Installation and operating manual

MSRN-XSC3 + CEV-XN

Air cooled heat pump in two sections

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 beat 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 injures to people.

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

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

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

1.4 Intended use

Use the unit only:

- for cooling/heating water or a water and glycol mix
- 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

Outdoor installation

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

Follow local safety regulations.

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

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 indentification

The serial number label is positioned on the unit and allows to indentify 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: R410A

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 wiringdiagram

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.

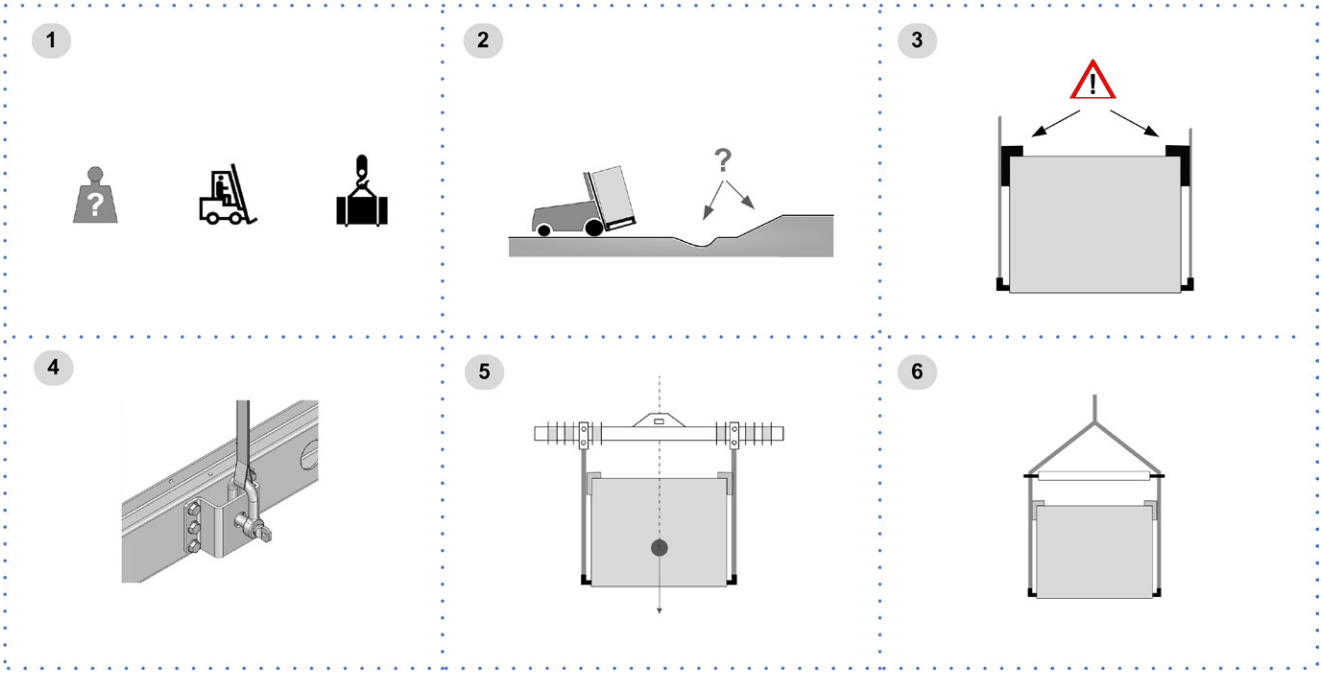
⚠ Any disputes must be made within 8 days from the date of the delivery. Complaints after this period are invalid.

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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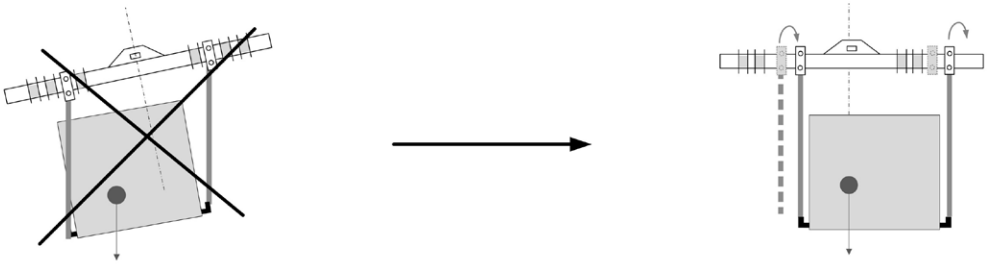

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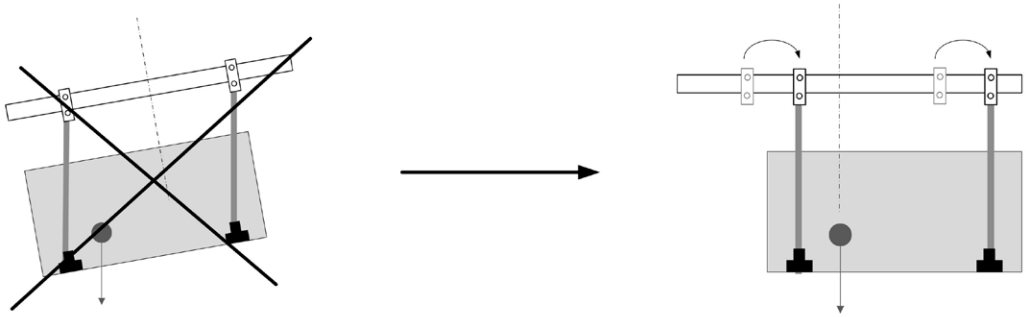

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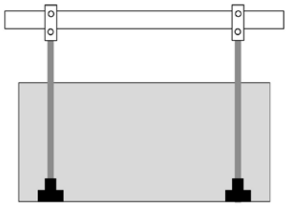
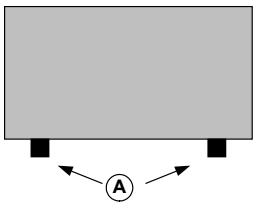


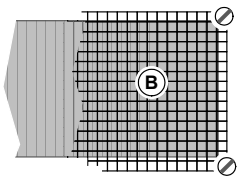
2.3 Packaging removing

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.





A Supports for handling: remove after the handling.

B Remove the coil protective mesh before the start-up

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 anti-vibration devices or neoprene strips on the unit support points
- install flexible joints on the hydraulic connections
- 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
- install the unit raised from the ground
- verify unit weight and bearing point capacity
- verify that all bearing points are aligned and leveled
- condensate water draining
- consider the maximum possible snow level
- Avoid installations in places subject to flooding

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

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

⊘ 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

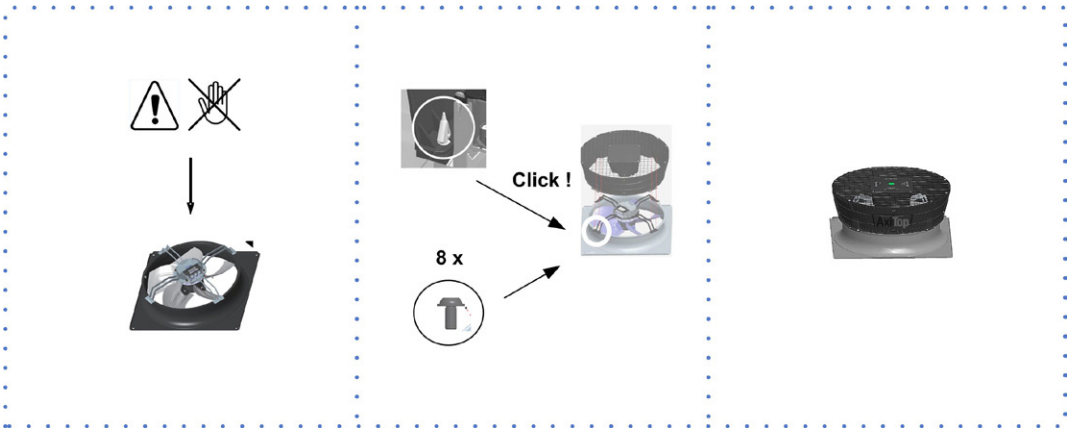
Ignoring the previous indications could:

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

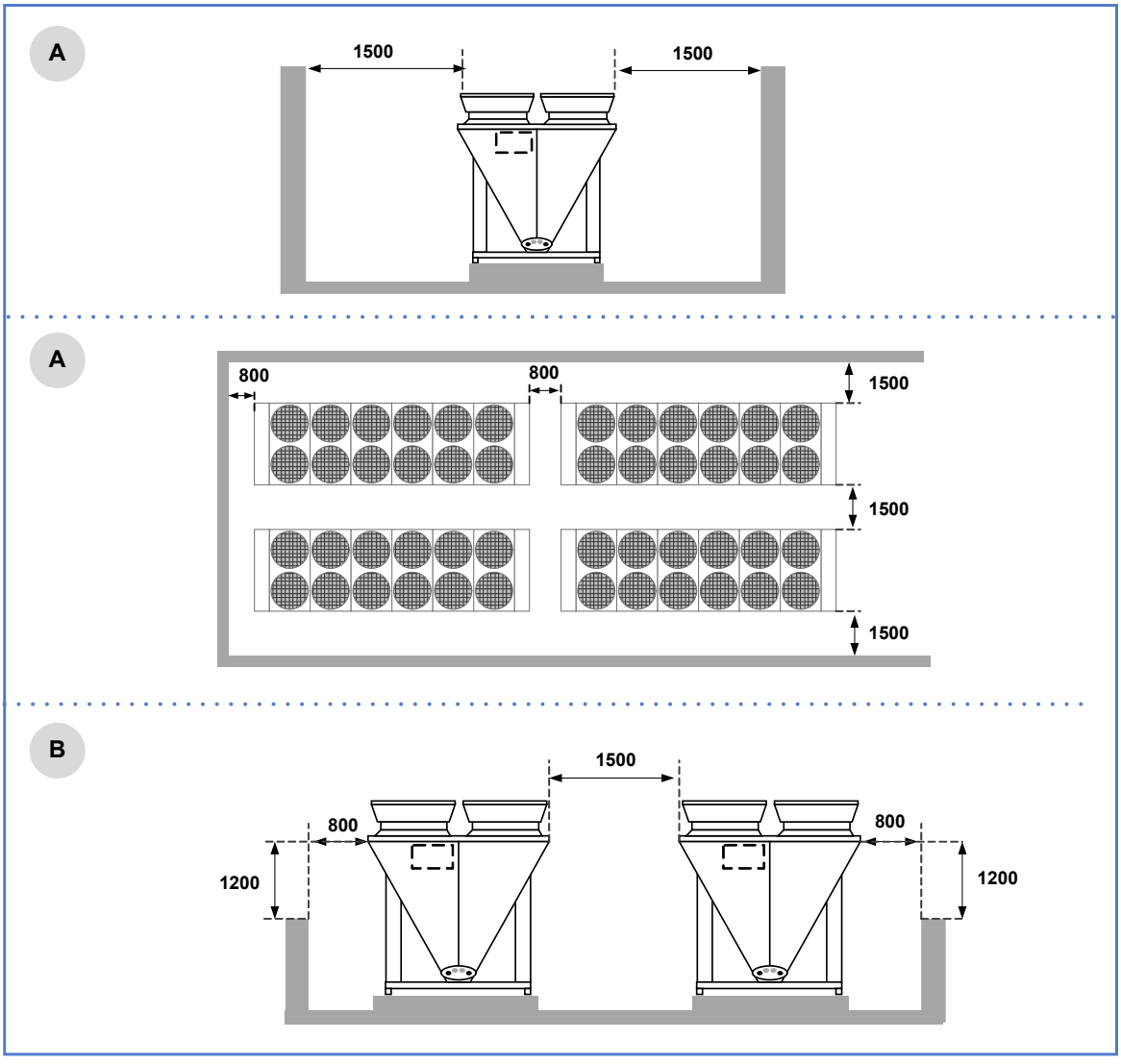
3.3 Saftey valve gas side

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

3.4 AxiTop



3.5 Functional spaces



A full height wall: standard compliance spaces
B low height wall: reduced space

3.6 Anti-vibration mount support

For details see:

10 Accessories p. 53

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:

PH	**7,5 ÷9,0**	
SO_4^{2-}	**< 100**	ppm
HCO_3^-/SO_4^{2-}	**> 1**	
Total Hardness	**4,5 ÷8,5**	dH
Cl^-	**< 50**	ppm
PO_4^{3-}	**< 2,0**	ppm
NH3	**< 0,5**	ppm

Free Chlorine	**< 0,5**	ppm
Fe_3^+	**< 0,5**	ppm
Mn^{++}	**< 0,05**	ppm
CO_2	**< 50**	ppm
H_2S	**< 50**	ppb
Temperature	**< 65**	°C
Oxygen content	**< 0,1**	ppm

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:

- within exchanger operating range
- guarantee, also with variable system conditions (for example in systems where some circuits are bypassed in particular situations).

4.5 Minimum system water content

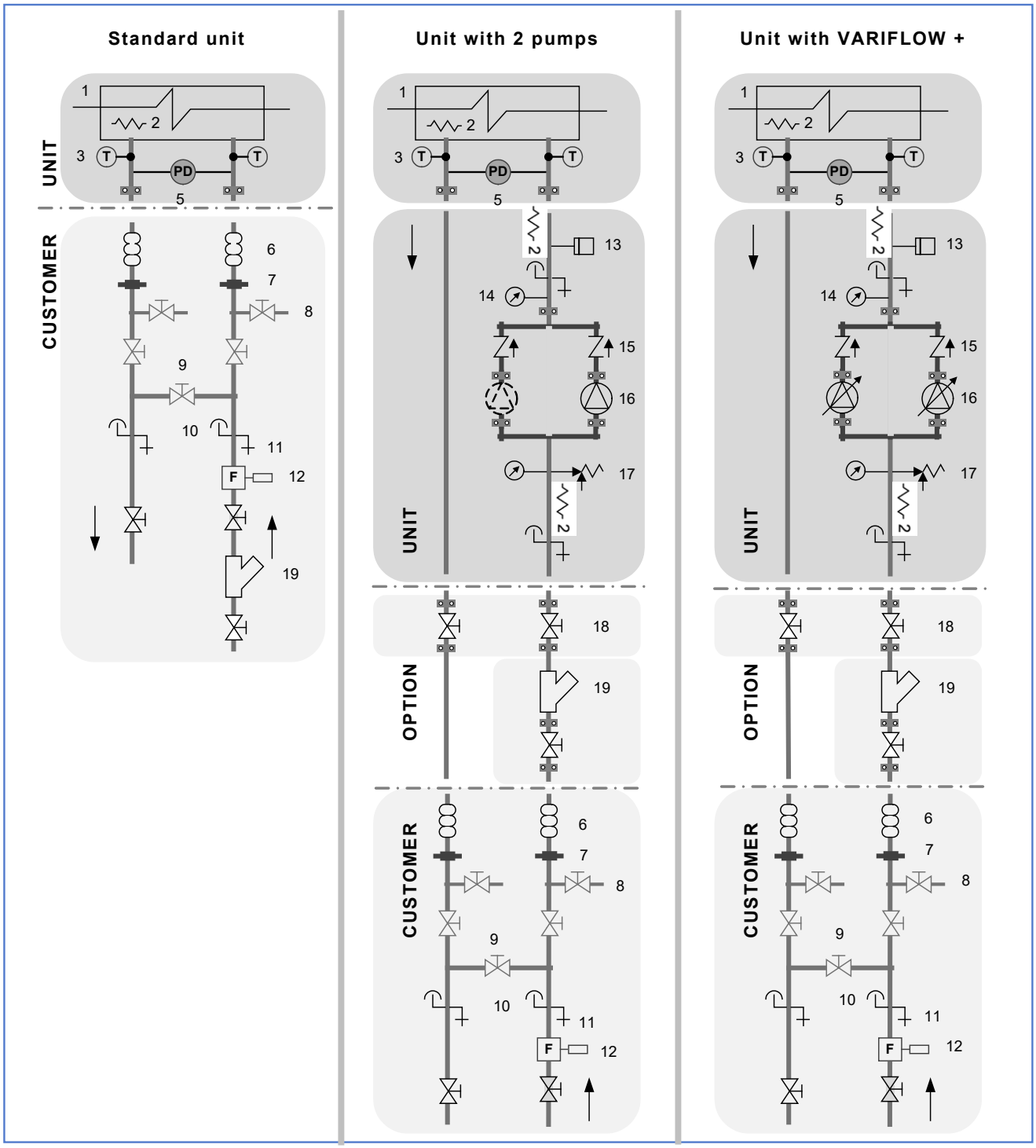
Minimum system water volumes have to be satisfied to avoid continuous compressor switching on and off.

4.6 Recommended connection

⚠ The installer must define:

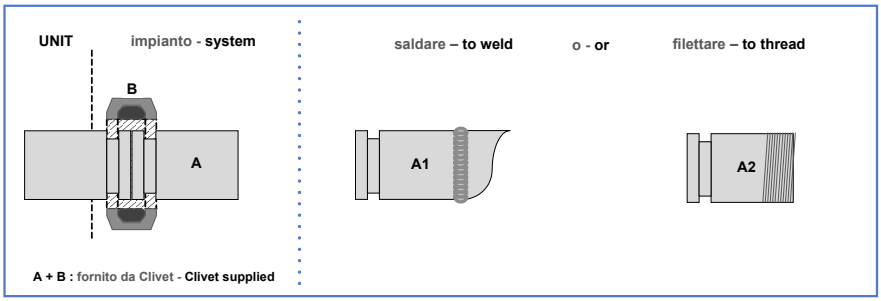
- component type
- position in system

Examples:



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

Use filter with mesh pitch:

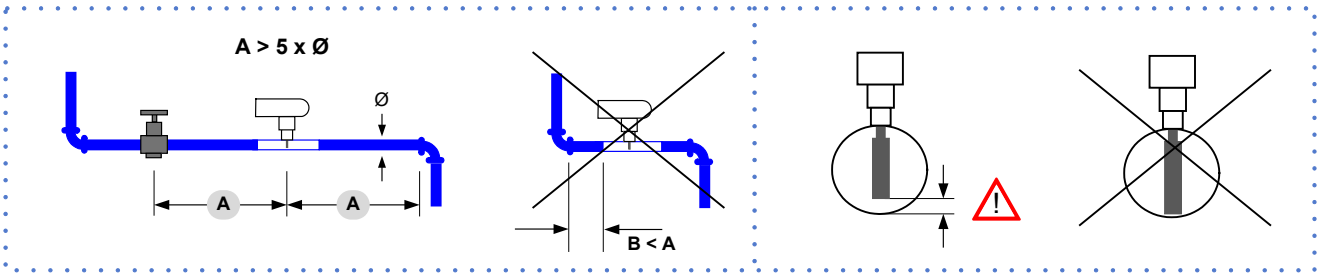
1,6 mm

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.

4.9 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.
Electrically connect the flow switch at the inlet arranged on the XC terminal block.
The flow switch must be set to the minimum reachable flow rate.



A. minimum distance

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

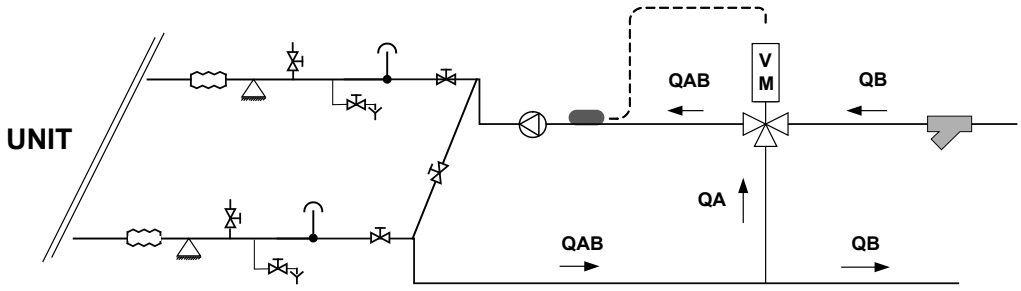
A configuration which enables the production of hot water free-of-charge while operating in the cooling mode, thanks to the partial recovery of condensation heat that would otherwise be rejected to the external heat source.

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

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 Refrigeranting connections

5.1 Pressure Equipment Directive

This unit is a subset: to operate it has to be combined to another unit.
It is an installer responsability:

- follow the PED Directive and to the national regulations of PED Directive realization
- consider the insertion of any additional security devices
- check the safety device operation
- write on the serial label number the amount of total refrigerant
- issue the Declaration of conformity
- inform the user of the need to carry out regular checks

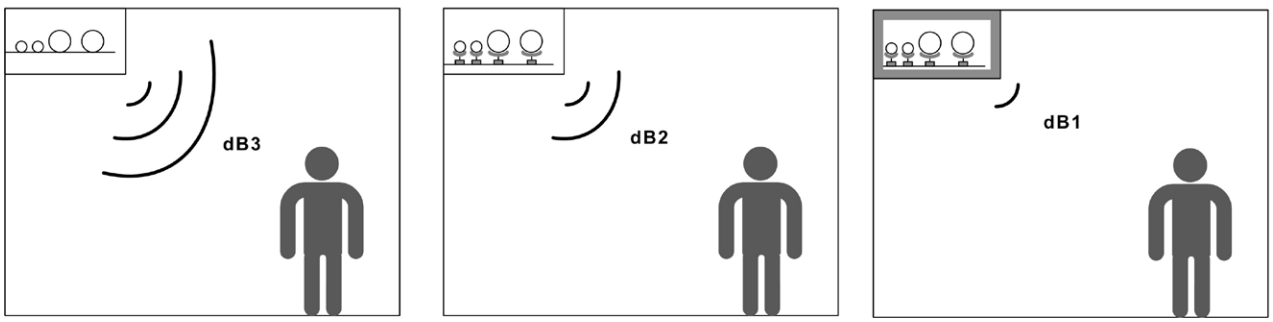
5.2 Vibrations / Noise

⚠ The installation of the pipes may affect the level of noise in the system:

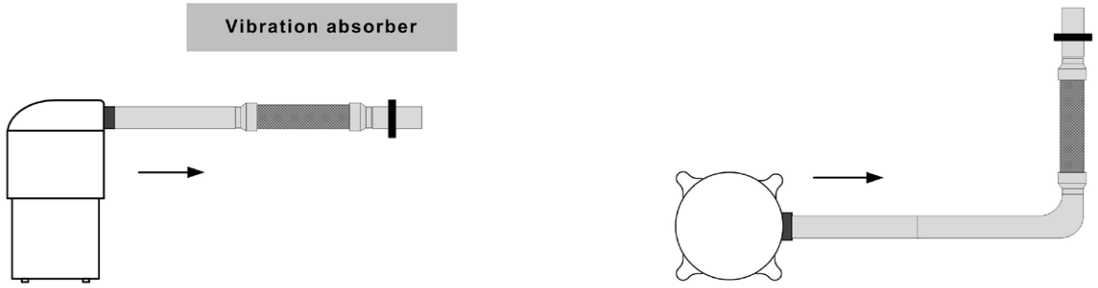
- install flexible joints between the unit and the pipes
- Install antivibration material between the brackets and the pipes so as to prevent the transmission of vibrations
- avoid the passage in particularly silent environments

Elastomer mounts

dB3 > dB2 > dB1 > 0



Vibration absorber



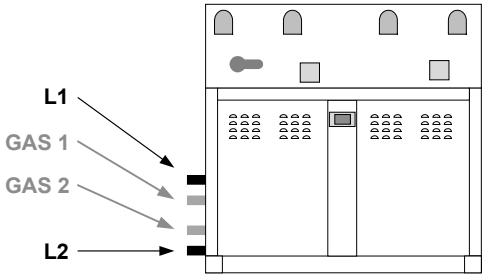
5.3 General description

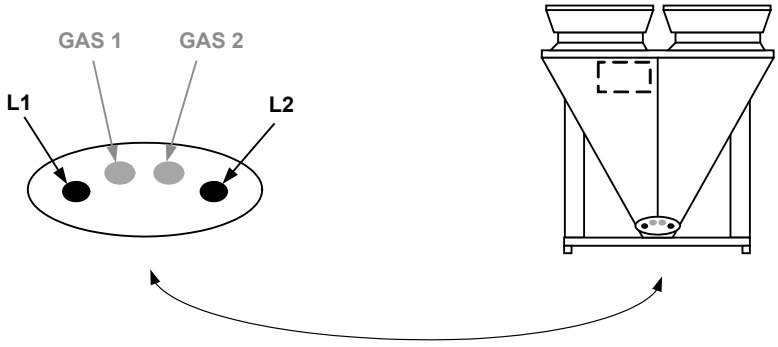
⚠ The sizing of the refrigerating connection lines is of extreme importance for the system operating and reliability.

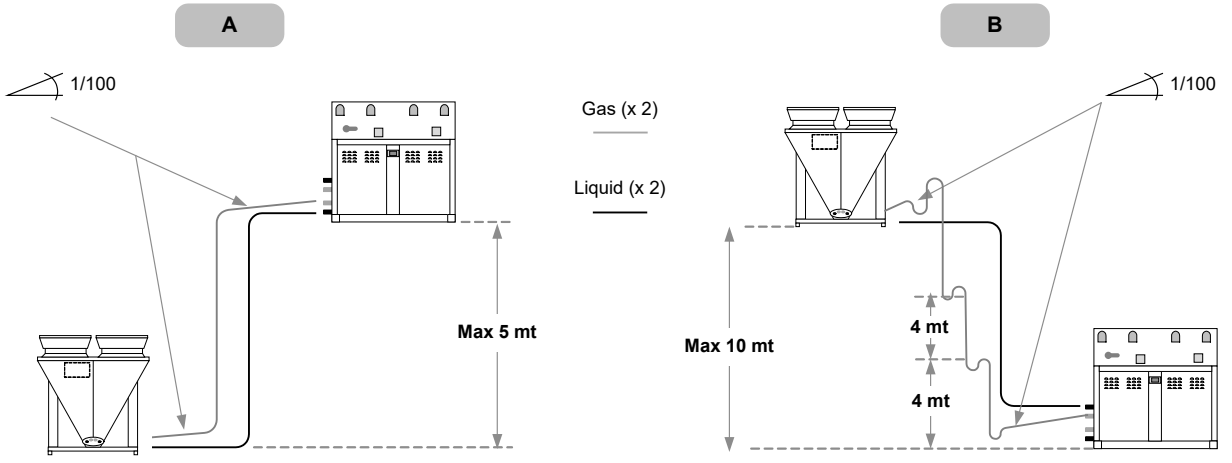
⚠ The diameter of the connection between the two units is function of distances, differences in level and curve number; it has so to be calculated by a qualified technician.

⚠ Incorrect sizing may damage the compressor or affect cooling capacity.

- The operations must be performed by an expert refrigerator technician
- use only a copper pipe for chiller operating
- pipes must be perfectly clean (perform a cleaning with nitrogen or dry air before connecting the pipes to the two units) and without humidity to allow a good vacuum operation
- pipes must not to be too much long and with too much curves
- for a good efficiency do not perform curves with a radium too much short and avoid the pipe crushing
- to allow the vacuum and charge operations install service fittings on pipes (if the unit is not fitted with taps with service fittings)







Maximum piping length and lift

	Total equivalent length (m)	Max. difference in height (m)
A	20	10
B	20	5

The equivalent length is the sum of the effective length of the piping plus a length that is equivalent to the distributed and concentrated pressure drop.

To determine the equivalent length refer to tables or data declared by the supplier of the piping.

Located leaks

Diameter for pipe thickness	Standard 90° bend	Wide radius 90° bend	Short radius 90° bend	Standard 45° bend	Short radius 45° bend	Standard 180° bend	Non return valve
							
mm	Lunghezza equivalente in m						
28x1,2	0,8	0,5	1,2	0,4	0,6	1,2	3,5
35x1,5	1,0	0,7	1,7	0,5	0,9	1,7	4,1
42x2,0	1,2	0,8	1,9	0,6	1,0	1,9	4,7
54x2,0	1,5	1,0	2,5	0,8	1,4	2,5	6,0

5.4 Risk of explosion

⚠ When you install cut-off devices (solenoid valves, taps, etc.), be aware that they may cause traps for refrigerant in the form of closed zones upstream and downstream where the refrigerant cannot freely expand.

⚠ In this situation, if there is an increase in temperature (due to exposure to the sun, proximity of pipes or sources of heat), the expansion of the trapped gas may cause the refrigeration pipes to explode.

⚠ Evaluate whether safety valves can be installed, especially in the liquid pipes that are most exposed to this risk.

5.5 Supply line

Insulate only if you want to prevent burns due to accidental contact.

5.6 Liquid line

The liquid line must be insulated if it is exposed to the sunlight or it crosses zones with a temperature higher than the external one, otherwise it can be free.

Avoid excessive diameters to not cause an excessive refrigerant charge.

5.7 solenoid valve on the liquid line

It is not necessary to install a solenoid valve.

The electronic thermostatic valve operates as a solenoid valve, also in case of blackout.

5.8 Checking for leaks

1 Check carefully that the evaporator unit taps are closed.
2 Connect the pressure gauges with the service fittings (on the taps or on the connection pipes).
3 Pressurise the system with nitrogen:
mode 1: up to PS (see the label) and wait few hours
mode 2: up to PS x 1,43 law (as according to UNI-EN 378-2)

⚠ **CAUTION: EXPLOSION DANGER**

4 Spray using a leak detector spray taps and pipes and check if bubbles are present (gas leaks).
5 Discharge the nitrogen from the unit.

5.9 Vacuum operations

Make sure that all the service outlets are closed with proper caps; if caps are not present a leak of refrigerant can be possible.

With the taps of the motor condenser closed, drain the system.

Using a gauge group, connect the vacuum pump on both connections of the taps, make sure that the solenoid valve or any intermediate taps are open, proceed with the vacuum.

Stop the pump at a pressure of about 100 Pa and leave it under vacuum for a few hours; a slight initial rise of pressure is normal, followed by stabilization.

If the pressure continues to rise, it means there are either small leaks or humidity is present. In the first case, repeat the operations in the paragraph on checking for leaks in the manual for the refrigerant pipes.

In the second case, recharge the system with refrigerant gas up to 100KPa and re-create the vacuum as described above.

Once the pressure is permanently stable, move on to the next phase, which is charging.

5.10 Refrigerant Charge

⚠ Check the type of refrigerant on the serial number label

⚠ The CEV-XN units are shipped with a nitrogen-tight charge.

⚠ The refrigerant charge must to be completed during the start-up phase, based on the type of indoor unit and on the pipe development.

Refrigerant charge for combination with remote condenser

Size			90.4	100.4	110.4	120.4	140.4	160.4
EXCELLENCE SC	C1	[kg]	44	46	47	64	66	69
	C2	[kg]	44	46	47	64	66	69
EXCELLENCE EN	C1	[kg]	44	46	54	71	73	75
	C2	[kg]	44	46	54	71	73	75

Refrigerant charge for different equivalent lengths

MSRN-XSC3 EXC SC					
Size	Refrigerant charge		Total equivalent length (m)		
			10	15	20
90.4	C1	kg	2	5	8
	C2	kg	2	5	8
100.4	C1	kg	2	5	9
	C2	kg	2	5	9
110.4	C1	kg	2	6	9
	C2	kg	2	6	9
120.4	C1	kg	2	7	12
	C2	kg	2	7	12
140.4	C1	kg	3	8	12
	C2	kg	3	8	12
160.4	C1	kg	4	8	13
	C2	kg	4	8	13

MSRN-XSC3 EXC EN					
Size	Refrigerant charge		Total equivalent length (m)		
			10	15	20
90.4	C1	kg	2	5	8
	C2	kg	2	5	8
100.4	C1	kg	2	5	9
	C2	kg	2	5	9
110.4	C1	kg	2	5	8
	C2	kg	2	5	8
120.4	C1	kg	3	8	13
	C2	kg	3	8	13
140.4	C1	kg	2	7	12
	C2	kg	2	7	12
160.4	C1	kg	3	8	13
	C2	kg	3	8	13

With the system under vacuum, close the taps of the gauge group and disconnect the vacuum pump.

Connect the refrigerant gas tank, venting the air out of the hose for connection to the gauge group.

Open the tap of the liquid line.

Open the taps of the gauge group and let liquid-state refrigerant enter using an appropriate pump.

Once charging is complete, open the gas tap so that the unit is ready to be started.

5.11 Adding oil

Consider adding oil if the connection pipes are particularly long.

Check the oil level of the compressor in the indicator or in the Schrader plug.

6 Electrical connections

The characteristics of the electrical lines must be determined by qualified electrica 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.

6.1 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 wiringdiagram Nr.

6.2 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.

6.3 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.

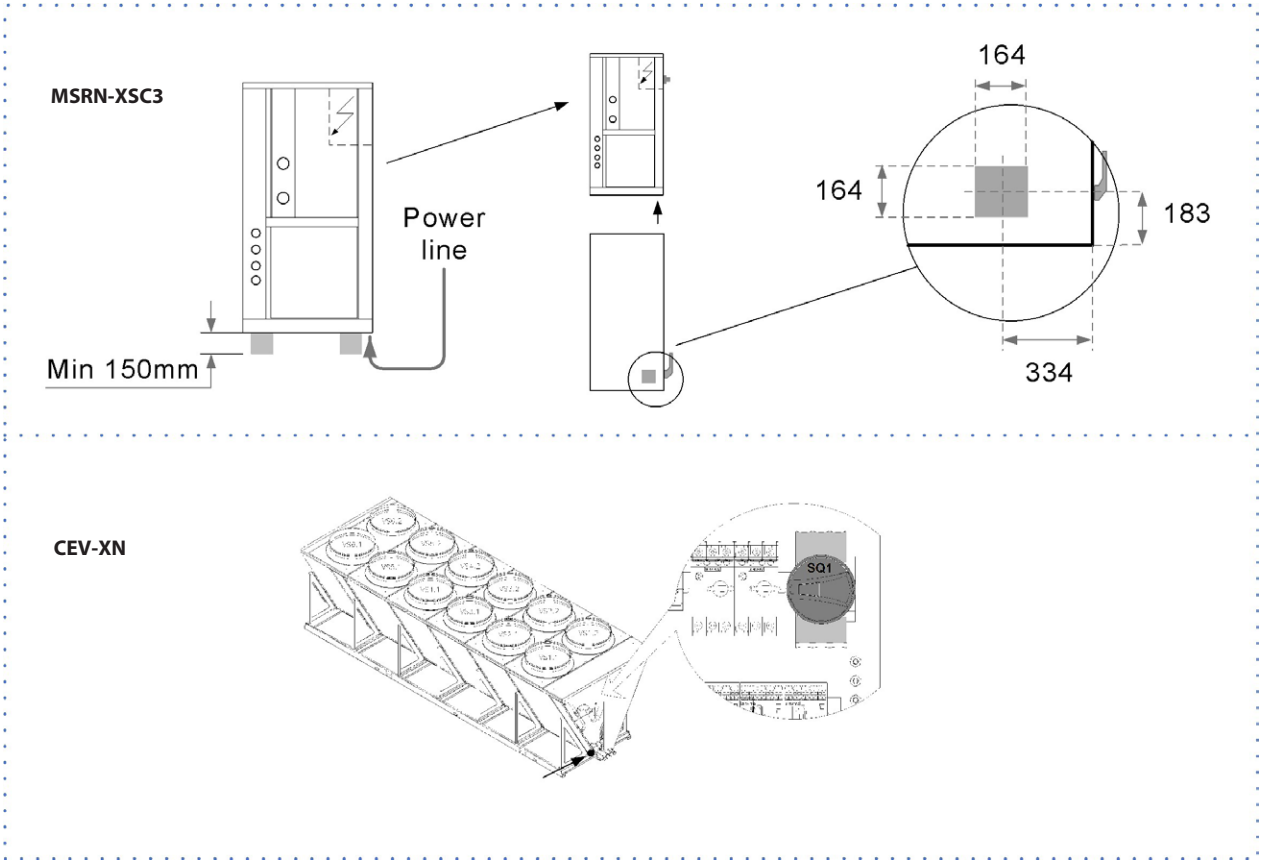
Respect impendency, capacity and attenuation indications.

6.4 Power input

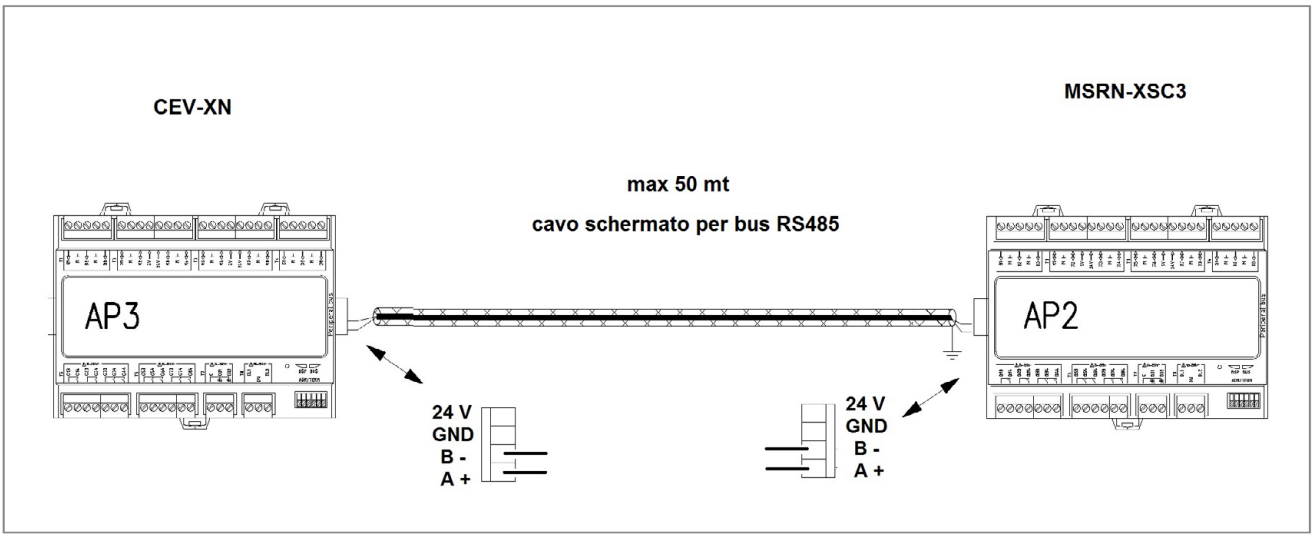
Fix the cables: if vacated may be subject to tearing.

Respect the minimum distance from the ground to allow the entry of the power line.

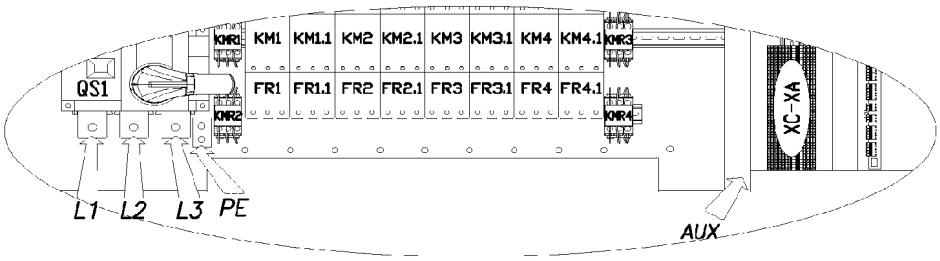
The cable must not touch the compressor and the refrigerant piping (they reach high temparatures).

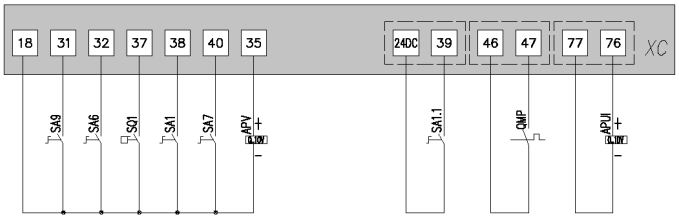


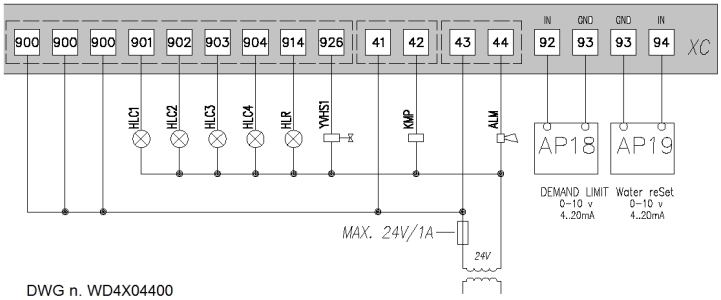
6.5 Connections performer by customer



MSRN-XSC3







DWG n. WD4X04400

ALM	segnalazione blocco cumulativo cumulative fault signal signalisation alarme Sammelstörmeldung señalización bloqueo cumulativo
HLC1-HLC4	lampada di segnalazione stato compressore compressor status signal lamp lampe de signalisation état compresseur Signallampe Verdichterzustand lámpara de señalización estado compresor
HLR	Lampada di segnalazione allarme resistenze 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 secondo set-point second set-point enabling switch sélecteur validation deuxième consigne Wahlschalter 2.Sollwert selector habilitación segundo set-point
SA6	selettore richiesta acqua sanitaria sanitary water cycle selector sélecteur demande eau sanitaire Wahlschalter der Brauchwasser selector solicitud agua sanitaria
SA7	selettore remoto "estate/inverno" remote winter/summer selector sélecteur déporté été/hiver Fernwahlschalter Winter/Sommer selector remoto verano/invierno"
SA9	termostato di richiesta raffreddamento cooling thermostat thermostat de demande refroidissement Thermostat Kühlbetrieb termostato de solicitud refrigeración

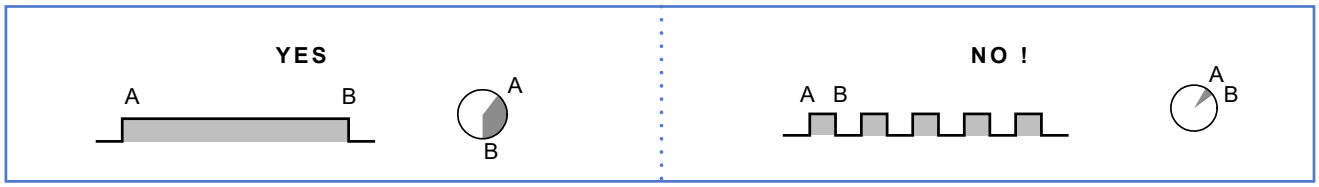
SQ1	flussostato flow switch contrôleur de débit Strömungswächter flujostato
QMP	interruttore automatico a protezione pompa ricircolo recirculation pump protection automatic device interrupteur automatique de protection pompe recirculation automatischer Schalterschutz der Umlaufpumpe interruptor automático de protección bomba recirculación
KMP	contattore pompa di circolazione evaporatore evaporator pump contactor contacteur pompe de circulation évaporateur Schütz Kaltwasserpumpe 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 usó
APV	uscita analogica 0..10V da elettronica per gestione valvola/ventilazione Free Cooling 0..10V analogical output from electronics for valve/FREE-COOLING ventilation management Sortie analogique 0..10V de électronique pour gestion soupape/ventilation FREE-COOLING Analogausgang 0..10V der Elektronik zur Steuerung des Ventils/Gebläse Free Cooling Salida analógica 0..10V de electrónica para gestión válvula/ventilación FREE-COOLING
AP18	demand-limit demand-limit demand-limit demand-limit demand-limit
AP19	Water reSet Water reSet Water reSet Water reSet Water reSet
YVHS1	valvola sanitaria sanitary valve soupape sanitaire Brauchventil válvula sanitaria

6.6 Power supply cables section / power bars

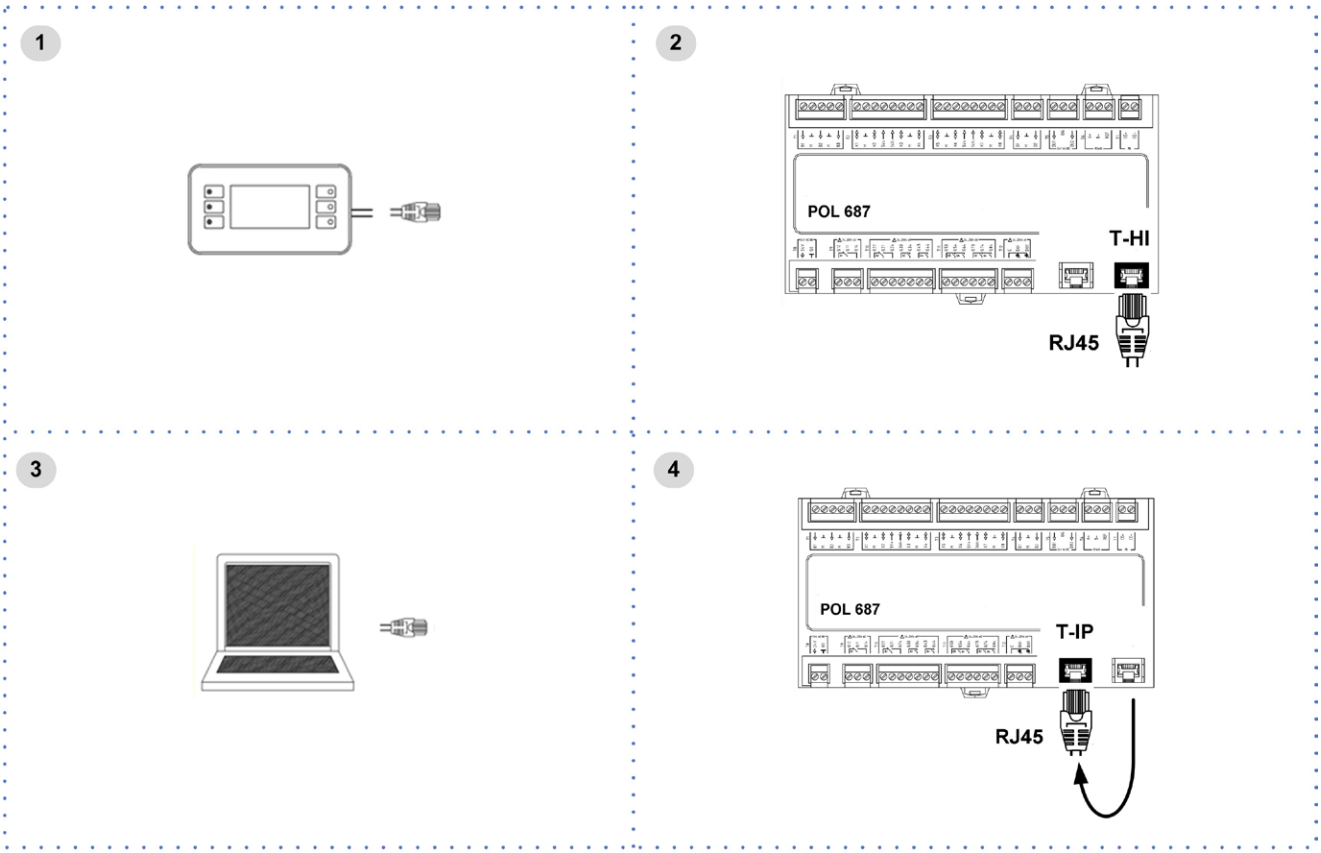
Size	90.4	100.4	110.4	120.4	140.4	160.4
Min. cable section Cu (mm^2)	1x95	1x95	1x150	1x150	1x150	1x240
Max. cable section Cu (mm^2)	1x185	1x185	1x240	1x240	1x240	1x240
Min. bar Cu section (mm^2)	-	-	-	-	-	-
Max. bar Cu width (mm)	32	32	32	32	32	40
Tightening torque (Nm)	20	20	20	20	20	20

6.7 Remote ON-OFF

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



6.8 Computer connection



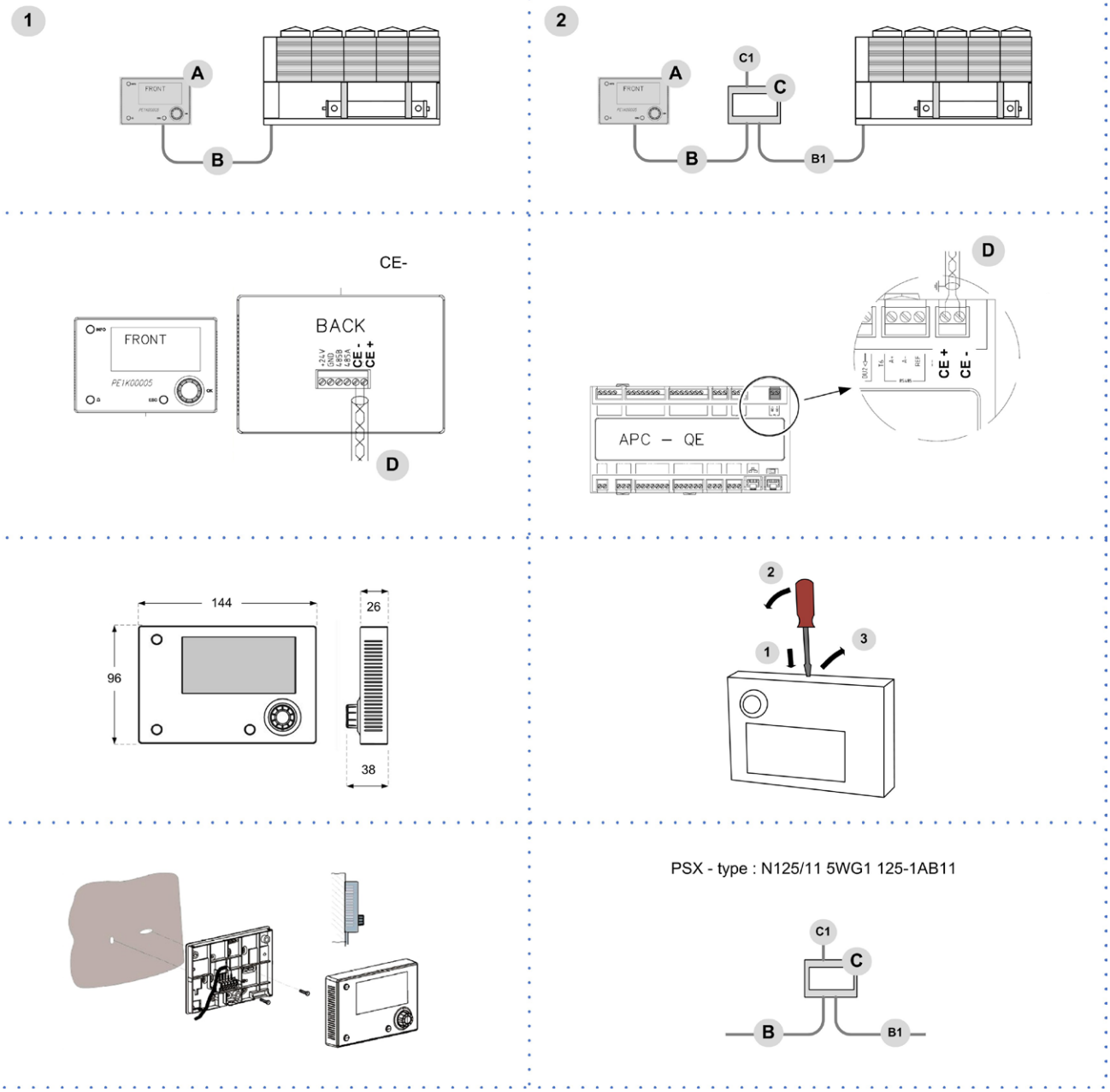
1. Service keypad
2. RJ45: standard connection
3. P.C.-not supplied
4. P.C. connection, shift RJ45 from T-HI to T-IP

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 (TPC) IPV4 and enter Property
7. set the IP address 192.168.1.100
8. set Subnet mask as 255.255.255.0
9. confirm (OK)
10. enter Start (Windows button)
11. write the command cmd and enter/do it
12. write and run the command Ping 192.168.1.42
13. the message, connection is OK, will appear when successful
14. enter the browser (Crhome, Firefox ecc)
15. write and run the command http:/192.168.1.42
16. Userid = WEB
17. Password = SBTAdmin!

6.9 Remote control

Option

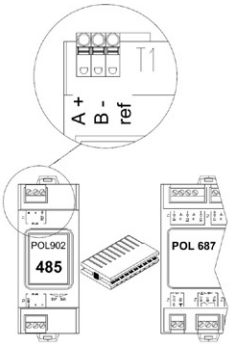


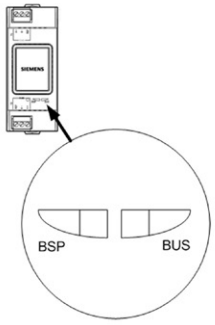
1	Distance up to 350 mt
2	Distance up to 700 mt

A	User interface
B = B1	KNX bus, max 350 mt twisted pair with shield, ø 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

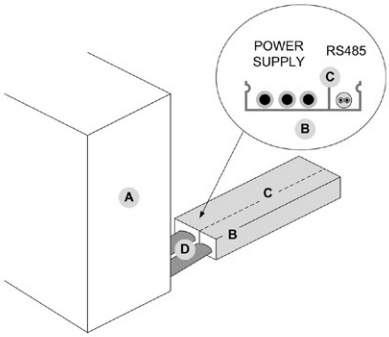
6.10 Modbus - RS485

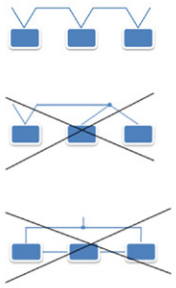
Option





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





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

Modbus / LonWorks / BACnet Cable requirements

Couple of conductors twisted and shielded

Section of conductor 0,22mm2…0,35mm2

Rated power between conductors < 50 pF/m

Nominal impedance 120 Ω

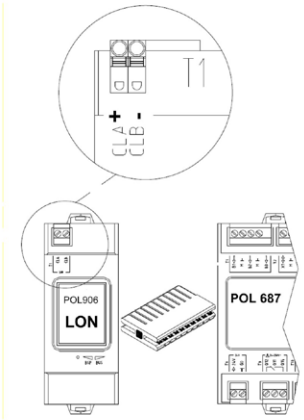
Recommended cable BELDEN 3106A

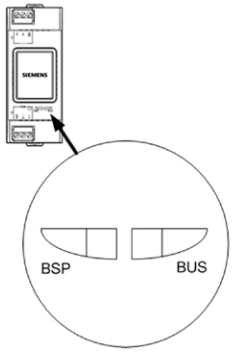
- Every RS485 serial line must be set up using the 'In/Out' bus system.
- Other types of networks are not allowed, such as Star or Ring networks.
- The difference in potential between the earth of the two RS485 devices that the cable shielding needs to be connected to must be lower than 7 V
- There must 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.

6.11 LonWorks

Option

LonWorks





LONWORK CABLE TYPE

Echelon allows three cable types for channel type TP/FT-10, including the Category 5 network cable used commonly in building automation and control (TIA 568A Cat-5).

CAT-5 SPECIFICATIONS

Unshielded cable, twisted pair with at least 18 beats per meter:

- Cross-sectional area Min.Ø 0.5mm, AWG24, 0.22mm^2
- Operating capacity between two wires of a pair < 46 nF/km
- DC loop resistance < 168 Ω
- Impedance 100 +/- 15% @ f > 1 MHz
- Capacity pair to ground, asymmetric. < 3.3 nF/km

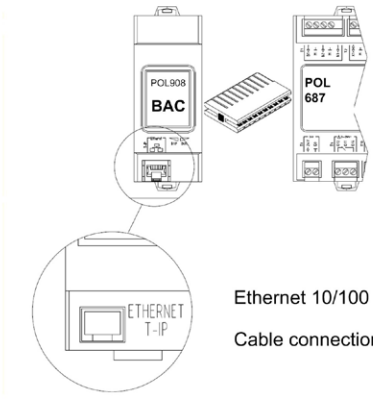
LED BSP	communication with AP1 module
green	communication ok
yellow	software ok but communication with AP1 down
red	flashing: software error
	fixed: hardware error

LED BUS	communication with LonWorks
green	ready for communication
yellow	startup
red	flashing: communicating not possible
	communication down

6.12 BACnet IP

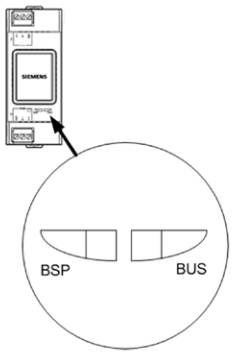
Option

BACnet



Ethernet 10/100 Mbit (IEEE 802.3U)

Cable connection RJ45 jack, 8 pins



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

LED BUS	communication with BACnet
green	ready for communication
yellow	startup
red	BACnet server down
	restart after 3 sec

7 Start-up

7.1 General description

The indicated operations should be done by qualified technician with specific training on the product.
The electrical, water connections and the other system works are by the installer.
Upon request, the service centres performing the start-up.
Agree upon in advance the star-up data with the service centre.
For details refer to the different manual sections.
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.

7.2 Preliminary checks

Unit OFF power supply

1. safety access
2. Axitop installed, if provided
3. functional spaces
4. air flow: correct return and supply (no bypass, no stratification)
5. structure integrity
6. fans run freely
7. unit on vibration isolators
8. refrigerant line section
9. length of the refrigerant lines
10. siphon on the gas line every 6 meter back up
11. vacuum and additional charge
12. unit input water filter + shut-off valves for cleaning
13. vibration isolators on water connections
14. Minimum system water content
15. expansion tank (indicative volume = 5% system content)
16. cleaned system
17. loaded system + possible glycol solution + corrosion inhibitor
18. system under pressure
19. vented system
20. refrigerant circuit visual check
21. earthing connection
22. power supply features
23. electrical connections provided by the customer

7.3 Start-up sequence

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

7.4 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.

7.5 Water circuit

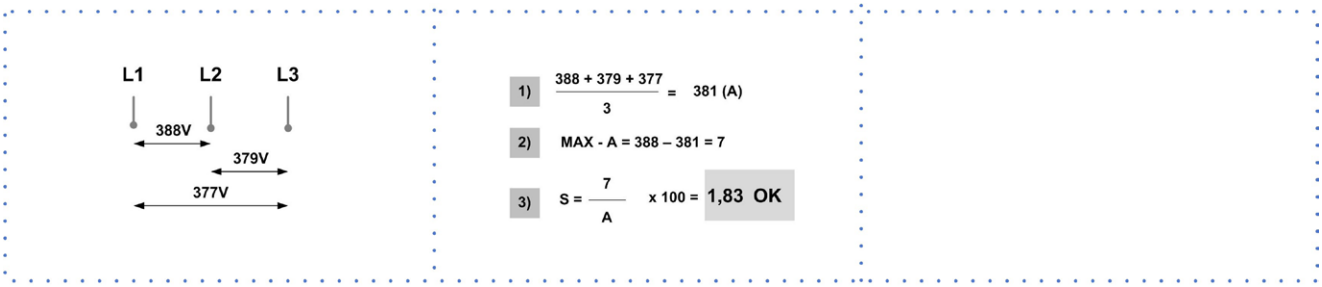
1. Before realizing the unit connection make sure that the hydraulic system has been cleaned up and the cleaning water has been drained.
2. Check that the water circuit has been filled and pressurized.
3. Check that the shut-off valves in the circuit are in the "OPEN" position.
4. Check that there isn't 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.

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

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

7.6 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.

7.7 Compressor crankcase heaters

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

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

1. Supply the resistances switching off the unit isolator switch.
2. To make sure that 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.

7.8 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).

7.9 Evaporator water flow-rate

Check that the difference between the temperature of exchanger return and supply water corresponds to power according to this formula:

unit cooling power (kW) x 860 = Dt (°C) x 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.

7.10 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

7.11 Scroll compressor

The Scroll compressors have only one rotation direction.

In the event it is reversed, the compressor is not immediately damaged, but increases its noise and jeopardises pumping.

After a few minutes, the compressor blocks due to intervention of the thermal protection.

In this case, disconnect power supply and invert 2 phases on the machine power supply.

Avoid the compressor working for a long time with contrary rotation: more than 2-3 of these anomalous start-ups can damage it.

To ensure the rotation direction is correct, measure the condensation and suction pressure.

The pressures must significantly differ: upon start-up, the suction pressure decreases whereas the condensation one, increases.

7.12 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.

7.13 Demand limit

⚠ Menu accessible only after having entered the password.

⚠ Access reserved only to specifically trained personnel.

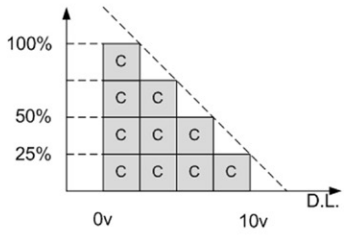
⚠ The parameter modification can cause irreversible damages.

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

The higher the signal is, the lower the number of compressors available to meet the thermal need.

If only P0002: EnDemandLimit ≠ 0

Path: Main Menu / Unit parameters / Demand limit



Step	Display	Action	Menu/Variable	Keys		Notes
1		Press 3 sec.		✓		
2	Password	Set	Password	▲	✓	
3		Press		i		
4	Main menu	Select	Unit parameters	▼	✓	
5	Unit parameters	Select	Set Point	▼	✓	
6	Set Point	Select	Demand limit	▼	✓	
7		Set	Demand limit	▲	▼	
8		Confirm		✓		
9		Press 3 sec.		⏻		
10		Select	Local connections	✓		

Path: Main Menu / Unit parameters / Demand limit

Parameters	Short description	description
P0200	setpointdemandlimit	Parameter setting of the value % of demand limit

7.14 Climatic TExt

⚠ Menu accessible only after having entered the password.

⚠ Access reserved only to specifically trained personnel.

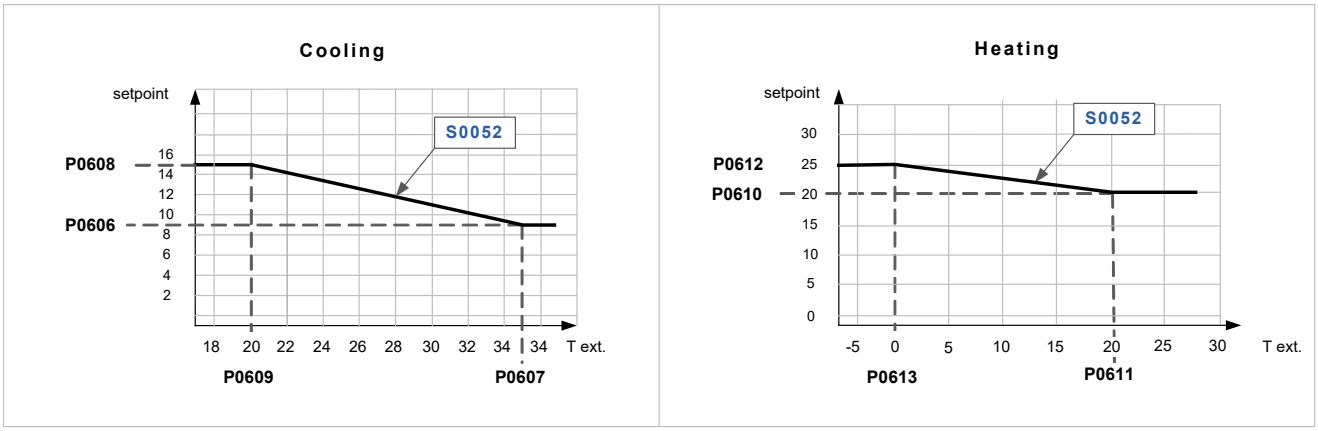
⚠ The parameter modification can cause irreversible damages.

The setpoint defined by the temperature curve is shown at status S0052: ActualUtSetp

Only if P0036: EnCompExt ≠ 0

Path: Main Menu / Unit parameters / TExt Correction config

Example



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

Path: Main Menu / Unit parameters / TExt Correction config

Parameters	Short description	description
P0606	CSptLow	setpoint temperature value when the air temperature value is AirAtSptLowC
P0607	AirAtSetPointLowC	external air temperature value where the calculated setpoint takes on the value given by CSptLow
P0608	CSptHigh	setpoint temperature value when the air temperature value is AirAtSptHigC
P0609	AirAtSetPointHighC	external air temperature value where the calculated setpoint takes on the value given by CSptHigh
P0610	HSptLow	setpoint temperature value when the air temperature value is AirAtSptLowH
P0611	AirAtSptLowH	external air temperature value where the calculated setpoint takes on the value given by HSptLow
P0612	HSptHigh	setpoint temperature value when the air temperature value is AirAtSptHigH
P0613	AirAtSptHigH	external air temperature value where the calculated setpoint takes on the value given by HSptHigh

P0606 / P0609: Coooling
P0610 / P0613: Heating

7.15 Water reset

⚠ Menu accessible only after having entered the password.

⚠ Access reserved only to specifically trained personnel.

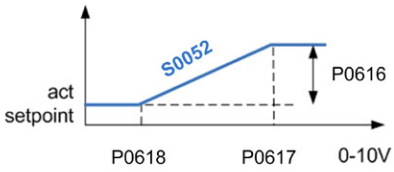
⚠ The parameter modification can cause irreversible damages.

The water reset correction affects the setpoint defined by the Climate curve TExt (actual setpoint).

The setpoint is shown at status S0052: ActualUtSetp

Only if P0003: En WaterReset ≠ 0

Path: Main menu / Unit parameters / Water reset config



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

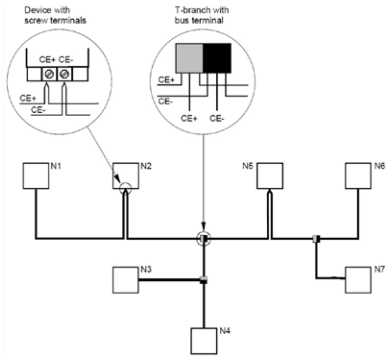
Path: Main Menu / Unit parameters / Water reset

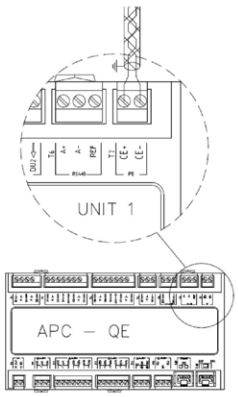
Parameters	Short description	description
P0616	MaxCWRC	Maximum correction to be applied to the setpoint Cooling
P0617	SWRMaxC	Value of the WR control signal corresponding to the correction of the set Cool equal to P0616
P0618	SWRMinC	Value of the WR control signal corresponding to the correction of the set COOL equal to 0
P0615	MaxCWRH	Maximum correction to be applied to the setpoint Heating
P0619	SWRMaxH	Value of the WR control signal corresponding to the correction of the set Heating equal to P0615
P0620	SWRMinH	Value of the WR control signal corresponding to the correction of the set Heating equal to 0

P0616 / P0618: Cooling
P0615, P0619, P0620: Heating

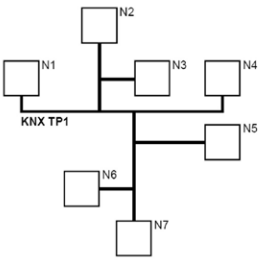
7.16 ECOSHARE function for the automatic management of a group of units

- Max 7 units
- Maximum length of the bus line: 700 m.
- Maximum distance between 2 units: 300 m
- Type of cable: shielded twisted pair cable Ø 0,8 mm. use an EIB/KNX cable
- Possible connections: Tree, star, in/out bus, mixed
- It is not possible to use a ring connection
- No end-of-line resistor or terminator required
- There must be suitable arresters to protect the serial lines from the effects of atmospheric discharges
- The data line must be kept separate from the power conductors or powered at different voltage values and away from possible sources of electrical interference

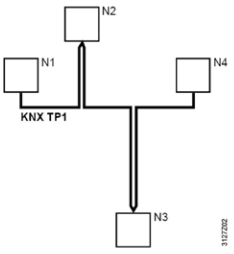


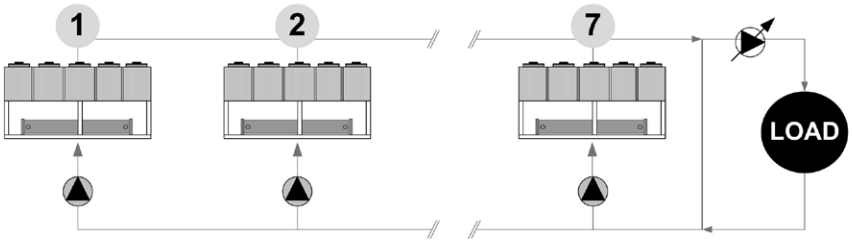


Tree topology (with stub lines)



Line topology (with loops)





If there are more units connected in a local network set the mode of operation.

MODE A

Every unit manages its own compressors according to the setpoint.

Every unit optimizes its refrigeration circuits.

Pumps always active, even with compressor stoped.

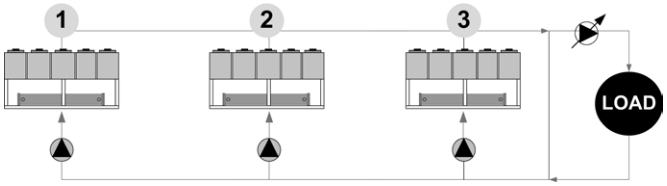
P0658 = 0

P0657 > 0 °C

setpoint1 > setpoint2 > setpoint3

or

setpoint1 < setpoint2 < setpoint3



MODE B

The master manages the single cooling.

The master optimizes individual refrigerant circuits.

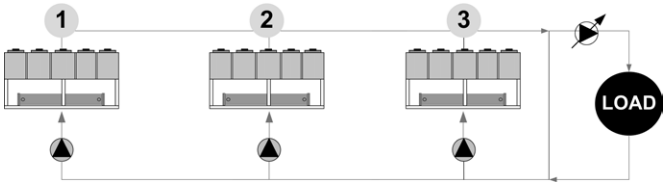
Pumps always active, even with compressor stoped.

P0658 = 1

P0657 = 0 °C

setpoint1 = setpoint2 = setpoint3

plus: optimal H2O temperature control



MODE C

The master manages the single cooling.

The master optimizes individual refrigerant circuits.

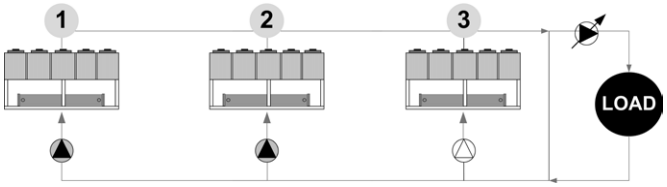
Active pumps only with active compressors.

P0658 = 2

P0657 = 0 °C

setpoint1 = setpoint2 = setpoint3

plus: minimum pumps consumption need balanced system (t1 = t2 = t3)



Path: Main Menu / Unit parameters / Master Slave

Parameters	Short description	description
P0655	LNinstalledUnits	Number of network-connected units including the master
P0656	LNStandByUnits	Number of units kept in standby
P0657	LNOffset	Temperature Offset the master sum or subtract, depending on the way you set, in order of priority, to the set point of the slave
P0658	TypeRegMS	Operation mode: 0=mode A; 1=mode B; 2=mode C
P0659	LNAddress	ProcessBus address unit

7.17 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.

7.18 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)

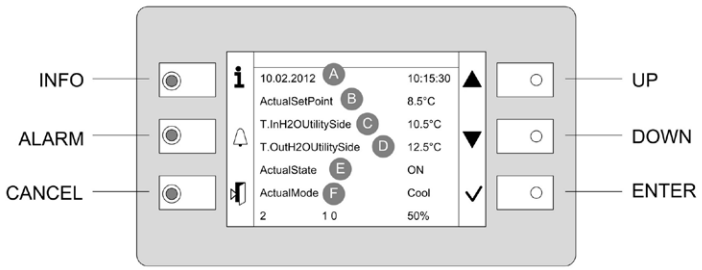
Certification of setting in service:

- for all the units

Periodical verifications:

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

8 Control



8.1 Led

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

⚠ Heat: Heating (not used)

8.2 Display

Ref.	Variable	description
A		Date - Time
B	**ActualSetPoint**	Temperature setting
C	**T.InH2OUtilitySide**	Water inlet temperature utility side
D	**T.OutH2OUtilitySide**	Water outlet temperature utility side
E	**ActualState**	On / off / eco / pmp On
F	**ActualMode**	Cool: water cooling Heat: HEATING
	2	Installed compressors
	1 - 0	Compressors ON example: circuit 1 = 1 compr. On circuit 2 = 0 compr. On
	50%	Heating capacity

8.3 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

8.4 Change unit state

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

* Local state

ECO: recurrent pump ON-OFF; compressors keep water system at setpoint ECO

Pmp ON: pump ON, compressor OFF

8.5 Change the mode

Step	Display	Action	Menu/Variable	Keys		Notes
1		Press				
2	Main menu	Select	Cmd Local mode			
3		Set	Cool: water cooling Heat: HEATING			
4		Confirm				
5		Exit				

8.6 Modify setpoint

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

Parameters	Short description	description	
P0583	SetPointCooling	Setpoint Cool	
P0584	2SetPointCooling	2° Setpoint Cool	Enable by remote switch
P0855	SetPointECOCooling	Economic summer SetPoint	
P0577	SetPointHeating	Setpoint Heat	
P0578	2SetPointHeating	2° Setpoint Heat	
P0579	SetPointECOHeating	Economic winter SetPoint	
P0640	SetPointRecover	Recovery Set Point	
P0580	ACSSetPoint	domestic hot water set point	

8.7 Scheduler

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

Step	Display	Action	Menu/Variable	Keys		Notes
1		Press				
2	Main menu	Select	Scheduler			
3	Scheduler	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	Display	Action	Menu/Variable	Keys		Notes
1		Press 3 sec.				
2	Password	Set	Password			
3		Press				*
4	Main menu	Select	Unit Parameters			
5		Select	Option config			
6		Set	P0052=1			
7		Press 3 sec.				
		Select	Local connections			

* Unit Parameters menu is displayed

8.8 Display the status

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

Nr.	GENERAL STATA
50	Current Mode
51	Current Status
52	Current Setpoint User-side
53	Steps Qty
54	Steps On
55	Current Setpoint Recovery
56	Alarms
57	Warning
58	Recovery Request
59	User-side Request
60	Domestic Hot Water Status
801	Recovery Pump 1 Hours
802	Recovery Pump 2 Hours
803	Recovery Pump 3 Hours
-	Bitmap Alarms 1
-	Bitmap Alarms 2
-	Bitmap Alarms 3
-	Bitmap Alarms 4

Nr.	USER-SIDE STATA
80	User-side Pump 1 Command
81	User-side Pump 2 Command
82	User-side Pump 3 Command
83	User-side Inverter Command
84	User-side Inverter Signal
85	User-side Inverter Reset
86	Pump On for Anti-freeze
87	Anti-freeze Heaters User side
88	User-side Flow Request
89	LimitFlow Heating
90	LimitFlow Recovery
91	LimitFlow Cooling
92	User-side Pump 1 Hours
93	User-side Pump 2 Hours
94	User-side Pump 3 Hours

Nr.	SOURCE STATA
70	Source Pump 1 Command
71	Source Pump 2 Command
72	Source Pump 2 Command
73	Source Inverter Command
74	Source Inverter Signal
75	Source Inverter Reset
1601	Source Pump 1.1 Hours
1602	Source Pump 2.1 Hours
1603	Source Pump 3.1 Hours
2601	Source Pump 1.2 Hours
2602	Source Pump 2.2 Hours
2603	Source Pump 3.2 Hours

Nr	CIRCUIT 1 STATA
1001	Current Schema 1.1
1002	SubCooling
1003	Current capacity %
1004	Pressure ratio
1005	Envelope Zone 1.1
1006	Envelope Zone 2.1
1007	Envelope Zone 3.1
1008	Offset Envelope 1.1
1009	Superheat Set PID 3.1
1100	Defrost Command 1.1
1101	Superheat Set PID 1.1
1102	Superheat Set PID 2.1
1103	Number Compressors On
1104	Compressor 1.1 Starts
1105	Compressor 2.1 Starts
1106	Compressor 3.1 Starts
1107	Compressor 1.1 Hours
1108	Compressor 2.1 Hours
1109	Compressor 3.1 Hours
-	EEV PID 1 controller status
-	EEV PID 2 controller status
-	EEV PID 3 controller status
-	Source EEV 1
-	Source EEV 2
-	User-side EEV
-	Bitmap Alarms 1.1
-	Bitmap Alarms 2.1
-	Bitmap Alarms 3.1
-	Bitmap Alarms 4.1

Nr.	DIGITAL INPUT
100	2nd Setpoint User-side
101	Recovery System Load
102	User-side System Load
103	Domestic Hot Water Request
104	Recovery Request
105	User-side Request
106	F.C. O. YV Cool
107	F.C. O. YV Heat
108	F.C. C. YV Cool
109	F.C. C. YV Heat
110	Free-cooling Flow
111	Recovery Flow
112	Source Flow
113	User-side Flow
114	Remote Heat/Cool
115	Remote On/Off
116	Phase Monitor
117	Free-cooling Pressure
118	Recovery Inverter Protection
119	Source Inverter Protection
120	User-side Inverter Protection
121	Free-cooling Pump 1 Protection
122	Recovery Pump 1 Protection
123	Source Pump 1 Protection
124	User-side Pump 1 Protection
125	Free-cooling Pump 2 Protection
126	Recovery Pump 2 Protection
127	User-side Pump 2 Protection
128	Free-cooling Pump 3 Protection
129	Recovery Pump 3 Protection
130	Source Pump 3 Protection
131	User-side Pump 3 Protection
132	Leak Detector
138	Source Pump 2 protection
139	Source System Load
1180	High Pressure 1.1
1181	Compressor 1.1 Protection
1182	Compressor 2.1 Protection
1184	Source Fan 1.1 Protection
2180	High Pressure 1.2
2181	Compressor 1.2 Protection
2183	Compressor 2.2 Protection
2184	Source Fan 1.2 Protection

Nr.	ANALOGIC INPUT
201	Demand Limit
202	User-side Differential Pressure switch
203	Free-cooling Water Temperature
204	External Air Temperature
205	Recovery In Temperature
206	Recovery Out Temperature
207	Cabinet Temperature
208	Water Reset
830	User-side In Temperature
831	User-side Out Temperature
885	Source In Temperature
886	Source Out Temperature
1201	Suction Pressure 1.1
1202	Suction Pressure 2.1
1203	Discharge Pressure 1.1
1204	Suction Temperature 1.1
1205	Suction Temp 2.1
1206	Suction Temperature 3.1
1207	Source In Temperature 1.1
1208	Recovery Liquid Temperature 1.1
1209	Source Out Temperature 1.1
1210	Discharge Temperature 1.1
1211	Discharge Temperature 2.1
2201	Suction Pressure 1.2
2202	Suction Pressure 2.2
2203	Discharge Pressure 1.2
2204	Suction Temperature 1.2
2205	Suction Temperature 2.2
2206	Suction Temperature 3.2
2207	Source In Temperature 1.2
2208	Recovery Liquid Temperature 1.2
2209	Source Out Temperature 1.2
2210	Discharge Temperature 1.2
2211	Discharge Temperature 2.2

Nr.	OUTPUT ANALOGICI
301	User-side YV Bypass
302	Grouped Alarms
303	Free-cooling Pump 1
304	Recovery Pump 1
305	Free-cooling Pump 2
306	Recovery Pump 2
307	Free-cooling Pump 3
308	Recovery Pump 3
309	Anti-freeze Heaters
310	Free-cooling Heaters
311	Cabinet Heating
312	Cabinet Fan
313	Domestic Hot Water Valve
314	Free-cooling Valve Open
315	Free-cooling Valve Close
318	YV 1 Cooling
319	YV 2 Heating
320	YV 3 Cooling
321	YV 4 Heating
1301	Aries / Defrost Injection 1.1
1302	Source Pump 1.1 Command
1303	Compressor 1.1 Command
1304	Compressor 2.1 Command
1305	Liquid Injection 1.1
1306	Liquid Injection 2.1
1307	RecValve Battery 1.1
1308	RecValve Chiller 1.1
1309	RecValve Recovery 1.1
1310	Reversing Cycle Valve 1.1
2301	Aries / Defrost Injection 1.2
2302	Source Pump 2.1 Command
2303	Compressor 1.2 Command
2304	Compressor 2.2 Command
2305	Liquid Injection 1.2
2306	Liquid Injection 2.2
2307	RecValve Battery 1.2
2308	RecValve Chiller 1.2
2309	RecValve Recovery 1.2
2310	Reversing Cycle Valve 1.2

Nr.	ANALOGIC OUTPUT
401	Free-cooling Valve
402	Recovery Pump Signal
1401	Source Fan 1.1
2401	Source Fan 1.2

8.9 Keyboard settings

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

8.10 Alarms

Before resetting an alarm identify and remove its cause.
Repeated resets can cause irreversible damage.
Example:
+ eE0001: Phase monitor: Fault = active alarm
- EE0003: Pum 1 faulty: Ok = resetted alarm
Display of alarm: step 1-3
Reset allarm: step 4-10

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

For details see:
General list of alarms

8.11 General list of alarms

ELECTRICAL CIRCUIT ALARMS			
Num	**Name**	**Description**	**Category**
eE0001	Phase monitor	Phase monitor fault	Central
EE0003	Pump 1 faulty	User side pump 1 overload protection	GP Ut
EE0004	Pump 2 faulty	User side pump 2 overload protection	GP Ut
EE0005	Pump 3 faulty	User side pump 3 overload protection	GP Ut
eE0008	Utility Inverter Protection	User side inverter overload protection	GP Ut
ee0010	Master Offline	Master unit offline	MS
ee0011	Unit 2 in alarm	2nd slave unit fault	MS
ee0012	Unit 2 OffLine	2nd slave unit offline	MS
ee0013	Unit 3 in alarm	3rd slave unit fault	MS
ee0014	Unit 3 OffLine	3rd slave unit offline	MS
ee0015	Unit 4 in alarm	4th slave unit fault	MS
ee0016	Unit 4 OffLine	4th slave unit offline	MS
ee0017	Unit 5 in alarm	5th slave unit fault	MS
ee0018	Unit 5 OffLine	5th slave unit offline	MS
ee0019	Unit 6 in alarm	6th slave unit fault	MS
ee0020	Unit 6 OffLine	6th slave unit offline	MS
ee0021	Unit 7 in alarm	7th slave unit fault	MS
ee0022	Unit 7 OffLine	7th slave unit offline	MS
ee0027	Utility Water In temp Error	User side in water temperature probe fault	Central
ee0028	Utility Water Out temp Error	User side out water temperature probe fault	Central
ee0029	Temp Ext Sensor Error	External air temperature probe fault	HW
ee0030	DemandLimit	Demand limit fault	HW
ee0031	WaterReset	Water reset fault	HW
ee0032	External Humidity probe Error	Relative humidity probe fault	HW
ee0033	T.Quadro Ele	Electrical panel temperature probe fault	HW
ee0035	YV Cool Open	YV Cool opening fault	4P
ee0036	YV Heat Open	YV Heat opening fault	4P
ee0037	YV Cool Close	YV Cool closing fault	4P
ee0038	YV Heat Close	YV Heat closing fault	4P
ee0040	FCI Water Temp.	Freecoling water temperature probe fault	HW FCI
EE0044	Pump 1 Allarm	Freecooling pump 1 overload protection	FCI Circuit 1
EE0045	Pump 2 Allarm	Freecooling pump 2 overload protection	FCI Circuit 1
EE0046	Pump 3 Allarm	Freecooling pump 3 overload protection	FCI Circuit 1
ee0047	Pump Change for Utility Flow	Switching pump on user side for flow alarm	GP User side
ee0050	P.DifferenzialeUtil	User side differential pressure sensore fault	HW
EE0054	Recovery Pump 1 protection	Recovery side pump 1 overload protection	Recovery
EE0055	Recovery Pump 2 protection	Recovery side pump 2 overload protection	Recovery
EE0056	Recovery Pump 3 protection	Recovery side pump 3 overload protection	Recovery
eE0057	Recovery Inverter Protection	Recovery side inverter overload protection	Recovery
ee0100	TimeOutModPOL98U	1st POL98U module disconnected	HW TimeOut
ee0101	TimeOutModPOL98U_2	2nd POL98U module disconnected	HW TimeOut
ee0102	TimeOutModPOL96U	POL96U module disconnected	HW TimeOut
ee0103	TimeOutModPOL945	POL945 module disconnected	HW TimeOut

ELECTRICAL CIRCUIT ALARMS			
Num	**Name**	**Description**	**Category**
ee0104	TimeOutModPOL965	POL965 module disconnected	HW TimeOut
ee0105	TimeOutModPOL94U	1st POL94U module disconnected	HW TimeOut
ee0106	TimeOutModPOL94U_2	2nd POL94U module disconnected	HW TimeOut
ee0107	TimeOutModPOL985	POL985 module disconnected	HW TimeOut
ee1001	T.Suction Gas	Gas temperature probe 3 fault	HW Circuit 1
ee1002	T.Suction Gas	Gas temperature probe 5 fault	HW Circuit 1
ee1003	P.Suction Heat	Pressure sensor fault, low pressure heating	HW Circuit 1
ee1004	EEV1 blocked	EEV 1 blocked	Circuit 1
ee1005	EEV1 blocked	EEV2 blocked	Circuit 1
EE1006	Comp 1 protections	Compressor 1 overload protection	Circuit 1
EE1007	Comp 2 protections	Compressor 2 overload protection	Circuit 1
EE1008	Comp 3 protections	Compressor 3 overload protection	Circuit 1
EE1009	Source Inverter Protection	Source side inverter overload protection	Source 1
ee1010	Pump Change for Source Flow	Switching pump on source side for flow alarm	Source 1
EE1013	Source Pump 1 protection	Source side pump 1 overload protection	Source 1
EE1014	Source Pump 2 protection	Source side pump 2 overload protection	Source 1
EE1015	Source Pump 3 protection	Source side pump 3 overload protection	Source 1
EE1018	Source side protection	Source side ventilation overload protection	Circuit 1
ee1022	T.Discharge C1.1	Compressor 1 discharge temperature probe fault	HW Circuit 1
ee1023	T.Discharge C2.1	Compressor 2 discharge temperature probe fault	HW Circuit 1
ee1024	T.Discharge C3.1	Compressor 3 discharge temperature probe fault	HW Circuit 1
ee1025	T.Source 1	Source 1 temperature probe fault	HW Circuit 1
ee1026	T.Source 2	Source 2 temperature probe fault	HW Circuit 1
ee1027	T.Suction Gas	Suction temperature probe fault	HW Circuit 1
ee1028	P.Discharge	High pressure probe fault	HW Circuit 1
ee1029	P.Suction	Low pressure probe fault	HW Circuit 1
ee1030	T.GasRecovery	Recovery exchanger gas temperature probe fault	HW Circuit 1
ee1031	P.GasRecovery	Recovery exchanger gas pressure probe fault	HW Circuit 1
ee1032	T.Ing Recovery	Recovery in temperature probe fault	HW Circuit 1
ee1033	T.Out Recovery	Recovery out temperature probe fault	HW Circuit 1
ee1037	Alarm Inverter 1	Inverter 1 in alarm	Inverter APY
ee1038	Alarm missing comunication inv1	Inverter 1 Modbus communication error	Inverter APY
ee1039	Timeout comunication inv1	Inverter 1 communication timeout	Inverter APY
ee1040	Alarm Inverter 2	Inverter 2 in alarm	Inverter APY
ee1041	Alarm missing comunication inv2	Inverter 2 Modbus communication error	Inverter APY
ee1042	Timeout comunication inv2	Inverter 2 communication timeout	Inverter APY
ee1043	Alarm Inverter 3	Inverter 3 in alarm	Inverter APY
ee1044	Alarm missing comunication inv3	Inverter 3 Modbus communication error	Inverter APY
ee1045	Timeout comunication inv3	Inverter 3 communication timeout	Inverter APY
EE1047	Alarm Envelop Comp1	Compressor 1 envelope alarm	Circuit 1
EE1048	Alarm Envelop Comp2	Compressor 2 envelope alarm	Circuit 1
EE1049	Alarm Envelop Comp3	Compressor 3 envelope alarm	Circuit 1
ee1055	Alarm Inverter 1	Inverter 1 in alarm	Inverter DFS
ee1056	Alarm missing comunication inv1	Inverter 1 Modbus communication error	Inverter DFS
ee1057	Timeout comunication inv1	Inverter 1 communication timeout	Inverter DFS

ELECTRICAL CIRCUIT ALARMS			
Num	**Name**	**Description**	**Category**
ee1058	Alarm Inverter 2	Inverter 2 in alarm	Inverter DFS
ee1059	Alarm missing comunication inv2	Inverter 2 Modbus communication error	Inverter DFS
ee1060	Timeout comunication inv2	Inverter 2 communication timeout	Inverter DFS
ee1061	Alarm Inverter 3	Inverter 3 in alarm	Inverter DFS
ee1062	Alarm missing comunication inv3	Inverter 3 Modbus communication error	Inverter DFS
ee1063	Timeout comunication inv3	Inverter 3 communication timeout	Inverter DFS
ee1070	User side ECV 1.1	User side ECV connection problem	HW Circuit 1
ee1071	Source ECV 1.1	Source side ECV 1 connection problem	HW Circuit 1
ee1072	Source ECV 2.1	Source side ECV 2 connection problem	HW Circuit 1
ee2001	T.Suction Gas	Gas temperature probe 4 fault	HW Circuit 2
ee2002	T.Suction Gas	Gas temperature probe 6 fault	HW Circuit 2
ee2003	P.Suction Heat	Pressure sensor fault, low pressure heating	HW Circuit 2
ee2004	EEV1 blocked	EEV1 blocked	Circuit 2
ee2005	EEV1 blocked	EEV2 blocked	Circuit 2
EE2006	Comp 1 protections	Compressor 1 overload protection	Circuit 2
EE2007	Comp 2 protections	Compressor 2 overload protection	Circuit 2
EE2008	Comp 3 protections	Compressor 3 overload protection	Circuit 2
EE2009	Source Inverter Protection	Source side inverter overload protection	Source 2
ee2010	Pump Change for Source Flow	Switching pump on source side for flow alarm	Source 2
EE2013	Source Pump 1 protection	Source side pump 1 overload protection	Source 2
EE2014	Source Pump 2 protection	Source side pump 2 overload protection	Source 2
EE2015	Source Pump 3 protection	Source side pump 3 overload protection	Source 2
EE2018	Source side protection	Source side ventilation overload protection	Circuit 2
ee2022	T.Discharge C1.1	Compressor 1 discharge temperature probe fault	HW Circuit 2
ee2023	T.Discharge C2.1	Compressor 2 discharge temperature probe fault	HW Circuit 2
ee2024	T.Discharge C3.1	Compressor 3 discharge temperature probe fault	HW Circuit 2
ee2025	T.Source 1	Source 1 temperature probe fault	HW Circuit 2
ee2026	T.Source 2	Source 2 temperature probe fault	HW Circuit 2
ee2027	T.Suction Gas	Suction gas temperature probe fault	HW Circuit 2
ee2028	P.Discharge	High pressure probe fault	HW Circuit 2
ee2029	P.Suction	Low pressure probe fault	HW Circuit 2
ee2030	T.GasRecovery	Recovery exchanger gas temperature probe fault	HW Circuit 2
ee2031	P.GasRecovery	Recovery exchanger gas pressure probe fault	HW Circuit 2
ee2032	T.Ing Recovery	Recovery in temperature probe fault	HW Circuit 2
ee2033	T.Out Recovery	Recovery out temperature probe fault	HW Circuit 2
ee2037	Alarm Inverter 1	Inverter 1 in alarm	Inverter APY
ee2038	Alarm missing comunication inv1	Inverter 1 Modbus communication error	Inverter APY
ee2039	Timeout comunication inv1	Inverter 1 communication timeout	Inverter APY
ee2040	Alarm Inverter 2	Inverter 2 in alarm	Inverter APY
ee2041	Alarm missing comunication inv2	Inverter 2 Modbus communication error	Inverter APY
ee2042	Timeout comunication inv2	Inverter 2 communication timeout	Inverter APY

ELECTRICAL CIRCUIT ALARMS			
Num	**Name**	**Description**	**Category**
ee2043	Alarm Inverter 3	Inverter 3 in alarm	Inverter APY
ee2044	Alarm missing comunication inv3	Inverter 3 Modbus communication error	Inverter APY
ee2045	Timeout comunication inv3	Inverter 3 communication timeout	Inverter APY
EE2047	Alarm Envelop Comp1	Compressor 1 envelope alarm	Circuit 2
EE2048	Alarm Envelop Comp2	Compressor 2 envelope alarm	Circuit 2
EE2049	Alarm Envelop Comp3	Compressor 3 envelope alarm	Circuit 2
ee2055	Alarm Inverter 1	Inverter 1 in alarm	Inverter DFS
ee2056	Alarm missing comunication inv1	Inverter 1 Modbus communication error	Inverter DFS
ee2057	Timeout comunication inv1	Inverter 1 communication timeout	Inverter DFS
ee2058	Alarm Inverter 2	Inverter 2 in alarm	Inverter DFS
ee2059	Alarm missing comunication inv2	Inverter 2 Modbus communication error	Inverter DFS
ee2060	Timeout comunication inv2	Inverter 2 communication timeout	Inverter DFS
ee2061	Alarm Inverter 3	Inverter 3 in alarm	Inverter DFS
ee2062	Alarm missing comunication inv3	Inverter 3 Modbus communication error	Inverter DFS
ee2063	Timeout comunication inv3	Inverter 3 communication timeout	Inverter DFS
ee2070	User side ECV 1.1	User side ECV connection problem	HW Circuit 2
ee2071	Source ECV 1.1	Source side ECV 1 connection problem	HW Circuit 2
ee2072	Source ECV 2.1	Source side ECV 2 connection problem	HW Circuit 2

REFRIGERANT CIRCUIT ALARMS			
Num	**Name**	**Description**	**Category**
ff1005	Min overheating EEV1	Value of refrigerant superheat too low EEV1 (user side)	Circuit 1
ff1006	Min overheating EEV2	Value of refrigerant superheat too low EEV1 (source)	Circuit 1
fF1009	Low Pressure Alarm (DI)	Low Pressure Alarm (DI)	Circuit 1
ff1010	Warning LP Cool	Low Pressure Pre Alarm in Cooling Mode	Circuit 1
ff1011	Warning LP Heat	Low Pressure Pre Alarm in Heating Mode	Circuit 1
fF1012	Low pressure Alarm Heat (AI)	Low Pressure in Heating Mode (AI)	Circuit 1
fF1013	High Pressure (DI)	High Pressure Alarm (DI)	Circuit 1
ff1014	Warning High Pressure	High Pressure Pre Alarm	Circuit 1
fF1015	High Pressure Alarm (AI)	High Pressure Alarm (AI)	Circuit 1
ff1016	Max RC Warning	Maximum Pressure Ratio Pre Alarm	Circuit 1
fF1017	Min RC Alarm	Minimum Pressure Ratio Pre Alarm	Circuit 1
fF1018	Low Pressure Alarm Cool(AI)	Low Pressure Alarm in Cooling Mode	Circuit 1
FF1019	Max RC Alarm	Maximum Pressure Ratio	Circuit 1
FF1034	Vacuum Circuit	Vaacum Alarm	Circuit 1
FF1046	LimLp	Low pressure limit	Circuit 1
ff1047	DFRForced	Defrost Forced	Circuit 1
ff1048	DFRWaterTLow	Low water temperature for defrost operation	Circuit 1
ff1049	DFRTimeMax	Defrost Maximum Time	Circuit 1

REFRIGERANT CIRCUIT ALARMS			
Num	**Name**	**Description**	**Category**
ff2005	Min overheating EEV1	Min Superheat value (user side)	Circuit 2
ff2006	Min overheating EEV2	Min Superheat value (source)	Circuit 2
fF2009	Low Pressure Alarm (DI)	Low pressure Alarm (DI)	Circuit 2
ff2010	Warning LP Cool	Low pressure Pre Alarm CoolingMode	Circuit 2
ff2011	Warning LP Heat	Low pressure Pre Alarm HeatingMode	Circuit 2
fF2012	Low pressure Alarm Heat (AI)	Low pressure Pre Alarm Heating Mode (AI)	Circuit 2
fF2013	High Pressure (DI)	High pressure Alarm (DI)	Circuit 2
ff2014	Warning High Pressure	High pressure Pre Alarm	Circuit 2
fF2015	High Pressure Alarm (AI)	High pressure Alarm (AI)	Circuit 2
ff2016	Max RC Warning	Maximum pressure Ratio Pre Alarm	Circuit 2
fF2017	Min RC Alarm	Minimum pressure Ratio Pre Alarm	Circuit 2
fF2018	Low Pressure Alarm Cool(AI)	Low Pressure Alarm Cooling Mode	Circuit 2
FF2019	Max RC Alarm	Maximum Pressure Radio	Circuit 2
FF2034	Vacuum Circuit	Vaacum Alarm	Circuit 2
FF2046	LimLp	Low pressure limit	Circuit 2
ff2047	DFRForced	Defrost Forced	Circuit 2
ff2048	DFRWaterTLow	Low water temperature for defrost	Circuit 2
ff2049	DFRTimeMax	Defrost Time	Circuit 2

HYDRAULIC CIRCUIT ALARMS			
Num	**Name**	**Description**	**Category**
iI0002	Water pressure	User side low water pressure	GP Ut
iI0006	Flow switch utility side	User side low flow rate	GP Ut
II0007	Freeze alarm	User side Water Frost Protection	Centrale
ii0008	Pumps antifreeze alarm	Pump activation Water Frost Protection	Centrale
II0009	Inconsistent deltaT across the exchanger	Water outlet temperature, discordant with the current operation mode, user side	Centrale
II0042	Pressure allarm	Freecooling low water pressure	FCI Circuito 1
II0043	Freeze alarm	Freecooling water frost protection	FCI Circuito 1
ii0047	Flow switch allarm	Freecooling water low flow rate	FCI Circuito 1
iI0052	Recovery Low H2O Flow	Recovery water low flow rate	Recupero
iI0053	Recovery Low Pressure Plant	Recovery low water pressure	Recupero
iI1017	Source Low Pressure Plant	Source low water pressure	Sorgente 1
iI1020	Source Low H2O Flow	Source side low water flow	Sorgente 1
II1021	Source H2O Freeze Alarm	Source side water frost protection	Sorgente 1
iI2017	Source Low Pressure Plant	Source low water pressure	Sorgente 2
iI2020	Source Low H2O Flow	Source side low water flow	Sorgente 2
II2021	Source H2O Freeze Alarm	Source side water frost protection	Sorgente 2

9 Maintenance

9.1 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.

9.2 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	water: quality, ph, weight of glycol (%)		X	
7	check the exchanger efficiency			X
8	circulating pumps		X	
9	check of the fixing and the insulation of the power lead			X
10	check of the earthing cable			X
11	electric panel cleaning			X
12	capacity contactor status			X
13	termina closing, cable insulation integrity			X
14	voltage and phase unbalancing (no load and on-load)		X	
15	absorptions of the single electrical loads		X	
16	test of the compressor crankcase heaters		X	
17	Checking for leaks			*
18	survey of the refrigerant circuit operating parameters		X	
19	safety valve			*
20	protective device test: pressure switches, thermostats, flow switches etc..		X	
21	control system test: setpoint, climatic compensations, capacity stepping, water / air flow-rate variations		X	
22	control device test: alarm signalling, thermometers, probes, pressure gauges etc..		X	

* Refer to the local regulations; and ensure correct adherance. 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.

9.3 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
- intervention description
- carried out measures etc.

9.4 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.

9.5 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.

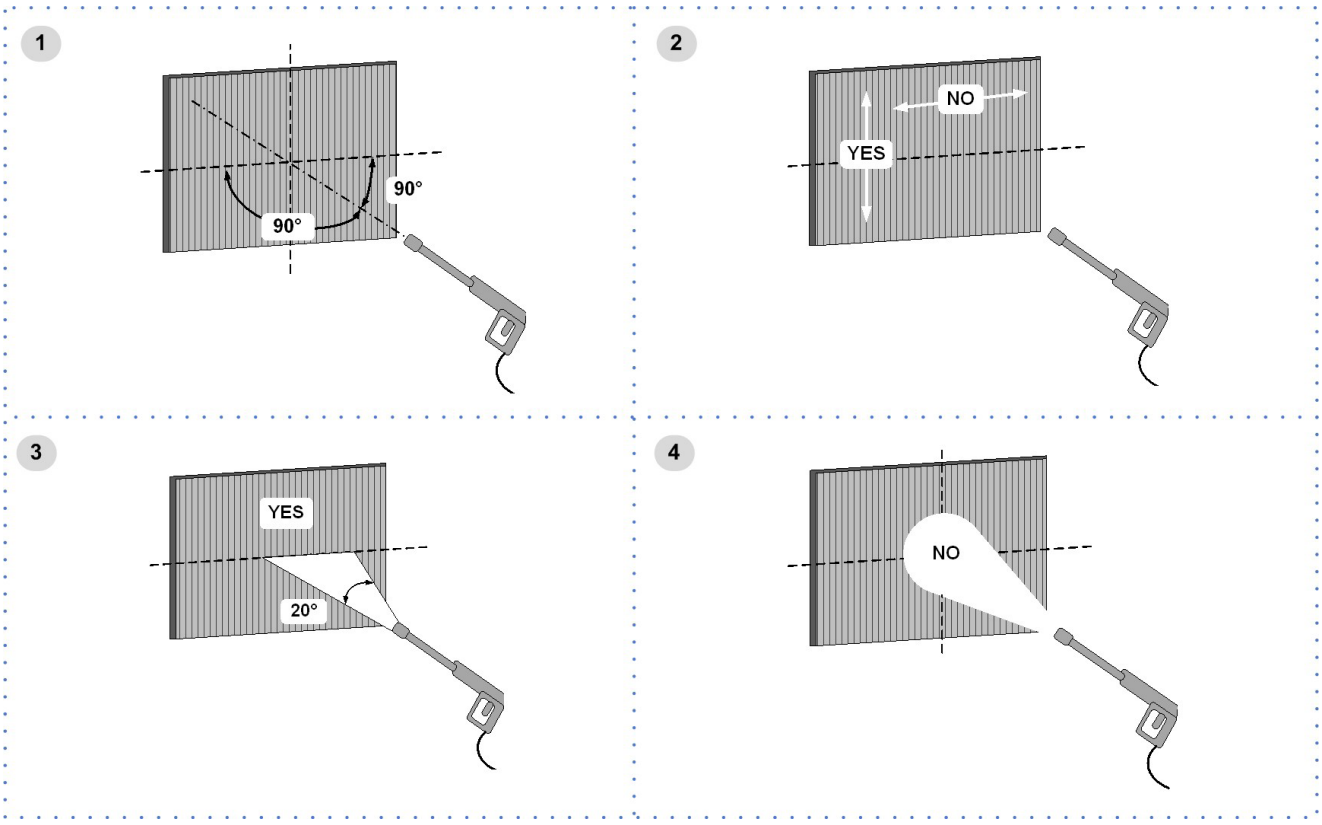
Remove all impurities from the surface.

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, vacumn 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.



9.6 Electric fans

Check:

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

9.7 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

9.8 Water filter

Check that no impurities prevent the correct passage of water.

9.9 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

9.10 Flow Switch

- controls the operations
- remove incrustations from the palette

9.11 Insulations

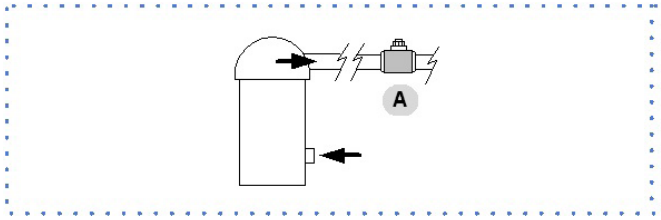
Check the condition of the insulations: if necessary apply glue and and renew the seals.

9.12 Compressor supply line shut-off valve

⚠ Do not remove the seal

Remove only if authorized by the manufacturer.

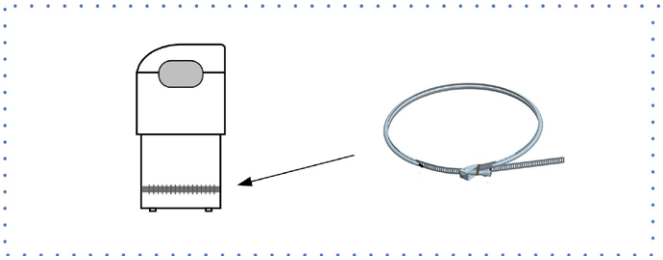
Please contact the maker for informations.



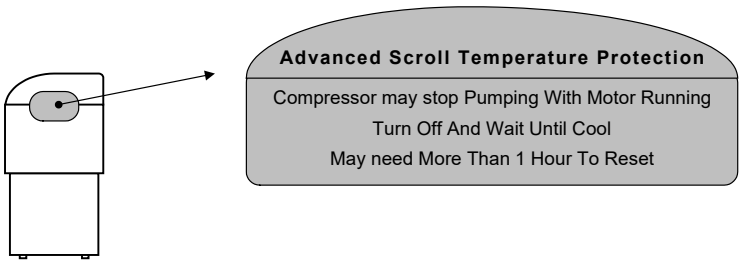
9.13 crankcase heather

Check:

- closure
- Operation



9.14 Copeland scroll compressor



9.15 System discharge

1. evacuate the system
2. evacuate the exchanger, use all the present taps
3. use compressed air to blow the exchanger
4. dry completely the exchanger by an hot air jet; for greater safety fill the exchanger with glycoled solution
5. protect the exchanger from the air
6. 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.

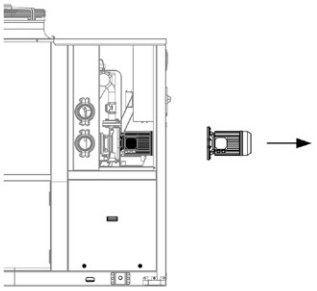
Example

- 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.

9.16 Pump replacement

1



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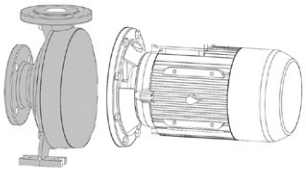
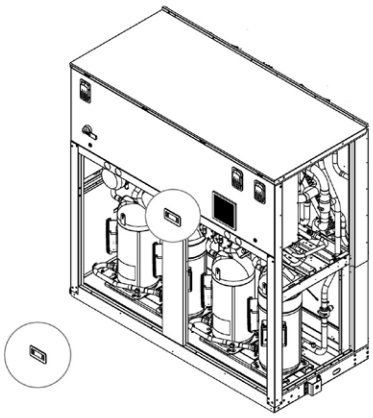


9.17 Compressor replacement

1



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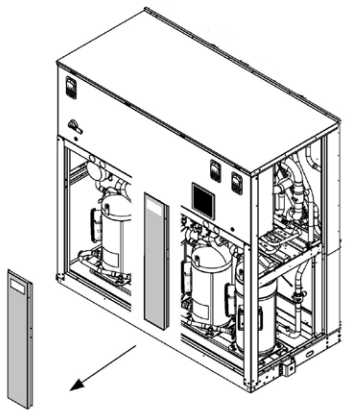

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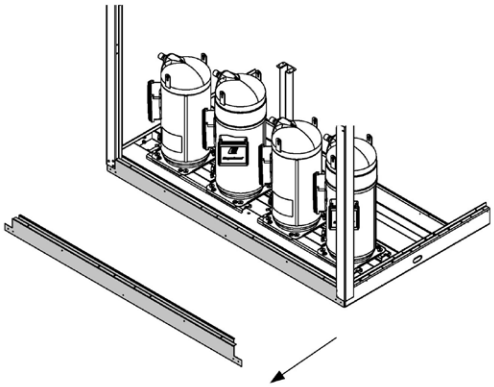

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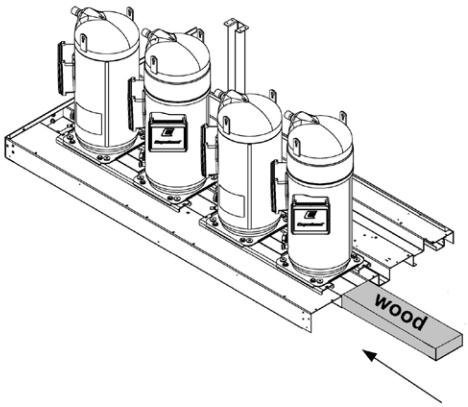

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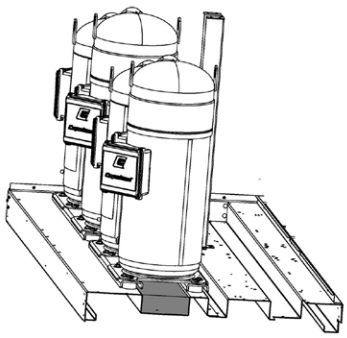

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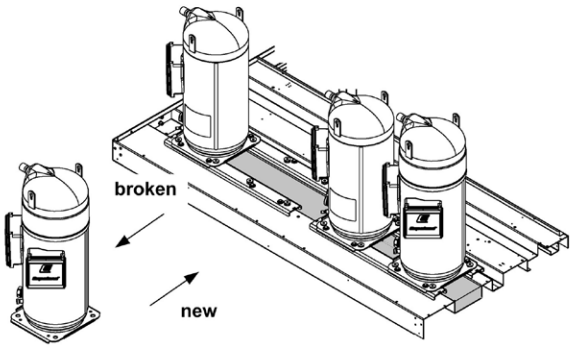
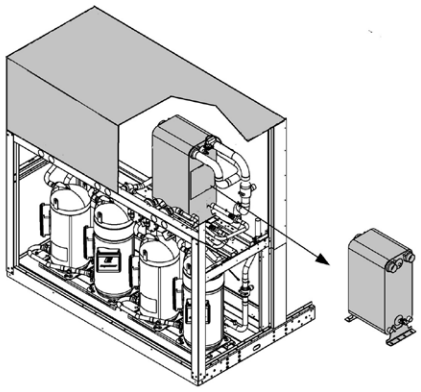
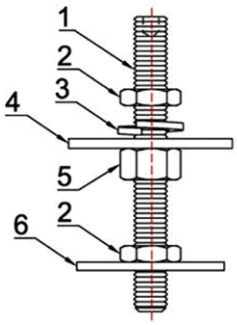


9.18 Exchanger replacement



10 Accessories

10.1 Anti-vibration mount support



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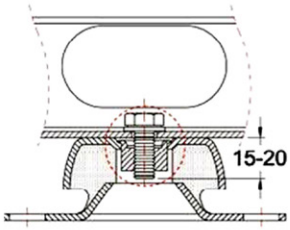

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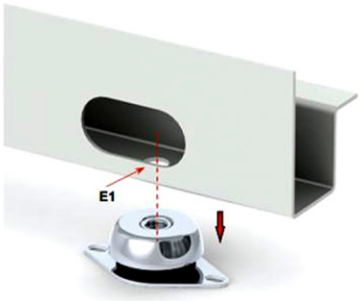

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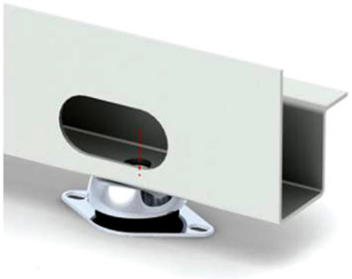

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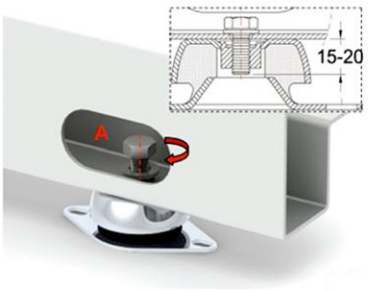

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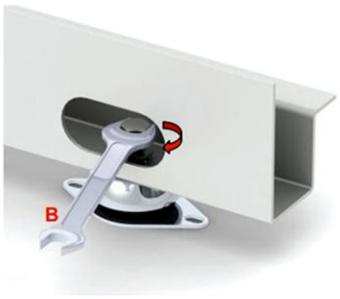

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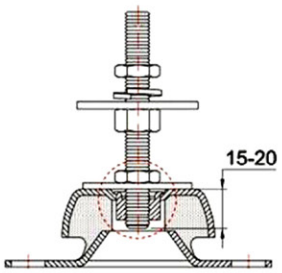

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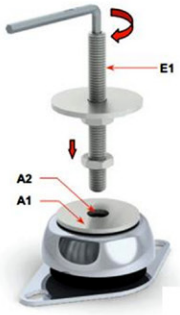

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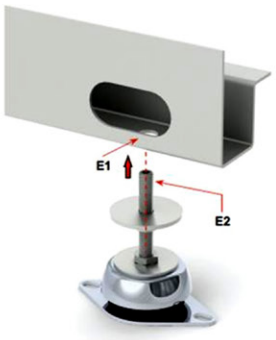

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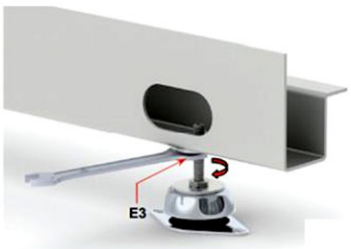

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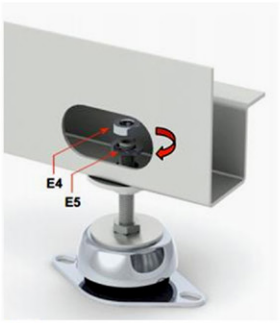
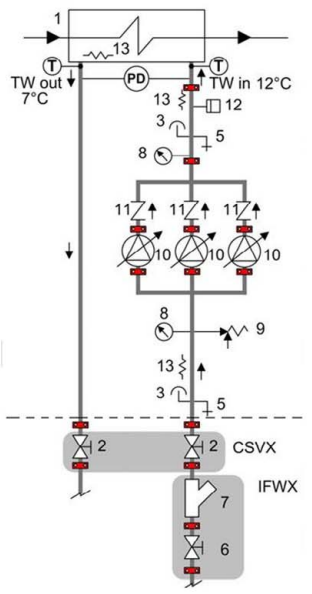


10.2 Hydro Pack

Hydropack user side with 2/3 ON/OFF pumps
Recovery side hydronic unit with 2/3 inverter pumps



1	cvaf_lecp
2	Asrmdd t_jtc
3	Nspec t_jtc
4	non utilizzato
5	drain valve
6	Cutoff valve
7	Steel mesh strainer
8	Manometer
9	Safety valve (6 Bar)
10	Electric pump
11	Non return valve
12	pressure switch of the charged system
13	Antifreeze heater
CSVX	Couple of manual shut-off valves
IFWX	Steel mesh strainer water side
PD	Differential pressure switch
T	Temperature probe
TWin	chilled water inlet
TW out	chilled water outlet

11 Decommissioning

11.1 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.

11.2 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.

11.3 Directive EC RAEE

El fabricante está inscrito en el Registro Nacional AEE, de conformidad con la actuación de la directiva 2012/19/UE y las correspondientes normas nacionales vigentes acerca de los desechos de aparatos eléctricos y electrónicos.
Esta directiva aconseja la eliminación de los aparatos eléctricos y electrónicos.
Los que lleven la marca del contenedor tachado tienen que eliminarse al final de su vida útil de forma separada con el fin de evitar daños para la salud del hombre y del medio ambiente.
Los aparatos eléctricos y electrónicos tienen que eliminarse con todas sus piezas.
Para eliminar un aparato eléctrico y electrónico «doméstico», el fabricante recomienda dirigirse a un revendedor autorizado o a una isla ecológica autorizada.
La eliminación de un aparato eléctrico y electrónico «profesional» tiene que efectuarse por personal autorizado mediante los consorcios específicamente presentes en el territorio.
Con este fin, a continuación se expone la definición de RAEE doméstico y RAEE profesional:
Los RAEEs procedentes de los núcleos domésticos: los RAEEs que se originan en núcleos domésticos y los RAEEs de origen comercial, industrial, institucional y de otro tipo, análogos, por naturaleza y cantidad, a los originados en núcleos domésticos. Los desechos de los AEE que pudieran utilizarse tanto por los núcleos domésticos como por usuarios diferentes de los núcleos domésticos en cualquier caso se consideran RAEEs procedentes de núcleos domésticos;
Los RAEEs profesionales: todos los RAEEs diferentes de los procedentes de los núcleos domésticos a los que se refiere el punto anterior.
Estos aparatos pueden contender:
gas refrigerante que tiene que recuperarse íntegramente por parte de personal especializado y que cuente con las habilitaciones necesarias en los contenedores correspondientes;
• aceite de lubricación contenido en los compresores y en el circuito frigorífico que tenga que recogerse;
• mezclas con anticongelantes contenidos en el circuito hídrico, cuyo contenido tenga que recogerse adecuadamente;
• partes mecánicas y eléctricas que tengan que separarse y eliminarse de forma autorizada.
Cuando los componentes de las máquinas se quiten para ser cambiados por motivos de mantenimiento o cuando toda la unidad llegue al final de su vida útil y sea necesario quitarla de la instalación, se aconseja diferenciar los desechos según su naturaleza y hacer que se eliminen por personal autorizado en los centros de recogida existentes.

12 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 necesssary 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 isolater 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.

STANDARD CONFIGURATION

Acoustic configuration: compressor soundproofing (SC)

General technical data - PERFORMANCE

Internal section size - MSRN-XSC3			90.4	100.4	110.4	120.4	140.4	160.4
External section size - CEV-XN			**105.0**	**105.0**	**115.0**	**130.0**	**160.0**	**170.0**
Cooling								
Cooling capacity	1	[kW]	240	260	285	320	366	407
Compressor power input	1	[kW]	76,5	84,8	94,6	107	121	137
Total power input	2	[kW]	87,0	95,5	105	117	135	151
Partial recovery heating capacity	3	[kW]	60,6	65,9	72,1	81,0	92,6	103
EER	1	-	2,76	2,73	2,71	2,73	2,71	2,70
SEER	7		4,13	4,07	4,03	4,00	4,11	4,10
Water flow-rate (User Side)	1	[l/s]	11,7	12,6	13,9	15,4	17,7	19,9
Internal exchanger pressure drops	1	[kPa]	30,2	34,8	31,8	39,0	42,8	42,0
Cooling capacity (EN14511:2013)	4	[kW]	239	255	279	309	361	402
Total power input (EN14511:2013)	4	[kW]	86,8	95,4	105	121	135	151
EER (EN 14511:2013)	4	-	2,75	2,67	2,65	2,56	2,67	2,67
Heating								
Heating capacity	5	[kW]	280	310	337	371	419	473
Compressor power input	5	[kW]	78,0	86,2	94,1	104	117	131
Total power input	2	[kW]	88,6	97,1	105	115	131	145
COP	5	-	3,16	3,19	3,21	3,23	3,20	3,26
Heating capacity (EN14511:2013)	6	[kW]	280	307	333	366	419	476
Total power input (EN14511:2013)	6	[kW]	88,5	96,9	105	115	130	145
COP (EN 14511:2013)	6		3,16	3,17	3,18	3,19	3,22	3,28
SCOP - AVERAGE Climate - W35	7		3,80	3,81	3,83	3,69	3,89	3,72

Acoustic configuration: super-silenced (EN)

General technical data - PERFORMANCE

Internal section size - MSRN-XSC3			90.4	100.4	110.4	120.4	140.4	160.4
External section size - CEV-XN			**150.0**	**150.0**	**160.0**	**180.0**	**185.0**	**190.0**
Cooling								
Cooling capacity	1	[kW]	240	259	280	320	362	411
Compressor power input	1	[kW]	76,2	83,8	93,8	105	120	133
Total power input	2	[kW]	86,1	93,8	104	115	132	146
Partial recovery heating capacity	3	[kW]	60,7	65,5	70,9	81,0	91,5	104
EER	1	-	2,79	2,76	2,70	2,78	2,74	2,81
SEER	5		4,18	4,16	4,04	4,17	4,14	4,20
Water flow-rate (User Side)	1	[l/s]	11,1	12,2	13,3	14,7	17,0	19,1
Internal exchanger pressure drops	1	[kPa]	27,4	32,7	29,4	35,3	39,5	38,8
Cooling capacity (EN14511:2013)	4	[kW]	239	258	280	319	361	410
Total power input (EN14511:2013)	4	[kW]	85,9	93,8	104	116	134	146
EER (EN 14511:2013)	4	-	2,78	2,75	2,70	2,75	2,70	2,81
Heating								
Heating capacity	5	[kW]	280	310	336	377	425	466
Compressor power input	5	[kW]	78,0	86,2	94,1	104	117	130
Total power input	2	[kW]	88,1	96,4	104	114	130	143
COP	5	-	3,18	3,22	3,22	3,30	3,28	3,26
Heating capacity (EN14511:2013)	6	[kW]	282	304	333	376	425	468
Total power input (EN14511:2013)	6	[kW]	88,1	96,2	104	115	129	143
COP (EN 14511:2013)	6		3,20	3,16	3,19	3,28	3,29	3,28
SCOP - AVERAGE Climate - W35	7		3,85	3,82	3,84	3,72	3,92	3,75

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 x 10^(-4) m2 K/W
2. The Total Power Input value does not take into account the part related to the pumps and required to overcome the pressure drops for the circulation of the solution inside the exchangers
3. Option. 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 referred to the following conditions: internal exchanger water = 40/45 °C. Entering external exchanger air temperature = 7°C D.B./6°C W.B. Evaporator fouling factor = 0.44 x 10^(-4) m^2 K/W
6. Data compliant to Standard EN 14511:2013 referred to the following conditions: - Internal exchanger water temperature = 40/45 °C. Entering external exchanger air temperature = 7°C D.B./6°C W.B.
7. Data calculated according to the EN 14825:2016 Regulation

Data calculated considering an equivalent distance between the internal and the external section of 7,5 m.

DUAL CONFIGURATION

Acoustic configuration: compressor soundproofing (SC)

General technical data - PERFORMANCE

Internal section size - MSRN-XSC3			D90.4	D100.4	D110.4	D120.4	D140.4	D160.4
External section size - CEV-XN			D105.0	D105.0	D115.0	D130.0	D160.0	D170.0
Cooling								
Cooling capacity	1	[kW]	479	521	570	640	732	814
Compressor power input	1	[kW]	153	170	189	214	242	273
Total power input	2	[kW]	174	191	210	235	270	301
Partial recovery heating capacity	3	[kW]	121	132	144	162	185	206
EER	1	-	2,75	2,73	2,71	2,73	2,71	2,70
SEER	7	-	4,18	4,12	4,07	4,04	4,14	4,13
Water flow-rate (User Side)	1	[l/s]	11,7	12,6	13,9	15,4	17,7	19,9
Internal exchanger pressure drops	1	[kPa]	30,2	34,8	31,8	39,0	42,8	42,0
Cooling capacity (EN14511:2013)	4	[kW]	478	509	558	617	721	804
Total power input (EN14511:2013)	4	[kW]	174	191	210	241	271	301
EER (EN 14511:2013)	4	-	2,75	2,67	2,65	2,56	2,67	2,67
Heating								
Heating capacity	5	[kW]	561	620	674	742	839	947
Compressor power input	5	[kW]	156	172	188	208	234	262
Total power input	2	[kW]	177	194	210	230	262	291
COP	5	-	3,17	3,19	3,21	3,23	3,20	3,26
Heating capacity (EN14511:2013)	6	[kW]	560	613	666	731	839	952
Total power input (EN14511:2013)	6	[kW]	177	194	210	229	261	290
COP (EN 14511:2013)	6		3,16	3,17	3,18	3,19	3,22	3,28
SCOP - AVERAGE Climate - W35	7		3,81	3,81	3,83	3,69	3,89	3,72

Acoustic configuration: super-silenced (EN)

General technical data - PERFORMANCE

Internal section size - MSRN-XSC3			D90.4	D100.4	D110.4	D120.4	D140.4	D160.4
External section size - CEV-XN			D150.0	D150.0	D160.0	D180.0	D185.0	D190.0
Cooling								
Cooling capacity	1	[kW]	480	518	561	640	723	821
Compressor power input	1	[kW]	152	168	188	209	239	267
Total power input	2	[kW]	172	188	208	230	264	292
Partial recovery heating capacity	3	[kW]	121,4	131,1	141,9	161,9	182,9	207,7
EER	1	-	2,79	2,76	2,70	2,79	2,74	2,81
SEER	7	-	4,23	4,21	4,07	4,20	4,17	4,23
Water flow-rate (User Side)	1	[l/s]	11,7	12,6	13,9	15,4	17,7	19,9
Internal exchanger pressure drops	1	[kPa]	30,2	34,8	31,8	39,0	42,8	42,0
Cooling capacity (EN14511:2013)	4	[kW]	478	517	560	639	722	819
Total power input (EN14511:2013)	4	[kW]	172	188	207	232	267	292
EER (EN 14511:2013)	4	-	2,78	2,75	2,70	2,75	2,70	2,81
Heating								
Heating capacity	5	[kW]	559	620	672	755	850	932
Compressor power input	5	[kW]	156	172	188	208	234	261
Total power input	2	[kW]	176	193	209	229	259	286
COP	5	-	3,17	3,22	3,22	3,30	3,28	3,26
Heating capacity (EN14511:2013)	6	[kW]	564	609	665	752	850	937
Total power input (EN14511:2013)	6	[kW]	176	192	208	229	258	286
COP (EN 14511:2013)	6		3,20	3,16	3,19	3,28	3,29	3,28
SCOP - AVERAGE Climate - W35	7		3,86	3,82	3,85	3,79	3,93	3,75

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 x 10^(-4) m2 K/W
2. The Total Power Input value does not take into account the part related to the pumps and required to overcome the pressure drops for the circulation of the solution inside the exchangers
3. Option. 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 referred to the following conditions: internal exchanger water = 40/45 °C. Entering external exchanger air temperature = 7°C D.B./6°C W.B. Evaporator fouling factor = 0.44 x 10^(-4) m^2 K/W
6. Data compliant to Standard EN 14511:2013 referred to the following conditions: - Internal exchanger water temperature = 40/45 °C. Entering external exchanger air temperature = 7°C D.B./6°C W.B.
7. Data calculated according to the EN 14825:2016 Regulation

Data calculated considering an equivalent distance between the internal and the external section of 7,5 m.

TRIPLE CONFIGURATION

Acoustic configuration: compressor soundproofing (SC)

General technical data - PERFORMANCE

Internal section size - MSRN-XSC3			T110.4	T120.4	T140.4	T160.4
External section size - CEV-XN			**T115.0**	**T130.0**	**T160.0**	**T170.0**
Cooling						
Cooling capacity	1	[kW]	889	998	1142	1269
Compressor power input	1	[kW]	284	320	363	410
Total power input	2	[kW]	316	352	405	452
Partial recovery heating capacity	3	[kW]				
EER	1	-	2,82	2,83	2,82	2,81
SEER	7	-	4,08	4,05	4,15	4,14
Water flow-rate (User Side)	1	[l/s]	13,3	14,7	17,0	19,1
Internal exchanger pressure drops	1	[kPa]	29,4	35,3	39,5	38,8
Cooling capacity (EN14511:2013)	4	[kW]	837	926	1082	1205
Total power input (EN14511:2013)	4	[kW]	315	362	406	452
EER (EN 14511:2013)	4	-	2,65	2,56	2,67	2,67
Heating						
Heating capacity	5	[kW]	1011	1113	1257	1419
Compressor power input	5	[kW]	282	312	351	393
Total power input	2	[kW]	315	344	393	436
COP	5	-	3,21	3,23	3,20	3,26
Heating capacity (EN14511:2013)	6	[kW]	1000	1097	1258	1427
Total power input (EN14511:2013)	6	[kW]	315	344	391	435
COP (EN 14511:2013)	6		3,18	3,19	3,22	3,28
SCOP - AVERAGE Climate - W35	7					

Acoustic configuration: super-silenced (EN)

General technical data - PERFORMANCE

Internal section size - MSRN-XSC3			T110.4	T120.4	T140.4	T160.4
External section size - CEV-XN			**T160.0**	**T180.0**	**T185.0**	**T190.0**
Cooling						
Cooling capacity	1	[kW]	840	949	1082	1228
Compressor power input	1	[kW]	293	333	376	417
Total power input	2	[kW]	323	364	413	455
Partial recovery heating capacity	3	[kW]	213	240	274	311
EER	1	-	2,60	2,61	2,62	2,70
SEER	5	-				
Water flow-rate (User Side)	1	[l/s]	13,3	14,7	17,0	19,1
Internal exchanger pressure drops	1	[kPa]	29,4	35,3	39,5	38,8
Cooling capacity (EN14511:2013)	4	[kW]	840	958	1082	1229
Total power input (EN14511:2013)	4	[kW]	311	349	401	437
EER (EN 14511:2013)	4	-	2,70	2,75	2,70	2,81
Heating						
Heating capacity	5	[kW]	1008	1131	1275	1398
Compressor power input	5	[kW]	282	312	351	390
Total power input	2	[kW]	313	343	389	428
COP	5	-	3,22	3,30	3,28	3,26
Heating capacity (EN14511:2013)	6	[kW]	998	1128	1275	1405
Total power input (EN14511:2013)	6	[kW]	313	344	388	429
COP (EN 14511:2013)	6		3,19	3,28	3,29	3,28
SCOP - AVERAGE Climate - W35	7		3,84	3,69	3,89	3,72

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 x 10^(-4) m2 K/W
2. The Total Power Input value does not take into account the part related to the pumps and required to overcome the pressure drops for the circulation of the solution inside the exchangers
3. Option. 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 referred to the following conditions: internal exchanger water = 40/45 °C. Entering external exchanger air temperature = 7°C D.B./6°C W.B. Evaporator fouling factor = 0.44 x 10^(-4) m^2 K/W
6. Data compliant to Standard EN 14511:2013 referred to the following conditions: - Internal exchanger water temperature = 40/45 °C. Entering external exchanger air temperature = 7°C D.B./6°C W.B.
7. Data calculated according to the EN 14825:2016 Regulation

Data calculated considering an equivalent distance between the internal and the external section of 7,5 m.

STANDARD CONFIGURATION

Acoustic configuration: compressor soundproofing (SC)

General technical data - INTERNAL UNIT CONSTRUCTION

Internal section size - MSRN-XSC3			90.4	100.4	110.4	120.4	140.4	160.4
Compressor								
Type of compressors		-	SCROLL					
Refrigerant		-	R-410A					
No. of compressors		Nr	4	4	4	4	4	4
Rated power (C1)		[HP]	45	50	55	60	70	80
Rated power (C2)		[HP]	45	50	55	60	70	80
Std Capacity control steps		-	6	6	6	4	6	4
Oil charge (C1)		[l]	10	11	13	13	13	13
Oil charge (C2)		[l]	10	11	13	13	13	13
Refrigeration circuits		-	2	2	2	2	2	2
Internal exchanger								
Type of internal exchanger	2	-	PHE					
Water content		[l]	24,0	24,0	29,0	29,0	32,0	37,0
System water content	3	l	1284	1628	2072	2499	2526	3227
Connections								
Water fittings		-	4"	4"	4"	4"	4"	4"
Power supply								
Standard power supply		V	400/3/50					
Refrigerant connections								
Gas line	7	mm	42	42	54	54	54	54
Liquid line	7	mm	35	35	35	42	42	42
Electrical data								
F.L.I. - Total		kW	106,5	117,4	127,0	144,6	165,8	187,0
F.L.A. - Total		A	180,6	191,9	208,7	237,5	266,5	295,5
M.I.C. - Value	6	A	431,0	442,3	459,1	487,9	586,4	615,4
M.I.C. - with soft start accessory	6	A	293,2	304,5	321,3	350,1	414,4	443,4

The combinations between internal and external unit are uniquely identified by following the table columns.

Data calculated considering an equivalent distance between the internal and the external section of 7,5 m.

1. PHE = plate exchanger
2. Recommended system water content that does not consider the internal exchanger water content (evaporator). With outdoor air low temperature applications or low medium requested loads, the minimum installation water volume is obtained doubling the indicated value.
3. M.I.C.=Maximum unit starting current. The M.I.C. value is obtained adding the max. compressor starting current of the highest size to the power input at max. admissible conditions (F.L.A.) of the remaining electric components. Electrical data refer to standard units; according to the installed accessories, the data can suffer some variations. Unbalance between phase max 2 %. Voltage variation: max +/- 10%.
4. Where not specified, the diameters of the supply and liquid lines are equal in both refrigeration circuits. In size 220.4 the circuit 1 diameter both of the supply and the liquid line is 42 mm, the circuit 2 diameter is 54 mm.

STANDARD CONFIGURATION
EXCELLENCE VERSION

Acoustic configuration: compressor soundproofing (SC)

General technical data - EXTERNAL UNIT CONSTRUCTION

External section size - CEV-XN			90.0	105.0	115.0	120.0	145.0
Fans							
Type of fans	1	-	AX				
Number of fans		Nr	6	6	6	8	8
Type of motor	2	-	AC	AC	AC	AC	AC
Standard airflow		[l/s]	36779	36143	35703	48075	47272
Power supply							
Standard power supply		V	400/3/50				
Refrigerant connections							
Supply line	4	mm	42	54	54	54	54
Liquid line	4	mm	35	35	42	42	42
Electrical data							
F.L.I. - Total		kW	11,6	11,6	11,6	15,5	15,5
F.L.A. - Total		A	23,4	23,4	23,4	31,2	31,2
M.I.C. - Value	3	A	41,6	41,6	41,6	67,6	67,6

1. AX = axial fan
2. AC = asynchronous three-phase external rotor motor.
3. M.I.C.=Maximum unit starting current. The M.I.C. value is obtained adding the max. compressor starting current of the highest size to the power input at max. admissible conditions (F.L.A.) of the remaining electric components. Electrical data refer to standard units; according to the installed accessories, the data can suffer some variations. Unbalance between phase max 2 %. Voltage variation: max +/- 10%.
4. Where not specified, the diameters of the supply and liquid lines are equal in both refrigeration circuits. In size 220.4 the circuit 1 diameter both of the supply and the liquid line is 42 mm, the circuit 2 diameter is 54 mm.

Acoustic configuration: super-silenced (EN)

General technical data - EXTERNAL UNIT CONSTRUCTION

External section size - CEV-XN			115.0	120.0	130.0	150.0	160.0
Fans							
Type of fans	4	-	AX				
Number of fans		Nr	8	8	8	10	10
Type of motor	5	-	AC	AC	AC	AC	AC
Standard airflow		[l/s]	40357	38374	36663	47773	52594
Power supply							
Standard power supply		V	400/3/50				
Refrigerant connections							
Supply line	7	mm	42	54	54	54	54
Liquid line	7	mm	35	35	42	42	42
Electrical data							
F.L.I. - Total		kW	9,7	9,7	9,7	12,1	12,1
F.L.A. - Total		A	17,8	17,8	17,8	22,3	22,3
M.I.C. - Value	6	A	26,1	26,1	26,1	30,6	30,6

1. AX = axial fan
2. AC = asynchronous three-phase external rotor motor.
3. M.I.C.=Maximum unit starting current. The M.I.C. value is obtained adding the max. compressor starting current of the highest size to the power input at max. admissible conditions (F.L.A.) of the remaining electric components. Electrical data refer to standard units; according to the installed accessories, the data can suffer some variations. Unbalance between phase max 2 %. Voltage variation: max +/- 10%.
4. Where not specified, the diameters of the supply and liquid lines are equal in both refrigeration circuits. In size 220.4 the circuit 1 diameter both of the supply and the liquid line is 42 mm, the circuit 2 diameter is 54 mm.

Sound levels

EXTERNAL SECTION: CEV-XN

Compressor soundproofing (SC)

Size	Sound power level (dB)								Sound Pressure level at 10m	Sound power level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
105.0	94	82	83	81	77	76	74	70	**52**	**84**
115.0	94	82	83	81	77	76	74	70	**52**	**84**
130.0	94	82	83	81	77	76	74	70	**52**	**84**
160.0	95	83	84	82	79	77	76	72	**53**	**85**
170.0	95	83	84	82	79	77	76	72	**53**	**85**

Super-silenced (EN)

Size	Sound power level (dB)								Sound Pressure level at 10m	Sound power level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
150.0	87	78	79	76	74	72	71	66	**48**	**80**
160.0	87	78	79	76	74	72	71	66	**48**	**80**
180.0	87	78	79	76	74	72	71	66	**48**	**80**
185.0	88	79	80	77	74	73	72	67	**48**	**81**
190.0	88	79	80	77	74	73	72	67	**48**	**81**

INTERNAL SECTION: MSRN-XSC3

Size	Sound power level (dB)								Sound Pressure level at 1m	Sound power level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
90.4	50	55	69	73	77	77	71	64	**64**	**82**
100.4	50	59	72	74	77	78	71	63	**64**	**82**
110.4	50	56	72	74	78	79	73	66	**65**	**83**
120.4	50	56	72	75	79	79	73	65	**66**	**84**
140.4	50	55	73	76	82	81	74	65	**68**	**86**
160.4	50	55	74	76	82	82	75	66	**68**	**86**

I livelli sonori si riferiscono alla sezione esterna dotata di Axitop nelle condizioni nominali di prova. Il livello di pressione sonora è riferito ad 10 m di distanza dalla superficie esterna dell'unità funzionante in campo aperto e a pieno carico. Le misure vengono effettuate in accordo alla normativa UNI EN ISO 9614-2, nel rispetto di quanto richiesto dalla certificazione EUROVENT 8/1, la quale prevede una tolleranza di 3 dB(A) sul livello di potenza sonora, che è l'unico dato acustico da considerarsi impegnativo.
Dati riferiti alle seguenti condizioni:
- acqua scambiatore interno = 12/7 °C
- temperatura aria esterna 35°C

Nel caso di installazioni multiple, il calcolo del livello sonoro totale seguirà quanto riportato nelle normative inerenti all'acustica

Admissible water flow-rates

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

EXCELLENCE SC / EN		90.4	100.4	110.4	120.4	140.4	160.4
Qmin	[l/s]	6,7	7,4	8,0	9,3	10,1	11,5
Qmax	[l/s]	18,3	20,0	21,8	25,1	27,5	31,2

Overload and control device calibrations

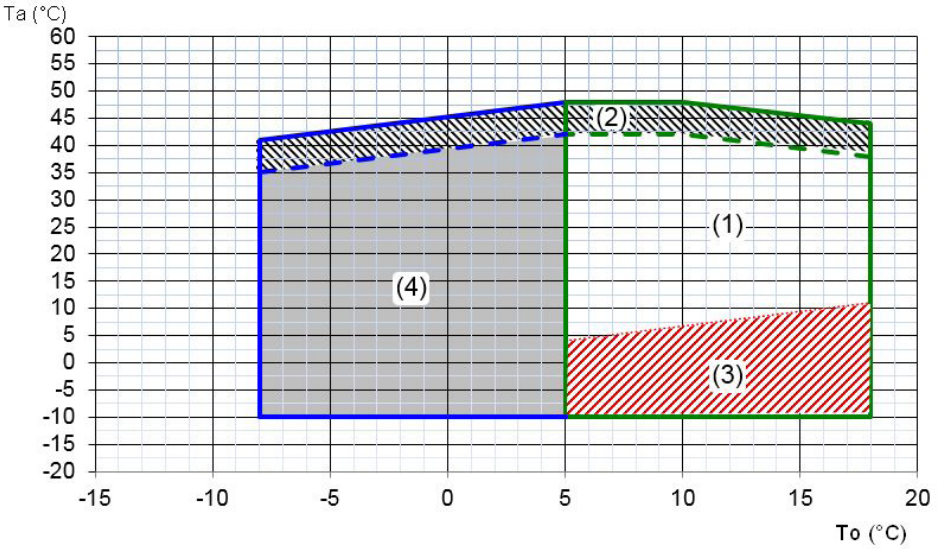
			open	closed	value
High pressure safety pressure switch		[kPa]	4050	3300	-
Antifreeze protection		[°C]	3	5.5	-
High pressure safety valve		[kPa]	-	-	4500
Low pressure safety valve		[kPa]	-	-	2950
Max no. of compressor starts per hour		[n°]	-	-	10
High compressor discharge temperature safety thermostat		[°C]	-	-	140

Exchanger operating range

	DPr		DPw
PED (CE) - Internal echanger	4500	4500	1000
PED (CE) - External exchanger	4500	4500	1000

Operating range - Cooling

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

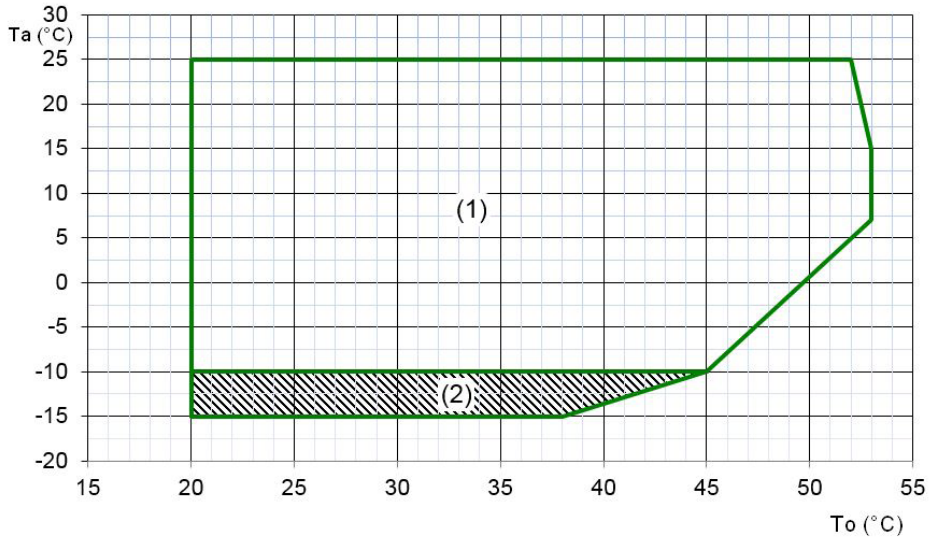


Ta (°C) = external exchanger inlet air temperature (D.B.)
To (°C) = internal exchanger outlet water temperature

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. Only with CREFB option.
4. Unit operating range in 'B - Low water temperature' configuration (40% ethylene glycol). Only with CREFB option.

Operating range - Heating

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



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

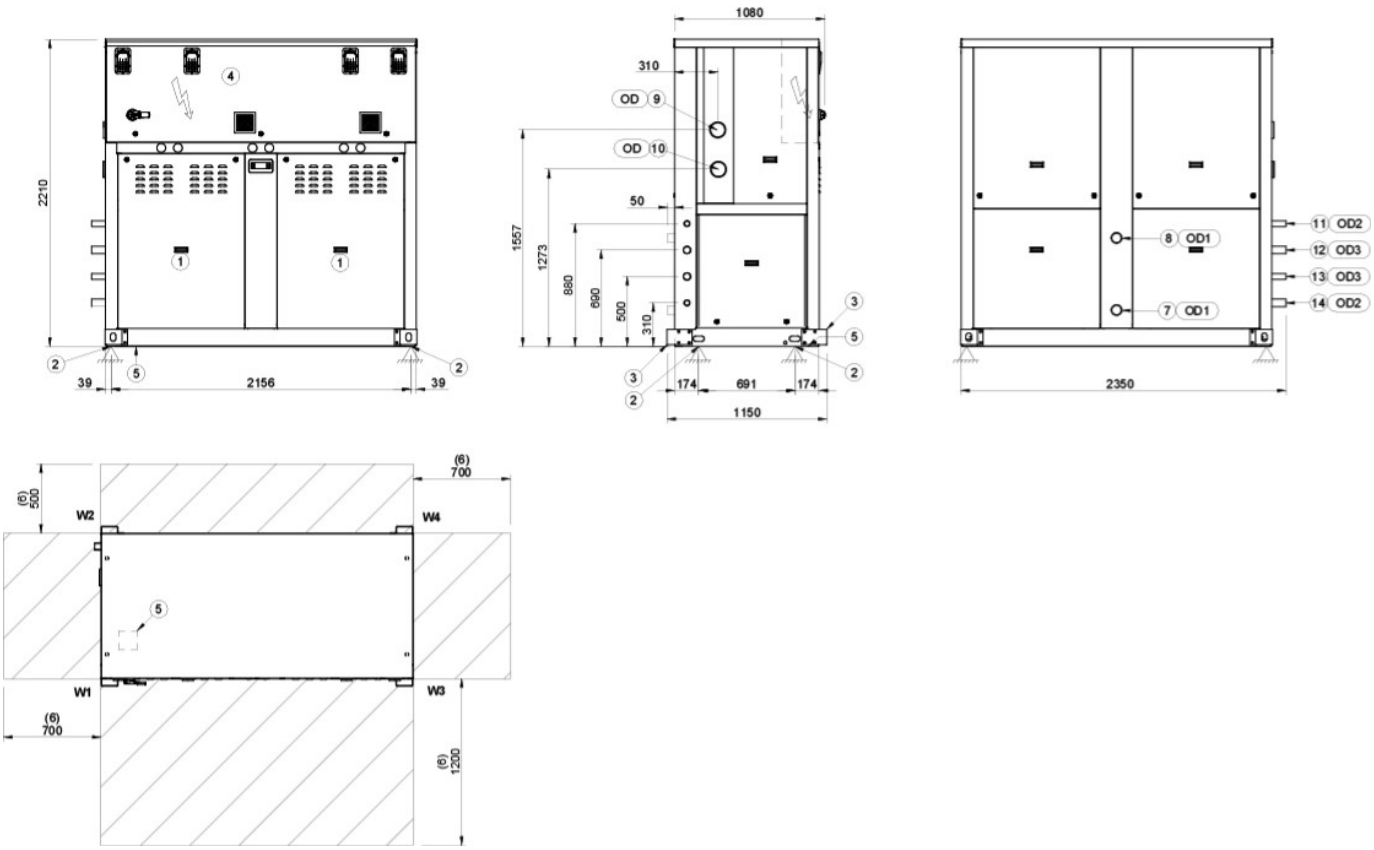
1. Standard unit operating range at full load
2. Field in which the unit operation is allowed for a limited period regarding the system start-up.

Dimensional drawings

INTERNAL SECTIONS: MSRN-XSC3

Size 90.4 - 160.4

DAA4X0002 _00
DATA/DATE 29/06/2018



1. Compressors
2. Antivibration fixing holes ø 15mm
3. Lifting brackets (removable)
4. General electrical panel
5. Power input
6. Suggested clearance
7. Recovery side exchanger water inlet (optional)
8. Recovery side exchanger water outlet (optional)
9. Water inlet user side of no pumps unit / Water outlet user side of unit with pumps (optional)
10. Water outlet user side of no pumps unit / Water inlet user side of unit with pumps (optional)
11. Circuit 1 liquid line
12. Circuit 1 gas line
13. Circuit 2 gas line
14. Circuit 2 liquid line

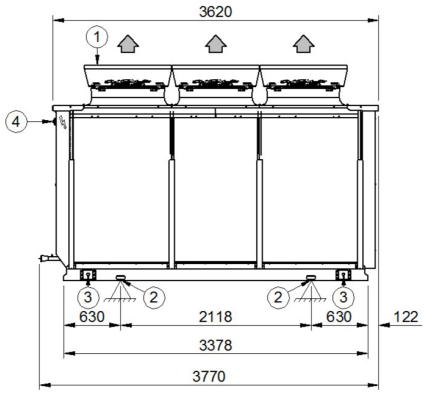
Size		90.4	100.4	110.4	120.4	140.4	160.4
Length	mm	2350	2350	2350	2350	2350	2350
Depth	mm	1150	1150	1150	1150	1150	1150
Height	mm	2210	2210	2210	2210	2210	2210
OD (internal exchanger)	mm	114,3	114,3	114,3	114,3	114,3	114,3
OD1 (partial recovery)	mm	60,3	60,3	60,3	60,3	60,3	60,3
OD2 (liquid line)	mm	35	35	35	42	42	42
OD3 (gas line)	mm	42	42	54	54	54	54
W1 Supporting point	kg	434	486	505	518	545	556
W2 Supporting point	kg	363	393	406	417	419	449
W3 Supporting point	kg	466	510	529	540	571	585
W4 Supporting point	kg	394	418	430	439	445	478
Operating weight	kg	1657	1807	1870	1914	1980	2068
Shipping weight	kg	157	1720	1780	1810	1870	1900

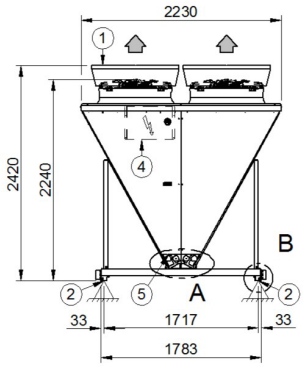
The presence of optional accessories may result in a substantial variation of the weights shown in the table.

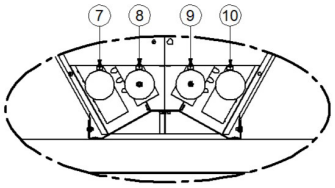
EXTERNAL SECTION: CEV-XN

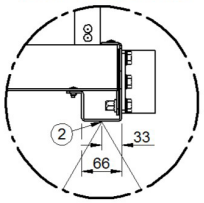
Size 105.0 - 115.0 - 130.0

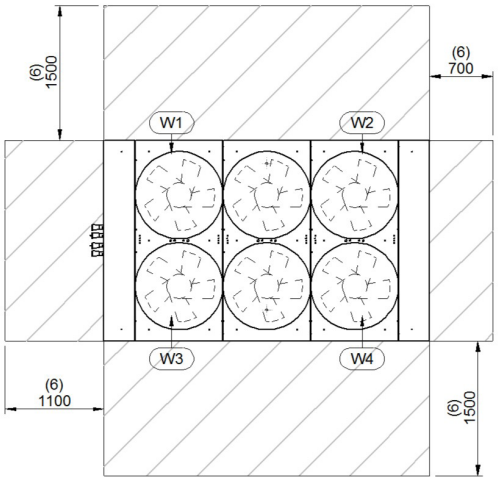
DAA5X0001 _00
DATA/DATE 04/06/2018











1. Axitop (removable)
2. Antivibration fixing holes ø 18mm
3. Lifting brackets (removable)
4. General electrical panel
5. Power input
6. Suggested clearance
7. Circuit 1 liquid line
8. Circuit 1 gas line
9. Circuit 2 gas line
10. Circuit 2 liquid line

For the measurement of the refrigeration connection diameter refer to the "General technical data - Construction" table.

Size		105.0	115.0	130.0
Length	mm	3770	3770	3770
Depth	mm	2230	2230	2230
Height	mm	2420	2420	2420
W1 Supporting point	kg	273	277	295
W2 Supporting point	kg	268	273	292
W3 Supporting point	kg	273	277	295
W4 Supporting point	kg	268	273	292
Operating weight	kg	1082	1100	1174
Shipping weight	kg	1040	1060	1120

The presence of optional accessories may result in a substantial variation of the weights shown in the table.

EXTERNAL SECTION: CEV-XN

Size 150.0 - 160.0 - 170.0 - 180.0

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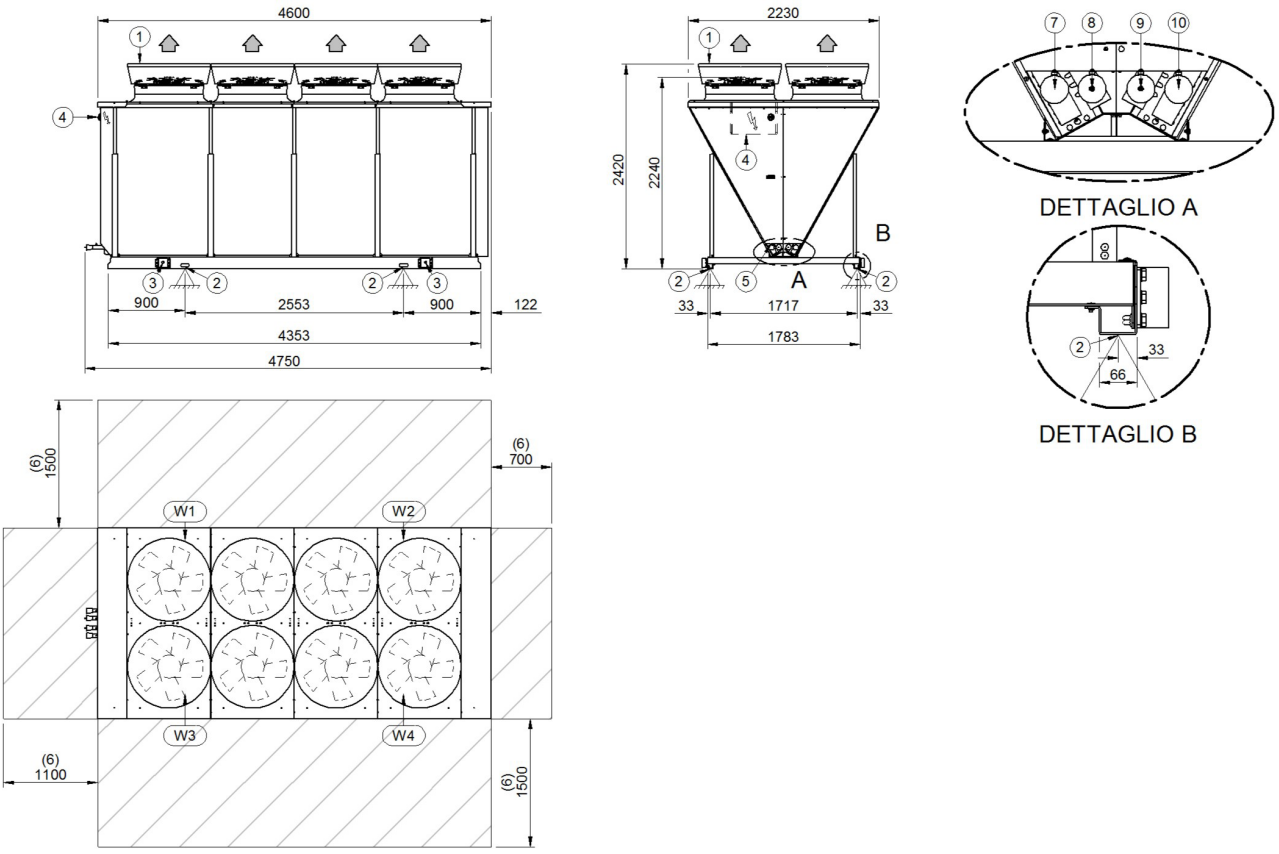
DATA/DATE 04/06/2018



1. Axitop (removable)
2. Antivibration fixing holes ø 18mm
3. Lifting brackets (removable)
4. General electrical panel
5. Power input
6. Suggested clearance
7. Circuit 1 liquid line
8. Circuit 1 gas line
9. Circuit 2 gas line
10. Circuit 2 liquid line

For the measurement of the refrigeration connection diameter refer to the "General technical data - Construction" table.

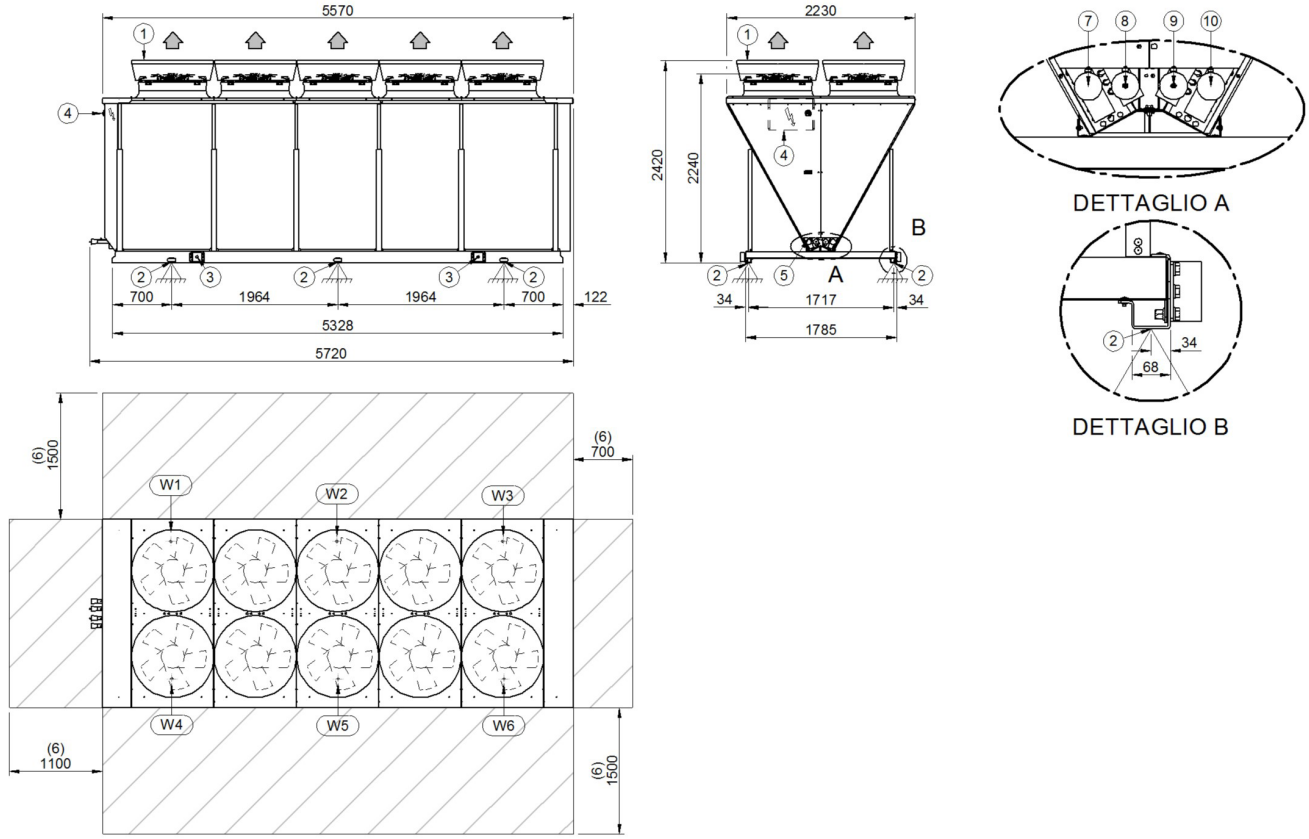
Size		150.0	160.0	170.0	180.0
Length	mm	4750	4750	4750	4750
Depth	mm	2230	2230	2230	2230
Height	mm	2420	2420	2420	2420
W1 Supporting point	kg	323	348	354	385
W2 Supporting point	kg	318	345	350	381
W3 Supporting point	kg	323	348	354	385
W4 Supporting point	kg	318	345	350	381
Operating weight	kg	1282	1386	1408	1532
Shipping weight	kg	1245	1335	1355	1465

The presence of optional accessories may result in a substantial variation of the weights shown in the table.

EXTERNAL SECTION: CEV-XN

Size 185.0 - 190.0

DAA5X0003 _00
DATA/DATE 04/06/2018



1. Axitop (removable)
2. Antivibration fixing holes ø 18mm
3. Lifting brackets (removable)
4. General electrical panel
5. Power input
6. Suggested clearance
7. Circuit 1 liquid line
8. Circuit 1 gas line
9. Circuit 2 gas line
10. Circuit 2 liquid line

For the measurement of the refrigeration connection diameter refer to the "General technical data - Construction" table.

Size		185.0	190.0
Length	mm	5720	5720
Depth	mm	2230	2230
Height	mm	2420	2420
W1 Supporting point	kg	282	287
W2 Supporting point	kg	279	284
W3 Supporting point	kg	277	282
W4 Supporting point	kg	282	287
W5 Supporting point	kg	279	284
W6 Supporting point	kg	277	282
Operating weight	kg	1676	1706
Shipping weight	kg	1615	1645

The presence of optional accessories may result in a substantial variation of the weights shown in the table.

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