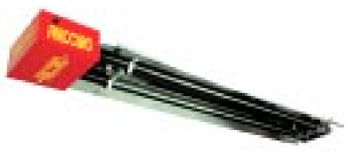
Instruction and Installation handbook for sealed radiant tube heater

dei pannelli radianti Panrad



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FRACCARO
OFFICINE TERMOTECNICHE

INDEX

GENERAL REMARKS

This instruction manual should always be kept with the PANRAD Radiant Tube, so that it can be consulted by the maintenance personnel or by the user in case of need.
The installation of PANRAD Radiant Tube should be performed in respect of the regulations in effect in each country, according to the manufacturer's instructions or those of professionally qualified personnel with specific technical expertise in the field of radiation heating.
Improper installation and improper use of the system could cause damage to persons, animals or objects for which the manufacturer is not responsible.
Before performing any operation of cleaning or maintenance, disconnect the burner from the supply mains using the switch on the electric control panel and/or the organs of interception provided; in case of breakdown and/or malfunction of the burner it should be disconnected immediately.
No attempt at repair or other intervention should be attempted and the user should contact our local Technical Service Center.
If the system should be taken out of use for a prolonged period, close the gas taps and disconnect power using the circuit breaker on the burner.
To ensure the efficiency of the appliance and proper operation it is a good rule to have the annual maintenance performed by personnel from our Technical Service Center according to the manufacturer's instructions.
Use of the equipment is restricted to authorized personnel only.

Start-up of the unit, and its transformation from gas of one type to gas of another, should be done exclusively by personnel from the Technical Service Center authorized by Fraccaro srl.

USE

Unskilled persons should not be allowed to use any device powered by electricity and the following precautions should be observed:
- do not touch the device with damp or wet parts of the body;
- protect the burner adequately against atmospheric agents if installed outdoors;
- provide efficient grounding according to the local safety regulations;
- do not use the gas pipes to ground electrical devices;
- do not touch hot parts of the equipment such as the exchanger pipes, the combusted gas exhaust pipe, as during and after operation (for a certain amount of time) they are very hot;
- do not spray water or other liquids on the burner;
- do not place any object on the burner or radiating pipes.

If you smell gas, act as follows:
- do not turn on any switches or do anything that could cause sparks;
- open doors and windows immediately to create a draft and air the room, then close the gas taps;
- request the intervention of professionally qualified personnel.

RECOMMENDATIONS FOR INSTALLATIONS

This device must be installed in conformity with local regulations in effect and used only in a well-ventilated place.
Consult the instruction manual before installing and using the equipment.

FRACCARO SRL COULD NOT BE HELD RESPONSIBLE IF MAIN RULES WRITTEN IN THIS MANUAL WERE NOT OBSERVED DURING INSTALLATION. A WRONG INSTALLATION COULD CAUSE BAD WORKING OF THE APPLIANCES OR MAKE THE PLANT NOT WORKING AT ALL.

BURNER CHARACTERISTICS

On/Off working Models

Modelli con funzionamento On/Off			**FRA2**	**FRA3**	**FRA4.1**	**FRA4**	**FRB3**	**FRB4**	**FRB4.1**	**FRC4**	**FRC5**
Potenza **Power**	Max.	[kW]	20,00	30,00	35,00	40,00	30,00	40,00	45,00	40,00	50,00
Consumo PCS **Consumption**	G20	[m³st/h]	1,90	2,85	3,33	3,81	3,81	3,81	4,28	3,81	4,76
	G25	[m³st/h]	2,21	3,24	3,87	4,43	4,43	4,43	4,98	4,43	5,54
	G30	[Kg/h]	1,45	2,18	2,54	2,91	2,91	2,91	3,27	2,91	3,63
	G31	[Kg/h]	1,42	2,14	2,50	2,85	2,85	2,85	3,21	2,85	3,57

Dual-Stage working Models

Modelli con funzionamento a 2 stadi			**FRA2S2**	**FRA3S2**	**FRA4.1S2**	**FRA4S2**		**FRB4S2**	**FRB4.1S2**		**FRC5S2**
Potenza **Power**	Min/Max	[kW]	10/20	20/30	30/35	30/40		30/40	30/45		40/50
Consumo PCS **Consumption**	G20	[m³st/h]	0,95÷1,90	1,90÷2,85	2,85÷3,33	2,85÷3,81		2,85÷3,81	2,85÷4,28		3,81÷4,76
	G25	[m³st/h]	1,10÷2,21	2,21÷3,24	3,24÷3,87	3,32÷4,43		3,32÷4,43	3,32÷4,98		4,43÷5,54
	G30	[Kg/h]	0,72÷1,45	1,45÷2,18	2,18÷2,54	2,18÷2,91		2,18÷2,91	2,18÷3,27		2,91÷3,63
	G31	[Kg/h]	0,71÷1,42	1,42÷2,14	2,14÷2,50	2,14÷2,85		2,14÷2,85	2,14÷3,21		2,85÷3,57
Tipo di bruciatore **Type of burner**			**Atmosph.**								
Diametro attacco gas **Gas connector diameter**			1/2"								
Alimentazione elettrica **Power supply**		[VAC 1N]	1~ \ N \ 50 Hz 230V								
Assorbimento elettrico **Power absorbed**		[Watt]	56,00								
Assorbimento elettrico **Power absorbed**		[A]	0,50								
Peso del bruciatore **Burner weight**		[Kg]	17,00								
Peso apparecchio completo **Total weight of unit**		[Kg]	108,00				147,00			185,00	
N° venturi frazionati in vena d'aria a depressione **Number of Venturi tubes fractioned in depression air vein**		[n°]	2,00	3,00	4,00		3,00	4,00			
Lunghezza dei tubi scambiatori **Length of exchangers pipes**		[mt]	6,00				9,00			12,00	
Diametro dei tubi scambiatori **Diam. of exchangers pipes**		[mm]	89,00								
Diametro attacco condotto scarico fumi **Diam. of fume exhaust pipe**		[mm]	80,00								
Diametro attacco condotto aspirazione aria **Diam. of air intake pipe**		[mm]	80,00								
Aria necessaria per la corretta combustione **Air required for proper combustion**		[m³/h]	40,00	60,00	75,00	80,00	60,00	80,00	90,00	80,00	100,00
Categoria gas **Gas category**			II2H3+								

Tab. 1

ELEMENTS OF RADIANT TUBES

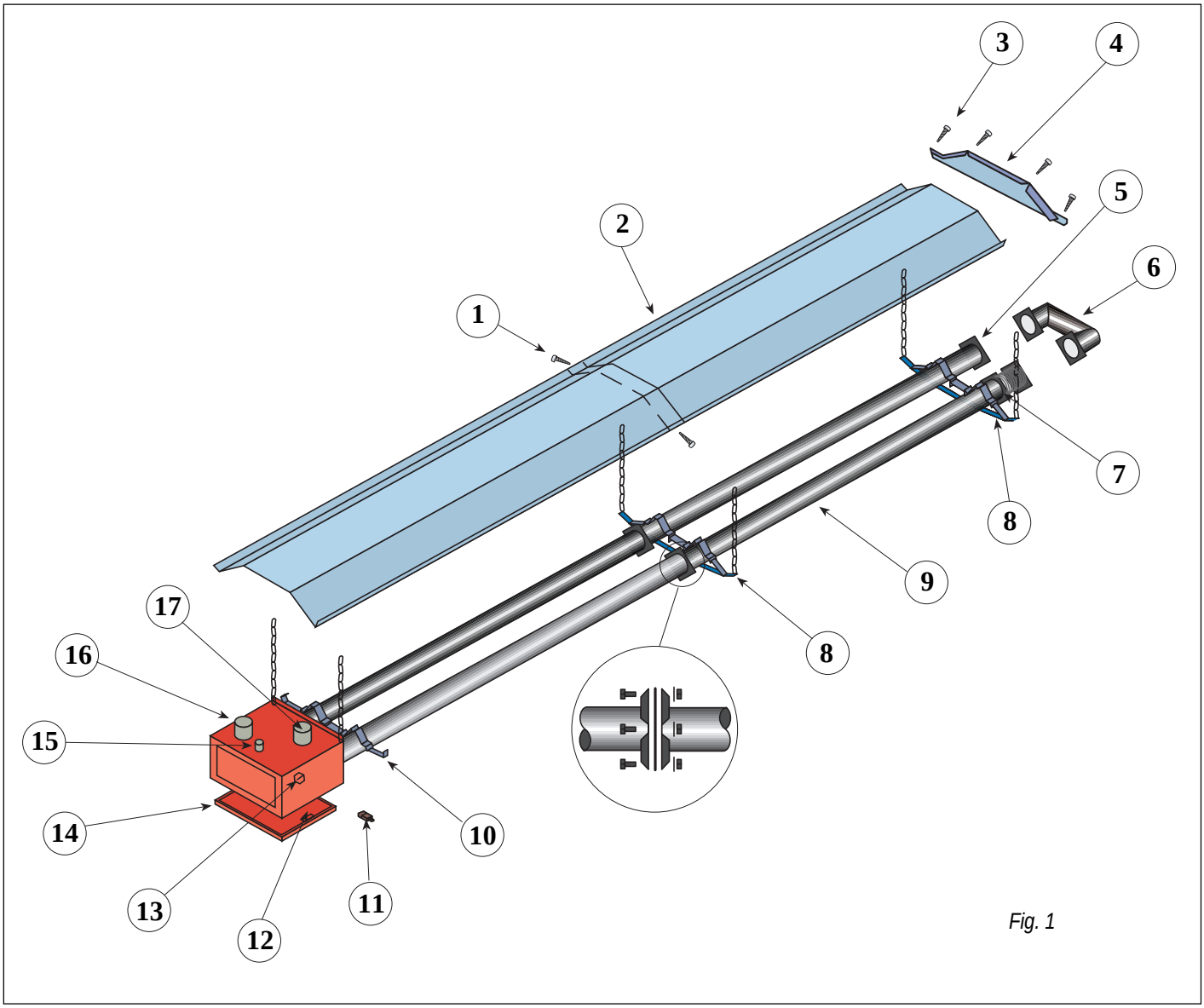


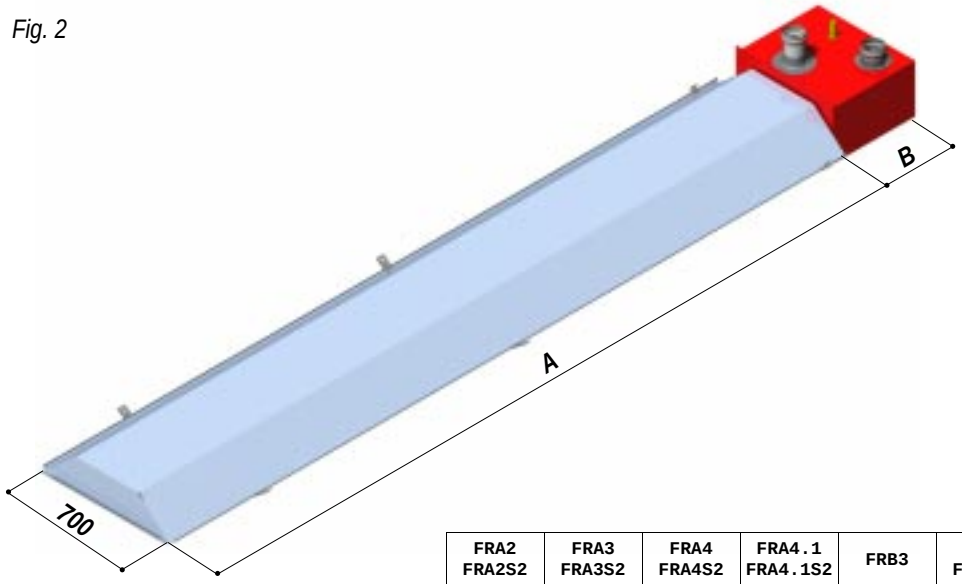
Fig. 1

Key:

1 = Dish securing screws
2 = Reflecting dish in aluminium
3 = End closure securing screws
4 = End closure
5 = Flange
6 = Head union
7 = Expander
8 = Carrying bracket (fig.21 page 13)
9 = Exchanger pipe
10 = Dish support bracket (fig. 26 page 14)
11 = Electrical plug (fig. 4 page 7)
12 = Lever operated closure, opened by screwdriver
13 = Electrical socket (fig. 4 page 7)
14 = Cover with locks
15 = 1/2" gas union
16 = Combustion air intake
17 = Burned gases exhaustion port

EXTERNAL DIMENSIONS OF RADIANT TUBES

Fig. 2



	FRA2 FRA2S2	FRA3 FRA3S2	FRA4 FRA4S2	FRA4.1 FRA4.1S2	FRB3	FRB4 FRB4S2	FRB4.1 FRB4.1S2	FRC4	FRC5 FRC5S2
A [mm]	6.060				8.970			11.900	
B [mm]	390								
A+B [mm]	6.450				9.360			12.290	

Tab. 2

EXTERNAL DIMENSIONS OF BURNERS

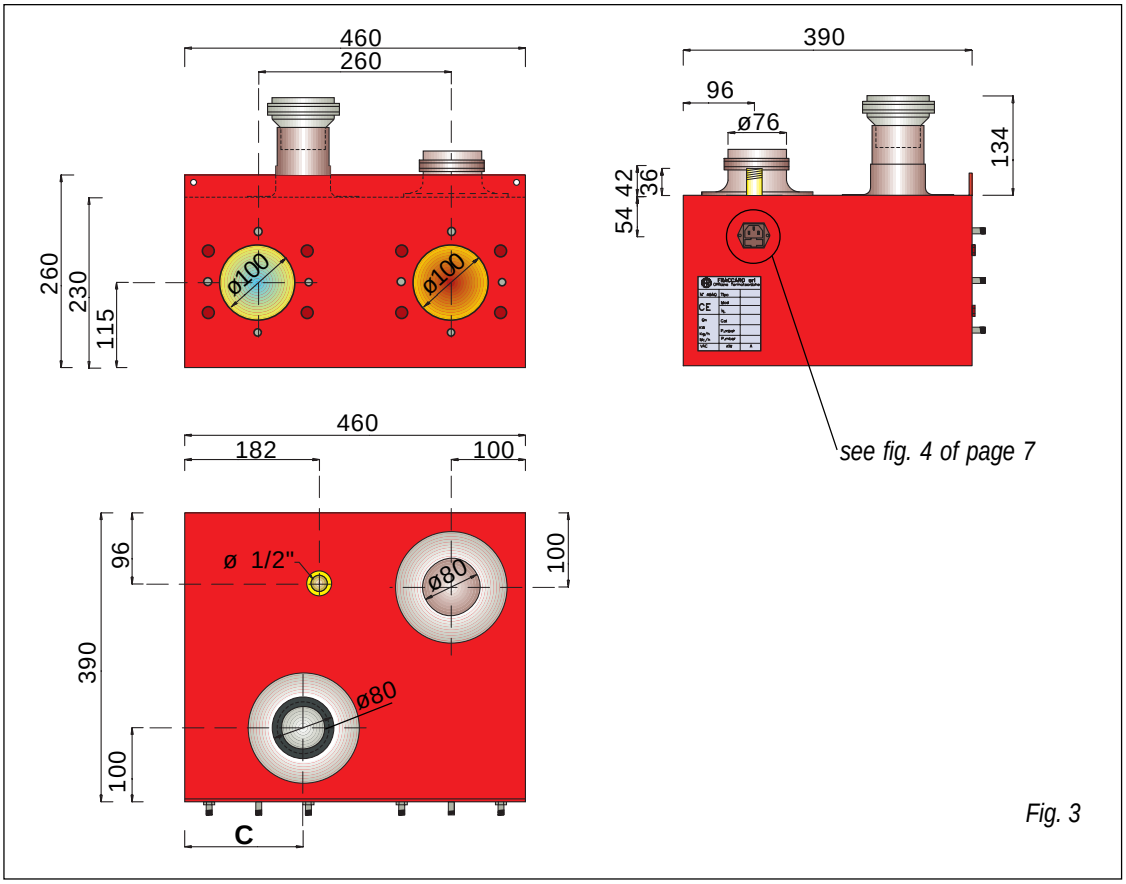


Fig. 3

	FRA2	FRA3	FRA4	FRA4.1	FRB3	FRB4	FRB4.1	FRC4	FRC5
C [mm]	160	160	160	160	160	185	185	185	185
	FRA2S2	FRA3S2	FRA4S2	FRA4.1S2		FRB4S2	FRB4.1S2		FRC5S2
C [mm]	160	160	160	160		185	185		185

Tab. 3

BURNER: INTERIOR VIEW*

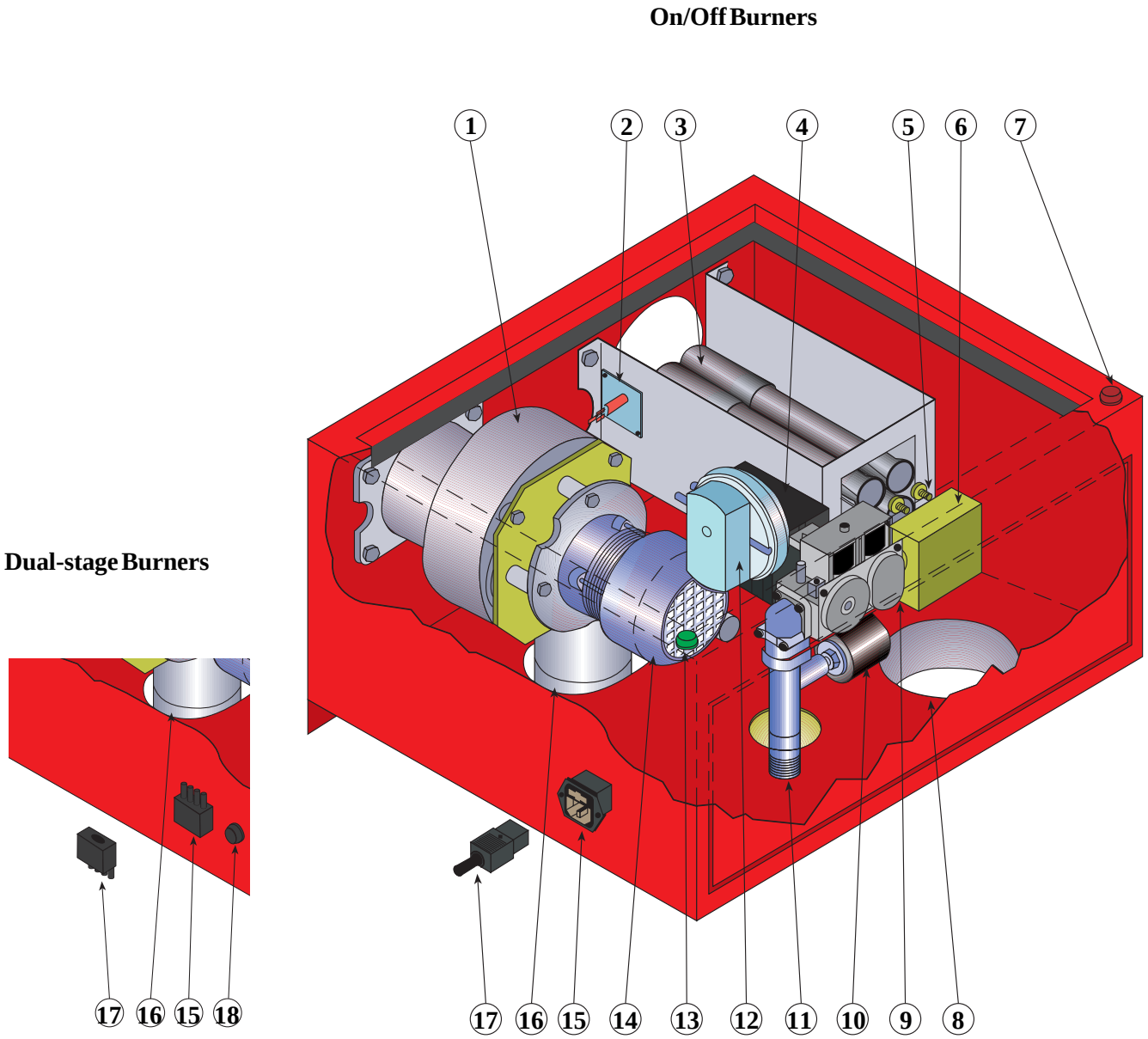


Fig. 4

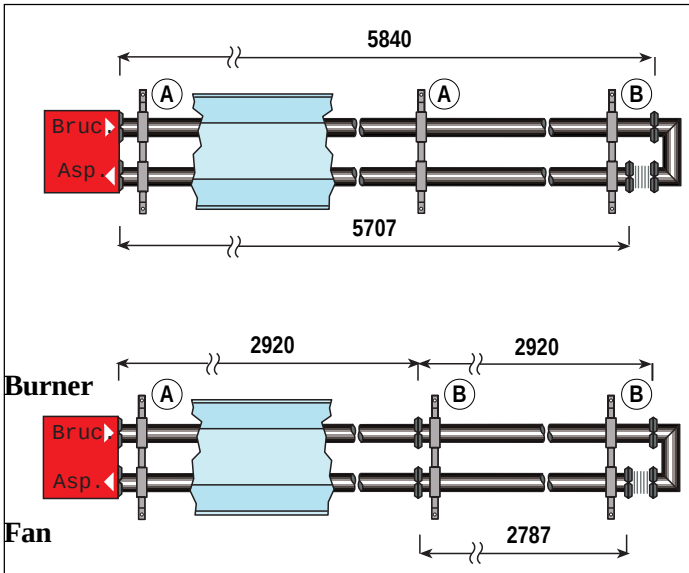
KEY:

1 = Scroll
2 = Electrode unit
3 = Venturi tubes
4 = Control box
5 = Nozzle
6 = Nozzle bearing block
7 = "Burner shut-down" indicator light (red)
8 = Suction tube fitting port
9 = Solenoid valve
10 = Gas pressure switch
11 = Gas supply union
12 = Air vacuum switch
13 = "Burner operating" indicator light (green)
14 = Fan
15 = Plug (with fuse 2A inside, only for On/Off burners)
16 = Burned gas exhaustion hole
17 = Socket
18 = Fuse 2A (only for Dual-Stage burners)

** For a clearer view of burner components, the above diagram shows an overturned burner.*

PANRAD ASSEMBLY OUTLINES

In fig. 5-6-7 you can find assembly outlines of radiant tubes with flanged pipes **in 3 or 6 mt. lengths** Place the dish support bracket type **A** and carrying bracket type **B** as follows.

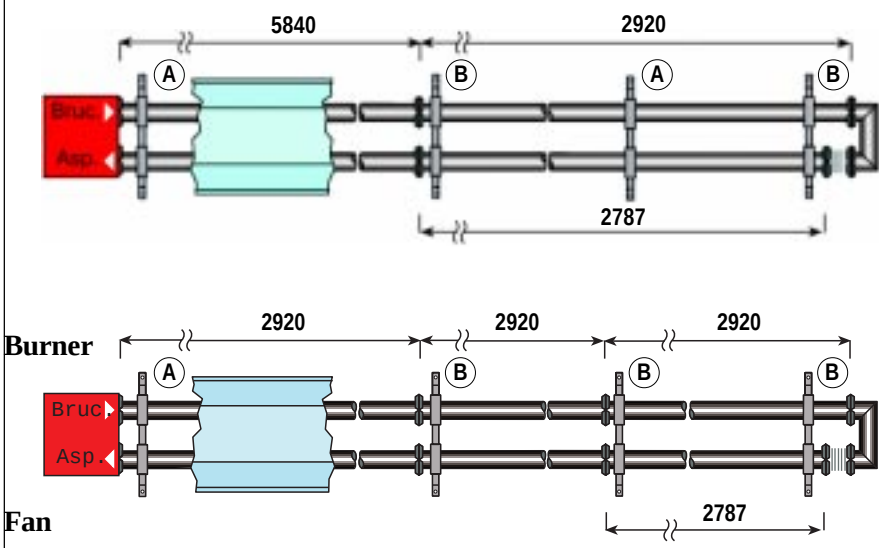


In 6 mt. lengths

In 3 mt. lengths

Models:
FRA2, **FRA3** and **FRA4.1**
FRA2S2, **FRA3S2** and **FRA4.1S2**

Fig. 5

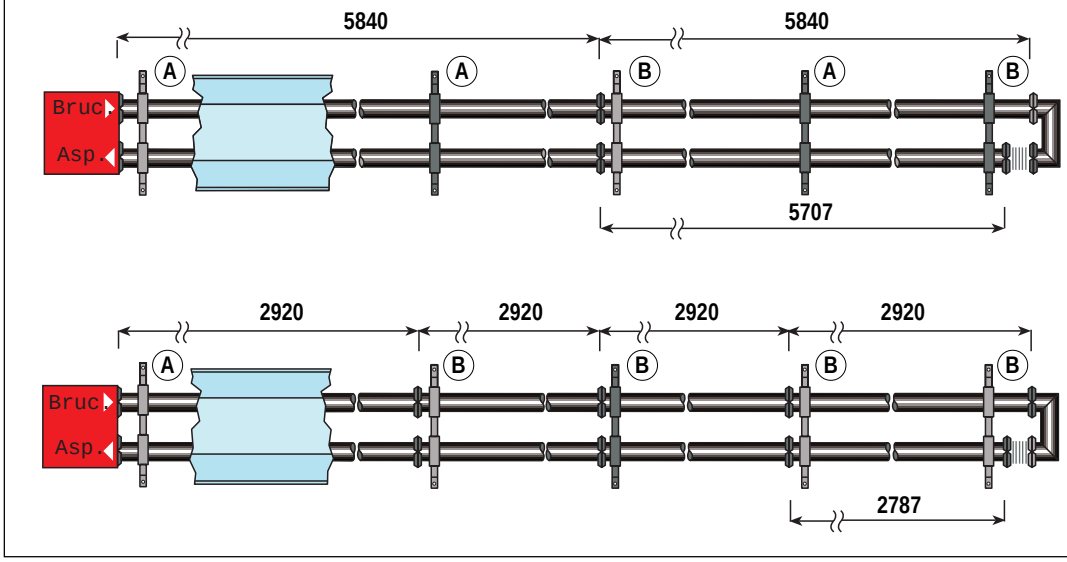


In 6 mt. lengths

In 3 mt. lengths

Models:
FRB3, **FRB4** and **FRB4S2**

Fig. 6



In 6 mt. lengths

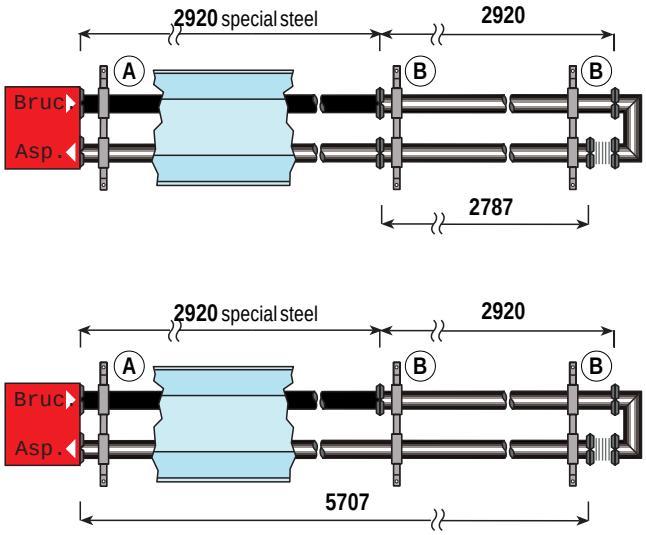
In 3 mt. lengths

Model:
FRC4

Fig. 7

PANRAD ASSEMBLY OUTLINES

In fig. 8-9-10 you can find assembly outlines of radiant tubes with flanged pipes **in 3 or 6 mt. lengths.** Place the dish support bracket type **A** and carrying bracket type **B** as follows.

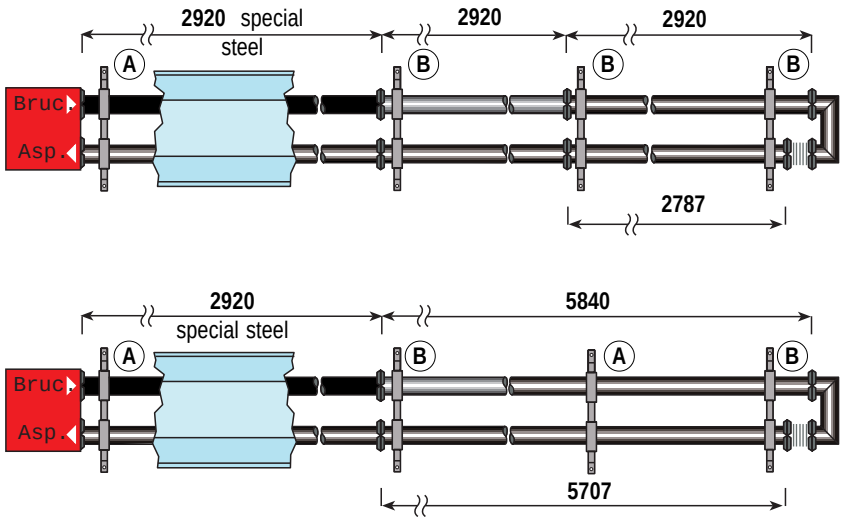


In 3 mt. lengths

In 3 and 6 mt. lengths

Models:
FRA4 and **FRA4S2**

Fig. 8

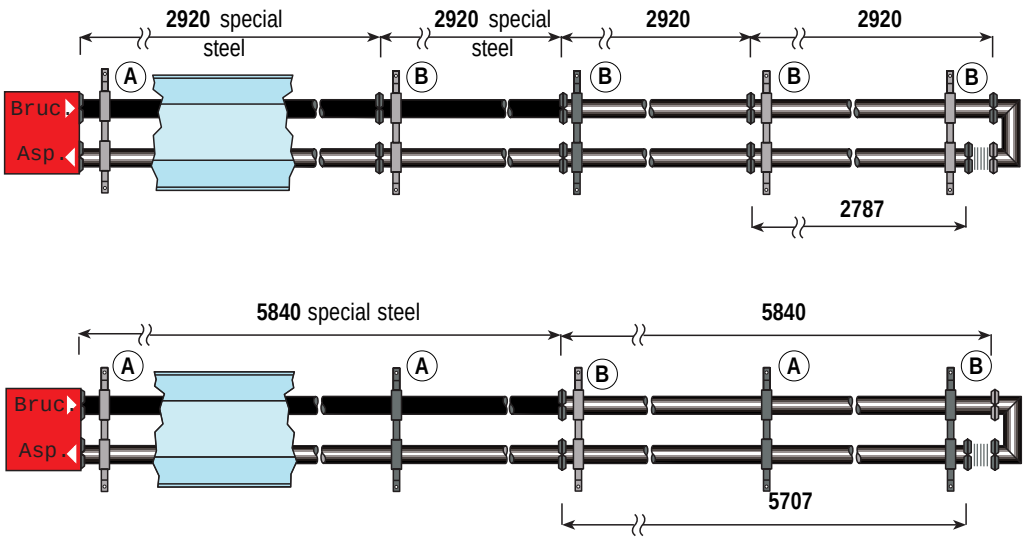


In 3 mt. lengths

In 6 mt. lengths

Models:
FRB4.1 and **FRB4.1S2**

Fig. 9



In 3 mt. lengths

In 6 mt. lengths

Models:
FRC5 and **FRC5S2**

Fig. 10

ASSEMBLY OF HEAT EXCHANGER PIPES

Radiant Tube is composed of:

1) A combustion/exhaustion group assembled inside a protective box;
2) Flanged pipes in different lengths;
3) A flanged head union;
4) A flanged expander;
5) A set of brackets type A and type B;
6) Reflecting dish in different pieces;
7) A set of ceramic fibre gaskets with M8 nuts and securing screws.

After the above mentioned material has been noticed, start assembly operation as follows:

a) Place the flanged exchanger pipes on the floor or on a flat surface, following outlines of page 8 and page 9 according to the model.
b) Place the pipe having the **5-holes flange** of fig. 11 detail A on **burner connection** of cover fig. 12, so that the 5° hole of the flange is inserted on the steel screw welded on the cover as shown in fig. 13 (burner side). In order to ease the identification, the 5-holes flange is painted **red**.

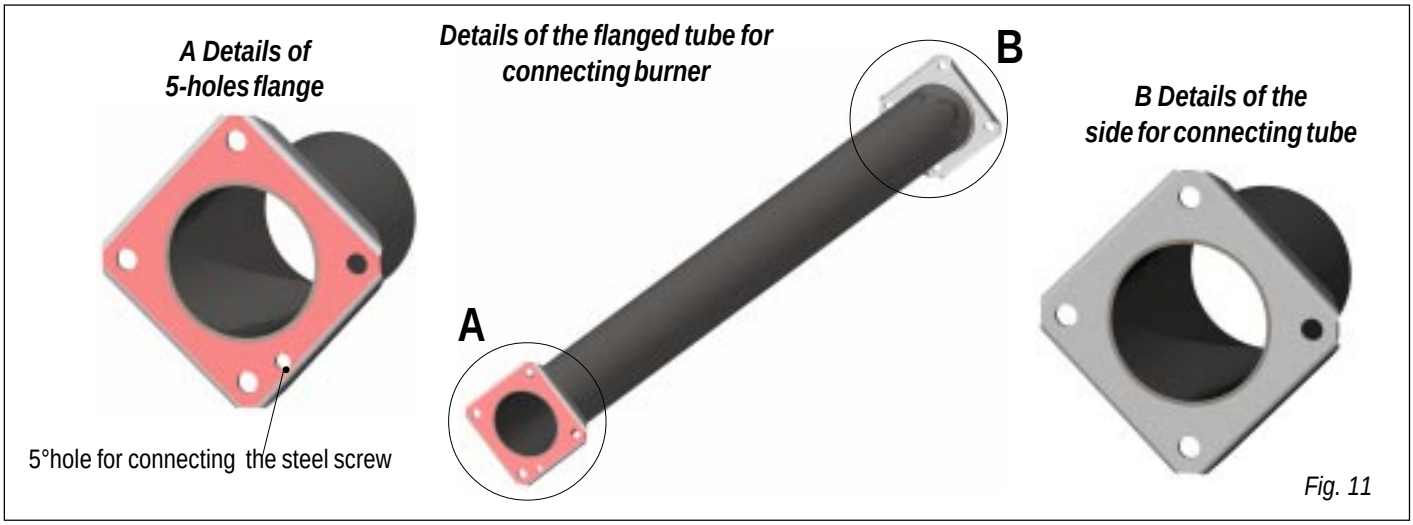


Fig. 11

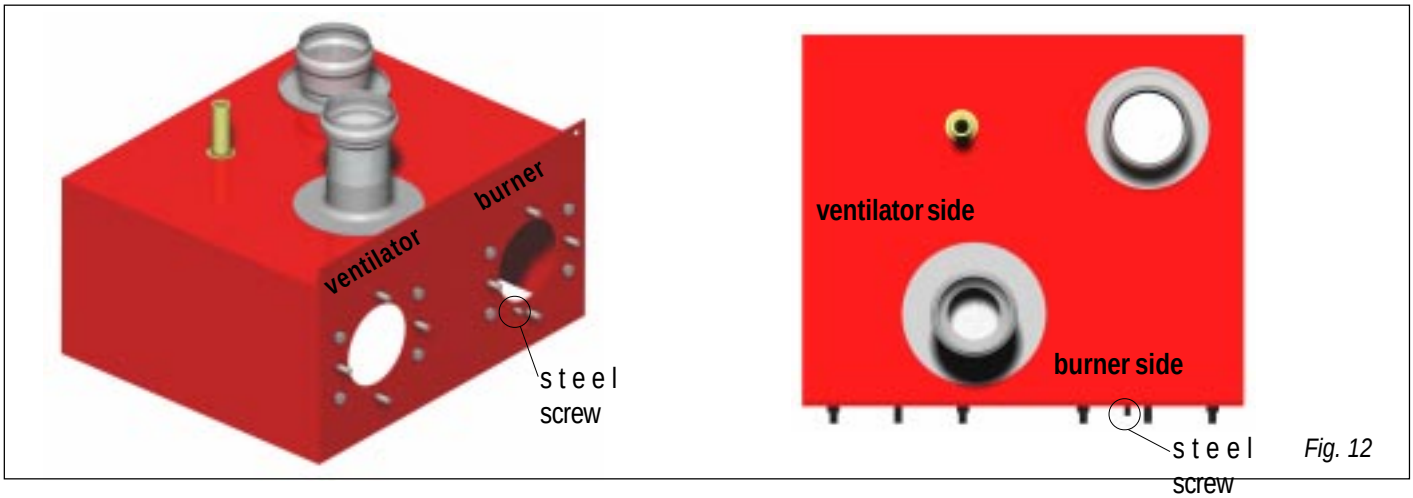


Fig. 12

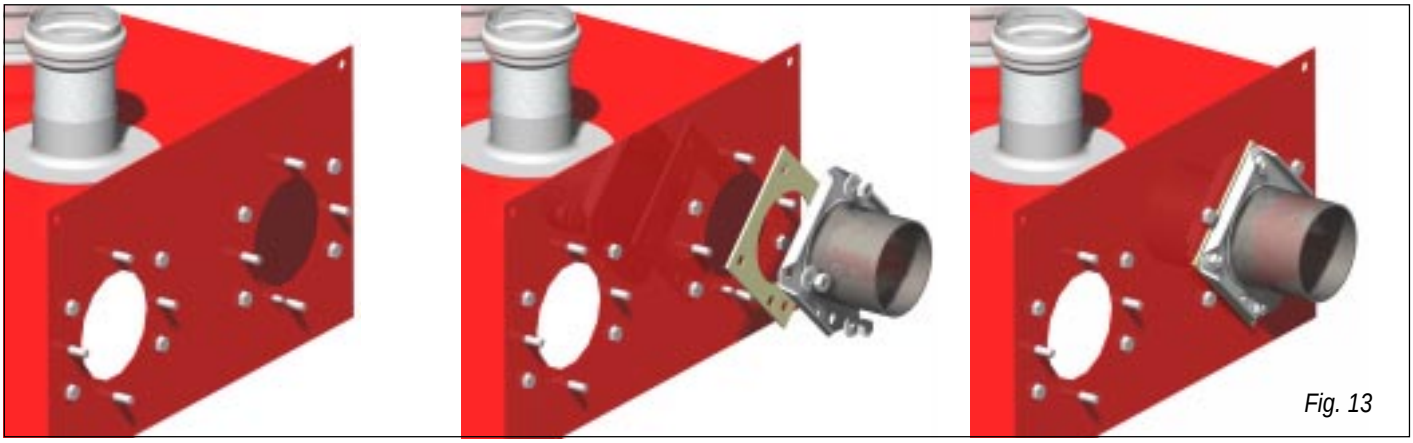


Fig. 13

c) Place **the flanged short pipe fig. 14 (2787 or 5707 mm. length)** ***on the side of the expander*** as shown on fig. 15-16.
To ease identification of this short pipe, the flange is white painted.

Key:
1 = Flanged head union
2 = M8 nut
3 = Washer
4 = Ceramic fibre gasket
5 = Flanged expander
6 = M8 screw
7 = Short flanged pipe
8 = Standard flanged pipe

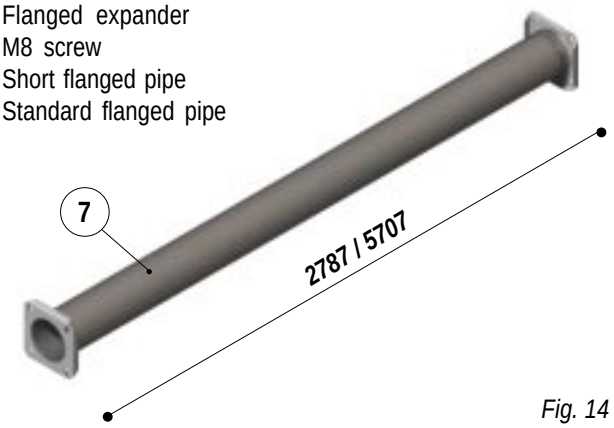


Fig. 14

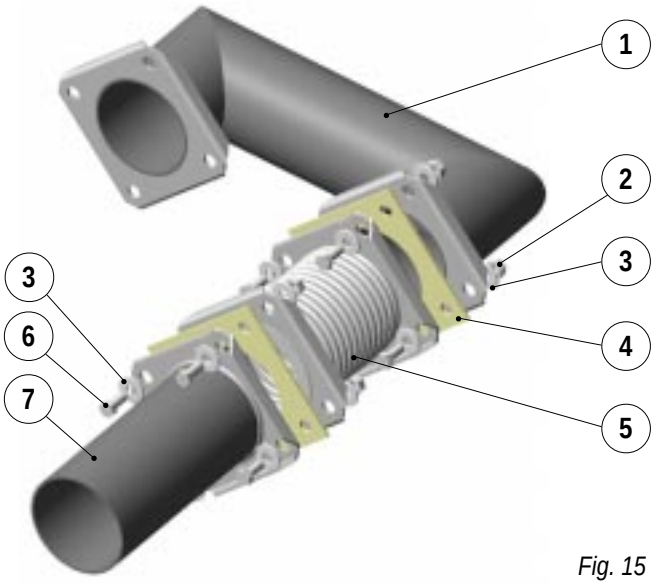
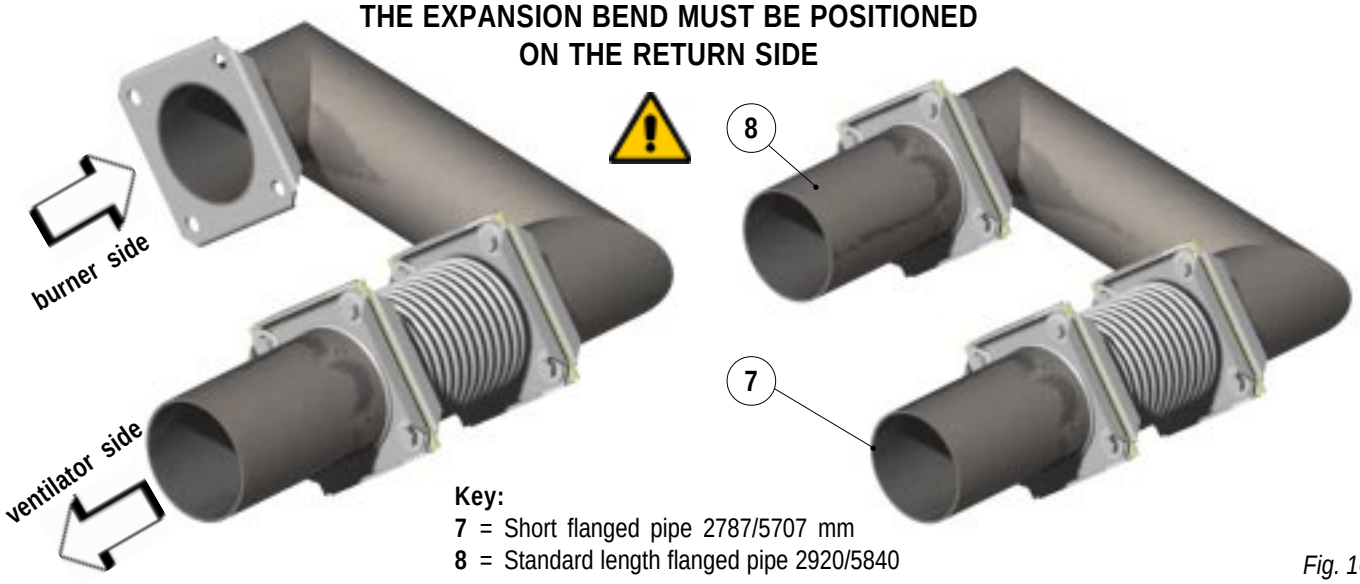


Fig. 15

THE EXPANSION BEND MUST BE POSITIONED ON THE RETURN SIDE



Key:
7 = Short flanged pipe 2787/5707 mm
8 = Standard length flanged pipe 2920/5840 mm

Fig. 16

d) Insert **one gasket** on every **connection between pipes** of the circuit (fig. 17), tighten through bolts and washers (fig. 18).

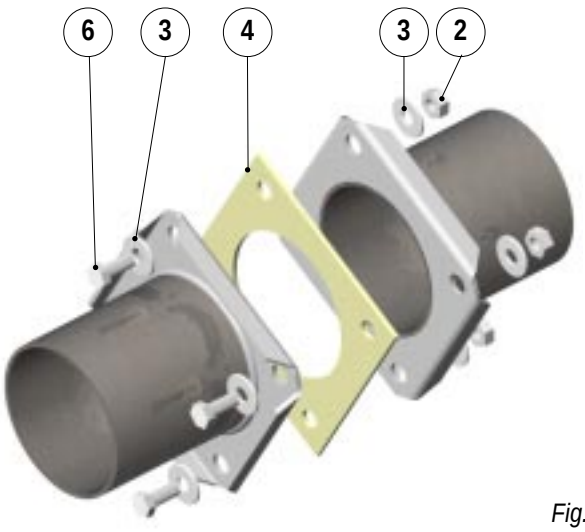


Fig. 17

Fig. 18

e) Upon completion, be sure that radiant tube is as shown on fig. 19, otherwise repeat and check all operations as previously described.

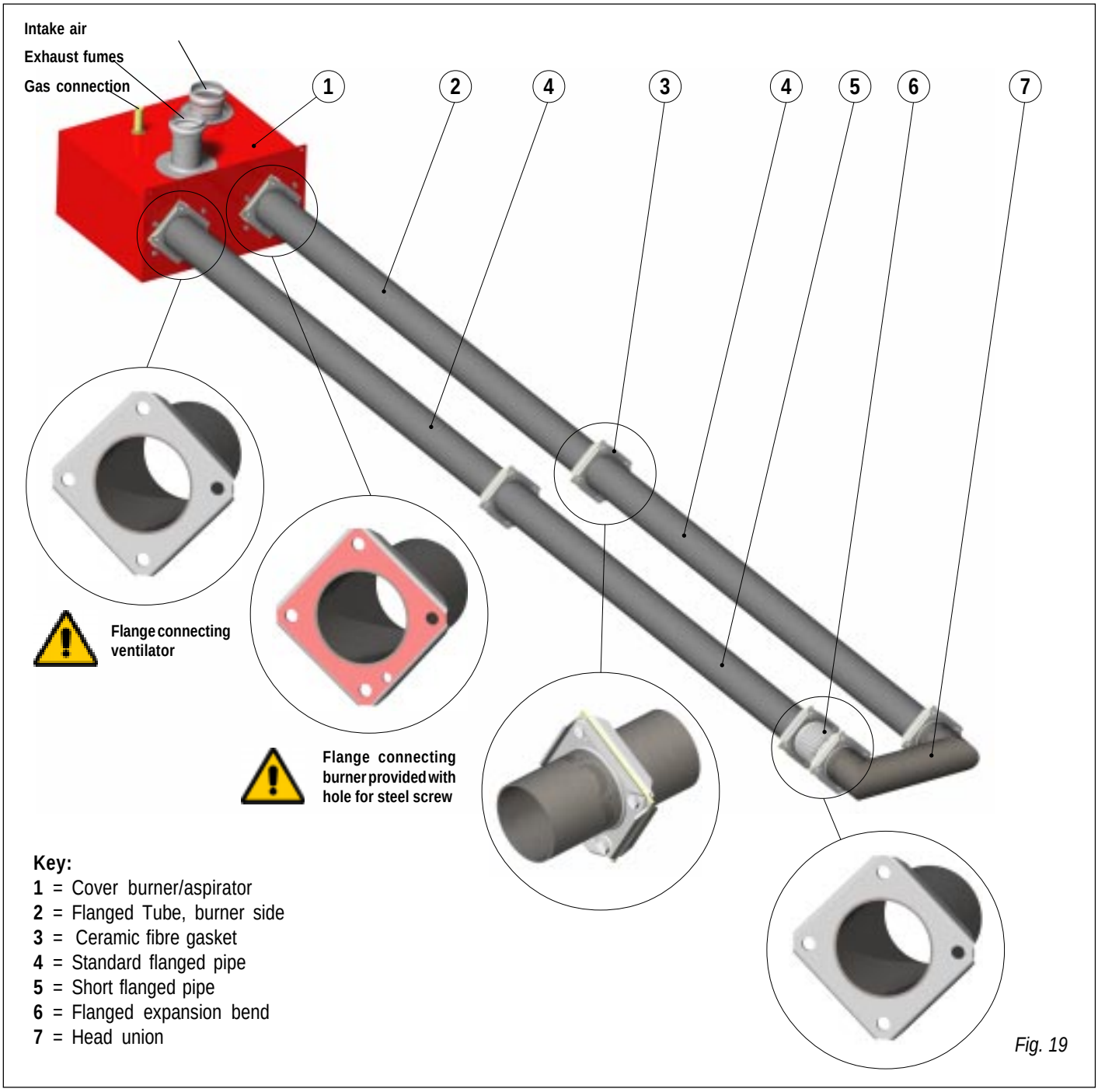


Fig. 19

WRONG INSTALLATION

On fig. 20 a **WRONG** installation is shown, the expansion bend must **NOT** be positioned on **delivery pipe** or burner side.

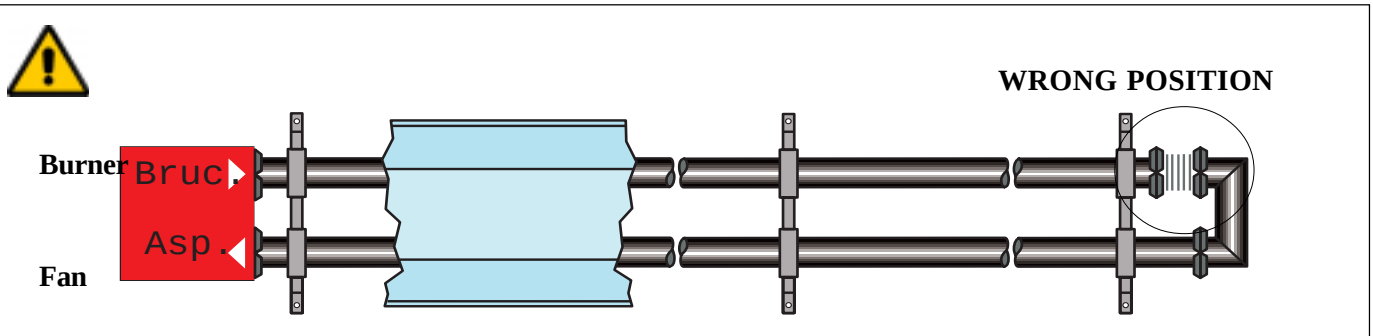


Fig. 20

ASSEMBLY OF CARRYING BRACKET type B

- Place the carrying bracket type B fig. 21 as shown in fig. 5 - 6 - 7 - 8 - 9 - 10 of pages 8-9.
- Rest the brackets type B on the lower part of the pipes as shown in fig. 22 - 23.
- Open the tabs on the small bracket slightly as shown in fig. 24 and insert the carrying bracket in the small bracket fig. 25, repeating this operation for the other exchanger and all the carrying brackets to be mounted.
- Upon completion, close the tabs on the small bracket again, taking care not to break and/or crack the tab.

Carrying bracket type B

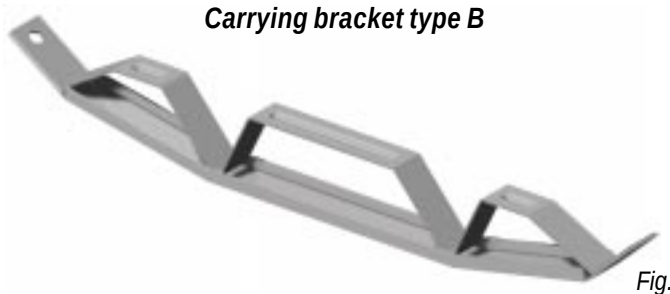


Fig. 21

Fig. 22

Fig. 23

Open the tabs on the small bracket

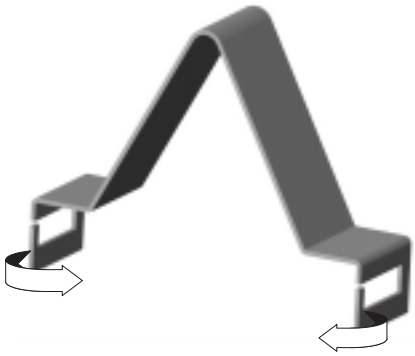
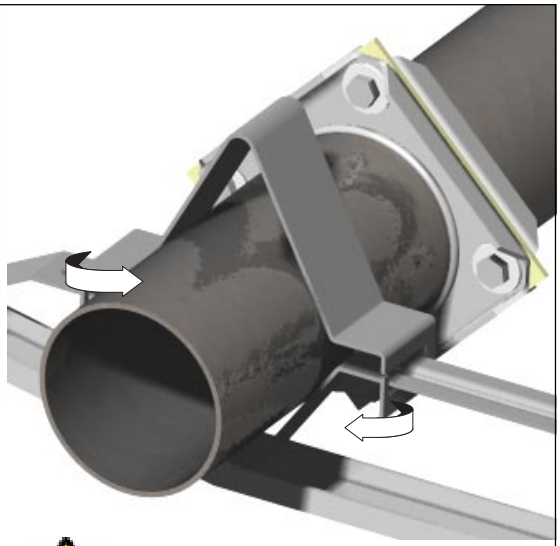


Fig. 24

TAKE CARE NOT TO BREAK AND/OR CRACK THE TABS ON THE SMALL BRACKET.



UPON COMPLETION OF ASSEMBLY OPERATIONS, TAKE CARE TO CLOSE THE TABS ON THE SMALL BRACKET.

Fig. 25

ASSEMBLY OF DISH SUPPORT BRACKET type A

- Place the dish support brackets type A fig. 26 as shown in fig. 5 - 6 - 7 - 8 - 9 - 10 of pages 8-9.
- Rest the brackets type A on the lower part of the pipes as shown in fig. 27 - 28.
- Open the tabs on the small bracket as shown in fig. 29, then insert the carrying bracket in the small bracket fig. 30 repeating this operation for the other exchanger and all the dish support brackets type A to be mounted.
- Upon completion, close the tabs on the small bracket again, taking care not to break and/or crack the tab.

Dish support bracket type A

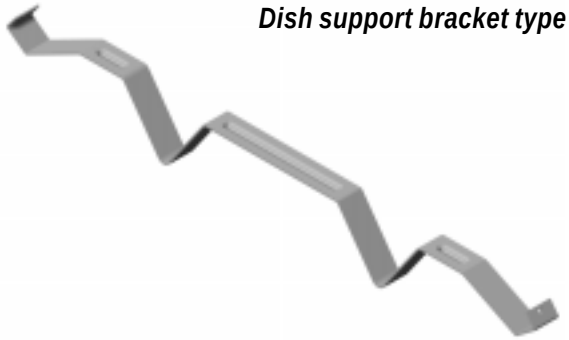


Fig. 26

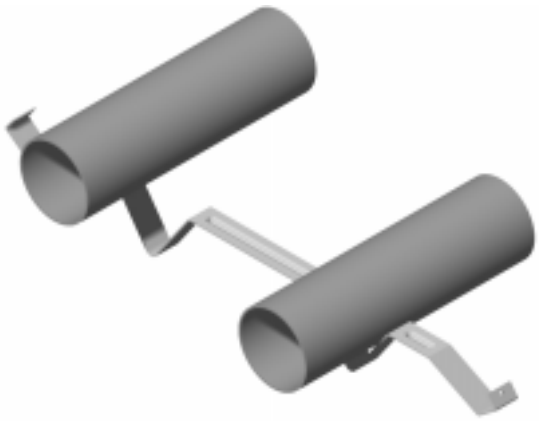


Fig. 27

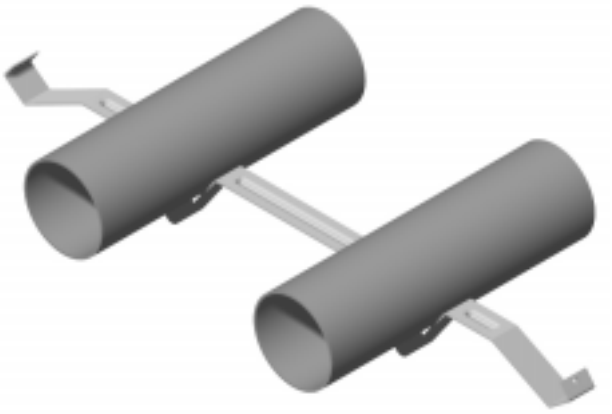


Fig. 28

TAKE CARE NOT TO BREAK AND/OR CRACK THE TABS.

Open the tabs on the small bracket

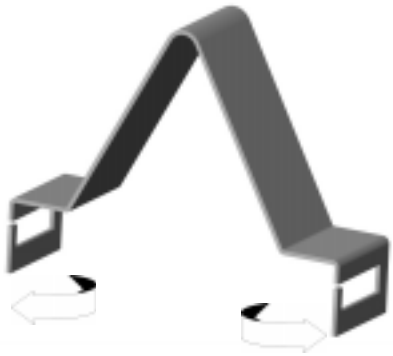
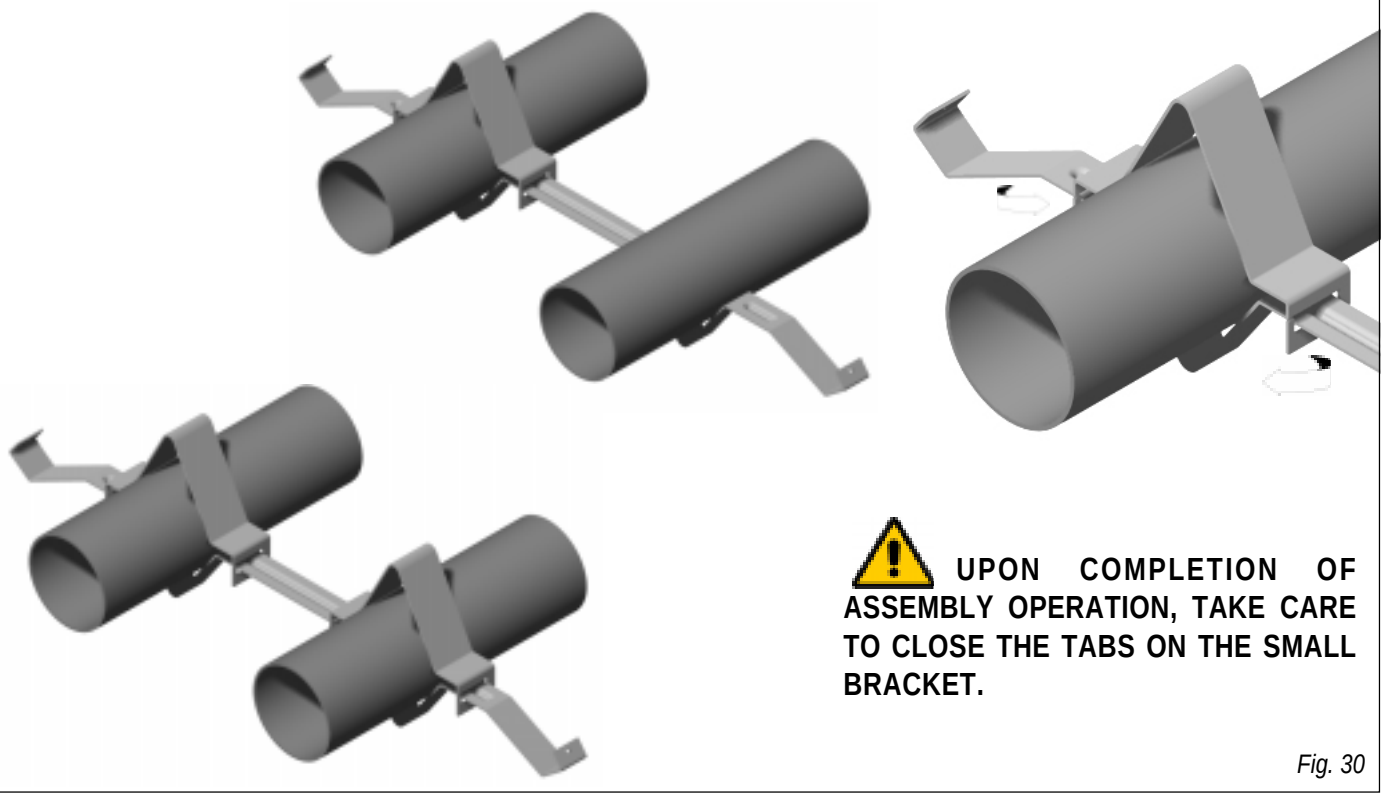


Fig. 29



UPON COMPLETION OF ASSEMBLY OPERATION, TAKE CARE TO CLOSE THE TABS ON THE SMALL BRACKET.

Fig. 30

ASSEMBLY OF REFLECTORS

- Take out the protective film covering the reflector of fig. 31;
- Rest the reflectors on the brackets you have just assembled as shown in fig. 32 - 33;
- Pass the spring supplied over the reflector between the brackets and insert the ends of the spring in the holes type A and type B, then fold the ends so that they cannot escape fig. 34.
- This spring serves to fasten the reflector to the small bracket so that it does not vibrate.
- Connect the reflectors each other applying a self-threading screw as shown in fig. 35.

Reflector

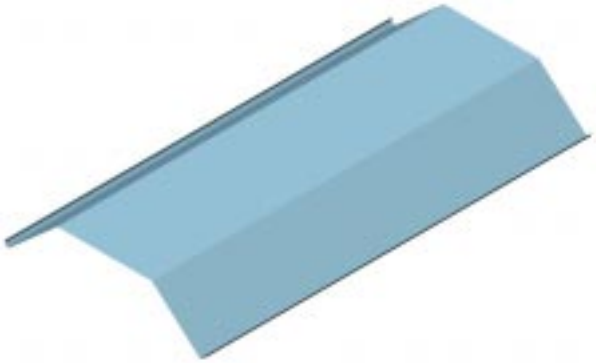


Fig. 31

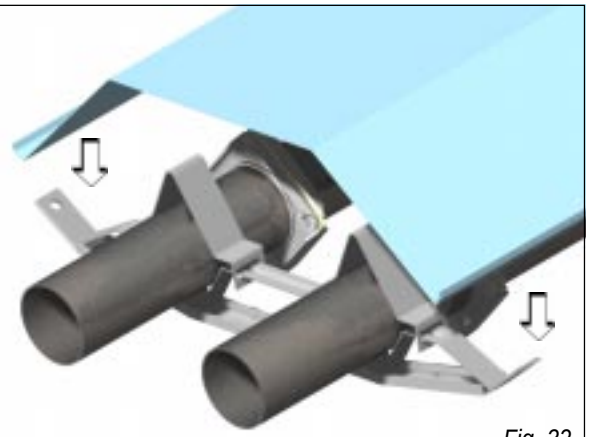
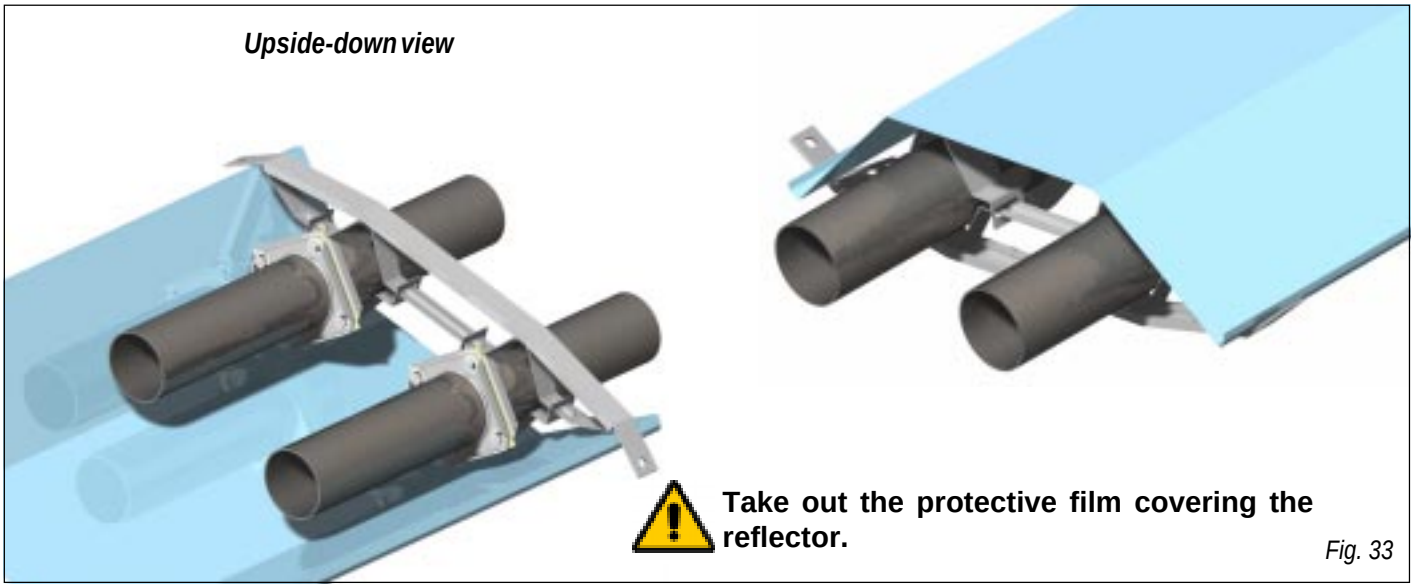


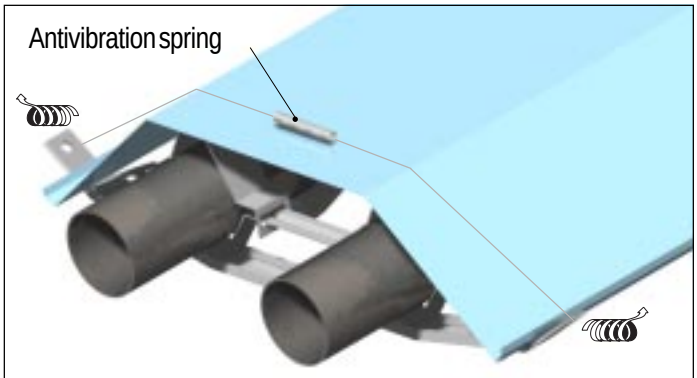
Fig. 32

Upside-down view



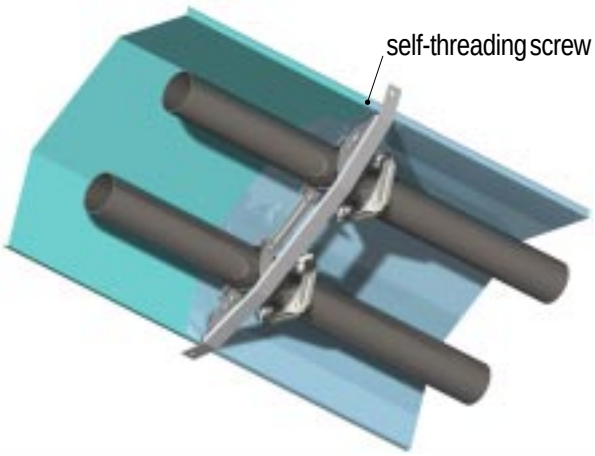
Take out the protective film covering the reflector.

Fig. 33



Fold the ends of the spring into the holes of both side of the bracket.

Fig. 34



Connect the reflectors on both sides using self-threading screws where the reflectors overlap

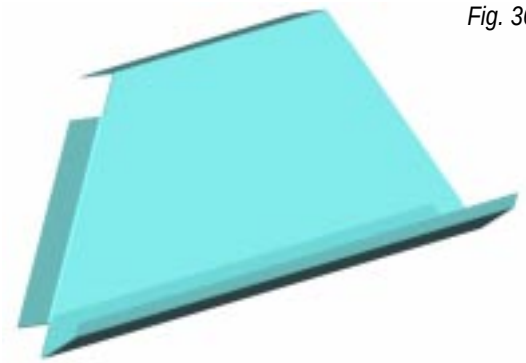
Fig. 35

Upon completion, apply a self-threading screw in the point where the reflectors overlap <u>taking care not to connect the reflector to the carrying bracket</u>, check that the protective film has been taken out.

ASSEMBLY OF REFLECTOR END CLOSURE

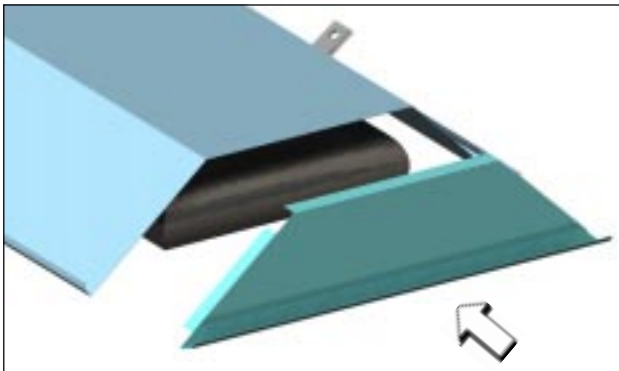
After that reflectors have been assembled to radiant tubes, insert the reflector end closure fig. 36 using self-tapping screws as shown in fig. 37. Upon completion, take out the protective film covering the reflector end closure. The **distance between head union and reflector end closure** shall be at least **5 cm**, so that the exchanger pipes cannot be in contact with the internal surface of reflector end closure while expanding.

Fig. 36



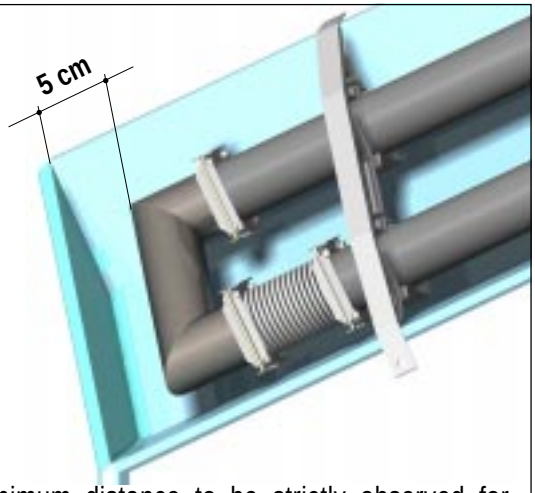
Details of reflector end closure

Fig. 37

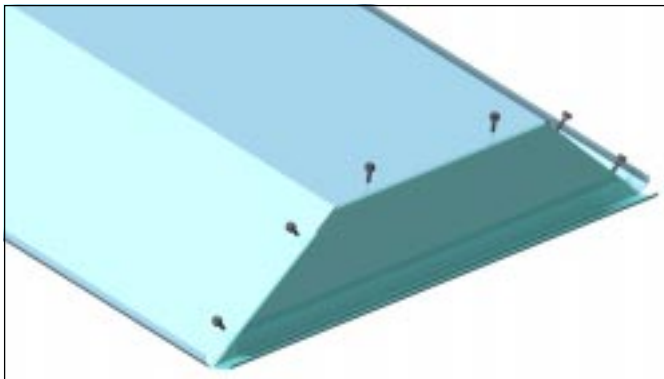


Details of assembly operation of reflector end closure through self-tapping screws.

Fig. 38



Minimum distance to be strictly observed for assemblying reflector end closure



Fixing through self-tapping screws

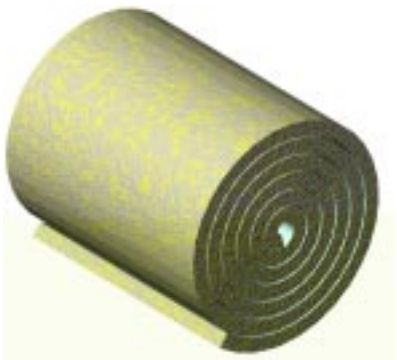
Fig. 39

INSTALLATION OF UPPER INSULATION

A glasswool mattress in rolls fig.40 is supplied standard for some PANRAD models and on request for remaining models in rolls **f**g. 40. It has to be placed above reflector of radiant tube through some shaped sheet profiles fig. 41.

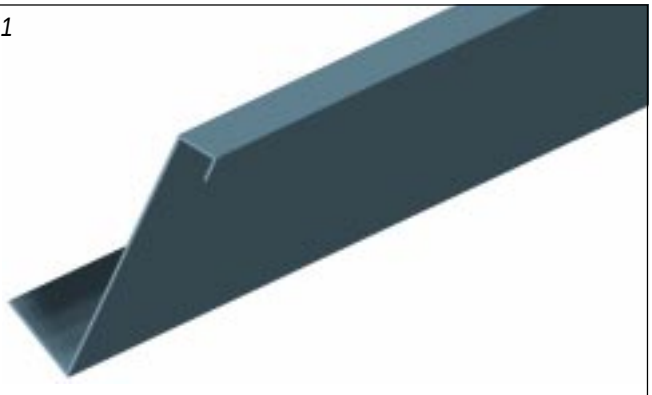
1) Stretch the insulating mattress above reflectors taking care that the aluminium foil is in the higher part, fig. 42 of page 17.
2) Cut the mattress already stretched, up to reflector end closure, fig. 43 of page 17.
3) Fix corner units on the reflectors through **a screw to be placed down the middle**, fig. 44 of page 17.
4) Last operation, insert the antivibration springs according to indications of page 15 fig. 34.

Fig. 40



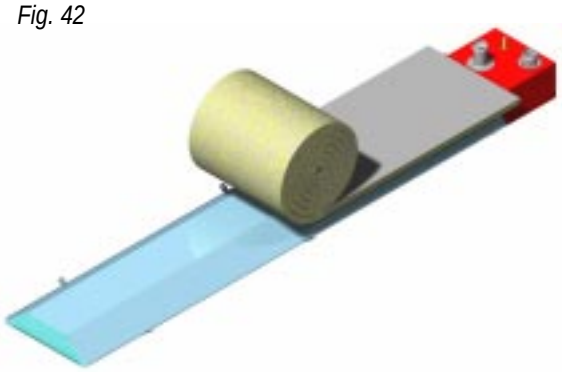
Insulating mattress supplied in rolls

Fig. 41



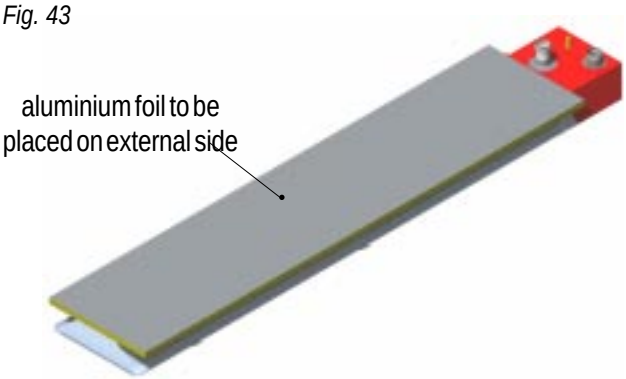
Details of shaped steel profile or corner units for insulation fixing

Fig. 42



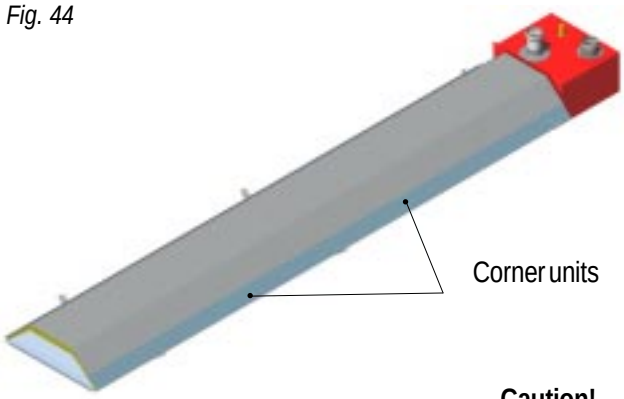
Stretch the insulating mattress

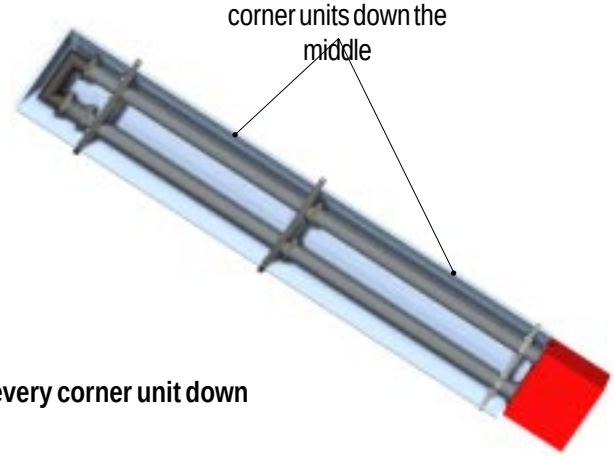
Fig. 43



Cut the insulating mattress made-to-measure

Fig. 44

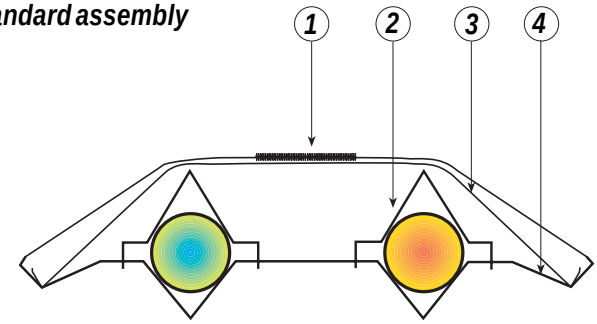




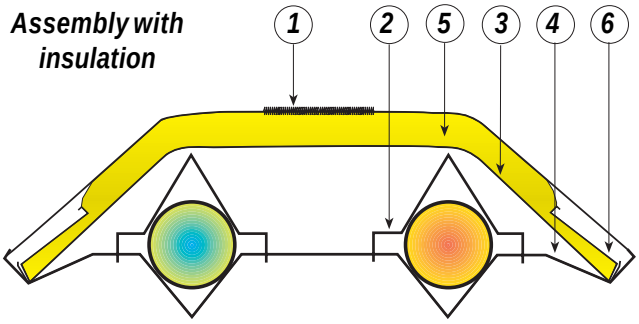
Caution!
Fix one screw on every corner unit down the middle

DETAILS OF ASSEMBLY OPERATION

Standard assembly



Assembly with insulation

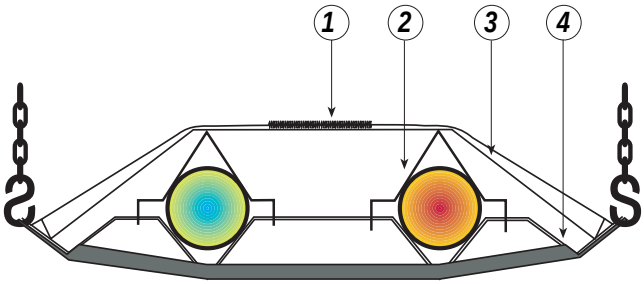


Key:

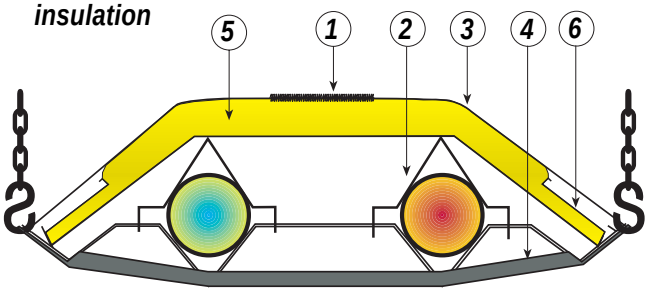
1 = Antivibration spring
2 = Small bracket
3 = Reflector
4 = Dish support bracket type A
5 = Insulation
6 = Corner unit

Front view of Radiant Tube with bracket type A. *Fig. 45*

Standard assembly



Assembly with insulation



Key:

1 = Antivibration spring
2 = Small bracket
3 = Reflector
4 = Carrying bracket type B
5 = Upper insulation
6 = Corner unit

Front view of Radiant Tube with carrying bracket type B.

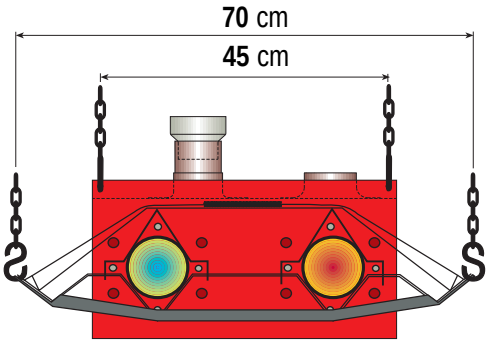
Fig. 46

CEILING INSTALLATION

Radiant tube shall be installed a
s follows:

- If roof is in reinforced concrete, hook the fastening eye bolts to the ceiling; if there is light roofing, hook the fastening eye bolts on bars placed between one upright and the next. The chains should be placed crosswise **with an interaxis of 70 cm between them**, except for the **first two** that are hooked to the burner and have **an interaxis of 45 cm.** Furthermore the chains should respect longitudinally the distances obtained between one carrying bracket and the next as shown in fig. 47;
- Raise the radiant tube (completely assembled on the ground) up to the height of installation, then block it in place by inserting and tightening the "S" hooks in the chains, so that it cannot move out as shown in fig. 48;
- On a ceiling with Y beams, the fastening points for the chains can be obtained by fastening 1"1/4 pipes to the ends of the Y beams as shown in fig. 49.

Front view of radiant tube
Interaxis for radiant tube hooking



Front above of radiant tube
Longitudinal distances for radiant tube hooking

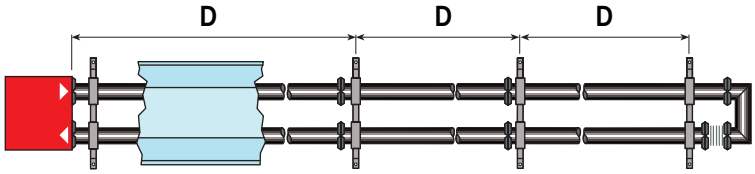
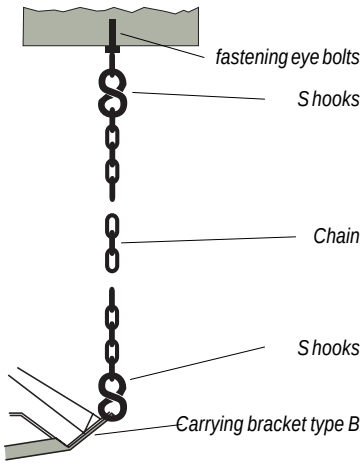


Fig. 47



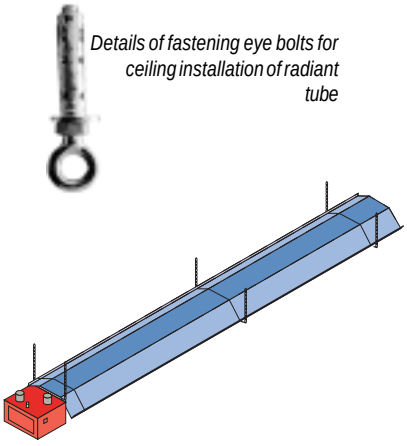
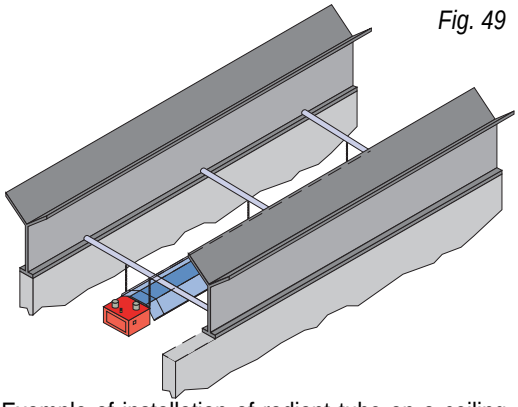


Fig. 48

Fig. 49



Example of installation of radiant tube on a ceiling with "Y" beams. The chains can be hooked by fastening pipes to the ends of the beams and then using these pipes as fastening points for the chains

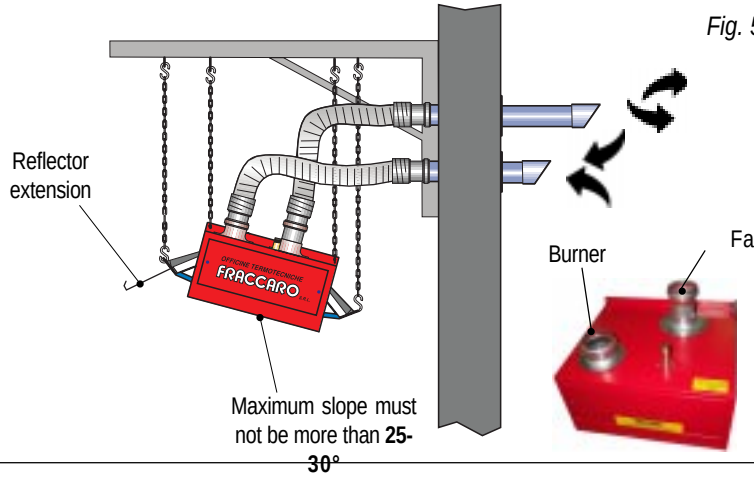
WALL INSTALLATION

In case radiant tube shall be installed on wall, take care of following indications:

- fix on the "burner" side of reflector theextension, by using self-tapping screws;
- **take care that the combustion group is in the higher part and exhaustion group is in the lower part;**
- maximum allowed slope is 25-30° as shown in fig. 50

OBSERVE STRICTLY THE ABOVE MENTIONED INDICATIONS

Fig. 50



INSTALLATION OF INIAKE AND EXHAUST CHIMNEY THROUGH ROOF

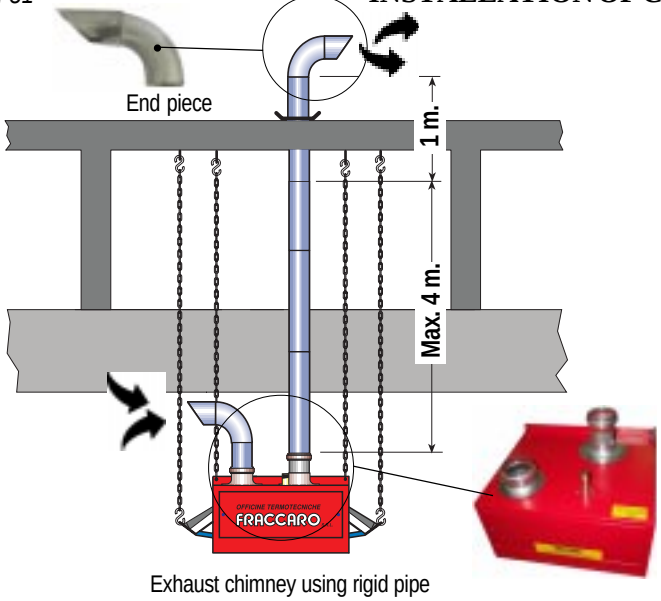
INSTALLATION CHIMNEY TYPE B_{22} AND C_{32}

In order to install correctly suction and/or exhaust chimney, take care of the following indications:

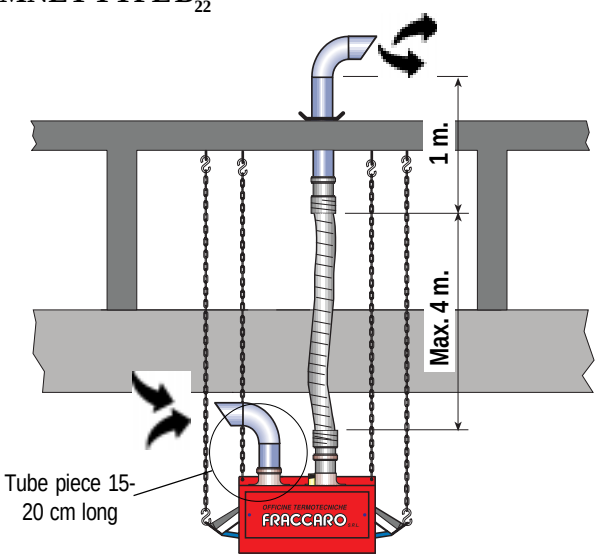
1) After fastening the Radiant Tube to the ceiling, use a milling drill with a diameter of Ø 80 mm, not depending on the type of PANRAD installed, drill one hole in the roof for chimney type B_{22} see fig. 51 or two holes in the roof for chimney type C_{32} see fig. 52 of page 20 corresponding to the perpendicular of the burned gases exhaustion port in the burner.
2) In case we have an air-tight installation, make the intake chimney so that the end pieces are each other placed in opposite position as shown in fig. 52 of page 20. In this way the intake pipe does not draw in the fumes as they are released by the exhaust pipe.
3) The total extension of **each of the pipes for intake and exhaust should not be longer than 4 m.** and should not contain any bend or narrowing. If it should be necessary to insert any bend, calculate **1 linear meter** less for **each bend**. Diameter of intake and exhaust chimney shall be 80 mm.
4) Install the roof valley in the hole previously done, taking care to seal any space between roof valley and the roof with silicon. In this way it is ensured that no moisture or water can leak in.
5) By using tube pieces and bends having male/female connection, connect the outlet between the roof valley on the ceiling and the connection to the burner, making sure that all connections are perfectly tight.
6) Make sure that the intake and exhaust chimney are provided with bird protective net on end piece.
7) If flexible pipe is used for intake and/or exhaust chimney, install on the roof valley and on the fitting ports of the burner the special connections for flexible pipe as shown on fig. 51 and 52.

Fig. 51

INSTALLATION OF CHIMNEY TYPE B_{22}

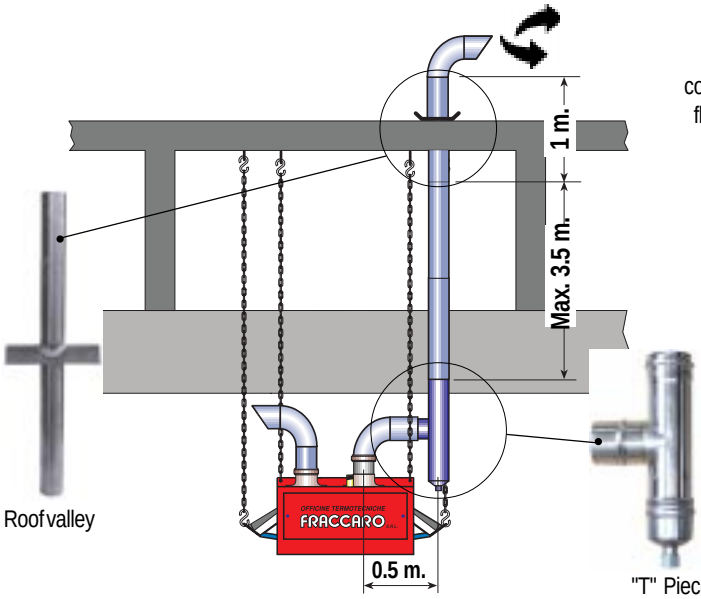


Exhaust chimney using rigid pipe

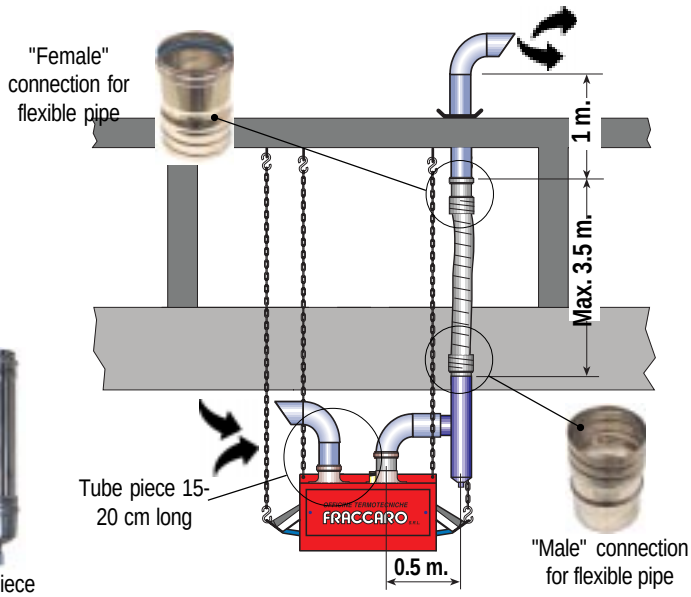


Exhaust chimney using flexible pipe

SUGGESTED INSTALLATION FOR FRB.. - FRC.. MODELS



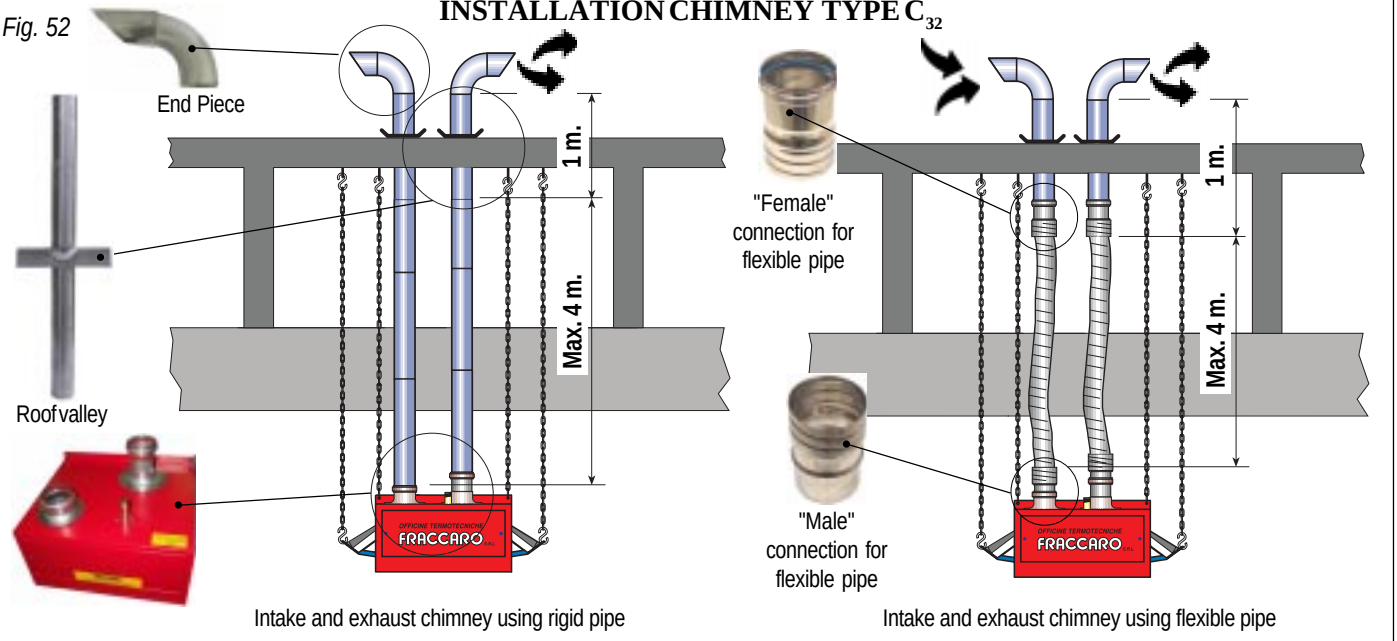
Exhaust chimney carried out with "T" condensation trap and rigid pipe



Exhaust chimney carried out with " T" condensation trap and flexible pipe

Fig. 52

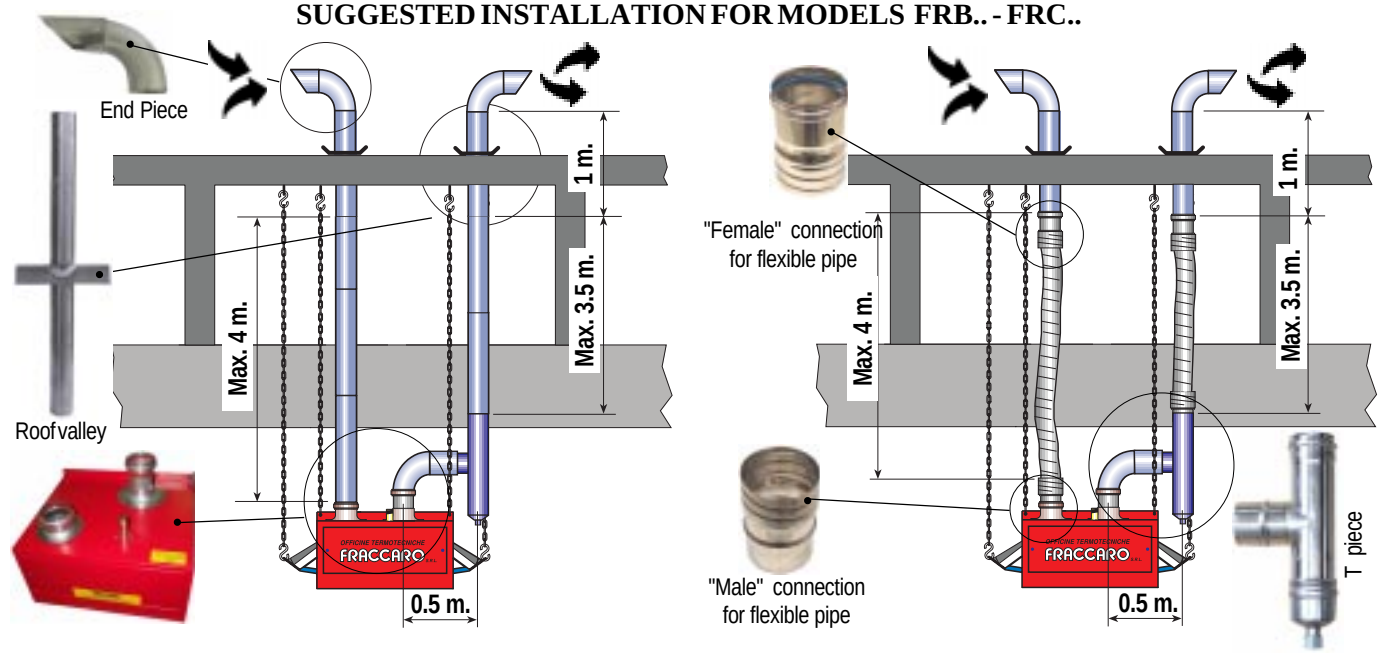
INSTALLATION CHIMNEY TYPE C_{32}



Intake and exhaust chimney using rigid pipe

Intake and exhaust chimney using flexible pipe

SUGGESTED INSTALLATION FOR MODELS FRB.. - FRC..



Intake and exhaust chimney using rigid pipe

Intake and exhaust chimney using flexible pipe

INSTALLATION OF INTAKE AND EXHAUST CHIMNEY THROUGH WALL

CHIMNEY INSTALLATION TYPE B_{22} and C_{12}

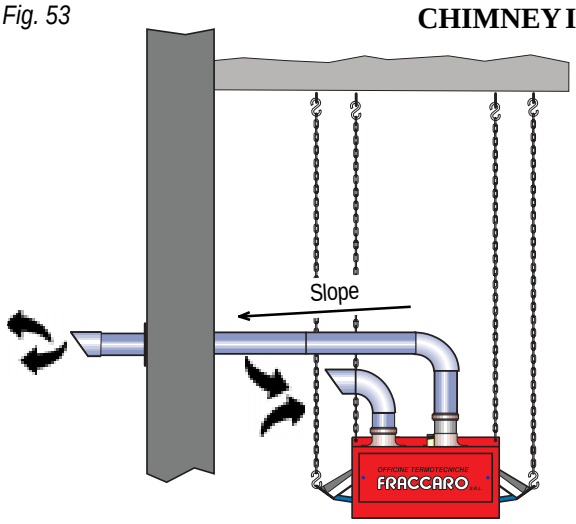
To make a proper installation of exhaust and/or intake chimney, follow these indications here below:

1) After fastening the Radiant Tube to the ceiling, use a milling drill with a diameter of Ø 80 mm, not depending on the type of PANRAD installed, drill one hole in the roof for chimney type B_{22} see fig. 53 or two holes in the roof for chimney type C_{12} see fig. 54.
2) In case we have an air-tight installation, the **intake chimney shall be placed lower on the wall than the exhaust chimney**, so as to create a **distance between them** of at least **50 cm.** as shown in fig. 54. In this way the intake pipe does not draw in the fumes as they are released by the exhaust pipe.
3) The total extension of **each of the pipes for intake and exhaust should not be longer than 3,5 m.** and should not contain any narrowing. If it should be necessary to insert any bend, calculate **1 linear meter** less for **each bend**. Diameter of intake and exhaust chimney shall be 80 mm.
4) By using tube pieces and bends having male/female connection, connect the outlet between the roof valley on the ceiling and the connection to the burner, making sure that all connections are perfectly tight.
5) Make sure that the intake and exhaust chimney are provided with bird protective net on end piece.
6) If flexible pipe is used for intake and/or exhaust chimneys, install on the flashing and on the fitting ports of the burner the special connections for flexible pipe as shown on fig. 54.

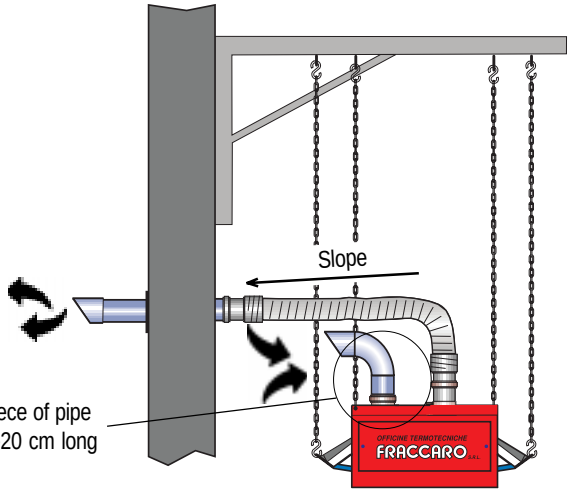
If the chimney reaches the maximum length, position the pipe at an angle to create a height difference to facilitate the release of condensation by the exhaust pipe.

Fig. 53

CHIMNEY INSTALLATION TYPE B_{22}



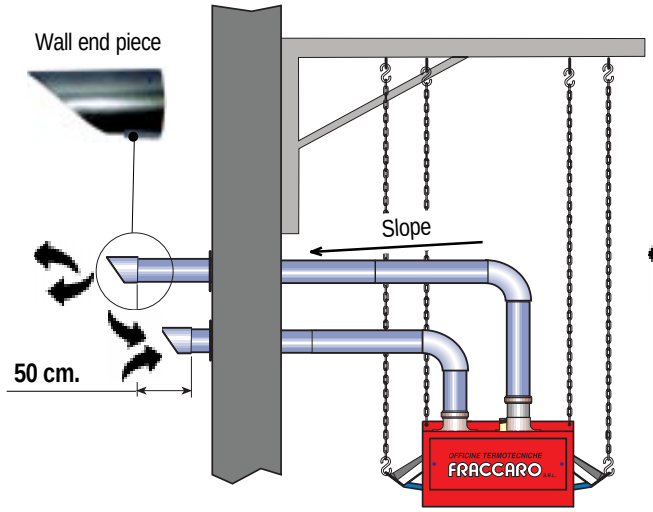
Exhaust flue using rigid pipe



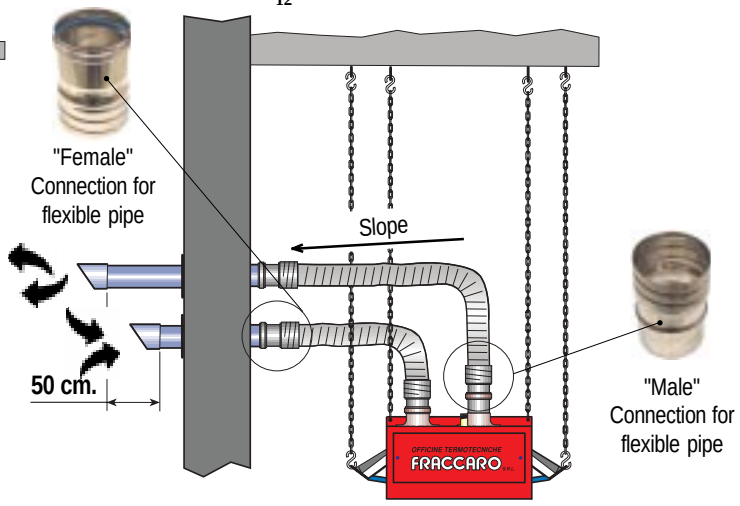
Exhaust flue using flexible pipe

Fig. 54

CHIMNEY INSTALLATION TYPE C_{12}



Exhaust flue using steady pipe



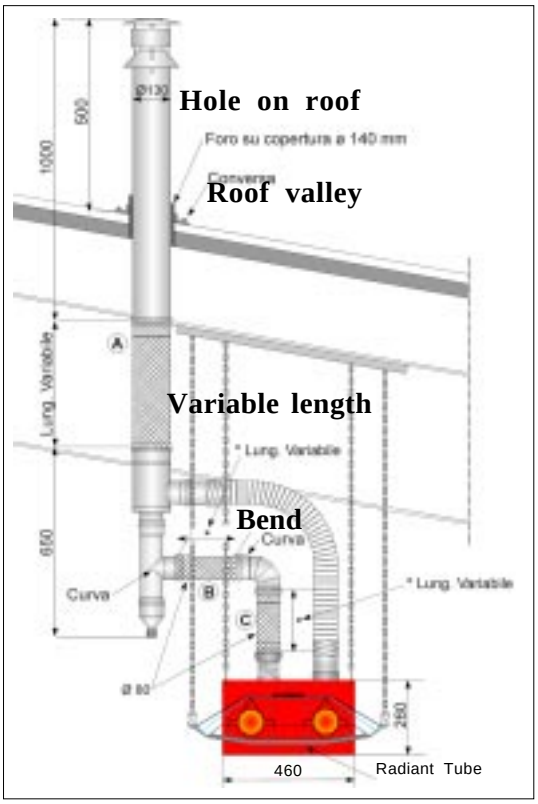
Exhaust flue using flexible pipe

CONCENTRIC EXHAUST AND SUCTION FLUE

FLUE INSTALLATION TYPE C_{32}

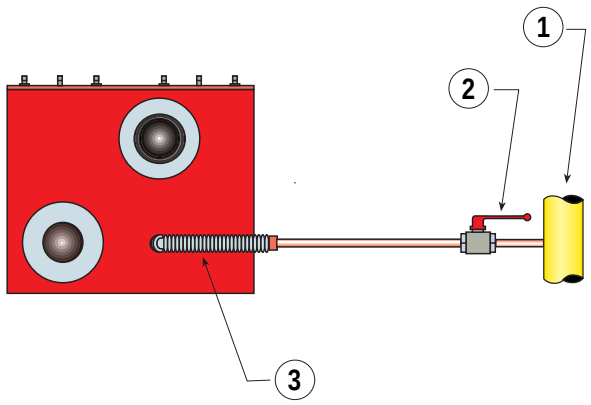
In order to install correctly exhaust and/or intake chimney follow the instructions as below:

1) After fastening the radiant tube to the ceiling, use a milling drill Ø 140 mm and drill two holes in the roof as shown on fig. 55. This is valid for every model of Panrad.
2) Concentric chimney should be **put out** from the roof at least **minimum of 50 cm**;
3) The length of the flue system **should be not longer than 6 m. virtual length.** If it should be necessary to insert any **bend,** calculate **one linear meter less for each bend**. Moreover the total length of pipes **A**, **B**, **C must not exceed 2,35 linear meter**.
4) Connect all pieces of chimney using delivered special band that are included in the delivery;
5) Install the chimney on the ceiling, taking care to seal any space between the flashing and the roof so that no moisture or water can leak in.
6) Always make sure that the terminal of the concentric chimney is not becoming obstructed. Fraccaro delivers pieces of chimney whose standard length are 950 - 450 - 200 mm. with male/female connection;



GAS SUPPLY

Installation of a gas adduction system should be done by professionally qualified personnel in respect of the regulations in effect in the country where it is installed. The pipeline for gas adduction should be sized according to the capacity and pressure necessary, and provision should be made for the installation of safety and control devices as prescribed by the local regulations. Fig. 56 illustrates an example of connection of the burner to the gas mains pipeline. Such material is supplied by Fraccaro only on request.



Key:

1 = Gas mains
2 = Ball valve
3 = Flex pipe in stainless steel or copper ø 16 mm

Fig. 56

ELECTRICAL CHARACTERISTICS OF RADIANT TUBES

a) Power the PANRAD with a single-phase line at **230V/50Hz + neutral + ground** considering that Radiant Tube has an absorption of **0,5 A**;
b) Install an automatic bipolar magnetothermic differential circuit breaker with the following characteristics:
Icn= 6 KA; Vn= 400V; Ian= 0,03A
c) If this line powers more than one Radiant Tube, the bipolar magnetothermic differential circuit breaker should be of suitable size considering the effective power absorbed as mentioned above.

ELECTRICAL CONNECTION TO THE CONTROL PANEL

Power supply shall be done as shown in fig. 57 for On/Off PANRAD and fig. 58 for dual-stage PANRAD. Wires shall be connected to the plug on the side of the burner correctly respecting the phases and neutral as shown below. **The probe** should be placed at a **height of 1,80 m. from the ground**, while black globe should be directed towards the Radiant Tube. Th e probe is unique for ambient thermosthat and anti-freeze function. The maximum lenght of **cable** connecting probe shall not exceed **30 meters**.

- Terminal L1 = power supply phase wire
- Terminal N = power supply neutral wire
- Terminal PE = ground wire
- Terminal L2 = II°stage phase wire

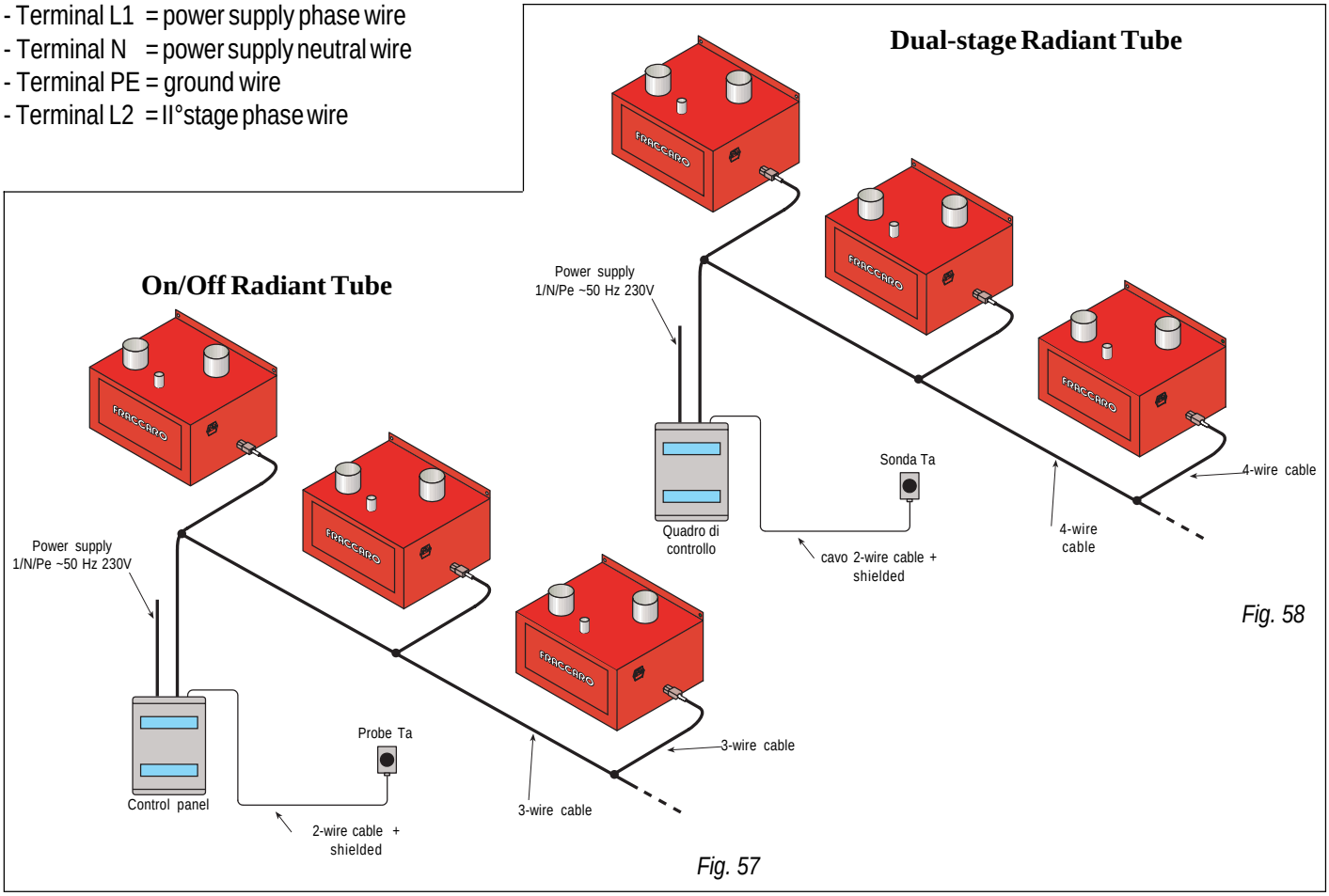


Fig. 58

Fig. 57

WIRING DIAGRAM OF CONTROL PANEL WITH 2 THERMOSTHATS FOR ON/OFF PANRAD

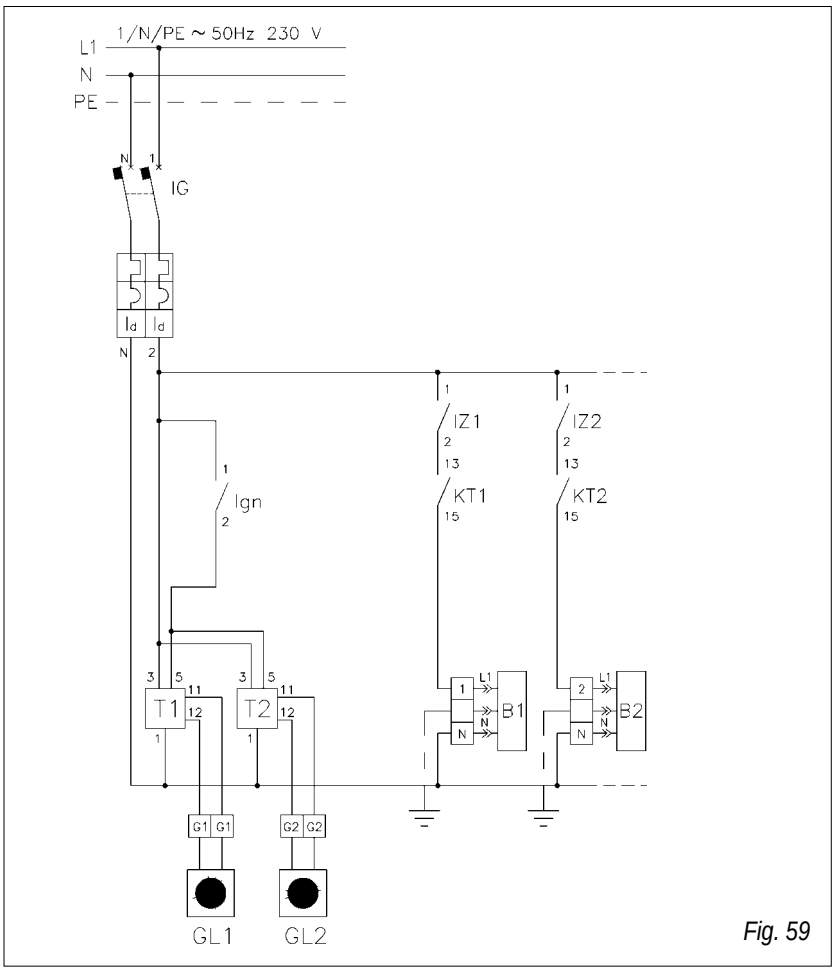


Fig. 59

Key:

L1 = Power supply phase 220V 50 Hz

N = Neutral

PE = Ground wire

IG = Bipolar magnetothermic circuit breaker

ID = Differential switcher

Ign = Day-night manual switcher

T1...T10 = Ambient thermosthat

B1...B10 = Group of Panrad burners

GL1...GL10 = Probe

IZ1...IZ10 = Zone switcher

KT1...KT10 = Control Relay of group .... Panrad

WIRING DIAGRAM OF CONTROL PANEL WITH 2 THERMOSTHATS FOR DUAL-STAGE PANRAD

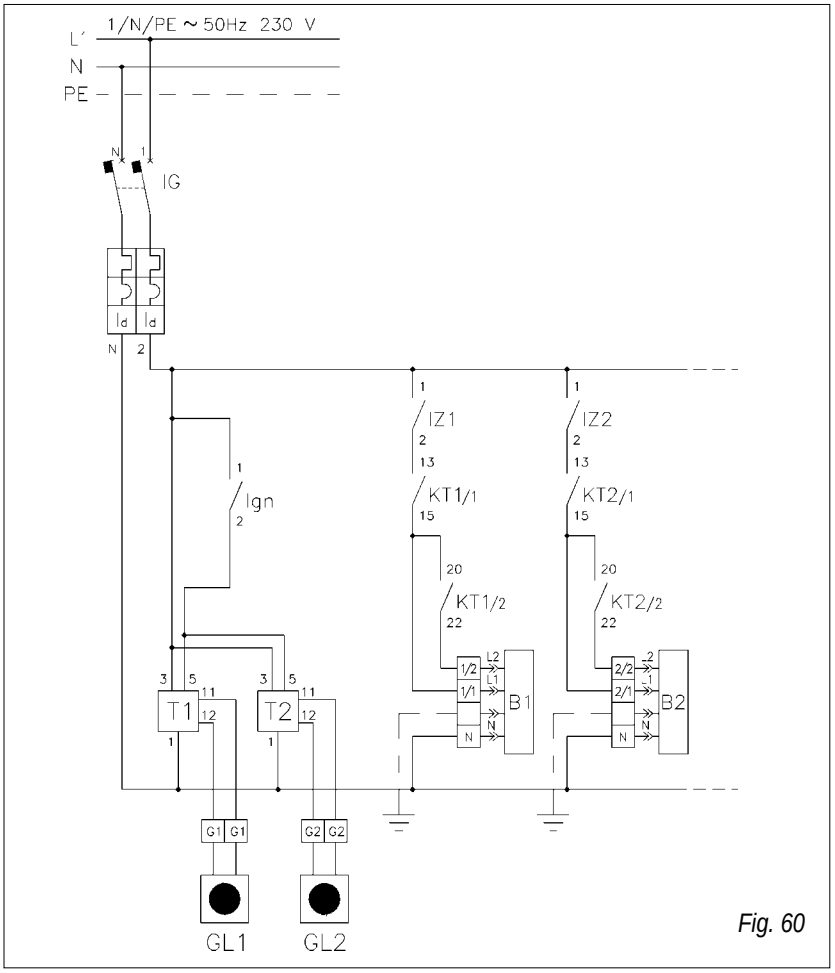


Fig. 60

Key:

L1 = Power supply phase 220V 50 Hz

N = Neutral

PE = Ground wire

IG = Bipolar magnetothermic circuit breaker

ID = Differential switcher

Ign = Day-night manual switcher

T1...T10 = Ambient thermosthat

B1...B10 = Group of Panrad burners

GL1...GL10 = Probe

IZ1...IZ10 = Zone switcher

KT.../ 1 = Control Relay of group .... I° stage Panrad

KT.../ 2 = Control Relay of group .... II° stage Panrad

MAN = Manual control switcher and clock exclusion

WIRING DIAGRAM OF CONTROL PANEL WITH 2 THERMOSTHATS AND CLOCK FOR ON/OFF PANRAD

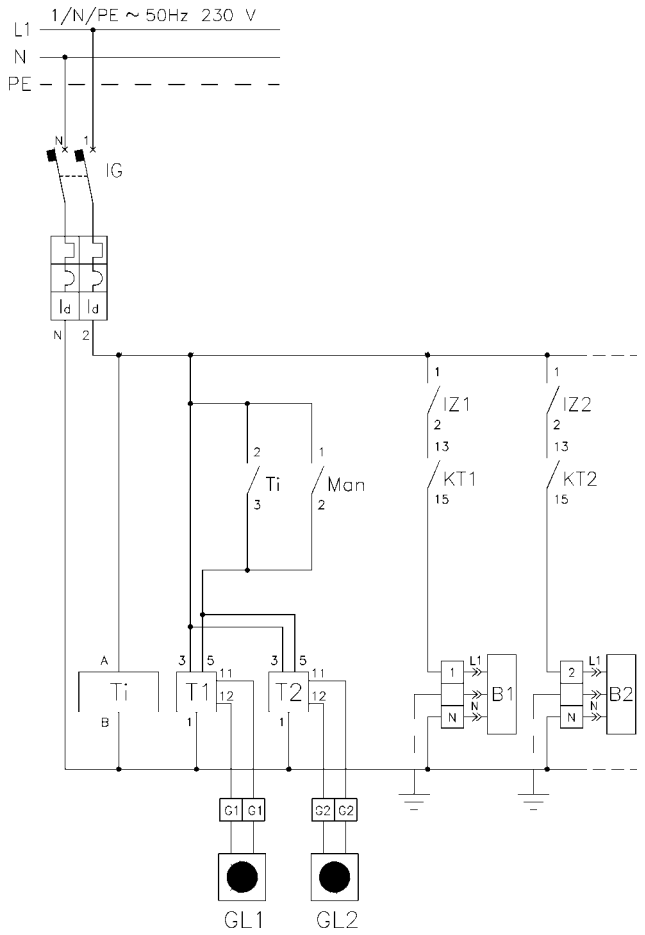


Fig. 61

Key:

L1 = Power supply phase 220V 50 Hz

N = Neutral

PE = Ground wire

IG = Bipolar magnetothermic circuit breaker

ID = Differential switcher

Ti = Day-week programming clock

Ign = Day-night manual switcher

T1...T10 = Ambient thermosthat

B1...B10 = Group of Panrad burners

GL1...GL10 = Probe

IZ1...IZ10 = Zone switcher

KT1...KT10 = Control Relay of group .... Panrad

MAN = Manual control switcher and clock exclusion

WIRING DIAGRAM OF CONTROL PANEL WITH 2 THERMOSTHATS AND CLOCK FOR DUAL-STAGE PANRAD

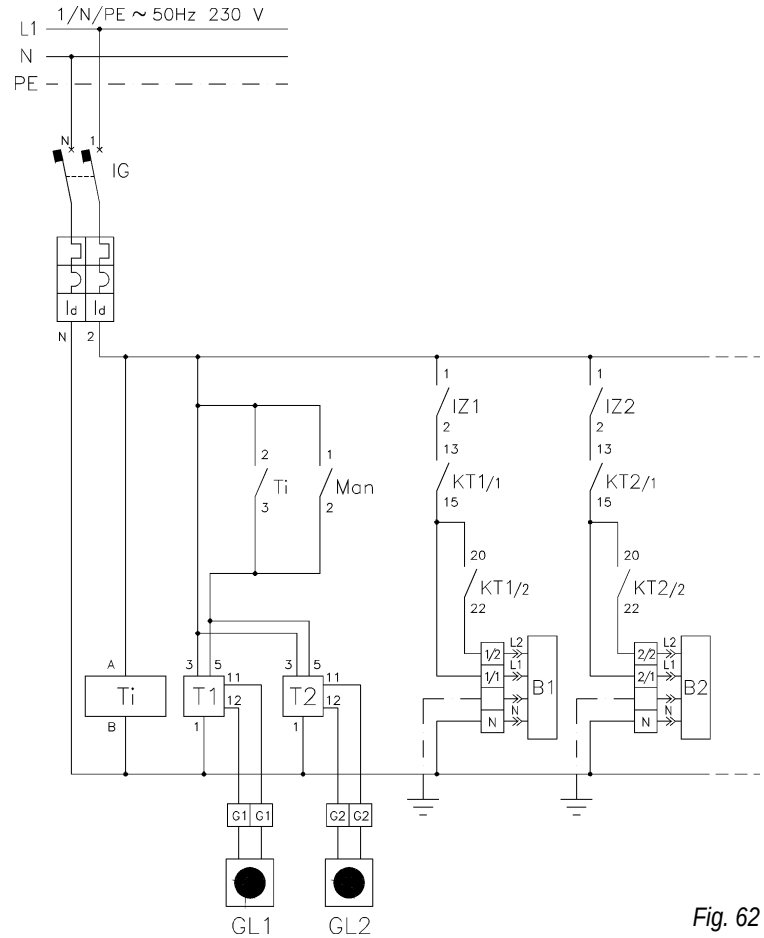


Fig. 62

Key:

L1 = Power supply phase 220V 50 Hz

N = Neutral

PE = Ground wire

IG = Bipolar magnetothermic circuit breaker

ID = Differential switcher

Ti = Day-week programming clock

Ign = Day-night manual switcher

T1...T10 = Ambient thermosthat

B1...B10 = Group of Panrad burners

GL1...GL10 = Probe

IZ1...IZ10 = Zone switcher

KT.../1 = Control Relay of group .... I° stage Panrad

KT.../2 = Control Relay of group .... II° stage Panrad

MAN = Manual control switcher and clock exclusion

DESCRIZIONE E COMPONENTISTICA DEI QUADRI ELETTRICI

I quadri elettrici di controllo (fig. 63) sono forniti dalla FRACCARO Srl su specifica richiesta, servono per ottenere una gestione degli impianti di riscaldamento che valorizzi i parametri di comfort e risparmio energetico. Vengono adibiti al controllo dei moduli a tubi radianti PANRAD e si compongono nel seguente modo:

- Scatola in PVC a parete stagna con porta trasparente predisposta per l'alloggiamento morsettiere con grado di protezione IP65;
- Interruttore automatico magnetotermico differenziale tipo Bticino modello ***G8813A/6AC*** per quadri da ***1*** a ***2 termostati***, tipo ***G8813A/10AC*** per quadri da ***3*** a ***10 termostati,*** con caratteristiche:
  230V~ 1P+N 4500 IDn 0,03 A ~ 2 mod;
- Orologio programmatore settimanale con accumulatore al piombo tipo Legrand modello ***MiniRex QWT41*** con caratteristiche:
  1x24h+1x7d 230V 50/60 Hz 16A/250V R100h;
- Termostato elettronico con grado di protezione IP42 completo di tastiera a membrana, display di lettura e globosonda a distanza, tipo FRACCARO modello ***1096421*** per funzionamento ***On/Off***, modello ***1096482*** per funzionamento ***a due stadi***, con caratteristiche:
  230Vac 50 Hz -9.9°C/99.9°C display a 3 cifre H12.5 + indicatori a led;
- Morsetti Legrand da 4 mm^2;
- Interruttore manuale che permette l'avviamento dell'impianto senza interferire nella programmazione dell'orologio;
- Sezionatore che interrompe l'alimentazione dei pannelli radianti.

Tutti i componenti installati nei quadri elettrici sono omologati CE e rispettano la normativa vigente.

Fig. 63

Fig. 64

Legenda:

1 = Interruttore automatico magnetotermico differenziale
2 = Interruttore manuale esclusione orologio
3 = Orologio program. settimanale giornaliero tipo Legrand
4 = Sezionatore di zona
5 = Termostato elettronico digitale
6 = Centralino a parete stagno con porta trasparente
7 = Sonda di temperatura o "globosonda"

INSTALLAZIONE ED USO DEL TERMOSTATO MOD. 1096421 PER PANRAD ON/OFF

Il termostato mod. 1096421 fig. 65, viene fornito dalla FRACCARO completo di sonda detta anche globosonda (fig. 64 di pag. 25) per il controllo della temperatura interna di un locale. Un termostato può essere collegato per comandare fino a ***8 pannelli radianti Panrad*** del ***tipo On/Off***.

Fig. 65

= Tasto ***UP*** serve per aumentare i valori a display durante le fasi di programmazione;

= Tasto ***SET*** serve per impostare il valore del set-point (temperatura d'intervento), se viene premuto per più di 5 sec. permette l'accesso al menù di configurazione;

= Tasto ***DOWN*** serve per diminuire i valori a display durante le fasi di program.;

= Led ***OROLOGIO*** indica lo stato del contatto orologio:
led acceso, contatto orologio aperto
led spento, contatto orologio chiuso
led lampeggiante, programmazione parametri in corso

out1 = Led ***out1*** indica lo stato del relè K1;
led acceso, relè eccitato
led spento, relè non eccitato;

out2 = Led ***out2*** non usato;

out3 = Led ***out3*** non usato.

VISUALIZZAZIONE E MODIFICA DEL VALORE DI TEMPERATURA (set-point SP1)

Come valore di "set-point" si intende la temperatura d'intervento uscita K1 cioè la temperatura interna che si vuole impostare nel locale da riscaldare.

- Premere il tasto ***SET*** fino a che il display visualizza la scritta "***SP1***";
- Rilasciare il tasto ***SET***, ora il display visualizza la temperatura d'intervento del termostato e il led ***OROLOGIO*** inizia a lampeggiare;
- Per modificare la temperatura agire sui tasti ***UP*** o ***DOWN***;
- Per uscire dalla procedura e registrare le modifiche, premere ***SET*** oppure attendere 30 secondi senza operare sulla tastiera.

PROGRAMMAZIONE PARAMETRI TERMOSTATO

- Premere il tasto ***SET*** e mantenerlo premuto fino a che il display visualizza la scritta "***PA***";
- Rilasciare il tasto ***SET***, ora il display visualizza cifra "00" e il led ***OROLOGIO*** inizia a lampeggiare;
- Impostare il codice d'accesso agendo sui tasti ***UP*** o ***DOWN*** (richiedere codice al nostro ufficio assistenza in FRACCARO);
- Premere brevemente il tasto ***SET*** ;
- Ricerca il parametro da modificare tramite i tasti ***UP*** o ***DOWN***;
- Premere brevemente il tasto ***SET*** per selezionare il parametro da modificare;
- Per modificare il valore agire sui tasti ***UP*** o ***DOWN***;
- Premere brevemente il tasto ***SET*** per visualizzare nuovamente l'elenco dei parametri;
- Ripetere tutte le stesse operazioni per modificare i valori degli altri parametri;
- Per uscire e registrare le modifiche attendere 15 secondi senza operare sulla tastiera.

TABELLA PARAMETRI TERMOSTATO

Parametri	Descrizione	Min	Max	Unità di misura		Parametri di default
diF	*Differenziale regolatore*	-9.9	-0.1	°C		-1.0
LSP	*Set-point 1 minimo*	-9.9	HSP	°C		10
HSP	*Set-point 1 massimo*	LSP	99.9	°C		30
CAL	*Calibrazione sonda*	-9.9	20	°C		0.0
St1	*Temperatura notturna o antigelo, attiva con ingresso orologio aperto. Impostare 0.0°C per mantenere i bruciatori spenti con ingresso orologio aperto*	0.0	99.9	°C		10
bdo	*Ritardo attivazione bruciatore all'accensione dello strumento*	0	250	sec		0
rS	*Stabilità lettura sonda*	0	14	letture		3

Tab. 4

SEGNALAZIONE DI ERRORE E DI ALLARME

Display	Descrizione tipo di errore	Stato uscite
E0	*Termostato guasto (EEprom guasta)*	Non noto
E1	*Sonda in corto o non collegata, oppure temperatura oltre i limiti dello strumento. Controllare lo stato del cavo che collega la sonda.*	Spente

Tab. 5

FUNZIONAMENTO CON OROLOGIO PROGRAMMATORE

Qualora si intenda programmare il periodo di funzionamento del termostato mod. 1096421 attraverso un orologio programmatore, è necessario tenere presente che il led ***OROLOGIO*** acceso, indica che il funzionamento del termostato dipende dalla programmazione del parametro "***St1***" (tab. 4 a pag. 26).

COLLEGAMENTI ELETTRICI

Nell'esecuzione dei collegamenti verso il termostato attenersi alla fig. 66 nel caso di collegamento **senza orologio** alla fig. 67 nel caso di collegamento **con orologio** e alla tabella 5 sotto riportata. Si ricorda di prestare attenzione alle polarità linea e neutro dell'alimentazione di rete. Evitare di incrociare i cavi tra loro separando le connessioni della sonda alle connessioni riferite all'alimentazione. Il ***termostato non è protetto contro sovraccarichi***, dotare quindi le opportune sicurezze elettriche. Verificare inoltre che le condizioni d'impiego rientrino nei limiti indicati nelle caratteristiche tecniche sotto riportate.

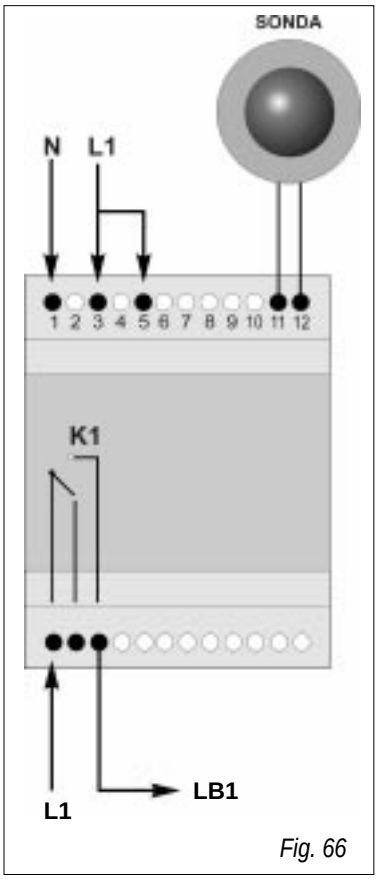


Fig. 66

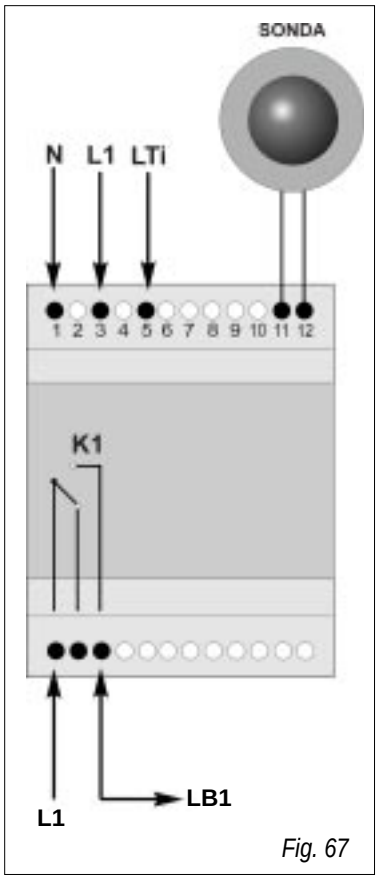


Fig. 67

Legenda:

N = Neutro
L1 = Fase di alimentazione termostato
LB1 = Fase uscita per alimentazione bruciatori
LTi = Contatto eventuale orologio programmatore

Contatti	*Descrizione morsetti*
1	*Neutro alimentazione 230Vac +/-10%*
3	*Linea alimentazione 230Vac +/-10%*
3;5	*Contatto orologio programmatore. In assenza dell'orologio ponticellare i morsetti come fig. 66*
11;12	*Sonda interna di temperatura "globosonda"*
13;14;15	*Uscita K1, comando bruciatore relè: 8(3)A 250 Vac*

Tab. 5

CARATTERISTICHE TECNICHE TERMOSTATO

Alimentazione:	230Vac +/- 10%
Campo di lavoro:	-9.9°C a 99.9°C
Consumo termostato:	5VA a 230 Vac
Contenitore:	plastico DIN 4 moduli
Montaggio:	guida OMEGA
Classe d'isolamento:	II
Protezione frontale:	IP42
Precisione:	0.5% del fondo scala
Condizioni d'utilizzo:	temperatura di lavoro 0/+50°C - immagaz. -20/+70°C
Umidità relativa ambiente:	30/80% senza condensa
Visualizzazione:	display a 3 cifre H12.5+indicatori a led
Ingressi:	1 ingresso 250 Vac optoisolato contatto orologio - 1 ingresso predisposto per sonda PTC
Uscite:	1 relè K1 SPDT 8 (3)A 250 Vac

INSTALLAZIONE ED USO DEL TERMOSTATO MOD. 1096482 PER PANRAD A 2 STADI

Il termostato mod. 1096482 fig. 68, viene fornito dalla FRACCARO completo di sonda detta anche globosonda (fig. 64 di pag. 25) per il controllo della temperatura interna di un locale. Cadaun termostato può essere collegato per comandare fino a ***8 pannelli radianti Panrad*** del tipo ***a 2 stadi***, a due livelli di potenza.

Fig. 68

= Tasto ***UP*** serve per aumentare i valori a display durante le fasi di programmazione;

= Tasto ***SET*** serve per impostare il valore del set-point (temperatura d'intervento), se viene premuto per più di 5 sec. permette l'accesso al menù di configurazione;

= Tasto ***DOWN*** serve per diminuire i valori a display durante le fasi di program.;

= Led ***OROLOGIO*** indica lo stato del contatto orologio:
led acceso, contatto orologio aperto
led spento, contatto orologio chiuso
led lampeggiante, programmazione parametri in corso

out1 = Led ***out1*** indica lo stato del relè K1;
led acceso, relè eccitato
led spento, relè non eccitato;

out2 = Led ***out2*** non usato;

out3 = Led ***out3*** non usato.

VISUALIZZAZIONE E MODIFICA DEL VALORE DI TEMPERATURA set-point "SP1"

Come valore di "set-point" si intende la temp. d'intervento uscita K1 cioè la temp. interna che si vuole impostare nel locale da riscaldare.

- Premere il tasto ***SET*** fino a che il display visualizza la scritta "***SP1***";
- Rilasciare il tasto ***SET***, ora il display visualizza la temperatura d'intervento del termostato e il led ***OROLOGIO*** inizia a lampeggiare;
- Per modificare la temperatura agire sui tasti ***UP*** o ***DOWN***;
- Per uscire dalla procedura e registrare le modifiche, premere ***SET*** oppure attendere 30 secondi senza operare sulla tastiera.

PROGRAMMAZIONE PARAMETRI TERMOSTATO

- Premere il tasto ***SET*** e mantenerlo premuto fino a che il display visualizza la scritta "***PA***";
- Rilasciare il tasto ***SET***, ora il display visualizza cifra "00" e il led ***OROLOGIO*** inizia a lampeggiare;
- Impostare il codice d'accesso agendo sui tasti ***UP*** o ***DOWN*** (richiedere codice al nostro ufficio assistenza in FRACCARO);
- Premere brevemente il tasto ***SET*** ;
- Ricerca il parametro da modificare tramite i tasti ***UP*** o ***DOWN***;
- Premere brevemente il tasto ***SET*** per selezionare il parametro da modificare;
- Per modificare il valore agire sui tasti ***UP*** o ***DOWN***;
- Premere brevemente il tasto ***SET*** per visualizzare nuovamente l'elenco dei parametri;
- Ripetere tutte le stesse operazioni per modificare i valori degli altri parametri;
- Per uscire e registrare le modifiche attendere 15 secondi senza operare sulla tastiera.

FUNZIONAMENTO CON OROLOGIO PROGRAMMATORE

Qualora si intenda programmare il periodo di funzionamento del termostato mod. 1096482 attraverso un orologio programmatore, è necessario tenere presente che il led ***OROLOGIO*** acceso, indica che il funzionamento del termostato dipende dalla programmazione del parametro "***St1***" (tab.7 a pag. 29).

PROGRAMMAZIONE INTERVENTO USCITA K2 SECONDO STADIO BRUCIATORE

Il parametro "SP2" rappresenta il valore da sottrarre al set-point "SP1" per cui avviene l'attivazione dell'uscita K2, secondo stadio bruciatore.

Esempio pratico:

Imposto il parametro di set-point ***SP1=18 °C*** (temperatura interna desiderata nel locale);
Imposto il parametro di set-point ***SP2=-1.0 °C*** (attivazione relè K2 secondo stadio);
Imposto il parametro del differenziale ***diF=-0.1 °C***;
Stato uscite del termostato:
fascia di temperature inferiori ai ***17 °C*** uscite ***out1=on*** e ***out2=on***; (bruciatore alla potenza massima)
fascia di temperature comprese fra i ***17 °C e 18 °C*** uscite ***out1=on*** e ***out2=off***; (bruciatore alla potenza minima)
fascia di temperature sopra i ***18 °C*** uscite ***out1=off*** e ***out2=off***. (bruciatore spento)

FUNZIONE DOPPIA ACCENSIONE

Per aumentare l'efficienza dell'impianto di riscaldamento e diminuire gli effetti dell'inerzia termica, è stato inserito il parametro ***itS*** che regola l'attività del secondo stadio bruciatore. Se questo parametro è diverso da 0 la funzione "doppia accensione" è attiva, in questa condizione ad ogni attivazione dell'uscita K1 corrisponde l'attivazione dell'uscita K2 per un tempo pari al valore del parametro itS. Al termine del tempo ***itS*** l'uscita K2 riprende a funzionare in modo normale.

RITARDO ATTIVAZIONE USCITA K2 SECONDO STADIO BRUCIATORE

E' possibile, agendo sul parametro ***dtS***, ritardare la partenza del secondo stadio bruciatore. Il ritardo viene introdotto ad ogni accensione del secondo stadio e ad ogni comando di reset inviato al bruciatore.

COLLEGAMENTI ELETTRICI

Nell'esecuzione dei collegamenti verso il termostato attenersi alle figure 69 - 70 e alla tabella 7. Si ricorda di prestare attenzione alle polarità linea e neutro dell'alimentazione di rete. Evitare di incrociare i cavi tra loro separando le connessioni della sonda alle connessioni riferite all'alimentazione. Il ***termostato non è protetto contro sovraccarichi***, dotare quindi le opportune sicurezze elettriche. Verificare inoltre che le condizioni d'impiego rientrino nei limiti indicati nelle caratteristiche tecniche sotto riportate.

TABELLA PARAMETRI TERMOSTATO

Parametri	Descrizione	Min	Max	Unità di misura		Parametri di default
diF	Differenziale regolatore	-9.9	-0.1	°C		-1.0
SP2	Set-point potenza massima bruciatore. Il parametro "SP2" rappresenta il valore da sottrarre al set-point "SP1" per cui avviene l'attivazione dell'uscita K2	-9.9	0.0	°C		-0.2
LSP	Set-point 1 minimo	-9.9	HSP	°C		10
HSP	Set-point 1 massimo	LSP	99.9	°C		30
CAL	Calibrazione sonda	-9.9	20	°C		0.0
St1	Temperatura notturna o antigelo, attiva con ingresso orologio aperto. Impostare 0.0°C per mantenere i bruciatori spenti con ingresso orologio aperto	0.0	99.9	°C		10
itS	Durata funzione "doppia accensione". Impostare 0 minuti per escludere la funzione "doppia accensione"	0	59	min		0
dtS	Ritardo tra primo e secondo stadio bruciatore	0	250	sec		0
bdo	Ritardo attivazione bruciatore all'accensione dello strumento	0	250	sec		0
rS	Stabilità lettura sonda	0	14	letture		3

Tab. 7

SEGNALAZIONE DI ERRORE E DI ALLARME

Display	Descrizione tipo di errore	Stato uscite
E0	Termostato guasto (EEprom guasta)	Non noto
E1	Sonda in corto o non collegata, oppure temperatura oltre i limiti dello strumento. Controllare lo stato del cavo che collega la sonda.	Spente

Tab. 8

CARATTERISTICHE TECNICHE TERMOSTATO

Alimentazione: 230Vac +/- 10%
Campo di lavoro: -9.9°C a 99.9°C
Consumo termostato: 5VA a 230 Vac
Contenitore: plastico DIN 4 moduli
Montaggio: guida OMEGA
Classe d'isolamento: II
Protezione frontale: IP42

Ingressi: 1 ingresso 250 Vac optoisolato contatto orologio
1 ingresso predisposto per sonda PTC
Uscite: 2 relè K1-K2 SPDT 8 (3)A 250 Vac
Precisione: 0.5% del fondo scala
Condizioni d'utilizzo: temp. di lavoro 0/+50°C - immagaz. -20/+70°C
Umidità relativa amb.: 30/80% senza condensa
Visualizzazione: display a 3 cifre H12.5+indicatori a led

Fig. 69

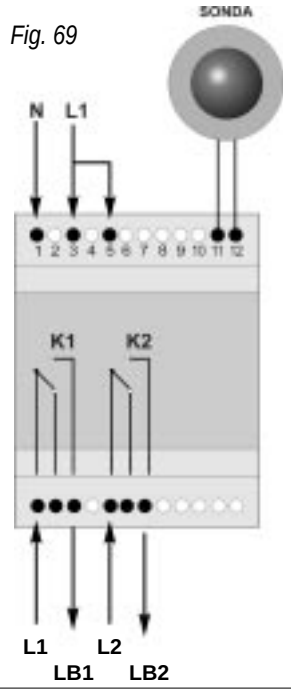
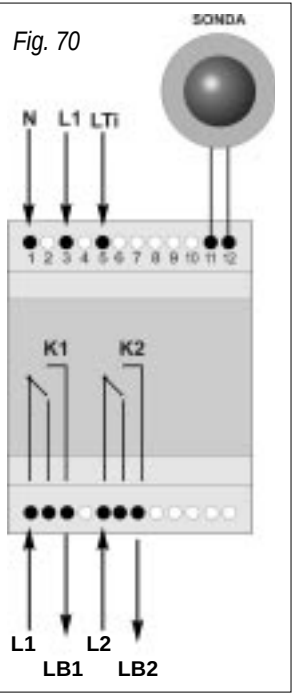


Fig. 70



Legenda:

N = Neutro
L1 = Fase di alimentazione termostato
L2 = Fase di alimentazione termostato
LTi = Contatto eventuale orologio programmatore
LB1 = Fase uscita per alimentazione bruciatori potenza minima I° stadio
LB2 = Fase uscita per alimentazione bruciatori potenza massim al II° stadio

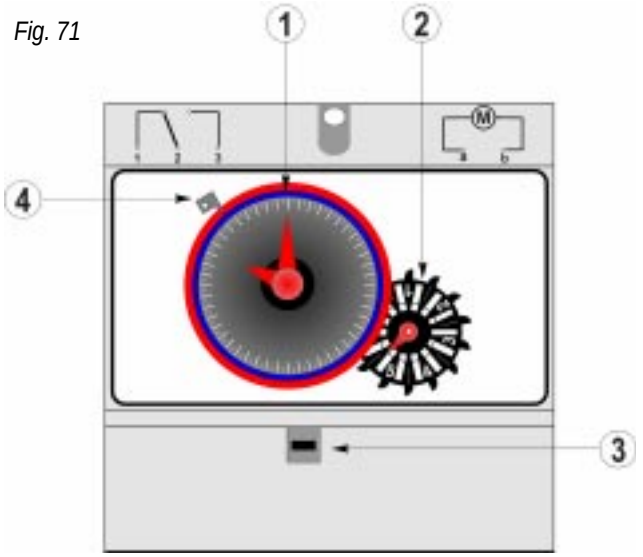
Contatti	Descrizione morsetti
1	Neutro alimentazione 230Vac +/-10%
3	Linea alimentazione 230Vac +/-10%
3;5	Contatto orologio programmatore. In assenza dell'orologio ponticellare i morsetti come fig.69
11;12	Sonda interna di temperatura "globosonda"
13;14;15	Uscita K1, primo stadio comando bruciatore relè: 8(3)A 250 Vac
17;18;19	Uscita K2, secondo stadio comando bruciatore relè: 8(3)A 250 Vac

Tab. 9

INSTALLAZIONE ED USO DELL'OROLOGIO PROGRAMMATORE TIPO LEGRAND

L'orologio programmatore del tipo Legrand è costituito da due quadranti rotondi opportunamente suddivisi da dei selettori a leva manuali. Il quadrante a ruota più piccolo posto alla destra dell'orologio fig. 71 con numerazione dal n. 1 al n. 7 viene detto ***quadrante settimanale***, quello più grande posto al centro con numerazione dal n.1 al n. 24 viene detto ***quadrante giornaliero***. Mediante la posizione dei selettori a leva posti nei due quadranti viene impostato il tempo in giorni e ore di accensione dei bruciatori.

Fig. 71



Legenda

1 = Quadrante giornaliero in cui vengono impostate durante l'arco della giornate le ore di funzionamento dei bruciatori;

2 = Quadrante settimanale in cui vengono impostati i giorni di funzionamento durante la settimana;

3 = Leva per togliere il coperchio copri morsettiera, da premere con un cacciavite e sollevare;

4 = Sensore a punzone.

IMPOSTAZIONE DEL PROGRAMMA GIORNALIERO

Per impostare durante l'arco delle 24 ore di una giornata, i vari orari di accensione o spegnimento dei bruciatori, agire sul quadrante giornaliero (punto 1 fig. 71). Questo quadrante presenta una numerazione dal n.1 al n. 24 ed è suddiviso in 96 selettori a leva. ***Ogni selettore*** corrisponde ad un tempo di ***15 minuti*** da cui ***1 ora = 4 selettori***. Guardando la posizione delle lancette di un qualsiasi orologio, impostare la posizione delle lancette sul quadrante settimanale ed alzare il selettore a leva corrispondente. ***Non girare mai il quadrante giornaliero con la mano.***

Esempio d'impostazione orologio:

Orario di accensione bruciatori scelto dalle 8.00 alle 12.00;

Fig. 72

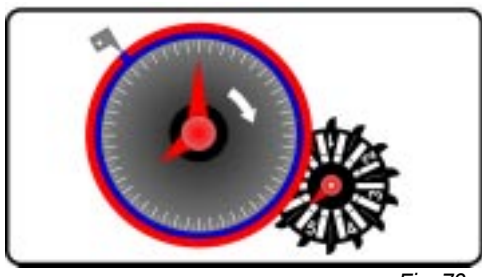


Fig. 73

Guardando le lancette dell'orologio corrispondenti alle ore 8.00, impostare sul quadrante giornaliero facendo ruotare in senso orario la lancetta grande fig. 73, fino ad ottenere la stessa posizione dell'orologio indicata in fig. 72. A questo punto, tramite un cacciavite, alzare il selettore corrispondente sul sensore a punzone.

Tempo di accensione impostato ore 8.00.

Fig. 74

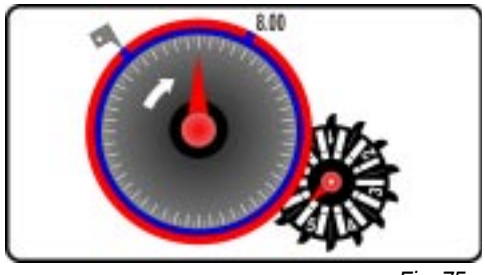


Fig. 75

Per impostare il secondo orario eseguire le stesse operazioni sopra riportate, una volta che la lancetta del quadrante è posizionata come in fig. 75, alzare il selettore corrispondente sul sensore a punzone.

Tempo di accensione impostato ore 12.00.

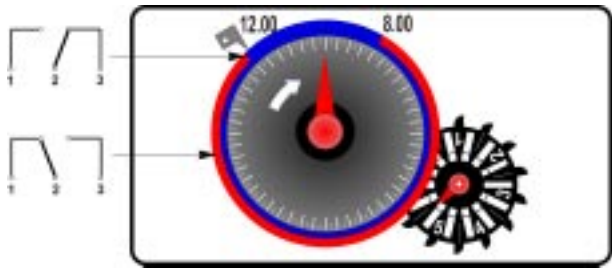


Fig. 76

In fine per attivare la fascia oraria che va dalle ore 8.00 alle ore 12.00, alzare tutti i selettori compresi tra i due estremi precedentemente alzati come riportato in fig. 76.

IMPOSTAZIONE DEL PROGRAMMA SETTIMANALE

Per impostare durante l'arco della settimana , i vari giorni di accensione o spegnimento dei bruciatori, agire sul quadrante settimanale (punto 2 fig.71 pag. 30). Questo quadrante presenta una numerazione dal n.1 al n. 7 ed è suddiviso in 14 selettori a leva. ***Ogni selettore*** corrisponde ad un tempo di ***12 ore*** da cui ***24 ore = 2 selettori***. Impostando il quadrante in:

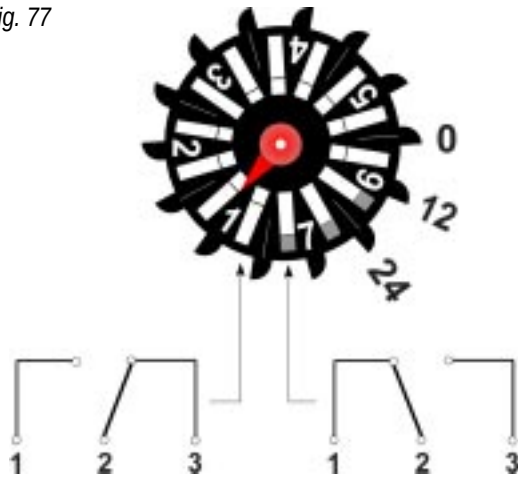
1 = lunedì
2 = martedì
3 = mercoledì
4 = giovedì
5 = venerdì
6 = sabato
7 = domenica

Per sopprimere l'accensione di un giorno o di mezza giornata abbassare il selettore sul numero del giorno selezionato come in fig. 77.

Esempio:

Soppressione del sabato dalle ore 12 alle ore 24 della domenica.

Fig. 77



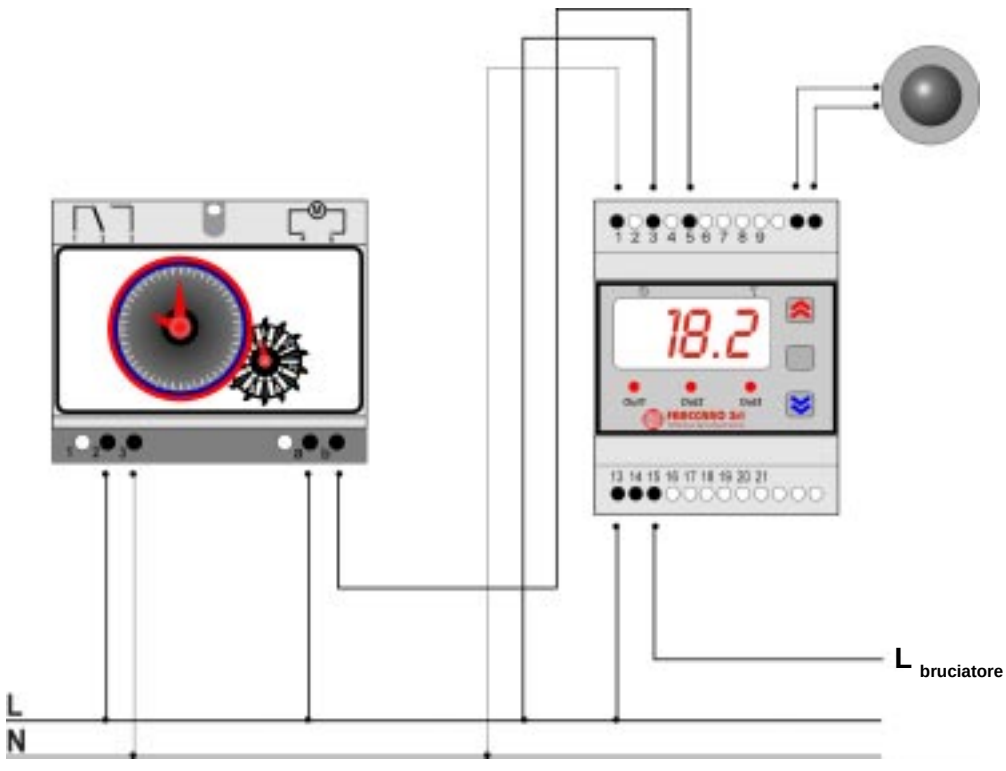
Il selettore a leva abbassato esclude il funzionamento dell'orologio durante il giorno e la fascia oraria scelta, come in fig. 77, viene escluso il giorno 6 (sabato) dalle ore 12 alle 24 e il giorno 7 (domenica) dalle ore 0 alle ore 24.

ESEMPIO DI COLLEGAMENTO FRA TERMOSTATO E OROLOGIO

Proteggere il circuito a monte con adeguati interruttori magnetotermico.

Collegamento sonda di temperatura con cavo schermato a calza collegata da un lato a terra.

Fig. 78



POSITION OF THE ELECTRODES

Proper position of electrodes inside its bearing block are shown herebelow. For every maintenance inspection, check that distances among electrodes are respected and that ceramic insulation is not damaged.

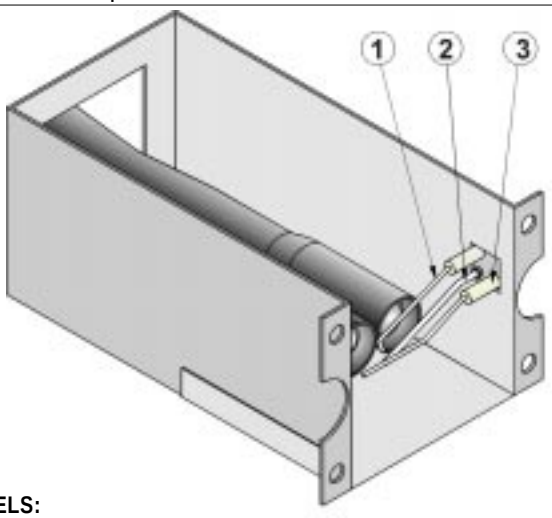
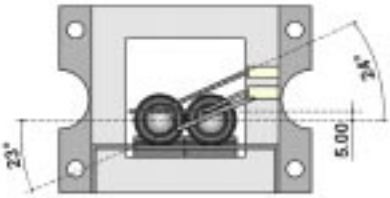
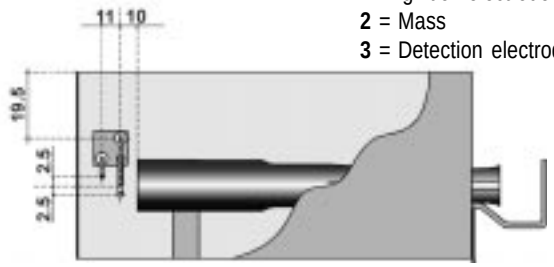


Fig. 79



Key:
1 = Ignition electrode
2 = Mass
3 = Detection electrode



MODELS:
FRA2 - FRA2S2

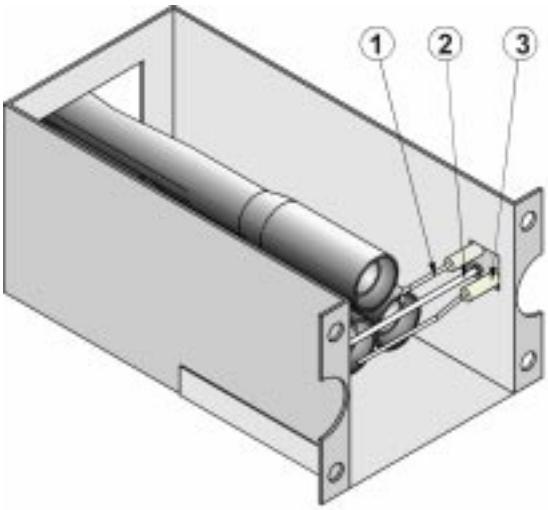
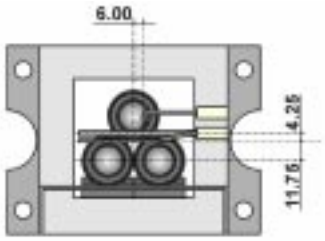
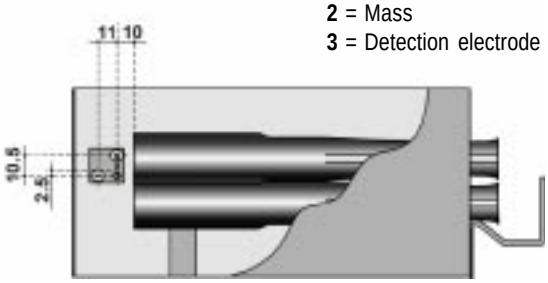


Fig. 80



Key:
1 = Ignition electrode
2 = Mass
3 = Detection electrode



MODELS:
FRA3 - FRA3S2 - FRB3

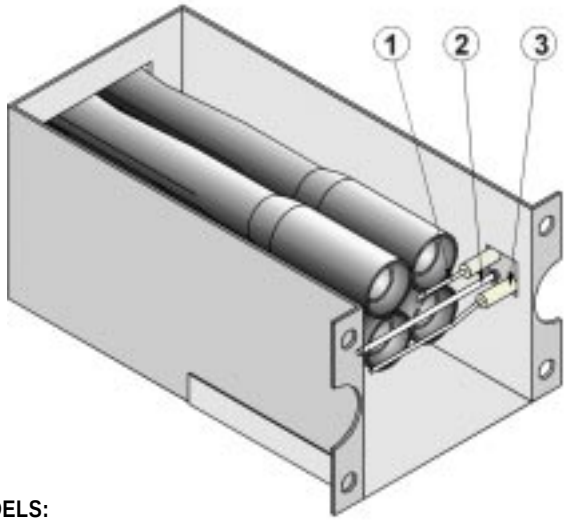
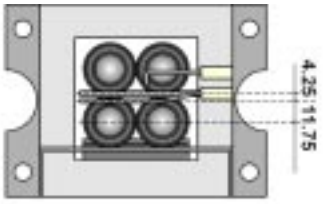
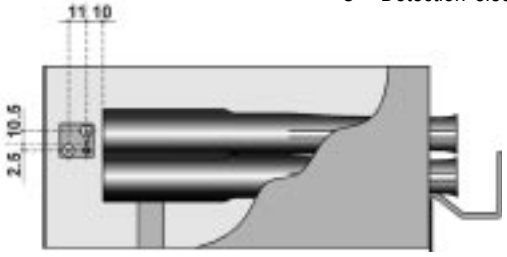


Fig. 81



Key:
1 = Ignition electrode
2 = Mass
3 = Detection electrode



MODELS:
FRA4 - FRA4.1 - FRB4 - FRB4.1 - FRC4 - FRC5
FRA4S2 - FRA4.1S2 - FRB4S2 - FRA4.1S2 - FRC4S2 - FRC5

START-UP

To ignite the burner the following instruments should be available:

a) combustion gas analyzer for gaseous fuels;
b) pressure gauge scale 0 - 50 mbar to measure gas pressure;
1) Check that the burner is correctly connected to the phase, neutral and ground.
2) Open the gas tap and check that the type of gas and pressure correspond to the indications on the burner plate and table on pages 35 - 36 - 37.
3) START OF OPERATION OF BURNER.
a) The fan starts turning.
b) The red block indicator lights up.
c) After a prewash time of more than 30 sec., the burner will carry out ignition for 5 sec. If the gas flow is correct the burner will light up. During normal operation of the burner the green operation light will light up.
4) Always check combustion and yield, using the combustion analyzer, after unscrewing the bolt on the end of the scroll on the outside of the burner. The values measured should fall within the limits imposed by the regulations in effect.
5) To release the blocked burner disconnect power for a few seconds with the local switcher

SOLENOID VALVE ADJUSTMENT AND GAS PRESSURE CHECKING

To check and measure the **gas intake** pressure Pi unscrew the screw and connect the pressure gauge to the pressure attachment shown on **n° 1** fig. 82 - 83 - 84 and 85. To check and measure the **gas pressure to the nozzle** Pu unscrew the screw and connect the pressure gauge to the pressure attachment shown on **n° 2** of fig. 82 - 83 - 84 e 85.
If using gas of the II[a] family (G20 and G25), adjust the pressure to the nozzle Pu as shown on tables of pages 35-36-37, regulating the stabilizer on the solenoid valve. Remove the black plastic protection cap for the solenoid valves on fig. 84 and fig. 85 applying slight leverage on the edge, connect the pressure gauge to the pressure attachment downstream of the solenoid shown with n° 2, adjust the **pressure at I° stage** operating on the **screw n° 4**, adjust the pressure at **II° stage** operating on the **bolt n° 3**. For the solenoid valve of fig. 82, adjust the pressure to the nozzle operating **on the screw** indicated with **n°3**. For the solenoid valve of fig. 83, remove the screw **n° 3**, and adjust the **pressure to the nozzle** regulating the **inside screw**.
If using gas of the III[a] family (G30 and G31), adjust the pressure to the nozzle according to the values written on the table at pages 35 - 36 - 37 following the same procedure as above.

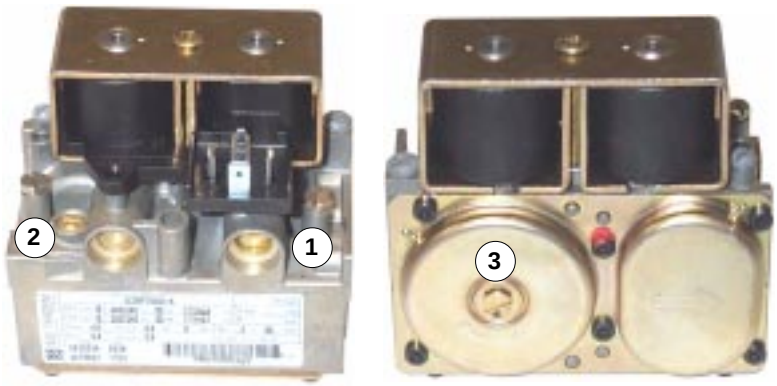


Fig. 82 Solenoid valve type 830

Fig. 83 Solenoid valve type 840

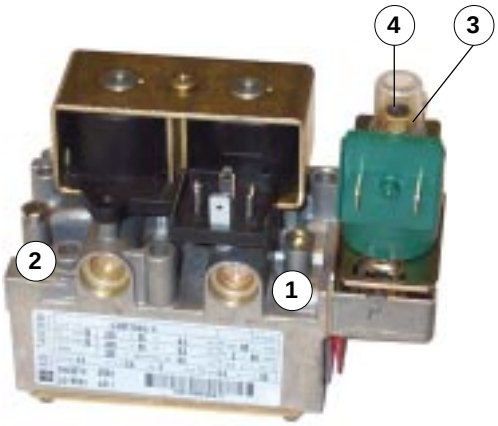


Fig. 84 Solenoid valve type 836

Fig. 85 Solenoid valve type 843

WHAT TO DO IF....

1) THE BURNER IS BLOCKED.

a) Disconnect power with the local switch and after a few seconds restore power.

2) THE MOTOR ON THE CENTRIFUGE AIR FAN DOES NOT WORK.

a) Check that the burner is correctly powered

b) Check that the control device is correctly installed

c) Make sure the protection hood behind the motor is not blocking the cooling fan

d) Make sure the gas pressure on the intake Pi is high enough to trip the gas pressure switch Pg

3) THE MOTOR STARTS BUT THE BURNER IS BLOCKED

a) Check that the differential pressure switcher is functioning correctly

b) Replace the control device.

4) THE IGNITION SPARKS BUT THE BURNER DOES NOT LIGHT UP.

a) Check that the solenoid valve is allowing gas to flow to the nozzles

b) Check that the ignition electrode is in the right position and intact (see fig. 79 - 80 and 81 of page 32).

5) THE BURNER LIGHTS UP, BUT THE IGNITION CONTINUES TO SPARK.

a) Check that the phase and neutral wires of the burner power supply are connected correctly

b) Check that the detection electrode is not in contact with any metal part

c) Make sure that the detection electrode is in the right position (see fig. 79 - 80 and 81 of page 32).

6) THE RESULTS OF THE COMBUSTION TEST ARE NOT SATISFACTORY

a) Check that the pressures Pi and Pu are correct as per tables on pages 35 - 36 and 37.

b) Check that the diaphragm FRA2, FRA3 and FRB4.

c) Check that the length of the chimney does not exceed the values indicated in the tables on pages 19 - 20 and 21.

d) Check that the connection pipes on the exhaust and intake openings to the exhaust end pieces have the minimum diameter indicated in the table of pages 19 - 20 and 21.

e) Check that the exhaust and intake end pieces are not obstructed in any way.

WARNINGS

1) Always be sure of the compatibility betweeen the type of activity carried out in the room to be heated and the Radiant Tube, taking into consideration that its installation is not allowed in case of activities that, during processing, develop powders or fumes that could cause explosion or fire. When in doubt, consult our technical department.

2) **To change from gas of the II^ to gas of the III^ family, and vice versa, the nozzles have to be changed and solenoid calibrated (as per table on pages 35 - 36 and 37), the gas pressure switch has to be re-calibrated and the ignition procedure repeated. This operation should always be performed by an Authorized Service Center**

3) When adjusting the pressure of the burners, respect the indications in the tables of pages 35 - 36 and 37 scrupulously.

Failure to observe this fundamental rule will invalidate any kind of warranty and/or responsibility on the part of FRACCARO srl, for damage to objects and persons

DISTANCE FROM FLAMMABLE MATERIALS

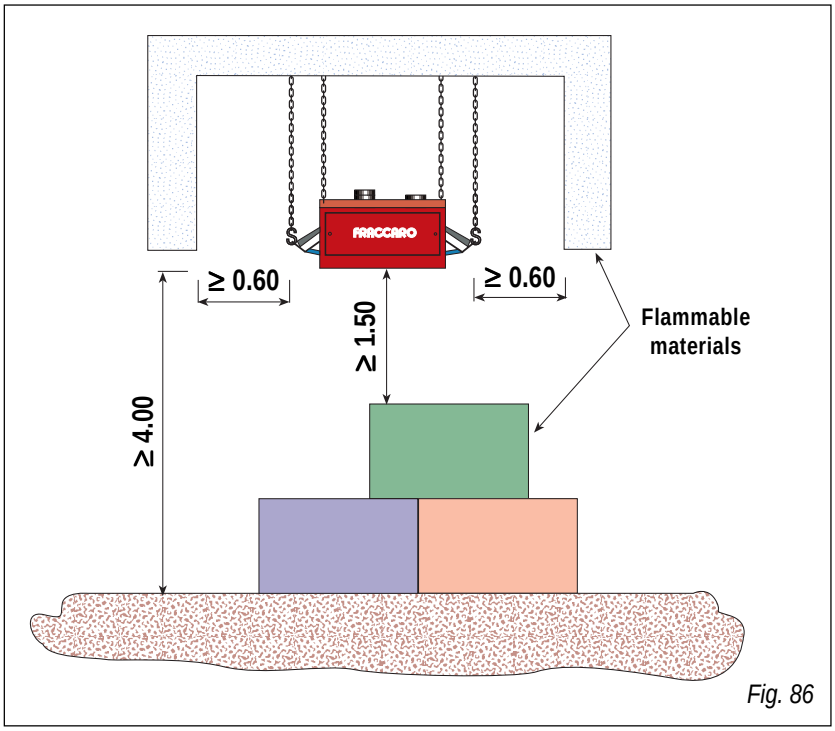


Fig. 86

1) Minimum distance in the vertical position of Radiant Tube from flammable materials should be at least 1.5 m.

2) Minimum distance of the insulated sides of Radiant Tubes from flammable materials should be at least 60 cm.

3) Minimum distance in the vertical position of Radiant Tubes from the floor should be at least 4.0 m.

PRESSIONI E UGELLI PER BRUCIATORI On/Off

GAS	Pressione ingresso Pi [mbar]	Pressione uscita Pu [mbar]	Elettrovalvola codice	Stabilizzatore	Pressostato Gas P. Reset [mbar]	n° e Ø ugelli	Potenza Max [KW]	Diaframma coclea [mm]
FRA2								
G20	20	8.5	830 / 840	si	9 / 10	2 x 2.80	20.0	ø 42
G25	20	12.5	830 / 840	si	9 / 10	2 x 2.80	20.0	ø 42
G25	25	12.5	830 / 840	si	14 / 15	2 x 2.80	20.0	ø 42
G30	29	29.0	830 / 840	no	24 / 25	2 x 1.55	20.0	ø 42
G30	50	50.0	830 / 840	no	44 / 45	2 x 1.35	20.0	ø 42
G31	30	30.0	830 / 840	no	24 / 25	2 x 1.60	20.0	ø 42
G31	37	37.0	830 / 840	no	30 / 31	2 x 1.55	20.0	ø 42
G31	50	50.0	830 / 840	no	44 / 45	2 x 1.45	20.0	ø 42
FRA3								
G20	20	8.5	830 / 840	si	9 / 10	3 x 2.80	30.0	ø 42
G25	20	12.5	830 / 840	si	9 / 10	3 x 2.80	30.0	ø 42
G25	25	12.5	830 / 840	si	14 / 15	3 x 2.80	30.0	ø 42
G30	29	29.0	830 / 840	no	24 / 25	3 x 1.55	30.0	ø 42
G30	50	50.0	830 / 840	no	44 / 45	3 x 1.35	30.0	ø 42
G31	30	30.0	830 / 840	no	24 / 25	3 x 1.60	30.0	ø 42
G31	37	37.0	830 / 840	no	30 / 31	3 x 1.55	30.0	ø 42
G31	50	50.0	830 / 840	no	44 / 45	3 x 1.45	30.0	ø 42
FRA4.1								
G20	20	7.0	830 / 840	si	9 / 10	4 x 2.80	35.0	no
G25	20	11.0	830 / 840	si	9 / 10	4 x 2.80	35.0	no
G25	25	11.0	830 / 840	si	14 / 15	4 x 2.80	35.0	no
G30	29	29.0	830 / 840	no	24 / 25	4 x 1.45	35.0	no
G30	50	50.0	830 / 840	no	44 / 45	4 x 1.25	35.0	no
G31	30	30.0	830 / 840	no	24 / 25	4 x 1.55	35.0	no
G31	37	37.0	830 / 840	no	30 / 31	4 x 1.45	35.0	no
G31	50	50.0	830 / 840	no	44 / 45	4 x 1.35	35.0	no
FRA4								
G20	20	8.5	830 / 840	si	9 / 10	4 x 2.80	40.0	no
G25	20	12.5	830 / 840	si	9 / 10	4 x 2.80	40.0	no
G25	25	12.5	830 / 840	si	14 / 15	4 x 2.80	40.0	no
G30	29	29.0	830 / 840	no	24 / 25	4 x 1.55	40.0	no
G30	50	50.0	830 / 840	no	44 / 45	4 x 1.35	40.0	no
G31	30	30.0	830 / 840	no	24 / 25	4 x 1.60	40.0	no
G31	37	37.0	830 / 840	no	30 / 31	4 x 1.55	40.0	no
G31	50	50.0	830 / 840	no	44 / 45	4 x 1.45	40.0	no

Tab. 10

PRESSIONI E UGELLI PER BRUCIATORI On/Off

FRB3								
G20	20	8.5	830 / 840	si	9 / 10	3 x 2.80	30.0	no
G25	20	12.5	830 / 840	si	9 / 10	3 x 2.80	30.0	no
G25	25	12.5	830 / 840	si	14 / 15	3 x 2.80	30.0	no
G30	29	29.0	830 / 840	no	24 / 25	3 x 1.55	30.0	no
G30	50	50.0	830 / 840	no	44 / 45	3 x 1.35	30.0	no
G31	30	30.0	830 / 840	no	24 / 25	3 x 1.60	30.0	no
G31	37	37.0	830 / 840	no	30 / 31	3 x 1.55	30.0	no
G31	50	50.0	830 / 840	no	44 / 45	3 x 1.45	30.0	no
FRB4								
G20	20	8.5	830 / 840	si	9 / 10	4 x 2.80	40.0	55
G25	20	12.5	830 / 840	si	9 / 10	4 x 2.80	40.0	55
G25	25	12.5	830 / 840	si	14 / 15	4 x 2.80	40.0	55
G30	29	29.0	830 / 840	no	24 / 25	4 x 1.55	40.0	55
G30	50	50.0	830 / 840	no	44 / 45	4 x 1.35	40.0	55
G31	30	30.0	830 / 840	no	24 / 25	4 x 1.60	40.0	55
G31	37	37.0	830 / 840	no	30 / 31	4 x 1.55	40.0	55
G31	50	50.0	830 / 840	no	44 / 45	4 x 1.45	40.0	55
FRB4.1								
G20	20	11.0	840	si	9 / 10	4 x 2.80	45.0	no
G25	20	8.5	840	si	9 / 10	4 x 3.20	45.0	no
G25	25	8.5	840	si	14 / 15	4 x 3.20	45.0	no
G30	29	29.0	840	no	24 / 25	4 x 1.65	45.0	no
G30	50	50.0	840	no	44 / 45	4 x 1.40	45.0	no
G31	30	30.0	840	no	24 / 25	4 x 1.70	45.0	no
G31	37	37.0	840	no	30 / 31	4 x 1.65	45.0	no
G31	50	50.0	840	no	44 / 45	4 x 1.50	45.0	no
FRC4								
G20	20	8.5	830 / 840	si	9 / 10	4 x 2.80	40.0	no
G25	20	12.5	830 / 840	si	9 / 10	4 x 2.80	40.0	no
G25	25	12.5	830 / 840	si	14 / 15	4 x 2.80	40.0	no
G30	29	29.0	830 / 840	no	24 / 25	4 x 1.55	40.0	no
G30	50	50.0	830 / 840	no	44 / 45	4 x 1.35	40.0	no
G31	30	30.0	830 / 840	no	24 / 25	4 x 1.60	40.0	no
G31	37	37.0	830 / 840	no	30 / 31	4 x 1.55	40.0	no
G31	50	50.0	830 / 840	no	44 / 45	4 x 1.45	40.0	no
FRC5								
G20	20	6.5	840	si	9 / 10	4 x 3.20	50.0	no
G25	20	11.0	840	si	9 / 10	4 x 3.20	50.0	no
G25	25	11.0	840	si	14 / 15	4 x 3.20	50.0	no
G30	29	29.0	840	no	24 / 25	4 x 1.70	50.0	no
G30	50	50.0	840	no	44 / 45	4 x 1.55	50.0	no
G31	30	30.0	840	no	24 / 25	4 x 1.80	50.0	no
G31	37	37.0	840	no	30 / 31	4 x 1.70	50.0	no
G31	50	50.0	840	no	44 / 45	4 x 1.60	50.0	no

Tab. 11

PRESSIONI E UGELLI PER BRUCIATORI a 2 stadi

GAS	Pressione ingresso Pi [mbar]	Pressione uscita al I° stadio Pu [mbar]	Pressione uscita al II° stadio Pu [mbar]	Elettrovalvola codice	Stabilizzatore	Pressostato Gas P. Reset[mbar]	n° e Ø ugelli	Potenza Min/Max [KW]	Diaframma coclea [mm]
FRA2S2									
G20	20	2.0	8.5	836 / 843	si	9 / 10	2 x 2.80	10 / 20	ø 42
G25	20	3.0	12.5	836 / 843	si	9 / 10	2 x 2.80	10 / 20	ø 42
G25	25	3.0	12.5	836 / 843	si	14 / 15	2 x 2.80	10 / 20	ø 42
G30	29	7.0	29.0	836 / 843	no	24 / 25	2 x 1.55	10 / 20	ø 42
G30	50	12.0	50.0	836 / 843	no	44 / 45	2 x 1.35	10 / 20	ø 42
G31	30	10.0	30.0	836 / 843	no	24 / 25	2 x 1.60	10 / 20	ø 42
G31	37	10.0	37.0	836 / 843	no	30 / 31	2 x 1.55	10 / 20	ø 42
G31	50	12.5	50.0	836 / 843	no	44 / 45	2 x 1.45	10 / 20	ø 42
FRA3S2									
G20	20	3.8	8.5	836 / 843	si	9 / 10	3 x 2.80	20 / 30	ø 42
G25	20	5.5	12.5	836 / 843	si	9 / 10	3 x 2.80	20 / 30	ø 42
G25	25	5.5	12.5	836 / 843	si	14 / 15	3 x 2.80	20 / 30	ø 42
G30	29	11.0	29.0	836 / 843	no	24 / 25	3 x 1.55	20 / 30	ø 42
G30	50	20.0	50.0	836 / 843	no	44 / 45	3 x 1.35	20 / 30	ø 42
G31	30	14.0	30.0	836 / 843	no	24 / 25	3 x 1.60	20 / 30	ø 42
G31	37	15.0	37.0	836 / 843	no	30 / 31	3 x 1.55	20 / 30	ø 42
G31	50	20.0	50.0	836 / 843	no	44 / 45	3 x 1.45	20 / 30	ø 42
FRA4S2									
G20	20	5.0	8.5	836 / 843	si	9 / 10	4 x 2.80	30 / 40	no
G25	20	7.0	12.5	836 / 843	si	9 / 10	4 x 2.80	30 / 40	no
G25	25	7.0	12.5	836 / 843	si	14 / 15	4 x 2.80	30 / 40	no
G30	29	16.0	29.0	836 / 843	no	24 / 25	4 x 1.55	30 / 40	no
G30	50	29.0	50.0	836 / 843	no	44 / 45	4 x 1.35	30 / 40	no
G31	30	15.0	30.0	836 / 843	no	24 / 25	4 x 1.60	30 / 40	no
G31	37	22.0	37.0	836 / 843	no	30 / 31	4 x 1.55	30 / 40	no
G31	50	28.0	50.0	836 / 843	no	44 / 45	4 x 1.45	30 / 40	no
FRA4.1S2									
G20	20	5.0	7.0	836 / 843	si	9 / 10	4 x 2.80	30 / 35	no
G25	20	7.0	11.0	836 / 843	si	9 / 10	4 x 2.80	30 / 35	no
G25	25	7.0	11.0	836 / 843	si	14 / 15	4 x 2.80	30 / 35	no
G30	29	20.0	30.0	836 / 843	no	24 / 25	4 x 1.45	30 / 35	no
G30	50	40.0	30.0	836 / 843	no	44 / 45	4 x 1.25	30 / 35	no
G31	30	22.0	30.0	836 / 843	no	24 / 25	4 x 1.55	30 / 35	no
G31	37	28.0	37.0	836 / 843	no	30 / 31	4 x 1.45	30 / 35	no
G31	50	38.0	50.0	836 / 843	no	44 / 45	4 x 1.35	30 / 35	no
FRB4S2									
G20	20	5.0	8.5	836 / 843	si	9 / 10	4 x 2.80	30 / 40	55
G25	20	7.0	12.5	836 / 843	si	9 / 10	4 x 2.80	30 / 40	55
G25	25	7.0	12.5	836 / 843	si	14 / 15	4 x 2.80	30 / 40	55
G30	29	16.0	29.0	836 / 843	no	24 / 25	4 x 1.55	30 / 40	55
G30	50	29.0	50.0	836 / 843	no	44 / 45	4 x 1.35	30 / 40	55
G31	30	15.0	30.0	836 / 843	no	24 / 25	4 x 1.60	30 / 40	55
G31	37	22.0	37.0	836 / 843	no	30 / 31	4 x 1.55	30 / 40	55
G31	50	28.0	50.0	836 / 843	no	44 / 45	4 x 1.45	30 / 40	55
FRB4.1S2									
G20	20	8.5	11.0	843	si	9 / 10	4 x 2.80	30 / 45	no
G25	20	7.0	8.5	843	si	9 / 10	4 x 3.20	30 / 45	no
G25	25	7.0	8.5	843	si	14 / 15	4 x 3.20	30 / 45	no
G30	29	20.0	29.0	843	no	24 / 25	4 x 1.65	30 / 45	no
G30	50	39.0	50.0	843	no	44 / 45	4 x 1.40	30 / 45	no
G31	30	22.5	30.0	843	no	24 / 25	4 x 1.70	30 / 45	no
G31	37	25.0	37.0	843	no	30 / 31	4 x 1.65	30 / 45	no
G31	50	37.0	50.0	843	no	44 / 45	4 x 1.50	30 / 45	no
FRC5S2									
G20	20	5.0	6.5	843	si	9 / 10	4 x 3.20	40 / 50	no
G25	20	7.0	11.0	843	si	9 / 10	4 x 3.20	40 / 50	no
G25	25	7.0	11.0	843	si	14 / 15	4 x 3.20	40 / 50	no
G30	29	18.5	29.0	843	no	24 / 25	4 x 1.70	40 / 50	no
G30	50	32.0	50.0	843	no	44 / 45	4 x 1.55	40 / 50	no
G31	30	19.0	30.0	843	no	24 / 25	4 x 1.80	40 / 50	no
G31	37	23.0	37.0	843	no	30 / 31	4 x 1.70	40 / 50	no
G31	50	35.0	50.0	843	no	44 / 45	4 x 1.60	40 / 50	no

Tab. 12

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