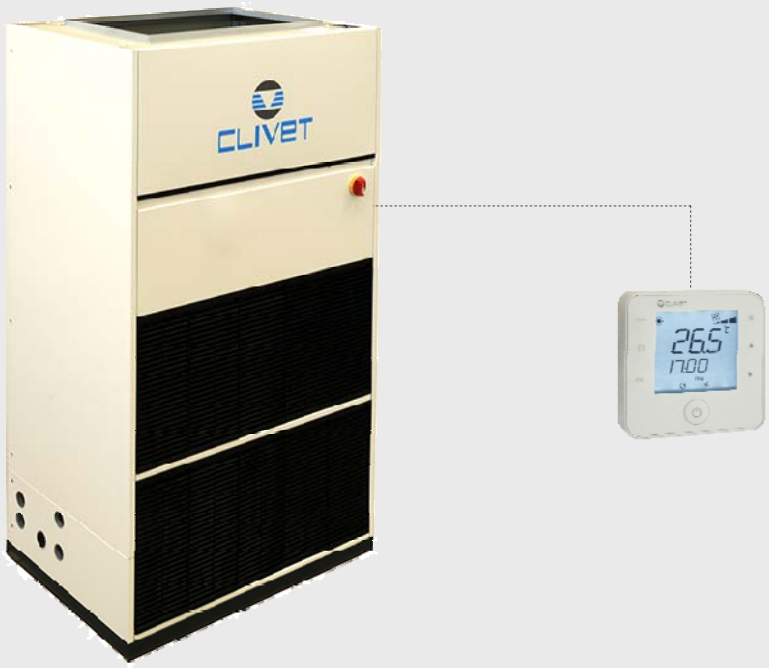
CASR-X 31-222

High efficiency cooling only packaged air-conditioner condenserless ductable for indoor installation

Installation use and maintenance manual



CLIVET

R-410A

M04U40F12-01 24-03-14

Dear Customer,

We congratulate you on choosing these product.

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 con-sumption, 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

INDEX

1 - GENERAL

1.1 MANUAL

The manual provides correct unit installation, use and maintenance.

Pay particolar attention to:

Warning identifies particularly important operations or information .

Prohibited operations that must not be carried out, that compromise the operating of the equipment 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. The preliminary information must be read prior to carrying out any of the following operations.

1.2 GENERAL INSTRUCTIONS

1.2.1 **Preliminaries**

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

On the unit can operate only qualified personal , as determined by the regulations in force.

Using the unit in case of breakdown or malfunction :

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

Follow local safety regulations. .

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

Recycle and dispose of packing material in conformity with local regulations. .

1.2.2 **Risk situations**

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

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

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

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

1.2.3 **Intended use**

Use the unit for :

CIVIL AIR-CONDITIONING

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

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

1.2.4 **Installation**

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

1.2.5 **Maitenance**

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

Turn the machine off before any operation.

1.2.6 **Modification**

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

1.2.7 **Breakdown/Malfuction**

Disable the unit immediately in case of breakdown or malfunction. .

Contact a constructor certified assistance service.

Use original spares parts only.

1.2.8 **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.

1.2.9 **Data update**

Continual product improvements may imply manual data changes .

Visit manufacturer web site for updated data.

1.3 INDICATIONS FOR THE USER

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 machine notebook that allows any interventions carried out on the machine 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 format on:

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

1.4 UNIT INDENTIFICATION

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

It has not to be removed for any reason.

It reports the regulations indications such as:

- machine type,
  Series → **CASR-X**
  Size → **31 .... 222 etc.)**
- serial number
  Axxxxxxxxxxx
- year of manufacture
- wiring diagram number
- electrical data
- manufacturer logo and address .

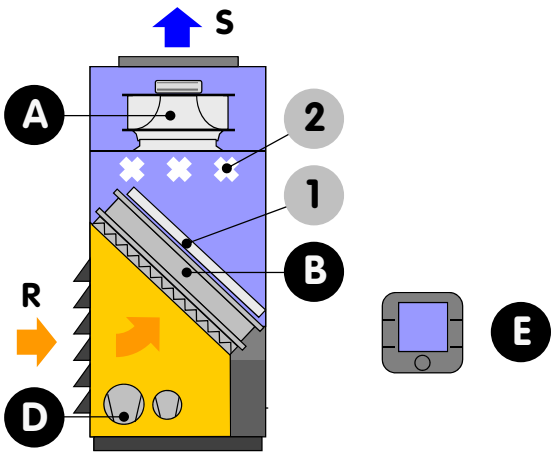
1.4.2 **Serial number**
It identifies uniquely each machine.

It identifies specific spare parts for the machine.

1.4.3 **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.
In case of intervention you have to provide data.

Typology
Size
Serial number
Year of manufacture
Wiring diagram

1.5 UNIT DESCRIPTION



R Air intake
Optional: front, bottom or rear.

S Treated air supply
Optiona: upwards or rear.

A Supply fan and air filter
Electronic control, which returns the air to the setting after having taken it in, strained it with G4 efficiency and treated it

B Internal exchanger
It transfers energy (heat/cool)to the fresh supply air

C Source side exchanger
It exchanges energy (heat or cool) with the outdoor air

D Direct expansion circuit
Produces cool or heat energy through Scroll compressors and an electronic expansion valve

E User interface
Easy to use, with automatic control sensors built-in.

MAIN OPTIONS

1 Hot gas post-heating /Hot water heating
Gas post-heating recovers condensation energy in summer humidity control. The hot water heating (available as an alternative), when necessary, integrates or substitutes the workings of the direct expansion circuit

2 Electric heating
Integrates or substitutes the workings of the direct expansion circuit when necessary

1.6 ACCESSORIES

- Front air discharge plenum H=500mm
- Differential pressure switch for dirty air filters
- 2 rows hot water coil
- Modulating three-way valve
- Re-heating coil
- External humidifier control with 0-10V command
- Electronic room control with display, for wall installation in built-in box
- Constant outlet air flow-rate
- Temperature control with on-board probe
- Temperature and humidity ambient control by on board probes
- Serial port RS485 with MODBUS protocol
- LonWorks serial communication module
- BACnet serial communication module
- Electric heaters.
- Rubber antivibration mounts
- High and low pressure gauges
- Phase monitor
- Power factor correction capacitors (cosfi > 0.9)

2 - RECEPTION

2.1 PRELIMINARY INFORMATION

General

Operate in compliance with safety regulations in force .

For detailed information (dimensions, weight, technical characteristics etc.) please refer to the “Technical information” section.

Use single protection devices : gloves, glasses ecc.

Stocking

Observe external packing instructions .

Handling

Verify unit weight and handling equipment lifting capacity .

Identify critical points during handling (disconnected routes, flights, steps, doors).

Verify the position of the barycentre in the Technical information - DIMENSIONS section.

Before handling verify that the unit keeps its balance.

Packing removing

Be careful not to damage the unit.

Recycle and dispose of packing material in conformity with local regulations.

2.2 DELIVERY CONTROL

Before accepting the delivery you have to check:

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

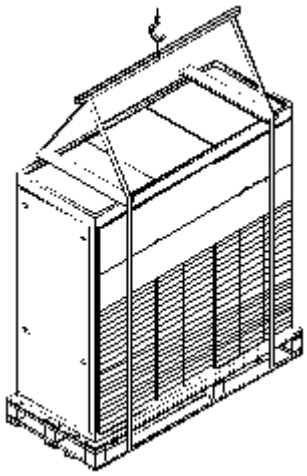
In case of damage or anomaly:

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

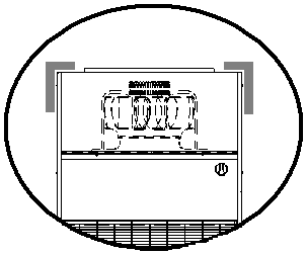
Any disputes must be made within the 8 days following the delivery. Complaints after this period are invalid.

2.3 HANDLING

Considerer that the barycentre could out of centre



Use protection to avoid the unit damaging



3 - POSITIONING

3.1 PRELIMINARY INFORMATION

Operate in compliance with safety regulations in force.

For detailed information (dimensions, weight, technical characteristics etc.) please refer to the TECHNICAL INFORMATION section.

⚠ Use single protection devices : gloves, glasses ecc.

During positioning consider these elements :

- technical spaces required for the machine and system
- place where the machine will be installed
- electrical connections
- water connections
- air / aeraulic ducts

⚠ Do not considerer these elements could decrease performances and operational life of the unit.

3.2 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 TECHNICAL INFORMATION section.

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

3.3 POSITIONING

⚠ Units are designed to be installed:

- INTERNAL
- in fixed positions.

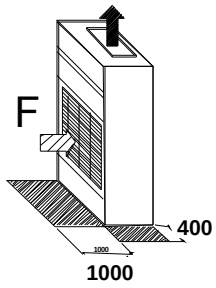
Limit vibration transmission:

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

Installation standards:

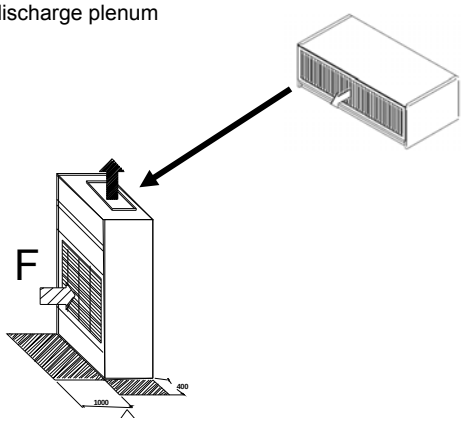
- Safe accessible position;
- avoid flood-prone places;
- verify unit weight and bearing point capacity;
- verify that all bearing points are aligned and leveled;

F : front air intake



The plenum enables treated air to be taken frontally

Front air discharge plenum



4 - WATER CONNECTIONS

4.1 PRELIMINARY INFORMATION

Selection and installation of system components must be carry out by installer.

Following you will find some indications to integrate with what is provided by the local regulations in force and by the good technical laws.

4.2 COMPONENTS

CUT-OFF VALVES :

- installed at inlet and outlet allow maintenance operations without having to empty the system .

THERMOMETERS AND MANOMETERS :

- installed at entry and exit of the main elements facilitate inspection and maintenance.

AN AIR BLEED VALVE :

- installed in all of the highest points of the system allowing the venting of the circuits air.

DRAINAGE TAPS :

- installed in the lowest points of the system to allow bleeding.

EXPANSION TANK :

- It keeps a correct system pressure when the water temperature changes. It must be dimensioned as a function of water content. Could be necessary install in addition on the unit one or more of it .

WATER FILTER :

- must be installed immediately in the water input of the unit, in a position that is easily accessible for cleaning.
- The filter should never be re-moved, this operation invalidates the guaranty .

SUPPORTS :

- The hydraulic pipes weight mustn't burden on the unit connections ..

FLOW SWITCH

- The flow switch must be present as a component of the system

4.3 OPERATION SEQUENCE

Before connecting the unit, carefully wash the system by filling it and emptying it several times with clean water.

In the units equipped with hydraulic pipeworks use the bypass.

Ignoring this operation will lead to several filter cleaning interventions and at worst cases can cause damages to the exchangers and the other parts.

Execute leakage test before isolate the pipes.

To avoid heat dispersions and formation of condensate isolate all the pipes.

Leave various point of service free (wells, vent-holes etc)

4.4 WATER QUALITY

The water quality is determined by the following factors, avoid therefore:

- Inorganic salts
- pH
- Biological load (seaweeds etc)
- Suspended solids
- Dissolved oxygen

Water with inadequate characteristics can cause:

- pressure drop increase
- energy efficiency decrease
- corrosive symptom increase

4.5 RISK OF FREEZE

If the unit or the relative water connections can be subject to temperatures close to 0°C adopt measures for prevent risk of freeze.

For example:

- Mix water with ethylene glycol
- Safeguard the pipes with heating cables placed under the insulation
- Empty the system in cases of long non-use and check that:
  - there are no closed taps present that could trap water even after emptying
  - there are no low points in which water can stagnate even after emptying; carry out any blowing required .

4.6 ANTI-FREEZE SOLUTION

Consider that the use of anti-freeze solution determines an increase in a pressure drop.

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

4.11 CONDENSATE DISCHARGE

The condensate must be dispersed to avoid damages to persons and property .

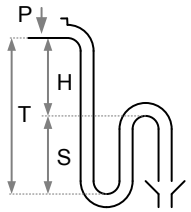
- Unit discharge fitting : the connection must avoid the transmission of mechanical stresses and must be performed paying attention to avoid the damaging of the unit discharge fitting .
- Make a trap that, eliminating the depression caused by the fan, stops the return of gas from the discharge pipe
- The ducting must have an appropriate slope to allow the downflow
- Anchor the ducting with an appropriate number of supports.
  Otherwise are generated ducting failures and air pockets that prevent the downflow.
- Insulate the ducting and the siphon to avoid condensate drippings
- Connect the condensate discharge to a rainwater drain.
- Do NOT use sewerage drains, so as to avoid the return of odours if the water contained in the trap evaporates
- Finally, check that the condensate will drain correctly by pouring water into the tray stud

Calculation of the siphon height

T = 2P

S = T/2

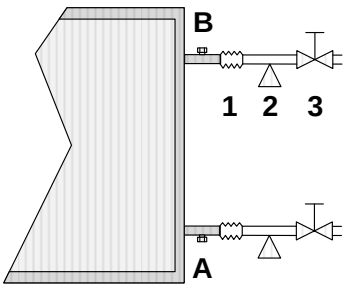
P is the pressure determinate by the fan in correspondence of the drain pain (1mm c.a = 9.81 Pa)



Exsample :

P = 300 Pa = 30 mm
T = 2P = 60 mm
S = T/2 = 30 mm

4.12 HEATING COIL - OPTION



A drain cock

B air vent

Supplied by the customer :

1 vibration isolators

2 ducting supports

3 shutoff valves

5.1 REFRIGERANT PIPES

The sizing of the connection refrigerating lines is basic for a good operating and for the system reliability.
The connection diameter between two units is function of distances, differences in height and curves number; it must be then calculated by a qualified technician.

- The following operations must be performed by an expert refrigerator technician.
- Pipes have not to be too long and too many curves.
- The lines must not be particularly long, nor have too many curves.
- Do not make curves with too small radius and prevent lines from squeezing, as the efficiency could decrease.
- Fasten the connection lines with clamps and make sure they do not transfer vibrations to the structures.
- Use only refrigerating copper pipe.
- All lines must be perfectly clean (clean with nitrogen or dry air before connecting the lines with the two units) and free of humidity to enable a perfect vacuuming.

The liquid line must be isolated if it is exposed to sunlight or if it crosses zones with a temperature higher than the external one, otherwise it can be free. Avoid excessive diameters to not cause too much refrigerant charge.
For too much long pipes it is suggested the solenoid valve installation on the liquid line.

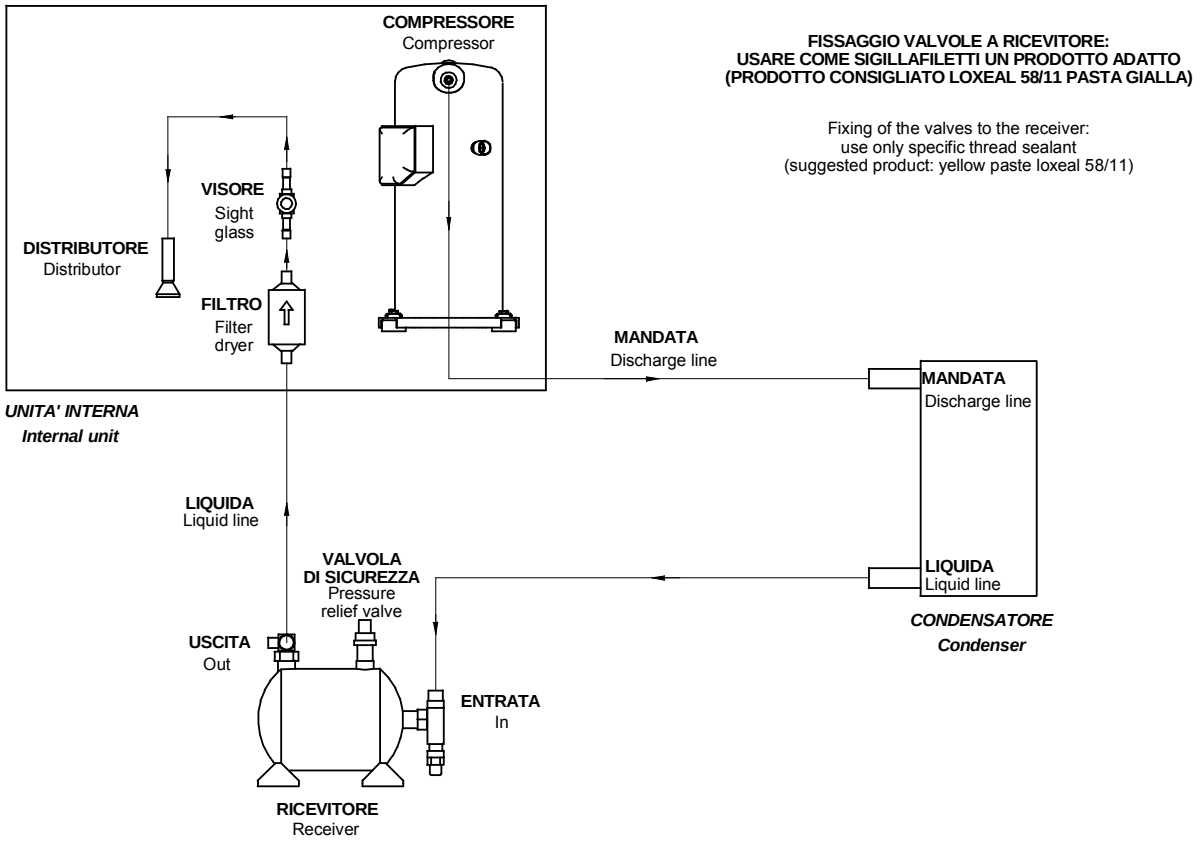
This to avoid dangerous refrigerant gas migrations from the internal unit to the external one and vice versa.

5.2 LIQUID RECEIVER

When the indoor terminal unit is fitted with a thermostat, if the connection pipes are longer than around 15/20 metres or alternatively if the system is expected to operate in variable climatic conditions (for example, very different Day/Night outside air temperature) a liquid receiver of suitable capacity should be installed near the indoor unit.
The liquid receiver performs the following functions:

- It prevents gaseous freon form reaching the expansion device.
- It compensates for the variations in charge that occur in the system due to the change in operating conditions.
- For a certain time it partly compensates for any immeasurable microscopic leaks that occur in the system over time.
- It prevents the excessive flooding of the condenser with the corresponding raising of the condensing temperature/pressure if the system has been charged with a higher quantity of refrigerant, or if the system was charged in abnormal climatic conditions.

Having said this, the liquid receiver should always be installed when the connections are very long.



5 - REFRIGERANT PIPES

- In horizontal sections Inclination with the gas flow to aid the movement of the oil. (0.5% inclination).
- WARNING the discharge temperature can reach values of 80/100°C. Appropriate insulation is required if there is contact with the exterior.
- This is to avoid accidental contacts by unqualified personnel.
- When the condenser is installed above the compressor the discharge line must have a trap at the compressor level which drops to the floor.
- This will reduce the risk of condensed liquid refrigerant returning up the compressor line during shutdowns (SEE FIGURE1).
- For vertical rises in addition to the base well, provide oil traps every 6 meters (see Figure 2).
- Use wide curving bends (not elbows)
- Carefully avoid flattening the pipes.

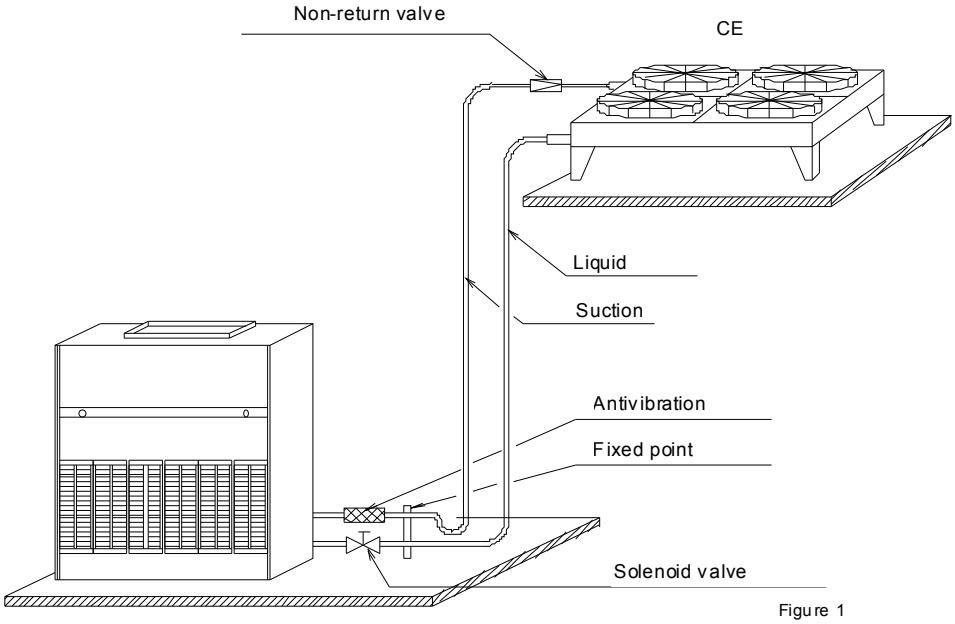
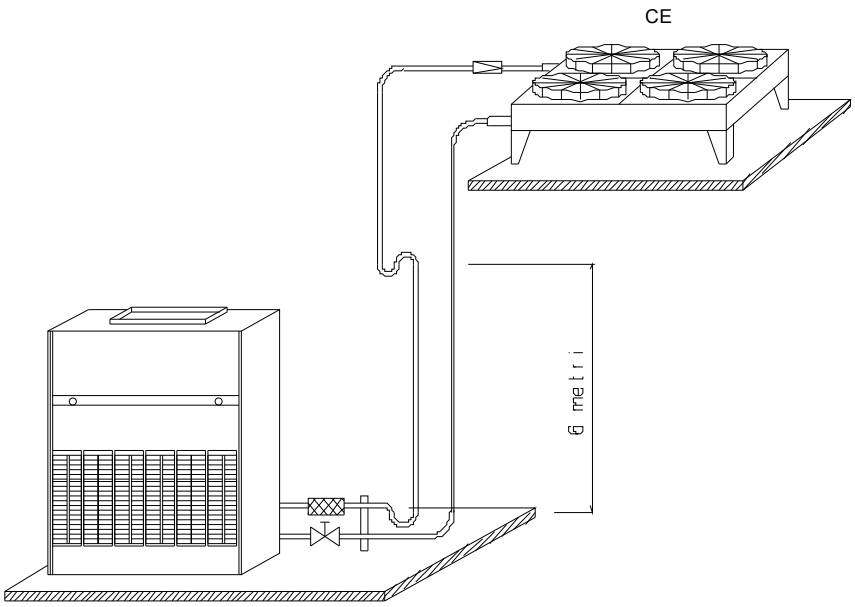


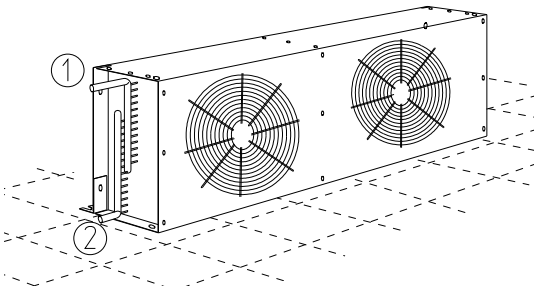
Figure 1



5 - REFRIGERANT PIPES

5.3 CONNECTION

Connecting the unit it must be considered that the gas inlet manifold is always with the larger diameter and the nearest to the fans.



1 – gas manifold

2 – liquid manifold

5.4 CHECKING FOR LEAKS

Connect the pressure gauge assembly to the service test points (by client on high pressure pipes).

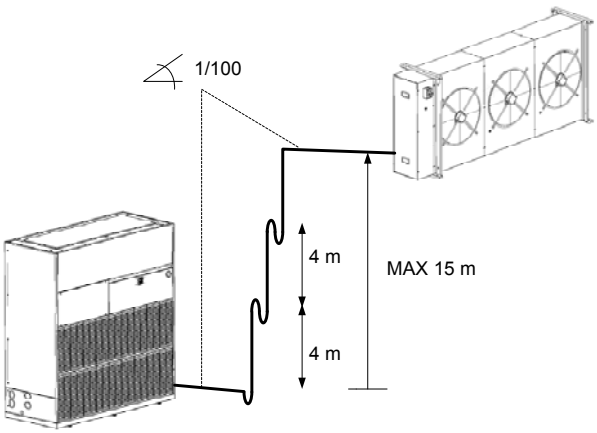
- Close the valves on the pressure gauge assembly and connect the nitrogen bottle.
- Open the valves on the pressure gauge.
- Pressurise the system with nitrogen .
- Carefully check all the pipes , with special attention to the welds and joints in general.

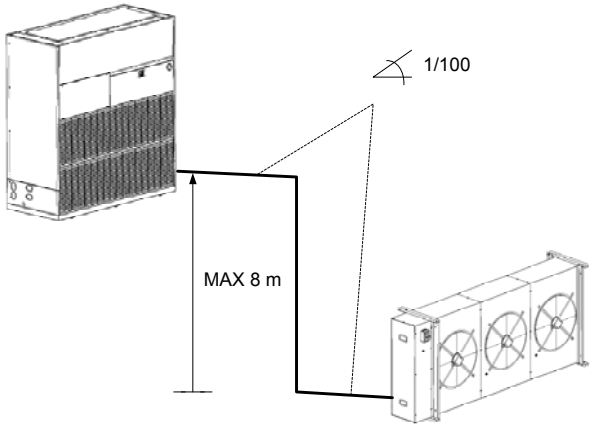
If the necessary equipment is not available, make sure any parts that may give rise to refrigerant leaks (welds, joints etc.) are accessible

5.5 LIQUID PIPES

- Must be insulated if exposed to the sun or crosses areas with a higher temperature than the ambient temperature. In other cases it can be left bare.
- Avoid using excessively large diameters which would result in an excessive refrigerant charge.

The plan shows the discharge line (gas line).





Refrigerating line recommended diameters

SIZES		31	41	51	61	71	81	82	102	122	162	182	222
External diameter of the gas pipeline	mm	12	12	12	16	16	16	18	18	22	22	22	22
External diameter of the liquid pipe	mm	12	12	12	16	16	16	16	18	18	22	22	22

Copper pipe recommended diameters for applications with R-410A refrigerant, max. operation pressure PS = 45 bar

6 - AERAULIC CONNECTIONS

6.1 GENERAL

Proper execution and sizing of air connections are essential for ensuring correct operation of the unit and an acceptable level of silence in the room.

When designing and creating ducts, consider PRESSURE DROPS, FLOW RATE and AIR SPEED which need to be compatible with the characteristics of the unit.

Special consideration needs to be made for pressure drops that are greater than the unit's static pressure, which would lead to a reduction in flow rate resulting in unit shutdown.

- the weight of the ducts must not be supported by the connection flanges
- place anti-vibration joints between the ducts and the unit
- the connection to the flanges and between the various sections of the ducts must ensure an airtight seal, preventing leakage in delivery and return which would compromise overall system efficiency.
- limit pressure drops by optimizing the path, the type and number of curves and the branches
- use curves with a wide radius. Consider whether it might be useful to equip them with deflectors (especially if the air speed is high or if curves are tight)

6.2 FEATURES FOR DUCTS FOR TREATED AIR

- The inner surface of the duct must be smooth and washable. It must not contaminate the air.
- Thermally insulate the ducts and the flanges so as to prevent loss of energy and condensation build-up.

GRILLES OUTLETS DIFFUSERS

Proper distribution of air in the room is essential for ensuring comfort levels.

In the selection and positioning of grilles, outlets and diffusers, the following are to be avoided:

- excessive air speed
- formation of stagnant zones and layering
- entry of cold air into the room
- formation of localized currents (due to uneven air distribution)
- excessive variations in ambient temperature in the vertical and horizontal planes
- short circuiting of delivery air towards return air

For purposes of comfort, the following things need to be considered:

- air diffusers must be selected by checking the sound power generated at nominal flow rate conditions
- the disconnections to the diffusers are to be made using flexible elements
- the return grilles must be amply sized

APPLICATIONS AT HIGH DEGREE OF SILENCE

For applications that require a high degree of silence in the system:

- In delivery and return, provide septum silencers, preferably inserted in sections of ducts located outside the building. The septums must ensure the required dampening with minimum pressure drops (ONLY OUTDOOR UNITS – do not print note).
- Equip all curves with deflectors.

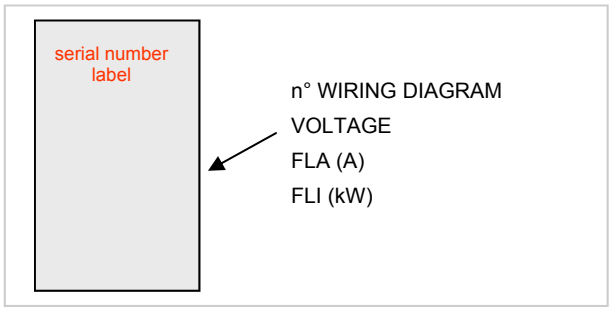
7 - ELECTRICAL CONNECTIONS

7.1 PRELIMINARY INFORMATION

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.
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. 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.
Operate in compliance with safety regulations in force .

7.2 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.
Refer to the electrical data report on the serial number label.



F.L.A. full load ampere
Full load current at max admissible conditions

F.L.I. Full load input
Full load power input
(at max. admissible condition)

7.3 CONNECTIONS

1. refer to the unit electrical diagram (the number of the diagram is shown on the serial number label)
2. verify that the network has characteristics conforming to the data shown on the serial number label
3. Before starting work, verify that the sectioning device at the start of the unit power line is open, blocked and equipped with cartel warning
4. Primarily you have to realize the earthing connection
5. Shelter the cables using adequate measure fairleads
6. Before power the unit, make sure that all the protections that were removed during the electrical connection work have been restored.

7.4 SIGNALS / DATA LINES

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 tension and that are able to emit electromagnetic disturbances.

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

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

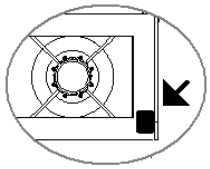
Connect the screen to the ground, only if there aren't disturbances

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

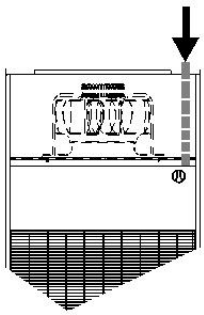
Respect impendency, capacity and attenuation indications.

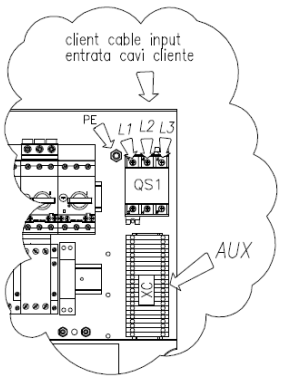
7.5 ELECTRIC LINES INLET

Unit top view



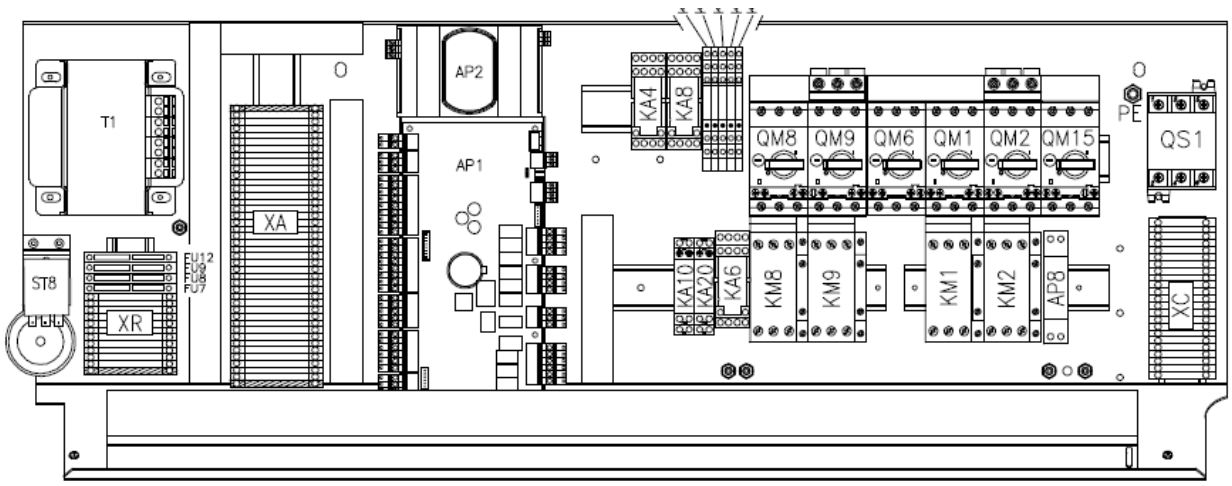
Unit front view





QS1 main isolator switch
PE protection conductor

7.6 ELECTRICAL PANEL

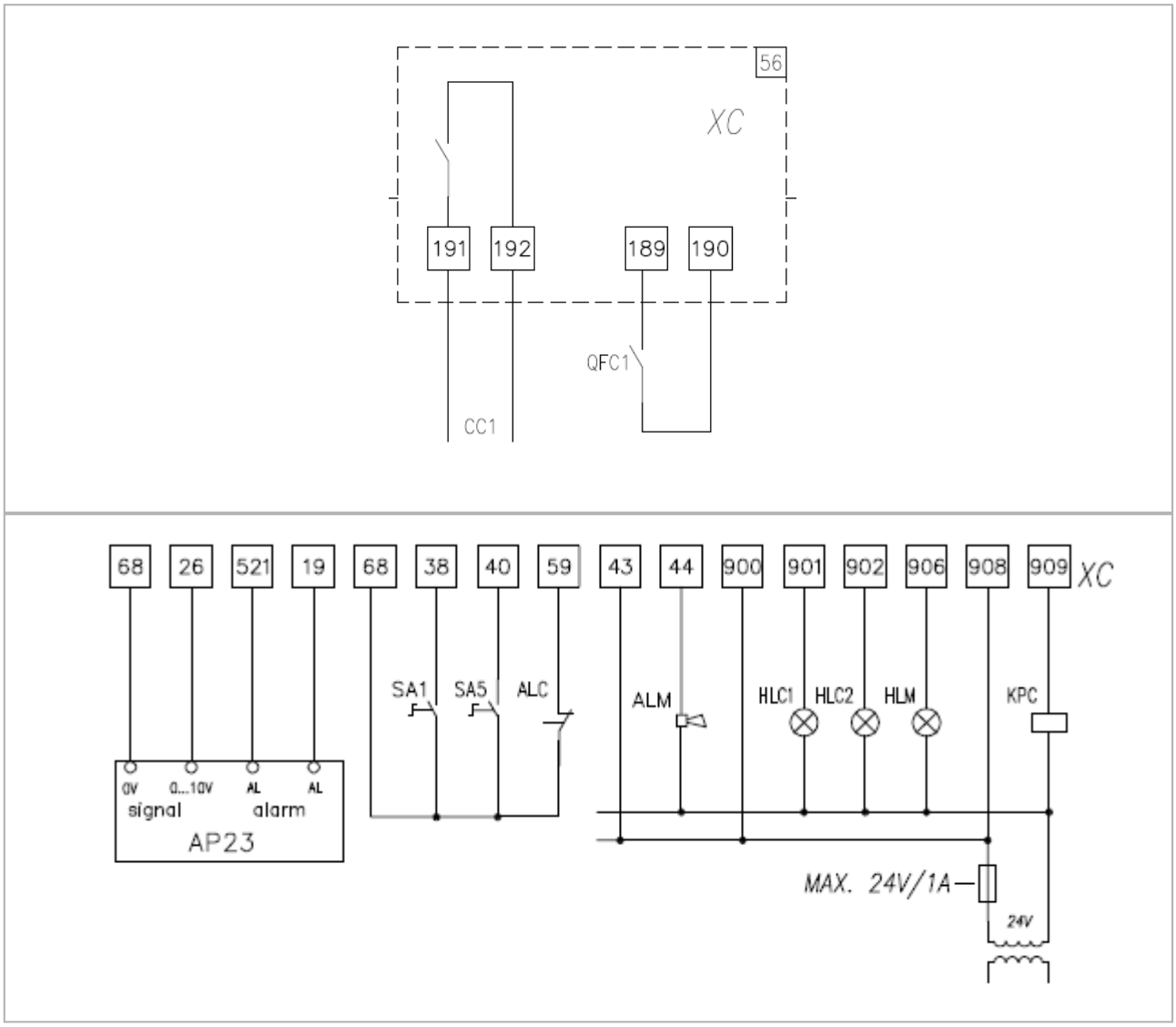


AP1	Master module
AP2	Electronic thermostatic module
XC	Customer connection
QS1	Main isolator switch
QM1 - QM2	Compressor magnetothermic switch
KM1 - 2	Compressor contactor

QM8 - QM9	Electric heart thermal magnetic circuit breakers
KM8 - KM9	Heater contacotr
QM6	Outlet fan motor overload switch
QM15	Auxiliary circuit thermal magnetic circuit breaker
ST8	High temperature saftey thermostat
T1	Auxiliary circuit transformer

Layout of the standard unit electrical panel.
With special configurations the layout can be modified: refer to the layout indicated on the unit specific electrical panel.

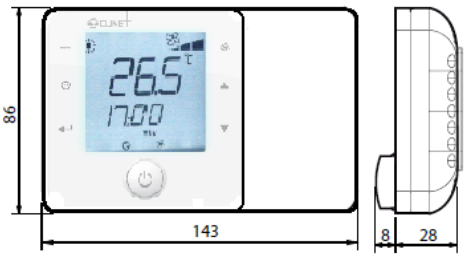
7.7 CONNECTIONS



SA1 remote on/off selector
SA5 remote winter/summer selector
ALC free contact from signalling system of fire alarm
ALM cumulative fault signal
KPC heating coil pump control
HLC1 compressor 1 status
HLC2 compressor 2 status
HLM indicating light of the supplì fan status
AP23 remote umidification group

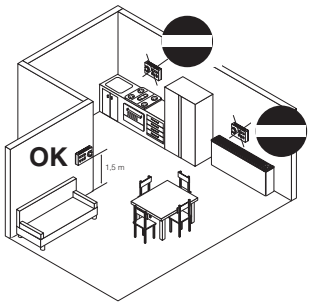
7 - ELECTRICAL CONNECTIONS

7.8 WALL AMBIENT THERMOSTAT



Install the room thermostat far from heat sources (radiators, sunbeam, kitchens), from doors , windows etc.

Provide 230 VAC power supply



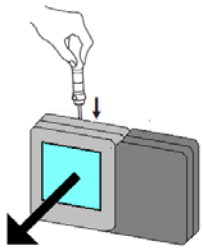
ASSEMBLY

- separate the front from the rear of the terminal using a screwdriver (**Fig. 1**);
- disconnect the 4-pin connector from the front part (**Fig. 2**);
- to remove cover A1, unscrew screw A2 and press the point of attachment (**Fig. 3**); access terminal block A3 (**Fig. 4**)
- drill the holes in the wall (dia. 5 mm); then insert the plugs and screws supplied, making sure that the electrical wires pass through hole E (**Fig. 5**);
- perform the electrical connections between thermostat ambient and XC terminal block in the unit electric panel (**Fig 6**)
  Connect RT2 (provided with room thermostat)
- close cover A1, completing the same operations as descrive above in reverse;
- plug the 4-pin connector back in (**Fig. 8**);
- fi nally replace the terminal, starting with the bottom tabs and applying a hinge movement. Make sure that the electrical wires are inside to ensure correct fastening (click on).

DISMANTLING

Insert a screwdriver into the clot at the top (**Fig. 1**) and press downwards to detach the display.

1



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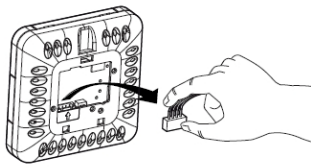

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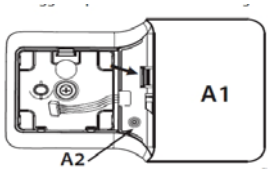

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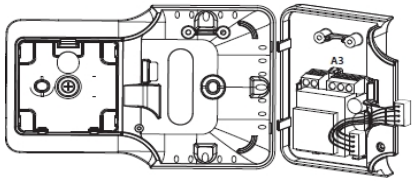

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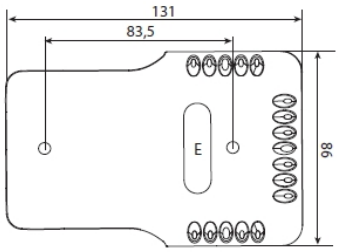

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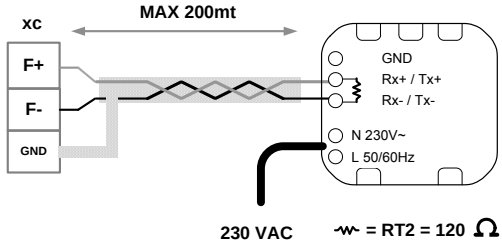

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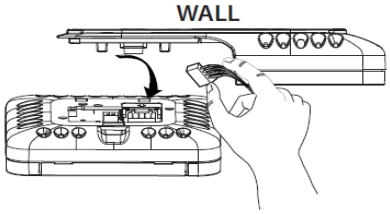
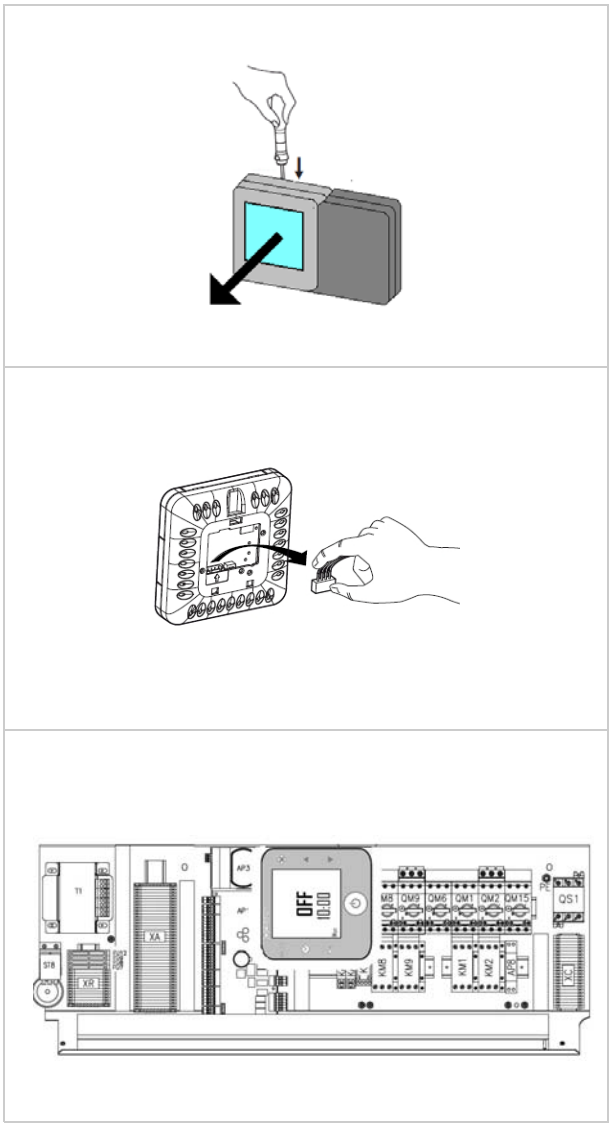
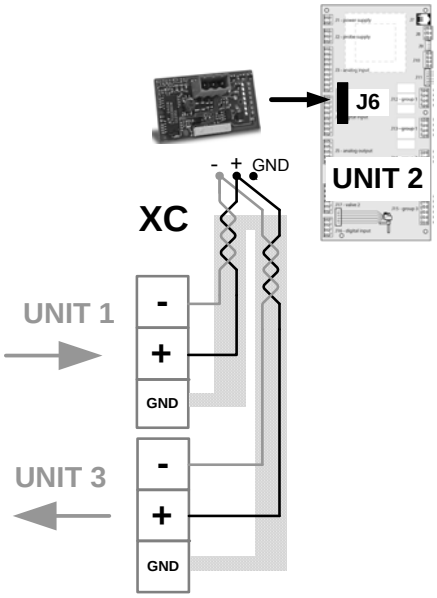


7 - ELECTRICAL CONNECTIONS

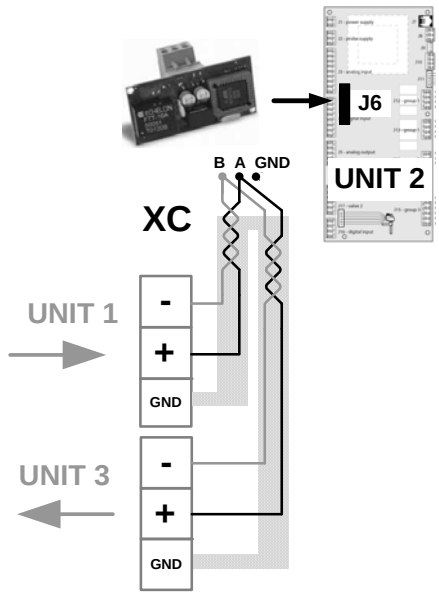
For maintenance operations it is possible to remove the thermostat from its base, wall installed, and connect it to the base inside the unit electrical panel.



7.10 RS 485 WITH MODBUS PROTOCOL



7.11 SERIAL WITH LONWORKS PROTOCOL



7.12 CHARACTERISTICS CABLE

Couple of conductors twisted and shielded
Section of conductor 0.22mm^2…0,35mm^2
Nominal capacity between conductors < 50 pF/m
nominal impedance 120 Ω
Recommended cable BELDEN 3105 A

8 - START-UP

Preliminary checks

Checks with machine in OFF, before start-up .
For details refer to the various chapters in the manual.

√
• safe access
• functional spaces
• section of the cooling lines
• length of the cooling lines
• height difference in the cooling lines less than 15 m
• siphons every 4 m going back up on the gas line
• vacuum and additional load carried out
• cooling circuit visual control
• integrity of structure
• fans turn freely
• unit on anti-vibration devices
• earth connection
• unit powered by fixed network or by electrogen group
• electric connections by customer

Start-up sequence

Machine start-up operations.
For details refer to the various chapters in the manual.

√
• Powered unit
• compressor carter heaters ON from at least 8 hours
• phases sequence control
• vacuum voltage measurement
• unit ON
• load voltage measurement and absorptions
• fans operation check
• treated air flow rate measurement
• supply, return and outdoor air temperature measurement
• subcooling and overheating measurement
• no anomalous vibrations check
• static pressure relief in return
• set date and time
• set-point customisation
• fire alarm configuration
• available machine documentation

* only if present

8.1 PRELIMINARY INFORMATION

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.

8.2 PRELIMINARY CHECKS

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 sectioned at the beginning.
- The line sectionalizing device is open, locked and equipped with the suitable warning
- make sure no tension is present

8.3 REFRIGERANT 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.

8.4 HYDRAULIC CIRCUIT

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

Weight of glycol (%)	**10**	**20**	**30**	**40**
Freezing temperature (°C)	-4	-9	-15	-23
Safety temperature (°C)	-2	-7	-13	-21

8.5 ELECTRICAL CIRCUIT

Verify that the unit is connected to the ground plant

Check the conductors tightening: the vibrations caused by handling and transport might cause loosing

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

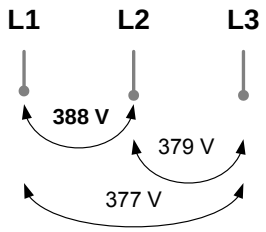
Check the tension and line frequency values which must be within the limits :

400/3/50 +/- 10%

Control the unbalancing of the phases:

it must be lower than 2%

Example:



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

2) **388** (max) – **381** = **7**

3) $\frac{7}{381} \times 100 =$ **1,83 OK**

The working out of the limits can cause irreversible damages and voids the warranty.

8.6 COMPRESSOR CRANKCASE RESISTANCES

Feed the oil resistances on the compressor crankcase at least 8 hours before the start compressor :

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

1. Feed the resistances closing the unit isolator (sorter??).
2. Control the resistances electrical absorption to be sure that they're function .
3. Carry out start-up only if the compressor crankcase 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 .

8.7 TENSIONS

Check that the air and water temperatures are included in the working limits

For information on the control system, refer to the paragraph CONTROL.

Start the unit

With unit of full load, namely in stable conditions and close to those of work, check :

- Power supply tension
- Total absorption of the unit
- Absorption of the single electric loads

8.8 REMOTE CONSENT

- Check that the remote commands (ON-OFF, etc.) are connected and if necessary enabled with the relevant parameters as described in ELECTRICAL CONNECTIONS section
- Check that probes or optional components are connect and enable with the relative parameters(ELECTRICAL CONNECTION section)

8.9 APPLICATIONS WITH TEXTILE DUCTING

It is possible to modify the fan start-up ramp to personalize it in case of applications with textile ducting.

Set the parameter

P62 EnRampaEsp :

0 = disabile ramp

1 = slow ramp

10 = rapid ramp

It is also possible to set intermediate values.

8.10 AIR FLOW SETTING

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

It is therefore necessary to check the air flow and in case to set the parameter:

P57 FanSpeedOut

Before checking, make sure that the system has been completed

In all its parts (shunts, dampers, grilles, diffusers etc.)

8.11 FIRE ALARM : CONFIGURATION

It is possible to set the unit operating in case of an alarm signal from the fire signalling controller.

Par 151 TypeFireMode = complete unit shutdown

The unit cannot be used as smoke extractors.

8.12 STARTING REPORT

Realize the operating objective conditions is useful for check the unit over time.

With unit of full load, namely in stable conditions and close to those of work, take the following data:

- Tension and general absorptions with unit at full load
- Absorption of varied electrical loads (compressors, fans, pumps etc)
- Temperatures and capacities of different liquid (water, air) in the inlet and outlet of the unit
- Temperatures and pressures on the refrigerant circuit characteristic points (compressor discharge, liquid, intake)

The remarks should be preserved and available during maintenance .

8.13 CE 97/23 PED DIRECTIVE

97/23 CE PED DIRECTIVE gives instructions for installers, users and maintenance technicians as well.

Refer to local actuation norms; 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 section)

9 - BEDIENING

WEERGAVE VAN HET DISPLAY

Standaard geeft het display de **ruimte temperatuur** weer.

1. Druk eenmaal op▲ of ▼ om de **ingestelde temperatuur;** het setpoint weer te geven. Op het display verschijnt [set])
2. Druk ▲of▼ om het setpoint te wijzigen
3. Wacht tot de ruimte temperatuur wederom op het display verschijnt. ([set] verdwijnt uit het display)

HOOFD TOETSEN		
	AAN-UIT	Druk 5 seconden op deze toets om de unit in of uit te schakelen
mode	**MODUS**	Wijzig de bedieningsmodus: zomer, winter, automatisch
	KLOK	Datum en tijd instellingen
OK	**OK**	Bevestigen, weergeven setpoint, weergeven van buitenluchttemperatuur (**tE**)
	OMHOOG/ OMLAAG	Door het menu scrollen, verhogen/verlagen waarde
+	5 sec	Toegang tot het fabrieks-menu (voorzien van code)
mode +	5 sec	Toegang tot het alarmmenu: alleen indien het volgende symbool zichtbaar is:

BETEKENIS SYMBOLEN	
	Werkingsmodus: zomerbedrijf
	Werkingsmodus: winterbedrijf
Auto	Werkingsmodus: automatisch bedrijf
Auto	Ventilatorsnelheid
	Alarm
	Toetsenbord vergrendeld
	Timerfunctie geactiveerd
	Timerfunctie werkingsbedrijf
	Compressor actief
	Ontdooiingscyclus geactiveerd
	Elektrische verwarming of heetwaterbatterij actief (optioneel)

AAN / UIT

Druk gedurende 5 seconden

Uit

TOETSEN VERGRENDELING/ONTGRENDELING

OK Druk beide toetsen gezamenlijk in gedurende 5 seconden

Vergrendelingssymbool verschijnt

MODUS WIJZIGEN

Druk op de mode toets om de modus te wijzigen

mode

Koelen

Verwarmen

AUTO Automatisch

Werkingsbedrijf:

Koelen

9.1 WERKINGSMODI

Zomerbedrijf:
Indien de ruimte temperatuur hoger is dan de ingestelde temperatuur werkt de unit in koelingsmodus. Indien de ruimte temperatuur lager is dan de ingestelde temperatuur, zal de unit stand-by staan. (ventilator AAN, compressor UIT) .
Winterbedrijf: (alleen indien voorzien van verwarming)
Indien de ruimte temperatuur lager is dan de ingestelde temperatuur werkt de unit in verwarmingsmodus. Indien de ruimte temperatuur hoger is dan de ingestelde temperatuur, zal de unit stand-by staan. (ventilator AAN, compressor, verwarming, bevochtiging UIT).

9.2 WIJZIGEN VAN WERKINGSMODI

AUTOMATISCH
Wijziging tussen ZOMER-WINTER bedrijf gaat automatisch. De unit wijzigt naar:

- Zomerbedrijf: indien de ruimte temperatuur hoger is dan de ingestelde temperatuur.
- Winterbedrijf: indien de ruimte temperatuur lager is dan de ingestelde temperatuur.

Het setpoint wijzigt automatisch op basis van de buitenlucht-temperatuur. De wisseling en de variatie van de instellingen kan aangepast worden via de unit parameters.
Het setpoint kan ten allen tijde aangepast worden via de ▲en/ of ▼ toets.
HANDMATIG
Wijziging tussen ZOMER-WINTER bedrijf geschiedt door middel van de **MODE** toets.
Het setpoint kan ten allen tijde aangepast worden via de ▲en/ of ▼ toets.

9.3 ENERGIEBESPARINGSMODUS

Het ECO setpoint is ontwikkeld om het

energieverbruik van de unit te reduceren:

- In zomerbedrijf ligt het ECO setpoint hoger dan het standaard setpoint.
- In winterbedrijf ligt het lager.

Om deze modus te activeren, dient parameter P04 gewijzigd te worden (instructies op volgende pagina).

In ECO modus zal de unit bij het bereiken van het ECO setpoint zowel de ventilator als de compressor uitschakelen.

Indien het ECO setpoint geactiveerd is:

- Zodra het setpoint **wordt bereikt:**
  De ventilator, de compressor en andere temperatuur regulerende componenten worden uitgeschakeld.
- Zolang het setpoint **niet bereikt is:**
  De ventilator, de compressor en andere temperatuur regulerende componenten blijven ingeschakeld.

Indien de regeling geschiedt op basis van de optionele retourluchtsensor in plaats van op basis van de thermostaat is er sprake van afwijkend regelgedrag.

De ventilator wordt gestart in tijdsintervallen zoals ingesteld via de P19 TimeECO parameter en blijft actief voor een tijdsperiode zoals ingesteld via de P20 TimeTestECO parameter :

- Zodra het setpoint wordt **bereikt**:
  De ventilator wordt uitgeschakeld en zal pas weer starten na de tijd zoals ingesteld via parameter P19.
- Zolang het setpoint **niet bereikt** is:
  De ventilator, compressor en andere temperatuur regulerende componenten blijven actief. .

Zodra het setpoint wordt bereikt, wordt de cyclus herhaald:

- Ventilator wordt uitgeschakeld
- Na de tijdsinterval P19 TimeECO → ventilator AAN
- Ventilator aan gedurende tijdsinterval P20 TimeTestECO
- Controle setpoint, etc..

9.4 TIJDSINSTELLING

- Druk op de **KLOK** toets gedurende 5 seconden
- Via de ▲ ▼ toetsen, selecteer het **clock** menu
- Bevestig met **OK**
- Het uur begint te knipperen: stel in met de ▲ ▼ toetsen
- Bevestig met **OK**
- Herhaal de procedure voor de minuten en de weekdagen
- Keer terug naar het hoofdscherm, selecteer het **Esc** menu en bevestig met **OK**

9.5 TIMER FUNCTIE

4 types van timer functie programmering zijn mogelijk:

- 7 dagen timer (maandag tot en met zondag)
- 5 dagen timer (maandag tot en met vrijdag)
- 2 dagen timer (zaterdag en zondag)
- Dag na dag timer (iedere dag onafhankelijk instelbaar)

Dag programmering

 Aanwezig

 Afwezig

 Terugkomst

Nacht programmering

 Aanwezig

 Afwezig

 Terugkomst

Dag na dag timer

Druk gedurende 5 seconden

Selecteer Time bands

Druk op OK

Selecteer het gewenste programma:

- Day by day

Druk op OK

Druk op OK

Stel het uur in

Druk op OK

Stel de minuten in

Druk op OK

Stel de temperatuur in

Druk op OK

Selecteer de volgende periode
Druk op OK en herhaal **vanaf stap 5**

Na afronding van het programmeren, selecteer ESC

Druk op OK

Druk op OK om de volgende dag te programmeren

Selecteer de volgende dag

Druk op OK

Herhaal vanaf **punt 04**

Om het programmeren af te sluiten druk op ESC

Druk op OK

Selecteer Esc om af te sluiten

Druk op OK

Timer functie aan of uitzetten

Druk op deze toets om de timer functie aan of uit te zetten

Indien de timerfunctie niet actief is, zal het onderstaand symbool niet in het display staan:

9.6 ALARMMELDINGEN

Alarmmeldingen worden weergeven via het ALARM symbool.

Voorafgaand aan het resetten van een alarm dient de oorzaak van het alarm geidentifceerd en opgelost te worden

Herhaaldelijk resetten zonder probleemoplossing kan tot onherstelbare schade aan de apparatuur leiden!

Om de foutmelding te resetten

1. Druk de Modus + Klok toets in gedurende 5 seconden.
2. De alarmmelding wordt weergegeven
3. Indien er meerdere alarmen gelijktijdig actief zijn, scroll door de lijst via de ▲ ▼ toetsen.
4. Selecteer met de▲ ▼ toetsen het alarm reset menu(resALM)
5. Druk op **OK**
6. Het hoofdscherm verschijnt zonder alarmmeldingen

Naast weergave is het ook mogelijk een geluidssignaal in te stellen voor alarmmeldingen. Het activeren van deze functie gaat via parameter P200.

ALARMLIJST		
CODE	**Omschrijving**	
AE01	Retourluchttemperatuursensor µPC foutmelding	A
AE02	Toevoerluchttemperatuursensor µPC foutmelding	A
AE03	Buitenluchttemperatuursensor µPC foutmelding	A
AE04	Condensortemperatuursensor µPC foutmelding	A
AE05	Alarm of faulty differential pressure probe of the supply fan µPC	A
AE06	Alarm of faulty condensing pressure probe µPC	A
AE07	Alarm of faulty evaporating pressure probe µPC	A
AE08	Alarm of faulty return temp. probe µPC	A
AE09	Alarm of faulty antifreeze probe temp. probe of the additional coil µPC	A
AE10	Alarm of faulty air quality probe µPC	A
AE11	Alarm of faulty ext. RH probe µPC	A
AE12	Alarm of faulty return RH probe µPC	A
AE13	Alarm of faulty diff. Detector of the fresh/ ambient air	A
AE14	Alarm of faulty ambient thermostat temp. probe	A
AE15	Alarm of faulty ambient thermostat RH%	A
AE20	pCOE communication alarm	A
AE21	Alarm of the humidifier communication	A
AE22	Alarm of ambient thermostat communication	A
AE23	Alarm of supply fan overload (cond. fan/pump) or compartment opening or supply flow alarm	M
AE26	Compressor 1 overload alarm	M
AE27	Compressor 2 overload alarm	M
AE28	Phase monitor alarm	M
AF01	HP alarm of the refrigerant circuit	M
AF02	LP alarm of the refrigerant circuit	A / M
AF03	HP1 high pressure prealarm	A
AF04	LP1 low pressure prealarm	A
AF05	HP2 high pressure prealarm	A
AF06	LP2 low pressure prealarm	A
AA01	Fire alarm	M
AA02	Dirty filter warning	A
AA03	Resistance high temperature alarm	M
AI01	Source water flow-rate alarm	A
AI02	Antifreeze alarm of the source exchanger	M
AI10	Humidifier alarm group 1	A
AI11	Humidifier alarm group 2	A
Cn	communication failure thermostat-main board	

A = alarmmelding met AUTOMATISCHE reset

M = alarmmelding met HANDMATIGE reset

A/M = alarmmelding met AUTOMATISCHE reset, na 3 alarmmeldingen in 1 uur tijd is een HANDMATIGE reset noodzakelijk

ALARMLOG (installateurmenu)

Druk deze toetsen gelijktijdig en gedurende 5 seconden in	
Voer het wachtwoord in Bevstig met OK	
Selecteer **S ALM** Bevestig met OK	
Scroll door de alarmlijst (AL1, AL2...) en geef het gewenste alarm weer	
1° alarm - 1° weergave AL1 nieuw alarm XX alarmmelding	
1° alarm - 2° weergave dA1 Dag alarm 2 YY Het dagnummer wordt weergegeven na het alarm	
1° alarm - 3°weergave HA1 Tijd alarm 2 hhmm De tijd wordt weergegeven na het alarm	

9.7 PARAMETERS

Het parameter menu is voorzien van een wachtwoord om onomkeerbare wijzigingen die tot schade aan de apparatuur kunnen leiden te voorkomen.

Toegang tot het parametermenu:

1. Druk op de **AAN/UIT + VENTILATOR** toets gedurende 5 sec.
2. Voer het wachtwoord in: via de ▲ ▼ toetsen
3. Bevestig met **OK**
4. Selecteer het **PAr** menu en bevestig met **OK**
5. Navigeer door de lijst met ▲ ▼
6. Selecteer de gewenste parameter met **OK**
7. Wijzig de waarde met ▲ ▼ en bevestig met OK
8. Om af te sluiten, navigeer naar **ESC** en bevestig met **OK**

P02	Economic SetPoint in heat mode
P03	Economic SetPoint in cool mode
P04	Enable the set and the economical functions
P05	Enables the automatic setpoint
P06	Set CO2
P200	Enables buzzer in case of alarm : 0=disabled, 1=enabled

9.8 STATA

To access to the stata:

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**

S01	ManSet	°C
S02	SetUR	%
S03	Request of total Vc capacity	%
S04	Capacity request to compressors	%
S05	Capacity delivered from free cooling/heating	%
S06	Capacity requested to the aux. element	%
S07	N. of active compressors	-
S08	Ext. damper opening	%
S09	Exhaust fan modulation	%
S10	Return air differential pressure	Pa
S11	Additional element modulation (electric resistances / hot water coil)	%
S12	Operative return temperature	°C
S13	Supply temperature	°C
S14	Operative ambient RH%	%
S15	CO2 probe	Ppm
S16	Fresh air temperature	°C
S17	Fresh air RH%	%
S18	Temperature of the coil probe/source exchanger	°C
S19	Temperature of the aux. element antifreeze probe	°C
S20	Condensing pressure	Bar
S21	Evaporating pressure	Bar
S22	Condensing fan signal	%
S23	Return temperature	°C
S24	Current overheating	°C
S25	Thermostatic valve opening	%
S26	Supply air flow	m3/ h*10
S27	Signal of modulating supply fan	%
S28	Supply differential pressure	Pa
S29	Modulating humidifier signal	%
S30	Post heating request	%
S31	Functionning compressor 1 hours	
S32	Functionning compressor 2 hours	
S33	Compressor 1 starts	
S34	Compressor 2 starts	
S35	Software type	
S36	Software version number	
S37	Software release day	
S38	Software release month	
S39	Software release year	

10 - MAINTENANCE

10.1 GENERAL

Maintenance must be done by authorized centres or by qualified personnel

The maintenance enables:

- 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

10.2 INSPECTIONS FREQUENCY

The inspections should be carried out at least:

- Every year for only the cooling units
- Every six months for the cooling and warming units

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) .

10.3 MACHINE BOOKLET

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

In this way will be easier marker the various interventions and will be e facilitate any troubleshooting.

Report on the booklet :

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

10.4 PUT A REST

- If a long period of inactivity is foreseen :
- put the unit in OFF
- wait for 1 minute, so that the water valves are in rest position
- Turn of the power in order to avoid electrical risks or damages by lightning strike
- avoid the risk of frosts (empty or add glycol in the plant sections subjected to temperatures below zero , power antifreeze resistances if are present)

It's recommended that the starter after the period of detention is made by a qualified technician, especially after seasonal stops or seasonal switch.

When restarting, refer to the START-UP section .

Schedule technical assistance in advance to avoid hitches and be able to use the installation when necessary.

10.5 STRUCTURE

Check the condition of the parts making up the structure. Paint so as to eliminate or reduce oxidation at the points in the unit where this problem may occur.

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

10.6 PLEATED FILTERS

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.

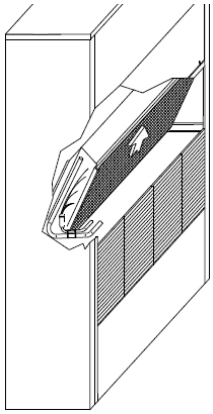
Operation with clogged filters leads to a reduction in the air flow rate, resulting in malfunctions and unit shutdowns. It may even cause the unit to break down.

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.

As a guideline, 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 .

- Remove the closing doors
- Carefully extract the filter so that no dust reaches the parts below
- 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
- Reinsert it to its seat
- Reassemble the closing doors

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



TENSIONS

After switching off the power, wait at least 5 minutes before accessing to the electrical panel or any other electrical component.
Check with a multimeter that there are no residual tensions

10.7 INTERNAL AIR COIL

Accidental contact with the fins of the exchanger may cause small cuts. When performing the following steps, use protective gloves.
The finned surfaces of the cooling coils and especially the condensation collection trays are the places where micro-organisms and moulds most easily flourish. It is therefore very important to clean regularly with suitable detergents and disinfect with appropriate products as necessary.

10.8 CONDENSATE DISCHARGE

Dust and deposits could cause obstructions .
In the tank can also proliferate microorganisms and mold.
Very important to provide for a periodic cleaning with appropriate detergents and in case to a disinfection with sanitizing products.
Clean the tank, pour some water into the tank and check water flows normally.

10.9 DUCTING

Check the fixing screws and the operation of the anti-vibration devices in order to prevent the transmission of vibrations in the room .

10.10 ELECTRICAL HEATING ELEMENTS

Regularly check the cleaning and the fixing status .

10.11 ELECTRIC FANS

Check :

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

10.12 OIL COMPRESSOR ELECTRIC HEATERS

Regularly check the fixing status .

10.12 CONTROL BOARD

Controls effected on ……..By …… Of the Company……..……

√	intervention frequency (months)	1	6	12
□	presence corrosion			●
□	panel fixing			●
□	fans fixing		●	
□	coil cleaning		●	
□	bowl cleaning + sanitisation		●	
□	outflow test		●	
□	air filters 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		●	
□	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 - option			●

Notes / interventions recommended to the owner

*European regulation 303/2008

Refer to the local actuation regulations; in short and just as an indication the regulation order as follow.

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.

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 hydraulic circuit
- 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 electric, cooling and hydraulic circuits of the unit are integral and closed.

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

12 - 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 necesssary 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 damge 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 isolater situated on the connection line of the unit itself, padlock and display the suitable sign.

Contact with the fans can cause incurie.

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 peopl, things or shortcircuit the unit

GENERAL TECHNICAL SPECIFICATIONS

Size			31	41	51	61	71	81	82	102	122	162	182	222
Cooling with rated condensation temperature														
Cooling capacity	1		9.9	11.5	14.9	16.4	18.5	23.3	32.8	37.8	46.6	53.4	63.4	73.7
Sensible capacity	1		7.0	8.2	10.6	11.4	12.6	15.7	26.9	30.4	38.3	43.7	51	58.9
Compressor power input	1		2.3	2.7	3.4	4.1	4.5	5.6	7.4	8.5	10.1	11.7	13.7	16.3
EER	1		4.3	4.3	4.4	4.0	4.1	4.2	4.43	4.4	4.6	4.6	4.6	4.5
Cooling - Matching to standard remote condenser														
Cooling capacity	2	kW	9.8	11.3	14.6	16.0	18.3	22.9	30.5	34.1	43.5	49.6	58.9	68.7
Sensible capacity	2	kW	7.9	9.2	11.8	13.1	13.9	17.6	26.1	29.3	36.9	42.3	48.7	55.6
Compressor power input	2	kW	2.5	2.9	3.7	4.5	4.8	6.1	8.5	10.1	11.6	13.3	15.5	18.7
EER			3.9	3.9	3.9	3.6	3.8	3.8	3.6	3.9	3.8	3.7	3.8	3.7
Compressor														
Type of compressors	3		Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
No. of compressors		No	1	1	1	1	1	1	2	2	2	2	2	2
Std Capacity control steps		No	1	1	1	1	1	1	3	3	2	3	3	3
Refrigeration circuits		No	1	1	1	1	1	1	1	1	1	1	1	1
Air Handling Section Fans (Supply)														
Type of supply fan	4		RAD	RAD	RAD	RAD	RAD	RAD	RAD	RAD	RAD	RAD	RAD	RAD
Number of supply fans		No	1	1	1	1	1	1	1	2	2	2	2	2
Fan diameter		mm	310	310	310	355	355	355	500	500	450	500	500	500
Type of motor	5		EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC
Supply airflow		l/s	569	778	889	1056	1167	1250	1944	2222	2778	3194	3611	15000
Supply airflow		m^3/h	2050	2800	3200	3800	4200	4500	7000	8000	10000	11500	13000	15000
Installed unit power		kW	0.80	0.80	0.80	0.90	0.90	0.90	2.70	2.70	1.00	2.70	2.70	2.70
Max. static pressure supply fan	6	Pa	700	460	275	365	240	120	450	340	240	540	510	400
Power supply														
Standard power supply		V	400/3~/50	400/3~/50	400/3~/50	400/3~/50	400/3~/50	400/3~/50	400/3~/50	400/3~/50	400/3~/50	400/3~/50	400/3~/50	400/3~/50

Performance refers to operation at full re-circulation

DB = dry bulb
WB = wet bulb

1. Ambient air at 27°C/19°C W.B.
   condensing temperature = 45°C
   Performance not including fan motor capacity
   EER referred only to compressors

2. Ambient air at 27°C/19°C W.B.
   entering air temperature to the external exchanger 35°C
   Performance not including fan motor capacity
   EER referred only to compressors
   Data referred to Acoustic Configuration: Standard and to matching to remote condenser: Standard.
3. SCROLL = scroll compressor
4. RAD = radial fan
5. EC Electronic switching motor
6. Net outside static pressure to win the outlet and intake onboard pressure drops

SOUND LEVELS

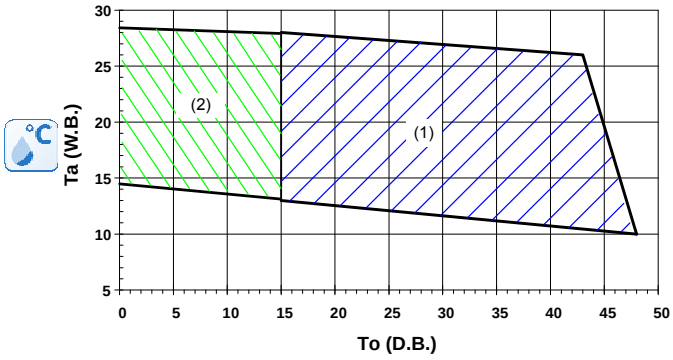
SIZES	Sound Power Level (dB)								Sound pressure level	Sound power level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
31	68	68	70	64	63	62	51	48	53	68
41	71	71	73	66	64	64	53	50	55	70
51	72	72	75	68	66	66	56	51	57	72
61	74	74	77	70	68	68	58	53	59	74
71	76	75	80	72	70	69	60	54	61	76
81	78	77	82	74	72	71	62	55	63	78
82	67	72	79	74	71	67	59	54	60	76
102	70	75	82	77	74	70	62	56	63	79
122	67	74	78	75	71	66	54	54	59	76
162	68	73	80	75	72	69	59	56	61	78
182	70	75	82	77	74	71	62	57	63	80
222	73	77	85	80	77	73	66	60	65	82

The sound levels are referred to units working at full load in nominal conditions.
The sound pressure level is referred at a distance of 1 m. from the ducted unit surface working 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.

OPERATING LIMITS (COOLING) WITH MATCHING TO STANDARD REMOTE CONDENSER

MATCHING TO STANDARD REMOTE CONDENSER



THE LIMITS ARE INDICATIVE AND HAVE BEEN CALCULATED CONSIDERING:
- VALUES GENERAL AND NOT SPECIFICATIONS,
- STANDARD AIR FLOW-RATE,
- NON-CRITICAL POSITIONING AND CORRECT USE OF THE UNIT,
- OPERATION AT FULL LOAD
- EQUIVALENT LENGTH OF THE GAS PIPES 10M AND DIFFERENCE IN HEIGHT LOWER THAN 4M
- ISOLATED GAS PIPES AND PERFECTLY MADE

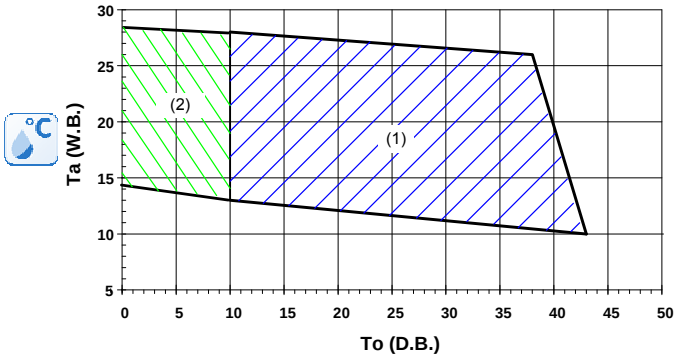
TA = AIR TEMPERATURE ENTERING THE AIR HANDLING COIL
CAUTION! TEMPERATURE MEASURED WITH WET BULB
(W.B.) = WET BULB

TO = TEMPERATURE OF AIR ENTERING THE EXTERNAL EXCHANGER
CAUTION! DRY BULB MEASURED TEMPERATURE
(D.B.) = DRY BULB

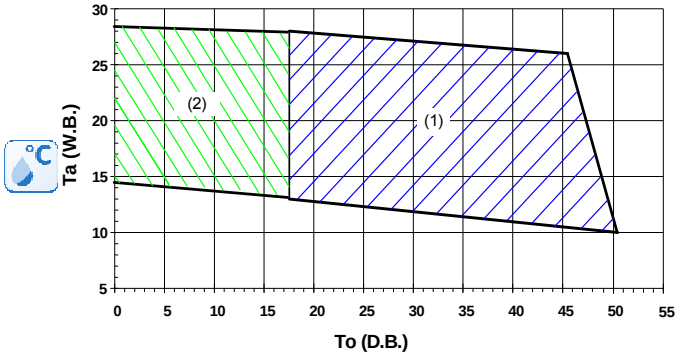
1= OPERATION RANGE OF THE UNIT MATCHED TO STANDARD REMOTE CONDENSER

2= OPERATING LIMIT OF THE UNIT COMBINED TO REMOTE CONDENSER WITH FRESH AIR LOW TEMPERATURE DEVICE

MATCHING TO MAX. COMPACTNESS REMOTE CONDENSER



MATCHING TO HIGH EFFICIENCY REMOTE CONDENSER

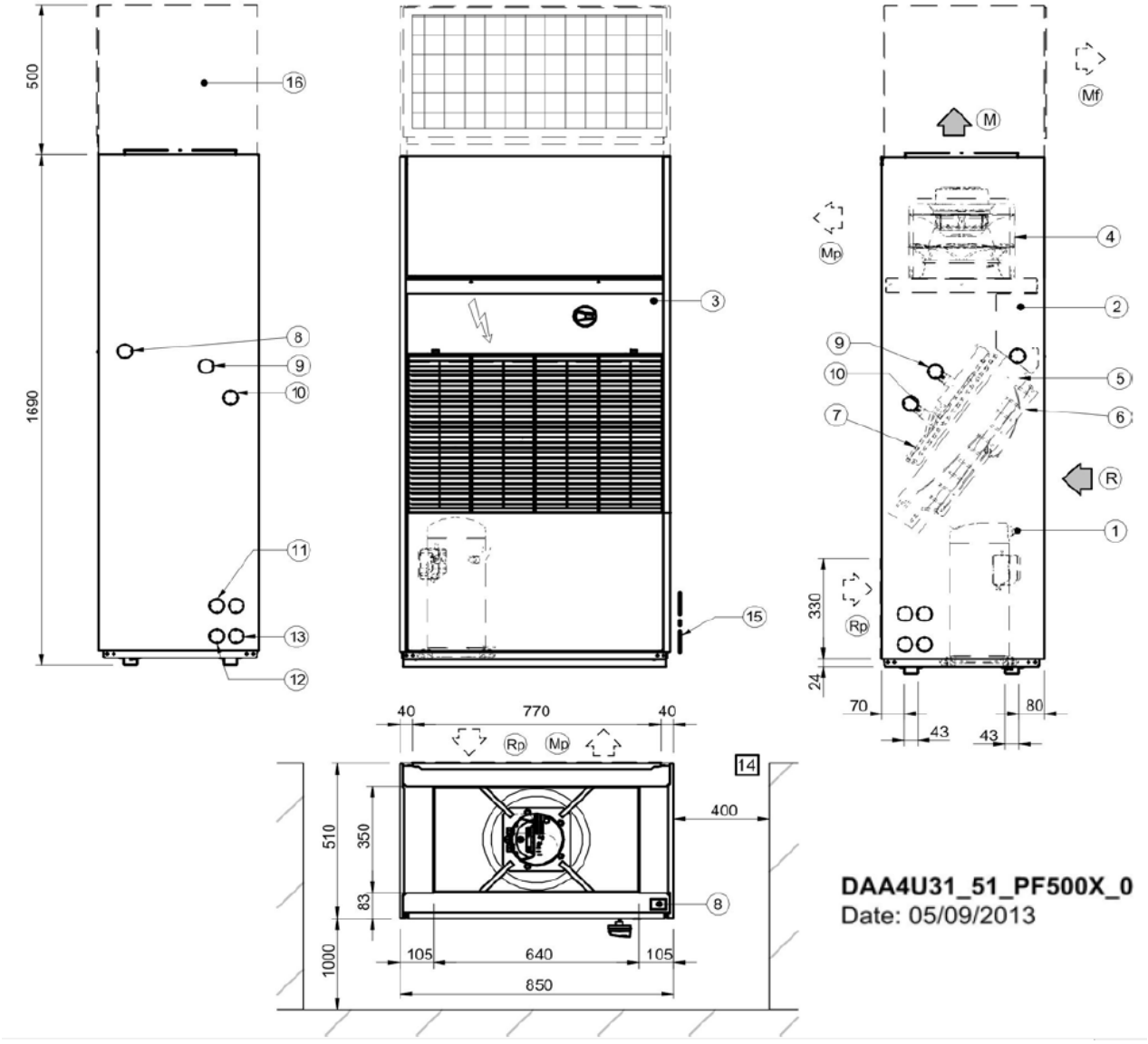


Wet bulb temperature - Example

19°C W.B. { 24°C D.B. / 63% R.H.
26°C D.B. / 52% R.H.
27°C D.B. / 48% R.H.

13 - TECHNICAL INFORMATION

SERIE: CASR-X 31-51



1. Compressor
2. Electrical panel
3. Access to the electrical panel
4. Supply fan
5. Direct expansion coil
6. G4 air filters
7. Hot water coil (Optional) o Electric heaters (Optional)
8. Power input
9. Hot water heat exchanger water outlet Ø 1"
10. Hot water heat exchanger water inlet Ø 1"
11. Inlet for gas line connection
12. Inlet for liquid line connections
13. Condensate discharge
14. Functional spaces
15. Water connection side
16. Plenum for front air delivery or on three sides (Optional)

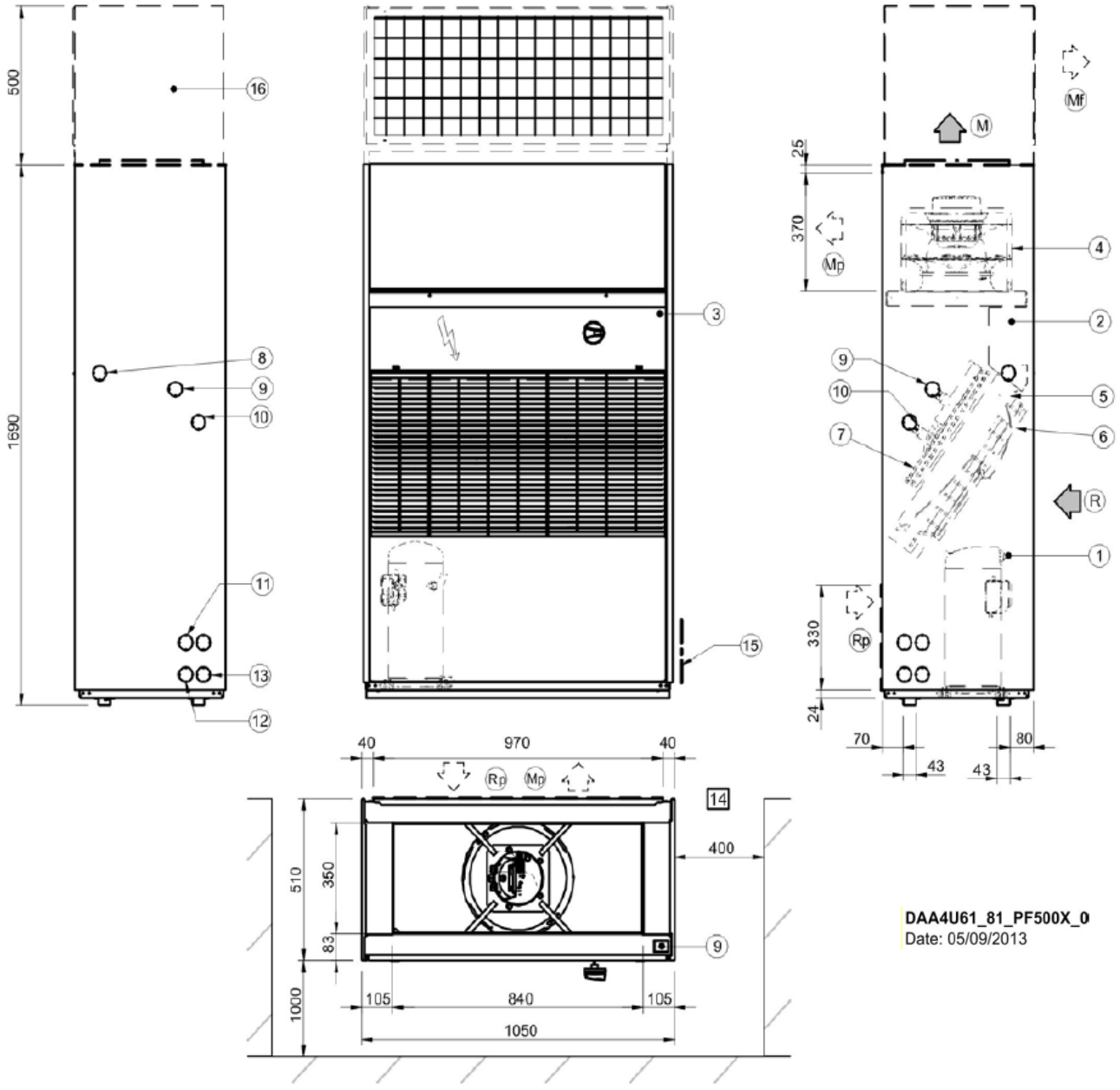
R. Air return
M. Standard supply
MP. Rear supply air (Optional)
MF. Front air outlet (Optional)
RP. Rear air inlet (Optional)

Size			31	41	51
A - Length		mm	850	850	850
B - Width		mm	510	510	510
C - Height		mm	1705	1705	1705
Standard unit weight					
Shipping weight		kg	173	175	181
Operating weight		kg	173	175	181

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

13 - TECHNICAL INFORMATION

SERIE: CASR-X 61-81



1. Compressor
2. Electrical panel
3. Access to the electrical panel
4. Supply fan
5. Direct expansion coil
6. G4 air filters
7. Hot water coil (Optional) o Electric heaters (Optional)
8. Power input
9. Hot water heat exchanger water outlet Ø 1"
10. Hot water heat exchanger water inlet Ø 1"
11. Inlet for gas line connection
12. Inlet for liquid line connections
13. Condensate discharge
14. Functional spaces
15. Water connection side
16. Plenum for front air delivery or on three sides (Optional)

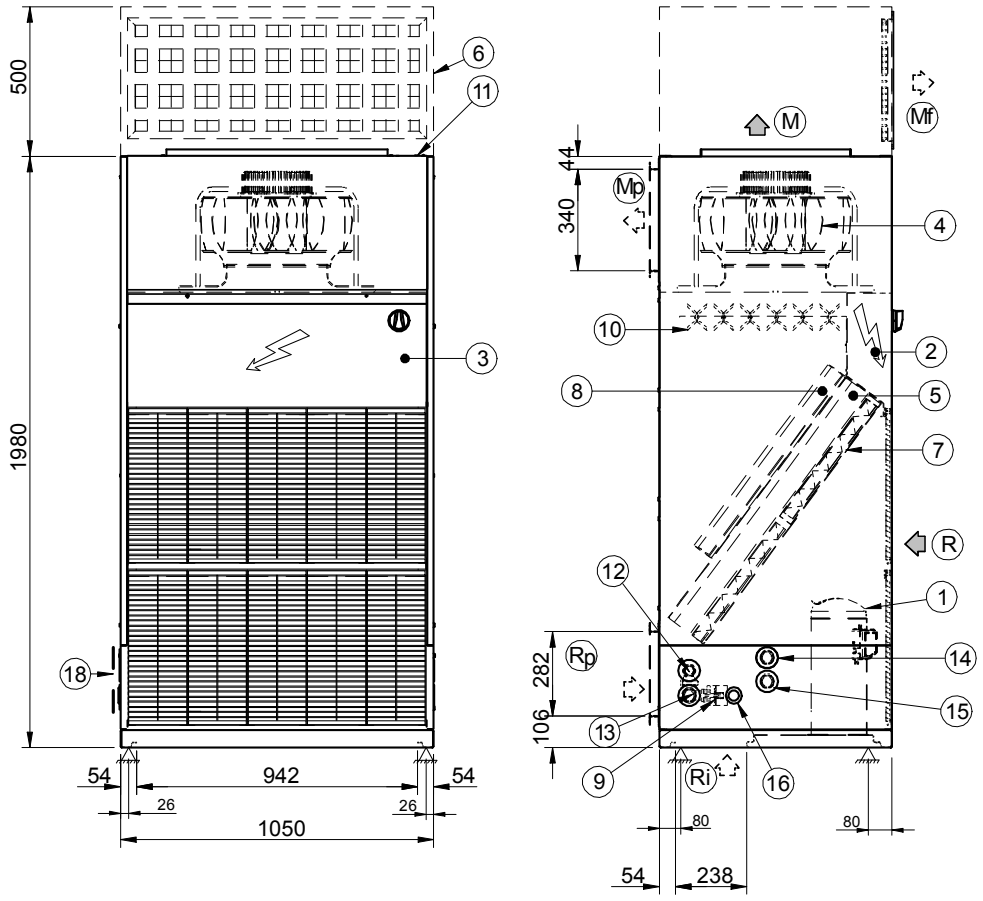
R. Air return
M. Standard supply
MP. Rear supply air (Optional)
MF. Front air outlet (Optional)
RP. Rear air inlet (Optional)

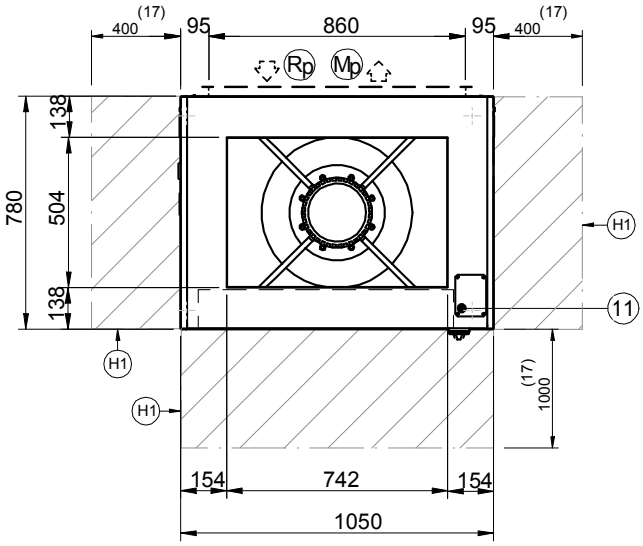
Size			61	71	81
A - Length		mm	1050	1050	1050
B - Width		mm	510	510	510
C - Height		mm	1705	1705	1705
Standard unit weight					
Shipping weight		kg	200	200	202
Operating weight		kg	200	200	202

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

13 - TECHNICAL INFORMATION

SERIE: CASR-X 82-102





DAA4U82_102_PF500X_0
Date: 11/08/2011

(1) COMPRESSOR
(2) ELECTRICAL PANEL
(3) ACCESS TO THE ELECTRICAL PANEL
(4) SUPPLY FAN
(5) DIRECT EXPANSION COIL
(6) FRONT SUPPLY PLENUM (OPTIONAL)
(7) G4 AIR FILTERS
(8) HOT WATER COIL-RE-HEAT COIL (OPTIONAL)
(9) 3 WAYS-VALVE (OPTIONAL)
(10) ELECTRIC HEATERS (OPTIONAL)
(11) POWER INPUT
(12) HOT WATER HEAT EXCHANGER WATER INLET Ø 3 / 4 "
(13) EXCHANGER WATER OUTLET Ø1" 3/4 GAS
(14) IINPUT FOR GAS LINE CONNECTIONS
(15) INPUT FOR LIQUID LINE CONNECTIONS
(16) CONDENSATE DISCHARGE
(17) FUNCTIONAL CLEARANCES
(18) WATER CONNECTION SIDE
(R) AIR RETURN
(M) STANDARD AIR SUPPLY
(MP) REAR AIR OUTLET (OPTIONAL)
(MF) FRONT AIR OUTLET
(RP) REAR AIR INLET
(RI) FLOOR AIR INLET
(**) CLEARANCE ACCESS RECOMMENDED

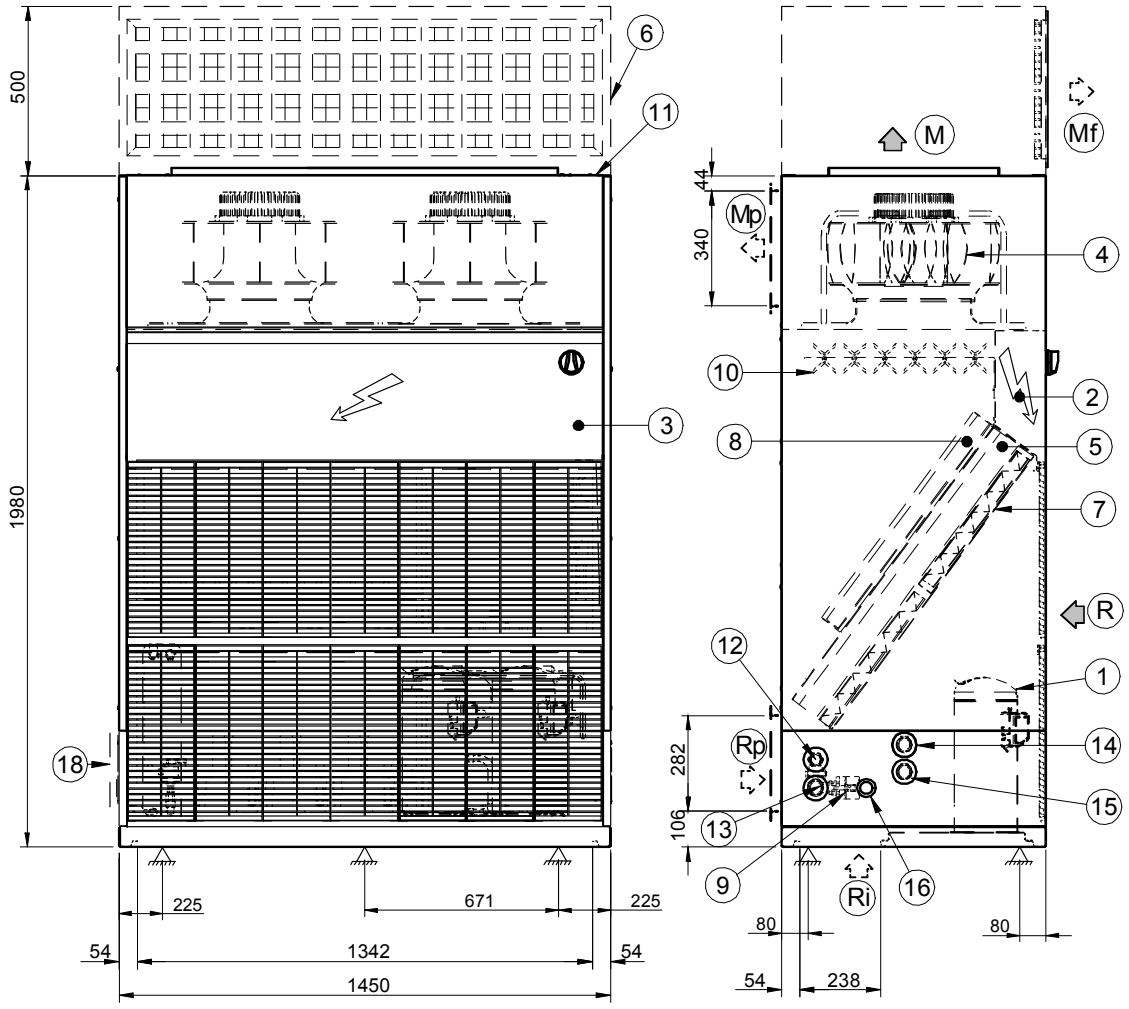
SIZES		82	102
WEIGHT	Kg	297	302

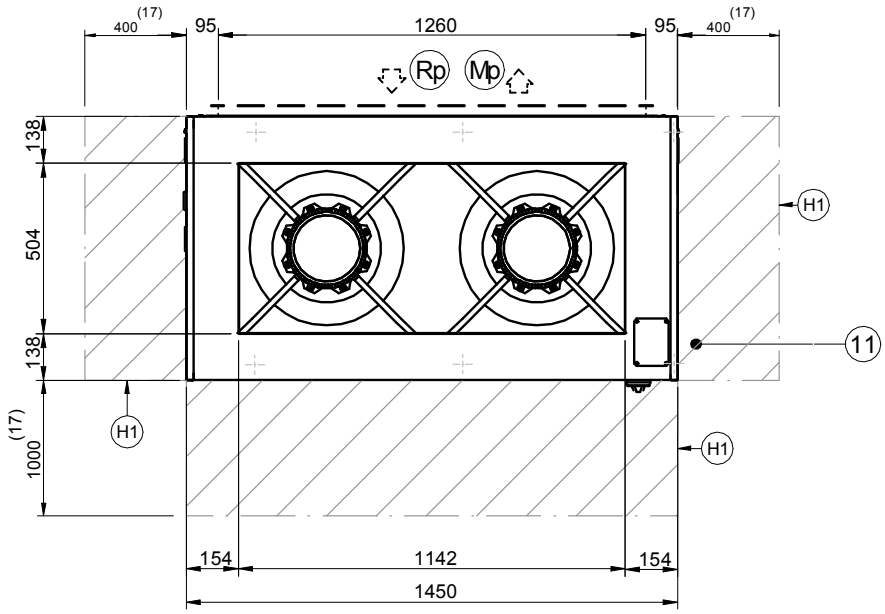
The presence of optional accessories may result in a substantial variation of the weights shown in the table.

13 - TECHNICAL INFORMATION

SERIE: CASR-X 122-162

DAA4U122_162_PF500X_0
Date: 11/08/2011





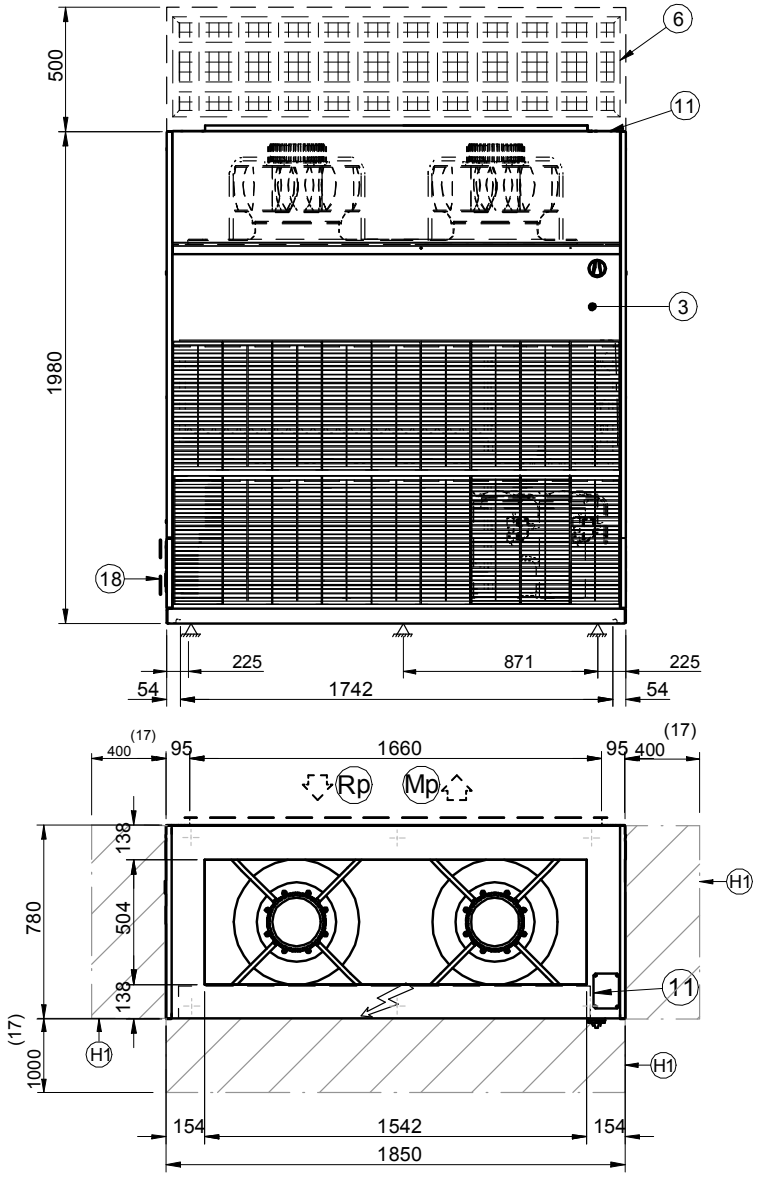
SIZES		122	162
WEIGHT	Kg	387	392

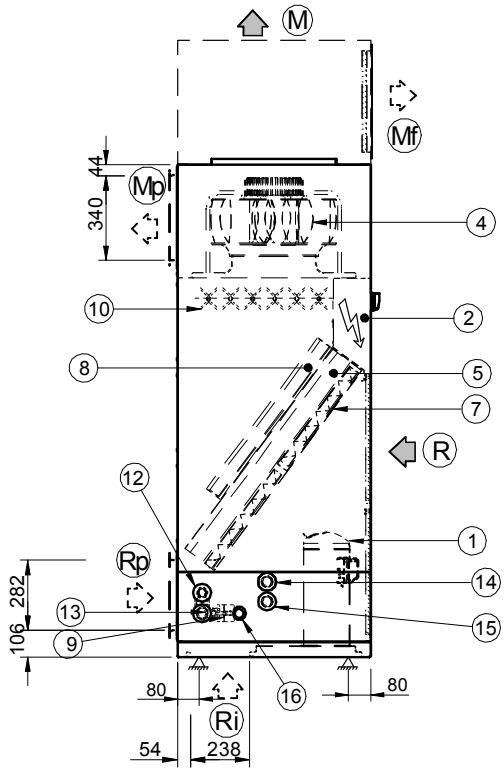
(1) COMPRESSOR
(2) ELECTRICAL PANEL
(3) ACCESS TO THE ELECTRICAL PANEL
(4) SUPPLY FAN
(5) DIRECT EXPANSION COIL
(6) FRONT SUPPLY PLENUM (OPTIONAL)
(7) G4 AIR FILTERS
(8) HOT WATER COIL-RE-HEAT COIL (OPTIONAL)
(9) 3 WAYS-VALVE (OPTIONAL)
(10) ELECTRIC HEATERS (OPTIONAL)
(11) POWER INPUT
(12) HOT WATER HEAT EXCHANGER WATER INLET Ø 3 / 4 "
(13) EXCHANGER WATER OUTLET Ø1" 3/4 GAS
(14) IINPUT FOR GAS LINE CONNECTIONS
(15) INPUT FOR LIQUID LINE CONNECTIONS
(16) CONDENSATE DISCHARGE
(17) FUNCTIONAL CLEARANCES
(18) WATER CONNECTION SIDE
(R) AIR RETURN
(M) STANDARD AIR SUPPLY
(MP) REAR AIR OUTLET (OPTIONAL)
(MF) FRONT AIR OUTLET
(RP) REAR AIR INLET
(RI) FLOOR AIR INLET
(**) CLEARANCE ACCESS RECOMMENDED

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

13 - TECHNICAL INFORMATION

SERIE: CASR-X 182-222 **DAA4U182_222_PF500X_0**





(1) COMPRESSOR
(2) ELECTRICAL PANEL
(3) ACCESS TO THE ELECTRICAL PANEL
(4) SUPPLY FAN
(5) DIRECT EXPANSION COIL
(6) FRONT SUPPLY PLENUM (OPTIONAL)
(7) G4 AIR FILTERS
(8) HOT WATER COIL-RE-HEAT COIL (OPTIONAL)
(9) 3 WAYS-VALVE (OPTIONAL)
(10) ELECTRIC HEATERS (OPTIONAL)
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(16) CONDENSATE DISCHARGE
(17) FUNCTIONAL CLEARANCES
(18) WATER CONNECTION SIDE
(R) AIR RETURN
(M) STANDARD AIR SUPPLY
(MP) REAR AIR OUTLET (OPTIONAL)
(MF) FRONT AIR OUTLET
(RP) REAR AIR INLET
(RI) FLOOR AIR INLET
(**) CLEARANCE ACCESS RECOMMENDED

SIZES		182	222
WEIGHT	Kg	472	482

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

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