UniPACK-PI
UniPACK-P
UniPACK-P EXP

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Air cooled Chillers, reversible Heat pumps & Multipurpose EXP units with scroll compressor, low GWP natural gas R290.

SUMMARY

- **A natural** eco-friendly solution
- **Advantages & performances**
- **Features & technology**
- Control **logic**
- **Hydraulic equipment** and **DHW** production
- **one step forward**

UniPACK-P is a new generation chiller, heat pump & EXP units with **R290** (propane) refrigerant gas:

- Non-toxic **natural refrigerant**
- **Zero impact** on the ozone layer
- Low **GWP** value (**0,02**) - AR6 by IPCC
- **No F-gas** requirements
- **A3** classification (flammable)
- Suitable for all kind of **new application** & **replacement**

Advantages & performances

UniPACK, a dedicated chillers, heat pumps & multipurpose units !

- Chiller product range with **WIDE & PRECISE** inverter modulation
- **EFFICIENCT & RELIABLE** heat pump & Multipurpose solutions
- **Heat pump** up to **72°C** hot water production (**78°C** with inverter technology)
- **WIDE OFFER** with **11 sizes** from 50 to 160 kW (from 75 to 150 with inverter technology)
- **POWERFUL & REDUNDANT** with **SIR** multi unit management
- **SAFE** with the **safety chain** implemented
- **FLEXIBLE** with many **options**
- **SUPERSILENT** in the **Q version**

UniPACK-P/PI & UniPACK-P EXP: advantages & performances

- **EFFICIENCY:**
  Heat pumps with high efficiency at **partial loads**:
  SCOP LT up to 4,37 and SCOP MT up to 3,57 (3,29 in the ON/OFF unit)
  Chillers with SEER up to 5,17
  EXP units with high energy saving and TER up to 7,73 during the contemporary cooling & heating production.

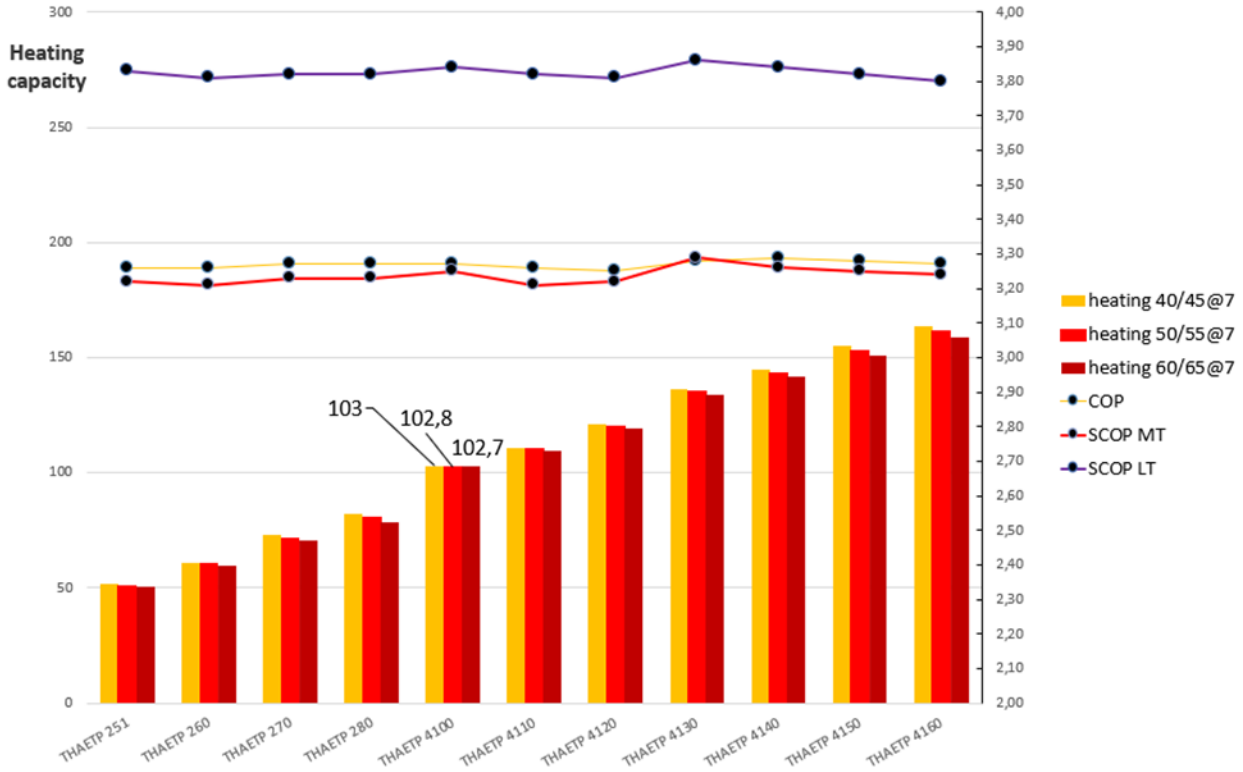
- **MANAGEMENT up to 4 UNITS:**
  The heating capacity can be increased according to the plant load requirement in a simple and quick way up to 600 kW.

- **GREEN SOLUTIONS** suitable for all kinds of installation: new constructions, buildings renovation with replacement of the heating system, integration of heat pump in existing boiler heating system, EXP units for all year cooling & heating production.

UniPACK-P/PI & UniPACK-P EXP: advantages & performances

Heating capacity & index efficiency for **UniPACK-P Heat Pump**

(A 7°C|W 40/45°C)
(A 7°C|W 50/55°C)
(A 7°C|W 60/65°C)



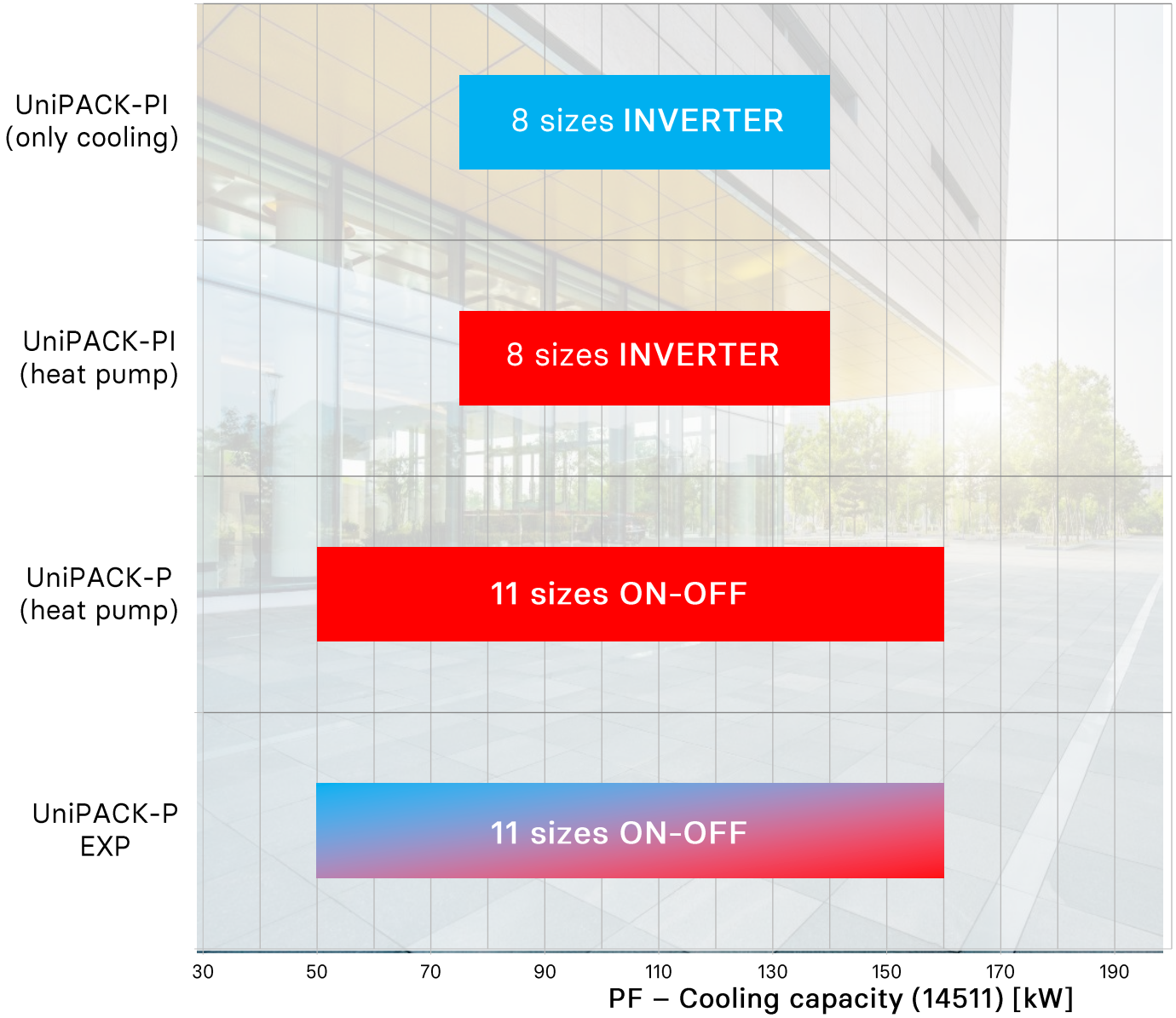
According EU Regulations No.811/2013 and No.813/2013)
Low temperature application (35°C)
Medium temperature application (55°C)

... and at low ambient temperature: the heating capacity to produce hot water at 45-55-65°C is almost the same !!

UniPACK is a good choice for any application in any climate conditions

Features & technology

UniPACK-P/PI & UniPACK-P EXP: features & technology



1 circuit/1 compressor 75 kW
2 circuits/1+i up to 100 kW
2 circuits/2+i up to 140 kW

1 circuit/2 compressors up to 80 kW
2 circuits/4 compressors up to 160 kW

1 circuit/2 compressors up to 80 kW
2 circuits/4 compressors up to 160 kW

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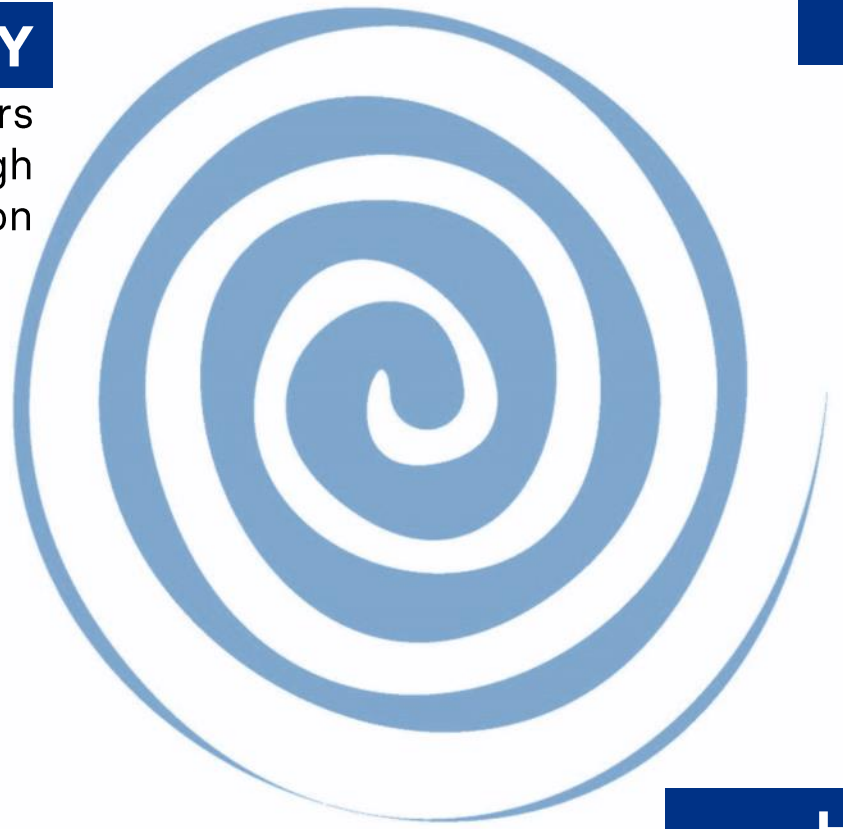
UniPACK-P/PI & UniPACK-P EXP: features & technology

TECHNOLOGY

ON/OFF and INVERTER compressors specific for R290 and high temperature water production

MANAGEMENT

Accuracy and precision for the plant



REDUCED GAS CHARGE

For greater attention to the environment in which we live

EXP

Patented technology

DEDICATED COMPONENTS

To improve performance

HIGH EFFICIENCY CONCEPT

To increase energy savings

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UniPACK-P/PI & UniPACK-P EXP: features & technology

Features

AC fans with cut phase as standard; **EC-brushless (FIEC & FIAP)** as option. FIEC as standard option in the EXP 251-280

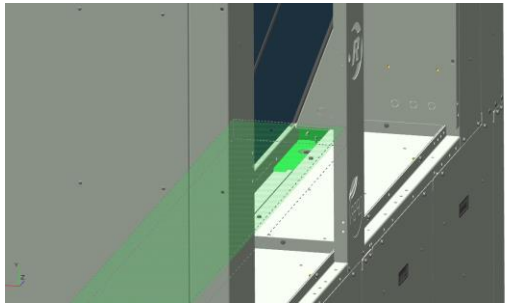
MCHX (chiller), Cu-AL condensing coil (heat pump); **hydrophilic (BRH)** or **prepainted (RAP)** coil as option

Coil protection **grille** as standard; aesthetic metal frame as accessory **(PTL)**

Electric heater (RAB) on the drain pan as option (heat pumps & EXP)

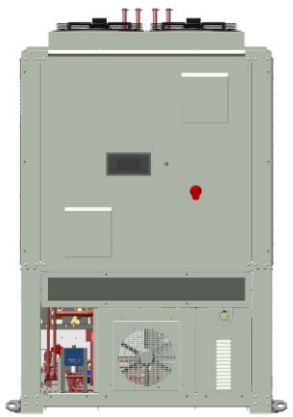
Drain pan **outlet connection** for condensate water

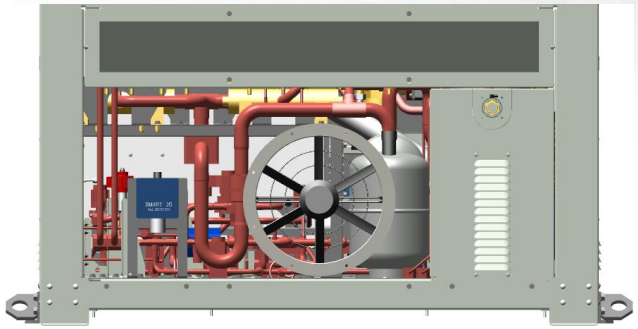
Technical compartment (specifically designed for R290) with **pumping groups** on the back side



UniPACK-P/PI & UniPACK-P EXP: features & technology

Features





- **Electrical box** with easy accessibility
- **Acoustic/luminous** red light, activated as a gas leakage is detected
- Control panel (7" **touch control keyboard** as accessory)
- Main power supply switch
- Drain pan **outlet connection** for condensate water
- **Gas sensor** inside technical compartment (infrared type) and **EX fan**
- Closed technical compartment (specifically designed for R290) with **compressors and refrigerant circuit** on the front side

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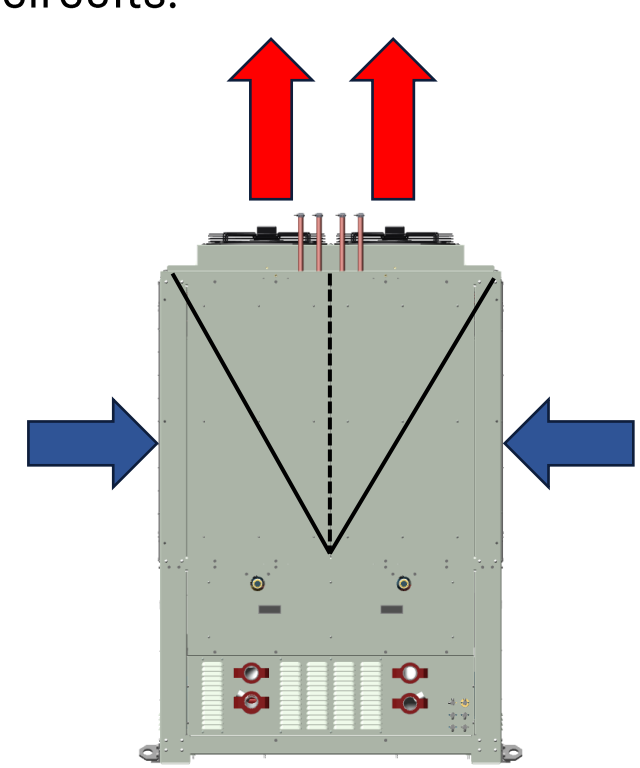
Circuits configuration and layout

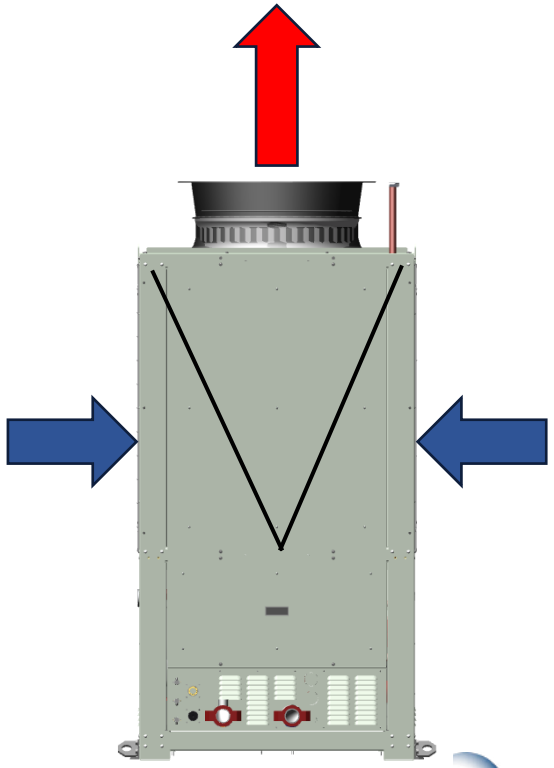
The units **with two refrigerant circuits** have coils and fan rows **completely independent:**

- better management of the single circuit and the defrost function;
- reduced power consumption due to the switch off the fans / compressors in the circuit;
- EXP units (**always with two refrigerant circuits**) can manage easily and independent hot water production in both refrigerant circuits.

UniPACK-P	n° CIRCUITS (heat pump)	n° CIRCUITS (EXP)
251 ÷ 280	1	2
4100 ÷ 4160	2	2

UniPACK-PI	n° CIRCUITS (heat pump)	n° CIRCUITS (chiller)
175	1	1
290 ÷ 3150	2	2



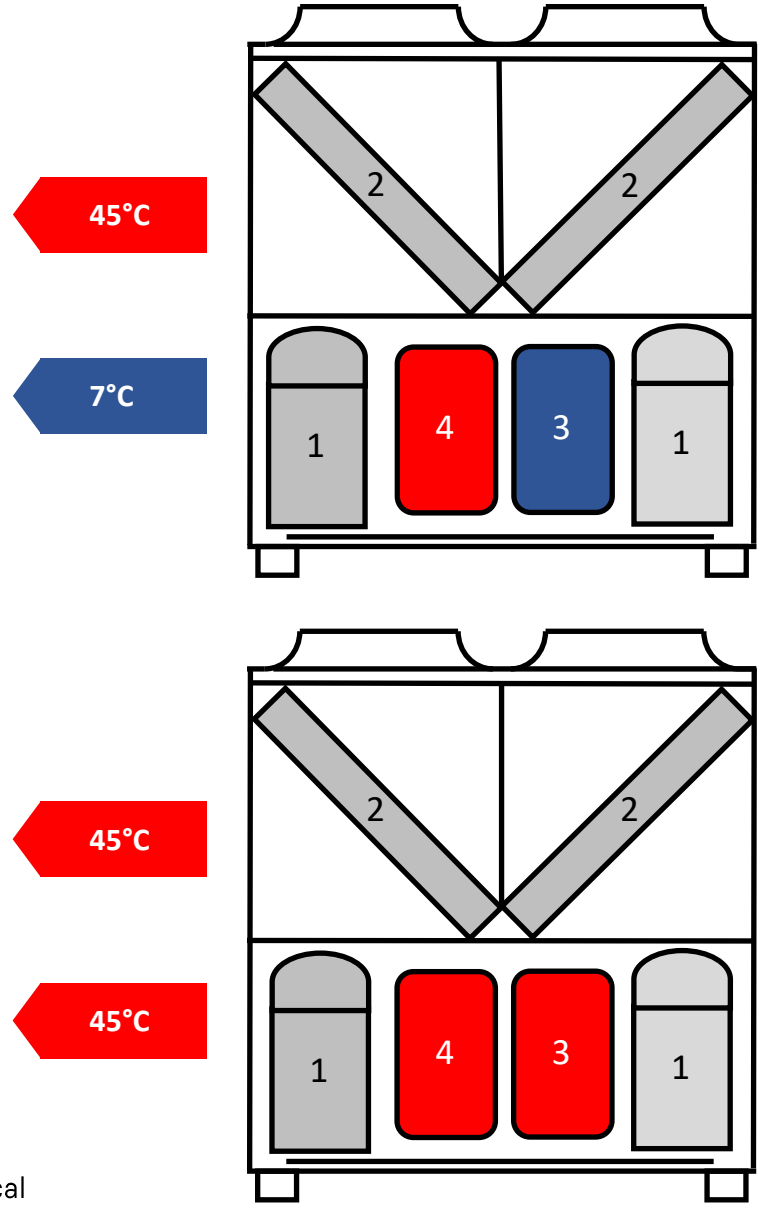


UniPACK-P EXP: features & technology

EXP is the multi purpose ecological system designed by Rhoss to satisfy the simultaneous or independent production of **chilled** and **hot** water.

EXP has two working modes:

- **AUTOMATIC**: automatically allows the simultaneous or independent production of **hot** water from secondary/recovery exchanger (4) and **cold** water from main exchanger (3);
- **SELECT**: production of **hot** water from main exchanger (3) and/or secondary one (4), according to system's requests and user's priority.



Note: to ensure the unit works correctly, the system needs a minimum volume of water (more information in the technical documentation)

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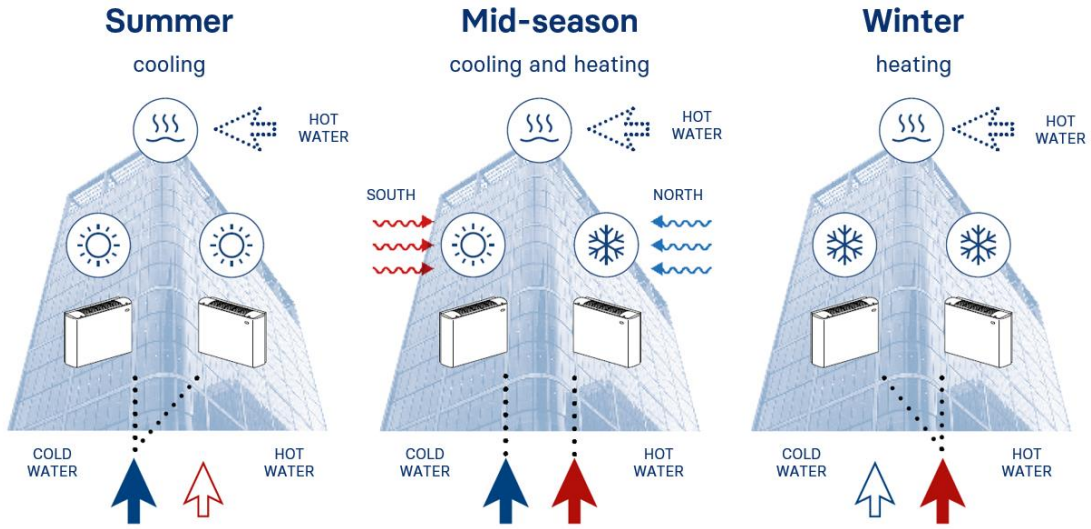
UniPACK-P EXP: technology

EXP works in 4 pipes systems with:

- **AUTOMATIC** mode selected.

It's also possible to manage the **partial heat recovery** (DS) to produce **hot** water (6 pipes plant) (*)

(*) the hot water production is available only when the unit is working and according to the request from the user



EXP works in 2 pipes systems with:

- **AUTOMATIC** mode selected in the summer season;
- **SELECT** mode selected in the winter season. The priority to main or secondary/recovery exchangers must be set up (in case of contemporary requests of hot water).

Note: it's not allowed to drain the water from the primary circuit (main exchanger side) even if there is the only need of hot water from the secondary exchanger/recovery. The use of ethylene glycol is recommended if you do not wish to drain the water from the hydraulic system during the winter stoppage.

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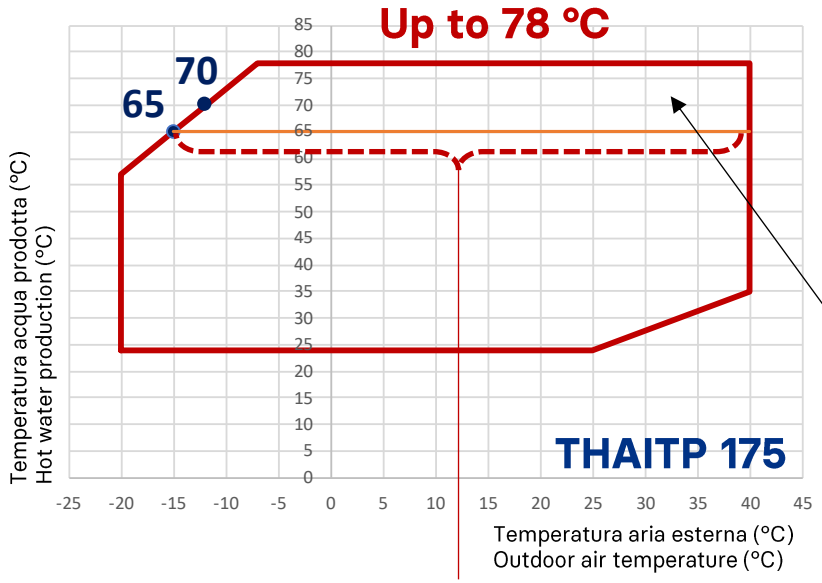
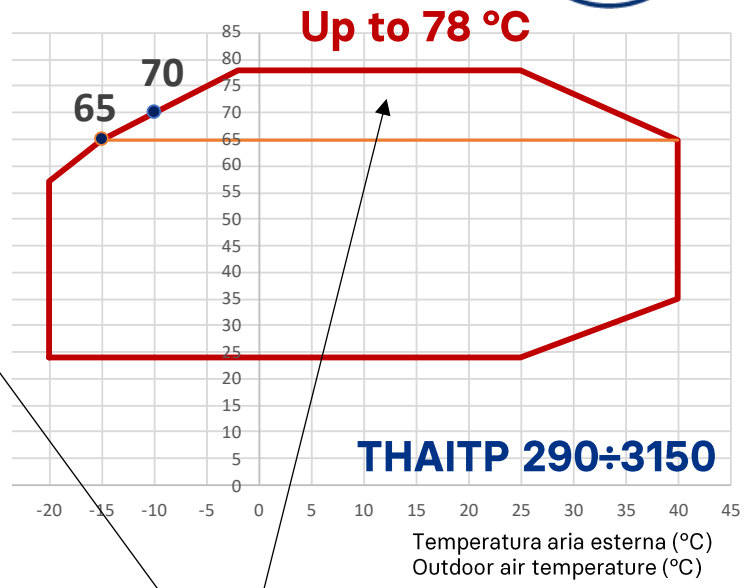
UniPACK-PI: features & technology

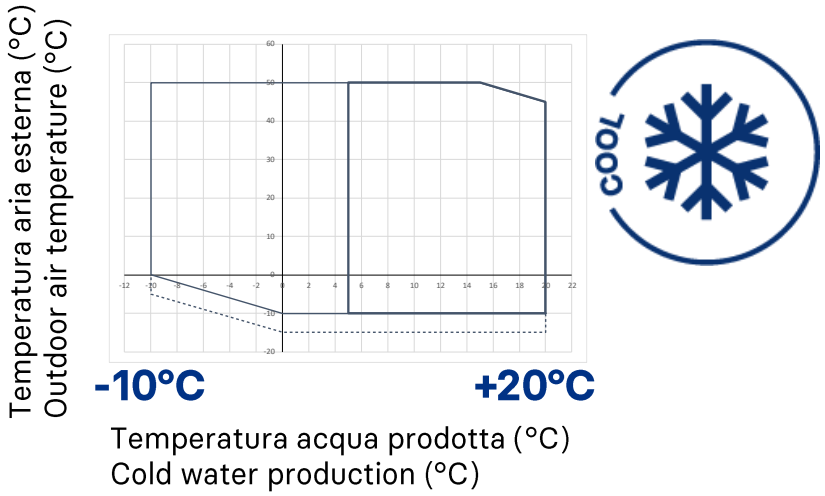
Working limits (inverter units)





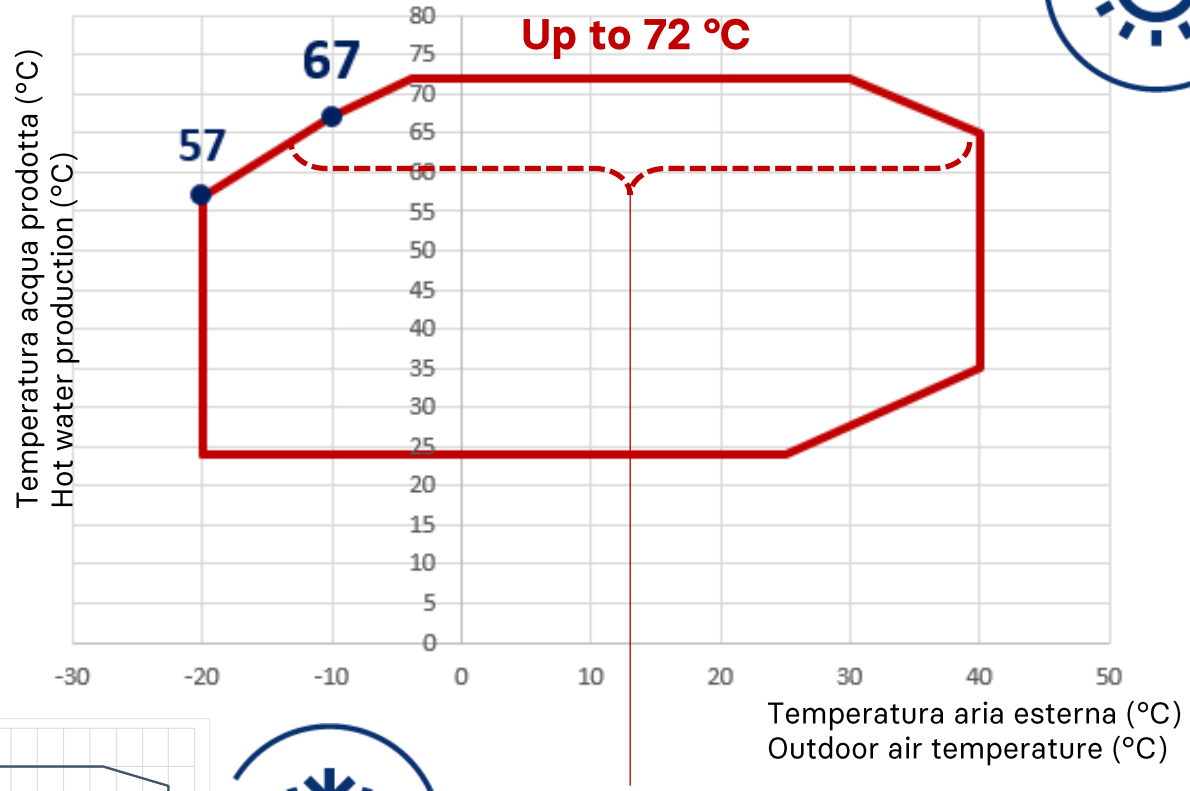
Stable **hot water** production at **65°C** from **-15°C** to **40°C**

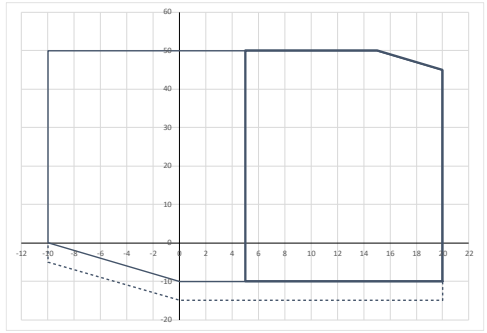
Partialization with frequency reduction of the inverter compressor



UniPACK-P/PI & UniPACK-P EXP: features & technology

Working limits (ON/OFF units)





Stable hot water production at **65°C** from **-12°C** to **40°C**

Installation site requirements

UniPACK are intended to be used only outdoors (class III, open air as defined in Chapter 4.2 of EN 378-3) and in a site without obstacles to ventilation (minimum ground air speed greater than 0.15 m/s according to EN 60079-10-1; condition to be understood with the machine switched off and in the absence of other ventilation systems).

If the unit has max refrigerant charge per circuit less than 5kg, the access category to the unit can be “a” according to EN 378-1 and defined **general access**.

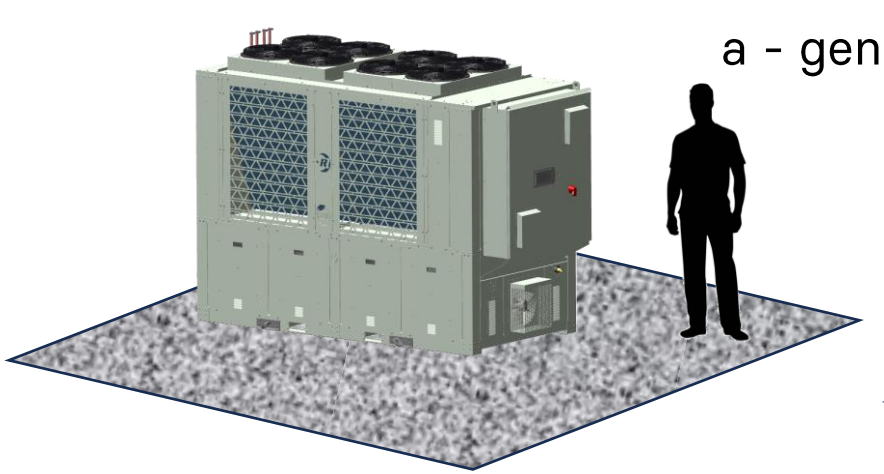
If the unit has max refrigerant per circuit that doesn’t exceed 10 kg, the access category to the unit can be “b” according to EN 378-1 and defined **supervised access**.

Access categories classify the characteristics of people accessing a given space from a security point of view:

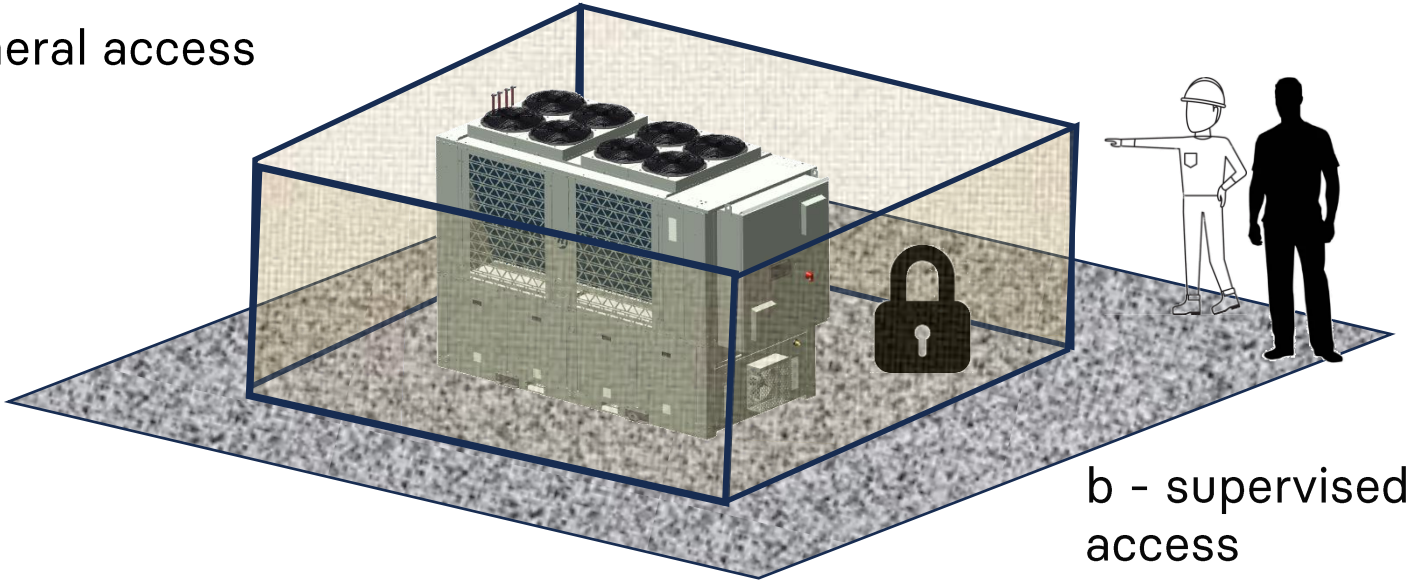
general access means without more particular restriction (those who access it have no information regarding security).

supervised access means with restriction, so the access to the unit has to be controlled and free access cannot be allowed.

Access category



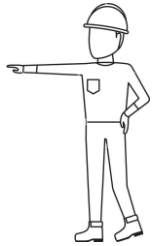
a - general access



b - supervised access

b - supervised access; the unit has to be segregated in case of installation place where there is NO possibility to control the access and/or there is NO limited number of people.

Note:
- private area like factory, top of the building where the access is permitted only to the authorized persons, business or professional offices can be considered segregated areas.



UniPACK-P/PI & UniPACK-P EXP: features & technology

Access category

Category	Heat Pump ON/OFF	EXP ON/OFF
251	b	a
260	b	a
270	b	a
280	b	a
4100	b	b
4110	b	b
4120	b	b
4130	b	b
4140	b	b
4150	b	b
4160	b	b

Category	Chiller inverter	Heat pump inverter
175	a	b
290	a	b
2100	a	b
3110	a	b
3120	a	b
3130	a	b
3140	a	b
3150	a	b

UniPACK-P/PI & UniPACK-P EXP: features & technology

Clearance (for each unit)

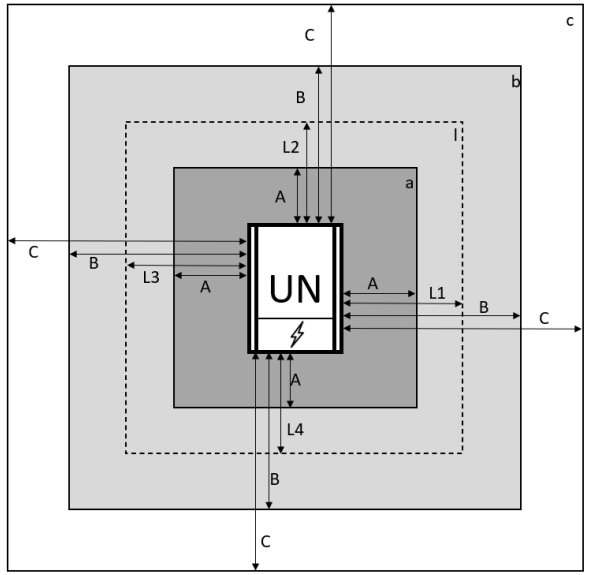
A: Atex area 0,5m (only “Ex” devices admitted)

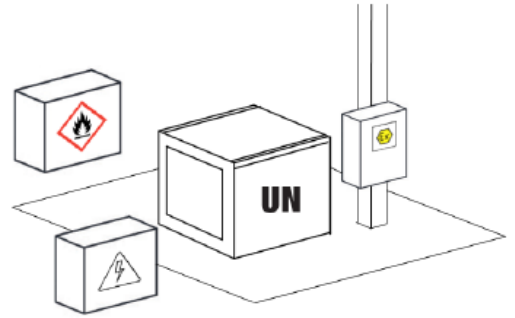
L: service area (maintenance of the unit)

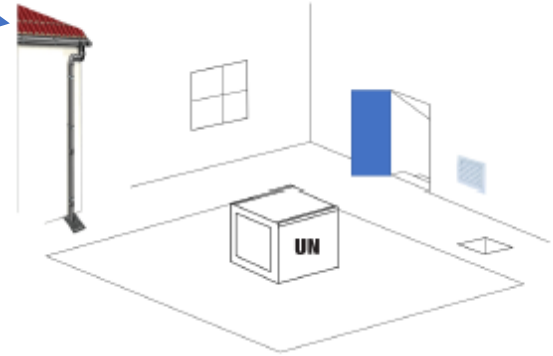
B: safety area 2,5m (from all kind of openings*)

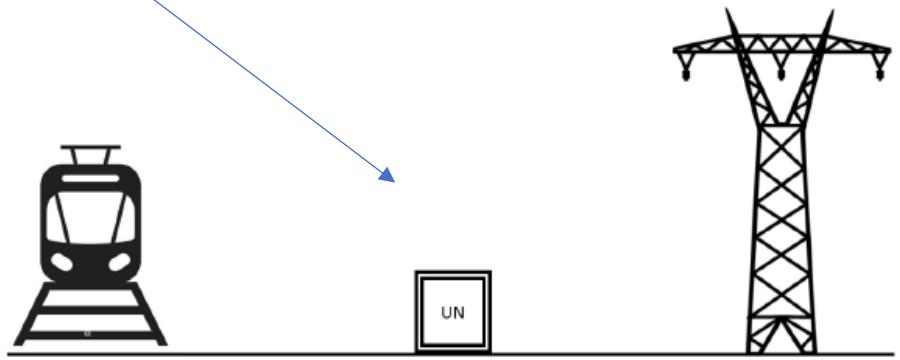
C: safety area 15m (railway lines, tramways and high voltage power lines)

(*) ventilation systems, vents or ventilation ducts, entrance doors or windows, manholes, storm drains, gutters, drains, hoppers, trapdoors, ladders, openings to the ground (sewers), shafts, spaces for the passage of pipes, cables or similar.









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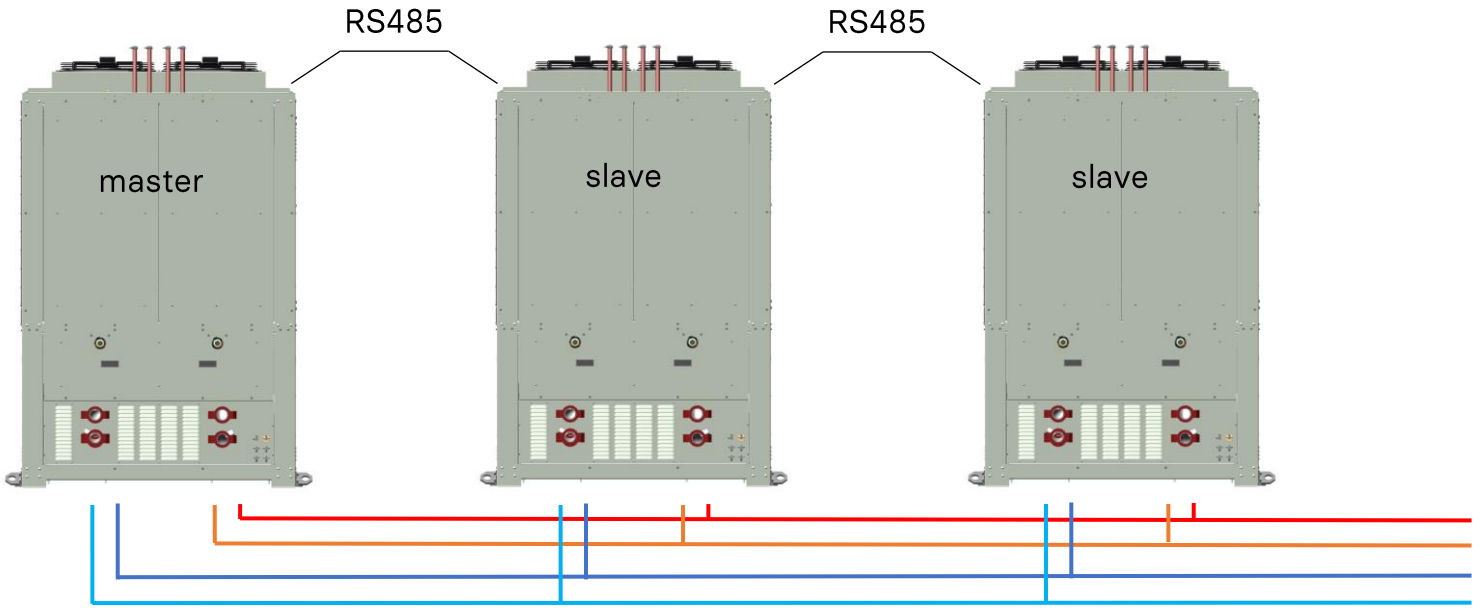
Clearance between the units

If more than one unit is installed, SIR - sequencer integrated Rhoss can manage the group of the units and the minimum distance between the finned coils should be at least 2 m.

Hydraulic connection
Example for EXP unit

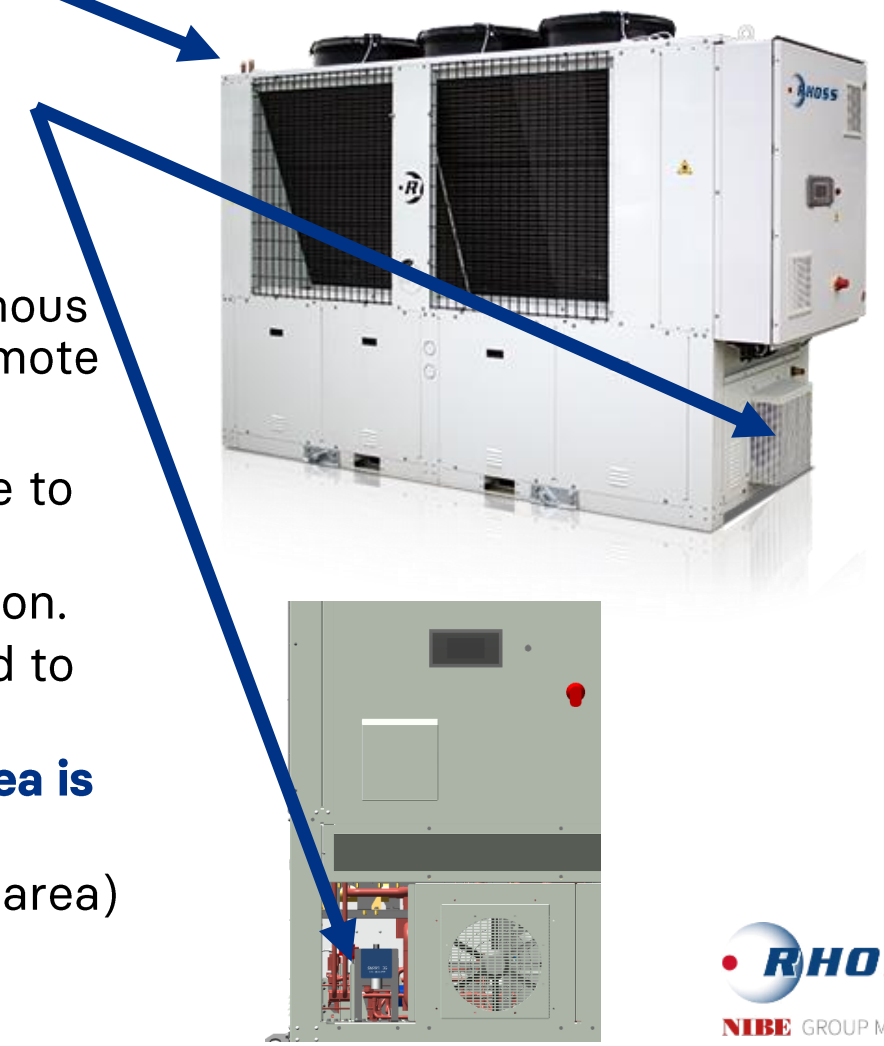


Safety valves

In the units charged with A3 gas, the system manager must evaluate the possible need to remotely discharge the safety LP-HP valves so as to keep the gas from escaping in the event of the valves being triggered due to overpressure. In the technical manual there are dimension of the exhaust cone starting from safety valves, diameter of the pipes and the low-high pressure values.

Design for safe use of the unit

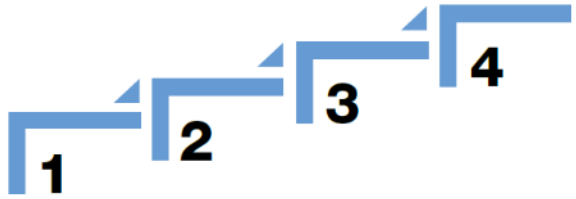
- Optimized place of the **safety valve** to make a simple canalization (if requested).
- Safety chain consisting of an infrared **gas sensor and Ex fans.** In the event of a refrigerant leak, the unit is disconnected from power supply and the technical compartment is ventilated to prevent the formation of hazardous atmospheres. In this period an acoustic/luminous red-light signal is active on the front and the relative remote contact is activated
- Thanks to the numerous tests performed, it was possible to obtain that:
  - the electrical panel is not a possible source of ignition.
  - the carpentry ensures that any gas leak is conveyed to the sensor to be promptly detected.
  - when unit is operating normally, the **surrounding area is fully safe**.
  - the safety is guaranteed **even in event of failure** (A area)



Control logic & electrical connections

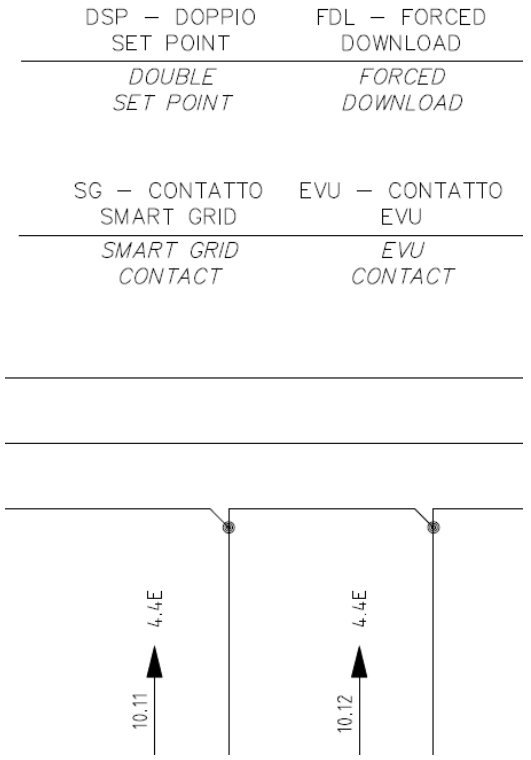
UniPACK-P/PI & UniPACK-P EXP: control logic & electrical connections

- Control on the **leaving water temperature**.
- **Smart dynamic defrost** function.
- Pump **«energy saving»** management.
- **DHW** management function with 3-way external valve:
- Customizable **set-point**:
  - by unit, from the remote keyboard or BMS;
  - CS and DSP options management.
- **Control logic for group of unit (SIR)**:
  - RS485 units connection – the unit with inverter technology is equipped with an integrated RS485 port for SIR connection
  - up to 4 units connected in hydraulic parallel;
  - smart management of heat pumps even with simultaneous start;
  - balance of unit operation hours;
  - management of main alarms;
  - master and slave of the units have to be defined;
  - management 3-way diverter valve and desuperheater.



UniPACK-P/PI & UniPACK-P EXP: Smart Grid logic

SG contact	EVU contact	Configuration 1	Configuration 2
open	open	Normal mode	Reduced Mode 2
open	closed	Enhanced mode	Normal mode
closed	open	Reduced mode 1	Boost Mode
closed	closed	Boost Mode	Boost Mode



Normal Mode: The unit operates normally as per the set-point settings.

Enhanced Mode: The unit operates normally, with the set-points thus modified:

- In cooling the set-point is decreased by 1°C.
- In heating mode the set-point is increased by 2°C.
- In DHW mode, the set-point is increased by 5°C.

Boost mode: The unit operates normally, with the set-points thus modified:

- In cooling mode the set-point is decreased by 2°C.
- In heating mode, the set-point is increased by 5°C.
- In DHW mode, the set-point is raised to the maximum possible, with a restart differential of 1°C, and the additional electric heaters (if present) are activated.

Reduced mode:

- In Configuration 1 (Reduced mode 1) the unit is switched off for a settable time (up to a maximum of 2 hours), then operates in normal mode.
- In Configuration 2 (Reduced Mode 2) the unit runs in normal mode for an adjustable time (up to a maximum of 2 hours), then is switched off.

Hydraulic equipment and DHW production

Hydraulic equipment

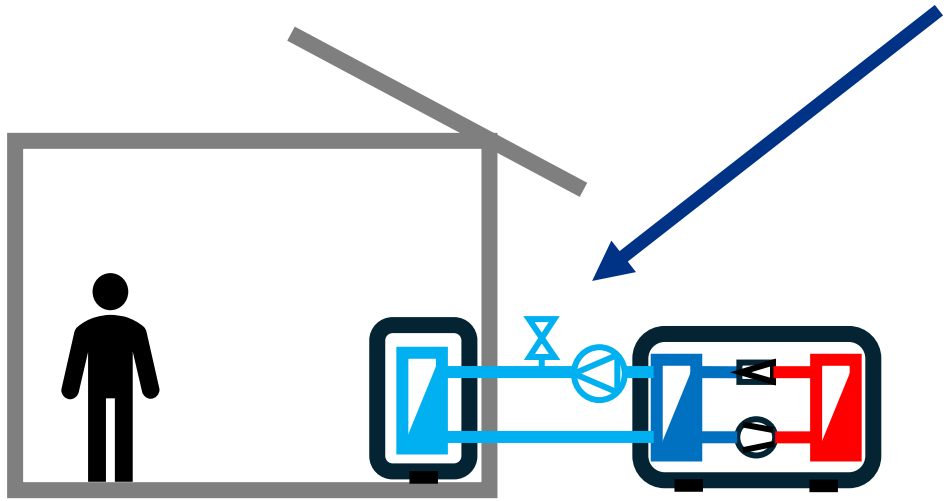
The units can be supplied without or with hydraulic equipment like P/DP (low or high static pressure), ASP/ASP with inertial tank. In particular:

- the VPF management (**VPF_R by Rhoss**), that can be enabled from the keyboard, is available as standard feature. In this case the customer can work at variable flow providing the pump P/DP + inverter or he can buy from Rhoss the pump and the accessory VPF_R+INVERTER

- possibility to ask for pumps with INVERTER regulation for the start up and commissioning (option **INV_P**);

NOTE:

An indirect type of system must also be provided, compatible with class III installation (according to Chapter 5.5 of standard EN 378-1); for example through the installation of an **automatic type deaerator**, always externally and near the unit (IN/OUT water) before any shut-off valve and at the highest point and/or where any gas stagnation pockets could be generated to vent them in areas without sources of ignition (including unit) and adequately far from the unit, possibly through ducting with suitable piping.

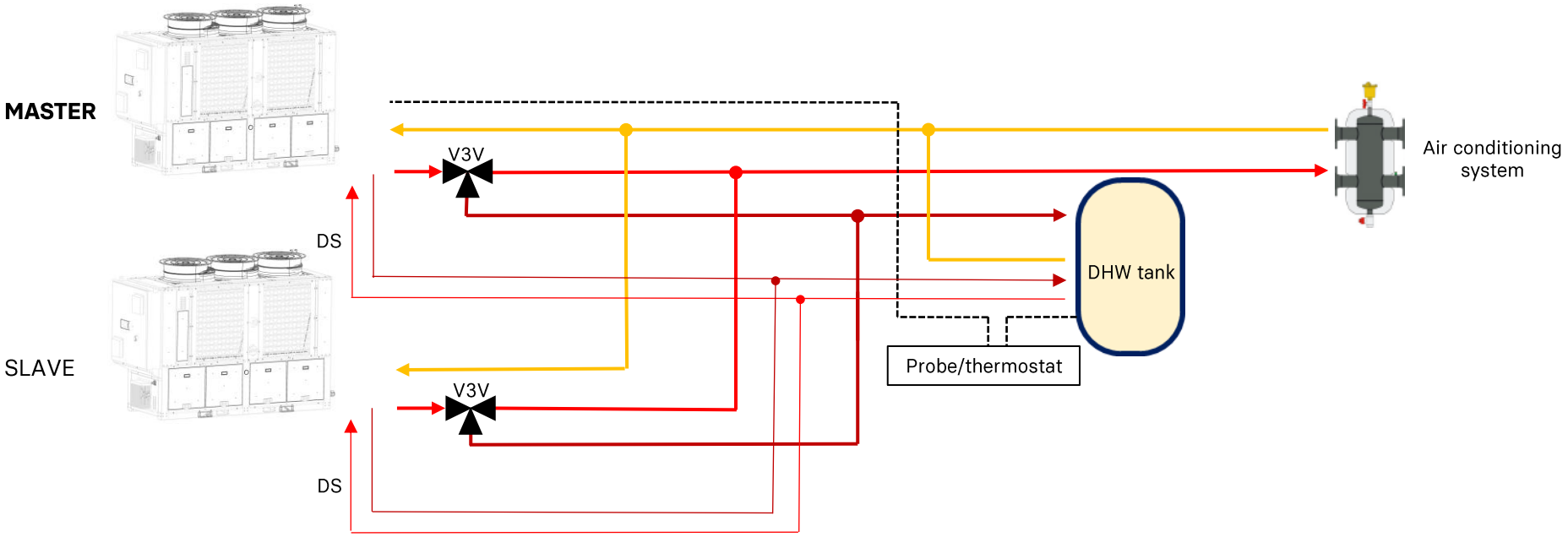


Recovery and DHW production

The **chiller** can be provided with DS - desuperheater or RC100 - total heat recovery (accessory).

The **heat pump and EXP** can be provided with or without desuperheater (accessory).

If a **heat pump** is equipped with DS and also with a 3-way diverter valve (supplied from the installer), all DSs of the units in operation are initially activated, then the SIR provides for the sequenced (in case of probe) or non-sequenced (in case of thermostat) management of the DHW (domestic hot water).



one step forward.

UniPACK-P/PI & UniPACK-P EXP: one step forward.

- **Dedicated Heat Pump & Multipurpose EXP** for very high-water temperature production and wide operation limits.
- **R290** natural gas with extremely low GWP.
- **PLUG&PLAY** hydraulic equipment.
- Wide range of **accessories and options**.
- High seasonal efficiency in winter conditions, **SCOP MT** up to **3,57** and **SCOP LT** up to **4,37** (inverter technology)
- **Smart Grid** contacts.
- **HEAT PUMPS** suitable for all kinds of installation: new constructions, buildings renovation with replacement of the heating system, integration of heat pump in existing boiler heating system.

Thanks.

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