

WDAT-iL3 250.2-580.2

High efficiency air-cooled liquid chiller air-cooled for outdoor installation



Dear Customer,

We congratulate you on choosing this product

For many years Clivet has been offering systems that provide maximum comfort, together with high reliability, efficiency, quality and safety.

The aim of the company is to offer advanced systems, that assure the best comfort, reduce energy consumption and the installation and maintenance cost for the life cycle of the system.

The purpose of this manual is to provide you with information that is useful from reception of the equipment, through installation, operational usage and finally disposal so that this advanced system offers the best solution.

Yours faithfully,

CLIVET Spa

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1 General description

1.1 Manual

The manual provides correct unit installation, use and maintenance.

Pay particular attention to:



Warning, identifies particularly important operations or information.



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

- It is advisable to read it carefully so you will save time during operations.
- Follow the written indications so you will not cause damages to things and injuries people.

1.2 Preliminaries

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

1.3 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.

1.4 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.

1.5 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.

1.6 Maintenance

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



Turn the unit off before any operation.

1.7 Modification



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

1.8 Breakdown/Malfuction

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
- may increase time and repair costs

1.9 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

1.10 Data update

Continual product improvements may imply manual data changes.

Visit manufacturer web site for updated data.

1.11 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

1.12 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

Type of refrigerant: R134A

1.13 Serial number

It identifies uniquely each unit.

Must be quoted when ordering spare parts.

1.14 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
Electrical wiring diagram

2 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.



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

2.1 Storage

Observe external packaging instructions.

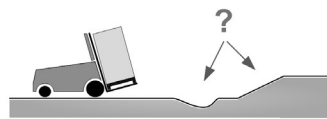
2.2 Handling

1. Verify unit weight and handling equipment lifting capacity.
2. Identify critical points during handling (disconnected routes, flights, steps, doors).
3. Suitably protect the unit to prevent damage.
4. lifting brackets
5. Lifting with balance
6. Lifting with spacer bar
7. Align the barycenter to the lifting point
8. Use all the lifting brackets (see the dimensional section)
9. Gradually bring the lifting belts under tension, making sure they are positioned correctly.
10. Before starting the handling, make sure that the unit is stable.

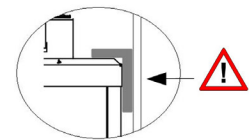
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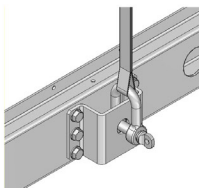
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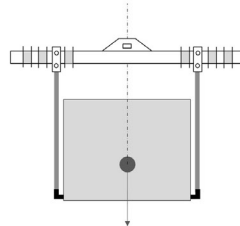
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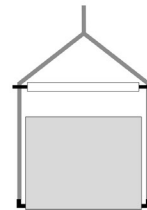
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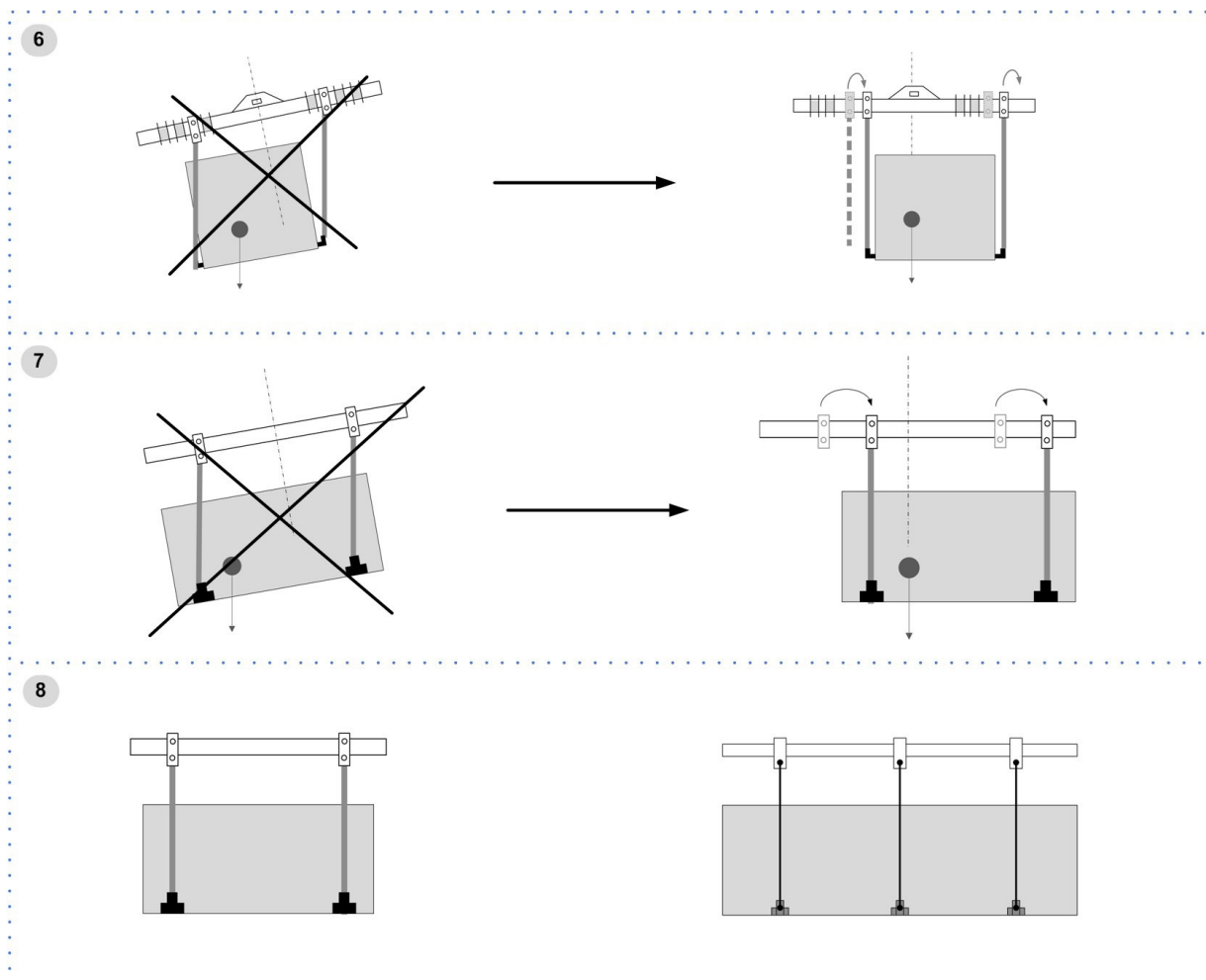


5



6





2.3 Packaging removing

Be careful not to damage the unit.

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

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

3 Positioning

During positioning consider these elements:

- Technical spaces requested by the unit
- Electrical connections
- Water connections
- Spaces for air exhaust and intake

3.1 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 DIMENSIONS section.

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

3.2 Positioning



Units are designed to be installed:

- EXTERNAL
- in fixed positions

Limit vibration transmission:

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

Choose the installation place according to the following criteria:

- Customer approval
- safe accessible position
- technical spaces requested by the unit
- spaces for the air intake/exhaust
- max. distance allowed by the electrical connections
- avoid installations in places subject to flooding
- verify unit weight and bearing point capacity
- verify that all bearing points are aligned and leveled
- install the unit raised from the ground
- consider the maximum possible snow level

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

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



Avoid therefore:

- obstacles to the airflow
- difficulty of exchange
- leaves or other foreign bodies that can obstruct the air coil
- 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)
- incorrect positioning, close to very high walls, attics or in angles that could give rise to stratification or recirculation phenomenons

Ignoring the previous indications could:

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

3.3 Safety valve gas side

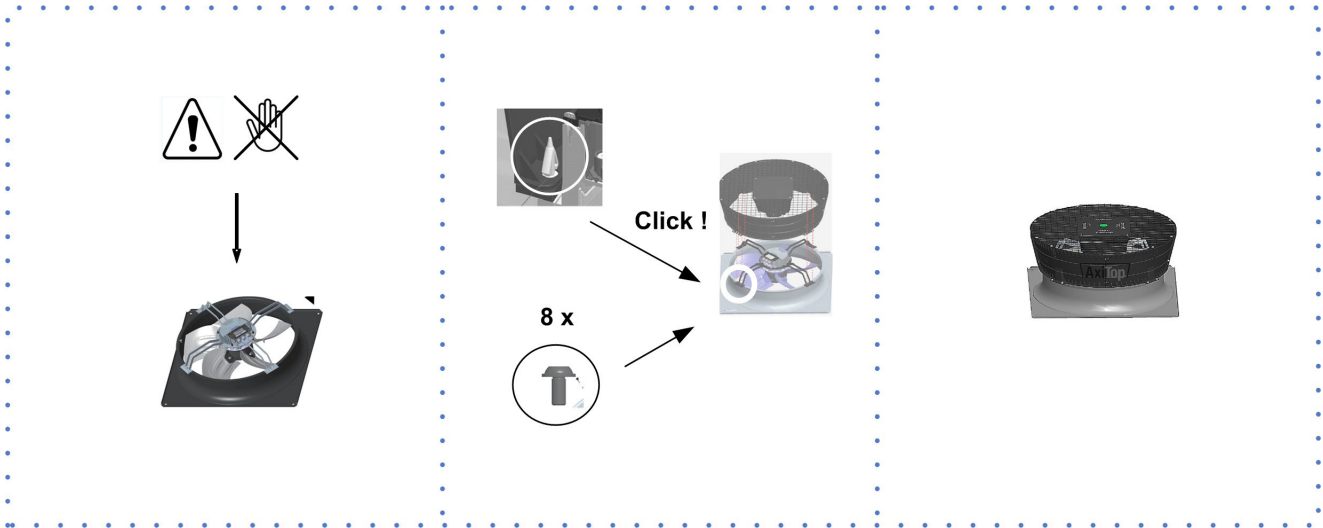
The installer is responsible for evaluating the opportunity of installing drain tubes, in conformity with the local regulations in force (EN 378).

3.4 Antivibration

For details see:

9.1 Anti-vibration mount support p. 40

3.5 AxiTop



4 Water connections

4.1 Water quality

Water features

- confirming to local regulations
- total hardness < 14°fr
- within the limits indicated by table

The water quality must be checked by qualified personnel.

Water with inadequate characteristics can cause:

- pressure drop increase
- reduces energy efficiency
- increased corrosion potential

Acceptable water quality values:

ACCEPTABLE WATER QUALITY LIMITS					
PH (25°C)		6.8 - 8.0	Iron	mg Fe/l	<1.0
Electrical conductivity	µS/cm 25°C	< 800	Copper	mg Cu/l	<1.0
Chloride ion	mg Cl ⁻ /l	<150	Sulphide ion	S ⁻⁻ /l	none
Chlorine molecular	mg Cl ₂ /l	<5	Ammonium ion	mg NH ₄ ⁺ /l	<1.0
Sulphate ion	mg SO ₄ ⁻⁻ /l	<100	Silica	mg SiO ₂ /l	<50
Alkalinity (mg CaCO ₃ /l)	mg CaCO ₃ /l	<100	Total dissolved solids	mg/l	<1500
Total Hardness	mg CaCO ₃ /l	<200	Max Ethylene, Propylene glycol		75%

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

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

4.2 Risk of freezing

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

- mix water with glycol, or
- safeguard the pipes with heating cables placed under the insulation, or
- empty the system in cases of long non-use

4.3 Anti-freeze solution

The use of an anti-freeze solution results in an increase in pressure drop.



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



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

4.4 Water flow-rate

The project water-flow must be:

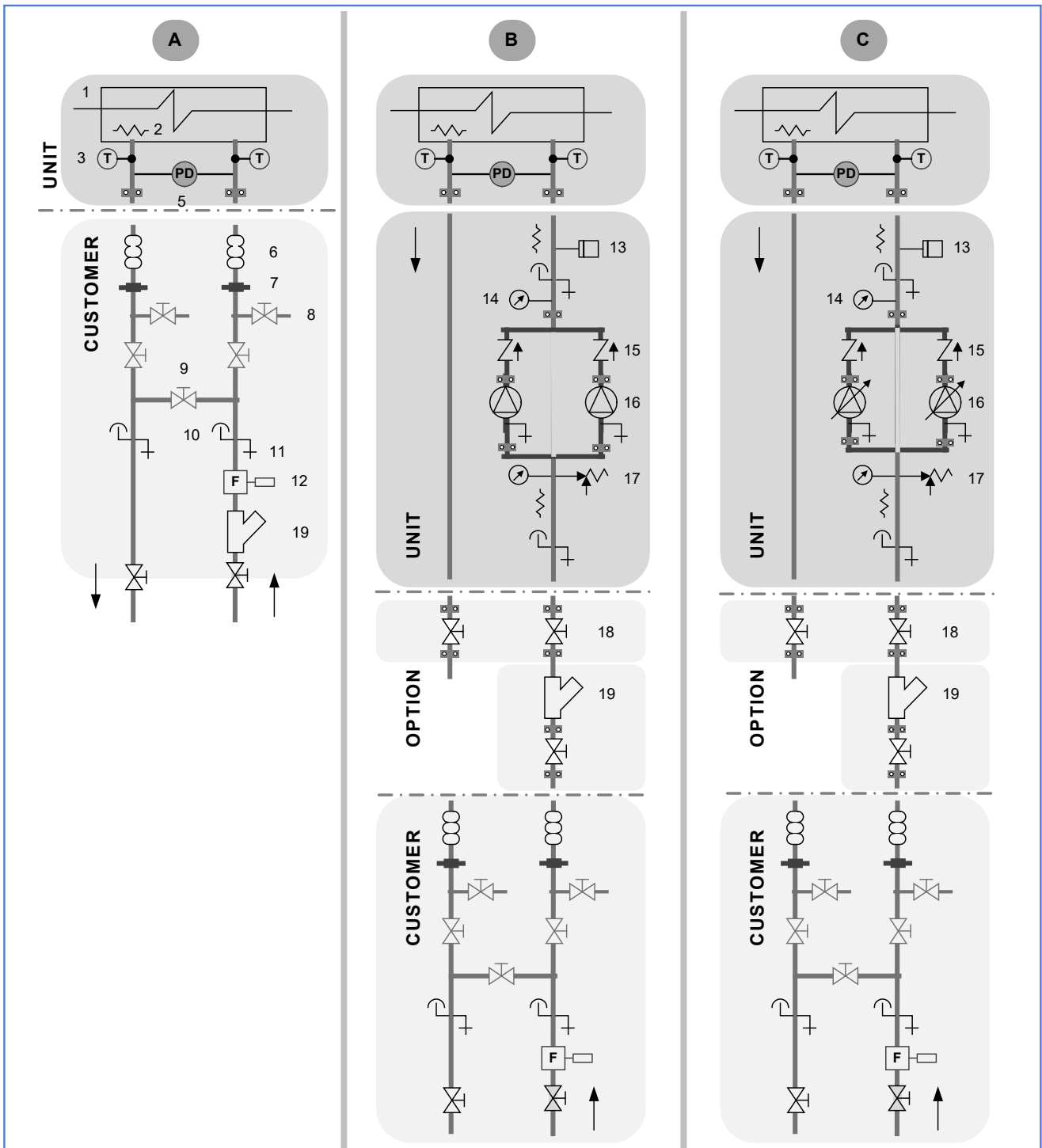
- inside the exchanger operating limits (see the TECHNICAL INFORMATION section)
- guarantee, also with variable system conditions (for example in systems where some circuits are bypassed in particular situations).

4.5 Minimum system water content

Minimum system water volumes are described within 'General technical data' section and they have to be satisfied to avoid continuous compressor switching on and off.

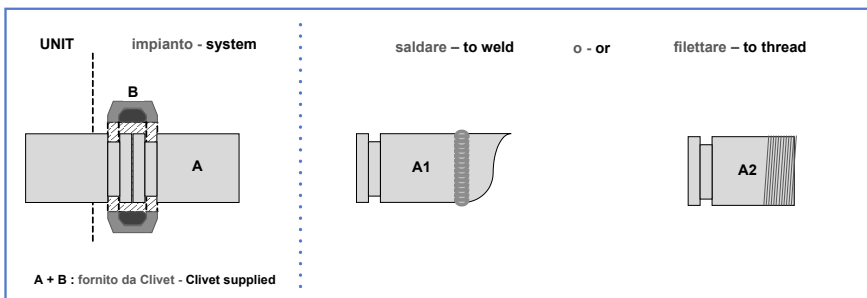
4.6 Recommended connection

- ⚠ The installer must define:
- component type
 - position in system
- Standard unit



- | | | | |
|----|------------------------------------|----|------------------------------------|
| 1 | exchanger | 11 | drain |
| 2 | anti-ice electric heater | 12 | Flow Switch |
| 3 | water temperature probe | 13 | System load safety pressure switch |
| 5 | differential pressure switch | 14 | pressure gauge |
| 6 | antivibration joints | 15 | non-return valve |
| 7 | piping support | 16 | Pump |
| 8 | exchanger chemical cleaning bypass | 17 | safety valve |
| 9 | Cleaning system bypass | 18 | shut-off valve |
| 10 | vent | 19 | filter |

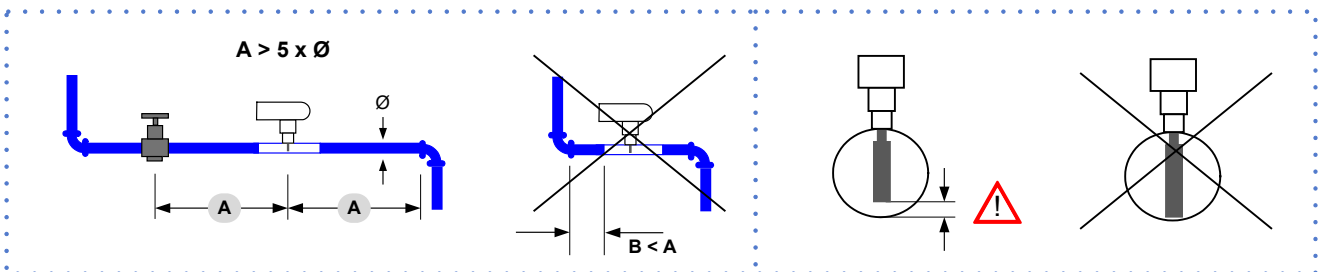
4.7 Hydraulic connections



- ⊘ Do not weld the system pipe with the Victaulic connection joint attached. The rubber gasket might be irreparably damaged.

4.8 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.



A. minimum distance

4.9 Water filter

- ⚠ Use a filter with 1,6 mm degree of filtration
- ⚠ It 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.

4.10 Operation sequence

Close all vent valves in the high points of the unit hydraulic circuit
Close all drain valves in the low points of the unit hydraulic circuit:

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

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

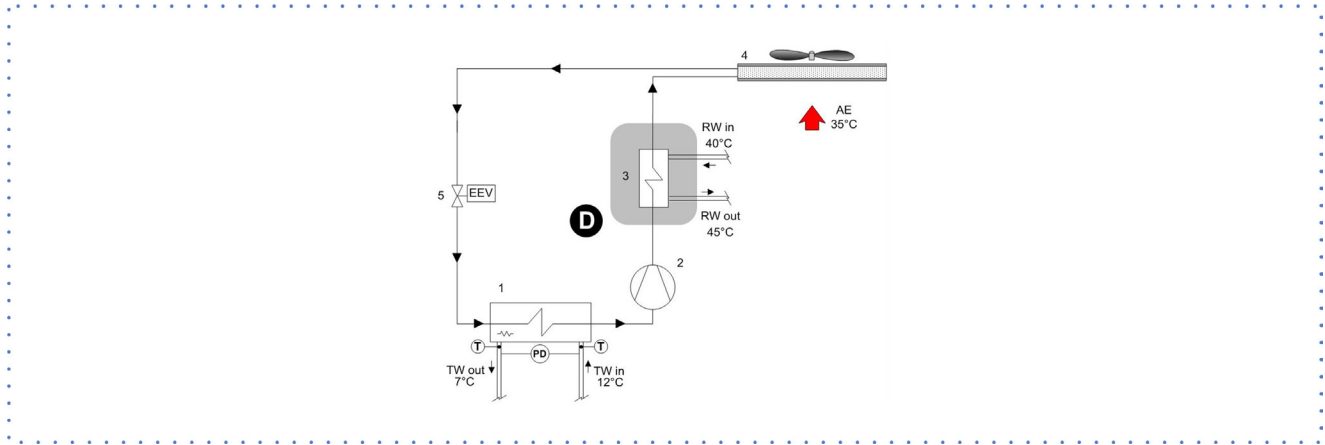
4.11 Partial energy recovery

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. Electronic expansion valve

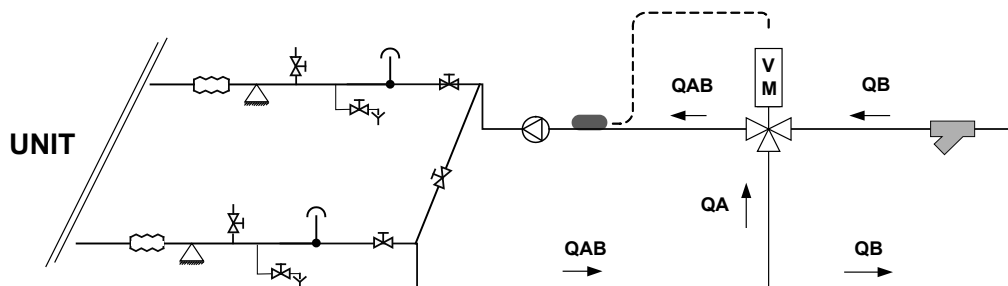
TW in chilled water inlet

TW out chilled water outlet

RW in - Recovery water inlet
RW out - Recovery water outlet

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.



5 Electrical connections

The characteristics of the electrical lines must be determined by qualified electrical 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 all short circuit current, the value must be determined in accordance with 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 qualifications required by the regulations in force and being informed about the risks relevant to these activities.

Operate in compliance with safety regulations in force.

5.1 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.

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

- Voltage
- 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.

5.2 Connections

1. Refer to the unit electrical diagram (the number of the diagram is shown on the serial number label).
2. Verify that the electrical supply has characteristics conforming to the data shown on the serial number label.
3. Before starting work, ensure the unit is isolated, unable to be turned on and a safety sign used.
4. Ensure correct earth connection.
5. Ensure cables are suitably protected.
6. Before powering up the unit, make sure that all the protections that were removed during the electrical connection work have been restored.

5.3 Signals / data lines

Do not exceed 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.

5.4 Power input



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

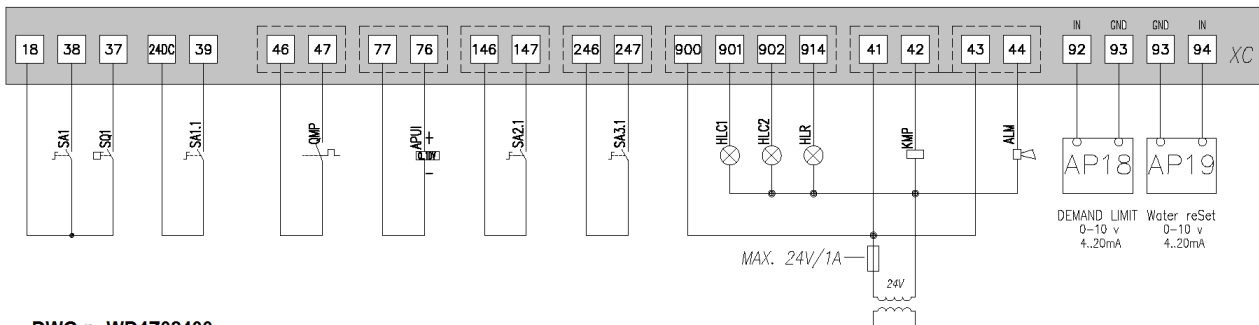


The cable must not touch the compressor and the refrigerant piping (they reach high temperatures).

5.5 Power supply cables section

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

5.6 Connections performer by customer



DWG n. WD4Z02400

HLC1-HLC2	lampada di segnalazione stato compressore compressor status signal lamp lampe de signalisation état compresseur Sighallampe Verdichtierzustand lámpara de señalización estado compresor
ALM	segnalazione blocco cumulativo cumulative fault signal signalisation alarme Sammelstörungmeldung señalización bloqueo cumulativo
HLR	Lampada di segnalazione allarme resistenza quadro elettrico Alarm signal lamp resistance electrical panel Signal d'alarme de résistance lampe du cabinet Alarm Signallampe Widerstand Schrank Señal de alarma de la lámpara de resistencia del gabinete
SA1	selettore on/off remoto remote on/off selector sélecteur ON/OFF déporté Fernwahlschalter Ein/Aus selector on/off remoto
SA1.1	selettore abilitazione seconda set-point second set-point enabling switch sélecteur validation deuxième consigne Wahlschalter 2. Sollwert selector habilitación segundo set-point
SA2.1	selettore remoto di abilitazione compressore remote compressor enabling selector sélecteur déporté de validation compresseur Fernwahlschalter Verdichterbetrieb selector remoto de habilitación compresor
SA3.1	selettore remoto di abilitazione compressore remote compressor enabling selector sélecteur déporté de validation compresseur Fernwahlschalter Verdichterbetrieb selector remoto de habilitación compresor

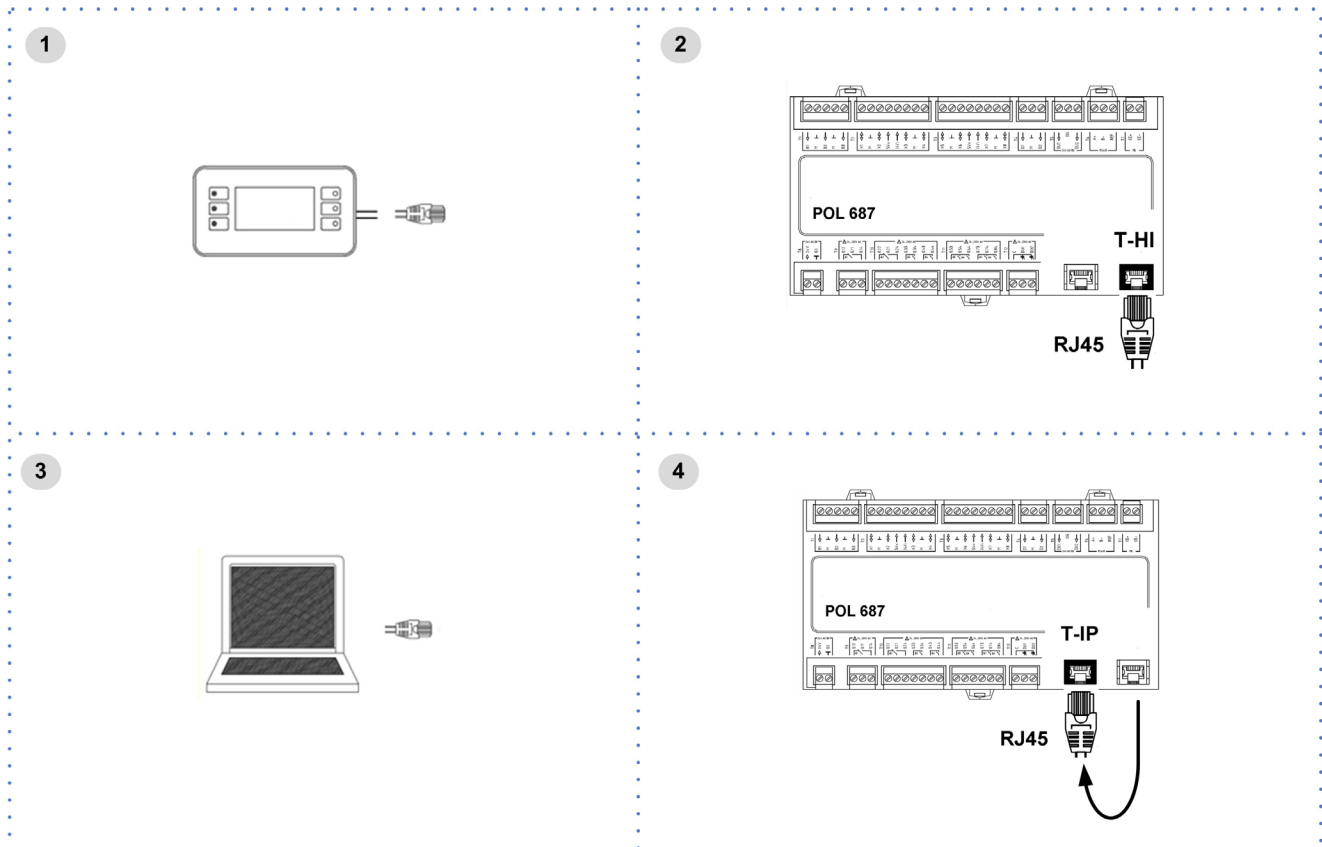
SQ1	flussstato flow switch contrôleur de débit Strömungswächter flujostato
QMP	interruttore automatico a protezione pompa ricircolo recirculation pump protection automatic device interrupteur automatique de protection pompe recirculation automatischer Schalterschutz der Umluftpumpe interruptor automático de protección bomba recirculación
KMP	contattore pompa di circolazione evaporatore evaporator pump contactor contacteur pompe de circulation évaporateur Schütz Kältewasserpumpe contactor bomba de circulación evaporador
APUI	Inverter pompe lato utilizzo Inverter side pumps use Pompes côté variateur utilisation Wechselrichter-Seite Pumpen Einsatz Inverter bombas lado uso
AP18	demand-limit demand-limit demand-limit demand-limit
AP19	Water reSet Water reSet Water reSet Water reSet

5.7 Remote ON-OFF

- ⊗ Do not perform short On Off cycles
- ⊗ Do not use the remote On Off with thermoregulation function.



5.8 Computer connection



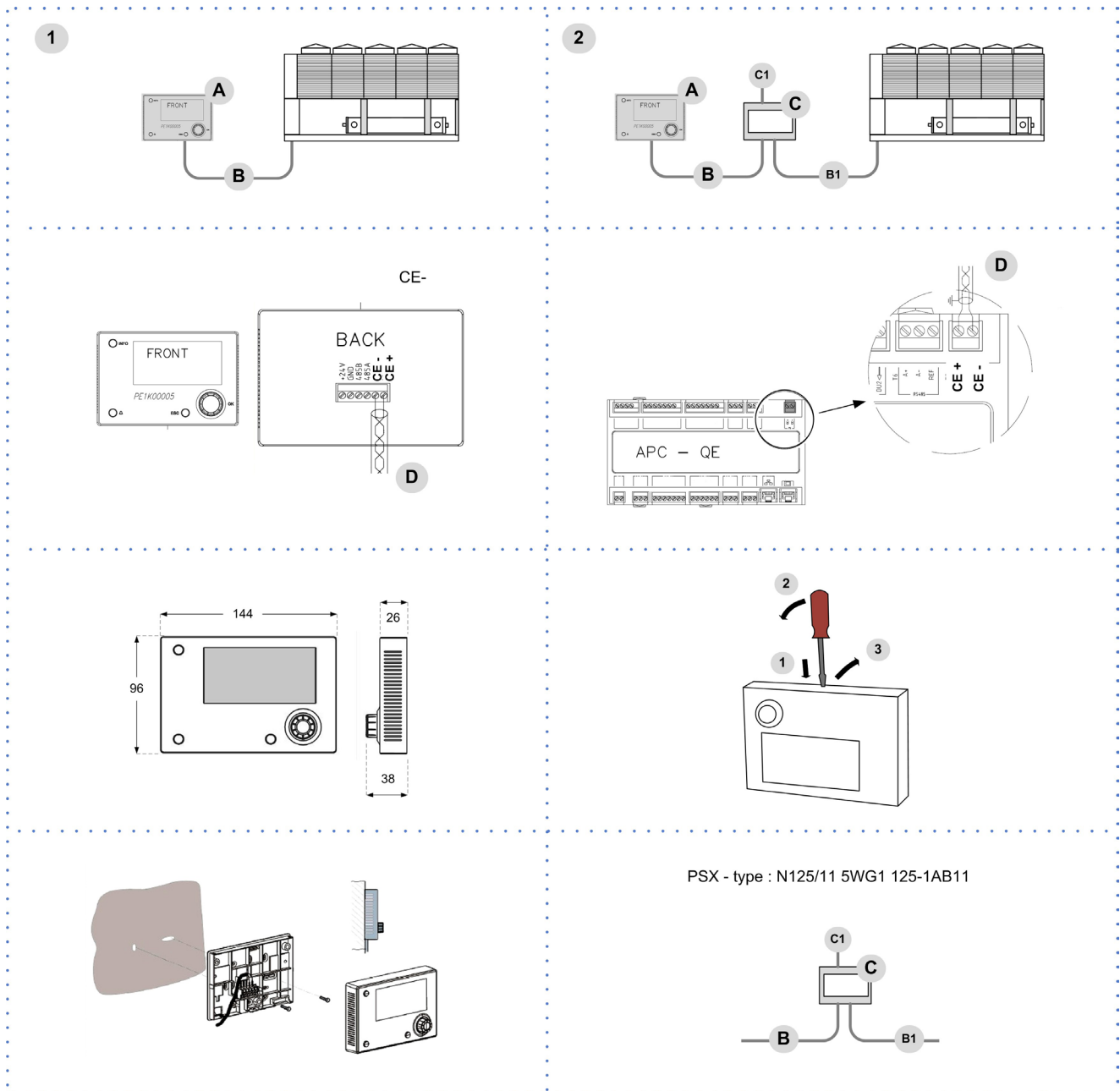
1. Service keypad
2. RJ45: standard connection
3. P.C.-not supplied
4. P.C. connection, shift RJ45 from T-HI to T-IP

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 (TCP) 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!

5.9 Remote control

Option

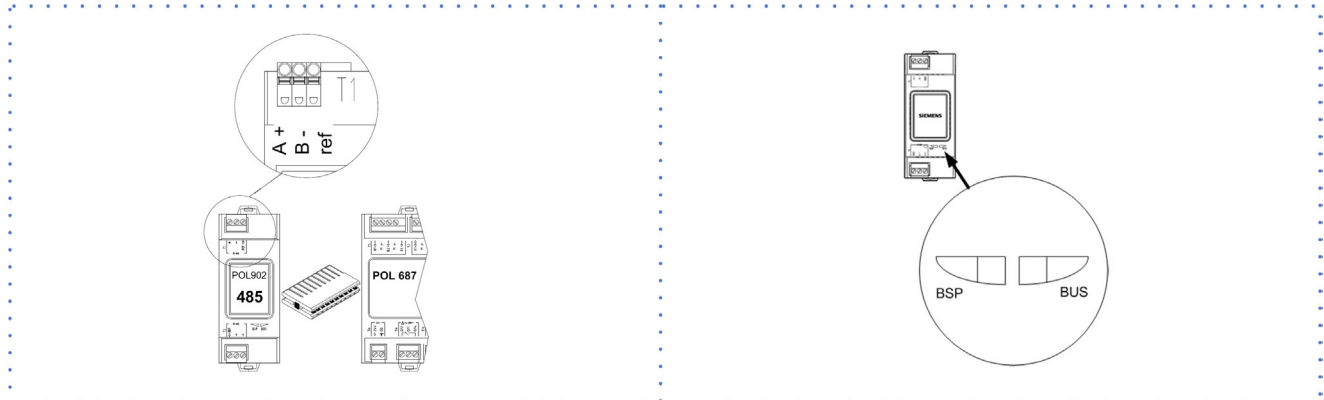


- 1 Distance up to 350 mt
- 2 Distance up to 700 mt

- A User interface
- B = B1 KNX bus, max 350 mt
twisted pair with shield, \varnothing 0,8 mm
EIB/KNX cable marking recommende
- C PSX - Mains power supply unit
pwer supply unit N125/11 5WG1 125-1AB11
- C1 AC 120...230V, 50...60Hz
- D KNX bus, max 350 mt

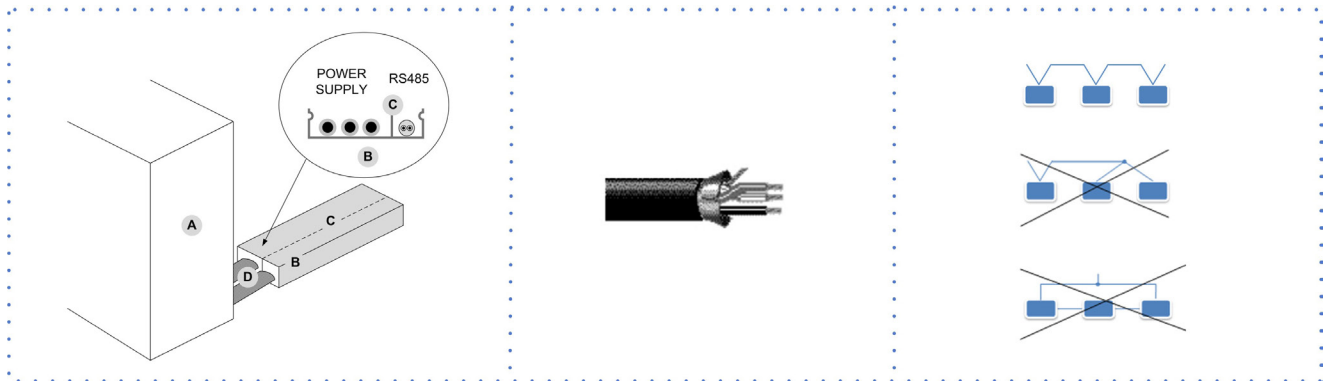
5.10 Modbus - RS485

Option



LED BSP
 green communication with AP1 module
 communication ok
 yellow software ok but communication with AP1 down
 red flashing: software error
 fixed: hardware error

LED BUS
 green communication with Modbus
 communication ok
 yellow startup / channel not communicating
 red communication down



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

Modbus / LonWorks / Cable requirements

Couple of conductors twisted and shielded

Section of conductor 0,22mm²...0,35mm²

Rated power between conductors $\leq 50 \text{ pF/m}$

Nominal impedance 120 Ω

Recommended cable BELDEN 3106A

- Every 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.

6 Start-up

6.1 General description

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

Upon request, the service centres performing the start-up.

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

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

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 isolated at the beginning
- the unit isolator is open, locked and equipped with the suitable warning
- make sure no tension is present



After turning off the power, 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.

6.2 Preliminary checks

For details refer to the different manual sections.

Unit OFF power supply

1. safety access
2. functional spaces
3. air flow: correct return and supply (no bypass, no stratification)
4. structure integrity
5. fans run freely
6. unit on vibration isolators
7. unit input water filter + shut-off valves for cleaning
8. vibration isolators on water connections
9. expansion tank (indicative volume = 5% system content)
10. Close all drain valves in the low points of the unit hydraulic circuit:
11. cleaned system
12. loaded system + possible glycol solution + corrosion inhibitor
13. system under pressure
14. vented system
15. fresh air probe
16. refrigerant circuit visual check
17. earthing connection
18. power supply features
19. electrical connections provided by the customer

6.3 Start-up sequence

For details refer to the different manual sections.

Unit ON power supply

1. compressor crankcase heaters operating at least since 8 hours
2. off-load voltage measure
3. phase sequence check
4. pump manual start-up and flow check
5. shut-off valve refrigerant circuit open
6. unit ON
7. load voltage measure and absorptions
8. liquid sight glass check (no bubbles)
9. check all fan operating
10. measure return and supply water temperature
11. measure super-heating and sub-cooling
12. check no anomalous vibrations are present
13. climatic curve personalization
14. climatic curve personalization
15. scheduling personalization
16. complete and available unit documentation

6.4 Refrigeration circuit

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

6.5 Water circuit

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

Weight of glycol (%)	10	20	30	40
Freezing temperature (°C)	-3.9	-8.9	-15.6	-23.4
Safety temperature (°C)	-1	-4	-10	-19

6.6 Electric Circuit



Verify that the unit is connected to the ground plant.

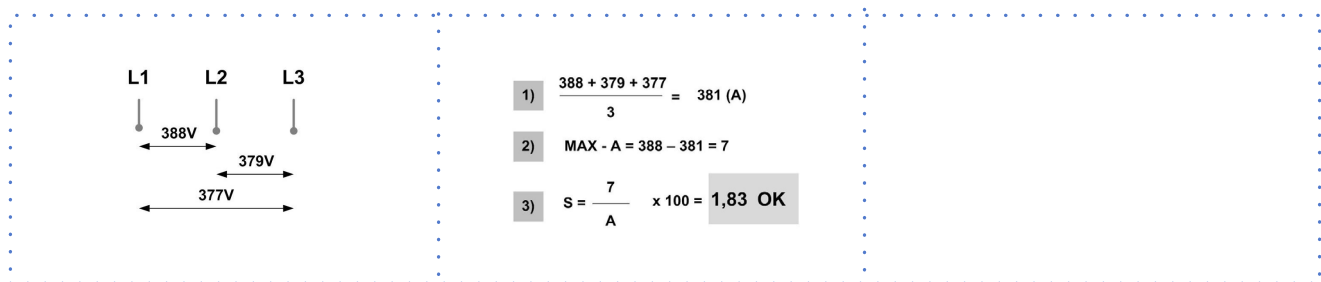
Check the conductors are tightened as: the vibrations caused by handling and transport might cause these to come loose.

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

Check the voltage and line frequency values which must be within the limits: 400/3/50 +/- 10%

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

Example



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

6.7 Compressor crankcase heaters

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

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



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

6.8 Voltages

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

Start-up the unit.

With unit operating in stable conditions, check:




- Voltage
- Total absorption of the unit
- Absorption of the single electric loads

6.9 Remote controls

Check that the remote controls (ON-OFF etc) are connected and, if necessary, enabled with the respective parameters as indicated in the “electrical connections” section.

Check that probes and optional components are connected and enabled with the respective parameters (“electrical connections” section and following pages).

6.10 Options

-  Menu accessible only after having entered the password.
-  Access reserved only to specifically trained personnel.
-  The parameter modification can cause irreversible damages.

Path: Main menu / Unit parameters / Options

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

6.11 Evaporator water flow-rate

Check that the difference between the temperature of exchanger return and supply water corresponds to power 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 table of the GENERAL TECHNICAL DATA included in this manual, referred to specific conditions, or in the tables on COOLING PERFORMANCE 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 exchanger input and output and compare it with the graph on WATER SIDE EXCHANGER PRESSURE DROPS

The measurement of pressure will be easier if pressure gauges are installed as indicated in the DIAGRAM OF SUGGESTED WATER CONNECTIONS.

6.12 Start-up report

Identifying the operating objective conditions is useful to control the unit over time.

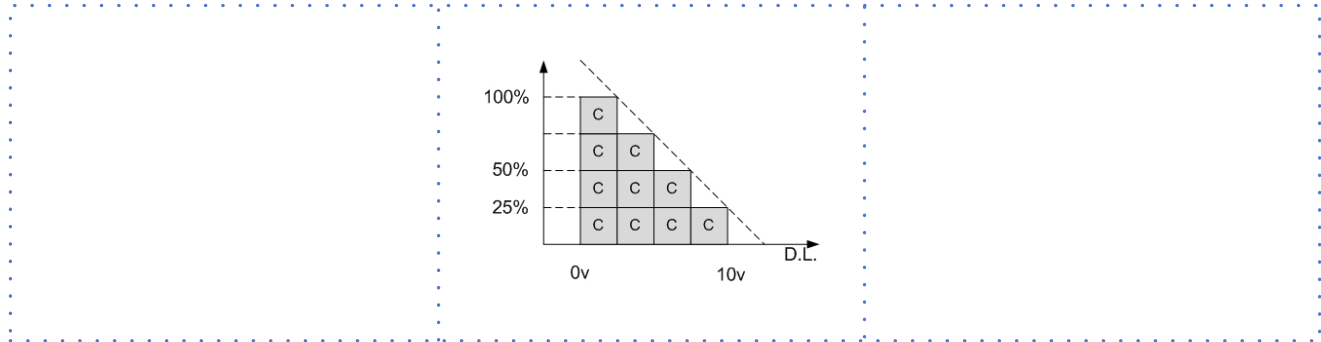
With unit at steady state, i.e. in stable and close-to-work conditions, identify the following data:

- 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
- temperature and pressures on the characteristic points of the refrigerating circuit (compressor discharge, liquid, intake)

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

6.13 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	Set Point	▼	✓	Set Point
6	Select	Demand limit	▼	✓	
7	Set	Demand limit	▲	▼	
8	Confirm		✓		
9	Press 3 sec.		🔊		
10	Select	Local connections	✓		

Path: Main menu / Unit parameters / Options

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

Path: Main Menu / Unit parameters / Setpoint

Parameters	Short description	description
P0009:	set demand limit	Parameter setting of the value % of demand limit

6.14 Climatic 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

Example



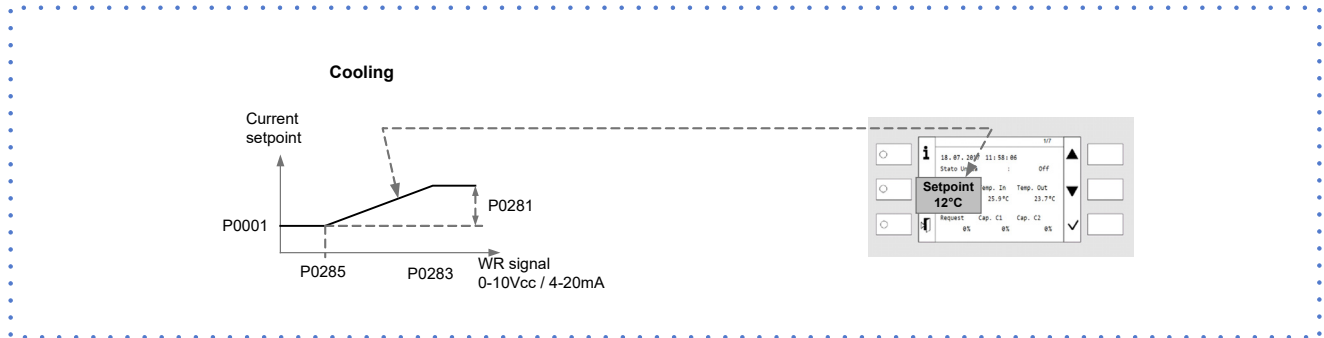
Step	Action	Menu/Variable	Keys		Display
1	Press 3 sec.		✓		Password
2	Set	Password	▲	✓	
3	Press		i		Main menu
4	Select	Unit parameters	▼	✓	Unit parameters
5	Select	Climatic TExt	▼	✓	Climatic TExt (pwd)
6	Select	Parameter	▼	✓	
7	Set		▼	▲	
8	Confirm		✓		
9	Press 3 sec.		🔊		
10	Select	Local connections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

Path: Main Menu / Unit parameters / Climatic TExt

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

6.15 Water reset

- ⚠ Menu accessible only after having entered the password.
- ⚠ Access reserved only to specifically trained personnel.
- ⚠ The parameter modification can cause irreversible damages.
It is possible to limit the absorbed electric power with an external signal 0-10 Vcc or 4-20mA.
The setpoint based on the climatic curve and the Water Reset is displayed on the display
Only if P0051: En WaterReset = 1
Path: Main menu / Unit parameters / Options



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

Path: Main menu / Unit parameters / Options

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

Path: Main Menu / Unit parameters / Water reset

Parameters	Short description	description
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
P0285	SWRMinC	Value of the WR control signal corresponding to the correction of the set COOL equal to 0

6.16 Operating at reduced load

The units are equipped with partialization steps and they can, therefore, operate with reduced loads.

However a constant and long operation with reduced load with frequent stop and start-up of the compressor/s can cause serious damages for the lack of oil return.

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

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

Check periodically the average operating times and the frequency of the compressors starts: approximately the minimum thermal load should be such as to need the operating of a compressor for at least ten minutes.

If the average times are close to this limit, take the proper corrective actions.

6.17 2014/68/UE PED directive

DIRECTIVE 2014/68/UE PED gives instructions for installers, users and maintenance technicians as well.

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)

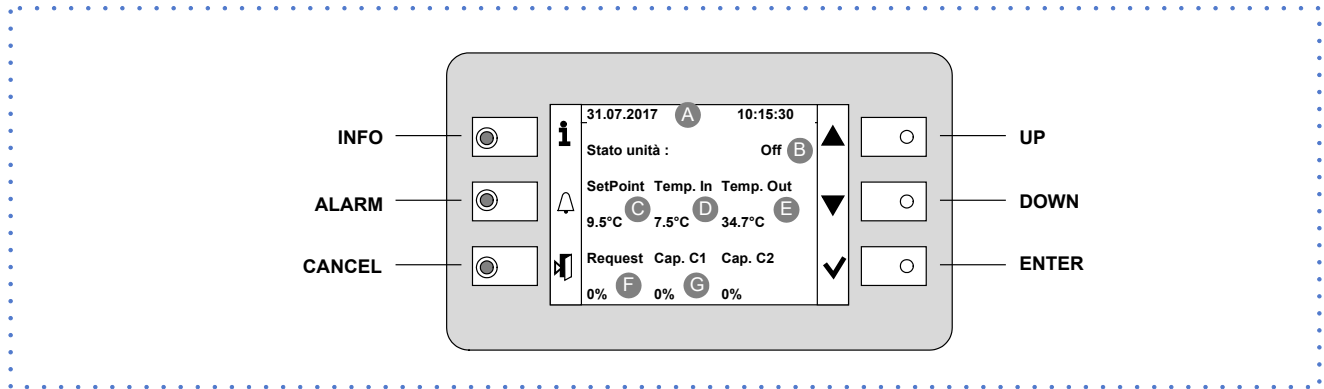
Certification of setting in service:

- for all the units

Periodical verifications:

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

7 Control



7.1 Led

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

7.2 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

7.3 Keys

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

7.4 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

7.5 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	

7.6 Display the status

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

7.7 Scheduler

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

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

Enable Scheduler

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

* Unit Parameters menu is displayed

7.8 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			

7.9 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			

7.10 General list of alarms

The alarm code identifies the concerned circuit:

Example:

ee 1 01:TimeOutModCirc = circuit 1

ee 2 01:TimeOutModCirc = circuit 2

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

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

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

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

ID	Italiano	English	Deutsch	Français	Espagnol
ff2100	STO_ResetsQty	STO_ResetsQty	STO_ResetsQty	STO_ResetsQty	MotorOvl
ff2102	EnvelopeZone	EnvelopeZone	EnvelopeZone	EnvelopeZone	MotorTemp
ff2103	EnvelopeCfg	EnvelopeCfg	EnvelopeCfg	EnvelopeCfg	FCOverload
ff2104	OilTemp	OilTemp	OilTemp	OilTemp	OverCurrent
ff2105	OilLevel	OilLevel	OilLevel	OilLevel	OverVoltage
ff2107	MotorTemp	MotorTemp	MotorTemp	MotorTemp	UnderVoltage
ff2118	PressLimits	PressLimits	PressLimits	PressLimits	FCOverTemp
ID	Italiano	Inglese	German	Francese	FCHWConfig
ii0002	Press. Acqua Utilizzo	User-side Water Low Press.	Wasserdruck	Basse Pression Eau Utilisation	FCSWConfig
ii0006	Flusso Utilizzo	Low User-side Flow	Verbrauch Durchfluss	Contrôleur Débit Utilisation	FCParamCfg
ii0007	Gelo Utilizzo	Freeze on User-side	Frostalarm	Alarme Antigel	FCElectronics
ii0008	Pompe Antigelo	Anti-freeze Pumps	Frostalarm Pumpen	Antigel Pompe Utilisation	TempSensors
ii0009	DeltaIncongruo	Incongruous Delta-T	Delta-T verkehrt	Cohérence Delta T	PressLimits

8 Maintenance

8.1 General description

Maintenance must be done by authorized centres or by qualified personnel.

The maintenance allows to:

- maintain the unit efficiency
- increase the life span of the equipment
- assemble information and data to understand the state of the unit efficiency and avoid possible damages

Before checking, please verify the following:

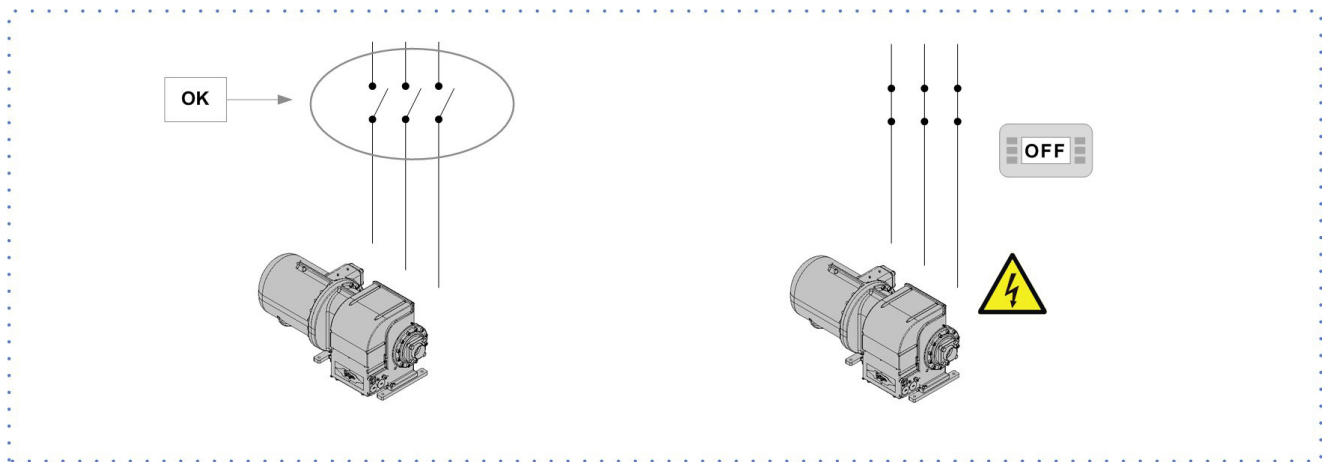
- the electrical power supply line should be isolated at the beginning
- the unit isolator is open, locked and equipped with the suitable warning
- make sure no tension is present



After turning off the power, 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.



8.2 Unit booklet

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

In this way it will be easier to adequately note the various interventions and aid any troubleshooting.

Report on the booklet:

- date
- type of intervention effected
- intervention description
- carried out measures etc.

8.3 Standby mode

If a long period of inactivity is foreseen:

- turn off the power
- avoid the risk of frost (empty the system or add glycol)

Turn off the power to avoid electrical risks or damages by lightning strikes.



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

It's recommended that the re-start after the stopping period is performed by a qualified technician, especially after seasonal stops or seasonal switching.

When restarting, refer to what is indicated in the "start-up" section.

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

8.4 Inspections frequency

Perform an inspection every 6 months minimum.

The frequency, however, depends on the use.



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

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

√	intervention frequency (months)	1	6	12
1	presence corrosion			X
2	panel fixing			X
3	fan fixing		X	
4	coil cleaning		X	
5	water filter cleaning		X	
6	check the exchanger efficiency			X
7	circulating pumps		X	
8	check of the fixing and the insulation of the power lead			X
9	check of the earthing cable			X
10	electric panel cleaning			X
11	capacity contactor status			X
12	terminal closing, cable insulation integrity			X
13	voltage and phase unbalancing (no load and on-load)		X	
14	absorptions of the single electrical loads		X	
15	test of the compressor crankcase heaters		X	
16	leak control*			X
17	survey of the refrigerant circuit operating parameters		X	
18	protective device test: pressure switches, thermostats, flow switches etc..		X	
19	control system test: setpoint, climatic compensations, capacity stepping, water / air flow-rate variations		X	
20	control device test: alarm signalling, thermometers, probes, pressure gauges etc..		X	

* European regulation 303/2008

Refer to the local regulations; and ensure correct adherence. Companies and technicians that effect interventions of installation, maintenance/repairs, leak control and recovery must be CERTIFIED as expected by the local regulations. The leak control must be effected with annual renewal.

8.5 Water side exchanger

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

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

The clearing must be effected:

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

8.6 Water filter

Check that no impurities prevent the correct passage of water.

8.7 Circulating pumps

Check:

- no leaks
- bearing status (anomalies are highlighted by abnormal noise and vibration)
- the terminal protection covers are closed and the cable holders are properly positioned
-

8.8 Flow Switch

- controls the operations
- remove incrustations from the palette

8.9 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

8.10 Air coil



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

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

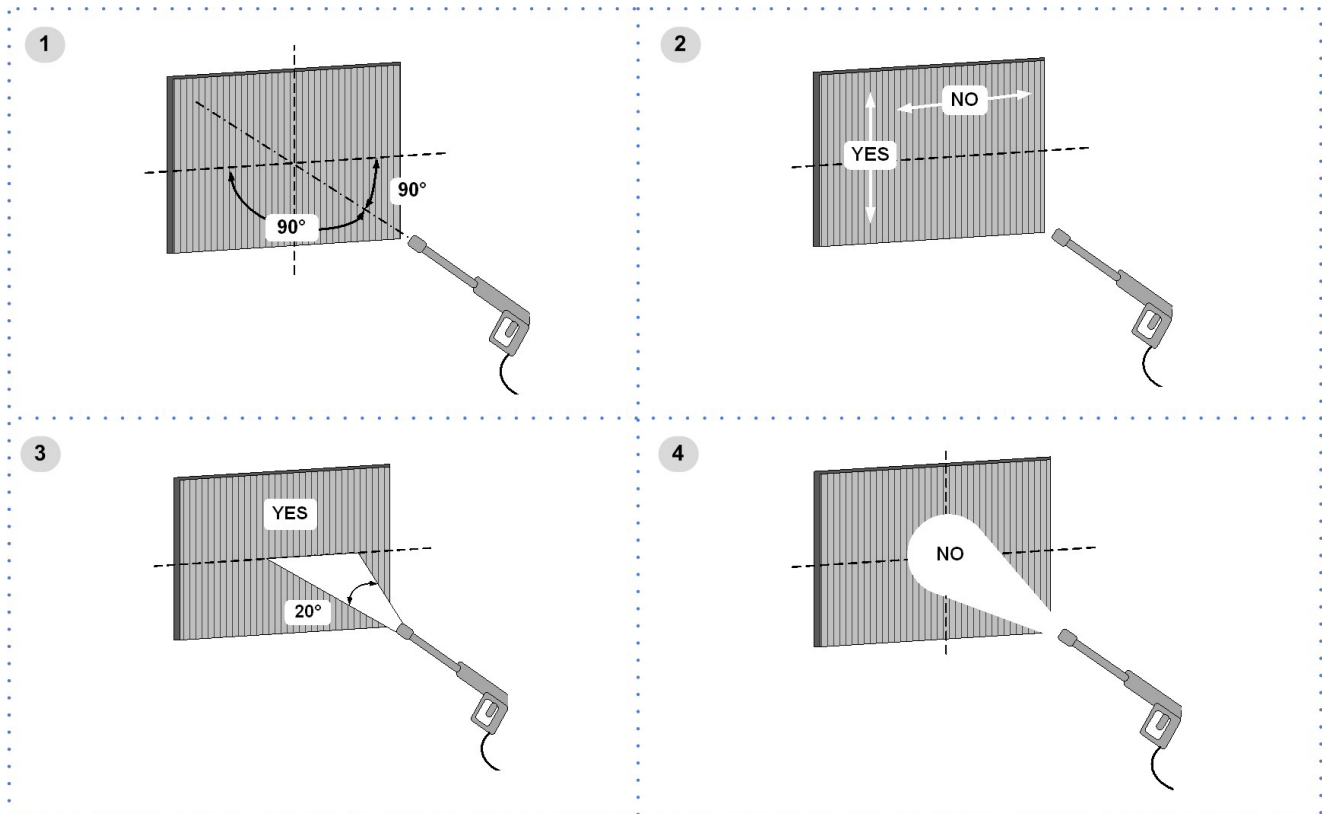
Using an air pressure gun, clean the aluminum surface of the battery; be careful to direct the air in the opposite direction of the fan air movement.

Hold the gun parallel to the fins to avoid damages.

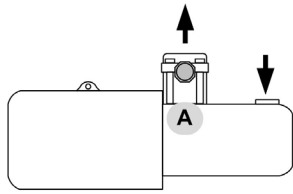
As an alternative, vacuum cleaner can be used to suck impurities from the air input side.



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



8.11 Compressor supply line shut-off valve



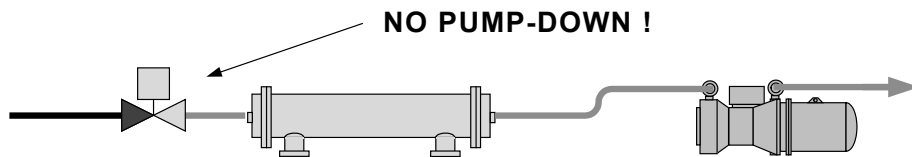
A. Supply line shut-off valve

- Do not remove the seal
- Remove only if authorized by the manufacturer.
Please contact the maker for informations.

8.12 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

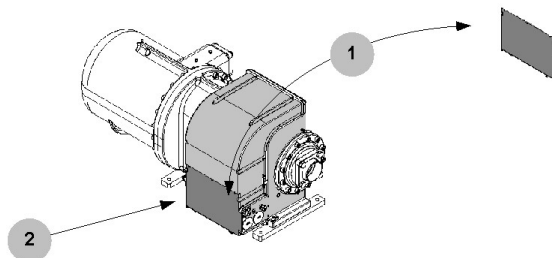
C = CHECK R = replace



Inverter replacement

- Remove only if authorized by the manufacturer.
- Please contact the maker for informations.

8.13 Crankcase heater



8.14 Insulations

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

8.15 System discharge

1. evacuate the system
2. It is possible to limit the absorbed electric power with an external signal 0-10 Vcc or 4-20mA.
3. evacuate the exchanger, use all the present taps
4. use compressed air to blow the exchanger
5. dry completely the exchanger by an hot air jet; for greater safety fill the exchanger with glycoled solution
6. protect the exchanger from the air
7. remove the drain plugs to the pumps



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



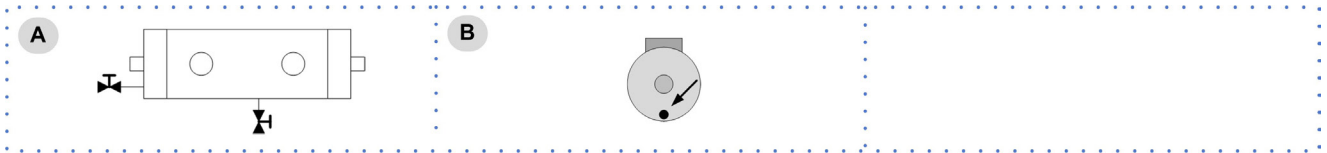
It must be collected and reused.



Before starting a washing the plant.

Example

- A. emptying evaporator
- B. emptying pump



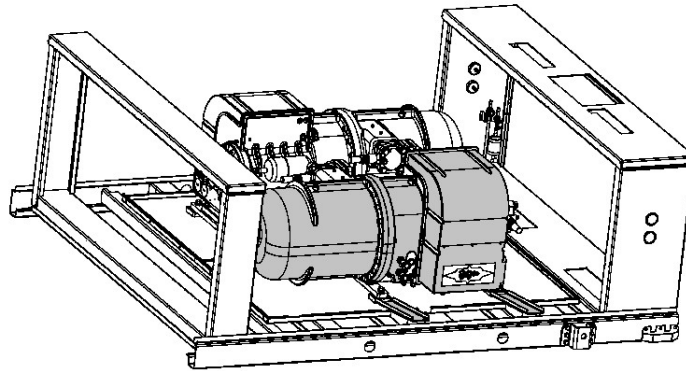
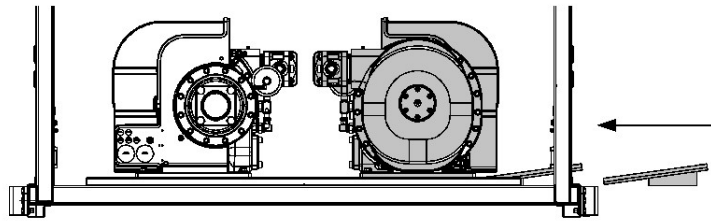
It's recommended that the re-start after the stopping period is performed by a qualified technician, especially after seasonal stops or seasonal switching.

When restarting, refer to what is indicated in the "start-up" section.

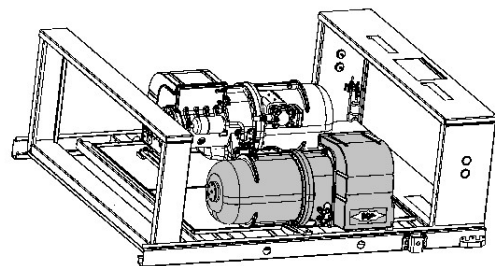
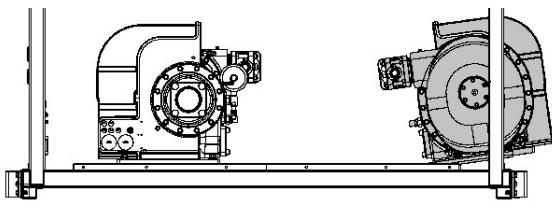
Schedule technical assistance in advance to avoid hitches and to guarantee that the system can be used when required.

8.16 Compressor replacement

1




2




9 Accessories

9.1 Anti-vibration mount support

Anti-vibration mount support

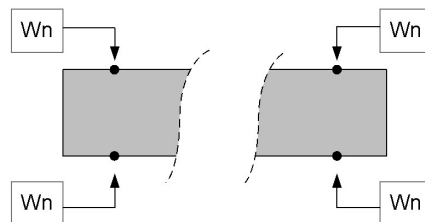
	W1	W2	W3	W4	W5	W6	W7	W8	W9
PE4Z00016	RF4130-Z322P	RF412-Z320P	RF4130-Z322P	RF412-Z320P					
PE4Z00017	RF413-Z322P	RF411-Z320P	RF480-X303P	RF413-Z322P	RF411-Z320P	RF480-X303P			
PE4Z00018	RF414-Z324P	RF480-X303P	RF410-Z320P	RF480-X303P	RF414-Z324	RF480-X303P	RF410-Z320P	RF480-X303P	
PE4Z00019	RF413-Z322P	RF410-X204-Z120P	RF410-X204-Z120P	RF409-Z308P	RF413-Z322	RF410-X204-Z120P	RF410-X204-Z120P	RF409-Z308P	
PE4Z00020	RF413-X307P	RF490-X203-Z112Pr	RF410-Z212-X104P	RF410-Z320P	RF490-X203-Z112Pr	RF413-X307P	RF410-X307P	RF410-X304P	RF410-X304P
PE4Z00021	RF413-X207-Z124P	RF490-Z212-X104P	RF413-X207-Z124P	RF410-Z212-Z120P	RF480-Z308Pr	RF414-Z324P	RF411-Z212-Z120P	RF413-X307P	RF410-Z312P
PE4Z00025	RZ424-222-X108P	RZ608-X104Pr	RX407-204-Z122P	RZ608-X103Pr	RZ424-222-X108P	RZ608-X104Pr	RX607-Z124P	RZ608-120Pr	

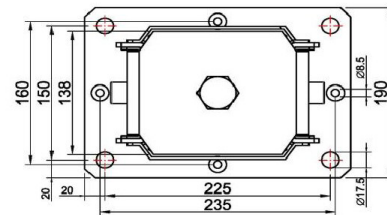
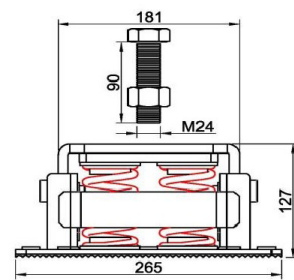
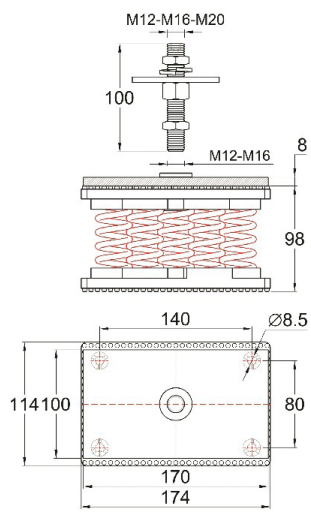
anti-seismic spring antivibration mounts

	W1	W2	W3	W4	W5	W6	W7	W8	w9	w10
PE4Z00010	LaLV255	LaLV251	LaLV255	LaLV251						
PE4Z00011	LaLV255	LaLV2510	LaLV2305	LaLV255	LaLV2510	LaLV2305				
PE4Z00012	LaLV447	LaLV420	LaLV4301	LaLV420	LaLV447	LaLV420	LaLV4301	LaLV420		
PE4Z00013	LaLV255	LaLV250	LaLV250	LaLV2305	LaLV255	LaLV250	LaLV250	LaLV2305		
PE4Z00022	LaLV433	LaLV422	LaLV430	LaLV4300	LaLV422	LaLV433	LaLV4301	LaLV430	LaLV4300	LaLV422
PE4Z00023	LaLV433	LaLV430	LaLV433	LaLV4300	LaLV414	LaLV447	LaLV4301	LaLV433	LaLV430	LaLV414

PE code

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





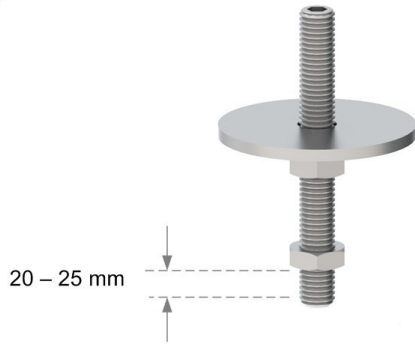
Brugola da 8
Allen key 8th



Chiave del 24
Simple key 24th



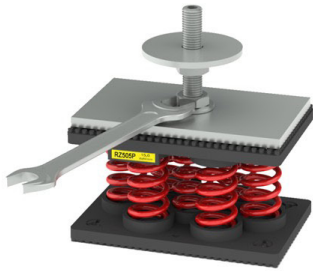
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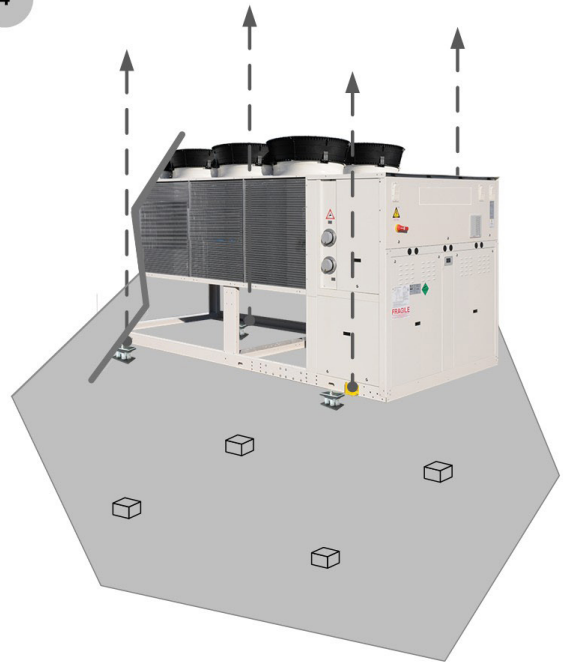
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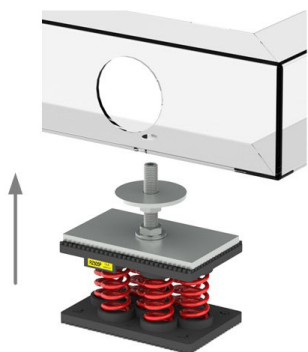
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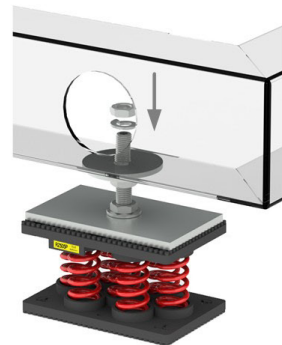
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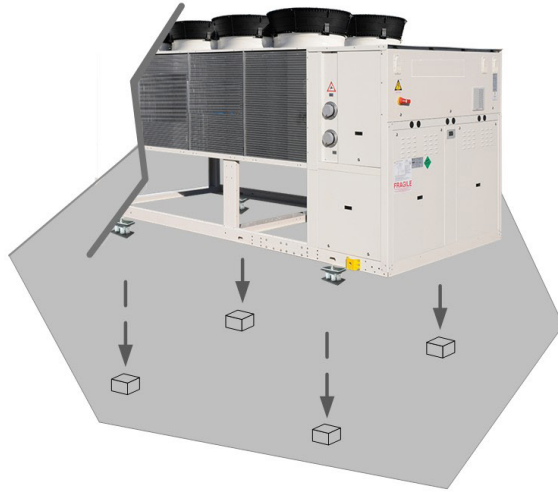
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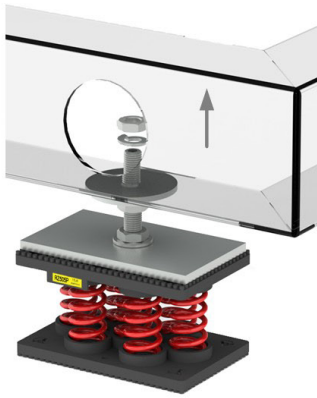
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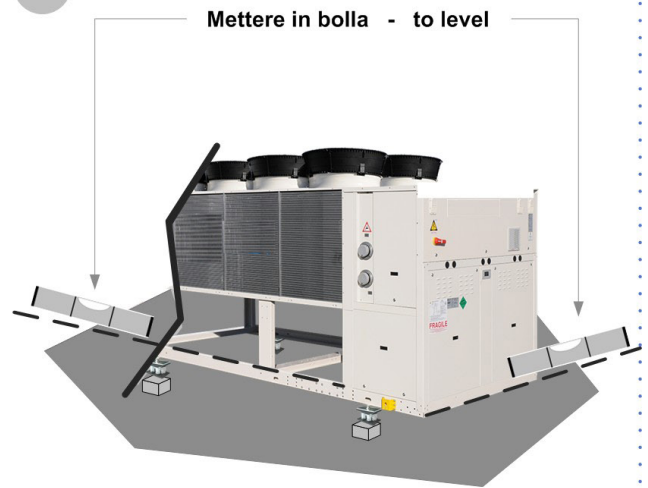
7



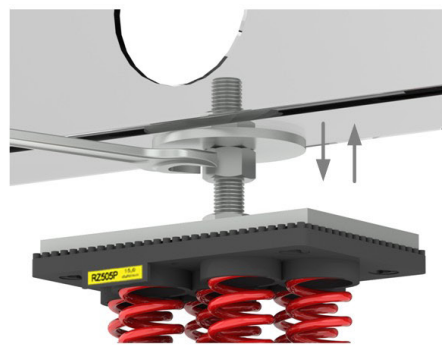
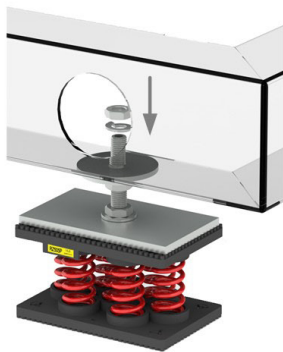
8



9



10



10 Decommissioning

10.1 Disconnecting

Only authorised personnel must disconnect the unit.

Avoid leak or spills into the environment.

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

- refrigerant gas
- anti-freeze solutions in the water circuit

Awaiting dismantling and disposal, the unit can also be stored outdoors, if the electrical, cooling and water circuits of the unit have 100% integrity and are isolated, bad weather and rapid change in temperature will not result in any environmental impact.

10.2 Dismantling and disposal

The unit must always be sent to authorised centres for dismantling and disposal.

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

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

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

10.3 Directive EC RAEE

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 wheellie 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.



11 Residual risks

General description

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

Danger zone

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

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

Handling

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

Handle the unit following the instructions provided in the present manual regarding the packaging and in compliance with the local regulations in force. Should the refrigerant leak please refer to the refrigerant "Safety sheet".

Installation

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

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

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

Carefully check the positioning of the unit.

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

Carefully check the positioning and the anchoring of the unit.

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

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

General risks

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

Electrically isolate the unit (yellow-red isolator).

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

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

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

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

Always contact the qualified assistance centre.

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

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

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

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

Electric parts

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

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

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

Always fix the unit cover properly.

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

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

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

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

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

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

Moving parts

Contact with the transmissions or with the fan aspiration can cause injuries. Prior to entering the inside of the unit open the isolator situated on the connection line of the unit itself, padlock and display the appropriate warning sign.

Contact with the fans can cause injury.

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

Refrigerant

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

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

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

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

Do not place any heat source inside the danger zone.

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

Hydraulic parts

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

12 General technical data - Performance

Acoustic configuration: compressor soundproofing (SC)

Size			250.2	280.2	320.2	360.2	400.2	420.2	440.2	480.2	540.2	580.2
Cooling												
Cooling capacity	1	[kW]	558	618	715	804	904	957	1000	1080	1173	1286
Compressor power input	1	[kW]	185	209	232	261	288	327	331	369	390	431
Total power input	2	[kW]	197	223	248	280	310	350	353	396	417	458
Partial recovery heating capacity	3	[kW]	112	124	142	160	179	193	200	217	234	258
EER	1	-	2,84	2,77	2,88	2,87	2,92	2,74	2,83	2,73	2,81	2,81
Water flow-rate (User Side)	1	[l/s]	26,7	29,5	34,2	38,4	43,2	45,7	47,8	51,6	56,0	61,5
Internal exchanger pressure drops	1	[kPa]	55	47	43	34	48	54	49	37	45	55
Cooling capacity (EN14511:2013)	4	[kW]	556	616	712	802	902	954	997	1077	1169	1282
Total power input (EN14511:2013)	4	[kW]	199	225	251	282	311	353	357	398	421	463
EER (EN 14511:2013)	4	-	2,80	2,74	2,84	2,84	2,90	2,71	2,79	2,71	2,78	2,77
SEER	6	-	4,63	4,57	4,59	4,61	4,68	4,68	4,67	4,72	4,77	4,79
SEPR	7	-	5,24	5,27	5,04	5,20	5,25	5,30	5,30	5,32	5,25	5,23
Cooling capacity (AHRI 550/590)	5	[kW]	555	615	710	799	898	950	986	1077	1159	1270
Total power input (AHRI 550/590)	5	[kW]	196	220	247	279	319	348	350	392	414	454
COPR	5	-	2,84	2,80	2,87	2,87	2,82	2,73	2,81	2,75	2,80	2,80
IPLV	5	-	5,04	5,03	5,01	5,01	5,06	5,12	5,08	5,18	5,20	5,20

1. Data referred to the following conditions: internal exchanger water = 12/7 °C. Entering external exchanger air temperature 35°C. Evaporator fouling factor = $0.44 \times 10^{(-4)}$ m² K/W.
2. The Total Power Input value does not take into account the part related to the pumps and required to overcome the pressure drops for the circulation of the solution inside the exchangers.
3. Recovery exchanger water=40/45°C
4. Data compliant to Standard EN 14511:2013 referred to the following conditions: internal exchanger water temperature = 12/7°C. Entering external exchanger air temperature = 35°C
5. Data compliant to Standard AHRI 550/590 referred to the following conditions: internal exchanger water temperature = 6,7 °C. Water flow-rate 0,043 l/s per kW. Entering external exchanger air temperature 35°C. Evaporator fouling factor = $0.18 \times 10^{(-4)}$ m² K/W
6. Data compliant to Standard EN 14825:2016
7. Data compliant according to EU regulation 2016/2281

General technical data - Construction

Acoustic configuration: compressor soundproofing (SC)

Size			250.2	280.2	320.2	360.2	400.2	420.2	440.2	480.2	540.2	580.2		
Compressor														
Type of compressors	1	-	ISW											
Refrigerant		-	R-134a											
No. of compressors		Nr	2											
Rated power (C1)		[HP]	125	125	160	160	200	200	220	240	270	290		
Rated power (C2)		[HP]	125	160	160	200	200	220	220	240	270	290		
Std Capacity control steps	6		17-100%											
Oil charge (C1)		[l]	18						35					
Oil charge (C2)		[l]	18						35					
Refrigerant charge (C1)		[kg]	52	61	75	92	108	108	108	133	141	141		
Refrigerant charge (C2)		[kg]	54	67	70	97	115	115	115	140	149	149		
Refrigeration circuits		-	2											
Internal exchanger														
Type of internal exchanger	2	-	S&T											
N. of internal exchanger		Nr	1											
Water content		[l]	222	240	307	280	481	481	481	514	514	514		
External exchanger														
Frontal surface		m ²	18,7	23,4	28,1	32,8	37,4	37,4	37,4	46,8	46,8	46,8		
External Section Fans														
Type of fans	3	-	AC/P											
Number of fans		Nr	8	10	12	14	16	16	16	20	20	20		
Type of motor	4	-	EC											
Standard airflow		[l/s]	46959	59689	72815	83566	93919	93919	93919	121358	121358	117399		
Connections														
Water fittings		-	6"	6"	6"	6"	8"	8"	8"	8"	8"	8"		
Power supply														
Standard power supply		-	400/3~/50											
Electrical data														
FLA Total		A	386,2	438,9	491,6	568,2	644,8	714,8	784,8	864,0	904,8	976,0		
FLI Total		kW	233,4	266,6	299,8	348,9	398,0	436,2	474,4	483,0	521,0	591,0		
M.I.C. - Value		A	386,2	438,9	491,6	568,2	644,8	714,8	784,8	864,0	904,8	976,0		

1. ISW = double screw compressor
2. S&T = shell and tube
3. AX = axial fan
4. AC/P = asynchronous three-phase external rotor motor with phase cutting speed automatic control
5. M.I.C. = compressor 2 starting current + compressor 1 current at 75% of the max load + circuit 1 fan
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
6. The unit is able to perform a continuous capacity control. The following data refers to the unit operation.

Sound levels

Size	Sound power level (dB)								Sound power level	Sound pressure level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
250.2	107	96	80	89	100	81	77	72	100	80
280.2	112	103	85	98	99	85	80	73	101	80
320.2	115	106	87	101	98	88	82	74	102	80
360.2	116	107	88	101	98	88	83	75	102	81
400.2	116	107	88	102	98	89	83	76	102	81
420.2	117	108	89	102	99	89	84	76	103	81
440.2	117	108	89	103	99	90	84	76	103	81
480.2	118	109	90	103	100	90	85	78	104	82
540.2	118	109	90	103	100	90	85	78	104	82
580.2	118	109	90	103	100	90	85	78	104	82

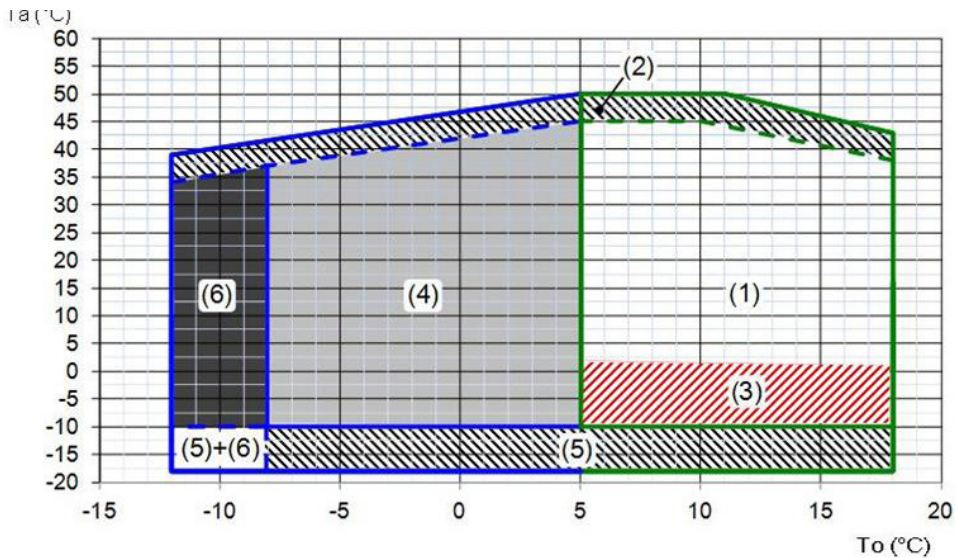
Sound levels refer to full load units, in test nominal conditions. The sound pressure level refers to 1 m. from the standard unit outer surface operating in open field. Measures according to UNI EN ISO 9614-2 regulations, with respect to the EUROVENT 8/1 certification, which provides for a tolerance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

Data referred to the following conditions:

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

Operating range

Acoustic configuration: compressor soundproofing (SC)



Ta (°C) = external exchanger inlet air temperature (D.B.)

To (°C) = internal exchanger outlet water temperature

1. Standard unit operating range at full load
2. Unit operating range with automatic staging of the compressor capacity
3. Standard unit operating range with air flow automatic modulation
4. Unit operating range in 'B - Low water temperature' configuration (40% ethylene glycol)
5. Unit operating range with 'REGBT - device for the condensing coil partialization'
6. Extended of operating range (extremely low water temperature option available on request)

Admissible water flow-rates

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

PREMIUM SC		250.2	280.2	320.2	360.2	400.2	420.2	440.2	480.2	540.2	580.2
Qmin	[l/s]	15,3	20,1	20,1	21,6	39,4	39,4	39,4	32,3	32,3	32,3
Qmax	[l/s]	37,3	45,2	45,2	53,4	86,6	86,6	86,6	72,5	72,5	72,5

Exchanger operating range

	Internal exchanger	
	DPr	DPw
PED (CE)	2450	1050

DPr = Maximum operating pressure on refrigerant side in kPa

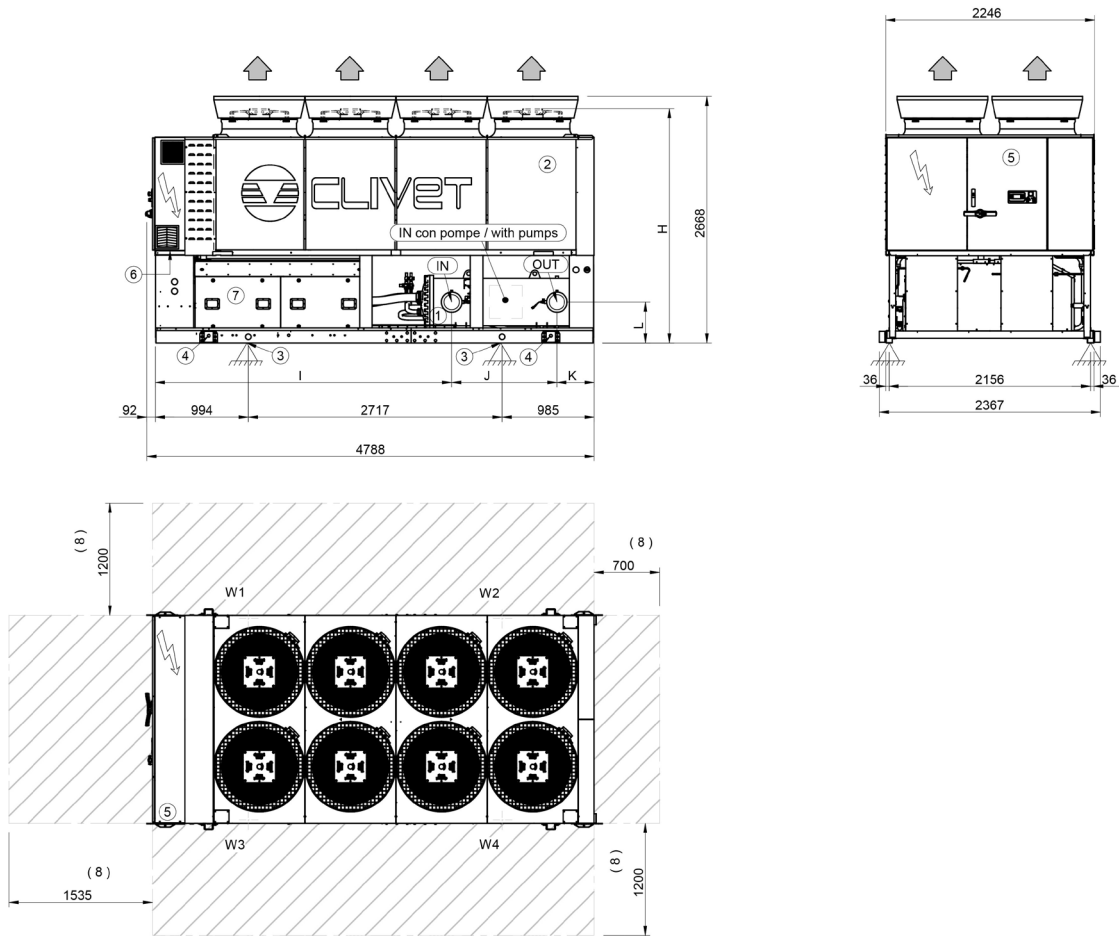
DPw = Maximum operating pressure on water side in kPa

Overload and control device calibrations

		open	closed	value
High pressure switch	[kPa]	2000	1450	–
Antifreeze protection	[°C]	3	5.5	–
High pressure safety valve	[kPa]	–	–	2400
Low pressure safety valve	[kPa]	–	–	1650
Max no. of compressor starts per hour	[n°]	–	–	6
Discharge safety thermostat	[°C]	–	–	120

13 Dimensional drawings

Size 250.2 - Acoustic configuration: compressor soundproofing (SC)

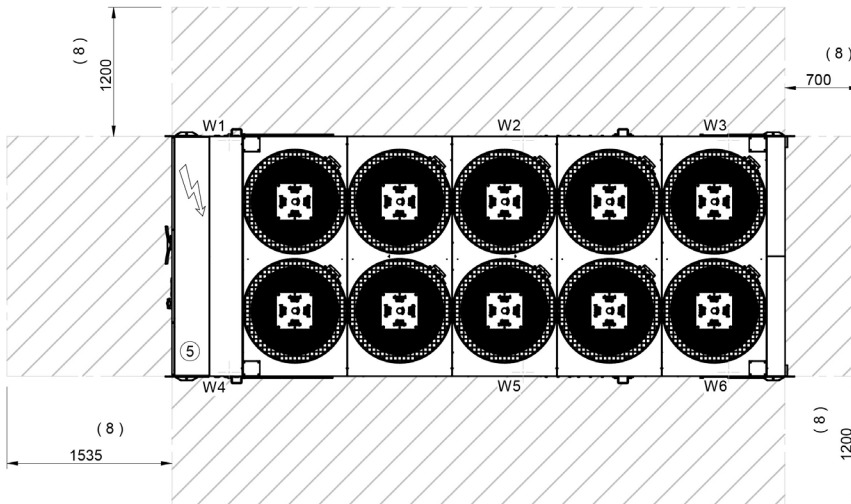
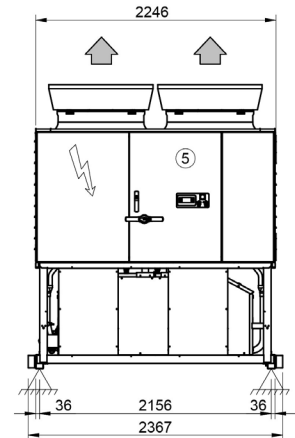
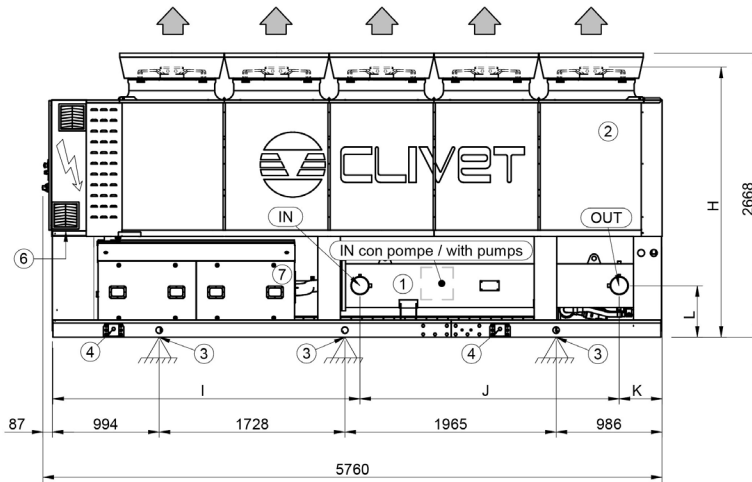


- 1. Internal exchanger (evaporator)
- 2. External exchanger (condenser)
- 3. Unit fixing holes
- 4. Lifting brackets (removable, if required, after the unit positioning)
- 5. Electrical panel
- 6. Power input
- 7. Sound proof enclosure (only in the relevant versions)
- 8. Clearance access recommended

Size		SC-PRM
		250.2
I	mm	3171
J	mm	1127
K	mm	398
L	mm	437
OD	mm	6"
A - Length	mm	4788
B - Depth	mm	2246
C - Height	mm	2484
C - Height with AXITOP	mm	2668
W1 Supporting point	kg	1402
W2 Supporting point	kg	1121
W3 Supporting point	kg	1408
W4 Supporting point	kg	1127
Shipping weight	kg	4824
Operating weight	kg	5058

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

Size 280.2 - Acoustic configuration: compressor soundproofing (SC)

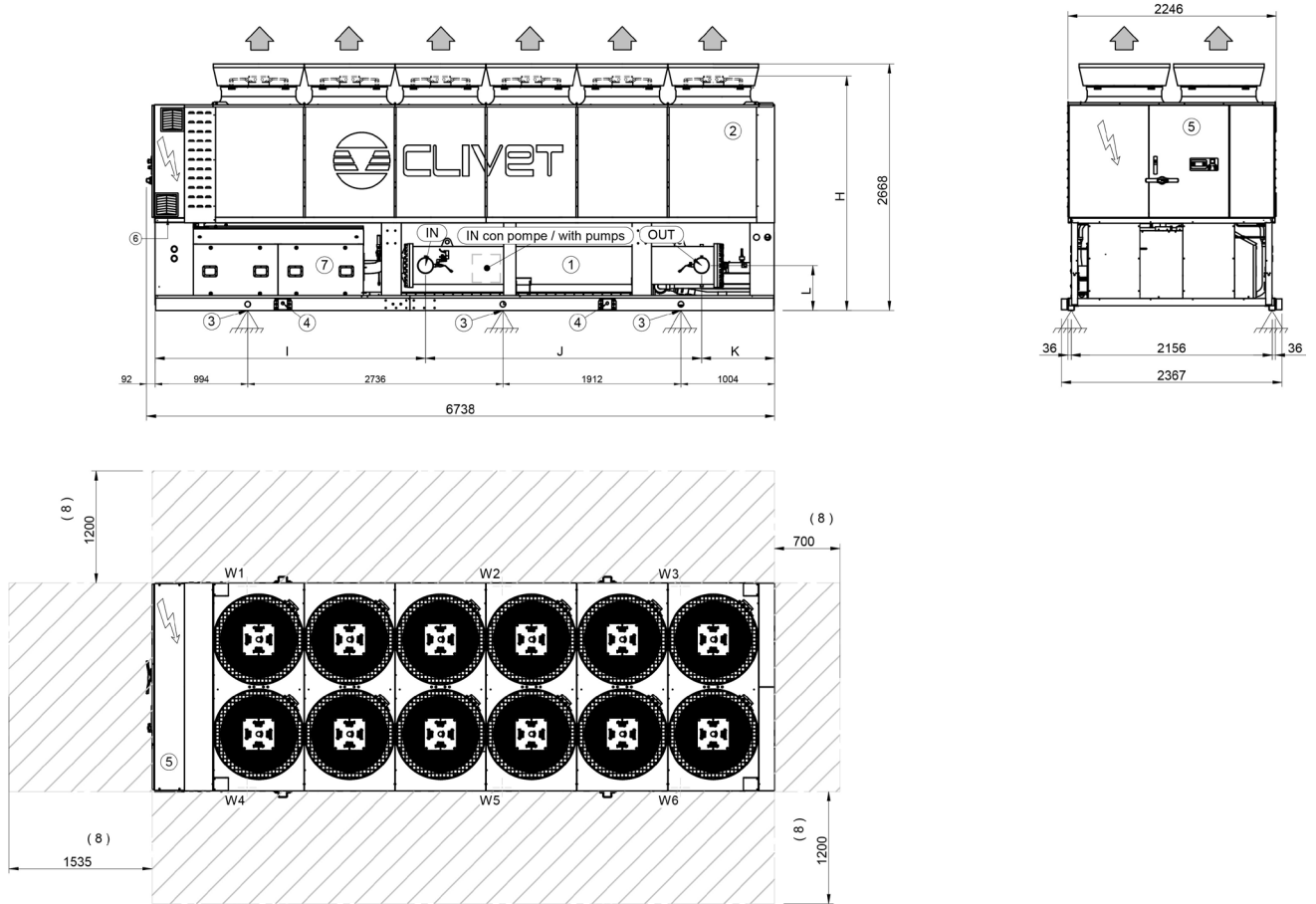


- | | |
|--|--|
| 1. Internal exchanger (evaporator) | 5. Electrical panel |
| 2. External exchanger (condenser) | 6. Power input |
| 3. Unit fixing holes | 7. Sound proof enclosure (only in the relevant versions) |
| 4. Lifting brackets (removable, if required, after the unit positioning) | 8. Clearance access recommended |

Size		SC-PRM
		280.2
I	mm	2857
J	mm	2412
K	mm	399
L	mm	480
OD	mm	6"
A - Length	mm	5760
B - Depth	mm	2246
C - Height	mm	2484
C - Height with AXITOP	mm	2668
W1 Supporting point	kg	1273
W2 Supporting point	kg	1001
W3 Supporting point	kg	551
W4 Supporting point	kg	1276
W5 Supporting point	kg	1004
W6 Supporting point	kg	553
Shipping weight	kg	5418
Operating weight	kg	5658

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

Size 320.2 - Acoustic configuration: compressor soundproofing (SC)

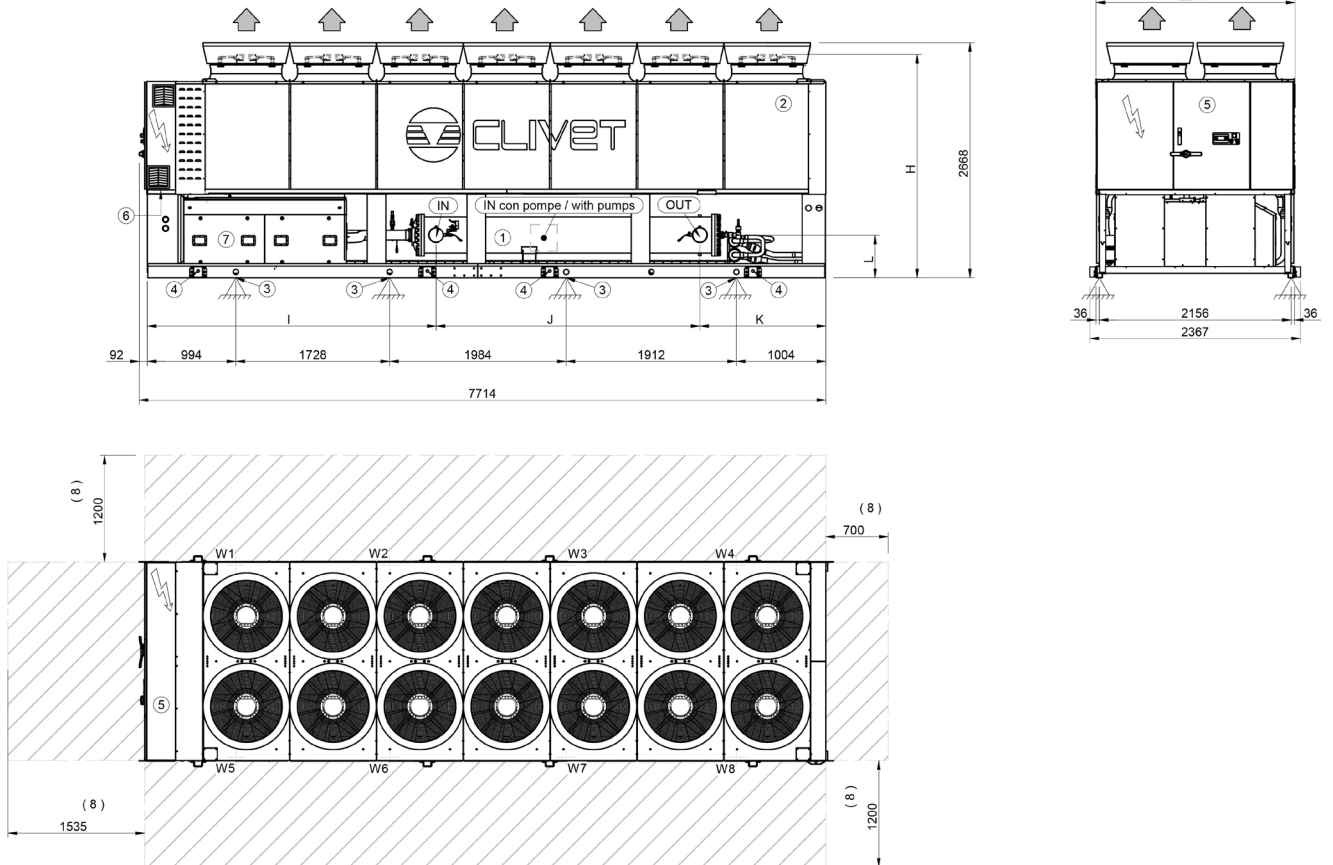


- 1. Internal exchanger (evaporator)
- 2. External exchanger (condenser)
- 3. Unit fixing holes
- 4. Lifting brackets (removable, if required, after the unit positioning)
- 5. Electrical panel
- 6. Power input
- 7. Sound proof enclosure (only in the relevant versions)
- 8. Clearance access recommended

Size		SC-PRM
		320.2
I	mm	2900
J	mm	2962
K	mm	784
L	mm	480
OD	mm	6"
A - Length	mm	6738
B - Depth	mm	2246
C - Height	mm	2484
C - Height with AXITOP	mm	2668
W1 Supporting point	kg	1570
W2 Supporting point	kg	1108
W3 Supporting point	kg	502
W4 Supporting point	kg	1559
W5 Supporting point	kg	1101
W6 Supporting point	kg	499
Shipping weight	kg	6031
Operating weight	kg	6339

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 - Acoustic configuration: compressor soundproofing (SC)

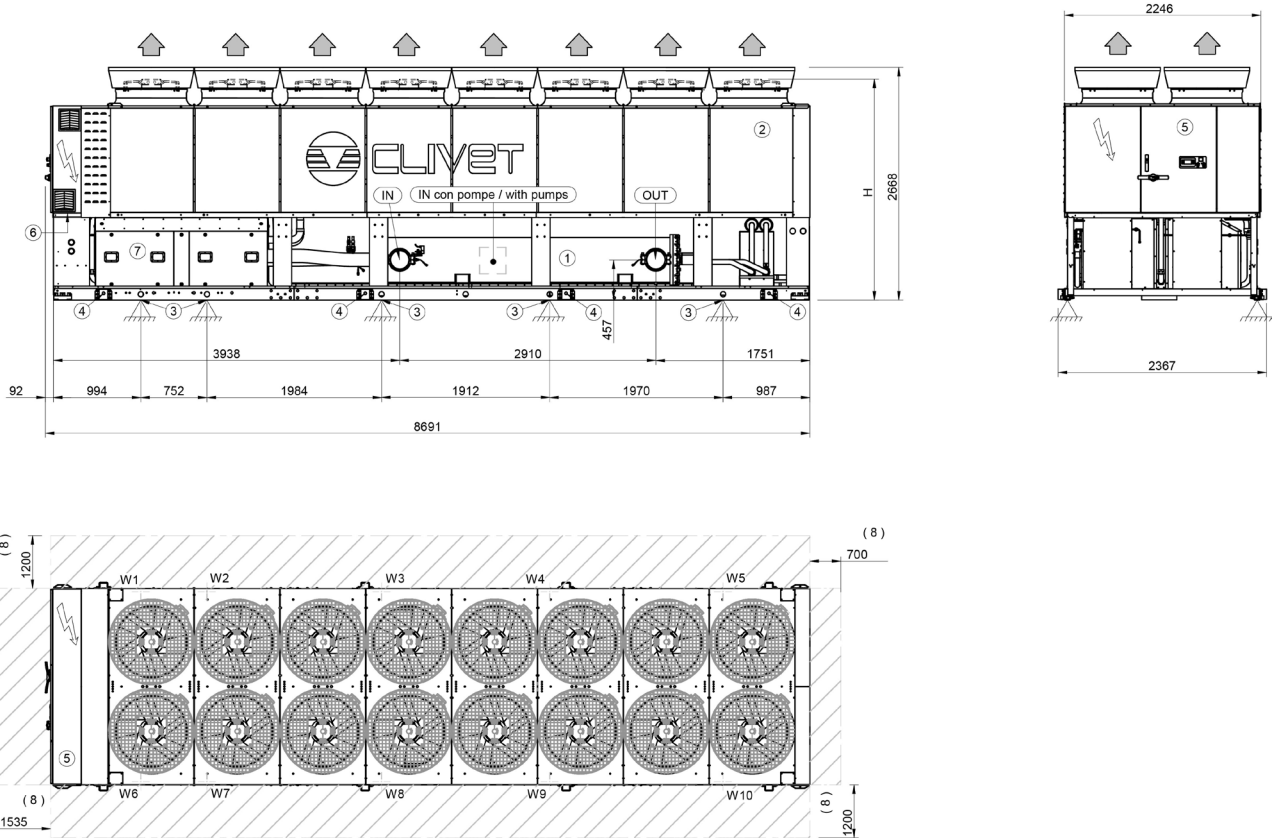


- | | |
|--|--|
| 1. Internal exchanger (evaporator) | 5. Electrical panel |
| 2. External exchanger (condenser) | 6. Power input |
| 3. Unit fixing holes | 7. Sound proof enclosure (only in the relevant versions) |
| 4. Lifting brackets (removable, if required, after the unit positioning) | 8. Clearance access recommended |

Size		SC-PRM
		360.2
I	mm	3245
J	mm	2962
K	mm	1415
L	mm	480
OD	mm	6"
A - Length	mm	7714
B - Depth	mm	2246
C - Height	mm	2484
C - Height with AXITOP	mm	2668
W1 Supporting point	kg	1630
W2 Supporting point	kg	540
W3 Supporting point	kg	1007
W4 Supporting point	kg	520
W5 Supporting point	kg	1617
W6 Supporting point	kg	536
W7 Supporting point	kg	958
W8 Supporting point	kg	495
Shipping weight	kg	7024
Operating weight	kg	7303

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

Size 400.2 - Acoustic configuration: compressor soundproofing (SC)

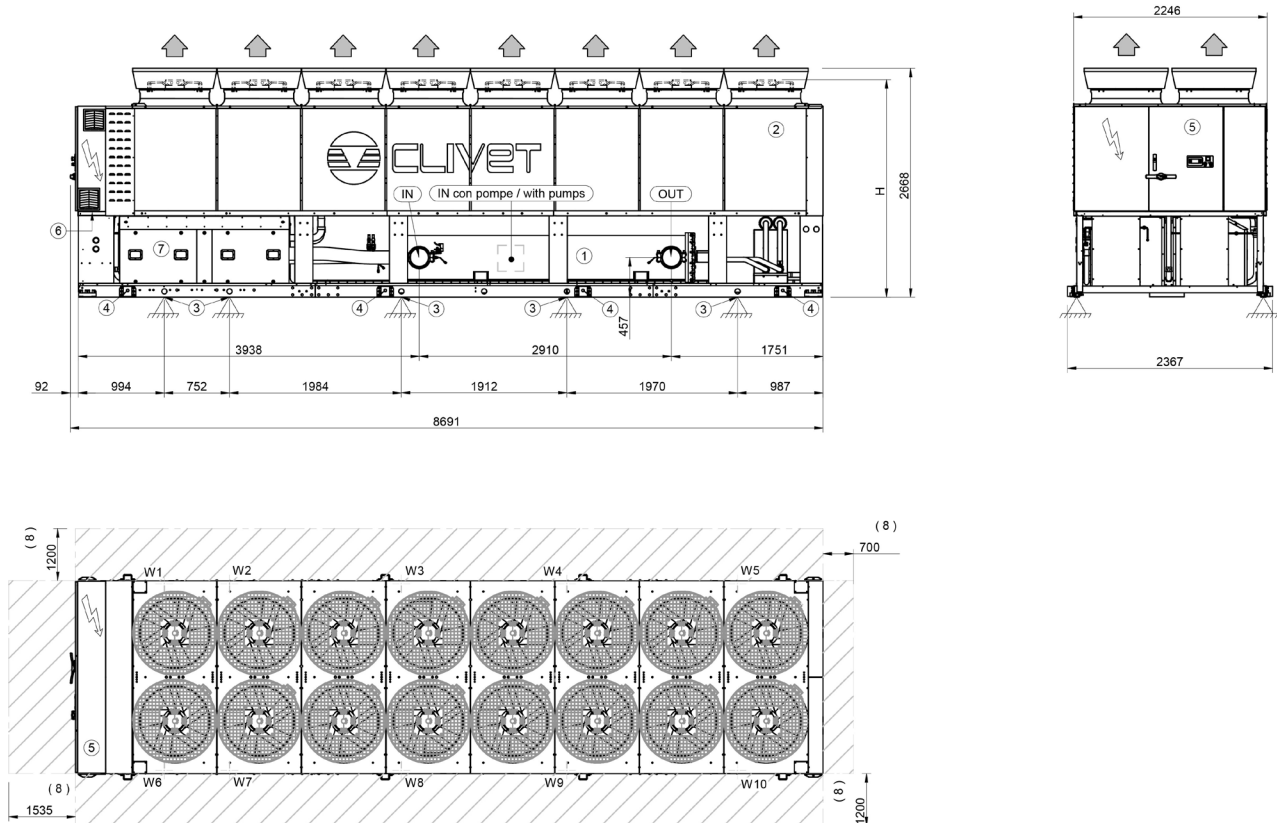


- 1. Internal exchanger (evaporator)
- 2. External exchanger (condenser)
- 3. Unit fixing holes
- 4. Lifting brackets (removable, if required, after the unit positioning)
- 5. Electrical panel
- 6. Power input
- 7. Sound proof enclosure (only in the relevant versions)
- 8. Clearance access recommended

Size		SC-PRM	
		400.2	
I	mm	2980	
J	mm	2910	
K	mm	2709	
L	mm	480	
OD	mm	8"	
A - Length	mm	8691	
B - Depth	mm	2246	
C - Height	mm	2484	
C - Height with AXITOP	mm	2668	
W1 Supporting point	kg	1449	
W2 Supporting point	kg	943	
W3 Supporting point	kg	978	
W4 Supporting point	kg	555	
W5 Supporting point	kg	1423	
W6 Supporting point	kg	925	
W7 Supporting point	kg	935	
W8 Supporting point	kg	530	
Shipping weight	kg	7257	
Operating weight	kg	7738	

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

Size 420.2 - 440.2 - Acoustic configuration: compressor soundproofing (SC)

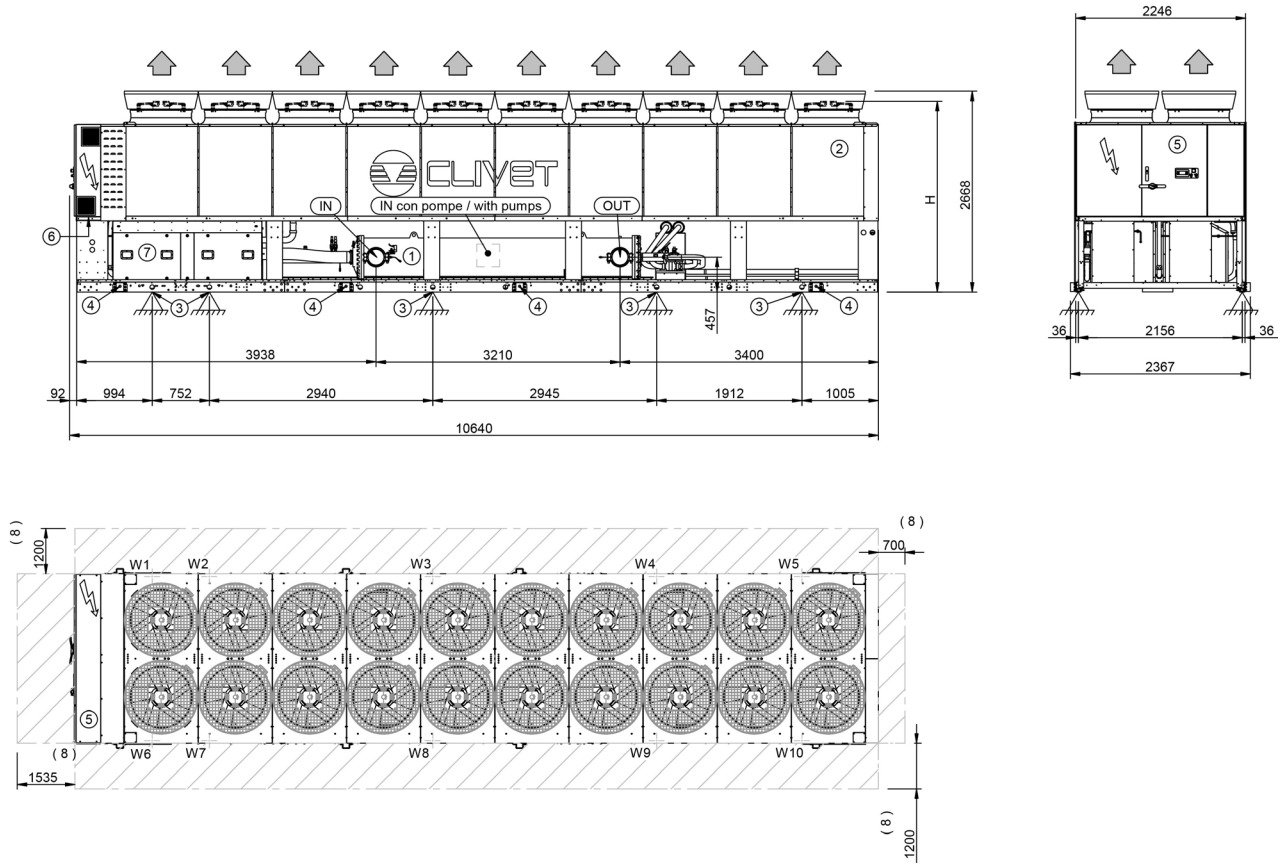


- | | |
|--|--|
| 1. Internal exchanger (evaporator) | 5. Electrical panel |
| 2. External exchanger (condenser) | 6. Power input |
| 3. Unit fixing holes | 7. Sound proof enclosure (only in the relevant versions) |
| 4. Lifting brackets (removable, if required, after the unit positioning) | 8. Clearance access recommended |

Size		SC-PRM	
		420.2	440.2
OD	mm	8"	8"
A - Length	mm	8691	8691
B - Depth	mm	2246	2246
C - Height	mm	2484	2484
C - Height with AXITOP	mm	2668	2668
W1 Supporting point	kg	1137	1361
W2 Supporting point	kg	706	548
W3 Supporting point	kg	742	758
W4 Supporting point	kg	856	851
W5 Supporting point	kg	615	628
W6 Supporting point	kg	1035	1516
W7 Supporting point	kg	997	854
W8 Supporting point	kg	777	795
W9 Supporting point	kg	809	805
W10 Supporting point	kg	577	582
Shipping weight	kg	7611	8057
Operating weight	kg	8251	8698

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

Size 480.2 - 540.2 - 580.2 - Acoustic configuration: compressor soundproofing (SC)



- 1. Internal exchanger (evaporator)
- 2. External exchanger (condenser)
- 3. Unit fixing holes
- 4. Lifting brackets (removable, if required, after the unit positioning)
- 5. Electrical panel
- 6. Power input
- 7. Sound proof enclosure (only in the relevant versions)
- 8. Clearance access recommended

Size		SC-PRM		
		480.2	540.2	580.2
OD	mm	8"	8"	8"
A - Length	mm	10640	10640	10640
B - Depth	mm	2246	2246	2246
C - Height	mm	2484	2484	2484
C - Height with AXITOP	mm	2668	2668	2668
W1 Supporting point	kg	1322	1322	1322
W2 Supporting point	kg	725	725	725
W3 Supporting point	kg	1320	1320	1320
W4 Supporting point	kg	830	830	830
W5 Supporting point	kg	439	439	439
W6 Supporting point	kg	1554	1554	1554
W7 Supporting point	kg	939	939	939
W8 Supporting point	kg	1294	1294	1294
W9 Supporting point	kg	771	771	771
W10 Supporting point	kg	416	416	416
Shipping weight	kg	8896	8896	8896
Operating weight	kg	9610	9610	9610

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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