaranteeing greater heating efficiency.** The presence of two completely independent thermodynamic circuits ensures **uninterrupted operation** also during the defrosting phase, **with practically no thermal discomfort for the user.**

Maximised energy efficiency

The units of the MLA range fall within the energy efficiency class A, both in cooling and in heating mode. This is thanks to a careful selection of internal components, which also includes the adoption of **innovative high efficiency Scroll compressors with direct start,permanent magnet motor technology.** The high modulation range guaranteed by the multi-Scroll technology allows cooling/heating requirements to be met at any time, **minimising energy waste and increasing seasonal efficiency.** The high degree of partial load operation (**up to 11%** of the rated power), combined with water flow rate modulation (**up to 20%** of the nominal flow) allows **operating costs and system maintenance costs to be reduced.**

MLA		294PS	324PS	374PS	404PS	454PS	496PS	556PS	596PS	636PS	676PS	748PS	808PS	868PS	900PS	1072PS
Cooling: User water values 12/7°C, 35°C outside air, 40% U.R.																
Cooling capacity	kW	288.8	322.9	374.8	401.8	448.1	487.3	545.7	593.8	617.9	663.4	756.8	804	840.4	942.3	1125
Total absorbed power	kW	86.6	102.1	114	125	144.6	150.8	173.8	191.4	198.6	214.2	228.5	249.7	270.6	283.8	335.1
EER		3.34	3.16	3.29	3.21	3.1	3.23	3.14	3.1	3.11	3.1	3.31	3.22	3.11	3.32	3.36
SEER		4.93	4.73	4.83	4.82	4.89	5.01	5.09	5.15	4.95	5.08	4.75	4.72	4.61	4.91	5
SCOP		4.01	3.96	4.07	4.2	4.26	3.93	4.13	4.01	3.93	4.01	3.83	4	3.93	3.81	3.8
Cooling: Utility water temperature 12/7°C, Recovery water temperature 40/45°C																
Cooling capacity	kW	286.2	324.4	371	403.3	451	479.8	546.8	582.8	607.7	651.6	755.5	807	866.7	931.7	1126.8
Thermal power	kW	362.7	413.5	471.6	511.6	576.2	614.4	699.1	748.6	786.4	843.3	954.1	1023	1099.7	1181.8	1430.6
Total absorbed power	kW	81.4	95.1	107.5	115.7	134.3	144.6	164	178.9	193.1	207.8	212	230.9	249.5	267.8	327.5
SEER		4.93	4.73	4.83	4.82	4.89	5.01	5.09	5.15	4.95	5.08	4.75	4.72	4.61	4.91	5
TER		7.97	7.76	7.84	7.9	7.65	7.57	7.6	7.44	7.22	7.19	8.06	7.93	7.88	7.89	7.81
SCOP		4.01	3.96	4.07	4.2	4.26	3.93	4.13	4.01	3.93	4.01	3.83	4	3.93	3.81	3.8
COP Total		7.97	7.76	7.84	7.9	7.65	7.57	7.6	7.44	7.22	7.19	8.06	7.93	7.88	7.89	7.81
Heating: User water values 40/45°C, 7°C outside air, 89% U.R.																
Thermal power	kW	292.4	323.5	406	441.2	481.8	505.4	556.7	597	653.1	694.4	777.7	861.8	886	975.8	1177.4
Total absorbed power	kW	86.5	99.6	114.6	122.6	140.2	153	170.8	185.9	202.3	216	225.9	245.1	262.4	285.2	347.5
SEER		4.93	4.73	4.83	4.82	4.89	5.01	5.09	5.15	4.95	5.08	4.75	4.72	4.61	4.91	5
COP		3.38	3.25	3.54	3.6	3.44	3.3	3.26	3.21	3.23	3.21	3.44	3.52	3.38	3.42	3.39
SCOP		4.01	3.96	4.07	4.2	4.26	3.93	4.13	4.01	3.93	4.01	3.83	4	3.93	3.81	3.8
Sound power [Standard]	dB(A)	89	90	90	90	92	91	92	91	93	93	93	93	94	95	96
Sound power [Low noise]	dB(A)	86	87	87	87	89	87	88	87	89	89	90	89	90	91	92
Sound power [Super Low noise]	dB(A)	84	85	85	85	87	85	86	85	87	87	88	87	88	89	90
Dimensions [LxHxD]	mm	3520x2680x2256		4520x2680x2256			5520x2680x2256			6520x2680x2256		9085x2680x2256			11085 x2680 x2256	12930 x2680 x2256

Also available with 60 Hz power supply

MSW

MULTIPURPOSE WATER-CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS

42-549 kW

MSW units are multi-purpose water-cooled heat pumps with Scroll compressors, designed for both tertiary and industrial uses. They guarantee **extensive configurability, in terms of both accessories and refrigeration circuit**. All sizes of the MSW series can be coupled to both 2 and 4-pipe systems. In the former case production is guaranteed on the hot or cold water primary system side with simultaneous production of hot water on the total recovery side; in the latter case the simultaneous production of hot and cold water is guaranteed for heating and cooling. The numerous cooling configurations available, which offer **single-circuit** and **two-circuit solutions with compressors in a tandem arrangement**, ensure **maximum efficiency even at partial loads and optimised redundancy**. The MSW range is thus designed to meet any requirement efficiently.

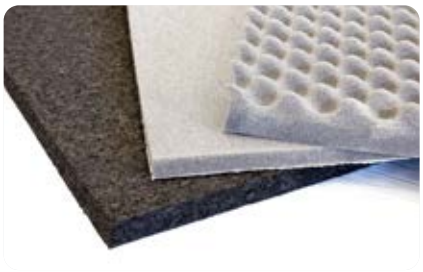
Operation modes with 2-pipe system: cooling mode, heating mode, domestic water mode and cooling + domestic water.

Operation modes with 4-pipe system: cooling mode, heating mode and cooling + heating.

- Refrigerant R410A: Available on request with R454B
- Electronic expansion valve
- Vic-Taulic-type hydraulic connections (optional)
- Available versions: multi-purpose for 2-pipe system (M) and multi-purpose for 4-pipe system (P)

More space in the heating unit

The adoption of compact plate heat exchangers facing the unit right side panel **maximise the use of the available internal space thanks to reduced unit footprint.**



Maximum efficiency at partial loads

Meticulous selection of components allows **high efficiency to be obtained at partial loads** thanks to the use of Scroll compressors and the use of electronically controlled electric expansion valves (one per circuit), **optimised to track refrigerant load trends in all conditions of use.** The plate heat exchanger also ensures low water/refrigerant approaches during operation, **all to the advantage of heat exchange efficiency.**

Excellent configurability of the refrigeration section

One of the main strengths of the MSW range is the excellent configurability of the refrigeration circuit structure, which depending on the required size and special requirements can consist of:

- **a dual compressor (tandem) on a single circuit** for greater efficiency at partial loads;
- **four compressors (dual tandem) on dual circuit,** for a redundant system that is also efficient with low loads.

Attention to detail and low noise operation

The Scroll compressors, which are the main source of noise from the machine, can be mounted on a rubber support that **dampens vibrations,** wrapped in special insulating sheaths and placed in a dedicated compartment lined with sound-absorbing material. The machine noise emission and vibrations are thus **considerably reduced at all operating points.**

MSW		042P	052P	062P	072P	082P	092P	112P	132P	142P	144P	162P
Cooling: Utility water temperature 12/7°C, Recovery water temperature 40/45°C												
Cooling capacity	kW	42.3	49	56.7	63.5	73.9	82.4	98.7	111.6	125.2	128.2	137
Thermal power	kW	54.8	63.8	73.2	82	94.8	106.3	126.6	144.1	160.5	164.7	175.4
Total absorbed power	kW	13.2	15.7	17.6	19.7	22.3	25.5	29.8	34.8	37.8	39.1	41.2
TER		7.33	7.16	7.38	7.38	7.56	7.4	7.57	7.34	7.55	7.5	7.58
COP Total		7.33	7.16	7.38	7.38	7.56	7.4	7.57	7.34	7.55	7.5	7.58
User water values 12/7°C, 40/45°C source water side												
Cooling capacity	kW	42.3	49	56.7	63.5	73.9	82.4	98.7	111.6	125.2	128.2	137
Total absorbed power	kW	13.2	15.7	17.5	19.7	22.3	25.5	29.7	34.8	37.8	39.1	41.2
EER		3.2	3.12	3.24	3.22	3.31	3.24	3.32	3.21	3.31	3.28	3.33
User water values 12/7°C, 15/10°C source water side												
Thermal power	kW	59.6	69.4	79.5	89.1	103.2	115.3	137.4	156.8	174.3	179.4	190.5
Total absorbed power	kW	13.4	16	17.7	20.1	22.6	25.7	30.1	35.3	38.3	39.6	41.8
COP		4.46	4.34	4.5	4.44	4.57	4.48	4.56	4.44	4.56	4.54	4.56
SCOP		4.59	4.52	4.67	4.65	4.77	4.71	4.66	4.69	4.75	4.91	4.81
Sound power [Standard]	dB(A)	76	78	78	79	79	81	83	85	85	82	85
Sound power [Low noise]	dB(A)	72	74	74	75	75	77	79	81	81	78	81
Dimensions [LxHxD]	mm	1174x1930x772						1644x1930x772			2374x1990x877	1644x1930x772

MSW		164P	182P	184P	204P	214P	244P	284P	314P	344P	374P	424P
Cooling: Utility water temperature 12/7°C, Recovery water temperature 40/45°C												
Cooling capacity	kW	146.1	174	167.9	181.2	197.8	234	255.5	277	313.4	350.3	399.2
Thermal power	kW	188.2	223.3	214.6	232.4	253	297	324.9	352.8	400.1	447.7	506.1
Total absorbed power	kW	45.1	52.8	50	55	59.3	67.1	74.1	81.3	93	104.5	114.9
TER		7.42	7.52	7.65	7.51	7.6	7.91	7.83	7.75	7.67	7.63	7.88
COP Total		7.42	7.52	7.65	7.51	7.6	7.91	7.83	7.75	7.67	7.63	7.88
User water values 12/7°C, 40/45°C source water side												
Cooling capacity	kW	146.1	174	167.9	181.2	197.8	234	255.5	277	313.4	350.3	399.2
Total absorbed power	kW	45.1	52.8	50.1	55	59.3	67.1	74.1	81.2	93	104.5	114.8
EER		3.24	3.3	3.35	3.29	3.33	3.49	3.45	3.41	3.37	3.35	3.48
User water values 12/7°C, 15/10°C source water side												
Thermal power	kW	204.4	242.4	233.7	252.8	274.7	322.2	352.2	382.4	433.7	485	549.2
Total absorbed power	kW	45.5	53.6	50.4	55.6	60	67.7	74.8	82	94	106	115.9
COP		4.49	4.52	4.64	4.55	4.58	4.76	4.71	4.66	4.61	4.58	4.74
SCOP		4.89	4.75	5.01	4.89	4.9	5.05	5.1	5.08	4.94	4.97	5.14
Sound power [Standard]	dB(A)	82	90	84	85	86	88	88	88	91	93	89
Sound power [Low noise]	dB(A)	78	86	80	81	82	84	84	84	87	89	85
Dimensions [LxHxD]	mm	2374x1990x877	1644x1930x772	2374x1990x877	3130x1990x877							

Also available with 60 Hz power supply

PSW

MULTIPURPOSE WATER-CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS

294-867 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

SCROLL COMPRESSORS

A2L READY

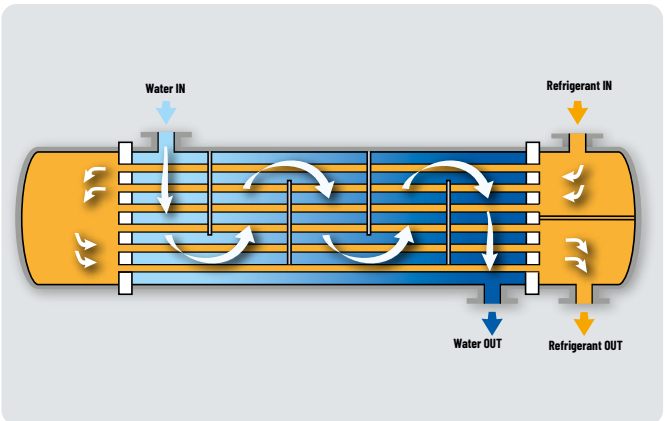
LOW GWP REFRIGERANT

SHELL AND TUBE HEAT EXCHANGER

CLASS A

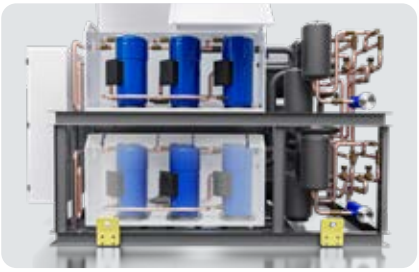
PSW multi-function units are used to produce hot and cold water, **both independently and simultaneously**, to meet the cooling and heating needs of both industrial and commercial applications. PSW units are ideally suited for **use in 4-pipe systems**. All units are available with two refrigerant circuits and shell and tube exchangers, for a high level of unit reliability. The layout of the components allows **easy access during maintenance** while the hydraulic connections all on the same side allow for **easy installation** and reduced installation space requirements.

- Available refrigerants: R1234ze and R515B
- Electronic expansion valve
- Vic-Taulic-type hydraulic connections (optional)
- Available in Standard and Low Noise versions
- Programmable electronic control as part of standard equipment
- Smart management of several units in parallel
- Easy access to components for routine maintenance
- Available in multipurpose version for 4 pipe systems



Reliability: shell and tube

The use of shell and tube exchangers with water flow on the shell side implies **a lower risk of blocking the flow due to exchanger clogging** - compared to units with plate heat exchangers. This is ascribable to larger throughsections - the exchanged power being the same. Additionally, the dual-pass heat exchanger ensures **high heat exchange efficiency** both in "chiller" and in "heat pump" modes, **with lower consumption figures for the user.**

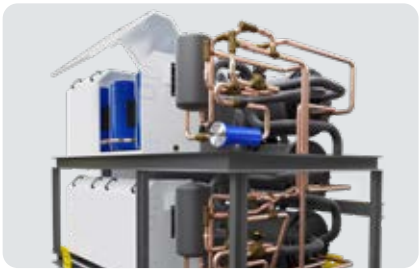


Maximum efficiency at partial loads

Accurate selection of the components allows **high efficiency to be obtained at partial loads;** this is thanks above all to the use of Scroll compressors and to the use of electronically controlled electric expansion valves (one for each circuit), **optimised to track refrigerant load trends in all conditions of use.** The shell and tube heat exchanger also ensures low water/refrigerant approach temperatures during operation, **all to the advantage of heat exchange efficiency.**

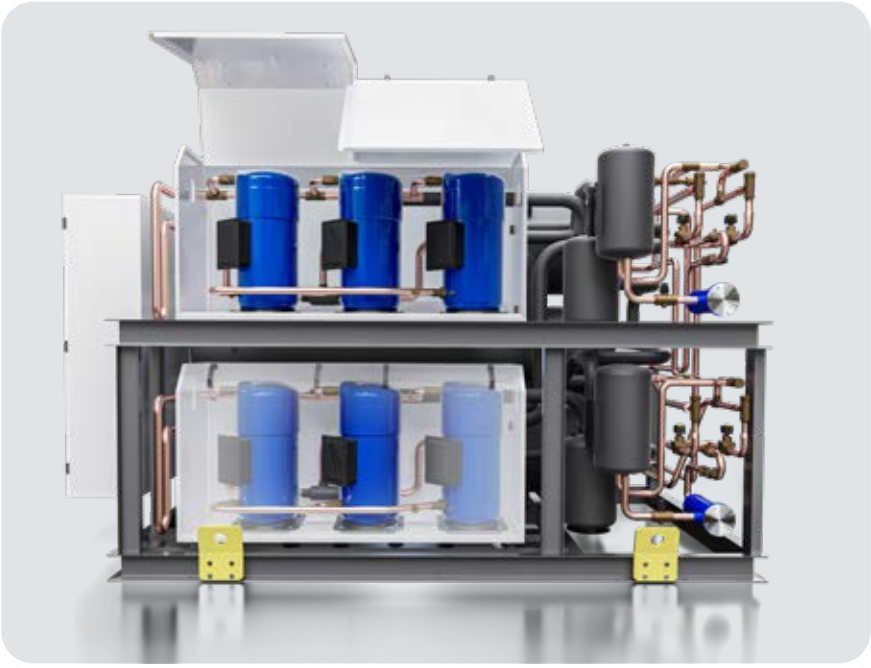
Reduced footprint

The PSW series has a **compact layout** thanks to the optimised arrangement of the compressors and heat exchangers. **The power density reaches very high values, exceeding 100kW/m².** The lower weight compared to units with screw compressors **facilitates installation and maintenance operations.**



Low noise levels

Thanks to the Scroll compressors used, the PSW units feature lower noise levels than other compressor technologies used for similar applications. Also, thanks to the use of multi-Scroll technology, at partial loads unnecessary compressors are turned off which results in **a further noise reduction.** For extra soundproofing, the **Low Noise version** is available with soundproofed sheet metal enclosures to compartmentalise the compressors.



PSW		324P	374P	444P	484P	506P	566P	646P	706P
Cooling + heating: User water temperature 12/7°C, Recovery water temperature 40/45°C									
Cooling capacity	kW	293.7	334	398.6	412	442.4	500.6	579	676.2
Thermal power	kW	370.8	423.9	503.6	521.4	558.1	635.7	730.2	866.6
Total absorbed power	kW	77.1	89.9	105.1	109.4	115.7	135.1	151.2	190.3
TER		8.62	8.43	8.59	8.53	8.65	8.41	8.66	8.11
COP Total		8.62	8.43	8.59	8.53	8.65	8.41	8.66	8.11
Cooling: User water values 12/7°C, 30/35°C source water side									
Cooling capacity	kW	329.3	374.4	445.6	459.9	498.4	561.4	648.7	692
Total absorbed power	kW	61.9	72.1	84	87.2	92.9	108.3	121.1	130.9
EER		5.32	5.2	5.31	5.27	5.34	5.18	5.36	5.29
User water values 40/45°C, 12/7°C source water side									
Thermal power	kW	370.8	423.9	503.6	521.4	558.1	635.7	730.2	866.6
Total absorbed power	kW	77.1	89.9	105.1	109.4	115.7	135.1	151.2	190.3
COP		4.81	4.72	4.79	4.77	4.82	4.71	4.83	4.55
Sound power [Standard]	dB(A)	89	89	90	90	91	91	91	90
Sound power [Low noise]	dB(A)	85	85	86	86	87	87	87	86
Dimensions [LxHxD]	mm	3013x2010x1998				4013x2010x1998			

HIGH TEMPERATURE HEAT PUMPS

KSW

WATER/WATER HEAT PUMPS FOR HIGH EVAPORATION AND CONDENSATION TEMPERATURES

38-590 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

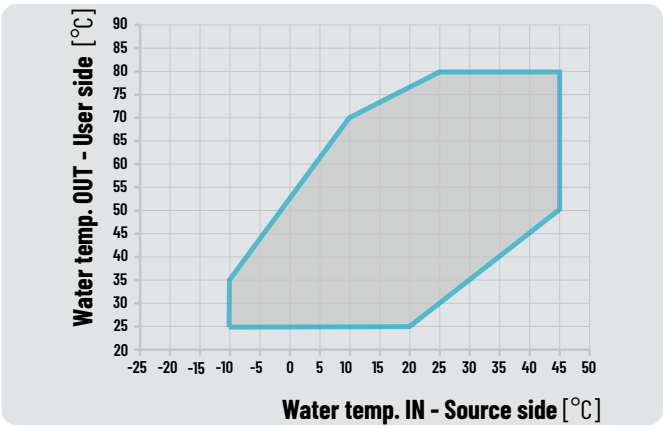
SCROLL COMPRESSORS

CORROSION RESISTANT MATERIAL

PLATE HEAT EXCHANGER

HiRef's range of KSW Water/Water heat pumps is designed for all applications where the cold source is at medium temperatures and at the same time, very hot water is required at the condenser - up to 80°C. This particular feature makes KSW units the **ideal solution in the event of medium heat** (up to 45°C) waste heat, which can be used to produce water at higher temperatures in both residential and industrial applications, e.g. district heating systems. All this while **ensuring partial load efficiency, redundancy, compact footprint in utility rooms, low noise levels, auxiliary system management and easy installation**.

- Refrigerant R134a or R513A
- Electronic expansion valve
- Vic-Taulic-type hydraulic connections (optional)
- Optional integrated energy meter via Modbus, for metering the energy absorbed by the machine
- External pump control according to constant T or constant ΔT logic



Optimised units for high temperature water production (80°C)

The KSW range units can produce water **up to 80°C** even when associated with a source of medium-temperature water (up to 45°C). This is thanks to **an accurate sizing of the heat exchangers and to the use of Scroll compressors** specially developed for high evaporation and condensation temperatures.

Efficiency and reliability in line with system requirements

The available refrigerating circuit configurations have been designed to ensure, also simultaneously, **redundancy and efficiency at partial loads.** More specifically, the units - depending on the size of the machine and on specific plant engineering requirements - consist of two compressors on two circuits **for high system redundancy** or four compressors (double tandem) on two circuits for a system that is **simultaneously redundant and efficient at partial loads.**

More space in the heating unit

The adoption of compact plate heat exchangers facing the unit right side panel **maximise the use of the available internal space thanks to reduced unit footprint.**

Attention to detail and low noise operation

Scroll compressors, which are the main noise source in the unit, are fitted on rubber feet; **these dampen vibration and therefore attenuate the noise transmitted to the various system parts.** On request, the compressor compartment can be lined with special sound absorbing material and the compressors encased in special insulating hoods **to reduce airborne noise emissions.**

Maximum efficiency at partial loads

The KSW range adopts a multi-Scroll solution also on single circuits, electronically controlled expansion valves, plate heat exchangers and the option to control the (external) circulation pumps **via dedicated software:** all these characteristics allow **high energy efficiency to be achieved at partial loads.**

Ideal design for medium temperature heat sources

Thanks to the special features of the KSW range, heat sources at temperatures **between 30° and 45°C** (and therefore, unsuitable for direct use) are used by heat pumps **to produce hotter water.** This is true for industrial heat waste, which can be reused to produce, for example, district heating. Similarly, in residential applications, KSW heat pumps can, for example, use in **wintertime fan coil loop water as a heat source** to produce water to feed to high temperature terminals, produce hot water or run anti-legionella cycles.

KSW		040K	050K	060K	081K	082K	091K	092K	101K	102K	121K	122K	151K	152K	171K	172K	174K	201K
R134a - Heating: User water values 70/80°C, 45/40°C source water side																		
Thermal power	kW	38	49.5	61.1	75.6	75.8	83.9	84.1	97.1	97.3	121.3	121.5	148.8	149.3	171	171.3	166.4	191.2
Total absorbed power	kW	8.5	11.2	14.1	16.9	16.9	19	19	22.4	22.3	27.9	27.8	35	35	40.2	40.1	38.3	45.2
COP		4.45	4.41	4.33	4.47	4.49	4.41	4.44	4.34	4.35	4.35	4.37	4.25	4.26	4.26	4.27	4.35	4.23
SCOP		4.18	4.2	4.17	4.91	4.92	4.89	4.94	4.84	4.95	4.86	4.87	4.52	4.59	4.62	4.65	5.15	4.67
Sound power [Standard]	dB(A)	74	74	78	77	77	77	77	77	77	81	81	84	84	85	85	80	86
Sound power [Low noise]	dB(A)	70	70	74	73	73	73	73	73	73	77	77	80	80	79	79	74	80
Dimensions [LxHxD]	mm	804x1462x607			1174x1594x772										1644x1594x772		2374 x1854 x877	1644 x1594 x772

KSW		202K	204K	221K	222K	241K	242K	244K	301K	302K	304K	344K	404K	444K	484K	554K	604K
R134a - Heating: User water values 70/80°C, 45/40°C source water side																	
Thermal power	kW	191.3	192	211.4	211.8	240.9	241.7	239.5	291.5	292.3	296.1	339.5	380.5	431.7	474.7	537.1	589.7
Total absorbed power	kW	45.2	45.1	51.4	51.3	56.5	56.4	56.3	69.9	69.9	70.4	80.6	91.2	102.3	114.5	126.3	139.8
COP		4.24	4.25	4.12	4.13	4.26	4.28	4.26	4.17	4.18	4.2	4.21	4.17	4.22	4.14	4.25	4.22
SCOP		4.84	5.14	4.68	4.84	4.72	4.82	5.05	4.65	4.85	4.74	4.84	4.98	5	4.93	4.98	5.01
Sound power [Standard]	dB(A)	86	80	87	87	88	88	84	90	90	87	88	89	90	91	92	93
Sound power [Low noise]	dB(A)	80	74	81	81	82	82	78	82	82	79	80	81	82	83	84	85
Dimensions [LxHxD]	mm	1644 x1594 x772	2374 x1854x 877	1644x1594x772				2374 x1854 x877	1644x1594x772		2374x1854x877						

KSW		040K	050K	060K	081K	082K	091K	092K	101K	102K	121K	122K	151K	152K	174K	204K	244K	304K
R513A - Heating: User water temperature 70/80°C, Source water temperature 45/40°C																		
Thermal power	kW	41	48	60.7	85.4	85.4	99	99.3	111	111	125.5	125.8	148.3	148.4	197.3	222	250	295
Total absorbed power	kW	9.7	11.3	14.7	18.8	18.7	22.1	22.1	25.1	25	28.8	28.8	34.2	34.2	44.2	50	57.5	70
COP		4.2	4.2	4.1	4.5	4.5	4.4	4.5	4.4	4.4	4.36	4.3	4.3	4.3	4.46	4.4	4.3	4.2
Sound power [Standard]	dB(A)	70	70	75	73	73	73	73	74	74	78	78	81	81	74	75	79	80
Dimensions [LxHxD]	mm	804x1462x607			1174x1594x772										2374x1854x877			

Also available with 60 Hz power supply

ZSW

WATER/WATER HEAT PUMPS FOR HIGH EVAPORATION AND CONDENSATION TEMPERATURES

228-604 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

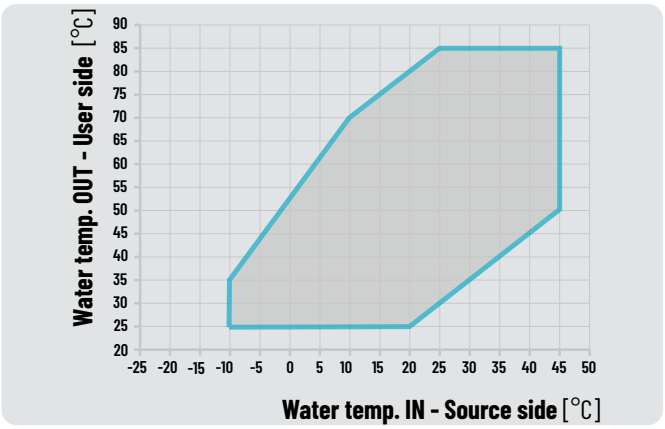
SCROLL COMPRESSORS

CORROSION RESISTANT MATERIAL

PLATE HEAT EXCHANGER

HiRef's range of ZSW Water/Water heat pumps is designed for all applications where the cold source is at medium temperatures and at the same time, very hot water is required at the condenser - up to 85°C. This particular feature makes ZSW units the **ideal solution in the event of medium heat** (up to 50°C) waste heat, which can be used to produce water at higher temperatures in both residential and industrial applications, e.g. district heating systems. All this while **ensuring partial load efficiency, redundancy, compact footprint in utility rooms, low noise levels, auxiliary system management and easy installation**.

- Available refrigerants: R1234ze and R515B
- Electronic expansion valve
- Vic-Taulic-type hydraulic connections (optional)
- Optional integrated energy meter via Modbus, for metering the energy absorbed by the machine
- External pump control according to constant T or constant ΔT logic



Optimised units for high temperature water production (85°C)

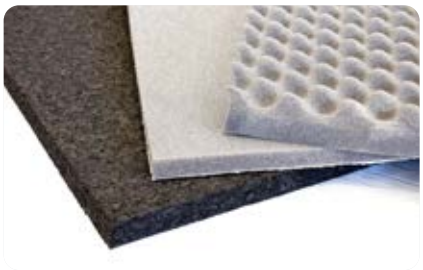
The ZSW range units can produce water **up to 85°C** even when associated with a source of medium-temperature water (up to 50°C). This is thanks to **an accurate sizing of the heat exchangers and to the use of Scroll compressors** specially developed for high evaporation and condensation temperatures.

More space in the heating unit

The adoption of compact plate heat exchangers facing the unit right side panel **maximise the use of the available internal space thanks to reduced unit footprint.**

Maximum efficiency at partial loads

The ZSW range adopts a multi-Scroll solution also on single circuits, electronically controlled expansion valves, plate heat exchangers and the option to control the (external) circulation pumps **via dedicated software:** all these characteristics allow **high energy efficiency to be achieved at partial loads.**



Attention to detail and low noise operation

Scroll compressors, which are the main noise source in the unit, are fitted on rubber feet; **these dampen vibration and therefore attenuate the noise transmitted to the various system parts.** On request, the compressor compartment can be lined with special sound absorbing material and the compressors encased in special insulating hoods **to reduce airborne noise emissions.**

Efficiency and reliability in line with system requirements

The available refrigerating circuit configurations have been designed to ensure, also simultaneously, **redundancy and efficiency at partial loads.** More specifically, the units - depending on the size of the machine and on specific plant engineering requirements - consist of two compressors on two circuits **for high system redundancy** or four compressors (double tandem) on two circuits for a system that is **simultaneously redundant and efficient at partial loads.**

Ideal design for medium temperature heat sources

Thanks to the special features of the ZSW range, heat sources at temperatures **between 30° and 45°C** (and therefore, unsuitable for direct use) are used by heat pumps **to produce hotter water.** This is true for industrial heat waste, which can be reused to produce, for example, district heating. Similarly, in residential applications, KSW heat pumps can, for example, use in **wintertime fan coil loop water as a heat source** to produce water to feed to high temperature terminals, produce hot water or run anti-legionella cycles.

ZSW		221K	222K	241K	242K	484K	604K
R1234ze - Heating: User water values 75/85°C, 45/40°C source water side							
Thermal power	kW	230.4	230.4	303.6	303.6	457.8	603.8
Total absorbed power	kW	63.1	63.1	80.9	80.9	127.6	163.5
COP		3.65	3.65	3.75	3.75	3.59	3.69
SCOP		4.10	4.11	4.35	4.37	4.23	4.49
R515B - Heating: User water values 75/85°C, 45/40°C source water side							
Thermal power	kW	229.1	227.8	299.6	299.8	452.4	596.5
Total absorbed power	kW	63.1	63.1	80.6	80.5	127.7	162.5
COP		3.63	3.61	3.72	3.72	3.54	3.67
SCOP		4.10	4.12	4.34	4.36	4.23	4.48
Sound power [Standard]	dB(A)	88	88	91	91	91	94
Sound power [Low noise]	dB(A)	84	84	87	87	87	90
Dimensions [LxDxH]	mm	1790x1930x770				3130x1990x880	

Also available with 60 Hz power supply

KVW

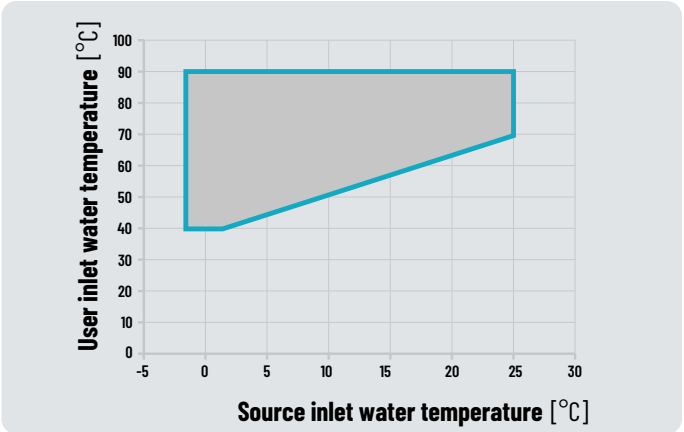
HIGH TEMPERATURE HEAT PUMPS WITH TWO-STAGE COMPRESSORS

324–2208 kW

- MULTI-PROTOCOL COMMUNICATION INTERFACE
- SCREW COMPRESSORS
- CORROSION RESISTANT MATERIAL
- CLASS A
- LOW GWP REFRIGERANT
- SPRAY FLOODED SHELL AND TUBE

KVW is HiRef's range of water-condensed high-temperature heat pumps with **two-stage screw compressors**, **spray flooded shell and tube evaporator** and **shell and tube condenser**. The units are available with traditional refrigerant R515B or R1234ze, with a **very low GWP** (Global Warming Potential) value. The range covers the thermal power range from 400 to 2000kW* and reaches COP values of 2.2 producing water at +90°C (with R1234ze) from a source at -2°C. The KVW **extra high temperature heat pump series is ideally suitable for low-medium temperature heat recovery to produce hot water for district heating networks or industrial processes**.

- Available refrigerants: R1234ze and R515B
- Available in version: heating only heat pumps for high temperatures and chiller with total high temperature recovery.
- Monitoring and limitation of the maximum absorbed power
- Standard supply with inverter-driven screw compressors (included), in enclosed version, allowing power modulation from 25% to 100%.
- Thermal insulating hoods on compressors for high-temperature heat pump versions (optional)
- Modulation and supervision managed by the software
- Available in a single-circuit version with a single compressor and a dual-circuit version with two compressors



Power and flexibility

Screw compressor allows achievement of **high cooling capacities** with load modulation via the special slide valve, **with obvious advantages in terms of energy efficiency.**

Two-level evaporation

The unit is equipped with a flooded evaporator with spray technology and double water-side passage. With this technology, **the refrigerant charge is reduced by 30% compared to a standard flooded bundle.**

Standard touch screen display

The KVW series comes with a **touch screen display and customized software and screens as standard.** On request, total web monitoring can be integrated through an Ethernet card

Production of hot water up to 90°C

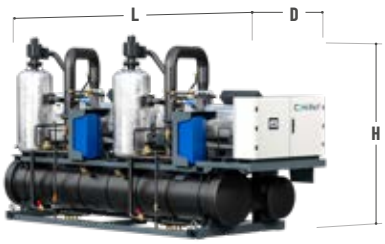
The units of the KVW range **can produce water at a temperature of 90°C even from a very cold source.** Thanks to this feature, the heat pumps can be integrated into the **district heating circuits** even in replacement of traditional heat generators.

Economiser, power and flexibility

The integration of the refrigeration circuit with the economiser allows **the heat output of the heat pump and also the efficiency (COP) to be increased.**

Optimised installation space

The unit is available in both standard and 'mirrored' layout versions. When ordered together, the two versions **can be placed adjacent to each other on the long side** in order to occupy **as little space as possible in the heating plant and facilitate maintenance operations.**



KVW		300K	500K	1001K	2001K
User water temperature 65/85°C, Source water temperature 4/1°C 20% ethylene glycol					
Thermal power	kW	324	535	1104	2208
Total absorbed power	kW	135.2	227.6	460	920
Sound power [Standard]	dB(A)	95	96	99	102
Dimensions [LxHxD]	mm	3233X2651X1800	3815X2651X1800	5180X2574X1800	5180X2574X3600

The 2000kW unit is composed of two 1000kW modules built in a symmetrical configuration

XVA K

HEATING-ONLY WATER CONDENSED HEAT PUMPS WITH INVERTER DRIVEN SCREW COMPRESSORS

408–1679 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

SCREW COMPRESSORS

SHELL AND TUBE HEAT EXCHANGER

FAST RESTART

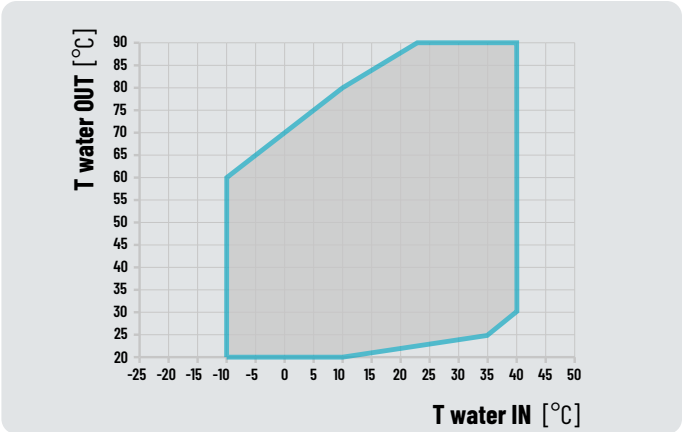
CORROSION RESISTANT MATERIAL

CLASS A

LOW GWP REFRIGERANT

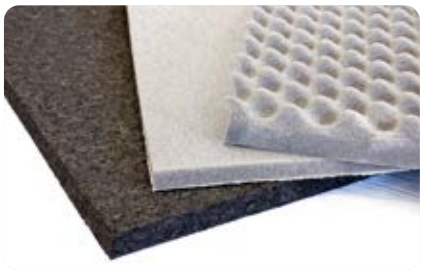
XVA K is HiRef's range of water-cooled chillers with screw compressors and shell and tube heat exchangers. Use of the new R1234ze refrigerant, **with ultra-low GWP** (Global Warming Potential), and **achievement of high energy efficiency levels**, especially at partial loads, **ensures the system has a low TEWI** (Total Equivalent Warming Impact). Using the R1234ze refrigerant, water temperatures of up to 90°C can be achieved; upon request, the R1233zd refrigerant can be selected, allowing temperatures to reach up to 120°C. The broad capacity range offered and the availability of different versions caters to a wide variety of needs.

- Available refrigerants: R1234ze and R515B
- Available versions: heating only heat pump and heating only heat pump for high temperatures
- Electronic expansion valve
- Monitoring and limitation of the maximum absorbed power
- Available with screw compressors driven by inverter as standard
- Thermal insulating jackets on compressors



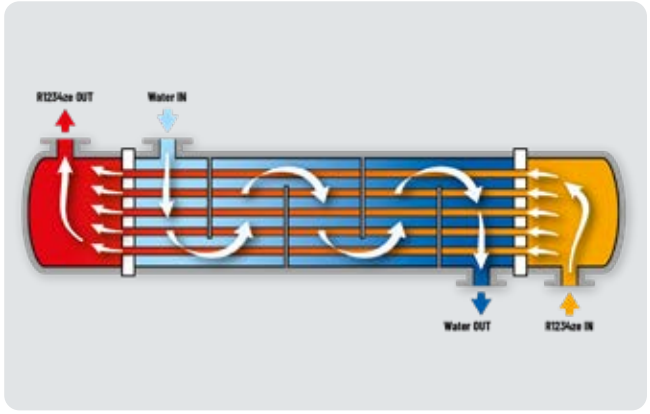
Power and flexibility

Screw compressor allows **high thermal power** to be achieved with load modulation via the special slide valve. A version with inverter either on one or on both compressors is available, **for finer adjustment of cooling capacity and obvious advantages in terms of energy efficiency.**



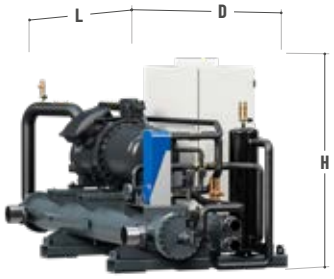
Low Noise set-up

The screw compressors, the only source of noise on the machine, can be placed in a dedicated enclosure lined with sound-absorbing material **that reduces the overall noise emission.**



New concept of heat exchange

Single pass shell and tube evaporators provide **excellent levels of thermodynamic efficiency** thanks to full heat exchange counter-flow.



XVA K		039YK	043IK	044YK	049IK	051YK	057IK	060YK	060IK	066YK	066IK	075YK	075IK	086YK	086IK	106YK	117IK	126YK	138IK	147YK	147IK	172YK	172IK
Heating: User water temperature 80/90°C, Source water temperature 45/40°C																							
Thermal power	kW	408.2	425.5	456	475.1	528.8	551.3	592.7	592.7	649.9	649.9	735.4	735.4	848	848	1080	1125.6	1284.4	1339.2	1442.5	1442.5	1679	1679
Total absorbed power	kW	135.9	142.8	151.0	160.5	176.3	186.9	191.8	193.7	217.4	219.6	248.1	250.6	284.1	286.5	349.5	370.3	401.4	425.1	442.5	446.6	496.7	501.2
COP		3.04	5.10	3.02	2.96	3.00	2.95	3.09	3.06	2.99	2.96	2.96	2.93	2.98	2.96	3.09	3.04	3.20	3.15	3.26	3.23	3.38	3.35
SCOP		4.94	5.10	5.04	5.12	4.99	5.15	5.10	5.21	5.11	5.22	5.09	5.20	5.17	5.26	5.06	5.21	5.16	5.31	5.22	5.36	5.35	5.47
Sound power[Standard]	dB(A)	91	92	91	92	91	92	91	91	95	95	95	95	96	96	96	97	97	98	97	97	98	98
Dimensions [LxHxD]	mm	3937x1507x2000				4700x1507x2000				4700x1650x2200						5198x1817x2450						5288 x1817 x2450	

HYDRAULIC MODULES

PLM

POLYMORPH HYDRONIC MODULES FOR WATER/WATER CHILLERS SYSTEMS

MULTI-PROTOCOL COMMUNICATION INTERFACE

PLATE HEAT EXCHANGER

HiRef Polymorph modules provide a **solution that "converts" a water-condensed chiller into a more advanced system**. The water management system is the "master" element of the heating system. Thanks to **a hydronic circuit specially designed for the application, and built-in software to control the different operating modes**, any water-to-water chiller (even of a different brand) can also be used as: a reversible heat pump, a chiller with total recovery, a multipurpose heat pump for 2-pipe systems, a multipurpose heat pump for 4-pipe systems or an air conditioning system with Free-Cooling.

- The PLM module, unlike traditional pumping modules, acts as the "master" unit managing the system, which can be made up of one or more chillers in parallel
- Built-in software for managing the different modes and interfacing with the chiller
- Compatibility with any chiller, even if already present in the system
- Vic-Taulic type quick water couplings
- Suitable for any chiller size
- Also available in Low-Noise silenced set-up with internal compartment lined with sound-absorbing material
- Standard high efficiency pumps

PLM - POLYMORPH H

Reversible heat pump

The Polymorph PLM-H module allows **a reversible heat pump to be obtained** for the production of chilled water or hot water when connected to a chilling-only water-water chiller.

PLM - POLYMORPH R

Chiller with total recovery

The Polymorph PLM-R module, in combination with a water-water chiller, **recovers 100% of the condensation heat** avoiding dissipation to the outside heat source and making heat available for different purposes.

PLM - POLYMORPH M

2T multi-purpose heat pump

The Polymorph PLM-M module is able to turn a water-condensed chilling-only chiller into **a multipurpose heat pump (with total condensation heat recovery)** suitable for installation in a "two-pipe" system. Its possible functions are:

- production of chilled water only;
- hot water production only set-point #1 (e.g. heating);
- hot water production only set-point #2 (e.g. DHW);
- production of chilled water and hot water at the same time set-point #2.

PLM - POLYMORPH P

4T multi-purpose heat pump

The Polymorph PLM-P module is suitable for **all so-called "four-pipe" systems** where hot and cold water must be produced at the same time. The water/water chiller combined with the PLM-P allows the following functions:

- production of chilled water only;
- production of hot water only;
- production of chilled water and hot water at the same time.

PLM - POLYMORPH F

Free-Cooling system

A Dry Cooler water-condensed water chiller can be combined with a Polymorph PLM-F module to convert the system **into a Free-Cooling system.** Outdoor air, if sufficiently cold, is used as a source of cooling capacity **allowing considerable savings of electricity.** Below the TFT (Total Free-Cooling Temperature) the compressors are switched off and the cooling demand is completely **covered with the only consumption being from auxiliaries** (fans and circulators).

PLM		FRAME 1	FRAME 2	FRAME 3	FRAME 4
FRAME 1					
Dimensions [LxHxD]	mm	1174x1590x772	1644x1590x772	2374x1850x877	3130x1850x877

Also available with 60 Hz power supply

SUPERVISION

INDUSTRIALE

HiNode

ADVANCED TECHNOLOGY AND FLEXIBILITY TO MANAGE AIR CONDITIONING AND PROCESS COOLING

MONITORING AND CONTROL

MULTI-PROTOCOL COMMUNICATION INTERFACE

HiNode 2.0 is a complete system for the management and supervision of air conditioning and process cooling plants, capable of interfacing with all units and devices in an installation to make operation more efficient.

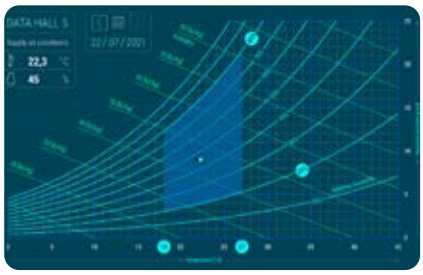
Advanced and flexible in use, **HiNode 2.0** can monitor system performance and optimally manage fault resolution, ensuring maximum service continuity for the user. The system sizing is modular and can be defined each time according to the number of devices to be controlled.

The heart of the device

Equipped with digital and analogue inputs and outputs to control the devices present (pumps, valves, etc.) and to acquire and record temperature, pressure, etc. values. At the heart of **HiNode 2.0** is a programmable microprocessor **compatible with all major serial and Ethernet communication protocols.** Operating data can be accessed locally, via the LCD display or touch screen, or remotely, via the clear and intuitive web interface. The system can also be configured to send data to a third-party cloud service via MQTT protocol.

Communication protocols

HiNode 2.0 supports the following communication protocols: Modbus RTU or TCP/IP, BACnet MS-TP or IP, SNMP v1-v2c-v3, MQTT, and Redfish.

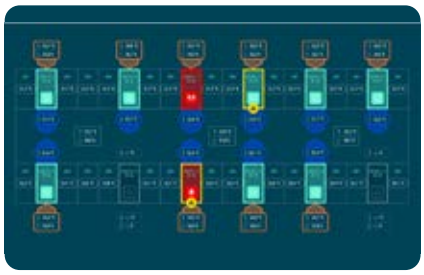


Information management

The system lets you verify the main operating variables for the managed units, displaying trends over time in graph form and recording them together with the event history. The data can also be exported in different formats and sent automatically by e-mail.

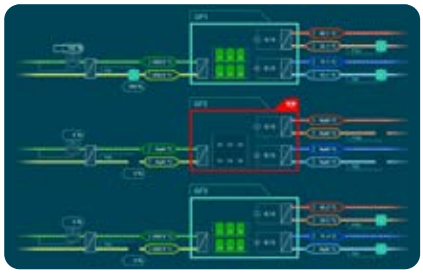
User flexibility

The software allows you to perform numerous basic functions and **can be integrated with customised management logics, adapting itself to each type of plant.** With **HiNode 2.0** it is possible to achieve high energy efficiency and greater savings in operating operating costs. HiNode 2.0 software was designed and developed by the HiRef Controls team. **It allows several basic operations to be performed and can be integrated with many customised functions according to the type of system to be managed.**



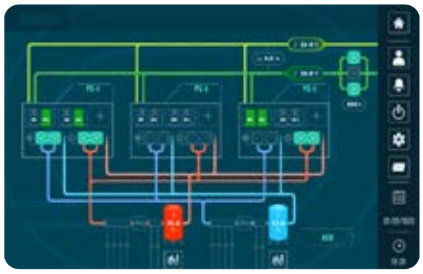
Operation logic

The **HiNode 2.0** software is designed and developed by HiRef and **enables efficient management of the distribution of heat loads between installed units,** even if they are of different ranges.



On/off and modulating valve management

Management of mixed climate zones. Control of groundwater rejection temperature.

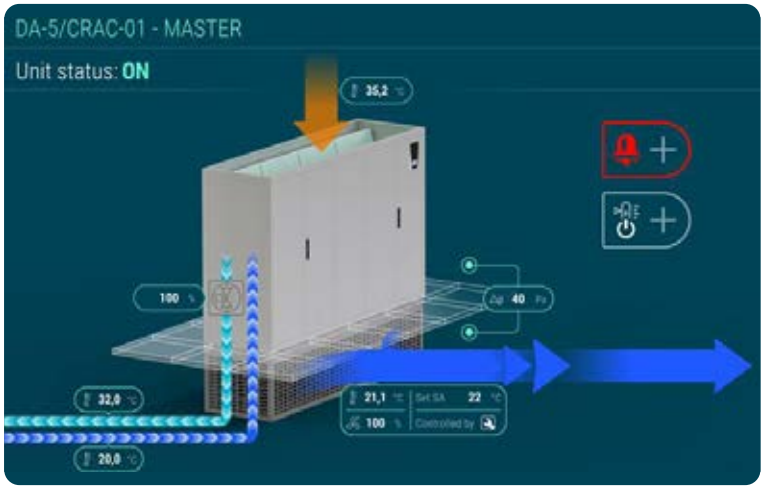


Controlled devices and functions: on/off and modulating distribution pump management

Time rotation, constant or variable flow control, control with ΔT or constant pressure. Flow balancing between primary and secondary circuits.

Energy metering

Measurement of thermal energy and electrical energy. With the possibility of using MID-certified devices (Measuring Instruments Directive 2014/32/EU).

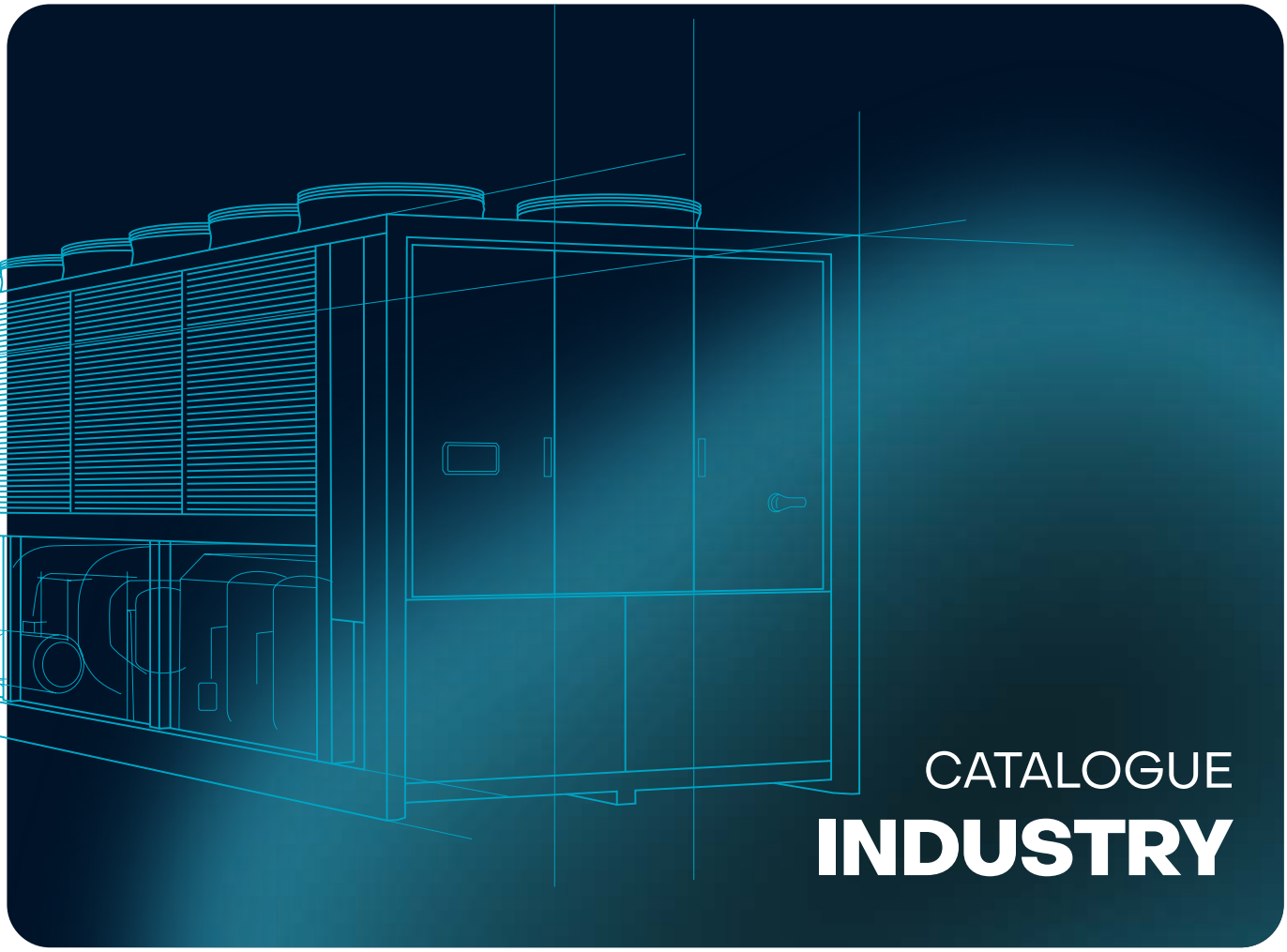


Controlled devices and functions: HiRef air conditioning unit

Management of load distribution between available units with selection of the most suitable resource, in addition to basic functions managed by LAN connected machines. Heating/cooling generation calculation based on working temperatures between primary and secondary circuits. Running time balancing and advanced Dynamic Setpoint function.


HiRef


INNOVATORS
above the standards



CATALOGUE
INDUSTRY

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