Installation and operating manual

CKN-XHE2i 7.1-14.2

High efficiency "Roof Top" air cooled heat pump

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:

- civil air-conditioning
- keep to the limits foreseen in the technical schedule and in this manual

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

1.5 Installation

Outdoor installation

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

Follow local safety regulations.

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

1.6 Maintenance

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

⚠ Turn the unit off before any operation.

1.7 Modification

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

1.8 Breakdown/Malfuction

Disable the unit immediately in case of breakdown or malfunction.

Contact a certified service agent.

Use original spares parts only.

Using the unit in case of breakdown or malfunction:

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

1.9 User training

⚠ The installer has to train the user on:

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

1.10 Data update

Continual product improvements may imply manual data changes.

Visit manufacturer web site for updated data.

1.11 Indications for the User

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

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

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

In case of breakdown or malfunction:

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

⚠ The installer must train the user, particularly on:

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

1.12 Unit indentification

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

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

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

⊘ The matriculation plate must never be removed.

⚠ It contains fluorinated greenhouse gases

Type of refrigerant: R410A

1.13 Serial number

It identifies uniquely each unit.

Must be quoted when ordering spare parts.

1.14 Assistance request

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

Series
Size
Serial number
Year of manufacture
Electrical wiringdiagram

2 Reception

You have to check before accepting the delivery:

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

In case of damage or anomaly:

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

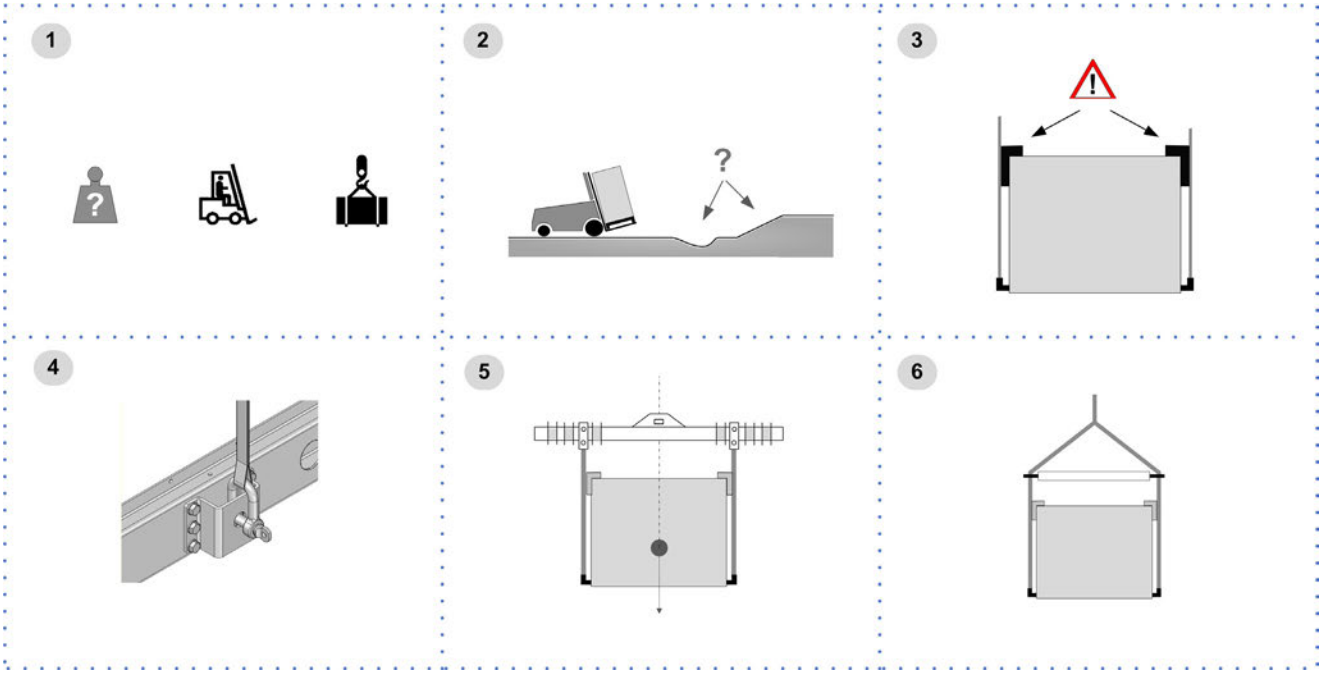
⚠ Any disputes must be made within 8 days from the date of the delivery. Complaints after this period are invalid.

2.1 Storage

Observe external packaging instructions.

2.2 Handling

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



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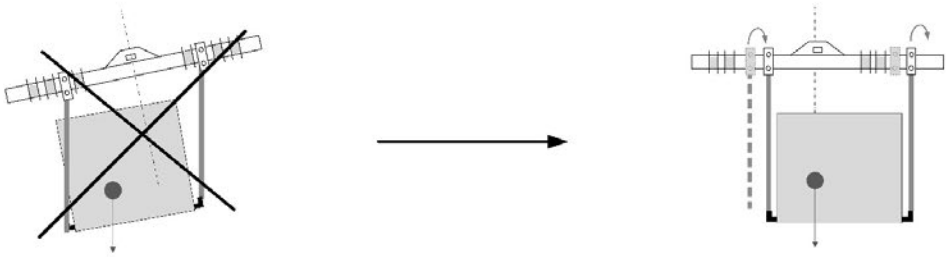

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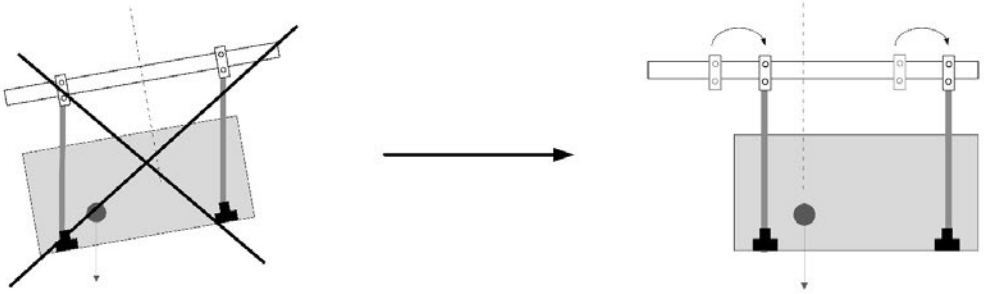

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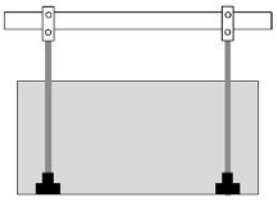
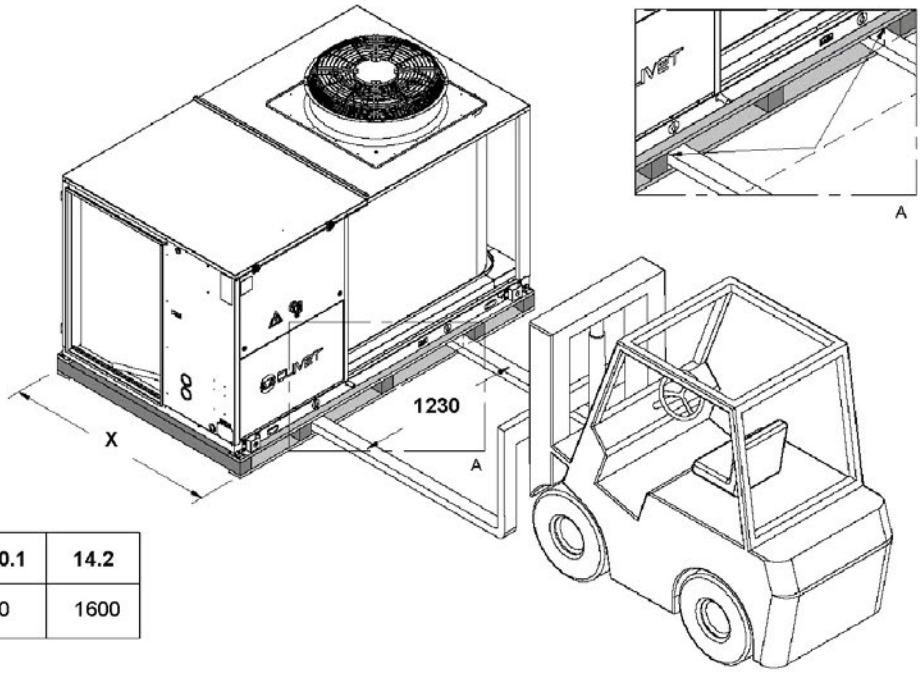




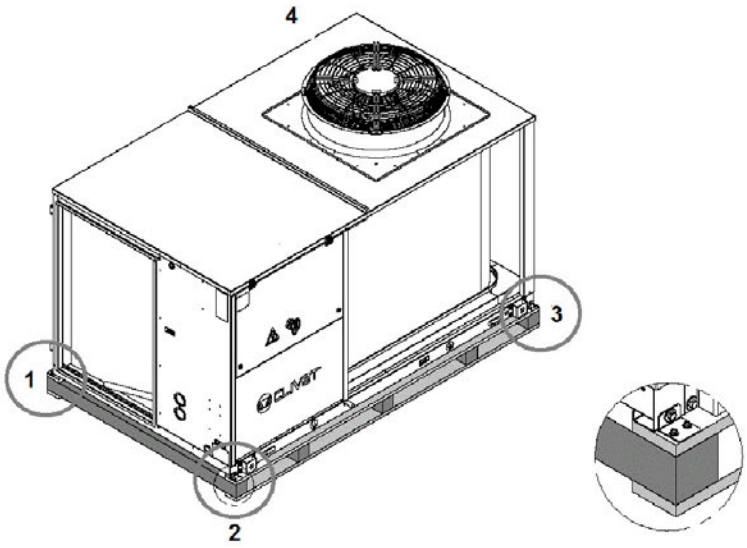
Size	7.1, 10.1	14.2
X	1160	1600

2.3 Packaging removing

Be careful not to damage the unit.

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

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



3 Positioning

During positioning consider these elements:

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

3.1 Functional spaces

Functional spaces are designed to:

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

Respect all functional spaces indicated in the DIMENSIONS section.

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

3.2 Positioning

⚠ Units are designed to be installed:

- EXTERNAL
- in fixed positions

Limit vibration transmission:

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

Choose the installation place according to the following criteria:

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

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

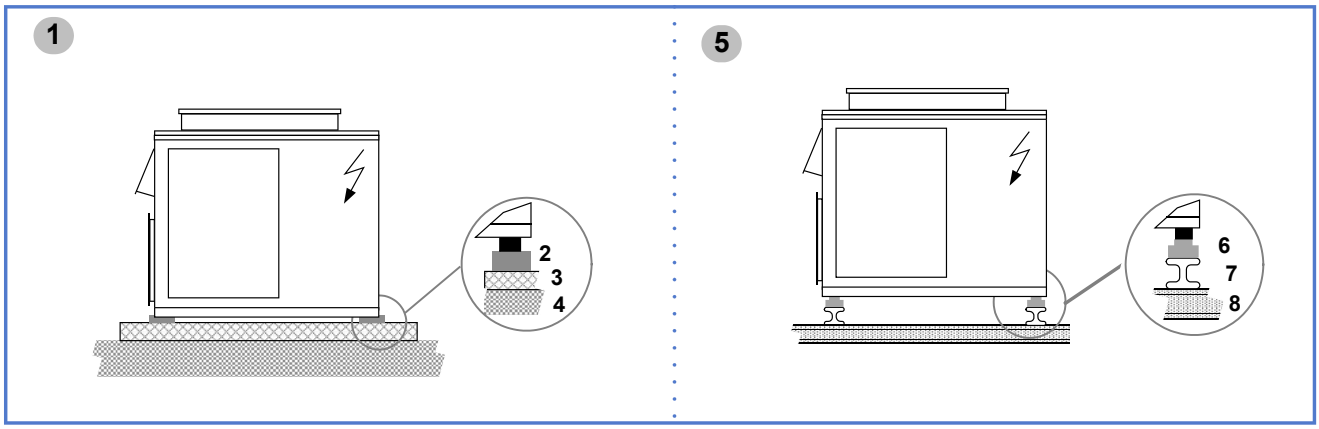
A correct circulation of the air is mandatory to guarantee the good unit operating.

⊘ Avoid therefore:

- obstacles to the airflow
- difficulty of air 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

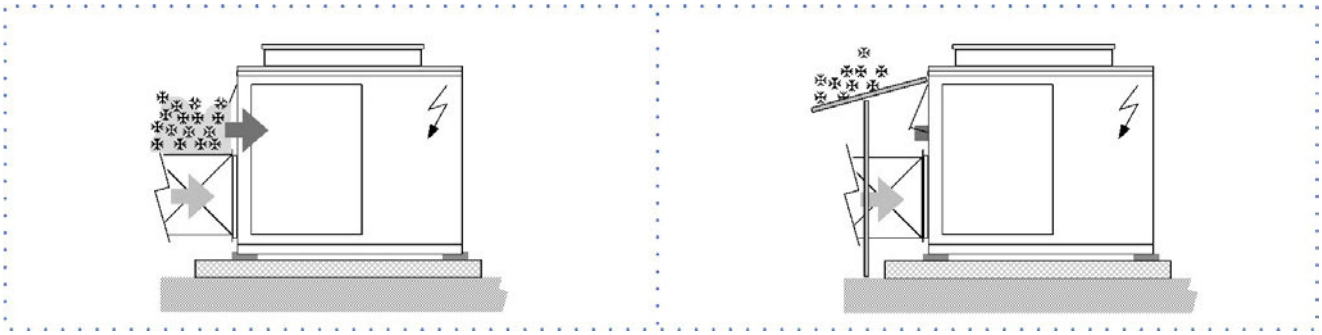
Ignoring the previous indications could:

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



1 Positioning on concrete floor
2 2 cm thick neoprene strips
3 concrete floor
4 insulation
5 Positioning on steel structure
6 antivibration mounts
7 steel structure
8 steel structure

Avoid the accumulation of snow and ice in front of the exhaust air outlet

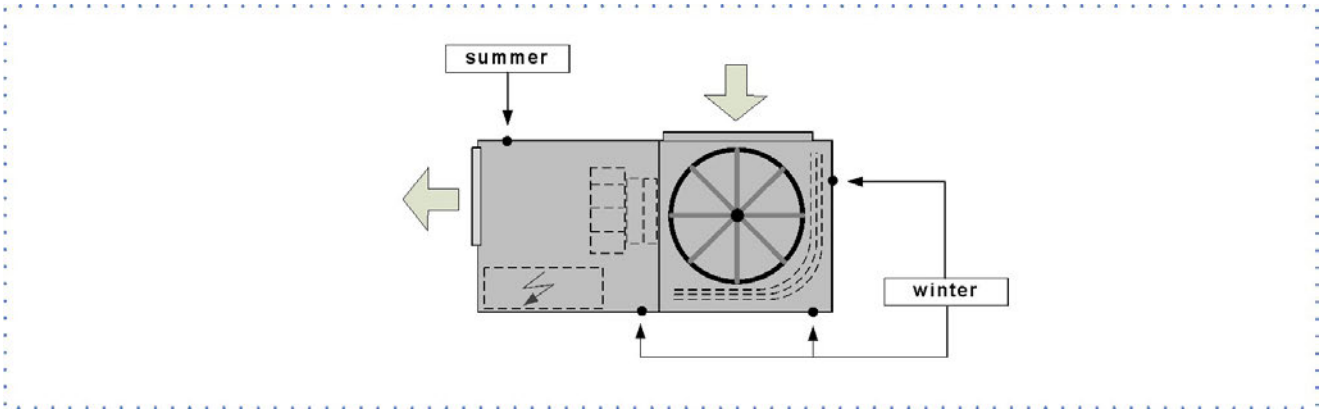


3.3 Saftey valve gas side

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

3.4 Condensate water

When a heat pump is running it produces a considerable amount of water due to the defrosting cycles of the external coil.
The condensate must be disposed in order to avoid damages to people and things.

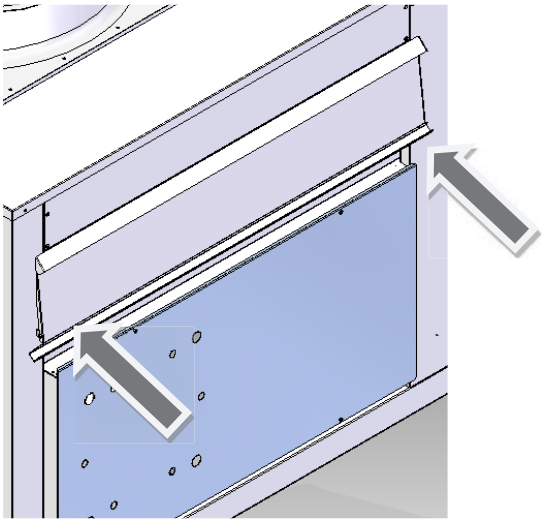


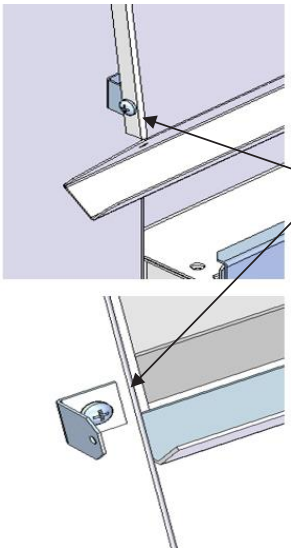
3.5 Configurations CBK, CCK

CUFFIA ARIA ESTERNA - EXTERNAL AIR HOOD

1 - APRIRE CUFFIA ARIA ESTERNA – All'interno ci sono le finiture DX e SX, rete AE + viti di fissaggio

1 – OPEN THE EXTERNAL AIR HOOD – Inside there are right and left parts, grid EA + fixing screws





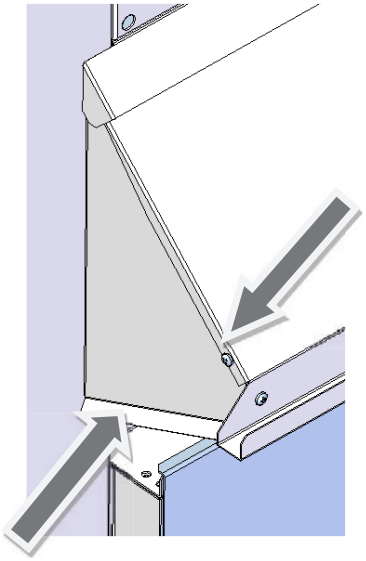
Togliere viti e staffa di fissaggio

Remove screws and mounting bracket

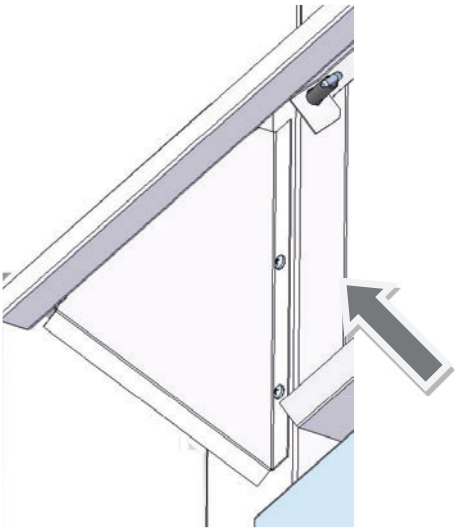
2 - FISSARE LE FINITURE DX E SX - Esternamente e internamente, sugli appositi fori con le viti in dotazione.

2 – FIX RIGHT and LEFT PARTS - With screws supplied, on the appropriate holes internal and external side.

FISSAGGI ESTERNI - EXTERNAL FIXING



FISSAGGI INTERNI - INTERNAL FIXING

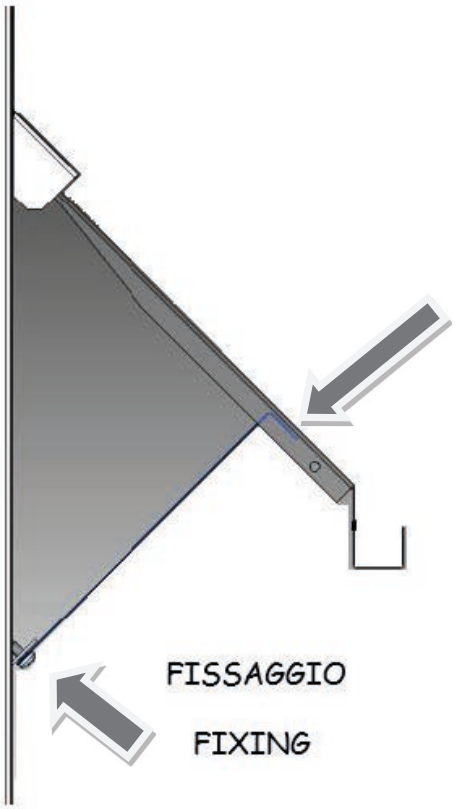


Le pieghe in basso devono andare verso l'esterno della cuffia !

The folds on the bottom must be installed on the external side of the air hood !

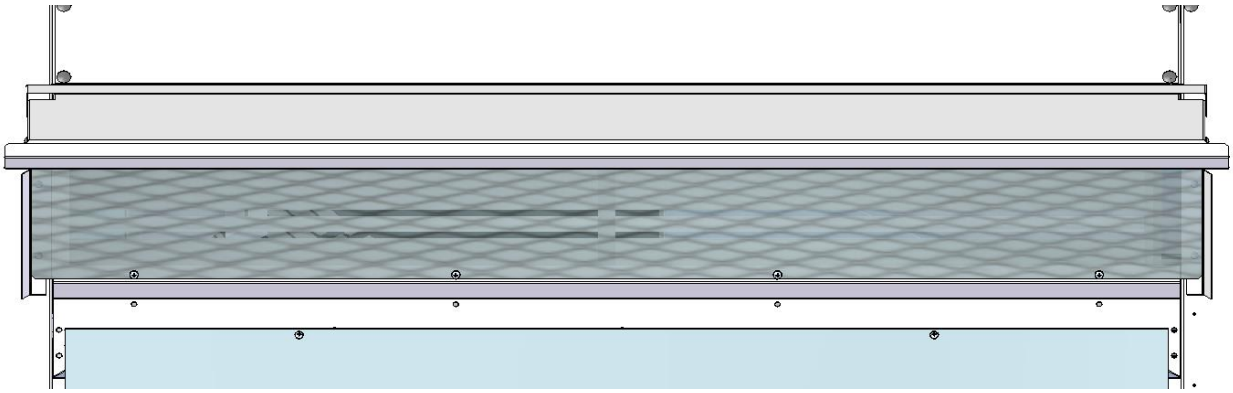
3 - FISSARE LA RETE ARIA ESTERNA (AE)- Sugli appositi fori con le viti in dotazione.

3 – FIX GRID EXTERNAL AIR (EA)- With screws supplied, on the appropriate holes.



La piega deve andare verso l'esterno della cuffia

The fold must be installed on the external side of the air hood



3.6 Electronic filter

For details see:
10.1 Electronic filters p. 47

3.7 Gas module

For details see:
10.4 Modulating condensation gas heating module p. 51

4 Water connections

4.1 Condensate drain

The condensate must be disposed in order to avoid damages to people and things.

- Unit discharge fitting: the connection must not transmit mechanical stresses and must be performed taking care not to damage the unit discharge fitting.
- Provide a siphon that, eliminating the negative pressure caused by the fan, prevents the air intake from the discharge duct.
- The ducting must have a min. slope of 3% to allow the runoff.
- Anchor the ducting with an adequate number of supports.
- Insulate the duct and the siphon to avoid the condensate drippings.
- Connect the condensate discharge to a sewerage drainage network.

DO NOT use white water or drainage networks to avoid the aspiration of odours in the case of evaporation of water contained in the siphon.

Check at the end of the work, the regular condensate runoff pouring some water in the tray.

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 Humidifier

For details see:

10.3 Immersed electrode humidifier p. 49

5 Aeraulic connections

The dimensioning and correct execution of the aeraulic connections are fundamental to guarantee good unit operation and adequate level of silence in the room.

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

⚠ Particularly consider that load losses higher than the unit useful prevalence, lead to reduction in flow rate, with consequent unit blocks.

- the weight of the channels must not burden on 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
- limit the load losses by optimising the path, the type and number of bends and junctions
- use wide bends evaluating the opportunity of equipping them with deflectors (in particular with high air speed or bends with reduced radius)

5.1 Treated air channelling

The internal surface of the channel must be smooth, enable its washing and must not contaminate the air.

Thermally isolate the channels and the flanges to avoid energy losses and forming of condensation.

DIFFUSERS INLETS GRILLES

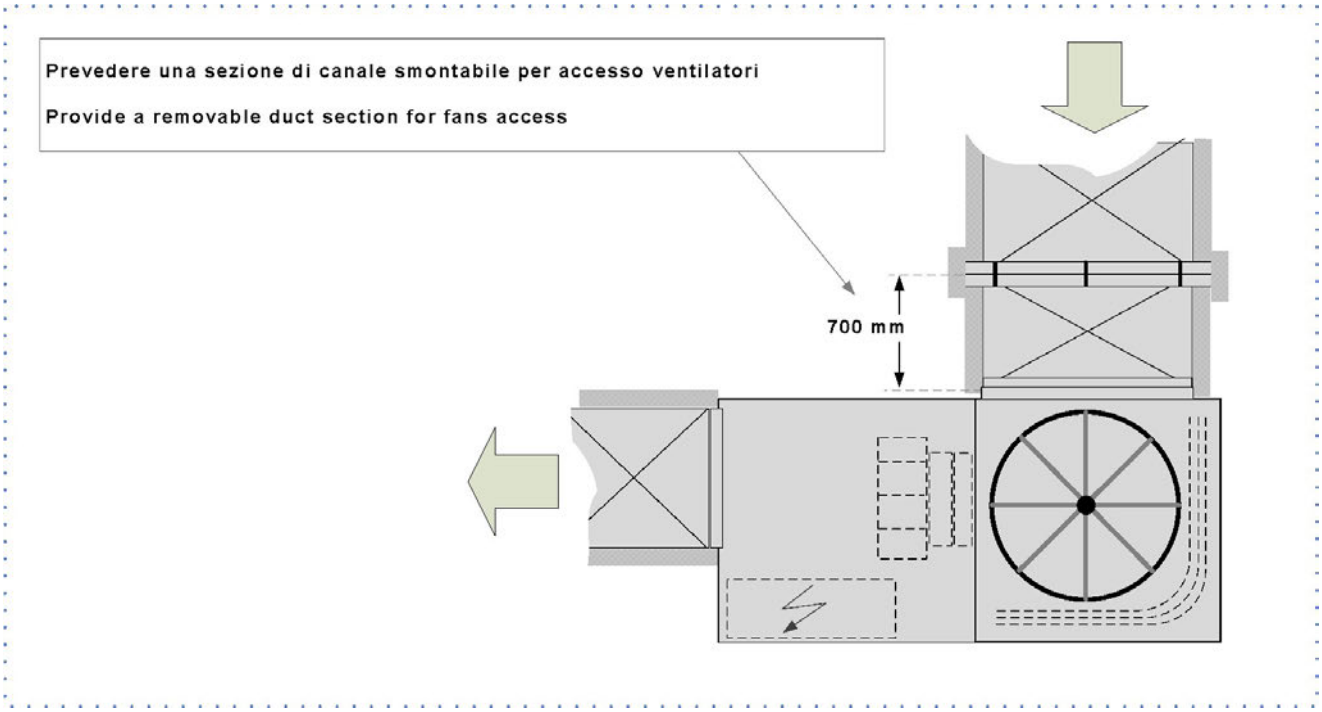
A correct diffusion of the air in the room is determining for the level of comfort.

⊘ When choosing and positioning the grilles, inlets and diffusers, avoid:

- excessive air speed
- forming of stagnant and stratification areas
- cold air delivery in room
- forming of localised currents (also due to uneven distribution of air)
- excessive room temperature variations, vertically and horizontally
- short circuits of the supply air towards the return air

⚠ For sound comfort, consider that:

- the air diffusers must be chosen verifying the sound power generated at nominal flow rate conditions
- the cut-off to diffusers must be carried out with flexible elements
- the return grilles must be widely dimensioned



⚠ Thermally isolate the channels and the flanges to avoid energy losses and forming of condensation.

6 Electrical connections

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

The protection devices of the unit power line must be able to stop all short circuit current, the value must be determined in accordance with system features.

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

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

Operate in compliance with safety regulations in force.

6.1 Electrical data

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

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

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

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

6.2 Connections

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

6.3 Signals / data lines

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

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

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

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

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

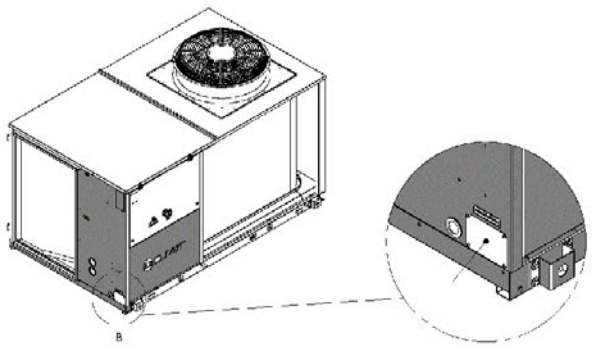
Guarantee the continuity of the screen during the entire extension of the cable.

Respect impendency, capacity and attenuation indications.

6.4 Power input

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

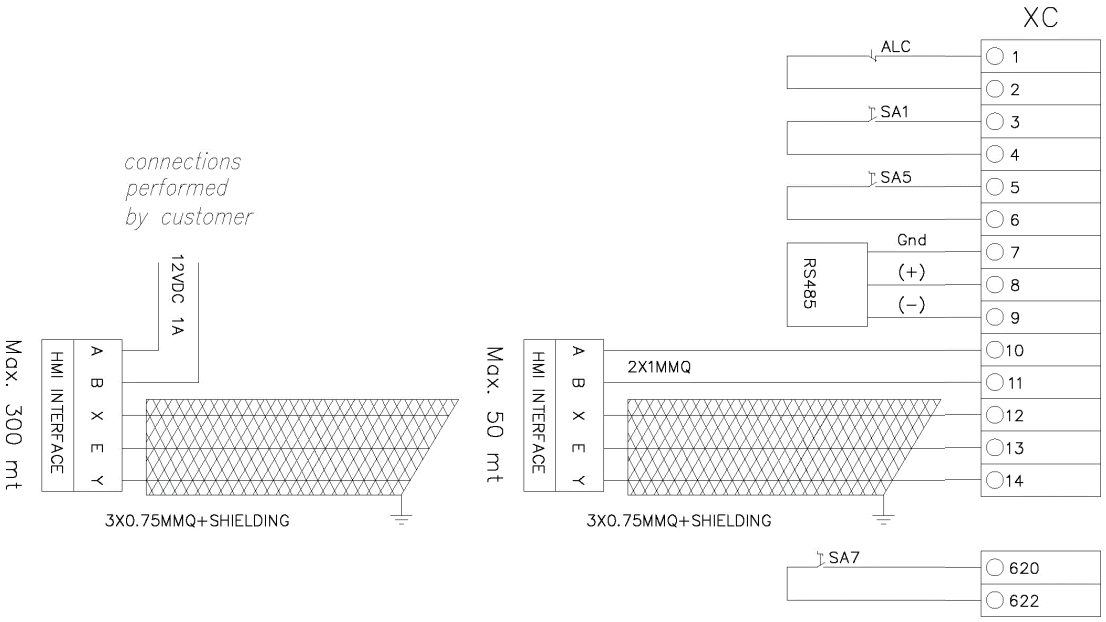
⊘ The cable must not touch the compressor and the refrigerant piping (they reach high temparatures).

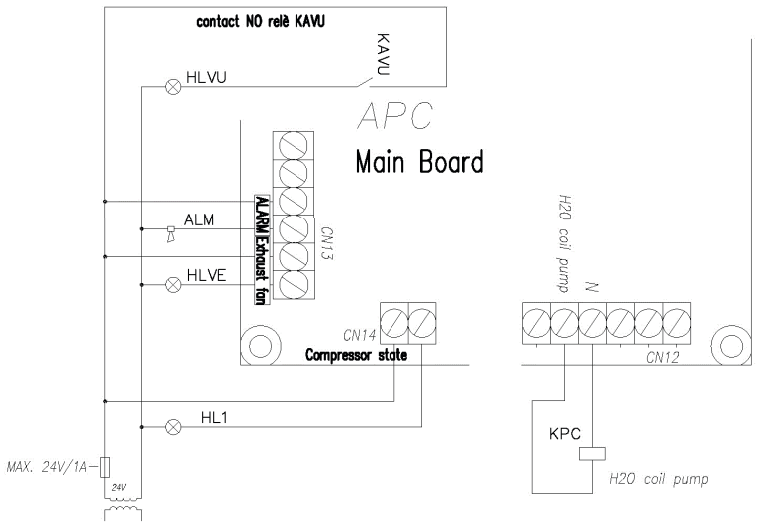


6.5 Connections performer by customer

ALC	contatto pulito da impianto di segnalazione allarme antincendio free contact from signalling system of fire alarm contact libre de installation de signalisation alarme d'incendie Schließerkontakt aus der Signalisierungsanlage der Feuerschutzalarm contacto libre de installación de señalización alarma antiincendio
HLVU	lampada segnalazione stato ventilatore di mandata indicating light of the supply fan status lampe de signalisation de l'état ventilateur de refoulement Signallampe des Zustandes des Druckventilators lámpara indicadora estado ventilador de impulsión
ALM	segnalazione blocco cumulativo cumulative fault signal signalisation alarme Sammelstörmeldung señalización bloqueo cumulativo
SA1	selettore on/off remoto remote on/off selector sélecteur ON/OFF déporté Fernwahlschalter Ein/Aus selector on/off remoto
HL1	lampada di segnalazione stato compressore compressor status signal lamp lampe de signalisation état compresseur Signallampe Verdichterzustand lámpara de señalización estado compresor

SA5	selettore remoto "estate/inverno" remote winter/summer selector sélecteur déporté "été/hiver" Fernwahlschalter „Winter/Sommer" selector remoto verano/invierno
SA7	selettore abilitazione allo scarico manuale umidificatore enabling selector to the humidifier manual discharge sélecteur validation à la décharge manuelle humidificateur Freigabewähler auf den manuellen Ablauf des Befeuchters selector habilitación a la descarga manual humidificador
KPC	comando pompa/circolatore della batteria integativa pump/circulating pump control of the integration coil commande pompe/pompe de circulation de la batterie supplémentaire Pumpe/Zirkulationspumpe-Steuerung der Zusatzbatterie mando bomba/bomba de circulación de la bateria comolementaria
HLVE	lampada segnalazione stato ventilatore d' estrazione Exhaust fan status warning light * * *

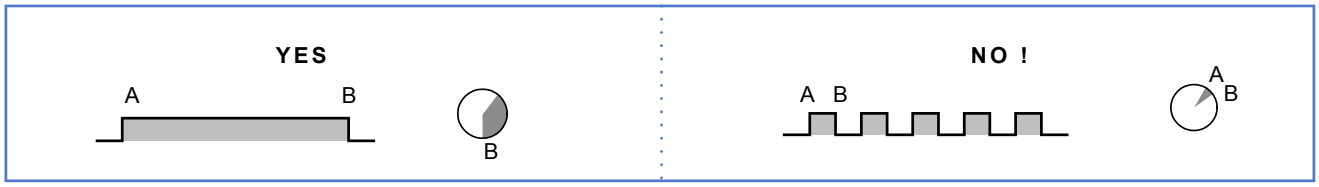




6.6 Remote ON-OFF

1.05 EnOnOff	ON / OFF from:
= 0	digital input: ON = power ON OFF = power OFF 
= 1	controller 
= 2	BMS 

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



6.7 Wall mounted electronic room control

Before proceeding, make sure you have:

Name	Quantity	Notes
Controller	1	KJRH-120H/BMKO-E
Half-round Phillips head mounting screw	3	GB950-86 M4X20 For mounting on wall
Half-round Phillips head mounting screw	2	M4X25 GB823-88 For mounting on electrical junction box
Plastic bolt	2	To install the controller inside the switch box
Plastic expansion plug	3	For mounting on wall

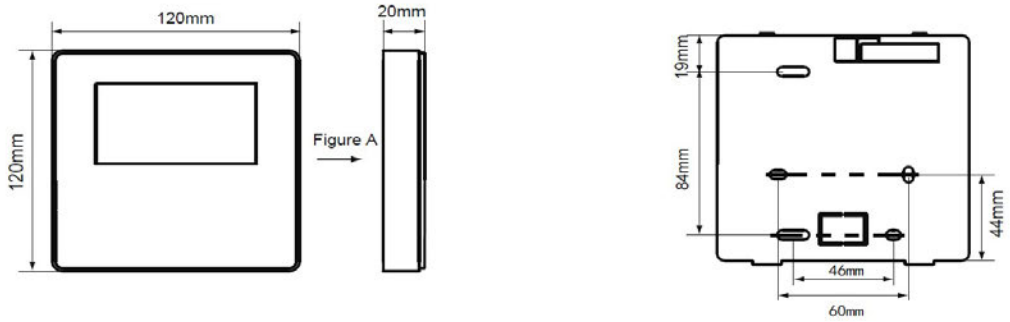
- Do not install in a place subject to flammable gas leaks. Once the flammable gases have leaked and spread around the controller, they could trigger a fire.
- Do not place the controller near lamps, in order to prevent potential interferences with the controller signal
- Do not install the unit in a place subject to excessive amounts of oil, vapour, sulphide gases. Exposure to these substances may cause the product to deform and stop working.

  The wiring must be suited to the controller's current rating. If not, electrical dispersions or overheating may occur, which could trigger a fire.

  The controller operates with a low-voltage circuit. Never connect it to a standard 220 V/380 V circuit or insert it through the same cable grommet of the circuit.

  The shielded cable must be stably grounded, or the transmission might fail.
- After making the connections, do not use the insulation tester to check the signal cable's insulation.
- Do not apply any external force on the terminal. This may cause the wires to break or overheating, which could trigger a fire.

Operating temperature : -15°C / +43°C



Take a slotted-head screwdriver and insert it into the recess on the lower part of the controller, then turn the screwdriver to lower the back cover. (Pay attention to the rotation direction, or the back cover may get damaged!)

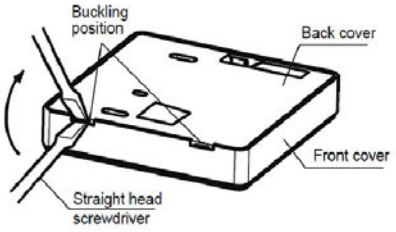
Use three GB950-86 M4X20 screws to install the back cover directly onto the wall.

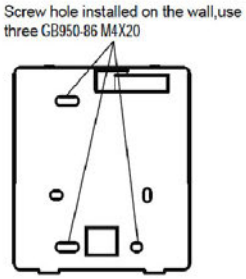
Use two GB823-88 M4X25 screws to install the back cover in the electrical junction box 86 and use one GB950-86 M4X20 screw to install it directly onto the wall.

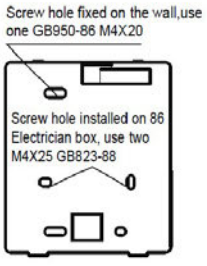
Adjust the length of the two plastic plugs to the standard distance from the threaded bar of the wall-mounted switch box. When inserting the plastic plugs into the wall, make sure that the lie flush with the wall.

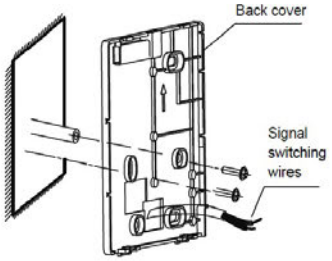
Use Phillips-head screws to fasten the back cover of the controller to the wall using the plastic plug. Make sure that the back cover of the controller lies at the same level after installation and mount the controller back onto the rear cover.

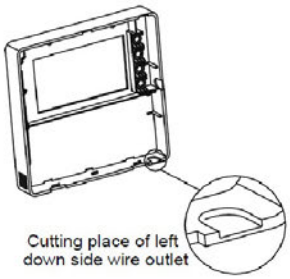
Install the back cover correctly and securely fasten both the front and back covers, otherwise the front cover could fall.

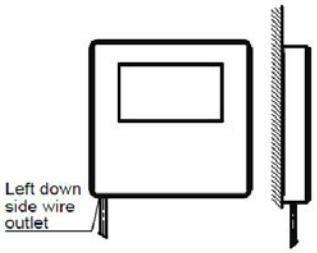


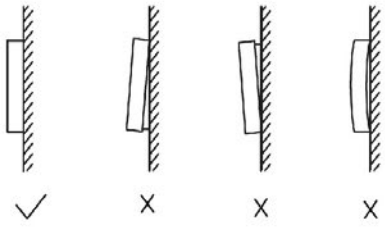








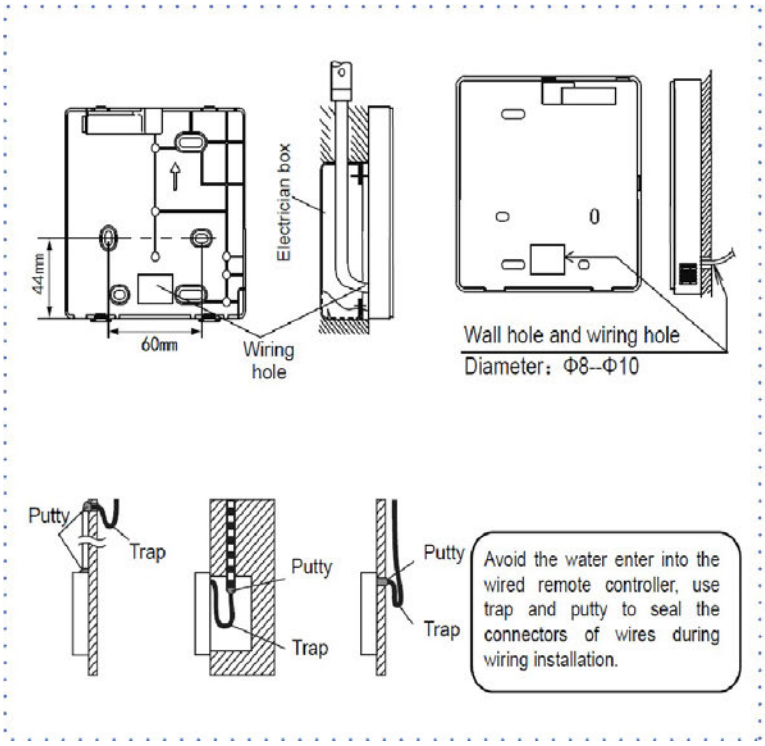


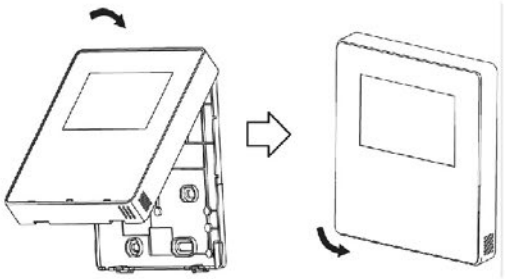


⚠ Make sure that no water penetrates inside the controller; use mastic and other contraptions to seal the cable connectors during installation.

⚠ Adjust the front cover then fasten it; avoid blocking the cables during installation.

⚠ The sensor must not be subject to humidity.





7 Start-up

7.1 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.

7.2 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. air filters present and clean
8. completed aeraulic system
9. refrigerant circuit visual check
10. earthing connection
11. power supply features
12. electrical connections provided by the customer

7.3 Start-up sequence

For details refer to the different manual sections.

Unit ON power supply

1. the compressor crankcase heating elements have been running for at least 12 hours
2. off-load voltage measure
3. phase sequence check
4. shut-off valve refrigerant circuit open
5. unit ON
6. load voltage measure and absorptions
7. check all fan operating
8. check air flow on outer coil (no by-pass, no stratification)
9. air flow rate measurement
10. supply, return and outdoor air temperature measurement
11. measure super-heating and sub-cooling
12. check no anomalous vibrations are present
13. climatic curve personalization
14. climatic curve personalization
15. scheduling personalization
16. fire alarm configuration *
17. complete and available unit documentation

* only if present

7.4 Refrigeration circuit

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

7.5 Water circuit

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

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

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

7.6 Electric Circuit

⚠ Verify that the unit is connected to the ground plant.

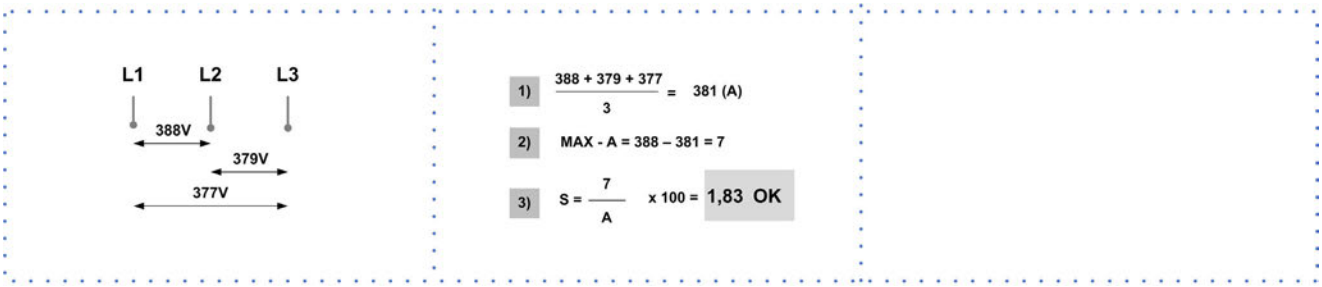
Check the conductors are tightened as: the vibrations caused by handling and transport might cause these to come loose.

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

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

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

Example



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

7.7 Compressor crankcase heaters

Power the heating elements of the compressor oil for at least 12 hours before the compressor starts:

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

1. Supply the resistances switching off the unit isolator switch.
2. The heating elements activate with an outdoor temperature below 3°C.
3. To make sure that heaters are working, check the power input.
4. At start-up the compressor crank-case temperature on the lower side must be higher at least of 10°C than the outside temperature.

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

7.8 Voltages

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

Start-up the unit.

With unit operating in stable conditions, check:

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

7.9 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).

7.10 Air flow management

Standard mode

The delivery air flow stays constant as the thermal load varies.

The ventilation remains active even when the setpoint is fulfilled.

Constant air flow rate

Option

The delivery air flow rate stays constant during variations in the thermal load and head losses of the unit and system.

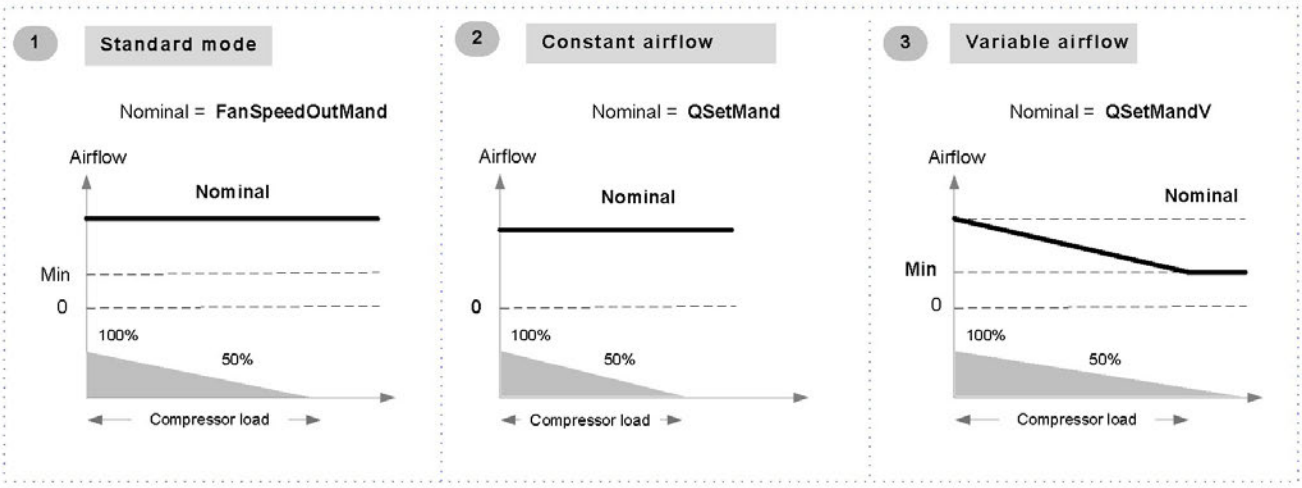
The ventilation remains active even when the setpoint is fulfilled.

Variable airflow

Option

The air flow supply varies depending on the heat load, up to a minimum value compatible with the distribution system and the chosen air diffusion.

The ventilation remains active even when the setpoint is fulfilled.



7.11 Air flow setting

Standard mode

The real unit flow is according to the aeraulic system features.

⚠ Before checking, make sure that the system has been completed in all its parts (shunts, dampers, grilles, diffusers etc.).

⚠ Check the doors and windows of the serviced room are closed.

⚠ The unit must be calibrated while full recirculation has been running for at least 30 minutes.

The unit is in full recirculation during the first 60 minutes of operation.

Set the fan's percentage of operation:

FanSpeedOutMand

7.12 ECO mode

The air flow supply remains constant at varied heat loads and is shutdown when setpoint is fulfilled.

To further increase the energy savings in this condition, it is also possible to set less demanding operation setpoints for the unit in respect to the standard mode.

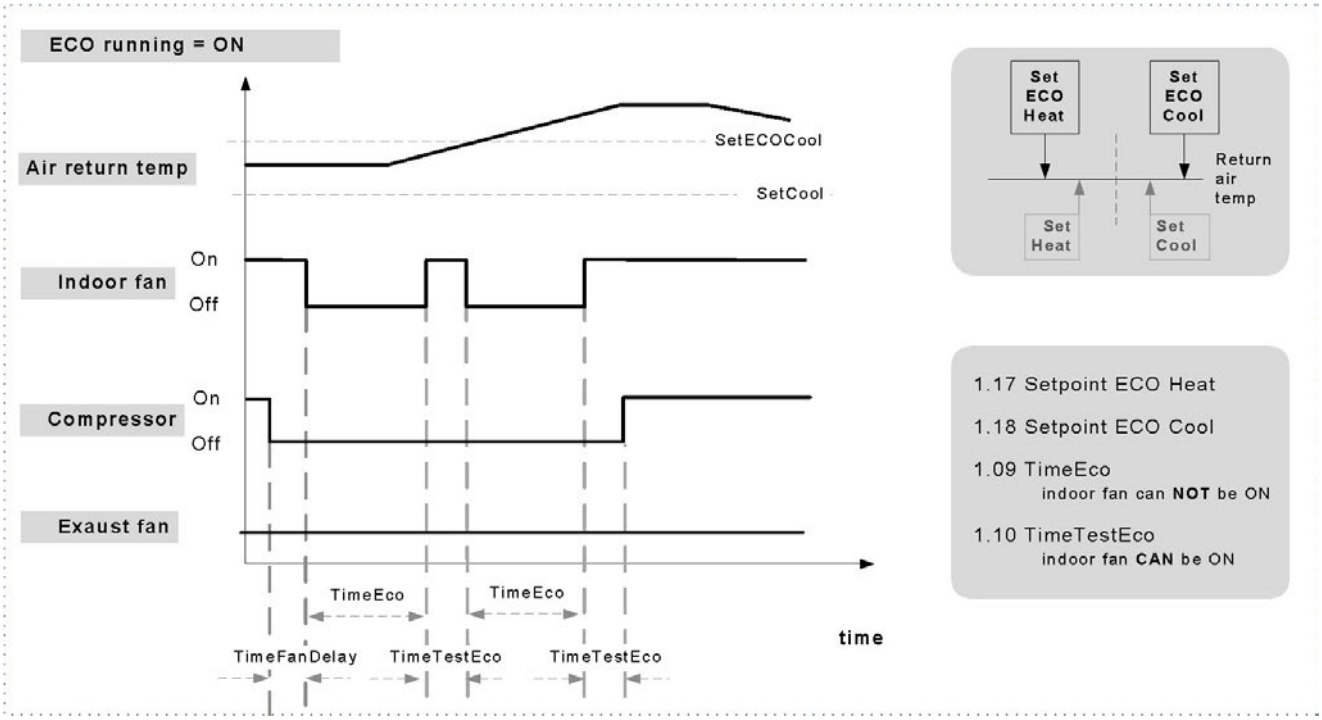
This function is indicated for the thermal maintenance of the served area in case it is temporarily not used, which can for example occur at night.

In ECO mode, the renewal air is not managed.

The ECO mode can be activated:

- Manually: P04 Enable EcoMode = 1
- Automatically by means supervision system

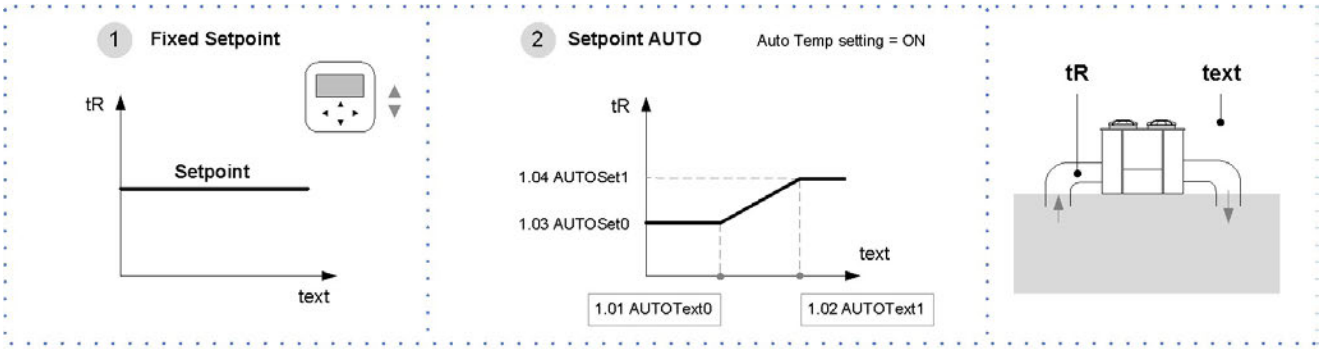
Example in cooling mode:



7.13 Operating mode

The set point can be fixed (1) or variable depending on the outdoor temperature (2).

Menu: Auto Temp. Setting



The HEAT/COOL mode can be modified:

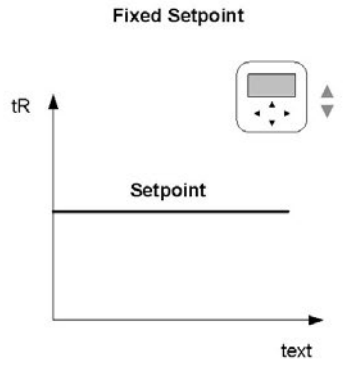
- manually through the SA5 contact, from the keypad or through the BMS
- automatically depending on the return temperature

To choose, set 1.06 EnMode.

Entonces será posible elegir entre 4 tipos de funcionamiento:

1. Fixed set point - Manual mode
2. Fixed set point - Automatic mode
3. Variable set point - Manual mode
4. Automatic set point - Automatic mode

Fixed set point - Manual mode

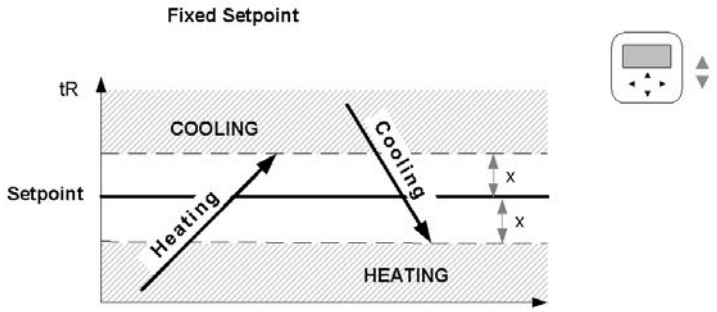


Mode MAN

1.06 EnMode	Heat / Cool from:
= 0	digital input: ON = heating, OFF = cooling — SA5
= 1	controller
= 2	BMS

	COOL	HEAT
On	tR > set	tR < set
Off	tR < set	tR > set

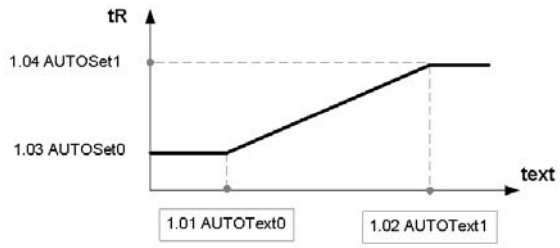
Fixed set point - Automatic mode



Mode AUTO

1.06 EnMode = 3

Variable set point - Manual mode

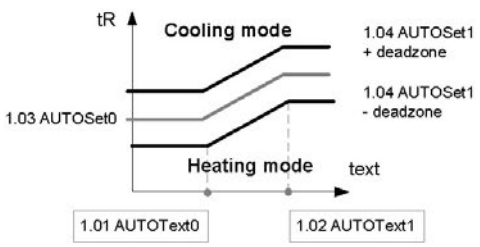


Mode MAN

1.06 EnMode	Heat / Cool from:
= 0	digital input: ON = heating, OFF = cooling — SA5
= 1	controller
= 2	BMS

Automatic set point - Automatic mode

Setpoint AUTO Mode AUTO **1.06 EnMode = 3**



	COOL	HEAT
On	tR > (Autoset + deadzone)	tR < (Autoset - deadzone)
Off	tR < (Autoset + deadzone)	tR > (Autoset - deadzone)

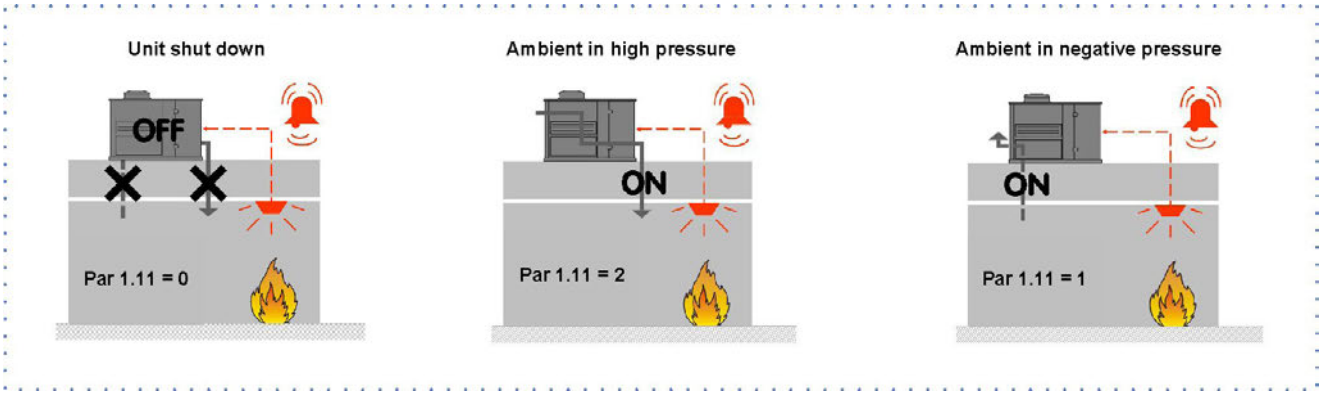
7.14 Fire alarm: configuration

It is possible to configure the unit behaviour in presence of alarm signal.

Par 1.11 TypeFireMode

The unit cannot be used as smoke extractor.

⚠ Any fire detection devices built-in the unit must be considered as an auxiliary safety system, and, accordingly, must not be a replacement for any fire detection devices in the room.



7.15 Room pressure calibration

CCK configurations

1. check the doors and windows of the serviced room are closed
2. calibration must be carried out with unit all in recirculation
3. view the status on the display: Pf2 RETURN AIR PRE
4. wait for the pressure value to stabilise and take note of the value
5. to keep the room at neutral pressure, memorise the value of the read pressure in 5.07 SetPAmb
6. to maintain the room in overpressure, memorise a higher value respect to that detected
7. to maintain the room in depression, memorise a lower value

7.16 Start-up report

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

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

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

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

7.17 2014/68/UE PED directive

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

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

Compulsory verification of the first installation:

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

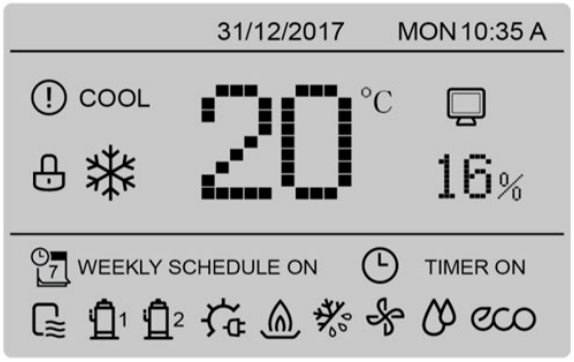
Certification of setting in service:

- for all the units

Periodical verifications:

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

MENU	To access the various menus of the HOME page.
▲, ▼, ◄ ►	▲ up, ▼ down, ◄ left, ► right To shift the cursor, modify the selection or modify the set value. The parameter can be rapidly modified by pressing it extendedly..
OK	To confirm an operation
ON/OFF	To set the ON / OFF function
BACK	To return to the previous level. Press to exit the current page and return to the previous page. Press extendedly to return to the home page directly.
UNLOCK	To lock/unlock.



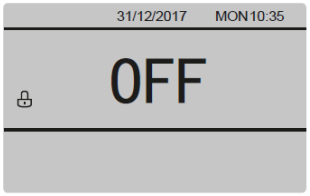
	Mode: indicates, respectively, heat, cool and auto
OFF	Controller deactivated (off)
	Remotely controlled controller Appears when the unit is set from the keypad for being controlled from a remote terminal or a remote switch.
20	Return air temperature. 16: value of the return air humidity (indicator on only when humidity check is enabled) Generally, this area displays the actual temperature of the return air and the relative humidity of the return air; when the set value is modified, it displays the modified temperature and the relative humidity.
	Unit status: indicator on when the unit is running.
	Compressor: indicator on when the compressor is running.
	Auxiliary electric heater: indicator on when the auxiliary electric heater or H2O coil is running.
	Gas module: indicator on when the gas module is running.
	Defrosting: indicator on when the unit is defrosting the outdoor coil
	Internal fan: indicator on when the internal fan is running.
	Humidifier: indicator on when the humidifier is running.
eco	Eco running: indicator on when the ECO function is set to ON
	Timer: indicator on when a valid timer has been set (weekly schedule).
	Alarm: indicator on when a fault occurs or a protection device intervenes.
	Lock: indicator on when the controller's keypad is locked.

Lock/unlock

To lock/unlock the screen, press UNLOCK for 3 sec.

Switch-on/off

To switch it on/off, press ON/OFF.



Temperature/humidity adjustment

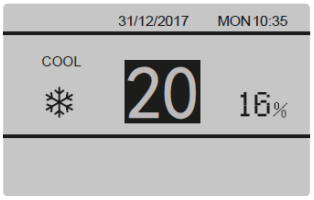
Press ◄ ► to adjust the temperature

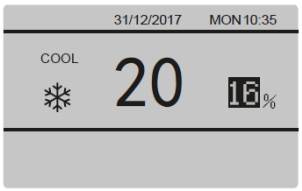
Press ▲▼to select

Press◄ ► to adjust the temperature (if the sensor is enabled)

Press OK to confirm

If no operations are made for more than 10 sec, the system automatically memorises the settings and returns to the home page



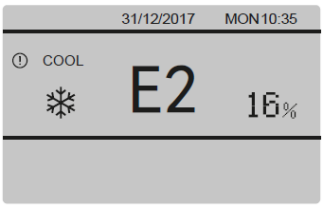


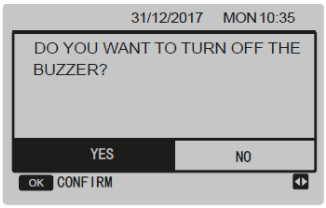
Alarms

If an alarm intervenes, the "**!**" symbol flashes and the error code appears.

The beeper sounds 3 times for 180 sec.

Press OK: the buzzer can be silenced. Select using ◄ ► and press OK.



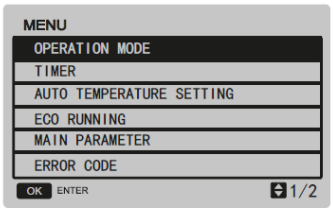


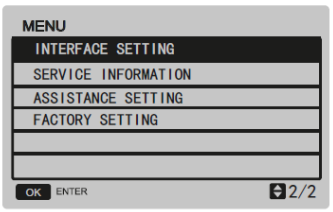
Settings menu

Press ▲▼ to select each menu option.

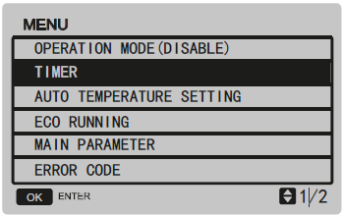
Press OK to access the corresponding sub-menu

Press BACK to return to the home page .

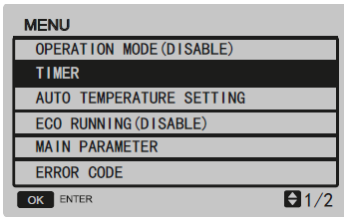




If ENMode=0 or =2 (in the ASSISTANCE menu), the mode operation is disabled



If ENMode=3 (in the ASSISTANCE menu), the mode and eco mode operations are disabled

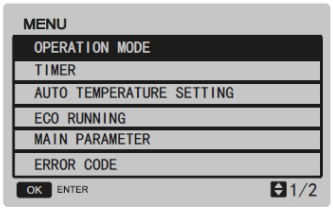


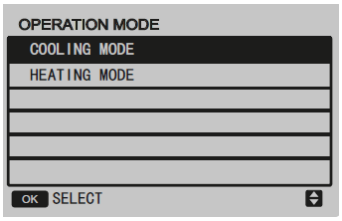
Operating mode

Choose the mode with

▲▼. Confirm with OK.

After 10 sec, without any operation, the mode is memorised automatically



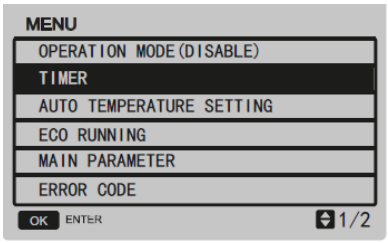


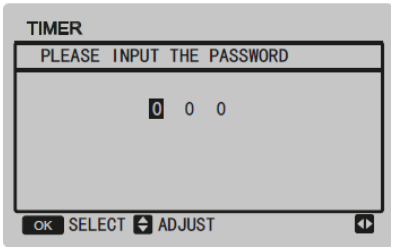
Timer

Select TIMER using ◄ ► and press OK.

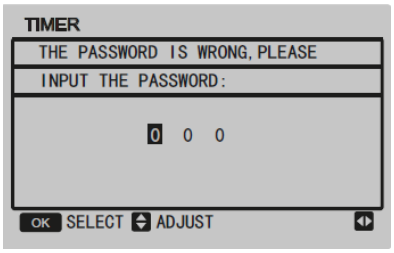
Press ◄ ► to select the value of the password Press ▲ ▼ to enter the value of the password.

The password is **123** and cannot be modified.

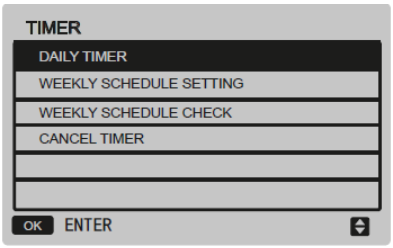




If the password is incorrect, the display will appear as follows:

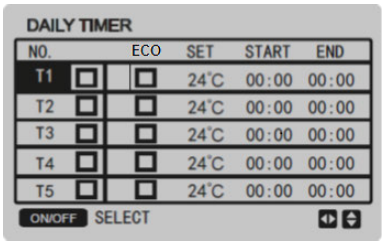


After entering the correct password, the display will appear as follows:



Daily timer

Select DAILY TIMER using ▲▼ and press OK .



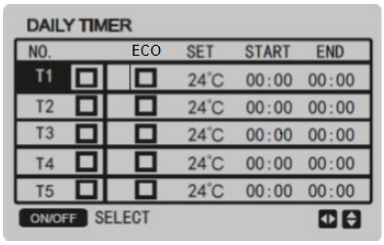
Press ▲ ▼ to choose timer T1 - T5.

Press ON/OFF to enable/disable the selected timer.

Press ▲▼ to select each option to be set

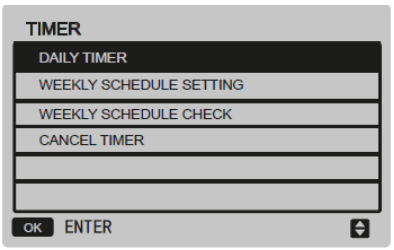
Press ▲ ▼ to adjust the temperature and start/end time parameters.

Press OK to confirm the setting and return to the previous page, or press BACK to delete the setting and return to the previous page .



Weekly timer

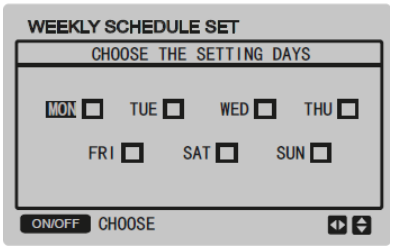
Select DAILY TIMER using ▲▼ and press OK



Press ◄ ► ▲ ▼ to select the days.

Press ON/OFF to confirm/delete the selected days

After the selection, press OK to view the next page



Press ▲ ▼ to choose timer T1 - T5.

Press ON/OFF to enable/disable the selected timer.

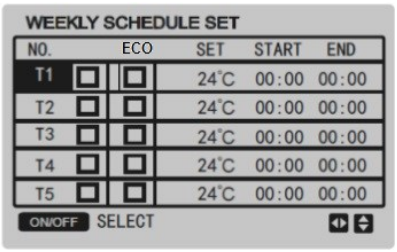
Press ON/OFF to enable/disable ECO function

Press ▲▼ to select each option to be set

Press ▲ ▼ to adjust the temperature and start/end time parameters.

Press OK to confirm the setting and return to the previous page,

or press BACK to delete the setting and return to the previous page.

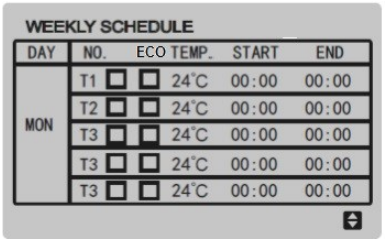


Verification of the weekly schedule

Select WEEKLY SCHEDULE CHECK in the TIMER menu

The WEEKLY CHECK allows for viewing, but not modifying, the weekly schedule.

Press ▲ ▼ to shift from one day of the week to another.

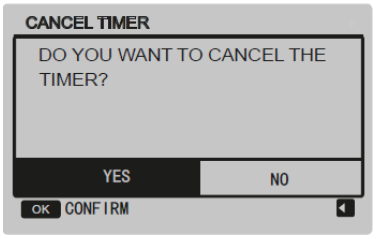


Verification of the weekly schedule

Select CANCEL TIMER in the TIMER menu

Press ◄ ► to select YES.

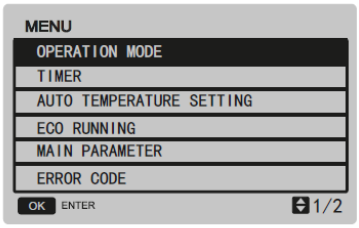
Press OK to cancel all the settings of the daily and weekly timers.

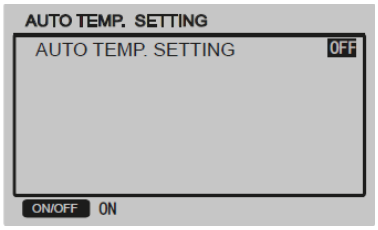


AUTOMATIC TEMPERATURE

Press ON/OFF to enable/disable the function.

Press OK to confirm or BACK to cancel the operation and return to the previous page .



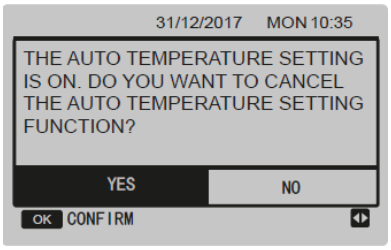


When AUTO TEMP. SETTING = ON, manual adjustment of the temperature is disabled.

Shown to the side is the page that appears when the user attempts to modify the temperature manually.

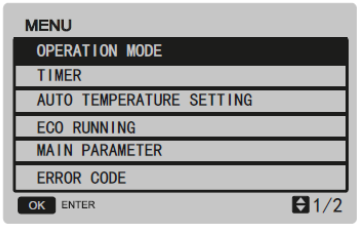
Press ◄ ► to select YES.

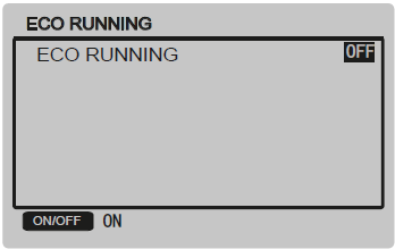
Press OK to disable the AUTO TEMP. function and return to the previous page



ECO RUNNING

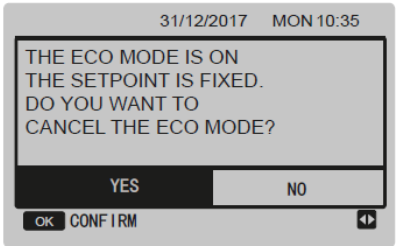
When ECO RUNNING is set to ON, the unit operates in the energy saving mode..





When ECO RUNNING is set to ON, the set point cannot be modified from the HOME page; if the user attempts to modify it, the following page appears:

If YES is selected, the ECO RUNNING function is disabled; if NO is selected, ECO RUNNING is still active .



MAIN PARAMETERS

Press ▲ ▼ to select the parameter.

Press ◄ ► to set the value.

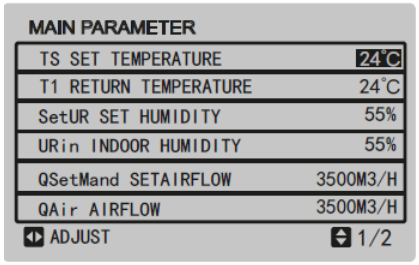
Press OK to confirm the value or press BACK to cancel it and return to the previous page.

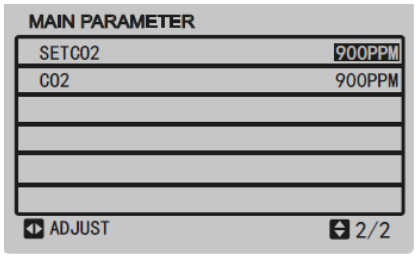
If EnURCool = 0 and EnURHeat = 0 are set on the controller, SetUR is disabled; SetUR and URin are displayed as "--".

If EnDiffMand = 0 is set on the controller, QSetMand is disabled; QSetMand and QAir are displayed as "--".

If EnProbe = 0 is set on the controller, SetCO2 is disabled; SetCO2 and VOC are displayed as "--".

If the sensor does not work, the current value is displayed as "--".





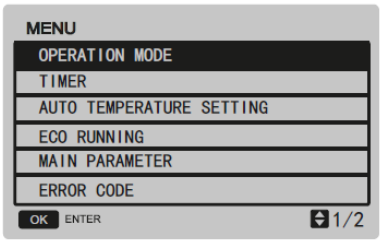
ALARM LOG

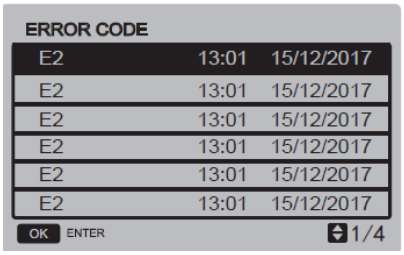
Press ▲ ▼ to select ERROR CODE.

The time of the error code is that at which the corresponding protection device intervenes or the error occurs.

Press▲ ▼ to skip to the log pages.

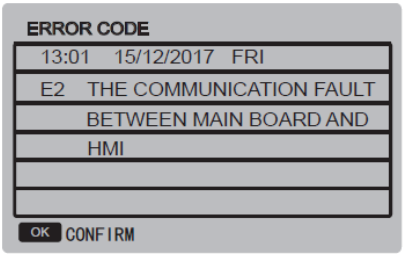
Up to maximum 24 errors can be displayed (when 25 faults occur or protection devices intervene, the error that occurs first will be cancelled)





Select an error code and press OK to access the page with the details.

If an error occurs, the same page appears



Codice	Description
E0	Main board EPROM fault
E1	Main board phase error
E2	Communication error between the main board and the keypad/controller
E3	T2 probe fault
E4	Tw probe fault
E5	T3 probe fault
E6	T1 probe fault
E7	T4 probe fault
E8	Power phase protection fault
E9	Compressor type error
Eb	T2B probe fault
Ed	Tp probe fault
EP	Fire alarm
EU	Room fan alarm
H0	IPM module communication error
H1	Low-voltage protection
H4	10 interventions of the protection module in 120 minutes
H9	Outdoor fan fault
HE	EXV disconnection alarm
F8	Expulsion fan
F9	TF probe fault
C0	Heating elements high temperature alarm
C1	Humidifier alarm
C3	Filter alarm
C4	Electric filter alarm
C6	URin probe fault
C7	URout probe fault
C8	Pf1 probe fault
C9	Pf2 probe fault
CA	CO2 probe fault
P0	High discharge temperature or high-pressure protection
P1	Low pressure
P4	High current
P6	L0-L9 module fault
P7	T3 high-temperature protection in cool mode
P9	DC fan outdoor DC protection
Pb	Water coil anti-frost protection
PL	TF high-temperature alarm

KEYPAD SETTINGS

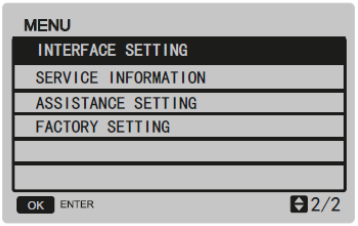
Select INTERFACE SETTING

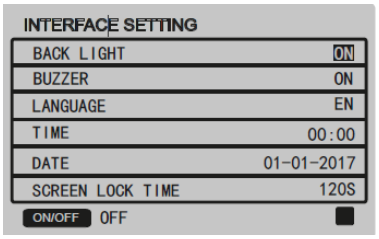
To shift the cursor, press ▲ ▼;

select ON or OFF

To adjust the value, press ◄ ►.

To select the language, press ▲ ▼.

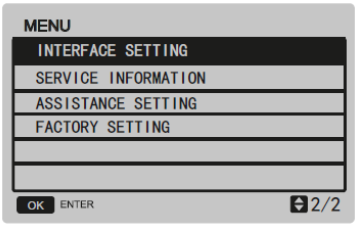


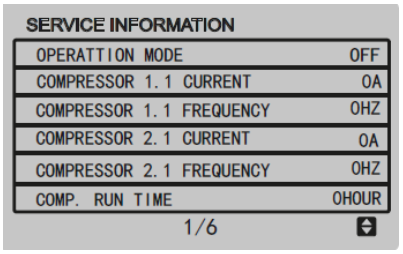


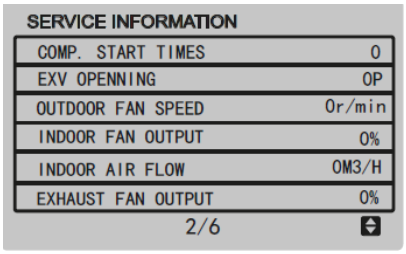
SERVICE INFORMATION

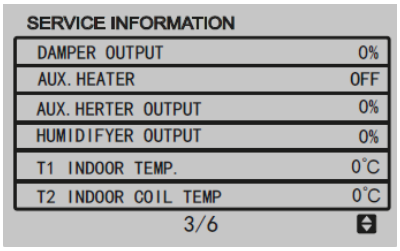
Select SERVICE INFORMATION

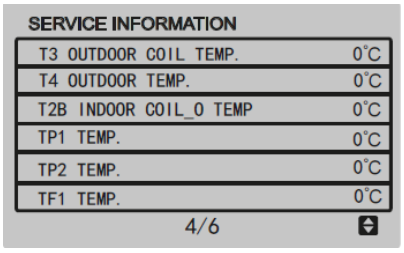
To shift the cursor, press ▲ ▼

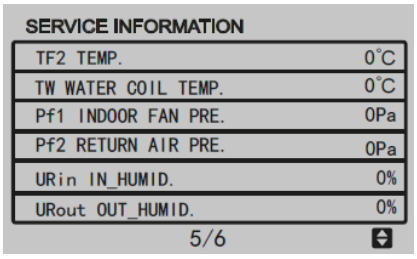


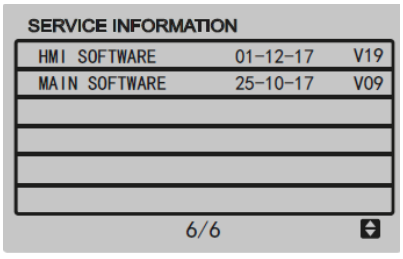












MODBUS

1、Summary

The communication protocol is between the wired controller and the unit, adopt Modbus RTU, wired controller is Master, Unit is Slave.

2 Enabling

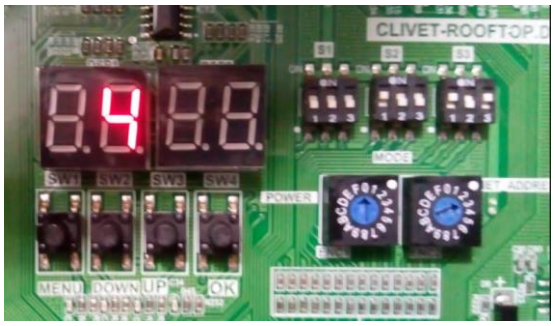
Menu > Assistance setting > password > operation parameter :
05 EnOnOff = 2
06 EnMode = 2

3 Communication spec:RS-485：

Protocol :ModbusRTU：9600,8,N,1
Baud rate : 9600bps
Data bits: 8 Data bits
Parity bit： None Parity
Stop bit: 1 stop bit

4 Function code

Unit address is setted by the encoder called “NET ADRESS”. The unit address is corresponding with Encoder setting+1 (eg, if it is setted to 0, the corresponding unit address is 1). The unit address is shown in the main borad in the display called “DSP1”.
The default encoder setting is 0. The default address is 1



It should power on the unit after set the dipswitch.

Function Code	
03	Read Holding Registers
06	Write Single Register
16	Write Multiple Registers

Error code：

Exception Code)		
01	Illegal function code	Unsupported function code.
02	illegal data address	The address that is sent when query or set, undefined in the online controller.
03	illegal data value	The parameters set are illegal, beyond the reasonable range or not the valid parameter for current state of the wired controller.

Customer's BMS registers		
Register number	**Register content**	**Note**
0	Mode setting	8=OFF; 0=Stanby; 1=Cooling mode; 2=Heating mode
1	Temperature setpoint	16°C -- 28°C
2	Ur% setpoint	0% -- 100%
3	Constant airflow setpoint	set [m3/h]
4	Enable Auto Temperature	0=OFF; 1=ON
5	Enable ECO Mode	0=OFF; 1=ON
6	Air quality setpoint	set [ppm]
7	void	
8	void	
9	void	
10	void	
Status		
Register number	**Register content**	**Note**
200	Host address	-
201	PCB swithches setting	-
202	Encoder setting	7 = size 7.1; 11 = size 10.1; 18 = size 14.2
203	Operation mode	8=OFF; 0=Stanby; 1=Cooling mode; 2=Heating mode
204	HMI visualization	1 = ON
		0 = OFF
		BIT0 = Unit running
		BIT1 = Compressor 1 running
		BIT2 = Compressor 2 running
		BIT3 = Electric air heater
		BIT4 = Gas Burner or Water coil
		BIT5 = Defrost Logo
		BIT6 = Indoor fan state
		BIT7 = Humidifier state
		BIT8 = ECO running
		BIT9 = Fault state
205	Current compressor	Current [A] Compressor A

206	Current compressor	Current [A] Compressor B
207	Frequency compressor	Frequency [Hz] Compressor A
208	Frequency compressor	Frequency [Hz] Compressor B
209	EXV step	step
210	Outdoor fan speed	RPM
211	Supply fan output	%
212	Airflow	2000~2000 m^3/h
213	Exhaust fan output	%
214	Damper output	%
215	Fault code	See below
216	Ai setpoint	0 ~ 65535 m^3/h
217	T1	-25 °C ~ 70 °C
218	Tc	-25 °C ~ 70 °C
219	T2	-25 °C ~ 70 °C
220	T3	-25 °C ~ 70 °C
221	T4	-25 °C ~ 70 °C
222	TP1	-25 °C ~ 70 °C
223	TP2	-25 °C ~ 70 °C
224	TF1	0 °C ~ 140 °C
225	TF2	0 °C ~ 140 °C
226	T2B	-25 °C ~ 7 0°C
227	Tw	-25 °C ~ 70 °C
228	Pfin	0 Pa ~ 2000 Pa
229	Pfout	0 Pa ~ 2000 Pa
230	URin	0% ~ 100%
231	URout	0% ~ 100%
232	CO2 concentration	0 ppm ~ 2000 ppm
233	Exhaust fan output	%
234	Auxiliary heating source output	%
235	Humidifier output	%
236	Factory test mode output	step

In BMS reading, register 215 displays one of the following "Fault codes" in hexadecimal format (hex), considering only the LOW BYTE.
Consider only the last two alphanumeric digits of the code.

Fault code	A0	A1	A2	A3	A4	A5	A6	A7	A8	A9	AA	AB	AC	AD	AE	AF	AH	AL	AP	AU
LOW BYTE [Hex]	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	10	11	12	13	14
Fault code	**B0**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**B8**	**B9**	**BA**	**BB**	**BC**	**BD**	**BE**	**BF**	**BH**	**BL**	**BP**	**BU**
LOW BYTE [Hex]	15	16	17	18	19	1A	1B	1C	1D	1E	1F	20	21	22	23	24	25	26	27	28
Fault code	**C0**	**C1**	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**	**C9**	**CA**	**CB**	**CC**	**CD**	**CE**	**CF**	**CH**	**CL**	**CP**	**CU**
LOW BYTE [Hex]	29	2A	2B	2C	2D	2E	2F	30	31	32	33	34	35	36	37	38	39	3A	3B	3C
Fault code	**E0**	**E1**	**E2**	**E3**	**E4**	**E5**	**E6**	**E7**	**E8**	**E9**	**EA**	**EB**	**EC**	**ED**	**EE**	**EF**	**EH**	**EL**	**EP**	**EU**
LOW BYTE [Hex]	3D	3E	3F	40	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E	4F	50
Fault code	**F0**	**F1**	**F2**	**F3**	**F4**	**F5**	**F6**	**F7**	**F8**	**F9**	**FA**	**FB**	**FC**	**FD**	**FE**	**FF**	**FH**	**FL**	**FP**	**FU**
LOW BYTE [Hex]	51	52	53	54	55	56	57	58	59	5A	5B	5C	5D	5E	5F	60	61	62	63	64
Fault code	**H0**	**H1**	**H2**	**H3**	**H4**	**H5**	**H6**	**H7**	**H8**	**H9**	**HA**	**HB**	**HC**	**HD**	**HE**	**HF**	**HH**	**HL**	**HP**	**HU**
LOW BYTE [Hex]	65	66	67	68	69	6A	6B	6C	6D	6E	6F	70	71	72	73	74	75	76	77	78
Fault code	**L0**	**L1**	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**	**L8**	**L9**	**LA**	**LB**	**LC**	**LD**	**LE**	**LF**	**LH**	**LL**	**LP**	**LU**
LOW BYTE [Hex]	79	7A	7B	7C	7D	7E	7F	80	81	82	83	84	85	86	87	88	89	8A	8B	8C
Fault code	**J0**	**J1**	**J2**	**J3**	**J4**	**J5**	**J6**	**J7**	**J8**	**J9**	**JA**	**JB**	**JC**	**JD**	**JE**	**JF**	**JH**	**JL**	**JP**	**JU**
LOW BYTE [Hex]	8D	8E	8F	90	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
Fault code	**N0**	**N1**	**N2**	**N3**	**N4**	**N5**	**N6**	**N7**	**N8**	**N9**	**NA**	**NB**	**NC**	**ND**	**NE**	**NF**	**NH**	**NL**	**NP**	**NU**
LOW BYTE [Hex]	A1	A2	A3	A4	A5	A6	A7	A8	A9	AA	AB	AC	AD	AE	AF	B0	B1	B2	B3	B4
Fault code	**P0**	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**PA**	**PB**	**PC**	**PD**	**PE**	**PF**	**PH**	**PL**	**PP**	**PU**
LOW BYTE [Hex]	B5	B6	B7	B8	B9	BA	BB	BC	BD	BE	BF	C0	C1	C2	C3	C4	C5	C6	C7	C8
Fault code	**R0**	**R1**	**R2**	**R3**	**R4**	**R5**	**R6**	**R7**	**R8**	**R9**	**RA**	**RB**	**RC**	**RD**	**RE**	**RF**	**RH**	**RL**	**RP**	**RU**
LOW BYTE [Hex]	C9	CA	CB	CC	CD	CE	CF	D0	D1	D2	D3	D4	D5	D6	D7	D8	D9	DA	DB	DC
Fault code	**T0**	**T1**	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**	**T8**	**T9**	**TA**	**TB**	**TC**	**TD**	**TE**	**TF**	**TH**	**TL**	**TP**	**TU**
LOW BYTE [Hex]	DD	DE	DF	E0	E1	E2	E3	E4	E5	E6	E7	E8	E9	EA	EB	EC	ED	EE	EF	F0
Fault code	**U0**	**U1**	**U2**	**U3**	**U4**	**U5**	**U6**	**U7**	**U8**	**U9**	**UA**	**UB**	**UC**	**UD**	**UE**	**UF**	**UH**	**UL**	**UP**	**UU**
LOW BYTE [Hex]	F1	F2	F3	F4	F5	F6	F7	F8	F9	FA	FB	FC	FD	FE	FF					

9 Maintenance

9.1 General description

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

The maintenance allows to:

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

Before checking, please verify the following:

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

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

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

9.2 Inspections frequency

Perform an inspection every 6 months minimum.

The frequency, however, depends on the use.

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

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

√	intervention frequency (months)	1	6	12
1	presence corrosion			X
2	panel fixing			X
3	fan fixing		X	
4	coil cleaning		X	
5	bowl cleaning + sanitisation		X	
6	outflow test		X	
7	air filters cleaning / inspection	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	Checking for leaks			*
17	survey of the refrigerant circuit operating parameters		X	
18	safety valve			*
19	protective device test: pressure switches, thermostats, flow switches etc..		X	
20	control system test: setpoint, climatic compensations, capacity stepping, water / air flow-rate variations		X	
21	control device test: alarm signalling, thermometers, probes, pressure gauges etc..		X	

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

9.3 Unit booklet

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

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

Report on the booklet:

- date
- intervention description
- carried out measures etc.

9.4 Standby mode

If a long period of inactivity is foreseen:

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

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

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

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

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

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

9.5 Outdoor air coil

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

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

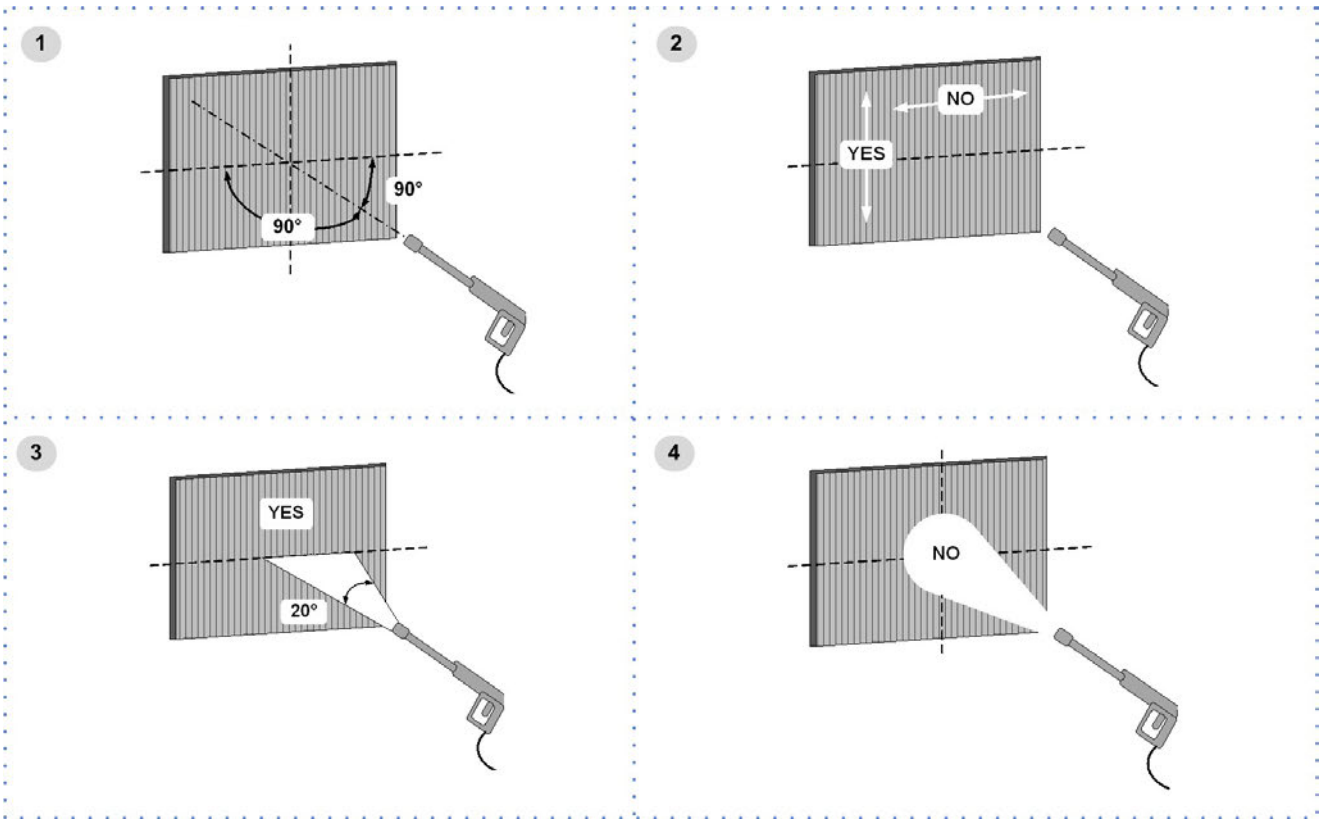
Remove all impurities from the surface.

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

Hold the gun parallel to the fins to avoid damages.

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

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



9.6 Indoor air coil

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

The finned surfaces of the cooling coils and, in particular, the condense collection bowls constitute places where microorganisms and moulds greatly flourish.

It is very important to foresee periodical cleaning with suitable detergents and, eventually, disinfect with sanitising products.

9.7 Electric fans

Check:

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

9.8 Condensation collection basin

Dirt or scale can give rise to clogging.

Also, microorganisms and mould can flourish in the bowl.

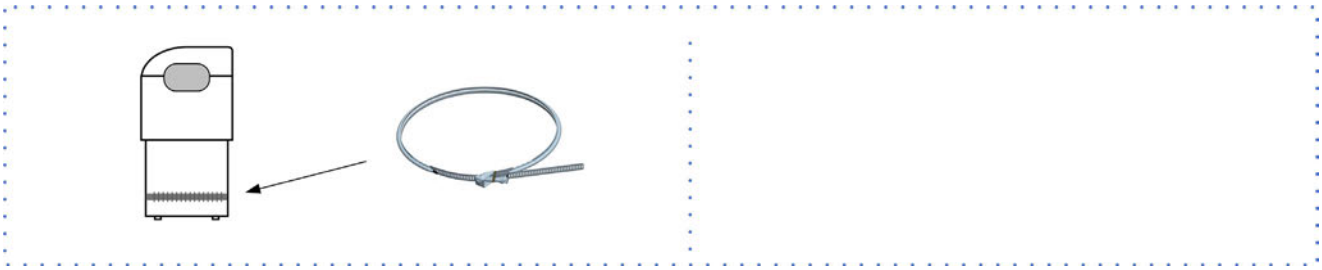
It is very important to foresee periodical cleaning with suitable detergents and, eventually, disinfect with sanitising products.

Once cleaning is completed, pour water inside the bowl to check the regular outflow.

9.9 crankcase heather

Check:

- closure
- Operation



9.10 G4 Folded air filters

It is very important for the air treatment coil to offer maximum thermal exchange: the unit must always work with clean and installed filters.

Cleaning and replacement of filters are very important from an hygienic-sanitary point of view.

⚠ Operation with clogged filters leads to a reduction in the air flow rate with malfunctionings and block, up to possible breaks in the unit.

The frequency with which the filters must be checked depends on the quality of the air, the unit operation hours, the dustiness and crowding of rooms.

⚠ Frequency can indicatively vary from WEEKLY to MONTHLY.

⚠ It is advised to start with frequent checks, subsequently adjusting frequency to degree of detected dirt.

1. Remove the closing panels
2. Delicately remove the filter avoiding dirtying the area below
3. Wash the filtering jacket in warm water with common detergent
4. Accurately rinse in running water avoiding spilling in the room
5. Dry the filter
6. Insert it back in its seat
7. Remount the closing panels

Old filters, washing wastewater and residues must be disposed of according to the current standards.

9.11 F7 Highly efficient filters

Accessory

For details see:

10.2 F7 Highly efficient filters p. 48

9.12 Electronic filters

Accessory

For details see:

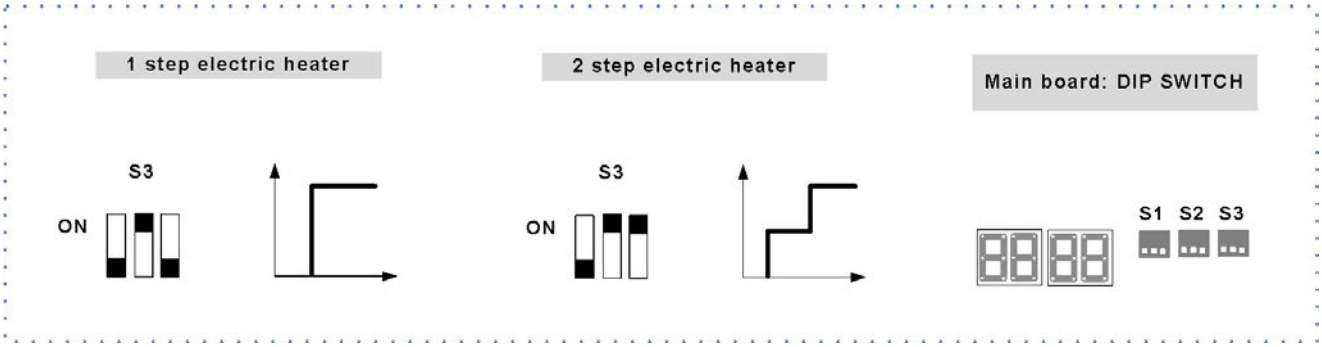
10.1 Electronic filters p. 47

9.13 Electric heaters

Accessory

Check:

- cleaning state
- fastening
- presence of corrosion



9.14 Immersed electrode humidifier

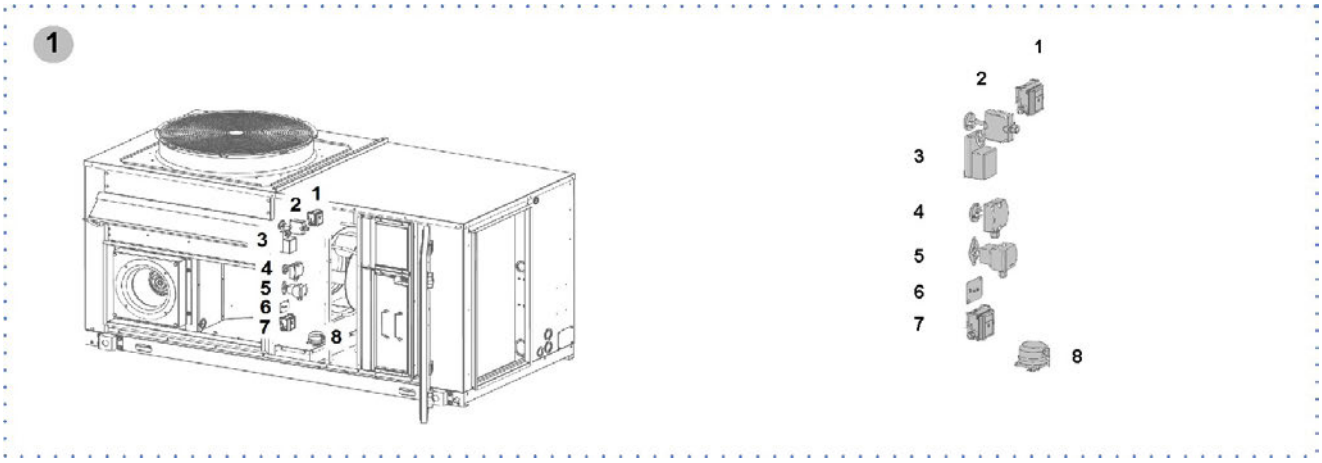
Accessory

For details see:

10.3 Immersed electrode humidifier p. 49

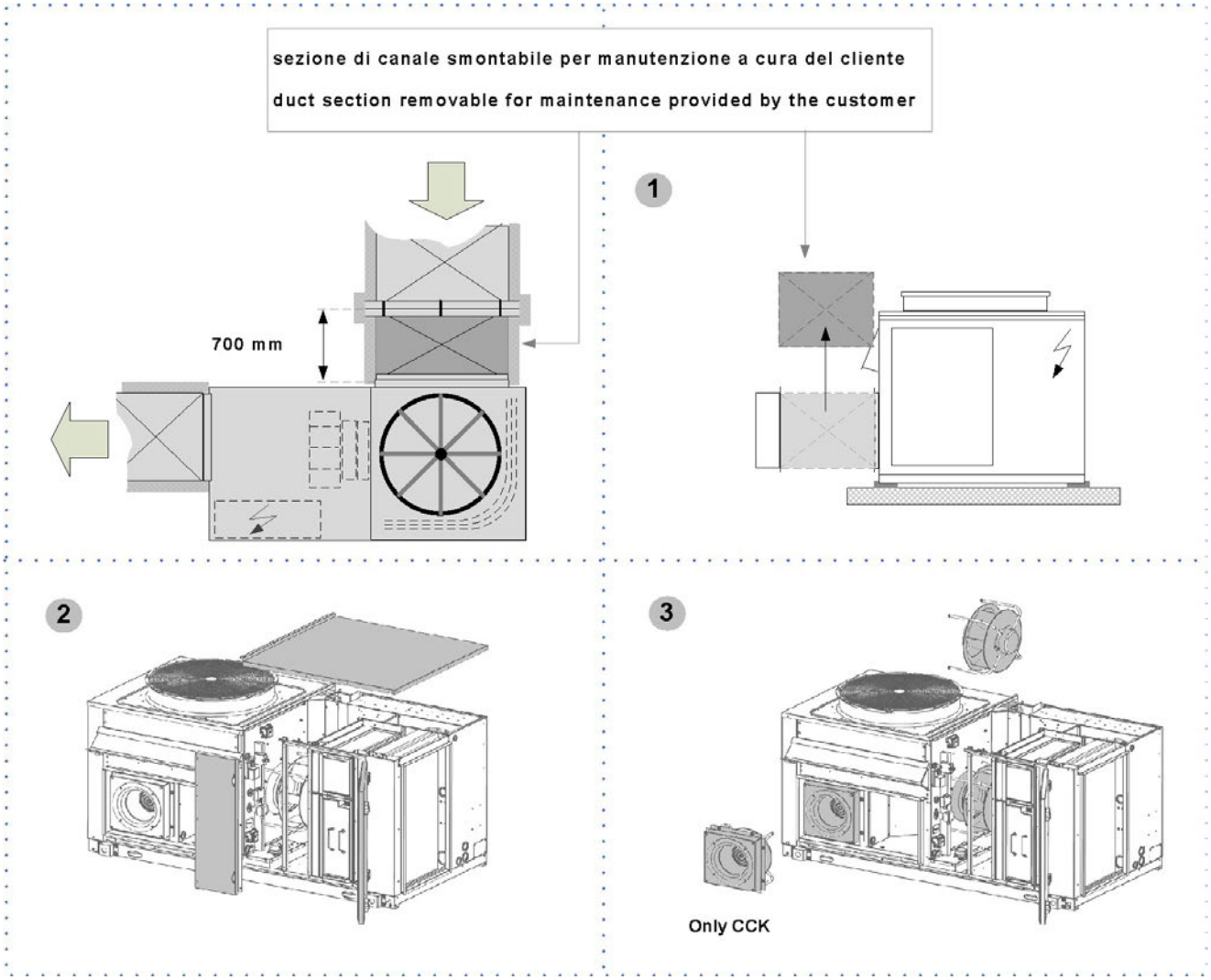
9.15 access to the components

Probes and transducers



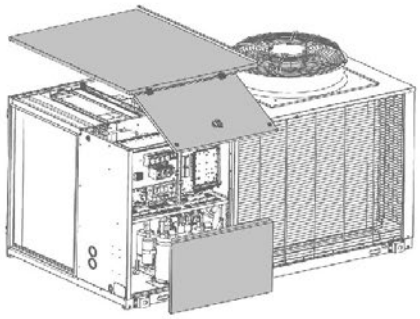
1. Outdoor / return air pressure transducers
2. Outdoor air humidity probe
3. Outdoor air shutter actuator
4. Return humidity probe
5. Return air quality probe
6. Return temperature probe
7. Delivery pressure transducer
8. Filter differential pressure switch

Fans

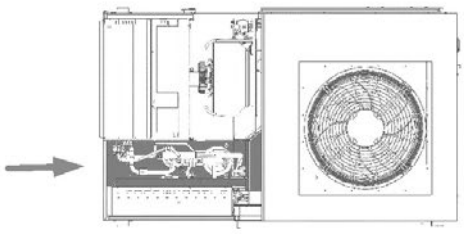

sezione di canale smontabile per manutenzione a cura del cliente
duct section removable for maintenance provided by the customer
700 mm
1
2
3
Only CCK

VALVES
Only value 14.2

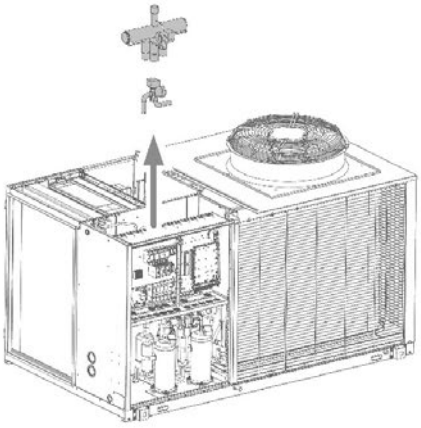
1



2



3



10 Accessories

10.1 Electronic filters

The most common contaminants for which the filter is designed, are: air pollution by PM10, PM 2,5 and PM1

Contaminants that can be filtered:

- dry smokes
- powder (up to 0,3 microns)
- smoke electrostatically charged

Contaminants that can NOT be filtered:

- water vapors also in low concentration
- oil vapors
- large amounts of dust
- metal shavings,iron filing dusts and waste generally
- Gas

Absolutely to avoid:

- metal dusts also fine
- fumes produced by combustion of organic and not materials (wood, coal, gasoline, etc.)

MATERIALS NECESSARY FOR MAINTENANCE

- Plastic or steel tank (750x750x310 mm) with settling bottom
- Acid detergent B01212 (code CLIVET C6460316)
- Protective gloves and goggles
- Graduated jug
- Pump for manual or pneumatic spraying

Do not use aluminum tanks or galvanized

Foresee a stainless steel frame that keeps the filters lifted from the tank base to have a settling bottom for the muds.

The electronic adjustment is integrated in the filter; maintenance can be carried out without removing it.

Remove the pre-filter by lifting it of about 1 cm and remove it as shown in figure.

1. Position the filter to be washed on a support to facilitate work.
2. Prepare a tank with a solution of B01212 detergent and water at 1÷20.
3. Immerse the filter in this solution.
4. Ensure the solution covers the entire filter.
5. A slight chemical reaction is noticed within 2÷3 minutes with the development of foam. Wait 3 or 4 minutes.
6. Rinse the filter with a jet of water or using a low-pressure water jet machine.
7. Leave the electrostatic cells to dry in a hot room or directly in the sun for a few hours. Keep the cells lifted from the ground using two metal or wooden laths.
8. Check the ionisation wires before remounting the filter.

The cleaner can be used to clean about 20 filters.

Can be recovered and placed in plastic containers closed; the air oxidizes the cleaner and reduces its effectiveness.

IONISATION WIRES

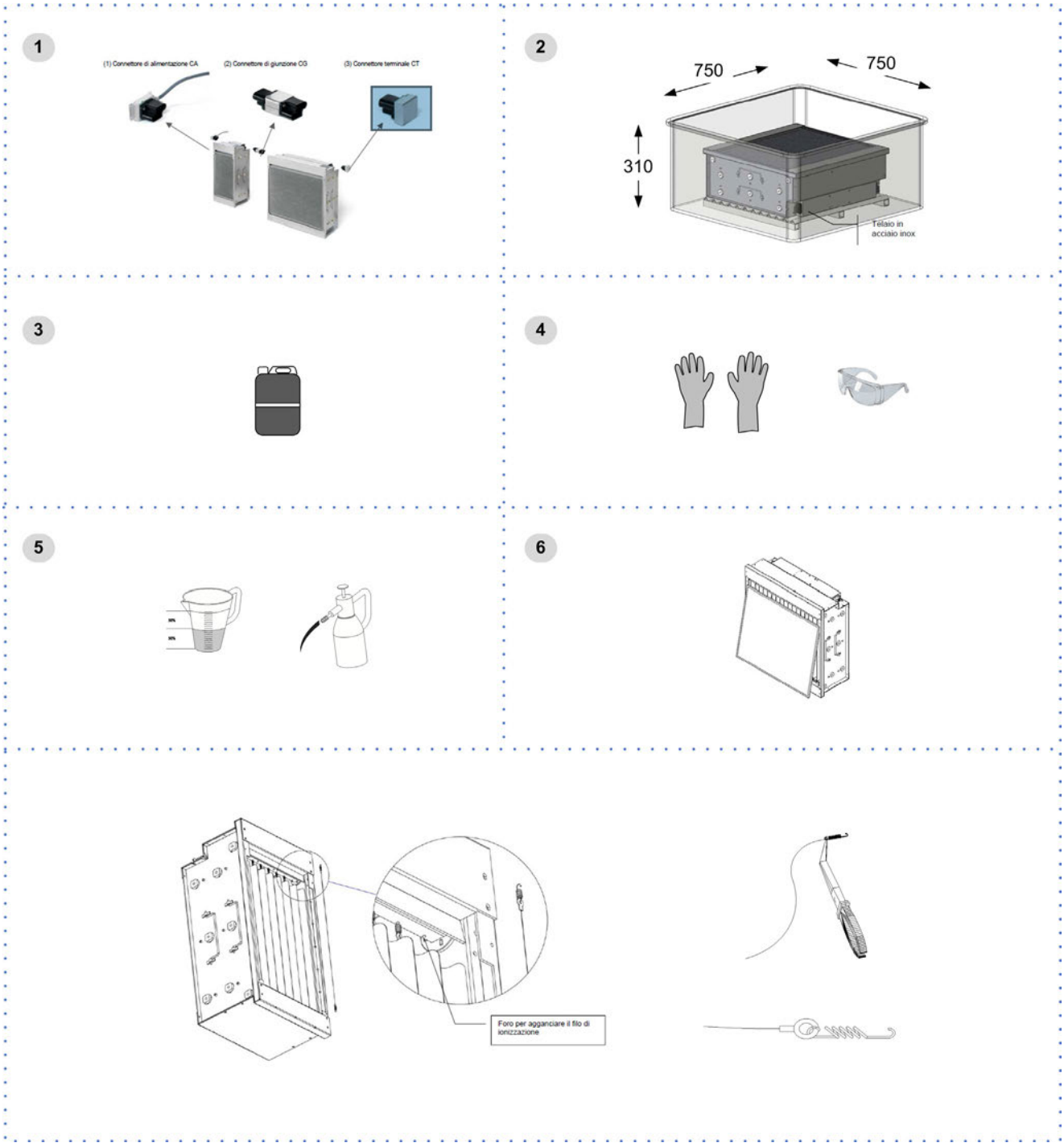
The impurities can determine oxidation or scaling on the wires, which can be removed using a cloth soaked in alcohol or an abrasive scourer with very fine grain.

Due to the high voltage powering them, the ionisation wires are subject to wear.

To foresee a yearly replacement OF ALL WIRES avoids unexpected breaks.

In case of break:

1. remove all wire pieces present in the cell and remove the springs stretching the wire
2. hook the spring to the wire eyelet
3. grip the ionisation wire with curved beaks pliers
4. hook the top of the spring with the open eyelet to the wire stretcher rod of the electrostatic cell
5. keeping the ionisation wire stretched, with the other hand hook it to the other wire stretching rod, always by means of the curved beaks pliers



10.2 F7 Highly efficient filters

The pocket filters are not renewable, once dirty they must be replaced

1. Open the access panel
2. Delicately remove the filter avoiding dirtying the area below
3. Insert the new filters, with the pockets vertically
4. Close the panel
5. Dispose of the old filters sending them to specialised recycling or collection centres (keep to the standards in force)

10.3 Immersed electrode humidifier

SUPPLY WATER

The humidifier must be supplied with mains water having the following features:

- pressure between 0.1 and 0.8 Mpa (1 – 8 bar)
- temperature between 1 and 40°C

Do not use:

- water treated with softeners: it can corrode the electrodes and form foam with possible faults/malfunctionings
- pit, industrial or potentially polluted (chemically or bacteriologically) water
- disinfectants or anti-corrosive substances mixed with water, as potentially irritating

Supplying the humidifier with water treated with reverse osmosis filtering system gives the following advantages:

- reduces limescale deposits
- reduces energy consumptions
- reduces maintenance costs
- increases the humidifier's duration

Check that the filter guarantees a water flow rate higher than the flow rate of the installed humidifier.

DRAINAGE WATER

It can reach a temperature of 100°C

It contains the same substances of the supply water but in higher concentration.

As it is not toxic, it can be disposed of with white waters.

Limit values for the supply water with medium-high conductivity in an immersed electrode humidifier

			min	max
Hydrogen ions	pH		7	8,5
Specific conductivity at 20°C		µS/cm	300	1250
Total dissolved solids	TDS	mg/l	(1)	(1)
Dry residue at 180°C	R_{180}	mg/l	(1)	(1)
Total hardness	TH	mg/l $CaCO_3$	100 (2)	400
Temporary hardness		mg/l $CaCO_3$	60 (3)	300
Iron + Manganese		mg/l Fe+Mn	0	0,2
Chlorides		ppm Cl	0	30
Silica		mg/l SiO_2	0	20
Residual chlorine		mg/l Cl^-	0	0,2
Calcium sulphate		mg/l $CaSO_4$	0	100
Metallic impurities		mg/l	0	0
Solvents, diluents, soaps, lubricants		mg/l	0	0

Limit values for the supply water with medium-low conductivity in an immersed electrode Humidifier

			min	max
Hydrogen ions	pH		7	8,5
Specific conductivity at 20°C		µS/cm	125	500
Total dissolved solids	TDS	mg/l	(1)	(1)
Dry residue at 180°C	R_{180}	mg/l	(1)	(1)
Total hardness	TH	mg/l $CaCO_3$	50 (2)	250
Temporary hardness		mg/l $CaCO_3$	30 (3)	150
Iron + Manganese		mg/l Fe+Mn	0	0,2
Chlorides		ppm Cl	0	20
Silica		mg/l SiO_2	0	20
Residual chlorine		mg/l Cl^-	0	0,2
Calcium sulphate		mg/l $CaSO_4$	0	60
Metallic impurities		mg/l	0	0
Solvents, diluents, soaps, lubricants		mg/l	0	0

(*) Values depending on specific conductivity; in general: TDS ≅ 0.93 * σ_{20}, R_{180} ≅ 0.65 * σ_{20}
(*) not lower than 200% of the chloride content in mg/l of Cl^-
(*) not lower than 300% of the chloride content in mg/l of Cl^-

Periodical checks

Do not use solvents or detergents to clean the plastic components.

For descaling use a vinegar or acetic acid solution at 20%, subsequently rinsing with water.

15 days	Cylinder: not over 300 hours of work checking operation, general state, no leaks
90 days	Cylinder: not over 1000 hours of work checking operation, general state, no leaks, any replacement
1 year	Cylinder: not over 2500 hours of work (disposable cylinders) Load solenoid valve replacement: disconnect electric power supply, dismantle valve, clean the filter Drain solenoid valve: disconnect electric power supply, remove reel and dismantle valve body and any impurity and rinse The power supply bowl, piping: check they are free and without impurities
5 years	Cylinder: not over 10000 hours of work (inspectional cylinders) replacement

Humidifier cylinder drainage

Cylinder must be drained in these situations:

- cleaning of the cylinder
- emptying of the cylinder to avoid ice forming
- replacement of the cylinder

The manual drainage is carried out by means of selector SA7: see ELECTRIC CONNECTIONS chapter.

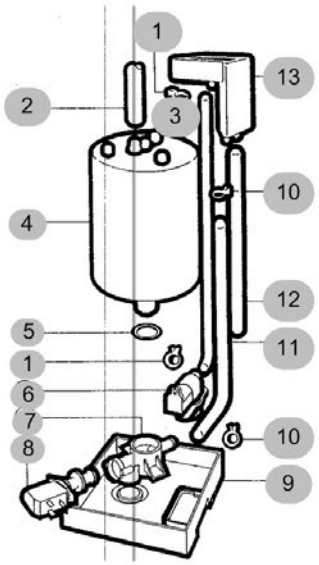
Replacement of the cylinder

To remove the cylinder:

- completely drain the water
- interrupt power supply voltage of humidifier by means of the unit isolator
- remove the vapour pipe from the cylinder
- disconnect the electric connections of the electrodes and remove the pins from the high level electrodes
- loosen the ring nut to remove the pipe unions and the filter (when filter is outside the cylinder)
- lift the cylinder to remove it

Before mounting it:

- the filter body does not require replacing, wash it with water and remount it on the new cylinder, using the new gasket provided with the latter
- check the seal gasket between the cylinder and the drain unit
- remount the cylinder repeating the operations in reverse order



10.4 Modulating condensation gas heating module

System maintenance booklet

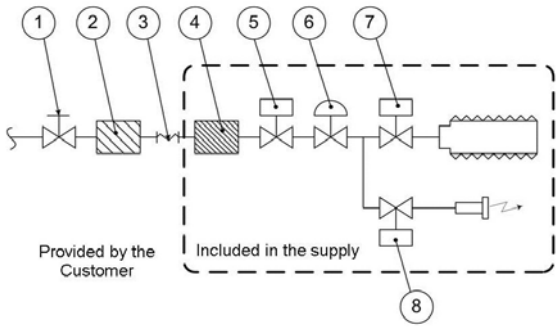
- It must be kept in the place of installation of the unit
- It must be filled-in upon commissioning
- It must be updated with the results of the periodical checks, of the routine and extraordinary maintenance interventions.

Gas connection

- Read the gas heating module manual.
- Connection must be carried out by qualified personnel.
- use certified components and comply with the local standards in force
- install on the gas connection: tap, large section filter and anti-vibration joint
- check the supply pressure is correct and stable, in particular where more uses are inserted on the same line.

The heating module includes:

- hot air generator with condensation and integrated modulating adjustment, powered with methane gas
- kit for transformation of power with liquefied petroleum gas (LPG)
- kit of steel chimney for exhaust fumes
- All the control and safety devices



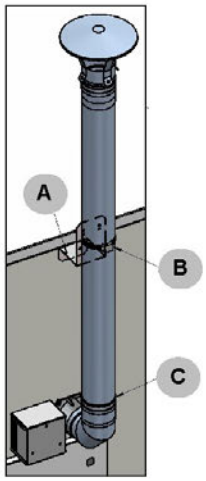
1. GAS COCK
2. GAS FILTER (LARGE SECTION)
3. ANTI-VIBRATION JOINT
4. GAS FILTER (SMALL SECTION)
5. SAFET GAS SOLENOID VLAVE
6. PRESSURE STABILISER
7. MAIN GAS BURNER SOLENOID VALVE
8. PILOT BURNER GAS SOLENOID VALVE

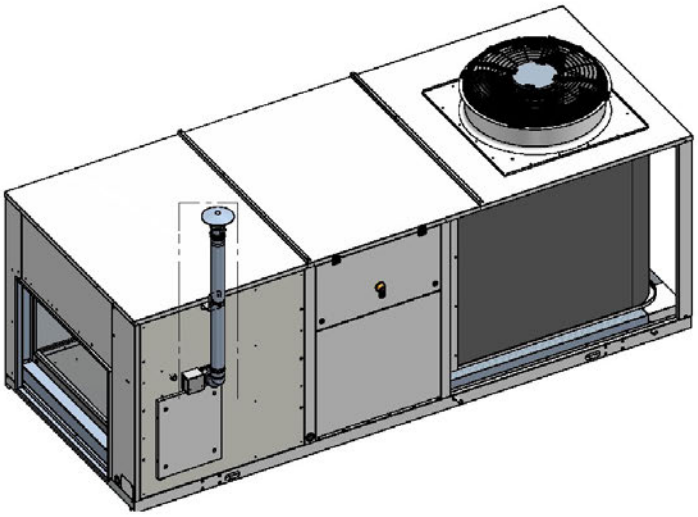
		35kW		44kW		65kW		82kW	
Classe di NOx	Val	5							
		min	max	min	max	min	max	min	max
Potenza termica nominale	kW	7.60	34.85	8.50	42.00	12.40	65.00	16.40	82.00
Rendimento Hi (P.C.I.)	%	106.97	96.30	105.88	96.19	108.06	96.82	108.35	97.60
Rendimento Hs (P.C.S.)	%	96.37	86.76	95.39	86.66	97.36	87.22	97.62	87.93
Max condensa prodotta	l/h	0.9		1.1		2.1		3.3	
Monossido di carbonio CO (0% di O_2)	ppm	<5		<5		<5		<5	
Ossidi di azoto - NOx (0% di O_2)		41 mg / k Wh 23 ppm		35 mg / k Wh 20 ppm		40 mg / k Wh 23 ppm		34 mg / k Wh 19 ppm	
Pressione disponibile al camino	Pa	90		100		120		120	
Diametro attacco gas	GAS	UNI ISO 7/1-3/4"		UNI ISO 7/1-3/4"		UNI ISO 7/1-3/4"		UNI ISO 7/1-1"	
Diametro tubi scarico	mm	80		80		80		80	

Flue stack assembly

A. Fissare con viti la staffa di sostegno del camino al pannello frontale del Modulo Gas
B. Fissare tramite fascetta le allunghe alla staffa di sostegno del camino
C. Fissare i componenti del camino (curve, allunghe e terminali) tramite le relative guarnizioni

A. Screw the chimney support bracket to the front panel of the Gas Module with screws
B. Fix the extensions to the support bracket of the chimney using a clamp
C. Fix the components of the chimney (curves, extensions and terminals) through the relative gaskets

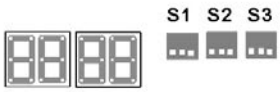




Gas burner NOT work with heat pump

Gas burner CAN work with heat pump

Main board: DIP SWITCH



10.5 Gas heating module with 2-stage control

System maintenance booklet

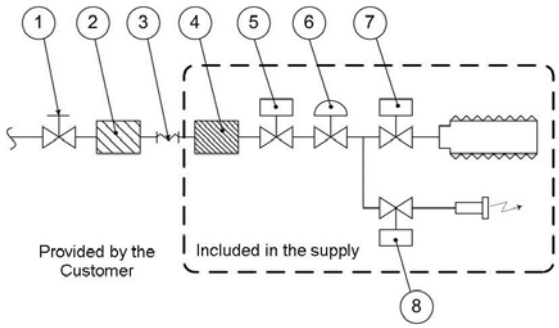
- It must be kept in the place of installation of the unit
- It must be filled-in upon commissioning
- It must be updated with the results of the periodical checks, of the routine and extraordinary maintenance interventions.

Gas connection

- Read the gas heating module manual.
- Connection must be carried out by qualified personnel.
- use certified components and comply with the local standards in force
- install on the gas connection: tap, large section filter and anti-vibration joint
- check the supply pressure is correct and stable, in particular where more uses are inserted on the same line.

The heating module includes:

- hot air generator with condensation and integrated modulating adjustment, power with methane gas
- kit for transformation of power with liquefied petroleum gas (LPG)
- kit of steel chimney for exhaust fumes
- All the control and safety devices



1. GAS COCK
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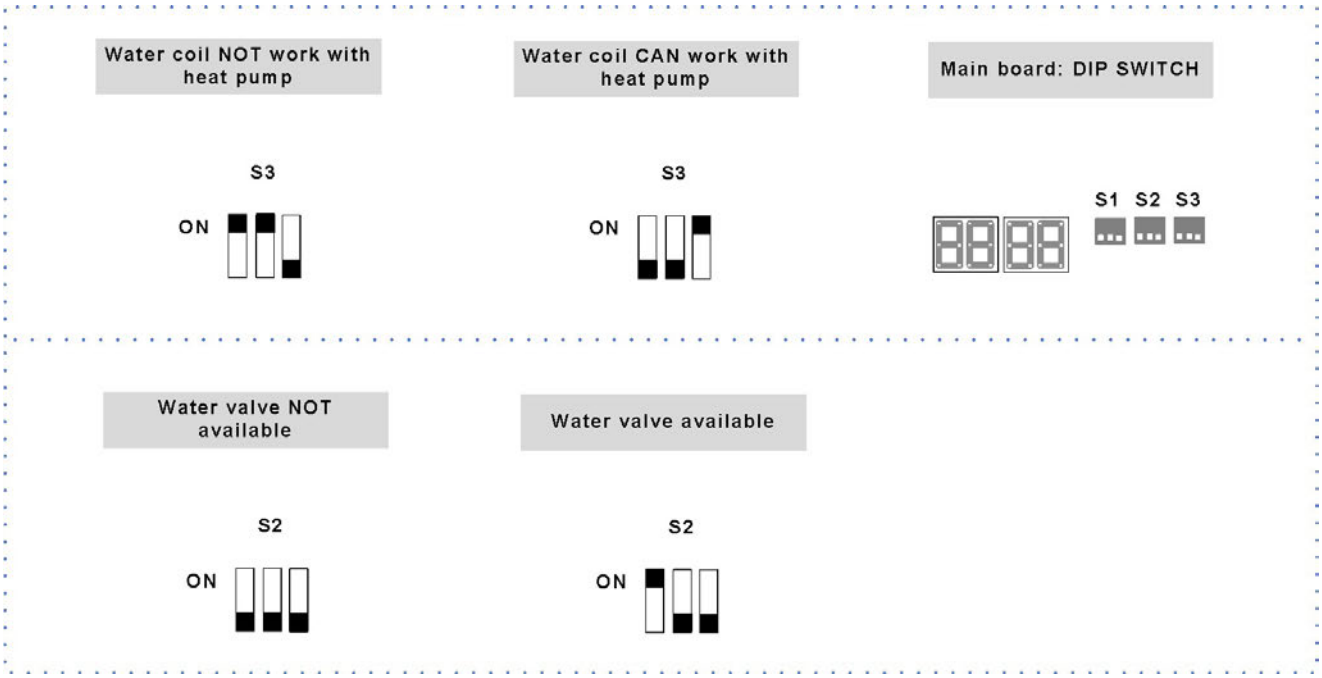
4. GAS FILTER (SMALL SECTION)
5. SAFET GAS SOLENOID VLAVE
6. PRESSURE STABILISER
7. MAIN GAS BURNER SOLENOID VALVE
8. PILOT BURNER GAS SOLENOID VALVE

			35kW		44kW		53kW		74kW		100kW	
Classe di NOx		Val	5									
			min	max	min	max	min	max	min	max	min	max
Potenza termica nominale		kW	27,5	34,8	35,5	44,0	42,4	52,2	60,0	73,5	81,8	100,0
Rendimento Hi (P.C.I.)		%	93,7	91,8	93,2	91,3	93,2	91,3	93,7	91,8	93,9	92,3
Rendimento Hs (P.C.S.)		%	84,3	82,6	83,8	82,2	84,7	83,0	84,3	82,6	84,5	83,1
Pressione disponibile al camino		Pa	120		120		130		140		140	
Diametro attacco gas		GAS	UNI ISO 228/1-G 3/4"		UNI ISO 228/1-G 3/4"		UNI ISO 228/1-G 3/4"		UNI ISO 228/1-G 3/4"		UNI ISO 228/1-G 3/4"	
Diametro tubi scarico		mm	80		80		80		80		80	

10.6 Hot water coil



11 Decommissioning

11.1 Disconnecting

Only authorised personnel must disconnect the unit.

Avoid leak or spills into the environment.

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

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

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

11.2 Dismantling and disposal

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

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

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

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

11.3 Directive EC RAEE

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.

12 Residual risks

General description
In this section the most common situations are indicated,as these cannot be controlled by the manufacturer and could be a source of risk situations for people or things.
Danger zone
This is an area in which only an authorised operator may work.
The danger zone is the area inside the unit which is accessible only with the deliberate removal of protections or parts thereof.
Handling
The handling operations, if implemented without all of the protection necesssary and without due caution, may cause the drop or the tipping of the unit with the consequent damage, even serious, to persons, things or the unit itself.
Handle the unit following the instructions provided in the present manual regarding the packaging and in compliance with the local regulations in force.
Should the refrigerant leak please refer to the refrigerant "Safety sheet".
Installation
The incorrect installation of the unit could cause water leaks, condensate accumulation, leaking of the refrigerant, electric shock, poor operation or damage to the unit itself.
Check that the installation has been implemented by qualified technical personnel only and that the instructions contained in the present manual and the local regulations in force have been adhered to.
The installation of the unit in a place where even infrequent leaks of inflammable gas and the accumulation of this gas in the area surrounding the area occur could cause explosions or fires.
Carefully check the positioning of the unit.
The installation of the unit in a place unsuited to support its weight and/or guarantee adequate anchorage may result in consequent damage to things, people or the unit itself.
Carefully check the positioning and the anchoring of the unit.
Easy access to the unit by children, unauthorised persons or animals may be the source of accidents, some serious.
Install the unit in areas which are only accessible to authorised person and/or provide protection against intrusion into the danger zone.
General risks
Smell of burning, smoke or other signals of serious anomalies may indicate a situation which could cause damage to people, things or the unit itself.
Electrically isolate the unit (yellow-red isolator).
Contact the authorised service centre to identify and resolve the problem at the source of the anomaly.
Accidental contact with exchange batteries, compressors, air delivery tubes or other components may cause injuries and/or burns.
Always wear suitable clothing including protective gloves to work inside the danger zone.
Maintenance and repair operations carried out by non-qualified personnel may cause damage to persons, things or the unit itself.
Always contact the qualified assistance centre.
Failing to close the unit panels or failure to check the correct tightening of all of the panelling fixing screws may cause damage to persons, things or the unit itself.
Periodically check that all of the panels are correctly closed and fixed.
If there is a fire the temperature of the refrigerant could reach values that increase the pressure to beyond the safety valve with the consequent possible projection of the refrigerant itself or explosion of the circuit parts that remain isolated by the closure of the tap.
Do not remain in the vicinity of the safety valve and never leave the refrigerating system taps closed.

Electric parts
An incomplete attachment line to the electric network or with incorrectly sized cables and/or unsuitable protective devices can cause electric shocks, intoxication, damage to the unit or fires.
Carry out all of the work on the electric system referring to the electric layout and the present manual ensuring the use of a system thereto dedicated.
An incorrect fixing of the electric components cover may lead to the entry of dust, water etc inside and may consequently electric shocks, damage to the unit or fires.
Always fix the unit cover properly.
When the metallic mass of the unit is under voltage and is not correctly connected to the earthing system it may be as source of electric shock and electrocution.
Always pay particular attention to the implementation of the earthing system connections.
Contact with parts under voltage accessible inside the unit after the removal of the guards can cause electric shocks, burns and electrocution.
Open and padlock the general isolator prior to removing the guards and signal work in progress with the appropriate sign.
Contact with parts that could be under voltage due to the start up of the unit may cause electric shocks, burns and electrocution.
When voltage is necessary for the circuit open the isolator on the attachment line of the unit itself, padlock it and display the appropriate warning sign.
Moving parts
Contact with the transmissions or with the fan aspiration can cause injuries.
Prior to entering the inside of the unit open the isolater situated on the connection line of the unit itself, padlock and display the appropriate warning sign.
Contact with the fans can cause injury.
Prior to removing the protective grill or the fans, open the isolator on the attachment line of the unit itself, padlock it and display the appropriate warning sign.
Refrigerant
The intervention of the safety valve and the consequent expulsion of the gas refrigerant may cause injuries and intoxication.
Always wear suitable clothing including protective gloves and eyeglasses for operations inside the danger zone.
Should the refrigerant leak please refer to the refrigerant "Safety sheet".
Contact between open flames or heat sources with the refrigerant or the heating of the gas circuit under pressure (e.g. during welding operations) may cause explosions or fires.
Do not place any heat source inside the danger zone.
The maintenance or repair interventions which include welding must be carried out with the system off.
Hydraulic parts
Defects in tubing, the attachments or the removal parts may cause a leak or water projection with the consequent damages to people, things or shortcircuit the unit.

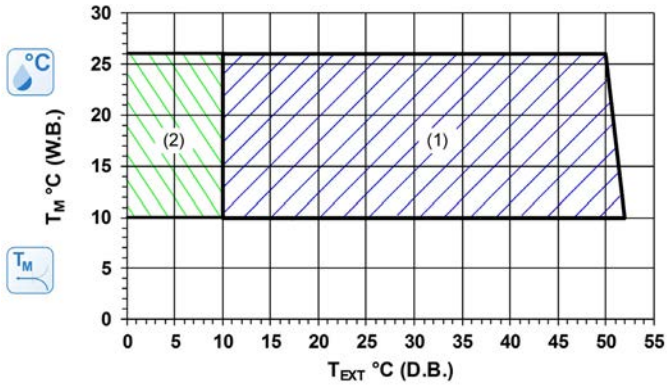
General technical data

Size			7.1	10.1	14.2
Cooling					
Cooling capacity	1	kW	20,6	30,4	45,7
Sensible capacity	1	kW	16,5	24,6	35,9
Compressor power input	1	kW	5,27	8,28	11,5
EER	1		3,91	3,67	3,97
Heating					
Heating capacity	2	kW	20,9	29,8	43,8
Compressor power input	2	kW	5,08	7,24	9,89
COP	2		4,11	4,12	4,43
Compressor					
Type of compressors	3		Rot	Scroll	Rot
No. of compressors		Nr	1	1	2
Std Capacity control steps		Nr	20-100%	20-100%	20-100%
Refrigerant charge (C1)	4	kg	7,0	10,0	13,0
Refrigeration circuits		Nr	1	1	1
Air Handling Section Fans (Supply)					
Type of supply fan	5		RAD	RAD	RAD
Number of supply fans		Nr	1	1	1
Fan diameter		mm	450	500	560
Type of motor	6		EC Brushless	EC Brushless	EC Brushless
Supply airflow		l/s	1111	1667	2500
Supply airflow		m^3/h	4000	6000	9000
Installed unit power		kW	1,0	2,6	2,9
Max. static pressure supply fan	7	Pa	380	680	510
Fans (Exhaust)					
Type of exhaust fan	5		RAD	RAD	RAD
Number of exhaust fans	8	Nr	1	1	1
Fan diameter	8	mm	355	355	450
Type of motor	6		EC Brushless	EC Brushless	EC Brushless
Installed unit power	8	kW	0,9	0,9	1,0
External Section Fans					
Type of fans	9		AX	AX	AX
Number of fans		Nr	1	1	1
Fan diameter		mm	750	750	780
Fan RPM	6		EC Brushless	EC Brushless	EC Brushless
Standard airflow		l/s	2361	3500	5833
Installed unit power		kW	0,65	0,75	1,5
Connessioni					
Scarico condensa		mm	20	20	20
Power supply					
Standard power supply		V	400/3/50+N	400/3/50+N	400/3/50+N

Performance data are referred to operation with 30% of fresh air intake and same amount of air exhaust. (configuration CCK)

1. Ambient air at 27°C/19°C W.B.. external exchanger entering air temperature 35°C. EER referred only to compressors
2. Ambient air 20°C D.B. Outdoor air 7°C D.B./6°C W.B.. COP referred only to compressors
3. ROT = compressore rotativo; SCROLL = scroll compressor
4. Indicative values for standard units with possible +/-10% variation. The actual data are indicated on the label of the unit
5. RAD = radial fan
6. EC Electronic switching motor
7. Net outside static pressure to win the outlet and intake onboard pressure drops
8. Configuration for fresh air supply with exhaust and extraction
9. AX = axial fan

Operating range (Cooling)



The limits are meant as an indication and they have been calculated by considering:
- general and non specific sizes,
- standard airflow,
- non-critical positioning of the unit and correct operating and maintenance of the unit,
- operating at full load

To verify the operation field of the operating units with percentages of external air, always calculate the Tm mixing temperature at the internal heat exchanger input.

TM = INTERNAL EXCHANGER ENTERING AIR TEMPERATURE
temperature measured with wet bulb (W.B.=WET BULB)

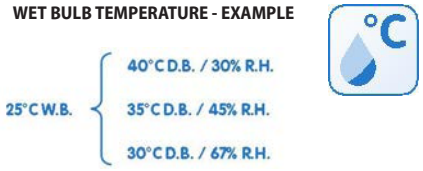
TEXT = INLET AIR TEMPERATURE IN THE EXTERNAL EXCHANGER
dry bulb measured temperature (D.B.=DRY BULB)

Within the operating range, the unit can operate at a part load to maximaze the energy efficiency

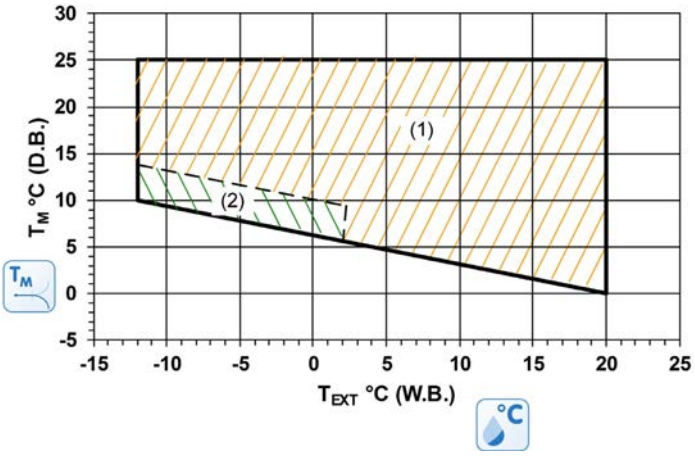
1.Standard operating range

2. Operation field of the unit in FREE-COOLING mode

WET BULB TEMPERATURE - EXAMPLE



Operating range (Heating)



The limits are meant as an indication and they have been calculated by considering:
- general and non specific sizes,
- standard airflow,
- non-critical positioning of the unit and correct operating and maintenance of the unit,
- operating at full load

To verify the operation field of the operating units with percentages of external air, always calculate the Tm mixing temperature at the internal heat exchanger input.

TM = INTERNAL EXCHANGER ENTERING AIR TEMPERATURE
temperature measured with wet bulb (W.B.=WET BULB)

TEXT = INLET AIR TEMPERATURE IN THE EXTERNAL EXCHANGER
dry bulb measured temperature (D.B.=DRY BULB)
Within the operating range, the unit can operate at a part load to maximaze the energy efficiency

1. Standard operating range
2. Range in which the unit operation is allowed only for a limited period (max 1 hour)

In extended operating mode, in heat pump operation with an outdoor air temperature of less than 6°C, the unit performs defrosts by reversing the cycle, so as to eliminate the ice that forms on the surfaces of the outside exchanger; in addition, in the event of negative temperatures, the water resulting from the defrosts must be drained so as to avoid the accumulation of ice near the base of the unit. Make sure that this does not constitute a danger for people or things.

With an outdoor air temperature between –10°c and –20°c install the following options:
- 2 rows hot water coil
- Combustion module
- Electrical panel anti-freeze protection

Sound levels

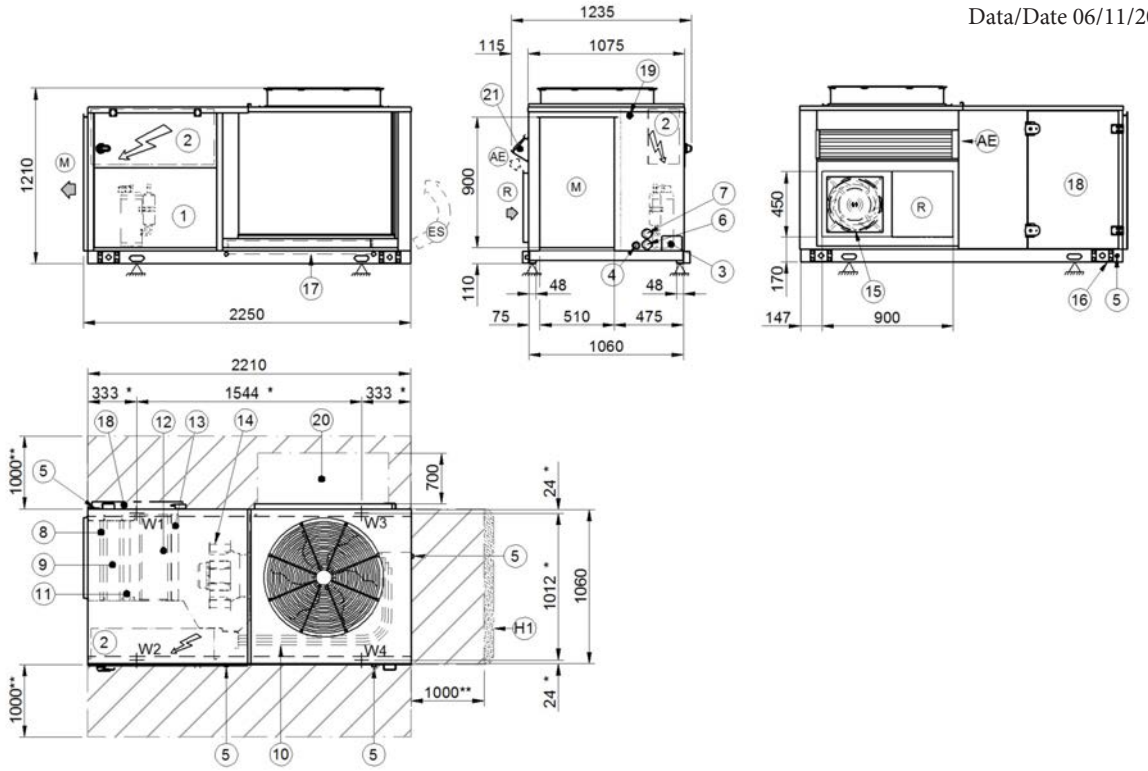
Size	Sound power level (dB)								Sound power level	Sound pressure level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
7.1	69	73	76	77	77	75	70	74	82	65
10.1	77	75	77	79	79	77	71	75	84	66
14.2	73	78	79	82	81	79	74	78	86	68

The sound levels are referred to unit operating at full load in nominal conditions. The sound pressure level is referred at a distance of 1 m. from the ducted unit surface operating in free field conditions. External static pressure 50 Pa. (standard UNI EN ISO 9614-2)
Measures are according to UNI EN ISO 9614-2 regulations, with respect to the EUROVENT 8/1 certication, which provides for a tolerance of 3 dB(A) on the sound power level, which is the only acoustic data to be considered binding. If unit is set without Axitop, the sound power level presents an increase up to 3 dB(A).
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.

Dimensional drawings

Size 7.1 - Version CAK/CBK/CCK

DAA6K0001_7.1_0_REV00
Data/Date 06/11/2017



1. Compressor compartment
2. Electrical panel
3. Power input
4. Humidifier connections
5. Condensate drain
6. H2O heating coil output Φ 3/4"
7. H2O heating coil input Φ 3/4"
8. Re-heating coil (optional)
9. Internal exchanger
10. External exchanger
11. H2O heating coil (optional) or heating elements (optional)
12. Electrostatic filters or F7 (optional)
13. G4 air filters (standard)
14. Electric fan (supply-return)
15. Exhaust electric fan (version CCK only)
16. Lifting brackets (removable)
17. Over pressure damper exhaust (version CCK only)
18. Access for inspection coil, filters, hesting elements
19. Access for inspection of the bleed valve (hot water coil)
20. Duct section removable for maintenance provided by the customer
21. Fresh air intake cap (only version CBK-CCK)

(R) Air return
(M) Air supply
(AE) Fresh air intake
(ES) Air exhaust (only version CCK)
(H1) Wall with same height as unit on a maximun of three side
(**) Minimun suggested clearance
(*) Vibration mounts position

Weight distribution of full re-circulation (CAK) / Recirculation and renewal air (CBK) configuration

Size		7.1
W1 Supporting Point	kg	98
W2 Supporting Point	kg	122
W3 Supporting Point	kg	96
W4 Supporting Point	kg	100
Shipping weight	kg	452

Weight distribution of full re-circulation, renewal air and exhaust (CCK) configuration

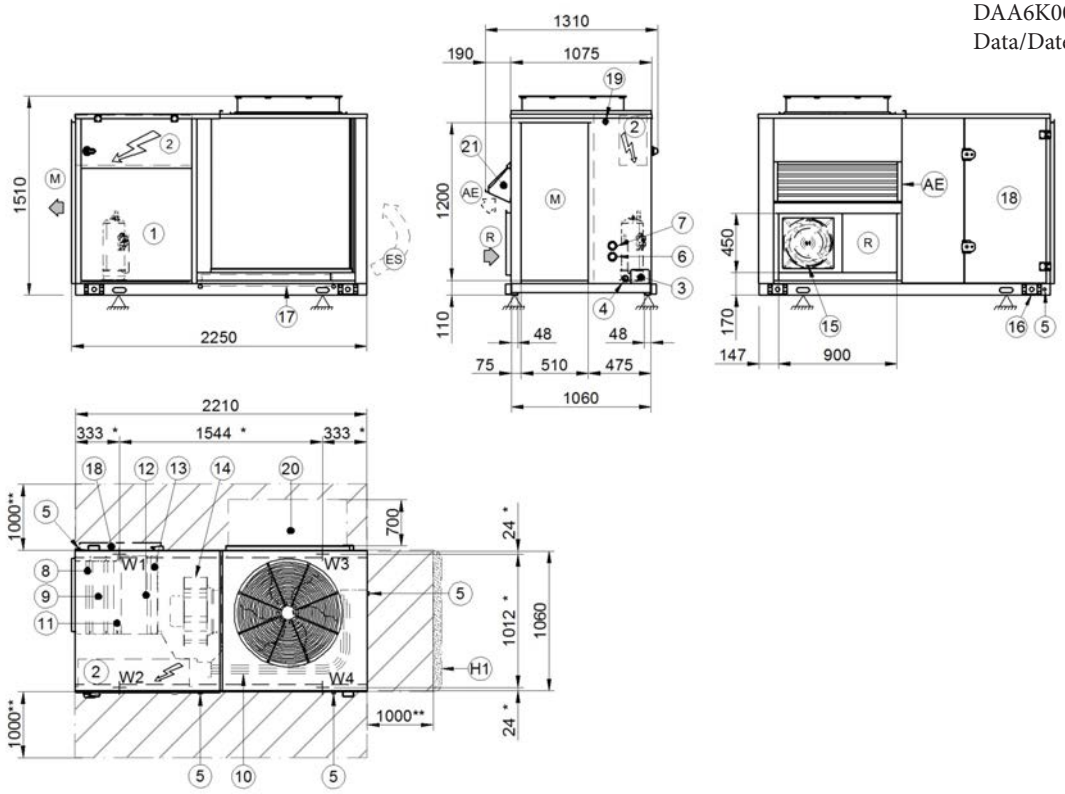
Size		7.1
W1 Supporting Point	kg	102
W2 Supporting Point	kg	126
W3 Supporting Point	kg	101
W4 Supporting Point	kg	105
Shipping weight	kg	470

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

Dimensional drawings

Size 10.1 - Version CAK/CBK/CCK

DAA6K0002_10.1_0_REV00
Data/Date 06/11/2017



1. Compressor compartment
2. Electrical panel
3. Power input
4. Humidifier connections
5. Condensate drain
6. H2O heating coil outpu Φ 1″
7. H2O heating coil input Φ 1″
8. Re-heating coil (optional)
9. Internal exchanger
10. External exchanger
11. H2O heating coil (optional) or heating elements (optional)
12. Electrostatic filters or F7 (optional)
13. G4 air filters (standard)
14. Electric fan (supply-return)
15. Exhaust electric fan (version CCK only)
16. Lifting brackets (removable)
17. Over pressure damper exhaust (version CCK only)
18. Access for inspection coil, filters, hesting elements
19. Access for inspection of the bleed valve (hot water coil)
20. Duct section removable for maintenance provided by the customer
21. Fresh air intake cap (only version CBK-CCK)

(R) Air return
(M) Air supply
(AE) Fresh air intake
(ES) Air exhaust (only version CCK)
(H1) Wall with same height as unit on a maximun of three side
(**) Minimun suggested clearance
(*) Vibration mounts position

Weight distribution of full re-circulation (CAK) / Recirculation and renewal air (CBK) configuration

Size		10.1
W1 Supporting Point	kg	132
W2 Supporting Point	kg	107
W3 Supporting Point	kg	131
W4 Supporting Point	kg	126
Shipping weight	kg	532

Weight distribution of full re-circulation, renewal air and exhaust (CCK) configuration

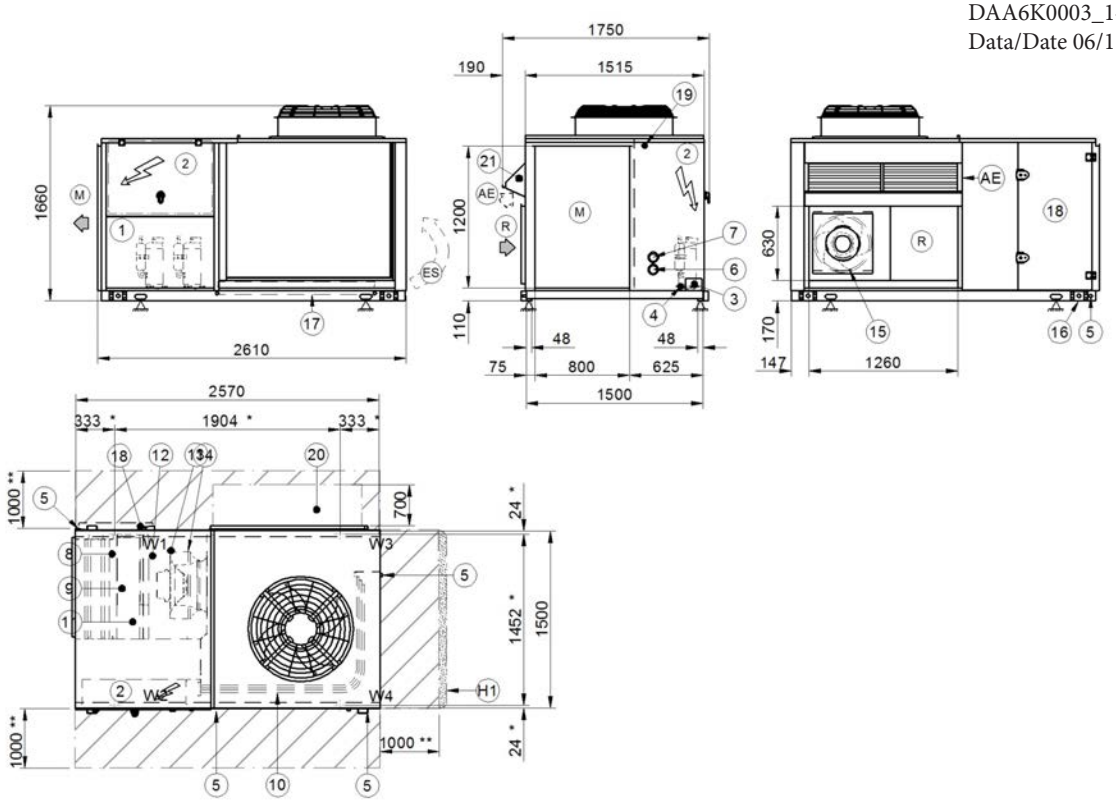
Size		10.1
W1 Supporting Point	kg	138
W2 Supporting Point	kg	113
W3 Supporting Point	kg	137
W4 Supporting Point	kg	132
Shipping weight	kg	556

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

Dimensional drawings

Size 14.2 - Version CAK/CBK/CCK

DAA6K0003_14.2_0_REV00
Data/Date 06/11/2017



1. Compressor compartment
2. Electrical panel
3. Power input
4. Humidifier connections
5. Condensate drain
6. H2O heating coil outpuΦ 1″ 1/4
7. H2O heating coil input Φ 1″ 1/4
8. Re-heating coil (optional)
9. Internal exchanger
10. External exchanger
11. H2O heating coil (optional) or heating elements (optional)
12. Electrostatic filters or F7 (optional)
13. G4 air filters (standard)
14. Electric fan (supply-return)
15. Exhaust electric fan (version CCK only)
16. Lifting brackets (removable)
17. Over pressure damper exhaust (version CCK only)
18. Access for inspection coil, filters, hesting elements
19. Access for inspection of the bleed valve (hot water coil)
20. Duct section removable for maintenance provided by the customer
21. Fresh air intake cap (only version CBK-CCK)

(R) Air return
(M) Air supply
(AE) Fresh air intake
(ES) Air exhaust (only version CCK)
(H1) Wall with same height as unit on a maximun of three side
(**) Minimun suggested clearance
(*) Vibration mounts position

Weight distribution of full re-circulation (CAK) / Recirculation and renewal air (CBK) configuration

Size		14.2
W1 Supporting Point	kg	175
W2 Supporting Point	kg	127
W3 Supporting Point	kg	171
W4 Supporting Point	kg	162
Shipping weight	kg	685

Weight distribution of full re-circulation, renewal air and exhaust (CCK) configuration

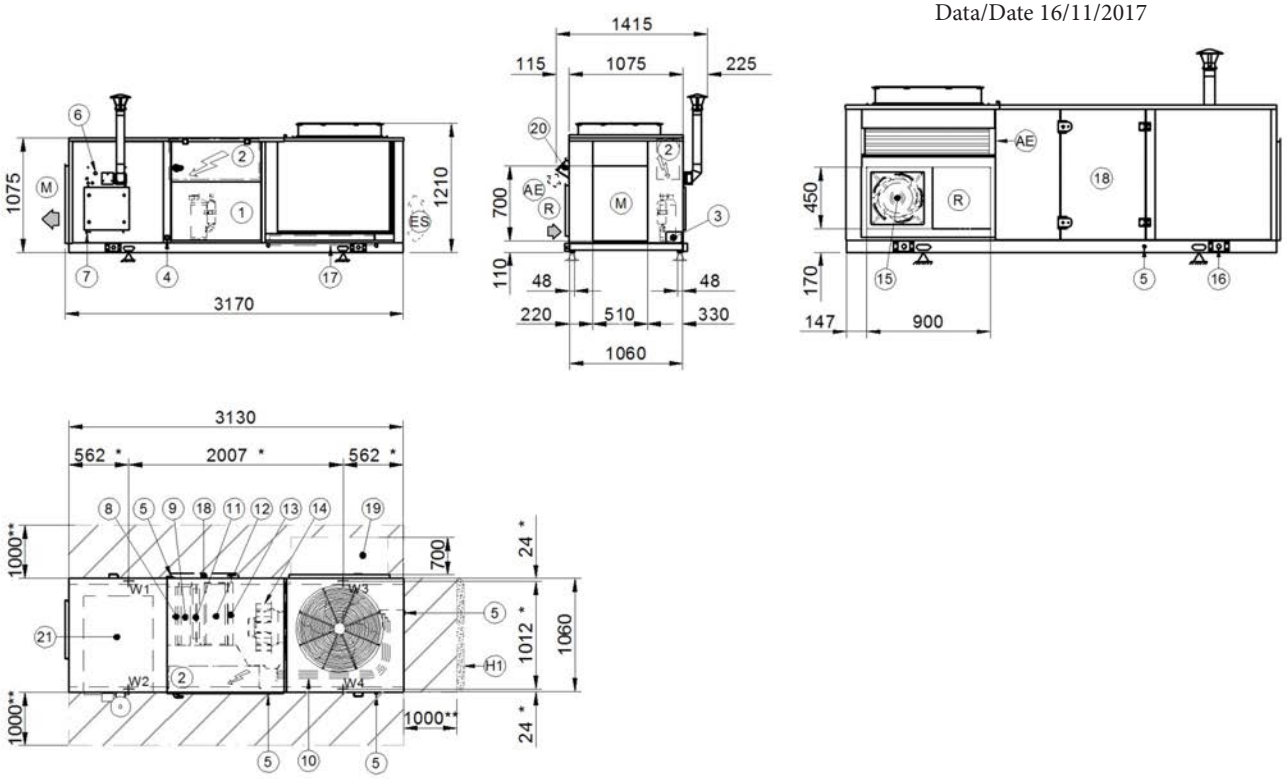
Size		14.2
W1 Supporting Point	kg	183
W2 Supporting Point	kg	137
W3 Supporting Point	kg	180
W4 Supporting Point	kg	170
Shipping weight	kg	720

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

Dimensional drawings

Size 7.1 - Version CAK/CBK/CCK - Gas heating module 35/53 kW

DAA6K0004_7.1_GC01_GD13_0 REV00
Data/Date 16/11/2017



1. Compressor compartment
2. Electrical panel
3. Power input
4. Humidifier connections
5. Condensate drain
6. Gas connection
7. Condensate drain (only for condensation gas heating module)
8. Re-heating coil (optional)
9. Internal exchanger
10. External exchanger
11. Resistenze elettriche (optional)
12. Electrostatic filters or F7 (optional)
13. G4 air filters (standard)
14. Electric fan (supply-return)
15. Exhaust electric fan (version CCK only)
16. Lifting brackets (removable)
17. Over pressure damper exhaust (version CCK only)
18. Access for inspection coil, filters, hesting elements
19. Duct section removable for maintenance provided by the customer
20. Fresh air intake cap (only version CBK-CCK)
21. Gas module

(R) Air return
(M) Air supply
(AE) Fresh air intake
(ES) Air exhaust (only version CCK)
(H1) Wall with same height as unit on a maximun of three side
(**) Minimun suggested clearance
(*) Vibration mounts position

Weight distribution of full re-circulation (CAK) / Recirculation and renewal air (CBK) configuration

Size		7.1
W1 Supporting Point	kg	136
W2 Supporting Point	kg	167
W3 Supporting Point	kg	141
W4 Supporting Point	kg	145
Shipping weight	kg	625

Weight distribution of full re-circulation, renewal air and exhaust (CCK) configuration

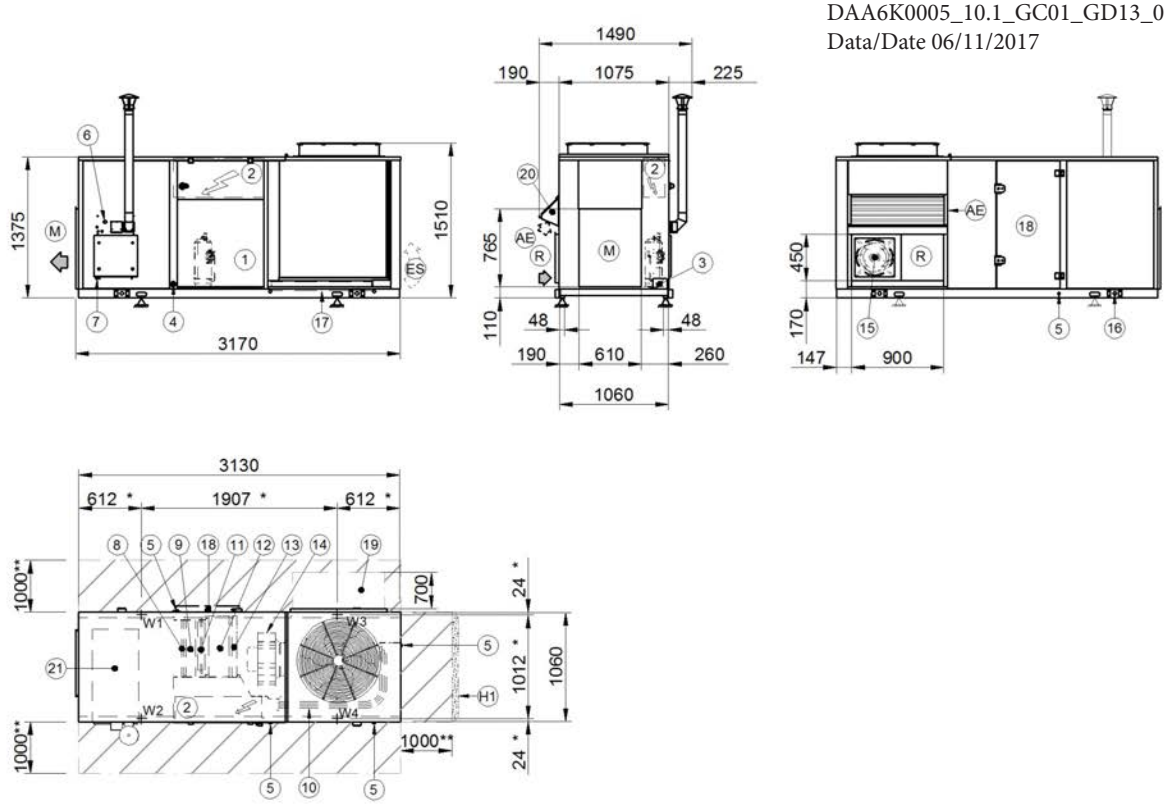
Size		7.1
W1 Supporting Point	kg	140
W2 Supporting Point	kg	172
W3 Supporting Point	kg	145
W4 Supporting Point	kg	150
Shipping weight	kg	643

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

Dimensional drawings

Size 10.1 - Version CAK/CBK/CCK - Gas heating module 35/53 kW

DAA6K0005_10.1_GC01_GD13_0 REV00
Data/Date 06/11/2017



1. Compressor compartment
2. Electrical panel
3. Power input
4. Humidifier connections
5. Condensate drain
6. Gas connection
7. Condensate drain (only for condensation gas heating module)
8. Re-heating coil (optional)
9. Internal exchanger
10. External exchanger
11. Resistenze elettriche (optional)
12. Electrostatic filters or F7 (optional)
13. G4 air filters (standard)
14. Electric fan (supply-return)
15. Exhaust electric fan (version CCK only)
16. Lifting brackets (removable)
17. Over pressure damper exhaust (version CCK only)
18. Access for inspection coil, filters, hesting elements
19. Duct section removable for maintenance provided by the customer
20. Fresh air intake cap (only version CBK-CCK)
21. Gas module

(R) Air return
(M) Air supply
(AE) Fresh air intake
(ES) Air exhaust (only version CCK)
(H1) Wall with same height as unit on a maximun of three side
(**) Minimun suggested clearance
(*) Vibration mounts position

Weight distribution of full re-circulation (CAK) / Recirculation and renewal air (CBK) configuration

Size		10.1
W1 Supporting Point	kg	180
W2 Supporting Point	kg	148
W3 Supporting Point	kg	173
W4 Supporting Point	kg	168
Shipping weight	kg	705

Weight distribution of full re-circulation, renewal air and exhaust (CCK) configuration

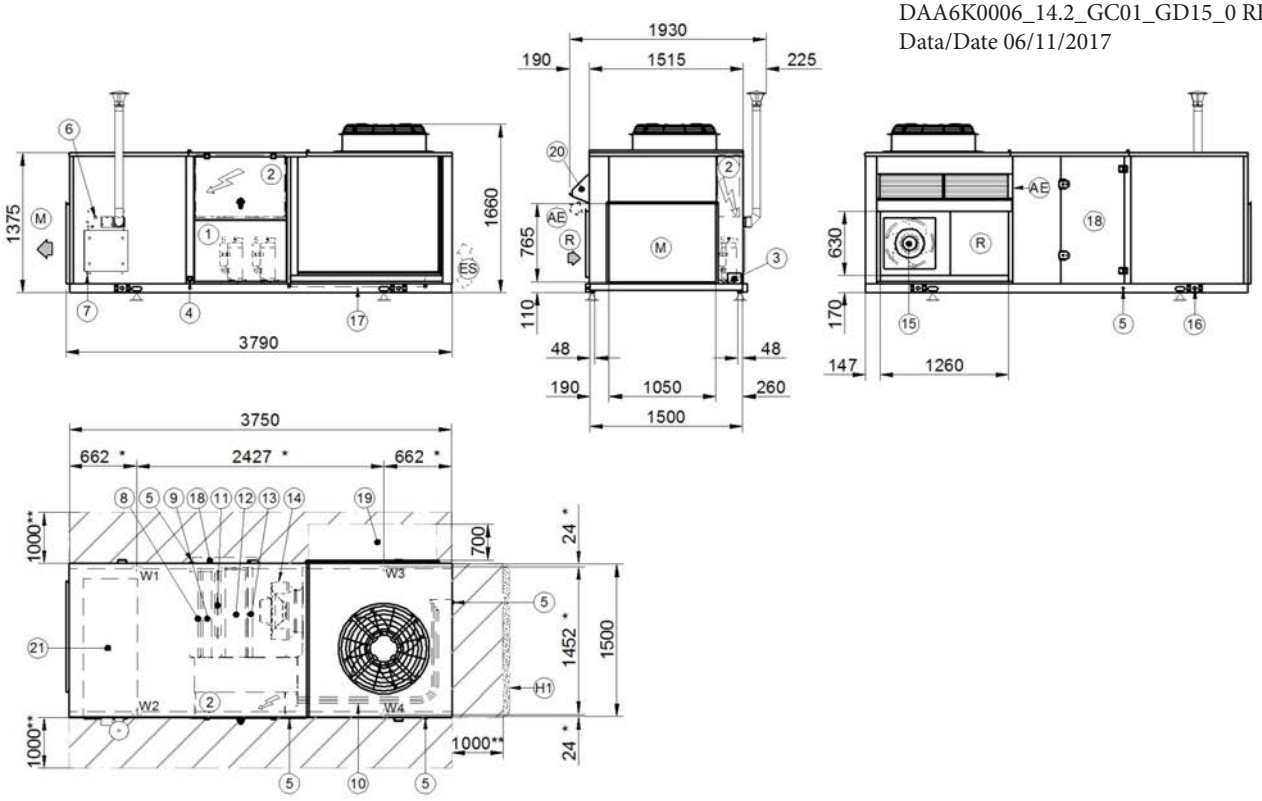
Size		10.1
W1 Supporting Point	kg	186
W2 Supporting Point	kg	154
W3 Supporting Point	kg	179
W4 Supporting Point	kg	174
Shipping weight	kg	729

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

Dimensional drawings

Size 14.2 - Version CAK/CBK/CCK - Gas heating module 35/100 kW

DAA6K0006_14.2_GC01_GD15_0 REV00
Data/Date 06/11/2017



1. Compressor compartment
2. Electrical panel
3. Power input
4. Humidifier connections
5. Condensate drain
6. Gas connection
7. Condensate drain (only for condensation gas heating module)
8. Re-heating coil (optional)
9. Internal exchanger
10. External exchanger
11. Resistenze elettriche (optional)
12. Electrostatic filters or F7 (optional)
13. G4 air filters (standard)
14. Electric fan (supply-return)
15. Exhaust electric fan (version CCK only)
16. Lifting brackets (removable)
17. Over pressure damper exhaust (version CCK only)
18. Access for inspection coil, filters, hesting elements
19. Duct section removable for maintenance provided by the customer
20. Fresh air intake cap (only version CBK-CCK)
21. Gas module

(R) Air return
(M) Air supply
(AE) Fresh air intake
(ES) Air exhaust (only version CCK)
(H1) Wall with same height as unit on a maximun of three side
(**) Minimun suggested clearance
(*) Vibration mounts position

Weight distribution of full re-circulation (CAK) / Recirculation and renewal air (CBK) configuration

Size		14.2
W1 Supporting Point	kg	249
W2 Supporting Point	kg	191
W3 Supporting Point	kg	235
W4 Supporting Point	kg	226
Shipping weight	kg	951

Weight distribution of full re-circulation, renewal air and exhaust (CCK) configuration

Size		14.2
W1 Supporting Point	kg	258
W2 Supporting Point	kg	200
W3 Supporting Point	kg	243
W4 Supporting Point	kg	235
Shipping weight	kg	986

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

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