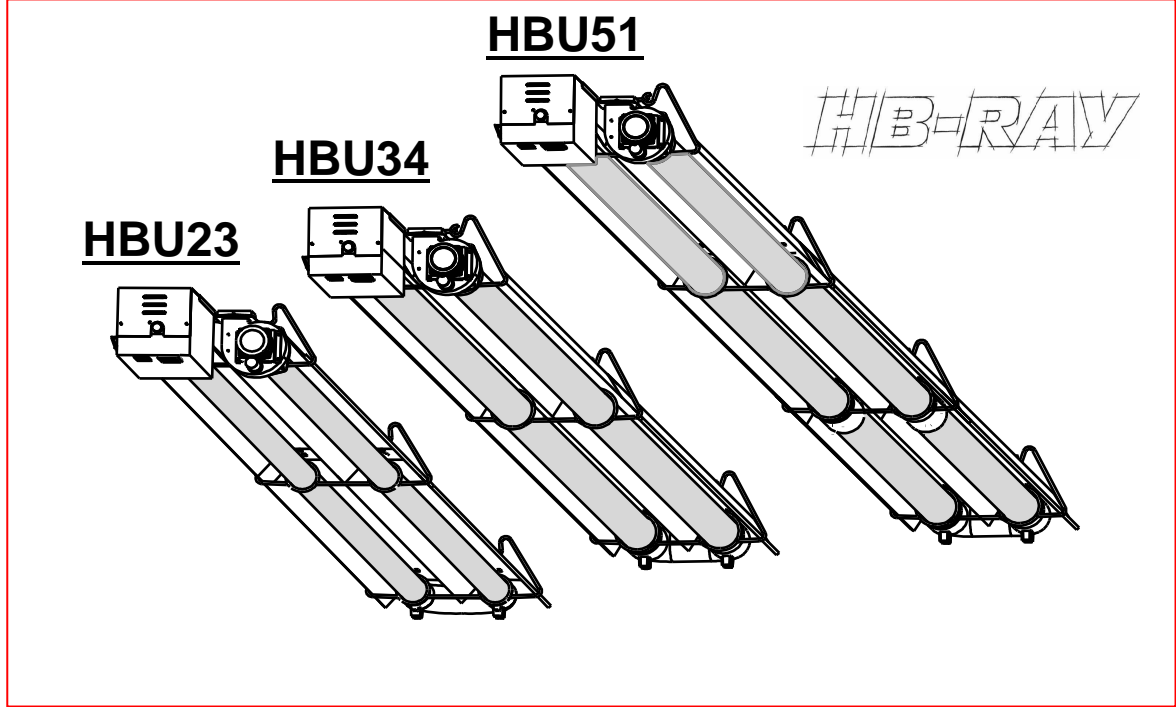




H+B MACHINERY (H+B MAKINA) GAS RADIANT HEATERS



Model = U- type radiant tubes HBU
Series = HBU 23 / 34 / 51

Gas Category II 2H3B/P

TECHNICAL INSTRUCTIONS FOR INSTALLATION **INSTALLER - USER**

Installation - Maintenance - Use

Warning

Read necessarily this document before any installation.

The document accompanying each unit is meant for the installer and the user. These **instructions must be given to the user** by the installer at the end of work. The document contains instructions for installation and particularly involves gas and electricity connections as well as fume ducts etc... Eventual subcontractors will therefore also have to receive the document, which is available on request in case of lacking.

Manufacturer :

05\2010.00

İMALATÇI : H+B DIŞ TİC. DANIŞMANLIK VE MAKİNA SANAYİ LTD. ŞTİ .
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1 RULE

GENERAL WARNING

- The installation has to be **in compliance** with the norms in force and be carried out according to traditional rules by a skilled worker.
- The installer has to refer to the various existing official documents according to the different stages that the installation requires.
- Our gas radiant heaters are marked "CE" and certified in several countries multi-countries". Because of the national specificities in the countries of European Union, it is necessary to use, in these countries, the models which are specifically manufactured for them (please contact us). It will not be possible to grant any guarantee of compliance to the norms or to the regulation in force in case of installation or usage of these units in a foreign country, whether being a member of the European Union or not.
- The appliance includes a flame furnace chamber and a « heated spot» which is higher than 150°C. As a result, installation of the product to the areas with explosive hazard is prohibited by law. Please refer to the local authorities, laws and legislations and experts about the list of those areas.
- The use is also prohibited in all the premises where there are corrosive fumes, even in small quantities, whose combination with water vapor and/or combustion products will entail abnormal deteriorations of the appliances. For example: chlorinated, sulfurous, ammonia or sodic products and diverse acid products.
- All the requirements of the present regulations concerning ventilation and purifying shall be respected.

GUARANTEE LIMIT

The disobedience to the instructions below results automatically with the cancellation of all warranty:

- Appliances meant to be used for **non domestic buildings**. All kinds of usage for other specific processes are excluded.
- Use inside premises only, protection against humidity and bad weather must be ensured.
- No guarantee would be also granted in case the heaters are used in all the premises where there are corrosive fumes, even if there are small quantities, whose combination with water vapour and/or combustion products will entail abnormal deteriorations of the appliances. For example: chlorinated, sulphurous, ammonia or sodic products and diverse acid products.
- Appliance has to be handled and stored carefully in order to avoid the shocks and the exposure to bad weather.
- The entirety of the instructions of this document must be respected
- No modification of the appliances is authorized

2 TECHNICAL SPECIFICATIONS

Model	Net Input (power)	Nominal useful power*	Gas connection	Electrical connection	Fuse Protection burner/extractor	Starting electrical power	Functioning electrical power	Weight
HBU23	21kW PCI	17,85kW	3/4"gas	230/240V 50Hz Single-phase	1 fuse 5A	115VA	80VA	65 kg
HBU34	30kW PCI	25,5kW	3/4"gas	230/240V 50Hz Single-phase	1 fuse 5A	115VA	80VA	86 kg
HBU51	45kW PCI	38,25kW	3/4"gas	230/240V 50Hz Single-phase	1 fuse 5A	115VA	80VA	117 kg

* Value measured during the certification of the appliances with natural gas G20).

Gas category of the country

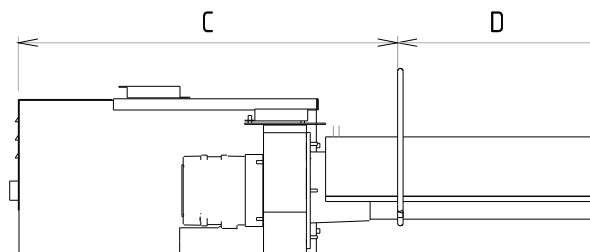
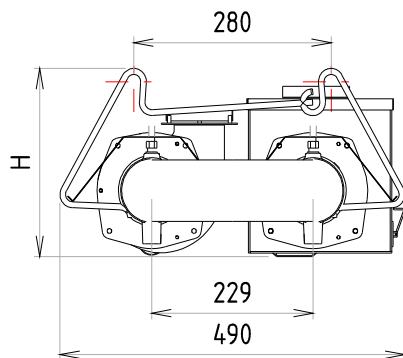
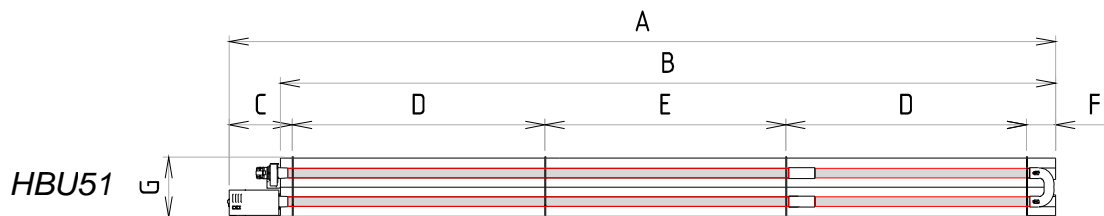
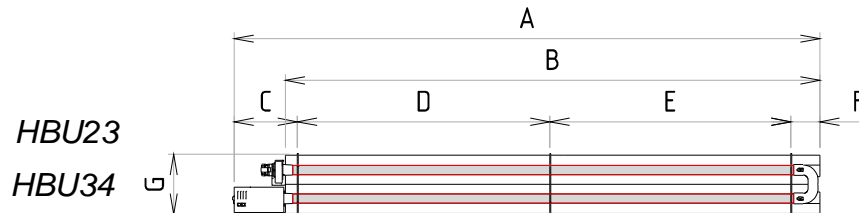
Country	Country symbol	Category of agreement	2nd family		3rd family	
			Reference gas	Nominal supply pressure	Reference gas	Nominal supply pressure
Turkey	TR	II2H3B/P	G20	20mbar	G30/G31	28-30/ 37mbar
Denmark	DK	II2H3B/P	G20	20mbar	G30/G31	28-30/ 37mbar
Spain	ES	II2H3B/P	G20	20mbar	G30/G31	28-30/ 37mbar
Finland	FI	II2H3B/P	G20	20mbar	G30/G31	28-30/ 37mbar
England	UK	II2H3B/P	G20	20mbar	G30/G31	28-30/ 37mbar
Greece	GR	II2H3B/P	G20	20mbar	G30/G31	28-30/ 37mbar
Ireland	IRL	II2H3B/P	G20	20mbar	G30/G31	28-30/ 37mbar
Italy	ITA	II2H3B/P	G20	20mbar	G30/G31	28-30/ 37mbar
Norway	NOR	II2H3B/P	G20	20mbar	G30/G31	28-30/ 37mbar
Portugal	PT	II2H3B/P	G20	20mbar	G30/G31	28-30/ 37mbar
Sweden	SWE	II2H3B/P	G20	20mbar	G30/G31	28-30/ 37mbar
Belgium	BEL	II2H3B/P	G20	20mbar	G30/G31	28-30/ 37mbar
Bulgaria	BUL	II2H3B/P	G20	20mbar	G30/G31	28-30/ 37mbar
Macedonia	MK	II2H3B/P	G20	20mbar	G30/G31	28-30/ 37mbar
Malta	MT	II2H3B/P	G20	20mbar	G30/G31	28-30/ 37mbar

HBU23/HBU34/HBU51 settings for various gases

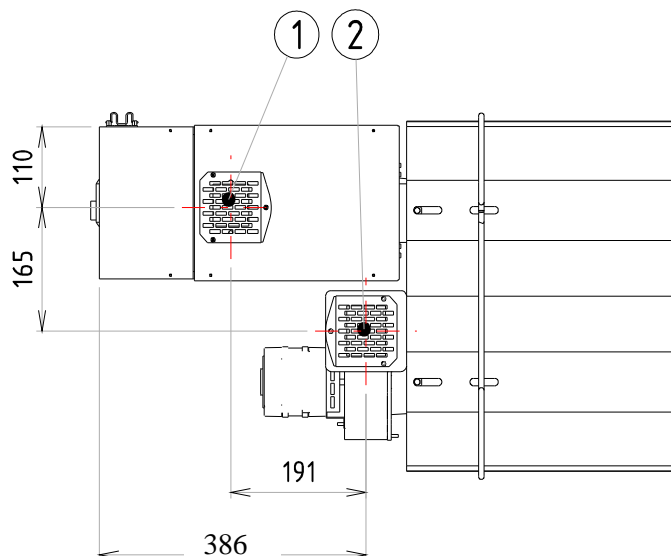
Model	Gas family	Reference gas	PCI gas 15°C 1013mbar	Gas supply mbar			ø injector 1/100 mm	Pressure by injector	Nominal gas flow
				nominal	mini	maxi			
HBU23	2nd family 2H natural gas	G 20	34.02 MJ/m ³	20	17	25	ø390	10.9mbar	2.14 m ³ /h
	3rd family 3B Butane gas	G 30	45.65 MJ/kg	28-30	20	35	ø240	governor to max	1640g/h
HBU34	2nd family 2H natural gas	G 20	34.02 MJ/m ³	20	17	25	ø490	9 mbar	3.21 m ³ /h
	3rd family 3B Butane gas	G 30	45.65 MJ/kg	28-30	20	35	ø290	governor to max	2340g/h
HBU51	2nd family 2H natural gas	G 20	34.02 MJ/m ³	20	17	25	Ø600	9mbar	4.76 m ³ /h
	3rd family 3B Butane gas	G 30	45.65 MJ/kg	28-30	20	35	Ø343	governor to max	3550g/h

3 DIMENSIONS

Model	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm
HBU23	4960	4550	555	2130	2030	245	490	262
HBU34	5765	5350	565	2550	2350	376	490	290
HBU51	8340	7980	565	2550	2350	376	490	320



- ① Combustive air inlet
On burner block
- ② Combustion products
outlet on the extractor
block

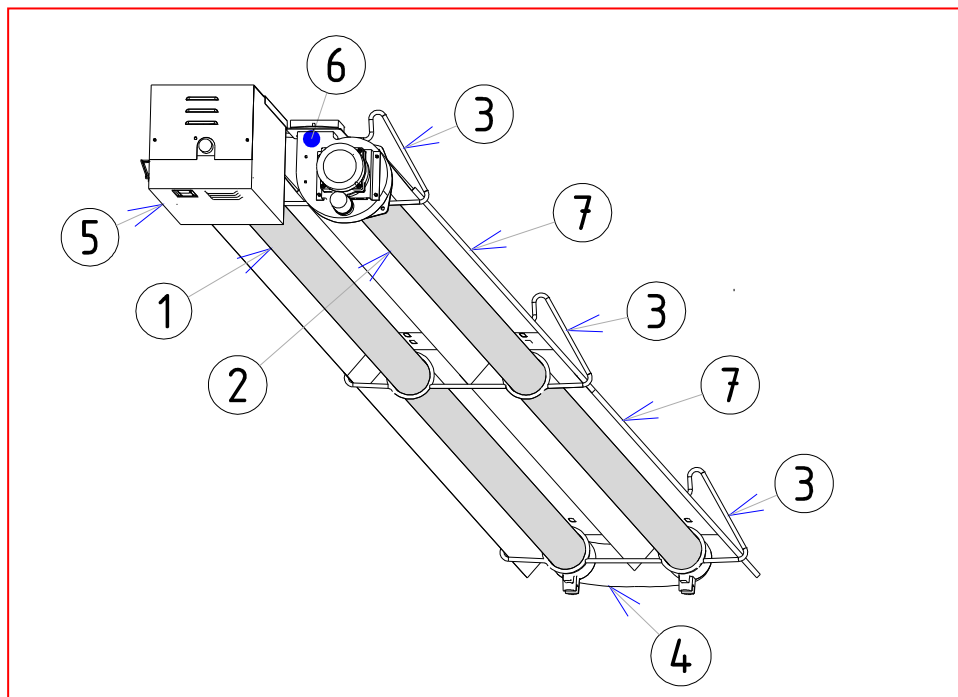


4 ASSEMBLY OF THE APPLIANCES HBU23 & HBU34

HBU23 list of components to be assembled

To assemble by respecting the order below

Mark	Quantity	Designation	Code
1	1	Emitting Tube on the Burner side Ø76.1 lg :4400	1030001
2	1	Emitting Tube on the Extractor Side Ø76.1 lg :4400	1030001
3	3	Wire support for HBU23 (packed inside the carton)	1203116
4	1	Cast iron U-bend Ø76.1 (packed inside the carton)	1001113-1
5	1	Burner block (packed inside the carton)	HBU23
6	1	Extractor block (packed inside the carton)	HBU23
7	2	Reflector lg 2375	1003212
8	4	Clips for reflector connection (packed inside the carton)	1716000
9	1	Plug Hanging Hook (packed inside the carton)	1025245
10	1	Electrical supply cable (packed inside the carton)	1025238

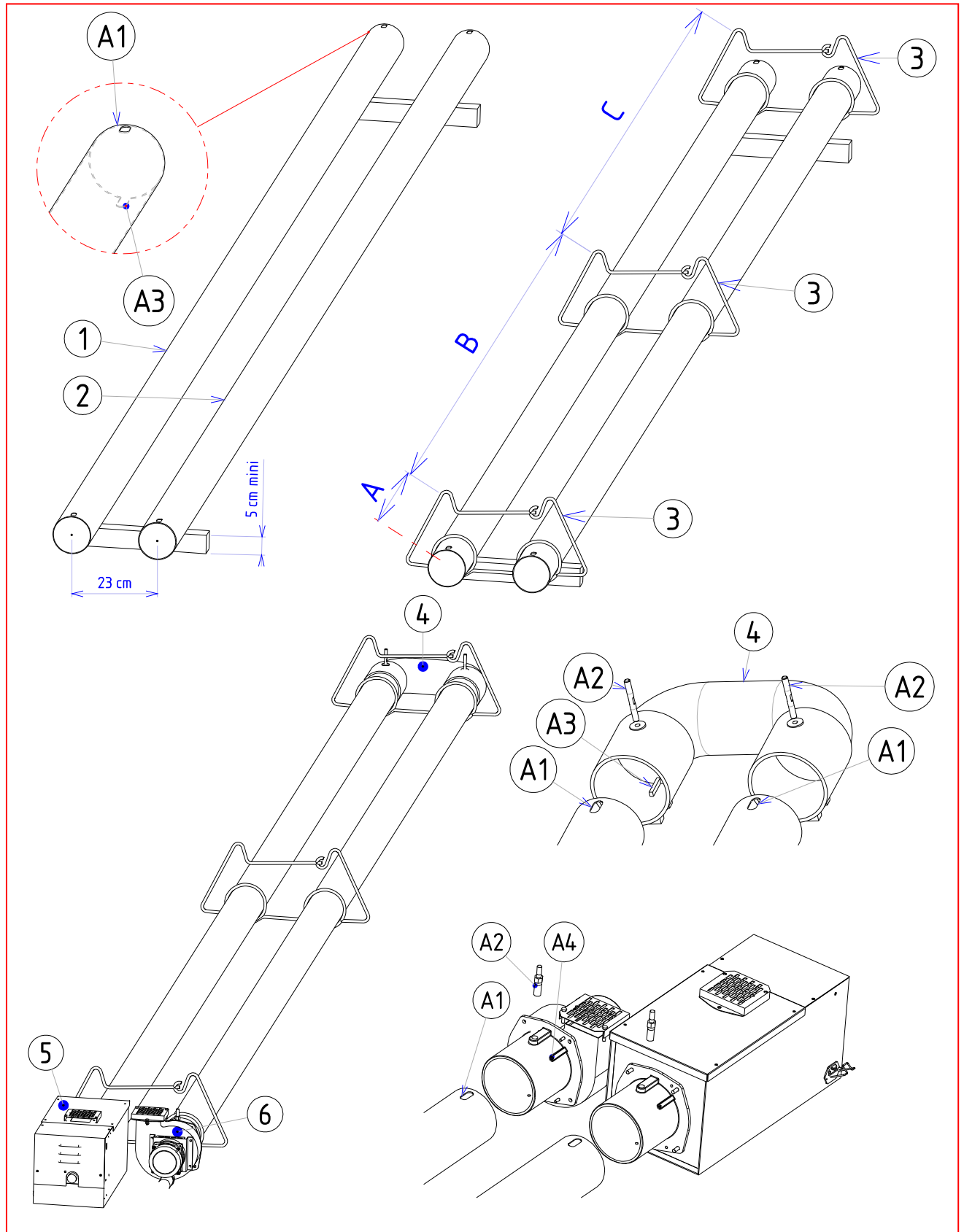


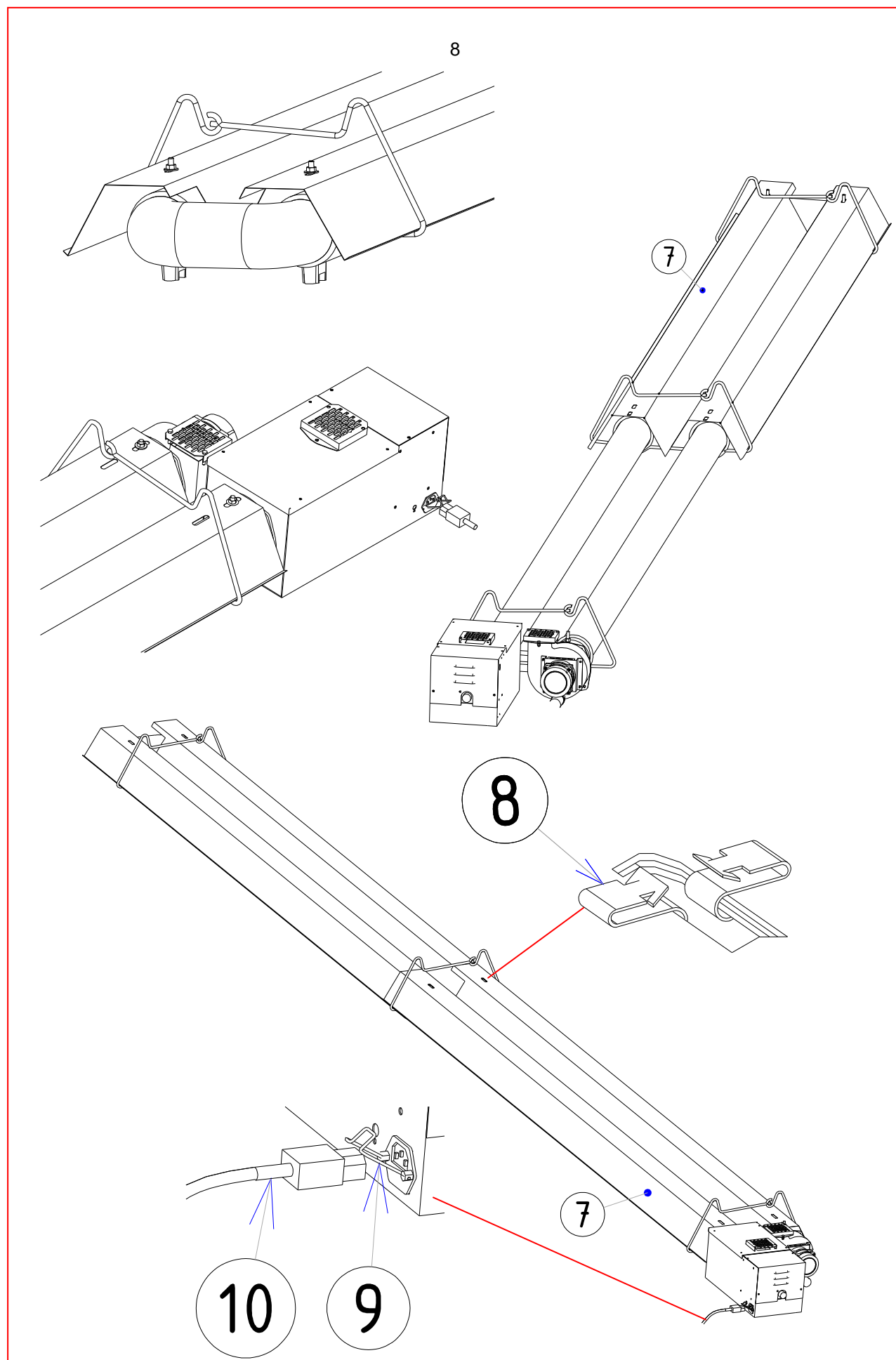
HBU34 list of components to be assembled

To assemble by respecting the order below

Mark	Quantity	Designation	Code
1	1	Emitting Tube on the Burner side Ø101.6 lg :5200	1030116
2	1	Emitting Tube on the Burner side Ø101.6 lg :5200	1030116
3	3	Wire support for HBU34 (packed inside the carton)	1203108
4	1	Cast iron U-bend Ø101.6 (packed inside the carton)	1001116
5	1	Burner block (packed inside the carton)	HBU34
6	1	Extractor block (packed inside the carton)	HBU34
7	2	Reflector lg 2775	1003213
8	4	Clips for reflector connection (packed inside the carton)	1716000
9	1	Plug Hanging Hook (packed inside the carton)	1025245
10	1	Electrical supply cable (packed inside the carton)	1025238

Mark	Designation of assembly systems
A1	Elongated hole for block
A2	Gudgeon for immobilisation (it must go through hole A1)
A3	Notch for unmistak
A4	Clamping screw

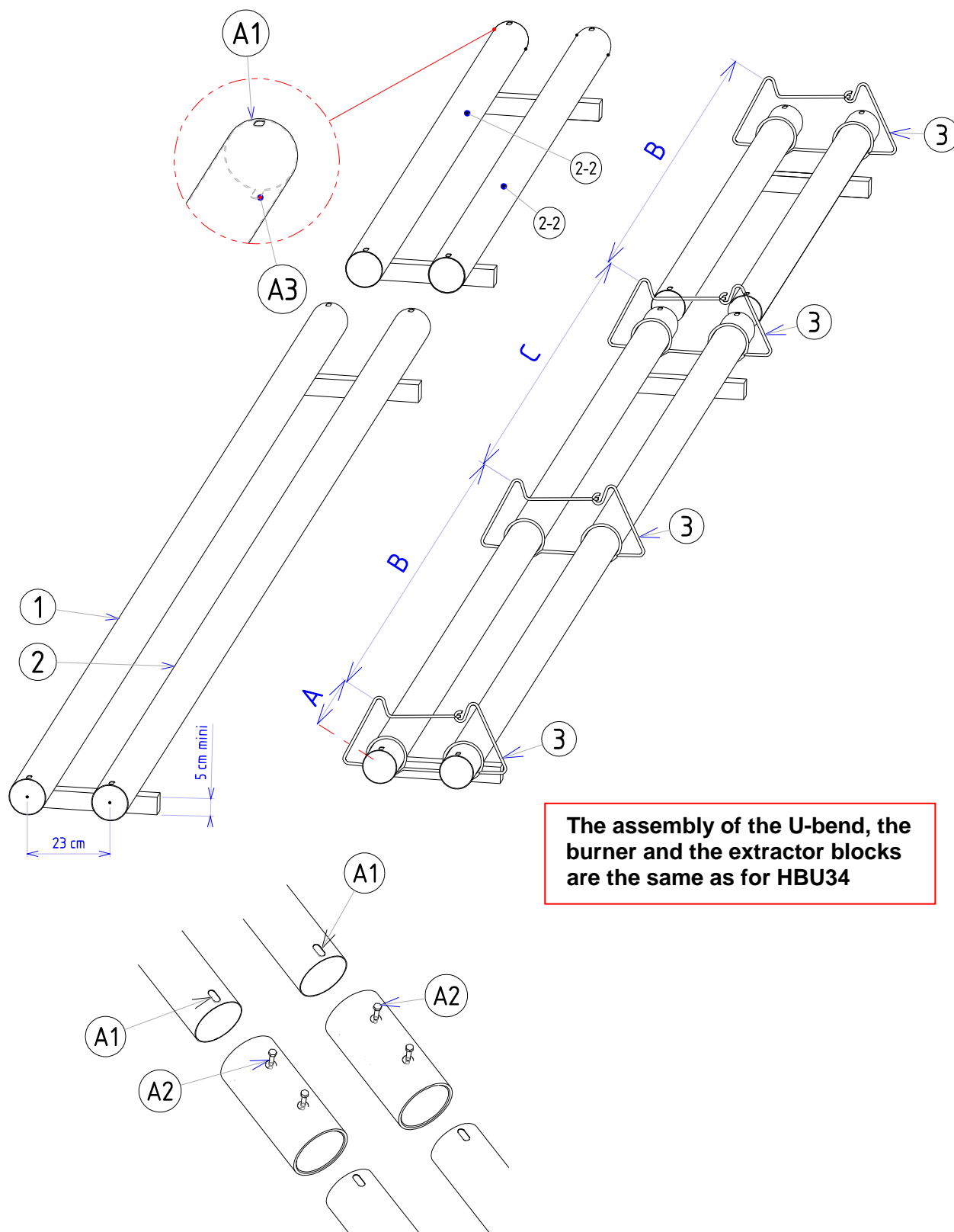


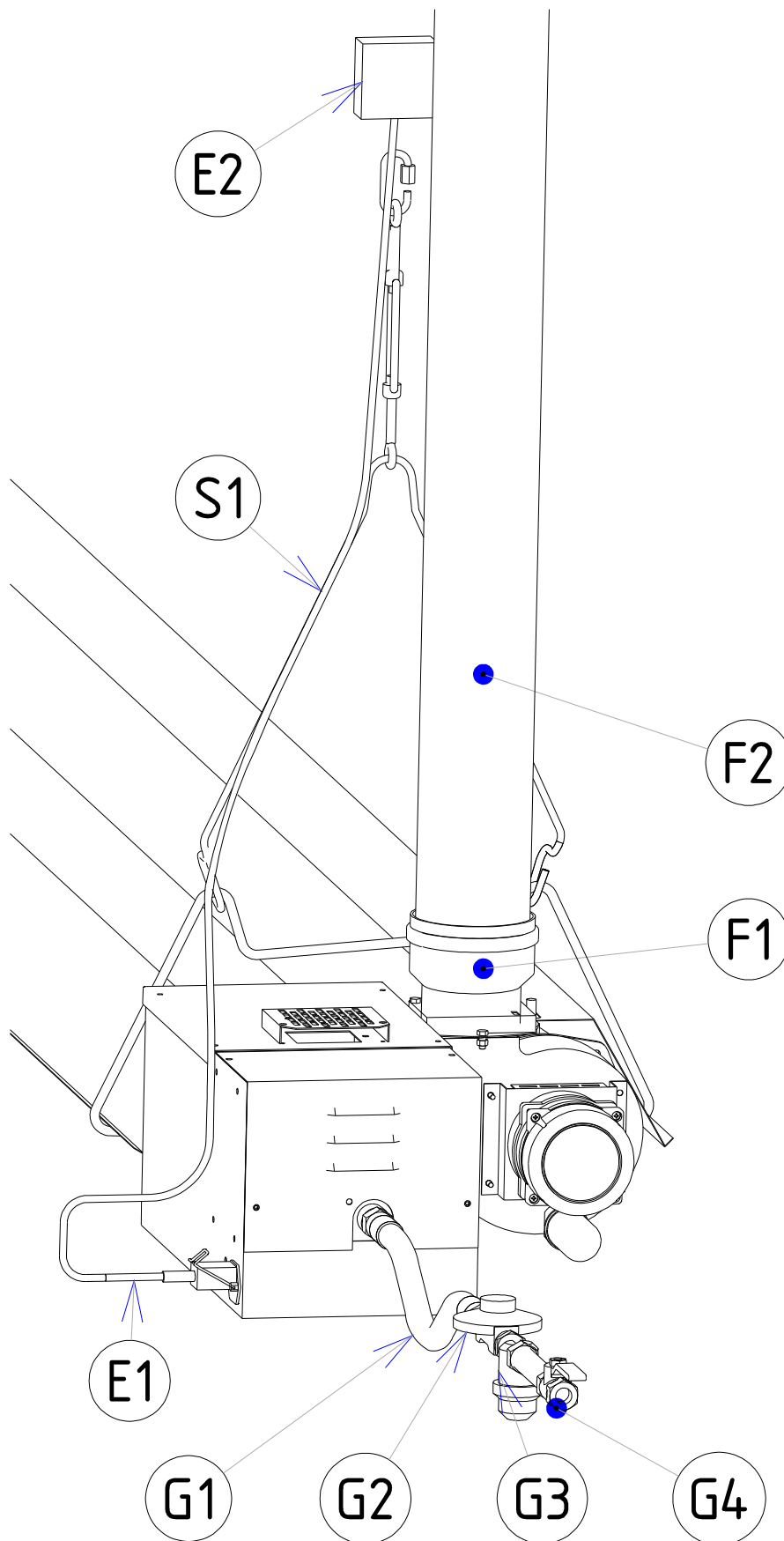


! WARNING: before any mounting, please take off the protection plastic film from reflectors and check that nothing obstructs the emitting tubes.



Mark	Designation of assembly systems
A1	Elongated hole for block
A2	Gudgeon for immobilisation (it must go through hole A1)
A3	Notch for unmistak
A4	Clamping screw



6 INSTALLATION SAMPLE

Hanging Section

	Designation
S1	Horizontal hanging (H+B MACHINERY accessory)
S2	Hanging rope or chain

Electrical section

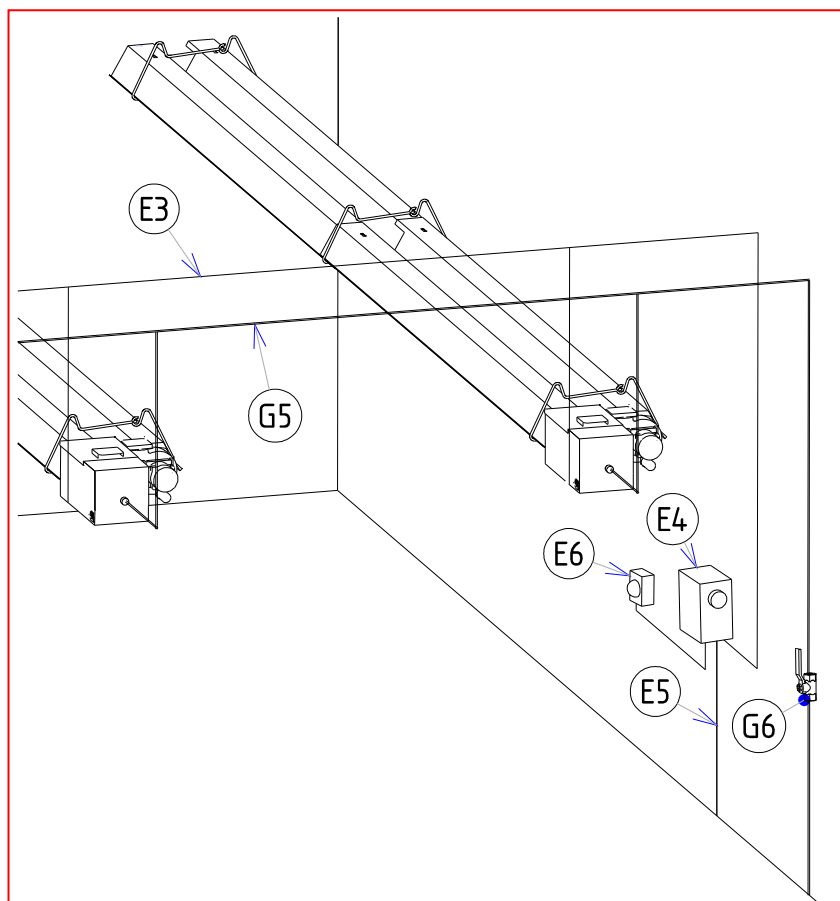
Mark	Designation
E1	Electric cables (provided with the appliance),1 for extractor, 1 for burner
E2	Electrical connecting box
E3	Feeding cable both for extractor and burner
E4	Electric Control Box (H+B MACHINERY accessory available upon request)
E5	Electrical supply 230V50Hz neutral phase earth
E6	Sensor (H+B MACHINERY accessory)

Fumes section

Mark	Designation
F1	Connection part for rigid pipes Ø97 (H+B MACHINERY accessory)
F2	Chimney rigid pipe Ø97

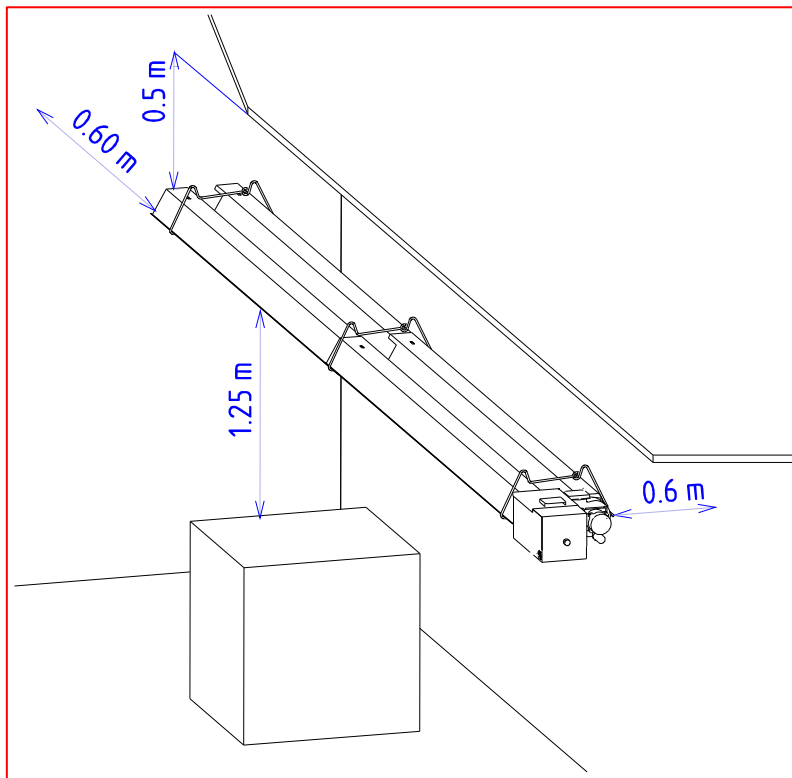
Gas section

Mark	Designation
G1	Flexible connection (H+B MACHINERY accessory)
G2	Gas reducer (H+B MACHINERY accessory)
G3	Filter
G4	Valve ¼ of turn
G5	Gas pipe
G6	General gate valve



7 SAFETY AND COMFORT DISTANCES

- Minimal distances from unprotected combustible material -

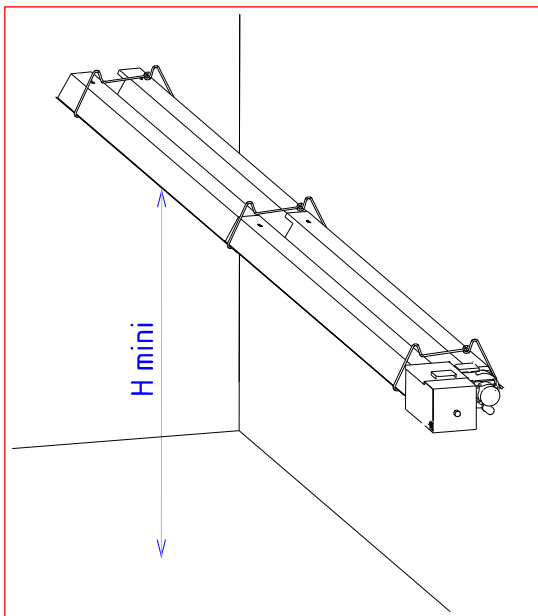


The appliance must be placed at a good distance from the unprotected combustible materials.

Moreover, it will be necessary to envisage the installation of a heat insulator between the support of the appliance and the material on which it is fixed in case this material is combustible.

• **CAREFUL: Refer to the rules in force**

- Minimal heights recommended from the ground -



• The minimal recommend fixation height in relation to the ground in the case of global heating of a closed building is:

Model	Horizontal hanging	Wall hanging
HBU23	3,6 m	3 m
HBU34	4,5 m	3,5 m
HBU51	5,5 m	4,5 m

• The positioning and the height of fixing of the appliance depend on the structure of the building and the dimensioning study (heat calculation).

Before installation it is necessary to check the compatibility of the local conditions of distribution (nature and the gas pressure) and the appliance adjustments indicated on the identification plate and the packing

PARTICULAR CASES :

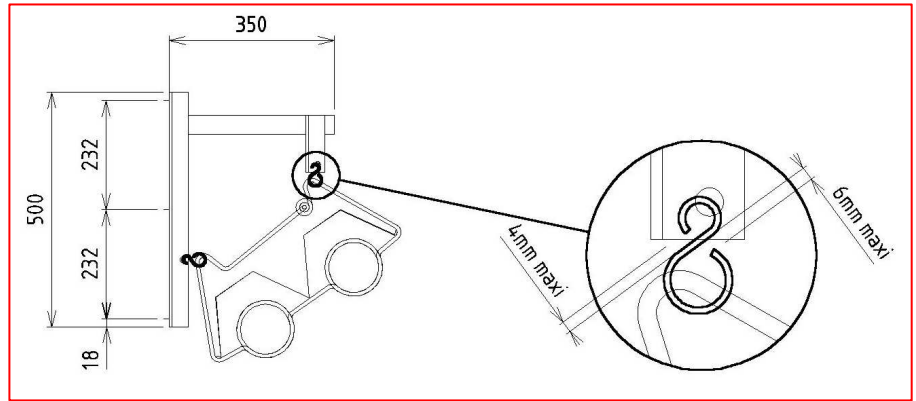
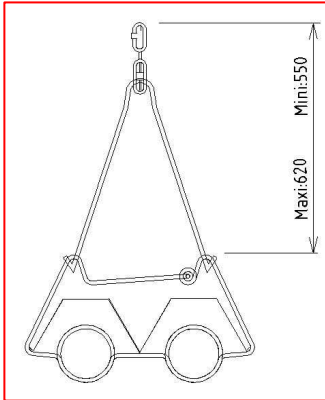
- 1) When installing radiant tubes above an overhead travelling crane, provide, if necessary, the protection of the carriage motor and the electric components by means of an insulating screen.
- 2) Avoid the installation of radiant tubes above bulky machines or storages. Those factors have negative influence on homogeneous distribution of radiation.
- 3) In the presence of hydraulic ramps (garage for example), be careful not to place radiant tubes above these bridges. Indeed, it could lead to deteriorations on vehicles body because of the excess heat.
- 4) In the case of a workshop with pits or masked zones, identical conditions of comfort as in the rest of the room can not be guaranteed

8-SUSPENSION

Once the number and the positioning of the appliances have been determined, provide their horizontal adjustments, chains or cables of a convenient length fixed to the ceiling or under brackets or specially made gantries between columns or against a wall.

Hanging accessories can be supplied as an option by H+B MACHINERY:

- HORIZONTAL AND WALL SUSPENSION KITS



HORIZONTAL SUSPENSION

WALL SUSPENSION

CAREFUL: do not incline the appliance at more than 35°C

➤ Suspension kits are proposed in option by H+B MACHINERY (see dimensions above):

- 1- Horizontal hanging kit containing several supports.
- 2- Wall hanging kit containing several supports.

Model	Horizontal suspension		Wall suspension	
	Kit reference	Number of supports	Kit reference	Number of supports
HBU23	0340030	2	0340033	2
HBU34	0340030	2	0340033	2
HBU51	0340031	3	0340034	3

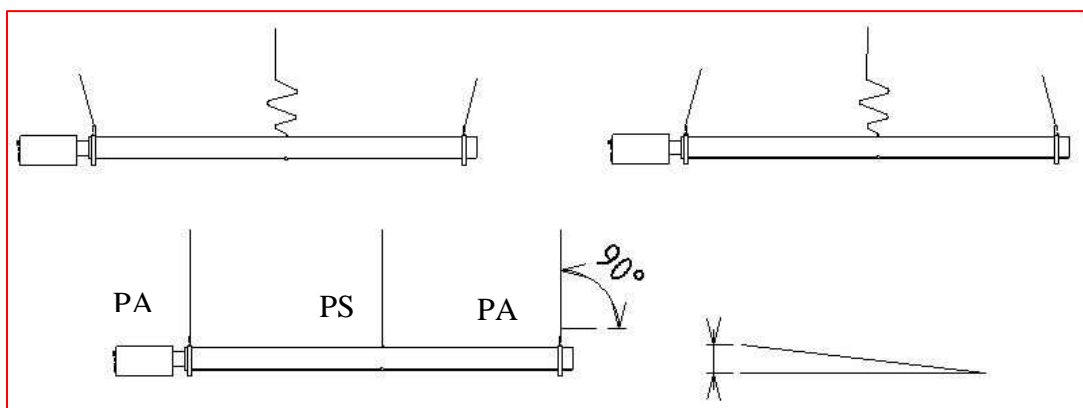
SAFETY INSTRUCTIONS

Fixing points must be perpendicular to the end supports of the appliance. HBU23 and HBU34 have 3 fixing points (2 fixing points are compulsory and one is to be said optional, "security"); HBU51 has 4 fixing points (3 fixing points are compulsory and one is optional as "security").

The security point can be fixed to the frame work by using a cable or a non stretched chain which shall not bear any load.

Good

Bad



Good

40mm ± 10mm toward the U-Bend

Very important: In all cases, the appliances must be fixed to their supports by flexible system in order to allow the expansion of the emitting tubes. However, excessive oscillations will have to be avoided.

Wall supports, supplied upon request by H+B MACHINERY takes this instruction into account. Whatever the method of hanging, the appliance should have a slope of 40 mm, in the direction of the U-Bend. Furthermore, in case of wall hanging, the incline of the appliance should not exceed 35° in relation to the horizontal line.

9 COMBUSTION PRODUCTS EVACUATION

According to the type of building, to the insulation or to the air tightness of the building, there are 3 possible solutions.

Type A - Evacuation of the combustion products into the atmosphere

Type B - Individual flue of each unit outside the building.

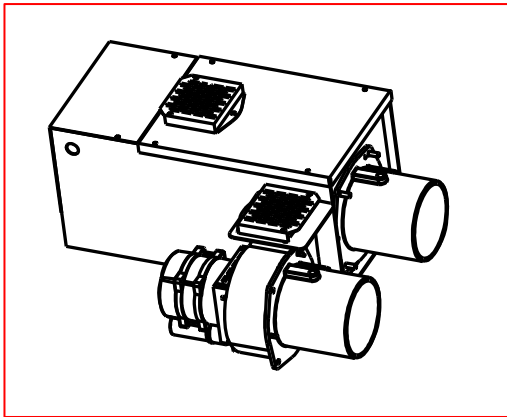
Type B - Appliances connected to a collective flue system.

Type C - Balanced flue system, combustive air and combustion products taken/thrown from/ outside (by concentric air hole or separated pipes).

The following indications are about the air renewal concern for the good functioning of the appliances (EN 13410 standard). Do not also forget to take into account the rules concerning people living in the heated premises.

Type A - EVACUATION OF THE COMBUSTION PRODUCTS INTO THE ATMOSPHERE

H+B MACHINERY radiant tubes have a good combustion hygiene which has been controlled for the **CE** mark. However, they can only be installed and used in **well ventilated premises**.



Radiant tubes can be installed without evacuation ducts for the combustion products within the limits of the current regulations. In that case, no modification has to be brought to the units which are already equipped with a protection grid.

* However we draw your attention to the fact that combustion products emitted into the atmosphere can perceptibly modify the humidity level depending on the insulation of the building and the air renewal. If there is no external evacuation of the combustion products, air inlets in the premises **must be sufficient in order to ensure the correct functioning of the appliances** and the dilution of the combustion products must be in the order of

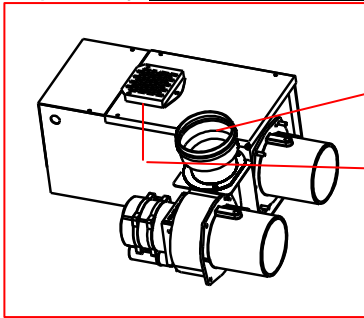
10 m³/h per kW installed.

It should be ensured that the combustion products do not come into contact with flammable materials.

CAREFUL: Refer to the rules in force.

Type B - INDIVIDUAL FLUE OF EACH UNIT OUTSIDE THE BUILDING

In this case, the appliance must be equipped with a connection piece to flue system, supplied on request by **H+B MACHINERY**



N°	Designation
1	Connection piece for evacuation of combustion products, Ø 100 mm internal to receive pipe of Ø 97 mm external
2	Combustive air inlet

VERY IMPORTANT: Refer to the rules in force.

- It is essential to take off the existing grid before fixing the connection part.
- The grid must not be used as a protection at the end of a fume duct.
- Air inlets must be sufficient in the premises in order to allow a good supply of the burner with combustive air. Provide for an air flow of at least of 1, 75 m³/h per kW installed.

SAFETY INSTRUCTIONS CONCERNING THE INDIVIDUAL EVACUATION DUCT:

- No reduction of diameter can be acceptable after mounting the connection piece.
- Use a **smooth** and **rigid** duct manufactured from stainless steel or aluminum.
- The evacuation must be realized according to the laws and legislations in each concerned country.
- The maximum length of the evacuation duct shall not be more than => 8 meters of cross section + 3 elbows of 90° + 1 standard cap against the rain (see table bellow of equivalent pressure drops).
- The duct must not be placed below than any appliance in any condition.
- Any accessory made of plastic or PVC is absolutely prohibited.

	Air flow	Fumes' temperature	Volumic flow	Massic flow	Extracted flow dilution included
HBU23	38,5 m ³ /h	230°C	73 m ³ /h	50 kg/h	210 m ³ /h
HBU34	58 m ³ /h	230°C	107 m ³ /h	73 kg/h	300 m ³ /h
HBU51	79 m ³ /h	217°C	162 m ³ /h	111 kg/h	460 m ³ /h

Equivalent pressure drops:

Rigid duct Ø97	Rigid duct equivalence
a U-Bend at 90°	2 meters
a U-Bend at 45°	1 meter
a standard cap against rain	2 meters
a meter of rigid duct	1 meter

Type B - APPLIANCES CONNECTED TO A COLLECTIVE FLUE SYSTEM

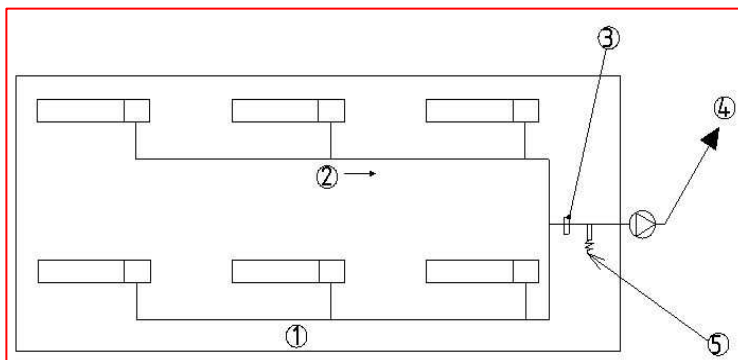
Very important:

The flow extracted on each appliance must be equivalent.

The installer will have to comply with the official texts of each country concerning mechanical evacuation and will have to get information from the competent national organizations about:

- 1) How to balance the network.
- 2) The controls and the different securities to put into operation.

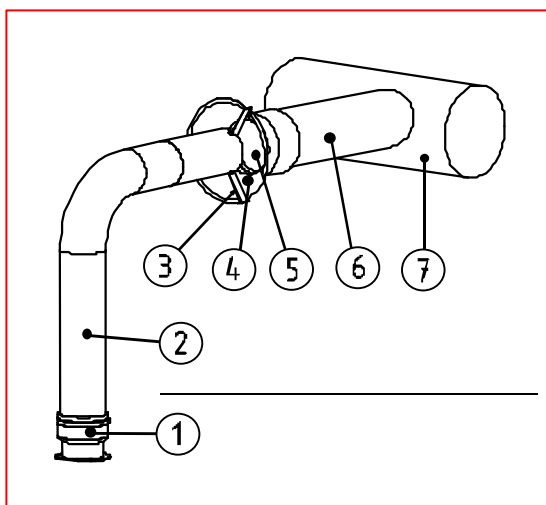
- PRINCIPLE SCHEMA



N°	Designation
1	Collector
2	Slope 4mm/m
3	Security pressure switch
4	Extraction fan
5	Condensation collector

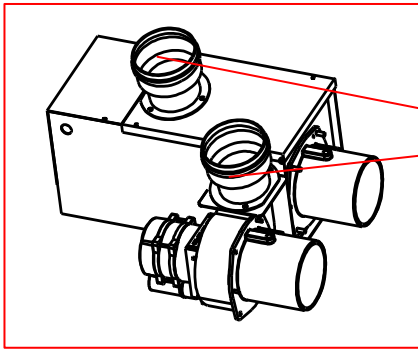
It is necessary remove first the flue outlet grid from the appliances and to replace it by a connection piece. Connect the top of the dilution piece to the collector by means of a pipe (aluminum or stainless steel), while checking that the connection of this duct is made on the side of the main duct (collector) and not from below. Place the dilution piece on the tube coming from the appliance and fasten the 3 fixing lugs by the means of screws or rivets. Do not take off the screwed rod which is used as a thrust.

- Details for the collector connection



N°	Designation
1	Connection piece for HBU type B
2	Evacuating pipe Ø 97 mm
3	3 fixing lugs at 120°
4	Dilution piece (Option supplied by G.I. on request)
5	If necessary install a damper in order to balance the network
6	Collection pipe to main duct (Ø 125 mm minimum)
7	Collector (main duct) connected to a general extraction fan

Type C BALANCED FLUE SYSTEM, COMBUSTIVE AIR AND COMBUSTION PRODUCTS TAKEN/THROWN FROM/TO THE OUTSIDE



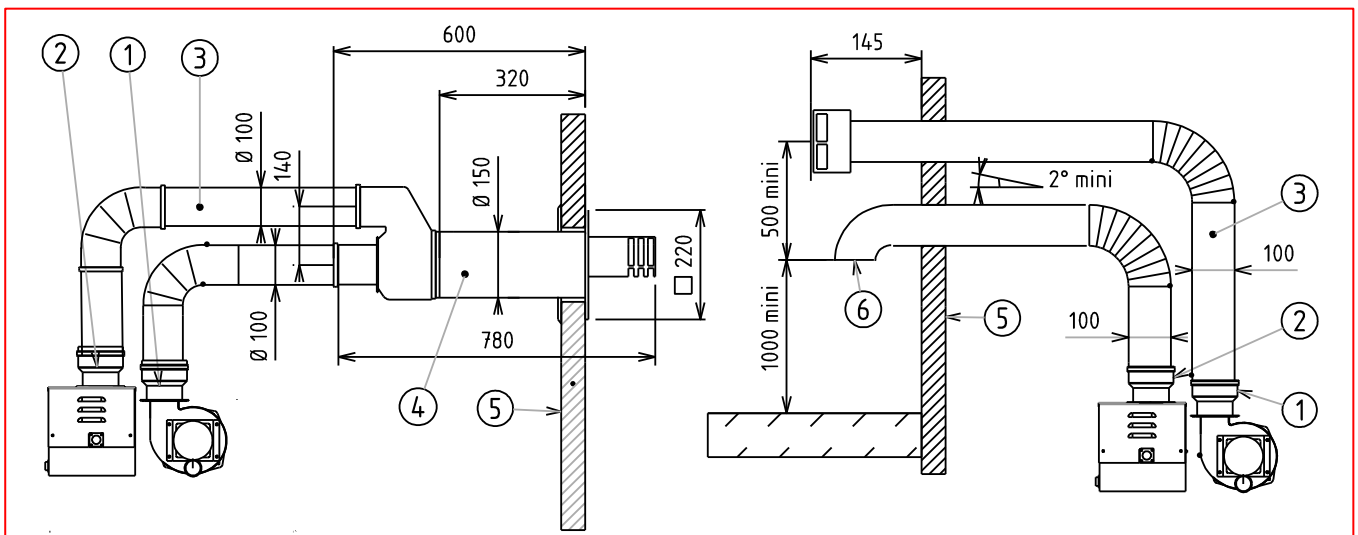
N°	Description
1	Combustive air inlet
2	Connection piece for evacuation of combustion products, Ø 100 mm internal to receive pipe of Ø 97 mm external

CAREFUL: refer to the rules in force.

- It is essential to take off the existing grille before fixing the connection part.

Type C12 Wall balanced flue terminal

Wall insulated chimney



Insulated chimney:

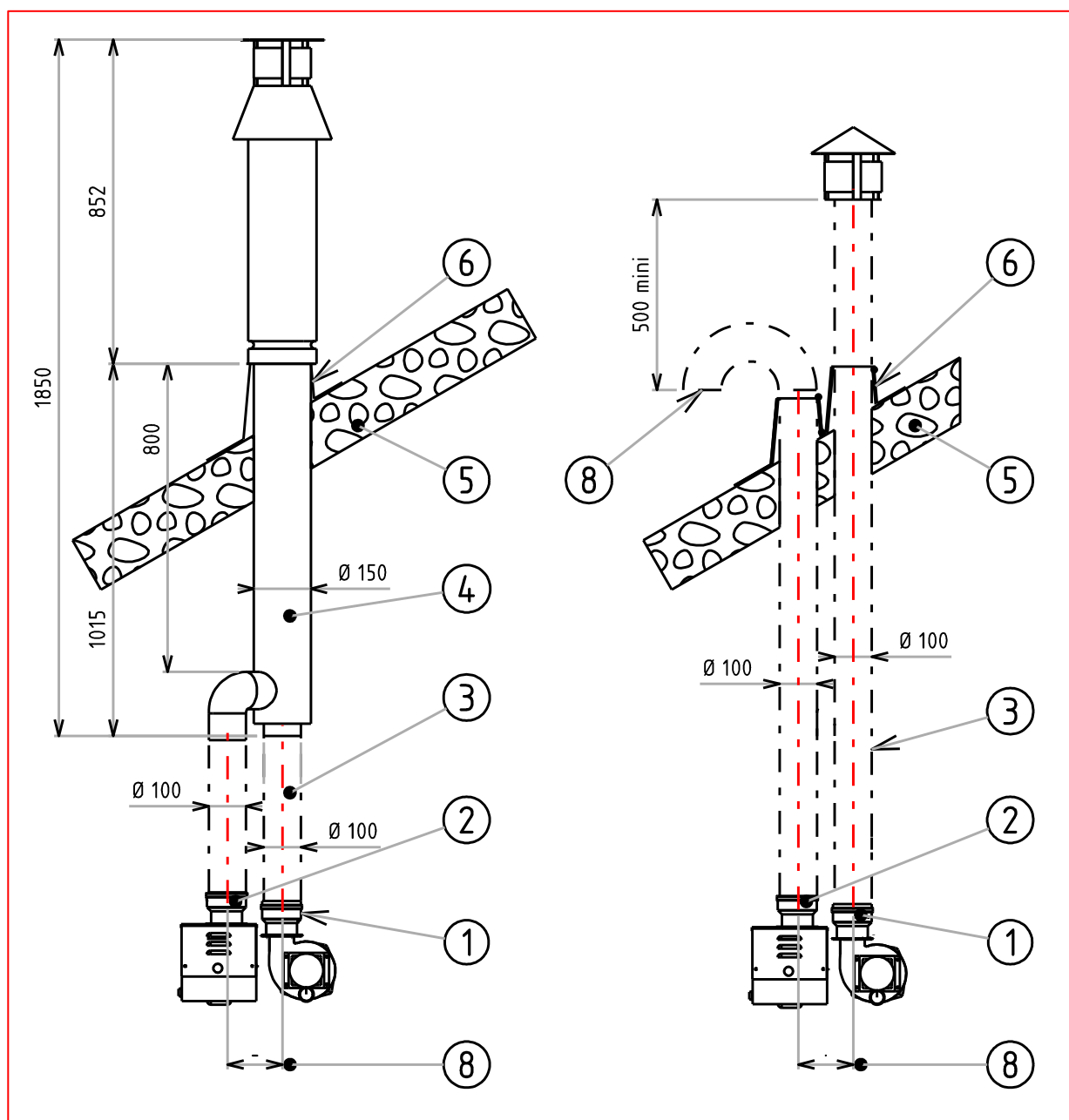
The distance between the two duct's ends should not be lower than 500 mm. The air inlet must be located at more than one meter from the ground or from any other wall but the frontage from where they emerge.

The combustion product's outlet must be located above the combustive air inlet.

N °	Designation
1	Combustion products outlet for insulated pipe Ø 100
2	Combustive air inlet for insulated pipe Ø 100
3	Non supplied insulated pipe Ø 100
4	Wall balanced flue terminal Ø 150 for two insulated pipes Ø 100
5	Outside wall of the building
6	Grid against birds

Type C32 Roof balanced flue terminal

Roof insulated chimney



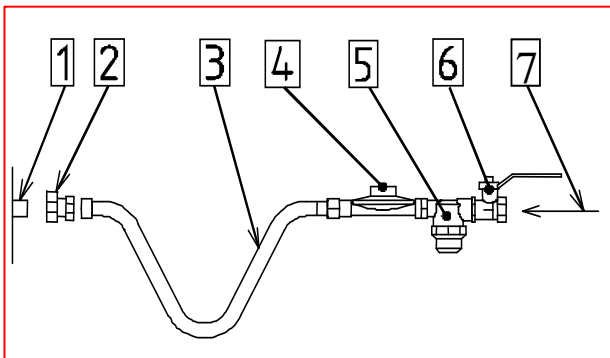
N°	Designation
1	Combustion products outlet
2	Air inlet
3	Ø 100 pipe, not provided
4	Roof balanced flue terminal Ø 150
5	Building roof
6	Roof balanced flue terminal sealing not provided
7	Grid against birds
8	Distance between axes 182 mm

10 GAS CONNECTIONS

The gas connection on the appliance is 3/4" male (**mark 1**). In case of a gas distribution pressure higher than the standard nominal pressures, it is necessary to install a gas reducer fitted upstream of each appliance (**mark 4**). It is also recommended to place a gas filter upstream the reducer (**mark 5**) in order to avoid the obstruction of the reducer through eventual calamines that can subsist in the pipes.

Certain flexibility must be left to the gas connection in order to allow the appliance expansion. This can be obtained by including a stainless steel flexible (**mark 3**). A union (**mark 2**) is delivered with the appliance. The flexible can be replaced by a tempered copper making a winding up of at least 500mm diameter. Immediately upstream of this connection should be an insulation valve of ¼ turns type (**mark 6**).

In all cases, the assembly of the different accessories should be carried out respecting the following order:



N°	Designation
1	HBU Gas Input ¾" Male
2	F ¾ "
3	Flexible
4	Reducer if necessary
5	Gas filter
6	Valve ¼ turn
7	Gas Network Supply

11 ELECTRICAL CONNECTION

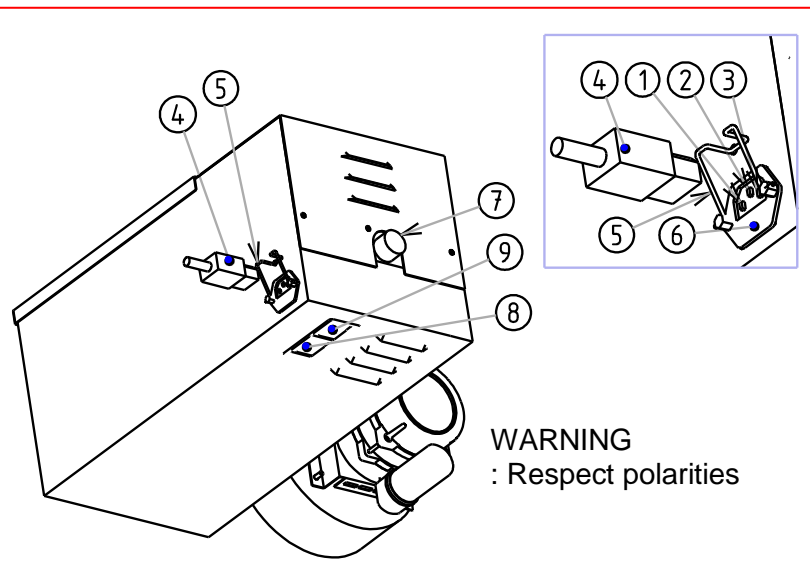
The electrical connection is 230 volts between live and neutral + earth. The necessary starting power is 115VA per appliance. No tension, even transitory, between neutral and earth can be allowed.

In case of electrical installation without neutral (or neutral of bad quality), an insulation transformer has to be provided in order to create an artificial neutral. For this, connect a pin of the secondary transformer directly to the earth.

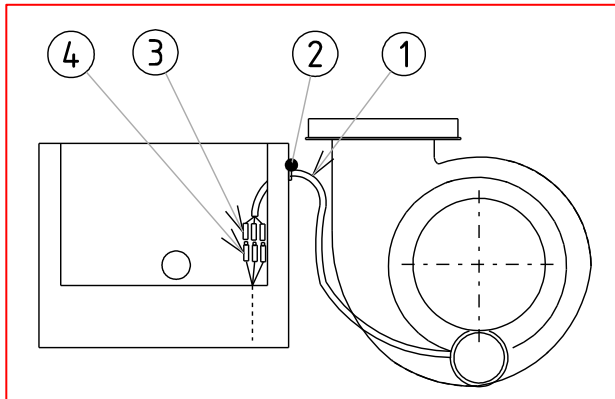
Two electrical cables are supplied with the appliance. Respect the polarity blue neutral wire, green/yellow earth wire, black or brown phase wire. It is the same for the connector of the extractor block.

If the appliances are manually controlled, the switches (3A protection) must be placed either within reach on a general control panel or close to each appliance. In all cases be sure that there is no electromagnetic disturbance which would seriously affect the functioning and/or the longevity of electronic components.

Careful: In no case should the electrical cable be located or stay on the reflectors or on the functional blocks of the appliance.



N°	Designation
1	Phase (brown wire)
2	Earth (green/yellow wire)
3	Neutral (blue wire)
4	Female connector
5	Hanging hook
6	Fuse 5A
7	Gas connection M3/4
8	Red light Appliance in fault
9	Orange light Appliance supplied



Extractor connection

The motor cable (mark 1) is connected to the burner box.

The burner box have a hole with a wire pass (mark 2), the motor female sockets (mark 3) must be connected to the male sockets of the burner box electrical beam (mark 4).

Respect polarities. Phase earth neutral.

12. DEFAULT INFORMATION

H+B MACHINERY radiant tubes have a control light visible from the ground which can indicate any functioning problem. Therefore it is possible to centralize this information in an electrical control board with a sound or light signal.

In this case H+B MACHINERY radiant tubes can have in option a device with an electrical plug (on burner block).

Working:

The transfer of the light defect information is done through a low intensity relay (dry contact) **mark 3** which is installed inside the burner box and supplied in parallel of the defect light indicator of the appliance (**mark 2**).

The dry contact of the relay is closed in normal functioning and is open when appliance on defect status.

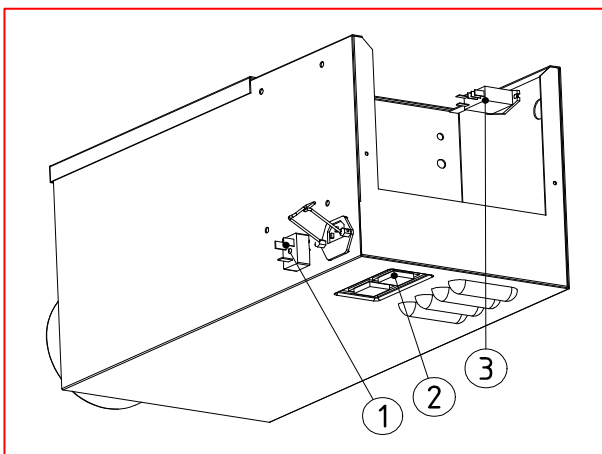
This dry contact is sent on a 3 pins electrical plug which is on the side of burner box.

The defect information can be for each unit or for a group of units (see connection principle).

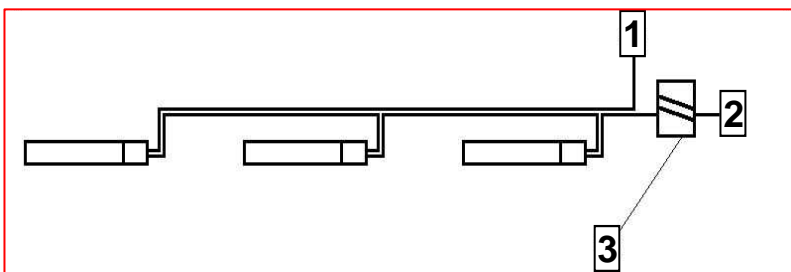
The alarm current can be 230 volts or 24 volts.

Important: it is compulsory to temporize the alarm signal of at least 30 seconds in order to avoid the setting off at each ignition. This temporizing is to be installed in the general electrical board.

Appliance with Lockout Relay option



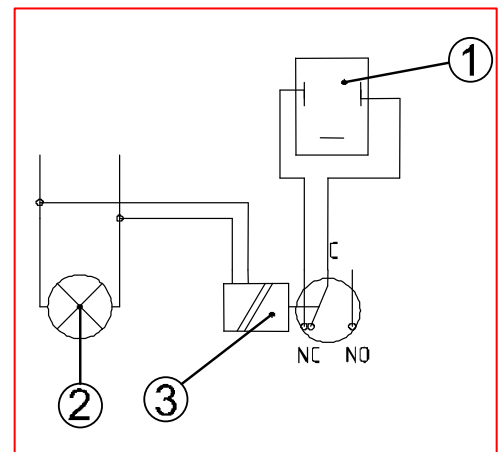
Connection principle



Mark 1 Default relay plug

Mark 2 Red light default

Mark 3 Default relay



N°	Designation
1	Phase
2	Neutral
3	Temporized relay (>30s)

13 TEMPERATURE REGULATION

It is advised to provide an automatic regulation according to the heating needs. A regulation will be placed per premises or per zone. The regulation occurs either closed or open on the electrical supply of appliances.

The regulation advised for all installations, whether for zones or global heating, is known as consequential regulation. It includes an electronic regulator and a black ball sensor which senses the energy radiated from one or several appliances. It regulates the installation on the dry resultant temperature, which is a better criterion of comfort than air temperature only. The regulator includes possibility of a low temperature regulation: for this it is necessary to use the dry contact of a clock or a relay.

We advise to respect the instructions concerning the material and particularly:

- To position the sensor at about 1.5m from the ground between two appliances so that it receives a homogeneous radiation,
- To insulate the sensor from the wall on which it can be found in order to avoid the cold radiation of the wall through the interposition of an insulating material (glass wool, wood, etc...),
- The connection between sensor and regulator must be made out of armored cable or phone cable, 2 pairs.
- The length of the connection sensor/regulator must not exceed 30 m,
- In any case, do not put these wires in the cable path which already contain many wires carrying energy.
- Do not go beyond the resistance of 10 Ohms per meter.

14 PROGRAMMING

The clock index shall be placed so as to activate the start up about 30 minutes before the premises are occupied. The time lapse should be modified according to the inertia of the building and to the external temperature.

In the case of a very low external temperature, it is advised not to stop the heating during periods of inoccupation, but instead to simply reduce the temperature.

It is advised not to stop the heating during short interruptions in the use of premises.

15 COMMISSIONING

As trials for tightness, mechanical resistance and the cleaning of the gas network had been carried out:

- Purge the gas network.
- Check that electrical supply is correct.
- Check presence and correct state of the flue installation..

FUNCTIONING CYCLE

Appliances are regulated in factory and do not need any additional adjustments on site.

- As soon as the electrical supply is turned on, beginning of the pre-purge sequence of about 15 seconds (yellow and red control lamps light).
- Control of the negative pressure in the tube through differential pressure switch.
- When the negative pressure is sufficient, the ignition spark starts and the electromagnetic gas valve opens (Yellow lamp lights and red lamp turns on).
- When the sensor detects the flame, the ignition spark stops and the appliance functions as long as it is supplied with gas and electricity.
- If for whatever reason the flame is no longer detected, the electro valve closes and the unit switches to safety position (yellow and red control lights turn on), then the appliance attempts another ignition and a second working cycle starts.
- In the event of a second ignition attempt without success, the unit again goes to safety position. The ignition sequence can only start again if the electric supply is cut and reconnected a couple of seconds later.
- While operating, only the yellow control light stays on with permanent control of the negative pressure and the flame.
- In case of technical problem, refer to **paragraph 18 “Faults - Possible causes- Solutions”**

16. MAINTENANCE

We recommend you to check the appliance and the installation at least once every year. The checking must be made by skilled personal. A maintenance contract is advised.

CAREFUL: Refer laws and legislations. Make sure that access conditions and safety minimum distances are respected.

List of necessary tools:

Brush, duster, paint brush, flue brush, vacuum cleaner, small case of electromechanical tools.

CAREFUL: INSULATE GAS AND ELECTRICITY BEFORE ANY MAINTENANCE WORKS.

MAINTENANCE INSTRUCTIONS:

1) Emitting tubes:

Remove the dust with a metal brush from outside the tubes, inspect inside by removing from one end the functional block and from the other one the U-Bend (put a temporary tube support).

The tubes must be cleaned from inside if there is an accessible layer of dust deposits. Use a flue brush with an adapted diameter and an industrial vacuum cleaner.

Also remove inside of the U-Bend.

2) Reflector:

Inspect the state of the reflector and if necessary remove it for cleaning. The reflector can be cleaned with a soft cloth and diluted detergent. If necessary use a non abrasive metal polish.

3) Extraction Turbine:

Check that it turns freely and remove with a brush any accumulation of deposits that may exist on blades. Also remove dust from the fan volute.

4) Motor and cooling fan of motor axis:

Remove dust using compressed air (careful with the turbine over speed) and clean the aeration ears.

5) Ignition and security box:

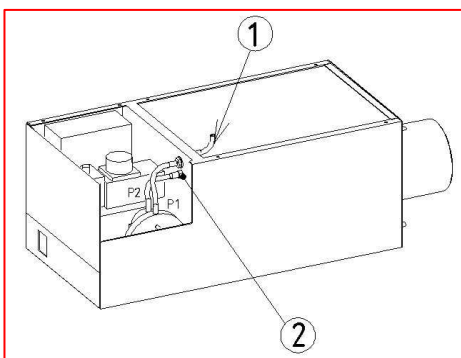
Remove the electrical plate and remove dust if necessary.

Make sure the control contact of negative pressure occurs correctly.

6) Gas tray set and mono-electrode

- Remove the electrode mounting panel. Disconnect the electric wires, inspect the electrode, brush it and change it if necessary. Control the gap which must be 4 mm.
- Disconnect the electric wires of the electro valve.
- Take out the gas tray set by taking out the assembly screws on the face.
- Clean the injector, the burner and the burner head which must not be clogged.
- Clean the electro valve and regulator filters and the cartridge filter.

7) Connection of pressure switch:



N°	Designation
1	Pressure plug on the air inlet
2	Burner negative pressure plug (green pipe)

8) Evacuation duct

Check and clean the fume ducts according to the rules in force.

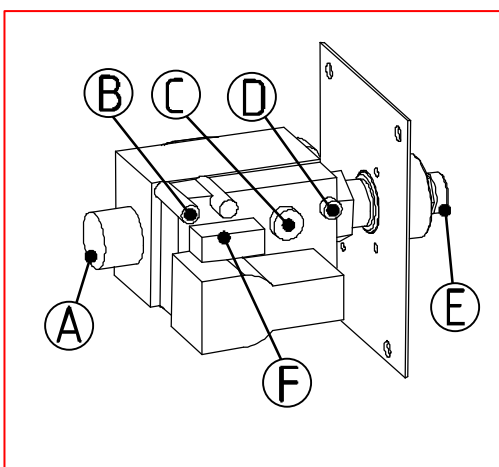
17 GAS CHANGE

(See table of paragraph 2 TECHNICAL SPECIFICATIONS)

- The transformation of the appliance for the change of used gas must be carried out by a skilled installer.
- The injector **mark E** is the only piece to be changed in order to change from one gas to another.
- The diameter of the injector is engraved in hundredth of mm
- The table of characteristics gives different diameters of injectors which have to be respected.
- The same table indicates the regulation values of the pressure at the injector which have to be respected as well as the nominal supply pressure.

NOTA: A transformation kit is available on request.

It includes: the adapted injector, the joint and the label of the gas nature indicating the new adjustment (the label has to be placed on the former one).



Successive operations to be carried out:

- Control the supply pressure of the appliance in function by the means of a manometer connected to the pressure point n°B.
- Then control the pressure on the pressure point n°D.
- Adjust the pressure at the injector by the means of a regulation screw n°C.
- Stick the label of gas nature.

NOTA: For gases belonging to the 3rd family 3+, Propane or Butane, the regulator "C" is blocked (maximum screwed).

Mark N°	Designation
A	Electro valve inlet
B	Supply pressure intake (unblocked the screw in order to measure the pressure)
C	Pressure regulator (remove the brass plug terminal in order to access to the regulator screw)
D	Injector pressure intake (unblocked the screw in order to measure the pressure)
E	Brass injector (carved in mmx100)
F	Electro valve power supply

18 FAULTS - POSSIBLE CAUSES - SOLUTIONS

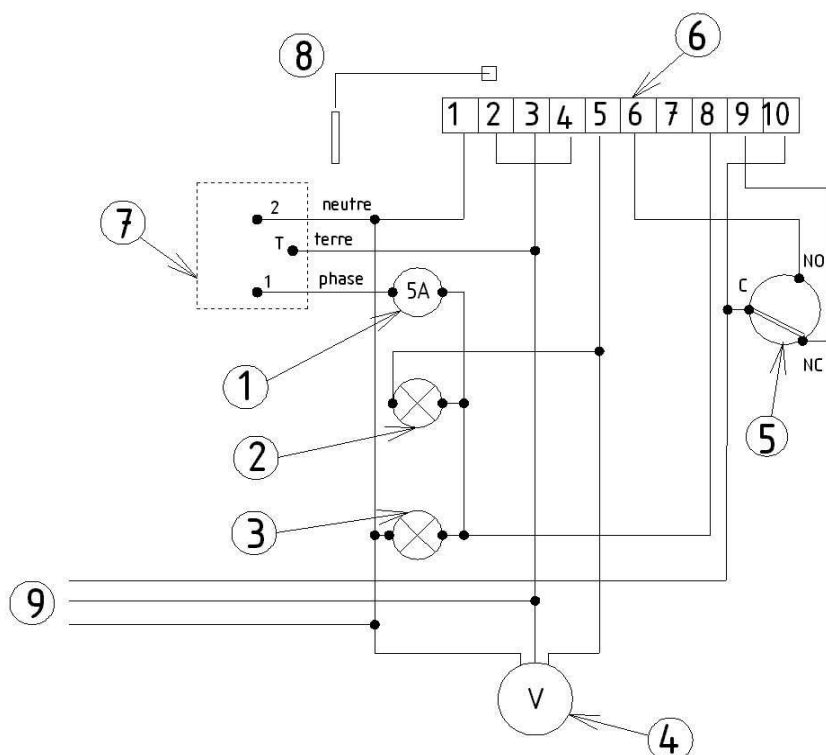
Before any replacement of components internal to the appliances, make sure that:

- 1) The electrical supply of appliances is correct.
- 2) The gas is correctly supplied until the gas inlet of one or several appliances (gas filter cleaned).

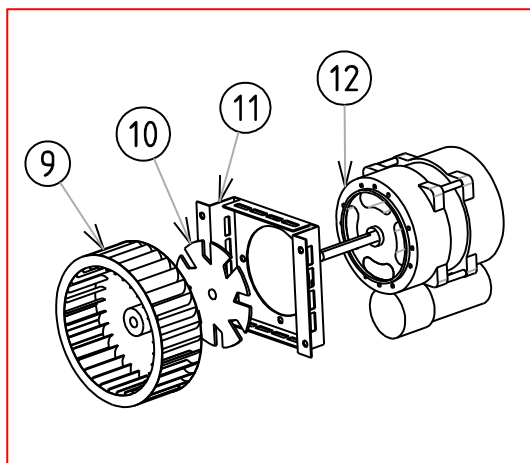
FAULTS	POSSIBLE CAUSES	SOLUTIONS
the motor does not run (red and yellow lamps switch on)	Impeller jammed Motor seized up or failed burnt fuse	Clean the fan casing Unseize and/or change change the fuse
the motor turns (red and yellow control lamps light on) but the appliance does not ignite	Clogged chimney Faulty motor Folded or disconnected pressure switch pipes Faulty ignition box Dirty impeller	Check - Clear To be cleaned or changed Replace them correctly To be changed To be cleaned (compressed air)
The pressure switch works correctly but there are no sparks	Cracked electrode Too big gap for ignition electrode Faulty control box	To be changed To be adjusted ($4\text{ mm} \pm 1\text{ mm}$) To be changed
Sparks occur but the burner ignition does not occur. (yellow lamp lights on, red lamp lights off)	Faulty electro valve Ignition and security box Electrode out of position Default of gas supply	To be changed To be changed To be repositioned Clean filter and pipes
Ignition occurs but the appliance stops afterwards	Faulty flame control Inversion phase neutral Faulty ignition box	Check the ionization sensor and electrical connections (or quality of neutral) To be changed
Abnormal noise	Badly set burner Fan impeller rubbing Faulty ball bearings of motor	Check the regulation To be repositioned Change the motor

INTERNAL ELECTRICAL SCHEMA

N°	Description
1	Fuse
2	Red lamp
3	Yellow lamp
4	Electro valve
5	Pressure Switch
6	Security and ignition box
7	Supply plug
8	Ignition and ionization
9	Motor supply



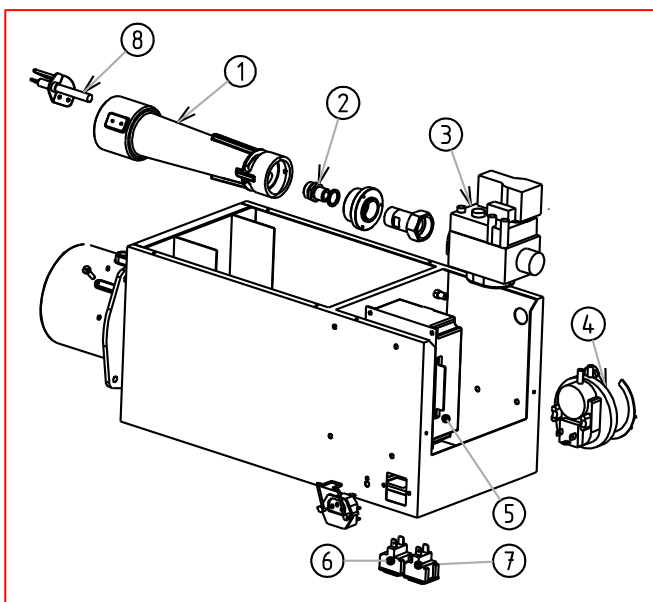
19 SPARE PARTS



1) Fan motor group

N°	Designation	Reference
9	Extraction turbine	1026002
	Ø 120 x 42 HBU23/34 Ø 133 x 42 HBU51	1026004
10	Cooling blade	1026001
11	Motor support	1203105
12	Motor 60.2.50 M	1027011

2) Burner block



N°	Designation	Reference	
1	Venturi Burner	0410029	
2	Injector 2H/2L 20/25mbar	HBU23	1019172
		HBU34	1019173
		HBU51	1019164
	Injectors 3B/P 28-30mbar et 3+ 37mbar	HBU23	1019175
		HBU34	1019174
		HBU51	1019157
3	Venturi Burner	1021210	
4	Pressure switch	HBU23	1021208-86
		HBU34	1021208-69
		HBU51	1021208-64
5	Control Box	8021101	
6	Red light	1025244	
7	Orange light	1025243	
8	Electrode	1030016	

Your Installer: