INSTALLATION AND OPERATING MANUAL

ELFOFresh^2 CPAN-U 70-500

make up and purification unit with active thermodynamic recovery

ELFOFresh^2 70-120

ELFOFresh^2 200-500

Change living home

M05E40C15-06

18-09-2019

Dear Customer,

We congratulate you on choosing an ELFOSystem product, the air conditioning system at annual cycle that offers the possibility in a sole system of meeting all the heating, conditioning and domestic hot water needs, purifies and renews the air

Clivet is being working for years to offer systems able to assure the maximum comfort for long time with high reliability, efficiency , quality and safety. The target of the company is to offer advanced systems, that assure the best comfort, reduce the energy consumption, the installation and maintenance costs for all the life-cycle of the system.

With this manual, we want to give you information that are useful in all the phases: from the reception, to the installation and use until the disposal so that a system so advanced offers the best procedure of installation and use.

Best regards and have a nice reading !

CLIVET Spa

1 - GENERAL

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

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

Before going ahead with operations, read the GENERAL WARNINGS on page 97

Pay particular attention to :

⚠ WARNING, identifies particularly important operations or information

⛔ PROHIBITIONS, identifies operations that must not be carried out, that compromises the operating of the unit or may cause damages to persons or things.

1 **DAIR50X - DAIR80X**
AIRJET 50/I - 80/I supply diffuser - white frame and black inside

2 **GAIR50X - GAIR80X**
Intake grille + extractable filter AIRJET 50/A - 80/A - white frame and black inside

3 **PAIR50X- PAIR80X**
Suction/supply plenum with AIRJET 50 - 80 control damper - rear connection

4 **GINOX - GIVEX**
Suction/supply rectangular grill 350x130mm stainless or white

5 **FREX**
Filter for rectangular grilles 350x130mm (5 pcs.)

6 **VIEX**
Extraction/intake valve in ABS DN125 without air filter

7 **FT125X**
Filter for DN125 valve (5 pcs.)

8 **GQIEX**
Extraction/intake squared grill of DN125 joint with air filter

9 **TFT90X**
DN90 round flexible tube (Int. diam. 78mm) in a 20m. coil without insulation

10 **IT90X**
Insulation in a 20mt. coil for DN90 round flexible tube

11 **CBT90X**
Connector to distribution box for DN90 round tube

12 **GIUTX**
Connecting joint for DN90 round tube

13 **CT90X**
Printed curve of 90-degree angle for DN90 round tube

14 **A90DTX**
90-degree adaptor, double DN90 round tube for DN125 valve + cap

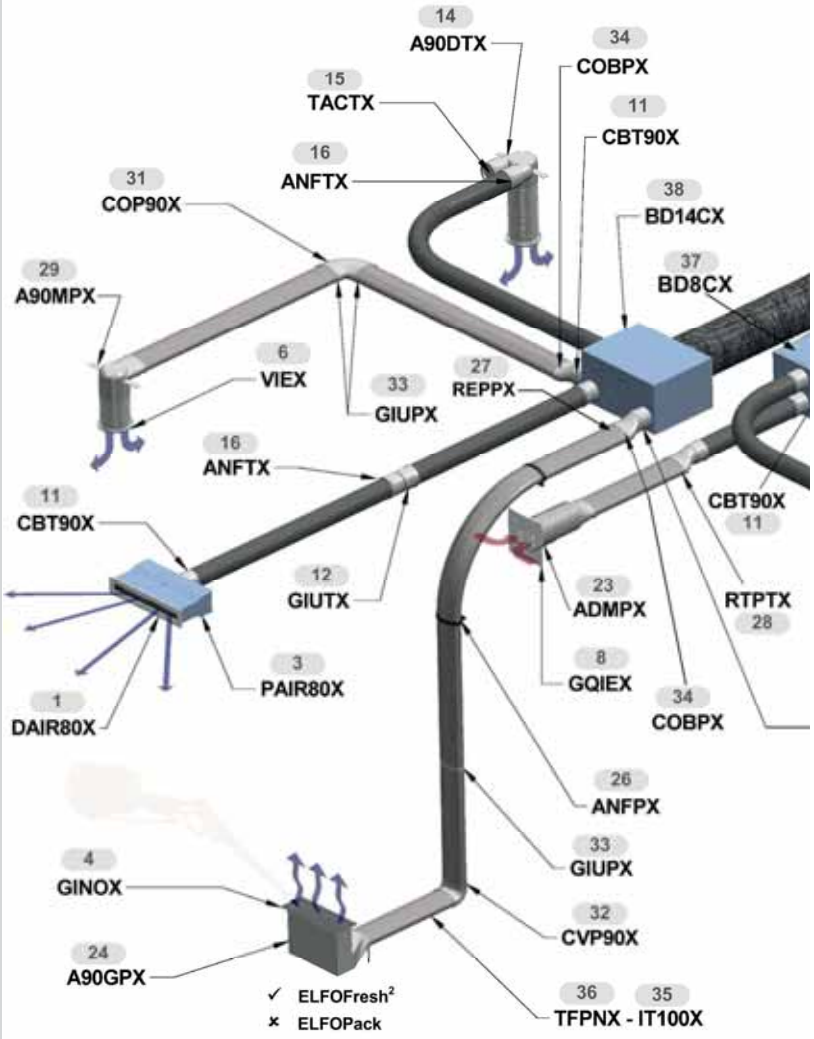
15 **TACTX**
Cap for DN90 round tube (5 pcs.)

16 **ANFTX**
DN90 seal O-Ring (10 pcs.)

41 **CPRX**
Manifold for DN150-200 air recirculation plenum

40 **PRX**
Soundproofed plenum for air recirculation

39 **GPRX**



17 **TFIS150X - TFIS200X - TFIS250X**
DN150/200/250 soundproofing insulated flexible tube in a 10mt. coil

18 **GR150X-GR200X- GR250X**
Exhaust / return squared wall grig with circular coupling DN150/200/250

19 **GF150X**
GF200X
GF250X

Grill for recirculation air return plenum 325x175 mm white

38 **BD14CX**
14-output distribution box, DN200 joint

37 **BD8CX**
8-output distribution box, DN150-200 joint

36 **TFPNX**
Flat flexible tube 132x52mm in a 20m. coil without insulation

35 **IT100X**
Insulation in a 20mt. coil for flat flexible tube 132x52

28 **RTPTX**
Round/flat tube connecting joint

27 **REPPX**
Flow controller for flat tube

34 **COBPX**
DN90 connector joint (CBT90X) --> flat tube

26 **ANFPX**
Fixing ring for flat tube (10 pcs.)

33 **GIUPX**
Seal and connecting joint for flat tube (10 pcs.)

25 **TACPX**
Cap for flat tube (5 pcs.)

32 **CVP90X**
Vertical 90-degree curve for flat tube

24 **A90GPX**
90-degree adaptor, single tube for flat grill 350x130 mm

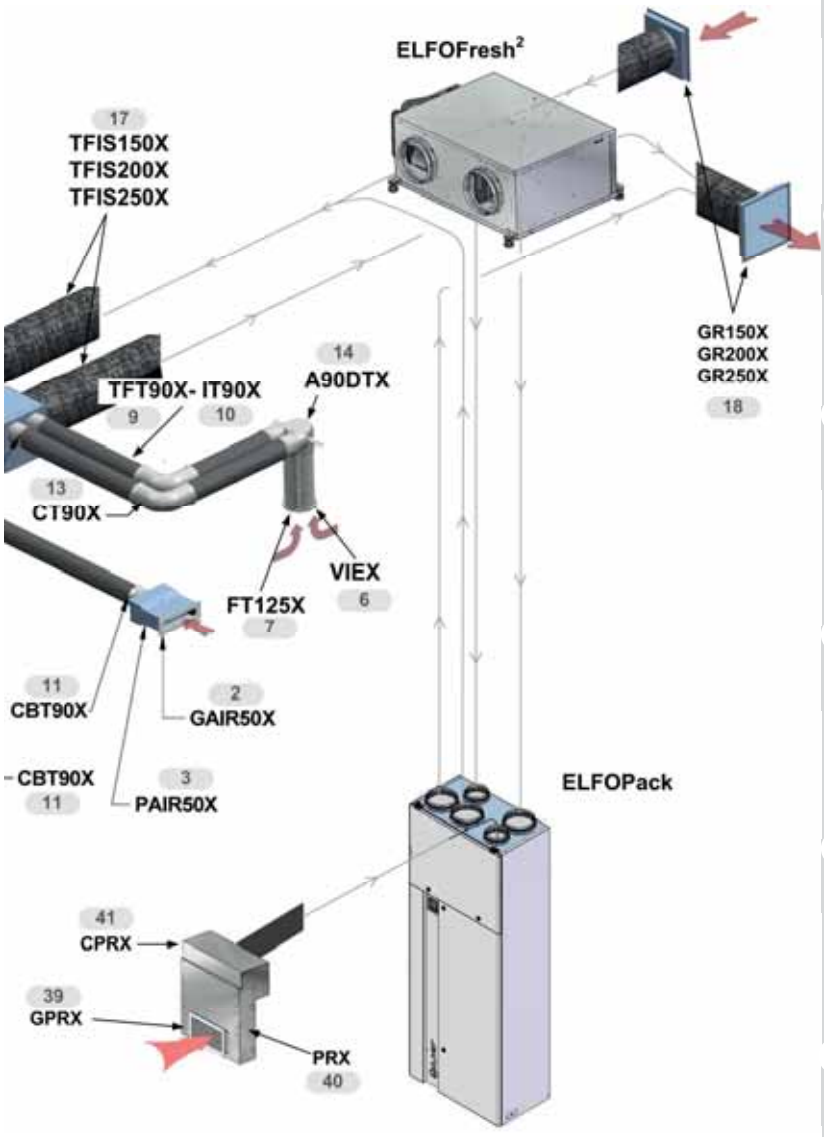
31 **COP90X**
Horizontal 90-degree curve for flat tube

23 **ADMPX**
Straight adaptor, single flat tube for DN125 valve

30 **CTP180X**
Joint for 180-degree flat tube rotation

22 **A90DPX**
90-degree adaptor, double flat tube for DN125 valve

29 **A90MPX**
90-degree adaptor, single tube for DN125 valve



F/F DN150/200/250 joint

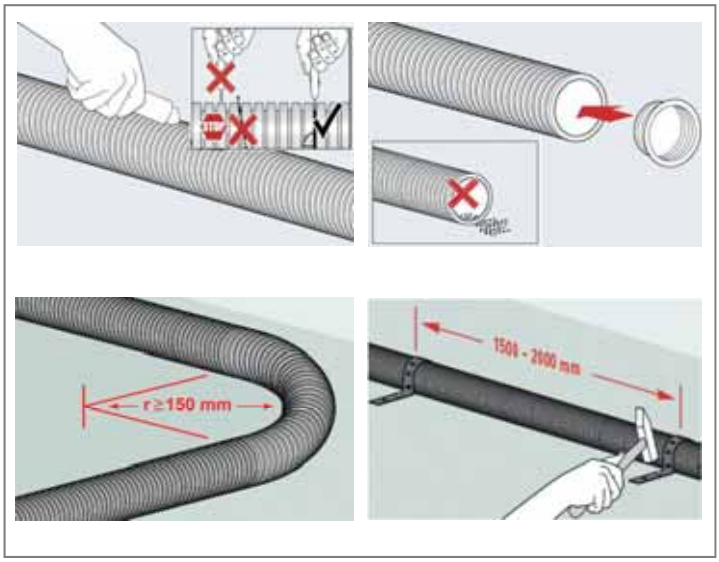
20 **R2015X - R2520X**
DN200-DN150 reducer
DN250-DN200 reducer

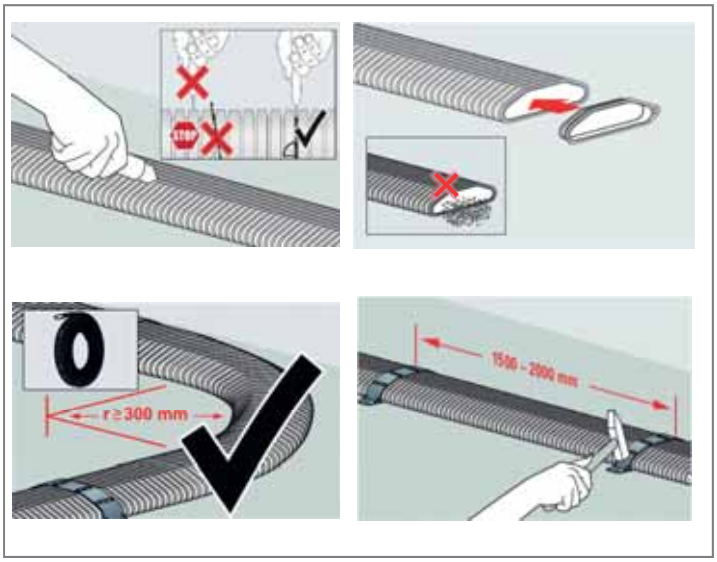
21 **DY200X**
DN200-DN200-DN200 Y-joint
DY250X
DN250-DN200-DN200 Y-joint

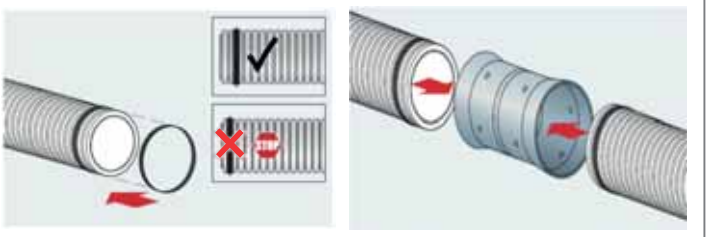
ELFOAir

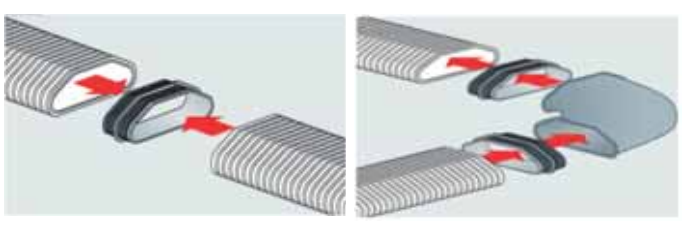
04-05-16

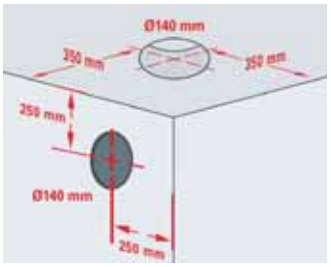
MTOA40M14-02

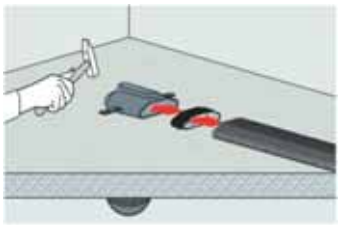

r≥150 mm
1500 - 2000 mm

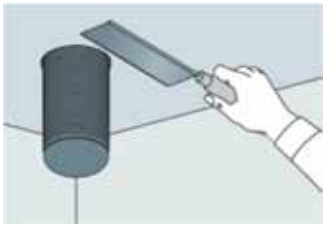

r≥300 mm
1500 - 2000 mm

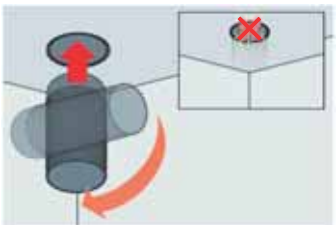


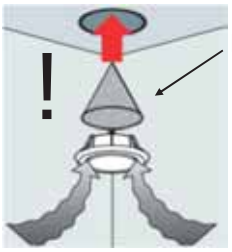


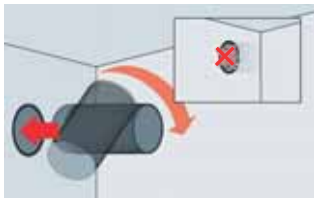

Ø140 mm
350 mm
350 mm
250 mm
Ø140 mm
250 mm

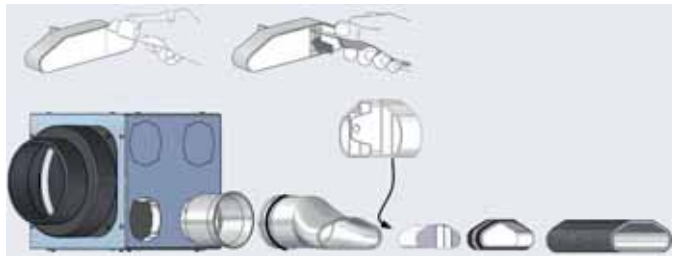


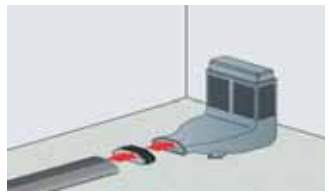


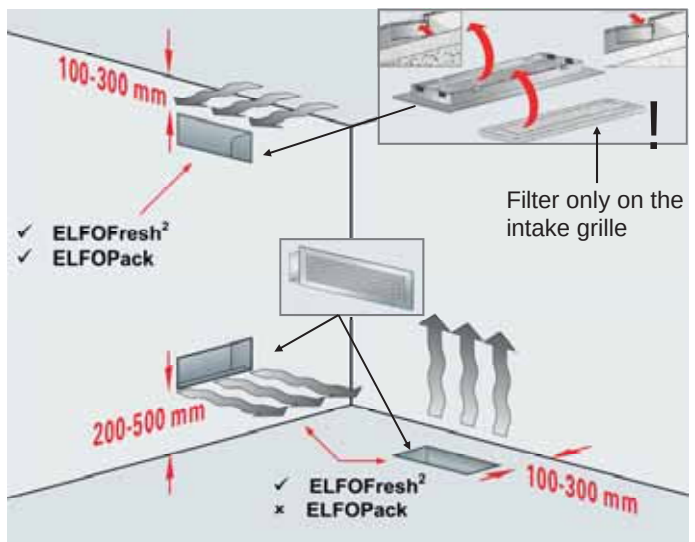


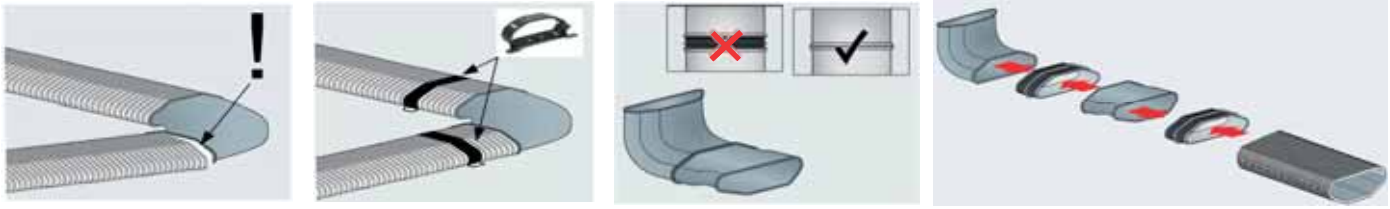

!
Filter

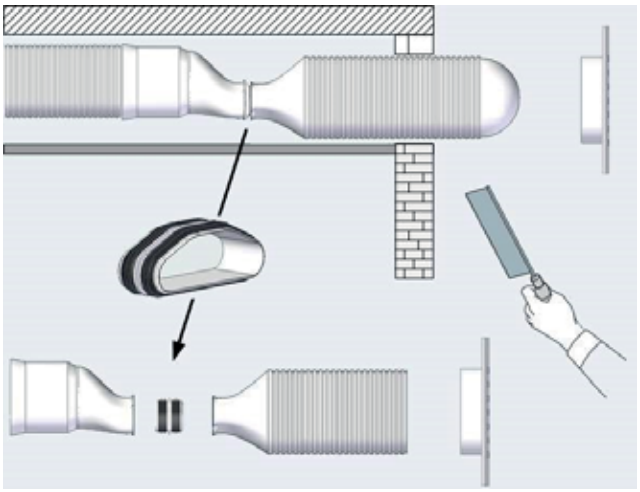




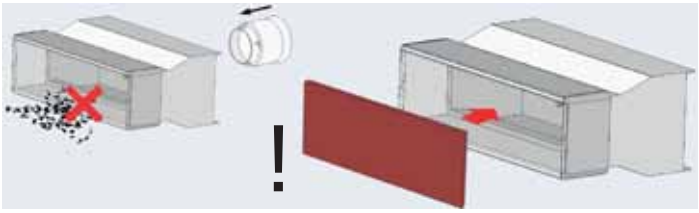


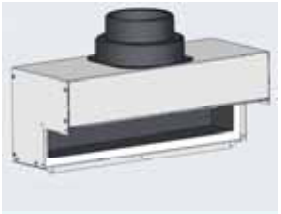

100-300 mm
!
Filter only on the intake grille
✓ ELFOFresh²
✓ ELFOPack
200-500 mm
✓ ELFOFresh²
× ELFOPack
100-300 mm

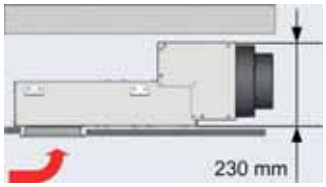


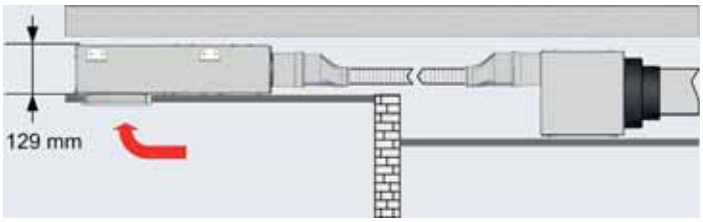


Cover the plenum, openings, grilles with cardboard, adhesive tape, etc...

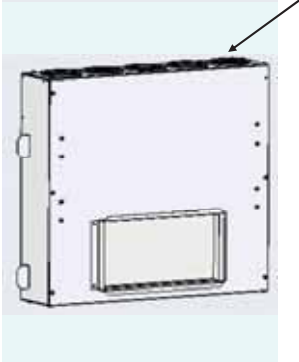


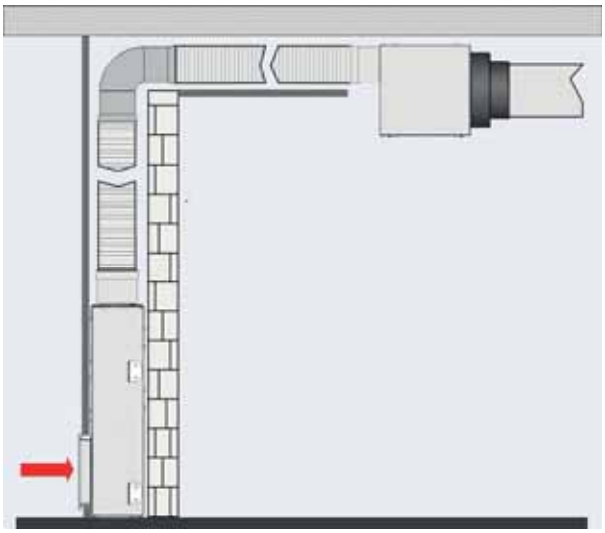


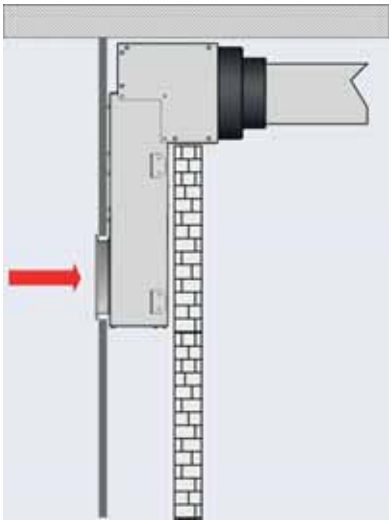




Remove caps



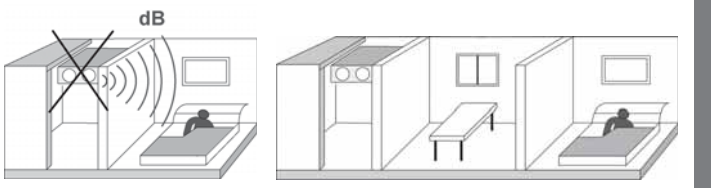




A Consider sound emissions

Avoid installations next to bedrooms

For details see the manual sections

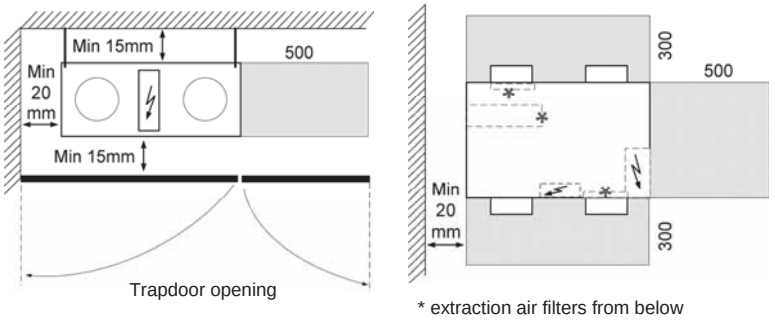


Install in a local or compartment where the temperature can't drop below 0 ° C.

B

CPAN-U 70-120

Respect the spaces to conduct normal and extraordinary maintenance

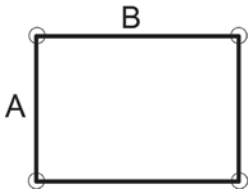


* extraction air filters from below

C Aeraulic ducts

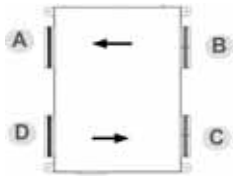
Unit fixing points

Install supplied antivibration



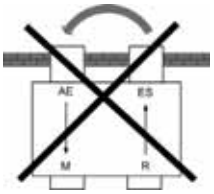
Size	70-120	200-300	500
A (mm)	636	666	710
B (mm)	755	760	993

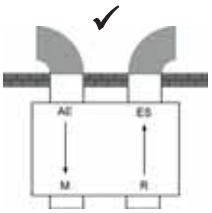
Dimensions connections



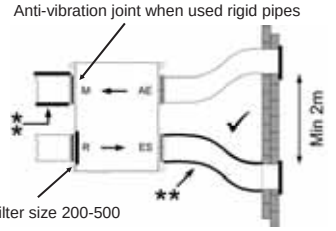
	Size	70-120	200-300	500
A	Air expulsion	Ø 150 mm	Ø 200 mm	Ø 250 mm
B	Ambient air return	Ø 150 mm	Ø 200 mm	Ø 250 mm
C	Ambient air distribution	Ø 150 mm	Ø 200 mm	Ø 250 mm
D	Fresh air intake	Ø 150 mm	Ø 200 mm	Ø 250 mm

Avoid air bypass



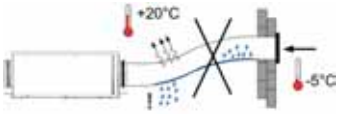


Anti-vibration joint when used rigid pipes



Filter size 200-500

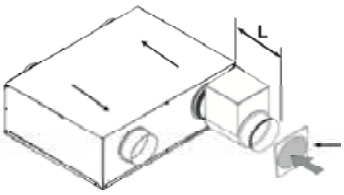
** Insulated ducts



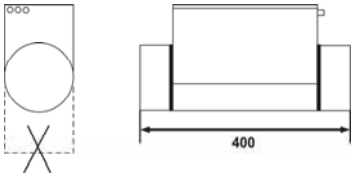
Should not be tilted towards unit

E Electric heaters (option)

L = 1,5 m = max. distance between resistances and electrical panel



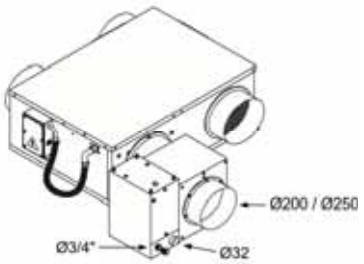
Install an air filter upstream. This should be at least a G2 class filter to protect the heating elements (provided by the customer)



ATTENTION
Don't invert downwards

F Humidifier (option)

CPAN-U 200-500

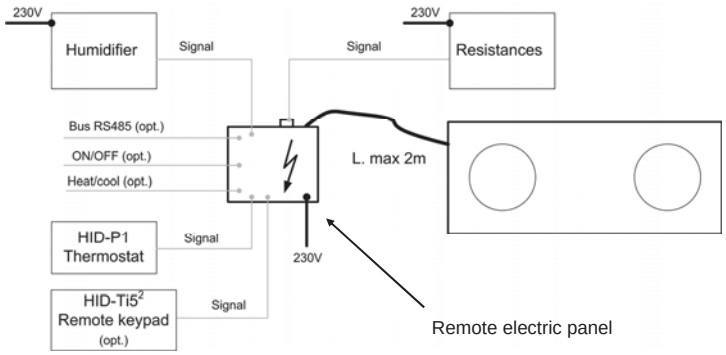


Water supply

Condensate discharge

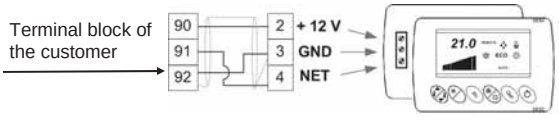
H HID-P1 ambient thermostat

CPAN-U 200-500



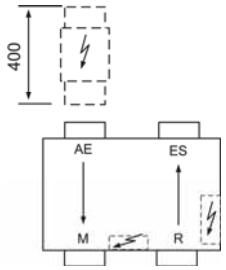
Connect the ambient thermostat to the terminal block of the customer connections

Connections
Cable 3x0,34 mm² shielded
Max. length 80 m



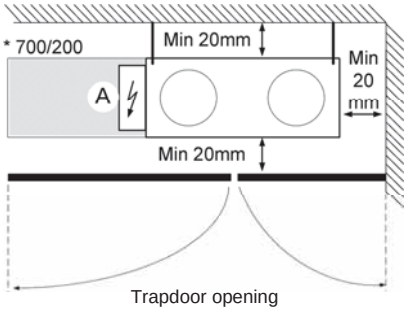
Ceiling access

If there are electric heaters, increase access space



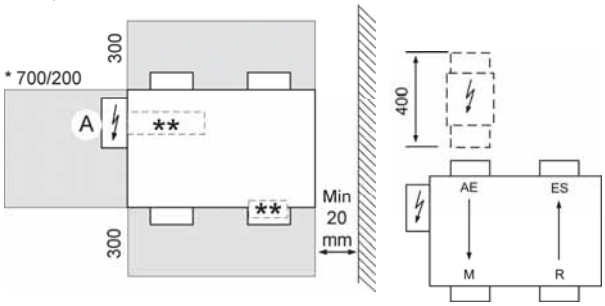
AE fresh air intake
ES air expulsion
M ambient air distribution
R ambient air return

CPAN-U 200-500



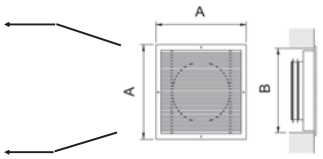
Trapdoor opening

Space to access:
* 700 - filter access from below, electrical panel on board unit
* 200 - filter access from below, remote electrical panel



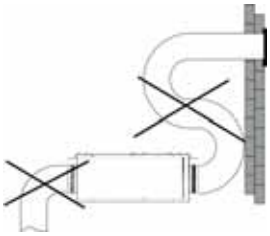
** extraction air filter from below

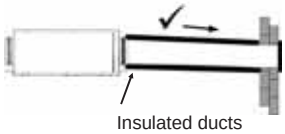
Safety grilles



Size	A	B
70-120	226	206
200-300	310	276
500	370	336

Avoid tight bends

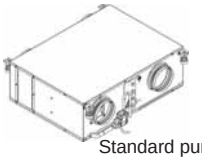




Insulated ducts

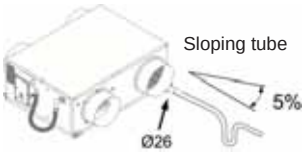
D Condensate discharge

CPAN-U 70-120



Standard pump

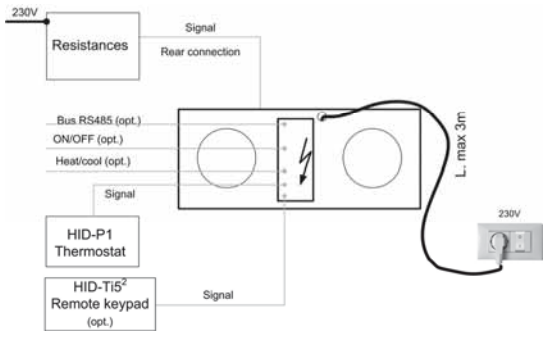
CPAN-U 200-500

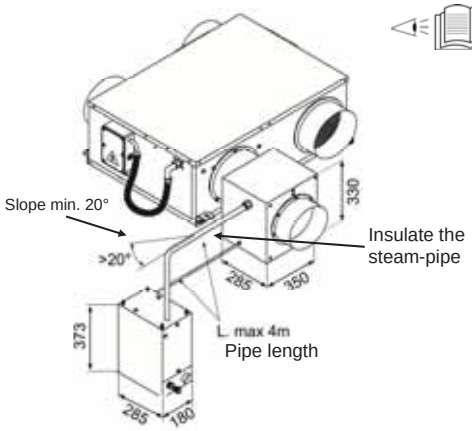


Sifón

G Electric connections

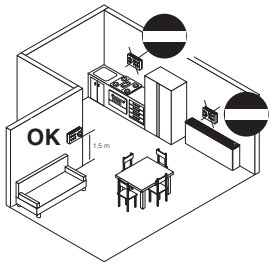
CPAN-U 70-120





Pag. 22/26/30

Positions thermostat



The thermostat must be placed:
- at a height of 150 cm
- preferably on an internal wall
- Positions to avoid:
- next to heat sources
- points exposed to direct sunlight
- Ecc….

BEFORE REQUESTING START-UP
- **Completed system**
- **Completed aeraulic system and free of dirt**
- **Electric connections**

Rapid guide

ELFOFresh²

Document reference
M05E40C15

19-09-19

MT5E40M15-06

1.1 UNIT DESCRIPTION

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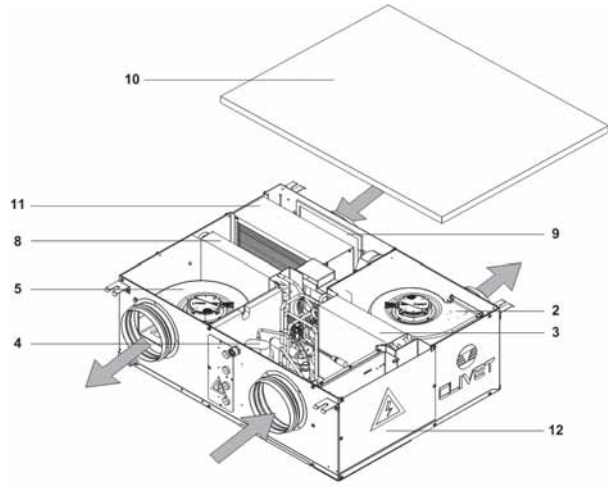
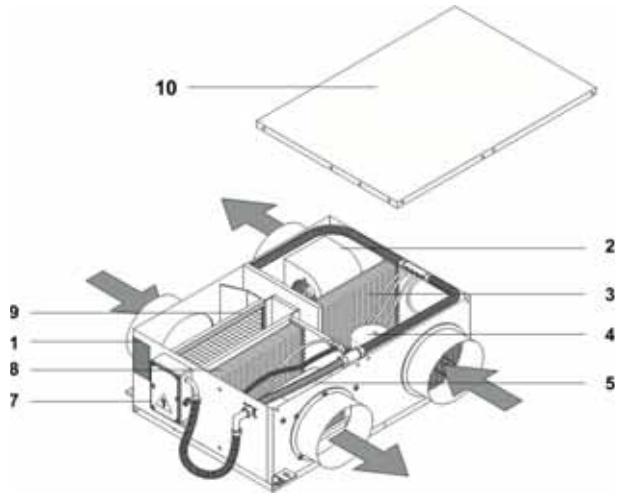


CPAN-U 200 - 500



1 Serial number label

2 Exhaust air fan
It rejects the unhealthy air outdoors.

3 Internal exchanger
It transfers energy (heat / cool) to the fresh air .

4 Compressor

5 Supply fan
It blows treated air in the rooms.

7 Electrical remote panel
It is possible to remove the electrical panel and make it remote to facilitate the installation

8 External exchanger
It recovers energy (heat / cool) from the exhaust air.

9 Air filter
It purifies the fresh air before introducing it into the rooms

10 Upper panel

11 Electronic filter (option)

12 Electrical panel

1.2 ACCESSORIES

CDPX : Discharge condensate pump (size 200-500)

EHPCX : Preheating elements 0,7 kW in duct (size 70-120)
Preheating elements 1,5/3 kW in duct (size 200-500)

FSEX : Electronic filter kit (size 70-500)

HSE3LX: Immersed electrode steam humidifier for Elfofresh DN200 (size 200-500)

HSE3MX: Immersed electrode steam humidifier for Elfofresh DN250 (size 200-500)

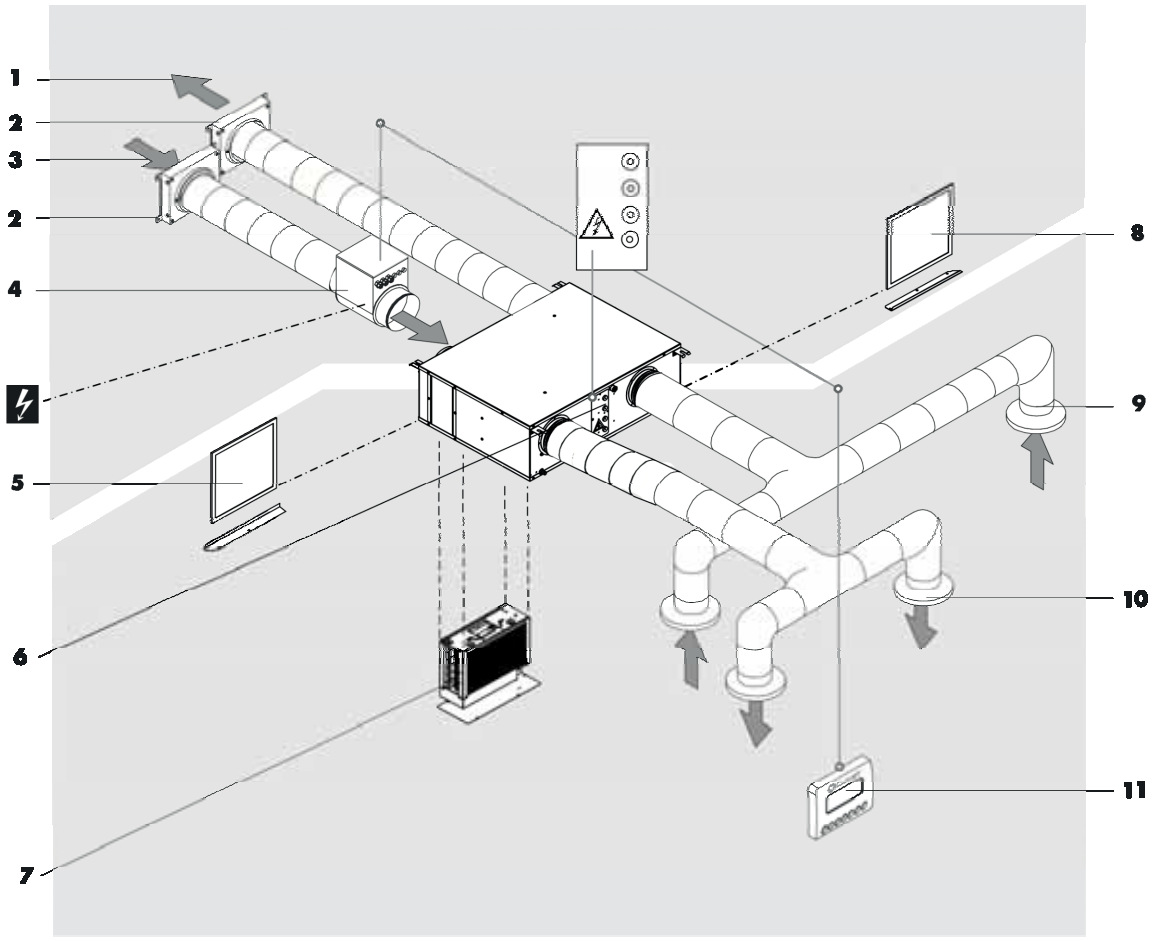
FAEX : Kit of exhaust air filter (size 200-500)

CMMBX : Serial communication module to supervisor (MODBUS)

ELFOAir

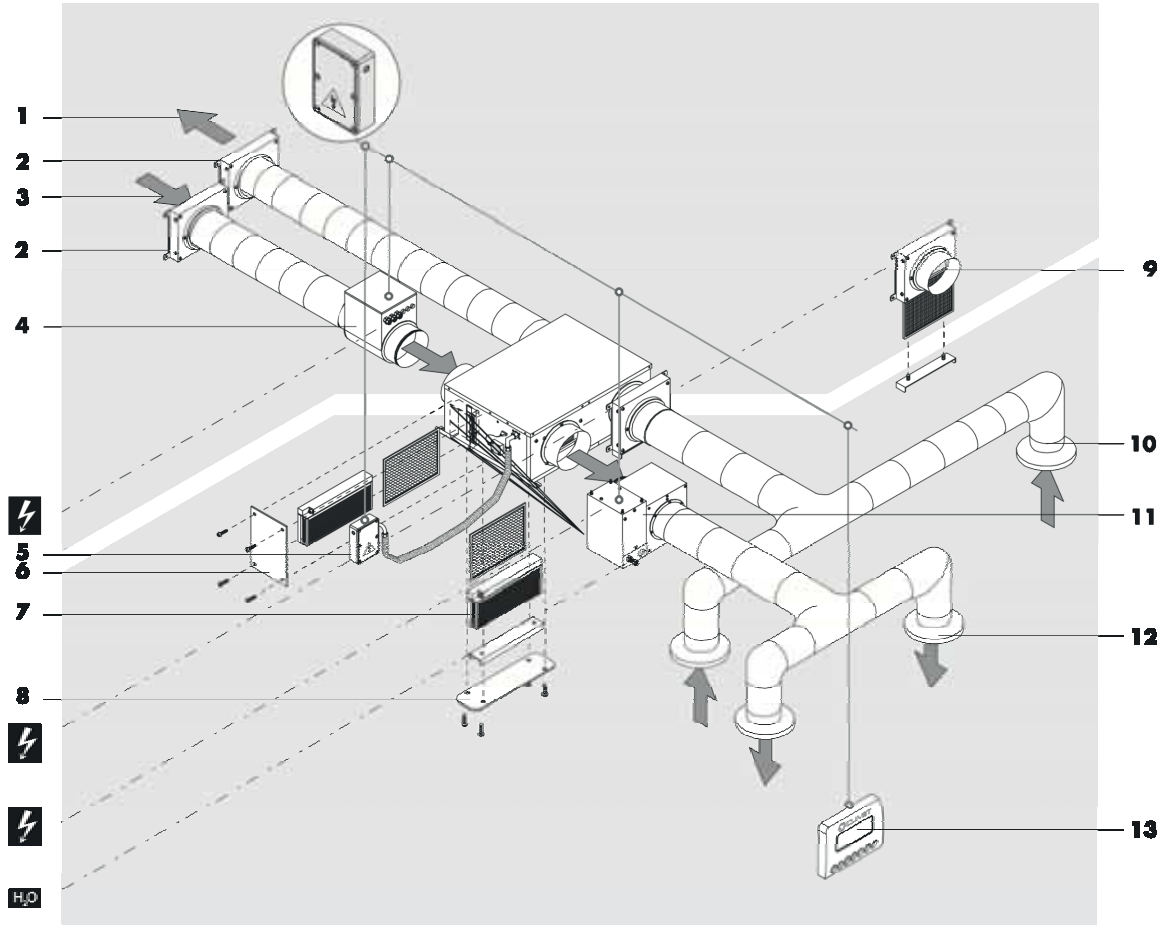
Is the air distribution system.

CPAN-U 70 - 120



1	Ambient exhaust air	6	Customer connections
2	Grid to prevent small animals or leaves from entering inside (option)	7	Electronic filter (option)
3	Outdoor air intake	8	Exhaust air filter
4	Kit of electric resistance (option)	9	Ambient air intake
5	Intake air filter	10	Ambient air supply
		11	HID-P1 ambient thermostat

CPAN-U 200 - 500



1 Ambient exhaust air
2 Grid to prevent small animals or leaves from entering inside (option)
3 Outdoor air intake
4 Kit of electric resistance (option)
5 Remote electrical panel
6 Filter extraction with remote electrical panel
7 Electronic filter (option)
8 Filter extraction with built-in remote electrical panel
9 Kit of exhaust air filter (optional)
10 Ambient air intake
11 Humidifier kit (optional)
12 Ambient air supply
13 HID-P1 ambient thermostat

1.3 UNIT IDENTIFICATION

Serial number label

The serial number label is positioned on the unit, generally next to the electrical panel, and allows you to indentify all the unit features.

The serial number label has not to be removed for any reason.

It reports the regulations indications such as:

- Type of unit
- size →
- serial number
  xxxxxxxxxxxx
- year of manufacture
- wiring diagram number
- electrical data
- manufacturer logo and address

Serial number

It identifies uniquely each unit.

It identifies specific spare parts for the unit.

Intervention requests

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

In case of intervention you have to provide the data indicated sideways.

Serie
Size
Serial number
Year of manufacture
Wiring diagram

When ordering repair parts please always give the following information:
Model, serial and product number.
Parts name.

PRELIMINARY INFORMATION

Before beginning the work, ensure you that have the final project for installing the aeraulic, hydraulic, electric,drains and positioning the units.

Operate in compliance with safety regulations in force .

Use single protection devices.

Recommended instruments

Set of Philips and flathead screwdrivers;
Cutters;
Drill;
Scissors;
Set of open spanners or pipe wrenches;
Range;
Hydraulic material for the sealing of the threads;
Electrical equipment for the connections;
Cut prevention gloves;
Tester and amperometric pliers.

BEFORE REQUESTING START-UP

- Completed system
- Completed aeraulic system and free of dirt
- Electric connections

2.1 DELIVERY CONTROL

Before accepting the delivery you have to check:

- 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 'A' 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".
- Contest by fax and registered mail with advice of receipt to supplier and the carrier.

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

2.2 - STORAGE

Shelter from: direct sunlight, rain, sand and wind.

Stocking temperature:

maximum 50°C

minimum -10°C

The respect of the instructions on the exterior side of the packaging assures the physical and functional integrity of the unit for the final user's advantage.

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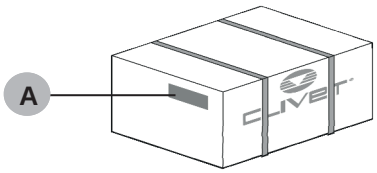
The following examples are indications; the choice of the means and of the handling modes will depend on factors, such as:

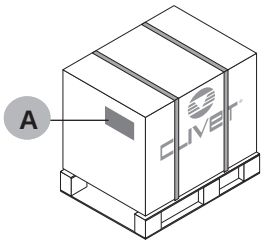
- The unit weight
- Type and overall dimensions of the unit
- Place and route for the handling (dirt yard, asphalted square, etc.)
- Condition of the place of destination (roof, square, etc.) distances, drops and gradients.



- Do not trample

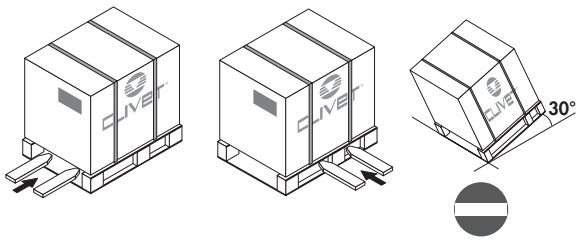
- Do not leave loose packages during the transport

CPAN-U 200 - 500



Lifting with forks:

- Insert the forks as indicated in the figure.
- During the handling is forbidden to exceed the maximum allowable inclination as indicated in the figure.
- It is forbidden to lift simultaneously more packages letting them looses.
- In case of lifting of more units at the same time, an appropriate container must be used.

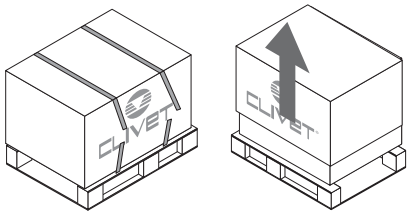


Packing removing

Be careful not to damage the unit.

- Cut the fixing strips.
- Remove the packaging lifting it upwards.
- Remove the protective nylon.

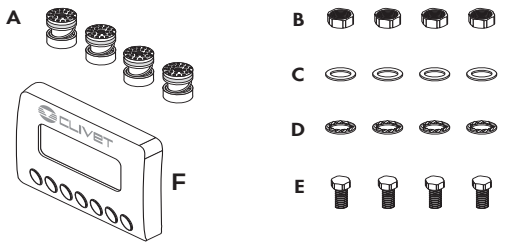
Keep packing material out of children's reach it may be dangerous. Recycle and dispose of packing material in conformity with local regulations.



2.2 KIT REMOVAL

Installation kit

A	spring antivibrations	n.4
B	M8 nuts	n.4
C	plain washers	n.4
D	toothed washers	n.4
E	M8 bolts	n.4
F	ambient thermostat	

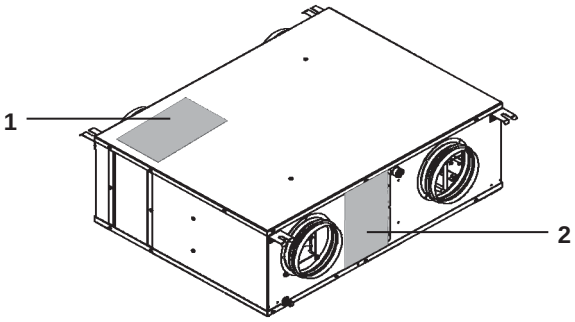


CPAN-U 70 - 120

The unit is supplied in a single pack and is equipped with:

1 installation manual

2 installation kit - Ambient thermostat

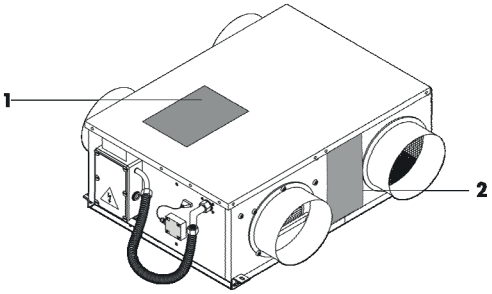


CPAN-U 200 - 500

The unit is supplied in a single pack and is equipped with:

1 installation manual

2 installation kit - Ambient thermostat



3.1 CLEARANCE ACCESS RECOMMENDED

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.

Intended use

Use the unit for the air treatment.

Follow the limits defined in the technical bulletin and on this manual.

Do not treat air with :

high concentrations of dust

aggressive substances

residues from industrial processing.

The unit has been designed to be installed :

- **indoor**
- **in fixed position**

The unit can not be installed outdoor or in a room / compartment where the temperature can drop below 0 ° C.

Choose the installation place according to the following criteria:

- customer approval
- safe accessible position
- the operation noise and air flow expelled shall not affect neighbors
- spaces for conduits
- avoid flood-prone places;
- verify the unit weight and bearing point capacity;
- verify that all bearing points are aligned and levelled
- unit in bubble level
- plan in the false ceiling (or in the floor) the openings indicated in the functional clearances to allow the access to the unit for the maintenance operations
- Ceiling positioning : let free the projection to the ground of the unit and of the functional clearances to allow the access with ladders or other means
- Floor positioning : install the unit raised from the ground .

Limit vibration transmission:

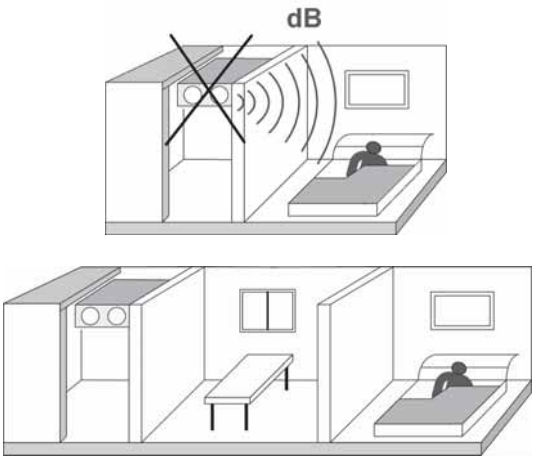
- use antivibration devices on unit bearing/ supporting points
- install flexible joints on the hydraulic/aeraulic connections.

Neglecting these aspects may decrease the unit performances and life.

Consider sound emissions

Avoid installations next to bedrooms

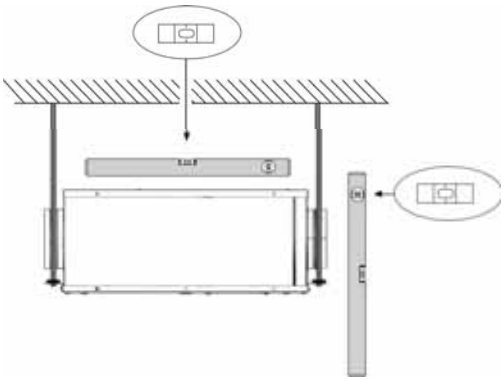
If the unit is installed near bedrooms, it is recommended that acoustic insulation is arranged.



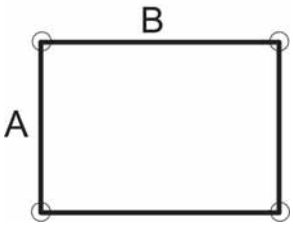
The functional clearances have to :

- guarantee the unit good operating
- allow the maintenance operations
- safeguard the authorized operators and the exposed person.
- position the unit taking into consideration the clearances indicated in the figure.(following pages)
- consider the space necessary for return ambient filter extraction (see option).

UNIT IN BUBBLE LEVEL

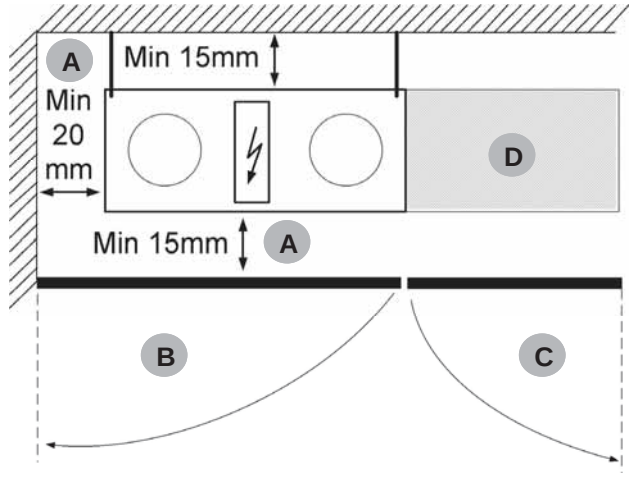


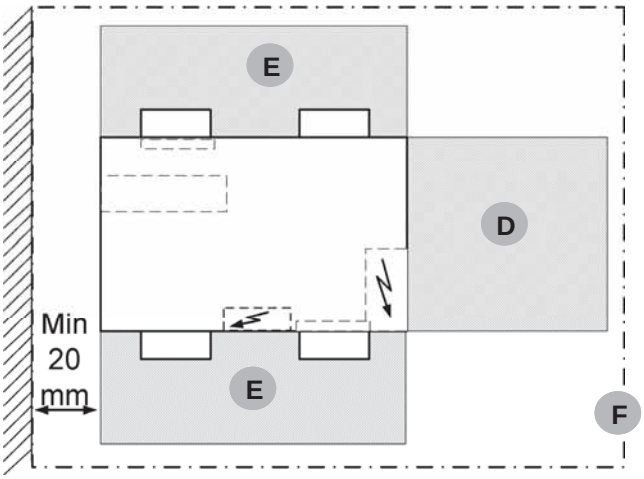
UNIT FIXING POINTS



Size	70-120	200-300	500
A (mm)	636	666	710
B (mm)	755	760	993

CPAN-U 70 - 120





A Distance to prevent vibrations from being transmitted.

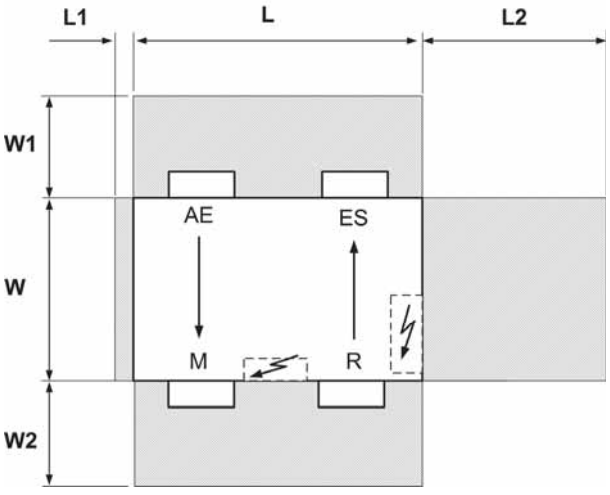
B Trap door for routine maintenance (access to the connections of the electrical panel, air filters and the optional electronic filter)

C Trap door for extraordinary maintenance

D Access to the electrical panel

E Access to clean the filter (air filters)

F Access to conduct extraordinary maintenance (to replace the fan, compressor, etc.)



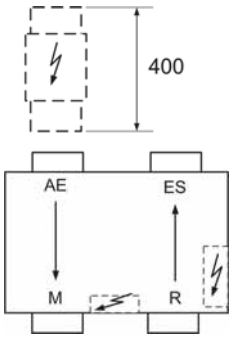
AE fresh air intake

ES air expulsion

M Ambient air distribution

R Ambient air return

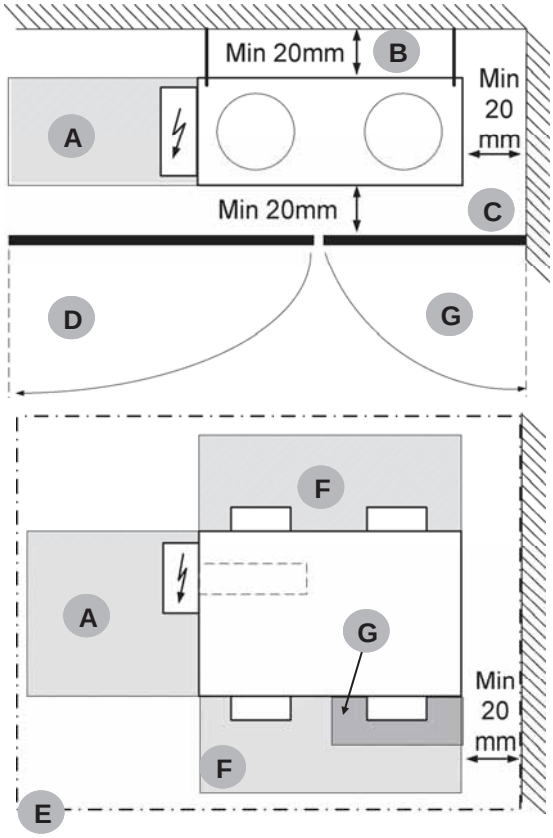
Heat. el.



Heat. el. = If there are heating elements, increase the W1 value (information on heating elements on page 71)

Mod	L1	L	L2	W1	W	W2
70 - 120	20 mm	800 mm	500 mm	300 mm	590 mm	300 mm

CPAN-U 200 - 500



A Space to access the electrical panel

B Space necessary for the by-pass damper

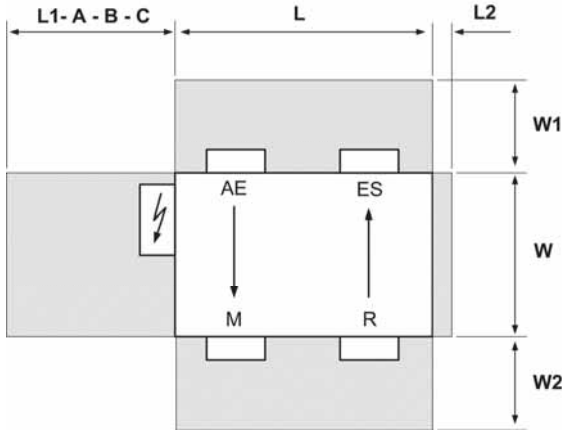
C Distance to prevent vibrations from being transmitted (insert a neoprene sheet)

D Trap door for routine maintenance (access to electrical panel and optional electronic filter)

E Access to conduct extraordinary maintenance (to replace the fan, compressor, etc.)

F Access to fan removal

G Access to clean the filter (exhaust air filter - option)



AE fresh air intake

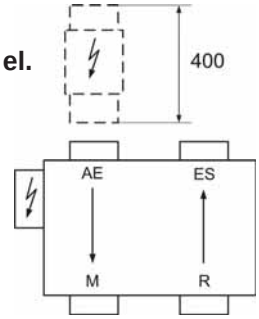
ES air expulsion

M Ambient air distribution

R Ambient air return

Heat. el. = If there are heating elements, increase the W1 value (information on heating elements on page 79)

Heat. el.



Mod	L1A	L1B	L1C	L	L2	W1	W	W2
200	700 mm	400 mm	200 mm	920 mm	20 mm	300 mm	704 mm	300 mm
300	700 mm	400 mm	200 mm	920 mm	20 mm	300 mm	704 mm	300 mm
500	700 mm	400 mm	200 mm	1158 mm	20 mm	300 mm	741 mm	300 mm

L1A ceiling installation, filter access from below, non-remote electrical control board at a distance
floor installation, lateral filter access, non-remote electrical control board at a distance

L1B floor installation, lateral filter access, remote electrical control board at a distance

L1C ceiling installation, filter access from below, remote electrical control board at a distance

3.2 CEILING POSITIONING

- Fix some M8 threaded bars (not supplied) to the ceiling.
- Pass the M8 threaded bars in the brackets on the unit.
- Insert and screw on the tapped bar the spring antivibration device.
- The antibration device must be positioned with the interior threaded downward
- Insert the flat and notched washer and screw the nut to lock.
- Avoid to over tighten the nuts, the springs, because if too much crushed they don't absorb vibrations.

3.3 FLOOR POSITIONING

- Insert the M8 threaded bar on the support base.
- Match the upper hole of the antivibration device with the hole of the support bracket.
- The antibration device must be positioned with the interior threaded upward.
- Insert the flat and notched washer in the bolt.
- Screw the bolt in the top of the antivibration device letting it pass through the hole on the bracket.
- Do not over tighten the nuts, the springs, because if too much crushed they don't absorb vibrations

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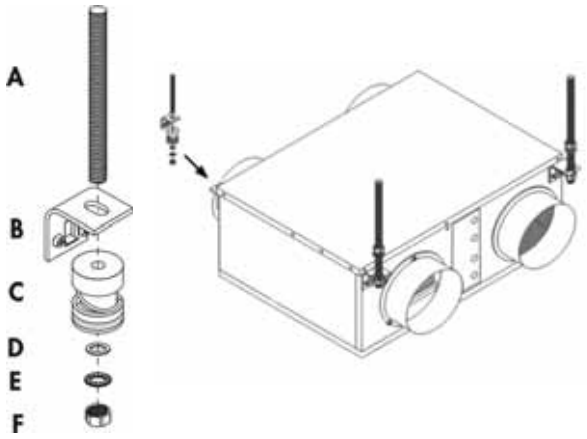
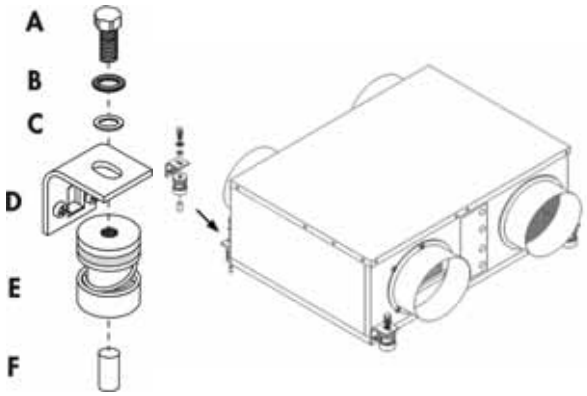
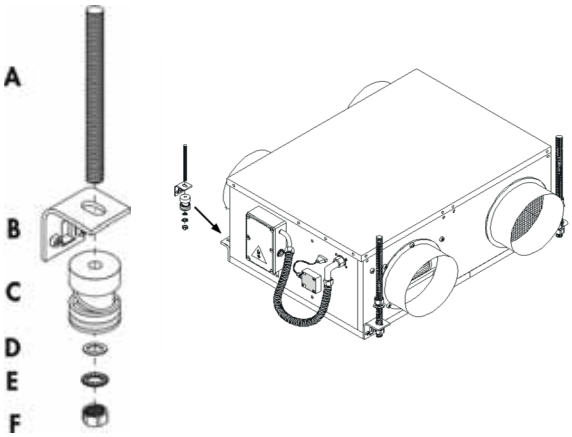


CPAN-U 70 - 120

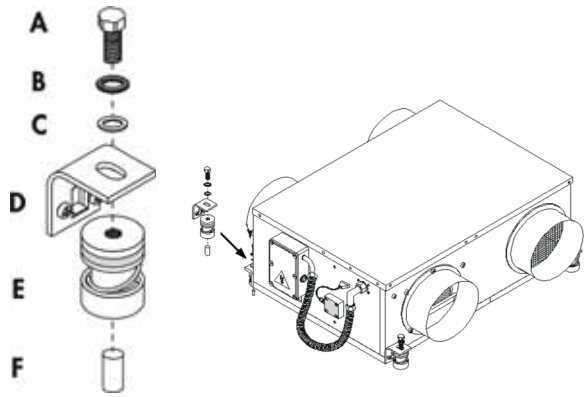


CPAN-U 200 - 500



A threaded bar
B bracket
C antivibration foot
D flat washer
E notched washer
F nut

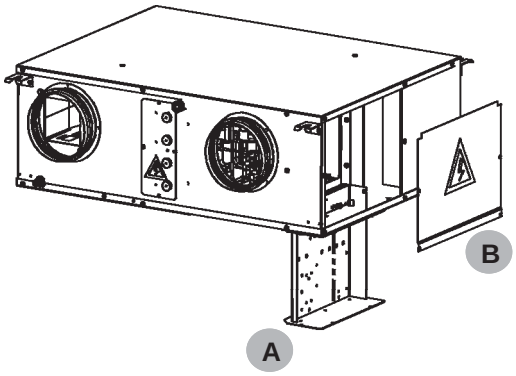
CPAN-U 200 - 500



A bolt
B notched washer
C flat washer
D bracket
E antivibration foot
F threaded bar

3.4 ELECTRIC PANEL

CPAN-U 70 - 120



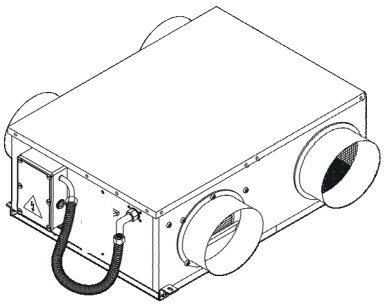
Access to the electrical panel:

A from below

B lateral

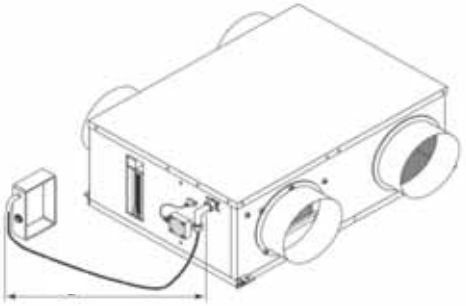
CPAN-U 200 - 500

The electrical panel is provided assembled on the unit side but if necessary it can be remotely controlled up to 2 mt. away.



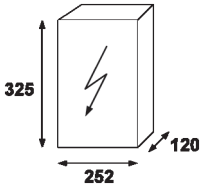
Remote positioning

- Unscrew the fixing screws and remove the electrical panel cover.
- Unscrew the fixing screws (M6) and remove the panel from the unit side.
- Fix the panel using screws and screw anchors suitable for the characteristics of the used support.
- If later it is supposed the installation of the electric elements (optional) consider that the cable to connect to the electrical panel has a max length of 1,5 metres.
- In this case the filter removal for cleaning can be performed either from the side or from below.



L = 2mt

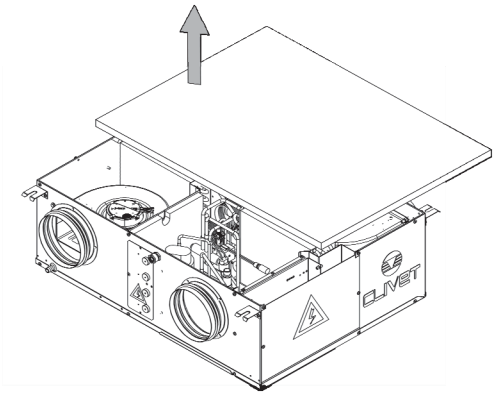
Electric panel



3.5 ACCESS TO INTERNAL PARTS

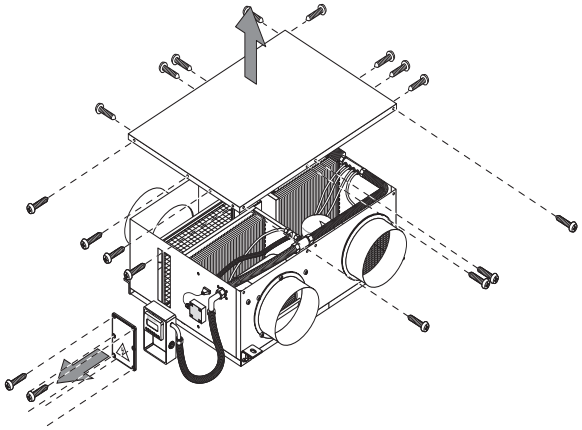
CPAN-U 70 - 120

Access from the upper side

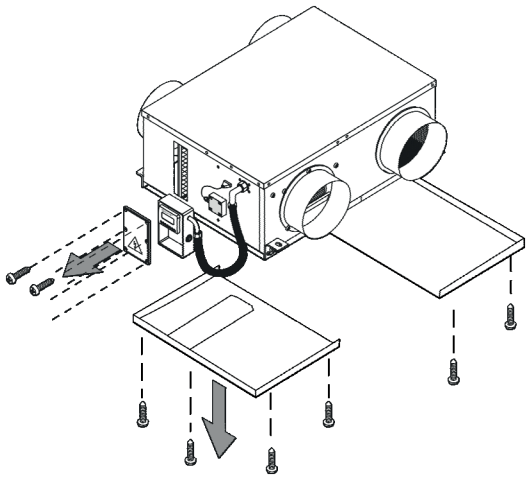


CPAN-U 200 - 500

Access from the upper side



Access from the bottom side



3.6 AMBIENT THERMOSTAT

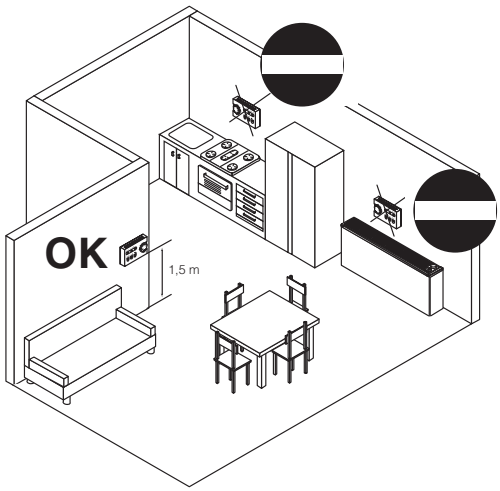
The choice of the installation point is decisive for the environmental comfort and the energy consumption.

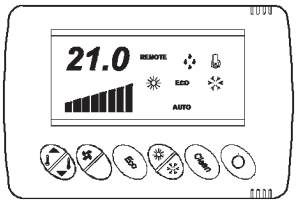
The thermostat must be placed :

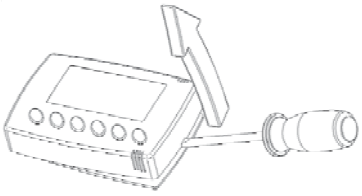
- In a room with medium temperature and humidity conditions, representative of the other rooms
- at a height of **150 cm**
- preferably on an internal wall

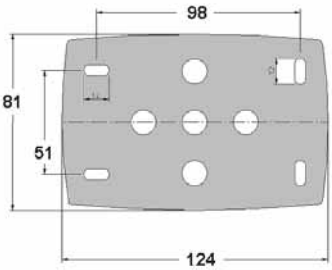
Positions to avoid :

- next to heat sources
- points exposed to direct sunlight
- in a position with air rejected from outlets or diffusers
- behind curtains or pieces of furniture
- near windows and doors to the outside
- on walls crossed by fireplaces or heating ducts
- on external walls.







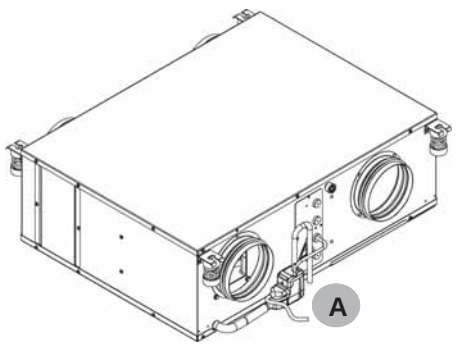


4.1 CONDENSATE DISCHARGE

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

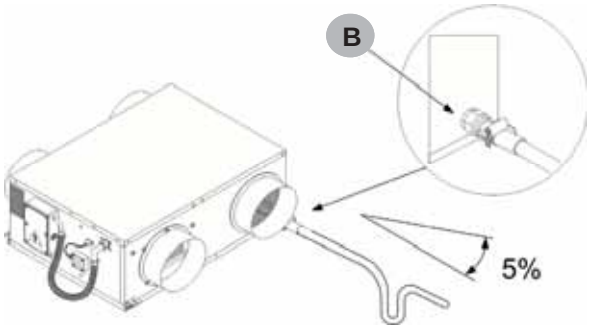
- Unit discharge fitting: the connection must not transmit mechanical stresses and must be performed taking care not to damage the unit discharge fitting.
- Provide a siphon that, eliminating the negative pressure caused by the fan, prevents the air intake from the discharge duct.
- The ducting must have a min. slope of 5% to allow the runoff.
- Anchor the ducting with an adequate number of supports.
- Otherwise are generated duct failures and air locks that prevent the runoff.
- 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.
- The connection must not be hermetic, so as to allow the venting and avoid possible liquid returns.
- Check at the end of the work, the regular condensate runoff pouring some water in the tray.

CPAN-U 70 - 120



A - Condensate discharge pump (standard) - (page 86)

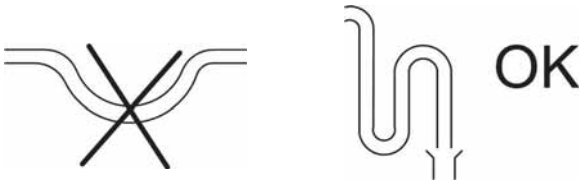
CPAN-U 200 - 500



B Condensate discharge fitting Ø 26 mm

Condensate discharge pump - option (page 86)

Siphon

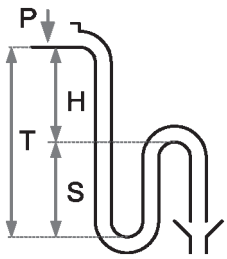


Siphon height calculation

T = 2P

S = T/2

P is the pressure determined by the fan in correspondence of
the condense collection bowl (approx. 1 mm = 9.81 Pa)



Example:

P = 100 Pa = 10 mm
T = 2P = 20 mm
S = T/2 = 10 mm

4.2 RISK OF FREEZE

Prevent the risk of freeze if the unit, drain or plumbing connections of the humidifier can be subject to temperatures close to 0°C.

For example:

- safeguard the pipes with heating cables placed under the insulation .
- insulate the pipes.
- perform the installation draining if unused for long periods.
- provide the antifreeze resistance in case of rigorous temperatures.

5 - AERAULIC CONNECTIONS

5.1 AERAULIC DESIGN CRITERIA

Make sure you have the final plan of the ELFOAir aeraulic system.

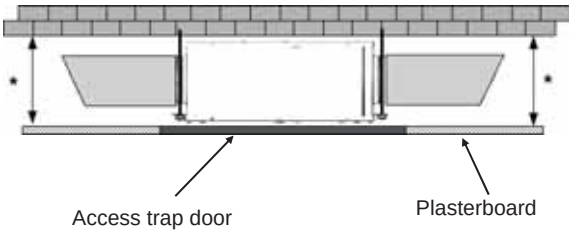
The dimensioning and the correct execution of the aeraulic connections are critical to ensure the unit operating and an appropriate level of quietness in the served area.

Here are some indications, as a simple checklist to support the installer and the designer of the installation.

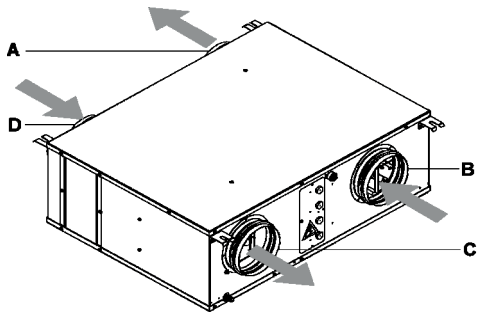
- AIR RENEWALS = 0,5 volumes per hour , max 1 volume per hour ; in the volume are not considered the extraction rooms (kitchens, bathrooms, etc.)
- AIR SPEED included between 2 and 3 m/sec (it guarantees the system silence)
- RETURN AIR in the kitchens / bathrooms / rooms with vapours, unpleasant odours
- SUPPLY AIR in the living room , bedrooms , studies etc....

5.2 SIZE CONNECTIONS

* Ensure sufficient space for the conduit accessories

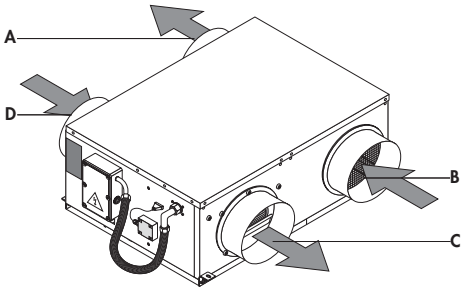


CPAN-U 70 - 120



Size		70-120
A	Air exhaust	Ø 150 mm
B	Ambient air return	Ø 150 mm
C	Ambient air distribution	Ø 150 mm
D	Fresh air intake	Ø 150 mm

CPAN-U 200 - 500



Size		200-300	500
A	Air exhaust	Ø 200 mm	Ø 250 mm
B	Ambient air return	Ø 200 mm	Ø 250 mm
C	Ambient air distribution	Ø 200 mm	Ø 250 mm
D	Fresh air intake	Ø 200 mm	Ø 250 mm

5.2 AIR DISTRIBUTION / EXHAUST SYSTEM

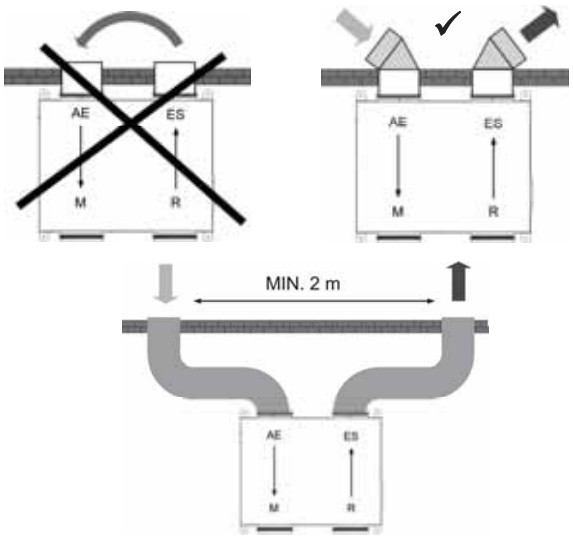
If the duct outlets for the outdoor air inlet and exhaust are outside of coverage, must end with a 90 ° bend downward, to prevent entry of water from the air inlet, if they are outside the roof, they must end with roof hoods (not provided by Clivet), so as to prevent water from entering. During the design stage, their features must limit load losses so as not to affect the correct operation of the unit.

To perform the ductings:

- Connect the ductings fixing them to the connections with the special hookings to the circular flanges.
- The duct weight should not lie on the connection flanges.
- Put antivibration joints between ducts and units.
- The connection to the flanges and among the different duct sections must guarantee the air seal, avoiding air dispersions in supply and return that penalize the overall efficiency of the installation.
- Limit the pressure drops by optimizing the path, the type and the number of curves and branches.
- Use curves of large radius.
- Thermically insulate the supply ducts to avoid heat losses and condensate.

Do not cover the nozzles/grilles with objects (furniture, wardrobes, etc.), which would prevent the regular circulation of air in the room.

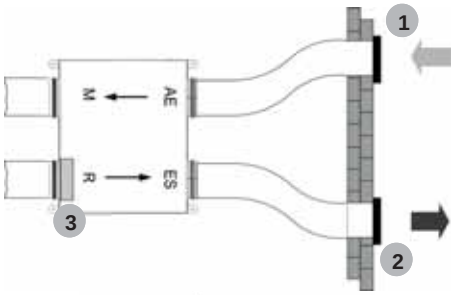
Avoid recirculation of exhaust/return air

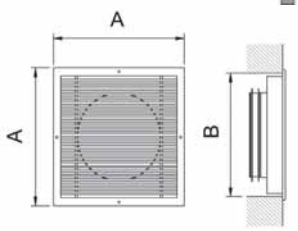


Exhaust/return grille (GR150X - GR200X - GR250X)
Accessory separately supplied

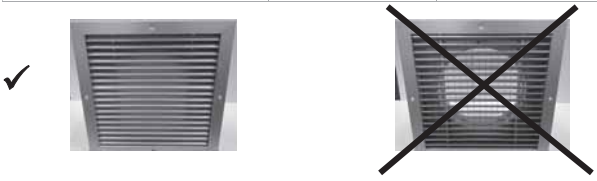
Install on:

1. Fresh air intake
   to be placed in an area with a low concentration of impurities (dust, odours, exhaust fumes, etc.).
2. Ambient air exhaust
   away from terraces, balconies, property boundary lines; avoid windward zones.
3. Ambient air return
   of the filter to avoid soiling the coil (size 200-500)



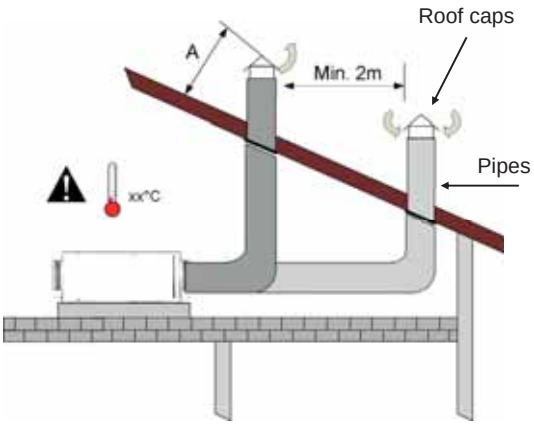


Size	A	B
70-120	226	206
200-300	310	276
500	370	336



Rooftop exhaust/return

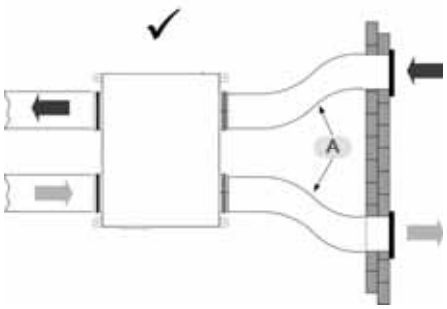
Unit installed in the attic with ejection/intake on the roof. Install pipes and roof hoods (not provided by Clivet).



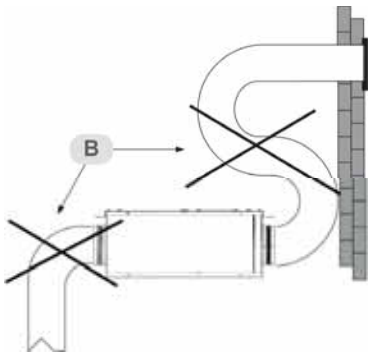
A ≥ 500 mm In areas with abundant snowfalls

Insulated flexible pipe

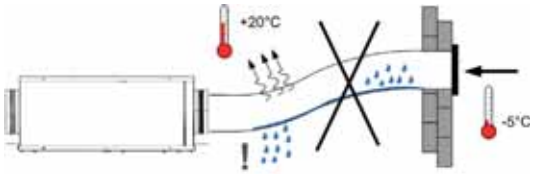
A. Thermically insulate the supply ducts to avoid heat losses and condensate.

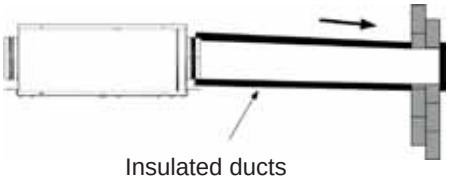


B. Avoid compressing the pipes and tight bends to prevent any pressure drop.
The flexible pipe supplied by Clivet allows bends of 180° to be made without any compression and without any reduction in pressure drop



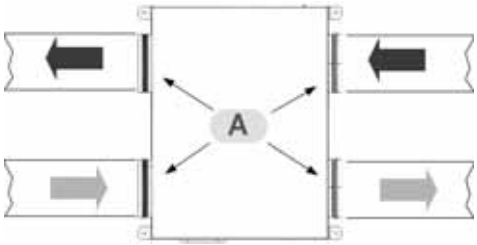
The ducts should not be tilted towards unit to avoid the condensate and water return.



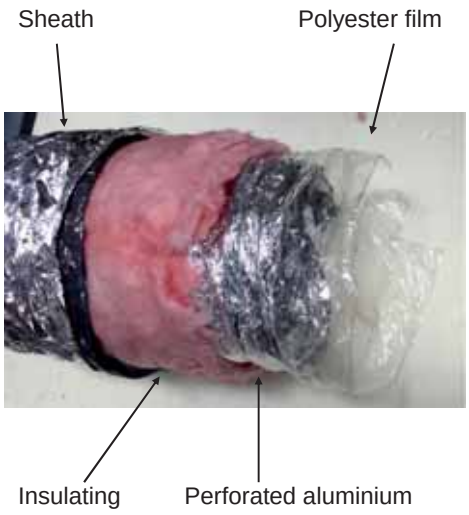


Insulated ducts

A - Flexible pipe fixing



Layers of the flexible pipe



1 - Introduce the perforated aluminium part

2 - Pull the polyester part down (plastic)

3 - Tighten well using the strap

4 - Pull the insulating layer down

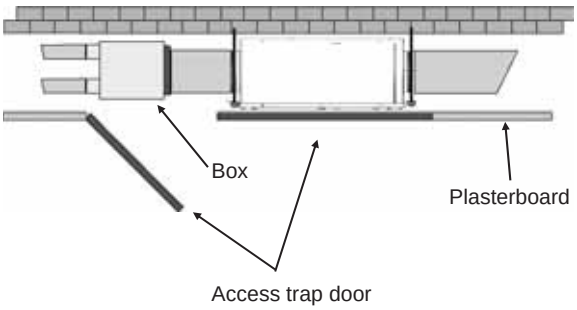
5 - Pull the sheath down

6 - Tighten well using the strap

Air distribution box (can be inspected)

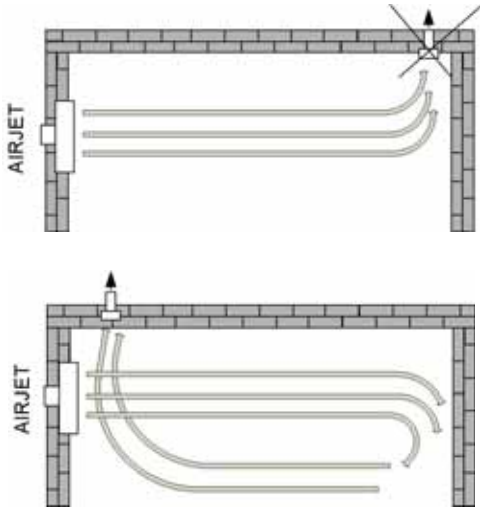
If there is enough space between the ceiling and the box, the acoustic insulation can be further improved by further covering the air distribution box.

Use soundproof material (low-density polyester fibre is recommended).



AIRJET supply diffuser + extraction valve

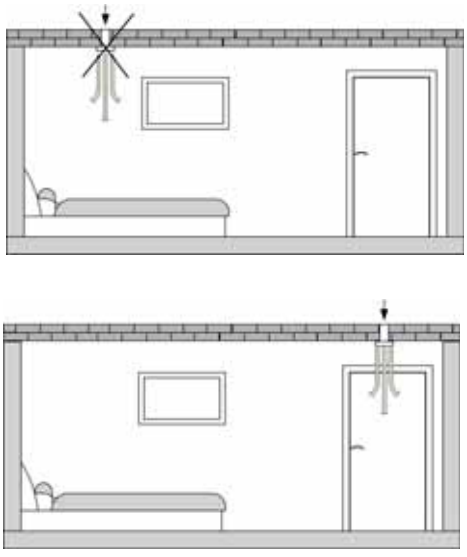
The extraction valve must not be positioned on the side facing the air supply.



Air distribution valve (VIEX)

The air distribution valve must not be positioned above the bed, for example.

Adjust the valve so that the air supply does not exceed 30m^3/h.



Warning

During the installation, carefully close all the open points of the aeraulic system as well as the intake/ supply grilles in order to prevent dust and debris from the construction site from entering the pipes.

This way you can prevent the unit from clogging when it is started for the first time and also avoid any additional costs for the cleaning of the aeraulic system and the unit.

5.4 AERAULIC SYSTEM

Before installing the aeraulic system, check the passages of the pipes and position of the accessories based on the design.

- Unit position:
  in a specific room (where temperature never drops below 0°C), away from bedrooms. Check useful height available in relation to the unit's height and local regulatory constraints.

- Choose the position of the fresh air intake:
  check local regulations (especially the minimum height between the lower point of the intake and the ground)
  avoid positions excessively close to the ground (entry of odours / radon)
  choose the shortest possible distance from the unit
  install anti-intrusion grilles to prevent small animals or leaves from entering (accessory supplied separately)
  prevent water infiltrations
  avoid positions close to windows, terraces, etc.
  avoid positions close to flues of boilers, extractors, etc.
  avoid vehicle parking areas
  avoid bypasses with stale air exhaust

- Choose the position of the exhaust outlet:
  see previous point
  avoid positions close to windows, terraces, etc.
  avoid windward zones
  avoid pedestrian passages
  avoid unventilated attics, garages, basements

- Supply and return box:
  to be installed in a barycentric position, so the air ducts have a similar height

- Choose the rooms with air intake: living room, bedrooms, study, etc…...

- Identify the position of the intake nozzles (ceiling, wall, or floor)

- Choose the rooms with air extraction:
  kitchen, bathroom, store rooms, lofts, dry cleaners, walk-in closet, etc.
  avoid suction from the kitchen hood, as it is too close to the hob. Minimum horizontal distance from the hob ~ 1 m

- Choose the outlets:
  always high, as this position facilitates moisture extraction

- Check the passage of air between the various rooms (a gap below the door of 1 cm approx.) to allow air circulation

6 - ELECTRIC CONNECTIONS

6.1 ELECTRICAL CONNECTION DIAGRAM

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

The unit must be installed with an Creepage Breaker near the power supply and must be effectively earthed.

A creepage breaker must be installed adjacent to the power supply

Set the electric leakage protector according to the relevant electric technical standards of the State.

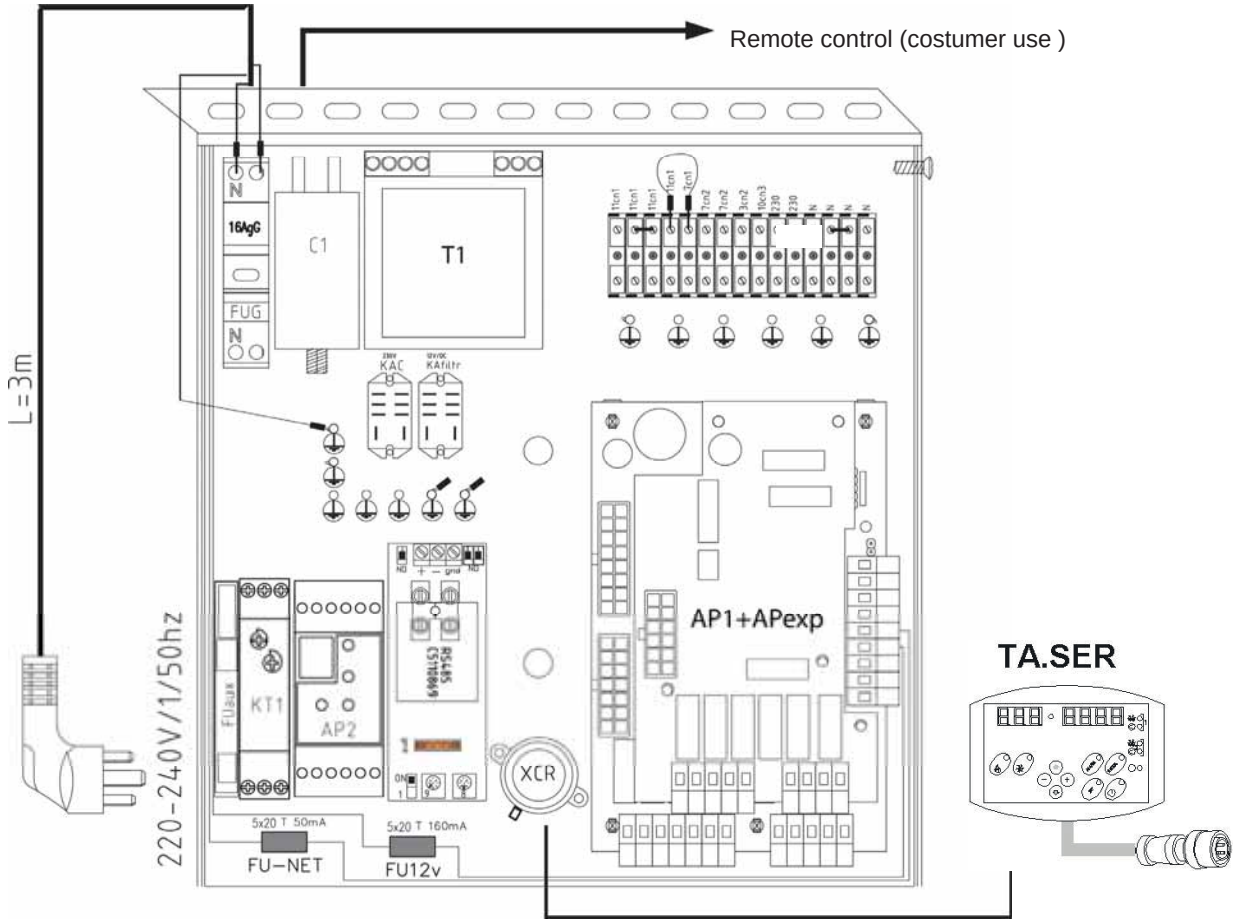
After wire connection, check it again and make sure the correctness before power on.

Do not use water pipes to earthing connection of the unit

WARNING

This unit is required reliable earthing before usage, otherwise might cause death or injury.

PRINCIPAL ELECTRICAL PANEL - CPAN-U 70-120



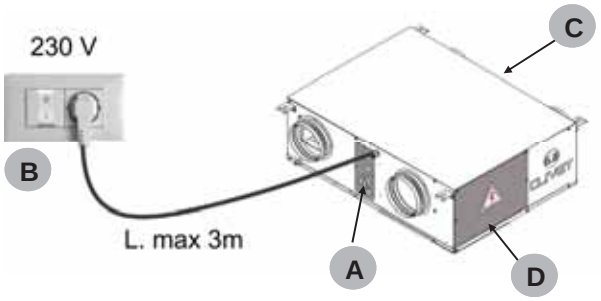
AP1	Main control module	**KAC**	Compressor control relay
APexp	Expansion module	**KAfiltr.**	Auxiliary relay
FUG	Fuse	**KT1**	Timer
FU. Aux	Auxiliary circuit fuse	**T1**	Aux. circuit transformer
FU 12v	Protection fuse 12v (AP1) 5x20 T 160mA	**RS485**	RS485 converter module
FU NET	Protection fuse NET (AP1) 5x20 T 50mA	**XCR**	Connection of the service keypad

There are 2 card (AP1) protection fuses (FU 12v and FU NET) in order to protect itself from any connection errors of the HID-P1 Keypad

6.2 ELECTRICAL CONNECTION DIAGRAM

CPAN-U 70 - 120

A - Remote control (costumer use)
B - 230/1/50 power supplì
Provide the power outlet (on/off switch + schuko)
C - Electric heater
D - Electrical panel

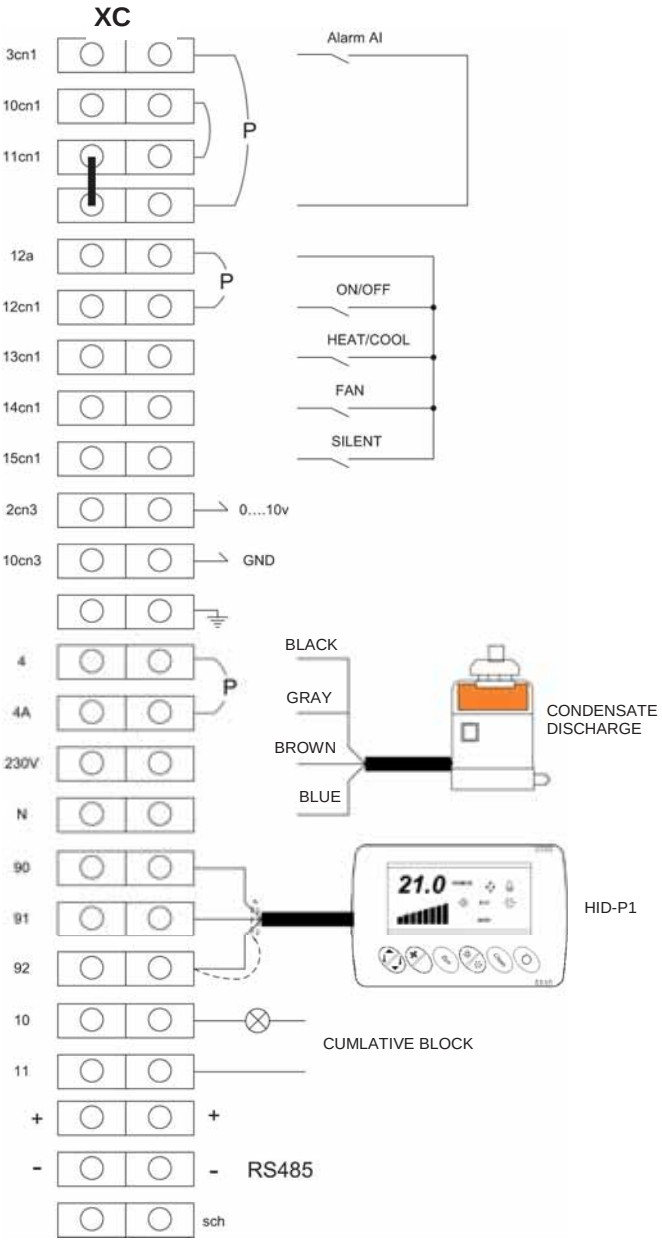


REMOTE CONTROLS

Refer to the unit electrical diagram (the number of the diagram is shown on the serial number label).

Access :

1. Unscrew the panel screws
2. Identify the control
3. Make a hole in the cable sleeve
4. Remove the jumper (P)on the terminal block if the control is used
5. The control connect



Remote summer-winter selector switch (heat/cool)

It allows the change of the operating mode from heating to cooling from an external control.

- Set parameter 161
  = 0 only from keypad/thermostat
  = 1 control only from remote control

On - Off

Remove the jumper **12cn1 and 12a** on the **XC** terminal block

- Set parameter 162 :
  = 0 only from keypad/thermostat
  = 1 control only from remote control

Silent

It reduces the fan speed.

- Set parameter 224
  = 0 disabled
  = 1 from digital input
  = 2 digital / supervisor input

Ventilation (fan)

Only the fans are actives and no check on the temperature and humidity is performed (compressor, humidifier and resistances are disabled).

Fire signalling (alarm AI)

In case of alarm signalling from a fire surveying station, the unit can put the ambient:

- in negative pressure
- in pressure
- maintains a neutral ambient

Set parameter 91 :
= 0neutral ambient
= 1 depressurized ambient
= 2 ambient in pressure

Remove the jumper **11cn1 and 3cn1** on the **XC** terminal block.

Connect the alarm signalling to terminals **11cn1 and 3cn1.**

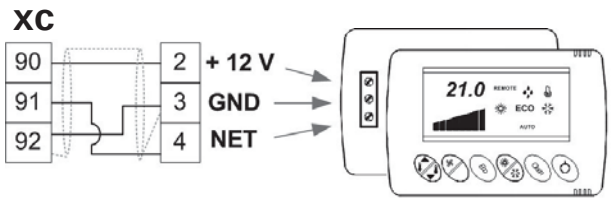
Cumlative block

Unit blocked signal

HID-P1 AMBIENT THERMOSTAT

Compulsory with humidifier option or if the ELFOCONTROL[3] not present .
Connect the HID-P1 ambient thermostat as indicated in the figure.
Connections :

- 3x0,34mm[2] shielded
- max. length 80 m



Pressing any button of the thermostat there is not control / communication check the fuses (FU 12v and FU NET).

If the fuses are burnt replace them and check the connections.

HID-Ti5[2] - REMOTE CONTROL WITH TOUCH SCREEN DISPLAY, FOR BUILT-IN INSTALLATION (BOX 503) OR FOR WALL INSTALLATION.(option)

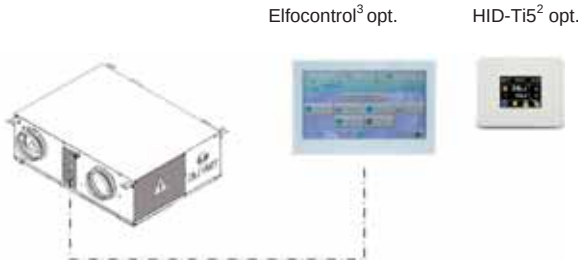
Remote user keypad, to control the unit main functions.

To use the keyboard, you need:

- AL12X - 12Vdc power supply unit (supplied separately)
- CMMBX - RS485 serial communication module

(supplied separately)

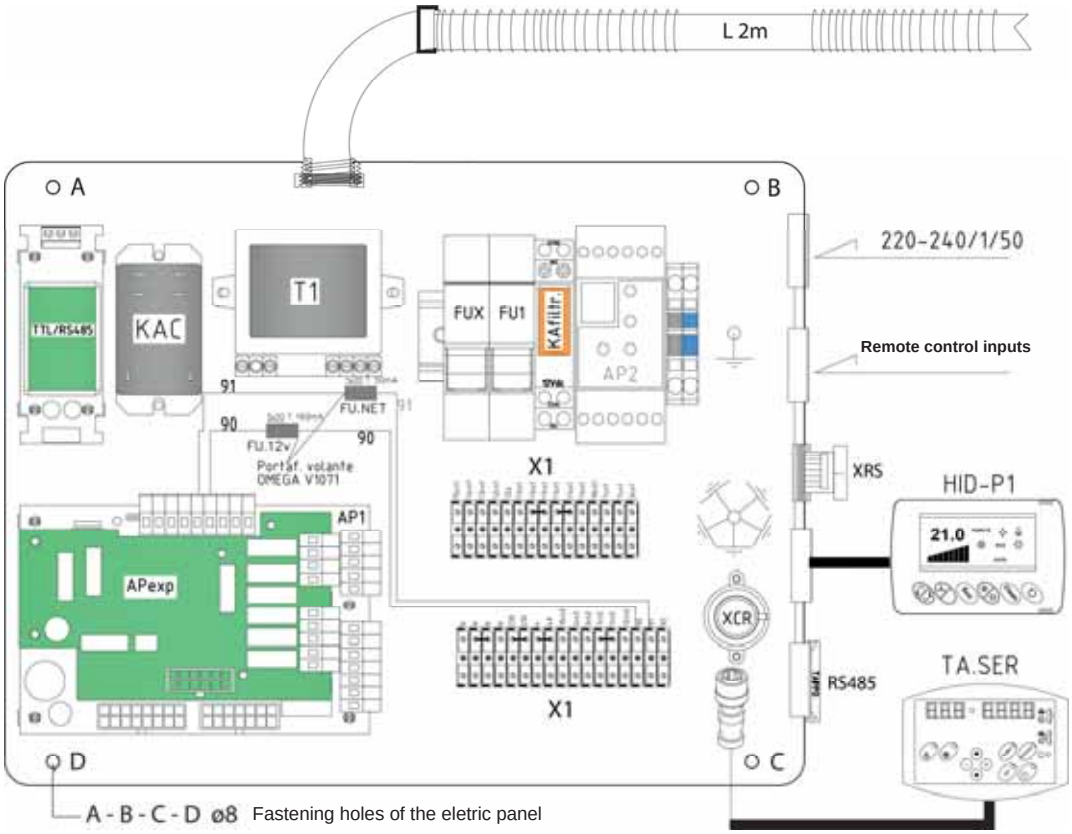
For details, see instructions accessory.



On the RS485 board is possible to connect only one control,Elfocontrol[3] or remote HID-Ti5[2] keypad.

NOT BOTH

REMOTE ELECTRIC PANEL - CPAN-U 200 - 500



AP1	Main control module	**KAfiltr.**	Relay
AP exp	Expansion module	**T1**	Aux. circuit transformer
FU1	Compressor fuse	**RS485**	Serial communication module
FUX	230v auxiliary circuit protection fuse	**XCR**	Connection of the service keypad
FU 12v	Protection fuse 12v (AP1) 5x20 T 160mA	**XRS**	Connection of the preheating resistances
FU NET	Protection fuse NET (AP1) 5x20 T 50mA	**X1**	Terminal block of the Customer connections
KAC	Compressor control relay		

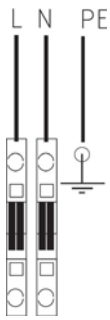
There are 2 card (AP1) protection fuses (FU 12v and FU NET) in order to protect itself from any connection errors of the HID-P1 Keypad

POWER SUPPLY

The holes for passing the electric lines are present on the electric panel.

To connect:

- Remove the hole protection cover
- Pull the cable up to the connection terminal
- Carry out the connection in accordance with the electric connection layout
- Ensure that the cable is correctly inserted and blocked in the clamp.

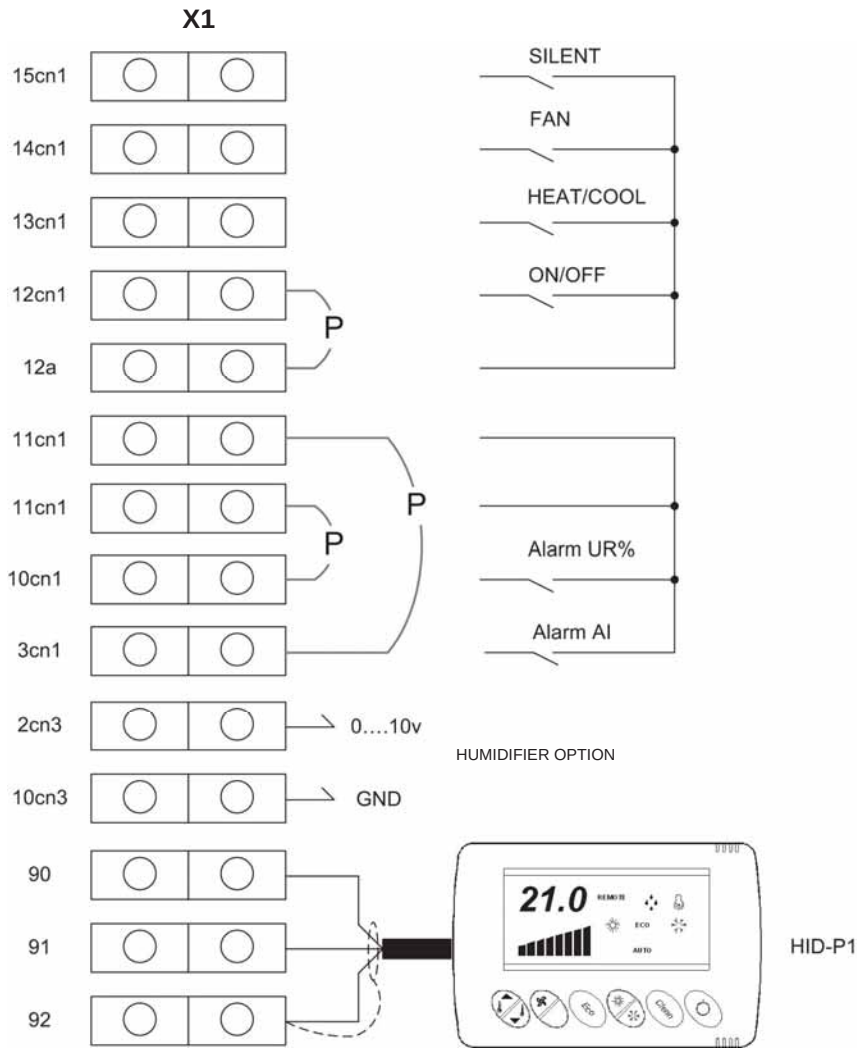


REMOTE CONTROLS

Refer to the unit electrical diagram (the number of the diagram is shown on the serial number label).

Remove the jumper (P) on the terminal block if the control is used

The control connect



Remote summer-winter selector switch (heat/cool)

It allows the change of the operating mode from heating to cooling from an external control.

- Set parameter 161
  = 0 only from keypad/thermostat
  = 1 control only from remote control

On - Off

Remove the jumper **12cn1 and 12a** on the **X1** terminal block

- Set parameter 162 :
  = 0 only from keypad/thermostat
  = 1 control only from remote control

Silent

It reduces the fan speed.

- Set parameter 224
  = 0 disabled
  = 1 from digital input
  = 2 digital / supervisor input

Ventilation (fan)

Only the fans are actives and no check on the temperature and humidity is performed (compressor, humidifier and resistances are disabled).

Fire signalling (alarm AI)

In case of alarm signalling from a fire surveying station, the unit can put the ambient:

- in negative pressure
- in pressure
- maintains a neutral ambient

Set parameter 91 :

= 0neutral ambient
= 1 depressurized ambient
= 2 ambient in pressure

Remove the jumper **11cn1 and 3cn1** on the **X1** terminal block.

Connect the alarm signalling to terminals **11cn1 and 3cn1.**

Humidifier signalling (alarm UR%)

Signalling of the winter humidification function block

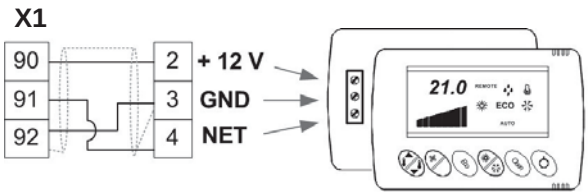
HID-P1 AMBIENT THERMOSTAT

Compulsory with humidifier option or if the ELFOCONTROL^3 not present .

Connect the HID-P1 ambient thermostat as indicated in the figure.

Connections :

- 3x0,34mm^2 shielded
- max. length 80 m



Pressing any button of the thermostat there is not control / communication check the fuses (FU 12v and FU NET).

If the fuses are burnt replace them and check the connections.

HID-Ti5^2 - REMOTE CONTROL WITH TOUCH SCREEN DISPLAY, FOR BUILT-IN INSTALLATION (BOX 503) OR FOR WALL INSTALLATION.(option)

Remote user keypad, to control the unit main functions.

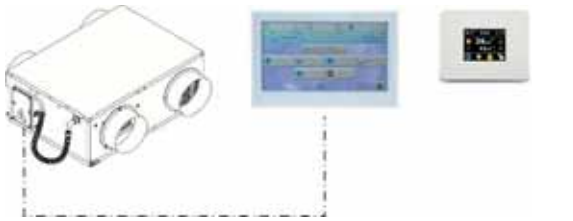
To use the keyboard, you need:

- AL12X - 12Vdc power supply unit (supplied separately)
- CMMBX - RS485 serial communication module

(supplied separately)

For details, see instructions accessory.

Elfocontrol^3 opt. HID-Ti5^2 opt.



On the RS485 board is possible to connect only one control,Elfocontrol^3 or remote HID-Ti5^2 keypad.

NOT BOTH

7.1 PRELIMINARY INFORMATION

General

- The indicated operations should be done by qualified technician with specific training on the product.
- The service centres shall perform by request the start-up; the electrical, hydraulic connections and the remaining work on the system are provided by the installer.
- Agree upon the start-up date with the service centre sufficiently in advance .

Before checking, please verify that :

- the unit should be installed properly and in conformity with this manual.
- the electrical power supply line should be sectioned at the beginning.
- the line sectioning device is open, locked and equipped with the suitable warning signs.
- ensure no voltage 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.

Refrigerant circuit

- Visually check the refrigerating circuit: the presence of oil stains can mean leakage (caused, for example, by transport, handling or other).

⚠ - **Use the pressure taps only if you need to load or unload the refrigerant circuit.**

Hydraulic circuit

If the humidifier is present:

- Before realizing the unit connection make sure that the hydraulic system has been cleaned up and the clearing water has been drained .
- Check that the water circuit has been charged and pressurised .
- Check that the cut-off valves on the circuit are in the "OPEN" position.
- Check that no air is present in the circuit, if required, evacuate using the air bleeding valve placed at the system's high points.

Aeraulic system

Verify that:

- the rooms are clean (free from dirt)
- possible dampers are opened and calibrated
- the air filters are not removed from unit and are cleaned (possible ventilation checks and the operating starting period determinate a ducting “cleaning” with consequent filter precocious clogging, filters that must be cleaned and replaced)
- ducting are completed, connected and without obstructions
- Grilles, outlets, and diffusers must be free of obstructions (furniture, shelves, etc.), open and pre-calibrated, so as to ensure proper air distribution, which is essential to comfort in the room

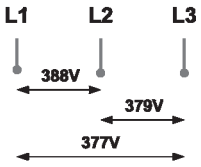
Electrical circuit

- Verify that the unit is connected to the ground plant .
- Check tightening of the conductors: the vibrations caused by handling and transport might cause loosing . ⚠
- Feed the unit by closing the sectioning device, but leave it on OFF
- Check the voltage and frequency net values which must be within the limits:

220 - 240/1/50 +/- 10%

Check that the phases unbalancing must be lower than 2%

Example:



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

2) MAX - A = 388 – 381 = 7

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

The operating out of the limits can cause irreversible damages and makes decay the warranty. ⚠

Voltages

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

With unit at steady state, i.e. in stable and close-to-work conditions, check:

- supply voltage
- unit total absorption
- absorption of each electric load.

Remote controls / consents

Check that the used remote controls are wired and enabled with the respective parameters :

- ON-OFF
- Summer-Winter
- Silent
- Ventilation
- Electric resistances
- Humidifier

PRELIMINARY CHECKS

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.

Before starting the unit, make sure that the room is free of dust and debris and that the conduits are not blocked

The following check list is a brief reminder of the points to check and of the operations to perform to start-up the unit.
For details refer to the various chapters in the manual.

	√	**Preliminary checks verify the presence/efficiency of:**	Pag
1	☐	Safe access	
2	☐	Are the functional spaces being observed	16
3	☐	Structure integrity	
4	☐	Unit in bubble level	16
5	☐	Unit on vibration isolators	19
6	☐	Return air filter available (size 200-500 necessary)	89
7	☐	Presence of anti-intrusion grille against small animals or leaves (option)	25
8	☐	Air flow: correct return and supply (no bypass)	25
9	☐	Completed aeraulic system	
10	☐	Insulation of supply conduits to room and air exhaust conduits	25
11	☐	Presence of anti-vibration joints between the conduit and unit (e.g. canvas conduits)	
12	☐	Condensate drain with trap - sloping	23
13	☐	Presence of electric heater (option) - installed correctly	7/79
14	☐	Presence of humidifier (option - sizes 200-500 only) - installed correctly	81
15	☐	Presence of electrostatic filter (option)	90
16	☐	Visual check of oil / leak presence	
17	☐	Electrical connections provided by the customer	30/33
18	☐	Earthing connection	
19	☐	Proper overload fuse or circuit breaker protection installed.	
20	☐	Power supply cables separated by signal cables	

START-UP SEQUENCE

During the initial start-up procedure, the fan airflow rates must be adjusted in order to balance the amount of air entering and exiting the environment.

Door and windows must be mounted.

External doors and windows must be closed.

Instruments needed in addition to normal instruments.

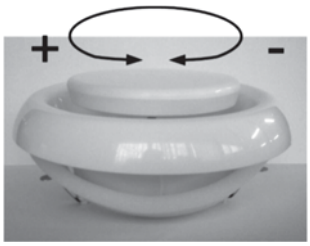
- Anemometer complete with probe to measure the differential pressure and vane probe.
- Aeraulic system plan compete with flow rates into the individual rooms.
- Rectangular and circular extensions to rest on the inlets in rooms in order to ensure an even air flow rate of the supply nozzles and extraction valves when this is measured.

	√	Start-up sequence	Pag
1	☐	Powered unit	45
2	☐	Unit ON	
3	☐	Check for unusual vibrations or noise with the compressor and fans activated	
4	☐	Verify that the inlets/outlets in the room and any dampers in the conduits are open	
5	☐	Check the airflow (anemometer) by taking a reading directly on the external inlets and outlets (see table on page 40)	
6	☐	Impossible to access the external inlets/outlets, check the airflows in the room using the following formula: **Airflow m^3/h = Area (m^2) x Speed (m/s) x 3600 seconds**	
7	☐	Set the unit to winter mode ventilation only	
8	☐	Start the unit: when it reaches full power, with the compressor on verify that the evaporation pressure (status 51) exceeds 7 bar (values 200-600) and 1.8 bar (values 70-120), and that the temperature difference between the external air (status 4) and the supply air (status 50) is at least 10°C in summer mode and at least 15°C in winter mode.	
9	☐	Fans operation check	
10	☐	With the compressor on, verify that the unit's power supply voltage falls between 207-253 V	
11	☐	Fan configuration (size 200-500)	41
12	☐	No anomalous vibrations check	
13	☐	Instruct the operator on how to switch the device on/off, change the set-point and clean the filter	101
14	☐	Collect all the machine documentation and give it to the customer together with the commissioning report duly completed and signed.	

Adjustable vents

VIEX - Extraction/intake valve

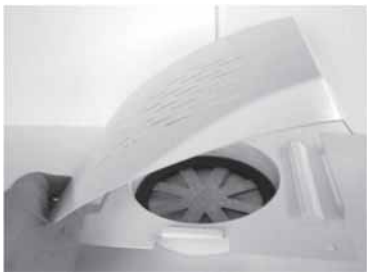
Closed



GQIEX - Extraction/intake squared grille

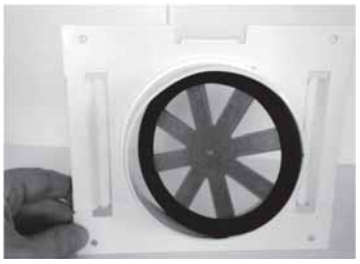
1 - Unhook

2 - Remove

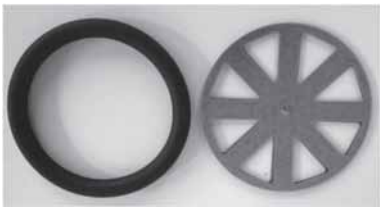


3 - Overturn

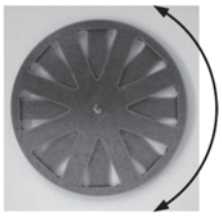
4 - Extract



5 - Remove rubber



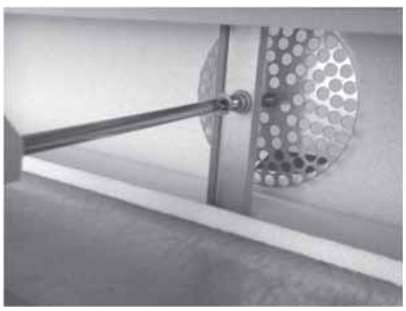
6 - Rotate



PAIR50X/80X - Suction/supply plenum with control damper

1 - Closed

2 - Adjust with screwdriver



START-UP SEQUENCE

	√	HEATER OPERATION CHECK (option)	Pag.
1	☐	set the unit to heating mode	45
2	☐	temporarily set parameter 208=1	
3	☐	with the unit not powered, open the compressor's fuse holder (FU1 to sizes 200-500 / FUG to sizes 70-120)	29/32
4	☐	start the unit and wait until the heaters begin treating the supply air	
5	☐	with the unit not powered, set parameter 208=0	
6	☐	close the compressor's fuse holder	

	√	HUMIDIFIER OPERATION CHECK (option, sizes 200-500 only)	Pag.
1	☐	set the unit to heating mode	45
2	☐	through the ambient thermostat (parameter P05) or service keypad (parameter 30), set the humidity set-point to 90%	
3	☐	check that the cylinder fills with water and starts boiling	
4	☐	a full cylinder combined with a very low current absorption value (with respect to the nominal value indicated on the cylinder) and a delay in boiling do not imply any malfunctions, but indicate that the water is poorly conductive and that the cylinder will take some time to reach full power	

AIRFLOW TABLES

Airflows measured on the external inlets/outlets.
Example of conduits:

circular tube Ø mm	airflow m^3/h	speed medium m/s
125	70	1,59
150	**70**	**1,10**
200	70	0,62
125	120	2,72
150	**120**	**1,89**
200	120	1,06
160	200	2,76
200	**200**	**1,77**
250	200	1,13
160	300	4,15
200	**300**	**2,65**
250	300	1,70
200	500	4,42
250	**500**	**2,83**
315	500	1,78

rectangular tube (LxH)		airflow m^3/h	speed medium m/s
150	80	70	1,62
180	**100**	**70**	**1,08**
250	100	70	0,78
160	80	120	2,60
180	**100**	**120**	**1,85**
300	100	120	1,11
250	80	200	2,78
300	**100**	**200**	**1,85**
400	120	200	1,16
250	80	300	4,17
300	**100**	**300**	**2,78**
400	120	300	1,74
300	100	500	4,63
400	**120**	**500**	**2,89**
450	140	500	2,20

square tube (L x H)		airflow m^3/h	speed medium m/s
110	110	70	1,61
130	**130**	**70**	**1,15**
180	180	70	0,60
110	110	120	2,75
140	**140**	**120**	**1,70**
180	180	120	1,03
140	140	200	2,83
180	**180**	**200**	**1,71**
220	220	200	1,15
140	140	300	4,25
170	**170**	**300**	**2,88**
220	220	300	1,72
180	180	500	4,29
220	**220**	**500**	**2,87**
280	280	500	1,77

7.2 FAN CONFIGURATION - CPAN-U 200 - 500

Depending on the ducting pressure drops are available three configurations that can be set by the ambient thermostat through the parameter modification.

The setting must be performed both for the exhaust fan and for the supply fan.

Fan parameters

EXHAUST	P01	= 1 Low pressure drop	~ 40 Pa
		= 2 Medium pressure drop	~ 80 Pa
		= 3 High pressure drop	~ 120 Pa
SUPPLY	P08	= 1 Low pressure drop	~ 40 Pa
		= 2 Medium pressure drop	~ 80 Pa
		= 3 High pressure drop	~ 120 Pa

On your keyboard:

P01 = SetUpFanRip = p232

P08 = SetUpFanMan = p233

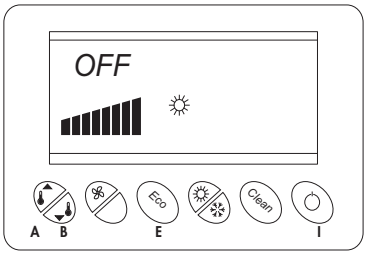
PARAMETER MODIFICATION

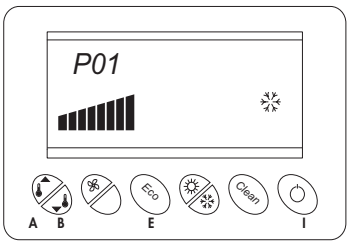
By the ambient thermostat is possible to set the unit changing some parameters.

- Position the main installation switch on “On”.
- The display is switched on in Off.
- Press the On-Off button (**I**) for 5 seconds until on the display is visualized the ambient setpoint value.
- Immediately press both buttons for the Setpoint Control (**A - B**) until the code is visualized.
- To switch to another parameter use the buttons for the setpoint Control (**A - B**) .
- Press the Eco button (**E**) to visualize the parameter value.
- Use the buttons for the setpoint Control (**A - B**) to modify the value.
- Press the Eco button (**E**) to save.

To exit from the scheduling mode:

- Press both the buttons for the setpoint Control (**A - B**) until the parameter code is visualized
- If no action is performed, after 10 seconds the thermostat will exit from the scheduling mode





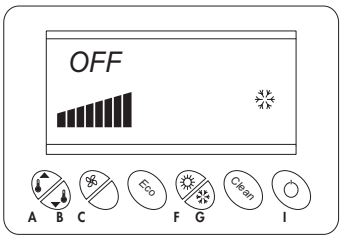
A Ambient setpoint control button up
B Ambient setpoint control button down
E Eco
I On - Off

7.3 CHECK OF THE AIR FLOW CPAN-U 200 - 500

After the fan configuration in function of the installation pressure drop it is necessary to check the air flows.

Set the unit in heating mode:

1. Hold the On-Off button (I) for 5 seconds until the unit start-up.
2. Hold the ventilation button(C), the unit is started-up in the ventilation only mode.
3. Hold the Heating button down (G) for 5 seconds, until the symbol ❄ appears.If ventilation fails to start, it means that the outdoor temperature is too low or high. In this case, modify parameters 226/227 "LimitNewAir" from the service keyboard (remember to restore their values at the end of the procedure).
4. Measure the total air flow of the intake/ejection grilles and make sure that it matches with the nominal one (see air flow tables)



5. **RETURN AIR**

If the return air flow is high:
set P01 = 2
If it is still high:
set P01 = 1
If it is still high:
decrease the value of the parameters

Par.		Description
189	NomHeatRip_0	Nominal value of the return fan control in Heat (with SetUpFanRip= 0)
190	NomCoolRip_0	Nominal value of the return fan control in Cool (with SetUpFanRip= 0)

If the return air flow is low:
set P01 = 2
If it is still low:
set P01 = 3
If it is still low:
increase the value of the parameters

Par.		Description
254	NomHeatRip_3	Nominal value of the return fan control signal in Heat (with SetUpFanRip= 3)
255	NomCoolRip_3	Nominal value of the return fan control signal in Cool (with SetUpFanRip= 3)

Service keypad:

P01 = parameter 232

P08 = parameter 233

6. SUPPLY

If the supply air flow is high::
set P08 = 2
If it is still high:
set P08 = 1
If it is still high:
decrease the value of the parameters

Par.		Description
191	NomHeatMan_0	Nominal value of the supply fan control in Heat (with SetUpFanMan= 0)
192	NomCoolMan_0	Nominal value of the supply fan control in Cool (with SetUpFanMan= 0)

If the supply air flow is low:
set P08 = 2
If it is still low:
set P08 = 3
If it is still low:
increase the value of the parameters

Par.		Description
256	NomHeatMan_3	Nominal value of the supply fan control signal in Heat (with SetUpFanMan= 3)
257	NomCoolMan_3	Nominal value of the supply fan control signal in Cool (with SetUpFanMan= 3)

7. Hold the Ventilation button (C) down to exit the Ventilation Only mode

Excessively high flow rates may be a source of acoustic discomfort.
Flow rates lower than 15% compared to the nominal one are sources of malfunctions and may cause the ejection coil to freeze and thus occasionally loose condensate.

⚠ Ejection/Supply values must always fall within the parameters' limits, even when being modified: from 185 to 188; from 234 to 237; from 242 to 245; from 250 to 253. DO NOT MODIFY

CHECK OF THE AIR FLOW CPAN-U 70-120

The unit automatically configures the flow rate based on the system's load losses.

If needed, you can take action as indicated.

RETURN AIR

If the return air flow is high:
decrease the value of the parameters

Par.		Description
189	NomHeatRip_0	Nominal value of the return fan control in Heat (with SetUpFanRip= 0)
190	NomCoolRip_0	Nominal value of the return fan control in Cool (with SetUpFanRip= 0)

If the return air flow is low:
increase the value of the parameters

Par.		Description
189	NomHeatRip_0	Nominal value of the return fan control in Heat (with SetUpFanRip= 0)
190	NomCoolRip_0	Nominal value of the return fan control in Cool (with SetUpFanRip= 0)

Service keypad:

P01 = parameter 232

P08 = parameter 233

SUPPLY

If the supply air flow is high:
decrease the value of the parameters

Par.		Description
191	NomHeatMan_0	Nominal value of the supply fan control in Heat (with SetUpFanMan= 0)
192	NomCoolMan_0	Nominal value of the supply fan control in Cool (with SetUpFanMan= 0)

If the supply air flow is low:
increase the value of the parameters

Par.		Description
191	NomHeatMan_0	Nominal value of the supply fan control in Heat (with SetUpFanMan= 0)
192	NomCoolMan_0	Nominal value of the supply fan control in Cool (with SetUpFanMan= 0)

Excessively high flow rates may be a source of acoustic discomfort.

Flow rates lower than 15% compared to the nominal one are sources of malfunctions and may cause the ejection coil to freeze and thus occasionally loose condensate.

⚠ Ejection/Supply values must always fall within the parameters' limits, even when being modified: from 185 to 188; from 234 to 237; from 242 to 245; from 250 to 253. DO NOT MODIFY

7.4 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 air flow of the different fluids (water, air) both in input and in output from the unit
- The measurements must be kept and made available during maintenance interventions.

8 - CONTROL

KEYS FUNCTIONS

- Ambient setpoint control up / down
- Ventilation
  Alarm
- Eco (used in combination with other keys)
- Cooling / Heating
- Clean
- ON / OFF

KEYS COMBINATION

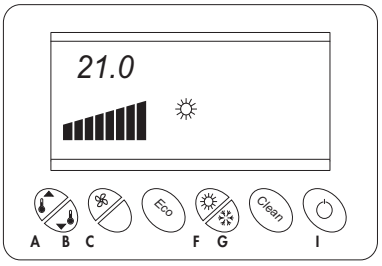
+	It displays the temperature detected in ambient	Long press
	It scrolls down the alarm list of one code at a time	Single press
Eco + Clean	Alarm reset in progress	Long press
Clean +	Button lock / Button unlock	Long press It appears “- - -“ at each press
Clean	Display of supply temperature	Long press

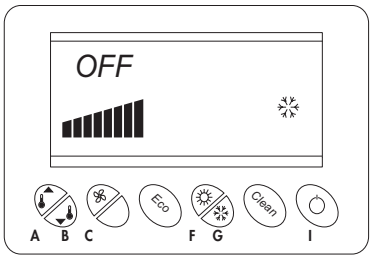
DISPLAY

Icon	Meaning	Notes
	Cooling	Symbols alternatively together
	Heating	
	Humidifier	Visible if active
	Compressor	Visible if active
21.0	Set - point	Ambient temperature
	Fan	Fan speed
REMOTE	Operation managed by supervisor	Visibile if Elfofresh² is connected to a supervisor
AUTO	Automatic operating	Visible if active

8.1 FIRST START-UP

- Position the main switch of the installation on “On”.
- The display is switched on in Off.
- Hold the On-Off button (**I**) for 5 seconds until the unit start-up.
- The ambient setpoint is displayed.
- Select the desired operating mode between heating and cooling.





Heating

- Hold the Heating button (**G**) for 5 seconds until is displayed the Heating symbol
- Use the setpoint Control buttons (**A - B**) to set the desired setpoint

Cooling

- Hold the Cooling button (**F**) for 5 seconds until is displayed the Cooling symbol.
- Use the setpoint Control buttons (**A - B**) to set the desired setpoint.

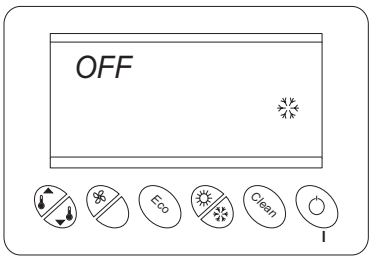
In each of the two modes is possible to activate the function

Ventilation only

- Hold the Ventilation button (**C**) for 5 seconds until the setpoint value is replaced with “- - -”.
- To deactivate, hold the Ventilation button (**C**) for 5 seconds, until the setpoint value is displayed.

8.2 SHUTDOWN

- Hold the On-Off button (**I**) for 5 seconds until the unit shutdown.
- “Off” is displayed
- At the next starting, the unit is started-up in the last set mode



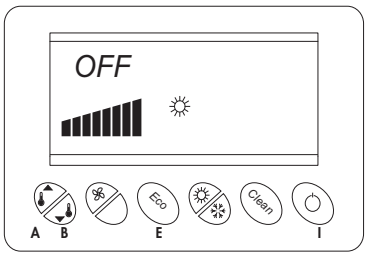
8.3 PARAMETER MODIFICATION

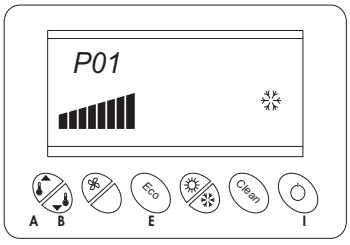
By the ambient thermostat is possible to set the unit changing some parameters.

- Position the main installation switch on “On”.
- The display is switched on in Off.
- Press the On-Off button (**I**) for 5 seconds until on the display is visualized the ambient setpoint value.
- Immediately press both buttons for the Setpoint Control (**A - B**) until the code is visualized.
- To switch to another parameter use the buttons for the setpoint Control (**A - B**) .
- Press the Eco button (**E**) to visualize the parameter value.
- Use the buttons for the setpoint Control (**A - B**) to modify the value.
- Press the Eco button (**E**) to save.

To exit from the scheduling mode:

- Press both the buttons for the setpoint Control (**A - B**) until the parameter code is visualized
- If no action is performed, after 10 seconds the thermostat will exit from the scheduling mode





A Ambient setpoint control button up
B Ambient setpoint control button down
E Eco
I On - Off

8.4 OTHER CONFIGURATIONS

To adapt the unit operating to the installation needs, it is possible to set the operating modifying some parameters by the ambient thermostat.

Par.	Description
P02	manual or auto setpoint enabling (onsetman)
P03	manual or automatic mode change enabling (onmodeman)
P04	humidity setpoint in the Cool mode (seturcool)
P05	humidity setpoint in the Heat mode (seturheat)
P06	outlet temperature setpoint in COOL mode (setoutcool)
P07	outlet temperature setpoint in HEAT mode (setoutheat)
P09	defines the range within which the user can change the unit set point
P10	thermostat temperature probe offset
P11	thermostat humidity probe offset
P12	Clivet Bus thermostat address

8.5 MAIN FUNCTIONS

ELFOFresh[2] treats fresh air: it is used for the air filtration, humidification or dehumidification and the right temperature is reached to guarantee always fresh and clean air in the served rooms.
The temperature control is performed according to the ambient temperature sent by ElfoControl[3], or detected by the HID-P1 thermostat or by the return probe installed built-in.

Heating
In heating are managed the compressor, free-heating (it uses the fresh air heat to heat the room), resistances, humidifier.

Cooling
In cooling are managed the compressor and the free-cooling (it uses the fresh air to cool the room).

Mode change
The change between cooling and heating can be:
AUTOMATIC: according to the outside temperature
MANUAL: by the thermostat button
For the automatic or manual change set the P03 ONModeMan parameter on the ambient thermostat.

Set Point
There are two setpoint : cooling and heating.
The set can be modified in MANUAL or AUTOMATIC mode.

Manual Set Point
In MANUAL mode it is possible to modify the setpoint by thermostat with the buttons A and B (previous page).
The two set are connected to avoid their overlapping. If the cooling set is decreased, also the heating set is automatically decreased.
If the heating set is increased, also the cooling set is automatically decreased.

Automatic Set Point
The setpoint change according to the outside temperature, depending on a curve set by parameters.
The heating setpoint is below the curve; the cooling setpoint is above.

Ventilation
The unit operates as a fan, no control on the ambient temperature.

Winter HR control
Only if is present the humidifier option.
The humidification is enabled only in heating.
The set point can be modified by thermostat with the parameter p05 seturhe-at.

Silent
In this mode the fans are controlled with reduced speeds.
The activation can be performed from digital input or from supervisor.
The enabling is performed by parameter 224 SiletMode:
0=disabled; 1=from digital input; 2=from digital input or supervisor.
The reduction of percentage is defined by the parameter 225 (90% standard)
The silent mode can be activated only in heating .

Button lock / Button unlock
The long pressure of Clean and On-Off buttons, stop all the button functions.
The lockout status is highlighted by characters “---“ at each pressure of any button.

8.6 VENTILATION

AIR FLOW MODULATION

REDUCED FLOW IN WINTER

With an outdoor air temperature lower than -5°C, the flow is reduced (**A**) to maintain the ambient inlet air temperature (**I**) approximately equal to the internal temperature (20°C) .

In this situation the need of ventilation is completely satisfied.

NOMINAL FLOW

With an outdoor temperature included between -5°C and +20°C, the fresh air flow remains constant (**B**).

The ambient inlet air temperature (**II)** increases at the outdoor temperature increasing.

In this situation ELFOFresh^2, in addition to satisfy the needs of ventilation, satisfies in whole or in part the heat request.

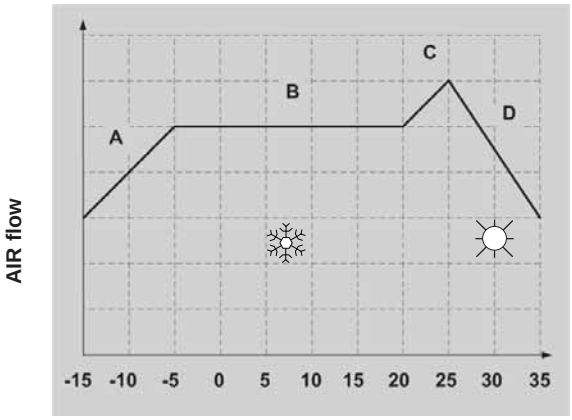
FLOW

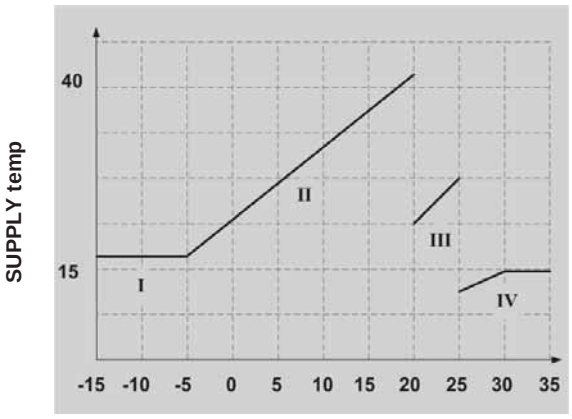
With an outdoor temperature included between +20°C and +24°C is effected a free-cooling increasing the inlet fresh air flow and disabling the compressor (**C**).

The ambient inlet air temperature is equal to the outdoor temperature (**III**).

REDUCED FLOW FOR DEHUMIDIFICATION

In order to effect more effectively the fresh air dehumidification, ELFOFresh^2 reduces the flow modulating the fan speed (**D**), so it is possible to cool the rooms by using the radiant panels and to effectively dehumidify.





STOPPING THE FANS

In certain circumstances, ventilation is stopped to prevent sudden temperature changes in the room.

When the ventilation is turned off, the compressor is turned off as well.

SUMMER

The ventilation is stopped if the temperature:

OUTSIDE

high, more than 40°C

or

AMBIENT

high, more than 35°C

or

SUPPLY

low, below 5°C

or

SUPPLY

high, more than ROOM SETPOINT value + 6°C

WINTER

The ventilation is stopped if the temperature:

OUTSIDE

low, below -15°C

or

AMBIENT

low, below 10°C

or

SUPPLY

low, below 8°C

or

SUPPLY

high, more than 45°C

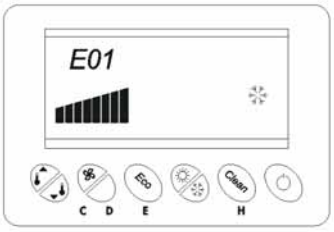
8.7 ALARMS

Whenever the unit is in alarm, on the thermostat display is visualized the code of the alarm in progress.

The code will alternate at intervals of about 3 seconds with the display of the ambient temperature.

In case of multiple alarms will be displayed what occurred first.

To recognize the cause, refer to the ALARM table in the “Technical Information” section.



Alarm visualization

- To display all alarms in progress, press the Alarm button (**D**).
- To scroll down the alarm list press repeatedly the Alarm button (**D**).
- The display will return to normal visualization after 5 seconds from the last pressure on Alarms

Alarm reset

- To reset the alarms press both the Eco (**E**).and the Clean buttons (**H**).

- Before resetting an alarm, identify and remove the cause that generated it.
- Repeated reset can lead to irreversible damages .
- In case of doubt please contact an Assistance Centre.

ALARMS

Alarm	Description	Possible cause	
E00	No communication between thermostat and unit	Check wiring between the thermostat and the unit board Loose wiring, possible failure of the board or the thermostat following an anomaly related to the power supply voltage	M
E01	Inlet temp. Probe fault	Check wiring. Potential probe failure, replace it	A
E02	Outlet temp. Probe fault	Check wiring. Potential probe failure, replace it	A
E03	Externe air temperature probe fault	Check wiring. Potential probe failure, replace it	A
E05	Ambient humidity probe fault	Replace the thermostat.	A
E07	Supply humidity probe fault	Check wiring. Potential probe failure, use a series tester to make sure that the generated signal is within the range (4-20 mA). Replace the probe	A
E10	Water temperature probe fault	Check wiring. Potential probe failure, replace it.	A
E11	Fire alarm	If there is a fire sensor: check the sensor and the wiring. If there is no fire sensor: check the input jumper.	M
E12	Electric heater alarm	If heaters are present: check if powered If heaters are not present: check jumper on input (11cn1 - 7cn1) Dirty air filter Dirty heaters (no filter) No airflow (control the fan) Heater reset (see pag.77)	M
E13	Compressor low pressure	SUMMER insufficient supply air flow rate in ambient - filters air dirty - obstacles air distribution system - supply fan fault Cooling circuit anomaly - Contact a qualified technician. WINTER insufficient exhaust air flow rate - filters air dirty - return installation obstacles from ambient - exhaust fan fault - problems during defrost	A / M
E14	Compressor high pressure	WINTER insufficient supply air flow rate in ambient - filters air dirty - obstacles air distribution system - supply fan fault SUMMER insufficient exhaust air flow rate - filters air dirty - return installation obstacles from ambient - exhaust fan fault	M
E18	Humidifier alarm	problems related to the humidifier	M
E19	Outlet high temp. signaling	the temperature of the air supplied in the room is too high; - the air is not compatible with the unit's operating limits - insufficient supply air flow rate in ambient - filters air dirty - obstacles air distribution system - supply fan fault	A
E20	Outlet 2 high temp. signaling	the temperature of the air supplied in the room is too high; - the air is not compatible with the unit's operating limits - insufficient supply air flow rate in ambient - filters air dirty - obstacles air distribution system - supply fan fault	A / M

ALARMS

Alarm	Description	Possible cause	
E21	Outlet low temp. signaling	the temperature of the air supplied in the room is too low; - the air is not compatible with the unit's operating limits - insufficient supply air flow rate in ambient - filters air dirty - obstacles air distribution system - supply fan fault	A
E22	Outlet 2 low temp. signaling	the temperature of the air supplied in the room is too low; - the air is not compatible with the unit's operating limits - insufficient supply air flow rate in ambient - filters air dirty - obstacles air distribution system - supply fan fault	A / M
C23	Clogged filter signal	filters that need to be cleaned	A
E25	Ventilation block due to external low air temperature	The external air is not compatible with the unit's operating limits and the compressor cannot operate. Introducing air that is too cold with the compressor off would mean cooling the room, something that should be avoided. The only solution is to wait for the outside environment to become warmer	A
E26	Ventilation block due to external high temperature air	The external air is not compatible with the unit's operating limits and the compressor cannot operate. Introducing air that is too warm with the compressor off would mean warming up the room, something that should be avoided. The only solution is to wait for the outside environment to become cooler	A
E27	Ventilation block due to ambient low temperature	The air inside the house is not compatible with the unit's operating limits. This might mean that there is no main heating system or that it is not running. This is an air renewal unit with heat recovery and not a heating device: wait for the room to reach the right temperature and then turn on the unit	A
E28	Ventilation block due to ambient high temperature	The air inside the house is not compatible with the unit's operating limits. This might mean that there is no main air-conditioning system or that it is not running. This is an air renewal unit with heat recovery and not an air-conditioning device: wait for the room to reach the right temperature and then turn on the unit	A
E29	Unit configuration error	internal anomaly	A
E31	Alarm of max supply temperature limit	the temperature of the air supplied in the room is too high; poor air flow rate due to dirty air filters or features of the system	M
E33	Recovery compressor lockout for low temperature ambient (heat mode)	The air inside the house is not compatible with the unit's operating limits. This might mean that there is no main heating system or that it is not running. This is an air renewal unit with heat recovery and not a heating device: wait for the room to reach the right temperature and then turn on the unit	A
E34	Recovery compressor lockout for high ambient air temperature (cool mode)	The air inside the house is not compatible with the unit's operating limits. This might mean that there is no main air-conditioning system or that it is not running. This is an air renewal unit with heat recovery and not an air-conditioning device: wait for the room to reach the right temperature and then turn on the unit	A
C35	Humidifier on in antifreeze protection	see E04	A
C/E36	Pressure transducer fault	Check wiring and values detected by the transducer. Potential transducer failure, replace it	A
C37	Fans off for fresh air temperature in Ventilation Only mode	The unit is set to operate in ventilation-only mode (no active compressor), but the external air is too warm / cold (depending on the mode). Wait until the external air reaches again a temperature suitable for the unit's operation	A

ALARMS

Alarm	Description	Possible cause	
C38	Modulating resi stance On with recovery circuit Off	Air preheating, no anomaly	A
C39	Control of the supply title not satisfied	The unit operates regularly. High supply air humidity: open windows, lots of people, etc.	A
E40	Inconsistency of the temperature differential	The temperature difference at the air inlet and outlet is not consistent with the mode. The unit can not heat / cool of 3 ° C the air introduced in the room. Check : - Unit partially discharged of gas - Compressor not operating - 4-way valve not operating	M
E41	Low voltage protection	Check supply voltage Check the phase monitor	A
C65	Communication failure	as E00	A

The code **C** indicates the presence of an anomalous situation that does not prejudice the operation of the unit.
The **E** code indicates alarms that compromise the unit operating.
The passage from a code **C** to a code **E** occurs if the alarm switches from an automatic to a manual reset, this because the number of events per hour that occurred exceeded the critical threshold.

A the alarm automatically resets when the cause that set it off ends
B the alarm manually resets when the cause that set it off ends and a keypad reset is executed

8.8 - HID-Ti5² / REMOTE CONTROL WITH TOUCH SCREEN DISPLAY, FOR BUILT-IN INSTALLATION (BOX 503) OR FOR WALL INSTALLATION (OPTION)

Display

28.3 °C	Outside temperature	***11:15***	Hour
26.2 °C	Ambient Temperature	***64%***	Ambient humidity
	Compressor operating (visible when active)		HEATING
	Preheating elements (if present)		COOLING
	Control function of the supply title		Automatic mode
	Off		Non-blocking signal (press to display the problem)
	On		Alarm on progress
	Scheduling		Operation correct of the unit
	Unit in ventilation only mode		Access settings

Compressor operating %

	From 1 % to 40%		From 61 % to 80%
	From 41 % to 60%		From 81 % to 100%

Access functions

Press Settings

	Lock touch (press) Lock the display for 20 sec. for the thermostat cleaning		Time scheduling
	Prolonged press 5 seconds = access parameters (installer use) Press = access unit stata (Visualization only)		Display automatic shutdown Brightness Beep ((touch sound) Home page (not used)
	Previous menu		Down / Value decreasing
	Confirm		On / Value increasing

ON / OFF

1

Press

2

Select the control:

- Spento (off)
- Acceso (on)
- Programmato (Programmed) (the unit follows the programmed schedule)
- Solo ventilazione (Ventilation only) (the unit acts like a fan: it does not heat/cool the air introduced into the environment)

3

Press spento (off)

4

Press

SEASON CHANGE

Automatico = Automatic Mode: it automatically switches from riscaldamento (heating) to raffreddamento (cooling) depending on the outdoor temperature.

1

Press

2

Select: riscaldamento (heating)

3

Press

4

Confirm

SETPOINT AMBIENT

It allows the setting of the desired room temperature, the current mode.

1

Press

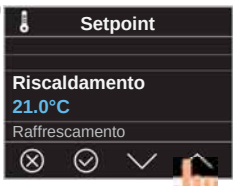
2

Select: riscaldamento (heating)

3

Press

4

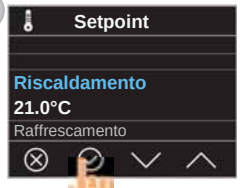


Press to increase or decrease the value

5

Press

6



Confirm

Raffrescamento = Cooling

Riscaldamento = Heating

DATE AND HOUR

It allows the setting of the current date and time

1

Press the hour

2

Press : 11

3

Press to increase or decrease the value

4

Press

Repeat the same procedure for the date

VISUALISATION OF CURRENT ALARMS

Visualisation the symbol

1

Press

2

Scroll down to view warnings

For alarm list see chapter 8.7

TIME SCHEDULING

It allows the user to customise the time scheduling of the days, according to his/her own requirements, setting up to 6 different time bands for each day and selecting the relative setpoint temperature.

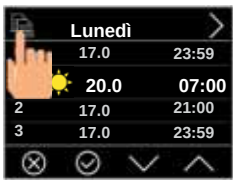
1

Press: impostazioni (settings)

2

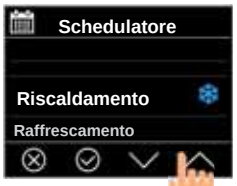
Press: programmazione oraria (Time scheduling)

3



Press

4



Select:

- Riscaldamento (heating)
- Raffrescamento (cooling)

5

Confirm

6

Select: Martedì (Tuesday)

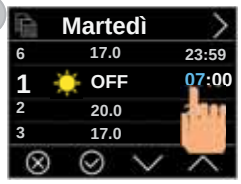
7

Press: 20.0 (setpoint)

8

Press to increase or decrease the value (OFF)

9

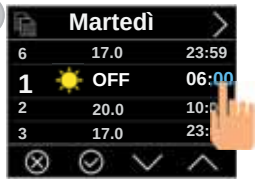


Press the hour

10

Press

11



Press : minutes

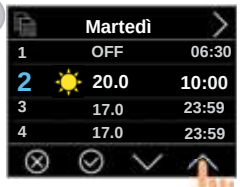
12

Press

13

To save the modifications press

14



Select: 2

Repeat starting from point 7 for the other programs.

Example program

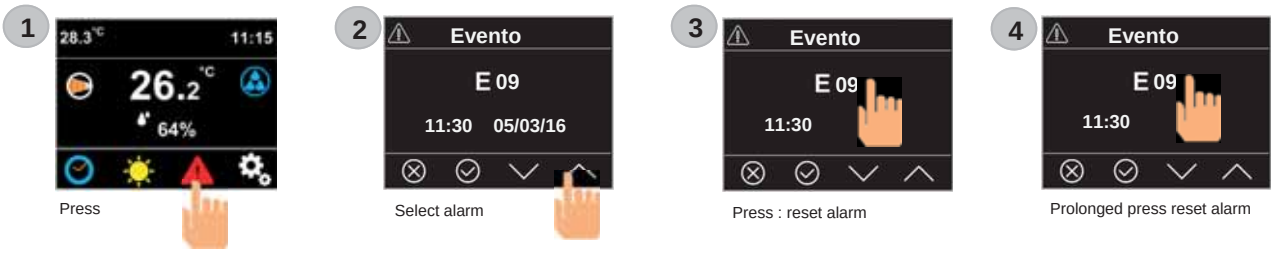
time range	start	end	temperature
1	00:00	06:30	OFF
2	06:30	10:00	20.0
3	10:00	23:59	17.0

Complete the settings of the last time band (3) setting the time at 23 59 to define the end of the day.
If the other time bands 4,5 and 6 are not used always enter the 23:59 hour.

VISUALISATION ALARMS LOG/ RESET

Visualisation the symbol 

Before resetting an alarm identify and remove the cause that generate it
Repeated reset can cause irreversibile damages as malfunctioning of the system itself.
In case of doubt please contact an Assistance Centre.



UNIT STATUS (only consultation)

During the operation is possible to visualize the unit status by the values obtained from sensors and from the main unit operating parameters.

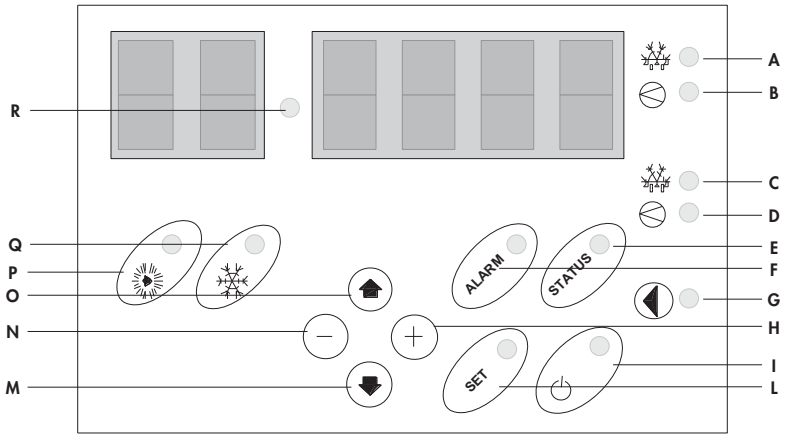
ACCESS PARAMETERS (installer use)

Unità = unit	Unit address entry filed on Modbus network through the numeric keypad screen
Registro = Register	Entry field of the unit Modbus register to be questioned on the Modbus network through the numeric keypad screen
Scrivi = Write	Display field of the value to write on the unit register through the numeric keypad screen If not value is entered, the field remains empty
Leggi = Read	Field where to display the value read in the unit register If the field is not questioned it remains empty
	Button associated to the unit register Modbus reading entered in the appropriate fields
	Button associated to the value Modbus writing in the unit register inserted in the appropriate fields

8.9 SERVICE KEYPAD - OPTION

The service keypad allows the access to the unit parameters to perform the advanced settings or to display the operating stata.

For the normal use of the keypad is not necessary the access to the unit parameters. The operations listed below are required only for particular calibrations and configurations, they are therefore addressed only to qualified authorized assistance centres.



A	Signalling led of defrosting 1	**I**	On - Off
B	Signalling led of compressor 1	**L**	Set
C	Signalling led of defrosting 2	**M**	Arrow down
D	Signalling led of compressor 2	**N**	Index decrement
E	Stata menu	**O**	Arrow up
F	Alarms	**P**	Heating
G	Signalling led of the pump	**Q**	Cooling
H	Index increment	**R**	Led

ADVANCED CONFIGURATIONS

The access to the advanced configurations occurs on more levels on the basis of the password use.

Accessible parameters without password

- Press the set button to enter in the scheduling mode.
- Select the parameter using the **M** and **O** arrows.
- Modify the value by the **+** and **-** buttons.
- To store, go to another parameter
- Set to esc (**L**).
- Pressing the set button (**L**), before passing to another parameter, the modifications are not saved.
- The full parameter list is available in the “Technical Information” section

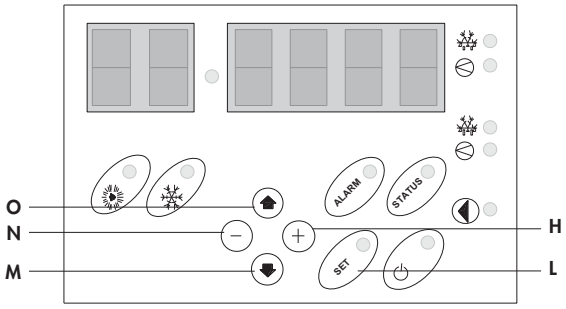
Par	Mnemonico	Description
1	OnModeMan	Operating mode manual selection enabling
4	OnSetMan	Enables the manual ambient setpoint
30	SetURHeat	HR SetPoint in winter operating (2%)
97	SetURCool	HR SetPoint in summer operating (2%)
224	SilentMode	Enabling of the silence mode

Parameters protected by password

- Press the Set button (**L**) to enter in the scheduling mode.
- Position on index **0** using the **M** and **O** arrows.
- Insert the password 115 by the index Increment (**H**) and Decrement index buttons (**N**).
- Modify the value by the index Increment (**H**) and Decrement index buttons(**N**).
- To store, pass to another parameter pressing the set button (**L**) before passing to another parameter; the modifications are not saved.
- The possibility to access to the parameters by password is automatically cancelled if any button is pressed more than 2 minutes.
- The modifications to the setting parameters that are protected by password, can cause malfunctions.

In case of doubt contact an authorized assistance centre.

The full parameters list is available in the following pages.

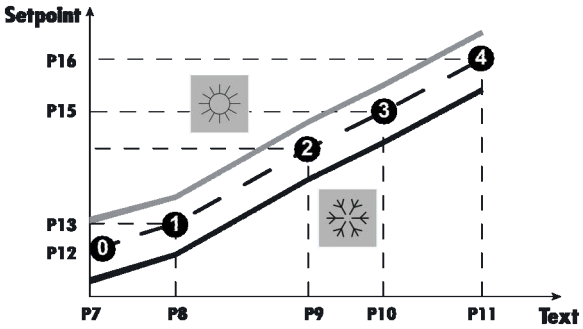


H Index increasing
L Set
M Arrow down
N Index decreasing
O Arrow up

Automatic setpoint

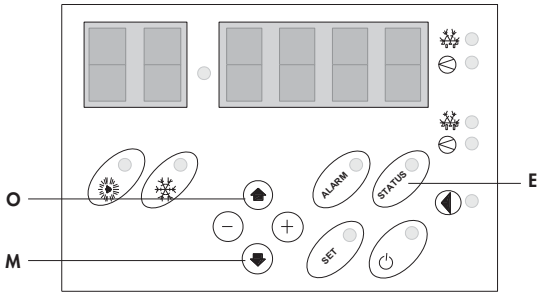
The setpoint change depending on the outside temperature, according to a curve set by parameters.

Parametres	Mnemonico	Description	default
P7	Text0	Outdoor temperature 0	15
P8	Text1	Outdoor temperature 1	18
P9	Text2	Outdoor temperature 2	21
P10	Text3	Outdoor temperature 3	24
P11	Text4	Outdoor temperature 4	30
P12	Set 00	value 0, setpoint 0	19
P13	Set 01	value 1, setpoint 1	21
P14	Set 02	value 2, setpoint 2	23
P15	Set 03	value 3, setpoint 3	25
P16	Set 04	value 4, setpoint 4	27



OPERATING STATA

- Press Status button (**E**)
- Select the status to display using the **M** and **O** arrows
- Press Status to esc (**E**)
- The full parameter list is available in the in the following pages.



E Status
M Arrow down
O Arrow up

8.10 UNIT STATA

Index	Description	Unit of measurment
001	Outlet actual SetPoint	°C
002	Inlet actual SetPoint	°C
003	Inlet temperature	°C
004	External temperature	°C
005	VHeat/CoolExt control component	%
006	VHeat/CoolAmb control component	%
007	VHeat/CoolRec control component	%
008	Compressor inverter control signal	%
009	Compressor operating mode (1= heat pump)	0 ÷ 1
010	Active title control status of the supply air	0 ÷ 1
011	Free-Cooling status	0 ÷ 1
012	Free-Heating status	0 ÷ 1
014	Outlet Fan control signal	%
015	Outlet Fan active Step number	0 ÷ 1
016	Inlet Fan control signal	%
017	Inlet Fan active Step number	0 ÷ 1
018	Water coil control signal / modulating preheating resistances	%
019	System water temperature	°C
020	Ambient UR probe	%
021	Outlet UR probe	%
023	On-Off humidifier status	0 ÷ 1
024	Humidifier control signal	%
027	Electrostatic filter control signal	%
028	Antifreeze Probe	°C
030	External damper status	0 ÷ 1
031	Unit clock	Hour
032	C1 operating hours	Hour
033	Not used	
034	C1 starts	Int
035	Not used	Int
036	Keypad software	-
037	“keypad homologation year ”	2008
038	“keypad homologation month”	4
039	“keypad homologation day”	3
040	Base software	-
041	“base homologation year ”	2008
042	“base homologation month”	4
043	“base homologation day”	3
044	Modulation time of the water valve/heater control opening (calculation)	Sec
045	Correction time of the water valve/heater control opening (calculation)	Sec
046	Electrostatic filter on/off status	0 ÷ 1
048	Control signal of the modulating post-heating	%
050	Supply temperature	°C
051	Return pressure/exhaust air coil	Bar
052	Operative SetURCool (used in the SetXMan calculation)	%
053	Value of the setpoint for the control of the supply air title (SetXMan)	g/Kg
054	Value of the supply air title (XMan)	g/Kg
055	Value of the ambient air enthalpy (hAmb)	Kcal/Kg

8.11 UNIT PARAMETERS FOR THE INSTALLER USE

ATTENTION

The access to parameters or modifications are allowed only to the installer who assumes all responsibility, in case of doubts please contact Clivet.

For any changes not permitted or not approved by Clivet, the same declines any responsibility for malfunctions and/or damages to the unit/system.

Par	Description	Extended description	UM	Pass.*
1	OnModeMan	Operating mode manual selection enabling		0
2	TempH2OHeat	Water temperature in heating	°C	1
3	TempH2OCool	Water temperature in cooling	°C	1
4	OnSetMan	Manual ambient setpoint enabling		0
6	DeadZone	Dead zone between winter and summer set	°C	1
7	Text0	Setpoint compensation: external 0 temperature	°C	1
8	Text1	Setpoint compensation: external 1 temperature	°C	1
9	Text2	Setpoint compensation: external 2 temperature	°C	1
10	Text3	Setpoint compensation: external 3 temperature	°C	1
11	Text4	Setpoint compensation: external 4 temperature	°C	1
12	Set0	Setpoint compensation: value 0	°C	1
13	Set1	Setpoint compensation: value 1	°C	1
14	Set2	Setpoint compensation: value 2	°C	1
15	Set3	Setpoint compensation: value 3	°C	1
16	Set4	Setpoint compensation: value 4	°C	1
17	ExtRecManager	Enables the recovery compressor management at supervisor charge		1
18	BandPR	Proportional band	°C	1
19	DeltaHeatAmb	Dead zone (VheatAmb)	°C	1
20	BandHeatRec	Proportional band (VheatExt)	°C	1
21	DeltaHeatRec	Dead zone (VheatExt)	°C	1
22	RecInteg	Water coil operating enabling only in integration		1
24	LimTextHeat	External temp. limit for the compressor operating in heating	°C	1
25	TextCompOn	External temperature limit below which the compressor is always on	°C	1
26	SetOutHeat	Outlet SetPoint in heating	°C	1
27	DeltaSetOutHeat	Setpoint variation range in Heat outlet	°C	1
28	BandOutHeat	Water coil modulation band in heating	°C	1
30	SetURHeat	UR SetPoint in heating	%	0
31	BandURHeat	UR humidity control band in winter ambient	%	1
32	SetUROut	Outlet limit humidity in heating	%	1
33	BandUROut	Outlet limit humidity control band	%	1
34	MaxOut	Humidifier control signal max. value	%	1
35	LimTextCool	Compressor external temperature limit in cooling	°C	1
36	BandCoolRec	Proportional band (VCoolExt)	°C	1
37	DeltaCoolRec	Dead zone (VCoolExt)	°C	1
38	DeltaCoolAmb	Dead zone (VCoolAmb)	°C	1
40	SetOutCool	Outlet SetPoint in cooling	°C	1
41	DeltaSetOutCool	Setpoint variation range in Cool outlet	°C	1
42	BandOutCool	Water coil modulation band in cooling	°C	1
44	LimOutDC	Outlet temperature limit during the dehumidification	°C	1
45	BandLimOutDC	Outlet temperature limit control band during the dehumidification	°C	1
46	TimeStart	Fan starting time	sec	1
47	TimeStop	Fan stopping time	sec	1
48	TextStopFanHeat	Ventilation stop external temp. in Heat	°C	1
49	TambStopFanHeat	Ventilation stop ambient temp. in Heat	°C	1
50	TextStopFanCool	Ventilation stop external temp. in Cool	°C	1
51	TambStopFanCool	Ventilation stop ambient temp. in Cool	°C	1
54	TimeCycle	Time between ventilation stop and start	sec	1
88	TimeThrow	Permanence max. time of the outlet temperature more than the allowed limits	sec	1
89	MaxFiltri	Filter max. control signal value	%	1

90	Minfiltri	Filter min. control signal value	%	1
92	SetAlarmFreeze	SetPoint for water coil antifreeze alarm	°C	1
93	DeltaAlarmFreeze	Differential for the water coil antifreeze alarm reset	°C	1
94	Tstarting	Min. interval between start/stop of two compressors	sec	1
96	FanPFcorr	PWM fan power factor correction	1=500ns	1
97	SetURCool	UR SetPoint in cooling	%	0
99	TimeByPassFiltri	Clogged filter alarm Bypass time	sec	1
100	SetAlarmOverheating	Setpoint for water coil overtemperature	°C	1
101	DeltaAlarmOverheating	Differential for water coil overtemperature alarm reset	°C	1
102	DeltaMinH2OHeat	Difference of water coil air temperature during heating with water at TH2OminHeat	°C	1
103	DeltaMaxH2OHeat	Difference of water coil air temperature during heating with water at TH2OMaxHeat	°C	1
105	TH2OMinHeat	Coil hot water temperature that provides the DeltaMinH2OHeat	°C	1
106	TH2OMaxHeat	Coil hot water temperature that provides the DeltaMaxH2OHeat	°C	1
107	DeltaMinH2OCool	Difference of water coil air temperature during cooling with water at TH2OMinCool	°C	1
108	DeltaMaxH2OCool	Difference of water coil air temperature during cooling with water at TH2OMaxCool	°C	1
109	TH2OMinCool	Coil hot water temperature that provides the DeltaMinH2OCool	°C	1
110	TH2OMaxCool	Coil hot water temperature that provides the DeltaMaxH2OCool	°C	1
111	TimeOpenValve	Water coil opening time	sec	1
112	TimeCorrection	Water coil opening correction time	sec	1
119	LimTambHeat	Compressor operating limit in heating for ambient temperature	°C	1
120	LimTambCool	Compressor operating limit in cooling for ambient temperature	°C	1
126	MaxVarDeltaBatt	Max DeltaBatteria variation beyond which is performed the water valve modulation reset 0: it excludes the reset on the DeltaBatteria variation	°C	1
127	MaxVarSetOut	Max SetMandata variation beyond which is performed the water valve modulation reset 0: it excludes the reset on the SetMandata variation	°C	1
128	MinApValvH2O	Min. opening of the handling water coil valve (phisical threshold to have the flow)		1
129	RiduzDeltaBattH2O	Reduction coefficient to the coil delta in the valve modulation of initial opening	%	1
131	OffSetTin	Inlet probe offset	°C	1
132	OffSetTout	Outlet probe offset	°C	1
133	OffSetText	External temperature probe offset	°C	1
135	OffSetTfreeze	Antifreeze probe offset	°C	1
137	OffSetTH2O	system water probe offset	°C	1
139	OffSetURProbe	Ambient humidity probe offset	%	1
141	OffSetURProbeThrow	Outlet humidity probe offset	%	1
149	MinProbePress	Pressure value corresponding to 4mA of the return pressure transducer /exhaust air coil	bar	1
150	MaxProbePress	Full scale value of the return pressure transducer/exhaust air coil	bar	1
151	OffsetProbePress	return pressure transducer offset/exhaust coil	bar	1
165	MODBusAddress	ModBus serial address		1
166	Baud Rate	Baud Rate (0=4800 / 1=9600)		1
167	Parity	Parity (0=no / 1=si)		1
168	CANaddressNode	CANOPEN board address		1
180	TimeOnURfreeze	Humidifier activation time in antifreeze	min	1
181	TimeOffURfreeze	Humidifier off wait time in antifreeze	min	1
182	PotURfreeze	Modulating output level of the humidifier in antifreeze	%	1
183	hAmbStopComp	Ambient enthalpy setpoint that leads to compressor stop	g/kg	1
184	DeltahAmb	Ambient enthalpy delta for compressor enabling	g/kg	1
185	MaxRip_0	Max. value of the return fan control (with SetUpFanRip= 0)	%	1
186	MinRip_0	Min. value of the return fan control (with SetUpFanRip= 0)	%	1
187	MaxMan_0	Max. value of the supply fan control (with SetUpFanMan= 0)	%	1
188	MinMan_0	Min. value of the supply fan control (with SetUpFanMan= 0)	%	1
189	NomHeatRip_0	Nominal value of the return fan control in Heat (with SetUpFanRip= 0)	%	1
190	NomCoolRip_0	Nominal value of the return fan control in Cool (with SetUpFanRip= 0)	%	1
191	NomHeatMan_0	Nominal value of the supply fan control in Heat (with SetUpFanMan= 0)	%	1
192	NomCoolMan_0	Nominal value of the supply fan control in Cool (with SetUpFanMan= 0)	%	1
198	MinTThrowHeat	Min. supply temperature in Heat	°C	1
199	DeltaTThrowHeat	Differential for the MinTThrowHeat calculation	°C	1
200	MaxTThrowHeat	Keypad address	°C	1

201	DeltaTThrowCool	Differential for the MaxTThrowCool calculation	°C	1
202	MinTThrowCool	Min. supply temperature in Cool	°C	1
204	MinSetTHeat	Min. ambient set that can be set manually in Heat	°C	1
205	MaxSetTHeat	Max. ambient set that can be set manually in Heat	°C	1
206	MinSetTCool	Min. ambient set that can be set manually in Cool	°C	1
207	MaxSetTCool	Max. ambient set that can be set manually in Cool	°C	1
208	HeatMode	Operating mode in Heat (0=Efficiency, 1=Comfort)		1
220	EnBatteria	Coil enabling (0=no coil, 1=extH2O coil, 2=preheating resistances)		1
224	SilentMode	Enabling of the silence mode:0 disabled,1 from digital input (ID4),2 digital input /supervisor		0
225	PercSilent	Percentage respect to the nominal of the reference signals in silence mode	%	1
226	LimNewAirCool	Inhibition threshold of Ventilation Only in Cool	°C	1
227	LimNewAirHeat	Inhibition threshold of Ventilation Only in Heat	°C	1
228	BandMan	Proportional band of the supply flow rate control in Cool	°C	1
232	SetUpFanRip	Selection of the setting setup of the fan parameters in Return		0
233	SetUpFanMan	Selection of the setting setup of the fan parameters in Supply		0
234	MaxRip_1	Max. value of the return fan control signal (with SetUpFanRip= 1)	%	1
235	MinRip_1	Min. value of the return fan control signal (with SetUpFanRip= 1)	%	1
236	MaxMan_1	Max. value of the supply fan control signal (with SetUpFanMan= 1)	%	1
237	MinMan_1	Min. value of the supply fan control signal (with SetUpFanMan= 1)	%	1
238	NomHeatRip_1	Nominal value of the return fan control signal in Heat (with SetUpFanRip= 1)	%	1
239	NomCoolRip_1	Nominal value of the return fan control signal in Cool(with SetUpFanRip= 1)	%	1
240	NomHeatMan_1	Nominal value of the supply fan control signal in Heat (with SetUpFanMan= 1)	%	1
241	NomCoolMan_1	Nominal value of the supply fan control signal in Cool(with SetUpFanMan= 1)	%	1
242	MaxRip_2	Max. signal of the return fan control signal (with SetUpFanRip= 2)	%	1
243	MinRip_2	Min. signal of the return fan control signal (with SetUpFanRip= 2)	%	1
244	MaxMan_2	Max. signal of the supply fan control signal (with SetUpFanMan= 2	%	1
245	MinMan_2	Min. signal of the supply fan control signal (with SetUpFanMan= 2)	%	1
246	NomHeatRip_2	Nominal value of the return fan control signal in Heat (with SetUpFanRip= 2)	%	1
247	NomCoolRip_2	Nominal value of the return fan control signal in Cool(with SetUpFanRip= 2)	%	1
248	NomHeatMan_2	Nominal value of the supply fan control signal in Heat (with SetUpFanMan= 2)	%	1
249	NomCoolMan_2	Nominal value of the supply fan control signal in Cool(with SetUpFanMan= 2)	%	1
250	MaxRip_3	Max. value of the return fan control signal (with SetUpFanRip= 3)	%	1
251	MinRip_3	Min. value of the return fan control signal (with SetUpFanRip= 3)	%	1
252	MaxMan_3	Max. value of the supply fan control signal (with SetUpFanMan= 3)	%	1
253	MinMan_3	Min. value of the supply fan control signal (with SetUpFanMan= 3)	%	1
254	NomHeatRip_3	Nominal value of the return fan control signal in Heat (with SetUpFanRip= 3)	%	1
255	NomCoolRip_3	Nominal value of the return fan control signal in Cool (with SetUpFanRip= 3)	%	1
256	NomHeatMan_3	Nominal value of the supply fan control signal in Heat (with SetUpFanMan= 3)	%	1
257	NomCoolMan_3	Nominal value of the supply fan control signal in Cool (with SetUpFanMan= 3)	%	1
258	TimeScanDeltaTManExt	% Fan at start	min	1
259	MaxNDeltaTManExt	% Fan at start	num	1
600	AddTast	Keypad address		1

*** Pass** =0 Accessible without password

Pass =1 Access for Installers, with password

9 - MAINTENANCE

9.1 GENERAL

Maintenance must be done by authorized centres or by qualified personnel

The maintenance allows to:

- maintain the unit efficiency
- reduce the deterioration speed to whom every equipment is subject over time
- 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 close intervals:

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

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:

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

9.4 PUT AT REST

If a long period of inactivity is foreseen:

- put the unit in OFF
- wait a few minutes to allow all the actuators to reach the rest position
- Turn off the power in order to avoid electrical risks or damages by lightning strikes
- avoid the risk of frost (empty or add glycol to the parts of the system exposed to temperatures below zero, maintain powered any anti-freeze resistances)

It's recommended that the starting-up after the stopping period is performed by a qualified technician, especially after seasonal stops or seasonal switch.

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 STRUCTURE

Check the condition of the structure parts .

Paint so as to eliminate or reduce oxidation where needed.

Check that the paneling is correctly fastened. Poor fastening may give rise to malfunctions and abnormal noise and vibration .

9.6 COIL

The accidental contact with the fins of the exchanger may cause small cuts: use protective gloves.

The finned surfaces of the coils and especially the drain pans are the places where micro-organisms and moulds most easily flourish.

It is therefore very important to clean regularly with suitable detergents and in case disinfect with appropriate products.

9.7 CONDENSATE DISCHARGE

Dust and deposits could cause obstructions .

In addition in the pan can proliferate microorganisms and moulds.

It is very important to provide a periodic cleaning with appropriate detergents and in case a disinfection with sanitizing products.

After cleaning pour water into the pan to ensure a regular flow.

9.8 AIR FILTER

It is very important for the air treatment coil to be able to offer maximum thermal exchange. Therefore, the unit must always operate with the filters installed and clean.

Cleaning and replacement of filters are very important in terms of health and hygiene.

The operating with clogged filters leads to a reduction of the air flow, leading to malfunctions and unit shutdowns.

How often the filters need to be checked depends on the quality of outdoor air, unit operating hours, dust and number of persons in the rooms.

Approximately, cleaning should ideally take place between weekly and monthly. It is advisable to start with frequent checks, and to adjust the frequency based on how much dirt is discovered.

Old filters, washing residuals and residual parts must be disposed of, according to the law in force .

Access to the filter

The access to the filter is possible in two positions :

CPAN-U 70-120

A - Superior access (floor units)

B - Lower access (ceiling units)

CPAN-U 200-500

C - Lateral access (floor units)

D - Lower access (ceiling units)

To access to the filter:

- Remove the closing panels
- Filter support (F) only CPAN-U 200-500
- Carefully extract the filter so that no dust reaches the parts below

To reposition the filter:

- Proceed in reverse.

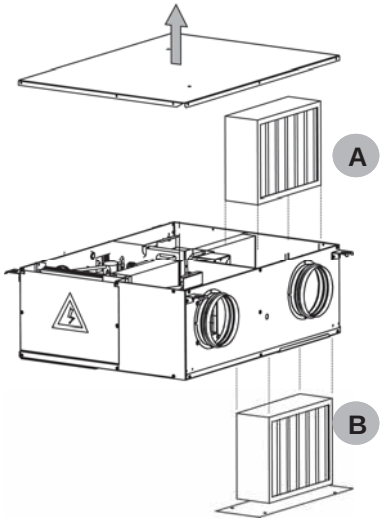
Cleaning of the pleated filter

- Wash the filtering mattress in warm water with a common detergent.
- Carefully rinse it under water while preventing to pour water in the room.
- Dry the filter .

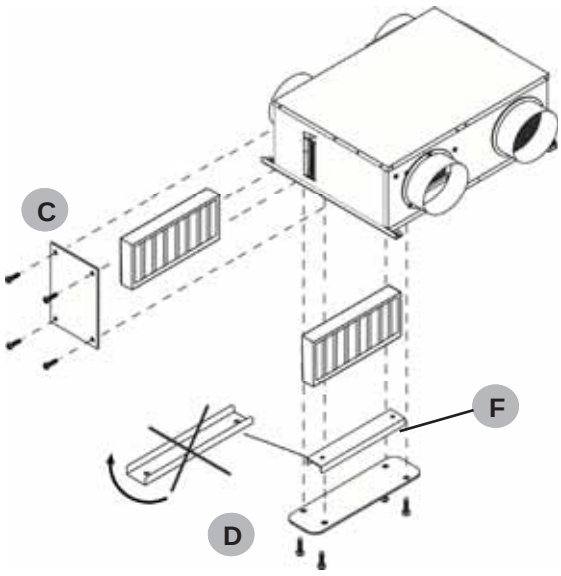
Lateral access:

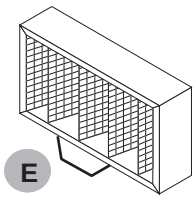
To easily remove the filter it is possible to remove the handle (**E**)

CPAN-U 70 - 120



CPAN-U 200 - 500





9.9 FESX - ELECTRONIC FILTER - OPTION

Switch off the unit.

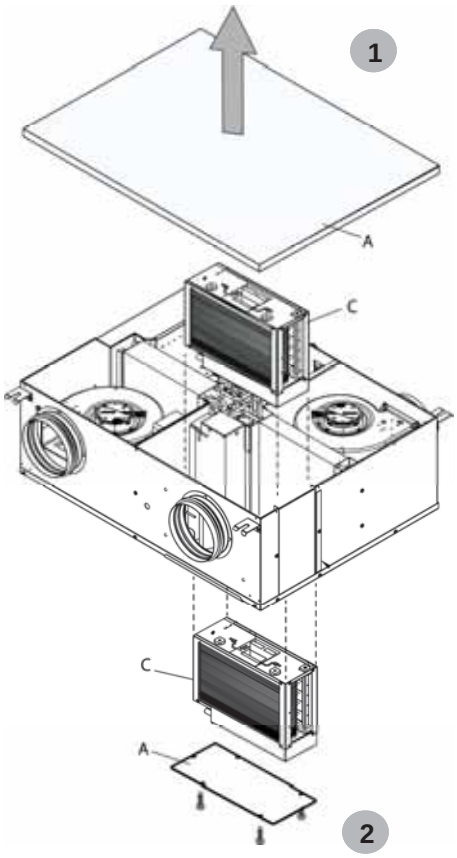
CPAN-U 70 - 120

Access to the filter

The access to the filter is possible in two positions :

1 - Superior access (floor units)

2 - Lower access (ceiling units)



To access to the filter:

- Remove the closing panels (A)
- Carefully extract the filter (C)
- Quick connector (F)

To reposition the filter:

- Proceed in reverse.

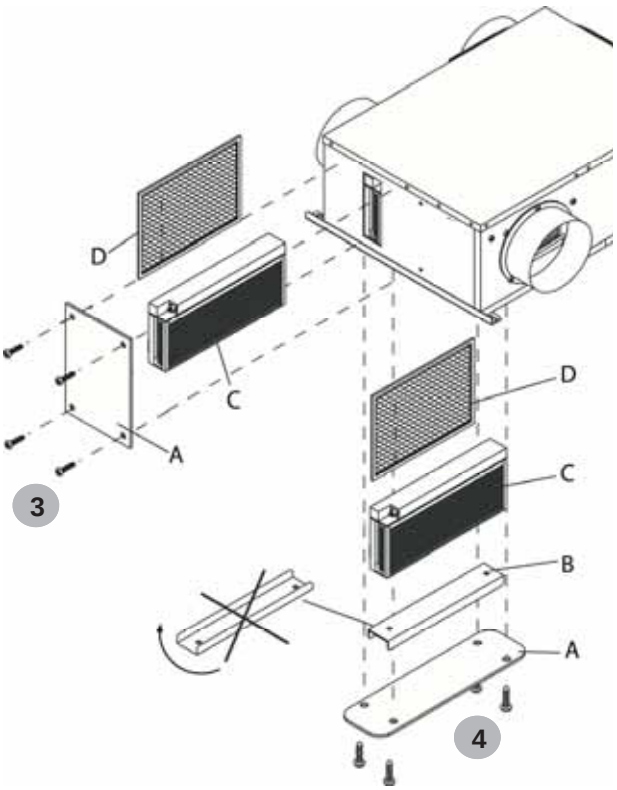
CPAN-U 200 - 500

Access to the filter

The access to the filter is possible in two positions :

3 - Lateral access (floor units)

4 - Lower access (ceiling units)



To access to the filter:

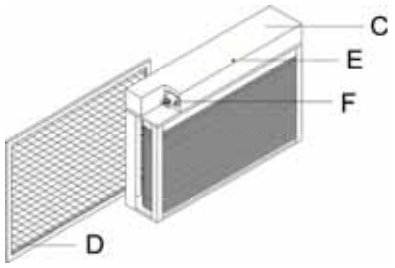
- Remove the closing panel (A)
- Remove filter support (B)
- Carefully extract the filter (C)
- Extract the metal mesh prefilter (D) only CPAN-U 200-500
- Disconnect the quick connector (F).

To reposition the filter:

- Proceed in reverse.

The filter status is signalled by the green led (E) on the higher part of the filter.

on	→	Correct operating
flashing	→	Stopped filter
off	→	Check the electrical connections



C Electrostatic filter
D Metal mesh prefinte (only CPAN-U 200-500)
E Signalling green led
F Quick connector

Quick connector closed (F)

Quick connector open (F)

Cleaning of the electrostatic filter

MATERIALS NECESSARY FOR MAINTENANCE

1. Acid detergent CRIC10099
2. plastic or steel tank (750x750x310 mm) with settling bottom
3. Protective gloves and goggles;
4. Graduated jug;
5. Pump for manual or pneumatic spraying.

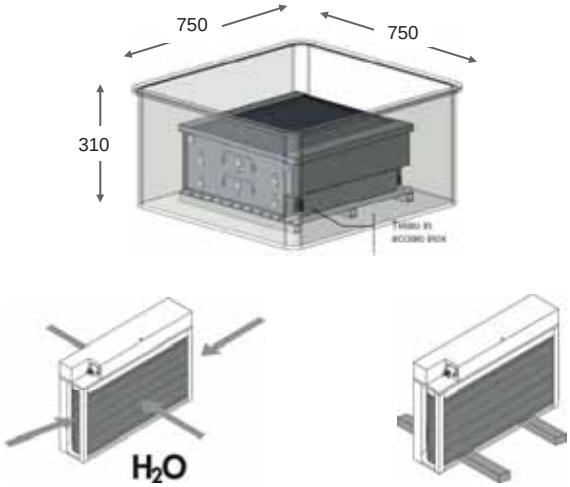
Do not use aluminum tanks or galvanized.

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

1. Position the filter to be washed on a support to facilitate work.
2. Prepare a tank with a solution of CRIC10099 detergent and water at 1÷20.
3. Immerse the filter in this solution
4. Ensure the solution covers the entire filter
5. Immerse it for about 5-7 minutes. A slight chemical reaction is noticed within 2÷3 minutes with the development of foam indicating the occurred elimination of residues.
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

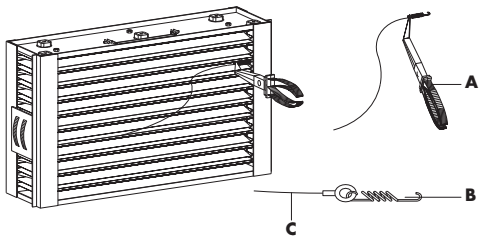
The impurities can determine oxidation or scaling on the wires, which can be removed using a cloth soaked in alcohol or an abrasive scourer with very fine grain.

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.



A Curved pincer
B Spring
C Wire

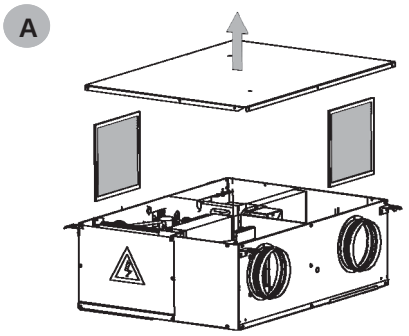
9.10 RETURN / SUPPLY AMBIENT FILTER

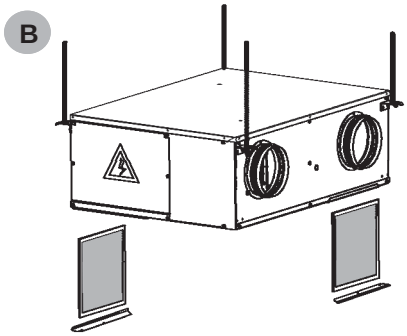
CPAN-U 70 - 120

The ambient filter installation is possible in 2 positions:

A - from the top (floor units)

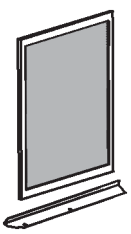
B - from the bottom (ceiling units)





To clean the filter:

- Unscrew the 2 screws of the locking filter
- Clean the filter in tepid water with common detergent.
- Rinse thoroughly in running water to avoid spillage into the served area.
- Dry the filter.



9.11 FAEX - KIT EXAUST AIR FILTER - OPTION

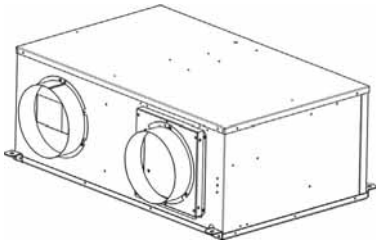
CPAN-U 200 - 500

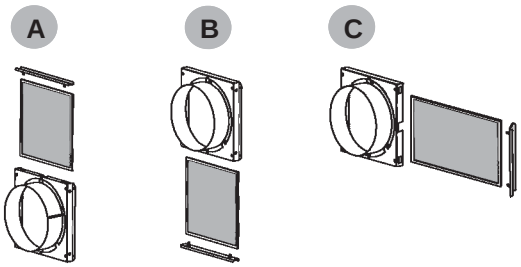
The ambient filter installation is possible in 3 positions:

A - from the top (floor units)

B - from the bottom (ceiling units)

C - lateral (floor units)





To clean the filter:

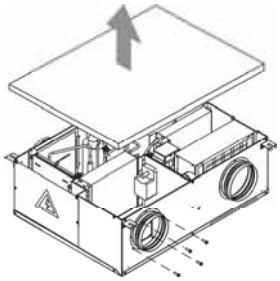
- Unscrew the 2 screws of the locking filter
- Clean the filter in tepid water with common detergent.
- Rinse thoroughly in running water to avoid spillage into the served area.
- Dry the filter.

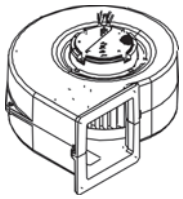
9.12 FANS

CPAN-U 70 - 120

The fans can be removed from above.

- Remove the roof
- Unscrew the 4 front screws.
- Disconnect the quick connector.
- Extract the fan

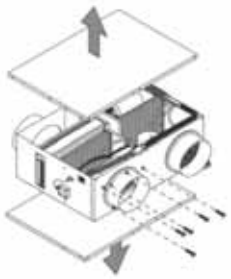




CPAN-U 200 - 500

The fans can be removed from above and from below.

- Remove the roof or the lower panel.
- Unscrew the 4 front screws.
- Disconnect the quick connector.
- Extract the fan



9.13 HSE3LX / HSE3MX - ELECTRODE HUMIDIFIER (OPTION)- CPAN-U 200 - 500

The humidifier and the cylinder contain live electrical components and hot surfaces.
During operation, the steam production cylinder reaches high temperatures!
Maintenance must be performed after the cylinder has cooled. Use protective gloves.
The cylinder must be replaced periodically.
This operation is necessary when lime incrustations build up on the inside such that sufficient current passage does not occur.
How frequently this needs to be done depends on the water supply. The harder the water, the more often the cylinder will need to be replaced.
See water tables on page 82
After prolonged use or use with very hard water, the solid deposits on the electrodes may increase in size until they adhere to the inner wall of the cylinder.
With especially conductive deposits, the plastic may heat so much that it melts, resulting in water leakage.
In case of leaks, power off the unit before touching the cylinder, because electrical current may be flowing through the water.

PERIODIC CHECKS

Do not use detergents or solvents to clean plastic components.
To remove incrustations, wash with a 20% solution of vinegar or acetic acid, and then rinse with water .

Every 15 days	Cylinder	after not more than 300 hours of service check of operation, general condition, lack of leaks
Every 3 months	Cylinder	after not more than 1000 hours of service check of operation, general condition, lack of leaks, any replacement required
Every year	Cylinder	after not more than 2500 hours of service (disposable cylinders) - replacement
	Filling solenoid valve	disconnect the electrical power supply, remove the valve, and clean the filter
	Filling solenoid valve	disconnect the electrical power supply, remove the bobbin, disassemble the valve body, remove any impurities and rinse
	Supply pan , ducts	check that they are free and without impurities
Every 5 years	Cylinder	after not more than 10000 hours of service (for inspectable cylinders) - replacement

Drainage of humidifier cylinder

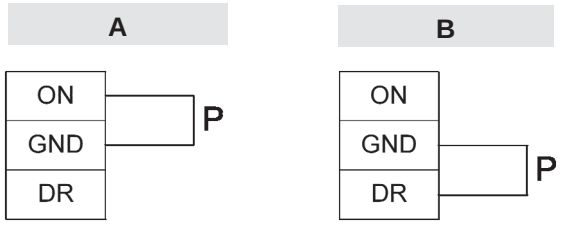
The cylinder must be drained in these situations:

- cleaning of the cylinder
- emptying of the cylinder to prevent formation of ice
- replacement of cylinder

On the electronic card that controls the humidifier:

- to activate drainage move the jumper to the terminals GND and DR
- to resume operation of the humidifier, return the jumper to the terminals GND – ON

Refer to the electrical diagram of the unit

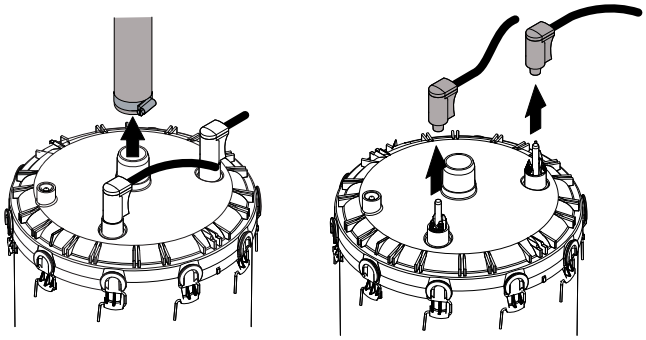


A Humidifier ON
B Drainage ON
P Jumper

Replacement of the cylinder

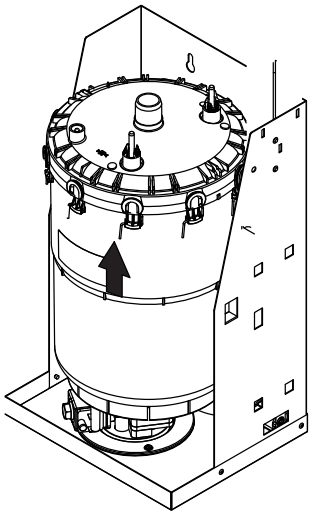
To remove the cylinder:

- Completely drain the water.
- Cut power to the humidifier using the unit isolator switch.
- Remove the steam tube from the cylinder.
- Detach the electrical connections of the electrodes and remove the plugs from the high-level electrodes.
- Unscrew the ring nut to remove the nozzle and the filter (when the filter is outside the cylinder)
- Lift the cylinder to extract it



Before putting it back in place:

- The filter body does not need to be replaced. Wash it with water and place it on the new cylinder, using the new gasket that comes with it.
- Check the gasket for the seal between the cylinder and the drain group.
- Put the cylinder back in place by repeating the operations in reverse



9.14 RECOMMENDED PERIODICAL CHECKS SHEET

Checks carried out on…….....by……..……company…..…….

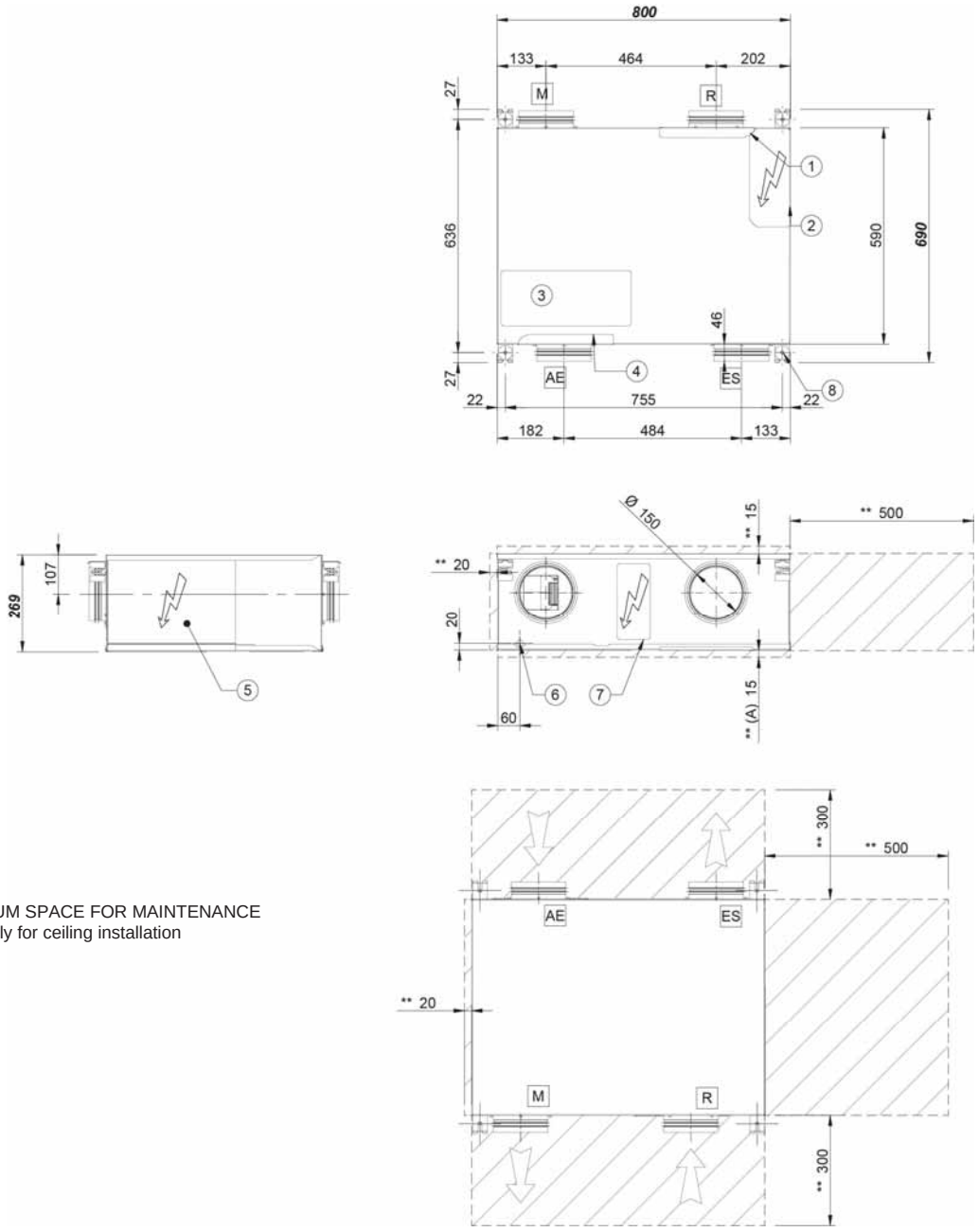
√	intervention frequency (months)	3	6	12
□	presence corrosion			●
□	panel fixing			●
□	fans fixing		●	
□	coil cleaning		●	
□	bowl cleaning + sanitisation		●	
□	outflow test		●	
□	electrostatic filter cleaning/inspection			●
□	electronic filter cleaning/inspection	●		
□	air flow rate measurement			●
□	channelling: anti-vibration devices and fastenings check			●
□	power supply cable isolation and fastening check			●
□	earth cable check			●
□	electric control board cleaning			●
□	power remote controls state			●
□	clamps closure, cables isolation integrity			●
□	phases unbalancing and power supply voltage (vacuum and loaded)		●	
□	absorption of the individual electric loads		●	
□	compressors carter heaters test		●	
□	leaks control *			●
□	cooling circuit work parameters detection		●	
□	four-way valve exchange check		●	
□	protective equipment test: safety valves, pressure switches, thermostats, flow meters, etc.		●	
□	protective equipment test: setpoint, climatic compensations, power slicing, air flow rate variations		●	
□	control devices test: alarms signal, thermometers, probes, pressure gauges, etc.		●	
□	electrical heaters check (if present)			●

Notes/interventions recommended to Owner

* Refer to the local implemented standards; in synthesis and for merely indicative purposes, the regulation prescribes the following.
Companies and technicians carrying out installation, maintenance/repair interventions, leaks check and recovery must be CERTIFIED as foreseen by the local standards.
The leaks check must be carried out on a yearly basis

10.1 DIMENSIONS

Size 70-120



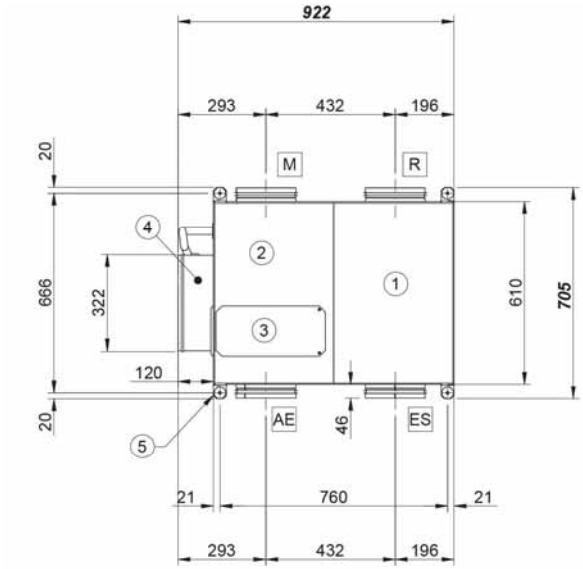
** MINIMUM SPACE FOR MAINTENANCE
A(15) : only for ceiling installation

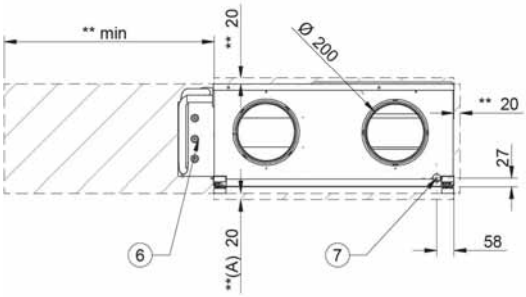
(1) REMOVABLE PANEL FROM LOWER ACCESS OF THE EXHAUST AIR FILTER
(2) REMOVABLE PANEL FROM LOWER ACCESS OF THE ELECTRICAL PANEL
(3) REMOVABLE PANEL FROM LOWER ACCESS OF THE HANDLING FILTER AIR
(4) REMOVABLE PANEL FROM LOWER ACCESS OF THE FILTER AIR INTAKE
(5) REMOVABLE PANEL FROM SIDE ACCESS OF THE ELECTRICAL PANEL
(6) CONDENSATE DISCHARGE DUCT
(7) REMOVABLE PANEL FROM CLIENT TERMINAL BLOCK ACCESS
(8) FIXING POINTS

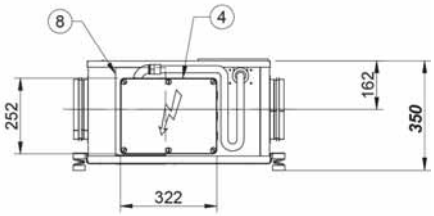
(AE) FRESH AIR INTAKE
(ES) AIR EXHAUST
(M) AMBIENT AIR DISTRIBUTION
(R) AMBIENT AIR INTAKE

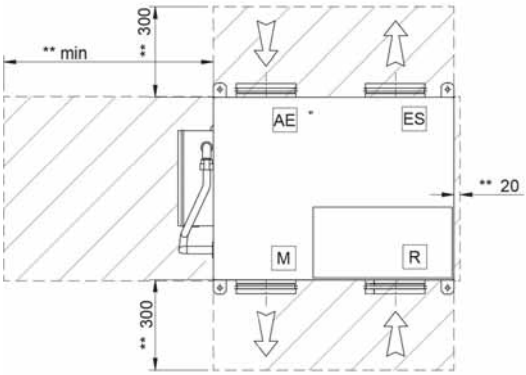
Size		70	120
Length	mm	800	800
Depth	mm	690	690
Height	mm	269	269
Operating weight	kg	40	46,6
Shipping weight	kg	54	59,9

Size 200-300









** min:
a) - ceiling installation, filter access from below, remote electrical control board at a distance of at least 200 mm

b) -ceiling installation, filter access from below, non-remote electrical control board at a distance of at least 700 mm

c) -floor installation, lateral filter access, remote electrical control board at a distance of at least 400 mm

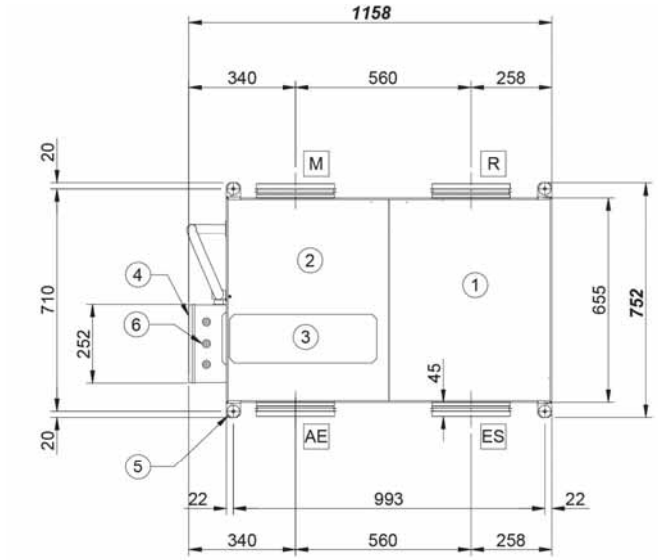
d) -floor installation, lateral filter access, non-remote electrical control board at a distance of at least 700 mm

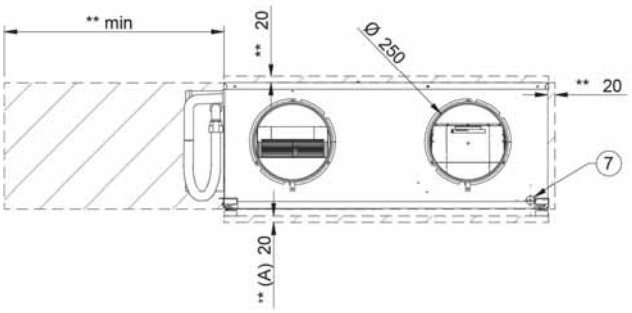
** MINIMUM SPACE FOR MAINTENANCE
20mm : only for ceiling installation

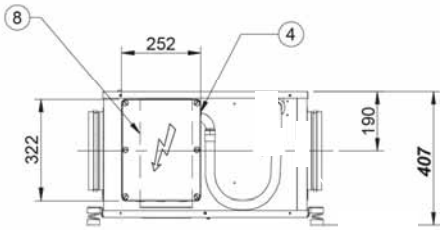
(1) REMOVABLE PANEL FOR ACCESS TO THE COMPONENTS OF HANDLING SECTION
(2) REMOVABLE PANEL FOR ACCESS TO THE COMPONENTS OF THE RECOVERY SECTION
(3) REMOVABLE PANEL FOR LOWER ACCESS TO THE AIR FILTER
(4) ELECTRICAL PANEL
(5) FIXING POINTS
(6) POWER INPUT
(7) CONDENSATE DISCHARGE DUCT
(8) REMOVABLE PANEL FOR LOWER ACCESS TO THE AIR FILTER
(AE) FRESH AIR INTAKE
(ES) AIR EXHAUST
(M) AMBIENT AIR DISTRIBUTION
(R) AMBIENT AIR INTAKE

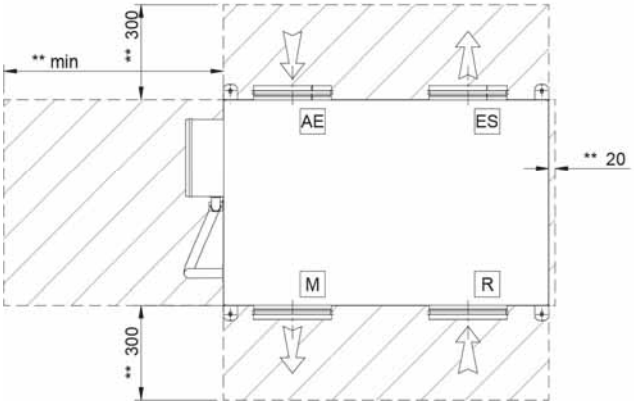
Size		200	300
Length	mm	922	922
Depth	mm	705	705
Height	mm	350	350
Operating weight	kg	70,9	71,1
Shipping weight	kg	86	86

Size 500









** min:
a) - ceiling installation, filter access from below, remote electrical control board at a distance of at least 200 mm

b) -ceiling installation, filter access from below, non-remote electrical control board at a distance of at least 700 mm

c) -floor installation, lateral filter access, remote electrical control board at a distance of at least 400 mm

d) -floor installation, lateral filter access, non-remote electrical control board at a distance of at least 700 mm

** MINIMUM SPACE FOR MAINTENANCE
20mm : only for ceiling installation

(1) REMOVABLE PANEL FOR ACCESS TO THE COMPONENTS OF HANDLING SECTION
(2) REMOVABLE PANEL FOR ACCESS TO THE COMPONENTS OF THE RECOVERY SECTION
(3) REMOVABLE PANEL FOR LOWER ACCESS TO THE AIR FILTER
(4) ELECTRICAL PANEL
(5) FIXING POINTS
(6) POWER INPUT
(7) CONDENSATE DISCHARGE DUCT
(8) REMOVABLE PANEL FOR LOWER ACCESS TO THE AIR FILTER
(AE) FRESH AIR INTAKE
(ES) AIR EXHAUST
(M) AMBIENT AIR DISTRIBUTION
(R) AMBIENT AIR INTAKE

Size		500
Length	mm	1158
Depth	mm	752
Height	mm	407
Operating weight	kg	92,5
Shipping weight	kg	111,4

10.2 GENERAL TECHNICAL DATA

SIZES			70	120	200	300	500
COOLING AE 30°C							
Cooling capacity	1	kW	0,429	0,813	1,57	2,10	3,01
Compressor power input	1	kW	0,164	0,279	0,498	0,640	0,916
Total power input	1	kW	0,189	0,315	0,542	0,700	1,04
EER	1		2,27	2,58	2,90	3,00	2,91
COOLING AE 35°C							
Cooling capacity	2	kW	0,446	0,846	1,63	2,17	3,13
Compressor power input	2	kW	0,174	0,297	0,523	0,674	0,976
Total power input	2	kW	0,199	0,333	0,567	0,734	1,096
EER	2		2,24	2,54	2,87	2,96	2,86
HEATING AE 7°C							
Heat output	3	kW	0,517	0,984	1,81	2,33	3,58
Compressor power input	3	kW	0,139	0,235	0,401	0,541	0,748
Total power input	3	kW	0,153	0,252	0,441	0,593	0,838
COP	3		3,38	3,90	4,10	3,93	4,27
HEATING AE –5°C							
Heat output	4	kW	0,517	0,971	1,86	2,35	3,74
Compressor power input	4	kW	0,110	0,188	0,320	0,379	0,582
Total power input	4	kW	0,124	0,205	0,360	0,431	0,672
COP	4		4,17	4,74	5,17	5,45	5,57
COMPRESOR							
Type of compressors			ROT	ROT	ROT	ROT	ROT
No. of Compressors		Nr	1	1	1	1	1
Type of refrigerant			R134a	R134a	R410A	R410A	R410A
Refrigerant charge		Kg	0,29	0,21	0,66	0,63	0,78
Total charge	7	tCO_2-eq	0,41	0,30	1,37	1,31	1,62
FANS							
Type of fans			CFG	CFG	CFG	CFG	CFG
Number of fans		Nr	2	2	2	2	2
Air flow		mc/h	70	120	200	300	480
Absorbed capacity by fans	5	kW	0,014	0,017	0,040	0,052	0,090
Available head nominal		Pa	40	40	40	40	40
Max outside static pressure		Pa	120	120	120	120	120
CONNECTIONS							
Condensate discharge			16	16	26	26	26
POWER SUPPLY							
Standard power supply		V	220-240/1/50				
NOISE LEVELS							
Sound pressure level (1m)	6	dB(A)	37	38	39	41	48

(1) **AE 30°C**: data referred to the following conditions:
- Outdoor air temperature: 30°C BS/ 22.0°C BU
- Internal air temperature: 27°C BS/ 19°C BU
- nominal air flow

(2) **AE 35°C** : data referred to the following conditions:
- Outdoor air temperature: 35°C BS/ 24.0°C BU
- Internal air temperature: 27°C BS/ 19°C BU
- nominal air flow

(3) **AE 7 °C** :data referred to the following conditions:
- Outdoor air temperature: 7°C BS/ 6°C BU
- Internal air temperature: 20°C BS/ 15°C BU
- nominal air flow

(4) **AE –5°C** :data referred to the following conditions:
- Outdoor air temperature: -5°C BS/ -5.4°C BU
- Internal air temperature: 20°C BS/ 15°C BU
- nominal air flow

(5) the fan absorptions refer to the air flows of the heating operation (conditions as indicated in note (3)) and 40Pa available head

(6) Sound levels refer to units with full load under nominal test conditions.
The sound pressure is measured at 1 m from the external surface of the unit in open field conditions.

(7) It contains fluorinated greenhouse gases

10.3 ELECTRICAL DATA

Size			70	120	200	300	500
F.L.A. FULL LOAD CURRENT AT MAX ADMISSIBLE CONDITIONS							
F.L.A. - Compressor 1		A	0,87	1,62	2,2	3,1	5,13
F.L.A. - Single supply fan		A	0,3	0,9	1,2	1,2	1,2
F.L.A. - Single exhaust air fan		A	0,3	0,9	1,2	1,2	1,2
F.L.A. - Total		A	1,5	3,4	4,95	5,85	7,88
L.R.A. LOCKED ROTOR AMPERES							
L.R.A. - Compressor 1		A	4,35	8,10	12	16,5	25,2
F.L.I. FULL LOAD POWER INPUT (AT MAX ADMISSIBLE CONDITION)							
F.L.I. - Compressor 1		kW	0,19	0,34	0,47	0,69	1,10
F.L.I. - Single External Fan		kW	0,037	0,115	0,165	0,165	0,165
F.L.I. – Single exhaust air fan		kW	0,037	0,115	0,165	0,165	0,165
F.L.I. - Total		kW	0,264	0,57	0,88	1,10	1,51
M.I.C. MAXIMUM INRUSH CURRENT							
M.I.C. - Value		A	4,95	9,9	14,8	19,3	28

Power supply 220-240/50Hz +/- 10%

10.4 SOUND LEVELS

Size	Sound Power Level (dB)								Sound pressure level	Sound Power Level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
70	60	65	53	42	37	31	25	24	37	51
120	57	57	58	48	38	32	31	22	38	52
200	59	56	52	49	49	40	33	32	39	52
300	60	57	53	51	51	41	34	33	41	54
500	68	65	61	58	58	58	42	41	48	62

Sound levels refer to the unit at full load installed on the ceiling, ducted, with nominal fan air flow rate. Available static pressure 40 Pa.

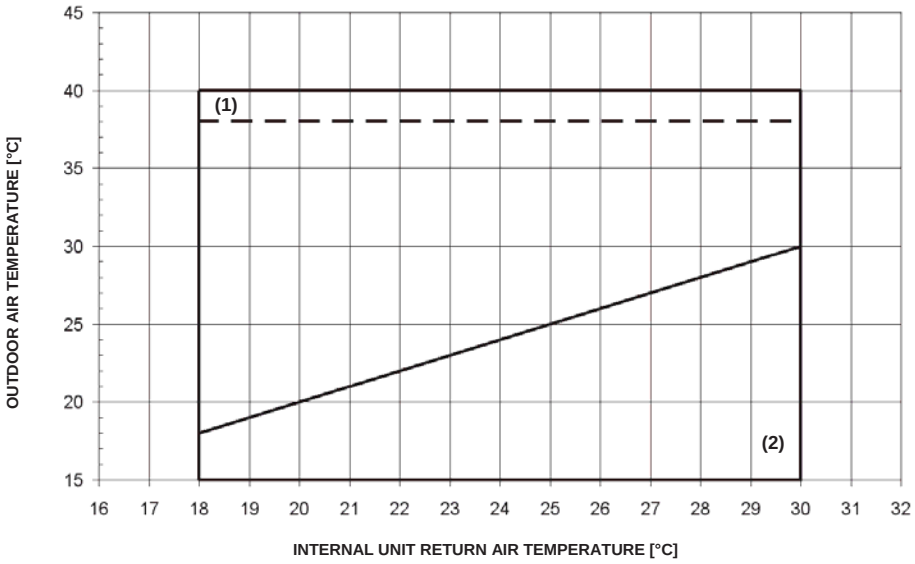
In accordance with the UNI-EN ISO 3744 regulation, the average sound pressure level refers to a distance of 1 m from the external surface of the unit in open field conditions.

The power measurements are taken in accordance with the UNI EN ISO 9614-2 standard, with a ducted unit installed near a reflective surface

If the unit is installed in conditions other than the nominal ones (for instance, near walls or obstacles in generally) the sound levels may undergo substantial variations.

10.5 OPERATING LIMITS

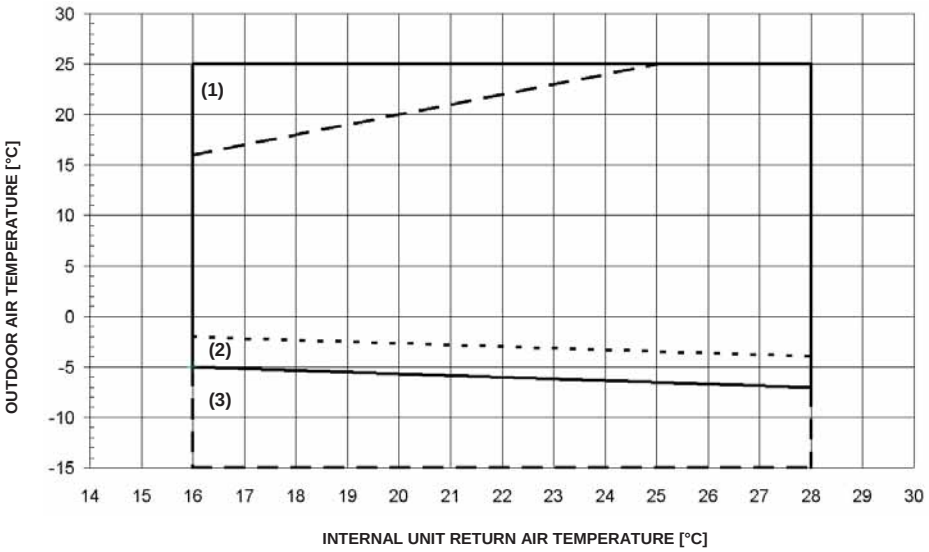
Cooling



The limits are meant as an indication. Please note that they have been calculated by considering:
- general and not specific sises,
- clean batteries and filters,
- non-critical positioning of the unit and correct operating and maintenance of the unit.

(1) Operating field with external RH < 40%
(2) Zone of possible operation in Free Cooling

Heating



The limits are meant as an indication. Please note that they have been calculated by considering:
- general and not specific sises,
- clean batteries and filters,
- non-critical positioning of the unit and correct operating and maintenance of the unit.
- relative humidity of the return air > 50%

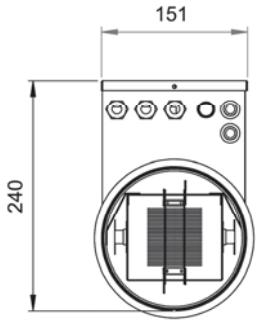
(1) zone of possible Free Heating operating

(2) the broken line identifies the operating limit of the standard unit with internal relative humidity < 40%

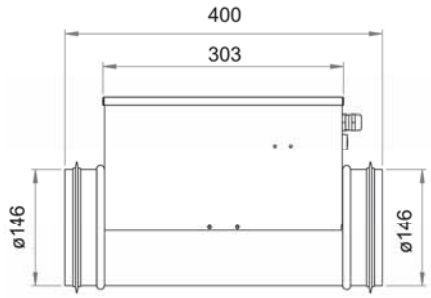
(3) operating range with return air flow modulation. In case of a long permanence in this zone it is recommended the use of the “electrical resistance of modulating pre-heating” accessory.

11.1 EHPCX : PREHEATING ELEMENTS 0,7 KW CPAN-U 70 - 120

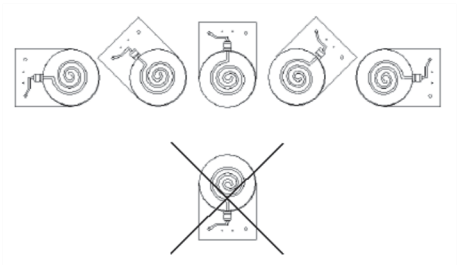
Resistances : front view



Resistances : side view

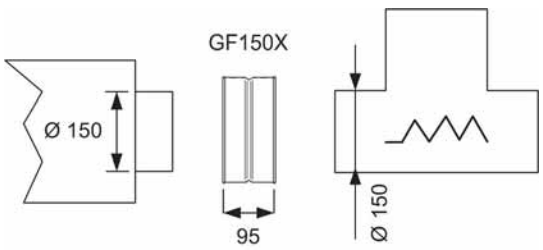


Admitted positions

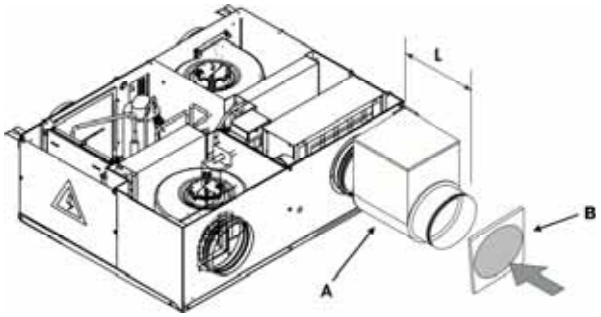


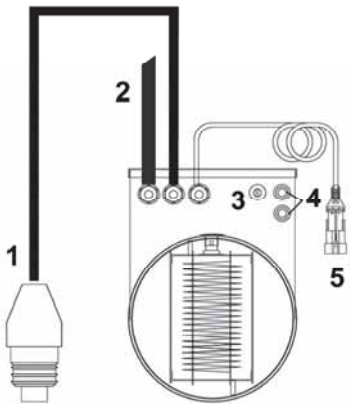
To connect the heaters use the GF150X joint

Accessory separately supplied



- Install the resistances (**A**) on the fresh air return.
- Install an air filter upstream (**B**). This should be at least a G2 class filter to protect the heating elements (provided by the customer)
- **L** = 1,5 mt max. distance between resistances and electrical panel.





1 connector for the connection to the unit electrical panel

2 power supply input

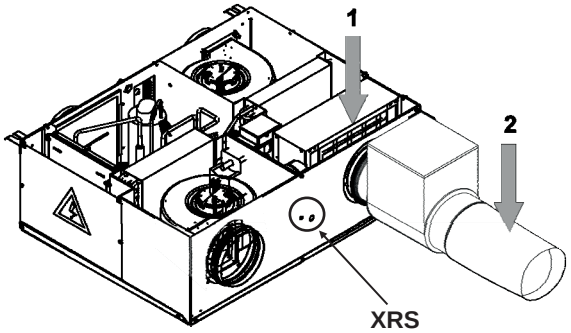
3 heater reset button

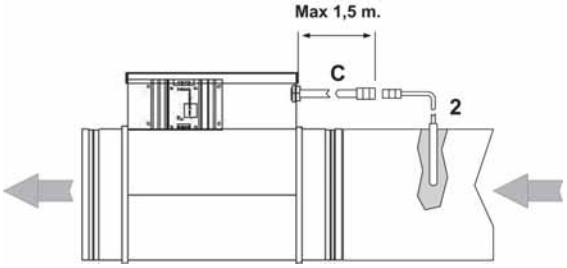
4 led :
green = power supply on,
red = alarm

5 connector of the outdoor air probe (yellow)

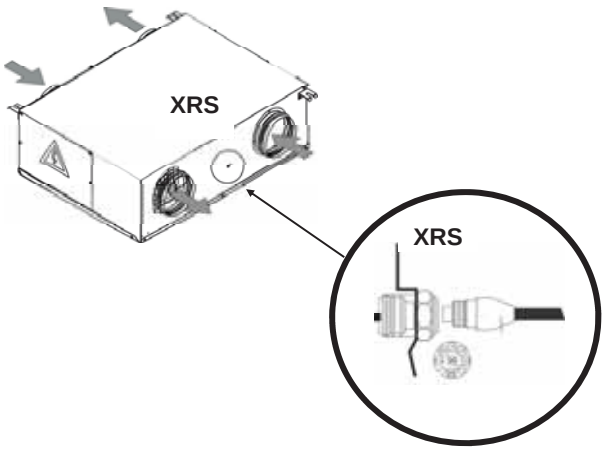
In case of installation of the resistance module it is necessary to move the air probe present in the unit.

- Disconnect the probe connector.
- Disassemble the return air (**1**) probe from the unit.
- Install it upstream of the resistances (**2**).
- Connect it to the YELLOW cable connector of the resistance module (**C**).

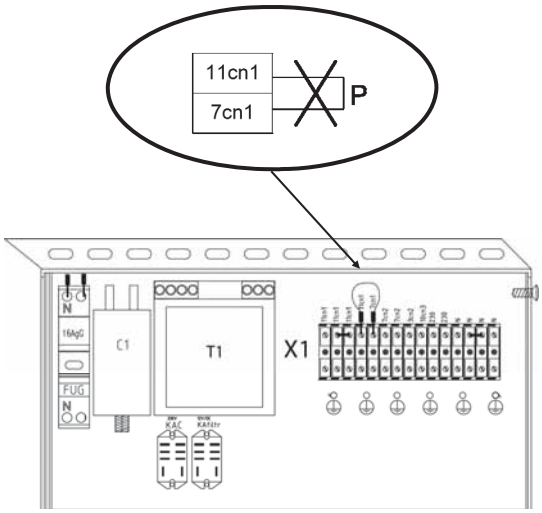




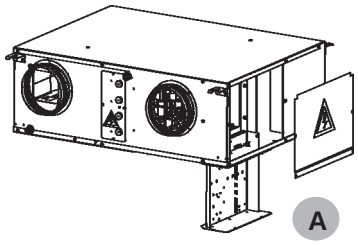
- Remove the cap on the unit.
- Connect the connector of the resistance cable **XRS** on the unit.



- Remove the jumper **P** on the **XC** terminal block of the unit electrical panel.

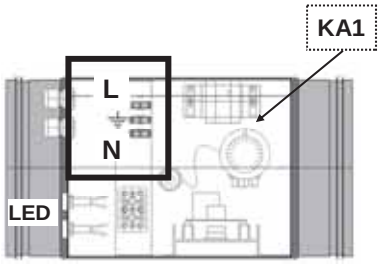


Unit electrical panel (A)



- Unscrew the fixing screws and remove the electrical panel cover on the electric resistances.
- Feed the resistances with 230/1/50 power supply .

Resistance from the top



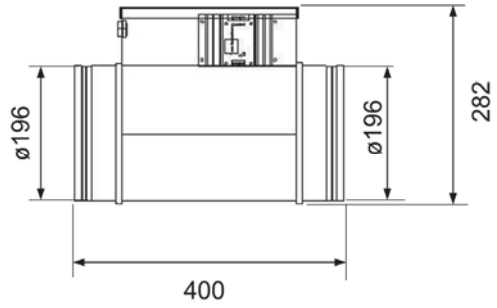
Enable the electric heaters

- Set parameter 220= 2

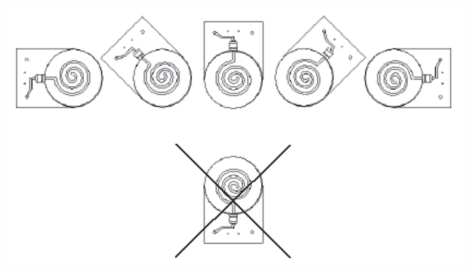
Heating elements failure ⇨ **page 80**

11.2 EHPCX - PREHEATING ELEMENTS 1,5/3 KW — CPAN-U 200 - 500

Resistances : side view



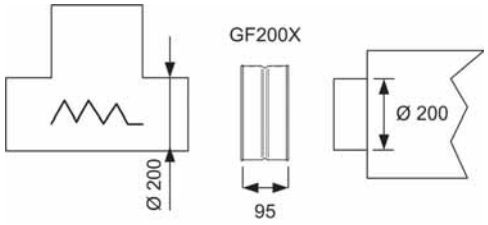
Admitted positions



Size 200/300

To connect the heaters use the GF200X joint

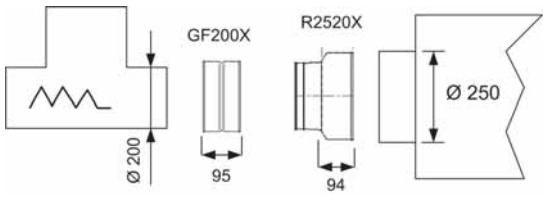
Accessory separately supplied



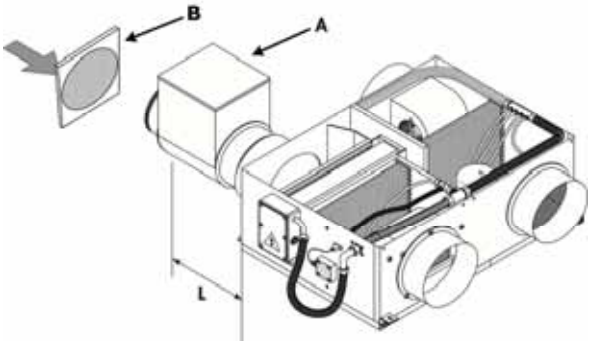
Size 500

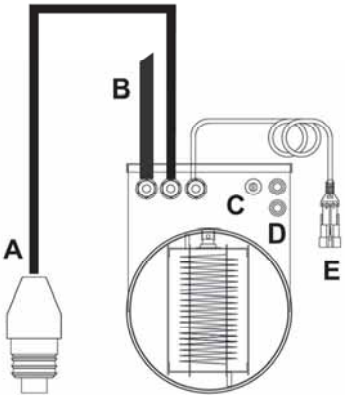
To connect the heaters use the GF200X joint and R2520X reducer

Accessory separately supplied



- Install the resistances (**A**) on the fresh air return.
- Install an air filter upstream (**B**). This should be at least a G2 class filter to protect the heating elements (provided by the customer)
- **L** = 1,5 mt max. distance between resistances and electrical panel.





A connector for the connection to the unit electrical panel

B power supply input

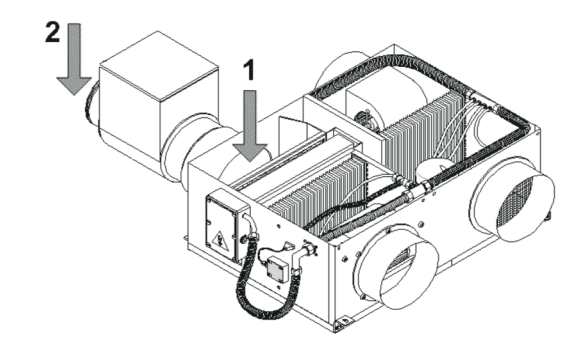
C heater reset button

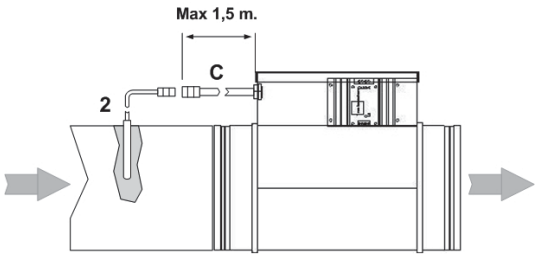
D led :
green = power supply on,
red = alarm

E connector of the outdoor air probe (yellow)

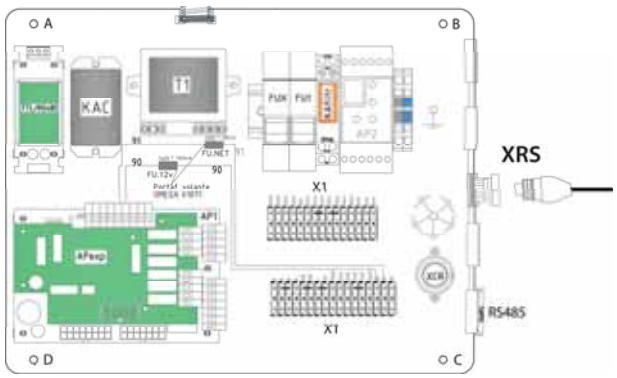
In case of installation of the resistance module it is necessary to move the air probe present in the unit.

- Disconnect the probe connector.
- Disassemble the return air (**1**) probe from the unit.
- Install it upstream of the resistances (**2**).
- Connect it to the YELLOW cable connector of the resistance module (**C**).

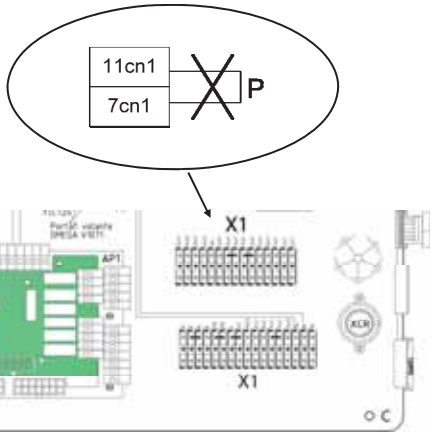




- Connect the connector of the resistance cable **XRS** on the unit electrical panel.

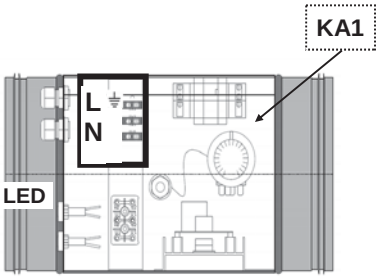


- Remove the jumper **P** on the **X1** terminal block of the unit electrical panel.



- Unscrew the fixing screws and remove the electrical panel cover on the electric resistances.
- Feed the resistances with 230/1/50 power supply .

Resistance from the top



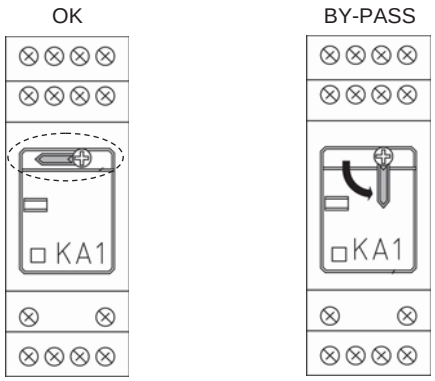
Enable the electric heaters

- Set parameter 220= 2
- Set parameter 208 = 0

Heating elements failure

KA1 alarm by-pass

Switch off the unit.



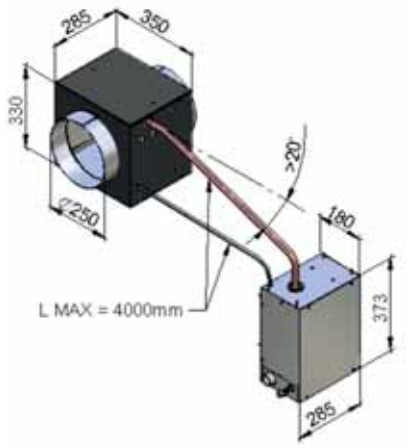
The unit can run even without heating elements until their replacement.

11.3 HSE3LX - IMMERSED ELECTRODE HUMIDIFIER DN200 (gr.200-500)

HSE3MX - IMMERSED ELECTRODE HUMIDIFIER DN250 (gr.200-500)

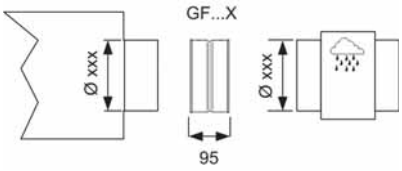
CPAN-U 200 - 500

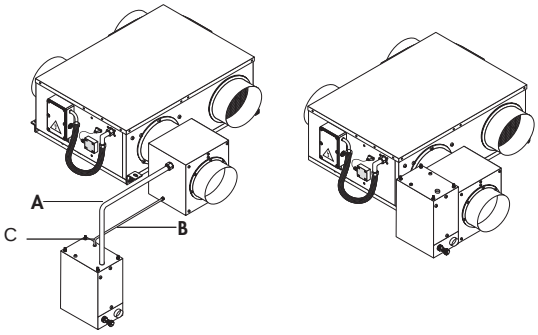
- The humidifier is supplied separately from the unit.
- It must be installed on the supply duct, connected to the power supply and to the unit electrical panel.
- In case of encumbrance problems, the steam production module can be divided from the steam distribution module and placed in another position, for example wall-mounted, up to a maximum of 4 meters away. The uphill section of the steam-pipe must maintain a slope not less than 20 °.



To connect the humidifier use the GF200X or GF250X joint.

Accessory separately supplied





A Steam-duct

B Condensate discharge

Length max 4 m., slope min. 20°

C Insulate the steam-pipe

- A shut-off valve installed on the humidifier inputs allows the maintenance operations without draining the system.
- A filter must be installed on the humidifier supply duct.

Feed water

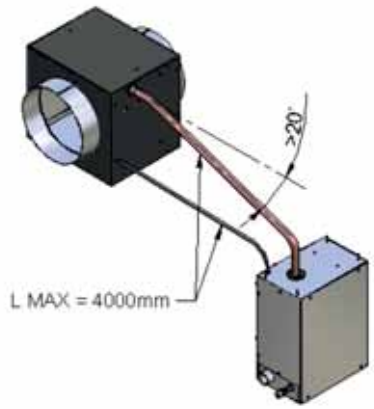
- The humidifier must be fed with mains water with the following characteristics:
- pressure included between 0.1 and 0.8 Mpa (1 – 8 Bar);
- temperature included between 1 and 40 °C.

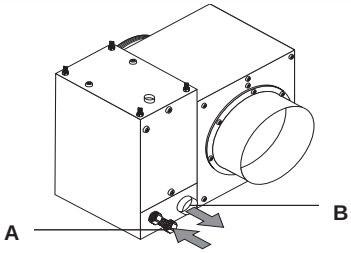
Do not use:

- water treated with softeners may cause corrosion of the electrodes and foaming with possible malfunctions / failures;
- well, industrial or otherwise potentially contaminated water (chemically or biologically);
- Disinfectant or anti-corrosive substances
- mixed with water because potentially irritating.

Drainage water

- It can reach a temperature of 100 °C
- It contains the same substances of the feed water but in greater concentration;
- It is not toxic and it can be disposed with white waters .

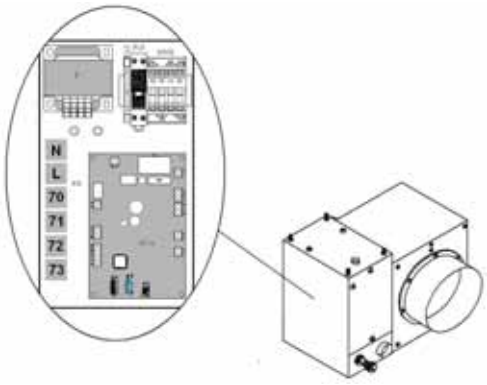




A water supply Ø 3/4"

B condensate discharge Ø 32 mm

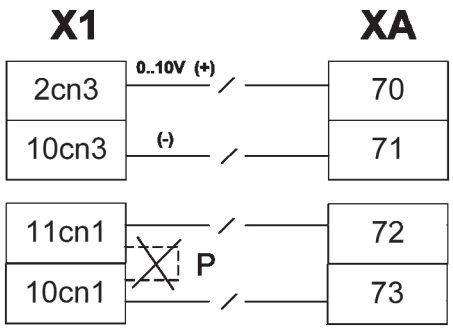
Humidifier electrical panel



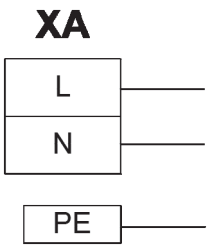
CONNECTION

- Remove the **10cn1** and **11cn1** jumper (**P**) on the **X1** terminal block.
- Perform the connections between **X1** terminal block of the ELFOFRESH^2 and **XA** terminal block of the humidifier.

ELFOFresh^2 | Humidifier



- Feed the humidifier electrical panel with 230/1/50 power supply.



Enable the Humidifier

- Set parameter 29= 1

Enable ambient humidity probe

- Set parameter 138= 1

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

(1) Values depending on specific conductivity; in general:

$$TDS \cong 0{,}93 * \sigma_{20;}\ R_{180} \cong 0{,}65 * \sigma_{20}$$

(2) not lower than 200% of the chloride content in mg/l of Cl-

(3) not lower than 300% of the chloride content in mg/l of Cl-

No relation can be demonstrated between water hardness and conductivity.

ALARMS- RED LED

LED flashes:

Led	Duration seconds
Rapid flashes	0,2 seconds
Long flashes	1 second

LED flashes	Description - causes	Solution	Action
2 rapid	Excess electrode current: current> maximum limits 1 - Conductivity of the water too high, errata confi guration TAM 2 - AM electrical circuit not confi gured correctly 3 - Malfunction in the TAM electrical circuit	1 - The water conductivity must be between 75 and1250 µS/cm. Softening the water may worsen the problem 2 - Switch unit off and confi gure TAM jumper. Switch unit on and check if the alarm is repeated 3 - Check the correct operation of the TAM circuit: a. Check the signal generated by the TAM: this must be between 0-2 Vac. b. Check the correct connection between the TAM and the board: restore the connection if necessary. c. Replace the TAM. d.Replace the board	humidif. stopped
3 rapid	Internal memory error The software or the confi guration parameters are corrupted.	Download the correct confi guration via humiSet; replace the board.	humidif. stopped
4 rapid	Confi guration parameter error The confi guration parameters are corrupted	Download the correct confi guration via humiSet; replace the board.	humidif. stopped
5 rapid	Conductivity of the water too high. The alarm occurs: After 1 hour if conductivity > b6 for more than 1 hour, OR Immediately if conductivity > 3x b6 1 - High water conductivity alarm threshold. 2 - Conductivity of the water higher than 1250 µS/cm. 3 - Conductivity probes shortcircuited. 4 - Malfunction in the conductivity meter electrical circuit	1 - Increase the high water conductivity alarm threshold with parameter “b6”. 2 - The water conductivity must be between 75 and 1250 µS/cm. Softening the water may worsen the problem 3 - Clean the probes 4 - Check the correct operation of the conductivity meter electrical circuit: a. Check the electrical connections between the conductivity meter and the board: if necessary, restore the connection. b. Replace the conductivity meter/fi ll tank. c. Replace the board.	Signal only humidif. stopped
6 rapid	Memory backup fails Internal memory error	If the problem persists, contact the service center	Signal only
7 rapid	Maintenance time expired. This is displayed when: hour counter > bb (default 3000 hours). 1 - Maintenance time expired.	1 - Replace /clean the cylinder, then set the hour counter to zero via RS485	Signal only
8 rapid	Life timer expired. This is displayed when the hour counter> 1.5xbb (default 1.5x3000 = 4500 h) 1 - Life timer expired.	1 - Replace /clean the cylinder, then set the hour counter to zero.	humidif. stopped

ALARMS- RED LED

LED flashes	Description - causes	Solution	Action
2 long	serial disconnected 1 - Cable broken /disconnected / not properly connected after the previous set	1 - check the connection of electricity and their supervisor	humidif. stopped
3 long	No supply water: the humidifier tries to add water but the level inside the cylinder does not increase at the expected speed (the level of water is estimated by the TAM electrical circuit). 1– Low supply water pressure. 2 - Steam hose bent, choked or blocked by condensate: this may cause high backpressure that prevents the water from being filled into the cylinder 3 - Excessive backpressure in the hoses 4 - Internal fill hoses bent, choked or blocked 5 - The drain valveleaks 6 - Fill valve blocked or malfunctioning.	1 - The water supply pressure must be between 0.1 and 0.8 MPa (1-8 bars) 2 - Check and reposition/replace 3 - To check this, switch the unit off , remove the steam hose from the cylinder and switch the unit on: fi ll water into the cylinder, then reconnect the steam hose. 4 - Check and reposition /clean/replace 5 - Check and clean 6 - Check the correct operation of the fi ll valve: a. Switch the unit off and on again: can the noise of the valve opening be heard? YES: go to “2”; NO: go to “3”. b. Clean/replace. If the internal flow limiter, installed at the valve outlet, is detached from the valve, the water may fl ow directly to the drain through the fill tank as the flow-rate is too high. If this is the case, replace the valve. c. Replace the board.	humidif. Stopped only for 10 minutes
4 long	Low steam flow-rate during reduced production. The steam flow-rate is estimated by the TAM circuit 1 - Conductivity of the mains water too low. 2 - Too much foam in the cylinder. 3 - Excess scale in the cylinder 4 - TAM electrical circuit not config. correctly. 5 - Malfunction in the TAM electrical circuit.	1 - The water conductivity must be between 75 and1250 µS/cm. 2 - Perform the pre-wash 3 - Clean/replace the cylinder. 4 - See solution (3 long - relating to TAM electrical circuit not configured) 5 - See solution (3 long - relating to TAM electrical circuit not configured)	humidif. stopped
5 long	1 - Drain valve blocked / malfunctioning 2 - Manifold blocked 3 - Cylinder filter blocked	1 - Check that the drain valve is working correctly: a. Switch unit off ; b. short-circuit M2.5 with M2.6; c. switch unit on; d. can noise of the drain valve opening be heard? YES: remove drain valve and clean; NO: replace the valve 2 - Remove cylinder and valve and clean manifold. 3 - Replace the cylinder.	humidif. stopped
6 long	The cylinder requie maintenance due to the accumulation of lime scale. The “Cylinder almost depleted” and “Cylinder depleted” warnings can be disabled by b1-parameter 1 - The lime scale limits steam production.	1 - Routine maintenance: check the correct operation of the cylinder, clean it and, if necessary, replace it	Signal only

ALARMS- RED LED

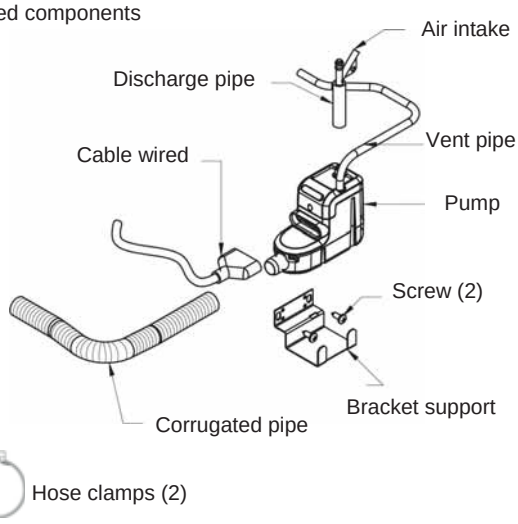
LED flashes	Description - causes	Solution	Action
7 long	External control signal not connected correctly (2-10V only); or - for control via serial (variable I62 bit2=1) - no data over 485 serial connection (cable probably disconnected). 1 - Cable broken/disconnected/ not connected correctly. 2 - Incorrect voltage of external control signal.	1 - Check and connect correctly. 2 - Set A0 =1; based on external signal set A2 = 0: 0-1V, A2=1 0-10V, A2=2 2-10V, A2=3 0-20mA, A2=4 4-20mA	humidif. stopped
8 long	High water level without humidification demand. Alarm ON if the water reaches the high level electrodes when the humidifier is shutdown or disabled (contactor open, fill & drain valves closed) 1 - Leaks from the fill valve. 2 - High level sensor short-circuited. 3 - Malfunction of the high level sensor electrical circuit .	1 - Check for any leaks from the fill valve and clean/replace 2 - If possible, open the cylinder and clean it 3 - Make sure the electrical connections between the sensor and the board are correct: reconnect if necessary or replace the board	humidif. stopped
9 long	Foam 1 - Lubricants, solvents, detergents in the supply water (at times the water hoses are dirty after installation). 2 - Softened water. 3 - High level sensor short-circuited 4 - Malfunction of the high level sensor electrical circuit.	1 - 2 - Wash all water supplì hoses thoroughly. The water conductivity must be between 75 and1250 µS/cm. Softening the water may worsen the problem. 3 - If possible, open the cylinder and clean it 4 - Make sure the electrical connections between the sensor and the board are correct; if necessary replace the board	Signal only
10 long	Cylinder depleted. The alarm is displayed when the cylinder is almost depleted - and production cannot satisfy demand within 3 hours from the cylinder almost depleted warning. The “Cylinder almost depleted” and “Cylinder depleted” warnings can be disabled by b1- parameter. 1 - The cylinder is full of fl akes.	1 - Replace the cylinder	Signal only

11.4 CDPX - DISCHARGE CONDENSATE PUMP

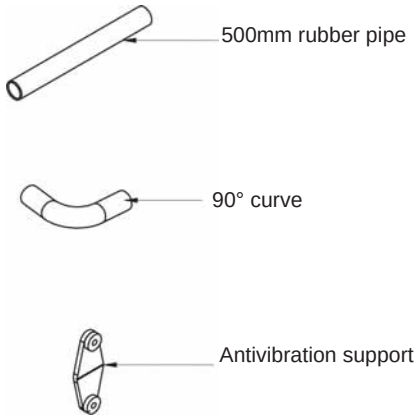
Centrifugal condensate discharge pump that guarantees an optimal condensate downflow everytime it is not possible to have a proper downflow by gravity.
The packaged structure includes a floating chambre with two levels of intervention: the first level starts up itself the pump while the second level is a safety level that intervenes in case of difficulty of the pump in the downflow stopping the unit

CPAN-U 70 - 120

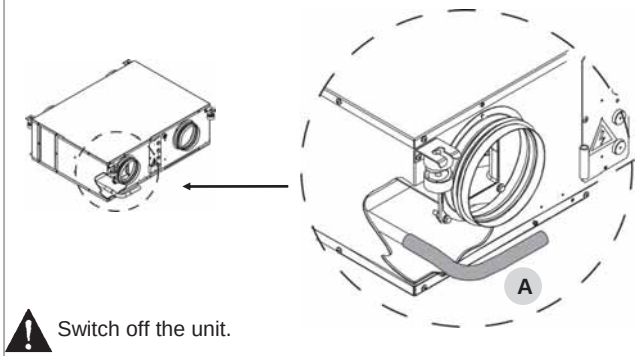
Used components



Unused components



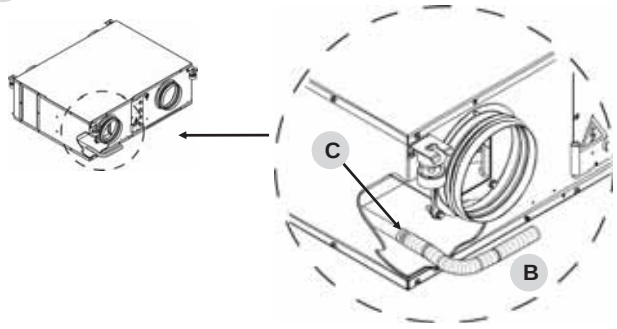
1 ⚠ To access remove the higher



⚠ Switch off the unit.

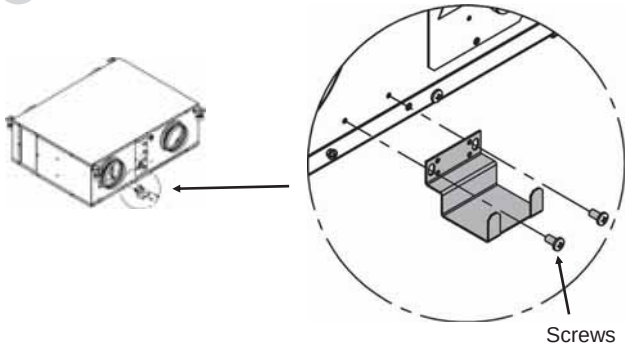
Remove the standard condensate drain pipe (A)

2



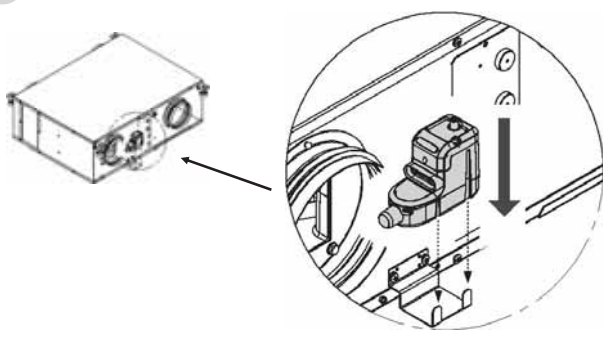
Insert the corrugated tube (B)
Fix with the hose clamps (C)

3



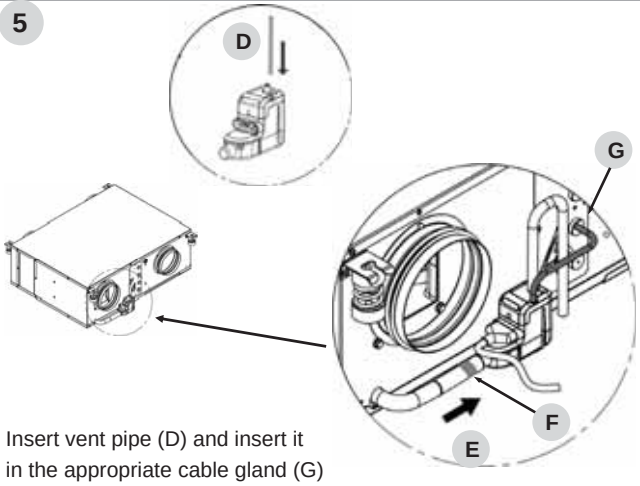
Screw the pump support

4



Insert pump

5

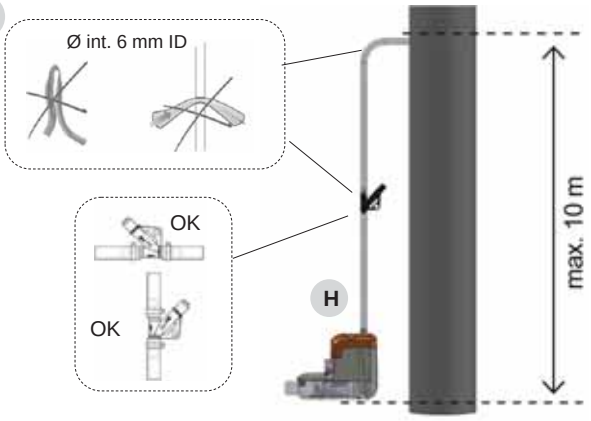


Insert vent pipe (D) and insert it in the appropriate cable gland (G)

Connect the pipe (E) to pump

Fix with the hose clamps (F)

6

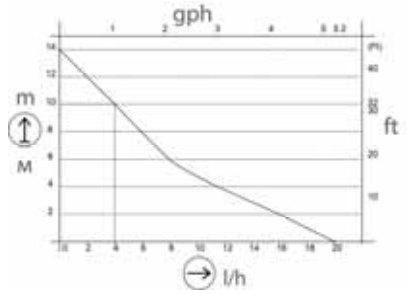


Connect the condensate discharge pipe (H) to a drainage network.

⚠ Do not crush the pipe that could limit the passage of water

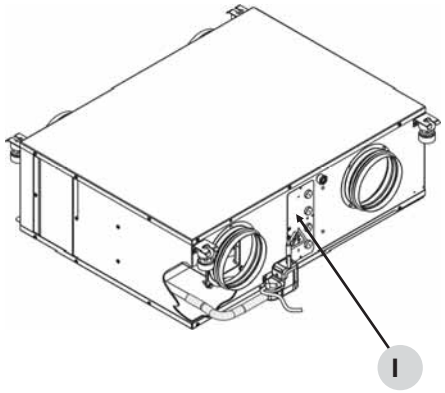
7 Table flow-rare (l/h)

	Total tube length (ø int. 6mm)			
Discharge head	5 m	10 m	20 m	30 m
0 m	20	19	18	17
2 m	16	15	14	13,5
4 m	11,5	11	10,5	10
6 m		8,5	7,5	6,5
8 m		6	5	4
10 m		4	3,5	2,5

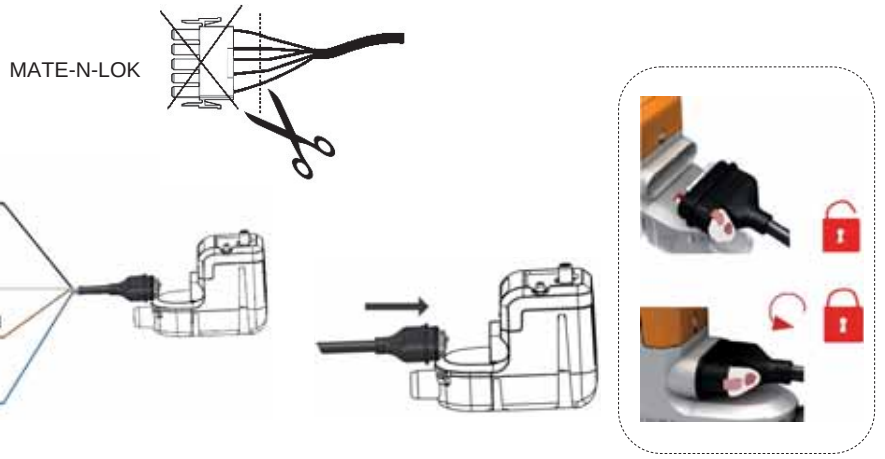


Discharge head Flow-rate

8 Electrical connection



Remove panel (I) to access the XC terminal block

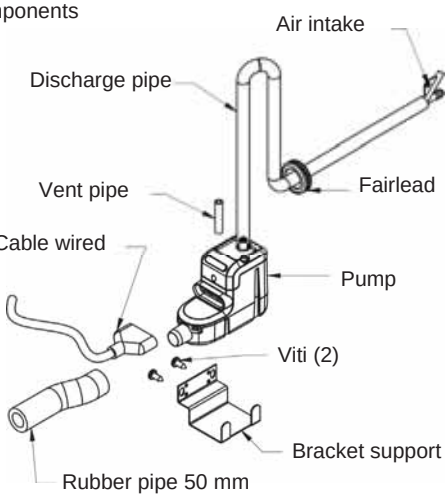


⚠ Remove the MATE-N-LOK connector, connect the wires to the XC terminal block

Remove the jumper (*) on the terminal block XC

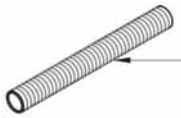
CPAN-U 200 - 500

Used components



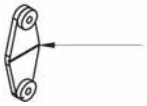
Hose clamps (2)

Unused components



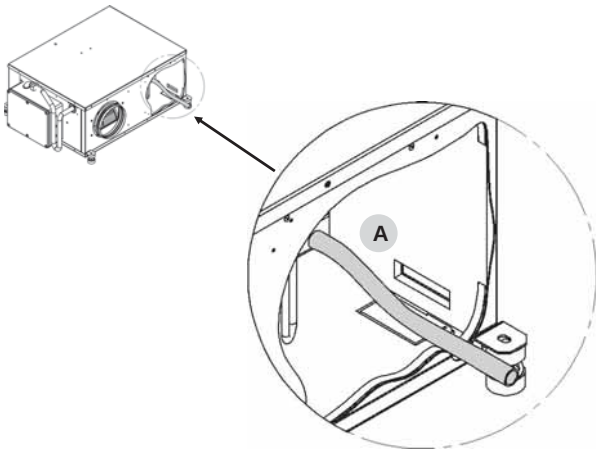
Corrugated pipe

90° curve



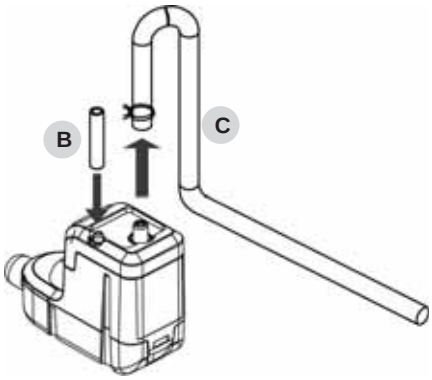
Antivibration support

1 To access remove the higher or lower panel



Remove the standard condensate drain pipe (A)

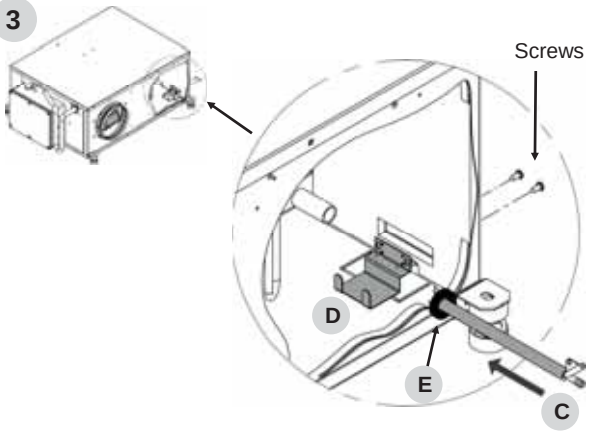
2



Insert vent pipe (B)

Remove the discharge condensate pipe (C) + clip

3

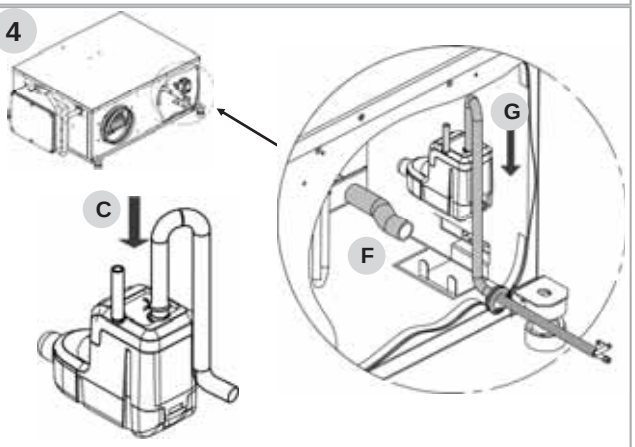


Screw the pump support (D)

Insert fairlead (E)

Make a hole in the fairlead (E) and insert the condensate discharge pipe (C)

4

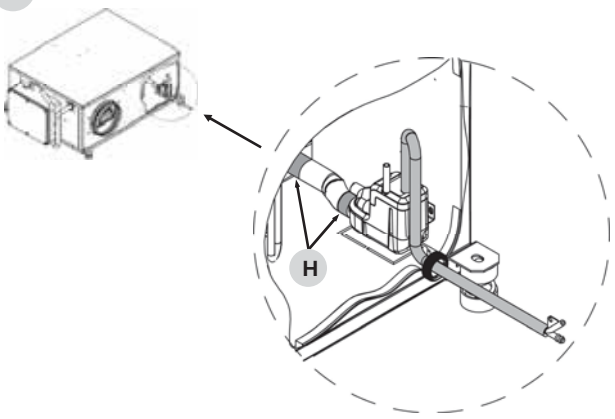


Insert the discharge condensate pipe (C) + clip

Connect the pipe (F) to the tray (L = 50mm)

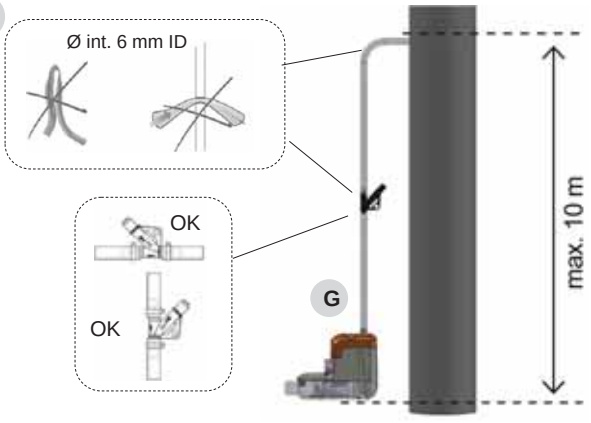
Insert pump (G) and connect the pipe (F)

5



Fix with the hose clamps (I)

6

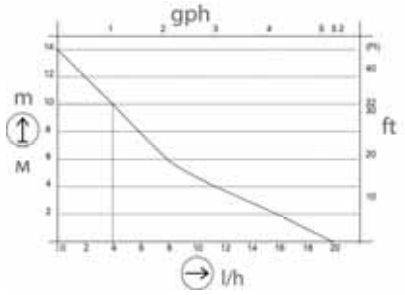


Connect the condensate discharge pipe (G) to a drainage network.

⚠ Do not crush the pipe that could limit the passage of water

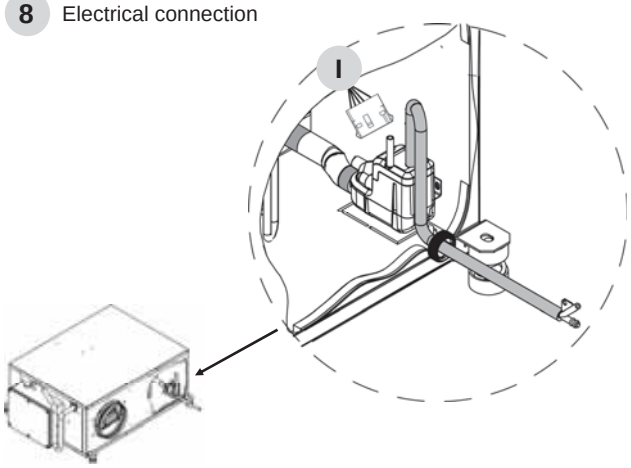
7 Table flow-rare (l/h)

	Total tube length (ø int. 6mm)			
Discharge head	5 m	10 m	20 m	30 m
0 m	20	19	18	17
2 m	16	15	14	13,5
4 m	11,5	11	10,5	10
6 m		8,5	7,5	6,5
8 m		6	5	4
10 m		4	3,5	2,5



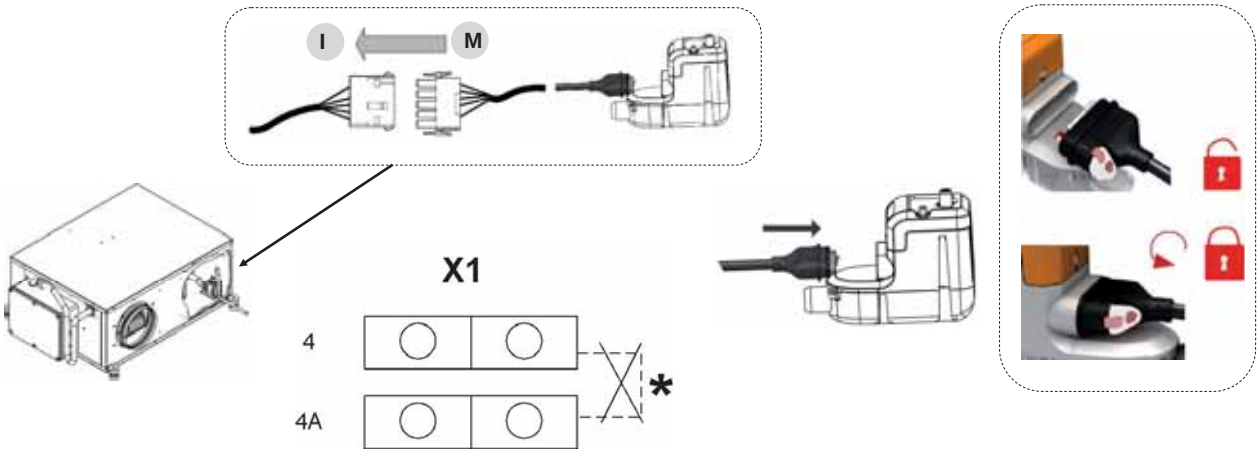
Discharge head Flow-rate

8 Electrical connection



Connector MATE-N-LOK (I)

Remove the electrical panel cover (L) to access terminal block X1



⚠ Connect MATE-N-LOK (M)

Remove the jumper (*) on the terminal block X1

⚠ If present remove the jumper on the terminal block X1 (4 and 4A) on the electrical panel, see wiring diagram

11.5 FAEX - KIT OF EXHAUST AIR FILTER

CPAN-U 200 - 500

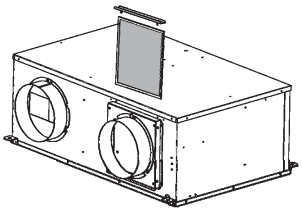
The ambient filter installation is possible in 3 positions:

A - from the top (floor units)

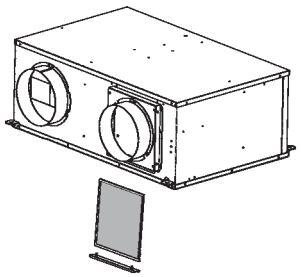
B - from the bottom (ceiling units)

C - lateral (floor units)

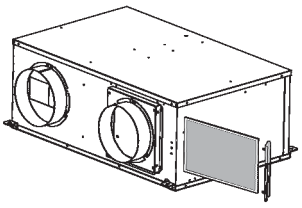
A



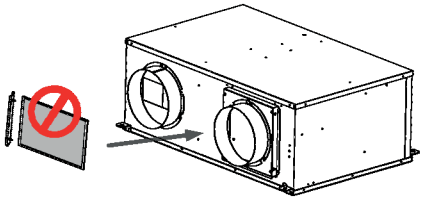
B



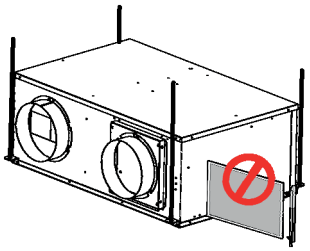
C



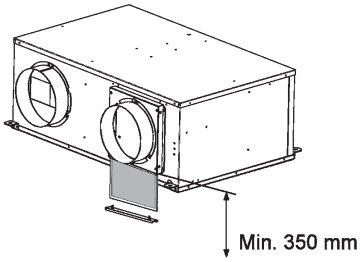
Installation not permitted



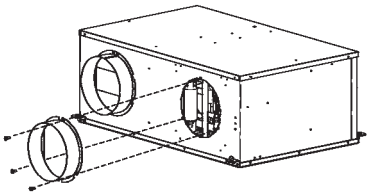
Lateral ceiling installation not allowed.



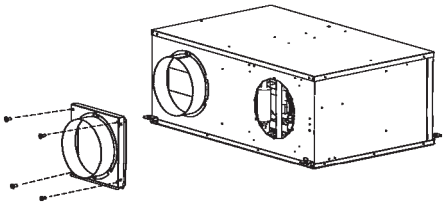
Minimum space for filter extraction.



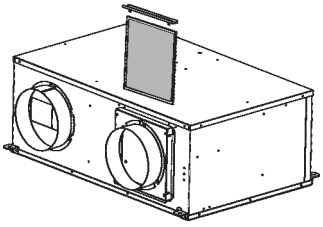
1 Unscrew the front screws.
Remove the existing collar.



2 Install the filter holder.



3 Insert the filter.
Close the filter.
Screw the 2 screws of the locking filter



11.5 FESX - ELECTRONIC FILTER

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 vapours also in low concentration
- oil vapours
- 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.)

Filter installation

The filter installation is possible in 2 positions:

CPAN-U 70-120

A - from the top (floor units)

B - from the bottom (ceiling units)

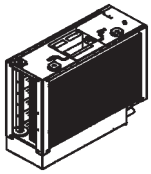
CPAN-U 200-500

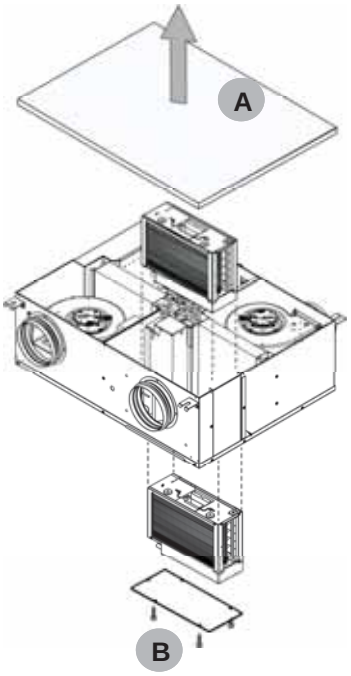
C - lateral (floor units)

D - from the bottom (ceiling units)

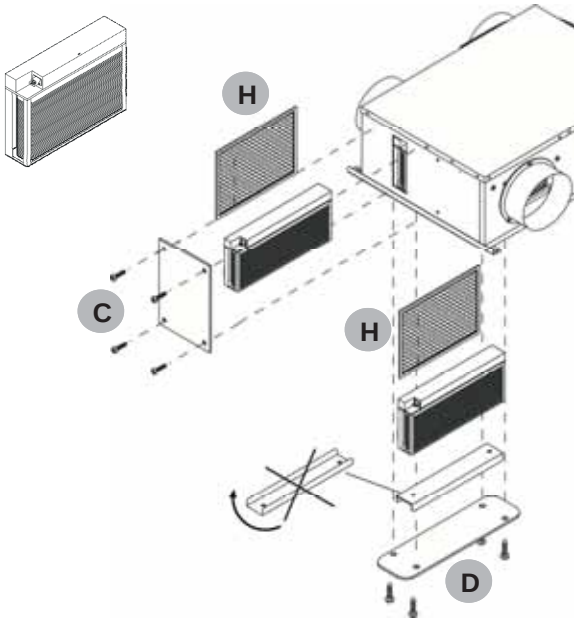
Switch off the unit.

CPAN-U 70 - 120





CPAN-U 200 - 500

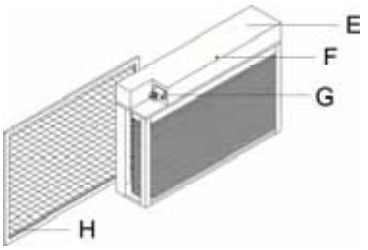


To install the filter:

- Remove the closing panels
- Extract the pleated filter
- Connect the quick connector (**G**)
- Insert the electronic filter
- Insert the metal mesh prefilter (**H**) only CPAN-U 200-500
- Close the panels

Quick connector (**G**)

E Electrostatic filter
F Signalling green led
G Quick connector
H Metal mesh prefinte (only CPAN-U 200-500)



11.7 CMMBX : SERIAL COMMUNICATION MODULE TO SUPERVISOR (MODBUS)

The unit can be connected to ELFOControl[3], remote keypad (HID-Ti5[2]) or an external supervisor system.

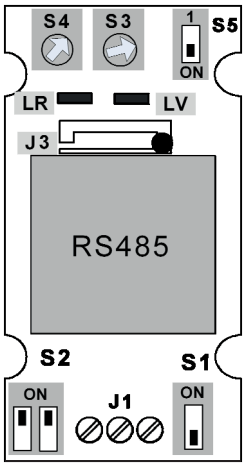
* parameter	description	Extended description	value
165	Adress	ModBus supervision serial address	3
166	BaudRate	Baud Rate (0=4800 / 1=9600 2=19200) supervision serial	1
167	Parity	Parity 0=NO / 1=Odd 2=Even supervision serial	0

* Parameters that can be accessed with the maintenance technician password

Only qualified personnel can have access with the password. Changes to parameters can cause malfunctions.

ModBus protocol details: following pages.

RS485 MODULE



LV = GREEN LED :

OK

LR = RED LED QUICK FLASHING:

wrong address

faulty module

Polarisation

Only one card must be polarised inside network 485

S2 = OFF = polarised NO

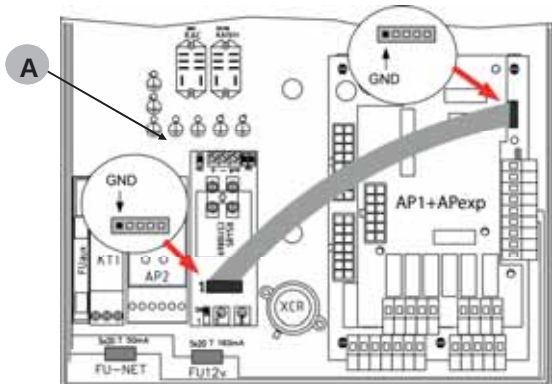
Termination

The last component of the network must be terminated

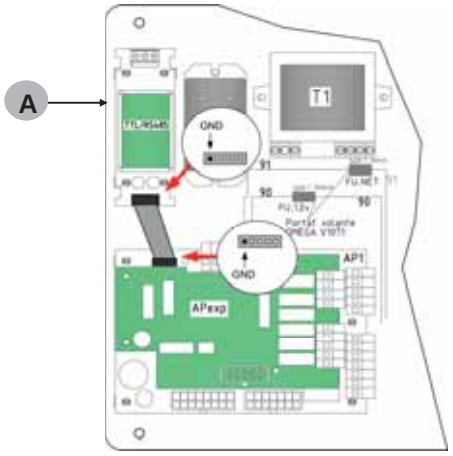
S1 = ON = termination YES

- Position the RS 485 (**A**) module in the Elfofresh[2] electrical panel.
- For a correct connection use the GND (**blue**) as reference.

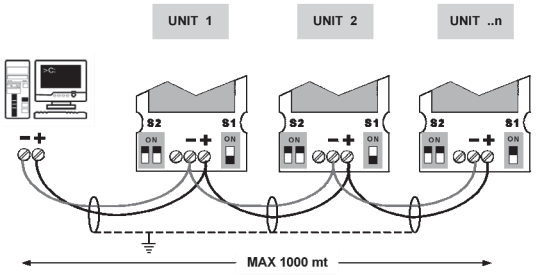
ELECTRIC PANEL - CPAN-U 70 - 120



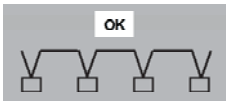
ELECTRIC PANEL - CPAN-U 200 - 500

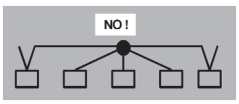


- The shielding must be connected to a ground without disturbances and in only one point;
- Provide a continuous shielding during all the serial cable.



- The total length of the serial line must not exceed 1000 meters.
- The potential difference between the "grounds" of two RS485 devices must be less than 7 V.
- The serial lines must be connected in bus type, i.e. nodes are not allowed to more points.





11.8 MODBUS PROTOCOL

STATUSES, PROBES, ALARMS, CONTROLS

STATUS AREA			
Modbus Address (decimal)	**rd**: read **wr**: write		
		Description	**Unit**
2000	rd	Warm setpoint	°C/10
2001	rd	Cold setpoint	°C/10
2002	rd	Current setpoint (return)	°C/10
2007	rd	Number of compressors on	no.
2011	rd	Active control status of supply air quality	no. (0-1)
2013	rd	External bypass damper status	no. (0-1)
2015	rd	Free-cooling status	no. (0-1)
2016	rd	Free-heating status	no. (0-1)
2017	rd	Fan status set to silent	no. (0-1)
2018	rd	Supply fan control signal	%
2020	rd	Return fan control signal	%
2022	rd	On-off humidifier status	no. (0-1)
2023	rd	Humidifier control signal	%
2024	rd	On/off status (local)	no. (0-1)
2025	rd	Heat/cool machine mode	no. (0-1)
2026	rd	(Eco status – *off*)	no. (0-1)
2027	rd	Ventilation-only active status	no. (0-1)
2030	rd	Operating statuses bitmaps	bitmap
2031	rd	2 operating statuses bitmaps	bitmap
2032	rd	(Operating) return temperature	°C/10
2033	rd	Supply temperature (mean value)	°C/10
2034	rd	Fresh air temperature	°C/10
2035	rd	Supply humidity	%
2036	rd	(Operating) return humidity	%
2044	rd/wr	Compressor1 hours of operation	no.
2046	rd/wr	Compressor1 start-ups	no.
2050	rd	Statuses1 bitmaps (compressor and assoc. circ. mix)	bitmap
2052	rd	Alarms bitmap 1	bitmap
2053	rd	Alarms bitmap 2	bitmap
2054	rd	Alarms bitmap 3	bitmap
2068	rd	Ambient air enthalpy value hAmb	0.1 Kcal/ Kg

CONVENTIONAL CODES FOR THE PROBES

Error on one of the probes (value higher than the expected operating range). This is indicated with the specific probe error code = 0x7fff.

When the relative parameter reports that there is no probe, this is indicated with the no probe code = 0x7ffe (it does not appear in the local probes value, but in the value related to the operating probes).

Statuses1-2 bitmaps (compressor and assoc. circ. mix)

Posit.	meaning	mask
bit**0**	Compressor timing in progress	0x01
bit**1**	Compressor on	0x02
bit**2**	Excited reverse valve	0x04
bit**3**	-------	0x08
bit**4**	-------	0x10
bit**5**	Fan di mandata acceso	0x20
bit**6**	-------	0x40
bit**7**	-------	0x80

Bitmap 1 alarm (probe)

Posit.	meaning	mask
bit**0**	External air temperature probe failure	0x01
bit**1**	---------	0x02
bit**2**	Supply temperature probe failure	0x04
bit**3**	Return temperature probe failure (local or from thermostat or from serial device)	0x08
bit**4**	Return humidity probe failure (local or from thermostat or from serial device)	0x10
bit**5**	---------	0x20
bit**6**	---------	0x40
bit**7**	---------	0x80
bit**8**	---------	0x0100
bit**9**	Supply humidity probe failure	0x0200
bit**10**	Suction pressure probe/exhaust coil failure	0x0400
bit**11**	---------	0x0800
bit**12**	---------	0x1000
bit**13**	---------	0x2000
bit**14**	---------	0x4000
bit**15**	---------	0x8000

Bitmap 2 alarmas

Posit.	meaning	mask
bit**0**	High pressure alarm	0x01
bit**1**	Low pressure alarm	0x02
bit**2**	Compressor thermal alarm	0x04
bit**3**	---------	0x08
bit**4**	---------	0x10
bit**5**	Control signal - supply air quality not met with all the resources used	0x20
bit**6**	Preheating modulating heating elements with recovery circuit off	0x40
bit**7**	Fans off due to external air temperature in Ventilation-only mode	0x80
bit**8**	Ventilation alarm due to low external temperature	0x100
bit**9**	Ventilation alarm due to high external temperature	0x200
bit**10**	Ventilation alarm due to low ambient temperature	0x400
bit**11**	Ventilation alarm due to high ambient temperature	0x800
bit**12**	Circuit block alarm due to low enthalpy/ ambient temperature (heat)	0x1000
bit**13**	Circuit block alarm due to high ambient temperature (cool)	0x2000
bit**14 , 15**	---------	

Bitmap 3 alarmas

Posit.	meaning	mask
bit**0**	Fire alarm	0x01
bit**1**	Supply and return fan safety alarm	0x02
bit**2**	Dirty filters alarm	0x04
bit**3**	---------	0x08
bit**4**	---------	0x10
bit**5**	---------	0x20
bit**6**	Humidifier alarm	0x40
bit**7**	Humidifier antifreeze alarm	0x80
bit**8**	Maximum supply temperature alarm	0x0100
bit**9**	Machine configuration alarm (1)	0x0200
bit**10**	High supply temperature alarm 1	0x0400
bit**11**	High supply temperature alarm 2	0x0800
bit**12**	Low supply temperature alarm 1	0x1000
bit**13**	Low supply temperature alarm 2	0x2000
bit**14**	Water temperature out of limits alarm	0x4000
bit**15**	Temperature differential inconsistency between supply air and external air (with compressor on for more than 10 min.)	0x8000

(1) The configuration alarm is sent when at least one of the conditions below has occurred:

the PotC1 =0 parameter is set;

when the H2OLogic=3 parameter is set to PotC2 >= PotC1;

with the PotC2 >0 parameter is set to En Inverter=1;

Operating statuses bitmaps

Posit.	meaning	mask
bit**0**	(Clean on - *off*)	0x01
bit**1**	Heat mode	0x02
bit**2**	Remote input on/off	0x04
bit**3**	Cool mode	0x08
bit**4**	Ventilation-only active	0x10
bit**5**	(ECO on - *off*)	0x20
bit**6**	Local on/off	0x40
bit**7**	-------	0x80

Operating statuses 2 bitmaps

Posit.	meaning	mask
bit**0**	Humidifier status on	0x01
bit**1**	AUTO/MAN season change	0x02
bit**2**	AUTO/MAN setpoint change	0x04
bit**3**	-------	0x08
bit**4**	-------	0x10
bit**5**	-------	0x20
bit**6**	-------	0x40
bit**7**	-------	0x80

SUPERVISOR AREA			
Address Modbus (decimal)	**rd**: read **wr**: write		
		Description	**Value**
-----	rd/wr	Control in heat/cool mode	no. (0-1)
-----	rd/wr	Control in on/off mode	no. (0-1)
-----	rd/wr	(Eco control - *off*)	no. (0-1)
-----	rd/wr	(Clean control - *off*)	no. (0-1)
-----	rd/wr	Ventilation-only control	no. (0-1)
2100	rd/wr	Operating statuses controls bitmaps	bitmap

SUPERVISOR AREA			
Address Modbus (decimal)	**rd**: read **wr**: write		
2101	rd/wr	Flag register	bitmap
2102	rd/wr	EXTERNAL value of the Vrec adjustment component	%
2103	rd/wr	Return temperature EXTERNAL value	°C/10
2104	rd/wr	Return humidity EXTERNAL value	°C/10
2105	rd/wr	External temperature EXTERNAL value	°C/10
2106 MSB	rd/wr	(Reduced air flow rate control - *off*)	no. (0-1)
2106 LSB	rd/wr	Silent mode control	no. (0-1)
2107	rd/wr	Heat Ambient Setpoint value	°C/10
2108	rd/wr	Cool Ambient Setpoint value	°C/10

CONTROLS ASSOCIATED WITH STATUSES/OPERATING MODE

Controls received via the Modbus serial device are subject to the same acquisition constraints that apply for keyboards (for instance, if the ventilation-only mode is active, it is not possible to switch from ECO to non-ECO or vice versa).

For the bitmap controls from Modbus, the 4-5-6 bits must be set to specific set of three values according to the required status and the current status (if the set of three values is not allowed, the control of the associated statuses is ignored).

REQUIRED CONTROL (from Modbus)	**bit6 bit5 bit4** onoff eco vent. loc. only	Current operating status that allows to acquire the required control **bit2 bit6 bit5 bit4**
REQU. in OFF mode	0 0 0	1 x y z (x,y,z ={0,1})
REQU. in ON mode	1 0 0	1 0 0 0 (current status – off) 1 0 1 0 (current status – eco)
REQU. in ECO mode	0 1 0	1 1 0 0 (current status – normal on)
REQU. in VENT-ONLY mode on	0 1 1 1 0 1	1 0 1 0 (current status – eco) 1 1 0 0 (current status – normal on)
REQU. in VENT-ONLY mode on	0 1 0 1 0 0	1 0 1 1 (current status – fan-only in eco mode) 1 1 0 1 (current status – fan-only in normal on)

For the other status/mode controls (heat/cool), the activation request is indicated by corresponding bit=1

Simplified table

Bit	7	6	5	4	3	2	1	0	Value to send
Weight	128	64	32	16	8	4	2	1	
Controls									
Unit switching on and/or go to Test mode	0	**64**	0	0	0	**4**	0	**1**	**69 (0x45)**
Unit switching on and/or go to Heat mode	0	**64**	0	0	0	**4**	**2**	0	**70 (0x46)**
Unit switching on and/or go to Cool mode	0	**64**	0	0	**8**	**4**	0	0	**76 (0x4C)**
Unit switching off (as by ON/ OFF button)	0	0	0	0	0	**4**	0	0	**4 (0x04)**
Unit off and/or go to Heat mode	0	0	0	0	0	4	2	0	**6 (0x06)**
Unit off and/or go to Cool mode	0	0	0	0	8	4	0	0	**12 (0x0C)**
Unit switching off (as by digital input)	0	**64**	0	0	0	0	0	0	**64 (0x40)**

REFERENCE CONTROLS FOR PROBES AND OTHER SPECIAL CONTROLS

There is the option of setting the adjustment component of the compressors and/or specific adjustment probes or the Silent Mode control of the fans via the Modbus serial device.
This category of controls is subject to the following application criteria:

- The possibility of acquiring the control from a serial device (Modbus) is subject to a given value of the parameter that configures the specific element (compressor adjustment component, probe, silent mode management, etc.);
- Provided that the previous section has been checked, each Modbus control is acquired only if in the Flag Register (written by Modbus) the flag that enables that specific control has been set to 1;
- If the conditions above are met and the ***TimeOffLine*** parameter is > 0, the Modbus serial device experiences a communication timeout. The control is no longer acquired by the Modbus (until the connection is re-established); if instead the ***TimeOffLine*** parameter is = 0, the connection to the latest control received from the Modbus remains in place (if enabled in the Flag Register);
- If a control cannot be acquired by the Modbus, the system sets itself in the "local" logic.

Flag Register (bit=1 with control enabled from network, bit=0 with control not enabled from network)

Posit.	Name	Description	mask
bit**0**	EnNetworkReturnT	Return temperature from network	0x01
bit**1**	EnNetworkReturnH	Return humidity from network	0x02
bit**2**	EnNetworkExternalT	External temperature from network	0x04
bit**3**	EnNetworkCompAdjust	Compressor adjustment component from network	0x08
bit**4**	EnNetworkReducedFlowRate	(Reduced flow rate from network control - - *off*)	0x10
bit**5**	EnNetworkSilentMode	Ventilation Silent mode control	0x20
bit**6**	EnNetworkSetpoint	Ambient setpoint from network (1)	0x40
bit**7**	------	(*not used*)	0x80
bit**8**	------	(*not used*)	0x0100
bit**9**	------	(*not used*)	0x0200
bit**10**	------	(*not used*)	0x0400
bit**11**	------	(*not used*)	0x0800
bit**12**	------	(*not used*)	0x1000
bit**13**	------	(*not used*)	0x2000
bit**14**	------	(*not used*)	0x4000
bit**15**	------	(*not used*)	0x8000

(1) the network setpoint is selected also for the non-current operating mode

PARAMETRES

Modbus address of a generic parameter = 1000 + key-board display index – 1.

PARAMETERS AREA			
Address Modbus (decimal)	**rd**: read **wr**: write		
		Description	**Value**
>1000	rd/wr	16-bit parameters with sign	
>1000	rd/wr	8-bit parameters without sign	
>=1000	rd/wr	8-bit parameters with sign	

PASSWORD TO ACCESS PARAMETERS IN WRITING MODE AND SPECIAL CONTROLS

PASSWORD AREA			
Address Modbus (decimal)	**rd**: read **wr**: write		
		Description	**Value**
400	rd/wr	Alarms manual reset control	101 Modbus
401		Installer password for parameters (level 1 - maintenance)	115
402		Manufacturer password for parameters (level 2)	321

MODULES FW VERSIONS

VERSIONE FW MODULO BASE		
Address Modbus (decimal)	**rd**: read **wr**: write	
		Description
1	rd	FW version
2	rd	FW revision
3 MSB	rd	Eeprom version
3 LSB	rd	Date: Day
4 MSB	rd	Date: Month
4 LSB	rd	Date: Year

12.1 MANUAL

The manual allows a correct unit installation, use and maintenance.

Pay particular attention to :

WARNING, identifies particularly important operations or information

PROHIBITIONS, identifies operations that must not be carried out, that compromises the operating of the unit or may cause damages to persons or things.

- It is advisable to read it carefully so you will save time during operations.
- Follow the indications so you will not cause damages to things and injuries to people .The preliminary information must be read before carrying out any of the following operations.

12.2 GENERAL INSTRUCTIONS

Preliminaries

Read carefully the IOM and use the unit strictly according to the instructions in order to avoid personal injuries, damages to the unit, damages to property and litigations.

Our company does not assume any legal liability for any damage caused by improper use of the unit.

The positioning, the hydraulic, refrigerating and electrical system and the air ducting must be determined by the system designer according to the local regulations.

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

Using the unit in case of breakdown or malfunction :

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

Follow local safety regulations

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

Recycling and disposing the packaging material in conformity with local regulations.

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 the risk situations.

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

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

Intended use

Use the unit for the air treatment.

Follow the limits defined in the technical bulletin and on this manual.

Do not treat air with :

- high concentrations of dust
- aggressive substances
- residues from industrial processing.

Any use other than intended does not involve the manufacturer in any commitment or obligation.

12.3 ELECTRIC SYSTEM

General

The characteristics of the electrical lines must be determined by specialized personnel able to design electrical installations; moreover, the lines must be in conformity with regulations in force. Please refer to the "Information" section for the detailed characteristics of the unit (dimensioning, performance, etc) .

Operate in compliance with safety regulations in force .

This unit is required reliable earthing before usage, otherwise might cause death or injury.

If you can't make sure that your house power supply is earthed well, please don't install the unit if it does not in conformity with regulations in force.

Power supply circuit should be earthed effectively.

Do not use water pipes to earthing connection of the unit

Use single protection devices : gloves, glasses ecc.

The protection devices of the unit power line must be able to stop the presumed short circuit current, whose value must be determined in function of system features. The power cables and the protection cable section must be defined in accordance with the characteristics of the protections adopted. The serial number label reports the unit specific electrical data, included any electrical accessories.

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

Refer to those data.

Connection

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

Refer to the unit electrical diagram (the number of the diagram is shown on the serial number label).

Verify that the network has characteristics conforming to the data shown on the serial number label .

Make sure that the unit supply line is selected at start.

Shelter the cables using adequate measure fairleads.

Before starting work, verify that the sectioning device at the start of the unit power line is open, blocked and equipped with sign warning.

First create the earthing connection**.**

After wire connection, check it again and make sure the correctness before power on.

Prior to powering the unit ensure that all the protections that were removed during the electrical connection work have been restored.

Signal lines/data-lay

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

Lay the cables far from power cables or cables having a different voltage 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 for the entire extension of the cable.
Respect impendency, capacity and attenuation indications.

12.4 MODIFICATION

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

12.5 BREAKDOWN/MALFUNCTION

Disable the unit immediately in case of breakdown or malfunction.
Contact a constructor certified assistance service.
Use original spares parts only.

12.6 USER TRAINING

The installer has to train the user on :

- ON / OFF
- set points change;
- standby mode;
- Maintenance;
- what to do / what not to do in case of breakdown.

12.7 DATA UPDATE

Continual product improvements may imply manual data changes .
Visit manufacturer web site for updated data.

13 - RESIDUAL RISKS

General

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

Danger zone

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

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

Handling

The handling operations, if implemented without all of the protection necessary and without due caution, may cause the fall 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 gas refrigerant leak please refer to the refrigerant "Safety sheet".

Installation

An incorrect installation of the unit could cause water leaks, condensate accumulation, leaking of the refrigerant, electric shock, bad functioning 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 cause the fall or the tipping of the unit with the 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 favour the entry of dust, water etc inside and may consequently can 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 shield.

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 shield.

Moving parts

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

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

Contact with the fans can cause injuries.

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 gas 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 cut-off parts may cause a leak or water projection with the consequent damages to people, things or short-circuit the unit.

14.1 DISCONNECTION

Only authorised personnel must disconnect the unit.

- Avoid leak or spills into the served area.
- Before disconnecting the unit, the following must be recovered, if present:
  - refrigerant gas
  - Anti-freeze solutions in the hydraulic circuits
- When awaiting dismantling and disposal, the unit can also be stored outdoors, as bad weather and rapid changes in temperature will not cause damage to the environment, if the unit's electric, cooling and hydraulic circuits are integral and closed.

14.2 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 .

14.3 CE WEEE DIRECTIVE

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 CE Directive on waste electrical and electronic equipment (WEEE).

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 CE-WEEE. This information is also available from the retailer who sold this appliance or from the local authorities who handle waste.

CE-WEEE directive 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.

If disposal takes places at the same time as delivery of a new electrical or electronic equipment for the same family, the product may be collected directly by the distributor.

USER MANUAL

ELFOFresh^2 70-120

ELFOFresh^2 200-500

Change living home

15.1 USER

It is forbidden the use of the device to children and unassisted disables .

It is forbidden to touch the device if you are barefoot and with wet body parts . It is forbidden any cleaning, before having disconnected the device positioning the system main switch on “off”. It is forbidden to pull, remove, twist the electric cables that come out from the device even if it is disconnected from the mains supply.

It is forbidden to trample on the device and/or to put on it any type of object.

It is forbidden to throw or spray water directly on the device.

It is forbidden to insert sharpened objects by the air return and supply grilles.

It is vorbidden to open the lids of access to the internal device parts, without having before positioned the main switch of the system on “off”.

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

Note the unit lable data so you can provide them at 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 constructor certified assistance service.
- Use original spares parts only

Ask the installer to be trained on:

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

15.2 MAIN FUNCTIONS

Heating

In heating are managed the compressor, free-heating (it uses the fresh air heat to heat the room) ,resistances, humidifier.

Cooling.

In cooling are managed the compressor and the free-cooling (it uses the fresh air to cool the room).

Mode change

The change between cooling and heating can be:

AUTOMATIC: according to the outside temperature

MANUAL: by the thermostat button

For the automatic or manual change set the P03 ONModeMan parameter on the ambient thermostat.

Set Point

There are two setpoint : cooling and heating.

The set can be modified in MANUAL or AUTOMATIC mode.

Manual Set Point

In MANUAL mode it is possible to modify the setpoint by thermostat with the buttons. 

The two set are connected to avoid their overlapping.

If the cooling set is decreased, also the heating set is automatically decreased.

If the heating set is increased, also the cooling set is automatically decreased.

Automatic Set Point

The setpoint change according to the outside temperature, depending on a curve set by parameters.

The heating setpoint is below the curve; the cooling setpoint is above.

Ventilation T

he unit operates as a fan, no control on the ambient temperature.

Winter HR control

Only if is present the humidifier option.

The humidification is enabled only in heating.

The set point can be modified by thermostat with the parameter p05 seturhe-at.

Silent

In this mode the fans are controlled with reduced speeds.

The activation can be performed from digital input or from supervisor.

The enabling is performed by parameter 224 SiletMode:

0=disabled; 1=from digital input; 2=from digital input or supervisor.

The reduction of percentage is defined by the parameter 225 (90% standard)

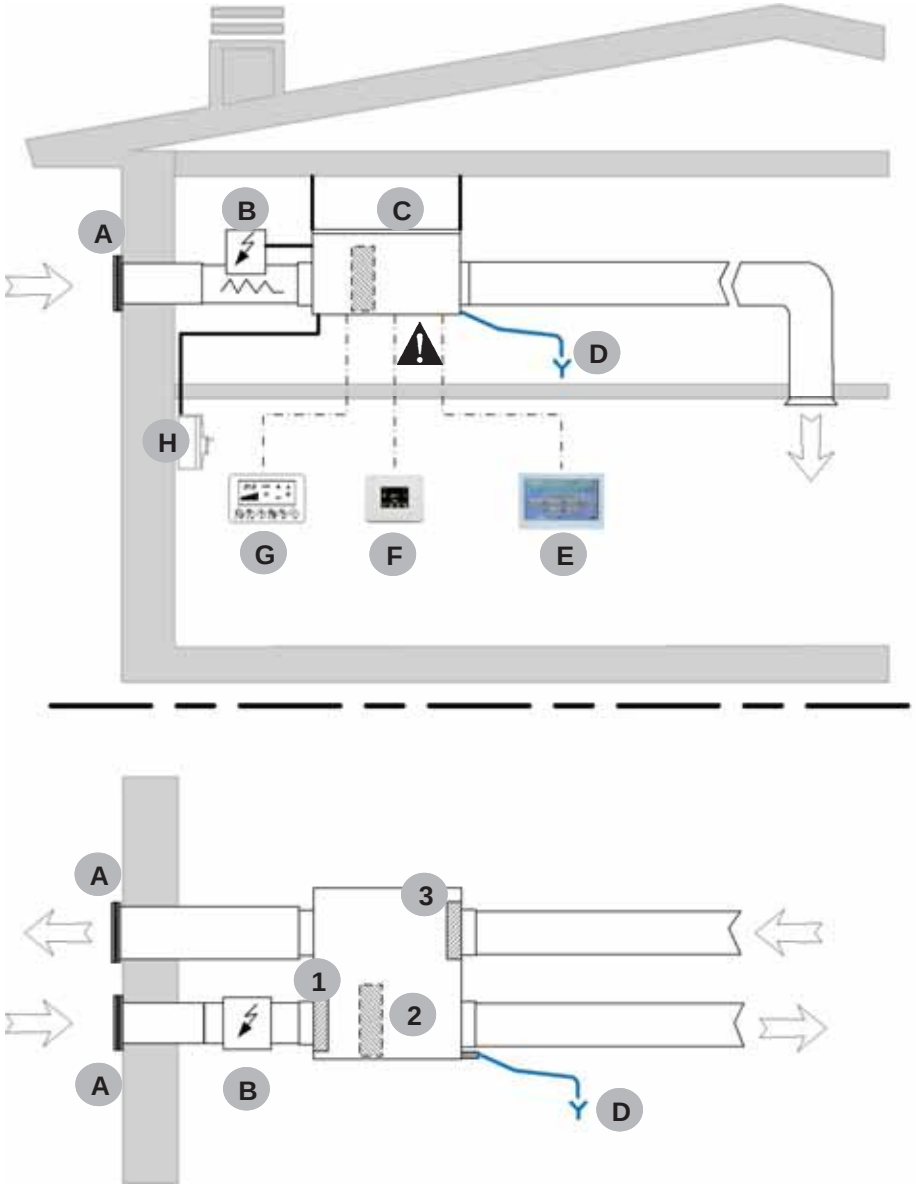
The silent mode can be activated only in heating .

Button lock / Button unlock

The long pressure of Clean and On-Off buttons, stop all the button functions.

The lockout status is highlighted by characters “---“ at each pressure of any button.

CPAN-U 70 - 120

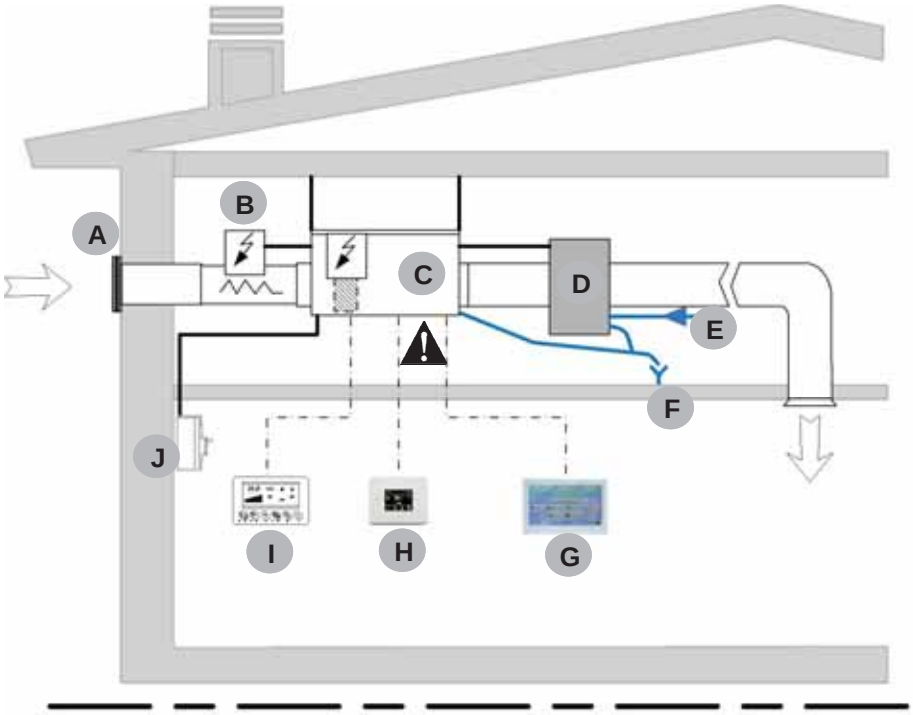


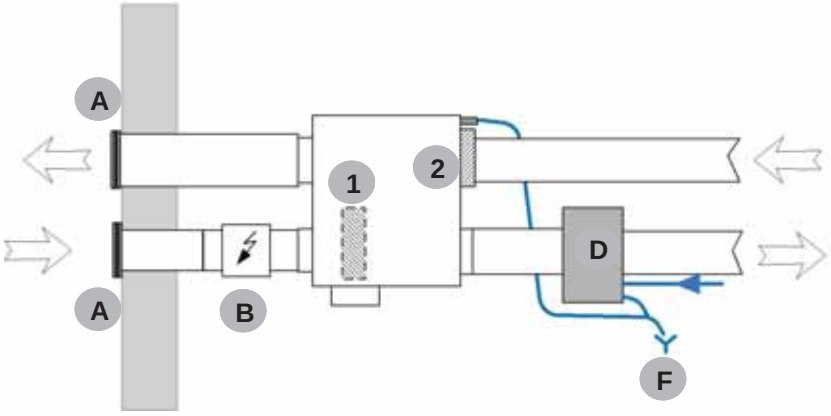
A Grid to prevent small animals or leaves from entering inside (option)
B Kit of electric resistance (option)
C Unit
D Condensate discharge
E Elfocontrol[3] (option)
F HID-Ti5[2] Remote control (option)
G Ambient thermostat
H Power supply

1 Intake air filter
2 Electronic filter (optional)
3 Exhaust air filter

On the RS485 board is possible to connect only one control,Elfocontrol[3] or remote HID-Ti5[2] keypad.
NOT BOTH

CPAN-U 200 - 500





A Grid to prevent small animals or leaves from entering inside (option)
B Kit of electric resistance (option)
C Unit
D Humidifier kit (optional)
E Water supply
F Condensate discharge
G Elfocontrol[3] (option)
H HID-Ti5[2] Remote control (option)
I Ambient thermostat
J Power supply

1. Electronic filter (option)
2. Kit of exhaust air filter (optional - recommended)

On the RS485 board is possible to connect only one control,Elfocontrol[3] or remote HID-Ti5[2] keypad.
NOT BOTH

15.3 VENTILATION

AIR FLOW MODULATION

REDUCED FLOW IN WINTER

With an outdoor air temperature lower than -5°C, the flow is reduced (**A**) to maintain the ambient inlet air temperature (**I**) approximately equal to the internal temperature (20°C) .

In this situation the need of ventilation is completely satisfied.

NOMINAL FLOW

With an outdoor temperature included between -5°C and +20°C, the fresh air flow remains constant (**B**).

The ambient inlet air temperature (**II)** increases at the outdoor temperature increasing.

In this situation ELFOFresh^2, in addition to satisfy the needs of ventilation, satisfies in whole or in part the heat request.

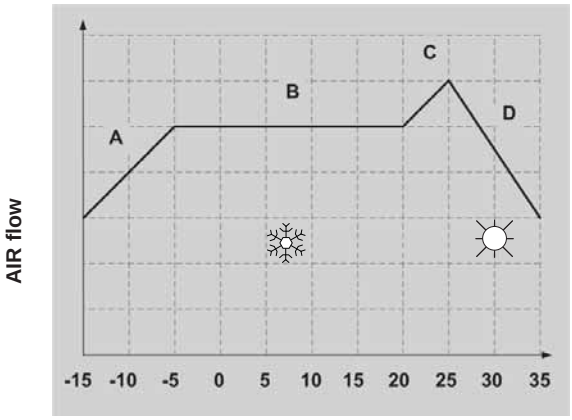
FLOW

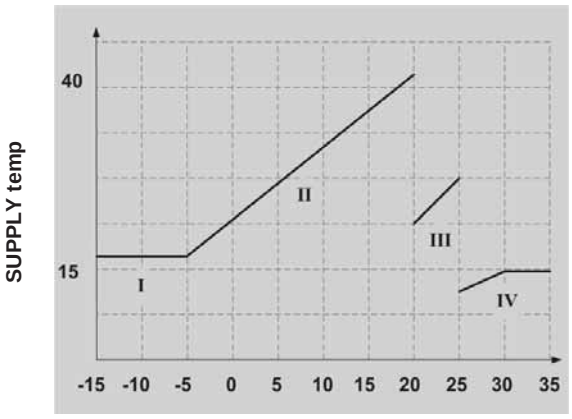
With an outdoor temperature included between +20°C and +24°C is effected a free-cooling increasing the inlet fresh air flow and disabling the compressor (**C**).

The ambient inlet air temperature is equal to the outdoor temperature (**III**).

REDUCED FLOW FOR DEHUMIDIFICATION

In order to effect more effectively the fresh air dehumidification, ELFOFresh^2 reduces the flow modulating the fan speed (**D**), so it is possible to cool the rooms by using the radiant panels and to effectively dehumidify.





STOPPING THE FANS

In certain circumstances, ventilation is stopped to prevent sudden temperature changes in the room.

When the ventilation is turned off, the compressor is turned off as well.

SUMMER

The ventilation is stopped if the temperature:

OUTSIDE

high, more than 40°C

or

AMBIENT

high, more than 35°C

or

SUPPLY

low, below 5°C

or

SUPPLY

high, more than ROOM SETPOINT value + 6°C

WINTER

The ventilation is stopped if the temperature:

OUTSIDE

low, below -15°C

or

AMBIENT

low, below 10°C

or

SUPPLY

low, below 8°C

or

SUPPLY

high, more than 45°C

KEYS FUNCTIONS

	Ambient setpoint control up / down
	Ventilation Alarm
Eco	Eco (used in combination with other keys)
	Cooling / Heating
Clean	Clean
	ON / OFF

KEYS COMBINATION

+	It displays the temperature detected in ambient	Long press
	It scrolls down the alarm list of one code at a time	Single press
Eco + Clean	Alarm reset in progress	Long press
Clean +	Button lock / Button unlock	Long press It appears “- - -“ at each press
Clean	Display of supply temperature	Long press

DISPLAY

Icon	Meaning	Notes
	Cooling	Symbols alternatively together
	Heating	
	Humidifier	Visible if active
	Compressor	Visible if active
21.0	Set - point	Ambient temperature
	Fan	Fan speed
REMOTE	Operation managed by supervisor	Visibile if Elfofresh² is connected to a supervisor
AUTO	Automatic operating	Visible if active

START UP

The display is switched on in Off.

Hold the On-Off button for 5 seconds until the unit start-up.

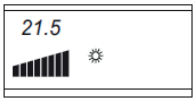
The ambient setpoint is displayed

Select the desired operating mode between heating and cooling

COOLING

Hold the Cooling button for 5 seconds until is displayed the

Cooling symbol



Use the setpoint Control buttons to set the desired setpoint.

HEATING

Hold the Heating button for 5 seconds until is displayed the

Heating symbol

Use the setpoint Control buttons to set the desired setpoint.

In each of the two modes is possible to activate the function:
Ventilation only

VENTILATION ONLY

Hold the Ventilation button for 5 seconds until the setpoint value is replaced with “- - -”.

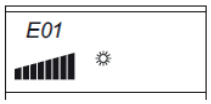
To deactivate, hold the Ventilation button for 5 seconds, until the setpoint value is displayed

SET-POINT CONTROL

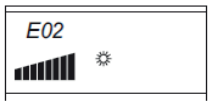
Use the buttons for the setpoint Control to modify the value.

ALARM VISUALIZATION

To display all alarms in progress, press the Alarm button.



To scroll down the alarm list press repeatedly the Alarm button.

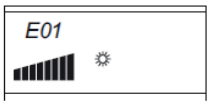


The display will return to normal visualization after 5 seconds from the last pressure on Alarms

ALARM RESET

Before resetting an alarm, identify and remove the cause that generated it.
Repeated reset can lead to irreversible damages .

To reset the alarms press both the Eco and the Clean buttons.



SPEGNIMENTO

SHUTDOWN

Hold the On-Off button for 5 seconds until the unit shutdown.

Off" is displayed .

At the next starting, the unit is started-up in the last set mode.

STOP FOR LONG PERIODS

Hold the On-Off button for 5 seconds until the unit shutdown. “Off” is displayed ”.		
Position the main installation switch on “Off”.		
At the next starting, the unit is started-up in the last set mode.		

MAINTENANCE

ACCESS TO THE UNIT

To conduct periodical maintenance, you need to be able to access the unit safely, see the recommended distances on page 17 and 18

Any furniture or other objects must be easily moved.

USER MAINTENANCE

CONDENSATE DISCHARGE

Dust and deposits could cause obstructions .

In addition in the pan can proliferate microorganisms and moulds.

It is very important to provide a periodic cleaning with appropriate detergents and in case a disinfection with sanitizing products.

⚠ After cleaning pour water into the pan to ensure a regular flow.

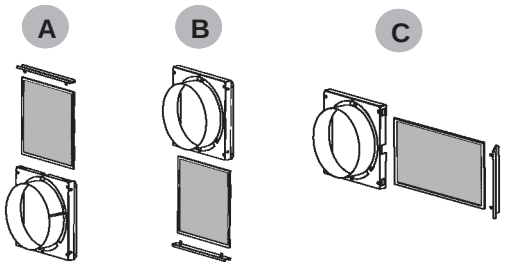
CPAN-U 200 - 500

The ambient filter installation is possible in 3 positions:

A - from the top (floor units)

B - from the bottom (ceiling units)

C - lateral (floor units)



To clean the filter:

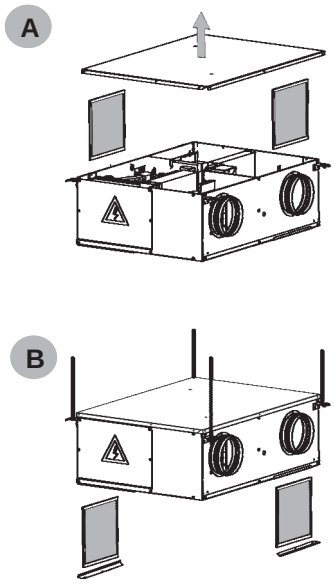
- Unscrew the 2 screws of the locking filter
- Clean the filter in tepid water with common detergent.
- Rinse thoroughly in running water to avoid spillage into the served area.
- Dry the filter.

CPAN-U 70 - 120

The ambient filter installation is possible in 2 positions:

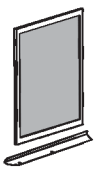
A - from the top (floor units)

B - from the bottom (ceiling units)



To clean the filter:

- Unscrew the 2 screws of the locking filter
- Clean the filter in tepid water with common detergent.
- Rinse thoroughly in running water to avoid spillage into the served area.
- Dry the filter.



MAINTENANCE

Filters and inlets/outlets must be cleaned to ensure optimal operation of the system.
Visually inspect the level of clogging.
The device should be visually inspected frequently and cleaned at least every 6 months.

CLEANING

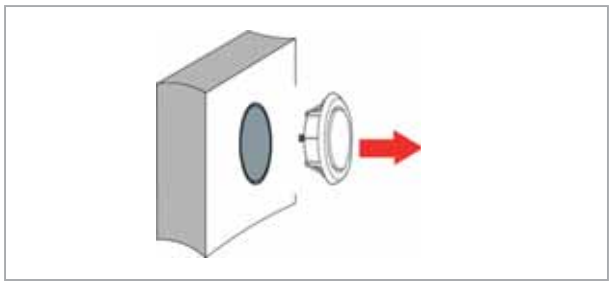
Check the filter: replace if very dirty or wash it with water
To clean:

- clean in tepid water with common detergent.
- rinse thoroughly in running water to avoid spillage into the served area.
- dry

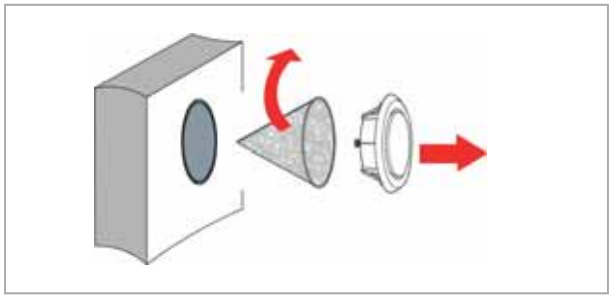
Alternatively:

- blowing or vacuuming

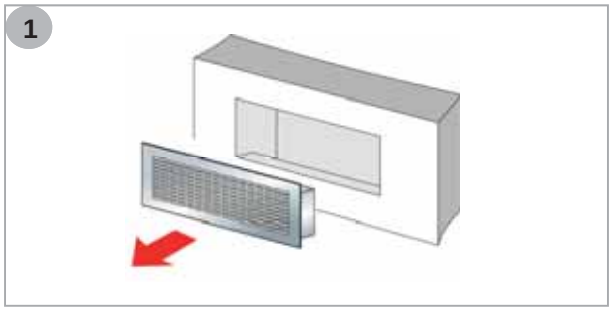
Outlet

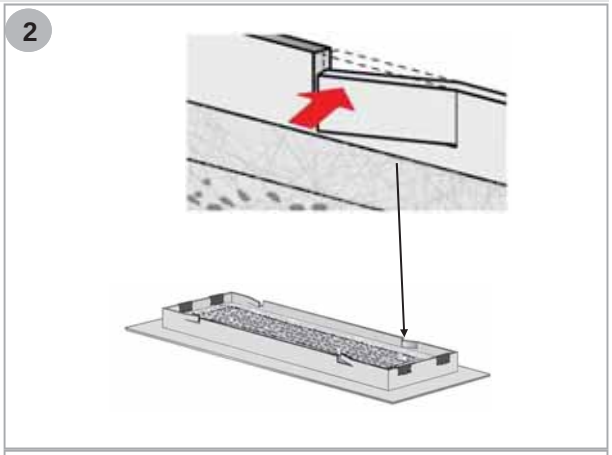


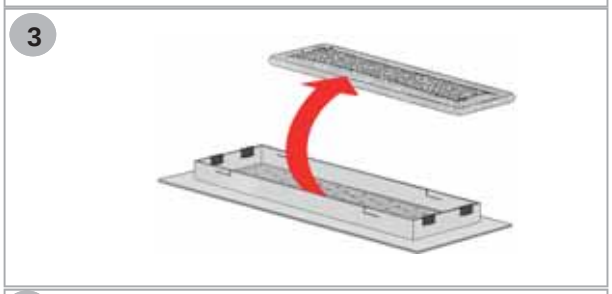
Replacement of inlet filter (VIEX)

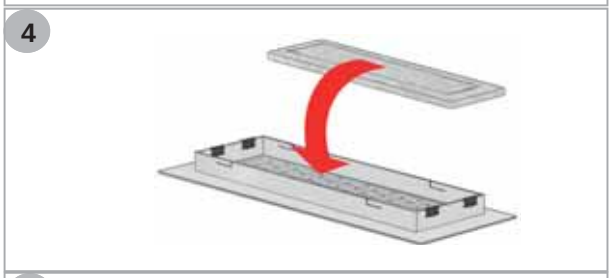


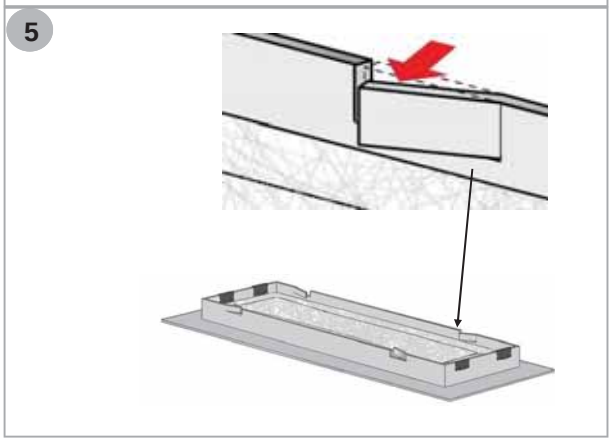
Replacement of rectangular grille filter (GINOX-GIVEX)



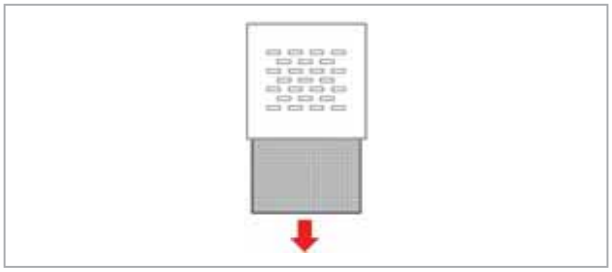






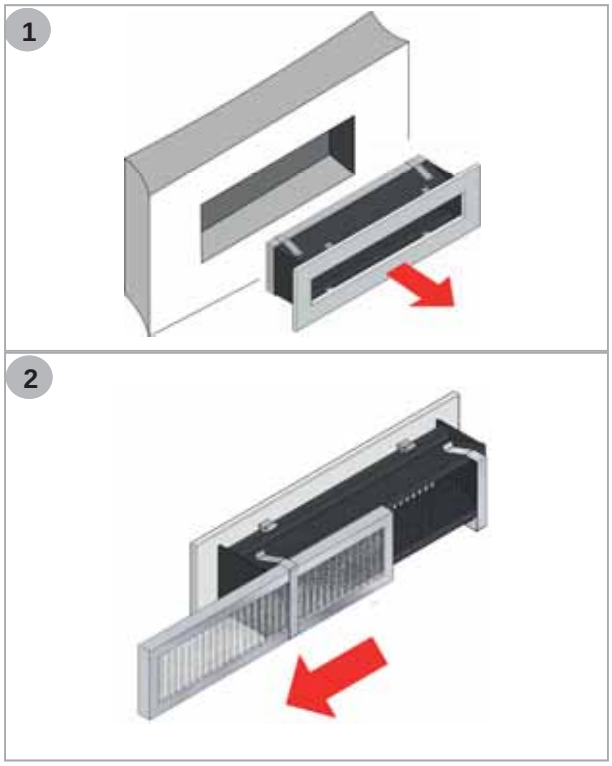


Square grille metal filter (GQIEX)



MAINTENANCE

Extraction grille regenerable filter (GAIR50/80X)



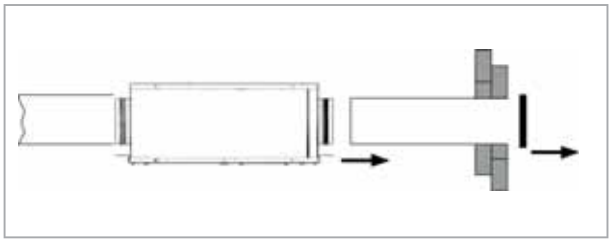
Check for air filters on vents/inlet grilles before switching on the unit, otherwise the entire air distribution system may become dirty.

CLEANING THE AERAULIC/SANITISATION SYSTEM

Cleaning of the aeraulic system is to be carried out by a specialised technician trained in aeraulic hygiene air processing (in compliance with technical regulations and national/local regulations in force).
The aeraulic system must be checked regularly to verify the state of conduits.
If there are any dirt deposits, contact a specialised technician and have it cleaned.

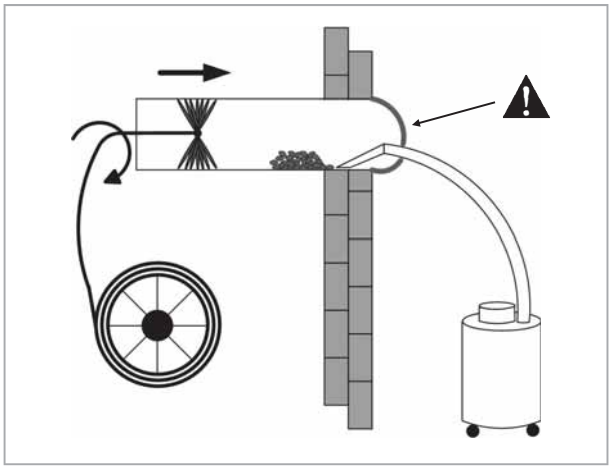
Cleaning is performed with the aid of suitable instruments (wheel brushes mounted on a flexible cable, vacuum cleaners, etc.), on supply and return conduits, distribution boxes, grilles and aeration inlets/outlets.

Conduits subject to dirt build-up are those that extract air from the room, while inlet conduits are less subject to clogging as the air is filtered; if an electrostatic filter is mounted, filtration improves and the air introduced into the room will be cleaner, thus resulting in cleaner conduits within Elfofresch[2]



Disconnect the conduits from the unit

Remove the grille



Clean the conduits

Use a suitable vacuum cleaner, cover the inlet

PERIODIC MAINTENANCE

Only qualified personnel can conduct work on the unit, as specified by current standards.

For details see page 64

NOTE

NOTE

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