

# INSTALLATION, USE AND MAINTENANCE MANUAL

## WRE

Chillers and heat pumps  
40 kW - 750 kW



Erp 2021



Scroll compressor



Refrigerant  
R-410A



Cooling only



Heating/Cooling

### PLUS

- » Electronic expansion valve
- » Up to 6 compressors
- » 1 or 2 cooling circuits
- » Remote connectivity with the most common protocols
- » Compact dimensions
- » 3 different acoustic configurations
- » High seasonal efficiency values



Dear Customer,

Thank you for placing your trust in one of the products of Galletti S.p.a

This product is the result of our work and our commitment to design, research, and production and has been made from the finest materials, employing state-of-the-art components and production technology.

The CE marking of the product ensures its compliance with the safety requirements of the following directives: the Machinery Directive, the Electromagnetic Compatibility Directive, the Electrical Safety Directive, and the Pressure Equipment Directive. Fulfillment of the Ecodesign requirements is fully in keeping with the environmental awareness that has always guided our company.

The company certification of the Quality and Safety management system ensures that product quality is constantly checked and improved, and that the product is manufactured in full compliance with the highest standards.

By choosing our product, you have opted for Quality, Reliability, Safety, and Sustainability.

At your disposal, once again.

Galletti S.p.a

#### **TRANSLATION BY ORIGINAL INSTRUCTIONS**

The water chillers and heat pumps comply with directive 2014/68/EC (PED).

*The technical and dimensional data reported in this manual may be modified in view of any product improvement.*

*For any information , please contact the company: [info@galletti.it](mailto:info@galletti.it)*


The unit data are reported on the rating label in this page.  
(FAC-SIMILE)

**THE LABEL SHOWS THE FOLLOWING DATA:**

- Series and size of the unit
- Date of manufacture
- Main technical data
- Manufacturer
- The label is applied on the unit, usually on the enclosing panels

**IMPORTANT: NEVER REMOVE THE LABEL**

- Unit serial number
- The serial number permits to identify the technical characteristics and the components installed
- Without this datum it will be impossible to identify the unit correctly

	Galletti S.p.A. - Via L.Romagnoli 12/a 40010 Bentivoglio (BO) Italy  Made in Italy CATEGORY 2
Serial number Code Date of production Cooling capacity (W) Heating capacity (W) Power supply Power input (kW) Weight (kg) Max power input (kW) Max running amperage (A) HP power input (kW) Refrigerant Max refrigerant pressure Max refrigerant temperature (°C)	

**GENERAL CAUTIONARY NOTES**

- Keep this manual intact in a safe place for the all life of the unit.
- Carefully read all the information contained in this manual, paying special attention to sections marked "Important" and "Warning"; failure to comply with the instructions provided could result in injury to persons or damage to the equipment.
- Should a fault occur, consult this manual and if necessary contact the nearest Galletti S.p.A. service centre.
- All installation and maintenance operations must be carried out by qualified personnel, unless otherwise indicated in this manual.
- The first start up must be carried out exclusively by qualified personnel and authorized by Galletti S.p.A. (see warranty sheet attached).
- Before performing any work on the unit, disconnect it from the power supply.
- Failure to comply with the rules provided in this manual will result in the immediate invalidation of the warranty.
- Galletti S.p.A. shall not accept any liability for injury or damage resulting from improper use of the equipment or failure to comply with the directions provided in this manual and on the unit itself.
- It's mandatory to install filters heat exchangers protection will immediately invalidate the warranty.

**SAFETY SYMBOLS**



**Carefully read this manual.**



**Warning**



**Use personal protective equipment**



**Warning:**

Electrical and electronic products may not be mixed with unsorted household waste. Do NOT try to dismantle the system yourself: the dismantling of the system, treatment of the refrigerant, of oil and of other parts must be done by an authorized installer and must comply with applicable legislation. Units must be treated at a specialized treatment facility for reuse, recycling and recovery. By ensuring this product is disposed of correctly, you will help to prevent potential negative consequences for the environment and human health. For more information, contact your installer or local authority.

**USE SUITABLE PPE (GLOVES FOR REFRIGERANT, PROTECTIVE GOGGLES)**

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# 1 WRE SERIE


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## 1.1 FIELD OF APPLICATION

WRE series water chillers and water-cooled monobloc reversible heat pumps are designed for heating or cooling water for residential and commercial air-conditioning systems as well as industrial process applications.

**The units are intended to be installed in technical compartments, in a position accessible to authorised personnel.**

**Do not install the unit in environments with gas or flammable dusts.**

 **WARNING:** Always install the unit in well-ventilated technical compartments and in compliance with the safety requirements specified in UNI EN 378-3.

## 1.2 MAIN FEATURES

WRE is the new series of water-cooled chillers and heat pumps designed to meet the requirements of configurability and reliability; furthermore, the high seasonal efficiency it has achieved exceeds the 2021 limits established by the Eco Design Directive. The series consists of 27 models with cooling capacities ranging from 46 to 740 kW, available in cooling only or reversible heat pump versions.

The sizing of the plate heat exchangers aimed at optimising the operation both as condenser and evaporator, combined with the use of compressors with IDV (Intermediate Discharge Valve) technology in tandem uneven and trio configurations, makes it possible to obtain high values of seasonal energy efficiency in both heating and cooling modes.

The use of electronic valves with a wide operating range and high actuation speed makes it possible to track all partial load conditions without compromising the efficiency and operating stability of the unit.

The internal processor allows up to four external pumps to be managed in OR logic (two per source and two per device), with various water flow modulation logics.

Furthermore, every model is fully configurable with a choice of control, acoustic and partial heat recovery options without changing the overall dimensions.

### 1.3 MODELS AND VERSIONS

The WRE series consists of 27 models with cooling capacities ranging from 46 to 740 kW, available in cooling only or reversible heat pump versions. All models are charged with R410A

#### Configuration options

- 1 Power supply**
  - 0 400 - 3 - 50 + N
  - 1 400 - 3 - 50
  - 2 400 - 3 - 50 + N + circuit breakers
  - 3 400 - 3 - 50 + circuit breakers
- 2 Control microprocessor and lamination device**
  - B Advanced + electronic expansion valve
- 3 Partial heat recovery**
  - 0 Absent
  - D Desuperheater (partial heat recovery)
- 4 Management of source side pumps**
  - 1 Single pump
  - 2 Dual pump
  - 3 Single pump + condensation control with 0-10V modulated output signal
  - 4 Dual pump + condensation control with 0-10V modulated output signal
- 5 User water flow modulation**
  - 1 Single pump
  - 2 Dual pump
  - 3 Single pump + output signal with water flow modulation in  $\Delta T$  logic = cost
  - 4 Dual pump + output signal with water flow modulation in  $\Delta T$  logic = cost
  - 5 Single pump + output signal with water flow modulation in T logic = cost
  - 6 Dual pump + output signal with water flow modulation in T logic = cost

refrigerant.

**NOTE:** The choice of some options can make the choice of some others forbidden or make some selection (fields) mandatory. Please contact Galletti S.p.A. for verification.

- 6 Remote communication**
  - 0 Absent
  - 1 RS485 serial card (Modbus or Carel protocol)
  - 2 Lonworks serial card
  - 4 Ethernet card (SNMP or BACNET protocol) + clock card
  - 5 Ethernet card + clock card + monitoring software
- 7 Anti vibration shock mounts**
  - 0 Absent
  - G Rubber vibration dampers at the base of the unit
  - M Spring vibration dampers at the base of the unit
- 8 Packing**
  - 0 Standard
  - 1 Wooden cage
  - 2 Wooden crate
- 9 Remote control**
  - 0 Absent
  - 1 Simplified remote control panel
  - 3 Remote display for programmable microprocessor
- 10 Anti-intrusion panelling**
  - 0 Absent
  - P Present (standard for Q version)

#### » Accessories

<b>A</b>	Power factor capacitors
<b>B</b>	Soft starter
<b>C</b>	Service kit (advanced controller required)
<b>D</b>	Signal for user side water flow reversal valve management
<b>E</b>	ON/OFF status of the compressors
<b>F</b>	Remote control for step capacity limit (advanced controller required)
<b>G</b>	Configurable digital alarm board (advanced controller required)
<b>H</b>	Refrigerant pressure gauges
<b>I</b>	Two pairs of Victaulic joints
<b>L</b>	Filter regulating kit
<b>M</b>	Set point compensation outdoor temperature probe
<b>N</b>	Compressor tandem/trio isolation valves
<b>P</b>	Unit lifting pipes
<b>Q</b>	Temperature probe for pump shutdown on the primary circuit
<b>V</b>	Set-point modification with 4-20mA signal

## 1.4 MAIN COMPONENTS

### Structure

Galvanised steel sheet structure treated with a polyester powder coating suitable for indoor applications.

On request the unit can be supplied complete with easily removable containment panels to greatly simplify all maintenance and inspection operations.

### Cooling circuit

- Scroll type compressors in a tandem or trio configuration that can be sound insulated. The adopted components' efficiency, reliability, and noise emission levels represent the state of the art for scroll compressors.
- Brazed plate heat exchangers made of stainless steel and optimised for use with R410A.
- Dehydrating filter.
- Flow indicator with humidity indicator.
- Electronic expansion valve with integrated sight glass.
- Cycle reversing valve (only WRE H)
- Check valve (WRE H)
- High and low pressure switch
- Schrader valves for checks and/or maintenance
- Refrigerant pressure gauges (optional)

On some models, depending on the type of compressor used, the following may be present:

- Relief valve for limiting the maximum pressure of the low pressure circuit.
- Relief valve for limiting the pressure of the high pressure circuit in compliance with UNI EN 378-2.

### Electronic microprocessor control

The electronic control enables the complete control of the **WRE** unit. It can be easily accessed through a polycarbonate flap with IP65 protection rating.

Main functions:

- Control of water returning from the system's temperature
  - With modulating pump, control of the flow temperature to the unit or the Delta T
  - Management of a signal to control a flow reverse valve on the equipment side. This makes it possible to reverse the water-side cycle for cooling-only versions, that is, to adjust the temperature at the evaporator or condenser inlet depending on the operating mode and to provide an external signal for reversing the system-side valves that connect the equipment to the unit's heat exchanger. For models with heat pump operation, this allows the water inlet and outlet to be reversed on an external hydraulic circuit breaker in order to improve stratification.
  - Possibility of adapting the set-point to the outside load conditions or to the outside temperature
  - Control of the electronic valve
  - Complete alarm management, including history
  - An RS485 serial port is available for monitoring
  - Possibility of connecting a second remote terminal (display)
  - On request, possibility of monitoring the COP in real time
  - Management of multiple units connected to a LAN network
- Devices controlled
- Compressor
  - Reverse cycle valve (WRE H)
  - Alarm signalling relay
  - LAN networks for controlling 4 units in parallel and managing BACNET and LON communication protocols
  - Management of the external pumping unit and, as an option,

management of the splitting of the water flow both on the source side and on the equipment side.

## 2 INSPECTION, CONVEYANCE DIMENSIONAL AND SITING

### 2.1 INSPECTION

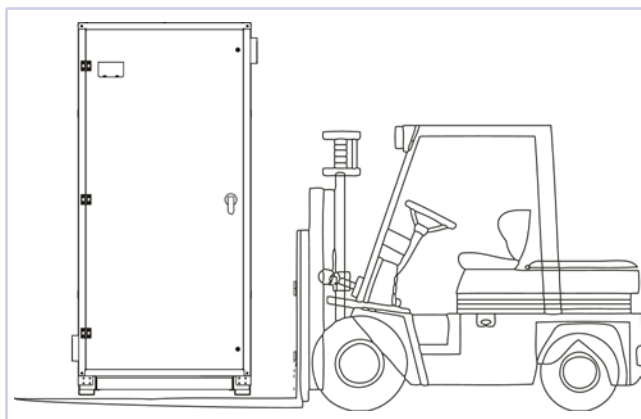
On receiving the unit, check that the packing is intact: the machine left the factory in perfect conditions and after thorough inspection.

Should you detect any signs of damage, immediately report them to the carrier and note them on the delivery slip.

Galletti S.p.A. Must be notified of the entity of the damage within 8 days of the delivery date.

Check that the following items are present:

- starting up module,
- wiring diagram
- warranty certificate
- make sure that this manual is intact (52 pagine).



### 2.2 CONVEYANCE

During handling it is compulsory to check dimensions, weights, centre of gravity and anchorages. Check as well that lifting and positioning devices conform to the current safety regulations. The unit leaves the factory screwed onto a wooden pallet, which allows it to be easily conveyed with a forklift truck. After removing the unit from the pallet, handle it gently, without applying excessive pressure on the side panels. You should collect and separate the packing materials (wood, cardboard, nylon etc.) and make them available for recycling in order to minimise their environmental impact. Before lifting, remove the screws fastening the base of the unit to the wood platform.

While the unit is being unloaded and positioned, utmost care must be taken to avoid abrupt or violent manoeuvres. Be very careful when transporting it inside rooms. Do not use the unit components as anchors.

The unit should be lifted using  $\varnothing 1\frac{1}{2}$ " GAS steel pipes at least 3mm thick inserted through the holes provided on the base side members and identified by means of appropriate stickers. The pipes, which must project at least 300 mm on every side, will be slung with ropes of equal length and secured to the lifting hook (apply stops at the end of the pipes to prevent the weight from causing the rope to slip off the pipe).

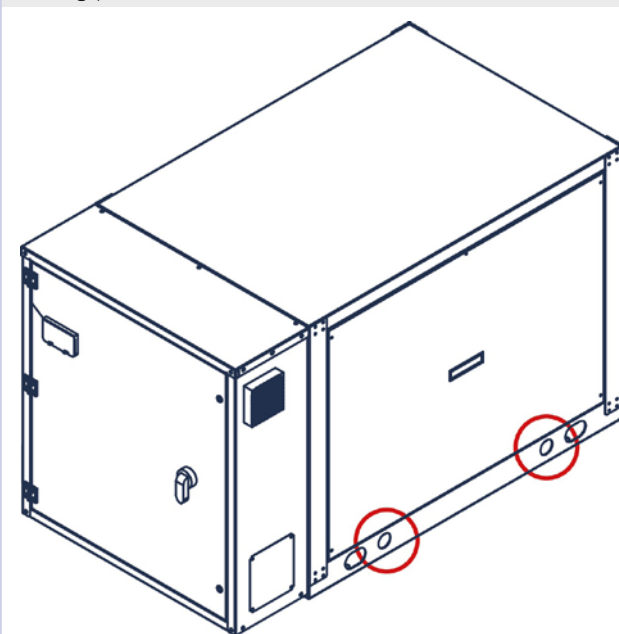
Use ropes or belts whose length exceeds the machine height and place spacer boards and bars on the top of the unit to avoid damaging the sides and upper part of the unit itself.

In this phase, before the definitive position, vibration damping supports can be installed (optional).

**⚠ WARNING** In all lifting operations make sure that the unit is securely anchored in order to prevent accidental falls or overturning.

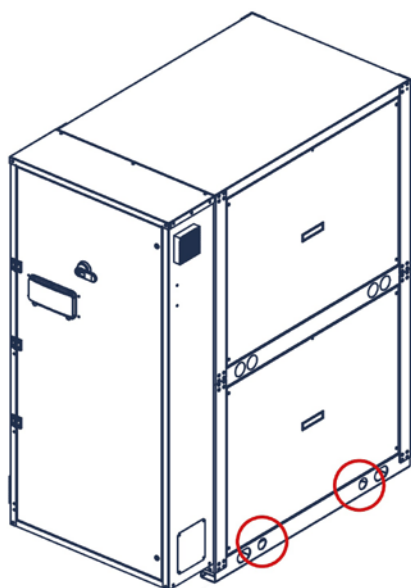
**⚠ USE** all available lifting points.

» Lifting points frame 1

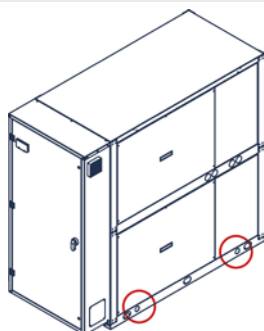




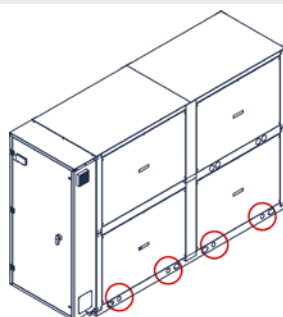
» Lifting points frame 2



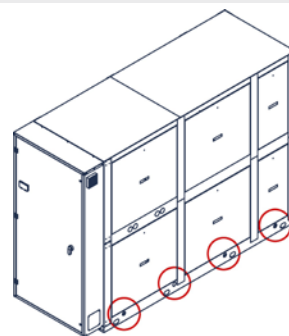
» Lifting points frame 3



» Lifting points frame 4



» Lifting points frame 5



## 2.3 SITING AND DAMPERS

It is important to bear in mind the following aspects when choosing the best site for installing the unit:

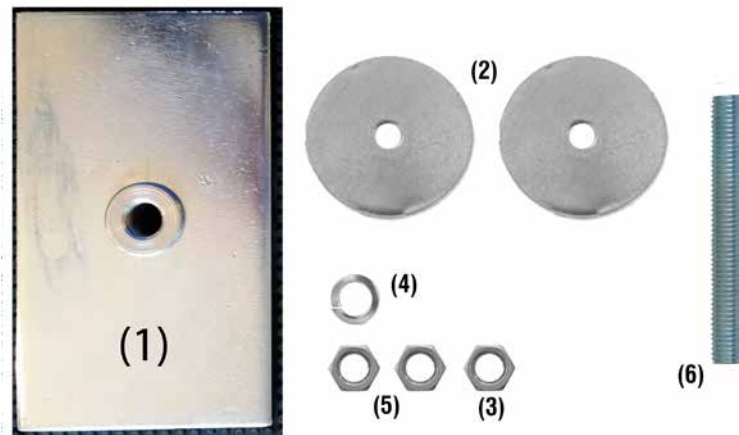
- Size and origin of water pipes;
- Location of the power supply;
- Solidity of the supporting surface;
- Avoid the possible reverberation of sound waves; do not install the unit in narrow or cramped spaces;
- Ensure adequate accessibility for maintenance or repairs (see section on 2.4 Installation clearance requirements and dimensional p. 10).

**This appliance is not intended to be used by children or persons with physical, sensorial or mental problems, inexperienced or unprepared, without supervision. Be careful that children do not approach the appliance.**

When installing the vibration dampers follow the instructions below:

1. Screw the jack (6) into the vibration damper with jack support plate (1) all the way;
2. Screw the bolt (5) until the jack (6) is locked in place on the vibration damper (1);
3. Screw the bolt (3) and insert one of the two disks (2) into the jack (6);
4. Insert the jack (6) into the hole on the unit base;
5. Adjust the height by turning the bolt (3);
6. Insert the second disk (2) into the jack (6) until it makes contact with the base;
7. Tighten the vibration damper with the split washer (4) and the bolt (5) to the unit base.

WRE	DAMPERS
F1	4
F2	4
F3	4
F4	4
F5	4



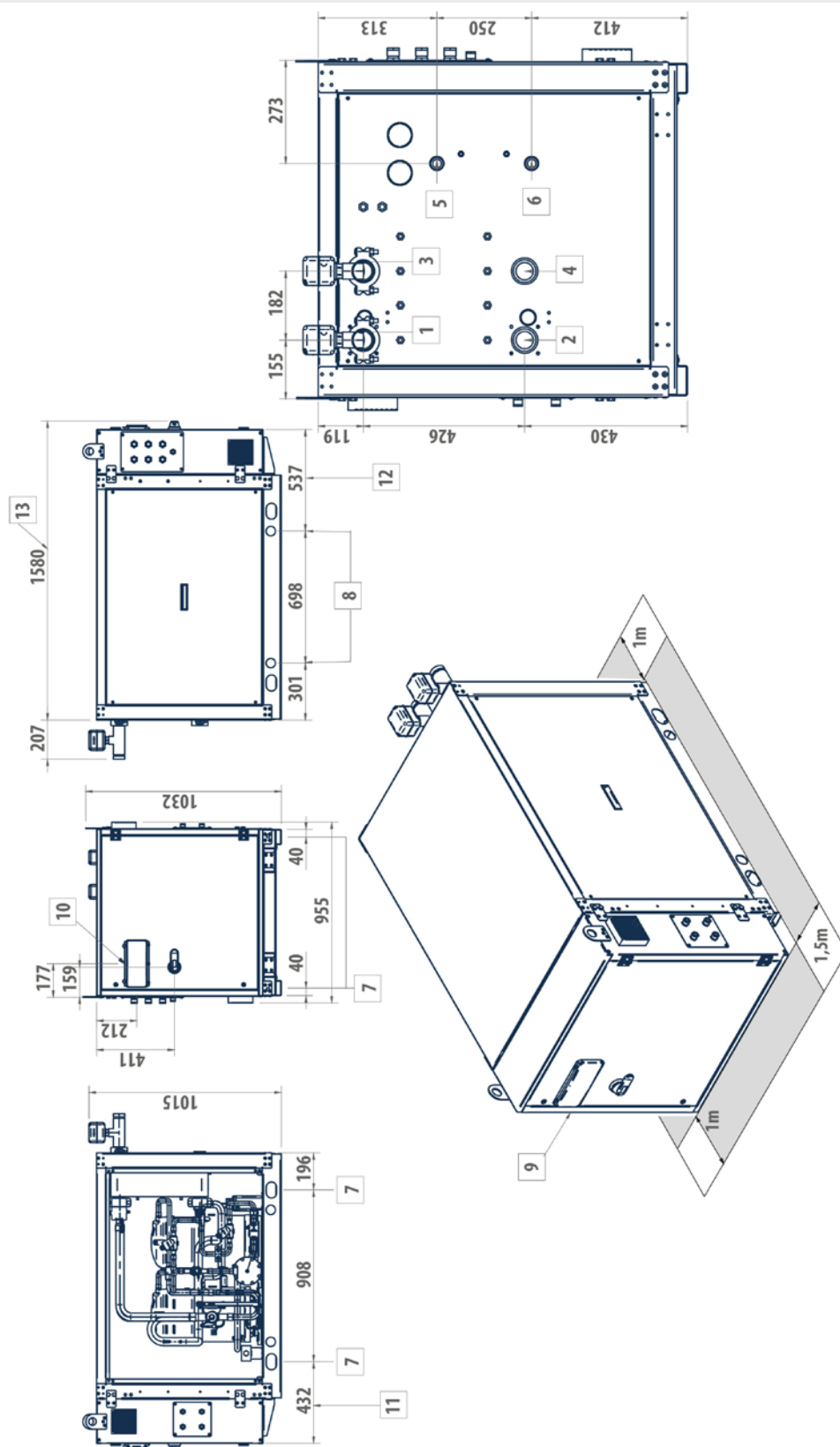
## 2.4 INSTALLATION CLEARANCE REQUIREMENTS AND DIMENSIONAL

To ensure the proper operation of the unit and accessibility for maintenance purposes, it is necessary to comply with the minimum installation clearance requirements shown in figures p. 11, p. 12, p. 13, p. 14, p. 15, p. 16, p. 17.

**⚠ WARNING:** These clearances must be considered the minimum necessary for proper routine maintenance. The clearances recommended for major extraordinary maintenance operations (changing compressors, replacement of heat exchangers, etc.) can be obtained by increasing the side installation clearances by 0.5 metre.

- For maintenance requirements, keep at least 0.5 m of clearance from the ceiling.
- It is recommended to keep the disconnection operations easily accessible.
- If even only one of the above conditions is not fulfilled, please contact the manufacturer to check for feasibility.
- In the design of the WRE series, special care has been taken to minimise noise and vibrations transmitted to the ground.
- Even greater insulation may be obtained, however, by using vibration damping base supports (available as optional accessories).
- If vibration damping base supports are adopted, it is strongly recommended also to use vibration damping couplings on the water pipes.
- Whenever the unit is to be sited on unstable ground (various types of soil, gardens, etc.) it is a good idea to provide a supporting base of adequate dimensions.

» WRE 52 - 92



#### Legend WRE C

- 1 Dissipation side - outlet (Victaulic 2")
- 2 Dissipation side - inlet Victaulic (Victaulic 2")
- 3 User side - inlet (Victaulic 2")
- 4 User side - outlet (Victaulic 2")
- 5 Desuperheater water inlet 1"
- 6 De-superheater water outlet 1"
- 7 Vibration dampers
- 8 Lifting points
- 9 Power supply input
- 10 User interface

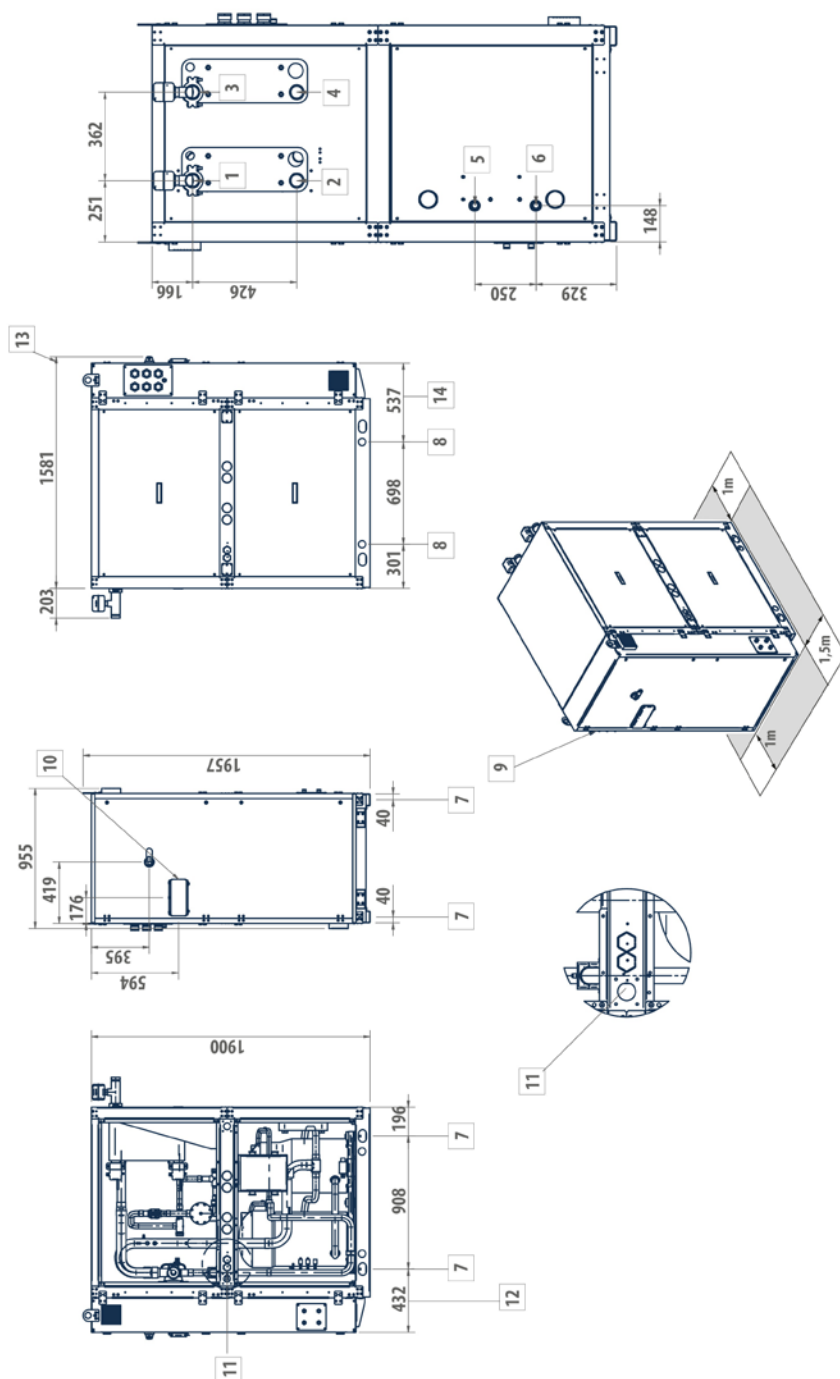
#### Legend WRE H

- 11 Outdoor installation 463 mm
- 12 Outdoor installation 568 mm
- 13 Outdoor installation 1611 mm

#### Chiller Flow Switch Position: 2-3

- 7 Vibration dampers
- 8 Lifting points
- 9 Power supply input
- 10 User interface
- 11 Outdoor installation 463 mm
- 12 Outdoor installation 568 mm
- 13 Outdoor installation 1611 mm

**Heat Pump Flow Switch Position: 1-3**  
**Closing panelling available on request**



#### Legenda WRE C

- 1 Dissipation side - outlet (Victaulic 2")
- 2 Dissipation side - inlet (Victaulic 2")
- 3 User side - inlet (Victaulic 2")
- 4 User side - outlet (Victaulic 2")
- 5 De-superheater water inlet 1"
- 6 De-superheater water outlet 1"
- 7 Vibration dampers
- 8 Lifting points
- 9 Power supply input
- 10 User interface

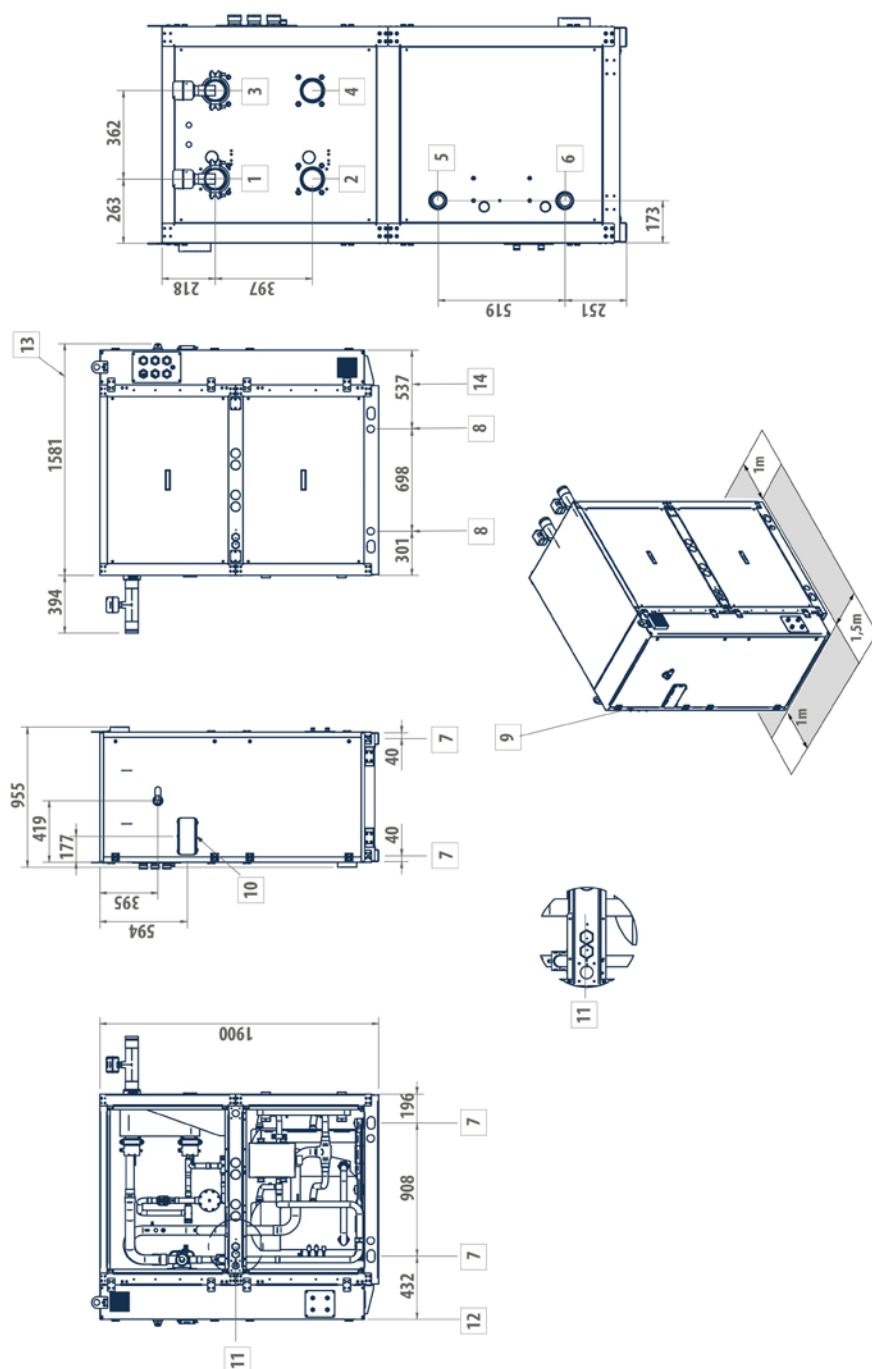
#### Chiller Flow Switch Position: 2-3

- 1 Dissipation side - inlet (Victaulic 2")
- 2 Dissipation side - outlet (Victaulic 2")
- 3 User side - inlet (Victaulic 2")
- 4 User side - outlet (Victaulic 2")
- 5 De-superheater water inlet 1"

- 6 De-superheater water outlet 1"
- 7 Vibration dampers
- 8 Lifting points
- 9 Power supply input
- 10 User interface
- 11 Outlet safety valve G. 3/4" F
- 12 Outdoor installation 463 mm
- 13 Outdoor installation 1612 mm
- 14 Outdoor installation 568 mm

**Heat Pump Flow Switch Position: 1-3**  
**Closing panelling available on request**

» WRE 182 - 242



#### Legenda WRE C

- 1 Dissipation side - outlet (Victaulic 3")
- 2 Dissipation side - inlet (Victaulic 3")
- 3 User side - inlet (Victaulic 3")
- 4 User side - outlet (Victaulic 3")
- 5 Desuperheater water inlet 2"
- 6 De-superheater water outlet 2"
- 7 Vibration dampers
- 8 Lifting points
- 9 Power supply input
- 10 User interface

#### Legenda WRE H

- 1 Outlet safety valve G. 3/4" F
- 2 Outdoor installation 463 mm
- 3 Outdoor installation 1612 mm
- 4 Outdoor installation 568 mm

#### Chiller Flow Switch Position: 2-3

- 1 Dissipation side - inlet (Victaulic 3")
- 2 Dissipation side - outlet (Victaulic 3")
- 3 User side - inlet (Victaulic 3")
- 4 User side - outlet (Victaulic 3")
- 5 Desuperheater water inlet 2"

#### Legenda WRE H

- 6 De-superheater water outlet 2"
- 7 Vibration dampers
- 8 Lifting points
- 9 Power supply input
- 10 User interface
- 11 Outlet safety valve G. 3/4" F
- 12 Outdoor installation 463 mm
- 13 Outdoor installation 1612 mm
- 14 Outdoor installation 568 mm

**Heat Pump Flow Switch Position: 1-3**  
**Closing panelling available on request**

- 1 User side - Inlet (Victaulic 3")
- 2 User side - outlet (Victaulic 3")
- 3 Dissipation side - outlet (Victaulic 3")
- 4 Dissipation side - Inlet (Victaulic 3")
- 5 Desuperheater water inlet 2"
- 6 Desuperheater water outlet 2"
- 7 Vibration dampers
- 8 Lifting points
- 9 Power supply input
- 10 User interface

### Legenda WRE C

- Chiller Flow Switch Position: 1-4**
- Legenda WRE H**
- |   |  |
|---|--|
| 1 | User side - inlet (Virtualclic 3")         |
| 2 | User side - outlet (Virtualclic 3")        |
| 3 | Dispipation side - inlet (Virtualclic 3")  |
| 4 | Dispipation side - outlet (Virtualclic 3") |
| 5 | Desuperheater water inlet 2"               |

### Chiller Flow Switch With Position: 1-4

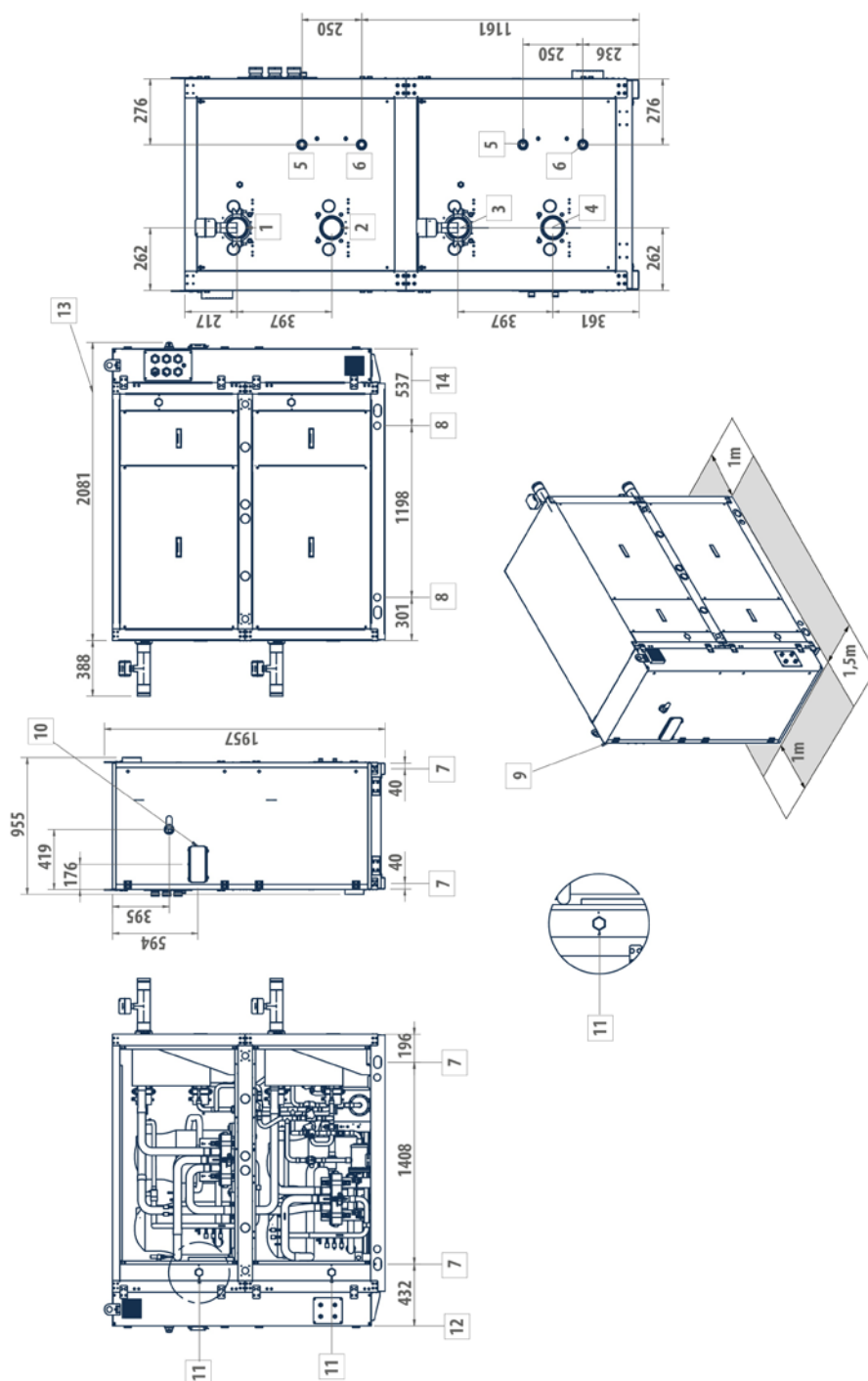
Legenda WRE H

- Legend: W1=1"
- 1 User side - inlet (Victaulic 3")
  - 2 User side - outlet (Victaulic 3")
  - 3 Dissipation side - inlet (Victaulic 3")
  - 4 Dissipation side - outlet (Victaulic 3")
  - 5 Desuperheater water inlet 2"

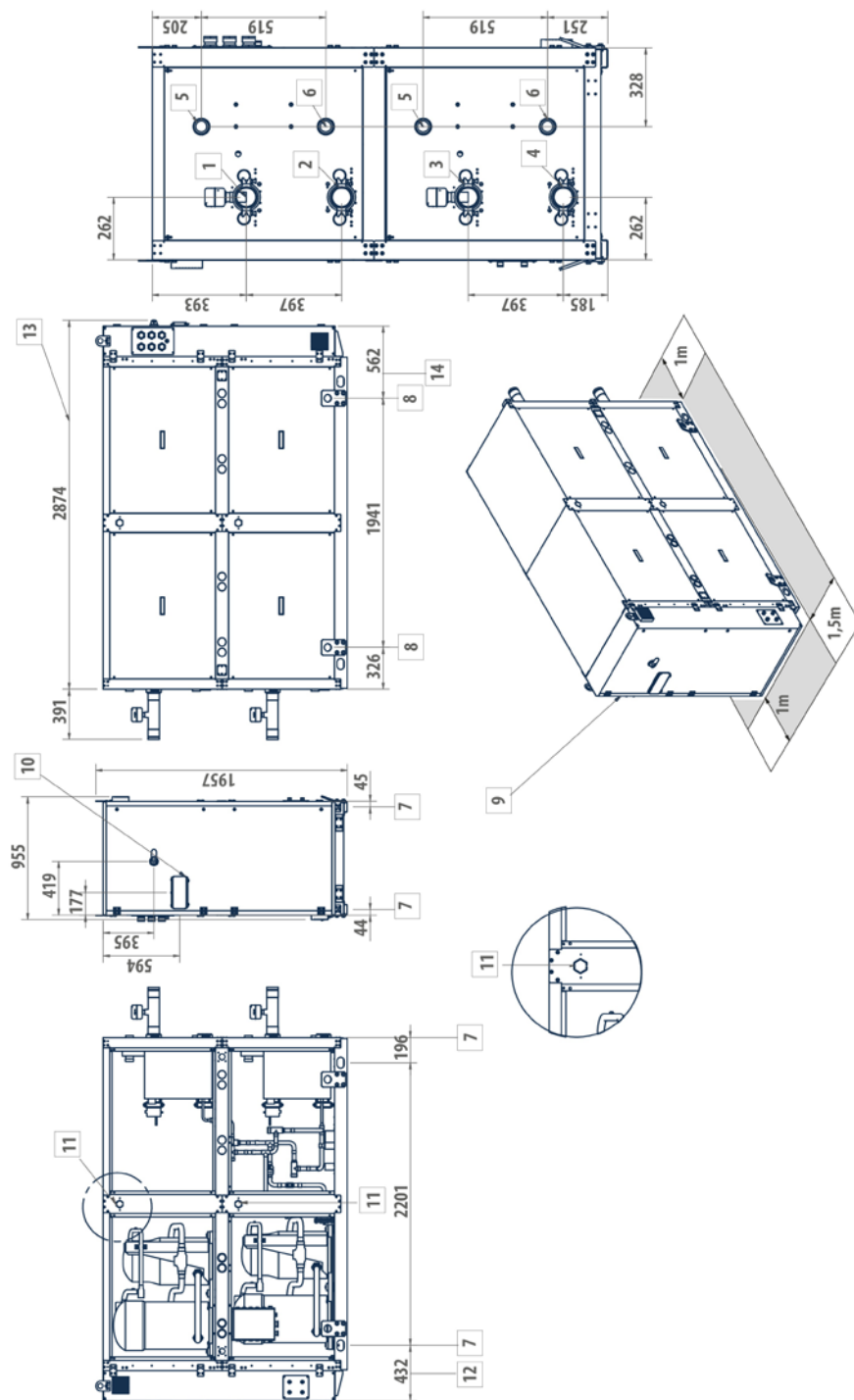
- 6** De-superheater water outlet 2"
- 7** Vibration dampers
- 8** Lifting points
- 9** Power supply input
- 10** User interface
- 11** Outlet safety valve G, 1" F
- 12** Outdoor installation 463 mm
- 13** Outdoor installation 2112 mm
- 14** Outdoor installation 568 mm

### 14 Outdoor Installation 200 111111

**Closing panelling available on request**



» WRE 314 - 384



#### Legenda WRE C

- 1 User side - inlet (Victaulic 3")
- 2 User side - outlet (Victaulic 3")
- 3 Dissipation side - outlet (Victaulic 3")
- 4 Dissipation side - inlet (Victaulic 3")
- 5 Desuperheater water inlet 2"
- 6 Desuperheater water outlet 2"
- 7 Vibration dampers
- 8 Lifting points
- 9 Power supply input
- 10 User interface

#### Legenda WRE H

- 1 User side - inlet (Victaulic 3")
- 2 User side - outlet (Victaulic 3")
- 3 Dissipation side - inlet (Victaulic 3")
- 4 Dissipation side - outlet (Victaulic 3")
- 5 Desuperheater water inlet 2"
- 6 Desuperheater water outlet 2"
- 7 Vibration dampers
- 8 Lifting points
- 9 Power supply input
- 10 User interface

#### Chiller Flow Switch Position: 1-4

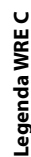
- 11 Outlet safety valve G. 1" F
- 12 Outdoor installation 463 mm
- 13 Outdoor installation 2905 mm
- 14 Outdoor installation 593 mm

#### Heat Pump Flow Switch Position: 1-3

- 6 De-superheater water outlet 2"
- 7 Vibration dampers
- 8 Lifting points
- 9 Power supply input
- 10 User interface
- 11 Outlet safety valve G. 1" F
- 12 Outdoor installation 463 mm
- 13 Outdoor installation 2905 mm
- 14 Outdoor installation 593 mm

**Closing panelling available on request**





- 1 User side - inlet (Victaulic 4")
- 2 User side - outlet (Victaulic 4")
- 3 Dissipation side - outlet (Victaulic 4")
- 4 Dissipation side - inlet (Victaulic 4")
- 5 Desuperheater water inlet 2"
- 6 De-superheater water outlet 2"
- 7 Vibration dampers
- 8 Lifting points
- 9 Power supply input
- 10 User interface
- 11 Low pressure safety valve outlet WPE 454-504 G. 1" F; WRE 564 G. 3/4" F

**12** High-pressure relief valve outlet WRE 564 G. 1" M

- |   |                              |
|---|------------------------------|
| 1 | High pressure inlet 463 mm   |
| 2 | Outdoor installation 463 mm  |
| 3 | Outdoor installation 2905 mm |
| 4 | Outdoor installation 2905 mm |
| 5 | Outdoor installation 593 mm  |
| 6 | Outdoor installation 593 mm  |
- Chiller Flow Switch Position: 1-4**
- Legenda WRE H**
- |   |  |
|---|--|
| 1 | User side - inlet (Vitrualic 4")       |
| 2 | User side - outlet (Vitrualic 4")      |
| 3 | Dispation side - inlet (Vitrualic 4")  |
| 4 | Dispation side - outlet (Vitrualic 4") |
| 5 | Desuperheater water inlet 2"           |
| 6 | De-superheater water outlet 2"         |
| 7 | Vibration dampers                      |

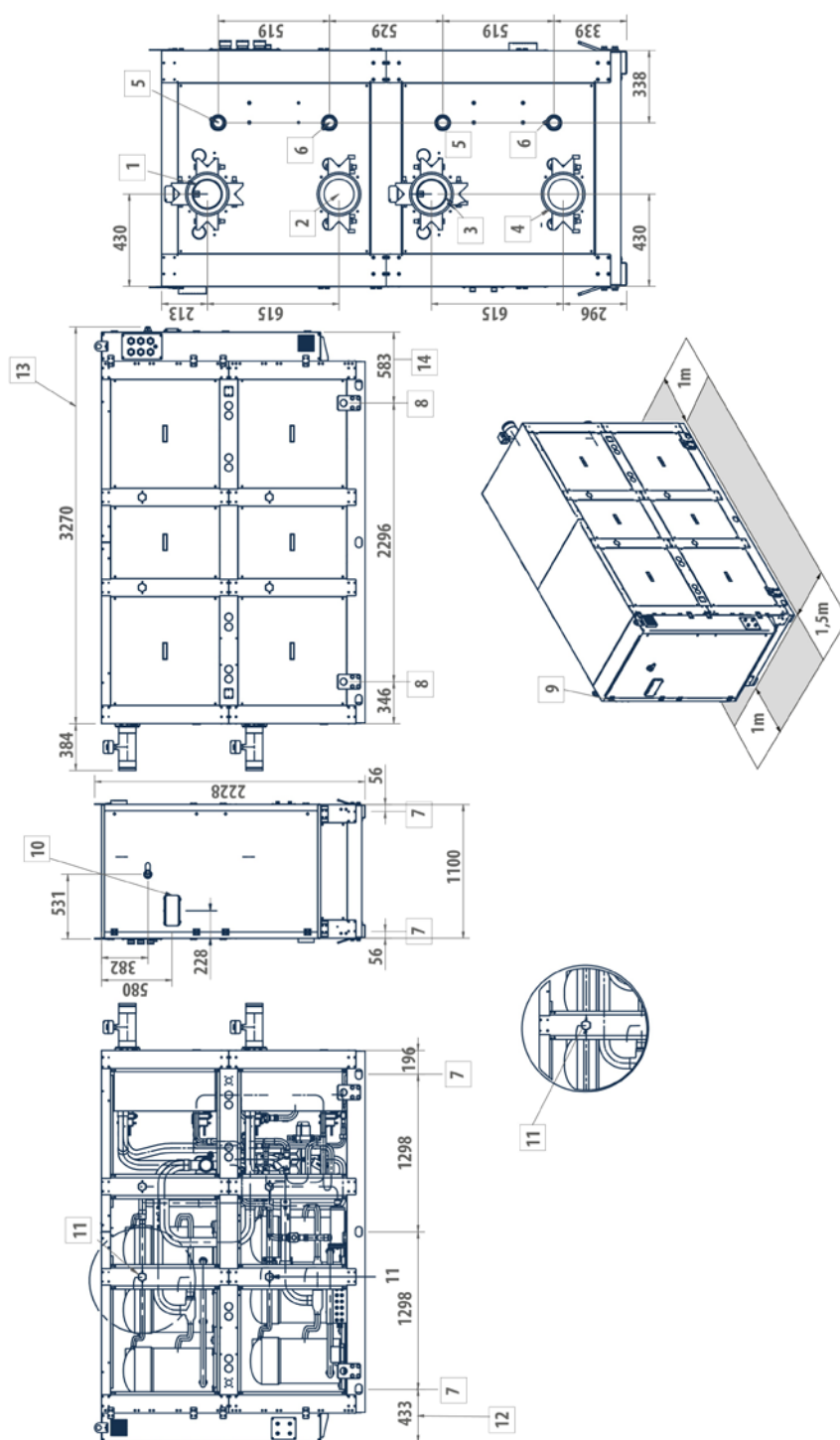
### Chiller Flow Switch With Position: 1-4

- Legend: **WHL 1**  
**1** User side - inlet (Victaulic 4")  
**2** User side - outlet (Victaulic 4")  
**3** Dissipation side - inlet (Victaulic 4")  
**4** Dissipation side - outlet (Victaulic 4")  
**5** Desuperheater water inlet 2"  
**6** De-superheater water outlet 2"  
**7** Vibration dampers

### 13 Outdoor Installation 333

**Closing panelling available on request**





#### Legenda WRE C

- 1 User side - inlet (Victaulic 5")
- 2 User side - outlet (Victaulic 5")
- 3 Dissipation side - outlet (Victaulic 5")
- 4 Dissipation side - inlet (Victaulic 5")
- 5 Desuperheater water inlet 2"
- 6 De-superheater water outlet 2"
- 7 Vibration dampers
- 8 Lifting points
- 9 Power supply input
- 10 User interface

#### Legenda WRE H

- 1 User side - inlet (Victaulic 5")
- 2 User side - outlet (Victaulic 5")
- 3 Dissipation side - inlet (Victaulic 5")
- 4 Dissipation side - outlet (Victaulic 5")
- 5 Desuperheater water inlet 2"

#### Chiller Flow Switch Position: 1-4

- 11 Outlet safety valve G. 1" 1/4 F
- 12 Outdoor installation 462 mm
- 13 Outdoor installation 3299 mm
- 14 Outdoor installation 593 mm

#### Heat Pump Flow Switch Position: 1-3

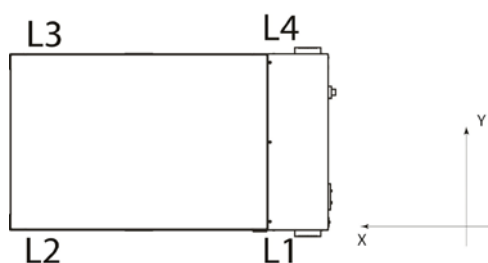
- 6 De-superheater water outlet 2"
- 7 Vibration dampers
- 8 Lifting points
- 9 Power supply input
- 10 User interface
- 11 Outlet safety valve G. 1" 1/4 F
- 12 Outdoor installation 462 mm
- 13 Outdoor installation 3299 mm
- 14 Outdoor installation 593 mm

**Closing panelling available on request**

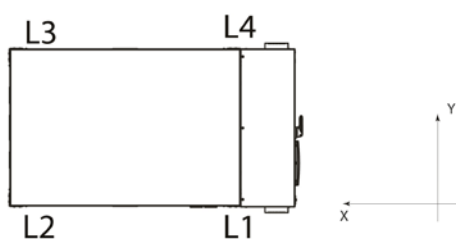
### 3 WEIGHTS

This drawing shows the points of the machine for which weights have been calculated, with respect to the basic chiller and heat pump model. The weights are shown in the tables below.

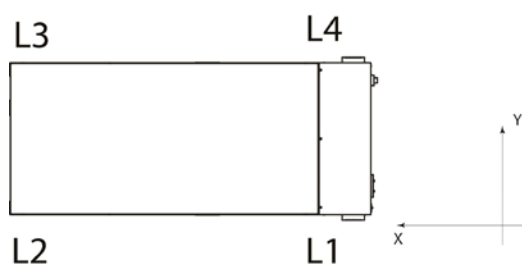
» WRE Frame 1



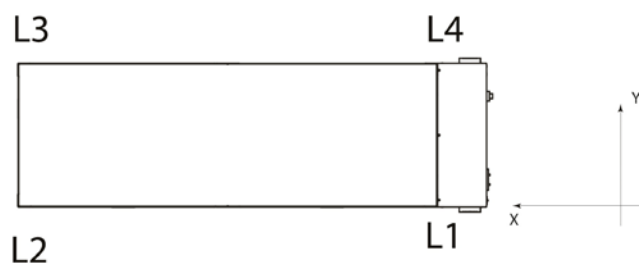
» WRE Frame 2



» WRE Frame 3



» WRE Frame 4



» WRE Frame 5



» Lifting center of gravity for transporting unit C version without hydraulic options

WRE		052	062	072	082	092	122	132	152	182
Xb	mm	403	406	411	413	406	384	376	369	367
Yb	mm	691	684	675	670	668	675	674	671	666

WRE		154	184	212	214	242	244	274	302	314
Xb	mm	464	411	362	417	363	422	419	425	391
Yb	mm	890	989	661	978	645	968	970	955	1526

WRE		364	384	454	504	564	606	636	696	746
Xb	mm	394	399	424	420	413	508	509	506	507
Yb	mm	1507	1488	1376	1392	1415	1560	1551	1560	1545

» Lifting center of gravity for transporting unit H version without hydraulic options

WRE		052	062	072	082	092	122	132	152	182
Xb	mm	691	684	675	670	668	675	674	671	666
Yb	mm	403	406	411	413	406	384	376	369	369

WRE		154	184	212	214	242	244	274	302	314
Xb	mm	890	987	661	976	645	966	969	953	1521
Yb	mm	469	417	364	423	365	428	425	438	399

WRE		364	384	454	504	564	606	636	696	746
Xb	mm	1502	1484	1375	1390	1412	1558	1549	1558	1543
Yb	mm	402	407	431	427	420	523	524	521	522

All weights shown below include the R410A refrigerant charge.

» Operating weight C version without hydraulic options

WRE		052	062	072	082	092	122	132	152	182
L1	kg	97	101	104	109	124	166	185	208	218
L2	kg	72	76	79	84	96	150	169	191	204
L3	kg	69	75	82	89	99	114	124	136	145
L4	kg	73	76	77	80	88	130	140	153	159
Total	kg	310	328	343	361	408	560	619	688	727

WRE		154	184	212	214	242	244	274	302	314
L1	kg	286	314	240	323	252	325	365	358	539
L2	kg	190	184	229	191	256	194	213	213	231
L3	kg	311	220	160	239	182	252	280	292	317
L4	kg	210	214	171	220	179	222	243	238	307
Total	kg	997	932	799	973	869	992	1101	1101	1393

WRE		364	384	454	504	564	606	636	696	746
L1	kg	571	574	665	693	735	838	866	869	896
L2	kg	247	254	329	333	340	554	576	563	587
L3	kg	353	372	559	562	566	676	709	692	732
L4	kg	320	323	371	380	394	524	538	525	538
Total	kg	1491	1523	1925	1968	2035	2592	2689	2648	2752

» Operating weight H version without hydraulic options

WRE		052	062	072	082	092	122	132	152	182
L1	kg	98	103	107	111	127	169	189	212	223
L2	kg	73	78	82	86	99	153	173	196	209
L3	kg	70	77	85	91	102	117	128	141	150
L4	kg	74	77	80	82	91	133	145	157	164
Total	kg	315	334	353	371	418	572	635	706	746

WRE		154	184	212	214	242	244	274	302	314
L1	kg	288	315	245	324	258	326	367	361	541
L2	kg	191	186	234	192	261	195	215	216	233
L3	kg	318	227	165	247	188	260	288	309	330
L4	kg	217	221	176	228	185	230	251	255	320
Total	kg	1014	948	820	991	893	1012	1121	1141	1425

WRE		364	384	454	504	564	606	636	696	746
L1	kg	574	576	668	696	738	843	872	874	901
L2	kg	250	256	331	336	343	559	582	568	593
L3	kg	367	386	574	579	584	709	746	730	769
L4	kg	334	337	386	397	411	558	575	563	575
Total	kg	1523	1555	1959	2008	2075	2669	2775	2734	2838

## 4 TECHNICAL FEATURES

### 4.1 RATED TECHNICAL DATA OF WRE C WATER CHILLERS

WRE			052	062	072	082	092	122	132
Power supply		V-ph-Hz	400 - 3N - 50						
Cooling capacity	(1)(E)	kW	47,1	59,0	68,5	80,5	92,6	119	135
Total power input	(1)(E)	kW	11,0	13,8	16,1	18,8	21,7	27,7	31,4
EER	(1)(E)		4,26	4,26	4,26	4,28	4,27	4,31	4,31
SEER	(2)(E)		5,48	5,71	5,75	5,53	5,84	5,55	5,53
Water flow user side	(1)	l/h	8112	10158	11807	13864	15946	20510	23312
Water pressure drop user side	(1)(E)	kPa	50	50	48	49	49	47	47
Water flow source side	(1)	l/h	9873	12364	14382	16884	19432	24979	28414
Water pressure drop source side	(1)(E)	kPa	77	77	73	74	75	70	71
Maximum current absorption		A	29,0	36,0	42,0	49,0	57,0	72,0	81,0
Start up current		A	112	161	211	218	178	288	296
Startup current with soft starter		A	67	97	127	131	107	173	178
Compressors / circuits			2 / 1						
Sound power level	(3)(E)	dB(A)	73	75	76	77	80	80	82
Sound power level, low-noise version	(3)	dB(A)	67	69	70	71	74	74	76
Sound power level quiet version	(3)	dB(A)	61	63	64	65	68	68	70
Transport / operating weight		kg	310	328	343	361	408	560	619

WRE			152	154	182	184	212	214	242
Power supply		V-ph-Hz	400 - 3N - 50						
Cooling capacity	(1)(E)	kW	156	149	182	185	215	214	240
Total power input	(1)(E)	kW	36,2	35,0	41,0	42,6	48,4	48,9	53,3
EER	(1)(E)		4,32	4,24	4,43	4,34	4,44	4,37	4,51
SEER	(2)(E)		5,80	5,30	5,83	6,31	5,60	5,95	5,53
Water flow user side	(1)	l/h	26893	25552	31238	31791	36973	36795	41332
Water pressure drop user side	(1)(E)	kPa	48	35	39	38	41	41	37
Water flow source side	(1)	l/h	32772	31290	37948	38779	44903	44808	50098
Water pressure drop source side	(1)(E)	kPa	74	52	60	58	63	63	57
Maximum current absorption		A	91,0	90,0	112	114	130	128	151
Start up current		A	356	224	380	293	399	307	420
Startup current with soft starter		A	214	153	228	199	239	210	252
Compressors / circuits			2 / 1	4 / 2	2 / 1	4 / 2	2 / 1	4 / 2	2 / 1
Sound power level	(3)(E)	dB(A)	87	79	87	83	89	83	89
Sound power level, low-noise version	(3)	dB(A)	81	73	83	77	84	77	85
Sound power level quiet version	(3)	dB(A)	75	67	77	71	78	71	79
Transport / operating weight		kg	688	997	727	932	799	973	869

(1) Water temperature - user side 12°C / 7°C, water temperature - dissipation side 30°C / 35°C (EN14511:2018)

(2)  $\eta$  efficiency values for heating and cooling are respectively calculated by the following formulas:  $[\eta = SCOP / 2,5 - F(1) - F(2)]$  e  $[\eta = SEER / 2,5 - F(1) - F(2)]$ . For further information, please refer to the technical document "ErP 2009/125/EC DIRECTIVE" in the catalogue introducing pages, or to the EN14825:2017 regulation.

(3) Sound power level measured according to ISO 9614

(E) EUROVENT certified data

WRE			244	274	302	314	364	384	454
Power supply		V-ph-Hz	400 - 3N - 50						
Cooling capacity	(1)(E)	kW	238	271	299	314	362	388	457
Total power input	(1)(E)	kW	54,7	62,3	66,8	71,4	82,1	88,0	93,7
EER	(1)(E)		4,35	4,35	4,48	4,40	4,41	4,40	4,88
SEER	(2)(E)		5,96	5,91	5,55	6,22	6,19	5,92	6,50
Water flow user side	(1)	l/h	40957	46553	51448	54021	62227	66617	78600
Water pressure drop user side	(1)(E)	kPa	44	46	44	46	47	47	30
Water flow source side	(1)	l/h	49913	56753	62410	65722	75682	81052	94179
Water pressure drop source side	(1)(E)	kPa	65	68	67	71	71	71	50
Maximum current absorption		A	144	161	166	182	224	240	261
Start up current		A	360	377	510	447	492	508	529
Startup current with soft starter		A	244	259	306	305	340	353	369
Compressors / circuits			4 / 2	4 / 2	2 / 1	4 / 2	4 / 2	4 / 2	4 / 2
Sound power level	(3)(E)	dB(A)	83	85	91	90	90	90	92
Sound power level, low-noise version	(3)	dB(A)	77	79	88	84	86	86	87
Sound power level quiet version	(3)	dB(A)	71	73	82	78	80	80	81
Transport / operating weight		kg	992	1101	1101	1393	1491	1523	1925

WRE			504	564	606	636	696	746
Power supply		V-ph-Hz	400 - 3N - 50					
Cooling capacity	(1)(E)	kW	511	565	596	643	696	747
Total power input	(1)(E)	kW	104	118	127	138	148	157
EER	(1)(E)		4,91	4,80	4,69	4,65	4,70	4,74
SEER	(2)(E)		6,56	6,52	6,56	6,51	6,53	6,57
Water flow user side	(1)	l/h	87730	97009	102425	110456	119608	128288
Water pressure drop user side	(1)(E)	kPa	36	43	43	47	46	47
Water flow source side	(1)	l/h	104947	116367	123329	133152	143938	154171
Water pressure drop source side	(1)(E)	kPa	60	70	71	76	75	75
Maximum current absorption		A	303	317	328	370	412	454
Start up current		A	571	661	593	638	680	722
Startup current with soft starter		A	403	460	421	457	491	524
Compressors / circuits			4 / 2	4 / 2	6 / 2	6 / 2	6 / 2	6 / 2
Sound power level	(3)(E)	dB(A)	92	93	94	94	94	94
Sound power level, low-noise version	(3)	dB(A)	88	90	88	89	89	90
Sound power level quiet version	(3)	dB(A)	82	84	82	83	83	84
Transport / operating weight		kg	1968	2035	2592	2689	2648	2752

(1) Water temperature - user side 12°C / 7°C, water temperature - dissipation side 30°C / 35°C (EN14511:2018)

(2)  $\eta$  efficiency values for heating and cooling are respectively calculated by the following formulas:  $[\eta = SCOP / 2,5 - F(1) - F(2)]$  e  $[\eta = SEER / 2,5 - F(1) - F(2)]$ . For further information, please refer to the technical document "ErP 2009/125/EC DIRECTIVE" in the catalogue introducing pages, or to the EN14825:2017 regulation.

(3) Sound power level measured according to ISO 9614

(E) EUROVENT certified data

## 4.2 RATED TECHNICAL DATA OF WRE H REVERSIBLE HEAT PUMPS

WRE			052	062	072	082	092	122	132
Power supply		V-ph-Hz	400 - 3N - 50						
Cooling capacity	(1)	kW	47,1	58,9	68,5	80,5	92,6	119	135
Total power input	(1)	kW	11,1	13,8	16,1	18,9	21,7	27,7	31,4
EER	(1)		4,25	4,26	4,26	4,27	4,26	4,30	4,31
SEER	(2)		5,48	5,71	5,75	5,53	5,84	5,55	5,53
Water flow user side	(1)	l/h	8122	10147	11798	13874	15946	20512	23307
Water pressure drop user side	(1)	kPa	50	50	48	49	49	47	47
Water flow source side	(1)	l/h	9889	12353	14371	16899	19436	24984	28407
Water pressure drop source side	(1)	kPa	77	77	73	74	75	70	71
Heating capacity	(3)	kW	53,1	66,4	77,5	91,0	105	137	157
Total power input	(3)	kW	14,1	17,5	20,3	23,6	27,3	34,9	39,7
COP	(3)		3,76	3,80	3,82	3,86	3,83	3,94	3,94
SCOP	(2)		5,01	5,08	5,11	5,05	5,17	5,06	5,09
Heating energy efficiency class	(4)		A+++						
Water flow user side	(3)	l/h	9186	11487	13414	15752	18136	23816	27138
Water pressure drop user side	(3)	kPa	68	68	64	65	66	65	65
Water flow source side	(3)	l/h	11584	14517	16962	19943	22903	30323	34543
Water pressure drop source side	(3)	kPa	95	96	93	94	94	96	96
Maximum current absorption		A	29,0	36,0	42,0	49,0	57,0	72,0	81,0
Start up current		A	112	161	211	218	178	288	296
Startup current with soft starter		A	67	97	127	131	107	173	178
Compressors / circuits			2 / 1						
Sound power level	(5)	dB(A)	73	75	76	77	80	80	82
Sound power level, low-noise version	(5)	dB(A)	67	69	70	71	74	74	76
Sound power level quiet version	(5)	dB(A)	61	63	64	65	68	68	70
Refrigerant charge - circuit 1	(6)	kg	5,0	5,0	6,3	6,3	8,0	9,7	13,0
Refrigerant charge - circuit 2	(7)	kg	-						
Transport / operating weight		kg	315	334	353	371	418	572	635
Height		mm	975	975	975	975	975	1900	1900
Length		mm	1640	1640	1640	1640	1640	1640	1640
Depth		mm	948	948	948	948	948	948	948

- (1) Water temperature - user side 12°C / 7°C, water temperature - dissipation side 30°C / 35°C (EN14511:2018)
- (2)  $\eta$  efficiency values for heating and cooling are respectively calculated by the following formulas:  $[\eta = SCOP / 2,5 - F(1) - F(2)]$  e  $[\eta = SEER / 2,5 - F(1) - F(2)]$ . For further information, please refer to the technical document "ErP 2009/125/EC DIRECTIVE" in the catalogue introducing pages, or to the EN14825:2017 regulation.
- (3) Water temperature - user side 40°C / 45°C, water temperature - source side 10°C / 7°C (EN14511:2018)
- (4) Seasonal energy efficiency class for LOW TEMPERATURE room heating under AVERAGE climatic conditions [EUROPEAN REGULATION No 811/2013]
- (5) Sound power level measured according to ISO 9614
- (6) If the two cooling circuits are unbalanced, it is the smaller circuit. Kg gas value is estimated. For the exact value refer to the plate data on the unit.
- (7) If the two cooling circuits are unbalanced, it is the larger circuit. Kg gas value is estimated. For the exact value refer to the plate data on the unit.

WRE			152	154	182	184	212	214	242
Power supply		V-ph-Hz	400 - 3N - 50						
Cooling capacity	(1)	kW	156	148	182	185	215	214	240
Total power input	(1)	kW	36,2	35,0	41,0	42,6	48,4	48,9	53,3
EER	(1)		4,31	4,24	4,43	4,34	4,44	4,38	4,51
SEER	(2)		5,80	5,30	5,83	6,31	5,60	5,95	5,53
Water flow user side	(1)	l/h	26895	25545	31235	31789	36961	36787	41326
Water pressure drop user side	(1)	kPa	48	35	39	38	41	41	37
Water flow source side	(1)	l/h	32778	37944	44893	50089	62402	31283	38775
Water pressure drop source side	(1)	kPa	74	60	63	57	67	52	58
Heating capacity	(3)	kW	176	174	201	211	243	244	269
Total power input	(3)	kW	45,4	44,0	53,3	53,5	60,8	61,6	66,9
COP	(3)		3,88	3,96	3,77	3,94	4,00	3,96	4,02
SCOP	(2)		5,18	4,92	5,18	5,56	5,14	5,44	5,06
Heating energy efficiency class	(4)		A+++						
Water flow user side	(3)	l/h	30579	30190	34885	36631	42241	42305	46681
Water pressure drop user side	(3)	kPa	65	49	52	52	57	57	50
Water flow source side	(3)	l/h	38688	38317	43571	46423	53818	53713	59452
Water pressure drop source side	(3)	kPa	93	73	72	75	81	81	72
Maximum current absorption		A	91,0	90,0	112	114	130	128	151
Start up current		A	356	224	380	293	399	307	420
Startup current with soft starter		A	214	153	228	199	239	210	252
Compressors / circuits			2 / 1	4 / 2	2 / 1	4 / 2	2 / 1	4 / 2	2 / 1
Sound power level	(5)	dB(A)	87	79	87	83	87	83	89
Sound power level, low-noise version	(5)	dB(A)	81	73	83	77	84	77	85
Sound power level quiet version	(5)	dB(A)	75	67	77	71	78	71	79
Refrigerant charge - circuit 1	(6)	kg	13,0	8,7	17,5	9,0	19,2	11,0	21,0
Refrigerant charge - circuit 2	(7)	kg	-	8,7	-	9,0	-	11,0	-
Transport / operating weight		kg	706	1014	746	948	820	991	893
Height		mm	1900	1900	1900	1900	1900	1900	1900
Length		mm	1640	2140	1640	2140	1640	2140	1640
Depth		mm	948	948	948	948	948	948	948

- (1) Water temperature - user side 12°C / 7°C, water temperature - dissipation side 30°C / 35°C (EN14511:2018)
- (2)  $\eta$  efficiency values for heating and cooling are respectively calculated by the following formulas:  $[\eta = SCOP / 2,5 - F(1) - F(2)]$  e  $[\eta = SEER / 2,5 - F(1) - F(2)]$ . For further information, please refer to the technical document "ErP 2009/125/EC DIRECTIVE" in the catalogue introducing pages, or to the EN14825:2017 regulation.
- (3) Water temperature - user side 40°C / 45°C, water temperature - source side 10°C / 7°C (EN14511:2018)
- (4) Seasonal energy efficiency class for LOW TEMPERATURE room heating under AVERAGE climatic conditions [EUROPEAN REGULATION No 811/2013]
- (5) Sound power level measured according to ISO 9614
- (6) If the two cooling circuits are unbalanced, it is the smaller circuit. Kg gas value is estimated. For the exact value refer to the plate data on the unit.
- (7) If the two cooling circuits are unbalanced, it is the larger circuit. Kg gas value is estimated. For the exact value refer to the plate data on the unit.



WRE			244	274	302	314	364	384	454
Power supply		V-ph-Hz	400 - 3N - 50						
Cooling capacity	(1)	kW	238	271	299	314	362	388	457
Total power input	(1)	kW	54,7	62,3	66,8	71,4	82,1	88,0	93,7
EER	(1)		4,35	4,35	4,48	4,40	4,41	4,40	4,88
SEER	(2)		5,96	5,91	5,55	6,22	6,19	5,92	6,50
Water flow user side	(1)	l/h	40958	46550	51446	54007	62223	66618	78595
Water pressure drop user side	(1)	kPa	44	46	44	46	47	47	30
Water flow source side	(1)	l/h	44790	49915	56749	65705	75683	81057	94186
Water pressure drop source side	(1)	kPa	63	65	68	71	71	71	50
Heating capacity	(3)	kW	271	310	338	359	412	439	509
Total power input	(3)	kW	68,8	78,4	83,6	90,3	103	109	117
COP	(3)		3,95	3,95	4,05	3,97	3,99	4,01	4,36
SCOP	(2)		5,41	5,42	5,09	5,55	5,50	5,39	5,95
Heating energy efficiency class	(4)		A+++						
Water flow user side	(3)	l/h	47109	53836	58708	62288	71491	76255	88389
Water pressure drop user side	(3)	kPa	59	62	60	64	64	63	45
Water flow source side	(3)	l/h	59784	68402	75069	79238	91067	97284	115004
Water pressure drop source side	(3)	kPa	87	91	88	91	92	92	59
Maximum current absorption		A	144	161	166	182	224	240	261
Start up current		A	360	377	510	447	492	508	529
Startup current with soft starter		A	244	259	306	305	340	353	369
Compressors / circuits			4 / 2	4 / 2	2 / 1	4 / 2	4 / 2	4 / 2	4 / 2
Sound power level	(5)	dB(A)	83	85	91	90	90	90	92
Sound power level, low-noise version	(5)	dB(A)	77	79	88	84	86	86	87
Sound power level quiet version	(5)	dB(A)	71	73	82	78	80	80	81
Refrigerant charge - circuit 1	(6)	kg	10,7	12,8	26,0	16,9	16,7	18,0	31,3
Refrigerant charge - circuit 2	(7)	kg	10,7	12,8	-	16,9	16,7	18,0	31,3
Transport / operating weight		kg	1012	1121	1141	1425	1523	1555	1959
Height		mm	1900	1900	1900	1900	1900	1900	1900
Length		mm	2140	2140	2140	2930	2930	2930	2930
Depth		mm	948	948	948	948	948	948	948

- (1) Water temperature - user side 12°C / 7°C, water temperature - dissipation side 30°C / 35°C (EN14511:2018)
- (2)  $\eta$  efficiency values for heating and cooling are respectively calculated by the following formulas:  $[\eta = SCOP / 2,5 - F(1) - F(2)]$  e  $[\eta = SEER / 2,5 - F(1) - F(2)]$ . For further information, please refer to the technical document "ErP 2009/125/EC DIRECTIVE" in the catalogue introducing pages, or to the EN14825:2017 regulation.
- (3) Water temperature - user side 40°C / 45°C, water temperature - source side 10°C / 7°C (EN14511:2018)
- (4) Seasonal energy efficiency class for LOW TEMPERATURE room heating under AVERAGE climatic conditions [EUROPEAN REGULATION No 811/2013]
- (5) Sound power level measured according to ISO 9614
- (6) If the two cooling circuits are unbalanced, it is the smaller circuit. Kg gas value is estimated. For the exact value refer to the plate data on the unit.
- (7) If the two cooling circuits are unbalanced, it is the larger circuit. Kg gas value is estimated. For the exact value refer to the plate data on the unit.

WRE			504	564	606	636	696	746
Power supply		V-ph-Hz	400 - 3N - 50					
Cooling capacity	(1)	kW	510	565	596	643	696	747
Total power input	(1)	kW	104	118	127	138	148	157
EER	(1)		4,91	4,80	4,69	4,65	4,70	4,74
SEER	(2)		6,56	6,52	6,56	6,51	6,53	6,57
Water flow user side	(1)	l/h	87721	97016	102424	110464	119601	128286
Water pressure drop user side	(1)	kPa	35	43	43	47	46	47
Water flow source side	(1)	l/h	104931	116374	123327	133169	143929	154171
Water pressure drop source side	(1)	kPa	60	70	71	76	75	75
Heating capacity	(3)	kW	566	630	665	719	775	833
Total power input	(3)	kW	130	148	158	172	185	197
COP	(3)		4,34	4,27	4,20	4,18	4,20	4,24
SCOP	(2)		5,92	5,88	5,97	5,85	5,86	5,88
Heating energy efficiency class	(4)		A+++					
Water flow user side	(3)	l/h	98259	109416	115479	124926	134660	144717
Water pressure drop user side	(3)	kPa	53	63	63	67	66	67
Water flow source side	(3)	l/h	127862	141965	149123	161213	174027	187468
Water pressure drop source side	(3)	kPa	70	86	85	92	91	93
Maximum current absorption		A	303	317	328	370	412	454
Start up current		A	571	661	593	638	680	722
Startup current with soft starter		A	403	460	421	457	491	524
Compressors / circuits			4 / 2	4 / 2	6 / 2	6 / 2	6 / 2	6 / 2
Sound power level	(5)	dB(A)	92	93	94	94	94	94
Sound power level, low-noise version	(5)	dB(A)	88	90	88	89	89	90
Sound power level quiet version	(5)	dB(A)	82	84	82	83	83	84
Refrigerant charge - circuit 1	(6)	kg	31,1	31,3	35,0	34,8	37,7	37,6
Refrigerant charge - circuit 2	(7)	kg	31,1	31,3	35,0	34,8	37,7	37,6
Transport / operating weight		kg	2008	2075	2669	2775	2734	2838
Height		mm	1900	1900	2300	2300	2300	2300
Length		mm	2930	2930	3330	3330	3330	3330
Depth		mm	948	948	1168	1168	1168	1168

- (1) Water temperature - user side 12°C / 7°C, water temperature - dissipation side 30°C / 35°C (EN14511:2018)
- (2)  $\eta$  efficiency values for heating and cooling are respectively calculated by the following formulas:  $[\eta = SCOP / 2,5 - F(1) - F(2)]$  e  $[\eta = SEER / 2,5 - F(1) - F(2)]$ . For further information, please refer to the technical document "ErP 2009/125/EC DIRECTIVE" in the catalogue introducing pages, or to the EN14825:2017 regulation.
- (3) Water temperature - user side 40°C / 45°C, water temperature - source side 10°C / 7°C (EN14511:2018)
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## 5 MICROPROCESSOR CONTROL

Below are specified the microprocessor control functions in the basic version.

The advanced control instructions are described in service manual.

» pGD1



### 5.1 DESCRIPTION OF CONTROL PANEL

The unit's control panel allows you to display and set the unit's operating parameters and read the main operating data. In addition it indicates what mode (cooling or heating) the unit is operating in and signals any alarms that may have been triggered. In addition to this, on the default screen it is possible to read some values read by the probes and the status of the main devices of the unit such as the compressors.

All settings are memorised in the circuit board and used when the system is switched back on, even after a power failure.

#### 5.1.1 Remote control panels (accessories)

Installing a PCDS remote control panel enables you to switch the unit on and off and set the operating mode (cooling - heating) from a distance and have a cumulative alarm indicator (thanks to an alarm signalling relay integrated in the electronic control device).

Installing a PGD remote control panel instead makes it possible to access all the electronic control functions on the unit.

#### 5.1.2 Main functions

- Water temperature control according to the required setting
- Control of pumps (both on/off and inverter) outside the unit
- Complete alarm management (storage of history)
- Designed for serial line connection for monitoring / remote support
- Designed for connection to a remote terminal that duplicates the electronic control functions
- Designed for LAN connection of up to 6 units

#### 5.1.3 Devices controlled

- Compressor
- Cycle reversing valve (heat pump versions only)
- Water circulation pumps (external)
- Electronic expansion valve driver
- Alarm signalling relay inside the electronic controller (designed to control a warning light or buzzer)

## 5.2 USING THE CONTROL PANEL

### 5.2.1 Display

The graphic display shows the evaporator inlet and outlet water

temperature as well as the notifications relating to the active components and current alarms.

### 5.2.2 Information about equipment status

Information regarding the status of the unit is provided by means of LEDs on the display.

SYMBOL	KEY	DESCRIPTION
	ALARM	Press the ALARM key to reset alarms. When there is an alarm, it will light up.
	PROGRAM	Press PRG to access the main menu.
	ESC	Press ESC to move up to a higher level in the menu.
	UP	Press UP to go to the next screen or increase the value of a parameter.
	ENTER	Press ENTER to go into the fields of parameters to be edited and to confirm changes.
	DOWN	Press DOWN to go to the previous screen or decrease the value of a parameter.

### 5.2.3 Meaning of LEDs on the display:

In this menu you can find the parameters useful to the maintenance technician for properly managing and maintaining the unit. The following are the parameter categories available:

- Alarm history
- Non-serious alarm settings
- I/O forcing
- Operating hours counter
- LAN settings
- ...



SYMBOL	MEANING
<b>1) Event notification area</b>	
	Water valve opening/closing
	Cycle reversing valve opening/closing
	LAN monitoring active
	Power limitation active
	Prevent procedure active
	Manual overrides active
	Pump start/stop procedure
	EEV opening/closing
	Seasonal reversing
	Oil recovery cycle
	Writing default parameters
<b>2) Status bar</b>	
	Unit ON
	Unit OFF via the display
	Unit OFF via digital input
	Unit OFF from supervisor
	Unit OFF via time bands
	Unit OFF from alarm
	Unit OFF via remote display
	Unit OFF via LAN
	Unit in standby
	Alarm active
	Winter mode
	Summer mode
	Equipment pump ON
	Source pump ON
	Compressor ON
<b>3) Temperature display area</b>	
<b>4) Date/Time</b>	

### 5.3 SWITCHING ON AND OFF AND CHANGING THE OPERATING MODE

The unit may be switched on and off from the control panel installed on the unit itself.  
To enable remote ON-OFF switching from the PCDS or via an external switch (not supplied) make connections to terminals 18-30 (normally jumpered).

Remote **ON-OFF** open: unit OFF (keyboard disabled)

Remote **ON-OFF** closed: unit ON (possibility to switch the unit ON and OFF from the keyboard)

**WARNING** Where remote ON-OFF switching is enabled, after a power failure occurs and power is restored the unit will go into the mode indicated by the remote input without considering any changes that have been made from the unit control panel That is:

remote **ON-OFF** open: the unit remains Off

remote **ON-OFF** closed: the unit starts again

#### 5.3.1 Switching the unit on and off in the cooling or heating mode

To switch the unit on and off in both operating modes, follow the instructions below:

- Press the UP key or the DOWN key to access the quick menu
- Move the cursor to the power-on symbol and press ENTER
- Follow the on-screen instructions to turn the unit on in the selected operating mode (press PRG when indicated)

It is not possible to change over directly from the cooling mode to the heating mode: to do so it is necessary to select the heating mode using the PCDS remote control (accessory) or close terminal bridge 19-30 on the electric control board.

#### 5.3.2 Changing the operating mode

The unit leaving the factory has been configured for a fast, easy connection to the PCDS remote control (accessory), which enables the user to change the operating mode and turn the unit on and off from a distance.

If the unit is not equipped with this accessory, to select the operating mode it is necessary to use terminals 19-30 on the electric control board as follows:

- terminals 19-30 closed for cooling
- terminals 19-30 open for heating

**WARNING** Only specialised personnel may access the electric control board.

### 5.4 DISPLAY AND SETTING OF OPERATING PARAMETERS

Once on the main page, press the UP or DOWN key to display the quick menu. In the quick menu there are 4 items identified by a symbol:

- Switch-on unit
- General information about the software
- Set-point and basic temperature control
- Access to advanced menu



All items in this menu are freely accessible. If you select access to the advanced menu, you must enter your password. Depending on the password entered, you can access various types of parameters. The main menu is divided into 4 blocks, each identified by a symbol:

- Unit status information (free)
- User menu (password 000100)
- Maintenance technician menu (000118)

— Manufacturer's menu (password private)



#### 5.4.1 Info Menu

In this menu you can find all the information regarding the operation of the unit, such as:

- Status of all inputs and outputs
- Status of all the unit's devices (e.g. compressors, valve, etc.)
- LAN Status
- ...

#### 5.4.2 User Menu

In this menu you can find the parameters useful to the user in order to use the unit according to the requirements of the system. The following are the parameter categories available:

- Temperature control
- Remote control settings
- Settings for communication with BMS
- ...

#### 5.4.3 Maintenance Menu

In this menu you can find the parameters useful to the maintenance technician for properly managing and maintaining the unit. The following are the parameter categories available:

- Alarm history
- Non-serious alarm settings
- I/O forcing
- Operating hours counter
- LAN settings
- ...

#### 5.4.4 Manufacturer's menu

In this menu you can find the parameters useful to the manufacturer for properly configuring the unit. The parameters contained within it concern the construction and functional version of the unit. In addition to this, the rules for serious alarms and operation of all the unit's devices are set here. These parameters must not be modified for any reason by the end user or the maintenance technician unless explicitly instructed to do so by the manufacturer.

### 5.5 OTHER FUNCTIONS

Besides standard functions listed above, necessary for normal management of cooling unit, the software is able to manage the following functions.

#### 5.5.1 Refrigerant leak alarm

The function is activated only when there is a control unit with gas leak detection sensors.

The refrigerant leak alarm (activated by a double level gas leak sensor) has two thresholds. The first threshold (called "gas warning") produces a NON-LOCKING alarm that by default has an activation delay of 15 seconds (automatic reset) and causes the "PRG" key to light up with a yellow LED, as is the case for all warnings. The second threshold (called "gas leak") produces a

LOCKING alarm that by default has an activation delay of 0 seconds (manual reset) with the following effects:

- Key «alarm» switched on with red LED, as all alarms
- Total unit switching off
- Activation of forced ventilation of electrical board

The alarm can only be reset if the sensor no longer detects the presence of refrigerant in the air above the alarm threshold.

#### 5.5.2 Restart - Fast restart

When the power supply to the unit is interrupted, the card can store the status it is in (on/off - sum/win - set-point), and when power is restored, it starts again in the same mode. When re-starting, the compressor activation time is taken into account.

Fast restart is a function suitable for data centre or process installations. It is not recommended to enable it in other cases, which is why it cannot be enabled by default. With fast restart, when power is restored, the compressors are not subject to the delay times.

#### 5.5.3 Clock logic board

The pCO5+ board has an integrated clock card by default, so that time slots can be managed locally for the unit or for individual devices. The software can also handle daylight saving time.

#### 5.5.4 Partition of compressors power

During card programming the percentage of cooling capacity generated by each individual compressor is configured in the software. In this manner the differential is distributed in proportion to the power generated.

EXAMPLE: Unit with 2 compressors, one of which has three times the power of the other

Cmp1 = 75%

Cmp2 = 25%

Differential 2°C

Cmp2 is switched on at half a degree from the set point, while cmp1 is switched on at 2°C from the set point. The same thing happens when approaching the set point.

**NB:** the compressors can be disabled by parameter. When this operation is carried out, however, it is necessary to distribute the power among the missing compressors so that the total is 100%.

#### 5.5.5 Power analyzer

A power analyser can be installed to monitor all the electrical values of the unit, such as currents, voltages, frequencies, power, cos phi, etc., from the PGD display of the pCO5+.

The data collected can also be consulted via supervisor.

#### 5.5.6 Smart logic

Smart logics are custom functions to activate by software

As input can be used analog/digital input of pCO5+ or pCOE/EVD

Available logic functions are: AND, OR, IMPULSE, TIMER, HYSTERESIS, ...

The output signal (if is analog or digital) can be bring on pCO5+/pCOE output

#### 5.5.7 Tanks probes management

The software offers the possibility of installing a tank sensor for each device. Once the tank sensor is installed, the main regulation is switched from the return temperature to the tank temperature. The sensor is optional.

### 5.5.8 Antifreeze (heating element) protection management

Antifreeze protection is provided by two devices: the pump and antifreeze heating elements.

These two devices are regulated on the basis of two parameters: outdoor air temperature and outlet water temperature. In addition to this, the time variable is involved in the regulation.

When the unit is switched ON, the heating elements are NEVER ACTIVATED because protection is provided by the pump, which is always on and therefore keeps the water moving by discharging a small amount of heating capacity into the system.

If the unit enters an alarm state, it is considered to be OFF DUE TO ALARM; therefore, the heating elements switch on, if required.

When the unit is switched OFF, on the other hand, an outdoor air temperature SET POINT must be set (with hysteresis) below which the process is active.

When the procedure is active the following items are activated:

- Pump: based on a chosen timing (e.g. 2 minutes every 10).  
In the case of an inverter pump, it is also possible to select the speed at which the pump will run when it is switched on.
- Antifreeze heating elements: based on a thermostat setting (set point with hysteresis) on the outlet water sensor side.

### 5.5.9 Outlet regulation

Outlet regulation can be obtained with two different ways:

- Pure outlet regulation
- Indirect outlet regulation got with modulating pump

#### PURE OUTLET REGULATION

The compressors are switched off with the standard logic (set point and differential divided on the compressor power), but the relevant temperature is the flow temperature and not the return temperature. The control can be set in various ways (P, PI, etc.) in order to avoid sudden starts/stops. It can only be used in units with a stable thermal load and a high number of compressors

(certainly not in tandem configurations), otherwise the temperature control would be unstable.

#### INDIRECT OUTLET REGULATION GOT WITH MODULATING PUMP

In this case, the main regulation of the unit (the one that turns the compressors on and off) is carried out in the conventional way on the return water temperature. The number of compressors turned on therefore depends on the distance from the inlet water temperature set point.

At the same time, however, the modulating pump varies its speed in order to keep the flow temperature at a fixed temperature. The pump will therefore have a lower speed when the number of compressors switched on is lower and a higher speed when it is higher. This system is more stable than the previous one and is the one that is recommended.

### 5.5.10 LAN

Lan (Local Area Network) is a set of integrated functions for optimising the regulation of systems with at least 2 chillers. This function happens thanks to control board pCO5+ electrical connections.

The port used for the LAN (PLAN) is supplied as standard on the pCO5+ boards, therefore the function hasn't an additional cost except for the electrical connection on site (twisted and shielded data cable is recommended).

In any LAN network there will be just a unit master which:

- Receives operating data from other slave units
- Processes the received data and on the basis of the chosen control logic decides how many and which machines/compressors to start
- Sends commands to slave units
- In all LAN network is possible to configure the master display like, with a simple pushing buttons, display for all slave.

Below a summary of various available logics:

Logic	Number of unit to start	System probe	Step type	Compressors regulation	Compatibility with multifunction	Arrangement
Time rotation	Fixed according to the operating mode	No	Machine	Stand alone	Yes	Working hours
Macro step	Variable based on temperature setpoint and load	Tank (2 multifunctions)	Machine	Stand alone	Yes	Work hours and priorities
Load stand alone	Variable according to load	No	Machine	Stand alone	Yes	Work hours and priorities
Load global	Variable based on temperature setpoint and load	1 on machine return line 1 on system delivery line	Machine	Stand alone	No	Work hours and priorities
Cascade	Variable based on system PID	Selecting between: System return or delivery, or Master input or output, or Average of machine inputs or outputs	Compressor	Centralised from master	No	Working hours and priority level/load level of the machine
Step control	Variable based on system PID	Selecting between: System return or delivery, or Master input or output, or Average of machine inputs or outputs	Compressor	Centralised from master	No	Working hours and priority level/load level of the machine
Cascade & step	Variable based on system PID	Selecting between: System return or delivery, or Master input or output, or Average of machine inputs or outputs	Compressor	Centralised from master	No	Working hours and priority level/load level of the machine

For more information about LAN management see the dedicated NCS manual.



## 6 START-UP

**The first start up must be carried out exclusively by qualified personnel and authorized by Galletti S.p.A. (see warranty sheet attached).**

At first start-up of the installation make sure to comply with current national regulations.

### 6.1 PRELIMINARY CHECKS

When starting up the unit for the first time or after a seasonal period of quiescence, it is advisable to have the following checks performed by specialised personnel:

- Check that the electrical connections have been made properly and that all the terminals are securely tightened.
- Check that the external power supply is within  $\pm 5\%$  tolerance from the power supply reported on the unit identification label. If the power supply is subject to frequent voltage fluctuations, contact Galletti S.p.A. for advice on choosing suitable protections.
- Check for refrigerant leaks, with the aid of a leak detector if necessary
- Check that the plumbing connections have been properly made according to the indications given on the plates to be found on the unit itself (water inlet, water outlet etc.).
- Make sure that the pump is not blocked.
- Make sure that the water circuit is duly bled to completely eliminate the presence of air: load the circuit gradually and open the air vent valves, which the installer should have set in place.

In order to avoid soiling that could result in the breakage of the plate heat exchangers and hydronic pumps, it is necessary to wash the hydraulic system properly, before allowing water to circulate inside the unit. More specifically:

1. The hydraulic system must be flushed out, with a flow of water (which is then to be disposed of) and without passing through the filter at the inlet of the unit, in order to eliminate large-diameter impurities, debris, and any dirt present as residue from the work carried out (e.g. welding). Continue flushing until the water (to be disposed of) becomes clear.
2. The system can then be connected to the chiller, on which the inlet water filter must be installed. In this phase it is necessary to let the water circulate inside the unit (through the

filter) without starting the compressors in any case. Perform this operation for a sufficient time to allow the water to circulate in the system a few times.

3. At the end of the previous phase, clean the inlet filter, refit the cartridge in place, and circulate the water by starting the unit. In case of a flow alarm, check whether there is air in the circuit.

The fluid in the hydraulic circuit must not contain:

- dirt or solids in suspension;
- acids or bases or corrosive liquids in general;
- sea water;
- liquids that are flammable and generally dangerous.

**⚠ CAUTION:** during the start-up phase, maximum attention must be paid to the filling pressure of the system and in particular to the pressure of the intake water to the pump (under operating flow rate conditions) in order to AVOID CAVITATION phenomena that could seriously compromise the reliability of the pump. The intake pressure value must be higher than the minimum value indicated in the manuals. The cavitation phenomenon can also be identified by the anomalous noise produced by the pump when it is running; this noise disappears if the pressure returns to its proper value.

**⚠ WARNING** before starting the unit, make sure all the covering panels are in place and secured with the fastening screws provided. To start the unit, move the main switch to on. Use the keypad of the electronic control as directed in section 7.3 Electrical data p. 35 to select the cooling or heating mode.

**⚠ ATTENZIONE** You should not disconnect the unit from the power supply during periods when it is inoperative but only when it is to be taken out of service for a prolonged period (e.g. at the end of the season). To turn off the unit temporarily follow the directions provided in the section 7.3 Electrical data p. 35.

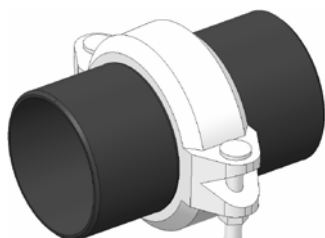
**⚠ WARNING** do not cut off power using the main switch: the latter device serves to disconnect the unit from the power supply when there is no passage of current, i.e. when the unit is already turned OFF.

## 7 PLUMBING AND ELECTRICAL CONNECTIONS

### 7.1 PLUMBING CONNECTION

All units in the WRE series are equipped with water flow switch, manual vent valve, and water pressure gauge.

» Victaulic connection



#### 7.1.1 General guidelines for plumbing connections

When you are getting ready to set up the water circuit for the evaporator you should follow the directions below and in any case make sure you comply with national or local regulations (use the diagrams included in this manual as your reference).

1. Connect the pipes to the chiller using flexible couplings to prevent the transmission of vibrations and to compensate for thermal expansions. These units are all configured for installation of the water inlet-outlet pipes outside the unit (on the rear) and these pipes are supplied as standard accessories at no extra cost for the customer.
2. Install the following components on the piping:
  - Pair of quick-connection couplings with pipe section to be welded (optional item that may be selected from the price list). They facilitate the connecting operations to the plumbing system, greatly speeding up installation
  - temperature and pressure indicators for routine maintenance and monitoring of the unit. Checking the pressure on the water side will allow you to promptly detect any water leaks in the system. The installation of a pressure indicator upstream and downstream from the Y filter is strongly recommended, in order to check the pressure drop on the filter itself and assess how dirty it is in advance. It is also advisable to keep the pipe section between the Y filter and the inlet to the heat exchangers as short as possible.
  - sumps on inlet and outlet piping for temperature detection, for a direct view of operating temperatures. They can also be consulted on the microprocessor on board the unit.
  - cut-off valves (gate valves) to isolate the unit from the hydraulic circuit.
  - metal net filter compulsory (inlet piping) with mesh no larger than 1 mm, to protect the heat exchanger from slag or impurities inside the piping. If the machine is combined with process cycles, it is recommended to install a readily serviceable uncoupling exchanger to prevent possible operation blockages and/or breakage of the plate evaporator.
  - air vent valve placed on the higher parts of the hydraulic circuit to bleed the air. The internal pipes of the unit are fitted with small air vent valves for bleeding the unit itself: this operation should be conducted when the unit is disconnected from the power supply - make sure that the circuit is completely full of water and check again to make sure there is no

air before starting the pump for the first time.

**⚠ WARNING** Failure to use anti-freezing solutions may cause serious damage to the hydraulic/cooling circuit in general.

#### Requirements for the heat transfer fluid and maintenance of the system

In order to avoid problems of reliability and/or operation of the hydronic system, it is necessary to take into consideration the characteristics of the heat transfer fluid (water or mixtures of water and glycol) and the hydraulic circuit.

The use of an unsuitable fluid can cause sludge deposits, algae growth, scale build-up, or corrosion and in some cases even erosion.

The Manufacturer does not accept any responsibility for damage caused by the use of untreated water, water containing particles or debris in suspension, water that has been incorrectly treated or admixed, or salt water.

By way of example, some (non-exhaustive) advice is given below (contact a specialist and consult specific standards such as UNI 8065)

- Ammonium ions ( $\text{NH}_4^+$ ) dissolved in water should be eliminated due to their high reactivity with copper.
- Chlorine ions ( $\text{Cl}^-$ ) pose a risk of holes developing due to corrosion.
- Sulfate ions ( $\text{SO}_4^{--}$ ) must be eliminated because they may present a risk of corrosion.
- Limit for fluoride ions: 0.1 mg/l.
- Silicon may pose a risk of corrosion. Limit: < 1 mg/l.
- Electrical conductivity: the higher the specific resistivity, the lower the tendency of corrosion. Therefore, the following limit must be observed: Electrical conductivity: < 3,500  $\mu\text{S}/\text{cm}$
- pH: neutral pH at 20 °C ( $7 < \text{pH} < 8$ )
- Fixed residue (at 180 °C): < 2 000 mg/kg
- Conditioners Present within the concentrations prescribed by the supplier

The water must be analysed: it is advisable to contact a qualified water treatment specialist to determine the most suitable type of treatment according to the materials used in the hydraulic system.

The installed hydraulic circuit must include all the necessary devices for water treatment: mesh filter (immediately at the inlet to the unit), additive dosing systems if necessary, any intermediate heat exchangers, vent valves at all points of possible air accumulation, air intakes, isolation valves, etc., and anything else necessary according to best practice.

**⚠ CAUTION:** in case of regular shut-down, if it is necessary to empty the hydraulic circuit, the system must be flushed internally with nitrogen, making sure to leave it pressurized (at a pressure approximately equal to half the maximum pressure of the hydraulic circuit) in order to avoid the entry of oxygen and to protect the parts of the system from the risk of corrosion.

#### 7.1.2 Recommended water circuit

**⚠ WARNING** when making the plumbing connections, make sure there are no open flames in proximity to or inside the unit.

When setting up the water circuit, it is advisable to equip it with:

- valves for regulating (VI) the unit on the water pipes, immediately upstream and downstream from the unit itself, to be



- used in the event maintenance work is required;
- standard mechanical filter (FM) (OBLIGATORY!) on the pipe feeding the unit, in proximity to the latter;
- standard mechanical filter (FM) (OBLIGATORY!) and check valve (VNR), on the supply line upstream from the filling tap (RC);
- an air vent valve at the highest point of the circuit;
- escape pipe for the safety valve (VS), which, in the event the safety valve opens,diverts the jet of water to an area where it cannot harm persons or things, (**Important!**);
- vibration-damping couplings (GA) on the pipes to prevent vibrations from being transmitted toward the system.

**Important!** It is advisable to ensure that the pipes connected upstream and downstream from the unit are not smaller in diameter than the plumbing connections of the unit itself.

**Important!** During wintertime the water circuit (or the water chiller only) must be emptied to prevent damage caused by freezing; alternatively, the circuit may be filled with a mixture of water and glycol; the percentage of glycol necessary will depend on the lowest forecast temperature (see table):

Percentage by weight of ethylene glycol (%)	Mixture freezing temperature (°C)
0	0
10	-3
20	-8
30	-15
40	-25

**NOTE:** The percentage shown in the upper table are indicative. Always refer to your glycol supplier for the right freezing temperatures.

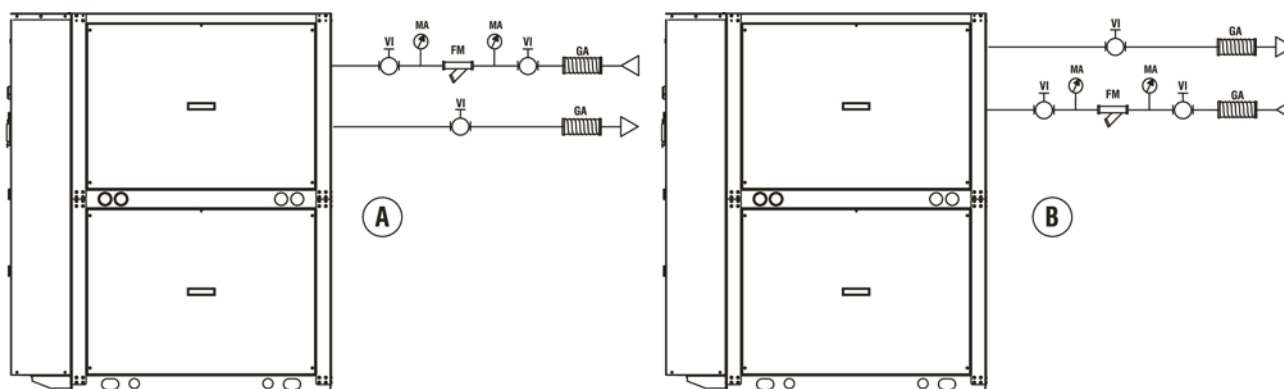
**NOTE:** For choice of glycol percentage to use, in case of low temperature water produced, is recommended keeping a edge of 5K on outlet water temperature in order to consider any temperature fluctuations inside the heat exchanger. Example: water temperature produced: -10°C, minimum water temperature during the fluctuations: -10-5=-15°C, recommended ethylene glycol percentage: >30%.

**Important!** If different antifreeze product is to be used, please contact the manufacturer.

Failure to install filters and vibration dampers may cause problems of clogging, breakages and noise, for which the manufacturer may not be held liable.

**WARNING:** before connecting the unit to the water circuit, always make sure you have installed the flow switch according to the instructions given in section 7.1.4 p. 34.

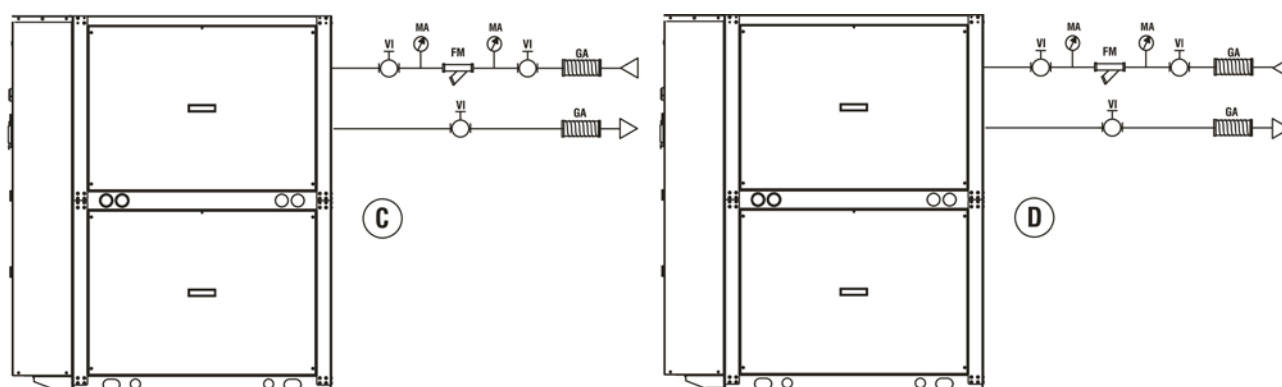
» Recommended water circuit - version C, evaporator (A) and condenser (B) connections



**LEGEND**

**MA** Pressure gauge (not supplied)  
**VI** Shut-off valve (not supplied)

**GA** Vibration-damping coupling (not supplied)  
**FM** Mechanical filter (MANDATORY)



#### LEGEND

**MA** Pressure gauge (not supplied)  
**VI** Shut-off valve (not supplied)

**GA** Vibration-damping coupling (not supplied)  
**FM** Mechanical filter (MANDATORY)

### 7.1.3 Filling the system

- Before you start filling, make sure that the system draining tap is closed.
- Open all the air vent valves of the system and of the indoor units and chiller.
- Open the system regulating devices.
- Start filling the system.
- When water starts to flow out of the indoor units' air vent valves, close them and continue filling until the pressure gauge reading is at least 1.5 bars.

**WARNING** The filling pressure value must be such as to ensure that the pump does not experience aspiration cavitation while running; therefore, it is advisable to take into account the pump pressure head, its NPSHr, and the estimated pressure drops in the system as well as the mechanical resistance to pressure of the system components downstream from the pump.

### 7.1.4 Flussostat connection

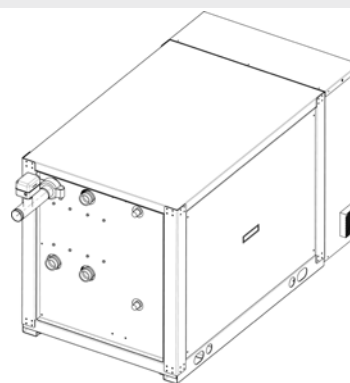
All units are supplied with a vane-type flow switch previously calibrated during testing.

This accessory, which is essential for the safe operation of the unit, is fastened to a straight pipe section of suitable diameter.

**WARNING** failure to connect the flow switch may cause irreversible damage to the unit!

1. Connect the straight pipe section with flow switch mounted on the inlet section to the plate heat exchanger
2. Check the Victaulic connection
3. Check that the direction of flow is consistent with the movement of the flow switch vane
4. Check that the electrical connection of the flow switch to the unit's electrical panel is intact

### » Flussostat connection



## 7.2 ELECTRICAL CONNECTIONS

All operations must be performed by qualified service personnel in accordance with current laws and regulations. For any electrical work on the unit, refer to the electric diagrams supplied with the unit. It is recommended to make sure that:

- The characteristics of the mains power supply are adequate for the electrical inputs specified in the table of electrical data.

**WARNING** Before carrying out any job on electrical parts, make sure the power supply is disconnected. Check that the mains electricity supply is compatible with the specifications (voltage, number of phases, frequency) shown on the unit rating plate. The supply voltage may not undergo fluctuations exceeding  $\pm 5\%$  of the rated voltage. The electrical connections must be made in accordance with the wiring diagram provided with the unit and the regulations in force.

**WARNING** Never attempt to modify internal electrical connections: any undue modifications will immediately invalidate the warranty.

**An all-pole circuit breaker must be used on the electric panel upstream, conform to IEC Standards (contacts must be open at least of 3 mm), with suitable interruption capacity and differential protection, according to the electrical data tables in 7.3 Electrical data p. 35 paragraph, described below, and installed as close as possible to the device.**

For the unit power supply line use H07RN-F-type flexible rubber cables with the cross-section shown in the tables included in section 7.3 Electrical data p. 35. Use cable ducts and conduits suitable for outdoor installation to route the cables. Provide a switch and delayed fuses meeting the specifications given in the tables included in section 7.3 Electrical data p. 35.

Power supply cable must be insert inside the unit electrical panel through the cable holder on side panel.

Tighten the wires securely to the terminals and clamp the cable in place with the cable holder.

To preserve the protection degree of the machine, use a cable

gland compatible with the sheath or power cable diameter, in correspondence to the unit side panel hole.

**An earth connection is mandatory: connect the earthing wire to the terminal provided on the electric control board (see the electric control board layout supplied with the unit), marked  $\perp$ .**

If you wish to include:

- a remote on/off switch
- a remote switch for changing over between the cooling and heating mode (WRE H only),
- a remote alarm indicator

**It is a good idea to do so at this stage of the installation procedure, by connecting the switches or PCDS remote control (accessory) to the electric control board terminals as directed in section 7.3 Electrical data p. 35 and using the unit wiring diagram as your reference.**

## 7.3 ELECTRICAL DATA

» WRE electrical specifications

WRE			052	062	072	082	092	122	132	152	154	182
Maximum current absorption		A	29,0	36,0	42,0	49,0	57,0	72,0	81,0	91,0	90,0	112
Start up current		A	112	161	211	218	178	288	296	356	224	380
Startup current with soft starter		A	67	97	127	131	107	173	178	214	153	228
Power supply		V-ph-Hz	400 - 3N - 50									
Auxiliary power supply		V-ph-Hz	230 - 1 - 50									
Cross-section area of power cables	(1)	mm <sup>2</sup>	10,0	10,0	16,0	16,0	16,0	25,0	25,0	25,0	25,0	35,0
Safety fuse F		A	40	50	50	63	63	100	100	100	100	125
Circuit breaker IL		A	40	50	50	63	63	100	100	100	100	125

(1) The shown section is to be considered as the minimum recommended section. The cables must be chosen in compliance with CEI - UNEL 35024/1. standard.

WRE			184	212	214	242	244	274	302	314	364	384
Maximum current absorption		A	114	130	128	151	144	161	166	182	224	240
Start up current		A	293	399	307	420	360	377	510	447	492	508
Startup current with soft starter		A	199	239	210	252	244	259	306	305	340	353
Power supply		V-ph-Hz	400 - 3N - 50									
Auxiliary power supply		V-ph-Hz	230 - 1 - 50									
Cross-section area of power cables	(1)	mm <sup>2</sup>	35,0	35,0	35,0	50,0	50,0	50,0	50,0	50,0	70,0	70,0
Safety fuse F		A	125	160	160	200	160	200	200	200	250	315
Circuit breaker IL		A	125	160	160	200	160	200	200	200	250	315

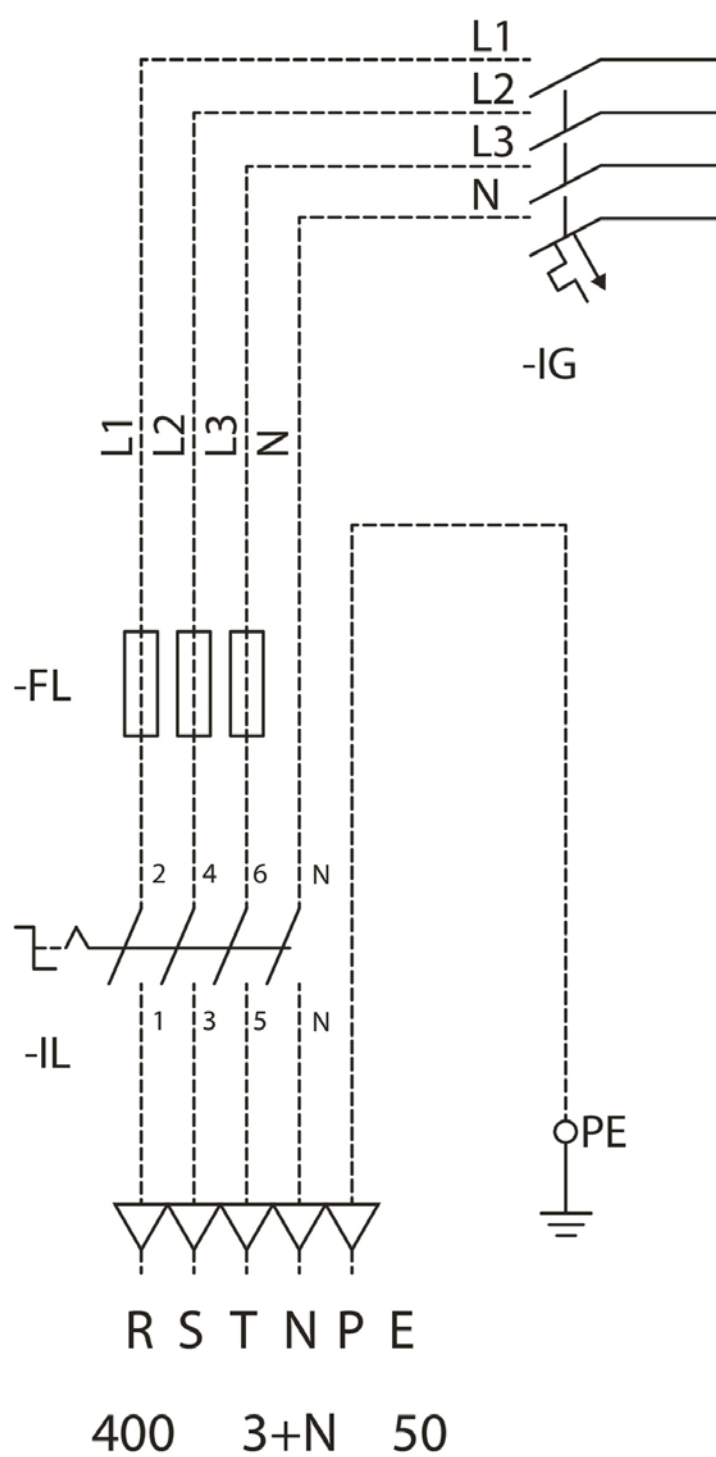
(1) The shown section is to be considered as the minimum recommended section. The cables must be chosen in compliance with CEI - UNEL 35024/1. standard.

WRE			454	504	564	606	636	696	746
Maximum current absorption		A	261	303	317	328	370	412	454
Start up current		A	529	571	661	593	638	680	722
Startup current with soft starter		A	369	403	460	421	457	491	524
Power supply		V-ph-Hz	400 - 3N - 50						
Auxiliary power supply		V-ph-Hz	230 - 1 - 50						
Cross-section area of power cables	(1)	mm <sup>2</sup>	70,0	95,0	95,0	120	120	120	120
Safety fuse F		A	315	355	355	355	400	500	500
Circuit breaker IL		A	315	400	400	400	400	630	630

(1) The shown section is to be considered as the minimum recommended section. The cables must be chosen in compliance with CEI - UNEL 35024/1. standard.

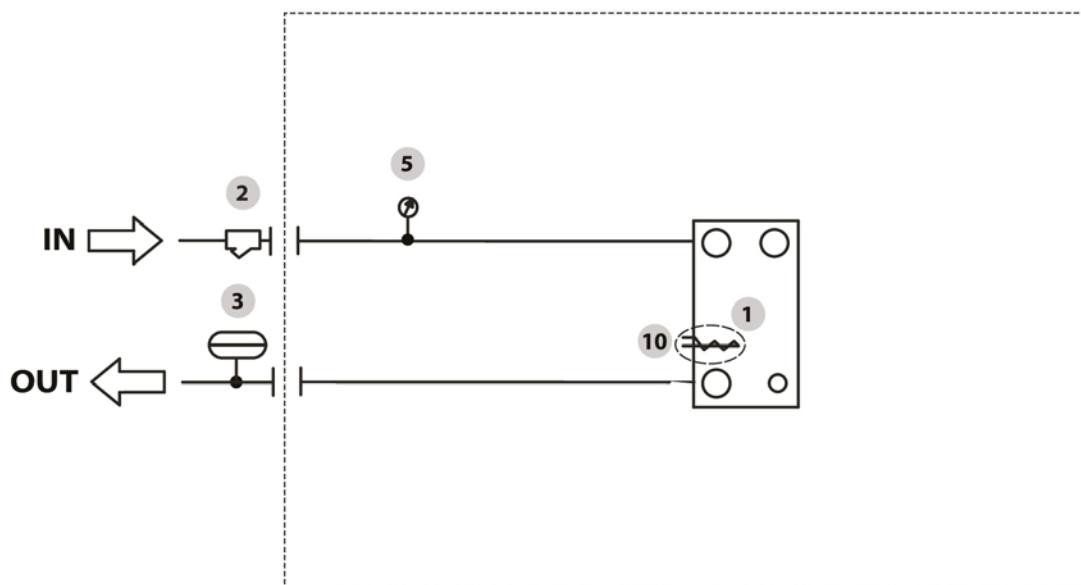
- The unit's maximum power input, corresponding to the mains power that must be available in order to operate the unit, can be calculated from the maximum current input, if the supply voltage and the power factor of the mains power supply are known.
- The maximum current absorption refers to the current that will trigger the internal safety devices of the unit. It is the

maximum current allowed in the unit This value may never be exceeded; it must be used as a reference for determining the size of the power supply line and the related safety devices (refer to the wiring diagram supplied with the units).



## 7.4 WATER CIRCUIT

» WRE (evaporator)



### LEGEND

- 1 Evaporator
- 2 Water filter (included)
- 3 Flow switch
- 4 -
- 5 Pressure gauge
- 6 -

- 7 -
- 8 -
- 9 -
- 10 Antifreeze electric heating
- Internal and external borderline
- OPTIONAL

## 8 OPERATING LIMITS

The following graphs illustrate the continuous operating limits of the WRE units in relation to the outlet water temperature of the unit and the water inlet temperature of the source. The following limits are to be considered valid for water temperature fluctuations of 5 K.

**⚠ WARNING:** contact the support area if you wish to operate with water temperature fluctuations other than 5 K at full load.

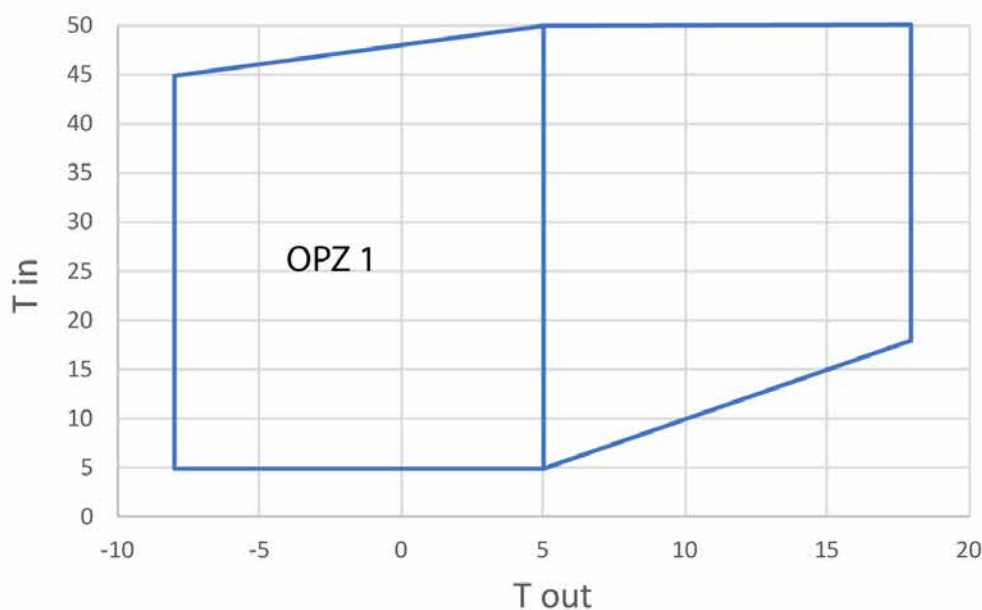
**⚠ WARNING:** except for special requests, which can be managed on request, the WRE series units set the number of compressors running according to the temperature of the water entering the unit (temperature returning from the system) and not according to the outlet temperature. Therefore, the settable set point always refers to the temperature of the water entering the unit. The outlet water temperature,

to which the following operating limits refer, therefore depends on the set point/differential combination set on the return line, on the design thermal differential, and on any unit splitting conditions (refer to the controller's technical manual). Therefore, if you would like to operate continuously in the vicinity of the operating range, you should always make sure that the temperatures are in compliance with the operating limits, even under conditions of load regulation and splitting of the unit. If in doubt, contact the Galletti product support department.

**⚠ WARNING:** The units are designed to operate with water temperatures within the operating limits. Attempting to operate the units beyond these limits may cause irreparable damage to the units themselves.

### 8.1 OPERATING LIMITS FOR WRE C

» WRE C operating range

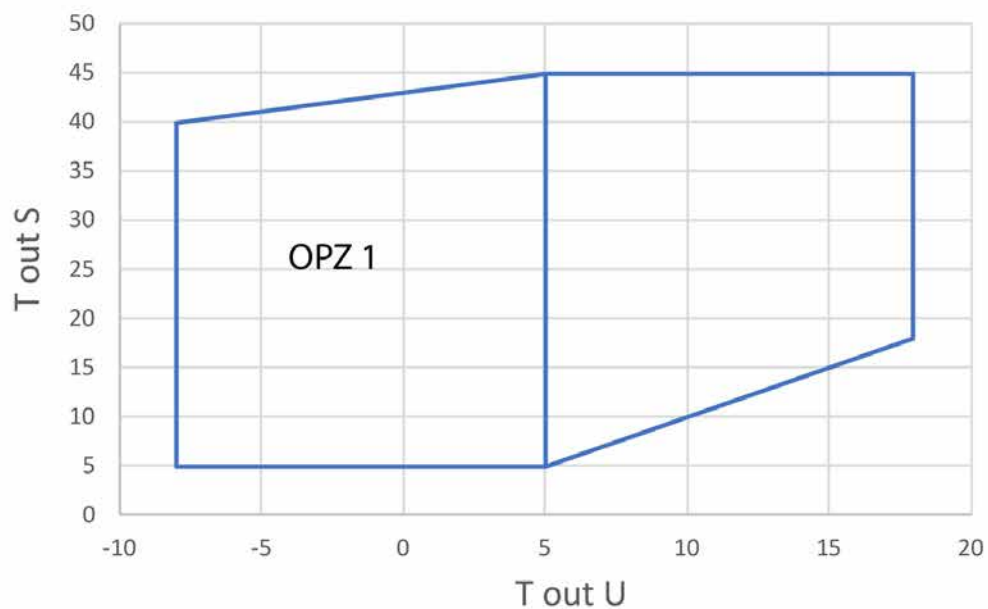


**OPT 1**  
**T out**  
**T in**

Glycol  
Outlet water temperature (equipment)  
Inlet water temperature (source)

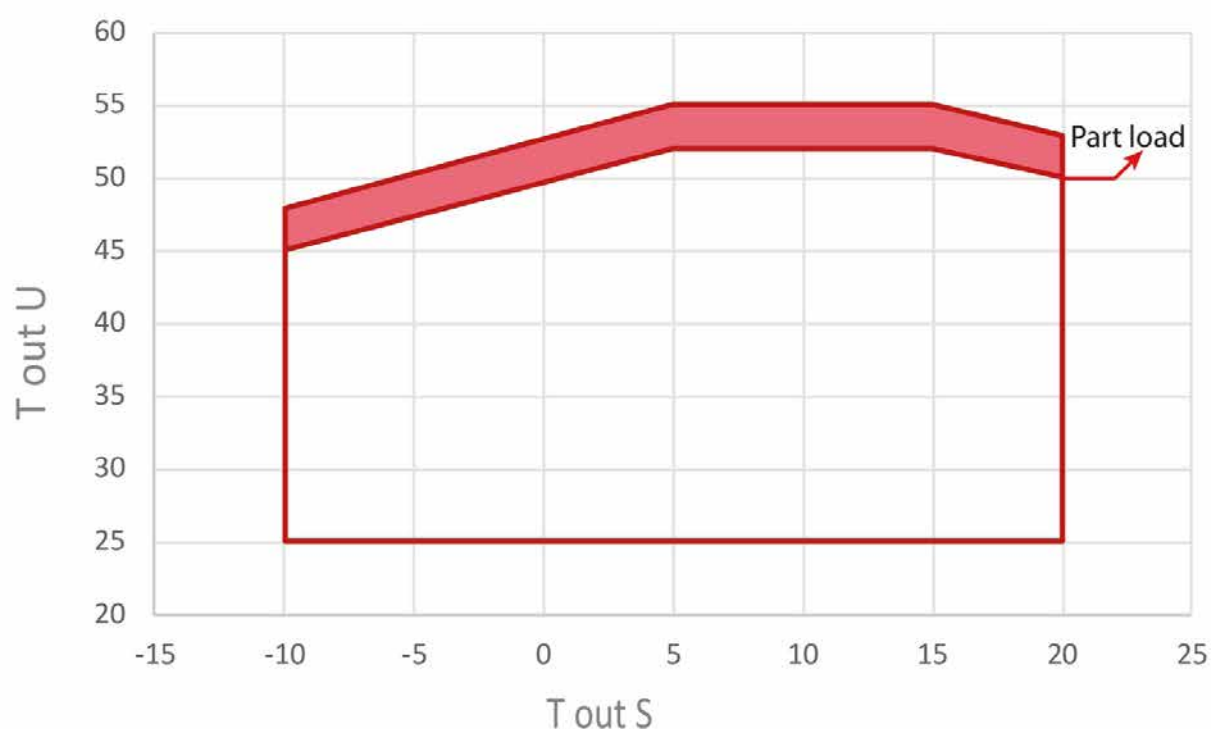
## 8.2 OPERATING LIMITS FOR WRE H

» WRE H operating range - cooling mode



**OPT 1**  
**T out U**  
**T out S**

Glycol  
Outlet water temperature (user)  
Outlet water temperature (source)



**T out U** Outlet water temperature (user)  
**T out S** Outlet water temperature (source)  
**Part load** in this area of the envelope the unit can enter the prevent mode, with temporary disconnection of a compressor in order to prevent high-pressure alarms as much as possible, thereby keeping the unit operating uninterruptedly.

### 8.3 THERMAL CARRYING FLUID

The units belonging to the WRE series can operate with mixtures of water and up to 35% ethylene glycol.

Make sure that the external pumping unit, if present, is capable of handling mixtures of water and ethylene glycol.

For more precise characteristics of the heat transfer fluid, refer to section 7.1.1 p. 32.



## 9 CONTROL AND SAFETY DEVICES

All the control and safety devices are set and tested in the factory before the unit is dispatched.

### 9.1 CONTROL DEVICES

#### 9.1.1 Service thermostat

The service thermostat activates and deactivates the compressor according to the demand for chilled water (cooling mode) or heated water (heat pump mode), as determined by a sensor installed on the water exchanger inlet. This device is governed by the microprocessor control (see also the chapter regarding the microprocessor).

#### 9.1.2 Control device settings

CONTROL DEVICES	SET POINT	MIN	MAX	DIFFERENTIAL
Service thermostat (outlet water temp. cooling mode)	11,5 °C	8 °C	20 °C	2 °C
Service thermostat (outlet water temp. heat pump mode)	40 °C	25 °C	47 °C	3 °C

### 9.2 SAFETY DEVICES

#### 9.2.1 High pressure switch

The high pressure switch stops the compressor when the delivery pressure exceeds the set value.

#### 9.2.2 High-pressure relief valve

Available only in the sizes with compressors generating a displacement volume greater than 25 litres per second, in compliance with UNI EN 378-2.

**⚠ WARNING!** In the case of a naked machine (one without panels), it is necessary to convey the relief valve discharge to the outside of the technical compartment in order to prevent the leakage of refrigerant inside a closed and confined space.

#### 9.2.3 Low pressure switch

The low pressure switch stops the compressor when the intake

pressure falls below the set value.

#### 9.2.4 Low pressure safety valve

. Available only in some sizes, it limits the compressors intake pressure to a value in line with the stated PED class of the machine.

**⚠ WARNING!** In the case of a naked machine (one without panels), it is necessary to convey the relief valve discharge to the outside of the technical compartment in order to prevent the leakage of refrigerant inside a closed and confined space.

**⚠ WARNING!** In case of storage with a loaded unit, in high-temperature environments or exposed to direct sunlight for extended periods of time, it is possible that the activation pressure of the low-pressure relief valve could be reached. Therefore, storage in environments where the temperature cannot be monitored or where it may exceed the limit value of 49 °C should be avoided.

#### 9.2.5 Anti-recycle timer

The function of the timer is to prevent excessively frequent compressor starts and stops. This device is a function included in the microprocessor control; it prevents the compressor from starting up again after a stop until a set period of time has elapsed (approximately 5 minutes).

#### 9.2.6 Antifreeze thermostat

The antifreeze thermostat situated at the evaporator outlet performs a dual function: it prevents ice from forming in the evaporator in the event of an excessive decrease in the water flow; it stops the unit in the event of a failure of the service thermostat. This device is governed by the microprocessor control (see also the chapter regarding the microprocessor).

#### 9.2.7 Water differential pressure switch

The water differential pressure switch stops the unit in the event of an excessive reduction in the water flow, thus protecting it from the formation of ice (chiller operation) and excessively high condensation temperatures (heat pump operation)

#### 9.2.8 Safety device settings

Safety device	Start up	Differential	Resetting
Maximum pressure switch (bars)	42 <sup>(1)</sup> ; 40,5 <sup>(2)</sup> ; 38 <sup>(3)</sup>	-	Manual
Maximum pressure switch with high pressure safety valve present (bar)	40,5 <sup>(4)</sup> ; 38 <sup>(5)</sup>	-	Manual
High pressure security valve (bar)	42 <sup>(4)</sup> ; 40,5 <sup>(5)</sup>	-	-
Security valve low pressure (bar)	28,4	-	-
Minimum pressure switch (bars)	2	-	Automatic
Antifreeze thermostat (°C)	3	3	Manual

<sup>(1)</sup> from WRE 52 to WRE 384

<sup>(2)</sup> from WRE 454 to WRE 564

<sup>(3)</sup> from WRE 606 to WRE 746

<sup>(4)</sup> WRE 302

<sup>(5)</sup> WRE 564

## 10 ROUTINE MAINTENANCE AND CHECKS

It is recommended to carry out periodic checks of the safety devices (pressure switches and safety valves) and verify the absence of refrigerant leaks.

After the first start-up, the periodic checks must be carried out in conformity with the schedule and the manners provided for by current national regulations.

To keep the unit in good working order and guarantee the expected levels of performance and safety, it is necessary to carry out some periodic routine checks: some may be performed directly by the user while others must be carried out solely by specialised personnel.

**⚠ CAUTION:** Installation and maintenance activities performed on units may only be carried out by personnel and companies holding the appropriate certificate in compliance with Regulation (EU) no. 2015/2067, which establishes, in accordance with Regulation (EU) no. 517/2014 of the European Parliament and of the Council, minimum requirements for companies and personnel with regard to stationary refrigeration equipment, air conditioning equipment, and heat pumps containing certain fluorinated greenhouse gases.

### 10.1 CHECKS TO BE PERFORMED BY THE USER

The checks and operations described in this section may be easily performed by the user, provided that the latter shows a minimum of attention.

- Check the level of water in the circuit using the water pressure gauge, which should indicate a pressure of about 1.5 bars (monthly).
- Check the water circuit for leaks (monthly).
- If the unit is to remain out of service for a long time, drain the water (or other fluid present in the circuit) from the pipes and the unit itself. This is indispensable if, during the shut-down period of the unit, ambient temperatures are expected to fall below the freezing point of the fluid used (seasonal operation). Drain the unit and the parts of the system at risk of freezing.
- Before placing the unit back in service at the start of the season, refill the water circuit as directed in section 1.4 Main components p. 7.
- Check that the noise emissions of the unit are regular (monthly).
- Check that the escape pipe of the safety valves on the refrigerant side, where present, is tightly secured.

### 10.2 CHECKS AND MAINTENANCE TO BE PERFORMED BY SPECIALISED PERSONNEL

#### REQUIREMENTS

**All the operations described in this section MUST ALWAYS BE PERFORMED BY QUALIFIED PERSONNEL.**

**⚠ WARNING** Before carrying out any work on the unit or accessing internal parts, make sure you have disconnected it from the mains power supply.

**⚠ WARNING** The upper part of the compressor casing and the outlet pipe reach high temperatures. Be especially careful when working in their vicinity.












**After completing maintenance jobs, always replace the panels enclosing the unit and secure them with the fastening screws provided.**

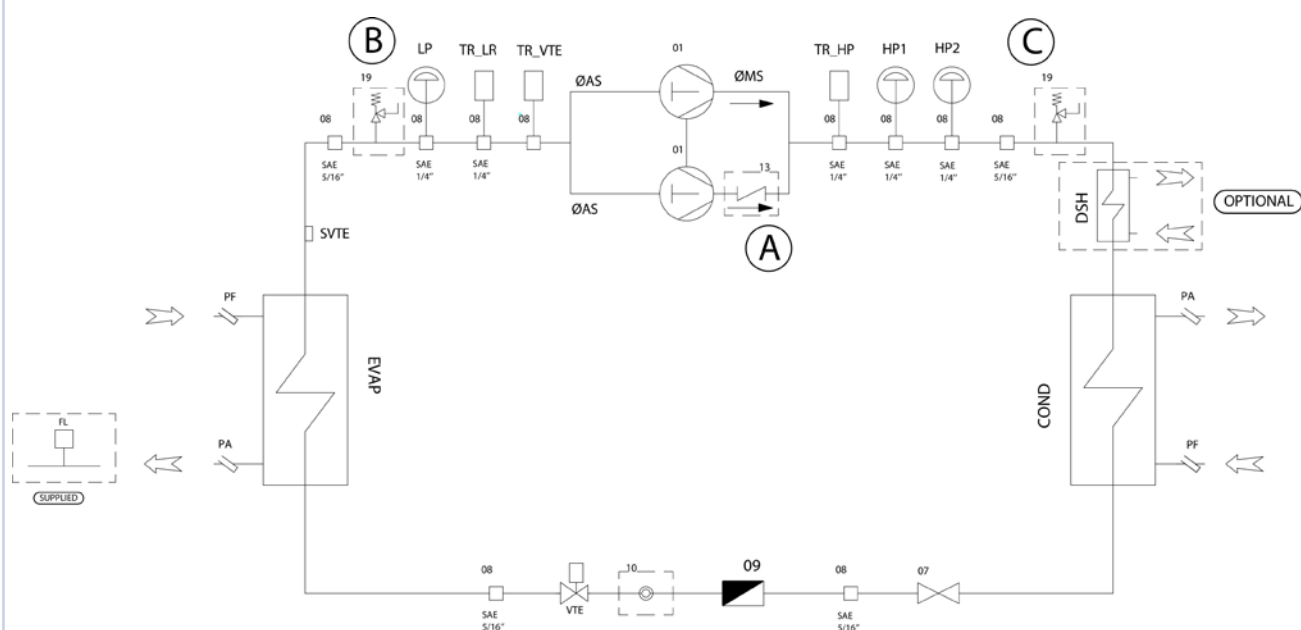
The checks and operations described in this section must be carried out on a yearly basis by specialised personnel.

- Check the electric control board terminals to ensure that they are securely tightened: the movable and fixed contacts of the circuit breakers must be periodically cleaned and replaced whenever they show signs of deterioration.
- Check the compressor and pipes for oil leaks.
- Check that the flow switch is working properly.
- Clean the metal filters mounted in the water pipes.

## 11 COOLING CIRCUITS

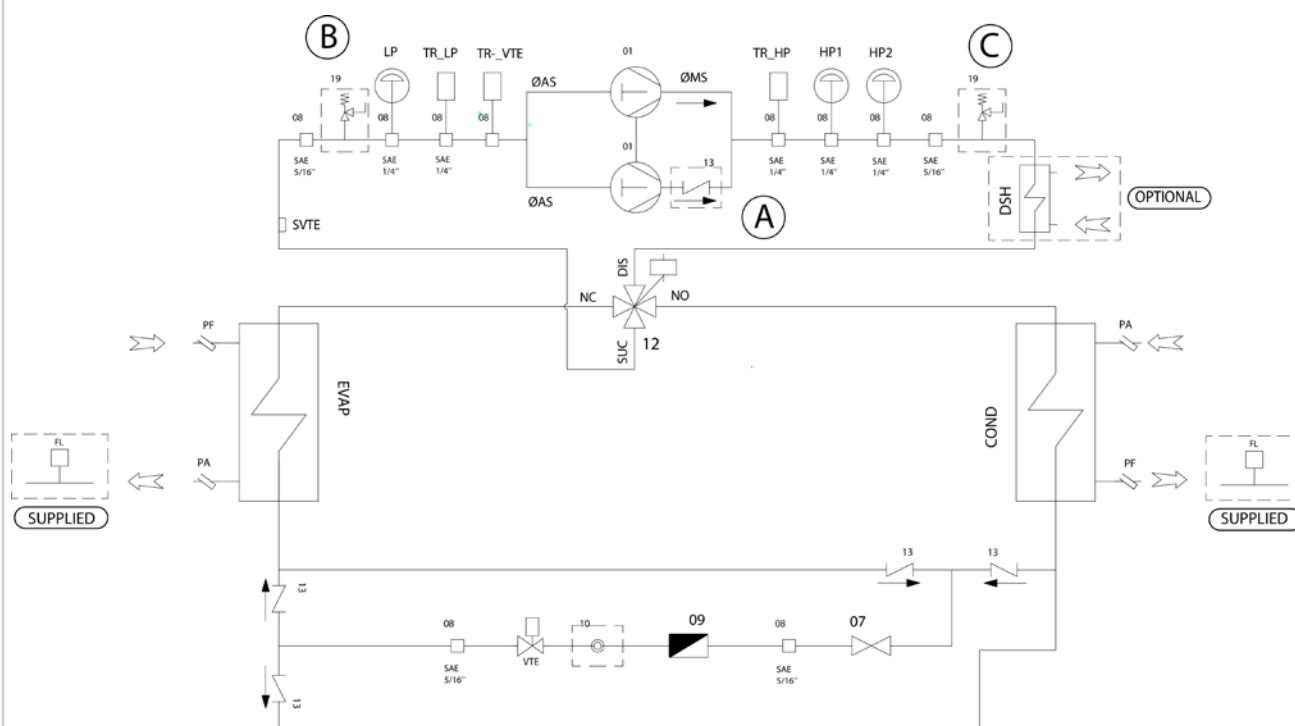
### » Legend

COMPONENT	SYMBOL
Compressor	
Evaporator/Condenser	
Filter	
Sight glass	
High pressure switch (HP)	
Low pressure switch (LP)	
Service connection	
Check valve	
4 Way diversion valve	
Pressure transducer	
De-superheater	
Shut-Off valve	
Safety valve	
Flow switch	
Electronic expansion valve	



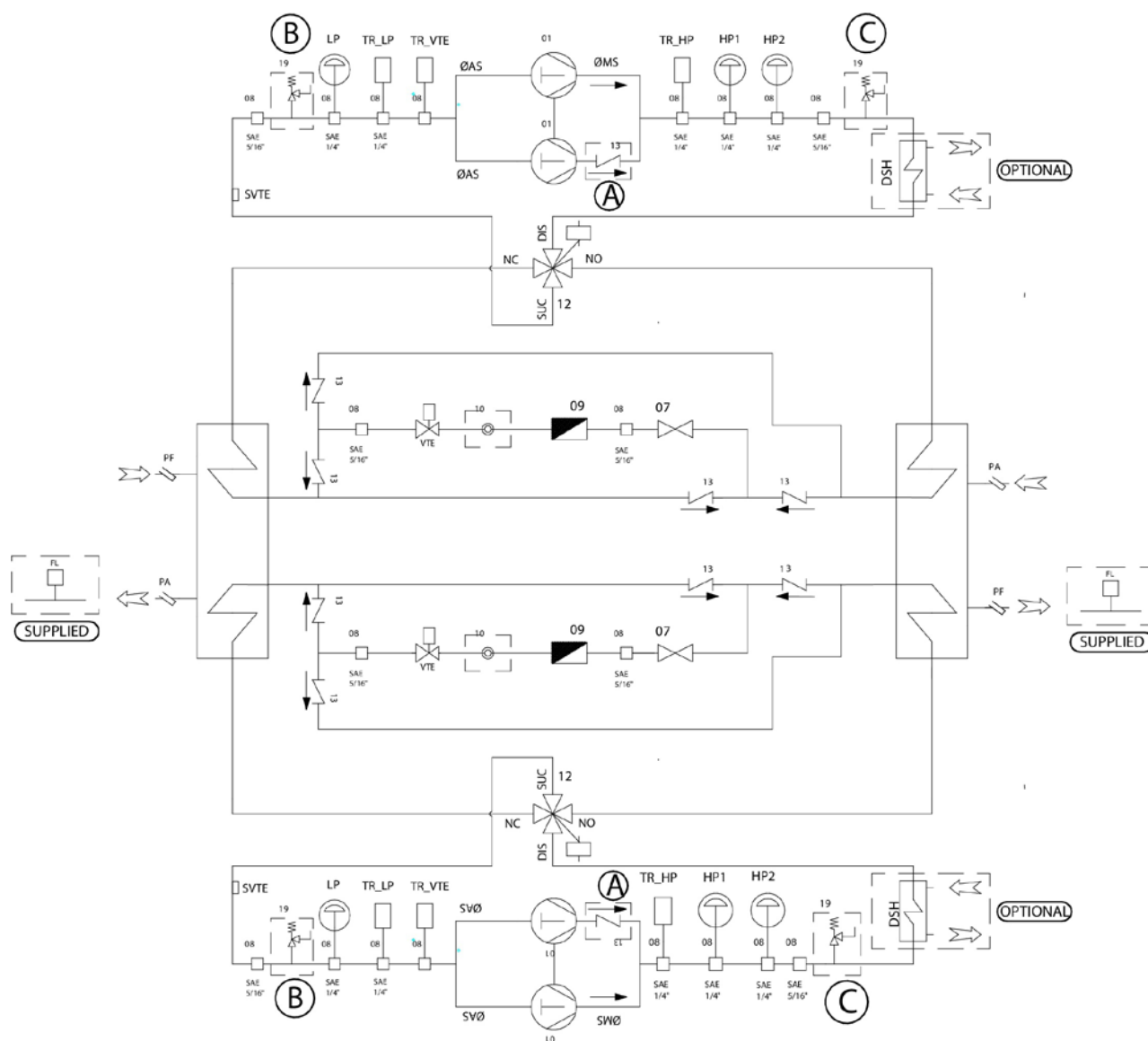
- A.** available in sizes 92, 122, 184, 214, and 244  
**B.** available in sizes 152, 162, 182, 212, 242, 302, 314, 364, 384, 454, 504, 564, 606, 636, 696, and 746  
**C.** available in sizes 302 and 564

» Single-circuit WRE H cooling circuit diagram



- A.** available in sizes 92, 122, 184, 214, and 244
- B.** available in sizes 152, 162, 182, 212, 242, 302, 314, 364, 384, 454, 504, 564, 606, 636, 696, and 746
- C.** available in sizes 302 and 564

» Dual-circuit WRE heat pump cooling circuit diagram

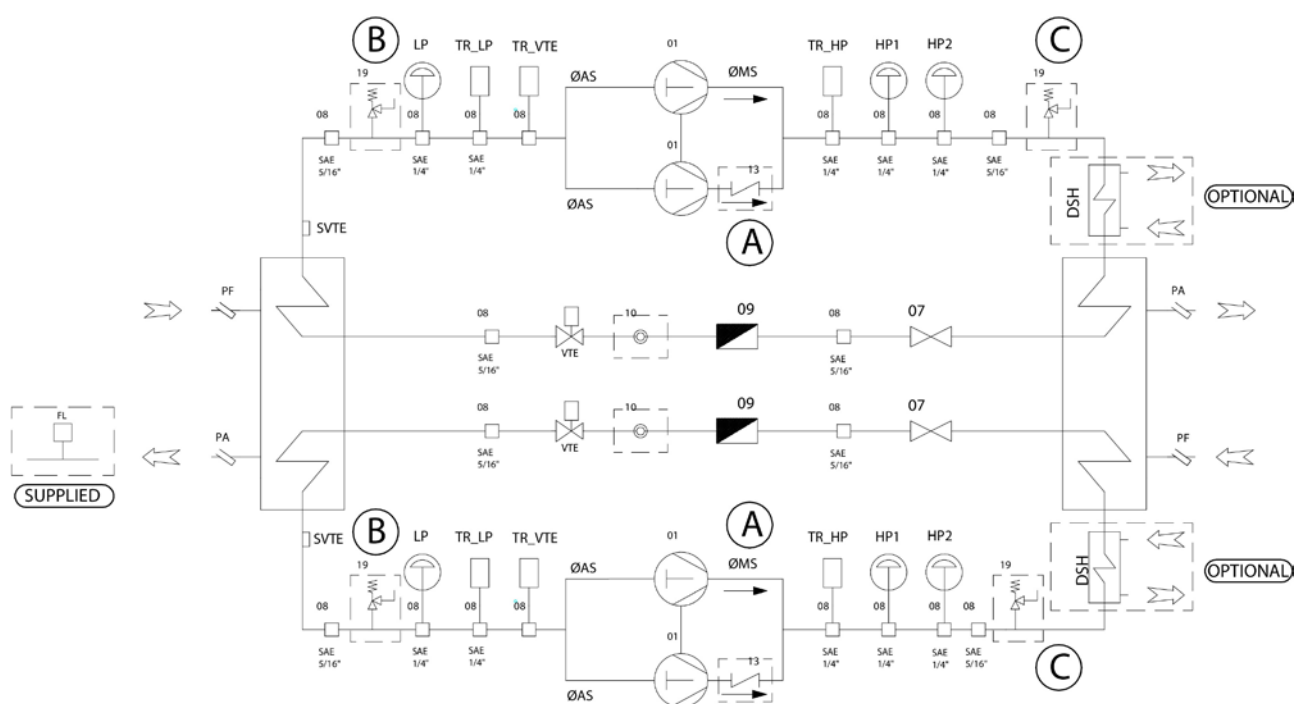


**A.** available in sizes 92, 122, 184, 214, and 244

**B.** available in sizes 152, 162, 182, 212, 242, 302, 314, 364, 384, 454, 504, 564, 606, 636, 696, and 746

**C.** available in sizes 302 and 564

» Dual-circuit WRE chiller cooling circuit diagram





- A.** available in sizes 92, 122, 184, 214, and 244
- B.** available in sizes 152, 162, 182, 212, 242, 302, 314, 364, 384, 454, 504, 564, 606, 636, 696, and 746
- C.** available in sizes 302 and 564

## 12 TROUBLESHOOTING

In this section you will find a list of the most common problems that may cause the chiller unit to stop or malfunction. Possible remedies are shown alongside a description of easily identifiable remedies.

**⚠ WARNING** Extreme care should be taken when performing work or repairs on the unit: overconfidence can result in injuries, even serious ones, to inexperienced individuals. Operations marked with the letter "U" can be performed directly by the user, who must carefully follow the instructions provided in this manual. Operations marked with the letter "S" may be performed exclusively by specialised personnel. Once the cause has been identified, you are advised to contact a Galletti S.p.A. service centre or a qualified technician for help.

SYMPTOM			Who can take corrective action U = User S = specialised personnel	Possible control panel indication	Probable cause	Possible remedy
<b>A</b> The unit does not start	X	X	S	EU EO	Faulty connection or contacts open. Wrong voltage	Check the voltage and close the contacts
	X	X	S		Not enabled by remote controls	Check the efficiency of the water circulation pump, pressure switch, bleed air from the circuit; check whether contacts 16 and 30 on the terminal board are closed
	X	X	U		Anti-recycle timer active	Wait 5 minutes until the timer enables operation
	X	X	S	E1	Service thermostat sensor defective	Check and replace if necessary
	X	X	U		Not enabled by service thermostat	System at the set temperature, no demand; Check the setting
	X	X	U	A1	Not enabled by antifreeze thermostat	Check the water temperature Check the antifreeze setting
	X	X	S	E2	Antifreeze sensor defective	Check whether it is functioning properly
	X	X	S		Tripping of main circuit breaker	Check for the presence of short circuits in the wiring or windings of the pump, fan and compressor motors or in the transformer
	X	X	S	L1 H1	Not enabled by high or low pressure switch	See items D-E
	X	X	S		Compressor defective	See item B
<b>B</b> The compressor does not start	X	X	S		Compressor burnout or seizure	Replace the compressor
	X	X	S		Compressor contactor deenergized	Check the voltage at either end of the compressor contactor coil and verify the continuity of the coil itself
	X	X	S		Power circuit open	Locate the cause that tripped the protection; check for the presence of short circuits in the wiring or windings of the pump, fan and compressor motors or in the transformer
	X	X	S		Power circuit open	The compressor has operated in critical conditions or there is insufficient refrigerant within the circuit; check the working conditions and make sure they fall within the operating limits. Refrigerant leak: refer to item G
<b>C</b> The compressor starts up and stops repeatedly	X	X	S	L1	Minimum pressure switch has tripped	See item E
	X	X	S		Compressor contactor defective	Check and replace if necessary
	X	X	U		Wrong set-point or differential setting	Change them according to the indications given in the tables
	X	X	S		Lack of refrigerant	See item G
<b>D</b> The compressor does not start because the maximum pressure switch has tripped	X	X	S	H1	Pressure switch failure	Check and replace
	X	X	S	H1	Excessive refrigerant charge	Discharge the excess gas
		X	U	H1	Water circulation pump blocked	Release the pump
		X	S	H1	Water circulation pump defective	Check the pump and replace it if necessary.
	X	X	S	H1	Presence of incondensable gas in the cooling circuit	Recharge the circuit after having drained and evacuated it
	X	X	S	H1	Refrigerant filter clogged	Check and replace



SYMPTOM			Who can take corrective action U = User S = specialised personnel	Possible control panel indication	Probable cause	Possible remedy
<b>E</b> The compressor does not start because the minimum pressure switch has tripped	X	X	S	L1	Pressure switch failure	Check and replace
	X	X	S	L1	Unit completely empty	See item G
	X		S	L1	Water circulation pump blocked	Release the pump
	X		S	L1	Water circulation pump blocked defective	Check the pump and replace it if necessary.
	X	X	S	L1	Refrigerant filter clogged	Check and replace
	X	X	S	L1	Expansion valve is not working properly	Check and replace if necessary
	X	X	S	L1	Presence of humidity in the cooling circuit	Replace the filter and, if necessary, dry out the circuit and recharge
<b>G</b> Lack of gas	X	X	S	L1	Cooling circuit leak	Check the cooling circuit using a leak detector after pressurising the circuit to approximately 4 bars Repair, evacuate and refill
<b>I</b> Frost in liquid pipe downstream from a filter	X	X	S	H1 L1	Liquid filter clogged	Replace the filter
<b>L</b> The unit works continuously without ever stopping	X	X	S		Lack of refrigerant gas	See item G
	X	X	U		Wrong setting of operating thermostat	Check the setting
	X	X	S		Thermal overload	Reduce the thermal load
	X	X	S		Compressor does not provide the rated heating capacity	Check and replace or overhaul
	X	X	S		Liquid filter clogged	Replace
<b>M</b> The unit works regularly but with an insufficient capacity	X	X	S		Low level of refrigerant	See item G
	X	X	S		4-way cycle reversing valve defective	Check the valve power supply and coils and replace the valve if necessary
<b>N</b> Frost in the compressor intake pipe	X	X	S		Expansion valve is not working properly	Check and replace
	X		S		Water circulation pump blocked	Release the pump
	X	X	S		Water circulation pump defective	Check the pump and replace it if necessary.
	X	X	S		Low level of refrigerant	See item G
	X	X	S		Liquid filter clogged	Replace
<b>O</b> The defrosting cycle is never activated		X	S		4-way cycle reversing valve defective	Check the valve power supply and coil and replace the valve if necessary
		X	S		The defrost thermostat has broken down or has been set incorrectly	Check and replace if defective or change the setting
<b>P</b> Abnormal noises detected in the system	X	X	S		The compressor is noisy	Check and replace if necessary
	X	X	S		The panels vibrate	Fasten properly

## 13 RETIRING THE UNIT

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When the unit has reached the end of its working life and needs to be removed and replaced, a series of operations should be carried out: In particular, the disposal of the unit should be carried out solely by qualified technicians specifically trained for this type of equipment, in conformity with current regulations.

Main components and materials:

- Plastic (ABS) and pre-painted or painted sheet metal
- Heat exchanger: steel
- Electric motors: copper, aluminium, iron
- Internal structure: galvanized sheet (ferrous materials)
- Refrigerant piping: copper / brass
- Packaging: cardboard / polystyrene / wood
- Instructions: paper

The refrigerant gas and the compressor's lubricating oil must be recovered and sent to an authorized collection center.

In general, the structure and the components (if they can no longer be used) must be disassembled and separated according to the main type of material. Especially for the parts made of iron, copper, and aluminum, which are present in large quantities in the product.

If the unit contains electronic boards or controls of any kind, at the time of disposal of the unit, it is necessary to consider these components to be "electrical and electronic waste," and they must be disposed of in accordance with the requirements of Directive 2012/19/EU - (also known as the WEEE (Waste Electrical and Electronic Equipment) – Directive.

These products should be handled properly and the materials that they are made of – such as copper, iron, steel, aluminum, glass, silver, gold, lead, and mercury – should be sorted for recycling, thereby avoiding a waste of resources that can be reused to manufacture new equipment, thus contributing to environmental sustainability.

To learn the EWC (European Waste Catalog) code of the different types of materials listed above, refer to Decision 2014/955 /EU of the European Commission (and any subsequent amendments thereto).





Galletti S.p.A Organization has a Management System Certified by Kiwa Cermet Italia S.p.A, according to the UNI EN ISO 9001:2015, UNI EN ISO 14001:2015 and UNI ISO 45001:2018 standards.

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