



WDAT-iZ4

120.1 - 580.2

MANUAL

FOR INSTALLATION,
USE AND MAINTENANCE



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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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.

Preliminaries

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

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.

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.

Before any work read:

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



Outdoor installation

1 SAFETY CONSIDERATIONS

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

2 BEFORE INSTALLATION

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

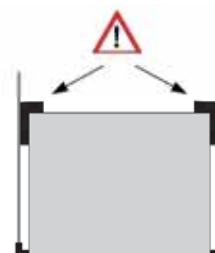
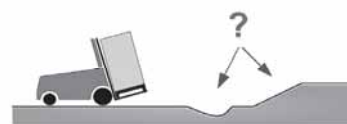
⇒ The unit may not be tilted more than 15° during transport.

NOTE

Removal of packaging

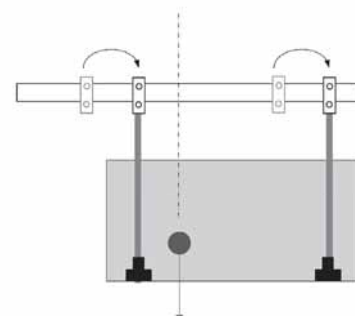
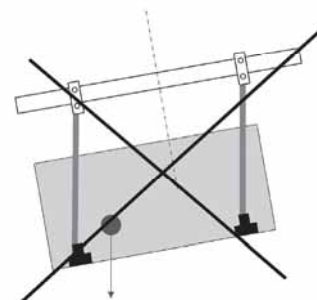
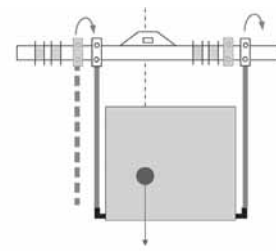
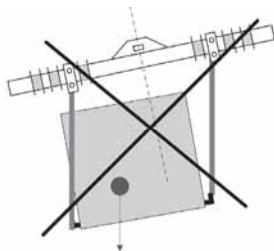
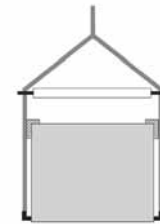
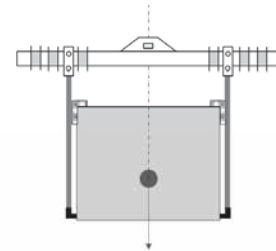
Be careful not to damage the unit.

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.



3 SELECTING THE INSTALLATION SITE

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..

3 SELECTING THE INSTALLATION SITE

Avoid therefore:

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

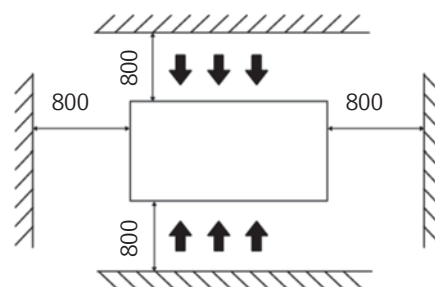
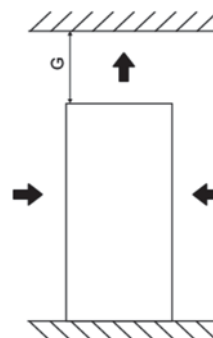
Ignoring the previous indications could:

- energy efficiency decrease
- blocchi per ALTA PRESSIONE (in estate) o BASSA PRESSIONE (in inverno).

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 .



4 WATER CONNECTIONS

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).

Water flow-rate

The design water flow-rate must be:

- inside the exchanger operating limits (see the TECHNICAL INFORMATION 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

Minimum system water contents are given in the 'General technical data' section and they have to be satisfied to stop the compressor from continuously switching on and off.

Water filter

Use filter with mesh pitch:

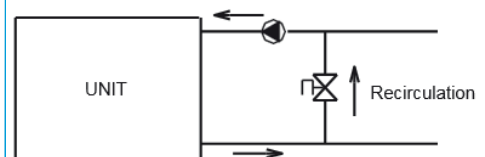
1,6 mm

⇒ *Must be installed immediately in the water input of the unit, in a position that is easily accessible for cleaning.*

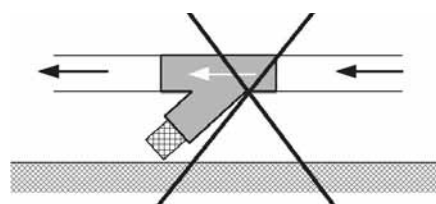
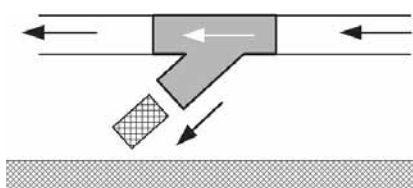
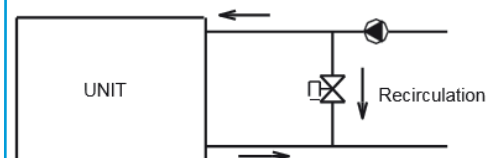
⇒ *The filter never should be removed, this operation invalidates the guaranty.*

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

Minimum water flow



Maximum water flow



4 WATER CONNECTIONS

Flow Switch

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

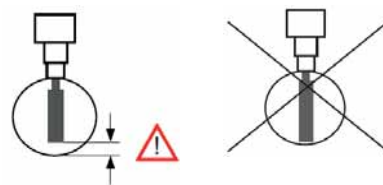
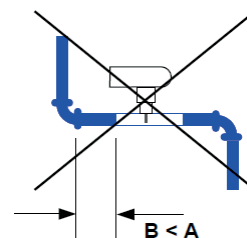
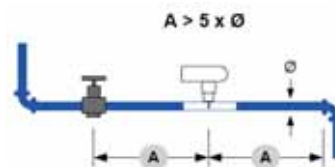
It has to be installed in a duct rectilinear part, not in proximity of curves that cause turbulences.

Operations sequence

Before starting the unit pump:

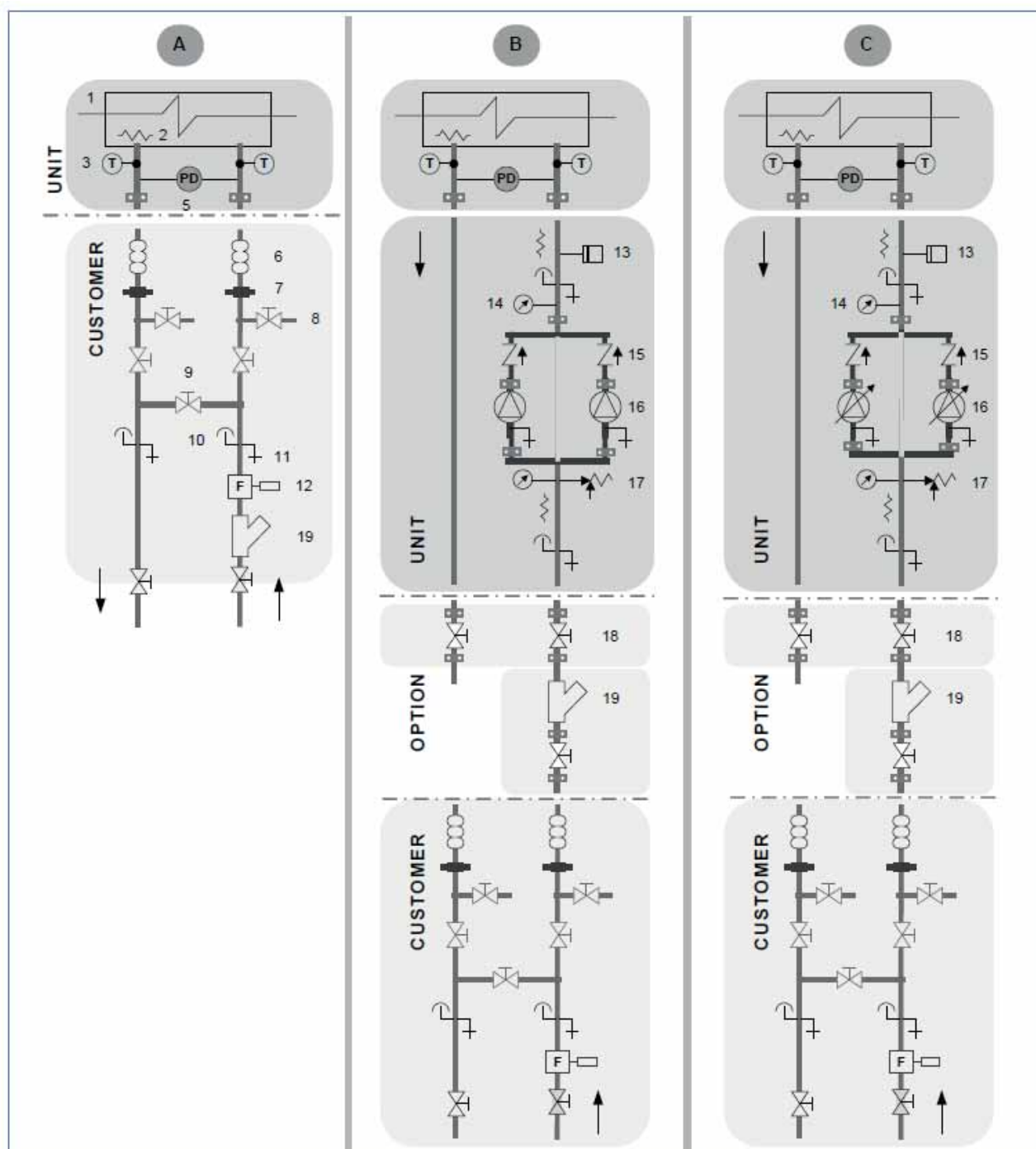
- 1 Close all vents in the high points of the unit's water circuit.
 - 2 Close all drain shut-off valves in the low points of the unit's water circuit
 - Exchangers
 - Pumps
 - collectors
 - storage tanks
 3. Thoroughly wash the system with clean water:
use the bypass to exclude the exchanger from the 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



- 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 check valve
- 16 pump
- 17 safety valve
- 18 shut-off valves
- 19 filter

4 WATER CONNECTIONS

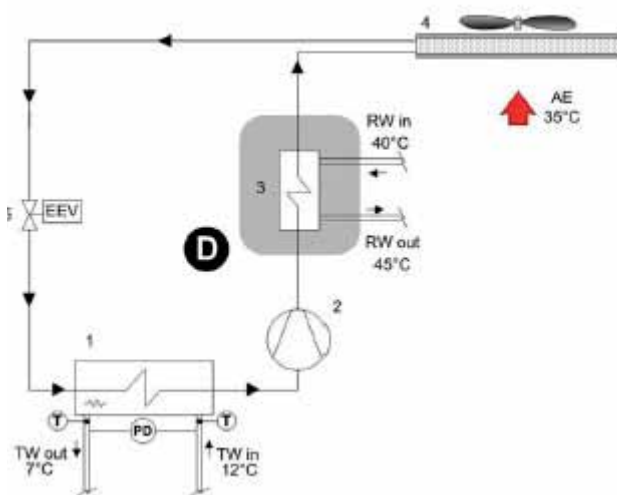
Partial energy recovery

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

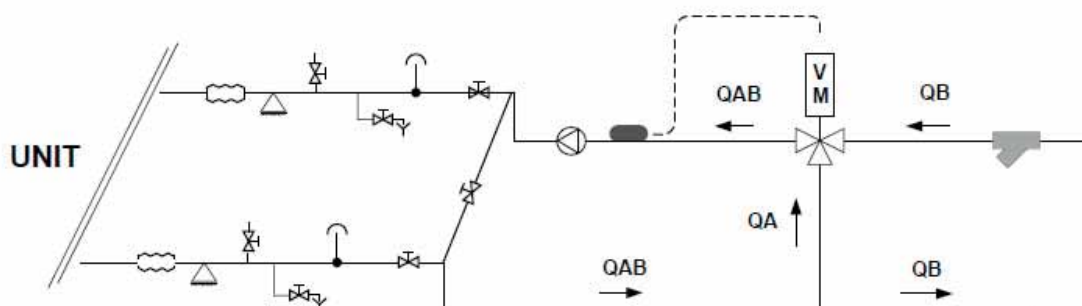
- 1 - Internal exchanger
- 2 - Compressors
- 3 - Recovery exchanger
- 4 - External exchanger
- 5 - Expansion electronic valve

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

refer to the unit electrical diagram (the number of the diagram is shown on the serial number label).

verify that the network has characteristics conforming to the data shown on the serial number label.

Before starting work, verify that the sectioning device at the start of the unit power line is open, blocked and equipped with cartel warning.

Primarily you have to realize the earthing connection.

Shelter the cables using adequate measure fairleads.

Before power the unit, make sure that all the protections that were removed during the electrical connection work have been restored.

5 ELECTRICAL CONNECTIONS

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.

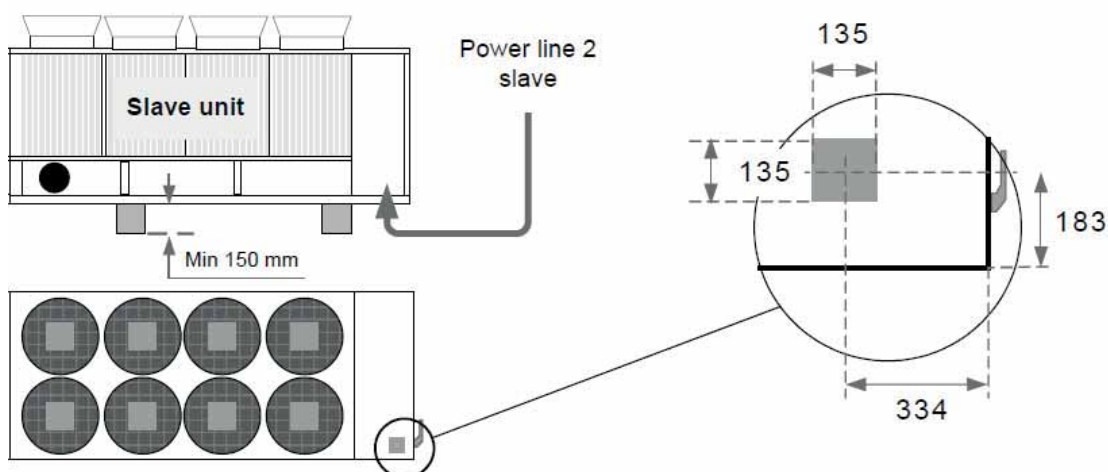
Guarantee the continuity of the screen during the entire extension of the cable.

Respect impedance, capacity and attenuation indications.

Power input

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

The cable must not touch the compressor and the refrigerant piping (they reach high temperatures).



Remote ON-OFF

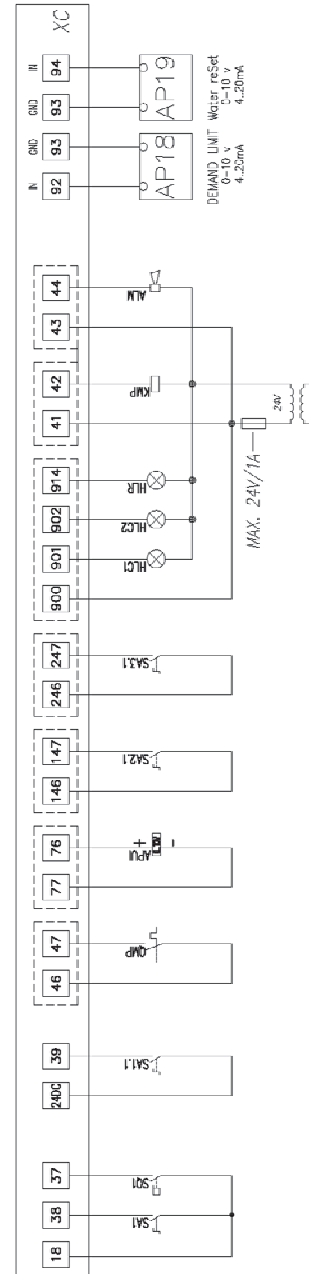
Do not perform short On Off cycles

Do not use the remote On Off with thermoregulation function.

Power supply cables section

Size	250.2	280.2	320.2	360.2	400.2
Min. cable section Cu (mm ²)	1x240	2x150	2x150	2x185	2x185
Max. cable section Cu (mm ²)	1x240	2x300	2x300	2x300	2x300
Min. bar Cu section (mm ²)	-	2x30x5	2x30x5	2x40x5	2x40x5
Max. bar Cu width (mm)	40	50	50	63	63
Tightening torque (Nm)	20	20	20	-	-
Size	420.2	440.2	480.2	540.2	580.2
Min. cable section Cu (mm ²)	2x240	2x240	2x240	-	-
Max. cable section Cu (mm ²)	4x185	4x185	4x185	4x185	4x185
Min. bar Cu section (mm ²)	2x50x5	2x50x5	2x50x5	2x50x5	2x50x5
Max. bar Cu width (mm)	63	63	63	63	63
Tightening torque (Nm)	-	-	-	-	-

ALC-HC2		lampada di segnalazione stato compressore lampe de segnalation etat compresseur Signallampe Verlichtungsstand lampara de senalizaci3n estado compresor	
AM		segnalatore blocco accumulatore signaleur blocq accumulateur Sammlerblock señalizador bloque acumulativo	
HR	RAQF1	Lampada di segnalazione allarme resistenza guido elettrico Alarm signal lamp resistance electric guid Signallampe allarme de resistance électrique Lampara de senalizaci3n alarma de resistencia de guido	475 53 F.9. 26.12
SA		selettore on/off remoto selecteur on/off remote Fernwählschalter Ein/Aus seleci3n remoto	
SA11		svellatore abitazione seconda set-point selecteur de l'habitation deuxieme consigne Wohnschalter 2. Sollwert seleci3n habitaci3n segundo set-point	
SQ21		svellatore remoto di abitazione compressore remote compressor enabling selector Fernschalter Kompressor ein/ausschalten seleci3n remoto de habitaci3n compresor	
SQ1		svellatore remoto di abitazione compressore remote compressor enabling selector Fernschalter Kompressor ein/ausschalten seleci3n remoto de habitaci3n compresor	
SQ1		flussovalvola low switch contrôleur de débit Schrumpungswächter invalvola	
QMP		interuttore automatico a protezione pompa motore interrupteur automatique à protection pompe Schutzschalter für die Pumpe autanulador Schuttschalter der Umwälzpumpe interlucido automatico de protecci3n bomb motorizaci3n	411.1 F.9. 27.2
KMP		svellatore pompa di circolazione e evaporatore evaporator pump contactor Schaltz für das Wasserpumpen und Verdampfer contactor bomba de circulaci3n e evaporador	411.1 F.9. 27.2
APU1		inverter pompe lato utilizzo inverter side pumps use Pompe side ventiler, utilisation inverter für Wasserpumpen Einsatz	411.1 F.9. 27.2
AP18		demand-limit demand-limit demand-limit demand-limit	
AP19		Water reset Water reset Water reset Water reset	



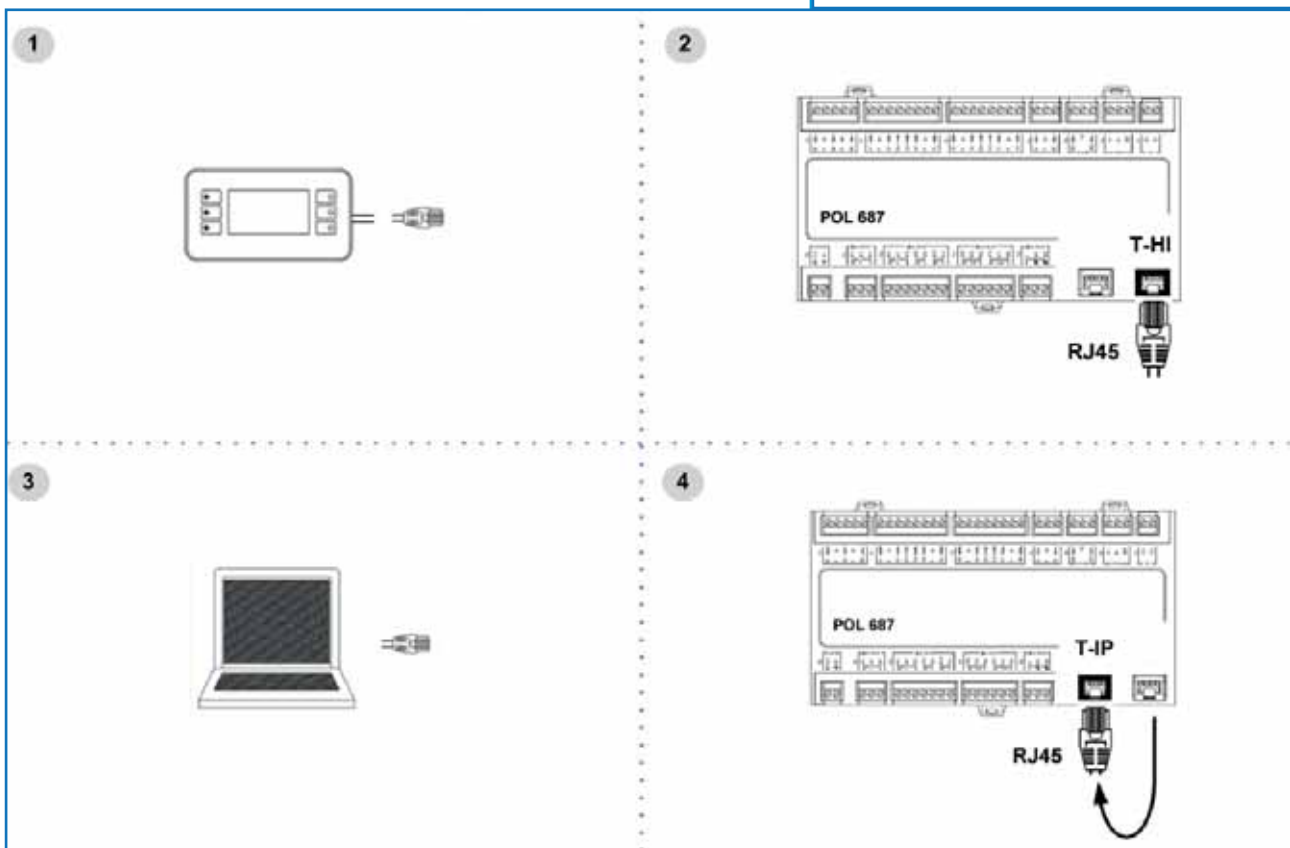
5 ELECTRICAL CONNECTIONS

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 (Crhome, 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

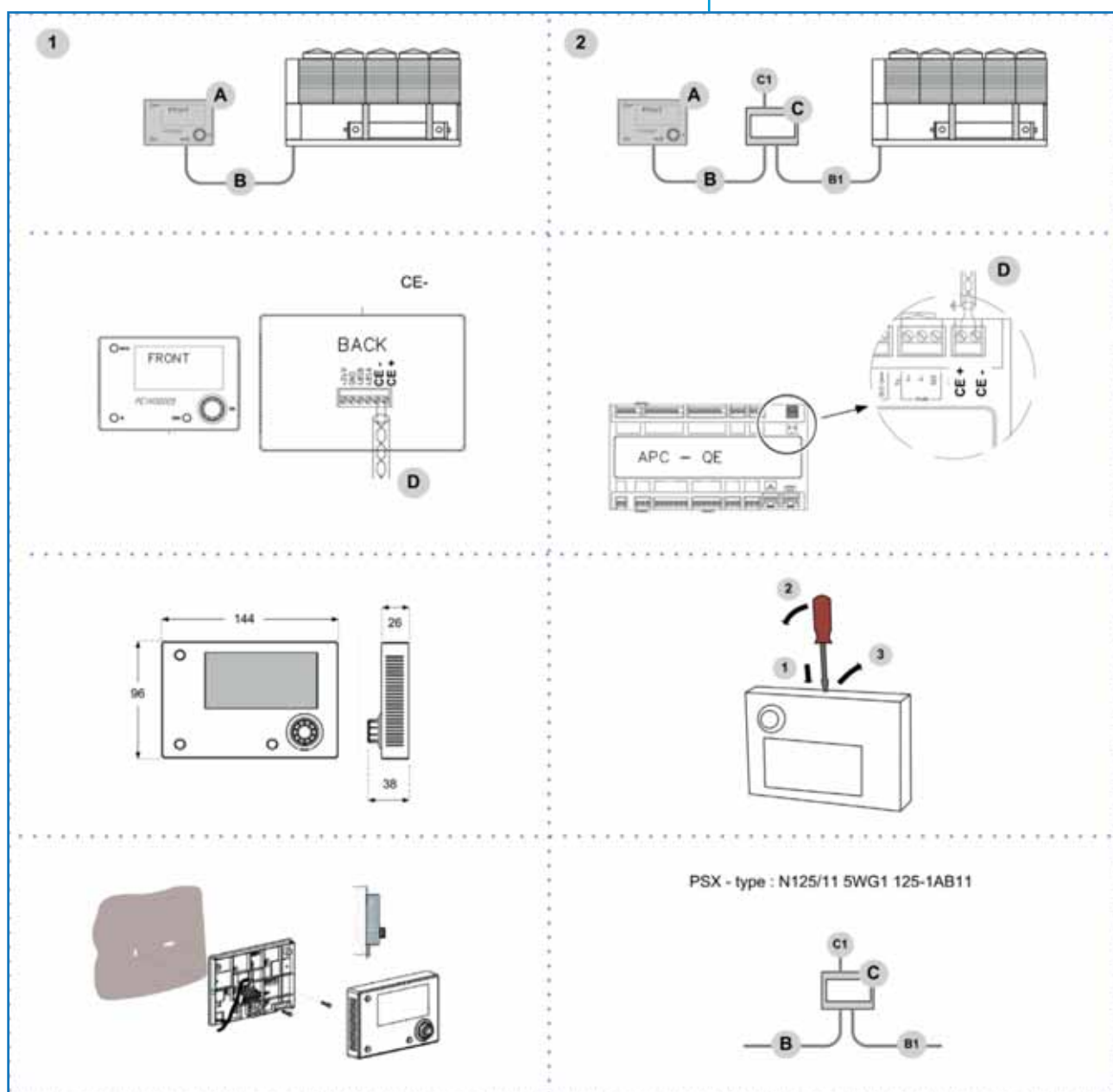
A User interface

B=B1 KNX bus, max 350 mt
twisted pair with shield, \varnothing 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

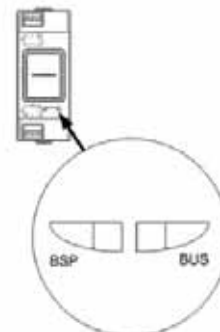
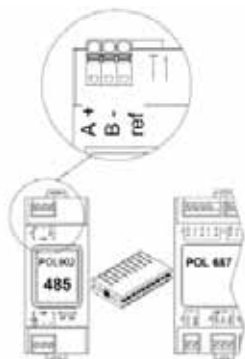
D KNX bus, max 350 mt



5 ELECTRICAL CONNECTIONS

Modbus - RS485

Option



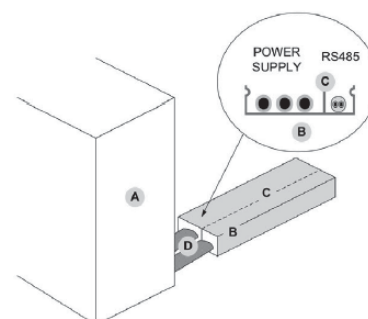
LED BSP	communication with AP1 module	LED BUS	communication with Modbus
green	communication ok	green	communication ok
yellow	software ok but communication with AP1 down	yellow	startup / channel not communicating
red	flashing: software error fixed: hardware error	red	communication down

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.*

6 START-UP

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	unit input water filter + shut-off valves for cleaning	
12	vibration dampeners on hydraulic connections	
13	expansion tank (recommended volume = 10% system content)	
14	minimum system water content	
15	clean system	
16	loaded system + possible glycol solution + corrosion inhibitor	
17	system under pressure + vented	
18	refrigerant circuit visual check	
19	earthing connection	
20	power supply features	
21	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	

6 START-UP

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.*

Weight of glycol (%)	10	20	30
Freezing temperature (°C)	-3.9	-8.9	-15.6
Safety temperature	+1	-4	-10

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%

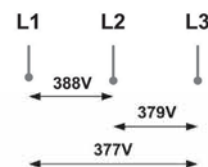
Example:

$$400 - 6\% = 376$$

$$400 + 6\% = 424$$

NOTE

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



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

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

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

Compressor casing resistances

Connect the compressor oil heating resistances at least 8 hours before the compressor is to be started:

- at the first unit start-up
 - after each prolonged period of inactivity
- 1 Power the heaters: isolator switch on 1 / ON.
 - 2 Check the power consumption of the resistances to make sure that they are functioning.
 - 3 Start-up the compressor only if the crank-case temperature on the lower side is be higher than the outside temperature by at least 10°C .
 - 4 Do not start the compressor with the crankcase oil below operating temperature.

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

6 START-UP

Demand limit

Menu accessible only after having entered the password.

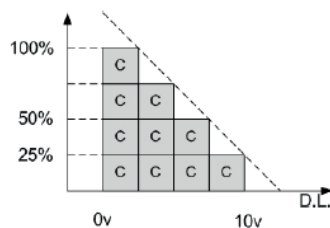
⇒ Access reserved only to specifically trained personnel.

⇒ 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 \neq 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	Set Point	▼	✓	Set Point
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	Press 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

6 START-UP

Water reset

Menu accessible only after having entered the password.

⇒ Access reserved only to specifically trained personnel.

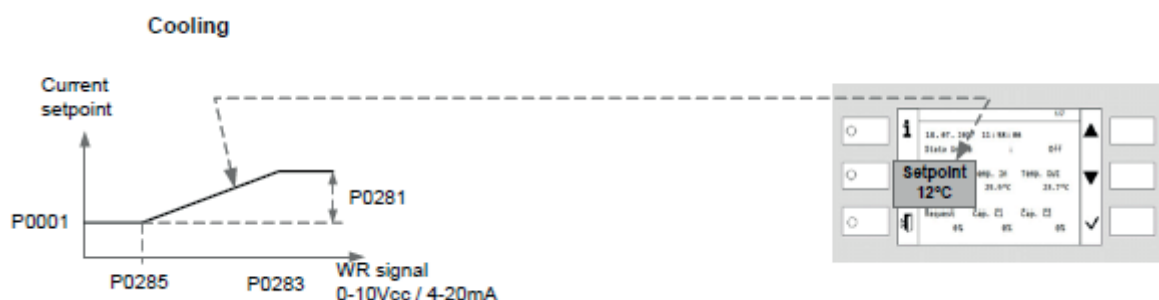
⇒ The parameter modification can cause irreversible damages.

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	Parameter	▼	✓	
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:

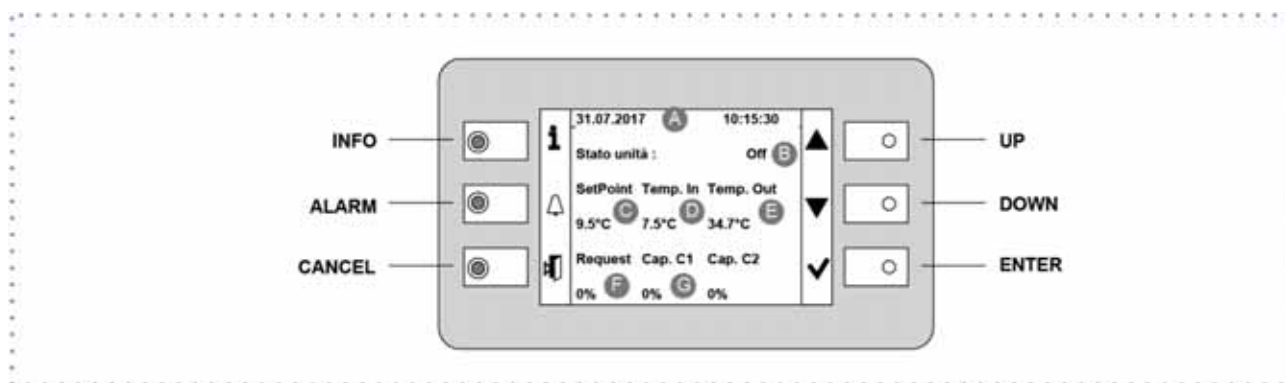
- only for units assembled on the installer's building site (for ex. condensing circuit + direct expansion unit)

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

7 CONTROL

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

7 CONTROL

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 alarm: 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

ID	Italiano	English	Deutsch	Français	Espagnol
ee0001	Monitore di Fase	Phase Monitor	Phasenkontrolle	Moniteur De Phase	Spagnolo
EE0003	Pompa 1 Utilizzo	Pump 1 User-side	Fehler Verbraucherpumpe 1	Thermique Pompe 1 Utilisation	TimeOut POL98U
EE0004	Pompa 2 Utilizzo	Pump 2 User-side	Fehler Verbraucherpumpe 2	Thermique Pompe 2 Utilisation	Temp. Agua In Utilizo Sonda
EE0005	Pompa 3 Utilizzo	Pump 3 User-side	Fehler Verbraucherpumpe 3	Thermique Pompe 3 Utilisation	Temp. Agua Out Utilizo Sonda
ee0008	Inverter Utilizzo Guasto	User-side Inverter Protection	Fehler Inverter Verbrauch	Protection Inverter Utilisation	External Temp. Probe
ee0010	Master Offline	Master Unit Offline	Master nicht verbunden	Maître Offline	Temp. Cuadro electrico
ee0011	Unità 2 in allarme	Unit 2 In Alarm	Gerät 2 Alarm	Unité 2 en alarme	P.DifferenzialeUtil
ee0012	Unità 2 OffLine	Unit 2 Offline	Gerät 2 nicht verbunden	Unité 2 Offline	Demand Limit
ee0013	Unità 3 in allarme	Unit 3 In Alarm	Gerät 3 Alarm	Unité 3 en alarme	Demand Limit
ee0014	Unità 3 OffLine	Unit 3 Offline	Gerät 3 nicht verbunden	Unité 3 Offline	Water Reset
ee0015	Unità 4 in allarme	Unit 4 In Alarm	Gerät 4 Alarm	Unité 4 en alarme	Water Reset
ee0016	Unità 4 OffLine	Unit 4 Offline	Gerät 4 nicht verbunden	Unité 4 Offline	Monitor De Fase
ee0017	Unità 5 in allarme	Unit 5 In Alarm	Gerät 5 Alarm	Unité 5 en alarme	Helada Agua Utilizo
ee0018	Unità 5 OffLine	Unit 5 Offline	Gerät 5 nicht verbunden	Unité 5 Offline	Bomba Antihelo Utilizo
ee0019	Unità 6 in allarme	Unit 6 In Alarm	Gerät 6 Alarm	Unité 6 en alarme	Delta T Incongruente
ee0020	Unità 6 OffLine	Unit 6 Offline	Gerät 6 nicht verbunden	Unité 6 Offline	Salida de Gas
ee0021	Unità 7 in allarme	Unit 7 In Alarm	Gerät 7 Alarm	Unité 7 en alarme	Alarma Bomba 1 Utilizo
ee0022	Unità 7 OffLine	Unit 7 Offline	Gerät 7 nicht verbunden	Unité 7 Offline	Alarma Bomba 2 Utilizo
ee0027	Temp. In Utilizzo	User-side In Temp. Probe	Fehler Wassertemperatur IN	Temp. Eau Entrée Utilisation Sonde	Alarma Bomba 3 Utilizo
ee0028	Temp. Out Utilizzo	User-side Out Temp. Probe	Fehler Wassertemperatur OUT	Temp. Eau Sortie Utilisation Sonde	Alarma Inverter Utilizo
ee0029	Temp. Aria Esterna	External Temp. Probe	External Temp. Probe	External Temp. Probe	Baja Presión Agua Utilizo
ee0030	Demand Limit	Demand Limit	Nachfrage Grenze	Demand Limit	Bajo Flujo Agua Utilizo
ee0031	Water Reset	Water Reset	Wasser Reset	Water Reset	TimeOut Init Inverter
ee0033	Temp. Quadro Elettrico	Cabinet Temp. Probe	Schaltschranktemperatur	Température Armoire	TimeOut Init Inverter
ee0050	Press. Diff. Utilizzo	User-side Diff. Press. Probe	Betrieb Diff. Druck	P.DifferenzialeUtil	Master fuera de linea
ee0100	TimeOut POL98U	TimeOut POL98U	Auszeit POL98U	TimeOut POL98U	Unidad 2 en alarma
ee0130	Demand Limit	Demand Limit	Nachfrage Grenze	Demand Limit	Unidad 2 fuera de linea
ee0131	Water Reset	Water Reset	Wasser Reset	Water Reset	Unidad 3 en alarma
ee1004	EEVBlocked	EEVBlocked	EEVBlocked	EEVBlocked	Unidad 3 fuera de linea.
EE1018	Vent. Sorgente	Source Vent. Protection	Thermischer Quellschutz	Prot. Vent. Source	Unidad 4 en alarma
ee1027	Temp. Aspir.	Suction Temp. Probe	Fehler Sensor Temperatur Ansaugluft	Suction Temp. Probe	Unidad 4 fuera de linea

ID	Italiano	English	Deutsch	Français	Espagnol
ee1028	Press. Scarico	Discharge Press. Sensor	Fehler Sensor Druck Auslass	Discharge Press. Sensor	Unidad 5 en alarma
ee1029	Press. Aspir.	Suction Press. Sensor	Fehler Sensor Druck Ansaugluft	Suction Press. Sensor	Unidad 5 fuera de línea
ee1039	TimeOut Inverter	TimeOut Inverter 1	Auszeit Inverter 1	TimeOut Inverter 1	Unidad 6 en alarma
ee1101	MainsFailure	MainsFailure	MainsFailure	MainsFailure	Unidad 6 fuera de línea
ee1106	MotorOvl	MotorOvl	MotorOvl	MotorOvl	Unidad 7 en alarma
ee1108	FCOverload	FCOverload	FCOverload	FCOverload	Unidad 7 fuera de línea
ee1109	OverCurrent	OverCurrent	OverCurrent	OverCurrent	TimeOut Inverter 1
ee1110	OverVoltage	OverVoltage	OverVoltage	OverVoltage	Suction Temp. Probe
ee1111	UnderVoltage	UnderVoltage	UnderVoltage	UnderVoltage	Suction Press. Sensor
ee1112	FCOverTemp	FCOverTemp	FCOverTemp	FCOverTemp	Discharge Press. Sensor
ee1113	FCHWConfig	FCHWConfig	FCHWConfig	FCHWConfig	Circuito Vacío
ee1114	FCSWConfig	FCSWConfig	FCSWConfig	FCSWConfig	Alarma Baja Presión Fresco (Al)
ee1115	FCParamCfg	FCParamCfg	FCParamCfg	FCParamCfg	Alta Presión (DI)
ee1116	FCElectronics	FCElectronics	FCElectronics	FCElectronics	Alarma Alta Presión (Al)
ee1117	TempSensors	TempSensors	TempSensors	TempSensors	Alarma Max RC
ee1139	TimeOut Init Inverter	TimeOut Init Inverter	Auszeit Inverter	TimeOut Init Inverter	Alarma Min RC
ee2004	EEVBlocked	EEVBlocked	EEVBlocked	EEVBlocked	Prot. Vent. Sorgente
EE2018	Vent. Sorgente	Source Vent Protection	Thermischer Quellschutz	Prot. Vent. Source	Limite Baja Pres.
ee2027	Temp. Aspir.	Suction Temp. Probe	Fehler Sensor Temperatur Ansaugluft	Suction Temp. Probe	Min. Recalentamiento EEV
ee2028	Press. Scarico	Discharge Press. Sensor	Fehler Sensor Druck Auslass	Discharge Press. Sensor	EEVBlocked
ee2029	Press. Aspir.	Suction Press. Sensor	Fehler Sensor Druck Ansaugluft	Suction Press. Sensor	STO_ResetsQty
ee2039	TimeOut Inverter	TimeOut Inverter 1	Auszeit Inverter 1	TimeOut Inverter 1	MainsFailure
ee2101	MainsFailure	MainsFailure	MainsFailure	MainsFailure	EnvelopeZone
ee2106	MotorOvl	MotorOvl	MotorOvl	MotorOvl	EnvelopeCfg
ee2108	FCOverload	FCOverload	FCOverload	FCOverload	OilTemp
ee2109	OverCurrent	OverCurrent	OverCurrent	OverCurrent	OilLevel
ee2110	OverVoltage	OverVoltage	OverVoltage	OverVoltage	MotorOvl
ee2111	UnderVoltage	UnderVoltage	UnderVoltage	UnderVoltage	MotorTemp
ee2112	FCOverTemp	FCOverTemp	FCOverTemp	FCOverTemp	FCOverload
ee2113	FCHWConfig	FCHWConfig	FCHWConfig	FCHWConfig	OverCurrent
ee2114	FCSWConfig	FCSWConfig	FCSWConfig	FCSWConfig	OverVoltage

ID	Italiano	English	Deutsch	Français	Español
ee2115	FCParamCfg	FCParamCfg	FCParamCfg	FCParamCfg	UnderVoltage
ee2116	FCElectronics	FCElectronics	FCElectronics	FCElectronics	FCOverTemp
ee2117	TempSensors	TempSensors	TempSensors	TempSensors	FCHWConfig
ee2139	TimeOut Init Inverter	TimeOut Init Inverter	Auszeit Inverter	TimeOut Init Inverter	FCSWConfig
ff0001	Perdita Refrigerante	Refrigerant Leakage	Gasastritt	Fuite De Réfrigérant	FCParamCfg
ff1005	Min Surric. EEV	Min Overheating EEV	Min. Überhitzung EEV	Min. Surchauffe EEV	FCElectronics
ff1013	Alta Pressione (DI)	High Pressure (DI)	Hochdruckalarm (DI)	Haute Pression (DI)	TempSensors
ff1015	Alta Pressione (AI)	High Pressure Alarm (AI)	Hochdruckalarm (AI)	Alarme Haute Pression (AI)	PressLimits
ff1017	Min Rapp. Compr.	Min RC Alarm	Alarm RC min	Min RC Alarme	TimeOut Inverter 1
ff1018	Bassa Press. Cool (AI)	Low Pressure Alarm Cool(AI)	Niederdruckalarm Cool (AI)	Alarme Basse Pression Refroidissement(AI)	Suction Temp. Probe
FF1019	Max Rapp. Compr.	Max RC Alarm	Alarm RC max	Max RC Alarme	Suction Press. Sensor
ff1034	Circuito Scarico	Circuit Vacuum	Vakuumpreislauf	Circuit Vide	Discharge Press. Sensor
FF1046	Limite Bassa Press.	Low Press. Limit	Niederdruck Grenze	Limite Basse Press.	Circuito Vacio
ff1100	STO_ResetsQty	STO_ResetsQty	STO_ResetsQty	STO_ResetsQty	Alarma Baja Presión Fresco (AI)
ff1102	EnvelopeZone	EnvelopeZone	EnvelopeZone	EnvelopeZone	Alta Presión (DI)
ff1103	EnvelopeCfg	EnvelopeCfg	EnvelopeCfg	EnvelopeCfg	Alarma Alta Presión (AI)
ff1104	OilTemp	OilTemp	OilTemp	OilTemp	Alarma Max RC
ff1105	OilLevel	OilLevel	OilLevel	OilLevel	Alarma Min RC
ff1107	MotorTemp	MotorTemp	MotorTemp	MotorTemp	Prot. Vent. Sorgente
ff1118	PressLimits	PressLimits	PressLimits	PressLimits	Limite Baja Pres.
ff2005	Min Surric. EEV	Min Overheating EEV	Min. Überhitzung EEV	Min. Surchauffe EEV	Min. Recalentamiento EEV
ff2013	Alta Pressione (DI)	High Pressure (DI)	Hochdruckalarm (DI)	Haute Pression (DI)	EEVBlocked
ff2015	Alta Pressione (AI)	High Pressure Alarm (AI)	Hochdruckalarm (AI)	Alarme Haute Pression (AI)	STO_ResetsQty
ff2017	Min Rapp. Compr.	Min RC Alarm	Alarm RC min	Min RC Alarme	MainsFailure
ff2018	Bassa Press. Cool (AI)	Low Pressure Alarm Cool(AI)	Niederdruckalarm Cool (AI)	Alarme Basse Pression Refroidissement(AI)	EnvelopeZone
FF2019	Max Rapp. Compr.	Max RC Alarm	Alarm RC max	Max RC Alarme	EnvelopeCfg
ff2034	Circuito Scarico	Circuit Vacuum	Vakuumpreislauf	Circuit Vide	OilTemp
FF2046	Limite Bassa Press.	Low Press. Limit	Niederdruck Grenze	Limite Basse Press.	OilLevel

ID	Italiano	English	Deutsch	Français	Espagnol
#2100	STO_ResetsQty	STO_ResetsQty	STO_ResetsQty	STO_ResetsQty	MotorOvl
#2102	EnvelopeZone	EnvelopeZone	EnvelopeZone	EnvelopeZone	MotorTemp
#2103	EnvelopeCfg	EnvelopeCfg	EnvelopeCfg	EnvelopeCfg	FCOverload
#2104	OilTemp	OilTemp	OilTemp	OilTemp	OverCurrent
#2105	OilLevel	OilLevel	OilLevel	OilLevel	OverVoltage
#2107	MotorTemp	MotorTemp	MotorTemp	MotorTemp	UnderVoltage
#2118	PressLimits	PressLimits	PressLimits	PressLimits	FCOverTemp
ID	Italiano	Inglese	German	Francese	FCHWConfig
II0002	Press. Acqua Utilizzo	User-side Water Low Press.	Wasserdruck	Basse Pression Eau Utilisation	FCSWConfig
II0006	Flusso Utilizzo	Low User-side Flow	Verbrauch Durchfluss	Contrôleur Débit Utilisation	FCParamCfg
II0007	Gelo Utilizzo	Freeze on User-side	Frostalarm	Alarme Antigel	FCElectronics
II0008	Pompe Antigelo	Anti-freeze Pumps	Frostalarm Pumpen	Antigel Pompe Utilisation	TempSensors
II0009	DeltaIncongruo	Incongruous Delta-T	Delta-T verkehrt	Cohérence Delta T	PressLimits

SAFETY WARNINGS FOR OPERATIONS ON UNITS CONTAINING R1234ze

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 performed 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 the 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.

8 MAINTENANCE

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.

8 MAINTENANCE

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 performing any work, please read carefully: SAFETY WARNINGS FOR OPERATIONS ON UNITS CONTAINING R1234ze*



	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.

Compressor casing heater

Check:

- closure
- Operation

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

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.

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.

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:

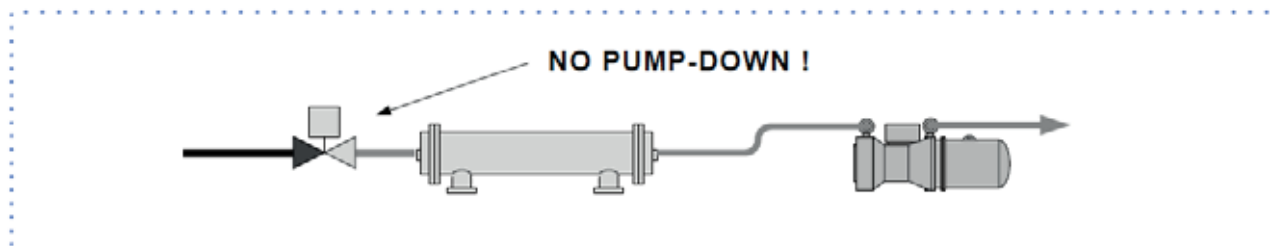
- the fans and the relative protection grids are well fixed
- the fan bearings (evident by noise and anomalous vibrations)
- the terminal protection covers are closed and the cable holders are properly positioned.

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

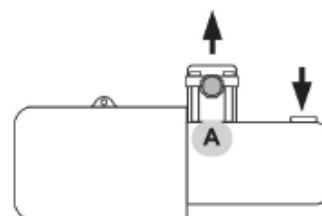


Compressor supply line shut-off valve

Do not remove the seal

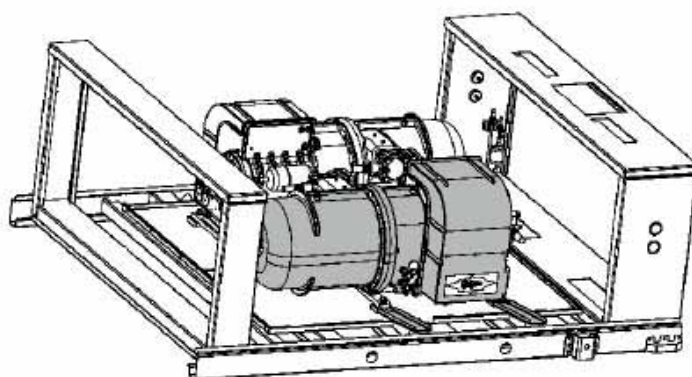
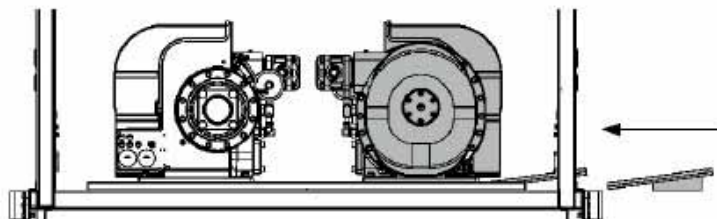
Remove only if authorized by the manufacturer.

Please contact the maker for informations.

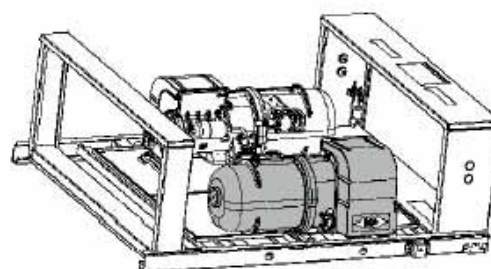
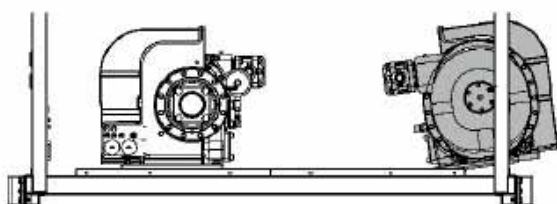


Compressor replacement

1



2



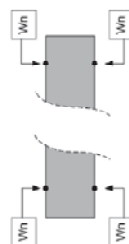
Anti-vibration mount support

	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12
PES200004	RX504-Z208P	RX703P	RX504-Z208P	RX703P								
PES200005	RX603-Z120P	RX604-Z120P	RZ505-X201Pr	RX703P	RZ412-Z220-X107P	RZ505-X201Pr						
PES200006	RZ412-Z220-X107P	RZ412-Z220-X107P	RZ505-X201Pr	RX703P	RZ412-Z220-X107P	RZ708Pr						
PES200007	RX703P	RX703P	RQX 404-Z124Pr	RX502-Z01Pr	RZ708Pr	RZ708Pr	RX703P	RX502-Z01Pr				
PES200008	RZ412-Z220-X107P	RX507-Z212P	RZ702Pr	RX507-Z212P	RQX 403-Z105Pr	RQX 404-Z124Pr	RX507-Z212P	RQZ 405-X102Pr	RZ412-Z220-X107P	RQX 401-Z105Pr		
PES200009	RZ412-Z220-X107P	RZ412-Z220-X107P	RX603-Z120P	RX507-Z212P	RQX 403-Z105Pr	RQX 404-Z124Pr	RZ412-Z220-X107P	RQX 404-Z124Pr	RZ412-Z220-X107P	RQZ 405-X102Pr		
PES200010	RX603-Z120P	RZ502-Z12P	RZ508-Z03Pr	RZ502-Z12P	RX502-Z01Pr	RZ505-X201Pr	RX503-Z01Pr	RX504-Z208P	RX503-Z01Pr	RX504-Z208P	RZ505-X201Pr	
PES200011	RX504-Z205P	RX507-Z212P	RX703P	RX407-Z324P	RZ708Pr	RZ505-X201Pr	RX703P	RZ502-X203P	RX507-Z212P	RX507-Z212P	RZ708Pr	RZ505-X201Pr

PE code



W1 Wn : see dimensional drawings IOM manual
vedere disegni dimensionali sul manuale



Anti-seismic spring antivibration mounts

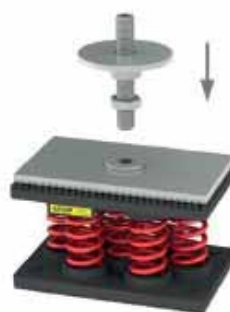
	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12
PES200012	LaIV 248-M16	LaIV 245-M16	LaIV 247-M16	LaIV 233-M16								
PES200013	LaIV 247-M16	LaIV 2510-M16	LaIV 222-M16	LaIV 245-M16	LaIV 250-M16	LaIV 222-M16						
PES200014	LaIV 2510-M16	LaIV 2510-M16	LaIV 222-M16	LaIV 245-M16	LaIV 2501-M16	LaIV 231-M16						
PES200015	LaIV 245-M16	LaIV 245-M16	LaIV 248-M16	LaIV 230-M16	LaIV 231-M16	LaIV 231-M16	LaIV 233-M16	LaIV 2300-M16				
PES200016	LaIV 250-M16	LaIV 253-M16	LaIV 209-M16	LaIV 251-M16	LaIV 214-M16	LaIV 247-M16	LaIV 2510-M16	LaIV 220-M16	LaIV 2501-M16	LaIV 214-M16		
PES200017	LaIV 2501-M16	LaIV 2510-M16	LaIV 245-M16	LaIV 251-M16	LaIV 234-M16	LaIV 247-M16	LaIV 250-M16	LaIV 247-M16	LaIV 250-M16	LaIV 220-M16		
PES200018	LaIV 247-M16	LaIV 2510-M16	LaIV 2300-M16	LaIV 251-M16	LaIV 230-M16	LaIV 230-M16	LaIV 231-M16	LaIV 250-M16	LaIV 231-M16	LaIV 250-M16	LaIV 230-M16	LaIV 230-M16
PES200019	LaIV 245-M16	LaIV 2510-M16	LaIV 231-M16	LaIV 253-M16	LaIV 2301-M16	LaIV 222-M16	LaIV 2305-M16	LaIV 250-M16	LaIV 2510-M16	LaIV 2510-M16	LaIV 2301-M16	LaIV 222-M16

9 ANTIVIBRATION MOUNTS

1



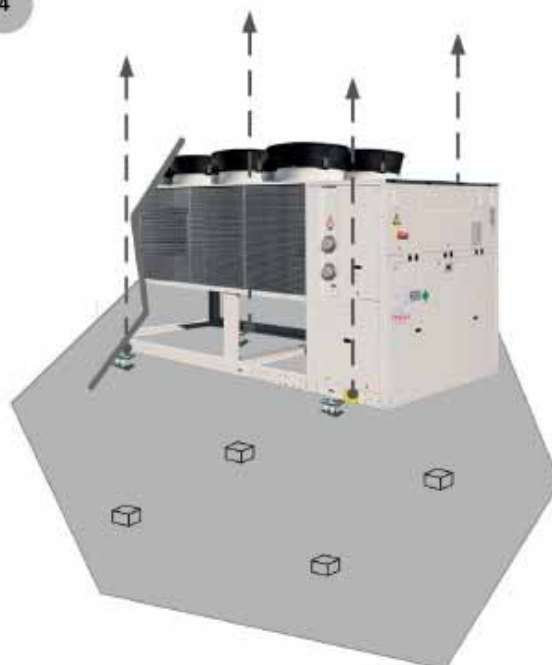
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3



4



5



6



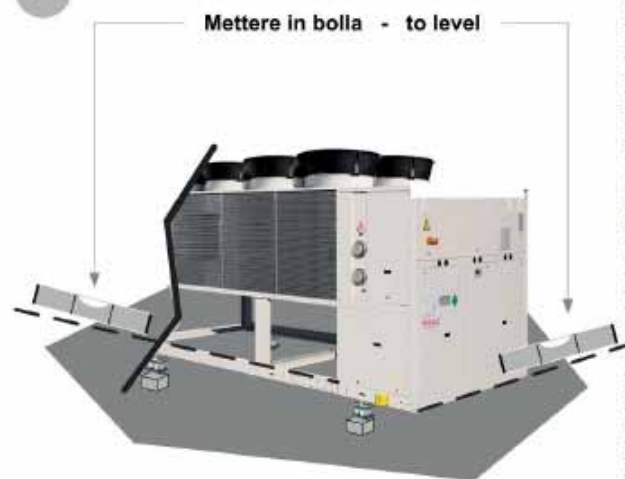
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8



9



10



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.
- Calibrate the sensor or contact the Manufacturer to exchange the sensor with a factory calibrated sensor.

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.



Warning:
Fire hazard
Flammable materials



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 regarding 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)	-	64,0	84,5	114	141	165	133	154	178	210	239	260	298	319	344
Partial recovery heating capacity	(3)	-	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)	Nr	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)	Nr	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)	l/s	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)	l/s	204	256	360	420	510	422	482	540	630	710	790	880	965	1055
Total power input (EN14511:2018)	(4)	l/s	64,7	85,4	115	142	167	134	156	180	212	241	263	301	322	348
EER (EN14511:2018)	(4)	kPa	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)	V	5,01	5,00	5,05	5,00	5,14	5,24	5,22	5,10	5,23	5,17	5,23	5,13	5,19	5,24
SEPR	(7)	dB(A)	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

1. Data referred to the following conditions: internal exchanger water temperature = 12/7 °C. Entering external exchanger air temperature = 35°C. Evaporator fouling factor = $0,44 \times 10^{(-4)}$ 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 = $0,18 \times 10^{(-4)}$ m² K/W

6. Data compliant to Standard EN 14825:2016

7. Data compliant according to EU regulation 2016/2281

construction - 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
► 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													
► 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			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			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			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 = Batteria condensante Microcanali in alluminio

4. AX = Axial fan

5. EC = Motore Asincrono a magneti permanenti commutato elettronicamente

General technical data

sound levels - Standard acoustic configuration (ST)

SIZE	SOUND POWER LEVEL (dB) - Octave band (HZ)								Sound power level	Sound pressure level
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
120.1	54	53	70	81	98	87	72	58	79	99
160.1	55	54	70	82	99	88	73	58	80	99
200.1	64	57	83	89	98	89	79	68	79	99
240.1	67	72	78	85	99	86	82	65	79	99
290.1	50	58	78	92	97	93	82	68	79	100
250.2	69	72	74	86	99	89	76	62	79	100
280.2	69	72	75	86	99	90	77	62	80	100
320.2	70	73	75	87	100	90	77	62	80	101
360.2	80	88	81	90	100	90	85	68	80	101
400.2	81	89	82	91	102	91	86	69	82	103
440.2	71	77	82	97	102	96	86	72	82	103
480.2	84	93	85	93	102	90	89	71	81	103
540.2	82	90	85	98	101	96	89	73	81	103
580.2	68	79	85	100	101	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

sound levels - Compressor soundproofing (SC)

SIZE	SOUND POWER LEVEL (dB) - Octave band (HZ)								Sound power level	Sound pressure level
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
120.1	55	53	69	77	96	82	71	55	77	96
160.1	56	54	69	78	97	82	72	56	78	97
200.1	66	56	82	85	96	84	78	65	77	97
240.1	68	71	77	81	96	82	80	62	77	97
290.1	52	57	77	87	95	88	80	65	76	97
250.2	70	71	73	82	97	84	76	59	76	97
280.2	71	72	74	83	97	84	76	59	77	98
320.2	71	72	74	83	98	85	76	60	77	98
360.2	81	86	79	85	97	85	82	63	77	98
400.2	83	88	81	87	100	87	84	66	79	100
440.2	72	76	81	92	99	90	84	68	79	100
480.2	86	92	84	89	100	87	87	68	79	100
540.2	83	89	84	93	99	90	87	70	79	101
580.2	70	78	84	95	99	92	87	71	78	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

Admissible water flow-rate

Minimum (Qmin) and maximum (Qmax) admissible water flow for the unit to operate correctly.

PREMIUM SC		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
Qmin	[l/s]	6,6	7,1	10,5	11,6	11,6	12,7	15,2	14,3	15,2	18,5	19,8	23,3	23,3	27,0
Qmax	[l/s]	16,7	18,5	23,9	28,1	43,4	36,6	44,1	43,4	44,1	56,2	58,3	70,5	70,5	77,6

Correction factors for glycol use

% ETHYLENE GLYCOL BY WEIGHT		5%	10%	15%	20%	25%	30%	35%	40%
Freezing temperature	°C	-2,0	-3,9	-6,5	-8,9	-11,8	-15,6	-19,0	-23,4
Safety temperature	°C	3,0	1,0	-1,0	-4,0	,6,0	-10,0	-14,0	-19,0
Cooling Capacity Factor	Nr	0,995	0,989	0,983	0,977	0,971	0,964	0,956	0,949
Compressor power input Factor	Nr	1,0011	1,0022	1,003	1,004	1,006	1,007	1,008	1,009
Internal exchanger glycol solution flow factor	Nr	1,003	1,01	1,02	1,033	1,05	1,072	,095	1,124
Pressure drop Factor	Nr	1,05	1,10	1,15	1,20	1,25	1,30	1,35	1,40

Fouling Correction Factors

INTERNAL EXCHANGER (EVAPORATOR)		
m ² °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)		
PED (CE)	DPr	DPw
	2400	1000

DPr = Maximum operating pressure on refrigerant side in kPa

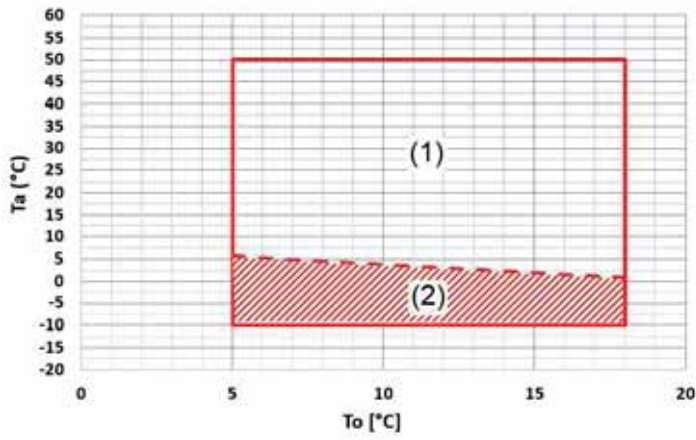
DPw = Maximum operating pressure on water side in kPa

Overload and control device calibrations

		APRE	CHIUDE	VALORE
High pressure switch	[kPa]	1900	1600	-
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

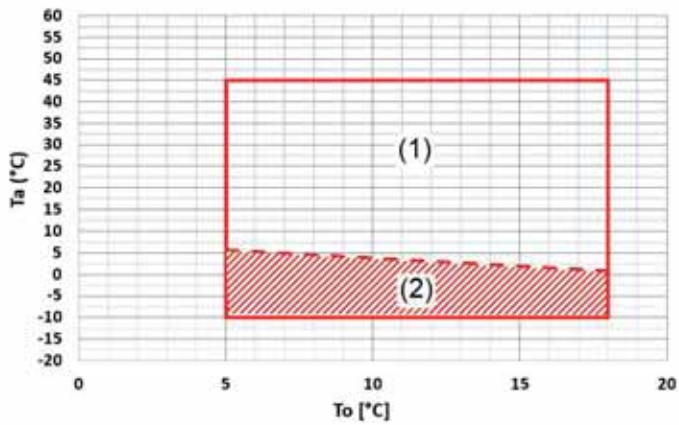
Operating range - Standard acoustic configuration (T)



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

Operating range - Acoustic configuration: compressor soundproofing (S)



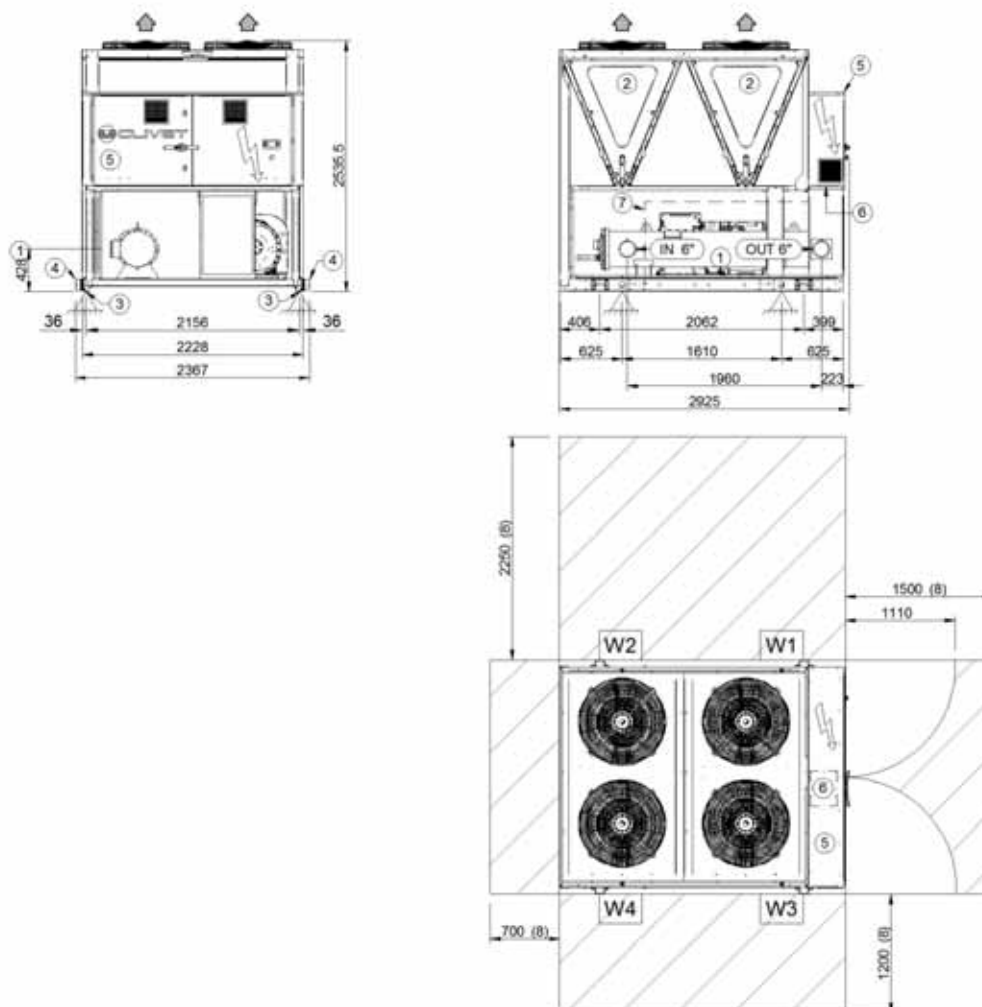
T_a (°C) = external exchanger inlet air temperature (D.B.)
 T_o (°C) = internal exchanger outlet water temperature

1. Standard unit operating range at full load
2. Standard unit operating range with air flow automatic modulation

Dimensional drawings

SIZE 120.1 - 160.1 ST-SC

DAA5Z0009 REV00
DATA/DATE 30/10/2019



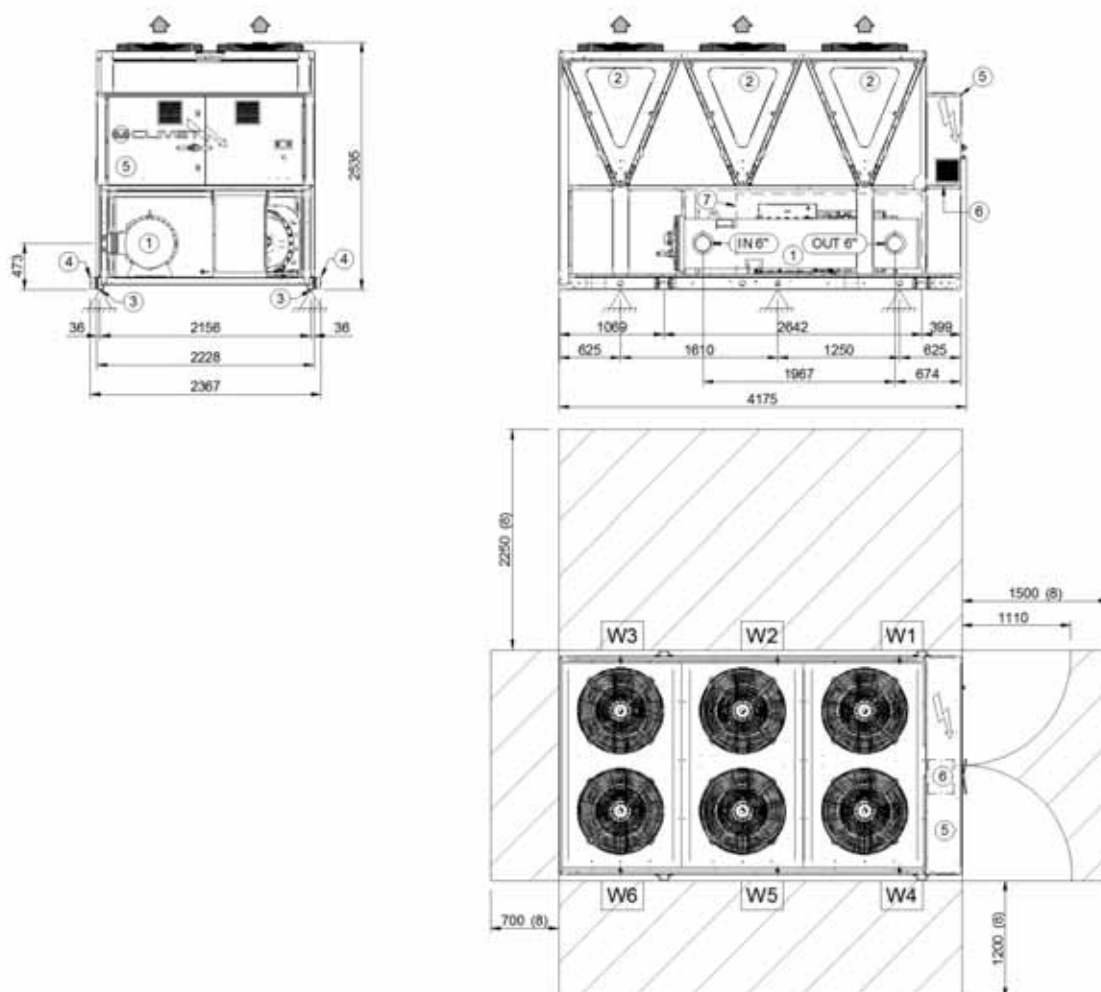
1. Internal exchanger (evaporator)
2. External exchanger (condenser)
3. Unit fixing holes
4. Lifting brackets (removable)
5. Electrical panel
6. Power input
7. Sound proof enclosure, only SC version
8. Clearance access recommended

SIZE		120.1		160.1	
		ST		SC	
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



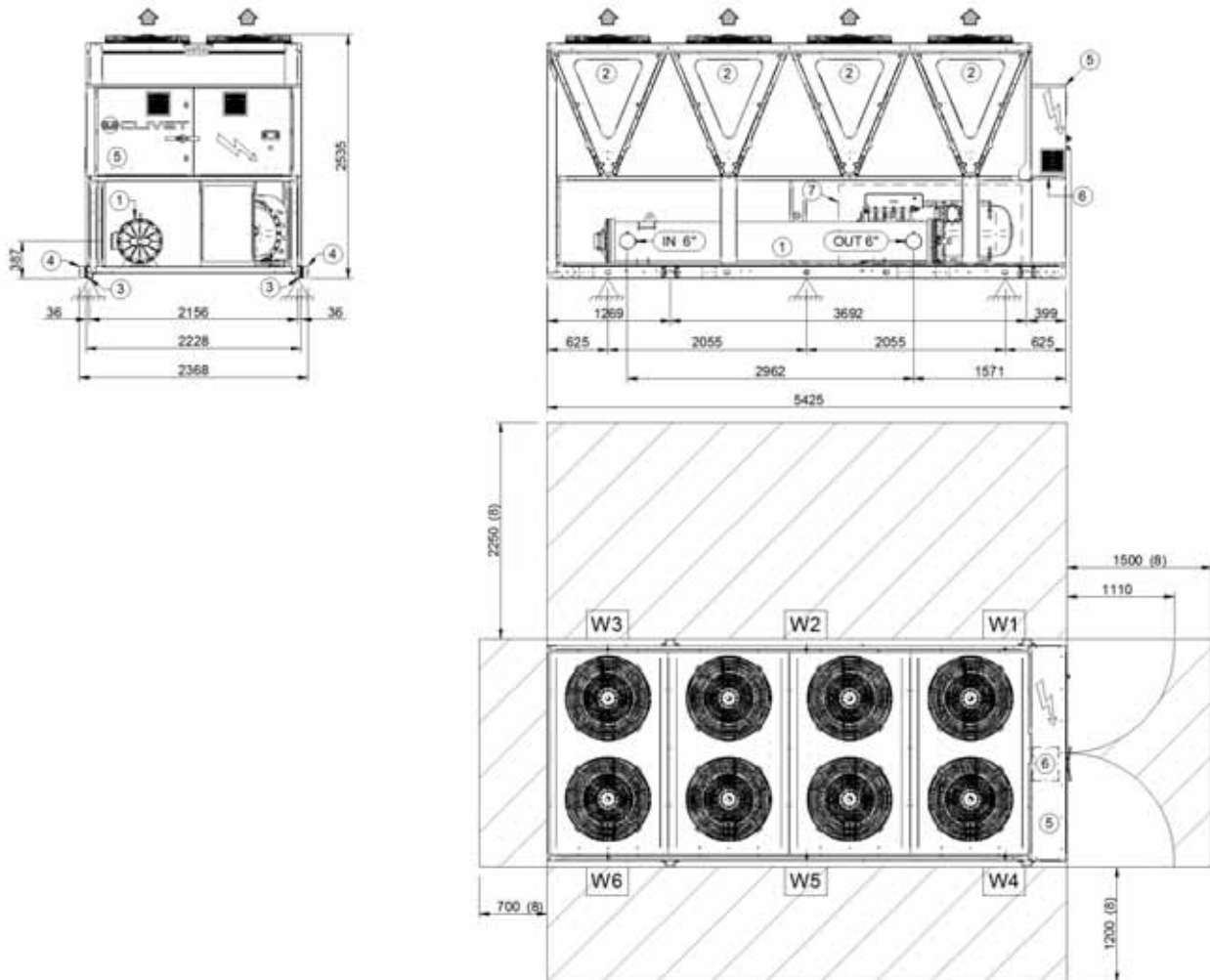
- 1. Internal exchanger (evaporator)
- 2. External exchanger (condenser)
- 3. Unit fixing holes
- 4. Lifting brackets (removable)
- 5. Electrical panel
- 6. Power input
- 7. Sound proof enclosure, only SC version
- 8. Clearance access recommended

SIZE		200.1		240.1	
		ST	SC	ST	SC
Length	mm	4175	4175	4175	4175
Depth	mm	2228	2228	2228	2228
Height	mm	2535	2535	2535	2535
W1 Supporting point	kg	725	762	726	763
W2 Supporting point	kg	952	1089	954	1091
W3 Supporting point	kg	286	276	287	277
W4 Supporting point	kg	663	675	665	677
W5 Supporting point	kg	879	926	883	930
W6 Punto di appoggio	kg	315	312	316	313
Operating weight	kg	3820	4040	3831	4051
Shipping weight	kg	3410	3630	3438	3658

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



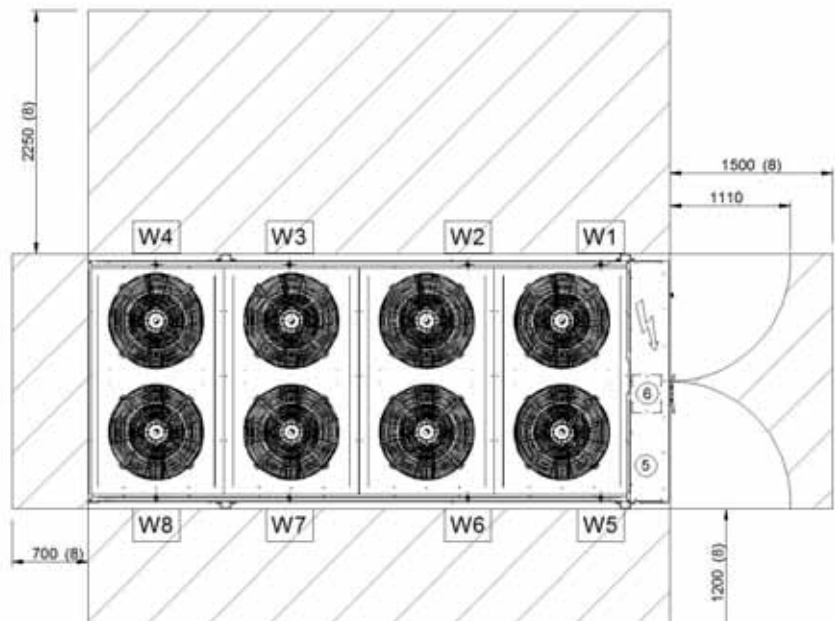
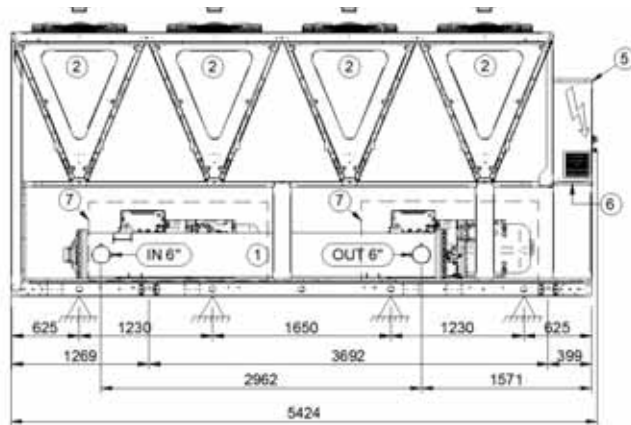
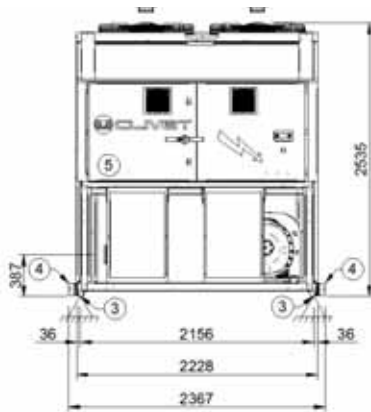
1. Internal exchanger (evaporator)
2. External exchanger (condenser)
3. Unit fixing holes
4. Lifting brackets (removable)
5. Electrical panel
6. Power input
7. Sound proof enclosure, only SC version
8. Clearance access recommended

		290.1	
SIZE		ST	SC
Length	mm	5425	5425
Depth	mm	2228	2228
Height	mm	2535	2535
W1 Supporting point	kg	907	987
W2 Supporting point	kg	937	1035
W3 Supporting point	kg	294	280
W4 Supporting point	kg	638	666
W5 Supporting point	kg	874	908
W6 Punto di appoggio	kg	497	492
Operating weight	kg	4147	4368
Shipping weight	kg	3827	4047

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



- 1. Internal exchanger (evaporator)
- 2. External exchanger (condenser)
- 3. Unit fixing holes
- 4. Lifting brackets (removable)

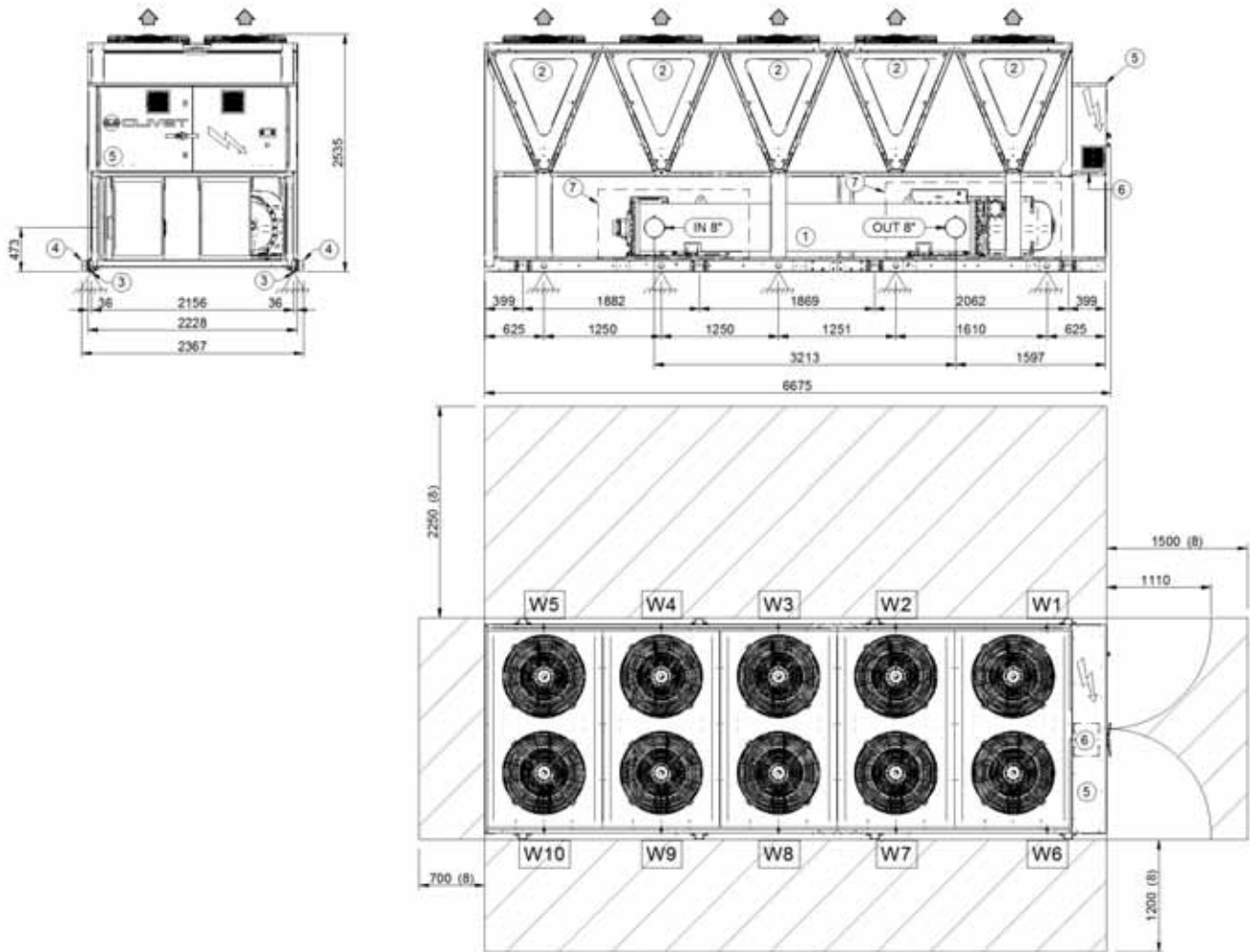
- 5. Electrical panel
- 6. Power input
- 7. Sound proof enclosure, only SC version
- 8. Clearance access recommended

SIZE		250.2		280.2		320.2	
		ST	SC	ST	SC	ST	SC
Length	mm	5425	5425	5425	5425	5425	5425
Depth	mm	2228	2228	2228	2228	2228	2228
Height	mm	2535	2535	2535	2535	2535	2535
W1 Supporting point	kg	679	725	679	725	680	725
W2 Supporting point	kg	629	715	630	716	630	716
W3 Supporting point	kg	787	886	788	886	789	887
W4 Supporting point	kg	371	403	371	403	372	404
W5 Supporting point	kg	556	569	556	570	556	570
W6 Supporting point	kg	542	568	544	569	545	570
W7 Supporting point	kg	614	643	615	645	616	646
W8 Supporting point	kg	420	429	421	430	422	431
Operating weight	kg	4598	4938	4604	4944	4610	4949
Shipping weight	kg	4290	4630	4306	4646	4319	4659

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

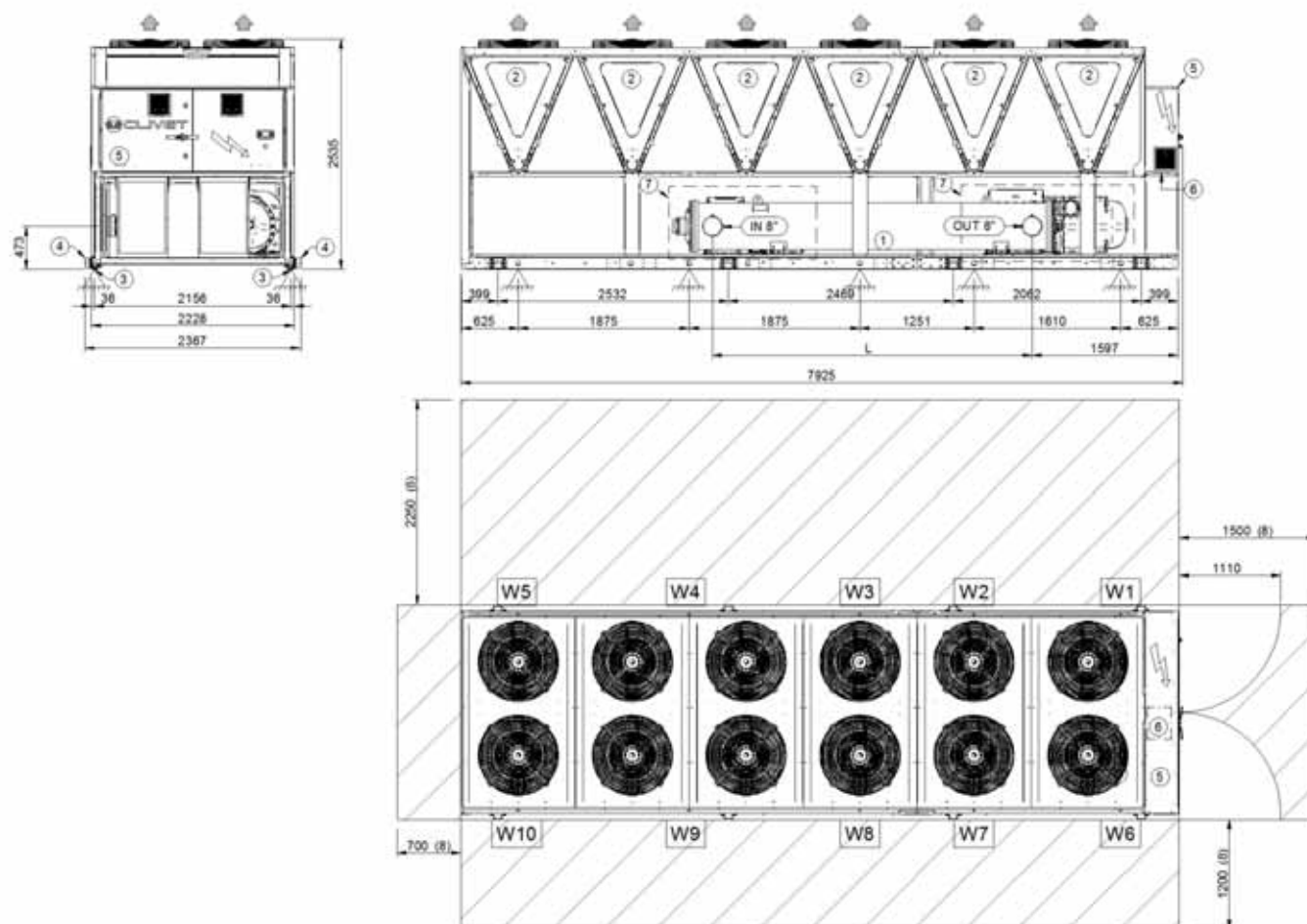


- 1. Internal exchanger (evaporator)
- 2. External exchanger (condenser)
- 3. Unit fixing holes
- 4. Lifting brackets (removable)
- 5. Electrical panel
- 6. Power input
- 7. Sound proof enclosure, only SC version
- 8. Clearance access recommended

SIZE		360.2		400.2	
		ST	SC	ST	SC
Length	mm	6675	6675	6675	6675
Depth	mm	2228	2228	2228	2228
Height	mm	2535	2535	2535	2535
W1 Supporting point	kg	806	863	804	861
W2 Supporting point	kg	1013	1150	1016	1152
W3 Supporting point	kg	114	83	111	80
W4 Supporting point	kg	951	1089	955	1093
W5 Supporting point	kg	166	161	168	162
W6 Supporting point	kg	697	716	688	708
W7 Supporting point	kg	945	992	952	999
W8 Supporting point	kg	217	206	207	196
W9 Supporting point	kg	887	928	898	940
W10 Supporting point	kg	160	159	163	161
Operating weight	kg	5956	6352	5962	6823
Shipping weight	kg	5408	5821	5430	6195

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

SIZE 440.2 - 480.2 ST-SC



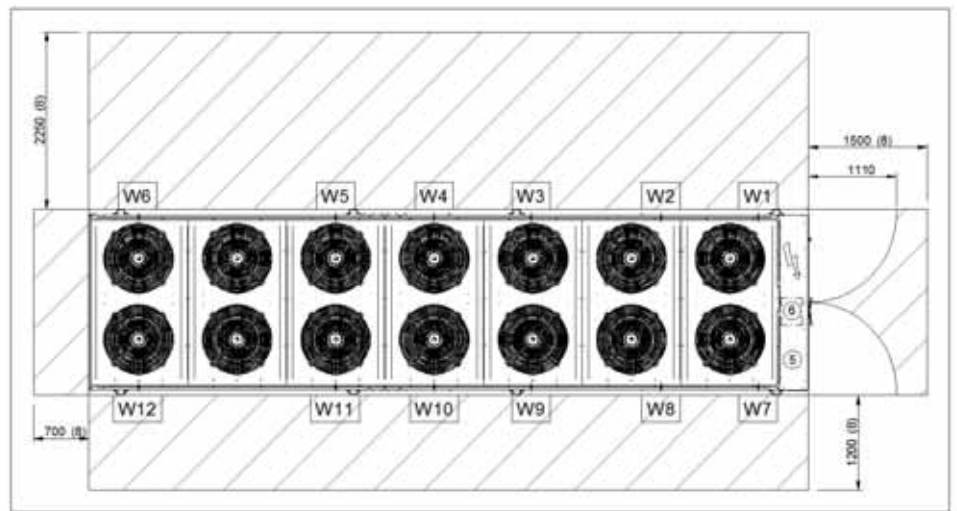
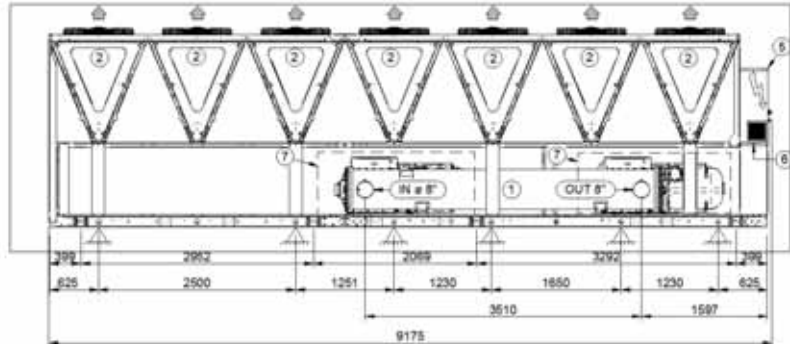
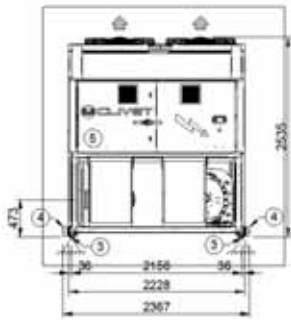
- | | |
|------------------------------------|---|
| 1. Internal exchanger (evaporator) | 5. Electrical panel |
| 2. External exchanger (condenser) | 6. Power input |
| 3. Unit fixing holes | 7. Sound proof enclosure, only SC version |
| 4. Lifting brackets (removable) | 8. Clearance access recommended |

SIZE		440.2		480.2	
		ST	SC	ST	SC
Length	mm	7925	7925	7925	7925
Depth	mm	2228	2228	2228	2228
Height	mm	2535	2535	2535	2535
W1 Supporting point	kg	840	899	836	896
W2 Supporting point	kg	891	1006	856	968
W3 Supporting point	kg	531	566	651	696
W4 Supporting point	kg	865	962	1111	1236
W5 Supporting point	kg	193	182	177	164
W6 Supporting point	kg	707	727	672	692
W7 Supporting point	kg	804	845	770	808
W8 Supporting point	kg	663	672	731	746
W9 Supporting point	kg	708	737	807	849
W10 Supporting point	kg	230	227	224	219
Operating weight	kg	6432	6823	6835	7274
Shipping weight	kg	5805	6195	6280	6720

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



1. Internal exchanger (evaporator)
2. External exchanger (condenser)
3. Unit fixing holes
4. Lifting brackets (removable)

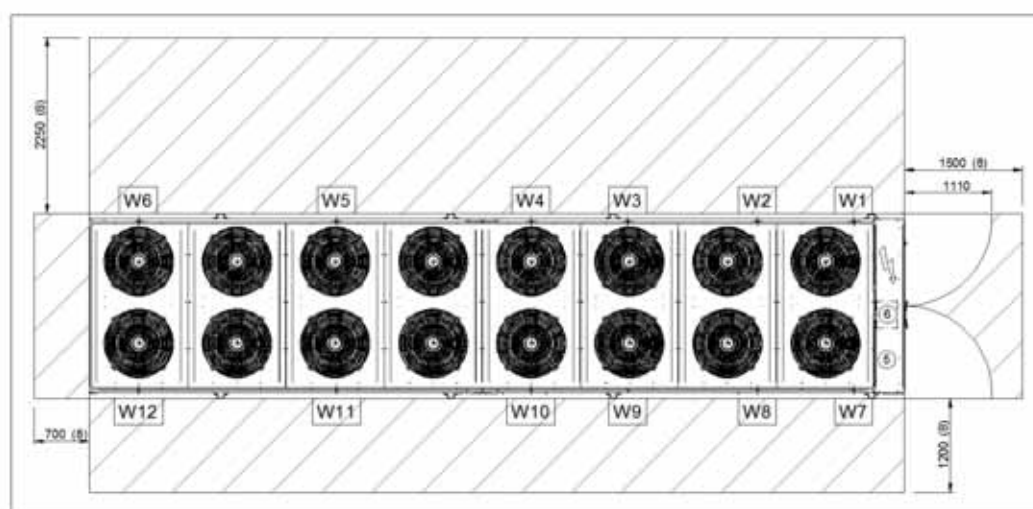
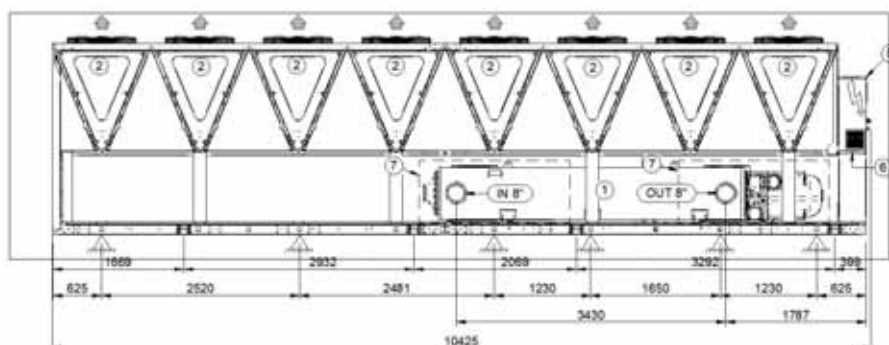
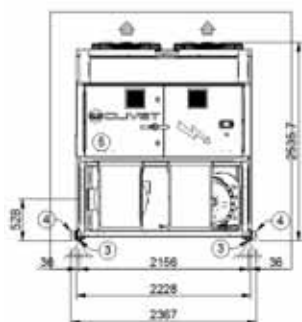
5. Electrical panel
6. Power input
7. Sound proof enclosure, only SC version
8. Clearance access recommended

		540.2	
SIZE		ST	SC
Length	mm	9175	9175
Depth	mm	2228	2228
Height	mm	2535	2535
W1 Supporting point	kg	706	745
W2 Supporting point	kg	957	1082
W3 Supporting point	kg	423	423
W4 Supporting point	kg	1034	1198
W5 Supporting point	kg	375	375
W6 Supporting point	kg	319	319
W7 Supporting point	kg	558	571
W8 Supporting point	kg	863	905
W9 Supporting point	kg	565	565
W10 Supporting point	kg	828	884
W11 Supporting point	kg	330	330
W12 Supporting point	kg	321	321
Operating weight	kg	7279	7718
Shipping weight	kg	6684	7124

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

SIZE 580.2 ST-SC

Dimensional drawings



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 version
8. Clearance access recommended

		580.2	
SIZE		ST	SC
Length	mm	10425	10425
Depth	mm	2228	2228
Height	mm	2535	2535
W1 Supporting point	kg	694	734
W2 Supporting point	kg	982	1107
W3 Supporting point	kg	597	597
W4 Supporting point	kg	1240	1404
W5 Supporting point	kg	464	464
W6 Supporting point	kg	277	277
W7 Supporting point	kg	544	558
W8 Supporting point	kg	896	938
W9 Supporting point	kg	1069	1069
W10 Supporting point	kg	1048	1105
W11 Supporting point	kg	449	449
W12 Supporting point	kg	280	280
Operating weight	kg	8540	8982
Shipping weight	kg	7459	7899

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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