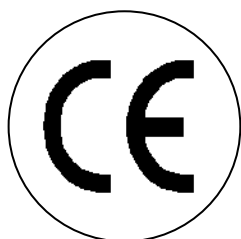
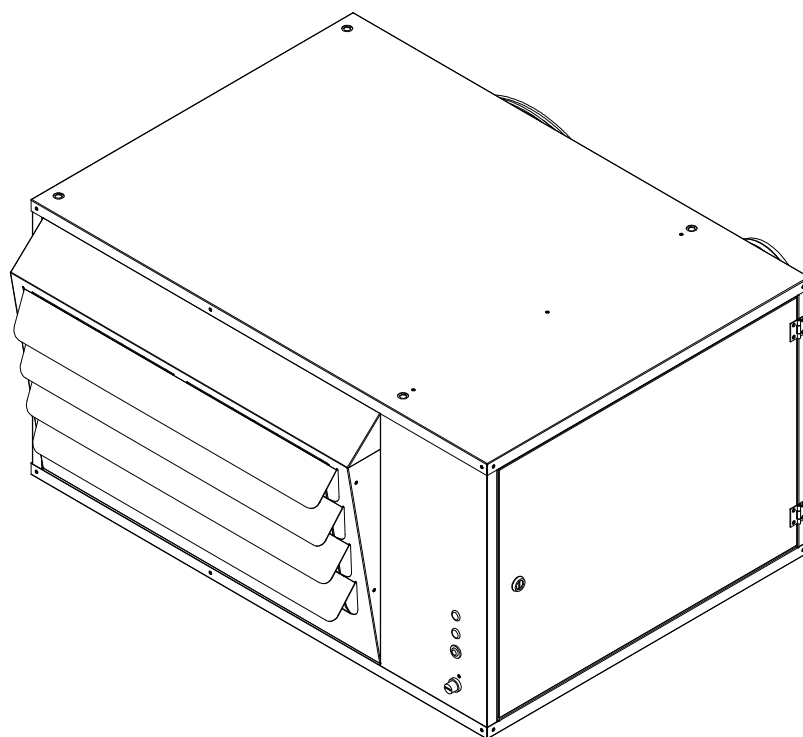


TECHNICAL INFORMATION – ASSEMBLY, OPERATING AND MAINTENANCE INSTRUCTIONS

Hanging gas warm air heaters of single-stage type,
with axial fan

MINIJET SERIES



FLEXIHEAT UK LTD
Flexible Heating & Dehumidification Solutions

01202 822221
www.flexiheatuk.com

CONFORMITY

The warm air heaters of the **MINIJET** series conform to:

- 2006/42/CE Machine Directive.
- 2006/95/CE Low tension Directive.
- 2009/142/CE Gas Equipment Directive.
- Electromagnetic Compatibility Directive 2004/108/CE

PIN NUMBER

The CE certification PIN number is indicated on the TECHNICAL DATA tag.

RANGE

Throughout this manual, reference is made to the **TYPE**. The table below specifies the range and the relationship between the Type and the Trade Name.

Type	Name
1	MJ 20
2	MJ 30
3	MJ 40

WARRANTY

The warm air heater is covered by a **SPECIFIC WARRANTY**, as from the date of purchase of the equipment, to be documented by the Purchaser; if she/he cannot do this, the warranty shall apply as from the data of manufacture of the equipment.

The warranty terms are specified in detail in the **WARRANTY CERTIFICATE**, delivered together with the equipment, that should be read with great care.

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The following symbols are used in some parts of this handbook:



WARNING = for actions requiring special care and appropriate training



FORBIDDEN = for actions that **MUST NOT** be performed

This handbook consists of 40 pages

GENERAL WARNINGS



This instruction handbook is an integral part of the equipment, and accordingly shall be always maintained with care, and shall always follow the equipment even if it is assigned to another owner or user. If this handbook is damaged or lost, contact your local After-Sales Service Centre to obtain another copy of it.

After removing the packaging, check that its content is in good condition and complete. If it is non-conforming, please contact the Organisation that sold the equipment.

The warm air heaters shall be installed by a company certified pursuant to law No. 46, 5 March 1990, that, on completion of the work, shall issue the declaration of conformity to the owner, to furnish evidence of workmanlike installation, i.e. in compliance with the applicable National and Local Standards and according to the instructions provided in this instruction handbook.

These equipments have been manufactured for room heating and shall be used for this purpose according to their operating characteristics.

The manufacturer may not be held liable (either by contract or not) for any damage to people, animals or property, caused by wrong installation, regulation and maintenance or improper use.

An excess temperature is unhealthy and is a useless waste of energy.

Make sure that the rooms do not remain closed for a long time. Open the windows from time to time, to ensure a proper air renewal.

Smells and fumes may be produced during the first start-up, due to the evaporation of the liquid that protects the heat exchanger during storage; this event is normal and disappears after a short period of operation. It is recommended to properly ventilate the room.

If it is expected that the equipment will not be used for long periods, perform at least the following operations:

- turn the equipment's master switch and the plant's master switch to "OFF"
- close the central cock that feeds the fuel

In the event that the generator is not operated for long periods, it is recommended to contact the After-Sales Service or qualified personnel so that the equipment can be started-up again.

The equipments shall be equipped only with original accessories. The manufacturer may not be held liable

for any damage caused by improper uses of the equipment and the use of non-original materials and accessories.

All references to laws, regulations and technical standards mentioned in this handbook are provided for information purposes only and shall be valid as of the date of printing thereof. The enforcement of new provisions or modifications of the existing ones shall never bind the manufacturer before any third parties.

Servicing or maintenance operations shall be carried out by the After-sales Service or by qualified personnel, as provided for by this handbook. Do not modify/tamper with the equipment, as this is likely to create hazardous situations, in which case the manufacturer may not be held liable for any damage.

The systems that shall be prepared (gas piping, power supply etc.) shall be properly secured and shall never become obstacles, involving the risk of stumbling.

The manufacturer is responsible for the conformity of its product to the laws, directives and standards in force when the product is sold. The knowledge and respect of the provisions of the law and the directives applicable to plant designing, its installation, operation and maintenance are the exclusive responsibility of the designer, the installer and the user, within their respective competence.

The manufacturer may not be held liable for non-compliance with the instructions contained in this handbook, for the consequences of any manoeuvre carried out but not specifically planned, or for any translations that could result in wrong interpretations.

The equipment is designed to be operated with the heating capacity and the air flowrate indicated in the Data Sheet chapter. If the heating capacity is too low and/or the air flowrate is too high, combustion products may condensate, resulting in the irreparable corrosion of the heat exchanger. If the heating capacity is too high and/or the air flowrate is too low, an anomalous overheating of the heat exchanger may occur, resulting in the activation of the safety devices and causing damage to the exchanger.

This equipments shall be installed according to the applicable National and Local Standards and shall be used only in a well ventilated room. Please consult the instructions before installing and using this equipment.

BASIC SAFETY RULES



Please remember that using gas/electric products requires compliance with a few essential rules, such as:

Using the warm air heater is forbidden to children and unassisted disabled people.

It is forbidden to activate electric devices or equipments, such as circuit breakers, domestic equipments etc. if you notice a smell of fuel or unburnt products. In this case:

- ventilate the room by opening the doors and the windows
- close the fuel shutoff device
- promptly request the intervention of the After-Sales Service or qualified personnel

It is forbidden to touch the equipment barefoot and with wet limbs.

It is forbidden to perform any cleaning and maintenance operations before disconnecting the equipment from the power supply by turning the system's master switch to "OFF", and before shutting off the fuel.

It is forbidden to modify safety or control systems without the authorisation and the instructions of the manufacturer of the equipment.

It is forbidden to pull, detach, twist the power cables from the equipment, even if it is disconnected from the power supply.

It is forbidden to open the doors providing access to the interior of the equipment before turning the system's master switch to "OFF".

It is forbidden to dump, abandon or leave the packaging materials (cardboard, staples, plastic bags etc.) within the children's reach, as they could be a potential source of hazard.

It is forbidden to install the equipment near flammable material or in rooms characterised by the presence of aggressive atmospheres.

It is forbidden to rest any objects on the equipment, or to insert them through the grille of the casing and in the exhaust ducts for combustion products and the suction of combusive air.

It is forbidden to touch the exhaust duct for combustion products, as during normal operation it may reach high temperatures, hazardous by contact.

It is forbidden to use adapters, multiple jacks and extensions for connecting the equipment.

It is forbidden to install the equipment outdoor or anyway in places where it may be subject to different natural phenomena.

It is forbidden to distribute this product in other countries, as its documentation and configuration shall be modified accordingly

DESCRIPTION OF THE EQUIPMENT

FUNCTIONAL CHARACTERISTICS

The hanging warm air heater a gas usually known as air heater is an equipment that heats the room air, using the thermal energy generated by combustion.

The heat exchange occurs by making the heat exchangers' surfaces be touched by an air flow generated by a propeller fan, without using any intermediate fluid.

Easily adjustable guide fins make it possible to direct the hot air flow according to any specific installation requirements.

Once the heat exchange has been completed, the combustion products are discharged outside by a centrifugal extractor, that allows the equipment to be operated also without a connection to the flue.

This system permits a considerable reduction in plant costs, and safe savings on running costs, and has proved to be particularly fit for all applications requiring intermittent and occasional use.

By installing the combustive air intake outside, the air heater's combustion circuit becomes watertight, and this makes it possible to use these equipments also for heating public rooms (churches, gyms, trade centres etc.).

The equipment is also preset for room ventilation only, in the summertime.

GENERAL STRUCTURAL CHARACTERISTICS

HEAT EXCHANGER

The heat exchanger is made of welded steel plate, tightness tested according to **UNI-CIG 9462**, and consists of:

- **STAINLESS** steel streamlined **combustion chamber**, with low heat load and high volume.
- **STAINLESS** steel **exchange elements** of large surface, in a semi-horizontal fan configuration, provided with crossed and opposed turbolator prints.
- **STAINLESS** steel **breeching** provided with a small inspection door.

CASING

The absence of elements showing for panel fastening gives to the product a modern and nice aspect, although the equipment remains easy to inspect.

The casing consists of removable panels made of powder-painted or pre-painted galvanised sheet, and includes also:

- a watertight burner compartment, with a small access door;
- an antiradiant heat insulation for the surfaces more exposed to the exchanger's radiation;
- hot air flow terminal device.

VENTILATION UNIT

It consists of a propeller fan featuring reduced sound emissions, which can move a considerable air flow; it is actuated by a single-phase electric motor and is complete with a protective safety grille.

ELECTRONIC EQUIPMENT

- It consists of an electronic device directly mounted onto the gas solenoid valve, which controls all the functions of the equipment.

GAS SOLENOID VALVE UNIT

The multi-function safety and control solenoid valve consists of:

- safety solenoid valve;
- control solenoid valve;
- pressure regulator;
- gas filter;

MULTIGAS ATMOSPHERIC BURNER UNIT

It consists of:

- An anchor plate with an eyehole for the visual inspection of the electrode and the flame, thermal insulation ensured by a rigid ceramic fibre panel;
- A tubing made of special stainless steel with radial flame expansion and Venturi tube for a proper air /gas mixture;
- An injector.
- A single electrode for flame lighting and detection, coated with ceramics and easy to inspect.

SAFETY THERMOSTAT

The generator is provided with a manual reset "**LM**" **safety thermostat (shop calibrated at 100°C)**, of the liquid expansion type, with positive safety device; it stops the burner operation in the presence of an anomalous air heating. If the "LIMIT" is activated, reset it with the relevant push-button, after checking and removing the causes of its activation (fixed calibration at 100°C).

"FAN" FUNCTION

It consists of a contact thermostat. It starts the fan after about 60 seconds from the moment when the burner is turned on, and stop it after about 3 minutes from the turning off of the burner. This makes it possible to prevent the injection of uncomfortable cold air into the room upon start-up and to dissipate the thermal energy accumulated by the exchanger, ensuring its use before the stop. The calibration is fixed and cannot be modified, unless you work on the microprocessor's programming.

DIFFERENTIAL PRESSURE SWITCH

It is used to stop the operation of the burner in the presence of obstructions in the combustion product exhaust duct or in the combustive air suction duct, if the fume extractor does not work.

FUME EXTRACTOR

It consists of a simple-suction centrifugal fan, actuated by an electric motor with die-cast aluminium rotor.

OPTICAL SIGNALLING UNIT

It consists of a lamp and a release push-button, positioned on the front of the equipment:

- **Green lamp**, to signal normal operation; it lights up when the gas solenoid valve unit opens.
- **Yellow lamp**, to signal LIMIT safety thermostat is activated.
- **Red push-button**, to signal the block of the electronic equipment, and to restore its operation.

FUME EXHAUST/ COMBUSTIVE AIR INLET

The equipment is provided with two circular co-axial unions to be connected and secured to exhaust ducts for combustion products, and to suck the air required for combustion.

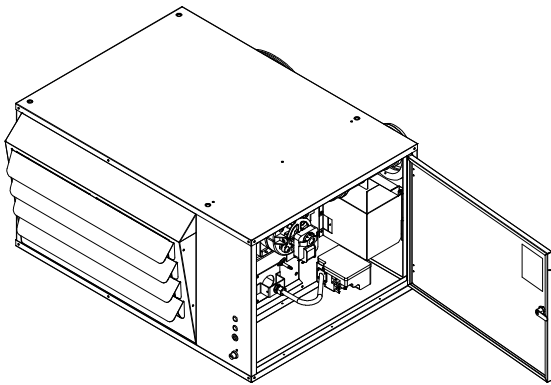
IDENTIFICATION

The warm air heaters can be identified via:

- The **DATA SHEET** label, which shows the main specifications of the equipment, positioned inside the access door of the burner compartment.

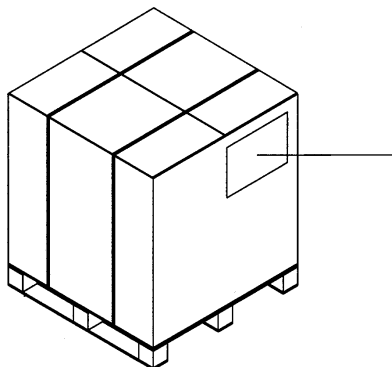
- The packaging label, that shows the code, model and serial number of the equipment.
- ⚠ If damaged or lost, please contact the After-Sales Service to receive a copy of it.

POSITION OF THE DATA SHEET LABEL:



MANUFACTURER'S ID DATA		CE	
WARM AIR HEATER			
Model	<input style="width: 100%;" type="text"/>		
Serial number	<input style="width: 100%;" type="text"/>		
Country	<input style="width: 50%;" type="text"/>	PIN	<input style="width: 50%;" type="text"/>
Category	<input style="width: 50%;" type="text"/>	Code	<input style="width: 50%;" type="text"/>
Tipo	<input style="width: 50%;" type="text"/>	Year	<input style="width: 50%;" type="text"/>
Heat input	<input style="width: 80%;" type="text"/>		kW
Heating capacity	<input style="width: 80%;" type="text"/>		kW
Air flow rate	<input style="width: 80%;" type="text"/>		m ³ /h
Power supply	<input style="width: 100%;" type="text"/>		
Power input	<input style="width: 80%;" type="text"/>		W
Protection class	<input style="width: 100%;" type="text"/>		
GAS TYPE	<input style="width: 25%;" type="text"/>	<input style="width: 25%;" type="text"/>	<input style="width: 25%;" type="text"/>
Supply pressure	mbar	<input style="width: 25%;" type="text"/>	<input style="width: 25%;" type="text"/>
Injector pressure	mbar	<input style="width: 25%;" type="text"/>	<input style="width: 25%;" type="text"/>
Nozzle diameter	mm	<input style="width: 25%;" type="text"/>	<input style="width: 25%;" type="text"/>
Gas consumption	m ³ /h	<input style="width: 25%;" type="text"/>	<input style="width: 25%;" type="text"/>

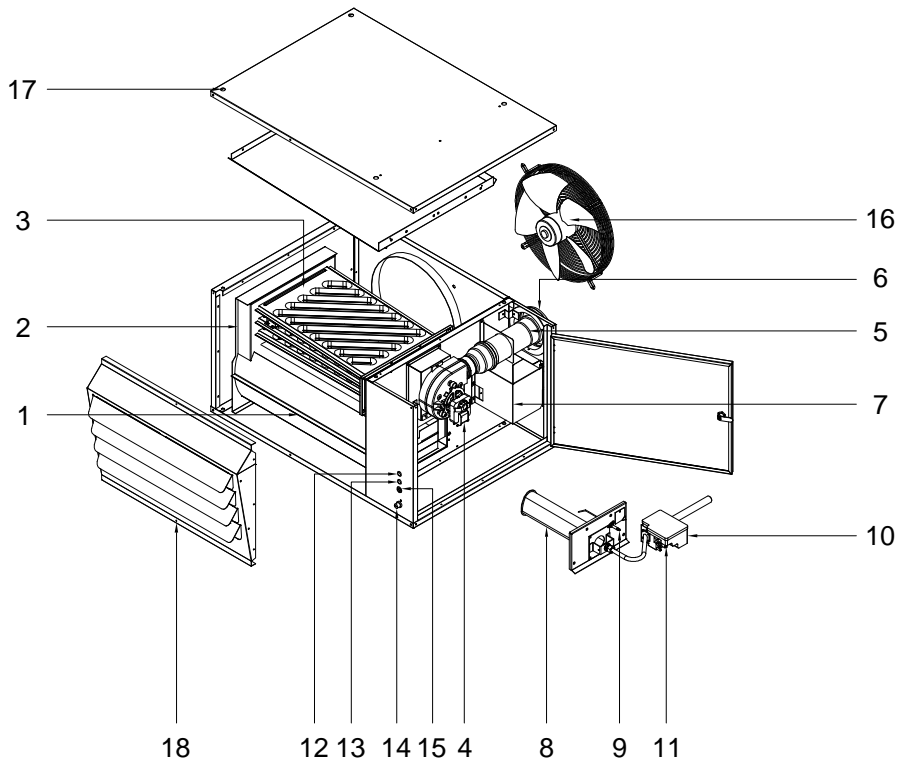
POSITION OF THE PACKAGING ID LABEL:



Code Model Serial number	CE
--------------------------------	----

STRUCTURE

The warm air heaters consist of:



- 1 Combustion chamber
- 2 Rear breeching
- 3 Tube bundle
- 4 Extractor for combustion products
- 5 Combustion product exhaust union
- 6 Combustive air suction union
- 7 Switchboard with terminal board for connections
- 8 Tubular burner
- 9 Ionization – trigger electrode
- 10 Electronic control equipment
- 11 Gas solenoid valve
- 12 Green signal lamp/operation
- 13 Yellow signal lamp/LIMIT thermostat activation
- 14 Manual reset push-button/safety limit thermostat activation
- 15 Red signal lamp/block with manual reset push-button
- 16 Axial fan
- 17 M6 threaded inserts to support or hang the equipment
- 18 Tilted diffuser panel with pre-sheared horizontal fins

TECHNICAL DATA

DATA SHEET TABLE

DESCRIPTION	TIPO 1	TIPO 2	TIPO 3	UNITA'
MAX. HEAT INPUT	17,3	27,2	36,7	Kw
	14870	23390	31560	kcal/h
MAX. USEFUL HEATING CAPACITY	16,0	25,0	34,0	Kw
	13760	21500	29240	kcal/h
MAX. EFFICIENCY	92,5	92,0	92,5	%
AIR FLOW RATE AT +15°C	1630	2550	3450	Nm ³ /h
ΔT	29	29	29	°K
NET FUME TEMPERATURE	~ 120			°K
SOUND PRESSURE LEVEL ⁽¹⁾	46,5	52,0	54,5	dB(A)
CALIBRATION OF SAFETY LIMIT THERMOSTAT	100			°C
CALIBRATION OF THE FAN THERMOSTAT	42			°C
CALIBRATION OF AIR PRESSURE SWITCH (vertical rising position)	0,45	1,03	1,65	mBar
DISCHARGE HEAD BEFORE PRESSURE SWITCH ACTIVATION	39	59	52	Pa
PROPELLER FAN				
- Number	1	1	1	N°
- Fan diameter	300	350	395	mm
- Rotating speed	1.330	1.360	1.330	rpm
- Electric power	75	130	210	W
- Current	0,36	0,64	0,90	A
- Condenser (400V)	2,5	2,5	6,3	microF
SINGLE-PHASE POWER SUPPLY	230V ~ 50Hz			
POWER INPUT	0,8	1,2	1,3	A
ELECTRICAL PROTECTION	40			IP
TYPE OF INSTALLATION	B22 – C12 – C32			
OPERATING RANGE				
- Working temperature	0 / +30			°C
- Max. relative humidity (at 40°C non-condensing)	80			%
G20 METHANE GAS				
- Number of injectors	1	1	1	N°
- Injector diameter	345	425	490	mm/100
- Gas feed pressure	20	20	20	mBar
- Pressure to injectors	12,5	13,0	13,0	mBar
- Consumption ⁽²⁾	1,74	2,73	3,68	Nm ³ /h
G31 PROPANE GAS				
- Number of injectors	1	1	1	N°
- Injector diameter	210	255	300	mm/100
- Gas feed pressure	37	37	37	mBar
- Pressure to injectors	36,5	36,5	36,5	mBar
- Consumption ⁽³⁾	0,67	1,05	1,41	Nm ³ /h
	1,34	2,11	2,85	Kg/h
	2,64	4,15	5,60	Litri/h
G30 BUTANE GAS				
- Number of injectors	1	1	1	N°
- Injector diameter	210	255	300	mm/100
- Gas feed pressure	30	30	30	mBar
- Pressure to injectors	29,5	29,5	29,5	mBar
- Consumption ⁽⁴⁾	0,51	0,80	1,08	Nm ³ /h
	1,36	2,14	2,89	Kg/h
	2,37	3,72	5,05	Litri/h
MASS of COMBUSTION PRODUCTS ⁽⁵⁾	0,0101	0,0159	0,0214	kg/s

(1) References:
Typical wall installation/free field
Measurement taken on the front, at a distance of 6 metres

(2) References:
Atmospheric pressure 1.013 mBar
Gas temperature 15°C
Net Heating Value 8,570 kcal/Nm3

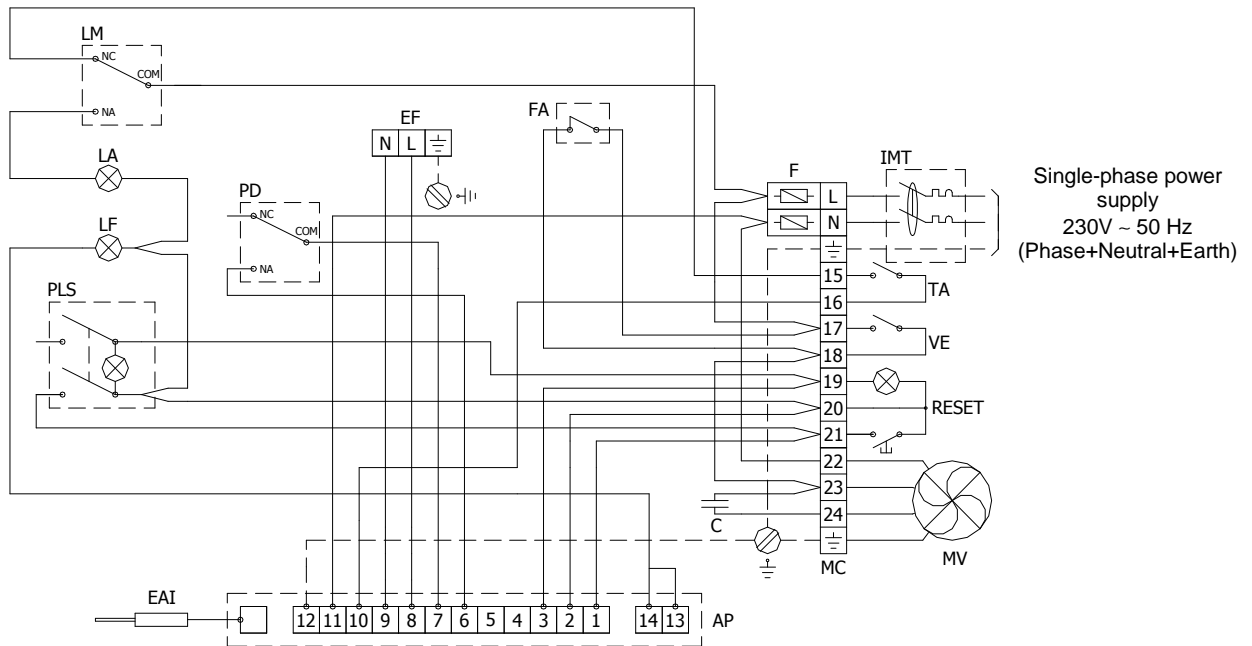
(3) References:
Atmospheric pressure 1.013 mBar
Gas temperature 15°C
Net Heating Value 22,360 kcal/Nm3 – 11.070 kcal/kg – 5.635 kcal/liter

(4) References:
Atmospheric pressure 1013 mBar
Gas temperature 15°C
Net Heating Value 29.330 kcal/Nm3 – 10.905 kcal/kg – 6.285 kcal/liter

(5) Value calculated with 7% mean CO2

WIRING DIAGRAM

The electrical system inside every single equipment is installed according to the following diagram:



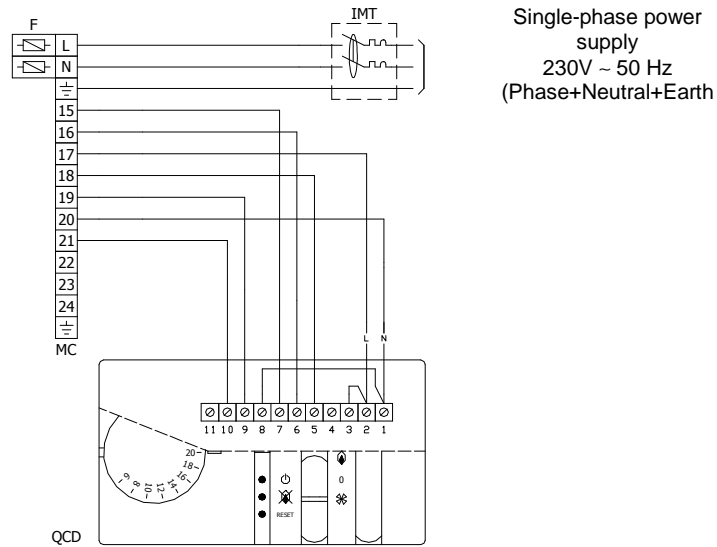
LEGENDA:

LM	Manual reset safety thermostat
C	Fan condenser
MV	Axial fan
F	Line fuses (3.15 A delayed)
LF	Operation indicator
LA	Signal of the activation of the LIMIT safety thermostat
PLS	Block signal and reset push-button
EF	Fume extractor
PD	Differential pressure switch
EAI	Ionization – trigger electrode
AP	Electronic equipment
FA	FAN thermostat
MC	Terminal board
IMT (*)	Differential magnetothermal switch
RESET (*)	Display and remote release of the equipment
TA (*)	Room thermostat
VE (*)	Summer ventilation switch

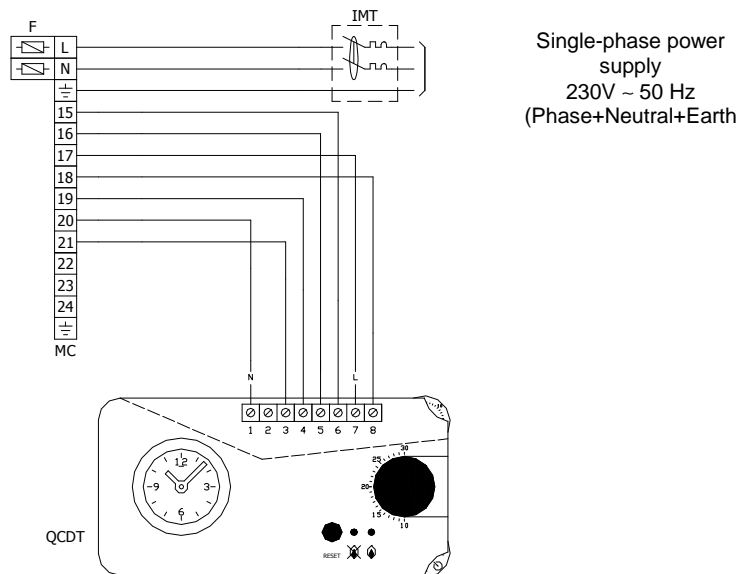
(*) Outside the equipment, not included in the supply, to be installed by the Customer

CONTROL PANEL (ACCESSORY)

Electrical connection to the remote control panel, by a single-stage thermostat (accessory on demand)



Electrical connection to the remote control panel, by a single-stage thermostat and clock controller (accessory on demand)



LEGEND:

- F** Line fuses
- MC** Terminal board for the warm air heater's connections
- QCD** Remote control panel with thermostat
- QCDT** Remote control panel with thermostat and clock controller
- IMT (*)** Differential magnetothermal switch

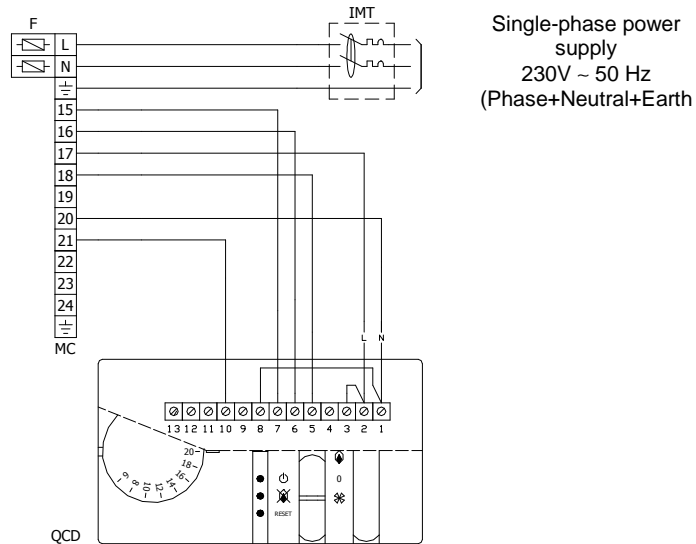
(*) Outside the equipment, not included in the supply, to be installed by the Customer.

! BEFORE INSTALLING AND USING THE REMOTE CONTROL PANEL, CAREFULLY READ THE INSTRUCTIONS PROVIDED TOGETHER WITH IT.

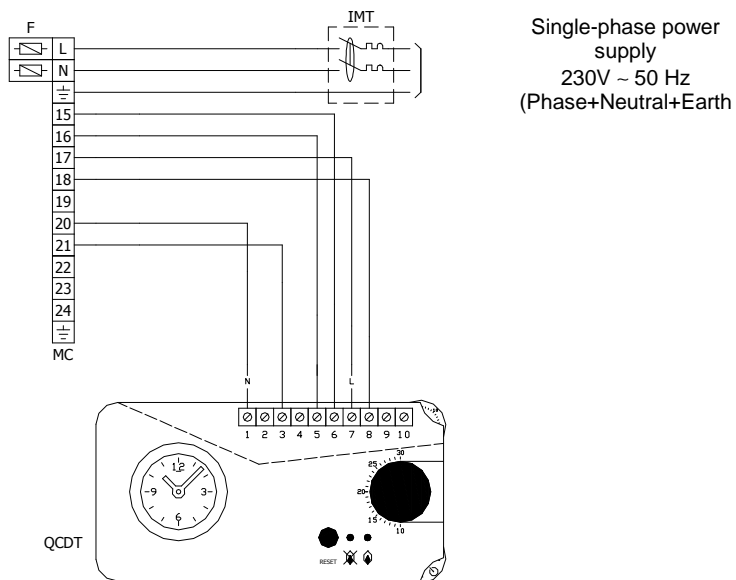
! FOR A CORRECT OPERATION OF THE EQUIPMENT, PERFORM ALL JUMPERS AND CONNECTIONS.

! THE WRONG CONNECTION OF THE REMOTE CONTROL PANEL TO THE EQUIPMENT MAY RESULT IN IRREPARABLE DAMAGE TO THE ELECTRONIC CONTROL EQUIPMENT.

Electrical connection of to the remote control panel, by a double-stage thermostat (accessory on demand)



Electrical connection of to the remote control panel, by a double-stage thermostat and clock controller (accessory on demand)



LEGEND:

- F** Line fuses
- MC** Terminal board for the warm air heater's connections
- QCD** Remote control panel with thermostat
- QCDT** Remote control panel with thermostat and clock controller
- IMT (*)** Differential magnetothermal switch

(*) Outside the equipment, not included in the supply, to be installed by the Customer.

IMPORTANT!

- are not enabled:
- The double-stage function

- The block signal on the remote control panel

! BEFORE INSTALLING AND USING THE REMOTE CONTROL PANEL, CAREFULLY READ THE INSTRUCTIONS PROVIDED TOGETHER WITH IT.

! FOR A CORRECT OPERATION OF THE EQUIPMENT, PERFORM ALL JUMPERS AND CONNECTIONS.

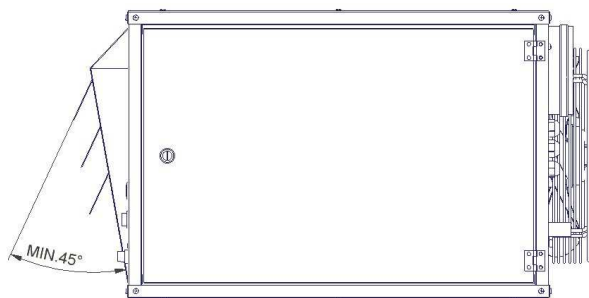
! THE WRONG CONNECTION OF THE REMOTE CONTROL PANEL TO THE EQUIPMENT MAY RESULT IN IRREPARABLE DAMAGE TO THE ELECTRONIC CONTROL EQUIPMENT.

ADJUSTING THE GUIDE FINS

The hot air diffuser panel is provided with horizontal pre-sheared fins on the outlet panel, each of which can be adjusted. The vertical fins kit is available as accessory.

ADJUSTING THE HORIZONTAL FINS:

Manually adjust every single horizontal fins, so that the hot air distribution is arranged vertically, according to the room to be treated.



A correct air flow rate is essential to obtain an ideal heating of the room, and is also necessary for a proper cooling of the heat exchanger.

For this reason, it is essential that there is no resistance on the air flow generated by the fan, avoiding the presence of any obstacles on the air discharge and inlet, and that the guide fins (both horizontal and vertical) are open.



IMPORTANT

The horizontal guide fins shall be open and shall not be tilted by more than 45° with respect to the air flow direction.

The vertical guide fins (if installed as accessory) shall be open. They shall not be tilted by more than 45° with respect to the air flow direction.

START-UP

Enabling the “HEATING” function

- Turn the main magnetothermal switch to “ON” (not included in the supply, to be installed by the customer).
- Turn the function selector (if available) to “HEATING”.
- Set the desired temperature on the thermostat.
- The operation is fully automatic.

Disabling the “HEATING” function

- Set on the room thermostat a temperature lower than the room temperature or, alternatively, turn the function selector (if available) to “STOP”.
- The burner is turned off immediately, and the fan stops after 3 minutes.
- If necessary, turn the main magnetothermal switch to “OFF”



WARNING!

Never stop the heater by disconnecting the equipment from the electricity supply, for the thermal energy accumulated in the exchanger could determine the activation of the LIMIT safety thermostat, requiring a manual release. Furthermore, this operation, if repeated, may cause hazardous overheating of the heat exchanger.

Enabling the “VENTILATION” function

- Turn the main magnetothermal switch to “ON”.
- Set a temperature lower than the room temperature on the thermostat.
- Turn the function selector (if available) to “VENTILATION”. Only the ventilating unit can start.

Disabling the “VENTILATION” function

- Turn the function selector (if available) to “STOP”.
- If necessary, turn the main magnetothermal switch to “OFF”
- The fan stops

Stop

- Turn the function selector to “STOP”

Prolonged shut-downs

- Turn the function selector (if available) to “STOP”
- Turn the main magnetothermal switch to “OFF”
- Close the gas feed cocks

CLEANING

For a proper operation and preservation of the equipment, is it recommended, from time to time:

• to clean the external panelling

It shall be cleaned only with wet rags and soap. For ingrained stains, wet the rug with a mixture of 50% water and 50% denaturised alcohol or with specific products. After cleaning, carefully dry the surfaces.



It is forbidden to use sponges soaked with abrahasive products or washing powder.



It is forbidden to carry out any cleaning operation before disconnecting the equipment from power supply, by turning the system's master switch to “OFF”.

MAINTENANCE

Routine maintenance is essential to always keep the equipment in working order, safe and reliable over time. It can be carried out every six months, for some operations, and every year for other ones, by the local After-Sales Service, duly trained and qualified from a technical standpoint, that can have at its disposal, if necessary, original spare parts.

SELLER
Mr.
Address
Tel.

AFTER-SALES SERVICE
Mr.
Address
Tel.

A correct air flow rate is essential to obtain an ideal heating of the room, and is also necessary for a proper cooling of the heat exchanger. For this reason, it is essential that there is no resistance on the air flow generated by the fan, avoiding the presence of any obstacles on the air discharge and inlet, and that the guide fins (both horizontal and



WARNING

For equipments installed near the sea, or in very difficult conditions, the maintenance intervals shall be halved.

INSTALLER
Mr.
Address
Tel.

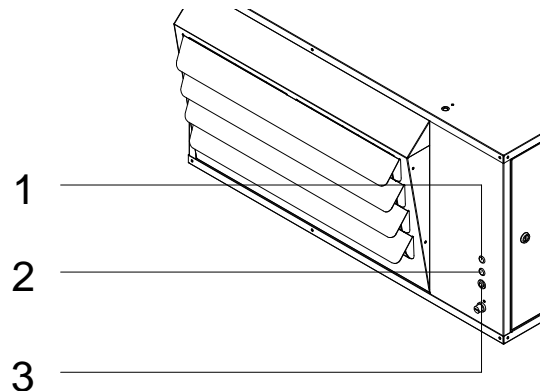
vertical) are open, as described in the paragraph "Adjusting the guide fins". It is also essential to regularly check that there is no foreign matter that could affect the air circulation (such as paper and/or rugs on the fan's protection grille and/or on the air terminal device).

ANOMALY DETECTION

In case of functional anomaly of the equipment, some signals are displayed on the machine, and the equipment is automatically stopped in full safety. The reset shall be carried out in manual mode after the local After-Sales Service has removed the causes of its activation:

- **Green lamp, to signal normal operation (1).** It is positioned on the front of the equipment. It lights up when the burner is operating.
- **Yellow lamp, to signal the LIMIT safety thermostat is activated (2).** It is positioned on the front of the equipment. It lights up after a block of the burner, following the activation of the limit safety thermostat. If the limit safety thermostat is activated, it shall also be reset.

- **Red push-button and block signal (3).** It is positioned on the front of the equipment or on the remote control panel (if available). It lights up after a block of the burner, when no flame is detected or following the activation of the limit safety thermostat. To restore the operation, press this push-button. If the limit safety thermostat is activated, it shall also be reset.




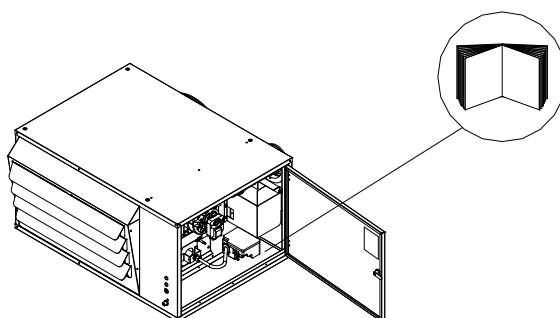
DELIVERY OF THE PRODUCT

The warm air heaters are delivered complete with:

- instruction handbook of the warm air generator;
- warranty certificate;
- kit for liquid gas transformation.

available in a plastic envelope positioned inside the burner compartment of the equipment.


 The handbook is an integral part of the equipment and accordingly, once the packaging has been removed, it is recommended to store it with care




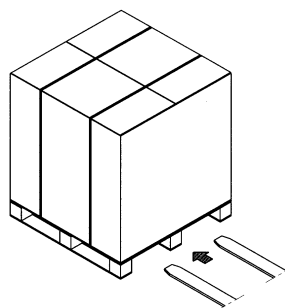
HANDLING

The equipment shall be handled by personnel properly equipped, using tools suitable for the weight of the equipment. If a lift truck is used, insert the forks under the bottom of the equipment, using the guides available in the supports.

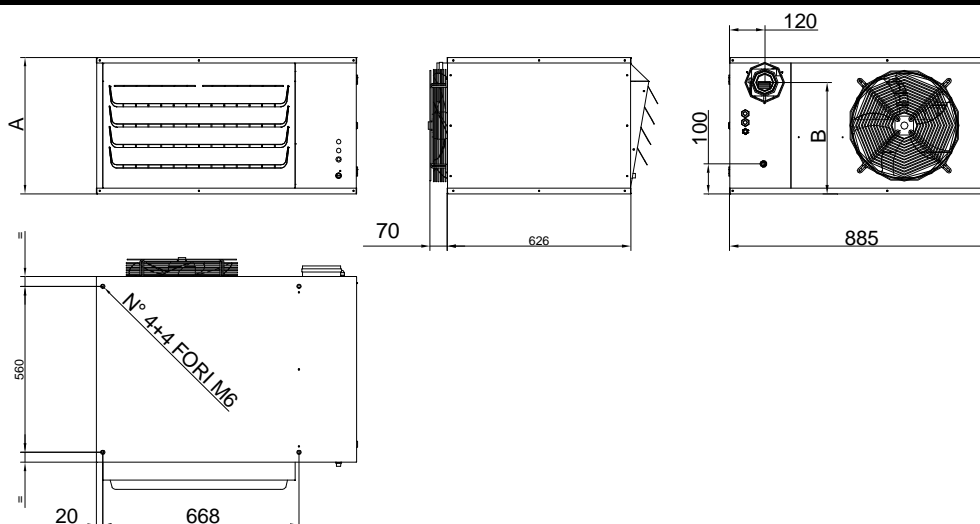
WARNING!

 It is forbidden to overlap more equipments than the ones specified by the overlapping index on the packaging.

 It is forbidden to stand near the equipment during all handling and transport operations.



DIMENSIONS AND WEIGHTS



TYPE		1	2	3
A	mm	420	460	520
B	mm	340	376	402
fume exhaust \varnothing	mm	\varnothing 80 mm (female)		
combustive air \varnothing	mm	\varnothing 125 mm (female)		
gas connection \varnothing	inches	$\frac{1}{2}$ (male)		
net weight	Kg	54	62	66

LOCATION

The place of installation shall be determined by the plant designer out by a competent person, and shall take into account any technical requirements, Standards and Regulations in force, that require the issue of specific authorisations (e.g.: town-planning, architectural, fire-fighting, environmental regulations etc.)

Therefore, before installing the equipment, it is advisable to request and obtain the necessary authorisations.

For a correct installation, remember that war air heaters must:

- be positioned on a flat surface, that can support its weight;
- respect the distances specified in this manual, so as to deliver a correct air flow and to allow routine cleaning and maintenance operations;
- be easy to connect to the flue;
- be easy to connect to the fuel distribution network and to the combustive air suction duct;
- be near a power outlet;
- facilitate the execution of all maintenance operations and checks;
- be provided with ventilation openings, as provided for by the Local and National Standards in force.

Furthermore, make sure that:

- The capacity and pressure of the fuel gas are consistent with the presetting of the equipment and the data reported in the paragraph DATA SHEET.
- The operating temperature range is 0 to +30 °C.

It is forbidden to install the equipment:

- In rooms characterised by aggressive atmospheres.
- In small rooms, where the sound level of the equipment may be emphasised by reflection or resonance.
- In corners where dust, leaves and other matter which are likely to reduce the efficiency of the equipment could deposit, obstructing the air openings.

 **WARNING!**

The warm air heater is usually installed on elevated shelves, according to the following figures. In this case, **be careful that the shelves are secured to a suitable frame, by means of the relevant fastening devices.**

 **WARNING!**

The warm air heater is equipped with a propeller fan, and accordingly is not fit for connection to ducts with considerable pressure drops. For any particular requirements, please contact the manufacturer.

ACCESSORIES

The following accessories are available on demand:

DESCRIPTION			
	TYPE 1	TYPE 2	TYPE 3
Two supporting shelves	●	●	●
Single-stage room thermostat	●	●	●
Remote control panel with single-stage thermostat	●	●	●
Remote control panel with single-stage thermostat and timer	●	●	●
Interface device for simultaneous control (up to 4 equipments)	●	●	●
Kit of vertical fins	●		
		●	
			●

Note:

To discharge the combustion/combustive air suction products, a wide range of kits and components are also available (ducts, curves, terminals etc.), with special coupling system and O-ring seal, in order to meet a variety of installation requirements.

 **WARNING!**

Optionals, kits and accessories shall be only original products.

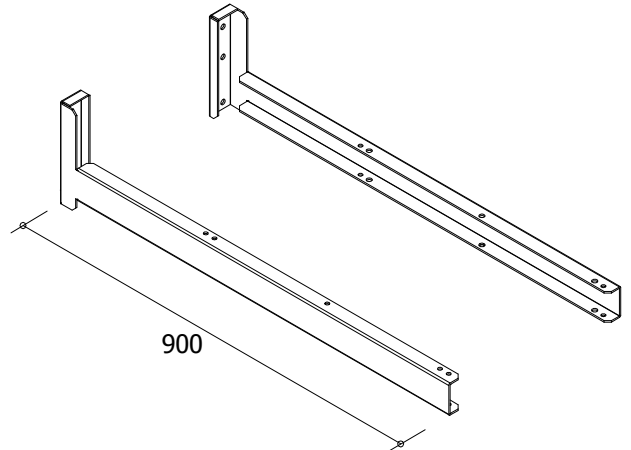
SHELVES (ACCESSORY)

Some supporting shelves are also available to suspend the equipment:



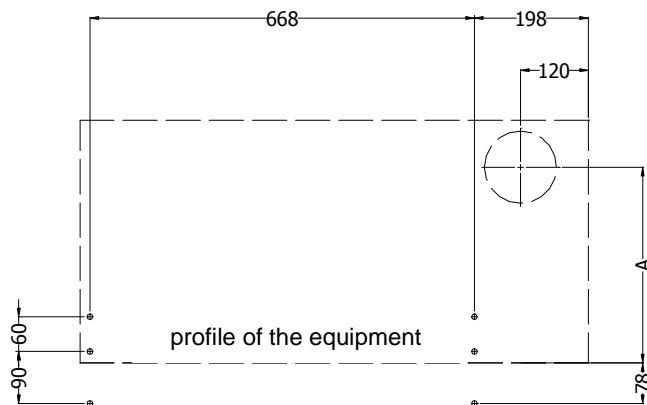
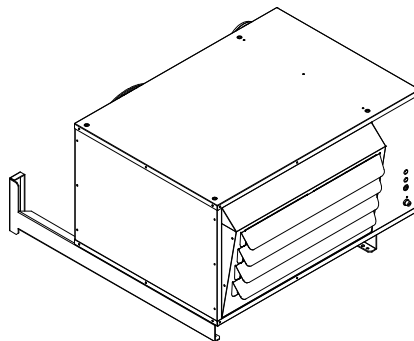
WARNING!

The supporting shelves are properly dimensioned to hold up the **weight of the equipment only**. The manufacturer may not be held liable for any damage caused by improper fastening of the supporting shelves to the wall.



DRILLING TEMPLATE TO INSTALL THE EQUIPMENT ON A SIDE-WALL WITH:

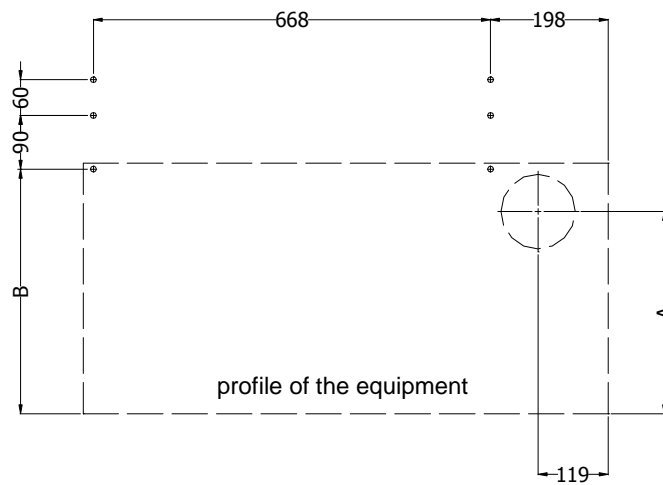
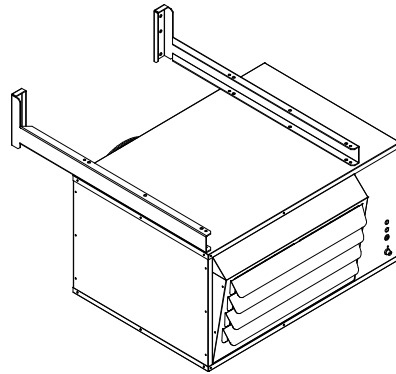
- Coaxial fume exhaust and combustive air suction pipes
- Shelves positioned under the equipment



TYPE		1	2	3
A	mm	340	376	402

DRILLING TEMPLATE TO INSTALL THE EQUIPMENT ON A SIDE-WALL WITH:

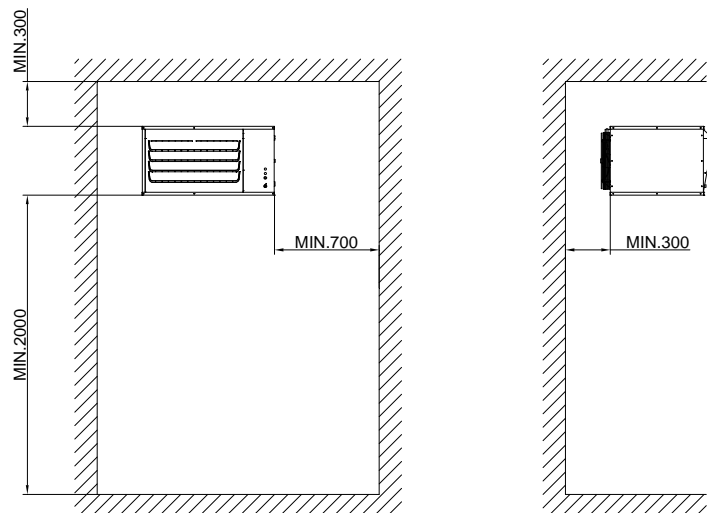
- Coaxial fume exhaust and combustive air suction pipes
- Shelves positioned on the equipment



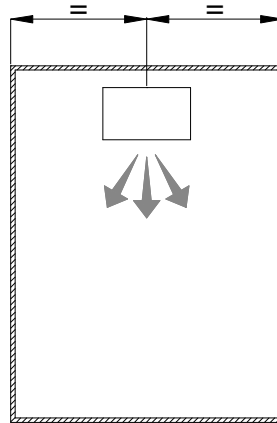
TYPE		1	2	3
A	mm	340	376	402
B	mm	408	448	508

RESPECT AREA

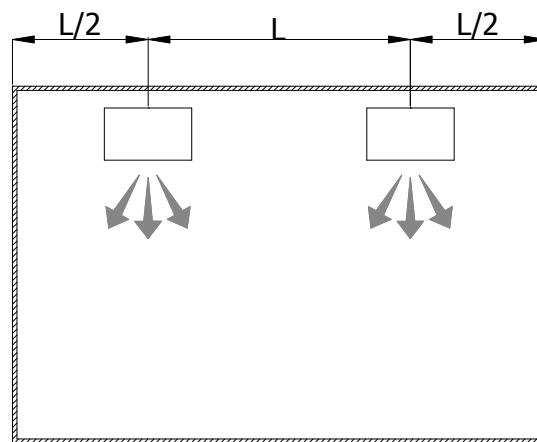
To ensure the proper operation of the equipment, and to provide access in case of maintenance operations, it is necessary to arrange a service space around the equipment, where no objects must be positioned.



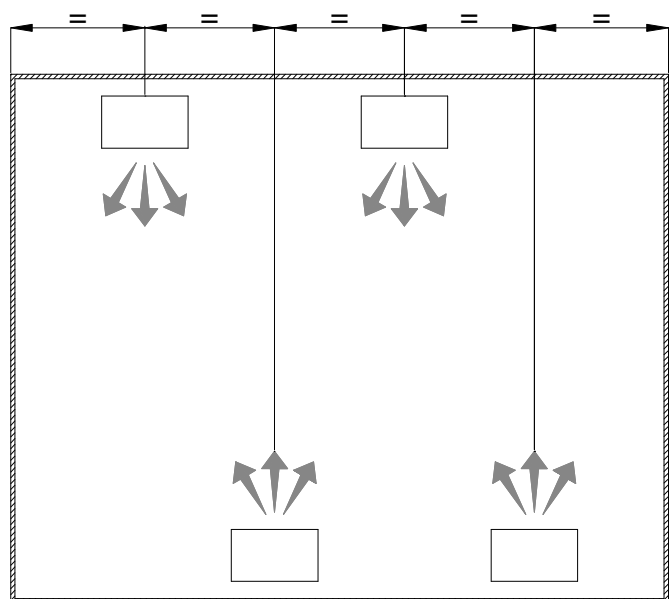
Example of positioning in small rooms:



Example of positioning in medium-sized rooms:



Example of positioning in large rooms:



GAS CONNECTION

The connection of the warm air heater to the gas (methane or GPL.) supply shall be performed in compliance with the current National and Local Installation Standards by a qualified person. The warm air heater is delivered already tested and pre-regulated for operation with methane gas, group H (G20), and is complete with a kit for transformation into a butane gas (G30) and propane (G31) system.

Before performing the connection, make sure that:

- The type of gas is the one for which the equipment is configured.
- The pipes have been thoroughly cleansed.

Diagram for connection to the gas network

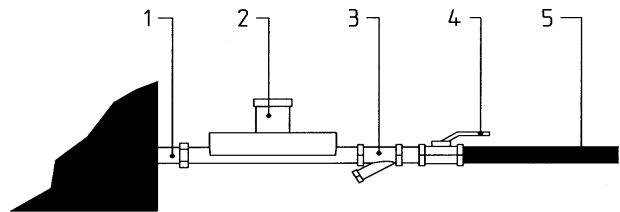
1. Male **threaded union** 1/2" gas
2. **Pressure stabiliser** * (required to ensure a correct feed pressure for the fuel gas).
3. **Filter*** (required to prevent any impurity that may be present inside the gas line, from reaching the interior of the equipment, and to ensure easy inspection and maintenance).
4. **Manual gate** * (required to isolate the equipment during all maintenance operations or prolonged shut-downs).
5. **Gas line duct** *

(* **Not included in the supply, to be installed by the Customer.**

- The dimensioning of the distribution network is correct, so as to ensure an ideal fuel flow rate and pressure, according to the "DATA SHEET" paragraph
- The gas feed piping shall be as large as or larger than the union of the equipment.



Once the installation has been completed, it is mandatory to check that the tightness of all connections, as required by National and Local Installation Standards.



Warning!

For butane gas, propane or GPL feeding, it is recommended to install a first pressure adapter next to the liquid gas reservoir, to reduce pressure down to 1.5 bar, and another adapter next to the generator but outside the building, to bring the pressure from 1.5 bar to 40 mbar max. A third reducer mounted next to the equipment ensures the correct feed pressure.

For high fuel flow rates, contact the supplier of the reservoir, in order to check whether a vaporiser should be mounted.

To prevent any problems while the reservoir is being emptied (e.g. soot or failure to start), it is recommended to install a MP pressure switch.

SMOKES EXHAUST AND COMBUSTION INLET AIR

In compliance with the applicable standards, these equipments can be installed according to any of the following three types of ducts for exhaust gases and combustive air, indicated by the symbols **B₂₂** - **C₁₂** - **C₃₂**.

Diagram **B₂₂**

In this configuration the equipment shall be connected to a single duct to discharge the combustion products outside the room. The combustive air is directly taken inside the room.

Diagram **C₁₂**

In this case the equipment shall be connected to two ducts, one for discharging the combustion products and the other for sucking the combustive air outside the room. The outlet shall be on the wall and can be made up of two separate ducts or concentric ducts.

Diagram **C₃₂**

In this case the equipment shall be connected to two ducts, one for combustion products and the other to take the combustive air outside the room where the equipment has been installed. The outlet shall be concentric and on the ceiling.

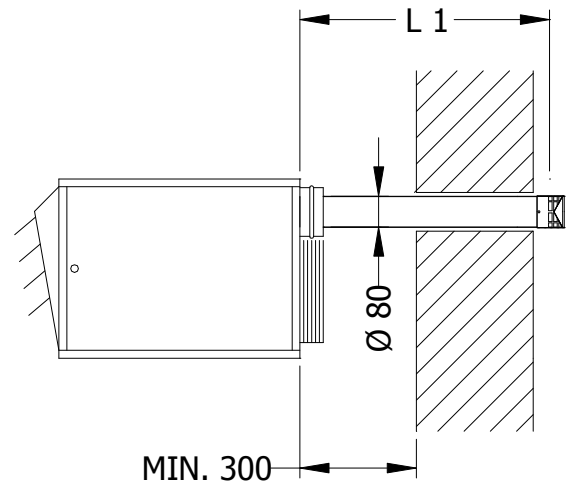
The ducts shall have the following characteristics:

- they shall be made of metal (fume duct) and their external surface shall be smooth
- their section shall not be narrower than the outlet union on the generator
- they shall be secured, to prevent any unstable positions
- they shall be provided with a wind/rain proofing terminal, to prevent any foreign matter from entering the equipment
- they shall conform to the Standards in force in the Country of installation
- they shall not exceed the minimum and maximum lengths, as specified
- they shall have a condensate drain in the lowest point of the fume exhaust duct

A picture of these types of system is available in the following pages.

B₂₂:

INSTALLATION DIAGRAM, WITH FUME EXHAUST ON THE WALL AND SUCTION OF THE COMBUSTIVE AIR FROM THE ROOM.



B₂₂:

INSTALLATION DIAGRAM, WITH FUME EXHAUST ON THE CEILING AND SUCTION OF THE COMBUSTIVE AIR FROM THE ROOM.

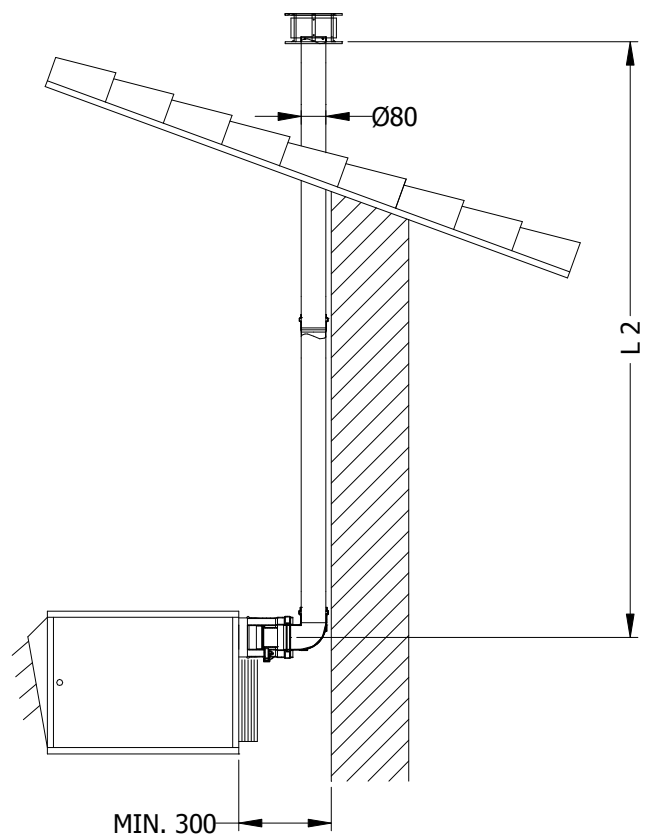


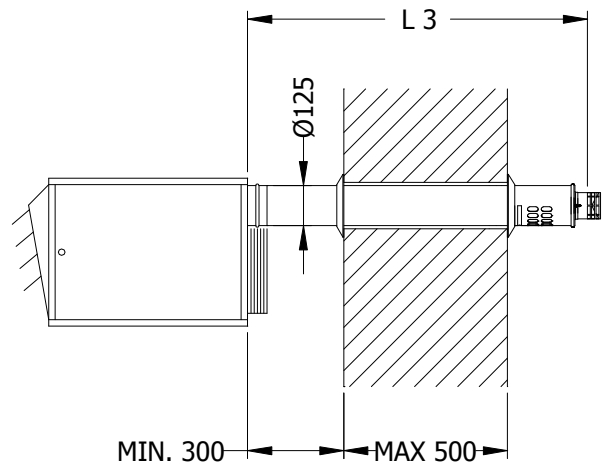
TABLE OF THE LENGTHS OF FUME EXHAUST DUCTS:

TYPE	UNIT	FUME EXHAUST ON THE WALL		FUME EXHAUST ON THE CEILING	
		L1 MIN	L1 MAX	L2 MIN	L2 MAX
1	meters	1,0	6,0	1,0	6,0
2	meters	1,0	6,0	1,0	6,0
3	meters	1,0	6,0	1,0	6,0

IMPORTANT NOTES:

- When manufacturing the fume exhaust and combustive air suction ducts, use only the accessories supplied by the manufacturer of the warm air heater.
- Make sure that the condensate, if any, inside the fume exhaust duct will not enter the warm air heater; install a condensate discharge connection in the lowest point of the duct.
- Every curve corresponds to a straight section of approx. 0.8 – 1.0 meters.

C₁₂:
INSTALLATION DIAGRAM, WITH CONCENTRIC FUME EXHAUST AND SUCTION OF THE COMBUSTIVE AIR ON THE WALL.



C₃₂:
INSTALLATION DIAGRAM, WITH CONCENTRIC FUME EXHAUST AND SUCTION OF THE COMBUSTIVE AIR ON THE ROOF.

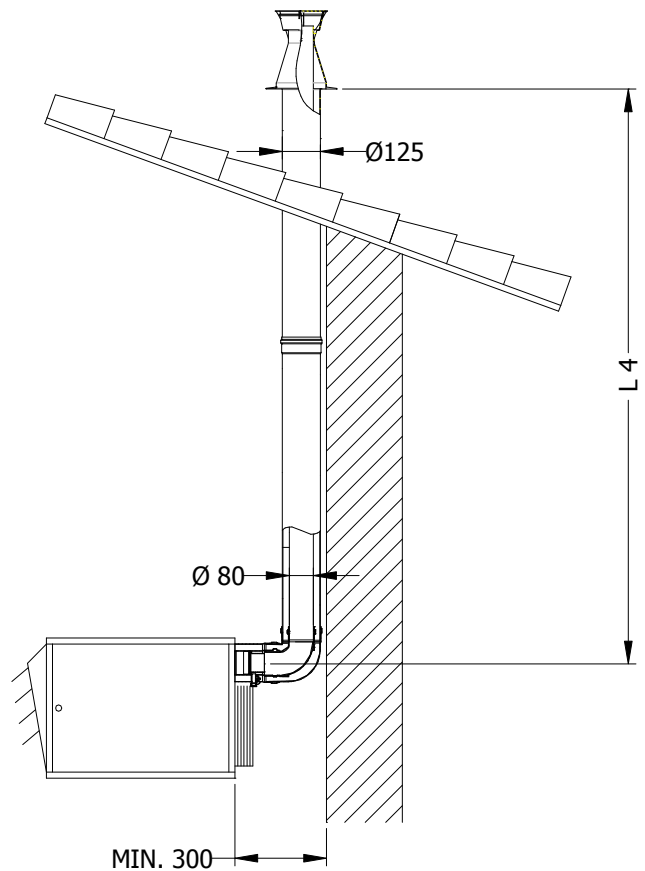


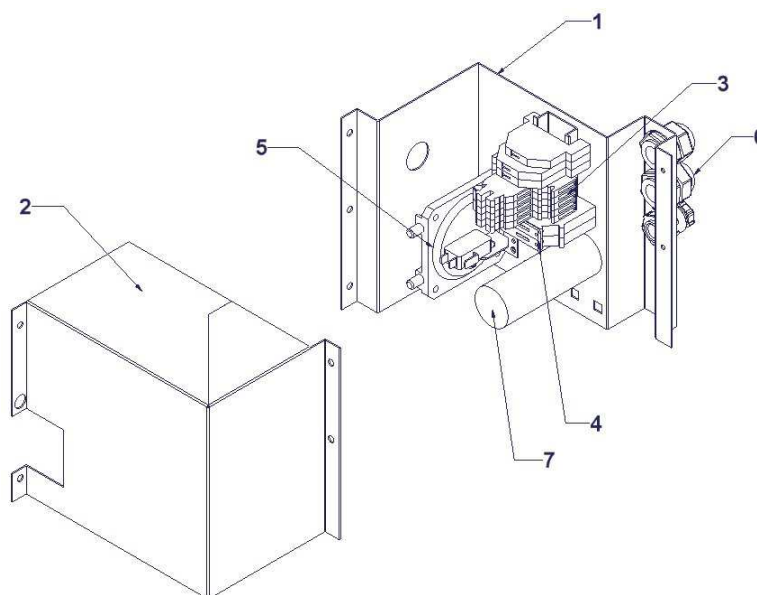
TABLE OF THE LENGTHS OF FUME EXHAUST AND COMBUSTIVE AIR suction DUCTS:

TYPE	UNIT	CONCENTRIC FUME EXHAUST AND COMBUSTIVE AIR SUCTION DUCTS ON THE WALL		CONCENTRIC FUME EXHAUST AND COMBUSTIVE AIR SUCTION DUCTS ON THE ROOF	
		L3 MIN	L3 MAX	L4 MIN	L4 MAX
1	meters	1,0	3,2	1,0	3,2
2	meters	1,0	3,2	1,0	3,2
3	meters	1,0	3,2	1,0	3,2

IMPORTANT NOTES:

- When manufacturing the fume exhaust and combustive air suction ducts, use only the accessories supplied by the manufacturer of the warm air heater.
- Make sure that the condensate, if any, inside the fume exhaust duct will not enter the warm air heater; install a condensate discharge connection in the lowest point of the duct.
- Every curve corresponds to a straight section of approx. 0.8 – 1.0 meters.

SWITCHBOARD




1. Baseplate of the switchboard
2. Switchboard cover
3. Terminal board
4. Line fuses
5. Differential pressure switch
6. Cable glands
7. Condenser


ELECTRICAL CONNECTIONS


The warm air heaters are delivered with the switchboard mounted and wired, and need to be connected to:


- the mains;
- the room thermostat;
- any other accessories of the system (fire dampers, remote control panel, summer ventilation switch etc.)


The electrical connections shall be performed by qualified personnel, according to the National and Local Standards in force, using the terminal boards provided. For any electrical work, please refer to the wiring diagrams included in this handbook.

 For a proper operation of the equipment, please respect the phase neutral polarity

 The equipment must be connected to a system provided with an effective earthing. Make sure that the earth wire is slightly longer than the line cables, so that, if broken, this wire will be the last to detach.

 The manufacturer may not be held liable for any damage caused by failure to earth the equipment.

 Install near the equipment a single-pole switch, with a contact opening of at least 3 mm.

 Install a differential magnetothermal protection upstream of every single equipment.


 It is forbidden to use the water pipes for the earthing of the equipment.

TABLE FOR THE DIMENSIONING OF THE MAIN

Type	Supply voltage (V-50Hz)	Max. current (A)	Line fuses (1) (A)	Section of line conductors (2) (mm ²)	Section of ground conductors (2) (mm ²)
1	230V 50Hz~	0,8	3,15	1,5	1,5
2	230V 50Hz~	1,2	3,15	1,5	1,5
3	230V 50Hz~	1,3	3,15	1,5	1,5

(1) Included in the supply of the machine

(2) The section of the power cables ensure a drop lower than 5% for a length of 30 meters

To perform the electrical connections, proceed as follows:
(see the drawing in the § “Switchboard”)

Connection to the mains, controls and other accessories of the system (thermostat, fire dampers, remote control panel, summer ventilation switch etc.)

1. Turn the master switch to OFF (disconnect the power supply)
2. Disassemble the cover of the switchboard **(2)**
3. Loosen the nuts of the cable gland **(6)** and insert the connecting cables

4. Connect the power cables to the terminals **(3)** according to the wiring diagram shown in this handbook
5. Tighten the nuts of the cable glands **(6)** and re-install the cover of the switchboard **(2)**



For a proper operation of the equipment, respect the phase-neutral polarity

PREPARING THE FIRST START-UP

The first start-up of the equipment shall be carried out by the authorised After-Sales Service, that after the work validates the Warranty Certificate. Before starting-up and conducting the final performance test on the generator, check that:

- all safety conditions have been respected
- the equipment has been properly positioned
- the service area around the equipment has been respected
- all fuel connections have been carried out properly
- the fume exhaust and combustive air ducts have been installed properly

- all the cocks of the different circuits are open
- all electrical connections have been completed properly
- the fuel is compatible with the presetting of the equipment



During the first start-up, there may be some smell or fumes caused by the evaporation of the liquid which protects the heat exchanger during storage; these circumstances are normal and the problem disappears after a short period of operation. It is recommended to ventilate the room properly.

FIRST START-UP

VENTILATION FUNCTION

- Turn on the equipment
 - Turn the switch of the remote control panel (if available) to the “VENTILATION” position.
- At this point, only the fan can work, and the air is injected into the room at the return temperature.

HEATING FUNCTION

- Turn on the equipment
- Turn the switch of the remote control panel (if available) to the “HEATING” position
- Set the room thermostat to the desired temperature
- At this point, the electronic equipment supplies the extractor of combustion products, and after checking the differential pressure switch and the pre-washing function of the combustion chamber, the flame is lighted. After approx. 60 seconds, the fan is started and the hot air is injected into the room to be heated.

When the temperature preset on the room thermostat is reached, the burner turns off, followed by the fan after approximately 3 minutes.

The whole cycle is automatically repeated whenever the temperature drops below the value preset on the room thermostat

- Turn the main magnetothermal switch to “ON”
- Set the room thermostat to the desired temperature
- Remove any anomaly reports indicated by the yellow and/or red lamps, by pressing the relevant reset push-buttons.

The fume extractor will be operated, by switching the electric contact of the differential pressure switches. Once the combustion chamber has been pre-washed, the electronic equipment will power the switch-on device and the gas solenoid valve at the same time.

FIRST START-UP

- Connect the pressure gauge to the pressure intake downstream from the pressure reducer of the gas solenoid valve

It may happen that, due to the possible presence of air inside the gas piping, the burner is not started after the first attempt, resulting in the activation of the device which blocks the equipment. In this case, it is necessary to repeat the start-up operation by pressing the reset push-button.

⚠ WARNING! Before a block occurs, the equipment performs three start-up attempts. Before pressing the reset push-button, wait for at least 10 seconds.

- With the burner ON, check the gas pressure on the connected pressure gauge, and if necessary bring it to plate values again, using the screw of the solenoid valve's pressure regulator
- Make sure that the gas consumption read on the meter matches with the data indicated in the DATA SHEET chapter
- Stop the burner by opening the contact of the room thermostat, turn the main magnetothermal switch to "OFF" and close the gas cock. Disconnect the pressure gauge and make sure that the pressure intake screw is secured, to prevent any gas leaks
- Re-open the gas cock, turn the main magnetothermal switch to "ON" and set the room thermostat to the desired temperature.
At this point, the warm air heater is ready for use

⚠ WARNING! The equipment must work with the burner compartment doors closed.

STOP

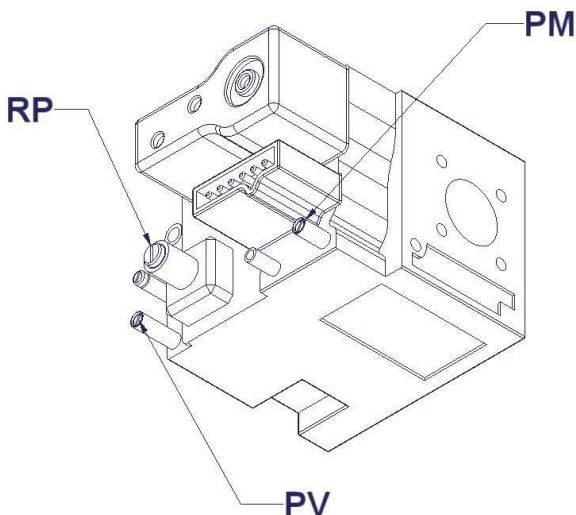
To stop the operation of the heater, use also the room thermostat by setting it to minimum temperature or by opening the contact of its switch (if available). Wait until the fan stops (after about 3 minutes), and then, if necessary, disconnect the voltage via the main magnetothermal switch. In case of prolonged shut-down, close also the gas cock.

⚠ WARNING!

The equipment shall never be stopped by disconnecting the main power supply (i.e. by cutting off also the post-ventilation), since the thermal energy accumulated inside the heat exchanger may dangerously overheat it and damage also the warm air heater. Furthermore, the LIMIT thermostat may be activated, requiring a manual release.

SOLENOID VALVE - GAS SIT 840 SIGMA

- PM** Pressure intake upstream of the pressure regulator
- PV** Pressure intake downstream of the pressure regulator
- RP** Screw of the pressure regulator



GAS TRANSFORMATION

The warm air heaters are supplied preset for H (G20) methane gas operation, under the conditions reported in the following table:

Methane gas H (G20)

TYPE	1	2	3	
Number of injectors	1	1	1	N°
Injector diameter	345	425	490	mm/100
Gas feed pressure	20			mBar
Pressure to injectors	12,5	13,0	13,0	mBar

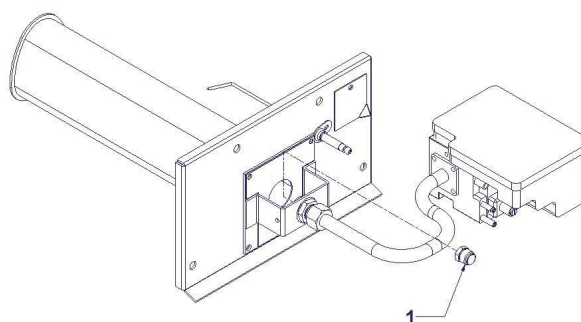
Every single equipment is provided with a kit for using another type of gas. This transformation shall be performed only by the local After-Sales Service, or by personnel authorised by the manufacturer, although the thermal unit has already be installed. To do this, proceed as follows.

Instructions for transformation from G20 methane gas to G31 propane and G30 butane:

1. Replace the gas injector
2. Set the gas feed pressure
3. Set the gas pressure to the injector
4. Mount the primary air diaphragm (where required)
5. Replace the stick-on label with the configuration of the equipment

REPLACING THE GAS INJECTOR:

- Unscrew and disassemble the injector (1) with a 13 mm Allen wrench
- Take the new injector available in the transformation kit and tighten it.



Propane gas (G31)

TYPE	1	2	3	
Number of injectors	1	1	1	N°
Injector diameter	210	255	300	mm/100

Butane gas (G30)

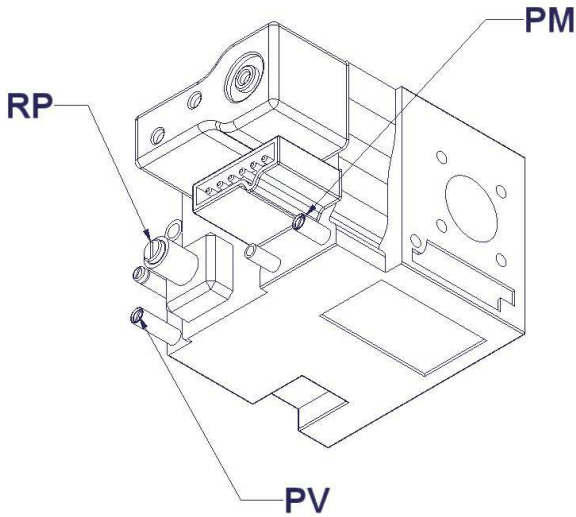
TYPE	1	2	3	
Number of injectors	1	1	1	N°
Injector diameter	210	255	300	mm/100

The gas injector shall be replaced with the equipment stopped (cold) and isolated from the mains and the gas feed line.

It is recommended to be very careful with the diameter of the hole indelibly printed directly on the injector.

It is recommended to be very careful with the injectors' tightening torque, in order to ensure the perfect tightness of the gas circuit, that must always be checked during the first start-up.

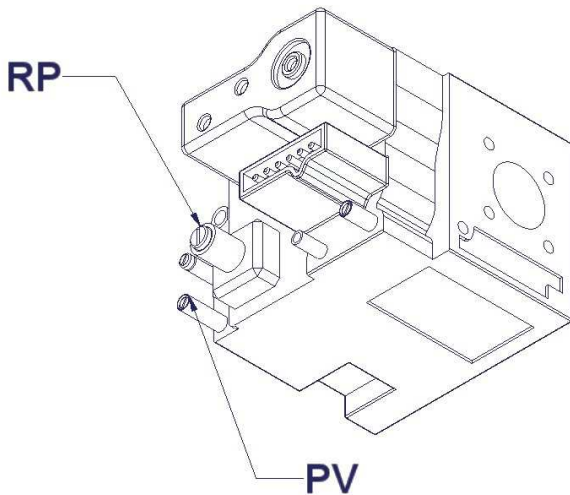
SETTING THE GAS FEED PRESSURE



- Connect a pressure gauge to the pressure intake upstream of the pressure regulator (**PM**)
- Set the gas pressure using the pressure regulator positioned upstream of the equipment (not included in the supply)

⚠ To prevent any irreparable damage to the gas solenoid valve unit, the gas feed pressure must never exceed 60 mBar.

SETTING THE GAS PRESSURE TO THE INJECTOR

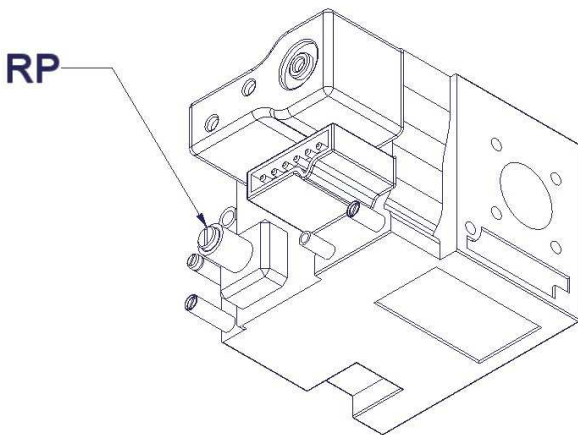


To set the gas pressure to the injectors:

- Connect a pressure gauge to the pressure intake downstream of the pressure regulator (**PV**)
- Set the gas pressure via the pressure regulator of the solenoid valve (**RP**)

⚠ After each setting, it is necessary to seal the pressure regulator with paint.

SETTING THE PRESSURE GAS TO THE INJECTOR WITH PROPANE GAS (G31) AND BUTANE GAS (G30)



For operation with G31 propane gas and G30 butane, the control device for the gas pressure of the solenoid valve shall be cut-out. In this way, the fuel flow and, accordingly, the heating capacity of the equipment depend only on the injectors' feed pressure and diameter.

To cut out the control device of the gas solenoid valve, with the heater on, tighten the **RP** screw.

⚠ After each setting, it is necessary to seal the pressure regulator with paint.

GAS PRESSURE TABLE

Methane gas (G20)

TYPE	1	2	3	
Gas feed pressure		20		mBar
Pressure to the injectors	12,5	13,0	13,0	mBar

Propane gas (G31)

TYPE	1	2	3	
Gas feed pressure		37		mBar
Pressure to the injectors	36,5	36,5	36,5	mBar

Butane gas (G30)

TYPE	1	2	3	
Gas feed pressure		30		mBar
Pressure to the injectors	29,5	29,5	29,5	mBar

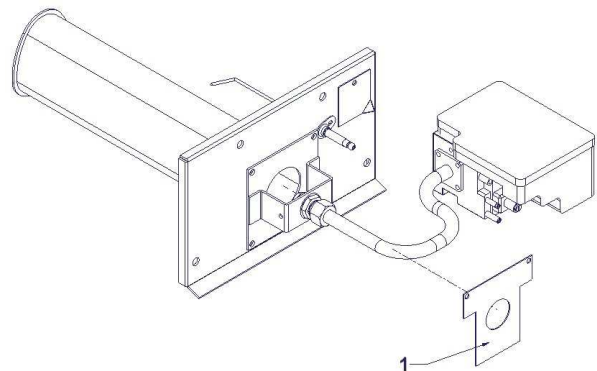
PRIMARY AIR MOUNTING

For operation with G31 propane gas or G30 butane gas, the equipments are equipped with a primary air diaphragm, to be installed according to the following figure:

- Unscrew only the two upper self-tapping screws which secure the burner tubular.
- Take the primary air diaphragm (1) from the transformation kit, position and secure it with the disassembled screws.



The primary air diaphragm shall be installed only for operation with G31 propane gas and G30 butane gas. When using methane gas, it must be disassembled.



STICK-ON LABEL FOR GAS PRESETTING

The gas transformation kit is complete with a stick-on label that, once the transformation has been completed, shall be applied onto the shop-installed label. This label shall cover all the previous label, so that no doubt may arise as to the equipment presetting.



WARNING!

It is recommended to be very careful with the diameter of the mounted nozzles and to check that the pressure of the gas to the burner, measured using the pressure intake on the heater, matches with the plate data. Once the transformation has been completed, replace the stick-on label on the header with the one delivered together with the Transformation Kit.

Make sure that all the components of the gas feed system are dimensioned for the device to be installed (tank, piping, pressure cocks, vaporizer etc.). Furthermore, seal the pressure regulator after every setting.

FLUE DIAPHRAGM

The equipment is delivered preset for operation with the exhaust ducts for the combustion products and the combusive inlet air ducts in their maximum length. If the equipment is installed with ducts of minimum length, in order to optimize the thermal efficiency it is necessary to reduce the capacity of the fume extractor, by mounting a diaphragm.

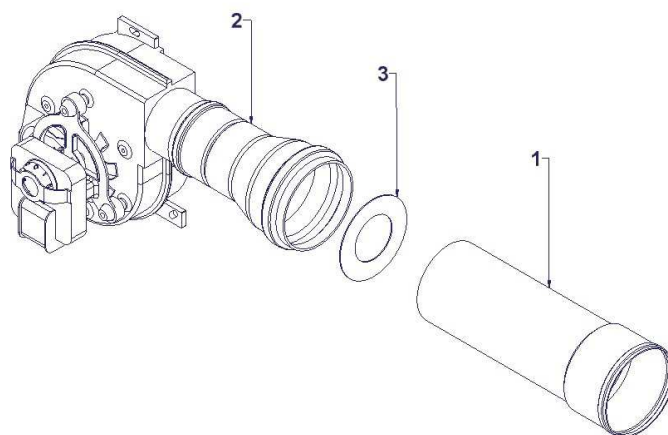
TABLE OF THE DIAMETERS OF THE FLUE DIAPHRAGM:

EQUIPMENT	DIAMETER OF THE FLUE DIAPHRAGM, WITH FUME EXHAUST AND COMBUSTIVE INLET AIR DUCTS OF MINIMUM LENGTH	DIAMETER OF THE FLUE DIAPHRAGM, WITH FUME EXHAUST AND COMBUSTIVE INLET AIR DUCTS OF MAXIMUM LENGTH
Tipo 1	Ø 42 mm	Ø 44 mm
Tipo 2	Ø 47 mm	Ø 50 mm
Tipo 3	Ø 60 mm	No diaphragm is installed

ASSEMBLY INSTRUCTIONS FOR THE FLUE DIAPHRAGM:

- Remove the stub pipe Ø 80 mm (1) from the adapter Ø 60/80 mm (2)
- Replace or mount the flue diaphragm (3)
Pressure-fit the stub pipe Ø 80 mm (1), being careful that it properly clamps the flue diaphragm (3) in the correct position.

! WARNING!
During this operation, be very careful that the seals are not damaged.



THERMOSTATS

The warm air heaters are provided with thermostats, with FAN and LIMIT function.

• FAN FUNCTION

This function is performed by a contact thermostat positioned on the heat exchanger. When the temperature reaches the thermostat's calibration value (42°C) and after some 60 seconds from the start-up of the burner, the electric contact closes and the fan is started.

When the temperature drops below the thermostat's calibration value (42°C) and after some 3 minutes from the burner stop, the electric contact opens and the fan is stopped. This function prevents the injection of uncomfortable cold air currents into the room, during start-up, and the dissipation of the thermal energy accumulated by the exchanger, ensuring its use before the stop.

• LIMIT SAFETY FUNCTION

When, due to an operating anomaly, the air near the sensor overheats and the temperature exceeds the value preset on the thermostat (100°C), the electric contact opens, the burner is turned off and after three unsuccessful attempts to start-up the equipment the red lamp lights up. The reset is manual, by pressing both the thermostat's reset push-button or the red lighted push-button.

CHECKS

To check the proper operation of the equipment, it is necessary to inspect a few essential parameters. Start the equipment and:

- check that the ventilating unit starts after approximately 60 seconds from the start-up of the burner.

With the warm air heater at full speed (after approximately 20 minutes of uninterrupted operation), proceed as follows:

- check the correct opening of the horizontal vanes. A correct air flow rate is essential to obtain the perfect heating of the room, and is also necessary to properly cool the heat exchanger. For this reason, it is essential that there is no resistance on the air flow generated by the fan, avoiding the presence of obstacles on the air discharge and intake, and that the guide vanes (both horizontal and vertical, where installed) are open, as indicated in the paragraph "Adjusting the guide vanes";
- check that there are no fuel leaks;
- check the correct fuel flow rate, by measuring it with a meter;
- check the gas feed pressure and the gas pressure to the injector;
- check the combustion data;
- check that the Δt matches with the nominal value specified in the § "Data Sheet". The Δt is the

differential between the air discharge and the suction temperature. Because the air discharge temperature is not constant in its outlet section, in order to obtain this value it is necessary to take several temperature measurements (on the whole outlet section) and to proceed with the arithmetic mean.

- check that the LM safety thermostat is not activated in an anomalous way;
- check that the thermal protection devices of the fume extractor's motor and propeller fan are not activated in an anomalous way;
- open the contact of the room thermostat and check that it works only on the burner, and that the ventilating unit is not stopped simultaneously;
- check that the air flow rate matches with the nominal value indicated in the § "Data Sheet".
- check that the power input of the propeller fan's motor does not exceed the plate value;
- check that the fan works for approximately 3 minutes also after the burner has been turned off, before stopping;
- check that there is no condensation phenomenon affecting the combustion products.

MAINTENANCE

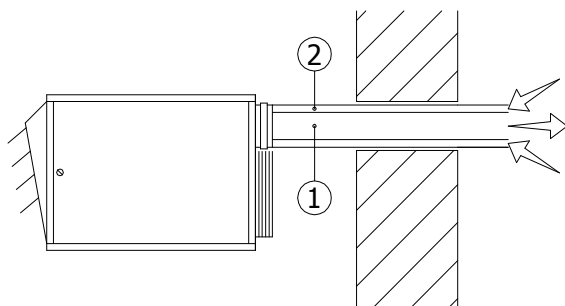
For a proper operation and preservation of the equipment, It is recommended to perform routine cleaning and maintenance operations:

- all these operations shall be performed by trained and qualified personnel, with the equipment stopped (cold), after disconnecting the power/fuel supply;
- it is recommended to wear safety gloves;
- all maintenance and/or cleaning operations on the equipment requiring the use of a ladder on another similar access equipment shall be performed in full safety, using suitable systems.

COMBUSTION PRODUCT SAMPLING

In order to analyse the combustion of the equipment, the sampling of combustion products shall be performed at the levels indicated in the following scheme:

EXAMPLE OF SAMPLING WITH THE EQUIPMENT INSTALLED ON THE WALL, WITH COAXIAL DISCHARGE OF COMBUSTION PRODUCTS AND COMBUSTIVE INLET AIR:



1. Sampling point for combustion products.
2. Sampling point for the combustive air.

• CLEANING THE EXHAUST AND SUCTION DUCTS

To clean the fume exhaust and combustive inlet air ducts, mechanically remove all the dust and foreign matter, if any, from its interior.

• CLEANING THE ELECTROFAN

To clean the fan, mechanically remove all the dust and foreign matter, if any, from its impeller, motor and protective grille.

• CLEANING THE FUME EXTRACTOR

To clean the fume extractor, mechanically remove all the dust and foreign matter, if any, from its impeller.

• LIMIT THERMOSTAT

Check the operation of the LIMIT thermostat every year, by simulating its activation and checking that the burner turns off.

• CLEANING THE BURNER

To clean the burner, take it away from its seat and remove the fouling, if any, from the tubular, using **only** compressed air or a brass brush. Replace all the broken tubular pieces and seals.

• ADJUSTING THE GUIDE FINS

A correct air flow is essential to obtain a perfect heating of the room, and is also necessary to properly cool the heat exchanger.

For this reason, there shall be no resistance on the air flow generated by the fan, avoiding any obstacles on the air discharge and return, and the guide vanes (both horizontal and vertical) shall be open, as specified in the § "Adjusting the guide vanes".

It is also necessary to check, from time to time, that there is no foreign matter which may affect the free circulation of the air (e.g. paper and/or rugs on the protective grille on the fan and/or on the air terminal device).

• CHECKING THE FASTENING ELEMENTS

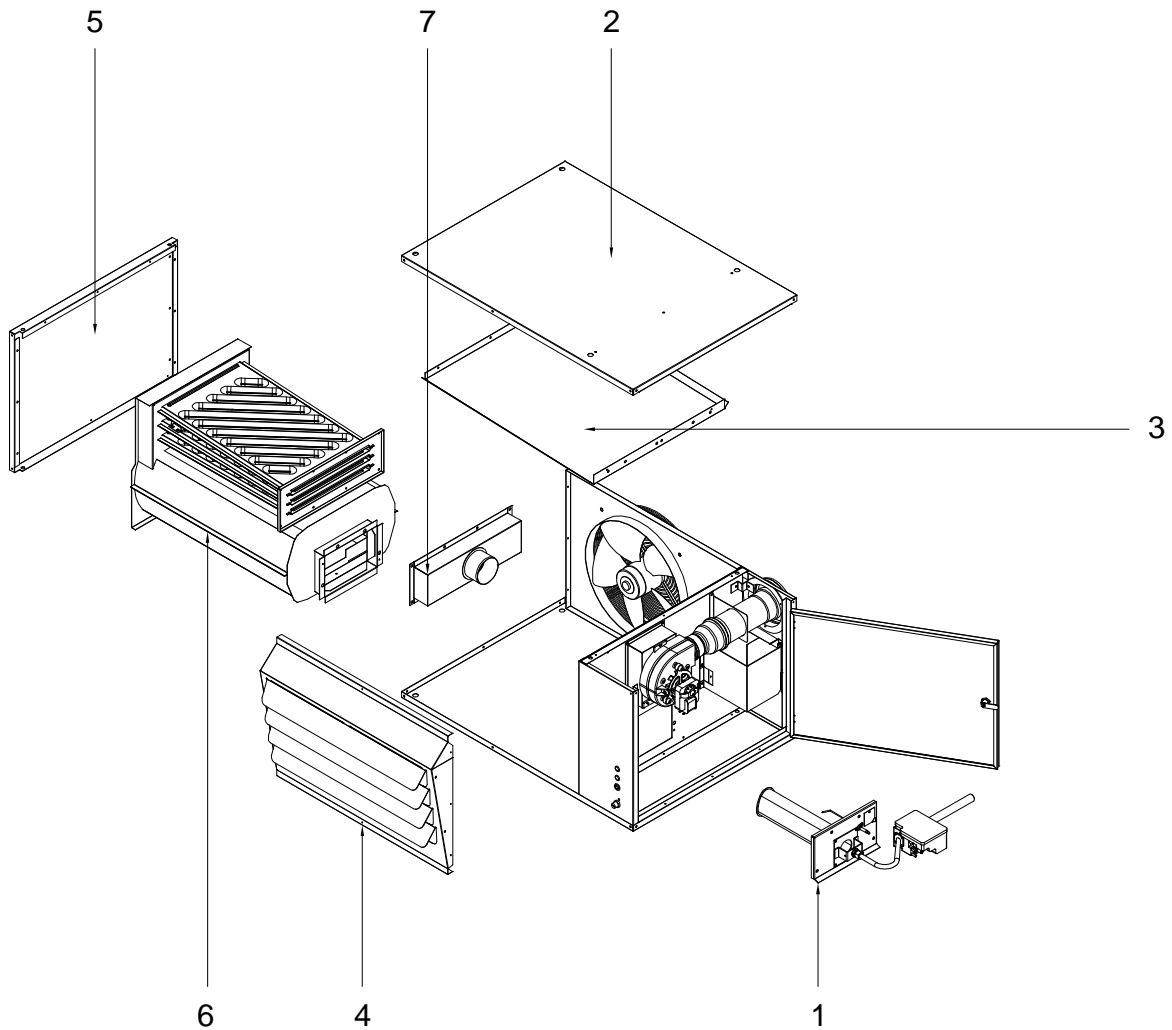
Regularly check the correct fastening of all screws and bolts of the equipment.

• POSITIONING THE FLAME DETECTION AND TRIGGER ELECTRODE

For a correct start-up and operation of the equipment, it is important to check the exact position of the trigger-ionization electrode. In particular, check that the ignition discharge occurs near the slots of the burner tubular, at a distance of 3-4 mm, and that the electrode rod is immersed in the flame.

● **CLEANING HEAT EXCHANGER**

The heat exchanger shall be cleaned by qualified personnel, and is subject to strict Standards. In this respect, it is recommended to clean it at least once a year, at the beginning of each winter season. To perform this operation, proceed as follows:



- Disconnect the equipment from the mains, the fume exhaust and combustive air ducts, the gas feed line, and place the equipment onto the ground.
- Remove the burner unit **(1)** from its seat, after disconnecting the gas solenoid valve unit.
- Remove the upper panel **(2)**
- Remove the upper conveyor **(3)**
- Remove the diffuser panel **(4)**
- Remove the left-hand side panel **(5)**
- Remove the whole exchanger **(6)**
- Disassemble the front fume breaching **(7)** of the heat exchanger
- Clean the exchange elements using suitable mechanical or chemical products, or a water cleaning machine
- Remove from the combustion chamber, using an exhauster, all the soot from the exchange elements
- Clean all the external surfaces of the exchanger
- Re-assemble all these pieces, and be very careful with the seal; replace the different gaskets, if necessary

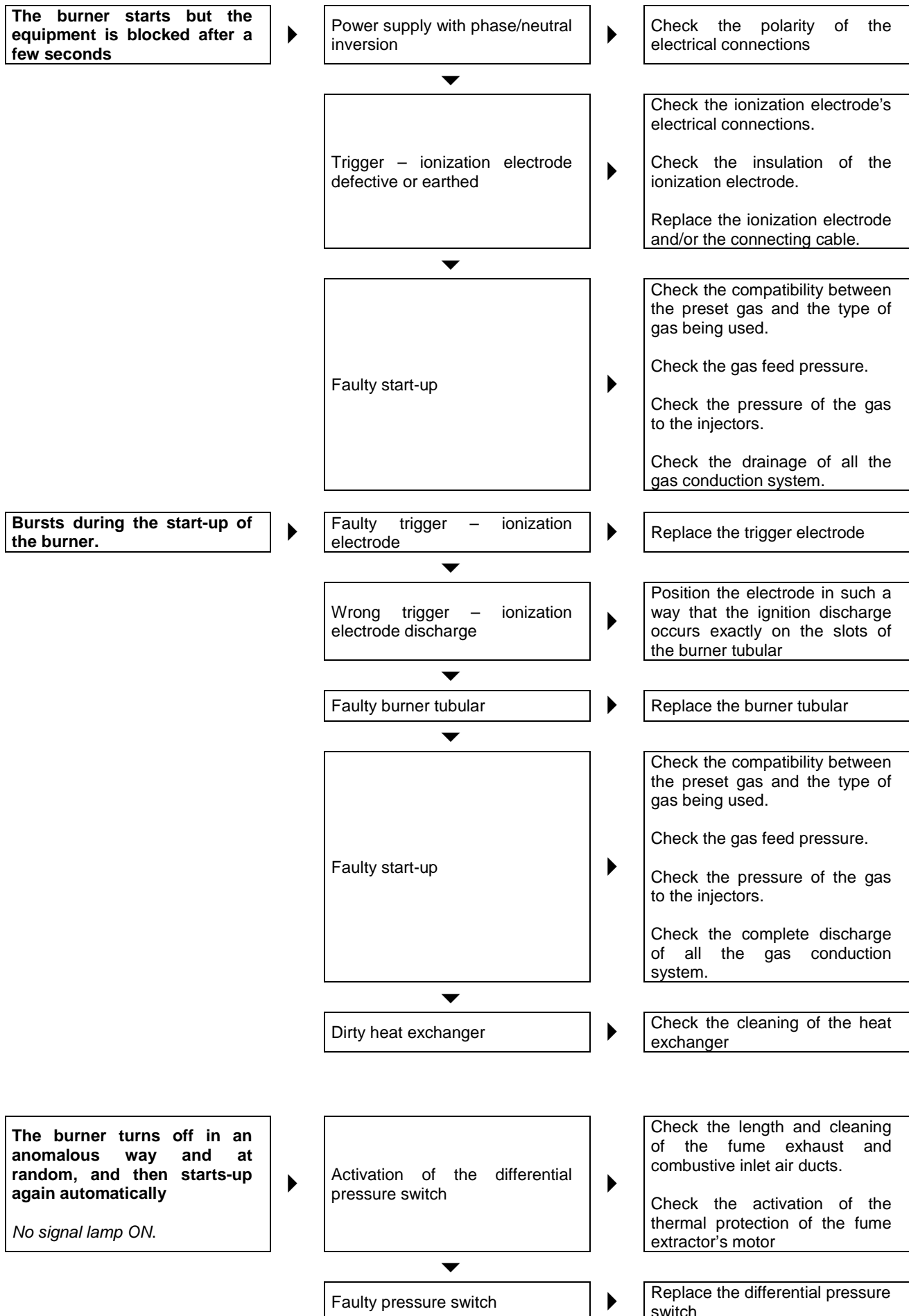
ANOMALIES – CAUSES – CORRECTIVE MEASURES

In case of anomalous operation of the warm air heaters, make sure that :

- no blackout has occurred
- there are no voltage drops exceeding +15%, -15%
- the gas is fed

the pressure and the gas flow rate match with the values indicated in the “DATA SHEET” chapter.

ANOMALY	CAUSE	CORRECTIVE MEASURE
<p>The equipment does not work (in heating mode or in summer ventilation)</p>	<p>Power failure</p>	<p>Check the master switch. Check the mains. Check the line fuses. Check the electrical connections</p>
<p>No discharge of the trigger electrode. <i>The fume extractor is working</i> <i>No signal lamp is ON</i></p>	<p>Activation of the differential pressure switch</p>	<p>Check the length and cleaning of the fume exhaust and combustive inlet air ducts.</p>
	<p>Faulty differential pressure switch</p>	<p>Replace the differential pressure switch</p>
	<p>Faulty connection to the differential pressure switch</p>	<p>Check the cleaning and proper condition of the pipe connecting the pressure switch to the exchanger. Make sure there is no condensate in the pipe connecting the pressure switch to the exchange.</p>
	<p>Faulty fume extractor</p>	<p>Replace the fume extractor</p>
	<p>Failure of the electronic flame control equipment</p>	<p>Replace the electronic flame control equipment</p>
	<p>Trigger – ionization electrode earthed</p>	<p>Check the proper condition of the ceramic insulator of the ionization electrode. Check that the rod of the ionization electrode is not earthed</p>
<p>No discharge of the trigger electrode. <i>The fume extractor is working</i> <i>No signal lamp is ON</i></p>	<p>Room thermostat open</p>	<p>Check the closing of the contact of the room thermostat.</p>
	<p>Faulty fume extractor</p>	<p>Replace the fume extractor</p>
	<p>Failure of the electronic flame control equipment</p>	<p>Replace the electronic flame control equipment</p>



The burner turns off after the intervention of the LIMIT (LM) safety thermostat.
Push-button – red lamp ON

Room thermostat in the warm air flow

Check the position of the room thermostat sensor

Overheating of the discharge air, due to an excess heating capacity.

Check the gas feed pressure.
Check the pressure of the gas to the injectors.
Check the compatibility between the preset gas and the type of gas being used.
Check the diameter of the installed injectors.

Overheating of the discharge air, due to an insufficient air flow.

Check the performance and cleaning of the propeller fan.
Check the opening of the horizontal and vertical vanes (if installed) of the discharge panel.
Check that there are no obstacles hindering the air circulation.

Faulty thermostat

Replace the thermostat

Faulty propeller fan

Check the condenser of the propeller fan's motor.
Check the propeller fan's motor.

Activation of the thermal protection of the fan motor

Check the activation of the thermal protection of the propeller fan's motor, due to an overload and/or insufficient cooling

Faulty FAN function

Replace the multifunction electronic board and/or the SND probe

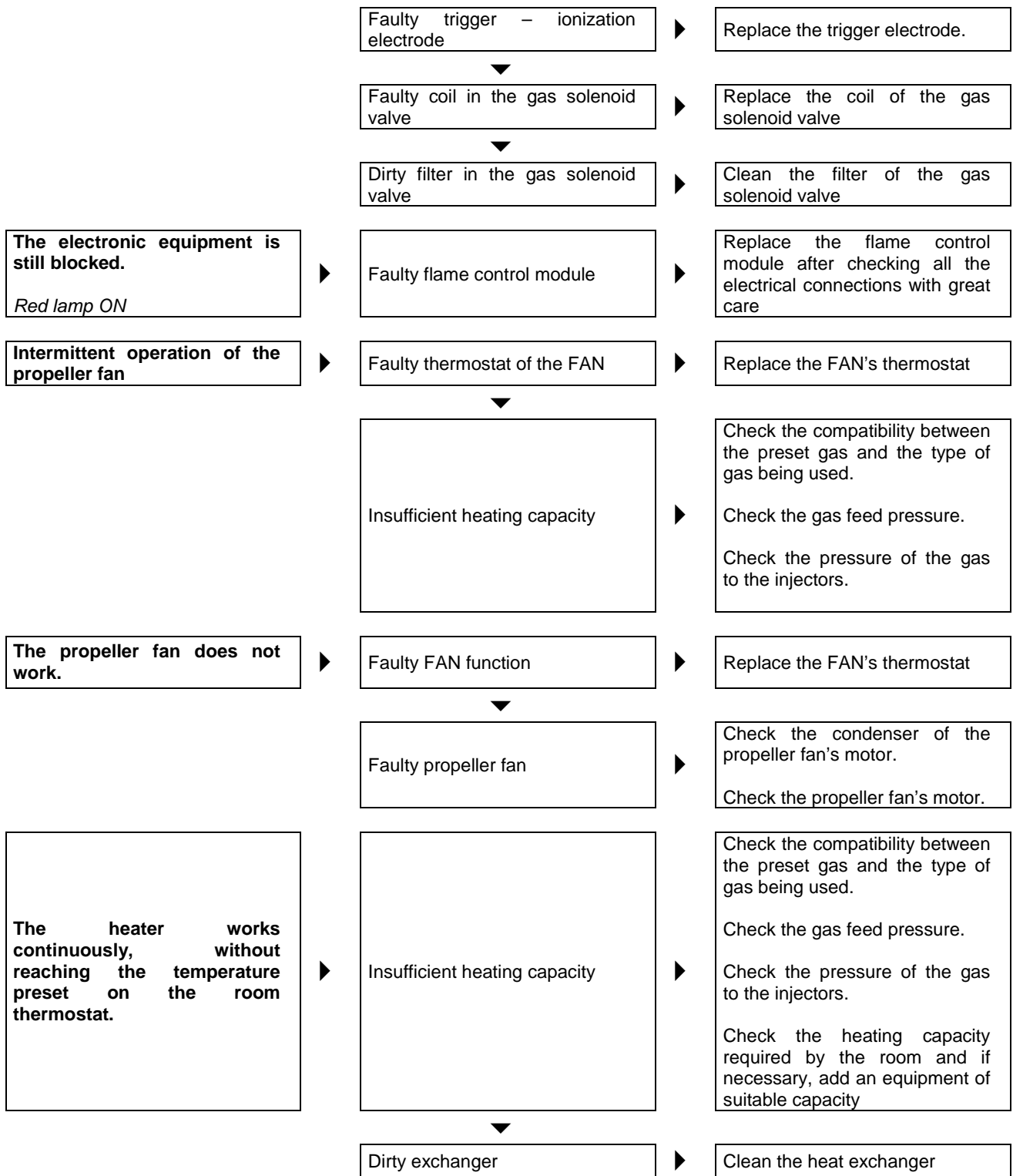
The electronic equipment is blocked.
Red lamp ON

Faulty switching-on

Check the compatibility between the preset gas and the type of gas being used.
Check the gas feed pressure.
Check the pressure of the gas to the injectors.
Check the discharge of the whole gas conduction system.

Defective or earthed trigger – ionization electrode

Check the ionization electrode's electrical connections.
Check the insulation of the ionization electrode.
Replace the ionization electrode and/or the connecting cable.





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