

10670

06 - 2024

VECTIOS™ PJ

Instructions manual



CONTENTS

1 - INTRODUCTION	5
2 - SAFETY ADVISE	5
2.1. General safety advise	5
2.2. Safety standards for refrigerant	6
3 - POSSIBLE TYPES OF ASSEMBLIES	7
4 - TRANSPORT	9
4.1 Transport	9
4.2 Receipt of goods	9
4.3 Unit identification	9
5 - HANDLING	9
6 - OPERATION LIMITS	12
7 - POSITIONING AND INSTALLATION	12
7.1 Storage	12
7.2 Choice of location	12
7.3 Antivibrators assembly (silent-blocks)	14
7.4 Pre-assembly roof curb (optional)	15
7.5 Centres of gravity, weight and reactions in the supports	20
7.6 Recommended service clearance	28
8 - ELECTRICAL CONNECTION	30
8.1 Installation norms	30
8.2 Power supply	30
8.3 Wire sizing	30
8.4 Electric cabinet	30
8.5 Vectic electronic control	31
8.6 Customer connection	33
8.7 Location of sensors on the machine	34
8.8 Sensors connection by the costumer	34
9 - FANS AND AIR DUCTS	36
9.1 Checks in the axial fans	36
9.2 Checks in the EC plug-fans	36
9.3. Checks in the centrifugal fans (optional)	36
9.4 Air ducts connections	37
10 - CONDENSATE DRAIN	38
11 - SAFETY ELEMENTS	39
12 - FACTORY OPTIONS AND ACCESSORIES	41
12.1 Dampers hoods	41
12.2 Stop-drop on the fresh air intake	41
12.3 Fresh air housing (CK, CA, CP, CR, CW, TP 0280 to 0380 and TW assemblies)	42
12.4 Passive recovery (CW and TW assemblies)	43
12.5 Enclosure for lower return (models 0200 to 0240 with TS assembly)	45
12.6 Return fans module (models 0200 to 0240 with TP assembly)	45
12.7 Air filters	46
12.8 Heat recovery coil	47
12.9 Electrical heaters	48
12.10 Stop-drop in the indoor coil	48
12.11 Preheater module	49
12.12 Hot water coil	50
12.13 Gas boiler (only with R-410A)	51
12.14 Gas burner	58
12.15 Cooling recovery circuit (CR and CT assemblies)	68
12.16 Zoning of the air flow	69
13 - COMMISSIONING	70
13.1 Checks prior to commissioning	70
13.2 Possible problems at commissioning	71
13.3 Operational checks	71
14 - MAINTENANCE	72
14.1 General recommendations	72
14.2 Servicing	72
14.3 Access to the main components	73
15 - CONTROL AND ANALYSIS OF BREAKDOWNS	80
16 - FINAL SHUTDOWN	81

ORIGINAL TEXT: SPANISH VERSION

1 - INTRODUCTION

The **VECTIOS™** range consist of autonomous and compact air-air units of horizontal design, rooftop type.

Series	Description	Refrigerant	Models
RPJ	Cooling-only units	R-410A R-454B	0090 - 0120 - 0140 - 0160 - 0180 - 0190 - 0200 - 0220 - 0240 - 0280 - 0320 - 0360 - 0380
IPJ	Reversible heat pump	R-410A	0090 - 0120 - 0140 - 0160 - 0180 - 0190 - 0200 - 0220 - 0240 - 0280 - 0320 - 0360 - 0380 - 0400
		R-454B	0090 - 0120 - 0140 - 0160 - 0180 - 0190 - 0200 - 0220 - 0240 - 0280 - 0320 - 0360 - 0380

Two configurations are available, depending on the indoor air flow direction:

- “Cross flow”: all models, with R-410A and R-454B.
- “Tunnel flow”: models 0200 to 0380, only with R-410A.

These units are designed to be installed outdoors, in a free field-type, well ventilated area. It is user’s responsibility to ensure that the final installation respects all local, national and international regulations.

The units are connected directly to an air distribution ductwork without

additional elements or equipment, pipes, cables, etc. taking no floor space at all. This design reduces the cost of installation, facilitates a quick connection and ensures reliable operation.

The units comply with European Directives:

- Machinery Directive 2006/42/EC (MD)
- Electromagnetic Compatibility Directive 2014/30/EU (EMC)
- Pressure Equipment Directive 2014/68/EU (Category 2) (PED)
- Eco-design Directive 2009/125/EC (Eco-design)
- Regulation (EU) 2016/2281 SEER/SEPR HT
- Harmonized Standard: EN 378-2:2016 (Refrigerating systems and heat pumps - Safety and environmental requirements. Part 2: Design, construction, testing, marking and documentation).

After manufacturing, all units are charged with the selected refrigerant: R-410A or R-454B, and are tested at the factory, verifying the correct operation of all their components within the operating range for which they are intended.



Technicians who install, commission, operate and service the unit must possess the necessary training and certifications, understand the instructions given in this manual and be familiar with the specific technical characteristics of the installation site.

2 - SAFETY ADVISE

2.1. General safety advise

Units are designed to provide a very high level of safety during installation, start-up, operation and maintenance.

They will provide safe and reliable service when operated within their application range.

It is required to follow the recommendations and instructions in this brochure, the labels, and the specific instructions.

Compliance with the norms and regulations in effect is mandatory. It is recommended to consult the competent authorities regarding the applicable regulations for users of units or components under pressure. The characteristics of these units or components are included on the plates of characteristics or in the regulatory documentation provided with the product.

To avoid any risk of accident during installation, commissioning or maintenance, it is obligatory to take into consideration the following specifications for the units: refrigerated circuits under pressure, refrigerant presence, electrical voltage presence and implantation place.

All operations on the unit must be carried out by authorized, qualified and trained people to do it using appropriate tools.

All refrigerant charging, removal and draining operations must be carried out by a qualified technician and with the correct equipment for the unit. Any inappropriate handling can lead to uncontrolled fluid or pressure leaks.

All persons who have to work with the equipment must wear personal protective equipment adapted to the intervention on the unit:

- Safety shoes.
- Safety gloves or specific hand protection (cut resistant gloves, chemical gloves, thermic gloves, ...).
- Head protection.
- Ears protection.
- Eyes or face protection (safety glasses, goggles, facial shed).



- A2L detector, in units with A2L gas (R-454B).

Additional equipment may be required, depending on the risk analysis that must be done prior to any intervention.

The unit must be installed in a place that is not accessible to the public or protected against access by non-authorized persons.

Do not modify or bypass any of the safety guards or switched in the system.



Caution: Before intervening in the unit, verify that the main power to the unit is cut off. An electric shock can cause personal damage. The main disconnect switch is located in the unit’s electrical cabinet.



Risk of falling: No part of the unit must be used as a walkway, rack or support. Use a platform, or staging to work at higher levels.

It is mandatory to use all required PPE for work at height. Pay special attention to units with lower supply and/or return.

In heat pumps, during operation in heating mode, condensation water falls directly to the ground and action is required to prevent slipping hazard.



Periodically check and repair or if necessary replace any component or piping that shows signs of damage. The refrigerant lines can break under the weight and release refrigerant, causing personal injury.



The compressor and line surfaces can reach temperatures above 100°C causing burns to the body. In the same fashion, under certain conditions these surfaces can reach very cold temperatures that can cause freezing risks.



No combustible matter should be placed within 6.5 metres of the unit.



Risk of explosion: Never exceed the specified maximum operating pressures. Verify the allowable maximum high-side and low-side test pressures by checking the instructions in this manual and the pressures given on the unit name plate.

2 - SAFETY ADVISE

Important: These units are prepared to withstand a maximum available pressure of 800 Pa. If there is a higher pressure, deformation, breakage, etc., may occur.

In the case of an installation fire test, the unit can be deformed and/or broken. It is necessary to foresee this test and to take appropriate measures.

2.2. Safety standards for refrigerant

Important: These units contain a fluorinated greenhouse gas covered by the Kyoto protocol.

All interventions on the refrigerating circuit must be performed in accordance with applicable legislation.

Within the European Union, it is necessary to observe regulation (EU) No.517/2014, known as F-Gas, over **Certain greenhouse effect fluoride gases**.

The operator is bound by the obligation to perform periodical sealing tests on the refrigerating circuit according to the regulation (EU) No.517/2014. Please, consult the frequency of tests in chapter of "Maintenance".

Important: the type of refrigerant included in the unit can be consulted on the name plate, see section 4.3.

Type of refrigerant	R-410A	R-454B
Global warming potential (GWP)	2.088	466
Flammability class	A1	A2L

Ensure that refrigerant is never released to the atmosphere when the equipment is installed, maintained or sent for disposal.

It is prohibited to deliberately release refrigerant into the atmosphere. The operator must ensure that any refrigerant recovered is recycled, regenerated or destroyed.

Always remember that refrigeration systems contain pressurised liquids and vapours. All necessary provisions must be made when the system is partially opened: ensure the part of the circuit concerned is not pressurised.

Ensure good ventilation, as accumulation of refrigerant in an enclosed space can displace oxygen and cause asphyxiation or explosions.

Inhalation of high concentrations of vapour is harmful and may cause heart irregularities, unconsciousness, or death. Vapour is heavier than air and reduces the amount of oxygen available for breathing. These products cause eye and skin irritation. Decomposition products are hazardous.

Avoid contact with liquid refrigerant. Wash any spills from the skin with soap and water. If liquid refrigerant enters the eyes, immediately and abundantly flush the eyes with water and consult a doctor.

The accidental releases of the refrigerant, due to small leaks or significant discharges following the rupture of a pipe or an unexpected release from a relief valve, can cause frostbites and burns to personnel exposed. Do not ignore such injuries. Installers, owners and especially service engineers for these units must:

- Seek medical attention before treating such injuries.
- Have access to a first-aid kit, especially for treating eye injuries.

Refrigerant R-410A

According to EN 378-1, R-410A belongs to the A1/A1 group, i.e. with high safety both in the mix and also in the case of a leak.

Although it is not flammable, keep them away from open flames (e.g. cigarettes) as temperatures of over 300°C cause their vapours to break down and form phosgene, hydrogen fluoride, hydrogen chloride and other toxic compounds. These compounds may produce severe physiological consequences if accidentally inhaled or swallowed.

In case of a leak:

- To detect leaks, an electronic leak detector, an ultraviolet lamp or soapy water must be used. Flame detectors do not help.
- If a leak occurs or if the refrigerant becomes contaminated (e.g. by a short circuit in a motor) remove the complete charge using an specific recovery unit for R-410A.
- The refrigerant must be stored in mobile certified containers.
- Repair the leak detected and recharge the circuit with the total refrigerant charge, as indicated on the unit name plate. Only charge liquid refrigerant at the liquid line.

Refrigerant R-454B

According to EN 378-1, refrigerant R-454B belongs to the A2L group, that is, non-toxic and low flammability, so it only requires minimal precautions for a completely safe operation.

Always use tools qualified for A2L refrigerants according to EN 378 or ISO 817.

Risk of flammability: with A2L refrigerant, always use an A2L refrigerant detector when near the unit. Default potentially flammable zone is 0.6 metres around the unit. See section 7.2.

Never apply an open flame or live steam to a refrigerant container. Dangerous overpressure can result.

In case of combustion of refrigerant, do not clean combustion by-products with water, the mixture is highly corrosive.

In case of a leak:

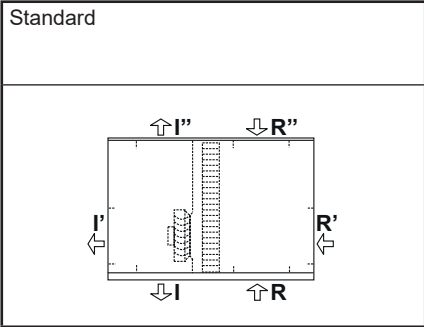
- To detect leaks, an electronic leak detector, must be used.
- If a leak occurs or if the refrigerant becomes contaminated (e.g. by a short circuit in a motor) remove the complete charge using an specific recovery unit for A2L flammable refrigerants.
- The refrigerant must be stored in mobile certified containers. In this case a special bottle shall be used, with the top painted in red and threaded to the left (opposite direction to R-410A). Vacuum the recovery bottle to remove the air before filling it with flammable refrigerant.
- Use a vacuum pump, dual effect and anti-spark based on DIN 8975.
- Do not mix flammable refrigerants with other types of refrigerants in a recovery bottle. Label the recovery bottle to show that it contains a flammable substance.
- Check that there are no hazardous or combustible objects nearby and make sure that in case of fire the extinguisher is nearby. The fire extinguisher must be appropriate to the system and the refrigerant type.
- Always check that there is no refrigerant in the cooling circuit, rinsing with nitrogen before welding, and checking that the nitrogen flows correctly.
- Repair the leak detected and recharge the circuit with the total refrigerant charge, as indicated on the unit name plate. Only charge liquid refrigerant at the liquid line.

3 - POSSIBLE TYPES OF ASSEMBLIES

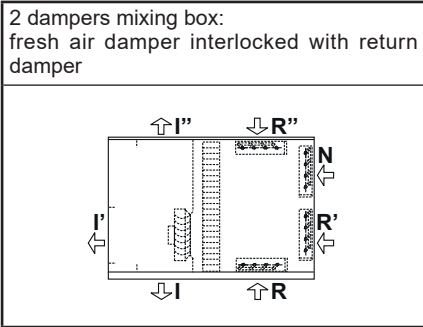
Depending on the indoor airflow direction

“Cross Flow” assemblies (all models): R-410A and R-454B

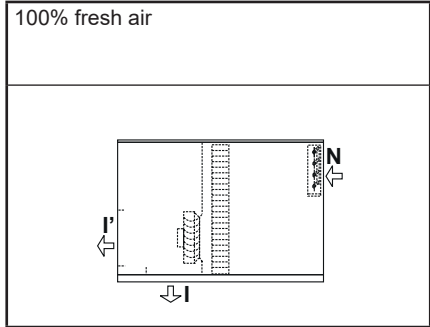
C0 assembly



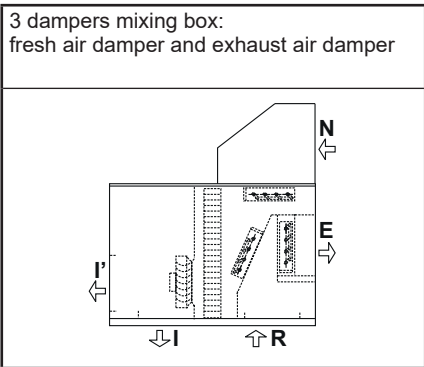
CS assembly



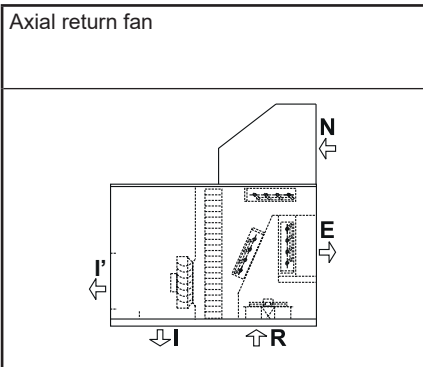
CF assembly



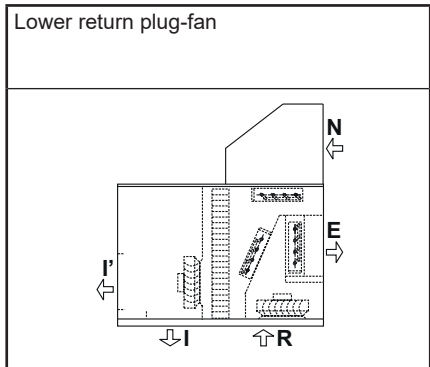
CK assembly



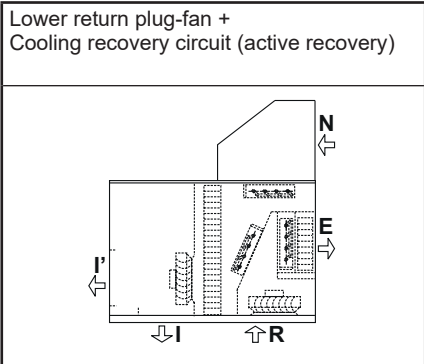
CA assembly



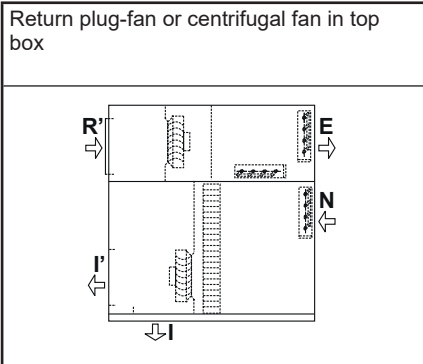
CP assembly



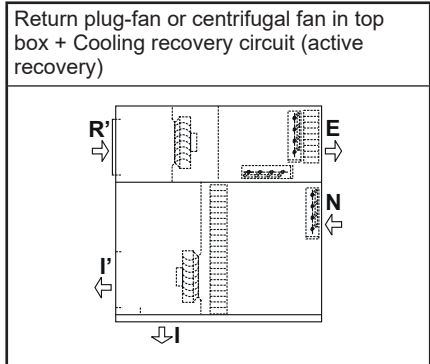
CR assembly



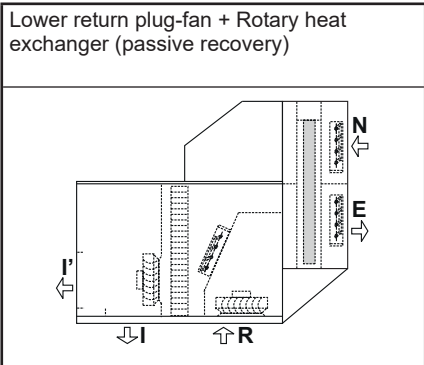
CQ assembly



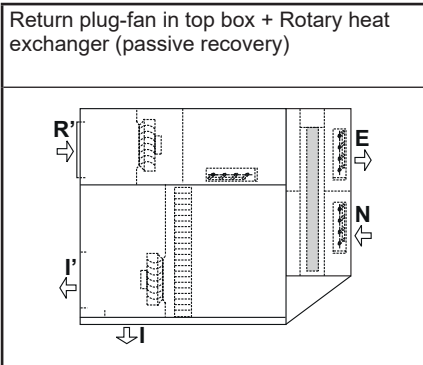
CT assembly



CW assembly



CL assembly (upon request)



Legend

I	Lower air supply	R	Lower air return
I'	Lateral air supply	R'	Lateral air return
I''	Upper air supply	R''	Upper air return
N	Fresh air intake	E	Exhaust air outlet

Note: only one of the three possible options (lower, lateral or upper) can be selected for both, supply and return.

Indoor airflow direction

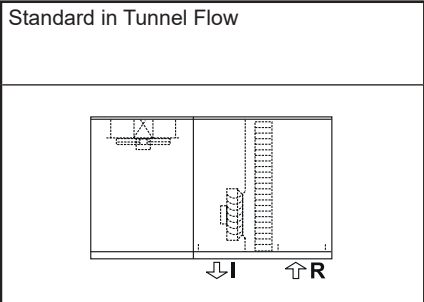
0	Lower supply and lower return	3	Lateral supply and lateral return	6	Upper supply and lateral return
1	Lateral supply and lower return	4	Upper supply and lower return	7	Lower supply and upper return
2	Lower supply and lateral return	5	Lateral supply and upper return	8	Upper supply and upper return

3 - POSSIBLE TYPES OF ASSEMBLIES

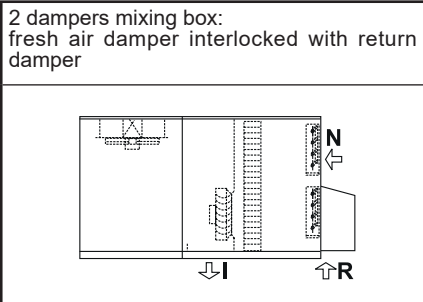
Depending on the indoor airflow direction

“Tunnel Flow” assemblies (models 0200 to 0240): R-410A only

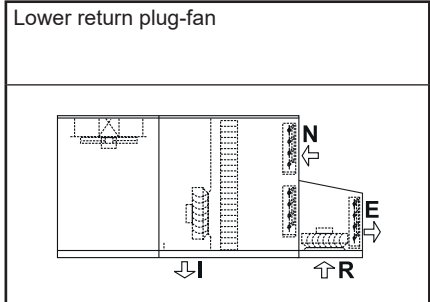
T0 assembly, Direction 0



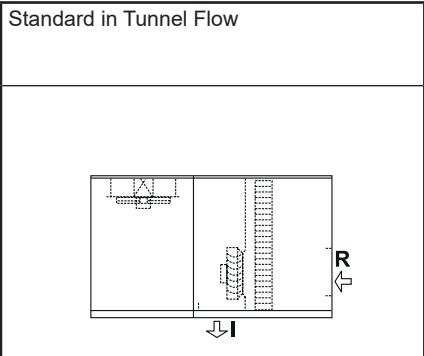
TS assembly, Direction 0



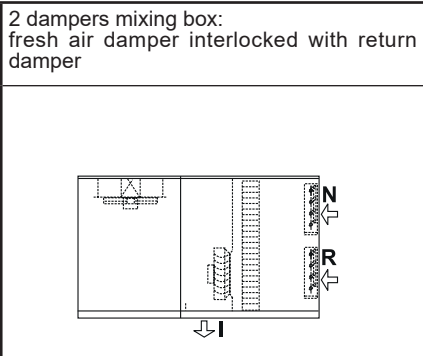
TP assembly, Direction 0



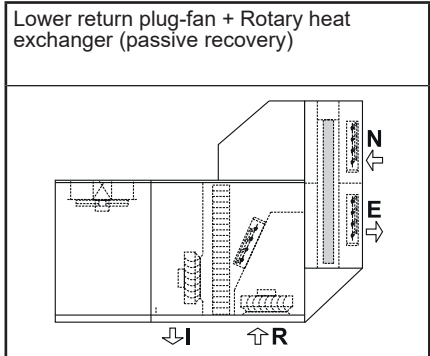
T0 assembly, Direction 2



TS assembly, Direction 2

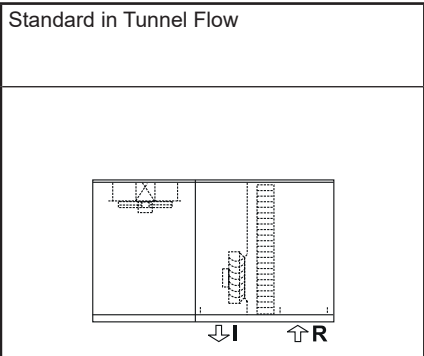


TW assembly, Direction 0

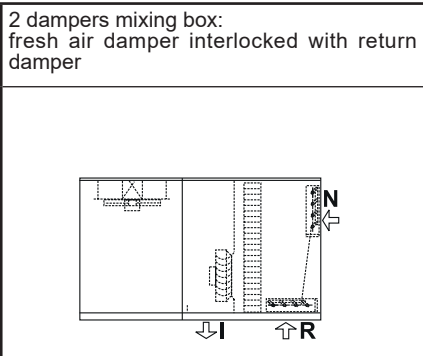


“Tunnel Flow” assemblies (models 0280 to 0380): R-410A only

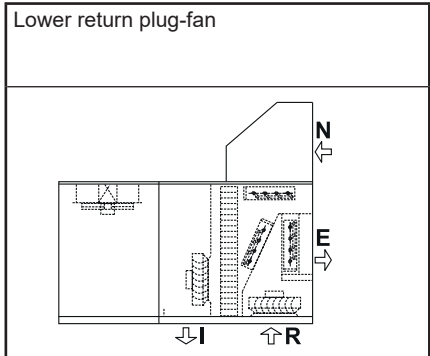
T0 assembly, Direction 0



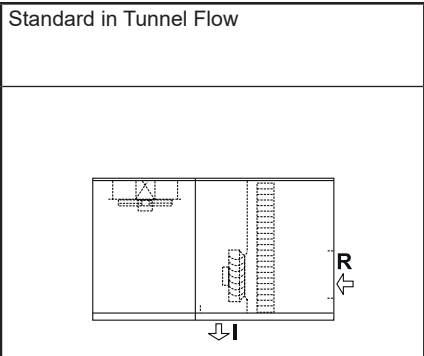
TS assembly, Direction 0



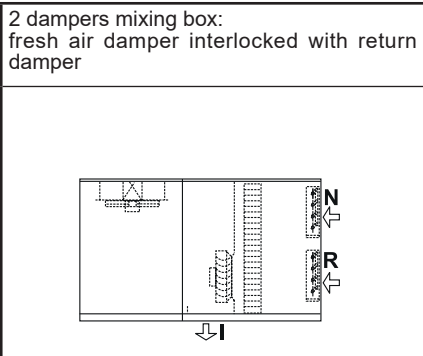
TP assembly, Direction 0



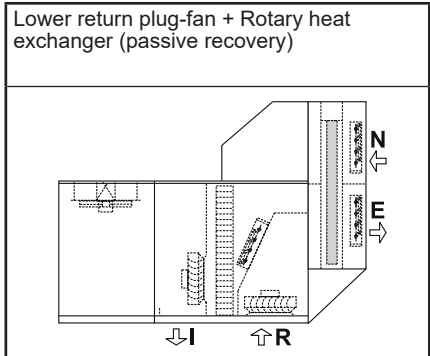
T0 assembly, Direction 2



TS assembly, Direction 2



TW assembly, Direction 0



Indoor airflow direction

0	Lower supply and lower return
2	Lower supply and lateral return

Legend

I	Lower air supply	R	Lower air return	N	Fresh air intake
I'	Lateral air supply	R'	Lateral air return	E	Exhaust air outlet

4 - TRANSPORT

4.1 Transport



Caution: If the unit contains refrigerant R-454B (A2L fluid) specific transport safety standards must be complied with:

- Road transport: UN 3358 Refrigerating machines, containing flammable, non-toxic, liquefied gas.
Transport through the Eurotunnel and through tunnels with category D and E is not permitted.
- Maritime transport: IMDG (International Maritime Dangerous Goods) code: DS 291.
- Air transport: not permitted.

The container must be identified according to UN 3358.

Do not approach the container or truck in the presence of an open flame, an electrical power source, a mobile phone, or any other heat source.

Important: the type of refrigerant included in the unit can be consulted on the name plate, see section 4.3.

4.2 Receipt of goods

Check the unit for any damage or missing components upon delivery. Check that the unit and the accessories have not been damaged during transport and that no parts are missing. If the unit and the accessories have been damaged or the shipment is incomplete, send a claim to the shipping company.

It is necessary to check on the name plate that this is the model requested.



Important: The serial number must be used in all correspondence regarding the unit.

4.3 Unit identification

Markings (name plate, punch marks, labels) must remain visible. They must not be altered, removed or modified.

Name plate

All units bear, legibly and indelibly, a name plate located in a prime space, as appears in the attached image.

Año/An. Year	Ref/Reference	No Serie/serial Nbr.
1	2	3
Product/Product/Produit		
4		
Ref. Product/Item Nbr	6	7
5	6	7
Tension/Voltage	Kit Elec.	Max. Intensidad/Intensité/Current
8	9	10
Refrigerant/GWP(PCA)	Refrig. KG (Fábrica/Factory/Usine)/Co2 Teq.	
11	12	
PSmax(AP/HP)	PSmax(BP/LP)	Temp. Max./ IP
13	14	15
Peso/Poids/Weight		16
CARRIER, Route de Thil 01120, MONTLUEL, France		0094 0038
<small>UK Importer: Toshiba Carrier UK Ltd, Porsham Close, Roborough, Plymouth, PL6 7DB</small>		
<small>Contient des gaz à effet de serre fluorés \ Contains fluorinated greenhouse gases regulated by the Kyoto protocol Contiene gases fluorados de efecto invernadero regulados por el protocolo de Kyoto</small>		

Legend

- 1 Year of manufacture
- 2 Commercial product name
- 3 Serial number
- 4 Description of the product
- 5 Purchase order number
- 6 Sales order number
- 7 Work order number
- 8 Power supply
- 9 Power output of the auxiliary electrical heaters kit (optional) (kW)
- 10 Maximum absorbed current under full load (A) (including the electrical kit)
- 11 Type of refrigerant: R-410A or R-454B
- 12 Refrigerant content (kg) and Environment impact (t CO₂e)
- 13 Maximum service pressure in the high pressure side (R-410A = 42 bar / R-454B = 40,5 bar)
- 14 Maximum service pressure in the low pressure side (R-410A = 24 bar / R-454B = 24 bar)
- 15 Maximum operating temperature (refer to "Opration limits")
Maximum shipment and storage temperature: +50°C
Electrical protection rating: IP54
- 16 Operation weight (kg) (empty weight + fluid + refrigerant)

5 - HANDLING

These machines must be unloaded and positioned by a specialist handling company using the appropriate, standardised tools.

The unit must be handled with care to avoid transport damage. Do not remove the protective packaging and the transport guards until the unit is in its final location.

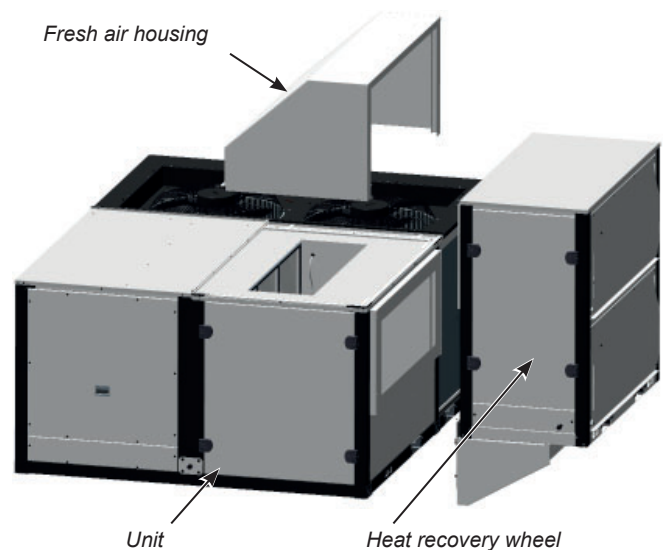
Important: The transport of two stacked units is allowed, but not the simultaneous handling of both units.

Before handling, check that the path leading to the installation location is accessible and free from obstacles.

Optional modules, such as the fresh air housing (CK, CA, CP, CR, CW, TP and TW assemblies) and the rotary heat exchanger (CW and TW assemblies), are supplied disassembled with the unit, for installation on site.

It is always mandatory to grasp the unit by the points intended for that purpose, as described in this chapter.

Any handling of the unit by other means or by gripping points different from those described here may be dangerous for both the unit and the personnel who are carrying out the discharging or transport work.

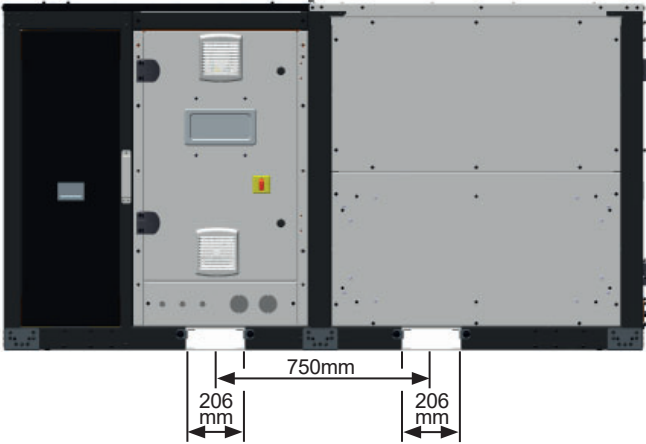


Always check the weight of the unit and verify that the discharging method used is approved for handling that weight.

5 - HANDLING

Discharge via forklift truck

The unit is designed to be transported safely by using a forklift truck. The base features guide rails to accommodate the forks of the fork-lift truck. These guide rails ensure that the centre of gravity of the unit remains within the forks, and at the same time, avoid the possible introduction of the truck's fork into functional parts that may cause damage to the unit.



Note: the module with the rotary heat exchanger (CW and TW assemblies) also includes these guides in its base frame with the same dimensions.

The recommended length for the forks will be bigger than the unit width (refer to the following table), so that the entire weight-bearing structure of the unit can be supported on the forklift truck.

The standards and recommendations of the forklift truck must also be respected with regards to the maximum load, inclination of the fork carriage, elevation of the load for transport, and, in particular, the maximum speed.

Units dimensions for transportation (1):

PJ	C0, CS, CF, CK, CA, CP, CR, CW assemblies			CQ, CT assemblies			T0, TS, TP, TW assemblies		
	Length (mm)	Width (mm)	Height (mm) (2)	Length (mm)	Width (mm)	Height (mm)	Length (mm)	Width (mm)	Height (mm) (2)
0090									
0120									
0140	2.225	1.750	1.230	2.230	1.760	1.975	--	--	--
0160									
0180									
0190									
0200									
0220	3.000	2.200	1.230	3.000	2.210	1.995	3.000	2.200	1.230
0240									
0280									
0320	3.650	2.200	1.230	3.655	2.210	1.995	3.650	2.200	1.230
0360									
0380									
0400	3.650	2.200	1.230	3.655	2.210	1.995	--	--	--

(1) Consult the overall dimensions of the available assemblies in paragraph 7.6 "Recommended service clearance".

(2) With 2-speed outdoor fan (optional) add +275 mm.

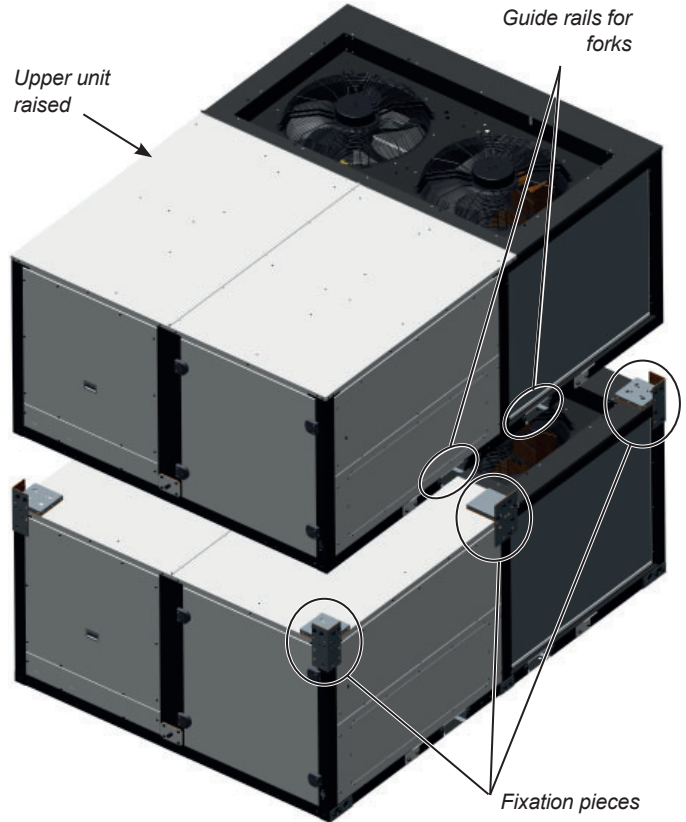
Discharge of stacked units

Important: this option is only available with electronic outdoor fans (included as standard).

The fixation set factory-installed for the transport of two stacked units ensures the safe fixation of units and the stability of units during transport.

The discharge of the units on-site will be done via fork-lift truck with the forks accommodated in the guide rails of the lower unit. The units must be unstacked after discharging. The simultaneous handling of both units is not allowed.

The 6 fixation pieces are fixed to the units using 4 M8 screws (hex. key 13). First, unscrew all the screws attaching the pieces to the upper unit. Raise the upper unit with the fork-lift truck to save the pieces height and then, set down it carefully on the floor. Finally, remove the fixing pieces from the lower unit by unscrewing the rest of the screws.



Discharge via crane

Important: This discharge method is not allowed in the case of two stacked units.

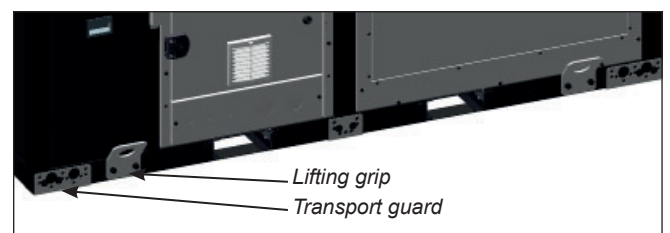
It is mandatory to follow the lifting instructions given in the drawings provided on the next page.

Approved textile slings, suitable for the dimensions and weight of the unit, must be used. A structure with centre of gravity adjustment must also be used to separate the slings from the top of the unit.

Important: slings must be attached to **all** the marked rigging points (grips). These points are clearly identified by labels.

The slings hooks should be fixed on top of the grips.

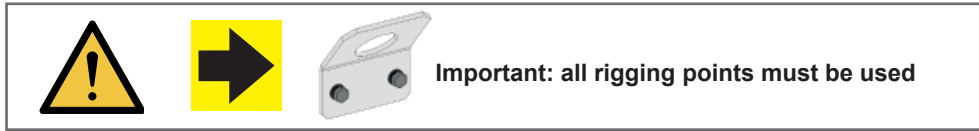
All models are provided with 2 lifting grips on each beam, except the 0200 to 0400 models with CR and CT assemblies that are provided with three lifting grips per beam.



Raise and set down the unit carefully. Take care not to tilt it by more than 15°, as this could adversely affect its operation.

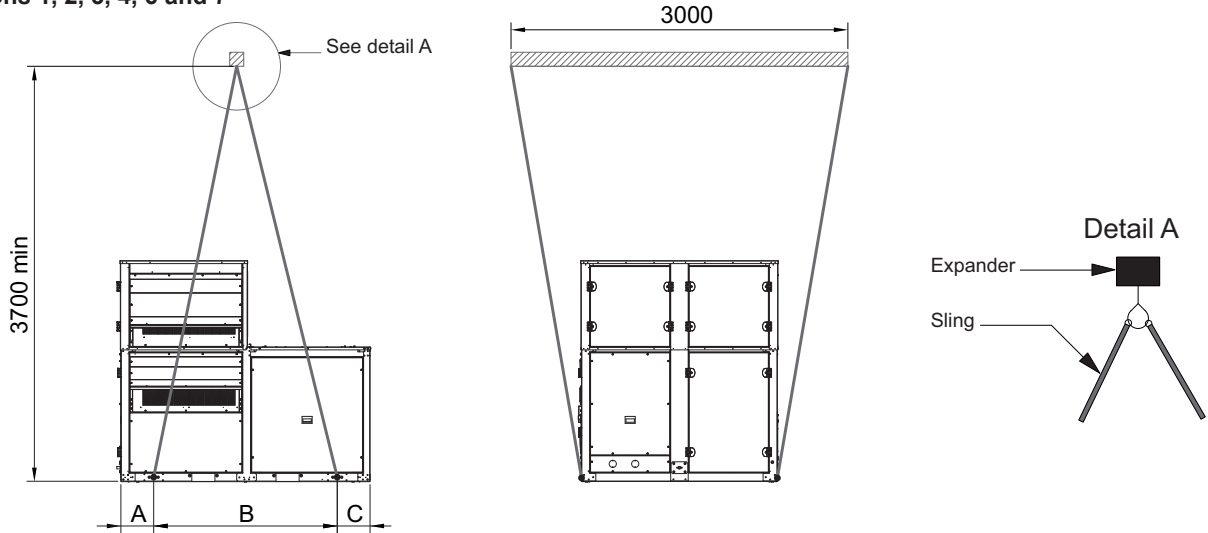
Safety when lifting can only be guaranteed if all these instructions are followed. Otherwise, there is a risk of equipment damage or injury to personnel.

5 - HANDLING

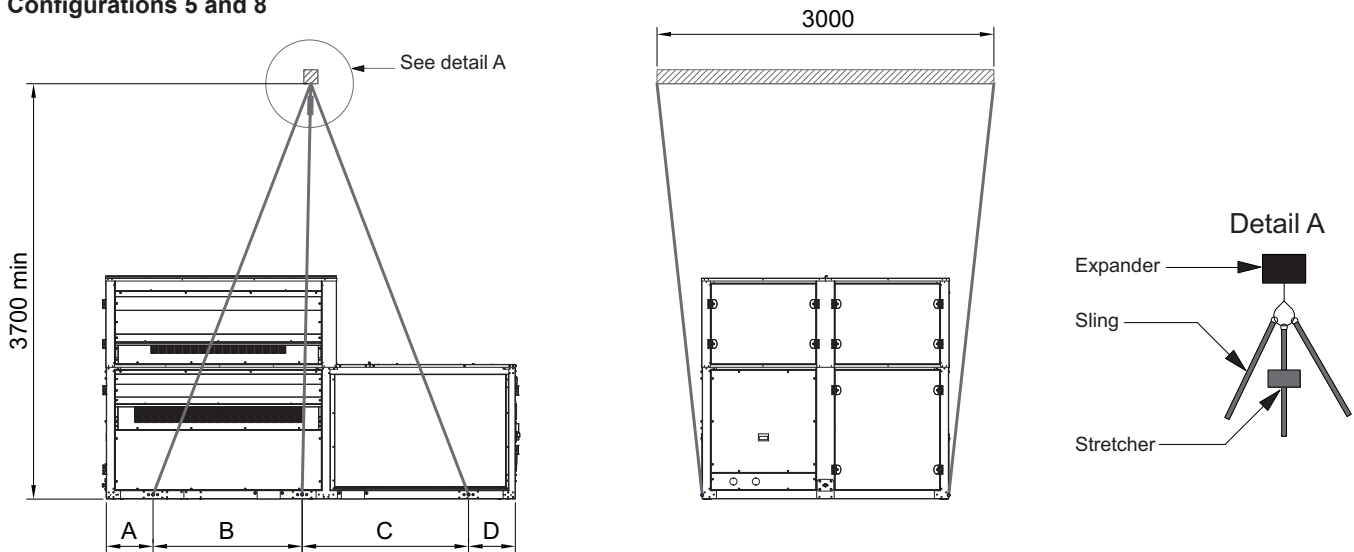


Important: The centre of gravity is not necessarily in the middle of the unit and the forces applied to the slings are not always identical. Please consult the weight and the centre of gravity of each model stated in paragraph 7.6.

Configurations 1, 2, 3, 4, 6 and 7



Configurations 5 and 8



RPJ / IPJ	Assemblies	Configuration	No. riggings points x beam	Unit width (mm)	Beam length (mm)	Distance between riggings points (mm)			
						A	B	C	D
0090 / 0120	C0, CS, CF, CK, CA, CP, CR, CQ, CT, CW	1	2	1750	2215	300	1600	315	-
0140 / 0160 / 0180 / 0190	C0, CS, CF, CK, CA, CP, CR, CQ, CT, CW	2	2	1750	2215	300	1600	315	-
0200 / 0220 / 0240	C0, CS, CF, CK, CA, CP, CQ, CW	3	2	2200	2985	732,5	1520	732,5	-
0200 / 0220 / 0240	T0, TS, TP, TW	4	2	2200	2985	732,5	1520	732,5	-
0200 / 0220 / 0240	CR, CT	5	3	2200	2985	732,5	665	855	732,5
0280 / 0320 / 0360 / 0380 / 0400	C0, CS, CF, CK, CA, CP, CQ, CW	6	2	2200	3639	779,5	2130	729,5	-
0280 / 0320 / 0360 / 0380	T0, TS, TP, TW	7	2	2200	3639	779,5	2130	729,5	-
0280 / 0320 / 0360 / 0380 / 0400	CR, CT	8	3	2200	3639	779,5	995	1135	729,5

After the placing of the unit, it is recommended to remove the grips as they can be a hindrance for maintenance. The grips are fixed to the beams using M10 screws (hex. key 17). Put the grips back in case of unit transport (tightening torque of screws 25 Nm).

6 - OPERATION LIMITS

Inlet air conditions		Cooling		Heating
		RPJ	IPJ	IPJ
Indoor coil	Minimum	9,7°C WB		10°C
	Maximum	24°C WB		27°C
Outdoor coil	Minimum	-10°C ①		-15°C WB ②
	Maximum	52°C	48°C	15°C WB

- ① If the condensation pressure control (standard) is disabled, the minimum temperature will be 12°C.
- ② When the outdoor temperature is usually below 5°C WB it is recommended installing a support element.

7 - POSITIONING AND INSTALLATION

7.1 Storage

Important: It is prohibited to store and install the machine in an explosive atmosphere zone (ATEX).

If it is necessary to store the unit for a period of time before its installation, the following recommendations should be followed:

- Do not remove the protective packaging and the transport supports. The unit packed with plastic protective film should not remain exposed to the sun for long, as prolonged exposure of the protective film can deteriorate the unit's paint.
- Store the unit on a flat and horizontal surface.
- It is highly recommended to store the unit in a dry place and protected from the weather.
- Supplied accessories must be stored in a dry and clean place for future unit assembly.
- The unit should always be stored under the following environmental conditions:
 - Minimum ambient temperature: -30°C
 - Maximum ambient temperature: 50°C
 - Maximum relative humidity: 95% (to avoid condensation).

7.2 Choice of location

When choosing the location, whatever may be the selected fashion, the following precautions have to be taken into consideration:

- It is mandatory to comply with norm EN 378-3 on Safety and Environmental Requirements. Part 3: "In situ" installation and protection to people.
- Important: In units with R-454B refrigerant consult the "Rooftop A2L Installation guide" (Nb. 10714), which includes a set of recommendations for choosing the most suitable site. It is the customer's responsibility to carry out the risk analysis of the installation.
- Important: The unit performance is not guaranteed in case of installation at an altitude of more than 1000 meters.
- It is necessary to check that the structure supports the unit's weight (please consult the weight in section 7.5).
- The area where the unit will be located must be perfectly accessible for cleaning and maintenance operations (please consult the "Recommended service clearance" in section 7.6).
- Since the unit is designed to work outdoors, some specific installation norms must be followed:

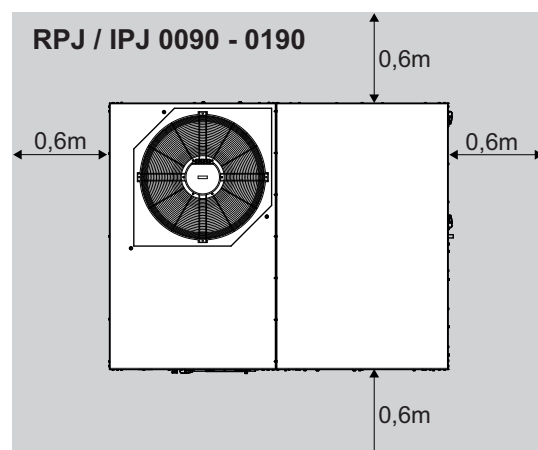
- The unit will be located on the roof of the premises. If it is foreseen that it will work more on heating than on cooling, it is preferable to direct the coil towards the sun. If little work on heating is foreseen, choose North direction.
- The chosen location must not flood and must be above the average height the snow reaches in that region.
- Do not install the unit in a closed enclosure or in conditions that originate air recirculation.
- Avoid placing obstacles in the air supply or return. No obstacle may impede the air aspiration into the coils.
- Do not fix the outdoor coil side in the predominant wind direction.
- Do not place the fresh air hood in the prevailing wind direction to prevent water from entering.

General information on potentially flammable zone and ignition sources (R-454B refrigerant)

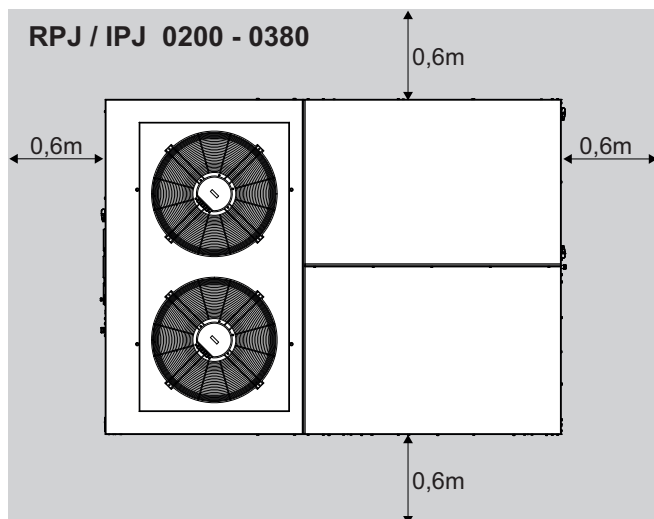
The full unit, including all options & accessories that are delivered by the manufacturer, has been qualified for the use with A2L refrigerant.

For that purpose, the manufacturer complies with EN 378-2 §6.2.14 and defined potentially flammable zone using EN 60079-10-1 in order to identify where ignition sources must not be present. Then the manufacturer designed the machine in order that, if the unit is used the way it was designed for, there is no internal ignition source in the internal potentially flammable zone.

Thus, the only residual risk is to have an ignition source introduced in the potentially flammable zone by the user. For that purpose, the manufacturer decided to represent the external potentially flammable zone where the user must not introduce ignition source.



7 - POSITIONING AND INSTALLATION



This indication is only here to help our customer to identify the limits of the flammability risk.

But there is no risk of explosion linked to the used of A2L refrigerant due to the machine itself.

Note (the following information is provided by the manufacturer exclusively for informational purposes. The application of the following directives relies exclusively upon the user):

According to directives 2009/104/EC and 1999/92/EC, these zones might be qualified by the user as ATEX Zone based on the user's own risk analysis for which the user remains solely responsible. According to the definition of Annex I of directive 1999/92/EC, this zone might be classified Zone 2 because it might be a place in which an explosive atmosphere consisting of a mixture of air with flammable substances in the form of gas is not likely to occur in normal operation but, if it does occur, will persist for a short period only.

In case an additional equipment is necessary (motorized valve, pump, etc....), it must be:

- installed out of defined potentially flammable zone;
- qualified as a non-ignition source for the fluid used.

Minimum area for indoor air distribution

(R-454B refrigerant)

The unit with refrigerant R-454B (A2L fluid) needs a minimum surface in the room where the air supplied by its indoor circuit will be distributed, according to EN-378-1:

RPJ	0090	0120	0140	0160	0180	0190
Refrigerant charge per circuit (kg)	7,2	7,5	9,9	9,9	10,2	10,4
Minimum area (m ²)	35,6	38,4	67,4	67,4	71,1	75,0

RPJ	0200	0220	0240	0280	0320	0360	0380
Refrigerant charge per circuit (kg)	10,2	10,4	10,6	16,1	16,3	16,3	16,5
Minimum area (m ²)	71,5	74,4	77,3	119,8	121,3	121,3	122,8

IPJ	0090	0120	0140	0160	0180	0190
Refrigerant charge per circuit (kg)	7,2	7,5	9,9	9,9	10,2	10,4
Minimum area (m ²)	35,6	38,4	67,4	67,4	71,1	75,0

IPJ	0200	0220	0240	0280	0320	0360	0380
Refrigerant charge per circuit (kg)	5,7	5,8	5,9	9,0	9,1	9,1	9,2
Minimum area (m ²)	21,8	22,8	23,5	55,7	57,4	57,4	58,5

Important: It is the customer's responsibility to carry out the risk analysis of the installation and, as a result of that analysis, to take the necessary measures according to standard EN-378-1. Consult the recommendations given in the "A2L rooftop installation guide" (Nb. 10714).

These units are equipped as standard with a leak detector that from a certain concentration of gas (parametrizable) activates a PROTECTION MODE until the mitigation of the leak (see the chapter on "Safety elements").

Sound Level

These units are designed to work with a low acoustic level. In any case, the following must be taken into account for the design of the installation: the outdoor environment for acoustic radiation, the type of building for the noise transmitted by air, the solid elements for the transmission of vibrations.

To reduce transmission through solid surfaces to the maximum, it is very advisable to install shock absorbers between the ground or structure and the unit frame. If necessary, a study must be commissioned to an acoustic technician.

Sound power level (LW)

RPJ / IPJ	0090	0120	0140	0160	0180	0190	0200
63 Hz	55,2	60,8	61,4	60,9	61,3	63,1	64,3
125 Hz	64,2	66,7	68,9	66,1	70,0	71,1	69,6
250 Hz	71,8	74,8	76,1	72,9	76,3	76,4	77,0
500 Hz	70,2	76,7	76,4	76,8	77,1	78,3	79,5
1000 Hz	72,0	76,2	76,3	77,5	77,3	78,2	79,4
2000 Hz	69,7	73,5	74,3	75,3	74,1	75,5	77,0
4000 Hz	62,6	69,2	70,3	70,6	70,4	72,2	73,1
8000 Hz	59,0	63,7	65,5	65,8	65,6	67,5	67,9
Total dB(A)	77,5	82,0	82,5	82,5	83,0	84,0	85,0

RPJ / IPJ	0220	0240	0280	0320	0360	0380	0400
63 Hz	64,5	64,9	64,8	64,6	64,6	65,3	66,8
125 Hz	69,9	71,5	72,4	71,3	71,4	74,0	75,5
250 Hz	77,7	78,9	79,7	78,4	77,9	79,3	80,8
500 Hz	80,1	80,4	79,9	80,1	80,2	80,9	82,4
1000 Hz	79,9	80,2	79,8	80,4	80,6	80,7	82,2
2000 Hz	77,4	77,8	77,7	78,3	78,1	77,7	79,2
4000 Hz	73,4	73,7	73,8	73,9	74,2	74,4	75,9
8000 Hz	68,2	68,6	68,9	69,1	69,4	69,6	71,1
Total dB(A)	85,5	86,0	86,0	86,0	86,0	86,5	88,0

Sound pressure level (LP)

Measurement conditions: in a clear field, measured at a distance of 10 metres, directivity 2 and at 1,5 metres from the ground.

RPJ / IPJ	0090	0120	0140	0160	0180	0190	0200
Total dB(A)	45,8	50,3	50,8	50,8	51,3	52,3	53,1

RPJ / IPJ	0220	0240	0280	0320	0360	0380	0400
Total dB(A)	53,7	54,2	54,2	54,1	54,1	54,6	56,1

Note: The sound pressure level depends on the installation conditions and, as such, it only indicated as a guide. Values obtained according to the ISO 3744 standard.

7 - POSITIONING AND INSTALLATION

Preparation of the ground

It is necessary to ensure that the surface where the unit is going to be installed is completely flat. Any defect in the preparation of the unit support surface translates into stresses on the structure, which may result in its deformation. The unit must be perfectly level when installed.

These units can be installed on the floor or on a brick curb or steel profile. Based on the fixing solution defined in the installation project, it will be necessary to plan the placement in the base of threaded rods in the expectation that the unit supports can be fixed later on. To do so, it is recommended that a template be made with the heights corresponding to the fixings.



Foresee appropriate damping devices in these fixings to ensure that noise and vibration transmission is avoided (consult the reactions in the support in section 7.5).

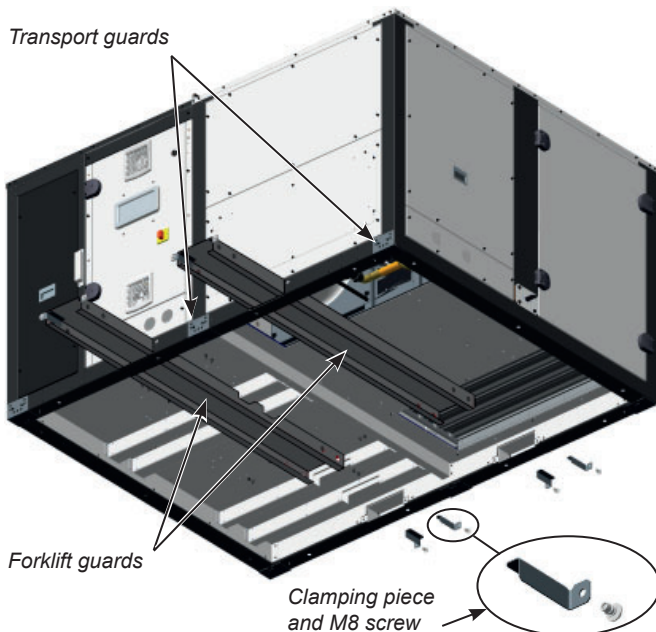
Removing forklift guards

On units with lower supply and return, the fork-lift truck guards must be removed. This is also the case when the units are to be connected onto a roof curb.

These guide rails are designed to be removed from both sides of the unit, as required. They are secured to the unit using 4 clamping pieces with M8 screws.

Attention: a free space equal to the width of the machine is required for removing the rails, bigger than the "Recommended service clearance".

Important: the transport guards also must be removed before installing. These guards are fixed with M4.8 self-tapping screws.



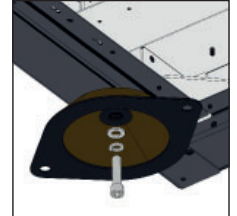
7.3 Antivibrators assembly (silent-blocks)

Although the installer is the one who must decide on a case-by-case basis the best way to place the unit in the ultimate location, always in observation of the handling standards that have been described, below is a proposed assembly sequence that may facilitate the operation, keeping in mind that the sequence performed in the installation shall be the one most suitable to the solution chosen for each particular case based on the existence (or lack thereof) of brick curb, type of silent-blocks used, etc.

In the event of assembling directly on silent-blocks to the ground, it is recommended that a template of the unit's footprint with the anchoring points of the silent-blocks be made, as described in the paragraph "Preparation of the ground".

With the help of the crane or the forklift truck, the unit will be raised to a sufficient height that the silent-blocks can be screwed into its base (see Chapter 5).

M12 metric threads have been provided for their placement in the supports (consult the fixing for antivibrators in paragraph 7.5). All models will use M12 screws with a maximum length of 60 mm. A hex key 19 or Allen wrench 10 will be used for this operation based on the type of screw used.



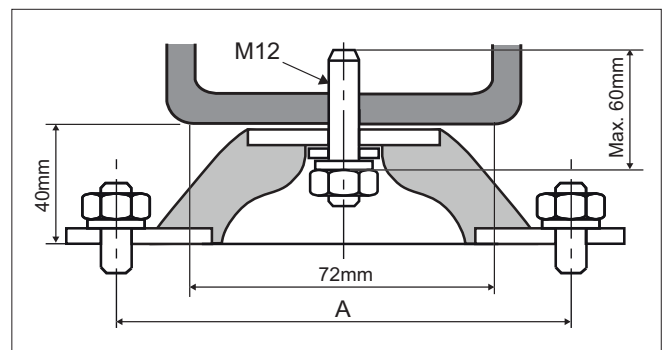
The optional silent-blocks that can be supplied for these units must be placed perpendicular to the unit, as shown in the following image.



The screws required for the installation of the silent-blocks are **not supplied** from the factory.

These screws must have an adequate quality to withstand the stresses to which they will be subjected, and they must be adapted to the installation site, either on a brick curb or a steel profile.

Note: If the silent-block hole has a diameter greater than M12, a washer can be used to adjust the size.



RPJ / IPJ		A (mm)
0090 to 0190		182
0200 to 0240	C0 / T0 / TW	182
	CA / CK / CP / CQ / CR / CS / CT / CW / TP / TS	240
0280 to 0400		240

7 - POSITIONING AND INSTALLATION

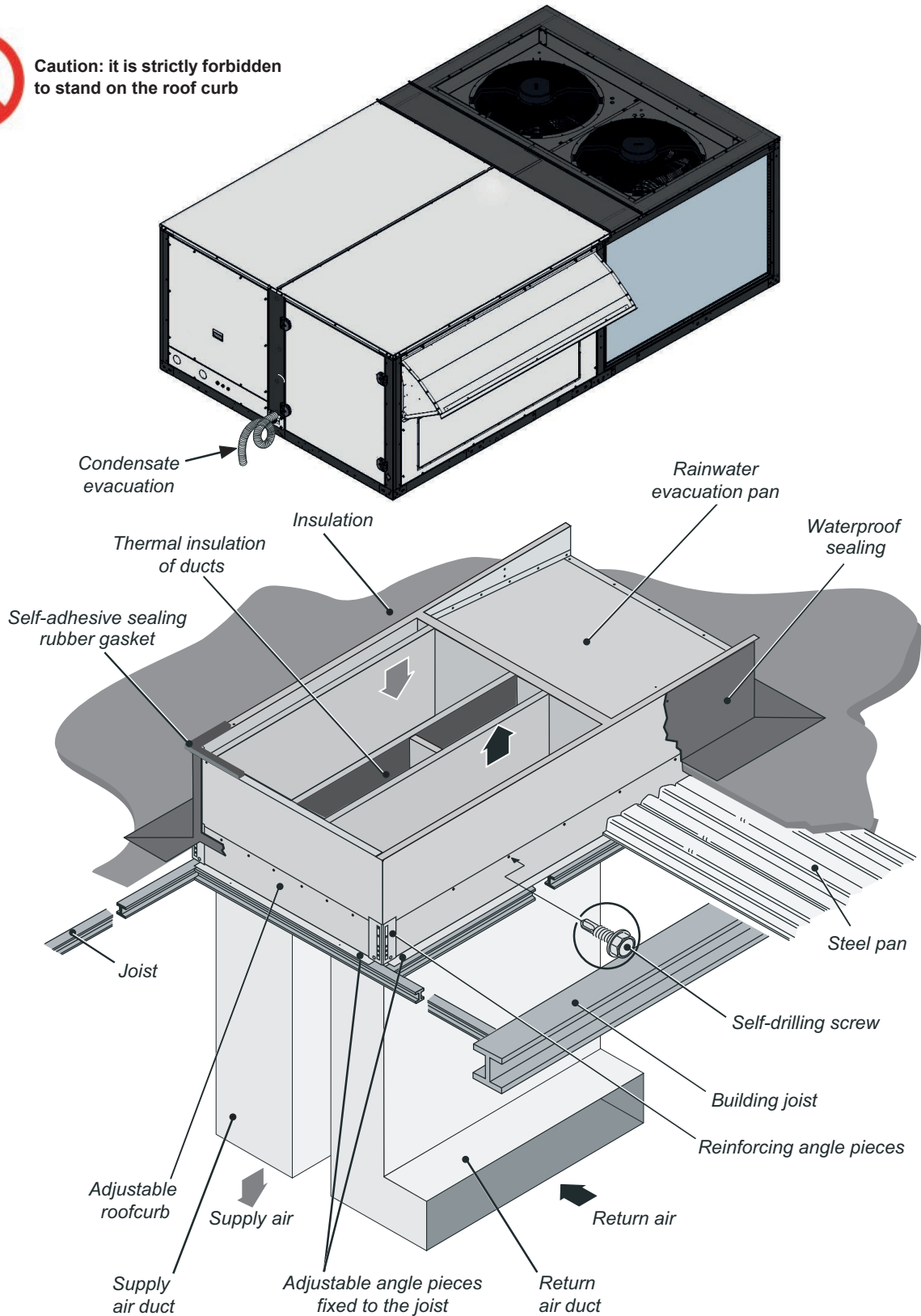
7.4 Pre-assembly roof curb (optional)

The "Cross flow" assemblies can rest on standardised pre-assembly roof curbs with adjustable height, built in galvanised steel panelling with polyester paint and thermal insulation.

The levelling system uses angle pieces that allow adjustments in the X and Y axes. As a result, the unit will be perfectly levelled on a sloping roof.



Caution: it is strictly forbidden to stand on the roof curb



These roof curbs can also incorporate a gas burner. For more information consult the paragraph 12.14 "Gas burner".

Note: These units have a wide range of adaptation roof curbs that are ready for direct replacement on site of units from different manufacturers (upon request).

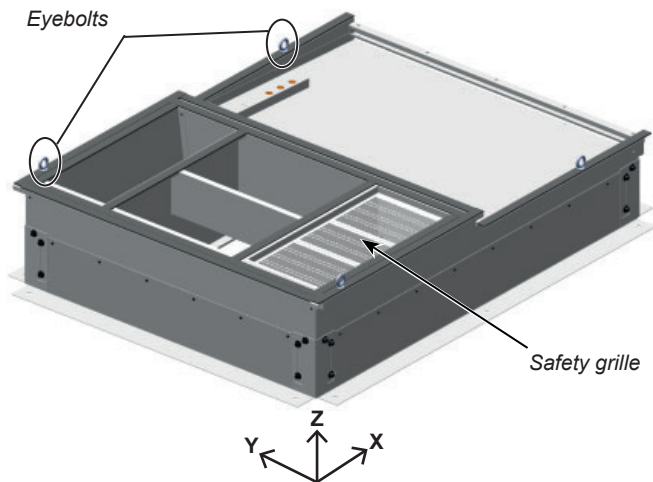
7 - POSITIONING AND INSTALLATION

Handling

For transport and lifting up to the roof using a crane, a rocker arm as well as approved slings, both suitable for the dimensions and weight of the roof curb, must be used.

Models	Standard roof curb				Roof curb with burner			
	Weight (kg)	Centre of gravity (mm)			Weight (kg)	Centre of gravity (mm)		
		X	Y	Z		X	Y	Z
0090 to 0190	145	864	870	194	284	885	881	338
0200 to 0240	205	1422	1100	202	411	1214	1277	344
0280 to 0400	237	1757	1102	200	483	1492	1289	348

These slings will be hooked on the eyebolts fitted to the roof curb. Check that the eyebolts are perfectly screwed in before attaching the slings.

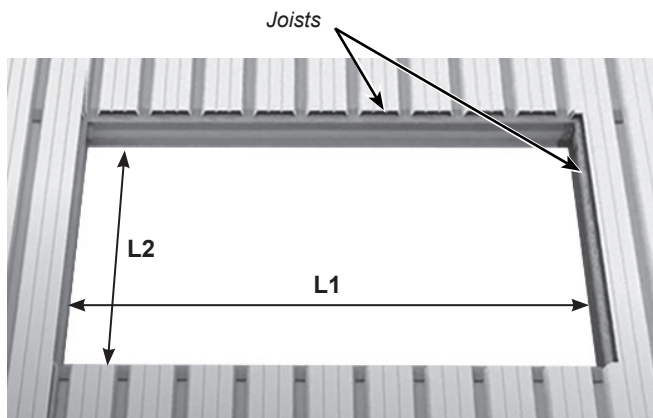


After the placing of the roof curb, it is necessary to remove the eyebolts. Put the eyebolts back in case of transport.

Note: All roof curb are supplied with a return safety grille intended for plenum installations. For installations with ducted return, the grille must be removed prior to place the machine on the roof curb.

Installation on the roof

First of all, an opening in the steel pan has to be prepared for the installation of the roof curb. The roof curb will be supported on some joists placed for this purpose in the roof.



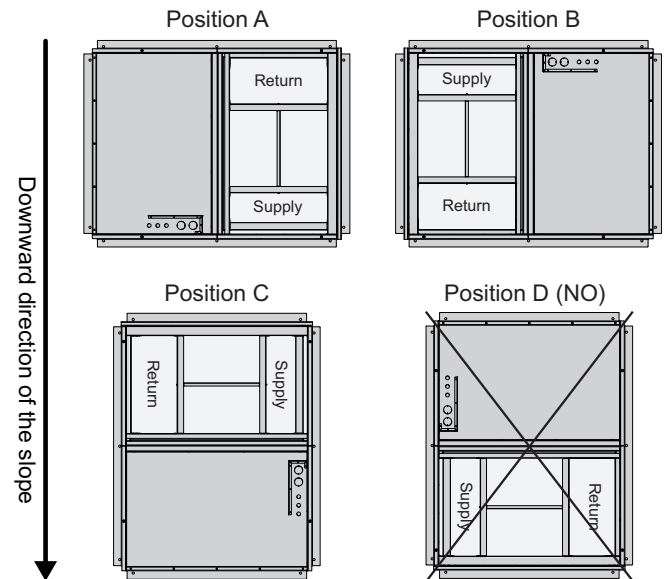
The dimensions of this opening should be as follows:

Dimensions (mm)	L1	L2
0090 to 0190	1968	1485
0200 to 0240	2738	1934
0280 to 0400	3391	1934



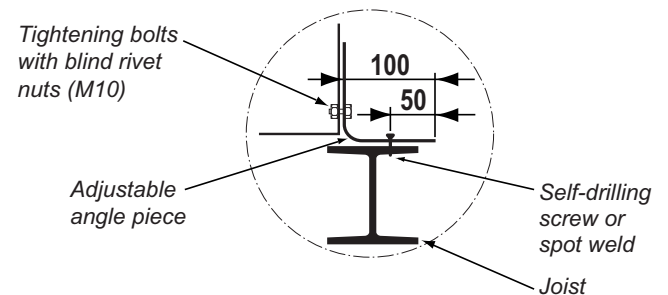
It is mandatory to use all required PPE for work at height.

Place the roof curb on the joists and check that it has been positioned in the right direction.

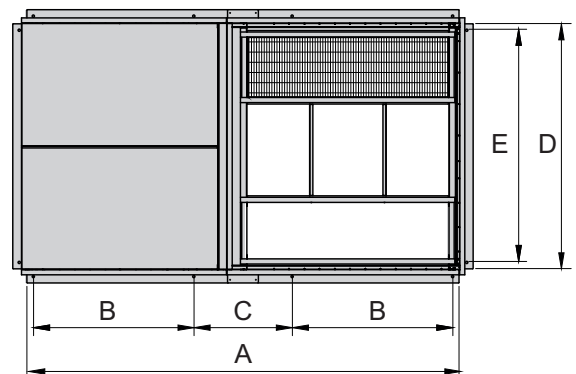


Note: Position A is best suited for gas burner roof curb. In this position it is easier to access the burner register. It is also the most optimal solution in areas where snow can accumulate.

Next, the roof curb must be secured. To do this, the adjustable angle pieces of the roof curb must be fixed to the joists using self-drilling screws or electric spot welding.



The following image shows the position of the drills in the angle pieces (Ø 18mm):



Dimensions (mm)	A	B	C	D	E
0090 to 0190	1943	922	0	1460	1360
0200 to 0240	2713	1307	0	1909	1809
0280 to 0400	3366	1250	766	1909	1809

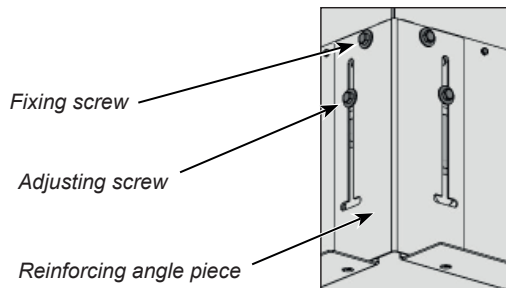
7 - POSITIONING AND INSTALLATION

The next step will be to check the leveling of the roof curb.

The roof curb is shipped from the factory with its minimum height.

The fixing screws of the reinforcing angle pieces have to be removed and all the adjusting screws have to be loosened. At that time the roof curb can be aligned to correct the angle of the roof. It is recommended to use a leveler.

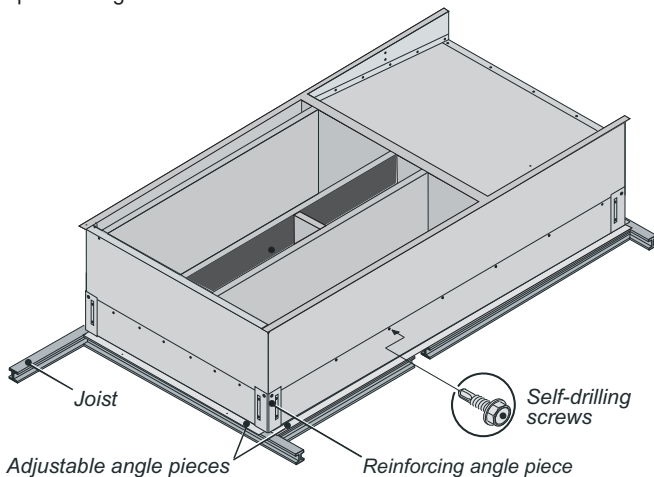
The eyebolts and the lifting slings can be used to carry out leveling.



When the roof curb is perfectly level, the adjusting screws must be tightened again and the fixing screws must be placed.

At this time the transport eyebolts must be removed.

Then, the adjustable angle pieces must be fixed with 4.8 hexagonal self-drilling screws (supplied from the factory) or by means of electric spot welding.

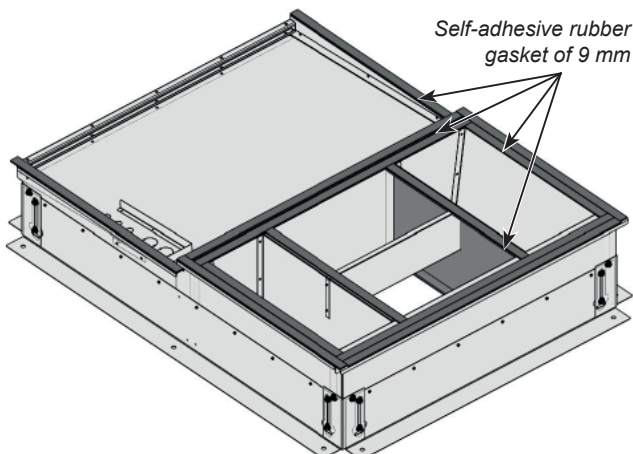


Insulation and waterproof sealing

Following insulation is standard for the roof curb:

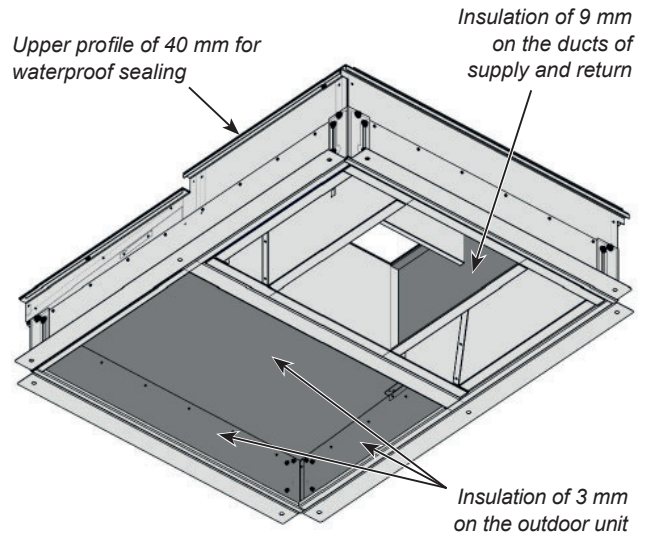
- Self-adhesive rubber gasket of 9 mm around its entire perimeter and the crossbeams.

Important: Before installing the rooftop unit, the status of this gasket must be checked. If it is not in good condition it should be replaced.



- Thermal insulation of 9 mm on the outer faces of the ducts of supply and return. It is only placed inside the supply duct in the case of burner roof curb (in which case the optional insulation A2-s1, d0 (M0) can be selected).
- Insulation of 3 mm on the panels that support the outdoor unit to prevent condensation build-up.

Note: Acoustic and thermal insulation in this part of the roof curb is recommended.



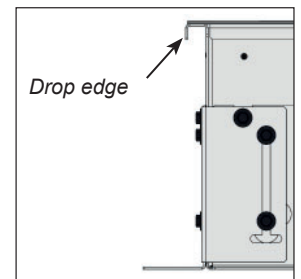
When the installation of the roof curb is finished, the steel pan must be insulated again. It is also necessary to completely seal the roof curb to ensure tightness and prevent water from entering the building.

Important: These works are the sole responsibility of the installer.

Caution: it is strictly forbidden to get onto the roof curb.

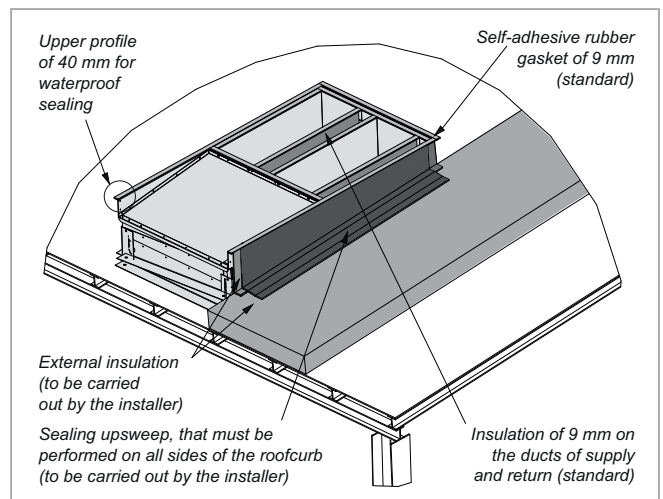
The upstream of the sealing must always end below the drop edge of the roof curb.

This sealing must be continuous around the roof curb. Check all joints.



Follow the recommendations given in the following pictures:

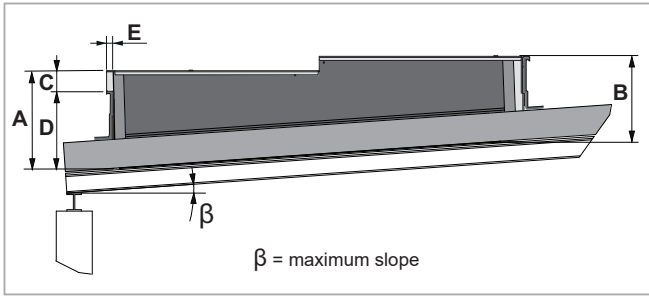
Detail of the roof curb installed on the roof (position C):



7 - POSITIONING AND INSTALLATION

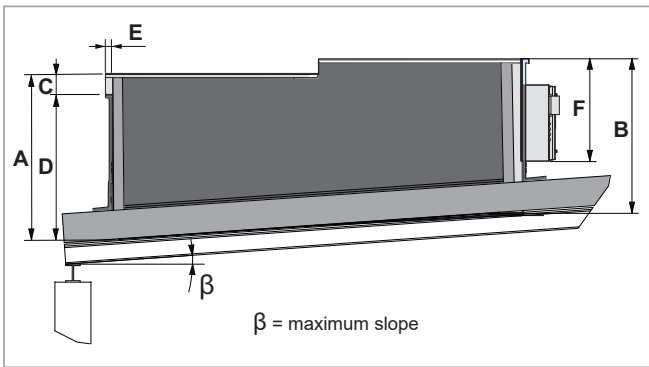
Side view after installation on roof (position C):

Standard roof curb



Dimensions (mm)		A	B	C	D	E	β
Standard roof curb	0090 to 0190	472	440	103	369	34	3° (5,1%)
	0200 to 0240	510	440	103	407	34	3° (5,5%)
	0280 to 0400	486	440	103	383	34	2° (4,0%)

Burner roof curb

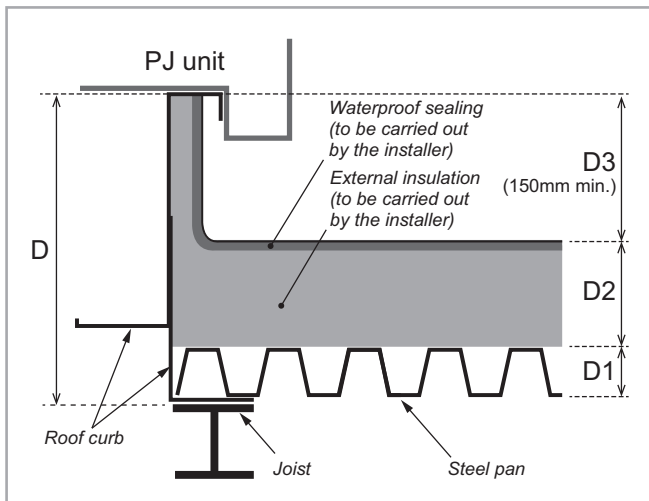


Dimensions (mm)		A	B	C	D	E	F	β
Burner roof curb	0090 to 0190	782	750	103	679	34	490	3° (5,1%)
	0200 to 0240	822	750	103	719	34	490	3° (5,5%)
	0280 to 0400	855	752	103	752	34	490	2° (4,0%)

Important: Check that the roof curb height is sufficient to respect the minimum sealing height required according to local regulations (example: 150 mm minimum sealing height in France according to DTU).

To do this, check that the dimension "D" of the roof curb exceeds the thickness of the steel pan "D1" plus the insulation "D2" plus the minimum sealing distance required "D3".

$$D \text{ (mm)} \geq D1 + D2 + D3 \text{ (150 mm min.)}$$



It is mandatory that the installer performs a waterproofness test on the roof curb when finished with the sealing, both to the side sealing and to the surface of the roof curb itself, in anticipation that during transport and lifting its tightness could have deteriorated.

PARA GARANTIZAR LA ESTANQUEIDAD DE LA BANCADA DESPUÉS DE LA INSTALACIÓN, HAY QUE REVISAR QUE TODAS LAS JUNTAS Y UNIONES ESTÉN EN PERFECTO ESTADO. ES NECESARIO ASEGURAR LA ESTANQUEIDAD Y LA SUJECCIÓN DEL EQUIPO Y LA BANCADA DESPUÉS DE MONTAR EL CONJUNTO

IN ORDER TO GUARANTEE THE ROOFCURB TIGHTNESS AFTER THE INSTALLATION, THE PERFECT CONDITION OF ALL SEAMS AND JOINTS SHOULD BE REVISED. IT IS NECESSARY TO ENSURE THE TIGHTNESS AND FASTENING OF THE UNIT AND THE ROOFCURB AFTER MOUNTING THE ASSEMBLY.

POUR GARANTIR L'ÉTANCHÉITÉ DE L'EMBASE APRÈS L'INSTALLATION, IL FAUT RÉVISER QUE TOUS LES RACCORDS ET JOINTS SOIENT EN PARFAIT ÉTAT. IL EST NÉCESSAIRE DE S'ASSURER DE L'ÉTANCHÉITÉ ET LA FIXATION DE L'UNITÉ ET L'EMBASE APRÈS LE MONTAGE.

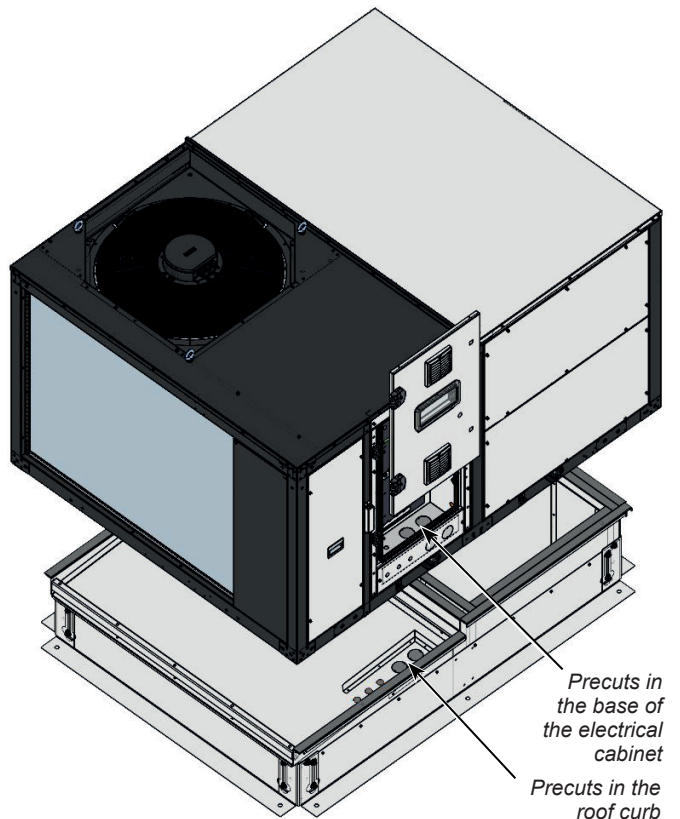
Passage of the electrical cables through the roof curb

The power and control cables can be routed into the electric cabinet of the unit via the panel located under the electric cabinet or via the base of the unit, depending on the client's requirements.

If the connection of the power cables is to be carried out via the machine base they will have to go through the roof curb using the sheet metal precuts for this purpose.

These precuts are located in the roof curb area below the electric cabinet. Its position can be consulted in the dimensional drawings.

Note: The position of the electrical cabinet is different for RPJ and IPJ on 0200 to 0380 models. The roof curb incorporates precuts in both positions for the installer to use as needed.



Note: Refer to Chapter 8 for more detailed information on the electrical wiring of the unit.



Important: The installer must ensure the sealing in all the precuts after passing through them the hoses of the power supply.

7 - POSITIONING AND INSTALLATION

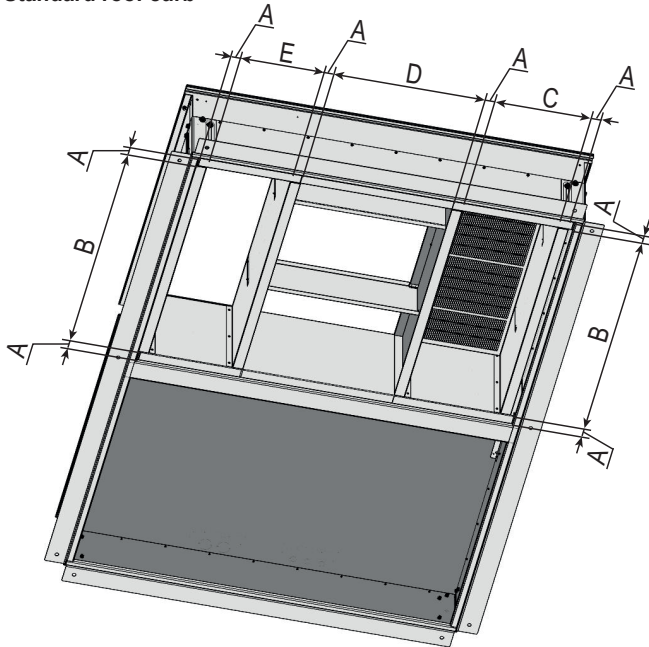
Air ducts connections

For units with vertical airflow, the ducts must be connected to the profiles from underneath the roof curb.

In order to carry out the air ducts follow the recommendations in the paragraph 9.4 "Air ducts connections".

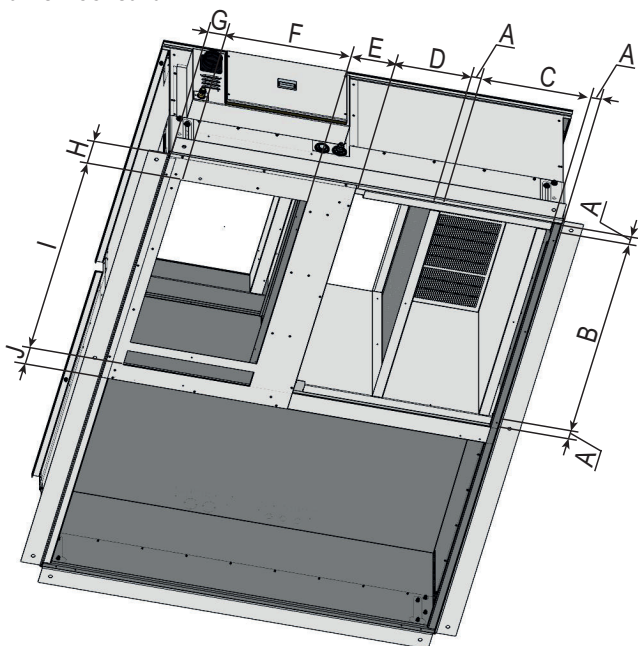
The thickness of the sheet metal profiles to connect the discharge and/or return ducts to the roof curb are shown in the following tables:

Standard roof curb



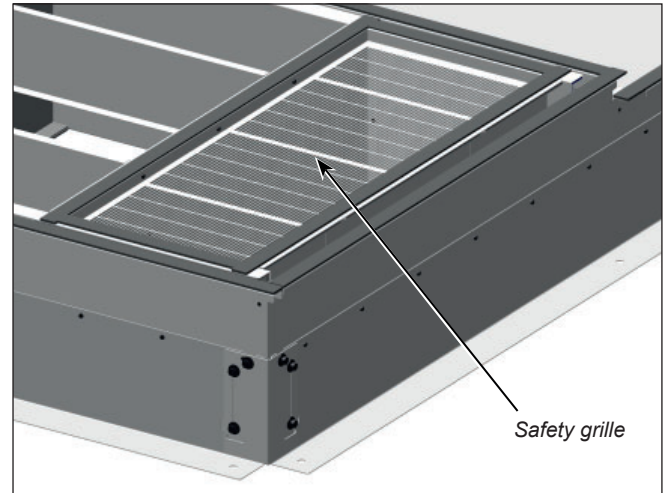
Dimensions (mm)		A	B	C	D	E
Standard roof curb	0090 to 0190	50	798	321	619	243
	0200 to 0240	50	1234	470	745	410
	0280 to 0400	50	1575	470	715	410

Burner roof curb



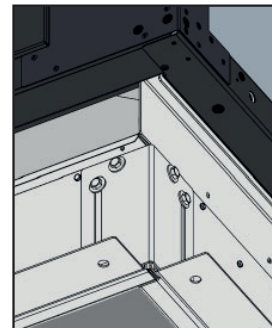
Dimensions (mm)		A	B	C	D	E	F	G	H	I	J
Burner roof curb	0090 to 0190	50	797	373	0	275	631	52	155	770	89
	0200 to 0240	50	1229	470	376	207	619	85	155	1219	101
	0280 to 0400	50	1570	470	373	126	704	85	155	1491	198

Important: All roof curb are supplied with a return safety grille intended for plenum installations. For installations with ducted return, the grille must be removed prior to place the machine on the roof curb. This grille is fastened using 4.8 self-tapping hex screws.

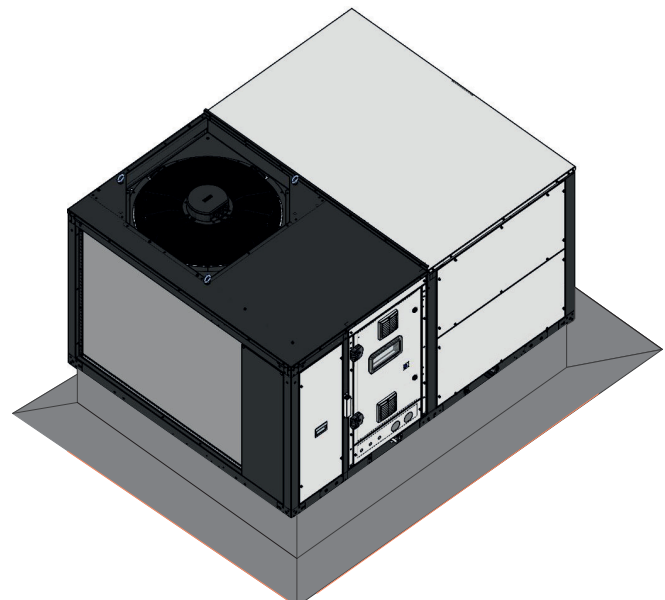


Positioning the unit above the roof curb

Once the previous work has been carried out, the rooftop unit can be positioned above the roof curb with the help of a crane. For the handling of the unit, the recommendations given in chapter 5 should be followed. Suction cup handles can be used to guide this operation.



The machine fits perfectly on the roof curb, no connecting element is necessary.



7 - POSITIONING AND INSTALLATION

7.5 Centres of gravity, weight and reactions in the supports: RPJ series (Cross flow)

RPJ	C0 assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0090	1.083	779	554	594	93	154	84	70	131	61
0120	1.066	791	567	617	98	158	83	77	137	62
0140	1.048	761	572	699	119	183	95	87	151	63
0160	1.050	762	572	698	118	183	95	86	151	64
0180	1.049	763	579	704	119	185	96	87	153	64
0190	1.049	761	576	701	119	184	96	87	152	64

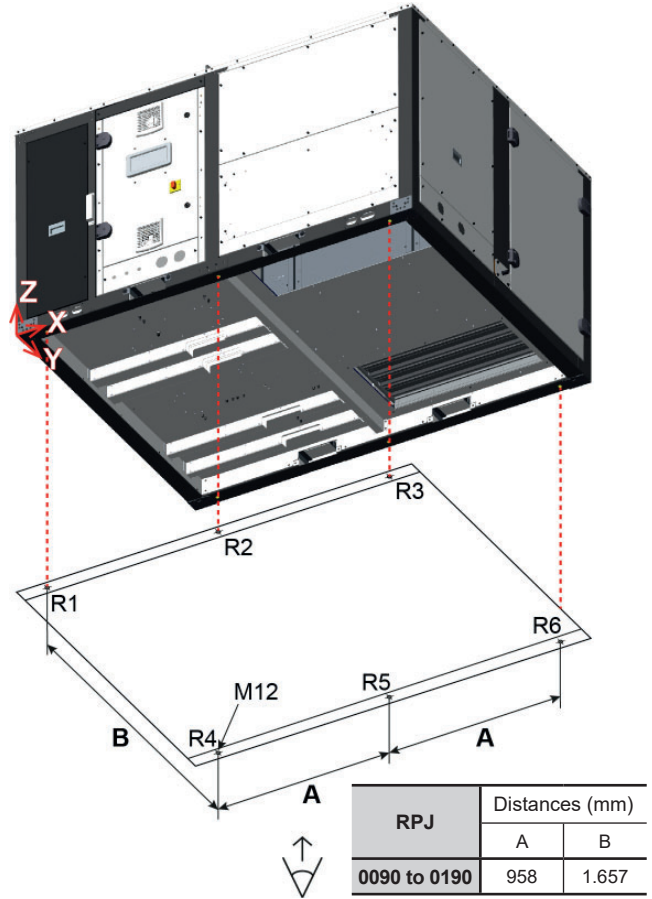
RPJ	CS and CF assemblies									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0090	1.104	803	558	609	90	155	87	72	137	69
0120	1.087	814	570	632	94	159	86	79	144	70
0140	1.065	783	571	718	116	185	98	89	159	71
0160	1.065	783	571	718	116	185	98	89	159	71
0180	1.064	784	581	718	116	185	98	89	159	71
0190	1.064	782	575	720	116	186	98	89	159	71

RPJ	CK assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0090	1.162	868	629	682	82	165	99	79	162	96
0120	1.145	876	638	705	87	169	98	86	169	97
0140	1.120	841	631	796	108	197	111	97	185	99
0160	1.120	841	631	796	108	197	111	97	185	99
0180	1.119	841	640	796	109	196	110	97	185	99
0190	1.119	840	635	798	109	197	111	97	185	99

RPJ	CA assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0090	1.183	890	615	713	79	169	104	82	173	107
0120	1.165	896	624	736	83	174	103	89	179	108
0140	1.134	857	621	815	105	199	114	99	192	107
0160	1.134	857	621	815	105	199	114	99	192	107
0180	1.133	857	630	815	105	198	113	99	192	107
0190	1.133	856	625	817	106	199	114	99	192	107

RPJ	CP assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0090	1.187	897	617	723	78	170	105	83	176	110
0120	1.170	903	626	746	83	175	104	90	182	112
0140	1.144	863	621	831	104	202	117	100	197	112
0160	1.144	863	621	831	104	202	117	100	197	112
0180	1.138	862	631	828	105	201	115	100	196	110
0190	1.143	862	625	833	105	202	117	100	197	112

RPJ	CR assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0090	1.163	934	613	781	83	178	103	101	196	120
0120	1.148	939	620	804	88	183	102	108	203	121
0140	1.102	926	614	900	112	207	106	129	224	123
0160	1.102	926	614	900	112	207	106	129	224	123
0180	1.101	927	622	897	111	206	105	129	223	122
0190	1.101	925	618	902	112	208	106	129	224	123



RPJ	CQ assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0090	1.222	804	796	774	91	197	134	67	174	111
0120	1.205	813	800	797	96	202	133	74	180	112
0140	1.177	787	779	882	117	228	145	84	195	113
0160	1.177	787	779	882	117	228	145	84	195	113
0180	1.176	788	787	882	117	228	145	84	195	113
0190	1.176	787	782	884	118	228	146	85	195	113

RPJ	CT assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0090	1.200	850	780	832	98	206	132	84	193	119
0120	1.184	857	782	855	103	211	131	91	199	120
0140	1.138	849	764	951	124	234	135	112	222	123
0160	1.138	849	764	951	124	234	135	112	222	123
0180	1.138	850	772	951	124	234	135	113	222	123
0190	1.137	848	767	953	125	234	135	113	222	123

RPJ	CW assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0090	1.301	1.243	719	976	87	242	182	72	226	167
0120	1.286	1.240	724	999	94	248	183	77	231	166
0140	1.258	1.188	713	1.088	130	249	211	89	240	170
0160	1.258	1.188	713	1.088	130	249	211	89	240	170
0180	1.257	1.189	719	1.088	130	249	211	89	240	170
0190	1.257	1.187	715	1.091	131	250	211	89	240	170

Note: This is the weight of the standard unit and it can be increased depending on the selected options. Check the total weight on the unit's data plate.

7 - POSITIONING AND INSTALLATION

7.5 Centres of gravity, weight and reactions in the supports: RPJ series (Cross flow)

RPJ	C0 assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0200	1.377	1.046	564	914	147	227	106	132	211	91
0220	1.377	1.046	564	929	150	230	108	134	215	92
0240	1.369	1.040	563	936	154	233	108	136	215	90

RPJ	CS and CF assemblies									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0200	1.396	1.067	562	946	146	232	110	136	222	100
0220	1.393	1.070	561	967	150	236	111	140	227	102
0240	1.387	1.066	561	969	152	237	111	141	227	101

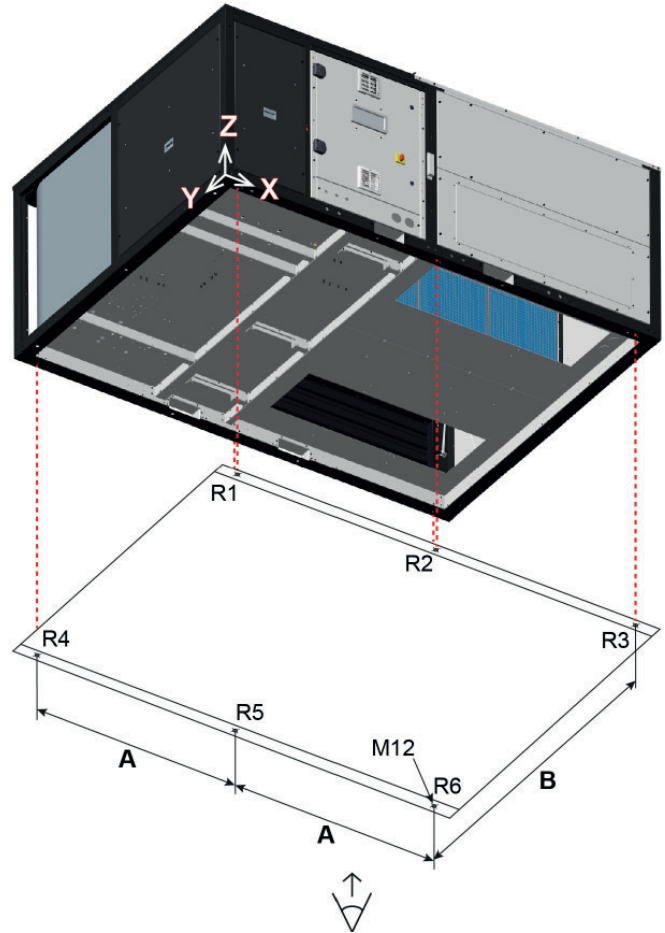
RPJ	CK assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0200	1.476	1.138	622	1.047	135	245	126	147	257	138
0220	1.476	1.138	622	1.062	137	248	128	149	260	140
0240	1.467	1.131	620	1.070	141	252	128	151	261	138

RPJ	CA assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0200	1.494	1.153	608	1.090	135	253	132	152	270	149
0220	1.491	1.155	607	1.111	137	257	133	156	275	152
0240	1.485	1.151	606	1.112	140	258	133	156	275	150

RPJ	CP assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0200	1.512	1.167	609	1.120	132	257	137	155	280	160
0220	1.509	1.170	608	1.141	135	261	138	159	285	163
0240	1.503	1.165	607	1.142	137	262	138	159	285	161

RPJ	CR assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0200	1.487	1.204	607	1.211	141	271	135	180	310	174
0220	1.484	1.206	606	1.232	144	275	137	184	315	177
0240	1.479	1.201	605	1.233	146	276	137	185	315	175

RPJ	CQ assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0200	1.565	1.047	796	1.213	154	302	184	132	280	162
0220	1.565	1.047	796	1.228	156	305	186	134	283	163
0240	1.556	1.042	792	1.236	161	309	186	136	284	161



RPJ	Distances (mm)	
	A	B
0200 to 0240	1.356	2.108

RPJ	CT assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0200	1.523	1.068	789	1.304	172	320	183	157	305	168
0220	1.520	1.070	787	1.319	174	323	184	160	309	169
0240	1.514	1.067	785	1.327	177	326	184	162	310	168

RPJ	CW assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0200	1.661	1.515	696	1.470	146	350	233	150	354	237
0220	1.658	1.516	695	1.491	149	355	236	153	359	239
0240	1.652	1.509	694	1.493	152	357	236	153	358	237

Note: This is the weight of the standard unit and it can be increased depending on the selected options. Check the total weight on the unit's data plate.

7 - POSITIONING AND INSTALLATION

7.5 Centres of gravity, weight and reactions in the supports: RPJ series (Cross flow)

RPJ	C0 assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0280	1.628	1.054	564	1.035	173	256	112	158	241	97
0320	1.628	1.054	564	1.059	176	261	115	161	246	99
0360	1.644	1.055	572	1.057	174	261	117	158	246	102
0380	1.634	1.048	569	1.078	180	267	119	162	249	101

RPJ	CS and CF assemblies									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0280	1.659	1.080	563	1.070	169	260	116	162	253	110
0320	1.659	1.080	563	1.094	173	265	119	166	259	112
0360	1.667	1.074	569	1.112	176	271	123	166	262	114
0380	1.664	1.074	568	1.113	176	271	123	167	262	114

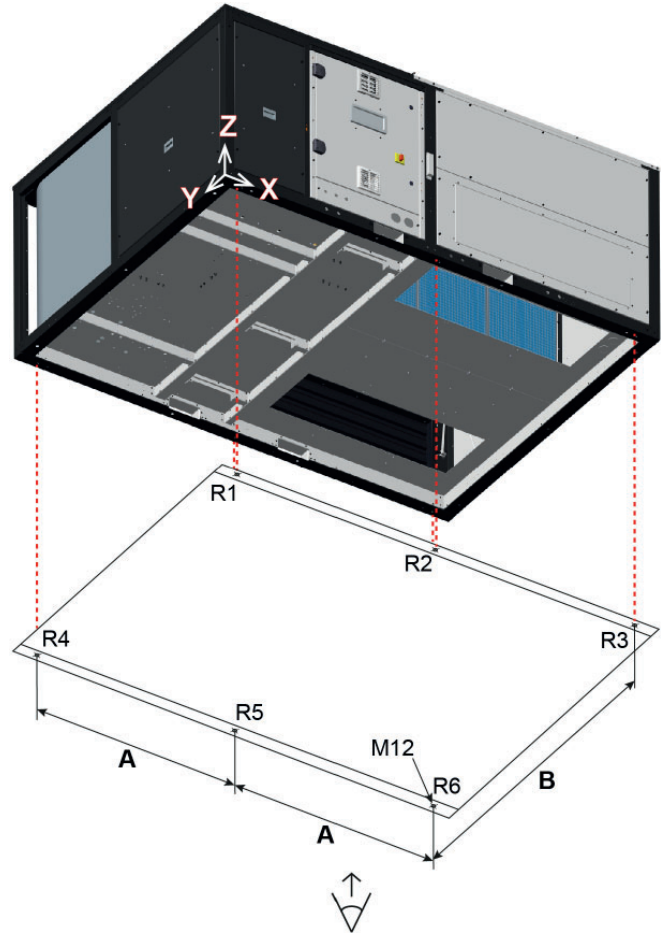
RPJ	CK assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0280	1.749	1.139	624	1.197	163	280	135	177	294	149
0320	1.749	1.139	624	1.221	166	285	138	180	299	152
0360	1.750	1.139	629	1.230	167	288	139	182	302	153
0380	1.747	1.139	629	1.231	168	288	139	182	302	153

RPJ	CA assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0280	1.784	1.168	608	1.248	158	286	142	184	312	167
0320	1.784	1.168	608	1.272	161	292	144	187	318	171
0360	1.790	1.162	613	1.290	163	297	149	187	321	173
0380	1.787	1.161	612	1.291	164	297	148	188	321	172

RPJ	CP assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0280	1.798	1.171	611	1.276	158	292	147	186	320	174
0320	1.798	1.171	611	1.300	161	297	149	189	326	178
0360	1.798	1.172	616	1.309	162	299	150	191	328	179
0380	1.795	1.171	615	1.310	163	300	150	191	328	179

RPJ	CR assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0280	1.781	1.208	611	1.379	167	308	148	211	353	193
0320	1.781	1.208	611	1.403	169	313	150	215	359	196
0360	1.786	1.202	615	1.412	171	317	154	214	360	197
0380	1.784	1.201	615	1.413	171	317	153	215	360	197

RPJ	CQ assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0280	1.852	1.058	787	1.371	184	339	194	163	318	173
0320	1.852	1.058	787	1.395	187	345	197	166	324	176
0360	1.857	1.053	791	1.413	189	350	202	166	327	179
0380	1.855	1.053	789	1.414	190	350	201	167	327	178



RPJ	Distances (mm)	
	A	B
0280 to 0380	1.683	2.108

RPJ	CT assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0280	1.831	1.090	771	1.474	195	357	196	188	350	189
0320	1.831	1.090	771	1.498	198	362	199	191	355	192
0360	1.836	1.085	775	1.516	200	368	204	191	359	195
0380	1.833	1.085	774	1.517	201	368	204	191	359	194

RPJ	CW assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0280	1.976	1.513	692	1.660	178	396	251	181	399	254
0320	1.976	1.513	692	1.684	181	402	255	183	405	258
0360	1.979	1.506	695	1.702	184	408	260	183	408	260
0380	1.977	1.505	694	1.703	185	409	260	183	407	259

Note: This is the weight of the standard unit and it can be increased depending on the selected options. Check the total weight on the unit's data plate.

7 - POSITIONING AND INSTALLATION

7.5 Centres of gravity, weight and reactions in the supports: RPJ series (Tunnel flow)

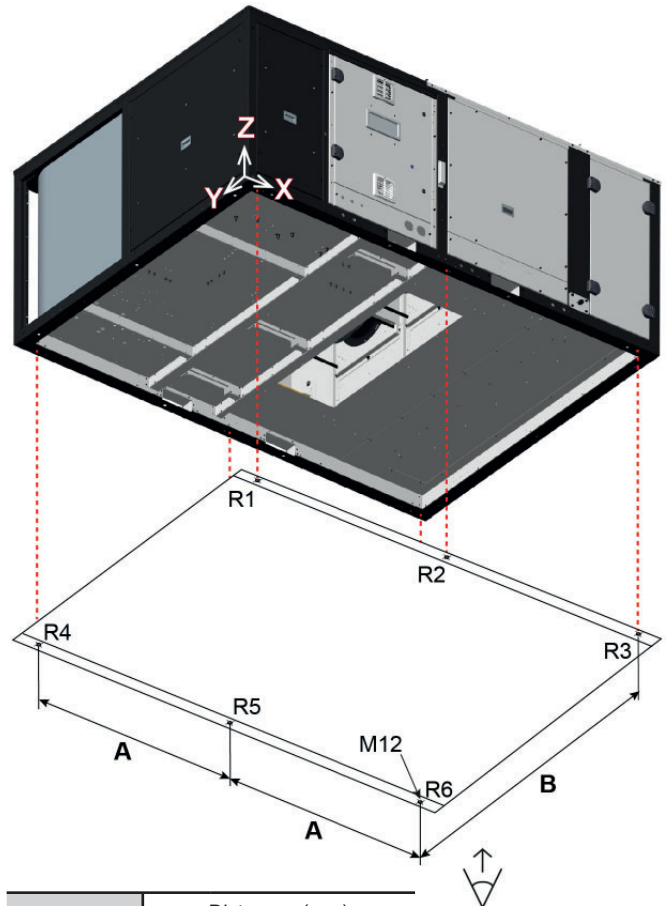
RPJ	T0 assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0200	1.402	1.104	569	972	144	232	108	145	234	110
0220	1.399	1.107	568	993	147	237	110	149	239	112
0240	1.393	1.103	568	994	149	238	109	150	239	110
0280	1.607	1.106	571	1.068	173	255	104	175	257	105
0320	1.607	1.106	571	1.092	177	261	106	179	263	108
0360	1.608	1.106	578	1.111	179	265	108	182	267	110
0380	1.606	1.106	577	1.111	180	265	107	182	267	110

RPJ	TS assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0200	1.461	1.103	570	1.010	138	242	124	139	243	125
0220	1.458	1.106	569	1.031	141	246	125	143	248	127
0240	1.452	1.102	569	1.033	144	247	125	144	248	126
0280	1.658	1.104	571	1.105	171	264	116	172	266	117
0320	1.658	1.104	571	1.129	174	270	118	176	271	120
0360	1.659	1.105	577	1.147	177	274	120	178	276	122
0380	1.657	1.105	576	1.148	177	274	120	179	276	122

RPJ	TP assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0200	1.732	1.103	535	1.180	197	282	110	198	283	111
0220	1.728	1.105	534	1.201	201	287	110	203	289	112
0240	1.720	1.101	535	1.202	203	288	109	204	288	110
0280	1.866	1.103	615	1.294	161	310	176	161	310	176
0320	1.866	1.103	615	1.318	164	316	180	164	315	179
0360	1.866	1.104	620	1.336	167	320	182	166	320	181
0380	1.863	1.103	619	1.337	167	321	181	167	320	181

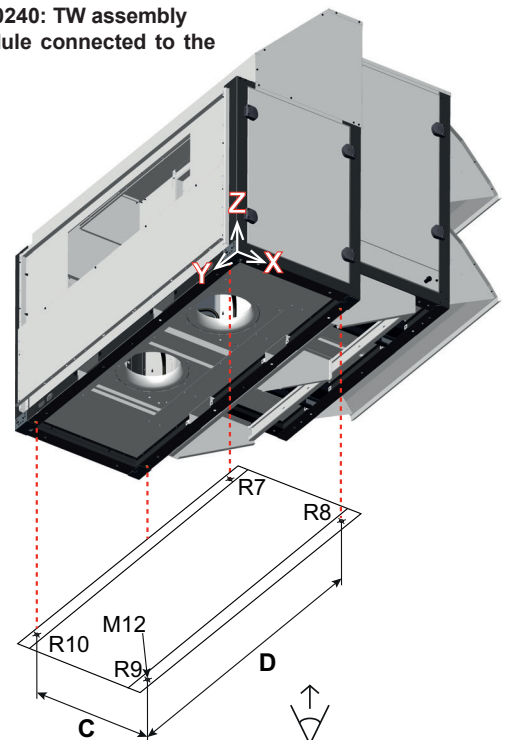
RPJ	TW assembly (machine + recovery module)							
	Centre of gravity: machine (mm)			Centre of gravity: module (mm)			Machine weight (kg)	Module weight (kg)
	X	Y	Z	X	Y	Z		
0200	1.345	1.105	568	905	1.093	864	957	719
0220	1.342	1.108	567	905	1.093	864	978	719
0240	1.337	1.103	567	905	1.093	864	980	719
0280	2.364	1.102	693	--	--	--	1.247	454
0320	2.364	1.102	693	--	--	--	1.271	454
0360	2.362	1.103	697	--	--	--	1.289	454
0380	2.358	1.102	696	--	--	--	1.290	454

RPJ	TW assembly (machine + recovery module)										
	Total weight (kg)	Reactions in the supports (kg)									
		R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
0200	1.676	132	230	118	131	229	117	150	214	209	146
0220	1.697	135	234	120	135	234	120	150	214	209	146
0240	1.699	137	235	119	136	234	118	150	214	209	146
0280	1.701	189	408	256	187	407	254	--	--	--	--
0320	1.725	192	414	259	190	412	258	--	--	--	--
0360	1.743	194	418	261	193	417	260	--	--	--	--
0380	1.744	195	419	260	194	417	259	--	--	--	--



RPJ	Distances (mm)			
	A	B	C	D
0200 to 0240	1.356	2.108	766	1.916
0280 to 0380	1.683	2.108	--	--

RPJ - 0200 to 0240: TW assembly
Recovery module connected to the machine



Note: This is the weight of the standard unit and it can be increased depending on the selected options. Check the total weight on the unit's data plate.

7 - POSITIONING AND INSTALLATION

7.5 Centres of gravity, weight and reactions in the supports: IPJ series (Cross flow)

IPJ	C0 assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0090	1.083	779	554	594	93	154	84	70	131	61
0120	1.066	791	567	617	98	158	83	77	137	62
0140	1.048	761	572	699	119	183	95	87	151	63
0160	1.050	762	572	698	118	183	95	86	151	64
0180	1.049	763	579	704	119	185	96	87	153	64
0190	1.049	761	576	701	119	184	96	87	152	64

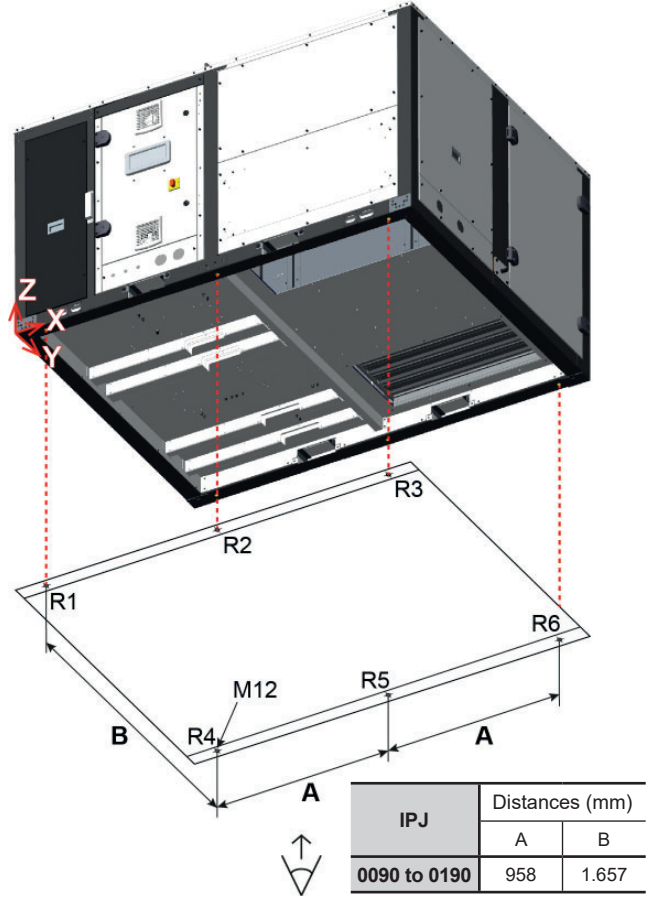
IPJ	CS and CF assemblies									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0090	1.104	803	558	609	90	155	87	72	137	69
0120	1.087	814	570	632	94	159	86	79	144	70
0140	1.065	783	571	718	116	185	98	89	159	71
0160	1.065	783	571	718	116	185	98	89	159	71
0180	1.064	784	581	718	116	185	98	89	159	71
0190	1.064	782	575	720	116	186	98	89	159	71

IPJ	CK assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0090	1.162	868	629	682	82	165	99	79	162	96
0120	1.145	876	638	705	87	169	98	86	169	97
0140	1.120	841	631	796	108	197	111	97	185	99
0160	1.120	841	631	796	108	197	111	97	185	99
0180	1.119	841	640	796	109	196	110	97	185	99
0190	1.119	840	635	798	109	197	111	97	185	99

IPJ	CA assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0090	1.183	890	615	713	79	169	104	82	173	107
0120	1.165	896	624	736	83	174	103	89	179	108
0140	1.134	857	621	815	105	199	114	99	192	107
0160	1.134	857	621	815	105	199	114	99	192	107
0180	1.133	857	630	815	105	198	113	99	192	107
0190	1.133	856	625	817	106	199	114	99	192	107

IPJ	CP assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0090	1.187	897	617	723	78	170	105	83	176	110
0120	1.170	903	626	746	83	175	104	90	182	112
0140	1.144	863	621	831	104	202	117	100	197	112
0160	1.144	863	621	831	104	202	117	100	197	112
0180	1.138	862	631	828	105	201	115	100	196	110
0190	1.143	862	625	833	105	202	117	100	197	112

IPJ	CR assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0090	1.163	934	613	781	83	178	103	101	196	120
0120	1.148	939	620	804	88	183	102	108	203	121
0140	1.102	926	614	900	112	207	106	129	224	123
0160	1.102	926	614	900	112	207	106	129	224	123
0180	1.101	927	622	897	111	206	105	129	223	122
0190	1.101	925	618	902	112	208	106	129	224	123



IPJ	CQ assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0090	1.222	804	796	774	91	197	134	67	174	111
0120	1.205	813	800	797	96	202	133	74	180	112
0140	1.177	787	779	882	117	228	145	84	195	113
0160	1.177	787	779	882	117	228	145	84	195	113
0180	1.176	788	787	882	117	228	145	84	195	113
0190	1.176	787	782	884	118	228	146	85	195	113

IPJ	CT assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0090	1.200	850	780	832	98	206	132	84	193	119
0120	1.184	857	782	855	103	211	131	91	199	120
0140	1.138	849	764	951	124	234	135	112	222	123
0160	1.138	849	764	951	124	234	135	112	222	123
0180	1.138	850	772	951	124	234	135	113	222	123
0190	1.137	848	767	953	125	234	135	113	222	123

IPJ	CW assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0090	1.301	1.243	719	976	87	242	182	72	226	167
0120	1.286	1.240	724	999	94	248	183	77	231	166
0140	1.258	1.188	713	1.088	130	249	211	89	240	170
0160	1.258	1.188	713	1.088	130	249	211	89	240	170
0180	1.257	1.189	719	1.088	130	249	211	89	240	170
0190	1.257	1.187	715	1.091	131	250	211	89	240	170

Note: This is the weight of the standard unit and it can be increased depending on the selected options. Check the total weight on the unit's data plate.

7 - POSITIONING AND INSTALLATION

7.5 Centres of gravity, weight and reactions in the supports: IPJ series (Cross flow)

IPJ	C0 assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0200	1.377	1.046	564	986	159	245	114	142	228	98
0220	1.377	1.046	564	986	159	244	114	142	228	98
0240	1.369	1.040	563	1.004	165	250	116	146	231	97

IPJ	CS and CF assemblies									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0200	1.396	1.067	562	1.018	157	249	118	147	239	108
0220	1.393	1.070	561	1.024	158	250	118	149	241	108
0240	1.387	1.066	561	1.037	162	254	119	151	243	108

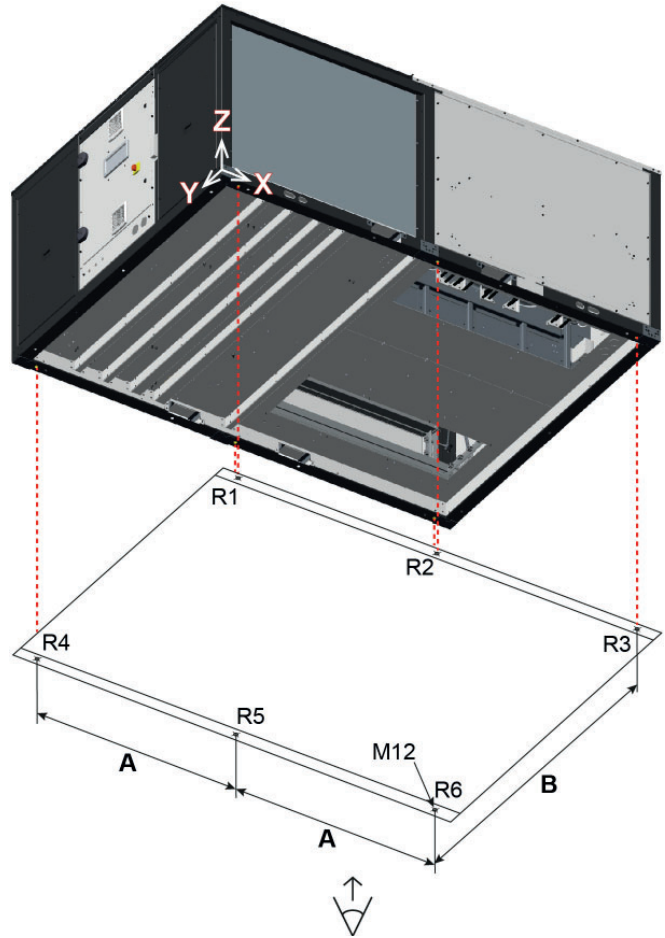
IPJ	CK assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0200	1.476	1.138	622	1.119	144	262	134	157	274	147
0220	1.476	1.138	622	1.119	144	262	134	157	274	147
0240	1.467	1.131	620	1.138	150	267	136	160	278	146

IPJ	CA assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0200	1.494	1.153	608	1.162	143	269	141	162	288	159
0220	1.491	1.155	607	1.168	144	270	140	164	290	160
0240	1.485	1.151	606	1.180	148	274	141	166	292	159

IPJ	CP assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0200	1.512	1.167	609	1.192	140	273	146	165	298	170
0220	1.509	1.170	608	1.198	141	274	145	167	300	171
0240	1.503	1.165	607	1.210	145	278	146	169	302	170

IPJ	CR assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0200	1.487	1.204	607	1.283	149	287	143	191	328	185
0220	1.484	1.206	606	1.289	150	288	143	193	330	185
0240	1.479	1.201	605	1.301	154	291	144	195	332	185

IPJ	CQ assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0200	1.565	1.047	796	1.285	164	320	195	140	296	171
0220	1.565	1.047	796	1.285	164	320	195	140	296	171
0240	1.556	1.042	792	1.304	169	325	196	143	299	170



IPJ	Distances (mm)	
	A	B
0200 to 0240	1.356	2.108

IPJ	CT assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0200	1.523	1.068	789	1.376	182	338	193	166	322	177
0220	1.520	1.070	787	1.376	182	337	192	167	322	177
0240	1.514	1.067	785	1.395	186	343	194	170	326	177

IPJ	CW assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0200	1.661	1.515	696	1.542	153	368	245	157	371	248
0220	1.658	1.516	695	1.548	155	369	245	158	373	249
0240	1.652	1.509	694	1.561	159	374	247	160	374	247

Note: This is the weight of the standard unit and it can be increased depending on the selected options. Check the total weight on the unit's data plate.

7 - POSITIONING AND INSTALLATION

7.5 Centres of gravity, weight and reactions in the supports: IPJ series (Cross flow)

IPJ	C0 assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0280	1.628	1.054	564	1.146	191	283	124	174	266	107
0320	1.628	1.054	564	1.146	191	283	124	174	266	107
0360	1.644	1.055	572	1.135	186	280	125	170	264	109
0380	1.634	1.048	569	1.160	193	287	128	174	268	109
0400	1.634	1.048	569	1.186	197	292	132	178	272	113

IPJ	CS and CF assemblies									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0280	1.659	1.080	563	1.181	187	287	128	179	279	121
0320	1.659	1.080	563	1.181	187	287	128	179	279	121
0360	1.667	1.074	569	1.190	188	290	132	178	280	122
0380	1.664	1.074	568	1.195	189	291	132	179	281	122
0400	1.664	1.074	568	1.221	193	295	136	183	285	126

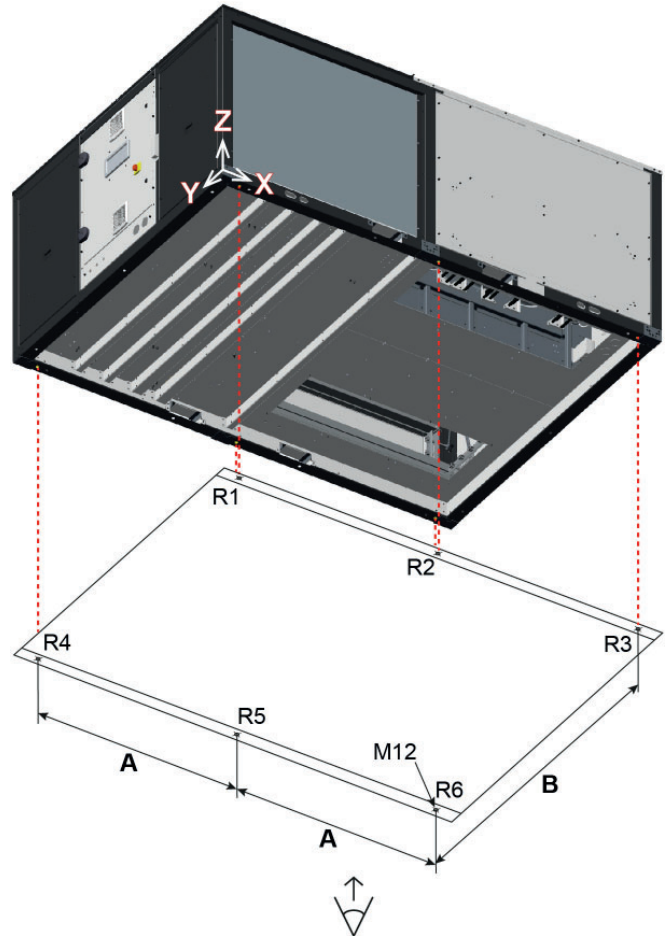
IPJ	CK assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0280	1.749	1.139	624	1.308	178	306	148	193	321	163
0320	1.749	1.139	624	1.308	178	306	148	193	321	163
0360	1.750	1.139	629	1.308	178	306	148	193	321	163
0380	1.747	1.139	629	1.313	179	307	148	194	322	163
0400	1.747	1.139	629	1.339	183	311	152	198	326	167

IPJ	CA assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0280	1.784	1.168	608	1.359	172	312	154	200	340	182
0320	1.784	1.168	608	1.359	172	312	154	200	340	182
0360	1.790	1.162	613	1.368	173	315	158	199	341	183
0380	1.787	1.161	612	1.373	174	316	158	200	342	183
0400	1.787	1.161	612	1.399	178	320	162	204	346	187

IPJ	CP assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0280	1.798	1.171	611	1.387	172	317	159	202	347	190
0320	1.798	1.171	611	1.387	172	317	159	202	347	190
0360	1.798	1.172	616	1.387	172	317	159	202	348	190
0380	1.795	1.171	615	1.392	173	318	159	203	349	190
0400	1.795	1.171	615	1.418	177	322	163	207	353	194

IPJ	CR assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0280	1.781	1.208	611	1.490	180	333	160	228	381	208
0320	1.781	1.208	611	1.490	180	333	160	228	381	208
0360	1.786	1.202	615	1.490	180	334	162	226	380	208
0380	1.784	1.201	615	1.495	181	335	162	227	381	208
0400	1.784	1.201	615	1.521	185	339	166	231	385	212

IPJ	CQ assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0280	1.852	1.058	787	1.482	199	366	210	177	344	187
0320	1.852	1.058	787	1.482	199	366	210	177	344	187
0360	1.857	1.053	791	1.491	200	370	213	175	345	189
0380	1.855	1.053	789	1.496	201	371	213	176	346	188
0400	1.855	1.053	789	1.522	205	375	217	180	350	192



IPJ	Distances (mm)	
	A	B
0280 to 0400	1.683	2.108

IPJ	CT assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0280	1.831	1.090	771	1.585	209	384	211	202	376	203
0320	1.831	1.090	771	1.585	209	384	211	202	376	203
0360	1.836	1.085	775	1.594	211	387	214	201	377	205
0380	1.833	1.085	774	1.599	212	388	215	202	378	205
0400	1.855	1.053	789	1.625	216	392	219	206	382	209

IPJ	CW assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0280	1.976	1.513	692	1.771	190	423	268	193	426	271
0320	1.976	1.513	692	1.771	190	423	268	193	426	271
0360	1.979	1.506	695	1.780	192	427	272	191	426	272
0380	1.977	1.505	694	1.785	194	428	273	192	427	271
0400	1.977	1.505	694	1.811	198	432	277	196	431	275

Note: This is the weight of the standard unit and it can be increased depending on the selected options. Check the total weight on the unit's data plate.

7 - POSITIONING AND INSTALLATION

7.5 Centres of gravity, weight and reactions in the supports: IPJ series (Tunnel flow)

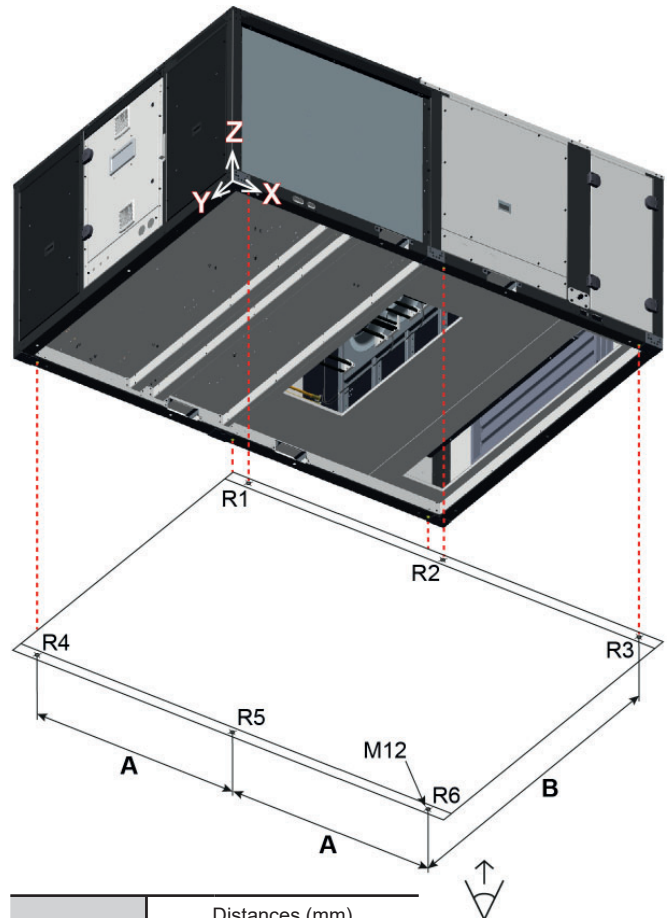
IPJ	T0 assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0200	1.402	1.104	569	1.044	154	249	116	156	251	118
0220	1.399	1.107	568	1.050	155	250	116	158	253	118
0240	1.393	1.103	568	1.062	159	254	117	160	255	118
0280	1.607	1.106	571	1.179	191	282	114	193	284	116
0320	1.607	1.106	571	1.179	191	282	114	193	284	116
0360	1.608	1.106	578	1.189	192	284	115	194	286	118
0380	1.606	1.106	577	1.193	193	285	115	195	287	118

IPJ	TS assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0200	1.461	1.103	570	1.082	148	259	133	149	260	134
0220	1.458	1.106	569	1.088	149	260	132	151	262	134
0240	1.452	1.102	569	1.101	153	263	133	153	264	134
0280	1.658	1.104	571	1.216	188	291	127	189	292	129
0320	1.658	1.104	571	1.216	188	291	127	189	292	129
0360	1.659	1.105	577	1.225	189	293	128	191	295	130
0380	1.657	1.105	576	1.230	190	294	129	192	296	130

IPJ	TP assembly									
	Centre of gravity (mm)			Weight (kg)	Reactions in the supports (kg)					
	X	Y	Z		R1	R2	R3	R4	R5	R6
0200	1.732	1.103	535	1.252	209	299	116	210	300	117
0220	1.728	1.105	534	1.258	210	300	115	212	302	117
0240	1.720	1.101	535	1.270	215	304	115	215	305	116
0280	1.866	1.103	615	1.405	175	337	191	175	336	191
0320	1.866	1.103	615	1.405	175	337	191	175	336	191
0360	1.866	1.104	620	1.414	176	339	192	176	339	192
0380	1.863	1.103	619	1.419	178	340	193	177	340	192

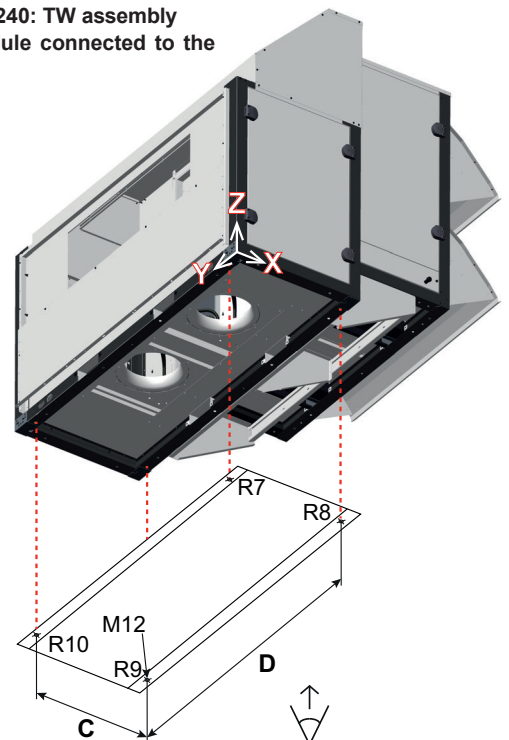
IPJ	TW assembly (machine + recovery module)							
	Centre of gravity: Machine (mm)			Centre of gravity: Module (mm)			Weight: Machine (kg)	Weight Module: (kg)
	X	Y	Z	X	Y	Z		
0200	1.345	1.105	568	905	1.093	864	1.029	719
0220	1.342	1.108	567	905	1.093	864	1.035	719
0240	1.337	1.103	567	905	1.093	864	1.048	719
0280	2.364	1.102	693	--	--	--	1.358	454
0320	2.364	1.102	693	--	--	--	1.358	454
0360	2.362	1.103	697	--	--	--	1.367	454
0380	2.358	1.102	696	--	--	--	1.372	454

IPJ	TW assembly (machine + recovery module)										
	Overall weight (kg)	Reactions in the supports (kg)									
		R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
0200	1.749	142	247	127	141	246	126	150	214	209	146
0220	1.755	143	248	127	143	248	127	150	214	209	146
0240	1.767	146	252	128	145	250	127	150	214	209	146
0280	1.812	201	435	272	200	433	271	--	--	--	--
0320	1.812	201	435	272	200	433	271	--	--	--	--
0360	1.822	203	437	273	202	436	271	--	--	--	--
0380	1.826	204	438	273	203	437	271	--	--	--	--



IPJ	Distances (mm)			
	A	B	C	D
0200 to 0240	1.356	2.108	766	1.916
0280 to 0380	1.683	2.108	--	--

IPJ - 0200 to 0240: TW assembly
Recovery module connected to the machine



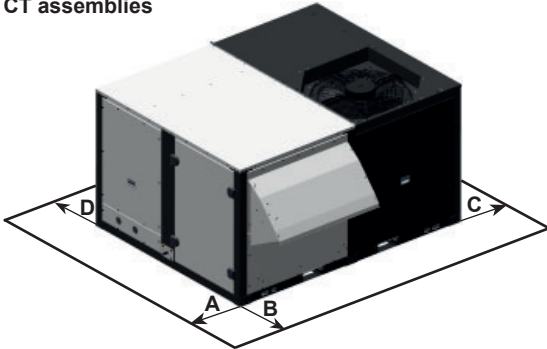
Note: This is the weight of the standard unit and it can be increased depending on the selected options. Check the total weight on the unit's data plate.

7 - POSITIONING AND INSTALLATION

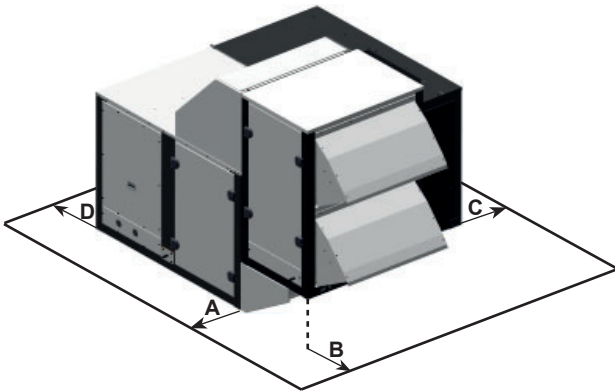
7.6 Recommended service clearance

Important: This is the **minimum** space required for maintenance operations and access inside the unit. Depending on the assembly selected for the unit and the characteristics of the installation site, a larger space around it may be required to ensure proper air circulation and therefore the correct operation of the unit.

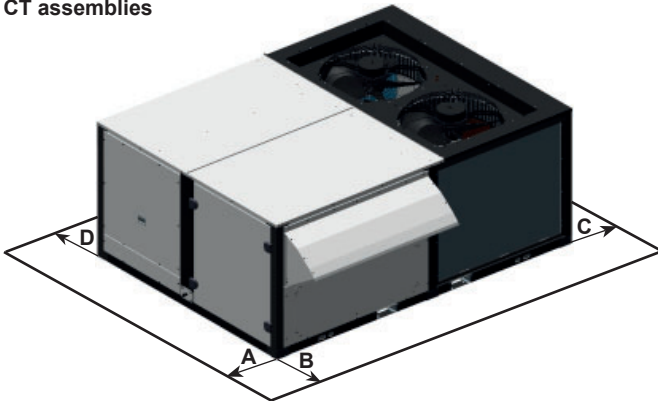
VECTIOS PJ - 0090 to 0190: C0, CS, CF, CK, CA, CP, CR, CQ and CT assemblies



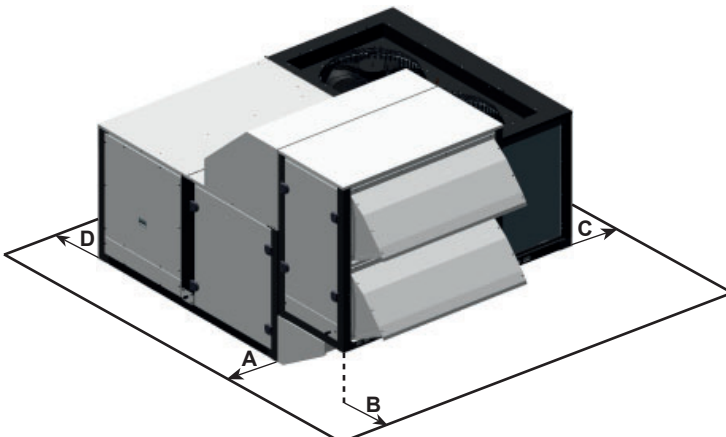
VECTIOS PJ - 0090 to 0190: CW assembly



VECTIOS PJ - 0200 to 0400: C0, CS, CF, CK, CA, CP, CR, CQ and CT assemblies



VECTIOS PJ - 0200 to 0400: CW assembly



RPJ / IPJ	Assemblies	Overall dimensions (mm)		
		Length	Width	Height
0090 to 0190	C0, CS, CF	2.225	1.750	1.230 (*)
	CK, CA, CP, CR	2.230	1.755	1.905
	CQ, CT	2.230	1.760	1.975

(*) With 2-speed outdoor fan (optional) add +275 mm

RPJ / IPJ	Service clearance (mm)			
	A	B	C	D
0090 to 0190	1.200	1.000	1.000	1.600

RPJ / IPJ	Assemblies	Overall dimensions (mm)		
		Length	Width	Height
0090 to 0190	CW	2.230	2.575	1.905

RPJ / IPJ	Service clearance (mm)			
	A	B	C	D
0090 to 0190	1.200	1.000	1.000	1.600

RPJ / IPJ	Assemblies	Overall dimensions (mm)		
		Length	Width	Height
0200 to 0240	C0, CS, CF	3.000	2.200	1.230 (*)
	CK, CA, CP, CR	3.000	2.205	1.905
	CQ, CT	3.000	2.210	1.995
0280 to 0400	C0, CS	3.650	2.200	1.230 (*)
	CK, CA, CP, CR	3.655	2.205	1.905
	CQ, CT	3.655	2.210	1.995

(*) With 2-speed outdoor fan (optional) add +275 mm

RPJ / IPJ	Service clearance (mm)			
	A	B	C	D
0200 to 0240	1.600	1.000	1.000	1.000
0280 to 0400	2.000	1.000	1.000	1.000

RPJ / IPJ	Assemblies	Overall dimensions (mm)		
		Length	Width	Height
0200 to 0240	CW	3.000	3.015	1.905
0280 to 0400	CW	3.655	3.015	1.905

RPJ / IPJ	Service clearance (mm)			
	A	B	C	D
0200 to 0240	1.600	1.000	1.000	1.000
0280 to 0400	2.000	1.000	1.000	1.000



Unit not designed to have overhead obstruction.

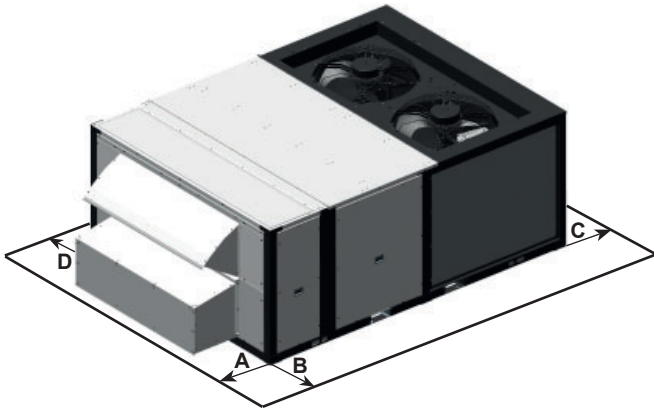
7 - POSITIONING AND INSTALLATION

7.6 Recommended service clearance

Important: This is the **minimum** space required for maintenance operations and access inside the unit. Depending on the assembly selected for the unit and the characteristics of the installation site, a larger space around it may be required to ensure proper air circulation and therefore the correct operation of the unit.

VECTIOS PJ - 0200 to 0380: T0 and TS assemblies

VECTIOS PJ - 0280 to 0380: TP assembly

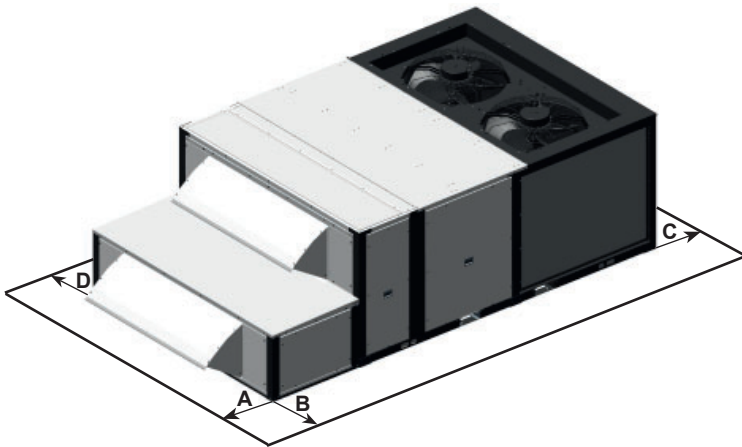


RPJ / IPJ	Assembly	Overall dimensions (mm)		
		Length	Width	Height
0200 to 0240	T0 & TS	3.000	2.200	1.230 (*)
0280 to 0380	T0 & TS	3.655	2.200	1.230 (*)
	TP	3.655	2.210	1.905

(*) With 2-speed outdoor fan (optional) add +275 mm

RPJ / IPJ	Service clearance (mm)			
	A	B	C	D
0200 to 0240	1.000	1.000	1.300	2.200
0280 to 0380	1.000	1.000	1.600	2.200

VECTIOS PJ - 0200 to 0240: TP assembly

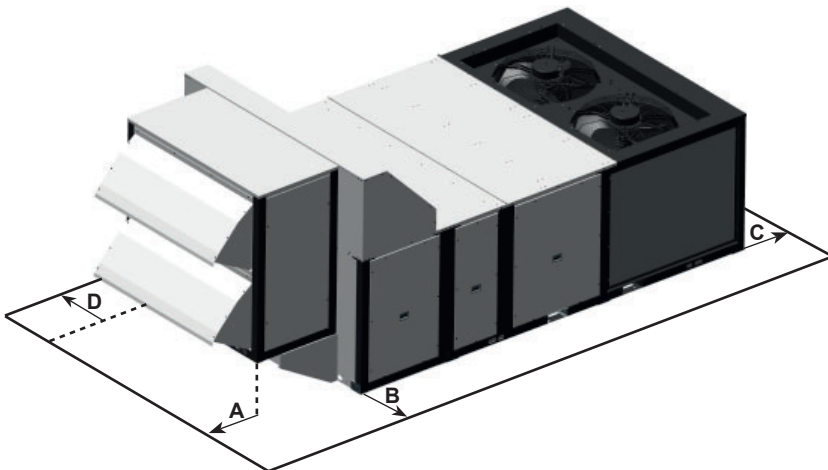


RPJ / IPJ	Assembly	Overall dimensions (mm)		
		Length	Width	Height
0200 to 0240	TP	3.865	2.200	1.230 (*)

(*) With 2-speed outdoor fan (optional) add +275 mm

RPJ / IPJ	Service clearance (mm)			
	A	B	C	D
0200 to 0240	1.000	1.000	1.300	2.200

VECTIOS PJ - 0200 to 0380: TW assembly



RPJ / IPJ	Assembly	Overall dimensions (mm)		
		Length	Width	Height
0200 to 0240	TW	4.665	2.210	1.905
0280 to 0380	TW	4.465	2.210	1.905

RPJ / IPJ	Service clearance (mm)			
	A	B	C	D
0200 to 0240	1.000	1.000	1.300	2.200
0280 to 0380	1.000	1.000	1.600	2.200



Unit not designed to have overhead obstruction.

8 - ELECTRICAL CONNECTION

8.1 Installation norms



Important: All connections in the site are the responsibility of the installer. These connections are always made as per the current regulation. Always refer to the wiring diagram provided with the unit.



The installer must provide electrical circuit protections according to the effective legislation.



To prevent electrical shocks, make all electrical connections before energizing the unit. Check that the automatic switch is closed. Omitting this can cause personal damage. Make the ground connection before any other electrical connection.

8.2 Power supply

Verify that power supply agrees with the unit name plate and that the voltage remains constant.

Warning: It is recommended the use of a residual current device (RCD) type B or B+, with a trip threshold of 300 mA and super resistant characteristic K.

Warning: Operation of the unit with an incorrect supply voltage or excessive phase imbalance constitutes misuse which will invalidate the manufacturer's warranty. If the phase imbalance exceeds 2% for voltage, or 10% for current, contact your local electricity supplier at once and ensure that the unit is not switched on until corrective measures have been taken.

Voltage phase imbalance (%)

$$\% \text{ imbalance} = \frac{100 \times \text{max. deviation from average voltage}}{\text{average voltage}}$$

Example:

On a 400 V - 3 ph - 50 Hz power supply, the individual phase voltages were measured with the following values:

AB = 406 V; BC = 399 V; AC = 394 V

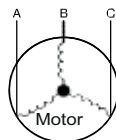
Average voltage = $(406+399+394)/3=1199/3 = 399.7$ i.e. 400 V

Calculate the maximum deviation from the 400 V average:

(AB) = 406 - 400 = 6 -> % = $100 \times 6 / 400=1.5$

(BC) = 400 - 399 = 1 -> % = $100 \times 1 / 400=0.25$

(CA) = 400 - 394 = 6 -> % = $100 \times 6 / 400=1.5$



Important: It is the responsibility of the installer to protect the unit from overvoltage coming from the mains or voltage spikes caused by lightning. Depending on the geographic location and the type of mains network (buried or overhead), a lightning rod needs to be installed. Check the local electrical codes and regulations. Failure to comply with the requirements of standards in force in the country of installation will void the warranty.

8.3 Wire sizing

Wire sizing is the responsibility of the installer to suit the characteristics of the installation site and comply with applicable regulations.

To perform the electric installation of the unit (cable glands, wire sizing and their calculations, protections, etc.), refer to the information provided in:

- The technical brochure of this series.
- The name plate data.
- The wiring diagram included with the unit.
- Norms in effect that regulate the installation of air conditioning units and electrical receivers in the country of installation.

Wiring must be selected based on:





- The maximum absorbed current, taking into account all the options it features (refer to the technical brochure and the name plate).

Important: Short-circuit current: 15 kA according to IEC/EN 60947-2.

- The distance between the unit and its power source.
- The protection to be placed at the power source.
- Neutral operating conditions.
- The electrical connections (refer to the wiring diagram provided with the unit).
- The temperature the wiring is exposed to;
- The fitting method.

After wire sizing has been completed, the installer must verify the appropriate means of connection and define any modifications necessary on site.

Maximum wire sizing depending on the main door switch:

OT125	70 mm ²	wire size for flange clamp		
OT160EV_	M8x25	metric thread diameter x length mm		
OT200E_	M8x25			
OT250_	M8x25			
OT315_	M10x30			
OT400_	M10x30			
OT630_	M12x40			

Note: Copper cable is recommended. If the unit needs to be adapted for an aluminum installation, please consult.

Note: If an adapter to increase this wire sizing is needed, please consult.

Power cable access routing

The power cables can be routed into the electrical box for the units:

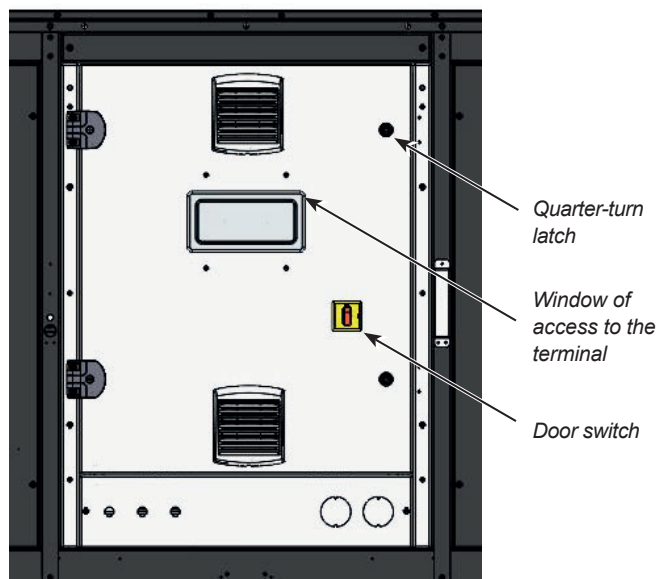
- Via the panel located under the electric cabinet.
- Via the base of the unit.

It is important to check that the power cable bend radius is compatible with the connection space available inside the electric cabinet.

8.4 Electric cabinet

All units include a fully wired electric cabinet, with forced ventilation.

The access door is insulated to prevent condensation. This door has hinges + quarter-turn latches.



8 - ELECTRICAL CONNECTION

These latches of stainless steel have triangular insert 8 mm (supplied wrench). The closing is done by rotating 90° (anti-clockwise): it brings the latch to the locked position.

Dual locks can function as hinges or can be used to remove the door. Check that the locks are not blocked. Open them with a 4 mm Allen wrench (in an anti-clockwise direction).

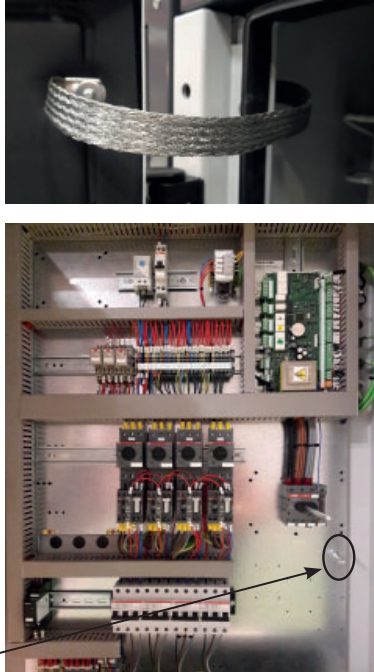
The fan for cooling the electric cabinet, the VectiGD terminal and the ground connector, all located on the door, must be disconnected before removing the door.

Electrical components are identified and all wires are numbered. It permits easy tracing and diagnostics.

Power cables are identified with the colors: black (L1) - Brown (L2) - grey (L3) - yellow/green (Ground).



PE

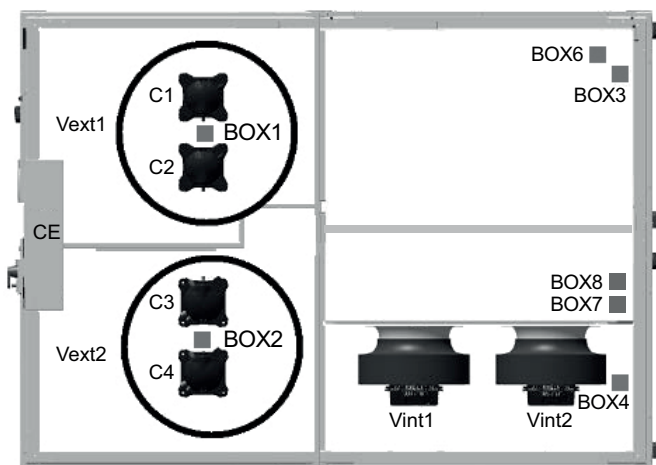


The grounding lug (PE), located on the panel plate, is used to earth the frame of the unit.

The main components of the unit are connected in intermediate boxes located next to these components.

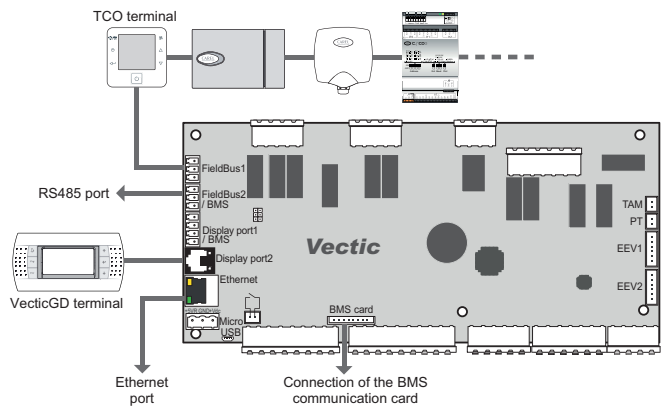
- BOX1: Motor-compressor circuit 1
- BOX2: Motor-compressor circuit 2 (models 0200 to 0400)
- BOX3: Mixing box
- BOX4: Indoor unit
- BOX5: Rotary heat exchanger (optional). In this case the box is located in the wheel module.
- BOX6: Return box (optional)
- BOX7: Electrical heaters (optional)
- BOX8: Hot water coil or heat recovery coil or gas burner or gas boiler (optionals)

The following image shows the location of boxes in a two-circuit unit with "Cross flow" assembly:



8.5 Vetic electronic control

Vetic electronic control is basically comprised of a control board, sensors, a VeticGD graphic terminal and a TCO user terminal (optional).



The µPC3 control board comes equipped with a web tool, C.FIELD, which can be accessed through the board's IP address. This tool enables users to monitor the status of the unit at all times. By navigating through various menus, users can view the variables that are controlled by the Vetic control.

This board also integrates two BMS communication ports:

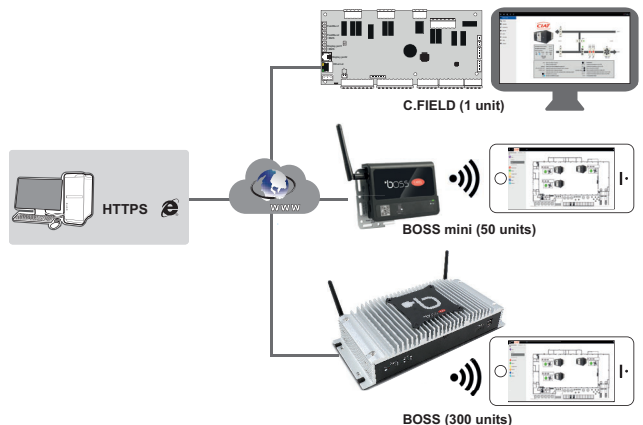
- One RS485 port (*Fieldbus2/BMS*) for communication with:
 - Modbus RTU.
 - BACnet MSTP (additional license required).

This port allows the unit to be connected to our remote monitoring solution: **ABOUND HVAC Performance**.

- One Ethernet IP port (*Ethernet*) for communication with:
 - Modbus TCP/IP.
 - BACnet IP (additional license required).

The Ethernet port allows the unit to be connected on a **shared network (SHRD)** of up to 15 units, with one unit configured as "Lead" and the rest as "Lag". This network allows the exchange of data and information among the various units. Depending on the installation conditions, it can also share the readings of certain probes installed in the unit that is configured as the "Lead" unit, as well as temperature setpoints and operating mode. Furthermore, it is possible to configure one of the units as a "Backup" to be activated in case of malfunction of the other unit.

This port also enables integration of the unit with our local supervision solutions: **BOSS mini** (50 units) and **BOSS** (300 units).



A communication card (*BMS card*) (optional) can also be connected to the µPC3 control board for the following protocols: BACnet MSTP, BACnet Ethernet, Modbus RTU and Ethernet TCP/IP.

Note: Refer to the Vetic control brochure to obtain more detailed information on its operation.

8 - ELECTRICAL CONNECTION

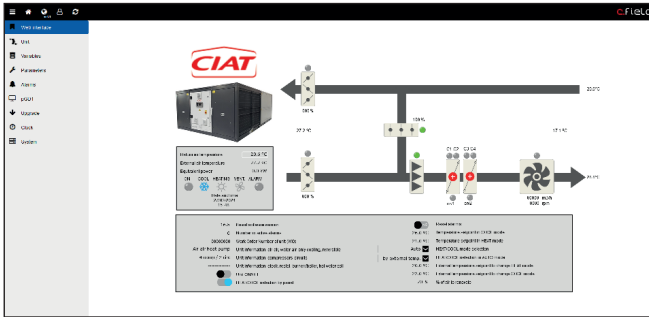
C.FIELD web tool

The µPC3 control board includes a web tool for managing the operation of the unit. C.FIELD facilitates unit setup, commissioning, maintenance and software version updates.

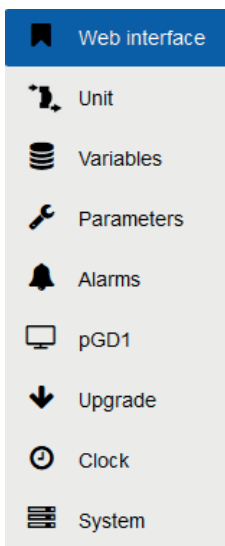
To access C.FIELD it is only necessary to know the IP address of the board: http://IP_address/commissioning/index.html

Note: if the board is not connected to the Internet, C.FIELD can be accessed via the microUSB port.

There are four levels of access, sorted from highest to lowest: Administrator, Service, User, Guest. The Web Interface section is displayed at all levels, also for guest users.



The C.FIELD menu includes the following sections:



Web interface: synoptic of the air circuit, visualization of the main variables and some parameters. Access to the cooling circuit overview.

Unit: display of the value of the inputs/ outputs grouped by type.

Variables: unit supervision variables divided into groups.

Parameters: all control parameters divided into groups.

Alarms: recording of alarms.

pGD1: emulation of the VecticGD terminal with all its functionalities.

Update: management of software updates, operating system and C.FIELD.

Clock: date, time and time zone.

System: µPC3 board information.

BOSSmini and BOSS supervision solutions

The following supervision solutions are available depending on the dimensions of the installation:

BOSS mini

It is the solution for the management and supervision of small or medium-sized air conditioning installations. Up to 10 units with 50 variables per unit or 50 units with 10 variables maximum per unit.

The µPC3 control board allows for communication through its built-in Ethernet port.

Its main advantages are:

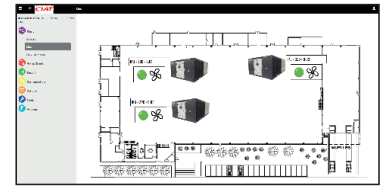
- Integrated WIFI Hotspot for direct access without any extra infrastructure.
- Smartphone compatibility.



- Secure supervisor control from remote through a simple browser.
- Introduces Bacnet protocol (MSTP and TCP/IP) along with Modbus protocols (MSTP and TCP/IP)
- Integration of BMS with IP Lag mode (sharing values of interest for the general management of the building).

To access BOSSmini it is only necessary to know its identification number (xxxx):

<http://mboss-xxxx/boss/>



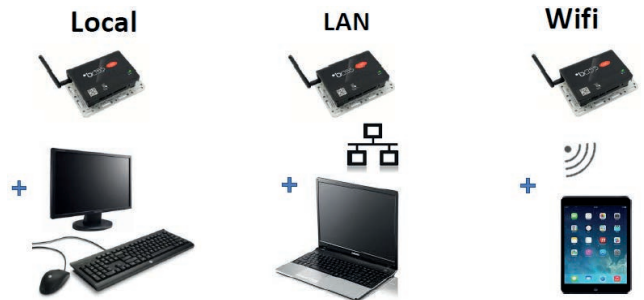
BOSSmini offers four different access levels, allowing for both commissioning and daily access for system maintenance. It also includes advanced monitoring functions and allows for the creation of areas and groups to simplify installation management.

This solution also allows the integration of energy meters for monitoring the electrical consumption of the installation.

BOSSmini is shipped from the factory with pre-configured settings and customizations that are based on the specific needs and specifications of each customer.

Available in two versions:

- CPU device.
- CPU device, monitor, mouse and keyboard.



BOSS

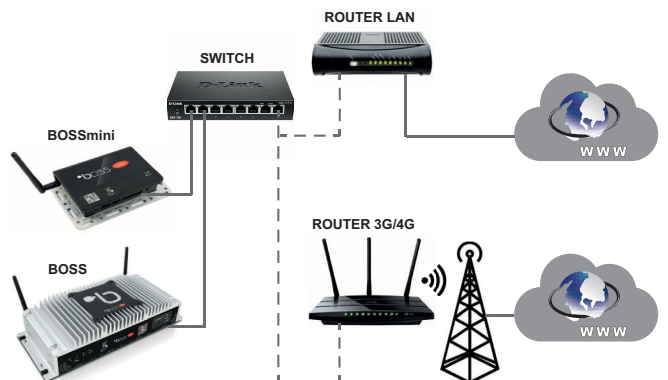
It is the solution for the management and supervision of large air conditioning installations, up to 300 units and 3500 variables.

The µPC3 control board also allows for communication through its built-in Ethernet port. It has the same features as BOSSmini.



To access BOSS: <http://boss-xxxx/boss/>

BOSSmini and BOSS enable remote system management. A simple Internet connection provides access to all the information on the system (Router LAN or 3G/4G). The Web interface, the same that is available to the local user, allows the monitoring and complete configuration of the installation: from the office or any other current location of the user.



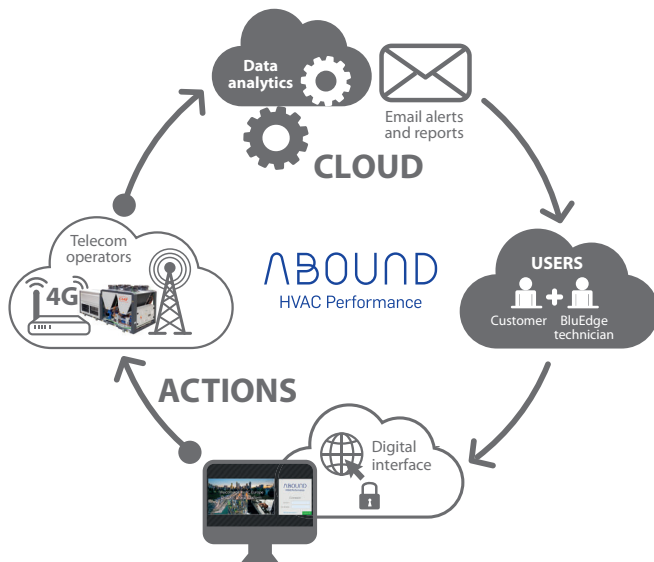
8 - ELECTRICAL CONNECTION

ABOUT HVAC Performance supervision solution

ABOUT HVAC Performance is a remote supervision solution dedicated to monitoring and controlling several CIAT machines in real time.

Its main advantages are:

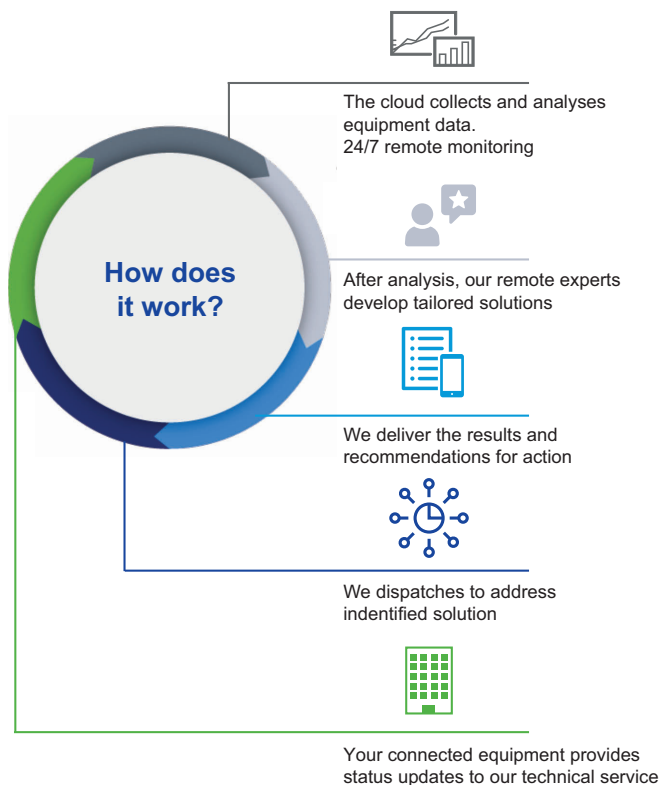
- Improved energy performance. European regulations encourage buildings to install control and supervision systems to achieve the 2030 energy efficiency target of $\geq 27\%$.
- Access to the operating trend curves for analysis.
- Improved availability rate for the machines.



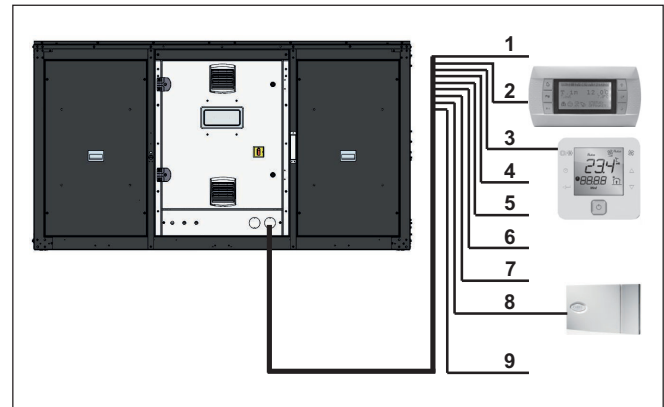
BluEdge maintenance service



With your BluEdge service agreement, enabled by About HVAC Performance supervision solution, both you and our highly trained team will gain visibility, access expert advice and effectively optimise the lifecycle outcomes of your installation.



8.6 Customer connection



No.	VECTIOS PJ		0090 to 0400
1	Main power supply	400 III ($\pm 10\%$)	3 Wires + Ground + Neutral
2	Remote connection of VectiGD terminal (by default installed on the electrical cabinet) ①		telephone cable 6 wires standard (RJ12 connector)
3	Connection of TCO user terminal (optional) ②		2 x 1 mm ² (230V) + 1 shielded cable for communication type AGW20 / 22 (1 braided pair + drain wire + shielding)
4	Remote off/on (optional)		2 x 1 mm ²
5	General alarm signal (optional) ③		2 x 1 mm ²
6	Remote Cooling/Heating (optional upon request)		2 x 1 mm ²
7	Circulation pump signal for HWC (antifreeze sec.) (optional)		1 x 1 mm ²
8	Ambient probe	NTC	2 x 1 mm ²
		RS485	4 x 0,5 mm ² + shielding ④
9	Air quality probe (optional)		3 x 1 mm ²

① By default, this control is supplied with a VectiGD graphic terminal, installed on the unit's electrical cabinet, but it can also be remotely connected:

- Up to 50 m, it can be connected directly with telephone wire.
- From 50 to 200 m, it is necessary to use the TCONN bypass cards and AWG 20/22 shielded cable with 2 twisted pairs.

The TCO user terminal (optional) can be installed in the electrical cabinet when the graphic terminal is remotely connected.

② The power supply of the electrical cabinet (230 V) must be used for terminal power.

③ The output for general alarm signal is not compatible with the following options:

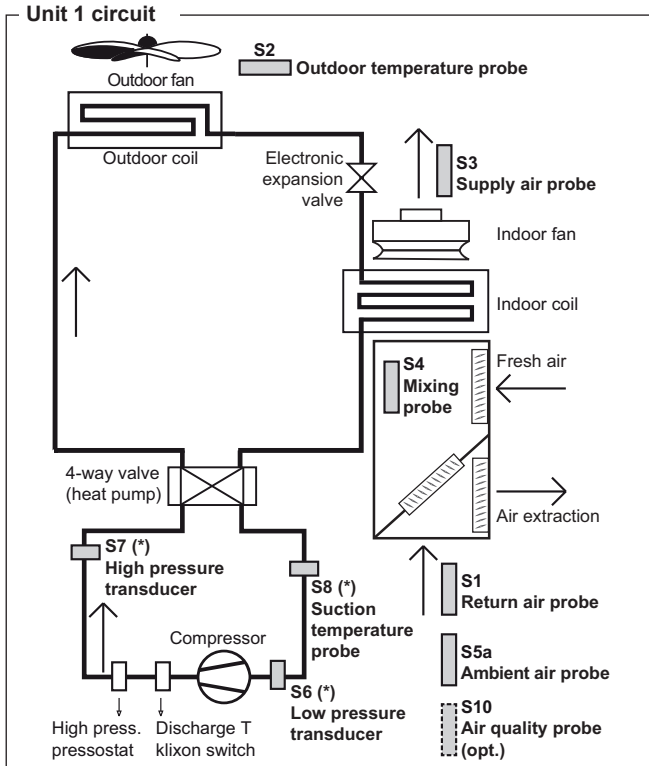
- hot water coil,
- heat recovery coil,
- rotary heat exchanger,
- gas boiler,
- on/off signal for external humidifier.

With these options, possibility of general alarm upon request.

④ Up to four RS485 ambient sensors can be connected in series on the field-bus of the control board.

8 - ELECTRICAL CONNECTION

8.7 Location of sensors on the machine



(*) In units with 2 circuits:

- Low pressure transducers: S6 (circ.1) and S11 (circ.2)
- High pressure transducers: S7 (circ.1) and S12 (circ.2)
- Suction temperature probes: S8 (circ.1) and S9 (circ.2)

Note: If the unit needs the outdoor humidity probe, used with enthalpic or thermoenthalpic free-cooling, this one (S5h) will be connected in the place of the ambient probe (S5a). In this case it is necessary to use a RS485 ambient temperature probe connected on the Field-bus.

8.8 Sensors connection by the costumer

The client must connect on-site the following probes:

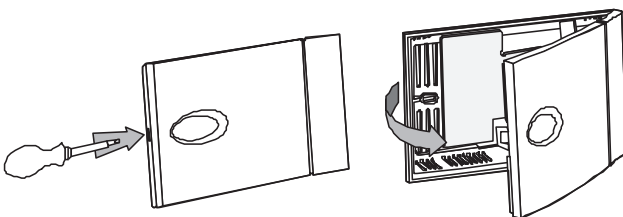
- Ambient NTC (standard) or RS485 (optional).
- Air quality (optional).
- Outdoor humidity (optional).

These probes are supplied inside the electric cabinet.

Please refer to the wiring diagram and the Vectic control brochure, both provided with the unit.

Connection of the ambient probe

- Open the case using a flathead screwdriver in the slot, paying extra care not to damage the electronic parts.



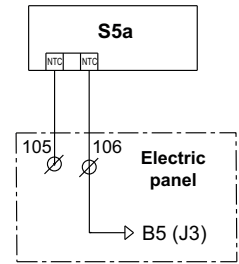
- Fasten the rear of the sensor case to the panel or the wall (for fastening the case, use the screws supplied with the fastening kit, paying attention to use the proper spacers, to not damage the sensor's electronics).

- This probe must be fastened to the panel or the wall of the room to be conditioned, at ca. 1.5 m height.

Electrical connection

- Make the electrical connection according to the unit configuration:

- NTC Probe S5a: B5 (connector J3): with 2 x 1,5 mm² section cable, within a maximum distance of 30 meters.

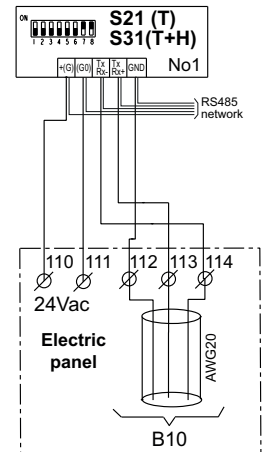


- 1 to 4 RS485 probes (connector J10): with AWG20 section cable, single braided pair preferably shielded with drain wire + Power supply 24 Vac (2 wires).

* Temperature:
S21 to S24.

* Temperature + humidity:
S31 to S34.

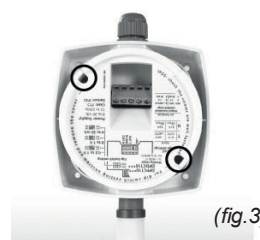
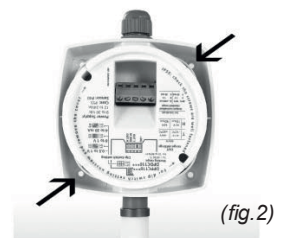
Note: in the case of more than one probe, connection of the probes in series, in the RS485 network. Please, refer to the control manual



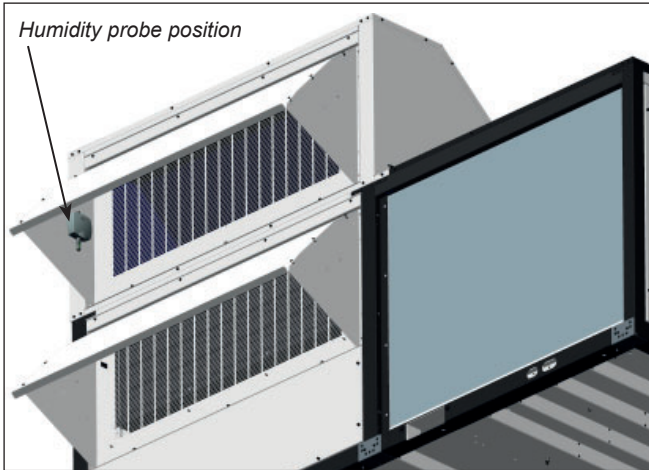
Connection of the outdoor humidity probe (optional)

The outdoor humidity probe (optional), necessary for the enthalpic and thermo-enthalpic free-cooling, must be installed on-site, on the hood of the fresh air intake.

- Open the case by turning the top cover anticlockwise (fig.1).
- Fasten the rear of the sensor case to the side panel of the hood (use the screws supplied together with the probe) placing the screws in the holes provided (fig.2).
- Make sure that the screws that hold the board protective cover are fastened tightly (fig.3).
- Close the sensor by turning the cover clockwise (fig.4).

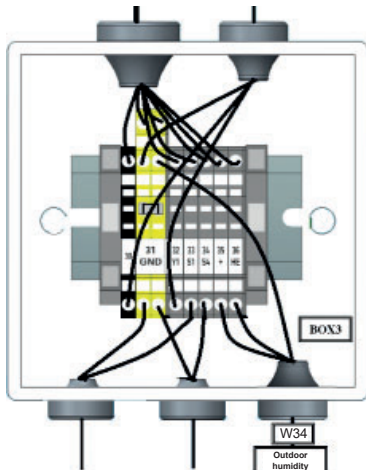


8 - ELECTRICAL CONNECTION



The installer must feed the W34 cable through the M16 feedthrough to connect it in the BOX3, located inside the unit, behind the side access panel.

Electrical connection



BOX3 (terminals)

Black: 35
Brown: 31
Grey: 36

Probe (terminals)

Black: G+
Brown: M
Grey: H

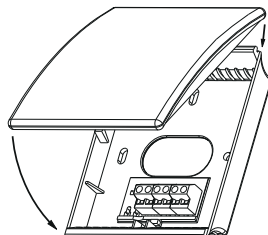
Connection of the CO₂ air quality probe

There are different options:

- Ambient air quality probe.
- Return air quality probe (duct-mounted).
- Probe installed on the "Lead" unit of the shared network (SHRD).
- Double quality probe:
 - two ambient air probes;
 - one ambient air probe and one outdoor air probe;
 - one return air probe (duct-mounted) and one outdoor air probe.

Installation in the environment

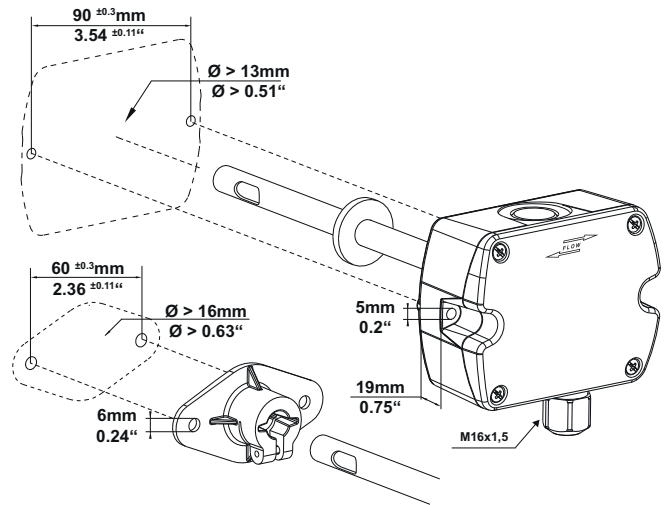
- This probe must be fixed to the interior wall of the room to be conditioned, at ca. 1.5 m height in the room and at least 50 cm from the next wall.
- It should never be mounted:
 - On outside walls.
 - In niches or behind curtains.
 - Above or near heat sources or shelves.
 - On walls covering heat sources such as a chimney.



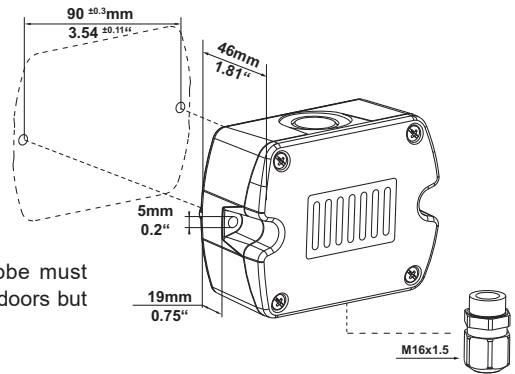
- In the radiation range of heat sources and lighting bodies e.g. spotlights.
- In areas exposed to direct solar radiation.

Duct-mounted

This version can be connected to the air duct in these two ways:



Outdoor installation

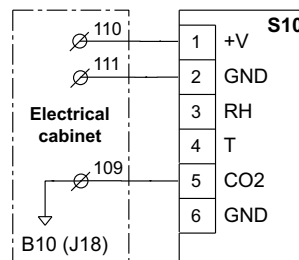


Note: This probe must be located outdoors but under cover.

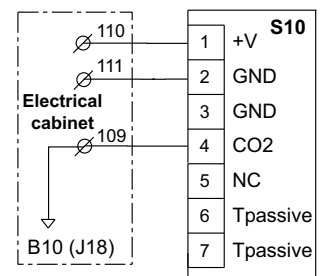
Electrical connection

This probe (S10) is configured as analogue output 4...20 mA (0..2000 ppm), in the analogue input B10 of the control board (connector J18). Recommended cable section : 1,5 mm².

Environment:

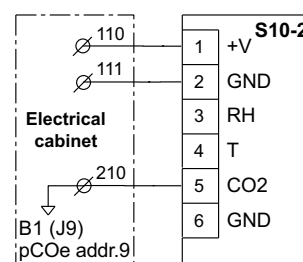


Duct-mounted:



The second probe (S10-2) is configured as analogue output 4...20 mA (0..2000 ppm), in the analogue input B1 of the expansion card pCOe with address 9 (connector J9). Recommended cable section : 1,5 mm².

Environment or outdoor:

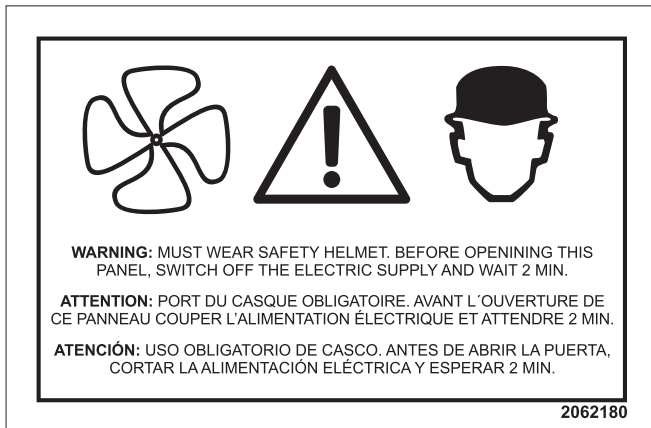


9 - FANS AND AIR DUCTS

9.1 Checks in the axial fans

- Before commissioning, check the blade rotation direction and that the axis turns without strokes nor vibrations.
- Once running, check the operation conditions: pressures, flows and consumptions.
- With electronic fans (standard), check that they adapt their rotational speed based on the condensation or evaporation pressure.

Note: Optionally these units can be supplied with two-speed fans.



Access to the outdoor unit from the fans

For some maintenance tasks, it may be convenient to access the outdoor unit by lifting the cover with the fan(s) (depending on the model).

First, the power supply to the fan must be disconnected.

Each fan features two quick-release connectors (power and control) inside the compressor box.

Then, the cover must be unscrewed.

This is fixed to the machine using M6 Allen screws.



Ring screws (not supplied with the unit) are to be fixed to the M10 hex nuts existing on the cover. The lifting slings will be hooked to these ring screws.

- Lid with 1 fan (weight 78 kg): 3 nuts.
- Lid with 2 fans (weight 145 kg): 4 nuts.

Important: These nuts are only intended to lift the cover.



9.2 Checks in the EC plug-fans

- Before commissioning, check the blade rotation direction and that the axis turns without strokes nor vibrations.
- Once running, check the operation conditions: pressures, flows and consumptions.
- The coupling of characteristic curves of the fan and the room is very important, so that the flows and pressures provided to the duct network are as required.
- The variable-speed plug-fans, both supply and return, have a flow control pressostat. This pressostat comes from the factory adjusted to the nominal airflow. However, the flow for different conditions can be readjusted on site from the VectiGD graphic terminal (please refer to the Vectic control brochure).

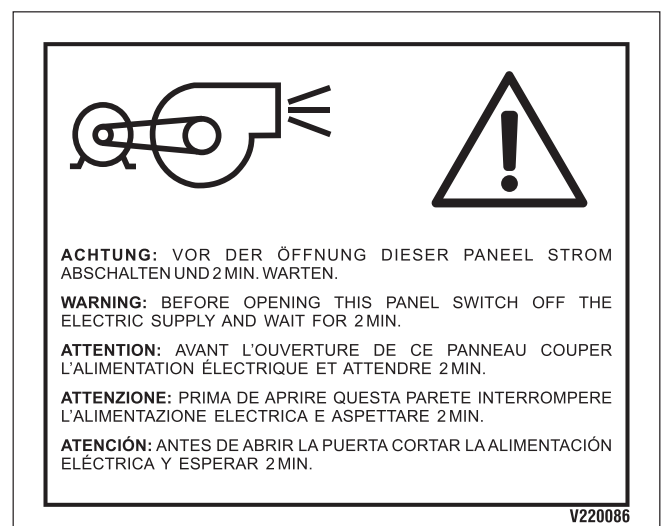


Flow control pressostat

9.3. Checks in the centrifugal fans (optional)

If the unit is equipped with centrifugal return fans (available in CQ and CT assemblies):

- Before commissioning, check the blade rotation direction and that the axis turns without strokes nor vibrations.
- Once running, check the operation conditions: pressures, flows and consumptions.
- The overlapping of characteristic curves of the fan and the room is very important, so that the flows and pressures provided to the duct network are as required.



9 - FANS AND AIR DUCTS

Pulley and belt calibration



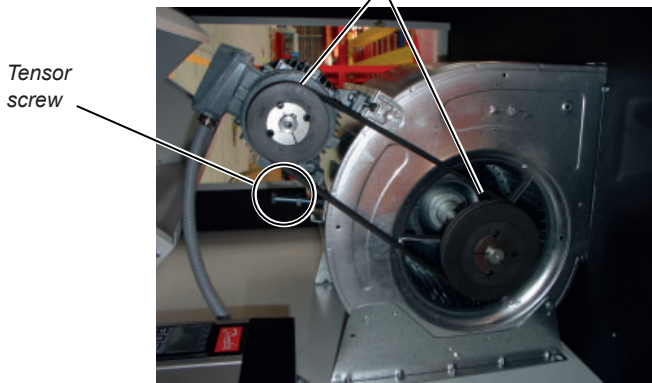
Attention: Before performing these operations, it is necessary to verify that the unit is disconnected from mains.

The centrifugal motorfans are coupled through pulleys and belts. In these fans, the following must be taken into consideration:

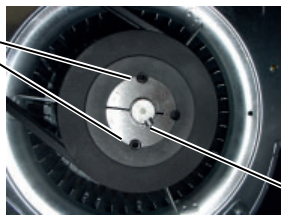
Pulley alignment:

- The pulleys must be on the same plane, so it is important to check them with the help of a ruler or a laser aligner.
- In case they are not aligned, remove the pulley screws, and after removing the taper pin, the set of pulley and taper can be slid over the axis (this action can be performed both in the motor as well as in the fan).

Pulleys must stay on the same plane



Pulley screws



Taper pin

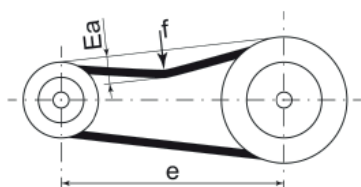
Belt tension:

After fixing the pulleys on the same plane, the belt tension is made by tightening the tensor screw.

Excessive tension on the belt can lead to premature wear on the assembly. Insufficient belt tension can cause slippage, overheating and premature wear of the belt.

It is essential to tension the belts using the "Deflection test" described below:

- The belt tension must be checked and corrected using a suitable measuring instrument (tensiometer or dynamometer).
- "Ea" calculation:
 - $Ea = (e \times E) / 100$ = deformation in mm for a pulley centre distance of 100 mm
 - e = pulley centre distance in mm
 - E = see table below for the value
 - f = force applied



- At the centre of the centre distance "e", apply a force "f", as determined in the table below, to each belt. Set the belt tension to obtain the calculated deflection "Ea".

Belt type	f(N) ①	d (mm) ②	E (mm) ③
SPZ	25	56 ≤ 71	2.45
		< 71 ≤ 90	2.20
		< 90 ≤ 125	2.05
		125	1.90

① Load to be applied per belt f (N)

② Small pulley diameter (mm)

③ Belt deformation for a pulley centre distance of 100 mm - E (mm)



Important: During commissioning, the belt tension must be checked after 48 hours of operation.

The belt tension must be checked in all cases and before system start-up.

9.4 Air ducts connections

The air supply and return ducts must be calculated in accordance with the nominal flow and the unit's available pressure (refer to the technical characteristics table).

The duct calculation and design must be made by qualified technical personnel.

It is advisable to take into consideration the following recommendations:

- Flexible connections must be made between the ducts and the unit that avoid the noise and vibration transmission.
- Curves in the fan supply outlet(s) must be avoided. It is recommendable to have a straight section of duct measuring approximately 1 metre. If it is not possible, they must be as smooth as possible, using indoor deflectors when the duct is of large dimensions.
- When making the ducts, direction sharp changes must be avoided since they can generate occasional pressure drops, which affect the available pressure and the flow. The location of discharge and aspiration grilles must be studied carefully to avoid the air recirculation and the transmission and generation of noises to the interior.
- Consideration should be given to the need to install filters on the return ducts, taking into account any particles in suspension existing which could settle inside the machine (e.g. textile fibres).
- Flexible connections must be made between the ducts and the unit that avoid the noise and vibration transmission.
- No matter the type of ducts used, they must be isolated and not be composed of materials that propagate fire nor expel toxic gases in the event of a fire. The internal surfaces must be smooth and should not pollute the air that circulates within them. In any case, the effective legislation about this issue must be respected.



It is mandatory to use all required PPE for work at height.

10 - CONDENSATE DRAIN

These units are equipped with a condensate drainage pan in the indoor circuit, with a 1/2" M gas threaded plastic drain connection.

The pan is sloped towards the drain, but it is important to check the leveling of the unit. A defective unit level can cause water overflowing. This drain pan is removable for easy cleaning. It is important to check that the drain is not clogged. The pan is secured to the unit using 4 M6 Allen screws.

Optionally, this pan can be made of stainless steel for corrosion protection.



Some options are equipped with a separate drain, 1/2" M gas threaded plastic:

- Cooling recovery circuit (CR and CT assemblies).
- Rotary heat exchanger (CW and TW assemblies).
- Gas burner (roof curb).



With outdoor temperatures which are lower than 0°C the necessary precautions must be taken to prevent the water in the drain ducts from freezing.

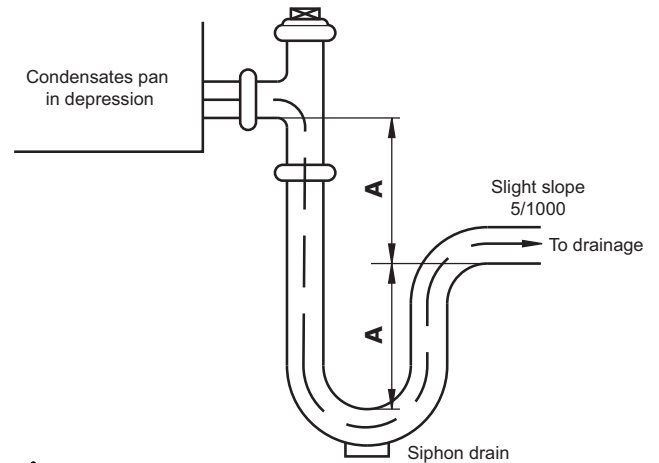
Important: the water drain pipe must be provided with a siphon to avoid bad smell and water spills.

**CONNECT SIPHON
METTRE SIPHON
PONER SIFON**
V220814

Siphon installation norms

Perform the assembly as per the scheme of the attached starting diagram:

- **Pan in overpressure:** It is installed to avoid the access through the drain piping of bad smells.
- **Pan in underpressure:** Besides the previous application, water must be sucked from the pan:
 - For the correct siphon design, the "A" height must be at least twice that of the underpressure (mm.w.c) where the condensate pan is placed.
 - The drain piping must be slightly sloped to ease circulation towards the drain.
 - The original diameter of the piping must be respected. No reduction can be made.



Check the connection watertightness.

11 - SAFETY ELEMENTS

High pressure switch

Connected to the compressor discharge, it will stop its operation when the pressure at that point reaches the setpoint. It is automatically reactivated.

Specified pressure to activate switch:

- R-410A: 42,0 bar.
- R-454B: 40,5 bar.

Safety valve

All models include a safety valve in the high pressure line. Valve tare value at 45 bar.

Note: The activation value of the safety is the same for R-410A and R-454B, as both refrigerants have similar working pressures.



Caution: Avoid the valve triggering direction

Low pressure safety

The low pressure safety is done by the Vectic electronic control via the measure of the low pressure transducer.

Protection for power lines

Protection for power lines of compressors with manual motor starters and power lines of fan motors with magnetothermic switches.

These devices provide protection against overload, short circuit, phase failure and undervoltage.

Safety in electrical heaters

If the contactor of the electrical heaters becomes locked in the closed position, their magneto-thermal switches will automatically open using current emission coils connected mechanically to them. The electronic control will signal an alarm for "locked contactor of electrical heaters" causing the unit to stop working, except for the indoor fans which will continue to operate at 100% airflow.

Automatic switch in the control circuit

Magnetothermal switch that protects the operation circuit against continuous surges as well as against high currents of short duration (short circuits).

Main door switch

By using a mechanical device, it impedes access to the electrical cabinet when the unit is with voltage.

DO NOT OPEN WITH VOLTAGE
NE PAS OUVRIR SOUS TENSION
NO ABRIR CON TENSION

V220007

Defrost control

This safety device is intended to eliminate ice which could accumulate in the outdoor coil when the unit is working in heating mode.

Defrosting is carried out by the control depending on the outdoor temperature and the value measured by the low pressure transducer.



Caution: Condensation water falls directly to the ground and action is required to prevent slipping hazard

Safeties at the compressors

- These units have a klixon switch on the compressor discharge which stops the operation of the motor when there is excessive heating.
- Compressor lock: In the event of a power cut-off for a period longer than 2 hours, the compressors will be locked. The unit must remain 8 hours consecutively with voltage to unlock the compressors. A warning screen on the VecticGD shows the remaining time until the end of the locking.
- High temperature safety in tandem compressors (optional): Working in COOLING mode, when the outdoor coil pressure of a circuit overcomes a limit value one of the two compressors will be stopped, thereby avoiding the stop of both compressors due to the high pressure. This compressor will start working again if the pressure drops below a safety value.

Control of air flow

The supply plug-fans adapt their speed to the average flow measured by the differential pressure sensor and the value set as a setpoint in the electronic control.

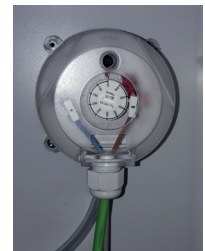
Clogged filter detector (optional)

Differential pressostat for detection of the filter clogging level.

This pressostat is installed in the factory:

- In the electric cabinet, for "Cross flow" models.
- On a panel next to the indoor coil, for "Tunnel flow" models.

Pressure reading is done thanks to two intakes within the air flow, such that a comparison is made between the pressure of the inlet air to the filter (positive) and the supply air of the same to the other side of the coil (negative).



The electronic control allows the settings selection for the clogged filter alarm: only indication (by default) or unit stoppage. Manual reset.

The pressostat set value for alarm signalling is configured in factory, depending on the filters selected for the unit, according to the following criterion (Standard EN 13053):

- Unit filter: the set value is the pressure drop for the filter classification, according to the attached table.
- Serial filters: the set value is the pressure drop of the highest efficiency filter + half of the pressure drop of the other filter, according to the attached table.

Filter classification	Pressure drop (Pa)
G4	150
M6 / F7	250
F8 / F9	350

Note: all filter frames have a sticker indicating the filter classification. Important: This safety device is particularly recommended with gas burner.

Condensation and evaporation pressure control

This safety, integrated in the control, enables managing the outdoor fan(s) when the units are working in cooling mode with low outdoor temperatures (condensation control) or in heating mode with high outdoor temperatures (evaporation control). This aids the unit's operation in all the seasons.

With electronic axial fans, the speed control is proportional, based on the average pressure measured by the pressure transducers.

11 - SAFETY ELEMENTS

Refrigerant leak control

Possible refrigerant leakage in case of low pressure alarm. Although sometimes the alarm has other reasons, the control allows to detect possible leakage, improving the protection of the environment.

R-454B Refrigerant leak detector (standard)

Due to the A2L category of refrigerant R-454B (lightly flammable), it requires the installation of a refrigerant leak detector. This detector uses infrared instead of semiconductor technology with no need of calibration (self-calibration), with very fast time response, and high lifetime (life cycle: 15 years).

This detector integrates, in a single assembly, housing + electronics + sensor. It is divided into two parts, for easy inspection and sensor replacement. Degree of protection: IP65

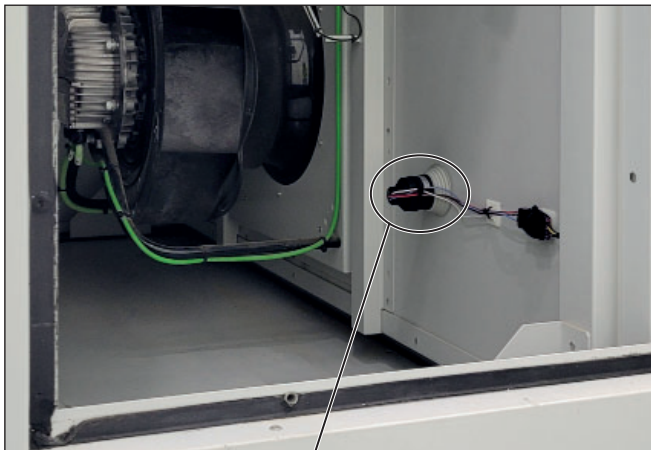
This detector is installed on a panel next to the supply fans of the indoor circuit. This position ensures the correct reading of the gas concentration in the indoor coil.

If the sensor detects a high concentration of gas (parameterizable) the unit enters the PROTECTION MODE. The electronic control instantly disables the compressors and support elements, activates the indoor fans (supply and also return if available) at 100% of airflow (parameterizable) and opens the fresh and exhaust air dampers at 100% (if they are available). This happens temporarily, as long as the leak occurs or the sensor is held down with failure. If one of these two conditions ceases, the unit will return to the operating mode it had before the leak and the warning of protection mode will disappear.

If the unit is connected to a BMS monitoring system, the electronic control is prepared to send an alarm signal in case of leakage detection.

In any case, alarms will be maintained until they are reset from the VeticGD terminal.

For more detailed information consult the "Maintenance" chapter.



Sensor

R-410A Refrigerant leak detector (optional)

The gas detector sensor is a device that signals leaks in refrigerant (in ppm). When the loss of a certain concentration is detected, the sensor sends the alarm to the control, which stops the unit and locally activates an acoustic and visual signal. This detector incorporates configurable relay outputs, bluetooth connection and an user interface.

This allows prompt identification of gas leaks, guaranteeing the safety of any people in the vicinity.

This sensor is installed next to the supply fans. In case of alarm, it is reset manually.



Anti-fire safety

The electronic control can activate an anti-fire safety device that detains the unit when the return air surpasses a temperature of 60°C (by default). It cannot return to operation until the temperature has dropped to below 40°C.

Note: Vetic electronic control allows to select, by parameters, the operating logic for the fulfillment of the ERP French fire regulations (Public access building), article CH40 paragraph 3.

Smoke detector (optional)

Smoke detecting station in accordance with the NF S 61-961 standard, 961, that uses a LED to indicate the installation status, and if the probe detects the presence of smoke in the installation, it stops the operation of the unit and gives the order to open or close the outdoor damper (configured by parameter).

To ensure compliance with the French regulations on Fire safety (ERP), it's possible to configure the opening of the fresh air damper and the exhaust air damper to 100% (return air damper closed).

The station is installed in the factory on a panel next to the electrical cabinet. To reset the station it is necessary to disassemble the protection box.



Smoke detecting probe

Anti-freeze protection for low outdoor temperatures (optional)

- Electrical heater for protecting the components of the electric cabinet. This safety device is mandatory for an outdoor temperature lower than -10°C WB. A reinforced electrical heater is mandatory for a temperature lower than -14°C WB. The electrical heater(s) is(are) activated when the thermostat installed inside the electric cabinet detects that the temperature drops below 5°C.
- Compressor with low-temperature protection using an additional crankcase heater: mandatory for an outdoor temperature lower than -10°C WB. Activation temperature: -10°C WB.
- Electrical heater for antifreeze protection of dampers of the mixing box: mandatory for an outdoor temperature lower than -14°C WB. Activation temperature: -14°C WB.
- Electrical heater for protection of the gas burner housing (optional): mandatory for an outdoor temperature lower than -14°C WB. Housing temperature for activation: +1°C.
- Dampers of the mixing box with springs for automatic closing in the case of a cut in power.

Remote alarm (optional)

Vetic control allows the management of a relay for remote alarm signalling.

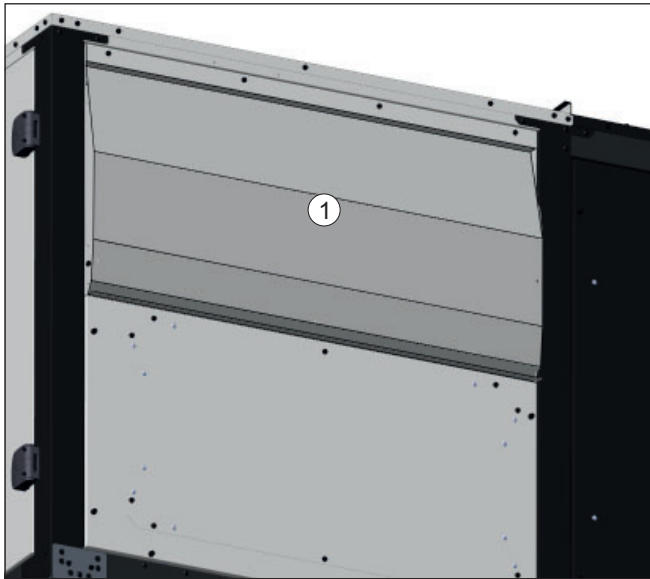
The output for general alarm signal is not compatible with the following options: hot water coil, heat recovery coil, gas boiler, rotary heat exchanger and on/off signal for external humidifier.

In this case, upon request, it would be possible to have a general alarm output in an input/output expansion module (see the Vetic control manual).

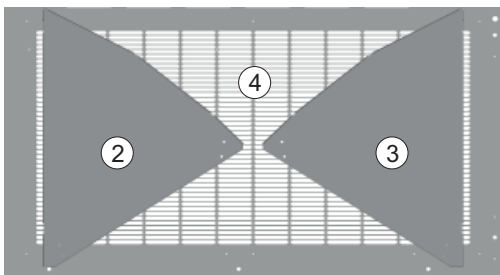
12 - FACTORY OPTIONS AND ACCESSORIES

12.1 Dampers hoods

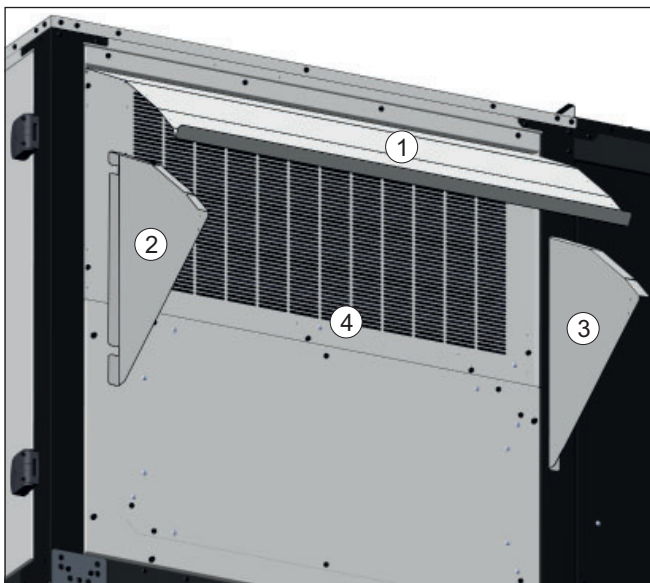
Depending on the assembly chosen, the fresh air and exhaust air damper hoods are supplied folded down, to be fitted on site by the installer.



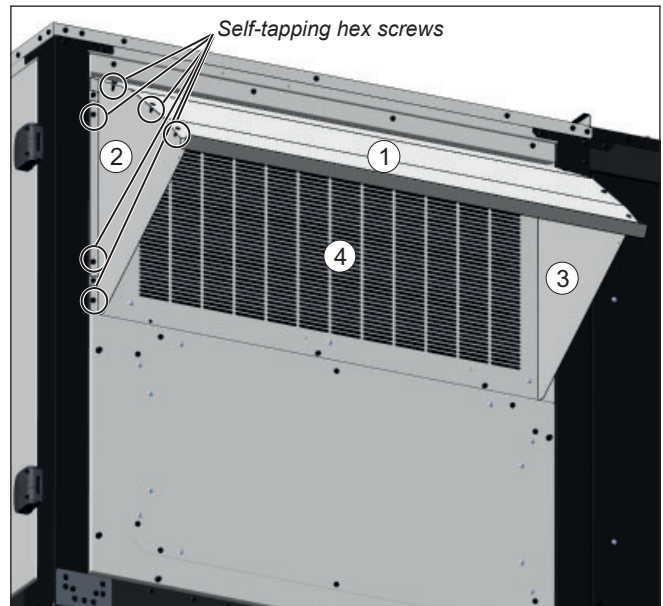
The left side (2) and right side (3) closure parts are supplied screwed to the inside panel (4).



The left side (2) and right side (3) closure parts will be screwed to the panel (4) using 3 screws and to the hood (1) using another 3 screws. These screws are 4.8 self-tapping hex screws and are supplied with the unit.



Important: Always check that the union of two panels using self-tapping screws is properly secured. The self-tapping screws must not be unscrewed frequently to prevent any clearance on the threading.



Caution: the detachment of the hood due to wrong implementation of the above steps may cause personal injury and property damage.

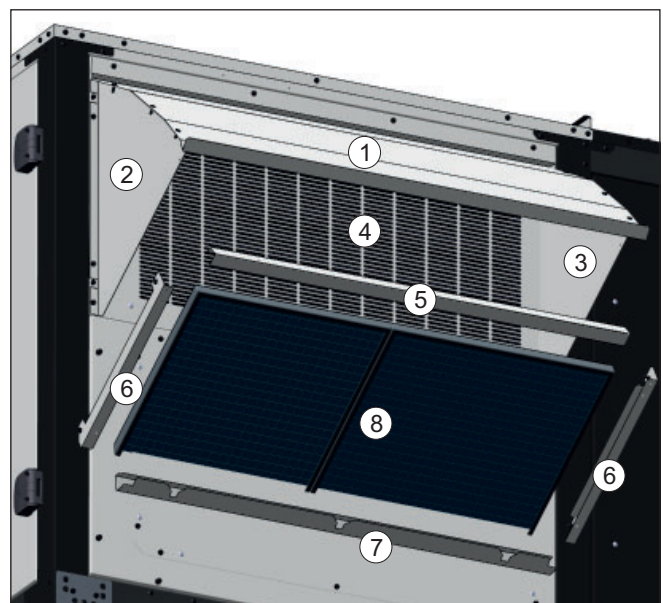
Note: Even though the previous images correspond to a "Cross flow" assembly, this procedure is also valid for "Tunnel flow" assemblies.

12.2 Stop-drop on the fresh air intake

The stop-drop can be installed on the fresh air intake. It is recommended in cases where a high moisture content in the air is foreseen.

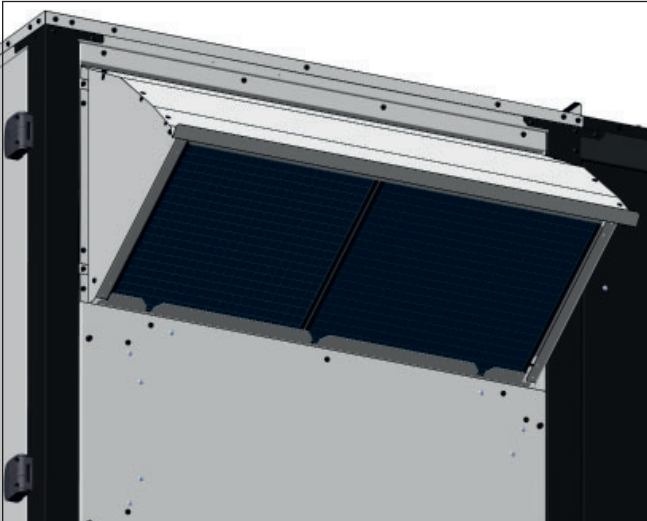
The stop-drop (8) is placed after the hood:

- First, the part (5) is placed inside the hood (1), using 3 of the 4.8 self-tapping hex screws. If the stop-drop has been ordered together with the unit, this part will be installed in the factory.
- Next, the side profiles (6) are fitted onto the side parts of the hood (2) and (3), each one with 2 of the 4.8 self-drilling hex screws.
- Finally, the profile (7) is fitted onto the panel (4). To do this, unscrew the 3 lower screws on the panel (M6 Allen) and screw them back on, attaching the profile.



12 - FACTORY OPTIONS AND ACCESSORIES

The following image shows the stop-drop placed:

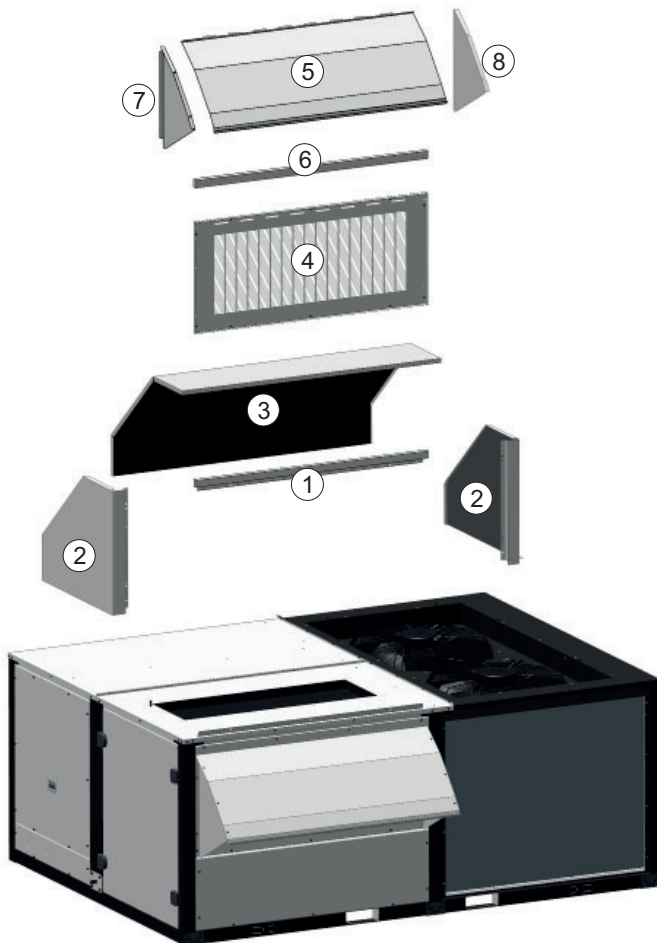


All the screws required for this assembly are supplied in a bag.

12.3 Fresh air housing (CK, CA, CP, CR, CW, TP 0280 to 0380 and TW assemblies)

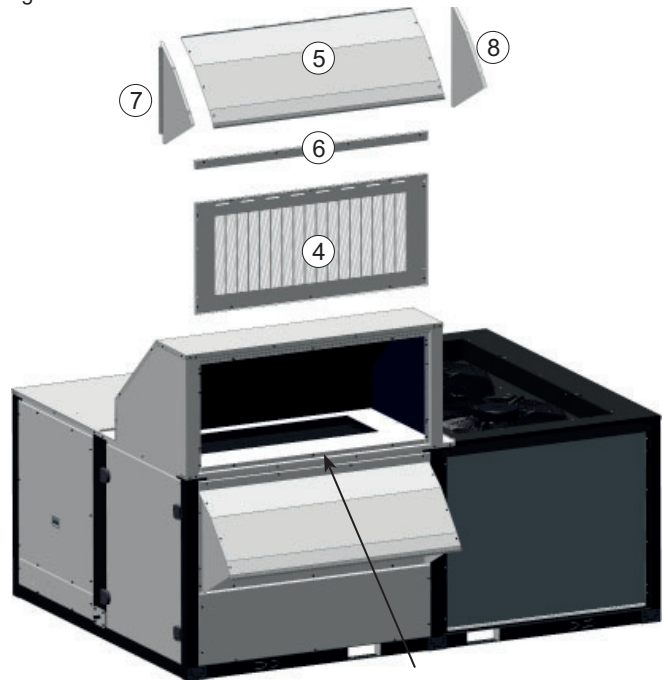
The fresh air housing is supplied disassembled with the unit, for installation on site.

This housing is composed of the parts that appear in the following image. The number of each part corresponds to the order of assembly



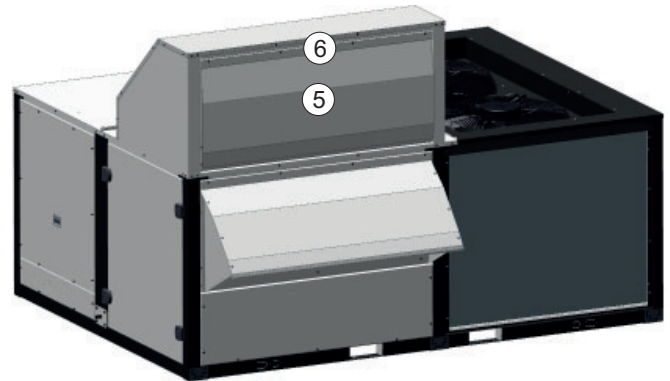
First, parts (1) and (2) must be connected. Then, part (3) is put in place. This structure must be fitted on top of the unit before continuing with the assembly process.

Important: Silicone should be applied to the joining area of the the fresh air housing with the machine, to prevent water entry and ensure tightness.

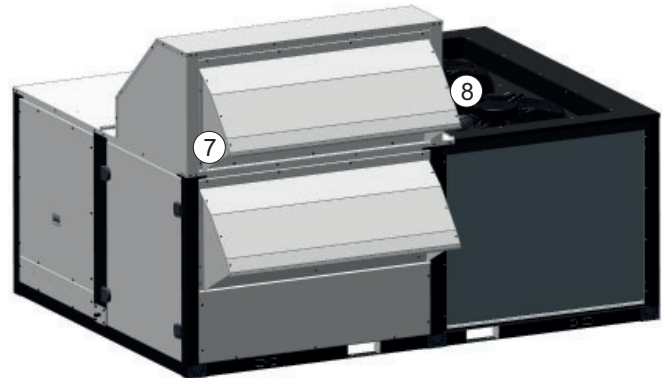


Then, the screen panel (4) is fitted to the cover and to the lower tab which incorporates the machine.

Before fitting the trim (6), the folded down hood (5) must be positioned so as to rest against the lower tab of the trim. Next, the trim is screwed onto the screen panel (4). This ensures that the hood is secure but still able to move.



Finally, the hood (5) is raised and the left (7) and right (8) side parts are secured, by being screwed onto the screen panel (4) and onto the hood.



The screws required for this assembly are 4.8 self-tapping hex except those of the trim (6) that are M4 Allen. All the screws are supplied in a bag.

Note: if the unit incorporates stop-drop, the assembly process is described in the previous section.

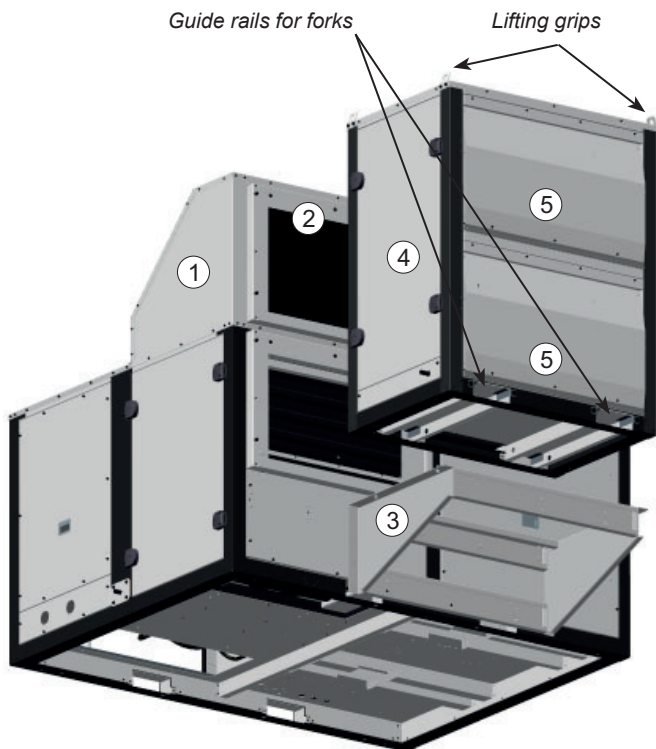
12 - FACTORY OPTIONS AND ACCESSORIES

12.4 Passive recovery (CW and TW assemblies)

Transport and handling

The module with the rotary heat exchanger and its support bed are supplied disassembled with the unit, for installation on site.

- The module can be handled safely by using a forklift truck. The base frame features guide rails to accommodate the forks of the fork-lift truck. These guide rails avoid any slippage.
- For transport and lifting up to the roof using a crane, a rocker arm as well as approved slings must be used. These slings are attached on the grips fitted to the cover of the module.



- First, the fresh air housing (1) is connected. Follow the steps detailed in paragraph 12.3.
- Next, the front panel (2) is secured using 8x40 hex screws.
- Then, the support bed (3) is fitted. This is fixed to the panel using 4.8 self-tapping hex screws on the sides and 8x40 hex screws on the front.
- Next, the recovery module is positioned on the support bed but without efforts on it. Do not remove the fork-lift truck until the module is not secured to the unit.

Note: on models 0280 to 0380 there is no such support bed.

- The module is secured to the unit using 8x40 hex screws. To do this, the side panels must be removed from the module. The right-hand panel (front view) is secured using M6 Allen screws, while the left-hand panel (4) incorporates dual locks.

Note: Check that the locks are not blocked. Open the locks with a 4 mm Allen key (anticlockwise).

- The module is screwed to rest on the support bed using 8x40 hex screws on both sides.
- Finally, raise the hoods (5) and secure the side parts. Follow the steps detailed in the preceding paragraph.

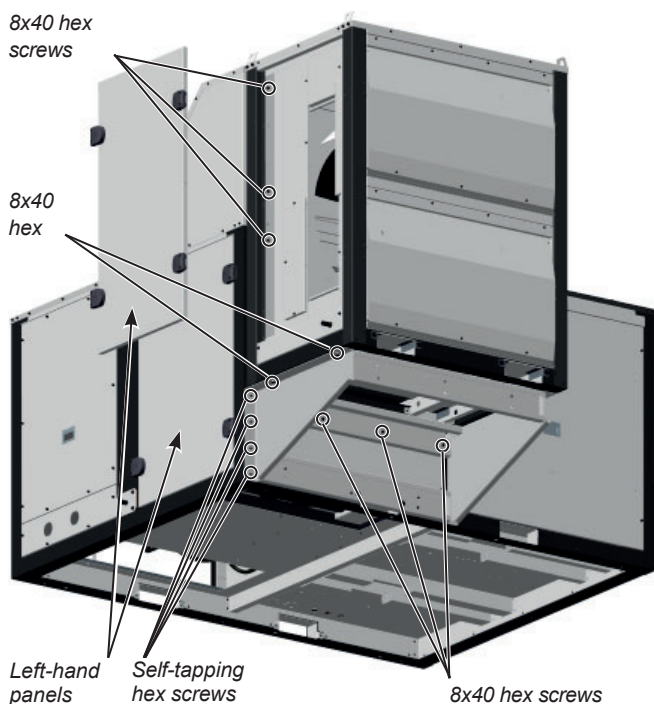
Note: All the screws required for this assembly are supplied secured on the module and the support bed.

Electrical connection to be made by the customer:

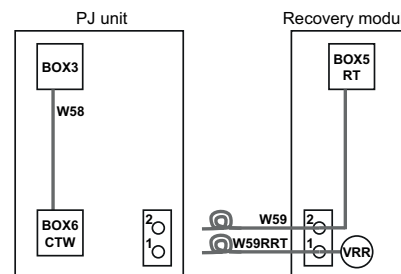
Note: see the wiring diagram included with the unit for a more detailed information about the wiring.

The connection is done through the left-hand panels (front view).

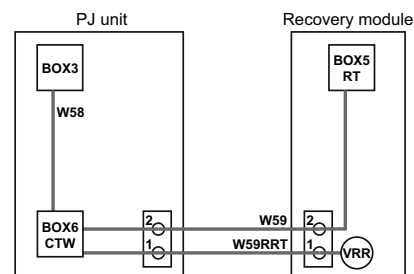
Installation of models TW - 0280 to 0360 and CW



Initial location of the cables for connection:



Connection to be made by the customer:



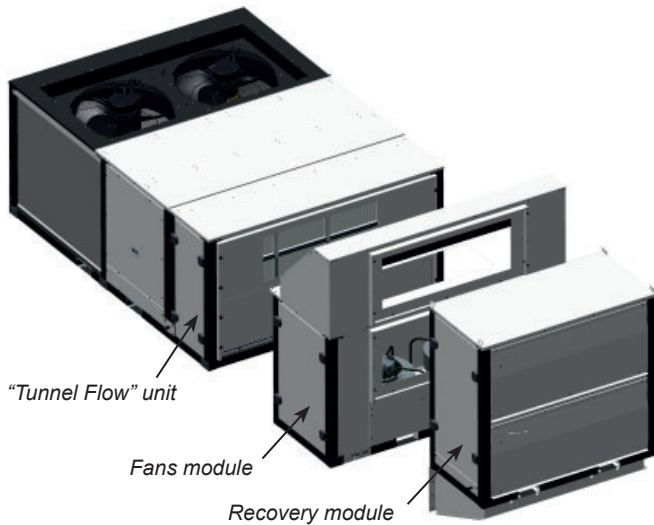
Installation of models TW - 0200 to 0240

In this case, before carrying out the steps outlined above, the return air fans module must be connected to the unit.

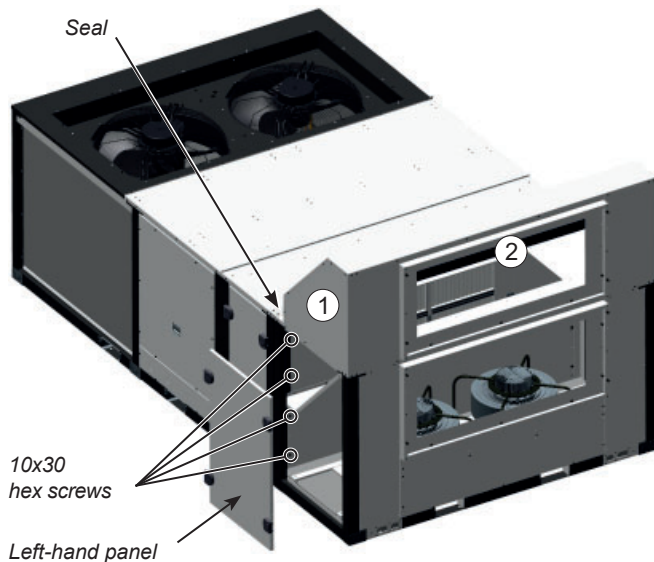
- The module can be handled safely by using a forklift truck. The base frame features guide rails to accommodate the forks of the fork-lift truck. These guide rails avoid any slippage.

12 - FACTORY OPTIONS AND ACCESSORIES

- For transport and lifting up to the roof using a crane, a rocker arm as well as approved slings must be used. These slings will be hooked on the anchorage points intended for this purpose in its base frame.



- First, the fresh air housing (1) is connected. Follow the steps detailed in paragraph 12.3.
- Next, the front panel (2) is secured using 8x40 hex screws.
- The fan module is secured to the unit using 10x30 hex bolts. To do this, the side panels must be removed from the module. The right-hand panel (front view) is secured using M6 Allen screws, while the left-hand panel incorporates dual locks.
- The cover of the unit and the cover of the module are joined using a seal. This is supplied attached to the cover of the module and must be joined to the cover of the unit using 4.8 self-tapping hex screws.



- Then, the recovery module is connected as described above.

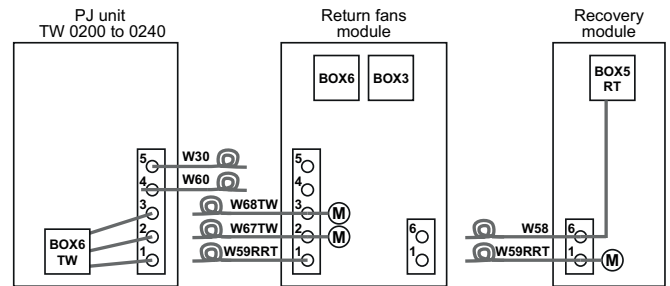
Note: All the screws required for this assembly are supplied secured on the fans module.

Electrical connection to be made by the customer:

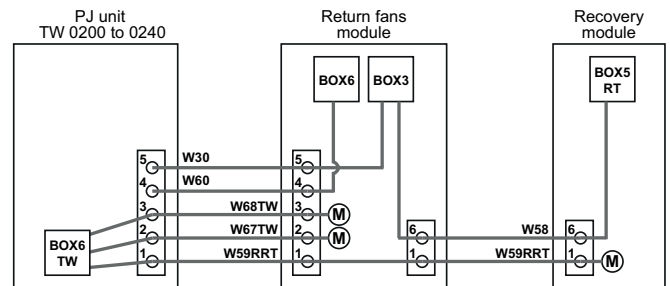
Note: see the wiring diagram included with the unit for a more detailed information about the wiring.

The connection is done through the left-hand panels (front view).

Initial location of the cables for connection:



Connection to be made by the customer:



Access to the inside of the recovery module

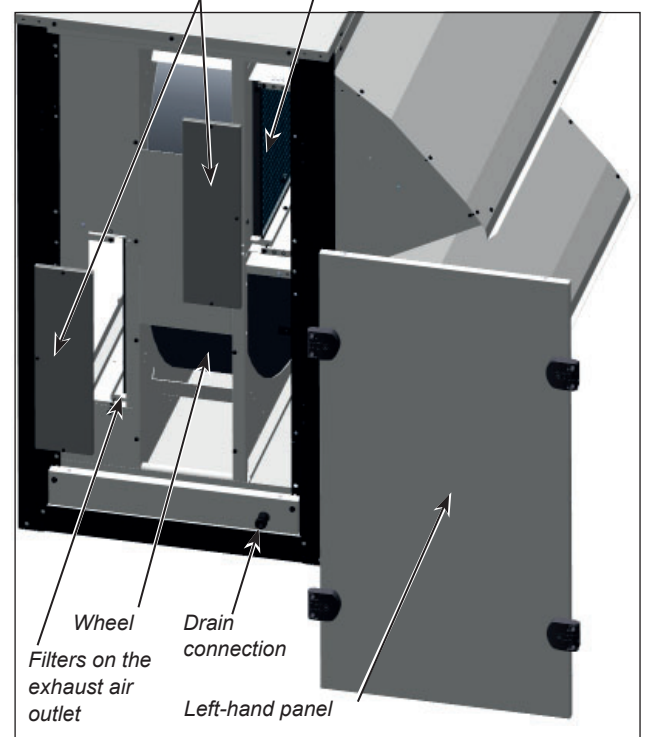
- The inside of the heat recovery unit module is accessed via the left-hand panel (front view), for maintenance tasks concerning the filters and the condensate pan (1/2" M gas threaded plastic drain connection). This panel features dual locks. Check that the locks are not blocked. Open the locks with a 4 mm Allen key (in an anticlockwise direction).

The access panels to the filters are secured using M4 Allen screws.

Note: The general procedure for removing and cleaning the filters is described in chapter "Maintenance".

Access panel to filters, M4 Allen screws

Filters on the fresh air intake

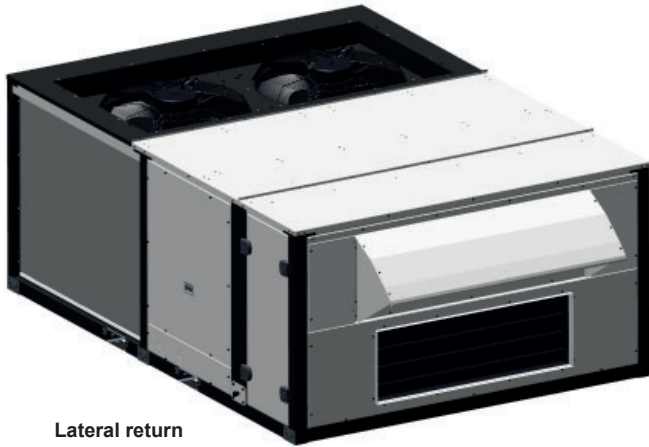


- The wheel motor can be accessed via the right-hand panel (front view). This panel is secured using M6 Allen screws.

12 - FACTORY OPTIONS AND ACCESSORIES

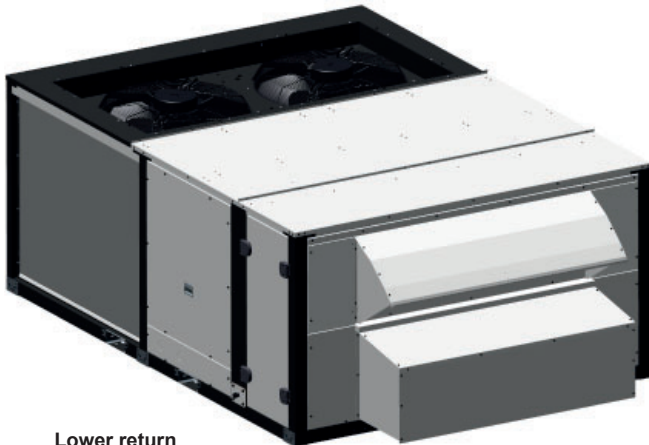
12.5 Enclosure for lower return (models 0200 to 0240 with TS assembly)

Models 0200 to 0240 with TS assembly are supplied factory-set with a lateral air return.



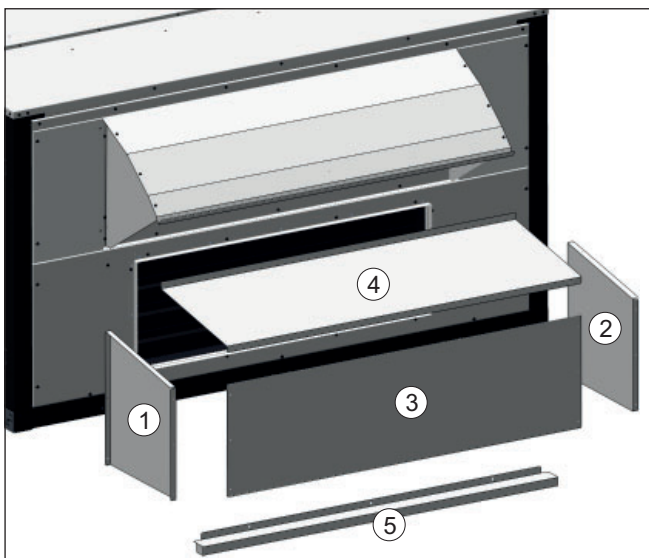
Lateral return

An enclosure must be fitted for the lower return, as shown in the image. All the parts and screws required for this assembly are supplied with the unit.



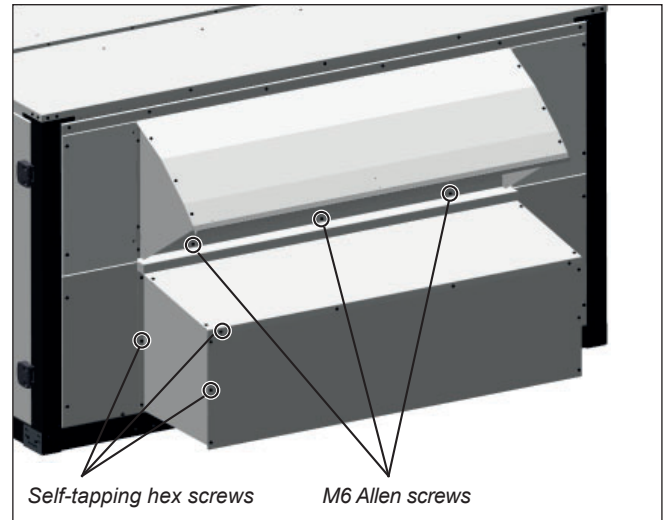
Lower return

This enclosure is composed of the parts that appear in the following image. The number of each part corresponds to the order of assembly.



First, left (1) and right (2) side parts must be connected. Then, parts (3) and (4) are put in place.

All these parts are fitted to the unit using 4.8 self-tapping hex screws. Finally, the trim (5) is fixed using M6 Allen screws.

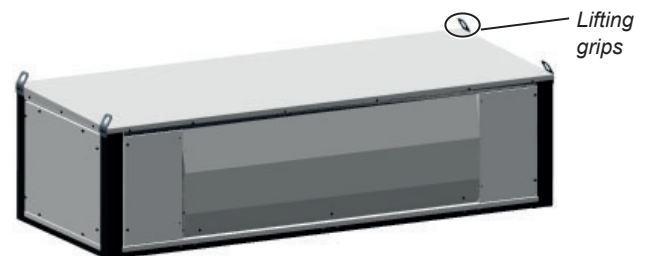


12.6 Return fans module (models 0200 to 0240 with TP assembly)

Transport and handling

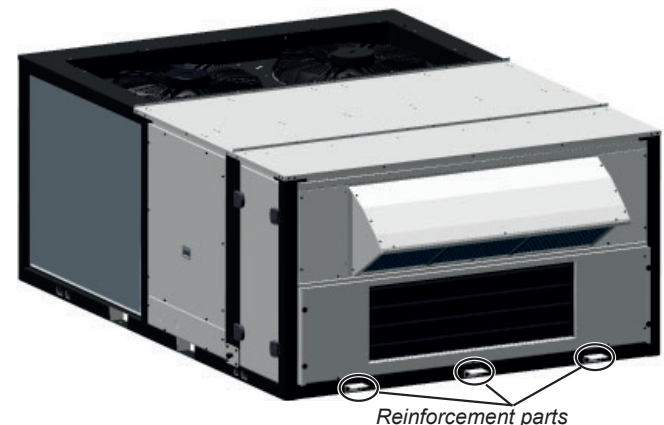
In these models, the module with the return fans is supplied disassembled with the unit, for installation on site.

For transport and lifting up to the roof using a crane, a rocker arm as well as approved slings must be used. These slings are attached on the grips fitted to the cover of the module.



Installation

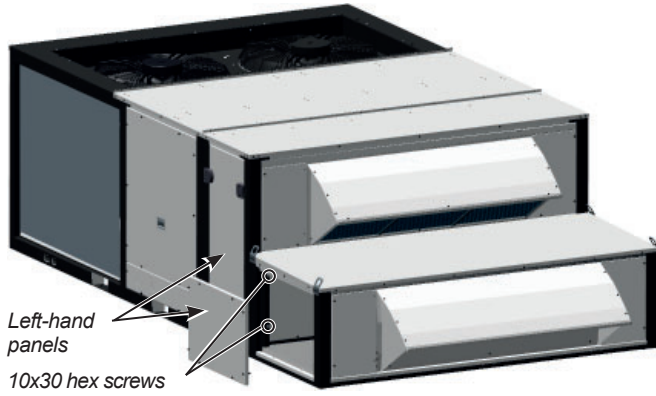
First, the three reinforcement parts are fitted to the base frame of the unit, using the 8x30 hex screws (supplied in a bag).



Next, the module is secured to the unit using 10x30 hex bolts. To do this, the side panels secured with M6 Allen bolts must be removed from the module.

12 - FACTORY OPTIONS AND ACCESSORIES

Finally, raise the hoods and secure the side parts.

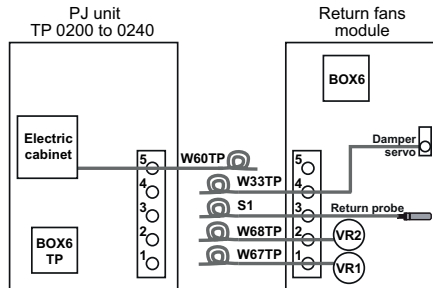


Electrical connection to be made by the customer:

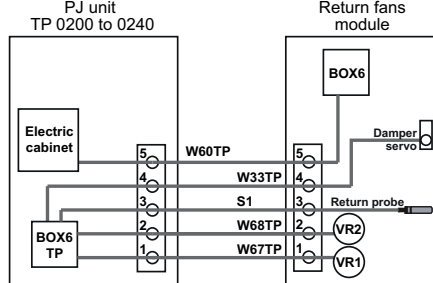
Note: see the wiring diagram included with the unit for a more detailed information about the wiring.

The connection is done through the left-hand panels (front view).

Initial location of the cables for connection:



Connection to be made by the customer:

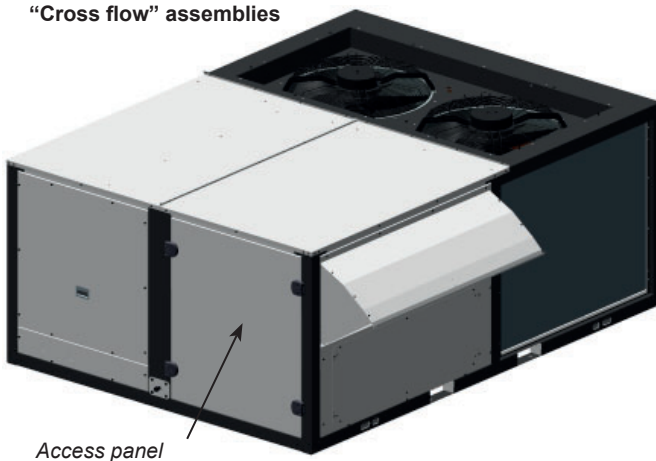


12.7 Air filters

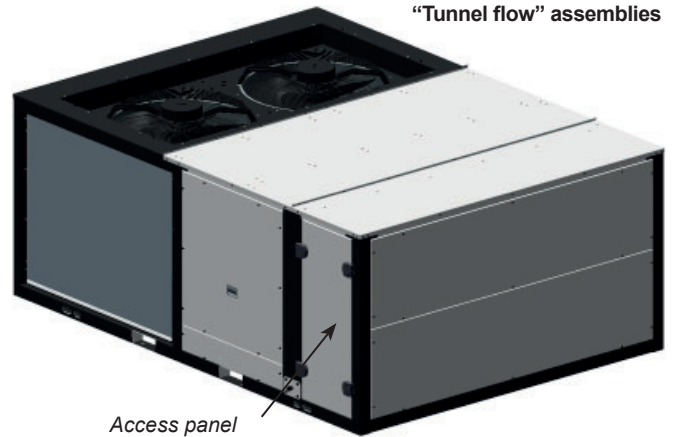
The access panel to the filters incorporates dual locks, they can function as hinges or can be used to remove the panel.

Note: Check that the locks are not blocked. Open them with a 4 mm Allen wrench (in an anti-clockwise direction).

“Cross flow” assemblies



“Tunnel flow” assemblies



- These units include G4 gravimetric filters standard type, which can be replaced by:
 - G4 gravimetric filters with low pressure drop.
 - G4 gravimetric filters standard type + M6, F7 or F9 folded opacimetric filters.
 - G4 gravimetric filters with low pressure drop + F7 or F9 folded opacimetric filters.
 - Double stage of folded opacimetric filters (M6 + F7, M6 + F9, F7 + F9 or F9 + F9).

- The thickness of the frames is 25 mm for the G4 standard type and 50 mm for the G4 low pressure drop and all opacimetric filters.

Filters supplied from the factory can be replaced on site by other types of filters with different thickness.

The filter holder structure supports the following filter combinations: 25 mm, 25 mm + 50 mm, 50 mm + 50 mm.

The filter holder structure incorporates a tensioner that can be moved along a guide to adjust the width according to the chosen combination. With the help of a locking knob, the position of the frames is locked after placement.

To extract the frames from each row, simply slide the tab.

Note: the filters cleaning procedure is explained in the chapter of “Maintenance”.



Tab for displacement of the frames

Tensioner

Locking knob for the tensioner

Guide

12 - FACTORY OPTIONS AND ACCESSORIES

12.8 Heat recovery coil

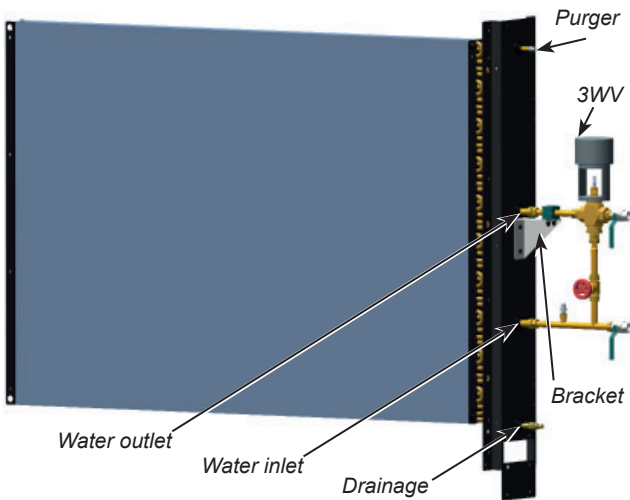
This option is compatible with C0, CS, CF, CQ, CT, T0 and TS assemblies.

- The heat recovery coil (HRC) is placed between the main indoor coil and the air filters. The function of the heat recovery coil is to pre-heat the air that will pass through the main indoor coil. For this, it uses the temperature of an outdoor water installation.

The unit incorporates an anti-freeze thermostat as safety system.

- The coil is supplied with a 3-way valve kit (3WV) for installation on-site, outside the unit.

Parts of this kit are shipped separate for installation by the installer: threaded pipe sections, purger, 3-way valve and actuator, ball valves, gate valve, bracket and clamp. First, it is advisable to place the bracket of the kit, using 2 of 4.8 self-tapping hex screws.

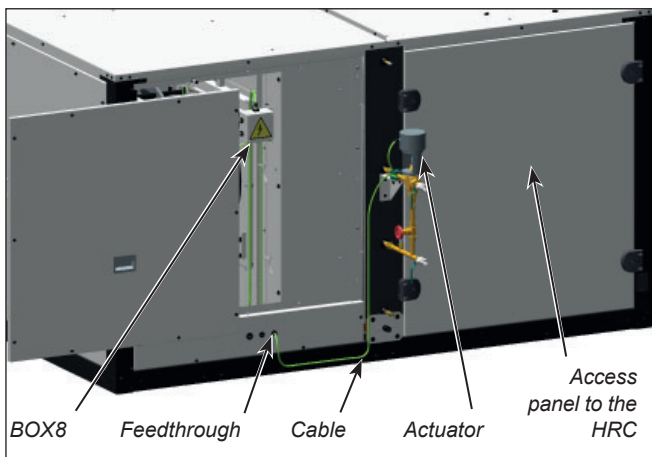


It is recommended to insulate all piping located on the outside of the unit.

- The unit's electronic control manages both the heat recovery coil and the 3-way valve.

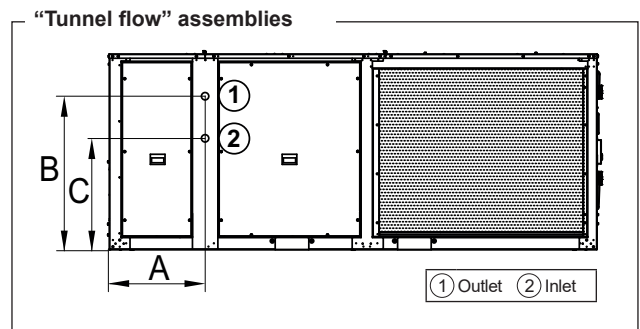
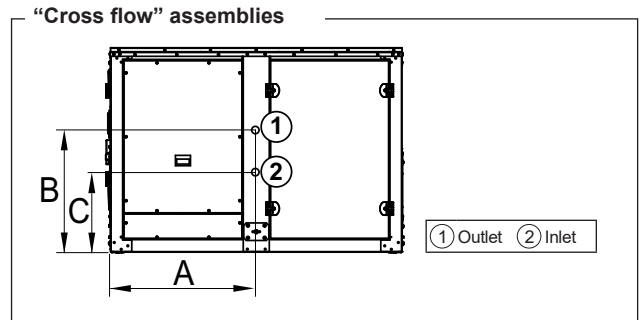
The cable with the wires for the electrical connection of the actuator must be connected in BOX8. The installer must feed the W43 cable through the M16 feedthrough located in the bottom panel of the PJ unit, and next, connect it to BOX8.

W43 (BOX8)	Actuator
40	→ COM
41	→ 24V
42	→ Y1



Note: see the wiring diagram included with the unit for a more detailed information about the wiring.

- The inlet/outlet connections of the coil are located on a side pillar of the unit. The position is shown in the following diagrams.



Dimensions (mm)		A	B	C	Ø I/O
Cross flow	0090 to 0190	872	721	443	1/2"
	0200 to 0240	1099	721	443	1/2"
	0280 to 0400	1099	721	443	3/4"
Tunnel flow	0200 to 0240	534	721	443	1/2"
	0280 to 0380	914	721	443	3/4"

- Coil filling:

- The coil filling must be made with the purger open until water runs through it, which is when it is time to close it.
- Cut off the water supply and let the bubbles generated go up to the highest coil point and eliminate by opening the purger.
- Pour more water into the circuit and repeat the previous steps.
- Activate the water pump (to be foreseen by the installer) and repeat the previous steps until no air noises are heard in the piping, which is when the filling of the installation will have been finished successfully.

- In case of long unit stops, and forcibly if they happen in the winter season, the coil must be emptied.
- To prevent the water from freezing, with this option the unit always has an anti-freezing thermostat. Add glycol to the water if necessary.
- The direction of the water flow must be correct and so the following indications must be observed:



Note: the heat recovery coil is not compatible with the hot water coil, the gas boiler or the gas burner.

12 - FACTORY OPTIONS AND ACCESSORIES

12.9 Electrical heaters

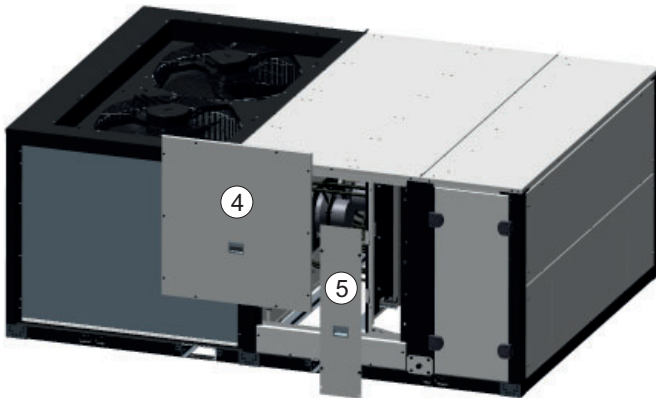
- The auxiliary electrical heaters are ready for operation in two power stages. These heaters are managed by the electronic control of the unit that can activate them in the following cases:
 - As a backup in HEATING mode, following the input of all the available compressors.
 - In HEATING mode, instead of compressors.
 - During the defrosting operation if selected as support.
 - As a backup in COOLING mode in accordance with the return and supply temperatures.
- Up to 3 values of total power available for each model:

VECTIOS PJ	E0L (Low)	E0N (Nominal)	E0H (High)
0090 to 0120	12 kW	18 kW	unavailable
0140 to 0190	12 kW	18 kW	27 kW
0200 to 0400	18 kW	27 kW	36 kW

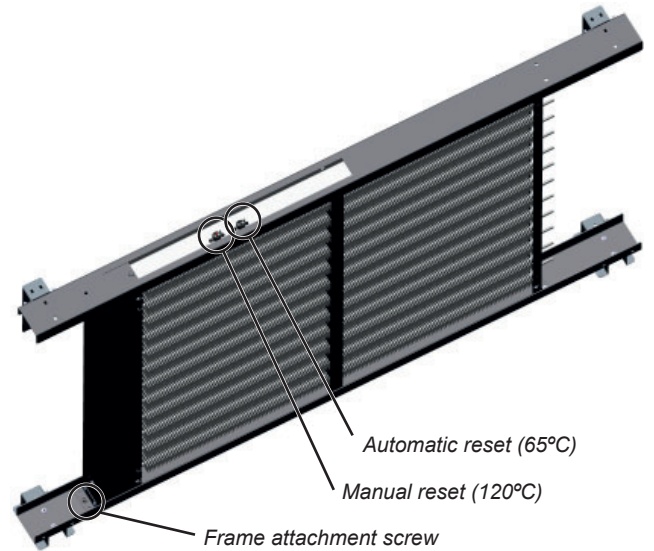
- The electrical heaters are assembled and connected inside the unit. They can be accessed by the same panel that the supply fan.
 - **“Cross flow” assemblies:** the heaters are accessed by removing the panels (1) and (2), and then the inside panel (3), all of them fixed with M6 Allen screws.



- **“Tunnel flow” assemblies:** the heaters are accessed by removing the panel (4), and then the inside panel (5), both fixed with M6 Allen screws.



- To remove the frame with the electrical heaters it is necessary to disconnect the safety thermistors from the connection box and unscrew the frame attachment screw (M4 Allen).
- The electrical heaters incorporate safety thermistors for protection of the unit against excess temperature. One of them has automatic reset and tare value at 65°C, the other one has manual reset and tare value at 120°C.

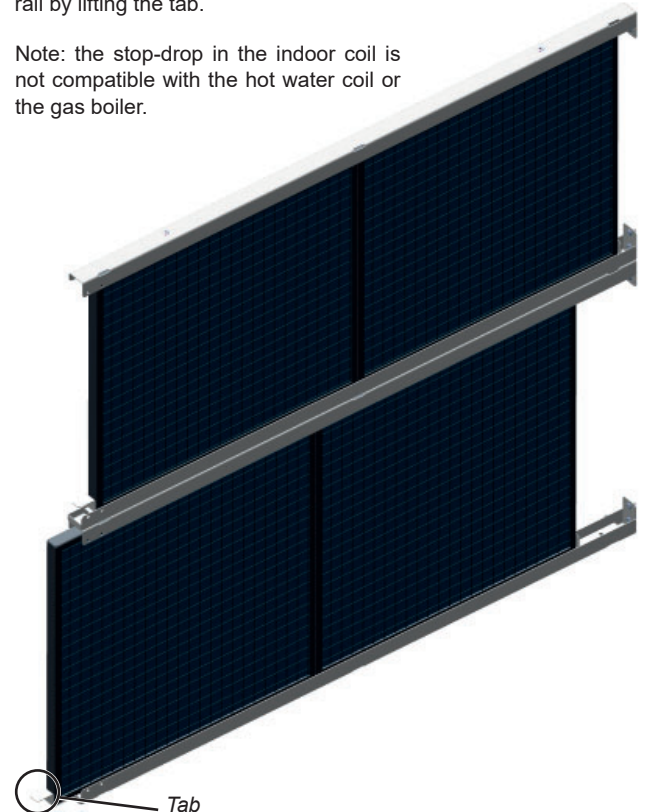


Important: If the contactor of the electrical heaters becomes locked in the closed position, their magneto-thermal switches will automatically open using current emission coils connected mechanically to them. The electronic control will signal an alarm for **“locked contactor of electrical heaters”** causing the unit to stop working, except for the indoor fans which will continue to operate at 100% airflow.

12.10 Stop-drop in the indoor coil

- The stop-drop can be installed in the indoor coil. It's recommended in cases where a high moisture content in the air is foreseen or when the air flow is high.
- The stop-drop is accessed by that same panels of electrical heaters, since it is placed between the indoor coil and the electrical heaters (see previous images).
 - **“Cross flow” assemblies:** panels (1), (2) and (3).
 - **“Tunnel flow” assemblies:** panels (4) and (5).
- The stop-drop frames are easily removable. They can be moved by rail by lifting the tab.

Note: the stop-drop in the indoor coil is not compatible with the hot water coil or the gas boiler.



12 - FACTORY OPTIONS AND ACCESSORIES

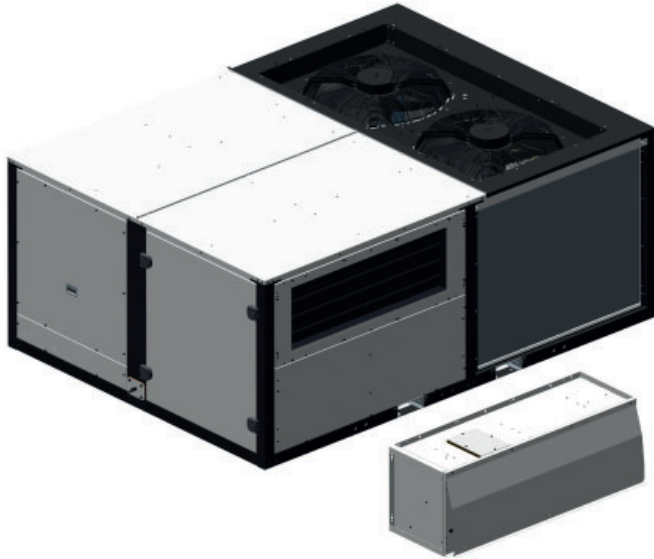
12.11 Preheater module

With CF assembly, 100% fresh air, it is possible to incorporate a preheater module (electrical heater) coupled to the fresh air intake.

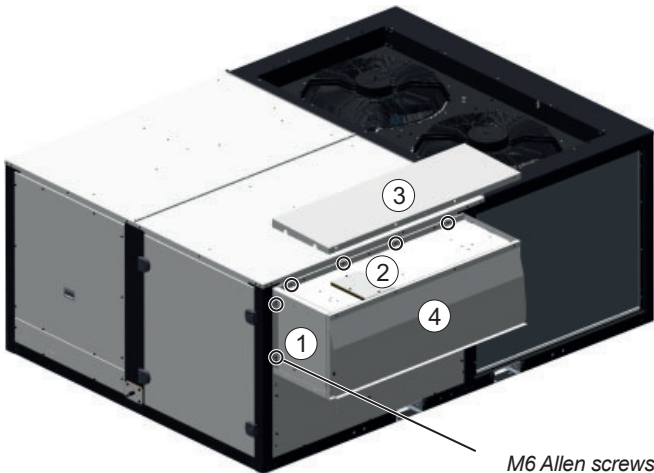
This module is supplied in kit for installation on site.

Electronic control manages this electrical heater with proportional control.

Two values of total power available for each model: Low (electrical heater in 1 row) and nominal (electrical heater in 2 rows).



The module (1) is attached to the machine using Allen M6 screws throughout the perimeter.



M6 Allen screws

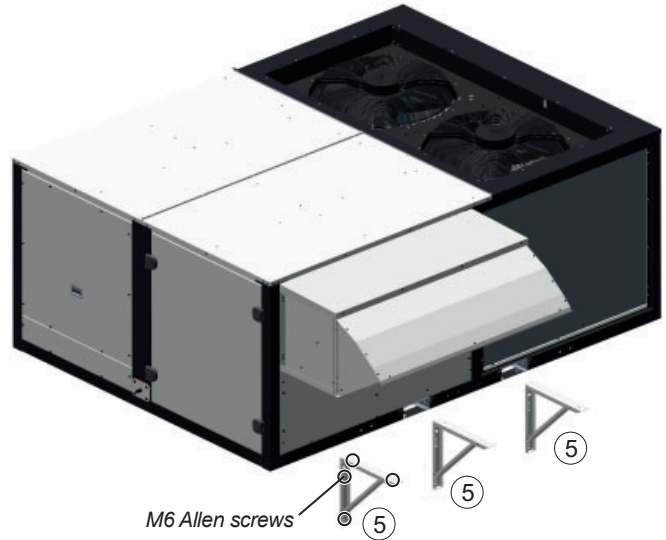
The register (2), secured with M4 Allen screws, allows access to the thermistors. Each row of the electrical heater incorporate safety thermistors for protection of the unit against excess temperature. One of them has automatic reset and tare value at 65°C, the other one has manual reset and tare value at 120°C.

After the module has been attached to the machine, the module cover (3) will be fitted using 4.8 self-tapping hex screws.

The hood (4) will then be raised and the side parts fixed. To do this, follow the steps described in paragraph 12.1.

Two or three L-shaped mounting brackets (4), depending on the model, are supplied with the module to increase the inflexibility of this union.

These mounting brackets will be fixed to the machine and to the base of this module, using Allen M6 screws.



Finally, the electrical connection box of this module (6) will be placed on the right side, by means of 4 screws M6 Allen. This box may also be located separately from the module.



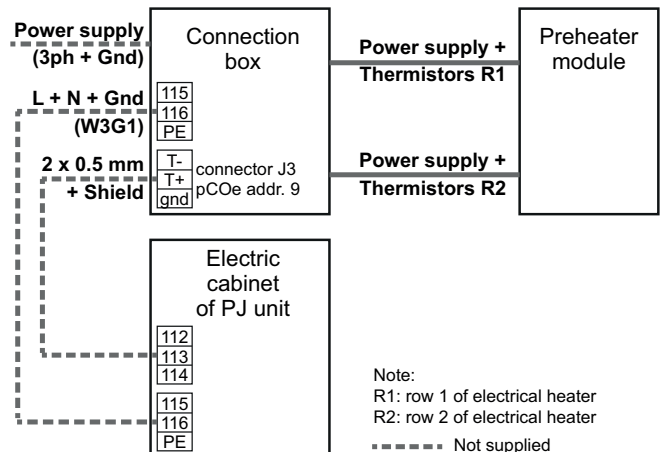
Note: All necessary screws for this assembly is shipped with the preheater module.

Electrical connection of the module:

Note: see the wiring diagram included with the unit for a more detailed information about the wiring.

Cables to connect the preheater module with the box are on the right side of this module. The power supply of the electrical heater should be made by the installer.

The installer must also connect two cables to the electric cabinet of the unit (not supplied).



12 - FACTORY OPTIONS AND ACCESSORIES

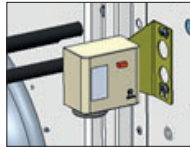
12.12 Hot water coil

- Hot water coil with a three-way valve managed by the electronic control of the unit. The water coil could be activated in the following cases:
 - As a backup in HEATING mode, following the input of all the available compressors (by default) or as first control stage.
 - As a backup in HEATING mode in accordance with the supply temperature.
 - During the defrosting operation if selected as backup.
 - With the unit running or shut down if an anti-freeze alarm is triggered.
 - With the unit stopped when the outdoor temperature drops below 4°C. In this case the circulation pump of the water circuit is connected.
 - As a backup in COOLING mode in accordance with the return and the outlet temperatures.
- This option always incorporates an anti-freeze thermostat as safety system.

There are two configuration types available:

- Standard (B0S), the unit always incorporates an anti-freeze thermostat as safety system.

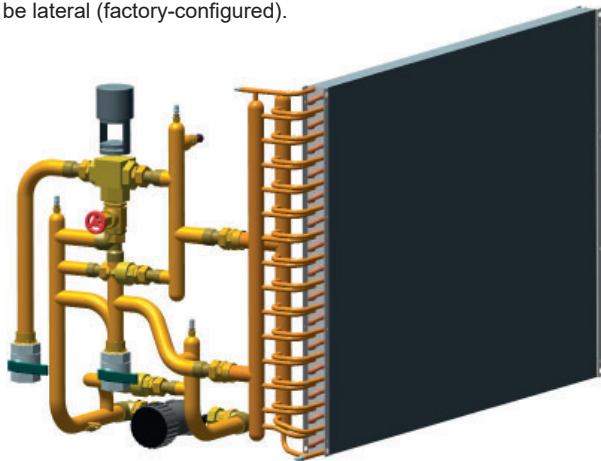
This thermostat is located on the panel next to the supply fans, if necessary to reset the safety.



- Great Cold (B0C), with additional anti-freeze technology based on the water temperature. This protection is made up of a circulation pump as well as two probes inserted in the input and the output of the coil.

Important: this option is mandatory for an outdoor temperature lower than -20°C WB. Consult for percentages of glycol water above 20%.

Note: on units with the "Great Cold" option, air supply only may be lateral (factory-configured).

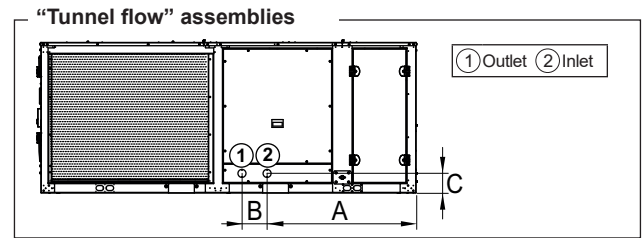
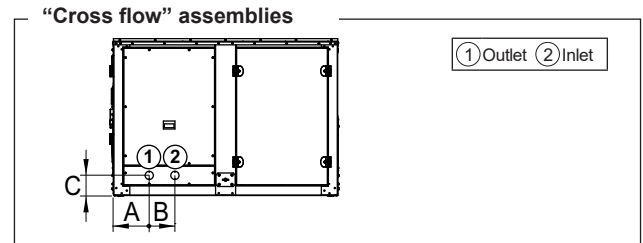


- The pump of the water circuit has to be activated whenever the 3-way valve is switched on. It is the installer's responsibility to connect the pump to the electronic control, except with the factory-installed GREAT COLD option. Please refer to the wiring diagram provided with the unit.

Operation of the pump with the GREAT COLD option:

- Antifreeze protection: if the water temperature in the coil drops below 4°C, the control activates the pump and the 3-way valve opens to 100%. The pump stops when 7°C are reached.
- Safety of minimum outdoor temperature: if the outdoor temperature drops below 4°C, the control activates the pump and the 3-way valve opens to maintain, in the water coil, a water outlet temperature of 10°C in ON operating mode and 15°C in OFF operating mode.
- The inlet/outlet connections of the hot water coil are located inside the unit and the connection is made via the side panel.

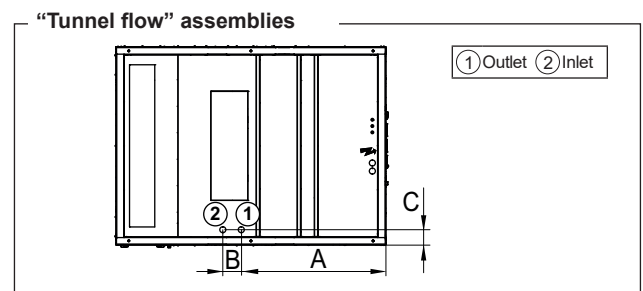
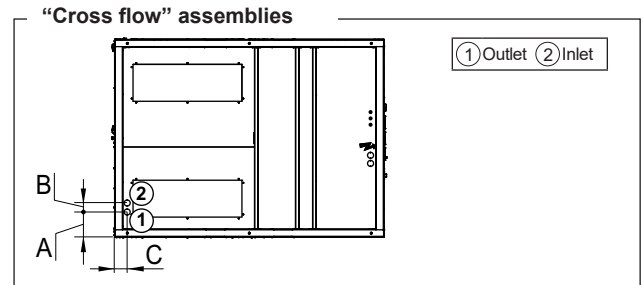
The position of the sheet metal precuts on the side panel are shown in the following diagrams.



Dimensions (mm)		A	B	C	Ø I/O
Cross flow	0090 to 0190	142	160	158	1 1/2"
	0200 to 0240	159	245	158	2"
	0280 to 0400	159	245	158	2"
Tunnel flow	0200 to 0240	934	280	158	2"
	0280 to 0380	1314	280	158	2"

In models 0200 to 0380 it can also be made via the base of the unit using flexible piping (only available for units without pre-assembly roof curb).

The position of the sheet metal precuts on the base are shown in the following diagrams.

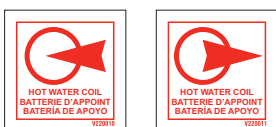


Dimensions (mm)		A	B	C	Ø I/O
Cross flow	0200 to 0240	280	100	140	2"
	0280 to 0380	280	120	180	2"
Tunnel flow	0200 to 0240	1597	270	170	2"
	0280 to 0380	1851	200	170	2"

- Coil filling:
 - The coil filling must be made with the bleeder valve open until water runs through it, which is when it is time to close it.
 - Cut off the water supply and let the bubbles generated go up to the highest coil point, which is the same as the bleeder valve, and eliminate by opening the purger.

12 - FACTORY OPTIONS AND ACCESSORIES

- Pour more water into the circuit and repeat the previous steps.
- Activate the water pump (to be foreseen by the installer, except with the GREAT COLD option) and repeat the previous steps until no air noises are heard in the piping, which is when the filling of the installation will have been finished successfully.
- In case of long unit stops, and forcibly if they happen in the winter season, the coil must be emptied.
- To prevent the water from freezing, with this option the unit always has an anti-freezing thermostat. Add glycol to the water if necessary.
- The direction of the water flow must be correct and so the following indications must be observed:



Note: the hot water coil is not compatible with the stop-drop in the indoor coil, the heat recovery coil or the active dehumidification.

12.13 Gas boiler (only with R-410A)

Natural or propane gas boiler with modulating actuator, in accordance with the Gas Directive 2009/142/EC, connected to one side of the unit. EC certification: 0085CP0214.



Note: the gas boiler is not compatible with the stop-drop in the indoor coil, the heat recovery coil or the active dehumidification.

- Up to 3 values of total power available for each model:

VECTIOS PJ	G1L (Low)	G1N (Nominal)	G1H (High)
0090 to 0190	unavailable	unavailable	Condexa PRO 70
0200 to 0400	unavailable	Condexa PRO 70	Condexa PRO 100

Important: The staff responsible for the installation, operation and maintenance of this burner must always strictly follow the instructions given in this manual, as well as in the manufacturer's (RIELLO) installation and maintenance brochure for the boilers in the CONDEXA series, supplied with the unit.

Characteristics of gas boiler

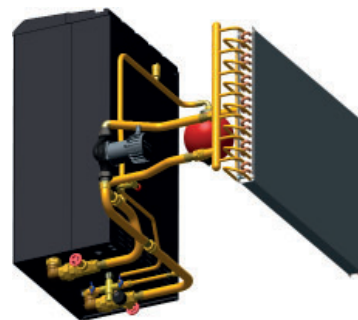
- The key features of the boiler are:
 - Burner with premixing and modulation technology that allows outputs close to 109% (Hi performance).
 - Heat exchanger made of stainless steel with a low carbon content.
 - Proportional air / gas valve. Low NOx emissions (class 5, according to standard EN 297).
 - Condensate drain with siphon.
 - Forced draught.

- Electronic ignition.
- Safety devices: safety thermostat, low water pressure safety switch, flowmeter, Delta-T control, smoke temperature sensor.
- NTC sensor for boiler water temperature regulation.
- Working temperature of water from -7°C to 100°C. Consult for percentages of glycol water above 20%.
- Electronic controller with microprocessor and Multifunction LCD display for boiler's control, configuration and diagnostics. Possibility of ModBus communication.
- The electronic control of the unit will only manage the boiler connection as heating support depending on the ambient conditions.

- The boiler is connected to the hydraulic circuit of the auxiliary hot water coil (consult paragraph 12.12).

This water circuit, installed inside the unit, is composed of:

- Water coil.
- Circulation pump.
- Expansion vessel.
- Gate valves.
- Safety valve with a tare value of 4 bar.
- Automatic air bleeder valve.



Safety instructions

Safety instructions to be followed by the staff responsible for work with this burner are described below.

• General cautions

Check the condition of the equipment upon delivery. Check that the details on the label, the packing and the name plate match the order. If equipment has been damaged, or there is a shortfall in delivery, notify accordingly.

During the installation, operation and maintenance of the boiler described in this manual, the use must always strictly follow the instructions given in all the chapters of this manual, and in the manufacturer manual provided with this unit.

The boiler must be installed in compliance with current regulations, according the manufacturer's instructions and by qualified staff, technically specialised in the heating field.

This thermal module must be used only for the applications it was designed for. Any other wrong or unreasonable use must be regarded as improper and therefore hazardous.

In the event of a water leak, disconnect the thermal module from the main power supply, shut off the water supply and promptly notify the Technical Assistance Service, or professionally qualified personnel.

Periodically check that operating pressure in the water circuit is over 1 bar but below the maximum limit specified for the boiler. If this is not the case, contact Technical Assistance Service or a professionally qualified heating engineer.

The following operations shall be necessary if the boiler is not used for a long period of time:

- Switch the boiler OFF at the control panel.
- Turn the magnetothermic switch "off", placed in the electric cabinet of the PJ unit.
- Close the fuel cock and heating circuit water cock.
- Drain the central heating circuit if there is any risk of freezing.

Maintenance must be performed on the boiler at least once a year.

This manual and the manufacturer's manual must be kept with care. If it is lost or damaged, please contact the Technical Assistance Service for a new copy.

12 - FACTORY OPTIONS AND ACCESSORIES

The thermal module, before being connected to the hydraulic system, the gas network, and the electrical system, may be exposed to temperatures ranging from 4°C to 40°C. After it can activate the Frost Protection function. Regularly check that the condensate drain is free from obstruction.

We recommend cleaning inside the exchanger once a year, extracting jet and burner and removing any installation debris by suction. This operation will be done by personnel from the Technical Assistance Service only.

• Basic safety rules

The operation of any appliance that uses fuel, electrical power and water demands that a number of fundamental safety precautions be respected. It is forbidden:

- To use electrical devices or equipment, such as switches, appliances, etc. if there is a smell of gas or unburnt products. If so:
 - Close the fuel shut-off cock.
 - Report the fault immediately to the Technical Assistance Service or a professionally qualified heating engineer.
 - Any technical or cleaning activity is forbidden before disconnecting the boiler from the main power supply by switching the magnetothermic switch placed in the electric cabinet of the PJ unit.
- To tamper with or adjust the safety or control devices without prior authorisation and instructions from the manufacturer.
- To pull, disconnect, or twist the electrical cables coming from the boiler even if it is disconnected from the mains electricity supply.
- To plug or block the condensate drain outlet
- To switch off the appliance if the outdoor temperature may drop to below ZERO (frost hazard).
- To activate the thermal module without water.

• Safety devices

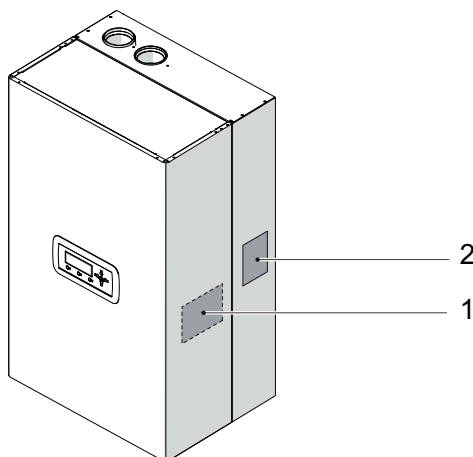
The triggering of safety devices indicates the malfunction of a potentially hazardous thermal module. Therefore, contact Technical Assistance Service immediately. After a brief pause, it is possible to try and restart the appliance.

Safety devices must be replaced by Technical Assistance Service, using only original parts. Refer to the spare parts catalogue supplied with the appliance. After making the repair, check that the appliance is working properly.

The appliance must not be put in service, even temporarily, when tampered safety devices are not in operation or have been tampered with.

Identification of the boiler

The boiler can be identified as follows:



1- Technical data plate:

It indicates the technical and performance data.

G20 - 20 mbar IT	RIELLO RIELLO S.p.A. Via Ing. Pileade RIELLO, 7 37046 Legnago (VR) -		Gas type: I: G20-20 mbar G30-28-30 mbar G31-37 mbar	Category: II2H3+	CE 0085 / 17 0085CP0214
	CONDExA PRO 100		P min G20-20 mbar		
Cod. 20115226 N° FC145000263		G20	G25	η ***	European Directive 90/269/EEC
230V ~ 50Hz 150 W		Qn(min)= 19,4kW - kW Pn(min)= 19,0kW - kW Qn(max)= 97kW - kW Pn(max)= 95,16kW - kW	NOx: 5		PMS=6 bar T=90°C B23-B53-B53p (C63, C63X)

Key:

- Central heating section
- Qn** Rated heat input
- Pn** Rated useful heat output
- IP** Electric degree of protection
- Pmw** Maximum operating pressure, DHW circuit
- Pms** Maximum operating pressure, CH circuit
- T** Temperature
- η** Efficiency
- D** Specific flow rate
- NOx** NOx class

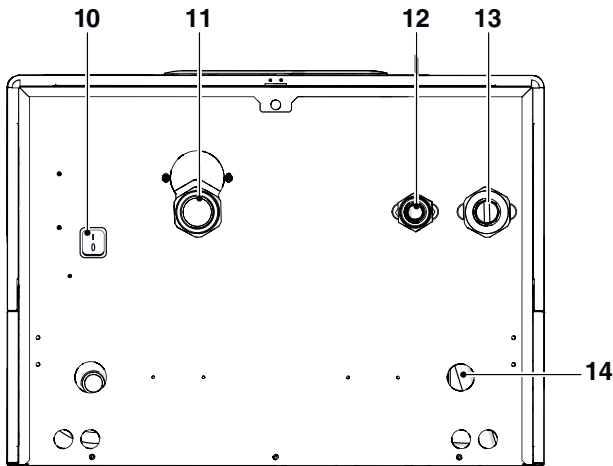
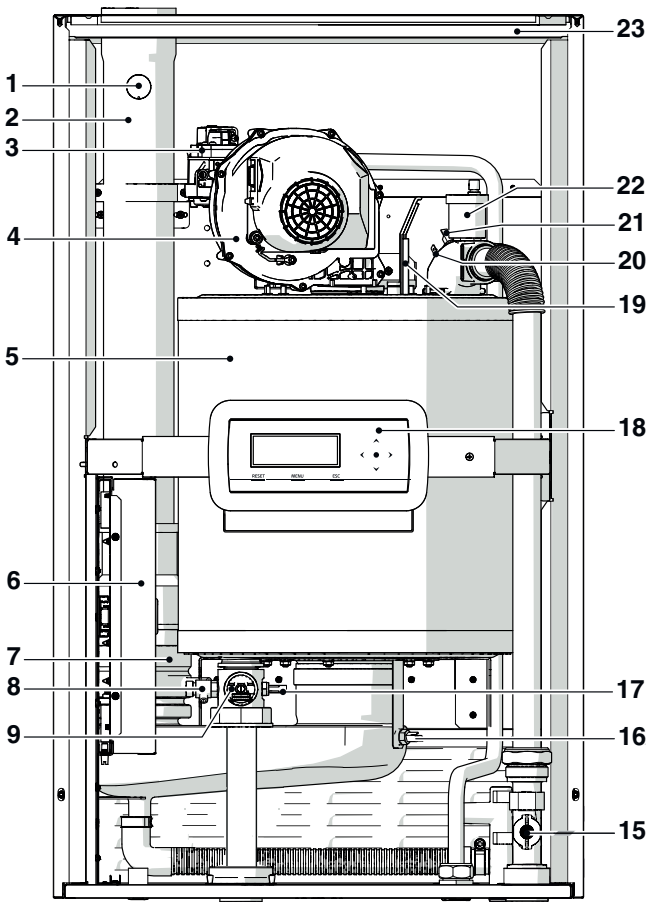
2- Gas label:

Is located on the appliance's side and states the type of fuel used and the country of destination:

Country	Category	Gas	Pressure (mbar)	Gas	Pressure (mbar)
Italy, Ireland, Great Britain, Portugal, Slovenia, Slovakia, Greece	II2H3+	G20	20	G30/G31	28-30/37
Spain	II2H3+	G20	18	G30/G31	28-30/37
Romania, Bulgaria, Turkey, Denmark, Estonia, Sweden, Norway, Latvia, Lithuania, Finland, Russia	II2H3B/P	G20	20	G30	30
Hungary	II2H3B/P	G20	25	G30	30
Poland	II2H3B/P	G20	25	G30	37
Croatia	II2H3B/P	G20	20	G30/G31	30
Holland	II2H3B/P	G25	25	G30	30
Czech Republic, Austria, Switzerland	II2H3B/P	G20	20	G30	50
Luxembourg	II2H3B/P	G20	20	G30	50
	II2E3P	G20	20	G31	37
Belgium	I2E(S)	G20/G25	20/25	--	--
	I3+	--	--	G30/G31	28-30/37
France	II2E+3+,	G20/G25	20/25	G30/G31	28-30/37
Malta, Cyprus, Iceland	I3B/P	--	--	G30	30
Germany	II2ELL3B/P	G20/G25	25	G30	50

12 - FACTORY OPTIONS AND ACCESSORIES

Boiler layout



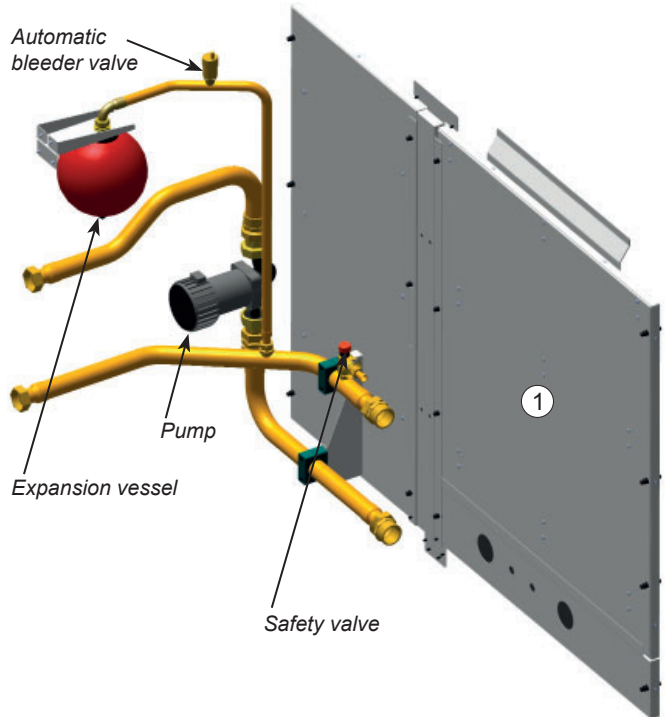
- | | |
|--|---------------------------------------|
| 1 Flue gas analysis outlet | 12 Gas supply |
| 2 Flue gas exhaust connection | 13 Discharge to the hydraulic circuit |
| 3 Gas valve | 14 Condensate drain connection |
| 4 Fan | 15 Flow-meter |
| 5 Combustion chamber | 16 Exhaust flue probe |
| 6 Electric cabinet | 17 Return probe |
| 7 Flue non-return valve | 18 Control panel |
| 8 Drain cock | 19 Ignition/detection electrode |
| 9 Minimum pressure switch | 20 Safety thermostat |
| 10 Main switch | 21 Flow probe |
| 11 Return from the hydraulic circuit of the hot water coil | 22 Automatic bleed valve |
| | 23 Casing |

Installation of the boiler

The boiler is supplied disassembled with the PJ unit, for installation on site.

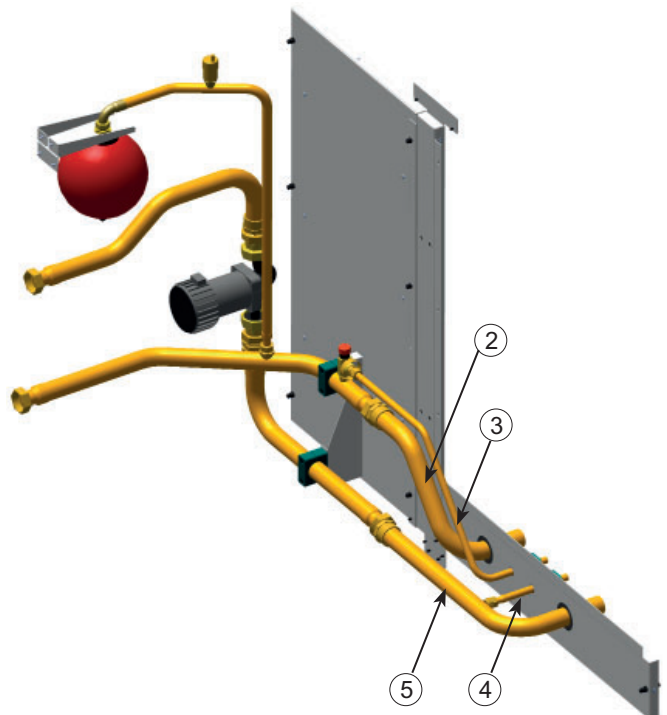
The hydraulic circuit is assembled inside the PJ unit. The installer must connect the connecting piping with the boiler.

Note: all this piping system is sent packed together with the boiler.



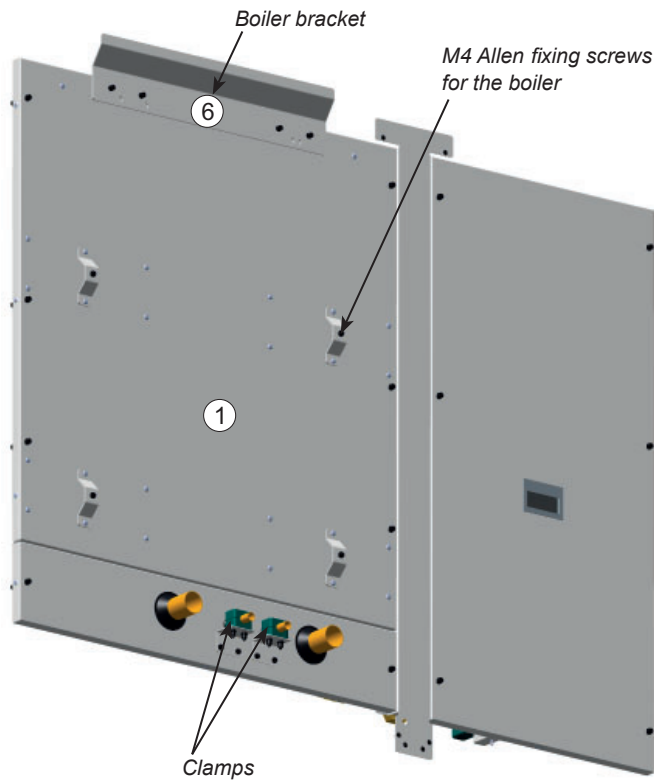
Step 1: Remove the panel (1) secured using M6 Allen screws to facilitate the work. Next, connect the piping:

- (2) Discharge to the hydraulic circuit of the hot water coil
- (3) drain connection of the safety valve
- (4) Filling line
- (5) Return from the hydraulic circuit of the hot water coil

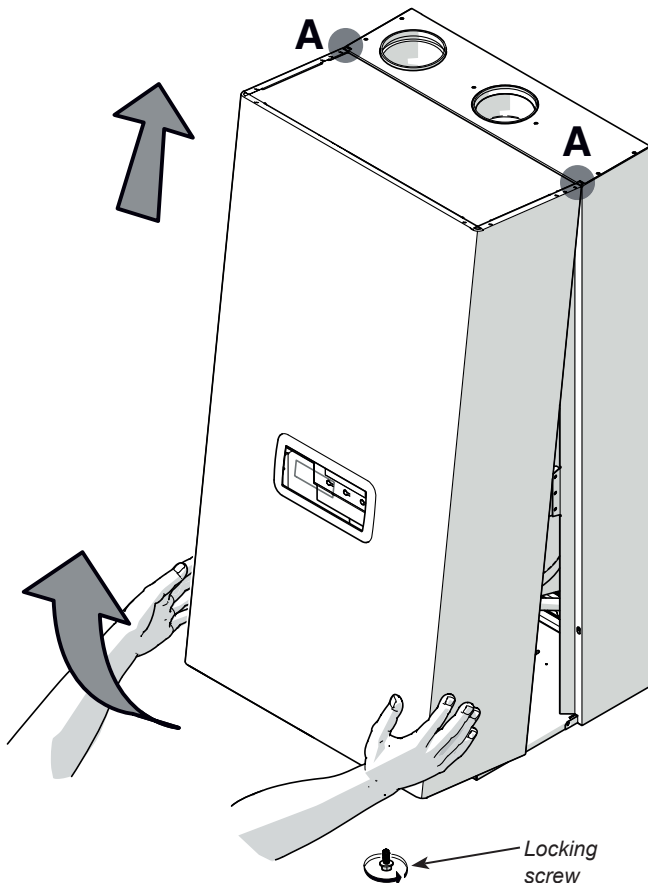


12 - FACTORY OPTIONS AND ACCESSORIES

Step 2: Replace the panel (1). The following image shows the panel by the outer side of the PJ unit. Then fix the clamps supplied to secure the pipes (3) and (4) (M6 Allen screws).



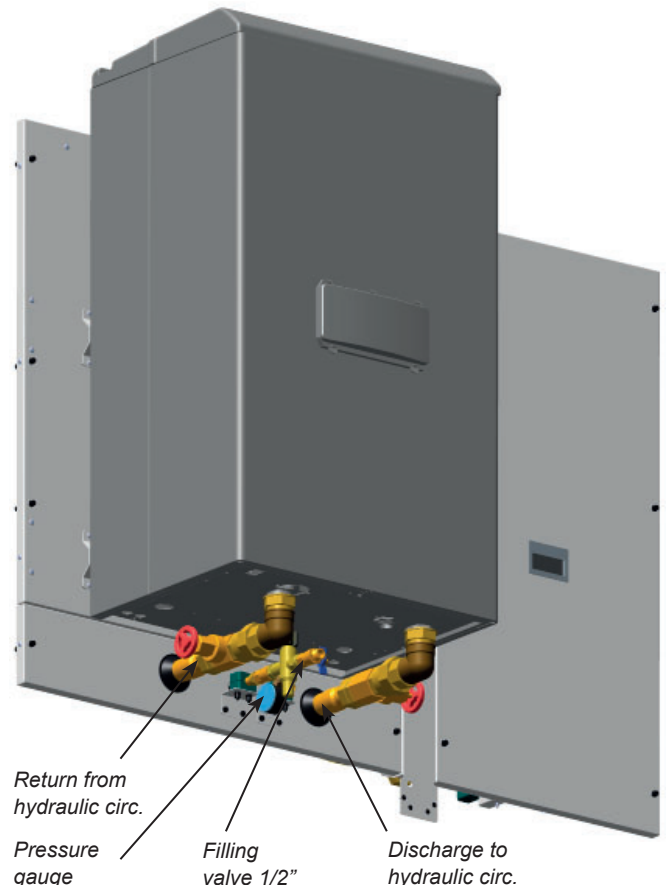
Step 3: Remove the casing of the boiler to screw it to the panel (1). To do this it is necessary to remove the locking screw, and then, pull the front panel outwards and later to the top to decouple it from points A.



Step 4: Drop the boiler on the bracket (6) and screw on the four fixings of this panel to secure (M4 Allen screws). Then reassemble the casing.



Step 5: Finally join the boiler with the piping using elbows and accessories factory-supplied.



12 - FACTORY OPTIONS AND ACCESSORIES

Gas connections

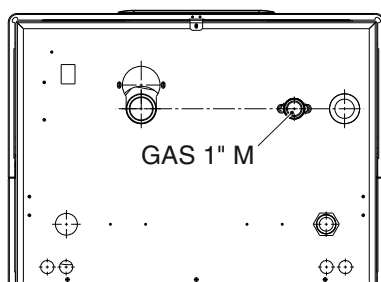
The gas connection must be made respecting the installation regulations in force, and sized to ensure the correct gas delivery to the burner.

Before making the connection, check that:

- The gas type is suitable for the boiler. Do not use any fuels other than those provided under any circumstances.
- If the boiler needs to be adapted for use with another gas fuel, contact the Technical Assistance Service to have the necessary modifications made. These operations may not be performed by the installer under any circumstances.
- The piping is thoroughly clean.
- The gas meter's flow rate is capable of ensuring the simultaneous use of all the appliances connected to it. The appliance's connection to the gas supply line must be carried out in accordance with the current regulations.
- Intake pressure with the appliance in the off position has the following reference values:
 - Powered by methane gas: optimal pressure 20 mbar.
 - Powered by L.P.G.: optimal pressure 35 mbar.
- The pressure never falls below 15 mbar.

While it is normal for the intake pressure to decrease while the boiler is in operation, it is advisable to verify that no excessive pressure fluctuations take place. In order to limit the extent of these types of variations, the diameter of the gas supply line to be used must be assessed based on the length and the pressure drops of the line itself, from the meter to the thermal module.

- If fluctuations in the gas distribution pressure are encountered, it is recommended to install an appropriate pressure stabiliser upstream of the boiler's gas intake. For G30 and G31 gas supply, all the necessary precautions must be taken in order to prevent the gas from freezing in the case of extremely low outdoor temperatures.
- If the gas distribution network contains solid particles, install a filter on the fuel supply line. When selecting it, consider that pressure drops due to the filter should be as low as possible.
- Once the boiler has been installed, check the connections are sealed according to current installation regulations.



Connection at the flue

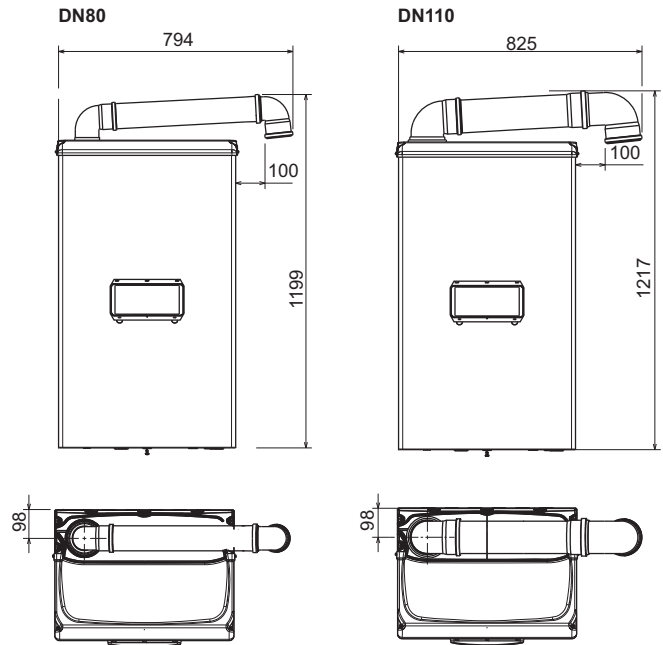
The boiler is supplied as standard in B-type configuration (B23-B53P-B53P), i.e. pre-fitted to suction air directly into the installation room and may be converted into a C-type appliance with the use of specific accessories.

For flue gas extraction and the intake of combustion air, it is essential to use only specific pipes for condensing boilers and ensure that they are correctly connected.

Diameter of the flue gas outlet (flue connection):

- * Condexa PRO 40 / 50 / 70: DN80
- * Condexa PRO 100: DN110

Optionally, a kit with all the flue gas accessories can be supplied:



Note: dimensions in mm

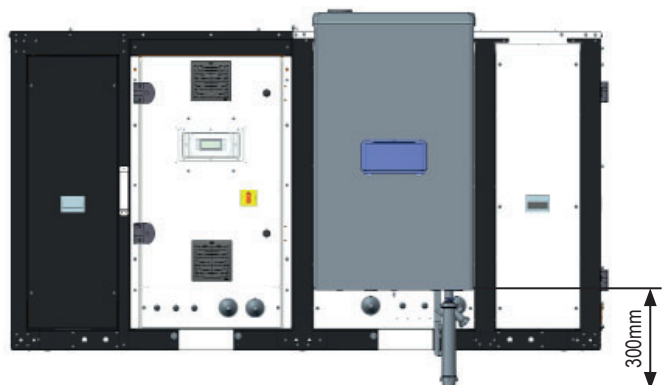
Preparation for the condensate drain

The condensate produced by the appliance Condexa PRO during normal operation must be extracted using an accessory (siphoned condensate collector).

This accessory must be fitted below the aforementioned thermal module, in line with the following instructions:

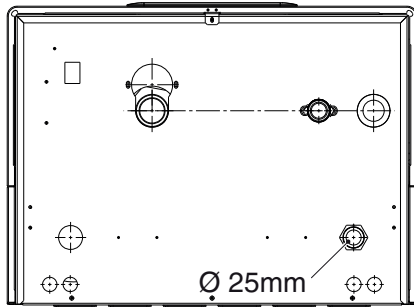
- It is advised to use plastic (PP) piping for building the condensate drainage. Never use copper pipes under any circumstances, as the condensate itself will cause them to rapidly deteriorate.
- The connection pipes used must be as short and as straight as possible. Any curves or sharp bends can lead to hoses becoming clogged and, therefore, can prevent proper condensate discharge.
- **Important:** The minimum distance between the condensate outlet and the ground must be at least **300 mm** to facilitate the proper implementation of the siphon. Therefore, it is essential to provide a roof curb for installation of the PJ unit on it.

Note: optionally PJ units can be supplied with roof curb.



12 - FACTORY OPTIONS AND ACCESSORIES

- The first section of the condensate drain pipe, which is connected to the condensate outlet from the boiler (Ø 25 mm), must be flexible pipe to avoid any contact with the discharge pipe.

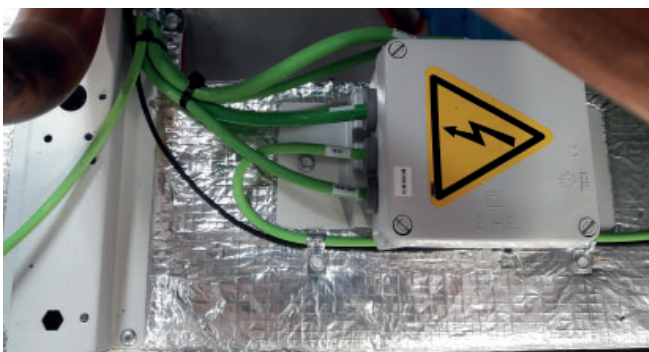
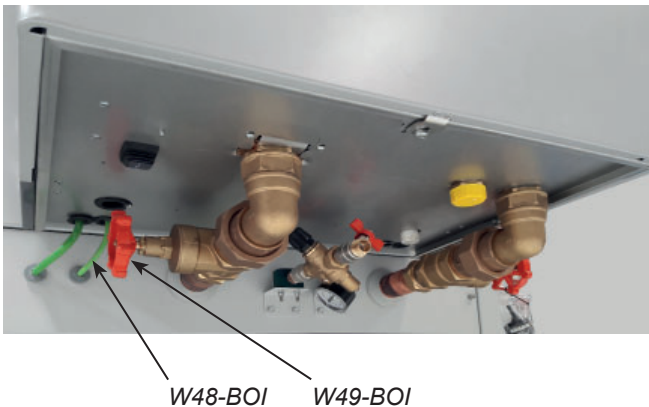


- Always maintain a slope angle of over 3° and ensure that the diameter of any condensate drain pipe is greater than that of the connection fitted at the drain outlet.
- The condensate drain must be connected to the drain and sewage network in such a way so that the condensate may not freeze under any circumstances.
- Connect the condensate drain hose to a domestic water drain in accordance with national and local legislation and standards.
- Fill the siphon with water before activating on the thermal module in order not to release any combustion products into the environment when the thermal module is first switched on.

Electrical connection

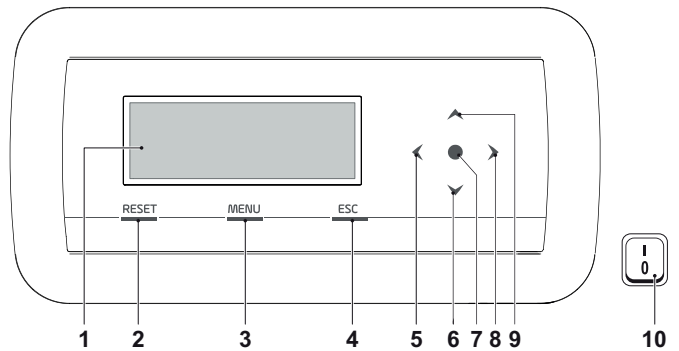
The cables for the electrical connection of the boiler are located on the lower part of the boiler.

The installer must pass these cables through the bottom panel of the PJ unit, and next, route them to the connection box "BOX8-BOI".



Note: see the wiring diagram included with the unit for a more detailed information about the wiring.

Boiler control panel



- 1 255x80 point backlit display (106,4 x 39,0mm)
- 2 RESET key:
Restores normal operations after a safety shut-down.
- 3 MENU key:
Switches on the main menu
- 4 ESC key:
In menu navigation, it enables you to exit a menu item and go back to the previous one.
- 5 ◀ navigation key:
Within a list of parameters if the cursor is located in the right column (values column), move the cursor in the left column (descriptions column).
- 6 ▼ navigation key:
 - Within a menu, this allows the navigation down to select different submenus;
 - Within a list of parameters, if the cursor is in the right column, it reduces the value of the selected parameter;
 - Within a list of parameters, if the cursor is in the left column, it selects the next parameter.
- 7 ● navigation key:
 - In menu navigation, It allows to enter the selected menu item;
 - Within a list of parameters, it allows to confirm a value or setting.
- 8 ▶ navigation key:
Within a list of parameters if the cursor is located in the left column (descriptions column), move the cursor in the right column (values column).
- 9 ▲ navigation key:
 - Within a menu, this allows the navigation up to select different submenus;
 - Within a list of parameters, if the cursor is in the right column, it increases the value of the selected parameter;
 - Within a list of parameters, if the cursor is in the left column, it selects the previous parameter.
- 10 Main switch (located on the lower part of the boiler)

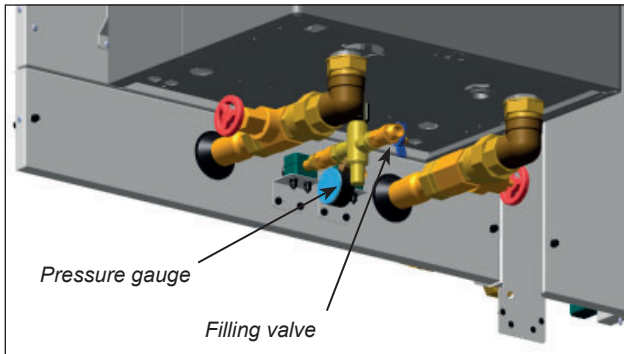
Important: For more information about the electronic control of the boiler refer to the manual of the manufacturer, provided together with the unit.

12 - FACTORY OPTIONS AND ACCESSORIES

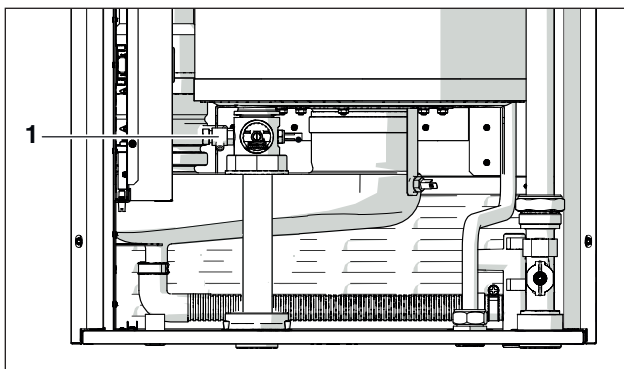
Hydraulic circuit

Circuit filling

- The charging system is connected to the boiler's return line. Automatic filling valve 1/2".

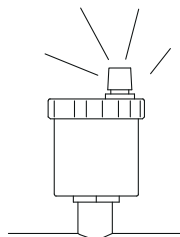
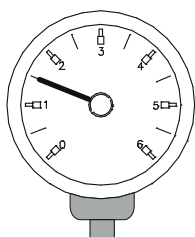


- Before filling the system, switch-off the thermal module's switch (0) and switch-off the magnetothermic switch placed in the electric cabinet of the PJ unit.
- Make sure that drain cocks (1) are closed before to start the load of the system.



- Unscrew the vent valve's release cap
- Open the shut-off cocks in order to slowly fill the system.
- Use the pressure gauge to check that the pressure is rising and the water is exiting through the vent valves.
- Close the shut-off cocks after the pressure reaches 1.5 bar.
- Start-up the circulation pump. This operation can be performed manually from a screen of the Vectic electronic control (on a screen of the "Service menu", password protected).
- During this stage, check that the air is correctly eliminated.
- Restore the pressure if necessary.
- Stop the pump and start-up again.
- Repeat the last three steps until the pressure is stabilised.

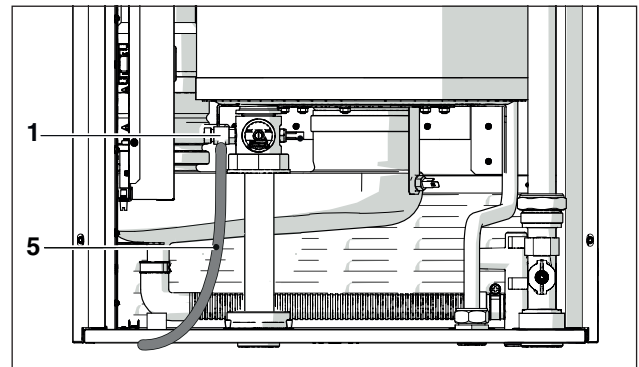
Excessive pressure fluctuations can cause stress and fatigue to the heat exchanger. Keep the operating pressure constant.



Immediately repair any leaks or drips that could result in air entering the system.

Circuit emptying

- In case of long unit stops, and forcibly if they happen in the winter season, the circuit must be emptied.
- Before emptying the system, switch-off the thermal module's switch (0) and switch-off the magnetothermic switch placed in the electric cabinet of the PJ unit.
- Close the water supply shut-off cocks;.
- In order to empty the boiler, fit a rubber hose (5) (inner diameter int. $\varnothing = 12$ mm) to the thermal module's discharge valve (1).



Water quality requirements

- It is **ABSOLUTELY NECESSARY** to treat the water system in order for the heat generator to work properly and to guarantee its service life, as well as that of all its components.

The water used for the central heating circuit must conform to the quality parameters given in the following table:

Parameter	Value	Unit
General characteristic	Colourless, without sediment	
PH value	Min. 6,5 ; Max. 8,0	pH
Dissolved oxygen	< 0,05	mg/l
Total iron (Fe)	< 0,3	mg/l
Total copper (Cu)	< 0,1	mg/l
Na ₂ SO ₃	< 10	mg/l
N ₂ H ₄	< 3	mg/l
PO ₄	< 15	mg/l
CaCO ₃	Min. 50 ; Max. 150	ppm
Trisodium phosphate	None	ppm
Chlorine	< 100	ppm
Electrical conductivity	<200	μSiemens/cm
Pressure	Min. 0.6 ; Max. 6	bar
Glycol	Max. 20% (only propylene glycol)	%



All data in the table refer to water contained in the system after 8 weeks' operation.

Do not use excessively softened water. Excessive water softening (total hardness < 5° f) results in corrosion due to contact with metal elements (pipes or thermal module components).

- To prevent the water from freezing, with this option the PJ unit always has an anti-freezing thermostat. Add glycol to the water if necessary (only propylene glycol).

12 - FACTORY OPTIONS AND ACCESSORIES

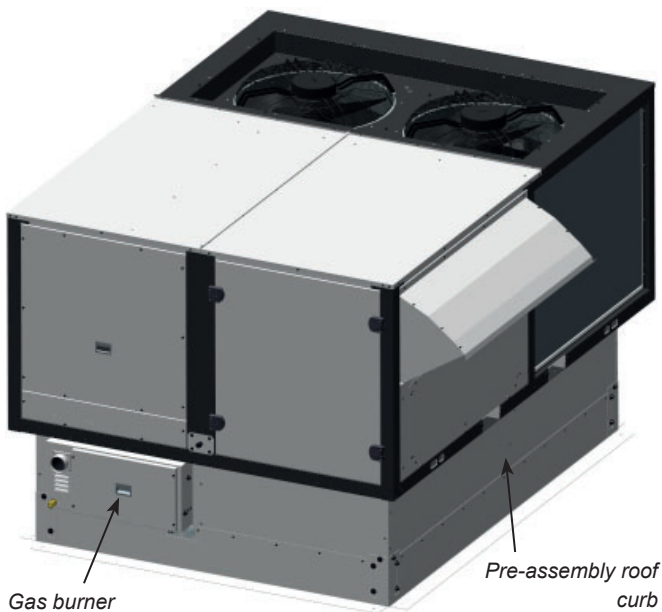
12.14 Gas burner

Natural or propane gas burner with modulating actuator, in accordance with the Gas Directive 2009/142/EC, installed inside a pre-assembly roof curb. The PJ unit with lower supply will be placed on this roof curb. EC certification: 0476CQ0451.

Note: the gas burner is not compatible with the heat recovery coil.

- Up to 3 values of total power available for each model:

VECTIOS PJ	G0L (Low)	G0N (Nominal)	G0H (High)
0090 to 0190	PCH020	PCH034	PCH045
0200 to 0240	unavailable	PCH065	PCH080
0280 to 0400	unavailable	PCH080	PCH105



Important: The staff responsible for the installation, operation and maintenance of this burner must always strictly follow the instructions given in this manual, as well as in the manufacturer's (APENGROUP) installation and maintenance brochure for the burners in the PCH series, supplied with the unit.

Characteristics of the gas burner

- Air is heated by contact with the surfaces of the combustion chamber and the heat exchanger pipes.
 - The heat exchanger complies with construction requirements set by EN1196 regulations for equipment where combustion gases produce condensate.
 - The combustion chamber is entirely made of stainless steel whilst surfaces of components where condensation occurs (such as pipe bundle and exhaust hood), are made of AISI 441, in order to provide high resistance to condensation.

The following table illustrates the types of stainless steels used:

USA-AIS	EN-No	COMPOSITION
AISI 430	1.4016	X6 Cr17
AISI 441	1.4509	X2 CrTiNb 18

- The burner is entirely made of stainless steel with special mechanical solutions to ensure optimal reliability and performance levels, as well as high thermal and mechanical resistance.

- The PCH heater is a modulating type; the thermal power output and, therefore, the thermal capacity (fuel consumption) vary according to the demand for heat. When the demand for heat from the environment drops, the heater uses less gas, increasing its performance up to 109% (performance on Hi).
- Inherent safety:
 - The performance increase at minimum power is achieved by using a sophisticated air/gas mixing technique and by adjusting at the same time the combustion air and the fuel gas.
 - This technology increase the heater safety as the gas valve supplies the fuel according to the air flow. The CO₂ content, unlike atmospheric burners, remains the same throughout the heater operating range, allowing it to increase its performance when the thermal power drops.
 - If there is no combustion air, the valve will not supply gas; if the combustion air flow drops, the valve will automatically reduce the gas flow yet will keep its combustion parameters at optimal levels.
- Lowest polluting emissions. The premixed burner, in combination with the air/gas valve, ensures a "clean" combustion by emitting a very low level of pollutants.
- The control located inside the burner housing allows the service centre to check and view the working phases and identify any faults that may have occurred.
- The electronic control of the unit will only manage the burner connection as heating support depending on the ambient conditions.

Note: the main technical characteristics of the burner can be found in the technical brochure.

Safety instructions

Safety instructions to be followed by the staff responsible for work with this burner are described below.

• General cautions

This burner module must be used only for the applications it was designed for. Any other wrong or unreasonable use must be regarded as improper and therefore hazardous.

During the installation, operation and maintenance of the burner described in this manual, the use must always strictly follow the instructions given in all the chapters of this operating and maintenance manual.

The condensing warm air heater must be installed in compliance with current regulations, according the manufacturer's instructions and by qualified staff, technically specialised in the heating field.

When first switched on, conversion between different types of gas and maintenance operations must be carried out only by staff provided by Service Centres authorised by current and older regulations. For more information, please contact us.

The warranty conditions are specified on the warranty certificate supplied with this burner module.

The manufacturer declares that the unit has been manufactured in compliance with UNI, UNI-CIG, CEI technical standards and with all relevant legislation, as well as with the 90/396/EEC gas directive and the later 2009/142/EC Directive.

12 - FACTORY OPTIONS AND ACCESSORIES



Attention: In compliance with the requirements of the Gas Directive 90/396 EEC it is strictly prohibited to alter the burner or the electronic control unit.

• Fuel

Before starting up the heater, make sure that:

- the gas mains supply data is compatible with the data stated on the nameplate;
- the combustion air intake ducts (when fitted) and the fume exhaust pipes are those specified by the manufacturer;
- the combustion air is supplied in such a way as to avoid even partial obstructions of the intake grille (caused by leaves etc.);
- the fuel intake internal and external seal is checked during the testing stage, as required by applicable standards;
- the burner is supplied with the same type of fuel it has been designed for;
- the system is correctly sized for such flow rate and is fitted with all safety and monitoring devices required by applicable standards;
- the inside of the gas pipes and air distribution ducts for ducted heaters has been thoroughly cleaned;
- the fuel flow rate is suitable for the power required by the burner;
- the fuel supply pressure is between the range specified on the nameplate.



If the burner is not going to be used over a prolonged period the gas supply valve must be closed.

• Gas leaks

If there is gas smell:

- do not operate electrical switches, telephones or any other object or device that could produce sparks;
- immediately open doors and windows to create an air flow to vent the gas out of the room;
- close the gas valves;
- call for **qualified staff**.



Supplying the gas circuit with pressure higher than 60 mbar is strictly prohibited. Such pressures could cause the valve to break.

• Operation

Do not allow children or inexperienced people to use any electrically powered equipment.

The following instructions must be followed:

- do not touch the equipment with wet or damp parts of your body and/or with bare feet;
- do not leave the equipment exposed to the elements (rain, sun etc....) unless it is adequately protected;
- do not use the gas pipes to earth electrical equipment;
- do not touch the hot parts of the heater, such as the fume exhaust duct;
- do not wet the heater with water or other fluids;
- do not place any object over the burner;
- do not touch the moving parts of the burner.

• Maintenance

Maintenance operations and combustion inspections must be carried out in compliance with current standards.

Before carrying out any cleaning and maintenance operations, isolate the heater from the mains power supply from the switch located on the electrical system and/or on the shut-out devices.

If the heater is faulty and/or incorrectly operating, switch it off and do not attempt to repair it yourself, but contact our local Technical Service.

All repairs must be carried out by using genuine spare parts.

Failure to comply with the above instructions could compromise the safety of the equipment and invalidate the warranty.

If the equipment is not used for long periods, shut the gas supply off through the gas stopcock and disconnect it from the power supply.

If the heater is to be put out of service, in addition to the above operations, potential sources of hazard on the unit must be removed.

It is strictly forbidden to obstruct the Venturi pipe inlet, located on the burner-fan unit, with your hands or with any other objects.

Any obstruction could cause a backfire from the premixed burner.

General recommendations

• Location

These roof curb with integrated burner are designed to be coupled with an PJ unit (roof-top installation). Make sure they are not fitted near areas where there is a risk of fire (flammable dust) or explosion, or in areas where aggressive products are kept, e.g. trichloroethylene, perchloric acid, etc.

• Delivery of the roof curb with gas burner

Check the condition of the equipment upon delivery. Check that the details on the label, the packing and the name plate match the order. If equipment has been damaged, or there is a shortfall in delivery, notify accordingly.

• Burner identification

The roof curb with the burner includes a name plate featuring the main gas characteristics as well as the roof curb serial number.

GAS INFORMATION			
COUNTRY	<input type="text"/>	CONSUMPT.	<input type="text"/> m ³ /h
GAS	<input type="text"/>	PRESSURE	<input type="text"/> mbar
CATEGORY	<input type="text"/>	TYPE	<input type="text"/>
PIN	<input type="text"/>	WO	<input type="text"/>

Roof curb with burner
CE certificate No.

Burner model

Roof curb
serial No.



Important: The serial number must be used in all communication regarding the unit.

12 - FACTORY OPTIONS AND ACCESSORIES

Transport and installation

Follow the recommendations given in section 7.4 which details how to handle and fit the adjustable roffcurb, and how to fit the PJ unit onto this roffcurb.

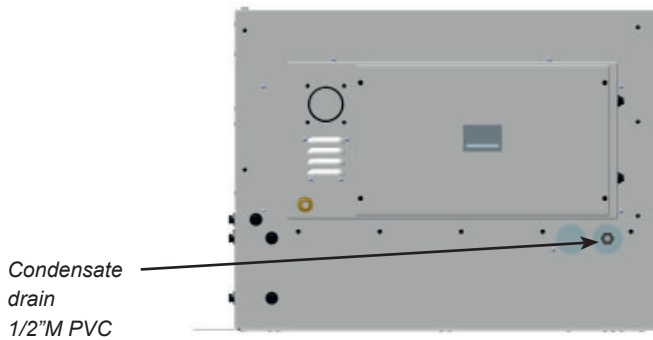
Conection of the burner condensate drain

These units are equipped with a junction for draining the burner condensates drain pan. Threaded connector 1/2" M in PVC.

To facilitate drainage, the structure of the group of generator pipes slopes slightly towards the discharge.

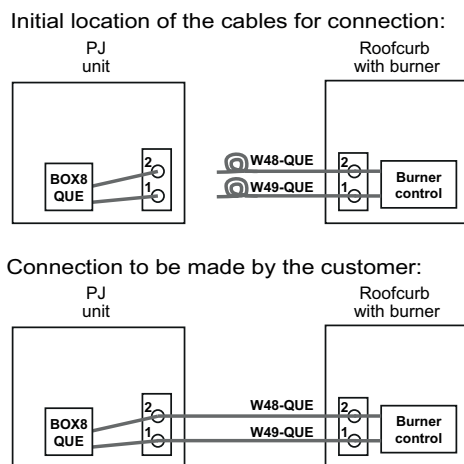
If the unit is going to be installed outdoors in a location where there are never low temperatures, the drain junction does not have to be connected to any pipe. It must simply be ensured that the water does not stagnate.

If the condensates are going to be discharged into a pipe do not seal it directly at the condensate outlet. If the water were to freeze in the pipe this could block the discharge of condensates and cause the water to accumulate inside the exchanger.



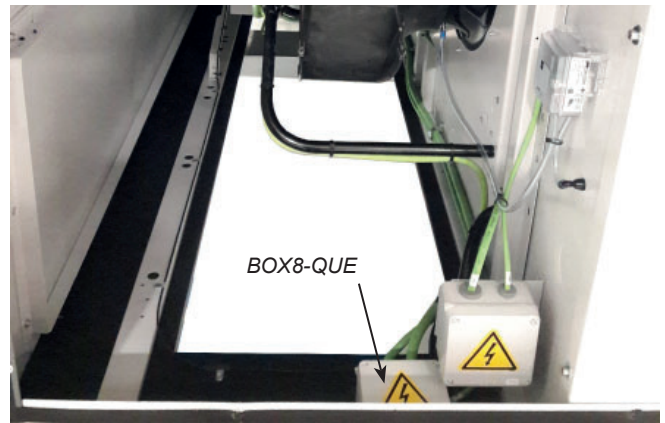
Electrical connection of the burner

It is necessary to communicate the burner control with the electric cabinet of the PJ unit. The customer must connect the cables coming from the burner to the connection box "BOX8-QUE" that is located inside of the PJ unit. This box is accessed via the same panel that the supply fans.



Note: see the wiring diagram included with the unit for a more detailed information about the wiring.

The following image shows the location of the connection box "BOX8-QUE".



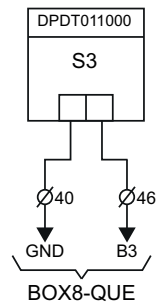
Connection of the outlet probe

The connection of the outlet temperature probes must be performed on-site. This probe is supplied inside the electric cabinet of the PJ unit.

Make the electrical connection of the probe (S3) to the connection box "BOX8-QUE" that is located inside of the PJ unit, using 2 x 1mm² section cable.

Note: this cable is **not** supplied with the probe.

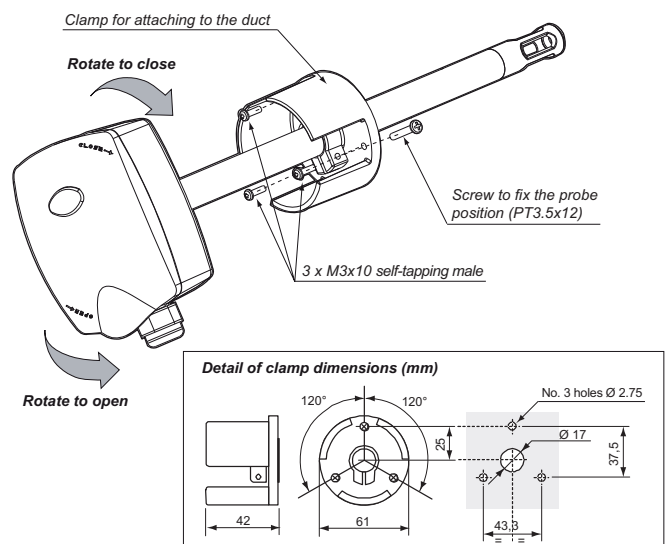
Please refer to the wiring diagram and the Vectic electronic control brochure, included with the unit.



For the electrical connections, remove the top cover of the sensor. Remove the cover by rotating it anticlockwise.

In order to guarantee the correct measurement of the outlet air temperature this probe will be positioned at 1.5 metres as a minimum from the outlet mouth at the bottom of the duct and as near to the middle as possible inside this duct. The probe is connected to the air duct using the special fastening bracket.

- Fasten the bracket to the air duct;
- Insert the rod on the bracket to the required depth;
- Tighten the screw on the bracket to fasten.

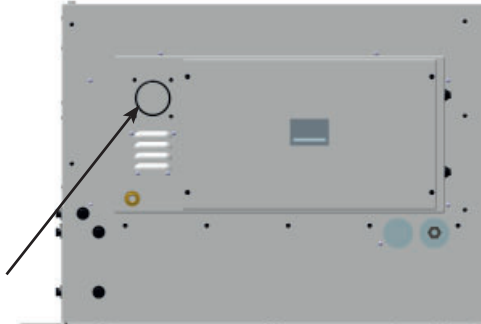


12 - FACTORY OPTIONS AND ACCESSORIES

Connections at the flue



Important: The flue of the gas burner is not supplied with the unit. Its design and installation is the responsibility of the installer and must comply with all the directives and regulations in force in the installation location.



Fumes exhaust:
80mm inner Ø

This PCH burner module is fitted with a watertight combustion circuit and with the burner fan located upstream of the heat exchanger.

Connection to the flue, according to how the heater is installed, can be made as "C" type, with combustion air being drawn from outside, or as "B" type with combustion air being drawn from the heater installation site.

If the heater is installed outdoor, a "B" type installation is also a "C" type.

More specifically, the heater is certified for the following exhausts: B23P-C13-C33-C43-C53-C63; for more information on the flue types, please refer to current regulations.

To fit the fume exhausts, certified pipes and terminals must be used, taking into account that the modules are of a condensing type; the following material must be used:

- aluminium with a thickness of at least 1.5 mm;
- stainless steel with a thickness of at least 0.6 mm; the steel must have a carbon content of at least 0,2 %.

Use sealed pipe to prevent condensation from leaking from the pipes; the seal must be adequate to withstand a fume temperature ranging between 25°C and 120°C.

The flue does not need to be insulated to prevent the build-up of water in the pipes, as this does is not detrimental to the heater, which is fitted with a water trap. Insulate the pipe if required to protect the flue from accidental contact.

For the air intake, use:

- aluminium with a thickness of at least 1.0 mm;
- stainless steel with a thickness of at least 0.4 mm;

Important: The horizontal sections of flue, which make up the fume exhaust, must be installed with a slightly incline (1°- 3°) towards the heater, in order to prevent the build of condensation in the exhaust.

Terminal configuration

• Type B23P

Open combustion circuit: the gases produced by the combustion are discharged outside, on a wall or on the roof, and the combustion air is directly drawn from the site where the equipment is installed.

In this case, the standards UNI-CIG 7129 and UNI-CIG 7131 require the provision of suitable vents on the walls.

Note: It is compulsory to fit an IP20 safety mesh to prevent solids with a diameter higher than 12mm from entering the combustion air intake; at the same time, the mesh opening must not be larger than 8mm.

• Type C13

Sealed combustion circuit (type "C") connected to a horizontal terminal on the wall by means of its own ducting.

• Type C33

Sealed combustion circuit (type "C") connected to a vertically installed terminal (on the roof) by means of its own ducting.

• Type C53

Sealed combustion circuit (type "C") connected by means of its own ducting split in two terminals which could end up in areas with different pressure (such as a ducting connected to the roof and a second one connected to the wall).

• Type C63

Sealed combustion circuit (type "C") connected to an approved and separately sold combustion air supply and combustion products exhaust system.

Selection Guide

If the terminal is not directly connected to the heater and, therefore, extra routing is required, according to the length of the ducting, the diameter of the selected terminals, extensions and bends must be checked.

After establishing the routing, the pressure drop must be calculated for each component; each component has a different pressure drop value as the glue gases flow rate is different.

The pressure drops of each component identified must be added, checking that the result is no higher than the value available for the PCH heater module used; if a combustion air supply pipe is fitted, the pressure losses must be added to the fume exhaust pressure drop.

If the sum of pressure drops caused by the fittings are higher than the pressure available at the exhaust, ducting with higher diameter must be used, rechecking the calculation; a pressure drop higher than the pressure available at the fume exhaust reduces the heater module thermal output.

If the duct routing requires the use of bends, the length required must be subtracted from the available length:

- Ø 80 wide radius bend at 90° EqL = 2.1m
- Ø 80 wide radius bend at 45° EqL = 1.1m
- Ø 100 wide radius bend at 90° EqL = 3.5m
- Ø 100 wide radius bend at 45° EqL = 1.6m

Pressure drop for terminals and exhaust ducting:

PCH model	020	034	045	065	080	105
Pressure avail. at the exhaust (Pa)	80	90	100	120	120	120
Component	Pressure drop (Pa)					
Ø 80 pipe (1 metre)	0,4	1,3	2,1	4,6	7,3	11,0
Ø 100 pipe (1 metre)	0,1	0,4	0,6	1,3	2,2	3,5
Ø 80 wide radius bend at 90°	0,9	2,8	4,4	9,5	15,0	22,2
Ø 100 wide radius bend at 90°	0,3	1,4	2,2	5,1	8,2	12,0
Ø 80 wide radius bend at 45°	0,5	1,4	2,2	4,6	7,3	11,0
Ø 100 wide radius bend at 45°	0,2	0,6	1,0	2,2	3,5	5,5
Ø 80 - 100 adaptor	0,2	0,6	1,0	1,2	1,8	2,7
Ø 80 hooded terminal	2,0	5,0	10,0	14,0	16,0	20,0
Ø 100 hooded terminal	1,5	3,7	7,5	10,5	12,0	15,0

12 - FACTORY OPTIONS AND ACCESSORIES

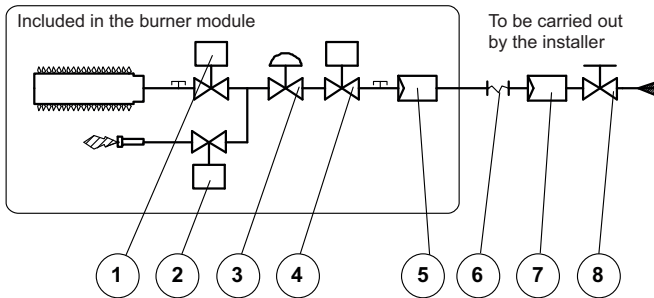
Gas connection

Use the gas line connections only with EC certified components.

The PCH module is supplied complete with a dual gas valve, gas stabiliser and filter. All components are fitted inside the burner housing.

To complete the installation, as required by current standards, an anti-vibration joint and a gas valve must be fitted.

Note: A EN216 certified gas filter with filtration level lower or equal to 50 micron must be used, with no pressure stabiliser, a wide range gas filter must be used since the filter supplied as standard, upstream of the gas valve, has a limited area.

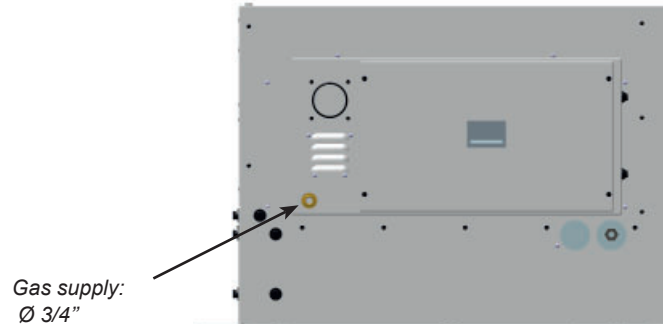


Key:

1. Main burner gas solenoid valve
2. Pilot burner gas solenoid valve
3. Pressure stabiliser
4. Safety gas solenoid valve
5. Gas filter (small section)
6. Anti-vibration joint
7. Gas filter (large section)
8. Gas valve

Important: For a correct maintenance, connect the PCH module by means of a seal and swivel gasket. Avoid using threaded connected directly on the gas connection.

During the installation, tighten the external gas supply pipe but without exceeding the tightening torque of 150 Nm.



Important: It is strictly prohibited to supply gas to the circuit with pressure higher than 60 mbar. Such pressures could cause the valve to break.

If pressure are higher than 60 mbar, a pressure reducer must be installed at least 10 m away and no pressure stabiliser must be fitted between the pressure reducer and the heater, but leaving the gas filter.



If the burner is not going to be used over a prolonged period the gas supply valve must be closed.

Gas type	Gas settings	PCH020		PCH034		PCH045		PCH065		PCH080		PCH105	
		min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
G20 Cat. E-H	Air supply pressure	mbar 20 [min 17-max 25]											
	Ø pilot nozzle	mm 0,7											
	Gas consumption (15°C-1013mbar)	0,51	2,01	0,80	3,69	0,90	4,44	1,31	6,88	1,74	8,68	2,22	10,58
	Carbon dioxide - CO ₂ content	8,8	9,1	8,7	9,1	8,7	9,1	8,7	9,1	8,7	9,1	8,5	9,1
	Fumes temperature	39	113	31	94	30	94	31	86	26,5	70	28	80
	Fume mass flow rate (max.)	kg/h 31		57		72		107		135		165	
	Gas butterfly valve	mm 5,8		7,4		7,5		11,0		12,2		15,8	
G25 Cat. L-LL	Air supply pressure	mbar 25 [min 17-max 30] (20 for Germany)											
	Ø pilot nozzle	mm 0,7 (0,75 for Germany)											
	Gas consumption (15°C-1013mbar)	0,59	2,34	0,93	4,29	1,05	5,17	1,53	8,00	2,02	10,1	2,21	12,30
	Carbon dioxide - CO ₂ content	8,8	9,0	8,6	9,0	8,8	8,9	8,8	9,2	8,6	8,9	8,8	9,0
	Fumes temperature	39	113	31	94	30	94	31	86	26	70	28	80
	Fume mass flow rate (max.)	kg/h --											
	Gas butterfly valve	mm 7,4		8,9		8,9		Not necessary		Not necessary		Not necessary	
G30 Cat. 3B-P	Air supply pressure	mbar 30 [min 25-max 35] - 50 [min 42,5-max 57,5]											
	Ø pilot nozzle	mm 0,51											
	Gas consumption (15°C-1013mbar)	0,40	1,58	0,63	2,90	0,71	3,49	1,03	5,39	1,49	6,80	1,70	8,30
	Carbon dioxide - CO ₂ content	10,8	11,4	10,8	11,5	10,8	10,9	10,7	11,3	10,1	10,3	10,4	10,6
	Fumes temperature	39	113	31	94	30	94	31	86	26,5	70	28	80
	Fume mass flow rate (max.)	kg/h --											
	Gas butterfly valve	mm 3,7		5,0		5,2		6,5		7,0		9,3	
G31 Cat. 3P	Air supply pressure	mbar 30 [min 25-max 35] - 37 [min 25-max 45] - 50 [min 42,5-max 57,5]											
	Ø pilot nozzle	mm 0,51											
	Gas consumption (15°C-1013mbar)	0,39	1,55	0,62	2,85	0,70	3,43	1,01	5,31	1,34	6,70	1,47	8,18
	Carbon dioxide - CO ₂ content	9,3	9,8	9,2	9,7	9,3	9,4	9,4	9,6	9,3	9,6	9,5	9,8
	Fumes temperature	39	113	31	94	30	94	31	86	26,5	70	28	80
	Fume mass flow rate (max.)	kg/h 24		45		58		84		107		130	
	Gas butterfly valve	mm 3,7		5,0		5,2		6,5		7,0		9,3	

Gas settings data for GAS G25.3 - Cat. K (Netherlands), G25.1 - Cat. S (Hungary), G2.350 - Cat. Ls (Poland) and G27 - Cat. Lw [ex GZ41.5] (Poland) can be found in the manufacturer's installation and maintenance manual (APENGROUP), supplied with the unit.

12 - FACTORY OPTIONS AND ACCESSORIES

Country table - gas category:

Country	Category	Gas	Pressure (mbar)	Gas	Pressure (mbar)
Austria, Switzerland	I12H3B/P	G20	20	G30/G31	50
Belgium<70kW	I2E(S)B,13P	G20/G25	20/25	G31	37
Belgium>70kW	I2E(R)B,13P	G20/G25	20/25	G31	37
Germany	I12ELL3B/P	G20/G25	20	G30/G31	50
Denmark, Finland, Greece, Sweden, Norway, Italy, Czech Republic, Estonia, Lithuania, Slovenia, Albania, Macedonia, Bulgaria, Romania, Croatia, Turkey Azerbaijan	I12H3B/P	G20	20	G30/G31	30
Spain, United Kingdom, Ireland, Portugal, Slovakia	I12H3P	G20	20	G31	37
France	I12Esi3P	G20/G25	20/25	G31	37
Luxembourg	I12E3P	G20/G25	20	G31	37/50
Netherlands	I12EK3B/P	G20/G25.3	20/25	G30/G31	30
Hungary	I12HS3B/P	G20/G25.1	25	G30/G31	30
Cyprus, Malta	I3B/P	--	--	G30/G31	30
Latvia	I2H	G20	20		
Iceland	I3P	--	--	G31	37
Poland	I12ELwLs-3B/P	G20/G27/G2.350 (*)	20/13	G30/G31	37
Russia	I12H3B/P	G20	20	G30/G31	30

(*) Consult the available burners with G2.350.

Conversion of burner gas type

Conversion to LPG

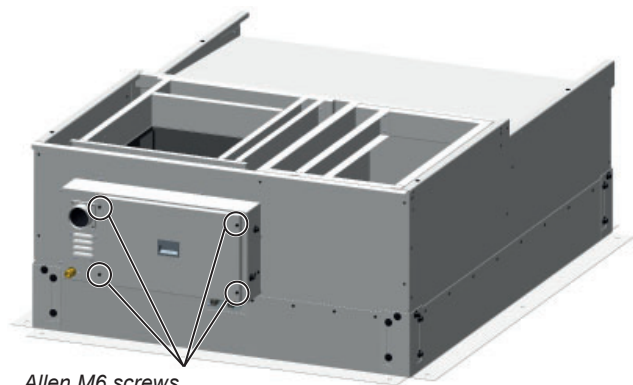
The gas burner is supplied already set for natural gas and with the kit for conversion to LPG, including:

- calibrated gas orifice plate;
- pilot nozzle;
- adhesive plate "Equipment converted..."

The kit is not supplied in countries where conversion is prohibited.

To convert the unit, follow these instructions:

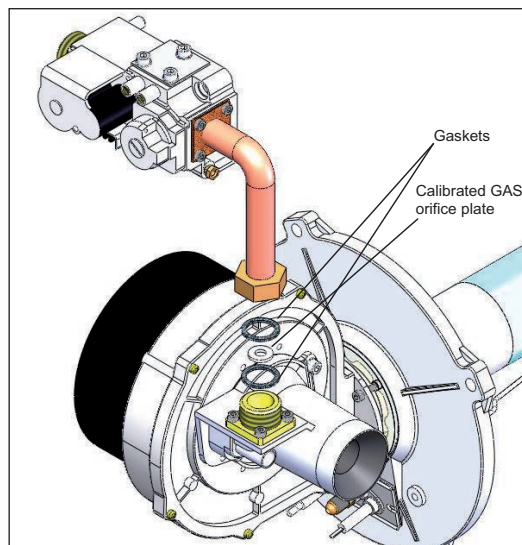
- disconnect from power supply;
- access the inside of the burner module by removing the 4 Allen M6 screws that secure the front panel;



Allen M6 screws

- between the gas pipe and the Venturi, replace the gas orifice plate fitted (natural gas) with the one supplied with the kit (for LPG);

- replace the pilot nozzle (natural gas) with the one in the kit (LPG);
- restore power supply and set the heater up for ignition;
- while the start-up electrode is sparking, make sure there are no gas leaks.



When the burner is lit and working at maximum capacity, verify that:

- the valve intake pressure corresponds to the value required for the type of gas that you are using;
 - the combustion analysis procedure is performed as described in paragraph "Analysis of combustion";
 - the level of CO₂ is within the limits indicated for the type of gas being used (tables in Paragraph "GAS connection"). If a different value is detected, change it by turning the adjustment screw: screwing it down decreases the CO₂ level, loosening it increases the level.
- Note: The heater with LPG is set up for G31 gas. If the unit runs on G30 instead, it is necessary to verify and possibly adjust settings for CO₂ as shown in the table in paragraph "Gas connection".
- that the gas valve Venturi pipe connector does not leak.

After converting and regulating the unit, replace the nameplate indicating "Equipment regulated for natural gas" with the one in the kit that indicates "Equipment converted ...".

Conversion to gas G25 - G25.1 - G25.3 - G27

Conversion for gasses from G20 to G25 or G25.1 or G25.3 or G27 is allowed only in countries of category I12ELL3B/P [Germany], I12Esi3P [France], I12E3P [Luxembourg] and category I12HS3B/P [Hungary] and category I12ELwLs3B/P [Poland].

For countries in category I12EK3B/P [Netherlands] the unit is supplied already set up and regulated for G20 or G25.3.

Conversion from one type of gas to another can only be performed by authorised service centres.

Note: The conversion kit to G25, G25.1 and G27 is only supplied on request. The conversion kit to G25 is included in the standard supply for France, Germany and Luxembourg.

Conversion to G25 and/or G25.1, G25.3, G27 where possible, consists in:

- insertion of orifice plate (according to the gas type and the equipment model).

After the conversion, relight the burner and follow the steps explained for the conversion to LPG.

Finally, stick the nameplate "Equipment converted for gas G25..."

12 - FACTORY OPTIONS AND ACCESSORIES

Analysis of combustion

Wait until the heater is switched on. Check that the heater is running at maximum power by using one of the two methods below:

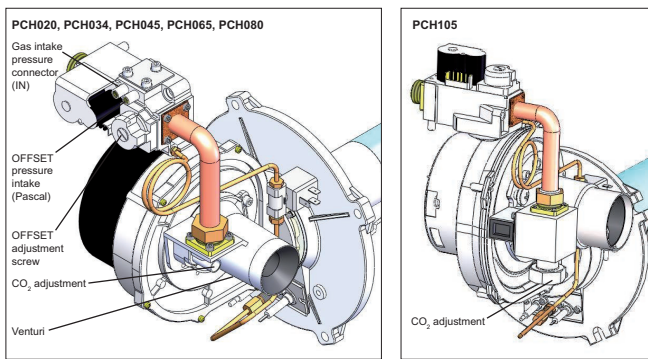
- check that Tin input signal is equal to 10 V;
- from the LCD display, access the REG menu, then use the Hi and Lo controls to force operation at maximum or minimum output (refer to the paragraph "Control of the gas burner").

At maximum output, check again that the input pressure in the valve corresponds to the value required; adjust if necessary.

Perform the combustion analysis to verify that the level of CO₂ corresponds to the figures in the table in Paragraph "Gas connection".

If the measured value is different, turn the adjustment screw on the Venturi pipe. Loosening the screw will increase the CO₂ level, screwing it down will decrease the level.

Set the heater to minimum output, and verify that the level of CO₂ corresponds to the figures in the tables in paragraph "Gas connection". If the values do not match, screw or loosen the offset screw respectively to increase or decrease the CO₂ level and repeat the procedure.



Operating cycle of the burner

• Burner operation:

When the unit demands heat, the modulation PCB will start the operation cycle. It authorises the flame monitoring equipment to start.

The equipment will immediately start ventilating burner [A] and prewashing the combustion chamber for a preset length of time.

After the prewash, the ignition phase starts: the equipment opens solenoid EV1 and, in parallel, solenoid EVP which supplies gas to the pilot burner [B].

	A	BC	D	E	F
NC	■	■	■	■	■
NA	■	■	■	■	■
			On/off signal		
DN	■	■	■	■	■
OFF	■	■	■	■	■
			Burner fan		
DN	■	■	■	■	■
OFF	■	■	■	■	■
			EVP - pilot light flame		
DN	■	■	■	■	■
OFF	■	■	■	■	■
			EV1 - 1st electromagnetic valve gas		
DN	■	■	■	■	■
OFF	■	■	■	■	■
			EV2 - 2nd electromagnetic valve gas		

After detecting the pilot flame, the equipment opens the main gas valve EV2 [C] to supply gas to the main burner.

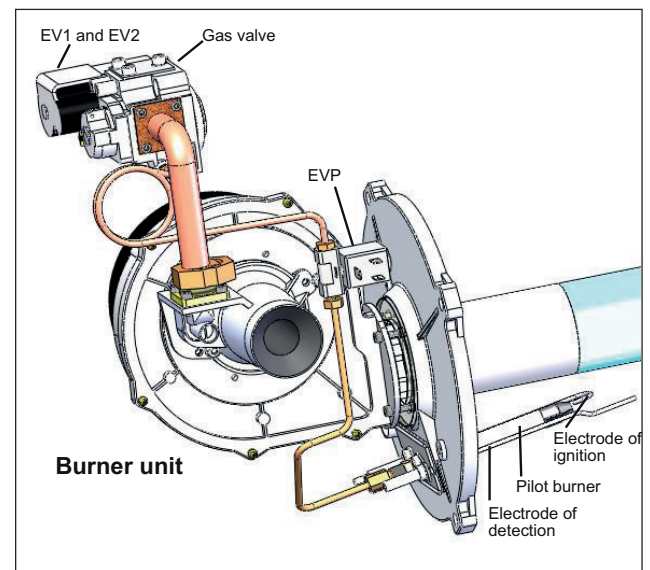
After a time of dual functioning of the two burners (pilot and main), the modulation PCB removes gas from the EVP valve and turns off the pilot burner [D].

A single electrode detects the flame both for the pilot burner and the main burner.

The ignition program lights the burner to obtain an intermediate level heat production capacity, which corresponds to about 30% of the maximum capacity. Once the flame is stabilised for a few seconds at ignition power, the burner begins to modulate its output to reach maximum output, if required, in a variable length of time programmed into the modulation PCB.

During operation, the modulation PCB will regulate the power output of the burner proportionally to the voltage (0-10 Vdc) in the terminals.

If there are multiple power modules, the 0/10 Vdc signal could turn off one or more modules in cascade.



• Turning off the burner:

When the demand for heating ceases, signalled by a voltage lower than the preset limit (0.5 Vdc), the modulation PCB turns off the burner [E]; the fan continues to purge the combustion chamber, post-wash, for a preset length of time [F].

Opening a contact (see electrical diagram) always causes the burner to stop without causing a fault.

• Safety thermostats:

A safety thermostat with automatic reset and positive safety setting is installed on the heater module. The breaking of the sensitive element corresponds to a safety intervention.

When the thermostat intervenes, through the flame monitoring equipment, the burner stops and the flame equipment is blocked.

The block of the flame equipment, caused by the safety thermostat, is signalled on the LCD display of the CPU PCB on the machine with F20. The block is classified as "non-volatile" and requires a manual reset.

Near the safety thermostat, there is an NTC1 probe set to the value of the ST1 parameter which reduced the burner's heat output independently from the incoming 0/10 Vdc signal when it reaches the set point. The probe monitors the ratio of heat capacity / cooling air flow. It is not advisable to change the ST1 value.

12 - FACTORY OPTIONS AND ACCESSORIES

• Fxx faults:

The modulation PCB can distinguish between 30 different types of faults. This ensures accurate diagnostics. Also, codes and possible causes of faults are listed in this manual.

For more serious faults that require a manual reset, use the LCD display to reset the CPU PCB on the machine by pressing the arrows at the same time.

• Air/gas premixing operation:

The PCH heater is fitted with a burner that completely premixes air and gas. The air/gas mixing occurs inside the impeller on the motor-fan.

The air taken into the impeller through the venturi tube, calibrated, creates a vacuum. The vacuum in the venturi is rebalanced by the gas valve, which is pneumatically controlled.

The air pressure - gas pressure ratio is 1:1. This ratio can be corrected by turning the offset adjustment screw (on the gas valve). The heater is supplied with the offset regulated and the screw sealed.

A second adjustment can be done with the screw on the venturi, which regulates the value of maximum gas capacity and determines the amount of carbon dioxide (CO₂) in the flue gases.

This adjustment is also made at the factory. The screw is not sealed to permit conversion to another type of gas, if desired.

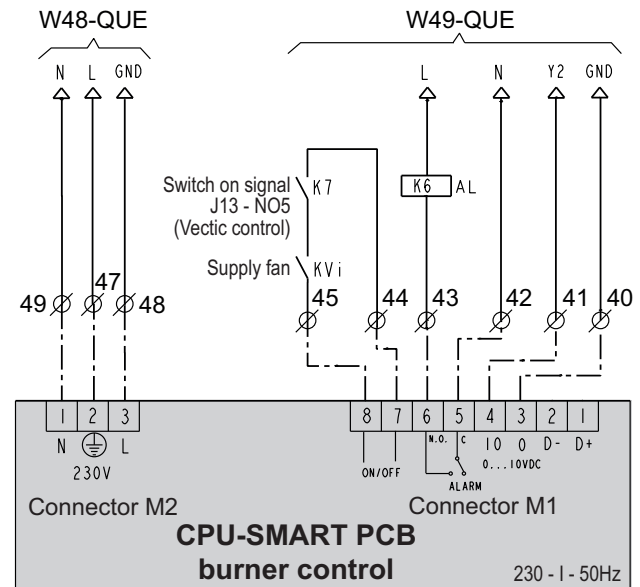
The modulation PCB, mounted on the heater, manages the motor rotation (in c.c.) depending on the heating capacity required by the environment. Varying the rotation speed of the motor changes the air flow capacity and therefore also the gas flow capacity. Minimum and maximum rotation values of the fan are programmed into the PCB and cannot be modified by the user or installer.

The gas burner integrates its own control. The Vectic control only receives a safety signal from the burner in the event of failure (digital input DI5). This signal only indicates the failure.

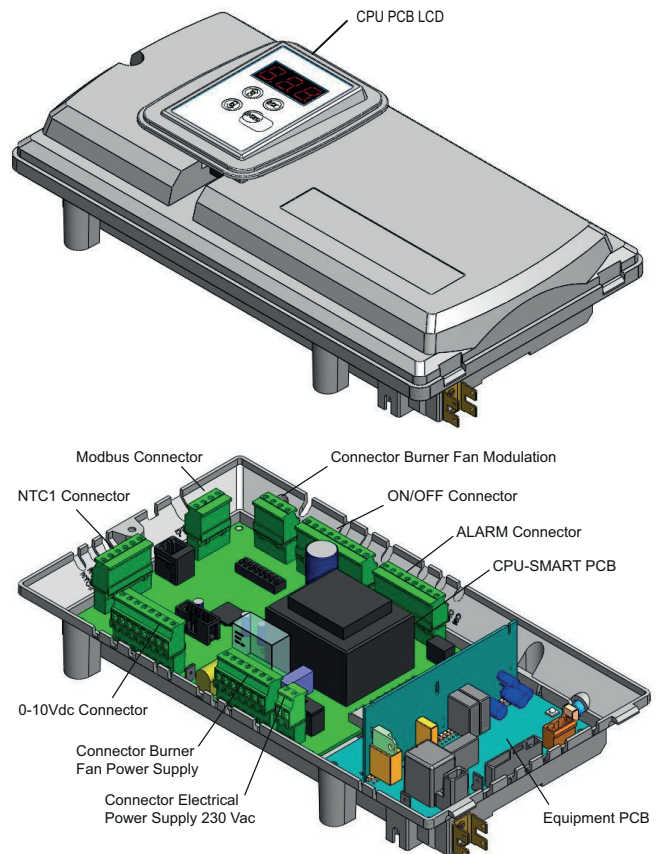
• Burner control:

The gas burner integrates its own CPU-SMART PCB board that manages the operation and the safety devices.

The cables "W48-QUE" and "W49-QUE" with the wires required for the connection of the CPU-SMART PCB board with the PJ unit must be connected to the connection box "BOX8-QUE" that is located inside of the PJ unit (please consult the paragraph "Electrical connection of the burner").



Detail of CPU-SMART PCB board



Control of the gas burner



Important: All the connections to be established by the client are featured on the wiring diagram included with the unit.

• Unit electronic control:

The Vectic control has a proportional output 0/10V (Y2) where a natural gas or propane gas proportional actuator can be connected.

The burner connection is managed by the control, in HEATING mode, through an ON/OFF signal of the digital output NO5

It is possible to select three operating modes for the burner:

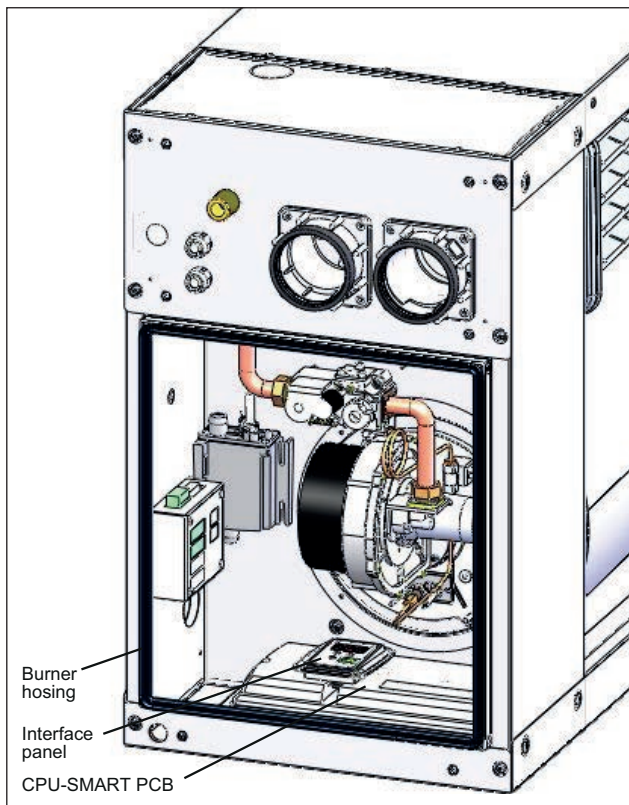
- Operation of the burner as one or two electrical heater stages (both option not compatible).
- Operation instead of the compressors.
- Operation instead of the compressors if the outdoor temperature is lower than the value set (5°C by default).

When the return temperature drops below the value set for the burner connection the burner will start to operate. The control of the power is carried out in accordance with the temperatures of the supply air and return air. The control compares both temperatures. If the supply temperature is excessively high, the control limits the power supplied by the burner despite the demand. This comparison avoids the stratification of the hot air masses and keeps the supply temperature below the safety value (55°C by default), which stops the burner.

Moreover, the control compares the supply temperature and the ambient temperature to improve the feeling of thermal comfort.

12 - FACTORY OPTIONS AND ACCESSORIES

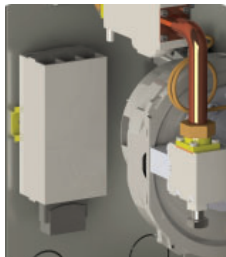
By removing the access door to the inside of the burner, the CPU-SMART PCB can be seen :



• Burner protection for low outdoor temperatures (optional):

With outdoor temperatures below -14°C WB, a protection kit for low temperature is available. The kit is composed of a 55W electrical heater and a NTC probe.

The burner control manages the electrical heater to maintain a constant temperature inside the burner housing higher than $+1^{\circ}\text{C}$.



• Interface panel:

Each PCH heater is fitted as standard with a multifunction LCD panel located inside the burner housing, which is used to control, configure and diagnose all operating parameters of the equipment.

The instrument panel is fitted with a red 3 digit LCD display and four function keys: \uparrow , \downarrow , ESC and ENTER; the display allows the user to display the heater operating mode and its faults. It allows our service centre to change the main operating parameters.

Changing parameters requires a password.



- Viewing the burner status:

The machine status is shown on the display by the following wordings:

rdy: the machine is on without burner flame; it is waiting for the ON control and/or the heat demand from the room temperature monitoring system.

On: the machine is on with burner flame or is in the ignition phase.

Off: the machine is turned off by the control on the LCD. Any heat demands will be ignored. To light the burner, the LCD must show "operation ON";

Fxx: Fault detected.

During normal operation, the display will show the writing **On** if the burner is on; **rdy** when the heater is being switched off or the room temperature has been reached.

Air when the EST function in the menu FUN was selected by mistake; modify FUN to ON or OFF.

In the event of communication problems between the CPU-SMART PCB of the burner and the LCD panel, the word CPU will flash on the display if the problem is caused by the CPU; three flashing dots will be displayed if the problem is caused by the display PCB. If needs be, check that the display and the PCB are correctly connected and that the small cable RJ11 is securely held in the connector.

- Navigating the menu:

The menu has three levels. The first is visible without entering a password, the second and third require using second and third level passwords.

Use the arrows to scroll the menus: \uparrow (up arrow) and \downarrow (down arrow). Press ENTER to select the menu, and again to select the parameter. Change the parameter with the arrows and confirm the change by pressing ENTER. To exit the parameter or menu, press ESC. If you exit the programming function, after about 10 minutes the program will exit the menu and go back to the "machine status" view.

To change the parameter, press the arrow keys: pressing \uparrow (up arrow) increases the parameter by 1, pressing \downarrow (down arrow) reduces it by 1. Pressing both arrow keys for at least three seconds increases the parameter scroll speed.

To confirm a change in parameters, press ENTER for at least 3 seconds. The change in the parameter is signalled by a flash of the display.

All submenus scroll from the bottom towards the top, and they start over when the end of the menu is reached.

- Entering the password:

- From the initial screen (ON/OFF/rdy/FXX) use the \uparrow (arrow up) and \downarrow (arrow down) keys to reach the ABI function; hold down the ENTER key for 3 seconds;

- Set the password inside the menu ABI and confirm it with ENTER; hold it down per approximately 3 seconds (the flashing display will show that the parameter has been stored);

- Press ESC and, by using the \uparrow and \downarrow arrow keys, return to the initial screen (ON/OFF/rdy/FXX); press ENTER for 3 seconds;

- Use the \uparrow and \downarrow arrow keys to reach the desired menu item (Fit, I/O, SET, PAR);

- Press ENTER to access the function;

- Use the \uparrow and \downarrow arrow keys to select the parameters to be displayed and edited;

- Press ENTER to display the parameter value;

- Use the \uparrow and \downarrow arrow keys to edit the value (only SET and

12 - FACTORY OPTIONS AND ACCESSORIES

PAR);

- Press ENTER to confirm the change made;
- To exit the parameter and the menu, press ESC until the initial screen is displayed (ON/OFF/rdy/FXX).

- First level menu:

The following menus are present on the first level:

machine status gives information about the operation of the PCH (ex. rdy, ON, etc.);

FUN from FUN it is possible to select the function ON, OFF or EST (do not select EST);

REG this menu allows the user to force the burner to the minimum or the maximum for combustion tests; it automatically returns to the previous position at the end of the preset time (10 minutes);

TIN allows the user to read the value of the 0/10 Vdc signal coming into the PCH;

Pra not used;

ABI used to enter the PWD to access menus of second and third level.

Entering the password 001 will provide access to the second level and make the Set Point and I/O menus available.

Entering the second password grants access to third level. This password must be requested directly to CIAT technical service.

• Reset:

The modulation PCB allows the operator to identify more than thirty different causes of faults. This makes it possible to manage each event very precisely.

To reset the faults, press both arrows simultaneously for a few seconds.

If ignition fails, the flame monitoring system reattempts ignition four times. After four failed attempts, it will block and display the code F10.

The faults code and cause of the faults is shown in the FAULT table in next Paragraph.

If the flame monitoring equipment is blocked (codes from F10 to F20), it is also possible to unblock it by using the button on the equipment itself. This block is shown by a LED that lights up on the equipment.

Warning: The flame monitoring equipment memorises the number of manual resets that are performed during its lifetime. In case of five resets performed in a period of 15 minutes, without a flame being ignited and detected, the equipment will go into a "timed" lockout (F13). In this case, it is required to wait another 15 minutes before resetting again. Press the reset button on the equipment to immediately reset this block condition.

Note: should the safety thermostat (STB) be open before starting the start-up cycle (this could be caused, for example, by low temperatures), the pilot light equipment will be kept in "standby" and block F15 will be shown.

• Analysis of Blocks - Faults

The CPU-SMART manages two types of blocks:

- preventive, it warns the client that the PCH heater requires maintenance;
- operational, it stops the PCH heater for safety reasons or to ensure its correct operation.

Some operational blocks require manual resets; others reset themselves when the problem that caused them is solved.

Below is a complete list of faults, possible causes and possible remedies.

Fault	Description	Cause	Remedy
Blocks caused by Flame - Dependent on the TER equipment			
F10	Failure to ignite flame after 4 attempts performed by the equipment	<ul style="list-style-type: none"> • Phase and neutral reversed. • Earth wire not connected. 	Manual reset
F11	Ill-timed flame	<ul style="list-style-type: none"> • Phase-phase connection without neutral. • Start-up electrode failed or badly positioned 	
F12	Failure of ignition; not visible. The count, displayed in the historical list, indicates whether the heater has had problems with ignition	<ul style="list-style-type: none"> • Detection electrode failed or badly positioned • Detection electrode that moves or disperses to the earthing system when hot. • Low CO2 value 	
F13	The TER equipment doesn't accept the reset command from CPU-SMART	TER has finished its 5 reset attempts in the period of 15 minutes.	Wait 15 min. or use reset button on equipment
F14	Lack of communication between TER equipment and CPU for more than 60s	TER equipment or CPU-SMART PCB broken	Auto-reset
F15	The CPU-SMART PCB sent the ignition signal to the equipment. After 300 seconds, the equipment has not yet lit the flame	safety thermostat blocking start up	Check contact closing
		TER equipment broken	Manual reset
F16	Generic equipment block	TER equipment broken	Manual reset
F17	Internal malfunction of TER equipment that does not accept reset command from CPU-SMART	TER equipment broken	Manual reset of equipment
Blocks caused by temperature (safety blocks)			
F20	Activation of safety thermostat STB	<ul style="list-style-type: none"> • Excess air temperature due to lack of air circulation • Safety thermostat broken or not connected 	Manual reset
Block FAN - burner ventilator			
F30	Fan speed too low in start up phase - VAG	Burner fan broken. FAN electrical cables broken or not connected	Manual reset
F31	Fan speed too high in start up phase - VAG		Manual reset
F32	Fan speed, during operation, outside minimum and maximum set parameters - VAG		Manual reset, autoreset after 5 min.
NTC probes broken or missing			
F41	Probe NTC1 error, air intake temperature	Absence of signal from probe or broken probe	Auto-reset
Over-temperature			
F51	The temperature of the air intake probe NTC1>TH1	<ul style="list-style-type: none"> • The minimum heat power of the PCH heater module is over-sized compared to the power output required by the environment. • Check the TH1 param. - air intake set point. 	Auto-reset if NTC1< TH1-15
Lack of voltage			
F75	No voltage during operation cycle (excluding stand-by); the fault is not visible on remote control but only counted.	No voltage during operation	Auto-reset
Internal malfunction of CPU-SMART PCB			
F00	Internal malfunction of CPU-SMART PCB	Perform a manual reset of the PCB; replace the CPUSMART if the problem persists	Manual reset

12 - FACTORY OPTIONS AND ACCESSORIES

12.15 Cooling recovery circuit (CR and CT assemblies)

Thermodynamic circuit dedicated to the recovery of the extracted air energy, with independent and proportional control, adapted to the air renewal requirements in order to raise the COP and EER of the unit.

The circuit is composed of:

- Return EC plug-fan.
- Air circuit comprised of coils with copper pipes and aluminium fins.
- Electronic expansion valve.
- Hermetic scroll-type compressor with sound insulation, assembled over antivibration mounts.
- Crankcase heater.
- Four-way cycle reversing valve.
- Anti-acid dehydrator filter.
- High and low pressure transducers.
- Condensates drain pan, with a 1/2" M gas threaded plastic drain connection.

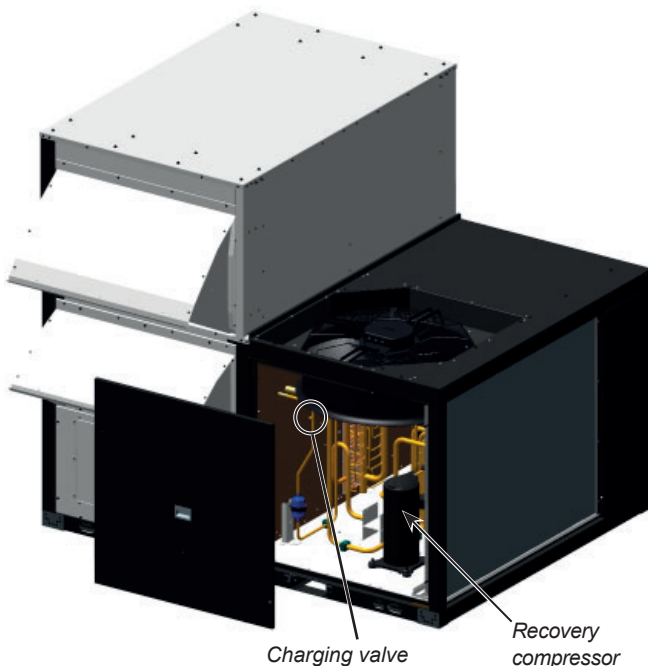
Characteristics of the recovery circuit

RPJ / IPJ		0090 to 0120	0140 to 0190	0200 to 0240	0280 to 0400
Type of refrigerant		R-410A			
Charge of R-410A	(kg)	1,7	2,5	3,0	3,4
Environment impact	(tCO2eq)	3,5	5,2	6,3	7,1
Volume of oil	(l)	0,7	1,2	1,7	1,8
Oil type		Copeland 3MAF 32cST, Danfoss POE 160SZ, ICI Emkarate RL 32CF, Mobil EAL Artic 22CC			

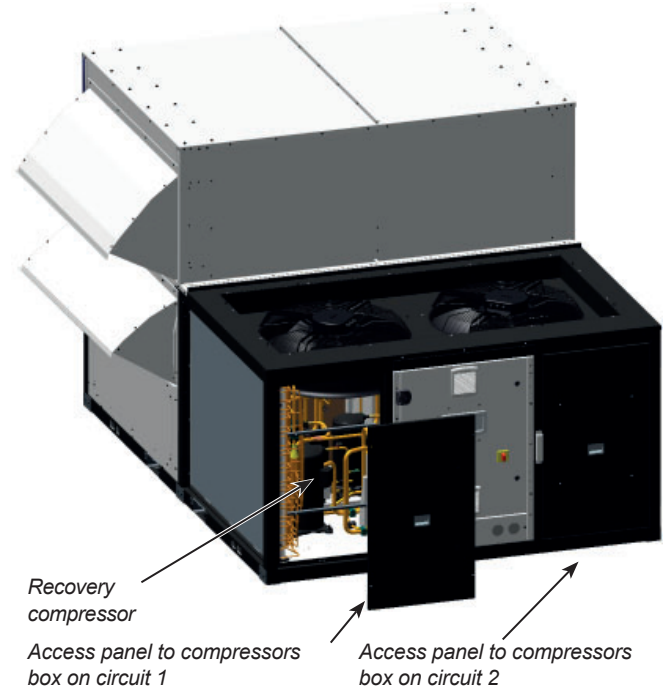
RPJ / IPJ		0090 to 0120	0140 to 0190	0200 to 0240	0280 to 0380
Type of refrigerant		R-454B			
Charge of R-454B	(kg)	1,9	2,3	2,7	3,1
Environment impact	(tCO2eq)	0,9	1,1	1,3	1,4
Volume of oil	(l)	1,24	1,24	1,24	1,72
Oil type		Copeland 3MAF 32cST, Danfoss POE 160SZ, ICI Emkarate RL 32CF, Mobil EAL Artic 22CC			

Access to the recovery circuit

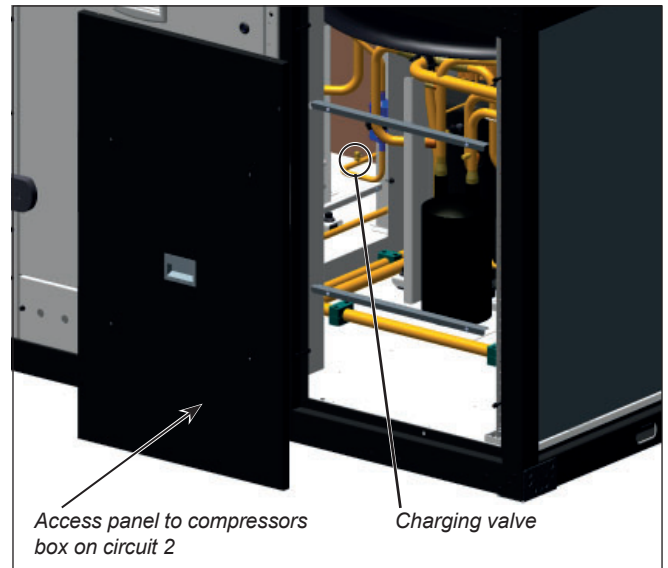
Models of 1 circuit (IPJ - 0090 to 0190 and RPJ - 0090 to 0380)



Models of 2 circuits (IPJ - 0200 to 0400)

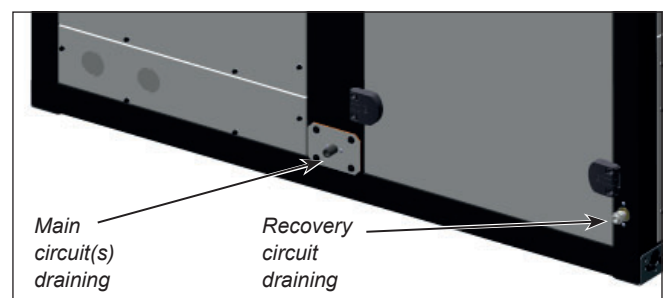


The charging valve, placed on the liquid line, is accessed via the compressors box on circuit 2, removing the communication panel between both circuits.



The charging valve (schrader type) must be used to adjust the refrigerant charge of the recovery circuit when this one is lower than required.

Position of the condensate drain

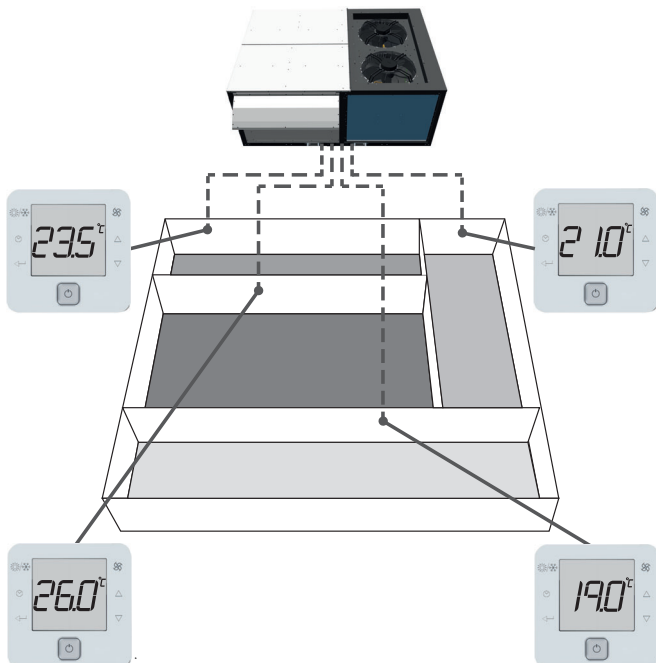


12 - FACTORY OPTIONS AND ACCESSORIES

12.16 Zoning of the air flow

This option allows the management of the air flow of the unit to condition up to 4 different zones with a minimum air flow of 35% (all of them in same operating mode: heating or cooling). This function allows to adapt the indoor air flow to the installation requirements.

Note: zoning is only possible with plug-fans.



Regulation gives the control signal to the dampers installed in each zone (dampers and servomotors for those dampers not supplied). The unit modifies the air flow and capacity depending on information coming from sensors in each zone and considering active zones in each moment.

The option includes 4 zone terminals (one for each zone), the additional control board supplied in an independent box to be connected with the 4 terminals, the unit board and also to the servomotors that control dampers in each zone (dampers and servos not supplied). The temperature information for each zone is coming from temperature sensor integrated inside each zone terminal. It is not needed to install any extra ambient sensor.

Note: There is a new option with **constant supply pressure** that extends the possibilities for multi-zone management. Available upon request.

Zone terminals

These terminals are the same as the TCO user's terminal (optional).



The main screen shows the ambient temperature, current operating mode of the unit, time and day of the week.

The following screen shows the temperature setpoint for this zone in the current operating mode.

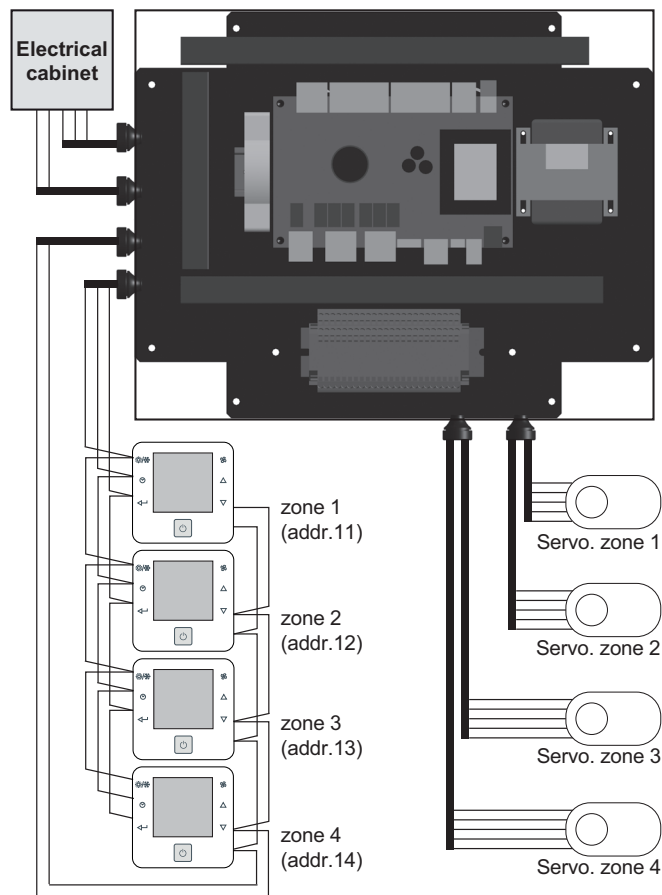
This screen can also show the zone that corresponds to the terminal, the regulation band associated with the temperature setpoint, the active alarms by means of codes and the delay set for the opening/closing of the damper.

These terminals also allow the schedule programming.

With the air zoning, the VectiGD terminal it also provides information on setpoints for each zone.

Zoning box connections

The control board of the air zoning is assembled in a separate box from the PJ unit. This board is connected in series on the Field-Bus of the main board of the Vectic control, placed on the electrical cabinet of the unit.



The installer must carry out the following connections:

• Connection of the zone terminals:

- Power supply (the same as the control board) at 230Vac 50/60Hz (L&N): 2 wires (section 0.5 at 1.5 mm²).
- Communication (RX+/TX+ & RX-/TX-): shielded cable type AWG20 or AWG22 with 1 braided pair + drainwire + shielding (e.g., model BELDEN 7703NH).

Zone terminals can be installed at a maximum distance of 100 metres from the zoning box.

These terminals are configured with their corresponding address in the factory. In the unlikely event of a communications failure the screen will display "Cn". Please make sure to check connections and the firmware version.

• Connection of the servomotors for the supply dampers:

- 5 wires (section 0.5 at 1.5 mm²), supply 24Vac.

• Connection to the electrical cabinet of the PJ unit:

- Power supply: 230Vac ((L&N): 2 wires (section 0.5 at 1.5 mm²).
- Communication (RX+/TX+ & RX-/TX-): shielded cable type AWG20 or AWG22 with 1 braided pair + drainwire + shielding (e.g., model BELDEN 7703NH).

Note: Please refer to the wiring diagram provided with the unit and the Vectic control manual to get more detailed information about the wiring.

13 - COMMISSIONING

13.1 Checks prior to commissioning

- It is advisable to make a complete sketch of the installation including the location of the unit and all the components used. This will be very helpful for maintenance and repairs to the installation.
- The following must be verified:
 - That the electrical power supply remains constant and that it corresponds to that featured on the unit data plate.
 - That the electric installation has been carried out according to the electric wiring diagram provided with the unit (consult the chapter on "Electrical connection").
 - The correct connection of the sensors supplied with the unit (consult the chapter on "Electrical connection").
 - That there are no cables close to heat sources.
- Once the above verifications have been carried out, the control circuit is supplied with voltage by the automatic control switch.

Attention: the compressor crankcase heater must be put under voltage for 24 hours before starting the compressor.

WICHTIG: WIEDERBEHEIZUNG DER OLWANNE

BEIDER ERSTEN INBETRIEBSETRUNZ ORDER NACH EINER LANGEN STROMUNTER-BRECHUNG BRINGEN SIE DIE MASCHINE UNTER SPANNUNG 24 STRUNDERLANG BEVOR SIE DEN(DIE) KOMPRESSOR(EN) EINSCHALTEN KOENNEN.

IMPORTANT: CRANKCASE HEATING

FOR THE FIRSTSTART OR AFTER A LONG TIME OUT OF VOLTAGE PUT THE MACHINE ON LIVE 24 HOURS BEFORE TO ALLOW THE COMPRESSOR(S) STARTING

IMPORTANT: SURCHAUFFE CARTER D'HUILE
AU PREMIER DÉMARRAGE OU APRÈS UNE ABSCENCE DE COURANT PROLONGÉE, METTRE LA MACHINE SOUS TENSION 24 HEURES AVANT D'AUTORISER LE DÉMARRAGE DU(DES) COMPRESSEUR(S).

IMPORTANTE: RISCALDARE IL CARTER DELL'OLIO

AL PRIMO AVVIAMENTO U DOPO UNA INTERRUZIONE PROLUNGATA DELLA ALIMENTAZIONE ELETTRICA, LASCIARE LA MACCINA SOTTO TENSIONE PER 24 ORE PRIMA DI AUTORIZZARE L'AVVIAMENTO DEL(DEI) COMPRESSORE(I).

IMPORTANTE: RECALENTAMIENTO DE ACEITE DEL CÁRTER

ANTES DEL PRIMER ARRANQUE O DESPUÉS DE UNA AUSENCIA DE CORRIENTE POR UN LARGO PERIODO DE TIEMPO, CONVIENE QUE LA UNIDAD ESTÉ CONECTADA UN MÍNIMO DE 24 HORAS.

V220084

Important: As a safety feature to ensure heating of the crankcase heater, if there is a power cut lasting over 2 hours, the compressors will be locked. The unit must be powered for 8 hours to unlock them. The VecticGD terminal unit display will show the time remaining until they can be unlocked.

- All the units are equipped with scroll type compressors and a phase control relay. Verify that they rotate in the correct sense and, if not, reverse the power wires.

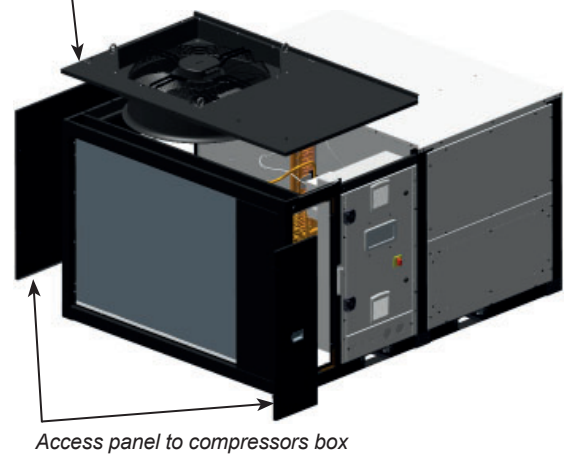
SCROLL COMPRESSOR.
CHECK SENSE OF ROTATION
COMPRESSEUR SCROLL.
VÉRIFIER LE SENS DE ROTATION
COMPRESOR SCROLL.
COMPROBAR SENTIDO DE GIRO

Optionally, these compressors can be fitted with a semiconductor compressor softstarter which limits the starting current using an auto adaptive algorithm.

- Check the unit operation and verify the safety devices.

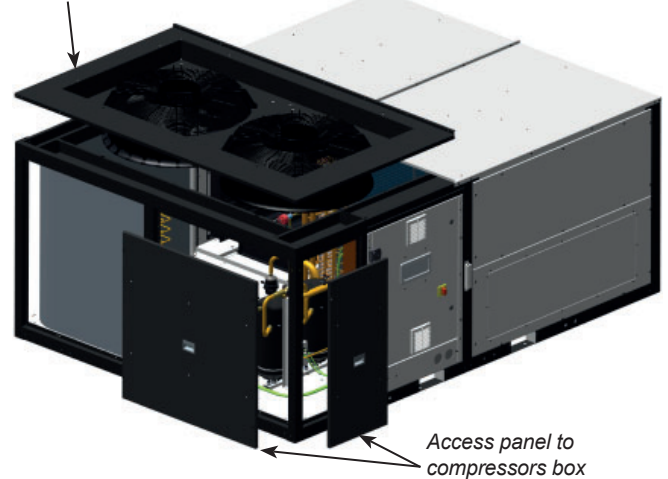
Models of 1 circuit:

Fan cover lifted (*)



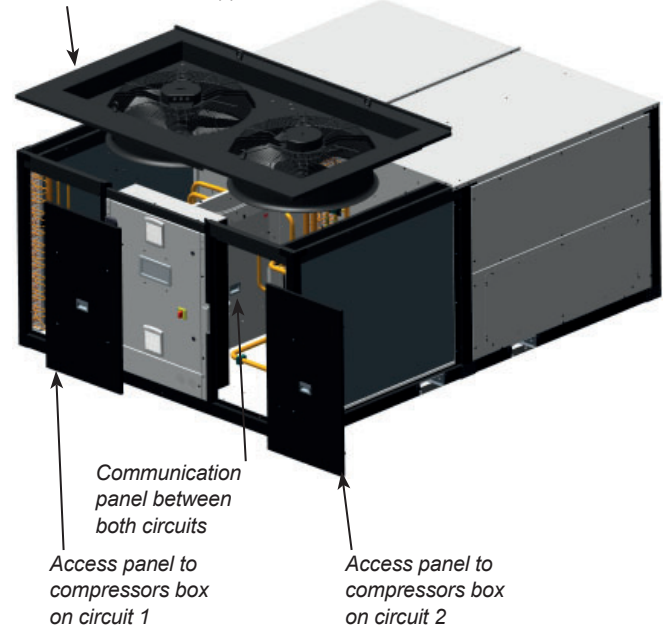
Models RPJ 0200 to 0380:

Fans cover lifted (*)



Models IPJ 0200 to 0400:

Fans cover lifted (*)



(*) For some commissioning and maintenance tasks, it may be convenient to access the outdoor unit by lifting the cover with the fan(s). See the lifting procedure in the section entitled "Fans and air ducts".

13 - COMMISSIONING

Control of the refrigerant charge

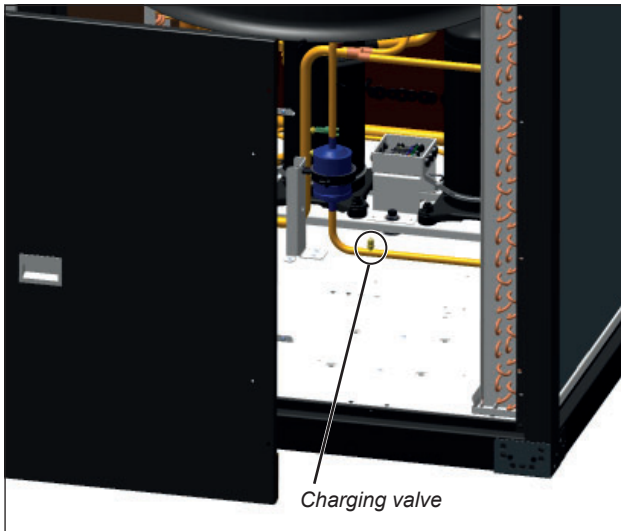
- Each unit is shipped with an exact charge of refrigerant for proper operation. Refrigerants available are: R-410A or R-454B.

Important: the type of refrigerant included in the unit can be consulted on the name plate, see section 4.3.

- To make sure that the unit is filled with the correct charge of refrigerant, check the values of overheating and subcooling, circuit by circuit, with the system running at full capacity.

If the refrigerant charge is lower than required, the suction pressure will drop and overheating on the compressor inlets will be high. This can cause an interruption in operation due to activation of the refrigerant charge safety device.

To adjust the refrigerant charge, each circuit has a schrader-type valve in the liquid line, before the filter drier.



- Verify the absence of any leaks of the refrigerant.

In case of a leak:

- Completely drain the refrigerant charge using a specific recovery machine for the type of refrigerant included in the unit (R-410A or R-454B). Repair the leak.

Important: Always follow the recommendations given in section 2.2 "Safety standards for refrigerant".

- Next, reload the refrigerant into the unit according to charge data provided in a table of the chapter on "Maintenance" and in the unit's name plate.
- Add the refrigerant via the charging valve, located in the liquid line, using the appropriate equipment and tools, with the compressors stopped, monitoring the pressures to control any anomaly.

13.2 Possible problems at commissioning

All indications given in this manual must be respected and complied with to guarantee a correct operation of the units.

Next, several possible operation problems are stated which could happen if the conditions of the commissioning are not appropriate.

- Air flow lack: very high differences between inlet and outlet temperatures, originated by a high pressure drop in the ducts, or by other causes that impede the correct circulation.
- Air recirculation in the unit, originated by some obstacle in the air aspiration or outlet.
- Noise problems because of excessive air flow in the grille.
- Water overflowing to the pan problems, originated by an excessive

flow, an incorrect siphon installation or because a defective unit level.

- Refrigerant circuit humidity problem, because of an incorrect vacuum realization.

13.3 Operational checks

Check the unit operation by verifying the electronic control and the safety devices.

It is also recommendable to create a report, taking note of the date, which includes the following information:

- the nominal voltage,
- current absorbed by the compressors, fans and other electrical components,
- significant temperatures in the cooling circuit (see attached table),
- other aspects considered interesting such as alarms detected by the electronic control of the unit.

The recording of these parameters whilst the unit is running allows controlling the installation performance and it is the best possible way to avoid breakdowns since the analysis of these data makes early detection of anomalies possible or the provision of the necessary means available to ensure that they do not take place.

Operating readings

Cooling MODE			
Compressor	Suction pressure	bar	
	Suction temperature (1)	°C	
	Condensation pressure	bar	
	Condensation temperature (2)	°C	
Air condenser	Gas inlet temperature	°C	
	Liquid outlet temperature (3)	°C	
	Air inlet temperature	°C	
	Outdoor temperature	°C	
Air evaporator	Air inlet temperature	°C	
	Air outlet temperature	°C	
	Liquid inlet temperature	°C	
	Evaporation outlet temperature (4)	°C	
Subcooling (2) - (3)		°C	
Overheating (4) - (1)		°C	

Heating MODE			
Compressor	Suction pressure	bar	
	Suction temperature (1)	°C	
	Condensation pressure	bar	
	Condensation temperature (2)	°C	
Air evaporator	Liquid inlet temperature	°C	
	Gas outlet temperature (4)	°C	
	Air inlet temperature	°C	
	Outdoor temperature	°C	
Air condenser	Air inlet temperature	°C	
	Air outlet temperature	°C	
	Gas inlet temperature	°C	
	Liquid outlet temperature (3)	°C	
Subcooling (2) - (3)		°C	
Overheating (4) - (1)		°C	

14 - MAINTENANCE

14.1 General recommendations

To ensure optimal efficiency and reliability of the equipment and all its functions, we recommend taking out a maintenance contract with the local organisation set up by your manufacturer. This contract will include regular inspections by the manufacturer's Service specialists so that any malfunction is detected and corrected quickly, ensuring that no serious damage can occur. The manufacturer's service maintenance contract is the best way to ensure the maximum operating life for your equipment and, through the expertise of manufacturer's qualified personnel, provides the ideal way to manage your system energy consumption effectively.

The refrigeration equipment must be serviced by professionals; however, routine checks may be carried out locally by specially trained technicians. See standard EN 378-4.

Note: Any deviation from or failure to comply with these maintenance criteria will render the guarantee conditions for the refrigeration unit null and void, and will release the manufacturer from its liability.

All refrigerant charging, removal and draining operations must be carried out by a qualified technician and with the correct equipment for the unit. Any inappropriate handling can lead to uncontrolled fluid or pressure leaks.



Before performing any work on the machine ensure it is de-energised. Cut off the main power supply with the door switch located in the electrical cabinet.

If a refrigerant circuit is opened, it must be evacuated, recharged and tested for leaks. Before any operation on a refrigerant circuit, it is necessary to evacuate the refrigerant charge using a charge transfer unit.

Simple preventive maintenance will allow you to get the best performance from your rooftop unit:

- Optimisation of energy performance,
- Reduced electricity consumption.
- Prevention of accidental component failure.
- Prevention of major time-consuming and costly work.
- Protection of the environment.

The AFNOR NF X 60 010 standard can serve as a reference, as it defines different maintenance levels for refrigeration units.

14.2 Servicing

Level 1 maintenance

These simple procedures can be carried out by the user:

- Visual inspection for oil traces (sign of a refrigerant leak).
- Clean the air-cooled exchangers (see the dedicated section).
- Check that the protective grilles (optional) are present and in good condition; and that the doors and covers are properly closed.
- Check the unit's alarm report (see the control manual);
- Check for any general signs of deterioration,
- Check the anti-corrosion coatings.

Level 2 maintenance

This level requires specific expertise in electrical, cooling and mechanical systems.

It is possible that this expertise may be available locally; there may be a maintenance service, industrial site or specialist subcontractor in the area.

The frequency of this maintenance level may be monthly or annual, depending on the verification type.

In these cases, the following maintenance operations are recommended:

Carry out all level 1 operations, then:

Electrical checks (annual checks):

- At least once a year tighten the electrical connections for the power supply circuits (see tightening torques table).
- Check and tighten all control connections, if required.
- Check the labelling of the system and instruments, re-apply the missing labels if required.
- Remove the dust and clean the interior of the electrical boxes. Be careful not to blow dust or debris into components; use a brush and vacuum wherever possible.
- Clean the insulators and bus bar supports (dust combined with moisture reduces the insulation gaps and increases current leakage between phases and from phase to ground).
- Check the presence, condition and operation of electrical protective devices.
- Check the presence, condition and operation of control components.
- Check that all heaters are operating correctly.
- Replace the fuses every 3 years or every 15000 hours (ageing).
- Check that no water has penetrated into the electrical cabinet.
- On the electrical cabinet, regularly check the cleanliness of the filter media to maintain the correct air flow.

Mechanical checks:

- Check that the mounting bolts for the ventilation sub-assemblies, fans, compressors and electrical cabinet are securely tightened.

Refrigerant circuit checks:

- The unit is subject to F-gas tight regulatory checks.
- Check the unit operating parameters and compare them with the previous values.
- Check the operation of the high-pressure switches. Replace them if there is a fault.
- Check the fouling of the filter driers. Replace them if necessary.
- Keep an up-to-date service booklet specific to the refrigeration unit in question.



Ensure all adequate safety measures are taken for all these operations: use appropriate PPE (personal protective equipment), comply with all industry and local regulations, use common sense.

14 - MAINTENANCE

Level 3 maintenance

Maintenance at this level requires specific skills, qualifications, tools and expertise. Only the manufacturer, his representative or authorised agent are permitted to carry out this work.

This maintenance work relates to the following:

- Replacement of major components (compressor, coil exchanger, etc).
- Operations on the refrigerant circuit (handling refrigerant).
- Modification of factory-set parameters (changes on the Vectic control);
- Movement or disassembly of the refrigeration unit.
- Any operation due to proven lack of maintenance.
- Any operation covered by the warranty.
- One or two leak detection operations per year performed by qualified personnel using a certified leak detector.
- To reduce waste, the refrigerant and the oil must be transferred.
- In accordance with applicable regulations, using methods that limit refrigerant leaks and pressure drops and with materials that are suitable for the products.
- Any leaks detected must be repaired immediately
- The compressor oil that is recovered during maintenance contains refrigerant and must be treated accordingly.
- Pressurised refrigerant must not be vented to the open air.
- If the refrigerating circuit must be opened, cap all openings for a period of up to one day. If open for longer, blanket the circuit with a dry, inert gas (e.g. nitrogen).

14.3 Access to the main components



Caution: Before performing any work on the machine ensure it is de-energised. Verify that the main power to the unit is cut off.



It is mandatory to use all required PPE for work at height. Pay special attention to units with lower supply and/or return.

Important: Whenever maintenance work is carried out on a unit with R-454B refrigerant, an A2L refrigerant detector must be available, regardless of that installed inside the unit.

Compressor

In the case of compressor replacement:

- Disconnect the unit from power supply.
- Completely drain the refrigerant charge using a specific recovery machine for the type of refrigerant included in the unit (R-410A or R-454B).

Important: Always follow the recommendations given in section 2.2 "Safety standards for refrigerant".

- Disconnect electrically the compressor.
- Carefully unsolder the suction and discharge piping.
- The compressor is fixed onto the platform with 4 screws.
- Unscrew the fixings.



- Place the new compressor and check that it has a sufficient oil charge.
Warning: when tightening the compressor screws, please consult the maximum torque that can be applied.
- Solder the suction and discharge piping.
- Connect the compressor in accordance with the wiring diagram.
- Make vacuum and next, reload the gas into the unit according to charge data provided in the table of section "Refrigerant" and in the unit's name plate.

Note: For some maintenance tasks, it may be convenient to access the outdoor unit by lifting the cover with the fan(s). Consult the lift procedure in chapter "Fans and air ducts".

Oil

Oils for refrigeration units do not pose any health risks if they are used in compliance with the precautions for use:

- Avoid unnecessary handling of components lubricated with oil. Use protective creams.
- Oils are flammable and must be stored and handled with care. Disposable rags or cloths used in cleaning must be kept away from open flames and disposed of in the appropriate manner.
- Containers must be stored with their caps on. Avoid using oil from an opened container stored under incorrect conditions.
- Check the oil level and aspect. In case of a colour change, check the oil quality using a contamination test.
- In the case of the presence of acid, water or metallic particles, replace the affected circuit oil, as well as the filter drier.
- If all the oil must be emptied, replace it imperatively with new oil of the same grade as the original oil which has been stored in a hermetically sealed container until its time of use.

The oil type recommended for these units is:

Copeland 3MAF 32cST, Danfoss POE 160SZ, ICI Emkarate RL 32CF, Mobil EAL Artic 22CC.

The following table indicates the required volume:

R-410A

Main circuits:

RPJ	0090	0120	0140	0160	0180	0190
Volume (l)	C1: 2,5	C1: 2,5	C1: 3,3	C1: 3,5	C1: 3,5	C1: 3,5

RPJ	0200	0220	0240	0280	0320	0360	0380
Volume (l)	C1: 3,6	C1: 5,0	C1: 5,0	C1: 5,0	C1: 6,5	C1: 6,8	C1: 6,8

IPJ	0090	0120	0140	0160	0180	0190	0200
Volume (l)	C1: 2,5	C1: 2,5	C1: 3,3	C1: 3,5	C1: 3,5	C1: 3,5	C1: 2,5 C2: 2,5

IPJ	0220	0240	0280	0320	0360	0380	0400
Volume (l)	C1: 2,5 C2: 2,5	C1: 2,5 C2: 3,3	C1: 3,3 C2: 3,3	C1: 3,3 C2: 3,5	C1: 3,5 C2: 3,5	C1: 3,5 C2: 3,5	C1: 5,0 C2: 5,0

Cooling recovery circuit (optional):

RPJ / IPJ	0090	0120	0140	0160	0180	0190	0200
Volume (l)	0,7	0,7	1,2	1,2	1,2	1,2	1,7

RPJ / IPJ	0220	0240	0280	0320	0360	0380	0400
Volume (l)	1,7	1,7	1,8	1,8	1,8	1,8	1,8

R-454B

Main circuits:

RPJ	0090	0120	0140	0160	0180	0190
Volume (l)	C1: 2,5	C1: 2,5	C1: 2,5	C1: 3,4	C1: 3,4	C1: 3,4

RPJ	0200	0220	0240	0280	0320	0360	0380
Volume (l)	C1: 6,0	C1: 6,6	C1: 6,6	C1: 6,6	C1: 6,6	C1: 6,6	C1: 7,2

IPJ	0090	0120	0140	0160	0180	0190
Volume (l)	C1: 2,5	C1: 2,5	C1: 2,5	C1: 3,4	C1: 3,4	C1: 3,4

IPJ	0200	0220	0240	0280	0320	0360	0380
Volume (l)	C1: 2,5 C2: 2,5	C1: 2,5 C2: 2,5	C1: 2,5 C2: 2,5	C1: 2,5 C2: 2,5	C1: 3,4 C2: 3,4	C1: 3,4 C2: 3,4	C1: 3,4 C2: 3,4

Cooling recovery circuit (optional):

RPJ / IPJ	0090	0120	0140	0160	0180	0190
Volume (l)	1,24	1,24	1,24	1,24	1,24	1,24

RPJ / IPJ	0200	0220	0240	0280	0320	0360	0380
Volume (l)	1,24	1,24	1,24	1,72	1,72	1,72	1,72

Refrigerant

These units are supplied with one of these refrigerants:

- **R-410A:** belongs to the A1/A1 group, i.e. with high safety both in the mix and also in the case of a leak.
- **R-454B:** belongs to the A2L group, that is, non-toxic and low flammability.

Caution: with A2L refrigerant, always use an A2L refrigerant detector when near the unit.

Important: the type of refrigerant included in the unit can be consulted on the name plate, see section 4.3.

Periodic check of tightness:

Only qualified personnel must perform a periodic leak testing, in accordance with the regulation (EC) **No. 517/2014**.

- The frequency of checks is no longer related to the refrigerant charge but to its global warming potential:

$$\text{Charge kg} \times \text{GWP} = \text{t CO}_2\text{e}$$

Carbon dioxide equivalency (t CO₂e) is a quantity that describes, for a given mixture and amount of greenhouse gas, the amount in tonnes of CO₂ that would have the same global warming potential (GWP).

- Operators shall ensure that the unit is checked for leaks ad minima according to the following frequency:

Environ. impact (Equiv. tonnes)	Equivalent charge (kg)		Frequency (months)	
	R-410A	R-454B	With detector	Without detector
t CO ₂ e < 5	2,4	10,8	not subject to revision	
t CO ₂ e 5 to 50	2,4	10,8	24	12
t CO ₂ e 50 to 500	23,9	108,5	12	6
t CO ₂ e > 500	239,5	1084,6	6	3

Important: units with A2L refrigerant are always equipped with a leak detector with infrared sensor. Consult the chapter "Safety elements".

- The following table shows the refrigerant charge and CO₂ equivalent tonnes (t CO₂e) for each model:

R-410A

Main circuits:

RPJ	0090	0120	0140	0160	0180	0190
Charge (kg)	C1: 7,3	C1: 7,6	C1: 9,7	C1: 9,7	C1: 10,0	C1: 10,3
Environ. impact (t CO ₂ e)	15,2	15,9	20,3	20,3	20,9	21,5

RPJ	0200	0220	0240	0280	0320	0360	0380
Charge (kg)	C1: 9,7	C1: 9,7	C1: 10,0	C1: 17,0	C1: 17,5	C1: 17,5	C1: 18,0
Environ. impact (t CO ₂ e)	20,3	20,3	20,9	35,5	36,5	36,5	37,6

IPJ	0090	0120	0140	0160	0180	0190	0200
Charge (kg)	C1: 8,0	C1: 8,3	C1: 11,0	C1: 11,0	C1: 11,3	C1: 11,6	C1: 6,3 C2: 6,3
Environ. impact (t CO ₂ e)	16,7	17,3	23,0	23,0	23,6	24,2	26,1

IPJ	0220	0240	0280	0320	0360	0380	0400
Charge (kg)	C1: 6,4 C2: 6,4	C1: 6,5 C2: 6,5	C1: 10,0 C2: 10,0	C1: 10,2 C2: 10,2	C1: 10,2 C2: 10,2	C1: 10,3 C2: 10,3	C1: 11,0 C2: 11,4
Environ. impact (t CO ₂ e)	26,7	27,1	41,8	42,4	42,4	42,8	46,8

Additional charge of the optional active dehumidification:

Active dehumidification is equipped with an additional condensation coil, in series with the main cooling circuit, to reheat the air. In two-circuit units, the coil is incorporated in circuit 2.

Note: this option is not available for IPJ-0400 model.

RPJ	0090	0120	0140	0160	0180	0190
Charge (kg)	C1: 3,3	C1: 3,3	C1: 5,4	C1: 5,4	C1: 5,4	C1: 5,4
Environ. impact (t CO ₂ e)	6,9	6,9	11,3	11,3	11,3	11,3

RPJ	0200	0220	0240	0280	0320	0360	0380
Charge (kg)	C1: 10,5	C1: 10,5	C1: 10,5	C1: 10,5	C1: 10,5	C1: 10,5	C1: 10,5
Environ. impact (t CO ₂ e)	21,9	21,9	21,9	21,9	21,9	21,9	21,9

IPJ	0090	0120	0140	0160	0180	0190
Charge (kg)	C1: 4,9	C1: 4,9	C1: 4,6	C1: 4,6	C1: 4,6	C1: 4,6
Environ. impact (t CO ₂ e)	10,2	10,2	9,6	9,6	9,6	9,6

IPJ	0200	0220	0240	0280	0320	0360	0380
Charge (kg)	C2: 11,2	C2: 11,2	C2: 11,2	C2: 11,5	C2: 11,5	C2: 11,5	C2: 11,5
Environ. impact (t CO ₂ e)	23,4	23,4	23,4	24,0	24,0	24,0	24,0

Cooling recovery circuit (optional):

RPJ / IPJ	0090	0120	0140	0160	0180	0190	0200
Charge (kg)	CR: 1,7	CR: 1,7	CR: 2,5	CR: 2,5	CR: 2,5	CR: 2,5	CR: 3,0
Environ. impact (t CO ₂ e)	3,5	3,5	5,2	5,2	5,2	5,2	6,3

RPJ / IPJ	0220	0240	0280	0320	0360	0380	0400
Charge (kg)	CR: 3,0	CR: 3,0	CR: 3,4	CR: 3,4	CR: 3,4	CR: 3,4	CR: 3,4
Environ. impact (t CO ₂ e)	6,3	6,3	7,1	7,1	7,1	7,1	7,1

14 - MAINTENANCE

R-454B

Main circuits:

RPJ	0090	0120	0140	0160	0180	0190
Charge (kg)	C1: 7,2	C1: 7,5	C1: 9,9	C1: 9,9	C1: 10,2	C1: 10,4
Environ. impact (t CO2e)	3,4	3,5	4,6	4,6	4,8	4,8

RPJ	0200	0220	0240	0280	0320	0360	0380
Charge (kg)	C1: 10,2	C1: 10,4	C1: 10,6	C1: 16,1	C1: 16,3	C1: 16,3	C1: 16,5
Environ. impact (t CO2e)	4,8	4,8	4,9	7,5	7,6	7,6	7,7

IPJ	0090	0120	0140	0160	0180	0190
Charge (kg)	C1: 7,2	C1: 7,5	C1: 9,9	C1: 9,9	C1: 10,2	C1: 10,4
Environ. impact (t CO2e)	3,4	3,5	4,6	4,6	4,7	4,9

IPJ	0200	0220	0240	0280	0320	0360	0380
Charge (kg)	C1: 5,7 C2: 5,7	C1: 5,8 C2: 5,8	C1: 5,9 C2: 5,9	C1: 9,0 C2: 9,0	C1: 9,1 C2: 9,1	C1: 9,1 C2: 9,1	C1: 9,2 C2: 9,2
Environ. impact (t CO2e)	5,3	5,4	5,5	8,4	8,5	8,5	8,6

Cooling recovery circuit (optional):

RPJ / IPJ	0090	0120	0140	0160	0180	0190
Charge (kg)	CR: 1,9	CR: 1,9	CR: 2,3	CR: 2,3	CR: 2,3	CR: 2,3
Environ. impact (t CO2e)	0,9	0,9	1,1	1,1	1,1	1,1

RPJ / IPJ	0200	0220	0240	0280	0320	0360	0380
Charge (kg)	CR: 2,7	CR: 2,7	CR: 2,7	CR: 3,1	CR: 3,1	CR: 3,1	CR: 3,1
Environ. impact (t CO2e)	1,3	1,3	1,3	1,4	1,4	1,4	1,4

- **A logbook must be established** for equipment subject to periodic leak tests (verify the registration requirements under national regulations). It should contain the quantity and the type of fluid present within the installation (added and recovered), the quantity of recycled fluid, regenerated or destroyed, the date and output of the leak test, the designation of the operator and its belonging company, etc. Contact your local dealer or installer if you have any questions.
- All refrigerant charging, removal and draining operations must be carried out by a qualified technician and with the correct equipment for the unit. Any inappropriate handling can lead to uncontrolled fluid or pressure leaks.
- Limit the amounts stored in mechanical rooms. Cylinders and tanks of refrigerant must be handled with care and signs warning users of the related poisoning, fire and explosion hazards must be clearly visible.
- Refrigerant that reaches the end of its life must be collected and recycled in accordance with applicable regulations.

Important: Always follow the recommendations given in section 2.2 "Safety standards for refrigerant".

R-454B refrigerant leak detector (standard)

Due to the A2L category of refrigerant R-454B (lightly flammable), it requires the installation of a refrigerant leak detector. This detector uses infrared instead of semiconductor technology with no need of calibration (self-calibration).

This detector integrates, in a single assembly, housing + electronics + sensor. It is divided into two parts, for easy inspection and sensor replacement.



This detector is installed on a panel next to the supply fans of the indoor circuit. This position ensures the correct reading of the gas concentration in the indoor coil.



Sensor

The mitigation parameters established in the electronic control in case of refrigerant leakage are:

- Delay time (by default, 180 seconds): Time so that when a warning appears on the sensor it does not become an alarm. After this period the PROTECTION MODE will be activated.
- Concentration of LFL (Lower flammability limit) for alarm (by default, 50%): percentage of the LFL from which the refrigerant leak failure occurs and the unit starts operating in PROTECTION MODE.
- Concentration of LFL for alarm switch-off (by default, 10%): Percentage of LFL below which the refrigerant leak alarm ends and the unit stops operating in PROTECTION MODE.
- Airflow (by default, to 100%): Percentage of the airflow rate of the indoor fans (supply and also return if available) when the unit starts operating in PROTECTION MODE..

The PROTECTION MODE instantly disables the compressors and support elements, activates the indoor fans (supply and also return if available) at 100% of airflow (parameterizable) and opens the fresh and exhaust air dampers at 100% (if they are available). This happens temporarily, as long as the leak occurs or the sensor is held down with failure. If one of these two conditions ceases, the unit will return to the operating mode it had before the leak (ON, OFF, COOLING, HEATING, VENT, etc.) and the warning of protection mode will disappear.

If the unit is connected to a BMS monitoring system, the electronic control is prepared to send an alarm signal in case of leakage detection.

In any case, alarms will be maintained until they are reset from the VectioGD terminal (manual reset).

Note: Refer to the Vectio control brochure to obtain more detailed information on its operation.

14 - MAINTENANCE

R-410A refrigerant leak detector (optional)

The gas detector sensor is a device that signals leaks in refrigerant. This sensor is installed next to the supply fan. In case of alarm, it is reset manually.



Maintenance:

- Annual testing: it is necessary to carry out testing every year.
- Every 5 years: the gas detection element should be replaced.

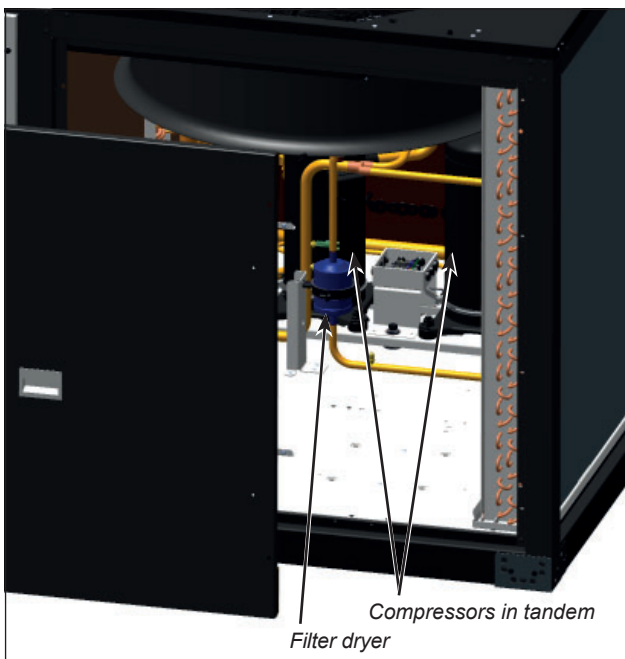
Note: Check the documentation attached to the leak detector for taring and calibration testing.

Active recovery (optional)

- A cooling recovery circuit is optionally available for these units (CR and CT assemblies). It is a complete circuit with independent electronic control. The circuit is composed of:
 - Return EC plug-fan.
 - Air circuit comprised of coils with copper pipes and aluminium fins.
 - Electronic expansion valve.
 - Hermetic scroll-type compressor assembled over antivibration mounts.
 - Crankcase heater.
 - Four-way cycle reversing valve.
 - Anti-acid dehydrator filter.
 - High and low pressure transducers.
 - Condensates drain pan.
- The same recommendations for the maintenance of the components of the main circuits must be followed for the components of this circuit.

Dryer filter

- The filter function is to preserve the cooling circuit clean and without humidity, neutralizing the acids that can be found in the cooling circuit.
- Measure the difference in the temperature of the pipes at the dryer inlet and outlet.
- If necessary, replace.



Air coil

- Check that the coil is free from dust and grease.
- Cleaning the accumulated dust on the coil can be performed using a soft-bristled brush or a vacuum cleaner perpendicular to the fins or with a low-pressure water cleaner. Grease can be removed with water with degreaser. Do not put stress on the fins as they could deform.



Use safety gloves for this task. Take care with the sharp parts of the coil.

Outdoor coil protective grille (optional)

A protective grille can be fitted to the coil.

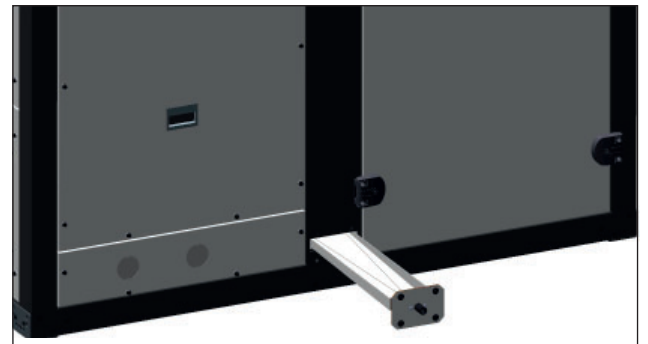
This grille, fixed with M6 Allen screws, must be removed to clean the coil.

M6 Allen screws



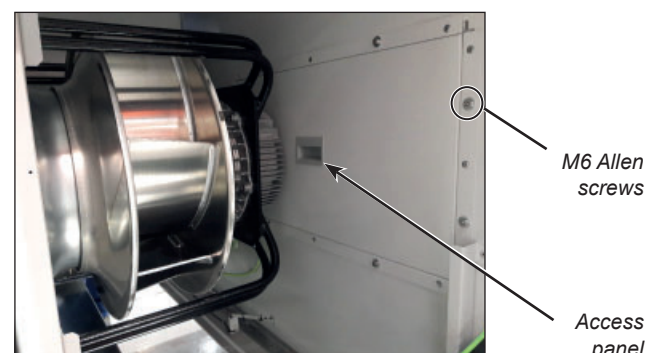
Condensate drainage pan

- These units are equipped with a condensate drainage pan sloped toward the drain. This pan is removable for easy cleaning. It is secured to the unit using 4 M6 Allen screws.
- Check that the condensate pan is sufficiently clean.
- Check that the drain is not clogged.
- Cleaning of the pan can be done with water and non-abrasive detergent.



Supply fan in «Tunnel flow» units

- The terminal block of the motor is accessed from the outdoor unit. For that the next panel must be removed:



14 - MAINTENANCE

Air filters

- Depending on the installation conditions, the filter aspect must be examined to define the cleaning or replacing periodicity. Spare parts should be planned for.

The pressure drop data of the technical catalogue are given for clean filters. Cleaning the filters is very important to maintain the required available pressure of the unit.

On units with a clogged filter differential pressure switch, an alarm is triggered on the electronic control when the factory-set clogging threshold is exceeded depending on the combination of filters selected.

- Gravimetric filters (G4). Cleaning can be done with a household vacuum cleaner. Replace them regularly.
- Creased opacimetric filters (M6, F7, F8 and F9). It is necessary to replace them.

Filter removal:

- The access panel to the filters features dual locks which can serve as a hinge or can be used to remove the panel. Check that the locks are not blocked. Open the locks with a 4 mm Allen key (in an anticlockwise direction).



Caution: pay attention when opening the panel to avoid any damage to the siphon of the condensate drain.

- The thickness of the frames is 25 mm for the G4 standard type and 50 mm for the G4 low pressure drop and all opacimetric filters.

Filters supplied from the factory can be replaced on site by other types of filters with different thickness.

The filter holder structure supports the following filter combinations: 25 mm, 25 mm + 50 mm, 50 mm + 50 mm.

The filter holder structure incorporates a tensioner that can be moved along a guide to adjust the width according to the chosen combination. With the help of a locking knob, the position of the frames is locked after placement.

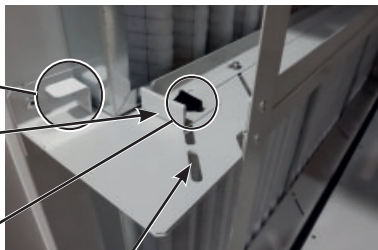
To extract the frames from each row, simply slide the tab.



Tab for displacement of the frames

Tensioner

Locking knob for the tensioner



Guide

Air filters in the recovery module

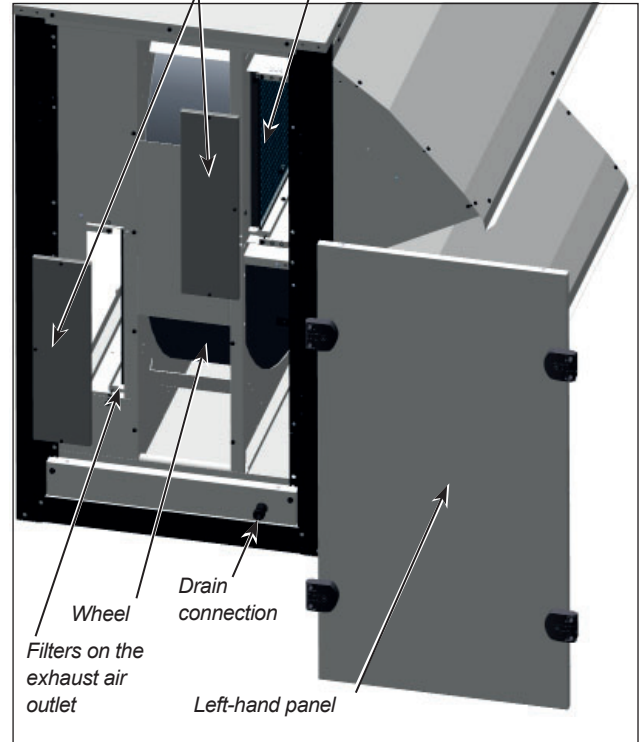
- The inside of the heat recovery unit module is accessed via the left-hand panel (front view), for maintenance tasks concerning the filters and the condensate pan. This panel features dual locks.

The access panels to the filters are secured using M4 Allen screws. The procedure for cleaning the filters is described in the preceding paragraph.

This module features gravimetric filters G4 with low pressure drop, both on the fresh air intake and on the exhaust air outlet.

Access panel to filters, M4 Allen screws

Filters on the fresh air intake



Wheel

Drain connection

Filters on the exhaust air outlet

Left-hand panel

Air filters in the grids of the electric cabinet

- The appearance of the filters located inside of the grids must be examined periodically, because the clogged filters impede good ventilation.
- Cleaning can be done with a household vacuum cleaner. Replace them regularly.

115 x 115 mm G2 filters.



Mixing boxes (optional)

In units with mixing box assemblies, it is advisable to check the condition of the servomotors of the motorised dampers.

Centrifugal fan (optional)

- Verify that the turbine and the motor remain clean.
- Foresee having a spare belt set for the fans.
- The motors and the fans have bearings that have been lubricated and sealed and, thus, do not need further lubrication.

14 - MAINTENANCE

Gas burner



Only qualified staff are allowed to undertake maintenance tasks or resolve a breakdown.



Pay attention to the temperatures of some components after operation. They could be very high (exchanger, flue exhaust, etc).



Hazard: Never use a naked flame whilst checking the burner. Never store flammable material in the machine room.

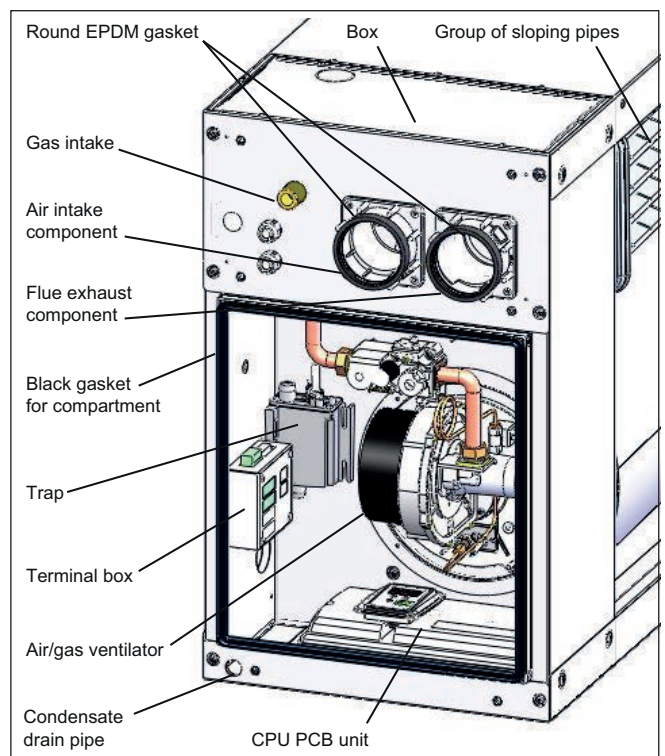
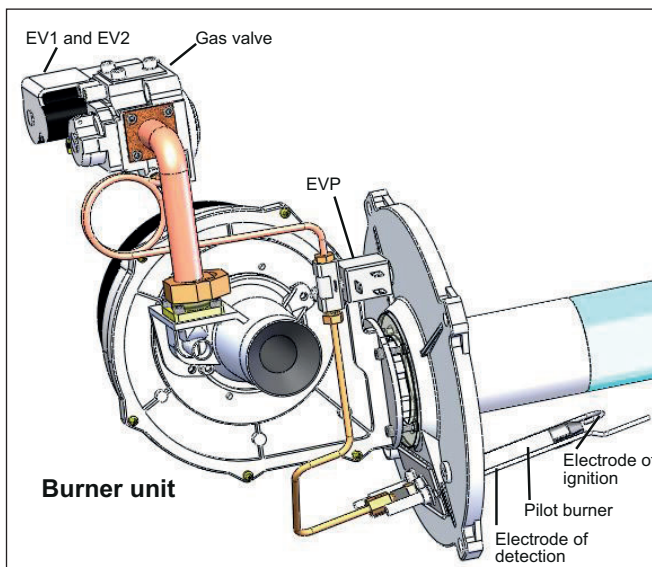
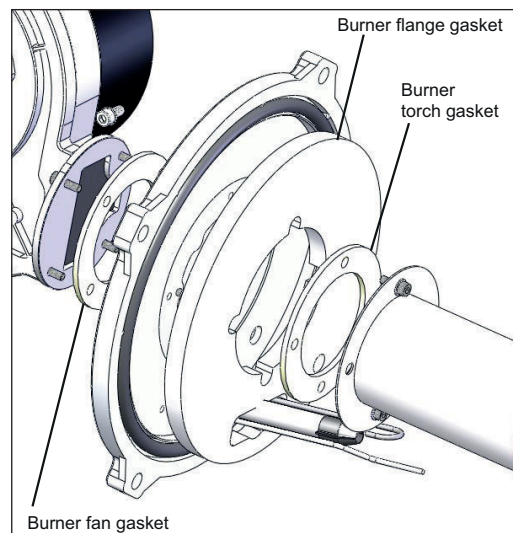
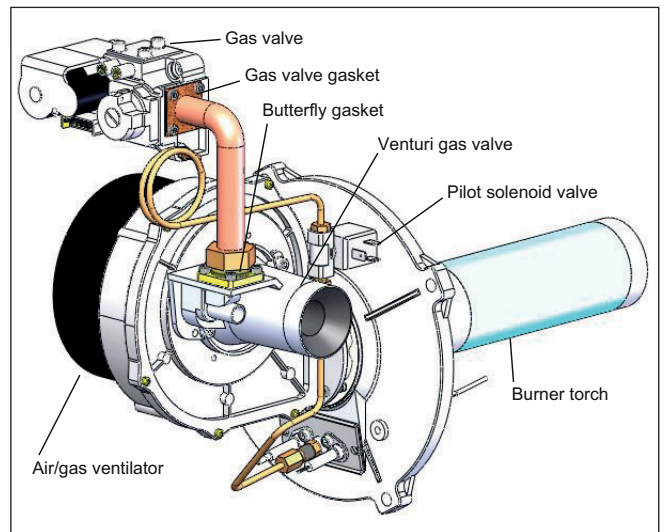
During the maintenance, the user must always strictly follow the instructions given in all the chapters of this brochure, as well as on the manufacturer's (APENGROUP) installation and maintenance brochure for the burners in the PCH series, supplied with the unit.

The maintenance and checking of the combustion must be performed in compliance with the legislation in force. Any modification or change in the material must be undertaken with the manufacturer's consent; the replacement of a faulty component for another non-compliant component could present a hazard for which CIAT could not accept liability.

To keep the machine efficient and guarantee a long lifetime of the heater, it is advisable to run some inspections every year, before turning it on for the season:

- 1) check the status of the start-up electrodes, detection electrodes and pilot flame;
- 2) check the status of flue exhaust and air intake ducts and terminals;
- 3) check the status of the venturi;
- 4) check and clean the exchanger and burner;
- 5) check and clean the water trap
- 6) check the intake pressure at the gas valve;
- 7) check the function of the flame monitoring equipment;
- 8) check the safety thermostat(s);
- 9) check the ionization current.

Note: Operations at points 1, 2, 3, 4 and 5 must be performed after disconnecting the heater from the electrical mains and closed the gas supply. Operations at point 6, 7, 8 and 9 must be done with the heater on.

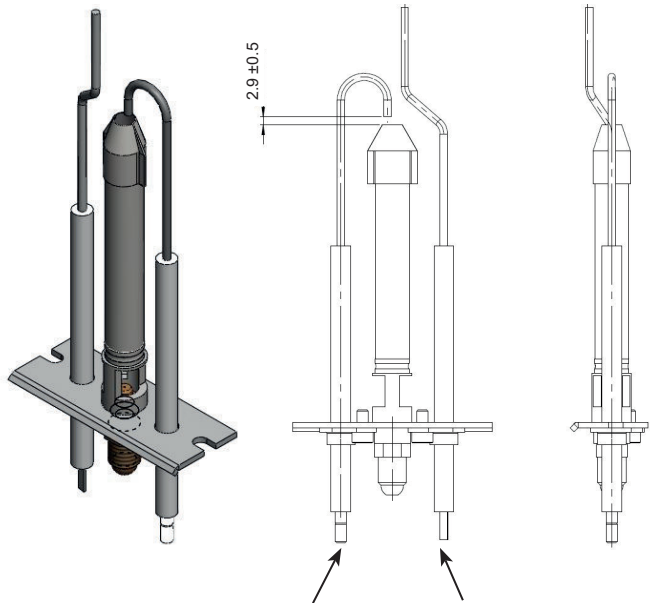


14 - MAINTENANCE

1) Inspection of electrodes

Dismantle the complete pilot flame and use a jet of compressed air to clean the mesh and nozzle. Check the integrity of the ceramic and use sandpaper to remove any oxidation on the metal parts of the electrodes. Check the correct position of the electrodes (see drawing below).

It is important that the detection electrode is at a tangent to the head of the pilot and not inside it. The start-up electrode must discharge onto the mesh of the pilot burner.



Verify that the start-up electrode discharges on the external edge of the pilot burner

Keep the detection electrode at a tangent to the pilot burner

2) Inspection of flue exhaust and air intake ducts

Visually inspect where possible or examine with specific tools to learn the status of the ducts.

Remove dust that forms on the air intake terminal.

3) Inspection and cleaning of the venturi

Remove any dirt at the mouth of the venturi with a brush, and be careful to not let it fall inside the venturi.

4) Inspection and cleaning of the exchanger and burner

Perfect combustion in PCH heaters prevents soot forming, which is normally caused by bad combustion.

It is advisable, therefore, to not clean the exchanger and burner unless there are exceptional circumstances.

An accumulation of soot inside the exchanger could be revealed by a sizeable variation in the heat output that is not caused by improper functioning of the gas valve.

Should it become required to clean the burner and/or exchanger, all of the gaskets mounted between the burner and the exchanger must be replaced.

5) Inspection and cleaning of the water trap

Clean the trap every year, and check the connections. Make sure there are no traces of metallic residue. If metallic residue has formed, increase the number of inspections.

6) Inspection of intake gas pressure

Verify that the intake pressure at the valve corresponds to the value required for the type of gas connected.

This verification must be done with the heater on at the maximum heat output.

7) Inspection of flame monitoring equipment

With the heater operating, close the gas tap and verify that the machine faults, signalled on the LCD display with code F10.

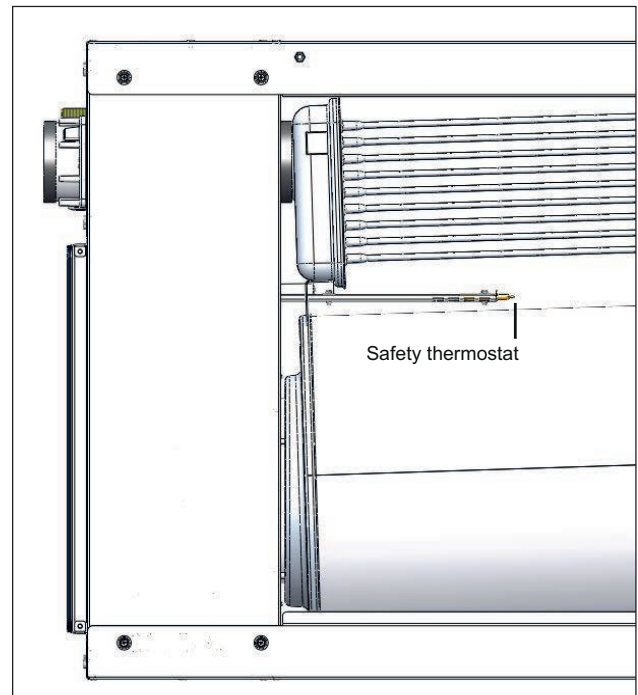
Reopen the gas tap, reset the fault and wait for the heater to start back up.

8) Inspection of the safety thermostat(s)

This procedure must be done with the heater on and the burner lit.

Open the thermostat series with an insulated tool [230 V], remove the fast-on from the safety thermostat, wait for the F20 block signal to appear on the LCD display.

Reclose the thermostat series, then reset the fault.



9) Inspection of the ionization current.

This procedure can be done directly from the LCD display by entering into the I/O menu (password 001). The **IO**n parameter indicates the value of the ionization current, and the reading is as follows:

- 100, indicates that the value is more than 2 microAmperes, which is plenty for the equipment to function;
- from 0 to 100, indicates a value from 0 to 2 microAmperes; for example, 35 corresponds to 0.7 microAmperes, which is the minimum threshold detectable for the flame monitoring equipment.

The value of the ionisation current must not be below 2 micro-Amperes. Lower values indicate: the detection electrode in a bad position, a rusted electrode or one about to stop functioning.

Replacing the gas valve of the burner

If the gas valve must be replaced, it is required to proceed with an inspection and possibly calibrate the CO₂ level through the adjustments on the Venturi pipe.

It is advisable not to calibrate the offset: the valve calibration is performed by the manufacturer.

If necessary, carry out the combustion analysis procedure as described in paragraph "Analysis of combustion".

It is recommended to always carry out the flue gas analysis after replacing the gas valve.

15 - CONTROL AND ANALYSIS OF BREAKDOWNS

Symptom	Cause	Solution
Evaporation pressure very high in relation with the air inlet	<ul style="list-style-type: none"> a) Charge excess b) High air temperature c) Compressor suction not air tight d) Cycle reversing valve in middle position 	<ul style="list-style-type: none"> a) Collect refrigerant b) Verify overheating c) Verify compressor state and replace d) Check that the valve is not clogged. Replace if necessary
Very low condensation pressure	<ul style="list-style-type: none"> a) Gas lack b) Compressor suction not air tight c) Cycle reversing valve in middle position d) Liquid circuit plugging 	<ul style="list-style-type: none"> a) Search for leaks, complete charge b) Verify compressor state and replace c) Check that the valve is not clogged. Replace if necessary d) Verify the dehydrating filter and expansion valve
Condensation pressure very high in relation to the air outlet, high pressure switch cutoff	<ul style="list-style-type: none"> a) Insufficient air flow b) Air inlet temperature very high c) Dirty condenser (does not exchange) d) Much refrigerant charge (flooded condenser) e) The condenser fan is broken down f) Air in the cooling circuit 	<ul style="list-style-type: none"> a) Verify the air circuits (flow, filter cleanliness...) b) Verify the control thermostat readjustment c) Clean it d) Collect refrigerant e) Repair f) Make vacuum and charge
Evaporation pressure too low (low pressure safety cut-off)	<ul style="list-style-type: none"> a) Low flow in evaporator. Air recirculation b) Frozen evaporator c) Liquid line as different temperatures at filter inlet and outlet d) Gas lack e) Very low condensation pressure f) Evaporator fan broken down 	<ul style="list-style-type: none"> a) Verify the air circuits (flow, filter cleanliness...) b) Verify defrost c) Replace filter d) Search for leaks, complete charge e) Temperature of air or water in condenser very low (air or water flow very high), adjust flow f) Repair
Compressor does not start, does not make noise (humming)	<ul style="list-style-type: none"> a) No power b) The contacts of a control element are open c) Timing of anti cycle short does not allow the starting d) Open contact e) Contactor coil burnt f) Indoor klixon open 	<ul style="list-style-type: none"> a) Check differential, fuses b) Verify the safety chain of the electronic control c) Verify electronic control d) Replace e) Replace f) Wait for reactivation, verify current absorbed
Compressor does not start, motor sounds intermittently	<ul style="list-style-type: none"> a) Electrical power supply very low b) Power cable disconnected 	<ul style="list-style-type: none"> a) Control line voltage and locate voltage drop b) Verify connections
Repeated compressor starts and stops	<ul style="list-style-type: none"> a) Because of high pressure b) Control differential too short (short cycle) c) Insufficient gas, cut-off because of low pressure d) Dirty or frosted evaporator e) The evaporator fan does not work, cuts off the low pressure switch f) Expansion valve damaged or clogged by impurities (cuts off the low pressure safety) g) Dehydrating filter clogged (cuts off the low pressure safety) 	<ul style="list-style-type: none"> a) Verify charge b) Increase differential c) Search for leak, reload unit d) Clean, verify evaporator air circuit e) Replace or repair f) Replace, as well as filter g) Replace
The compressor makes a noise	<ul style="list-style-type: none"> a) Loose attachment b) Oil lack c) Compressor noise 	<ul style="list-style-type: none"> a) Fix b) Add oil to recommended level c) Replace
Noisy operation	<ul style="list-style-type: none"> a) Unit installed without antivibration protection 	<ul style="list-style-type: none"> a) Place base over shock absorbers
Cycle reversing is not carried out: - No defrosting - Does not change winter - summer cycles	<ul style="list-style-type: none"> a) Electrical fault b) Inversion valve coil defective c) Defrost method not working d) Cycle reversing valve in middle position e) Control fault 	<ul style="list-style-type: none"> a) Locate and repair b) Replace c) Verify parameters d) Tap with running compressor. Replace if necessary e) Locate and repair
Alarm or reading error in the humidity probe (with enthalpic control)	<ul style="list-style-type: none"> a) Dirt in the humidity sensor 	<ul style="list-style-type: none"> a) Disassembly the probe capsule. b) Proceed to clean the sensor with some soft cotton element and non-abrasive fluid, without pressing it. c) Reassemble the casing, checking that the cable is in contact externally with the metallic mesh.

16 - FINAL SHUTDOWN

Shutting down

Separate the units from their energy sources, allow them to cool then drain them completely.

Recommendations for disassembly

Use the original lifting equipment.

Sort the components according to their material for recycling or disposal, in accordance with regulations in force.

Check whether any part of the unit can be recycled for another purpose

Fluids to be recovered for treatment

- Refrigerant
- Energy transfer fluid: depending on the installation, water, glycol/water mix.
- Compressor oil

Materials to be recovered for recycling

- Steel
- Copper
- Aluminium
- Plastics
- Polyurethane foam (insulation)

Waste electrical and electronic equipment (WEEE)

At the end of its life, this equipment must be disassembled and contaminated fluids removed by professionals and processed via approved channels for electrical and electronic equipment (WEEE).



Important: In order to recycle these units follow the stipulations of Directive 2012/19/EU on *Waste electrical and electronic equipment* (WEEE).

The quality management system of this product's assembly site has been certified in accordance with the requirements of the ISO 9001 standard (latest current version) after an assessment conducted by an authorized independent third party.

The environmental management system of this product's assembly site has been certified in accordance with the requirements of the ISO 14001 standard (latest current version) after an assessment conducted by an authorized independent third party.

The occupational health and safety management system of this product's assembly site has been certified in accordance with the requirements of the ISO 45001 standard (latest current version) after an assessment conducted by an authorized independent third party.

Please contact your sales representative for more information.

Order No.: 10670, 06.2024.Supersedes order No.: 06.2023

Manufacturer reserves the right to change any product specifications without notice.

Carrier, Montluel, France
Printed in the European Union