



**INSTALLATION AND OPERATION**

**MCS** **MASTER**<sup>®</sup>  
CLIMATE SOLUTIONS



**SERIES BF**

Dear Customer,

Thank you for choosing a **HOT AIR GENERATOR** from the **BF**, series, an innovative, modern, high-quality and high-performance product that will provide you comfort, maximum silence and safety for a long time, especially if the appliance is entrusted to a **DANTHERM** Technical Assistance Service that is specifically prepared and trained to maintain it at the highest level of efficiency with lower operating costs and, if necessary, provide original spare parts.

This User Manual includes important instructions and recommendations that should be complied with, in order to easily install and to better use the **HOT AIR GENERATOR** from the **BF** series

Thank you.

**Dantherm S.p.A.**

GENERAL  
INFORMATION

**COMPLIANCE**

The hot air generator mod. **BF** complies with:

- Machinery directive 2006/42/EC
- Low Voltage Directive 2006/95/EC
- Electromagnetic Compatibility Directive 2004/108/EC
- Regulation 2016/2281
- Directive 2009/125/CE

GENERAL  
INFORMATION

**RANGE**

This manual includes references to the TYPE. The following table shows the series and the correspondence between the TYPE and the TRADE NAME

TYPE	TRADE NAME
1	<b>BF 35</b>
2	<b>BF 75</b>
3	<b>BF 105</b>

GENERAL  
INFORMATION

**WARRANTY**

The **BF** air generator is covered by a **SPECIFIC WARRANTY**, which starts from the purchase date, which should be proved by the Customer through the relevant documents; if the customer is unable to present the relevant documents, the warranty starts from the machine manufacturing date. The warranty conditions are specified in the **WARRANTY CERTIFICATE**, provided together with the machine. We suggest reading it carefully.

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In the manual, the following symbols are used:



**WARNING** = operations requiring appropriate care and preparation



**FORBIDDEN** = operations that MUST NOT be performed, in any case



This manual is an integral part of the machine, therefore it should always be carefully kept and it should always be provided together with the machine, if it is transferred to another owner or user. If this manual is damaged or lost, a new one should be requested from the local Technical Assistance Service or from the Manufacturer.

After unpacking the product, check the integrity and completeness of the contents. If not, contact the Agency that sold the unit.

The installation of the appliance must be carried out by an authorized company which, at the end of the work, issues to the owner the Declaration of Conformity of Installation made in accordance with the rules, therefore in accordance with the Standards and the instructions provided by the Manufacturer in this instruction manual.

This appliance has been manufactured for room heating and it must be used for this purpose, compatibly with its performance characteristics.

Any contractual or extra-contract liability of the Producer in respect of damages caused to people, animal or things by a non correct installation, setting or maintenance or by the improper use of the machine is excluded.

If the temperature is too high, it could be harmful to health and would be a useless waste of energy. Do not leave the rooms closed for a long time. Periodically open the windows to ensure proper ventilation.

During the initial start-up, there may be the formation of odours and fumes due to the evaporation of the liquid added to protect the heat exchanger during storage; this is normal and it will disappear after a short period. It is recommended to suitably ventilate the room.

If you will not be using the unit for long periods, carry out the following operations:

- turn the main switch of the unit and the general switch of the plant to "OFF"
- close the main fuel supply valve

In case of long periods during which the equipment is not operated, it is recommended to contact either After-Sales Technical Assistance Service or anyhow professionally qualified personnel for its new start-up.

The machine shall be fitted only with original accessory equipment. The Producer is not liable for damages arising from the improper use of the machine or from the use of non-original materials or accessories.

References to Laws, Regulations, Directives and Technical Rules mentioned in this manual are provided only for information purposes and as they are in force when the manual is printed. The entry into force of new provisions or amendments to current laws does not represent an obligation of the manufacturer towards third parties.

Repairs or maintenance must be performed by the Technical Assistance Service or by qualified personnel in accordance with this manual. Do not modify or tamper with the appliance as dangerous situations can be created and the manufacturer will not be liable for any damage caused.

The systems that are to be created (gas pipes, power supply, etc.) must be suitably secured and must not be dangerous with the risk of tripping.

The Producer is responsible for the product compliance with Laws, Directives or Construction Rules in force when the product is marketed. The knowledge and observance of the laws and standards regarding plant design, installation, operation and maintenance are the sole responsibility of the designer, installer and user.

The Producer shall not be held responsible for failure to comply with the instructions of this manual, for the consequences of any operations carried out and not specifically provided for or for translations open to misinterpretation.

The electrical system must feature suitable individual and independent electrical protections for each appliance which, in case of accidental failure, will be activated on the single appliance without prejudice to the proper operation of the other units present on the installation.

**The appliance is designed to be operated with the heating capacity and the air flow rate specified in the Data Sheet chapter. If the heating capacity is too low and/or the air flow rate 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 flow rate 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**



Bear in mind that if you use products powered through electric power, gas, etc., you should comply with some basic rules, such as:

Children and unassisted disabled people must not use the hot air generator.

Do not operate electrical devices such as switches, electrical appliances, etc. if you can smell fuel. In this case:

- air the room by opening doors and windows;
- close the fuel control device;
- promptly request the intervention of the Technical Assistance Service or of skilled personnel

Do not touch the unit barefoot or when parts of the body are wet or damp.

Do not clean or perform maintenance before disconnecting the unit from the electrical power supply by turning the main switch of the system to "OFF", and shutting-off the fuel.

Do not modify the safety or adjustment systems without authorization and the instructions of the manufacturer of the unit.

Do not pull, disconnect and twist the electrical cables coming from the unit, even if it is disconnected from the electrical power supply.

Do not open the access doors to the inside of the unit, without turning the main switch of the unit to "OFF".

Do not dispose of, abandon or leave within the reach of children, the packaging materials (cardboard, staples, plastic bags, etc.), as they may be potentially dangerous.

Do not install the unit near flammable material, or in rooms with an aggressive atmosphere.

No object should be placed over the machine nor inserted through its case grill or through the combustion product exhaust ducts.

The exhaust duct should not be touched, since during normal operations it might reach high temperatures, being therefore dangerous to be touched.

Do not use adaptors, power strips and extension cables for the electrical connection of the unit.

Do not install the unit beyond the limits of use and operation shown in the instruction manual.

The warm air heater shall not be directly installed in small areas lacking proper ventilation, since the air intake might cause a remarkable depression within the room, causing serious problems.

It is prohibited to install the device outdoors and directly exposed to weathering.

Disposing of the appliance must be performed by an authorised company and in compliance with the applicable laws. Before taking waste to Authorised Collection Centres, dismantle and separate the various materials that compose it which in summary are:

- ferrous materials
- aluminium and copper
- electrical wiring
- Seals and insulating materials
- plastic materials
- electronic cards



The hot air generator is essentially a heat exchange unit between products of the combustion of a single-stage blown-air burner and a flow of air produced by a high-performance fan unit.

The air to be heated is drawn in by the latter and by touching the hot surfaces of the heat exchanger it is heated increasing in temperature; it can then be distributed either directly or through suitable channels.

Thanks to its features, the centrifugal fan can be installed in plants requiring the distribution of the heated through channels or, in general, where static pressure is needed.

Through this heating system, the plant costs can be remarkably reduced and a reliable operating economy can be reached; therefore, it is particularly fit for those cases where it will be used occasionally and discontinuously.

In summer, it is also possible to use only the fan unit.

### Heat Exchanger:

It is made of welded stainless steel, it can be easily inspected for ordinary cleaning and maintenance operations and it comprises the following elements:

- **STAINLESS STEEL AISI 430 stainless steel combustion chamber** with low thermal load, cylindrical and with volume.
- **Steel exchange elements** with a large surface, with a decreasing section and with opposing turbulencing prints.
- **Steel flue gas manifold**, equipped with an inspection door.

### External casing:

The casing consists of panels in pre-painted and/or powder-coated sheet metal and also includes:

- Anti-radiant thermal insulation of the surfaces exposed to the heater irradiation.
- Plenum for direct air diffusion with delivery nozzle on the four sides and adjustable horizontal fins that can be closed to exclude one side if necessary.
- Pre-cut hole to connect another secondary hot air distribution circuit.
- Cover to protect the burner and the tank (where present), with large inspection door.

### Fan assembly:

It consists of a centrifugal fan with a low level of sound emission and high performance.

### Safety and control thermostat:

The appliances are equipped with thermostats with sensitive elements positioned on the air delivery (pre-calibrated and electrically connected at the factory), with the following functions:

- **"FAN" function** (FAN thermostat – calibration +35°C), it activates the fans max. 60 seconds after the burner has started and it stops them approx. 4 minutes after it has stopped. Thus, it prevents unpleasantly cold air from being released in the room when the machine is activated and the thermal energy accumulated by the heat exchanger can be exhausted, by completely using it before the machine stops.
- **"LIMIT" function** (LM Thermostat - sealed calibration: +100 °C): it stops the burner if the air is abnormally overheated. It shall be manually restarted.

**Smoke discharge inlet:**

The machine is fitted with a round inlet where a metal pipe should be safely inserted and fixed, in order to discharge the combustion products. **The flue to be used must be in accordance with and certified standard C€.**

**Diesel tank:**

Types 1 and 2 feature a diesel tank, complete with filler neck, filter and connections to connect it to the burner.

**Diesel burner:**

The appliance is equipped with a self-aspirating diesel burner, complete with an electronic command and control module for fully automatic operation.

**GENERAL INFORMATION****IDENTIFICATION**

The warm air heaters can be identified through:

- The Technical Plate, applied on the machine, specifying the main technical-performance data.



In the event of damage or loss, request a duplicate from the Technical Assistance Service

**GENERAL INFORMATION****RECEIVING THE PRODUCT**

The appliance is supplied with:

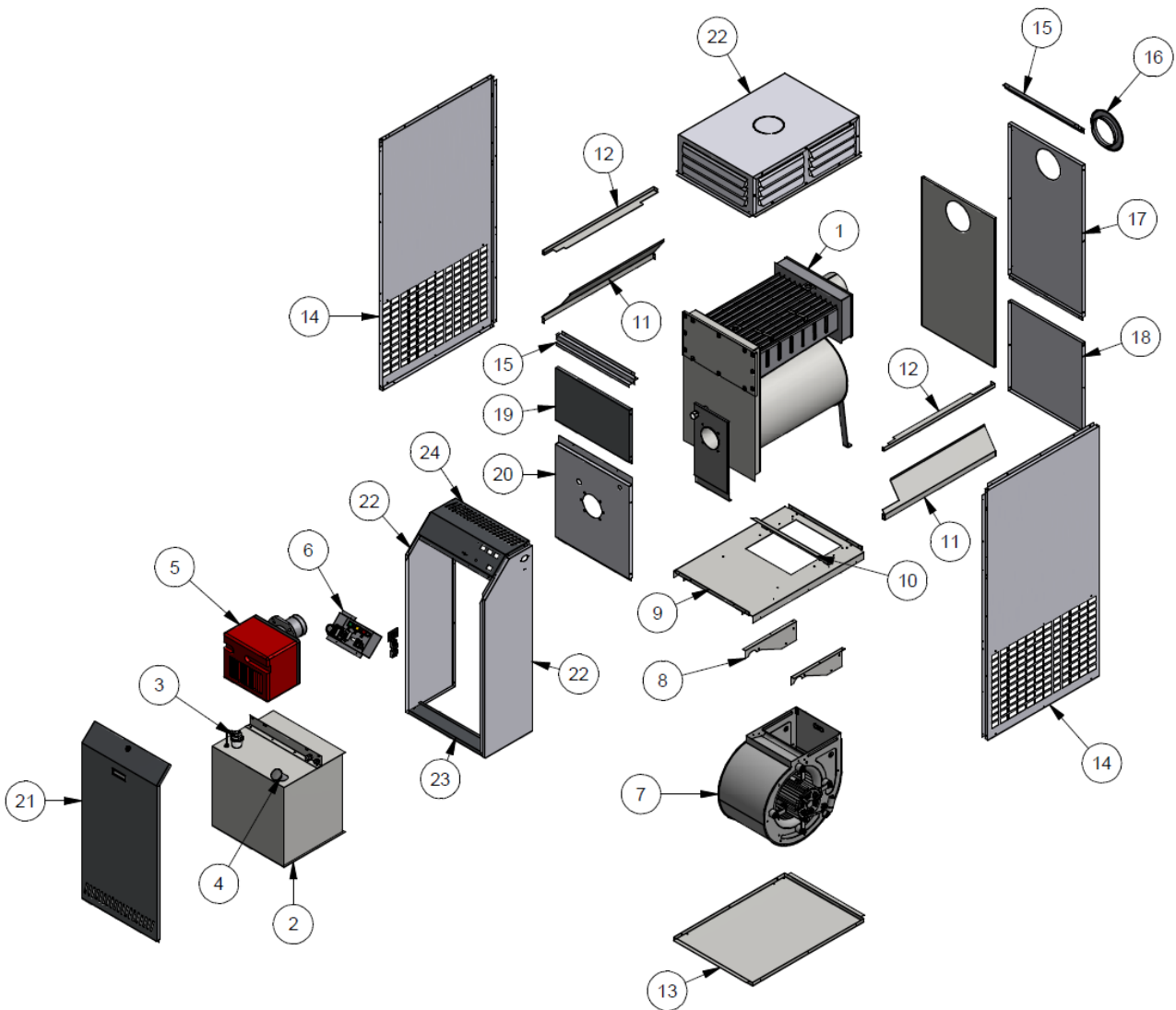
- Document envelope including:
  - User guide
  - Wiring diagram
  - Any warranty certificate
  - Barcode tags
  - Burner Owner's Manual (if supplied)

**GENERAL INFORMATION****FIXED PROTECTIONS**

In order to avoid the accidental contact with the movable parts of the machine, check if the following fixed protections have been properly installed:

- Appliance infill panels;
- Burner compartment access door

The drawing shows type 2:

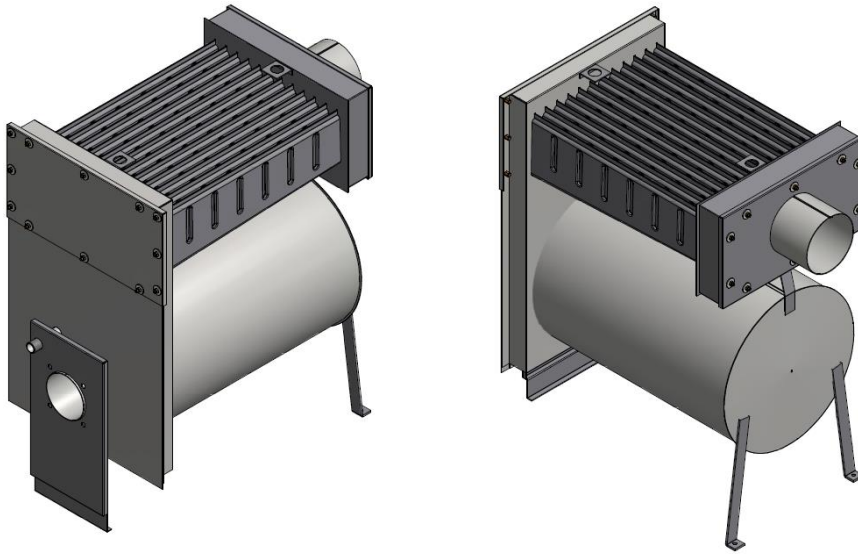


- 1. Fan assembly
- 2. Tank (where present)
- 3. Diesel filter (where present)
- 4. Filler neck (where present)
- 5. Diesel burner
- 6. Electrical panel
- 7. Fan
- 8. Fan support
- 9. Diaphragm
- 10. Deflector
- 11. Deflector
- 12. Deflector

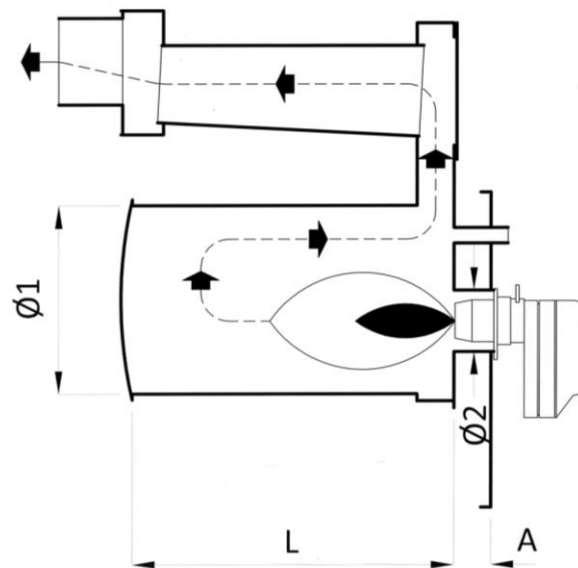
- 13. Panel
- 14. Side panel
- 15. Beam
- 16. Flue washer
- 17. Panel
- 18. Panel
- 19. Panel
- 20. Panel
- 21. Door
- 22. Side panel
- 23. Beam
- 24. Control panel



Image axonometric heat exchanger:



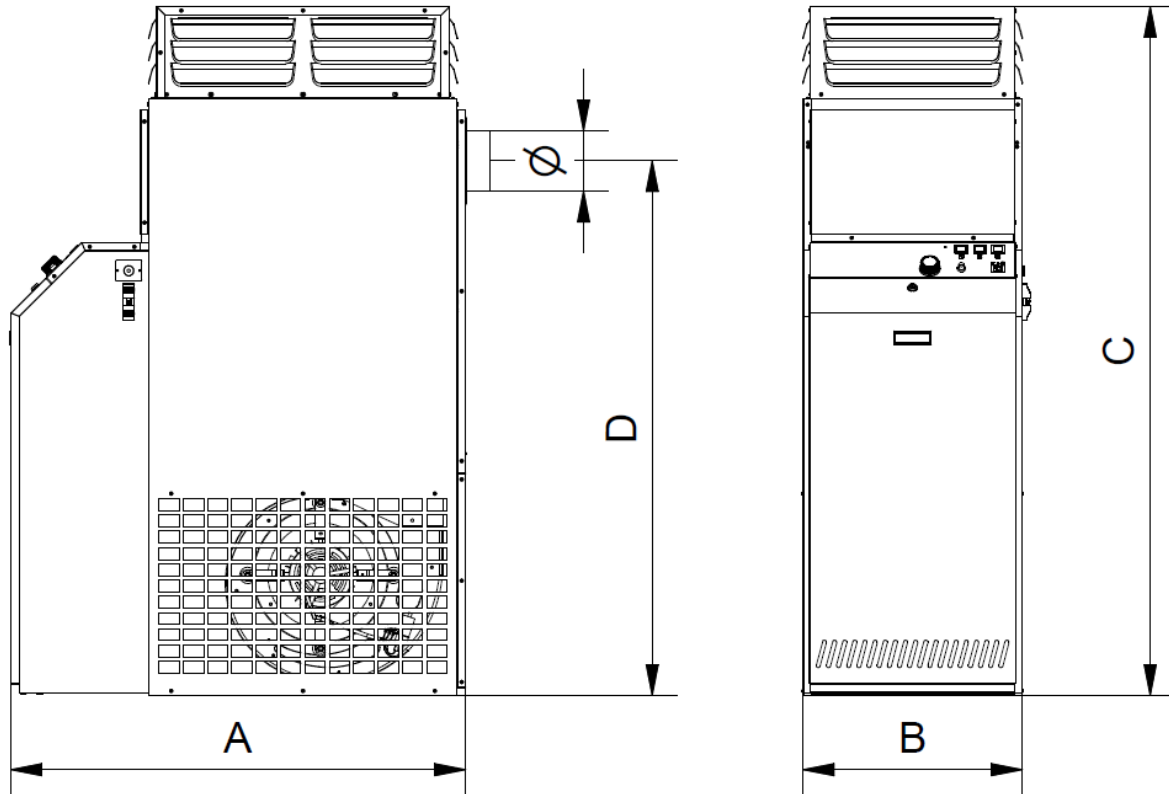
Operating diagram with main dimensions:



Combustion products:

- perform an inversion in the combustion chamber;
- are routed to the first exhaust manifold (front manifold) and are channelled in the exchange elements (smoke pipes);
- arrive in the second exhaust manifold (rear collector) and then they are discharged trough the circular connector.

TYPE	Ø1 (mm)	Ø2 (mm)	A (mm)	L (mm)
1	320	115	60	500
2	400	115	60	600
3	600	160	85	900



TYPE	A (mm)	B (mm)	C (mm)	D (mm)	Ø (mm)	NET WEIGHT <sup>1</sup> (kg)
1	1,020	500	1,600	1,240	120	~ 140
2	1,120	540	1,700	1,320	150	~ 180
3	1,400	760	2,000	1,580	180	~ 315

1. Without burner

TYPE		1	2	3
Thermal capacity <sup>1</sup>	kW	29.1	60.1	97.7
	kcal/h	25,050	51,680	84,020
Combustion yield <sup>1</sup>	%	92.5	92.5	93.0
Net smoke temperature <sup>2</sup>	°C	~ 160	~ 160	~ 150
Heat capacity <sup>1</sup>	kW	26.9	55.5	90.8
	kcal/h	23,130	47,730	78,090
Combustion chamber pressure	mbar	0.2	0.3	0.5
Mass of combustion products	kg/h	~ 45	~ 100	~ 160
Instantaneous diesel consumption <sup>3</sup>	kg/h	2.4	5.0	8.4
Nominal airflow rate	m <sup>3</sup> /h	2,800	5,300	8,800
Nominal air thermal gradient	°K	29	32	31
FAN thermostat calibration	°C	35	35	35
LIMIT thermostat calibration	°C	100	100	100
Sound pressure emission <sup>4</sup>	dB(A)	57	60	70
Range of use	°C	-5/+40	-5/+40	-5/+40
Electrical power supply	V~50 Hz	230	230	400 3N
Fan motor input power	W	245	560	2,200
Max electric power to the fan engine	A	2.8	5.9	4.6
Capacitor	microF	8	16	-
Electric protection degree	IP	20	20	20
Diesel tank capacity	litres	75	90	-

1) Referred to a lower heating power (Hi)

2) Referred to combustion air temperature +15°C

3) Fuel oil: Hi = 10,200 Kcal/kg

4) Measured in free field 3 metres away from the appliance, on the burner side.

TYPE		1	2	3
<b>Configuration:</b>		B <sub>23</sub>	B <sub>23</sub>	B <sub>23</sub>
<b>Fuel type:</b>		Liquid	Liquid	Liquid

<b>Capacity:</b>				
$P_{rated,h}$	kW	26.9	55.5	90.8
$P_{min}$	kW	-	-	-

<b>Useful efficiency:</b>				
$\eta_{nom}$	%	86.8	86.8	87.3
$\eta_{pl}$	%	-	-	-

<b>Electrical energy consumption:</b>				
$el_{max}$	kW	0.150	0.190	0.190
$el_{min}$	kW	-	-	-
$el_{sb}$	kW	0.002	0.002	0.002

<b>Other elements:</b>				
$F_{env}$	%	0	0	0
$P_{ign}$	kW	-	-	-
$\eta_{s,flow}$	%	90.6	89.7	89.9
$\eta_{s,h}$	%	72.3	72.1	72.9

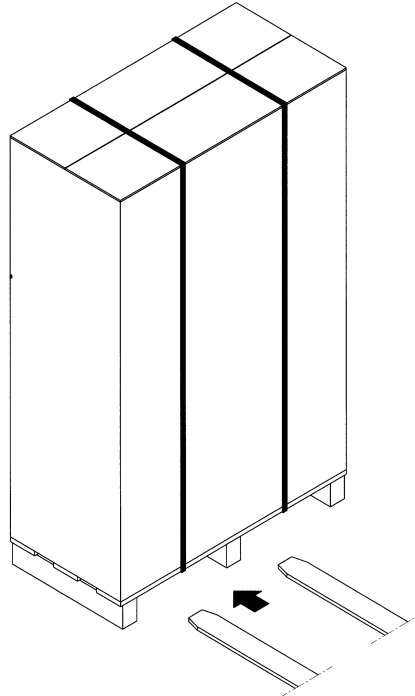
**Legend:**

$P_{rated,h}$	Nominal heating capacity
$P_{rated,h}$	Minimum heating capacity
$\eta_{nom}$	Nominal heating capacity useful efficiency
$\eta_{pl}$	Minimum capacity useful efficiency
$el_{max}$	At nominal heating capacity
$el_{max}$	At minimum heating capacity
$el_{sb}$	In "stand-by" mode
$F_{env}$	Envelope loss factor
$P_{ign}$	Ignition burner consumption
NO <sub>x</sub>	Nitrogen oxide emissions
$\eta_{s,flow}$	Emission efficiency
$\eta_{s,h}$	Ambient heating seasonal energy efficiency

**Note:**

The data reported in the table refer to the calorific power lower than the fuel (GCV)

Handling must be performed by properly equipped personnel. If a fork-lift is used, pitchfork the machine in the lower part using the appropriate ways in the wood bedplate.



Shipping and handling must be carried out with extreme care to avoid damage to the unit and danger to the persons involved.

During transportation and handling, it is forbidden to stand near the unit.

Use forklift forks with a minimum length equal to the width of the machine.

If belts or ropes are used, a rocker arm must be used (not included) to prevent the pressure exerted by the same from damaging the structure of the unit.

Should it be necessary to place more than one unit on top of each other, observe the index indicated on the packaging itself and be very careful when aligning the packages so as not to create unstable stacks.

If the device needs to be moved by hand, make sure that there is enough workforce available in proportion with the weight indicated in the section "DIMENSIONS AND WEIGHT" and depending on the distance to cover.

We recommend the use of personal protective equipment (PPE).

The location for the unit must be determined by the system designer or a competent person and it must take into account the technical requirements and the standards and regulations in force; generally, special permissions need to be obtained. (e.g.: regulations concerning zoning, architecture, fires, environmental pollution, noise emission, etc.). It is therefore advisable, before installing the unit, to request and obtain the necessary permissions.



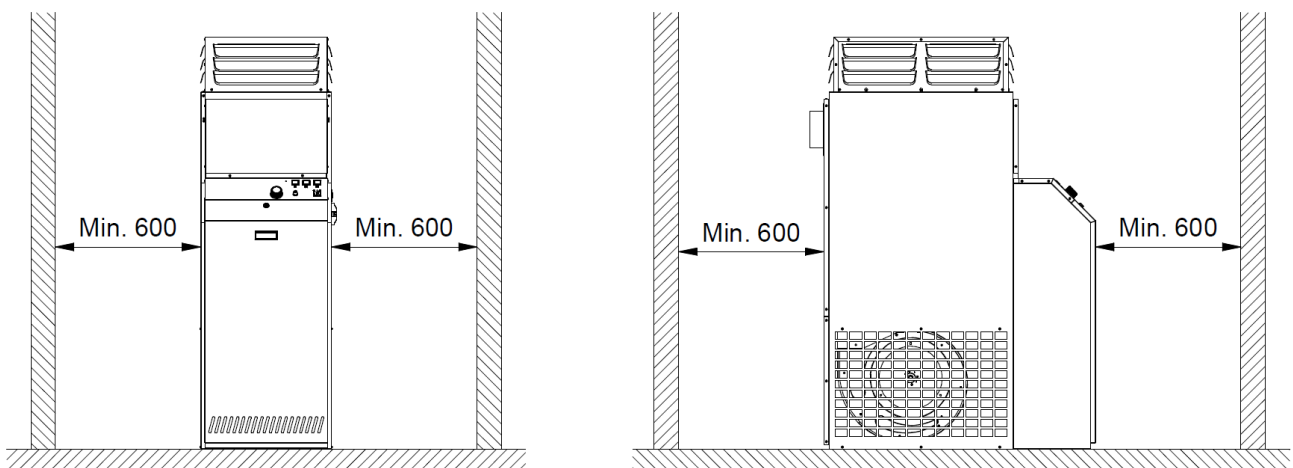
**To properly install the machine, bear in mind that the heaters should:**

- be placed on a flat surface, capable of bearing its weight;
- be supported over the entire perimeter of the lower base;
- be placed on a surface whose deflection and strength is such that it can prevent vibrations from reaching the area underneath;
- respect the distances in order to allow for a correct flow of air and normal cleaning and maintenance operations;
- maintain the safety distances from flammable material;
- be placed close to a flue chimney;
- be able to be connected to the fuel source
- be close to an electrical socket;
- allow for easy maintenance and inspections;
- be fitted with the ventilation openings required by the relevant regulations.

**It is forbidden to install it:**

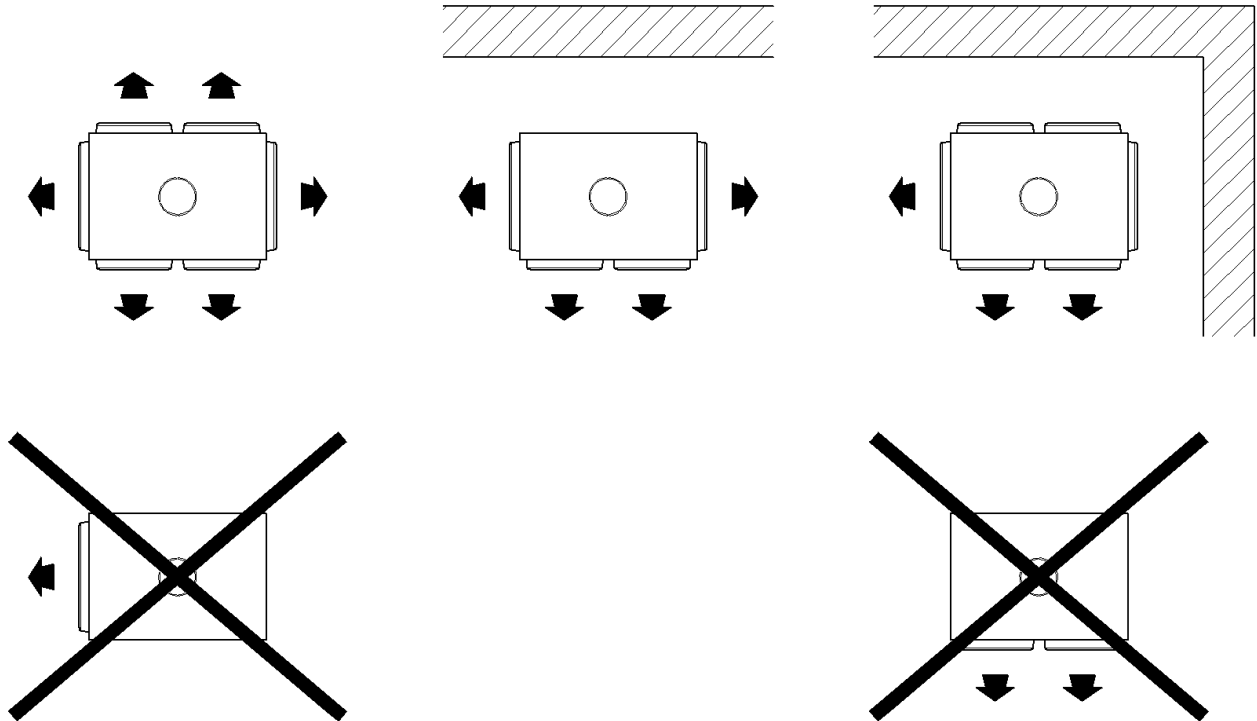
- in places where there are aggressive atmospheres;
- in cramped places where the sound level of the hot air generator can be increased by reflections or echoes;
- in corners where leaves could accumulate or where other objects could clog the air passage and reduce the generator efficiency;
- in pressurised places;
- in depressurised places;
- outdoors, if not provided with a protection against bad weather conditions.

**The unit must be easily and safely accessible without the need for special equipment (ladders, mobile platforms, etc.).** Around the unit it is also necessary to respect the minimum distances to allow normal control and/or maintenance operations and not to create obstacles to the flow of air.



Here is a series of examples of installation:

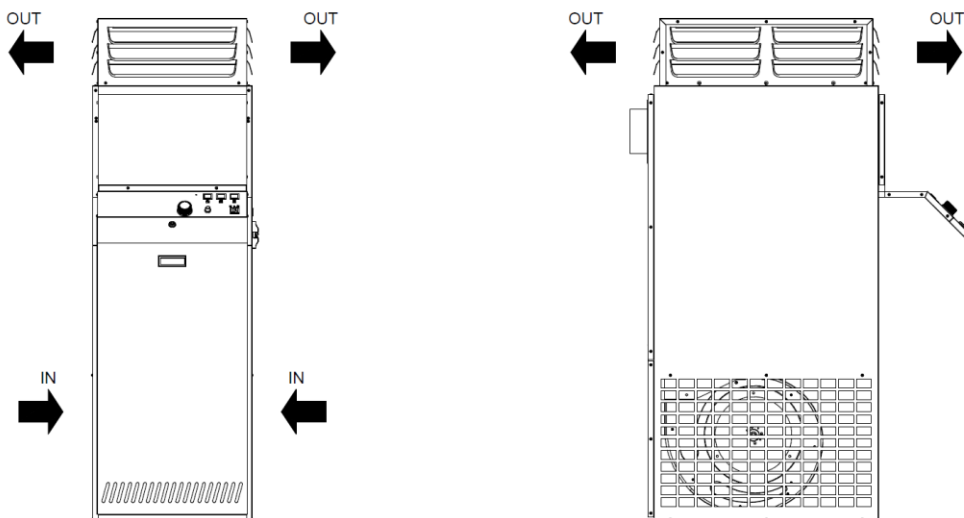
- At the centre of the room with delivery on 4 sides
- On the perimeter wall with delivery on 3 sides
- In the corner with delivery on 2 sides



Any restrictions deriving from specific Laws and regulations must also be observed (for example regarding fires). Refer to the designer of the system.

Air can not be delivered from only one side

**Intake direction and treated air outlet:**

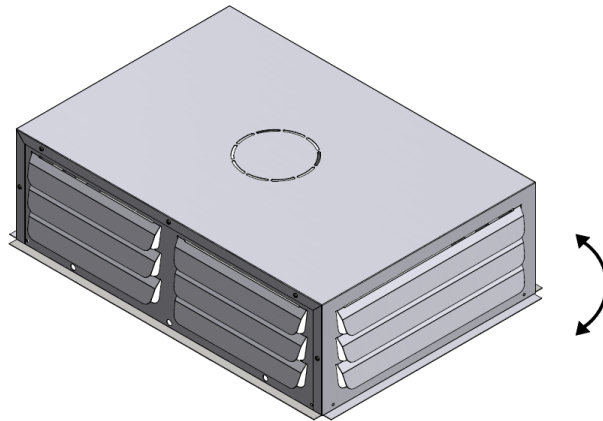


The appliance **is not ductable** and it is equipped with a delivery plenum fitted with fins that can be individually adjusted manually.

The fins must be adjusted in such a way that:

- they allow for adequate air distribution;
- they do not create excessive resistance;
- they do not bother people;

To get an optimal air diffusion, we recommend installing the appliance close to a perimeter wall or in the middle of the room itself, with the air outlet on three or four sides respectively.



- In order to avoid dangerous overheating of the appliance, the fins on at least two sides must be open.
- The upper surface of the plenum can not be stepped on.
- Air can not be spread from only one side of the plenum.

Any accessories must be original. To install them, follow the instructions included in the relevant package.

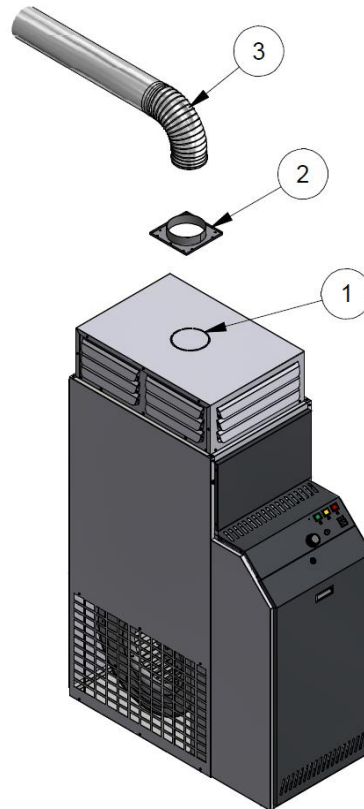
**The operating principle is described below:**

- When the room thermostat detects a temperature lower than the value set, it activates the burner at a fixed thermal power previously set.
- Approx. 1 minute after the flame has been ignited, also the ventilation unit starts, thus releasing warm air in the room.
- When the room thermostat detects that also the second pre-set temperature level has been reached, it authorises the turn-off of the burner. After approx. 3-4 min. - when the heat exchanger has completely cooled- the ventilation unit goes off too



It is possible to send, via secondary ducting, part of the volume of treated air to other rooms (e.g. an office) through the pre-cut hole.

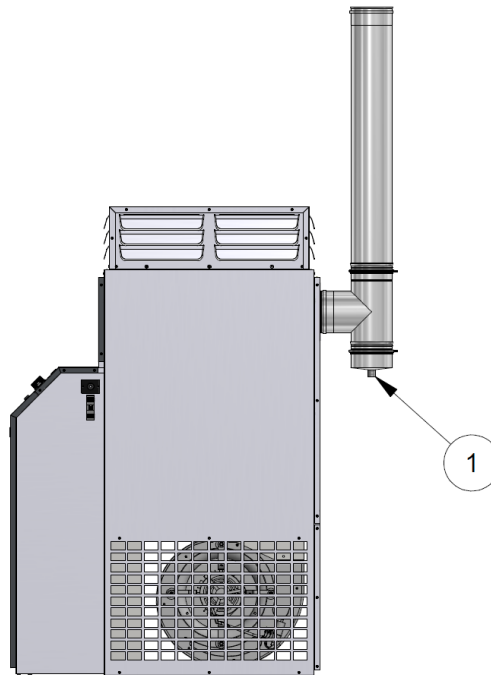
TYPE		1	2	3
Ø pre-cut hole	mm	150	150	300



1. Pre-cut hole
2. Circular fitting with stop (not supplied)
3. Secondary channelling (not supplied)

The machine should be connected to the fuel network by qualified and skilled personnel and the manual instructions and the relevant regulations should be carefully complied with.

Fume exhaust connection position and example of connection to the flue:



1. **Condensate discharge fitting**, necessary to prevent any condensate that has formed in the flue to flow inside the heat exchanger.



- The exhaust pipe and the flue connector should be made in compliance with the Regulations and Laws in force. They should be made up of metal and stiff ducts, capable of resisting to mechanical, thermal and chemical stress caused by the combustion.
- It is mandatory that all components of the flue be certified **CE**
- To avoid reflux of condensation from the flue to the hot air generator, there must be a condensation discharge at the lowest point of the smoke duct.
- The weight of the entire smoke duct must not rest on the appliance.
- The flue must ensure the minimum depression required by the current technical standards, considering "zero" pressure to the connection with the fume duct.
- Non insulated exhaust pipes might be a source of dangers.
- Unsuitable or wrongly sized flues or flue gas pipes might amplify the burning noise and affect negatively the combustion parameters.
- Joint seals should be made of materials resistant to the thermal and chemical stress caused by the combustion products.
- If walls and/or covers have to be crossed, this operation should be perfectly carried out, preventing seepage or fire risks.



- **The use of pipes made of plastic material is forbidden**

**IF INSTALLATION IS PROVIDED IN THE AREA OF FREE ACCESS TO PERSONS AND / OR ANIMALS, THE FLUE PIPE UP TO APROX. 2 METERS ABOVE, MUST BE REALIZED IN DOUBLE WALL VERSION AND/OR EQUIPPED WITH ANTI-SCALD PERFORATED NETWORK.**

Moreover, we suggest:

- avoiding or having just few horizontal ducts, which should anyway be upward raked;
- using metal pipes featuring a smooth internal surface and being capable of resisting to the thermal and chemical stress caused by the combustion products, with the same diameter as the connector of the machine or with a bigger diameter;
- avoid narrow bends and section reductions;
- having a trap to take and analyse the combustion products;
- properly anchoring the flue gas discharge pipe;
- having a proper end cover to prevent rainwater seepage into the machine and significant friction losses.
- The smoke pipe connecting the machine to the flue should be easily dismantled; this is a basic condition to enable the personnel to easily control and clean inside the heat exchanger

INSTALLATION  
INFORMATION

## COMBUSTION AIR



- The appliance must be installed in accordance with the regulations in force and be used only in a sufficiently ventilated area.
- Check that the combustion air inlet is always free from any obstacles (leaves, sheets of paper, nylon pieces, etc.)
- Proper air openings should be made, in compliance with the relevant Standards

INSTALLATION  
INFORMATION

## DIESEL BURNER ASSEMBLY

The burners are supplied, on request, disassembled and in separate packages.

The installer is in charge of mounting, electrically connecting and setting the burner. These operations should be carried out only by qualified and skilled personnel, carefully complying with the burner and supply ramp manuals (provided together with the devices).



- It is mandatory to install only burners with certificates **CE**.
- The data for the RIELLO brand burners are indicative as they can be subject to change without notice. We recommend always consulting the latest version of the burner documents.
- The availability of new burner models is in continuous evolution. For specific needs, consult the Manufacturer.

**Combination table for pre-calibrated RIELLO burners:**

TYPE		1	2	3
RIELLO burner	Mod.	REG 3	R40G10	R40G10
Nozzle Delavan 60°W	GPH	0.60	1.25	2.00
Pump pressure	bar	13.0	11.0	13.0
Burner Head Position	Notch no.	1.0	2.0	5.0
Air damper position	Notch no.	5.0	4.0	5.0
Measured CO <sub>2</sub>	%	~ 12.5	~ 12.5	~ 12.5
Measured CO	ppm	~ 5	~ 5	~ 5
Net smoke temperature	°K	~ 160	~ 160	~ 150



The above data and any pre-calibration at the factory are non-binding. It is always mandatory to check and adjust the burner at start-up and in the actual conditions of use.

The machine is provided as standard with the electric panel installed and with the engine, control and safety thermostats of the FAN-LIMIT device connected. Therefore, the fitter just has to perform the following operations:

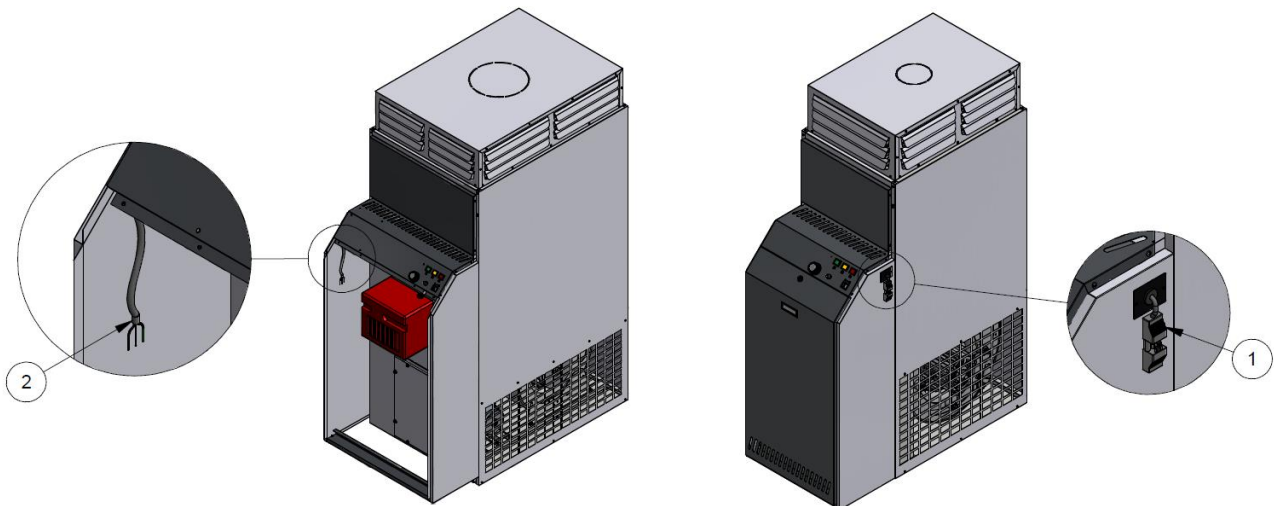
- connection to the general power supply;
- connections to the blown burner;
- connections to the various external safety systems (fire dampers, humidifier, fire protection, etc.).



- Electrical connections must only be carried out by qualified and competent personnel. In case of doubt, do not intervene on the appliance and consult the manufacturer.
- Install upstream of the unit a differential magneto thermal circuit breaker suitably sized according to the regulations in force.
- Always connect the earthing system, taking care to leave the earth wire slightly longer than the other wires, so that, in case of accidental pulling, the latter is the last one to be removed.
- Get qualified personnel to check that the section of the cables and the electrical system are suitable for the maximum power absorbed by the unit indicated on the information plate.
- Respect polarity in the connection of the power supply (phase - neutral). In any case, make sure that the direction of rotation of the fans is correct.
- The unit must be connected to an efficient earthing system. The manufacturer shall not be held responsible for any damage caused by failure to earth the appliance.
- The electrical cables must be positioned so as not to come into contact with hot and/or cold surfaces, or with sharp edges.
- In accordance with the Standards regarding the installation of electrical components, a device that ensures disconnection from the mains with an opening distance between contacts that guarantees complete disconnection in overvoltage conditions III (Standard EN 60335-1) must be included.
- It is forbidden to use water pipes or gas pipes to earth the unit.
- For the input and output of the electrical wires, use the dedicated cable clamps on the unit
- **The appliance must always be electrically powered. Operation consent must only be obtained by closing and opening the contact of the room thermostat.**

In types 1 and 2, single-phase, for the electrical connection of the main power supply, use the special outlet - plug positioned externally.

In type 3, three-phase, for the electrical connection of the main power supply, use the section of cable coming out of the electrical panel.



1. Three-pole outlet-plug
2. Section of electrical cable

An easily readable paper copy of the wiring diagram is placed in the electric panel or in the document bag

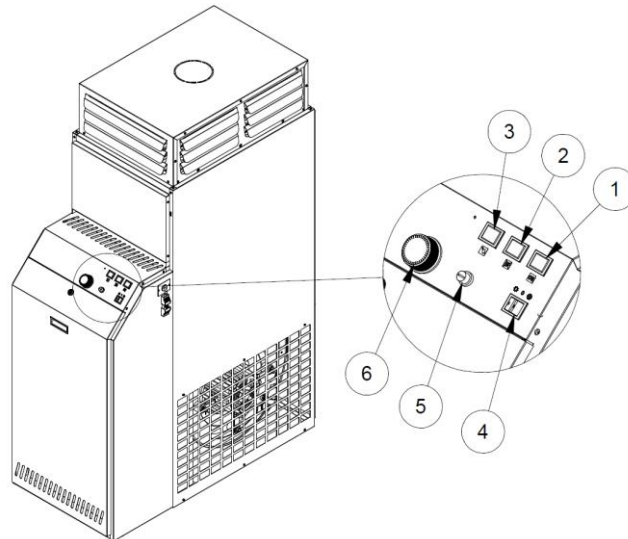
and it is an integral part of this instruction manual. **We recommend keeping it carefully together with the other documents.**

Should this copy be mislaid, ask the Manufacturer for a duplicate, notifying the serial number of the appliance and the wiring diagram code specified below.

TYPE		1	2	2
<b>Wiring diagram</b>	code	7328400	7328400	10052712-TC



- In case of doubts, do not perform any operation on the machine. Please, contact the Manufacturer for further clarifications.
- In accordance with the Standards regarding the installation of electrical components, a device that ensures disconnection from the mains with an opening distance between contacts that guarantees complete disconnection in overvoltage conditions III (Standard EN 60335-1) must be included.

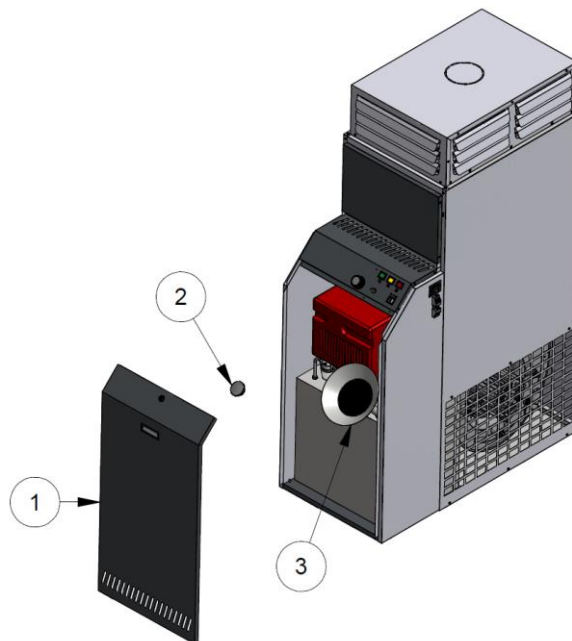


1. Voltage presence indicator (green)
2. LIMIT thermostat intervention indicator (orange)
3. Burner lock indicator (red)
4. Heating - stop - ventilation switch
5. LIMIT thermostat reset button
6. Room thermostat adjustment knob

Type 1 and 2 appliances feature a built-in tank.

The type 3 appliance, for reasons of operating autonomy, must be connected to an external tank not included in the supply.

**Tank filling:**



- Remove the burner cover 1;
- Remove the cap from the tank 2;
- Add the fuel using a funnel equipped with a filter 3

**ROOM THERMOSTAT:**

Installed on the appliance, its function is to switch the appliance on and off in order to keep the temperature close to the set value.

**Heating/stop/ventilation mode selector switch:**

It is placed in the machine electric panel and it is used to select the operating cycle:

- Set the machine on the "heating" symbol, it pre-sets the machine so that the fan and burner will start automatically when heat is requested.
- Set the machine on the "heating" symbol, it pre-sets the machine so that the burner will not operate. When only the fan is on, it is used for summer cooling.
- Set the machine on the "heating" symbol, it stops the warm air heater. The burner works for a certain period in order to exhaust the heat accumulated in the heat exchanger.

**LIMIT thermostat reset button:**

Placed on the body of the LIMIT thermostat, its function is to restore the operation of the burner after it has stopped due to overtemperature.



**Before restoring any device, the problem that has triggered the safety protection should be detected and solved. In case of doubt, please contact the closest Authorized Assistance Centre, which will provide you with the necessary technical assistance.**

**Operating cycle in ventilation mode:**

The operations to be performed to achieve correct operation in ventilation mode are the following:

- power the appliance;
- place the switch on "ventilation";

At this point, only the ventilation unit will operate and air at the return temperature will be sent into the environment.

**Operating cycle in heating mode:**

The operations to be performed to achieve correct operation in heating mode are the following:

- power the appliance
- set the room thermostat to the desired temperature
- place the switch on "heating"

At this point the burner is electrically powered and, after the pre-washing function of the combustion chamber, the flame is ignited.

About one minute after the flame is ignited, the ventilation unit starts and hot air is sent into the environment.

Once the temperature set on the room thermostat has been reached, the burner stops and after about 4 minutes the ventilation unit stops too.

The entire cycle is repeated automatically each time the temperature drops below the value set on the room thermostat.

**Start:**

The first start-up operation must be performed by qualified personnel, after making sure that the components of the plant have been installed properly and that all the safety devices have been adjusted correctly.

The first start-up consists of the following operations:

- close the room thermostat contact: the burner will start the operating cycle and, after the pre-washing cycle, the flame will be ignited
- check that the fan starts about 1 minute after the flame is ignited
- check the combustion parameters
- wait for the generator to reach full speed (~20 min.) and make sure that the LIMIT thermostat does not intervene
- open the room thermostat contact and make sure that the burner stops
- close the room thermostat contact again and perform a new burner ignition cycle
- close the fuel shut-off valve and make sure the burner stops



During the first start-up cycle, the burner may stop due to the lack of fuel supply. In this case, wait at least 30 seconds and, after unblocking the burner by pressing the dedicated button, repeat the operation.

During the first hours of operation, fumes and odours may form due to the heating of paints and seals. It is a normal phenomenon that disappears after a few hours of operation.

It is recommended to ventilate the room.

**Stop:**

To stop the hot air generator, USE ONLY THE ROOM THERMOSTAT, by setting it to the minimum temperature or by opening the contact of the switch itself (if present) or on STOP.

Wait for the fan to stop (~ 4 min.) and then, if necessary, turn the power off by acting on the main switch.



**Never stop the appliance by cutting off the electrical power, as the thermal energy stored in the heat exchanger may cause dangerous overheating of the same, with possible damage to the air heater. Moreover the LIMIT thermostat could be triggered and it might be necessary to release it manually.**



In order to ensure that the machine works properly, some basic parameters should be checked. Turn the unit on and:

- Make sure that the fan unit starts about max 30÷60 seconds after the burner is turned on.

With the unit steady (after about 20 minutes of continuous operation) perform the following operations:

- Make sure there are no fuel leaks.
- Check the correct fuel flow rate by weighing the diesel
- Check that the fume gas temperature is the one stated in the chapter "TECHNICAL DATA" with a tolerance of  $\pm 5^{\circ}\text{C}$ .
- Make sure that the manual resetting safety thermostat calibration is correct.
- Verify that the temperature near the sensitive element of the double thermostat is approximately  $50\text{-}55^{\circ}\text{C}$ .
- Check that no faults have been reported on the safety thermostat.
- Check that no faults have been reported on the safety devices present on the machine.
- Make sure that the temperature gradient is compliant to the value specified in the "TECHNICAL DATA" chapter with a  $\pm 2^{\circ}\text{K}$  tolerance.
- Re-activate the appliance. Simulate the intervention of the safety thermostat and check that the burner turns off. Do not intervene on the sealings made in the factory.
- check that the engine electric absorption value does not exceed the value specified in the plate.
- make sure that the fan operates for another 3/4 minutes after the burner has been turned off, before it stops.



All of the aforementioned checks must be carried out in all expected or predictable operating conditions.

If you want to control the flame through the flame viewer, you must remove the threaded plug and **make sure that you wear protective goggles.**

The appliance is designed to be operated with the heating capacity and the air flow rate specified in the Data Sheet chapter. If the heating capacity is too low and/or the air flow rate is too high, combustion products may condensate, resulting in the irreparable corrosion of the heat exchanger.



**It has to be checked if condensation is forming inside the heat exchanger during its functioning. This check should be performed by turning off the burner after half an hour of continuous functioning, checking simultaneously through the stack connection if there is any trace of humidity in the flue gas collector and in the flue gas pipe elements. In addition, there must be no leakage from the safety condensate discharge.**

**Voltage presence indicator:**

Positioned on the control panel, it consists of a green indicator light which comes on when there is electric voltage present.

**LIMIT thermostat intervention indicator:**

Positioned on the control panel, it consists of an orange indicator light which comes on when the LIMIT thermal safety device has intervened.

**Burner lock indicator:**

Positioned on the control panel, it consists of a red indicator which comes on when a burner lock has occurred.

**To measure the electrical absorption of the appliance motor, proceed as follows:**

- insert the current probe on a phase of the main supply line;
- set the machine for operation in summer mode, so as to exclude all other devices (burner and auxiliaries);
- read the electric absorption value on the current clump and compare it with the data written on the engine plate.



- **Repairs or maintenance must be performed by the Technical Assistance Service or by qualified personnel.**
- **Disconnect the unit from the main power and fuel supply before any maintenance and / or inspection work.**
- In order for the machine to properly work and be maintained, we suggest performing the regular cleaning and maintenance operations, according to the indications in the following paragraphs.
- Cleaning and maintenance interventions must be carried out in relation to the appliance use conditions, to the installation site and to the environment treated.
- Any action to this effect must be carried out safely by qualified personnel and authorized by the cold appliance without the power supply.
- It is recommended that you use personal safety equipment.
- All maintenance/cleaning operations requiring the use of ladder or of other means, should be performed with appropriate and completely safe systems.
- It is advisable to prepare a card to report the interventions performed on the appliance (date, description, type of intervention, cause, etc.).
- If you are not going to use the appliance for long periods, place the main switch and the general one on "off". If long periods of unusual operation occur, it is advisable to contact the Technical Assistance Service or, in any case, professionally trained personnel to resume operation.
- Regularly check that all the screws used to assembly the machine are properly fixed.



**For appliances close to areas or under particularly difficult conditions, maintenance intervals should be more frequent and in any case appropriate to the needs.**

**DIESEL BURNER CLEANING**

The burner should be cleaned by authorised personnel, strictly complying with the user manual of the burner.

**ELECTROVENTILATOR CLEANING**

After removing the necessary panels, clean the component using only a jet of compressed air. Type 3 features a transmission with belts and pulleys; periodically check the tension of the belts.



**The belts must be tensioned enough so that they do not slide on the pulley. Excessively tensioned belts may cause the bearings and/or shaft to break**

**THERMOSTAT SAFETY CHECK**

Check the functionality of the safety thermostat at least quarterly. Simulate its intervention and it should be verified that the burner goes out.

**SECURITY CONTROL**

Periodically check the operation of all the safety devices of the unit, by simulating their intervention and making sure that the unit stops safely.

**CHECKING ELECTRICAL CONNECTIONS**

Periodically check the correct tightening of all electrical connections.

**JACKET CLEANING**

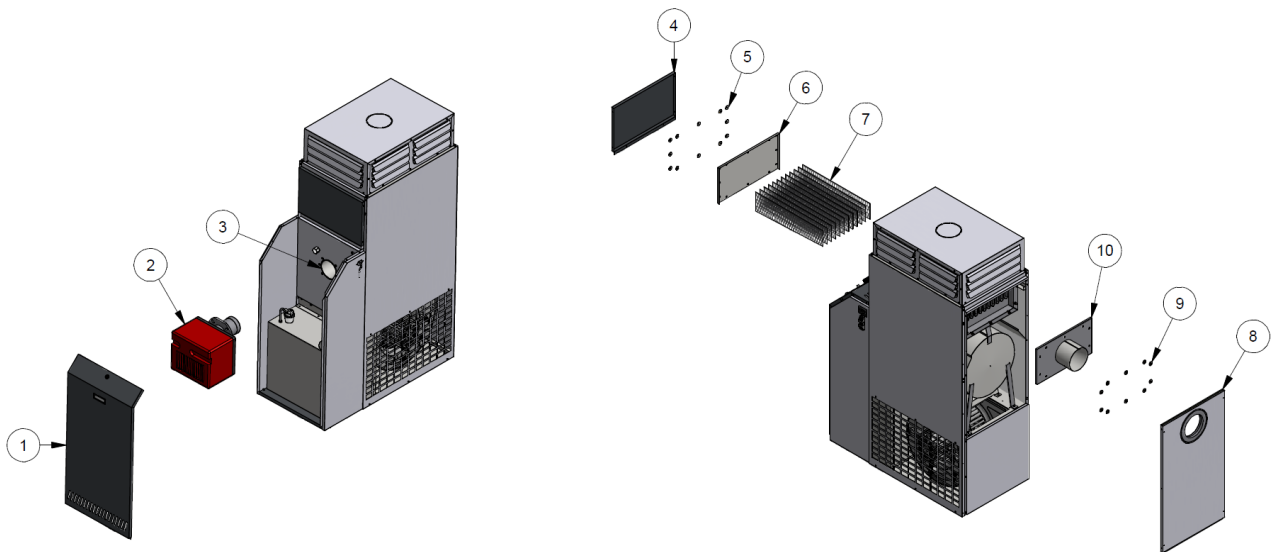
With compressed air and moistened cloth, clean all the inner and outer surfaces of the jacket. It is forbidden to use solvents and / or abrasives.

**FLUE GAS ANALYSIS**

\ Periodically carry out a combustion control-analysis, including the Bacharach degree of opacity

The heat exchanger should be cleaned, internally and externally, by authorized personnel and in compliance with specific rules. In general, we suggest cleaning the exchanger at least once a year, at the beginning of every winter.

For such operation, perform the following operations:



- Remove the cover **1**
- Disconnect the hoses and remove the burner **2**
- Remove the panel **4** and the door **6** after loosening the nuts **5**
- Remove the reticular turbulators **7** using the extraction hook supplied
- Remove the panel **8** and the door **10** after loosening the nuts **9**
- Using a brush, clean the inside of the smoke pipes
- Using an aspirator, remove any soot that has deposited in the rear flue gas collector, and in the combustion chamber through the opening **3**
- Reassemble all the pieces, especially considering the tightness and replacing the gaskets, if needed
- if necessary, also clean the flue pipe

The installation, commissioning and maintenance of the warm air heater shall be performed by qualified technical personnel.

In order to know which is the Authorized Customer Service centre responsible for your area, contact the Agency that sold you the machine. They will indicate you the Service Centre closest to the installation site.

# CE CONFORMITY CERTIFICATE



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Machinery directive 2006/42/EC

Low Voltage Directive 2006/95/EC

Electromagnetic Compatibility Directive 2004/108/EC

Directive 2009/125/CE

Regulation 2016/2281

Pastrengo, 2018

Stefano Verani (Member of the Board)

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