HiRef



# TECHNOLOGIES

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

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

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

In synergy with our in-house electrical, mechanical and software design department, we design full-custom air conditioning systems, which are customizable and adaptable to even the most critical environments, to be able to respond to any specific needs. We are guided by high quality engineering and the constant optimization of system efficiency, to mitigate its environmental impact.

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

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


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

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

### Free-Cooling

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

### High efficiency

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

### Shell and tube heat exchanger

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

### A2L Ready - Low environmental impact refrigerants

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

### Fast Restart and dedicated microprocessor control

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

### Control and supervision

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

### Plate heat exchanger

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

### Fans

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

### Inverter driven compressors

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

### Adiabatic Cooling

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

### Super low noise set-up

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

HiRef


# A2L GAS UPGRADE KIT

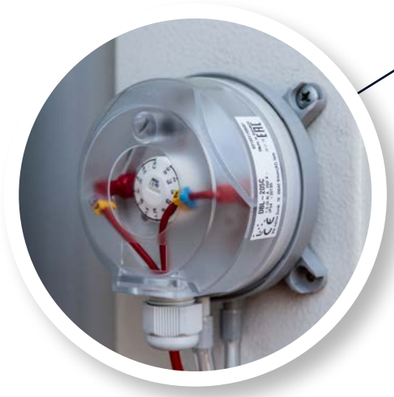
## FOR AIR CONDITIONING UNITS

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

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

### WHAT IS AN A2L READY UNIT?

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

### Compressors and components

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

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

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

### Refrigerant leak sensor

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

### Alarm control and management systems

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

### Safety

**ASHRAE A2L class refrigerants are mildly flammable**. This peculiarity requires certain precautions in terms of sensors and components in the air conditioning unit, to prevent - through adequate designing - the risk of igniting fires.

HiRef

# AIR/WATER

## Liquid chillers

INDUSTRIAL

# PCC

## AIR-CONDENSED CHILLERS FOR INDUSTRIAL PROCESSES

6 - 140 kW


MULTI-PROTOCOL COMMUNICATION INTERFACE

SCROLL COMPRESSORS

CORROSION RESISTANT MATERIAL

PLATE HEAT EXCHANGERS

AXIAL FANS

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

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

### Maximum efficiency at partial loads

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

### Solution designed for process applications

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






### Accurate regulation of the outlet temperature

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


### Perfect adaptability to any type of process

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

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


### Easy installation and maintenance

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


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

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

Also available with 60 Hz power supply

DATA CENTER SERVICES

# TSE

## CHILLERS WITH REMOTE CONDENSER WITH SCROLL COMPRESSORS

46 - 638 kW


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

**TSE** is the HiRef range of liquid chillers with remote condenser and Scroll compressors. These motoevaporating units are available with different refrigerating set-ups (Efficiency Packs), numerous power ratings and two different noise emission set-ups, making them particularly versatile for a number of system engineering applications.

Sizing, the choice of individual components and control of auxiliary units (circulation pumps, remote condenser fans) all aim to reduce energy consumption and increase energy savings throughout the system.

The configurations available for the refrigeration circuit are:

### EFFICIENCY PACK 1
(48 to 177 kW)

Dual compressor on dual circuit for high system redundancy.

### EFFICIENCY PACK 2
(48 to 177 kW)

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

### EFFICIENCY PACK 4
(146 to 481 kW)

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

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

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






### Maximum efficiency at partial loads

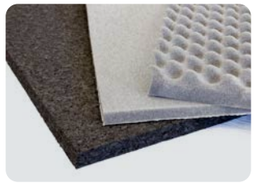
The **TSE** range features a multiscroll solution also on single circuits, electronically controlled expansion valves and the option of managing the circulation pumps and remote condenser fans via on-board software: all these features help achieve high standards of energy efficiency, particularly at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

### Reduced footprint

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


### Efficiency and reliability in line with system requirements

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



### Attention to detail and to low noise requirements

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


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

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

Also available with 60 Hz power supply


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

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

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

## Higher efficiency potential

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

## Natural refrigerant

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

## Modular and efficient

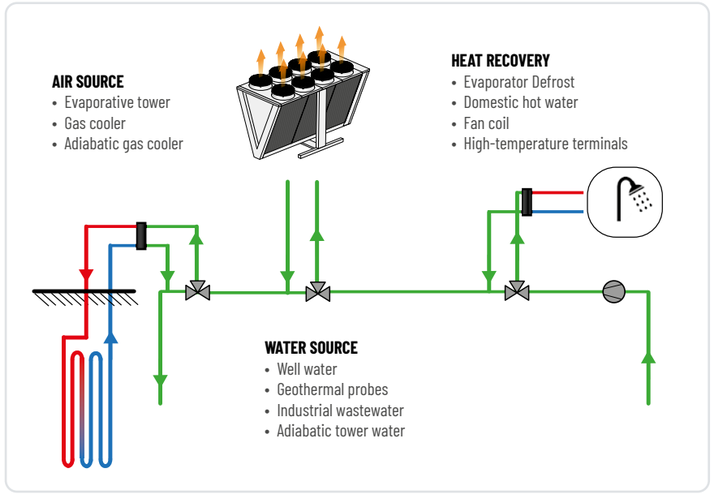
A configuration with very deep modular 'V' coils provides an extensive heat exchange surface area and therefore excellent thermal efficiency levels in relation to the unit footprint. Another special feature is the material of the coil tubes (alloy of copper and steel) which ensures mechanical strength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

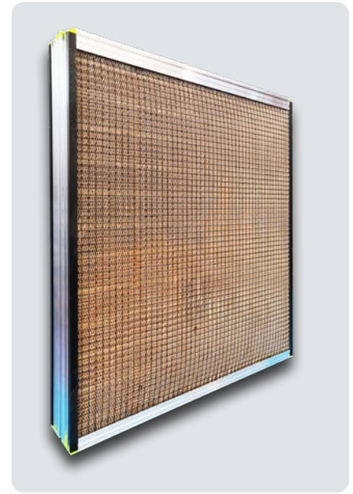
## Maximum efficiency at partial loads

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







## Very high temperature and multi-source heat recovery

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

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

## Adiabatic saturation system

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


| CDA - Version C (chilling only) | | CDA95CS | CDA190CS | CDA285CS |
|---|---|---|---|---|
| **Cooling capacity** @12/7°C; 35°C; 50% R.H. [100%] | kW | 96.0 | 192.0 | 288.0 |
| **Total absorbed power** | kW | 29.0 | 58.0 | 87.0 |
| **EER** [UNI 14511] | | 3.33 | 3.33 | 3.33 |
| **Cooling capacity on a total recovery basis** @12/7°C; 10/80 °C | kW | 131 | 262 | 393 |
| **Recovered thermal power** @10/80 °C | kW | 164 | 328 | 492 |
| **Total absorbed power** | kW | 33.5 | 67.0 | 100.5 |
| **Overall COP** | | 8.81 | 8.81 | 8.81 |
| **Efficiency class** [Eurovent standard] | | A | A | A |
| **Sound power** | dB(A) | 86 | 89 | 91 |
| **Dimensions** [L x D x H] | mm | 2255 x 1600 x 2655 | 2255 x 3200 x 2655 | 2255 x 4800 x 2655 |

Also available with 60 Hz power supply

DATA CENTER | INDUSTRIAL | SERVICES

# TTX

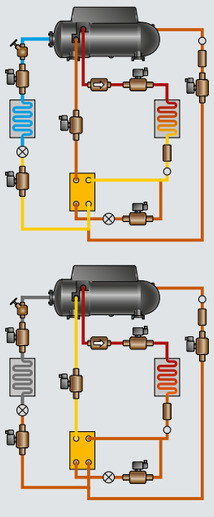
## AIR CONDENSED CHILLERS WITH OIL-FREE CENTRIFUGAL COMPRESSORS

281 – 1057 kW


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

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

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



### Top-class thermodynamic performance!

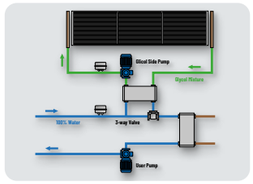
An effective combination of "oil-free" centrifugal compressor and flooded exchangers allows maximisation of thermal exchange efficiency; this is largely due to the absence of oil in the circuit and the reduced approach temperature between water and refrigerant (1K) as a result of no overheating in the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





### Is the unit working?

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



### Glycol-free kit

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

### Maximum efficiency at partial loads

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

### New refrigerant R1234ze

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


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

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

Also available with 60 Hz power supply

DATA CENTER | INDUSTRIAL | SERVICES

# HCB

## AIR CONDENSED CHILLERS WITH INVERTER DRIVEN SCREW COMPRESSORS

369 - 1200 kW

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

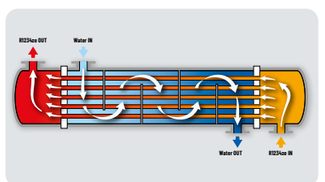
**HCB ChillBatic** sets a new standard for air cooled chillers, designed to ensure that processes are both energy-efficient and environment-friendly. Low environmental impact has been achieved by using new HFO refrigerants with low GWP (Global Warming Potential), while higher efficiency/footprint ratios are reached thanks to the special V-configuration of the heat exchange coils and their sizing, the largest among the chillers currently available on the market. The free-cooling version - where heat exchange surface areas are double the market average - ensure outstanding performance. The adiabatic cooling technology also produces the highest efficiency rates both at partial and at nominal loads, thanks to the lower temperature of the air entering the coils. The high thermodynamic efficiency (low TEWI, Total Equivalent Warming Impact) is combined with a special focus on maintainability and easy accessibility of the compressors contained in the removable HiRail© module which reduces noise emissions.

### New refrigerant R1234ze

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

### Inverter screw compressors

Wide load modulation capability and high efficiency at partial loads.




### New concept of heat exchange

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

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





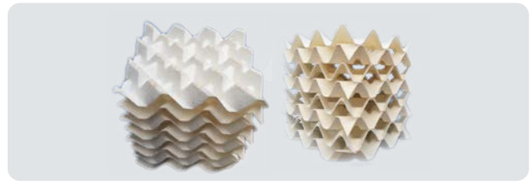
### Modular and efficient

The configuration with very deep 'V' modular coils provides an extensive heat exchange surface area and therefore excellent thermal efficiency in relation to the unit footprint.
The Free-Cooling version features heat exchangers sized in such a way as to allow a Total Free-Cooling Temperature (TFT) of 10 °C*.

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

### Low noise and accessibility: HI-RAIL©

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



### Adiabatic humidification system

The adiabatic humidification system installed on the units consists of a series of humidification panels installed upstream of the finned pack heat exchanger and equipped with a set of nozzles designed to wet the packs homogeneously.
This system relies on the physical principle according to which air, flowing through the wet panels and therefore coming into contact with the water contained in them, will absorb a certain amount of water vapour, with the air temperature lowering in the process.

For this reason, the air flowing out of the pack is chilled and can go through the finned pack heat exchangers at a lower temperature, resulting in an increase in the efficiency of the thermodynamic cycle and in the cooling capacity. Taking the average climatic conditions as reference, it appears that the energy savings on an annual basis exceed 35% compared to a traditional chiller of the same size (Data Centre located in Brussels with chilled water to 20/25 °C).


| Version C - HCB cooling only | | 0381C | 0401C | 0421C | 0451C | 0481C | 0531C | 0581C | 0621C | 0661C | 0721C | 0801C | 0831C | 0901C | 0971C | 1041C | 1101C | 1161C | 1231C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Cooling capacity** @12/7°C; 35°C [R134a] | kW | 369.7 | 398.5 | 417.3 | 442.2 | 477.9 | 519.2 | 565.1 | 614.8 | 652.2 | 705.6 | 773.6 | 815.5 | 880.5 | 938.5 | 1019.2 | 1067.7 | 1123.6 | 1199.4 |
| **Total absorbed power** | kW | 98.5 | 107.4 | 114.7 | 120.4 | 129.7 | 137.8 | 152.1 | 164.7 | 177.3 | 193.6 | 205.8 | 221.0 | 238.0 | 251.9 | 272.1 | 288.8 | 306.0 | 327.3 |
| **EER** [UNI 14511] | | 3.75 | 3.71 | 3.64 | 3.67 | 3.68 | 3.77 | 3.72 | 3.73 | 3.68 | 3.65 | 3.76 | 3.69 | 3.70 | 3.73 | 3.75 | 3.70 | 3.67 | 3.66 |
| **Cooling capacity** @16/10°C; 35°C | kW | 407.1 | 436.7 | 456.9 | 484.4 | 523.2 | 568.6 | 618.2 | 672.7 | 713.3 | 771.3 | 843.5 | 889.0 | 961.2 | 1023.5 | 1113.8 | 1165.5 | 1226.1 | 1308.9 |
| **Total absorbed power** | kW | 102.3 | 111.2 | 118.8 | 124.3 | 134.4 | 142.2 | 156.8 | 170.4 | 183.7 | 199.7 | 211.7 | 227.6 | 245.2 | 259.1 | 281.3 | 298.8 | 316.5 | 338.2 |
| **EER** [UNI 14511] | | 3.98 | 3.93 | 3.85 | 3.90 | 3.89 | 4.00 | 3.94 | 3.95 | 3.88 | 3.86 | 3.98 | 3.91 | 3.92 | 3.95 | 3.96 | 3.90 | 3.87 | 3.87 |
| **Eurovent efficiency class** | | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A |
| **Consumption of water** [Madrid climate] | m³/year | 2868 | 2868 | 2868 | 2812 | 2812 | 3824 | 3749 | 3749 | 3749 | 4780 | 4687 | 4687 | 5737 | 5624 | 5624 | 5624 | 6693 | 6561 |
| **Sound power** | dB(A) | 93 | 93 | 93 | 96 | 97 | 97 | 96 | 97 | 97 | 97 | 98 | 98 | 98 | 98 | 99 | 99 | 100 | 100 |
| **Sound power of Low Noise set-up** | dB(A) | 88 | 88 | 88 | 91 | 92 | 92 | 91 | 92 | 92 | 92 | 93 | 93 | 93 | 93 | 94 | 94 | 95 | 95 |
| **Dimensions** [L x D x H] | mm | 5755 x 2255 x 2650 | | | | | 7305 x 2255 x 2650 | | | | 8855 x 2255 x 2650 | | | 10405 x 2255 x 2650 | | | | 13000 x 2255 x 2650 | |

| Free-Cooling HCB version | | 0311 F | 0331 F | 0361 F | 0381 F | 0421 F | 0451 F | 0481 F | 0531 F | 0581 F | 0621 F | 0661 F | 0721 F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Cooling capacity** @12/7°C; 35°C [R134a] | kW | 299.8 | 316.0 | 342.0 | 362.1 | 402.0 | 423.7 | 445.4 | 478.7 | 517.8 | 553.6 | 589.1 | 654.1 |
| **Total absorbed power** | kW | 78.7 | 84.2 | 91.0 | 97.6 | 106.6 | 112.9 | 119.2 | 127.8 | 135.8 | 146.0 | 160.5 | 172.8 |
| **EER** [UNI 14511] | | 3.81 | 3.75 | 3.76 | 3.71 | 3.77 | 3.75 | 3.73 | 3.75 | 3.81 | 3.79 | 3.67 | 3.79 |
| **Total Free-Cooling Temperature** | °C | -0.8 | -1.1 | 0.0 | -0.3 | 0.3 | 0.1 | -0.2 | 0.4 | 0.0 | 0.4 | 0.1 | -0.4 |
| **Cooling capacity** @16/10°C; 35°C | kW | 330.2 | 347.6 | 376.5 | 398.0 | 442.4 | 465.9 | 489.5 | 525.0 | 568.3 | 607.6 | 646.9 | 717.3 |
| **Total absorbed power** | kW | 81.2 | 86.8 | 93.2 | 100.1 | 109.5 | 115.9 | 122.4 | 130.5 | 139.0 | 149.2 | 164.4 | 177.1 |
| **EER** [UNI 14511] | | 4.07 | 4.00 | 4.04 | 3.98 | 4.04 | 4.02 | 4.00 | 4.02 | 4.09 | 4.07 | 3.93 | 4.05 |
| **Total Free-Cooling Temperature** | °C | 2.6 | 2.3 | 3.5 | 3.2 | 3.9 | 3.6 | 3.3 | 3.9 | 3.5 | 4.0 | 3.6 | 3.0 |
| **Cooling capacity** @26/20°C; 35°C | kW | 441.7 | 462.7 | 502.7 | 528.8 | 591.4 | 621.0 | 650.6 | 694.7 | 754.1 | 806.1 | 858.7 | 948.2 |
| **Total absorbed power** | kW | 92.7 | 98.5 | 103.8 | 112.2 | 122.3 | 130.0 | 137.7 | 144.2 | 154.0 | 164.6 | 182.3 | 197.1 |
| **EER** [UNI 14511] | | 4.76 | 4.70 | 4.84 | 4.71 | 4.84 | 4.78 | 4.72 | 4.82 | 4.90 | 4.90 | 4.71 | 4.81 |
| **Total Free-Cooling Temperature** | °C | 10.4 | 10.0 | 11.7 | 11.3 | 12.1 | 11.8 | 11.4 | 12.3 | 11.7 | 12.3 | 11.9 | 11.1 |
| **Consumption of water** [Madrid climate] | m³/year | 2666 | 2666 | 3554 | 3554 | 4443 | 4443 | 4443 | 5332 | 5332 | 6220 | 6220 | 6220 |
| **Sound power** | dB(A) | 93 | 93 | 94 | 94 | 95 | 95 | 95 | 97 | 98 | 98 | 98 | 98 |
| **Sound power of Low Noise set-up** | dB(A) | 88 | 88 | 89 | 89 | 90 | 90 | 90 | 92 | 93 | 93 | 93 | 93 |
| **Dimensions** [L x D x H] | mm | 4900 x 2255 x 2650 | | 6155 x 2255 x 2650 | | 7405 x 2255 x 2650 | | | 8655 x 2255 x 2650 | | 10700 x 2255 x 2650 | | |

Also available with 60 Hz power supply

DATA CENTER | INDUSTRIAL | SERVICES

# TVA

## AIR CONDENSED CHILLERS WITH INVERTER DRIVEN SCREW COMPRESSORS

341 – 1282 kW


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

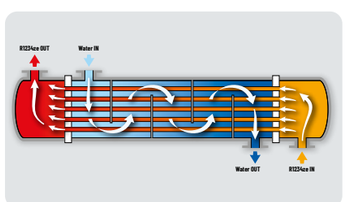
**TVA** sets a new standard for air cooled chillers, designed to ensure that processes are both energy-efficient and environment-friendly. Low environmental impact has been achieved by using new HFO refrigerants with low GWP (Global Warming Potential), while higher efficiency/footprint ratios are reached thanks to the special V-configuration of the heat exchange coils and their sizing, the largest among the chillers currently available on the market. The free-cooling version - where heat exchange surface areas are double the market average - ensure outstanding performance.

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

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

### Inverter screw compressors

Wide load modulation capability and high efficiency at partial loads.




### New concept of heat exchange

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

### New refrigerant R1234ze

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





### Low noise and accessibility: HI-RAIL®

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

### Modular and efficient

The configuration with very deep 'V' modular coils provides an extensive heat exchange surface area and therefore excellent thermal efficiency in relation to the unit footprint.
The Free-Cooling version features heat exchangers sized in such a way as to allow a Total Free-Cooling Temperature (TFT) of 10 °C*.

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


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

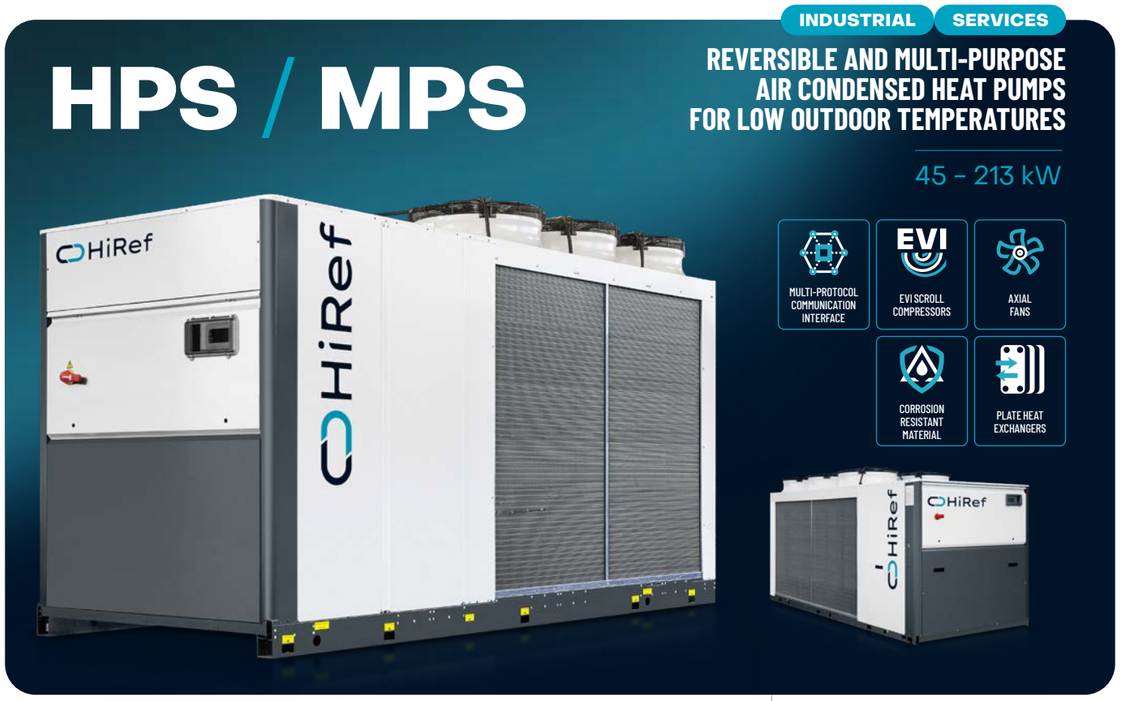
| Free-Cooling TVA version | | 0311F | 0331F | 0361F | 0381F | 0421F | 0451F | 0481F | 0531F | 0581F | 0621F | 0661F | 0721F | 0801F | 0831F | 0901F | 0971F | 1041F | 1101F | 1161F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Cooling capacity** @12/7°C;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

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

HiRef

# AIR/WATER

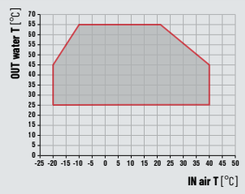
## Reversible heat pumps




**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

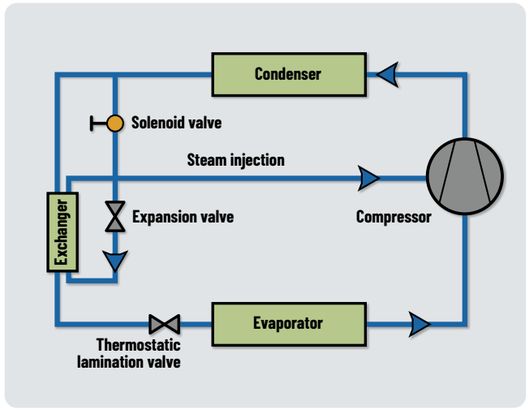
- Refrigerant R410A
- EVI compressors with steam injection
- Electronically controlled expansion valve
- "Cold" start Smart Kit
- Coils with hydrophilic treatment and wider fin pitch
- Defrost ice disposal chutes with heating elements
- Optional EC electronic switching fans

### MPS only

- Available in multipurpose version for 2 and 4 pipe systems

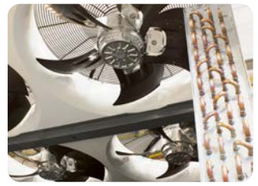







## Units optimised for climates with T down to -20°C

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

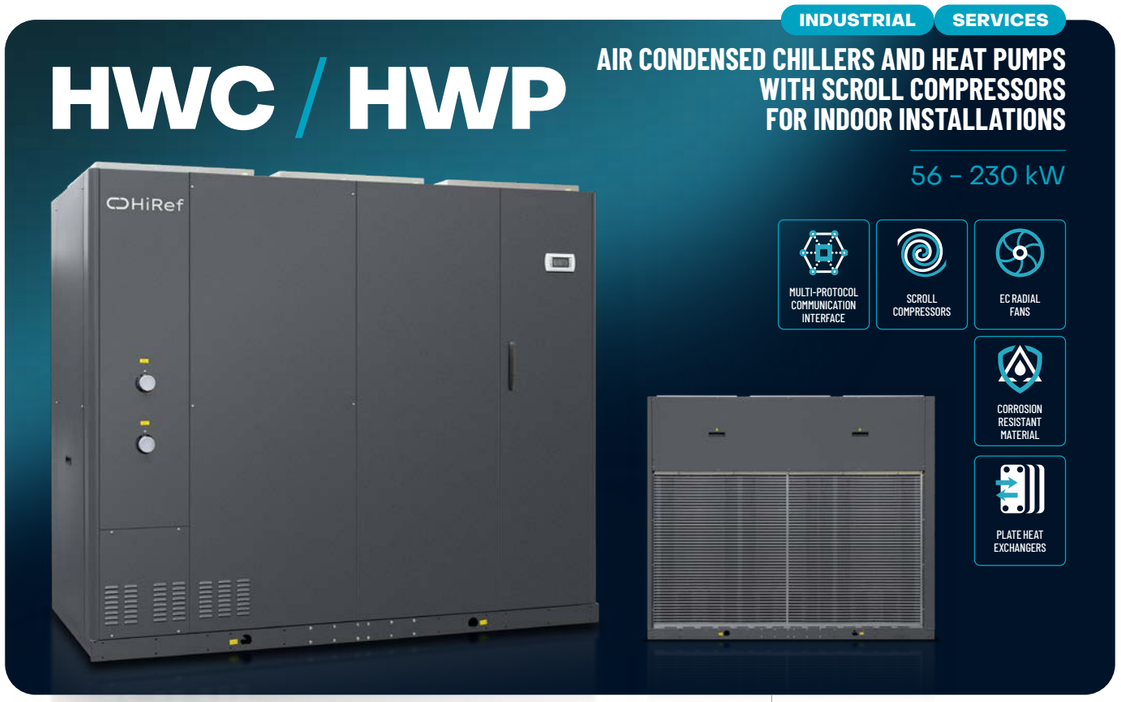
All units in the **HPS / MPS** range are, as standard, "Low Noise", which means fan speed is controlled, anti-vibration piping is used on the refrigeration circuit, and the compressors and pumping kit are compartmentalised in a box lined with soundproofing material. All this ensures minimum noise emissions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

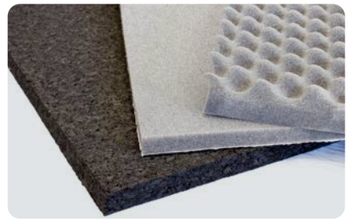
### EFFICIENCY PACK 4

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

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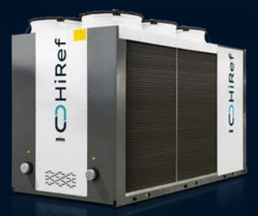
# TSS

## 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.

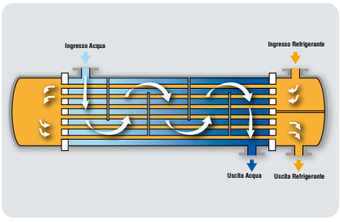
DETAILS AT **Page 12**





### 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

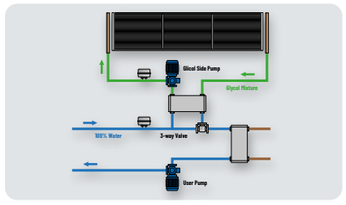

MULTI-PROTOCOL COMMUNICATION INTERFACE
SCROLL COMPRESSORS
INVERTER DRIVEN COMPRESSORS
AXIAL FANS
CORROSION RESISTANT MATERIAL
A2L READY
LOW GWP REFRIGERANT
PLATE HEAT EXCHANGERS


**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).

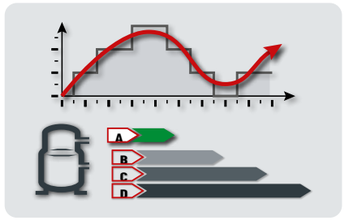



### Glycol-free kit

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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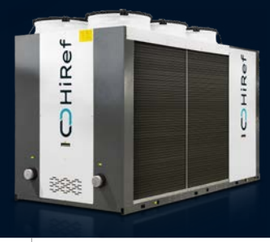
# TPS

## 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.

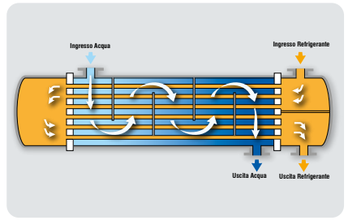
DETAILS AT **Page 12**






### 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