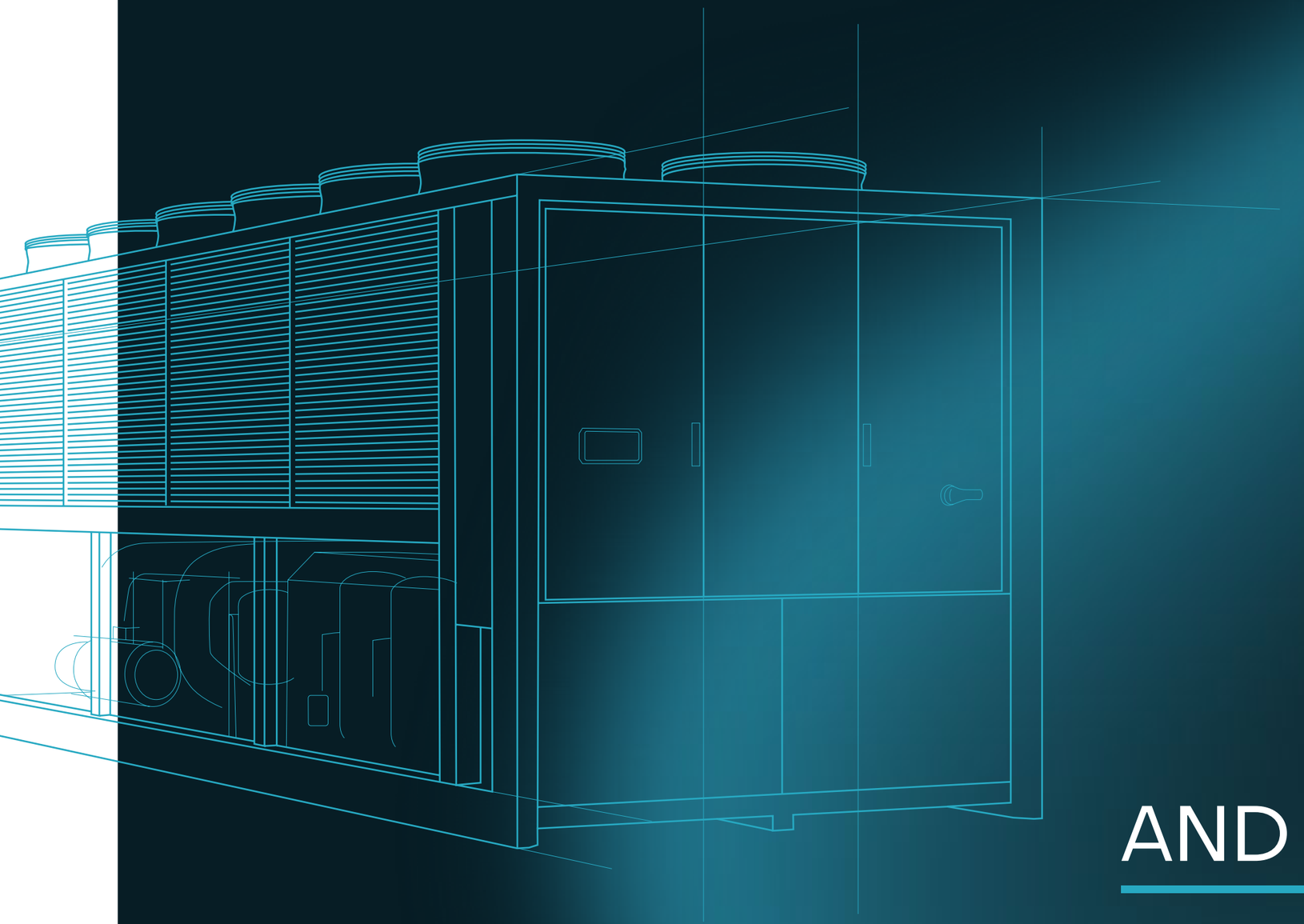
HiRef



CATALOGUE

CHILLERS AND HEAT PUMPS

AIR/WATER

Liquid chillers

	APPLICATION	VERSIONS	REFRIGERANT	RANGE	
 **PCC** — AIR CONDENSED CHILLERS FOR INDUSTRIAL PROCESSES	INDUSTRIAL		R-410A R-454B	6 - 140* (kW)	PAGE 7
 **TSE** — CHILLERS WITH REMOTE CONDENSER WITH SCROLL COMPRESSORS	DATA CENTER SERVICES	ME	R-410A R-454B	46 - 638* (kW)	PAGE 8
 **CDA** — CHILLERS WITH NATURAL REFRIGERANT R744 (CO_2) AIR COOLED AND WITH MODULATING COMPRESSORS - COOLING ONLY VERSION	DATA CENTER INDUSTRIAL SERVICES		R-744	96 - 492* (kW)	PAGE 9
 **CDA-F** — CHILLERS WITH NATURAL REFRIGERANT R744 (CO_2) AIR COOLED AND WITH MODULATING COMPRESSORS - FREE-COOLING VERSION	DATA CENTER INDUSTRIAL SERVICES		R-744	96 - 492* (kW)	PAGE 10
 **TVA** — AIR CONDENSED CHILLERS WITH INVERTER DRIVEN SCREW COMPRESSORS	DATA CENTER INDUSTRIAL SERVICES		R-134a R-1234ze R-513A	341 - 1282* (kW)	PAGE 11
 **TTX** — AIR CONDENSED CHILLERS WITH OIL-FREE CENTRIFUGAL COMPRESSORS	DATA CENTER INDUSTRIAL SERVICES		R-134a R-1234ze	281 - 1057* (kW)	PAGE 12
 **HCB** — AIR CONDENSED CHILLERS WITH INVERTER DRIVEN SCREW COMPRESSORS - COOLING ONLY VERSION	DATA CENTER INDUSTRIAL SERVICES		R-134a R-1234ze	369 - 1200* (kW)	PAGE 13
 **HCB-F** — AIR CONDENSED CHILLERS WITH INVERTER DRIVEN SCREW COMPRESSORS - FREE-COOLING VERSION	DATA CENTER INDUSTRIAL SERVICES		R-134a R-1234ze	300 - 1200* (kW)	PAGE 14

AIR/WATER

Reversible heat pumps

	APPLICATION	VERSIONS	REFRIGERANT	RANGE	
 **HPS** — REVERSIBLE AND MULTI-PURPOSE AIR CONDENSED HEAT PUMPS FOR LOW OUTDOOR TEMPERATURES	INDUSTRIAL SERVICES		R-410A	45 - 213** (kW)	PAGE 16
 **HWC** — INDOOR CHILLERS AND HEAT PUMPS WITH CENTRIFUGAL FANS	INDUSTRIAL SERVICES		R-410A	56 - 230* (kW)	PAGE 17
 **TSS** — CLASS A AIR CONDENSED CHILLERS AND HEAT PUMPS WITH SCROLL COMPRESSORS	DATA CENTER INDUSTRIAL SERVICES		R-410A R-454B	116 - 219* (kW)	PAGE 18
 **TAS** — AIR CONDENSED CHILLERS AND HEAT PUMPS WITH SCROLL COMPRESSORS	DATA CENTER INDUSTRIAL SERVICES		R-410A R-454B	116 - 219* (kW)	PAGE 19
 **MHA** — AIR CONDENSED CHILLERS AND HEAT PUMPS WITH SCROLL BLDC INVERTER COMPRESSORS	DATA CENTER INDUSTRIAL SERVICES		R-410A	22 - 207* (kW)	PAGE 20
 **TPS** — AIR CONDENSED CHILLERS AND HEAT PUMPS WITH SCROLL COMPRESSORS	DATA CENTER INDUSTRIAL SERVICES		R-410A R-454B	49 - 396* (kW)	PAGE 21

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

* User side: In/Out water T 16/10 °C, source side: outdoor air 35 °C (air/water), In/Out water T 30/35 °C (water/water)
** User side: In/Out water T 40/45 °C, source side: outdoor air 7 °C
*** User side: In/Out water T 70/80 °C, source side: In/Out water T 45/40 °C
**** 200 m³/h corresponding to 1.4 MW with ΔT = 6 K

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

AIR/WATER

Reversible heat pumps

TSL

APPLICATION: DATA CENTER, INDUSTRIAL, SERVICES
VERSIONS: Heating Only, Cooling Only, Reversible Heat Pump, Free-Cooling
REFRIGERANT: R-410A, R-454B
RANGE: 307 - 1006* (kW)
PAGE 22

CLASS A AIR CONDENSED CHILLERS AND HEAT PUMPS WITH SCROLL COMPRESSORS

TAL

APPLICATION: DATA CENTER, INDUSTRIAL, SERVICES
VERSIONS: Heating Only, Cooling Only, Reversible Heat Pump, Free-Cooling
REFRIGERANT: R-410A, R-454B
RANGE: 286 - 1164* (kW)
PAGE 23

CLASS A AIR CONDENSED CHILLERS AND HEAT PUMPS WITH SCROLL COMPRESSORS

TPL

APPLICATION: DATA CENTER, INDUSTRIAL, SERVICES
VERSIONS: Heating Only, Cooling Only, Reversible Heat Pump, Free-Cooling
REFRIGERANT: R-410A, R-454B
RANGE: 373 - 1115* kW
PAGE 24

CLASS A AIR CONDENSED CHILLERS AND HEAT PUMPS WITH SCROLL COMPRESSORS

AIR/WATER

Multipurpose

MPS

APPLICATION: INDUSTRIAL, SERVICES
VERSIONS: Polyvalent for 2-pipe system, Polyvalent for 4-pipe system
REFRIGERANT: R-410A
RANGE: 45 - 213** (kW)
PAGE 26

REVERSIBLE AND MULTI-PURPOSE AIR CONDENSED HEAT PUMPS FOR COLD CLIMATES

MPA

APPLICATION: DATA CENTER, INDUSTRIAL, SERVICES
VERSIONS: Polyvalent for 2-pipe system, Polyvalent for 4-pipe system
REFRIGERANT: R-410A, R-454B
RANGE: 51 - 250* (kW)
PAGE 27

CLASS A MULTIPURPOSE AIR-CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS

MSL

APPLICATION: DATA CENTER, INDUSTRIAL, SERVICES
VERSIONS: Polyvalent for 4-pipe system
REFRIGERANT: R-410A, R-454B
RANGE: 281 - 1146* (kW)
PAGE 28

CLASS A MULTIPURPOSE AIR-CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS

MLA

APPLICATION: DATA CENTER, INDUSTRIAL, SERVICES
VERSIONS: Polyvalent for 2-pipe system, Polyvalent for 4-pipe system
REFRIGERANT: R-410A, R-454B
RANGE: 288 - 1125* (kW)
PAGE 29

CLASS A MULTIPURPOSE AIR-CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS

HWP

APPLICATION: INDUSTRIAL, SERVICES
VERSIONS: Polyvalent for 2-pipe system, Polyvalent for 4-pipe system
REFRIGERANT: R-410A
RANGE: 56 - 230* (kW)
PAGE 30

INDOOR CHILLERS AND HEAT PUMPS WITH CENTRIFUGAL FANS

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

* User side: In/Out water T 16/10 °C, source side: outdoor air 35 °C (air/water), In/Out water T 30/35 °C (water/water)
** User side: In/Out water T 40/45 °C, source side: outdoor air 7 °C
*** User side: In/Out water T 70/80 °C, source side: In/Out water T 45/40 °C
**** 200 m³/h corresponding to 1.4 MW with ΔT = 6 K

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

WATER/WATER

Liquid chillers

XTW

APPLICATION: DATA CENTER, INDUSTRIAL, SERVICES
VERSIONS: Heating Only
REFRIGERANT: R-134a, R-1234ze
RANGE: 122 - 916* (kW)

WATER CONDENSED CHILLERS WITH OIL-FREE CENTRIFUGAL COMPRESSORS

PAGE 32

XVA

APPLICATION: DATA CENTER, INDUSTRIAL, SERVICES
VERSIONS: Heating Only, Free-Cooling
REFRIGERANT: R-134a, R-1234ze, R-513A, R515B
RANGE: 523 - 1587* (kW)

WATER CONDENSED CHILLERS AND HEAT PUMPS WITH INVERTER DRIVEN SCREW COMPRESSORS

PAGE 33

Split version with remote condenser available

Reversible heat pumps

XSA

APPLICATION: DATA CENTER, INDUSTRIAL, SERVICES
VERSIONS: Heating Only, Cooling Only, Reversible Heat Pump
REFRIGERANT: R-410A, R-454B
RANGE: 63 - 476* (kW)

WATER CONDENSED CHILLERS AND HEAT PUMPS WITH SCROLL COMPRESSORS

PAGE 35

RSW

APPLICATION: DATA CENTER, INDUSTRIAL, SERVICES
VERSIONS: Heating Only, Cooling Only, Reversible Heat Pump
REFRIGERANT: R-410A, R-454B
RANGE: 329 - 692* (kW)

MULTIPURPOSE WATER-CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS

PAGE 36

XSW

APPLICATION: DATA CENTER, INDUSTRIAL, SERVICES
VERSIONS: Heating Only, Cooling Only, Reversible Heat Pump
REFRIGERANT: R-410A, R-454B
RANGE: 39 - 626* (kW)

WATER CONDENSED CHILLERS AND HEAT PUMPS WITH SCROLL COMPRESSORS

PAGE 37

WATER/WATER

Multipurpose

KSW P

APPLICATION: INDUSTRIAL, SERVICES
VERSIONS: Polyvalent for 2-pipe system, Polyvalent for 4-pipe system
REFRIGERANT: R-134a
RANGE: 19 - 275* (kW)

MULTI-PURPOSE WATER COOLED HEAT PUMPS FOR HIGH TEMPERATURES, USER SIDE AND SOURCE SIDE

PAGE 39

MSW

APPLICATION: DATA CENTER, INDUSTRIAL, SERVICES
VERSIONS: Polyvalent for 2-pipe system, Polyvalent for 4-pipe system
REFRIGERANT: R-410A, R-454B
RANGE: 50 - 472* (kW)

MULTIPURPOSE WATER-CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS

PAGE 40

PSW

APPLICATION: DATA CENTER, INDUSTRIAL, SERVICES
VERSIONS: Polyvalent for 4-pipe system
REFRIGERANT: R-410A, R-454B
RANGE: 329 - 692* (kW)

MULTIPURPOSE WATER-CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS

PAGE 41

Heating only heat pumps

KSW

APPLICATION: INDUSTRIAL, SERVICES
VERSIONS: Cooling Only
REFRIGERANT: R-134a
RANGE: 50 - 472*** (kW)

WATER/WATER HEAT PUMPS FOR HIGH EVAPORATION AND CONDENSATION TEMPERATURES

PAGE 43

KVW

APPLICATION: INDUSTRIAL
VERSIONS: Cooling Only
REFRIGERANT: R-1234ze, R515B
RANGE: 500* 1000* 2000* (kW)

HIGH TEMPERATURE HEAT PUMPS WITH TWO-STAGE COMPRESSORS

PAGE 44

Hydraulic modules

PLM

APPLICATION: DATA CENTER, INDUSTRIAL, SERVICES
VERSIONS: Polyvalent for 2-pipe system, Polyvalent for 4-pipe system, Free-Cooling

POLYMORPH HYDRONIC MODULES FOR WATER/WATER CHILLER SYSTEMS

PAGE 46

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

* User side: In/Out water T 16/10 °C, source side: outdoor air 35 °C (air/water), In/Out water T 30/35 °C (water/water)
** User side: In/Out water T 40/45 °C, source side: outdoor air 7 °C
*** User side: In/Out water T 70/80 °C, source side: In/Out water T 45/40 °C
**** 200 m³/h corresponding to 1.4 MW with ΔT = 6 K

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

TECHNOLOGIES

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.

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.

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.

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.

A2L Ready - Low environmental impact refrigerants

Some ranges of liquid chillers, in addition to safety class A1 refrigerants R410A and R134a, can also be supplied with class A2L (slightly flammable) refrigerants with low environmental impact R454B and R1234ze. HiRef makes these product ranges available also in the "A2L Ready" version: filled with a safety class A1 refrigerant, they are factory-ready and equipped with all the necessary safety sensors to allow, if the customer requests it, fast switching to A2L at a later stage.

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.

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.

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.

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.

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

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.

Tax deductibility, "Conto Termico" (Heating Account) and SuperBonus 110% benefits

Hiref's high efficiency heat pump units are eligible, thanks to their high performance rating, to tax deductions, and to Conto Termico and 110% Superbonus benefits in Italy.

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.

A2L GAS UPGRADE KIT

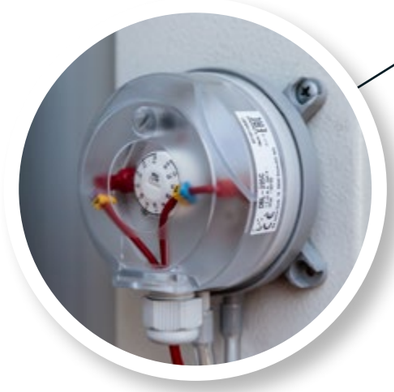
FOR AIR CONDITIONING UNITS

HiRef, in compliance with the European "F-Gas" regulation which imposes gradual but increasingly stringent restrictions to the use of fluorinated greenhouse gases (79% reduction of tonnes of equivalent CO_2 by 2030) encourages the development and use of new A2L ultra-low environmental impact refrigerants, promoting a new approach that aims to speed up the transition to an increasingly widespread adoption of a more environmentally friendly refrigerant class at global level.

The HiRef ranges of chillers and heat pumps can be ordered with class A2L refrigerant or alternatively, they can be supplied with a safety class A1 refrigerant. To expand its offer, HiRef makes these product ranges available also in **"A2L Ready"** versions.

WHAT IS AN A2L READY UNIT?

The unit, pre-filled with an A1 safety class refrigerant, is already pre-configured and equipped to allow, if the customer requires it, quick switching to another refrigerant at a later stage. Purchasing an **A2L Ready** version machine rather than an R454B factory-filled version is particularly advantageous for customers who, for various reasons, need to urgently replace their units or install new ones: an **A2L Ready** unit can be installed without having to apply for plant viability or CPI (fire prevention) certificates, as it is supplied with class A1 refrigerant. Another strong point of the **A2L Ready** range by HiRef consists in offering customers better guarantees in terms of return on their investment: the **A2L Ready** units are future-oriented.



Compressors and components

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

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.

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.

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

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.

HiRef

AIR/WATER

Liquid chillers

INDUSTRIAL

PCC

AIR-CONDENSED CHILLERS FOR INDUSTRIAL PROCESSES

6 – 140 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

SCROLL COMPRESSORS

CORROSION RESISTANT MATERIAL

PLATE HEAT EXCHANGERS

AXIAL FANS

PCC is the HiRef range of air condensed liquid chillers designed for process applications that require precision temperature control of the chilled water delivered to the system. The **PCC** units use Scroll type compressors and braze welded plate evaporators; the hydraulic circuit can be equipped with an open or closed circuit tank, it can be supplemented with high head pumps and with a by-pass valve to meet the requirements of several industrial applications.

- Refrigerant R410A: Available on request with R454B refrigerant
- Electronically controlled expansion valve supplied as standard
- Up to 5 bar pump set
- Dual day/night noise emission set-point
- Optional EC electronic switching fans
- Programmable on-board microprocessor control with dedicated software
- Equipment for production of water and glycol mixtures available

Maximum efficiency at partial loads

Multiscroll solutions, electronically controlled expansion valves, generously-sized plate heat exchangers, software-managed integrated control of fans and circulation pumps: these key characteristics make the **PCC** range suitable for numerous industrial applications that require precise control of delivered power and chilled water temperature.

Solution designed for process applications

The **PCC** range also allows for the installation, directly on-board the machine, of dual impeller pumps, the special configuration of which ensures the achievement of the highest heads to meet a broad range of process requirements. Pumping modules with pressures up to 5 bar are available.

Accurate regulation of the outlet temperature

For applications where accurate control of the cooling capacity delivered is required, the use of a water bypass valve ensures fine adjustment of the temperature of the chilled liquid flowing out of the unit.

Perfect adaptability to any type of process

A water tank can be installed inside all units of the **PCC** range. The tanks come in two configurations:

- With an open circuit that allows for continuous topping up of water to make up for losses in the utility circuit
- With a traditional closed circuit with expansion tank and safety valve

Easy installation and maintenance

The choice and layout of components make for a constructively straightforward unit, with installation and maintenance tasks made easier.

		005	010	015	020	025	030	035	040	045	050	055
		User water values: 12/7 °C; 35 °C outside air										
Cooling capacity	kW	5.6	8.8	13.0	14.6	18.8	21.9	26.0	28.8	31.8	35.8	39.0
Total absorbed power	kW	1.8	2.6	4.2	4.9	6.4	6.8	8.1	9.2	10.4	12.2	14.0
EER [UNI 14511]		3.08	3.34	3.11	3.01	2.92	3.20	3.22	3.14	3.06	2.93	2.78
		User water values: 16/10 °C; 35 °C outside air										
Cooling capacity	kW	6.2	9.7	14.3	16.2	20.7	24.2	28.6	31.7	35.0	39.3	42.7
Total absorbed power	kW	1.8	2.7	4.2	4.9	6.5	6.9	8.1	9.3	10.6	12.4	14.3
EER [UNI 14511]		3.43	3.65	3.43	3.31	3.17	3.52	3.51	3.42	3.31	3.17	2.99
		User water values: 26/20 °C; 35 °C outside air										
Cooling capacity	kW	8.4	12.9	19.1	21.6	27.5	32.2	38.1	41.8	46.0	51.3	55.7
Total absorbed power	kW	1.9	2.8	4.3	5.2	7.1	7.1	8.4	9.6	11.3	13.2	15.4
EER [UNI 14511]		4.53	4.55	4.45	4.16	3.87	4.56	4.53	4.38	4.09	3.88	3.62
ESEER		3.16	3.55	3.49	3.44	3.28	3.64	3.68	3.60	3.47	3.37	3.20
Sound power	db(A)	67	69	74	73	73	75	76	76	76	77	80
Dimensions [L x D x H]	mm	966x542x795	1500x650x1370						1661x914x146			
Weight	kg	103	245	250	265	280	385	395	405	410	420	430

		062	072	082	092	102	120	140	160	180	210
		User water values: 12/7 °C; 35 °C outside air									
Cooling capacity	kW	43.0	48.7	56.0	63.5	74.1	81.3	100.8	111.6	124.9	140.8
Total absorbed power	kW	13.2	16.0	18.2	20.8	23.7	27.0	32.6	37.2	42.2	48.6
EER [UNI 14511]		3.25	3.05	3.08	3.05	3.12	3.01	3.09	3.00	2.96	2.90
		User water values: 16/10 °C; 35 °C outside air									
Cooling capacity	kW	47.3	53.6	61.7	69.8	81.4	89.4	111.5	123.1	137.2	154.3
Total absorbed power	kW	13.4	16.2	18.4	21.2	24.0	27.4	33.0	37.6	43.1	49.6
EER [UNI 14511]		3.52	3.30	3.35	3.29	3.39	3.26	3.38	3.27	3.19	3.11
		User water values: 26/20 °C; 35 °C outside air									
Cooling capacity	kW	62.4	70.7	81.0	91.5	107.4	117.8	148.1	161.7	180.5	201.5
Total absorbed power	kW	14.1	17.4	19.6	22.7	25.2	29.0	34.6	39.3	46.1	53.3
EER [UNI 14511]		4.42	4.07	4.13	4.04	4.26	4.06	4.29	4.11	3.91	3.78
ESEER		4.78	4.59	4.37	4.36	4.32	4.26	3.67	3.68	3.68	3.71
Sound power	db(A)	74	75	83	77	78	82	79	80	80	81
Dimensions [L x D x H]	mm	2090x1170x1730				2440x1170x1730			3530x1140x1730		
Weight	kg	590	605	620	630	780	810	1190	1225	1250	1280

Also available with 60 Hz power supply

DATA CENTER SERVICES

TSE

CHILLERS WITH REMOTE CONDENSER WITH SCROLL COMPRESSORS

46 - 638 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

SCROLL COMPRESSORS

CORROSION RESISTANT MATERIAL

PLATE HEAT EXCHANGERS

A2L READY

LOW GWP REFRIGERANT

TSE is the HiRef range of liquid chillers with remote condenser and Scroll compressors. These motoevaporating 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
(48 to 177 kW)

Dual compressor on dual circuit for high system redundancy.

EFFICIENCY PACK 2
(48 to 177 kW)

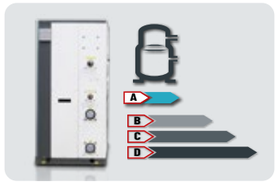
Dual compressor (tandem) on single circuit for greater efficiency at partial loads.

EFFICIENCY PACK 4
(146 to 481 kW)

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

Sizes above 481 kW are always of the dual refrigerating circuit type with five or six Scroll compressors.

- Refrigerant R410A: Available on request with R454B
- Electronically controlled expansion valve supplied as standard
- 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

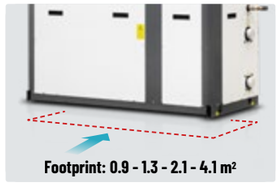


Maximum efficiency at partial loads

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

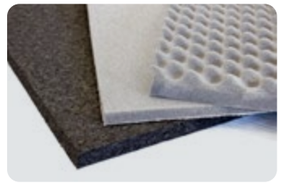
Reduced footprint

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.

		41	42	51	52	61	62	71	72	81	82	91	92	111	112	131	132	141	142	144
		User water values: 12/7 °C; condensing temperature 50 °C																		
Cooling capacity	kW	43.0	42.9	50.3	50.1	57.8	57.7	65.0	64.9	75.2	75.2	84.3	84.1	100.0	99.8	114.2	113.8	127.0	127.0	131.0
Total absorbed power	kW	13.3	13.3	15.6	15.6	17.5	17.5	19.6	19.6	22.5	22.5	25.3	25.3	29.9	29.9	34.6	34.6	37.8	37.8	39.0
EER [UNI 14511]		3.23	3.23	3.22	3.21	3.30	3.29	3.31	3.31	3.35	3.35	3.33	3.32	3.35	3.34	3.30	3.29	3.36	3.36	3.36
		User water values: 16/10 °C; condensing temperature 50 °C																		
Cooling capacity	kW	48.1	48.0	56.2	56.1	64.4	64.4	72.5	72.5	83.8	83.8	93.9	93.7	111.4	111.2	127.0	127.0	141.2	141.4	146.0
Total absorbed power	kW	13.2	13.3	15.6	15.6	17.4	17.4	19.6	19.6	22.4	22.4	25.2	25.2	29.8	29.8	34.6	34.6	37.8	37.8	39.0
EER [UNI 14511]		3.63	3.62	3.61	3.60	3.70	3.70	3.69	3.69	3.74	3.74	3.72	3.72	3.73	3.73	3.67	3.67	3.73	3.74	3.74
		User water values: 26/20 °C; condensing temperature 50 °C																		
Cooling capacity	kW	66.3	66.1	78.1	77.7	88.8	88.6	99.9	99.7	115.1	114.9	129.4	129.1	153.0	152.7	174.2	173.7	193.5	193.0	193.0
Total absorbed power	kW	13.0	13.0	15.4	15.4	17.0	16.9	19.5	19.5	22.1	22.1	25.0	25.0	29.6	29.6	34.5	34.5	37.8	37.8	37.8
EER [UNI 14511]		5.10	5.09	5.07	5.05	5.24	5.23	5.11	5.10	5.21	5.20	5.18	5.17	5.17	5.16	5.05	5.04	5.12	5.11	5.11
Sound power	dB(A)	72	72	72	72	73	73	73	73	74	74	76	76	76	76	77	77	77	77	80
Sound power of Low Noise set-up	dB(A)	68	68	68	68	69	69	69	69	70	70	72	72	72	72	73	73	73	73	76
Dimensions [L x D x H]	mm	1174x772x1594												1644x772x1594						2374x877x1854

		161	162	164	181	182	184	204	214	244	284	314	344	374	424	484	535	576	636	706
		User water values: 12/7 °C; condensing temperature 50 °C																		
Cooling capacity	kW	139.4	139.2	149.5	158.7	158.7	169.4	184.9	198.7	227.8	249.2	271.5	287.2	308.5	381.3	434.4	480.2	530.1	573.7	638.8
Total absorbed power	kW	41.2	41.2	44.8	50.1	50.1	50.4	55.0	59.7	68.8	75.5	82.2	91.0	99.8	120.3	132.0	148.6	163.1	182.1	200.6
EER [UNI 14511]		3.38	3.38	3.34	3.17	3.17	3.36	3.36	3.33	3.31	3.30	3.30	3.15	3.09	3.17	3.29	3.2	3.3	3.2	3.2
		User water values: 16/10 °C; condensing temperature 50 °C																		
Cooling capacity	kW	155.1	154.8	166.6	176.8	176.8	188.7	205.9	221.2	252.4	276.7	301.2	318.8	342.0	423.2	480.9	531.1	587.6	635.8	706.4
Total absorbed power	kW	41.2	41.2	44.7	50.0	50.0	50.2	54.9	59.6	68.8	75.5	82.3	91.0	99.6	119.8	132.0	148.9	162.9	181.9	200.2
EER [UNI 14511]		3.76	3.76	3.73	3.54	3.54	3.76	3.75	3.71	3.67	3.66	3.66	3.50	3.43	3.53	3.64	3.6	3.6	3.5	3.5
		User water values: 26/20 °C; condensing temperature 50 °C																		
Cooling capacity	kW	212.1	211.8	229.5	243.1	243.3	259.7	283.0	303.2	342.7	374.9	407.4	431.6	464.4	570.9	647.4	697.7	767.8	838.2	941.7
Total absorbed power	kW	41.3	41.3	44.0	49.3	49.2	49.5	54.2	59.2	68.1	75.1	82.3	90.4	98.2	120.2	133.9	150.9	165.4	184.5	206.0
EER [UNI 14511]		5.13	5.13	5.21	4.94	4.94	5.24	5.22	5.12	5.03	4.99	4.95	4.77	4.73	4.75	4.83	4.6	4.6	4.5	4.6
Sound power	dB(A)	77	77	80	78	78	81	81	81	82	82	82	83	83	83	86	89	89	90	91
Sound power of Low Noise set-up	dB(A)	73	73	76	74	74	77	77	77	78	78	78	79	79	79	82	80	81	81	86
Dimensions [L x D x H]	mm	1644x772x1594		2374x877x1854	1644x772x1594			2374x877x1854									3820x1085x2040			

Also available with 60 Hz power supply

DATA CENTER | INDUSTRIAL | SERVICES

CDA

CHILLERS WITH NATURAL REFRIGERANT R744 (CO_2) AIR COOLED WITH MODULATING COMPRESSORS - COOLING ONLY VERSION

96 - 288 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

ADIABATIC COOLING

REFRIGERANT R744(CO_2)

CLASS A

FAST RESTART

CORROSION RESISTANT MATERIAL

PISTON COMPRESSORS

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

The adiabatic saturation technology also allows the highest efficiency rates to be reached both at partial and at nominal loads, thanks to the lower temperature of the air entering the coils.

- EC fans as standard (as AC option)
- Aisi 316L stainless steel refrigeration circuit
- Low pressure side PS: 85 bar

Higher efficiency potential

Ejector technology (available as an option) makes it possible to flood the evaporator and increase the unit's performance by 8%.

Natural refrigerant

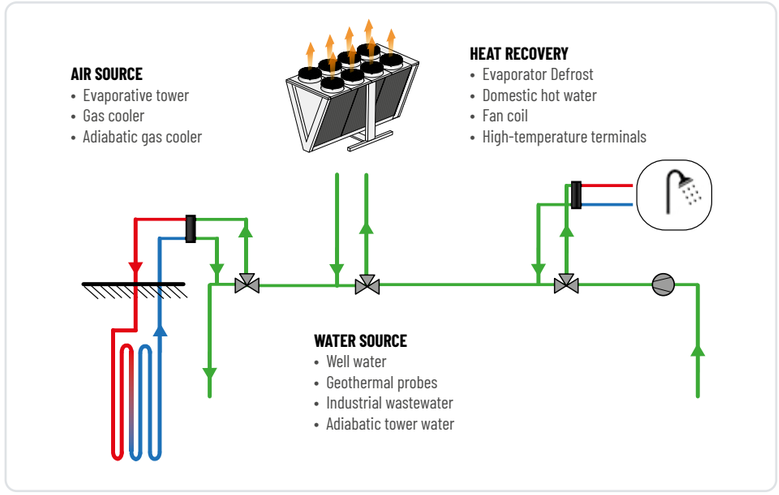
The refrigerant R744 is a natural gas, largely available in nature and without limitations of use. In addition, it is inert, non-toxic and, more importantly, non-flammable, all of which contributes to reducing costs and the difficulties associated with installing the systems safely.
This refrigerant 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

A 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

The choice of adopting a single refrigerant circuit configuration with an inverter-driven compressor, the use of EC electronic switching fans (supplied as standard) and management of the variable flow rate through circulation pumps: these main features maximise the efficiency of the **CDA** range at partial loads.



Very high temperature and multi-source heat recovery

In **CDA** units, the transcritical nature of the CO_2 refrigeration cycle makes it possible to interpose more heat exchangers in series on the dissipation side. A common configuration could consist of:

- A heat exchanger for partial or total recovery of dissipation heat, allowing to produce very high temperature water (over 90°C) without altering the unit's operating conditions in any significant way. The refrigerant does not change phases so this makes large instant temperature differences possible on the water side (for example 10°C / - 80°C) with very high efficiency levels; a common application is domestic hot water production;
- a heat exchanger with air heat sink, preferably adiabatic;
- a heat exchanger with water heat sink, with use of well water or geothermal probes. This allows the CO_2 to be chilled even more, guaranteeing greater cooling performance and efficiency during the most critical times in operation. The compressors and the pumping kit are placed in a box lined with sound-absorbing material.

Adiabatic saturation system

The adiabatic saturation system consists of a set of humidification panels placed in front of the finned pack heat exchangers and equipped with a system of nozzles that evenly wet the coils. The air flowing through these panels causes partial evaporation of the contained water and cools down as a result. This ensures higher efficiency of the thermodynamic cycle and increased refrigeration capacity.

CDA		095CS	190CS	285CS
		Raffreddamento: Temperatura acqua utenza 12/7°C, aria esterna 35°C, 40% U.R.		
Cooling capacity	kW	96	192	288
Total absorbed power	kW	29	58	87
EER		3.33	3.33	3.33
		Raffreddamento: Temperatura acqua utenza 12/7°C, Temperatura acqua recupero 10/80°C		
Cooling capacity	kW	131	262	393
Thermal power	kW	164	328	492
Total absorbed power	kW	33.5	67	100.5
Overall COP		8.81	8.81	8.81
Sound power	dB(A)	86	89	91
Dimensions [L x D x H]	mm	2255x2655x1600	2255x2655x3200	2255x2655x4800

Also available with 60 Hz power supply

DATA CENTER | INDUSTRIAL | SERVICES

CDA-F

CHILLERS WITH NATURAL REFRIGERANT R744 (CO_2) AIR COOLED WITH MODULATING COMPRESSORS - FREE-COOLING VERSION

96 - 288 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

PISTON COMPRESSORS

REFRIGERANT R744(CO_2)

CLASS A

FAST RESTART

CORROSION RESISTANT MATERIAL

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

- EC fans as standard (as AC option)
- Available in versions: Liquid chiller and Free-Cooling chiller.
- Aisi 316L stainless steel refrigeration circuit
- Low pressure side PS: 85 bar

Higher efficiency potential

Ejector technology (available as an option) makes it possible to flood the evaporator and increase the unit's performance by 8%.

Natural refrigerant

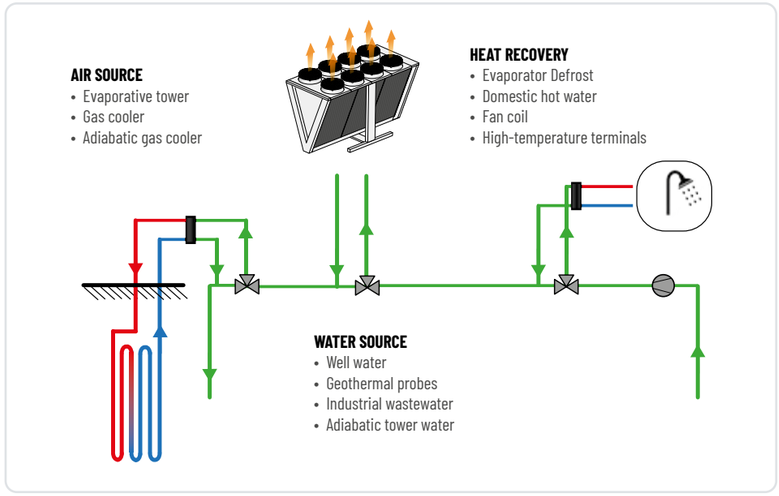
The refrigerant R744 is a natural gas, largely available in nature and without limitations of use. In addition, it is inert, non-toxic and, more importantly, non-flammable, all of which contributes to reducing costs and the difficulties associated with installing the systems safely.
This refrigerant 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

A 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

The choice of adopting a single refrigerant circuit configuration with an inverter-driven compressor, the use of EC electronic switching fans (supplied as standard) and management of the variable flow rate through circulation pumps: these main features maximise the efficiency of the **CDA** range at partial loads.



Very high temperature and multi-source heat recovery

In **CDA** units, the transcritical nature of the CO_2 refrigeration cycle makes it possible to interpose more heat exchangers in series on the dissipation side. A common configuration could consist of:

- A heat exchanger for partial or total recovery of dissipation heat, allowing to produce very high temperature water (over 90°C) without altering the unit's operating conditions in any significant way. The refrigerant does not change phases so this makes large instant temperature differences possible on the water side (for example 10°C / - 80°C) with very high efficiency levels; a common application is domestic hot water production;
- a heat exchanger with air heat sink, preferably adiabatic;
- a heat exchanger with water heat sink, with use of well water or geothermal probes. This allows the CO_2 to be chilled even more, guaranteeing greater cooling performance and efficiency during the most critical times in operation. The compressors and the pumping kit are placed in a box lined with sound-absorbing material.

CDA-F		095CS	190CS	285CS
		Raffreddamento: Temperatura acqua utenza 12/7°C, aria esterna 35°C, 40% U.R.		
Cooling capacity	kW	96	192	288
Total absorbed power	kW	29	58	87
EER		3.33	3.33	3.33
		Raffreddamento: Temperatura acqua utenza 12/7°C, Temperatura acqua recupero 10/80°C		
Cooling capacity	kW	131	262	393
Thermal power	kW	164	328	492
Total absorbed power	kW	33.5	67	100.5
Overall COP		8.81	8.81	8.81
Sound power	dB(A)	86	89	91
Dimensions [L x D x H]	mm	2255x2655x1600	2255x2655x3200	2255x2655x4800

Also available with 60 Hz power supply

DATA CENTER | INDUSTRIAL | SERVICES

TVA

AIR CONDENSED CHILLERS WITH INVERTER DRIVEN SCREW COMPRESSORS

341 – 1282 kW

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

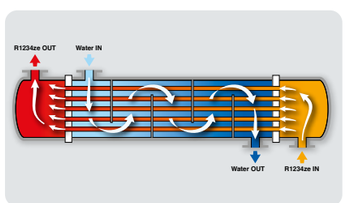
TVA sets a new standard for air cooled chillers, designed to ensure that processes are both energy-efficient and environment-friendly. Low environmental impact has been achieved by using new HFO refrigerants with low GWP (Global Warming Potential), while higher efficiency/ footprint ratios are reached 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.

The high thermodynamic efficiency (low TEWI, Total Equivalent Warming Impact) is combined with a special focus on maintainability and easy accessibility of the compressors contained in the removable HiRail® module which reduces noise emissions.

- Refrigerant R1234ze
- Also available with R134a refrigerant and on request with R513A
- Capacity modulation:
  1. with slide valve
  2. with inverters on both compressors or on one compressor only
- EC Fans
- Electronically controlled expansion valve
- HI-NODE® Supervision
- Monitoring and limitation of the maximum absorbed power

Inverter screw compressors

Wide load modulation capability and high efficiency at partial loads.



New concept of heat exchange

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

New refrigerant R1234ze

TVX 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.)

Low noise and accessibility: HI-RAIL®

The compressor hoods dramatically reduce noise thanks to the use of special sound-absorbing materials.
Moreover, sliding rails allow them to be removed effortlessly, making all maintenance tasks much easier.
The compressors can also be removed by hooking from above and lifting with a crane.

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.
The Free-Cooling version features heat exchangers sized in such a way as to allow a Total Free-Cooling Temperature (TFT) of 10 °C*.

* Data Center conditions with chilled water to 19/25 °C

Version C - TVA cooling only		0381C	0401C	0421C	0451C	0481C	0531C	0581C	0621C	0661C	0721C	0801C	0831C	0901C	0971C	1041C	1101C	1161C	1231C	1291C	1351C	1421C
Cooling capacity @12/7°C; 35°C	kW	341.2	369.9	387.1	410.7	444.0	484.5	525.7	567.7	605.4	657.4	715.7	756.1	821.1	869.7	942.6	985.8	1041.2	1106.2	1159.5	1218.9	1282.0
Total absorbed power	kW	105.3	115.1	123.4	131.0	142.4	148.6	165.3	179.8	194.6	209.9	223.9	240.0	254.2	272.5	297.8	316.8	332.3	356.1	375.8	385.1	403.4
EER [UNI 14511]		3.24	3.21	3.14	3.13	3.12	3.26	3.18	3.16	3.11	3.13	3.20	3.15	3.23	3.19	3.16	3.11	3.13	3.11	3.09	3.17	3.18
Cooling capacity @16/10°C; 35°C	kW	379.0	408.9	428.0	453.2	489.3	535.4	578.4	625.9	668.1	724.1	789.3	831.9	902.9	955.9	1034.9	1082.0	1145.1	1217.4	1275.6	1343.6	1415.7
Total absorbed power	kW	109.5	119.6	128.2	135.9	148.1	154.0	171.1	187.1	202.6	217.2	231.5	248.4	263.4	281.8	309.5	328.9	344.7	370.0	390.0	398.7	418.6
EER [UNI 14511]		3.46	3.42	3.34	3.33	3.30	3.48	3.38	3.35	3.30	3.33	3.41	3.35	3.43	3.39	3.34	3.29	3.32	3.29	3.27	3.37	3.38
ESEER		4.05	4.14	4.07	3.96	4.01	4.07	4.1	4.17	4.21	4.05	3.85	3.86	3.9	3.99	4.11	4.12	4.16	4.06	3.77	3.96	4.22
Sound power	dB(A)	92	92	92	95	96	97	96	96	96	97	97	97	97	98	98	99	99	99	100	100	100
Sound power of Low Noise set-up	dB(A)	89	89	89	92	93	94	93	93	93	94	94	94	94	95	95	96	96	96	97	97	97
Dimensions [L x D x H]	mm	4904x2255x2650					6155x2255x2650				7405x2255x2650			8655x2255x2650				10700x 2255x 2650		11950x 2255x 2650	13200x 2255x 2650	

Free-Cooling TVA version		0311F	0331F	0361F	0381F	0421F	0451F	0481F	0531F	0581F	0621F	0661F	0721F	0801F	0831F	0901F	0971F	1041F	1101F	1161F
Cooling capacity @12/7°C; 35°C	kW	275.5	291.5	324.7	344.8	375.3	395.5	415.8	463.2	491.0	540.5	575.5	612.5	659.9	703.6	771.4	815.4	870.9	919.9	1125.7
Total absorbed power	kW	81.9	88.8	93.2	101.1	107.6	114.9	122.1	130.4	140.2	149.0	166.9	178.9	189.2	205.2	220.4	238.0	256.5	273.4	326.8
EER [UNI 14511]		3.36	3.28	3.48	3.41	3.49	3.44	3.40	3.55	3.50	3.63	3.45	3.42	3.49	3.43	3.50	3.43	3.39	3.37	3.45
Total Free Cooling temperature	°C	0.3	0.0	1.0	0.7	1.3	1.1	0.9	1.2	0.9	1.2	0.9	0.6	0.9	0.6	0.7	0.4	0.0	-0.4	-1.1
Cooling capacity @16/10°C; 35°C	kW	305.9	323.1	360.4	382.0	416.1	438.2	460.2	513.0	543.2	597.9	638.8	678.6	731.9	778.2	853.9	901.5	965.1	1017.0	1242.5
Total absorbed power	kW	84.9	92.1	96.2	104.6	111.2	118.7	126.2	134.3	144.5	153.7	172.6	185.3	195.3	211.6	226.6	245.1	264.8	282.8	335.7
EER [UNI 14511]		3.60	3.51	3.75	3.65	3.74	3.69	3.65	3.82	3.76	3.89	3.70	3.66	3.75	3.68	3.77	3.68	3.64	3.60	3.70
Total Free Cooling temperature	°C	2.5	2.2	3.2	2.9	3.5	3.3	3.1	3.4	3.1	3.4	3.1	2.8	3.1	2.8	2.9	2.6	2.2	1.8	1.1
Cooling capacity @26/20°C; 35°C	kW	413.6	434.6	488.5	515.3	561.8	588.7	615.6	692.4	730.1	809.0	864.8	916.4	988.1	1041.7	1144.3	1203.0	1288.7	1352.9	1641.6
Total absorbed power	kW	97.9	105.5	108.4	118.3	125.0	134.0	143.0	151.1	163.0	172.6	194.8	209.3	219.8	236.4	251.6	273.2	297.5	318.8	371.9
EER [UNI 14511]		4.22	4.12	4.51	4.36	4.50	4.39	4.31	4.58	4.48	4.69	4.44	4.38	4.50	4.41	4.55	4.40	4.33	4.24	4.41
Total Free Cooling temperature	°C	9.8	9.3	11.1	10.5	11.8	11.4	11	11.5	11.1	11.5	11	10.4	10.9	10.4	10.7	10.2	9.4	8.9	7.7
ESEER		4.19	4.1	4.28	4.41	4.59	4.5	4.47	4.23	4.23	4.36	4.25	4.14	4.18	3.98	4.04	4.04	4.06	4.18	4.51
Sound power	dB(A)	92	92	92	92	93	93	92	96	96	97	96	97	97	97	97	98	98	98	98
Sound power of Low Noise set-up	dB(A)	89	89	89	89	90	90	89	93	93	94	93	94	94	94	94	95	95	95	95
Dimensions [L x D x H]	mm	4904x2255x2650		6155x2255x2650		7405x2255x2650			8655x2255x2650		10700x2255x2650			11950x2255x2650		13200x2255x2650				

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

DATA CENTER | INDUSTRIAL | SERVICES

TTX

AIR CONDENSED CHILLERS WITH OIL-FREE CENTRIFUGAL COMPRESSORS

281 – 1057 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

OIL-FREE CENTRIFUGAL FANS

FAST RESTART

CORROSION RESISTANT MATERIAL

AXIAL FANS

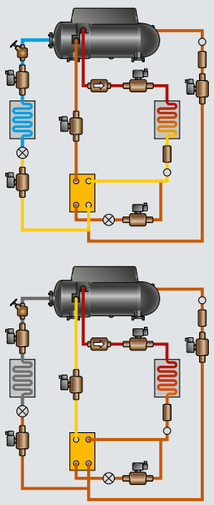
SPRAY FLOODED SHELL&TUBE

LOW GWP REFRIGERANT

CLASS A

The **TTX** range is the most innovative and efficient solution for air-condensed liquid chillers. The use of the oil-free centrifugal compressor in combination with new small-sized flooded exchangers (minimised water and refrigerant approach and reduction of refrigerant charge compared to traditional flooded heat exchangers) allows top efficiency values to be achieved, especially at partial loads. **TTX** range chillers can be used with the new HFO R1234ze refrigerant characterised by a very low environmental impact, minimising the TEWI of the entire system.

- Refrigerant R134a
- Available in version:
  1. Liquid chiller
  2. Free-Cooling chiller
- Energy efficiency class A
- Optional EC electronic switching fans
- Refrigerant leak sensor
- Water connections with Vic-Taulic quick couplings
- Dual day/night noise emission set-point

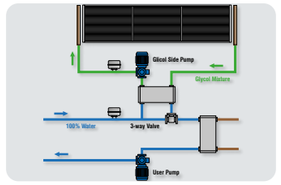


Top-class thermodynamic performance!

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.

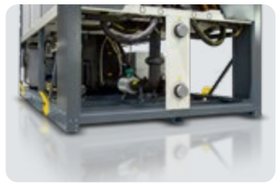
Is the unit working?

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.



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.



Maximum efficiency at partial loads

The adoption of oil-free centrifugal compressors, electronically controlled expansion valves, flooded heat exchangers, fan modulation and variable flow rate controlled with circulation pumps are all key features that make the **TTX** range particularly efficient at partial loads.

New refrigerant R1234ze

On request, **TTX** air condensed chillers can use the new HFO refrigerant with low GWP (GWPR1234ze=6), part of a wider Green Technology approach. (The standard version is with R134a).

		TTX280CS	TTX380CS	TTX410CS	TTX531CS	TTX561CS	TTX631CS
Cooling capacity @12/7°C; 35°C	kW	281	380	414	529	562	661
Total absorbed power	kW	90	121	130	169	180	211
EER [UNI 14511]	-	3.12	3.14	3.19	3.12	3.12	3.14
Dimensions [L]	mm	3065	4065	5060	5060	6130	7130
Dimensions [D]	mm	2256	2256	2256	2256	2256	2256
Dimensions [H]	mm	2652	2652	2650	2650	2650	2650

		TTX761CS	TTX813CS	TTX911CS	TTX821CS	TTX943CS	TTX1064CS
Cooling capacity @12/7°C; 35°C	kW	759	809	909	829	943	1057
Total absorbed power	kW	242	259	263	260	300	339
EER [UNI 14511]	-	3.14	3.12	3.46	3.19	3.15	3.12
Dimensions [L]	mm	8130	8125	9125	10120	10120	10120
Dimensions [D]	mm	2256	2256	2256	2256	2256	2256
Dimensions [H]	mm	2652	2652	2650	2650	2650	2650

Also available with 60 Hz power supply

DATA CENTER | INDUSTRIAL | SERVICES

HCB

AIR CONDENSED CHILLERS WITH INVERTER DRIVEN SCREW COMPRESSORS - COOLING ONLY VERSION

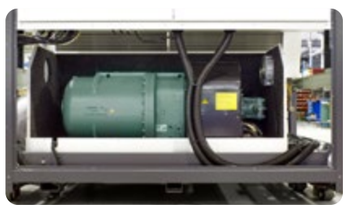
369 - 1200 kW

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

HCB ChillBatic sets a new standard for air cooled chillers, designed to ensure that processes are both energy-efficient and environment-friendly. Low environmental impact has been achieved by using new HFO refrigerants with low GWP (Global Warming Potential), 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 adiabatic cooling technology also produces the highest efficiency rates both at partial and at nominal loads, thanks to the lower temperature of the air entering the coils. The high thermodynamic efficiency low Total Equivalent Warming Impact (TEWI) is combined with a special focus on maintainability and easy accessibility of the compressors contained in the removable HiRail module which reduces noise emissions.

New refrigerant R1234ze

HCB range air condensed chillers use the new HFO refrigerant with low GWP (GWPR1234ze=6) as part of a wider Green Technology approach. (Also available in a version with R134a refrigerant).



Inverter screw compressors

Wide load modulation capability and high efficiency at partial loads.

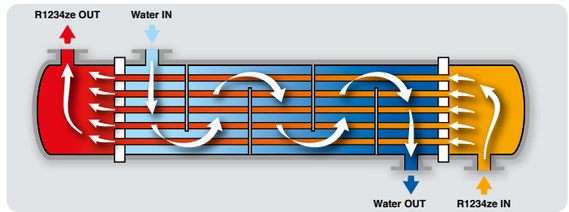
- Refrigerant R1234ze
- Also available with R134a refrigerant
- Also available in Standard and Compact set-ups
- Capacity modulation:
  1. with slide valve,
  2. with inverters on both compressors or on one compressor only
- EC Fans
- Electronically controlled expansion valve
- HI-NODE® Supervision
- Monitoring and limitation of the maximum absorbed power

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.

Low noise and accessibility: HI-RAIL®

The compressor hoods dramatically reduce noise thanks to the use of special sound-absorbing materials. Moreover, sliding rails allow them to be removed effortlessly, making all maintenance tasks much easier. The compressors can also be removed by hooking from above and lifting with a crane.



New concept of heat exchange: spray flooded shell and tube heat exchanger

A spray flooded shell and tube construction guarantees effectiveness and efficiency thanks to the minimal approach temperature between refrigerant and water. It requires about 30% less refrigerant charge compared to traditional flooded shell and tube configurations: a solution that benefits the environment and results in costs savings, in terms of both CapEx and OpEx.

Adiabatic humidification system

Adiabatic humidification consists of a series of humidification panels placed before the dissipation coils and kept uniformly humidified. With this system, hot air passes through the humidified panels, comes into contact with the contained water and transforms it into water vapour: the outgoing air is therefore cooler and passes through the dissipation coils at a lower temperature, increasing the efficiency of the thermodynamic cycle and the cooling capacity. Considering average climatic conditions, the energy saving on an annual basis is more than 35% compared to a conventional chiller with the same footprint.

HCB		0381C	0401C	0421C	0451C	0481C	0531C	0581C	0621C	0661C	0721C	0801C	0831C	0901C	0971C	1041C	1101C	1161C	1231C
		Raffreddamento: Temperatura acqua utenza 12/7°C, aria esterna 35°C, 40% U.R.																	
Cooling capacity	kW	369.7	398.5	417.3	442.2	477.9	519.2	565.1	614.8	652.2	705.6	773.6	815.5	880.5	938.5	1019.2	1067.7	1123.6	1199.4
Total absorbed power	kW	98.5	107.4	114.7	120.4	129.7	137.8	152.1	164.7	177.3	193.6	205.8	221	238	251.9	272.1	288.8	306	327.3
EER		3.75	3.71	3.64	3.67	3.68	3.77	3.72	3.73	3.68	3.65	3.76	3.69	3.7	3.73	3.75	3.7	3.67	3.66
Consumption of water	l	2868	2868	2868	2812	2812	3824	3749	3749	3749	4780	4687	4687	5737	5624	5624	5624	6693	6561
Sound power	dB(A)	93	93	93	96	97	97	96	97	97	97	98	98	98	98	99	99	100	100
Sound power of Low Noise set-up	dB(A)	88	88	88	91	92	92	91	92	92	92	93	93	93	93	94	94	95	95
Dimensions [L x D x H]	mm	5755x2652x2256					7405x2650x2256				8855x2650x2256			10700x2652x2256				13000x2652x2256	

Also available with 60 Hz power supply

DATA CENTER | INDUSTRIAL | SERVICES

HCB-F

AIR CONDENSED CHILLERS WITH INVERTER DRIVEN SCREW COMPRESSORS - FREE-COOLING VERSION

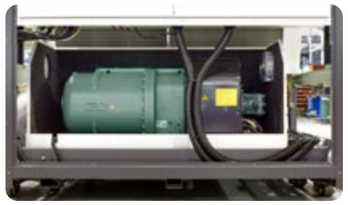
300 – 1200 kW

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

HCB ChillBatic sets a new standard for air cooled chillers, designed to ensure that processes are both energy-efficient and environment-friendly. Low environmental impact has been achieved by using new HFO refrigerants with low GWP (Global Warming Potential), 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. The high thermodynamic efficiency low Total Equivalent Warming Impact (TEWI) is combined with a special focus on maintainability and easy accessibility of the compressors contained in the removable HiRail module which reduces noise emissions.

New refrigerant R1234ze

HCB range air condensed chillers use the new HFO refrigerant with low GWP (GWPR1234ze=6) as part of a wider Green Technology approach. (Also available in a version with R134a refrigerant).



Inverter screw compressors

Wide load modulation capability and high efficiency at partial loads.

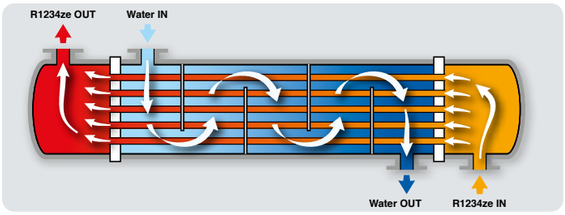
- Refrigerant R1234ze
- Also available with R134a refrigerant
- Also available in Standard and Compact set-ups
- Capacity modulation:
  1. with slide valve,
  2. with inverters on both compressors or on one compressor only
- EC Fans
- Electronically controlled expansion valve
- HI-NODE® Supervision
- Monitoring and limitation of the maximum absorbed power

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. The Free-Cooling version features heat exchangers sized in such a way as to allow a Total Free- Cooling Temperature (TFT) of 10°C (Data Center conditions with chilled water to 19/25 °C).

Low noise and accessibility: HI-RAIL®

The compressor hoods dramatically reduce noise thanks to the use of special sound-absorbing materials. Moreover, sliding rails allow them to be removed effortlessly, making all maintenance tasks much easier. The compressors can also be removed by hooking from above and lifting with a crane.



New concept of heat exchange: spray flooded shell and tube heat exchanger

A spray flooded shell and tube construction guarantees effectiveness and efficiency thanks to the minimal approach temperature between refrigerant and water. It requires about 30% less refrigerant charge compared to traditional flooded shell and tube configurations: a solution that benefits the environment and results in costs savings, in terms of both CapEx and OpEx.

HCB-F		0311F	0331F	0361F	0381F	0421F	0451F	0481F	0531F	0581F	0621F	0661F	0721F
		Raffreddamento/Free-Cooling: Temperatura acqua utenza 12/7°C 20% glicole etilenico, aria esterna 35°C, 40% U.R.											
Cooling capacity	kW	299.8	316	342	362.1	402	423.7	445.4	478.7	517.8	553.6	589.1	654.1
Total absorbed power	kW	78.7	84.2	91	97.6	106.6	112.9	119.2	127.8	135.8	146	160.5	172.8
EER		3.81	3.75	3.76	3.71	3.77	3.75	3.74	3.75	3.81	3.79	3.67	3.79
Consumption of water	l	2666	2666	3554	3554	4443	4443	4443	5332	5332	6220	6220	6220
Sound power	dB(A)	93	93	94	94	95	95	95	97	98	98	98	98
Sound power of Low Noise set-up	dB(A)	88	88	89	89	90	90	90	92	93	93	93	93

HCB-F		0311F	0331F	0361F	0381F	0421F	0451F	0481F	0531F	0581F	0621F	0661F	0721F
		Raffreddamento/Free-Cooling: Temperatura acqua utenza 12/7°C, glicole etilenico 20%											
Full Free-Cooling temperature	°C	-0.8	-1.1	0	-0.3	0.3	0.1	-0.2	0.4	0	0.4	0.1	0.4
Sound power	dB(A)	93	93	94	94	95	95	95	97	98	98	98	98
Sound power of Low Noise set-up	dB(A)	88	88	89	89	90	90	90	92	93	93	93	93

HCB-F		0381C	0401C	0421C	0451C	0481C	0531C	0581C	0621C	0661C	0721C	0801C	0831C	0901C	0971C	1041C	1101C	1161C	1231C
		Raffreddamento: Temperatura acqua utenza 12/7°C, aria esterna 35°C, 40% U.R.																	
Cooling capacity	kW	369.7	398.5	417.3	442.2	477.9	519.2	565.1	614.8	652.2	705.6	773.6	815.5	880.5	938.5	1019.2	1067.7	1123.6	1199.4
Total absorbed power	kW	98.5	107.4	114.7	120.4	129.7	137.8	152.1	164.7	177.3	193.6	205.8	221	238	251.9	272.1	288.8	306	327.3
EER		3.75	3.71	3.64	3.67	3.68	3.77	3.72	3.73	3.68	3.65	3.76	3.69	3.7	3.73	3.75	3.7	3.67	3.66
Consumption of water	l	2868	2868	2868	2812	2812	3824	3749	3749	3749	4780	4687	4687	5737	5624	5624	5624	6693	6561
Sound power	dB(A)	93	93	93	96	97	97	96	97	97	97	98	98	98	98	99	99	100	100
Sound power of Low Noise set-up	dB(A)	88	88	88	91	92	92	91	92	92	92	93	93	93	93	94	94	95	95
Dimensioni [LxHxD]	mm	5755x2652x2256				7405x2650x2256				8855x2650x2256				10700x2652x2256				13000x2652x2256	

Also available with 60 Hz power supply

HiRef

AIR/WATER

Reversible heat pumps

INDUSTRIAL SERVICES

HPS / MPS

REVERSIBLE AND MULTI-PURPOSE AIR CONDENSED HEAT PUMPS FOR LOW OUTDOOR TEMPERATURES

45 - 213 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

EVI SCROLL COMPRESSORS

AXIAL FANS

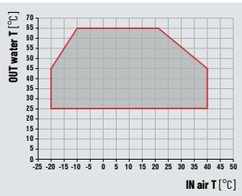
CORROSION RESISTANT MATERIAL

PLATE HEAT EXCHANGERS

HPS / MPS is the HiRef range of air-to-water multipurpose 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.

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.



Production of hot water up to 65 °C

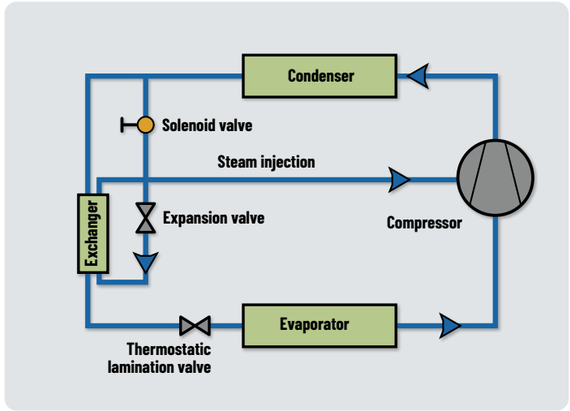
The units of the **HPS / MPS** range are capable of producing water at 65 °C, as well as operating with outdoor air temperatures down to -20 °C.

HPS / MPS

- Refrigerant R410A
- EVI compressors with steam injection
- Electronically controlled expansion valve
- "Cold" start Smart Kit
- Coils with hydrophilic treatment and wider fin pitch
- Defrost ice disposal chutes with heating elements
- Optional EC electronic switching fans

MPS only

- Available in multipurpose version for 2 and 4 pipe systems



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

The Scroll compressors of the **HPS / 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 (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 / MPS** range the ideal solution in case of extremely low outdoor temperatures.

Extra low noise

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

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.

HPS / MPS		041	051	071	081	101	134	164	204
		User water 40/45 °C; Outdoor air 7 °C							
Thermal power	kW	45.7	56.4	75.7	85.4	96.3	147.7	166.6	212.9
Total absorbed power	kW	14.0	16.9	22.8	26.3	28.7	44.3	52.3	65.7
COP [UNI 14511]		3.27	3.35	3.32	3.25	3.35	3.34	3.19	3.24
		User water 55/65°C; Outdoor air 7 °C							
Thermal power	kW	45.2	55.8	75.9	86.4	97	148.7	168.3	211.5
Total absorbed power	kW	19.3	22.7	32.7	37.4	40.5	63.7	74.4	90.8
COP [UNI 14511]		2.35	2.35	2.32	2.31	2.39	2.33	2.26	2.33
		User water 40/50°C; Outdoor air -15°C							
Thermal power	kW	27.2	34.2	44.9	51.2	56.9	85.2	97.5	128.7
Total absorbed power	kW	12.9	15.3	21.9	25	28	41.6	50.4	62
COP [UNI 14511]		2.11	2.24	2.06	2.04	2.03	2.05	1.93	2.08
SCOP		2.82	2.96	2.91	2.90	2.91	3.2	2.85	3.05
Sound power of Low Noise set-up	db(A)	81	81	82	83	84	87	88	88
Dimensions [L x D x H]	mm	2090 x 1183 x 1735		2792 x 1183 x 1735		3540 x 1183 x 1679	3538 x 1653 x 1884		3538 x 1653 x 2284

Also available with 60 Hz power supply

INDUSTRIAL SERVICES

HWC / HWP

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

56 - 230 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

SCROLL COMPRESSORS

EC RADIAL FANS

CORROSION RESISTANT MATERIAL

PLATE HEAT EXCHANGERS

HWC / HWP is the HiRef range of air-condensed liquid chillers with Scroll compressors for indoor installations. Four different versions (chiller, Free-Cooling chiller, reversible heat pump and multipurpose) the several available power output rates and compact frame make these units highly versatile and suited to a wide range of system layouts.

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 installation in equipment rooms and can be ducted at both suction 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).

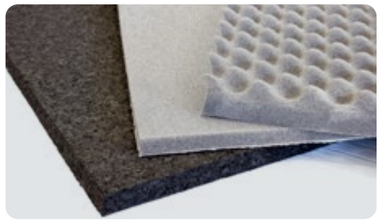
EFFICIENCY PACK 2

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.

- 2 different soundproofing set-ups available: Standard and Low Noise
- Electric control panel with IP55 protection rating
- Radial EC motor fans
- Electronic expansion valve
- Easy accessibility thanks to the optimisation of the internal space
- Programmable microprocessor control with proprietary software
- Available with single or double pumping kit in timed rotation
- Maintenance kit available
- Compliance with ERP regulations



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 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 multiscroll 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 / HWP** range particularly efficient at partial loads.

HWC CS (Chilling Only)		052	062	072	082	092	102	112	132	142	162	182	204
Cooling capacity @12/7°C; 35°C outside air	kW	55.9	62.0	71.0	78.7	94.5	106.8	119.8	128.2	142.0	155.5	183.0	201.5
Total absorbed power [UNI 14511]	kW	19.9	23.0	25.0	28.7	33.8	39.6	42.6	47.1	55.2	63.8	68.5	82.2
EER [UNI 14511]		2.81	2.69	2.84	2.74	2.80	2.70	2.82	2.72	2.57	2.44	2.67	2.45
SEER		4.38	4.10	4.46	4.38	4.20	4.29	4.36	4.36	-	-	4.14	4.10
SEPR		5.29	5.26	5.32	5.33	5.27	5.22	5.42	5.30	5.11	5.05	5.24	5.15
Sound power [Base model]	db(A)	82	82	82	83	85	86	86	86	89	90	92	89
Sound power [Low Noise set-up]	db(A)	78	79	79	80	82	83	84	84	86	88	89	86
Dimensions [L x D x H]	mm	2000x1100x2020				2400x1100x2020			3090x1100x2020			4090x1100x2104	

HWC HS (Heat Pump)		052	062	072	082	092	102	112	132	142	162	182	204
Cooling capacity @12/7°C; 35°C outside air	kW	55.1	61.2	71.0	78.7	94.5	106.0	119.6	127.9	141.6	152.3	181.1	201.5
Total absorbed power [UNI 14511]	kW	19.9	23.1	25.0	28.7	33.8	39.7	42.5	47.1	55.1	63.6	68.4	82.2
EER [UNI 14511]		2.77	2.65	2.84	2.74	2.80	2.67	2.81	2.71	2.57	2.40	2.65	2.45
Sound power [Base model]	db(A)	82	82	82	83	85	86	86	86	89	90	92	89
Sound power [Low Noise set-up]	db(A)	78	79	79	80	82	83	84	84	86	88	89	86
Dimensions [L x D x H]	mm	2000x1100x2020				2400x1100x2020			3090x1100x2020			4090x1100x2104	
Thermal power [UNI14511]	kW	58.0	64.6	76.6	85.5	102.3	115.2	131.2	141.8	159.1	175.1	203.1	230.8
Total absorbed power [UNI 14511]	kW	21.0	23.9	26.6	29.3	36.3	41.1	44.0	48.0	53.2	59.7	68.4	77.8
COP [UNI 14511]		2.76	2.71	2.88	2.92	2.82	2.80	2.98	2.96	2.99	2.93	2.97	2.97
SCOP		3.20	3.23	3.27	3.37	3.22	3.23	3.42	3.46	3.46	3.50	3.40	3.44

HWC FS (Free Cooling)		052	062	072	082	092	102	112	132	142	162	182	204
Cooling capacity @15/10°C; 35°C outside air*	kW	59.1	65.2	75.9	83.9	100.7	113.1	127.7	136.6	150.4	162.1	193.0	215.1
Total absorbed power [UNI 14511]	kW	20.5	23.9	25.9	29.6	35.2	41.2	44.2	48.8	57.5	66.2	71.1	85.5
EER [UNI 14511]		2.89	2.73	2.93	2.83	2.86	2.74	2.89	2.80	2.62	2.45	2.71	2.51
Total Free-Cooling Temperature	°C	-2.6	-3.9	-6.4	-8.1	-6.9	-8.9	-8.5	-9.8	-11.7	-13.3	-10.3	-12.6
Sound power [Base model]	db(A)	82	82	82	83	85	86	86	86	89	90	92	89
Sound power [Low Noise set-up]	db(A)	78	79	79	80	82	83	84	84	86	88	89	86
Dimensions [L x D x H]	mm	2000x1100x2020				2400x1100x2020			3090x1100x2020			4090x1100x2104	

* 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

DATA CENTER | INDUSTRIAL | SERVICES

TSS

CLASS A CHILLERS AND HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS

116 - 219 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

SCROLL COMPRESSORS

AXIAL FANS

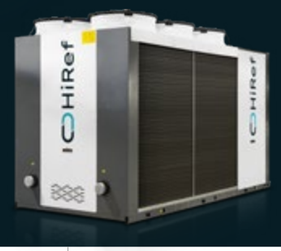
CORROSION RESISTANT MATERIAL

A2L READY

CLASS A

LOW GWP REFRIGERANT

SHELL&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 reliability in all working conditions, one of the assets of these units, is a critically important requirement. 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.

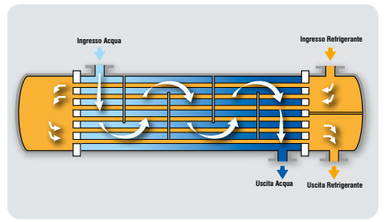
- 3 different soundproofing set-ups available: Standard, Low Noise and Super Low Noise
- Electric control panel with IP55 protection rating
- Class A units in both chiller and heat pump modes
- Radial EC motor fans (optional)
- Electrically controlled expansion valve
- Easy accessibility thanks to the optimisation of the internal space
- Programmable microprocessor control with proprietary software
- Compliance with ERP regulations

The **TSS** units can be supplied both with the standard R410A refrigerant, in class A1 (non-flammable), and with the new generation R454B refrigerant, in class A2L (mildly flammable) or in the A2L-ready configuration.

DETAILS AT **page 5**

Is the unit working?

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.



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 through-sections, 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.

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		104	144	164	244
		Chilling - Water conditions: user side 12/7°C; outside air temp. 35°C			
Cooling capacity [UNI 14511]	kW	116.4	146.5	172.8	219.2
Total absorbed power [UNI 14511]	kW	33.8	42.5	50.9	68.8
EER [UNI 14511]		3.44	3.44	3.40	3.18
SEER		4.81	4.84	4.98	4.68
		HEATING - Water conditions: user side 40/45°C; outside air temp. 7°C			
Thermal power [UNI 14511]	kW	123.5	155.1	179.0	232.0
Total absorbed power [UNI 14511]	kW	34.5	44.0	50.9	68.2
COP [UNI 14511]		3.58	3.53	3.52	3.40
SCOP		3.90	3.87	4.10	3.93
ERP efficiency	%	153	152	161	154
Sound power level Lw [Standard unit]	db(A)	83	86	87	89
Sound power level Lw [Low noise unit]	db(A)	80	83	84	85
Sound power level Lw [super Low noise unit]	db(A)	78	82	82	83
Dimensions [L x D x H]	mm	3540x1183x1735	3540x1653x1846	3540x1653x2330	4206x1653x2330

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

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TAS

CHILLERS AND HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS

61 – 250 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

SCROLL COMPRESSORS

AXIAL FANS

CORROSION RESISTANT MATERIAL

A2L READY

CLASS A

LOW GWP REFRIGERANT

PLATE HEAT EXCHANGERS

TAS is the HiRef 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, thanks to the possibility of choosing from as many as 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 set-ups available: Standard, Low Noise and Super Low Noise
- Optional EC motor fans
- Electrically controlled expansion valve
- Easy accessibility thanks to the optimisation of the internal space
- Programmable microprocessor control with proprietary software
- Available with variable flow pumping kit
- Maintenance kit available
- Compliance with ERP regulations

The **TAS** units can be supplied both with the standard R410A refrigerant, in class A1 (non-flammable), and with the new generation R454B refrigerant, in class A2L (mildly flammable) or in the A2L-ready configuration.

DETAILS AT **page 5**

Plate heat exchangers

The **TAS** 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.

Is the unit working?

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 multiscroll 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 CS (Chilling Only)		062	072	082	102	114	124	144	164	194	214	244
Cooling capacity @12/7°C; 35°C outside air	kW	61.5	75.5	88.5	102.8	118.2	127.0	149.6	162.5	187.7	222.6	250.4
Total absorbed power [UNI 14511]	kW	16.9	21.4	25.6	29.6	33.8	35.9	43.3	47.2	55.9	71.0	80.0
EER [UNI 14511]		3.63	3.53	3.45	3.47	3.50	3.54	3.46	3.44	3.36	3.14	3.13
SEER		4.70	4.55	4.52	4.66	5.14	5.06	5.05	5.15	5.15	5.00	4.96
Sound power [Base model]	db(A)	81	83	83	86	83	84	86	86	87	88	89
Sound power [Low Noise set-up]	db(A)	78	80	80	83	80	81	83	83	84	85	86
Sound power [Super Low Noise set-up]	db(A)	76	78	78	81	78	80	82	82	84	84	85
Dimensions [L x D x H]	mm	2792x1183x1735			3540x1183x1735		3540x1653x1846			3540x1653x2330		4206 x 1653 x 2330

TAS HS (Heat Pump)		062	072	082	102	114	124	144	164	194	214	244
Cooling capacity @12/7°C; 35°C outside air	kW	61.5	75.5	88.5	102.8	118.2	127.0	149.6	162.5	187.7	222.6	250.4
Total absorbed power [UNI 14511]	kW	16.9	21.4	25.6	29.6	33.8	35.9	43.3	47.2	55.9	71.0	80.0
EER [UNI 14511]		3.63	3.53	3.45	3.47	3.50	3.54	3.46	3.44	3.36	3.14	3.13
SEER		4.70	4.55	4.52	4.66	5.14	5.06	5.05	5.15	5.15	5.00	4.96
Sound power [Base model]	db(A)	81	83	83	86	83	84	86	86	87	88	89
Sound power [Low Noise set-up]	db(A)	78	80	80	83	80	81	83	83	84	85	86
Sound power [Super Low Noise set-up]	db(A)	76	78	78	81	78	80	82	82	84	84	85
Dimensions [L x D x H]	mm	2792x1183x1735			3540x1183x1735		3540x1653x1846			3540x1653x2330		4206 x 1653 x 2330
Thermal power @40/45°C; 7°C outside air	kW	60.3	74.2	85.5	100.7	121.3	127.6	147.0	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 [UNI 14511]		3.21	3.27	3.21	3.22	3.33	3.23	3.25	3.21	3.20	3.20	3.20
SCOP		3.74	3.99	3.88	4.03	3.97	3.89	3.88	3.91	4.03	4.09	4.16

TAS FS (Free Cooling)		061	071	081	101	114	124	144	164	194	214	244
Cooling capacity @15/10°C; 35°C outside air*	kW	60.9	75.1	87.9	101.9	117.6	125.8	148.3	160.4	186.3	221.0	248.7
Total absorbed power [UNI 14511]	kW	17.0	21.6	25.9	30.0	34.1	36.7	44.3	48.3	56.7	72.1	81.4
EER [UNI 14511]		3.57	3.48	3.39	3.39	3.45	3.43	3.35	3.32	3.29	3.07	3.06
Total Free-Cooling Temperature	°C	1	-0.8	-2.8	-2.5	-4.2	-2	-3.8	-5.2	-2.9	-5.4	-3.7
Sound power [Base model]	db(A)	81	83	83	86	83	84	86	86	87	88	89
Sound power [Low Noise set-up]	db(A)	78	80	80	83	80	81	83	83	84	85	86
Sound power [Super Low Noise set-up]	db(A)	76	78	78	81	78	80	82	82	84	84	85
Dimensions [L x D x H]	mm	2792x1183x1735			3540x1183x1735		3540x1653x1846			3540x1653x2330		4206 x 1653 x 2330

* 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

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MHA

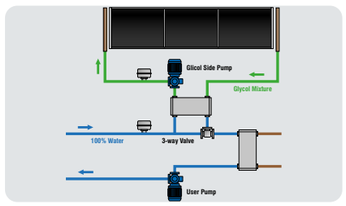
AIR CONDENSED CHILLERS AND HEAT PUMPS WITH SCROLL BLDC INVERTER COMPRESSORS

22 - 207 kW

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.

Attention to detail and to low noise requirements

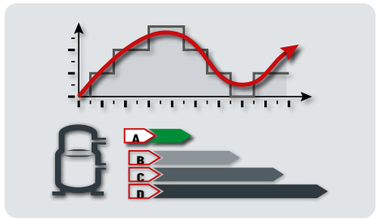
Depending on how important noise containment is in the overall plant layout, a standard version or a Low Noise version can be chosen.
Adopted technical solutions include fan speed control, the use of anti-vibration devices on the refrigerating circuit, compartmentalisation of compressors and pumping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



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.

- Refrigerant R410A
- Available in version:
  1. Liquid chiller
  2. Free-Cooling chiller
  3. Reversible heat pump
- Variable flow management up to 25% of the nominal flow rate
- Electronically controlled expansion valve supplied as standard
- Quick water connections
- Programmable microprocessor control with dedicated software
- Optional electronic flow switch



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.

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.

Advantages of modulation

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

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.

		30	35	61	62	81	82	101	102	104	121	122	124	141	142	144	171	172	174	204	244	294
MAXIMUM EFFICIENCY		Water Conditions: 12/7 °C user; 35 °C outside air																				
Cooling capacity	kW	22.5	26.5	55.4	55.4	67.9	68.0	86.8	87.5	84.5	110.6	116.0	115.2	143.2	144.1	144.7	146.6	146.9	156.6	140.8	234.4	206.8
Total absorbed power	kW	7.2	8.5	17.8	17.9	21.6	21.7	27.6	28.0	26.4	35.3	37.2	36.8	45.7	46.5	46.5	52.4	47.0	50.5	45.2	74.1	66.2
EER [UNI 14511]		3.13	3.12	3.11	3.10	3.14	3.13	3.14	3.13	3.20	3.13	3.12	3.13	3.13	3.10	3.11	3.10	3.12	3.10	3.11	3.16	3.12
MAXIMUM EFFICIENCY		Water Conditions: 16/10°C user; 35 °C outside air																				
Cooling capacity	kW	24.8	29.2	60.9	60.9	74.4	74.5	95.2	96.0	92.9	121.4	127.4	126.3	157.5	158.3	158.6	160.8	161.3	171.9	155.1	257.1	226.7
Total absorbed power	kW	7.3	8.6	18.1	18.1	22.0	22.2	28.1	28.4	27.4	35.9	37.9	37.5	47.6	47.4	47.3	47.6	48.0	51.1	45.9	75.2	67.6
EER [UNI 14511]		3.41	3.41	3.36	3.35	3.38	3.36	3.39	3.38	3.39	3.38	3.36	3.37	3.31	3.34	3.35	3.37	3.36	3.36	3.38	3.42	3.36
MAXIMISED EFFICIENCY		Water Conditions: 12/7 °C user; 35 °C outside air																				
Cooling capacity	kW	30.1	40.0	57.6	57.6	72.7	73.4	98.1	98.8	102.3	124.5	127.0	126.5	146.8	147.7	157.2	157.1	157.3	170.3	200.6	254.9	283.2
Total absorbed power	kW	11.3	15.0	19.0	18.9	24.9	24.8	34.3	34.2	37.6	44.1	43.3	43.5	48.5	48.4	53.2	52.7	52.6	58.8	73.0	86.9	100.3
EER [UNI 14511]		2.66	2.67	3.03	3.05	2.91	2.96	2.86	2.89	2.72	2.82	2.93	2.91	3.03	3.05	2.95	2.98	2.99	2.89	2.75	2.93	2.82
Total Free Cooling temperature	°C	1.6	-1.1	2.2	(1)	0.6	(1)	-0.3	(1)	-0.8	0.6	(1)	0.5	1.2	(1)	0.6	0.4	(1)	-0.4	-0.1	0.1	-1.2
MAXIMISED EFFICIENCY		Water Conditions: 16/10°C user; 35 °C outside air																				
Cooling capacity	kW	33.2	44.0	63.3	63.3	79.6	80.4	107.5	108.4	112.4	136.6	139.5	138.6	161.5	162.3	172.3	172.2	172.8	186.9	219.9	279.6	309.2
Total absorbed power	kW	11.5	15.2	19.4	19.3	25.5	25.4	35.0	34.9	38.4	45.1	44.2	44.4	49.4	49.2	54.2	53.7	53.6	59.9	74.3	88.5	102.5
EER [UNI 14511]		2.89	2.89	3.27	3.29	3.12	3.17	3.07	3.11	2.93	3.03	3.16	3.12	3.27	3.30	3.18	3.21	3.22	3.12	2.96	3.16	3.02
Total Free Cooling temperature	°C	-0.3	-3.2	0.6	(1)	-1.2	(1)	-2.1	(1)	-2.6	-1.1	(1)	-1.3	-0.5	(1)	-1.2	-1.3	(1)	-2.3	-2.0	-1.7	-3.2
ESEER		3.59	3.77	3.90	4.16	3.88	4.19	3.84	4.20	4.09	4.00	4.40	4.15	3.92	4.30	4.14	3.82	4.24	4.18	4.28	4.40	4.29
Sound power	dB(A)	87	92	87	87	88	88	90	90	90	94	94	88	94	94	90	94	94	90	94	94	94
Set-up 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 [L x D x H]	mm	1661x 914x 1468		2090x 1185x 1735		2972x1185x1735					3540x1185x1735			3540x1653x1847						3538x 1653x 2247	4206x 1653x 2247	
Weight [without options]	kg	418	424	600	600	750	750	790	790	830	1040	1040	1080	1340	1340	1380	1440	1440	1480	1580	1980	2010

(1) Free-Cooling version not available for this Efficiency Pack
Also available with 60 Hz power supply

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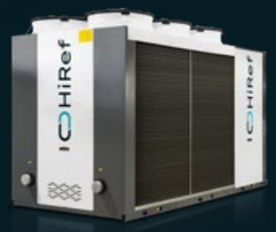
TPS

CHILLERS AND HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS

49 - 396 kW



MULTI-PROTOCOL COMMUNICATION INTERFACE

SCROLL COMPRESSORS

AXIAL FANS

CORROSION RESISTANT MATERIAL

A2L READY

LOW GWP REFRIGERANT

PLATE HEAT EXCHANGERS

TPS is the HiRef 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, thanks to the possibility of choosing from as many as 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 set-ups available: Standard, Low Noise and Super Low Noise
- Electric control panel with IP55 protection rating
- Radial EC motor fans (optional)
- Electronic expansion valve
- Easy accessibility thanks to the optimisation of the internal space
- Programmable microprocessor control with proprietary software
- Available with variable flow pumping kit
- Maintenance kit available
- Compliance with ERP regulations

The **TPS** units can be supplied both with the standard R410A refrigerant, in class A1 (non-flammable), and with the new generation R454B refrigerant, in class A2L (mildly flammable) or in the A2L-ready configuration.

DETAILS AT **page 5**

Is the unit working?

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 multiscroll 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		42	52	62	72	82	92	94	102	104	122	124	142	144	162
Cooling capacity @12/7°C; 35°C outside air	kW	49.1	54.2	63.0	70.7	78.3	94.1	95.9	105.4	109.4	122.1	125.0	133.5	141.1	148.2
Total absorbed power	kW	15.9	18.3	20.8	24.4	28.2	32.6	32.1	38.6	36.6	40.8	42.1	44.0	48.3	54.8
EER [UNI 14511]		3.10	2.96	3.03	2.89	2.77	2.88	2.99	2.73	2.99	2.99	2.97	3.03	2.92	2.70
Total Free Cooling temperatures**	°C	-2.1	-3.2	-2.2	-3.4	-4.4	-2.9	*	-4.3	*	*	-4.0	*	-5.4	*
Cooling capacity @16/10°C; 35°C outside air	kW	54.4	59.8	69.6	78.1	85.7	103.4	105.6	115.3	119.9	134.1	137.3	146.1	154.5	162.2
Total absorbed power	kW	16.2	18.7	21.2	24.9	28.8	33.2	32.7	39.5	37.3	41.5	43.0	45.0	49.4	55.9
EER [UNI 14511]		3.36	3.20	3.28	3.13	2.98	3.12	3.23	2.92	3.22	3.23	3.20	3.25	3.13	2.90
Total Free Cooling temperatures**	°C	0.1	-1.1	-0.3	-1.3	-2.5	-0.9	*	-2.3	*	*	-2.1	*	-3.5	*
Cooling capacity @26/20°C; 35°C outside air	kW	72.0	78.1	91.8	101.9	111.1	135.1	139.0	149.5	155.6	174.7	180.7	190.2	201.8	210.3
Total absorbed power	kW	17.3	19.9	22.7	26.8	31.1	35.7	35.0	42.9	39.8	44.7	46.0	48.5	53.0	60.4
EER [UNI 14511]		4.17	3.93	4.05	3.81	3.57	3.79	3.97	3.48	3.91	3.91	3.93	3.92	3.81	3.48
Total Free Cooling temperatures**	°C	6.0	4.6	6.2	4.5	3.0	5.1	*	3.2	*	*	3.6	*	1.8	*
ESEER		4.48	4.42	4.15	4.15	4.27	4.11	4.67	4.13	4.17	4.29	4.25	4.44	4.33	4.12
Sound power	db(A)	*	*	79.0	80.0	82.0	85.0	*	86.0	*	86.0	82.0	86.0	83.0	87.0
Sound power of Low Noise set-up	db(A)	72	73	73	74	78	80	75	81	76	82	78	82	78	83
Dimensions [L x D x H]	mm	2090x1183x1735			2010x1183x1735		2442x 1183x 1735	3540x 1183x 1735	2442x 1183x 1735	3540x 1183x 1735	3190x 1183x 1735	3540x 1183x 1735	3190x 1183x 1735	3540x 1183x 1735	3190x 1183x 1735

TPS		164	174	192	194	212	214	242	244	272	274	294	324	364	394
Cooling capacity @12/7°C; 35°C outside air	kW	155.9	165.8	181.7	188.0	207.0	210.7	229.6	231.6	265.4	266.6	279.7	292.2	339.9	396.6
Total absorbed power	kW	55.9	54.2	63.4	65.4	73.9	77.5	82.8	85.2	89.5	90.3	100.9	111.9	132.5	153.8
EER [UNI 14511]		2.79	3.06	2.87	2.87	2.80	2.72	2.77	2.72	2.97	2.95	2.77	2.61	2.57	2.58
Total Free Cooling temperatures**	°C	-6.7	*	-5.0	-5.5	-6.8	-7.0	-8.0	-8.2	-7.0	-7.1	-7.7	-8.3	-11.0	-10.5
Cooling capacity @16/10°C; 35°C outside air	kW	170.3	182.3	199.9	206.1	226.8	230.9	250.9	253.7	289.8	292.1	306.7	320.4	369.8	431.7
Total absorbed power	kW	57.2	55.0	64.5	66.8	75.7	79.4	84.8	87.3	91.6	92.2	103.0	114.1	135.9	157.7
EER [UNI 14511]		2.98	3.32	3.10	3.09	3.00	2.91	2.96	2.91	3.16	3.17	2.98	2.81	2.72	2.74
Total Free Cooling temperatures**	°C	-5.0	*	-3.2	-3.7	-5.1	-5.3	-6.4	-6.6	-5.2	-5.3	-6.0	-6.7	-9.3	-8.6
Cooling capacity @26/20°C; 35°C outside air	kW	220.9	240.1	262.1	269.0	295.8	298.2	325.2	328.1	376.1	379.9	398.6	416.4	470.6	550.3
Total absorbed power	kW	61.8	58.1	69.2	71.6	82.2	86.5	92.6	95.0	99.4	99.5	110.8	122.8	149.0	173.2
EER [UNI 14511]		3.57	4.13	3.79	3.76	3.60	3.45	3.51	3.45	3.78	3.82	3.60	3.39	3.16	3.18
Total Free Cooling temperatures**	°C	-0.2	*	2.1	1.5	-0.3	-0.5	-1.9	-2.1	0.2	-0.3	-1.3	-2.2	-5.0	-4.2
ESEER		4.28	4.36	4.17	4.05	4.17	4.07	4.07	4.10	4.14	4.13	4.03	4.01	3.95	4.06
Sound power	db(A)	85.0	86.0	92.0	87.0	92.0	89.0	94.0	89.0	94.0	89.0	89.0	90.0	94.0	97.0
Sound power of Low Noise set-up	db(A)	81	*	88	83	89	84	91	84	91	85	85	86	90	92
Dimensions [L x D x H]	mm	3540x 1183x 1735	3538x1653x1847							4206x1653x2330				4296x 1653x 2330	5350x 1653x 2330

* Set-up not available

** 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
Also available with 60 Hz power supply
Data declared using R410A refrigerant

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TSL

CLASS A CHILLERS AND HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS

307 - 1006 kW

The new **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.

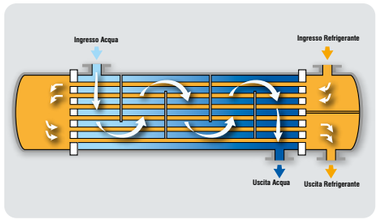
- 3 different soundproofing set-ups available: Standard, Low Noise and Super Low Noise
- Electric control panel with IP55 protection rating
- Class A units in both chiller and heat pump modes
- Radial EC motor fans (optional)
- Electronic expansion valve
- Easy accessibility thanks to the optimisation of the internal space
- Programmable microprocessor control with proprietary software
- Compliance with ERP regulations

The **TSL** units can be supplied both with the standard R410A refrigerant, in class A1 (non-flammable), and with the new generation R454B refrigerant, in class A2L (mildly flammable) or in the A2L-ready configuration.

DETAILS AT **page 5**

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.



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 through-sections, 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.

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 CS (Chilling Only)		294	324	374	404	454	496	556	596	636	676	748	808	868	900
Cooling capacity @16/10°C; 35°C outside air	kW	307.4	356.4	397.1	432.7	473.7	530.2	599.2	651.4	672.3	717.3	802.9	866.8	938.0	1006.0
Total absorbed power	kW	90.0	106.0	118.7	129.7	151.1	156.1	179.8	196.7	206.4	222.3	236.5	258.8	272.5	301.7
EER [UNI 14511]		3.42	3.36	3.35	3.34	3.14	3.40	3.33	3.31	3.26	3.23	3.39	3.35	3.44	3.33
SEER		4.90	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
Sound power [Base model]	db(A)	89	90	90	90	92	91	92	91	93	93	93	93	94	94
Sound power [Low Noise set-up]	db(A)	86	87	87	87	89	87	89	88	90	90	90	90	91	91
Sound power [Super Low Noise set-up]	db(A)	83	85	85	85	86	85	87	86	87	88	88	87	88	89
Dimensions [L x D x H]	mm	3520 x 2256 x 2652		4520 x 2256 x2652			5520 x 2256 x 2652			6520 x 2256 x 2652		7520 x 2256 x2652		8520 x 2256 x 2652	

TSL HS (Heat Pump)		294	324	374	404	454	496	556	596	636	676	748	808	868	900
Cooling capacity @16/10°C; 35°C outside air	kW	307.4	356.4	397.1	432.7	473.7	530.2	599.2	653.1	697.2	729.8	805.8	873.3	907.3	1002.4
Total absorbed power	kW	90.0	106.0	118.7	129.7	151.1	156.1	179.8	197.0	206.9	222.7	237.9	259.4	281.0	295.5
EER [UNI 14511]		3.42	3.36	3.35	3.34	3.14	3.40	3.33	3.32	3.37	3.28	3.39	3.37	3.23	3.39
SEER		-	-	-	-	-	-	-	5.19	5.10	5.20	4.63	4.69	4.73	4.63
Sound power [Base model]	db(A)	89	90	90	90	92	91	92	91	93	93	93	93	94	95
Sound power [Low Noise set-up]	db(A)	86	87	87	87	89	87	89	88	90	90	90	90	91	91
Sound power [Super Low Noise set-up]	db(A)	83	85	85	85	86	85	87	86	87	88	88	87	88	89
Dimensions [L x D x H]	mm	3520 x 2256 x2652		4520 x 2256 x2652			5520 x 2256 x 2652			6520x2256x2652		9085 x 2256 x 2652			11085 x 2256 x 2652
Thermal power @40/45°C; 7°C outside air	kW	291.9	337.0	390.9	412.9	448.8	504.5	566.0	603.9	656.7	683.9	776.9	841.0	883.1	1003.8
Total absorbed power	kW	89.1	102.3	119.2	126.0	143.4	153.6	173.3	184.1	200.6	213.5	231.3	250.5	267.9	295.1
COP [UNI 14511]		3.27	3.29	3.28	3.28	3.13	3.28	3.27	3.28	3.27	3.20	3.36	3.36	3.30	3.40
SCOP		4.01	4.17	4.10	4.10	4.24	3.82	3.99	-	-	-	-	-	-	-

TSL FS (Free Cooling)		294	324	374	404	454	496	556	596	636	676	748	808	868	900
Cooling capacity @16/10°C; 35°C outside air**	kW	302.9	347.3	386.6	418.4	460.9	522.8	594.4	638.1	663.0	705.8	790.7	861.8	925.5	989.4
Total absorbed power	kW	91.3	107.5	119.8	130.9	152.8	158.3	182.5	199.9	208.6	224.8	239.3	262.0	275.6	305.1
EER [UNI 14511]		3.32	3.23	3.23	3.20	3.02	3.30	3.26	3.19	3.18	3.14	3.30	3.29	3.36	3.24
Total Free-Cooling Temperature	°C	-8.0	-9.0	-5.0	-6.0	-7.5	-4.5	-6.5	-7.5	-5.0	-6.0	-5.0	-6.5	-5.5	-6.3
Sound power [Base model]	db(A)	89	90	90	90	92	91	92	91	93	93	93	93	94	94
Sound power [Low Noise set-up]	db(A)	86	87	87	87	89	87	89	88	90	90	90	90	91	91
Sound power [Super Low Noise set-up]	db(A)	83	85	85	85	86	85	87	86	87	88	88	87	88	89
Dimensions [L x D x H]	mm	3520 x 2256 x 2652		4520 x 2256 x2652			5520 x 2256 x 2652			6520 x 2256 x 2652		7520 x 2256 x 2652		8520 x 2256 x 2652	

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

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TAL

CLASS A CHILLERS AND HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS

286 - 1164 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

SCROLL COMPRESSORS

AXIAL FANS

CORROSION RESISTANT MATERIAL

A2L READY

LOW GWP REFRIGERANT

PLATE HEAT EXCHANGERS

CLASS A

The new **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 set-ups available: Standard, Low Noise and Super Low Noise
- Electric control panel with IP55 protection rating
- Class A units in both chiller and heat pump modes
- Optional EC motor fans
- Electronic expansion valve
- Easy accessibility thanks to the optimisation of the internal space
- Programmable microprocessor control with proprietary software
- Compliance with ERP regulations

The **TAL** units can be supplied both with the standard R410A refrigerant, in class A1 (non-flammable), and with the new generation R454B refrigerant, in class A2L (mildly flammable) or in the A2L-ready configuration.

DETAILS AT **page 5**

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 - 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 CS (Chilling Only)		294	324	374	404	454	496	556	596	636	676	748	808	868	900	1072
Cooling capacity @12/7°C; 35°C outside air	kW	286.1	319.8	370.1	397.8	450.0	485.1	542.9	591.2	629.9	662.1	746.6	791.3	841.2	911.8	1086.1
Total absorbed power	kW	86.2	101.9	114.0	124.4	145.3	149.0	172.3	188.8	198.0	213.2	226.8	248.1	261.1	289.2	344.2
EER [UNI 14511]		3.32	3.14	3.25	3.20	3.10	3.26	3.15	3.13	3.18	3.10	3.29	3.19	3.22	3.15	3.16
SEER		5.18	4.96	5.08	5.05	4.96	5.25	5.22	5.32	5.30	5.18	5.08	5.01	4.97	4.98	5.12
Sound power [Base model]	db(A)	89	90	90	90	92	91	92	91	93	93	93	93	94	94	95
Sound power [Low Noise set-up]	db(A)	86	87	87	87	89	87	89	88	90	90	90	90	91	91	92
Sound power [Super Low Noise set-up]	db(A)	83	85	85	85	86	85	87	86	87	88	88	87	88	89	90
Dimensions [L x D x H]	mm	3520x2256x2680		4520x2256x2680			5520x2256x2680			6520x2256x2680		7520x2256x2680		8520x2256x2680		11085 x 2256 x 2652

TAL HS (Heat Pump)		294	324	374	404	454	496	556	596	636	676	748	808	868	900	1072
Cooling capacity @12/7°C; 35°C outside air	kW	286.1	319.8	370.1	397.8	450.0	485.1	542.9	591.2	629.9	662.1	750.9	795.9	849.4	932.2	1113.5
Total absorbed power	kW	86.2	101.9	114.0	124.4	145.3	149.0	172.3	188.8	198.0	213.2	227.5	248.5	269.5	283.5	335.0
EER [UNI 14511]		3.32	3.14	3.25	3.20	3.10	3.26	3.15	3.13	3.18	3.10	3.30	3.20	3.15	3.29	3.32
SEER		-	-	-	-	-	-	-	5.32	5.30	5.26	4.96	4.91	4.90	4.95	5.12
Sound power [Base model]	db(A)	89	90	90	90	92	91	92	91	93	93	93	93	94	95	96
Sound power [Low Noise set-up]	db(A)	86	87	87	87	89	87	88	87	89	89	90	89	90	91	92
Sound power [Super Low Noise set-up]	db(A)	84	85	85	85	87	85	86	85	87	87	88	87	88	89	90
Dimensions [L x D x H]	mm	3520x2256x2680		4520x2256x2680			5520x2256x2680			6520x2256x2680		9085x2256x2680			11085 x 2256 x 2680	12930 x 2256 x 2680
Thermal power @40/45°C; 7°C outside air	kW	293.0	335.5	381.8	410.9	468.9	512.0	571.2	622.8	676.5	722.2	759.0	821.6	879.2	967.3	1161.1
Total absorbed power	kW	91.0	104.7	119.5	128.4	146.7	159.9	178.7	194.8	211.6	226.0	236.5	256.6	274.8	298.4	362.5
COP [UNI 14511]		3.22	3.21	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.21	3.20	3.20	3.24	3.20
SCOP		4.04	4.19	4.08	4.09	4.24	3.93	4.05	-	-	-	-	-	-	-	-

TAL FS (Free Cooling)		294	324	374	404	454	496	556	596	636	676	748	808	868	900	1072
Cooling capacity @15/10°C; 35°C outside air*	kW	308.0	343.1	398.2	427.3	470.3	520.5	581.7	632.7	675.9	698.6	801.6	850.1	902.2	977.3	1163.8
Total absorbed power	kW	89.0	105.3	117.4	128.6	150.2	154.6	178.6	196.5	205.1	221.0	234.6	257.0	270.1	300.1	356.7
EER [UNI 14511]		3.46	3.26	3.39	3.32	3.13	3.37	3.26	3.22	3.30	3.16	3.42	3.31	3.34	3.26	3.26
Total Free-Cooling Temperature	°C	-6.9	-8.4	-4.6	-5.4	-7	-4.4	-6.1	-7.6	-5.3	-5.8	-5.3	-6.2	-4.8	-6.1	-6.1
Sound power [Base model]	db(A)	89	90	90	90	92	91	92	91	93	93	93	93	94	94	95
Sound power [Low Noise set-up]	db(A)	86	87	87	87	89	87	89	88	90	90	90	90	91	91	92
Sound power [Super Low Noise set-up]	db(A)	83	85	85	85	86	85	87	86	87	88	88	87	88	89	90
Dimensions [L x D x H]	mm	3860x2256x2680		4860x2256x2680			5860x2256x2680			6860x2256x2680		7860x2256x2680		8860x2256x2680		11270 x 2256 x 2680

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

DATA CENTER | INDUSTRIAL | SERVICES

TPL

CLASS A CHILLERS AND HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS

373 - 1115 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

SCROLL COMPRESSORS

AXIAL FANS

CORROSION RESISTANT MATERIAL

A2L READY

LOW GWP REFRIGERANT

PLATE HEAT EXCHANGERS

The new **TPL** range chillers and heat pumps are high power density air/water units for both cooling and heating, 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 set-ups available: Standard, Low Noise and Super Low Noise
- Electric control panel with IP55 protection rating
- Class A units in both chiller and heat pump modes
- Optional EC motor fans
- Electronic expansion valve
- Easy accessibility thanks to the optimisation of the internal space
- Programmable microprocessor control with proprietary software
- Compliance with ERP regulations

The **TPL** units can be supplied both with the standard R410A refrigerant, in class A1 (non-flammable), and with the new generation R454B refrigerant, in class A2L (mildly flammable) or in the A2L-ready configuration.

DETAILS AT **page 5**

Easy maintenance

To carry out maintenance of the condensing coil manifolds and refrigeration circuit components, which are located behind the electrical panel, the **TPL** 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 **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.

Maximised energy efficiency

The units of the **TPL** range fall within the energy efficiency class A, on 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.

TPL CS (Chilling Only)		374	414	456	486	536	616	658	748	818	900	942	1072
Cooling capacity @12/7°C; 35°C outside air	kW	373.7	433.2	464.7	521.6	570.2	627.6	697.4	766.9	844.2	957.6	1062.0	1115.2
Total absorbed power	kW	129.9	142.1	157.8	185.0	188.9	219.6	248.4	260.1	302.5	321.1	365.1	398.5
EER [UNI 14511]		2.88	3.05	2.95	2.82	3.02	2.86	2.81	2.95	2.79	2.98	2.91	2.80
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
Sound power [Base model]	db(A)	90	92	91	92	91	93	93	93	95	93	95	94
Sound power [Low Noise set-up]	db(A)	87	89	89	90	89	91	91	90	92	91	93	92
Sound power [Super Low Noise set-up]	db(A)	86	87	87	88	88	89	89	89	90	89	90	90
Dimensions [L x D x H]	mm	3065x 2256x 2652	4065x2256x2652			5065x2256x2652			6060x2256x2650		7060x2256x2650		8060x 2256x 2650

TPL HS (Heat Pump)		374	414	456	486	536	616	658	748	818	900	942	1072
Cooling capacity @12/7°C; 35°C outside air	kW	373.7	433.2	464.7	521.6	570.2	627.6	697.4	764.2	837.9	940.1	1041.9	1159.1
Total absorbed power	kW	129.9	142.1	157.8	185.0	188.9	219.6	248.4	261.3	305.3	332.0	377.2	381.9
EER [UNI 14511]		2.88	3.05	2.95	2.82	3.02	2.86	2.81	2.92	2.74	2.83	2.76	3.04
SEER		-	-	-	-	5.14	5.02	4.71	4.81	4.67	4.71	4.85	5.13
Sound power [Base model]	db(A)	90	92	91	92	91	93	93	93	95	94	95	94
Sound power [Low Noise set-up]	db(A)	87	89	89	90	89	91	91	90	92	91	93	92
Sound power [Super Low Noise set-up]	db(A)	86	87	87	88	88	89	89	89	90	90	91	91
Dimensions [L x D x H]	mm	3065x 2256x 2652	4065x2256x2652			5065x2256x2652			7415x2256x2650		8415x2256x2650		10415x 2256x 2650
Thermal power @40/45°C; 7°C outside air	kW	390.3	450.1	483.8	548.2	598.7	676.6	732.7	781.8	880.4	968.3	1082.9	1194.9
Total absorbed power	kW	130.9	150.6	161.3	181.7	199.9	226.7	235.7	255.2	287.7	322.7	358.6	394.1
COP [UNI 14511]		2.98	2.99	3.00	3.02	2.99	2.98	3.11	3.06	3.06	3.00	3.02	3.03
SCOP		4.03	4.06	3.98	4.05	-	-	-	-	-	-	-	-

TPL FS (Free Cooling)		374	414	456	486	536	616	658	748	818	900	942	1072
Cooling capacity @15/10°C; 35°C outside air*	kW	395.7	462.0	494.9	554.8	607.3	663.6	736.1	817.1	889.3	1019.3	1126.7	1187.5
Total absorbed power	kW	136.1	147.9	164.2	193.0	197.6	230.8	260.8	271.0	318.2	335.3	381.5	414.8
EER [UNI 14511]		2.91	3.12	3.02	2.87	3.07	2.88	2.82	3.02	2.80	3.04	2.95	2.86
Total 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 [Base model]	db(A)	90	92	91	92	91	93	93	93	95	93	95	94
Sound power [Low Noise set-up]	db(A)	87	89	89	90	89	91	91	90	92	91	93	92
Sound power [Super Low Noise set-up]	db(A)	86	87	87	88	88	89	89	89	90	89	90	90
Dimensions [L x D x H]	mm	3415x 2256x 2652	4415x2256x2652			5415x2256x2652			6415x2256x2650		7415x2256x2650		8415x 2256x 2650

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

HiRef

AIR/WATER

Multipurpose

INDUSTRIAL SERVICES

HPS / MPS

REVERSIBLE AND MULTI-PURPOSE AIR CONDENSED HEAT PUMPS FOR LOW OUTDOOR TEMPERATURES

45 - 213 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

EVI SCROLL COMPRESSORS

AXIAL FANS

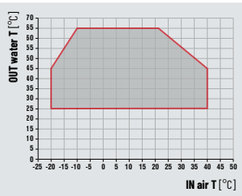
CORROSION RESISTANT MATERIAL

PLATE HEAT EXCHANGERS

HPS / MPS is the HiRef range of air-to-water multipurpose 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.

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.



Production of hot water up to 65 °C

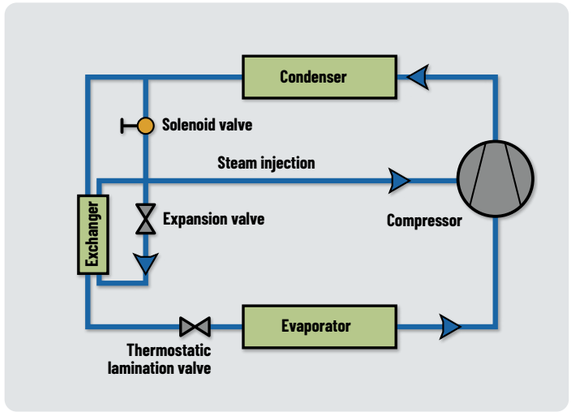
The units of the **HPS / MPS** range are capable of producing water at 65 °C, as well as operating with outdoor air temperatures down to -20 °C.

HPS / MPS

- Refrigerant R410A
- EVI compressors with steam injection
- Electronically controlled expansion valve
- "Cold" start Smart Kit
- Coils with hydrophilic treatment and wider fin pitch
- Defrost ice disposal chutes with heating elements
- Optional EC electronic switching fans

MPS only

- Available in multipurpose version for 2 and 4 pipe systems



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

The Scroll compressors of the **HPS / 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 (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 / MPS** range the ideal solution in case of extremely low outdoor temperatures.

Extra low noise

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

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.

HPS / MPS		041	051	071	081	101	134	164	204
		User water 40/45 °C; Outdoor air 7 °C							
Thermal power	kW	45.7	56.4	75.7	85.4	96.3	147.7	166.6	212.9
Total absorbed power	kW	14.0	16.9	22.8	26.3	28.7	44.3	52.3	65.7
COP [UNI 14511]		3.27	3.35	3.32	3.25	3.35	3.34	3.19	3.24
		User water 55/65°C; Outdoor air 7 °C							
Thermal power	kW	45.2	55.8	75.9	86.4	97	148.7	168.3	211.5
Total absorbed power	kW	19.3	22.7	32.7	37.4	40.5	63.7	74.4	90.8
COP [UNI 14511]		2.35	2.35	2.32	2.31	2.39	2.33	2.26	2.33
		User water 40/50°C; Outdoor air -15°C							
Thermal power	kW	27.2	34.2	44.9	51.2	56.9	85.2	97.5	128.7
Total absorbed power	kW	12.9	15.3	21.9	25	28	41.6	50.4	62
COP [UNI 14511]		2.11	2.24	2.06	2.04	2.03	2.05	1.93	2.08
SCOP		2.82	2.96	2.91	2.90	2.91	3.2	2.85	3.05
Sound power of Low Noise set-up	db(A)	81	81	82	83	84	87	88	88
Dimensions [L x D x H]	mm	2090 x 1183 x 1735		2792 x 1183 x 1735		3540 x 1183 x 1679	3538 x 1653 x 1884		3538 x 1653 x 2284

Also available with 60 Hz power supply

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MPA

MULTI-PURPOSE CLASS A HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS

51 - 250 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

AXIAL FANS

CORROSION RESISTANT MATERIAL

A2L READY

LOW GWP REFRIGERANT

SCROLL COMPRESSORS

CLASS A

FAST RESTART

PLATE HEAT EXCHANGERS

The new **MPA** class A 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 **MPA** 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 **MPA** range uses latest generation scroll compressors, braze-welded plate exchanger optimised for use with high pressure refrigerants (R410A/R454B) and axial fans suitable for outdoor installation.

- 3 different soundproofing set-ups available: Standard, Low Noise and Super Low Noise
- Available versions:
  1. Multi-purpose for 2-pipe system (M)
  2. Multi-purpose for 4-pipe system (P)
- Class A units in both chiller and heat pump modes
- Radial EC motor fans (optional)
- Electronic expansion valve
- Easy accessibility thanks to the optimisation of the internal space
- Programmable microprocessor control with proprietary software
- Compliance with ERP regulations

The **MPA** units can be supplied both with the standard R410A refrigerant, in class A1 (non-flammable), and with the new generation R454B refrigerant, in class A2L (mildly flammable) or in the A2L-ready configuration.

DETAILS AT **page 5**

Plate heat exchangers

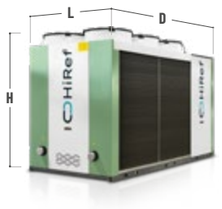
The **MPA** range uses braze-welded plate exchangers with asymmetrical channels, suitable for the use of high and medium pressure refrigerant gases. The configuration with asymmetrical channels allows high heat exchange efficiencies to be reached while maintaining low pressure drops on the water side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

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 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 **MPA**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 P		061	071	081	101	114	124	144	164	194	214	244
		Chilling - Water conditions: user side 12/7°C; outside air temp. 35°C										
Cooling capacity [UNI 14511]	kW	61.2	75.3	88.3	102.4	118.2	127.0	149.6	162.5	187.7	222.6	250.4
Total absorbed power [UNI 14511]	kW	16.9	21.4	25.6	29.7	33.8	35.9	43.3	47.2	55.9	71.0	80.0
EER [UNI 14511]		3.62	3.53	3.44	3.45	3.50	3.54	3.46	3.44	3.36	3.14	3.13
SEER		4.70	4.55	4.52	4.66	5.14	5.06	5.05	5.15	5.15	5.00	4.96
		HEATING - Water conditions: user side 40/45°C; outside air temp. 7°C										
Thermal power [UNI 14511]	kW	61.5	75.5	87.2	102.5	123.9	130.4	149.9	163.0	186.9	227.6	265.1
Total absorbed power [UNI 14511]	kW	17.5	21.1	24.8	29.2	33.8	36.7	42.1	46.3	53.2	64.8	75.3
COP [UNI 14511]		3.51	3.57	3.51	3.51	3.67	3.55	3.56	3.52	3.51	3.51	3.52
SCOP		4.00	4.27	4.19	4.33	4.26	4.16	4.19	4.22	4.37	4.41	4.51
ERP efficiency	%	157	168	165	170	167	163	165	166	172	173	177
		COOLING AND HEATING - Water conditions *										
Cooling capacity [UNI 14511]*	kW	73.9	93.0	111.0	126.9	146.5	155.2	186.8	203.1	238.5	286.3	324.7
Thermal power [UNI 14511]*	kW	59.1	74.5	89.2	101.2	116.9	124.2	150.0	162.5	191.0	227.2	258.0
Total absorbed power [UNI 14511]*		15.6	19.5	23.1	27.2	31.5	32.8	39.0	43.0	50.6	62.9	71.1
Total COP [UNI 14511]*		8.54	8.58	8.68	8.38	8.37	8.51	8.64	8.50	8.49	8.16	8.20
Sound power level Lw [Standard unit]	db(A)	81	83	83	86	83	84	86	86	87	88	89
Sound power level Lw [Low noise unit]	db(A)	76	78	78	81	78	80	82	82	84	84	85
Dimensions [L x D x H]	mm	2792x1183x1735			3540x1183x1735			3540x1653x1846		3540x1653x2330		8950x2258x2652

* Cold user In Water temperature 12°C
Cold user Out water temperature 7°C
Hot user In water temperature 40°C
Hot user Out water temperature 45°C
Also available with 60 Hz power supply

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MSL

MULTI-PURPOSE CLASS A HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS

281 - 1146 kW

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.

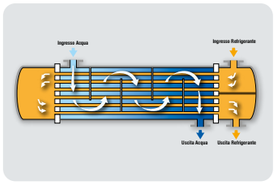
- Different soundproofing set-ups available: Standard, Low Noise and Super Low Noise
- Electric control panel with IP55 protection rating
- Class A units in both chiller and heat pump modes
- Radial EC motor fans (optional)
- Electronic expansion valve
- Easy accessibility thanks to the optimisation of the internal space
- Programmable microprocessor control with proprietary software
- Compliance with ERP regulations

The **MSL** units can be supplied both with the standard R410A refrigerant, in class A1 (non-flammable), and with the new generation R454B refrigerant, in class A2L (mildly flammable) or in the A2L-ready configuration.

DETAILS AT **page 5**

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.



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 through-sections, 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.

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.

* Cold user In Water temperature 12°C
Cold user Out water temperature 7°C
Hot user In water temperature 40°C
Hot user Out water temperature 45°C

MSL P		294	324	374	404	454	496	556	596
		Chilling - Water conditions: user side 12/7°C; outside air temp. 35°C							
Cooling capacity [UNI 14511]	kW	281.5	326.1	364.2	396.6	436.1	485.9	549.9	600.5
Total absorbed power [UNI 14511]	kW	88.7	104.2	117.0	127.6	148.6	153.7	176.9	193.4
EER [UNI 14511]		3.18	3.13	3.11	3.11	2.93	3.16	3.11	3.11
ESEER		-	-	-	-	-	-	-	5.19
		HEATING - Water conditions: user side 40/45°C; outside air temp. 7°C							
Thermal power [UNI 14511]	kW	296.9	332.8	383.4	418.3	456.0	512.6	564.2	605.8
Total absorbed power [UNI 14511]	kW	89.2	102.3	119.1	126.0	143.5	153.7	173.3	184.1
COP [UNI 14511]		3.33	3.25	3.22	3.32	3.18	3.33	3.26	3.29
SCOP		4.01	4.17	4.10	4.10	4.24	3.82	3.99	0.00
ERP efficiency	%	145	154	144	146	147	145	146	145
		COOLING AND HEATING - Water conditions*							
Cooling capacity [UNI 14511]*	kW	355.2	405.6	455.5	498.8	562.1	615.6	692.4	754.0
Thermal power [UNI 14511]*	kW	279.4	317.3	354.4	391.5	437.9	485.1	543.5	594.3
Total absorbed power [UNI 14511]*		81.5	95.4	109.8	116.2	135.2	141.8	162.8	172.8
Total COP [UNI 14511]*		7.79	7.58	7.38	7.66	7.40	7.77	7.59	7.80
Sound power level Lw [Standard unit]	db(A)	89	90	90	90	92	91	92	91
Sound power level Lw [Low noise unit]	db(A)	86	87	87	87	89	87	89	88
Dimensions [L x D x H]	mm	4520x2256x2652					5520x2256x2652		

MSL P		636	676	748	808	868	900	1072
		Chilling - Water conditions: user side 12/7°C; outside air temp. 35°C						
Cooling capacity [UNI 14511]	kW	639.9	669.8	737.5	798.8	831.9	917.3	1146.0
Total absorbed power [UNI 14511]	kW	203.3	218.6	234.4	255.8	275.7	291.0	343.9
EER [UNI 14511]		3.15	3.06	3.15	3.12	3.02	3.15	3.33
ESEER		5.10	5.20	4.63	4.69	4.73	4.63	4.65
		HEATING - Water conditions: user side 40/45°C; outside air temp. 7°C						
Thermal power [UNI 14511]	kW	656.7	683.9	756.3	840.3	863.4	977.7	1243.9
Total absorbed power [UNI 14511]	kW	200.6	213.5	231.2	250.5	267.7	294.8	349.9
COP [UNI 14511]		3.27	3.20	3.27	3.35	3.22	3.32	3.56
SCOP		-	-	-	-	-	-	-
ERP efficiency	%	134	141	137	131	132	139	141
		COOLING AND HEATING - Water conditions*						
Cooling capacity [UNI 14511]*	kW	792.9	851.3	937.6	1004.1	1087.9	1156.4	1425.3
Thermal power [UNI 14511]*	kW	620.7	666.5	742.0	791.7	857.1	906.0	1129.4
Total absorbed power [UNI 14511]*		186.6	201.0	212.0	230.8	248.6	270.3	319.5
Total COP [UNI 14511]*		7.57	7.55	7.92	7.78	7.82	7.63	8.00
Sound power level Lw [Standard unit]	db(A)	93	93	93	93	94	95	95
Sound power level Lw [Low noise unit]	db(A)	90	90	90	90	91	91	88
Dimensions [L x D x H]	mm	6520x2256x2652		9085x2256x2652			11085x2256x2652	13085x2258x2652

DATA CENTER | INDUSTRIAL | SERVICES

MLA

MULTI-PURPOSE CLASS A HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS

288 - 1125 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

AXIAL FANS

CORROSION RESISTANT MATERIAL

A2L READY

LOW GWP REFRIGERANT

SCROLL COMPRESSORS

CLASS A

FAST RESTART

PLATE HEAT EXCHANGERS

The air-water **MLA** 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 **MLA** 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 **MLA** 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 set-ups available: Standard, Low Noise and Super Low Noise
- Class A units in both chiller and heat pump modes
- Radial EC motor fans (optional)
- Electronic expansion valve
- Easy accessibility thanks to the optimisation of the internal space
- Programmable microprocessor control with proprietary software
- Compliance with ERP regulations

The **MLA** units can be supplied both with the standard R410A refrigerant, in class A1 (non-flammable), and with the new generation R454B refrigerant, in class A2L (mildly flammable) or in the A2L-ready configuration.

DETAILS AT **page 5**

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.

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.

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.

		294	324	374	404	454	496	556	596	636	676	748	808	868	900	1072
MLA PS		COOLING - Water conditions: user side 12/7°C; outside air temp. 35°C														
Cooling capacity [UNI 14511]	kW	288.8	322.9	374.8	401.8	448.1	487.3	545.7	593.8	617.9	663.4	756.8	804.0	840.4	942.3	1125.0
Total absorbed power [UNI 14511]	kW	86.6	102.1	114.0	125.0	144.6	150.8	173.8	191.4	198.6	214.2	228.5	249.7	270.6	283.8	335.1
EER [UNI 14511]		3.34	3.16	3.29	3.21	3.10	3.23	3.14	3.10	3.11	3.10	3.31	3.22	3.11	3.32	3.36
SEER		-	-	-	-	-	-	-	5.15	4.95	5.08	4.75	4.72	4.61	4.91	5.00
MLA PS		HEATING - Water conditions: user side 40/45°C; outside air temp. 7°C														
Thermal power [UNI 14511]	kW	293.0	325.3	407.7	444.6	481.5	508.1	559.9	600.4	656.8	684.2	780.7	866.8	889.6	981.5	1247.4
Total absorbed power [UNI 14511]	kW	83.5	95.8	110.1	118.1	134.6	146.4	163.8	177.4	192.9	205.6	218.2	236.0	252.4	274.7	333.3
COP [UNI 14511]		3.51	3.40	3.70	3.76	3.58	3.47	3.42	3.38	3.40	3.33	3.58	3.67	3.52	3.57	3.74
SCOP		4.07	4.07	4.16	4.27	4.37	4.00	4.20	-	-	-	-	-	-	-	-
ERP efficiency		159.8	159.8	163.4	167.8	171.8	157.0	165.0	-	-	-	-	-	-	-	-
ERP Efficiency Class	%	A++ / L.T. Heat Pump														
MLA PS		HEATING AND COOLING - Water conditions: user side 12/7°C; recovery side 40/45°C														
Cooling capacity [UNI 14511]*	kW	293.2	333.3	380.0	413.6	464.2	493.0	562.0	599.6	625.9	671.7	773.6	827.3	890.3	955.5	1158.0
Thermal power [UNI 14511]*	kW	366.3	418.2	476.1	516.6	583.5	620.9	706.6	756.6	795.0	853.1	963.2	1032.9	1112.3	1194.1	1446.6
Total absorbed power [UNI 14511]*		77.8	90.8	102.8	110.3	128.2	137.6	156.1	169.9	183.3	197.3	203.0	220.1	238.0	255.9	311.8
Total COP [UNI 14511]*		8.48	8.28	8.33	8.43	8.17	8.09	8.13	7.98	7.75	7.73	8.56	8.45	8.41	8.40	8.35
Sound power level Lw [Standard unit]	db(A)	89	90	90	90	92	91	92	91	93	93	93	93	94	95	96
Sound power level Lw [Low noise unit]	db(A)	86	87	87	87	89	87	88	87	89	89	90	89	90	91	92
Quiet unit	db(A)	84	85	85	85	87	85	86	85	87	87	88	87	88	89	90
Dimensions [L x D x H]	mm	3520x2256x2680		4520x2256x2680			5520x2256x2680			6520x2256x2680		9085x2256x2680			11085x2256x2680	12930x2256x2680

* Cold user In Water temperature 12°C
Cold user Out water temperature 7°C
Hot user In water temperature 40°C
Hot user Out water temperature 45°C
Also available with 60 Hz power supply

INDUSTRIAL SERVICES

HWC / HWP

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

56 - 230 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

SCROLL COMPRESSORS

EC RADIAL FANS

CORROSION RESISTANT MATERIAL

PLATE HEAT EXCHANGERS

HWC / HWP is the HiRef range of air-condensed liquid chillers with Scroll compressors for indoor installations. Four different versions (chiller, Free-Cooling chiller, reversible heat pump and multipurpose) the several available power output rates and compact frame make these units highly versatile and suited to a wide range of system layouts.

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 installation in equipment rooms and can be ducted at both suction 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).

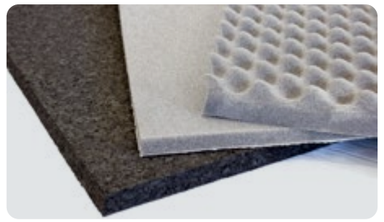
EFFICIENCY PACK 2

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.

- 2 different soundproofing set-ups available: Standard and Low Noise
- Electric control panel with IP55 protection rating
- Radial EC motor fans
- Electronic expansion valve
- Easy accessibility thanks to the optimisation of the internal space
- Programmable microprocessor control with proprietary software
- Available with single or double pumping kit in timed rotation
- Maintenance kit available
- Compliance with ERP regulations



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 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 multiscroll 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 / HWP** range particularly efficient at partial loads.

HWC CS (Chilling Only)		052	062	072	082	092	102	112	132	142	162	182	204
Cooling capacity @12/7°C; 35°C outside air	kW	55.9	62.0	71.0	78.7	94.5	106.8	119.8	128.2	142.0	155.5	183.0	201.5
Total absorbed power [UNI 14511]	kW	19.9	23.0	25.0	28.7	33.8	39.6	42.6	47.1	55.2	63.8	68.5	82.2
EER [UNI 14511]		2.81	2.69	2.84	2.74	2.80	2.70	2.82	2.72	2.57	2.44	2.67	2.45
SEER		4.38	4.10	4.46	4.38	4.20	4.29	4.36	4.36	-	-	4.14	4.10
SEPR		5.29	5.26	5.32	5.33	5.27	5.22	5.42	5.30	5.11	5.05	5.24	5.15
Sound power [Base model]	db(A)	82	82	82	83	85	86	86	86	89	90	92	89
Sound power [Low Noise set-up]	db(A)	78	79	79	80	82	83	84	84	86	88	89	86
Dimensions [L x D x H]	mm	2000x1100x2020				2400x1100x2020			3090x1100x2020			4090x1100x2104	

HWC HS (Heat Pump)		052	062	072	082	092	102	112	132	142	162	182	204
Cooling capacity @12/7°C; 35°C outside air	kW	55.1	61.2	71.0	78.7	94.5	106.0	119.6	127.9	141.6	152.3	181.1	201.5
Total absorbed power [UNI 14511]	kW	19.9	23.1	25.0	28.7	33.8	39.7	42.5	47.1	55.1	63.6	68.4	82.2
EER [UNI 14511]		2.77	2.65	2.84	2.74	2.80	2.67	2.81	2.71	2.57	2.40	2.65	2.45
Sound power [Base model]	db(A)	82	82	82	83	85	86	86	86	89	90	92	89
Sound power [Low Noise set-up]	db(A)	78	79	79	80	82	83	84	84	86	88	89	86
Dimensions [L x D x H]	mm	2000x1100x2020				2400x1100x2020			3090x1100x2020			4090x1100x2104	
Thermal power [UNI14511]	kW	58.0	64.6	76.6	85.5	102.3	115.2	131.2	141.8	159.1	175.1	203.1	230.8
Total absorbed power [UNI 14511]	kW	21.0	23.9	26.6	29.3	36.3	41.1	44.0	48.0	53.2	59.7	68.4	77.8
COP [UNI 14511]		2.76	2.71	2.88	2.92	2.82	2.80	2.98	2.96	2.99	2.93	2.97	2.97
SCOP		3.20	3.23	3.27	3.37	3.22	3.23	3.42	3.46	3.46	3.50	3.40	3.44

HWC FS (Free Cooling)		052	062	072	082	092	102	112	132	142	162	182	204
Cooling capacity @15/10°C; 35°C outside air*	kW	59.1	65.2	75.9	83.9	100.7	113.1	127.7	136.6	150.4	162.1	193.0	215.1
Total absorbed power [UNI 14511]	kW	20.5	23.9	25.9	29.6	35.2	41.2	44.2	48.8	57.5	66.2	71.1	85.5
EER [UNI 14511]		2.89	2.73	2.93	2.83	2.86	2.74	2.89	2.80	2.62	2.45	2.71	2.51
Total Free-Cooling Temperature	°C	-2.6	-3.9	-6.4	-8.1	-6.9	-8.9	-8.5	-9.8	-11.7	-13.3	-10.3	-12.6
Sound power [Base model]	db(A)	82	82	82	83	85	86	86	86	89	90	92	89
Sound power [Low Noise set-up]	db(A)	78	79	79	80	82	83	84	84	86	88	89	86
Dimensions [L x D x H]	mm	2000x1100x2020				2400x1100x2020			3090x1100x2020			4090x1100x2104	

* 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

HiRef

WATER/WATER

Liquid chillers

DATA CENTER | INDUSTRIAL | SERVICES

XTW

WATER-CONDENSED CHILLERS WITH OIL-FREE CENTRIFUGAL COMPRESSORS

122 - 916 kW

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

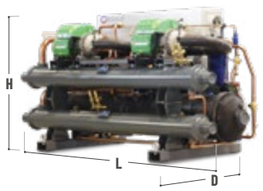
New refrigerant R1234ze

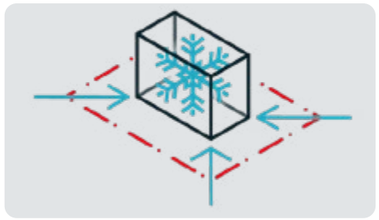
XTW range water condensed chillers use the new HFO refrigerant with low GWP (GWPR1234ze=6) as part of a wider Green Technology approach. (Also available with R134a refrigerant.)

Top-class thermodynamic performance!

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

- Refrigerant R1234ze
- Also available with R134a refrigerant
- Refrigerant leak sensor
- Quick restart technology
- Water connections with Vic-Taulic quick couplings
- Modularity and supervision managed by the software
- Low noise set-up with compressor insulation
- Ductable electrical panel (separate electrical panel ventilation)





Reduced footprint

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

"Silent" layout

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

Two-level evaporation

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

24/7 Operation

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

		XTW 310CS	XTW 450CS	XTW 520CS	XTW 651CS	XTW 901CS	XTW 1071CS	XTW 220CS	XTW 300CS	XTW 370CS	XTW 440CS	XTW 461CS	XTW 641CS	XTW 761CS	XTW 921CS
Refrigerant		R134a						R1234ze							
		Water Conditions: 12/7 °C user side, 30/35 °C source side													
Cooling capacity	kW	122-312	149-438	177-518	122-646	149-901	177-1071	89-221	108-305	130-367	240-436	89-461	109-644	129-764	240-916
EER [UNI 14511]1		5.93	5.92	6.06	6.22	6.30	6.46	5.79	5.91	5.90	6.01	6.18	6.39	6.35	6.43
		Water Conditions: 16/10 °C user side, 30/35 °C source side													
Cooling capacity	kW	109-338	149-469	163-557	109-697	149-956	163-1161	81-242	110-334	121-400	194-489	81-502	110-687	121-831	194-1034
EER [UNI 14511]1		6.71	6.73	6.87	7.11	7.26	7.43	6.81	7.04	6.98	6.82	7.23	7.54	7.41	7.43
ESEER1		7.99	7.93	8.05	8.48	8.27	8.52	7.99	7.87	8.27	7.97	8.52	8.79	8.77	8.86
SEER1		10.21	9.08	9.82	9.71	9.28	9.39	10.18	9.05	9.83	8.98	9.61	9.66	9.76	9.73
SEPR1		11.24	11.37	11.57	11.55	11.56	11.96	11.31	11.15	12.54	11.79	11.33	12.47	12.74	12.40
Sound power	dB(A)	86	89	89	89	92	92	86	89	89	89	89	92	92	92
Dimensions [L x D x H]	mm	2310 x 1080 x 2040	2700 x 1500 x 1900		4800 x 1500 x 1900		4800 x 1500 x 2000	2310 x 1080 x 2040		2700 x 1500 x 1900			4800 x 1500 x 1900		4800 x 1500 x 2000

Also available with 60 Hz power supply

DATA CENTER | INDUSTRIAL | SERVICES

XVA

WATER CONDENSED CHILLERS AND HEAT PUMPS WITH INVERTER DRIVEN SCREW COMPRESSORS

523 - 1587 kW

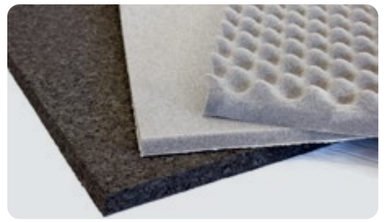
- MULTI-PROTOCOL COMMUNICATION INTERFACE
- SHELL&TUBE HEAT EXCHANGER
- SCREW COMPRESSORS
- FAST RESTART
- CORROSION RESISTANT MATERIAL
- CLASS A
- LOW GWP REFRIGERANT

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.

- Refrigerant R1234ze
- Versions with R134a refrigerant and on request with R513A are also available
- Available in version with Eurovent A (XVA) energy efficiency class
- Available in versions:
  1. Chilling only (with well water or evaporative tower)
  2. Chilling only (with Dry-Cooler)
  3. Heating only heat pump
  4. Heating only heat pumps for high temperatures.
- Electronic expansion valve
- Monitoring and limitation of the maximum absorbed power
- Available with screw compressors driven by inverters (on both compressors or on one compressor only)
- Thermal insulation hoods on the compressors for the high temperature heat pump versions (optional)

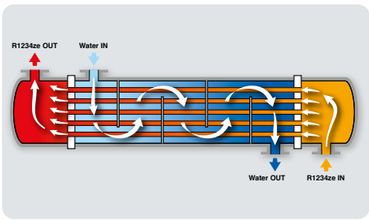
Power and flexibility

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

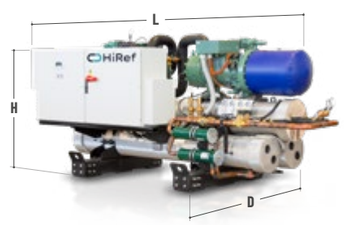
The screw compressors, the only source of noise on the machine, can be placed in a dedicated enclosure lined with sound-absorbing material that reduces the overall noise emission.



New concept of heat exchange

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

Suitable for coupling to Polymorph HiRef modules



XVA		521D	621D	691D	811D	901D	1071D	1201D	1321D	1531D	641D
R134a											
		Water Conditions: 12/7 °C user side, 30/35 °C source side									
Refrigerating power	kW	523.6	625.2	700.6	819.1	917.0	1065.9	1212.4	1320.0	1491.6	1587.7
Total absorbed power	kW	102.8	120.1	137.5	160.7	179.7	208.4	237.0	253.5	285.1	297.5
EER [UNI14511]		5.09	5.21	5.09	5.10	5.10	5.12	5.12	5.21	5.23	5.34
SEPR		8.00	8.20	8.05	8.08	8.10	8.11	8.08	8.83	9.44	9.66

XVA		451D	541D	601D	681D	801D	921D	1141D	1281D
R1234ze									
		Water Conditions: 12/7 °C user side, 30/35 °C source side							
Refrigerating power	kW	444.6	563.8	648.5	729.4	871.0	953.7	1113.8	1289.1
Total absorbed power	kW	80.8	101.5	119.3	135.1	158.2	177.9	190.5	220.2
EER [UNI14511]		5.50	5.56	5.44	5.40	5.51	5.36	5.85	5.85
SEPR		8.15	8.01	8.00	8.00	8.00	8.16	8.03	8.01

XVA		551D	641D	701D	821D	911D	1061D	1221D	1291D	1431D	1501D
R513A											
		Water Conditions: 12/7 °C user side, 30/35 °C source side									
Refrigerating power	kW	534.1	615.0	708.5	801.9	890.4	1090.6	1215.2	1266.2	1428.1	1502.4
Total absorbed power	kW	99.6	116.9	133.2	157.3	173.5	205.5	230.1	248.2	279.4	291.5
EER [UNI14511]		5.36	5.26	5.32	5.10	5.13	5.31	5.28	5.10	5.11	5.15
SEPR		8.02	8.00	8.01	8.04	8.04	8.03	8.01	8.14	8.55	8.55

HiRef

WATER/WATER

Reversible heat pumps

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XSA

CHILLERS AND HEAT PUMPS WATER CONDENSED WITH SCROLL COMPRESSORS

63-476 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

SCROLL COMPRESSORS

CORROSION RESISTANT MATERIAL

A2L READY

LOW GWP REFRIGERANT

PLATE HEAT EXCHANGERS

CLASS A

The **XSA** range consists of a wide range of units available in cooling only (D), heating only (W) and reversible heat pump (H) versions. The many refrigerating configuration options, together with specific construction choices, make **XSA** 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 units of the **XSA** range feature high nominal efficiency, including at seasonal and partial loads, which makes them the best choice among small- and medium-power water-condensed units.

Available versions:

- **D**: cooling only unit, suitable for combined use with dry-cooler
- **W**: heating only unit
- **H**: reversible heat pump

Maximised energy efficiency

The units of the **XSA** range all feature high energy efficiency ratings up to 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.

- Electronically controlled expansion valve supplied as standard
- Optional VicTaulic hydraulic couplings
- Available in Standard and Low noise versions
- Programmable electronic control as part of standard equipment
- Smart management of several units in parallel
- Suitable for coupling to Polymorph module (PLM)
- Compliance with ErP regulations

Plate heat exchangers

The **XSA** 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.

More space in the heating unit

The possibility of installing the pumping units directly on the machine avoids having to install external hydronic modules with the resulting coupling costs. This, together with the adoption of compact plate heat exchangers directly facing the right side panel of the unit, guarantees maximised unit compactness to make the most of the available space in the thermal power plant.

Integrated hydronic module

XSA units are available with integrated hydronic module (optional), which includes user side and/or source side circulation pumps.

The **XSA** units can be supplied both with the standard R410A refrigerant, in class A1 (non-flammable), and with the new generation R454B refrigerant, in class A2L (mildly flammable) or in the A2L-ready configuration.

DETAILS AT **page 5**

XSA		061HS	062HS	071HS	072HS	081HS	082HS	091HS	092HS	111HS	112HS	131HS	132HS	141HS	142HS	144HS	161HS
		UNIT 12/7 °C @ 30/35 °C															
Total Cooling capacity	kW	63.0	63.0	70.3	70.3	79.8	79.8	94.2	94.2	108.5	108.8	121.3	121.3	139.0	139.3	141.6	154.7
Total Absorbed Power	kW	12.3	12.3	13.8	13.8	15.4	15.4	18.5	18.5	21.5	21.5	24.9	24.9	27.6	27.6	27.4	30.8
EER	kW/kW	5.12	5.12	5.08	5.08	5.16	5.16	5.09	5.09	5.04	5.06	4.86	4.86	5.04	5.05	5.18	5.02
Total Pth [Thermal capacity]	kW	70.2	70.2	78.2	78.2	88.5	88.5	103.9	104.0	120.5	120.7	136.0	136.0	155.1	155.2	157.4	172.8
Total Absorbed Power	kW	15.4	15.4	17.3	17.3	19.3	19.3	23.3	23.3	27.0	27.0	31.2	31.2	34.9	34.9	34.2	39.4
COP	kW/kW	4.56	4.56	4.52	4.52	4.59	4.59	4.45	4.46	4.47	4.48	4.35	4.35	4.44	4.45	4.60	4.39
Dimensions	mm	1174 x 772 x 1594								1644 x 772 x 1594			1644 x 772 x 1594			2374 x 877 x 1854	1644 x 772 x 1594
Sound power level Lw [Base unit]	db(A)	79	79	81	81	83	83	85	85	85	85	82	85	85	82	90	90
Sound power level Lw [Low noise unit]	db(A)	75	75	77	77	79	79	81	81	81	81	78	81	81	78	86	86
SEER		6.84	7.74	6.68	7.54	6.86	7.56	6.71	7.55	6.51	7.21	6.39	7.21	6.48	7.23	8.14	6.53
SCOP		5.00	5.01	4.88	5.13	4.98	4.95	4.77	4.98	4.86	5.03	5.31	4.77	4.98	5.22	4.76	4.95

XSA		162HS	164HS	181HS	182HS	184HS	204HS	214HS	243HS	244HS	283HS	284HS	314HS	344HS	374HS	424HS	484HS
		UNIT 12/7 °C @ 30/35 °C															
Total Cooling capacity	kW	154.7	157.9	202.6	202.6	189.3	201.7	214.1	232.5	242.9	300.1	273.5	304.6	351.9	400.2	442.0	476.4
Total Absorbed Power	kW	30.8	31.2	40.4	40.4	37.0	40.4	43.9	46.0	49.8	61.3	56.3	62.6	72.1	81.2	90.9	102.1
EER	kW/kW	5.02	5.05	5.01	5.01	5.12	4.99	4.87	5.05	4.88	4.89	4.86	4.87	4.88	4.93	4.86	4.67
Total Pth [Thermal capacity]	kW	172.8	175.7	227.0	227.0	209.4	224.9	240.5	259.4	272.9	337.0	308.0	343.7	397.6	451.4	271.3	537.7
Total Absorbed Power	kW	39.4	39.2	51.3	51.3	46.0	50.3	54.6	59.0	62.3	79.1	71.6	78.1	89.9	101.6	63.0	127.4
COP	kW/kW	4.39	4.49	4.43	4.43	4.55	4.47	4.40	4.40	4.38	4.26	4.30	4.40	4.42	4.44	4.31	4.22
Dimensions	mm	1644 x 772 x 1594	2374 x 877 x 1854	1644 x 772 x 1594							2374 x 877 x 1854						
Sound power level Lw [Base unit]	db(A)	84	85	86	87	88	92	88	88	91	93	94	95	91	91	90	93
Sound power level Lw [Low noise unit]	db(A)	80	81	82	83	84	88	84	84	87	89	90	91	87	87	86	89
SEER		7.27	7.90	6.49	7.18	7.94	7.62	7.37	7.55	7.52	7.39	7.37	7.48	7.27	7.55	7.44	7.18
SCOP		5.24	5.18	4.99	4.91	4.83	4.78	4.90	5.08	-	-	-	-	-	-	-	-

DATA CENTER | INDUSTRIAL | SERVICES

PSW / RSW

MULTIPURPOSE WATER-CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS

329 - 692 kW

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

PSW multifunction units and **RSW** reversible heat pump 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 / RSW** units are ideally suitable 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 arrangement 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.

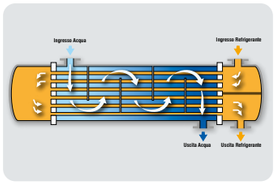
- Electronically controlled expansion valve supplied as standard
- Optional VicTaulic hydraulic couplings
- Available in Standard and Low Noise versions
- Programmable electronic control as part of standard equipment
- Smart management of several units in parallel
- Easy access to components for routine maintenance
- Compliance with ErP regulations
- Available in multipurpose version for 4 pipe systems

The **PSW / RSW** units can be supplied both with the standard R410A refrigerant, in class A1 (non-flammable), and with the new generation R454B refrigerant, in class A2L (mildly flammable) or in the A2L-ready configuration.

DETAILS AT **page 5**

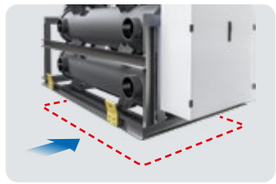
Maximum efficiency at partial loads

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.



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 through-sections - 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.



Reduced footprint

The **PSW/RSW** series has a compact layout thanks to the optimised arrangement of the main components - e.g. compressors and heat exchangers. The power density reaches very high values, exceeding 100kW/m^2.
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 / 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.

PSW		324	374	444	464	506	566	646	706
		Cooling - Water conditions: user side 12/7°C; source side 30/35°C							
Cooling capacity	kW	329.3	374.4	445.6	459.9	496.4	561.4	648.7	692.0
Total absorbed power	kW	61.9	72.1	84.0	87.2	92.9	108.3	121.1	130.9
EER		5.32	5.20	5.31	5.27	5.34	5.18	5.36	5.29
Sound power	dB(A)	89	89	90	90	91	91	91	90
Low Noise sound power	dB(A)	85	85	86	86	87	87	87	86
Dimensions [L x D x H]	mm	3500 x 1800 x 2100							
		Heating: Water conditions: user side 40/45°C; source side 12/7°C							
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
		Heating and cooling - Water conditions: user side 12/7°C; recovery side 40/45°C							
Refrigerating power	kW	293.7	334.0	398.6	412.0	442.4	500.6	579.0	676.2
Thermal power	kW	370.8	423.9	503.6	521.4	558.1	635.7	730.2	866.6
Absorbed power	kW	77.1	89.9	105.1	109.4	115.7	135.1	151.2	190.3
Total COP		8.62	8.43	8.59	8.53	8.65	8.41	8.66	8.11

RSW		324	374	444	464	506	566	646	706
		Cooling - Water conditions: user side 12/7°C; source side 30/35°C							
Cooling capacity	kW	329.3	374.4	445.6	459.9	496.4	561.4	648.7	692.0
Total absorbed power	kW	61.9	72.1	84.0	87.2	92.9	108.3	121.1	130.9
EER		5.32	5.20	5.31	5.27	5.34	5.18	5.36	5.29
Sound power	dB(A)	89	89	90	90	91	91	91	90
Low Noise sound power	dB(A)	85	85	86	86	87	87	87	86
Dimensions [L x D x H]	mm	3500 x 1800 x 2100							
		Heating: Water conditions: user side 40/45°C; source side 12/7°C							
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

DATA CENTER | INDUSTRIAL | SERVICES

XSW

CHILLERS AND HEAT PUMPS WATER CONDENSED WITH SCROLL COMPRESSORS

39 - 626 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

SCROLL COMPRESSORS

CORROSION RESISTANT MATERIAL

A2L READY

LOW GWP REFRIGERANT

SHELL&TUBE HEAT EXCHANGER

XSW is HiRef's range of water-condensed chillers and heat pumps with multiscroll compressors. The many refrigerating configuration options, together with specific construction choices, make the ample choice of **XSW** 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.

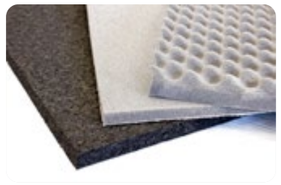
- Refrigerant R410A: Available on request with R454B refrigerant
- Can be used with Polymorph® hydronic modules by HiRef
- Versions:
  1. Cooling only chiller with well/mains water source
  2. Cooling only chiller with Dry Cooler water source/ evaporative tower
  3. Reversible heat pump
  4. Heating only heat pump
- Electronically controlled expansion valve supplied as standard
- Easy connection with Victaulic 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

The **XSW** units can be supplied both with the standard R410A refrigerant, in class A1 (non-flammable), and with the new generation R454B refrigerant, in class A2L (mildly flammable) or in the A2L-ready configuration.

DETAILS AT **page 5**

Maximum efficiency at partial loads

The **XSW** range adopts a multiscroll 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 **XSW** range is the number of available configurations of the refrigeration circuit, which depending on the machine size and special system requirements (redundancy and/ or efficiency at reduced loads) can include:

- From 92 to 196 kW: **EFFICIENCY PACK 1**
- From 53 to 200 kW: **EFFICIENCY PACK 2**
- From 268 to 301 kW: **EFFICIENCY PACK 3**
- From 160 to 560 kW: **EFFICIENCY PACK 4**
- Over 560 kW: 2 refrigeration circuits with 5 or 6 Scroll compressors.

XSW H		041	042	051	052	061	062	071	072	081	082	091	092	111	112	131	132	141	142	144	161
		COOLING																			
Cooling capacity @12/7; 40/45°C [UNI14511]	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 capacity [UNI14511]	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 [UNI14511]		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
		HEATING																			
Cooling capacity @40/45; 15/10°C [UNI14511]	kW	57.7	57.9	67	67.2	76.9	77.2	86.1	86.3	99.9	100.1	111.4	111.6	133	133.4	151.5	151.8	168.9	169	174	184.4
Total absorbed capacity [UNI14511]	kW	14.3	14.4	17.1	17.1	18.9	18.9	21.5	21.5	24.2	24.2	27.7	27.7	32.3	32.3	37.9	37.9	41.1	41.1	42.3	44.8
COP [UNI14511]		4.02	4.03	3.91	3.92	4.07	4.08	4.01	4.02	4.13	4.14	4.02	4.03	4.12	4.13	3.99	4	4.11	4.11	4.11	4.11
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 [Base model]	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 set-up]	dB(A)	72	72	74	74	74	74	75	75	75	75	77	77	79	79	81	81	81	81	78	81
Dimensions [L x D x H]	mm	1174x772x1594														1644x772x1594				2374x 877x 1854	1644x 772x 1594

XSW H		162	164	181	182	184	204	214	243	244	283	284	314	344	374	424	484	535	576	636	706
		COOLING																			
Cooling capacity @12/7; 40/45°C [UNI14511]	kW	129	137.5	164	164.3	158.4	170.5	186.4	203.1	224	248.4	240.2	259.9	294.2	328.9	376.3	423.5	471.7	523.6	552.6	626.7
Total absorbed capacity [UNI14511]	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 [UNI14511]		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
		HEATING																			
Cooling capacity @40/45; 15/10°C [UNI14511]	kW	184.7	198	235.3	235.2	226.7	245.1	266.5	285.7	315.9	354.1	341.1	369.9	419.6	469.3	534.9	600	669.3	715.5	762.5	868.3
Total absorbed capacity [UNI14511]	kW	44.9	49	57.2	57.3	54.1	59.7	64.4	65.5	72.4	85.1	80.7	88.7	101.4	114.1	127.7	141.6	161.2	162.7	175.4	199.2
COP [UNI14511]		4.11	4.04	4.11	4.11	4.19	4.1	4.14	4.36	4.36	4.16	4.22	4.17	4.14	4.11	4.19	4.24	4.15	4.4	4.35	4.36
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			
Sound power [Base model]	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 set-up]	dB(A)	81	78	86	86	80	81	82	83	84	88	84	84	87	89	90	91	87	87	86	89
Dimensions [L x D x H]	mm	1644x 772x 1594	2374x 877x 1854	1644x 772x 1594	2374x877x1854													3820x1085x2040			

Also available with 60 Hz power supply

HiRef

WATER/WATER

Multipurpose

INDUSTRIAL SERVICES

KSW P

MULTI-PURPOSE WATER COOLED HEAT PUMPS FOR HIGH TEMPERATURES, USER SIDE AND SOURCE SIDE

19 - 275 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

SCROLL COMPRESSORS

CORROSION RESISTANT MATERIAL

PLATE HEAT EXCHANGERS

The multi-purpose **KSW P** units are water-water heat pumps used for production of domestic hot water, designed for both residential and industrial applications. They ensure production of hot water up to 80 °C, without using an electric (element) or gas booster. The main feature of the **KSW P** range is being able to manage, on the heat source side, very different thermal levels: these heat pumps can use groundwater, usually available at 10-15 °C, or water from thermal waste up to 45 °C. The versions available for 2-pipe or 4-pipe systems and the number of refrigeration configurations provided, ranging from single-circuit solutions with single or tandem compressors up to two-circuit solutions with tandem compressors, allow the best redundancy and maximum efficiency to be achieved, even simultaneously, at partial loads.

More space in the heating unit

A **KSW P** unit can be used to produce domestic hot water, heating and cooling water from a single machine. This optimises the use of space in the heat station, avoiding the need to install cascade-connected units and additional hydronic modules that would reduce the space available for the installation of other equipment.

Operation safety

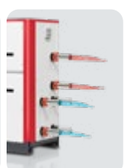
In **KSW P** units water up to 80 °C can be produced to avoid having to run anti-legionella cycles or, in the event that the water is stored at a lower temperature, to be able to run them more efficiently than via a boiler or an electrical heater.

Multi-purpose

All sizes of the **KSW P** series can be coupled to both 2 and 4-pipe systems. In the former case system-side production of hot or cold water and the simultaneous total recovery-side production of hot water is ensured; in the latter case the simultaneous production of hot and cold water for heating and cooling is ensured.

Total recovery

Heating



Cooling

- Refrigerant R134a
- Electronically controlled expansion valve supplied as standard
- Vic-Taulic hydraulic couplings
- Optional energy meter integrated via Modbus, for metering the energy absorbed by the machine
- External pump control according to constant T or constant ΔT logic

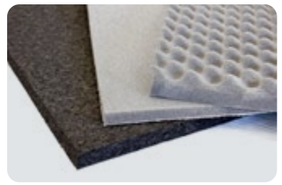
Efficiency and reliability in line with system requirements

The available refrigerating circuit configurations have been designed to ensure, also simultaneously, redundancy and efficiency at partial loads. In particular, depending on the size of the machine and any special plant requirements, the units may include:

- single circuit solutions with single compressor;
- single circuit solutions with compressors in a tandem arrangement for high system efficiency;
- dual circuit solutions with one compressor per circuit, for high system redundancy.
- dual circuit solutions with four compressors (in a dual tandem arrangement) on two circuits, for a system that is both redundant and efficient at partial loads.

Maximum efficiency at partial loads

The **KSW P** range uses scroll compressors, electronically controlled expansion valves for each circuit and plate heat exchangers: all these features ensure high efficiencies at partial loads and accurate tracking of cooling load trends in all conditions of use.



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.

COOLING

KSW P		040	050	060	081	082	091	092	101	102	121	122	151	152	171	172	174	201
Cooling capacity @16/10°C; 30/35°C [UNI14511]	kW	19.1	24.5	29.4	37.1	37.2	40.8	41.1	46.7	47.0	58.0	58.3	67.5	67.8	82.3	82.7	82.5	92.3
Total absorbed power	kW	3.5	4.6	5.9	6.9	6.9	7.8	7.8	9.2	9.2	11.5	11.5	15.3	15.3	16.7	16.6	15.5	18.2
EER [UNI 14511]		5.38	5.32	4.97	5.37	5.39	5.24	5.30	5.08	5.12	5.04	5.07	4.41	4.43	4.94	4.98	5.31	5.06
Sound power [Base unit]	db(A)	74	74	78	77	77	77	77	77	77	81	81	84	84	85	85	80	86
Sound power [Low Noise set-up]	db(A)	70	70	74	73	73	73	73	73	73	77	77	80	80	79	79	74	80

KSW P		202	204	221	222	241	242	244	301	302	304	344	404	444	484	554	604
Cooling capacity @16/10°C; 30/35°C [UNI14511]	kW	92.7	94.3	101.2	101.6	112.8	112.9	114.0	134.5	134.6	141.7	161.2	180.6	202.5	220.6	251.5	274.5
Total absorbed capacity [UNI14511]	kW	18.2	18.4	20.8	20.7	23.0	23.0	23.2	28.7	28.6	30.1	33.3	36.5	41.2	46.2	50.8	56.4
EER [UNI 14511]		5.10	5.13	4.87	4.90	4.90	4.91	4.92	4.69	4.70	4.71	4.84	4.95	4.92	4.77	4.95	4.87
Sound power [Base unit]	db(A)	86	80	87	87	88	88	84	90	90	87	88	89	90	91	92	93
Sound power [Low Noise set-up]	db(A)	80	74	81	81	82	82	78	82	82	79	80	81	82	83	84	85

HEATING

KSW P		040	050	060	081	082	091	092	101	102	121	122	151	152	171	172	174	201
Cooling capacity @40/45°C; 15/10°C [UNI14511]	kW	21.2	27.6	34.2	43.3	43.3	47.9	48.0	55.2	55.4	69.2	69.7	81.9	82.1	94.1	94.3	94.8	105.3
Total absorbed capacity [UNI14511]	kW	4.3	5.7	7.1	8.5	8.5	9.5	9.5	11.2	11.2	14.0	14.0	17.6	17.6	19.9	19.9	19.2	22.3
COP [UNI14511]		4.92	4.86	4.79	5.10	5.11	5.02	5.04	4.92	4.94	4.95	4.98	4.66	4.67	4.72	4.74	4.95	4.72
SCOP		4.18	4.20	4.17	4.90	4.91	4.89	4.93	4.86	4.97	4.85	4.86	4.53	4.60	4.63	4.65	5.14	4.69
Sound power [Base unit]	db(A)	74	74	78	77	77	77	77	77	77	81	81	84	84	85	85	80	86
Sound power [Low Noise set-up]	db(A)	70	70	74	73	73	73	73	73	73	77	77	80	80	79	79	74	80

KSW P		202	204	221	222	241	242	244	301	302	304	344	404	444	484	554	604
Cooling capacity @40/45°C; 15/10°C [UNI14511]	kW	105.6	109.3	116.9	117.1	132.5	132.7	136.2	161.1	161.3	160.5	184.5	206.6	234.2	257.3	291.2	319.8
Total absorbed capacity [UNI14511]	kW	22.3	22.6	25.4	25.4	27.8	27.8	28.1	34.5	34.5	35.1	39.8	44.8	50.2	56.4	62.0	68.6
COP [UNI14511]		4.73	4.84	4.60	4.61	4.77	4.78	4.84	4.67	4.68	4.58	4.63	4.61	4.66	4.56	4.70	4.66
SCOP		4.85	5.11	4.69	4.85	4.74	4.83	5.04	4.66	4.86	4.73	4.83	4.96	4.98	4.91	4.96	4.98
Sound power [Base unit]	db(A)	86	80	87	87	88	88	84	90	90	87	88	89	90	91	92	93
Sound power [Low Noise set-up]	db(A)	80	74	81	81	82	82	78	82	82	79	80	81	82	83	84	85

COOLING + HEATING

KSW P		040	050	060	081	082	091	092	101	102	121	122	151	152	171	172	174	201
Cooling capacity [UNI14511]*	kW	17.2	22.3	27.6	35.2	35.2	39.2	39.4	45.0	45.1	56.3	56.5	65.5	65.8	75.8	75.9	77.2	84.7
Thermal power [UNI14511]*	kW	21.3	27.7	34.3	43.3	43.3	48.2	48.4	55.6	55.7	69.6	69.7	82.2	82.4	94.7	94.8	95.3	105.9
Total absorbed capacity [UNI14511]*		4.3	5.7	7.1	8.5	8.5	9.5	9.5	11.2	11.2	14.0	13.9	17.6	17.5	19.9	19.9	19.1	22.3
Total COP		8.96	8.77	8.71	9.24	9.24	9.20	9.24	8.98	9.00	8.99	9.08	8.39	8.47	8.57	8.58	9.03	8.55
Sound power [Base unit]	db(A)	74	74	78	77	77	77	77	77	77	81	81	84	84	85	85	80	86
Sound power [Low Noise set-up]	db(A)	70	70	74	73	73	73	73	73	73	77	77	80	80	79	79	74	80

KSW P		202	204	221	222	241	242	244	301	302	304	344	404	444	484	554	604
Cooling capacity [UNI14511]*	kW	84.8	88.3	93.2	93.6	106.9	106.9	110.3	129.2	129.2	128.1	147.6	165.0	187.9	205.2	234.0	256.4
Thermal power [UNI14511]*	kW	106.0	109.7	117.3	117.6	133.2	133.2	137.0	161.9	161.9	161.4	185.4	207.6	235.5	258.7	292.8	321.5
Total absorbed capacity [UNI14511]*		22.3	22.5	25.4	25.3	27.7	27.7	28.1	34.4	34.4	35.0	39.8	44.8	50.1	56.3	61.9	68.5
Total COP		8.56	8.80	8.29	8.35	8.67	8.67	8.80	8.46	8.46	8.27	8.37	8.32	8.45	8.24	8.51	8.44
Sound power [Base unit]	db(A)	86	80	87	87	88	88	84	90	90	87	88	89	90	91	92	93
Sound power [Low Noise set-up]	db(A)	80	74	81	81	82	82	78	82	82	79	80	81	82	83	84	85

* Hot water temp. IN on user side 40°C, hot water temp. OUT on user side 45°C, cold water temp. IN on user side 16°C, cold water temp. OUT on user side 10°C.

Also available with 60 Hz power supply

DATA CENTER | INDUSTRIAL | SERVICES

MSW

MULTI-PURPOSE HEAT PUMPS WATER CONDENSED WITH SCROLL COMPRESSORS

50 - 472 kW

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

MSW units are multi-purpose water-cooled heat pumps with scroll compressors, designed for both residential 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 designed to efficiently meet any requirement.

More space in the heating unit

The possibility of installing the pumping units directly on the machine avoids having to install external hydronic modules with the resulting coupling costs.
This, together with the adoption of compact plate heat exchangers directly facing the right side panel of the unit, guarantees maximised unit compactness to make the most of the available space in the thermal power plant.

- Refrigerant R410A
- Electronically controlled expansion valve supplied as standard.
- Optional VicTaulic hydraulic couplings.
- Available versions:
  1. Multi-purpose for 2-pipe system (M)
  2. Multi-purpose for 4-pipe system (P)

OPERATION MODES

2-pipe system

- Cooling mode
- Heating mode
- Domestic water mode
- Cooling + domestic water

4-pipe system

- Cooling mode
- Heating mode
- Cooling + heating

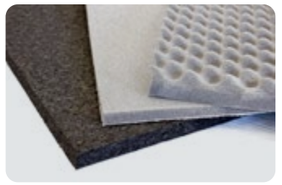
Maximum efficiency at partial loads

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 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.

Integrated hydronic module

On request, and up to a cooling capacity of 180 kW, a version with integrated hydronic module is available, which includes circulation pumps on the user side and/or on the source side.

MSW P		042	052	062	072	082	092	112	132	142	144	162
		Cooling - Water conditions: user side 16/10°C; source side 30/35°C										
Cooling capacity [UNI 14511]	kW	50.7	58.6	67.8	75.6	88.5	98.3	118.0	133.3	149.4	153.3	163.6
Total absorbed power [UNI 14511]	kW	11.7	14.2	15.5	17.8	19.8	22.6	26.3	31.0	33.5	34.6	36.5
EER [UNI 14511]		4.32	4.14	4.38	4.26	4.48	4.34	4.49	4.30	4.45	4.42	4.48
ESEER		5.34	5.14	5.46	5.31	5.57	5.43	5.39	5.39	5.46	5.77	5.55
		HEATING - Water conditions: user side 40/45°C; source side 15/10 °C										
Thermal power [UNI 14511]	kW	59.8	69.7	79.8	89.3	103.5	115.7	137.8	157.3	174.9	180.0	191.1
Total absorbed power [UNI 14511]	kW	13.5	16.1	17.8	20.1	22.7	25.8	30.2	35.3	38.3	39.6	41.8
COP [UNI 14511]		4.42	4.33	4.49	4.44	4.56	4.49	4.57	4.46	4.57	4.55	4.58
SCOP		4.15	4.11	4.22	4.23	4.30	4.25	4.21	4.25	4.30	4.40	4.33
ERP efficiency		163	161	166	166	169	167	165	167	169	173	170
ERP Efficiency Class		A+++ / H.T. Heat Pump										
		COOLING AND HEATING - Water conditions *										
Cooling capacity [UNI 14511]*	kW	46.9	54.3	62.8	70.3	82.0	91.2	109.2	123.6	138.5	142.4	151.2
Thermal power [UNI 14511]*	kW	59.7	69.6	79.7	89.4	103.5	115.6	137.8	157.0	174.8	179.9	190.8
Total absorbed power [UNI 14511]*		13.5	16.0	17.8	20.0	22.6	25.7	30.1	35.2	38.2	39.4	41.6
Total COP [UNI 14511]*		8.27	8.11	8.41	8.33	8.53	8.38	8.51	8.28	8.48	8.46	8.50
Sound power level Lw [Standard unit]	db(A)	76	78	78	79	79	81	83	85	85	82	85
Sound power level Lw [Low noise unit]	db(A)	72	74	74	75	75	77	79	81	81	78	81
Dimensions [L x D x H]	mm	1174x772x1594						1644x772x1594			2374x877x 1854	1644x772x 1594

MSW P		164	182	184	204	214	244	284	314	344	374	424
		Cooling - Water conditions: user side 12/7°C; source side 40/45°C										
Cooling capacity [UNI 14511]	kW	174.4	207.9	201.6	217.0	236.1	278.5	303.5	328.5	371.2	413.9	472.7
Total absorbed power [UNI 14511]	kW	39.9	47.2	43.8	48.6	52.3	59.0	65.5	72.2	83.0	93.8	101.4
EER [UNI 14511]		4.37	4.41	4.60	4.47	4.51	4.72	4.63	4.55	4.47	4.41	4.66
ESEER		5.75	5.41	5.96	5.86	5.75	6.15	6.03	6.00	5.69	5.77	5.89
		HEATING - Water conditions: user side 40/45°C; source side 15/10 °C										
Thermal power [UNI 14511]	kW	205.2	223.3	234.4	253.8	275.6	322.9	353.2	383.6	415.5	447.5	551.1
Total absorbed power [UNI 14511]	kW	45.5	49.7	50.4	55.6	60.0	67.7	74.8	82.0	90.2	98.5	115.9
COP [UNI 14511]		4.50	4.49	4.65	4.56	4.59	4.77	4.72	4.68	4.61	4.54	4.76
SCOP		4.38	4.29	4.44	4.40	4.37	4.48	4.51	4.50	4.40	4.43	4.41
ERP efficiency		172	169	175	173	172	176	177	177	173	174	173
ERP Efficiency Class		A+++ / H.T. Heat Pump										
		COOLING AND HEATING - Water conditions *										
Cooling capacity [UNI 14511] *	kW	161.8	192.5	186.0	200.8	218.5	258.2	282.0	305.1	346.0	386.2	441.0
Thermal power [UNI 14511] *	kW	205.1	243.3	233.8	253.5	275.5	322.5	353.1	383.0	435.3	486.8	550.8
Total absorbed power [UNI 14511] *		45.4	53.4	50.3	55.4	59.9	67.5	74.8	81.9	93.8	105.8	115.4
Total COP [UNI 14511] *		8.37	8.42	8.61	8.47	8.51	8.81	8.72	8.65	8.57	8.49	8.84
Sound power level Lw [Base unit]	db(A)	82	90	84	85	86	88	88	88	91	93	89
Sound power level Lw [Low noise unit]	db(A)	78	86	80	81	82	84	84	84	87	89	85
Dimensions [L x D x H]	mm	2374x877x 1854	1644x772x 1594	2374x877x 1854	3130x877x1854							

Also available with 60 Hz power supply

DATA CENTER | INDUSTRIAL | SERVICES

PSW / RSW

MULTIPURPOSE WATER-CONDENSED HEAT PUMPS WITH SCROLL COMPRESSORS

329 - 692 kW

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

PSW multifunction units and **RSW** reversible heat pump 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 / RSW** units are ideally suitable 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 arrangement 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.

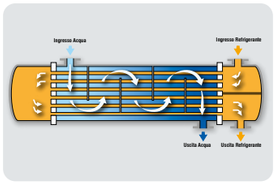
- Electronically controlled expansion valve supplied as standard
- Optional VicTaulic hydraulic couplings
- Available in Standard and Low Noise versions
- Programmable electronic control as part of standard equipment
- Smart management of several units in parallel
- Easy access to components for routine maintenance
- Compliance with ErP regulations
- Available in multipurpose version for 4 pipe systems

The **PSW / RSW** units can be supplied both with the standard R410A refrigerant, in class A1 (non-flammable), and with the new generation R454B refrigerant, in class A2L (mildly flammable) or in the A2L-ready configuration.

DETAILS AT **page 5**

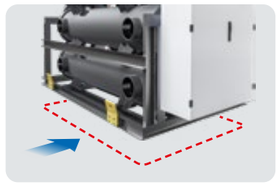
Maximum efficiency at partial loads

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.



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 through-sections - 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.



Reduced footprint

The **PSW/RSW** series has a compact layout thanks to the optimised arrangement of the main components - e.g. compressors and heat exchangers. The power density reaches very high values, exceeding 100kW/m^2.
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 / 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.

PSW		324	374	444	464	506	566	646	706
		Cooling - Water conditions: user side 12/7°C; source side 30/35°C							
Cooling capacity	kW	329.3	374.4	445.6	459.9	496.4	561.4	648.7	692.0
Total absorbed power	kW	61.9	72.1	84.0	87.2	92.9	108.3	121.1	130.9
EER		5.32	5.20	5.31	5.27	5.34	5.18	5.36	5.29
Sound power	dB(A)	89	89	90	90	91	91	91	90
Low Noise sound power	dB(A)	85	85	86	86	87	87	87	86
Dimensions [L x D x H]	mm	3500 x 1800 x 2100							
		Heating: Water conditions: user side 40/45°C; source side 12/7°C							
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
		Heating and cooling - Water conditions: user side 12/7°C; recovery side 40/45°C							
Refrigerating power	kW	293.7	334.0	398.6	412.0	442.4	500.6	579.0	676.2
Thermal power	kW	370.8	423.9	503.6	521.4	558.1	635.7	730.2	866.6
Absorbed power	kW	77.1	89.9	105.1	109.4	115.7	135.1	151.2	190.3
Total COP		8.62	8.43	8.59	8.53	8.65	8.41	8.66	8.11

RSW		324	374	444	464	506	566	646	706
		Cooling - Water conditions: user side 12/7°C; source side 30/35°C							
Cooling capacity	kW	329.3	374.4	445.6	459.9	496.4	561.4	648.7	692.0
Total absorbed power	kW	61.9	72.1	84.0	87.2	92.9	108.3	121.1	130.9
EER		5.32	5.20	5.31	5.27	5.34	5.18	5.36	5.29
Sound power	dB(A)	89	89	90	90	91	91	91	90
Low Noise sound power	dB(A)	85	85	86	86	87	87	87	86
Dimensions [L x D x H]	mm	3500 x 1800 x 2100							
		Heating: Water conditions: user side 40/45°C; source side 12/7°C							
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

HiRef

WATER/WATER

Heating only heat pumps

INDUSTRIAL SERVICES

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 EXCHANGERS

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:
- Electronically controlled expansion valve supplied as standard
- Optional Vic-Taulic hydraulic couplings
- Optional integrated energy meter via Modbus, for metering the energy absorbed by the machine
- Remote pump control according to constant T or constant ΔT logic

Ideal design for medium temperature heat sources

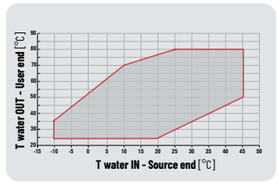
Thanks to the special features of the **KSW** range, heat sources at temperatures between 30° and 45°C (and therefore, unsuitable for direct use) are used by heat pumps to produce hotter water. This is true for industrial heat waste, which can be reused to produce, for example, district heating.
Similarly, 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.

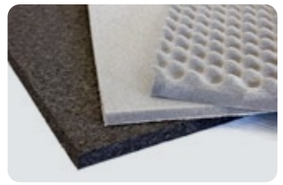
Maximum efficiency at partial loads

The **KSW** range adopts a multiscroll 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.



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.

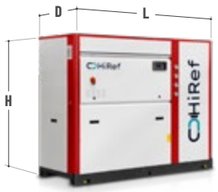


Attention to detail and low noise operation

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.



KSW		040	050	060	081	082	091	092	101	102	121	122	151	152	171	172	174	201
		Water conditions: user side 70/80°C; source side 45/40 °C																
Thermal power	kW	38.0	49.5	61.1	75.6	75.8	83.9	84.2	97.2	97.3	121.4	121.6	148.8	149.4	171.1	171.4	166.5	191.3
Total absorbed power	kW	8.6	11.3	14.2	17.0	16.9	19.1	19.0	22.5	22.5	28.0	27.9	35.2	35.1	40.3	40.2	38.4	45.4
COP [UNI 14511]		4.43	4.39	4.31	4.46	4.48	4.40	4.42	4.32	4.33	4.34	4.35	4.23	4.25	4.25	4.26	4.34	4.22
		Water conditions: user side 60/70°C; source side 40/35 °C																
Thermal power	kW	36.2	47.2	58.2	72.4	72.5	80.3	80.5	92.7	93.1	116.1	116.1	142.0	142.5	162.8	163.1	159.1	181.4
Total absorbed power	kW	7.1	9.4	11.8	14.0	14.0	15.8	15.7	18.6	18.6	23.1	23.1	29.0	29.0	32.5	32.4	31.8	35.8
COP [UNI 14511]		5.08	5.03	4.94	5.17	5.19	5.10	5.11	4.98	5.01	5.02	5.03	4.90	4.91	5.01	5.03	5.01	5.06
		Water conditions: user side 60/70°C; source side 35/30 °C																
Thermal power	kW	32.6	42.5	52.5	65.4	65.6	72.7	72.8	83.7	84.1	104.9	105.2	125.5	125.8	143.6	144.1	143.6	160.2
Total absorbed power	kW	7.2	9.4	11.8	14.1	14.1	15.8	15.8	18.7	18.6	23.3	23.2	28.4	28.5	32.0	31.9	31.9	35.5
COP [UNI 14511]		4.55	4.51	4.43	4.64	4.65	4.59	4.60	4.49	4.51	4.51	4.53	4.41	4.42	4.49	4.51	4.50	4.51
Sound power	db(A)	74	74	78	77	77	77	77	77	77	81	81	84	84	85	85	80	86
Dimensions [L x D x H]	mm	804x607x1462			1174x772x1594										1644x 772x 1594		2374x 877x 1854	1644x 772x 1594

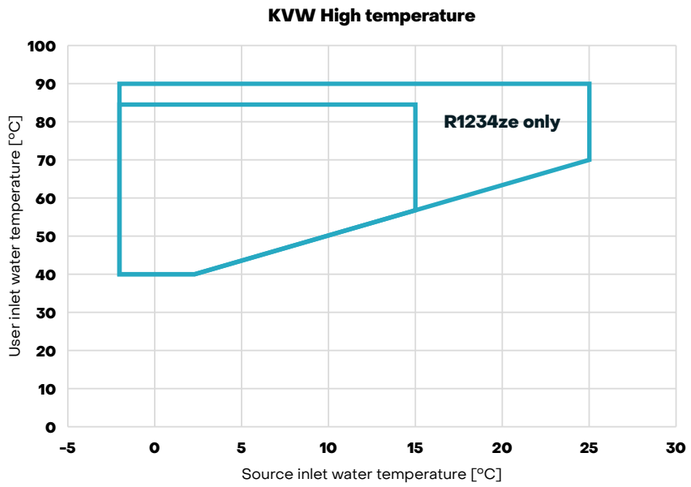
KSW		202	204	221	222	241	242	244	301	302	304	344	404	444	484	444	484
		Water conditions: user side 70/80°C; source side 45/40 °C															
Thermal power	kW	191.4	192.1	211.6	211.9	241.0	241.9	239.6	291.6	292.5	296.3	339.7	380.8	431.9	474.9	537.3	589.9
Total absorbed power	kW	45.3	45.3	51.5	51.4	56.6	56.6	56.4	70.0	70.0	70.5	80.7	91.3	102.4	114.6	126.4	139.8
COP [UNI 14511]		4.23	4.24	4.11	4.12	4.26	4.27	4.25	4.17	4.18	4.20	4.21	4.17	4.22	4.14	4.25	4.22
		Water conditions: user side 60/70°C; source side 40/35 °C															
Thermal power	kW	181.9	183.5	200.2	200.8	228.8	229.6	228.6	276.3	277.3	281.5	322.2	360.1	407.5	447.3	507.0	556.1
Total absorbed power	kW	35.8	37.5	40.7	40.7	44.8	44.7	46.7	55.4	55.3	58.1	64.9	72.1	80.8	90.6	99.8	110.4
COP [UNI 14511]		5.07	4.89	4.92	4.93	5.11	5.14	4.90	4.99	5.02	4.85	4.96	5.00	5.04	4.94	5.08	5.04
		Water conditions: user side 60/70°C; source side 35/30 °C															
Thermal power	kW	160.4	165.8	177.2	177.8	202.1	202.5	206.8	244.6	245.2	247.7	283.8	317.0	359.4	395.1	447.1	490.8
Total absorbed power	kW	35.5	37.5	40.4	40.3	44.3	44.3	46.8	54.9	54.9	57.0	64.0	71.4	80.0	89.7	98.8	109.3
COP [UNI 14511]		4.52	4.42	4.39	4.41	4.56	4.57	4.42	4.46	4.47	4.34	4.43	4.44	4.49	4.40	4.53	4.49
Sound power	db(A)	86	80	87	87	88	88	84	90	90	87	88	89	90	91	92	93
Dimensions [L x D x H]	mm	1644x 772x 1594	2374x 877x 1854	1644x772x1594				2374x 877x 1854	1644x772x1594		2374x877x1854						

Also available with 60 Hz power supply

KVW is HiRef's range of water-condensed high-temperature heat pumps with two-stage screw compressors, spray flooded shell and tube evaporator and shell and tube condenser. The units are available with traditional refrigerant R134a or R1234ze, with a very low GWP (Global Warming Potential) value.

The range covers the thermal power range from 400 to 2000kW* and reaches COP values of 2.2 producing water at +85°C (with R1234ze) from a source at 4°C.

The **KVW** extra high temperature heat pump series is ideally suitable for low-medium temperature heat recovery to produce hot water for district heating networks or industrial processes.



- Refrigerant R1234ze
- Versions with R134a refrigerant and on request with R513A are also available
- Available in version:
  1. Heating only heat pumps for high temperatures.
  2. Electronically controlled expansion valve.
- Monitoring and limitation of the maximum absorbed power
- Available with screw compressors driven by inverters (on both compressors or on one compressor only)
- Thermal insulation hoods on the compressors for the high temperature heat pump versions (optional)
- Modularity and supervision managed by the software

Power and flexibility

Screw compressor allows achievement of high cooling capacities 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.

Two-level evaporation

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

Production of hot water up to 90°C

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

Standard touch screen display

The **KVW** series comes with a touch screen display and customized software and screens as standard.

Economiser, power and flexibility

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

		KVW1001K	KVW500K
Power modulation	%	100	100
User inlet water temperature	°C	65	65
User outlet water temperature	°C	85	85
User glycol percentage	%	0	0
Source inlet water temperature	°C	4	4
Source outlet water temperature	°C	1	1
Source glycol percentage	%	20	20
Thermal power [UNI14511]	kW	1104	535
COP [UNI14511]		2.40	2.35
Sound power level Lw [Standard unit]	db(A)	99	96
Sound power level Lw [Base unit] @ 10 m EN3744	db(A)	67	64
Dimensions [L x D x H]	mm	5180 x 1800 x 2574	3045x1800 x 2574

		KVW1001K	KVW500K
Power modulation	%	100	100
User inlet water temperature	°C	70	70
User outlet water temperature	°C	90	90
User glycol percentage	%	0	0
Source inlet water temperature	°C	6	6
Source outlet water temperature	°C	2	2
Source glycol percentage	%	20	20
Thermal power [UNI14511]	kW	1121	544
COP [UNI14511]		2.24	2.20

* The 2000kW unit includes two 1000kW modules.

HiRef

WATER/WATER

Hydraulic modules

DATA CENTER | INDUSTRIAL | SERVICES

PLM

POLYMORPH HYDRONIC MODULES FOR WATER/WATER CHILLER SYSTEMS

MULTI-PROTOCOL COMMUNICATION INTERFACE

PLATE HEAT EXCHANGERS

HiRef Polymorph® modules provide a solution that "converts" a water-condensed chiller into a more advanced system. The water management system is the "master" element of the heating system.

Thanks to a hydronic circuit specially designed for the application, and built-in software to control the different operating modes, any water-to-water chiller (even of a different brand) can also be used as:

- a reversible heat pump
- a chiller with total recovery
- a multipurpose heat pump for 2-pipe systems
- a multipurpose heat pump for 4-pipe systems
- an air conditioning system with Free-Cooling.

PLM - POLYMORPH M

2T multi-purpose heat pump

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

Its possible functions are:

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

PLM - POLYMORPH P

4T multi-purpose heat pump

The **Polymorph® PLM-P** module is suitable for all the so-called "four-pipe" systems where hot and cold water must be produced at the same time.

The water/water chiller combined with **PLM-P** allows the following functions:

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

PLM - POLYMORPH F

Free-cooling system

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

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

The water/glycol decoupling exchanger is available as an optional part mounted on the module. Already included in PLM-F.

PLM - POLYMORPH H

Reversible heat pump

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

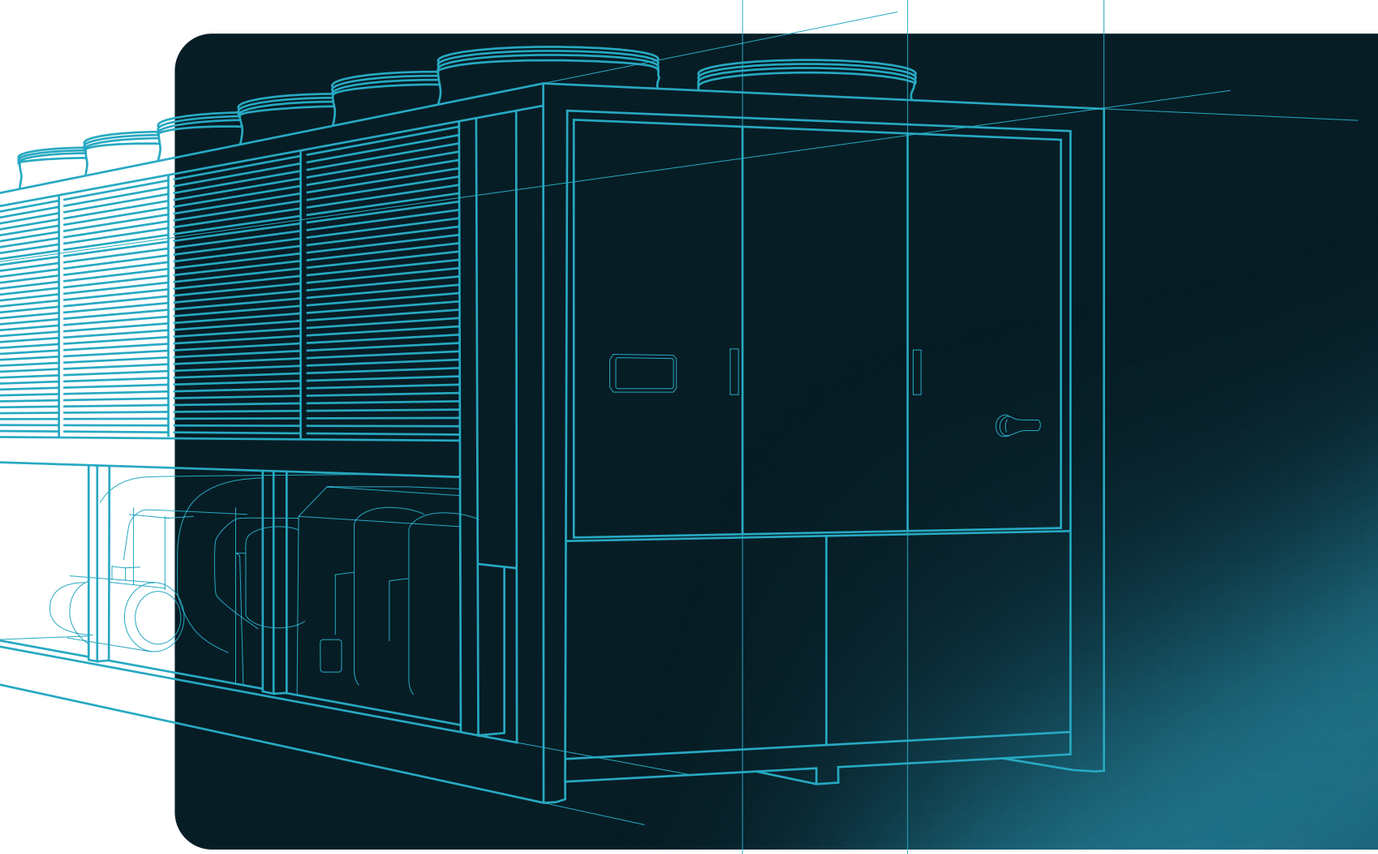
PLM - POLYMORPH R

Chiller with total recovery

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

PLM		FRAME 1	FRAME 2	FRAME 3	FRAME 4
Dimensions	L=mm	1174	1644	2374	3130
	H=mm	1590	1590	1850	1850
	D=mm	772	772	877	877
Footprint	m^2	0.91	1.27	2.08	2.75

Also available with 60 Hz power supply



CATALOGUE

CHILLERS AND HEAT PUMPS

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