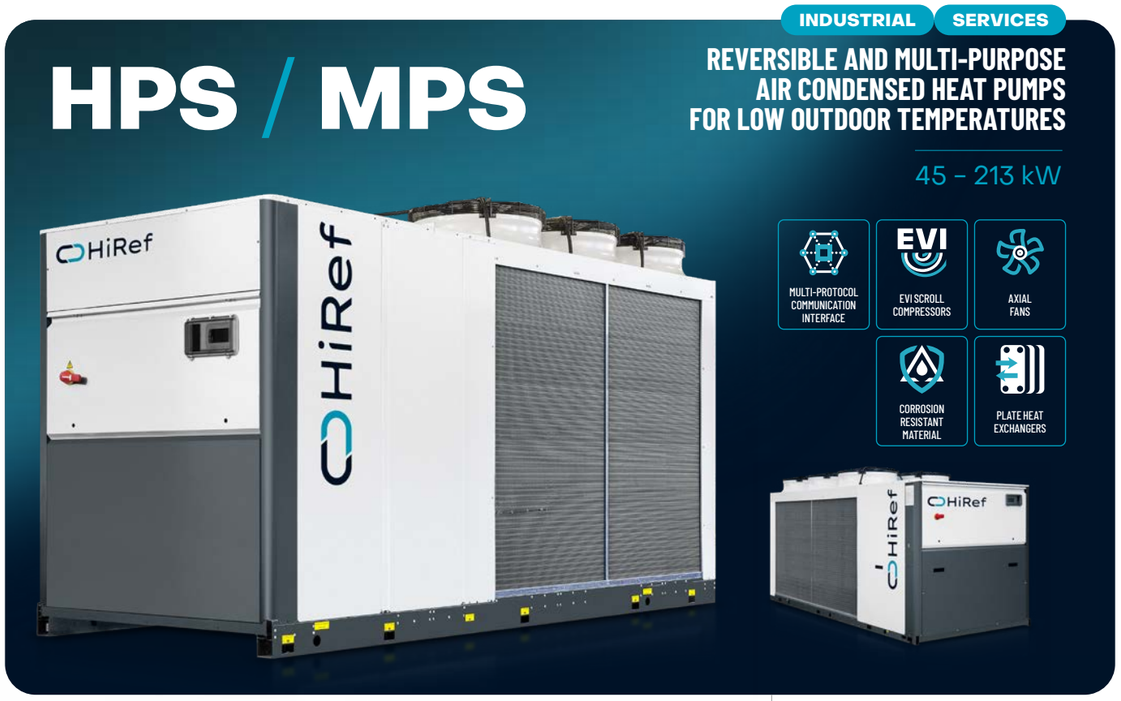
HiRef

AIR/WATER

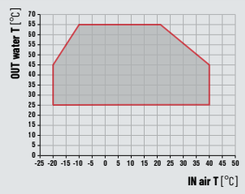
Reversible heat pumps



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

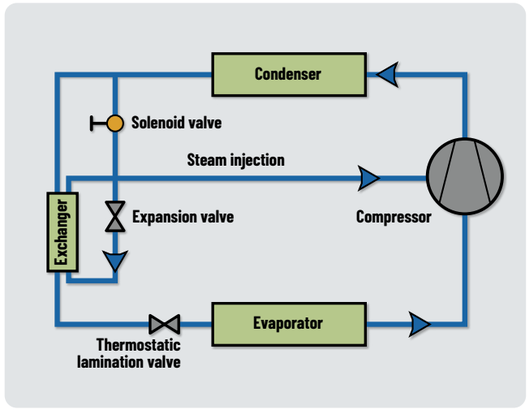
The units of the **HPS / MPS** range are capable of producing water at 65 °C, as well as operating with outdoor air temperatures down to -20 °C.

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

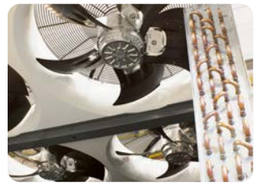
MPS only

- 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

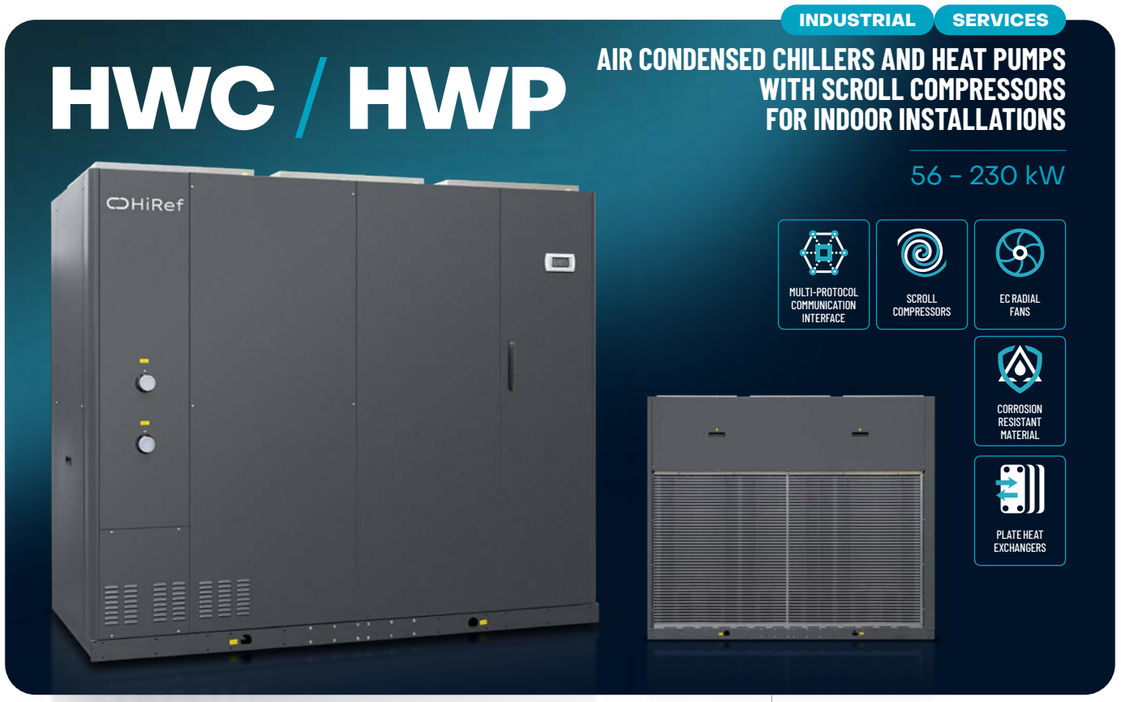
All units in the **HPS / MPS** range are, as standard, "Low Noise", which means fan speed is controlled, anti-vibration piping is used on the refrigeration circuit, and the compressors and pumping kit are compartmentalised in a box lined with soundproofing material. All this ensures minimum noise emissions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



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).

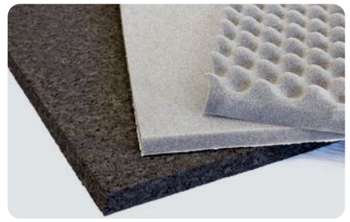
EFFICIENCY PACK 2

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

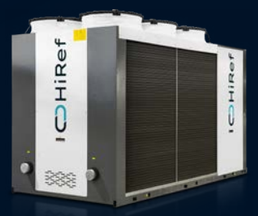
Data declared with use of R410A refrigerant

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.

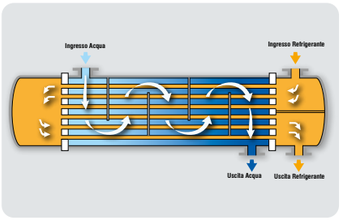
- 3 different soundproofing set-ups available: Standard, Low Noise and Super Low Noise
- Electric control panel with IP55 protection rating
- Class A units in both chiller and heat pump modes
- Radial EC motor fans (optional)
- Electrically controlled expansion valve
- Easy accessibility thanks to the 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 12**

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 12**

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

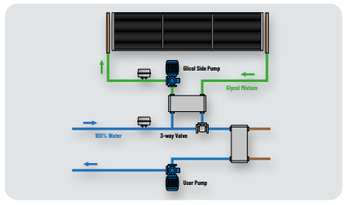
MULTI-PROTOCOL COMMUNICATION INTERFACE
SCROLL COMPRESSORS
INVERTER DRIVEN COMPRESSORS
AXIAL FANS
CORROSION RESISTANT MATERIAL
A2L READY
LOW GWP REFRIGERANT
PLATE HEAT EXCHANGERS

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.

- 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

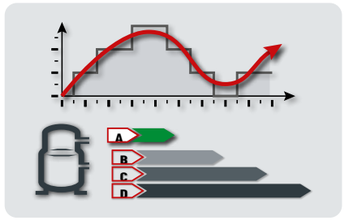
Attention to detail and to low noise requirements

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.



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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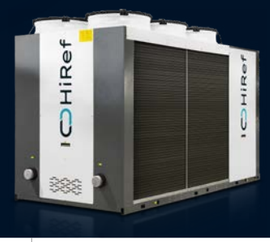
TPS

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 12**

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

DATA CENTER | INDUSTRIAL | SERVICES

TSL

CLASS A CHILLERS AND HEAT PUMPS AIR CONDENSED WITH SCROLL COMPRESSORS

307 – 1006 kW

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

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.

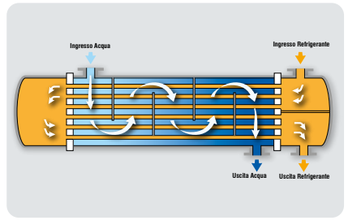
- 3 different soundproofing set-ups available: Standard, Low Noise and Super Low Noise
- Electric control panel with IP55 protection rating
- Class A units in both chiller and heat pump modes
- Radial EC motor fans (optional)
- Electronic expansion valve
- Easy accessibility thanks to the optimisation 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 12**

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

DATA CENTER | INDUSTRIAL | SERVICES

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 12**

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

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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 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 **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 12**

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	-	-	-	-	-	-	-	-

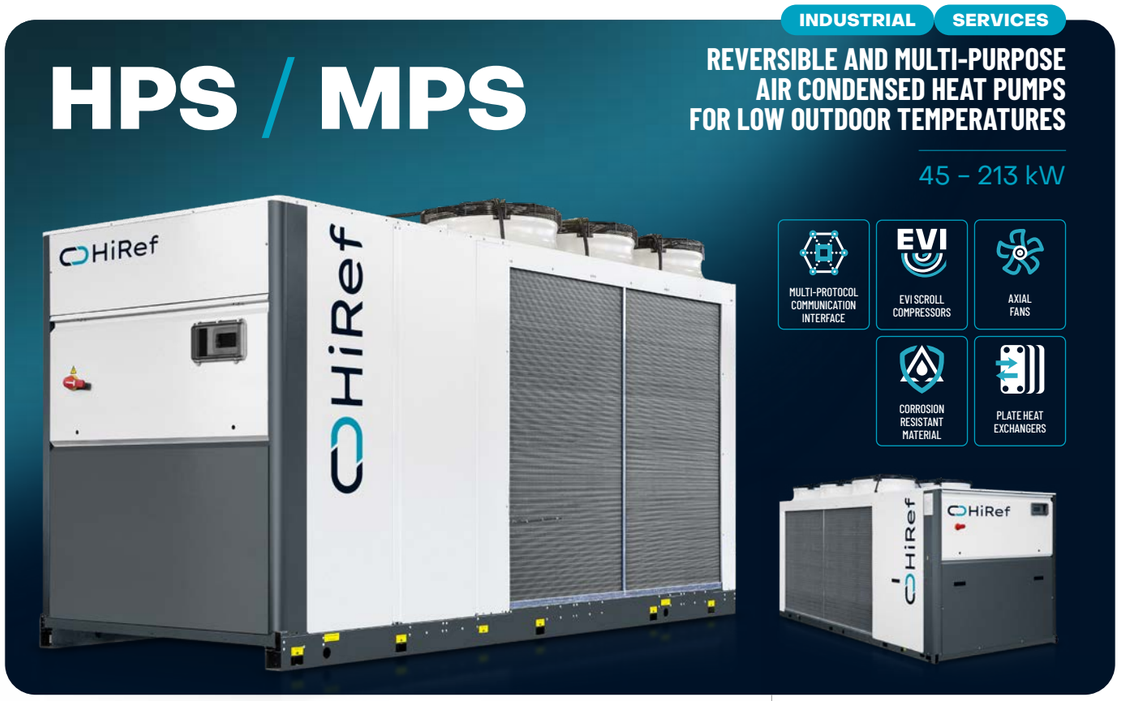
TPL FS (Free Cooling)		374	414	456	486	536	616	658	748	818	900	942	1072
Cooling capacity @15/10°C; 35°C outside air*	kW	395.7	462.0	494.9	554.8	607.3	663.6	736.1	817.1	889.3	1019.3	1126.7	1187.5
Total absorbed power	kW	136.1	147.9	164.2	193.0	197.6	230.8	260.8	271.0	318.2	335.3	381.5	414.8
EER [UNI 14511]		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

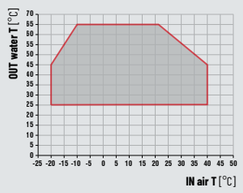
HiRef

AIR/WATER

Multipurpose



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

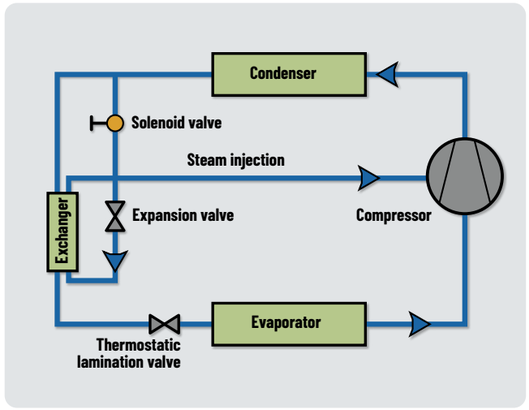
The units of the **HPS / MPS** range are capable of producing water at 65 °C, as well as operating with outdoor air temperatures down to -20 °C.

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

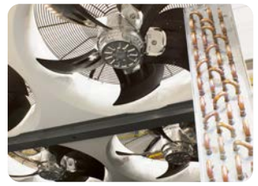
MPS only

- 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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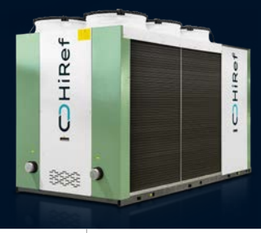
MPA

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 12**

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

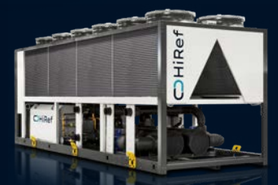
DATA CENTER | INDUSTRIAL | SERVICES

MSL

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

281 - 1146 kW

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



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.

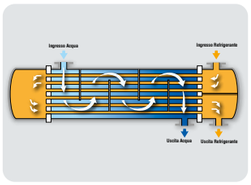
- Different soundproofing set-ups available: Standard, Low Noise and Super Low Noise
- Electric control panel with IP55 protection rating
- Class A units in both chiller and heat pump modes
- Radial EC motor fans (optional)
- Electronic expansion valve
- Easy accessibility thanks to the optimisation 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 12**

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.

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

* 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

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 12**

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.

MLA PS		294	324	374	404	454	496	556	596	636	676	748	808	868	900	1072
		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		11085x 2256x 2680	12930x 2256x 2680

* 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).

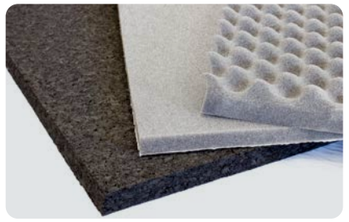
EFFICIENCY PACK 2

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

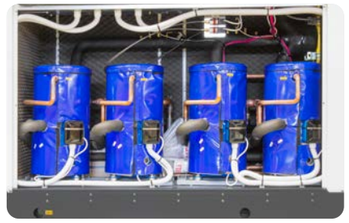


Attention to detail and to low noise requirements

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

Reversible heat pumps

DATA CENTER | INDUSTRIAL | SERVICES

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 12**

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.

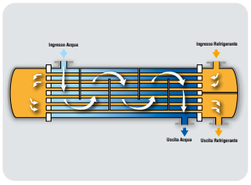
- Electronically controlled expansion valve supplied as standard
- Optional VicTaulic hydraulic couplings
- Available in Standard and Low Noise versions
- Programmable electronic control as part of standard equipment
- Smart management of several units in parallel
- Easy access to components for routine 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 12**

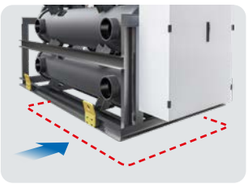
Maximum efficiency at partial loads

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 12**

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.

- 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

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.

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.

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

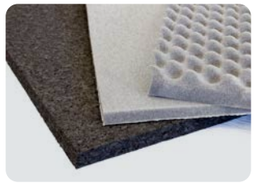
Efficiency and reliability in line with system requirements

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

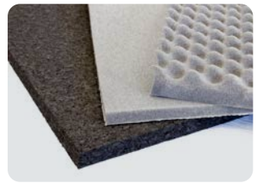
Maximum efficiency at partial loads

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.

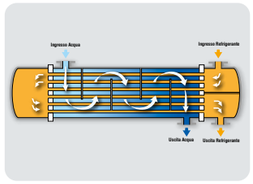
- Electronically controlled expansion valve supplied as standard
- Optional VicTaulic hydraulic couplings
- Available in Standard and Low Noise versions
- Programmable electronic control as part of standard equipment
- Smart management of several units in parallel
- Easy access to components for routine 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 12**

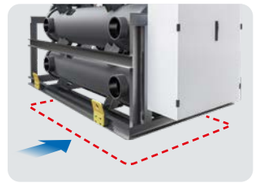
Maximum efficiency at partial loads

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

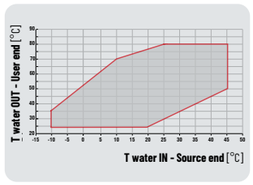
Thanks to the special features of the **KSW** range, heat sources at temperatures between 30° and 45°C (and therefore, unsuitable for direct use) are used by heat pumps to produce hotter water. This is true for industrial heat waste, which can be reused to produce, for example, district heating. Similarly,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

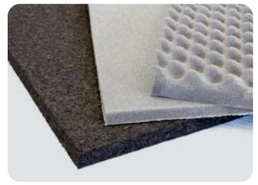
Maximum efficiency at partial loads

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

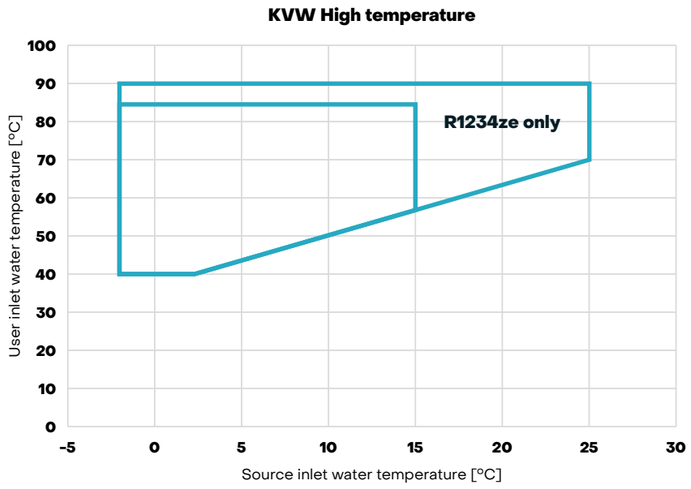
KSW		202	204	221	222	241	242	244	301	302	304	344	404	444	484	444	484
		Water conditions: user side 70/80°C; source side 45/40 °C															
Thermal power	kW	191.4	192.1	211.6	211.9	241.0	241.9	239.6	291.6	292.5	296.3	339.7	380.8	431.9	474.9	537.3	589.9
Total absorbed power	kW	45.3	45.3	51.5	51.4	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 2.50 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.