



WDAT-ik4

120.1 - 580.2



MANUAL

FOR INSTALLATION,
USE AND MAINTENANCE

MF500002-01 07-2025

R513A

Dear Customer,

We congratulate you on choosing these product

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

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

Best regards and have a good read.

CLIVET Spa

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Safety

Operate in compliance with safety regulations in force.

To carry out the operations use protection devices:

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

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

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

Manual

The manual provides correct unit installation, use and maintenance.

It is advisable to read it carefully so you will save time during operations.

Follow the written indications so you will not cause damages to things and injuries people.

Risk situations

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

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

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

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

Intended use

Use the unit only:

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

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

Installation

Outdoor installation

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

Follow local safety regulations.

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

Maintenance

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

Turn the unit off before any operation.



Pay particular attention to:

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

Outdoor installation

Modification

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

Breakdown/Malfunction

Disable the unit immediately in case of breakdown or malfunction.

Contact a certified service agent.

Use original spares parts only.

Using the unit in case of breakdown or malfunction:

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

User training

The installer has to train the user on:

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

Data update

Continual product improvements may imply manual data changes.

Visit manufacturer web site for updated data.

Indications for the User

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

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

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

In case of breakdown or malfunction

- Immediately deactivate the unit
- Contact a service centre authorized by the manufacturer

The installer must train the user, particularly on:

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

Unit identification

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

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

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

The matriculation plate must never be removed.

It contains fluorinated greenhouse gases.

Serial number

It identifies uniquely each unit.

Must be quoted when ordering spare parts.

Assistance request

Note data from the serial number label and write them in the chart on side, so you will find them easily when needed.

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

Physical characteristics of the R513A refrigerant		
Safety class (ISO 817)	A1	
Boiling point	-29,2	°C
GWP	631	

Reception

You have to check before accepting the delivery:

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

In case of damage or anomaly:

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

NOTE

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

Storage

Respect the indications on the outside of the pack.

In particular:

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

NOTE

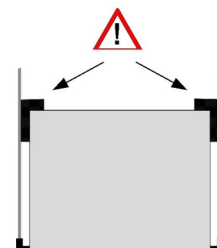
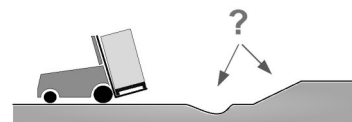
⇒ The unit may not be tilted more than 15° during transport.

NOTE

Removal of packaging

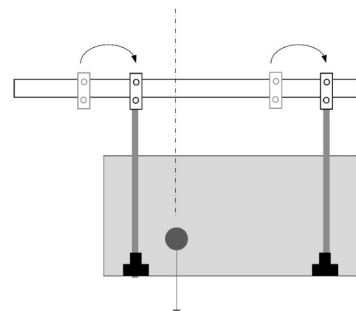
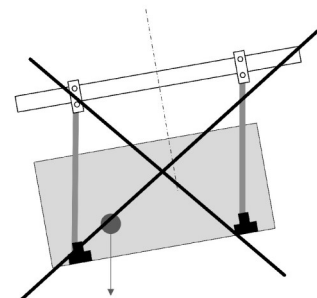
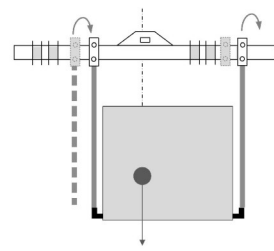
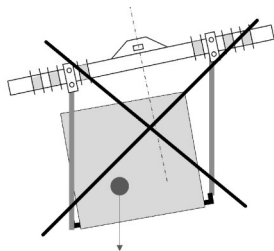
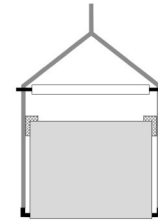
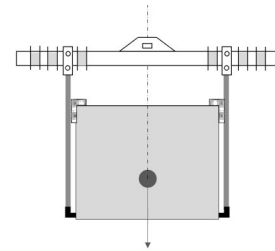
Be careful not to damage the unit.

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



Handling

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



Positioning

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

During positioning consider these elements:

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

Functional spaces

Functional spaces are designed to:

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

⇒ *Respect all functional spaces indicated in the TECHNICAL INFORMATION section.*

Positioning

Units are designed to be installed:

- EXTERNAL
- in fixed positions

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

Installation standards:

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

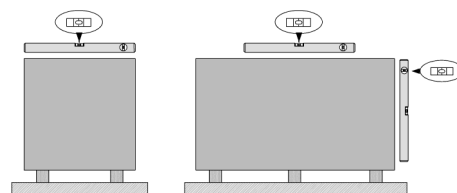
Limit vibration transmission:

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

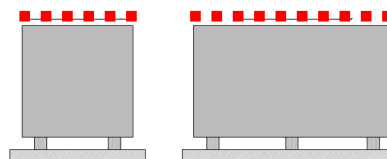
Protect the unit with suitable fence in order to avoid access to unauthorised personnel (children, vandals, etc.)

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

The unit must be level.



Do not go up to the surface



Avoid therefore:

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

Ignoring the previous indications could:

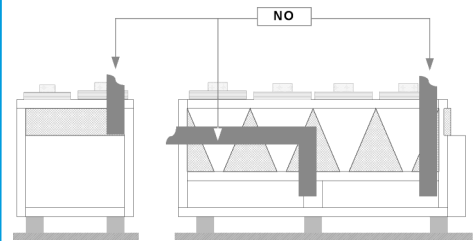
- energy efficiency decrease
- alarm lockout due to HIGH PRESSURE (in summer) or LOW PRESSURE (in winter).

Pressure relief valve gas side

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

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

The air flow must not be obstructed



Hydraulic system

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

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

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

Water quality

The water quality can be checked by qualified personnel.

Water with inadequate characteristics can cause:

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

Water features:

- within the limits indicated by table

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

Cleanliness

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

New systems

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

Existing systems

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

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

Water component for corrosion limit on Copper

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

Risk of freeze

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

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

Anti-freeze solutions

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

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

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

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

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

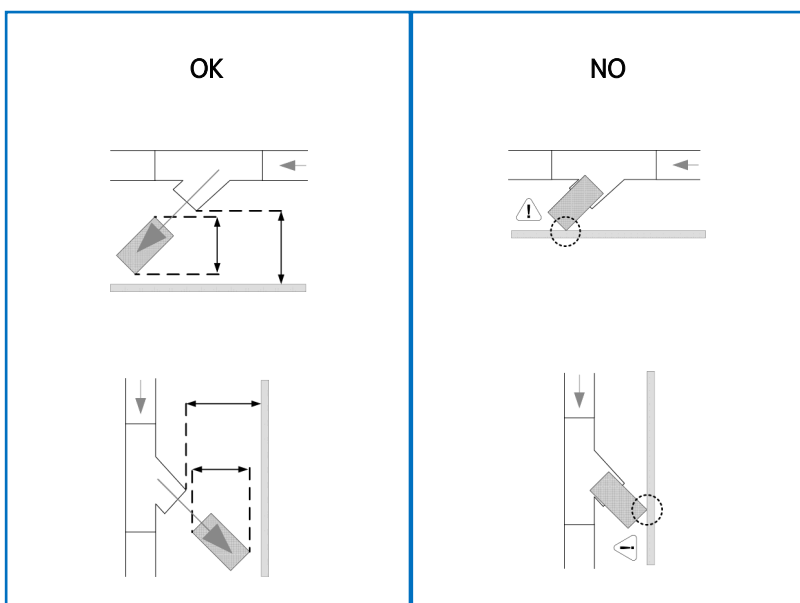
Water filter

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

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

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

0,87 mm - shell and tube evaporator



Water flow-rate

The design water flow-rate must be:

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

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

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

Minimum system water content

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

Minimum water content [l]

Comfort application [liters]

= 13 x kWf size 120.1-240.1

= 5 x kWf size 250.2-580.2

Process application [liters]

= 26 x kWf size 120.1-240.1

= 10 x kWf size 250.2-580.2

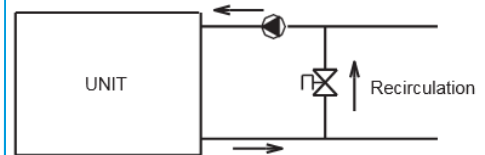
kWf = Nominal cooling capacity unit

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

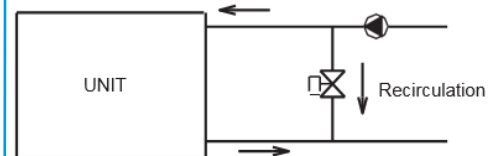
Non-return valve

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

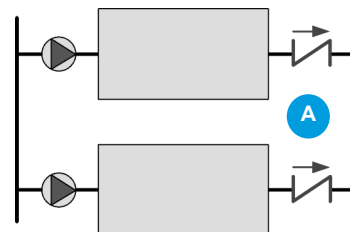
Minimum water flow



Maximum water flow



Non-return valve



Flow Switch

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

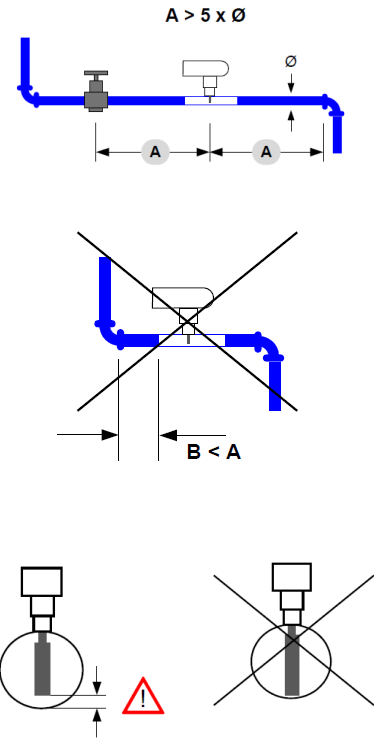
It has to be installed in a duct rectilinear part, not in proximity of curves that cause turbulences.

Operations sequence

Before starting the unit pump:

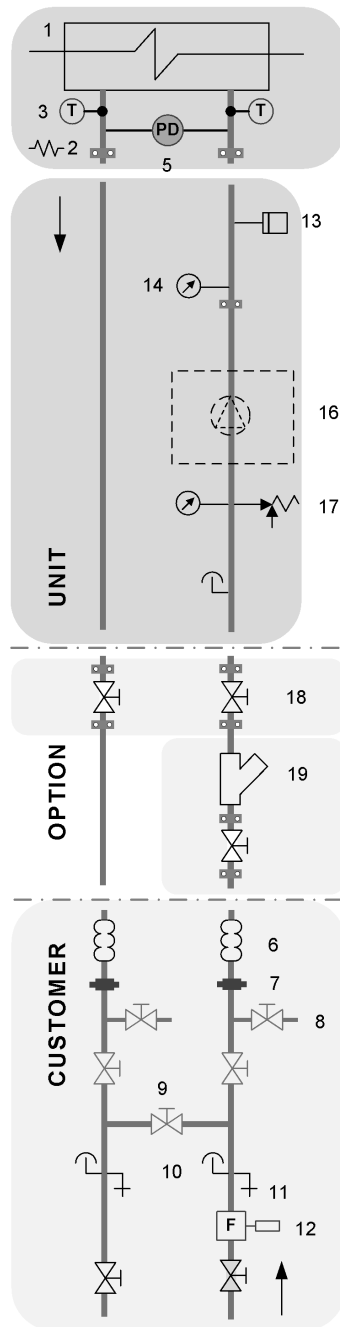
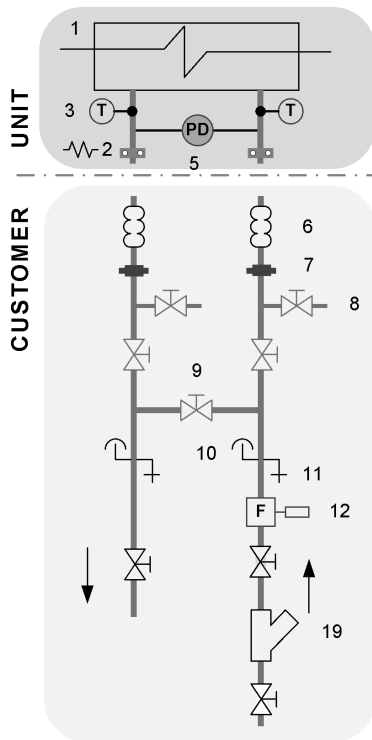
- 1 Close all vents in the high points of the unit's water circuit.
 - 2 Close all drain shut-off valves in the low points of the unit's water circuit
 - Exchangers
 - Pumps
 - collectors
 - storage tanks
 3. Thoroughly wash the system with clean water:
use the bypass to exclude the exchanger from the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

Flow switch

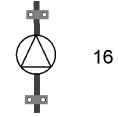


Standard unit

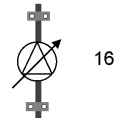
Unit + pump



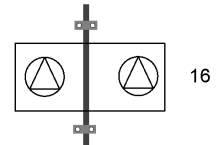
Option A



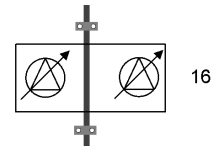
Option B



Option C



Option D



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

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

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

Partial energy recovery

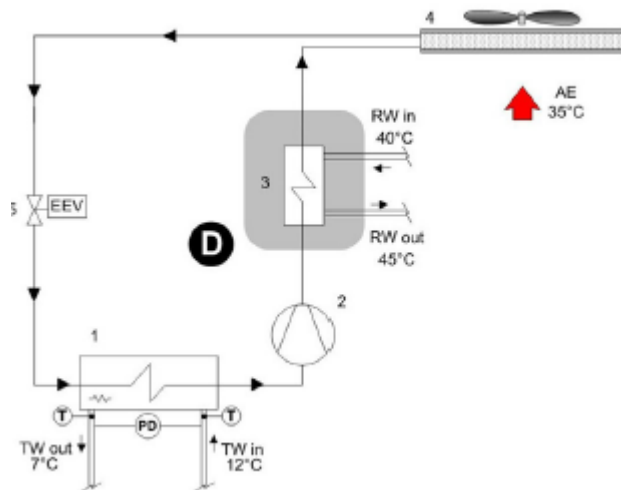
Option

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

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

The recovery exchanger must be always maintained full of water

The lack of water amplifies the noise generated by the operation



D - Partial recovery device

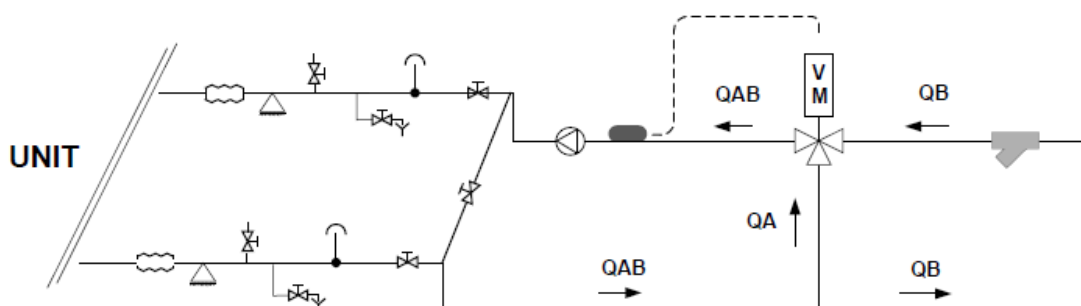
- 1 - Internal exchanger
- 2 - Compressors
- 3 - Recovery exchanger
- 4 - External exchanger
- 5 - Expansion electronic valve

TW in chilled water inlet
TW out chilled water outlet

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

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

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



The characteristics of the electrical lines must be determined by specialized personnel able to design electrical installations; moreover, the lines must be in conformity with regulations in force.

The protection devices of the unit power line must be able to stop the presumed short circuit current, whose value must be determined in function of system features.

The power cables and the protection cable section must be defined in accordance with the characteristics of the protections adopted.

All electrical operations should be performed by trained personnel having the necessary requirements by the regulations in force and being informed about the risks relevant to these activities.

Operate in compliance with safety regulations in force.

Electrical data

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

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

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

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

Connections

- 1 Refer to the unit electrical diagram (the number of the diagram is shown on the serial number label).
- 2 verify that the network has characteristics conforming to the data shown on the serial number label.
- 3 Before starting work, verify that the sectioning device at the start of the unit power line is open, blocked and equipped with cartel warning.
- 4 Primarily you have to realize the earthing connection.
- 5 Shelter the cables using adequate measure fairleads.
- 6 Prevent dust, insects or rodents from entering the electrical panel as they can damage components and cables.
- 7 Prevent noise from escaping from the compressor compartment; seal any openings made.
- 8 Secure the cables: if left unattached they can be stripped.
- 9 The cables must not touch the compressors or the refrigerant piping (they reach high temperatures).
- 10 Do not drill holes in the electrical panel.
Alternatively, restore the IP rating with watertight systems.
- 11 Before power the unit, make sure that all the protections that were removed during the electrical connection work have been restored.

Distribution systems

The compressors are compatible with TT or TN type systems.

They cannot be used in IT systems.

Signals / data lines

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

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

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

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

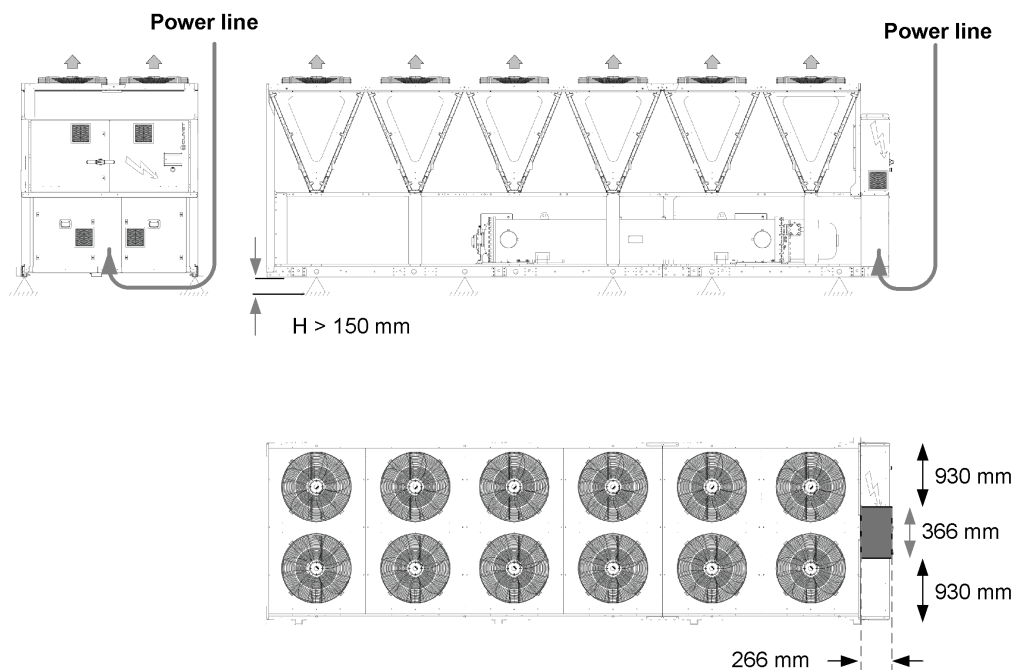
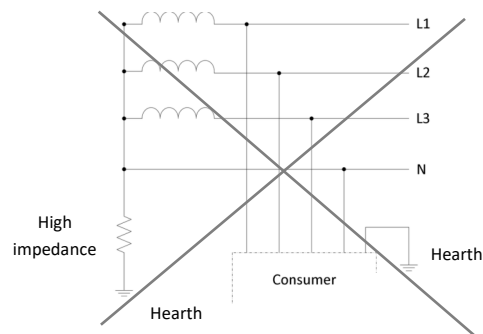
Connect the screen to the ground, only if there aren't disturbances.

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

Respect impedance, capacity and attenuation indications.

Power input

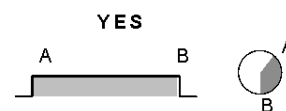
NO systems IT !



Remote ON-OFF

Do not perform short On Off cycles

Do not use the remote On Off with thermoregulation function.



Power supply cables section

Size	120.1	160.1	200.1	240.1	250.2
Min. cable section Cu (mm ²)	1 x 95	1 x 150	1 x 240	2 x 150	1 x 240
Max. cable section Cu (mm ²)	1 x 185	1 x 240	1 x 240	2 x 300	1 x 240
Min. bar Cu section (mm ²)	nd	nd	nd	2 x 30 x 5	nd
Max. bar Cu width (mm)	32.0	32.0	40.0	50.0	40.0
Tightening torque (Nm)	20.0	20.0	20.0	20.0	20.0

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

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

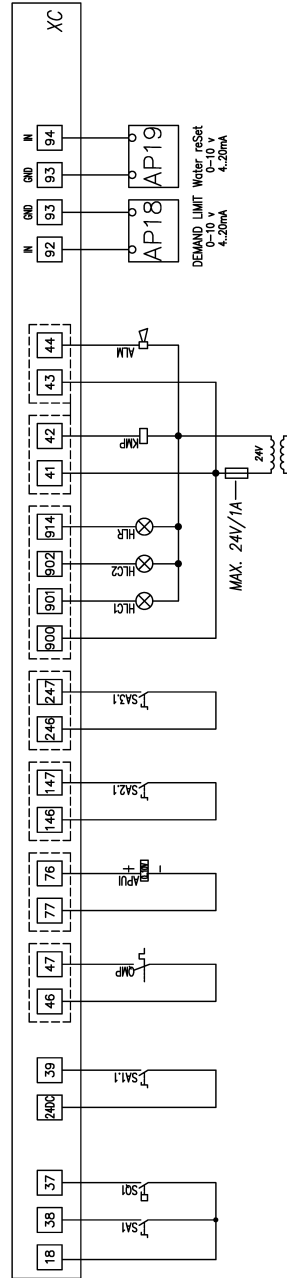
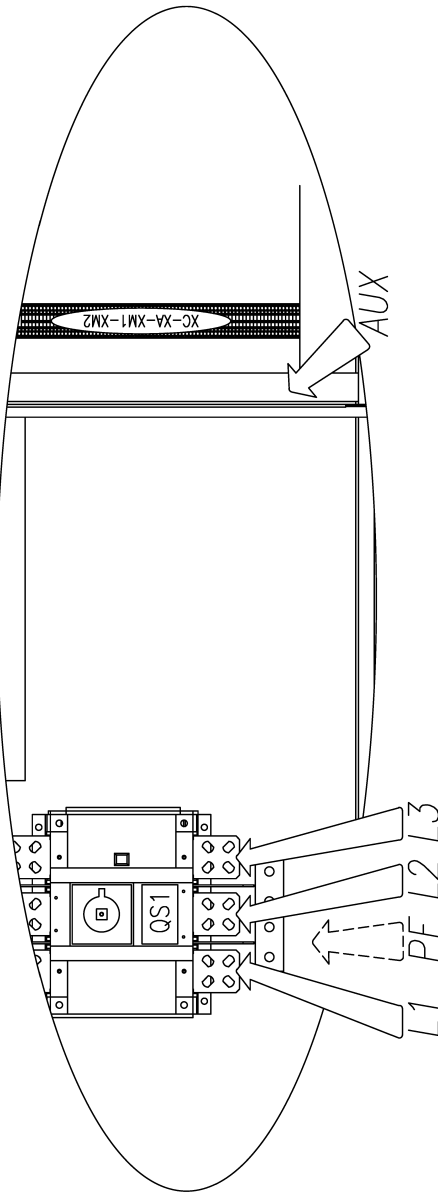
Power supply network requirements

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

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

HLCl-HLC2	lampada di segnalazione stato compressore compressor status signal lamp lampe de signalisation état compresseur signallampe verschaltungsstand compresor signallampe verschaltungsstand compresor	
ALM	segnalazione allarme cumulativo cumulative alarm signalisation alarme signalization alarme	
HLC1	lampada di segnalazione allarme resistenza guido elettrico electrical resistance alarm signal lamp Signal d'alarme de résistance ligne au cabinet Signal d'alarme de résistance ligne au cabinet Signal d'alarme de la lampara de resistencia del gabinete	RAQE1 475.53 Pg. 24.12
SA1	selettore on/off remoto remote on/off selector selektor on/off Fernschalter selektor on/off Fernschalter	
SA1.1	selettore abilitazione secondo set-point second set-point enabling switch selektor abilitación segundo set-point selektor habilitación segundo set-point	
SA2.1	selettore remoto di abilitazione compressore remote compressor enabling selector selektor remoto de habilitación compresor selektor remoto de habilitación compresor	
SA3.1	selettore remoto di abilitazione compressore remote compressor enabling selector selektor remoto de habilitación compresor selektor remoto de habilitación compresor	
SQ1	flussswitch flow switch contrôleur de débit contrôleur de débit	
QMP	intermittent automatico a protezione pompa, telecomando automatic pump protection, remote control interrupteur automatique de protection pompe, télécommande interrupteur automatique de protection pompe, télécommande intermittente automático de protección bomba, telecomando	411.1 Pg. 25.2
KMP	contattore pompa di circolazione evaporatore evaporator circulation pump contactor Schütz Kälteverpumpung contactor bomba de circulación evaporador	411.1 Pg. 25.2
APU1	Inverter pompa lato utilizzo pump side inverter Wechselrichter-Seite Pumpen-Einsatz Inverter bombas lado uso	411.1 Pg. 25.2
AP18	demand-limit demand limit demand-limit demand-limit	
AP19	Water reSet Water reSet Water reSet Water reSet	

collegamenti a cura del cliente
raccordements performed by customer
Kundenseitige Anschlüsse
conexiones a cargo del cliente

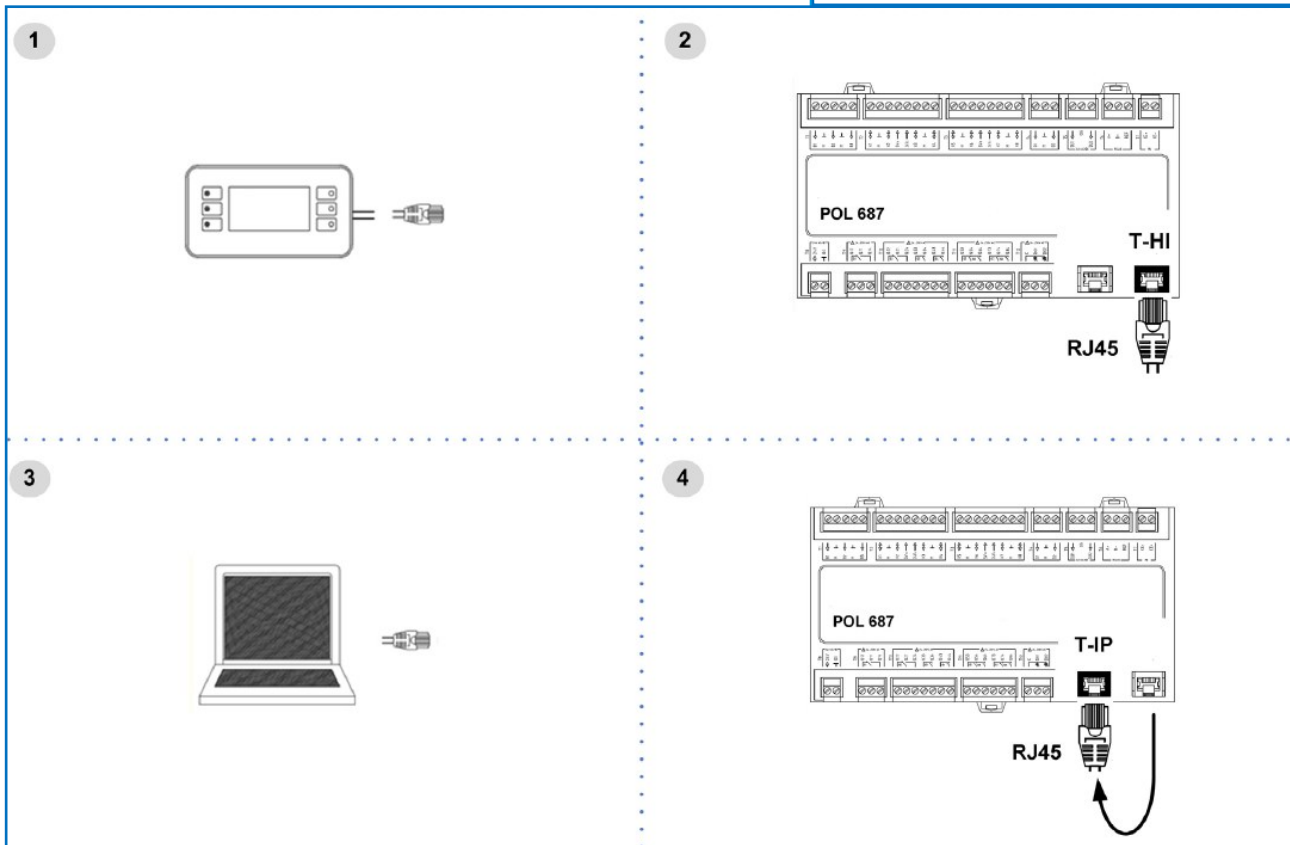


Computer connection

Configure P.C.

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

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



Remote Control

Option

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

A User interface

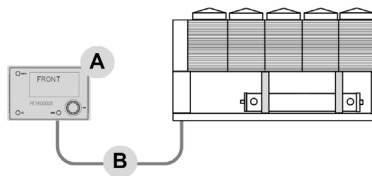
B=B1 KNX bus, max 350 mt
twisted pair with shield, \varnothing 0,8 mm
EIB/KNX cable marking recommended

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

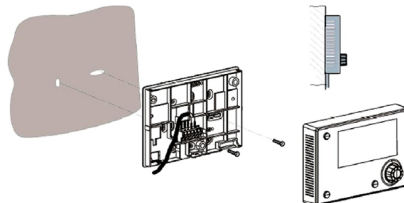
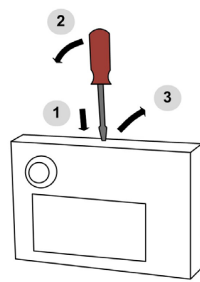
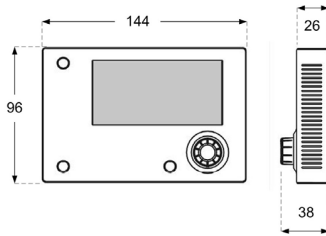
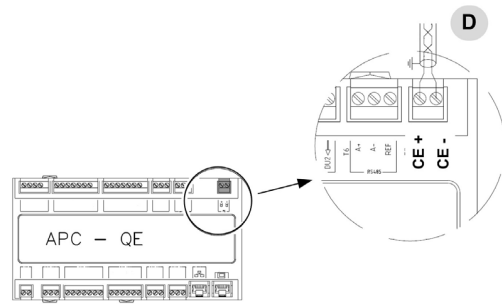
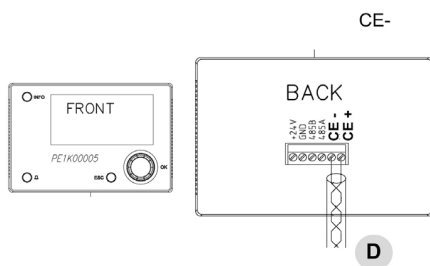
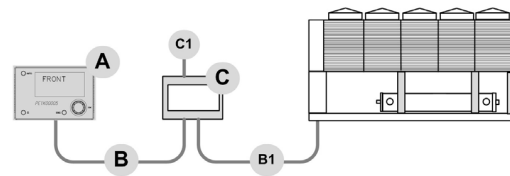
C1 AC 120...230V, 50...60Hz

D KNX bus, max 350 mt

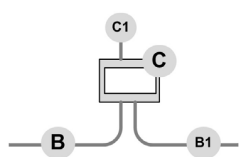
1



2

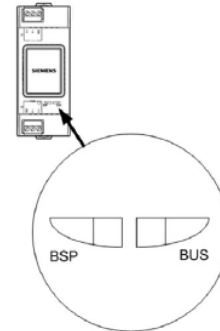
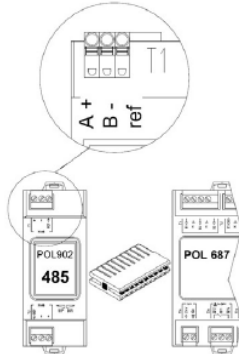


PSX - type : N125/11 5WG1 125-1AB11



Modbus - RS485

Option



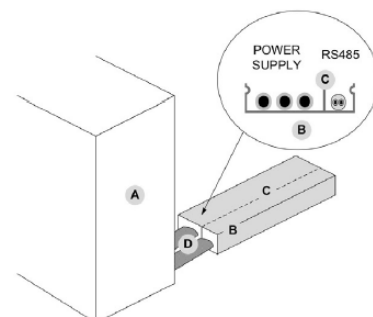
LED BSP	communication with AP1 module	LED BUS	communication with Modbus
green	communication ok	green	communication ok
yellow	software ok but communication with AP1 down	yellow	startup / channel not communicating
red	flashing: software error fixed: hardware error	red	communication down

Modbus / LonWorks / Cable requirements

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

Recommended cable BELDEN 3106A

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



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

General

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

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

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

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

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

Before checking, please verify the following:

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

WARNING

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

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

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

Preliminary checks

Unit OFF power supply

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

Start-up sequence

Unit power supply ON

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

Cooling circuit

- 1 Visually inspect the refrigerating circuit: the presence of oil stains can be a symptom of leakage (caused e.g. by transportation, handling or other).
- 2 Verify that the refrigerating circuit is in pressure: Using the unit manometers, if present, or service manometers.
- 3 Make sure that all the service outlets are closed with proper caps; if caps are not present a leak of refrigerant can be possible.
- 4 Open all of the refrigeration circuit shut-off valves (if applicable).

Hydraulic circuit

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

NOTE

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

Electric circuit

Check the unit is connected to the earthing system.

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

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

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

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

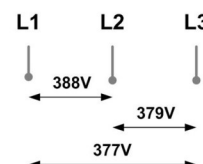
Example:

$$400 - 6\% = 376$$

$$400 + 6\% = 424$$

NOTE

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



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

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

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

Voltage

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

Start-up the unit.

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

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

Options

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

The parameter modification can cause irreversible damages.

Path: Main menu / Unit parameters / Options

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

Demand limit

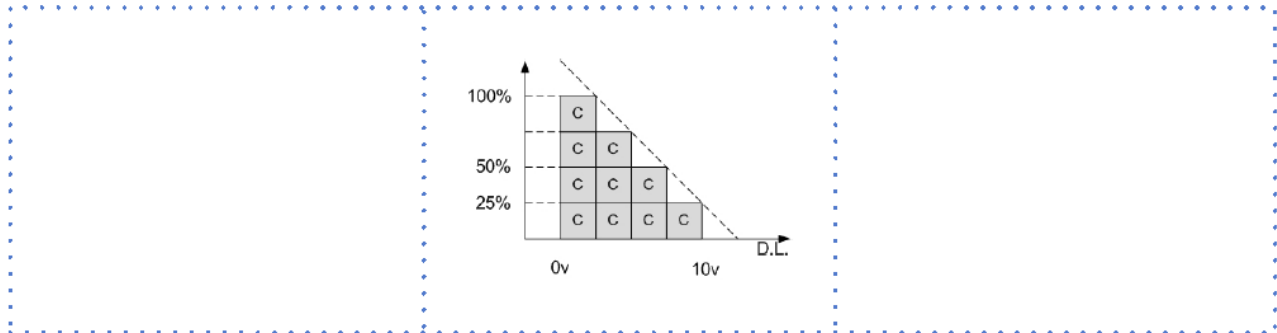
Menu accessible only after having entered the password.

⇒ Access reserved only to specifically trained personnel.

⇒ The parameter modification can cause irreversible damages.

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

Path: Main menu / Unit parameters / Options



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

Path: Main menu / Unit parameters / Options

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

Path: Main Menu / Unit parameters / Setpoint

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

Climatica TExt

Menu accessible only after having entered the password.

⇒ Access reserved only to specifically trained personnel.

⇒ The parameter modification can cause irreversible damages.

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

Path: Main menu / Unit parameters / Options



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

Path: Main menu / Unit parameters / Climatic TExt

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

Water reset

Menu accessible only after having entered the password.

⇒ Access reserved only to specifically trained personnel.

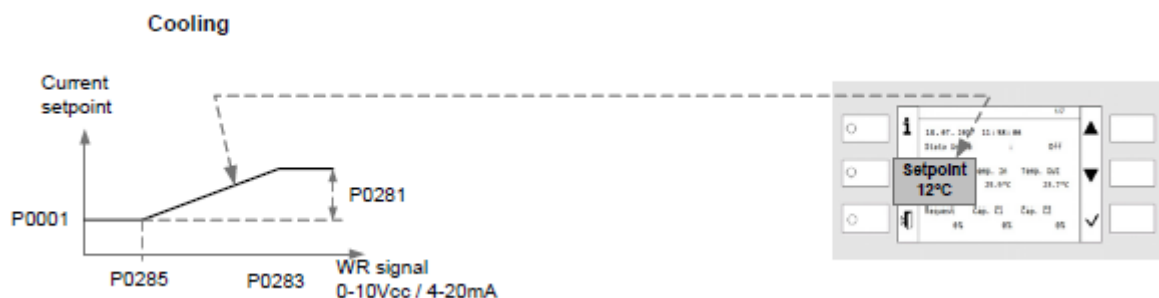
⇒ The parameter modification can cause irreversible damages.

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

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

Only if P0051: En WaterReset = 1

Path: Main menu / Unit parameters / Options



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

Path: Main menu / Unit parameters / Options

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

Path: Main Menu / Unit parameters / Water reset

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

Reduced load operation

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

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

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

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

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

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

Check the water flow-rate of the evaporator

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

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

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

Check for water side exchanger pressure drops:

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

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

Start-up report

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

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

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

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

Directive 2014/68EU PED

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

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

Compulsory verification of the first installation:

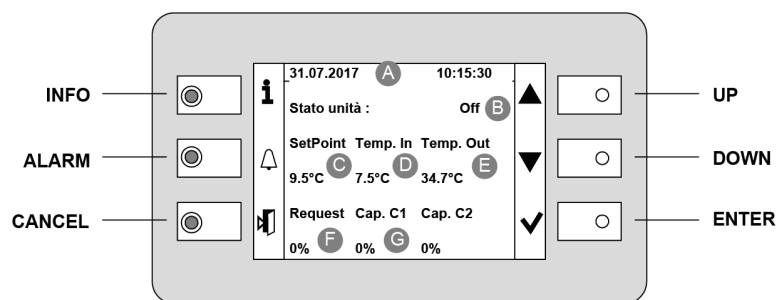
- only for units assembled on the installer's building site (for ex. condensing circuit + direct expansion unit)

Commissioning declaration:

- for all units

Periodical checks:

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



Led

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








Display

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

Keys











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

Change unit state

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







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

Modify setpoint

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

















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

Display the status














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

Scheduler

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

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

Enable Scheduler

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

* Unit Parameters menu is displayed

Keyboard settings

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

Alarms



Before resetting an alarm identify and remove its cause.

Repeated resets can cause irreversible damage.

Display of alarm: step 1-3

Reset allarm: step 4-10

Example:

+ eE001: Monitore fase: Fault = active alarm

- EE003: Guasto P1 Util: Ok = resetted alarm

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

General list of alarms

The alarm code identifies the concerned circuit:

Example:

ee 1 01:TimeOutModCirc = circuit 1

ee 2 01:TimeOutModCirc = circuit 2

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

Alarm list - 1

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

Alarm list - 2

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

Alarm list - 3

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

Alarm list - 4

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

Safety

Operate in compliance with safety regulations in force.

To carry out the operations use protection devices:

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

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

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

General

Maintenance must be performed by authorized centres or by qualified personnel

The maintenance allows to:

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

WARNING

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

Frequency of interventions

Perform an inspection every 6 months.

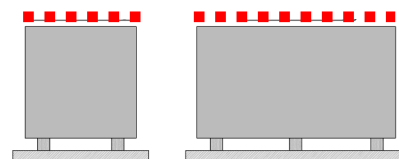
However, frequency depends on the type of use.

Plan inspections at close intervals in the event of:

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



Do not go up to the surface



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

NOTE

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

Unit booklet

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

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

On the schedule note:

- date
- intervention description
- carried out measures etc.

Standby mode

If foreseen a long period of inactivity:

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

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

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

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

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

System drain

The system must be drained only if necessary.

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

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

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

Before start-up, wash the system.

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

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

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

Water side heat exchanger

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

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

The clearing must be effected:

- with circulation opposite to the usual one
- with a speed at least 1,5 times higher than the nominal one
- with an appropriate product moderately acid (95% water + 5% phosphoric acid)
- after the cleaning rinse with water to inhibit the action of any residual product

Water filter

Check that no impurities prevent the correct passage of water.

Flow switch

- controls the operations
- remove incrustations from the palette

Circulation pumps

Check:

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

Insulations

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

Safety valve

The pressure relief valve must be replaced :

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

Air coil

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

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

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

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

Shut down periods

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

Cleaning procedure

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

Follow the steps below for proper cleaning.

Remove surface debris

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

Rinse

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

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

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

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

Blow dry

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

WARNING

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

Electric fans

Check:

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

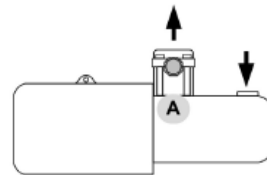
Compressor supply line shut-off valve

Do not remove the seal

Remove only if authorized by the manufacturer.

Please contact the maker for informations.

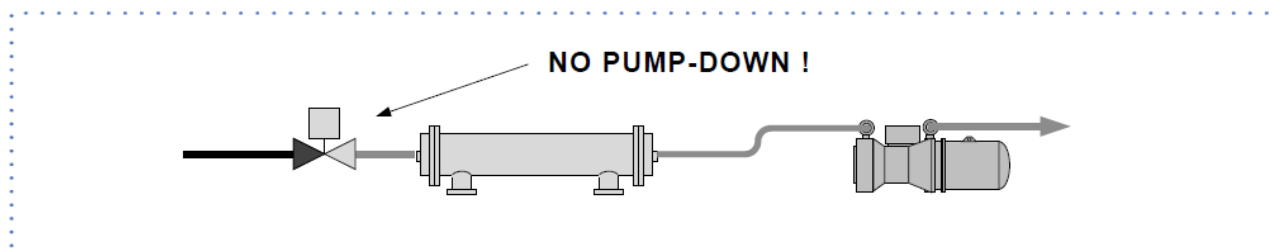
Screw compressors - Periodical checks



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

C = CHECK

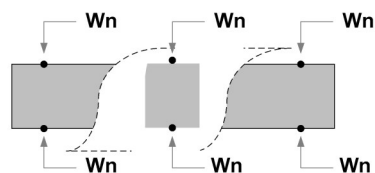
R = replace



Anti-vibration mount support

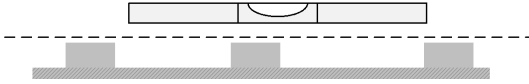
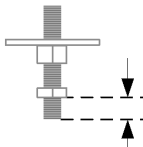
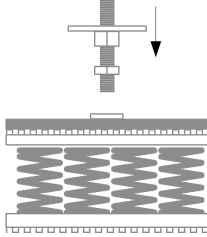
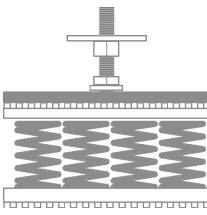
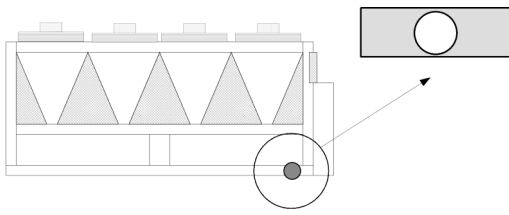
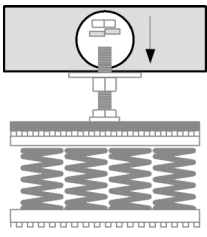
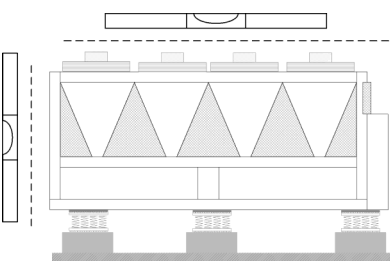
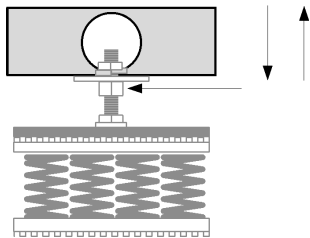
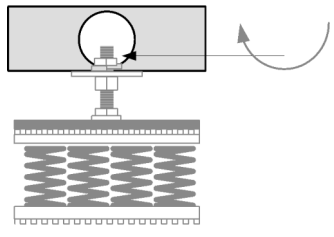


PE code

W1 Wn: see dimensional drawings
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PEF500003	RX603-Z120P	RZ412-X304P	RX601-Z105Pr	RZ408-312Pr	RX603-Z120P	RZ505-X201Pr
PEF500004	RX403-Z212-Z120P	RZ620-124P	RX701Pr	RX403-Z212-Z120P	RX404-Z220-X107P	RX502-Z202Pr
PEF500005	RX404-Z220-X107P	RX404-Z220-X107P	RZ505-X201Pr	RX403-Z212-X104P	RX404-Z220-X107P	RZ608-112Pr
PEF500007	RX403-Z212-Z120P	RX403-Z212-Z120P	RX504-Z212P	RX402-Z308Pr	RX603-Z112Pr	RX603-Z112Pr
PEF500006	RZ412-X204-Z120P	RX507-204P	RZ405-X202-X103Pr	RZ603-108Pr	RZ608-120Pr	RX604-107P
PEF500008	RZ612-120P	RZ612-120P	RX704P	RZ508-X202Pr	RX703Pr	RZ612-120P
PEF500010	RZ412-X204-X107P	RX603-107P	RX603-107Pr	RZ412-X204-X107P	RX501-Z202Pr	RX603-107P
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PEF500012	RX604-108P	RX604-108P	RZ412-X204-X107P	RZ508-X202Pr	RZ403-305Pr	RZ412-X204-X107P
PEF500013	RZ412-Z220-X107P	RX604-Z124P	RX504-201P	RZ412-Z220-X107P	RX501-Z202Pr	RX504-201P
PEF500016	RX504-201P	RX507-204P	RZ608-X103Pr	RX407-Z324P	RX602-103Pr	RZ505-X201Pr
PEF500014	RX504-202P	RX507-204P	RZ605-X102Pr	RX604-Z120P	RZ605-X102Pr	RZ605-X102Pr
PEF500017	RZ712P	RX707P	RZ712P	RX707P	RZ712P	RX402-Z208-X103Pr
PEF500045	RX403-Z212-Z120P	RX507-204P	RX602-Z112Pr	R507-204P	RZ608-X103Pr	RX701Pr

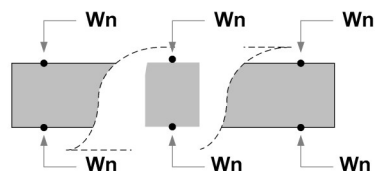
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PEF500003						
PEF500004						
PEF500005						
PEF500007	RX403-Z212-Z120P	RZ708Pr				
PEF500006	RX603-Z120P	RZ703Pr				
PEF500008	RZ612-120P	RZ608-120Pr				
PEF500010	RX603-107P	RX603-107P	RX603-107P	RX501-Z202Pr		
PEF500011	RZ520-X203P	RZ505-203Pr	RZ520-X203P	RZ703Pr		
PEF500012	RX604-108P	RZ412-X204-X107P	RZ405-X202-X103Pr	RZ403-305Pr		
PEF500013	RZ412-Z220-X107P	RX707P	RZ412-Z220-X107P	RX501-Z202Pr		
PEF500016	RZ408-X203-Z112Pr	RX404-Z320P	RX404-Z320P	RX507-204P	RX602-103Pr	RZ505-X201Pr
PEF500014	RZ408-312Pr	RX604-Z120P	RX503-Z203Pr	RX504-202P	RZ605-X102Pr	RZ605-X102Pr
PEF500017	RZ608-X104Pr	RZ520-212P	RX707P	RZ520-212P	RZ712P	RX402-Z208-X103Pr
PEF500045	RX503-Z208Pr	RZ412-Z220-X107P	RZ412-Z220-X107P	RX507-204P	RX503-Z208Pr	RX701Pr

<p>1</p> 	<p>2</p>  <p>20-25 mm</p>
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<p>5</p> 	<p>6</p> 
<p>7</p> 	<p>8</p> 
<p>8</p> 	

Anti-seismic spring antivibration mounts



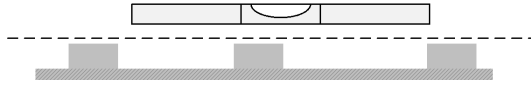
PE code

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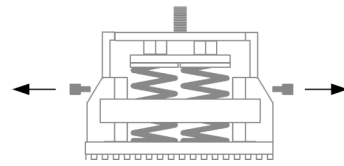
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PEF500020	LaLV 247	LaLV 253	LaLV 222	LaLV 247	LaLV 2510	LaLV 222
PEF500021	LaLV 2510	LaLV 2510	LaLV 222	LaLV 245	LaLV 2510	LaLV 231
PEF500022	LaLV 250	LaLV 251	LaLV 2300	LaLV 220	LaLV 233	LaLV 2510
PEF500023	LaLV 247	LaLV 247	LaLV 250	LaLV 2301	LaLV 245	LaLV 245
PEF500024	LaLV 248	LaLV 248	LaLV 2501	LaLV 2301	LaLV 233	LaLV 248
PEF500027	LaLV 2501	LaLV 253	LaLV 214	LaLV 251	LaLV 214	LaLV 247
PEF500026	LaLV 250	LaLV 247	LaLV 247	LaLV 250	LaLV 220	LaLV 247
PEF500028	LaLV 251	LaLV 251	LaLV 250	LaLV 2301	LaLV 220	LaLV 250
PEF500029	LaLV 2501	LaLV 2510	LaLV 247	LaLV 2501	LaLV 220	LaLV 247
PEF500030	LaLV 248	LaLV 253	LaLV 230	LaLV 2501	LaLV 230	LaLV 230
PEF500031	LaLV 247	LaLV 253	LaLV 2305	LaLV 255	LaLV 2300	LaLV 222
PEF500033	LaLV 247	LaLV 255	LaLV 247	LaLV 255	LaLV 247	LaLV 2301

KIT PE	W7	W8	W9	W10	W11	W12
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PEF500019						
PEF500020						
PEF500021						
PEF500022	LaLV 245	LaLV 214				
PEF500023	LaLV 247	LaLV 2305				
PEF500024	LaLV 248	LaLV 231				
PEF500027	LaLV 2501	LaLV 222	LaLV 2501	LaLV 214		
PEF500026	LaLV 247	LaLV 247	LaLV 247	LaLV 220		
PEF500028	LaLV 251	LaLV 250	LaLV 2300	LaLV 220		
PEF500029	LaLV 2501	LaLV 255	LaLV 2501	LaLV 220		
PEF500030	LaLV 233	LaLV 2501	LaLV 2305	LaLV 248	LaLV 230	LaLV 230
PEF500031	LaLV 231	LaLV 2510	LaLV 2510	LaLV 253	LaLV 2300	LaLV 222
PEF500033	LaLV 231	LaLV 2510	LaLV 255	LaLV 2510	LaLV 247	LaLV 2301

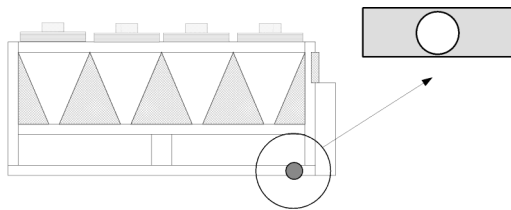
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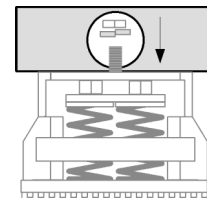
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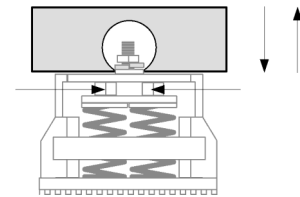
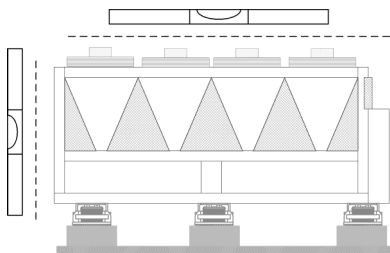
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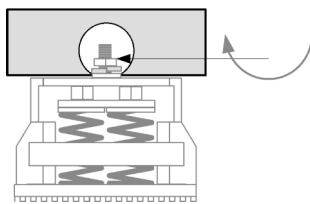
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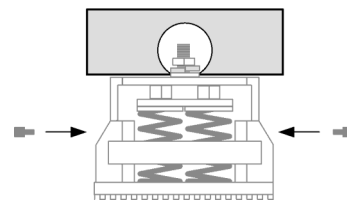
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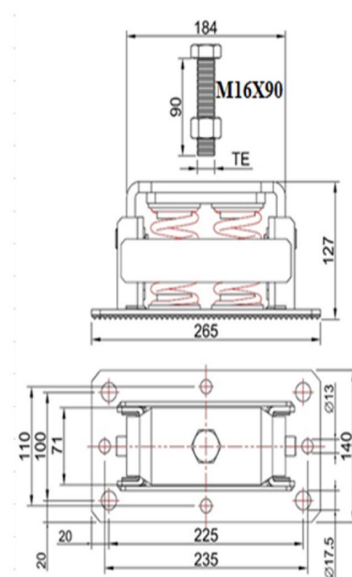
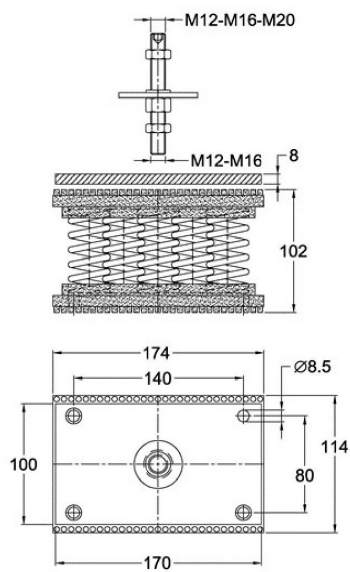


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Option present with compressor box

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

Maintenance

The inspection must be carried out by qualified service personnel.

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

The sensor must be calibrated or replaced every 12 months.

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

To recalibrate the sensor: see SERVICE MANUAL.

To replace the sensor: contact After-Sales Service.

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

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

Disconnection

WARNING

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

Avoid leak or spills into the environment.

Before disconnecting the unit, the following must be recovered, if present:

- refrigerant gas
- Anti-freeze solutions in the hydraulic circuit

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

WEEE INFORMATION

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

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

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

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

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

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

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

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

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

This equipment may contain:

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

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

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



General

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

Danger zone

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

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

Handling

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

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

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

Installation

The incorrect installation of the unit could cause water leaks, condensate accumulation, leaking of the refrigerant, electric shock, poor operation or damage to the unit itself.

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

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

Carefully check the positioning of the unit.

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

Carefully check the positioning and the anchoring of the unit.

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

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

General risks

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

Electrically isolate the unit (yellow-red isolator).

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

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

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

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

Always contact the qualified assistance centre.

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

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

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

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

Electric parts

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

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

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

Always fix the unit cover properly.

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

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

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

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

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

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

Moving parts

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

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

Contact with the fans can cause injury.

Prior to removing the protective grill or the fans, open the isolator on the attachment line of the unit itself, padlock it and display the appropriate warning sign.

Refrigerant

The intervention of the safety valve and the consequent expulsion of the gas refrigerant may cause injuries and intoxication.

Always wear suitable clothing including protective gloves and eyeglasses for operations inside the danger zone.

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

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

Do not place any heat source inside the danger zone.

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

Hydraulic parts

Defects in tubing, the attachments or the removal parts may cause a leak or water projection with the consequent damages to people, things or shortcircuit the unit.

General technical data

Performance - Excellence

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

SIZE			120.1	160.1	200.1	240.1	250.2	280.2	320.2	340.2	360.2	400.2	440.2	480.2	540.2	580.2
Cooling capacity	1	[kW]	294	374	506	603	594	670	742	812	901	992	1090	1205	1326	1423
Compressor power input	1	[kW]	86,8	112	152	180	166	194	222	235	263	297	343	361	414	459
Total power input	2	[kW]	92,5	119	161	192	179	207	235	250	281	315	361	383	436	482
Partial recovery heating capacity	3	[kW]	38,1	48,6	65,8	78,3	76,0	86,4	96,4	105	116	129	143	157	174	188
EER	1	-	3,18	3,15	3,14	3,15	3,32	3,23	3,15	3,24	3,21	3,15	3,02	3,15	3,04	2,95
Water flow-rate (User Side)	1	[l/s]	14,0	17,8	24,0	28,6	28,2	31,8	35,2	38,6	42,8	47,1	51,8	57,2	63,0	67,6
Internal exchanger pressure drops	1	[kPa]	55	46	54	50	49	49	45	41	39	49	39	45	53	38
Cooling capacity (EN14511:2018)	4	[kW]	294	374	505	602	593	669	741	811	900	991	1089	1204	1325	1422
Total power input (EN14511:2018)	4	[kW]	93,9	120	163	194	181	210	238	253	284	318	364	387	441	485
EER (EN14511:2018)	4	-	3,13	3,11	3,10	3,11	3,27	3,19	3,12	3,21	3,17	3,11	2,99	3,11	3,01	2,93
SEER	6	-	5,13	5,12	5,11	5,12	5,36	5,38	5,37	5,39	5,34	5,31	5,35	5,34	5,30	5,31
SEPR	6	-	5,95	5,89	6,10	5,99	6,10	6,03	5,93	5,99	5,99	5,97	5,95	5,99	5,99	5,92
Cooling capacity (AHRI 550/590)	5	[kW]	292	371	502	598	589	665	737	806	894	985	1082	1196	1317	1413
Total power input (AHRI 550/590)	5	[kW]	92,2	118	160	191	179	207	235	250	280	314	359	382	434	480
COP _R	5	-	3,16	3,14	3,13	3,13	3,30	3,22	3,14	3,23	3,19	3,14	3,01	3,13	3,03	2,94
IPLV	5	-	6,04	6,03	5,84	5,91	6,01	5,73	5,54	6,05	6,00	5,74	5,86	5,83	5,82	5,87

The Product is compliant with the Erp (Energy Related Products) European Directive. It includes the Commission delegated Regulation (EU) No 2016/2281, also known as Ecodesign LOT21. Contains fluorinated greenhouse gases (GWP 631)

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

Super-silenced acoustic configuration (EN)

SIZE			120.1	160.1	200.1	240.1	250.2	280.2	320.2	340.2	360.2	400.2	440.2	480.2	540.2	580.2
Cooling capacity	1	[kW]	294	374	506	603	594	670	742	812	901	992	1090	1205	1326	1423
Compressor power input	1	[kW]	86,8	112	152	180	166	194	222	235	263	297	343	361	414	459
Total power input	2	[kW]	92,5	119	161	192	179	207	235	250	281	315	361	383	436	482
Partial recovery heating capacity	3	[kW]	38,1	48,6	65,8	78,3	76,0	86,4	96,4	105	116	129	143	157	174	188
EER	1	-	3,18	3,15	3,14	3,15	3,32	3,23	3,15	3,24	3,21	3,15	3,02	3,15	3,04	2,95
Water flow-rate (User Side)	1	[l/s]	14,0	17,8	24,0	28,6	28,2	31,8	35,2	38,6	42,8	47,1	51,8	57,2	63,0	67,6
Internal exchanger pressure drops	1	[kPa]	55	46	54	50	49	49	45	41	39	49	39	45	53	38
Cooling capacity (EN14511:2018)	4	[kW]	294	374	505	602	593	669	741	811	900	991	1089	1204	1325	1422
Total power input(EN14511:2018)	4	[kW]	93,9	120	163	194	181	210	238	253	284	318	364	387	441	485
EER (EN14511:2018)	4	-	3,13	3,11	3,10	3,11	3,27	3,19	3,12	3,21	3,17	3,11	2,99	3,11	3,01	2,93
SEER	6	-	5,13	5,12	5,11	5,12	5,36	5,38	5,37	5,39	5,34	5,31	5,35	5,34	5,30	5,31
SEPR	6	-	5,95	5,89	6,10	5,99	6,10	6,03	5,93	5,99	5,99	5,97	5,95	5,99	5,99	5,92
Cooling capacity (AHRI 550/590)	5	[kW]	292	371	502	598	589	665	737	806	894	985	1082	1196	1317	1413
Total power input (AHRI 550/590)	5	[kW]	92,2	118	160	191	179	207	235	250	280	314	359	382	434	480
COP _R	5	-	3,16	3,14	3,13	3,13	3,30	3,22	3,14	3,23	3,19	3,14	3,01	3,13	3,03	2,94
IPLV	5	-	6,04	6,03	5,84	5,91	6,01	5,73	5,54	6,05	6,00	5,74	5,86	5,83	5,82	5,87

The Product is compliant with the Erp (Energy Related Products) European Directive. It includes the Commission delegated Regulation (EU) No 2016/2281, also known as Ecodesign LOT21. Contains fluorinated greenhouse gases (GWP 631)

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

Performances - Premium

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

SIZE			120.1	160.1	200.1	240.1	250.2	280.2	320.2	340.2	360.2	400.2	440.2	480.2	540.2	580.2
Cooling capacity	1	[kW]	281	341	473	577	551	615	682	754	837	911	1007	1121	1241	1339
Compressor power input	1	[kW]	91,5	125	165	189	183	214	249	257	281	311	361	379	425	474
Total power input	2	[kW]	96,1	129	172	198	192	223	258	268	295	325	374	397	443	492
Partial recovery heating capacity	3	[kW]	37,3	46,6	63,8	76,6	73,4	82,9	93,1	101	112	122	137	150	167	181
EER	1	-	2,92	2,64	2,75	2,91	2,87	2,76	2,64	2,81	2,84	2,81	2,69	2,82	2,80	2,72
Water flow-rate (User Side)	1	[l/s]	13,3	16,2	22,5	27,4	26,2	29,2	32,4	35,8	39,8	43,3	47,8	53,2	58,9	63,6
Internal exchanger pressure drops	1	[kPa]	39	51	36	51	48	41	50	52	43	48	50	38	47	54
Cooling capacity (EN14511:2018)	4	[kW]	281	341	473	576	550	614	681	753	836	910	1006	1120	1240	1338
Total power input (EN14511:2018)	4	[kW]	97,1	131	173	201	194	225	261	271	297	328	378	400	447	496
EER (EN14511:2018)	4	-	2,89	2,61	2,73	2,87	2,83	2,73	2,61	2,78	2,81	2,78	2,66	2,80	2,78	2,70
SEER	6	-	4,96	4,84	4,80	4,89	4,95	4,92	4,87	4,99	4,88	4,91	4,90	4,97	4,97	4,97
SEPR	6	-	5,93	5,32	5,79	5,72	5,85	5,71	5,70	5,75	5,84	5,81	5,71	5,79	5,79	5,71
Cooling capacity (AHRI 550/590)	5	[kW]	279	339	470	573	547	611	677	749	831	905	1000	1114	1232	1330
Total power input (AHRI 550/590)	5	[kW]	95,8	129	171	198	192	222	257	267	294	323	373	396	441	490
COP _R	5	-	2,91	2,63	2,74	2,90	2,85	2,75	2,63	2,80	2,83	2,80	2,68	2,81	2,80	2,71
IPLV	5	-	5,80	5,51	5,62	5,71	5,71	5,39	5,08	5,53	5,62	5,40	5,30	5,73	5,71	5,73

The Product is compliant with the Erp (Energy Related Products) European Directive. It includes the Commission delegated Regulation (EU) No 2016/2281, also known as Ecodesign LOT21. Contains fluorinated greenhouse gases (GWP 631)

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

Super-silenced acoustic configuration (EN)

SIZE			120.1	160.1	200.1	240.1	250.2	280.2	320.2	340.2	360.2	400.2	440.2	480.2	540.2	580.2
Cooling capacity	1	[kW]	267	324	450	549	534	591	654	724	796	866	957	1065	1179	1272
Compressor power input	1	[kW]	86,1	117	155	178	176	203	237	244	264	292	339	356	399	445
Total power input	2	[kW]	90,7	122	162	187	185	212	246	255	278	306	353	374	417	463
Partial recovery heating capacity	3	[kW]	35,3	44,1	60,5	72,7	71,0	79,4	89,1	97	106	116	130	142	158	172
EER	1	-	2,94	2,66	2,78	2,93	2,89	2,79	2,66	2,84	2,87	2,83	2,71	2,85	2,83	2,75
Water flow-rate (User Side)	1	[l/s]	12,7	15,4	21,4	26,1	25,4	28,1	31,1	34,4	37,8	41,1	45,5	50,6	56,0	60,4
Internal exchanger pressure drops	1	[kPa]	36	47	34	48	46	38	47	49	40	45	46	35	43	50
Cooling capacity (EN14511:2018)	4	[kW]	267	324	450	548	533	591	653	723	795	865	956	1064	1178	1271
Total power input (EN14511:2018)	4	[kW]	91,6	123	163	189	187	214	248	258	280	309	356	377	421	468
EER (EN14511:2018)	4	-	2,91	2,63	2,75	2,90	2,86	2,76	2,63	2,81	2,84	2,80	2,69	2,82	2,80	2,72
SEER	6	-	5,03	4,96	4,96	4,99	5,02	5,01	4,90	5,06	4,96	5,00	5,05	5,07	5,09	5,01
SEPR	6	-	5,93	5,32	5,79	5,72	5,85	5,71	5,70	5,75	5,84	5,81	5,71	5,79	5,79	5,71
Cooling capacity (AHRI 550/590)	5	[kW]	265	322	447	545	531	587	650	719	790	860	951	1058	1170	1263
Total power input (AHRI 550/590)	5	[kW]	85,8	117	155	177	175	202	236	243	263	291	338	355	398	444
COP _R	5	-	2,93	2,66	2,77	2,92	2,88	2,78	2,65	2,83	2,86	2,82	2,70	2,84	2,82	2,74
IPLV	5	-	5,86	5,58	5,66	5,75	5,73	5,41	5,11	5,55	5,64	5,42	5,32	5,74	5,73	5,75

The Product is compliant with the Erp (Energy Related Products) European Directive. It includes the Commission delegated Regulation (EU) No 2016/2281, also known as Ecodesign LOT21. Contains fluorinated greenhouse gases (GWP 631)

1. Data referred to the following conditions: internal exchanger water temperature = 12/7 °C. Entering external exchanger air temperature = 35°C. Evaporator fouling factor = 0.44 x 10⁻⁴ m² K/W.
2. The Total Power Input value does not take into account the part related to the pumps and required to overcome the pressure drops for the circulation of the solution inside the exchangers.
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6. Data compliant according to EU regulation 2016/2281

General technical data

Construction

Excellence

SIZE			120.1	160.1	200.1	240.1	250.2	280.2	320.2	340.2	360.2	400.2	440.2	480.2	540.2	580.2
Compressor																
Type of compressors	1		ISW													
Refrigerant			R513A													
No. of compressors		Nr	1	1	1	1	2	2	2	2	2	2	2	2	2	2
Rated power (C1)		HP	120	160	200	240	125	125	160	120	120	160	160	240	240	290
Rated power (C2)		HP					125	160	160	240	240	240	290	240	290	290
Std Capacity control steps			STEPLESS													
Oil charge (C1)		l	18	18	35	35	18	18	18	18	18	18	18	35	35	35
Oil charge(C2)		l					18	18	18	35	35	35	35	35	35	35
Refrigerant charge (C1)		kg	51	60	84	99	62	64	69	63	69	73	73	115	115	118
Refrigerant charge (C2)		kg					53	58	60	88	96	103	105	95	95	97
Refrigeration circuits		Nr	1	1	1	1	2	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	150	219	301	319	319	565	541	518	973	953	930	917	902	872
External exchanger (condenser)																
Type of external exchanger	3		CCM													
Number of coils		Nr	5	6	8	10	12	12	12	14	16	16	16	20	20	20
External Section Fans																
Type of fans	4		AX													
Number of fans		Nr	5	6	8	10	12	12	12	14	16	16	16	20	20	20
Type of motor	5		EC													
Standard airflow		l/s	27083	32500	43333	54167	65000	65000	65000	75833	86667	86667	86667	108333	108333	108333
Connections																
Water fittings			6"	6"	6"	6"	6"	6"	6"	8"	8"	8"	8"	8"	8"	8"
Power supply																
Standard power supply			400/3~/50													
Electrical data																
F.L.A. - Total		A	193,6	236,9	341,7	422,6	390,7	434,0	473,5	536,9	617,8	659,2	723,2	844,9	908,9	972,9
F.L.I. - Total		kW	119,5	148,0	212,2	262,7	241,4	269,8	295,8	332,8	383,3	410,5	450,5	525,2	565,2	605,2
M.I.C. - Value	6	A	193.6	236.9	341.7	422.6	390.7	434.0	473.5	536.9	617.8	659.2	723.2	844.9	908.9	972.9

Premium

SIZE		120.1	160.1	200.1	240.1	250.2	280.2	320.2	340.2	360.2	400.2	440.2	480.2	540.2	580.2
Compressor															
Type of compressors	1														
Refrigerant															
No. of compressors	Nr	1	1	1	1	2	2	2	2	2	2	2	2	2	2
Rated power (C1)	HP	120	160	200	240	125	125	160	120	120	160	160	240	240	290
Rated power (C2)	HP					125	160	160	240	240	240	290	240	290	290
Std Capacity control steps															
Oil charge (C1)	l	18	18	35	35	18	18	18	18	18	18	18	35	35	35
Oil charge (C2)	l					18	18	18	35	35	35	35	35	35	35
Refrigerant charge (C1)	kg	44	48	71	85	48	49	51	49	53	53	56	100	103	105
Refrigerant charge (C2)	kg					46	47	49	74	86	86	92	84	86	89
Refrigeration circuits	Nr	1	1	1	1	2	2	2	2	2	2	2	2	2	2
Internal exchanger (evaporator)															
Type of internal exchanger	2														
N. of internal exchanger	Nr	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Water content	l	150	214	365	292	292	283	506	536	518	518	953	931	917	902
External exchanger (condenser)															
Type of external exchanger	3														
Number of coils	Nr	4	4	6	8	8	8	8	10	12	12	12	16	16	16
External Section Fans															
Type of fans	4														
Number of fans	Nr	4	4	6	8	8	8	8	10	12	12	12	16	16	16
Type of motor	5														
Standard airflow	l/s	21667	21667	32500	43333	43333	43333	43333	54167	65000	65000	65000	86667	86667	86667
Connections															
Water fittings		6"	6"	6"	6"	6"	6"	6"	8"	8"	8"	8"	8"	8"	8"
Power supply															
Standard power supply		400/3~/50													
Electrical data															
F.L.A. - Total	A	193,6	236,9	341,7	422,6	390,7	434,0	473,5	536,9	617,8	659,2	723,2	844,9	908,9	972,9
F.L.I. - Total	kW	119,5	148,0	212,2	262,7	241,4	269,8	295,8	332,8	383,3	410,5	450,5	525,2	565,2	605,2
M.I.C. - Value	6 A	193,6	236,9	341,7	422,6	390,7	434,0	473,5	536,9	617,8	659,2	723,2	844,9	908,9	972,9

1. ISW = Double screw compressor
2. S&T = Shell and tube
3. CCM = Full aluminium microchannel coils
4. AX = Axial fan
5. EC = Asynchronous motor with permanent magnet commuted electronically.
6. M.I.C.= Maximum unit starting current. The M.I.C. value is obtained adding the

max. compressor starting current of the highest size to the power input at max. admissible conditions (F.L.A.) of the remaining electric components.

Unbalance between phase max 2%.

Voltage variation: max +/- 10%.

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

Sound levels - Excellence

Standard acoustic configuration (ST)

SIZE	Sound power level (dB) - Octave band (Hz)								Sound pressure level	Sound power level
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
120.1	74	72	72	84	95	91	81	66	77	97
160.1	81	80	76	88	93	93	82	67	77	97
200.1	82	74	84	91	94	91	86	75	77	97
240.1	87	90	80	88	95	90	90	73	77	98
250.1	71	63	75	89	100	90	75	62	79	101
280.2	77	69	78	92	100	92	76	62	80	101
320.2	79	71	80	94	99	93	77	63	80	101
340.2	78	65	85	94	101	91	79	69	80	102
360.2	82	78	81	92	101	90	82	67	80	102
400.2	83	79	82	94	101	92	82	67	80	102
440.2	78	71	83	99	101	96	82	70	81	103
480.2	85	82	84	94	102	90	85	70	80	103
540.2	83	80	85	99	102	95	85	72	81	104
580.2	69	68	84	101	101	97	85	73	81	104

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

Data referred to the following conditions:

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

Acoustic configuration with compressor soundproofing (SC)

SIZE	Sound power level (dB) - Octave band (Hz)								Sound pressure level	Sound power level
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
120.1	66	68	71	79	91	87	78	65	73	93
160.1	74	76	76	83	90	90	80	66	74	94
200.1	75	71	83	85	90	89	83	74	73	94
240.1	80	86	79	84	92	88	87	72	74	95
250.1	63	59	74	84	96	87	72	60	76	97
280.2	70	66	78	88	97	89	74	62	77	98
320.2	73	68	80	89	97	90	75	62	77	98
340.2	71	61	84	89	97	88	76	67	76	98
360.2	76	76	82	89	99	89	80	67	78	100
400.2	77	76	83	91	99	91	80	67	78	100
440.2	71	68	83	94	98	93	80	69	78	100
480.2	80	80	85	91	100	90	83	70	78	101
540.2	77	77	84	94	99	93	83	71	78	101
580.2	62	65	84	96	98	94	82	72	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

Super-silenced acoustic configuration (EN)

SIZE	Sound power level (dB) - Octave band (Hz)								Sound pressure level	Sound power level
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
120.1	65	67	71	81	86	83	76	62	69	89
160.1	73	74	77	86	86	84	77	63	70	90
200.1	73	67	82	87	86	84	78	69	69	90
240.1	78	83	79	85	87	85	81	68	70	91
250.1	62	57	74	86	92	82	71	58	72	93
280.2	69	63	79	90	93	84	72	59	73	94
320.2	71	65	80	91	92	84	72	59	73	94
340.2	69	58	84	90	92	83	72	63	72	94
360.2	74	73	82	90	95	85	75	64	74	96
400.2	75	73	83	92	94	86	75	64	74	96
440.2	69	64	82	95	93	85	74	65	74	96
480.2	77	76	84	92	96	87	77	66	74	97
540.2	74	73	83	95	94	86	76	66	74	97
580.2	59	61	82	96	93	86	75	67	74	97

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 - Premium

Standard acoustic configuration (ST)

SIZE	Sound power level (dB) - Octave band (Hz)								Sound pressure level	Sound power level
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
120.1	74	72	71	84	95	91	80	66	78	97
160.1	81	80	76	88	93	93	81	66	78	97
200.1	83	74	84	91	93	91	86	75	77	97
240.1	87	90	80	88	95	90	90	74	77	98
250.1	70	62	73	87	99	89	72	60	79	100
280.2	77	69	78	92	100	91	75	62	81	101
320.2	80	71	80	94	99	93	76	62	80	101
340.2	78	64	84	94	101	91	78	68	81	102
360.2	81	78	81	92	101	90	81	67	81	102
400.2	83	79	83	94	101	92	82	67	81	102
440.2	78	71	83	99	100	96	82	71	81	103
480.2	86	82	84	94	102	90	85	70	81	103
540.2	82	79	84	100	102	96	85	72	82	104
580.2	69	68	84	101	100	97	85	73	82	104

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

Data referred to the following conditions:

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

Acoustic configuration with compressor soundproofing (SC)

SIZE	Sound power level (dB) - Octave band (Hz)								Sound pressure level	Sound power level
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
120.1	67	69	70	79	91	87	77	65	74	93
160.1	75	77	77	84	90	90	79	66	75	94
200.1	76	71	84	86	90	88	83	74	74	94
240.1	80	87	80	84	92	88	87	73	74	95
250.1	64	59	73	83	96	86	70	60	76	97
280.2	70	65	77	86	96	88	72	60	76	97
320.2	73	69	80	89	96	90	74	62	77	98
340.2	71	61	84	88	97	87	75	67	77	98
360.2	74	74	79	86	97	87	77	65	76	98
400.2	77	76	83	90	98	90	80	67	78	99
440.2	71	68	83	94	98	93	80	70	78	100
480.2	79	79	84	90	99	88	82	69	78	100
540.2	75	75	84	94	98	92	82	71	78	100
580.2	63	66	85	97	98	95	82	73	79	101

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

Data referred to the following conditions:

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

General technical data

Super-silenced acoustic configuration (EN)

SIZE	Sound power level (dB) - Octave band (Hz)								Sound pressure level	Sound power level
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
120.1	67	68	72	82	87	82	75	63	70	89
160.1	75	76	78	87	86	84	76	64	71	90
200.1	74	68	84	88	85	83	78	70	70	90
240.1	79	84	80	85	87	84	81	69	70	91
250.1	64	58	75	86	92	81	68	58	72	93
280.2	69	63	78	89	91	81	69	58	72	93
320.2	72	66	81	92	92	83	70	59	73	94
340.2	70	59	84	91	92	82	71	64	73	94
360.2	73	72	80	89	93	82	72	62	72	94
400.2	75	73	83	92	93	84	73	63	74	95
440.2	69	65	83	96	92	84	73	66	74	96
480.2	77	76	84	92	94	85	76	65	74	96
540.2	73	72	83	96	93	84	74	66	74	96
580.2	60	62	83	98	92	85	74	68	75	97

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

Correction factors for ethylene glycol use

% ETHYLENE GLYCOL BY WEIGHT		5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
Freezing temperature	°C	-2,0	-3,9	-6,5	-8,9	-11,8	-15,6	-19,0	-23,4	-27,8	-32,7
Safety temperature	°C	3,0	1,0	-1,0	-4,0	,6,0	-10,0	-14,0	-19,0	-23,8	-29,4
Cooling Capacity Factor	kW	0,995	0,989	0,983	0,977	0,971	0,964	0,956	0,949	0,941	0,933
Compressor power input Factor	kW	0,998	0,997	0,995	0,994	0,992	0,990	0,989	0,987	0,986	0,984
Internal exchanger pressure drop factor	kW	1,041	1,085	1,131	1,180	1,231	1,285	1,341	1,400	1,461	1,525

Correction factors for propylene glycol use

% PROPYLENE GLYCOL BY WEIGHT		5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
Freezing temperature	°C	-2,0	-3,9	-6,5	-8,9	-11,8	-15,6	-19,0	-23,4	-27,8	-32,7
Safety temperature	°C	3,0	1,0	-1,0	-4,0	,6,0	-10,0	-14,0	-19,0	-23,8	-29,4
Cooling Capacity Factor	kW	0,993	0,985	0,977	0,968	0,958	0,947	0,936	0,925	0,912	0,899
Compressor power input Factor	kW	0,998	0,995	0,993	0,990	0,987	0,983	0,980	0,976	0,972	0,968
Internal exchanger pressure drop factor	kW	1,052	1,108	1,170	1,237	1,309	1,386	1,467	1,554	1,646	1,743

Fouling Correction Factors

INTERNAL EXCHANGER (EVAPORATOR)

M2 °C/W	F1	FK1
0,44 x 10 (-4)	1,0	1,0
0,88 x 10 (-4)	0,97	0,99
1,76 x 10 (-4)	0,94	0,98

F1 = Cooling capacity correction factors

FK1 = Compressor power input correction factor

Exchanger operating range

INTERNAL EXCHANGER (EVAPORATOR)

	DPR	DPW
PED (CE)	2400	1000

DPr = Maximum operating pressure on refrigerant side in kPa

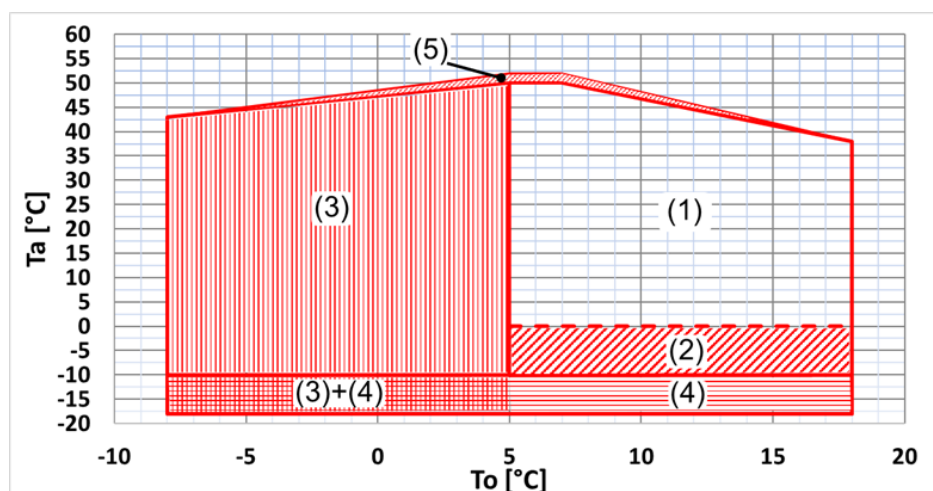
DPw = Maximum operating pressure on water side in kPa

Overload and control device calibrations

		OPEN	CLOSE	VALUE
High pressure switch	kPa	2100	1500	-
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

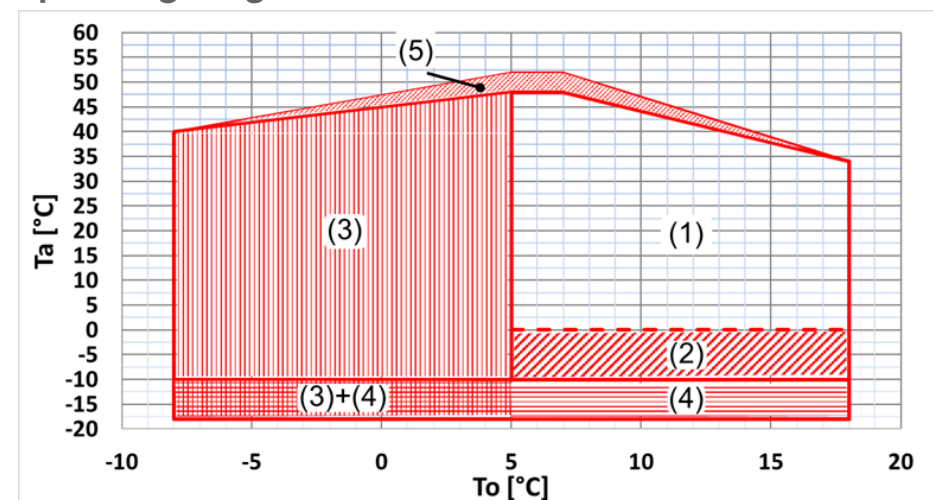
Operating range - Excellence



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

1. Standard unit operating range at full load
2. Standard unit operating range with air flow automatic modulation
3. Unit operating range in 'B - Low water temperature' configuration
4. Unit operating range with 'REGBT - Device for the condensing coil partialization'
5. Unit operating range with 52G option and automatic staging of the compressor capacity

Operating range - Premium



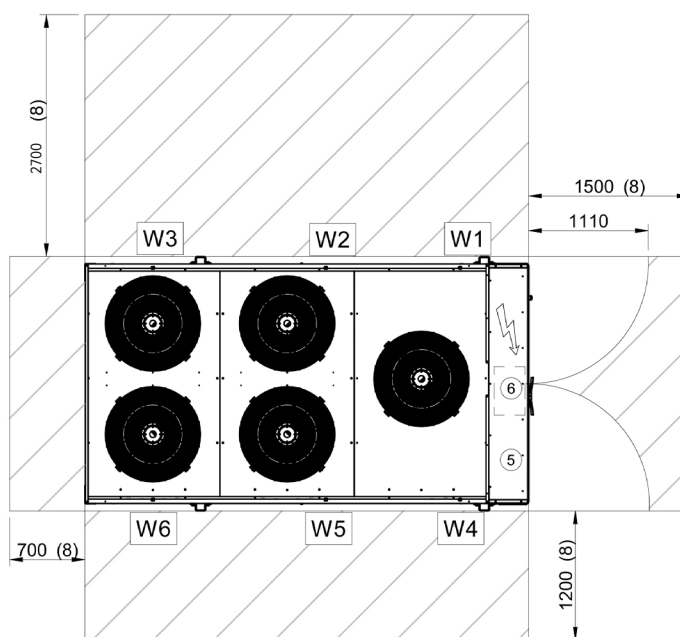
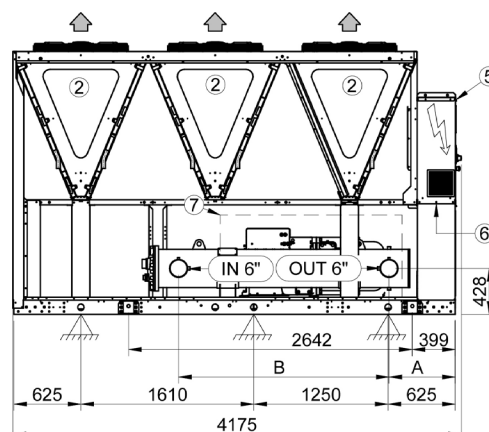
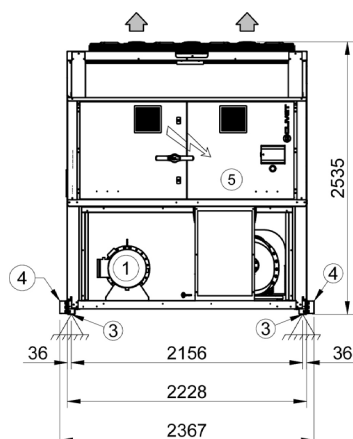
T_a (°C) = external exchanger inlet air temperature (D.B.)
 T_o (°C) = internal exchanger outlet water temperature

1. Standard unit operating range at full load
2. Standard unit operating range with air flow automatic modulation
3. Unit operating range in 'B - Low water temperature' configuration
4. Unit operating range with 'REGBT - Device for the condensing coil partialization'
5. Unit operating range with 52G option and automatic staging of the compressor capacity

Dimensional drawings

SIZE 120.1 - 160.1 - EXCELLENCE

DAAF50008_00
DATA/DATE 15/05/2020



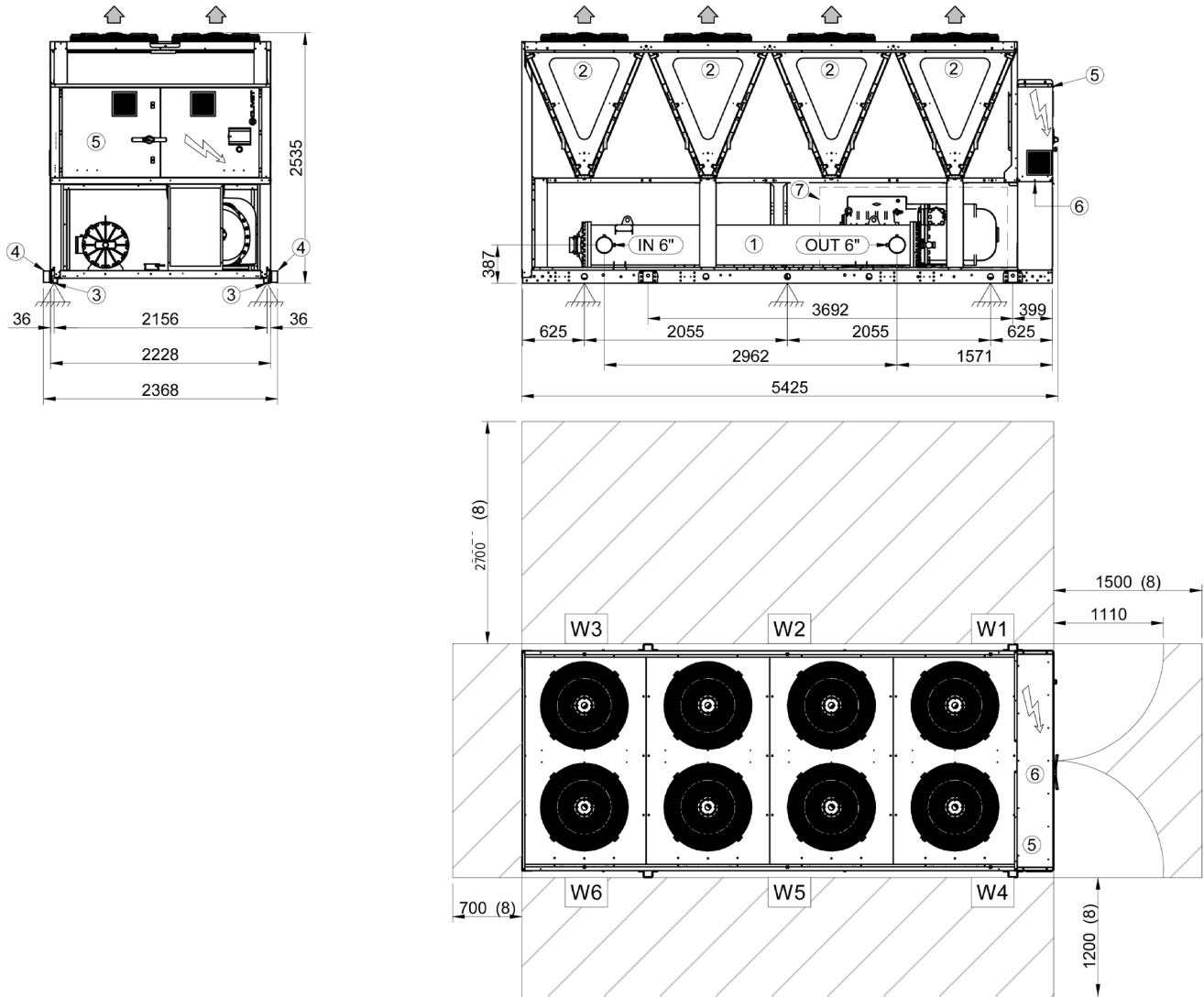
1. Internal exchanger (evaporator)
2. External exchanger (condenser)
3. Unit fixing holes
4. Lifting brackets (removable)
5. Electrical panel
6. Power input
7. Sound proof enclosure, only SC and EN version
8. Clearance access recommended

SIZE		120.1		160.1	
		ST	SC/EN	ST	SC/EN
Length	mm	4175	4175	4175	4175
Depth	mm	2228	2228	2228	2228
Height	mm	2535	2535	2535	2535
W1 Supporting point	kg	619	657	633	671
W2 Supporting point	kg	700	829	726	855
W3 Supporting point	kg	252	242	256	246
W4 Supporting point	kg	541	552	574	586
W5 Supporting point	kg	614	653	686	725
W6 Supporting point	kg	279	276	284	281
Operating weight	kg	3004	3209	3159	3364
Shipping weight	kg	2826	3031	2911	3116

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

SIZE 200.1 - EXCELLENCE

DAAF50009_00
DATA/DATE 15/05/2020



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

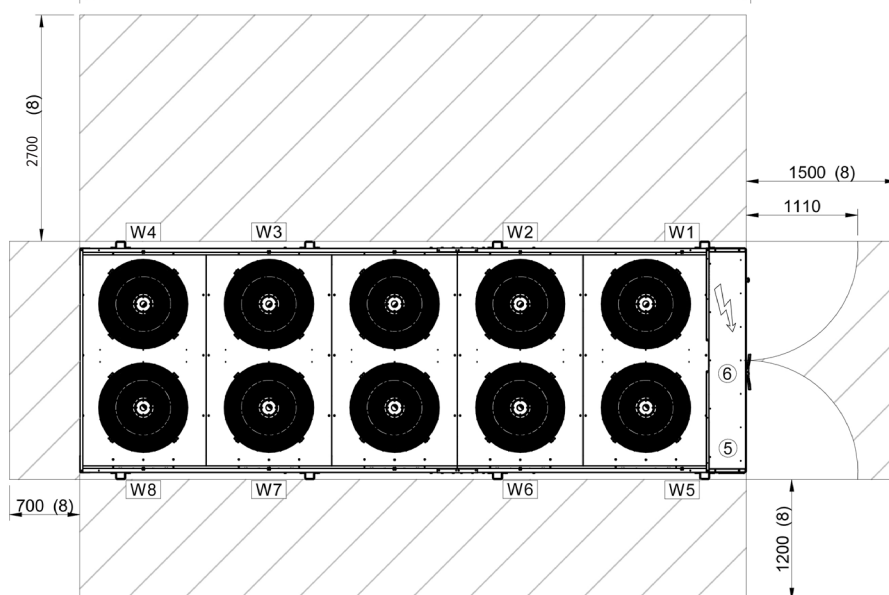
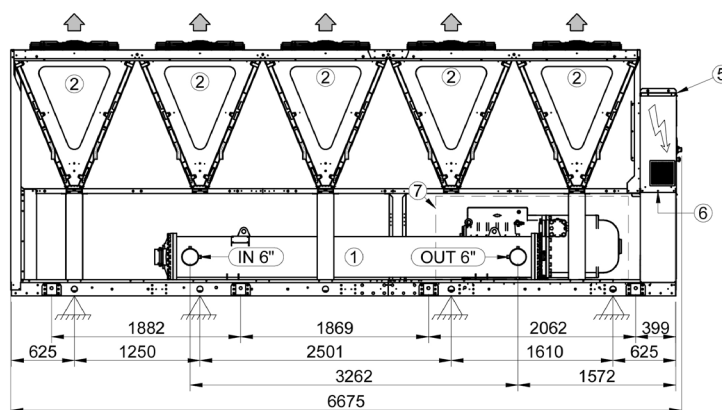
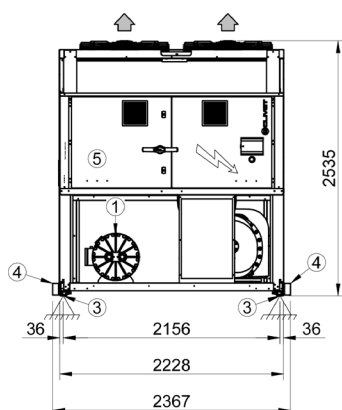
SIZE		200.1 EXC	
		ST	SC/EN
Length	mm	5425	5425
Depth	mm	2228	2228
Height	mm	2535	2535
W1 Supporting point	kg	913	1006
W2 Supporting point	kg	943	1057
W3 Supporting point	kg	289	272
W4 Supporting point	kg	645	677
W5 Supporting point	kg	881	920
W6 Supporting point	kg	491	485
Operating weight	kg	4162	4417
Shipping weight	kg	3834	4089

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 240.1 - EXCELLENCE

DAAF50010_00
DATA/DATE 18/05/2020



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

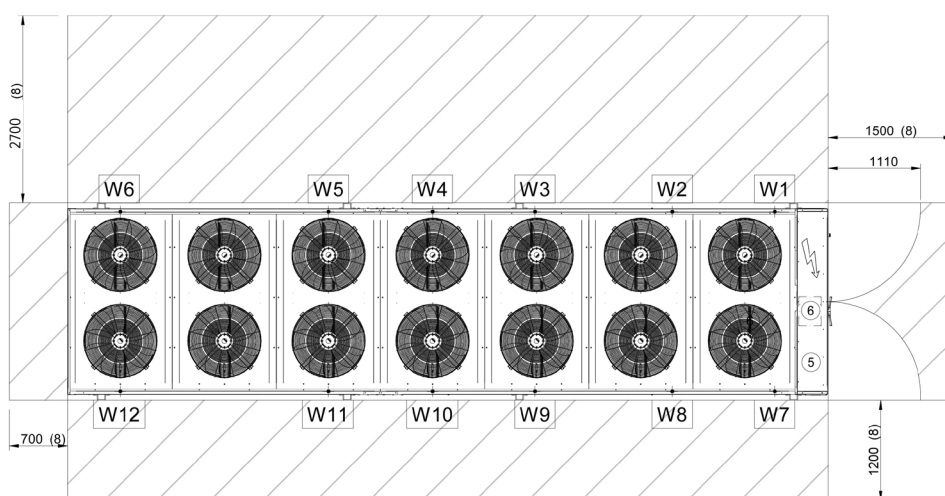
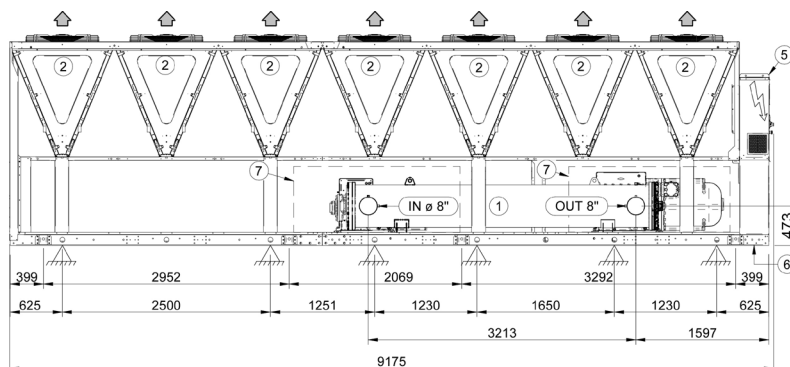
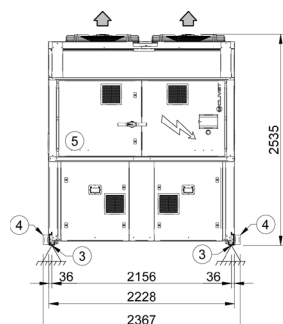
GRANDEZZE		240.1 EXC	
		ST	SC/EN
Length	mm	6675	6675
Depth	mm	2228	2228
Height	mm	2535	2535
W1 Supporting point	kg	764	835
W2 Supporting point	kg	1011	1143
W3 Supporting point	kg	367	347
W4 Supporting point	kg	205	212
W5 Supporting point	kg	527	551
W6 Supporting point	kg	903	948
W7 Supporting point	kg	658	651
W8 Supporting point	kg	161	164
Operating weight	kg	4595	4850
Shipping weight	kg	4247	4502

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 340.2 - EXCELLENCE

DAAF50012_00
DATA/DATE 20/05/2020



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

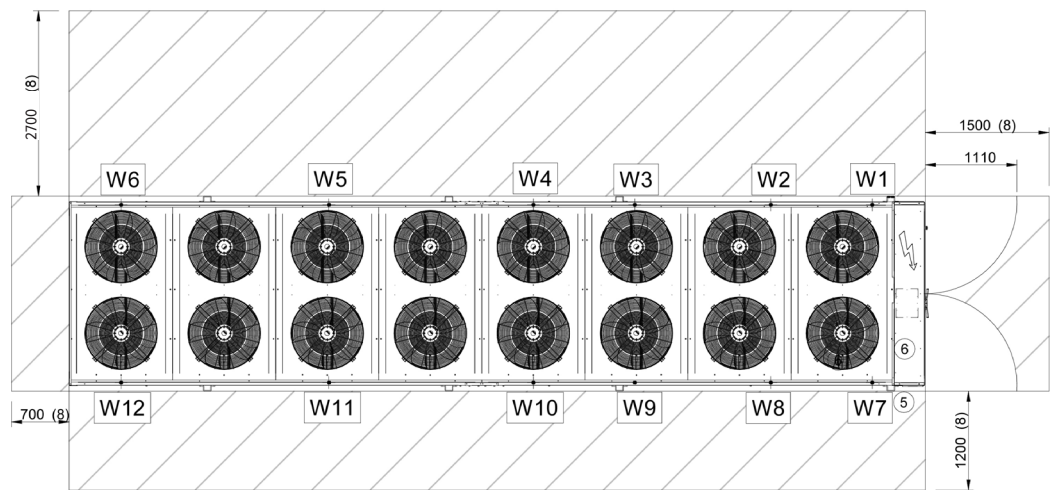
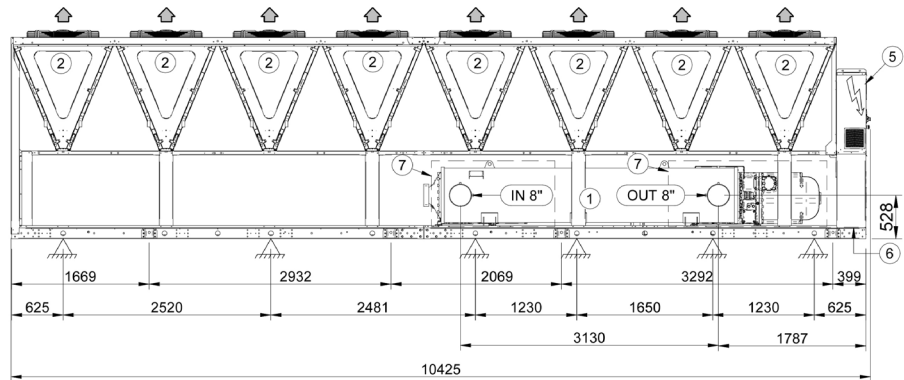
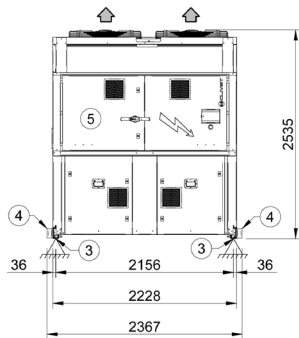
5. Electrical panel
6. Power input
7. Sound proof enclosure, only SC and EN version
8. Clearance access recommended

SIZE		340.2	
		ST	SC/EN
Length	mm	9175	9175
Depth	mm	2228	2228
Height	mm	2535	2535
W1 Supporting point	kg	689	729
W2 Supporting point	kg	1004	1168
W3 Supporting point	kg	322	307
W4 Supporting point	kg	815	978
W5 Supporting point	kg	308	303
W6 Supporting point	kg	298	298
W7 Supporting point	kg	552	566
W8 Supporting point	kg	885	942
W9 Supporting point	kg	469	464
W10 Supporting point	kg	745	795
W11 Supporting point	kg	297	295
W12 Supporting point	kg	298	299
Operating weight	kg	6683	7143
Shipping weight	kg	6109	6569

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

SIZE 360.2 - 400.2 - EXCELLENCE

DAAF50017_00
DATA/DATE 25/06/2020



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

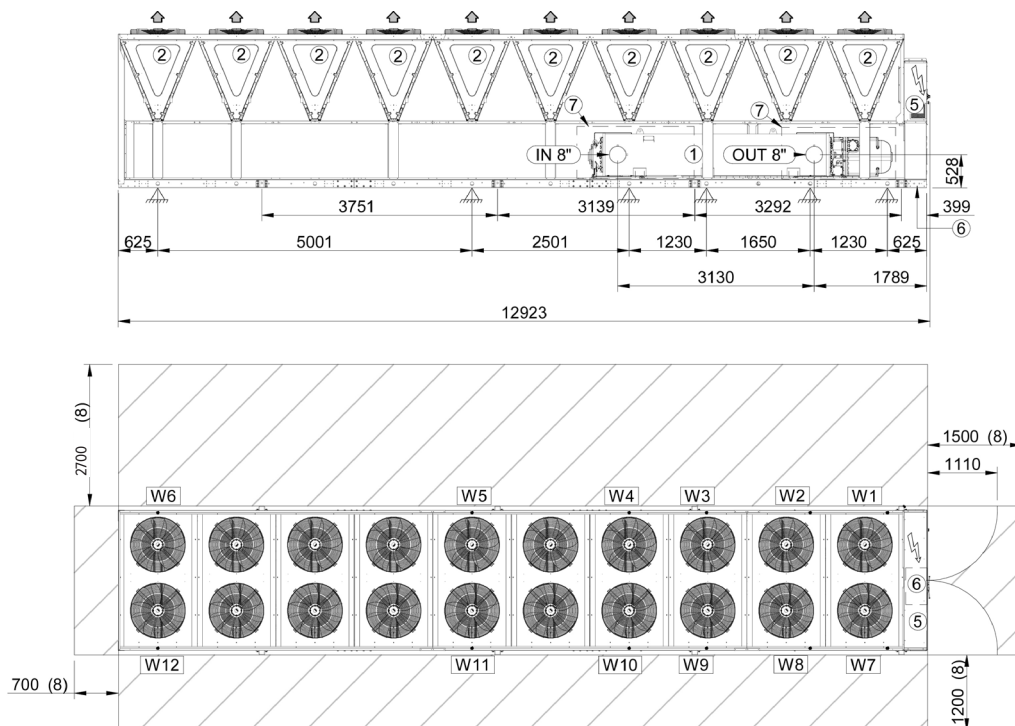
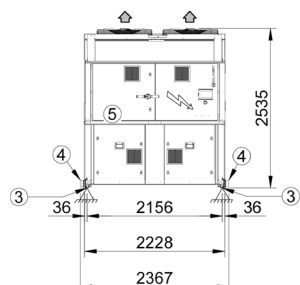
SIZE		360.2		400.2		440.2	
		ST	SC/EN	ST	SC/EN	ST	SC/EN
Length	mm	10425	10425	10425	10425	10425	10425
Depth	mm	2228	2228	2228	2228	2228	2228
Height	mm	2535	2535	2535	2535	2535	2535
W1 Supporting point	kg	669	709	670	710	670	710
W2 Supporting point	kg	993	1157	994	1158	995	1159
W3 Supporting point	kg	485	472	487	474	487	474
W4 Supporting point	kg	992	1150	993	1151	994	1152
W5 Supporting point	kg	382	379	383	381	384	382
W6 Supporting point	kg	276	276	277	277	277	277
W7 Supporting point	kg	510	524	511	525	511	525
W8 Supporting point	kg	867	924	870	926	871	927
W9 Supporting point	kg	983	978	986	981	987	983
W10 Supporting point	kg	951	999	953	1001	954	1003
W11 Supporting point	kg	383	383	385	384	386	385
W12 Supporting point	kg	275	275	276	276	277	277
Operating weight	kg	7766	8226	7785	8245	7793	8253
Shipping weight	kg	6794	7254	6831	7291	6863	7323

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 480.2 - 540.2 - 580.2 - EXCELLENCE

DAAF50007_00
DATA/DATE 12/05/2020



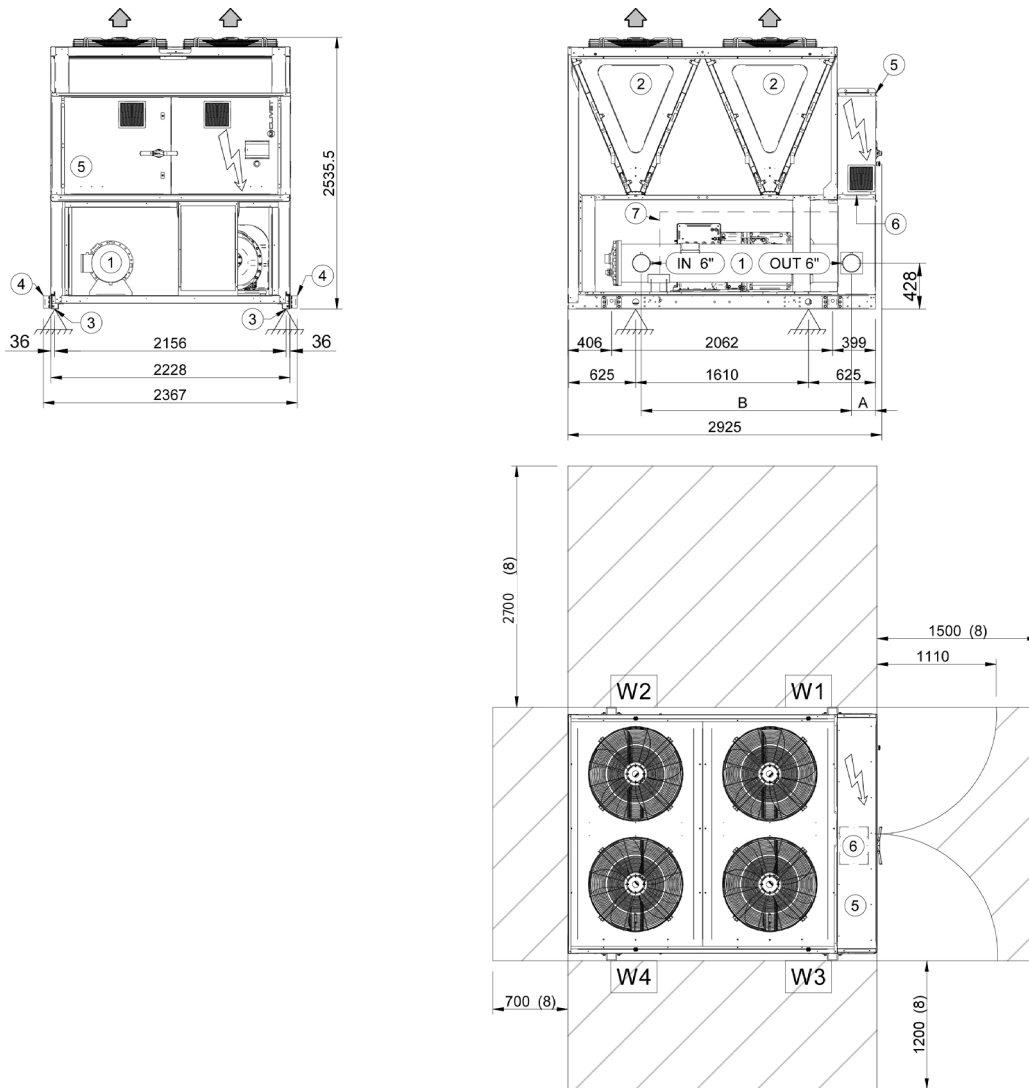
- 1. Internal exchanger (evaporator)
- 2. External exchanger (condenser)
- 3. Unit fixing holes
- 4. Lifting brackets (removable)
- 5. Electrical panel
- 6. Power input
- 7. Sound proof enclosure, only SC and EN version
- 8. Clearance access recommended

SIZE		480.2		540.2		580.2	
		ST	SC/EN	ST	SC/EN	ST	SC/EN
Length	mm	12923	12923	12923	12923	12923	12923
Depth	mm	2228	2228	2228	2228	2228	2228
Height	mm	2535	2535	2535	2535	2535	2535
W1 Supporting point	kg	663	703	664	704	664	704
W2 Supporting point	kg	1072	1236	1073	1237	1073	1237
W3 Supporting point	kg	662	645	663	646	663	646
W4 Supporting point	kg	1136	1330	1137	1331	1137	1331
W5 Supporting point	kg	743	742	745	744	745	744
W6 Supporting point	kg	419	419	420	420	420	420
W7 Supporting point	kg	507	520	507	521	507	521
W8 Supporting point	kg	937	994	939	996	939	996
W9 Supporting point	kg	1145	1140	1148	1142	1148	1142
W10 Supporting point	kg	888	955	890	956	890	956
W11 Supporting point	kg	743	743	745	745	745	745
W12 Supporting point	kg	419	419	420	420	420	420
Operating weight	kg	9335	9845	9350	9860	9350	9860
Shipping weight	kg	8361	8871	8421	8931	8376	8886

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

SIZE 120.1 - 160.1 - PREMIUM

DAAF50004_00
DATA/DATE 21/05/2020



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

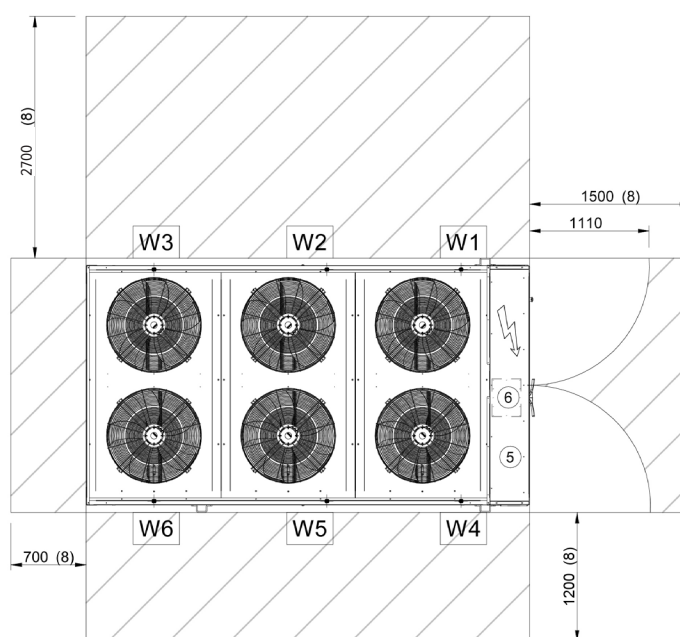
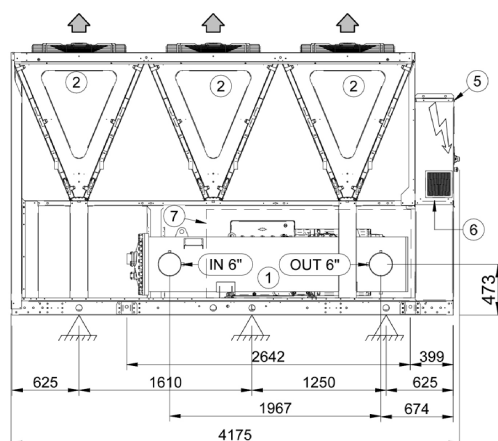
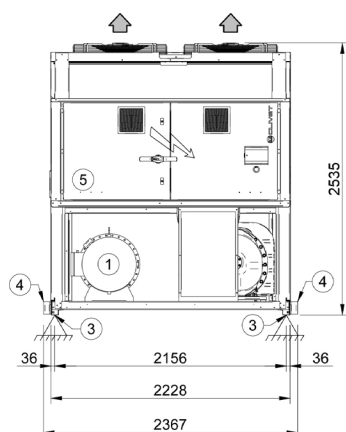
SIZE		120.1		160.1	
		ST	SC/EN	ST	SC/EN
Length	mm	2925	2925	2925	2925
Depth	mm	2228	2228	2228	2228
Height	mm	2535	2535	2535	2535
W1 Supporting point	kg	745	815	769	838
W2 Supporting point	kg	605	670	626	691
W3 Supporting point	kg	713	751	752	790
W4 Supporting point	kg	574	606	610	643
Operating weight	kg	2637	2842	2757	2962
Shipping weight	kg	2459	2664	2515	2720

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 - PREMIUM

DAAF50014_00
DATA/DATE 21/05/2020



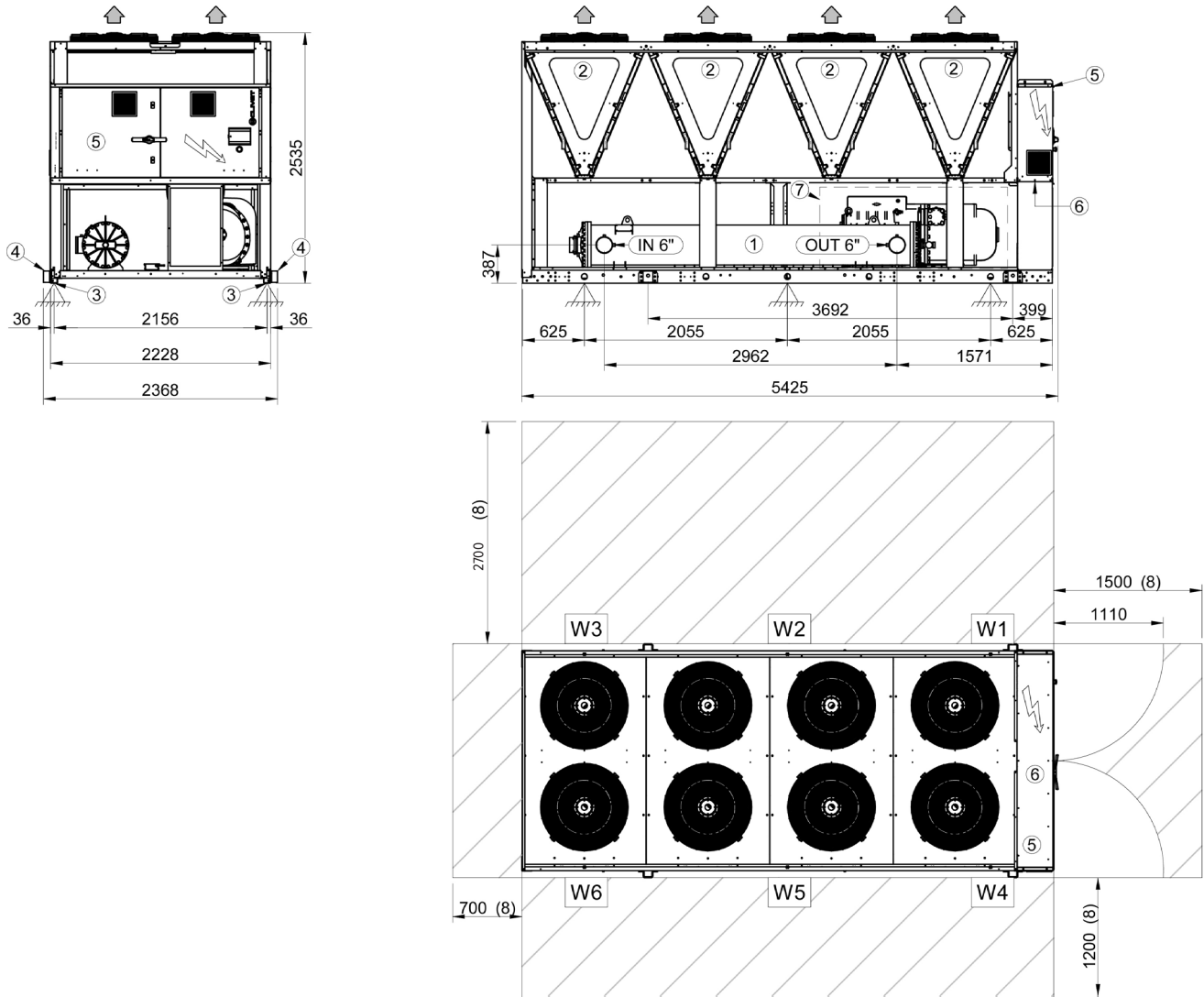
1. Internal exchanger (evaporator)
2. External exchanger (condenser)
3. Unit fixing holes
4. Lifting brackets (removable)
5. Electrical panel
6. Power input
7. Sound proof enclosure, only SC and EN version
8. Clearance access recommended

SIZE		200.1	
		ST	SC/EN
Length	mm	4175	4175
Depth	mm	2228	2228
Height	mm	2535	2535
W1 Supporting point	kg	700	734
W2 Supporting point	kg	1050	1178
W3 Supporting point	kg	250	240
W4 Supporting point	kg	648	659
W5 Supporting point	kg	934	977
W6 Supporting point	kg	291	288
Operating weight	kg	3872	4077
Shipping weight	kg	3480	3685

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

SIZE 240.1 - PREMIUM

DAAF50009_00
DATA/DATE 15/05/2020



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

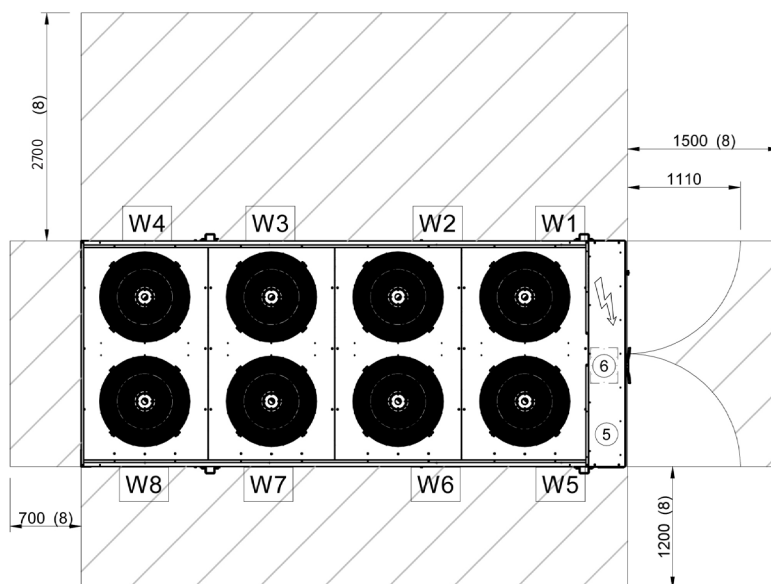
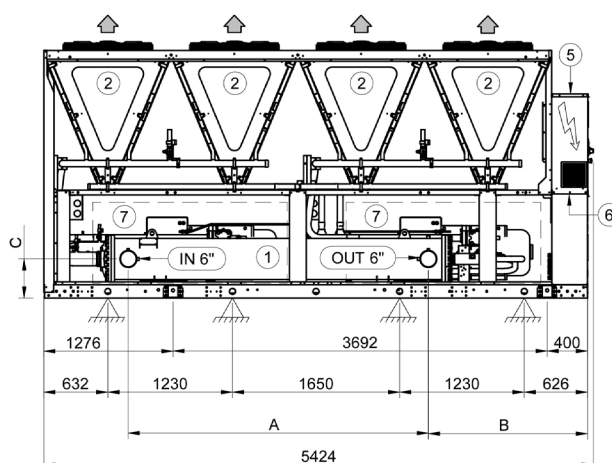
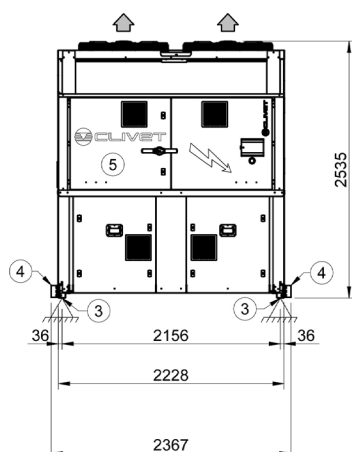
SIZE		240.1	
		ST	SC/EN
Length	mm	5425	5425
Depth	mm	2228	2228
Height	mm	2535	2535
W1 Supporting point	kg	913	1006
W2 Supporting point	kg	944	1058
W3 Supporting point	kg	289	272
W4 Supporting point	kg	645	677
W5 Supporting point		881	920
W6 Supporting point		492	486
Operating weight	kg	4164	4419
Shipping weight	kg	3844	4099

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 - PREMIUM

DAAF50013_00
DATA/DATE 16/04/2020



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

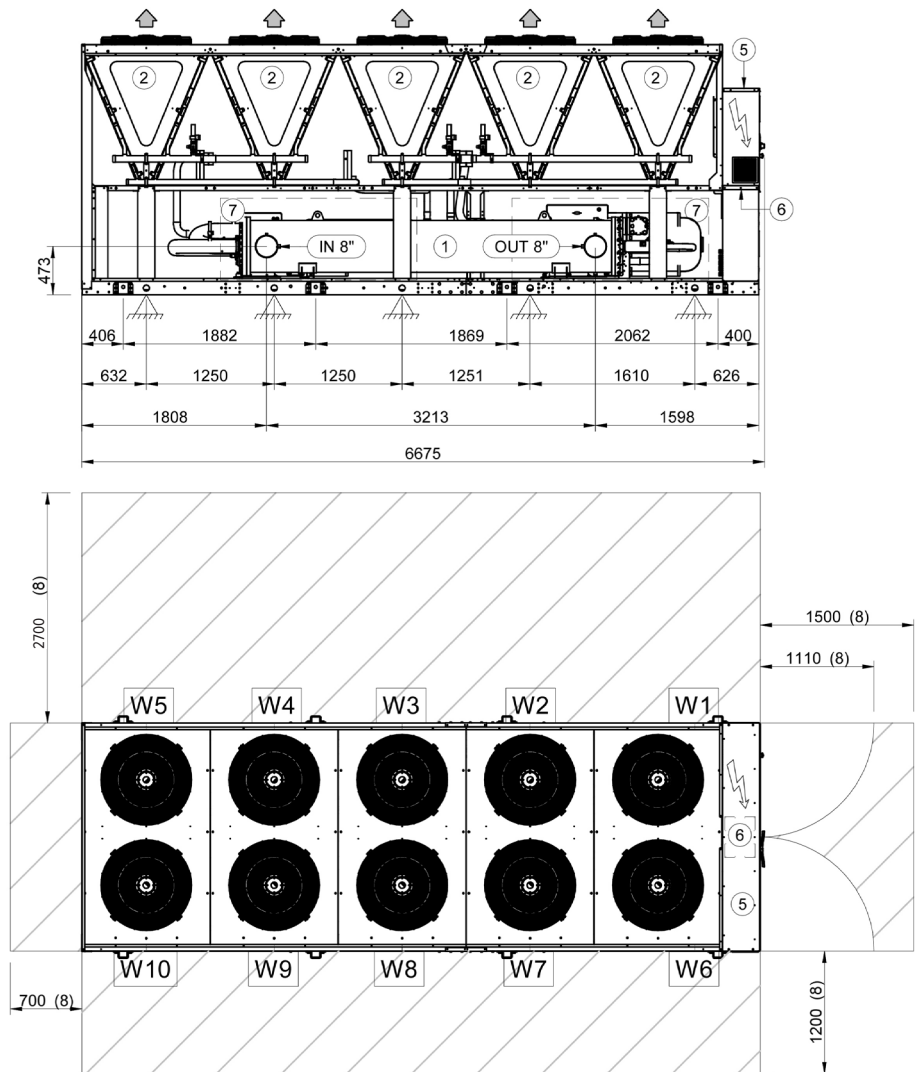
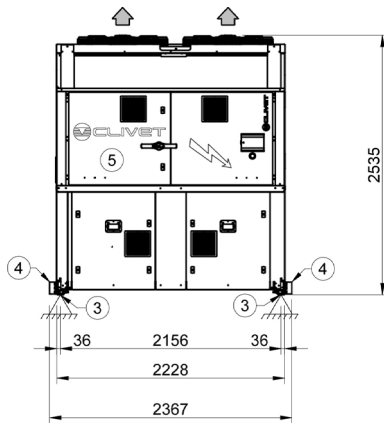
5. Electrical panel
6. Power input
7. Sound proof enclosure, only SC and EN version
8. Clearance access recommended

SIZE		250.2		280.2		320.2	
		ST	SC/EN	ST	SC/EN	ST	SC/EN
Length	mm	5424	5424	5424	5424	5424	5424
Depth	mm	2228	2228	2228	2228	2228	2228
Height	mm	2535	2535	2535	2535	2535	2535
W1 Supporting point	kg	683	742	683	743	683	742
W2 Supporting point	kg	622	721	622	721	673	772
W3 Supporting point	kg	777	895	778	895	817	934
W4 Supporting point	kg	380	419	381	419	409	447
W5 Supporting point	kg	584	602	585	603	580	598
W6 Supporting point	kg	585	615	586	616	733	763
W7 Supporting point	kg	663	699	664	700	776	812
W8 Supporting point	kg	444	456	445	457	525	537
Operating weight	kg	4738	5149	4744	5154	5196	5605
Shipping weight	kg	4449	4859	4464	4874	4694	5104

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

SIZE 340.2 - PREMIUM

DAAF50002_00
DATA/DATE 22/04/2020



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

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

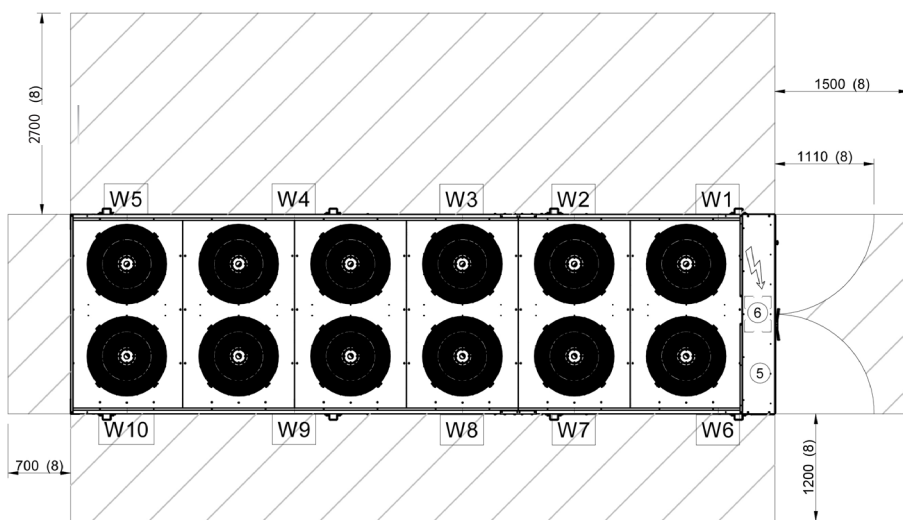
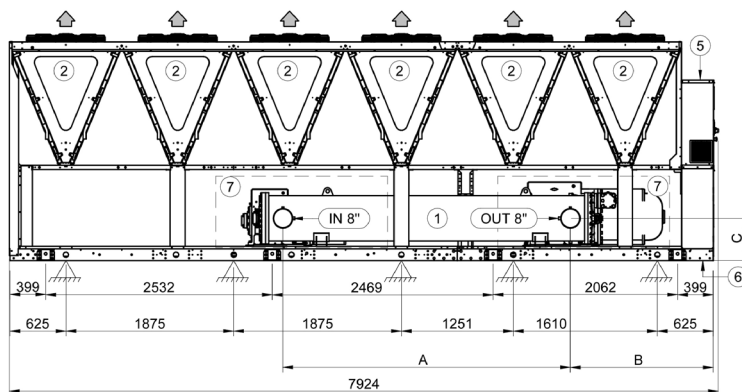
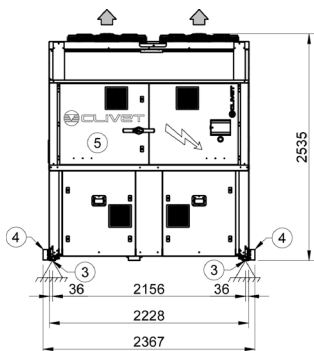
SIZE		340.2	
		ST	SC/EN
Length	mm	6675	6675
Depth	mm	2228	2228
Height	mm	2535	2535
W1 Supporting point	kg	843	909
W2 Supporting point	kg	1041	1196
W3 Supporting point	kg	172	144
W4 Supporting point	kg	923	1084
W5 Supporting point	kg	178	169
W6 Supporting point	kg	706	728
W7 Supporting point	kg	913	966
W8 Supporting point	kg	261	250
W9 Supporting point	kg	891	940
W10 Supporting point	kg	179	176
Operating weight	kg	6107	6562
Shipping weight	kg	5612	6072

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 - 440.2 - PREMIUM

DATA/DATE 23/04/2020



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

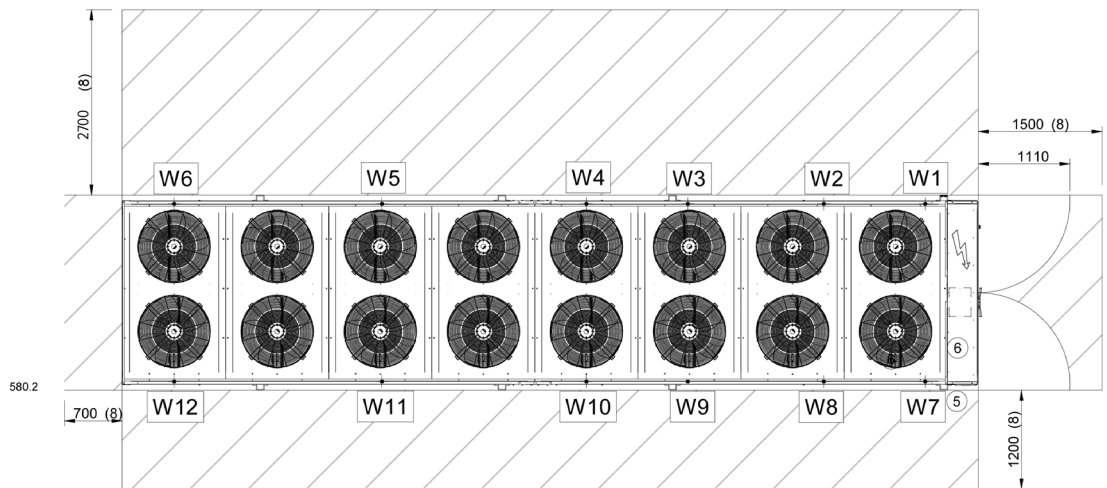
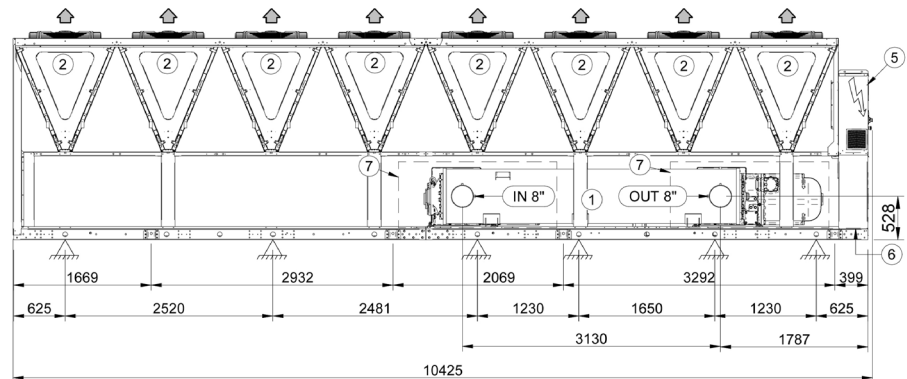
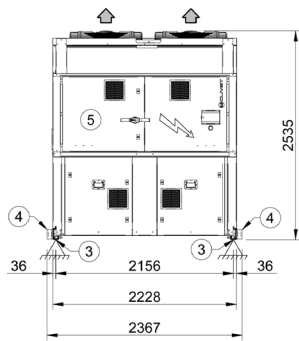
SIZE		360.2		400.2		440.2	
		ST	SC/EN	ST	SC/EN	ST	SC/EN
Length	mm	7924	7924	7924	7924	7924	7924
Depth	mm	2228	2228	2228	2228	2228	2228
Height	mm	2535	2535	2535	2535	2535	2535
W1 Supporting point	kg	927	1012	927	1012	849	918
W2 Supporting point	kg	996	1117	995	1116	918	1052
W3 Supporting point	kg	760	856	766	862	705	743
W4 Supporting point	kg	402	453	403	454	825	940
W5 Supporting point	kg	218	212	218	212	208	195
W6 Supporting point	kg	779	808	779	808	660	684
W7 Supporting point	kg	946	988	946	988	835	881
W8 Supporting point	kg	848	875	850	877	1170	1183
W9 Supporting point	kg	346	362	347	363	808	847
W10 Supporting point	kg	225	223	225	223	210	205
Operating weight	kg	6447	6906	6456	6915	7189	7649
Shipping weight	kg	5927	6387	5937	6397	6207	6667

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 480.2 - 540.2 - 580.2 - PREMIUM

DAAF50015_00
DATA/DATE 26/05/2020



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

SIZE		480.2		540.2		580.2	
		ST	SC/EN	ST	SC/EN	ST	SC/EN
Length	mm	10425	10425	10425	10425	10425	10425
Depth	mm	2228	2228	2228	2228	2228	2228
Height	mm	2535	2535	2535	2535	2535	2535
W1 Supporting point	kg	674	713	674	714	674	714
W2 Supporting point	kg	1003	1167	1004	1168	1005	1169
W3 Supporting point	kg	477	459	478	460	479	462
W4 Supporting point	kg	1317	1511	1318	1512	1320	1513
W5 Supporting point	kg	400	399	401	400	402	401
W6 Supporting point	kg	282	282	283	283	283	284
W7 Supporting point	kg	516	529	516	530	516	530
W8 Supporting point	kg	874	930	876	932	878	934
W9 Supporting point	kg	984	978	986	980	989	983
W10 Supporting point	kg	1079	1145	1081	1147	1083	1149
W11 Supporting point	kg	400	400	401	401	402	402
W12 Supporting point	kg	282	282	283	283	283	283
Operating weight	kg	8287	8797	8300	8810	8314	8824
Shipping weight	kg	7342	7852	7382	7892	7414	7924

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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