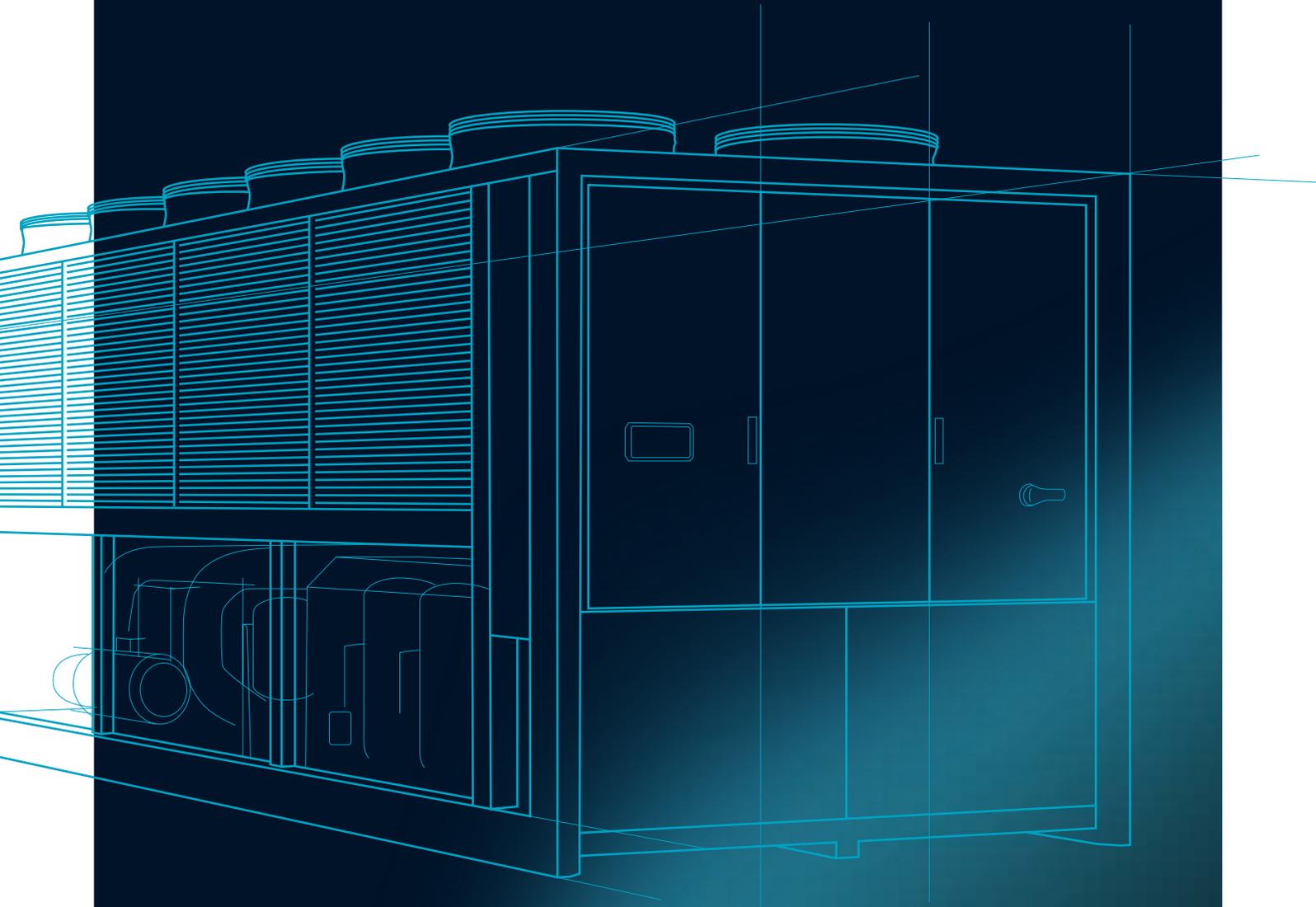


 HiRef



CATALOGUE
BUILDINGS

 HiRef

Rooftop

	SYSTEM TYPE	VERSIONS	REFRIGERANT	RANGE	PAGE
	OUTSIDE AIR UNIT WITH ROTARY HEAT EXCHANGER				
HRA	AIR/AIR	  		16-405 (kW)	16
	ROOFTOP IN CLASS A FOR AIR CONDITIONING. STAND-ALONE, MONOBLOC AND WITH HEAT PUMP				
HRT	AIR/AIR	  		20-131 (kW)	18

Liquid chillers

	CHILLERS WITH REMOTE CONDENSER WITH SCROLL COMPRESSORS				
TSE	AIR/WATER	 	 	43-433 (kW)	22
	AIR CONDENSED CHILLERS WITH INVERTER DRIVEN SCREW COMPRESSORS				
TVA	AIR/WATER	 	   	297-1367 (kW)	24
	AIR CONDENSED CHILLERS WITH OIL-FREE CENTRIFUGAL COMPRESSORS				
TTX	AIR/WATER	 		540-2120 (kW)	26
	WATER CONDENSED CHILLERS AND HEAT PUMPS WITH SCREW COMPRESSORS				
XVA	WATER/WATER		   	445-1494 (kW)	28



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	PAGE
	AIR-COOLED CHILLERS AND HEAT PUMPS WITH NATURAL REFRIGERANT R744 (CO₂) AND MODULATING COMPRESSORS				
CDA	AIR/WATER			75-706 (kW)	32
	CHILLERS AND HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS				
NHA	AIR/WATER			92-688* (kW)	34
	REVERSIBLE AIR CONDENSED HEAT PUMPS FOR LOW OUTDOOR TEMPERATURES				
HPS	AIR/WATER			36-176 (kW)	36
	AIR CONDENSED CHILLERS AND HEAT PUMPS WITH SCROLL COMPRESSORS FOR INDOOR INSTALLATIONS				
HWC	AIR/WATER			58-202 (kW)	38
	CLASS A CHILLERS AND HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS				
TSS	AIR/WATER			120-265 (kW)	40
	AIR CONDENSED CHILLERS AND HEAT PUMPS WITH SCROLL COMPRESSORS				
TAS	AIR/WATER			60-261 (kW)	42
	AIR CONDENSED CHILLERS AND HEAT PUMPS WITH SCROLL BLDC INVERTER COMPRESSORS				
MHA	AIR/WATER			30-288 (kW)	44
	AIR CONDENSED CHILLERS AND HEAT PUMPS WITH SCROLL COMPRESSORS				
TPS	AIR/WATER			43-445 (kW)	46
	CLASS A CHILLERS AND HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS				
TSL	AIR/WATER			277-1004 (kW)	48

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

Liquid chillers and reversible heat pumps

	SYSTEM TYPE	VERSIONS	REFRIGERANT	RANGE	PAGE
	CLASS A CHILLERS AND HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS				
TAL	AIR/WATER	  	 	283-1166 (kW)	50
	AIR CONDENSED CHILLERS AND HEAT PUMPS WITH SCROLL COMPRESSORS				
TPL	AIR/WATER	  	 	365-1199 (kW)	52
	WATER-COOLED CHILLERS AND HEAT PUMPS WITH SCROLL COMPRESSORS				
RSW	WATER/WATER	  	 	329-867 (kW)	54
	WATER CONDENSED CHILLERS AND HEAT PUMPS WITH SCROLL COMPRESSORS				
XSB	WATER/WATER	  	 	40-838 (kW)	56

Multipurpose

	MULTIPURPOSE AIR CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS				
NPA	AIR/WATER	 	 	60-162 (kW)	60
	MULTIPURPOSE AIR CONDENSED HEAT PUMPS FOR LOW OUTDOOR TEMPERATURES				
MPS	AIR/WATER	 		39-248 (kW)	62
	MULTIPURPOSE CLASS A AIR CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS				
MPA	AIR/WATER	 	 	59-325 (kW)	64
	MULTIPURPOSE CLASS A HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS				
MSL	AIR/WATER		 	279-1425 (kW)	66



Cooling Only



Heating Only



Reversible Heat Pump



Free-Cooling



Meto Evaporating



Polyvalent for 2-pipe system



Polyvalent for 4-pipe system

Multipurpose

	SYSTEM TYPE	VERSIONS	REFRIGERANT	RANGE	PAGE
	MULTIPURPOSE CLASS A AIR CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS				
MLA	AIR/WATER	2 4	R-410A R-454B	286-1431 (kW)	68
	MULTIPURPOSE AIR CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS FOR INDOOR INSTALLATIONS				
HWP	AIR/WATER	2 4	R-410A	34-184 (kW)	70
	MULTIPURPOSE WATER-CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS				
MSW	WATER/WATER	2 4	R-410A R-454B	42-549 (kW)	72
	MULTIPURPOSE WATER-CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS				
PSW	WATER/WATER	4	R-1234ze R-515B	294-867 (kW)	74

High temperature heat pumps

	WATER/WATER HEAT PUMPS FOR HIGH EVAPORATION AND CONDENSATION TEMPERATURES				
KSW	WATER/WATER	☀	R-134a R-513A	38-590 (kW)	78
	WATER/WATER HEAT PUMPS FOR HIGH EVAPORATION AND CONDENSATION TEMPERATURES				
ZSW	WATER/WATER	☀	R-1234ze R-515B	228-2304 (kW)	80

Supervision

	ADVANCED TECHNOLOGY AND FLEXIBILITY TO MANAGE AIR CONDITIONING AND PROCESS COOLING				
HiNode					PAGE 84

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



CATALOGUE
BUILDINGS

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.**

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. **An 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.**

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.**

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 CO₂ 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

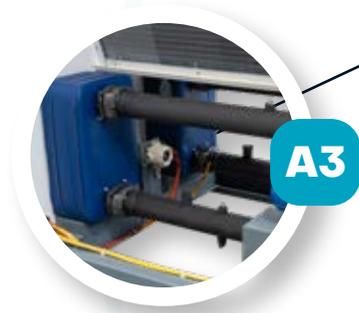
A refrigerant leak sensor is installed inside each dependent section of the control panel and inside each separate compartment that contains one or more compressors **to detect any gas leaks.**

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 CO₂ 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

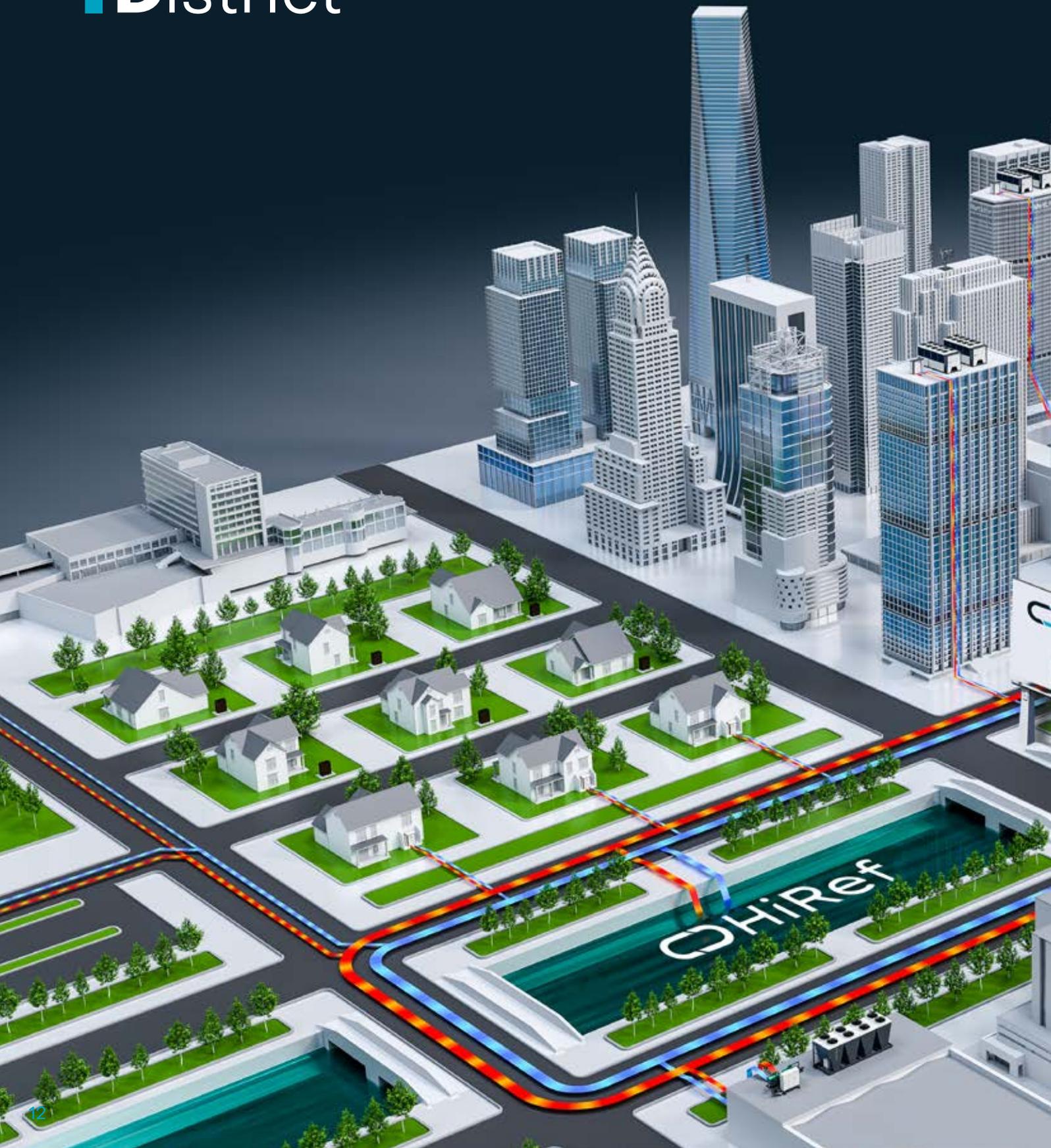
In order to ensure the operation of units operated with A3 refrigerants, **the emergency ventilation and refrigerant leakage sensors have a dedicated power supply.**

Compressors and components

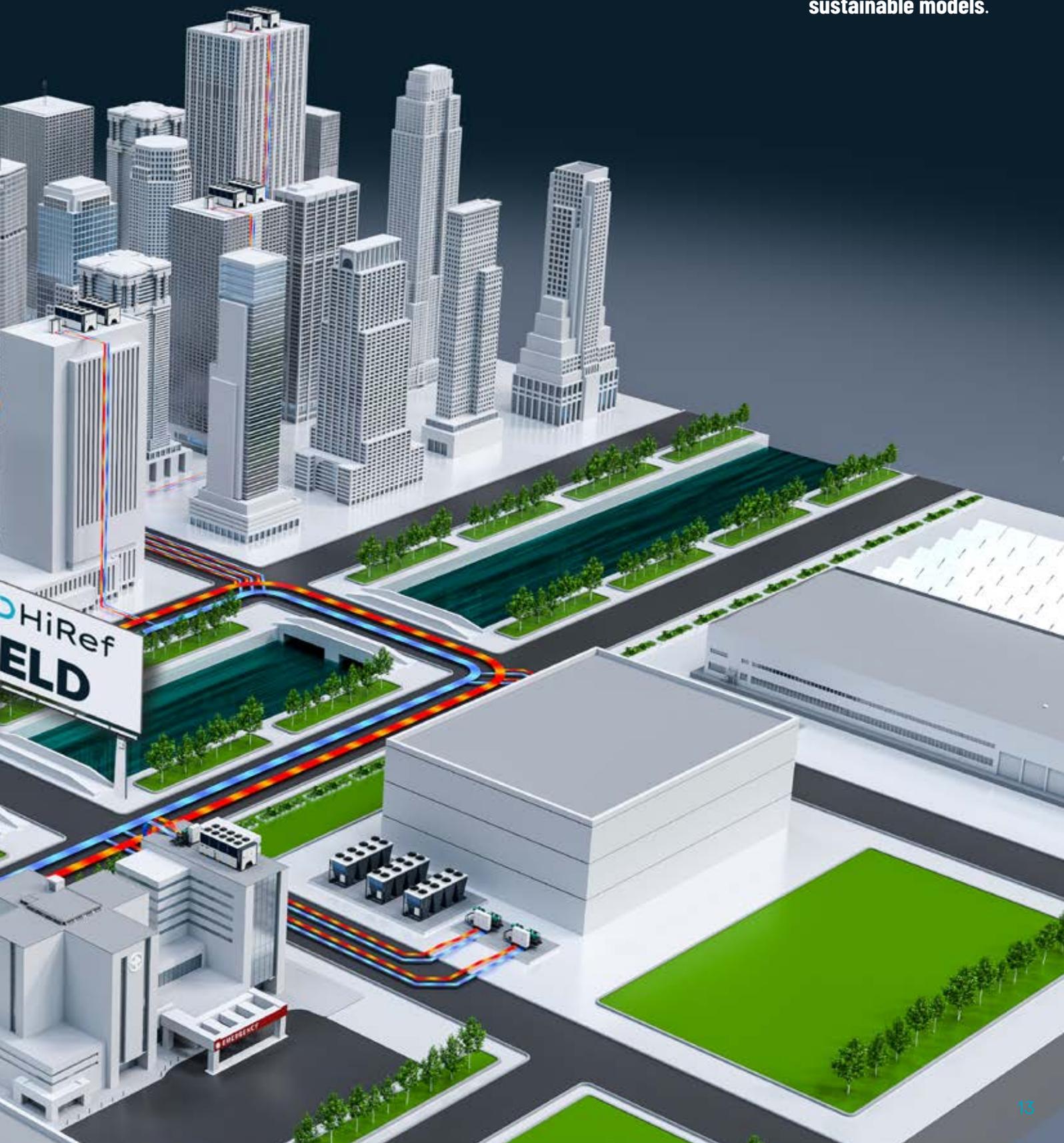
Compressors and components are specially designed and created to **work with A3 fluids.**



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.**



ROOFTOP

HRA

OUTSIDE AIR UNIT WITH ROTARY HEAT EXCHANGER

16-405 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

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 **the 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/CO₂ probe, HRA monitors the amount of CO₂ 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.**



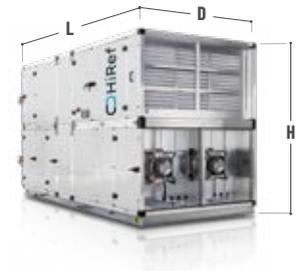
Thermodynamic recovery

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	m³/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

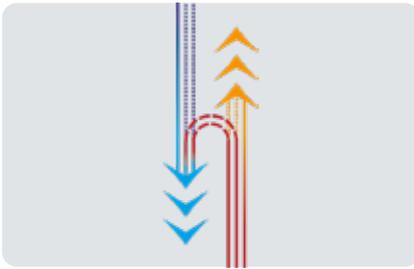


 MULTI-PROTOCOL COMMUNICATION INTERFACE	 SCROLL COMPRESSORS	 EC RADIAL FANS	 AXIAL FANS
 INVERTER DRIVEN COMPRESSORS	 MODULATING HOT GAS POST-HEATING	 CORROSION RESISTANT MATERIAL	 ENTHALPIC ROTARY HEAT RECOVERY UNIT
 ON-BOARD HUMIDIFIER		 CLASS A	

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).

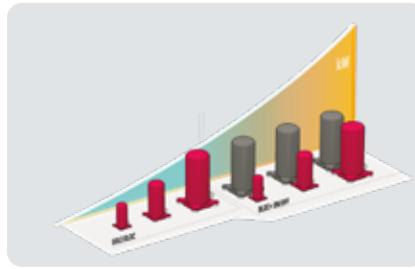
- Refrigerant R410A
- Direct Free-Cooling function
- Thermodynamic recovery on outlet air
- EC plug fan type delivery fan
- Air quality sensors
- Remote monitoring and control
- RS485 Protocol
- Flow modulation of EC plug-in fans via AirFlow Control (digital signal)
- Fan speed modulation based on thermal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





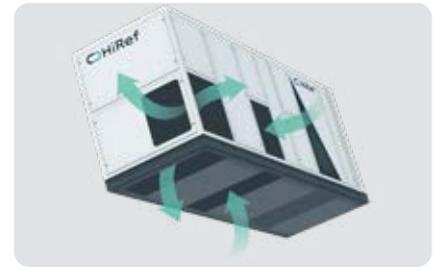
Enthalpic rotary heat recovery

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.



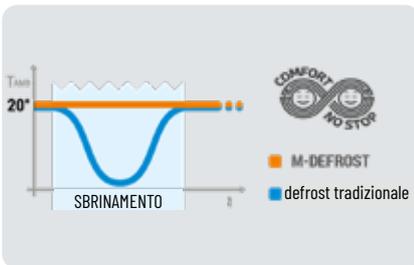
BLDC and on/off compressors join forces for maximised energy savings

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/CO₂ probe, HRA monitors the amount of CO₂ 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	022HO	032HO	042HO	052HO	062HO	104HO	124HO	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	59
EER		3.51	3.41	3.68	3.4	3.43	3.44	3.12	3.35	3.25	3.43	3.23
Sensible cooling capacity	kW	18.3	23.7	29.6	36.4	42.4	76	88.8	17.6	24.5	30	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	57.6
COP		4.2	4.18	4.23	3.85	4.02	3.91	3.53	3.62	3.75	3.62	3.47
Air flow	m ³ /h	3900	5500	7000	8000	9000	19000	21500	4500	6000	7000	11000

LIQUID CHILLERS

TSE

CHILLERS WITH REMOTE CONDENSER WITH SCROLL COMPRESSORS

43-433 kW



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

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:

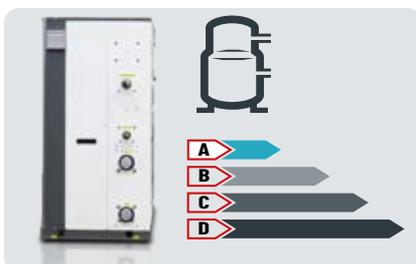
EFFICIENCY PACK 1: Dual compressor on dual circuit for high system redundancy. For units from 43 to 177 kW.

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	84.3	
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	
EER		3.26	3.25	3.25	3.24	3.32	3.32	3.34	3.33	3.37	3.37	3.34	
Weight	kg	372	362	432	422	442	432	452	442	472	462	492	
Sound power [Standard]	dB(A)	76	76	78	78	78	78	79	79	79	79	81	
Sound power [Low noise]	dB(A)	72	72	74	74	74	74	75	75	75	75	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	
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	
EER		3.36	3.36	3.31	3.3	3.37	3.37	3.37	3.39	3.39	3.34	3.3	
Weight	kg	563	553	573	563	633	618	723	673	653	743	693	
Sound power [Standard]	dB(A)	84	84	85	85	85	85	82	85	85	82	90	
Sound power [Low noise]	dB(A)	80	80	81	81	81	81	78	81	81	78	86	
Dimensions [LxHxD]	mm	1644x1930x772						2374x1990x877	1644x1594x772		2374x1854x877	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

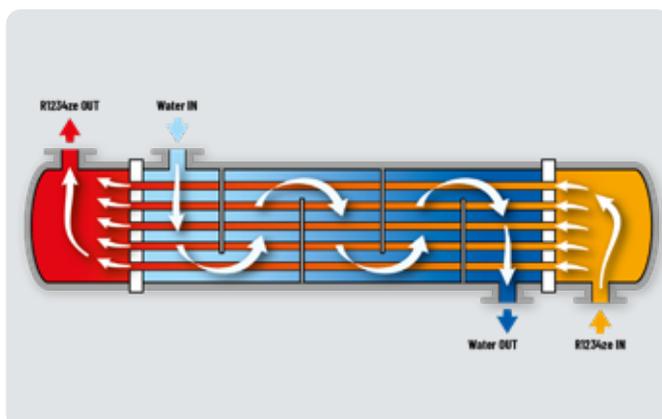
297-1367 kW



-  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

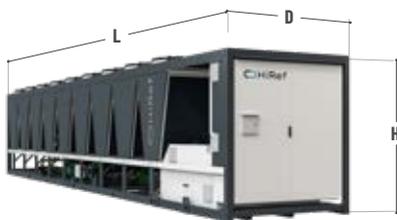
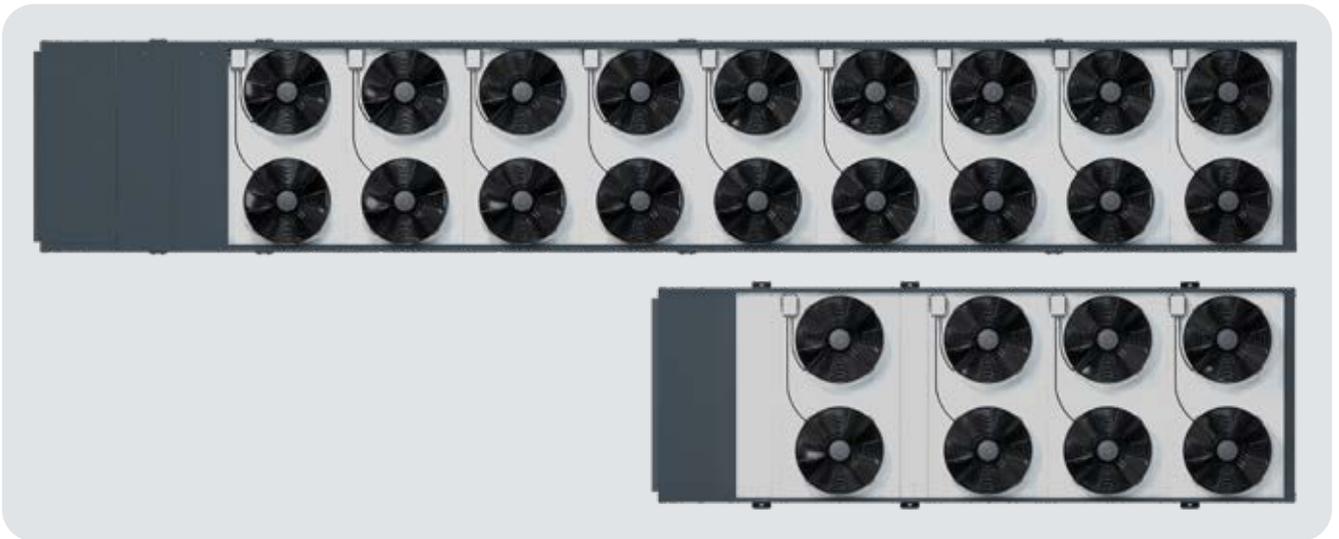
The configuration with very deep 'V' modular coils provides **an extensive heat exchange surface area and therefore excellent thermal efficiency in relation to the unit footprint.**

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

TTX

AIR CONDENSED CHILLERS WITH OIL-FREE CENTRIFUGAL COMPRESSORS

540-2120 kW

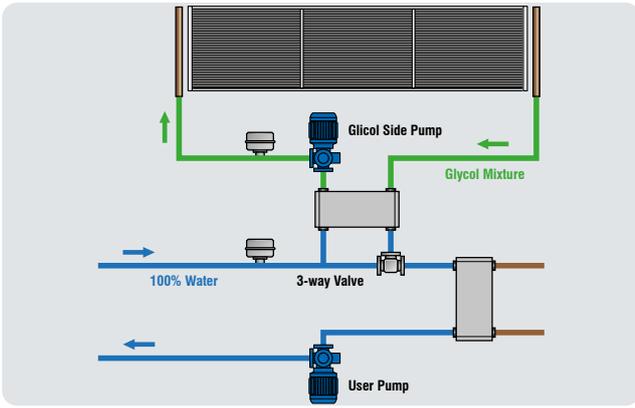


MULTI-PROTOCOL COMMUNICATION INTERFACE	OIL-FREE CENTRIFUGAL COMPRESSORS	SPRAY FLOODED SHELL AND TUBE	FAST RESTART
AXIAL FANS	CORROSION RESISTANT MATERIAL	CLASS A	SUPER LOW NOISE
LOW GWP REFRIGERANT			

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.

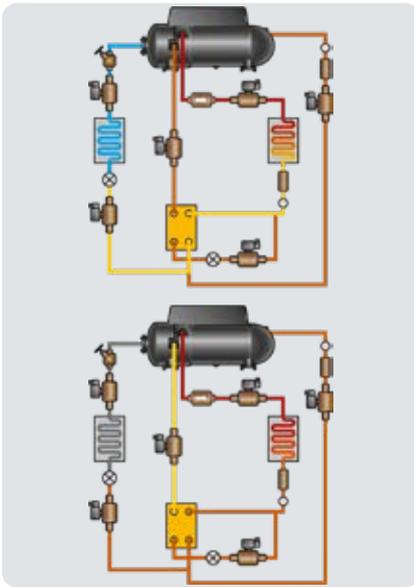


- R1234ze refrigerant
- Water connections with Vic-Taulic quick couplings
- Dual day/night noise emission set-point
- EC Fans
- Electronic expansion valve
- Capacity modulation via inverter on both compressors or on a single compressor
- Monitoring and limitation of the maximum absorbed power
- Available 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

XVA

WATER CONDENSED CHILLERS AND HEAT PUMPS WITH SCREW COMPRESSORS

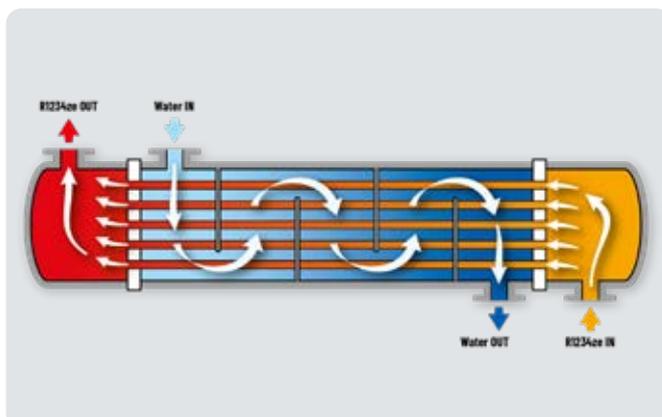
445-1494 kW



 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 (CO₂) AND MODULATING COMPRESSORS

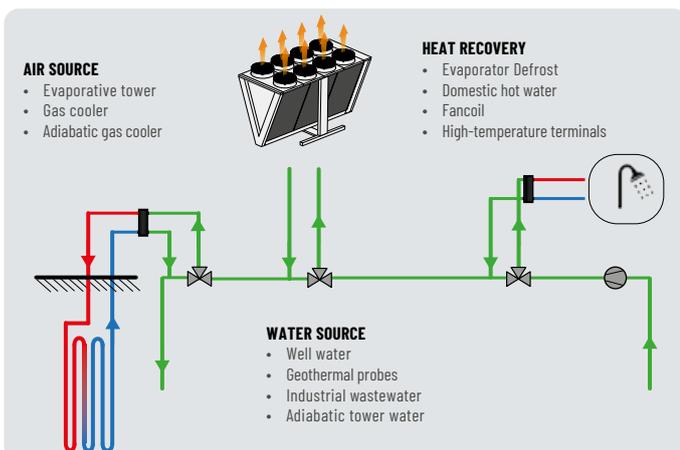
75-706 kW



<p>REFRIGERANT R744 (CO₂)</p>	<p>MULTI-PROTOCOL COMMUNICATION INTERFACE</p>	<p>PISTON COMPRESSORS</p>
<p>CLASS A</p>	<p>FAST RESTART</p>	<p>CORROSION RESISTANT MATERIAL</p>

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 CO₂ 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

CO₂ 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 CO₂ 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

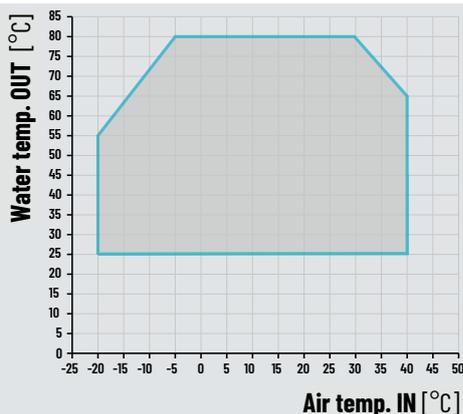
92-688 kW

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



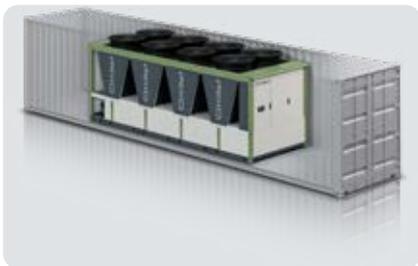
NHA is the range of air/water units in chiller and reversible heat pump versions with natural refrigerant R290. The NHA range is designed to handle **the air conditioning of industrial plants and thermal loads in technological applications, where maximum system reliability is required in all operating 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.



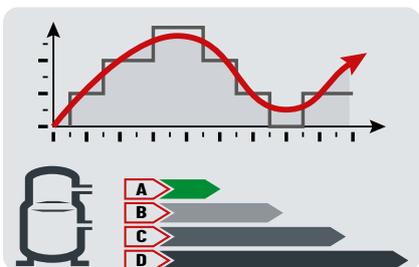
Plate heat exchangers

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.



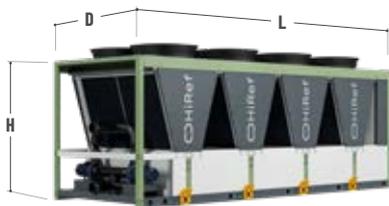
Modulation and redundancy

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

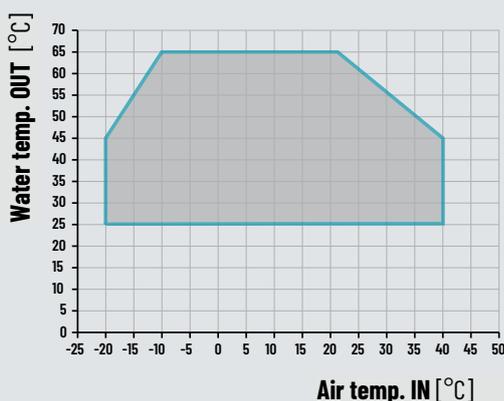
36-176 kW

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



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**.



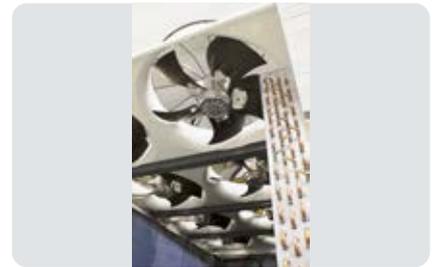
Efficiency and reliability in line with system requirements

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**.



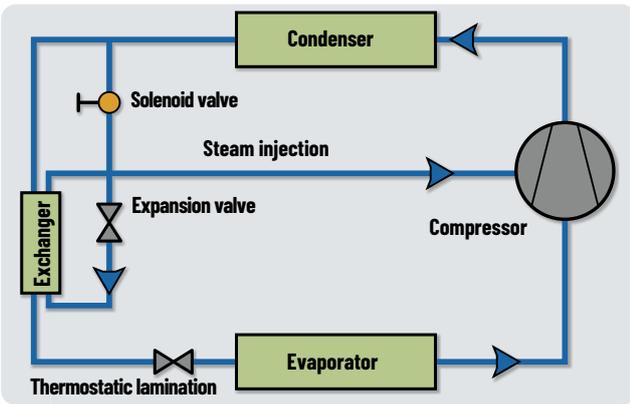
Smart Defrost System

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.



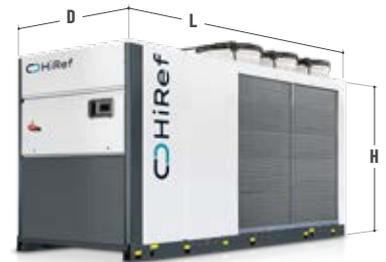
Extra low noise

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

HWC

AIR CONDENSED CHILLERS AND HEAT PUMPS WITH SCROLL COMPRESSORS FOR INDOOR INSTALLATIONS

58-202 kW



 MULTI-PROTOCOL COMMUNICATION INTERFACE	 SCROLL COMPRESSORS	 EC RADIAL FANS
 CORROSION RESISTANT MATERIAL	 PLATE HEAT EXCHANGER	

HWC is the range of air-condensed liquid chillers with Scroll compressors for indoor installations. Three different versions (chiller, Free-Cooling chiller and reversible heat pump) and several power output rates are available. The compact frame makes these units **highly versatile and suited to a wide range of system layouts**. Sizing and selection of individual components seeks to **contain energy consumption, aiming to optimise energy savings not just for individual chillers but for the entire system**. The unit is suitable for installation in equipment rooms and **can be ducted at both intake and delivery ends**. The maximum working head available is 250 Pa. The configurations available for the refrigeration circuit are:

EFFICIENCY PACK 1: Dual compressor and dual circuit unit, for a system with greater redundancy (only for Free-Cooling versions).

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

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

- Refrigerant R410A
- 2 different soundproofing set-ups available: Standard and Low Noise
- Radial EC motor fans
- Electronic expansion valve
- Easy accessibility thanks to the optimisation of the internal space
- Available with single or double pumping kit in timed rotation





Attention to detail and to low noise requirements

Scroll compressors are fitted on rubber feet that dampen vibration and 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.



All accessories on-board the machine

The special component layout, together with compact plate heat exchangers and Scroll compressors, ensures on one hand easier access to carry out maintenance procedures and on the other hand, sufficient internal space available for fitting a wide range of accessories and hydraulic options. The hydraulic circuit may include a dual shut-off pump, flow switch, tank, expansion tank and safety valve.



Maximum efficiency at partial loads

The adoption of a multi-Scroll solution, the use of electronically controlled expansion valves and plate heat exchangers and modulation of the compressors are all key features that make the HWC range particularly efficient at partial loads.



HWC		052CS	062CS	072CS	082CS	092CS	102CS	112CS	132CS	142CS	162CS	182CS	204CS	
Cooling: User water values 12/7°C, 35°C outside air, 40% U.R.														
Cooling capacity	kW	57.7	62	71	78.7	94.5	106.8	119.8	128.2	142	155.5	183	201.5	
Total absorbed power	kW	18.5	23	25	28.7	33.8	39.6	42.6	47.1	55.2	63.8	68.5	82.2	
EER		3.12	2.69	2.84	2.74	2.8	2.7	2.82	2.72	2.57	2.44	2.67	2.45	
SEER		4.38	4.1	4.46	4.38	4.2	4.29	4.36	4.36	4.15	4.21	4.14	4.1	
SEPR		5.29	5.26	5.32	5.33	5.27	5.22	5.42	5.3	5.11	5.05	5.24	5.15	
Sound power [Standard]	dB(A)	82	82	82	83	85	86	86	86	89	90	92	89	
Dimensions [LxHxD]	mm	2000x2020x1100						3090x2020x1100			4090x2104x1100			

Calculated with 20% glycol. Free-Cooling versions always have a refrigerating configuration consisting of one compressor per circuit or a dual tandem arrangement on two circuits | Features referred to the standard set-up. If not available, these features are referred to the Low Noise or Super Low Noise set-ups | Also available with 60 Hz power supply | Data declared with use of R410A refrigerant

TSS

CLASS A CHILLERS AND HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS

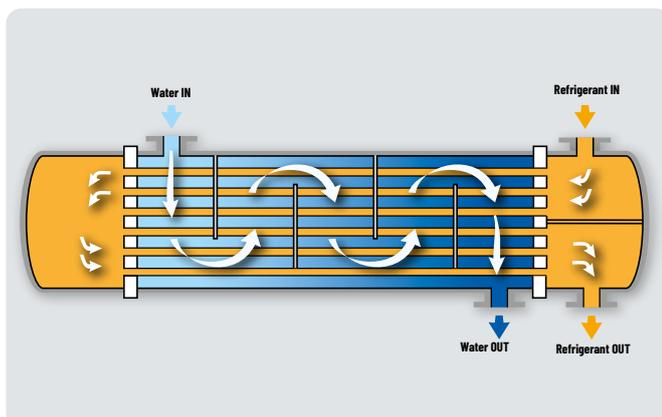
120–265 kW



MULTI-PROTOCOL COMMUNICATION INTERFACE	SCROLL COMPRESSORS	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

TAS

AIR CONDENSED CHILLERS AND HEAT PUMPS WITH SCROLL COMPRESSORS

60-261 kW



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

TAS is the range of air-condensed liquid chillers and heat pumps with Scroll compressors. Three different versions (chiller, Free-Cooling chiller and reversible heat pump) and the several available power output rates make these units **highly versatile and suited to a wide range of system set-ups**. The sizing and selection of individual components have focused on containing energy consumption, aiming to optimise energy savings not just for individual chillers but for the entire system. The unit is suitable for being installed in environments where **noise abatement is fundamentally important**; three different soundproofing set-ups are available. The configurations available for the refrigeration circuit are:

EFFICIENCY PACK 1: Dual compressor dual circuit unit for higher redundancy systems.

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

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

- 3 different soundproofing setups available: Standard, Low Noise and Super Low Noise
- Electronic expansion valve
- Optional EC fans
- Easy accessibility thanks to the optimisation of the internal space
- Available with variable flow pumping kit



Plate heat exchangers

The TAS range uses brazewelded 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.



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.



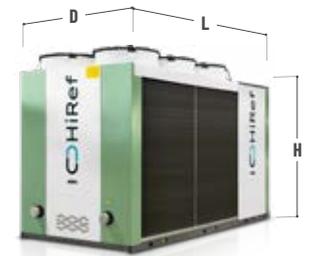
All accessories on-board the machine

The special component layout, together with compact plate heat exchangers and Scroll compressors, allows users on the one hand to make **the most of large sized condensing sections** and on the other hand, to have sufficient Free-Cooling internal space available for fitting **a wide range of accessories and hydraulic options**. The hydraulic circuit may include a dual shut-off pump, flow switch, tank, expansion tank and safety valve.



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 **TAS range particularly efficient at partial loads**.



TAS		061FS	071FS	081FS	101FS	114FS	124FS	144FS	164FS	194FS	214FS	244FS
User water temperature 12/7°C 20% ethylene glycol, outside air 35°C, 40% R.H.												
Cooling capacity	kW	60.4	74.3	87.1	100.8	116.4	124.5	146.8	159.3	184.6	218.6	246.1
Total absorbed power	kW	17	21.5	25.9	30	34.1	36.6	44.3	48.3	56.7	72.1	81.3
EER		3.55	3.45	3.36	3.36	3.42	3.4	3.31	3.3	3.26	3.03	3.03
Full free-cooling temperature	°C	-1.5	-3.2	-5.3	-4.9	-6.5	-4.8	-6.5	-8.1	-5.8	-8.2	-6.5
Cooling: User water values 12/7°C, 35°C outside air, 40% U.R.												
Cooling capacity	kW	61.5	75.5	88.5	102.8	118.2	127	149.6	162.5	187.7	222.6	250.4
Total absorbed power	kW	16.9	21.4	25.6	29.6	33.8	35.9	43.3	47.2	55.9	71	80
EER		3.63	3.53	3.45	3.47	3.5	3.54	3.46	3.44	3.36	3.14	3.13
SEER		4.68	4.82	4.94	4.71	4.87	4.76	4.79	4.91	4.9	4.81	4.76
SEPR		5.33	5.49	5.73	5.45	5.59	5.61	5.65	5.76	5.77	5.61	5.69
Heating: User water values 40/45°C, 7°C outside air, 89% U.R.												
Thermal power	kW	60.3	74.2	85.5	100.7	121.3	127.6	147	159.6	183.2	223.4	260.5
Total absorbed power	kW	18.8	22.7	26.6	31.3	36.4	39.6	45.2	49.8	57.2	69.8	81.5
COP		3.21	3.27	3.21	3.22	3.33	3.23	3.25	3.21	3.2	3.2	3.2
SCOP		3.45	3.83	3.81	3.74	3.7	3.59	3.61	3.67	3.77	3.9	3.93
Sound power [Standard]	dB(A)	81	83	83	86	83	84	86	86	87	88	89
Sound power [Low noise]	dB(A)	78	80	80	83	80	81	83	83	84	85	86
Sound power [Super Low noise]	dB(A)	76	78	78	81	78	80	82	82	84	84	85
Dimensions [LxHxD]	mm	2792x1735x1183			3340 x1735 x1183	3540 x1735 x1183	3540x1846x1653			3540x2330x1653		4206 x2330 x1653

Also available with 60 Hz power supply | Features referred to the standars set-up. If not available, these features are referred to the Low Noise or Super Low Noise set-ups | Data declared with use of R410A refrigerant

MHA

AIR CONDENSED CHILLERS AND HEAT PUMPS WITH SCROLL BLDC INVERTER COMPRESSORS

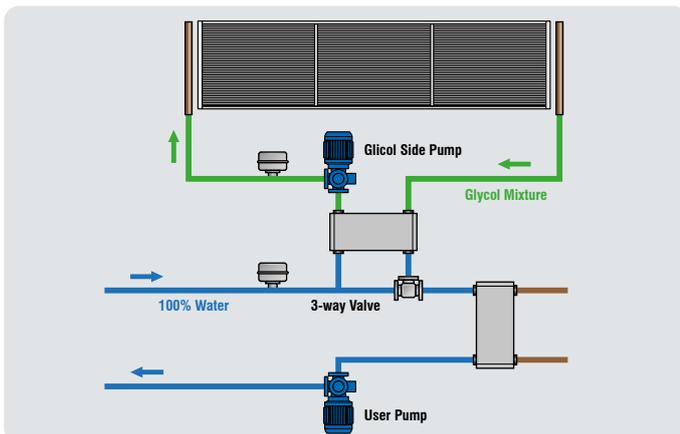
30-288 kW



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

MHA is the HiRef range of air condensed liquid chillers and heat pumps that uses a combination of Scroll ON/OFF compressors and modulating BLDC (Brushless DC-inverter) compressors. **Thanks to timely control of the supplied refrigerating power, based on the achievement of maximum system delivery or energy efficiency, the running costs of the system are minimised.** The excellent configurability of the range in terms of refrigerating circuit, noise levels and available power ratings, together with the numerous accessories and options, make MHA chillers **highly versatile and suitable for a wide range of system applications.**

- Available refrigerants: R410A and R454B
- Electronic expansion valve
- Available in version: Liquid chiller, Free-Cooling chiller and reversible heat pump
- Variable flow management up to 25% of the nominal flow rate
- Quick water connections
- Optional electronic flow switch



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.**



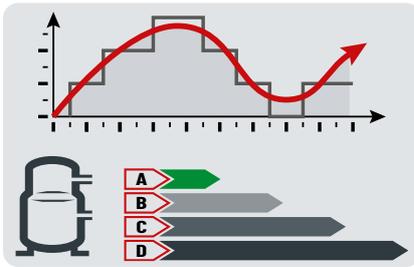
Attention to detail and to low noise requirements

Depending on how important noise containment is in the overall plant layout, a standard version or a **Low Noise version** can be chosen. Adopted technical solutions include fan speed control, the use of anti-vibration devices on the refrigerating circuit, compartmentalisation of compressors and pumping kits in a box internally lined with soundproofing material (**the new HI-BOX by HiRef**).



Advantages of modulation

DC-inverter compressors are frequency modulated: from an electrical viewpoint, **this significantly reduces inrush current**.



Dual management of the delivered power

The control software integrated on the MHA range allows management of the cooling capacity, delivered by the Scroll ON/OFF compressors combined with BLDC modulating compressors, according to a dual logic:

- **Maximum power:** the compressors are driven by the inverters at maximum frequency to quickly reach set-point conditions.
- **Maximum efficiency:** the software calculates the point of highest machine efficiency to minimise running costs. This function is particularly effective in the Free-Cooling versions.

Maximum efficiency at partial loads

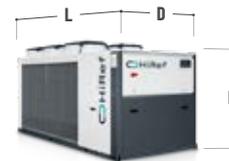
The high precision of the hot-wire flow switch (up to 1/10 of the nominal flow rate), combined with pump modulation via the control software, **allows an ideal combination of machine delivery and water flow rate in the primary circuit. This optimises the water flow** required at each operating point and **reduces the power absorbed by the hydraulic module**, preventing the risk of ice formation in the evaporator.



Efficiency and reliability in line with system requirements

Users can select, according to unit size and specific plant engineering requirements, refrigerating circuits with different set-ups:

- 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:** Three compressors (trio) on single circuit for higher efficiency at partial loads.
- EFFICIENCY PACK 4:** Four compressors (dual tandem) on dual circuit, for a redundant system that is also efficient with low loads.



MHA	030	035	061	062	081	082	101	102	104	121	122	124	141	142	144	171	172	174	204	244	294	
Utility water temperature 12/7°C, ethylene glycol 20%																						
Full free-cooling temperature	°C	1.6	-1.1	2.2	-	0.6	-	-0.3	-	-0.8	0.6	-	0.5	1.2	-	0.6	0.4	-	-0.4	-0.1	0.1	-1.2
Cooling: User water values 12/7°C, 35°C outside air, 40% U.R.																						
Cooling capacity	kW	30.2	40.3	57.8	57.7	75.7	76.4	98.2	98.9	102.4	124.9	127.3	126.6	146.1	147.4	155.7	156.3	156.7	170.4	200.9	252.8	278.6
Total absorbed power	kW	11.3	14.9	18.9	18.8	24.4	24.4	34.2	34.1	37.5	44	43.2	43.4	48.6	48.4	52.3	52.3	52.2	58.7	72.7	86.9	99.4
EER		2.68	2.7	3.07	3.07	3.1	3.13	2.87	2.9	2.73	2.84	2.95	2.91	3.01	3.04	2.98	2.99	3	2.9	2.76	2.91	2.8
SEER		4.5	4.57	4.39	5.17	4.43	5.23	4.18	4.88	4.48	4.28	5.19	4.71	4.27	5.03	4.5	4.19	4.95	4.44	4.55	4.68	4.62
SEPR		5.08	5	6.14	6.08	6.31	6.39	5.62	5.58	5.31	5.7	5.79	5.61	5.9	5.97	5.27	5.75	5.86	5.3	5.35	5.69	5.69
Weight	kg	418	424	600	600	789	789	789	789	789	1085	1085	1085	1390	1390	1390	1430	1430	1470	1620	1943	1985
Heating: User water values 40/45°C, 7°C outside air, 89% U.R.																						
Thermal power	kW	31.7	42.2	-	57.5	-	75.9	-	100.8	106.8	-	133.6	133.5	-	149.8	159	-	160.5	178.1	210.1	257	287.6
Total absorbed power	kW	11.7	15.7	-	19.9	-	26	-	35	38.1	-	45.1	45.7	-	51.8	55.5	-	55.6	61.4	74	89.4	100.4
COP		2.7	2.69	-	2.88	-	2.92	-	2.88	2.8	-	2.96	2.92	-	2.89	2.86	-	2.89	2.9	2.84	2.88	2.86
SCOP		3.28	3.32	-	3.2	-	3.21	-	3.34	3.32	-	3.36	3.22	-	3.22	3.21	-	3.2	3.2	3.36	3.27	3.31
Weight	kg	423	430	-	600	-	789	-	789	789	-	1085	1085	-	1390	1390	-	1430	1495	1655	1980	2025
Sound power [Standard]	dB(A)	87	92	87	87	88	88	90	90	90	94	94	88	94	94	90	94	94	90	94	94	94
Sound power [Low noise]	dB(A)	85	90	83	83	86	84	86	86	86	90	90	84	90	90	86	90	90	86	90	90	90
Dimensions [LxHxD]	mm		1661 x1468 x914	2440 x1735 x1185		2972x1735x1185				3540x1735x1185					3540x1847x1653				3538 x2247 x1653	4206 x2247 x1653		

Also available with 60 Hz power supply

TPS

AIR CONDENSED CHILLERS AND HEAT PUMPS WITH SCROLL COMPRESSORS

43-445 kW



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

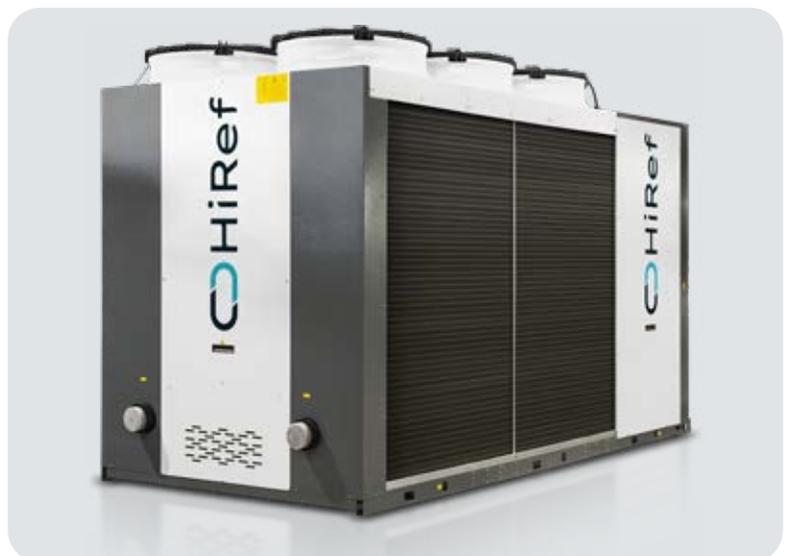
TPS is the range of air-condensed liquid chillers and heat pumps with Scroll compressors. Three different versions (chiller, Free-Cooling chiller and reversible heat pump) and the several available power output rates make these units **highly versatile and suited to a wide range of system set-ups**. The sizing and selection of individual components have focused **on containing energy consumption, aiming to optimise energy savings not just for individual chillers but for the entire system**. The unit is available with **three soundproofing set-ups**. The configurations available for the refrigeration circuit are:

EFFICIENCY PACK 1: Dual compressor dual circuit unit for higher redundancy systems.

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

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

- 3 different soundproofing setups available: Standard, Low Noise and Super Low Noise
- Optional EC fans
- Electronic expansion valve
- Easy accessibility thanks to the optimisation of the internal space
- Available with variable flow pumping kit





Acoustic comfort

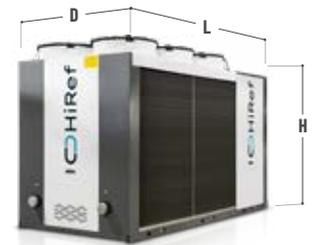
Three different soundproofing set-ups are available: the most suitable one will depend on the importance of noise containment in the overall plant layout. Adopted technical solutions include fan speed control, the use of anti-vibration devices on the refrigerating circuit, compartmentalisation of compressors and pumping kits in a box internally lined with soundproofing material.

All accessories on-board the machine

The special component layout, together with compact plate heat exchangers and Scroll compressors, allows users on the one hand to make **the most of large sized condensing sections** and on the other hand, to have sufficient Free-Cooling internal space available for fitting **a wide range of accessories and hydraulic options**. The hydraulic circuit may include a dual shut-off pump, flow switch, tank, expansion tank and safety valve.

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 TPS range particularly efficient at partial loads**.



TPS		042	052	062	072	082	092	102	122	124	142	144	162	164	
Cooling: User water values 12/7°C, 35°C outside air, 40% U.R.															
Cooling capacity	kW	43.2	54.4	63.1	70.9	78.5	94.4	105.6	122.4	125.3	133.7	141.4	160.5	156.2	
Total absorbed power	kW	13.1	18.3	20.7	24.3	28.1	32.6	38.5	40.8	42.1	43.9	48.3	59.2	55.9	
EER		3.31	2.98	3.05	2.91	2.79	2.9	2.74	3	2.98	3.04	2.93	2.71	2.79	
SEER		4.98	4.9	4.63	4.58	4.52	4.35	4.39	4.54	4.53	4.71	4.61	4.34	4.54	
SEPR		5.69	5.72	5.3	5.38	5.38	5.31	5.22	5.35	5.32	5.41	5.38	5.13	5.38	
Weight	kg	525	525	540	570	650	730	730	1010	1050	1055	1070	1085	1220	
Heating: User water values 40/45°C, 7°C outside air, 89% U.R.															
Thermal power	kW	50.7	57.1	64.2	72.6	80.8	96	108.7	124	126.9	142.4	151.8	175.8	169.6	
Total absorbed power	kW	16.8	19.1	22.3	25.1	28.3	33.8	38.6	42.8	44	46.9	51.2	58.7	56.8	
COP		3.02	2.99	2.87	2.89	2.86	2.85	2.82	2.9	2.89	3.03	2.97	3	2.99	
SCOP		3.99	3.99	3.66	3.73	3.71	3.58	3.66	3.68	3.54	3.69	3.58	3.68	3.68	
Weight	kg	545	545	585	585	675	755	760	1050	1090	1100	1120	1155	1270	
Sound power [Standard]	dB(A)	72	73	79	80	82	85	86	86	82	86	83	87	85	
Dimensions [LxHxD]	mm	2090x1740x1180					2640x1740x1180			x1740 x1180	x1740 x1180	x1740 x1180	x1740 x1180	x1740 x1180	x1740 x1180
TPS		174	192	194	212	214	242	244	272	274	294	324	364	394	
Cooling: User water values 12/7°C, 35°C outside air, 40% U.R.															
Cooling capacity	kW	166.2	189.1	188.4	207.6	211.2	230.1	232	267.2	266	293.2	317.5	352	397.6	
Total absorbed power	kW	54.2	65.4	65.4	73.9	77.5	82.8	85.2	90.3	89.5	104.9	120.5	136.9	153.8	
EER		3.06	2.89	2.88	2.81	2.72	2.78	2.72	2.96	2.97	2.79	2.63	2.57	2.59	
SEER		4.62	4.31	4.28	4.37	4.32	4.27	4.31	4.61	4.6	4.25	4.23	4.15	4.28	
SEPR		5.43	5.18	5.32	5.13	5.19	5.32	5.4	5.42	5.51	5.29	5.1	5.21	5.22	
Weight	kg	1440	1430	1460	1430	1470	1620	1620	1943	1943	1975	2010	2060	3090	
Heating: User water values 40/45°C, 7°C outside air, 89% U.R.															
Thermal power	kW	172.8	199.6	199.3	220.4	226.2	243.7	247.4	275.7	278	311	342.1	395.8	444.7	
Total absorbed power	kW	59	68.9	69.5	75.4	79.1	82.8	85.5	91.4	93	105.7	118.5	132.7	147.5	
COP		2.93	2.9	2.87	2.92	2.86	2.94	2.89	3.02	2.99	2.94	2.89	2.98	3.01	
SCOP		3.32	3.49	3.41	3.55	3.49	3.66	3.62	3.66	3.54	3.5	3.54	3.62	3.56	
Weight	kg	1495	1485	1515	1485	1530	1690	1690	2015	2015	2050	2101	2191	3190	
Sound power [Standard]	dB(A)	86	92	87	92	89	94	89	89	94	93	95	94	97	
Dimensions [LxHxD]	mm	3540x1847x1653					3540x2247x1653			4200x2330x1653			4296 x2330 x1653	5350 x2330 x1653	

Also available with 60 Hz power supply | Calculated with 20% glycol. The Free-Cooling versions always feature a refrigeration configuration consisting of one compressor per circuit or dual tandem on two circuits | Features referred to the standard set-up. If not available, they refer to the Low Noise or Quiet set-up | Data declared with use of R410A refrigerant

TSL

CLASS A CHILLERS AND HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS

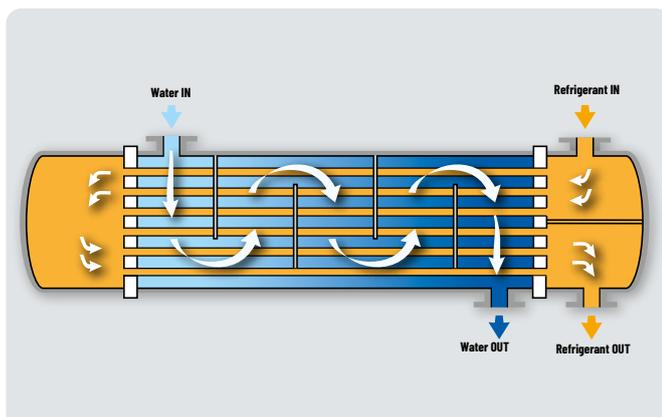
277-1004 kW



 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			11085x2652x2256		

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 reached while 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

TAL		294CS	324CS	374CS	404CS	454CS	496CS	556CS	596CS	636CS	676CS	748CS	808CS	868CS	900CS	1072CS	
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	789.6	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

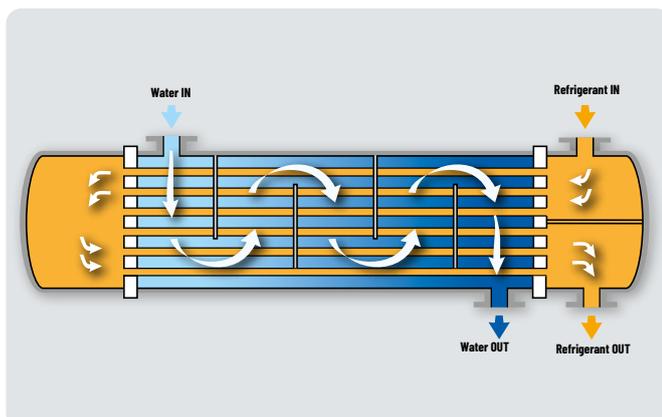
329-867 kW

 MULTI-PROTOCOL COMMUNICATION INTERFACE	 SCROLL COMPRESSORS	 A2L READY
 LOW GWP REFRIGERANT	 SHELL AND TUBE HEAT EXCHANGER	 CLASS A



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-Tauclic-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

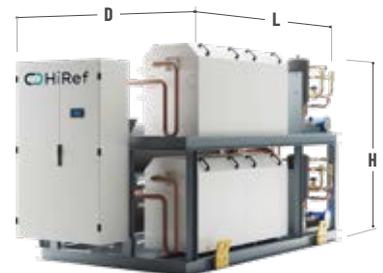
Accurate selection of the components allows **high efficiency to be obtained at partial loads**; this is thanks above all to the use of Scroll compressors and to the use of electronically controlled electric expansion valves (one for each circuit), **optimised to track refrigerant load trends in all 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	294.2	328.9	376.3	423.5	471.7	523.6	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

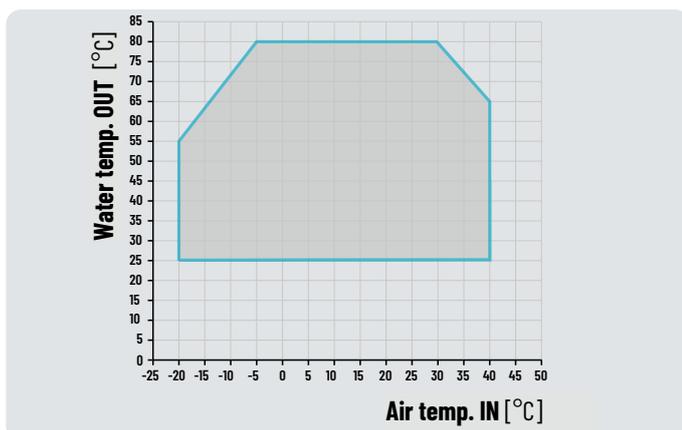
60-162 kW



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**.

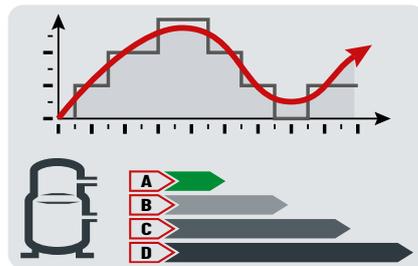
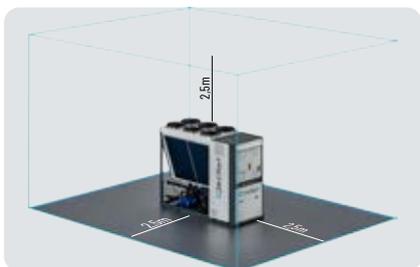


Plate heat exchangers

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

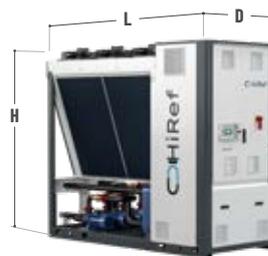
A factor that heavily weighs on the costs of managing the entire plant is finned coil defrosting during wintertime operation. The special management of the defrosting cycle of **NPA units minimises the time to completion and ensures that defrosting is only performed when strictly necessary, guaranteeing 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

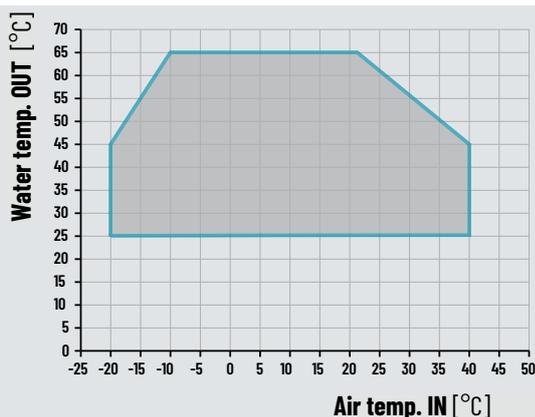
39–248 kW



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

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 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** 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**.



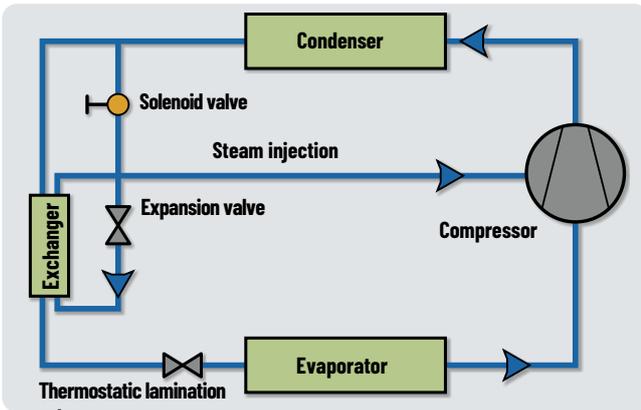
Extra low noise

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

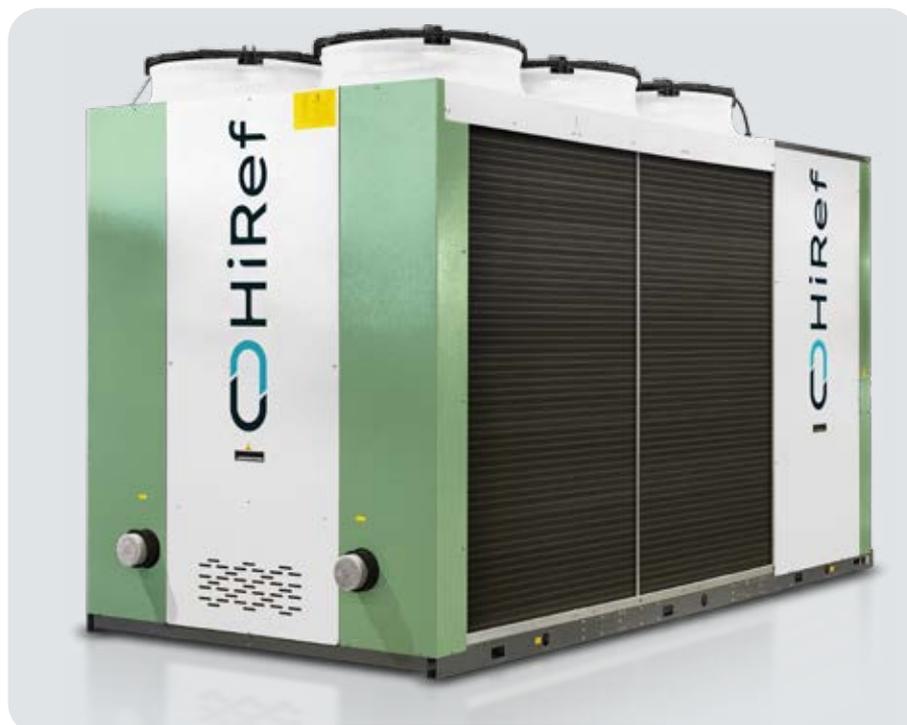




Plate heat exchangers

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		4206x2330x1653

Also available with 60 Hz power supply

MSL

MULTIPURPOSE CLASS A HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS

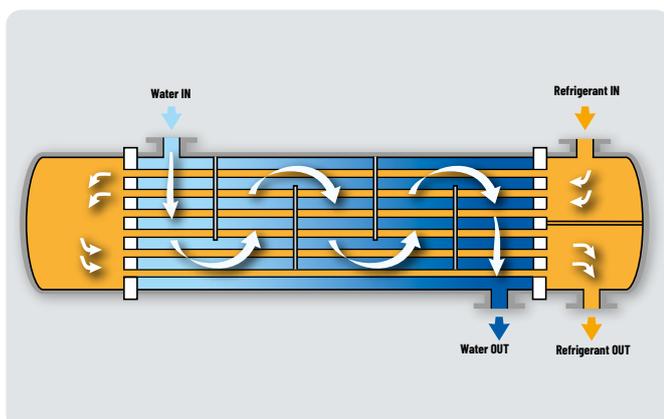
279-1425 kW



 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			11085x2680x2256	12930x2680x2256

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

HWP

MULTIPURPOSE AIR CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS FOR INDOOR INSTALLATIONS

34-184 kW



 MULTI-PROTOCOL COMMUNICATION INTERFACE	 SCROLL COMPRESSORS	 EC RADIAL FANS
 CORROSION RESISTANT MATERIAL	 PLATE HEAT EXCHANGER	

HWP units are multifunctional air/water systems for indoor installations with Scroll compressors. Sizing and selection of individual components seeks to **contain energy consumption, aiming to optimise energy savings not just for individual chillers but for the entire system**. The unit is suitable for installation in equipment rooms and can be **ducted at both intake and delivery ends**. The maximum working head available is 250 Pa. The configurations available for the refrigeration circuit are:

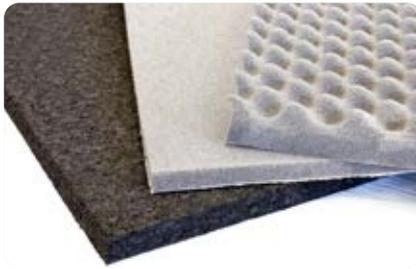
EFFICIENCY PACK 1: Dual compressor and dual circuit unit, for a system with greater redundancy (only for free-cooling versions).

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

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

- Refrigerant R410A
- 2 different soundproofing set-ups available: Standard and Low Noise
- Radial EC motor fans
- Electronic expansion valve
- Easy accessibility thanks to the optimisation of the internal space
- Available with single or double pumping kit in timed rotation
- Available versions: multi-purpose for 2-pipe system (M) and multi-purpose for 4-pipe system (P)





Attention to detail and to low noise requirements

Scroll compressors are fitted on rubber feet that dampen vibration and 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.



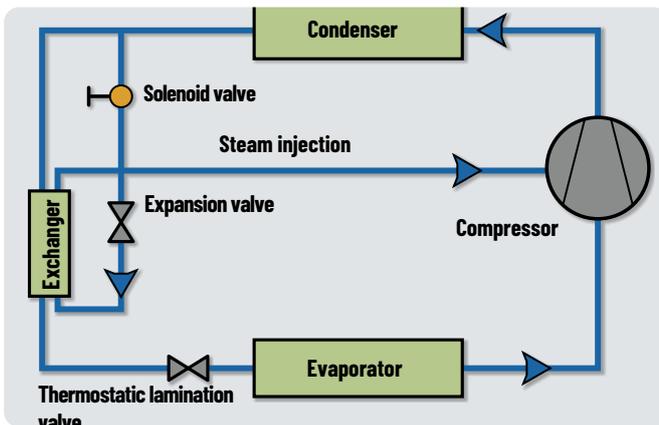
All accessories on-board the machine

The special component layout, together with compact plate heat exchangers and Scroll compressors, ensures on one hand easier access to carry out maintenance procedures and on the other hand, sufficient internal space available for fitting a wide range of accessories and hydraulic options. The hydraulic circuit may include a dual shut-off pump, flow switch, tank, expansion tank and safety valve.



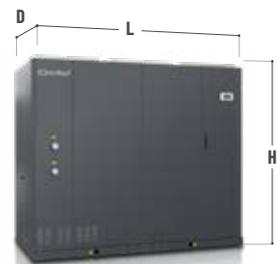
Maximum efficiency at partial loads

The adoption of a multi-Scroll solution, the use of electronically controlled expansion valves and plate heat exchangers and modulation of the compressors are all key features that make the HWP range particularly efficient at partial loads.



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

The Scroll compressors of the HWP 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.



HWP		030PS	052PS	062PS	072PS	092PS	114PS	124PS	144PS	194PS
Cooling: User water values 12/7°C, 35°C outside air, 40% U.R.										
Cooling capacity	kW	34.2	55.1	63.4	74.1	84	114.5	132	147.8	168.3
Total absorbed power	kW	11	19	23.5	25.2	28.1	35.2	42.2	50.7	57
EER		3.1	2.9	2.6	2.9	2.9	3.2	3.1	2.9	2.9
Heating: User water values 40/45°C, 7°C outside air, 89% U.R.										
Thermal power	kW	36	58.2	67.8	82	91.3	123.1	145.6	164.3	183.6
Total absorbed power	kW	11.6	18.3	21.7	25.5	27.5	37.7	44.2	49.5	53
COP		3	3.1	3.1	3.2	3.3	3.2	3.2	3.3	3.4
SCOP		3,6	4	4	3,7	3,8	4	4	4	4,2
Sound power [Standard]	dB(A)	81	82	82	83	82	84	84	84	84
Dimensions [LxHxD]	mm	2000x2020x1100			2400x2020x1100			4090x2104x1100		

Data declared with use of R410A refrigerant | Features referred to the standard set-up. If not available, these features are referred to the Low Noise or Super Low Noise set-ups | Also available with 60 Hz power supply

MSW

MULTIPURPOSE WATER-CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS

42-549 kW



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

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-Taubic-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		

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						3130x1990x877					

Also available with 60 Hz power supply

PSW

MULTIPURPOSE WATER-CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS

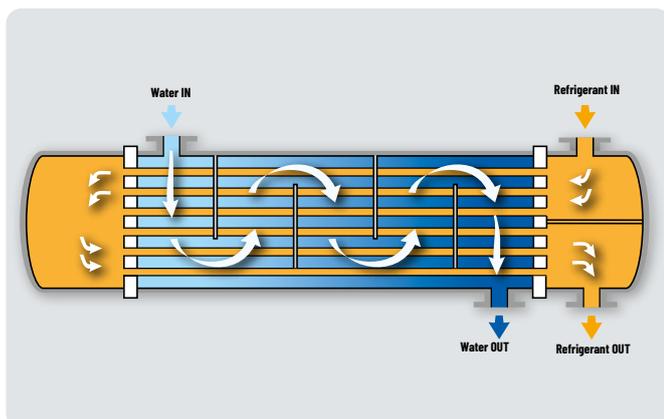
294-867 kW



<p>MULTI-PROTOCOL COMMUNICATION INTERFACE</p>	<p>SCROLL COMPRESSORS</p>	<p>A2L READY</p>
<p>LOW GWP REFRIGERANT</p>	<p>SHELL AND TUBE HEAT EXCHANGER</p>	<p>CLASS A</p>

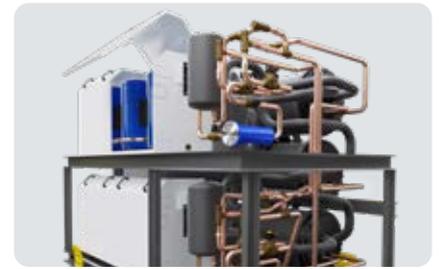
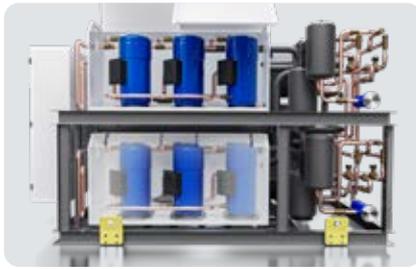
PSW multi-function units are used to produce hot and cold water, **both independently and simultaneously**, to meet the cooling and heating needs of both industrial and commercial applications. PSW units are ideally suited for **use in 4-pipe systems**. All units are available with two refrigerant circuits 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-Taucic-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

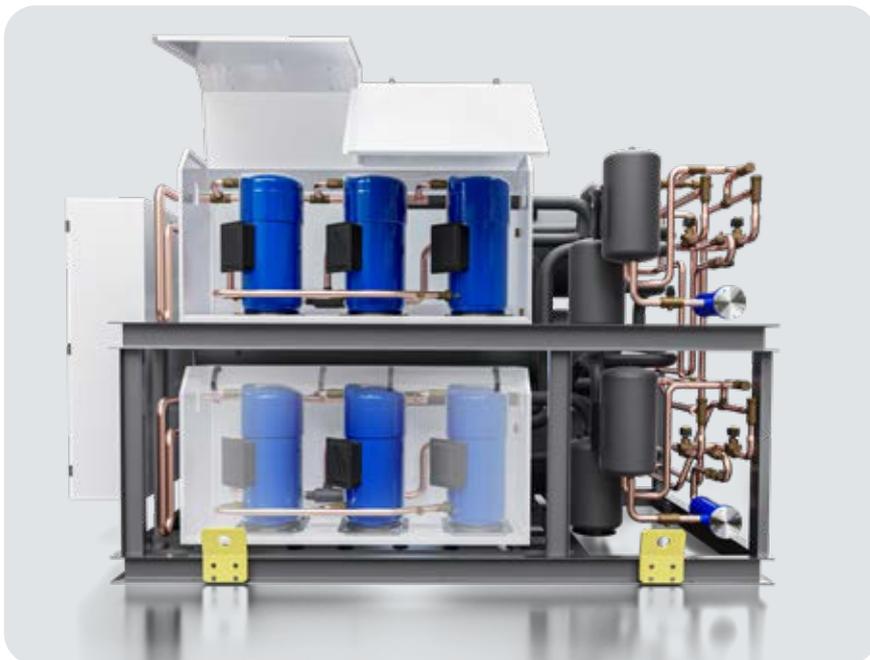
Accurate selection of the components allows **high efficiency to be obtained at partial loads**; this is thanks above all to the use of Scroll compressors and to the use of electronically controlled electric expansion valves (one for each circuit), **optimised to track refrigerant load trends in all 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

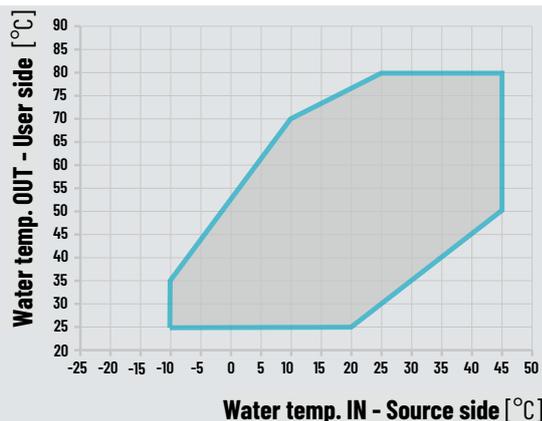
38-590 kW



 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-Taubic-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**.



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.

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**.



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					

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

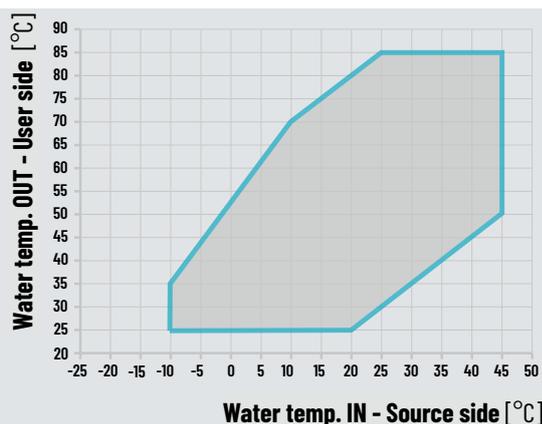
228-604 kW



 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-Taucic-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.**



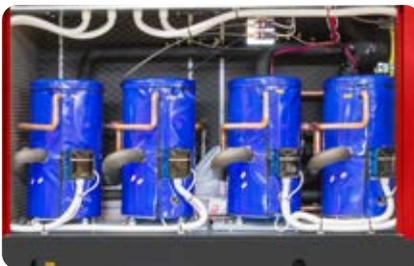
Maximum efficiency at partial loads

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

SUPERVISION

INDUSTRIALE

HiNode

ADVANCED TECHNOLOGY
AND FLEXIBILITY TO MANAGE
AIR CONDITIONING AND PROCESS COOLING



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

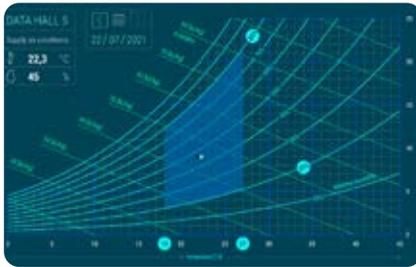
Equipped with digital and analogue inputs and outputs to control the devices present (pumps, valves, etc.) and to acquire and record temperature, pressure, etc. values.

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.



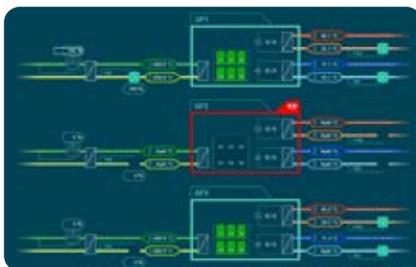
User flexibility

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 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.



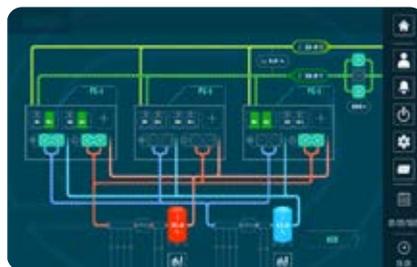
Operation logic

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.



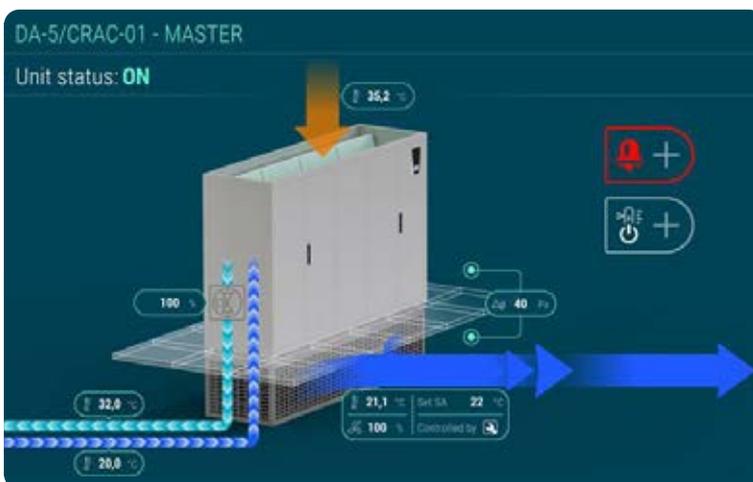
Controlled devices and functions: on/off and modulating distribution pump management

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
BUILDINGS

 **HiRef**

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