Installation , use and maintenance manual

Gas fired radiant strips heating systems

X CERK HE / X CERK HE-Jr pre-mix burner EVO4

X-CERK HE EVO 4 -2022-11--Iss1-0-EN

CE

ErP READY

EXELTEC

Technoparc Saône Vallée Est- 215 Rue Marie Curie-
01390 Civrieux en Dombes
Tel : 04 78 82 01 01 Fax : 04 78 82 01 02
www.exeltec.fr – info@exeltec.fr

This equipment has been manufactured to work for the intended purposes, without risk, provided that the following indications are observed:

- Installation, use and maintenance are carried out according to the instructions in the present manual;
- Power supply and working conditions comply with the product plate data.

IMPORTANT:

PLEASE READ THE INSTRUCTIONS CAREFULLY BEFORE PROCEEDING WITH THE INSTALLATION AND USE OF THIS EQUIPMENT. KEEP THE MANUAL FOR FUTURE REFERENCE.

Constant development in search of product improvement may lead, without advance notice, to changes or modifications of the contents and descriptions herein

Contents

1 INTRODUCTION

This manual contains the description of **X CERK HE EVO4** radiant strips heating system operation and the instructions necessary to correctly perform the main operations concerning installation, use and routine maintenance.

The information provided is intended for a professional user. This user must have specific knowledge on the use of the heating unit, be properly instructed and trained and have the necessary authorization to operate on it.

The use of original spare parts and accessories is recommended. The installation of non-original spare parts will invalidate the warranty. Furthermore, non-original parts could reduce the useful life and performance of the heating system, as well as be dangerous.

Special symbols are present on the unit. The heating system manager has the responsibility to keep them in perfect visual condition and to replace them in case they are no longer legible.

2 WARNINGS

Carefully read the instructions and warnings contained in this document before starting the system up, as they provide important information regarding safety, installation, use and maintenance.

1. This manual is an integral and essential part of the product and must be kept in a safe place and made available to personnel;
2. Give this manual to the new owner and/or installer who will take care of the installation if the appliance is sold, or transferred. In case of loss, immediately ask EXELTEC for a copy;
3. EXELTEC disclaims any liability for direct or indirect damage to people, animals or objects arising from errors in installation, use, failure to comply with the instructions in this manual and in any case with the instructions provided by the manufacturer;
4. The system must be installed in compliance with national and local regulations in force in the country of installation;
5. This system shall be used solely for the purposes for which it was expressly designed and built. Any other use is to be considered improper and therefore dangerous;
6. Any contractual or non-contractual liability of the manufacturer for damages arising from errors in installation, use and in any case from non-observance of the instructions provided by the manufacturer is excluded;
7. Installation in premises where artisan or industrial activities are carried out or where working activities and materials may lead to the risk of formation of gases, vapours or dusts likely to give rise to fires or explosions is not permitted;
8. The installation and start up of the system must be carried out by qualified and authorized personnel;
9. The packaging elements (nails, staples, plastic bags, polystyrene foam, etc.) must not be left within the reach of children as they are potential sources of danger, but must be disposed of in accordance to current legislation.

Check the system every year through a EXELTEC authorised service centre.

2.1 Special warnings

Check that the heat unit is pre-set to operate with the electrical power and the gas available in the network by checking what is indicated in the serial data on the unit.

Check the seal of the gas supply installation, check that it has the suitable size for the necessary capacity and that it is equipped with all safety and control devices according to the laws in force.

The electrical safety of the installation is complete when the installation is correctly connected to an efficient grounding system that must meet the requirements of the laws in force.

In case of repeated arrests of the thermal unit do not persist in performing manual reset procedures, but contact the professional, qualified personnel to solve this anomalous issue.

Deactivate the device in case of failure and/or malfunctioning, do not try to fix and/or directly intervene on it, but promptly contact the authorised customer service. In case of prolonged inactivity, close the valve of gas interception and power off the system.

If there are works in the place where the radiant circuit is to be installed, avoid accidental impacts that can damage the seal of radiant pipes.

Should the installation be subject to demolition, respect the laws in force in the country where the installation is located.

All materials and/or substances must not be dispersed in the environment but reused and/or disposed of according to current legislation.

The installation contains the following materials:

- plastic components;
- electrical/electronic components;
- single and double insulated electrical wires;
- mineral wool insulating material;
- glass wool insulating material;
- steel, copper and aluminium.

2.2 Disposal

2.2.1 Information to users

Illegal/abusive disposal of products on the part of the user, leads to the application of the administrative sanctions foreseen by the Italian Legislative Decree 152/2006.

INFORMATION TO USERS according to art. 14 of the Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE).

The crossed bin symbol (Fig. 2.1) on the appliance or on its packaging indicates that the product, at the end of its operating life, must be collected separately and not disposed together with other mixed urban waste.

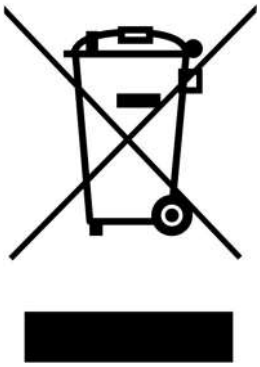


Fig 2.1

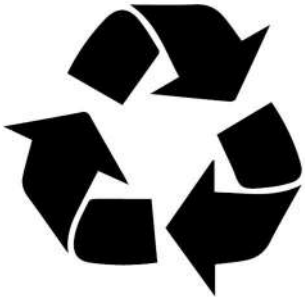


Fig. 2.2

The separate collection of this equipment at the end of its life is organized and managed by the manufacturer. The user who wishes to dispose of the present equipment can therefore contact the manufacturer and follow the system that this has adopted to allow the separate collection of the equipment at the end of life, or autonomously select an authorized waste chain for its management.

The adequate separate collection of the disused equipment for the start after recycling, treatment and environmentally compatible disposal helps to avoid possible negative effects on the room and human health and favours the reuse and / or recycling of the materials of which it is composed the equipment.

2.3 General description

XCERK HE/HE-Jr is a radiant heating system operating with gas, and it is particularly suitable to heat medium-large environments. Its design and manufacturing have involved special attention in order to obtain optimal results in terms of efficiency, safety, temperatures uniformity and reduction in polluting emissions.

XCERK HE/HE-Jr consists of aluminised steel fixed on the ceiling of the room to heat. The heated pipes emit infrared rays that heat the environment without creating air movement.

The production of the heat necessary for heating the radiant pipes takes place through a heat unit equipped with modulating burner. The heat exchange of the combustion chamber to the fluid present in the pipes is ensured by the continuous recirculation of the same fluid through a centrifugal fan.

2.4 Symbols and terminology used in the manual

2.4.1 Terminology

DAMAGE Physical injury or damage to health

GCV	Higher calorific value, it is the total quantity of heat emitted by a fuel mass unit dried till its intrinsic humidity, when this is subjected to complete combustion in presence of oxygen and when the products of combustion are back to the original pre-combustion temperatures; this quantity includes the vapour condensation heat created by the combustion of the hydrogen contained inside the fuel.
NCV	Lower calorific value, it is the total quantity of heat emitted by a fuel mass unit containing a proper humidity level, when this is subjected to complete combustion in presence of oxygen and when the products of combustion are back to the original pre-combustion temperatures.
DANGER	Potential source of damage, the term danger can be qualified in order to state its origin (for example electric, danger, mechanical danger, etc.).
QUALIFIED PERSONNEL	Person having the requisites required by the law in force, who has achieved experience concerning the necessary interventions, who attended proper specialisation and/or professional training courses.
USER	Person using the product.
INTENDED USE	Use of the appliance in conformity to the indications in the present manual.

2.4.2 Symbols

SYMBOL	DESCRIPTION
	**NOTE** Indicates information useful for the correct operation of the system or behavioural indications.
	**DANGER** Indicates a high level of danger. Failure to comply may result in serious injuries or death
	**DANGER** Indicates a medium level of danger. Failure to comply may result in medium or serious injuries
	**ATTENTION** Indicates a warning. Failure to comply may result in material or functional damage, even irreversible damage
	**PROHIBITION** Generic prohibition
	**PROHIBITION** Do not use screws
	**PROHIBITION** Do not use sealant
	**INDICATION** Use sealant
	**INDICATION** Use screws

Tab. 2.1

3 INTENDED USE

3.1 General description and intended use

X CERK HE/HE-Jr is a radiant heating system operating with gas, and it is particularly suitable to heat medium-large environments. Its design and manufacturing have involved special attention in order to obtain optimal results in terms of efficiency, safety, temperatures uniformity and reduction in polluting emissions.

X CERK HE/HE-Jr consists of aluminised steel fixed on the ceiling of the room to heat. The heated pipes emit infrared rays that heat the environment without creating air movement.

The production of the heat necessary for heating the radiant pipes takes place through a heat unit equipped with modulating burner. The heat exchange of the combustion chamber to the fluid present in the pipes is ensured by the continuous recirculation of the same fluid through a centrifugal fan.

Any use of the system other than that indicated above is to be considered unauthorised and dangerous.

3.2 Identification data of the machine

Each appliance is identified with a rating plate containing its technical characteristics and serial number. This label, together with warning ones, are applied on the electrical panel on board of the unit and they must not be removed.
Below is an example of the aforementioned label.

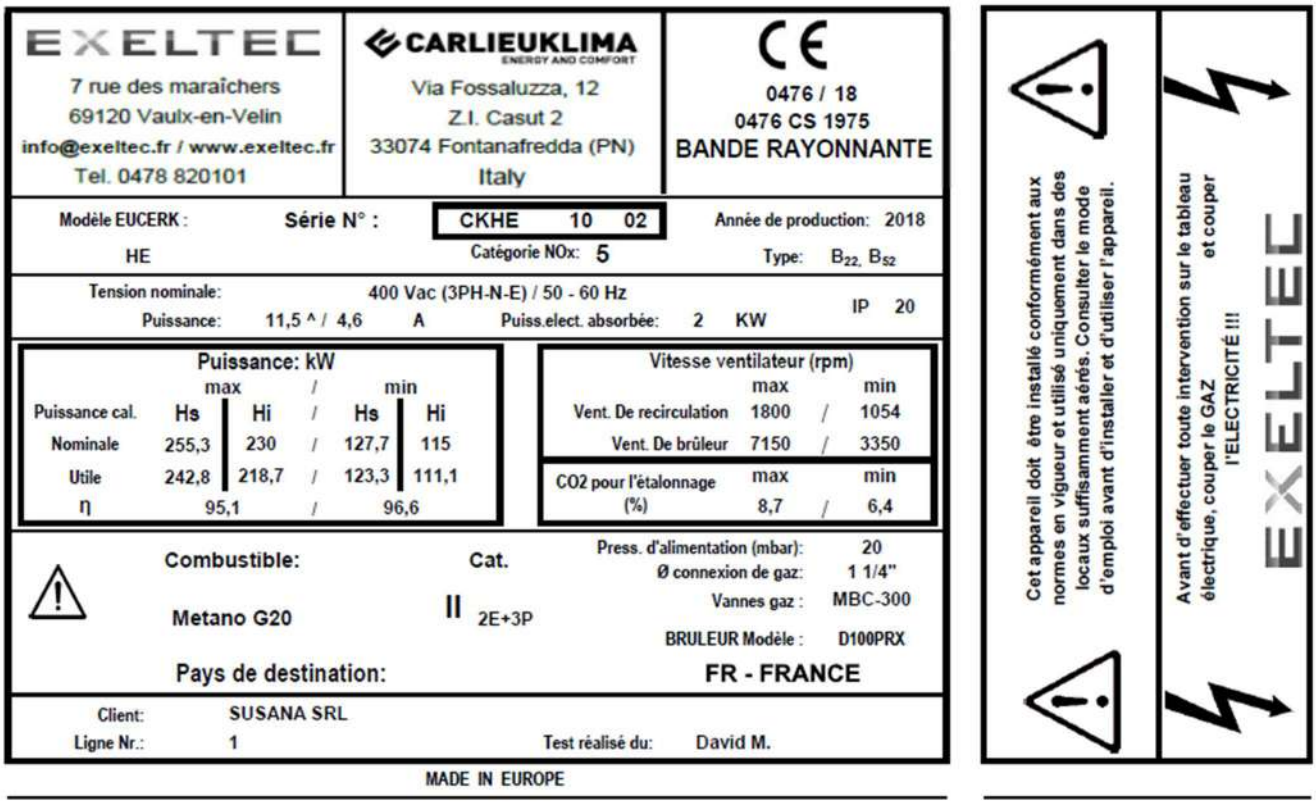


Fig. 3.1

In case of orders of spare parts or inquiries about procedures for the use and/or maintenance of the radiant strips heating systems, always indicate exact model and serial number as shown on the rating plate.

It is absolutely forbidden to remove the rating plate or alter its data.

4 TECHNICAL DATA

TECHNICAL SPECIFICATION	X CERK HE	X CERK HE-Jr
Nominal heat output [kW] Heat input [kW]	275.8	114.4
Thermal efficiency NCV 100% [%]	290	120
Thermal efficiency NCV 50% [%]	92.90%	93.10%
Envelope loss factor [%]	95.50%	95.40%
Exhaust gas – thermal loss @ burner ON [%]	2.20%	2.20%
Exhaust gas – thermal loss @ burner ON [%]	4.90%	4.70%
Exhaust gas – thermal loss @ burner OFF [%]	<0,1%	<0,1%
Useful efficiency NCV 100% [%]	**95.10%**	**95.30%**
Useful efficiency NCV 50% [%]	**96.60%**	**96.50%**
Exhaust gas temperature @ 100% [°C] (*)	120 ÷ 170	110 ÷ 140
Exhaust gas temperature @ 50% [°C] (*)	70 ÷ 120	60 ÷ 100
Fuel gas – compatibility	G20 - G25 - G31	
Heat-transfer fluid	-	
Emission system	Radiant strip	
Power supply [V/Hz/-]	400 / 50 / 3F+N	
Installed electric power [kW]	2.7	1.6
Power consumption in stand-by [W]	10	10
Max input current [A] @ 400 V / 50 Hz	4.7	2.7
Inverter presence	YES	
Modulation of the recirculation fan for combustion products	YES	
Combustion modulation	YES	
Evacuation of the combustion products – Type of installation	B22 ; B52	
Category	II2H3P	
Regulation mode	Modulating	
Burner type	Mixing premix blown	
Exahust gas - available pression [Pa]	50	10
Exhaust gas – duct max. length [m] (**)	5	8
Flue gas connection [mm]	150	120
Gas supply connection [BSP]	1”	3/4”
Nitrogen oxides emissions [mg/kWh]	27	29
Unit weight [kg]	190	122
Frame weight [kg]	29	20
Lw - Max sound power level [dB(A)]	90	86
Lp - Max sound power level @5m [dB(A)]	73	69
Supply pressure G20 min / max [mbar]	20 / 100	20 / 50
Supply pressure G31 min / max [mbar]	37 / 100	37 / 50
Radiant modules compatibility	M8Ø3 – M4Ø3 M12Ø3	M8Ø2 M8Ø3 – M4Ø3

Tab. 4.1

Reference gas G20

**Variable depending on module type and radiant line configuration*

***Consider that each 90° curve corresponds to 1.5 linear metres of duct.*

****Refer to the specifications indicated in the paragraph 5.8 .*

The thermal unit has been designed for an operating temperature between 0 °C (*) and + 40 °C

(*) With optional electric heater, to be ordered on request, it is possible to extend the operation up to – 15°C outside temperature.

4.1 Technical data in accordance with regulation (EU) 2015/1188 – DIRECTIVE 2009/125 / EC (ErP)

Mandatory information for local space heaters for commercial use.

Model identification:			**XCERK-HE-Jr 60**	**XCERK-HE-Jr 60**	**XCERK-HE-Jr 120**	**XCERK-HE-Jr 120**
Heat generator to be installed outside the heated area			yes	no	yes	no
Type of heating:			radiant strips	radiant strips	radiant strips	radiant strips
Fuel			Natural gas H	Natural gas H	Natural gas H	Natural gas H
Fuel			Gaseous	Gassoso	Gassoso	Gassoso
Data			**Value**	**Value**	**Value**	**Value**
Space heating emissions (*) (NOx ≤ 200 mg/kWhinput)		**[mg/kWhinput] (GCV)**	26	26	26	26
Heat output						
Nominal heat output	Pnom	kW	57.2	57.2	114.4	114.4
Minimum heat output	Pmin	kW	28.6	28.6	57.2	57.2
Minimum heat output (percentage of nominal heat output)	..	%	50	50	50	50
Nominal tube system heat output (if applicable)	Psystem	kW	N.A.	N.A.	N.A.	N.A.
Nominal tube segment heat output (if applicable)	Pheater,i	kW	N.A.	N.A.	N.A.	N.A.
Number of identical tube segments	n	-	-	-	-	-
Radiant factor						
Radiant factor at nominal heat output	RFnom	-	0.6446	0.6446	0.6446	0.6446
Radiant factor at minimum heat output	RFmin	-	0.5914	0.5914	0.5914	0.5914
Radiant factor of tube segment at nominal heat output	RFi	-	-	-	-	-
Auxiliary electricity consumption						
At nominal heat output	elmax	kW	0.500	0.500	0.500	0.500
At minimum heat output	elmin	kW	0.337	0.337	0.337	0.337
In standby mode	elSB	kW	0.010	0.010	0.010	0.010
Permanent pilot flame power requirement						
Pilot flame power requirement (if applicable)	*Ppilot*	kW	N.A.	N.A.	N.A.	N.A.
Useful efficiency (GCV) — tube local space heaters only (**)						
Useful efficiency at nominal heat output (**)	ηth,nom	%	85.8	85.8	85.8	85.8
Useful efficiency at minimum heat output (**)	ηth,min	%	85.9	85.9	85.9	85.9
Useful efficiency of tube segment at minimum heat output (if applicable)	ηi	%	N.A.	N.A.	N.A.	N.A.
Envelope losses						
Envelope insulation class	U	W/m2K	0.5		0.5	
Envelope loss factor	Fenv	%	2.2%	--	2.2%	--
Heat output control type (select one)						
— single stage (ON/OFF)			no	no	no	no
— two stage			no	no	no	no
— modulating			yes	yes	yes	yes
Seasonal space heating energy efficiency (≥74%)	ηS	%	**85.2**	**87.5**	**86.1**	**88.3**
(*) Nox = nitrogen oxides						

Tab 4.2

Model identification:			**XCERK-HE 150**	**XCERK-HE 150**	**XCERK-HE 300**	**XCERK-HE 300**
Heat generator to be installed outside the heated area			yes	no	yes	no
Type of heating:			radiant strips	radiant strips	radiant strips	radiant strips
Fuel			Natural gas H	Natural gas H	Natural gas H	Natural gas H
Fuel			Gaseous	Gassoso	Gassoso	Gassoso
Data			**Value**	**Value**	**Value**	**Value**
Space heating emissions (*) (NOx ≤ 200 mg/kWh$_{input}$)		**[mg/kWh$_{input}$] (GCV)**	19	19	19	19
Heat output						
Nominal heat output	P_{nom}	kW	142.7	142.7	275.8	275.8
Minimum heat output	P_{min}	kW	77.3	77.3	140.1	140.1
Minimum heat output (percentage of nominal heat output)	..	%	54	54	51	51
Nominal tube system heat output (if applicable)	P_{system}	kW	N.A.	N.A.	N.A.	N.A.
Nominal tube segment heat output (if applicable)	$P_{heater,i}$	kW	N.A.	N.A.	N.A.	N.A.
Number of identical tube segments	n	-	-	-	-	-
Radiant factor						
Radiant factor at nominal heat output	RF_{nom}	-	0.6487	0.6487	0.6487	0.6487
Radiant factor at minimum heat output	RF_{min}	-	0.5951	0.5951	0.5951	0.5951
Radiant factor of tube segment at nominal heat output	RF_{i}	-	-	-	-	-
Auxiliary electricity consumption						
At nominal heat output	el_{max}	kW	0.813	0.813	0.813	0.813
At minimum heat output	el_{min}	kW	0.485	0.485	0.485	0.485
In standby mode	el_{sb}	kW	0.010	0.010	0.010	0.010
Permanent pilot flame power requirement						
Pilot flame power requirement (if applicable)	P_{pilot}	kW	N.A.	N.A.	N.A.	N.A.
Useful efficiency (GCV) — tube local space heaters only (**)						
Useful efficiency at nominal heat output	$\eta_{th,nom}$	%	85.6	85.6	85.6	85.6
Useful efficiency at minimum heat output	$\eta_{th,min}$	%	87.0	87.0	87.0	87.0
Useful efficiency of tube segment at minimum heat output (if applicable)	η_{i}	%	N.A.	N.A.	N.A.	N.A.
Envelope losses						
Envelope insulation class	U	W/m²K	0.5		0.5	
Envelope loss factor	F_{env}	%	2.2%	--	2.2%	--
Heat output control type (select one)						
— single stage (ON/OFF)			no	no	no	no
— two stage			no	no	no	no
— modulating			yes	yes	yes	yes
Seasonal space heating energy efficiency (≥74%)	η_{s}	%	**87.1**	**89.3**	**87.5**	**89.8**
(*) Nox = nitrogen oxides						

Tab. 4.3

4.2 Dimensions of thermal units SX (left version)

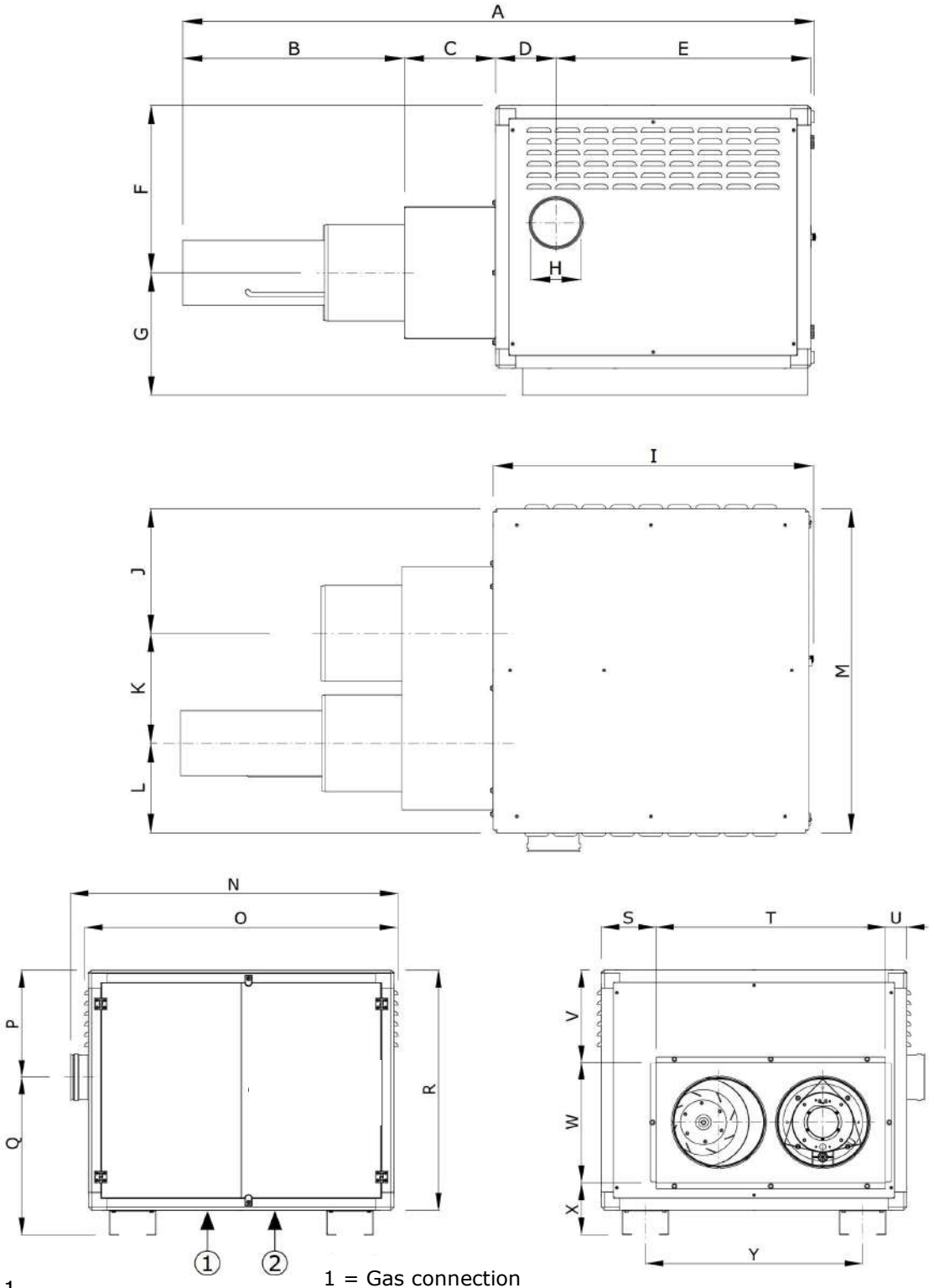


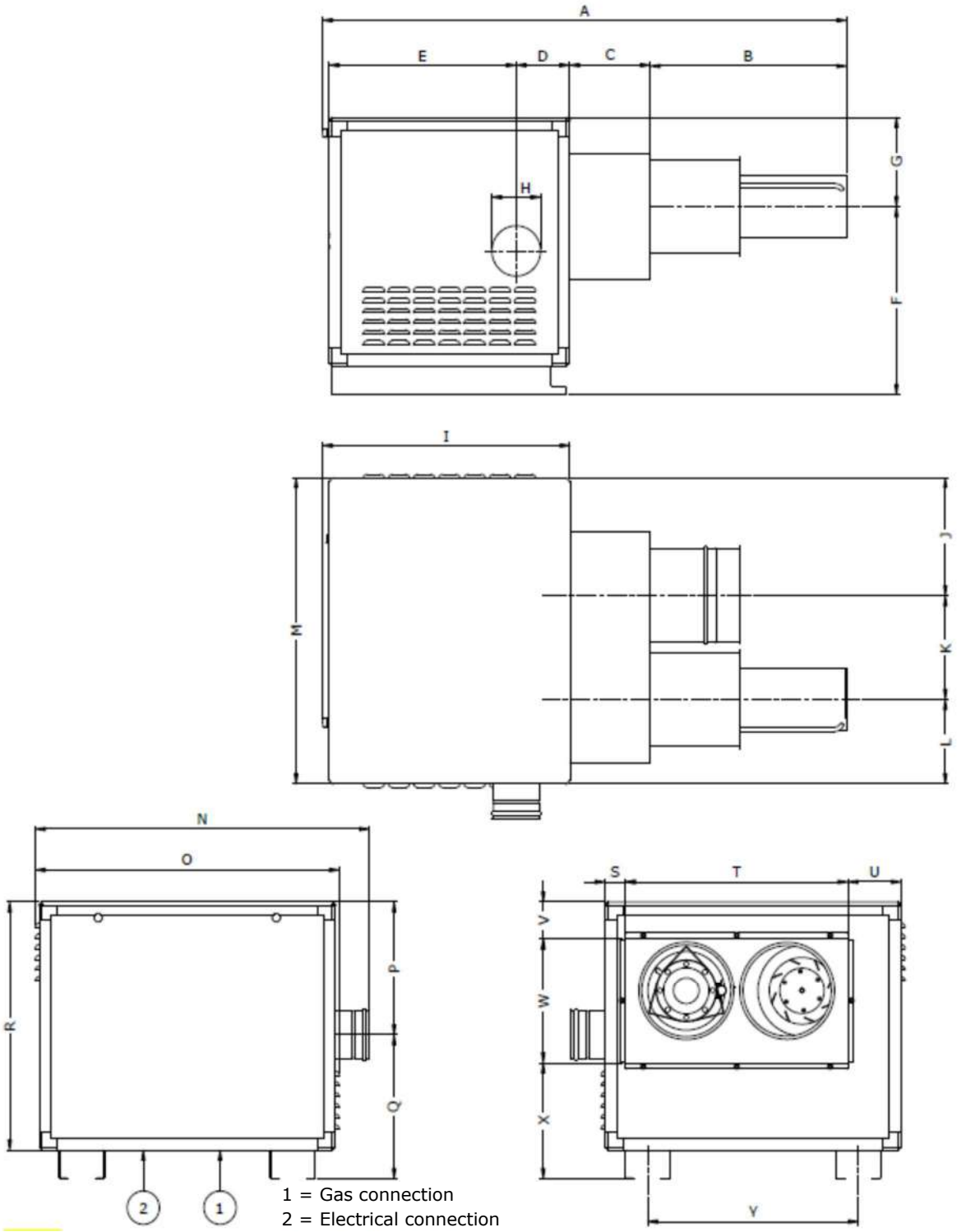
Fig. 4.1

1 = Gas connection
2 = Electrical connection

DIMENSION	X CERK HE-Jr (mm)	X CERK HE (mm)
A	1544	1757
B	459	660
C	265	264
D	157	189
E	658	640
F	326	490
G	358	416
H	120	150
I	820	833
J	239	384
K	320	340
L	239	274
M	798	998
N	930	1125
O	824	1023
P	311	372
Q	358	440
R	591	813
S	34	180
T	750	750
U	34	68
V	144	287
W	364	406
X	176	213
Y	528	710
WEIGHT	122 kg	190 kg

Tab 4.4

4.3 Dimensions of thermal units DX (right version)



1 = Gas connection
2 = Electrical connection

Fig. 4.2

DIMENSION	X CERK HE DX (right version) (mm)
A	1767
B	660
C	272
D	180
E	630
F	613
G	291
H	150
I	833
J	384
K	340
L	274
M	998
N	1125
O	1023
P	436
Q	469
R	813
S	70
T	750
U	179
V	120
W	406
X	376
Y	710
WEIGHT	190 kg

Tab. 4.5

4.4 Radiant ducts dimensions in millimetres

M12Ø3 model weighs 30 kg/m and has the following dimensions:

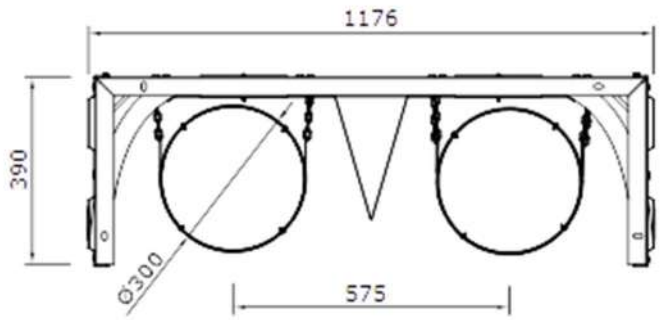


Fig. 4.3

M8Ø3 model (on the left) weighs 25 kg/m while **M4Ø3 model** (on the right) weighs 19 kg/m. Their dimensions are:

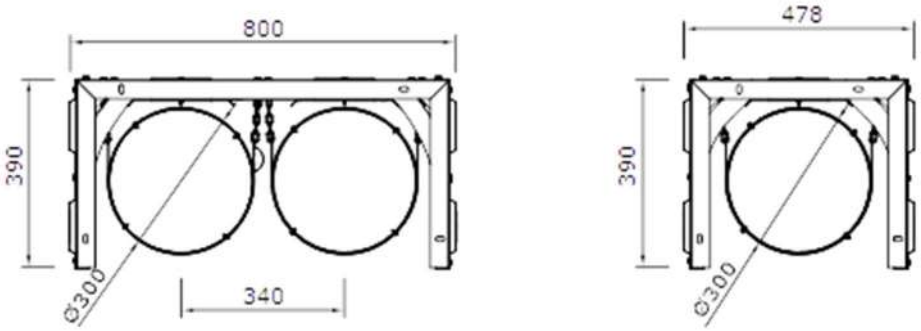


Fig. 4.4

M8Ø2 model (M8Ø2-RV with "V" reflector and M8Ø2-ST without reflector) weighs 20 kg/m and has the following dimensions:

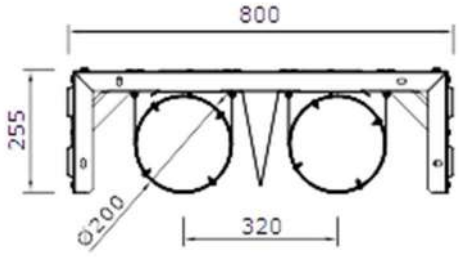


Fig. 4.5

4.5 Thermal unit components

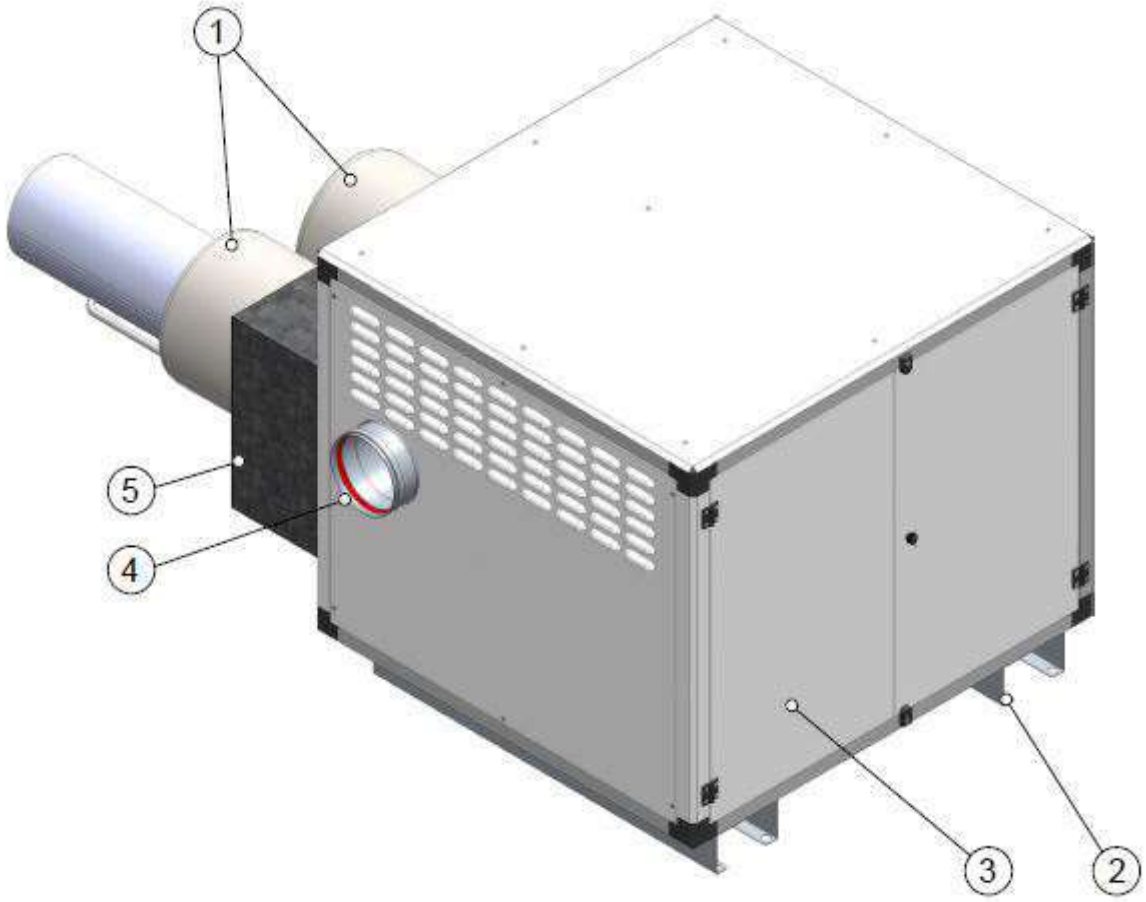


Fig. 4.6

POS.	DESCRIPTION
1	Delivery/return ducts
2	Support for frame stirrups
3	Access doors to burner/extractor (the model HE-Jr has one door only)
4	Ø 150 mm female exhaust pipeline for HE and Ø 120 mm for HE-Jr
5	Wall-crossing plenum

Tab. 4.6

4.6 Radiant ducts components

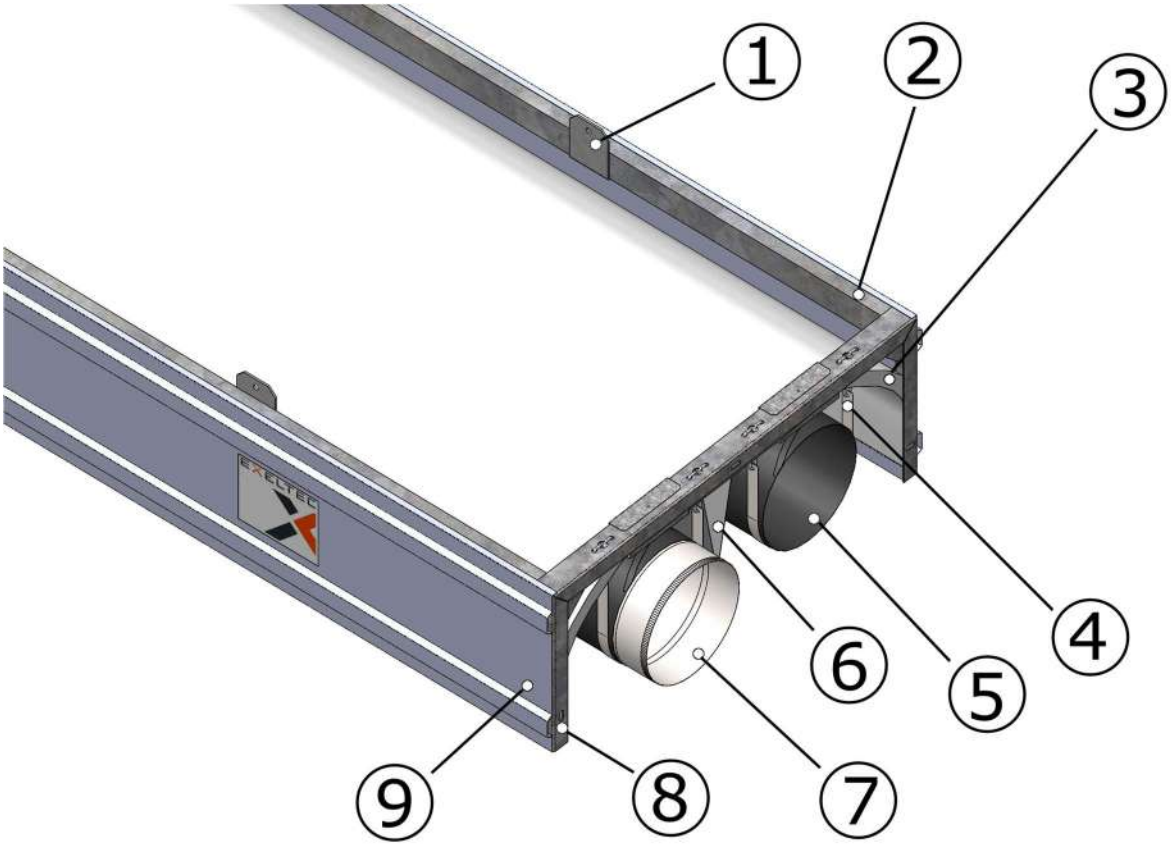


Fig. 4.7

POS.	DESCRIPTION
1	Suspension clamps
2	Tubular frame
3	Insulation with inorganic binder, covered with aluminium, positioned both sideways and above the radiant piping
4	Emitting pipe suspension chain
5	Emitting pipe with high-temperature metallurgic treatment, done in controlled atmosphere for higher and more homogeneous emitting effect (female connection)
6	Reflector for a better radiant efficiency (except for models M8Ø3 and M8Ø2-ST)
7	Radiant ducts junction nipple (male connection)
8	Fixing points for modules
9	Lateral containment sides

5 INSTALLATION

The installation must be performed by qualified personnel, in compliance with national and local regulations in force in the place of installation of the system.

5.1 Functional and surrounding spaces for the thermal unit

When positioning the thermal unit, it is necessary to respect the distances shown in the following picture, which guarantee the correct supply of air to the burner and enough space around the unit for first ignition and maintenance operations.

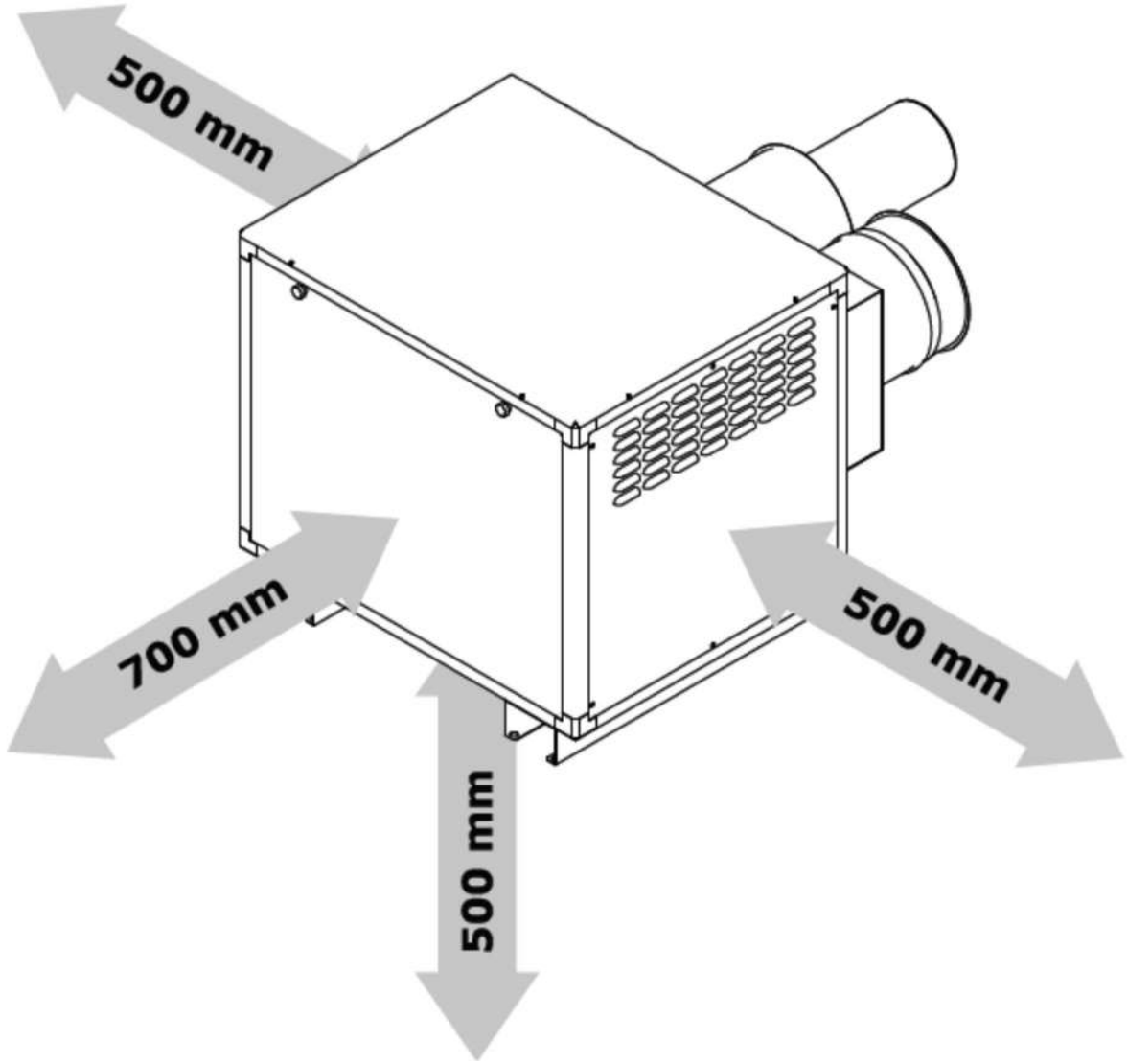


Fig. 5.1

5.2 Distance between radiant ducts and combustible material

The radiant circuit must be installed respecting a minimum distance of 4 metres (trampling floor/ lower edge of the circuit).

The distance between the external surface of the radiant ducts and any combustible materials stored must be such as to prevent dangerous temperatures from being reached on the surface of the materials themselves, which would possibly cause fires and/or combustion reactions, and in any case not less than 1.5 metres. The radiant ducts must be installed in such a way as to ensure that the temperature of the vertical and horizontal structures to which the ducts are connected does not exceed 50°C, interposing suitable protective shielding where necessary.

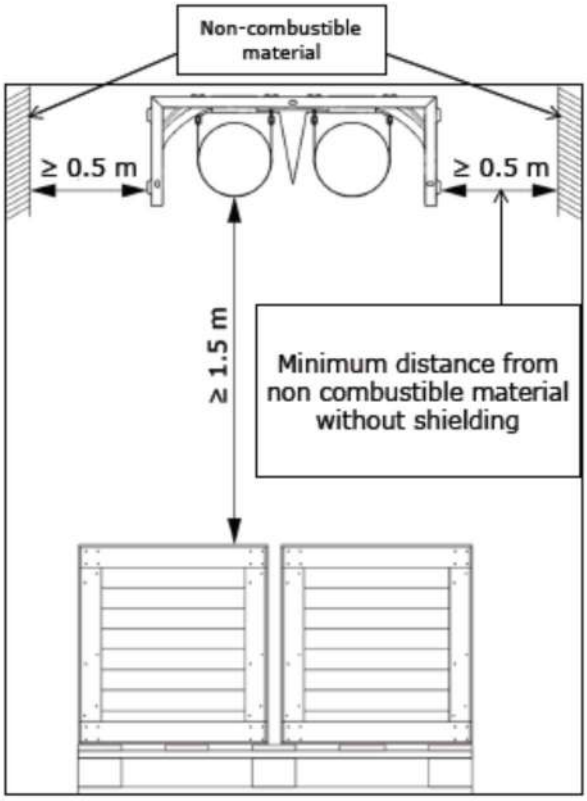


Fig. 5.2

5.3 Transport, handling and lifting

Handle the material according to the indications in this manual.

The operations of lift and transport of the materials must be carried out by qualified personnel, which must be informed about the operative mode of the intervention and of the prevention and protection norms to apply.

Lifting and transportation means must be proper for the loads to transport and lift, and used according to their characteristics.

In the case of use of a forklift truck, insert the forks in the templates so as to balance the weight of the load and make it safe (Fig. 5.3).

During handling, nobody shall be present in the manoeuvring area and the surrounding area must be considered risky. The personnel in charge for handling must verify the stability of the load before lifting and handling it.

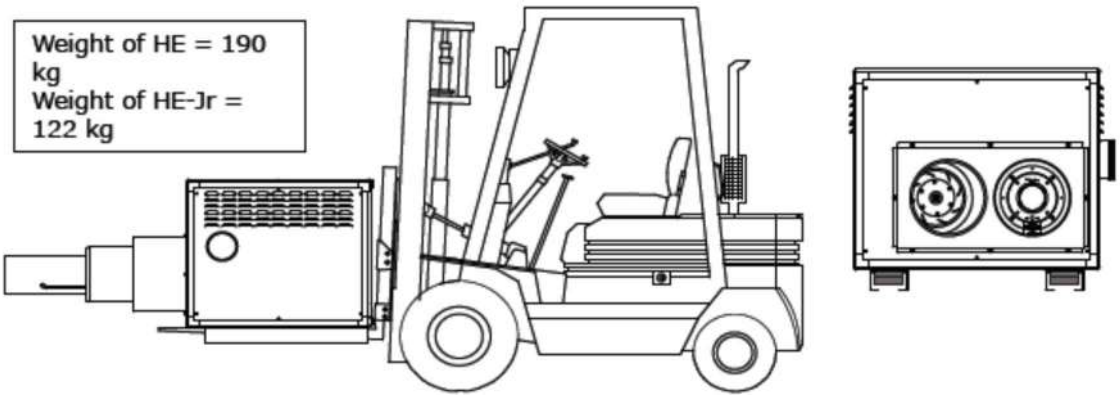


Fig. 5.3

In order to avoid any damage, pay attention in handling the components during unloading, movement and positioning operations.
Avoid contact with elements that could damage the system components (e.g. sharp, pointed elements etc.).
EXELTEC disclaims any liability for damage caused by incorrect operations, by unqualified personnel, by the use of improper means or by lack of protection from atmospheric agents.

5.3.1 Handling the thermal unit using eye-bolts (only mod. HE)

The fixing screws of handling eye-bolts are on the upper part of the thermal unit, under the top cover. To find them, remove the top cover as shown in Fig. 5.4.

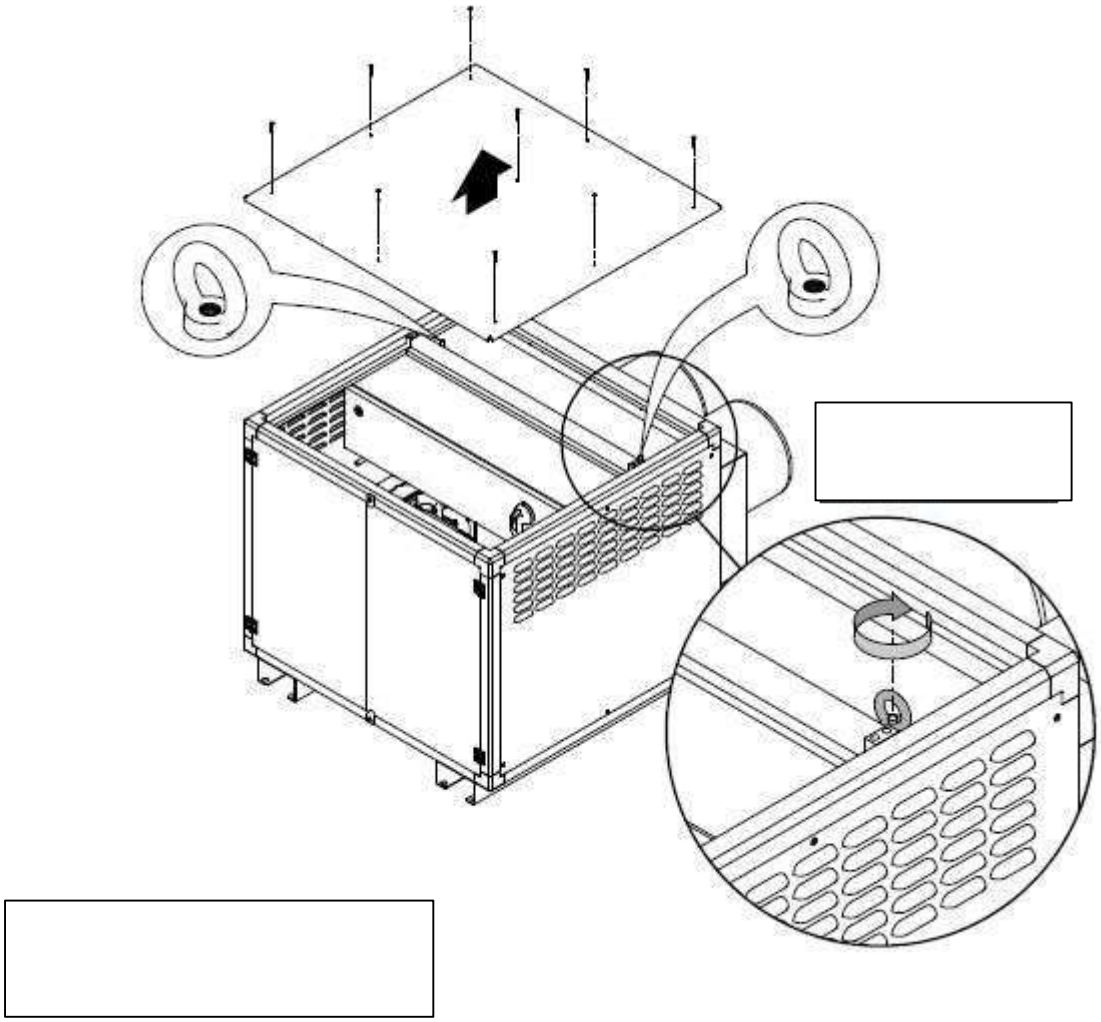


Fig. 5.4

Pay attention in handling the unit with eye-bolts, as the thermal unit could get an inclination backwards to balance its weight. The position of the suspension points is not the same of those of the barycentre of the thermal unit (Fig. 5.5).

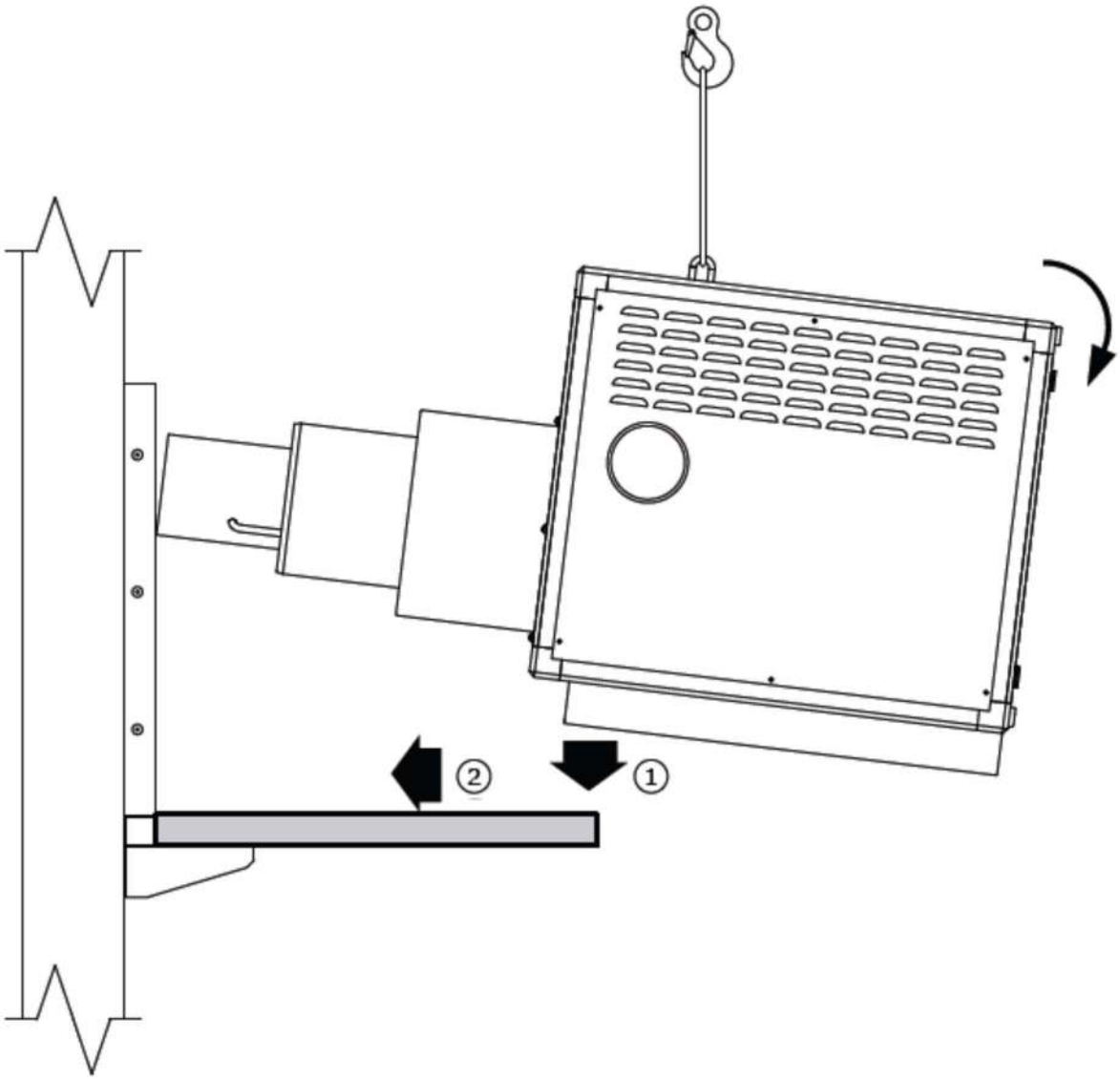


Fig. 5.5

Once handling of thermal unit is over, remove the eye-bolts and re-position the top cover.

5.4 Mounting of thermal unit

The structural engineer must verify whether the wall is able to support the thermal unit and define as well the way of anchoring.

The holes necessary to fix the frame of the X CERK HE-Jr combustion chamber must be done using a template with the same dimensions indicated in Fig. 5.6.

A = The frame is equipped with No.2 extra holes in case it is not possible to fix it on the main holes to the wall (distance between centres=450 mm).

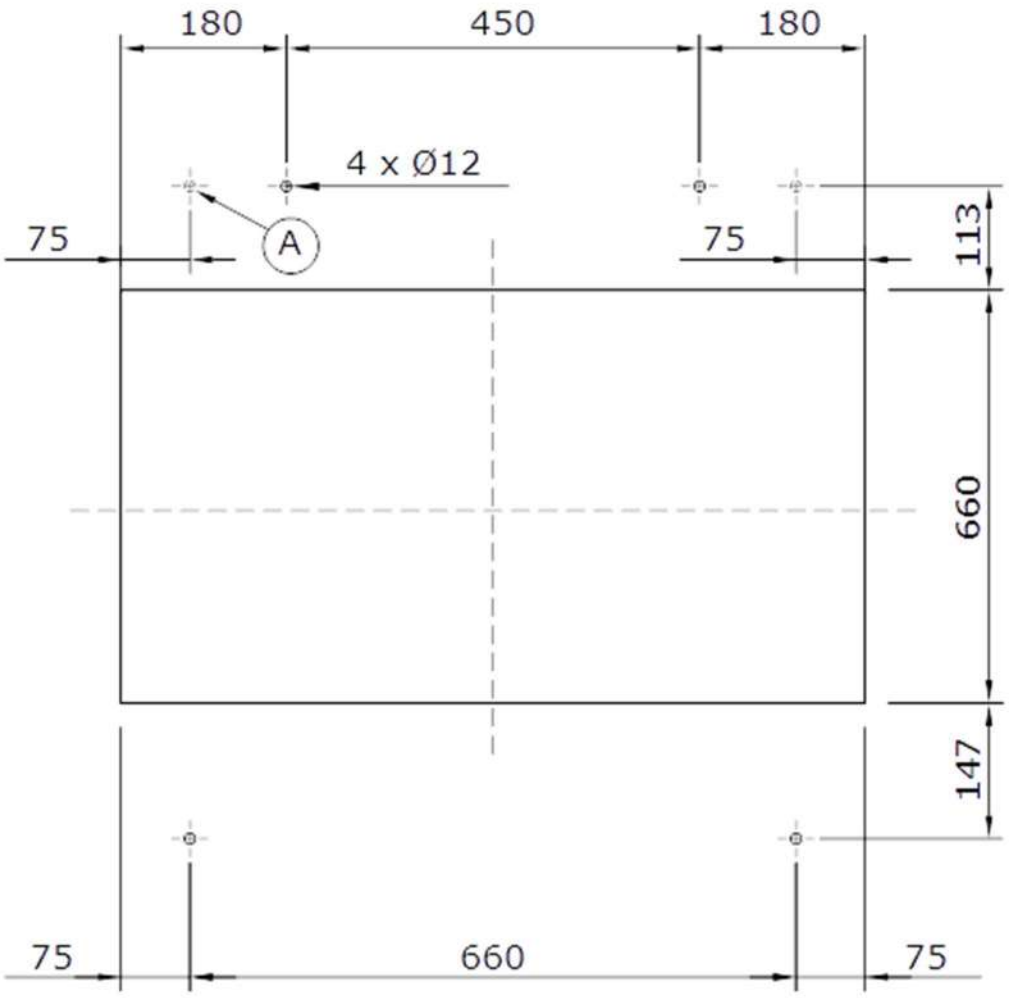


Fig. 5.6

The holes necessary to fix the frame of the X CERK HE SX (left version) combustion chamber must be done using a template with the same dimensions indicated in Fig. 5.7.

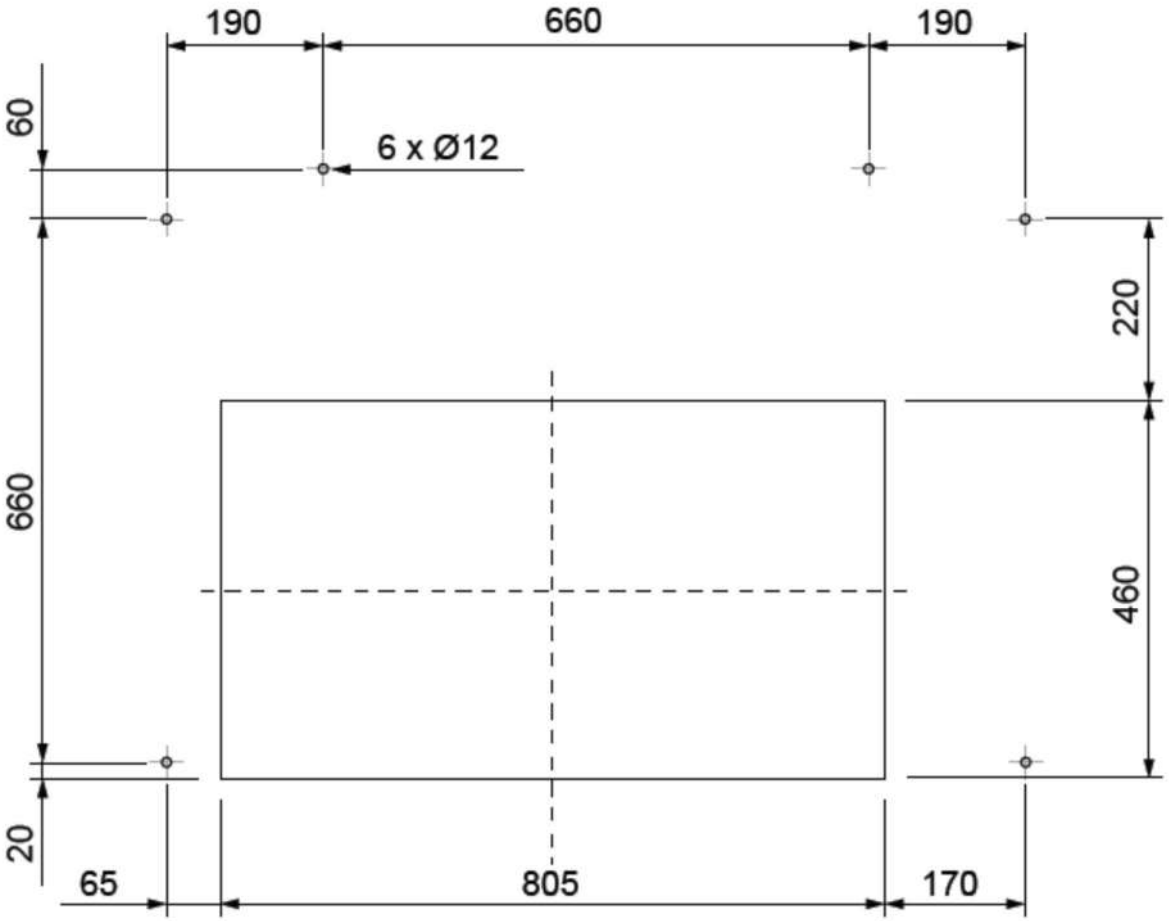


Fig. 5.7

The holes necessary to fix the frame of the X CERK HE DX (right version) combustion chamber must be done using a template with the same dimensions indicated in Fig. 5.8

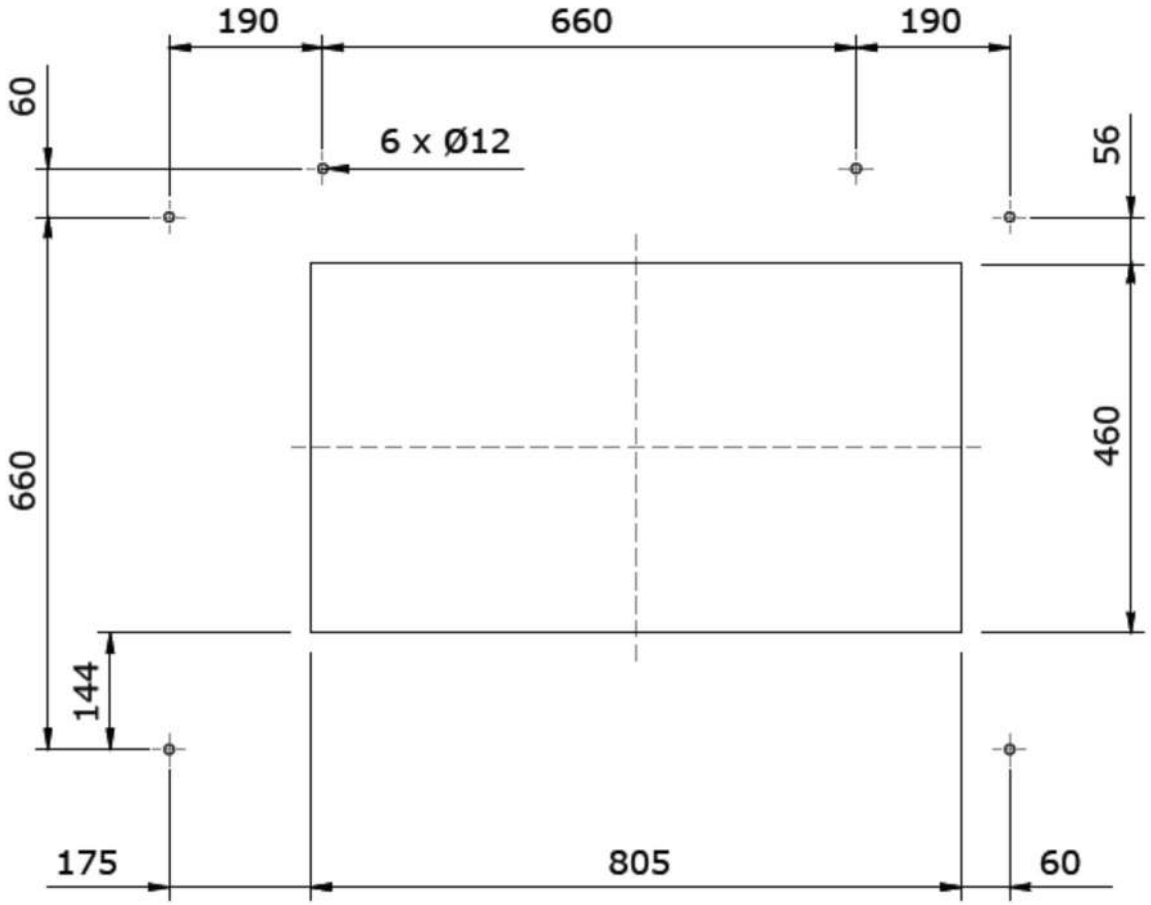


Fig. 5.8

Once the holes are done, proceed to fix the frame as shown indicatively in Fig. 5.9.

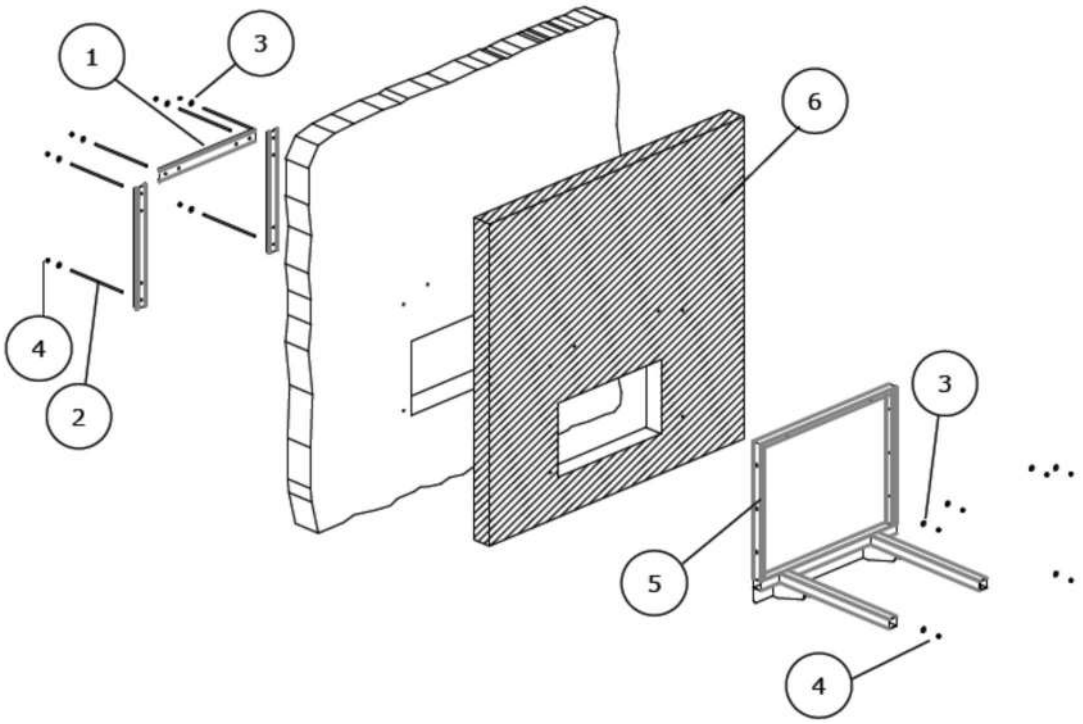


Fig. 5.9

POS.	DESCRIPTION
1	Reinforcing profile (mod. HE-Jr features two horizontal reinforcing profiles)
2	Screwed bar
3	Washer
4	Nut
5	Frame
6	EI 120 panel

Tab. 5.1

Should the EI 120 type panels be necessary, shape them properly, position them between the wall and the frame (Fig. 5.9) and fix them with the special perimeter frames. Cutting operations must be done according to the indications in Fig. 5.10.

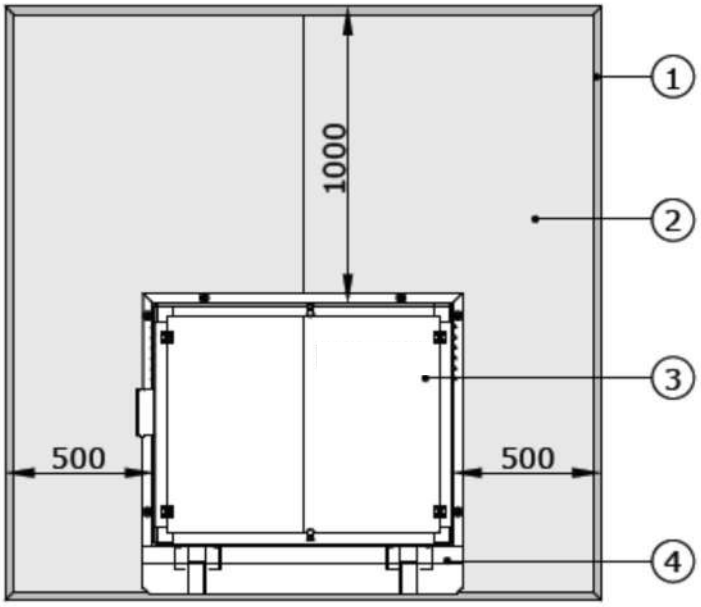


Fig. 5.10

POS.	DESCRIPTION
1	Closing frame for EI 120 panel
2	EI 120 panel
3	Thermal unit
4	Thermal unit supporting frame

Tab.5.2

At this point, place the unit on the frame, sliding it as shown below:

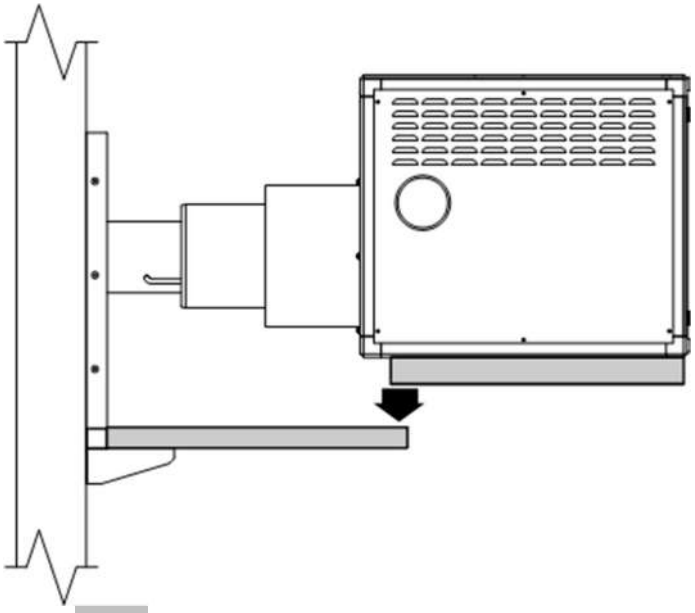


Fig. 5.11

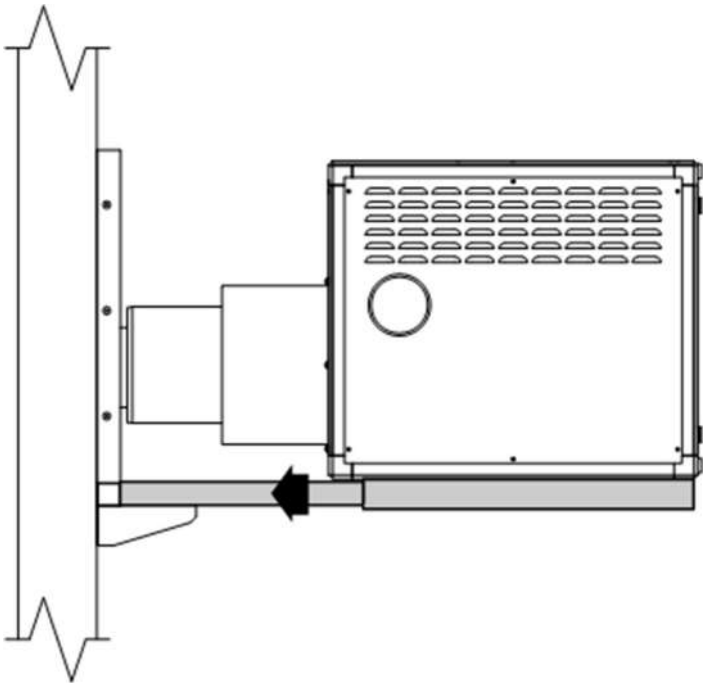


Fig. 5.12

Seal the lateral and upper edges of the thermal unit to avoid any possible infiltration through the wall hole.

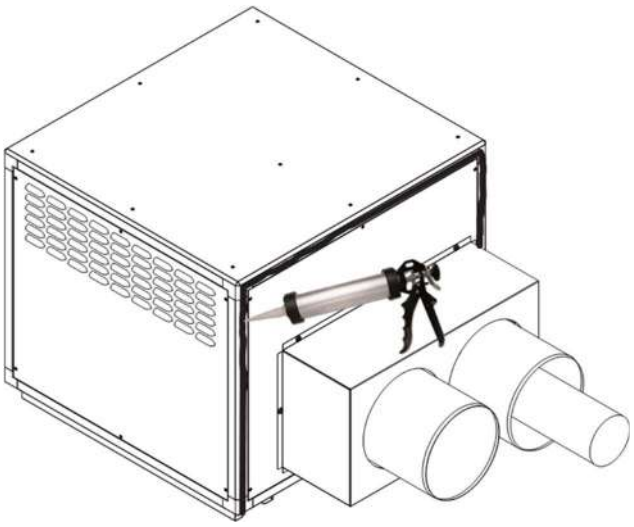


Fig. 5.13

Block the unit to the frame with no.6 - 4.8x32 mm screws for HE models and no.4 4.8x32 mm screws for HE- Jr models (screws are standard supplied).

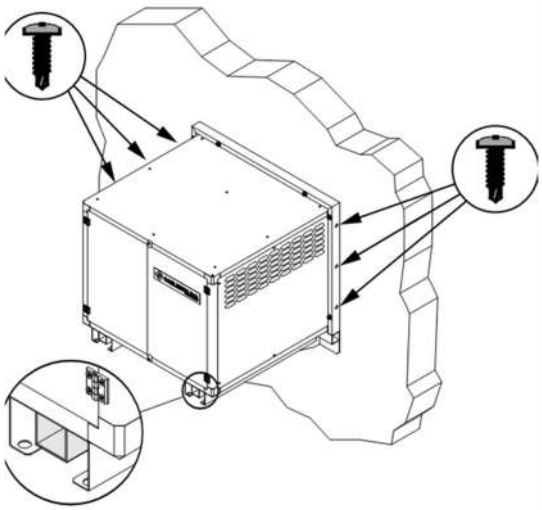


Fig. 5.14

Insert the closing frame by cutting the corners at 45° and fix them to the wall with screws and dowels.

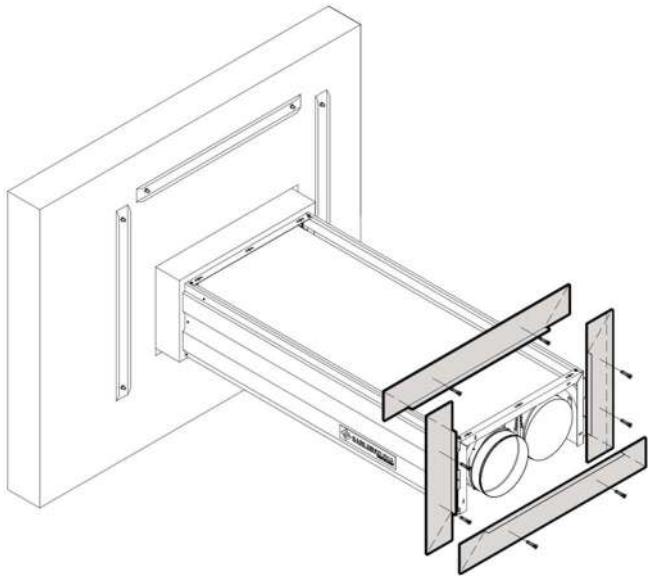


Fig. 5.15

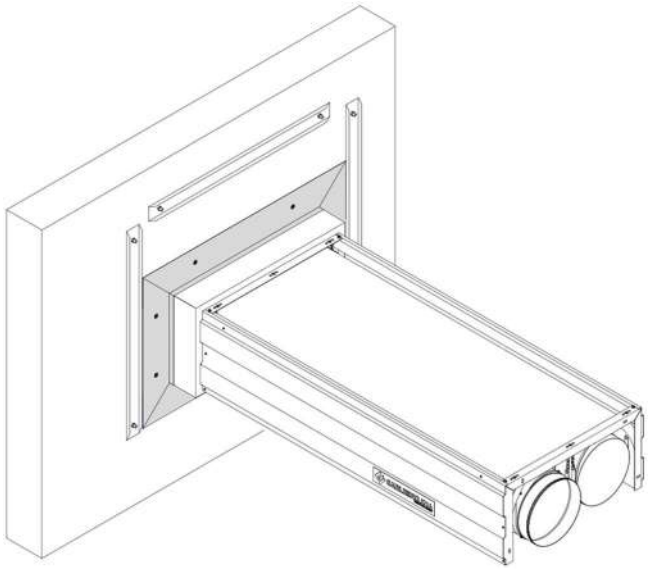


Fig. 5.16

5.5 Installation of the thermal unit over roof

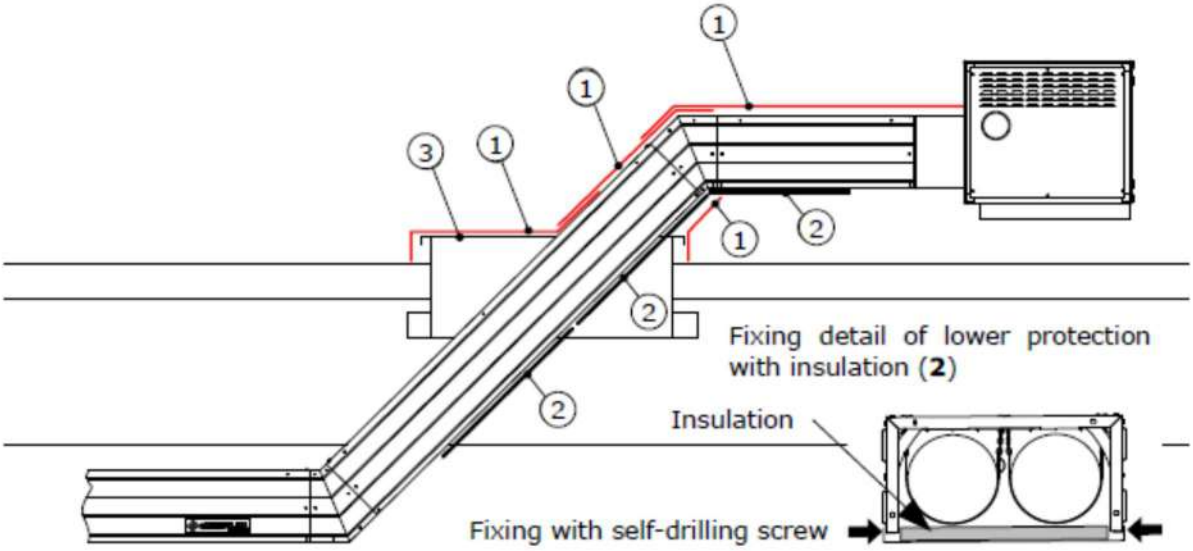


Fig. 5.17

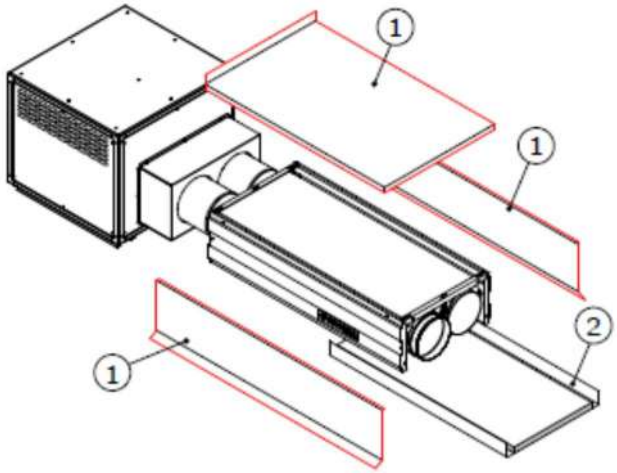


Fig. 5.18

POS.	DESCRIPTION
1	Closing plate
2	Lower protection with insulation
3	Inlet hole

5.6 EXHAUST PIPE

Respect the maximum length of **8 metres (mod.** HE) and **5 metres** (mod. **HE-JR)** (*). All the accessories for flue pipes (available on demand) are approved as required by the current European norm.

(*) Consider that each 90° curve corresponds to 1.5 linear metres of duct.

Appliance type B_{22} This typology includes the fumes exhaust outside the building, with connection to chimney or flue system through a proper duct realized with certified components (horizontal or vertical).

Appliance type B_{52} This typology includes the fumes exhaust through individual exhaust ducts, connected to individual terminals (no extra chimneys or flue systems).

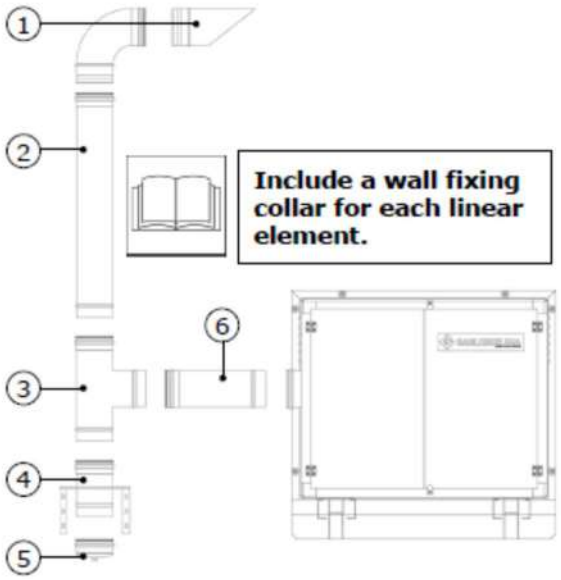


Fig. 5.19

POS.	DESCRIPTION
1	45° terminal with grid
2	Linear element (various lengths)
3	"T" connection element
4	Wall supporting element
5	Condensate collection element
6	Linear element, 0.25 m long (OPTIONAL)

Tab. 5.3

In completion of the system, EXELTEC supplies the components necessary for the evacuation of combustion products. However, the purchase and installation of these components are not mandatory, as the system designer may decide to use others.

5.6.1 Water drain in the flue

The thermal unit is designed to operate in absence of condensation in the combustion products, but it is not excluded that a small amount of water vapour condenses in the very first instants of system ignition; this quantity of condensate is really minimal and in any case will evaporate in the next phases of the cycle. In consideration of this, therefore, it is not necessary to use the water drain located at the bottom end of the flue.
However, if a secondary heat exchanger is common to the same flue gas exhaust system, any resulting condensation must be appropriately caught at the collection point, conveyed and treated in accordance with the rules of good practice and the legislation of the country of installation.
Finally, it is essential to consider that any infiltration of rainwater from the joints of the flue can compromise the proper functioning of the thermal unit, up to causing damage to the components involved. In this regard, if it is not possible to guarantee the absence of such infiltrations from the joints or from the expulsion terminal, EXELTEC recommends providing an appropriate system for conveying the infiltration water starting from the discharge point.

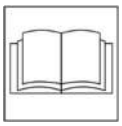
5.7 Installation of the radiant modules

For a correct installation it is essential to use sealants suitable for temperatures of 300°C. It is recommended to use the sealant supplied by EXELTEC.

Position / place the radiant line modules following the drawings provided by EXELTEC, paying particular attention to correctly identify the first two modules of the circuits.

5.7.1 First and second module

The **first** module of the radiant circuit is characterised by the fact that, in one side, the pipes to be connected to the thermal unit are set back from the support frame. This distance allows for coupling with joints of the same unit. This is done by means of stainless steel collars (supplied with the thermal unit).



Apply the sealant on the inside of the collars and tighten until the coupling is completely fixed (Fig. 5.20). Do not use screws to fix the thermal unit to the first module.

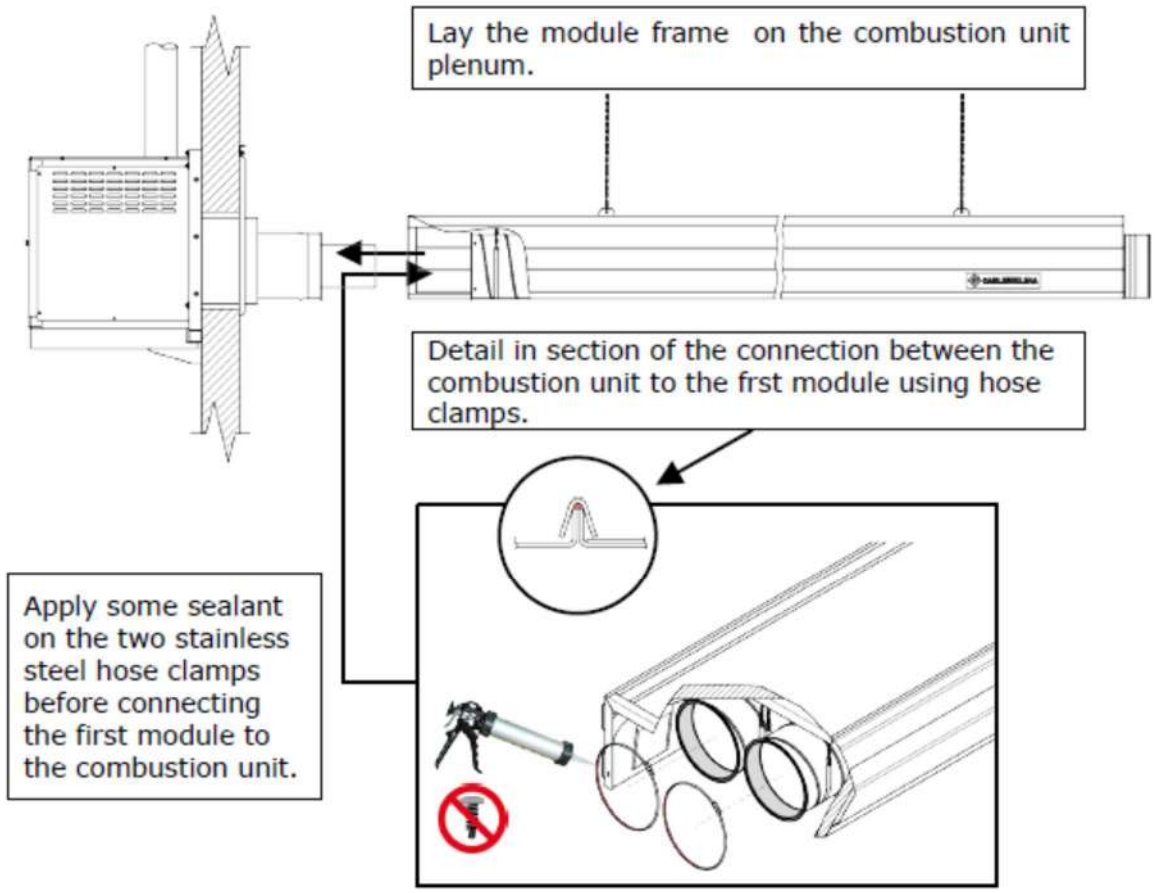


Fig. 5.20

The **second module** of the radiant circuit is characterised by the presence of an expansion joint on one of the two pipes (the one affected by the higher temperatures, it corresponds to the branch of the combustion chamber). With respect to an observer standing underneath the radiant modules with the thermal unit behind them, the expansion joint must necessarily be in the pipework where the combustion chamber is located (flue gas outlet side), as shown in the following picture, which shows both right and left side models, seen from above (Fig. 5.21).

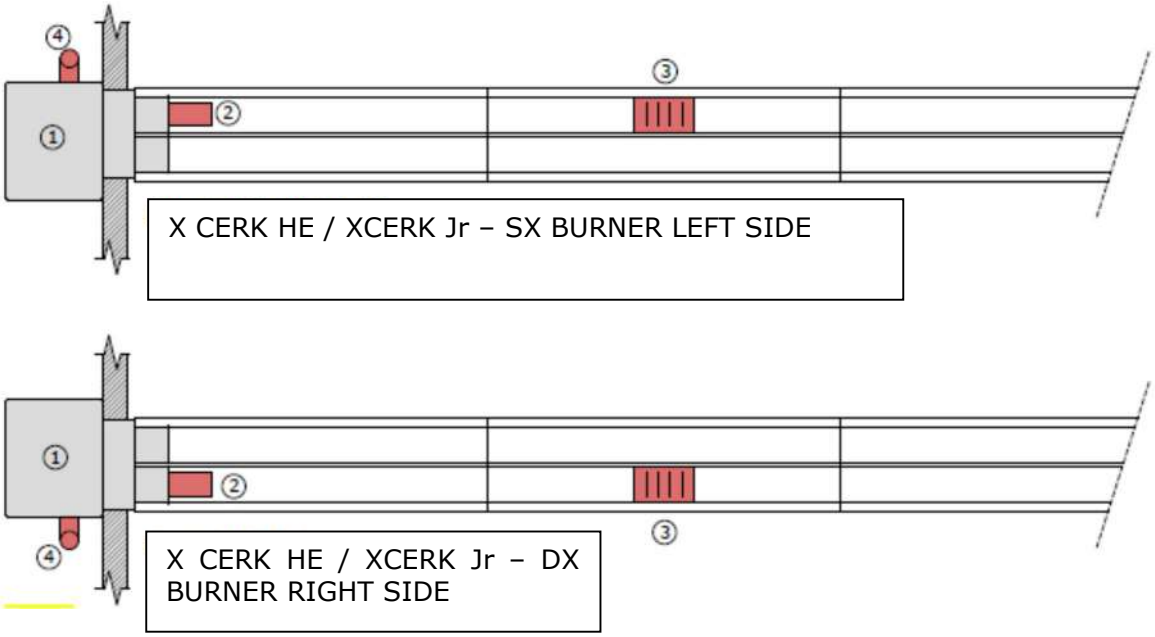


Fig. 5.21

POS.	DESCRIPTION
1	External combustion unit
2	Combustion chamber
3	Expansion joint
4	Smoke exhaust duct

Tab. 5.4

For the coupling first-second modules, see the indications in the next paragraphs.

5.7.2 Installation of the next modules

Couple the pipes of the modules according to the layout elaborated by EXELTEC technical dept., paying special attention on the position of the modules with thermal dilation joints (see par. 5.7.3 .)

Couple the pipes of the modules distributing sealant in the two dedicated recesses on the outer perimeter of the nipple as shown in Fig. 5.22.

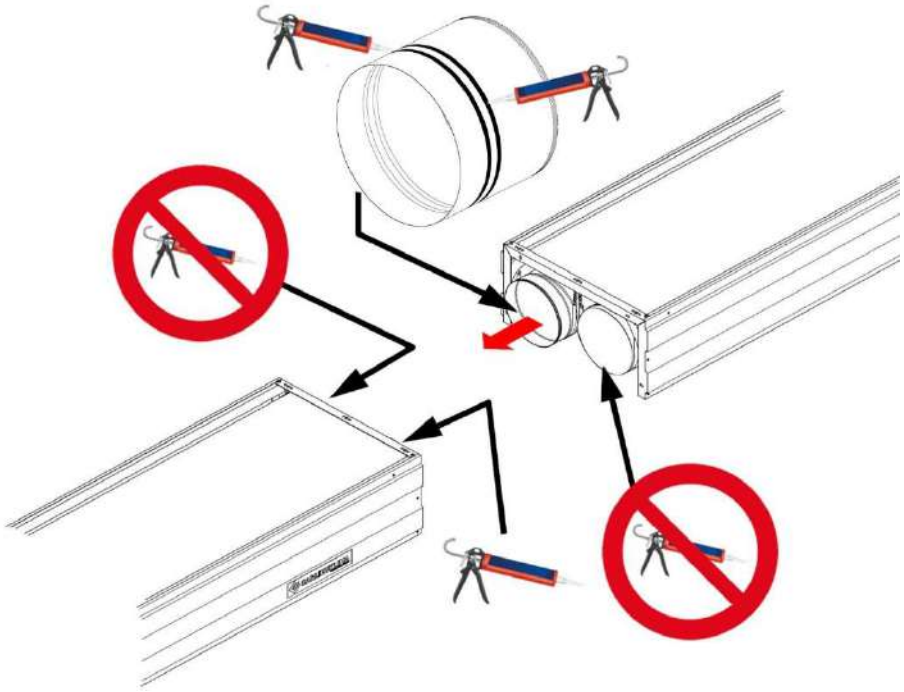


Fig. 5.22

Include No.4 8x25 mm screws and nuts for the junction of the frames between modules (Fig. 5.23 - not supplied by EXELTEC). Connect the frames of consecutive modules.

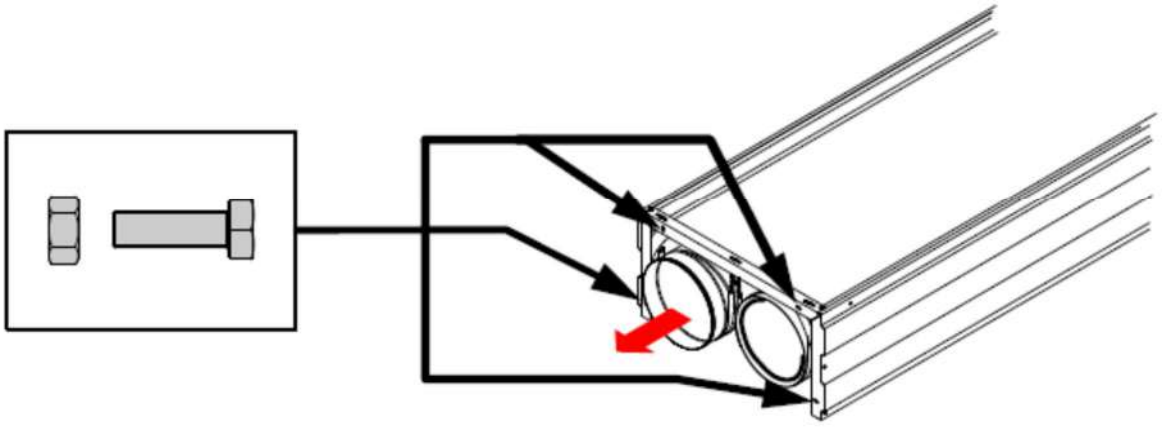


Fig. 5.23

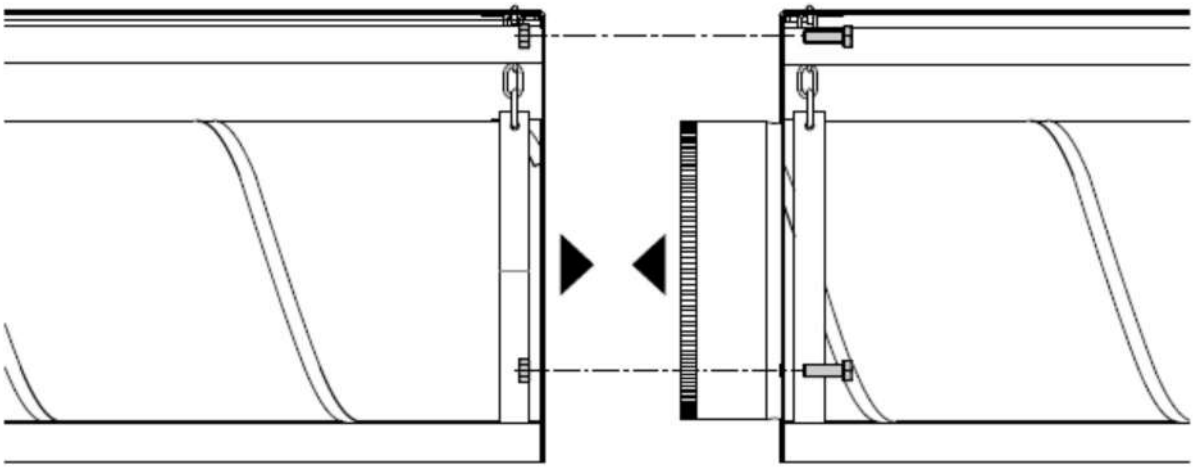


Fig. 5.24

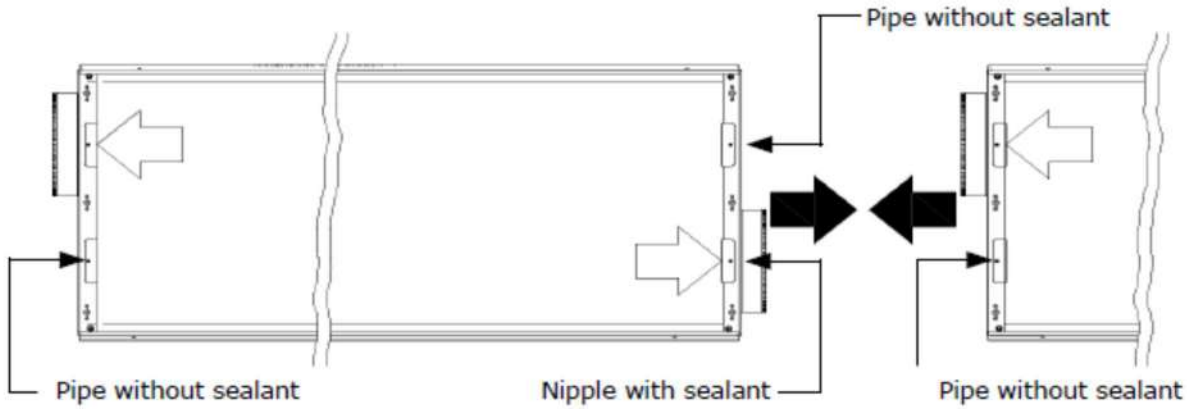


Fig. 5.25

Each pipe/nipple coupling, **not considering the initial one between start module and combustion unit**, must be blocked with self-drilling screws (No.3 screws for each pipe- not supplied by EXELTEC) positioned on the pipe suspension clamps as indicated in Fig. 5.26.

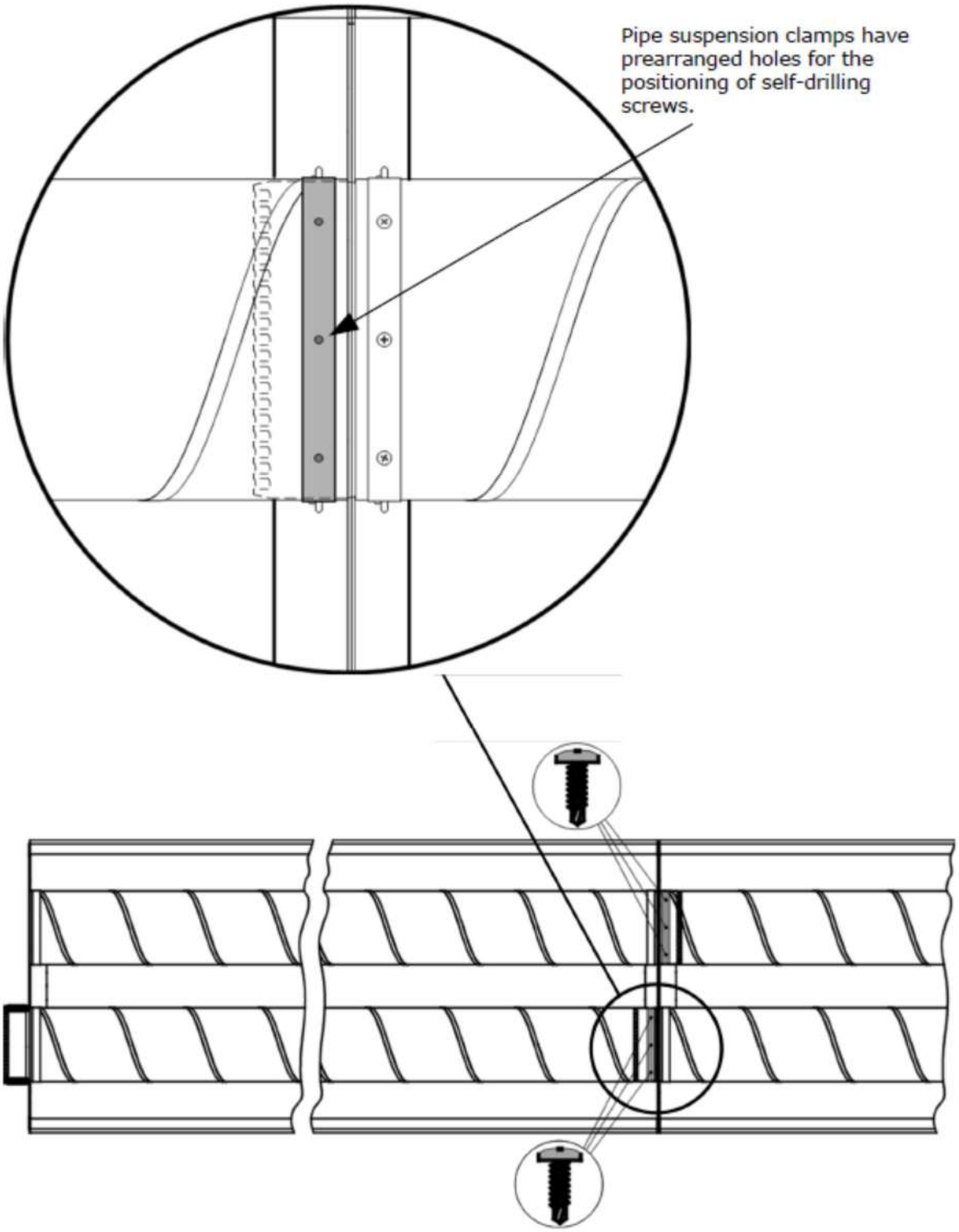

Pipe suspension clamps have prearranged holes for the positioning of self-drilling screws.

Fig. 5.26

To suspend radiant ducts on the ceiling, use a suitable chain (specific weight of modules: 30 kg/m per mod. M12Ø3, 25 kg/m per mod. M8Ø3 and 20 kg/m per mod. M8Ø2) to be attached to support brackets positioned 3.0 to 4.5 m apart (Fig. 5.27). The chain eye must have a size adequate for the use with M8 screws. Include No.4 supporting stirrups for each module, No.2 for each side (see Fig. 5.28).

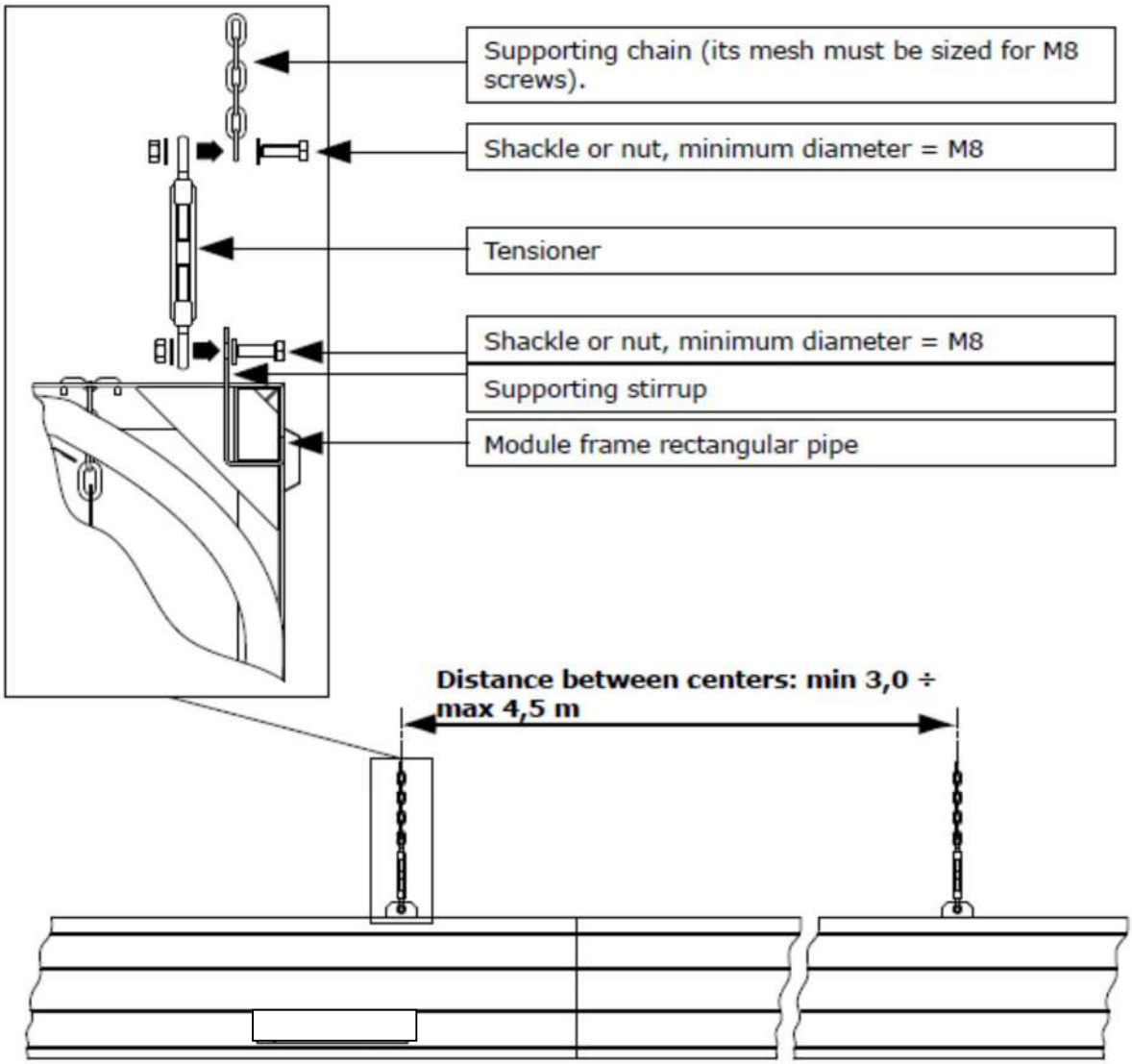


Fig. 5.27

Stirrups must be hooked to the frame of the module as indicated in the detail of Fig. 5.27

Include a screw coupling for the regulation of the chain.

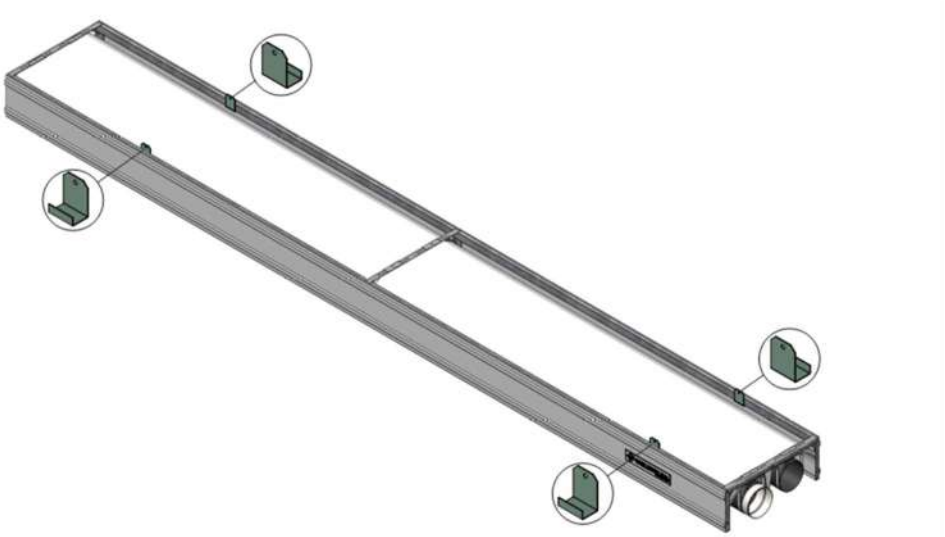


Fig. 5.28

Use an M8 shackle or nut (min.) for the stirrup/screw coupling and screw coupling/chain fixing.

Once the circuit is completed, check that the modules are horizontally levelled, adjusting the screw couplings (Fig. 5.29).

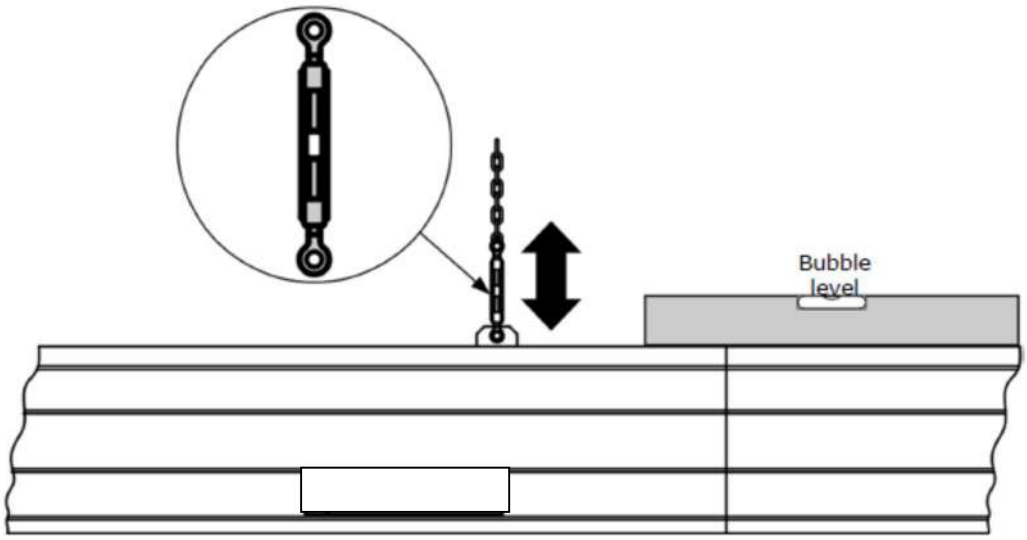


Fig. 5.29

5.7.3 Expansion joints

To compensate the thermal dilations arising along the pipeline, some modules are equipped with expansion joints. The modules with joint must be positioned in the circuit according to the installation scheme supplied with the system.

During installation it is necessary to check that the joints are completely extended and not compressed, so as to guarantee the absorption of the expansions during the normal operation of the system.

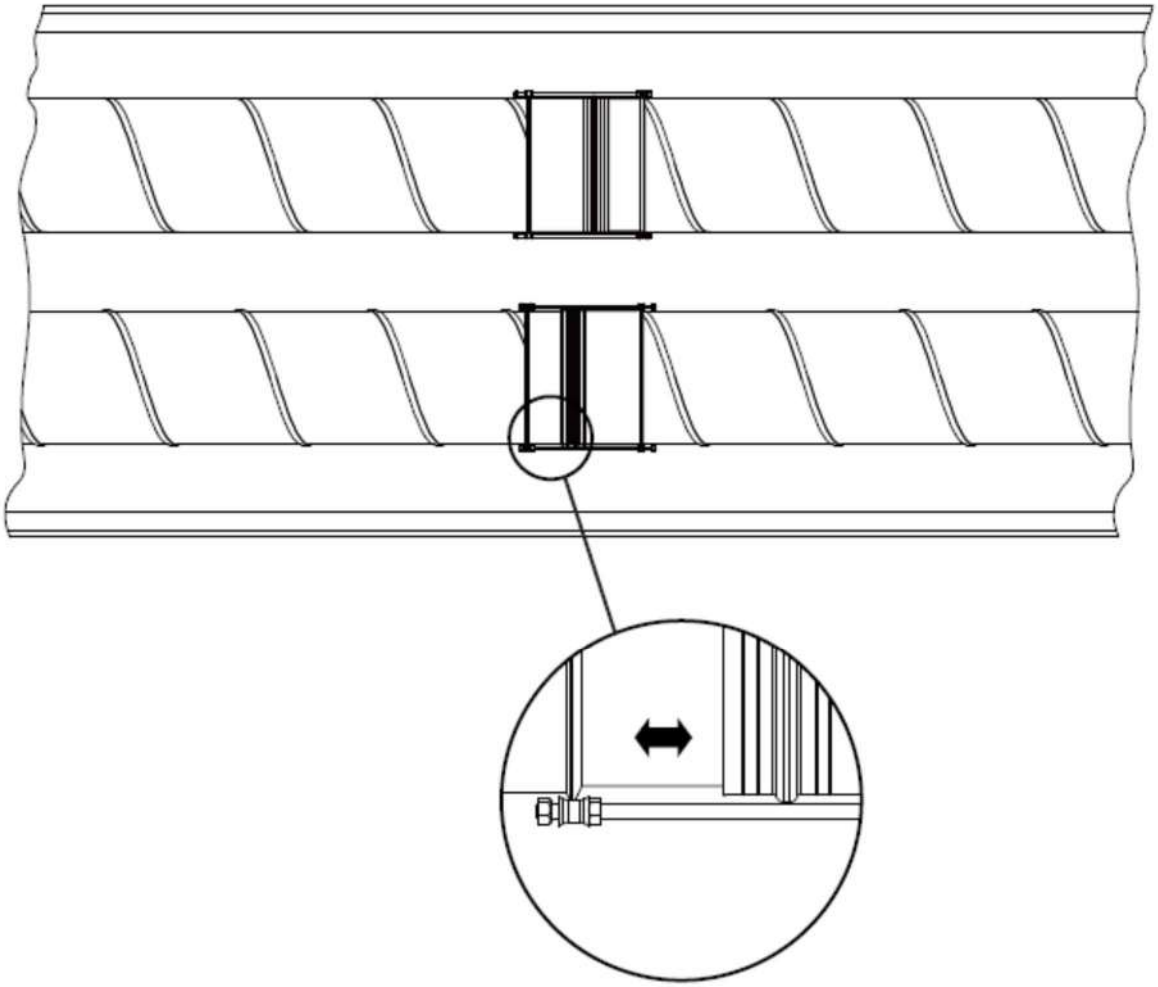


Fig. 5.30

5.8 Connections to gas net

The gas supply net must be realized by qualified personnel, adequately skilled, in compliance with national and local regulations in force in the country of installation. The piping and any components (ball valves, filters, reducers, etc.) must be calculated so to warranty a proper system working.

Before the connection, check that the thermal unit is prearranged to work with the type of fuel available in the gas network and carefully clean the gas piping, so to remove any residual that can compromise the proper functioning of the system. check that all gas connections are leakage-proof according to the indications of the laws in force.

The gas piping supplying the unit must have a diameter not less than 3/4" for the HE-Jr model and not less than 1" for HE model.

The static pressure of gas mains in the point where the unit is supplied must not exceed 100 mbar for the model HE and not exceed 50 mbar for the model HE-Jr.

When sizing the fuel gas supply network, consider that for both models, at continuous maximum power operation, a supply pressure of at least 20 mbar must be guaranteed.

If a single gas meter is used for more than one thermal unit, the size of the meter must be sufficient for the simultaneous use of all the appliances/systems connected to it. The gas connection diameter of the thermal unit is not decisive for the choice of the diameter of the unit/gas counter pipeline, but it must be sized according to its length and load losses in compliance with the laws in force and good technical practices.

Do not use gas piping as earthing of electrical devices.

The diagram in Fig. 5.31 shows the components that characterise the gas ramp recommended by EXELTEC and is just an example. The design of the gas distribution network and its components remains the responsibility of the designer in charge, who will take into consideration the conditions prescribed in this manual for the fuel gas supply.

Les étriers doivent être montés sur le châssis selon le détail de la **Erreur ! Source du renvoi introuvable.**.

Il est conseillé de prévoir un tendeur à cage pour l'équilibrage du module.

Pour la fixation du tendeur à cage, utiliser une vis de diamètre minimum M8.

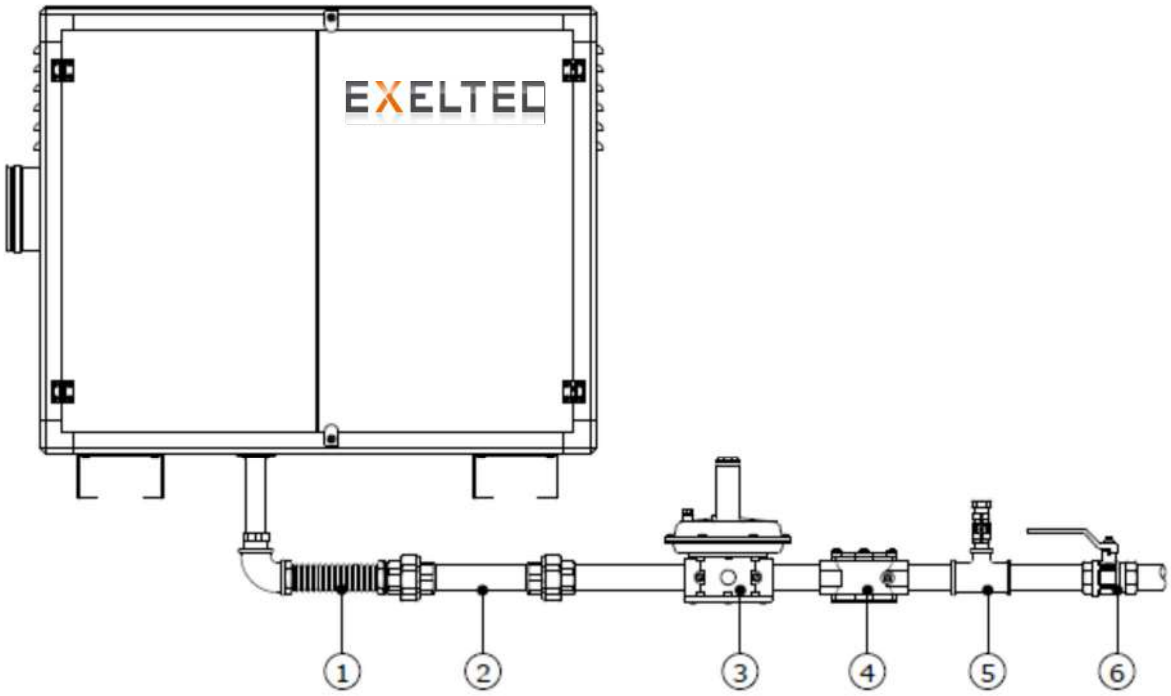


Fig. 5.31

POS.	DESCRIPTION
1	Expansion joint
2	Pipe for quantometer mounting (L=200÷250 mm) [*]
3	Possible reduction group
4	Filter
5	Pressure tap
6	Ball valve

[*] To be used only when the system is not equipped with its own gas contactor.

5.9 Electrical connections

Electrical connections must be realized by qualified personnel, adequately skilled, in compliance with national and local regulations in force in the country of installation.

Connect the **external power supply** to the terminals positioned in the on board electrical panel (see Fig. 5.32).

For the connection of the motive power are required 400Vac – 50/60 Hz (3-Ph/N/PE). For the specific electrical input of each thermal unit models, refer to the id-plate data or to the values indicated in paragraph 4 .

5.9.1 Thermal overload and short circuit protection

The general power supply cables must be sized in accordance with local regulations and designed for the relating current loads. The cross section of the PE conductor must be equal to the cross section of the phase conductor. The PE connection terminals must be connected to the earth circuit. The unit must be protected from thermal overload and short circuit by means of fuses or magneto-thermal switch, suitably sized on the basis of the data reported in paragraph 4.

5.9.2 Grounding

Make sure that the grounding cable is connected to the building's ground connection system. Do not connect the ground cable to gas or water pipes, to the lightning rod or to the telephone ground cable.

5.9.3 Protection from indirect contacts

The choice of how to protect the user from indirect contacts, according to the building's electrical distribution system, remains the responsibility of the designer.

In the case this protection occurs by means of a differential switch, this must be of type B, sensitive to omnipolar currents (in accordance with IEC 62423).

5.9.4 Connection terminal board

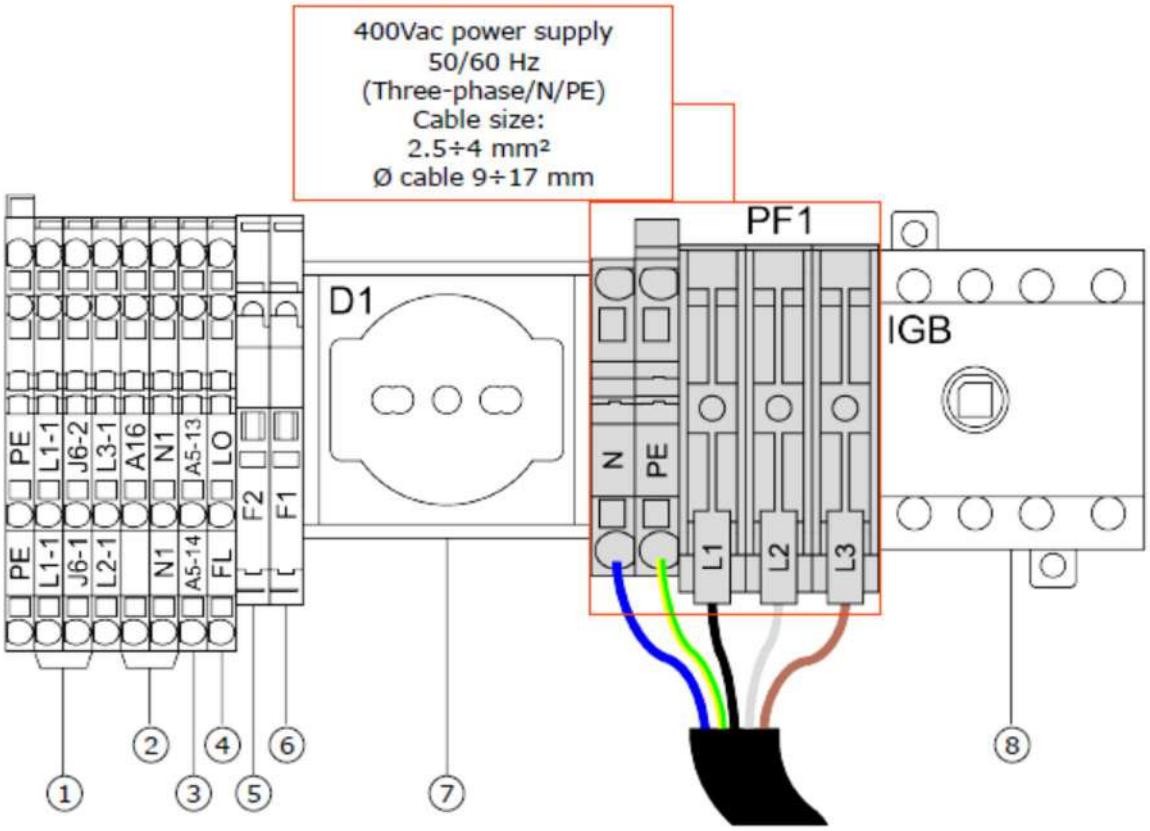


Fig. 5.32

POS.	DESCRIPTION
1	Ignition actuator (damper or solenoid valve)
2	Ignition transformer
3	Remote Reset Contact
4	Flame signal (FL) and Lockout signal (LO)
5	F2 Fuse 1A type F – EU-SP300 card protection
6	F1 Fuse 6.3A type F – Service outlet protection
7	Universal service outlet – 230Vac 50Hz
8	Manual circuit breaker with door lock 4P 16A

5.9.5 Connection diagram for sensors and EU-CM300 user interface

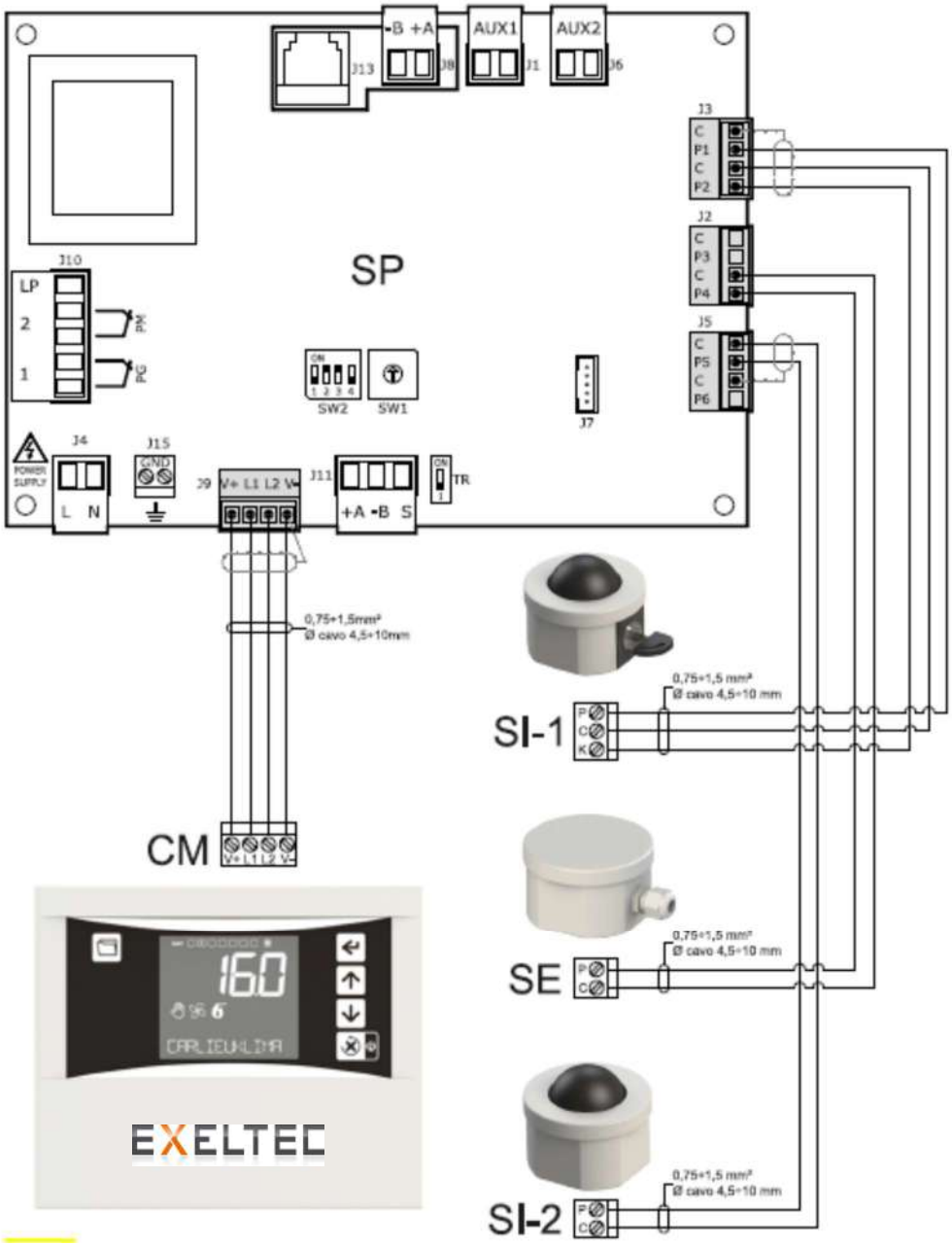


Fig. 5.33

Legend

SI-1 = Primary internal sensor

SI-2 = Secondary internal sensor

SE = External sensor

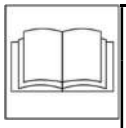
CM = EU-SP300 user interface

SP = EU-SP300 control board

For correct operation, each thermal unit requires the presence of a probe detecting the radiant temperature of the system (**SI-1 - Primary globothermometric probe**); under normal operating conditions, the monitoring of this value permits to go as close as possible to the set-point. The principal globothermometric probe - EU-RT020 - is equipped with a key switcher, permitting to force the operation of the unit by bypassing the programmed time schedule; it is possible to activate its operation in special events (i.e. the unscheduled holiday period) or to disable it in the opposite cases (the midweek holiday).
Connection cable: shielded 3 x (0.75÷1.5) mm² – Ø 4.0÷10.0 mm² – Lmax=100 m

Through an additional probe for the detection of the radiant temperature (SI-2 - Secondary globothermometric probe) it is possible to detect this parameter also in another point of the heated environment, and use it for the calculation of the weighted average with criteria to be defined according to the data testing and operation. The secondary probe – EU-RT010 - has no key switch; its use is strongly recommended where the shape of the radiant circuit and the characteristics of the building can cause asymmetries in the distribution of radiated heat, so as to better detect and monitor the performance of the system. The calibration of the relative weight factor attributed to the two probes is defined during the commissioning operations.
The SI-2 probe is an optional component.
Connection cable: shielded 2 x (0.75÷1.5) mm² – Ø 4.0÷10.0 mm² – Lmax=100 m

The connection of the external temperature probe (**SE**) allows the detection of the outdoor air temperature, a value used through appropriate algorithms in order to optimize the operation of the thermal unit and maximize its efficiency thanks also to the reduction of the maximum power output.
The SE probe is an optional component.
Connection cable: 2 x (0.75÷1.5) mm² – Ø 4.0÷10.0 mm² – Lmax=20 m



Connect the cable shield as shown in the diagram below (Fig. 5.33). Do not connect the shield on the probe side.

If there are still problems with the signal due to high electromagnetic interferences, connect the shield of the probe cables to the Earth terminal only (J15).

The **CM300** user interface for each thermal unit is necessary to control and manage of the system in local mode. If connected to a thermal unit included in a network of different appliances managed through a centralised system (EU-NET or EU-VISION configuration) its active use is disabled; in this centralised control mode it allows the display of the operating status, the alarm history and the possibility to reset the burner.
Connection cable: Shielded 4 x (0.75÷1.5) mm² – Ø 4.0÷10.0 mm² – Lmax=50 m

5.9.6 Electrical diagram for mod. HE

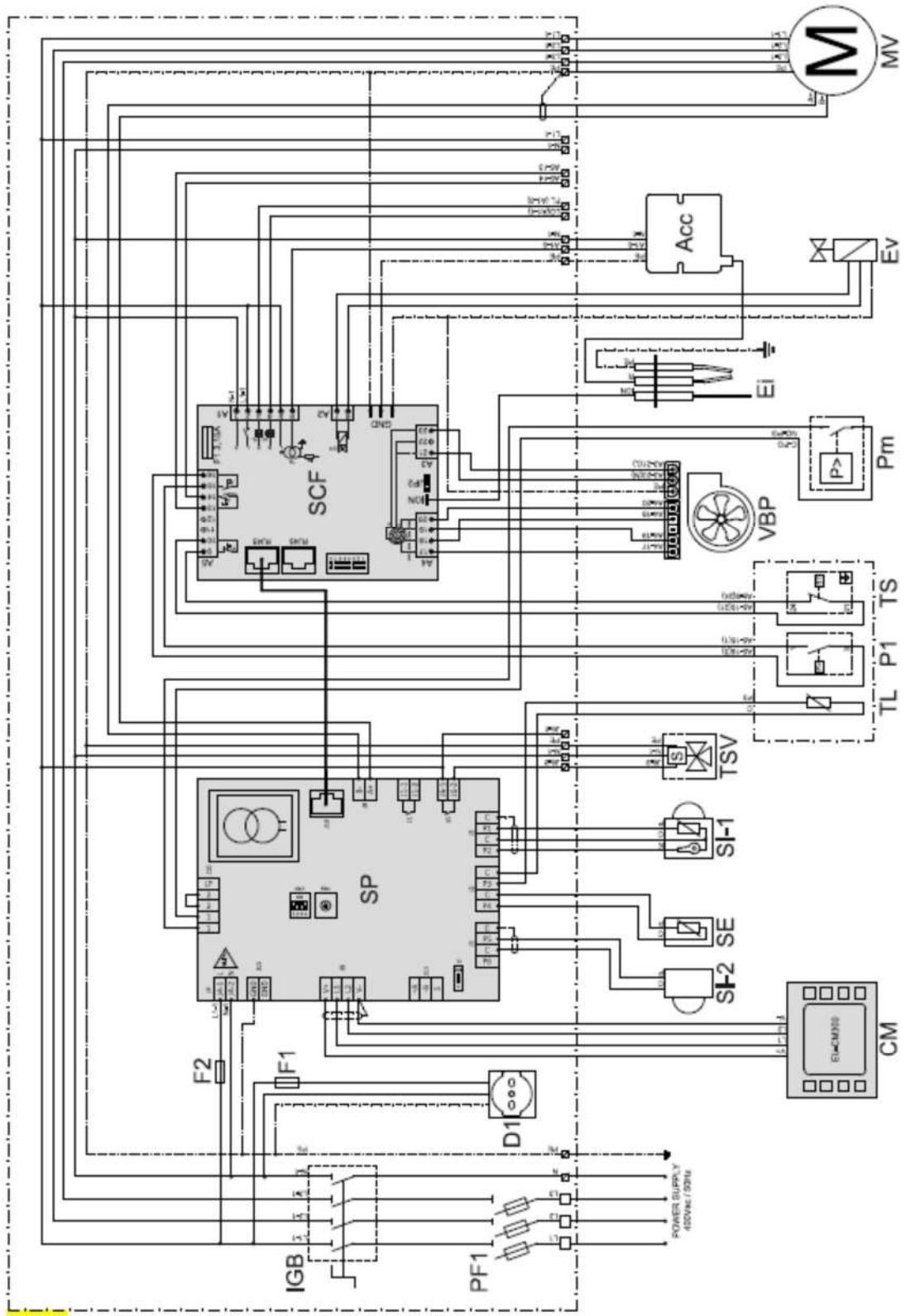


Fig. 5.34

5.9.7 Electrical diagram for mod. HE-Jr

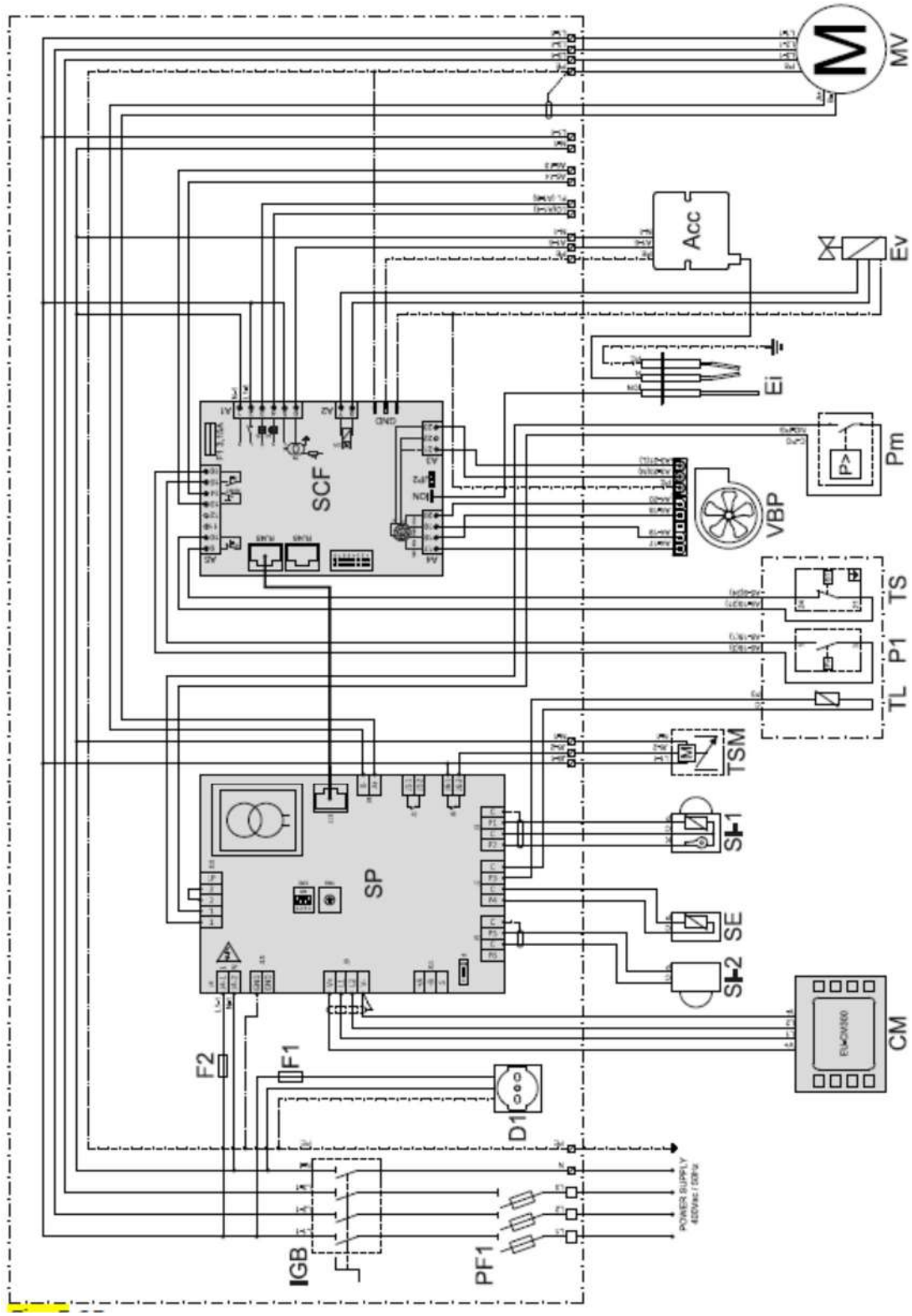


Fig. 5.35

Below is the legend of the wiring diagrams in Fig. 5.34 and Fig. 5.35.

REF.	DESCRIPTION
Acc	Ignition transformer
CM	EU-CM300 user interface
D1	230 Vac universal service outlet
Ei	Ignition/ionisation electrode
Ev	Solenoid valve
F1	6.3 A quick blow fuse (F) socket protection
F2	1 A quick blow fuse (F) EU-SP300 card protection
IGB	Manual main circuit breaker with door lock
MV	Recirculation fan fitted with inverter
P1	Recirculation pressure switch 0.2÷3 mbar
PF1	T-type 10A fuse main circuit breaker
Pm	Minimum gas pressure switch
SCF	Flame control and modulation card
SE	External probe
SI-1	Primary internal temperature probe
SI-2	Secondary internal temperature probe
SP	EU-SP300 burner control board
TL	Fumes probe PT1000
TS	Safety thermostat, calibrated at 245 °C
TSM	Motorised shutter
TSV	Three-way solenoid valve
VBP	Premix burner fan

Tab. 5.6

5.9.8 Electrical panel on board the machine (mod. HE / HE-Jr)

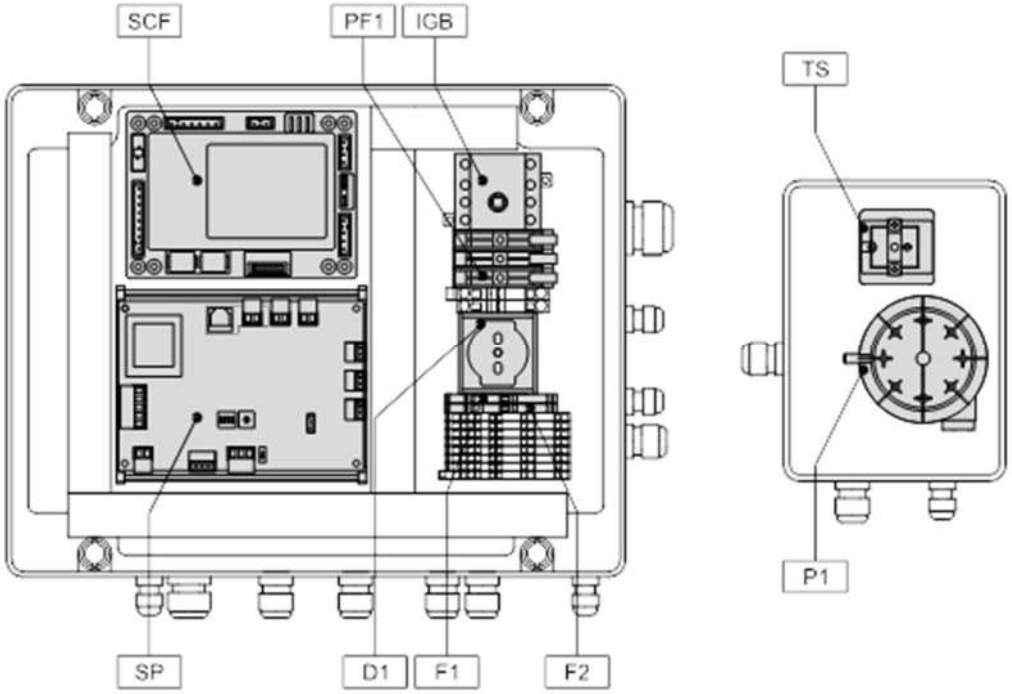


Fig. 5.36

For the programming of the EU-SP300 power board through EU-CM300 user interface, refer to the technical instruction IT_EU-SP300.

REF.	DESCRIPTION
SCF	Flame control and modulation card
PF1	T-type 10 A fuse main circuit breaker
IGB	Manual main circuit breaker with door lock
SP	EU-SP300 burner control board
D1	230 Vac universal service outlet
F1	6.3 A quick blow fuse (F) socket protection
F2	1 A quick blow fuse (F) EU-SP300 card protection
TS	Safety thermostat, calibrated at 245 °C
P1	Recirculation pressure switch 0.2÷3 mbar

Tab. 5.7

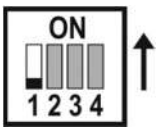
5.9.9 EU-SP300 programmable power board

The EU-SP300 power board, installed in the unit, is programmable. Programming is normally carried out in the company. Any updates can be made via the iFS key containing the update files owned by EXELTEC or remotely, if the system is within an EUBus network with a centralised EU-Qbo300 interface.

5.9.10 Local operation and via EUBus network with EU-NET (with EU-Qbo100) and EU-VISION (with EU-Qbo 300) configurations

To communicate correctly with the EU-CM300 user interface and/or the EU-Qbo100/300 centralised interfaces, set correctly the communication DIP-Switches.

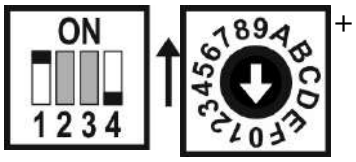
Local operation: In order to use the EU-CM300 user interface in local mode, directly connected to the EU-SP300 control board, set the Dip of Dip-Switch SW2 as follows:



Single board, connected to EU-CM300 keyboard only.

EUBus communication port disabled.

EUBus network operation: in order to communicate correctly with a EU-Qbo300 or EU-Qbo100 centralised interface, set the Dip-Switches SW1 and SW2 of the EU-SP300 control board as follows:



Board connected to a EU-Qbo100 or EU-Qbo300 network terminal.
EUBus communication port enabled.
NOTE: leave the Dip no.4 in OFF position.
SW1: Board network address from 0 to 15.

The SW1 rotary Dip-Switch gives the possibility to assign the Mod-Bus address to the unit (addresses from 0 to 15). An EUBus network includes up to 16 units. Each unit within the same EUBus network must have its own address to avoid conflicts and communication problems.

It is not compulsory that the position of BUS cable respects the progressive order of the BUS addresses; to the units can be assigned an address regardless of their position in the network.

All the units are supplied with the SW1 rotary switch in position 0; modify the position of the selector and assign the BUS address in accordance with the documentation provided by EXELTEC.

Any changes that maintain the uniqueness of the addresses do not affect the correct functioning of the system. However, it is recommended to check the exact correspondence of the "as built" schemes in order to guarantee the immediate identification of the units for future maintenance operations.

The last unit of the EUBus line must have inserted the end-of-line resistor using the Dip-Switch TR set to ON as follows:

End-of-line resistance enabled.

For more information on setting the Dip-Switches, see the technical instruction IT_EU-SP300 in chapter 4.

5.9.11 EUBus network connection scheme for EU-NET and EU-VISION configurations

Two internal temperature probes (one primary and one secondary with the possibility to perform a weighted average), an external probe and an EU-CM300 user interface can be connected simultaneously to an EU-SP300 control board. In case of an EUBus network, as in this example, only one external probe is required for the entire network (consisting of a maximum of 16 units from 0 ÷ 15). The EU-CM300 user interfaces (optional in this configuration) are "blocked" and there is only the possibility to reset any blocks and view the temperature and alarm history.
To perform a correct configuration of the EUBus line, consult procedure IT_EU_PY_03.
Fig. 5.37 shows an example of connection of an EUBus line.

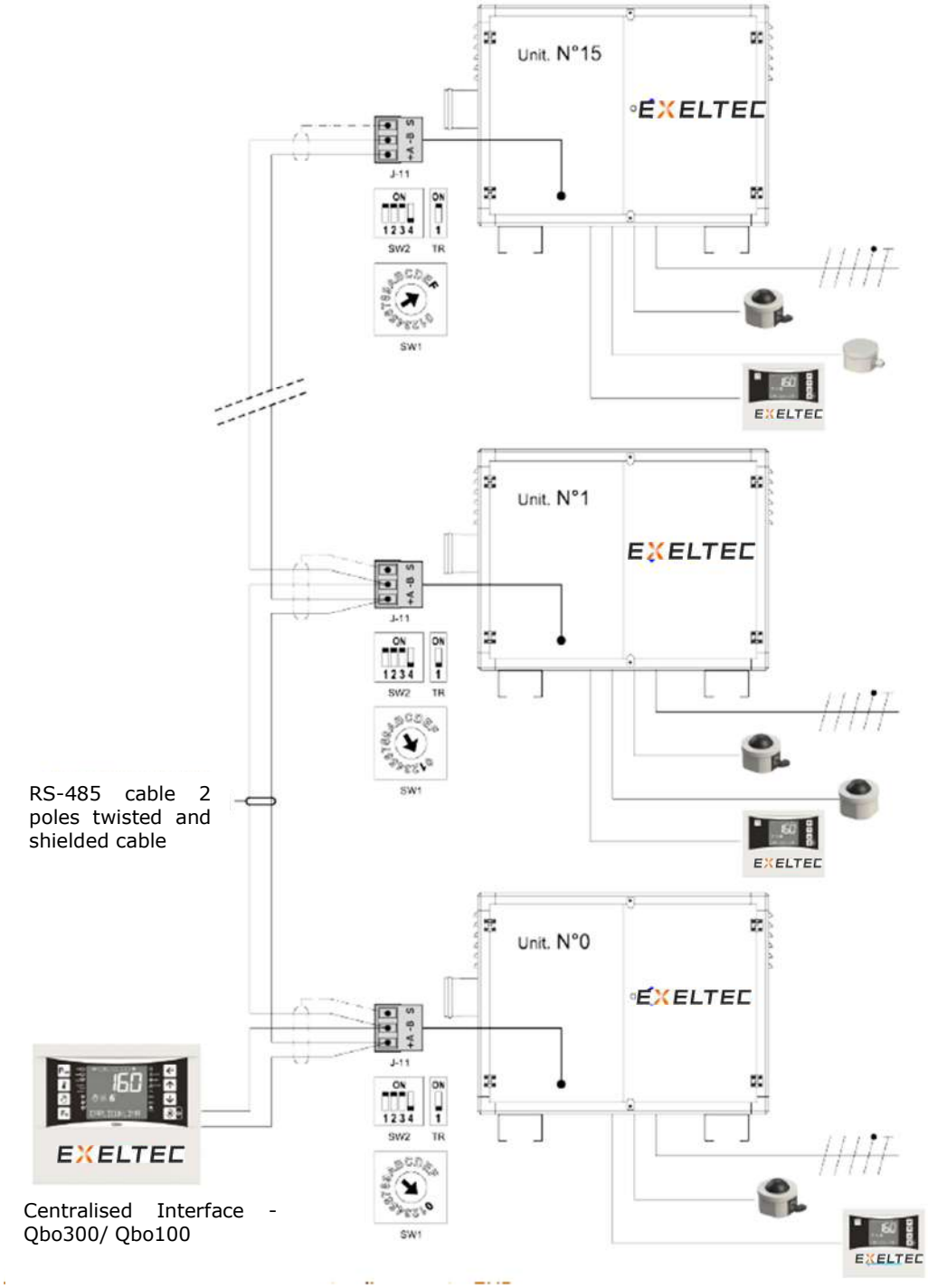


Fig. 5.37: Example of an EUBus network configuration.

6 WORKING SEQUENCE

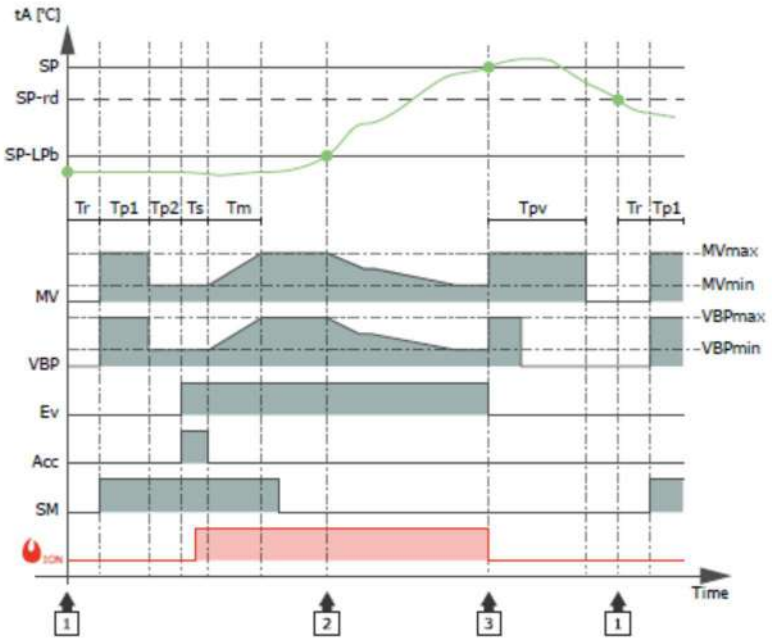


Fig. 6.1

REF.	DESCRIPTION
tA	Room temperature
SP	Current setpoint
Sp-rd	Re-ignition .t.T
Sp-LPb	Modulation band
MV	Recirculation fan
Mvmax	Recirculation fan maximum speed
Mvmin	Recirculation fan minimum speed
VBP	Burner fan
VBPmax	Burner fan maximum speed
VBPmin	Burner fan minimum speed
Ev	Gas solenoid valve status
Ace	Igniter status
SM	Ignition actuator status
ION	Ionization status (flame presence)
Tr	Ignition delay time
Tpl	Pre-ventilation time at maximum speed
Tp2	Pre-ventilation time at ignition speed
Ts	Safety time, ignition time
Tm	Stabilization time at required nominal power
Tpv	Post-ventilation time
1	Thermal request
2	Modulation start (temperature is within modulation band)
3	Reaching of setpoint temperature

Tab. 6.1

7 COMMISSIONING, SERVICE AND MAINTENANCE

7.1 Safety requirements

The personnel in charge of the maintenance of the unit, the radiant modules and all the elements connected to them, apart from being professionally qualified, must not wear clothing that could cause danger (wide sleeves, laces, belts or similar) and must use personal protective equipment in compliance with the laws in force.

Before carrying out any maintenance operations, carefully read this section of the user manual. For any need, contact the technical assistance service. The manufacturer is not liable for any damage or malfunctions if they occur due to failure to comply with the indications provided. During maintenance, display the "Work in progress" signs in the area so that they are visible from all access points. Record all maintenance operations performed in a special registry, taking care to note: date, time, type of intervention and name of the technician. The use of any equipment must be carried out in such a way as to avoid compromising the functionality of electrical cables, operating devices, pipes and ducts.

It is recommended to wear gloves.

IT IS STRICTLY FORBIDDEN TO:

- **deposit combustible material nearby the electrical panels;**
- **intervene on the electrical equipment without having previously disconnected the power supply line;**
- **intervene on any part of the unit before stopping the system;**
- **operate with the safety systems disabled or removed;**
- **disable or bypass the alarm signals;**
- **ignore the warnings and signs applied on the unit;**
- **operate the unit with the protections removed.**

Danger of explosions due to gas leakage. Improper maintenance work can cause gas leaks and explosions. Before starting the operations, close the fuel shut-off devices. The disassembly and re-assembly of parts of the system used for carrying gas must be carried out with extreme care. Tighten the screws at the measuring points and carry out a leak test.

Make sure that during the initial start-up operations, access to the spaces of the heated rooms where the radiant circuit is installed is prevented for the entire time necessary for the intervention; the usability of these spaces will only be restored once the operations are completed.

During the first ignition, fumes will develop due to the evaporation of the emulsion residues used to make the radiant tubes. In order not to cause inconvenience to the operators, it is advisable to suitably ventilate the rooms involved

7.2 Access to the thermal unit

To provide for the necessary maintenance operations over time, it is essential that the thermal units are easily accessible. In consideration of the fact that, in most cases, they are placed on the wall at significant heights, EXELTEC strongly recommends the installation of a permanent system to have access the units, complete of the relative work platform. It is possible to order a modular system which can be configured quickly and easily.

7.3 Commissioning and start-up

The system must be commissioned by a EXELTEC technician or by a qualified technician authorised by EXELTEC.

The operations required for commissioning the thermal unit are described in detail in the Technical Instruction IT_EU_PY_01; follow the instructions in this document.
A commissioning performed in a manner different from this Technical Instruction or whose Report (mod. M8.3-02 - Test sheet) shows parameters / settings that do not comply with the manufacturer's prescriptions is to be considered unsafe.
Upon the occurrence of one of these circumstances, any form of guarantee offered by EXELTEC is suspended and then ceased, unless otherwise specified by the EXELTEC Service Dept.
Before commissioning the system, it is recommended to check compliance with the conditions summarised in the initial checklist made available in Technical Instruction IT_EU_PY_01

For the commissioning of the heating unit, the qualified technician must have a gas flow meter (quantometer), a differential pressure gauge and an instrument for the analysis of the combustion products, which must be verified and calibrated in accordance with the manufacturer's instructions.

To perform the commissioning operations, connect to the thermal unit through the EU-CM300 user interface, this is joined directly to the terminals of the EU-SP300 power board (see paragraph 5.9.5). If the operator does not have his own interface available, he can use the one supplied with the system, disconnecting it from the circuit and using it in proximity of the unit's electrical panel.

If the heating unit is connected to a centralized user interface EU-Qbo 100/300 (EU-NET / EU-VISION configuration) and is not equipped with an EU-CM300 user interface, the technician must be equipped with an interface EU-CM300.

Setting data

Once the calibration operations of the thermal unit have been completed in accordance with the requirements of the Technical Instruction IT_EU_PY_01, fill in the paper label affixed to the inside of the cover of the electrical panel; the setting data shown therein will be extremely useful in case of replacement of the EU-SP300 control board and re-setting.

Once the smoke analysis is complete, DO NOT power off the thermal unit, so as not to prevent the correct completion of the post-ventilation cycle necessary for the controlled cooling of the components and the complete washing of the radiant circuit from the fumes contained in the pipes.

To allow the re-closing of the electrical panel, the unit can be disconnected only after the post-ventilation cycle has ended and the unit is in a stand-by state.

7.4 Ordinary maintenance – General indications and prescriptions

The **X CERK HE** radiant strips heating system must be subjected to routine maintenance in accordance with the regulations in force, the rules of good practice and as indicated below.
Maintenance operations must be carried out by qualified personnel, with the appropriate skills and in compliance with the relevant regulations in force.

EXELTEC, in order to preserve the full functionality of the system over time and to guarantee the maintenance of the safety conditions of the entire system, prescribes at least annually to provide for ordinary maintenance operations (as described below), preferably before winter starting.

In the case the unit is working for more than 1,800 hours during the season, it is necessary to plan the ordinary maintenance with more frequency.

To replace parts of the system, use only original spare parts, ordering them directly from EXELTEC (info@exeltec.fr) or from authorized service centers.

When placing the order, specify the data printed in the rating plate of the unit, in particular:

- model;
- production year;
- serial number

For the replacement of the components of the control system, specify also how the unit is managed:

- "local regulation" for single unit;
- management through centralised user interface.

EXELTEC recommends signing a maintenance contract with one of its authorised Technical Assistance Centres, to ensure a regular check of the system.

7.5 Ordinary maintenance operations

Some operations required for routine maintenance of the heating unit, in particular cleaning the burner, the combustion chamber and replacing the electrodes, are described in detail in the Technical Instruction IT_EU_PY_02. Follow the instructions in this document.

It will be the responsibility of the system operator (System Manager) to provide the technician in charge of maintenance operations with the specific Technical Instruction, possibly asking a copy in advance to the EXELTEC Technical Assistance Service.

It will be the responsibility of the technician in charge to organise the intervention in advance, obtaining the components subject to normal wear and tear and supposed to be replaced in accordance with the following requirements:

- Burner spacer gasket: annual frequency;
- Electrode gasket: annual frequency;
- Electrodes: every two years;

7.5.1 Thermal unit

Ordinary maintenance operations generally consist in cleaning the main components of the unit, as well as checking their functionality. Regardless of any legal restrictions and requirements, EXELTEC recommends carrying out the smoke analysis at the completion of the maintenance operations and after the operating configuration of the unit has been restored.

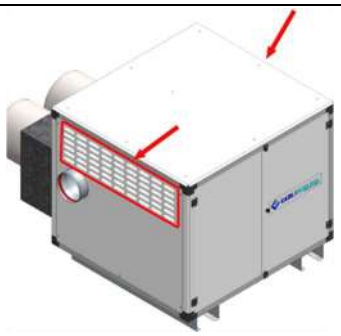
Once the smoke analysis is complete, DO NOT power off the thermal unit, so as not to prevent the correct completion of the post-ventilation cycle necessary for the controlled cooling of the components and the complete washing of the radiant circuit from the fumes contained in the pipes.

To allow the re-closing of the electrical panel, the unit can be disconnected only after the post-ventilation cycle has ended and the unit is in a stand-by state.

7.5.2 Radiant circuit modules

The integrity of the circuit seal is an essential requirement for the correct operation of the thermal unit; this is monitored when checking the maintenance of the suction pressure of the system. Ordinary maintenance operations are therefore mainly focused on verifying the mechanical functionality of the thermal expansion joints.
However, it is advisable to check that there is no dust on the upper surfaces of the radiant modules, and in particular, that there are no accumulations such as to constitute a fire hazard. If situations of potential danger due to excessive dust deposits are detected, the technician must promptly report it to the Plant Manager, ordering their immediate removal and promoting the implementation of extraordinary interventions to avoid happening again.
In the case the system is installed in environments where it is impossible to avoid a significant formation of dusty deposits, EXELTEC suggests the installation of the upper metal covers. Their smooth shape make the cleaning extremely easy.

7.5.3 Summary of main ordinary maintenance operation.

Activity	Description	Paragraph/ref. figure
General cleaning	Perform a general cleaning of the combustion unit	
Comburent air intake cleaning	Clean the intake grills of comburent air positioned on the sides of the thermal unit, by sucking the dirt on the grills.	
Burner cleaning	Remove the burner and clean the combustion head.	Please contact an authorised service centre, IT_EU_PY_02
Recirculation fan control	check that the recirculation fan rotates without frictions.	Please contact an authorised service centre, IT_EU_PY_02
Electrode status control and possible replacement	Pull out the electrodes from the combustion unit and, if oxidated/damaged, replace them. EXELTEC suggests their annual replacement.	Please contact an authorised service centre, IT_EU_PY_02
Solenoid valves upstream pressures control	Verify with the special device that the intake pressures of the solenoid valves correspond to the indications in Tab. 4.1 page.	Please contact an authorised service centre, IT_EU_PY_01
Gas ramp tightness control	Verify the tightness of the gas ramp with the proper soapy solution or equivalent product.	Please contact an authorised service centre, IT_EU_PY_01
Expansion joints control	Visual check of the integrity of expansion joints	5.7.3 , page 49
Combustion control	Through the special device, verify the correct combustion.	Please contact an authorised service centre, IT_EU_PY_01

Activity	Description	Paragraph/ref. figure
Vacuum control	Using a differential pressure gauge, check that the minimum vacuum values of the system are guaranteed.	Please contact an authorised service centre, IT_EU_PY_01
Ignition cycle control	Visual check of the ignition sequence and search for any anomalies/controller display signalling.	Chapter 6, page 63
Check of room temperature sensor/ external temperature sensor (optional)	Verify the exact measuring of the globe sensor (room temp.) and of external temp. sensor, if present, with the specific thermometers. Adjust any variation of the detected value by acting on the user interface of the controller.	See the Technical InstructionIT_EU-SP300 supplied with the system
Reset of the time counter for the next maintenance intervention	In case the "Time counter" is enabled, reset the count of remaining hours to the next maintenance intervention	See the Technical InstructionIT_EU-SP300 supplied with the system

8 TROUBLESHOOTING

The EU-CM300 user interface recognises and displays the single working status of the thermal unit, included the burner and recirculation fan malfunctions.

The **ALSt** menu of EU-CM300 user interface permits the reading of errors which are already occurred, active or solved (see the IT_EU-SP300 technical instructions to navigate the menu).

8.1 Error code identification

When the icon "⚠" appears on the main screen together with the wording "ALLARME IN CORSO", it means that an alarm event is in progress.

- Log in the **ALSt** menu and display the error code.

  How to view the error codes within the **ALSt** menu:

- A 01. together with the alarm code, the dot "." and the symbol "⚠" appear, this represents the last error, in progress;
- A 01 together with the alarm code, the symbol "⚠" appears, this means that the error is in progress;
- A 01. together with the alarm code the symbol "."appears, this represents the most recent error, already occurred and solved;
- A 01 only the alarm code appears, it means that the alarm has already occurred and has returned
- Find the error code
- Remove the cause of the error [chap 8.2]

The last 10 errors are stored in the **ALSt** menu, starting with the most recent.

8.2 Error removal procedure

The following tables show the error codes divided as follows:

- Error codes relating to the whole unit, communicated by the EU-SP300 power board and visible in the **ALSt** menu;
- Error codes relating to the burner, communicated by the flame control board and available in parameter **U02** of the **inFo** menu;
- Error codes relating to the recirculation fan status, communicated by the inverter and available in parameter **Y01** of the **inFo** menu.

ALSt ERRORS TABLE

Error Code	Reason	Elimination
A 01	Burner shut down error	• See the parameter **U01** of the **inFo** menu to identify the burner status and then the parameter **U02** to identify the specific error code.
A 10	Faulty EEprom of EU-SP300 power board	• switch off the power supply for a short time; • reset the burner, if the error persists, replace the EU-SP300 power board.
A 13	RTC Clock error	• Access the tiME menu using the EU-CM300 user interface and set the clock correctly; • if the error persists at each loss of voltage, replace the EU-SP300 power board, backup battery failure; • switch off the power supply for a short time; • reset the burner, if the error persists, replace the EU-SP300 power board.
A 18	Min. gas pressure switch error	• Check the gas connection pressure; • adjust the gas pressure switch; • check / replace the gas pressure switch; • check the correct wiring of the pressure switch.
A19	Heat recuperator error	• Check the heat recuperator fan; • check the connection to the 2 /PM contacts of the J10 connector of the EU-SP300 power board; • if the heat peculator is not present, check the 2 /PM contacts of the J10 connector of the EU-SP300 power board are correctly jumpered.
A 20	Room temperature probe error P1	• No probe is present or in short circuit, check the wire and the connection; • faulty probe, to be replaced; • temperature beyond the limits of the instrument, check the room temperature; • switch off the power supply for a short time; • reset the burner, if the error persists, replace the EU-SP300 power board.

ALSt ERRORS TABLE

Error Code	Reason	Elimination
A 22	Fumes temperature probe error P3	• No probe is present or in short circuit, check the wire and the connection; • faulty probe, to be replaced; • temperature beyond the limits of the instrument, check the fumes temperature; • switch off the power supply for a short time; • reset the burner, if the error persists, replace the EU-SP300 power board.
A 23	Outdoor temperature probe error P4	• No probe is present or in short circuit, check the wire and the connection; • faulty probe, to be replaced; • probe enabled but not present, disable the probe by setting the parameter **/P4** of the menu **PAr** to no; • temperature beyond the limits of the instrument, check the outdoor temperature; • switch off the power supply for a short time; • reset the burner, if the error persists, replace the EU-SP300 power board.
A 24	Auxiliary room temperature probe error P5	• No probe is present or in short circuit, check the wire and the connection; • faulty probe, to be replaced; • probe enabled but not present, disable the probe by setting the parameter **/P5** of the menu **PAr** to no; • temperature beyond the limits of the instrument, check the room temperature; • switch off the power supply for a short time; • reset the burner, if the error persists, replace the EU-SP300 power board.
A 41	High room temperature alarm P1	• Check the set limit in parameter **AH**, the error is automatically cleared when the temperature drops under the set value; switch off the power supply for a short time; • reset the burner, if the error persists, replace the EU-SP300 power board.
A 42	Low room temperature alarm P1	• Check the set limit in parameter **AL**, the error is automatically cleared when the temperature rises above the set value; • switch off the power supply for a short time; • reset the burner, if the error persists, replace the EU-SP300 power board.
A 45	High fumes temperature alarm P3	• Check that the parameter **AH3** is equal to 200 [°C], the error is automatically cleared when the temperature drops of 20°C under the set value; • check using parameter t-12 of the inFo menu that the P3 probe reading is congruous with the actual flue gas temperature and, if necessary, replace the probe;

ALSt ERRORS TABLE

Error Code	Reason	Elimination
		• check that the probe is correctly connected to terminal J2 of the EU-SP300 board; • check the integrity of the connection wires of the P3 fumes probe, replace the probe if necessary; • check the correct burner calibration and check that the fumes do not exceed 200°C; • switch off the power supply for a short time; • reset the burner, if the error persists, replace the EU-SP300 power board.
A 46	Low fumes temperature alarm P3	• Check that the parameter **AH3** is equal to -5 [°C]; the error is automatically cleared when the temperature rises of 5°C above the set value; • check using parameter t-12 of the inFo menu that the P3 probe reading is congruous with the actual flue gas temperature and, if necessary, replace the probe; • check that the probe is correctly connected to terminal J2 of the EU-SP300 board; • check the integrity of the connection wires of the P3 fumes probe, replace the probe if necessary; • switch off the power supply for a short time; • reset the burner, if the error persists, replace the EU-SP300 power board.
A 52	Flame control card communication error	• Check the BUS connection between the contact J13 of the EU-SP300 power board and the connector RJ45 of the flame control card; • check the power supply and the protection fuse of the flame control card; • switch off the power supply for a short time; • reset the burner and if the error persists, replace the flame control card.
A 53	Inverter communication error	• Check the connection BUS between the contact J8 of the EU-SP300 power board and the connector BUS of the Inverter; • check the inverter power supply; • switch off the power supply for a short time; • reset the burner and if the error persists, replace the Inverter.
A 98	Meters memory is corrupted	• Clear values **Cn-1** and **Cn-2** using the parameters **H14E** e **H15E**; • switch off the power supply for a short time; • reset the burner, if the error persists, replace the EU-SP300 power board.
A 100	Maintenance request	• Perform the ordinary maintenance on the burner and then reset the maintenance meter using the parameter **H14E**.
A 240	Volatile burner lockout error	• See the parameter **U01** of the **inFo** menu to identify the burner status and then the parameter **U02** to identify the specific error code.
MISSING DATA	"MISSING DATA" or "No communication" wording	• Wrong connection between the EU-CM300 keyboard and the EU-SP300 power board. Verify the status of wirings L1 and L2.

U02 BURNER ERRORS TABLE

Error Code	Reason	Elimination
04	Lockout caused by absence of flame signal at the end of "TS" safety time	• Check the ignition and ionisation electrodes and the relating wiring, if necessary clean/replace them; • check the ignition transformer and the power supply wire, replace them if necessary; • check the opening of the gas solenoid valve and the supply cable, replace them if necessary; • bad earthing, check the earthing of the electrode and of the flame control card; • check the combustion head, if faulty or damaged replace it; • check the gas pressure at the valve inlet, if it is higher than the maximum values supported by the valve, reduce it; • check the calibration of the burner, correctly calibrate the thermal unit according to IT_EU_PY_01; • reset the burner and if the error persists, replace the flame control card.
05	Lockout caused by absence of flame signal during operation	• Check the burner calibration, calibrate correctly the thermal unit according to IT_EU_PY_01 • check the ionisation electrode and the relating wire, if necessary clean/replace it; • bad earthing, check the earthing of the electrode and of the flame control card; • check the gas pressure at the valve inlet, if it is higher than the maximum values supported by the valve, reduce it; • check the correct operation of the gas solenoid membrane.
06	Card over-temperature	• check that the temperature of the card do not exceed the range: -10÷100°C; • reset the burner and if the error persists, replace the flame control card.
10	Generic error	• reset the burner and if the error persists, replace the flame control card.
11	Lockout caused by stray flame/light	• check ionisation electrode, replace it if necessary; • search for the stray flame/light source and remove it; • reset the burner and if the error persists, replace the flame control card.
20	Lockout caused by stray flame/light after shutdown	• See error code: 11.
24	Lockout caused by wrong fan burner speed	• Wrong speed fan during start-up **U01** = 02, the fan burner speed is different respect to those of set-point after 22s, check the fan burner, the PWM data wire and the supply wire, replace them if necessary; • reset the burner and if the error persists, replace the flame control card; • wrong fan speed in pre-ventilation and start-up **U01** = 3,4 o 13, the fan burner speed is different respect to those of set-point after 22s, check the fan burner, the PWM data wire and the supply wire, replace them if necessary; • reset the burner and if the error persists, replace the flame control card; • wrong fan speed during operation **U01** = 5, the speed of the burner fan is different respect to those of set-point after 5s, check the fan burner, the PWM data wire and the supply wire, replace them if necessary; • reset the burner and if the error persists, replace the flame control card.

U02 BURNER ERRORS TABLE

Error Code	Reason	Elimination
26	Lockout caused by missed fan burner shutdown	• Speed fan > 0 when U01 = 06, after a timeout of 30s, check the fan burner, the PWM data wire and the supply wire, replace them if necessary; • reset the burner and if the error persists, replace the flame control card.
40	Flame control card communication error	• Check the BUS connection between the contact J13 of the EU-SP300 power board and the connector RJ45 of the flame control card; • check the power supply and the protection fuse of the flame control card; • switch off the power supply for a short time; • reset the burner and if the error persists, replace the flame control card.
41	Communication error with SRM safety module	• No communication of the SRM safety module for a time greater than 4 sec; • switch off the power supply for a short time; • reset the burner and if the error persists, replace the flame control card.
42	Error for internal memory corruption	• switch off the power supply for a short time; • reset the burner and if the error persists, replace the flame control card.
43	Missing or insufficient power supply	• Check the protection fuse of the flame control card, if faulty, replace it; • check power supply, voltage < 85 Vac; • switch off the power supply for a short time; • reset the burner and if the error persists, replace the flame control card.
51	Lockout caused by intervention of the air pressure switch during operation	• Check the suction system pressure by using a manometer; • check the integrity of the ducts and of the joints of the radiant strip, if leaks are detected, replace/seal the modules / expansion joints; • check the air pressure switch calibration; • check that the + and – pipes of the air pressure switch are free and in good conditions, replace them if necessary; • check that the air intake and chimney are free; • Check that the pressure switch is working properly, replace it if necessary; • check the correct electrical connection; • check that the recirculation fan has no errors, using the parameter **Y01** of the menu **inFo**; • check the proper functioning of the recirculation fan, replace it if necessary; • switch off the power supply for a short time; • reset the burner and if the error persists, replace the flame control card.
52	Lockout caused by intervention of the safety pressure switch during operation	• Check the proper functioning of the air pressure switch and recirculation fan, replace them if necessary; • reset the thermostat and check its operation, replace it if necessary; • check that the connection cables are not interrupted or with unstable contacts, replace them if necessary; • switch off the power supply for a short time; • reset the burner and if the error persists, replace the flame control card.

U02 BURNER ERRORS TABLE

Error Code	Reason	Elimination
54	Lockout caused by malfunction of the air pressure switch during start-up	• See error code 51; • check the direction of rotation of the recirculation fan, if it turns in the opposite direction, reverse a motor power supply from the inverter.
55	Lockout caused by generic internal fault	• check the quality of the insulation of the ionisation and ignition cables, replace them if necessary; • check that the ignition cable is original and therefore equipped with a 1kΩ resistor, to reduce the intensity of the field generated by the ignition transformer; • switch off the power supply for a short time; • reset the burner and if the error persists, replace the flame control card.
60	Lockout caused by intervention of the safety thermostat during start-up after 26 sec	• Check that the thermostat has not performed an intervention for too low operating temperatures (below 0°C), bring the thermostat to a temperature of 20°C and press the reset button; • check that the power supply voltage to the unit is stable e that voltage is not removed during normal operation of the burner, thus interrupting the post-ventilation cycle; • check proper functioning air pressure switch e recirculation fan, replace them if necessary; • reset the thermostat and check its operation, replace it if necessary; • check that the connection cables are not interrupted or with unstable contacts, replace them if necessary; • switch off the power supply for a short time; • reset the burner and if the error persists, replace the flame control card.
61	Lockout caused by the switching contact of air pressure switch non in still position after 26 sec	• Check that the pressure switch is working properly, replace it if necessary; • check that the + and – pipes of the air pressure switch are free and in good conditions, replace them if necessary; • check the calibration of the air pressure switch, if it is set too low (0.2÷0.4 mbar) there could be exchange problems. Calibrate it according to the start-up instruction IT_EU_PY_01; • if there is a fume extractor in the chimney, check that the suction pressure generated does not interfere with the exchange of the air pressure switch; • switch off the power supply for a short time; • reset the burner and if the error persists, replace the flame control card.

Y01 INVERTER ERRORS TABLE

Error Code	Reason	• Elimination
01	Power module over temperature error	• It occurs when the temperature of the power module exceeds 80°C, check that the working environment of the inverter is free and clean and that natural ventilation is ensured; • switch off the power supply for a short time; • reset the unit and if the error persists, replace the inverter.
02	Over current error	• It occurs in case of instantaneous output over current (to the motor). It can also occur with particularly low power supply voltages and high mechanical loads applied to the motor axis; • check that the motor is not short-circuited or that there are no particular problems with the windings; • check that there are no particular noises during operation which could indicate wear of the bearings. If the noise is highly mechanical, check that there is no interference between the impeller and the blast tube, replace it if necessary the motor group; • switch off the power supply for a short time; • reset the unit and if the error persists, replace the inverter.
04	Over voltage error	• It occurs when the voltage across the inverter capacitors rises above the maximum allowed value, check the power supply voltage to the inverter; • check that during shutdown the motor decelerates normally without any particular friction, disassemble the motor group and check for any interference, replace if necessary; • switch off the power supply for a short time; • reset the unit and if the error persists, replace the inverter.
05	Motor protection alarm for cosϕ	• It occurs when the resistant torque applied to the motor shaft exceeds the preset value due to overheating or excessive wear of the bearings, check that the motor group is free and clean and that natural ventilation is ensured, check the wear of the bearings, if necessary, replace the motor group; • switch off the power supply for a short time; • reset the unit and if the error persists, replace the inverter.
10	"Communication Line" internal error	• switch off the power supply for a short time; • reset the unit and if the error persists, replace the inverter.
11	Communication Timeout on RS485	• Check the connection BUS between the contact J8 of the EU-SP300 power board and the connector BUS of the Inverter; • check power supply to the inverter; • switch off the power supply for a short time; • reset the burner and if the error persists, replace the Inverter.

8.2.1 Errors reset

- Reset the error by bringing the **rSt** parameter (from **Fnc** menu) to **YES**
- The error is unlocked

Damages caused by improper fault reset
Improper fault reset can lead to material damage or serious injury.

- Do not perform more than 2 consecutive resets;
- The causes of the lockout can only be eliminated by qualified personnel.

8.3 Problems during operation

In this paragraph are shown any problems that may arise during the normal operation of the thermal unit.

TABLE OF PROBLEMS DURING OPERATION

Observation	Reason	• Elimination
Incorrect operation of the burner during start-up	Incorrect start-up point calibration	• Perform the calibration according to the technical instructions IT_EU_PY_01.
	Ignition solenoid valve clogged or faulty [model XCERK HE-Jr]	• Check the correct functioning of the solenoid valve and check that the filter is clean, replace it if necessary.
	The motorised damper is faulty [model XCERK HE-Jr]	• Check the correct functioning of the damper, replace it if necessary.
	Ignition electrodes are dirty or damaged	• If necessary clean or replace the electrodes.
The combustion has strong pulsations, creating important vibrations	Incorrect calibration of maximum and/or minimum power	• Perform the calibration according to the technical instructions IT_EU_PY_01.
Strong vibrations from the external unit	recirculation fan with worn bearings or unbalanced	• Replace the recirculation fan.
Acoustic perception of an oscillation	Oscillation at low frequency of the recirculation fan	• Increase the value in **Hz** of the parameter **Y11** in the menu **PAr** until the oscillation ends.
The display of the EU-CM300 user interface is off	Incorrect or missing connection to the EU-SP300 power board	• Check that the interface is correctly connected to the terminal J9 of the EU-SP300 power board and that there is continuity in the connection wires.
	No power supply to the EU-CM300 user interface	• Check that there is power supply to the thermal unit; • check that there are 12 Vdc between V+ and V- contacts; • replace the EU-SP300 power board.
	Faulty EU-CM300 user interface	• Replace EU-CM300 user interface.
The burner lockout is no longer resettable	More than 5 unlocks in the last 15 minutes were done	• Switch off the power supply for at least 5 seconds, then it will be possible to reset the burner again.

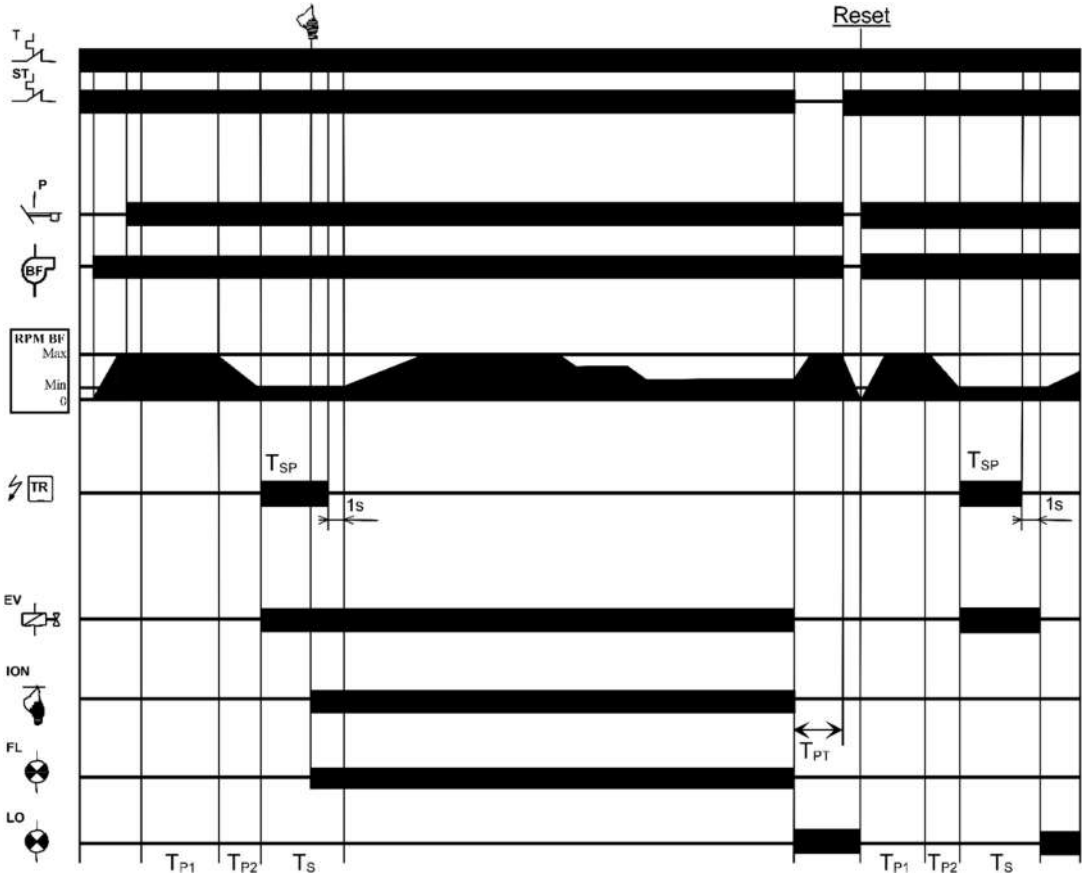
8.4 Operation status and burner cycle diagram

In this paragraph are shown in detail the working status of the burner, also illustrates by means of the cycle diagram. The operation status of the burner is indicated on parameter **U02** of inFo menu of the EU-CM300 interface.

U01 BURNER STATUS TABLE

Error Code	Reason	Elimination
00	Stand by	• The burner is in standby, there is no thermal request.
01	Check test	• Internal checks of the flame control card before start-up, there is a thermal request to the unit.
02	Startup fan	• Check of the burner fan revolutions and of the pressure switch status in still position before start-up of the fan burner, there is a thermal request to the unit, the air pressure switch is in still position, the safety thermostat is in working position, the speed of the burner fan is at 0, no flame signal.
03	Repurge Tp1 [Pre-ventilation time 1]	• Pre-ventilation cycle Tp1 lasting 45 seconds at the speed set in parameter **U12** in the **Par** menu, there is a thermal request to the unit, the air pressure switch is energised, the safety thermostat is in working position, the speed of the burner fan is in line with the set one, no flame signal.
13	Pre-purge Tp2 [Pre-ventilation time 2]	• Pre-ventilation cycle Tp2 lasting 15 seconds at the speed set in parameter **U14 in the** Par menu, there is a thermal request to the unit, the air pressure switch is energised, the safety thermostat is in working position, the speed of the burner fan is in line with the set one, no flame signal.
04	Ignition	• Start-up status corresponding to the safety time TS equal to 6 seconds, there is a thermal request to the unit, the air pressure switch is energised, the safety thermostat is in working position, the speed of the burner fan is in line with the set one.
05	Running	• Burner on, there is a thermal request to the unit, the air pressure switch is energised, the safety thermostat is in working position, the speed of the burner fan is in line with the set one, flame signal is present.
06	Stop	• Request of burner stop.
07	reset Unlockable	• Lockout status, the lockout cannot be reset.
08	reset Lockable	• Lockout status, the lockout can be reset.
10	Post-purge	• Post-ventilation status, the burner after each shutdown that may derive from a removal of a heat request or from a lockout status, performs the post-ventilation for a time of 300 seconds, the post-ventilation speed corresponds to the speed set in parameter **U12** in the **PAr** menu.

BURNER CYCLE DIAGRAM



LEGEND

Initial	Meaning
T	Temperature request, via ModBus (from EU-SP300 power board)
ST	Safety termostat
P	Air pressure switch
BF	Burner fan
RPM BF	Burner fan modulation point
TR	Ignition transformer
EV	Gas solenoid valve
ION	Ionization signal
FL	Flame signalling
LO	Block signalling
TP1	Pre-ventilation time 1 equal to 45 seconds
TP2	Pre-ventilation time 2 equal to 15 seconds
TS	Safety time equal to 6 seconds
TSP	Spark time equal to TS-1 seconds
TPT	Post-ventilation time equal to 300 seconds

9 WARRANTY TERMS

General terms

For the general warranty conditions, please refer to the "General Sales Terms", which is an integral part of the negotiation relationship. These conditions are understood to be fully known and acknowledged with the issue of the order by the Customer. Any other agreement or term is binding and valid only if confirmed in writing by EXELTEC.

EXELTEC guarantees the conformity of the products: by conformity of the products it is meant that they correspond in quality and type to what is established in the contract and in the technical data sheet in force; that means also that they are free from defects that may make them unsuitable for the use to which they are intended. The samples, the indications contained in the commercial leaflets or the information resulting from other advertising material are not binding and do not contain any restrictions in relation to the products.

EXELTEC assumes no responsibilities for any special uses not reasonably imaginable and not mentioned in phase of offer.

Specific terms

For each thermal unit, at the time of commissioning, a specific Commissioning Form (mod. M8.3-02) must be filled in as a test report according to UNI 10389-1.

The guarantee is valid only if a copy of this document is sent to EXELTEC within 7 working days of issue.

EXELTEC requires other 7 working days from the receipt of the document to approve its content; in case of discrepancies, EXELTEC will inform the technician in charge of commissioning about the steps necessary to restore the warranty conditions. In presence of conditions for exclusion listed below, all forms of guarantee will lapse.

The use of spare parts not approved by the manufacturer invalidates any form of warranty and releases EXELTEC from any liability for malfunctions or accidents.

The removal or modification of the safety protections relieves EXELTEC from any liability for damage caused to things and/or people.

EXELTEC will repair or replace all the products (or parts of them) whose defects are attributable to EXELTEC and confirmed by the technical service. The return of these products must be approved by EXELTEC beforehand; transport costs will be on EXELTEC charge.

In the event of defects due to extraordinary conditions of use, incorrect use and / or tampering, all warranties are void.

Exclusions

Not included in the warranty terms are all the interventions and supplies of parts for damage or malfunctions caused by:

- natural events and causes of force majeure;
- damage due to improper use not indicated by the technical and safety prescriptions contained in the product manual;
- failure to comply with the maintenance requirements;
- technical interventions not carried out by the Authorised Technical Service Network;
- assembly / supply of non-original spare parts and / or consumables that are not compatible with the technical specifications of the product;
- damage following installation, repair and / or maintenance interventions that differ from the specifications of the technical manual and / or attributable to inexperience / negligence of the Service centre;
- even slight tampering with the product or parts of it and / or changes in settings / calibrations, unless previously agreed and validated by EXELTEC;
- use of fuel other than the type for which the thermal unit has been set up and calibrated;
- supply of the thermal unit with gas pressures outside the allowed range specified in the technical manual;
- unauthorized modification of control parameters, access to which is restricted to qualified and authorized personnel only.

The guarantee does not cover parts subject to normal wear and tear or inevitable deterioration.

Technoparc Saône Vallée Est
215 Rue Marie Curie
01 390 CIVRIEUX EN DOMBES
Tel. 00 33 (0)4 78 82 01 01
Fax. 00 33 (0)4 78 82 01 02
Mail : info@exeltec.fr
www.exeltec.fr