WBAN

82 - 302

High efficiency air-cooled heat pump for outdoor installation

Installation use and maintenance manual

CLIVET®

A
Eurovent Energy Efficiency Class

R-407C

M0E240G9-10

22-04-2016

Dear Customer,

We congratulate you on choosing these product.

Clivet is being working for years to offer systems able to assure the maximum comfort for long time with high reliability, efficiency , quality and safety. The target of the company is to offer advanced systems, that assure the best comfort, reduce the energy con-sumption, the installation and maintenance costs for all the life-cycle of the system.

With this manual, we want to give you information that are useful in all the phases: from the reception, to the installation and use until the disposal so that a system so advanced offers the best procedure of installation and use.

Best regards and have a nice reading !

CLIVET Spa

INDEX

1.1 MANUAL

The manual provides correct unit installation, use and maintenance.

Pay particolar attention to:

Warning identifies particularly important operations or information .

Prohibited operations that must not be carried out, that compromise the operating of the equipment or may cause damage to persons or things.

- It is advisable to read it carefully so you will save time during operations.
- Follow the written indications so you will not cause damages to things and injuries people. The preliminary information must be read prior to carrying out any of the following operations.

1.2 GENERAL INSTRUCTIONS

Preliminaries

The positioning, hydraulic system, refrigerating, electrics and the channelisation of the air must be determined by the system designer in accordance with local regulations in force.

Only qualified personnel can operate on the unit, as required by the regulation in force.

Using the unit in case of breakdown or malfunction :

- voids the warranty
- may compromise the safety of the machine
- may increase time and repair costs.

Follow local safety regulations. .

Keep packing material out of children's reach it may be dangerous. .

Recycle and dispose of packing material in conformity with local regulations. .

Risk situations

The unit has been designed and created to prevent injures to people.

During designing it is not possible to plane and operate on all risk situation.

Read carefully "Residual risk" section where all situation which may cause damages to things and injuries to people are reported.

Installation, starting, maintenance and repair required specific knowledge; if they are carried out by inexperienced personnel, they may cause damages to things and injuries people.

Intended use

Use the unit for cooling/heating water or a water and glycol mix for air-conditioning only, within limits defined in the technical bulletin and on this manual..

Any use other than intended does not involve the manufacturer in any commitment or obligation. .

Installation

Verify that the electrical line characteristics are in compliance with data quotes on the unit serial number label.

Maitenance

Plan periodic inspection and maintenance in order to avoid or reduce repairing costs.

Turn the machine off before any operation.

Modification

All unit modifications will end the warranty coverage and the manufacturer responsibility. .

Breakdown/Malfuction

Disable the unit immediately in case of breakdown or malfunction. .

Contact a constructor certified assistance service.

Use original spares parts only.

User training

The installer has to train the user on :

- start-up / shutdown;
- set points change;
- standby mode;
- maintenance;
- what to do / what not to do in case of breakdown.

Data update

Continual product improvements may imply manual data changes .

Visit manufacturer web site for updated data.

1.3 INDICATIONS FOR THE USER

Keep this manual with the wiring diagram in an accessible place for the operator.

Note the unit lable data so you can provide them at the assistance centre in case of intervention (see "Unit identification" section).

Provide a machine notebook that allows any interventions carried out on the machine to be noted and tracked making it easier to suitably note the various interventions and aids the search for any breakdowns.

In case of breakdown or malfunction:

- immediately deactivate the unit .
- contact a assistance service centre authorized by the manifacturer.
- use original spares parts only

Ask the installer to format on:

- start-up / shutdown;
- set points change;
- standby mode;
- maintenance;
- what to do / what not to do in case of breakdown.

1.4 UNIT INDENTIFICATION

Serial number label
The serial number label is positioned on the unit and allows to indentify all the unit features.

It has not to be removed for any reason.

It reports the regulations indications such as:

- machine type, exmple:
  Series → **WBAN**
  Size → **82**
- serial number
  12 characters → **Axxxxxxxxxxx**
- year of manufacture
- wiring diagram number
- electrical data
- manufacturer logo and address .

Serial number
It identifies uniquely each machine.

It identifies specific spare parts for the machine.

Assistance request
Note data from the serial number label and write them in the chart on side, so you will find them easily when needed.
In case of intervention you have to provide data.

Serie
Size
Serial number
Year of manufacture
Wiring diagram

1.5 UNIT DESCRIPTION

VULCAN Medium is a high temperature heat pump series representing ideal single solution for heating, cooling and sanitary hot water production for centralised systems, such as in blocks of apartments, hotels and for use with collective applications in general.

- A CLASS Energy Efficiency according to Eurovent, both for heating and cooling.
- Ideal for all plant types including radiator systems using hot water produced at a temperature of up to 60°C, and ambient air at -10°C.
- A simplified system thanks to the use of a single generator for heating and cooling that eliminates the risks and obligatory maintenance costs associated with traditional combustion systems.

The units in the ELFOEnergy VULCAN Medium range can autonomously produce sanitary hot water and are set up for use in combination with solar panel storage tanks, thus enabling the direct use of solar energy.

1.6 ACCESSORIES

VERSIONS OPTIONS
D Partial energy recovery
B Water low temperature
REFRIGERANT CIRCUIT
CCCA Copper / aluminium condenser coil with acrylic lining
EOL Operating limit extension
AIR SIDE FEATURES
ECHP External fans with larger available head "ECOBREEZE"
HYDRAULIC CIRCUIT
3DHWX Three-way valve for domestic hot water
3DHW Built-in 3-way valve for domestic hot water on the unit
IS4 Compressor insulation
- Hydronic group utility side: not required
1PUS Standard pump
1PUR Single-pump with reduced available head
1PUM Single-pump with larger available head
1PUHE High efficiency single inverter pump for primary circuit.
CACSX Domestic hot water kit control
TCDC Condensate collection pan with electric heater
ELECTRIC CIRCUIT
TASRX Compartment for multifunction keyboard
PM Phase monitor
PMX Phase monitor
SFSTR4N Disposal for inrush current reduction, for unit 400/3/50+N
PFCP Power factor correction capacitors (cosfi > 0.9)
INSTALLATION
AMRX Rubber antivibration mounts
PGFC Finned coil protection grill
PGFCX Finned coil protection grill

X = Accessory separately supplied

2.1 PRELIMINARY INFORMATION

Operate in compliance with safety regulations in force .

For detailed information (dimensions, weight, technical characteristics etc.) please refer to the “Technical information” section.

Use single protection devices : gloves, glasses ecc. .

2.2 DELIVERY CONTROL

Before accepting the delivery you have to check:

- That the unit hasn’t been damaged during transport.
- Check that the materials delivered correspond with that indicated on the transport document comparing the data with the identification label ‘A’ positioned on the packaging.

In case of damage or anomaly:

- Write down on the transport document the damage you found and quote this sentence: "Conditional acceptance — clear evidence of deficiencies/ damages during transport".
- Contact supplier and the carrier by fax and registered mail with advice of receipt.

Any disputes must be made within the 8 days following the delivery. Complaints after this period are invalid..

2.3 HANDLING

1. Verify unit weight and handling equipment lifting capacity .
2. Identify critical points during handling (disconnected routes, flights, steps, doors)
3. Use protection to avoid the unit damaging .
4. Lifting pipe
5. Lifting beam with spacers
6. Lifting with spacer bar
7. Align the barycentre to the lifting point
8. Use all the lifting brackets (see "Technical informations - dimensions)
9. Gradually bring the lifting belts under tension, making sure they are positioned correctly. .
10. Before handling verify that the unit keeps its balance.

1

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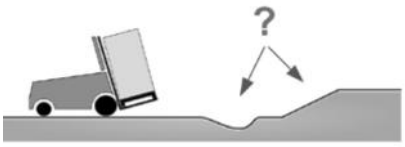

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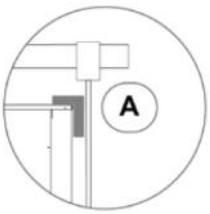

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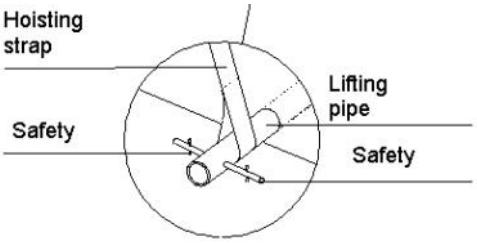

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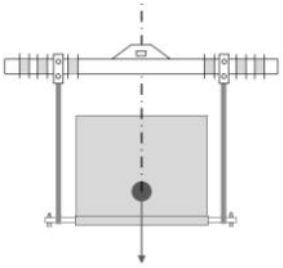

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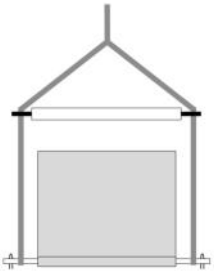

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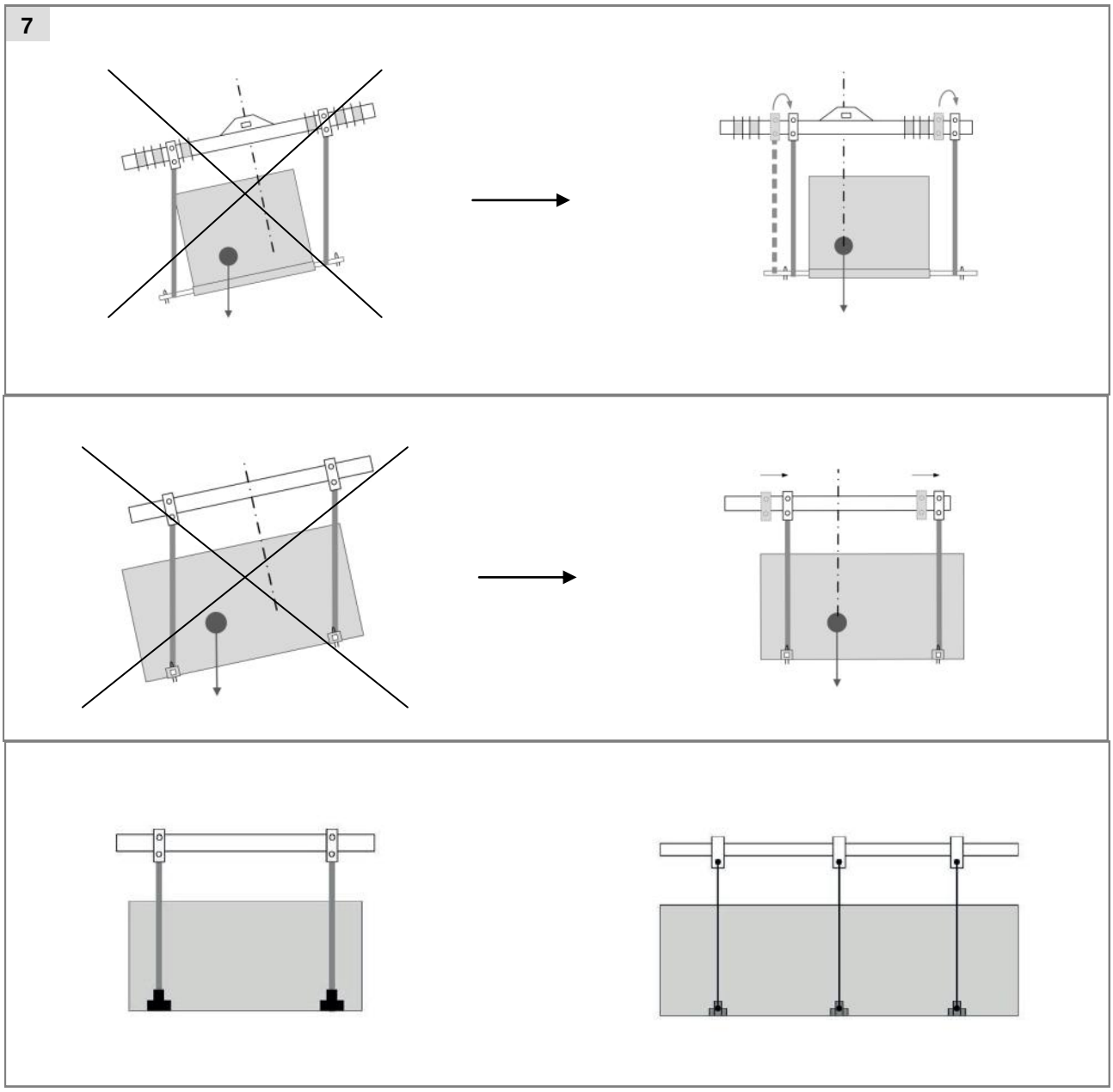


2.4 STORING

Observe external packing instructions .

2.5 PACKING REMOVING

Be careful not to damage the unit.

Recycle and dispose of packing material in conformity with local regulations.

3.1 PRELIMINARY INFORMATION

Operate in compliance with safety regulations in force.

For detailed information (dimensions, weight, technical characteristics etc.) please refer to the TECHNICAL INFORMATION section.

Use single protection devices : gloves, glasses ecc.

During positioning consider these elements :

- technical spaces required for the machine and system
- place where the machine will be installed
- electrical connections
- water connections
- air / aeraulic ducts

Do not considerer these elements could decrease performances and operational life of the unit.

3.2 FUNCTIONAL SPACES

Functional spaces are designed to:

- guarantee good unit operation
- carry out maintenance operations
- protect authorized operators and exposed people

Respect all functional spaces indicated in the TECHNICAL INFORMATION section.

Double all functional spaces if two or more unit are aligned.

3.3 POSITIONING

Units are designed to be installed:

- EXTERNAL
- in fixed positions.

Choose the installation place according to the following criteria:

- Customer approval
- safe accessible position
- technical spaces requested by the unit
- spaces for the air intake/exhaust
- max. distance allowed by the electrical connections
- control points with capacity adequate to the unit weight
- condensate water draining

Prefer places where the unit doesn't disturb the neighbours.

Avoid installations next to bedrooms or windows.

Avoid snow accumulations on batteries.

Avoid installations in places subject to flooding

In case of ground installation provide a raised base to avoid flood damages.

Protect the unit with an appropriate fencing to avoid the access to a not authorized personnel (babies, vandals etc.)

Limit vibration transmission:

- use antivibration devices on unit bearing points;
- install flexible joints on the hydraulic.

A correct circulation of the air is indispensible to guarantee the good working order of the machine.

Avoid therefore:

- obstacles to the airflow;
- exchange difficulties;
- leaves or other foreign bodies that can obstruct the exchange batteries;
- winds that hinder or favour the airflow;
- heat or pollution sources close to the unit (chimneys, extractors etc);
- stratification (cold air that stagnates at the bottom);
- recirculation (expelled air that is sucked in again);
- positioning below the level of the threshold, close to very high walls, attics or in angles that could give rise to stratification or recirculation phenomenons.

Ignoring the previous indications could:

- energy efficiency decrease;
- blocks due to HIGH PRESSURE (in summer) or LOW PRESSURE (in winter).

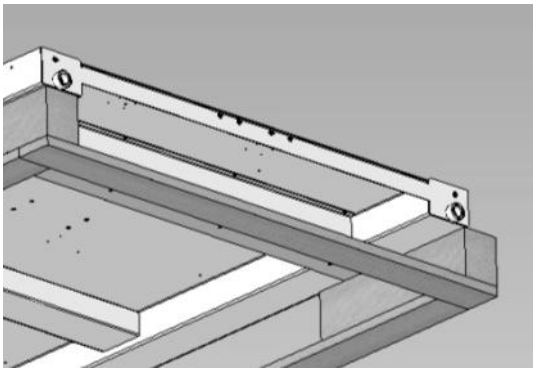
3.4 CONDENSATE WATER

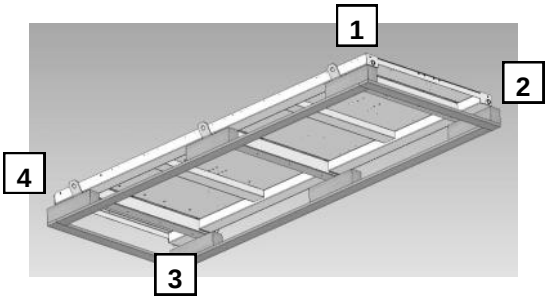
When a heat pump is running it produces a considerable amount of water due to the defrosting cycles of the external coil.

The condensation must be eliminated in a manner to avoid wetting pedestrian areas.

With extensive very cold outdoor temperatures, condensation could freeze and block the flow, causing a slow build-up of ice; therefore special attention must be paid to eliminating condensation, raising the unit off the ground and evaluating whether antifreeze elements should be installed

Condensate collection pan with electric heater - option





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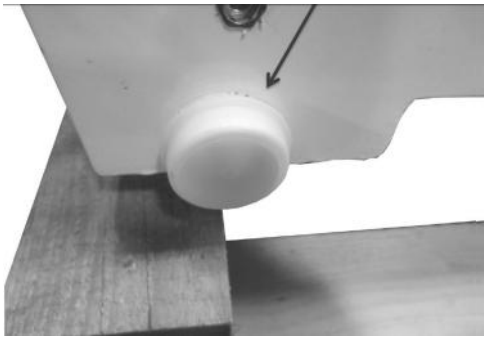

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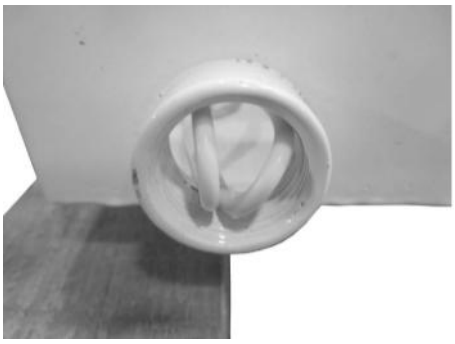

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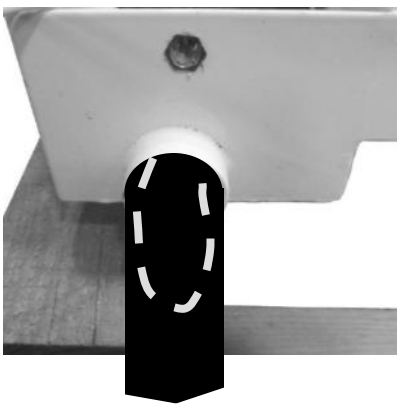


4.1 PRELIMINARY INFORMATION

Selection and installation of system components must be carry out by installer.

Following you will find some indications to integrate with what is provided by the local regulations in force and by the good technical laws.

4.2 COMPONENTS

CUT-OFF VALVES

- Installed at inlet and outlet (both on the water technique circuit as well as that of the hot domestic water) allow maintenance operations without having to empty the system .

THERMOMETERS AND MANOMETERS

- Installed at entry and exit of the main elements facilitate inspection and maintenance.

AIR BLEED VALVE

- Installed in all of the highest points of the system allowing the venting of the circuits air..

DRAINAGE TAPS

- Installed in the lowest points of the system to allow bleeding.

EXPANSION TANK

- It keeps a correct system pressure when the water temperature changes. It must be dimensioned as a function of water plant volume and temperature.

WATER FILTER

- If not present on-board the machine, must be installed immediately in the water input of the unit, in a position that is easily accessible for cleaning.
- The filter never should be removed, this operation invalidates the guaranty

SUPPORTS

- The hydraulic pipes weight mustn't burden on the unit connections ..

FLOW SWITCH

- The flow switch must be present as a component of the system

4.3 OPERATION SEQUENCE

1. Carefully wash the system with clean water: fill and drain the system several times.
2. Apply additives to prevent corrosion, fouling, formation of mud and algae.
3. Fill the plant
4. Execute leakage test.
5. Isolate the pipes to avoid heat dispersions and formation of condensate.
6. Leave various point of service free (wells, vent-holes etc).

Neglecting the washing will lead to several filter cleaning interventions and at worst cases can cause damages to the exchangers and the other parts.

4.4 WATER QUALITY

The water quality is determined by the following factors, avoid therefore:

- Inorganic salts
- pH
- Biological load (seaweeds etc)
- Suspended solids
- Dissolved oxygen

Water with inadequate characteristics can cause:

- pressure drop increase
- energy efficiency decrease
- corrosive symptom increase

4.5 RISK OF FREEZE

If the unit or the relative water connections can be subject to temperatures close to 0°C adopt measures for prevent risk of freeze.

For example:

- Mix water with ethylene glycol
- Safeguard the pipes with heating cables placed under the insulation
- Empty the system in cases of long non-use and check that:
  - there are no closed taps present that could trap water even after emptying
  - there are no low points in which water can stagnate even after emptying; carry out any blowing required .

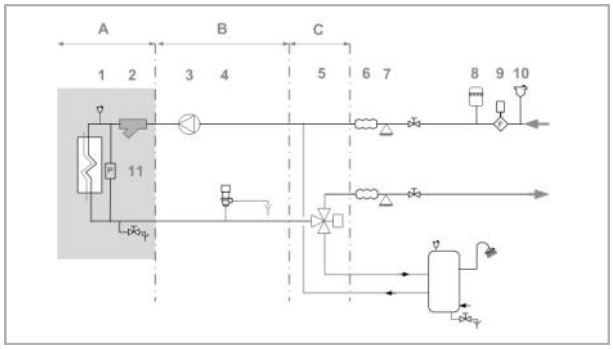
4.6 ANTI-FREEZE SOLUTION

Consider that the use of anti-freeze solution determines an increase in a pressure drop.

Make sure that the glycol type utilized is inhibited (not corrosive) and compatible with the hydraulic circuit components (pump etc).

Do not use different glicol mixture (i.e. ethylene with propylene)

4.7 RECOMMENDED CONNECTION



A unit without hydronic assembly
B unit with hydronic assembly
C unit with three-way valve

1. vent
2. filter
3. pump
4. safety valve
5. three-way valve
6. antivibration joints
7. supports
8. expansion tank
9. flow switch
10. vent
11. Differential pressure switch

4.8 PARTIAL ENERGY RECOVERY

A configuration which enables the production of hot water free -of-charge while operating in the cooling mode.

The partial recovery device is considered to be operating when it is powered by the water flow which is to be heated.

The customer is responsible for the management of the circulation pump, valves, thermostats, etc.

When the temperature of the water to be heated is particularly low, it is wise to insert a flow control valve into the system hydraulic circuit, in order to maintain the temperature at the recovery output at above 35°C and thus avoid the condensation of the refrigerant into the partial energy recovery device.

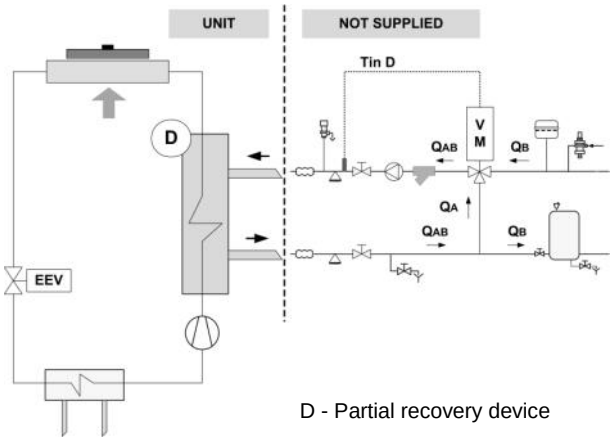
Water connections must be performed carefully as for the evaporator (filter, circuit washing, etc).

Perform all necessary interventions to avoid the RISK OF FREEZING (tubes insulation, emptying of circuit, addition of glycol, anti-freeze resistances).

Water temperature can reach high temperatures (up to 100°C)

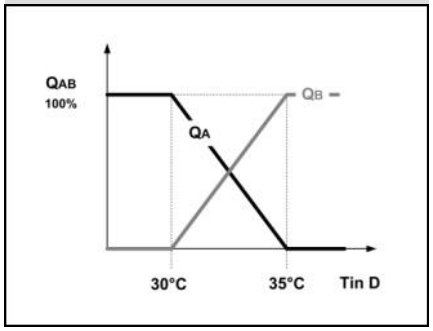
Avoid the RISK OF BURNS by adopting the necessary precautions (insulation of tubes, temperature detecting station on water if the sanitary use is foreseen, etc.)

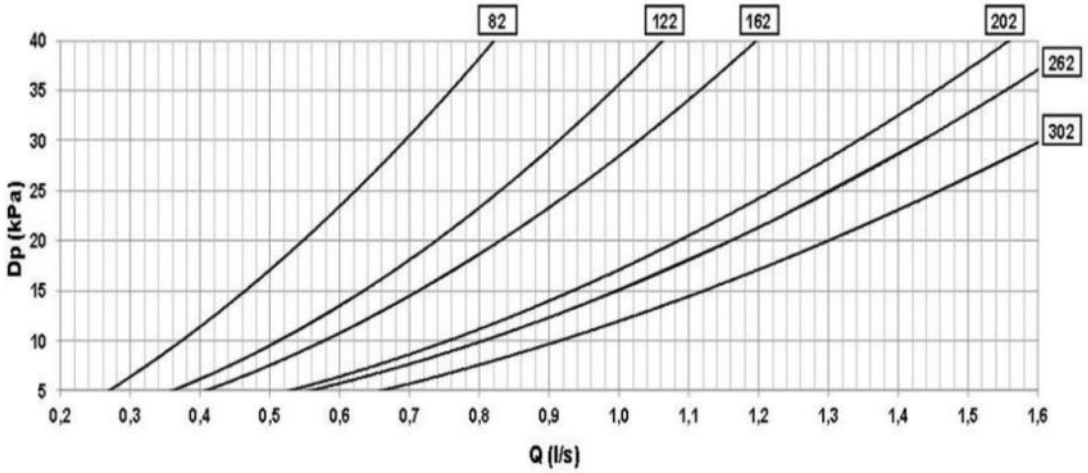
Install safety valves and specifically dimensioned expansion tanks in the hydraulic circuit.



D - Partial recovery device

VM - adjustment charged to the customer





Q [l/s] = Water flow rate
DP = Pressure drop
Keep within the heat exchanger operating limits (upper and lower).

5.1 PRELIMINARY INFORMATION

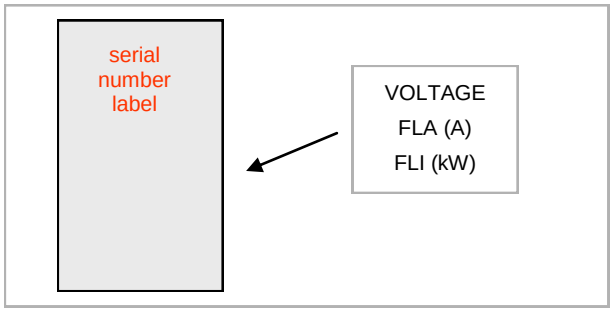
The characteristics of the electrical lines must be determined by specialized personnel able to design electrical installations; moreover, the lines must be in conformity with regulations in force.
The protection devices of the unit power line must be able to stop the presumed short circuit current, whose value must be determined in function of system features.
The power cables and the protection cable section must be defined in accordance with the characteristics of the protections adopted. All electrical operations should be performed by trained personnel having the necessary requirements by the regulations in force and being informed about the risks relevant to these activities.
Operate in compliance with safety regulations in force .

5.2 ELECTRICAL DATA

The serial number label reports the unit specific electrical data, included any electrical accessories .

The electrical data indicated in the technical bulletin and in the manual refer to the standard unit, accessories excluded.

Refer to the electrical data report on the serial number label.



F.L.A. full load ampere
Full load current at max admissible conditions

F.L.I. Full load input
Full load power input
(at max. admissible condition)

5.3 CONNECTIONS

1. refer to the unit electrical diagram (the number of the diagram is shown on the serial number label)
2. verify that the network has characteristics conforming to the data shown on the serial number label
3. Before starting work, verify that the sectioning device at the start of the unit power line is open, blocked and equipped with cartel warning
4. Primarily you have to realize the earthing connection
5. Shelter the cables using adequate measure fairleads
6. Before power the unit, make sure that all the protections that were removed during the electrical connection work have been restored.

5.4 SIGNALS / DATA LINES

Do not overpass the maximum power allowed, which varies, according to the type of signal.

Lay the cables far from power cables or cables having a different tension and that are able to emit electromagnetic disturbances.

Do not lay the cable near devices which can generate electromagnetic interferences.

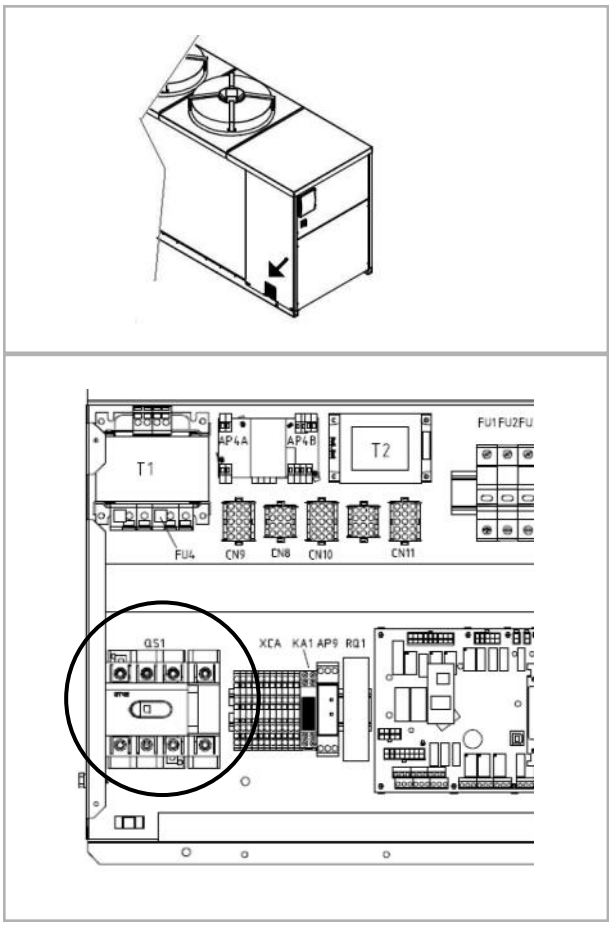
Do not lay the cables parallel to other cables; cable crossings are possible, only if laid at 90°.

Connect the screen to the ground, only if there aren't disturbances

Guarantee the continuity of the screen during the entire extension of the cable.

Respect impendency, capacity and attenuation indications.

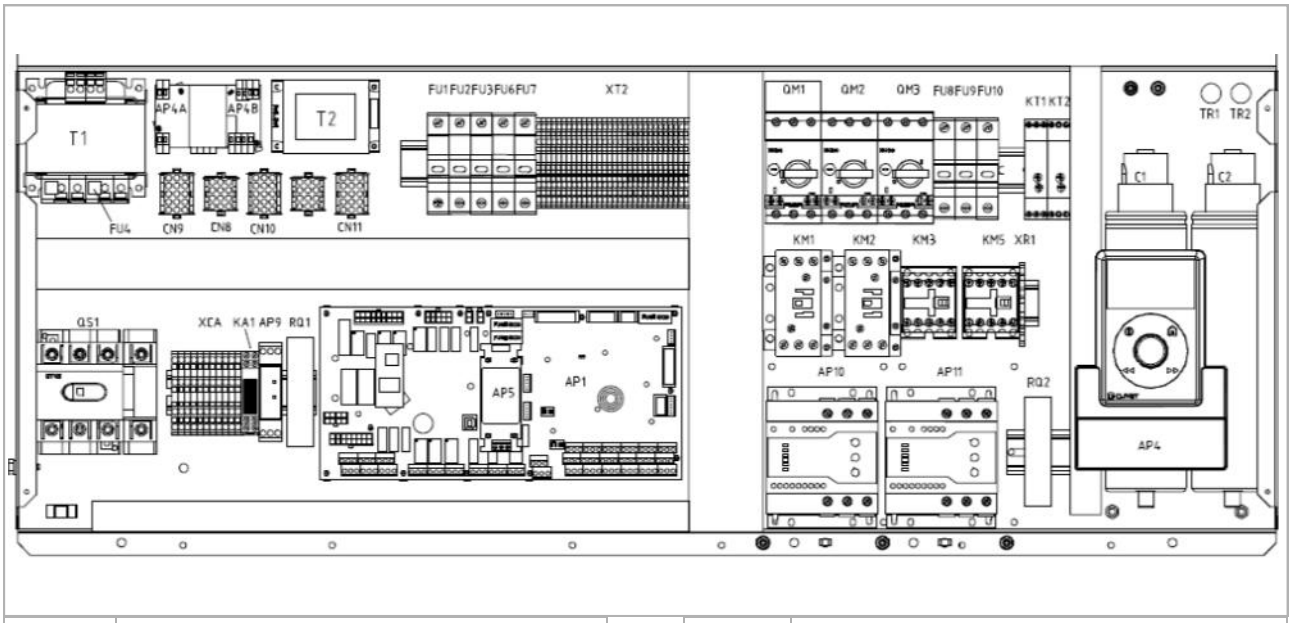
5.5 ELECTRIC LINES INLET



Fix the cables: if vacated may be subject to tearing.

The cable don't have to touch the compressor and the refrigerant piping (they reach high temparatures).

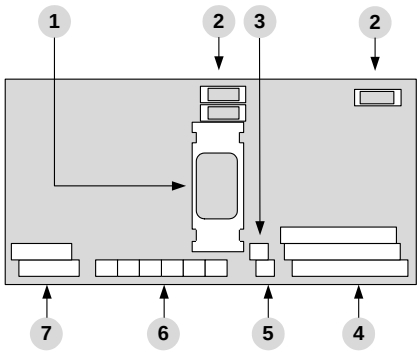
5.6 ELECTRICAL PANEL



AP1	Main control module
AP4	Local base for HID-H1 interface
AP4A-B	Fan Module
AP5	RS 485 module
AP10-11	Soft starter
XCA	Terminal block of Customer connections

QM1-2	Compressor motor overload cutout
QM3	Overload cutout switch pump
KM1-2	Compressor contactor
KM3	Pump contactor
FU1	Control circuit fuse
FU2-3	Phase monitor fuse
FU6-7	Fan fuse

AP1



1 RS 485 module

2 auxiliary fuse

3 terminal block **XC4**

4 terminal block **XC5**

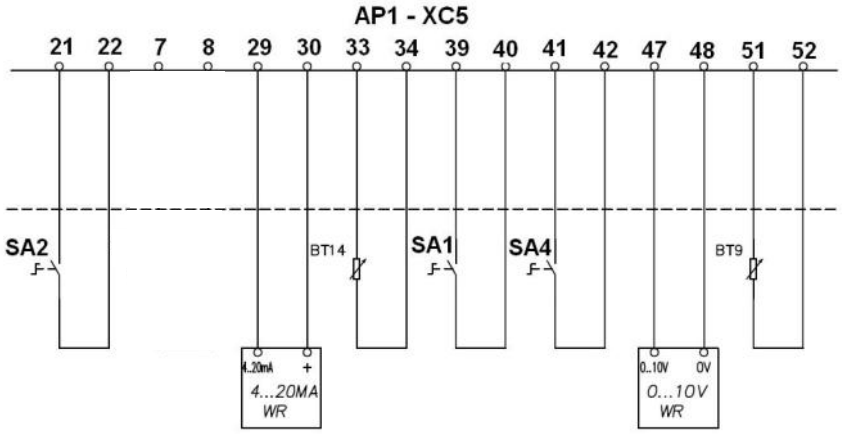
5 terminal block **XC3**

6 terminal block **XC2**

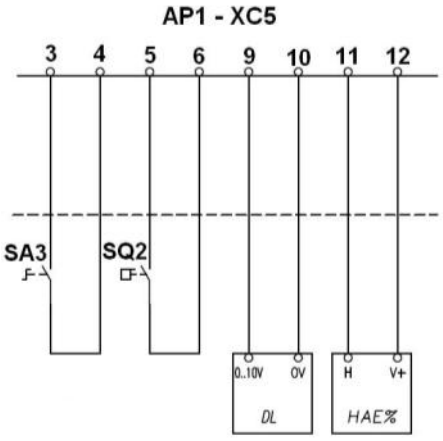
7 terminal block **XC1**

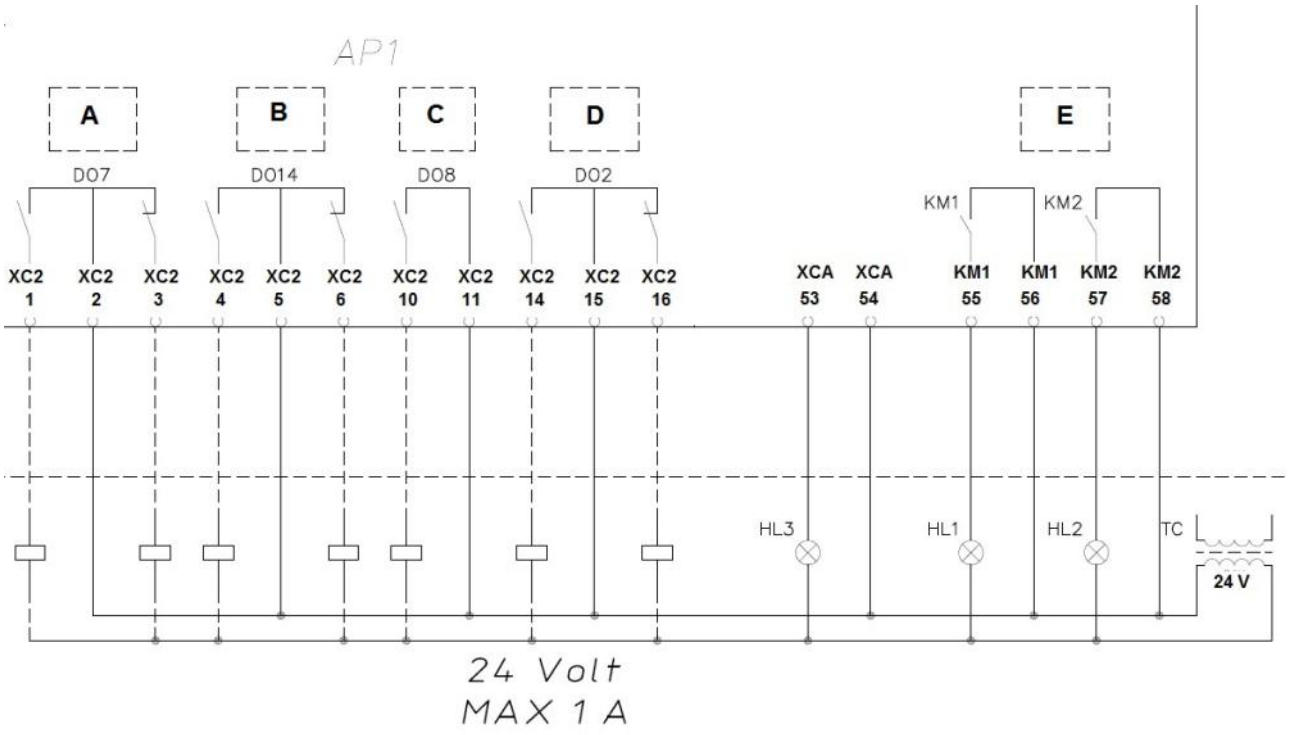
5.7 CUSTOMER CONNECTIONS

SA2 summer - winter
The mode switching can occur from keyboard or remote contact
Switch for remote selector (SA2): set par. 21=0 ; In this case, the keyboard command is not possible
WR 4-20mA water reset
BT14 water outlet temperature probe of hydraulic module
SA1 on-off
SA4 domestic hot water
WR 0-10V water reset
BT9 storage tank temperature probe



SA3 2nd setpoint
SQ2 flow switch
DL demand limit
HAE% humidity control probe

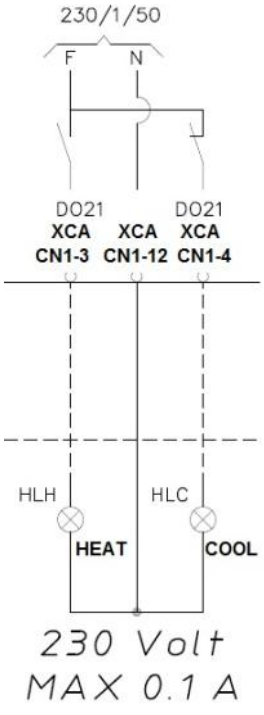




A	boiler valve control
B	sanitary hot water valve control
C	boiler control
D	cumulative fault alarm relay
E	unit operating signal

HL3	3-ways valve status
HL1-2	compressor status
KM1-2	compressor contactor

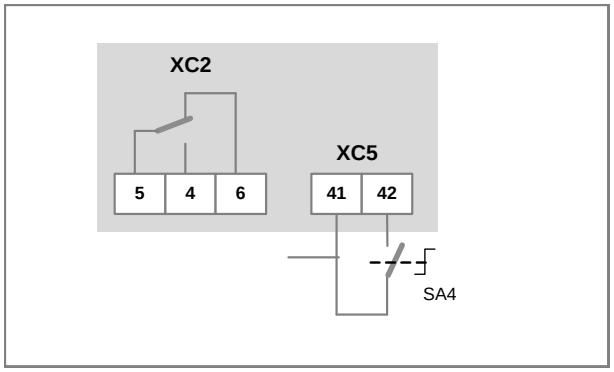
HLH	HEAT status
HLC	COOL status



5.8 3-WAY VALVE - CUSTOMER SUPPLIED

SA4 domestic hot water (Customer supplied)

XC2 valve command



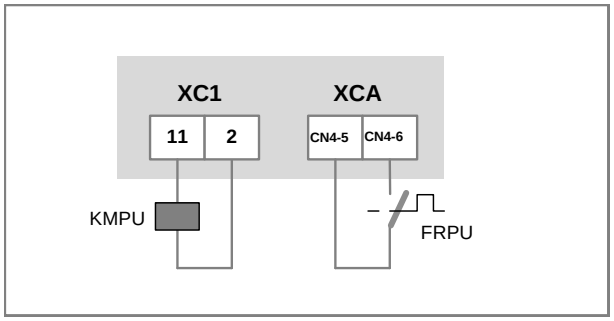
5.9 SYSTEM PUMP - CUSTOMER SUPPLIED

XC1 main module terminal block

XCA electrical panel terminal block

KMPU contactor (Customer supplied)

FRPU Overload cutout switch pump (Customer supplied)



5.10 AUXILIARY HEATER IN INTEGRATION

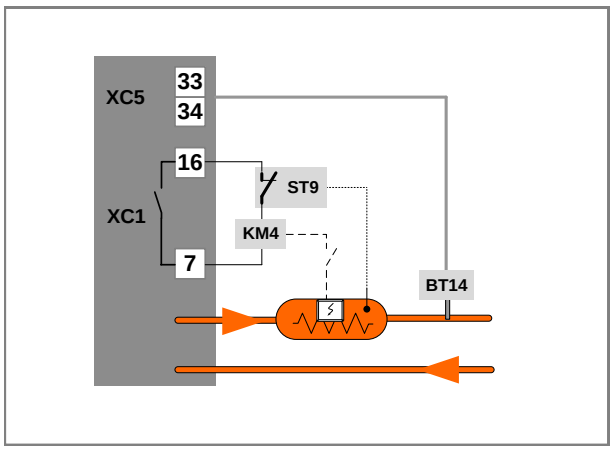
Customer supplied:

auxiliary heater

ST9 high temperature safety thermostat

BT14 temperature probe outlet heater

KM4 heater contactor



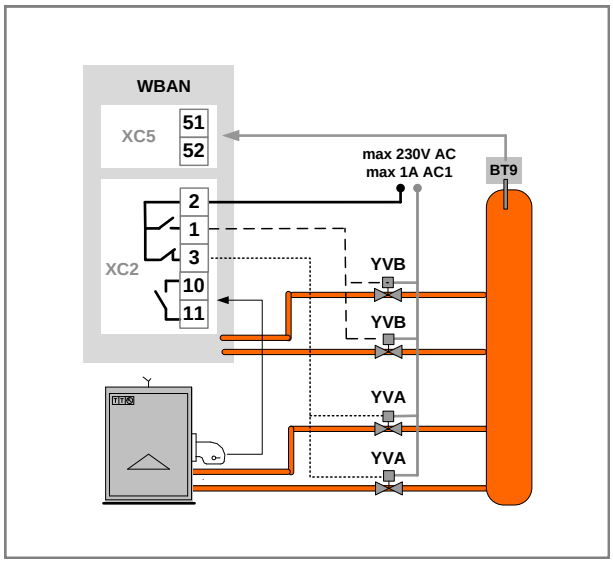
5.11 AUXILIARY HEATER IN REPLACEMENT

Customer supplied:

auxiliary heater

YVA heater interception valve

YVB unit interception valve



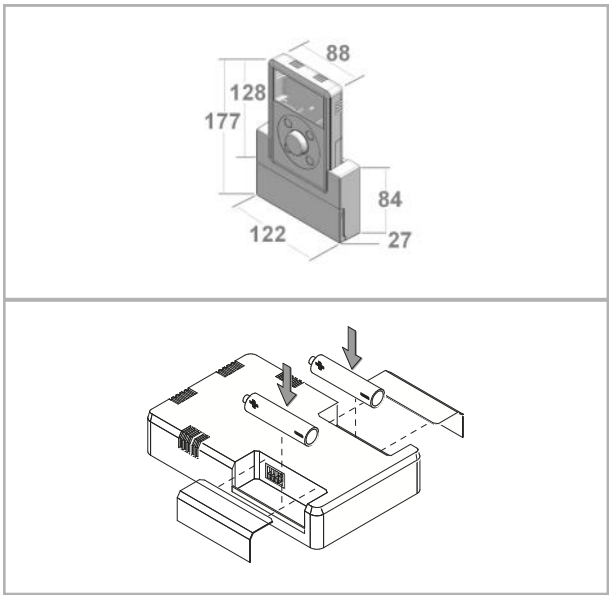
5.12 REMOTE KEYPAD

The keypad can be placed in a remote position for 2 different reasons :

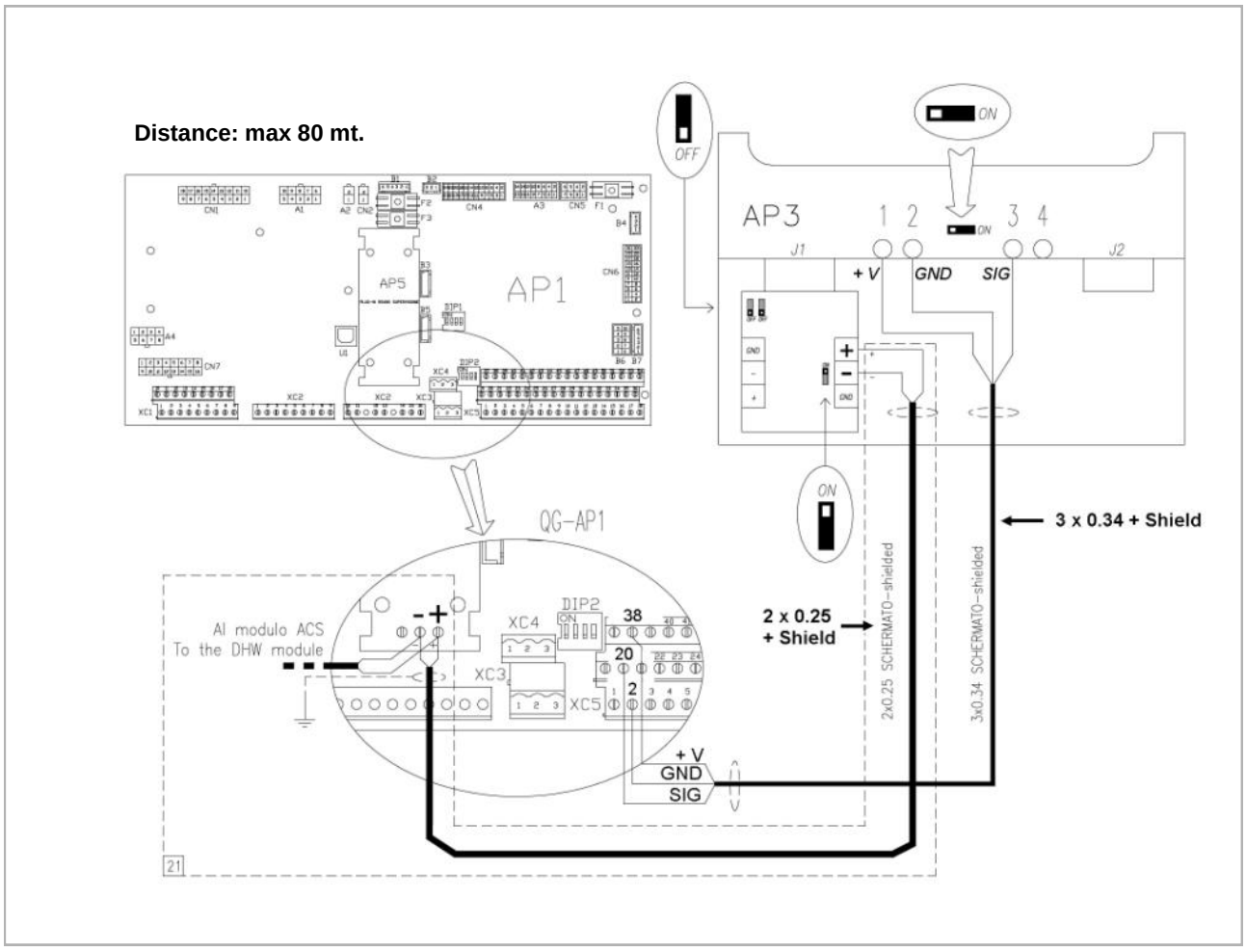
1. To directly interface with the unit without moving from the unit installation place
2. To be used as room thermostat, that measures the ambient temperature and manages the thermoregulation controlling the pump on the secondary

See the CONTROL section.

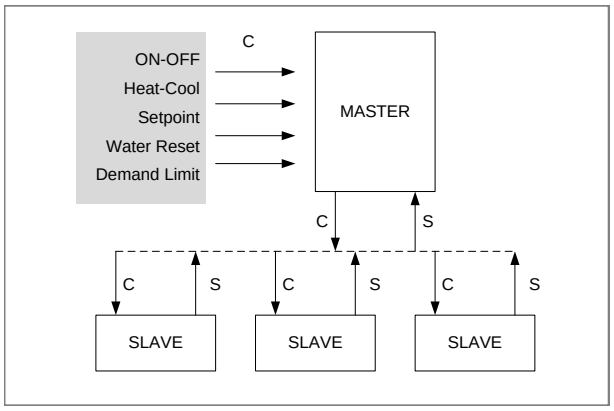
The KEYPAD SUPPORT accessory is necessary



Keypad rear view : 2 coils type AA LR6



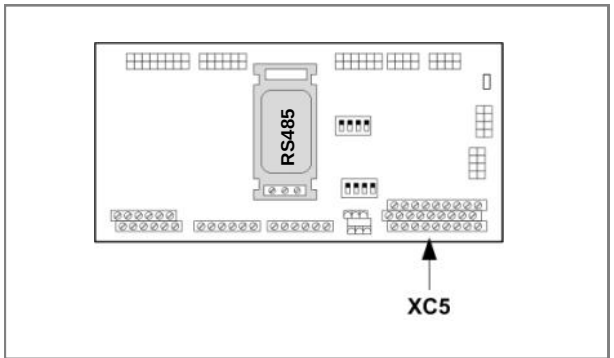
5.13 MINI-NET

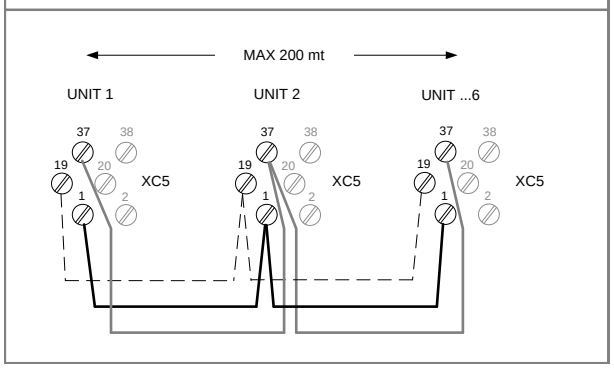


C controls
S signaling

1. max : 1 master + 5 slave
2. Perform the electrical connections as indicated in the diagram
3. Set the DIP1 on the master unit
4. Set the DIP1 on the slave units
5. Set the DIP2 - SW4 on the slave units
6. Switch on and off the master unit
7. On the master become visible the mininet parameters
8. Set the parameters on the master unit

Electrical connections
For the cable characteristics see MODBUS

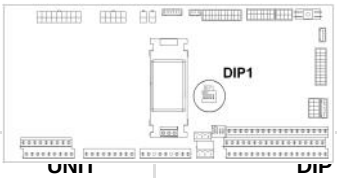




Mininet configuration parameters :
CONFIGURATION menu > UNIT > MININET

num.	Parameter description
343	N. of units connected in Mininet
344	N. of units in standby for rotation : it allows to keep one or more units in standby (automatic rotation)
345	Enables the exclusion of the unit in alarm (1=enabled)
346	Offset between the unit SetPoint

Mininet unit addressing through DIP1



num.	UNIT	DIP 1
1	master	ON 1 2 3 4
2	slave	ON 1 2 3 4
3	slave	ON 1 2 3 4
4	slave	ON 1 2 3 4
5	slave	ON 1 2 3 4
6	slave	ON 1 2 3 4
2 .. 6	slave	DIP2 ON 1 2 3 4

EXEMPLE

4 units operate for the installation

2 units operate for the DHW in an independent and dedicated way to its storage

ACS domestic hot water

I installation

M Master: installation **I**

S1 Slave1: installation **I**

S2 Slave2: installation **I** + ACS2

accessory 3DHW Three-way valve for domestic hot water

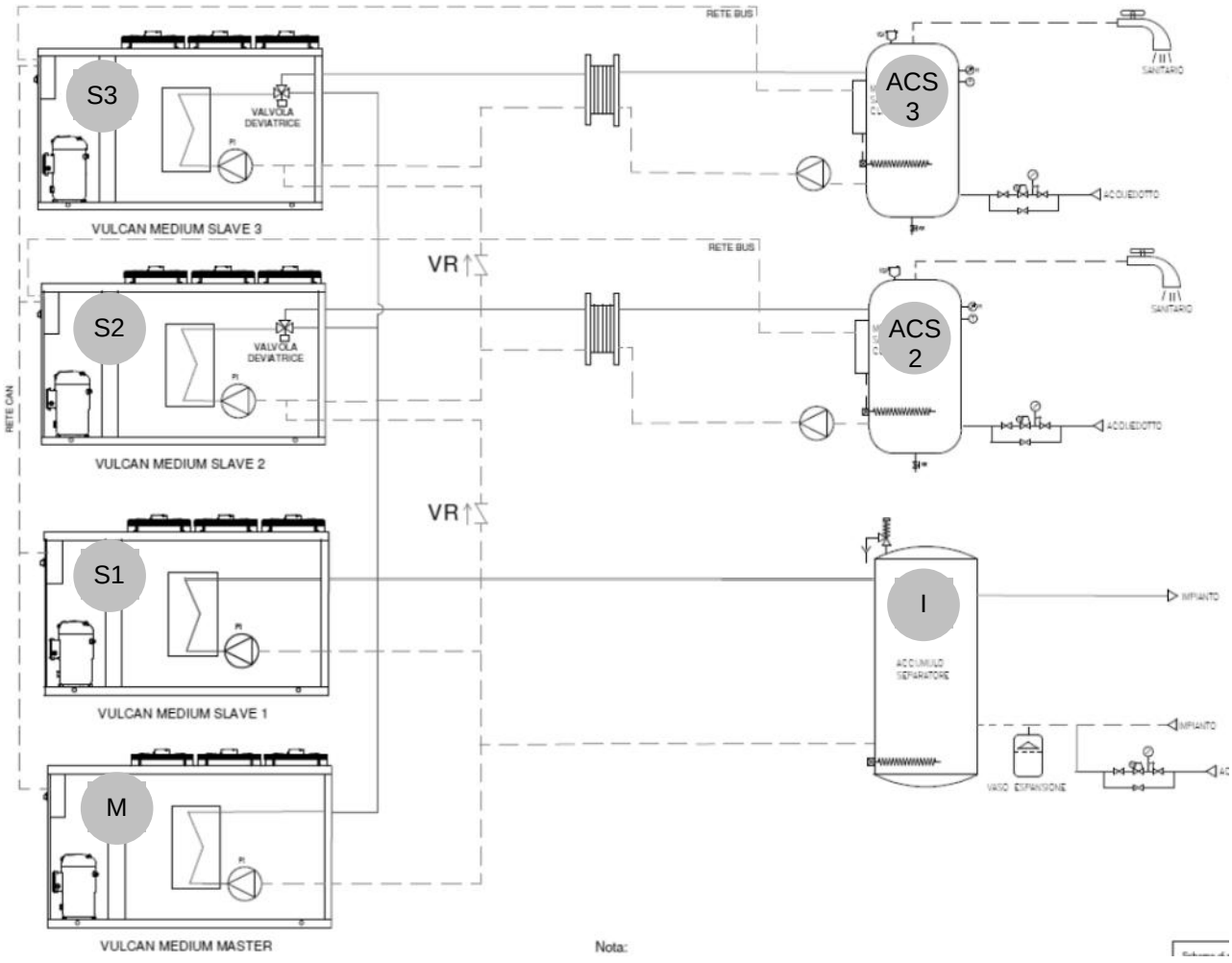
accessory CACSX Domestic hot water kit control

S3 Slave3: installation **I** + ACS3

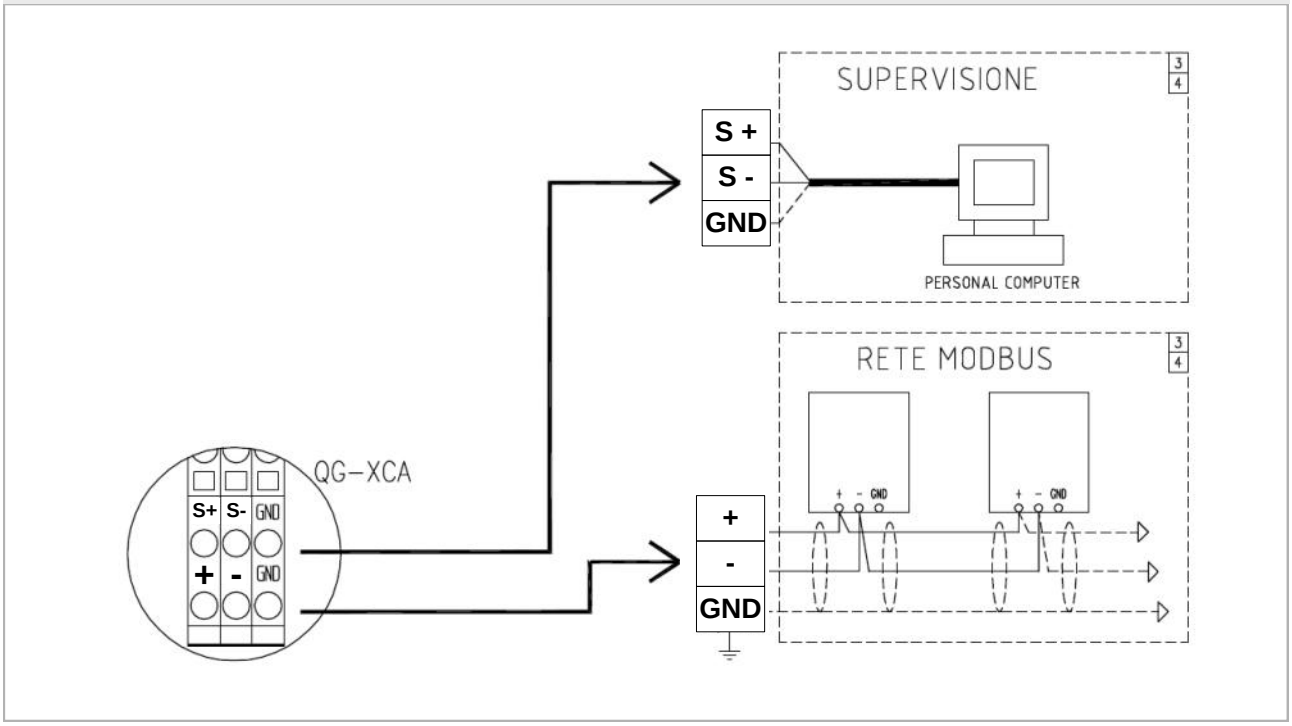
accessory 3DHW Three-way valve for domestic hot water

accessory CACSX Domestic hot water kit control

Indicative plumbing diagram



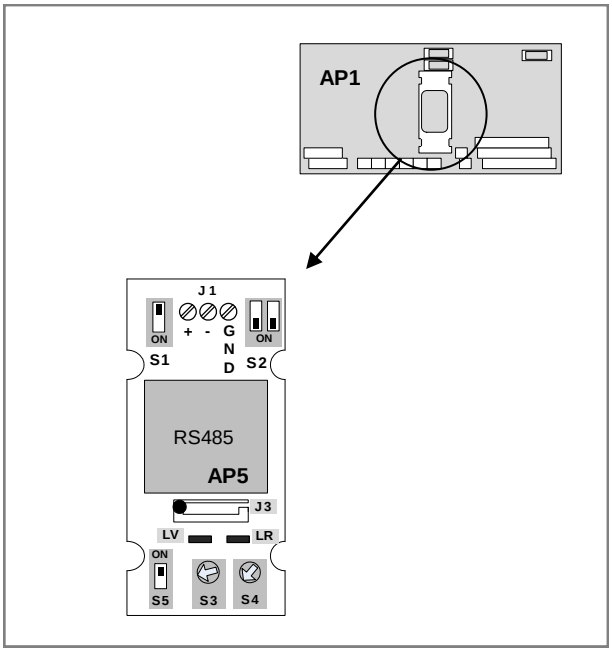
5.14 MODBUS



Perform the RS 485 MODULE addressing by S3, S4 S5 ;
allowed and valid addresses from 1 to 127

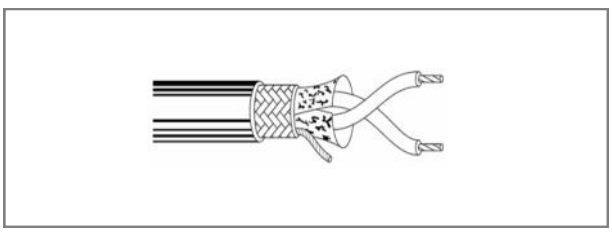
S3 it sets the address dozens
S4 it sets the address units
S5 it sets the address hundreds
ON = 100, OFF = 0

S1 485 terminator: ON = termination YES
S2 line polarizer:
Inside the 485 net only one card must be polarized, usually is polarized the master, i.e. the PC ; in this case
S2 = OFF = polarization NO
if more cards are polarized, faults occur
J1 RS 485 serial
J3 TTL serial



LV = GREEN LED :
OK
LR = RED LED QUICK FLASHING:
wrong address
faulty module

NETWORK CABLE FEATURES
Couple of conductors twisted and shielded
Section of conductor 0.22mm^2…0,35mm^2
Nominal capacity between conductors < 50 pF/m
nominal impedance 120 Ω
Recommended cable BELDEN 3105A



PRELIMINARY CHECKS

To check **before** starting-up the unit .

For details refer to the different manual sections.

√	**Preliminary checks - Unit OFF power supply**
☐	Access in safety
☐	Functional clearances
☐	Air flow : free return and supply (no bypass, no stratification)
☐	Structure integrity
☐	Fans run freely
☐	Unit on vibration isolators
☐	Unit input water filter + shut-off valves for cleaning
☐	Vibration isolators on water connections
☐	Expansion tank (indicative volume = 5% system content)
☐	Cleaned system
☐	Loaded system + possibile glicole solution + corrosion inhibitor
☐	Under pressure system
☐	Vented system
☐	Refrigerant circuit visual check
☐	Earthing connection
☐	Power supply features
☐	Electrical connections provided by the customer
☐	Ext. auxiliary heater connections (if present)
☐	External 3-way valve connection (if present)
☐	External pump connection (if present)

START-UP SEQUENCE

Operations to perform to start-up the unit.

For details refer to the different manual sections.

√	**Start-up sequence - Unit ON power supply**
☐	Compressor carter resistances operating at least since 8 hours
☐	Off-load voltage measure
☐	Phase sequence check
☐	Pump manual start-up and flow check
☐	Unit ON
☐	Load voltage measure and absorptions
☐	Liquid light check (no bubbles)
☐	Check of all fan operating
☐	Measure of return and supply water temperature
☐	Super-heating and sub-cooling measure
☐	Check no anomalous vibrations are present
☐	Set-point personalization
☐	Climatic curve personalization
☐	Scheduling personalization
☐	Complete and available unit documentation

6.1 PRELIMINARY INFORMATION

The indicated operations should be done by qualified technician with specific training on the product.

Upon request, the service centres performing the start-up; the electrical, water connections and the other system works are by the installer.

Agree upon in advance the star-up data with the service centre.

6.2 PRELIMINARY CHECKS

Before checking, please verify the following :

- the unit should be installed properly and in conformity with this manual.
- the electrical power supply line should be sectioned at the beginning.
- The line sectionalizing device is open, locked and equipped with the suitable warning
- make sure no tension is present

6.3 REFRIGERANT CIRCUIT

1. Check carefully the refrigerating circuit: the presence of oil stains can mean leakage caused by transportation, movements or other).
2. Verify that the refrigerating circuit is in pressure: Using the unit manometers , if present, or service manometers.
3. Make sure that all the service outlets are closed with proper caps; if caps are not present a leak of refrigerant can be possible.

6.4 HYDRAULIC CIRCUIT

1. Before realizing the unit connection make sure that the hydraulic system has been cleaned up and the clearing water has been drained
2. Check that the water circuit has been filled and pressurized
3. Check that the shut-off valves in the circuit are in the "OPEN" position.
4. Check that there isn't air in the circuit, if required, evacuate it using the air bleed valve placed in the system high points.
5. When using antifreeze solutions, make sure the glycol percentage is suitable for the type of use envisaged.

Weight of glycol (%)	**10**	**20**	**30**	**40**
Freezing temperature (°C)	-4	-9	-15	-23
Safety temperature (°C)	-1	-4	-10	-19

6.5 ELECTRICAL CIRCUIT

Verify that the unit is connected to the ground plant

Check the conductors tightening: the vibrations caused by handling and transport might cause loosing

Feed the unit by closing the sectioning device, but leave it on OFF.

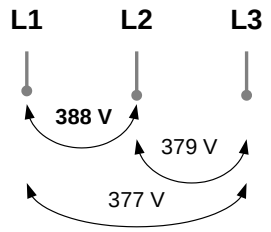
Check the tension and line frequency values which must be within the limits :

400/3/50 +/- 10%

Control the unbalancing of the phases:

it must be lower than 2%

Example:



1) $\frac{388 + 379 + 377}{3} = 381$

2) **388** (max) **– 381 = 7**

3) $\frac{7}{381} \times 100 = 1{,}83$ **OK**

The working out of the limits can cause irreversible damages and voids the warranty.

6.6 COMPRESSOR CRANKCASE RESISTANCES

Connect the oil resistances on the compressor crankcase at least 8 hours before the compressor is to be starter :

- at the first unit start-up
- after each prolonged period of inactivity

1. Supply the resistances switching off the unit isolator switch.
2. To make sure that hte resistances are working, check the power input .
3. At start-up the compressor crank-case temperature on the lower side must be higher at least of 10°C than the outside temperature.

Do not start the compressor with the crankcase oil below operating temperature.

6.6 TENSIONS

Check that the air and water temperatures are included in the working limits

For information on the control system, refer to the paragraph CONTROL.

Start the unit

With unit of full load, namely in stable conditions and close to those of work, check :

- Power supply tension
- Total absorption of the unit
- Absorption of the single electric loads

6.7 REMOTE CONSENT

- Check that the remote commands (ON-OFF, etc.) are connected and if necessary enabled with the relevant parameters as described in ELECTRICAL CONNECTIONS section
- Check that probes or optional components are connect and enable with the relative parameters(ELECTRICAL CONNECTION section)

6.8 STARTING REPORT

Realize the operating objective conditions is useful for check the unit over time.

With unit of full load, namely in stable conditions and close to those of work, take the following data:

- Tension and general absorptions with unit at full load
- Absorption of varied electrical loads (compressors, fans, pumps etc)
- Temperatures and capacities of different liquid (water, air) in the inlet and outlet of the unit
- Temperatures and pressures on the refrigerant circuit characteristic points (compressor discharge, liquid, intake)

The remarks should be preserved and available during maintenance .

6.9 CE 97/23 PED DIRECTIVE

97/23 CE PED DIRECTIVE gives instructions for installers, users and maintenance technicians as well.

Refer to local actuation norms; briefly and as an example, see the following

- Compulsory verification of the first installation :
  only for units assembled on the installer's building site (for ex. Condensing circuit + direct expansion unit)
- Certification of setting in service :
  for all the units
- Periodical verifications:
  to be executed with the frequency indicated by the manufacturer (see the maintenance section)

6.10 SETPOINT CORRECTION FOR OUTSIDE TEMPERATURE

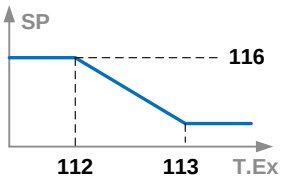
SUMMER

With outside low temperatures the refrigerant requirements are reduced.

The internal comfort can also be obtained with a set-point higher than standard.

The correction is summed to SP set-point :

it increases at the outside temperature T.Ex. decreasing



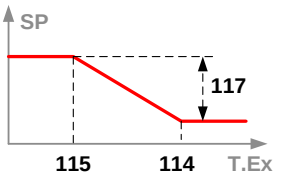
WINTER

With outside mild temperatures the thermal requirements are reduced.

The internal comfort can also be obtained with a lower set-point.

The correction is subtracted to SP set-point :

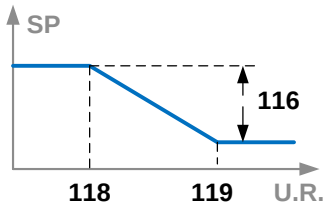
it decreasing at the outside temperature T Ex. increasing



Configuration parameters		
4	CompExt	External temp. comp. enabling 0=No, 1=Cool, 2=Heat, 3=Always
112	CextMaxC	Ext. Temp. max. winter correction
113	CextMinC	Ext. Temp. min. winter correction
114	CextMaxH	Winter correction max. value
115	CextMinH	Winter correction min. value
116	MaxCExtC	Summer correction max. value
117	MaxCExtH	Winter correction max. value
118	HExtMinC	Ext. enthalpy min. correction
119	HExtMaxC	Ext. enthalpy max. correction

6.11 SETPOINT CORRECTION FOR EXTERNAL ENTHALPY

SUMMER
With low ext. Humidity the refrigerant requirements are reduced.
The internal comfort can also be obtained with a set-point higher than standard.
The correction is summed to SP set-point :
it increases at the fresh air humidity RH decreasing.



Configuration parameters		
4	CompExt	Enable comp. for External Temp. 0=No, 1=Cool, 2=Heat, 3=Always
16	EnUrExt	Enable ext. RH% probe
116	MaxCExtC	Summer correction max. value
118	HExtMinC	Ext. enthalpy min. correction
119	HExtMaxC	Ext. enthalpy max. correction

6.12 DISTRIBUTION PUMP

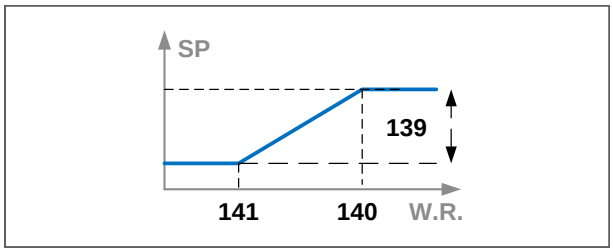
The pump of the secondary circuit can be controlled :

- by remote request at the SA1 input

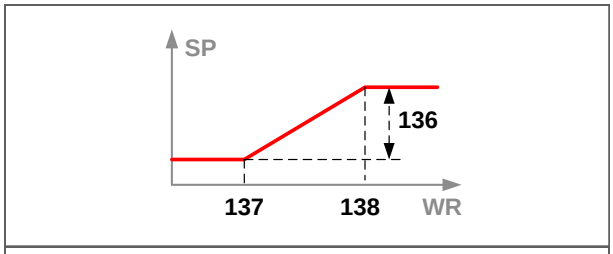
Configuration parameters		
20	PumpBord	Presence of second pump 0=Customer management 1=Single pump on the unit 2=Single pump+reserve 3=Pump at variable capacity
24	ControlPump	Enable the off control of the utility pump: 0=No 1=according of the ambient set 2=according to the storage temperature
25	RemOnOffMode	Set SA1 input: 1=On/Off, 0=thermal request by ambience

6.13 WATER RESET

SUMMER
When the refrigerant requirements are low the WR signal is high : the setpoint is increased
The correction is summed to SP set-point .



WINTER
When the thermal requirements are low the WR signal is low : the setpoint is decreased.
The correction is subtracted to SP set-point .



Configuration parameters		
5	WaterReset	Water Reset enabling 0=No 1=Cool 2=Heat 3=Always
135	TypeWR	Set WR signal 0=0-10V 1=4-20mA
136	MaxCWRH	Max. value of the Winter WR correction
137	SWRMAXH	Corresponding signal of the winter max. correction
138	SWRMinH	Corresponding signal of the winter min. correction
139	MaxCWRC	Summer correction max. value
140	SWRMaxC	Signal percentage of Summer MAX correction
141	SWRMinC	Signal percentage of Summer MIN correction

6.14 DEMAND LIMIT

It allows to temporarily limit the electrical capacity absorbed by the unit according to an ext. signal 0 - 10V
Higher is the signal and lower the number of available compressors, that is the electrical capacity absorbed.

Configuration parameters		
7	DemandLimitEn	Demand Limit enabling
175	Treaction	demand limit reaction time
176	TypeDL	Type of signal for the DL 0 = from analogical input , 1 = from serial line

6.15 HEATER IN REPLACEMENT

With fresh air temperature :

- Lower than p. 560 the boiler is enabled
- Higher than p. 560 + p. 561 the heat pump is enabled

With **system water** temperature :

- Lower than p. 558 the heat pump is disabled
- Higher than p. 558 - p. 559 the heat pump is enabled

Configuration parameters		
13	CaldaiaEn	Enable boiler function + heat pump
558	SogliaMaxImp	Water temp: over it the heat pump is disabled. Closed valves on Heat pump side
559	IsteresiSMI	Hysteresis for Heat pump enabling. Opened valves on Heat pump side
560	SogliaExtC	Outside temperature threshold: under it the boiler is enabled
561	IsteresiExt	External temperature hysteresis for heat pump re-activation
562	TimeBypassALM	Transition time for alarm from heat pump

6.16 HEATER IN INTEGRATION

With **fresh air** temperature :

- Lower than p. 647 the compressors are disabile and is
- activated only the heater
- Higher than p. 652 only the compressors are enabled
- Included between p. 647 and p. 652 resistances and heat pump are enabled

Configuration parameters		
18	EnPaux	Aux. heater enabling
646	PotRes	Power provided by the integration resistances
647	LimText	Ext. temperature limit for compressor operation
648	Tregime	Resistance Timeout
649	MaxInteg	Max. analogical output value of the integration res. when activated at the same time of the compressor
650	MinInteg	Min. analogical output value of the integration res. in modulation
651	OffsetOnAux	Step difference offset for aux connection
652	TextOnAux	Ext. temperature limit for auxiliary operation

6.17 DOMESTIC HOT WATER

Configuration parameters		
12	EnH2OSanitaria	Enabling of the DHW management
410	SanitariaHeatMode	Management for DHW forced production at satisfied system thermoregulation in heat
411	DelayValvS	Opening time of the DHW valve
412	CompExtH2OS	Enabling of compensation for outside temperature of the DHW setpoint
413	MaxCompH2OS	Max. outside T correction value for DHW setpoint
414	PriorCoolH2OSan	0=DHW priority ,1=system priority
415	PriorHeatH2Osan	0=DHW priority ,1=system priority
416	ComandoVSan	DHW valve management: 0=Managed according to the logic fixed by EnH2oSanitaria, 1= In Heat always excited, 2= In Cool always excited
417	SetH2OSanitaria	DHW Set Point
428	TimeAntiLoop	Max permanence time in DHW during the Antiloop control
430	DeltaChiller	Delta for DHW setpoint of the heat pump compared with DHW setpoint

7.1 MULTIFUNCTION KEYPAD

navigation

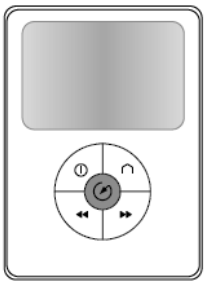
Select (rotate)
Confirm (press)

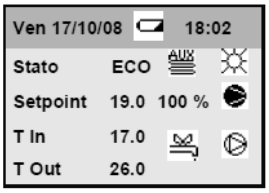
Previous menu

Main menu

Fast forwards

Fast backwards





Quick access to menu

main menu

Off-Comfort-Eco-Automatic
(press and hold)

Heating - Cooling
(press and hold)

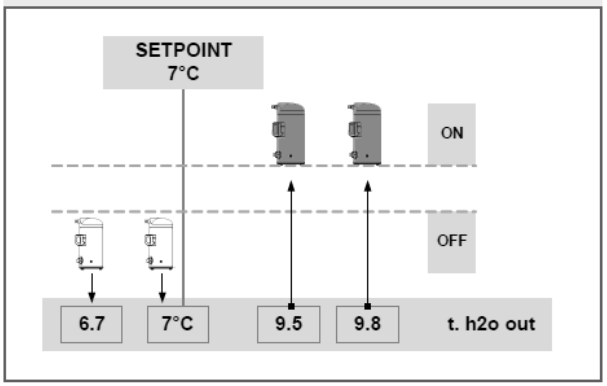
ALARMS (only if present)

Display

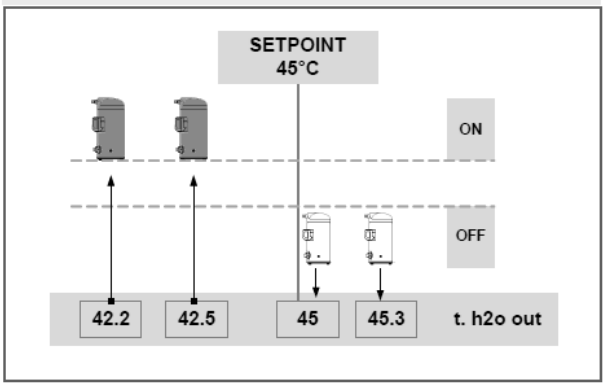
	Boiler		Flat battery
	Active pump		Summer operating
	DHW production		Winter operating
	Defrosting		Allarm in progress
AUX	Auxiliary heater		Compressor not timed
			All compressor timed

ON OFF COMPRESSORS

Cooling



Heating



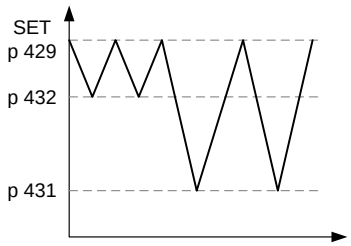
7.4 MENU STRUCTURE

SYSTEM CONTROLS	OFF	In this mode the MAINTENANCE function is enabled : at fix intervals the unit is started-up to maintain the system at the maintenance set-point.
	COMFORT	set-point for an optimal comfort
	ECONOMIC	set point for less energy consumption
	AUTOMATIC	Summer-winter change according to the system water temperature (function to enable by parameter)
	ONLY DHW	DHW production (if the 3-way valve is present)
SYSTEM MODALITIES	HEATING	The mode change can be performed by keypad or remote contact. If by remote contact (SA2) set the par. 21=0 ; in this case the control by keypad is not possible.
	COOLING	
STATUS	BASE INFO	It displays the component firmware version.
	KEYPAD INFO	It displays the component firmware version.
	MACHINE STATUS	menu accessible only after having entered the password INSTALLER
	I / O STATUS	It displays the status of the different inputs and outputs of the main module
ALARMS	ACTIVES ALARMS	Present alarms
	ALARM LOG	
	ALARM RESET	Before resetting an alarm identify and remove the cause that generate it. Repeated reset can cause irreversible damages as malfunctioning of the system itself.
	LOG RESET	Menu protected by password
CONFIGURATION	KEYPAD	menu accessible only after having entered the password INSTALLER
	MACHINE	menu accessible only after having entered the password INSTALLER
	SYSTEM VARIABLES	advanced menu for the service (MODSCAN software)
SCHEDULING	WEEKLY	Assigns to each day of the week a programme among the 7 available
	PROGRAMMES	Setting of each programme, from 0 to 24 : definition of the operating time bands (ECO- COMFORT-OFF)
	NAME MODIFICATION	
DATE AND HOUR	DAY	
	MONTH	
	YEAR	
	HOUR	
PASSWORD		INSTALLER password = 115 access reserved only to specifically trained personnel The parameter modification can cause irreversible damages

DOMESTIC HOT WATER (DHW)

The unit puts always the DHW at the set-point value p429.
During the accumulation phase the temperature falls down to par 432.
During the maintenance phase the temperature falls down to par 431.
It is opportune to schedule the maintenance phase by night and during periods of lower use of domestic water.
The scheduling allows to set the daily time bands and to assign the desired operating mode :

- Maintenance
- Maintenance + Recirculation
- Accumulation + Recirculation
- Accumulation



Par	Menu: Configuration - keyboard	Value
02	DHW enable	2
10	Enable network management	1

DHW MODULE

Par	Menu: Configuration - unit	Value
12	Enable DHW	1
315	Address	2
316	Baud Rate	1
317	Parity	0

Par	Parameters DHW module	Value
33	Index	1
34	Baud Rate	1
35	Parity	0
I27	Ensolar only if present solar system	1
MDS	Modbus Slave	1

7.5 USER PARAMETER

menu CONFIGURATION > UNIT > ALLI > USER PARAMETER

ID	Description	Extended description
4	CompExt	Enable comp. for External Temp. (0=No 1=Cool 2=Heat 3=always)
10	MantCoolEn	Enable summer maintenance 1=Yes/0=No
11	MantHeatEn	Enable winter maintenance 1=Yes/0=No
21	RemMode	Set remote inputs 0=H/C or H/DHW only or C/Solo sanitariDHW only from ID, 1=digital input no effect
51	SetCool	Summer Set Point
52	SetHeat	Winter Set Point
53	SecondSetC	Secondary summer SetPoint
54	SecondSetH	Secondary winter SetPoint

The list includes the parameters accessibile to the user.
Depending on the unit configuration of the unit some parameters may not be used.

7.6 STATUS

ID	DESCRIPTION	U.M.
1	Current set point	°C
2	Actual temperature difference (including compensation)	°C
3	Timer relative to resource insertion	seconds
4	Dynamic TimeScan relative to resource insertion	seconds
5	External T compensation	°C
6	Ambient T Compensation	°C
7	Water Reset compensation	°C
8	Charge compensation	°C
9	Duty Cycle comp	°C
10	Compensation on duration	°C
11	Utility water input temperature	°C
12	Utility water output temperature	°C
13	Auxiliary heater outlet temperature	°C
14	Fresh air temperature	°C
15	Condensing coil temperature	°C
16	Accumulation temperature	°C
17	Utility pump	0=Off 1=On
18	Utility secondary pump	0=Off 1=On
19	Source flow-rate	%
20	Condensing pressure	Bar
21	Evaporating pressure	Bar
22	Auxiliary heater control signal (0-10V)	%
23	Boiler command	0=Off 1=On
24	Boiler valve command	0=Off 1=On
25	Relative humidity	%
26	Free cooling (On-Off valve) 0=Off 1=On	0=Off 1=On
27	Variable speed compressor (0-10V)	%
28	Compressor 1 operating hours	hour
29	Comp 1 starts	Number
30	Compressor 2 operating hours	hour
31	Comp 2 starts	Number
32	Defrosting delay (SeTypeDFR = 0)	seconds
33	Defrosting count (SeTypeDFR = 0)	seconds
34	Ambient dew temperature	°C
35	Mininet	X=node disconnected O=Node connected
36	Electric power absorbed	KW

ID	DESCRIPTION	U.M.
37	Water input temperature 2	°C
38	Water output temperature 2	°C
39	Condensing coil temperature C2	°C
40	Ventilation (0-10V) C2	%
41	Condensing pressure C2	Bar
42	Evaporating pressure C2	Bar
43	Compressor 1 operating hours C2	hours
44	Comp 1 starts C2	Number
45	Compressor 2 operating hours C2	hours
46	Comp 2 starts C2	Number
47	Delay DFR C2 (SeTypeDFR = 0)	seconds
48	Count DFR C2 (SeTypeDFR = 0)	seconds
49	Return temperature	°C
50	Discharge temperature	°C
51	Condensing temperature	°C
52	Operative SuperHeat	°C
53	Thermostatic valve opening percentage	%
54	Actual set point in superheating	°C
55	Not used	
56	Not used	
57	Not used	
58	Not used	
59	Not used	
60	Not used	
61	Not used	
62	Not used	
63	Not used	
64	Not used	
65	Not used	
66	Not used	
67	Not used	
68	Not used	
69	Not used	
70	Not used	
71	Not used	
72	Operative SuperHeat C2	°C
73	Return temperature C2	°C

Depending on the configuration of the unit some status may not be used.

7.7 ALARMS (page 1)

Here is the complete list of alarms; according to the type of the unit and its configuration some codes indicated may not be used.

Before resetting an alarm identify and remove the cause that generate it.
Repeated reset can cause irreversibile damages as malfunctioning of the system itself.

e	00	Base keypad Timeout	A	N
E	01	Input temp. probe utility side	A	S
E	02	Supply temp. probe utility side	A	S
E	03	Outside temp. probe	A	S
E	04	Coil/output temp. probe source	A	S
E	05	Return temp. probe source side	A	S
E	06	Temp. probe in accumulation	A	S
E	07	AUX. heater temp. probe utility	A	S
E	08	Pressure 1 probe (HP)	A	S
E	09	Pressure 2 probe (LP_TE)	A	S
E	10	Ext. RH% probe	A	S
E	11	Water Reset input	A	S
E	12	Demand Limit input	A	S
E	13	Phase monitor	A/M	S
E	14	Capacity reading Timeout	A/M	S
E	15	Solar temperature / Source temperature circ. 2	A	S
E	16	High DHW temperature / Output temperature circ.2 utility	A	S
E	17	Low DHW temperature / Utility input temperature 2	A	S
E	18	Discharge Temp. probe	A	S
E	19	Return temperature probe	A	S
E	20	Driver disconnection	A	S
E	21	Disconnection between the driver and the thermostatic motor	A	S
E	22	No power supplì to the thermostatic driver	A	S
E	23	Source fan thermal / Source pump thermal	M	S
E	24	DHW pump thermal	M	S
E	25	Source fan thermal of Circuit 2 / Source pump thermal Circuit 2	M	S
E	26	Compressor 1 thermal / Circuit 1 thermal	M	S
E	27	Compressor 2 thermal / Circuit 2 thermal	M	S
E	28	Utility pump 1 thermal	M	S
E	29	Utility pump 2 thermal	M	S
E	30	Utility water flow-rate	A	
E	31	Pressure 1 probe of circuit 2	A	S

A = AUTOMATIC reset
M = MANUAL reset

S = it is memorie in the alarm log
N = it is NOT memorie in the alarm log

7.7 ALARMS (page 2)

F	01	High pressure (HP) → **pag 33**	A/M	S
F	02	Low pressure (LP)	A/M	S
f	03	HP1 Prealarm	A	S
f	04	LP1 Prealarm	A	S
f/F	05	HP2 Prealarm	A/M	S
f/F	06	LP2 Prealarm	A/M	S
f/F	07	Max pressure rateo	A/M	S
f/F	08	Defrosting forcing for low pressure	A/M	N/S
f/F	09	Defrosting stop alarm	A/M	S
F	10	Max. discharge temperature alarm	M	S
f/F	11	HP1 prealarm Circuit 2	A/M	S
f/F	12	LP1 prealarm Circuit 2	A/M	S
f/F	13	HP2 prealarm Circuit 2	A/M	S
f/F	14	LP2 prealarm Circuit 2	A/M	S
f/F	15	Max pressure rateo Circuit 2	A/M	S
f/F	16	Defrosting forcing for low pressure circuit 2	A/M	N/S
f/F	17	Defrosting stop alarm utility 2	A/M	S
F	18	High pressure Circuit 2 (HP) → **pag 33**	A/M	S
F	19	Low pressure Circuit 2 (LP)	M	S
I	01	Utility pump flow	A/M	S
I	02	Source pump flow	A	S
I	03	Utility freeze alarm	M	S
I	04	Freeze alarm source side	M	S
I	05	AUX heater antifreeze	M	S
I	06	System charged with utility water	A/M	S
I	07	Incongruent T Delta	M	S
I	08	Thermal alarm on al the utility pumps	M	S
i	09	Utility antifreeze prealarm	A	S
i	10	Change of utility pump	A	N
i	11	User input water temperature out of limit of the actual operating mode	A	S
i	12	DHW Incongruent thermostat	A	N
I	13	Ambient antifreeze alarm	A	S
I	14	Not used		
I	15	Not used		
I	16	Source pump flow circuit 2	A	S
I	17	Accumulation frost alarm	M	S

A = AUTOMATIC reset
M = MANUAL reset

S = it is memorie in the alarm log
N = it is NOT memorie in the alarm log

8.1 GENERAL

Maintenance must be done by authorized centres or by qualified personnel

The maintenance enables:

- maintain the unit efficiency
- Reduce the deterioration speed to whom every equipment is subject over time
- Assemble information and data to understand the state of the unit efficiency and avoid possible damages

8.2 INSPECTIONS FREQUENCY

The inspections should be carried out at least every six months

The frequency, however, depends on the use .

In the event of frequent use it is recommended to plan inspections at close intervals :

- frequent use (continuous or very intermittent use, near the operating limits, etc)
- critical use (service necessary) .

8.3 MACHINE BOOKLET

It's advisable to create a machine booklet to take notes of the unit interventions.

In this way will be easier marker the various interventions and will be e facilitate any troubleshooting.

Report on the booklet :

- data
- type of intervention effected
- intervention description
- Carried out measures etc ..

8.4 PUT A REST

If a long period of inactivity is foreseen

- Turn of the power in order to avoid electrical risks or damages by lightning strike
- avoid the risk of frosts (empty or add glycol in the plant sections subjected to temperatures below zero , power antifreeze resistances if are present)

It's recommended that the starter after the period of detention is made by a qualified technician, especially after seasonal stops or seasonal switch.

When restarting, refer to the START-UP section .

Schedule technical assistance in advance to avoid hitches and be able to use the installation when necessary.

8.5 WATER FILTER

Verify that there are no impurities which hinder the smooth passage of water.

8.6 WATER EXCHANGER

It is very important for the exchanger to be able to provide the maximum thermal exchange. Therefore, it is essential for the inner surfaces to be clean of dirt and incrustations.

Periodically check the difference between the temperature of the supply water and the condensation temperature. If the difference is greater than 8 °C – 10 ° C it is advisable to clean the exchanger.

The clearing must be effected :

- With circulation opposite to the usual one
- With a speed at least 1,5 times higher than the nominal one
- With an appropriate product moderately acid (95% water + 5% phosphoric acid
- After the cleaning rince with water to inhibe the detergent rests.

8.7 ELECTRIC FANS

Check :

- the fans and the relative protection gridsare well fixed
- The fan bearings (evident by noise and anomalous vibrations)
- the terminal protection covers are closed and the cable holders are properly positioned

8.8 AIR COIL

Contact with the exchanger fins can cause cuts. Wear protective gloves to perform the above described operations.

It is extremely important that the battery gives the maximum thermal exchange; therefore, its surface must be cleaned from dust and deposits. Remove all impurities from the surface.

It is extremely important that the battery gives the maximum thermal exchange; therefore, its surface must be cleaned from dust and deposits. Remove all impurities from the surface.

Using an air pressure gun, clean the aluminum surface of the battery. Be careful to direct the air in the opposite direction of the fan air movement.

Hold the gun parallel to the fins to avoid damages. As an alternative, an aspirator can be used to suck impurities from the air input side.

Verify that the aluminum fins are not bent or damaged. In the event of damages, contact the authorized assistance center and get the battery "ironed out" in order to restore the initial condition for an optimal air flow

8.9 CIRCULATION PUMPS

Verify :

- no leaks
- Bearing status (anomalies are highlighted by abnormal noise and vibration)
- The closing of the terminals cover and the correct positioning of the cable glands.

8.9 PERIODICAL CHECK LIST

Controls effected on ……..By …… Of the Company……

√	Frequency of intervention (months)	1	6	12
□	Presence of corrosions			●
□	Panel fixing			●
□	Fan fixing		●	
□	Coil cleaning		●	
□	Water filter cleaning		●	
□	Check the exchanger efficiency			●
□	Circulating pumps		●	
□	Check of the fixing and the insulation of the power lead			●
□	Check of the earthing cable			●
□	Electric panel cleaning			●
□	Capacity contactor status			●
□	terminal closing, cable insulation integrity			●
□	Voltage and phase unbalancing (no load and on-load)		●	
□	Absorptions of the single electrical loads		●	
□	Test of the compressor carter resistances		●	
□	Leak control *			●
□	Survey of the refrigerant circuit operating parameters		●	
□	Check of the 4-way change		●	
□	Protective device test : safety valves, pressure switches, thermostats, flow switches etc		●	
□	Control system test: setpoint, climatic compensations, capacity stepping, water / air flow-rate variations etc		●	
□	Control device test : alarm signalling, thermometers, probes, pressure gauges etc		●	

Notes / interventions recommended to the owner

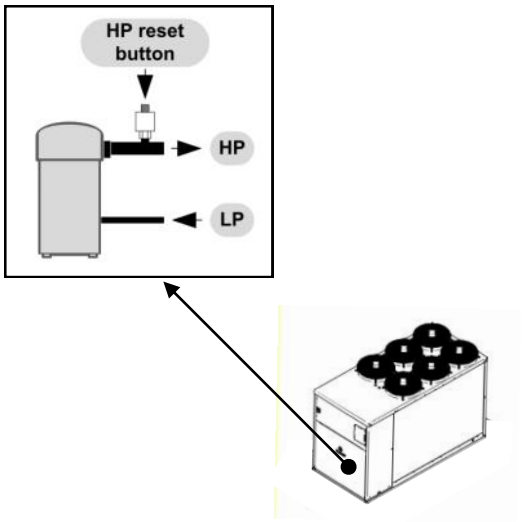
*European regulation 303/2008

Refer to the local actuation regulations; in short and just as an indication the regulation order as follow.

Companies and technicians that effect interventions of installation, maintenance/repairs, leak control and recovery must be CERTIFIED as expected by the local regulations.

The leak control must be effected with annual renewal.

HIGH PRESSURE ALARM MANUAL RESET



9 - DECOMMISSIONING

9.1 DISCONNECTING

Only authorised personnel must disconnect the unit.

- Avoid leak or spills into the environment .
- Before disconnecting the unit, the following must be recovered, if present:
  - refrigerant gas
  - Anti-freeze solutions in the hydraulic circuit
- Awaiting dismantling and disposal, the unit can also be stored outdoors, as bad weather and rapid changes in temperature will not cause damage to the environment, if electric, cooling and hydraulic circuits of the unit are integral and closed.

9.2 DISMANTLING AND DISPOSAL

THE UNIT MUST ALWAYS BE SENT TO AUTHORISED CENTRES FOR DISMANTLING AND DISPOSAL.

When dismantling the unit, the fan, the motor and the coil, if operating, may be recovered by the specialist centres for reuse.

All the materials must be recovered or disposed of in compliance with the corresponding national standards in force.

For further information on the decommissioning of the unit, contact the manufacturer.

9.3 CE RAEE CE DIRECTIVE

The units covered by the legislation in question are marked with the symbol on the side.

With the aim of protecting the environment, all of our units are produced in compliance with Directive EC on waste electrical and electronic equipment (WEEE).

The potential effects on the environment and on human health due to the presence of hazardous substances are shown in the use and maintenance manual in the section on residual risks.

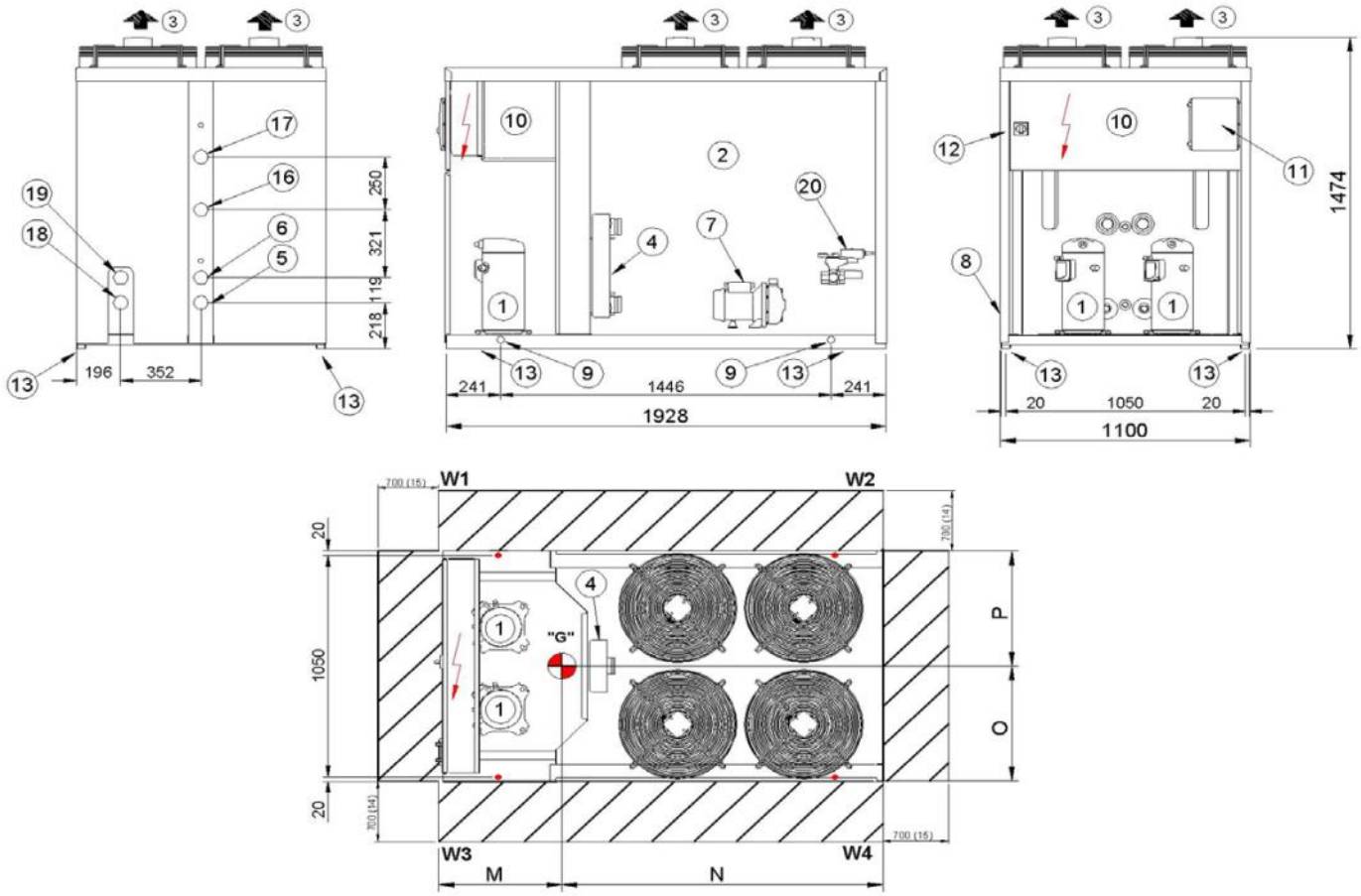
Information in addition to that indicated below, if required, can be obtained from the manufacturer/distributor/importer, who are responsible for the collection/handling of waste originating from equipment covered by EC - WEEE. This information is also available from the retailer who sold this appliance or from the local authorities who handle waste.

Directive EC - WEEE requires disposal and recycling of electrical and electronic equipment as described therein to be handled through appropriate collection, in suitable centres, separate from collection for the disposal of mixed urban waste.

The user must not dispose of the unit at the end of its life cycle as urban waste. It must instead be handed over to appropriate collection centres as set forth by current standards or as instructed by the distributor.

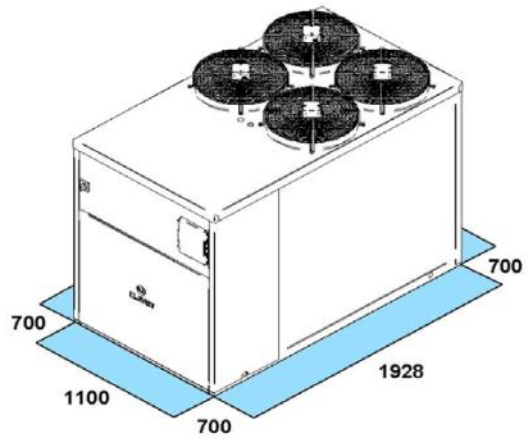
If disposal takes places at the same time as delivery of a new electrical or electronic equipment for the same family, the product may be collected directly by the distributor.

DIMENSIONALES AND WEIGHT DISTRIBUTION: WBAN 82-122



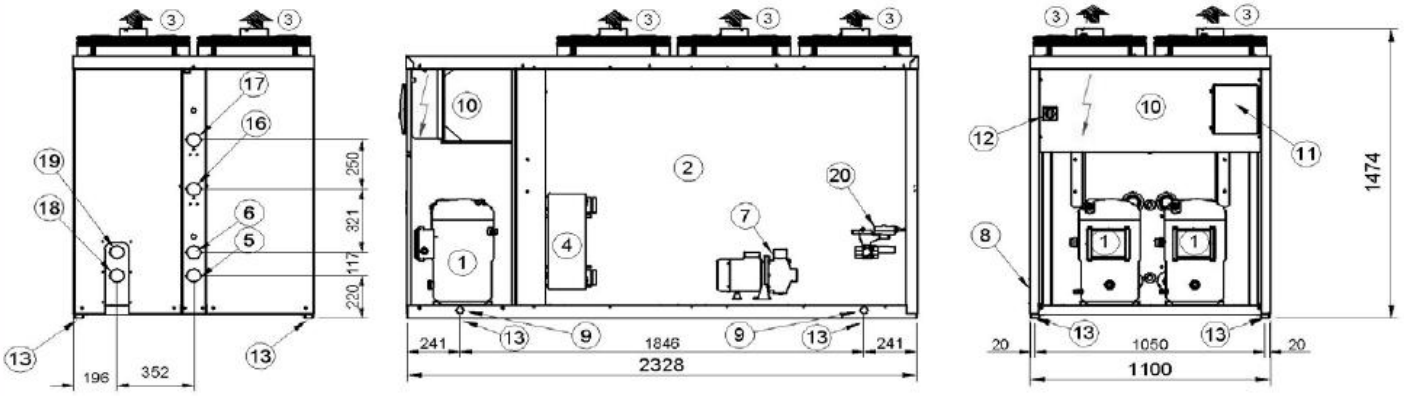
1. compressor
2. finned exchanger
3. helical fans
4. plate heat exchangers
5. exchanger water inlet
6. exchanger water outlet
7. pump
8. power input
9. lifting holes
10. electrical panel
11. microprocessor keyboard
12. main isolator switch
13. vibration mounts position
14. Minimum Clearance for a Proper Air flow to the Condenser
15. Minimum Safe Clearance
16. desuperheater water inlet 1" 1/2 Victaulic
17. desuperheater water outlet 1" 1/2 Victaulic
18. domestic hot water input
19. domestic hot water output
20. three-way valve (optional)

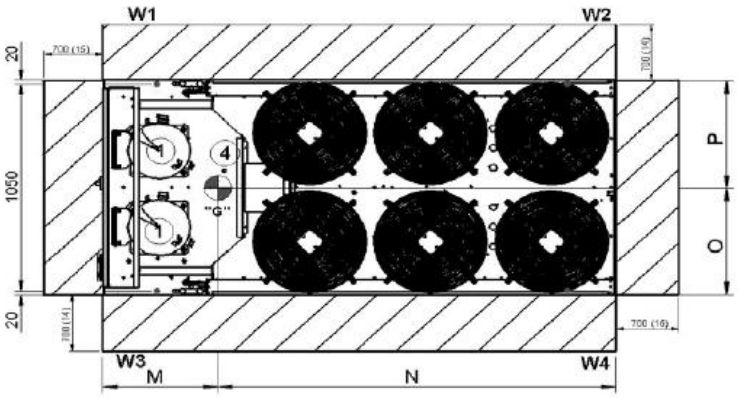
(G)Centre of gravity
Victaulic connection joints



Size		82	122
M	mm	757	761
N	mm	1070	1045
O	mm	456	439
P	mm	549	549
Length	mm	1928	1928
Depth	mm	1100	1100
Height	mm	1474	1474
W1	kg	142	159
W2	kg	88	101
W3	kg	117	126
W4	kg	73	80
Operating weight	kg	420	466
Shipping weight	kg	430	474

DIMENSIONALS AND WEIGHT DISTRIBUTION: WBAN 162-202





1. compressor
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3. helical fans
4. plate heat exchangers
5. exchanger water inlet
6. exchanger water outlet
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8. power input
9. lifting holes
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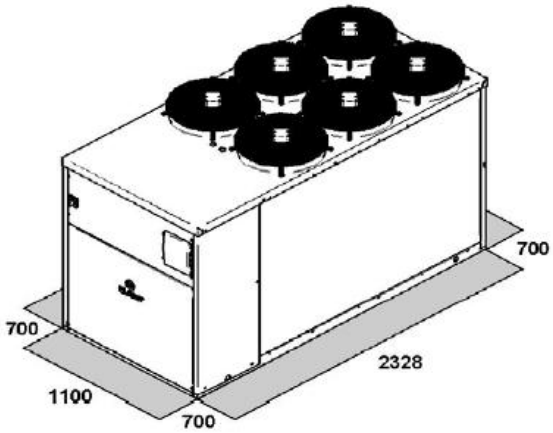
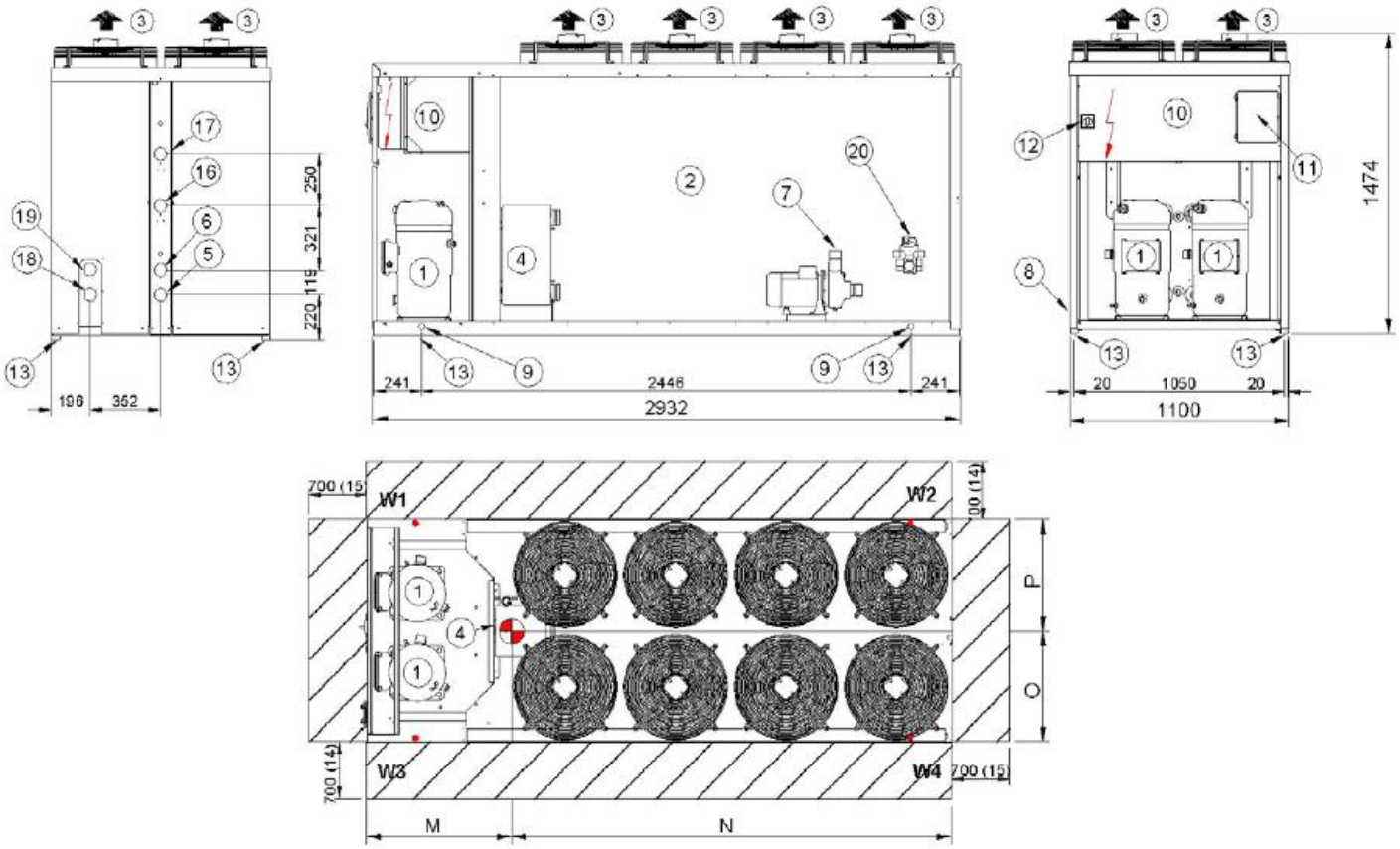
16. desuperheater water inlet 1" 1/2 Victaulic
17. desuperheater water outlet 1" 1/2 Victaulic
18. domestic hot water input
19. domestic hot water output
20. three-way valve (optional)

(G)Centre of gravity
Victaulic connection joints



Size		162	202
M	mm	817	815
N	mm	1303	1386
O	mm	465	452
P	mm	550	554
Length	mm	2328	2328
Depth	mm	1100	1100
Height	mm	1474	1474
W1	kg	224	246
W2	kg	121	124
W3	kg	188	200
W4	kg	102	100
Operating weight	kg	635	670
Shipping weight	kg	647	681

DIMENSIONALS AND WEIGHT DISTRIBUTION: WBAN 262-302



1. compressor
2. finned exchanger
3. helical fans
4. plate heat exchangers
5. exchanger water inlet
6. exchanger water outlet
7. pump
8. power input
9. lifting holes
10. electrical panel
11. microprocessor keyboard
12. main isolator switch
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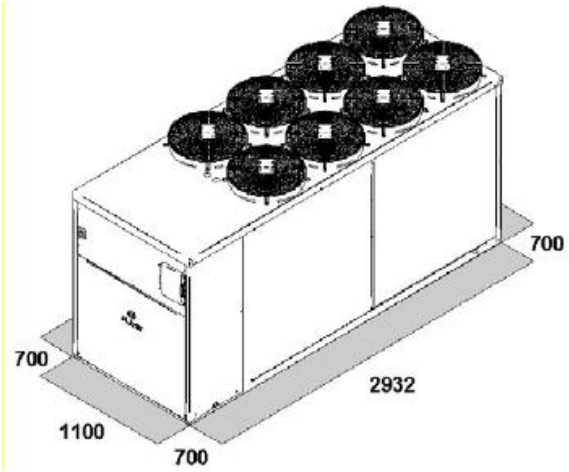
17. desuperheater water outlet 1" 1/2 Victaulic
18. domestic hot water input
19. domestic hot water output
20. three-way valve (optional)

(G)Centre of gravity
Victaulic connection joints



Size		262	302
M	mm	969	950
N	mm	1801	1824
O	mm	423	426
P	mm	576	575
Length	mm	2932	2932
Depth	mm	1100	1100
Height	mm	1474	1474
W1	kg	318	329
W2	kg	148	148
W3	kg	230	241
W4	kg	107	108
Operating weight	kg	803	826
Shipping weight	kg	814	834

General technical data

Size			82	122	162	202	262	302
Radiant panels								
Heating								
Heating capacity	1	kW	31,0	41,4	53,3	73,9	83,3	102,5
Total power input	2	kW	7,04	9,93	13,0	17,5	20,6	25,3
COP (EN 14511:2011)	3		4,40	4,17	4,12	4,23	4,05	4,05
Cooling								
Cooling capacity	6	kW	30,4	44,3	55,4	75,0	94,5	112,6
Total power input	2	kW	8,26	14,0	16,3	24,4	30,7	36,9
EER (EN 14511:2011)	7		3,69	3,18	3,39	3,08	3,07	3,05
Water flow-rate	6	l/s	1,44	2,10	2,62	3,56	4,48	5,34
Useful pump discharge head	6	kPa	157	153	148	164	138	166
Terminal units								
Heating								
Heating capacity	4	kW	29,1	40,3	51,0	71,1	80,4	99,5
Total power input	2	kW	8,53	12,1	15,5	20,8	24,8	30,8
COP (EN 14511:2011)	3		3,41	3,34	3,28	3,41	3,24	3,23
Cooling								
Cooling capacity	8	kW	21,3	32,2	39,7	53,9	65,9	80,3
Total power input	2	kW	7,79	12,5	14,9	21,9	27,6	32,1
EER (EN 14511:2011)	7		2,73	2,58	2,67	2,46	2,39	2,50
ESEER	9		3,36	3,16	3,22	2,96	2,91	3,05
Water flow-rate	8	l/s	1,00	1,52	1,88	2,55	3,12	3,90
Useful pump discharge head	8	kPa	183	183	173	195	184	201
Radiators								
Heating								
Heating capacity	5	kW	27,4	40,1	48,6	69,3	78,4	98,2
Total power input	2	kW	10,3	14,9	18,4	25,3	29,9	37,6
COP (EN 14511:2011)	3		2,65	2,69	2,64	2,74	2,62	2,61
Water flow-rate	5	l/s	1,3	1,9	2,3	3,3	3,8	4,7
Useful pump discharge head	5	kPa	164	163	158	172	164	181
Compressor								
Type of compressors			SCROLL					
Refrigerant			R-407C	R-407C	R-407C	R-407C	R-407C	R-407C
No. of compressors		No	2	2	2	2	2	2
Oil charge (C1)		l	1,89	1,89	4,00	4,00	4,14	4,14
Oil charge (C2)		l	1,89	1,89	4,00	4,00	4,14	4,14
Refrigeration circuits		No	2	2	2	2	2	2
Refrigerant charge (C1)		Kg	7,5	10,0	15,0	16,0	20,0	19,0
Refrigerant charge (C2)		Kg	7,5	10,0	15,0	16,0	20,0	19,0
Utility side exchanger								
Type of exchanger	10		PHE	PHE	PHE	PHE	PHE	PHE
No. of exchangers		No	1	1	1	1	1	1
Water content		l	2,3	3,3	4,2	5,8	7,0	8,3
Minimum flow		l/s	0,9	1,1	1,4	1,75	2,1	2,3
External Section Fans								
Type of fans	11		AX	AX	AX	AX	AX	AX
No. of fans		No	4	4	6	6	8	8
Standard airflow		l/s	5000	5000	7420	7420	9585	9585
Installed unit power		kW	0,22	0,22	0,22	0,22	0,22	0,22

Size			82	122	162	202	262	302
Hydraulic circuit								
Maximum water side pressure		kPa	550	550	550	550	550	550
Safety valve calibration		kPa	600	600	600	600	600	600
Min. installation water contents		l	75	110	140	190	230	280
Power supply								
Standard power supply		V	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N

1. Entering/leaving water temperature user side 30/35°C, external exchanger entering air temperature 7°C (R.H. = 85%)
2. The overall power absorbed is calculated by adding the power absorbed by the compressor + the power absorbed by the fans + the power absorbed by the auxiliary electrical circuit + the percentage value of the pump to overcome pressure drops inside the unit

3. COP (EN 14511:2011) heating performance coefficient. Ratio between heating power delivery and power absorption per EN 14511:2011. The power absorption is the sum of the power absorbed by the compressor+auxiliary circuit+pump to overcome internal pressure drops

4. Entering/leaving water temperature user side 40/45°C, external exchanger entering air temperature 7°C (R.H. = 85%)

5. Entering/leaving water temperature user side 50/55°C, external exchanger entering air temperature 7°C (R.H. = 85%)
6. User side entering/leaving water temperature 23/18°C, external exchanger entering air 35°C
7. EER (EN 14511:2011) Performance coefficient in cooling. Ratio between cooling power delivery and power absorption in compliance with EUROVENT EN14511:2011. The total input is given by the compressor input + auxiliary electric circuit + percentage of power absorbed by the pump to prevent pressure drops inside the unit.

8. User side entering/leaving water temperature 12/7 °C, external exchanger entering air 35°C

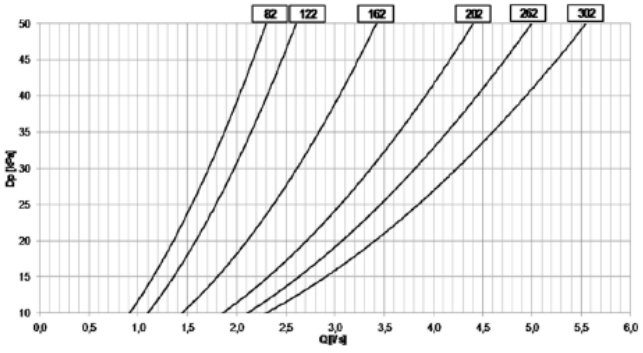
9. ESEER calculated by EUROVENT, for systems featuring terminal units with water produced at 7°C
10. PHE = plate exchanger
11. AX = axial fan

Sound levels

Size	Sound power level (dB)								Sound pressure level	Sound power level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
82	86	80	80	76	71	72	64	57	62	79
122	88	81	80	79	74	69	64	56	63	80
162	90	85	84	80	74	75	66	66	65	82
202	89	85	84	78	73	76	66	68	65	82
262	91	86	85	81	75	6	67	67	66	83
302	91	87	86	80	75	78	68	70	67	84

Measures according to ISO 3744 regulations, with respect to the EUROVENT 8/1 certification.
The sound levels of the internal unit refer to units at full load in normal test conditions.
The sound pressure level refers to a distance of 1 meter from the outer surface of the unit operating in open field.
Data referred to the following conditions:
internal exchanger water = 12/7°C

Internal exchanger pressure drops



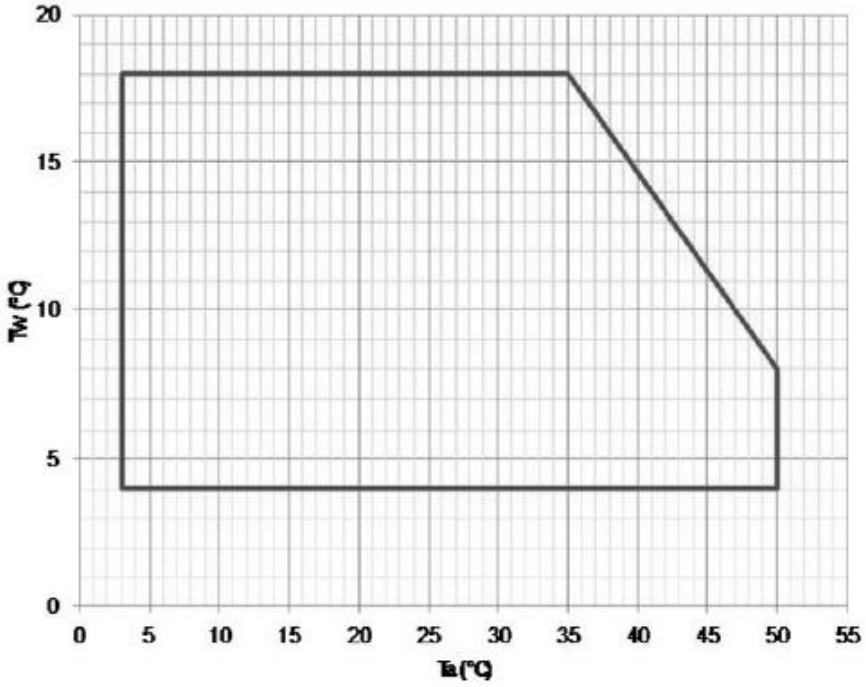
Exchamger pressure drop limit. Warning: don't use below this limit.

Q [l/s] = Water flow rate
DP = Pressure drop
Keep within the heat exchanger operating limits (upper and lower).

Exchamger pressure drop limit. Warning: don't use below this limit.

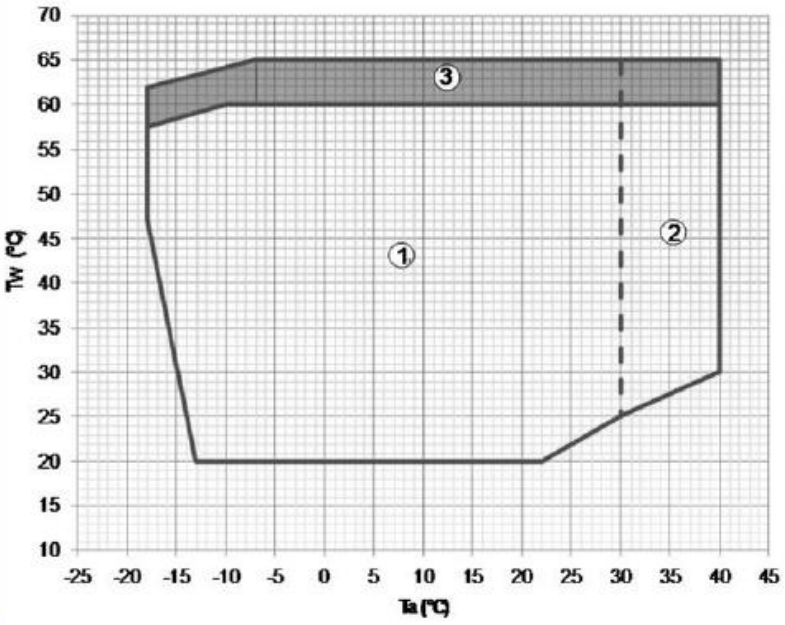
Operating limits

Cooling



Tw [°C] = Exchanger outlet water temperature
Ta [°C] = Air temperature dry bulb

Heating



Ta = Entering air temperature to the external exchanger
Tw [°C] = Exchanger outlet water temperature
(1) Normal operating range
(2) Operation with modulating fans
(3) Operation with extended operating limits version (EOL)

General technical data - Operating limits extension (EOL)

Size			82	122	162	202	262	302
Radiant panels								
Heating								
Heating capacity	1	kW	31,0	41,5	53,4	74,0	83,3	102,6
Total power input	2	kW	6,90	9,58	12,9	17,1	20,6	24,9
COP (EN 14511:2011)	3		4,50	4,33	4,15	4,33	4,05	4,12
Cooling								
Cooling capacity	6	kW	29,9	44,3	55,4	74,0	91,9	110,9
Total power input	2	kW	8,20	13,6	16,3	24,4	31,1	37,4
EER (EN 14511:2011)	7		3,65	3,26	3,40	3,03	2,96	2,97
Water flow-rate	6	l/s	1,42	2,10	2,62	3,51	4,35	5,26
Useful pump discharge head	6	kPa	103	82	117	79	114	87
Terminal units								
Heating								
Heating capacity	4	kW	29,2	40,4	51,1	71,5	80,5	99,7
Total power input	2	kW	8,41	11,8	15,4	20,8	24,6	30,4
COP (EN 14511:2011)	3		3,47	3,42	3,32	3,44	3,27	3,29
Cooling								
Cooling capacity	8	kW	21,2	32,1	39,8	53,8	65,9	80,2
Total power input	2	kW	7,73	12,3	14,7	21,4	27,4	31,6
EER (EN 14511:2011)	7		2,74	2,62	2,70	2,51	2,41	2,54
ESEER	9		3,36	3,16	3,22	2,96	2,91	3,05
Water flow-rate	8	l/s	1,00	1,52	1,88	2,55	3,12	3,80
Useful pump discharge head	8	kPa	120	104	153	125	153	138
Radiators								
Heating								
Heating capacity	5	kW	27,3	40,2	48,3	65,7	79,6	100,1
Total power input	2	kW	11,4	16,4	19,9	27,3	32,6	41,1
COP (EN 14511:2011)	3		2,40	2,44	2,43	2,40	2,44	2,43
Water flow-rate	5	l/s	0,65	0,96	1,16	1,58	1,91	2,40
Useful pump discharge head	5	kPa	133	124	185	168	181	174
Compressor								
Type of compressors			SCROLL					
Refrigerant			R-407C	R-407C	R-407C	R-407C	R-407C	R-407C
No. of compressors		No	2	2	2	2	2	2
Oil charge (C1)		l	1,89	1,89	4,00	4,00	4,14	4,14
Oil charge (C2)		l	1,89	1,89	4,00	4,00	4,14	4,14
Refrigeration circuits		No	2	2	2	2	2	2
Refrigerant charge (C1)		Kg	7,5	10,0	15,0	16,0	20,0	19,0
Refrigerant charge (C2)		Kg	7,5	10,0	15,0	16,0	20,0	19,0

Size			82	122	162	202	262	302
Utility side exchanger								
Type of exchanger	10		PHE	PHE	PHE	PHE	PHE	PHE
No. of exchangers		No	1	1	1	1	1	1
Water content		l	3,3	4,2	5,8	7,0	8,3	10,1
Minimum flow		l/s	0,6	0,9	1,1	1,55	1,9	2,4
External Section Fans								
Type of fans	11		AX	AX	AX	AX	AX	AX
No. of fans		No	4	4	6	6	8	8
Standard airflow		l/s	5000	5000	7420	7420	9585	9585
Installed unit power		kW	0,22	0,22	0,22	0,22	0,22	0,22
Hydraulic circuit								
Maximum water side pressure		kPa	550	550	550	550	550	550
Safety valve calibration		kPa	600	600	600	600	600	600
Min. installation water contents		l	75	110	140	190	230	280
Power supply								
Standard power supply		V	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N	400/3/50+N

1. Entering/leaving water temperature user side 30/35°C, external exchanger entering air temperature 7 °C (R.H. = 85%)
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5. Entering/leaving water temperature user side 55/65°C, external exchanger entering air temperature 7°C (R.H. = 85%)
6. User side entering/leaving water temperature 23/18°C, external exchanger entering air 35°C

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8. User side entering/leaving water temperature 12/7 °C, external exchanger entering air 35°C

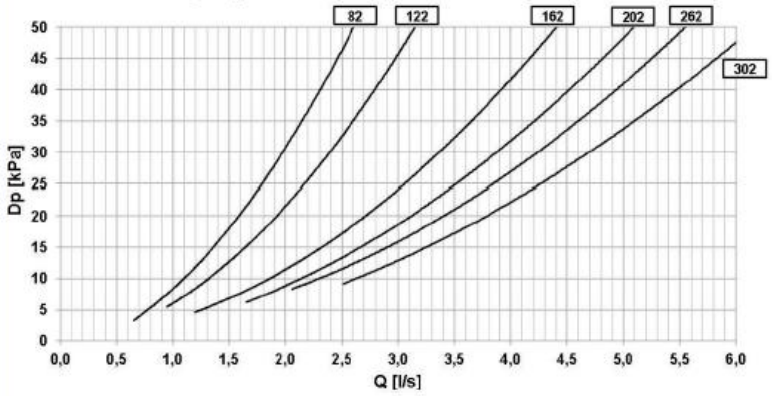
9. ESEER calculated by EUROVENT, for systems featuring terminal units with water produced at 7°C
10. PHE = plate exchanger
11. AX = axial fan

Operating Range (Cooling)

Please refer to the operating limits:

(3) Operation with extended operating limits version (EOL)

Internal exchanger pressure drops



Exchanger pressure drop limit. Warning: don't use over this limit.

DP [kPa] = Pressure drops
Q [l/s] = Water flow rate

Exchamger pressure drop limit. Warning: don't use below this limit.

General

In this section the most common situations are signalled. As these cannot be controlled by the manufacturer these could be a source of risk situations for people or things

Danger zone

This is an area in which only an authorised operator may work.

The danger zone is the area inside the unit which is accessible only with the deliberate removal of protections or parts thereof

Handling

The handling operations, if implemented without all of the protection necesssary and without due caution, may cause the fall or the tipping of the unit with the consequent damage, even serious, to persons, things or the unit itself.

Handle the unit following the instructions provided in the present manual regarding the packaging and in compliance with the local regulations in force.

Should the gas refrigerant leak please refer to the refrigerant "Safety sheet".

Installation

An incorrect installation of the unit could cause water leaks, condensate accumulation, leaking of the refrigerant, electric shock, bad functioning or damage to the unit itself.

Check that the installation has been implemented by qualified technical personnel only and that the instructions contained in the present manual and the local regulations in force have been adhered to.

The installation of the unit in a place where even infrequent leaks of inflammable gas and the accumulation of this gas in the area surrounding the area occur could cause explosions or fires.

Carefully check the positioning of the unit.

The installation of the unit in a place unsuited to support its weight and/ or guarantee adequate anchorage may cause the fall or the tipping of the unit with the consequent damage to things, people or the unit itself.

Carefully check the positioning and the anchoring of the unit.

Easy access to the unit by children, unauthorised persons or animals may be the source of accidents, some serious.

Install the unit in areas which are only accessible to authorised person and/or provide protection against intrusion into the danger zone .

General risks

Smell of burning, smoke or other signals of serious anomalies may indicate a situation which could cause damage to people, things or the unit itself.

Electrically isolate the unit (yellow-red isolator).

Contact the authorised service centre to identify and resolve the problem at the source of the anomaly.

Accidental contact with exchange batteries, compressors, air delivery tubes or other components may cause injuries and/or burns.

Always wear suitable clothing including protective gloves to work inside the danger zone.

Maintenance and repair operations carried out by non-qualified personnel may cause damge to persons, things or the unit itself.

Always contact the qualified assistance centre.

Failing to close the unit panels or failure to check the correct tightening of all of the panelling fixing screws may cause damage to persons, things or the unit itself.

Periodically check that all of the panels are correctly closed and fixed.

If there is a fire the temperature of the refrigerant could reach values that increase the pressure to beyond the safety valve with the consequent possible projection of the refrigerant itself or explosion of the circuit parts that remain isolated by the closure of the tap.

Do not remain in the vicinity of the safety valve and never leave the refrigerating system taps closed.

Electric parts

An incomplete attachment line to the electric network or with incorrectly sized cables and/or unsuitable protective devices can cause electric shocks, intoxication, damage to the unit or fires.

Carry out all of the work on the electric system referring to the electric layout and the present manual ensuring the use of a system thereto dedicated.

An incorrect fixing of the electric components cover may favour the entry of dust, water etc inside and may consequently can electric shocks, damage to the unit or fires.

Always fix the unit cover properly.

When the metallic mass of the unit is under voltage and is not correctly connected to the earthing system it may be as source of electric shock and electrocution.

Always pay particular attention to the implementation of the earthing system connections.

Contact with parts under voltage accessible inside the unit after the removal of the guards can cause electric shocks, burns and electrocution.

Open and padlock the general isolator prior to removing the guards and signal work in progress with the appropriate shield.

Contact with parts that could be under voltage due to the start up of the unit may cause electric shocks, burns and electrocution.

When voltage is necessary for the circuit open the isolator on the attachment line of the unit itself, padlock it and display the appropriate warning shield.

Moving parts

Contact with the transmissions or with the fan aspiration can cause injuries.

Prior to entering the inside of the unit open the isolater situated on the connection line of the unit itself, padlock and display the suitable sign.

Contact with the fans can cause incurie.

Prior to removing the protective grill or the fans, open the

display the appropriate warning sign.

Refrigerant

The intervention of the safety valve and the consequent expulsion of the gas refrigerant may cause injuries and intoxication. Always wear suitable clothing including protective gloves and eyeglasses for operations inside the danger zone.

Should the gas refrigerant leak please refer to the refrigerant "Safety sheet".

Contact between open flames or heat sources with the refrigerant or the heating of the gas circuit under pressure (e.g. during welding operations) may cause explosions or fires.

Do not place any heat source inside the danger zone.

The maintenance or repair interventions which include welding must be carried out with the system off.

Hydraulic parts

Defects in tubing, the attachments or the cut-off parts may cause a leak or water projection with the consequent damages to peopl, things or shortcircuit the unit

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