

INSTALLATION AND OPERATING MANUAL

|Sonning²

OHA RHE Systems

WARNINGS

Nortek Global HVAC (UK) Limited equipment must be installed and maintained in accordance with the requirements of the Codes of Practice or rules in force. All external wiring **MUST** comply with the codes of practice or rules in force in the country of installation.

Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death.

Read instructions before installing or servicing this equipment. Gas-fired appliances are not designed for use in hazardous atmospheres containing flammable vapours or combustible dust, containing chlorinated or halogenated hydrocarbons, or in applications with airborne silicone substances.

Reznor® is a registered trademark of Nortek Global HVAC, LLC.

Any reference made to Laws, Standards, Directives, Codes of Practice or other recommendations governing the application and installation of heating appliances and which may be referred to in Brochures, Specifications, Quotations, and Installation, Operation and Maintenance manuals is done so for information and guidance purposes only and should only be considered valid at the time of the publication.

The Manufacturer cannot be held responsible from any matters arising from the revision to or introduction of new Laws, Standards, Directives, Codes of Practice or other recommendations.

IMPORTANT NOTICE TO INSTALLERS

Installers should satisfy themselves that the gas pipework installation is carried out in accordance with all current legislation, Codes of Practice and recommendations .

Additionally it may be necessary to protect the gas valves which form part of the heater or burner assembly from potential pipe contamination particularly, but not exclusively, where copper gas pipework is used.

In instances where copper pipework is to be used for all or part of a gas pipework installation, including short length final connections then we advise that installers consult with gas supplier or provider and satisfy themselves what additional precautions may be necessary.

Please read this manual carefully before turning the radiant strip on. With the aim of constantly improving its products, the manufacturer reserves the right to change the contents without prior notice.

CONTENTS PAGE

1. General standards	4
1.1 Packing list	4
1.2 Technical features of the combustion unit	4
1.2.1 Code table	4
1.2.2 Operation and technical features	5
1.3 Explosion of thermal unit	7
1.4 Dimensions of the radiant strip	8
1.5 Combustion head	8
1.6 Dimensions of the generator	8
2. Installation	9
2.1 Minimum distance between the OHA radiant strip and inflammable materials	9
2.2 Strip assembly sequence	10
2.3 Modular platform (exploded view)	10
2.3.1 Assembling the standard platform (without glass fixing bracket kit and panel support kit REI120)	11
2.3.1.1 Hole for platform with glass holder kit and REI120 panel support kit	13
2.3.2 Assembling the heating unit on the platform	13
2.4 Tilted bracket for roof unit	14
2.5 Connecting the combustion chamber extension	15
2.5.1 Connecting the combustion unit to the strip	15
2.6 Assembling the strips	16
2.6.1 Side connections	17
2.6.2 Connections between pipes	17
2.6.3 How to assemble the curves	18
2.6.4 Mounting the expansion joins	19
2.6.5 Side connection (90°)	20
2.6.6 Assembling the end closed cover	20
2.6.7 Assembling the "T" branch	21
2.6.8 Assembling the top insulation	21
2.6.9 Vertical connection for the radiant strip positioned on two different levels	22
2.6.10 Assembling the bottom grid (optional)	23
2.6.11 Assembling the top shell (optional)	23
2.6.12 Assembling the reflecting sides (optional)	24
2.7 Installing the radiant strip the additional reflecting side	24
3. Gas piping	25
4. Electric wiring	26
4.1 Wiring diagram for the combustion unit to the ground control board SLIM2 and SYS2	26
5. Testing and start-up	27
5.1 Preliminary procedures for automatic ignition	27
5.1.1 Ignition phases for the combustion unit	27
5.2 Air damper regulation	27
5.3 Gas pressure regulation	28
5.4 Setting the air-differential pressure switch	28
6. Maintenance	29
6.1 Changing the fuel	29
6.1.1 Transformation from Natural gas to LPG gas	29
6.1.2 Transformation from LPG gas to Natural gas	29
7. Operating faults	30
8. Warranty	32
8.1 Cover and validity	32
8.2 Claims under warranty	32
9. Setting aside	32

1. General standards

The instructions given herein must be carefully followed, especially with regards the safety standards. The manufacturer declines all responsibility for direct or indirect damage caused to people, animals and property by failure to observe the instructions given herein.

Please make sure all users familiarise themselves with the following information in this list, before beginning use of the appliance.

- This instruction manual is an integral and important part of the radiant strip and must be kept in a safe place nearby for prompt consultation.
- Please read the instructions and warnings given in this manual carefully, as they give you important information regarding safety, installation, use and maintenance.
- If you lose this manual, please contact the manufacturer for a new one.
- This unit has been designed for heating large work areas, like industrial sheds and workshops, warehouse, areas with extensive air exchange, loading bays outside sheds, sports facilities, gymnasiums. As it works with the heat radiation principle; it can be used for heating single areas or for heating the entire room.
- The unit cannot be used to heat industrial areas where the processes and materials used carry the risk of gas, vapour or dust formation which could cause fires or explosions.
- The unit must only be installed by professionally qualified persons, fully respecting current legislation in force. The manufacturer declines all liability for damage caused due to faulty installation or improper and incorrect use of the radiant strip.
- The gas and electrical distribution must be made in accordance with national and local regulations in force in the country where the appliance is installed.
- The unit must be commissioned by a qualified engineer.
- If the radiant strip stops or does not work properly, turn it off immediately. Any parts must be repaired or replaced by a qualified engineer, using only original spare parts. Failure to do so could make the unit unsafe to use.
- To get the best performance from the radiant strip, the manufacturer's instructions must be followed in full and a full maintenance check must be performed at least once a year by a qualified engineer.
- The packing material (nylon, polystyrene, wood, staples, etc.) must not be left lying around within the reach of children, as they are potentially dangerous and also polluting, they must be collected and disposed of in accordance with current legislation.
- If the unit changes hands, or a new tenant enters the premises, all the documentation relative to the radiant strip must be handed over to the new owner.

1.1 Packing list

- Combustion chamber complete with terminal and electric board are delivered packed on a pallet, wrapped with shrink-wrap.
- Radiant strip is delivered loose, the pipe is supplied in sections of 6 meters long and packed; the insulation is in nylon bags, all the accessories (bends, brackets, sides, etc.) are packed on pallets and wrapped in shrink-wrap.

1.2 Technical features of the combustion unit

1.2.1 Code table

- Model, unit and thermal capacity
- Type of fuel
- Version
- Air lock type
- Combustion chamber type

Example: **OH20180 MT IT M S**

Thermal unit model OHA 200 (OH20), thermal capacity **180 kW** (180), feed **Natural Gas**. (MT), **standard** version (IT), **manual** air lock (M), standard combustion chamber (S)

N.B. No spaces must be left in the codes: **OH20180MTITMS**

OH10050	OHA 100-50kW
OH10100	OHA 100-100kW
OH20115	OHA 200-115kW
OH20150	OHA 200-150kW
OH20180	OHA 200-180kW
OH40200	OHA 400-200kW
OH40250	OHA 400-250kW
OH40300	OHA 400-300kW
OH11510	OHA RHE 100-115 kW
OH15010	OHA RHE 100-150 kW
OH20010	OHA RHE 100-200 kW
OH25020	OHA RHE 200-250 kW
OH30020	OHA RHE 200-300 kW
OH40020	OHA RHE 200-400 kW

OH10050	Standard combustion chamber
OH10100	Combustion chamber with 46° curve
OH20115	Combustion chamber with 90° curve
MT	Natural gas
PB	GPL
GS	Diesel oil
M	Manual air lock
A	Automatic
IT	Standard version
MD	Modulating (only OHA 400)
N4	OHA 400-300 with hose Ø 400
PL	Long plenum
IN	With inverter
PI	With inverter & Long plenum

Table 1 – OHA combustion unit code

1.2.2 Operation and technical features

OHA radiant strips are composed of a suspended combustion chamber on the outside and a radiant strip installed inside the room to be heated.

The combustion chamber generates heat through a gas burner, and the vector fluid is constantly recycled by a fan inside the airtight radiant strip which is depressed with respect to the heated area.

The variable temperature heat vector fluid is recycled fuel gas, which heats up the stainless steel combustion chamber and mixes with the new fuel gas produced by the burner; both these phases take place on the outside.

A special pressurised manifold, mounted on the outside, eliminates a part of the burnt mixture through the flue pipe, equivalent in mass to the amount of fuel supporter air and gas that enter the burner.

The machine works according to the fume temperature, modulating and following up the temperature that can be set between 150 and 180°C in order to guarantee always the maximum efficiency to the radiant strips.

We recommend installing a limit thermostat to allow setting the max. surface temperature of the pipes at levels based on the height the radiant strip is installed and the type of processes and materials contained in the premises.

An electric command and control system operates with detection probes to guarantee correct operations of the heat generation processes in the combustion chamber, of heat exchange and airtightness of the radiant strip inside the room, depression in the entire radiant unit and the discharge of the burnt gases through the exhaust pipe.

The comfortable level inside the premises depends on both the air temperature and the average radiated temperature and is set by the globe thermostat probes inside the room, which, through the electric command and control board, trigger on the operations of each single burner, changing the heat delivery (Modulation adjustment) and controlling ignition and they turn off on the basis of the outside temperature and/or the working hours.

Model RHE standard range rated				OHA RHE 100-115	OHA RHE 100-150	OHA RHE 100-200 Range rated	OHA RHE 200-250	OHA RHE 200-300	OHA RHE 200-400 Range rated
Thermal capacity		Max	kW (Hi)	115	150	200	250	300	370
		Min	kW (Lo)	100	100	100	200	200	200 (N.G.) 215 (L.G.P)
Thermal power	Natural gas G20	Max	kW (Hi)	105.2	136.8	183	227.5	272.7	336.7
		Min	kW (Lo)	91.5	91.2	91.5	182	181.8	182
	LPG Propane	Max	kW (Hi)	105.6	137.6	183.2	229.8	275.7	340.4
		Min	kW (Lo)	91.8	91.7	91.6	183.8	183.8	197.8
Combustion efficiency average	Natural gas G20	Max	%	91.5	91.2	91.5	91	90.9	91
		Min	%	91.5	91.2	91.5	91	90.9	91
	LPG Propane	Max	%	91.8	91.7	91.6	91.9	91.9	92
		Min	%	91.8	91.7	91.6	91.9	91.9	92
Rated consumption at 15°C and 1013 25mbar	Natural gas G20	Max	nm³/h	12.17	15.87	21.16	26.46	31.75	39.15
		Min	nm³/h	10.6	10.6	10.6	21.16	21.16	21.16
	LPG Propane	Max	kg/h	4.71	4.71	8.18	10.23	12.27	15.14
		Min	kg/h	4.9	4.9	4.09	8.18	8.18	8.79
Electric power supply				3/N/PE ~ 50/60Hz 400V					
Max Electric power supply			W	1300	1600	3000	3200	3500	4300
Average working electrical power			W	800	1100	2500	2700	3000	3800
Gas attachment (male)			Inches	1 "			1½ "		
Poids			kg	230			240		
Flue gas exhaust pipe diameter			mm	200					
Max length flue gas exhaust pipe			m	6					
Appliance type				B22					

The range rated model allows the calibration of the maximum power of the burner according to the effective thermal load requested by the radiant circuit.

Table 2 – Features of the OHA RHE combustion unit

Model RHE standard range rated			OHA RHE 100-115	OHA RHE 100-150	OHA RHE 100-200 Range rated	OHA RHE 200-250	OHA RHE 200-300	OHA RHE 200-400 Range rated
Radiant strips mod. M1 pipes Ø 300mm	min	m	60			160		-
	max	m	130	140	190	220	250	-
Radiant strips mod. U2 pipes Ø 300mm	min	m	35			90		
	max	m	75	90	115	130	150	160
Radiant strips mod. U2 pipes Ø 400mm (only with turbulators as per our project)	min	m	-	-	-	-	-	90
	max	m	-	-	-	-	-	160

Virtual length = Effective length of the radiant strip, increased by the equivalent lengths of direction change of 6 meters for each variation at 90° and 9 meters for the final curve of 180° and T-branch off.

Table 3 – Maximum circuit lengths according to the combustion unit

Model RHE standard range rated	Part No.	OHA RHE 100-115	OHA RHE 100-150	OHA RHE 100-200 Range rated	OHA RHE 200-250	OHA RHE 200-300	OHA RHE 200-400 Range rated
Control equipment	00CEAP0776				Yes		
Inverter ESV 552	05CEIN2610		Yes			No	
Inverter ESV 752	05CEIN2611		No			Yes	
Adjustable air pressure switch 50÷500 Pa	00CEPR1110				Yes		
Motor 3 kW - 2820 rpm + fan wheel Ø 330 x H 100	05ASMO0101		Yes			No	
Motor 5,5 kW - 2900 rpm + fan wheel Ø 330 x H 140	05ASMO0103		No			Yes	
Solenoid valve 1"	05CEGV2507		Yes			No	
Solenoid valve 1½"	05CEGV2508		No			Yes	
Air/gas control Dungs FRNG 510	05CNRE2713				Yes		

Table 4 – Main components in the generator

Exchange board		Solenoid valve 1"	
Part No.	00CEAP0776	Part No.	05CEGV2507
Electric power supply	220/240V 50Hz	Electric power supply	230V 50/60Hz
Working temperature	-20°C ÷ + 60°C	Protection level	IP40
Pre-washing time	20 Sec	Gas attachment	1"
Start up safety delay time	max 10 sec	Operating temperature	-10°C ÷ +60°C
Turn off safety delay time < 1 sec	< 1 Sec	Solenoid valve 1½"	
Pressure switch		Part No.	05CEGV2508
Part No.	00CEPR1110	Electric power supply	230V 50/60Hz
Assembly position	vertical	Protection level	IP40
Reset point	50÷500 Pa (± 4 pa)	Gas attachment	1½"
Pneumatic connection	Ø 6.2 Mm	Operating temperature	-10°C ÷ +60°C
Max. Working pressure	5000 Pa	Inverter ESV 552 N04TFC	
Working temperature	-30°C ÷ +60°C	Part No.	05CEIN2610
Asynchronous three-phase electric motor 3 kw		Electric power supply	400V 50/60Hz
Part No.	05CEMO0766	Protection level	IP65
Electric power supply	400V 50/60Hz	Electric power	5.5kW
Electric output	3 kw	Operating temperature	-10°C ÷ +60°C
Absorbed electric power	6.1 A	Inverter ESV 752 N04TFC	
Motor rpm	2820 rpm	Part No.	05CEIN2611
Asynchronous three-phase electric motor 5.5Kw		Electric power supply	400V 50/60Hz
Part No.	05CEMO0763	Protection level	IP65
Electric power supply	220-380V 50/60Hz	Electric power	7.5kW
Electric output	5.5 kW	Operating temperature	-10°C ÷ +60°C
Electric output	5.5 Kw	Air/gas regulator dungs FRNG 510	
Absorbed electric power	10.6 A	Part No.	05CNRE2713
Motor rpm	2900 rpm	Gas attachment	1"
		Operating temperature	-16°C ÷ +70°C

(**) The range rated model allows the calibration of the maximum power of the burner according to the effective thermal load requested by the radiant circuit.

Table 5 – Main components in the generator

1.3 Explosion of thermal unit

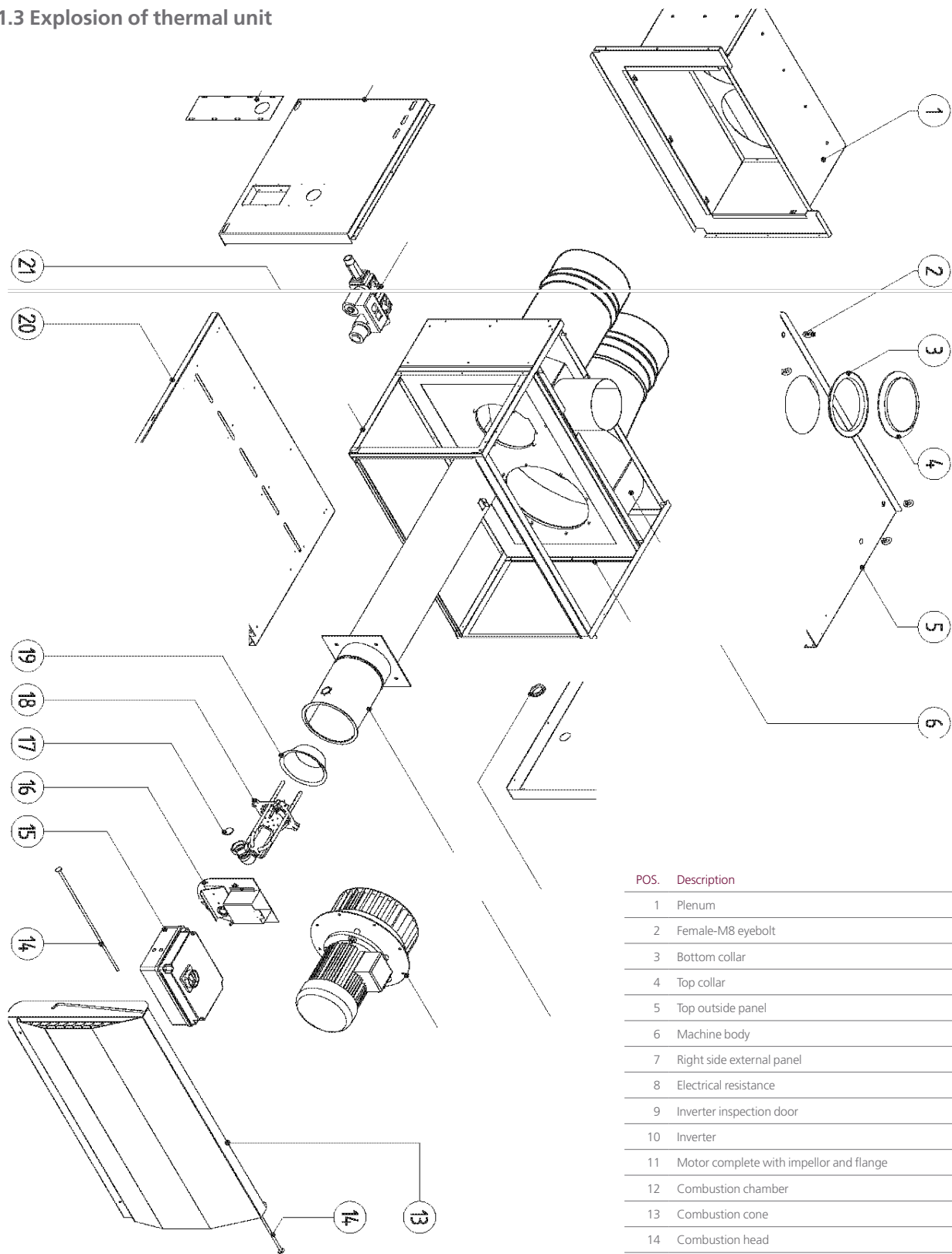


Figure 1. Explosion OHA

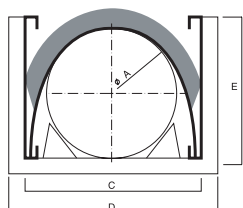
POS.	Description	Quantity
1	Plenum	1
2	Female-M8 eyebolt	4
3	Bottom collar	1
4	Top collar	1
5	Top outside panel	1
6	Machine body	1
7	Right side external panel	1
8	Electrical resistance	1
9	Inverter inspection door	1
10	Inverter	1
11	Motor complete with impellor and flange	1
12	Combustion chamber	1
13	Combustion cone	1
14	Combustion head	1
15	Air lock	1
16	On-board electric control panel with door lock selection switch	1
17	Threaded bar for door	2
18	Door panel	1
19	Pressure regulator	1
20	Solenoid valve assembly	1
21	Gas diaphragm	1
22	Bottom external panel	1
23	Panel supporting frame	1
24	Gas pipe disk	1
25	Left side external panel	1
26	Sealing frame	1

Table 6 – Exploded view parts

1.4 Dimensions of the radiant strip

Level	Dimension		
	1 pipe	2 pipe	2 pipe
A	Ø 300	Ø 300	Ø 400
B	-	335	460
C	512	850	1020
D	580	918	1088
E	374	374	478
Weight (kg/m)	19	28	35
Weight upper plate (kg/m)	2.5	4.0	4.8
Weight protection grid (kg/m)	1.2	2.0	2.3

Table 7 – Overall dimensions of the strip



Example: Weight of mod. U 300 radiant strip with upper plate and lower protection net.

Total weight for meter = 28+4+2=34 kg/m

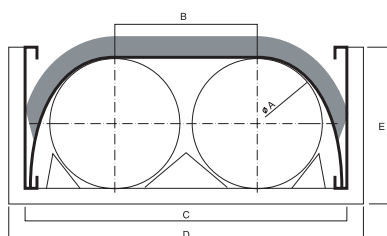


Figure 2. Radiant strip

1.5 Combustion head

OHA RHE 100-115, 100-150, 100-200			
	U.M.	Metano G20	GPL G31
Cone diameter	mm	120	
Combustion chamber diameter	mm	204	
Combustion chamber extended diameter	mm	204	
Combustion head code		05CNT02505	05CNT02506
Number of additional injectors	N.	2	Without injectors
Combustion chamber depression	mbar	5	5
Gas diaphragm diameter	mm	15	7.5
Pressure at the nozzle	mbar	14	30

Table 8 – Combustion head 1

OHA RHE 200-250, 200-300, 200-400			
	U.M.	Metano G20	GPL G31
Cone diameter	mm	Without cone	120
Combustion chamber diameter	mm	204	
Combustion chamber extended diameter	mm	204	
Combustion head code		05CNT02508	05CNT02505
Number of additional injectors	N.	4	2
Combustion chamber depression	mbar	5	5
Gas diaphragm diameter	mm	Without injectors	15
Pressure at the nozzle	mbar	7.7	20

Table 9 – Combustion head 2

1.6 Dimensions of the generator

Height	Dimension (mm)	
	Unit with pipe Ø 300mm	Unit with pipe Ø 400mm
A	1075	
B	359	
C	200	
D	664	
E	333	430
F	774	923
G	157	67
H	134	70
I	398	319
J	333	430
M	333	302
N	1292	
O	740	
P	493	
Q	142	
R	637	
S	426	475
T	162	113
U	300	400
V	344	352
X	1049	
Y	1202	

Table 10 – Generator dimensions

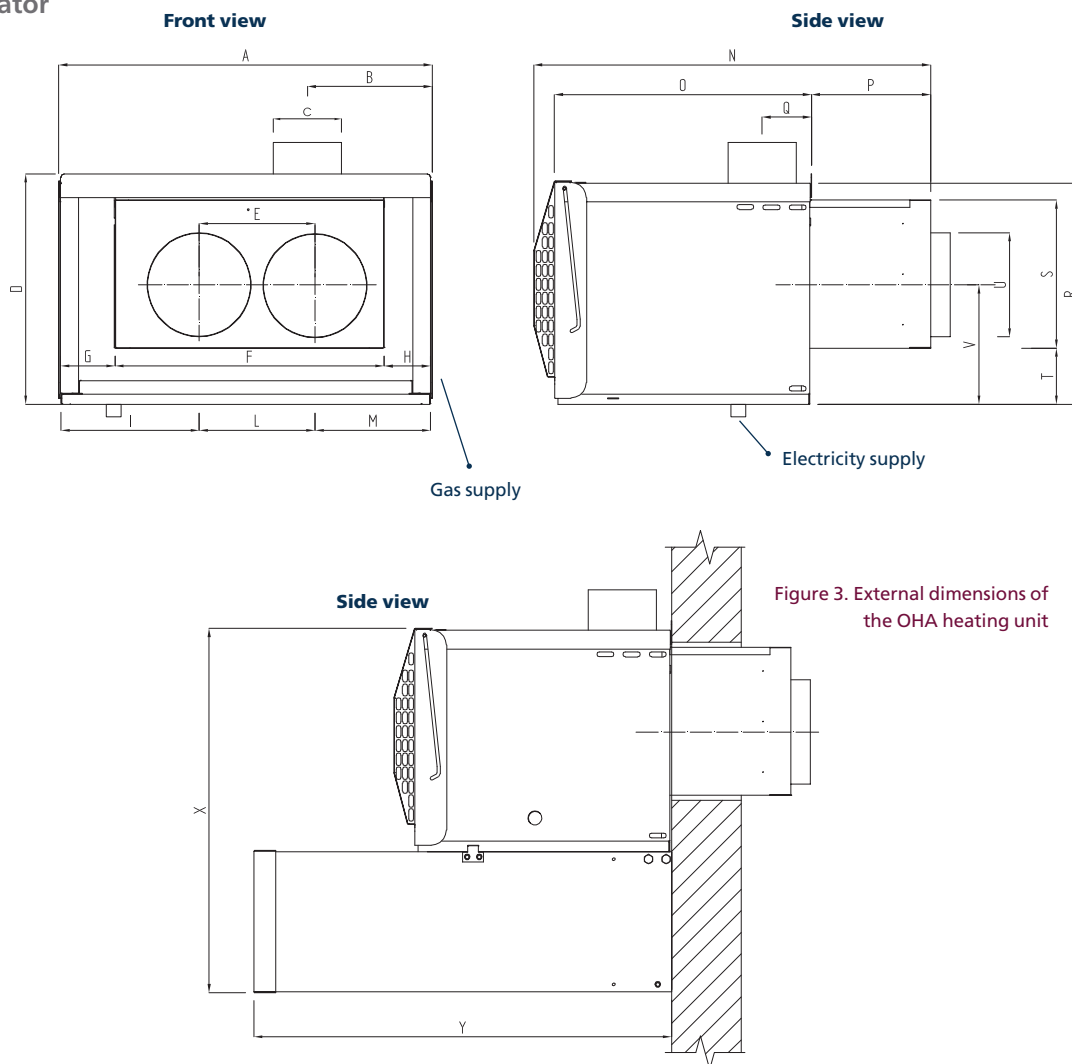


Figure 3. External dimensions of the OHA heating unit

2. Installation

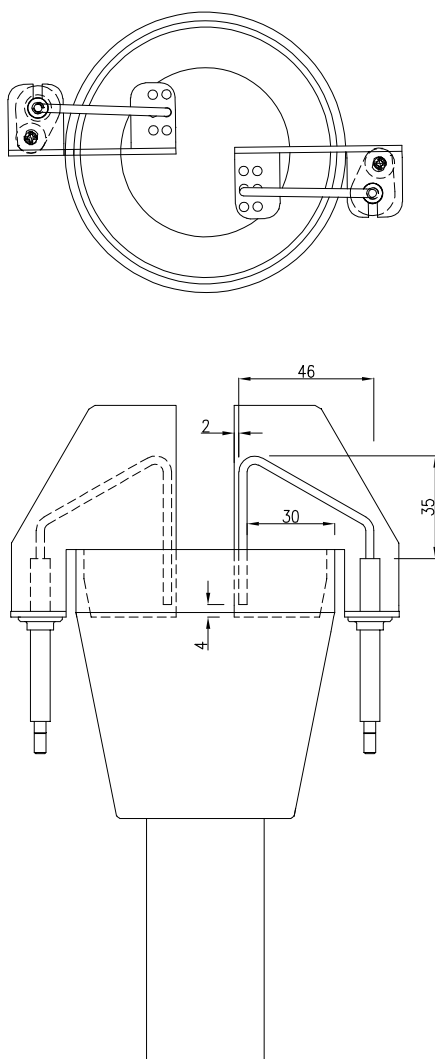


Figure 4. Combustion head with electrode positions

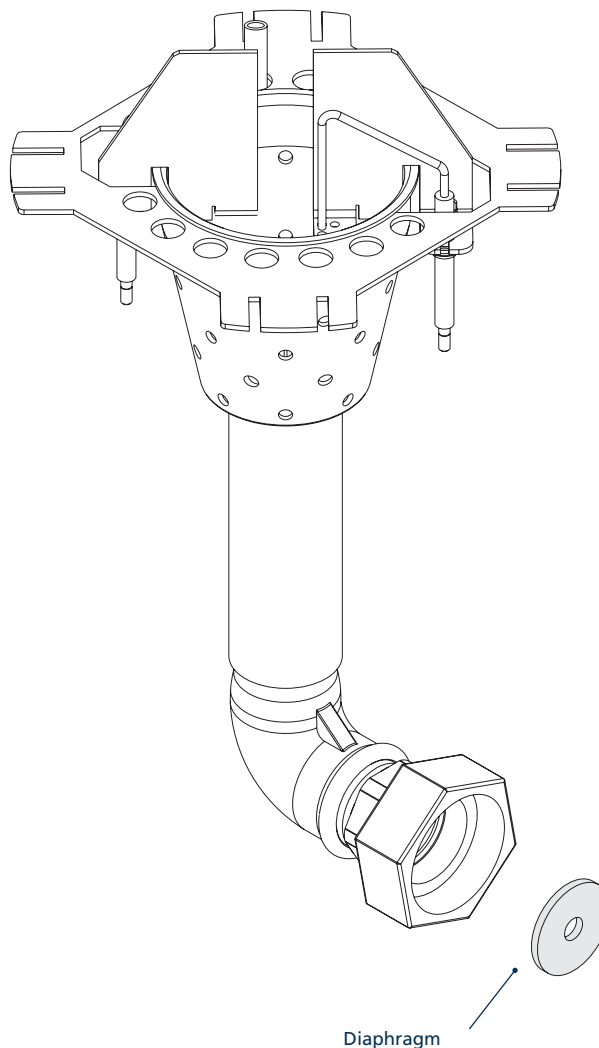


Figure 5. Diaphragm position

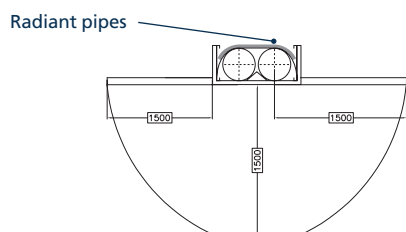


Figure 6. Minimum distances between the OHA radiant strip and inflammable materials

2.1 Minimum distance between the OHA radiant strip and inflammable materials

The distance between the external surfaces of the radiating pipes and any inflammable materials must be sufficient to avoid such materials reaching dangerous temperatures, to avoid fires developing or combustion reactions. In all circumstances it must be at least 1.5 meters.

Remember that the max. surface temperature of the radiating pipes can be set and controlled at any level between 150-300°C.

In particular cases when the radiant strips are installed nearby other equipments/machineries (for example motors of bridge cranes, electrical cables, lamps, cabins) it is necessary to apply suitable shielding to all the materials which are subjected to the radiant heating of the strips (see Figure 7).

Furthermore the radiant tubes have to be installed in order to guarantee that the vertical and horizontal structures to which the strips are leaned against do not exceed a temperature of 50°C. In case of need, provide for suitable protection shielding.

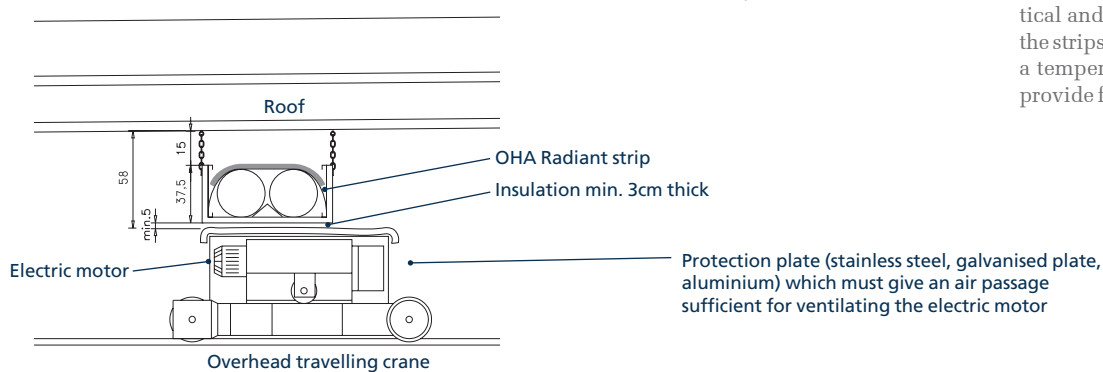
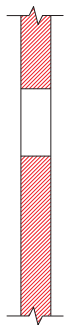


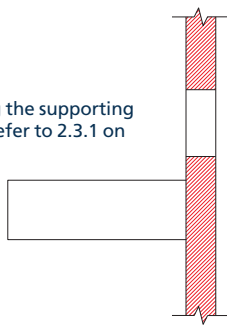
Figure 7. Protection for the overhead travelling crane

2.2 Strip assembly sequence

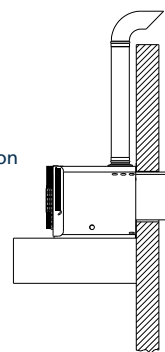
1. Drill the holes in the wall (refer to "Phase five" on page 12)



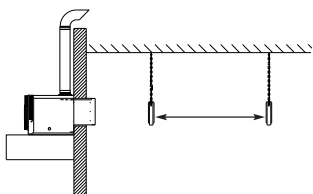
2. Installing the supporting platform (refer to 2.3.1 on page 11)



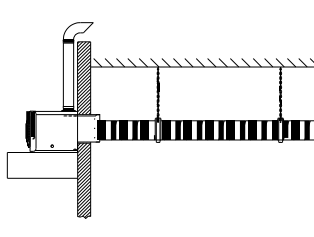
3. Fitting the combustion chamber (refer to 2.3.1.1 on page 13)



4. Fitting the brackets (refer to 2.5 on page 15)



5. Installing the pipes (refer to 2.5 on page 15)



6. Fitting the sides and top insulation (refer to 2.5)
7. Connections to the gas supply pipes (refer to section 3)
8. Electric connections (refer to section 4).
9. Testing and start up (refer to section 5)

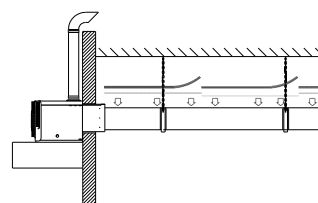


Figure 8. Strip assembly (this sequence is classed as one Figure)

2.3 Modular platform (exploded view)

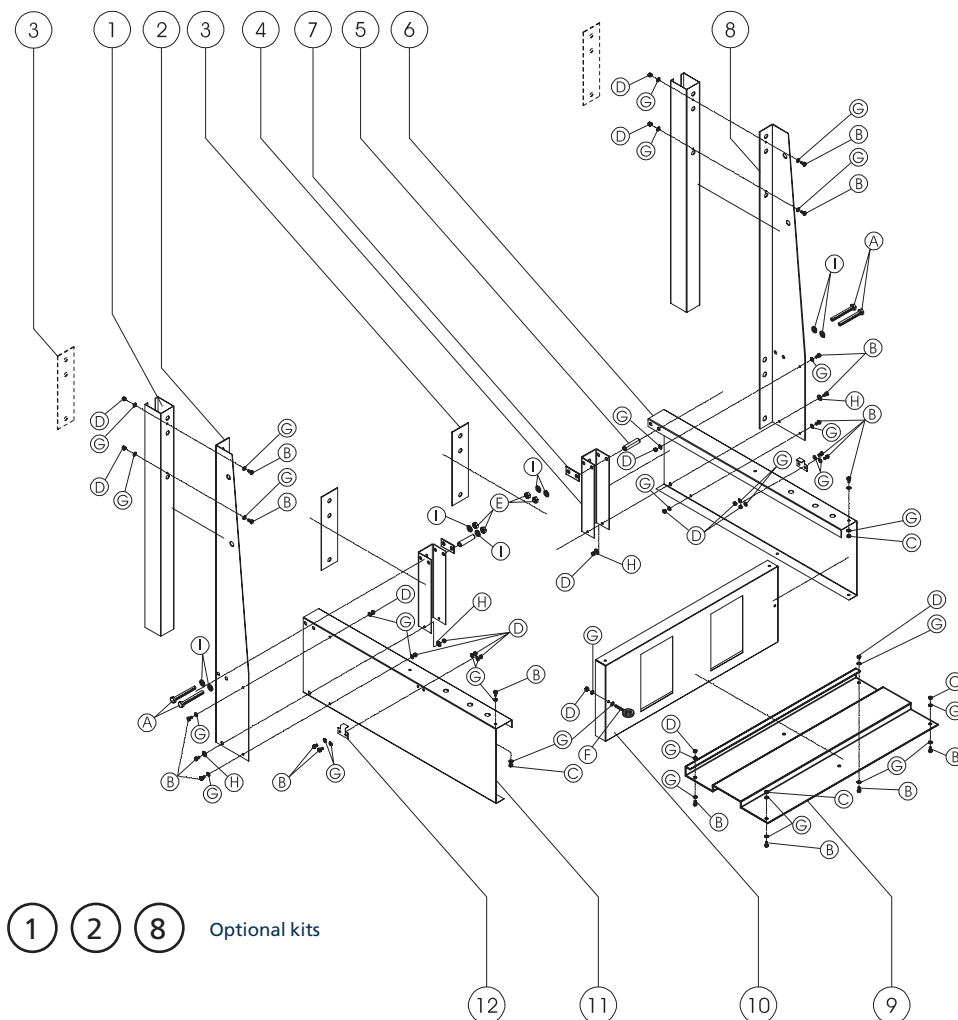
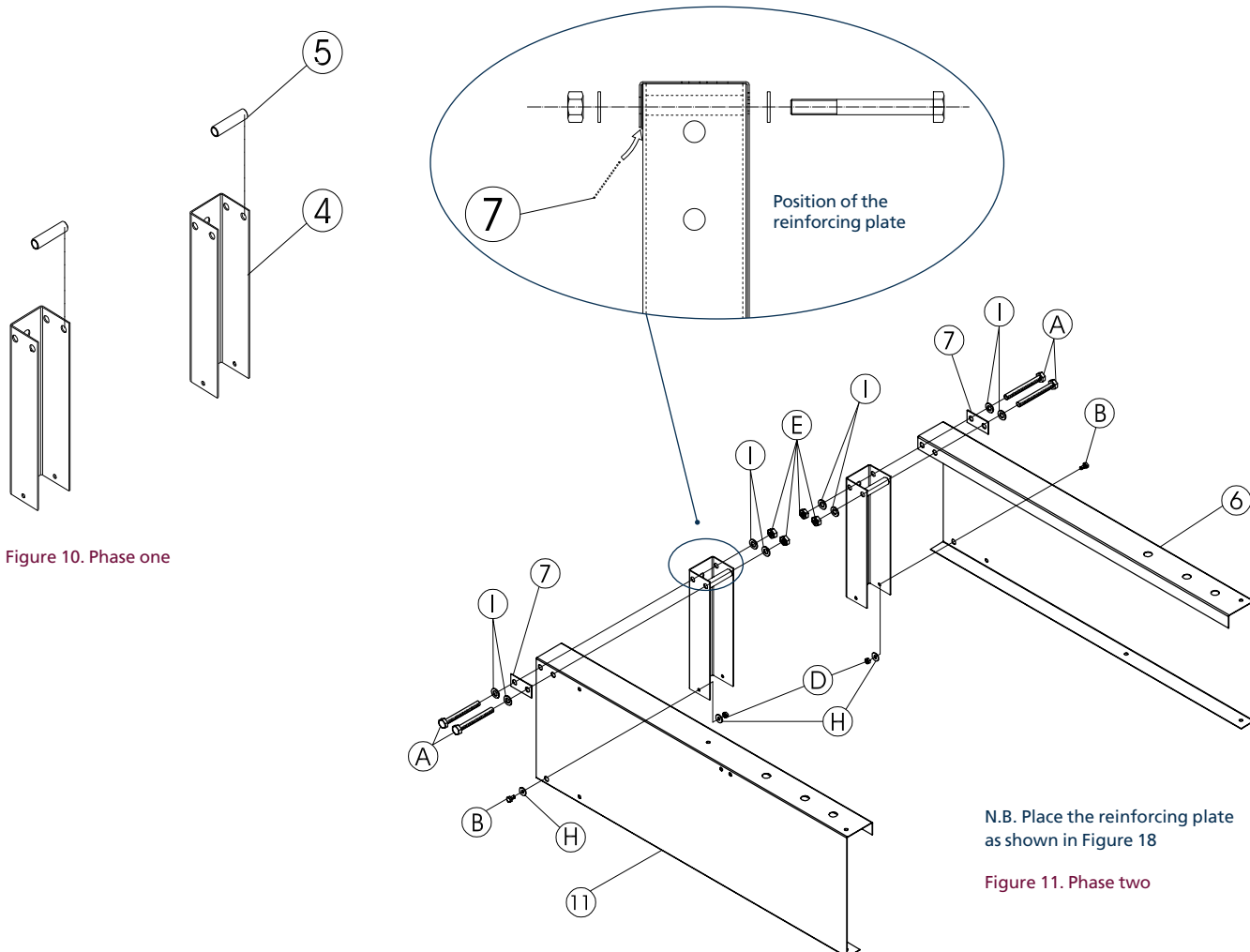


Figure 9. Platform composition

Pos	Part No.	Description	Platform kit cod.05ACKT0500 [Q.ty]	Optional	
				Angular glass fixing bracket kit cod. 05ACKT0502 [Q.ty]	Panel support kit REI120 cod. 05ACKT0501[Q.ty]
1	05CVPA8000	Panel support spacer REI120	-	-	2
2	05CVPA8002	Left hand angular support bracket for glass fixing	-	1	-
3	05CVPA8009	Internal plate for platform attachment	2	-	-
4	05CVPA8001	Head reinforcement	2	-	-
5	05CVDI8008	Painted reinforcing spacer	2	-	-
6	05CVPA8010	Right side of platform OHA	1	-	-
7	05CVPA8004	Reinforcing plate	2	-	-
8	05CVPA8011	Right hand angular support bracket for glass fixing (optional)	-	1	-
9	05CVPA8006	Platform bottom	1	-	-
10	05CVPA8005	Platform front	1	-	-
11	05CVPA8003	Left side of platform	1	-	-
12	05CNPA8007	Side block for the combustion unit	2	-	-
A	00CNVI1070	TE screws M14x130 UNI 5737 DIN931	4	-	-
B	00CNVI1050	TE screws M8x16 UNI 5739 DIN933	12	4	4
C	03CND3022	M8 self-locking nut	4	-	-
D	00CND30148	Nut M8 UNI 5739 DIN 933	9	4	4
E	00CND30900	M14 self-locking nut	4	-	-
F	05CNGO0002	M8 male eyebolt UNI 2947	1	-	-
G	00CNRO0368	Galvanised washer 8x17 UNI 6592 DIN 125A	22	8	8
H	00CNRO1086	Galvanised washer 8x24 UNI 6592 DIN 125A	4	-	-
I	00CNRO1087	Galvanised washer 15x28 UNI 6592 DIN 125A	8	-	-

Table 11 – Modular platform composition

2.3.1 Assembling the standard platform (without glass fixing bracket kit and panel support kit REI120)



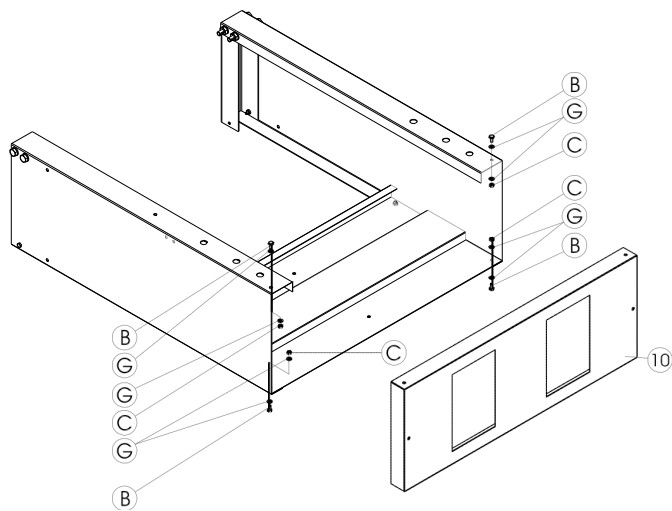


Figure 12. Phase three

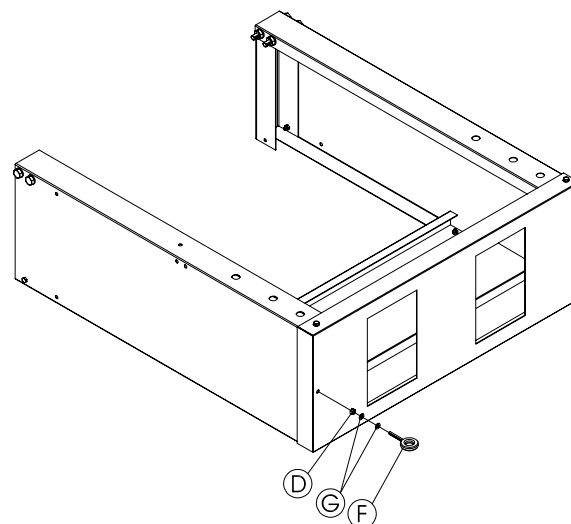
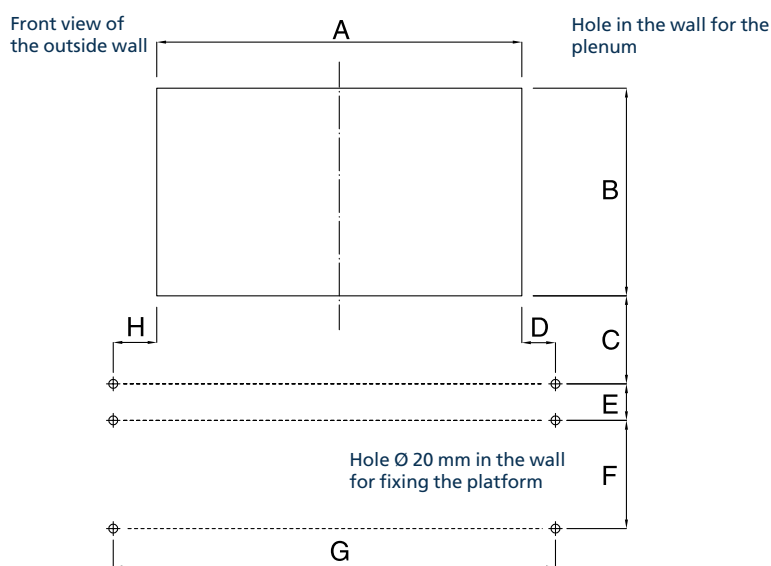


Figure 13. Phase four



Level	Dimension (mm)	Dimensions for pipe 400Ø (mm)
A	800	955
B	455	505
C	193	143
D	95	4
E	80	80
F	237	237
G	969	969
H	74	10

Table 12 – Drilling the wall

Figure 14. Phase five

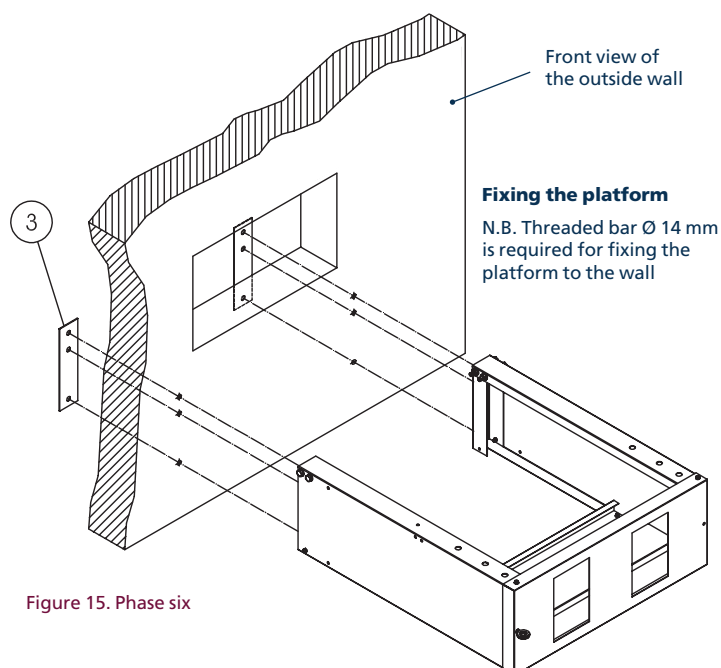


Figure 15. Phase six

Fixing the platform with the glass fixing kit, see Figure 20 for the template

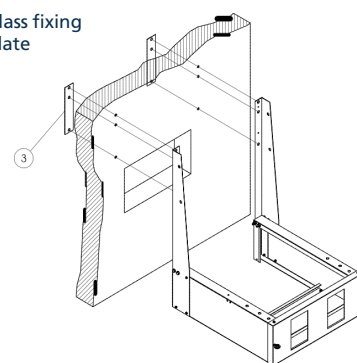


Figure 16.
Version with pipe Ø 300 mm

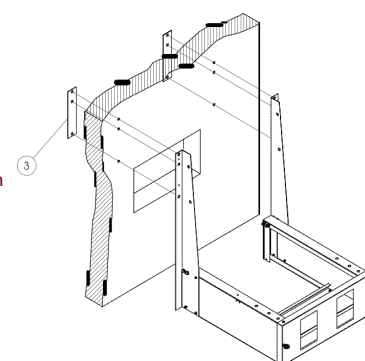


Figure 17.
Version with pipe Ø 400 mm

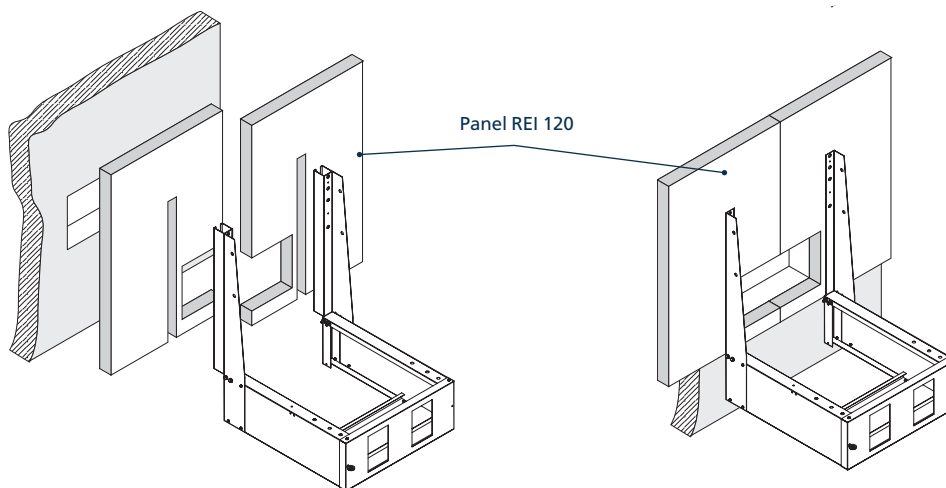


Figure 18. Platform assembly with REI120 glass kit

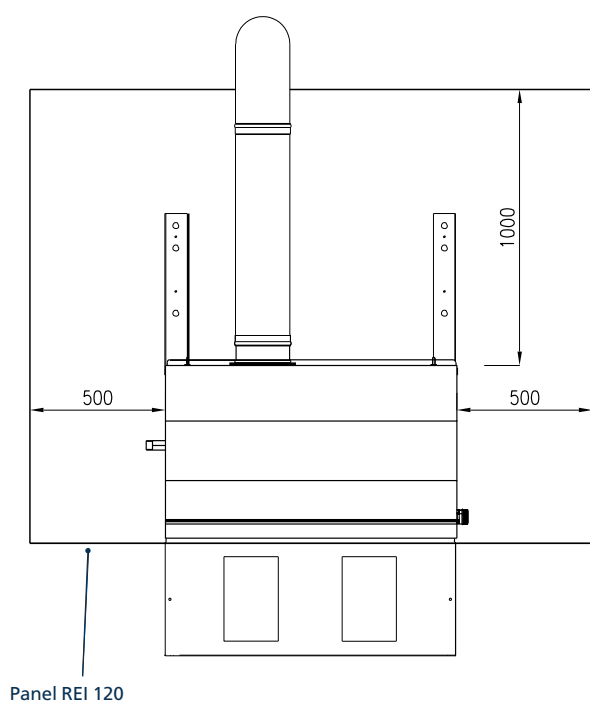


Figure 19. Front view of unit OHA with panel REI 120 dimensions

2.3.1.1 Hole for platform with glass holder kit and REI120 panel support kit

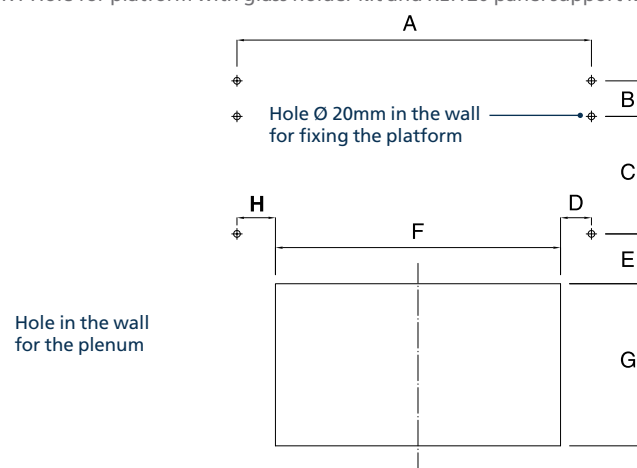


Figure 20. Front view of outside wall

Level	OHA 100, 200, 400 (mm)	Dimensions for pipe Ø pipe (mm)
A	990	1148
B		80
C		237
D	106	94
E		232
F	800	955
G	455	505
H	84	99

Table 13 – Hole for platform

2.3.2 Assembling the heating unit on the platform

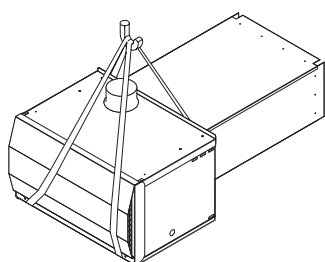


Figure 21. How to lift the combustion chamber (without using the eyebolts)

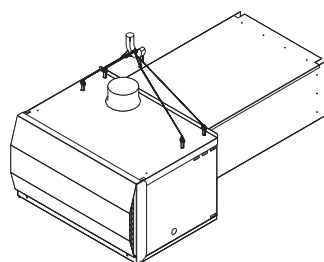


Figure 22. Lifting the combustion chamber (using the eyebolts).

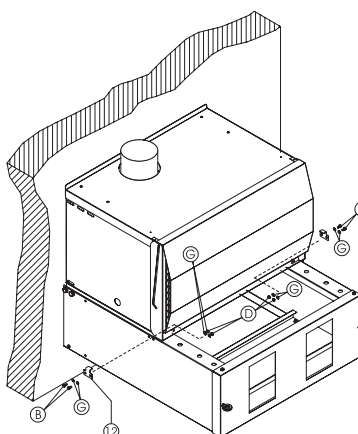


Figure 23. Positioning the heating unit and fixing the side blocks

The combustion chamber can be installed inside if the combustion supporter air is drawn from the outside through a pipe.

When performing any maintenance work, ensure the person is safely harnessed and hooked to a solid attachment.

2.4 Tilted bracket for roof unit

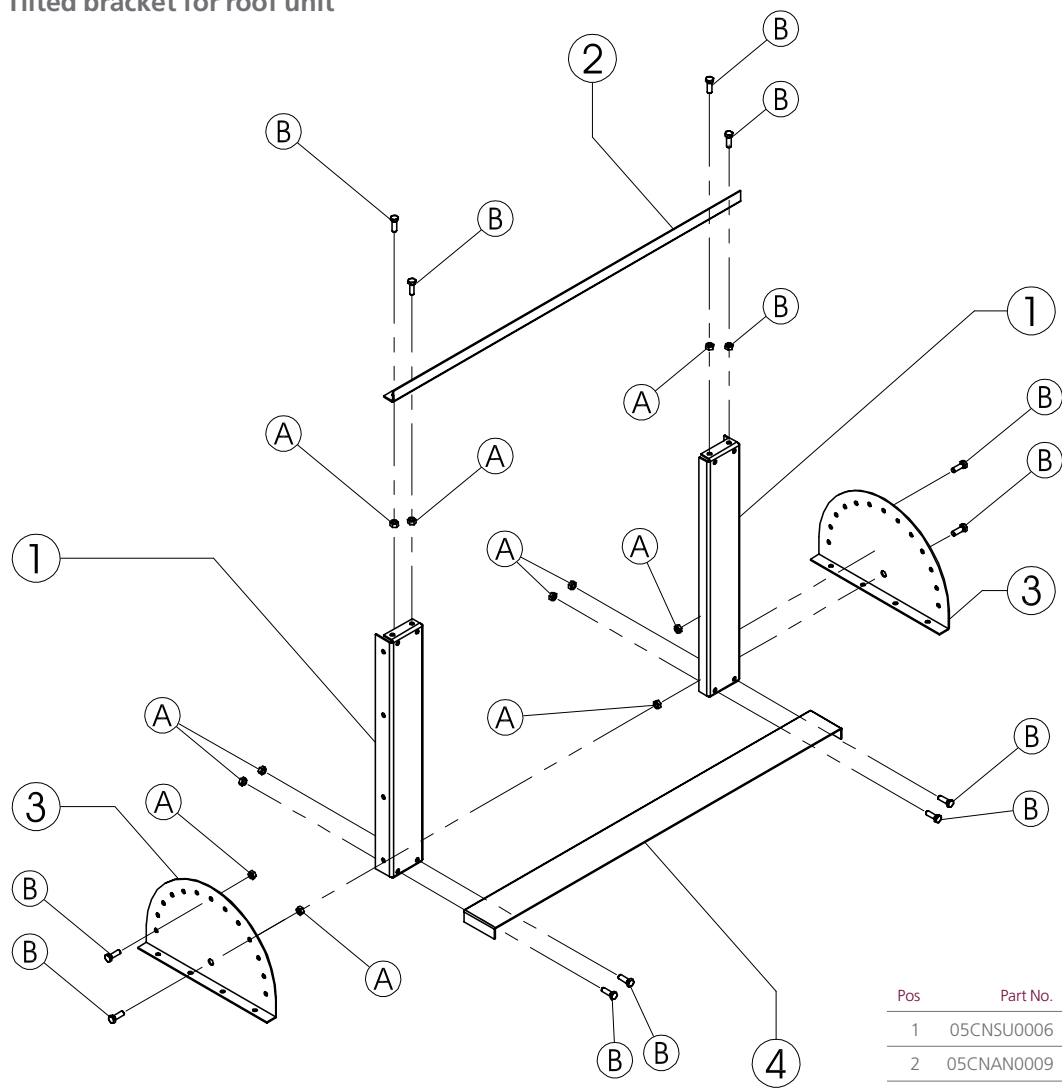


Figure 24. Tilted roof bracket

Pos	Part No.	Description	Quantity
1	05CNSU0006	Right/left support	2
2	05CNAN0009	Angle iron	1
3	05CNPA0001	Graduated right/left part	2
4	05CNTR0008	Bottom crosspiece	1
A	00CNDAA0154	Nut M10	12
B	00CNVI1060	Screw TE M10x30	12

Table 14 – Tilted roof bracket

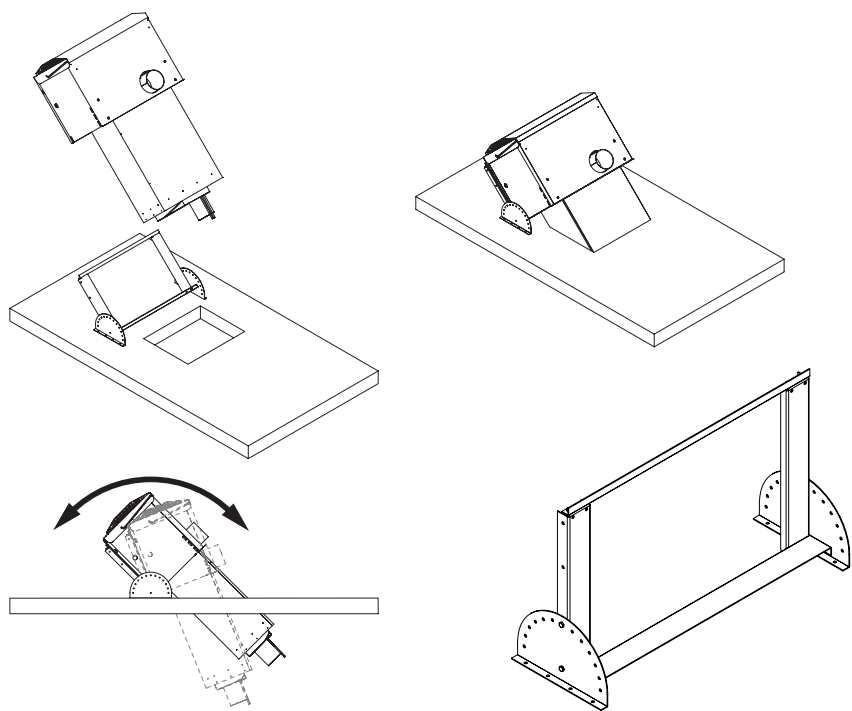


Figure 25. Positioning of the thermal unit on a an adjustable ceiling platform

2.5 Connecting the combustion chamber extension

Before positioning the OHA combustion unit, connect the combustion chamber extension using the supplied screws as shown in Figure 26.

The extension lengths are given in Table 15

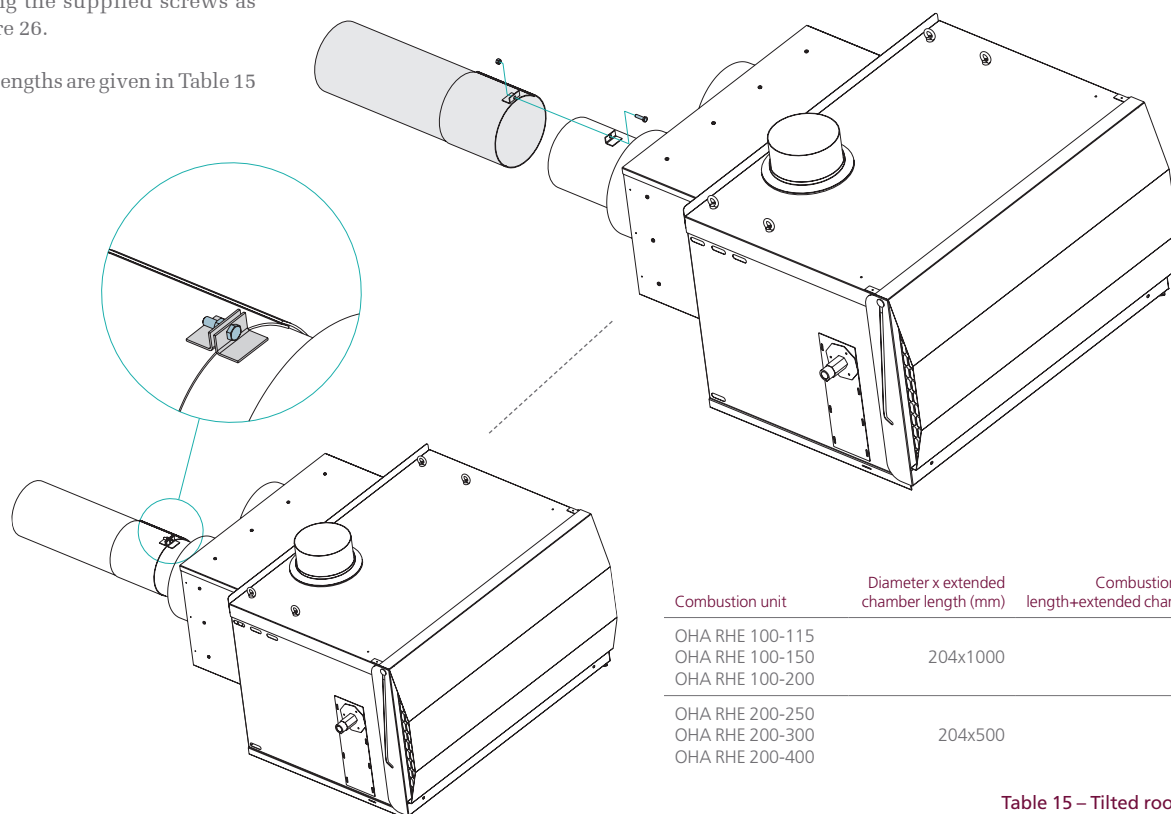


Table 15 – Tilted roof bracket

Figure 26. Combustion chamber extension

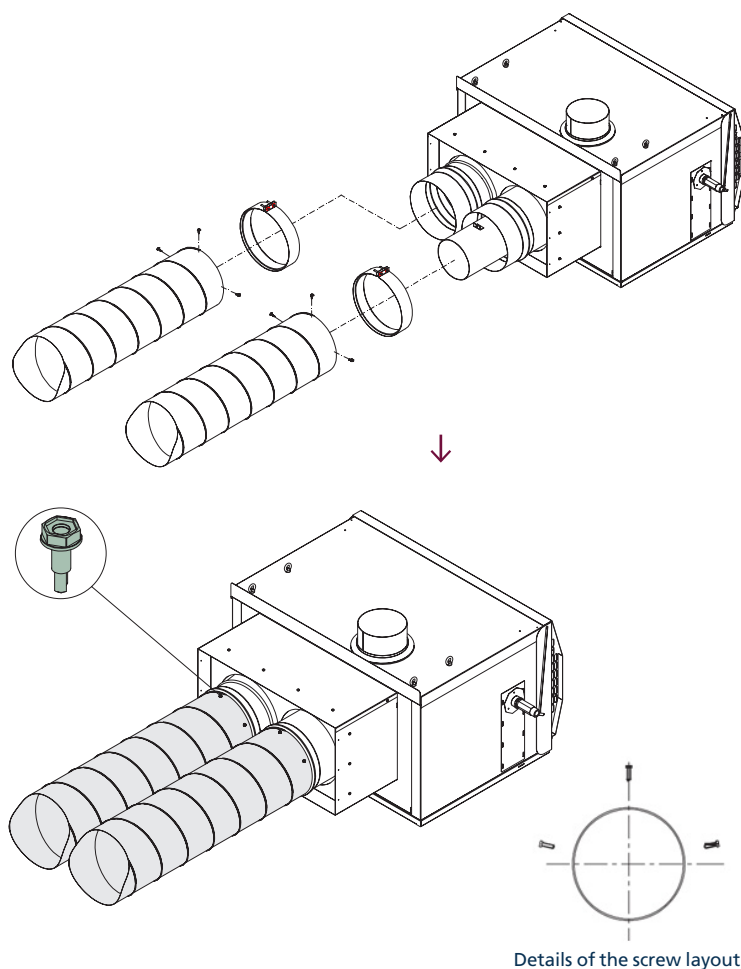


Figure 27. Combustion unit to strip

2.5.1 Connecting the combustion unit to the strip

To connect the combustion unit to the radiant circuit, there are 2 nipples;

- The nipples are already screwed to the combustion unit (Figure 26).
- Introduce the nipples to the outlet pipe, taking care that the conical part adheres well all around the pipe, fix them in place with the 3 self-tapping screws to the sides and top as shown in Figure 27.
- Fit the clamp and tighten the screw and nut; the clamp must be placed to cover the join and the fixing screws.
- Once the clamp is firmly fixed, the unit should appear as shown in the figure, with the fixing screws pointing upwards, as shown in Figure 35.6.

Chain characteristics:

- Dimensions 3.9x21.0x7.3 mm
- A minimum working load of 100 kg must be guaranteed (with distance between the brackets at 3m)

2.6 Assembling the strips

The strips are subject to movement due to expansion, therefore the chains must be long enough to allow for this.

1. Fit the bracket guide in the support bracket housing.
2. Fix the turnbuckle & speedlink to the support bracket using nut & bolt as shown in the enclosed figure, (refer to detailed Figure 28).
3. For the chain capacity, refer to the strip weights that are given in Table 7 on page 8 and the notes in Figure 28.
4. To hook to the building structure, the fixing must be chosen on the basis of the roof and the minimum capacity (for the dimensions, refer to Table 7 on page 8).
5. Place the radiant pipes on the bracket.
6. Fit the side layer between the pipes and the bracket, repeat on the other side.
7. Fix the sides in place with their supports

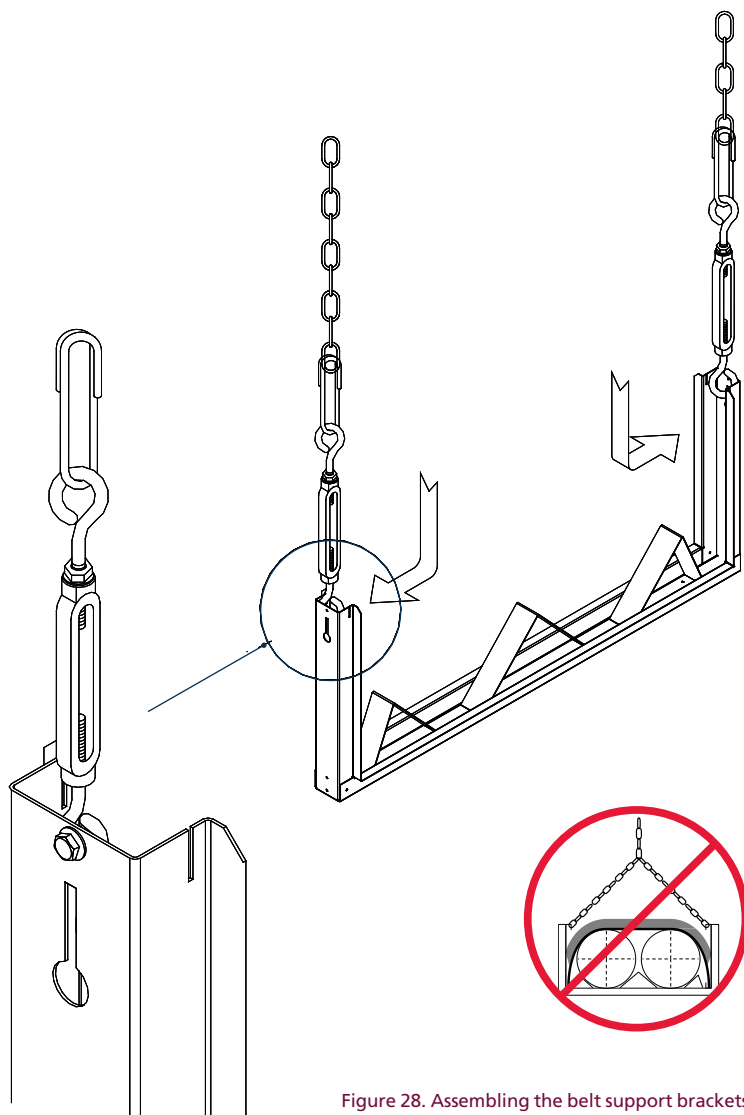


Figure 28. Assembling the belt support brackets

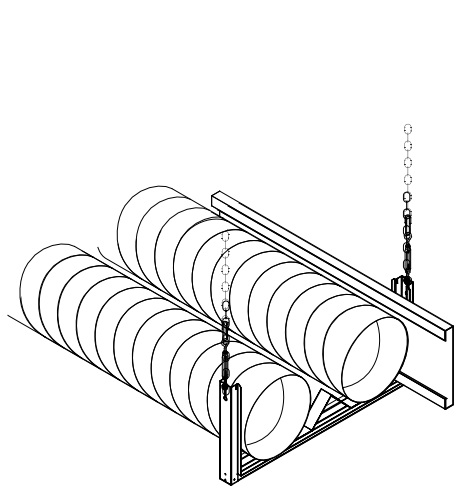


Figure 29. Radiant pipe assembly 1

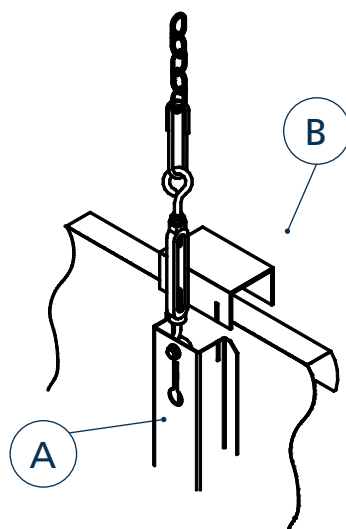


Figure 30. Radiant pipe assembly 2

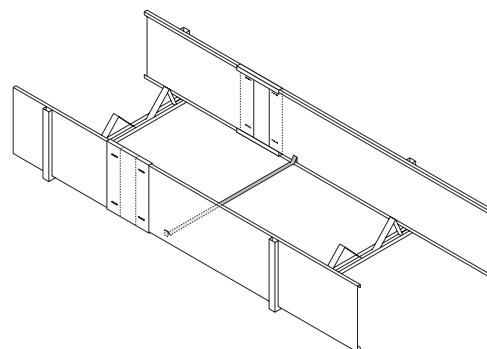


Figure 31. Radiant pipe assembly 3

To fit the sides to the brackets, fit the "U" shaped support by clicking it into the slots (A), so that the slits line up (B) as shown in Figure 16.

Attention: In case the distance between the holders is more than 3 meters or near the side junctions, it is necessary to use a further holder (code 05CNDI8010) which keeps straight the sides of the strip (Figure 31).

2.6.1 Side connections

Join the two sides with the connections. Leave a minimum 80mm space between the heads of both sides, to allow for expansion. Fix in place with self-drilling screws.



The two screws must be left slightly loose so that the sides can expand inwards. If the distance (A) Figure 32 between the connections and the sides is more or equal to 1 meter, it could cause cambering.

- Fix the connections with camber using a further 4 self-drilling screws as shown in Figure 32.
- The space between the heads of the side connections without camber is sufficient to allow the sides to expand inwards (Figure 33 point B).

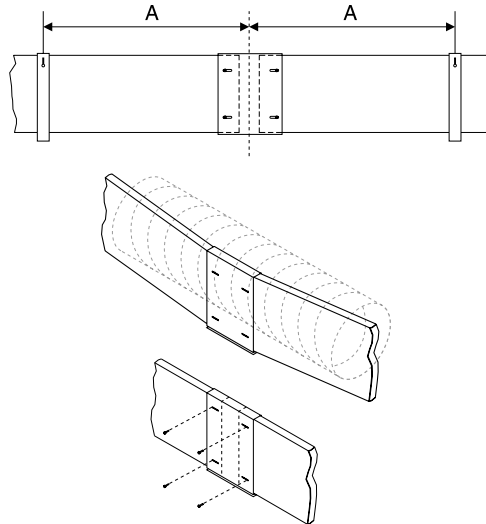
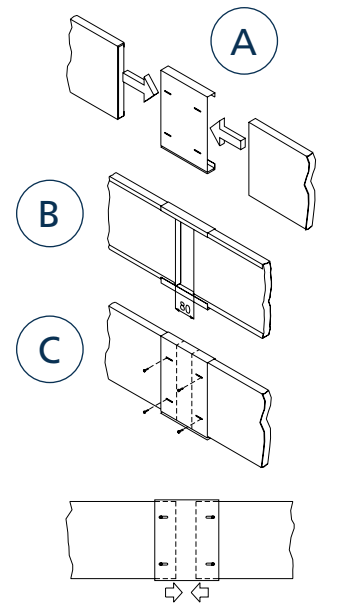


Figure 32. Side connections



Leave the screws slightly loose, to allow the sides to slide inwards

Figure 33. Side connections

2.6.2 Connections between pipes

The connections must be airtight, as the entire system is under vacuum. This ensures the system will work correctly and safely.

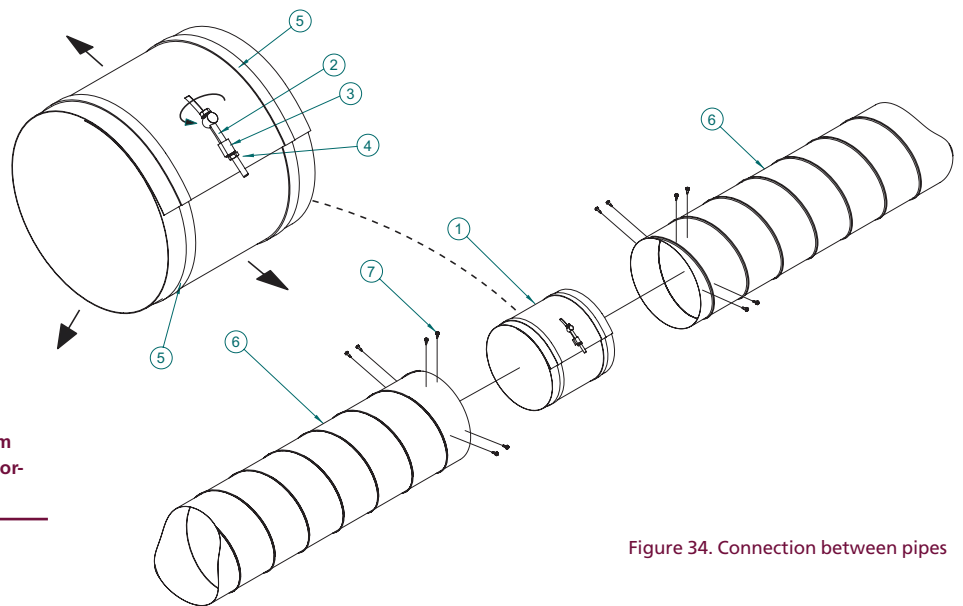


Figure 34. Connection between pipes

The joint nipples are carefully developed by the manufacturer to assure a perfect seal, when subject to high temperatures.

They are fixed to the tubes by self-tapping screws. The nipples are sealed to the emitter tube by gaskets, which are on the sides of the nipples.

To see how to assemble the pieces, please see pictures Figure 35–Figure 35.4).

1. Insert the nipple in the first emitter tube for a coupling length of about 120 mm, as shown in Figure 35
2. Insert on the exterior of the nipple the second emitter tube with a coupling length of about 120 mm, as shown in figure Figure 35.1.
3. Turn the hexagonal screw clockwise, allowing the nipple to increase its diameter. It will expand inside the inner surface of the two emitter tubes (see details in Figure 34)

Attention: If there are not two gaskets, use high temperature silicone on the circumference of the joint about 40 mm from the two edges.

4. Fix the nipple using 12 self-drilling screws, 4 for each side and 4 on the upper part. The correct installation is shown in Figure 35.2 and Figure 35.3.

Attention: Make sure that the joint nipple has the regulation screw in the position indicated in Figure 35.4. This makes installation and regulation easier, especially when the two tubes are side by side.

- | | |
|---|---------------------|
| 1 | Joint nipple |
| 2 | M8 regulation screw |
| 3 | Eyelet |
| 4 | M8 nut |
| 5 | Gasket |
| 6 | Radiant tube |
| 7 | Self-drilling screw |

Figure 35.

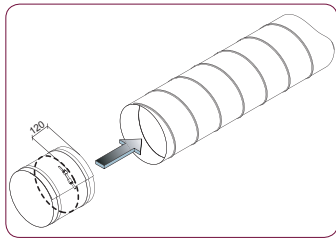


Figure 35.1

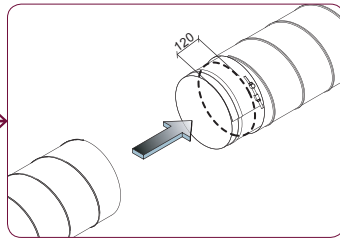


Figure 35.2

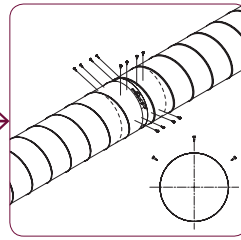


Figure 35.3

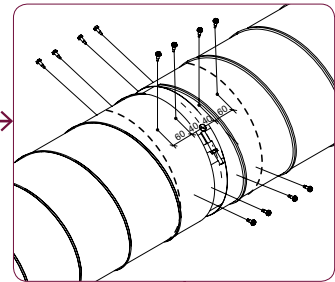


Figure 35.6

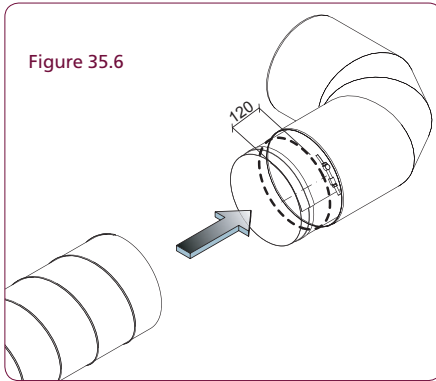


Figure 35.5

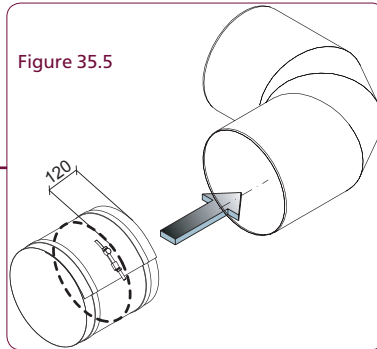
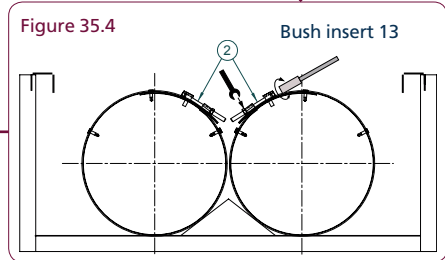
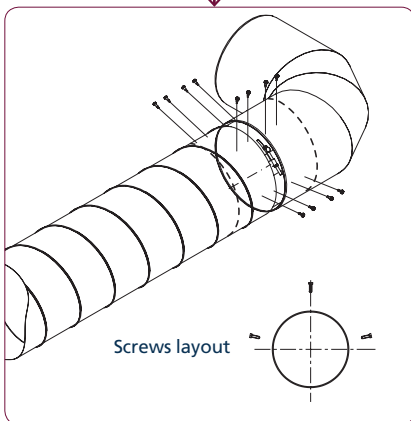


Figure 35.4



Bush insert 13



Screws layout

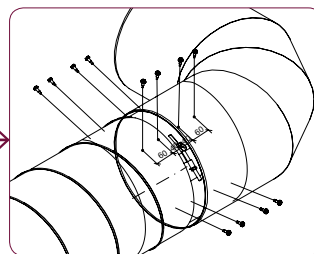
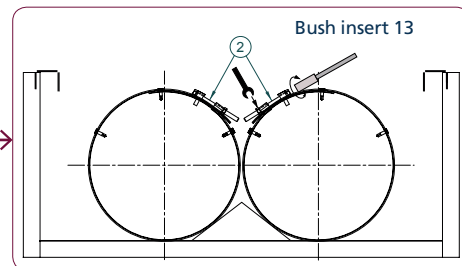


Figure 35.8



Bush insert 13

Figure 35.9

Figure 35.7

For OHA 300kW and 400kW units, the first bend must be positioned at least 3 meters from the burner.

2.6.3 How to assemble the curves

The curves can be assembled following the same steps with which the joints between the tubes are assembled.

They are developed by Nortek and assure a perfect seal, in particular they are resistant to high temperatures, which they have to bear. They are blocked to the tubes thanks to some self-tapping screws so that the system becomes a single block.

The sealing of the nipples with the tube and the emitting curve is possible thanks to the gaskets along their circumference.

For the steps which have to be followed, see the entirety of section 2.6.3:

- Insert the nipple in the first emitting tube for a coupling length of about 120 mm, as shown in Figure 35.5
- Insert on the exterior of the nipple the curve with a coupling length of about 120 mm.

- Turn the hexagonal screw in a clockwise sense, allowing to the nipple to increase its diameter. It will adhere to the inner surface of the two emitting tubes (see details in Figure 34)

Attention: In case there are not the two gaskets, use some silicone apt for high temperatures on the circumference of the joint at about 40 mm from the two edges.

- Fix the nipple using 12 self-drilling screws, 4 for each side and 4 on the upper part. The correct parts where you have to install them is indicated in Figure 35.7 and Figure 35.8.

Attention: Make sure that the joint nipple has the regulation screw in the same position indicated in Figure 35.9. In this way it is possible to make installation and regulation easier, especially when the two tubes are put one next to the other.

Figure 36.

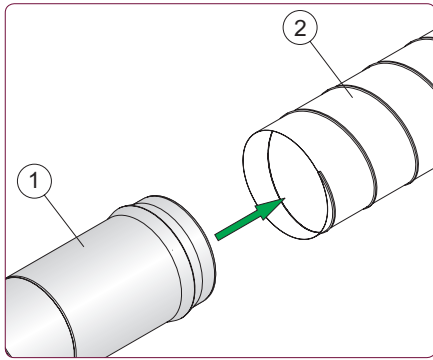


Figure 36.1

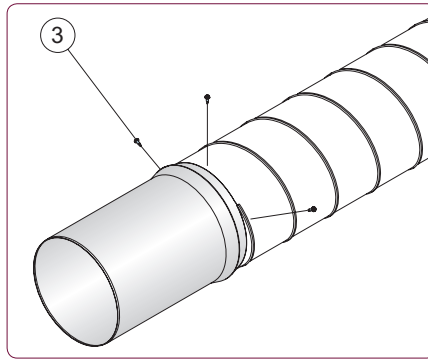
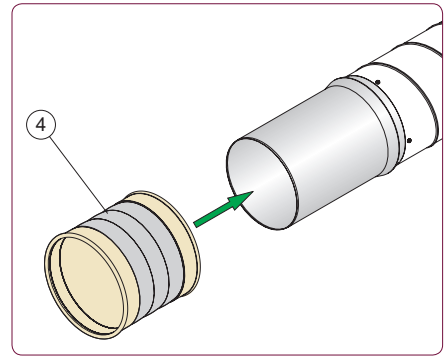


Figure 36.2



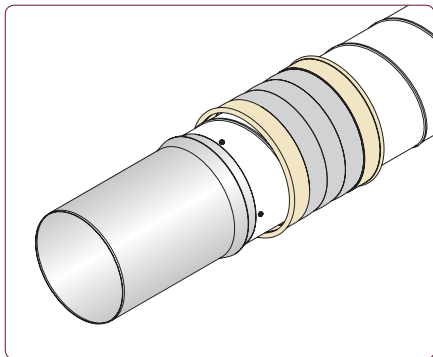
2.6.4 Mounting the expansion joins

1. Fit the nipple (1) in the outlet pipe (2) taking care that the conical part adheres well all around the pipe.

2. Block it with the self-tapping screws (3) to the top and sides as shown in fig. Figure 36.1.

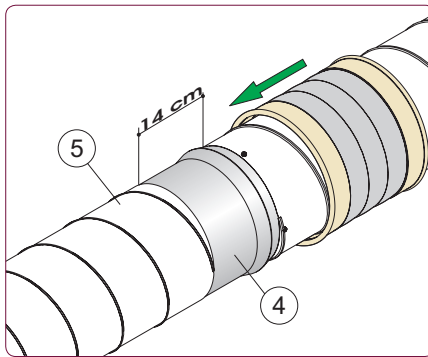
3. Fit the canvas extension (4)

Figure 36.3



4. Fit the nipple (4) in the outlet pipe (5) leaving 14 cm between the pipes, as during expansion they must be free to slide.
5. Place the fibreglass expansion to cover both the tubes.

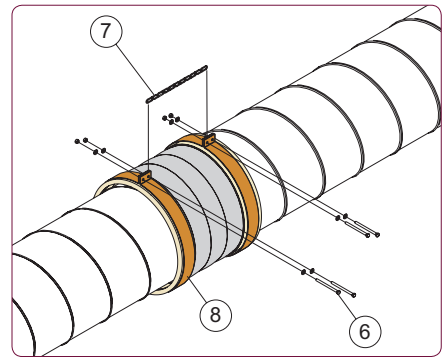
Figure 36.4



Important: Leave 14cm between pipes, as during expansion they must be free to slide.

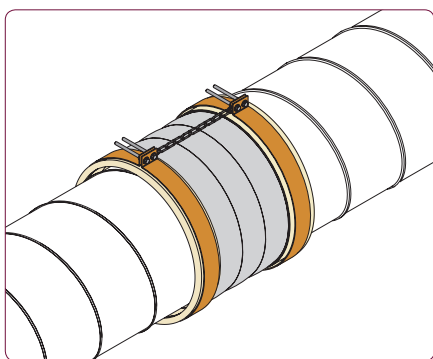
Important: The expansion joints have to be positioned in the tubes longer than 36 linear meters, 1 for m model and 2 for u model every 18 meters.

Figure 36.5



6. Fix the joint to both the tubes (2 and 5) with the clamps (8);

Figure 36.6



7. Foresee a limit stop chain (7) to hook amongst the clamps.

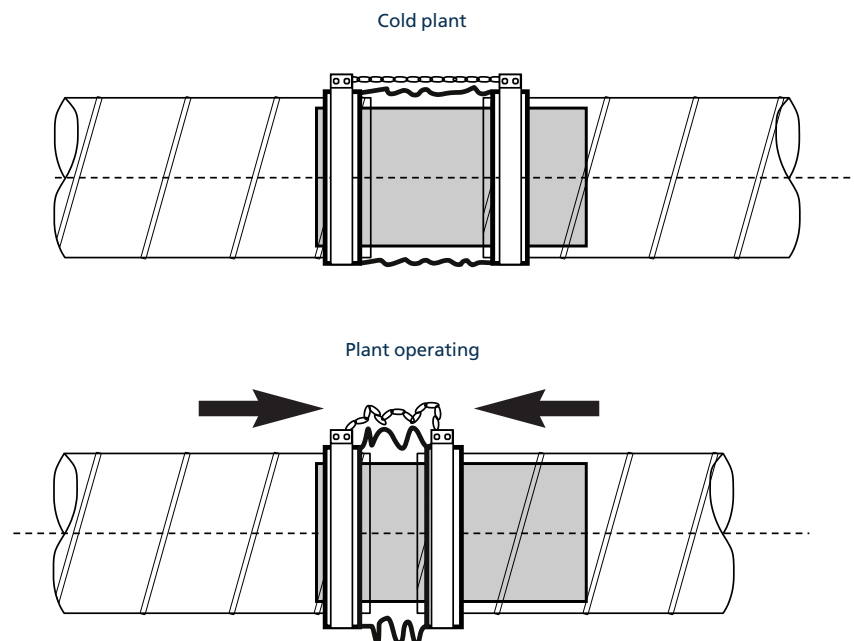


Figure 37. Expansion

2.6.5 Side connection (90°)

To form the 90° bend, shorten the internal side of the sides at level L (for the values refer to the table below).

Fit the 90° bend in the sides and fix in place with self-drilling screws. The screws must be loose on the outside of the slits, so that the sides can expand inwards.

Model type	Level 1 (mm)
Mod.U (2 pipes) Ø 400 mm	1020 plus slip screws holes
Mod.U (2 pipes) Ø 300mm	850 plus slip screws holes
Mod.M (1 pipe) Ø 300 mm	512 plus slip screws holes

Table 16 – Internal connection

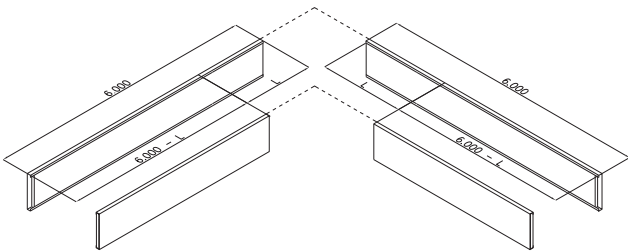


Figure 38. Side connections

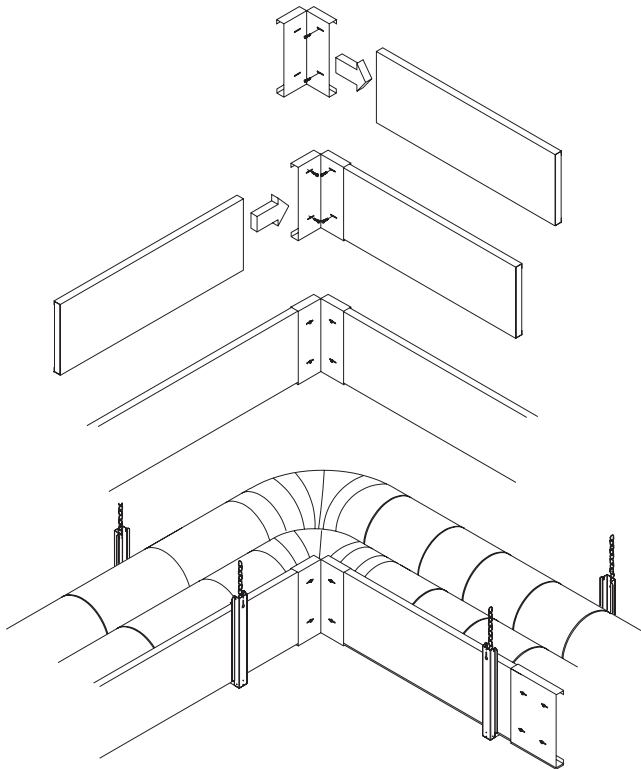


Figure 39. Connections for the internal sides

For the external sides, repeat the same operations as above: fit the 90° join in the sides and fix it in place with the self-tapping screws.

The fixing screws must be loosely tightened outside the slots, to allow the sides to expand inwards.

2.6.6 Assembling the end closed cover

Fit the blind cover along the profile of the side panels and fix with self-drilling screws, leave 30 cm between the bend and the side to allow the pipes to expand.

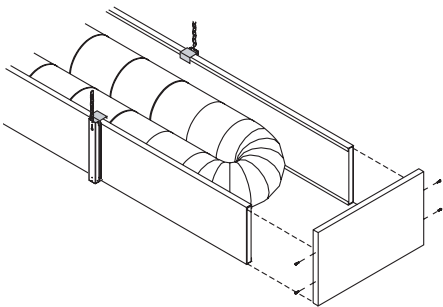


Figure 40. End cover

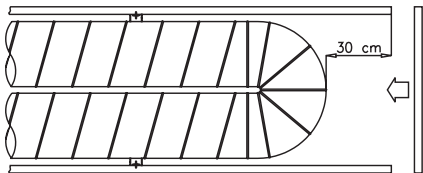


Figure 41. End closed cover

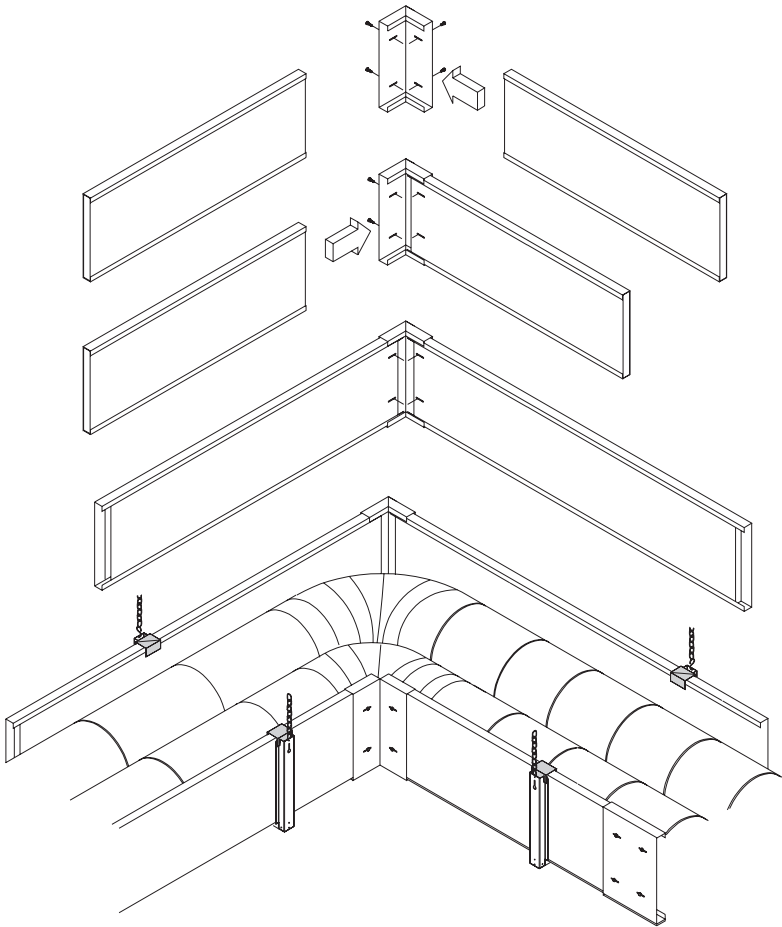
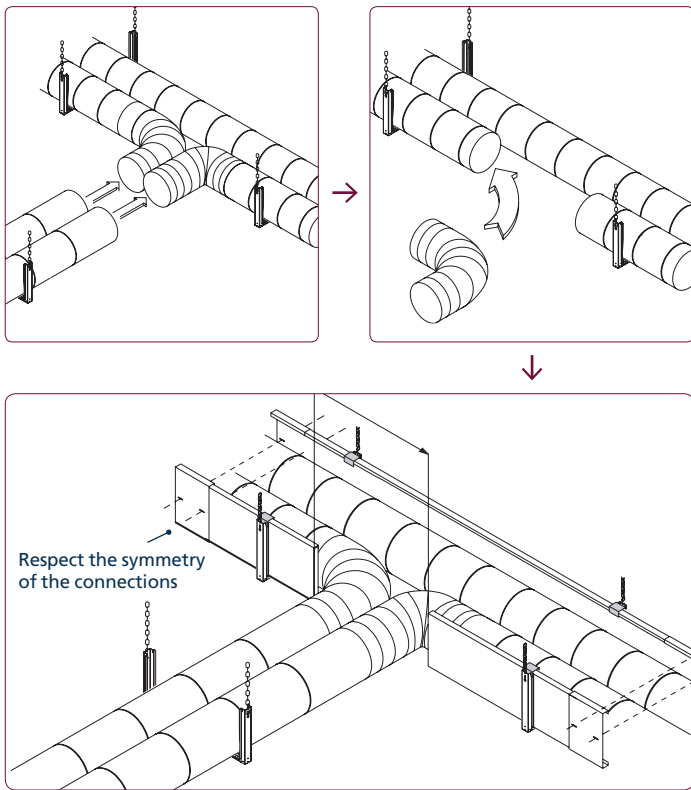


Figure 42. Connections for the external sides



2.6.7 Assembling the "T" branch

1. Fit the closed radius 90° bends as shown in Figure 43
2. Block the bends.
3. Fit the sides which were previously cut according to the need (leave a space) so that the symmetry between the sides' connections is respected.
 - 645 mm for Ø 200 mm plus slip screws holes
 - 850 mm for Ø 300 mm plus slip screws holes
 - 1020 mm for Ø 400 mm plus slip screws holes

Figure 43. 'T' branch assembly

2.6.8 Assembling the top insulation

- A. Join the plates together in groups of 4 units using a screw, one above the other of at least 4-5 cm. Every 4 units the plates must be one above the other for 10-15 cm near the junction. They have not to be fixed one to each other.
- B. Place the fiberglass isolation: the black part of this fiberglass isolation have to be on the top see picture (B)

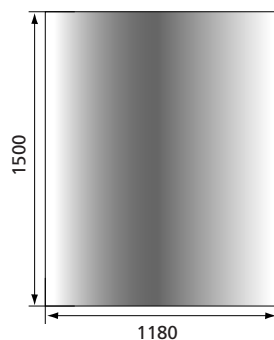


Figure 44. Sheet dimensions

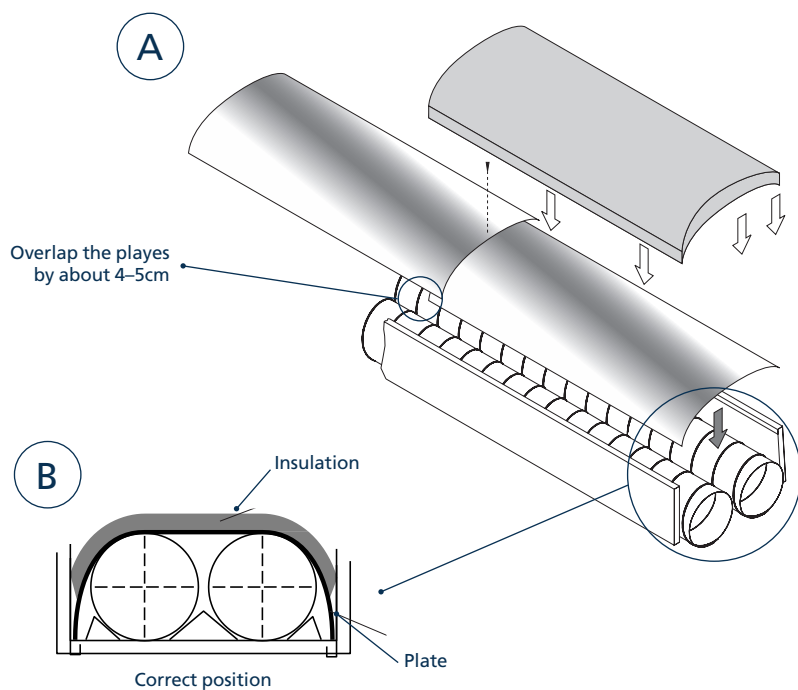
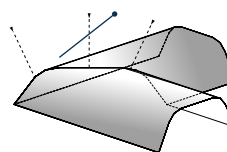
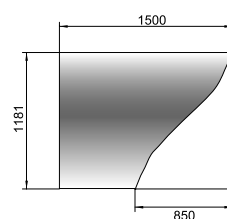


Figure 45. Assembling the top insulation on a straight strip

Fix with self-drilling screws



90° bend

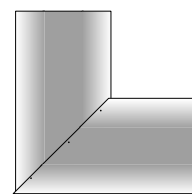
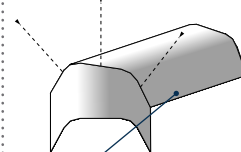
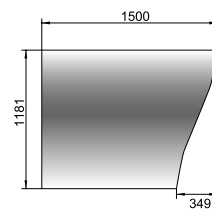


Figure 46. Assembling the insulating plate on the strip bends



45° bend

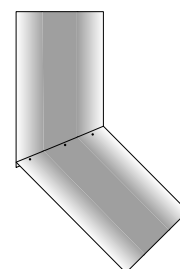


Figure 47. Assembling the insulating plate on the strip bends

Fix self-drilling screws

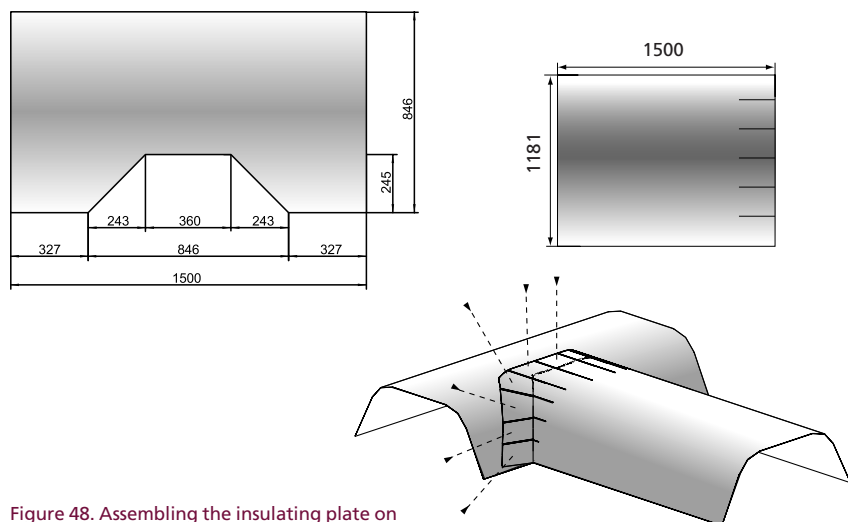


Figure 48. Assembling the insulating plate on the "T" connections in the strip

Fix self-drilling screws

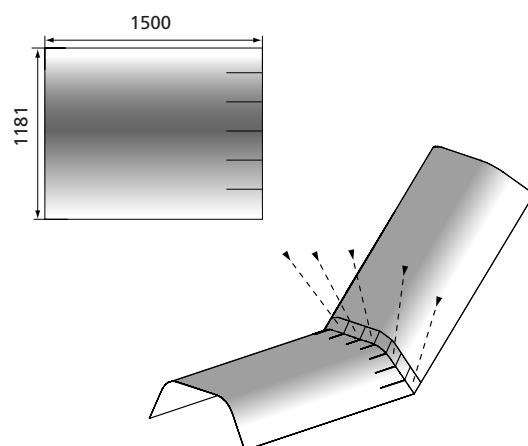


Figure 49. Assembling the insulating plate on the vertical bends in the strip

2.6.9 Vertical connection for the radiant strip positioned on two different levels

Fit the board cover along the profiles of the side panels and fix in place with self-drilling screws.

Fit the 90° or 45° bends into the pipes and fix.

Connect the bends with the pipe cut to measure.

Alternatively the height can be adjusted as shown in Figure 51, with the sides and top insulation.

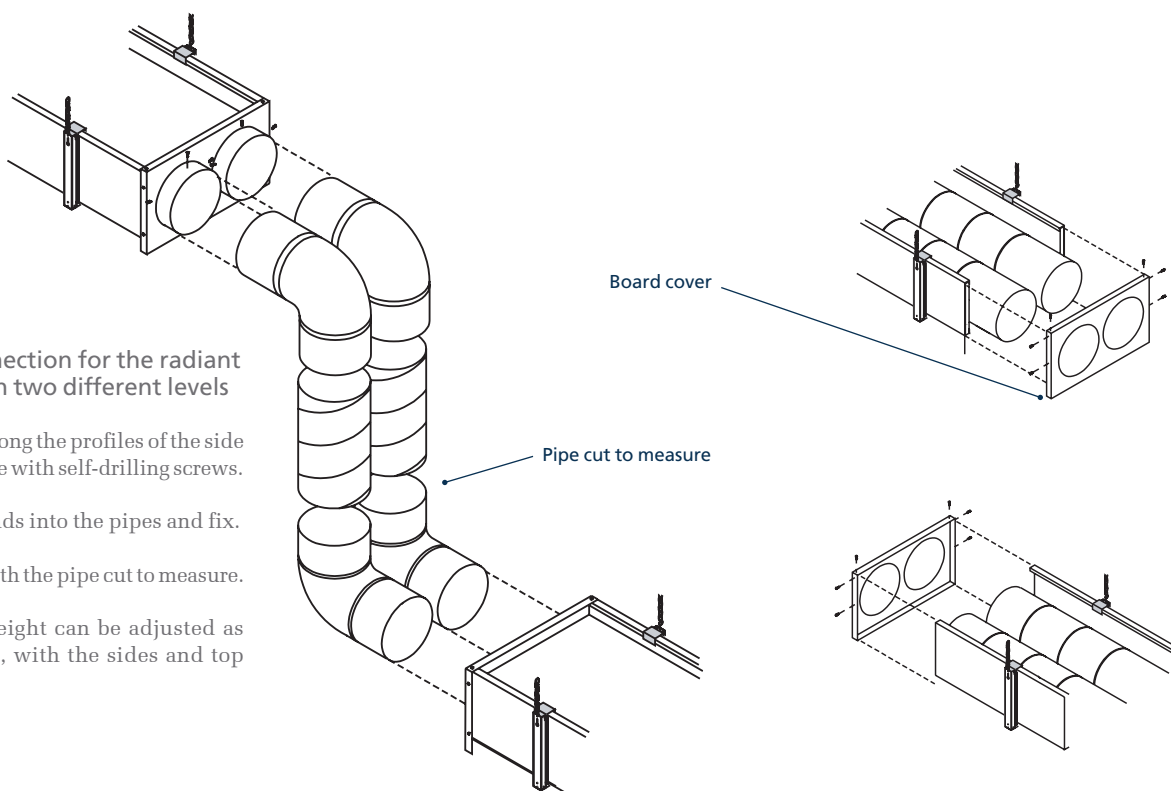


Figure 50. Vertical connections for the radiant strip positioned on two different levels

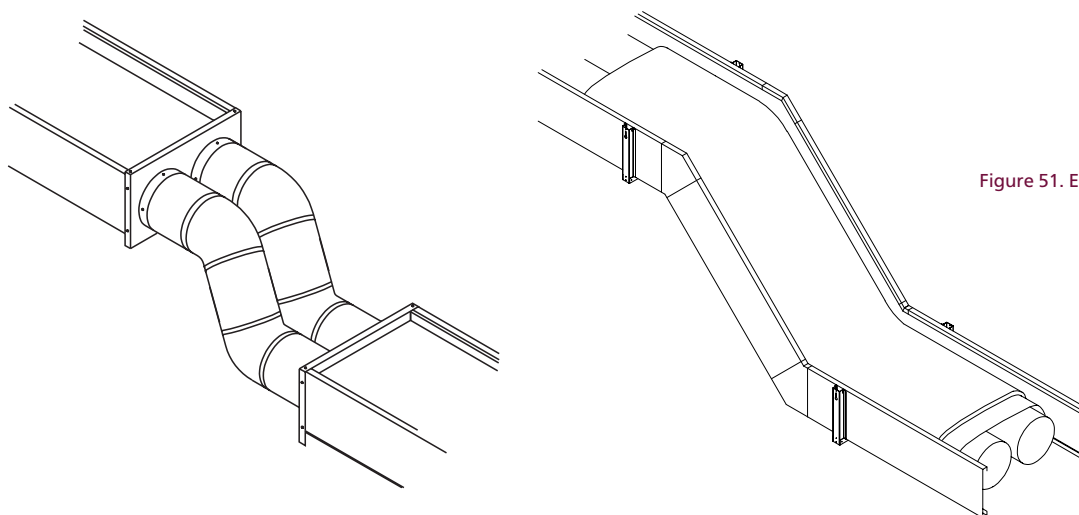
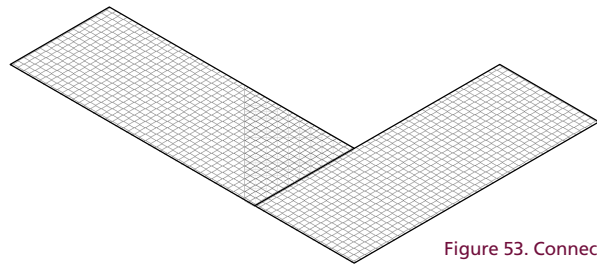
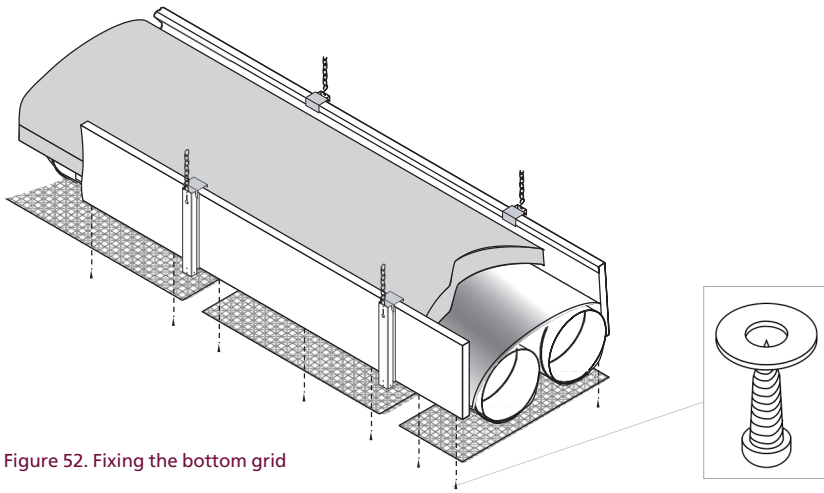


Figure 51. Examples of vertical connections

2.6.10 Assembling the bottom grid (optional)



2.6.11 Assembling the top shell (optional)

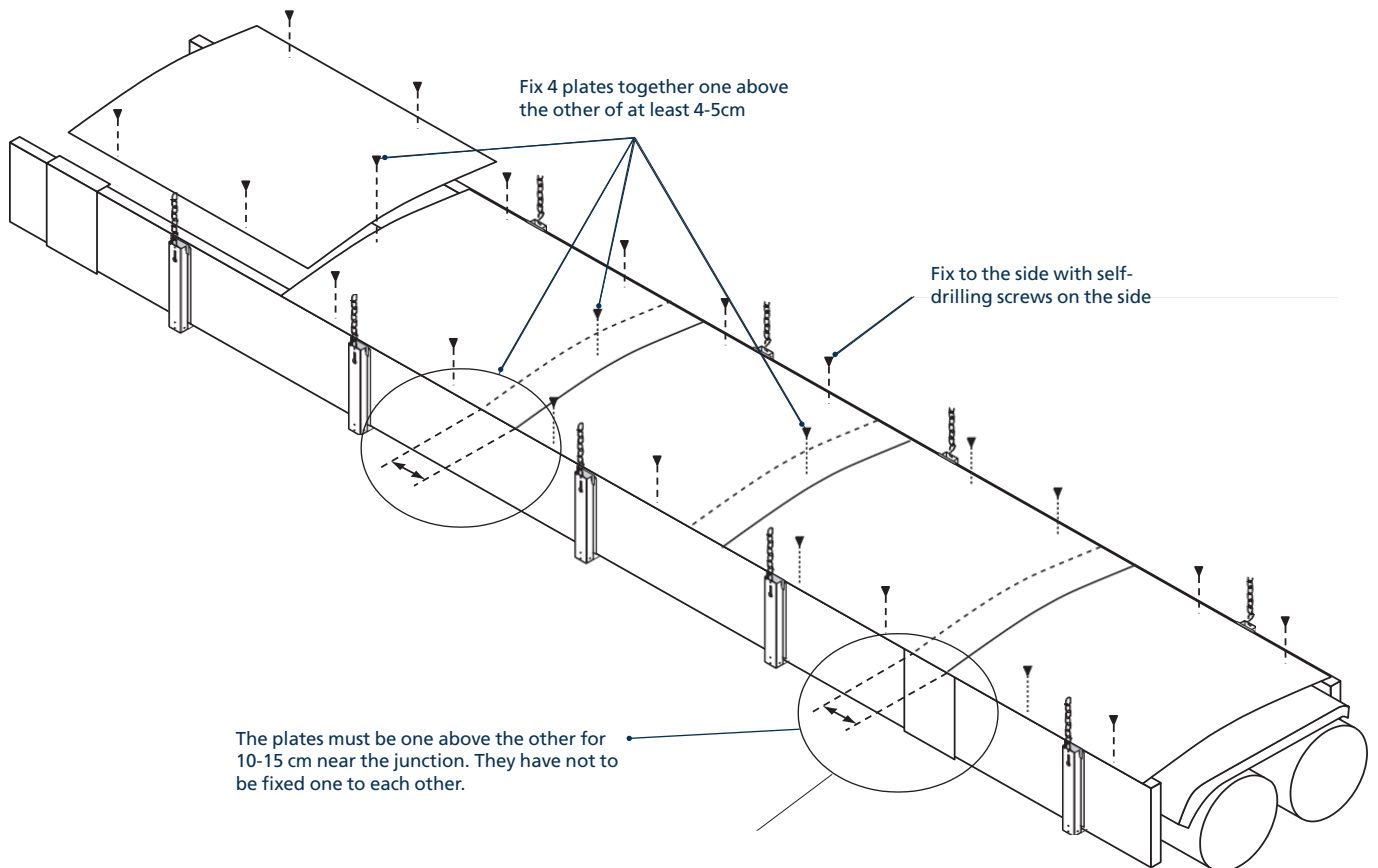


Figure 54. Assembling the top shell

2.6.12 Assembling the reflecting sides (optional)

Fix the bracket (A) onto the support strip, as shown in the figure.

Fit the reflecting sides onto the brackets, introducing the "U" side support into the slit (B) in the bracket, as shown in the figure below.

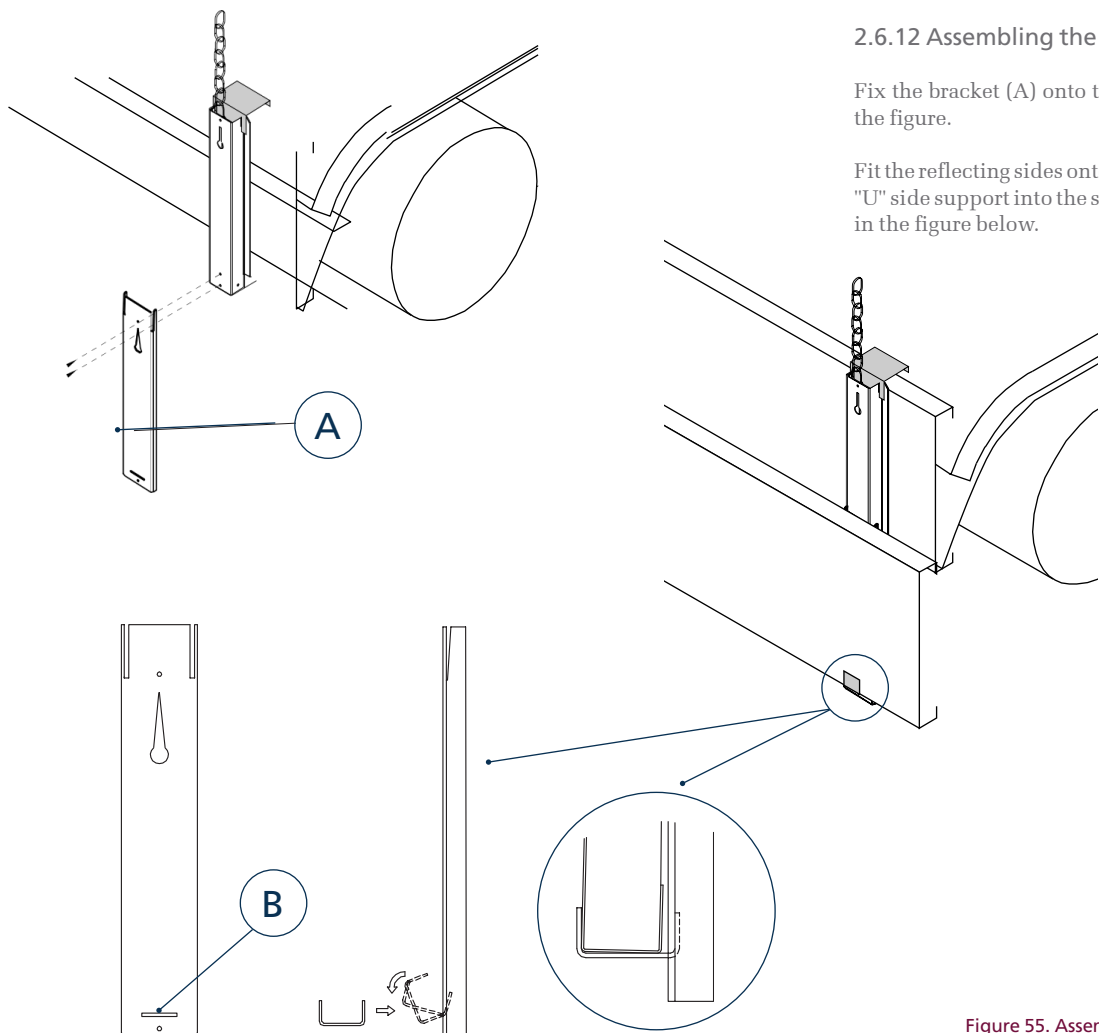


Figure 55. Assembly of additional sides (optional)

2.7 Installing the radiant strip the additional reflecting side

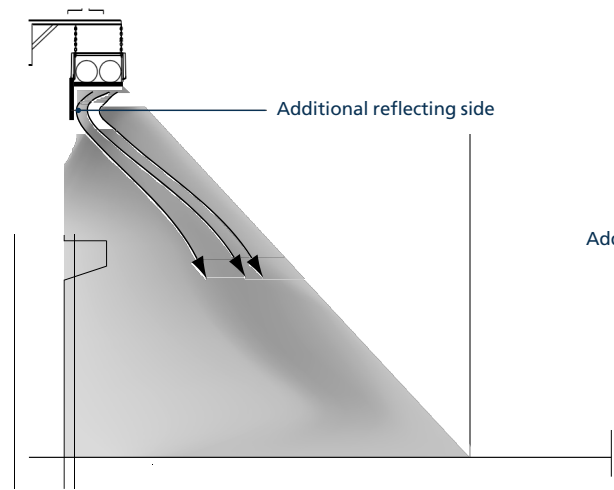


Figure 56. Installation on the wall

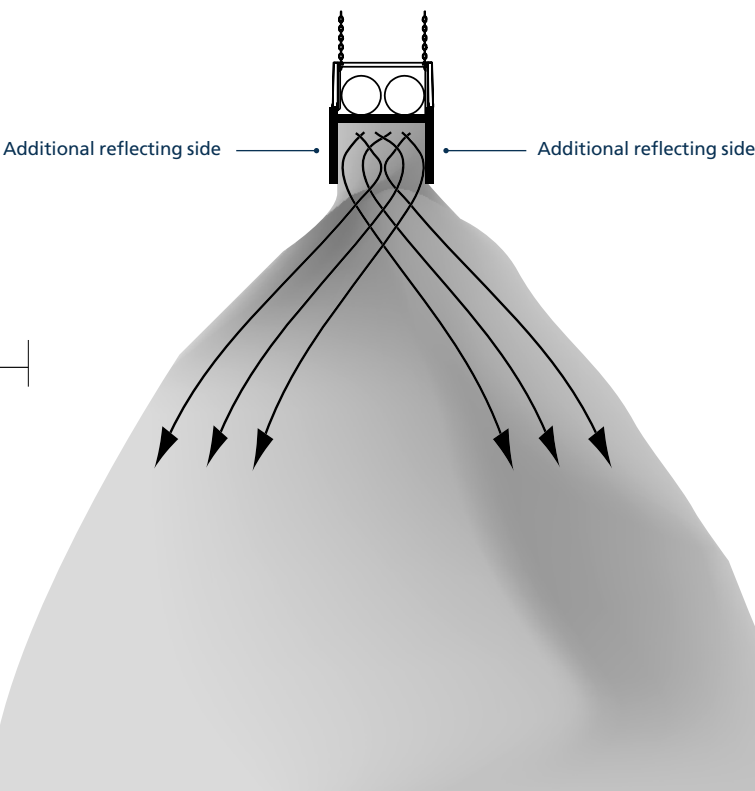


Figure 57. Installation at a very high level

3. Gas piping

The gas supply piping must be constructed in conformity with current legislation in the country of installation.

The size of the piping and any pressure reducers must guarantee the correct operations of the appliance.

The materials used must conform to current legislation in the country of installation.

- a. This appliance cannot support pressure above 40 mbar (0.04 bar), otherwise the gas valve membranes could break.
- b. If methane gas is used, a pressure stabiliser and pressure gauge with a scale of 0-60 mbar must be installed upstream from the main line, after the meter, regulated at a pressure of 20 mbar (0.02 bar); higher pressure could cause poor combustion and difficulty in lighting the flame.
- c. If LPG (Propane) is used, a 1st stage pressure reducer must be installed near the tank, to reduce pressure to 1.5 bar; a 2nd stage pressure reducer must be installed on the main outside line, at the foot of the shed, to reduce pressure to the levels given in the Table 17 on page 28. After the 2nd stage pressure reducer, install a pressure gauge (scale 0-60 mbar - 0.06 bar) and regulate the pressure to the levels given in the table on page 28; higher pressure could cause poor combustion and difficulty in lighting the flame.
- d. A pressure gauge must be installed upstream and downstream from the main gas supply line, clearly visible with a scale of 0-60 mbar (0.06 bar) so that it is possible to check the difference in pressure upstream and downstream, and therefore the delivery of the entire network.
- e. Furthermore, if the main gate valve is closed and all the equipment turned off, the plant and gas valves can be checked for airtightness, by checking after a few minutes if there is a pressure drop shown on the pressure gauges.
- f. The appliances must always be connected using ball valves and anti-vibration flexible connections for gas pipes.
- g. To regulate the gas supply pressure, all the appliances are tested and regulated in the factory at the preset pressure level (refer to the information given on the burner plate or refer to Table 17 on page 28).

IMPORTANT

For methane gas supply at a pressure above 20 mbar (200 mm app.), a pressure stabiliser must be fitted for each appliance and the pressure set at 20 mbar.

N.B. Put the seal cap on the solenoid gas regulation unit after setting.

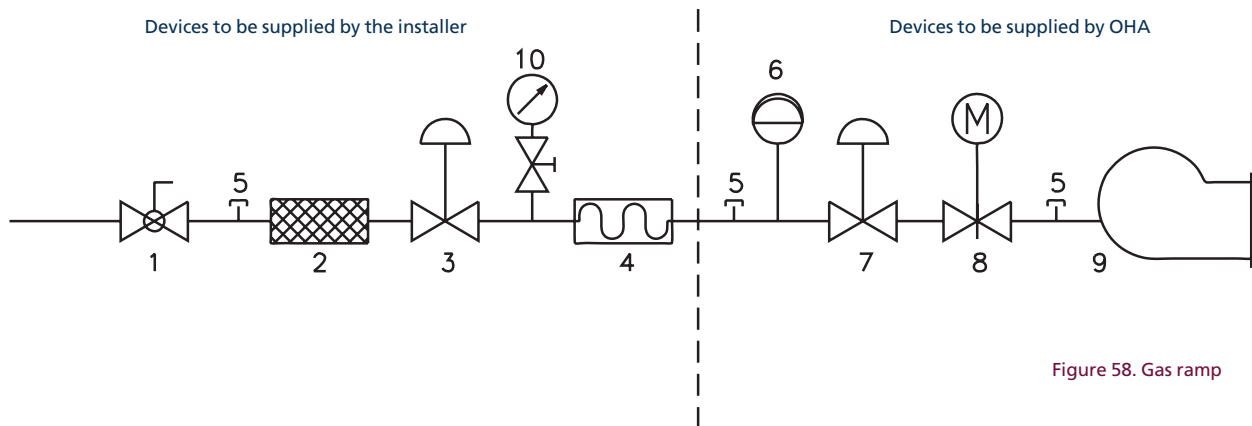


Figure 58. Gas ramp

1. Manual gas shut-off ball valve
2. Gas filter
3. Gas pressure regulator with minimum and maximum (device (Pu = 0.04 bar). A stabiliser must be installed for intake pressure ≤ 0.04 bar)
4. Anti-vibration connection
5. Gas pressure test point
6. Minimum gas pressure level control
7. Gas pressure regulator
8. Safety solenoid valve
9. Burner
10. Pressure gauge, scale 0-60 mbar with push button valve

4. Electric wiring

The electric wiring must be done in conformity with national and local legislation in the country of installation.

The electric system must be adequate to the maximum absorbed power by the radiant strip, which is given on the specification plate and in this manual; the lead section must be adequate for the absorbed maximum power.

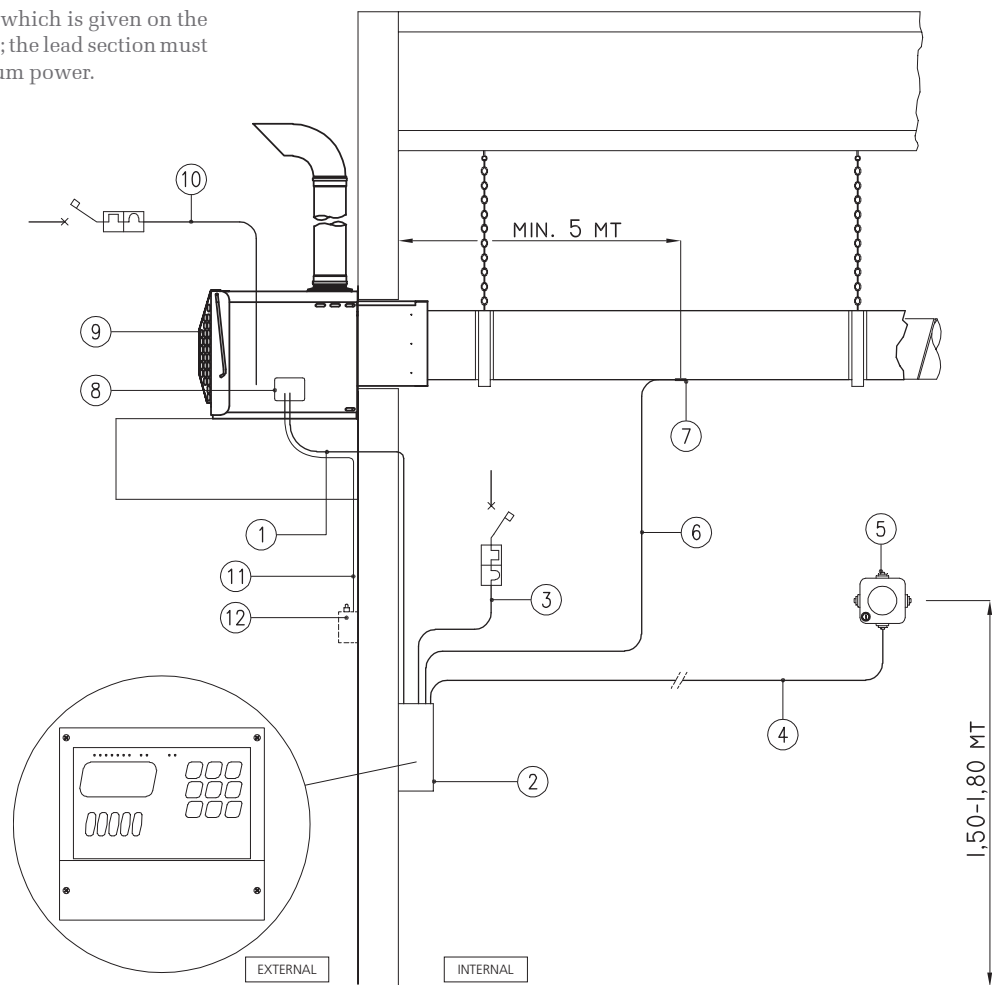


Figure 59. Wiring diagram to the control board mod. SLIM2 and SYS2

4.1 Wiring diagram for the combustion unit to the ground control board SLIM2 and SYS2

1. 1) Serial linkage between OHA thermal unit and thermostat (shielded cable which guarantees a double isolation of the parts under tensile stress with minimum section $2 \times 0,5 \text{ mm}^2$, separate from the high voltage cables; maximum length allowed for the network connection is 300 m).
2. 2) Inet serie thermostat
3. 3) 1/N ~ 50Hz 230V monophasic power supply of the Inet thermostat ($2 \times ? \text{ mm}^2$ section), the real section has to be defined according to the distance of the thermostat from the electric energy source.
4. 4) Internal probe connection ($3 \times 0,5 \text{ mm}^2$ min. sect. shielded cable and separate from the high voltage cables)
5. 5) Internal probe with 3 positions key selection (automatic, manual and off)
6. 6) PT1000 probe connection ($2 \times 0,5 \text{ mm}^2$ min. sect. shielded cable and separate from the high voltage cables)
7. 7) PT1000 probe (optional) code 05CESO0848 (placed minimum 5 m far from the thermal unit)
8. 8) Interface board
9. 9) Unità termica Oha
10. 10) 3/N/PE ~ 50Hz 400V three-phase power supply of the Oha unit ($5 \times ? \text{ mm}^2$ section), the real section has to be defined according to the distance of the Oha unit from the electric energy source

11. 11) External probe connection ($2 \times 0,5 \text{ mm}^2$ min. sect. shielded cable and separate from the high voltage cables)
12. 12) External probe

N.B. The power line (3) and (10) must be protected upstream, a multiple pole switch must be used with an opening of at least 3 mm between the contacts.

The appliance must always be connected to an efficient earth system.

For further information, consult the instruction manual included with the electric board

5. Testing and start-up

5.1 Preliminary procedures for automatic ignition

Before turning the OHA RHE combustion chamber on, the gas and electric connections must be carefully controlled; ensure that the nozzles are suitable for the fuel to be used.

1. TURN ON the GAS and CURRENT, OHA RHE combustion chamber (for the earth control board to work, there must be sufficient gas pressure to close the gas pressure switch).
2. TURN OFF the main switch.
3. PROGRAM the temperatures on the ground board (for further details consult the instruction manual with the control board).
4. PROGRAM the on times on the ground board, or turn the key on the ball probe to MANUAL to cut out the control board clock.
5. CHECK the circuit breaker on the appliance is turned on (otherwise the warning led lights up).
6. CHECK that the E82 control box is not locked out (the red led lights up, to reset press it).

IMPORTANT: before resetting, check the phase and neutral connections are correctly done.

7. CHECK the fan rotation direction.

5.1.1 Ignition phases for the combustion unit

1. After the electrical acknowledge of the gas pressure switch, of the minimum operative conditions of the inverter (minimum working temperature of the inverter -5°C), of the thermostat and the timer (excluded in case that the key of the globe-probe is positioned on “manual”), the power supply reaches the electronic board which start the ignition procedure.
2. The appliance begins the pre-washing procedure for the combustion chamber and checks the air pressure switch works, by turning the on-board fan on and opening the air damper to maximum.
3. The fan is turning and excites the air pressure switch. The appliance checks the air pressure switch works correctly and if so, starts the pre-washing procedure for the combustion chamber for a minimum of 20 seconds. For further information about the control box refer to the instruction manual supplied with the control board.

4. After the pre-washing phase the electronic board makes the ignition. The flame lights up at the minimum modulation frequency (of the inverter) and the corresponding light too.

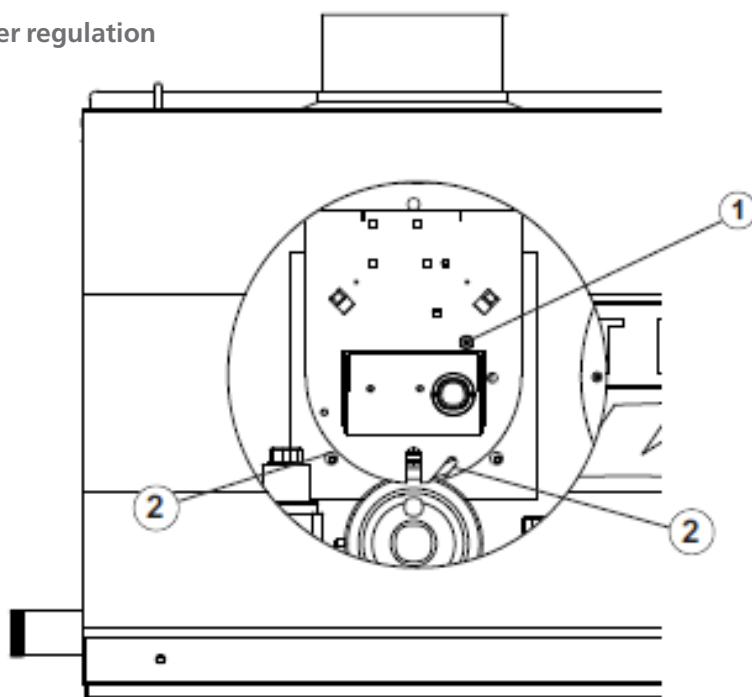
Attention:

- - *If the flame does not ignite, the appliance locks out and the red led indicating burner lockout lights up on the earth control board.*
- - *It is possible that the flame does not ignite due to a varying level of depression near the torch.*
- - *Check the ignition electrode position and if necessary, change the electrode position on the torch (Figure 4 on page 9).*
- - *Press the red led to reset and repeat the ignition procedure.*

5. The burner turns on at the minimum modulation frequency (of the inverter) and according to the fume temperature of the equipment the inverter will increase gradually the modulation frequency up to the maximum speed, modulating consequently according to the temperature parameters set and taken by the probes. In the ground control panel the operating led lights.

Attention: With the first start up of the radiant strips, the fixing process of the covering causes a small steam fume emission in the environments. So an adequate ventilation of the building is requested for a brief period.

5.2 Air damper regulation



The de-pressure measured in the pressure-switch must be of 30 mmCa (COOL)

1. Air regulation
2. Wing nuts for fixing the damper

Regulate the opening of the airlock, up to the reaching of the combustion values requested.

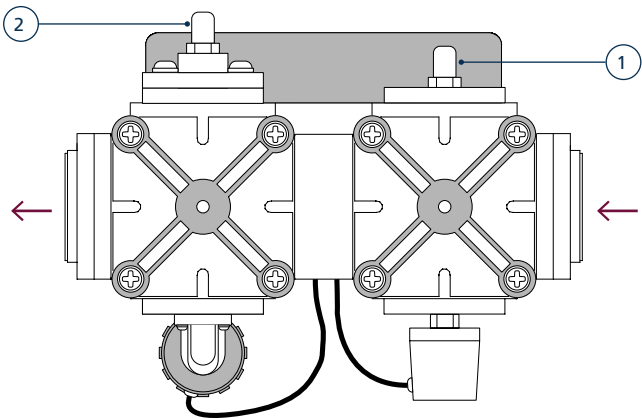
Figure 60. Detail of the air damper regulation

5.3 Gas pressure regulation

Unit version	Fuel	Power supply pressure	Combustion head code	Diameter gas diaphragm	Nozzle pressure
OHA RHE 100-115 OHA RHE 100-150 OHA RHE 100-200	Natural gas G20	20mbar	05CNT02505	15	14
	LPG propane G31	37mbar	05CNT02506	7.5	30
OHA RHE 200-250 OHA RHE 200-300 OHA RHE 200-400	Natural gas G20	20mbar	05CNT02508	Without diaphragm	7.7
	LPG propane G31	37mbar	05CNT02505	15	20

Table 17 – Gas pressure regulation

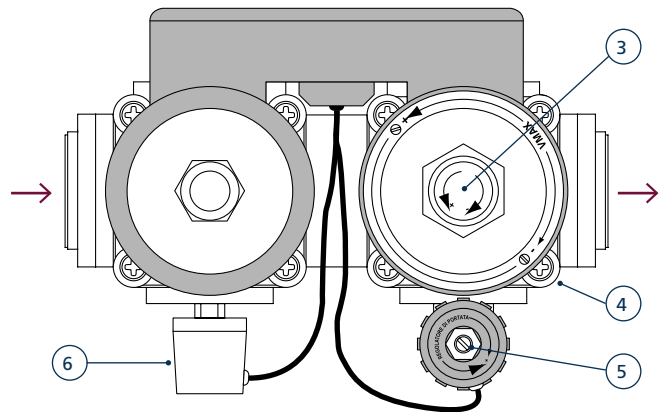
5.4 Setting the air-differential pressure switch



Check the setting on the differential pressure switch according to the data given in the table below.

	Unit version	Fuel
	OHA RHE 100-115 OHA RHE 100-150 OHA RHE 100-200	OHA RHE 200-250 OHA RHE 200-300 OHA RHE 200-400
Setting the pressure switch (Pa)	90	90

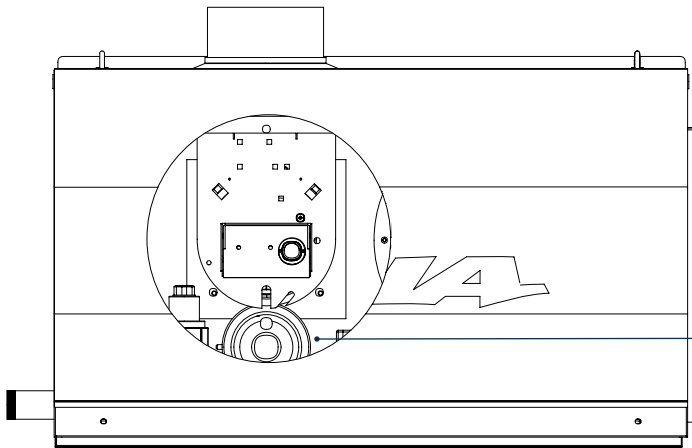
Table 18 – Pressure switch data



- 1. Pressure test point upstream from the solenoid
- 2. Pressure test point downstream from the solenoid
- 3. Slow ignition regulation (set during tests performed by Nortek)
- 4. Maximum flame regulation
- 5. Minimum flame regulation
- 6. Gas pressure switch

Put the seal cap on the solenoid regulation device after setting.

Figure 61. Solenoid assembly



Put the seal cap on the solenoid regulation device after setting

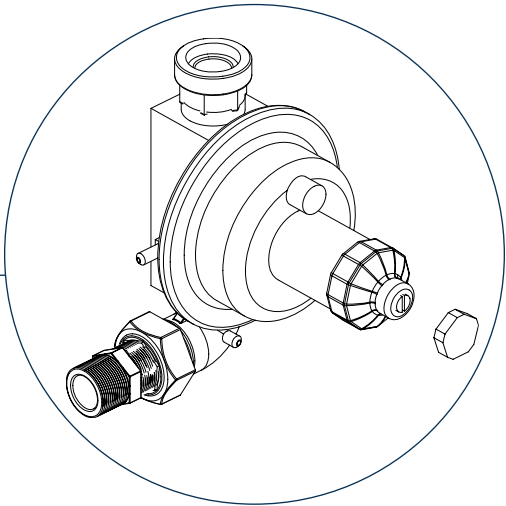


Figure 62. Solenoid assembly

6. Maintenance

The appliance must be checked once a year by an authorised person. Always turn off the power supply during maintenance work.

6.1 Changing the fuel

Transformation must only be performed by a qualified person, in compliance with safety regulations in force. The manufacturer declines all liability for damage caused by incorrect transformation or improper or incorrect use of the appliance.

For the change of combustible it is necessary to replace the baffle plate (Figure 5 on page 9) and in some cases the combustion head.

Table 17 on page 28, shows information for several combustion units on the different models for the combustion heads.

6.1.1 Transformation from Natural gas to LPG gas

1. Close the gas supply and disconnect the electric power supply.
2. Unscrew the two supporting wing-nuts and remove the air lock.
3. Unscrew the 3-part join that holds the combustion head (see Figure 5 on page 9 and Figure 63 on page 29) remove the diaphragm and replace it with a suitable one for propane gas. If the combustion head is changed, remove it from the combustion chamber, disconnect the connections (ignition and ground) and replace it with the new combustion head. However, before proceeding with replacement, check the new head corresponds to the table in this manual (Table 3 on page 5).

4. Mount the air lock and electric plug, fixing it in place with the two screws (if an automatic air lock is used).
5. Turn the appliance on and check that the pressure to the burner is 37 mbar (pressure test point near the solenoid entrance).
6. Adjust diaphragm pressure using the pressure regulator on the solenoid valve (see the Figure below), the values must correspond to those given in Table 17 on page 28.
7. Check the threaded connections are airtight against gas leaks.
8. Stick the label onto the specification plate (appliance set for using ...) with the new type of gas used.

Put the seal cap on the gas valve regulation device after setting.

6.1.2 Transformation from LPG gas to Natural gas

1. Proceed as for 1); 2); 3) and 4) in 6.1.1
5. Turn the appliance on and check that the pressure to the burner is 20 mbar (pressure test point near the entrance to the solenoid).
6. Adjust diaphragm pressure using the pressure regulator on the solenoid valve, the values must correspond to those given in Table 17. Check the threaded connections are airtight against gas leaks.
7. Stick the label onto the specification plate (appliance set for using...) with the new type of gas used.

Put the seal cap on the gas valve regulation device after setting.

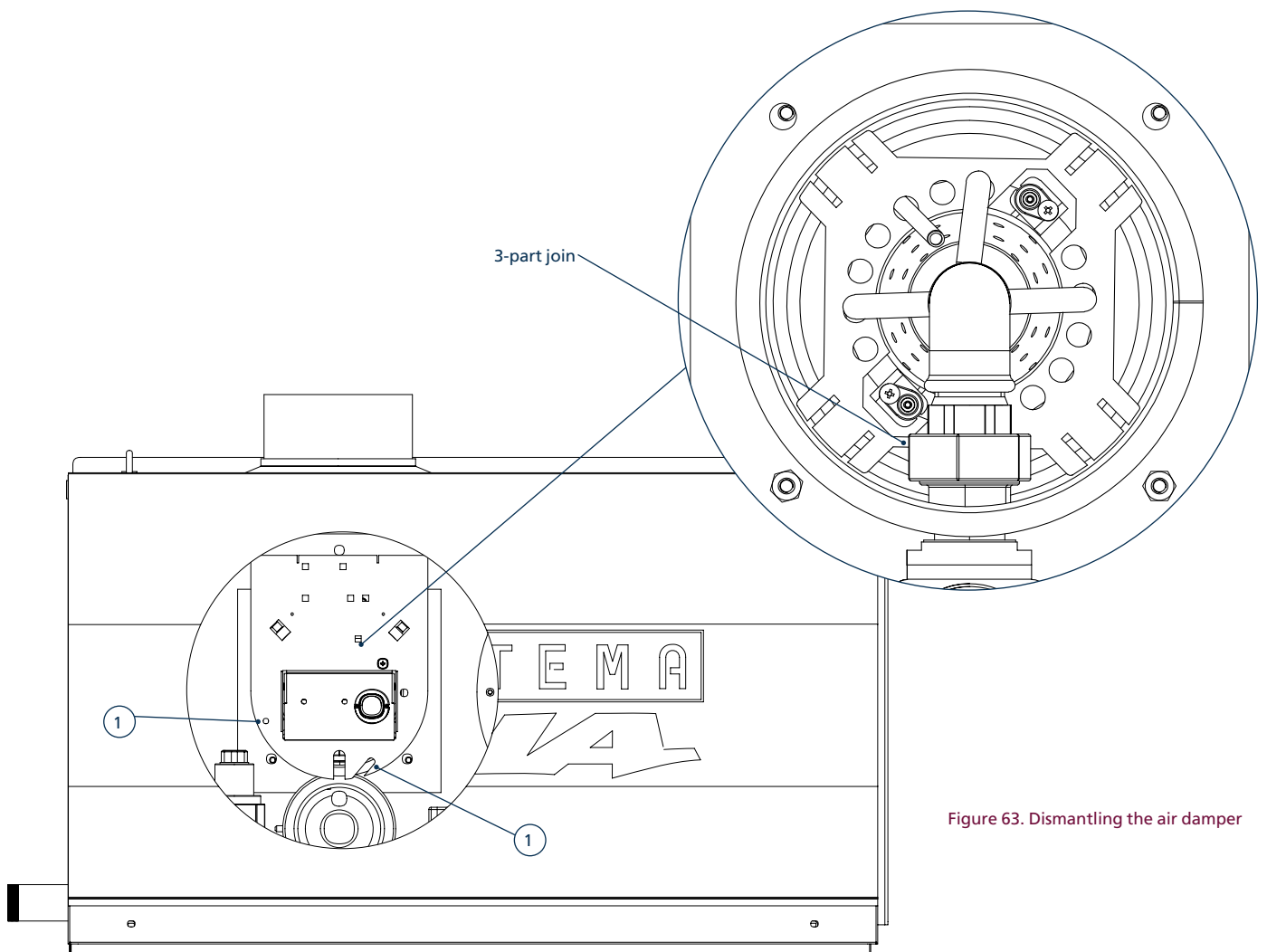


Figure 63. Dismantling the air damper

7. Operating faults

Diagram: One

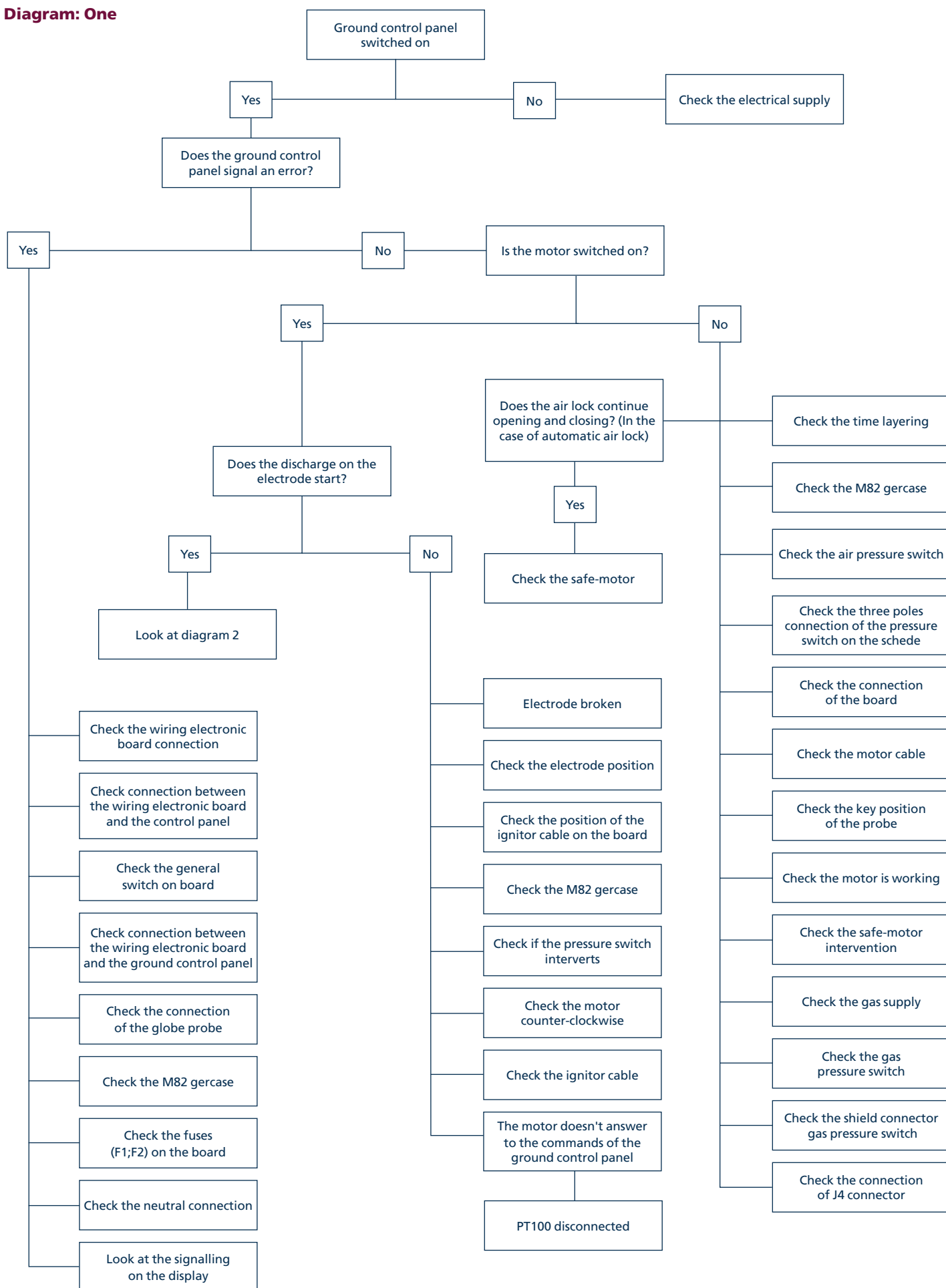
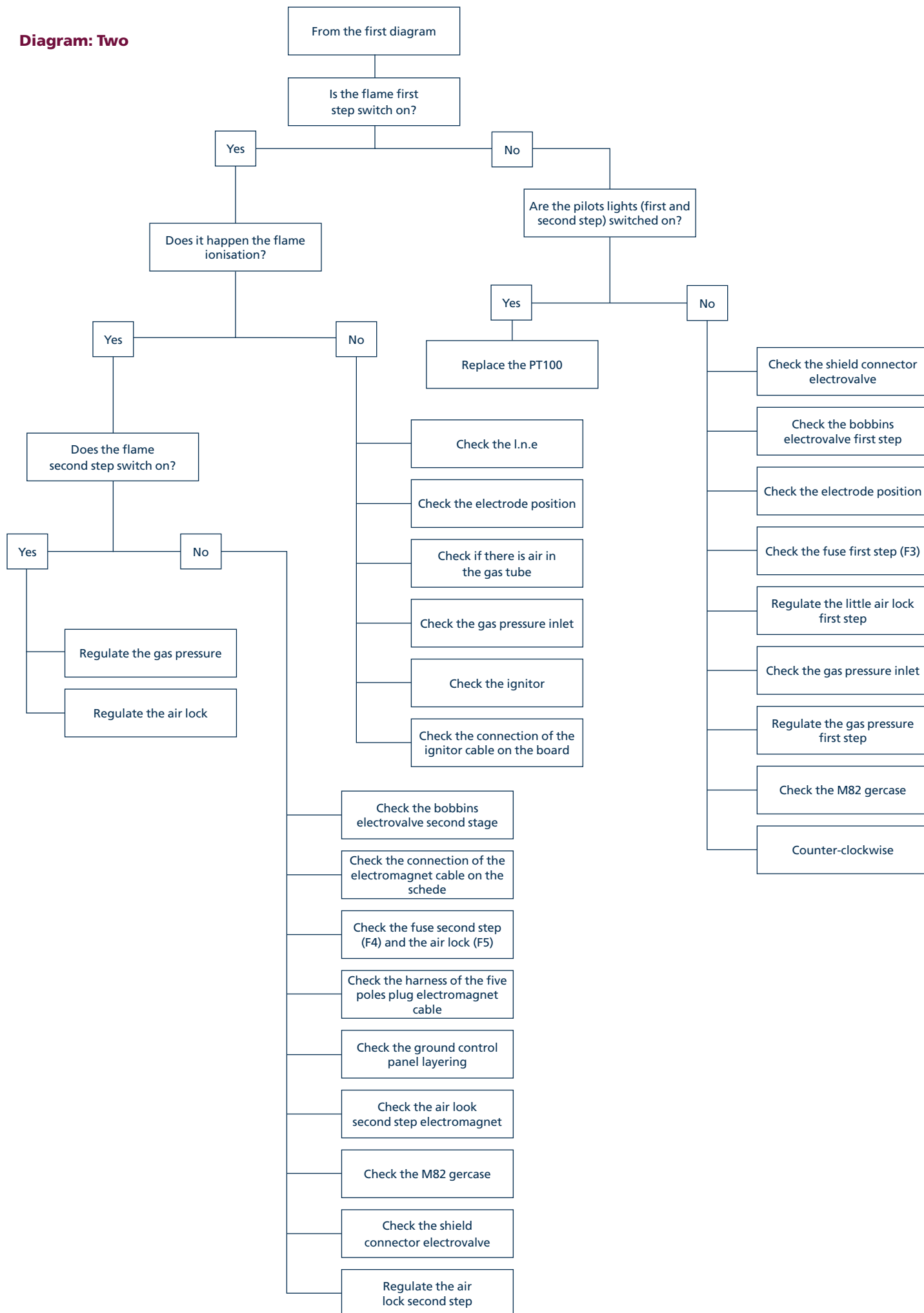


Diagram: Two



8. Warranty

8.1 Cover and validity

Sonning² OHA RHE units are supplied with twelve months guarantee from the date of commissioning by an approved agent, (commissioned within 6 months of despatch) or twelve months from date of despatch from our works.

The warranty is void if:

- Installation is not in accordance with the general requirements of this manual.
- The flue arrangement and air supply for the heaters are not in accordance with the following recommendations or codes of practice referred to in this manual.
- Ingress of water.
- Air flow through the heater is restricted.
- The main fan has been switched on or off by other means other than the control system i.e. not allowing an overrun to dissipate the heat in the heat exchanger once the burner has been switched off.
- The heater and/or burner are not operated at the rating laid down in this manual and/or on the heater data plate.
- Finalised commissioning data is not completed and copies supplied to our offices upon completion.

8.2 Claims under warranty

If a claim is made under warranty then the following information will be required to enable a replacement component to be supplied:

1. Heater model.
2. Heater serial number.
3. Site address and installers name and address.
4. Information and symptoms regarding the fault/defect.

Faulty parts must be returned to the manufacturer to verify the claim.

Note: Immediate notification is required if a fault is suspected so that rectification can be undertaken, otherwise no responsibility can be taken for any further damage or loss.

9. Setting aside

If the appliance will not be used for a long time, the following operations should be performed. Turn the main switch to "O" and turn the appliance off at the main power socket.

Close the gas supply valve and disconnect the appliance from the gas mains. In the case of change in ownership, or a new tenant, all the documentation regarding the heating system must be handed over to the new owner/tenant.



Only authorised persons should disconnect the appliance.

Current Full Part No. Reznor, OHA RHE, EN, May, 18, D301061

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