



WDAT-iZ4

120.1 - 580.2



MANUAL

FOR INSTALLATION,
USE AND MAINTENANCE

M05Z00003-01 10-2024

R1234ze

Dear Customer,

We congratulate you on choosing these product

Clivet has been working for years to offer systems able to assure the maximum comfort for a long time with highly-reliable, efficient, high-quality and safe solutions. The target of the company is to offer advanced systems, that assure the best comfort and reduce energy consumption as well as the installation and maintenance costs for the entire life-cycle of the system.

With this manual, we want to give you information that are useful for all phases: from reception, installation and use to disposal - so that such an advanced system can provide the best performances during installation and use.

Best regards and have a good read.

CLIVET Spa

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Safety

Operate in compliance with safety regulations in force.

To carry out the operations use protection devices:

gloves, goggles, helmet, headphones, protective knee pads.

All operations must be carried out by personnel trained on possible risks of a general nature, electrical and deriving from operating with equipment under pressure.

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

Manual

The manual provides correct unit installation, use and maintenance.

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.

Risk situations

The unit has been designed and created to prevent injuries 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 only:

- cooling water or a water and glycol mix for air-conditioning
- keep to the limits foreseen in the technical schedule and in this manual

The manufacturer accepts no responsibility if the equipment is used for any purpose other than the intended use.

Installation

Outdoor installation

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

Follow local safety regulations.

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

Maintenance

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

Turn the unit off before any operation.



Before any work read:

⇒ Chapter. *SAFETY WARNINGS FOR OPERATIONS ON UNITS CONTAINING R1234ze*



Pay particular attention to:

⇒ warnings / prohibitions / danger indicating particularly important operations or information, operations that cannot be done, which compromise the functionality of the unit or which may cause damage to things or persons.

Outdoor installation

Modification

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

Breakdown/Malfunction

Disable the unit immediately in case of breakdown or malfunction.

Contact a certified service agent.

Use original spares parts only.

Using the unit in case of breakdown or malfunction:

- voids the warranty
- it may compromise the safety of the unit
- it may increase time and repair costs

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.

Indications for the User

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

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

Provide a unit notebook that allows any interventions carried out on the unit 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 service centre authorized by the manufacturer

The installer must train the user, particularly on:

- Start-up/shutdown
- Set points change
- Standby mode
- Maintenance
- What to do / what not to do in case of breakdown

Unit identification

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

The matriculation plate shows the indications foreseen by the standards, in particular:

- unit type
- serial number (12 characters)
- year of manufacture
- wiring diagram number
- electrical data
- type of refrigerant
- refrigerant charge
- manufacturer logo and address

The matriculation plate must never be removed.

It contains fluorinated greenhouse gases.

Serial number

It identifies uniquely each unit.

Must be quoted when ordering spare parts.

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.

Series
Size
Serial number
Year of manufacture
Number of electrical wiring diagram

Physical characteristics of the R1234ze refrigerant		
Safety class (ISO 817)	A2L	
LFL Low flammability limit	0.303	kg/m ³ @T>30°C
BV Burning velocity	0	cm/s
Boiling point	-19	°C
GWP	7	100 yr ITH
GWP	<1	AR5 - 100 yr ITH
Self-ignition temperature	368	°C

Reception

You have to check before accepting the delivery:

- That the unit hasn't been damaged during transport
- That the materials delivered correspond with that indicated on the transport document comparing the data with the identification label 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 by fax and registered mail with advice of receipt to supplier and the carrier.

NOTE

⇒ Any disputes must be made within 8 days from the date of the delivery. Complaints after this period are invalid.

Storage

Respect the indications on the outside of the pack.

In particular:

- ⇒ minimum ambient temperature -10°C
(possible components damages)
- ⇒ maximum ambient temperature $+55^{\circ}\text{C}$
(possible safety valve opening)
- ⇒ maximum relative humidity 95%
(possible damages to electrical components)

NOTE

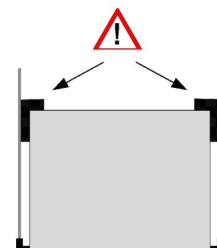
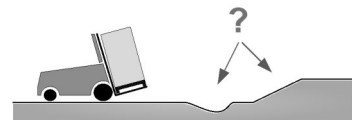
⇒ The unit may not be tilted more than 15° during transport.

NOTE

Removal of packaging

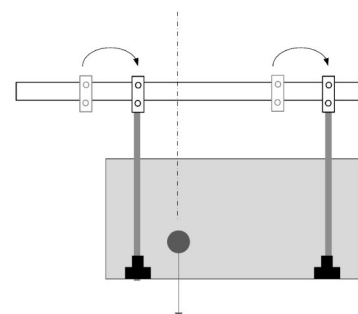
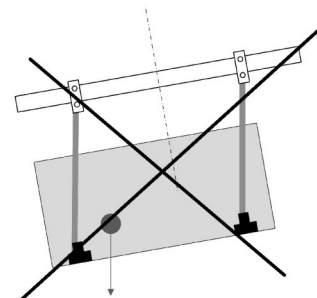
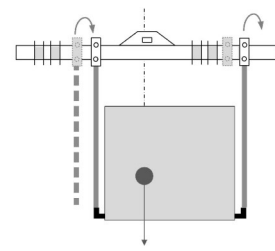
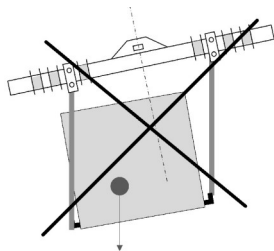
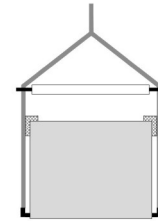
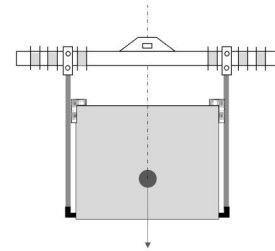
Be careful not to damage the unit.

Recycle and dispose of the packaging material in compliance with local regulations.



Handling

- ⇒ Check that all handling equipment complies with local safety regulations (cran, forklifts, ropes, hooks, etc.).
- ⇒ Provide personnel with personal protective equipment suitable for the situation, such as helmet, gloves, accident-prevention shoes, etc.
- Observe all safety procedures in order to guarantee the safety of the personnel present and the of material.
- Verify unit weight and handling equipment lifting capacity.
- Identify critical points during handling (disconnected routes, flights, steps, doors).
- Suitably protect the unit to prevent damage.
- Lifting with balance
- Lifting with spacer bar
- Align the barycenter to the lifting point
- Gradually bring the lifting belts under tension, making sure they are positioned correctly.
- Before starting the handling, make sure that the unit is stable.



Positioning

⇒ *Installation must be in accordance with local regulations. If they do not exist, follow EN378.*

During positioning consider these elements:

- customer approval
- unit weight and bearing point capacity
- safe accessible position
- functional spaces
- spaces for the air intake/exhaust
- electrical connections
- max. distance allowed by the electrical connections
- water connections

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.*

Positioning

Units are designed to be installed:

- EXTERNAL
- in fixed positions

⇒ *Put the unit in a position where any leaking gas cannot enter buildings or stagnate in closed areas. In the latter case, observe the rules for machinery rooms (ventilation, leak detection, etc.).*

Installation standards:

- install the unit raised from the ground
- bearing points aligned and leveled
- discharged condensation water must not cause harm/danger to people and property
- the accumulation of snow must not cause clogging of the coils
- avoid installations in places subject to flooding

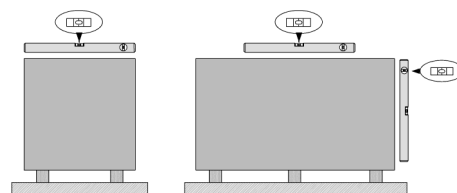
Limit vibration transmission:

- use anti-vibration devices or neoprene strips on the unit support points
- install flexible joints on the hydraulic connections

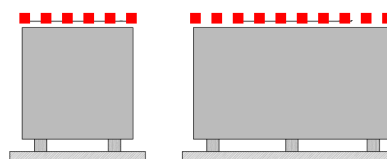
Protect the unit with suitable fence in order to avoid access to unauthorised personnel (children, vandals, etc.)

A correct circulation of the air is mandatory to guarantee the good unit operating..

The unit must be level.



Do not go up to the surface



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 phenomena.

Ignoring the previous indications could:

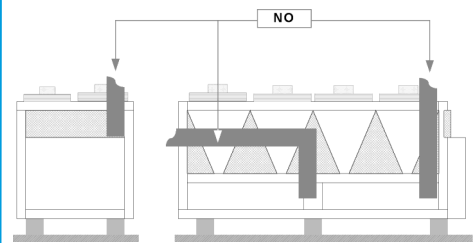
- energy efficiency decrease
- alarm lockout due to HIGH PRESSURE (in summer) or LOW PRESSURE (in winter).

Pressure relief valve gas side

The installer is responsible for evaluating the opportunity of installing drain pipes in compliance with the local regulations in force (EN 378).

If ducted, the valves must be sized according to EN13136 .

The air flow must not be obstructed



Hydraulic system

The pipes must be designed and manufactured to limit pressure drops as much as possible, i.e. optimise performance of the system. Keep the following to a minimum:

- overall length
- number of bends
- number of vertical changes of direction

If the unit is to replace an existing unit, clean the system thoroughly: see Sequence of operations on the following pages

Water quality

The water quality can be checked by qualified personnel.

Water with inadequate characteristics can cause:

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

Water features:

- within the limits indicated by table

Provide a water treatment system if values fall outside the limits.

Cleanliness

Before connecting the water to the unit, clean the system thoroughly with specific products effective to remove residues or impurities that may affect functioning. Existing systems must be free from sludge and contaminants and protected against build-ups.

New systems

In case of new installations, it is essential to wash the entire installation (with the circulator uninstalled) before commissioning the central installation. This removes residues of the installation process (welding, waste, joint products...). The system must then be filled with clean high-quality tap water.

Existing systems

If a new unit is installed on an existing system, the system must be rinsed to avoid the presence of particles, sludge and waste. The system must be drained before installing the new unit. Dirt can be removed only with a suitable water flow. Each section must then be washed separately. Particular attention must also be paid to "blind spots" where a lot of dirt can accumulate due to the reduced water flow. The system must then be filled with clean high-quality tap water. If, after rinsing, the quality of the water is still unsuitable, a few measures must be taken to avoid problems. An option to remove pollutants is to install a filter.

The warranty does not cover damages caused by limestone formations, deposits and impurities from the water supply and/or from failure to clean the systems.

Water component for corrosion limit on Copper

PH	7,5 ÷ 9,0	
SO ₄ ²⁻	< 100	
HCO ₃ ⁻ / SO ₄ ²⁻	> 1	
Total Hardness	8 ÷ 15	°f
Cl ⁻	< 50	ppm
PO ₄ ³⁻	< 2,0	ppm
NH ₃	< 0,5	ppm
Free Chlorine	< 0,5	ppm
Fe ₃ ⁺	< 0,5	ppm
Mn ²⁺	< 0,05	ppm
CO ₂	< 50	ppm
H ₂ S	< 50	ppb
Temperature	< 65	°C
Oxygen content	< 0,1	ppm
Sand	10 mg/L 0.1 to 0.7mm max diameter	
Ferrite hydroxide Fe ₃ O ₄ (black)	Dose < 7.5 mg/L 50% of mass with diameter < 10 µm	
Iron oxide Fe ₂ O ₃ (red)	Dose < 7.5mg/L Diameter < 1 µm	

Risk of freeze

If the unit or the relative water connections can be subject to temperatures close to 0°C:

- Mix water with ethylene glycol, or
- Safeguard the pipes with heating cables placed under the insulation, or
- Empty the system in cases of long non-use

Anti-freeze solutions

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.

Do not use different glycol mixture (i.e. ethylic with propylene).

The unit must always be protected from freeze.
Otherwise irreversible damage may occur.

% ETHYLENE GLYCOL BY WEIGHT		5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
Freezing temperature	°C	-2	-3.9	-6.5	-8.9	-11.8	-15.6	-19.0	-23.4	-27.8	-32.7
Safety temperature	°C	3	1	-1	-4	-6	-10	-14	-19	-23.8	-29.4

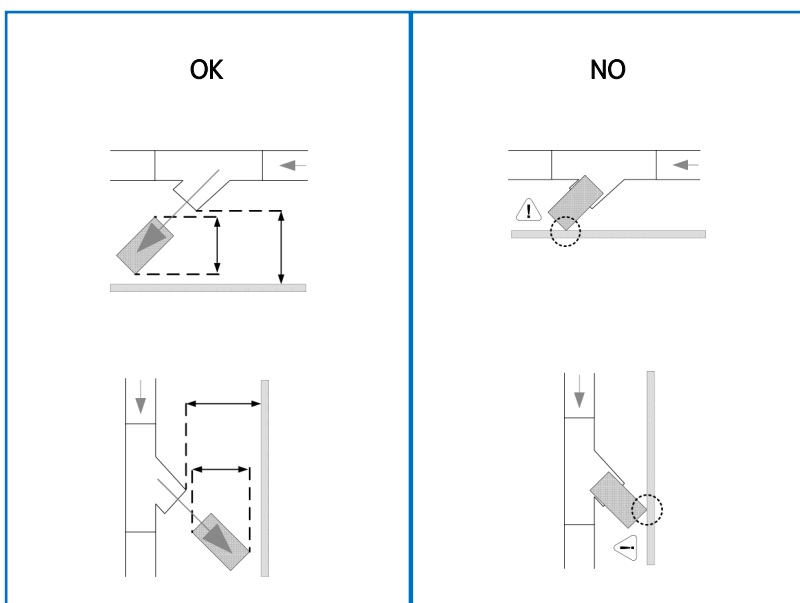
Water filter

⇒ 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.

The filter must have an adequate mesh to prevent the entry of particles greater than:

0,87 mm - shell and tube evaporator



Water flow-rate

The design water flow-rate must be:

- inside the exchanger operating limits (see the TECHNICAL DATA chapter)
- guaranteed also with variable system conditions (for example, in systems where some circuits are bypassed in particular situations)

If the system capacity is below the minimum flow, bypass the system as indicated in the diagram.

If the system capacity exceeds the maximum flow, bypass the system as indicated in the diagram

Minimum system water content

For a proper functioning of the unit a minimum water content has to be provided to the system.

Minimum water content [l]

Comfort application [liters]

= 13 x kWf size 120.1-240.1

= 5 x kWf size 250.2-580.2

Process application [liters]

= 26 x kWf size 120.1-240.1

= 10 x kWf size 250.2-580.2

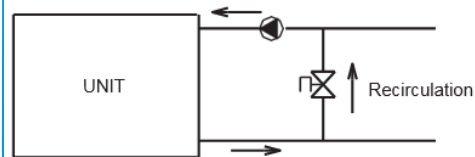
kWf = Nominal cooling capacity unit

Volume calculated does not consider internal heat exchanger (evaporator) water content.

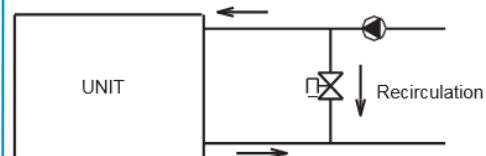
Non-return valve

Provide for the installation of non-return valves (A) in the case of several units connected in parallel.

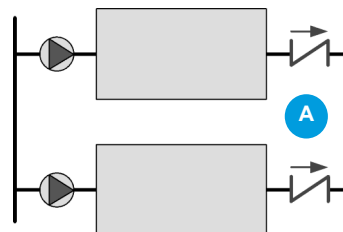
Minimum water flow



Maximum water flow



Non-return valve



Flow Switch

The flow switch must be present to ensure shutdown of the unit if water is not circulating.

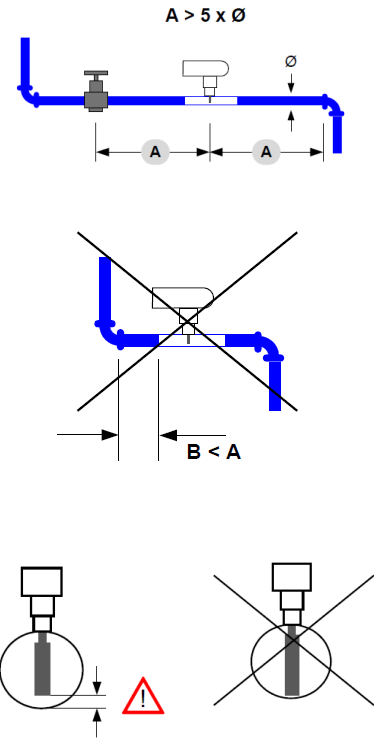
It has to be installed in a duct rectilinear part, not in proximity of curves that cause turbulences.

Operations sequence

Before starting the unit pump:

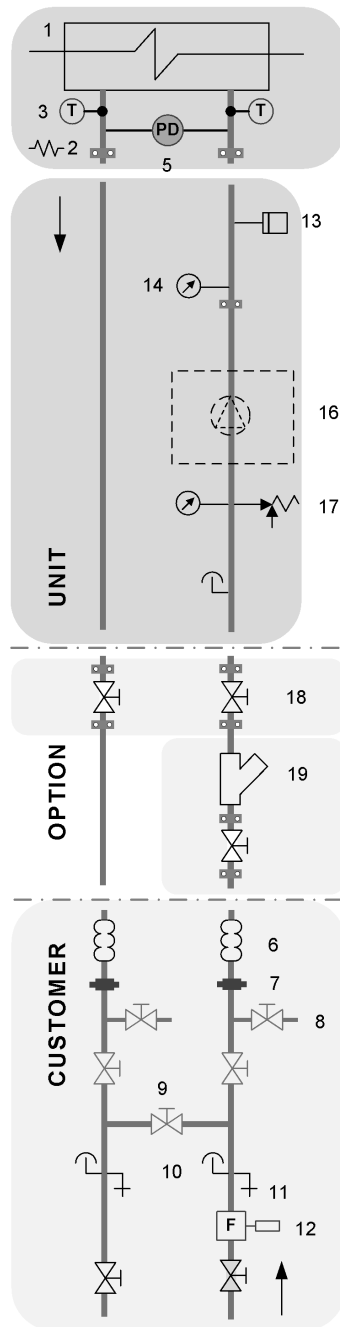
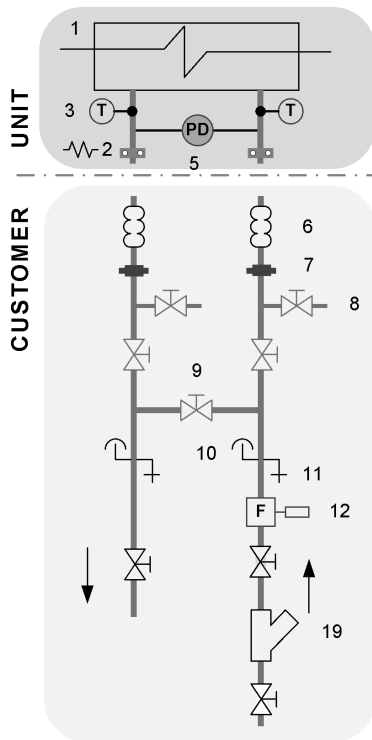
- 1 Close all vents in the high points of the unit's water circuit.
 - 2 Close all drain shut-off valves in the low points of the unit's water circuit
 - Exchangers
 - Pumps
 - collectors
 - storage tanks
 3. Thoroughly wash the system with clean water:
use the bypass to exclude the exchanger from the flow (diagram on previous page) fill and drain the system several times.
 4. Apply additives to prevent corrosion, fouling, formation of mud and algae.
 5. Fill the system
do not use the unit pump
 6. Conduct a leak test.
 7. Isolate the pipes to avoid heat dispersions and formation of condensate.
 8. Leave various service points free (wells, vents, etc).
- ⇒ *Neglecting to wash will lead to the filter having to be cleaned many times and at worst may damage the exchangers and compressors.*

Flow switch

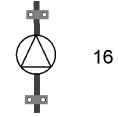


Standard unit

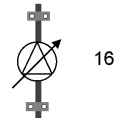
Unit + pump



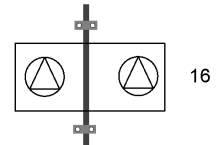
Option A



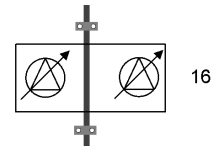
Option B



Option C



Option D



- 1 exchanger
- 2 antifreeze heater
- 3 water temperature probes
- 4 -
- 5 differential pressure switch
- 6 flexible couplings
- 7 piping supports

- 8 exchanger chemical cleaning bypass
- 9 system cleaning bypass
- 10 vent
- 11 drain
- 12 water flow switch
- 13 system loading safety pressure switch

- 14 pressure gauge
- 15 --
- 16 pump
- 17 safety valve
- 18 shut-off valves
- 19 filter

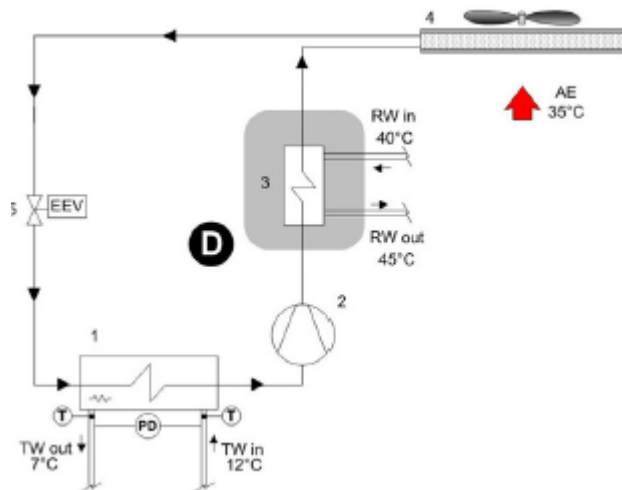
Partial energy recovery

Option

A configuration which enables the production of hot water free-of-charge while operating in the cooling mode, thanks to the partial recovery of condensation heat that would otherwise be rejected to the external heat source.

The maximum capacity available from the partial recovery is equal to the 15% of the rejected heating capacity (cooling capacity + compressor power input)

The recovery exchanger must be always maintained full of water
The lack of water amplifies the noise generated by the operation



D - Partial recovery device

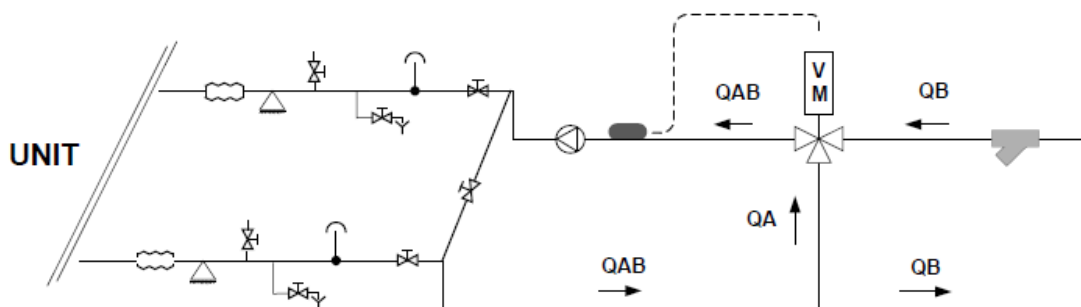
- 1 - Internal exchanger
- 2 - Compressors
- 3 - Recovery exchanger
- 4 - External exchanger
- 5 - Expansion electronic valve

TW in chilled water inlet
TW out chilled water outlet

RW in - Recovery water input
RW out - Recovery water output

T - Temperature probe
PD - Differential pressure switch
AE Outdoor air

When the temperature of the water to be heated is particularly low, it is wise to insert a flow-rate control valve into the system water 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..



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.

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:

- Tensione
- F.L.A.: full load ampere, absorbed current at maximum admitted conditions
- F.L.I.: full load input, full load power input at max. admissible condition
- Electrical wiring diagram Nr

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 Prevent dust, insects or rodents from entering the electrical panel as they can damage components and cables.
- 7 Prevent noise from escaping from the compressor compartment; seal any openings made.
- 8 Secure the cables: if left unattached they can be stripped.
- 9 The cables must not touch the compressors or the refrigerant piping (they reach high temperatures).
- 10 Do not drill holes in the electrical panel.
Alternatively, restore the IP rating with watertight systems.
- 11 Before power the unit, make sure that all the protections that were removed during the electrical connection work have been restored.

Distribution systems

The compressors are compatible with TT or TN type systems.

They cannot be used in IT systems.

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°.

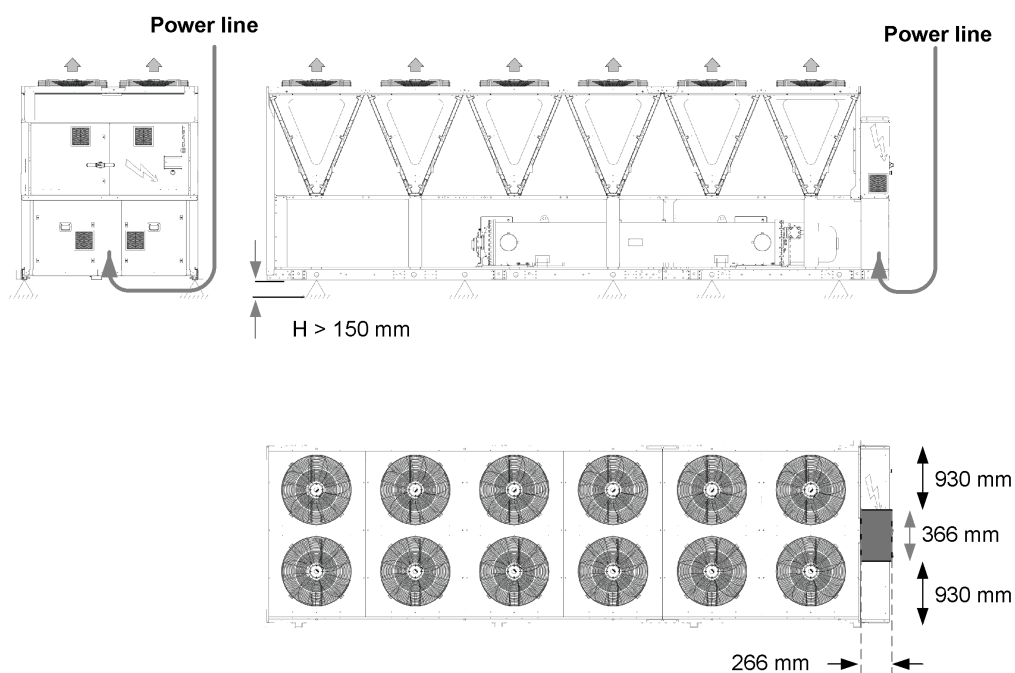
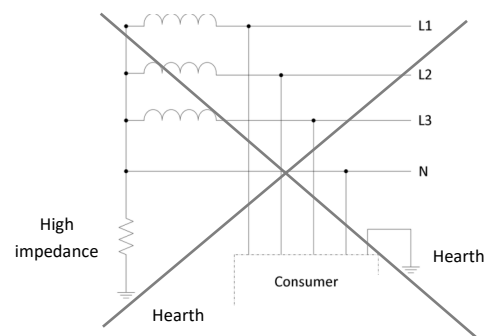
Connect the screen to the ground, only if there aren't disturbances.

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

Respect impedance, capacity and attenuation indications.

Power input

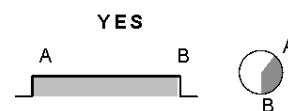
NO systems IT !



Remote ON-OFF

Do not perform short On Off cycles

Do not use the remote On Off with thermoregulation function.



Power supply cables section

Size	120.1	160.1	200.1	240.1	250.2
Min. cable section Cu (mm ²)	1 x 95	1 x 150	1 x 240	2 x 150	1 x 240
Max. cable section Cu (mm ²)	1 x 185	1 x 240	1 x 240	2 x 300	1 x 240
Min. bar Cu section (mm ²)	nd	nd	nd	2 x 30 x5	nd
Max. bar Cu width (mm)	32.0	32.0	40.0	50.0	40.0
Tightening torque (Nm)	20.0	20.0	20.0	20.0	20.0

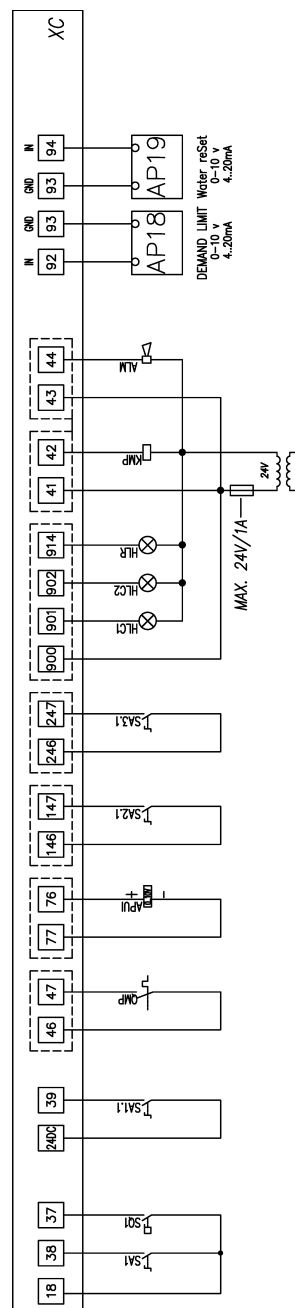
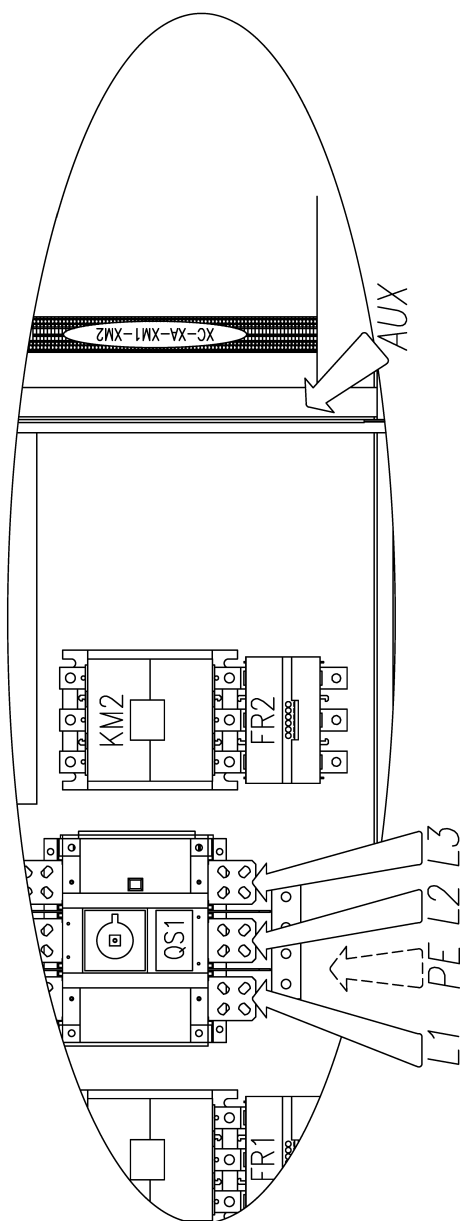
Size	280.2	320.2	340.2	360.2	400.2
Min. cable section Cu (mm ²)	2 x 150	2 x 150	2 x 185	2 x 185	2 x 240
Max. cable section Cu (mm ²)	2 x 300	2 x 300	2 x 300	2 x 300	4 x 185
Min. bar Cu section (mm ²)	2 x 30 x5	2 x 30 x5	2 x 40 x 5	2 x 40 x 5	2 x 50 x 5
Max. bar Cu width (mm)	50.0	50.0	63.0	63.0	63.0
Tightening torque (Nm)	20.0	20.0	nd	nd	nd

Size	440.2	480.2	540.2	580.2
Min. cable section Cu (mm ²)	2 x 240	nd	nd	nd
Max. cable section Cu (mm ²)	4 x 185	4 x 185	4 x 185	4 x 185
Min. bar Cu section (mm ²)	2 x 50 x 5	2 x 60 x 5	2 x 60 x 5	2 x 60 x 5
Max. bar Cu width (mm)	63.0	63.0	63.0	63.0
Tightening torque (Nm)	nd	nd	nd	nd

Power supply network requirements

- 1 The short circuit capacity of the line must be less than 15 kA
- 2 The units can only be connected to TN, TT distribution systems
- 3 Voltage 400-3-50 +/-10%
- 4 Phase unbalance < 2%
- 5 Harmonic distortion less than 12% (THDv<12%)
- 6 Voltage interruptions lasting no longer than 3ms and with at least 1 s between each one
- 7 Voltage dips not exceeding 20% of the RMS value, lasting no longer than a single period (50Hz) and with at least 1 s between each dip.
- 8 Earth cable as specified in the table:

Cross-section of the line conductors (mm ²)	Minimum cross-section of the protective conductor (PE) (mm ²)
$S \leq 16$	S
$16 < S \leq 35$	16
$S > 35$	S/2



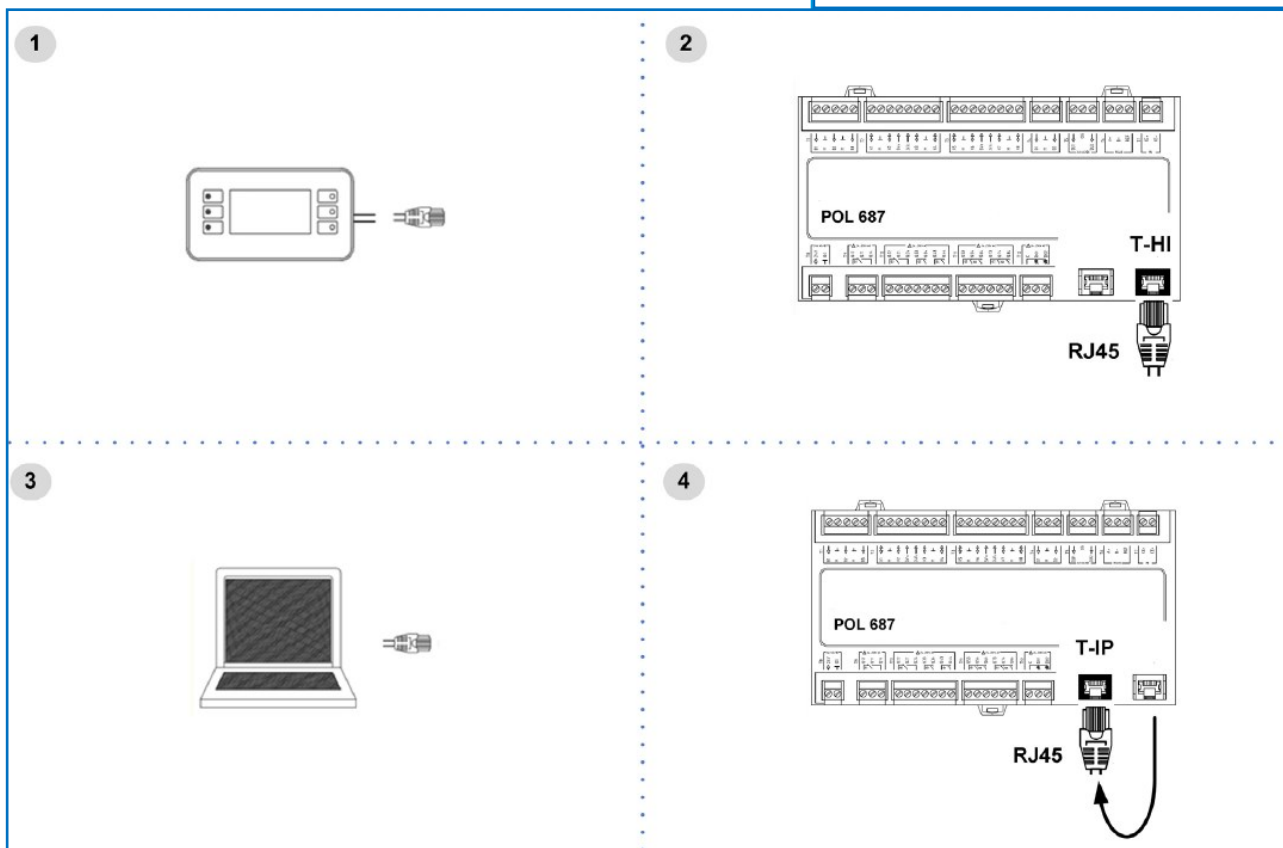
*collegamenti a cura del cliente
connections performed by customer
raccordements à la charge du client
Kundenseitige Anschlüsse
conexiones a cargo del cliente*

Computer connection

Configure P.C.

- 1 connect P.C. and main module with LAN cable
- 2 check in the taskbar that the connection is active
- 3 open Control Panel and select Network and sharing center
- 4 select Modify board setting
- 5 select Local area connection (LAN)
- 6 select Internet protocol version 4 (TPC) IPV4 and enter Property
- 7 set the IP address 192.168.1.100
- 8 set Subnet mask as 255.255.255.0
- 9 confirm (OK)
- 10 enter Start (Windows button)
- 11 write the command cmd and enter/do it
- 12 write and run the command Ping 192.168.1.42
- 13 the message, connection is OK, will appear when successful
- 14 enter the browser (Chrome, Firefox ecc)
- 15 write and run the command http://192.168.1.42
- 16 Userid = WEB
- 17 Password = SBTAdmin!

- 1 Service keypad
- 2 RJ45: standard connection
- 3 P.C.-not supplied
- 4 P.C. connection, shift RJ45 from T-HI to T-IP



Remote Control

Option

- 1 Distance up to 350 mt
- 2 Distance up to 700 mt

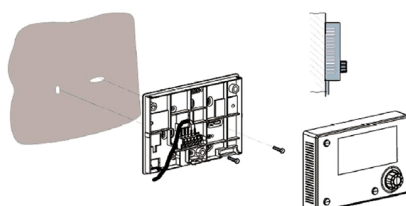
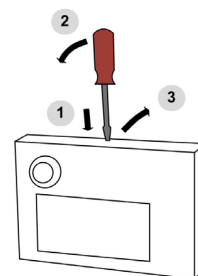
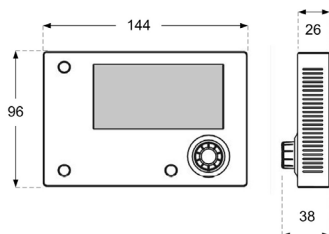
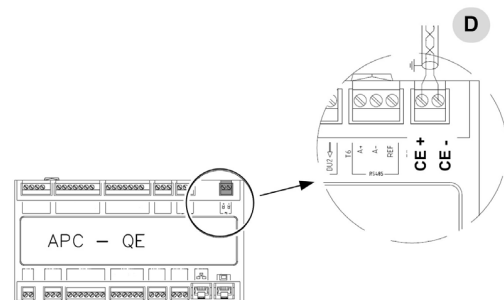
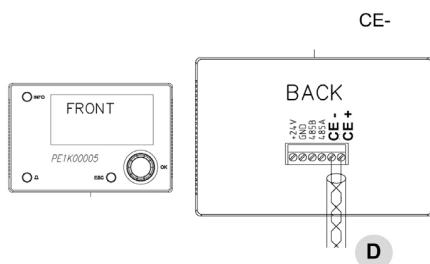
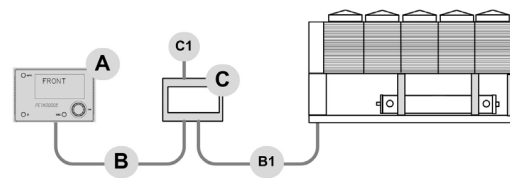
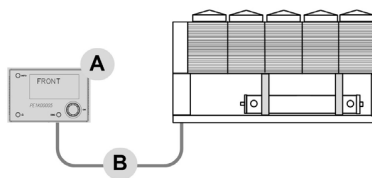
A User interface

B=B1 KNX bus, max 350 mt
twisted pair with shield, Ø 0,8 mm
EIB/KNX cable marking recommended

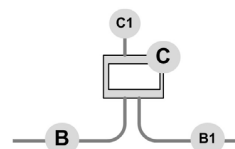
C PSX - Mains power supply unit
power supply unit N125/11 5WG1 125-1AB11

C1 AC 120...230V, 50...60Hz

D KNX bus, max 350 mt

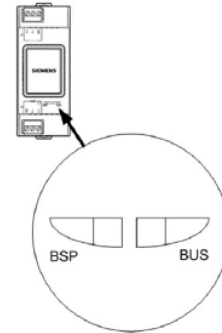
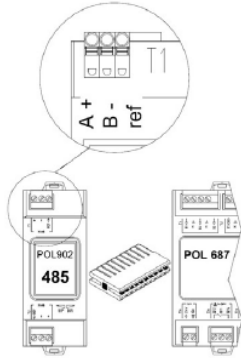


PSX - type : N125/11 5WG1 125-1AB11



Modbus - RS485

Option



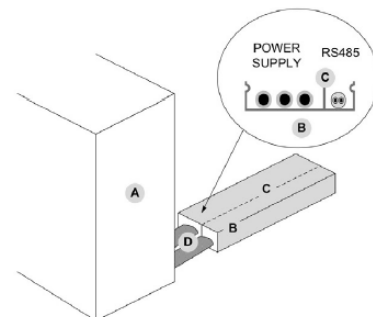
LED BSP	communication with AP1 module	LED BUS	communication with Modbus
green	communication ok	green	communication ok
yellow	software ok but communication with AP1 down	yellow	startup / channel not communicating
red	flashing: software error fixed: hardware error	red	communication down

Modbus / LonWorks / Cable requirements

Couple of conductors twisted and shielded Section of conductor 0,22mm²...0,35mm² Rated power between conductors < 50 pF/m Nominal impedance 120 Ω

Recommended cable BELDEN 3106A

- very RS485 serial line must be set up using the 'In/Out' bus system.
- Other types of networks are not allowed, such as Star or Ring networks.
- The difference in potential between the earth of the two RS485 devices that the cable shielding needs to be connected to must be lower than 7 V
- There must be suitable arresters to protect the serial lines from the effects of atmospheric discharges
- A 120 ohm resistance must be located on the end of the serial line. Alternatively, when the last serial board is equipped with an internal terminator, it must be enabled using the specific jumper, dip switch or link.
- The cable must have insulation features and non-flame propagation in accordance with applicable regulations.
- The RS485 serial line must be kept as far away as possible from sources of electromagnetic interference.



- A. Unit
- B. Metal conduit
- C. Metal septums
- D. Metal-lined sheath (sleeve)

General

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

The electrical, water connections and the other system works are by the installer.

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

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

For details, refer to the various chapters in the manual.

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

WARNING

⇒ *After turning off the power, wait at least 10 minutes before accessing to the electrical panel or any other electrical component.*

⇒ *Before accessing check with a multimeter that there are no residual stresses*

⇒ *Do not power the unit with empty water side exchangers. Possible damage to anti-freeze electric heaters.*

Preliminary checks

Unit OFF power supply

		Yes / No
1	safe access	
2	suitable frame to withstand unit weight + people weight	
3	functional clearances	
4	air flow: correct return and supply (no bypass, no stratification)	
5	considered level to be reachable by snow	
6	considered main winds	
7	lack of chimneys/corrosive atmospheres/pollutants	
8	structure integrity	
9	fans run freely	
10	unit on vibration isolators	
11	The unit must be level.	
12	unit input water filter + shut-off valves for cleaning	
13	vibration dampeners on hydraulic connections	
14	expansion tank (recommended volume = 10% system content)	
15	minimum system water content	
16	clean system	
17	loaded system + possible glycol solution + corrosion inhibitor	
18	system under pressure + vented	
19	refrigerant circuit visual check	
20	earthing connection	
21	power supply features	
22	remote On-Off	

Start-up sequence

Unit power supply ON

		Yes / No
1	compressor carter resistances operating at least since 8 hours	
2	off-load voltage measure	
3	phase sequence check	
4	pump manual start-up and flow check	
5	refrigeration circuit shut-off valves opening (if applicable)	
6	unit ON	
7	load voltage measure	
8	verify the lack of bubbles in the liquid light (if applicable)	
9	check of all fan operating	
10	measure of return and supply water temperature	
11	super-heating and sub-cooling measure	
12	check no anomalous vibrations are present	
13	set-point personalization	
14	scheduling customisation	
15	complete and available unit documentation	

Cooling circuit

- 1 Visually inspect the refrigerating circuit: the presence of oil stains can be a symptom of leakage (caused e.g. by transportation, handling 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.
- 4 Open all of the refrigeration circuit shut-off valves (if applicable).

Hydraulic circuit

- 1 Before connecting the unit to the hydraulic system, make sure that the hydraulic system has been washed and that the water has been drained
- 2 Check that the hydraulic 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 is no air inside the circuit, and bleed it through the vent valves in the high points of the system if necessary.
- 5 When using antifreeze solutions, make sure the glycol percentage is suitable for the type of use envisaged.

NOTE

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

Electric circuit

Check the unit is connected to the earthing system.

Check the conductors are tightened as: the vibrations caused by handling and transport might cause these to come loose.

Power the unit by closing the isolation device but leave in OFF.

Check the network frequency and voltage values, which must be within the limits: 380-415V 3N~ 50Hz +/-6%

Check and adjust the phase balance as necessary: it must be lower than 2%

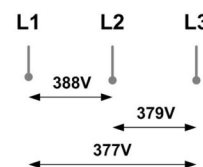
Example:

$$400 - 6\% = 376$$

$$400 + 6\% = 424$$

NOTE

⇒ *Working outside of these limits can cause irreversible damages and voids the warranty.*



$$1) \quad \frac{388 + 379 + 377}{3} = 381 \text{ (A)}$$

$$2) \quad \text{MAX} - A = 388 - 381 = 7$$

$$3) \quad S = \frac{7}{A} \times 100 = 1,83 \text{ OK}$$

Voltage

Check that the air and water temperatures are within in the operating limits.

Start-up the unit.

While the unit is operative, i.e. in stable conditions nearing operating ones, check:

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

Options

Menu accessible only after having entered the password. Access reserved only to specifically trained personnel.

The parameter modification can cause irreversible damages.

Path: Main menu / Unit parameters / Options

Parameters	Short description	Description
P0050	En Demand limit	Enabling Demand Limit: 0 = disabled, 1 = analogic input, 2 = parameter
P0051	En Water reset	Enabling Water reset: 0 = Off, 1 = Cool, 2 = Heat, 3 = Cool and Heat
P0052	En 2SetPoint	Enabling 2SetPoint: 0 = Off, 1 = On
P0053	En Climatica	Enabling Climatic TExt: 0 = Off, 1 = Cool, 2 = Heat, 3 = Cool and Heat
P0054	PrioritaCmd	Status and machine mode priority: Local [0] = Priority to local commands, BMS [1] priority to commands from plant supervisor
P0055	En DI On-Off	Enabling remote ON-OFF: 0 = Off, 1 = On
P0061	Enable scheduler	Enabling scheduler: 0 = Off, 1 = On
P0062	TypeDL	Inlet signal type: 0 = 0-10V; 1 = 4-20mA
P0063	TypeWR	Inlet signal type: 0 = 0-10V; 1 = 4-20mA

Demand limit

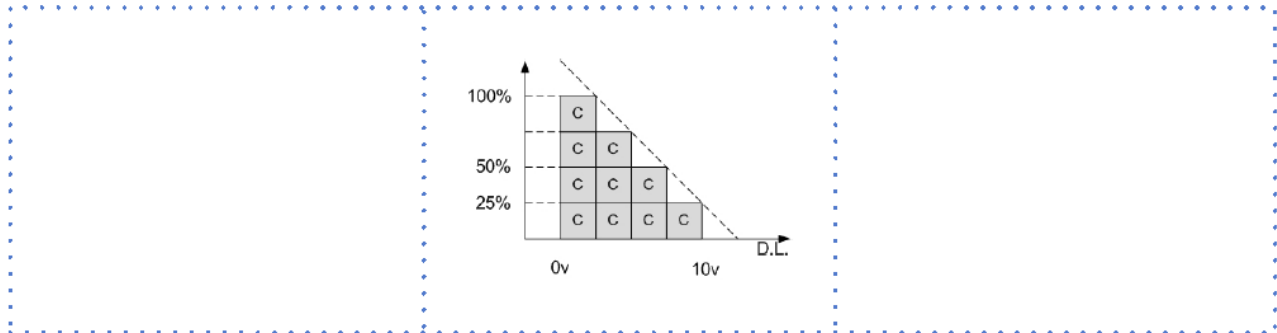
Menu accessible only after having entered the password.

⇒ Access reserved only to specifically trained personnel.

⇒ The parameter modification can cause irreversible damages.

It is possible to limit the absorbed electric power with an external signal 0-10 Vcc or 4-20mA. The higher the signal is, the lower the number of compressors available to meet the thermal need. Only if P0050:En DemandLimit ≠ 0

Path: Main menu / Unit parameters / Options



Step	Action	Menu - Variable	Keys		Display
1	Press 3 sec.		√		Password
2	Set	Password	▲	√	
3	Press		i		Main Menu
4	Select	Unit parameters	▼	√	Unit parameters
5	Select	Setpoint	▼	√	Setpoint
6	Select	Demand limit	▼	√	
7	Set	Demand limit	▲	▼	
8	Confirm		√		
9	Press 3 sec.		⏏		
10	Select	Local connections	√		

Path: Main menu / Unit parameters / Options

Parameters	Short description	Description
P0062	TypeDL	Inlet signal type: 0=0-10V; 1=4-20mA

Path: Main Menu / Unit parameters / Setpoint

P0009	set demand limit	Parameter setting of the value % of demand limit
-------	------------------	--

Climatica TExt

Menu accessible only after having entered the password.

⇒ Access reserved only to specifically trained personnel.

⇒ The parameter modification can cause irreversible damages.

The setpoint based on the climatic curve and the Water Reset is displayed on the display Only if P0053: En Climatica = 1

Path: Main menu / Unit parameters / Options



Step	Action	Menu - Variable	Keys		Display
1	Premere 3 sec.		√		Password
2	Set	Password	▲	√	
3	Press		i		Main menu
4	Select	Unit parameters	▼	√	Unit parameters
5	Select	Climatic TExt	▼	√	Climatic TExt (pwd)
6	Select	Parameter	▼	√	
7	Set		▼	▲	
8	Confirm		√		
9	Press 3 sec.		⏏		
10	Select	Local connections	▼	√	

Path: Main menu / Unit parameters / Climatic TExt

Parameters	Short description	Description
P0265	CSptLow	value of set Cool for outdoor air greater than P0266
P0266	AirAtSptLowC	value of outdoor air for set Cool equal to the parameter P0265
P0267	CSptHigh	value of set Cool for outdoor air lower than P0268
P0268	AirAtSptHigC	value of outdoor air for set Cool equal to the parameter P0267

Water reset

Menu accessible only after having entered the password.

⇒ Access reserved only to specifically trained personnel.

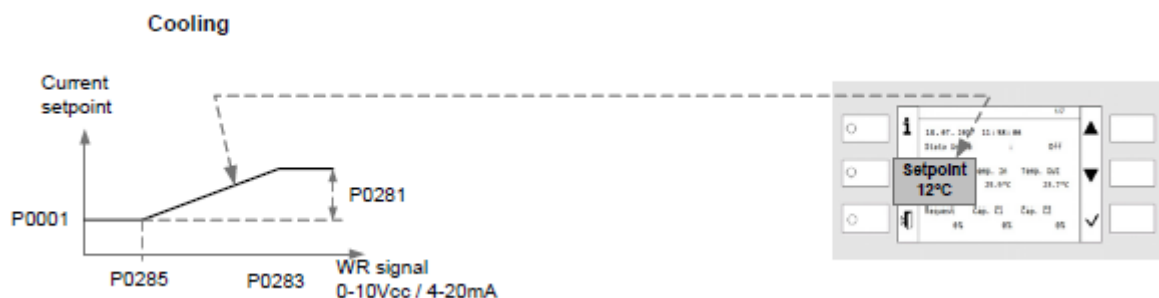
⇒ The parameter modification can cause irreversible damages.

It is possible to limit the absorbed electric power with an external signal 0-10 Vcc or 4-20mA.

The setpoint based on the climatic curve and the Water Reset is displayed on the display

Only if P0051: En WaterReset = 1

Path: Main menu / Unit parameters / Options



Step	Action	Menu - Variable	Keys		Display
1	Press 3 sec.		✓		Password
2	Set	Password	▼	✓	
3	Press		i		Main menu
4	Select	Unit parameters	▼	✓	Unit parameters
5	Select	Water Reset	▼	✓	Water Reset
6	Select	Parameters	▼	✓	
7	Set		▼	▲	
8	Confirm		✓		
9	Press 3 sec.		⏏		
10	Select	Local connections	✓		

Path: Main menu / Unit parameters / Options

Parameters	Short description	Description
P0063	TypeWR	Inlet signal type: 0=0-10V; 1=4-20mA

Path: Main Menu / Unit parameters / Water reset

P0281:	MaxCWRC	Maximum correction to be applied to the setpoint
P0283	SWRMaxC	Value of the WR control signal corresponding to the correction of the set COOL equal to the parameter P0281
P0283	SWRMinC	Value of the WR control signal corresponding to the correction of the set COOL equal to 0

Reduced load operation

The units are equipped with partialisation steps and can therefore operate with reduced loads.

However, a constant and prolonged operation with reduced load with frequent compressor(s) stops and start-ups can cause irreparable damages due to the absence of oil return.

The above-described operating conditions must be considered outside the operating limits.

In the event of a compressor breakdown due to operating in the above-mentioned conditions, the warranty shall not be valid and Clivet spa declines any responsibility.

Periodically check the average operating times and frequency of compressor start-ups: indicatively the minimum thermal load must be such as to require a compressor to operate for at least ten minutes.

If the average times are close to this limit, take the proper corrective actions, for example, increasing the water content of the system is not enough in this application.

Check the water flow-rate of the evaporator

Check that the difference between the temperature of the exchanger's input and output water corresponds to the potential according to this formula:

- $\text{unit cooling power (kw)} \times 860 = \text{Dt (}^{\circ}\text{C)} \times \text{flow rate (L/h)}$

The cooling power is shown in the GENERAL TECHNICAL DATA chart included in this manual, referred to specific conditions, or in the COOLING PERFORMANCE charts in the TECHNICAL BULLETIN referred to various conditions of use.

Check for water side exchanger pressure drops:

- determine the water flow-rate
- measure the difference in pressure between the exchanger's input and output water and compare it with the WATER-SIDE EXCHANGER PRESSURE DROPS chart

Measuring the pressure is easier if pressure gauges are installed as indicated in the DIAGRAM OF SUGGESTED WATER CONNECTIONS.

Start-up report

To detect the objective operational conditions is useful to control the unit over time.

With unit at steady state, i.e. in stable and close-to-work conditions, identify the following data:

- total voltages and absorptions with unit at full load
- absorptions of the different electric loads (compressors, fans, pumps etc)
- temperatures and flows of the different fluids (water, air) both in input and in output from the unit
- temperatures and pressures in the feature points of the cooling circuit (compressor, liquid, suction drain/unload)

The detections must be kept and made available during maintenance interventions.

Directive 2014/68EU PED

Directive 2014/68EU PED also sets out the regulations for unit installers, users and maintenance operators.

Refer to local regulations; briefly and as an example, see the following:

Compulsory verification of the first installation:

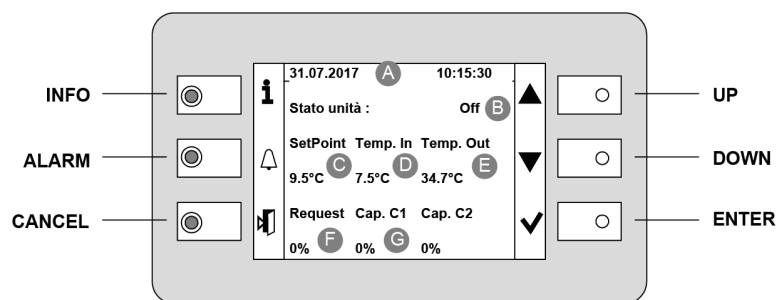
- only for units assembled on the installer's building site (for ex. condensing circuit + direct expansion unit)

Commissioning declaration:

- for all units

Periodical checks:

- to be executed with the frequency indicated by the Manufacturer (see the "maintenance inspections" paragraph)



Led

INFO	Not used
ALARM	Blink / fixed = alarm present
CANCEL	not used currently








Display

Ref.	Variable	description
A		Date - Time
B	Current state	On / off / eco / pmp On
C	SetPoint	Adjustment temperature
D	Temp. IN	Water inlet temperature utility side
E	Temp. OUT	Water outlet temperature utility side
F	Request	Power requested by thermoregulator (including any limitation from Demand Limit)
G	Cap. C1	Power capacity delivered by the compressor 1
	Cap. C2	Power capacity delivered by the compressor 2

Keys











Symbol	Name	description
	Info	Main menu
	Alarm	Alarm display
	Cancel	Exit Previous level Keyboard settings
	Up	Increases value
	Down	Decreases value
	Enter	Confirm Password

Change unit state

Step	Action	Menu/Variable	Keys		Display
1	Press				Main menu
2	Select	Cmd Local state			
3	Set	OFF - ECO - ON - Pump On			
4	Confirm				
6	Exit				







STATE	
ON	Compressors enabled
OFF	Compressors disabled
	Antifreeze protection user side active
ECO	Compressors enabled
	Pumps activated periodically
	Setpoint = SetPoint ECOCool
Pmp_On	Compressors disabled
	Pumps running

Modify setpoint

Step	Action	Menu/Variable	Keys		Display
1	Press				Main menu
2	Select	Unit parameters			Unit parameters
3	Confirm	Set Point			
4	Select	Set Point			
5	Set	Set Point			
6	Confirm				
7	Exit				

















Parameters	Short description	description	
P0001	SetPoint Cool	Setpoint Cool	
P0003	2°SetPoint Cool	2° Setpoint Cool	Enable by remote switch
P0005	SetPoint ECOCool	Economic summer SetPoint	

Display the status














Step	Action	Menu/Variable	Keys		Display
1	Press				Main menu
2	Select	Machine State			
3	Select	General, circuit, ecc..			
4	Exit				

Scheduler

It is possible to set 6 events (Off, Eco, On, Recirculating) for each week day.

Step	Action	Menu/Variable	Keys		Display
1	Press				Main menu
2	Select	Scheduler			Scheduler
3	Select	Day			
4	Select	Time			
5	Set	Event time			
6	Confirm				
7	Select	Value			
8	Set	On/Eco..			
9	Confirm				
10	Exit				

Enable Scheduler

Step	Action	Menu/Variable	Keys		Display	Notes
1	Press 3 sec.				Password	
2	Set	Password				
3	Press				Main menu	*
4	Select	Unit Parameters				
5	Select	Option config				
6	Set	P0061=1				
7	Press 3 sec.					
	Select	Local connections				

* Unit Parameters menu is displayed

Keyboard settings

Step	Action	Menu/Variable	Keys		Display
1	Press 3 sec.				
2	Press				HMI Settings
3	Select				
4	Press				
5	Press				
6	Select	Local connections			

Alarms



Before resetting an alarm identify and remove its cause.

Repeated resets can cause irreversible damage.

Display of alarm: step 1-3

Reset allarm: step 4-10

Example:

+ eE001: Monitore fase: Fault = active alarm

- EE003: Guasto P1 Util: Ok = resetted alarm

Step	Action	Menu/Variable	Keys		Display
1	Press				Alarm list detail
2	Press				Alarm list
3	Select	Alarm			Alarm list detail
4	Press 3 sec.				Password
5	Set	Enter password			Alarm list detail
6	Press				Alarm list
7	Select	Alarm			
8	Select	Reset Executed			
9	Press 3 sec.				
10	Select	Log off			

General list of alarms

The alarm code identifies the concerned circuit:

Example:

ee 1 01:TimeOutModCirc = circuit 1

ee 2 01:TimeOutModCirc = circuit 2

Code	Alarm type
ee, ff, ii	automatic reset
eE, fF, iI	automatic reset (after N intervention the alarm becomes manual reset)
EE, FF, II	manual reset

Alarm list - 1

ID	Description
ce1108	Critical. Inverter in critical overload status
ce1111	Critical. Inverter in critical undervoltage status
ce1112	Critical. Inverter in critical over-temperature status
ce1116	Critical. Main CPU HW error
ce1117	Critical. Temperature sensor error
ce2108	Critical. Inverter in critical overload status
ce2111	Critical. Inverter in critical undervoltage status
ce2112	Critical. Inverter in critical over-temperature status
ce2116	Critical. Main CPU HW error
ce2117	Critical. Temperature sensor error
cf1102	Critical. Compressor envelope in critical area
cf1105	Critical. Critical oil level
cf1107	Critical. Motor in critical temperature
cf2102	Critical. Compressor envelope in critical area
cf2105	Critical. Critical oil level
cf2107	Critical. Motor in critical temperature
eE0001	Phase monitor in alarm mode
EE0003	Thermal protection of utility pump 1 active
EE0004	Thermal protection of utility pump 2 active
EE0005	Thermal protection of utility pump 3 active
eE0008	Utility pump inverter alarm
ee0010	Master disconnected on eco share network
ee0011	Slave 2 on eco share network in generic alarm mode
ee0012	Slave 2 disconnected on eco share network
ee0013	Slave 3 on eco share network in generic alarm mode
ee0014	Slave 3 disconnected on eco share network
ee0015	Slave 4 on eco share network in generic alarm mode
ee0016	Slave 4 disconnected on eco share network
ee0017	Slave 5 on eco share network in generic alarm mode
ee0018	Slave 5 disconnected on eco share network
ee0019	Slave 6 on eco share network in generic alarm mode
ee0020	Slave 6 disconnected on eco share network
ee0021	Slave 7 on eco share network in generic alarm mode
ee0022	Slave 7 disconnected on eco share network
ee0027	Faulty utility inlet water sensor
ee0028	Faulty utility outlet water sensor
ee0029	Faulty outdoor air sensor
ee0030	Faulty analogue input for demand limit (0-10V)
ee0031	Faulty analogue input for water reset (0-10V)
ee0033	Faulty electrical panel sensor
ee0034	Faulty second electrical panel temperature sensor
ee0035	Faulty recovery inlet water sensor
ee0036	Faulty recovery outlet water sensor
ee0037	Faulty recovery water differential pressure transducer
ee0038	Faulty analogue input for recovery water reset (0-10V)
ee0039	Faulty analogue input for recovery water reset (4-20mA)
ee0040	Faulty source inlet water sensor
ee0041	Faulty source outlet water sensor

Alarm list - 2

ID	Description
ee0042	Faulty source water differential pressure transducer
ee0050	Faulty utility water differential pressure transducer
EE0054	Recovery pump 1 thermal protection active
EE0055	Recovery pump 2 thermal protection active
EE0056	Recovery pump 3 thermal protection active
eE0057	Recovery pump inverter alarm
EE0060	Source pump 1 thermal protection active
eE0061	Source pump inverter alarm
ee0100	Communication error between 98U1 expansion module and POL687
ee0101	Communication error between 98U2 expansion module and POL687
ee0110	Communication error between 98U3 expansion module and POL687
ee0130	Faulty analogue input for demand limit (4-20mA)
ee0131	Faulty analogue input for water reset (4-20mA)
ee1001	Faulty TEV3 suction temperature sensor
ee1002	Faulty TEV5 suction temperature sensor
ee1003	Faulty liquid intake pressure transducer
ee1004	Locked electronic valve
ee1005	Locked electronic valve
EE1006	Compressor protection
ee1011	Locked electronic valve
EE1018	Source fan thermal protection active
ee1027	Faulty suction temperature sensor
ee1028	Faulty condensation pressure transducer
ee1029	Faulty intake pressure transducer
ee1039	No ModBus communication between POL_687 and the inverter of circuit 1
ee1070	Fault on physical driver of electronic valve
ee1071	Fault on physical driver of electronic valve
ee1077	Fault on physical driver of electronic valve
ee1101	Fault. Faulty power supply network
ee1106	Fault. Motor in overload protection
ee1108	Fault. Inverter in overload protection
ee1109	Fault. Inverter in overcurrent
ee1110	Fault. Inverter in overvoltage
ee1111	Fault. Inverter in undervoltage
ee1112	Fault. Inverter in over-temperature
ee1113	Fault. Inverter in HW configuration error
ee1114	Fault. Inverter in SW configuration error
ee1115	Fault. Compressor motor parameter configuration error
ee1116	Fault. Main CPU HW error
ee1117	Fault. Temperature sensor error
ee1118	Liquid temperature sensor
ee1139	No ModBus communication between POL_687 and the inverter of circuit 1 for address configuration procedure
ee2001	Faulty TEV4 suction temperature sensor
ee2002	Faulty TEV6 suction temperature sensor
ee2003	Faulty liquid intake pressure transducer
ee2004	Locked electronic valve
ee2005	Locked electronic valve
EE2006	Compressor protection

Alarm list - 3

ID	Description
ee2011	Locked electronic valve
EE2018	Source fan thermal protection active
ee2027	Faulty suction temperature sensor
ee2028	Faulty condensation pressure transducer
ee2029	Faulty intake pressure transducer
ee2039	No ModBus communication between POL_687 and the inverter of circuit 2
ee2070	Fault on physical driver of electronic valve
ee2071	Fault on physical driver of electronic valve
ee2077	Fault on physical driver of electronic valve
ee2101	Fault. Faulty power supply network
ee2106	Fault. Motor in overload protection
ee2108	Fault. Inverter in overload protection
ee2109	Fault. Inverter in overcurrent
ee2110	Fault. Inverter in overvoltage
ee2111	Fault. Inverter in undervoltage
ee2112	Fault. Inverter in over-temperature
ee2113	Fault. Inverter in HW configuration error
ee2114	Fault. Inverter in SW configuration error
ee2115	Fault. Compressor motor parameter configuration error
ee2116	Fault. Main CPU HW error
ee2117	Fault. Temperature sensor error
ee2118	Liquid temperature sensor
ee2139	No ModBus communication between POL_687 and the inverter of circuit 2 for address configuration procedure
ff0001	Refrigerant leak detector in alarm mode
ff1005	Circuit lock due to low superheating
ff1006	Circuit lock due to low superheating
ff1007	Circuit lock due to low superheating
ff1012	Low pressure from transducer in recovery mode
ff1013	High pressure from pressure switch
ff1015	High pressure from transducer
ff1017	Minimum compression ratio
ff1018	Low pressure from transducer
FF1019	Maximum compression ratio
ff1034	Circuit drained of refrigerant
FF1046	Limit of low pressure from transducer
ff1100	Fault. Too many identical temporary reset errors in 24 hours / too many timed reset errors in 1 hour
ff1102	Fault. Compressor envelope in locking area
ff1103	Fault. Envelope configuration error
ff1104	Fault. High oil temperature
ff1105	Fault. Low oil level
ff1107	Fault. Motor in over-temperature
ff1118	Fault. High and low pressure transducers outside the limits
ff2005	Circuit lock due to low superheating
ff2006	Circuit lock due to low superheating
ff2007	Circuit lock due to low superheating

Alarm list - 4

ID	Description
fF2012	Low pressure from transducer in recovery mode
fF2013	High pressure from pressure switch
fF2015	High pressure from transducer
fF2017	Minimum compression ratio
fF2018	Low pressure from transducer
FF2019	Maximum compression ratio
ff2034	Circuit drained of refrigerant
FF2046	Limit of low pressure from transducer
ff2100	Fault. Too many identical temporary reset errors in 24 hours / too many timed reset errors in 1 hour
ff2102	Fault. Compressor envelope in locking area
ff2103	Fault. Envelope configuration error
ff2104	Fault. High oil temperature
ff2105	Fault. Low oil level
ff2107	Fault. Motor in over-temperature
ff2118	Fault. High and low pressure transducers outside the limits
iI0002	Utility hydraulic pressure alarm
iI0006	User side differential pressure switch/flow alarm
II0007	User freeze alarm
ii0008	Pumps active in freeze protection
II0009	Incongruent differential between user Tin and Tout
II0010	Recovery freeze alarm
ii0011	Pumps active in recovery freeze protection
II0012	Incongruent differential between recovery Tin and Tout
II0014	Source freeze alarm
ii0015	Pumps active in source freeze protection
iI0052	Recovery side differential pressure switch/flow alarm
iI0053	Recovery hydraulic pressure alarm
iI0062	Source hydraulic pressure alarm
iI0063	Source side differential pressure switch/flow alarm

Area checks

Before working on systems containing flammable refrigerants, perform safety checks to reduce the risk of combustion to the minimum. Before performing any reparation operations on the cooling system, comply with the following warnings.

Work procedures

Operations must be performed following a controlled procedure so as to reduce the risk of flammable gases or vapours developing.

General work area

All the personnel in charge with maintenance operations and other operators working in the local area must be instructed and monitored as regards the nature of the intervention.

Avoid working in tight spaces. The area surrounding the working space must be cordoned off. Make sure the area is secured by monitoring the flammable material.

Check the presence of refrigerant

Both before and during operations, the area must be monitored with a dedicated refrigerant detector to make sure the technician is aware of the presence of potentially-flammable environments.

Make sure the leak detection equipment is suitable for use with flammable refrigerants and therefore without sparks, suitably sealed or intrinsically safe.

Presence of the fire extinguisher

If hot interventions are not performed on cooling equipment or connected components, suitable fire fighting equipment must be kept at hand.

Keep a dry-powder or CO2 extinguisher near the loading area.

No ignition source

It is absolutely forbidden to use ignition sources that may lead to fire or explosion during operations on the cooling system or on pipes that contain or have contained flammable refrigerant.

All possible ignition sources, including cigarettes, must be kept sufficiently away from the installation, reparation, removal and disposal site as flammable refrigerant may be released in the surrounding area.

Before starting operations, the area surrounding the equipment must be inspected to guarantee the absence of flammables or combustion risks. "SMOKING IS FORBIDDEN" signs must be affixed.

Ventilated area

Before intervening on the system or performing any hot intervention, make sure to be in an outdoor or suitably ventilated area.

Ventilation must be maintained during operations. Ventilation must disperse the released refrigerant safely, preferably outdoors in the atmosphere.

Cooling equipment checks

Should a replacement be necessary, the new components installed must be suitable for the purpose envisaged and compliant with specifications.

Always follow the manufacturer guidelines on maintenance and assistance. In case of doubt, contact the manufacturer technical office for assistance.

The following checks must be preformed on systems containing flammable refrigerants:

- the quantity of the charge must comply with the size of the room where the parts containing refrigerant are installed;
- the machine and ventilation intake function correctly and are not obstructed;
- If an indirect cooling circuit is used, the secondary circuits must be checked to verify the presence of refrigerants; the marking on the equipment remains visible and readable;
- Make sure markings and symbols are always readable; cooling pipes or components must be installed in a position that makes improbable their exposure to substances that may corrode the components containing refrigerant, unless they are manufactured with material intrinsically resistant to corrosion or suitably protected against corrosion.

Electrical device checks

The reparation and maintenance of electric components must include initial safety checks and component inspection procedures.

In case of a fault that compromises safety, do not perform any electrical connection to the circuit until said fault is suitably resolved.

If it is not possible to repair the fault immediately and electrical components need to remain functioning, a temporary solution must be adopted. This must be reported to the owner of the equipment so as to keep all parties informed.

Initial safety checks must include:

- that condensers are emptied. This operation must be performed safely to avoid any sparks;
- that electrical components and wiring are not exposed during the charging, recovering or venting phases;
- That the earth conductor is continuous.

Repairing sealed components

- During the reparation operations of sealed components, disconnect all the equipment before removing sealed casings etc. If, during operations, it is absolutely necessary for the equipment to remain connected, a leak detection device must be placed in the most critical point so as to report any potentially-dangerous situation.
- Pay particular attention to what follows to guarantee that, while intervening on electrical components, the housing is not altered in a way so as to affect the level of protection. This includes damage to cables, an excessive number of connections, terminals not compliance with the original specifications, damage to gaskets, an unsuitable installation of gaskets, etc.
- Make sure the device is installed safely.
- Check that the seals or sealing materials are not altered in such a way that they no longer impede the entry of flammable environments. Spare parts must comply with manufacturer specifications.

NOTE:

⇒ *Using silicone sealants may inhibit the effectiveness of a few types of leak detection equipment. It is not necessary to isolate intrinsically safe components before performing operations on them.*

Reparation of intrinsically safe components

Do not apply permanent inductive or capacitive loads to the circuit without making sure that they do not exceed the admissible voltage and current allowed for equipment in use.

Intrinsically safe components are the only component type on which operations can be performed in a flammable atmosphere. The testing device must show a correct value. Replace components only with the parts specified by the manufacturer.

Following a leak, other parts could lead to the combustion of the refrigerant in the atmosphere.

Wires

Make sure wires are not subjected to wear, corrosion, excessive pressure or vibration, that there are no sharp edges and that they do not produce other negative effects on the environment. The inspection must also keep into consideration the effects of time or the continuous vibration caused e.g. by compressors or fans.

Detection of flammable refrigerants

Under no circumstance is it possible to use potential ignition sources to search or detect refrigerant leaks.

Do not use halide lights (or any other open flame detectors).

Leak detection methods

The following leak detection methods are considered acceptable for systems containing flammable refrigerants. Electric leak detectors must always be used to identify flammable refrigerants, although they do not present a suitable sensitivity level or require recalibration (detection equipment must be calibrated in an area free from refrigerants).

Check that the detector is not a possible source of ignition and that it is suitable for the refrigerant. Leak detection equipment must always be set to an LFL percentage and calibrated depending on the refrigerant used, so the correct gas percentage (25% max) must be verified.

Leak detection fluids are suitable for most refrigerants, although using detergents containing chlorine should be avoided as this substance may react with the refrigerant and corrode copper pipes.

If a leak is suspected, all open flames must be removed or switched off.

If a leak is identified that requires brazing, all the refrigerant must be recovered from the system or isolated (using interception valves) in a section of the system far away from the leak. Oxygen-Free-Nitrogen (OFN) is then purged through the system both before and during the brazing procedure.

Removal and evacuation

When intervening on the cooling circuit to perform repair work or any other type of work, always follow the normal procedure. However, considering the risk of flammability, we recommend following the best practices. Comply with the following procedure:

- remove the refrigerant;
- purge the circuit with inert gas;
- evacuate;
- Purge again with inert gas;
- Interrupt the circuit with interruption or brazing.

The refrigerant charge must be collected in suitable recovery tanks. To make the unit safe, flushing with Oxygen-free-Nitrogen must be performed. This procedure may have to be repeated multiple times. Do not use compressed air or oxygen for this operation.

Flushing is obtained interrupting the system vacuum with OFN and filling until the operating pressure is obtained, then releasing into the atmosphere and restoring the vacuum. This process must be repeated until there is no trace of refrigerant in the system.

When using the final OFN charge, the system must be vented to the atmospheric pressure to allow the intervention. This step is essential to perform brazing operations on the pipes.

Make sure that the vacuum pump intake is not near ignition sources and that there is suitable ventilation.

Charging operations

In addition to conventional charging operations, the following requirements must be complied with:

- When using charging equipment, make sure that the various refrigerants are not contaminated. Flexible tubes or conduits must be as short as possible to reduce to the minimum the quantity of refrigerant contained.
 - Tanks must be kept in a vertical position.
 - Before loading the system with refrigerant, check that the cooling system is earthed.
 - Label the system when fully charged (unless already labelled).
 - Make sure not to fill the cooling system excessively.
 - Before recharging the system, the pressure must be tested with OFN. A leak test must be performed after the charging operations but before commissioning.
- Before leaving the site, perform an additional leak test.

Dismantling

Before performing this procedure, it is essential that the technician has become familiar with the equipment and the relative details.

We recommend employing good practices for a safe recovery of the refrigerants.

Before performing the operation, take a sample of oil and refrigerant should an analysis be necessary before reusing the regenerated refrigerant. Before performing the operation, check the availability of electricity.

- Become familiar with the equipment and how it functions.
- Electrically isolate the system.

Before attempting the procedure, check that:

- The mechanical manipulation equipment is available, if necessary, to handle refrigerant tanks;
- All the personal protection equipment is available and employed correctly;
- The recovery procedure is monitored at all times by skilled personnel;
- The recovery equipment and tanks comply with suitable standards.
- If possible, pump the cooling system.
- If it is not possible to obtain a vacuum, make sure that a collector removes the refrigerant from various parts of the system.
- Before proceeding with the recovery, check that the tank is located on the scales.
- Start up the recovery machine and use it following the instructions by the manufacturer.
- Do not fill the tanks excessively. (Do not exceed 80% of the liquid volume).
- Do not exceed the tank's maximum operating pressure, not even momentarily.
- Once the tanks are filled correctly and the process is over, make sure that the tanks and equipment are immediately removed from the site and that all insulation valves on the equipment are closed.
- The refrigerant recovered must not be loaded into another cooling system unless it has been cleaned and checked.

Labelling

Equipment must be labelled reporting the dismantling and emptying of the refrigerant.

Labels must be dated and signed.

Make sure all the equipment is labelled and reporting the presence of flammable refrigerant.

Recovery

When removing the refrigerant from the system, please adopt good practices to remove all refrigerants safely in case of both assistance or decommissioning operations.

When transferring the refrigerant into the tanks, make sure only suitable tanks are used to recover the refrigerant.

Make sure enough tanks are used.

All the tanks to be used are designated for the recovered refrigerant and are labelled for that specific refrigerant (e.g. special tanks for refrigerant collection).

Tanks must be equipped with a perfectly-functioning safety valve and relative interception valves.

Empty recovery tanks are evacuated and, if possible, cooled before recovery.

Recovery equipment must be perfectly functioning with the respective instruction booklets at hand and they must be suitable to recover flammable refrigerants. A series of perfectly-functioning calibrated scales must also be available.

Flexible tubes must be equipped with leak-proof disconnection fittings in good condition. Before using the recovery machine, make sure it is in good condition, maintained and that all associated electrical components are sealed to avoid combustion in case of a refrigerant leak. Please contact the manufacturer in case of doubt.

The refrigerant recovered must be taken to the supplier in suitable recovery tanks and with the relative waste transfer note suitably filled in.

Do not mix the refrigerants in the recovery units nor in the tanks.

If it is necessary to remove compressors or compressor oils, make sure they are evacuated to an acceptable level to make sure no trace is left of the flammable refrigerant inside the lubricant. The evacuation process must be performed before taking the compressors back to the suppliers.

The electric resistance must be used with the compressor body only to accelerate this process.

Operations to discharge the oil from the system must be performed in full safety.

Transport, mark and storage

- 1 Transport of equipment containing flammable refrigerants
Compliance with transport regulations
- 2 Marking of equipment with symbols
Compliance with local regulations
- 3 Disposal of equipment employing flammable refrigerants
Compliance with national regulations
- 4 Storage of equipment/devices
The equipment must be stored in compliance with the instructions provided by the manufacturer.
- 5 Storing packed (unsold) equipment
Packing must be performed in such a way that mechanical damage to the equipment inside it does not cause refrigerant leaks.
The maximum number of elements that can be stored together is determined by local regulations.

Safety

Operate in compliance with safety regulations in force.

To carry out the operations use protection devices:

gloves, goggles, helmet, headphones, protective knee pads.

All operations must be carried out by personnel trained on possible risks of a general nature, electrical and deriving from operating with equipment under pressure.

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

General

Maintenance must be performed by authorized centres or by qualified personnel

The maintenance allows to:

- maintaining the unit efficient
- reduce the deterioration speed all the equipment is subject to over time
- collect information and data to understand the efficiency state of the unit and prevent possible faults

WARNING

- ⇒ *Before checking, please verify the following:*
- ⇒ *the electrical power supply line should be isolated at the beginning*
- ⇒ *the line isolator device is open, locked and equipped with the suitable warning sign*
- ⇒ *make sure no tension is present*
- ⇒ *After switching the power off, wait at least 5 minutes before accessing to the electrical panel or any other electrical component.*
- ⇒ *Before accessing check with a multimeter that there are no residual stresses.*

Frequency of interventions

Perform an inspection every 6 months.

However, frequency depends on the type of use.

Plan inspections at close intervals in the event of:

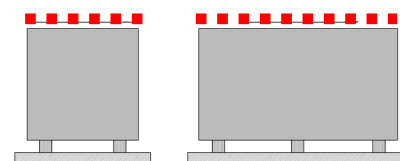
- frequent use (continuous or very intermittent use, near the operating limits, etc)
- critical use (service necessary)

WARNING

- ⇒ *Before any work read: Chapter. SAFETY WARNINGS FOR OPERATIONS ON UNITS CONTAINING R1234ze*



Do not go up to the surface



	intervention frequency (months)	1	6	12
1	Presence of corrosions			X
2	Panel fixing			X
3	Fan fixing		X	
4	coil cleaning		X	
5	Water filter cleaning		X	
6	water: quality, pH, glycol concentration		X	
7	check exchanger efficiency			X
8	circulation pump		X	
9	Check of the fixing and the insulation of the power lead			X
10	earth cable check			X
11	Electric panel cleaning			X
12	power remote controls status			X
13	clamp closure, cable isolation integrity			X
14	Voltage and phase unbalancing (no load and on-load)		X	
15	Absorptions of the single electrical loads		X	
16	compressor casing heaters test		X	
17	Checking for leaks *			*
18	cooling circuit work parameter detection		X	
19	safety valve *			*
20	protective device test: pressure switches, thermostats, flow switches etc..			X
21	control system test: setpoint, climatic compensations, capacity stepping, air flow-rate variations			X
22	Control device test: alarm signalling, thermometers, probes, pressure gauges etc			X

NOTE

⇒ Refer to the local regulations. Companies and technicians performing installation, maintenance/repair, leak control and recovery operations must be CERTIFIED as set out by the local regulations.

Unit booklet

Foresee a unit schedule to keep trace of the interventions made on the unit.

In this way, it will be easier to adequately schedule the various interventions and facilitate any troubleshooting.

On the schedule note:

- date
- intervention description
- carried out measures etc.

Standby mode

If foreseen a long period of inactivity:

- turn off the power
- Prevent the risk of freezing (use glycol or empty the system) disconnect voltage to avoid electric risks or damages following lightning

With lower temperatures keep heaters turned on in of the electrical panel (option).

It is recommended to have a qualified technician start the system after a period of inactivity, especially after seasonal stops or for seasonal switch-overs.

When starting, follow the instructions in the “start-up” section.

Schedule technical assistance in advance to avoid hitches and to guarantee that the system can be used when required.

System drain

The system must be drained only if necessary.

Avoid draining the system periodically; corrosive phenomena can be generated.

- 1 Empty the system
- 2 empty the exchanger, use all shut-off valves and grub screws
- 3 blow the exchanger with compressed air
- 4 dry the exchanger with hot air; for greater safety, fill the exchanger with glycol solution
- 5 protect the exchanger from air
- 6 take the drain caps off the pumps

Any anti-freeze liquid contained in the system should not be discharged freely as it is a pollutant. It must be collected and reused.

Before start-up, wash the system.

It is recommended to have a qualified technician start the system after a period of inactivity, especially after seasonal stops or for seasonal switch-overs.

When starting, follow the instructions in the “start-up” section.

Schedule technical assistance in advance to avoid hitches and to guarantee that the system can be used when required.

Water side heat exchanger

The exchanger must be able to provide the maximum thermal exchange, therefore it is essential for the inner surfaces to be clean of dirt and build-up.

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 rinse with water to inhibit the action of any residual product

Water filter

Check that no impurities prevent the correct passage of water.

Flow switch

- controls the operations
- remove incrustations from the palette

Circulation pumps

Check:

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

Insulations

Check the condition of the insulations: if necessary, apply glue and renew the seals.

Safety valve

The pressure relief valve must be replaced :

- if it has intervened
- if there is oxidation
- based on the date of manufacture, in compliance with local regulations.

Air coil

⇒ *Accidental contact with the exchanger fins can cause cuts: wear protective gloves.*

The coil must allow maximum thermal exchange, therefore, the surface must be clear from dirt and scaling.

It is recommended a quarterly cleaning of the coils, as the minimum.

The cleaning frequency should be increased depending on the level of dirt/dust accumulation and the environment (e.g., coastal areas with chlorides and salts) or industrial areas with aggressive substances.

Shut down periods

During periods when the unit is not operated for longer than a week, the coil must be completely cleaned following the cleaning procedure. .

Cleaning procedure

Relative to tube & fin heat exchangers, these coils tend to accumulate more dirt on the surface of the coil and less dirt inside the coil, making them easier to clean.

Follow the steps below for proper cleaning.

Remove surface debris

Remove surface dirt, leaves, fibers, etc. with a vacuum cleaner (preferably with a brush or other soft attachment rather than a metal tube), compressed air blown from the inside out, and/or a soft bristle (not wire!) brush. Do not impact or scrape the coil.

Rinse

Rinse only with water. Do not use any chemicals to clean heat exchangers, as they may cause corrosion.

Hose off gently, preferably from the inside-out and top to bottom, running the water through every fin passage until it comes out clean.

The fins are stronger than other coil fins but still need to be handled with care. Do not hit the coil with the hose.

We do not recommend using a pressure washer to clean the coil due to the possibility of damage. Warranty claims related to cleaning damage, especially from pressure washers, or corrosion resulting from chemical coil cleaners, will NOT be honored.

Blow dry

MicroChannel heat exchangers could possibly retain more water compared to traditional tube & fin coils. It is advised to blow off or vacuum out the residual water from the coil to speed up drying and prevent pooling.

WARNING

Field applied coatings are not recommended for brazed aluminum MicroChannel heat exchangers.

Electric fans

Check:

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

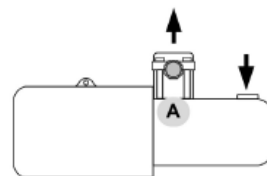
Compressor supply line shut-off valve

Do not remove the seal

Remove only if authorized by the manufacturer.

Please contact the maker for informations.

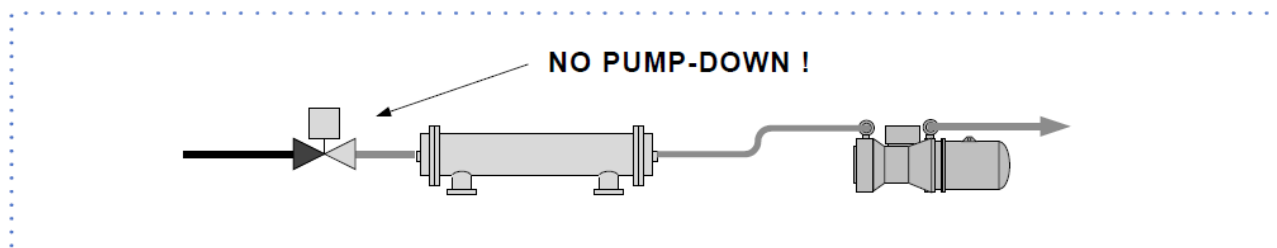
Screw compressors - Periodical checks



Operating hours	100	1000	5000	10000	15000	20000	25000	30000
Vibrations / Noise	C	C	C	C	C	C	C	C
Oil level	C	C	C	C	C	C	C	C/R
Oil filter	C		C		C		C	C/R
Filter the suction			C		C		C	C
Electric insulation		C	C	C	C	C	C	C
Bearings								C/R
check valve		C	C	C	C	C	C	C

C = CHECK

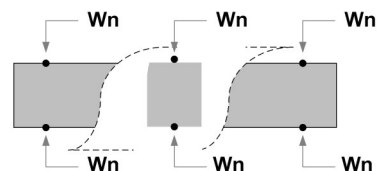
R = replace



Anti-vibration mount support



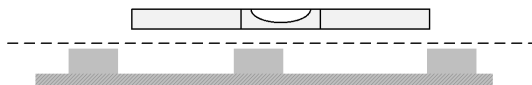
PE code

W1 Wn: see dimensional drawings
vedere disegni dimensionali

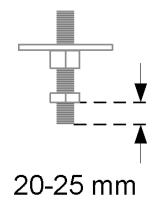
	W1	W2	W3	W4	W5	W6
PE5Z00004	RX504-Z208P	RX703P	RX504-Z208P	RX703Pr		
PE5Z00005	RX603-Z120P	RX604-Z120P	RZ505-X201Pr	RX703P	RZ412-Z220-X107P	RZ505-X201Pr
PE5Z00006	RZ412-Z220-X107P	RZ412-Z220-X107P	RZ505-X201Pr	RX703P	RZ412-Z220-X107P	RZ708Pr
PE5Z00007	RX703P	RX703P	RQX 404-Z124Pr	RX502-201Pr	RZ708Pr	RZ708Pr
PE5Z00008	RZ412-Z220-X107P	RX507-Z212P	RZ702Pr	RX507-Z212P	RQX 401-Z105Pr	RQX 404-Z124Pr
PE5Z00009	RZ412-Z220-X107P	RZ412-Z220-X107P	RX603-Z120P	RX507-Z212P	RQX 401-Z105Pr	RQX 404-Z124Pr
PE5Z00010	RX603-Z120P	RZ520-Z12P	RZ508-203Pr	RZ520-Z12P	RX502-201Pr	RZ505-X201Pr
PE5Z00011	RX504-Z205P	RX507-Z212P	RX703P	RX407-Z324P	RZ708Pr	RZ505-X201Pr
PE5Z00024	RX704P	RX407-Z324P	RZ505-202Pr	RX504-Z205P	RX507-204P	RX502-Z202Pr
PE5Z00025	RX504-Z208P	RX504-Z208P	RX504-Z208P	RX503-201Pr	RZ602-X101Pr	RX703Pr
PE5Z00026	RX404-Z220-X107P	RX404-Z220-X107P	RX403-Z212-X104P	RX507-204P	RX502-Z203Pr	RX504-203P
PE5Z00027	RX504-203P	RX507-204P	RX603-104Pr	RZ724P	RZ408-312Pr	RX601-Z108Pr
PE5Z00028	RX603-104P	RZ520-Z12P	RZ608-X103Pr	RZ705Pr	RX602-Z112Pr	RX603-104P
PE5Z00029	RZ412-X304P	RX403-Z312P	RZ601-103Pr	RX403-Z312P	RX403-Z312P	RZ402-Z203-X102Pr
PE5Z00030	RX404-Z220-Z124P	RZ522-Z12P	RZ602-X101Pr	RX404-Z220-Z124P	RX502-Z205Pr	RZ612-X108P
PE5Z00031	RZ412-X204-Z120P	RX707P	RX602-Z108Pr	RX707P	RZ408-X303Pr	RZ605-X103Pr

	W7	W8	W9	W10	W11	W12
PE5Z00004						
PE5Z00005						
PE5Z00006						
PE5Z00007	RX703Pr	RX502-201Pr				
PE5Z00008	RX507-Z212P	RQZ 405-X102Pr	RZ412-Z220-X107P	RQX 401-Z105Pr		
PE5Z00009	RZ412-Z220-X107P	RQX 404-Z124Pr	RZ412-Z220-X107P	RQZ 405-X102Pr		
PE5Z00010	RX503-201Pr	RX504-Z208P	RX503-201Pr	RX504-Z208P	RZ505-X201Pr	RZ505-X201Pr
PE5Z00011	RX703P	RZ520-X203P	RX507-Z212P	RX507-Z212P	RZ708Pr	RZ505-X201Pr
PE5Z00024						
PE5Z00025	RX403-Z212-X104P	RX703Pr	RX503-201Pr	RZ603-X102Pr		
PE5Z00026	RX504-203P	RX504-203P	RX404-Z220-X107P	RZ508-X201Pr		
PE5Z00027	RX603-104Pr	RZ520-X203P	RX407-Z324P	RX407-Z324P	RX603-104P	RX601-Z108Pr
PE5Z00028	RX504-202P	RX502-Z205Pr				
PE5Z00029						
PE5Z00030	RX404-Z220-Z124P	RX502-Z205Pr	RX404-Z220-Z124P	RZ508-X202Pr		
PE5Z00031	RX603-104Pr	RX604-107P	RX603-104Pr	RZ412-X204-Z120P	RX603-104Pr	RX602-Z108Pr

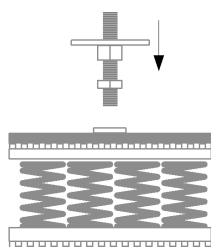
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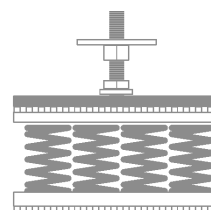
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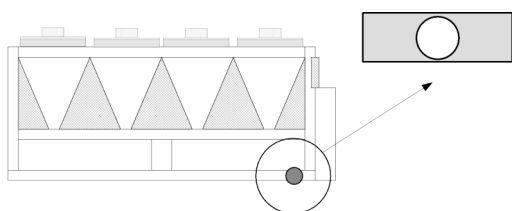
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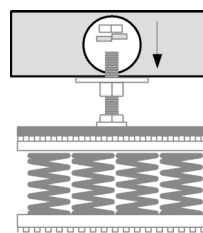
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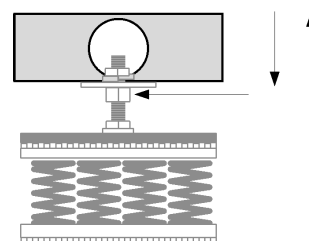
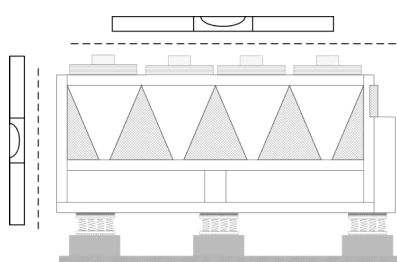
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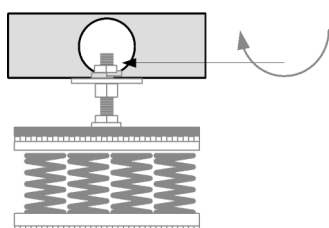
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7



8



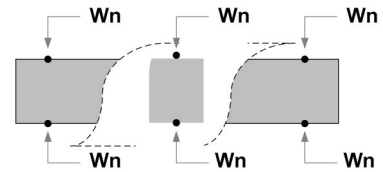
Anti-seismic spring antivibration mounts



PE code



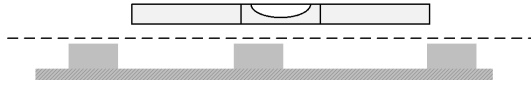
W1 Wn: see dimensional drawings
vedere disegni dimensionali



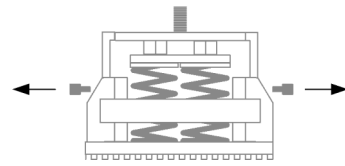
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PE5Z00013	LaLV 247-M16	LaLV 2510-M16	LaLV 222-M16	LaLV 245-M16	LaLV 250-M16	LaLV 222-M16
PE5Z00014	LaLV 2510-M16	LaLV 2510-M16	LaLV 222-M16	LaLV 245-M16	LaLV 2501-M16	LaLV 231-M16
PE5Z00015	LaLV 245-M16	LaLV 245-M16	LaLV 248-M16	LaLV 230-M16	LaLV 231-M16	LaLV 231-M16
PE5Z00016	LaLV 250-M16	LaLV 253-M16	LaLV 209-M16	LaLV 251-M16	LaLV 214-M16	LaLV 247-M16
PE5Z00017	LaLV 2501-M16	LaLV 2510-M16	LaLV 245-M16	LaLV 251-M16	LaLV 214-M16	LaLV 247-M16
PE5Z00018	LaLV 247-M16	LaLV 2510-M16	LaLV 2300-M16	LaLV 251-M16	LaLV 230-M16	LaLV 230-M16
PE5Z00019	LaLV 245-M16	LaLV 2510-M16	LaLV 231-M16	LaLV 253-M16	LaLV 2301-M16	LaLV 222-M16

	W7	W8	W9	W10	W11	W12
PE5Z00012						
PE5Z00013						
PE5Z00014						
PE5Z00015	LaLV 233-M16	LaLV 2300-M16				
PE5Z00016	LaLV 2510-M16	LaLV 220-M16	LaLV 2501-M16	LaLV 214-M16		
PE5Z00017	LaLV 250-M16	LaLV 247-M16	LaLV 250-M16	LaLV 220-M16		
PE5Z00018	LaLV 231-M16	LaLV 250-M16	LaLV 231-M16	LaLV 250-M16	LaLV 230-M16	LaLV 230-M16
PE5Z00019	LaLV 2305-M16	LaLV 250-M16	LaLV 2510-M16	LaLV 2510-M16	LaLV 2301-M16	LaLV 222-M16

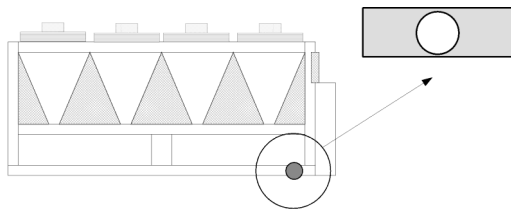
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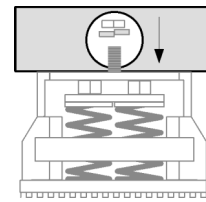
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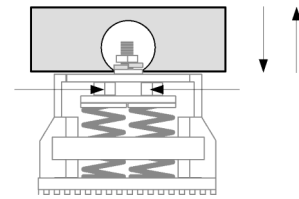
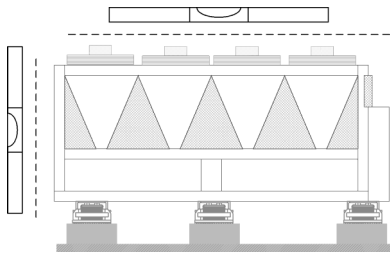
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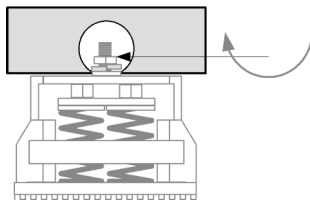
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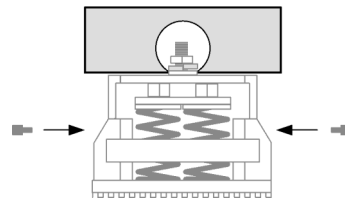
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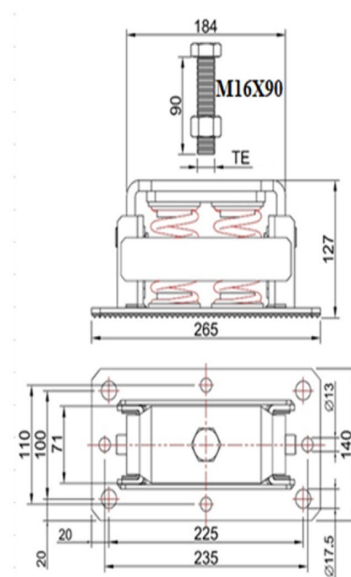
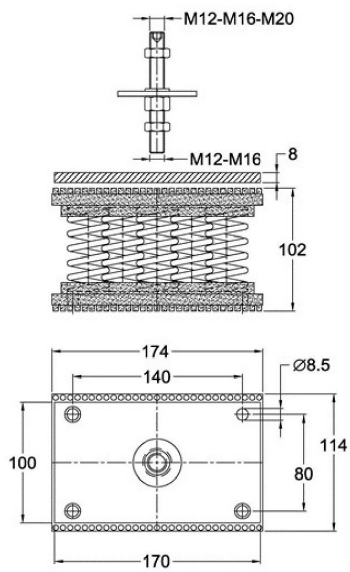


6



7





Option present with compressor box

For specific information refer to the component manufacturer's manual.

Maintenance

The inspection must be carried out by qualified service personnel.

- Check the correct operation of the LEDs.
- Check the correct functioning of the buzzer and relay.
- Check the signal transmission to the central BMS / controller, if connected.

The sensor must be calibrated or replaced every 12 months.

⇒ *Failure to carry out this operation can cause incorrect readings and in case of leak high concentrations can be reached: FIRE RISK with A2L refrigerants (eg R32 and R1234ze)*

To recalibrate the sensor: see SERVICE MANUAL.

To replace the sensor: contact After-Sales Service.

The sensors have an average life of 2 to 5 years, depending on the type, after which they must be replaced.

⇒ *Sensors must be checked after exposure to significant gas concentrations, which can reduce sensor life and / or reduce sensitivity.*

Disconnection

WARNING

⇒ Before performing any operation, read the warnings found in the Maintenance chapter.

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 decommissioning and disposal, the unit can also be stored outdoors, as bad weather and rapid changes in temperature do not harm the environment provided that the electric, cooling and hydraulic circuits of the unit are intact and closed.

WEEE INFORMATION

The manufacturer is registered on the EEE National Register, in compliance with implementation of Directive 2012/19/EU and relevant national regulations on waste electrical and electronic equipment.

This Directive requires electrical and electronic equipment to be disposed of properly.

Equipment bearing the crossed-out wheelie bin mark must be disposed of separately at the end of its life cycle to prevent damage to human health and to the environment.

Electrical and electronic equipment must be disposed of together with all of its parts.

To dispose of "household" electrical and electronic equipment, the manufacturer recommends you contact an authorised dealer or an authorised ecological area.

"Professional" electrical and electronic equipment must be disposed of by authorised personnel through established waste disposal authorities around the country.

In this regard, here is the definition of household WEEE and professional WEEE:

WEEE from private households: WEEE originating from private households and WEEE which comes from commercial, industrial, institutional and other sources which, because of its nature and quantity, is similar to that from private households. Subject to the nature and quantity, where the waste from EEE was likely to have been by both a private household and users of other than private households, it will be classed as private household WEEE;

Professional WEEE: all WEEE which comes from users other than private households.

This equipment may contain:

refrigerant gas, the entire contents of which must be recovered in suitable containers by specialised personnel with the necessary qualifications;

- lubrication oil contained in compressors and in the cooling circuit to be collected;
- mixtures with antifreeze in the water circuit, the contents of which are to be collected;
- mechanical and electrical parts to be separated and disposed of as authorised.

When machine components to be replaced for maintenance purposes are removed or when the entire unit reaches the end of its life and needs to be removed from the installation, waste should be separated by its nature and disposed of by authorised personnel at existing collection centres.



General

In this section the most common situations are indicated, as these cannot be controlled by the manufacturer and 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 necessary and without due caution, may cause the drop 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 re-garding the packaging and in compliance with the local regulations in force.

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

Installation

The incorrect installation of the unit could cause water leaks, condensate accumulation, leaking of the refrigerant, electric shock, poor operation 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 result in 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 damage 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 lead to the entry of dust, water etc inside and may consequently 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 sign.

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 sign.

Moving parts

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

Prior to entering the inside of the unit open the isolator situated on the connection line of the unit itself, padlock and display the appropriate warning sign.

Contact with the fans can cause injury.

Prior to removing the protective grill or the fans, open the isolator on the attachment line of the unit itself, padlock it and 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 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 removal parts may cause a leak or water projection with the consequent damages to people, things or shortcircuit the unit.

General technical data

Performance

Standard acoustic configuration (ST) / Compressor soundproofing (SC)

SIZE			120.1	160.1	200.1	240.1	290.1	250.2	280.2	320.2	360.2	400.2	440.2	480.2	540.2	580.2
Cooling capacity	1	[kW]	204	256	360	420	511	423	483	540	631	711	790	881	966	1056
Compressor power input	1	[kW]	59,1	79,6	107	134	156	123	145	169	198	227	246	285	303	326
Total power input	2	[kW]	64,0	84,5	114	141	165	133	154	178	210	239	260	298	319	344
Partial recovery heating capacity	3	[kW]	26,3	33,6	46,7	55,4	66,7	54,6	62,8	70,9	82,9	93,8	104	117	127	138
EER	1	-	3,20	3,03	3,15	2,99	3,09	3,18	3,13	3,03	3,01	2,98	3,04	2,95	3,03	3,07
Water flow-rate (User Side)	1	[l/s]	9,8	12,2	17,2	20,1	24,4	20,2	23,1	25,8	30,1	34,0	37,8	42,1	46,2	50,5
Internal exchanger pressure drops	1	[kPa]	35,0	42,7	39,2	42,7	49,2	38,5	36,0	46,7	52,9	47,8	51,9	46,3	52,9	47,7
Cooling capacity (EN14511:2018)	4	[kW]	204	256	360	420	510	422	482	540	630	710	790	880	965	1055
Total power input (EN14511:2018)	4	[kW]	64,7	85,4	115	142	167	134	156	180	212	241	263	301	322	348
EER (EN14511:2018)	4		3,16	3,00	3,12	2,95	3,05	3,15	3,10	3,00	2,97	2,94	3,00	2,92	3,00	3,03
SEER	6		5,15	5,13	5,17	5,14	5,20	5,42	5,38	5,36	5,42	5,37	5,39	5,37	5,33	5,35
SEPR	6		6,45	5,67	5,78	5,76	5,56	6,41	5,99	5,64	5,91	5,53	5,53	5,80	5,70	5,54
Cooling capacity (AHRI 550/590)	5	[kW]	204	256	360	420	511	423	483	540	631	711	790	881	966	1056
Total power input (AHRI 550/590)	5	[kW]	63,9	84,5	114	141	165	133	154	178	210	239	260	298	319	344
COP _r	5		3,19	3,03	3,16	2,98	3,10	3,18	3,14	3,03	3,00	2,97	3,04	2,96	3,03	3,07
IPLV	5	-	5,90	5,93	5,55	5,56	5,85	5,73	5,80	5,69	5,75	5,60	5,78	5,49	5,70	5,69

The Product is compliant with the Erp (Energy Related Products) European Directive. It includes the Commission delegated Regulation (EU) No 2016/2281, also known as Ecodesign LOT21. Contains fluorinated greenhouse gases (GWP < 1)

1. Data referred to the following conditions: internal exchanger water temperature = 12/7 °C. Entering external exchanger air temperature = 35°C. Evaporator fouling factor = 0.44 x 10⁻⁴ m² K/W.
2. The Total Power Input value does not take into account the part related to the pumps and required to overcome the pressure drops for the circulation of the solution inside the exchangers.
3. Recovery exchanger water = 40/45°C
4. Data compliant to Standard EN 14511:2018 referred to the following conditions: internal exchanger water temperature = 12/7°C. Entering external exchanger air temperature = 35°C
5. Data compliant to Standard AHRI 550/590 referred to the following conditions: internal exchanger water temperature = 6,7 °C. Water flow-rate 0,043 l/s per kW. Entering external exchanger air temperature = 35°C. Evaporator fouling factor = 0.18 x 10⁻⁴ m² K/W
6. Data compliant according to EU regulation 2016/2281

Configurazione acustica Supersilenziata (EN)

GRANDEZZE			120.1	160.1	200.1	240.1	290.1	250.2	280.2	320.2	360.2	400.2	440.2	480.2	540.2	580.2
Cooling capacity	1	[kW]	204	256	360	420	495	423	483	540	631	711	790	881	966	1056
Compressor power input	1	[kW]	59	80	107	134	145	123	145	169	198	227	246	285	303	326
Total power input	2	[kW]	64	84	114	140	154	133	154	178	210	238	260	298	318	344
Partial recovery heating capacity	3	[kW]	26,3	33,6	46,7	55,4	64,0	54,6	62,8	70,9	82,9	93,8	104	117	127	138
EER	1	-	3,21	3,05	3,16	3,00	3,21	3,19	3,13	3,04	3,01	2,98	3,04	2,95	3,03	3,07
Water flow-rate (User Side)	1	[l/s]	9,8	12,2	17,2	20,1	23,7	20,2	23,1	25,8	30,1	34,0	37,8	42,1	46,2	50,5
Internal exchanger pressure drops	1	[kPa]	35,0	42,7	39,2	42,7	49,2	38,5	36,0	46,7	52,9	47,8	51,9	46,3	52,9	47,7
Cooling capacity (EN14511:2018)	4	[kW]	204	256	360	420	494	422	482	540	630	710	790	880	965	1055
Total power input (EN14511:2018)	4	[kW]	64,4	85,2	115	142	155	134	155	180	212	241	263	301	322	348
EER (EN14511:2018)	4		3,16	3,01	3,12	2,96	3,18	3,15	3,10	3,00	2,97	2,95	3,00	2,92	3,00	3,04
SEER	6		5,15	5,13	5,17	5,14	5,30	5,42	5,38	5,36	5,42	5,37	5,39	5,37	5,33	5,35
SEPR	6		6,45	5,67	5,78	5,76	5,65	6,41	5,99	5,64	5,91	5,53	5,53	5,80	5,70	5,54
Cooling capacity (AHRI 550/590)	5	[kW]	204	256	360	420	495	423	483	540	631	711	790	881	966	1056
Total power input (AHRI 550/590)	5	[kW]	63,9	84,5	114	141	154	133	154	178	210	239	260	298	319	344
COP _r	5		3,19	3,03	3,16	2,98	3,21	3,18	3,14	3,03	3,00	2,97	3,04	2,96	3,03	3,07
IPLV	5	-	5,90	5,93	5,55	5,56	6,01	5,73	5,80	5,69	5,75	5,60	5,78	5,49	5,70	5,69

The Product is compliant with the Erp (Energy Related Products) European Directive. It includes the Commission delegated Regulation (EU) No 2016/2281, also known as Ecodesign LOT21. Contains fluorinated greenhouse gases (GWP < 1)

1. Data referred to the following conditions: internal exchanger water temperature = 12/7 °C. Entering external exchanger air temperature = 35°C. Evaporator fouling factor = 0.44 x 10⁻⁴ m² K/W.
2. The Total Power Input value does not take into account the part related to the pumps and required to overcome the pressure drops for the circulation of the solution inside the exchangers.
3. Recovery exchanger water = 40/45°C
4. Data compliant to Standard EN 14511:2018 referred to the following conditions: internal exchanger water temperature = 12/7°C. Entering external exchanger air temperature = 35°C
5. Data compliant to Standard AHRI 550/590 referred to the following conditions: internal exchanger water temperature = 6,7 °C. Water flow-rate 0,043 l/s per kW. Entering external exchanger air temperature = 35°C. Evaporator fouling factor = 0.18 x 10⁻⁴ m² K/W
6. Data compliant according to EU regulation 2016/2281

General technical data

Construction

Standard acoustic configuration (ST) / Compressor soundproofing (SC) / Super-silenced (EN)

SIZE		120.1	160.1	200.1	240.1	290.1	250.2	280.2	320.2	360.2	400.2	440.2	480.2	540.2	580.2
Compressor															
Type of compressors	1	ISW													
Refrigerant		R-1234ze													
No. of compressors	[Nr]	1	1	1	1	1	2	2	2	2	2	2	2	2	2
Rated power (C1)	[HP]	120	160	200	240	290	125	125	160	120	160	160	240	240	290
Rated power (C2)	[HP]	-	-	-	-	-	125	160	160	240	240	290	240	290	290
Std Capacity control steps		STEPLESS													
Oil charge (C1)	[l]	18	18	35	35	35	18	18	18	18	18	18	35	35	35
Oil charge (C2)	[l]	-	-	-	-	-	18	18	18	35	35	35	35	35	35
Refrigerant charge (C1)	[kg]	43	47	68	74	88	43	45	46	44	46	37	76	76	84
Refrigerant charge (C2)	[kg]	-	-	-	-	-	37	39	40	65	69	77	64	64	75
Refrigeration circuits	[Nr]	1	1	1	1	1	2	2	2	2	2	2	2	2	2
Internal exchanger (evaporator)															
Type of internal exchanger	2	S&T													
N. of internal exchanger	[Nr]	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Water content	[l]	160	219	382	365	292	310	301	292	553	536	581	506	537	1027
External exchanger (condenser)															
Type of external exchanger	3	CCM													
N. coils	[Nr]	4	4	6	6	8	8	8	8	10	10	12	12	14	16
External Section Fans															
Type of fans	4	AX													
Number of fans		4	4	6	6	8	8	8	8	10	10	12	12	14	16
Type of motor	5	EC													
Standard airflow	[l/s]	21667	21667	32500	32500	43333	43333	43333	43333	54167	54167	65000	65000	75833	86667
Connections															
Water fittings		6"	6"	6"	6"	6"	6"	6"	6"	8"	8"	8"	8"	8"	8"
Power supply															
Standard power supply		400/3~/50													
Electrical data															
F.L.A. - Total	[A]	182,3	228,0	337,9	402,9	459,0	364,3	410,0	455,7	584,9	630,6	702,5	805,5	877,3	949,2
F.L.I. - Total	[kW]	112,2	142,5	209,7	251,7	295,2	224,2	254,5	284,8	363,7	394,0	437,5	503,2	546,7	590,2
M.I.C. - Value	6 [A]	182,3	228,0	337,9	402,9	459,0	364,3	410,0	455,7	584,9	630,6	702,5	805,5	877,3	949,2

1. ISW = Double screw compressor
2. S&T = Shell and tube
3. CCM = Full aluminium microchannel coils
4. AX = Axial fan
5. EC = Asynchronous motor with permanent magnet commuted electronically.
6. M.I.C.= Maximum unit starting current. The M.I.C. value is obtained adding the max. compressor starting current of the highest size to the power input at max. admissible conditions (F.L.A.) of the remaining electric components.

Unbalance between phase max 2 %

Voltage variation: max +/- 10%

Electrical data refer to standard units; according to the installed accessories, the data can suffer some variations.

General technical data

Sound levels

Standard acoustic configuration (ST)

SIZE	Sound power level (dB) - Octave band (Hz)								Sound pressure level	Sound power level
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
120.1	74	72	72	84	95	91	80	66	77	97
160.1	81	80	76	88	93	93	82	66	78	97
200.1	82	73	83	91	93	91	86	75	77	97
240.1	86	89	79	87	94	89	89	73	77	97
290.1	69	74	78	93	92	95	88	75	78	99
250.2	68	71	74	85	98	89	76	61	78	99
280.2	75	79	78	90	99	91	78	63	80	100
320.2	78	82	81	93	99	94	80	64	81	101
360.2	80	88	81	90	100	90	85	68	80	101
400.2	82	90	83	93	101	93	86	69	81	102
440.2	77	81	84	98	100	96	86	72	81	103
480.2	85	93	85	93	102	91	89	72	81	103
540.2	81	90	85	97	101	95	88	73	81	103
580.2	68	79	85	100	100	98	89	75	82	104

Sound levels refer to full load units, in test nominal conditions. The sound pressure level refers to 1 m. from the standard unit outer surface operating in open field. Measures according to UNI EN ISO 9614-2 regulations, with respect to the EUROVENT 8/1 certification, which provides for a tolerance of 3 dB(A).

Data referred to the following conditions:

- internal exchanger water temperature = 12/7 °C
- ambient temperature = 35 °C

Acoustic configuration with compressor soundproofing (SC)

SIZE	Sound power level (dB) - Octave band (Hz)								Sound pressure level	Sound power level
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
120.1	67	68	70	79	91	87	78	64	74	93
160.1	74	76	76	83	89	90	79	65	74	94
200.1	75	70	83	85	90	89	83	74	74	94
240.1	80	86	79	83	91	86	86	72	74	94
290.1	62	72	78	88	89	92	85	74	75	96
250.2	62	69	73	82	95	86	74	60	75	96
280.2	68	75	78	85	96	89	76	62	76	97
320.2	72	79	82	88	97	91	78	64	78	98
360.2	73	85	81	85	97	87	82	67	77	98
400.2	76	87	83	88	98	90	83	68	78	99
440.2	71	79	84	93	98	94	83	71	78	100
480.2	78	90	85	89	99	89	86	71	78	100
540.2	75	87	84	92	98	92	85	72	78	100
580.2	61	76	85	95	98	95	86	74	79	101

Sound levels refer to full load units, in test nominal conditions. The sound pressure level refers to 1 m. from the standard unit outer surface operating in open field. Measures according to UNI EN ISO 9614-2 regulations, with respect to the EUROVENT 8/1 certification, which provides for a tolerance of 3 dB(A).

Data referred to the following conditions:

- internal exchanger water temperature = 12/7 °C
- ambient temperature = 35 °C

General technical data

Super-silenced acoustic configuration (EN)

SIZE	Sound power level (dB) - Octave band (Hz)								Sound pressure level	Sound power level
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
120.1	66	67	71	81	86	82	76	62	69	89
160.1	74	75	77	87	86	84	77	64	71	90
200.1	72	67	82	86	86	84	78	69	70	90
240.1	78	84	79	85	86	83	80	68	70	90
290.1	61	69	78	91	86	86	80	71	71	92
250.2	61	67	75	84	91	82	73	59	72	92
280.2	67	74	79	88	91	83	74	60	72	93
320.2	71	77	82	91	92	84	75	61	73	94
360.2	72	82	81	87	92	83	76	64	72	94
400.2	75	85	85	92	94	86	78	66	75	96
440.2	69	76	84	95	93	86	78	67	75	96
480.2	77	87	85	91	94	86	80	67	74	96
540.2	73	83	84	94	93	86	79	68	74	96
580.2	58	71	83	95	92	86	78	68	74	96

Sound levels refer to full load units, in test nominal conditions. The sound pressure level refers to 1 m. from the standard unit outer surface operating in open field. Measures according to UNI EN ISO 9614-2 regulations, with respect to the EUROVENT 8/1 certification, which provides for a tolerance of 3 dB(A).

Data referred to the following conditions:
 - internal exchanger water temperature = 12/7 °C
 - ambient temperature = 35 °C

Fouling Correction Factors

INTERNAL EXCHANGER (EVAPORATOR)		
m2 °C/W	F1	FK1
0,44 x 10 (-4)	1,0	1,0
0,88 x 10 (-4)	0,97	0,99
1,76 x 10 (-4)	0,94	0,98

F1 = Cooling capacity correction factors
 FK1 = Compressor power input correction factor

Exchanger operating range

	INTERNAL EXCHANGER (EVAPORATOR)	
	DPR	DPW
PED (CE)	2400	1000

DPr = Maximum operating pressure on refrigerant side in kPa
 DPw = Maximum operating pressure on water side in kPa

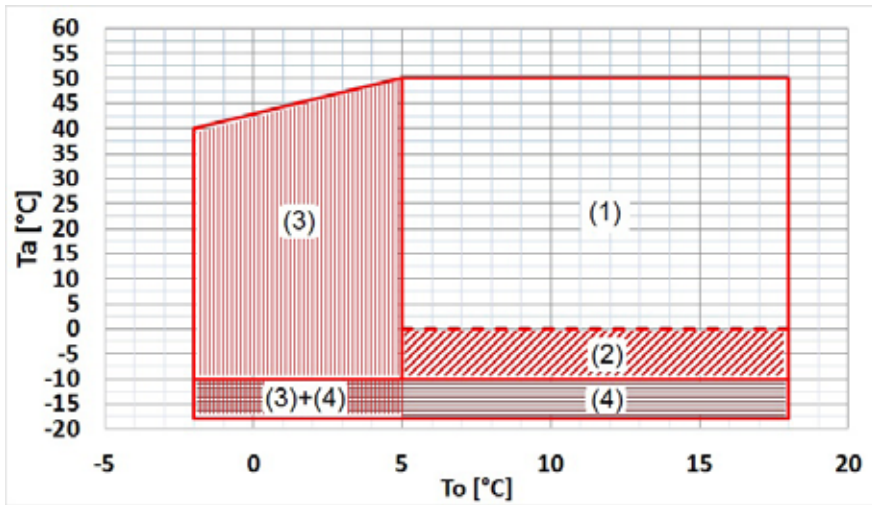
Overload and control device calibrations

		APRE	CHIUDE	VALORE
High pressure switch	[kPa]	1900	1400	-
Antifreeze protection	[°C]	3	5,5	-
High pressure safety valve	[kPa]	-	-	2400
Low pressure safety valve	[kPa]	-	-	1500
Max no. of compressor starts per hour	[n°]	-	-	6
Discharge safety thermostat	[°C]	-	-	120

General technical data

Operating range

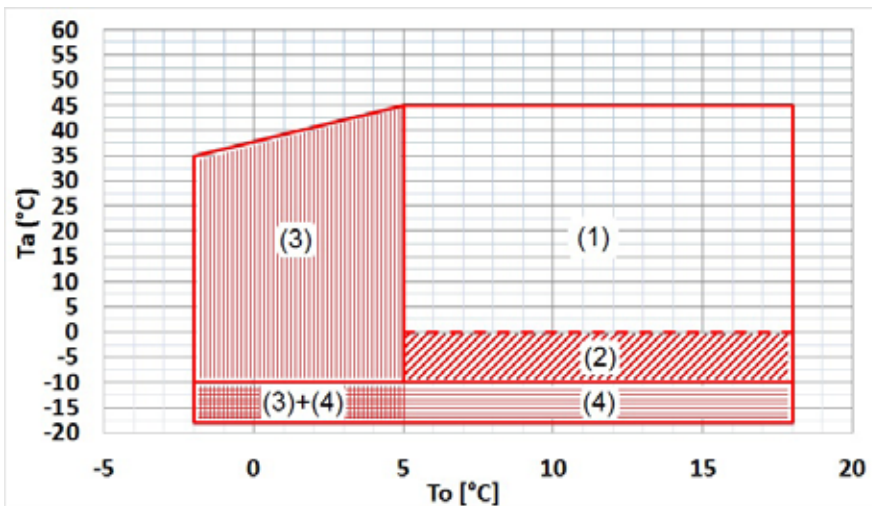
Standard acoustic configuration (ST)



T_a (°C) = external exchanger inlet air temperature (D.B.)
 T_o (°C) = internal exchanger outlet water temperature

1. Standard unit operating range at full load
2. Standard unit operating range with air flow automatic modulation
3. Unit operating range in "B - Low water temperature, down to -2°C (Brine)"
4. Unit operating range with "REGTB - Device for the condensing coil partialization"

Acoustic configuration: compressor soundproofing (SC) / Super-silenced (EN)



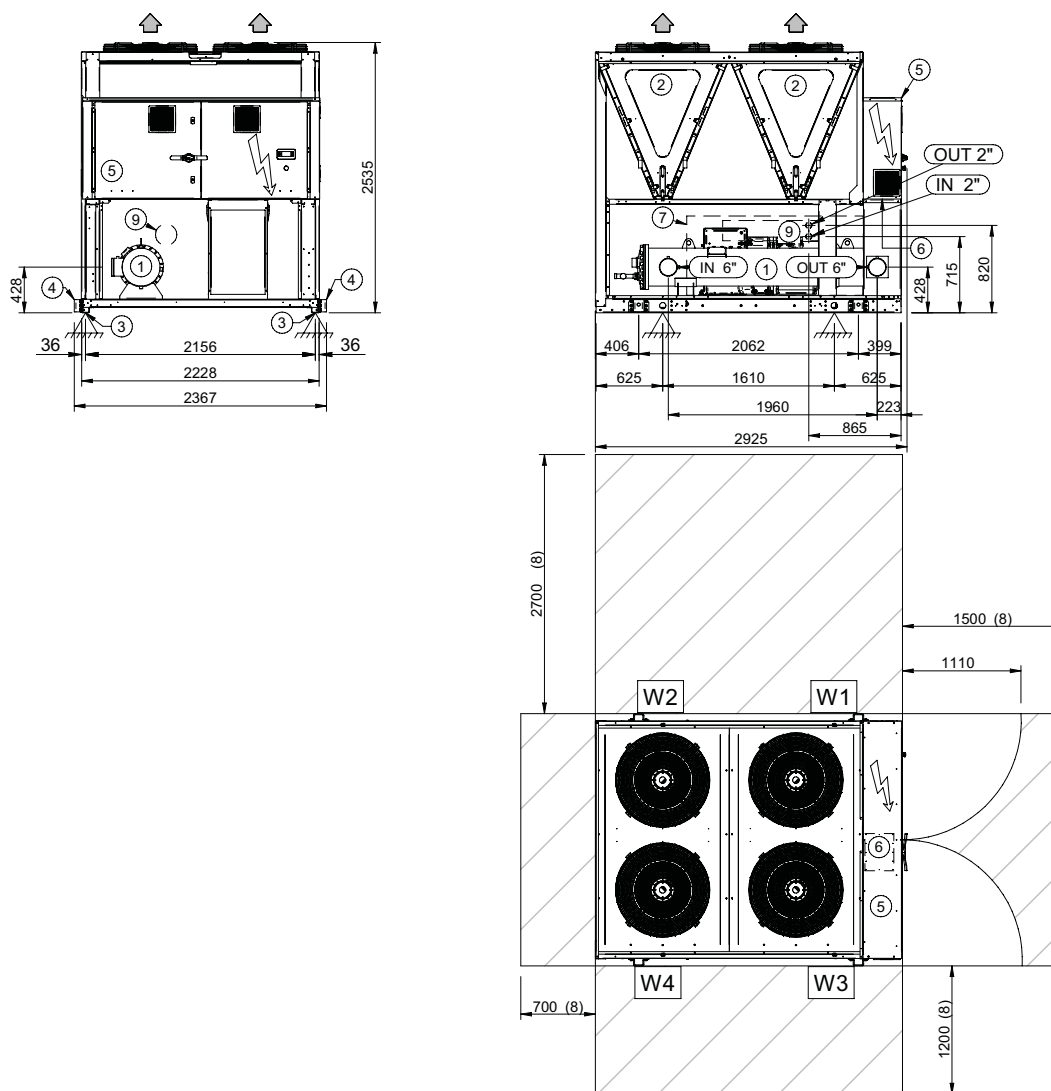
T_a (°C) = external exchanger inlet air temperature (D.B.)
 T_o (°C) = internal exchanger outlet water temperature

1. Standard unit operating range at full load
2. Standard unit operating range with air flow automatic modulation
3. Unit operating range in "B - Low water temperature, down to -2°C (Brine)"
4. Unit operating range with "REGTB - Device for the condensing coil partialization"

Dimensional drawings

SIZE 120.1 - 160.1 ST/SC/EN

DAA5Z0009 REV03
DATA/DATE 24/03/2021



1. Internal exchanger (Evaporator)
2. External exchanger (Condenser)
3. Unit fixing holes
4. Lifting brackets (Removable)
5. Electrical panel

6. Power input
7. Sound proof enclosure, only SC and EN version
8. Clearance access recommended
9. Partial recovery

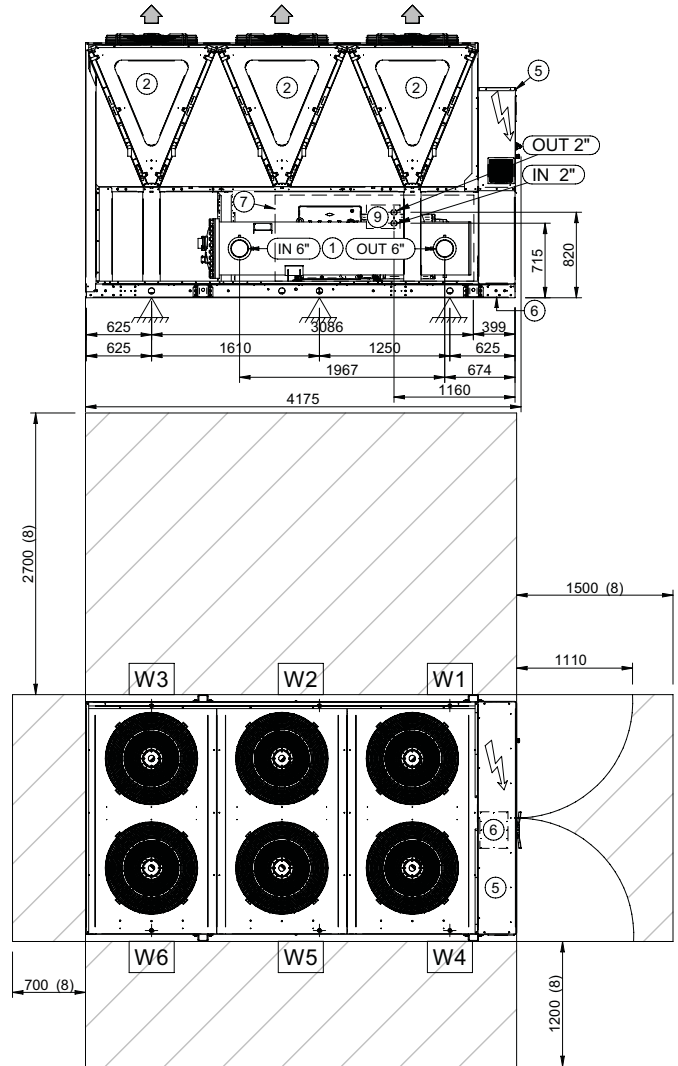
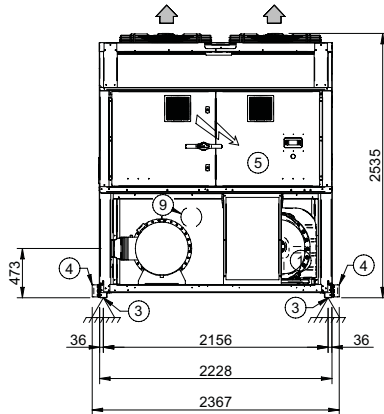
SIZE		120.1		160.1	
		ST	SC/EN	ST	SC/EN
Length	mm	2925	2925	2925	2925
Depth	mm	2228	2228	2228	2228
Height	mm	2535	2535	2535	2535
W1 Supporting point	kg	744	801	772	829
W2 Supporting point	kg	607	659	631	683
W3 Supporting point	kg	705	738	750	783
W4 Supporting point	kg	567	596	608	638
Operating weight	kg	2623	2794	2761	2933
Shipping weight	kg	2435	2605	2515	2685

The presence of optional accessories may result in a substantial variation of the weights shown in the table. Fan diffusers are separately supplied.

Dimensional drawings

SIZE 200.1 - 240.1 ST/SC/EN

DAA5Z0003 REV04
DATA/DATE 24/03/2021



1. Internal exchanger (Evaporator)
2. External exchanger (Condenser)
3. Unit fixing holes
4. Lifting brackets (Removable)
5. Electrical panel

6. Power input
7. Sound proof enclosure, only SC and EN version
8. Clearance access recommended
9. Partial recovery

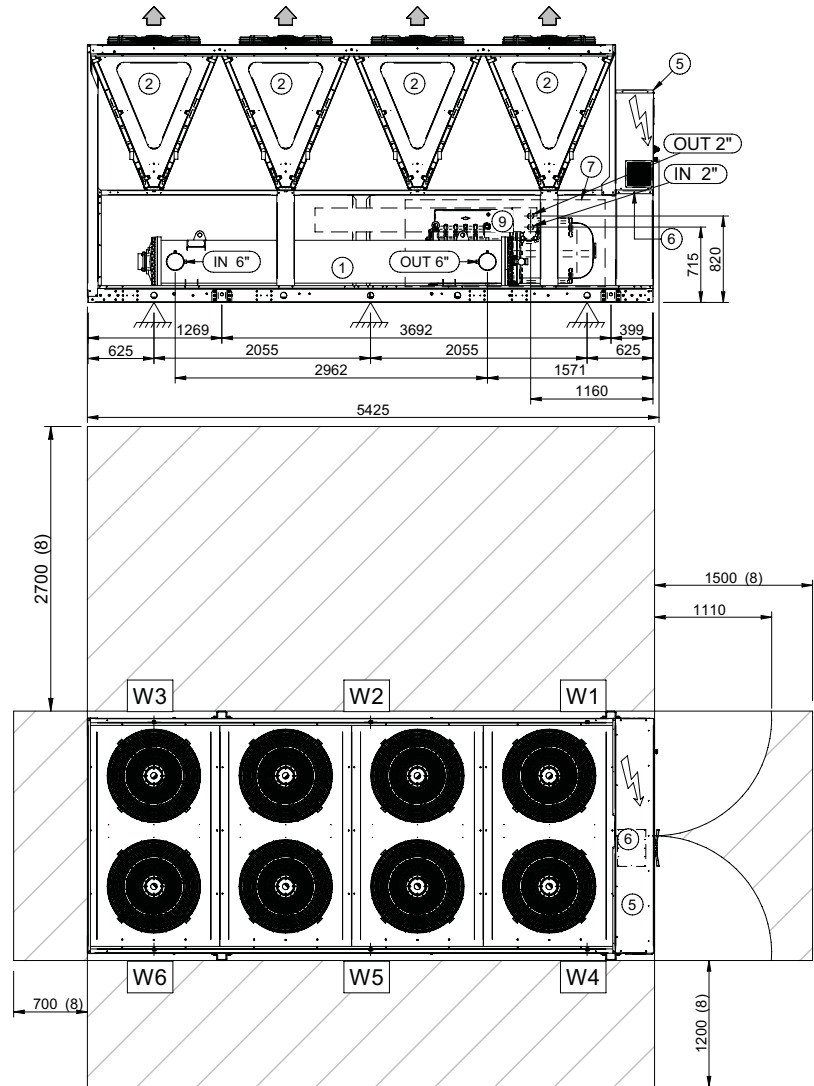
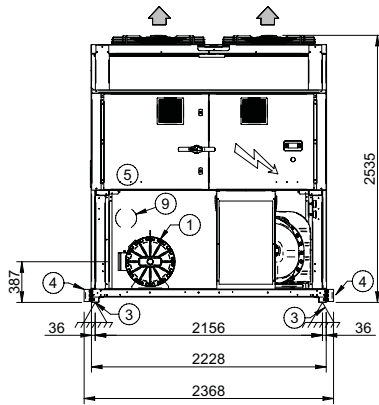
SIZE		200.1		240.1	
		ST	SC/EN	ST	SC/EN
Length	mm	4175	4175	4175	4175
Depth	mm	2228	2228	2228	2228
Height	mm	2535	2535	2535	2535
W1 Supporting point	kg	756	798	756	799
W2 Supporting point	kg	1053	1212	1054	1213
W3 Supporting point	kg	264	253	265	253
W4 Supporting point	kg	658	672	658	673
W5 Supporting point	kg	889	943	890	944
W6 Supporting point	kg	305	301	306	302
Operating weight	kg	3924	4179	3929	4184
Shipping weight	kg	3576	3831	3601	3586

The presence of optional accessories may result in a substantial variation of the weights shown in the table. Fan diffusers are separately supplied.

Dimensional drawings

SIZE 290.1 ST/SC/EN

DAA5Z0008 REV04
DATA/DATE 24/03/2021



1. Internal exchanger (Evaporator)
2. External exchanger (Condenser)
3. Unit fixing holes
4. Lifting brackets (Removable)
5. Electrical panel

6. Power input
7. Sound proof enclosure, only SC and EN version
8. Clearance access recommended
9. Partial recovery

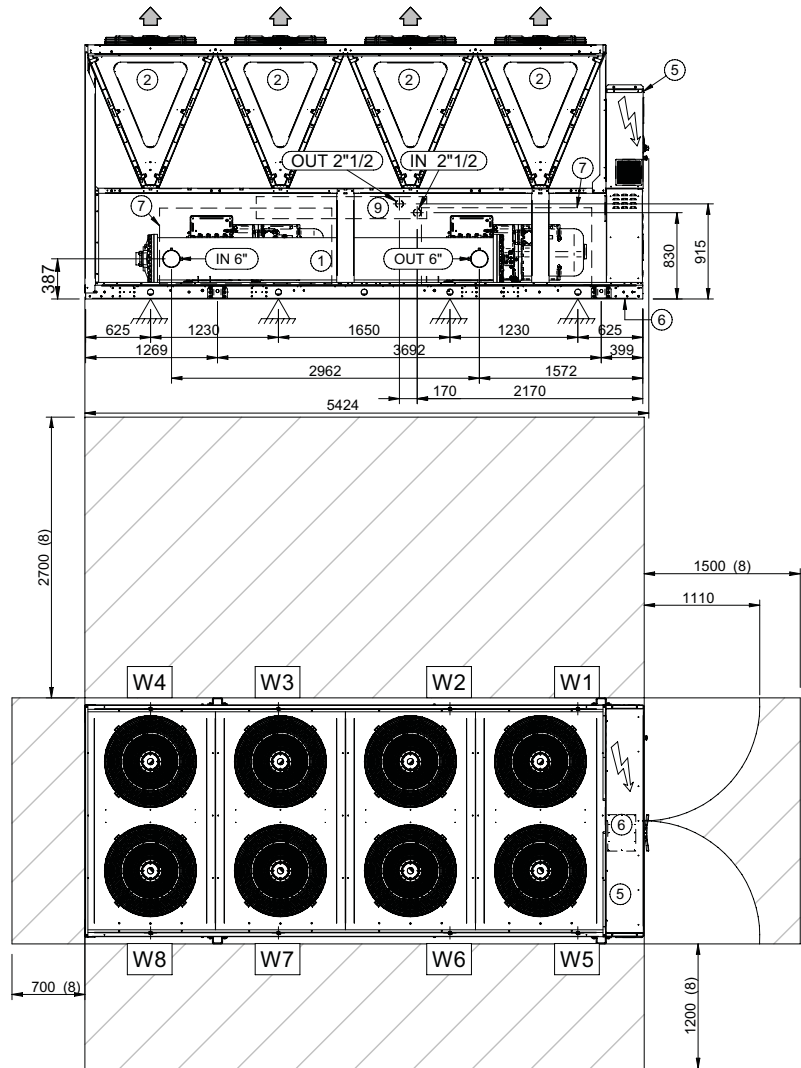
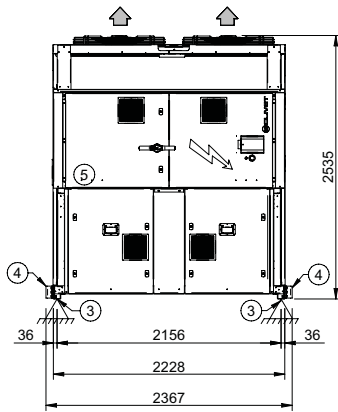
SIZE		290.1	
		ST	SC/EN
Length	mm	5425	5425
Depth	mm	2228	2228
Height	mm	2535	2535
W1 Supporting point	kg	945	1038
W2 Supporting point	kg	972	1086
W3 Supporting point	kg	292	275
W4 Supporting point	kg	670	702
W5 Supporting point	kg	908	947
W6 Supporting point	kg	497	491
Operating weight	kg	4284	4539
Shipping weight	kg	3927	4227

The presence of optional accessories may result in a substantial variation of the weights shown in the table. Fan diffusers are separately supplied.

Dimensional drawings

SIZE 250.2 - 280.2 - 320.2 ST/SC/EN

DAA5Z0007 REV04
DATA/DATE 24/03/2021



1. Internal exchanger (Evaporator)
2. External exchanger (Condenser)
3. Unit fixing holes
4. Lifting brackets (Removable)
5. Electrical panel

6. Power input
7. Sound proof enclosure, only SC and EN version
8. Clearance access recommended
9. Partial recovery

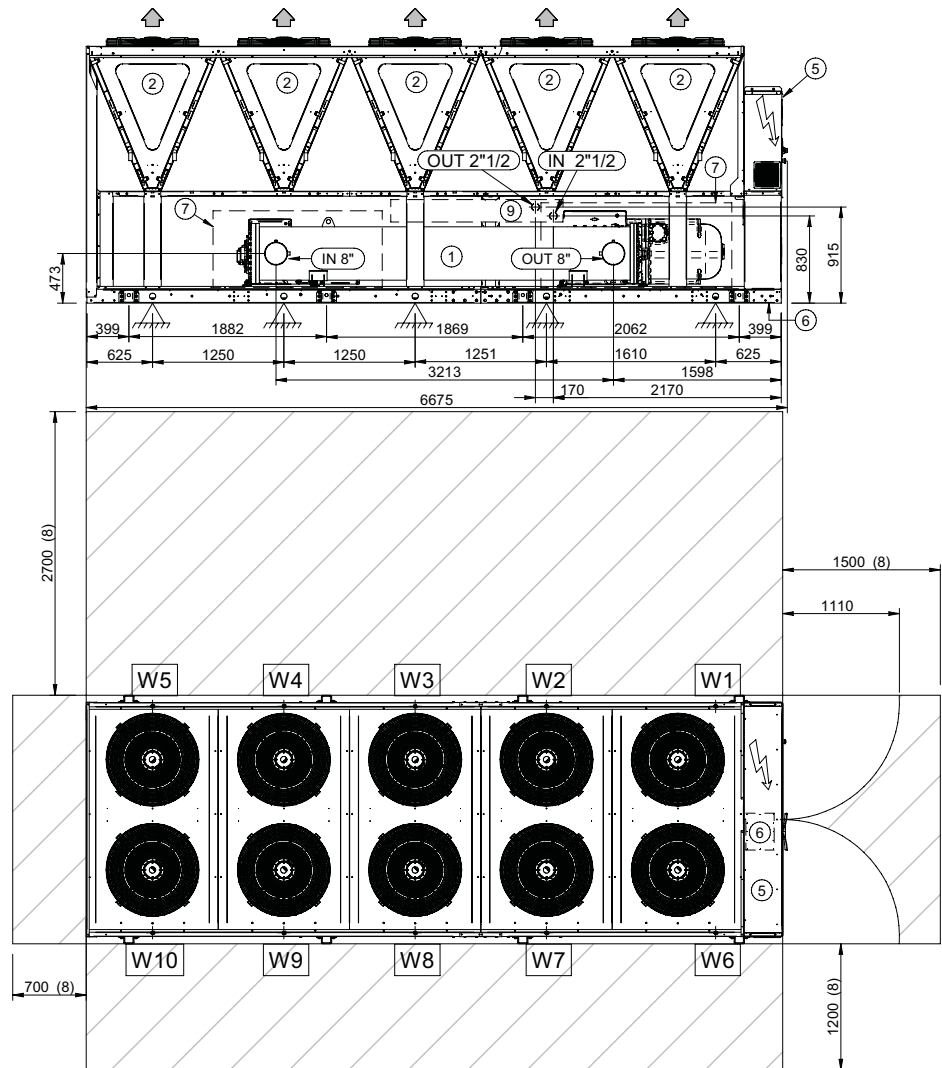
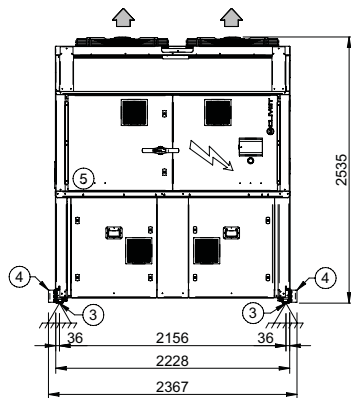
SIZE		250.2		280.2		320.2	
		ST	SC/EN	ST	SC/EN	ST	SC/EN
Length	mm	5424	5424	5424	5424	5424	5424
Depth	mm	2228	2228	2228	2228	2228	2228
Height	mm	2535	2535	2535	2535	2535	2535
W1 Supporting point	kg	780	833	780	833	781	834
W2 Supporting point	kg	636	736	637	738	638	738
W3 Supporting point	kg	758	873	759	874	760	875
W4 Supporting point	kg	393	430	394	431	394	431
W5 Supporting point	kg	633	651	633	652	634	652
W6 Supporting point	kg	601	635	604	639	605	640
W7 Supporting point	kg	622	661	625	664	626	665
W8 Supporting point	kg	426	439	428	441	429	442
Operating weight	kg	4850	5260	4861	5271	4867	5277
Shipping weight	kg	4514	4924	4541	4951	4555	7965

The presence of optional accessories may result in a substantial variation of the weights shown in the table. Fan diffusers are separately supplied.

Dimensional drawings

SIZE 360.2 - 400.2 ST/SC/EN

DAA5Z0004 REV04
DATA/DATE 24/03/2021



1. Internal exchanger (Evaporator)
2. External exchanger (Condenser)
3. Unit fixing holes
4. Lifting brackets (Removable)
5. Electrical panel

6. Power input
7. Sound proof enclosure, only SC and EN version
8. Clearance access recommended
9. Partial recovery

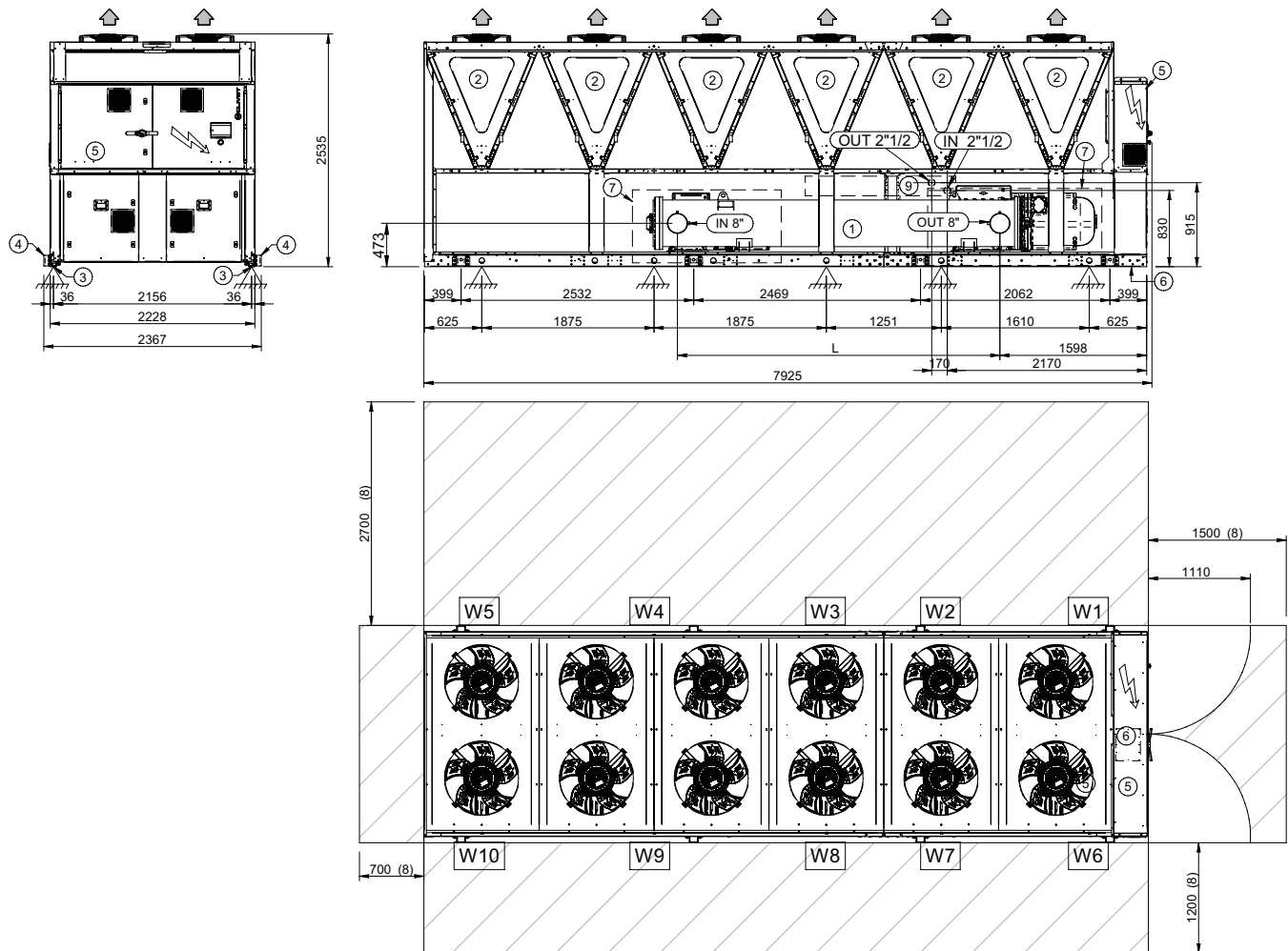
SIZE		360.2		400.2	
		ST	SC/EN	ST	SC/EN
Length	mm	6675	6675	6675	6675
Depth	mm	2228	2228	2228	2228
Height	mm	2535	2535	2535	2535
W1 Supporting point	kg	906	972	907	972
W2 Supporting point	kg	1026	1185	1027	1186
W3 Supporting point	kg	131	89	132	89
W4 Supporting point	kg	946	1109	947	1110
W5 Supporting point	kg	202	199	203	199
W6 Supporting point	kg	765	788	766	789
W7 Supporting point	kg	909	963	911	965
W8 Supporting point	kg	311	296	312	297
W9 Supporting point	kg	870	926	872	928
W10 Supporting point	kg	189	187	189	188
Operating weight	kg	6254	6714	6264	6724
Shipping weight	kg	5650	6110	5676	6136

The presence of optional accessories may result in a substantial variation of the weights shown in the table. Fan diffusers are separately supplied.

Dimensional drawings

SIZE 440.2 - 480.2 ST/SC/EN

DAA5Z0005 REV04
DATA/DATE 24/03/2021



1. Internal exchanger (Evaporator)
2. External exchanger (Condenser)
3. Unit fixing holes
4. Lifting brackets (Removable)
5. Electrical panel
6. Power input
7. Sound proof enclosure, only SC and EN version
8. Clearance access recommended
9. Partial recovery

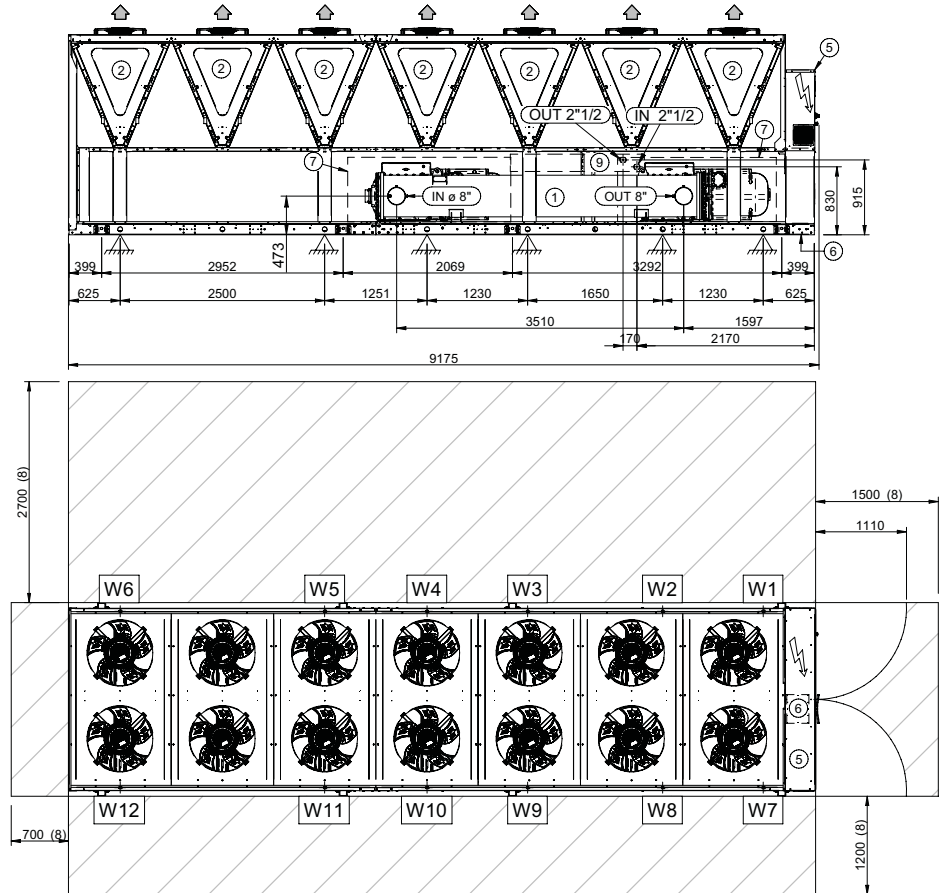
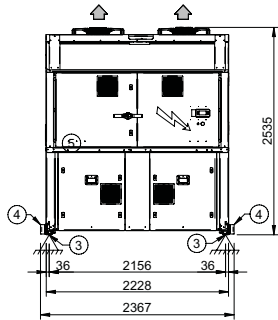
SIZE		440.2		480.2	
		ST	SC/EN	ST	SC/EN
Length	mm	7925	7925	7925	7925
Depth	mm	2228	2228	2228	2228
Height	mm	2535	2535	2535	2535
L	mm	3510	3510	3210	3210
W1 Supporting point	kg	918	986	925	994
W2 Supporting point	kg	890	1025	874	1004
W3 Supporting point	kg	589	622	737	789
W4 Supporting point	kg	810	929	1041	1187
W5 Supporting point	kg	197	184	173	158
W6 Supporting point	kg	779	803	783	807
W7 Supporting point	kg	804	850	817	861
W8 Supporting point	kg	736	748	795	812
W9 Supporting point	kg	764	804	846	896
W10 Supporting point	kg	199	195	191	186
Operating weight	kg	6686	7146	7183	7693
Shipping weight	kg	6054	6514	6581	7091

The presence of optional accessories may result in a substantial variation of the weights shown in the table. Fan diffusers are separately supplied.

Dimensional drawings

SIZE 540.2 ST/SC/EN

DAA5Z0010 REV04
DATA/DATE 24/03/2021



1. Internal exchanger (Evaporator)
2. External exchanger (Condenser)
3. Unit fixing holes
4. Lifting brackets (Removable)
5. Electrical panel

6. Power input
7. Sound proof enclosure, only SC and EN version
8. Clearance access recommended
9. Partial recovery

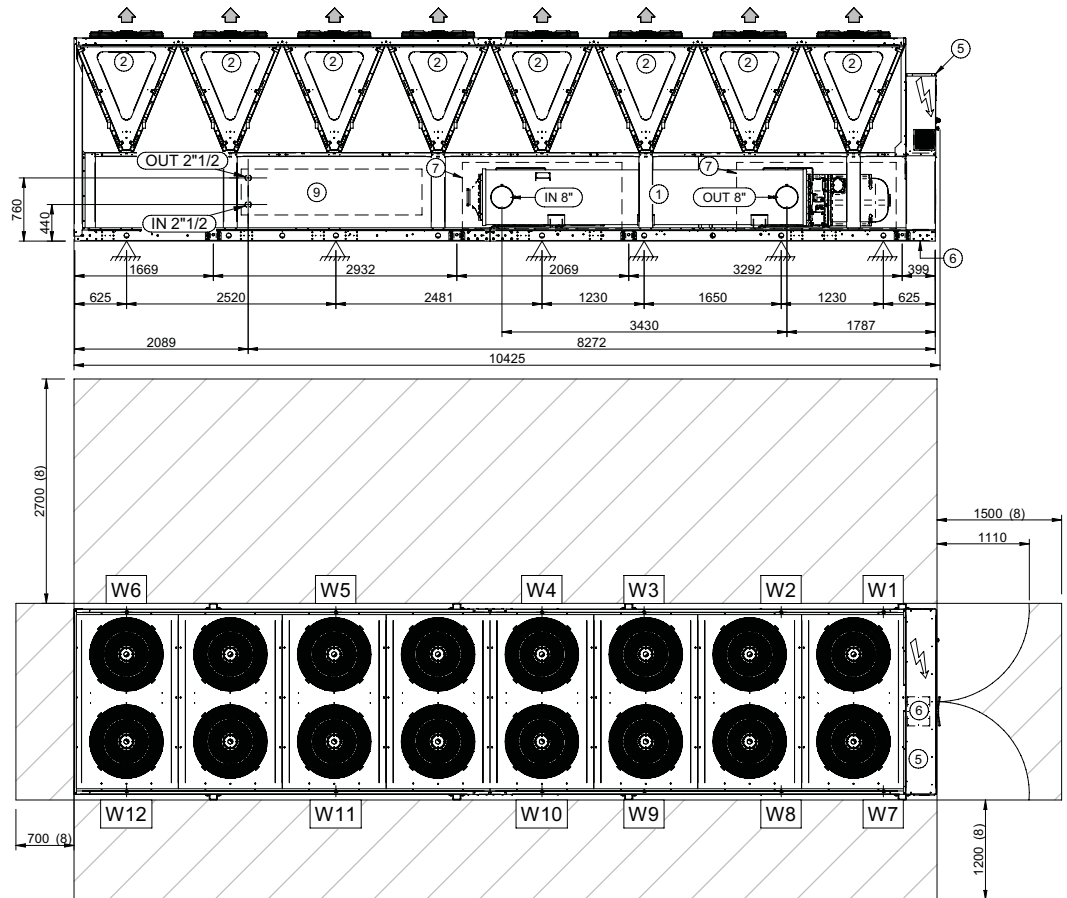
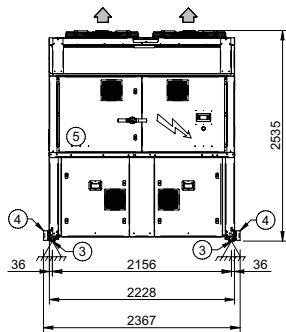
SIZE		540.2	
		ST	SC/EN
Length	mm	9175	9175
Depth	mm	2228	2228
Height	mm	2535	2535
W1 Supporting point	kg	767	807
W2 Supporting point	kg	1044	1209
W3 Supporting point	kg	381	362
W4 Supporting point	kg	1194	1391
W5 Supporting point	kg	304	301
W6 Supporting point	kg	297	298
W7 Supporting point	kg	608	621
W8 Supporting point	kg	901	958
W9 Supporting point	kg	604	597
W10 Supporting point	kg	907	974
W11 Supporting point	kg	290	288
W12 Supporting point	kg	298	298
Operating weight	kg	7595	8105
Shipping weight	kg	6977	7487

The presence of optional accessories may result in a substantial variation of the weights shown in the table. Fan diffusers are separately supplied.

Dimensional drawings

SIZE 580.2 ST/SC/EN

DAA5Z0006 REV04
DATA/DATE 24/03/2021



1. Internal exchanger (Evaporator)
2. External exchanger (Condenser)
3. Unit fixing holes
4. Lifting brackets (Removable)
5. Electrical panel

6. Power input
7. Sound proof enclosure, only SC and EN version
8. Clearance access recommended
9. Partial recovery

SIZE		580.2	
		ST	SC/EN
Length	mm	10425	10425
Depth	mm	2228	2228
Height	mm	2535	2535
W1 Supporting point	kg	771	811
W2 Supporting point	kg	995	1159
W3 Supporting point	kg	641	624
W4 Supporting point	kg	1377	1571
W5 Supporting point	kg	389	388
W6 Supporting point	kg	285	285
W7 Supporting point	kg	608	622
W8 Supporting point	kg	875	931
W9 Supporting point	kg	1370	1364
W10 Supporting point	kg	1155	1221
W11 Supporting point	kg	391	391
W12 Supporting point	kg	385	385
Operating weight	kg	9141	9652
Shipping weight	kg	7861	8371

The presence of optional accessories may result in a substantial variation of the weights shown in the table. Fan diffusers are separately supplied.

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