Installation and operating manual

SPINchiller² Duct

HIGH EFFICIENCY WATER COOLED LIQUID CHILLER FOR INDOOR INSTALLATION

WSA-XSC2 432-120D

R-410A

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 for air-conditioning only
- Keep to the limits foreseen in the technical schedule and in this manual

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

1.5 Installation

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

Follow local safety regulations.

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

1.6 Maintenance

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

⚠ Turn the unit off before any operation.

1.7 Modification

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

1.8 Breakdown/Malfuction

Disable the unit immediately in case of breakdown or malfunction.

Contact a certified service agent.

Use original spares parts only.

Using the unit in case of breakdown or malfunction:

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

1.9 User training

⚠ The installer has to train the user on:

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

1.10 Data update

Continual product improvements may imply manual data changes.

Visit manufacturer web site for updated data.

1.11 Indications for the User

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

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

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

In case of breakdown or malfunction:

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

⚠ The installer must train the user, particularly on:

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

1.12 Unit indentification

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

⃠ The matriculation plate must never be removed.

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
- manufacturer logo and address

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.

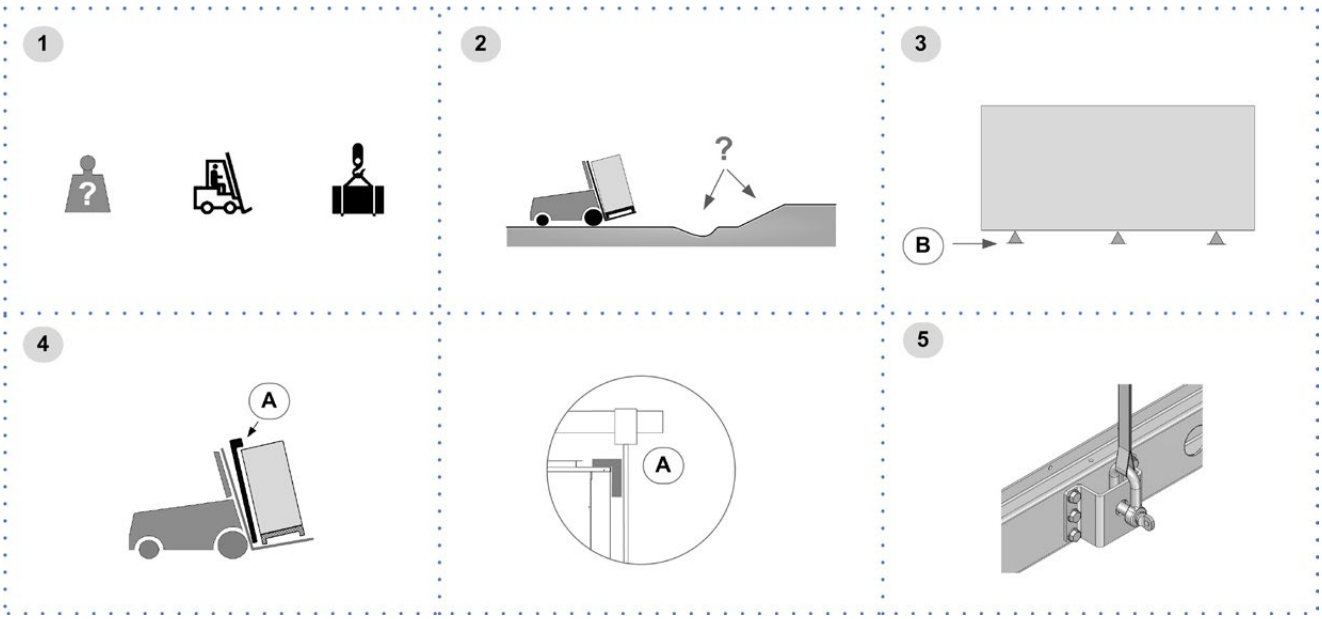
⚠ Any disputes must be made within 8 days from the date of the delivery. Complaints after this period are invalid.

2.1 Storage

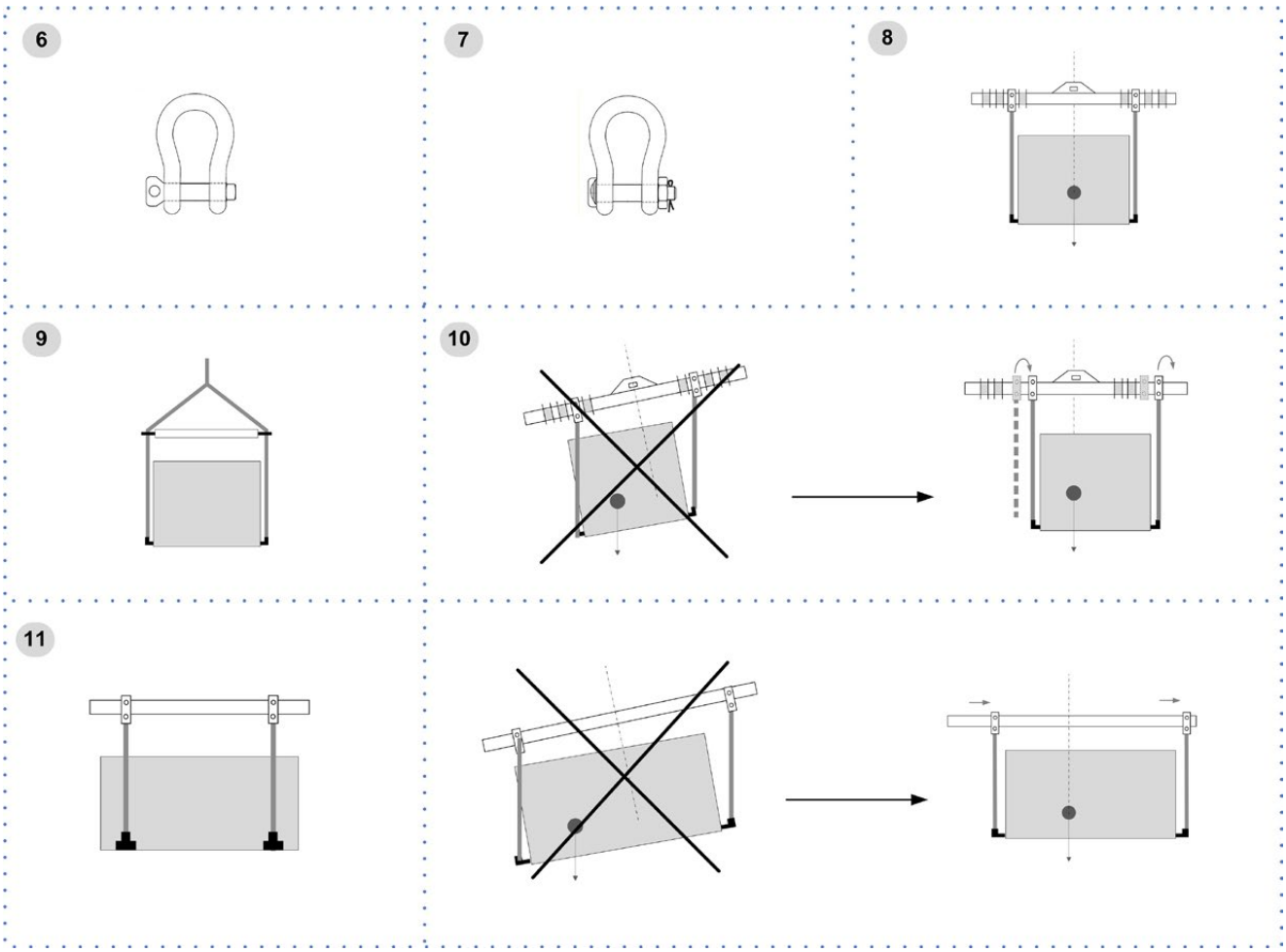
Observe external packaging instructions.

2.2 Handling

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



A. Protections
B. Supports for handling:



2.3 Packaging removing

Be careful not to damage the unit.

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

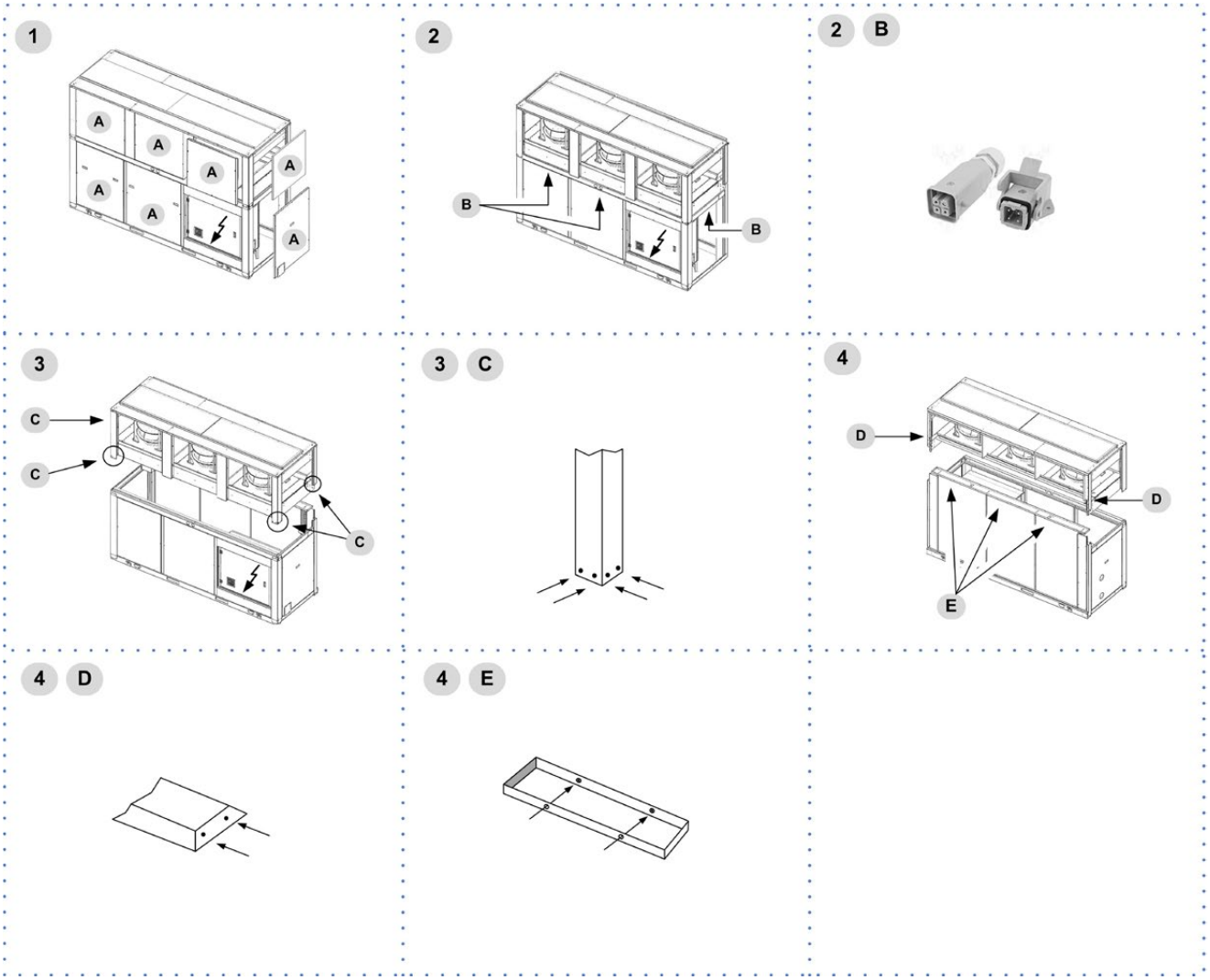
Recycle and dispose of the packaging material in conformity with local regulations.

2.4 Removable fan section for shipping

Option

The fan section is removable for an easier transport.

1. Remove panels
2. Disconnect fan cables
3. Remove screws
4. Remove screws



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:

- INTERNAL
- in fixed positions

Limit vibration transmission:

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

Choose the installation place according to the following criteria:

- safe accessible position
- avoid flood-prone places
- verify unit weight and bearing point capacity
- verify that all bearing points are aligned and leveled
- install the unit raised from the ground

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 Air channelling

When designing and manufacturing the ducting, consider LOAD LOSSES, AIR FLOW AND SPEED that must be consistent with the unit features.

Limit the load losses by optimising the path, the type and number of bends and junctions.

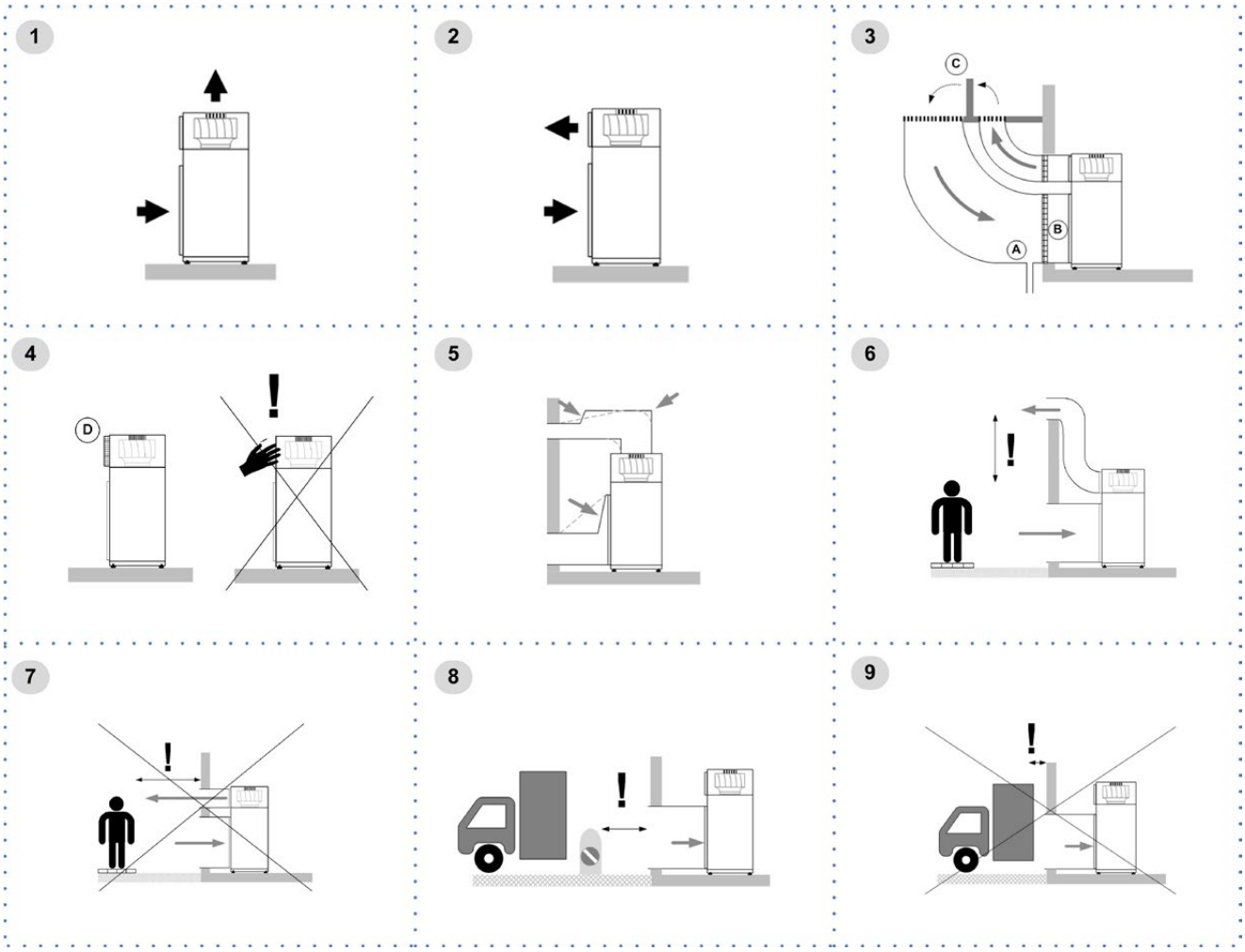
⚠ Consider that excessive external static pressure will lead to a reduction in flow rate, with consequent alarm lockout.

Ensure ducts are thermally insulated.

⃠ The weight of the ducting must not burden the connection flanges.

Place anti-vibration joints between channels and unit.

Connection to the flanges and between the various sections of the channels must guarantee air seal, avoiding dispersions penalising the overall efficiency of the system.



Vertical outlet standard (1)

Rear outlet option (2)

Provide:

- water discharge (3-A)
- grilles to restrict access to small animals (3-B)
- deflectors (3-C) to avoid the by-pass between the two air flows
- safety grille (4-D)

Avoid therefore:

- angle curves and narrowings (5)
- direct air flow on people (6-7), windows, doors, plants, obstacles in general
- obstacles that prevents the air inflow to the coil (8-9)
- installations next to silent rooms

4 Water connections

4.1 Water quality

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^{--}	< 100	ppm
HCO_3^- / SO_4^{--}	> 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.

4.2 Risk of freezing

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

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

4.3 Anti-freeze solution

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

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

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

4.4 Water flow-rate

The project water-flow must be:

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

4.5 Operation sequence

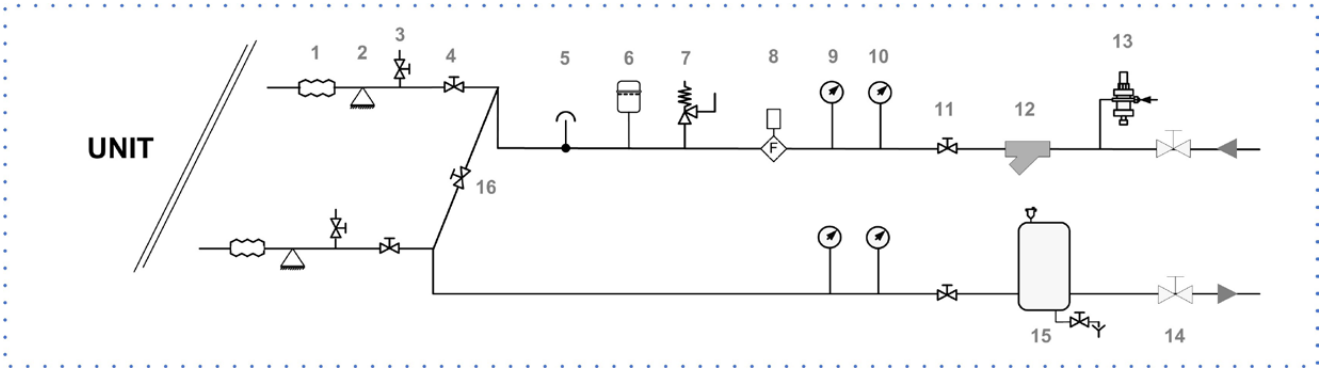
1. Carefully wash the system with clean water: fill and drain the system several times.
2. Apply additives to prevent corrosion, fouling, formation of mud and algae.
3. Fill the plant
4. Execute leakage test.
5. Isolate the pipes to avoid heat dispersions and formation of condensate.
6. Leave various 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.

4.6 Racommended connection

⚠ The installer must define:

- component type
- position in system



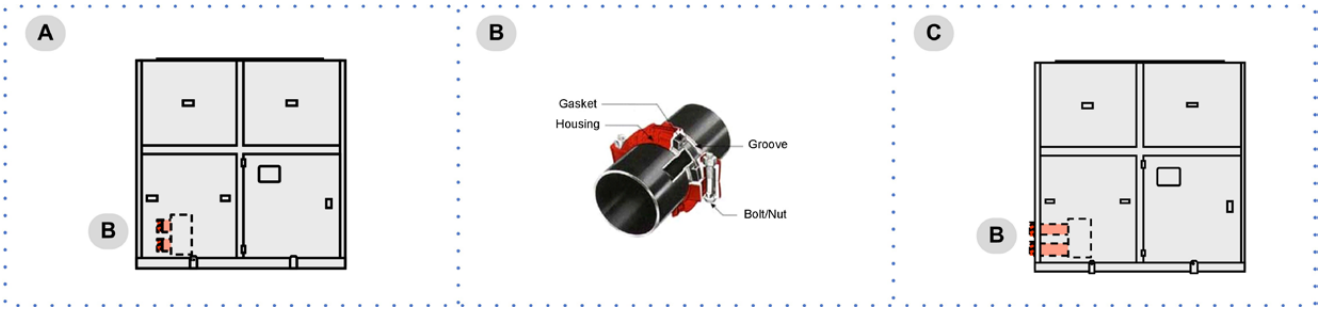
1	antivibration joints	9	pressure gauge
2	piping support	10	thermometer
3	exchanger chemical cleaning bypass	11	shut-off valve
4	shut-off valve	12	filter
5	vent	13	filling valve
6	expansion vessel	14	shut-off valve
7	safety valve	15	Internal storage tank
8	Flow Switch	16	Cleaning system bypass

4.7 Water filter

⚠ 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.

4.8 Hydraulic connections



A - standard

B - standard quick connections flush to the unit

C - connections flush the unit (option)

An option which simplifies the hydraulic connections which would otherwise be carried out within the unit (with the responsibility of the client).

Includes internal piping to the external unit panel, two fast fittings flush to the unit, two outlet connections for the system connections which are to be soldered by the client.

5 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.

5.1 Electrical data

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

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

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

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

5.2 Connections

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

5.3 Signals / data lines

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

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

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

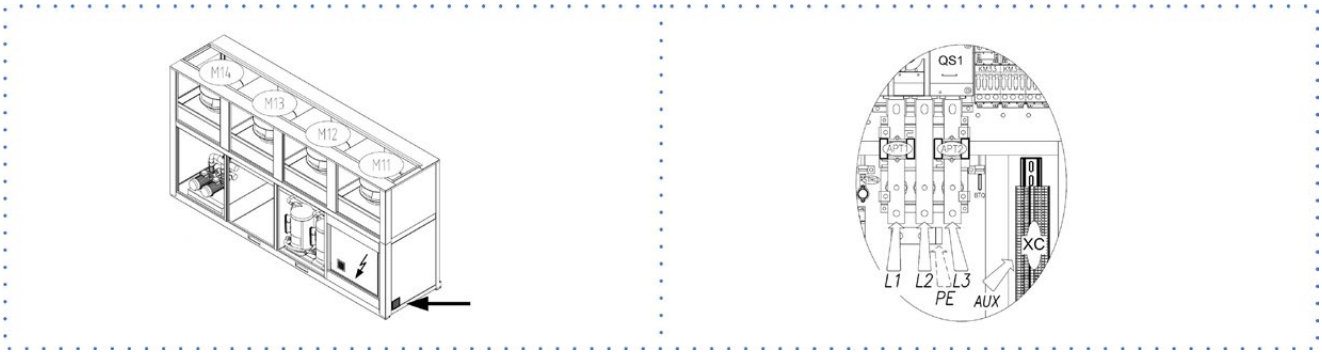
Do not lay the cables parallel to other cables, cable crossings are possible, only if laid at 90°.

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

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

Respect impendency, capacity and attenuation indications.

5.4 Power input



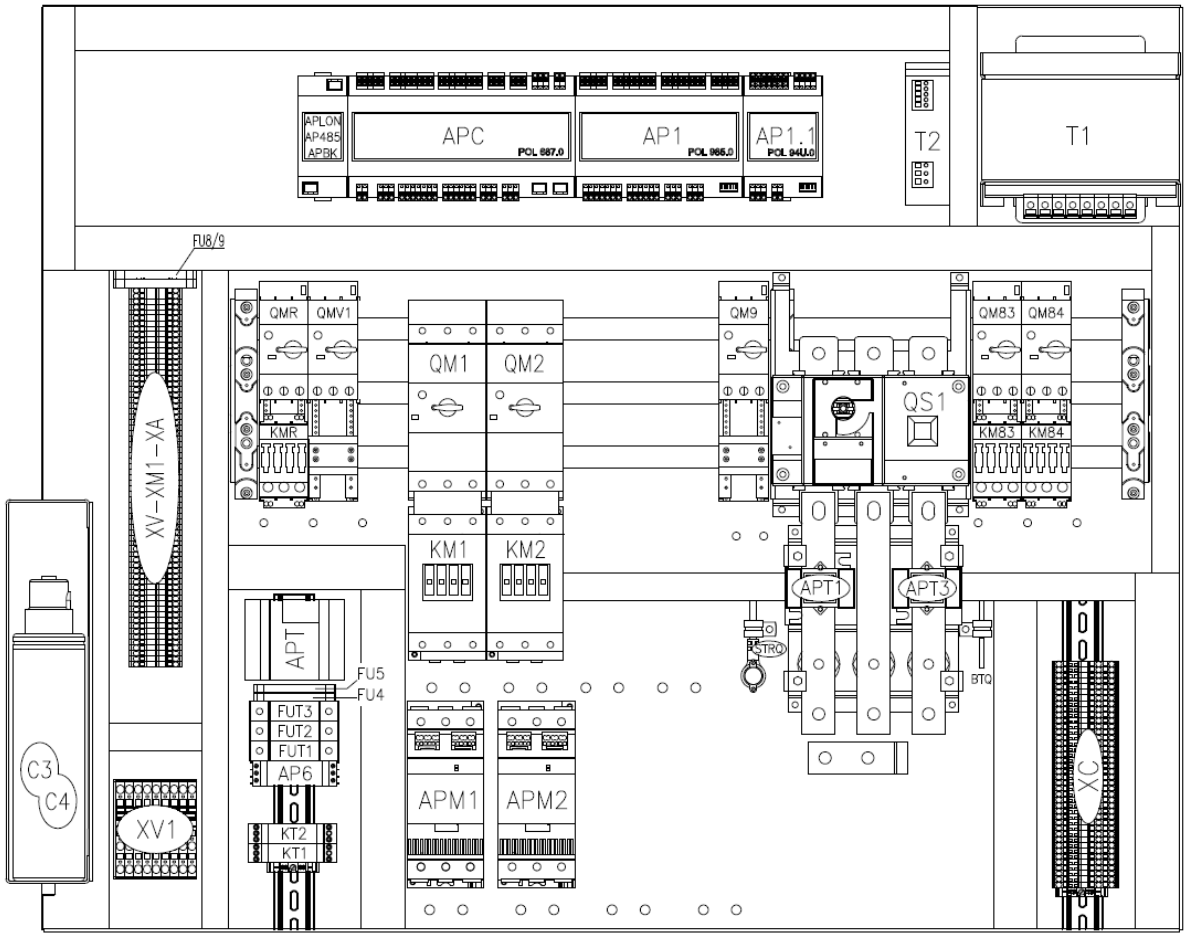
⚠ Fix the cables: if vacated may be subject to tearing.

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

QS1: main isolator switch

XC: Customer connections

5.5 Electrical panel

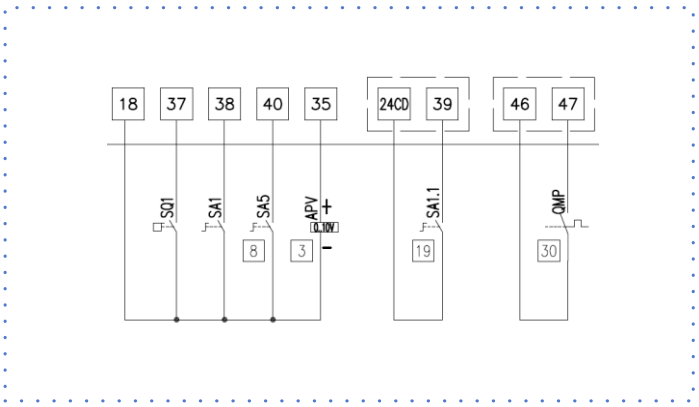


APBK	BACnet IP
AP485	Modbus RTU
APLON	LON-WORKS
APC	Main control module
AP1	Compressor control module
AP1.1	Electronic thermostatic management
AP6	Phase monitor
APM1-APM2	Compressor safety module
APT	Power player
FUT1-2-3	Wattmeter fuse
FU4-5	Wattmeter fuse
FU8-9	230V aux. circuit fuse
KT1-KT2	Soft start timer
KM83-84	User side pump contactor
KMR	Heater contactor
QM1-QM2	Compressor thermal magnetic circuit breaker
QM9	Auxiliary circuit thermal magnetic circuit breaker
QM83-84	Pump motor overload cutout
QMR	Fan motor overload cutout
QMV1	Fan motor overload cutout
QS1	Main isolator switch
STRQ	Safety thermostat temperature control cabinet
T1	Auxiliary circuit transformer
T2	24V dc stabilized feeder

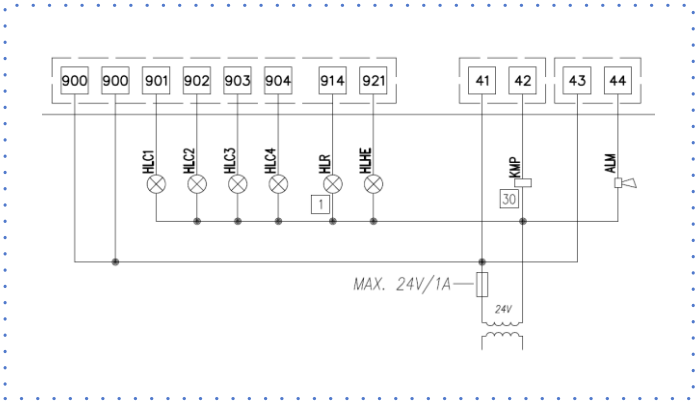
5.6 Connections performer by customer

Size	432	452	552	602	702	80D	90D	100D	110D	120D
Min. cable section Cu (mm^2)	1x95	1x95	1x95	1x95	1x95	1x95	1x95	1x95	1x95	1x150
Max. cable section Cu (mm^2)	1x150	1x150	1x150	1x150	1x150	1x185	1x185	1x185	1x185	1x240
Max. bar Cu width (mm)	32	32	32	32	32	32	32	32	32	32
Tightening torque (Nm)	20	20	20	20	20	20	20	20	20	20

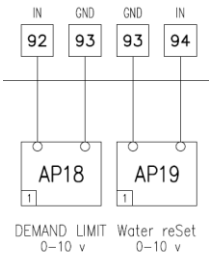
SQ1 Flow Switch
SA1 remote on/off
SA5 summer/winter
APV 0..10V analogical output
SA1.1 second setpoint
QMP ricirculation pump



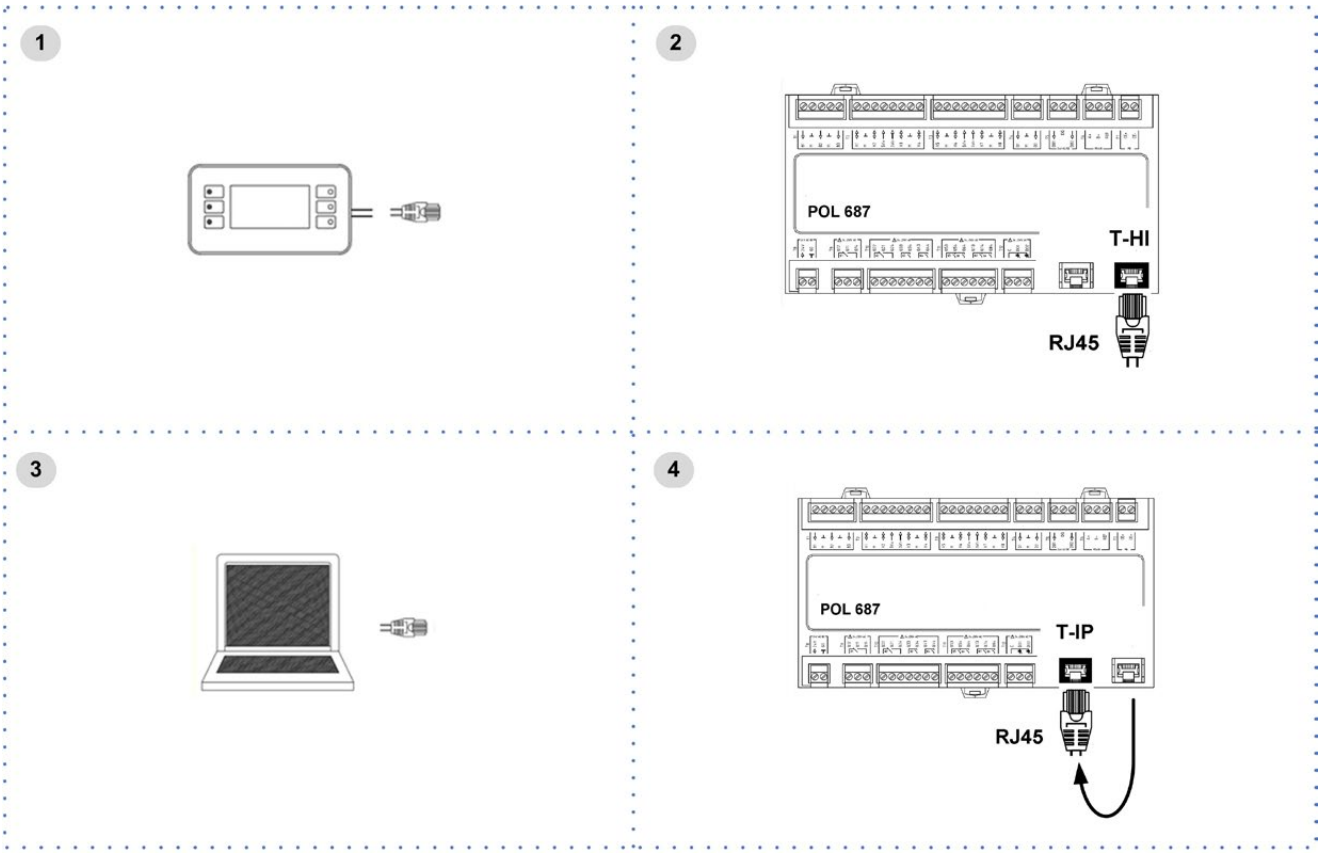
HLC1...4 compressor status signal
HLR alarm signal lamp electrical heater electrical panel selector
HLHE signal lamp HEAT status
KMP evaporator pump contactor
ALM cumulative fault signal



AP18 Demand limit
AP19 water reset



5.7 Computer connection



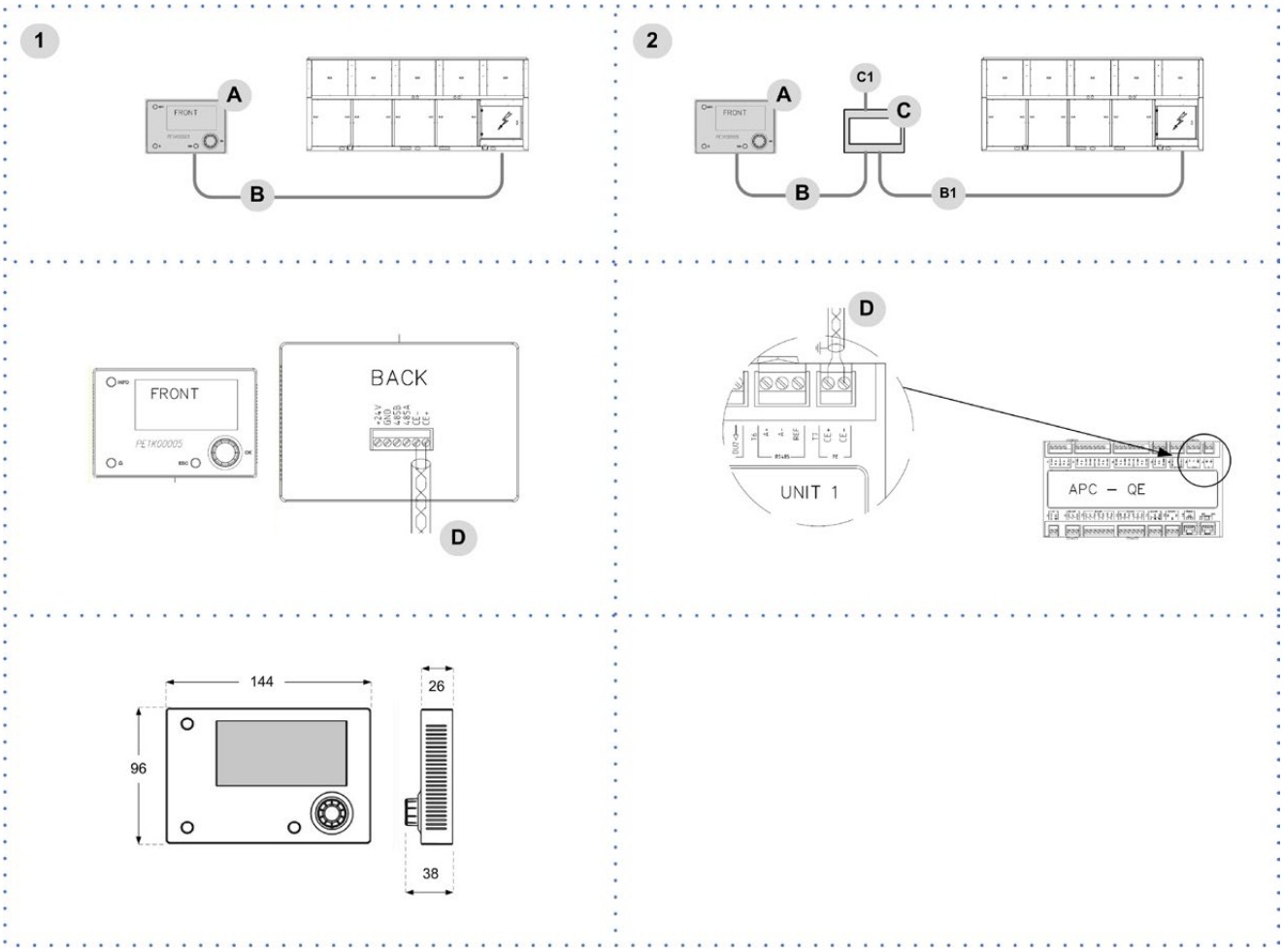
1. Service keypad
2. RJ45: standard connection
3. P.C.-not supplied
4. P.C. connection, shift RJ45 from T-HI to T-IP

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 = ADMIN
17. Password = SBTAdmin!

5.8 Room keypad

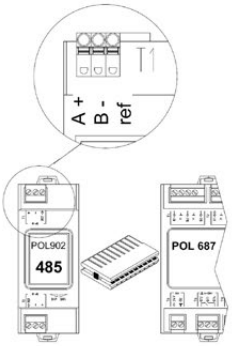
Accessory

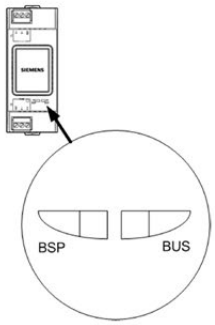


1	Distance up to 350 mt
2	Distance up to 700 mt
A	User interface
B = B1	KNX bus, max 350 mt twisted pair with shield, ø 0,8 mm EIB/KNX cable marking recommende
C	pwer supply unit N125/11 5WG1 125-1AB11
C1	AC 120...230V, 50...60Hz
D	KNX bus, max 350 mt

5.9 Modbus - RS485

Accessory



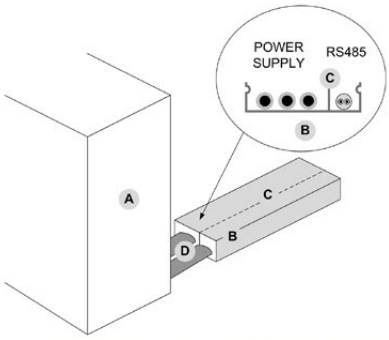


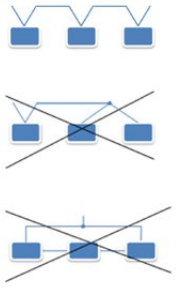
LED BSP	communication with AP1 module	LED BUS	communication with Modbus
green	communication ok	green	communication ok
yellow	software ok but communication with AP1 down	yellow	startup / channel not communicating
red	flashing: software error	red	communication down
	fixed: hardware error		

Path

Main menu → Unit Parameters → Modbus

Parameters	Short description	Description
P0445:	T1 bus termination	Termination resistor activation on T1 POL902 [0] port = Passive [1] = Active
P0446:	T2 bus termination	Termination resistor activation on T2 POL902 [0] port = Passive [1] = Active





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

Nominal capacity between conductors < 50 pF/m

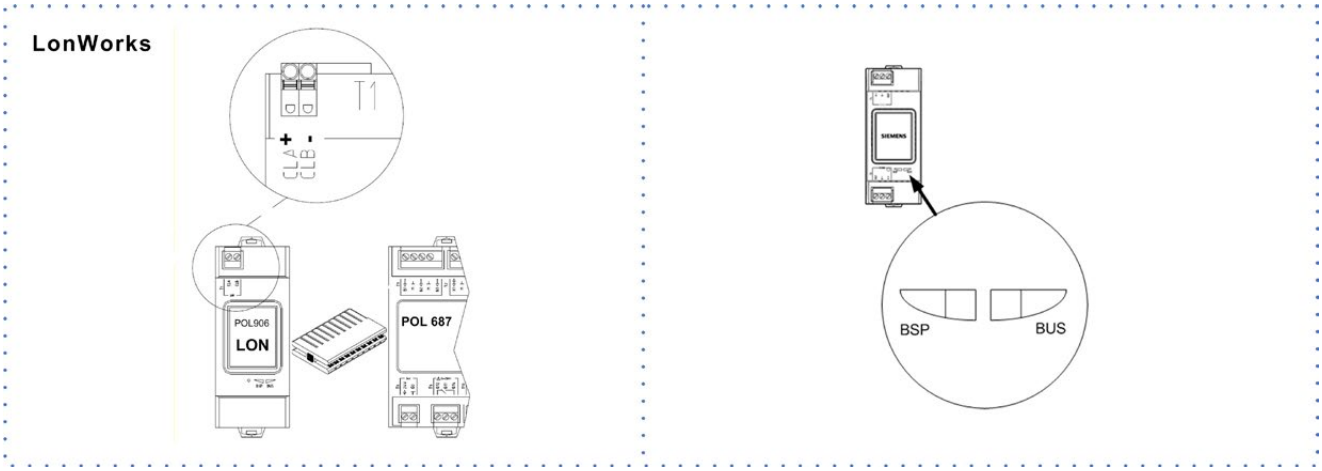
Nominal impedance 120 Ω

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.

5.10 LonWorks

Accessory



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

LONWORK CABLE TYPES

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, 0.22mm²

Impedance 100 Ω +/- 15 % @ f > 1 MHz

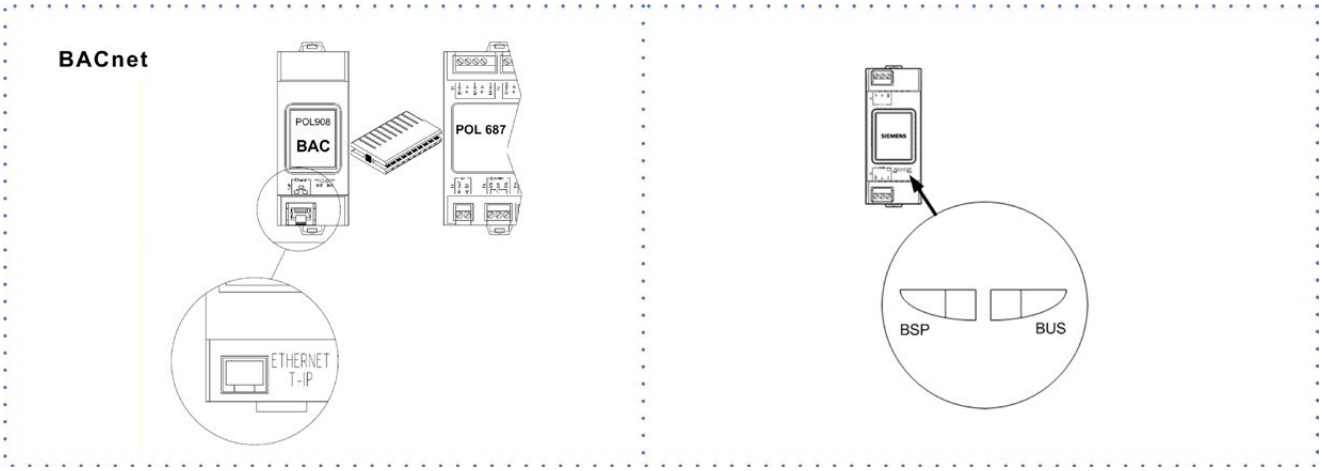
Operating capacity between two wires of a pair < 46 nF/km

Capacity pair to ground, asymmetric. < 3.3 nF/km

DC loop resistance < 168 Ω

5.11 BACnet

Accessory

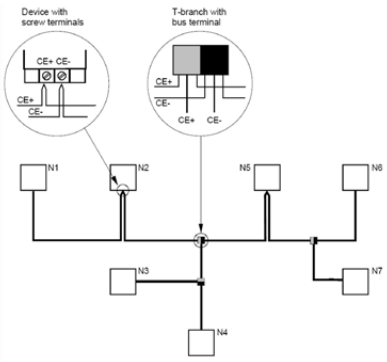


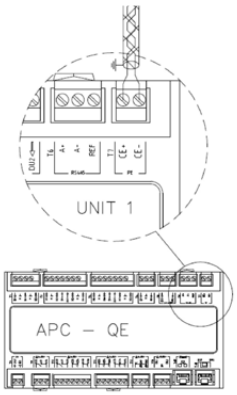
LED BSP	communication with AP1 module
green	communication ok
yellow	software ok but communication with AP1 down
red	flashing: software error
	fixed: hardware error

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

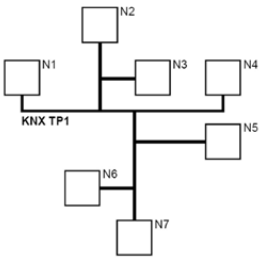
5.12 Ecoshare

- Max 7 units
- Maximum length of the bus line: 1000 m.
- Maximum distance between 2 units: 700 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

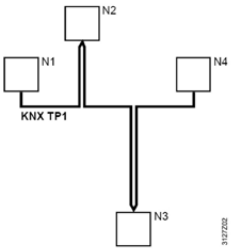


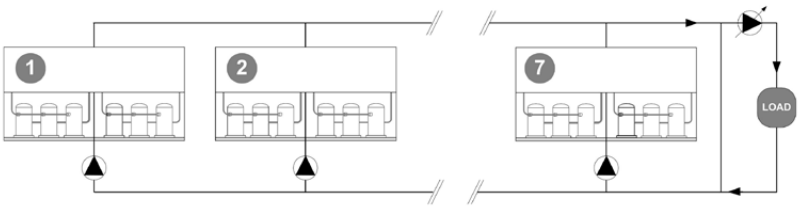


Tree topology (with stub lines)



Line topology (with loops)





6 Start-up

6.1 General description

The indicated operations should be done by qualified technician with specific training on the product.
Upon request, the service centres performing the start-up.
The electrical, water connections and the other system works are by the installer.
Agree upon in advance the star-up data with the service centre.
Before checking, please verify the following:

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

⚠ After turning off the power, wait at least 5 minutes before accessing to the electrical panel or any other electrical component.

⚠ Before accessing check with a multimeter that there are no residual stresses.

6.2 Preliminary checks

For details refer to the different manual sections.

Unit OFF power supply

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

6.3 Start-up sequence

For details refer to the different manual sections.

Unit ON power supply

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

6.4 Refrigeration circuit

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

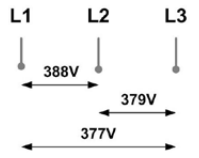
6.5 Water circuit

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

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

6.6 Electric Circuit

⚠ Verify that the unit is connected to the ground plant.
Check the conductors are tightened as: the vibrations caused by handling and transport might cause these to come loose.
Connect the unit by closing the sectioning device, but leave it on OFF.
Check the voltage and line frequency values which must be within the limits: 400/3/50 +/- 10%
Check and adjust the phase balance as necessary: it must be lower than 2%
Example



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

2) MAX - A = 388 – 381 = 7

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

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

6.7 Compressor crankcase heaters

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

6.8 Voltages

Check that the air and water temperatures are within in the operating limits.
Start-up the unit.
With unit operating in stable conditions, check:

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

6.9 Remote controls

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

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

6.10 Air flow setting

Adjust the maximum speed of the fan to ensure the air flow relative to the pressure drops of the ducts (see table on the following page).

Ventilation parameters:

- menu CONFIGURATION > UNIT > VENTILATION
- Par 495 MaxFan = % max fan speed

6.11 Operating at reduced load

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

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

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

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

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

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

6.12 Start-up report

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

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

- total voltages and absorptions with unit at full load
- absorptions of the different electric loads (compressors, fans, pumps etc)
- temperatures and flows of the different fluids (water, air) both in input and in output from the unit
- temperature and pressures on the characteristic points of the refrigerating circuit (compressor discharge, liquid, intake)

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

6.13 97/23 CE PED directive

97/23 CE PED DIRECTIVE 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)

6.14 Fan performance

Standard airflow

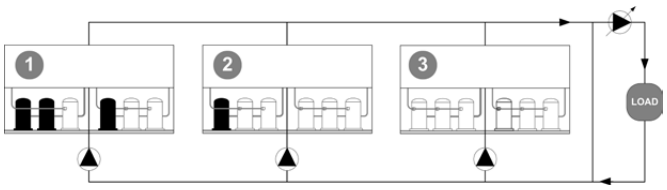
The performance has been calculated in relation to the internal pressure drop of a standard unit.

Size	Static available pressure (Pa)		70	80	90	100	120	150	180	210	240	270	300	330
432	Standard airflow	l/s	12333	12333	12333	12333	12333	12333	12333	12333	12333	12333	12333	12333
	Fan RPM	rpm	1599	1604	1609	1614	1624	1639	1655	1670	1686	1702	1718	1734
	Total input	kW	7,92	8,04	8,19	8,34	8,61	8,94	9,27	9,63	9,96	10,32	10,71	11,07
452	Standard airflow	l/s	12333	12333	12333	12333	12333	12333	12333	12333	12333	12333	12333	12333
	Fan RPM	rpm	1599	1604	1609	1614	1624	1639	1655	1670	1686	1702	1718	1734
	Total input	kW	7,92	8,04	8,19	8,34	8,61	8,94	9,27	9,63	9,96	10,32	10,71	11,07
552	Standard airflow	l/s	12333	12333	12333	12333	12333	12333	12333	12333	12333	12333	12333	12333
	Fan RPM	rpm	1614	1618	1626	1630	1636	1657	1671	1683	1699	1717	1735	1749
	Total input	kW	7,99	8,11	8,28	8,42	8,67	9,04	9,36	9,7	10,03	10,41	10,81	11,16
602	Standard airflow	l/s	12333	12333	12333	12333	12333	12333	12333	12333	12333	12333	12333	12333
	Fan RPM	rpm	1646	1653	1654	1664	1671	1688	1702	1718	1738	1749	1769	1786
	Total input	kW	8,15	8,28	8,41	8,59	8,85	9,21	9,53	9,9	10,26	10,6	11,03	11,4
702	Standard airflow	l/s	16444	16444	16444	16444	16444	16444	16444	16444	16444	16444	16444	16444
	Fan RPM	rpm	1630	1637	1637	1646	1658	1673	1686	1701	1716	1736	1754	1768
	Total input	kW	10,77	10,95	11,12	11,34	11,72	12,17	12,59	13,08	13,52	14,04	14,58	15,06
80D	Standard airflow	l/s	16444	16444	16444	16444	16444	16444	16444	16444	16444	16444	16444	16444
	Fan RPM	rpm	1630	1637	1637	1646	1658	1673	1686	1701	1716	1736	1754	1768
	Total input	kW	10,77	10,95	11,12	11,34	11,72	12,17	12,59	13,08	13,52	14,04	14,58	15,06
90D	Standard airflow	l/s	20555	20555	20555	20555	20555	20555	20555	20555	20555	20555	20555	20555
	Fan RPM	rpm	1629	1636	1642	1643	1656	1670	1688	1705	1721	1734	1752	1766
	Total input	kW	13,45	13,66	13,93	14,15	14,64	15,18	15,75	16,38	16,94	17,52	18,2	18,8
100D	Standard airflow	l/s	20555	20555	20555	20555	20555	20555	20555	20555	20555	20555	20555	20555
	Fan RPM	rpm	1629	1636	1642	1643	1656	1670	1688	1705	1721	1734	1752	1766
	Total input	kW	13,45	13,66	13,93	14,15	14,63	15,18	15,75	16,38	16,94	17,52	18,2	18,8
110D	Standard airflow	l/s	21388	21388	21388	21388	21388	21388	21388	21388	21388	21388	-	-
	Fan RPM	rpm	1658	1663	1667	1672	1682	1696	1711	1726	1741	1756	-	-
	Total input	kW	14,5	14,75	14,95	15,2	15,7	16,4	16,95	17,5	18,1	18,7	-	-
120D	Standard airflow	l/s	22222	22222	22222	22222	22222	22222	-	-	-	-	-	-
	Fan RPM	rpm	1713	1719	1724	1728	1738	1751	-	-	-	-	-	-
	Total input	kW	15,85	16,1	16,35	16,6	17,05	17,85	-	-	-	-	-	-

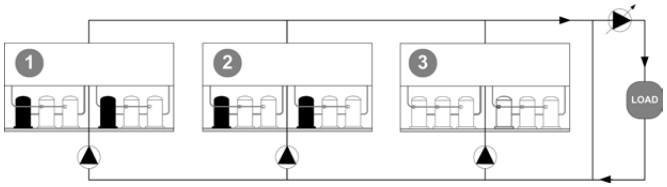
6.15 Ecoshare

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

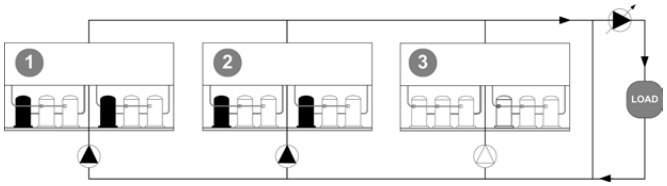
MODE A
Every unit manages its own compressors according to the setpoint.
Every unit optimizes its refrigeration circuits.
Pumps always active, even with compressor stoped.
P0343 = 0
P0344 > 0 °C
setpoint1 > setpoint2 > setpoint3
or
setpoint1 < setpoint2 < setpoint3



MODE B
The master manages the single cooling.
The master optimizes individual refrigerant circuits.
Pumps always active, even with compressor stoped.
P0343 = 1
P0344 = 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.
P0343 = 2
P0344 = 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
P0340:	Address unit	ProcessBus address unit
P0341:	Unit network	Number of network-connected units including the master
P0342:	Standby unit	Number of units kept in standby
P0343:	TypeRegMS	Operation mode: 0=mode A; 1=mode B; 2=mode C
P0344:	Offset Trm MS	Temperature Offset the master sum or subtract, depending on the way you set, in order of priority, to the set point of the slave

6.16 Climatic TExt

⚠ Menu accessible only after having entered the password.

⚠ Access reserved only to specifically trained personnel.

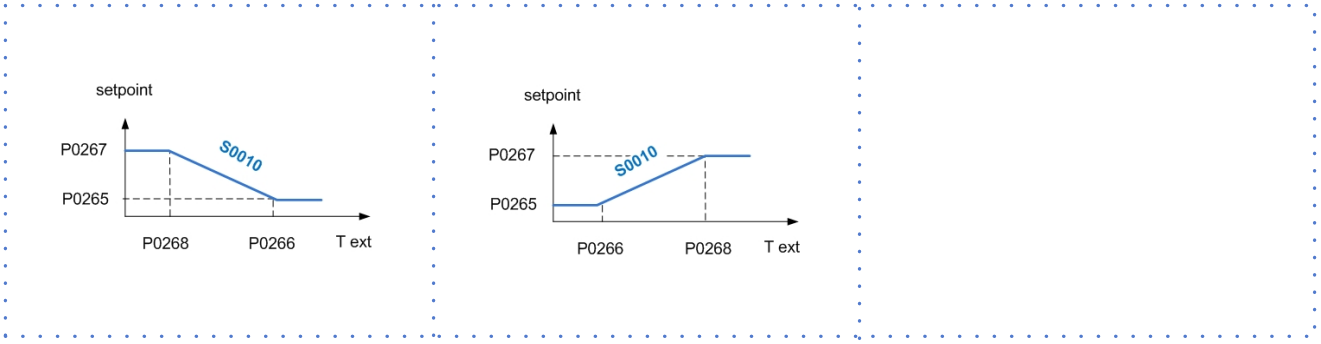
⚠ The parameter modification can cause irreversible damages.

The setpoint defined by the temperature curve is shown at status S0010: ActualSptTExt

Only if P0053: En Climatica ≠ 0

Path: Main Menu / Unit parameters / Climatica TExt

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 / Climatica TExt

Parameters	Short description	Description
P0265:	CSptLow	setpoint temperature value when the air temperature value is AirAtSptLowC
P0266:	AirAtSptLowC	external air temperature value where the calculated setpoint takes on the value given by SptLowC
P0267:	CSptHigh	setpoint temperature value when the air temperature value is AirAtSptHigC
P0268:	AirAtSptHigC	external air temperature value where the calculated setpoint takes on the value given by SptHigC

6.17 Demand limit

⚠ Menu accessible only after having entered the password.

⚠ Access reserved only to specifically trained personnel.

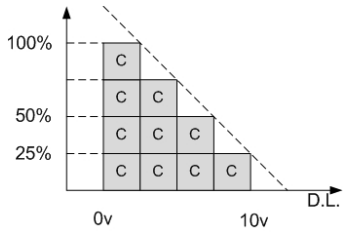
⚠ The parameter modification can cause irreversible damages.

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.

Only if P0050:En DemandLimit ≠ 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
P0009:	set demand limit	Parameter setting of the value % of demand limit

6.18 Water reset

⚠ Menu accessible only after having entered the password.

⚠ Access reserved only to specifically trained personnel.

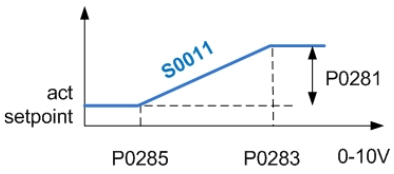
⚠ The parameter modification can cause irreversible damages.

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

The setpoint is shown at status S0011: ActualSptWR

Only if P0051: En WaterReset ≠ 0

Path: Main Menu / Unit parameters / Water reset

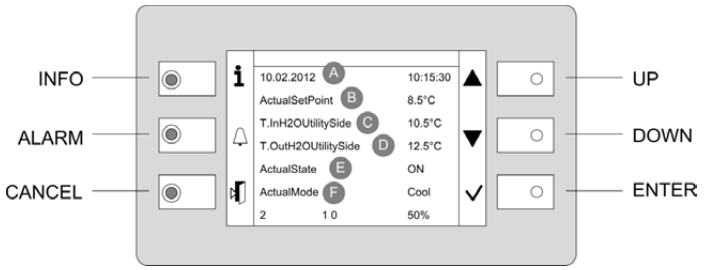


Step	Display	Action	Menu/Variable	Keys		Notes
1		Press 3 sec.		✓		
2	Password	Set	Password	▼	✓	
3		Press		i		
4	Main menu	Select	Unit parameters	▼	✓	
5	Unit parameters	Select	Water reset	▼	✓	
6	Water reset	Select	Parameter	▼	✓	
7		Set		▼	▲	
8		Confirm		✓		
9		Press 3 sec.				
10		Select	Local connections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

Path: Main Menu / Unit parameters / Water reset

Parameters	Short description	Description
P0281:	MaxCWRC	Maximum correction to be applied to the setpoint
P0283:	SWRMaxC	Value of Water-Reset signal, where the variation of the Set Point, cooling, is maximum, i.e. equal to P0281
P0285	SWRMinC	Value of Water-Reset signal, where the variation of the Set Point, cooling, is minimal, i.e. equal to 0° C

7 Control



7.1 Led

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

7.2 Display

Ref.	Variable	Description
A		Date - Time
B	**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: water heating (option)
	2	Installed compressors
	1 - 0	Compressors ON example: circuit 1 = 1 compr. On circuit 2 = 0 compr. On
	50%	Heating capacity

7.3 Keys

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

7.4 Change unit state

Step	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

7.5 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: water heating (option)			
4		Confirm				
5		Exit				

7.6 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	
P0001	SetPoint Cool	Setpoint Cool	
P0002	SetPoint Heat	Setpoint Heat	Not used
P0003	2°SetPoint Cool	2° Setpoint Cool	Enable by remote switch
P0004	2°SetPoint Heat	2° Setpoint Heat	not used currently
P0005	SetPoint ECOCool	Economic summer SetPoint	
P0006	SetPoint ECOHeat	Economic winter SetPoint	Not used
P0007	SetPointRec	Recovery Set Point	

7.7 Display the status

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

For details see:
14.2 Status →48

7.8 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	Unit Option			
6		Set	P0061=1			
7		Press 3 sec.				
		Select	Local connections			

* Unit Parameters menu is displayed

7.9 Alarms

⚠ Before resetting an alarm identify and remove its cause.
Repeated resets can cause irreversible damage.
Example:
+ eE001: Monitore fase: Fault = active alarm
- EE003: Guasto P1 Util: 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:
14.1 Alarms → 46

7.10 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 Maintenance

8.1 General description

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

The maintenance allows to:

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

Before checking, please verify the following:

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

⚠ After turning off the power, wait at least 5 minutes before accessing to the electrical panel or any other electrical component.

⚠ Before accessing check with a multimeter that there are no residual stresses.

8.2 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)

8.3 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
- type of intervention effected
- intervention description
- carried out measures etc.

8.4 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.

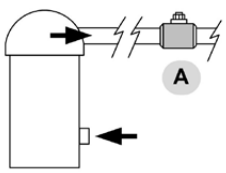
⚠ With lower temperatures keep heaters turned on in of the electrical panel (option).

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.

8.5 Compressor supply line shut-off valve



A. Supply line shut-off valve

⚠ CAUTION!

Do not remove the seal

Remove only if authorized by the manufacturer.

Please contact the maker for informations.

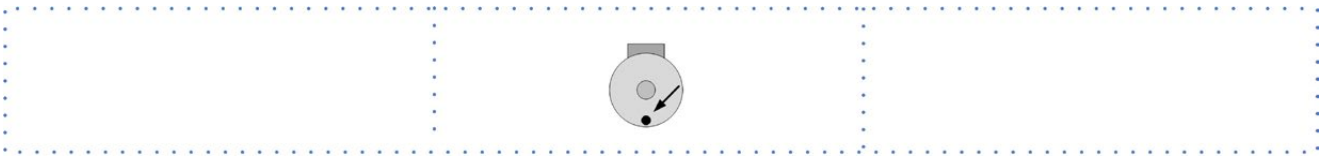
8.6 System discharge

1. evacuate the system
2. evacuate the exchanger, use all the cocks presents
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.

8.7 Control check list

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

* European regulation 303/2008

Refer to the local regulations; and ensure correct 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.

8.8 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.

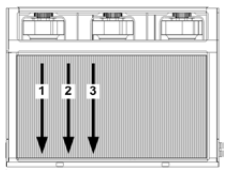
Remove all impurities from the surface.

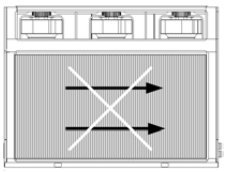
Using an air pressure gun, clean the aluminum surface of the battery; be careful to direct the air in the opposite direction of the fan air movement.

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.





8.9 Water filter

Check that no impurities prevent the correct passage of water.

8.10 Water side exchanger

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

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

The clearing must be effected:

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

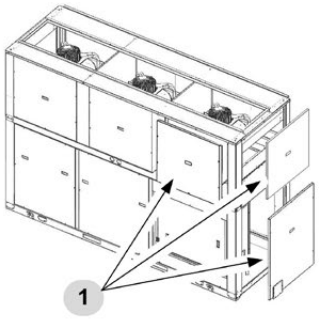
8.11 Electric fans

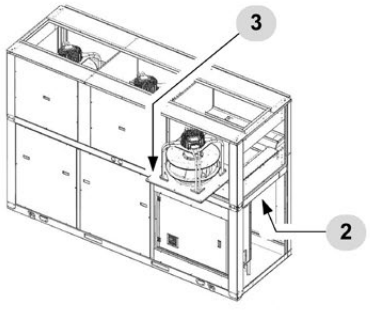
Check:

- 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

Removing fans:

1. remove panels
2. disconnect fan
3. remove fastening screws, extract





8.12 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 Decommissioning

9.1 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.

9.2 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.

9.3 Directive EC RAEE

The units covered by the legislation in question are marked with the symbol on the side.

With the aim of protecting the environment, all of our units are produced in compliance with Directive EC on waste electrical and electronic equipment (RAEE).

The potential effects on the environment and on human health due to the presence of hazardous substances are shown in the use and maintenance manual in the section on residual risks.

Information in addition to that indicated below, if required, can be obtained from the manufacturer/distributor/importer, who are responsible for the collection/handling of waste originating from equipment covered by EC-RAEE. This information is also available from the retailer who sold this appliance or from the local authorities who handle waste.

Directive EC-RAEE requires disposal and recycling of electrical and electronic equipment as described therein to be handled through appropriate collection, in suitable centres, separate from collection for the disposal of mixed urban waste.

The user must not dispose of the unit at the end of its life cycle as urban waste, it must instead be handed over to appropriate collection centres as set forth by current standards or as instructed by the distributor.

10 Residual risks

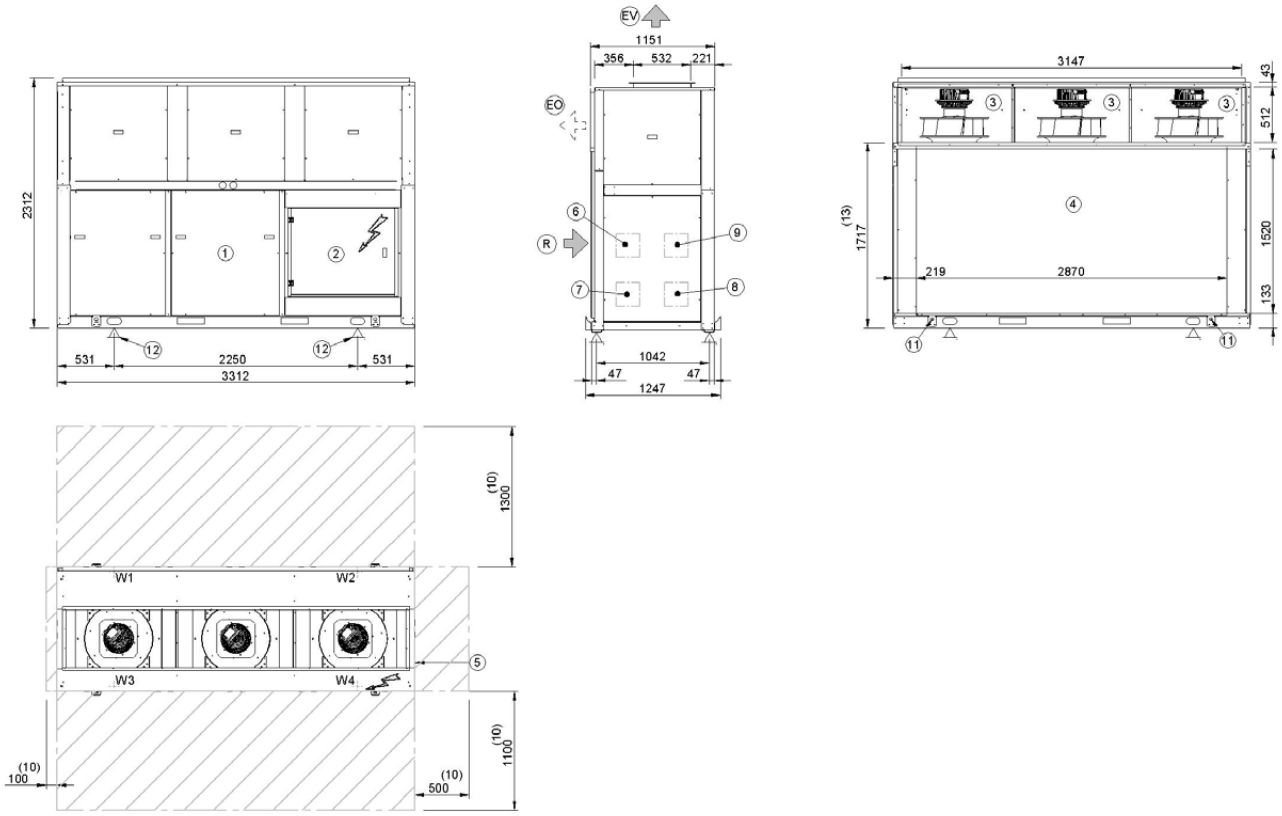
General description
In this section the most common situations are indicated,as these cannot be controlled by the manufacturer and could be a source of risk situations for people or things.
Danger zone
This is an area in which only an authorised operator may work.
The danger zone is the area inside the 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.

11 Dimensional drawings

11.1 WSA-XSC2 432-602

DAA1Z432_602_0
Date: 14/02/2013



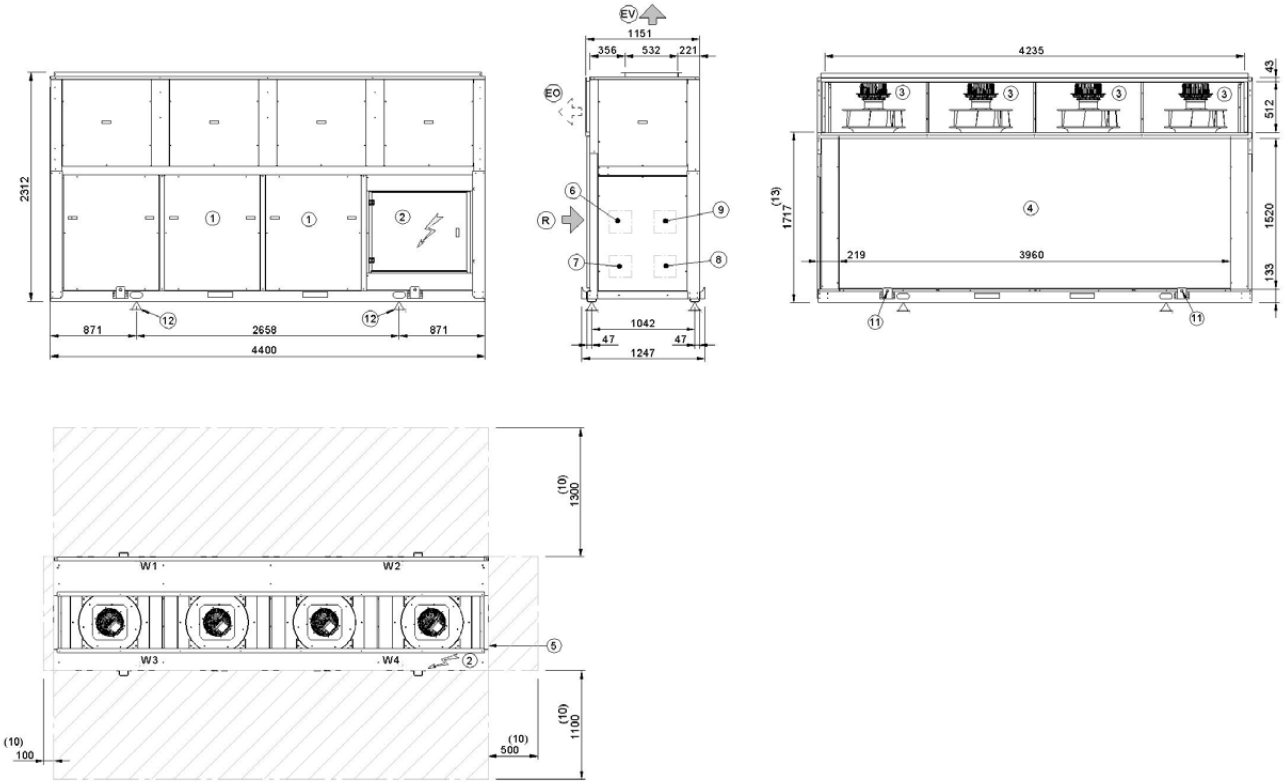
1 - Compressor compartment
2 - GENERAL ELECTRICAL PANEL
3 - EXHAUST RADIAL ELECTRIC FAN
4 - External exchanger
5 - Power input
6 - Internal exchanger water inlet standard unit or with pump option
7 - Internal exchanger water outlet standard unit or with pump option
8 - recovery side exchanger water inlet (optional) Position of the connections in relation with the recovery
9 - recovery side exchanger water outlet (optional) Position of the connections in relation with the recovery
10 - Functional spaces
11 - Lifting brackets (removable)
12 - Fixing points
13 - Unit height without fan section
R - outdoor air return
EV - Vertical air exhaust (standard)
EO - Horizontal air exhaust(OPTIONAL)

Size		432	452	552	602
A - Length	mm	3312	3312	3312	3312
B - Width	mm	1151	1151	1151	1151
C - Height	mm	2312	2312	2312	2312
W1 Supporting Point	kg	332	329	354	380
W2 Supporting Point	kg	304	300	320	338
W3 Supporting Point	kg	374	349	396	411
W4 Supporting Point	kg	420	406	437	444
Shipping weight	kg	1408	1359	1482	1545
Operating weight	kg	1430	1384	1507	1573
Internal exchanger water connections	Ø	2 ½"	2½"	2½"	2½"
Partial recovery water connections	Ø	1¼"	1¼"	1¼"	1¼"
Total recovery water connections	Ø	2"	2"	2"	2"

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

11.2 WSA-XSC2 702-80D

DAA1Z702_80D_0
Date: 14/02/2013



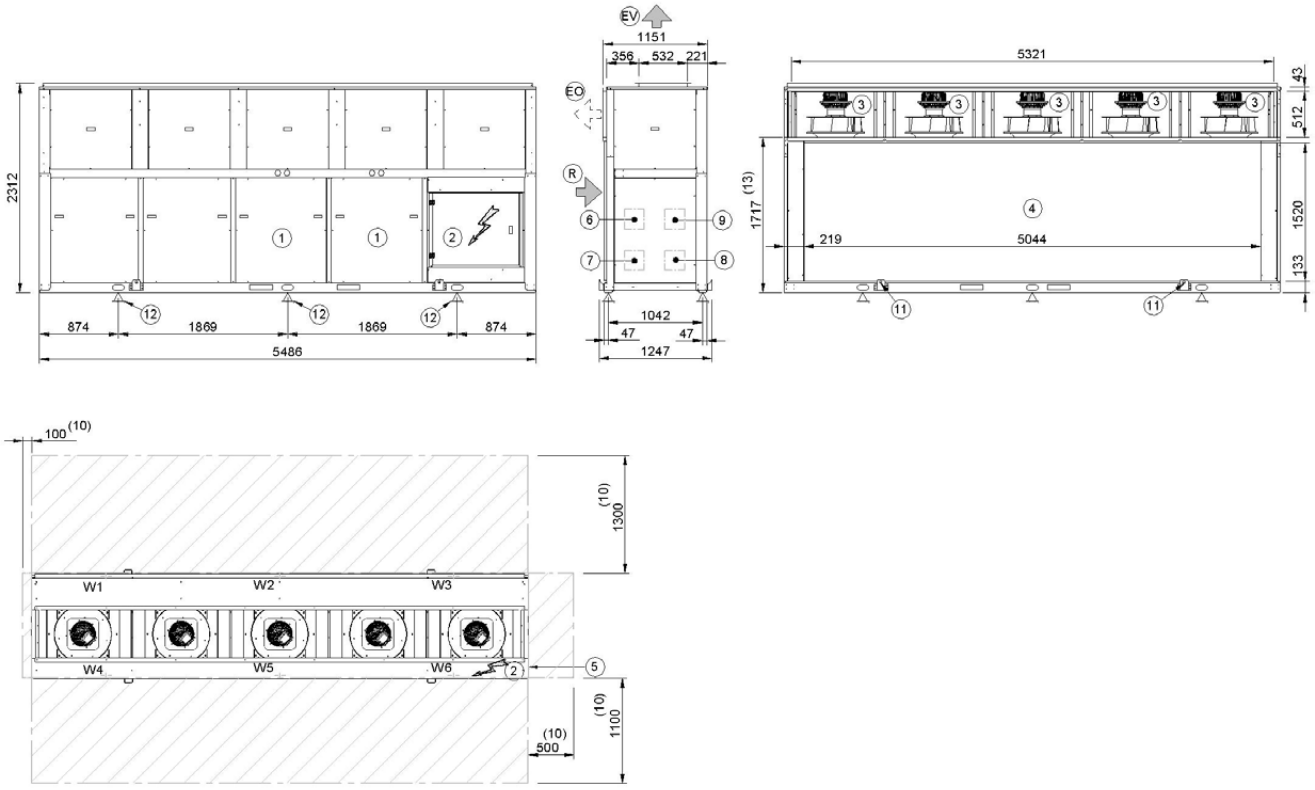
1 - Compressor compartment
2 - GENERAL ELECTRICAL PANEL
3 - EXHAUST RADIAL ELECTRIC FAN
4 - External exchanger
5 - Power input
6 - Internal exchanger water inlet standard unit or with pump option
7 - Internal exchanger water outlet standard unit or with pump option
8 - recovery side exchanger water inlet (optional) Position of the connections in relation with the recovery
9 - recovery side exchanger water outlet (optional) Position of the connections in relation with the recovery
10 - Functional spaces
11 - Lifting brackets (removable)
12 - Fixing points
13 - Unit height without fan section
R - outdoor air return
EV - Vertical air exhaust (standard)
EO - Horizontal air exhaust(OPTIONAL)

Size		702	80D
A - Length	mm	4400	4400
B - Width	mm	1151	1151
C - Height	mm	2312	2312
W1 Supporting Point	kg	425	449
W2 Supporting Point	kg	434	443
W3 Supporting Point	kg	403	484
W4 Supporting Point	kg	599	618
Shipping weight	kg	1831	1967
Operating weight	kg	1861	1994
Internal exchanger water connections	Ø	2½"	3"
Partial recovery water connections	Ø	2"	2"
Total recovery water connections	Ø	3"	3"

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

11.3 WSA-XSC2 90D-120D

DAA1Z90D_120D_0
Date: 14/02/2013



1 - Compressor compartment
2 - GENERAL ELECTRICAL PANEL
3 - EXHAUST RADIAL ELECTRIC FAN
4 - External exchanger
5 - Power input
6 - Internal exchanger water inlet standard unit or with pump option
7 - Internal exchanger water outlet standard unit or with pump option
8 - recovery side exchanger water inlet (optional) Position of the connections in relation with the recovery
9 - recovery side exchanger water outlet (optional) Position of the connections in relation with the recovery
10 - Functional spaces
11 - Lifting brackets (removable)
12 - Fixing points
13 - Unit height without fan section
R - outdoor air return
EV - Vertical air exhaust (standard)
EO - Horizontal air exhaust(OPTIONAL)

Size		90D	100D	110D	120D
A - Length	mm	5486	5486	5486	5486
B - Width	mm	1151	1151	1151	1151
C - Height	mm	2312	2312	2312	2312
W1 Supporting Point	kg	267	270	290	290
W2 Supporting Point	kg	522	574	621	630
W3 Supporting Point	kg	298	302	321	322
W4 Supporting Point	kg	187	185	186	185
W5 Supporting Point	kg	714	830	872	900
W6 Supporting Point	kg	381	400	405	410
Shipping weight	kg	2331	2513	2642	2684
Operating weight	kg	2369	2561	2695	2737
Internal exchanger water connections	Ø	3″	4″	4″	4″
Partial recovery water connections	Ø	2″	2″	2″	2″
Total recovery water connections	Ø	3″	3″	3″	3″

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

12 Technical information

12.1 General technical data

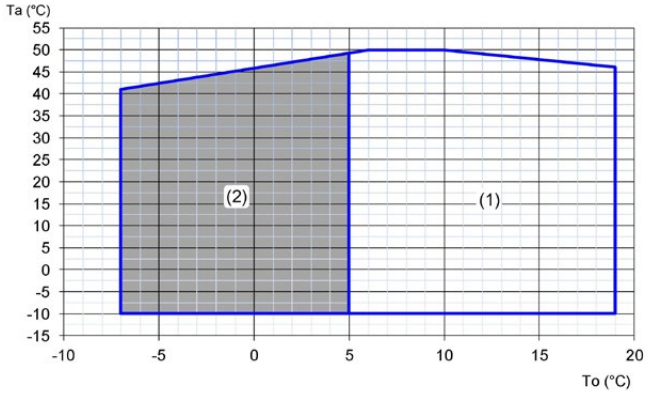
Size			432	452	552	602	702	80D	90D	100D	110D	120D
Cooling												
Cooling capacity	1	kW	116	123	148	165	185	206	240	269	296	315
Compressor power input	1	kW	37.4	40.6	49.4	55.2	62.0	69.4	80.3	90.8	100	115
Total power input	2	kW	41.5	44.7	53.4	59.2	67.3	74.7	86.8	97.3	107	124
Total recovery heating capacity	3	kW	144	154	185	207	232	259	301	338	372	404
Partial recovery heating capacity	3	kW	30.7	32.8	39.4	44.0	49.4	55.0	64.1	71.9	79.2	85.9
EER	1		2.79	2.76	2.76	2.78	2.75	2.75	2.77	2.76	2.76	2.54
Cooling capacity (EN14511:2011)	4	kW	115	123	147	164	184	205	239	268	295	313
Total power input (EN14511:2011)	4	kW	41.9	45.1	54.0	59.9	68.0	75.5	87.9	98.3	108	125
EER (EN 14511:2011)	4		2.76	2.73	2.72	2.74	2.71	2.71	2.72	2.73	2.73	2.51
ESEER	4		4.24	4.13	4.07	4.11	4.26	4.41	4.18	4.15	4.16	3.92
Compressor												
Type of compressors			SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL
No. of compressors		No	2	2	2	2	2	4	4	4	4	4
Rated power (C1)		HP	43	45	55	60	70	40	45	50	55	60
Nominal capacity (C2)		HP	-	-	-	-	-	40	45	50	55	60
Std Capacity control steps		No	3	3	3	2	3	6	6	6	6	4
Oil charge (C1)		l	12.0	10.0	13.0	13.0	13.0	10.0	10.0	11.0	13.0	13.0
Oil charge (C2)		l	-	-	-	-	-	10.0	10.0	11.0	13.0	13.0
Refrigerant charge (C1)	5	kg	24	24	24	24	32	16	20	20	20	20
Refrigerant charge (C2)	5	kg	-	-	-	-	-	16	20	20	20	20
Refrigeration circuits		No	1	1	1	1	1	2	2	2	2	2
Internal exchanger												
Type of internal exchanger	6		PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE	PHE
Water flow-rate (User Side)	4	l/s	5.50	5.90	7.00	7.80	8.80	9.80	11.4	12.8	14.1	15.0
Internal exchanger pressure drops	4	kPa	28	26	36	36	45	55	58	49	60	59
Water content		l	8.90	10.1	10.1	11.9	11.9	10.5	12.9	17.6	20.1	20.1
External Section Fans												
Type of fans	7		RAD	RAD	RAD	RAD	RAD	RAD	RAD	RAD	RAD	RAD
Number of fans		No	3	3	3	3	4	4	5	5	5	5
Standard airflow		l/s	12333	12333	12333	12333	16444	16444	20556	20556	21389	22222
Connections												
Water fittings			2" 1/2	2" 1/2	2" 1/2	2" 1/2	2" 1/2	3"	3"	4"	4"	4"
Power supply												
Standard power supply		V	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Noise Levels												
Sound power in the duct	8	dB(A)	92	92	92	92	93	93	95	95	96	97
Dimensions												
A - Length		mm	3312	3312	3312	3312	4400	4400	5486	5486	5486	5486
B - Width		mm	1151	1151	1151	1151	1151	1151	1151	1151	1151	1151
C - Height		mm	2312	2312	2312	2312	2312	2312	2312	2312	2312	2312
Standard unit weights												
Shipping weight		kg	1408	1359	1482	1545	1831	1967	2331	2513	2642	2684
Operating weight		kg	1430	1384	1507	1573	1861	1994	2369	2561	2695	2737

1. Data refer to the following conditions: internal water exchanger = 12/7 °C; outdoor air temperature 35°C
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 calculated in compliance with Standard EN 14511:2013 referred to the following conditions: - Internal exchanger water temperature = 12/7°C - Entering external exchanger air temperature = 35°C
5. indicative values for standard units with possible +/-10% variation. The actual data are indicated on the label of the unit.
6. PHE = plate exchanger
7. RAD = radial fan
8. Sound power measured in accordance with UNI EN ISO 9614 and Eurovent 8/1 standards for ducted unit with available pressure equal to 120 Pa.

12.2 Operating range

Size			432	452	552	602	702	80D	90D	100D	110D	120D
External exchanger												
Max entering air temperature	1	°C	46	45	43	45	44	43	44	42	42	40
Min. entering air temperature	2	°C	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
Min. entering air temperature	3	°C	-7.0	-7.0	-7.0	-7.0	-7.0	-7.0	-7.0	-7.0	-7.0	-7.0
Min. entering air temperature	4	°C	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Min. entering air temperature	5	°C	11	11	11	11	11	11	11	11	11	11
Internal exchanger												
Max inlet water temperature		°C	24	24	24	24	24	24	24	24	24	24
Min. leaving water temperature	6	°C	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Min. leaving water temperature	7	°C	-7.0	-7.0	-7.0	-7.0	-7.0	-7.0	-7.0	-7.0	-7.0	-7.0

Data referred to the following conditions:
internal exchanger water = 12/7°C
1. unit at full load
2. Unit at full load and outdoor air temperature at rest.
3. Part load unit and outdoor air temperature at rest.
4. Part load unit and air speed equal to 0.5 m/s.
5. Part load unit and air speed equal to 1 m/s.
6. Standard unit and external exchanger entering air 35 °C (no 'Low water temperature (Brine)' configuration).
7. Unit in 'Low water temperature (Brine)' configuration. Fluid processed with 40% ethylene glycol



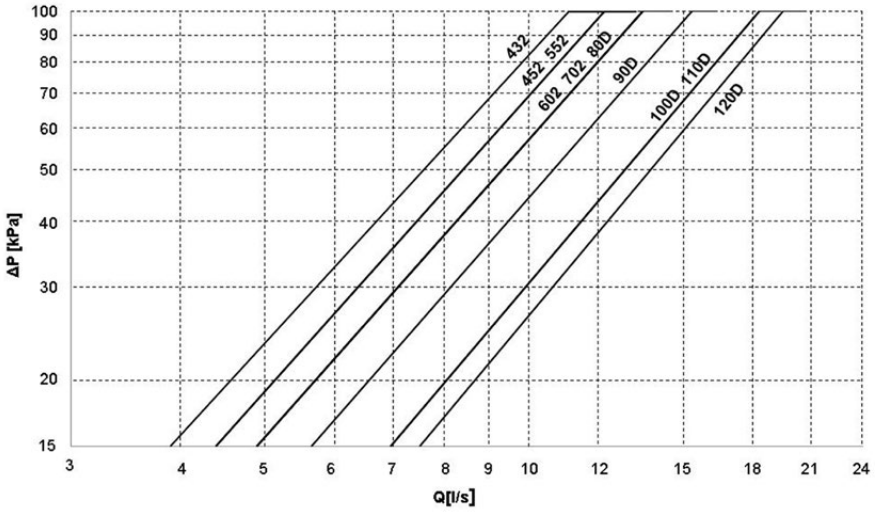
Ta (°C)= entering external exchanger air temperature (D.B.)
To (°C)= leaving internal exchanger water temperature

1 = Standard unit operating range
2 = Unit operating range in 'B - Liquid low temperature' configuration(40% ethylene glycol)
In the unit operating at part load the outdoor air minimum temperature limit is -7°C.

Water temperature to the internal exchanger		
Max entering water temperature	1	24°C
Min. leaving water temperature	2	5°C
Min. leaving water temperature	3	-7°C

1 Standard unit. Entering external exchanger air temperature 35°C
2 Standard unit. Entering external exchanger air temperature 35°C
3 Unit in 'Low water temperature (Brine)' configuration and entering external exchanger air temperature 35 °C. 40% ethylene glycol based water.

12.3 Internal exchanger pressure drops



Q = water flow rate[l/s]

DP = pressure drop [kPa]

The pressure drops on the water side are calculated by considering an average water temperature at 7°C.

The water flow rate must be calculated with the following formula

Q [l/s] = kWf / (4,186 x DT)

kWf = Cooling capacity in kW

DT = Temperature difference between inlet / outlet water

⚠ To the internal exchanger pressure drops must be added the pressure drops of the steel mesh mechanical strainer that must be placed on the water input line. It is a device compulsory for the correct unit operation, and it is available as Clivet option. (See the WATER CIRCUIT ACCESSORIES).

If the mechanical filter is selected and installed by the Customer, it is forbidden the use of filters with the mesh pitch higher than 1,6 mm, because they can cause poor unit operation and also serious damage.

12.4 Admissible water flow rates

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

Size		432	452	552	602	702	80D	90D	100D	110D	120D
Qmin	[l/s]	3,9	4,4	4,4	4,9	4,9	4,9	5,6	7,0	7,0	7,5
Qmax	[l/s]	11,1	12,2	12,2	13,5	13,5	13,5	15,3	18,3	18,3	19,5

12.5 Exchanger operating range

	Internal exchanger		
PED (CE)	kPa	DPw	DPr
		4500	1000

DPr = Max. operating pressure referigerant gas side

DPw = Max. operating pressure water side (utility)

Attention! For different approvals contact our sales office

12.6 Overload and control device calibrations

		open	closed	value
High pressure switch	[kPa]	4050	3300	-
Low pressure switch	[kPa]	450	600	-
Low pressure switch (Brine and FCD)	[kPa]	200	350	-
Antifreeze protection	[°C]	3	5,5	-
High pressure safety valve	[kPa]	-	-	4500
Low pressure safety valve	[kPa]	-	-	3000
Max no. of compressor starts per hour	[n°]	-	-	10
High discharge temperature safety thermostat	[°C]	-	-	120

12.7 Sound levels

Size	Sound power level (dB)								Sound power level	Sound pressure level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
432	69	76	92	87	85	86	79	76	95	76
452	69	76	91	87	85	86	79	76	95	76
552	69	76	92	87	85	86	79	76	95	76
602	69	76	92	87	85	86	79	76	95	76
702	70	78	93	89	87	88	81	78	96	77
80D	70	78	93	89	87	88	81	78	96	77
90D	72	80	95	90	89	89	83	80	98	78
100D	72	80	95	90	89	90	83	80	98	78
110D	73	80	96	91	90	90	84	81	99	79
120D	74	81	97	92	90	91	85	82	100	80

Sound levels refer to full load units, in test nominal conditions. The sound pressure level refers to 1 m. from the unit outer surface operating in open field.
(standard UNI EN ISO 9614-2)
Data referred to the following conditions:
Internal exchanger water temperature = 12/7°C
outdoor air temperature 35°C
Static available pressure 120 Pa
Please note that when the unit is installed in conditions different from nominal test conditions (e.g. near walls or obstacles in general), the sound levels may undergo substantial variations.

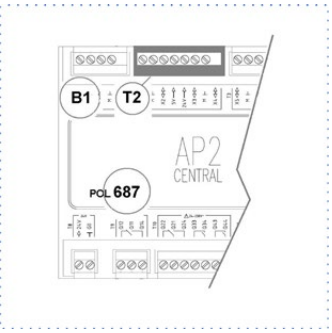
13 Accessories

VERSIONS	
D	Partial energy recovery
R	Total energy recovery
B	Water low temperature
CONFIGURATIONS	
EV	vertical air expulsion (Standard)
EO	Horizontal exhaust air
REFRIGERANT CIRCUIT	
CCCA	Copper / aluminium condenser coil with acrylic lining
CCCA1	Condenser coil with Energy Guard DCC Aluminum
MHP	high and low pressure gauges
SDV	cutoff valve on compressor supply and return
WATER CIRCUIT	
2PM	Hydropack with 2 pumps
3PM	Hydropack with 3 pumps
1PUS	Standard pump
PUN	Type N pump
PUNN	Pump NN
CSVX	Couple of manual shut-off valves
ABU	Flush hydraulic connections
IFWX	Steel mesh strainer on the water side
SYSTEM ADMINISTRATORS	
CMSC10	Serial communication module to LonWorks supervisor
CMSC9	Serial communication module to Modbus supervisor
CMSC8	Serial communication module to BACnet supervisor
ELECTRIC CIRCUIT	
RCMRX	Remote control via microprocessor control
CONTA2	energy meter
ECS	ECOSHARE function for the automatic management of a group of units
PM	phase monitor
MF2	Multi-function phase monitor
SFSTR	Disposal for inrush current reduction
PFCP	power factor correction capacitors (cosfi > 0.9)
SCP2	set-point compensation with outdoor air temperature probe
SCP4	set-point compensation with signal 0-10 V
FANQE	Electrical panel ventilation
PSX	mains power supply
INSTALLATION	
AMMX	spring antivibration mounts
PGFC	finned coil protection grill
SVSM	Removable fan section for shipping

X - When the letter X is placed at the end, this means that the accessory is supplied separately. If there is no X in the code, the accessory is mounted in the factory.

14 Alarms - Status

14.1 Alarms



The alarm code identifies the concerned circuit:

Example:

ee 1 01:TimeOutModCirc = circuit 1

ee 2 01:TimeOutModCirc = circuit 2

The number of refrigerant circuits depends on series and size of the unit.

t.i. input type:
DI = digital input

AI = analogic input

Module:
687 = main module

985 = circuit module

94U = thermostatic driver module

Input:
Connector number:

T1, T2, T3.....

PIN code:

X1, X2, Q13, DO1.....

t.a. alarm type:
A automatic reset

M manual reset

A/M automatic reset, (after N alarm interventions becomes manual reset)

code	detailed description	t.i.	module	input	t.a.
eE001	Phase monitor	DI	687 central	T13 DL1	A/M
EE003	Pump 1 overload	DI	687 central	T13 DL2	M
EE004	Pump 2 overload	DI	687 central	T4 D1	M
EE005	Pump 3 overload	DI	687 central	T13 DL2	M
ee010	Master Offline - Master Slave network enabled				A
ee011	Unit 2 in alarm - Master Slave network enabled				A
ee012	Unit 2 OffLine - Master Slave network enabled				A
ee013	Unit 3 in alarm - Master Slave network enabled				A
ee014	Unit 3 OffLine - Master Slave network enabled				A
ee015	Unit 4 in alarm - Master Slave network enabled				A
ee016	Unit 4 OffLine - Master Slave network enabled				A
ee017	Unit 5 in alarm - Master Slave network enabled				A
ee018	Unit 5 OffLine - Master Slave network enabled				A
ee019	Unit 6 in alarm - Master Slave network enabled				A
ee020	Unit 6 OffLine - Master Slave network enabled				A
ee021	Unit 7 in alarm - Master Slave network enabled				A
ee022	Unit 7 OffLine - Master Slave network enabled				A
EE023	Pump 1 thermal protection	DI	965 hydronic	T1 X4	M
EE024	Pump 2 thermal protection	DI	965 hydronic	T1 X5	M
EE025	Pump 3 thermal protection	DI	965 hydronic	T1 X6	A
EE026	Inverter thermal protection	DI	965 hydronic	T5 DL1	A
ee027	Water inlet temperature probe faulty	AI	687 central	T1 B1	A
ee028	Water outlet temperature probe faulty	AI	687 central	T1 B2	A
ee029	External air temperature probe faulty	AI	687 central	T1 B3	A
ee030	Signal logoff or short circuit	AI	687 central	T2 X1	A
ee031	Signal logoff or short circuit	AI	687 central	T2 X2	A
ee032:	External Humidity probe faulty	AI	687 central	T2 X3	A
ee033:	Cabinet temperature probe faulty	AI	687 central	T2 X4	A

code	detailed description	t.i.	module	input	t.a.
ee034:	Hydronic module on the ProcessBus is disconnected			peripheral bus	A
ee035:	Cool opening valve: error limit	DI	945 4P	X2	A
ee036:	Heat opening valve: error limit	DI	945 4P	X4	A
ee037:	Cool closing valve: error limit	DI	945 4P	X1	A
ee038:	Heat closing valve: error limit	DI	945 4P	X3	A
ee039:	Communication timeout 4P module	Logico	945 4P	peripheral bus	A
ee040:	FCI module water temperature probe fault	AI	955 FCI	X1	A
ee041:	Communication timeout FCI module	Logico	955 FCI	peripheral bus	A
EE044:	FCI module P1 thermal protection	DI	955 FCI	X5	M
EE045:	FCI module P2 thermal protection	DI	955 FCI	X6	M
EE046:	FCI module P3 thermal protection	DI	955 FCI	X7	M
ee050:	User side exchanger, differential pressure probe fault		965 hydronic	X3	A
ee054:	Recovery pump thermal protection	DI	955 FCI	X6	A
ee101:	Circuit 1 module on the ProcessBus is disconnected			peripheral bus	A
ee102:	Driver 1 module on the ProcessBus is disconnected			peripheral bus	A
ee103:	Recovery 1 module on the ProcessBus is disconnected			peripheral bus	A
ee104:	Driver 1 blocked		94U driver		A
EE106:	Compressor 1 thermal protection	DI	985 circuit 1	T4 D1	M
EE107:	Compressor 2 thermal protection	DI	985 circuit 1	T4 D2	M
EE108:	Compressor 3 thermal protection	DI	985 circuit 1	T4 D3	M
EE118:	Source side protection	DI	985 circuit 1	T9 DL2	M
ee122:	Faulty probe - discharge temperature compressor 1	AI	985 circuit 1	T1 B1	A
ee123:	Faulty probe - discharge temperature compressor 2	AI	985 circuit 1	T1 B2	A
ee124:	Faulty probe - discharge temperature compressor 3	AI	985 circuit 1	T2 X2	A
ee125:	Faulty probe - source 1 temperature	AI	985 circuit 1	T1 B3	A
ee126:	Faulty probe - source 2 temperature	AI	985 circuit 1	T2 X1	A
ee127:	Faulty probe - Suction temperature	AI	94U driver	T2 X2	A
ee128:	Faulty probe - discharge pressure	AI	985 circuit 1	T2 X3	A
ee129:	Faulty probe - suction pressure	AI	94U driver	T1 X1	A
ee130:	Faulty probe - Recovery gas temperature	AI	965 recovery	T1 X1	A
ee131:	Faulty probe - Recovery pressure	AI	965 recovery	T2 X7	A
ee132:	Faulty probe - Water recovery inlet	AI	965 recovery	T1 X2	A
ee133:	Faulty probe - Water recovery outlet	AI	965 recovery	T1 X3	A
ee135:	Bios wrong version		985 circuit 1		A
ff105:	Low overheating Thermostatic C1				A
fF109:	Low pressure from analogic input	DI	985 circuit 1	T3 X7	A/M
ff110:	Pre-alarm - low pressure COOL mode				A
ff111:	Pre-alarm - low pressure HEAT mode				A
fF112:	Low pressure from analogic input	AI	94U driver	T1 X1	A/M
fF113:	High pressure from digital input	DI	985 circuit 1	T3 X8	A/M
ff114:	Pre-alarm - high pressure				A
fF115:	High pressure from analogic input	AI	985 circuit 1	T2 X3	A/M
ff116:	Pre-alarm max. compression ratio (high pressure / low pressure)				A
fF117:	Min. compression ratio (high pressure / low pressure)				A/M
FF119:	Alarm max. compression ratio (high pressure / low pressure)				M
FF134	Empty circuit	AI	94U driver	T1 X1	M
ff136:	Defrost: low gas temperature	Logico	985	X2	M
fF137:	Oil pressure	DI	985	DL1	A/M
ff138:	Low condensing pressure	Logico	985	X3	A
fF139:	Maximum saturated condensation temperature	Logico			A/M
fF140:	Minimum saturated condensation temperature	Logico			A/M
fF141:	Maximum saturated evaporation temperatur	Logico			A/M
fF142:	Minimum saturated evaporation temperatur	Logico			A/M
fF143:	Maximum compression ratio	Logico			A/M

code	detailed description	t.i.	module	input	t.a.
FF144:	Minimum compression ratio	Logico			M
fF145:	Maximum engine torque	Logico			A/M
il002:	Low water pressure	DI	687 central	T5 DU1	A/M
il006:	Flow switch utility side	DI	687 central	T3 X8	A/M
II007:	Freeze alarm utility side				M
ii008:	Utility side pumps On for antifreeze alarm				A
II009:	COOL: outlet temperature higher than inlet temperature HEAT: inlet temperature higher than outlet temperature				A
il120:	Flow switch source side	DI	985 circuit 1	T2 X4	A/M
II121:	Freeze alarm source side				A
II042:	FCI module, system pressure	DI	955 FCI	X3	M
II043:	FCI module, antifreeze alarm	Logico	955 FCI	X1	M
ii047:	FCI module, water flow alarm	DI	955 FCI	X4	A
ii052:	Recosery module, flow alarm	DI	965 REC	X6	A
ii053:	Recovery module, system pressure	DI	965 REC	X6	A

14.2 Status

The status code identifies the concerned circuit:

Example:

S 1 100:CMP1 compressor1 starts = circuit 1

S 2 100:CMP1 compressor1 starts = circuit 2

The number of refrigerant circuits depends on series and size of the unit.

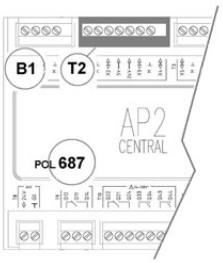
Example:

AI-687 T.IN H2OUtil_B1 Inlet water temperature

AI = analogic input

687 = main module

B1 = PIN



14.3 General stata and central module

code	description	detailed description
AI-687	T.IN H2OUtil_B1	Inlet water temperature utility side
AI-687	T.OUT H2OUtil_B2	Outlet water temperature user side
AI-687	Ext.Air temp_B3	Outdoor air temperature
AI-687	S.DemandLimit_X1	Signal of the demand limit function controls
AI-687	S.WaterReset_X2	Signal of the water reset function controls
AI-687	RHExt_X3	Outside relative humidity
AI-687	El.CabinetTemp_X4	Electrical panel temperature
AO-687	%FREE-COOLING _X5	Percentage value of the status of the external control signal of the ventilation/FREE-COOLING valve
DI-687	Sel.SetPoint_DU2	Status of the second digital input setpoint 0=1°set 1=2°Set
DI-687	SystemPressure_DU1	Status of the system water pressure sensor 0=OK 1=Fault
DI-687	FlowUser_X8	Status of the differential pressure switch/utilisation flow 0=OK 1=Fault
DI-687	ON-OFFRem_X7	Status of the unit status digital input 0=OFF 1=On
DI-687	Heat/CoolRem_X6	Status of the unit mode digital input 0=Heat 1=Cool
DI-687	PhaseMonitor_DL1	Status of the phase monitor input 0=OK 1=Fault
DI-687	OvlP1Util_D2	Status of thermal protection contact of utilisation pump 1 0=OK 1=Fault
DI-687	OvlP2Util_D1	Status of thermal protection contact of utilisation pump 2 0=OK 1=Fault
DI-687	OvlP3Util_DL2	Status of thermal protection contact of utilisation pump 3 0=OK 1=Fault
DO-687	El.CabinetFAN_DO1	Status of the ventilation control of the electrical panel: 0=Off 1=On
DO-687	El.CabinetHEAT_DO2	Status of the heating control of the electrical panel: 0=Off 1=On
DO-687	UnitMode_Q1	Status of the digital output related to the operating mode (N.O. Open=Cool N.O. Closed=Heat): 0=Cool 1=Heat

code	description	detailed description
DO-687	Cumul.Alarm_Q2	Unit cumulative alarm status (N.0.Open=All OFF N.O. Closed=All ON): 0=Off 1=On
DO-687	CmdP1User_Q3	Command pump 1 utility side: 0=Off 1=On
DO-687	CmdP2User_Q4	Command pump 2 utility side: 0=Off 1=On
DO-687	CmdP3User_Q5	Command pump 3 utility side: 0=Off 1=On
DO-687	OpenYV FC_Q7	Opening control of the FREE-COOLING valve FC Closed = ON: 0=Off 1=On
DO-687	CloseYV FC_Q8	Closure control of the FREE-COOLING valve FC Closed = OFF: 0=Off 1=On
DO-687	AntifreezeHeater_Q6	Status of the control of the antifreeze heaters: 0=Off 1=On
S0001	StartsP1User	Number of startup totalized from Pump 1
S0002	StartsP2User	Number of startup totalized from Pump 2
S0003	StartsP3User	Number of startup totalized from Pump 3
S0004	Pump1 running hours	Utilisation pump 1 hours
S0005	Pump2 running hours	Utilisation pump 2 hours
S0006	Pump3 running hours	Utilisation pump 3 hours
S0007	Antifreeze heat.	Antifreeze heater status 0=Off 1=On
S0008	Pump in antifreeze	Status of the utilisation pump for antifreeze protection 0=Off 1=On
S0009	Recovery	Recovery status: 0=Off 1=On
S0010	ActualSptTExt	Setpoint value calculated by the Text climate curve
S0011	ActualSptWR	Setpoint value calculated by the WaterReset function
S0012	StatusFREE-COOLING	FREE-COOLING status 0=Off 1=On
S0013	GenWarning	0=Off 1=On
S0014	GenBlock	0=Off 1=On
S0015	NCompOnUnit	Number of compressors currently active on the machine

14.4 Circuit 1 status

code	description	detailed description
AI-94U	SuctionTemp_X2	Suction temperature
AI-94U	SuctionPressureX1	Low pressure transducer
AI-985	DischargeTC1_B1	Compressor 1 discharge temperature
AI-985	DischargeTC2_B2	Compressor 2 discharge temperature
AI-985	DischargeTC3_X2	Compressor 3 discharge temperature
AI-985	SourceTemp1_B3	Source 1 temperature (for machines with air-based sources and reversible on gas = Probe 1 on source battery. For machines with water-based source = Source input probe)
AI-985	SourceTemp2_X1	Source 2 temperature (for machines with air-based sources and reversible on gas = Probe 2 on source battery. For machines with water-based source = Source outlet probe)
AI-985	DischargePressure_X3	High pressure transducer
AO-985	%Cmd Cmp_X5	Percentage value of the status of the control signal of the modulating compressor
AO-985	%Cmd Source_X6	% value source modulating signal control
DI-985	Source WaterFlow_X4	Status of the source flow contact (Only active on machines with water-based source): 0=Fault 1=OK
DI-985	LP Pressure switch_X7	Status of the LP-pressure switch contact: 0=Fault 1=OK
DI-985	Ovl Inverter_DL1	Status of the inverter compressor heater contact: 0=Fault 1=OK
DI-985	HP Pressure switch_X8	Status of the HP-pressure switch contact: 0=Fault 1=OK
DI-985	Ovl Source_DL2	Status of the contact of the thermal protection of the source motors: 0=Fault 1=OK
DI-985	Ovl Cmp1_D1	Status of the contact of the thermal protection of compressor 1: 0=Fault 1=OK
DI-985	Ovl Cmp2_D2	Status of the contact of the thermal protection of compressor 2: 0=Fault 1=OK
DI-985	Ovl Cmp3_D3	Status of the contact of the thermal protection of compressor 3: 0=Fault 1=OK
DI-985	Diff.PressureOilS-crew_D2	Status of the oil differential pressure switch contact (Active if compressor = Screw): 0=Fault 1=OK
DI-985	EnCircScrew_D3	Status of the circuit enabling input contact (Active if compressor = Screw): 0=Fault 1=OK
DO-985	Cmd Cmp1_Q2	Status of the compressor 1 control: 0=Off 1=On
DO-985	Cmd Cmp2_Q3	Status of the compressor 2 control: 0=Off 1=On
DO-985	Cmd Cmp3_Q4	Status of the compressor 3 control: 0=Off 1=On
DO-985	Cmd Source_Q1	Status of the source motor control: 0=Off 1=On
DO-985	Cmd Inj.Cmp1_Q5	Status of the compressor 1 liquid injection valve control: 0=Off 1=On
DO-985	Cmd Inj.Cmp2_Q7	Status of the compressor 2 liquid injection valve control: 0=Off 1=On

code	description	detailed description
DO-985	Cmd Inj.Cmp3_Q8	Status of the compressor 3 liquid injection valve control: 0=Off 1=On
DO-985	Cmd YV4 reversing-Valve_Q6	Status of the cycle inversion valve control: 0=Off 1=On
DO-985	Cmd Digital_DO2	Status of the button valve control for compressors PWM: 0=Off 1=On
DO-985	Cmd KMLine_Q2	Status of the line counter control for the power supply Cmp (Active if compressor = Screw): 0=Off 1=On
DO-985	Cmd KMPW1_Q3	Status of the control of the motor's 1st winding (with PartWiding start-up) / Status of the star contactor control (with delta start-up)(Active if compressor = Screw): 0=Off 1=On
DO-985	Cmd KMPW2_Q4	Status of the control of the motor's 2nd winding (with PartWiding start-up) / Status of the control of the triangle contactor (with delta start-up)(Active if compressor = Screw): 0=Off 1=On
DO-985	Cmd YV25%_Q7	Status of the start e stop valve YV25%(Active if compressor = Screw): 0=Off 1=On
DO-985	Cmd YV75%_Q8	Status of the valve control of the YV75%(CR3_Bitzer) (14_Refcomp) (Active if compressor = Screw): 0=Off 1=On
DO-985	Cmd YVUP_DO1	Status of the power increase valve control (CR4_Bitzer) (16_RefComp) (Active if compressor = Screw): 0=Off 1=On
DO-985	Cmd YVDW_DO2	Status of the power decrease valve control (CR2_Bitzer) (15_RefComp) (Active if compressor = Screw): 0=Off 1=On
S1100	CMP1 starts	Number of startup totalized from Compressor 1
S1101	CMP2 starts	Number of startup totalized from Compressor 2
S1102	CMP3 starts	Number of startup totalized from Compressor 3
S1103	StartsScrew	Number of startup totalized from Compressor
S1104	Source starts	Number of startup totalized from source Fan or pump
S1105	Hours Comp.1	Compressor 1 hours
S1106	Hours Comp.2	Compressor 2 hours
S1107	Hours Comp.3	Compressor 3 hours
S1108	HoursScrew	Screw compressor hours
S1109	HoursSource	Screw compressor hours
S1110	Total steps	Total number of active steps on the circuit
S1111	Comp.1 status	Compressor 1: 0=free 1=on 2=timing 3=Disabled
S1112	Comp.2 status	Compressor 2: 0=free 1=on 2=timing 3=Disabled
S1113	Comp.3 status	Compressor 3: 0=free 1=on 2=timing 3=Disabled
S1114	Current cap.	Capacity currently used up on the circuit
S1115	Requested cap.	Capacity required on the circuit
S1116	Pressure ratio	Compression ratio status (1+HP/1+LP)
S1117	FANPreAlarm	Status of the current maximum ventilation pre-alarm 0=Off 1=On
S1118	Defrost delay	Current value of the countdown towards the cycle inversion due to defrosting. (defrosting starts when the value reaches zero)
S1119	Defrosting status	Indicates the defrosting status 0=DfrOff (Cycle inversion phase for defrosting phase NOT active) 1=DfrON (Cycle inversion phase for defrosting phase ACTIVE)
S1120	HWErr	Hardware error of the POL94U module that does not preclude the possibility of moving the valve or closing it. Possible causes: anomalous voltage values in the valve motor 0=Off 1=On
S1121	BlckingHWErr	Hardware error of the POL94U module that prevents the electronic valve from moving. Possible causes: UPS not available, wrong POL94U Bios, HW POL94U Error, Disconnected EEV Motor, calibration error associated with configuration parameters. 0=Off 1=On
S1122	FailSafeSta	Active block status: 0=Off 1=On
S1123	UPSNotAval	UPS failure: 0=Off 1=On
S1124	CircWarning	Status associated with circuit block alarm
S1125	CircBlock	Lock alarm circuit
S1126	ThTDischarge	Theoretical discharge temperature

14.5 Thermostatic C1 status

code	description	detailed description
S1200	SHSpOp	Operating overheating setpoint net with SH and MET adjustments
S1201	AICalSuctSprHtP	Actual Overheating SetPoint
S1202	ECVState	0 = Idle 1 = ECVAlarm 2 = FailSafe 3 = Referencing 4 = Positioning 5 = Positioned 6 = ECVWaiting 7 = FastClosing
S1203	EEV:SH_Limiter	Maximum valve opening determined by the minimum SH control function
S1204	EEV:LET_Limiter	Status of the minimum LET intake temperature control
S1205	EEVMode	0=Idle (motor off) 1=Init (valve initialised when completely closed) 2=Manual (valve controlled in manual mode) 3=Control (the valve conducts adjustments to control SH)
S1206	Prepos	Thermostatic requested positioning %

code	description	detailed description
S1207	ECVSetPos	% Opening valve if EEVMod = Manual
S1208	ECVMode	0 = Idle 1 = Init 2 = Position 3 = FastClose
S1209	SHPIDOut	% value of the PID output to adjust the valve
S1210	EEVStatus	0 - Closed (Ready) 1 - StartUpPositioning 2 - StartUpPositioned 3 - SuperHeat 4 - Prepositioning 5 - MET 6 - LET 7 - Closing 8 - PumpDown 9 - DangAlarm 10 - PumpDownStartUp 11 - ECVAlarm 12 - MinSHLmtr 13 - WaitValveClose 255 - Warning
S1211	SetPosSteps	Control of the number of steps the valve must reach to adjust overheating
S1212	SetPos%	Opening % control of the valve to adjust overheating
S1213	Pol94xCommOK	Connection status of the POL94U module on processbus: 0=NotOK 1=OK
S1214	ActPos%	% value of the actual position valve EEV
S1215	ActPosSteps	Current number of steps of the EEV valve
S1216	ECVMode	0 = Idle 1 = Init 2 = Position 3 = FastClose
S1217	ECVState	0 = Idle 1 = ECVAlarm 2 = FailSafe 3 = Referencing 4 = Positioning 5 = Positioned 6 = ECVWaiting 7 = FastClosing

14.6 Recovery circuit 1 status

code	description	detailed description
AI-965	P.OutRec_X7	Pressure value recovery circuit
AI-965	T.InH2ORec_X2	Recovery inlet water temperature
AI-965	T.OutH2ORec_X3	Recovery outlet water temperature
AI-965	T.OutGasRec_X1	Recovery gas outlet temperature (liquid)
AO-965	%CmdPmpRec_X8	% 0-10vcc signal value recovery variable pump
DI-965	EnableRec_X4	Enabling recosvery input: 0=Fault 1=OK
DI-965	Ovl PmpRec_X5	Recovey thermal protection pump 0=Fault 1=OK
DI-965	FlowRec_X6	Flow recovery 0=Fault 1=OK
DI-965	SystemPress.Recovery_DL1	State of the water pressure switch contact of the system 0=Fault 1=OK
DO-965	YV1Rec_DO1	Command valve YV1 0=Off 1=On
DO-965	YV2Rec_DO2	Command valve YV2 0=Off 1=On
DO-965	YV3Rec_Q1	Command valve YV3 0=Off 1=On
DO-965	YV4Rec_Q2	Command valve YV4 0=Off 1=On
DO-965	YV5Rec_Q3	Command valve YV5 0=Off 1=On
DO-965	PmpRec_Q4	Recovery pump command 0=Off 1=On

14.7 Master slave status

code	description	detailed description
S0600	SetPoint Unit1	Value accessible from the display of the unit machine network master. Working setpoint master unit (Address 1 on periferalbus)
S0601	SetPoint Unit2	Value accessible from the display of the unit machine network master. Working setpoint unit 2 (Address 2 on periferalbus)
S0602	SetPoint Unit3	Value accessible from the display of the unit machine network master. Working setpoint unit 3 (Address 3 on periferalbus)
S0603	SetPoint Unit4	Value accessible from the display of the unit machine network master. Working setpoint unit 4 (Address 4 on periferalbus)
S0604	SetPoint Unit5	Value accessible from the display of the unit machine network master. Working setpoint unit 5 (Address 5 on periferalbus)
S0605	SetPoint Unit6	Value accessible from the display of the unit machine network master. Working setpoint unit 6 (Address 6 on periferalbus)
S0606	SetPoint Unit7	Value accessible from the display of the unit machine network master. Working setpoint unit 7 (Address 7 on periferalbus)
S0607	statusUnit1	Value accessible from the display of the unit machine network master. Status master unit 7 0=Off 1=Eco 2=On 3=PmpOn
S0608	StatusUnit2	Value accessible from the display of the unit machine network master. Status unit 2 0=Off 1=Eco 2=On 3=PmpOn
S0609	StatusUnit3	Value accessible from the display of the unit machine network master. Status unit 3 0=Off 1=Eco 2=On 3=PmpOn

code	description	detailed description
S0610	StatusUnit4	Value accessible from the display of the unit machine network master. Status unit 4 0=Off 1=Eco 2=On 3=PmpOn
S0611	StatusUnit5	Value accessible from the display of the unit machine network master. Status unit 5 0=Off 1=Eco 2=On 3=PmpOn
S0612	StatusUnit6	Value accessible from the display of the unit machine network master. Status unit 6 0=Off 1=Eco 2=On 3=PmpOn
S0613	StatusUnit7	Value accessible from the display of the unit machine network master. Status unit 7 0=Off 1=Eco 2=On 3=PmpOn

14.8 Hydronic module status

code	description	detailed description
AO-965	%CmdInverter_X7	% value inverter command signal
DI-965	OvlP1.Hid_X4	Pump 1 overload 1: 0=OK 1=Fault
DI-965	OvlP2.Hid_X5	Pump 2 overload: 0=OK 1=Fault
DI-965	OvlP3.Hid_X6	Pump 3 overload: 0=OK 1=Fault
DI-965	OvlInv.Hid_DL1	Inverter overload: 0=OK 1=Fault
DO-965	CmdP1.Hid_DO1	Pump 1 command: 0=Off 1=On
DO-965	CmdP1Inv.Hid_Q2	Pump 1 inverter command: 0=Off 1=On
DO-965	CmdP2.Hid_DO2	Pump 2 command: 0=Off 1=On
DO-965	CmdP2Inv.Hid_Q3	Pump 2 inverter command: 0=Off 1=On
DO-965	CmdP3.Hid_Q1	Pump 3 command: 0=Off 1=On
DO-965	ComdP3Inv.Hid_Q4	Pump 3 inverter command: 0=Off 1=On
DO-965	CmdInverter:X8	Hydronic inverter command: 0=Off 1=On
S0500	StartsP1Hidro	Hydronic module pump 1 starts
S0501	StartsP2Hidro	Hydronic module pump 2 starts
S0502	StartsP3Hidro	Hydronic module pump 3 starts
S0503	HoursP1.Hid	Hydronic module pump 1 hours
S0504	HoursP32.Hid	Hydronic module pump 2 hours
S0505	HoursP3.Hid	Hydronic module pump 3 hours
S0506	HoursInverter.Hid	Hydronic module inverter hours

14.9 Energy meter status

code	description	detailed description
S0720	U12	L1 - L2 voltage
S0721	U23	L2 - L3 voltage
S0722	U31	L3 - L1 voltage
S0723	Freq	Frequency
S0724	IL1	L1 current
S0725	IL2	L2 current
S0726	IL3	L3 current
S0727	Ptotale	Current active power
S0728	Cosfi	Total power factor
S0729	Energy	Active energy totalized
S0730	THD-U12	Sum of harmonic components of voltage between L1 e L2
S0731	THD-U23	Sum of harmonic components of voltage between L2 e L3
S0732	THD-U31	Sum of harmonic components of voltage between L3 e L1

14.10 Notes

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