

# **CSRN-XHE2 FFA 12.2-24.4**

High efficiency "Roof top" all fresh air cooled heat pump



Dear Customer,

We congratulate you on choosing this product

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

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

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

Yours faithfully.

CLIVET Spa

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# 1 General description

## 1.1 Manual

The manual provides correct unit installation, use and maintenance.

Pay particular attention to:



Warning, identifies particularly important operations or information.



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

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

## 1.2 Preliminaries

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

## 1.3 Risk situations



The unit has been designed and created to prevent injuries to people.

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

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

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

## 1.4 Intended use

Use the unit only:

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

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

## 1.5 Installation

Outdoor installation



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

Follow local safety regulations.

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

## 1.6 Maintenance

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



Turn the unit off before any operation.

## 1.7 Modification



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

## 1.8 Breakdown/Malfuction

Disable the unit immediately in case of breakdown or malfunction.

Contact a certified service agent.

Use original spares parts only.

Using the unit in case of breakdown or malfunction:

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

## 1.9 User training



The installer has to train the user on:

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

## 1.10 Data update

Continual product improvements may imply manual data changes.

Visit manufacturer web site for updated data.

## 1.11 Indications for the User



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

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

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

In case of breakdown or malfunction:

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



The installer must train the user, particularly on:

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

## 1.12 Unit identification

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



The matriculation plate must never be removed.

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

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

## 1.13 Serial number

It identifies uniquely each unit.

Must be quoted when ordering spare parts.

## 1.14 Assistance request

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

Series
Size
Serial number
Year of manufacture
Electrical wiring diagram

## 2 Reception



You have to check before accepting the delivery:

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

In case of damage or anomaly:

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



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

### 2.1 Storage

Observe external packaging instructions.

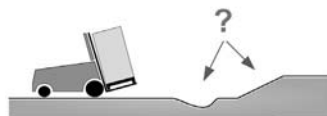
### 2.2 Handling

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

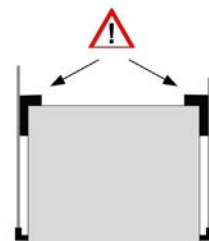
1



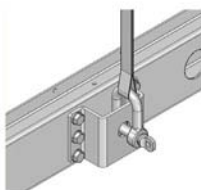
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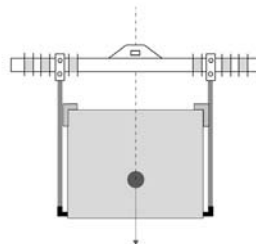
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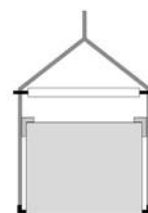
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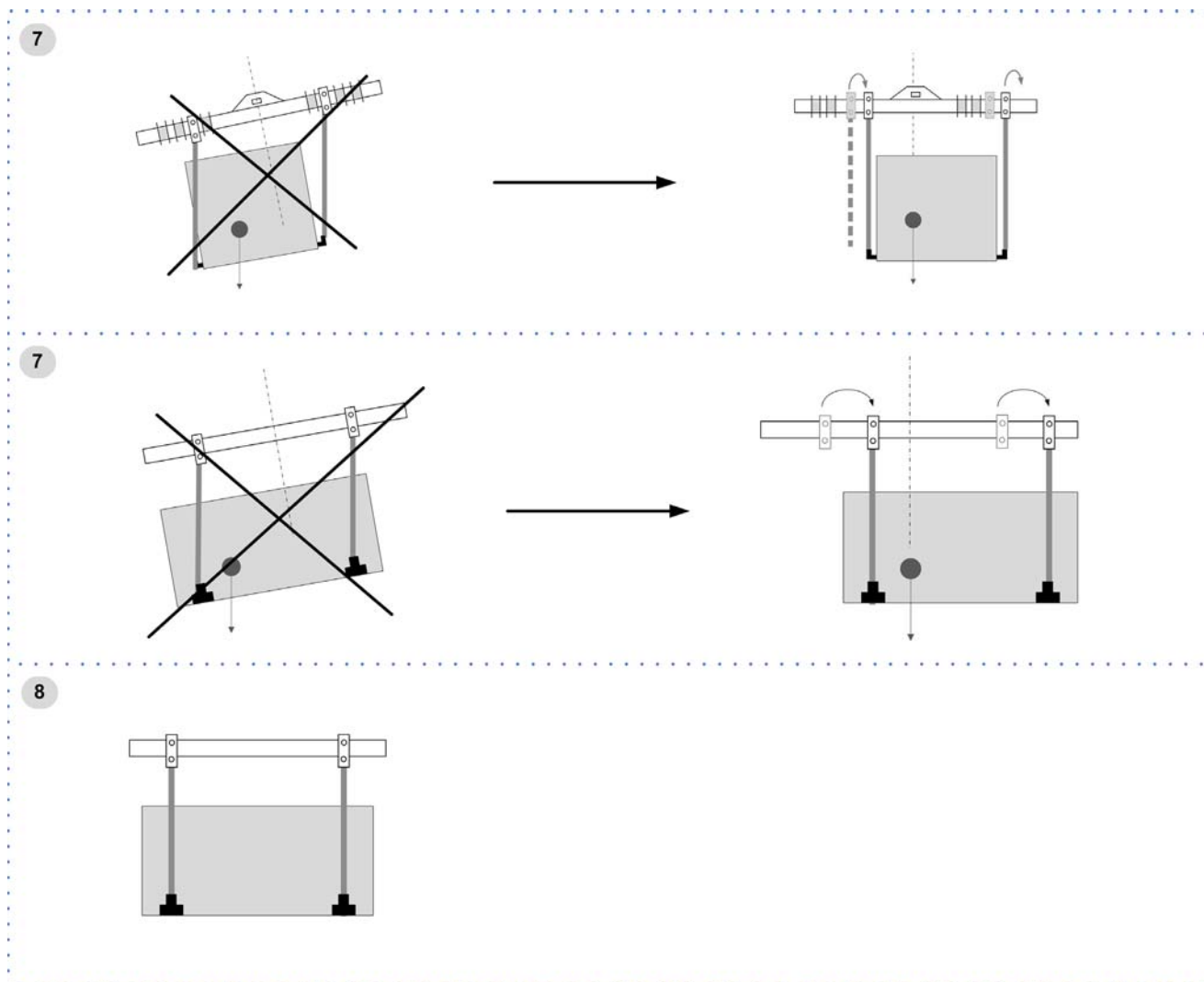


5



6



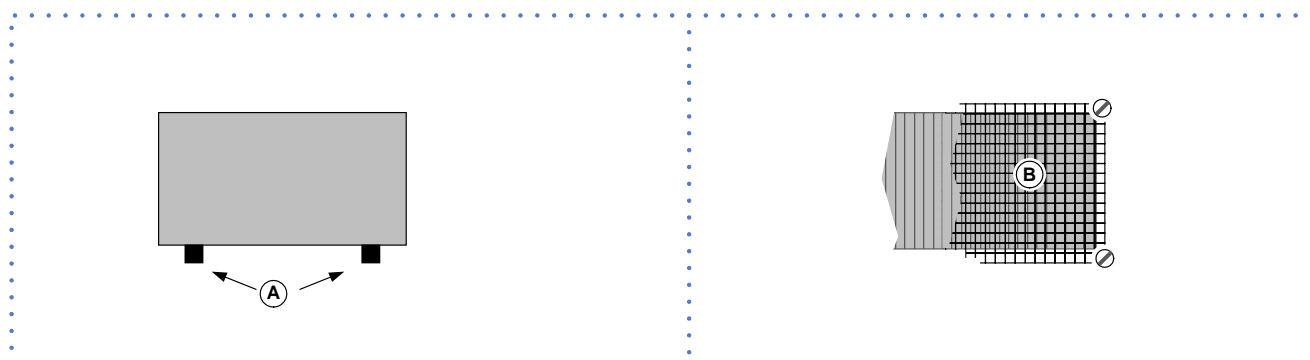


## 2.3 Packaging removing

Be careful not to damage the unit.

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

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



A Supports for handling: remove after the handling.

B Remove the coil protective mesh before the start-up

## 3 Positioning

During positioning consider these elements:

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

### 3.1 Functional spaces

Functional spaces are designed to:

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

Respect all functional spaces indicated in the DIMENSIONS section.

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

### 3.2 Safety valve gas side

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

### 3.3 Positioning



Units are designed to be installed:

- EXTERNAL
- in fixed positions

Limit vibration transmission:

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

Choose the installation place according to the following criteria:

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

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

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



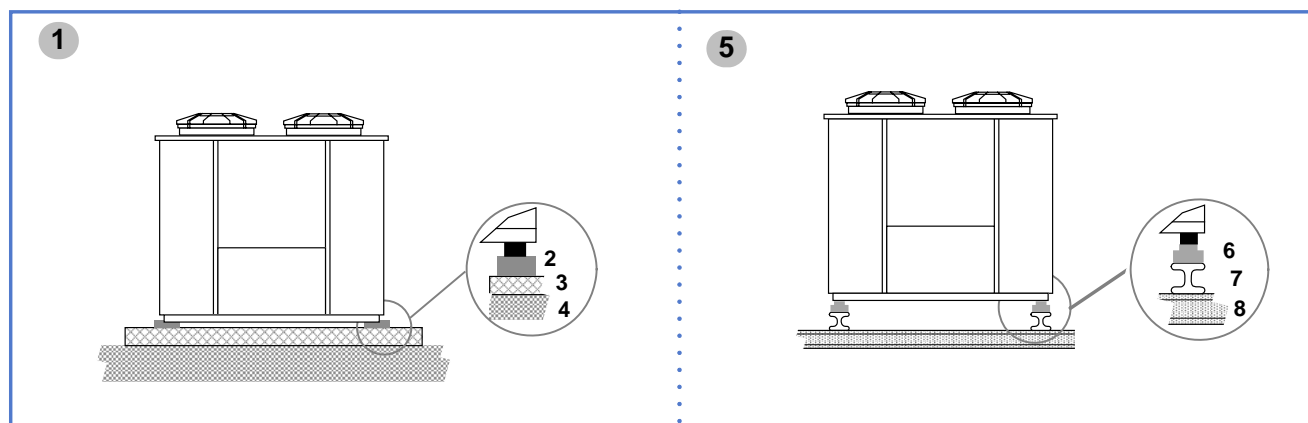
Avoid therefore:

- obstacles to the airflow
- difficulty of exchange
- leaves or other foreign bodies that can obstruct the air coil
- winds that hinder or favour the airflow
- heat or pollution sources close to the unit (chimneys, extractors etc..)
- stratification (cold air that stagnates at the bottom)
- recirculation (expelled air that is sucked in again)
- incorrect positioning, close to very high walls, attics or in angles that could give rise to stratification or recirculation phenomenons

Ignoring the previous indications could:

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





- 1 Positioning on concrete floor
- 2 2 cm thick neoprene strips
- 3 concrete floor
- 4 insulation

- 5 Positioning on steel structure
- 6 antivibration mounts
- 7 steel structure
- 8 steel structure

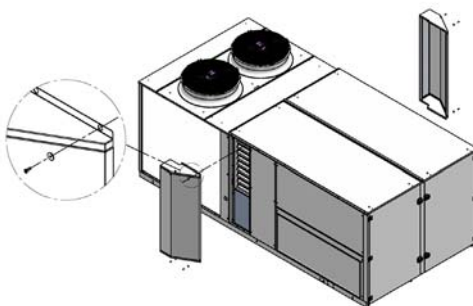
### 3.4 Condensate water

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

### 3.5 Configuration CCFFA

Fissare tramite le 4 viti M6x20 e rondelle ogni cuffia fornita

Fix with 4 screws M6x20 and washers both headphone supplied



### 3.6 Gas heating module - Electronic filters

For details see:  
10 Accessories p. 37

## 4 Water connections

### 4.1 Condensate drain

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

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



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



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

For details see:

14 Dimensional drawings p. 47

### 4.2 Risk of freezing

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

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

### 4.3 Anti-freeze solution

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



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



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

### 4.4 Humidifier

For details see:

10 Accessories p. 37

## 5 Aeraulic connections

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

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



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

- the weight of the channels must not burden on the connection flanges
- place anti-vibration joints between channels and unit
- connection to the flanges and between the various sections of the channels must guarantee air seal, avoiding dispersions penalising the overall efficiency of the system
- limit the load losses by optimising the path, the type and number of bends and junctions
- use wide bends evaluating the opportunity of equipping them with deflectors (in particular with high air speed or bends with reduced radius)

### 5.1 Treated air channelling

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

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

DIFFUSERS INLETS GRILLES

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



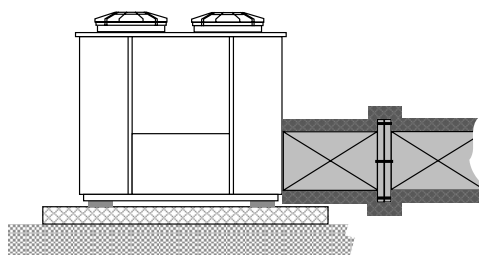
When choosing and positioning the grilles, inlets and diffusers, avoid:

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



For sound comfort, consider that:

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



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

## 6 Electrical connections

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

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

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

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

Operate in compliance with safety regulations in force.

### 6.1 Electrical data



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

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

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

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

### 6.2 Connections

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

### 6.3 Signals / data lines

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

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

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

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

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

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

Respect impedance, capacity and attenuation indications.

### 6.4 Power input

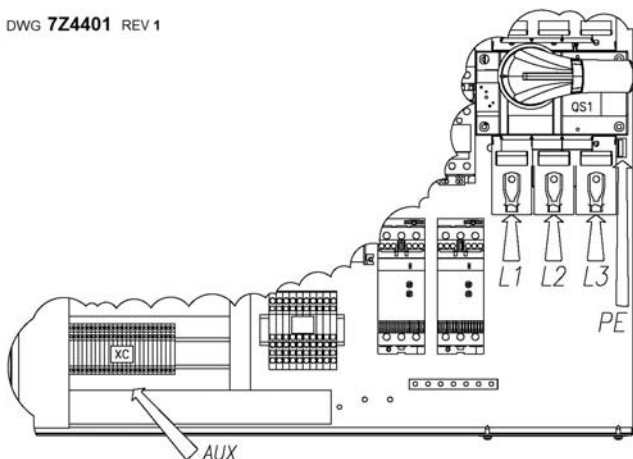


Fix the cables: if vacated may be subject to tearing.

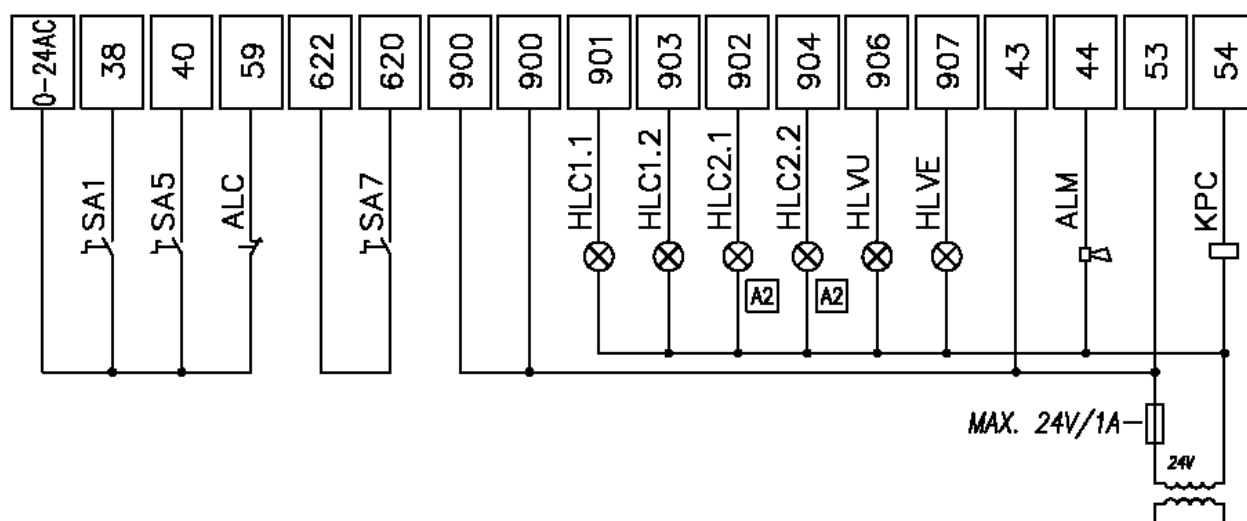


The cable must not touch the compressor and the refrigerant piping (they reach high temperatures).

DWG 7Z4401 REV 1



## 6.5 Connections performer by customer



ALC Free contact from signalling system of fire alarm  
 ALM cumulative fault signal  
 HLC1.1..2.2 Compressor status signal lamp  
 HLVE Indicating light of the return and/or supply fan status

HLVU Indicating light of the supply fan status  
 KPC Pump control of the integration coil  
 SA1 \* Remote ON/OFF selector  
 SA5 \* Settable input  
 SA7 Enabling selector to the umidifier manual discharge  
 \* pag 22

## 6.6 SA5 input

SA5: Summer / Winter mode remote change

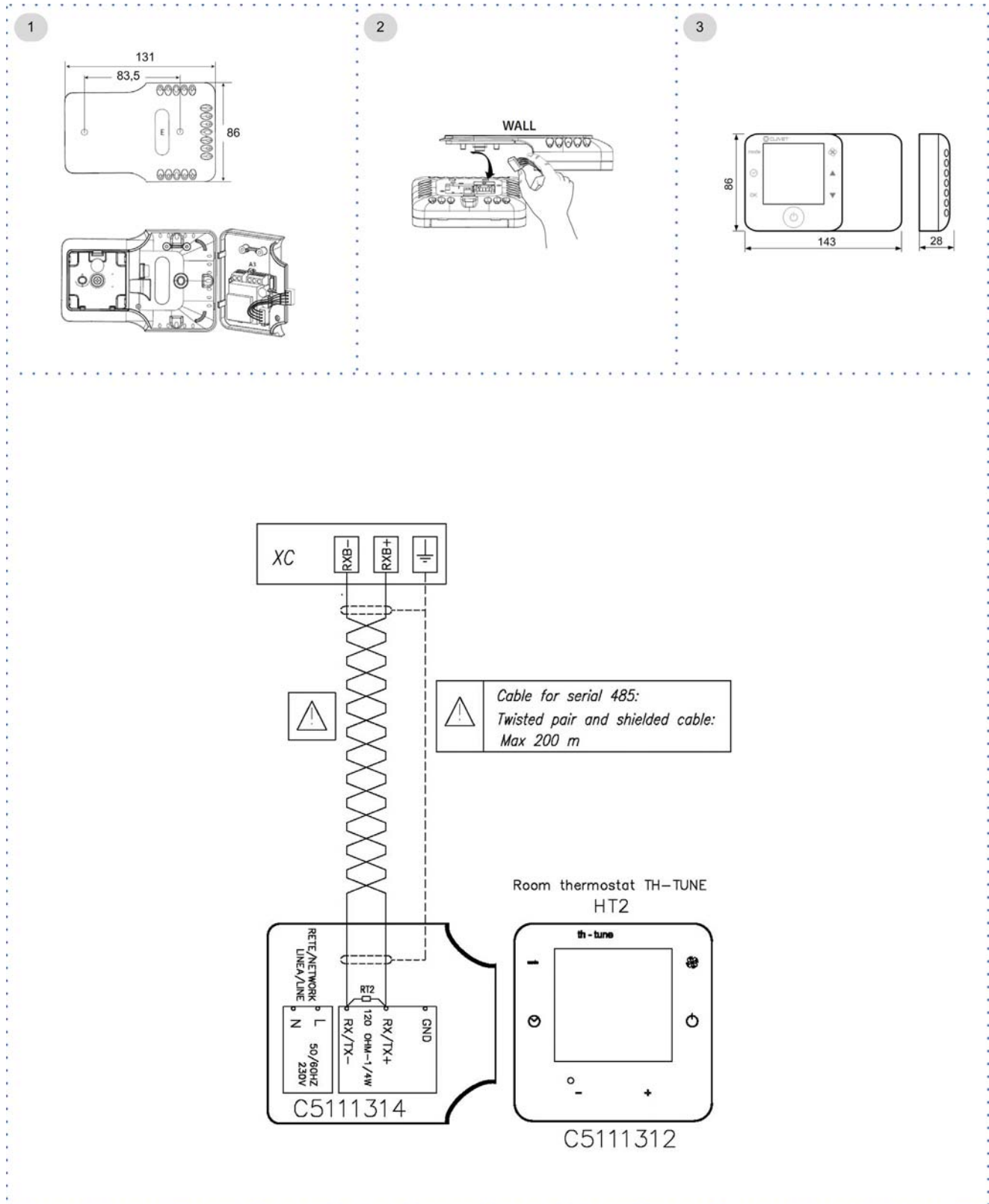
Summer - winter mode remote change	P1010
enabled from keyboard	0
enabled by SA5*	1
enabled by BMS	2

\* Fan-only function from SA5 not available

function Fan only	P2323
disabled	0
enabled by BMS	1
enabled by SA5*	2
enabled from keyboard	3

\*SUMMER - WINTER change mode by SA5 not available

## 6.7 Wall mounted electronic room control





## 7 Start-up

### 7.1 General description

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

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

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

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

Before checking, please verify the following:

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



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



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

### 7.2 Preliminary checks

For details refer to the different manual sections.

#### Unit OFF power supply

1. safety access
2. functional spaces
3. air flow: correct return and supply (no bypass, no stratification)
4. structure integrity
5. fans run freely
6. unit on vibration isolators
7. air filters present and clean
8. completed aeraulic system
9. refrigerant circuit visual check
10. earthing connection
11. power supply features
12. electrical connections provided by the customer

### 7.3 Start-up sequence

For details refer to the different manual sections.

#### Unit ON power supply

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

\* only if present



## 7.4 Refrigeration circuit

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

## 7.5 Water circuit

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



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

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

## 7.6 Electric Circuit



Verify that the unit is connected to the ground plant.

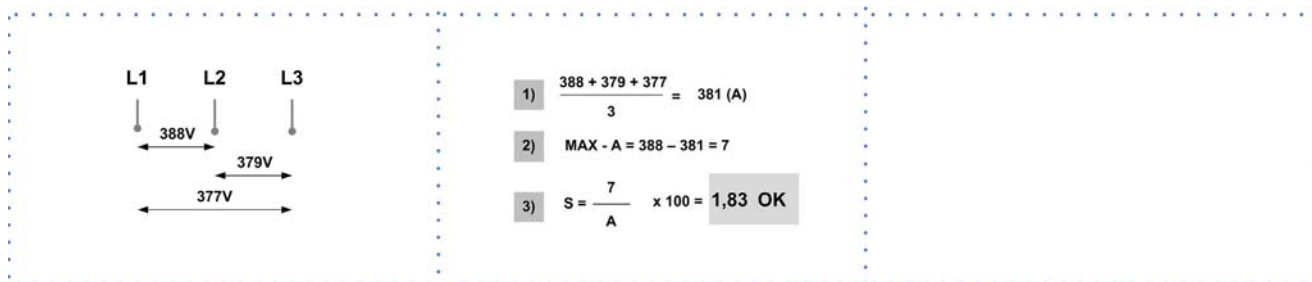
Check the conductors are tightened as: the vibrations caused by handling and transport might cause these to come loose.

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

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

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

Example



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

## 7.7 Compressor crankcase heaters

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

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



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

## 7.8 Voltages

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

Start-up the unit.

With unit operating in stable conditions, check:

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

## 7.9 Scroll compressor

The Scroll compressors have only one rotation direction.

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

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

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

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

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

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

## 7.10 Remote controls

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

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

## 7.11 Air flow setting

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



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



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

Set the flow rate:

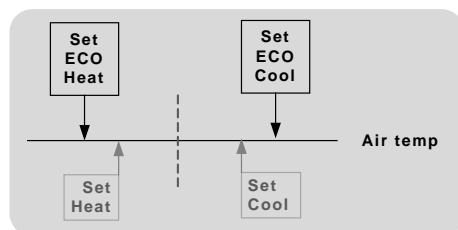
par 2252 (l/sec)

## 7.12 ECO mode

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

The ECO mode can be activated:

- Manually: P1008 enable setpoint Eco = 1
- Automatically by means supervision system



P1002 Setpoint ECO Cool  
P1003 Setpoint ECO Heat  
P1004 Set UR ECO Cool  
P1005 SetUR ECO Heat  
P1008 Enable EcoMode

## 7.13 Set-point automatic compensation

The set changes automatically according to the outside temperature.

Even the operating mode changes automatically according to the outside temperature.

The variation is defined by the climatic curve.

Par 1006 = 1 Enables automatic mode change

Par 1007 = 1 Enables automatic setpoint

## 7.14 Fire alarm: configuration

The unit is able to manage the signal coming from a fire detection system or fire control unit installed built-in, activating one of the logics illustrated, which can be set by parameter.

Par 3029 TypeFireMode

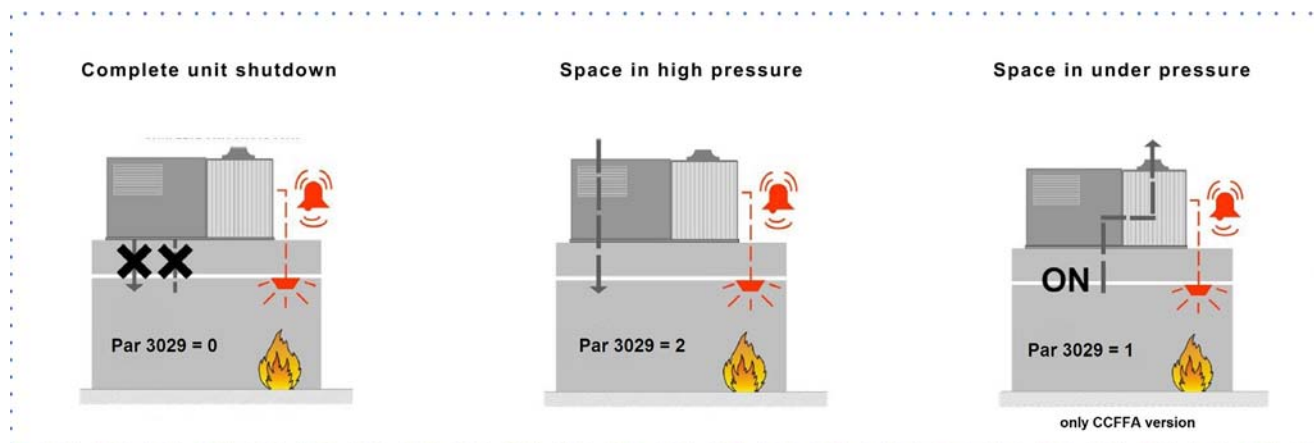
In the presence of alarm signal, the compressors are Always switched off; moreover, the remote on-off is disabled together with the switch on/off control from keypad.



The unit cannot be used as smoke extractor.



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



## 7.15 Application for low outdoor temperature

Option indicated for very cold climates, where the outside temperature can be between -10 and -30°C.

The option includes self-regulating heaters with thermostats that can protect the electrical panel from freezing to make sure it operates correctly.



The accessory is also active with unit OFF; the unit must remain powered.



## 7.16 Start-up report

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

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

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

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

## 7.17 2014/68/UE PED directive

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

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

Compulsory verification of the first installation:

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

Certification of setting in service:

- for all the units

Periodical verifications:

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

## 8 Control



### SETPOINT

the display visualizes the **ambient temperature**

1. Press once ▲ or ▼ to display the setpoint ( it appears on the display <sup>set</sup> )
2. press ▲▼ to modify the working setpoint
3. Wait that the ambient temperature appears again on the display ( disappears <sup>set</sup> )

KEY FUNCTION		
	<b>ON-OFF</b>	Press 5 seconds to access or switch off the unit.
mode	<b>MODE</b>	Change the operating mode : summer, winter, automatic
	<b>CLOCK</b>	Date and hour control
<b>OK</b>	<b>OK</b>	Confirm, display setpoint, display the outside temperature ( <b>tE</b> )
	<b>UP-DOWN</b>	Shift in the menu, increase-decrease the value
+	5 sec	Access to the password menu ( Code )
mode +	5 sec	Access to the alarm menu ; only if the icon is present

DISPLAY MEANING	
	Operating mode : summer
	Operating mode : winter
	Operating mode : automatic
	supply fan speed
	alarm
	Keyboard locked
	Time band activated
	Time band scheduling
	Active compressor
	Defrosting in progress
	External fan
	electric heaters , hot water coil - option

### BUTTON LOCK / UNLOCK

	Press together for 5 seconds	
<b>OK</b>		
	Symbol appears	

## CHANGE MODE HEAT - COOL

The mode HEAT - COOL can be changed:

Manually

- from keyboard
- from digital input SA5
- from BMS

Automatically


In function of the room temperature tR


The configuration is done with the parameters indicated in the table

Change mode Heat - Cool		
	Par. 1010	Par. 1006
From keyboard	0	0
From digital input SA5	1	0
From BMS	2	0
Automatic	-	1

Press to set the operating mode:


mode



 Cooling

 Heating

**AUTO** Automatic

Operating in:

 Cooling

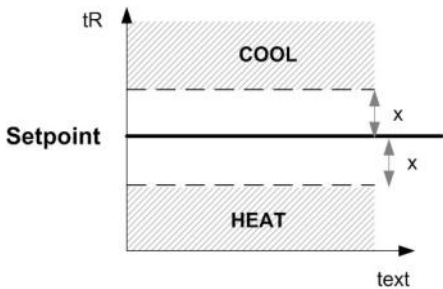



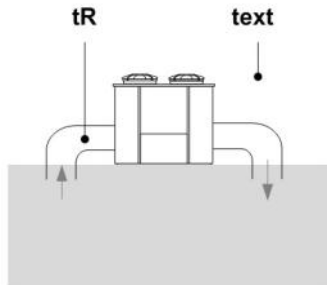
### Mode AUTO

P1006 = 1

COOL :  $tR > \text{set} + x$

HEAT :  $tR < \text{set} - x$






## ON - OFF


The status ON - OFF can be changed:

- from keyboard
- from digital input SA1
- from BMS


The configuration is done with the parameters indicated in the table

ON - OFF		
	Par. 1009	Par. 2004
From keyboard	0	0
From digital input SA1	1	0
From BMS	0	1

 Press for 5 seconds



OFF



## PARAMETERS

The setting parameters are protected by password to avoid inadvertent changes that can affect the unit operating.

To access to the parameters

1. press **On/Off + Fan** button for 5 sec.
2. enter password : with the **▲ ▼** button set **Code = 2**
3. Confirm with **OK**
4. Select the **PAr** menu and confirm with **OK**
5. Scroll the list **▲ ▼**
6. Select the parameter with **OK**
7. Modify the value **▲ ▼** and confirm with **OK**
8. To esc, scroll the lost, select **ESC** and confirm with **OK**

The configuration parameters are grouped in menus **PAr1-2 e PAr1-2-3**.

Thei are password-protected to prevent changes that can affect the operation of the unit.

The parameters are editable only by authorized service centers.

Parameter	Description	Def	UM
1000	Temperature Setpoint setted on thermostat		°C/10
1001	UR Setpoint setted on thermostat		°C/10
1002	Setpoint Eco Cool	270	°C/10
1003	Setpoint Eco Heat	190	°C/10
1004	SetUR Eco Cool	60	%
1005	SetUR Eco Heat	50	%
1006	Enable automatic change mode	0	---
1007	Enable automatic setpoint	0	---
1008	Enable eco setpoint	0	---
1009	Enable On-Off from digital input	0	---
1010	Mode selection (0=keyboard; 1=digital input; 2=BMS)	0	---
1011	Enable alarm buzzer : 0=disable, 1=enable	0	---

## DAY MODIFICATION




- Press the **CLOCK** button for 5 sec.
- By the **▲ ▼** buttons, select the **clock** menu
- Confirm with **OK**
- The hour is flashing : set with the **▲ ▼** buttons
- Confirm with **OK**
- Repeat the procedure for the minutes and week's day
- To go back to the main screen, select the **Esc** menu and confirm with **OK**

## TIME BAND SCHEDULING




It is possible to set 4 types of scheduling:

- 7 days (from monday to sunday)
- 5 days (from monday to friday)
- 2 days (from saturday to sunday)
- Day by day




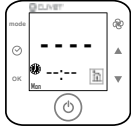
### Day scheduling


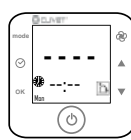





-  At home
-  Outside
-  Return to home

### Night scheduling





-  At home
-  Outside the home
-  Return to the home

### Day by day scheduling

	Press for 5 seconds	
▲	Select Time bands	
▼	Press OK	
▲	Select the scheduling:	
▼	- Day by day	
	Press OK	
	Press OK	
▲	Set the hour	
▼	Press OK	
▲	Set the minutes	
▼	Press OK	

▲	Set the temperature	
▼	Press OK	
▲	Select the next time band	
	Press OK and repeat from <b>point 05</b>	
▲	As all the programming is finished, select ESC	
▼	Press OK	
	Press OK to program the next day	
▲	Select the next day	
▼	Press OK	
	Repeat from <b>point 04</b>	
▲	To exit from the scheduling select ESC	
▼	Press OK	
▲	Select Esc to exit	
▼	Press OK	

## ON / OFF SCHEDULING

	Press for deactive or enable the scheduling.	
	The deactivated scheduling, the symbol  doesn't appear	



## STATA

To access to the main stata

1. press **OK**
2. scroll the list with **OK**
  - Setpoint room temperature
  - UR \*
  - Setpoint UR
  - Outdoor temperature \*

\* if enabled dehumidification function and Cool mode,  
humidification function and Heat mode

To access to the stata menu :

1. Press the On/Off + Fan button for 5 sec.
2. Enter the password: with **▲ ▼** buttons, set **Code = 1**
3. Confirm with **OK**
4. The **Sta** menu appears, confirm with **OK**
5. Scroll the list of stata with **▲ ▼** buttons
6. To esc scroll the list, select **ESC** and confirm with **OK**

Status	Description	UM
S001	Temperature Setpoint setted from thermostat	°C
S002	UR Setpoint setted from thermostat	%Ur
S100	Room temperature (room thermostat)	°C
S101	Room UR	%Ur
S102	Outdoor temperature (serial probe)	°C
S103	Outdoor UR (serial probe)	%Ur
S104	Digital inputs 1 .. 4	---
	1000 - ON – OFF remoto	
	0100 - HEAT – COOL remote (aperto = HEAT)	
	0010 - HP circuit 1	
	0001 - HP circuit 2	
S105	Digital inputs 5 .. 8	---
	1000 - Dirty filters	
	0100 - Fan (thermal overload, doors open)	
	0010 - Thermal overload circuit 1 (compressor, fan)	
	0001 - Thermal overload circuit 2 (compressor, fan)	
S106	Digital inputs 9 .. 10	---
	1000 - Phase monitor	
	0100 - Fire alarm	
S107	Digital outputs 1 .. 4	---
	1000 - Supply fan	
	0100 - Source fan circuit 1	
	0010 - 4-way valve circuit 1	
	0001 - Compressor 1 circuit 1	

Status	Description	UM
S108	Digital output 5 .. 8	---
	1000 - Compressor 1 circuit 2	
	0100 - 4-way valve circuit 2	
	0010 - Valve compressor digital C1	
	0001 - Not used	
S109	digital output 9 .. 12	---
	1000 - Cumulative alarms	
	0100 - source fan circuit 2	
	0010 - Postheating hot gas	
	0001 - external humidifier command	
S110	Supply temperature (analogic input 1)	°C
S111	Outdoor temperature (analogic input 2)	°C
S112	Outdoor coil temperature circuit 1 (analogic input 3)	°C
S113	Outdoor coil temperature circuit 2 (analogic input 4)	°C
S114	differential pressure supply fan (analogic input 5)	Pa
S115	Discharge pressure circuit 1 (analogic input 6)	bar
S116	Suction pressure circuit 1 (analogic input 7)	bar
S117	Suction temperature circuit 1 (analogic input 8)	°C
S118	Suction temperature circuit 2 (analogic input 9)	bar
S119	Air quality probe (analogic input 10)	ppm
S120	Discharge pressure circuit 2 (analogic input 11)	bar
S121	Suction pressure circuit 2 (analogic input 12)	bar
S122	Supply fan (analogic output 1)	V
S123	Source fan circuit 1 (analogic output 2)	V
S124	Exhaust air fan (analogic output 3)	V
S125	Source fan circuit 2 (analogic output 4)	V
S126	Digital input 1 .. 4 expansion 1	---
	1000 - gas module	---
	0100 - electronic filters alarm	---
	0010 - high temperature aux elements alarm	---
	0001 - Not used	---
S127	Digital output 1 .. 4 expansion 1	---
	1000 - water request from customer / Command gas module 1° step	---
	0100 - Signal status exhaust air fan	---
	0010 - Command electric heaters / Command gas module 1° step	---
	0001 - Not used	---

Status	Description	UM
S128	differential pressure exhaust air (analogic input 1 expansion 1)	Pa
S129	not used (analogic input 2 expansion 1)	
S130	antifreeze temperature auxiliary elements 7 hidronic recovery (analogic input 3 expansion 1)	°C
S131	not used (analogic input 4 expansion 1)	
S132	modulating signal hot water coil / gas module (analogic output 1 expansion 1)	V
S133	digital input 1..4 expansion 2	---
	1000 - not used	
	0100 - not used	
	0010 - not used	
	0001 - not used	
S134	digital output 1 .. 4 expansion 2	---
	1000 - Compressor 2 circuit 1	
	0100 - Compressor 2 circuit 2	
	0010 - not used	
	0001 - not used	
S135	not used (analogic input 1 expansion 2)	---
S136	not used (analogic input 2 expansion 2)	---
S137	not used (analogic input 3 expansion 2)	---
S138	not used (analogic input 4 expansion 2)	---
S139	not used (analogic output expansion 2)	V
S140	Room temperature (serial probe)	°C
S141	Room UR (serial probe)	%Ur
S200	Unit status	---
S201	Unit mode	---
S202	Supply air flow	m³/h/10
S203	Exhaust air flow	m³/h/10
S204	Supply air flow	l/s
S205	Exhaust air flow	l/s
S206	Capacity request	%
S207	Capacity request (from outdoor temperature )	%
S208	Capacity request (from supply temperature)	%
S209	Capacity delivered from Free Cooling/Heating	%

Status	Description	UM
S210	Capacity request to compressors	%
S211	Capacity requested to the aux. element	%
S212	Capacity requested for dehumidification	%
S300	Functionning hours compressor 1 circuit 1	h
S301	Starts compressor 1 circuit 1	---
S302	Functionning hours compressor 2 circuit 1	h
S303	Starts compressor 2 circuit 1	---
S304	Functionning hours compressor 1 circuit 2	h
S305	Starts compressor 1 circuit 2	---
S306	Functionning hours compressor 2 circuit 2	h
S307	Starts compressor 2 circuit 2	---
S995	Software type = 2	
S996	Software version	
S997	Day software release	
S998	Month software release	
S999	Year software release	

## ALARMS

Malfunctions are displayed with the ALARM icon.

Before resetting an alarm, identify and remove the cause that generated it.

Repeated reset may cause irreversible damages as a system malfunction.
















The alarm can be signalled by the thermostat also by a buzzer.

To disable the buzzer, modify the P200 parameter.  
(0 = disabled)

## ALARM RESET

mode	The symbol  is displayed	
	Press together for 5 seconds	
		
	Scroll the list	
		
	Select the alarm reset menu	
	Press OK	
		
	Select ESC	
	Press OK	

## STORED ALARM (installer use only)

		
	Press buttons for 5 sec	
	Enter password	
	Confirm with OK	
	Select <b>S ALM</b>	
	Confirm with OK	
	Scroll alarm list (AL1, AL2...)	
	and display alarm detail	
	1° alarm - 1° display	
AL1	new alarm	
XX	alarm code (STD column pag. 20)	
	1° alarm - 2° display	
dA1	alarm day 1	
YY	day number after alarm	
	1° alarm - 3° display	
HA1	alarm hour 1	
hhmm		

alarm	storege	description
A001	1	Clock board not connected
A002	2	Extended memory
A003	3	Input B10 Air quality probe fault / unplugged
A004	4	Input B06 Discharge pressure probe C1 fault / unplugged
A005	5	Input B02 Outdoor temperature probe fault / unplugged
A006	6	Input B01 Supply temperature probe fault / unplugged
A007	7	Input B04-E01 H2O probe fault / unplugged
A008	8	Input B05 Supply differential pressure probe fault / unplugged
A009	9	Input B01-E02 Exhaust air differential pressure probe fault / unplugged
A010	10	Input B03 defrost probe C1 fault / unplugged
A011	11	Input B03-E01 antifreeze probe fault / unplugged
A012	12	Input B11 Discharge pressure probe C1 fault / unplugged
A013	13	Input B04 defrost probe C2 fault / unplugged
A014	14	Input ID10 fire alarm
A015	15	Input ID6 Supply/exhaust fan
A016	16	Input ID07 Thermal overload Circuit 1
A017	17	Input ID08 Thermal overload Circuit 2
A018	18	Input ID03 High pressure Circuit 1
A019	19	Input ID04 High pressure Circuit 2
A020	20	Input ID03-E01 High temperature electric heaters / gas module
A021	21	Input ID05 Dirty filters
A022	22	Input ID09 Phase monitor
A023	23	Room temperature probe
A024	24	Outdoor temperature probe
A025	25	Supply temperature probe
A026	26	UR room probe
A027	27	UR outdoor probe
A028	28	Serial probe 1 UR outdoor fault / unplugged
A029	29	Serial probe 1 Outdoor temperature
A030	30	Serial probe 1 Outdoor temperature fault / unplugged
A031	31	Analogic input low pressure 1
A032	32	Analogic input low pressure 2
A033	33	Input ID05 Dirty filters
A034	34	Unit configurazione error
A035	35	Circuit 1 not available for alarm
A036	36	Circuit 2 not available for alarm
A037	37	Analogic low pressure circuit 1

alarm	storage	description
A038	38	Analogic low pressure circuit 2
A039	39	Antifreeze
A040	40	Antifreeze prealarm outdoor temperature
A041	41	Prealarm HP1 Circuit 1
A042	42	Prealarm HP1 Circuit 2
A043	43	Prealarm HP2 Circuit 1
A044	44	Prealarm HP2 Circuit 2
A045	45	Prealarm LP1 Circuit 1
A046	46	Prealarm LP1 Circuit 2
A047	47	Prealarm HP2 Circuit 1
A048	48	Prealarm HP2 Circuit 2
A049	49	Prealarm LP1 Circuit 1
A050	50	Prealarm LP1 Circuit 2
A051	51	Supply high temperature
A052	52	Supply low temperature - heat mode
A053	53	Defrost circuit 1 not available - Circuit 2 in alarm
A054	54	Defrost circuit 2 not available - Circuit 1 in alarm
A055	55	Disabling auto mode
A056	56	Forced defrost circuit 1 for low suction pressure
A057	57	Forced defrost circuit 2 for low suction pressure
A058	58	Max defrost NR circuit 1 ended for supply temp.
A059	59	Max defrost NR circuit 2 ended for supply temp.
A060	60	Supply air flow outside limits
A061	61	Exhaust air flow outside limits
A062	62	CPY:01
A063	63	Probe S1: suction pressure circuit 1
A064	64	Probe S2: suction temperature circuit 1
A065	65	Probe S3: suction pressure circuit 2
A066	66	Probe S4: suction temperature circuit 2
A067	67	Low superheating (LowSH) Valve A
A068	68	Low superheating (LowSH) Valve B
A069	69	Low suction temperature (LOP) Valve A
A070	70	Low suction temperature (LOP) Valve B
A071	71	High suction temperature (MOP) Valve A
A072	72	High suction temperature (MOP) Valve B
A073	73	High condensing temperature (HiTCond)
A074	74	Low suction temperature Valve A

alarm	storage	description
A075	75	Low suction temperature Valve B
A076	76	Autotune Valve A
A077	77	Autotune Valve B
A078	78	Serial probe n°1 Probe Offline
A079	79	Serial probe n°1 UR fault
A080	80	Serial probe n°1 temperature fault
A081	81	pCOe 1 offline
A082	82	pCOe 1 probe analogic input channel 1 fault / unplugged
A083	83	pCOe 1 probe analogic input channel 2 fault / unplugged
A084	84	pCOe 1 probe analogic input channel 3 fault / unplugged
A085	85	pCOe 1 probe analogic input channel 4 fault / unplugged
A086	86	pCOe 1 I/O mismatch (no confirmation from pCO for 10s)
A087	87	pCOe 2 offline
A088	88	pCOe 2 probe analogic input channel 1 fault / unplugged
A089	89	pCOe 2 probe analogic input channel 2 fault / unplugged
A090	90	pCOe 2 probe analogic input channel 3 fault / unplugged
A091	91	pCOe 2 probe analogic input channel 4 fault / unplugged
A092	92	pCOe 2 mismatch (no confirmation from pCO for 10s)
A093	93	Gas module
A094	94	Electronic filters
A095	95	Serial probe 2 room UR fault / unplugged
A096	96	Serial probe 2 room air
A097	97	Serial probe 2 room temperature fault / unplugged



## 9 Maintenance

### 9.1 General description

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

The maintenance allows to:

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

Before checking, please verify the following:

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



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



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

### 9.2 Inspections frequency

Perform an inspection every 6 months minimum.

The frequency, however, depends on the use.



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

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

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

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

### 9.3 Unit booklet

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

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

Report on the booklet:

- date
- intervention description
- carried out measures etc.

### 9.4 Standby mode

If a long period of inactivity is foreseen:

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

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



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

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

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

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

### 9.5 Electric fans

Check:

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

### 9.6 Outdoor air coil



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

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

Remove all impurities from the surface.

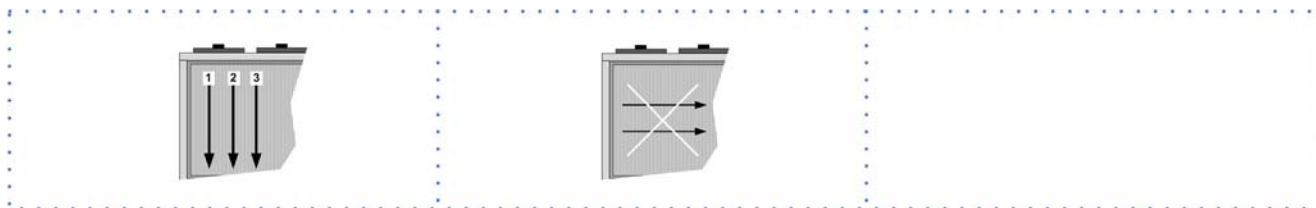
Using an air pressure gun, clean the aluminum surface of the battery; be careful to direct the air in the opposite direction of the fan air movement.

Hold the gun parallel to the fins to avoid damages.

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



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



### 9.7 Outdoor air coil



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

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

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

## 9.8 Condensation collection basin

Dirt or scale can give rise to clogging.

Also, microorganisms and mould can flourish in the bowl.

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

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

## 9.9 Compressor supply line shut-off valve



A. Supply line shut-off valve



Do not remove the seal

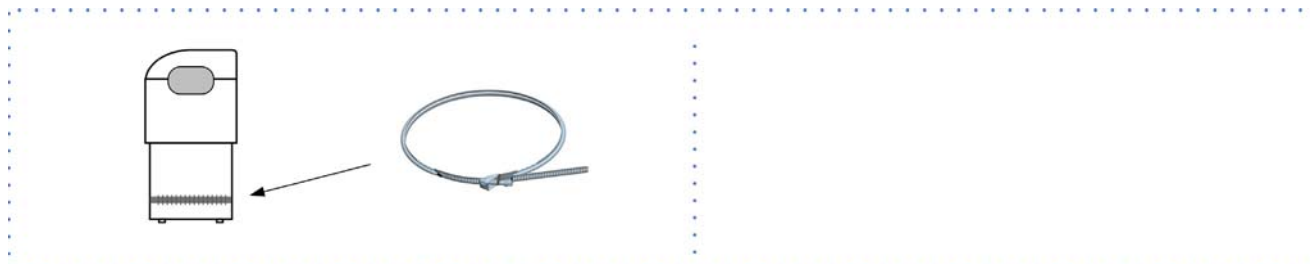
Remove only if authorized by the manufacturer.

Please contact the maker for informations.

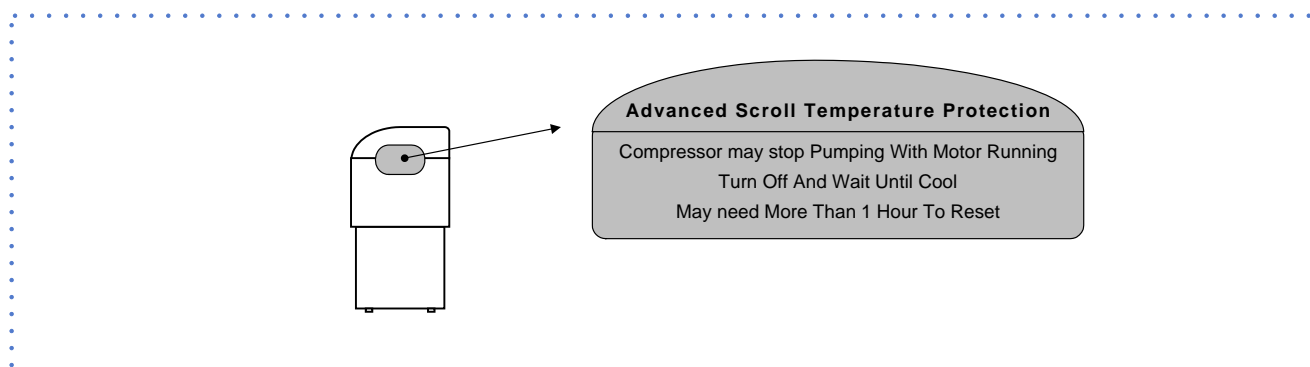
## 9.10 crankcase heater

Check:

- closure
- Operation



## 9.11 Copeland scroll compressor



## 9.12 Electric heaters

Check:

- cleaning state
- fastening
- presence of corrosion

## 9.13 G4 Folded air filters

It is very important for the air treatment coil to offer maximum thermal exchange: the unit must always work with clean and installed filters. Cleaning and replacement of filters are very important from an hygienic-sanitary point of view.

⚠ Operation with clogged filters leads to a reduction in the air flow rate with malfunctionings and block, up to possible breaks in the unit. The frequency with which the filters must be checked depends on the quality of the air, the unit operation hours, the dustiness and crowding of rooms.

⚠ Frequency can indicatively vary from WEEKLY to MONTHLY.

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

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

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

## 9.14 High efficiency air filter

For details see:

10 Accessories p. 37

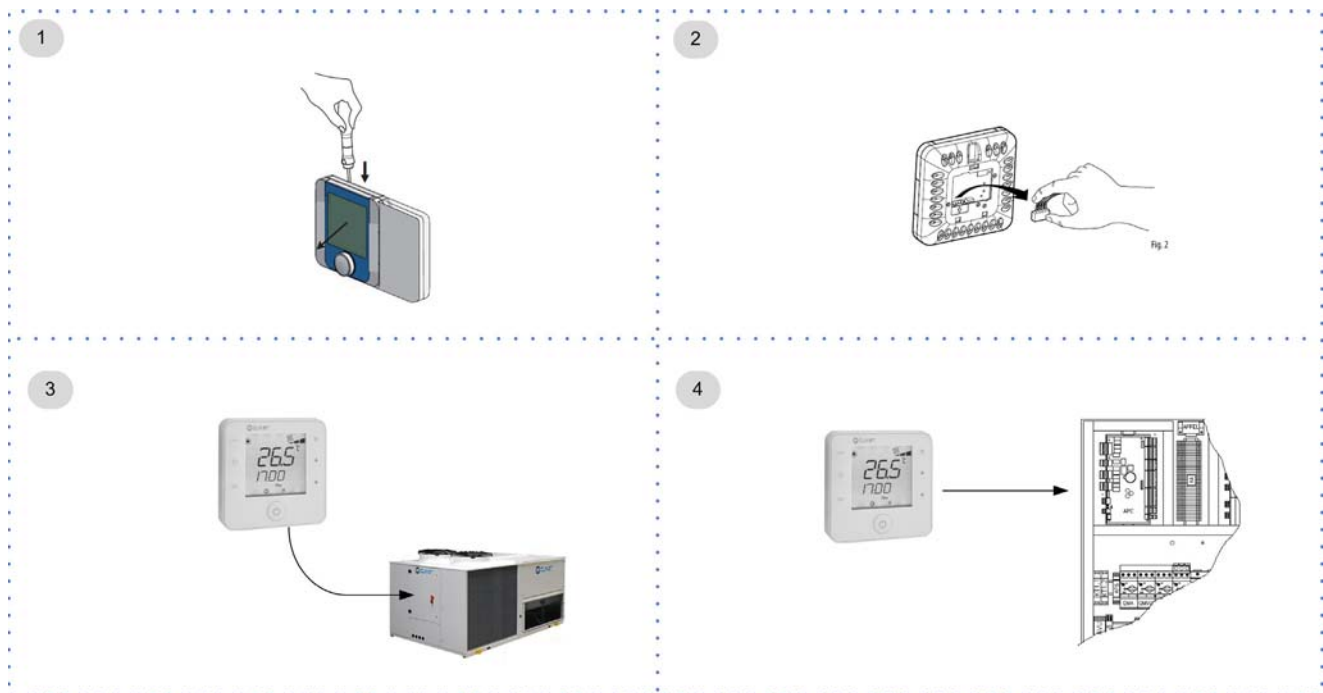
## 9.15 Humidifier

For details see:

10 Accessories p. 37

## 9.16 Wall mounted electronic room control

In the maintenance operations the keypad can be detached from the fixing support and directly connected to the unit electrical panel.

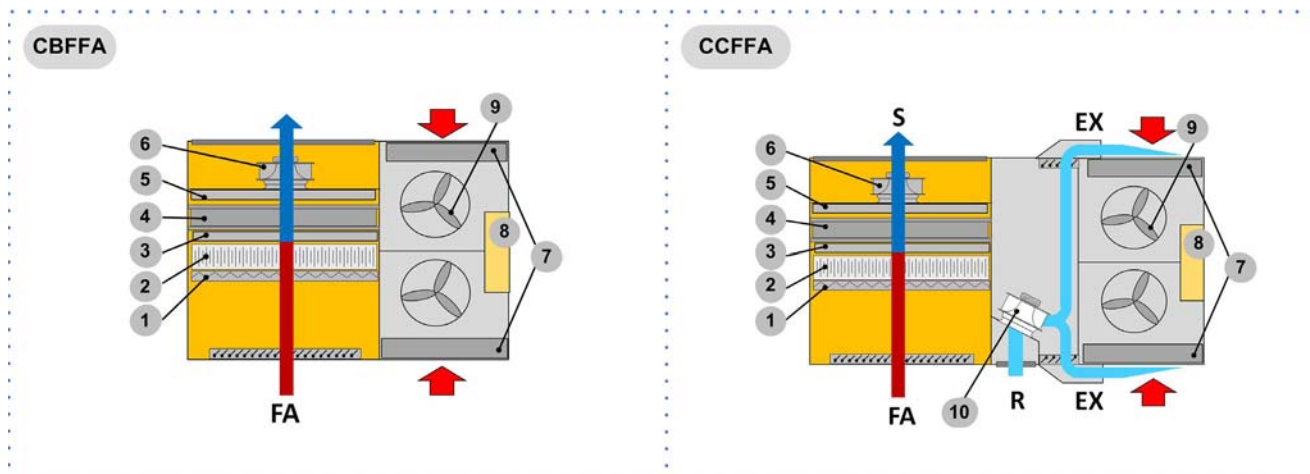


## 10 Accessories

### 10.1 Configurations

CCK Configuration with double fan section for recirculation, fresh and exhaust air

CCKP Configuration with double fan section with fresh air and THOR thermodynamic recovery



1. G4 efficiency filters + H10 equivalent electronic filters
2. Hot water exchanger or electric heaters
3. Handling exchanger
4. Hot gas reheating exchanger
5. Return + supply fan section

R Return air  
S Supply air

6. Source side exchanger
7. Electrical panel
8. Exhaust fan
9. Overpressure damper
10. Thermodynamic recovery exchanger, THOR

FA Fresh air  
EX Exhaust air

### 10.2 Heater humidifier

#### Start-up

Check the water supply pressure is not higher than 3 bar.

Open the flow rate measuring device/regulator and adjust it on 50% of the value in the table.

Wait 10/15 minutes so the heater soaks and starts.

Adjust the water flow rate by choosing whether to give greater importance to comfort or containment of the water consumption.

With an EXCESSIVE flow rate, it is possible for the water to flow in the channels or overflow from the bowl.

With INSUFFICIENT flow rate there is no humidifier action.

The heater is correctly wet if a veil of water shows on the external surface (with fan still).

#### Maintenance

The duration in time and absence of faults require constant cleaning which periodicity depends on different factors: concentration of dust in the air, water hardness, type of operation, etc..

When cleaning comply with the following prescriptions:

1. Close the water shut-off shutter
2. Remove the evaporating heater
3. Remove the casing panel corresponding to the humidifier
4. Remove the water distributor
5. Remove the evaporating heater
6. Was evaporating heater: the evaporating heater can be washed with water against lime deposits, but must be replaced if the deposits are of limescale type
7. Clean the spraying pipe, found on the alveolar distributor, with metal brush and steel points for the small holes
8. Check the water connection pipe is in good conditions, without holes or cuts that may cause water to leak
9. Wash inside the tank and the various components
10. Remount the evaporating heaters. ATTENTION: The evaporating heaters have a pre-set position to respect the air and water direction, that must be in counter-current. The incorrect position jeopardises the good operation and can cause flowing of the water downstream
11. Upon dehumidifier re-start, check operation again

## 10.3 Immersed electrode humidifier

### SUPPLY WATER

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

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

Do not use:

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

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

- reduces limescale deposits
- reduces energy consumptions
- reduces maintenance costs
- increases humidifier duration

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

### DRAINAGE WATER

It can reach a temperature of 100°C

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

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

Limit values for the supply water with medium-high conductivity in an immersed electrode humidifier				
		min	max	
Hydrogen ions	pH	7	8,5	
Specific conductivity at 20°C	µS/cm	300	1250	
Total dissolved solids	TDS mg/l <sup>(1)</sup>		<sup>(1)</sup>	
Dry residue at 180°C	R <sub>180</sub> mg/l <sup>(1)</sup>		<sup>(1)</sup>	
Total hardness	TH mg/l CaCO <sub>3</sub>	100 <sup>(2)</sup>	400	
Temporary hardness	mg/l CaCO <sub>3</sub>	60 <sup>(3)</sup>	300	
Iron + Manganese	mg/l Fe+Mn	0	0,2	
Chlorides	ppm Cl	0	30	
Silica	mg/l SiO <sub>2</sub>	0	20	
Residual chlorine	mg/l Cl <sub>2</sub>	0	0,2	
Calcium sulphate	mg/l CaSO <sub>4</sub>	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 <sup>(1)</sup>		<sup>(1)</sup>	
Dry residue at 180°C	R <sub>180</sub> mg/l <sup>(1)</sup>		<sup>(1)</sup>	
Total hardness	TH mg/l CaCO <sub>3</sub>	50 <sup>(2)</sup>	250	
Temporary hardness	mg/l CaCO <sub>3</sub>	30 <sup>(3)</sup>	150	
Iron + Manganese	mg/l Fe+Mn	0	0,2	
Chlorides	ppm Cl	0	20	
Silica	mg/l SiO <sub>2</sub>	0	20	
Residual chlorine	mg/l Cl <sub>2</sub>	0	0,2	
Calcium sulphate	mg/l CaSO <sub>4</sub>	0	60	
Metallic impurities	mg/l	0	0	
Solvents, diluents, soaps, lubricants	mg/l	0	0	

(1) Values depending on specific conductivity; in general:  $TDS \approx 0.93 * \sigma_{25}$ ,  $R_{180} \approx 0.65 * \sigma_{25}$

(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

### Periodical checks

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

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

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

### Humidifier cylinder drainage

Cylinder must be drained in these situations:

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

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

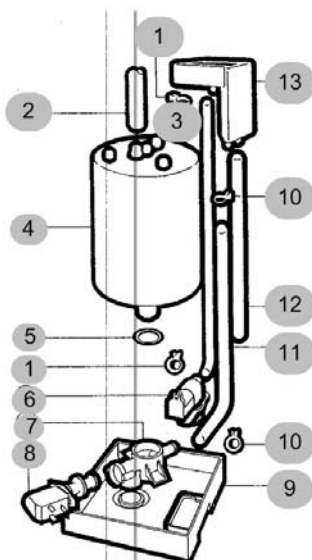
### Replacement of the cylinder

To remove the cylinder:

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

Before mounting it:

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



## 10.4 Electronic filters

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

Contaminants that can be filtered:

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



Contaminants that can NOT be filtered:

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



Absolutely to avoid:

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

### MATERIALS NECESSARY FOR MAINTENANCE

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



Do not use aluminum tanks or galvanized

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

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

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

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

The cleaner can be used to clean about 20 filters.

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

### IONISATION WIRES

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

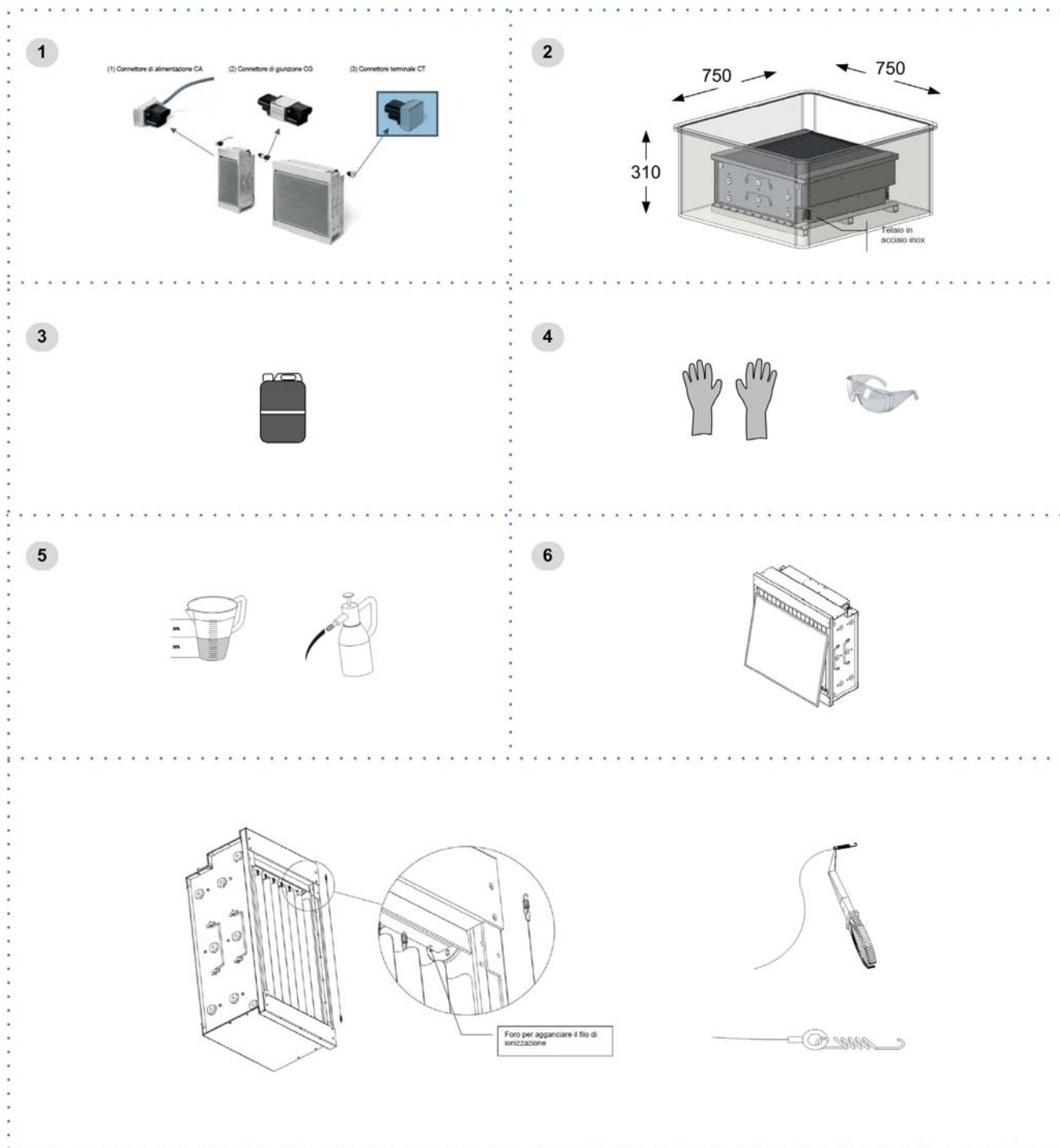
Due to the high voltage powering them, the ionisation wires are subject to wear.

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

In case of break:

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





## 10.5 F7 Highly efficient filters

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

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

## 10.6 Modulating condensation gas heating module

System maintenance booklet

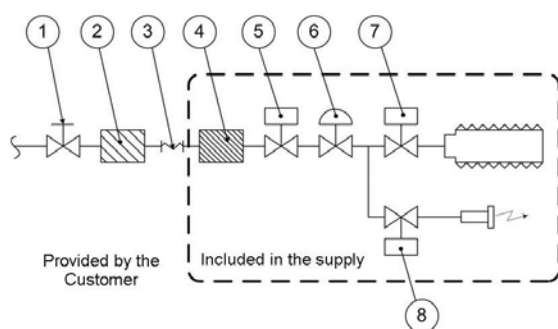
- It must be kept in the place of installation of the unit
- It must be filled-in upon commissioning
- It must be updated with the results of the periodical checks, of the routine and extraordinary maintenance interventions.

Gas connection

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

The heating module includes:

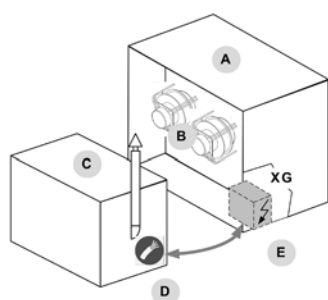
- hot air generator with condensation and integrated modulating adjustment, powered with methane gas
- kit for transformation of power with liquefied petroleum gas (LPG)
- kit of steel chimney for exhaust fumes
- All the control and safety devices



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

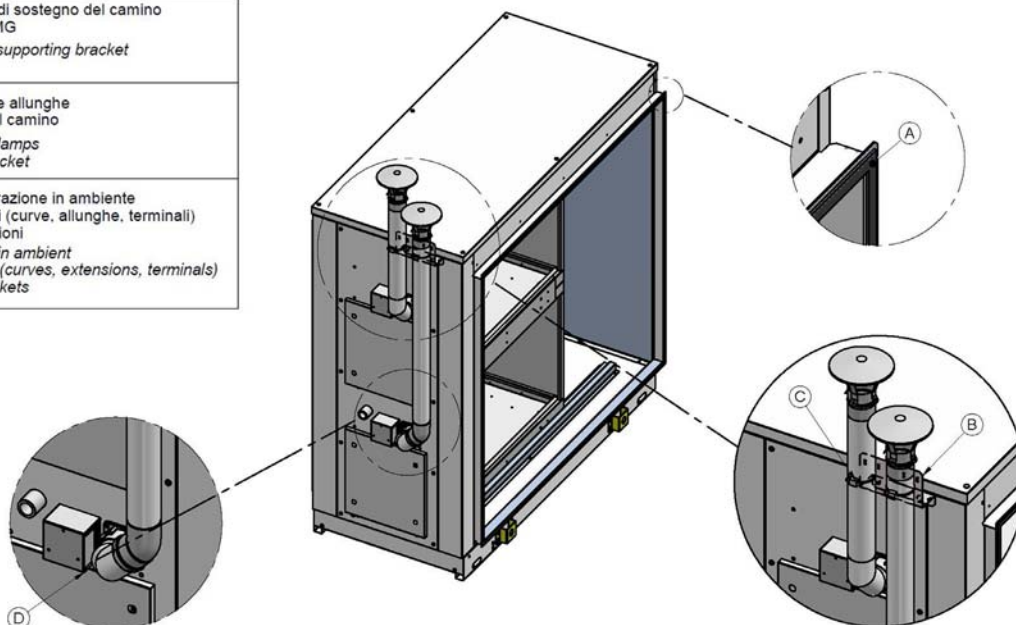
			35kW		44kW		65kW		82kW	
NOx class		Val	5							
			min	max	min	max	min	max	min	max
Rated thermal input		kW	7.6	34.85	8.50	42.00	12.40	65.00	16.40	82.00
Efficiency Hi (P.C.I.)		%	106.97	96.30	105.88	96.19	108.06	96.82	108.35	97.60
Efficiency Hs (P.C.S.)		%	96.37	86.76	95.39	86.66	97.36	87.22	97.62	87.93
Max condensation produced		l/h	0.9		1.1		2.1		3.3	
Carbon monoxide CO (0% di O <sub>2</sub> )		ppm	<5		<5		<5		<5	
Nitrogen oxides - NOx (0% di O <sub>2</sub> )			41 mg / k Wh 23 ppm		35 mg / k Wh 20 ppm		40 mg / k Wh 23 ppm		34 mg / k Wh 19 ppm	
Available flue pressure		Pa	90		90		120		120	
Gas connection diameter		GAS	UNI ISO 7/1-3/4"		UNI ISO 7/1-3/4"		UNI ISO 7/1-3/4"		UNI ISO 7/1-1"	
Exhaust pipe diameter		mm	80		80		80		80	

Electrical connections

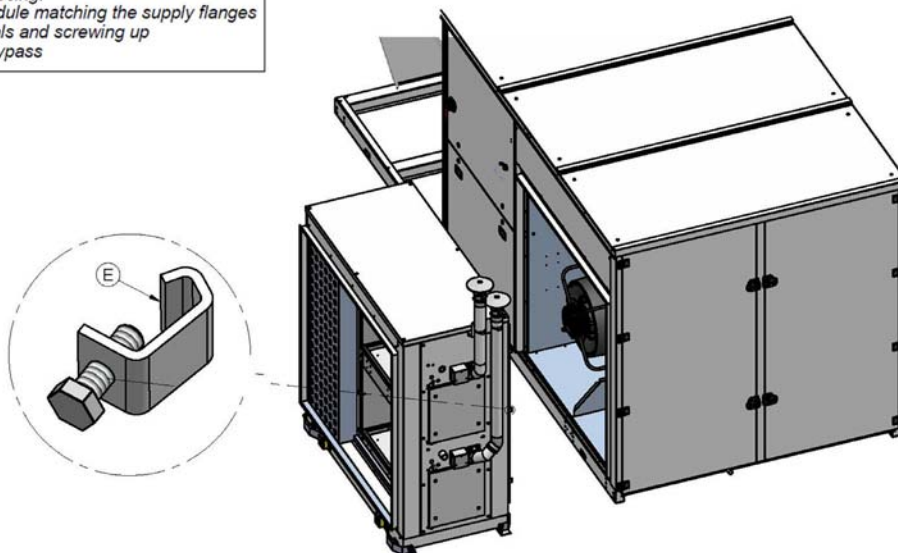


- rooftop
- supply fan
- gas module
- connecting cables
- electrical panel - terminal XG

A	<p>Applicare la guarnizione piana 15x5 adesiva lungo il perimetro delle flange del Modulo Gas in modo di garantire la completa assenza di bypass d'aria</p> <p><i>Apply the flat adhesive gasket 15x5 on the Gas Module flange perimeter to guarantee the absence of air bypass</i></p>
B	<p>Fissare con viti la staffa di sostegno del camino al pannello frontale del MG</p> <p><i>Fix with screws the flue supporting bracket to the GM frontal panel</i></p>
C	<p>Fissare tramite fascette le allunghe alla staffa di sostegno del camino</p> <p><i>Fix the extensions with clamps to the flue supporting bracket</i></p>
D	<p>Fissare i terminali di aspirazione in ambiente e i componenti dei camini (curve, allunghe, terminali) tramite le relative guarnizioni</p> <p><i>Fix the suction terminals in ambient and the fuel components (curves, extensions, terminals) by the corresponding gaskets</i></p>



E	<p>Togliere le chiusure delle flange di mandata dell'unità. Avvicinare l'unità al Modulo Gas accoppiando le flange mandata tramite i morsetti in dotazione e serrando le viti in modo di garantire la completa assenza di bypass d'aria</p> <p><i>Remove the unit supply flange closing. Approach the unit to the Gas Module matching the supply flanges by means of the supplied terminals and screwing up to guarantee the absence of air bypass</i></p>
---	--



## 11 Decommissioning

### 11.1 Disconnecting

Only authorised personnel must disconnect the unit.

Avoid leak or spills into the environment.

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

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

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

### 11.2 Dismantling and disposal

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

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

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

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

### 11.3 Directive EC RAEE

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

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

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

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

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

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



## 12 Residual risks

### General description

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

#### Danger zone

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

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

#### Handling

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

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

#### Installation

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

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

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

Carefully check the positioning of the unit.

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

Carefully check the positioning and the anchoring of the unit.

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

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

#### General risks

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

Electrically isolate the unit (yellow-red isolator).

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

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

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

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

Always contact the qualified assistance centre.

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

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

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

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

### Electric parts

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

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

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

Always fix the unit cover properly.

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

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

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

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

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

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

#### Moving parts

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

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

Contact with the fans can cause injury.

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

#### Refrigerant

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

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

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

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

Do not place any heat source inside the danger zone.

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

#### Hydraulic parts

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

# General technical data

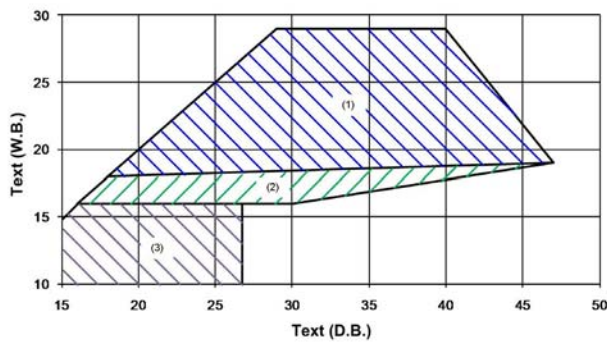
## Configuration: fresh air supply only (CBFFA)

Size			12.2	16.2	20.4	22.4	24.4
<b>Cooling</b>							
Cooling capacity	1	kW	33.1	49.5	76.1	83.4	90.4
Sensible capacity	1	kW	18.8	27.8	38.3	43.3	48.0
Compressor power input	1	kW	9.2	12.9	20.0	21.7	23.3
EER	1		3.60	3.84	3.81	3.84	3.88
<b>Heating</b>							
Heating capacity	2	kW	39.6	50.0	73.2	81.4	89.5
Compressor power input	2	kW	9.9	11.9	17.2	18.2	20.7
COP	2		4.00	4.20	4.26	4.47	4.32
<b>Compressor</b>							
Type of compressors	3		Scroll	Scroll	Scroll	Scroll	Scroll
No. of compressors		No	2	2	4	4	4
Std Capacity control steps		No	2	3	4	4	4
Refrigeration circuits			2	2	2	2	2
<b>Air Handling Section Fans (Supply)</b>							
Type of supply fan	4		RAD	RAD	RAD	RAD	RAD
Number of supply fans		No	1	1	1	1	1
Fan diameter		mm	400	400	560	560	560
Type of motor	5		EC	EC	EC	EC	EC
Supply airflow		m³/h	3400	4500	6000	7000	8000
Supply airflow		l/s	944	1250	1667	1944	2222
Installed unit power		kW	1.3	1.3	2.9	2.9	2.9
Max. static pressure supply fan	6	Pa	675	470	775	730	650
<b>High static pressure air handling section fans (OPTIONAL)</b>							
Type of supply fan			RAD	RAD	RAD	RAD	RAD
Number of supply fans		Nr	1	1	1	1	1
Fan diameter		mm	500	500	500	500	500
Supply airflow		l/s	944	1250	1667	1944	2222
Supply airflow		m³/h	3400	4500	6000	7000	8000
Installed unit power		kW	2,6	2,6	5,5	5,5	5,5
Max. static pressure supply fan		Pa	890	810	1260	1260	1260
<b>Fans (Exhaust) (only with CCFFA configuration)</b>							
Type of exhaust fan	7		RAD	RAD	RAD	RAD	RAD
Number of exhaust fans	7	No	1	1	1	1	1
Fan diameter	7	mm	400	400	500	500	500
Type of motor	7		EC	EC	EC	EC	EC
Exhaust airflow	8	l/s	0-944	0-1250	0-1667	0-1944	0-2222
Installed unit power	7	kW	1.3	1.3	2.6	2.6	2.6
Max. exhaust static pressure	7	Pa	550	400	670	560	430
<b>External Section Fans</b>							
Type of fans	9		AX	AX	AX	AX	AX
Number of fans		No	2	2	2	2	2
Fan diameter		mm	630	630	800	800	800
Standard airflow		l/s	6940	6940	11670	11670	11670
Installed unit power		kW	1.05	1.05	1.5	1.5	1.5
<b>Connections</b>							
Condensate drain		mm	20	20	20	20	20
<b>Power supply</b>							
Standard power supply		V	400/3~/50	400/3~/50	400/3~/50	400/3~/50	400/3~/50

1. Fresh air temperature: 35°C D.B. / 24°C W.B. EER referred only to compressors
2. Fresh air temperature: 7°C D.B. / 6°C W.B. COP referred only to compressors
3. SCROLL = scroll compressor
4. RAD = radial fan
5. EC Electronic switching motor
6. Available nett pressure to overcome the supply
7. CCFFA - configuration for fresh air supply with extraction and exhaust
8. Range of variability of the exhaust air flow (only for CCFFA configuration)
9. AX = axial fan



## Operating range (Cooling)

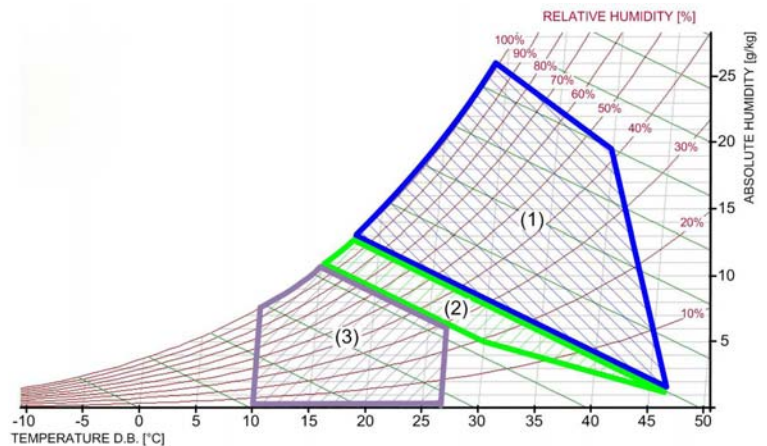


### WET BULB TEMPERATURE - EXAMPLE

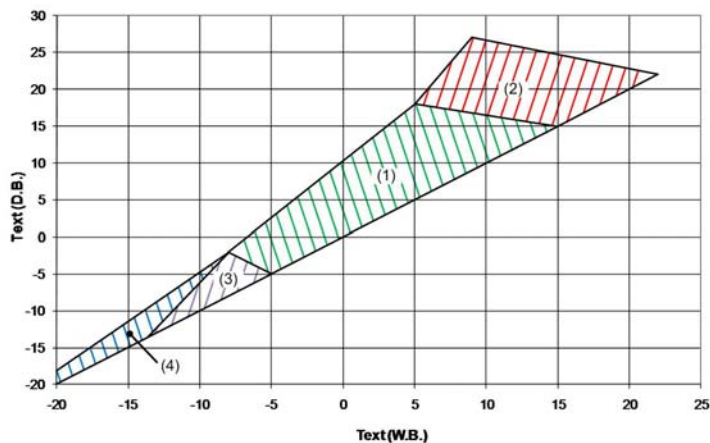


28°C W.B. {

- 40°C D.B. / 47% R.H.
- 35°C D.B. / 59% R.H.
- 30°C D.B. / 86% R.H.



## Operating range (Heating)



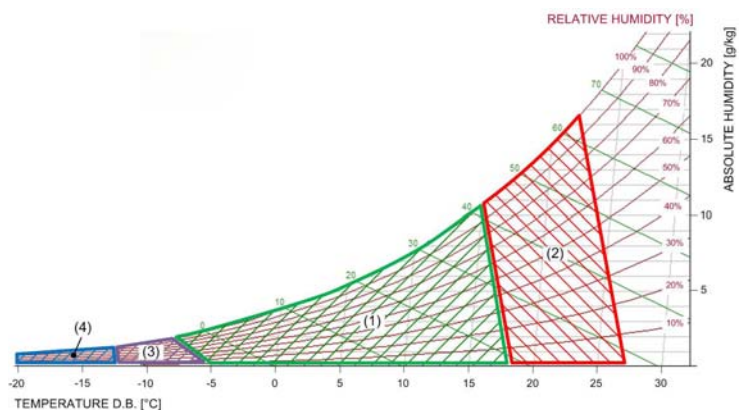
The limits are indicative and take into consideration:

- general and non specific sizes
- standard airflow
- operation at full load
- unit correctly installed and serviced

Text (D.B.) = Ambient air temperature / handling coil inlet dry bulb measured temperature (D.B.=DRY BULB)

TEXT (W.B.) = Fresh air temperature/inlet of treatment coil  
WARNING! WET BULB TEMPERATURE (W.B. = WET BULB)

1. Operation range at full load
2. Operating field at partial load (one active compressor for each refrigerant circuit)
3. Operating field of the unit with external low temperature equipment and pre-heating resistances or hot water coil options.
4. Operating field of the unit with external low temperature equipment and hot water coil or gas heating module options



## Sound levels

Size	Sound power level								Sound pressure level	Sound Power Level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000		
12.2	76	79	76	77	77	76	74	73	65	83
16.2	76	79	78	80	80	78	75	79	66	85
20.4	92	82	80	81	79	77	74	75	67	84
22.4	92	83	81	82	80	78	75	73	68	85
24.4	92	84	82	84	82	79	76	76	69	87

The sound levels are referred to unit operating at full load in nominal conditions. The sound pressure level is referred at a distance of 1 m. from the ducted unit surface operating in free field conditions. External static pressure 50 Pa. (standard UNI EN ISO 9614-2)

Please note that when the unit is installed in conditions different from nominal test conditions (e.g. near walls or obstacles in general), the sound levels may undergo substantial variations.



## Functional spaces

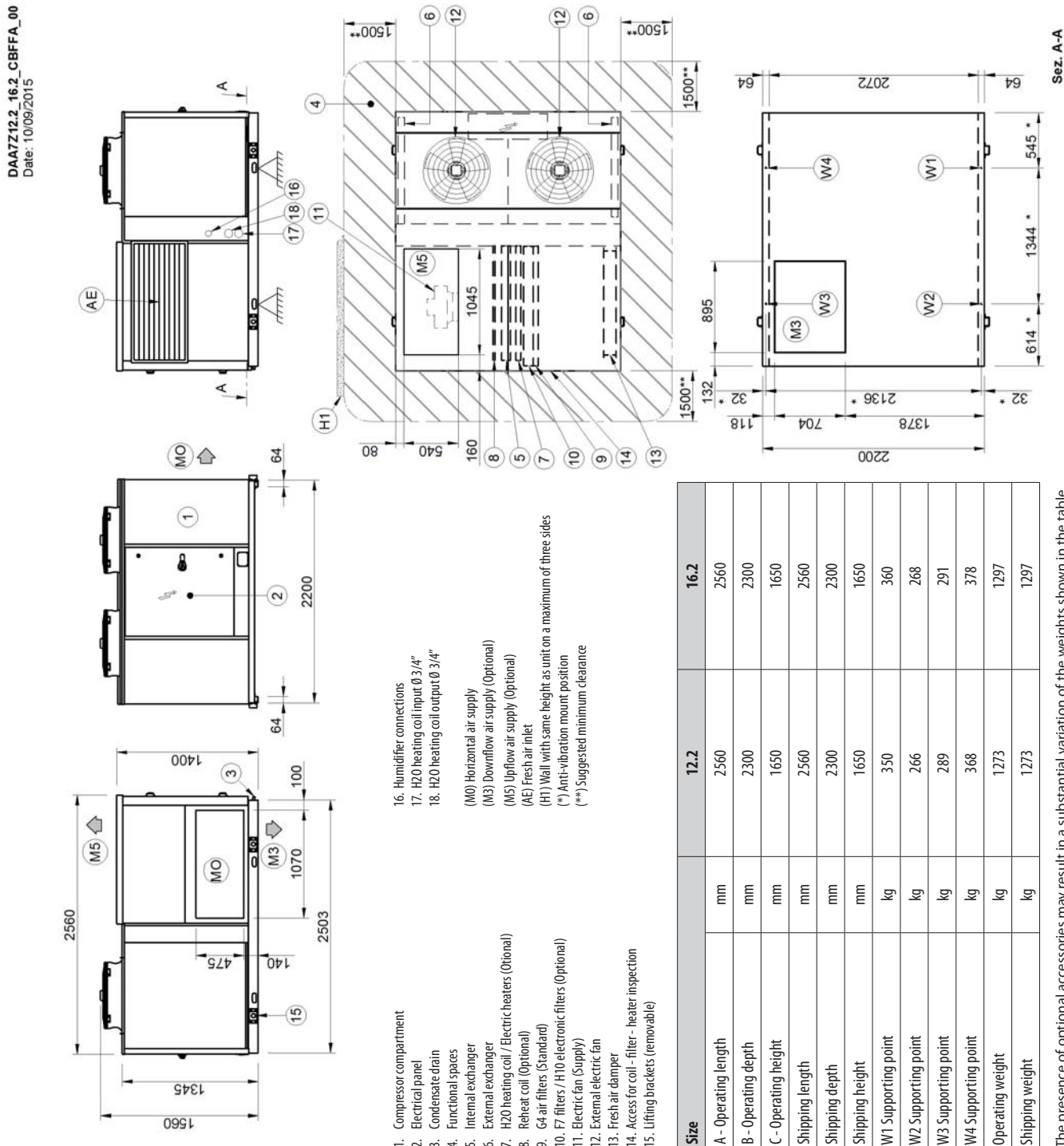
When placing the unit, it is necessary to comply with the functional spaces indicated in the dimensions. Compliance with functional spaces is essential to:

- ensure proper operation of the unit
- allow maintenance technicians easy access to the equipment compartments
- protect authorized operators and exposed persons.

If several units are placed near one another, the functional spaces between units must be doubled.

## Dimensional drawings

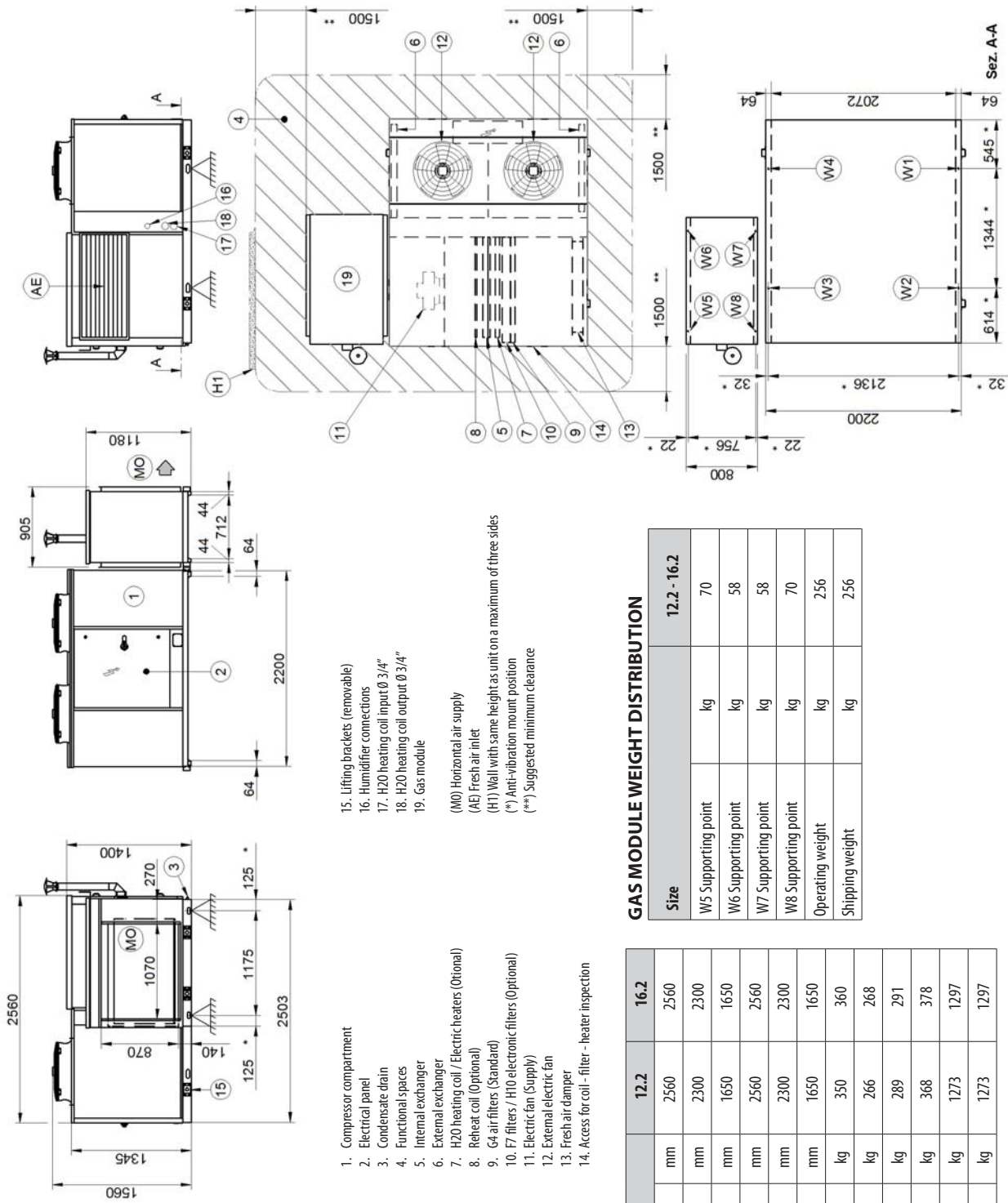
### Size 12.2 - 16.2 - CBFFA configuration



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

## Size 12.2 - 16.2 Combustion module - CBFFA configuration

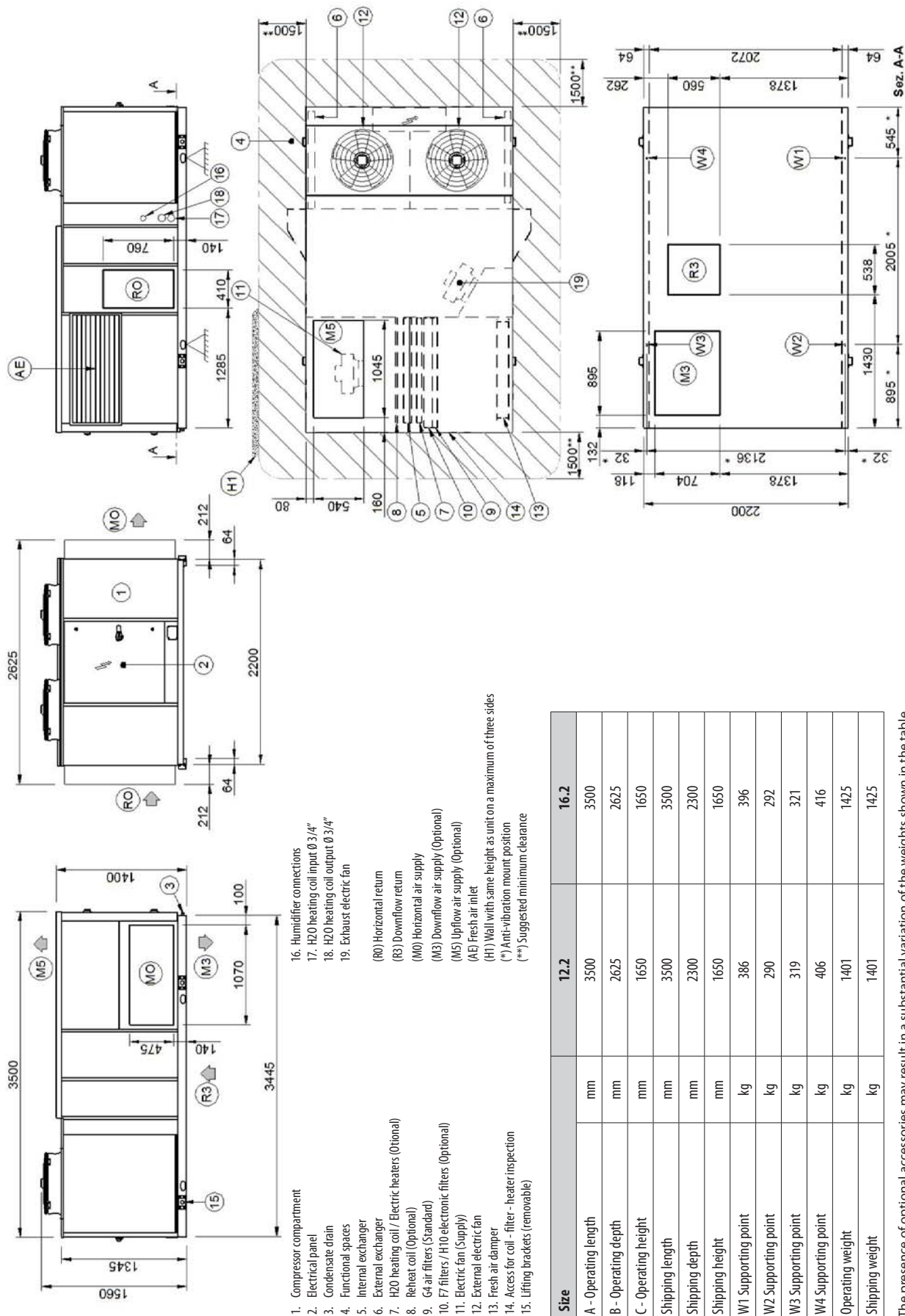
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Date: 10/09/2015



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

## Size 12.2 - 16.2 - CCFFA configuration

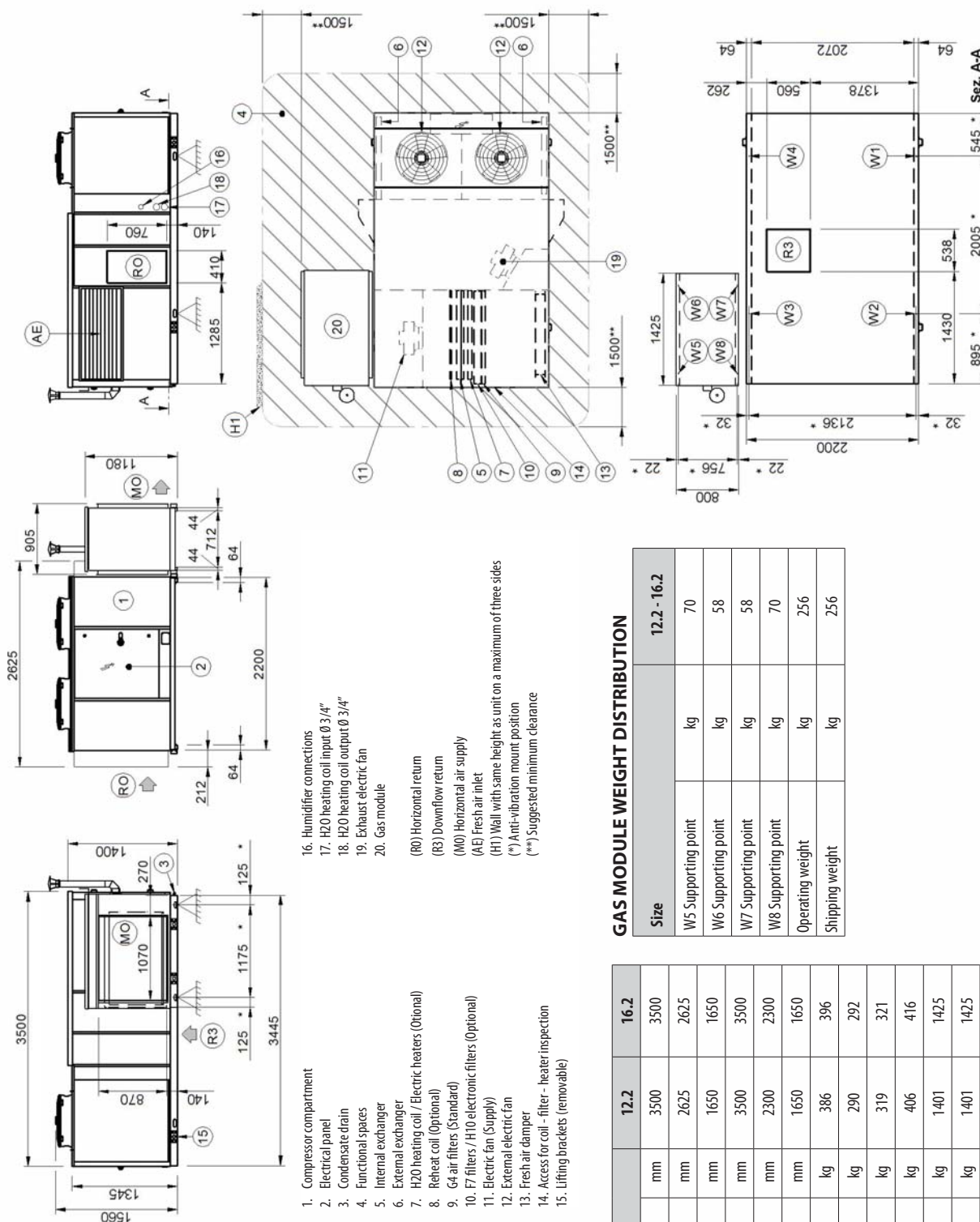
DAA7Z12.2\_16.2\_CCFFA\_00  
Date: 10/09/2015



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

## Size 12.2 - 16.2 Combustion module - CCFFA configuration

DAA7Z12.2\_16.2\_CCFFA\_GC01X\_GC09X\_00  
Date: 10/09/2015



### GAS MODULE WEIGHT DISTRIBUTION

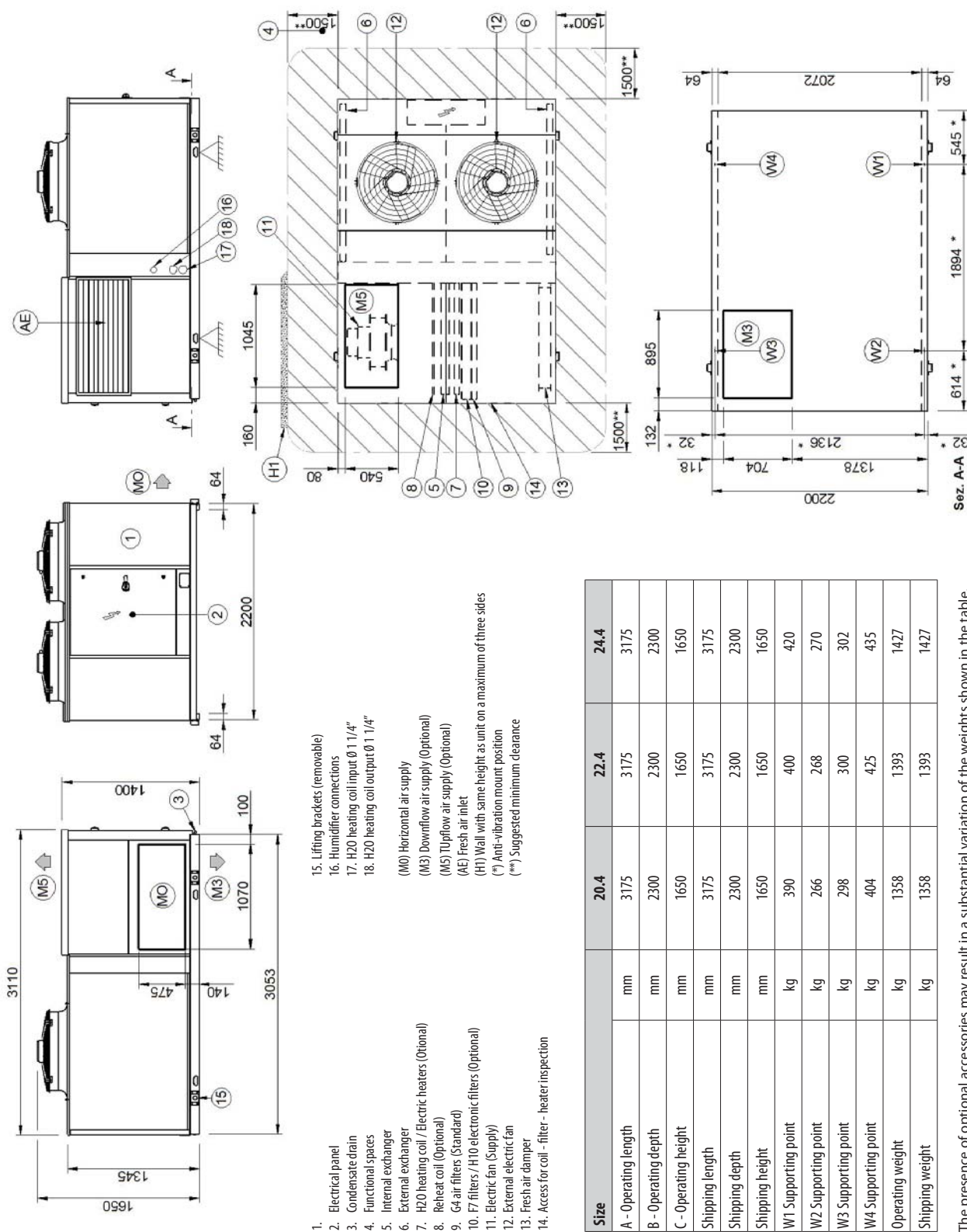
Size	12.2 - 16.2
W5 Supporting point	kg
W6 Supporting point	kg
W7 Supporting point	kg
W8 Supporting point	kg
Operating weight	kg
Shipping weight	kg

Size	12.2	16.2
A - Operating length	mm	3500
B - Operating depth	mm	2625
C - Operating height	mm	1650
Shipping length	mm	3500
Shipping depth	mm	2300
Shipping height	mm	1650
W1 Supporting point	kg	386
W2 Supporting point	kg	290
W3 Supporting point	kg	319
W4 Supporting point	kg	406
Operating weight	kg	1401
Shipping weight	kg	1401

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

## Size 20.4 - 22.4 - 24.4 - CBFFA configuration

DAA7Z20.4\_24.4\_CBFFA\_00  
Date: 14/09/2015



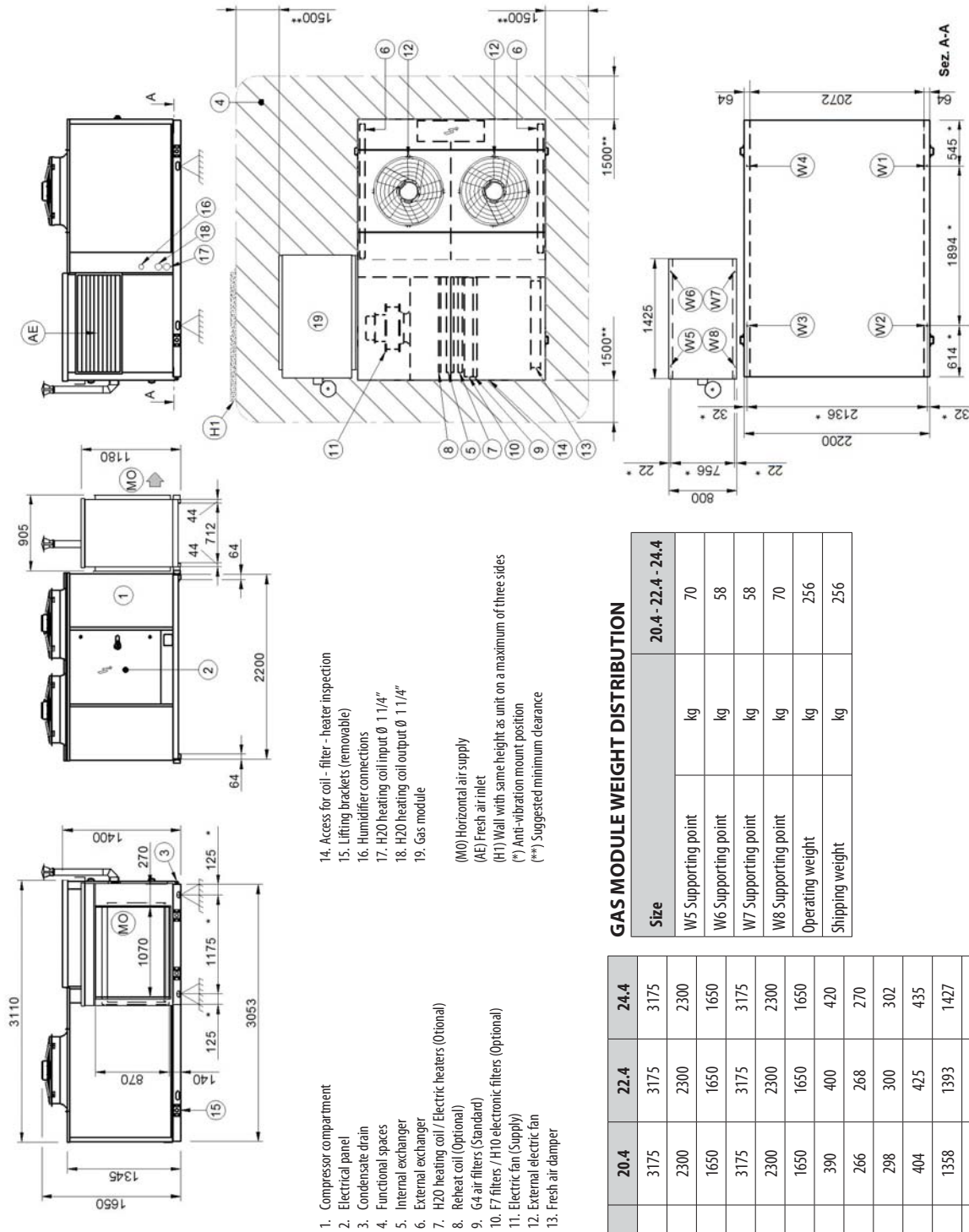
Size	20.4	22.4	24.4
A - Operating length	mm	3175	3175
B - Operating depth	mm	2300	2300
C - Operating height	mm	1650	1650
Shipping length	mm	3175	3175
Shipping depth	mm	2300	2300
Shipping height	mm	1650	1650
W1 Supporting point	kg	390	420
W2 Supporting point	kg	266	270
W3 Supporting point	kg	298	302
W4 Supporting point	kg	404	435
Operating weight	kg	1358	1427
Shipping weight	kg	1358	1427

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



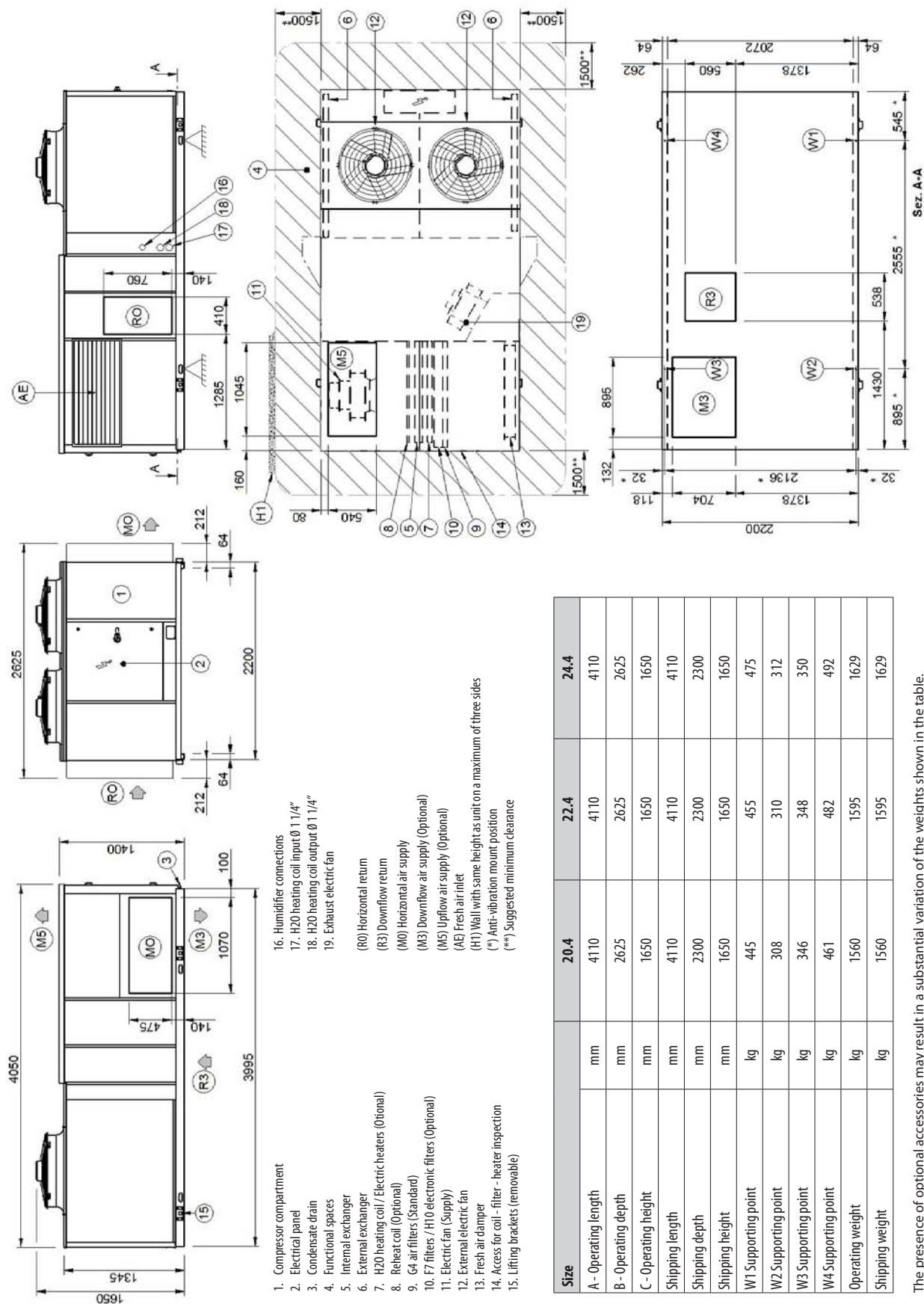
## Size 20.4 - 22.4 - 24.4 - Combustion module - CBFFA configuration

DAA7Z20.4\_24.4\_CBFFA\_GC08X-GC10X\_00  
Date: 14/09/2015



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

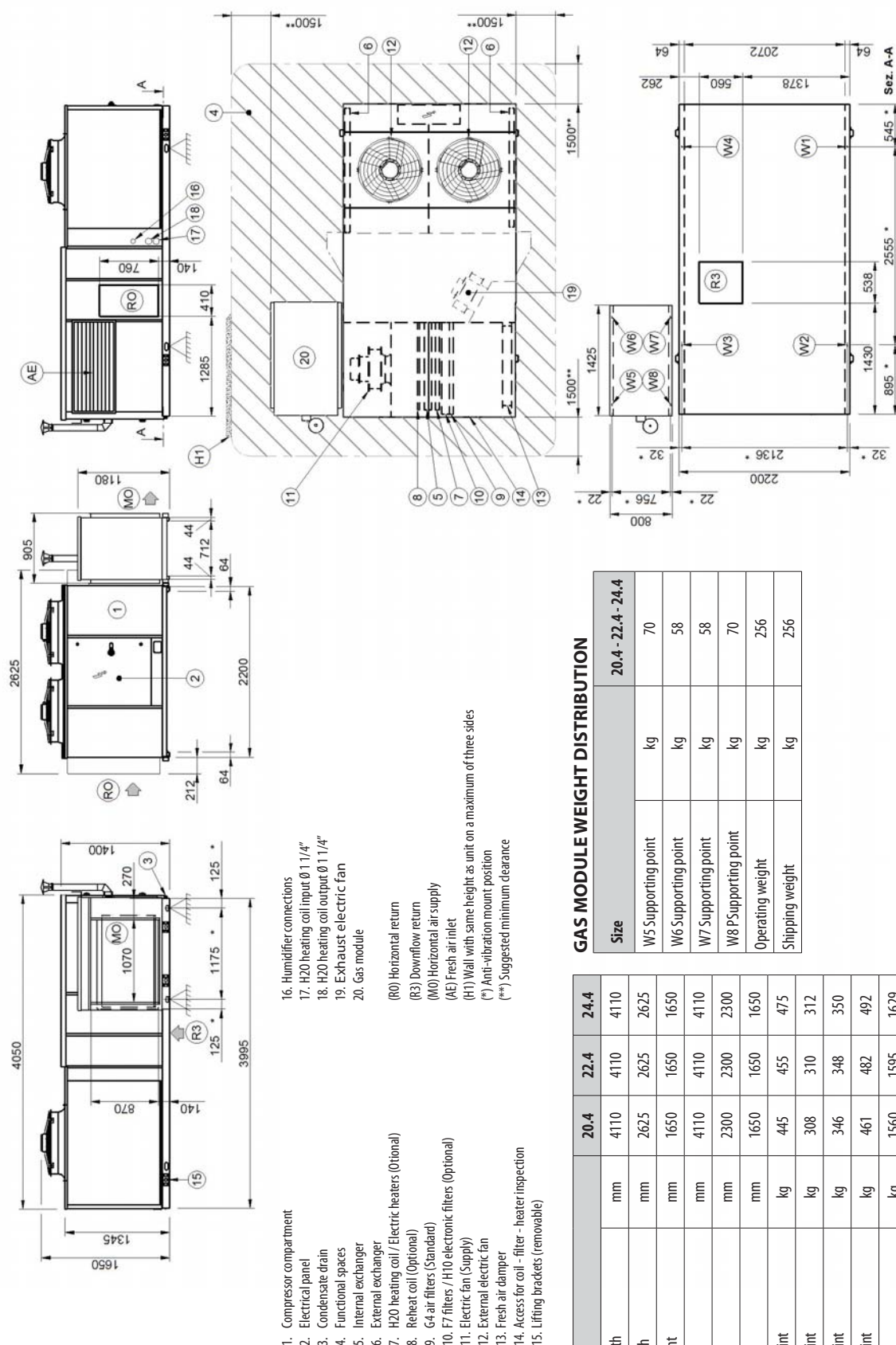
## Size 20.4 - 22.4 - 24.4 - CCFFA configuration

DAA7Z20.4\_24.4\_CCFFA\_01  
Date: 20/05/2015

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

## Size 20.4 - 22.4 - 24.4 Combustion module - CCFFA configuration

DAA7Z20.4\_24.4\_CCFFA\_GC08X-GC10X\_00  
Date: 20/05/2015



### GAS MODULE WEIGHT DISTRIBUTION

Size	20.4	22.4	24.4
A - Operating length	mm	4110	4110
B - Operating depth	mm	2625	2625
C - Operating height	mm	1650	1650
Shipping length	mm	4110	4110
Shipping depth	mm	2300	2300
Shipping height	mm	1650	1650
W1 Supporting point	kg	445	475
W2 Supporting point	kg	308	310
W3 Supporting point	kg	346	348
W4 Supporting point	kg	461	482
Operating weight	kg	1560	1595
Shipping weight	kg	1560	1595

Size	20.4 - 22.4 - 24.4
W5 Supporting point	kg
W6 Supporting point	kg
W7 Supporting point	kg
W8 PS Supporting point	kg
Operating weight	kg
Shipping weight	kg

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





**CLIVET SPA**

Via Camp Lonc 25, Z.I. Villapaiera - 32032 Feltre (BL) - Italy  
Tel. + 39 0439 3131 - Fax + 39 0439 313300 - info@clivet.it

**CLIVET UK LTD (Sales)**

4 Kingdom Close, Segensworth East - Fareham, Hampshire - PO15 5TJ - United Kingdom  
Tel. + 44 (0) 1489 572238 - Fax + 44 (0) 1489 573033 - info@clivet-uk.co.uk

**CLIVET AIRCON LTD (Service and Maintenance Division)**

Units F5&F6 Railway Triangle Ind Est, Walton Road - Portsmouth, Hampshire - PO6 1TG - United Kingdom  
Tel. +44 (0) 2392 381235 - Fax. +44 (0) 2392 381243 - info@clivetaircon.co.uk

**CLIVET ESPAÑA COMERCIAL S.L. (Sales)**

Calle Gurb, 17 1º 1ª - 08500 Vic, Barcelona - España  
Tel: +34 93 8606248 - Fax +34 93 8855392 - info@clivetcomercial.com

**CLIVET ESPAÑA S.A.U. (Service and Maintenance Division)**

Calle Real de Burgos Nº 12 - 28860 Paracuellos del Jarama, Madrid - España  
Tel. +34 91 6658280 - Fax +34 91 6657806 - info@clivet.es

**CLIVET GmbH**

Hummelsbütteler Steindamm 84, 22851 Norderstedt - Germany  
Tel. + 49 (0) 40 32 59 57-0 - Fax + 49 (0) 40 32 59 57-194 - info.de@clivet.com

**CLIVET RUSSIA**

Elektrozavodskaya st. 24, office 509 - 107023, Moscow, Russia  
Tel. + 74956462009 - Fax + 74956462009 - info.ru@clivet.com

**CLIVET MIDEAST FZCO**

Dubai Silicon Oasis (DSO), High Bay Complex, Ind Unit No. 3, PO BOX 28178, Dubai, UAE  
Tel. + 9714 3208499 - Fax + 9714 3208216 - info@clivet.ae

**CLIVET AIRCONDITIONING SYSTEMS PRIVATE LIMITED**

4BA, Gundecha Onclave - Kherani Road, Saki Naka, Andheri (East) - Mumbai 400 072 - India  
Tel. +91 22 6193 7000 - Fax +91 22 6193 7001 - info.in@clivet.com