

Space PG

Installation
Operation
Commissioning
Maintenance



Air-air rooftop units with a built in gas burner

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Space PG

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Cooling capacity: 58,9 to 135,5 kW
Heating capacity: 62,2 to 143,4 kW

1. INTRODUCTION

The **Space PG** cooling units and heat pumps are autonomous air-air units with a compact monoblock, horizontal rooftop design with a built in natural or propane gas burner (in accordance with the gas Directive 90/396 EEC).

They are equipped with centrifugal and axial fans, air coils, hermetic scroll compressors and electronic control with microprocessor, components optimised for the R-410A refrigerant.

These units have been designed for the air conditioning of large surface areas used for business or industry in areas with particularly low outdoor temperatures in winter.

A vast number of options meet numerous operating demands thus enabling quick installation and reliable operation.

■ Space RPG Series

Autonomous air-air **cooling** units with a compact horizontal rooftop design with a built in gas burner.

■ Space IPG Series

Autonomous reversible air-air **heat pump** units with a compact horizontal rooftop design with a built in gas burner.

After manufacturing, all units are charged with refrigerant and are tested at the factory, verifying the correct operation of all their components.

In this brochure are described the actions and safety norms for a correct unit handling.

2. OPERATION LIMITS

Inlet air conditions		Cooling	Heating
Indoor coil heat pump	Minimum	14°C WB	10°C
	Maximum	22°C WB	27°C
Outdoor coil heat pump	Minimum	12°C ①	-10°C WB
	Maximum	48°C ②	15°C WB
Gas Burner	Minimum	--	-30°C ③

① With a condensation pressure control operating down to -10°C.

② With high powered axial fan operating up to 52°C.

③ With outdoor temperatures below -15°C it is compulsory to select the anti-freeze protection option for the electric panel.

3. TECHNICAL CHARACTERISTICS

Space PG		241	321	361	242	322	362	420	485	540	600	
Cooling capacities	Cooling capacity ① (kW)	58,9	72,1	82,7	60,3	73,6	84,8	101,7	110,3	123,3	135,5	
	Power input ③ (kW)	21,4	28,1	32,7	21,1	27,5	32,0	33,0	37,0	42,8	49,8	
	EER performance	2,7	2,6	2,5	2,9	2,7	2,6	3,1	3,0	2,9	2,7	
Heating capacities	Heating capacity ② (kW)	62,2	76,7	92,3	62,2	76,1	91,6	105,5	115,5	129,0	143,4	
	Power input ③ (kW)	18,2	21,8	26,6	17,4	20,9	25,5	31,2	35,3	39,1	43,6	
	COP performance	3,4	3,5	3,5	3,6	3,6	3,6	3,4	3,3	3,3	3,3	
Outdoor circuit fan	Nominal air flow (m³/h)	30.000						42.000				
	Available static pressure (mm.a.c)	4										
	Type	Axial										
	Number	2						4				
	Diameter (mm)	2 x 800						2 x 630 + 2 x 800				
	Output (kW)	2 x 2,0 / 1,3						2 x 0,7 / 0,4 + 2 x 2,0 / 1,3				
	Speed (r.p.m.)	895 / 685						875 / 650 895 / 685				
Indoor circuit outlet fan	Nominal air flow (m³/h)	12.000	14.300	15.900	12.000	14.300	15.900	18.000	18.200	20.400	24.000	
	Available static pressure (mm.a.c)	12	12	12	12	12	12	12	12	15	15	
	Type	Centrifugal										
	Number / no. turbines	2 / 2										
	Motor output (kW)	2 x 1,5	2 x 2,2	2 x 3	2 x 1,1	2 x 2,2	2 x 2,2	2 x 2,2	2 x 2,2	2 x 3	2 x 4	
	Power input (kW)	2 x 1,13	2 x 1,67	2 x 2,11	2 x 0,93	2 x 1,35	2 x 1,68	2 x 1,70	2 x 1,74	2 x 2,40	2 x 3,42	
	Speed (r.p.m.)	847	939	995	762	829	870	708	713	790	860	
Compressor	Type	Scroll										
	Number of compressors	2										
	Number of circuits	2										
	Number stages	2										
	Oil type	Copeland 3MAF 32cST, Danfoss POE 160SZ, ICI Emkarate RL 32CF, Mobil EAL Artic 22CC										
	Volume of oil (l)	2 x 3,3	2 x 3,3	2 x 6,2	2 x 3,3	2 x 3,3	2 x 6,2	2 x 6,2	2 x 6,2	2 x 6,2	2 x 6,2	
Gas burner	Gas type	Natural or propane										
	Standard model	PCH-72				PCH-200						
	Max. heating capacity (kW)	73				197						
	Pressure drop (mm.a.c)	11,4	16,2	20,0	5,7	8,1	10,0	12,8	13,1	16,5	22,8	
Electrical characteristics	Electrical power supply	400 V / III ph / 50 Hz (±5%)										
	Power supply	3 Wires + Ground										
Maximum absorbed current	Compressor(s) (A)	58,0	70,0	72,0	58,0	70,0	72,0	87,0	102,0	116,0	130,0	
	Outdoor fan(s) (A)	8,6	8,6	8,6	8,6	8,6	8,6	11,2	11,2	11,2	11,2	
	Indoor fan (A)	7,2	10,0	13,8	5,4	10,0	10,0	10,0	10,0	13,8	18,0	
	Control (A)	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	
	Total (A)	75,8	90,6	96,4	74,0	90,6	92,6	110,2	125,2	143,0	161,2	
Refrigerant	Type	R-410A										
	Global warming potential (GWP) ④	1.720										
	Load (kg)	18,4	19,8	27,0	18,8	20,1	27,4	42,5	42,4	51,0	51,0	
Dimensions	Length (mm)	3.326				3.926			4.816			
	Width (mm)	2.205				2.205			2.205			
	Height (mm)	2.095				2.095			2.095			
Weight	(kg)	1.497	1.581	1.717	1.723	1.806	1.942	2.360	2.402	2.459	2.512	
Condensate outlet Ø		1 1/4" adaptor										

① Cooling capacity calculated in accordance with the UNE-EN-14511 standard given for indoor temperature conditions 27°C, 50% RH and 35°C outdoor temperature.

② Heating capacity calculated in accordance with the UNE-EN-14511 standard given for indoor temperature conditions 20°C and 6°C WB outdoor temperature.

③ Total power input by compressor and motorised fans under nominal conditions, calculated in accordance with the UNE-EN-14511 standard.

④ Climatic warming potential of a kilogram of fluorinated greenhouse gas in relation to a kilogram of carbon dioxide over a period of 100 years.



Air-air rooftop units with a built in gas burner

4. GENERAL RECOMMENDATIONS

Delivery of the unit

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

Unit identification

All units bear, legibly and indelibly, a data plate located in a prime space, with the following data:

Ref. Produit\Item Nbr		Designation\Description	
Order Nbr		Model	
An.Year	No Serie\Serial Nbr	No Produit	
	Manufacturing Nbr		
Refrigerant	kW Absorbee\input kW	Poids\Weight	
Refrigerant type		Weight in operation	
Refrigerant kg	Tension\Voltage	Temperature Maxi C	
	Line voltage		
BP Mini PSM/MOP	Intensité\Current A	IP	
Low pressure			
HP Maxi PSM/MOP	Int.. Kit Elect.	No CE	
High pressure	Electrical kit current		
		30, av JeanFalconnier 01350 CULOZ Tel : 33(0)4 79 42 42 42	
		Made in Spain	



Note: The serial number must be used in all communications regarding the unit.

For the gas burner the unit includes a second nameplate with its features:

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"/>

Documentation provided

The following documentation is provided with the Space PG unit:

- This brochure for the installation, operation and maintenance.
- Electrical diagram: this diagram must be consulted for the electrical connections of the Space PG unit.
- AVANT Pro electronic control brochure.
- Communications brochure for the AVANT PRO electronic control (in case the Space PG unit is connected to a pLAN network or to a BMS monitoring system).
- Manufacturer's installation and maintenance brochure (APENGROUP) for the burners in the PCH series.
- CE marking certificate.
- CIAT warranty document.

Location

These units are prepared for rooftop 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.

Installation

The Space PG units with built-in gas burner are to be installed in accordance with the applicable gas unit regulations and norms in force in the country of use.

Check that the supply, type, pressure and flow rate of the gas are compatible with the specifications on the burner rating plate. For safety and maintenance purposes, ensure that the aforementioned specifications are observed.

Unit maintenance

The unit is to be inspected annually by a qualified technician. He will check all the gas and electrical connections and make sure that the burner motor and safety devices and control systems are in good working order.



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.

Safety advice

To avoid accidents during installation, commissioning or maintenance, it is required to take into consideration the units specifications: refrigerated circuits under pressure, refrigerant presence, voltage presence and implantation.

Because of all of this, only qualified and experienced personnel can perform maintenance tasks or unit repairs.



It is required to follow the recommendations and instructions in the maintenance brochures, the labels, and the specific instructions. It is necessary to comply with the norms and regulations in effect.



The compressor surfaces, the lines and hot components on the gas burner can reach temperatures above 100°C, causing physical burns. In the same fashion, under certain conditions these surfaces can reach very cold temperatures that can cause freezing risks.



Use safety gloves and gloves whilst working. Be careful with sharp parts or elements in the unit.



Caution: Before intervening in the unit, verify that the main power to the unit is cut off. An electric shock can cause personal damage.



Note: In order to recycle these units follow the stipulations of directives (EC) No. 96/2002 and No. 108/2003 regarding electrical and electronic equipment and the management of the resulting waste.

Refrigerant safety

A periodical check must be performed for refrigerant gas leaks as per Regulation (CE) N°842/2006 over *certain greenhouse effect fluoride gases*.

These units work with refrigerant gas

R 410A

Components	R-32	R-125
Chemical formula	CH2F2	CHF2CF3
Weight ratio	50%	50%
Unitary global warming potential (GWP)	650	2.800
Global warming potential (GWP)	1.720	

Refrigerant leaks:

- Toxicity: According to ASHRAE 34, R-410A belongs to the A1/A1 group with high safety both in the mix and also in the case of a leak.
- Although it is not toxic, in case of a leak to atmospheric pressure the liquid phase evaporates. The resulting vapours are heavier than air and can displace the technician local air. In case of an accidental discharge in a closed enclosure, fans must be used to eliminate said vapours.
- Although the R-410A is not flammable, when in contact with a flame or hot spot it can decompose thus producing fluorhydric acid HF and fluophosgene COF₂ which are highly toxic and corrosive.
- To detect leaks, an electronic leak detector, an ultraviolet lamp or soapy water must be used. Flame detectors do not help.



Note: Repair immediately any refrigerant leak, using recovery unit specific for R-410A that avoids a possible mixture of refrigerants and/or oils.

Burner safety

The gas burner has a built-in maximum safety system which cuts off the supply of gas to the burner should the flame go out. Ensure that no objects impair the supply of air to the burner.



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

Natural or propane gas leaks in the burner:

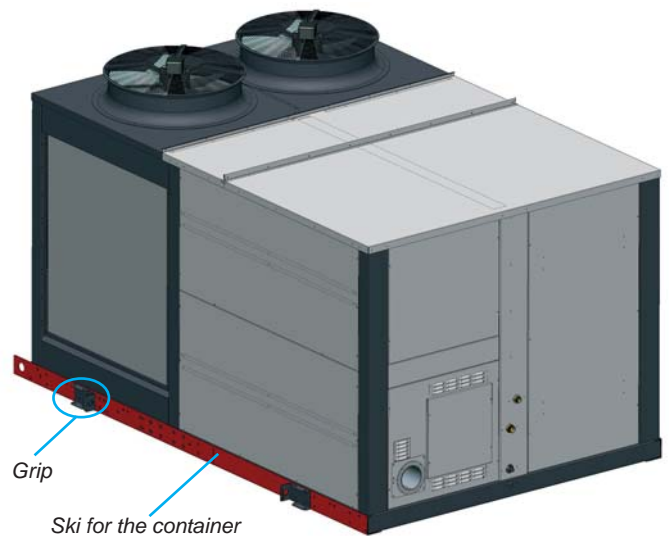
- Do not operate electric switches or other objects which could cause sparks.
- Close the gas supply valve.
- Improve the ventilation if the burner is located in a closed area.
- Ensure that there is no one in the vicinity of the leak and request the intervention of site staff.

5. TRANSPORT

The unit must be handled with care to avoid transport damage. Thus we recommend:

- For transport in a container, one must be selected that has an easy load and unload to the installation location.
- Do not dispose of the pallet or the packaging materials until the unit is in its final location.

Note: the skis for closed container transport can be removed by unscrewing them from the unit struts.



- The unit can be handled with a forklift truck, taking all necessary precautions to avoid sliding of the unit on the truck's fork.
- The unit must be lifted and fixed with care and without inclination (maximum inclination 15°), since it could harm its operation. Please refer to the gravity centre coordinates of each model in accordance with the assembly.
- For the transport and lifting to the roof using a crane cloth slings with rings will be used, with the appropriate resistance, separated by a strut to avoid damaging the casing. These slings are attached to the grips on the strut.



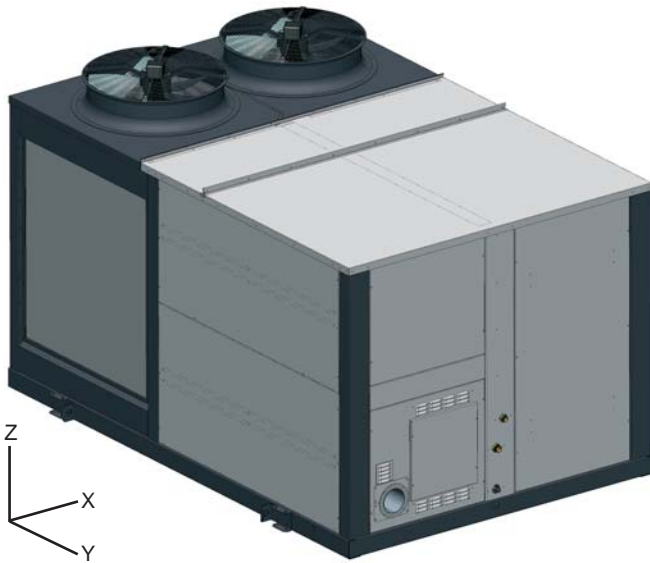
Attention: Check that the grips are perfectly screwed in before attaching the slings.

- After the placing of the unit, it is recommended to remove the grips as they can be a hindrance for maintenance. Put them back in case of unit transport.



Air-air rooftop units with a built in gas burner

Gravity centre



Space PG	Assembly	Centre of gravity (mm)			Weight ① (kg)
		X	Y	Z	
241	MO	1062	1310	830	1497
	MS	1127	1355	832	1578
	MA / MC0	1193	1385	804	1705
321	MO	1062	1310	830	1581
	MS	1127	1355	832	1662
	MA / MC0	1193	1385	804	1789
361	MO	1062	1310	830	1717
	MS	1127	1355	832	1798
	MA / MC0	1193	1385	804	1925
242	MO	1100	1300	845	1723
	MS	1165	1345	847	1805
	MA / MC0	1223	1386	776	1925
322	MO	1100	1300	845	1806
	MS	1165	1345	847	1888
	MA / MC0	1223	1386	776	2008
362	MO	1100	1300	845	1942
	MS	1165	1345	847	2024
	MA / MC0	1223	1386	776	2144
420	M0	1024	2300	794	2360
	MS	1085	2353	804	2458
	MA / MC0	1186	2469	746	2724
485	M0	1024	2300	794	2402
	MS	1085	2353	804	2500
	MA / MC0	1186	2469	746	2766
540	M0	1024	2300	794	2459
	MS	1085	2353	804	2557
	MA / MC0	1186	2469	746	2823
600	M0	1024	2300	794	2512
	MS	1085	2353	804	2610
	MA / MC0	1186	2469	746	2876

① The unit weight includes the burner installed as standard which matches the heaviest one amongst those available.

6. LOCATION AND ASSEMBLING

Location designation

Before moving the unit, make sure that all panels are fastened in place. Lift and lower with care.

When choosing the location, in any way 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.
- The area where the unit will be located must be perfectly accessible for cleaning and maintenance operations (check minimum free space for maintenance). Leave enough space for air circulation around the unit.
- Foresee appropriate damping devices throughout the installation to ensure that noise and vibration transmission is avoided (refer to the section "Anti-vibration Anchoring").
- Check that the structure can withstand the weight of the unit.
- 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.
 - Avoid placing obstacles in the air outlet 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 install the unit in a closed enclosure or in conditions that originate air recirculation.
 - The chosen location must not flood and must be above the average height the snow reaches in that region.
 - All models can be installed on the floor or on a brick frame or steel profile (see optional preassembly frames in chapter 11). In any case, check that the unit is perfectly level.

Sound Level

These units are designed to work with a low acoustic level. In any case, in the design of the installation the outdoor environment, the kind of building for the noise transmitted in the air and the solid elements for the vibration transmission must be taken into consideration for the acoustic radiation. If necessary, commission a study by an acoustic technician.

■ Sound power level

Space PG	241	321	361	242	322	362	420	485	540	600
Total dB(A)	90	90	91	88	88	89	94	95	95	95

Note: The sound power spectrums can be consulted in the technical brochure for the Space PG series.

■ Sound pressure level

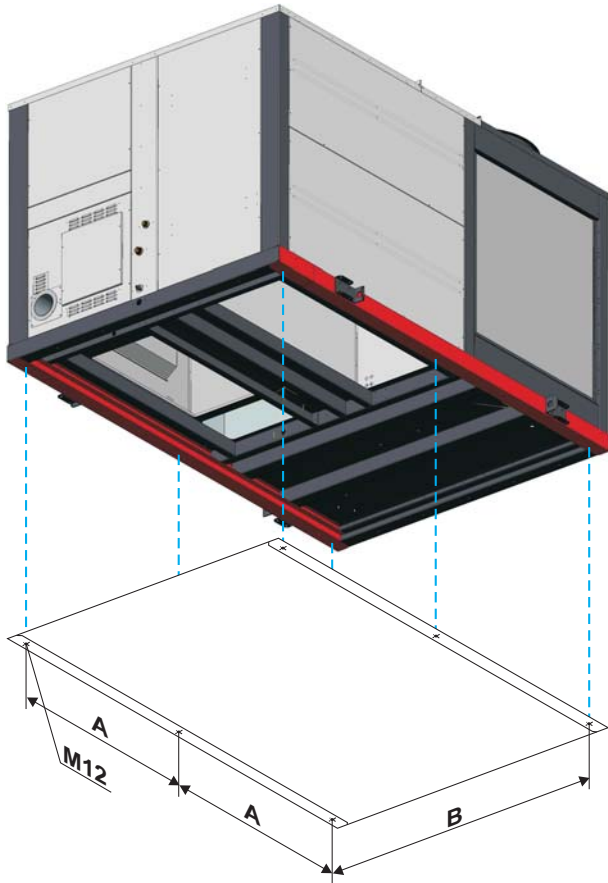
Measurement conditions: in free field, measured at a distance of 5 metres, directivity 2 and at 1.5 metres from the ground.

Space PG	241	321	361	242	322	362	420	485	540	600
Total dB(A)	63	63	64	61	61	62	67	67	67	67

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.

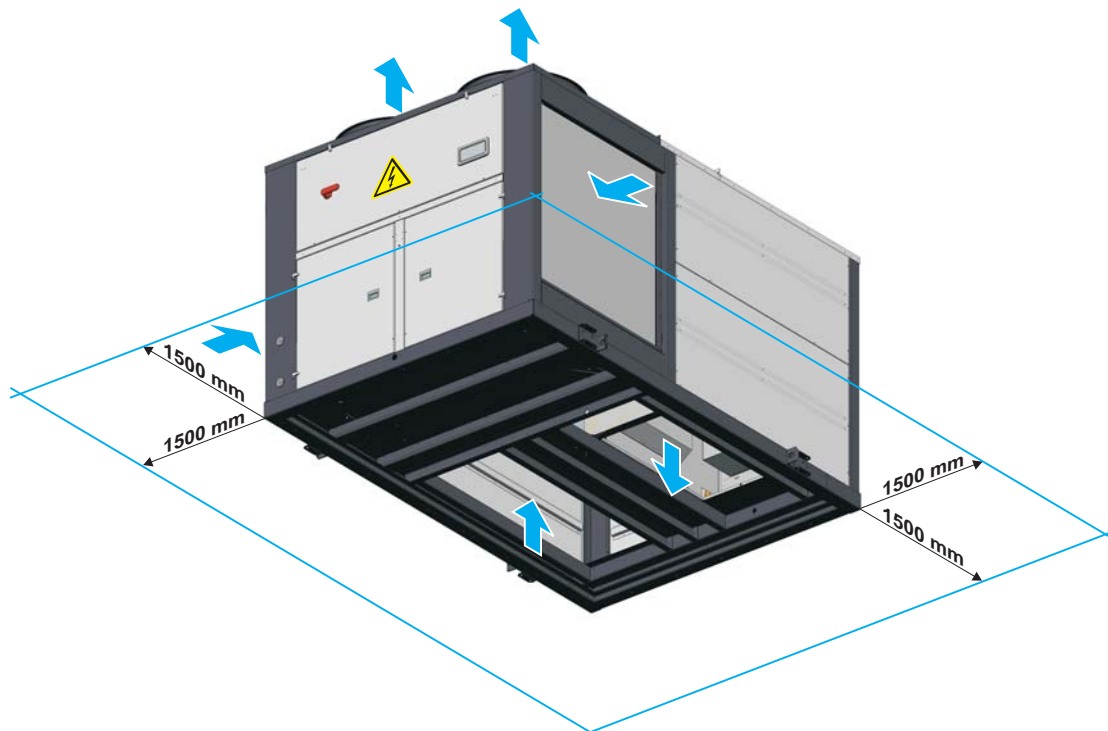
Anchorage for antivibrators

When selecting antivibration mounts both the unit weight and reactions in the supports must be taken in account and are featured in the following table.



Space PG	Assembly	A (mm)	B (mm)	Reactions in the supports (kg)						Weight (kg)
				R1	R2	R3	R4	R5	R6	
241	MO	1545	2095	100	349	271	119	368	290	1497
	MS	1545	2095	133	384	290	121	372	278	1578
	MA/MC0	1545	2095	170	433	323	121	384	274	1705
321	MO	1545	2095	105	369	286	126	389	306	1581
	MS	1545	2095	140	405	306	127	392	293	1662
	MA/MC0	1545	2095	178	454	339	127	403	288	1789
361	MO	1545	2095	114	400	311	137	422	333	1717
	MS	1545	2095	152	438	331	137	424	317	1798
	MA/MC0	1545	2095	192	489	365	136	433	310	1925
242	MO	1845	2095	69	412	378	70	413	380	1723
	MS	1845	2095	102	450	404	66	414	368	1805
	MA/MC0	1845	2095	137	498	438	63	424	364	1925
322	MO	1845	2095	72	432	397	74	433	398	1806
	MS	1845	2095	107	471	423	69	434	385	1888
	MA/MC0	1845	2095	143	520	457	66	443	380	2008
362	MO	1845	2095	78	464	427	79	466	428	1942
	MS	1845	2095	114	505	453	74	465	413	2024
	MA/MC0	1845	2095	153	555	488	70	473	406	2144
420	M0	2290	2095	250	536	306	309	595	365	2360
	MS	2290	2095	298	582	328	312	596	342	2458
	MA/MC0	2290	2095	409	689	373	337	616	300	2724
485	M0	2290	2095	254	545	311	314	605	371	2402
	MS	2290	2095	304	592	334	317	606	347	2500
	MA/MC0	2290	2095	415	699	378	342	626	305	2766
540	M0	2290	2095	260	558	318	322	620	380	2459
	MS	2290	2095	310	605	341	325	620	355	2557
	MA/MC0	2290	2095	424	714	386	349	639	311	2823
600	M0	2290	2095	266	570	325	329	633	388	2512
	MS	2290	2095	317	618	348	331	633	363	2610
	MA/MC0	2290	2095	432	727	394	355	651	317	2876

Minimum free space for commissioning and maintenance operations





Air-air rooftop units with a built in gas burner

7. GAS BURNER

Operating principle

Connection / disconnection of the burner

When heating is required (A), the burner remote control starts the working cycle of the modulation board which activates the flame control device. This device starts up the burner combustion air fan (A), thus starting an air current in the combustion chamber for a preset period of time.

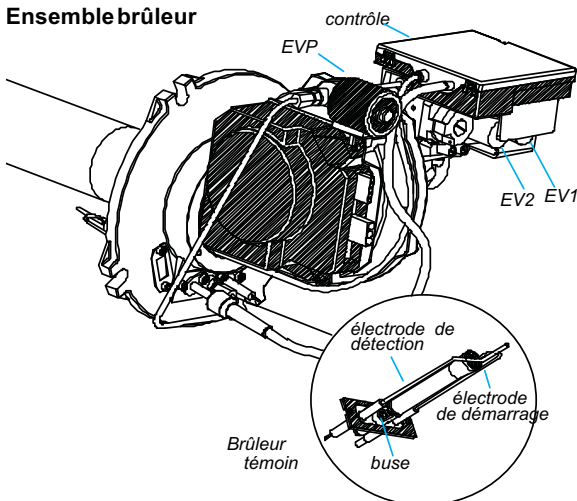
When this phase has been completed the ignition cycle begins: the electromagnetic valve EV1 opens at the same time as the EVP valve (B), supplying the pilot burner. When the device detects the pilot flame it will open the main gas valve EV2 (C) to supply the main burner.

The pilot and main burner will work together for a short period of time. After this, the modulation board will close the electromagnetic valve EVP (D) and disconnect the pilot burner.

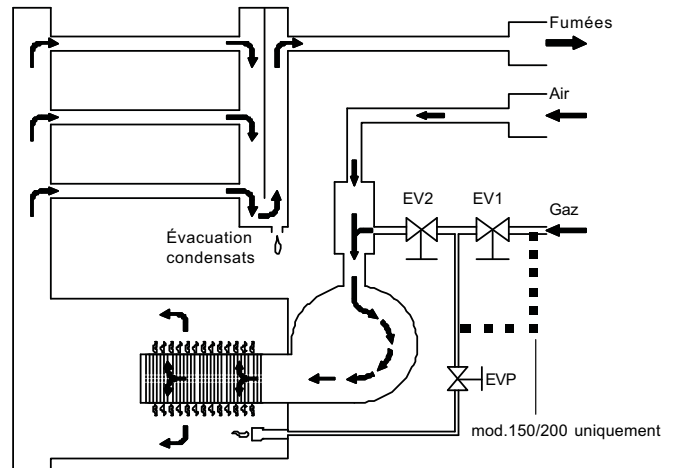
The one electrode only guarantees the detection of the flame for the pilot and main burner.

	A	BC	D	E	F
NC	■	■	■	■	■
NA	■	■	■	■	■
DN	■	■	■	■	■
OFF	■	■	■	■	■
DN	■	■	■	■	■
OFF	■	■	■	■	■
DN	■	■	■	■	■
OFF	■	■	■	■	■
DN	■	■	■	■	■
OFF	■	■	■	■	■

Ensemble brûleur



The ignition cycle connects the burner to half capacity (approx. 70% of its maximum thermal capacity). Two minutes after starting the burner reduces its capacity to the minimum and as from this moment starts to have modulating control (0-10Vdc) in accordance with the installation requirements.



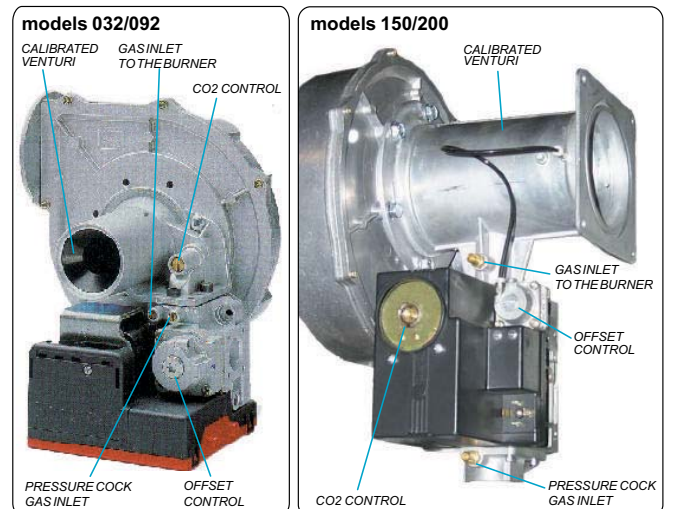
Operation of the air-gas premix

The air and the gas mix inside the vanes of the motor fan assembly. The air inlet is achieved via a calibrated Venturi pipe from which the gas is taken in.

The air/gas pressure ratio is 1:1 and can be adjusted by turning the offset screw in the gas valve. The burner is supplied with the offset set and the screw sealed.

The burner can also be regulated by adjusting the screw located above the Venturi which establishes the maximum air flow rate value and, as such, determines the carbon dioxide content in the condensates. This screw is factory-set and must not be touched, although it is not sealed thus allowing a changeover to another type of gas (before doing so this must be consulted).

The modulation board installed in the burner regulates the fan speed (in direct current) in accordance with the requirements of thermal capacity. The gas flow rate changes at the same time as the variation in the motor speed. The minimum and maximum values for the motor speed are stipulated on the plate and cannot be changed.



Control of the gas burner

AVANT Pro electronic control

The electronic control of the Space PG unit, **AVANT Pro**, is managed by the gas burner as a support element for the heating:

- In COOLING only devices, the control activates the burner the same way as an electrical heater stage.
- In heat pump units, three different methods can be selected (using the screen) to activate the burner:
 - Operation after the compressors.
 - Operation instead of the compressors.
 - Operation instead of the compressors if the outdoor temperature is less than a set value (5°C by default).

The burner is activated using an ON/OFF signal (digital output NO6 of connector J13 on the diagram enclosed), depending on the return air temperature.

The AVANT Pro control also regulates the burner's thermal capacity in accordance with the return air temperature, however whilst always taking into account the outlet air temperature. The control compares both temperatures and, even if there is a high demand for the burner power, if the outlet temperature is high it limits the power supplied by it. The control also analyses the temperature measured by the ambient probe by limiting the difference with the outlet temperature. The simultaneous analysis of these temperatures avoids the stratification of the hot air masses and the feeling of thermal comfort is improved.

The power control is carried out using a proportional output 0/10V (output Y2 of connector J4 on the diagram enclosed) where the proportional burner actuator is connected.

The control also sets a maximum safety value for the outlet air temperature, 55°C by default, above which the burner shuts down.

Burner remote control

The **burner remote control** is the one that manages the operation of the burner depending on the signal received from the AVANT Pro Control through a modulating control (0-10Vcc).

On the burner remote control screen the instantaneous voltage transmitted to the control plate is displayed:

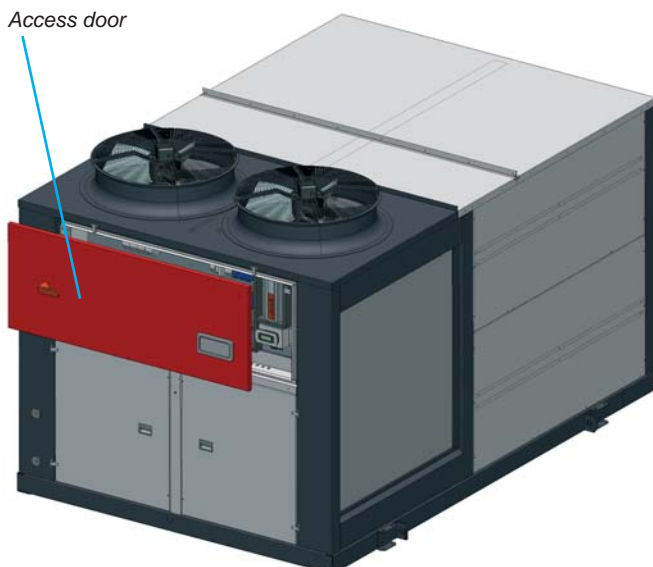


Unit switched on Gas in operation Instantaneous voltage display screen

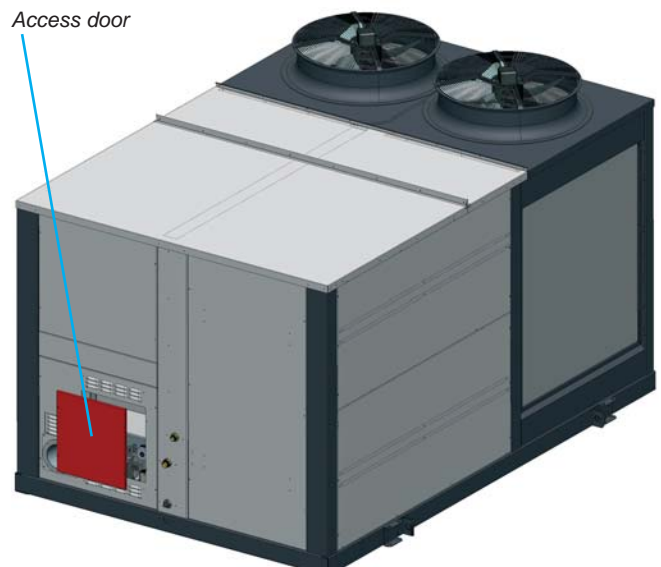
The burner remote control is also responsible for managing the safety devices. In the event of failure, the AVANT Pro control will be sent a failure signal (digital input ID6 from connector J5 on the diagram enclosed) which is only for indication purposes.

In addition to the burner's safety devices, the AVANT Pro control allows incorporating complementary safety elements in the unit for the detection of smoke, clogged filters etc. (consult the section on "Safety Devices in the Space PG Unit").

Main electric panel (AVANT Pro electronic control).



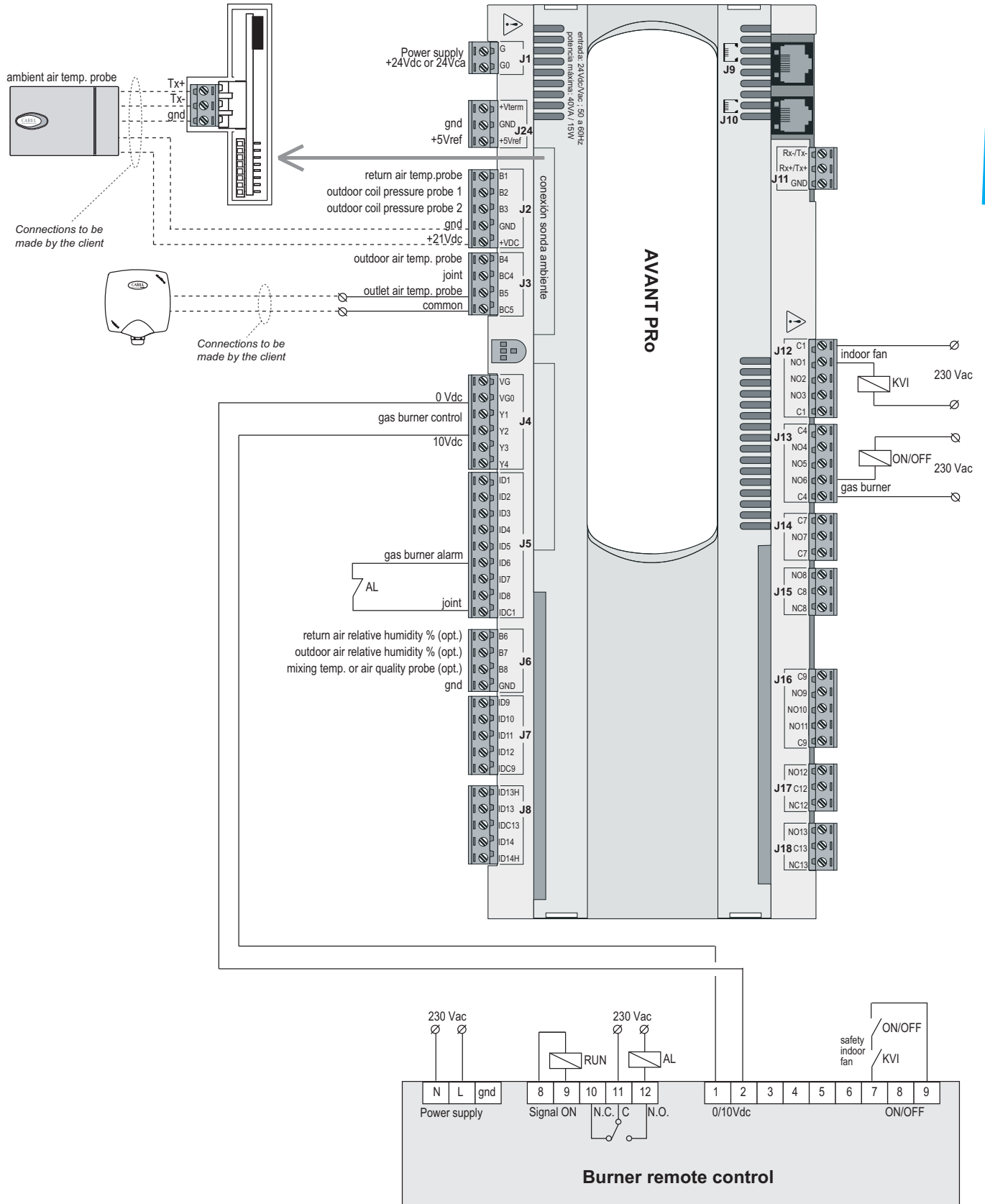
Auxiliary electric panel (burner remote control):





Air-air rooftop units with a built in gas burner

Wiring diagram:



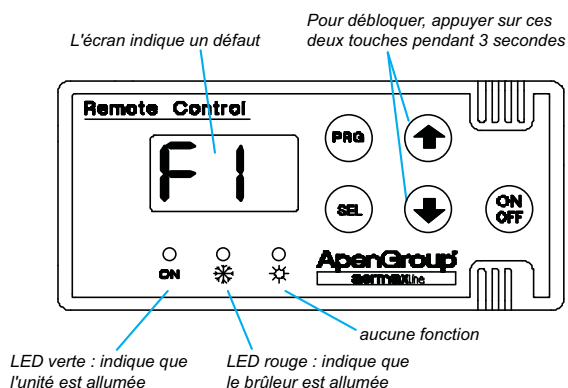
8. SAFETY ELEMENTS

Safety devices in the gas burner

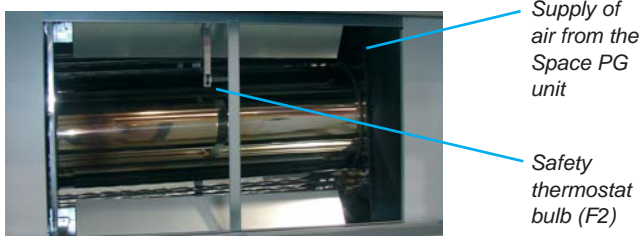
The burner remote control manages the burner protection devices by detecting and indicating the following operating faults on its display:

Indication	Failure	Problem
F1	The burner does not start.	Reversed phase and neutral. No gas supply. Connection without neutral. No ground connection. Problems with the flame detection electrode. The electrode nozzle is dirty or its diameter is incorrect.
F2	Safety thermostat	High temperature in the exchanger. Faulty thermostat bulb. Presence of smoke.
	Differential air pressostat	The plastic conduit that enters the pressostat is disconnected. The discharge pipe and / or air inlet pipe is (are) blocked. Pressostat fault.
F3	The fan does not start	The fan wiring is wrong or disconnected. The voltage values for the modulation are outside the range. Failure in the fan motor.
F4, F5, F6	Unused	
F7	No serial communication	The remote control is disconnected.
F8	The flame control device does not work	The flame control device is disconnected or broken.

Blocks F1, F2, F3 and F8 are triggered by safety devices and require manual resetting. To unblock press the up and down keys for 3 seconds at the same time.

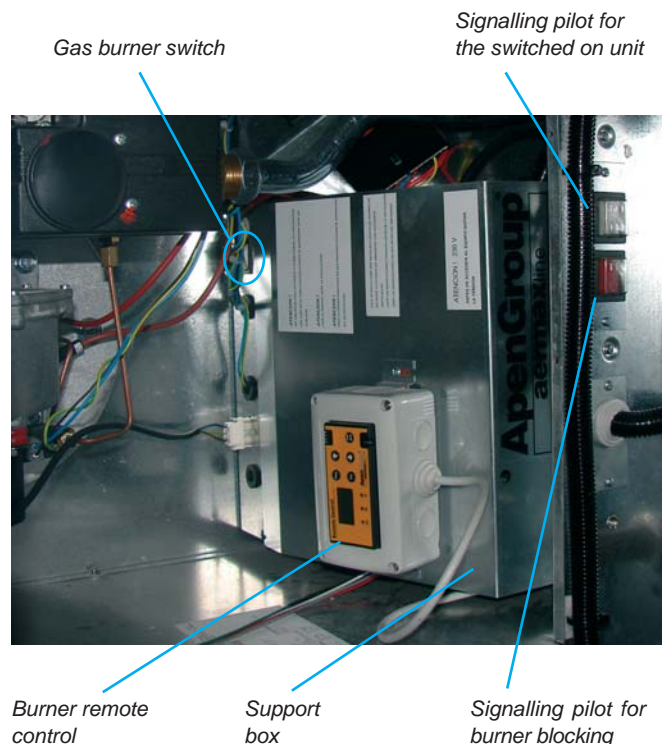


The F2 blocking can be triggered when the safety thermostat bulb detects an excessive temperature in the inlet air to the burner. The following figure shows the position of the aforementioned bulb:

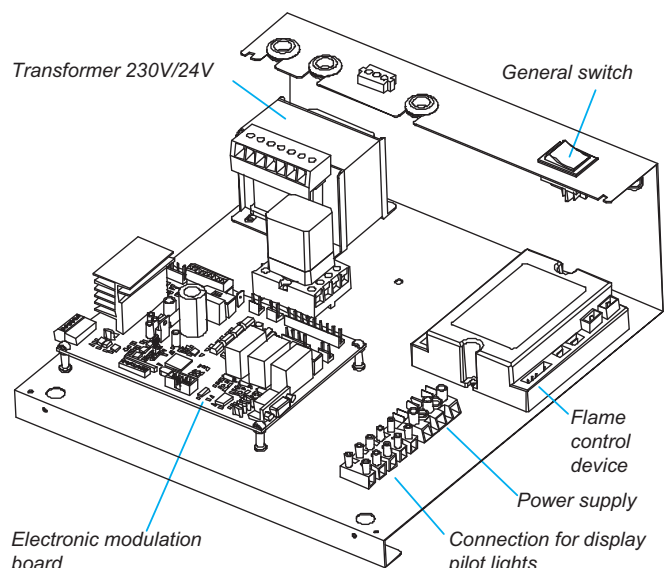


In the event of failure, the burner control will send the AVANT Pro control a safety signal which will only be used as an indication (see the electrical connections diagram in the previous chapter).

In order to access the gas burner control remove the door from the auxiliary electric panel:



By removing the support box for the remote control access is gained to the modulation board (0-10Vcc) and to the flame control device:





Air-air rooftop units with a built in gas burner

Safety devices in the Space PG unit

Low pressure pressostat

When connected to the compressor suction, it will stop its operation when the pressure at that point goes down below the tare value (caused by obstructions in the circuit, excessive dirt in the filters, fan stop or ice formation in the evaporator).



It disconnects at 2 bar and it is automatically reactivated.

High pressure pressostat

Connected to the compressor discharge, it will stop its operation when the pressure at that point reaches the setpoint. It disconnects at 42 bar and it is automatically reactivated.



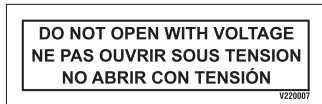
Safeties at the compressor

The scroll type compressor that these units as standard have the following safeties:

- Non-return valve built into the compressor.
- Klixon in the compressor, which stops the operation of the motor when there is excessive heating.

Main door switch

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



Magnetothermals for line protection

They are located at the beginning of the power lines of the compressor and motorised fans to protect them.

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).

Anti-fire safety device

This safety device, integrated in the control, shuts down the unit if the probe located in the return detects an air inlet temperature above 60°C. The unit will not return to operation until this temperature drops under 40°C.

Defrost control

This safety element is intended to eliminate ice which could accumulate in the outdoor coil when the unit is working in the heating CYCLE. Defrosting is carried out by the control depending on the value measured by the sensors on the outdoor coils and the time set between defrosting operations.

Condensation and evaporation pressure control

This safety element, integrated in the control, enables managing the outdoor fans 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 stations.

Control of air flow

Differential pressostat that measures the flow variation in the air outlet. This allows the detection of fan belt breakages, since the fan relay only detects operating faults that have arisen in the motor. This pressostat is installed in the factory in the auxiliary electric panel.

Protection of the electric panel (optional)

Anti-freeze protection for low outdoor temperatures with electric heater. This safety device is compulsory when the outdoor conditions guarantee an air inlet temperature to the burner which is less than -15°C.

Clogged filter detector (optional)

Differential pressostat for indication of maintenance to filters. Automatic reactivation. It is installed in the auxiliary electric panel.

Smoke detector (optional)

This smoke detection station 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. The station is installed in the factory in the auxiliary electric panel.



Smoke detecting probe
Smoke detecting station

Air quality probe (optional)

This probe is for installation in the environment or in duct to enable measuring CO₂ and/or volatile compounds.

This probe is to be connected by the client. The clamps on the terminal board on the main panel used for the connection are indicated on the wiring diagram provided with the unit.

This probe is supplied inside the main electric panel.

9. CHECKING BEFORE COMMISSIONING



Note: Under no circumstance should the unit be started without having read the brochure completely.

Electrical Connections

In order to establish the unit's electric power supply (cable inlet, calculation of the lead section, protection devices etc.), refer to:

- The information supplied in this document (table of technical characteristics).
- Data plate.
- The wiring diagram and the legend supplied with the unit.
- The AVANT Pro electronic control brochure which is also supplied with the unit.
- The regulations and norms in force which regulate the installation of air-conditioning units and electric receivers.

The electric power supply of the unit must be sized in accordance with the maximum power absorbed by the unit taking into account all the options it features (if necessary, refer to the technical brochure).



Note: All the connections to be established on site are the responsibility of the engineer and are indicated on the unit wiring diagram.



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.



The installer must fix line protection elements according to the effective legislation.

Before putting the unit into operation also check the following:

- Check the condition of the electrical connections and that they are correct (an electrical diagram is included with each unit, along with its legend).
- That the electrical power supply remains constant and that it corresponds to that featured on the unit data plate.
- That they are no cables close to heat sources.
- The correct connection of all the sensors supplied with the unit. The connection of the outlet temperature and ambient temperature probes must be established on-site. These probes are supplied inside the main electric panel.

ambient probe



outlet probe



Connection of the outlet temperature probe:

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 connection of the probe to the corresponding clamps on the control board (see wiring diagram) will be carried out with a cable with two wires measuring 1mm².

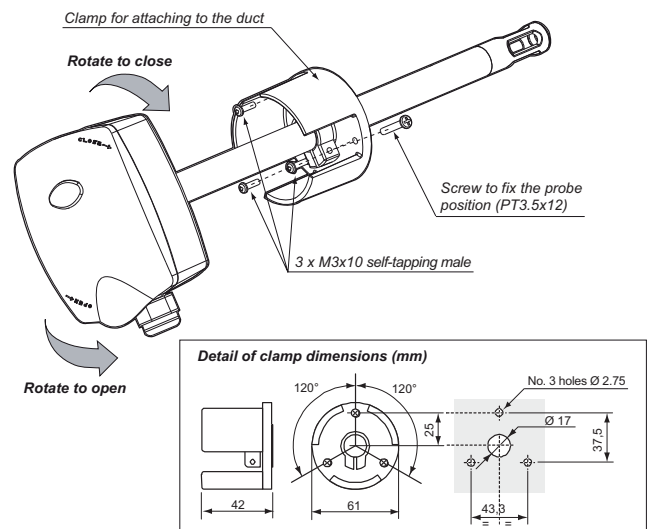


View of the probe without cover (rotate the cover anti-clockwise)



View of the probe interior (connection of 2 wires in the terminal board)

In order to fix the probe to the duct a clamp will be used which is supplied with the probe as shown in the figure below:



Gas Burner



Caution: During the installation work and when adjusting the burner the gas pipe must be unloaded.

- With regard to the **electric supply**, check:
 - The correct neutral and phase connection. If they are reversed the flame control prevents operation.
 - The correct adjustment of the burner control and regulation devices.

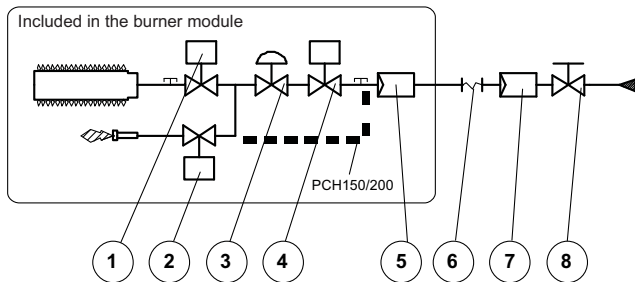
Air-air rooftop units with a built in gas burner

- With regard to the **gas supply**:

The burner module includes the following elements: solenoid valves, stabiliser and safety valve (see diagram).

To complete the installation a gasket must be fitted to dampen vibrations and a gas cock. It is also obligatory to install a gas filter with certification EN126 with a filtering level less than or equal to 50 microns, without pressure stabiliser for a high flow due to being assembled as standard with the gas valve.

For the gas power supply the burner has a bronze M 1" threaded drain junction.



Where:

1. Solenoid valve main burner (EV2)
2. Solenoid valve pilot burner (EVP)
3. Pressure stabiliser:
4. Solenoid safety valve (EV1)
5. Gas filter (small section)
6. Vibration damping gasket
7. Gas filter (large section)
8. Gas cock



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

- With regard to the **fuel**, check that:

- The gas supply network information is compatible with that indicated on the data plate and that the generator is supplied with the same type of fuel for which it has been manufactured.
- The aspiration of combustion air and the expulsion of smoke are free (presence of dirt, leaves etc.)
- The unit air flow rate is appropriate according to the data plate and the unit includes all the required safety elements in perfect condition.
- The fuel supply pressure is within the interval featured on the data plate.
- The supply line valves are open.
- There are no leaks in the gas line.



Note: The access panel to the burner includes two grilles for the recirculation of outdoor air in the case of a gas leak inside the module (see symbol **4** in the following figure).

- With regard to the **collection of condensates**:

These units are equipped with a junction for draining the burner condensates drain pan. Threaded connector M 3/4" in PVC (see symbol **3** in the following figure).

To facilitate drainage, the construction 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.



Group of sloping pipes

- With regard to the **smoke outlet**:

Smoke outlet connection type: category B23. *Inside diameter of the connection 146 mm and outside diameter 210 mm (symbol **6**).*



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

Chimney connection:

As a general indication, the chimney mouth must be located, as a minimum, 1 metre above the highest point of roofs, walls or any other distant obstacle at less than 10 metres. If the chimney mouth is located at a distance between 10 and 50 metres from any building it must be at a level of no less than the upper edge of the highest gap in the nearest building.

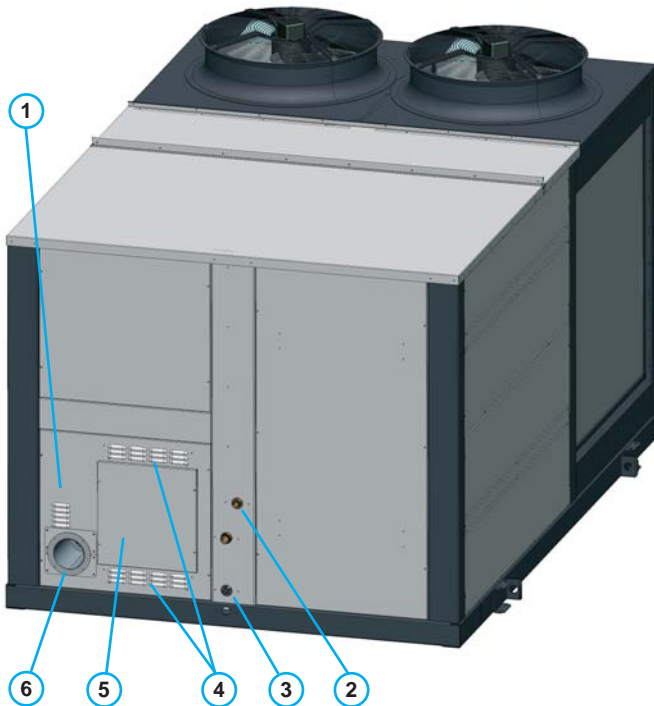
The materials used for the manufacture of the chimney are:

- Aluminium with a minimum thickness of 1.5 mm.
- Stainless steel with a minimum thickness of 0.6 mm (carbon content <2%).

Pipes with hermetic gaskets should be used to prevent any condensate leak. These gaskets must be prepared for working over a temperature range of 30°C to 160°C.

These pipes must also be insulated to protect those who could accidentally touch them from burns.

The following figure shows the gas burner connections:



Where:

1. Air inlet grilles to the burner (its design takes into account the removal of rainwater to the outside using the lower grille)
2. Gas power supply, junction M1"
3. Removal of burner condensate, junction M 3/4"
4. Grilles for the recirculation of outdoor air
5. Access panel to the auxiliary electric panel and to the burner remote control
6. Chimney connection (by the customer):
 \varnothing Indoor: 146 mm y \varnothing Outdoor: 210 mm

Air ducts connections

The air outlet 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:

- Bends in the discharge outlet 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, abrupt changes in direction must be avoided since they can cause 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.
- Flexible connections must be made between the ducts and the unit that avoid the noise and vibration transmission.

- No matter the type of ducts type to use, they must 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 in this respect must be observed.

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 (optional) check that in COOLING mode they adapt their speed according to the condensation pressure and in HEATING mode according to evaporation pressure.

ACHTUNG: VOR DER ÖFFNUNG DIESER PANEEL STROM ABSCHALTEN UND 2 MIN. WARTEN.

WARNING: BEFORE OPENING THIS PANEL SWITCH OFF THE ELECTRIC SUPPLY AND WAIT FOR 2 MIN.

ATTENTION: AVANT L'OUVERTURE DE CE PANNEAU COUPER L'ALIMENTATION ÉLECTRIQUE ET ATTENDRE 2 MIN.

ATTENZIONE: PRIMA DE APRIRE QUESTA PARETE INTERROMPERE L'ALIMENTAZIONE ELETTRICA E ASPETTARE 2 MIN.

ATENCIÓN: ANTES DE ABRIR LA PUERTA CORTAR LA ALIMENTACIÓN ELÉCTRICA Y ESPERAR 2 MIN.

V220087

Checks in the centrifugal fans

ACHTUNG: VOR DER ÖFFNUNG DIESER PANEEL STROM ABSCHALTEN UND 2 MIN. WARTEN.

WARNING: BEFORE OPENING THIS PANEL SWITCH OFF THE ELECTRIC SUPPLY AND WAIT FOR 2 MIN.

ATTENTION: AVANT L'OUVERTURE DE CE PANNEAU COUPER L'ALIMENTATION ÉLECTRIQUE ET ATTENDRE 2 MIN.

ATTENZIONE: PRIMA DE APRIRE QUESTA PARETE INTERROMPERE L'ALIMENTAZIONE ELETTRICA E ASPETTARE 2 MIN.

ATENCIÓN: ANTES DE ABRIR LA PUERTA CORTAR LA ALIMENTACIÓN ELÉCTRICA Y ESPERAR 2 MIN.

V220086



Air-air rooftop units with a built in gas burner

- 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 bends of the fan and the room is very important, so that the flows and pressures provided to the duct network are as required.

• Soft starter detail (optional):

The soft starter of the outlet fan extends the time to reach its regular speed. This is mainly intended for installations with fabric ducts.

It is installed in the factory in the auxiliary electric panel for motors up to 15kW.



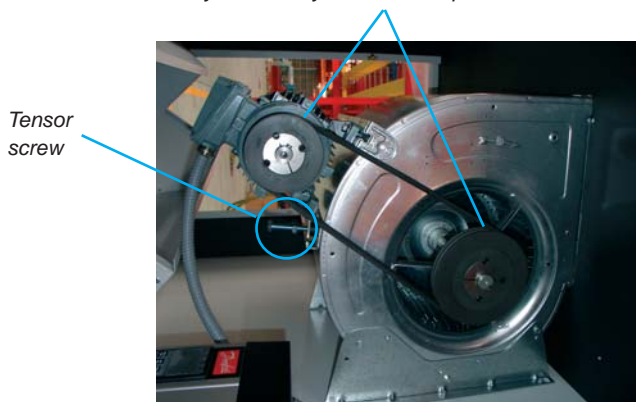
Pulley and belt adjustment

Centrifugal motorised fans in the indoor circuit are coupled using pulleys and belts. In this type of fans, the following must be taken into considerations:

- 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, remove the pulley screws, remove the pulley and, after removing the hub pin, it can be slid over the axle (this action can be performed both in the motor as well as in the fan).
- After fixing the pulleys on the same plane, the belt tension is made by tightening the tensor screw.
- The belt tension must be checked after 24 hours of motor operation.

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

Pulleys must stay on the same plane



Condensate drain connection

All the models are equipped with a junction for the draining of the condensates drain pan from the indoor circuit. Drain joint, made of bronze, gas thread M 1 1/4".

**CONNECT SIPHON
METTRE SIPHON
PONER SIFON**
V220014



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.



Siphon installation norms

- Check that the condensate outlet is not clogged.
- All water drain tubes must be provided with a siphon to avoid bad smell and water spills.

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

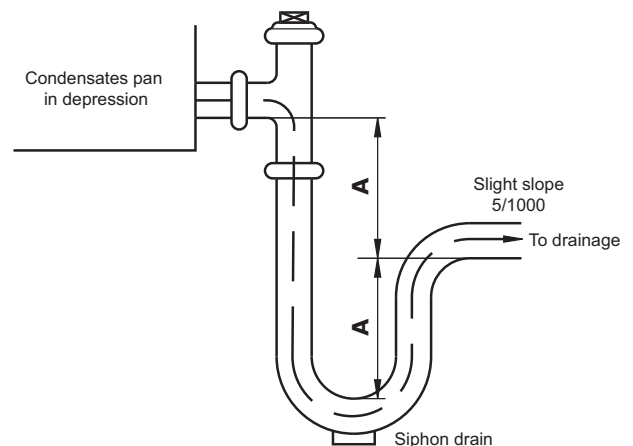
Pan in overpressure:

- It is installed to avoid the access through the drain tubing 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.a.c) where the condensates pan is placed.
- The drain tubing must be slightly sloped to ease circulation towards the drain.
- The original diameter of the tube must be respected. No reduction can be made.



Check the connection air tightness.

10. STARTING THE UNIT

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.
- Check that the electrical power supply matches the unit voltage and that its value lies within acceptable limits.
- It must also be verified that the electric installation has been carried out according to the electric wiring diagram provided with the unit (consult the chapter on "Checking before commissioning").
- Once the above verifications have been carried out, the control circuit is supplied with voltage by the automatic control switch. It is necessary to leave with voltage the compressor crankcase heater for 24 hours before starting the compressor.

WICHTIG: WIEDERBEHEIZUNG DER OLWANNE

BEI DER ERSTEN INBETRIEBSETZUNG ODER NACH EINER LANGEN STROMUNTERBRECHUNG BRINGEN SIE DIE MASCHINE UNTER SPANNUNG 24 STUNDEN LANG BEVOR SIE DEN(DIE) KOMPRESSOR(EN) EINSCHALTEN KOENNEN.

IMPORTANT: CRANKCASE HEATING

FOR THE FIRST START 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 MACCHINA 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

- When starting the compressors, check the subcooling and overheating and thus verify if the refrigerant load is appropriate to the operating conditions. To adjust the refrigerant load, a schrader valve is available on the liquid line.

R 410A

- Verify the absence of any leaks of the refrigerant.
- Check the unit operation and verify the safety elements.
- All the Space PG models are equipped with scroll type compressors and have a phase control relay. Verify that they turn in the correct direction 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**

V220040

Operational checks

Check the unit operation by verifying the electronic control and the safety elements.

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 table below) and 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.

COOLING mode			HEATING mode			
Compressor	Suction pressure	bar	Compressor	Suction pressure	bar	
	Suction temp. (1)	°C		Air evaporator	Suction temp. (1)	°C
	Condens. pressure	bar			Condens. pressure	bar
	Condens. temp. (2)	°C			Condens. temp. (2)	°C
Air condenser	Gas inlet temperature	°C	Air condenser		Gas inlet temperature	°C
	Gas outlet temp. (3)	°C		Gas outlet temp. (4)	°C	
	Air inlet temperature	°C		Air inlet temperature	°C	
	Outdoor temperature	°C		Outdoor temperature	°C	
Air evaporator	Air outlet temperature	°C	Air evaporator	Air outlet temperature	°C	
	Air inlet temperature	°C		Air inlet temperature	°C	
	Gas inlet temperature	°C		Gas inlet temperature	°C	
	Evap. outlet temp. (4)	°C		Gas outlet temp. (3)	°C	
Subcooling (2) - (3)		°C	Subcooling (2) - (3)		°C	
Overheating (4) - (1)		°C	Overheating (4) - (1)		°C	

Possible problems at commissioning

All indications given in this brochure 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, originated by a high pressure drop in the ducts, or by other causes that impede the correct air 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.

11. OPTIONS

Pre-assembly frames (optional)

The units can be attached to standardised preassembled frames with adjustable height, built in galvanised steel panelling with thermal insulation. For more information please consult the specific brochure for the frames.



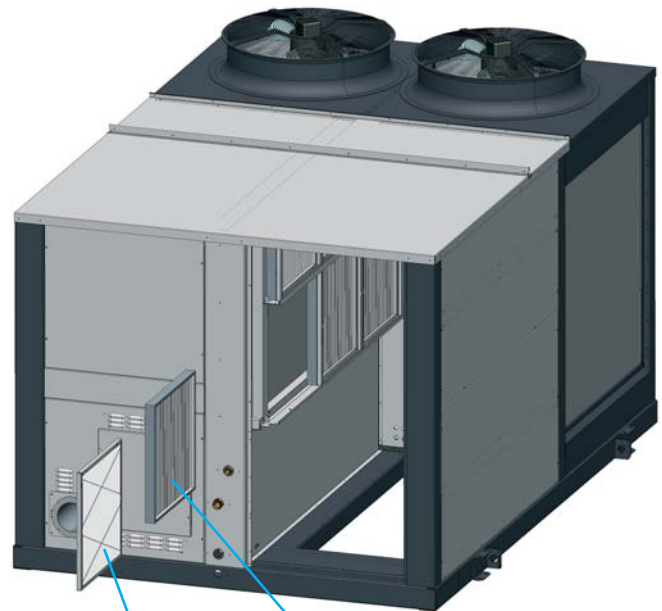
Control system



The installation of the following options causes pressure drops at air level which means this has to be taken into account in the selection of higher pressure fans (optional) or in the substitution of the standard pulley set with a new set that generates a higher turn speed to the pad. Both the fan performance curves, as well as the pressure drop graphs in the options, can be consulted in the technical brochure for the Space PG series.

Filters

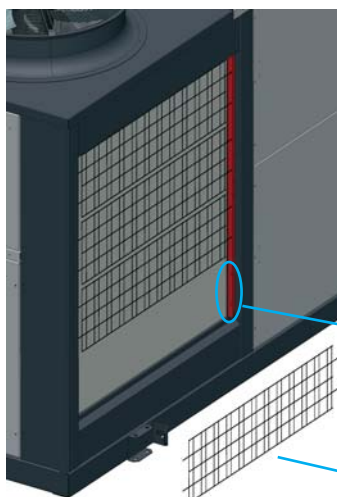
All model types can substitute the filtering mesh that the units include regularly with G4 rating, mounted on the same frames. Also, creased opacimetric ceramic F6 to F9 rating filters can be added.



Gravimetric filters

Creased opacimetric filters

Outdoor coil protection grille

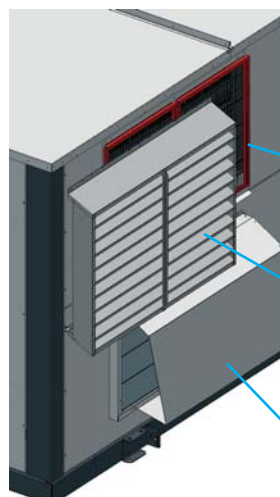


All the models can include a protection grille for this coil. This grille is fixed by modules in the holes made for this goal in the unit's support.

Holes

Grille module

Stop-drop



The units with outdoor air intake can include a stop-drop in this intake.

Stop-drop

Outdoor air damper (displaced)

Air outlet damper

12. MAINTENANCE

The minimal maintenance operations and their periodicity will be made according to the national regulations.

Any intervention on the electric cooling components must be made by a qualified and authorized technician.



Caution: Before intervening in the unit, cut off main power.

Recommendations:

In general, a corrosion control must be performed on the metallic parts of the unit (frame, bodywork, exchangers, electric panel, etc.). All the electric connection states must be checked as well, as well as the air tightness of the different circuits.

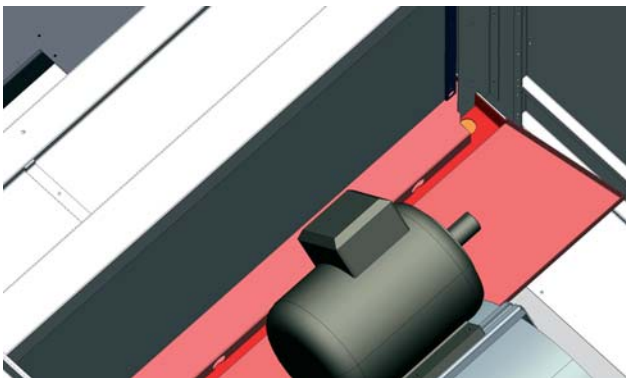
Next, some recommendations are stated to perform the cleaning of the unit's components:

Air coil

- Check that the coil is free from dust and grease.
- Cleaning the accumulated dust on the coil can be performed with 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.

Condensates drain pan

- Check that the condensates pan is clean. There should be no stagnant water.
- Check that the drain is not clogged.
- Cleaning of the pan can be done with water and non-abrasive detergent.



Centrifugal fan

- Verify that the turbine and the motor remain clean.
- Foresee having a spare belt set for the fans.
- The motors and the fans have bushings that have been lubricated and sealed and, thus, do not need further lubrication.

Air filters

- Clean usually. Depending on the installation conditions, the filter aspect must be examined to define the cleaning periodicity.
- Gravimetric filters: Cleaning the filtering mesh can be done with a household vacuum cleaner, or by submerging it in water.
- Creased opacimetric filters: these have to be replaced. Foresee replacement.

Filter removal:

The frames with the gravimetric filters as well as opacimetric frames (if the unit has includes them) are assembled over a sheet steel profile. Frames are moved by lifting the tab and dragging along the rail.

Opacimetric filters

Gravimetric filters



Tabs for displacement of the opacimetric filters

Tabs for displacement of the gravimetric filters

Mixing boxes and free-cooling

In units with mixing box assemblies with motorised dampers (MS, MA and MC0 assemblies) it is advisable to check the condition of the servomotor. In these units the mixing damper is locked to the outdoor air inlet.

Servomotor

Outdoor air damper



Dehydrant 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. Verify dirt by measuring the difference in temperature at the tubing level between the inlet and the outlet of the dehydrator.
- If necessary, replace.



Oil

- 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 dehydrant filter.
- In the event of an oil charge change, only new oil will be used, which will be identical to the original oil and taken from a can tightly closed until the moment of the charge.

Note: Both the oil type as well as the volume needed for each model are stated in the Technical characteristic tables in chapter 3.

Refrigerant

Qualified personnel must perform a periodic control to air tightness depending on the refrigerant load, in accordance with the regulation (CE) N° 842/2006.

It is important not to ever forget that the cooling systems contain liquids and vapours under pressure. The service pressure of R-410A is approximately 1.5 times higher than that of R-407c.

- All necessary precautions must be taken during the partial opening of the cooling circuit. This opening entails the discharge of a certain amount of refrigerant to the atmosphere. It is essential to limit to its minimum this amount of lost refrigerant by pumping and isolating the load in some other part of the circuit.
- The refrigerant fluid at low temperature can cause inflammatory injuries similar to burns when contacting the skin or eyes. Always use protection glasses, gloves, etc. when opening ducts that may contain liquids.
- The refrigerant in excess must be stored in appropriate containers and the amount of refrigerant stored at the technical rooms must be limited.
- Refrigerant barrels and deposits must be handled with precaution and visible warning signs must be placed to attract attention over the risks of intoxication, fire and explosion linked to the refrigerant.
- At the end of its useful life, the refrigerant must be retrieved and recycled as per the current regulations.

Gas Burner



Caution: Before starting any maintenance operations ensure that the supply of gas and electricity have been turned off.



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, chimney, etc).



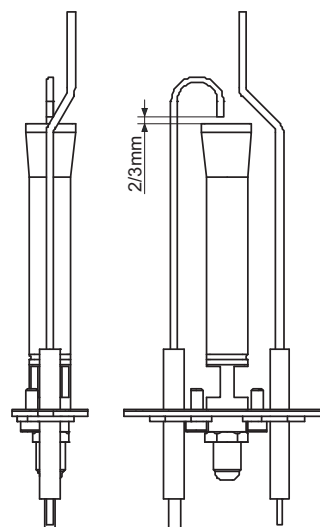
Hazard: Never use a naked flame whilst checking the burner. Never store flammable material in the machine room.

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.

These burners operate with minimum maintenance, however in order to guarantee optimum performance when starting each warming stage check:

1. The ignition, flame detector and the electrodes

Disassemble the set and clean the steel grille and the nozzle with a blast of compressed air. Check that the ceramic is intact and remove any oxide residue from the metal parts of the electrodes using emery paper. Check the correct positioning of the electrodes (see diagram below). Check that the detection electrode is positioned tangentially to the head of the burner, not inside it. The ignition electrode must rest on the ignition pilot grille.



Keep the detection electrode tangential to the ignition pilot head



Check that the ignition electrode is working between the grille and the outer edge

2. The smoke discharge ducts and the air inlet

Check the condition of the ducts by looking inside or using suitable tools. Remove the dust from the air inlet terminal.

3. The venturi

If required, use a brush to remove the dust from the venturi inlet ensuring that it does not fall inside.

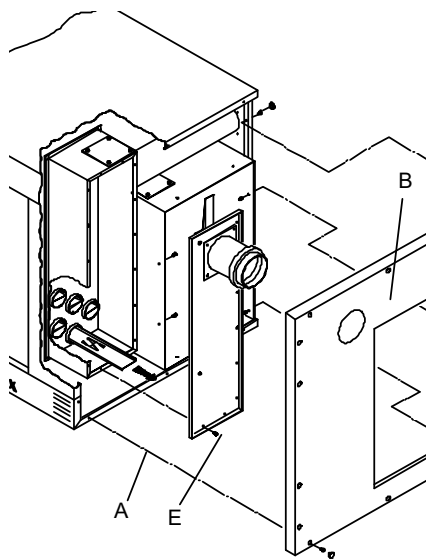
4. Cleaning the exchanger

Optimised combustion in these burners prevents the appearance of residual products. Nevertheless, dirt could be deposited inside the exchanger pipes due to the fine dust pulled through the combustion air duct.

Since it is not possible to plan a precise schedule for cleaning the exchanger a considerable reduction in the gas flow rate could indicate that there is dirt inside.

If the exchanger has to be cleaned observe the following operation when the unit is cold and disconnected from the supply:

- Remove the door and the gasket which goes around the edge of the control plate carefully to avoid damaging it.
- Remove self-tapping screws (A) which hold the control plate and the outer panel (B).
- Disconnect the gas pipe, the electric power supply and the smoke discharge system.
- Remove the outer panel (B).
- Remove screws (E) which hold the smoke manifold lid.
- Use a suitable brush to clean the entire length of the pipes pushing all the dirt towards the outlet to collect it.
- Check that the condensate discharge gasket is clean.
- Reassemble all the parts ensuring that the sealing is hermetic.



5. Cleaning the condensates drain siphon (if there is one)

Clean the siphon every year and check the gaskets. Ensure that there are no metal residues. If there are clean the siphon more frequently. After emptying the siphon, fill it with water and close it using a suitable lid before restarting the burner.

6. The inlet pressure of the gas valve

Check that the valve inlet pressure corresponds to that required for the gas. This check must be carried out with the burner operating at maximum output.

Replace the gas valve if required. Refer to the manufacturer's brochure.

7. The operation of the flame control device

With the burner in operation, close the gas valve and check that it blocks and that the remote control displays the error F1 on the screen (consult the section on "Burner Safety Devices"). Open the valve, unblock the control and check that the burner is operating correctly.

8. The safety thermostat and the air differential pressostat

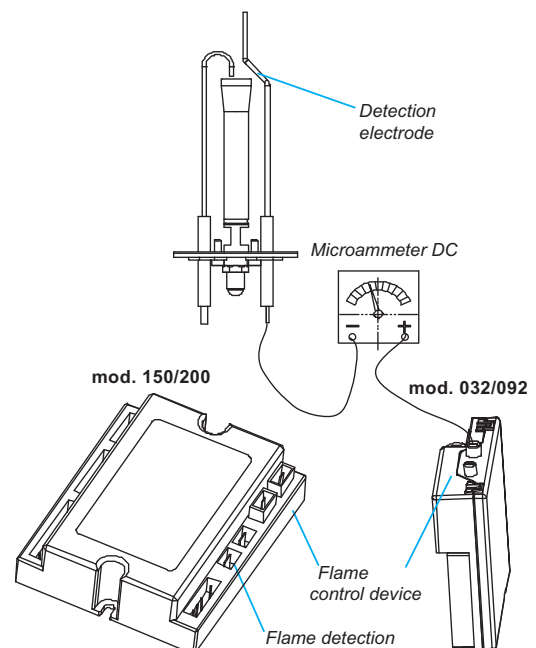
With the burner in operation open the thermostat using a suitable tool (230V). Quickly disconnect the pressostat or the safety thermostat and wait until the remote control displays the error F2 on the screen. Connect the thermostat again and unblock.

9. Ionisation current

Perform this operation using a device which is able to measure a direct current in microamperes. Do the following:

- Disconnect the unit from the electric power supply.
- Disconnect the cable from the flame control device and connect it to the negative pole of the ammeter.
- Use a cable to connect the positive pole of the ammeter and the flame control device.
- Switch on the device and wait until the burner starts.
- Measure the ionisation current.

This value must not be less than 2µA. Lower values would indicate that the detection electrode is diverted, rusty or about to break.



Note: The aforementioned items from 1 to 4 must be performed with the electric power supply and the gas supply disconnected. Items 5 to 9 must be verified with the burner in operation.

13. 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) Load 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 inversion 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 pressostat 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 load (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 load
Evaporation pressure too low (low pressostat cutoff)	<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 load 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 intensity 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) Gas lack, cutoff because of low pressure d) Dirty or frosted evaporator e) The evaporator fan does not work, cuts off the low pressostat f) Expansion valve damaged or clogged by impurities (cuts off low pressostat) g) Dehydrating filter clogged (cuts off low safety) 	<ul style="list-style-type: none"> a) Verify load 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 inversion 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

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CERTIFICATO DI ESAME CE DI TIPO EC TYPE EXAMINATION CERTIFICATE

Kiwa Gastec dichiara che i prodotti
Kiwa Gastec hereby declares that the products

generatori d'aria calda a tetto, tipo
roof-top gas-fired air heater, type

Marchio / trade mark: **Ciatesa**

Modelli / models: PG-0241 PG-0362
PG-0321 PG-0420
PG-0361 PG-0485
PG-0242 PG-0540
PG-0322 PG-0600

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soddisfano i requisiti riportati nella
meets the essential requirements as described in the

Direttiva Apparecchi a Gas 2009/142/CE (ex 90/396/CEE)
Directive on appliances burning gaseous fuels 2009/142/EC (ex 90/396/EEC)

I suddetti prodotti sono stati approvati per
Mentioned products have been approved for

Tipi di apparecchi / appliance type : C₁₃, C₃₃, C₄₃, C₅₃, C₆₃, B₂₃

Paesi e categorie apparecchi / Countries and appliance categories
AT, BE, DE, DK, ES, FI, FR, GB, GR, IE, IS, IT, LU, NL, NO, PT, SE,
EE, LV, LT, BG, CZ, SK, SI, TR, CH, RO, CY, MT, PL, HU

Le categorie dipendono dai bruciatori ad aria soffiata utilizzati.
Appliance categories depend on the used forced draught burner.

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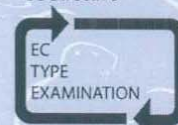
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