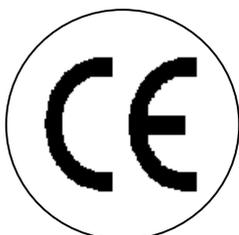
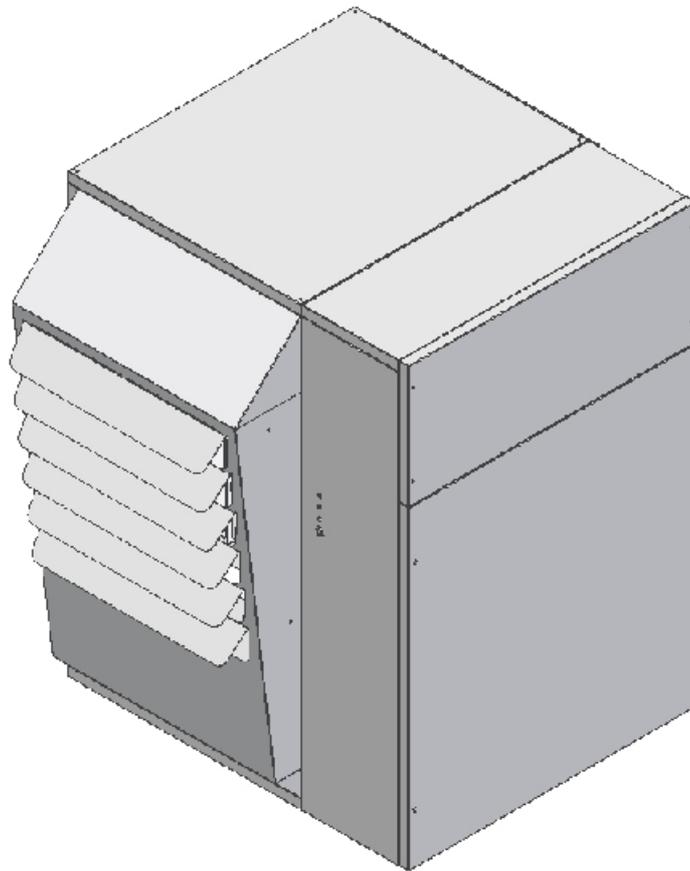


Gas fired room sealed unit heaters

**TECHNICAL INFORMATION, ASSEMBLY
INSTRUCTIONS, USE AND MAINTENANCE**

PA PA-2 PA-4



FLEXIHEAT UK LTD

Flexible Heating & Dehumidification Solutions

01202 822221

www.flexiheatuk.com

COMPLIANCE NOTICES

The warm air heaters comply with the following directives:

- EEC machine directives 98/37/CEE
- EEC gas directive 90/396
- EEC low tension directive 73/23

PIN NUMBER

Notified Body PIN Reference is 0694BN3750

	PA	PA-2	PA-4
	Single Stage Burner Single Speed Fan	Two Stage Burner Single Speed Fan	Two Stage Burner Two Speed Fan
1	PA 16	PA 16-2	PA 16-4
2	PA 26	PA 26-2	PA 26-4
3	PA 36	PA 36-2	PA 36-4
4	PA 46	PA 46-2	PA 46-4
5	PA 66	PA 66-2	PA 66-4
6	PA 86	PA 86-2	PA 86-4
7	PA 106	PA 106-2	PA 106-4

VERSION SINGLE STAGE

This heater has a single stage gas valve and a single speed axial fan .

VERSION TWO STAGE

This heater has a two stage Hi / Lo gas valve and a single speed axial fan.

VERSION DUAL POWER

This heater has a two stage Hi / Lo gas valve and a two speed axial fan .

GUARANTEE

Warm air heaters series **PA** are covered by a **SPECIFIC GUARANTEE** that starts on the date of purchase of the device, which date the buyer should document; if he cannot do this, the guarantee starts on the date of manufacture of the device.

The guarantee conditions are specified in detail in the GUARANTEE CERTIFICATE, supplied with the device, and we suggest you read them carefully.

INDEX

GENERAL

Description of equipment	pag.	6
Identification	"	7
Description	"	8
Technical data	"	10
Wiring diagram single and two stage	"	11
Wiring diagram dual power	"	12
Remote control connections	"	15
Regulating the air flows	"	16

FOR THE USER

Operation	"	16
Servicing	"	16
Heater indicator lights	"	17
Receipt of product	"	17
Transport	"	17
Dimension	"	18

FOR THE INSTALLER

Installation	"	20
Wall bracket dimensions	"	20
Gas connection	"	23
Flue and combustion options	"	24
Electrical panel with circuit board	"	28
Electrical connection	"	28

TECHNICAL ASSISTANCE SERVICE

Pre commissioning checks	"	29
Initial start up single stage	"	30
Initial start up two stage and dual power	"	31
Gas solenoid valves	"	32
Gas conversion	"	32
Thermostat	"	35
Checks	"	36
Maintenance	"	36
Fault finding	"	38

The following symbols are used in the manual:



WARNING = where the work to be carried out requires special care and suitable training



FORBIDDEN = where the action **MUST NOT** be carried out

This manual consists of 44 pages.

GENERAL NOTES



This Instruction Manual is an integral part of the device and as such must always be kept with the device. This also when the heater is sold to another user. The Manual must therefore be conserved carefully and consulted attentively before any action. In the case of damage or loss, you can at any time ask the local After Sales Service for a copy of the Manual.

After removing the packing, first make sure that the contents are complete and undamaged. If the heater does not correspond in any way, contact the Agency that sold the heater.

Installation of warm air heaters must be carried out by qualified companies. On completion of the job, they provide the owner with a declaration of conformity of the installation correctly carried out, that is according to the requisites of current applicable Norms and according to the indications provided by the Manufacturer in this Instruction Manual.

The heaters have been manufactured for room heating and they must be used for this purpose, compatibly with their performance characteristics.

The Manufacturer takes no contractual or extra-contractual responsibility for damage caused to persons, animals or property, due to errors in installation, adjustment and maintenance or due to improper use.

Excess temperature is damaging to health and represents a waste of energy. Avoid leaving rooms closed for long periods of time. Open the windows periodically to ensure adequate air change.

During the first start-up, there may be formation of smells and smoke due to evaporation of the liquid used to protect the heat exchanger during storage; this is a normal phenomenon that will disappear after a brief operation time.

The rooms must be adequately aerated.

On leaving the heater unused for a long period, you should carry out at least the following operations:

- Turn off the main heater switch and the main plant switch;
- Close the main fuel supply valve.

If the heater is not used for a long period of time, we suggest you contact the After Sales Service or other professionally qualified personnel for restarting.

All heaters must be fitted exclusively with original accessories. The Manufacturer is not responsible for any damage caused by improper use of the heater and by the use of accessories that are not original.

All references to Law, standards, directives and technical rules in this manual are to be considered as informative only and valid at the date of printing of the Manual. The enforcing of new dispositions or the alteration of current ones do not create any Manufacturer obligations towards third parties.

Repairs and maintenance must be carried out by the After Sales Service or by qualified personnel as specified in this Manual. Do not alter or tamper with the heater: this can create dangerous situations and the Manufacturer will not be responsible for any damage.

The systems that must be installed (gas or oil pipes, electrical supplies etc) must be suitably fastened and must not create obstacles that could cause tripping.

The Manufacturer is responsible for conformity of his product to laws, directives and construction standards current at the date of sale. Knowledge and observation of legislative instruments and of standards for the design of systems, and for installation, operation and maintenance are the exclusive responsibility of respectively the designer, the installation personnel and the user.

The Manufacturer is not responsible for failure to observe the instructions in this Manual, for the consequences of any operation carried out that is not specifically foreseen, or for any translations causing erroneous interpretations.

The heater is designed for operation at the thermal power and the airflow rate as specified in the Technical Data Chapter. A thermal power that is too low and/or an airflow that is too high can lead to condensation in the fluegases, with consequent irreparable **corrosion to the heat exchanger**. A thermal power that is too high and/or an airflow that is too low cause abnormal overheating of the heat exchanger with consequent actuation of the safety systems and damage to the heat exchanger.

GENERAL NOTES

The use of devices that employ electrical energy and/or fuel oil requires the observance of some fundamental safety rules such as:



Children and unassisted disabled persons must not use the warm air heaters.

Do not operate electrical equipment such as switches, electric household equipment etc if you can smell gas, fuel or other combustibles.

In this case:

- Open the doors and windows to aerate the room
- Close the fuel supply valves
- Call in quickly the After Sales Service or other professionally qualified personnel

Do not touch the heater if you are barefoot or if parts of your body are wet.

Do not carry out any cleaning or maintenance operation without first deactivating the heater by setting the main system switch to "OFF" and without first closing the fuel supply.

Do not alter the safety and adjustment systems without prior authorisation and indications by the heater Manufacturer.

Do not pull, detach or twist the electric cables that exit the heater, even if the heater is not connected to the electrical supply.

Do not open any doors that access the inside of the heater without turning the main system switch to "OFF".

Do not abandon or leave available to children the heater packing materials (cartons, nails, plastic bags etc), as these are a potential source of danger.

Do not install the heater near flammable material, or in areas where there is a corrosive atmosphere.

Do not place any object on the heater or push anything through the grilles in the casing nor in the fluegas ducts.

Do not touch the fluegas ducts as during normal operation these can reach high temperatures and represent a hazard.

Do not use any adapters, multiple sockets and cable extensions for the electrical connection of the heater.

Do not install the heater in the open air nor where it could be subject to atmospheric events.

Do not install the heater directly in limited spaces without adequate ventilation, as the burner air suction can create a pressure drop in the room and consequently cause serious problems.

DESCRIPTION OF EQUIPMENT

Heat exchanger

- Stainless steel construction easily accessible for inspection and cleaning and maintenance operations.
- Patented exchange elements made in stainless steel modular sections with large surface area, trapezoidal in section with swirl impressions for which give thermal yields of over 90%. The exchange elements have no welded joints or seams near to the burner flame so as to avoid exposure of any weak points.

Flue outlet with integral flue venter to assist dispersal of combustion gasses

External casing

Encloses all controls giving a good aesthetic appearance and streamlined look whilst allowing for easy inspection.

The casing consists of removable panels also includes:

A burner compartment, which is totally sealed off, with an inspection door;

Radiant heat insulation on the surfaces closest to the heat exchanger;

Outlet grille for directing the warm air complete with individually movable horizontal fins. vertical louvers are available on request

Fan assembly

One, two or three axial high air flow single speed single phase fan/motors complete with guards give effective cooling of the combustion / heat exchanger. **(single stage and two stage)** and two speed fans **(Dual Power)**.

The position of the fan(s) produce greater effective cooling of the combustion chamber, optimising the heat exchange and avoiding overheating.

Control and protection equipment

This is an electronic circuit board with ionisation flame detection and ignition controls. The equipment controls and monitors the operation of the burner in the following sequence.

Checks the differential pressure switch operated by the flue venter is in the closed position and the flue venter is working;

Checks the air temperature of the combustion chamber (below 100°C)

Opens the gas solenoid valve;

Starts burner ignition;

Detects flame signal from flame probe and allows normal heater operation

Failure in any of the above sequence will result in the control box shutting the gas valve and stopping the heater

The Heater will go to lockout and can be only be reset manually by pressing the red light on the front of the equipment.

Gas solenoid valve

The multifunctional 1 stage gas valve **(Single Stage)** and 2 Stage gas valve **(Two Stage and Dual Power)**

- Safety solenoid valve
- A regulatory solenoid valve
- A pressure regulator
- A gas filter

Atmospheric multigas burner assembly

Consisting of:

- Galvanized steel manifold
- Visual monitoring aperture for the
- electrodes and flame observation
- 1, 2 or 4 stainless steel burner bars
- Ignition and Detection electrodes.

Note: the type 6 - 7 models are equipped with two gas manifolds, each manifold has an ignition electrode.

Control and safety thermostats

The heater is controlled by three thermostats pre set to the following:

LM Limit thermostat (100°C)

Capillary type. Manual Reset

Act as a safety device and shuts down the burner if the heater goes to overheat. The yellow light will flash when in overheat. The LIMIT thermostat is reset by the removal of the plastic cap situated on the control panel inside the heater, and manually pressing the reset button, after first ensuring that the fault has been rectified. (calibrated at 100°C). Replaced cap after resetting thermostat.

TR Regulatory thermostat (0 – 90°C)

Capillary type. Automatic reset.

The thermostat monitors the temperature of the airflow and will shut down the burner if the set level is exceeded (calibrated at 70°C). Once the fan has sufficiently cooled the heat exchanger, the burner will automatically relight. The yellow indication light will flash until the burner relights. If this fault persists the cause should be investigated.

SND Control probe (0 – 40°C)

Connected in series with the thermostat TR. The probe will start the fan when the temperature reaches 30°C (approximately 30 seconds from burner ignition). When the desired room temperature is reached and the burner shuts down, the probe will allow the fan to run for approximately 3-4 minutes until the heat exchanger has cooled sufficiently.

The probe also monitors the operation of the TR thermostat and if a fault is detected will change the yellow flashing light to a continuous on light. In addition to this the SND probe monitors the temperature of the return air and will switch off the fan prior to the 3-4 minute run on time if the heat exchanger has cooled sufficiently (this avoiding cold air flow from the heater).

Differential air pressure switch

This switch will shut the gas valve if the flue venter fails or there is an obstruction in the flue.

Flue venter

This consists of a centrifugal fan which

Is run by an electric motor with self-cooling rotor the cooling air is supplied through a duct pipe situated in the axial fan air flow

Indication lights

These consist of three different coloured lights on the front of the heater:

- **Green light** – indicates normal working. Illuminates when the gas solenoid valve opens
- **Yellow light** – indicates the operation of the LM, TR and SND thermostat.
- **Red light** - to indicate lockout of the heater by the control circuit failure.

Reset button to reset the lockout

Flue spigot

A flue spigot (100mm) is situated at the rear of the heater for connection of flue pipes.

Combustion air spigot

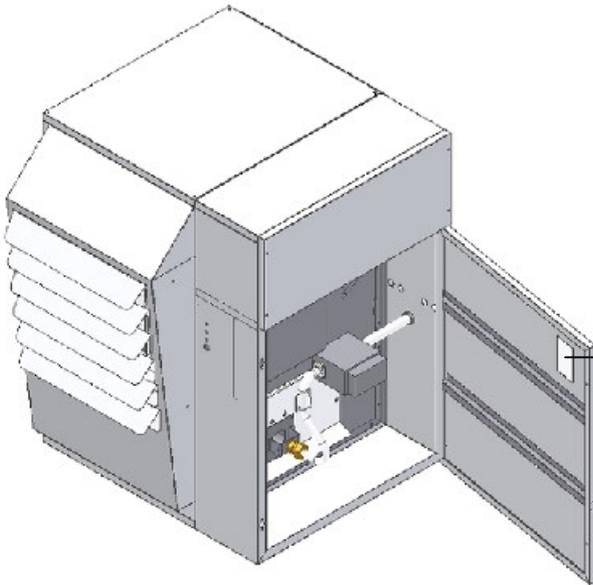
A combustion air spigot (100/150mm) with a safety mesh of less than 16 mm Ø on the rear of the heater allow for connection of combustion air pipes.

IDENTIFICATION



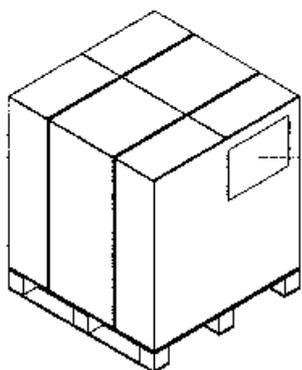
If the technical data is lost or damaged ask
 Manufacturer Technical Dept. for a duplicate.
 Check code and model is as data plate.

Position of data plate



Manufacturer		CE
AIR HEATER		
Model	<input style="width: 100%;" type="text"/>	
Serial Number	<input style="width: 100%;" type="text"/>	
Country	<input style="width: 50%;" type="text"/>	PIN <input style="width: 50%;" type="text"/>
Category	<input style="width: 50%;" type="text"/>	Code <input style="width: 50%;" type="text"/>
Type	<input style="width: 50%;" type="text"/>	Year <input style="width: 50%;" type="text"/>
Nominal heat INPUT	<input style="width: 80%;" type="text"/>	kW
Nominal heat OUTPUT	<input style="width: 80%;" type="text"/>	kW
Air Flow max	<input style="width: 80%;" type="text"/>	m ³ /h
Electrical Supply	<input style="width: 100%;" type="text"/>	
Electrical power	<input style="width: 80%;" type="text"/>	W
Protection rating	<input style="width: 100%;" type="text"/>	
GAS TYPE	<input style="width: 100%;" type="text"/>	
Supply pressure	mbar	<input style="width: 30%;" type="text"/> <input style="width: 30%;" type="text"/> <input style="width: 30%;" type="text"/>
Nozzle pressure	mbar	<input style="width: 30%;" type="text"/> <input style="width: 30%;" type="text"/> <input style="width: 30%;" type="text"/>
Nozzle diameter	mm	<input style="width: 30%;" type="text"/> <input style="width: 30%;" type="text"/> <input style="width: 30%;" type="text"/>
Gas consumption	m ³ /h	<input style="width: 30%;" type="text"/> <input style="width: 30%;" type="text"/> <input style="width: 30%;" type="text"/>
APPLIANCE PRESET FOR G20 NATURALGAS		

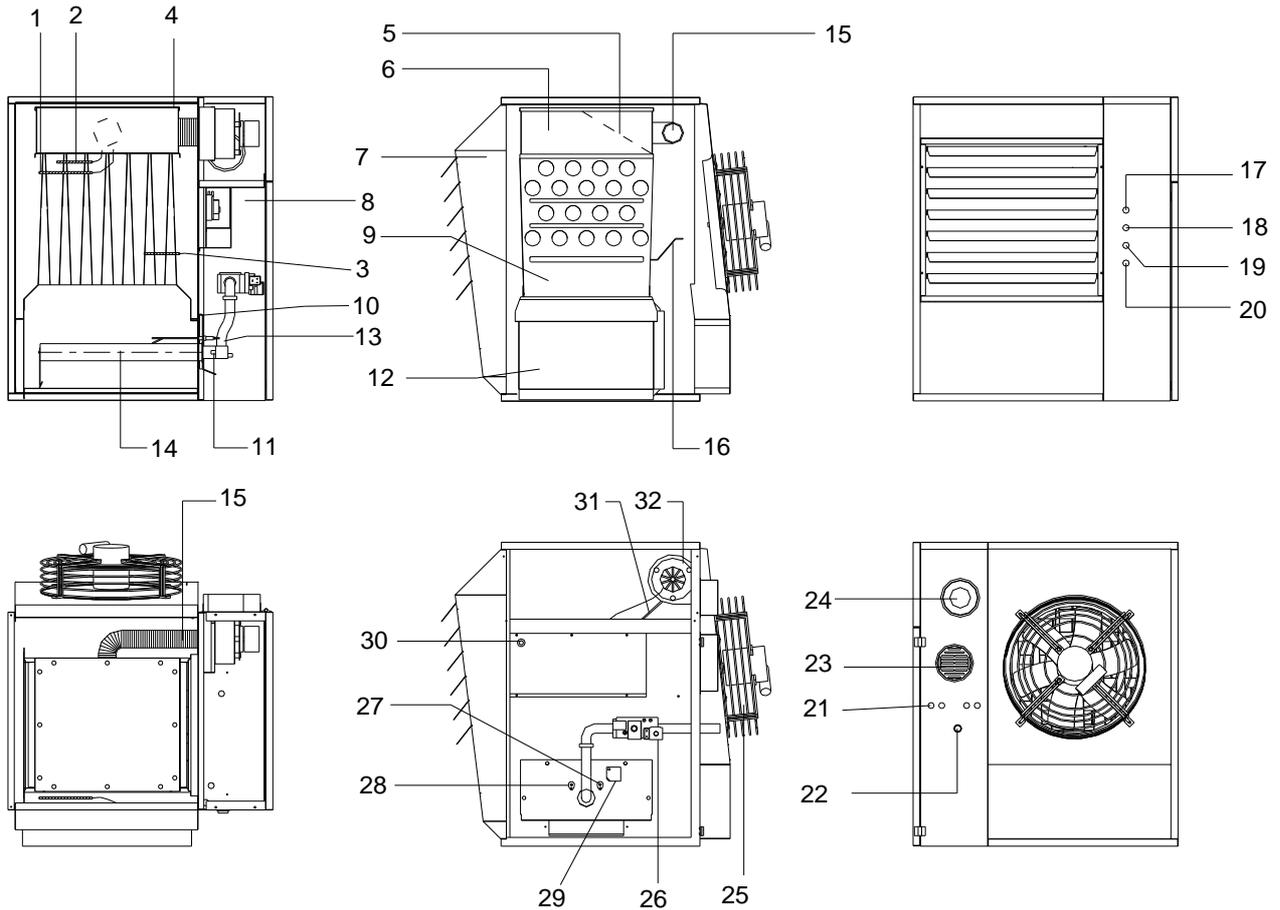
Packing label position



CE
Code Model Serial No

DESCRIPTION

Types 1 - 5

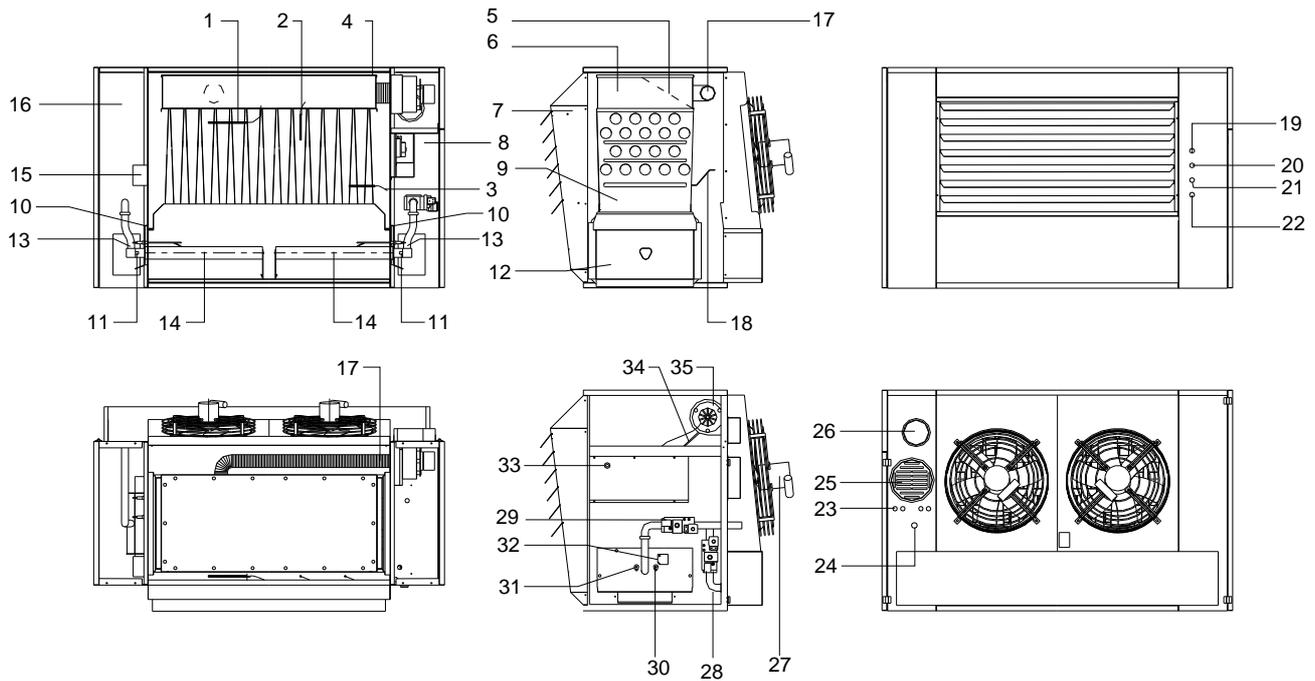


NOTE:

- Heaters type 1, 2, 3, 4, are equipped with one burner manifold
- Heaters type 5 are equipped with two burner manifolds
- Heaters type 1, 2, 3, 4, have one axial fan only
- Heaters type 5 have two axial fans

- | | |
|---|--|
| 1. Thermostat TR | 17. Green Power on LED |
| 2. Limit Thermostat LM | 18. Yellow high temperature indication LED |
| 3. Control probe SND | 19. Red Lockout indication LED |
| 4. Flue venter inspection door | 20. Lockout reset |
| 5. Flue gas section | 21. Electrical connection sockets |
| 6. Flue manifold | 22. Gas connection |
| 7. Air discharge plenum with horizontal louvres | 23. Combustion air spigot |
| 8. Burner compartment | 24. Flue spigot |
| 9. Burner clams | 25. Axial fan |
| 10. Burner plate insulation | 26. Gas valve |
| 11. Gas injector | 27. Spark Electrode |
| 12. Combustion chamber | 28. Flame probe |
| 13. Gas manifold | 29. Inspection flap |
| 14. Burner bars | 30. Overheat reset LIMIT |
| 15. Flue venter cooling pipe | 31. Differential pressure switch connection tube |
| 16. Deflector | 32. Flue venter |

Type 6 - 7



NOTE:

- Heaters type 6 are supplied with two opposing burners
- Heaters type 7 are supplied with four opposing burners
- Heaters type 7 have three fans.

- | | |
|---|--|
| 1. Control thermostat TR | 19. Green power on LED |
| 2. Limit thermostat LM | 20. Yellow high temperature indication LED |
| 3. Control probe SND | 21. Red lockout LED |
| 4. Flue inspection door | 22. Lockout reset |
| 5. Flue gas section | 23. Electrical connection sockets |
| 6. Flue manifold | 24. Gas connection |
| 7. Air discharge plenum with horizontal louvres | 25. Combustion air spigot |
| 8. Burner compartment | 26. Flue spigot |
| 9. Burner clams | 27. Axial fan |
| 10. Burner plate insulation | 28. Gas pipe |
| 11. Gas injector | 29. Gas Valve (n°2 per type 6 & 7) |
| 12. Combustion chamber | 30. Spark electrode |
| 13. Gas manifold | 31. Flame probe |
| 14. Burner bars | 32. Inspection flap |
| 15. Ignition transformer | 33. Overheat reset LIMIT |
| 16. Left hand burner compartment | 34. Differential pressure switch connection tube |
| 17. Flue venter cooling pipe | 35. Flue venter |
| 18. Deflector | |

TECHNICAL DATA

DESCRIPTION	PA16	PA26	PA36	PA46	PA66	PA86	PA106	UNIT	
HEAT OUTPUT	13,8	23,0	30,5	41,7	58,6	76,6	94,3	kW	
	12.900	21.844	29.068	39.818	55.900	73.100	90.042	kcal/h	
HEAT INPUT (Nett)	15,0	25,4	33,8	46,3	65,0	85,0	104,7	kW	
	11.868	19.780	26.230	35.862	50.396	65.876	81.098	kcal/h	
EFFICIENCY	92,0	90,1	90,2	90,1	90,1	90,1	90,1	%	
AIR FLOW +15°C	1250	1820	2920	4130	5900	7900	8750	Nm ³ /h	
MAX AIR OFF (ΔT)	32	37	31	30	30	29	32	°K	
FAN SPEED Max	900	900	1350	1300	1350	1300	1350	rpm	
SOUND LEVEL max @ 6m	39	44	53	55	54	56	59	Db(A)	
MIN AIR OFF (ΔT) (Two Stage)	20	25	21	20	20	20	22	°K	
MIN AIR OFF (ΔT) (Dual Power)	26	26	24	23	24	22	25	°K	
HEAT INPUT (Min) (Two Stage and Dual Power)	8.7	15.8	21.0	28.8	40.5	52.9	65.2	kW	
	7480	13.558	18.060	24.768	34.830	45.494	56.072	kcal/h	
FAN SPEED Min (Dual Power)	820	820	1200	1200	1200	1200	1200	rpm	
SOUND LEVEL min @ 6m	37	41	51	53	52	54	57	Db(A)	
Thermostat calibration									
Thermostat TR (auto reset)								70	°C
Thermostat LM (manual reset)								100	°C
Thermostat SND (auto reset)								70	°C
Fan operation									
Fan on								30	sec
Fan off								3	min'
Air pressure switch setting	0,90	0,85	0,90	0,85	1,95	0,40	0,70	m/Bar	
Maximum flue resistance	40	70	70	70	70	160	115	Pa	
Axial fan									
Number	1	1	1	1	2	2	3	N°	
Diameter	300	350	350	420	350	420	350	mm	
Fan throw	10	14	18	26	32	35	37	m	
Electrical supply	230 V - 50Hz ~ 1ph								
Electrical power	0,155	0,165	0,225	0,345	0,440	0,600	0,670	kW	
Electrical protection								40	IP
Gas category								II _{2H3BP}	
Installation types								B ₂₂ - C ₁₂ - C ₃₂	
Operational limits									
Operating temperatures								0/+40	°C
Relative humidity (non condensing)								60	%
Natural Gas G20									
Number of injectors	1	1	1	1	2	2	4	N°	
Diameter of injectors	310	410	480	555	500	540	450	mm/100	
Inlet pressure								20	m/Bar
Burner pressure (max)	12,0	13,0	13,0	13,0	10,0	13,0	10,5	m/Bar	
Burner pressure (min) (Two Stage Dual Power)	6,0	7,0	6,5	6,5	7,0	6,5	5,0	m/Bar	
Consumption (max) ⁽¹⁾	1,51	2,55	3,39	4,65	6,52	8,53	10,51	Nm ³ /h	
Consumption (min) (Two Stage Dual Power)	0,96	1,79	2,38	3,25	4,57	5,97	7,36	Nm ³ /h	
Propane Gas G31									
Number of injectors	1	1	1	1	2	2	4	N°	
Diameter of injectors	190	250	280	335	285	320	255	mm/100	
Inlet pressure								37	m/Bar
Burner pressure (max)	35,5	35,0	35,5	35,5	34,5	35,5	34,5	m/Bar	
Burner pressure (min) (Two Stage Dual Power)	17,0	18,0	18,5	18,0	18,0	18,0	18,5	m/Bar	
Consumption (max) ⁽²⁾	0,58	0,98	1,30	1,78	2,50	3,27	4,03	Nm ³ /h	
	1,17	1,97	2,63	3,60	5,05	6,60	8,13	Kg/h	
Consumption (min) ⁽²⁾	2,29	3,88	5,16	7,07	9,92	12,97	15,98	Ltrs/h	
	0,40	0,68	0,91	1,25	1,75	2,29	2,82	Nm ³ /h	
	0,75	1,38	1,84	2,52	3,53	4,62	5,69	Kg/h	
	1,46	2,72	3,62	4,94	6,04	9,08	11,19	Ltrs/h	
Butane Gas G30									
Number of injectors	1	1	1	1	2	2	4	N°	
Diameter of injectors	190	250	280	335	285	320	255	mm/100	
Inlet pressure								30	m/Bar
Burner pressure (max)	29,5	29,0	29,0	28,5	29,0	29,0	28,5	m/Bar	
Burner pressure (min) (Two Stage Dual Power)	16,0	16,5	16,5	16,5	16,5	16,5	16,5	m/Bar	
Consumption (max) ⁽²⁾	0,44	0,74	0,99	1,36	1,91	2,49	3,07	Nm ³ /h	
	1,18	2,00	2,67	3,65	5,13	6,70	8,26	Kg/h	
Consumption (min) ⁽²⁾	2,05	3,48	4,62	6,34	8,89	11,63	14,33	Ltrs/h	
	0,33	0,52	0,69	0,95	1,33	1,74	2,15	Nm ³ /h	
	0,76	1,40	1,87	2,56	3,59	4,69	5,78	Kg/h	
	1,31	2,08	3,24	4,43	6,23	8,14	10,03	Ltrs/h	
Mass products of combustion max	0,0139	0,0185	0,0253	0,0356	0,0465	0,0573		kg/s	

References:

1) 2) 3) Atmospheric pressure 1013 mBar
Gas temperature 15

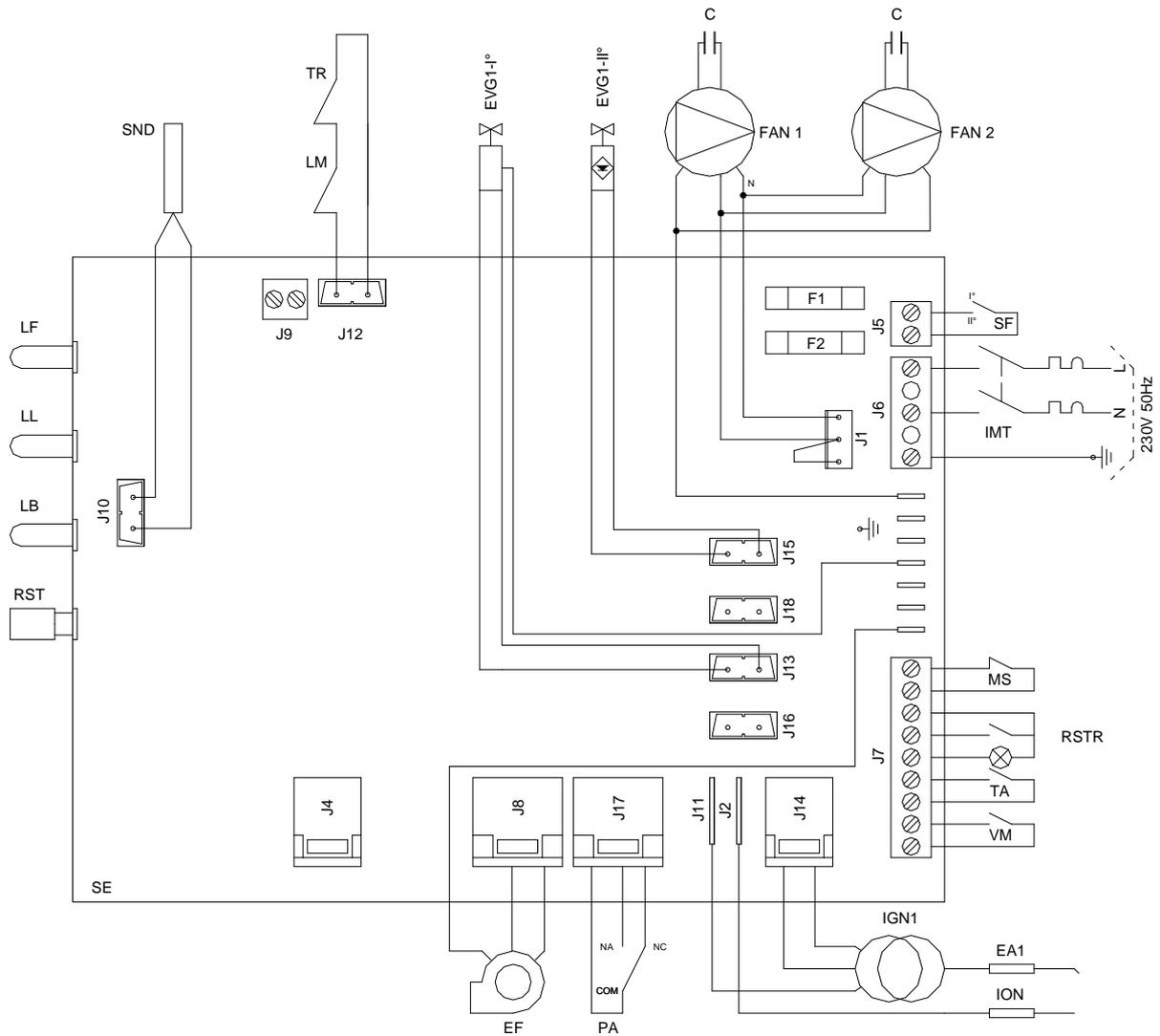
1) P.C.I. 8.570 kcal/Nm³

2) P.C.I. 22.360 kcal/Nm³ - 11.070 kcal/kg - 5.635 kcal/litro

3) P.C.I. 29.330 kcal/Nm³ - 10.905 kcal/kg - 6.285 kcal/litro

WIRING DIAGRAM SINGLE AND TWO STAGE

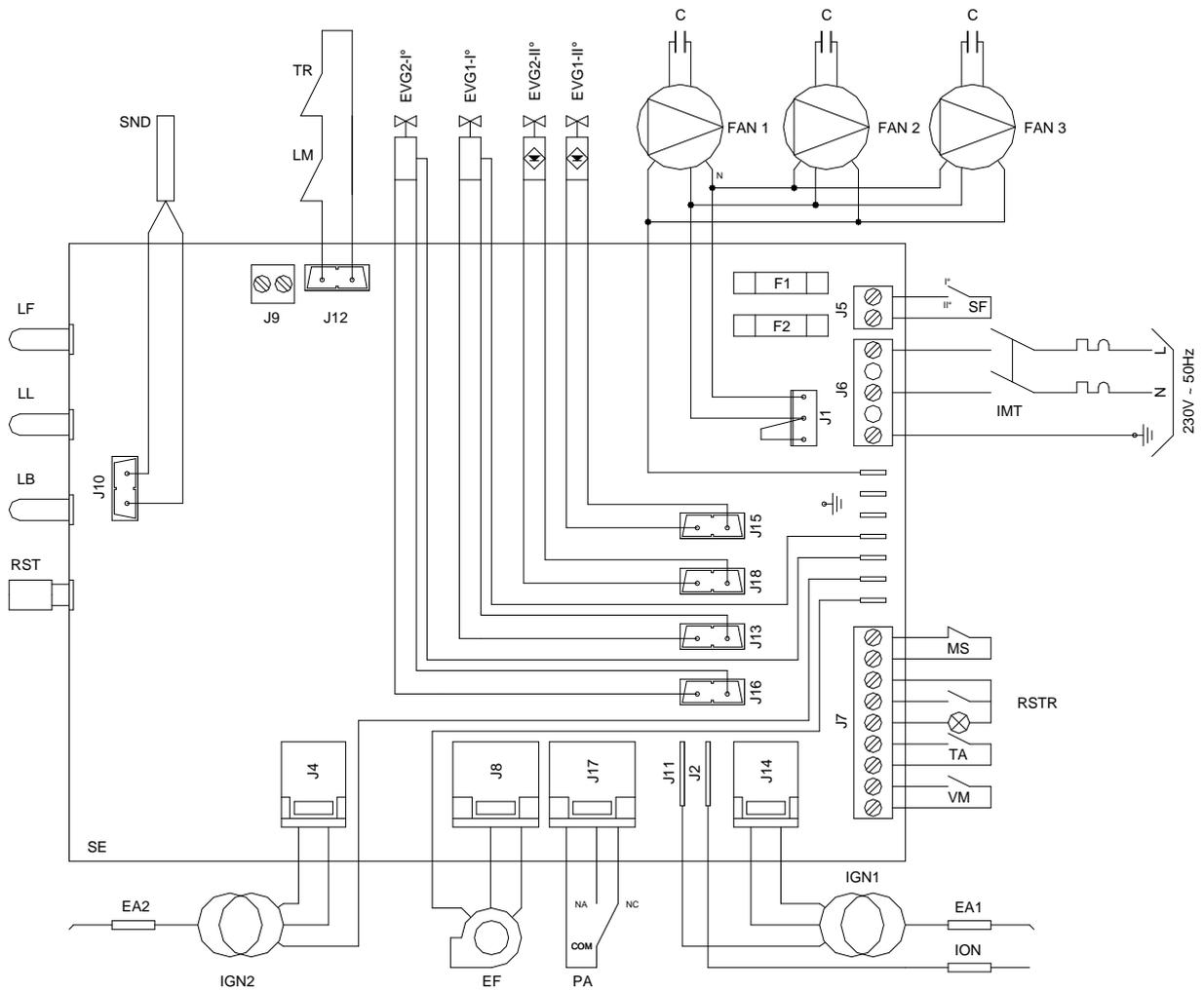
Type 1-2-3-4-5



KEY

- | | | | |
|-----------------|--|-----------------|------------------------------------|
| SND | Temperature probe | PA | Differential pressure switch |
| TR | Regulatory control thermostat (auto reset) | IGN1 | Ignition transformer |
| LM | LIMIT thermostat (Manual reset) | EA1 | Spark electrode |
| EVG1-I° | Gas solenoid valve 1 | ION | Ionisation probe |
| EVG1-II° | Second stage gas valve 1 (Two Stage version only) | SE | Electrical control board |
| C | Fan capacitor | IMT (*) | Fused isolator |
| FAN 1 | Axial fan 1 | MS (*) | Fire damper connection (accessory) |
| FAN 2 | Axial fan 2 (type 5) | RSTR (*) | Remote reset connection |
| F1-F2 | Line fuses | TA (*) | Room thermostat connection |
| LF | Green working light | VM (*) | Fan switch connection |
| LL | High temperature indication light | SF (*) | Second stage gas valve connection |
| LB | Lockout indication | | |
| RST | Lockout reset | | |
| EF | Flue venter | | |
- (*) External to the heater customer supply

Type 6-7



KEY:

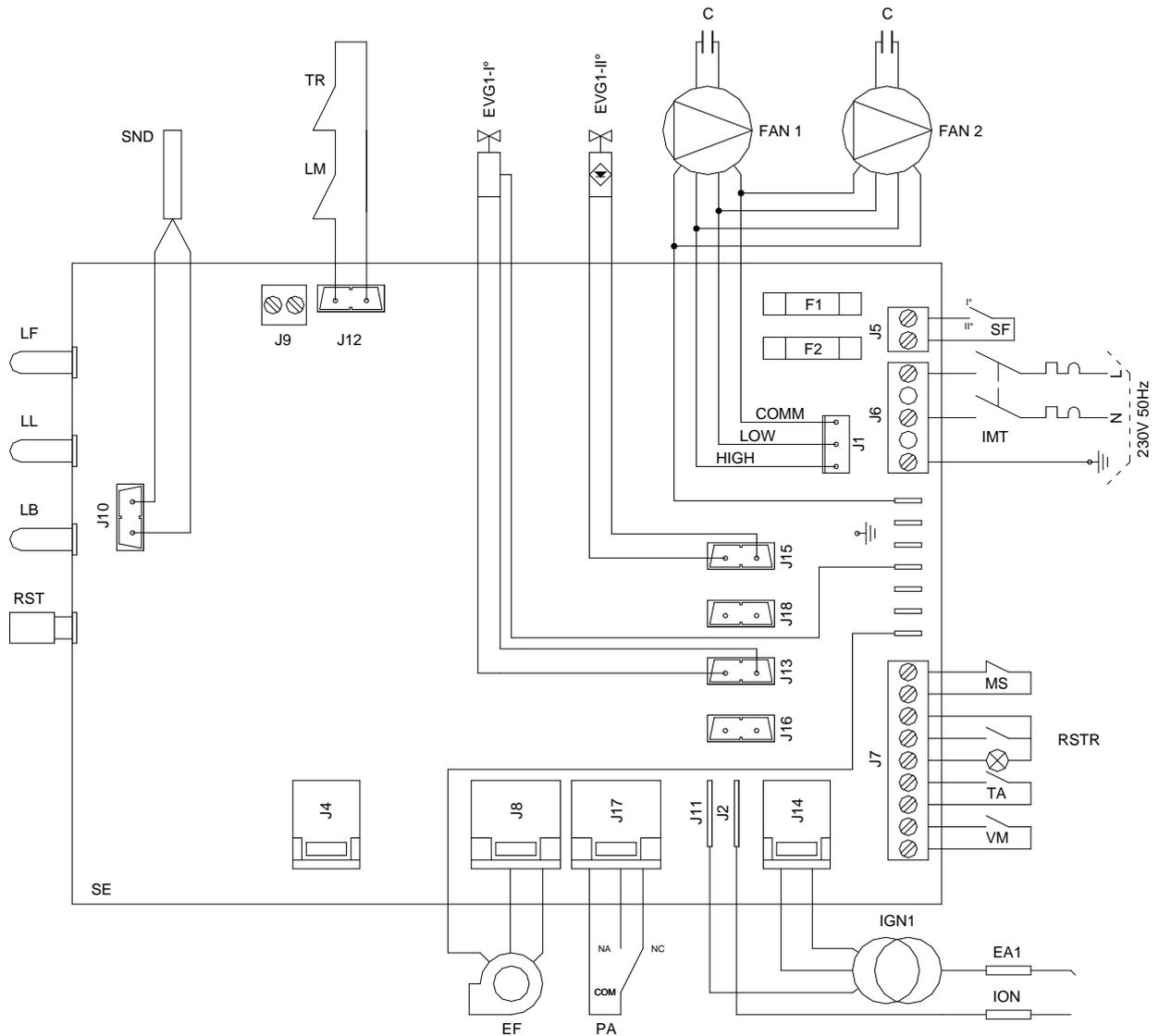
- SND** Temperature probe
- TR** Regulatory control thermostat (auto reset)
- LM** LIMIT thermostat (manual reset)
- EVG1-I°** Gas solenoid valve 1
- EVG1-II°** Second stage gas valve 1 **(Two Stage version only)**
- EVG2-I°** Gas solenoid valve 2
- EVG2-II°** Second stage gas valve 2 **(Two Stage version only)**
- C** Fan capacitor
- FAN 1** Axial fan 1
- FAN 2** Axial fan 2
- FAN 3** Axial fan 3 (type 7)
- F1-F2** Line fuse
- LF** Green working light
- LL** High temperature indication
- LB** Lockout indication

- RST** Lockout reset button
- EF** Flue venter
- PA** Differential pressure switch
- IGN1** Ignition transformer 1
- IGN2** Ignition transformer 2
- EA1** Spark electrode 1
- EA2** Spark electrode 2
- ION** Ionisation probe
- SE** Electrical control board
- IMT (*)** Fused isolator
- MS (*)** Fire damper connection (accessory)
- RSTR (*)** Remote reset connection
- TA (*)** Room Thermostat connections
- VM (*)** Fan switch connections
- SF (*)** Second stage gas valve connection

(*) External to the heater customer installation.

WIRING DIAGRAM DUAL POWER

Type 1-2-3-4-5



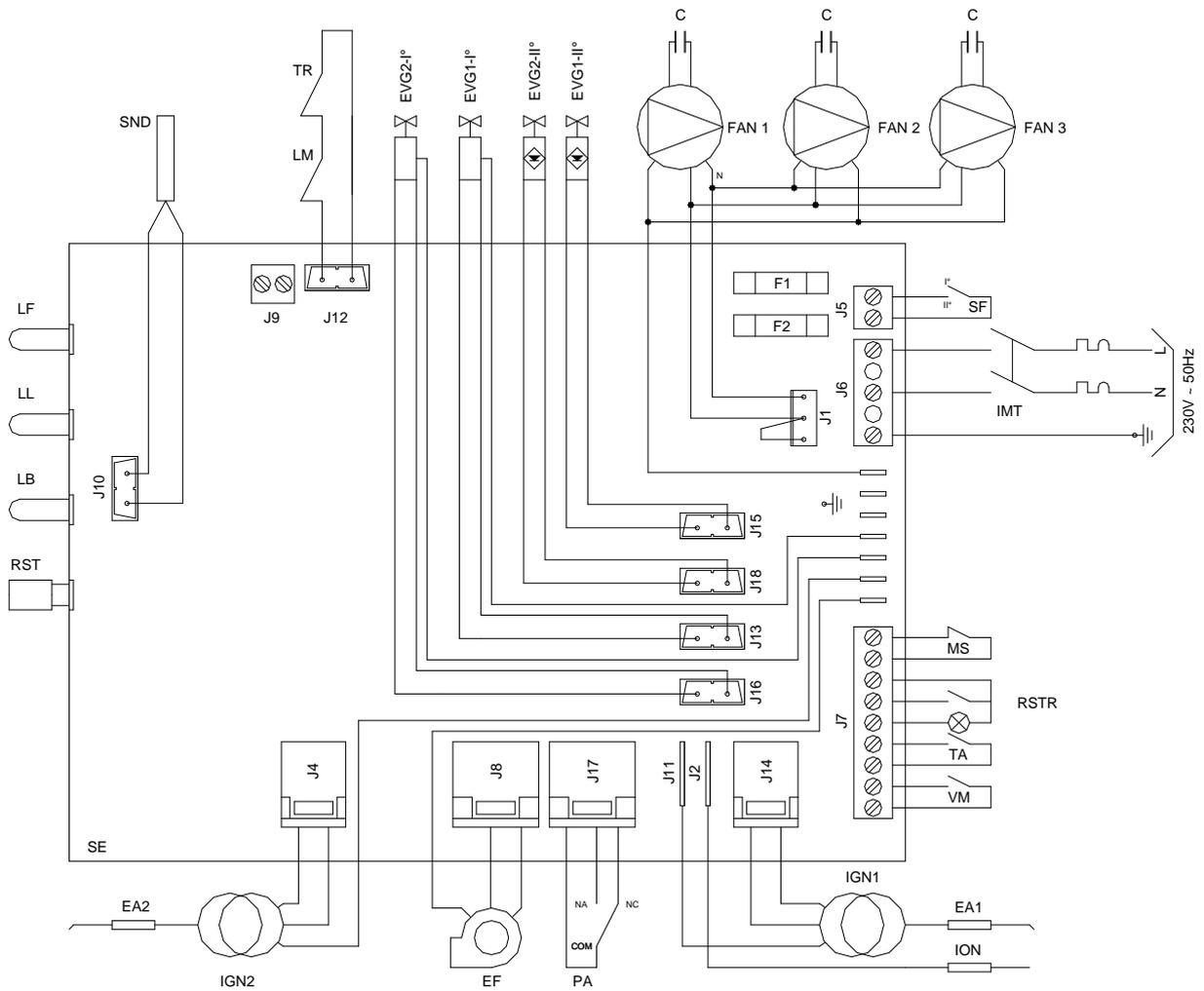
KEY

- SND** Temperature probe
- TR** Regulatory control thermostat (auto reset)
- LM** LIMIT thermostat (Manual reset)
- EVG1-I°** Gas solenoid valve 1
- EVG1-II°** Second stage gas valve 1
- C** Fan capacitor
- FAN 1** Axial fan 1
- FAN 2** Axial fan 2 (type 5)
- F1-F2** Line fuses
- LF** Green working light
- LL** High temperature indication
- LB** Lockout indication
- RST** Lockout reset button
- EF** Flue Venter

- PA** Differential pressure switch
- IGN1** Ignition transformer
- EA1** Spark electrode
- ION** Ionisation probe
- SE** Electrical board
- IMT (*)** Fused isolator
- MS (*)** Fire switch
- RSTR (*)** Remote reset
- TA (*)** Room thermostat
- VM (*)** Fan switch
- SF (*)** Second stage gas valve connection

(*) External to the heater customer installation

Type 6-7



KEY:

- SND** Temperature probe
- TR** Regulatory control thermostat (auto reset)
- LM** LIMIT thermostat (Manual reset)
- EVG1-I°** Gas solenoid valve 1
- EVG1-II°** Second stage gas valve 1
- EVG2-I°** Gas solenoid valve 2
- EVG2-II°** Second stage gas valve 2
- C** Capacitor
- FAN 1** Axial Fan
- FAN 2** Axial Fan
- FAN 3** Axial Fan (only type 7)
- F1-F2** Fuses
- LF** Green working light
- LL** High temperature indication
- LB** Lockout indication
- RST** Lockout reset button

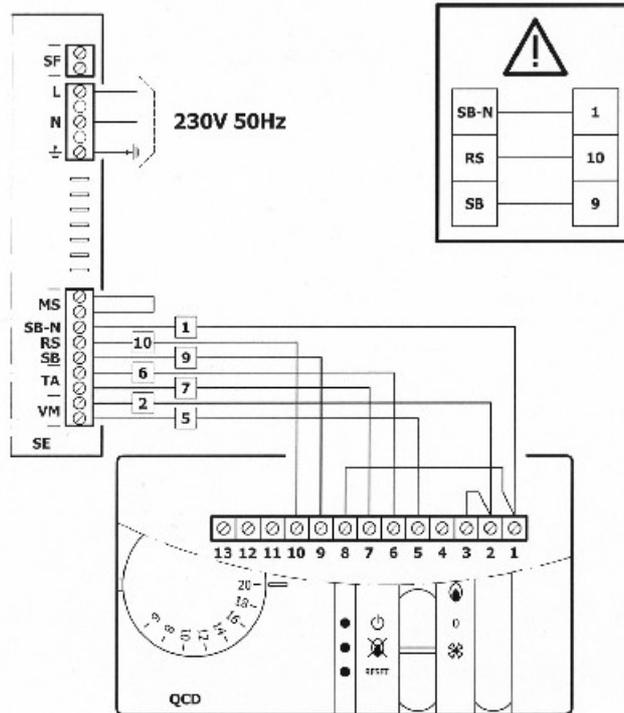
- EF** Flue venter
- PA** Differential pressure switch
- IGN1** Ignition transformer 1
- IGN2** Ignition transformer 2
- EA1** Spark electrode 1
- EA2** Spark electrode 2
- ION** Ionisation probe
- SE** Electrical board
- IMT (*)** Fused isolator
- MS (*)** Fire switch
- RSTR (*)** Remote reset
- TA (*)** Room Thermostat
- VM (*)** Fan switch
- SF (*)** Second stage gas valve connection

(*) External to the heater customer installation.

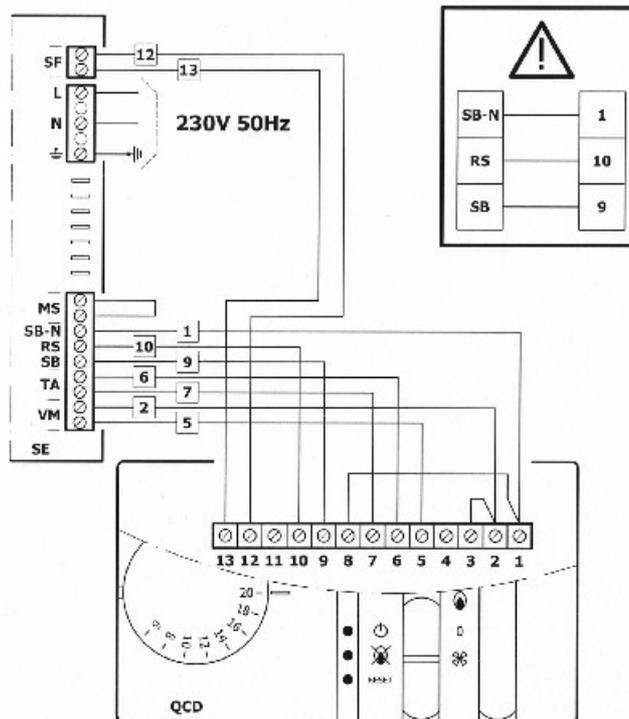
REMOTE CONTROL CONNECTIONS

Remote switchboard with thermostat (Optional) connection scheme.

VERSION SINGLE STAGE



VERSION TWO STAGE – DUAL POWER



DESCRIPTION:

- SE** Multifunction electronic plate
- QCD** Remote control switchboard
- MS (*)** Fire dumper's switch (if necessary)

(*) Not included in the apparatus, to be supplied and assembled by the Customer.

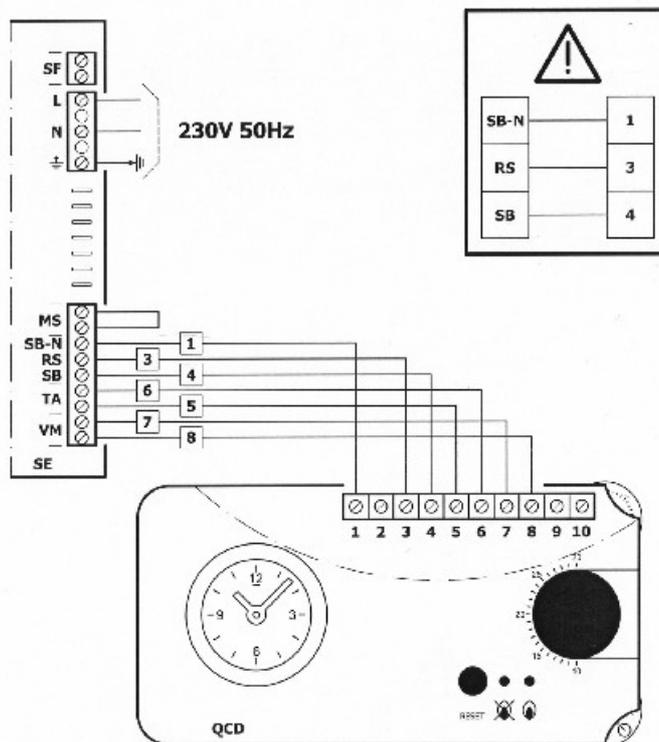
⚠ READ THE INSTRUCTION MANUAL BEFORE PROCEEDING WITH THE INSTALLATION.

⚠ THIS HEATER IS NEUTRALLY SWITCHED ENSURE THAT THE WIRING IS CORRECT TO THE DIAGRAMS PROVIDED.

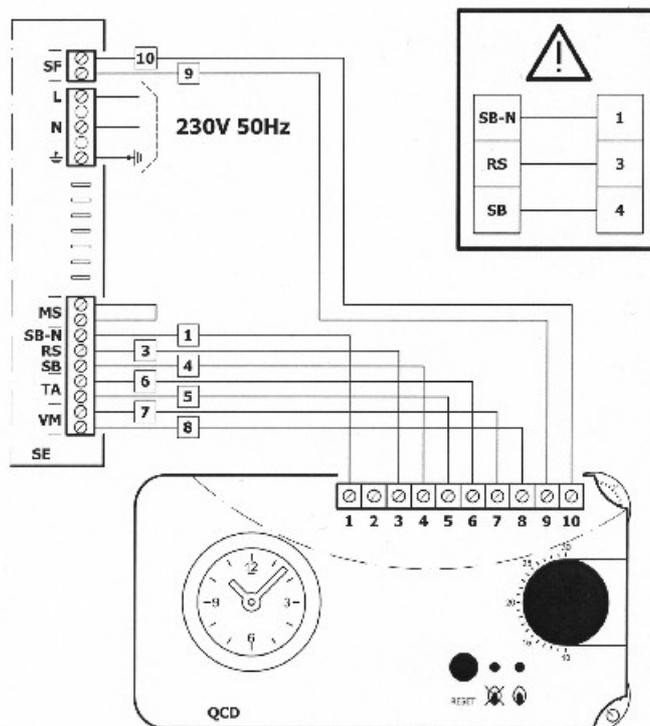
⚠ INCORRECT WIRING WILL DAMAGE THE ELECTRICAL CONTROL PANEL

Remote switchboard with thermostat and timer (Optional) connection scheme

VERSION SINGLE STAGE



VERSION TWO STAGE – DUAL POWER



DESCRIPTION:

- SE Multifunction electronic plate
- QCD Remote control switchboard
- MS (*) Fire dumper's switch (if necessary)

(*) Not included in the apparatus, to be supplied and assembled by the Customer.

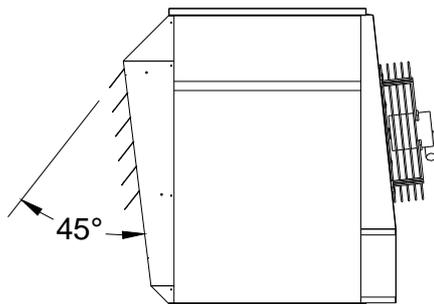
⚠ READ THE INSTRUCTION MANUAL BEFORE PROCEEDING WITH THE INSTALLATION.

⚠ THIS HEATER IS NEUTRALLY SWITCHED ENSURE THAT THE WIRING IS CORRECT TO THE DIAGRAMS PROVIDED.

⚠ INCORRECT WIRING WILL DAMAGE THE ELECTRICAL CONTROL PANEL

REGULATING THE AIR FLOW

The heater is supplied with horizontal louvres only vertical louvres are available as an option and locate inside the horizontal louver plenum.



HORIZONTAL

Ensure that the horizontal louvres are set so as to evenly distribute the air in the area to be heated they should be opened at a minimum of 45 degrees

This will ensure that there is sufficient air flow over the chamber and will avoid nuisance overheat lockout

For this reason it is also important to ensure that the vertical louvres if fitted are also open

OPERATION

To switch ON the heater

- Switch the fused isolator switch ON (supply customer)
- Switch the heater ON/OFF selector to "ON"
- Turn the thermostat to the desired temperature
- The heater will start automatically

To switch OFF the heater

- Turn the thermostat to its lowest temperature setting or alternatively switch the heater ON/OFF selector switch to OFF
- The burner will switch off but the fan will continue to operate for 3 to 4 minutes to cool the combustion chamber before stopping
- Finally switch the fused isolator to OFF

To switch ON fan only

- Switch the fused isolator to ON
- Set ON/STANDBY switch to ON
- Set VENT/HEAT switch to VENT position
- The fan only will run

To switch OFF fan

- Set ON/STANDBY switch to STANDBY

Stop

- Turn the selector switch to STOP

IF HEATER IS TO BE SWITCHED OFF FOR A LONG PERIOD

- Set ON/STANDBY switch to STANDBY
- Isolate at mains electrical supply
- Isolate the gas supply



WARNING! UNLESS IN AN EMERGENCY
Never stop the heater by switching off at the mains isolator. The residual heat accumulated in the heat exchanger may trigger the LIMIT safety device resulting in the need to reset manually.
If this is repeated it will damage the heat exchanger and will invalidate the warranty on the heater

SERVICING

It is a requirement that only qualified personnel are allowed to carry out installation commissioning or servicing. In addition only spare parts recommended by the manufacturer may be fitted, and the installer should provide a list of recommended spare parts that are available through the manufacturer or his agent. Before commencing any maintenance or servicing work the heater must be shut down and allowed to cool, and have the gas and electric supplies to it turned off at the supply cock and isolator respectively.

Always test for gas soundness after completing any service work particularly if this has necessitated the removal and / or replacement of gas carrying components

It is advisable that routine inspections are carried out on a frequent basis, servicing must also be carried out regularly, and in accordance with the manufacturers recommendations i.e. at a maximum interval of one year. In certain applications the frequency of servicing will have to be increased, this to a large extent is

governed by the working environment, and both the manufacturer and the installer will be able to offer further advice.

It is advisable that routine inspections are carried out on a frequent basis, servicing must also be carried out regularly, and in accordance with the manufacturers recommendations i.e. at a maximum interval of one year. In certain applications the frequency of servicing will have to be increased, this to a large extent is governed by the working environment, and both the manufacturer and the installer will be able to offer further advice.

CLEAN EXTERNAL PANELS

This cleaning should only be carried out with damp cloths with soap and water. If there are stubborn stains dampen. The cloth with a 50% mixture of water and white spirit

After cleaning dry the surfaces carefully

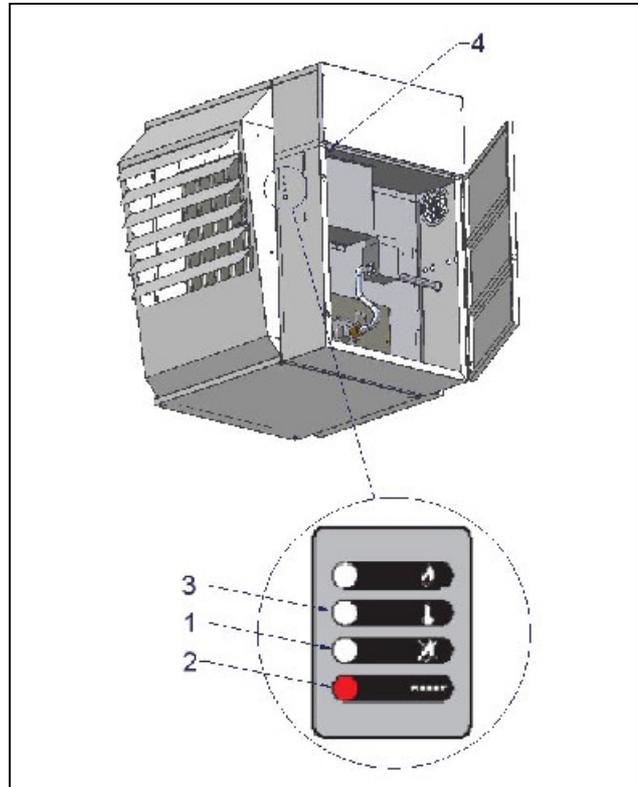
HEATER INDICATOR LIGHTS

If a fault should occur with the heater the lights situated at the right hand side of the heater will be illuminated indicating the fault

- **Red Lockout indication (1).**
This will be illuminated if the heater has gone to lockout due to the loss of flame sensing by the flame probe situated in the burner assembly in order to reset the heater the RESET Button (2) should be pressed (if fitted with remote controls the remote reset button will reset this switch).
- **Yellow overheat indication (3).**
This will be illuminated if the heater has exceeded the temperature set on the thermostat. The thermostat will shut down the burner until the fan(s) have cooled the chamber sufficiently and the burner will re light.

If the yellow light is flashing this means that the heater has gone to overheat and the LIMIT thermostat has operated and shut down the burner. The heater will not re light until the LIMIT (4) has been reset this can be done by removing the plastic cap covering the reset button and pushing the reset replace cap

The cause of the overheat should be investigated



RECEIPT OF PRODUCT

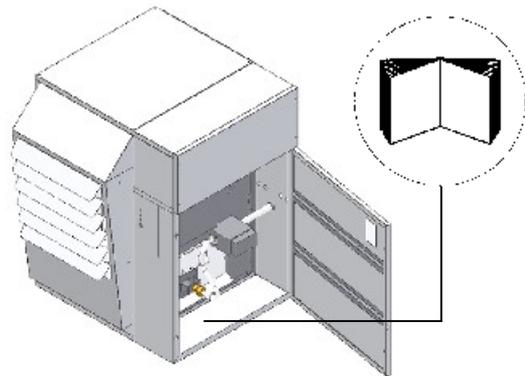
Delivery & pre installation checks

The heater is supplied wrapped in heavy duty protective polythene, mounted on a pallet.

On receipt of the heater, the following checks should be carried out;

- a) The model is as per order
- b) That it is undamaged
- c) That it is suitable for the gas supply and pressure
- d) That it is suitable for the electrical supply

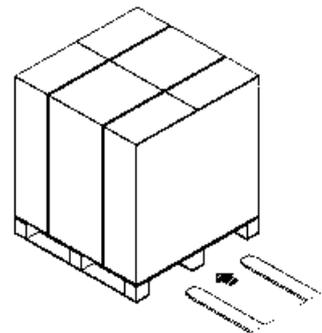
If any of these points are not satisfied then contact should be made with the Sales Office at manufacturer. In the case of claims for damage, this must be reported in writing within 24 hours of delivery, in order to comply with insurance



⚠ The instruction manual is an integral part of the equipment and so, after the packaging has been removed, make sure that it has been collected and stored safely.

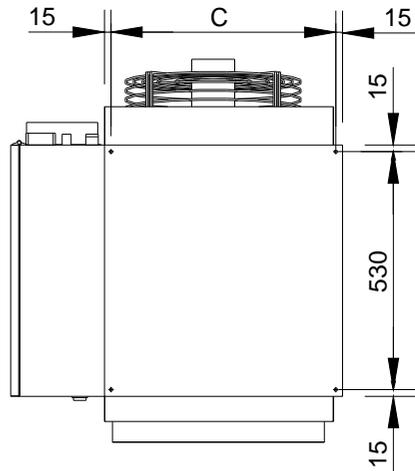
TRANSPORT

- ⚠** When moving the heater ensure that the equipment used is capable of lifting and supporting the weight of the heater
When lifting by fork truck ensure that the forks support the weight



DIMENSIONS

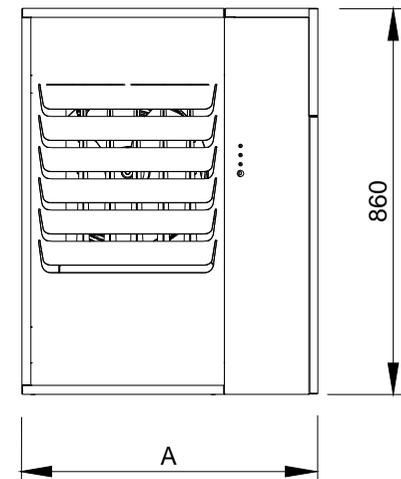
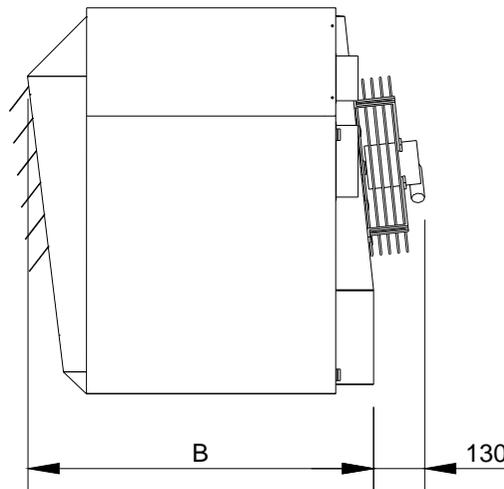
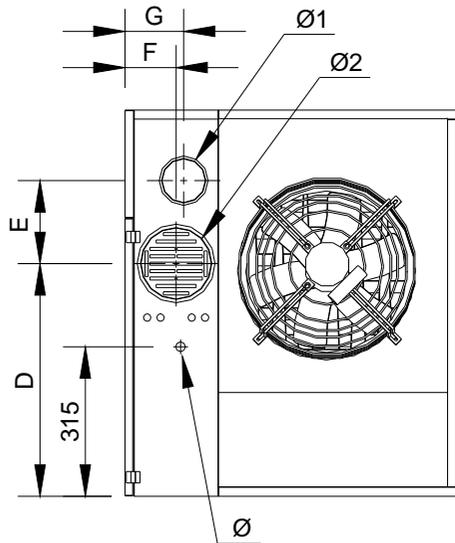
Heater types PA16 TO PA66



Type	PA16	PA26	PA36	PA46	PA66
A [mm]	610	665	745	925	1170
B [mm]	770	770	770	770	820
C [mm]	370	425	505	685	930
D [mm]	563	563	563	555	510
E [mm]	140	140	140	140	185
F [mm]	132	132	132	132	115
G [mm]	132	132	132	132	132
Ø1 [mm]	100 ⁽¹⁾	100 ⁽¹⁾	100 ⁽¹⁾	100 ⁽¹⁾	100 ⁽²⁾
Ø2 [mm]	100 ⁽¹⁾	100 ⁽¹⁾	100 ⁽¹⁾	100 ⁽¹⁾	150 ⁽²⁾
Ø [inch]	1/2	1/2	1/2	1/2	3/4
Nett weight [kg]	65	67	73	92	138

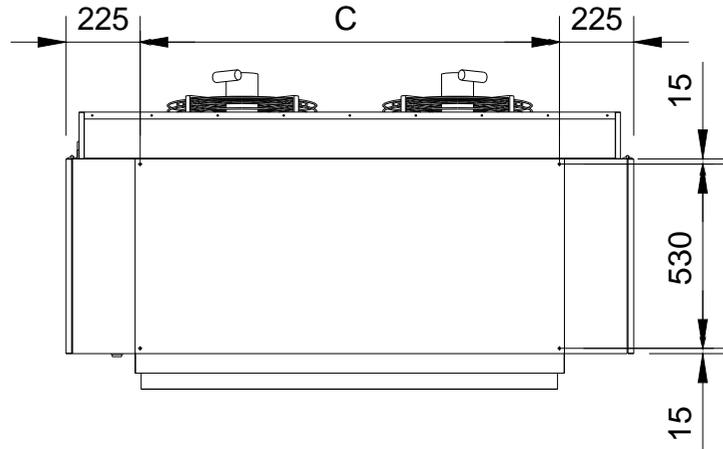
(1) female
(2) male

19

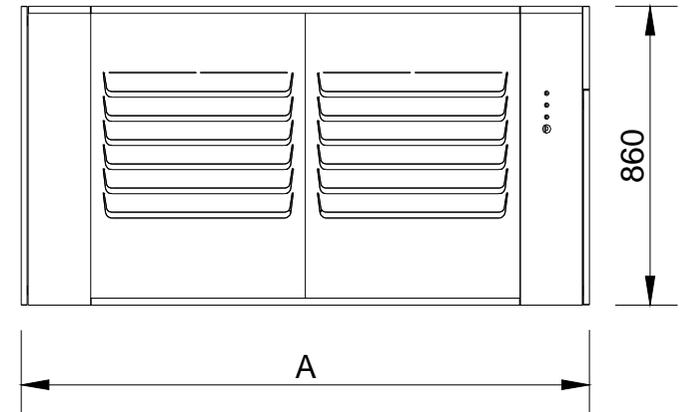
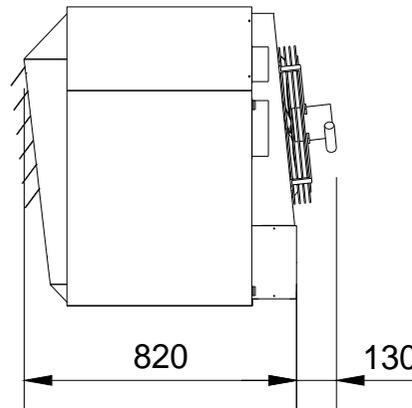
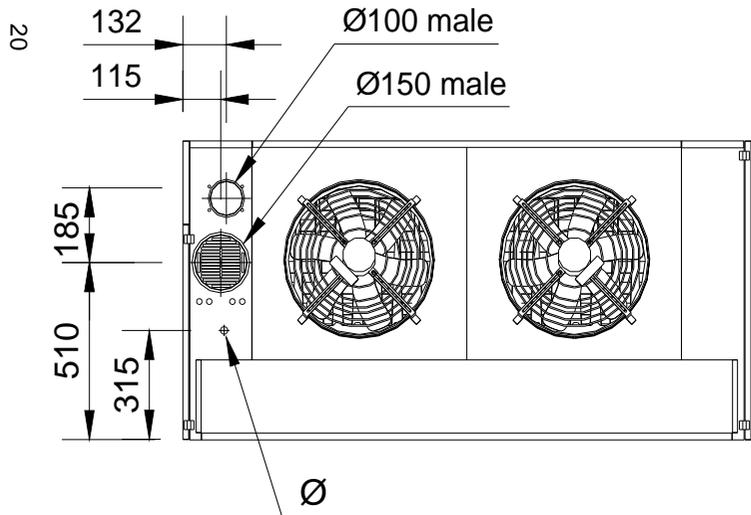


Note: Heater type 5 has two fans.

Heater types 6, 7



Type	6	7
A [mm]	1720	1960
C [mm]	1270	1510
Ø [inch]	¾	¾
Nett weight [kg]	171	205



NOTE heaters type 7 have three fans

INSTALLATION

Note

It is a requirement that only qualified and competent personnel may undertake installation commissioning and servicing of Heaters manufacturer.

⚠ WARNING

All of the basic criteria must be satisfied prior to commencing installation and commissioning, additionally, the Unit Heater must be positioned and installed so as to comply with all the relevant standards and guide lines as well as meeting national and local fire regulations and insurance criteria, especially if it is proposed that the heater is to be installed within a special risk area (e.g. proximity to where petrol engined vehicles are stored or parked, where cellulose spraying takes place, where woodworking machinery is operated, etc.).

Indirect fired heaters **must not** be located in hazardous areas. However, it is permissible for the heater to supply air to such areas. The heater **must not** be installed within an environment where there is a high concentration of chlorides, fluorides, salts, or other aggressive or volatile chemicals/compounds. Nor should the heater be positioned where the burner could be adversely affected by high winds or draughts. The heater must be installed so that it is level. Supports for the heater must be sufficiently robust to withstand the weight of the heater and any ancillary equipment. Any combustible material adjacent to the heater or flue system must be so placed or shielded so that its surface temperature does not exceed 65°C

The location chosen for the heater must allow for the fitting of an effective flue system.

The heater must be installed so that it is level, supports for the heater must be sufficiently robust to withstand the weight of the heater and any ancillary equipment. Any combustible material adjacent to the heater or flue system must be so placed or shielded so that its surface temperature does not exceed 65°C. Generally a free blowing heater should be located at a height (measured from floor level to the base of unit)

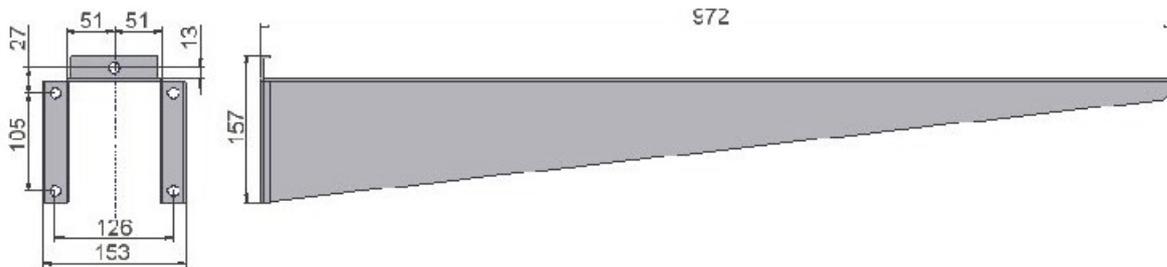
The location chosen for the air heater must allow for the fitting of an effective flue system. It must also allow adequate clearance for the air supply, return air circulation, gas supply, electrical supply and also provide good service access.

⚠ WARNING

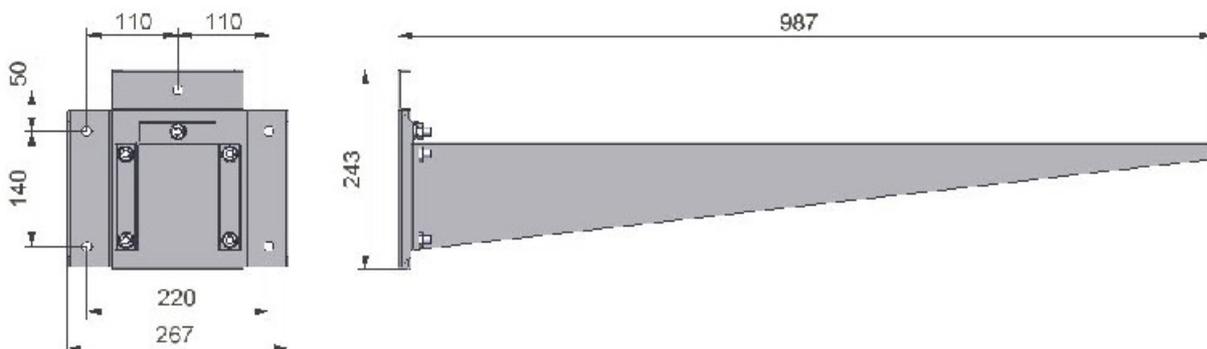
SUSPENSION OF THE HEATERS ARE SUPPLIED WITH SUPPORT CHANNELS (LOCATED INSIDE THE CONTROL PANEL DOOR) IF THEY ARE TO BE SUSPENDED HEATERS MUST NOT BE SUSPENDED BY THE TOP PANEL OF THE HEATER REMOVE THE KNOCKOUTS LOCATED IN THE BASE PANEL (NEXT TO WALL BRACKET FIXING SCREWS) INSERT 10MM DROP RODS THROUGH THE TOP OF THE HEATER AND SECURE TO THE CAPTIVE NUTS IN THE SUPPORT CHANNELS PROVIDED.

WALL BRACKET DIMENSIONS (ACCESSORIES)

Type 1-2-3-4



Type 5-6-7



⚠ WARNING

The wall brackets are designed to support one heater only it is the responsibility of the installer to ensure that all fixing brackets are properly secure.

Diagram showing the installation limits for independent pipe horizontal flue options when using wall support brackets:

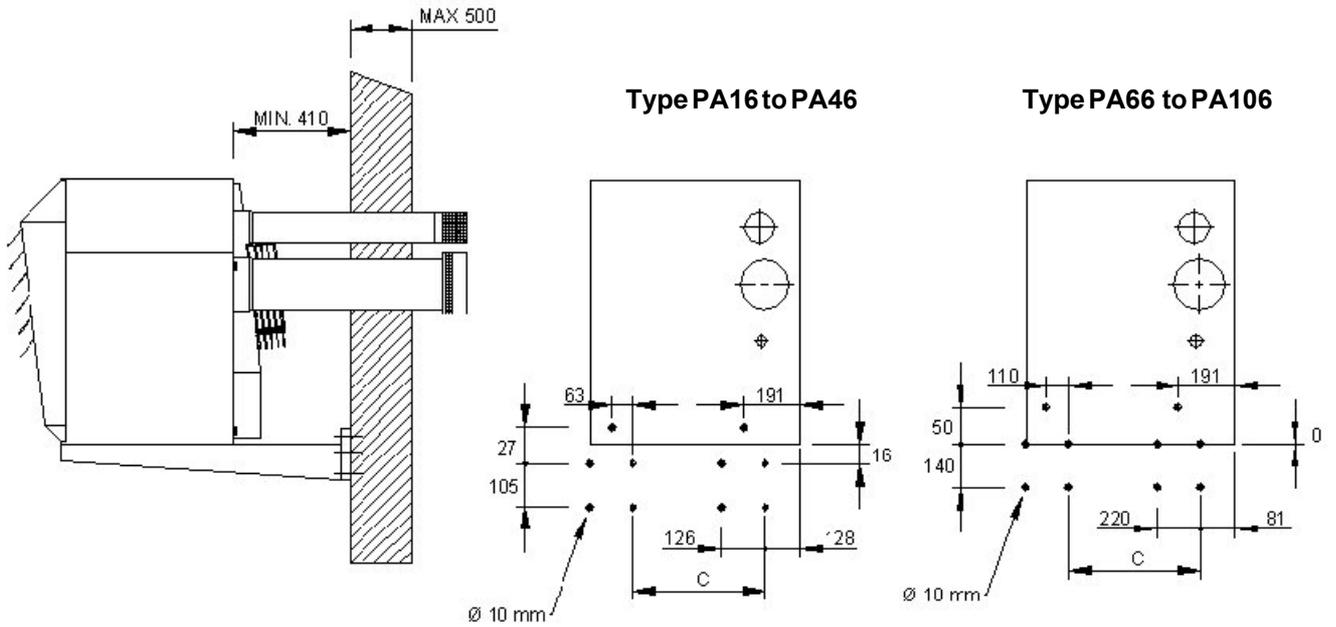
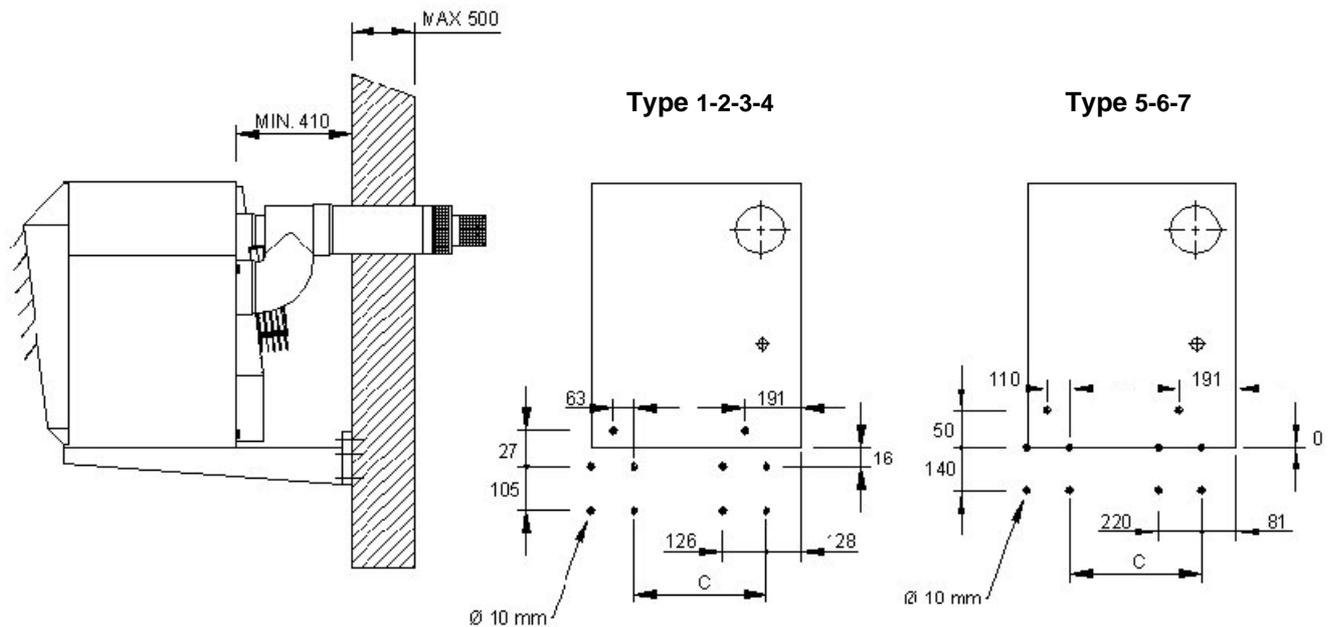
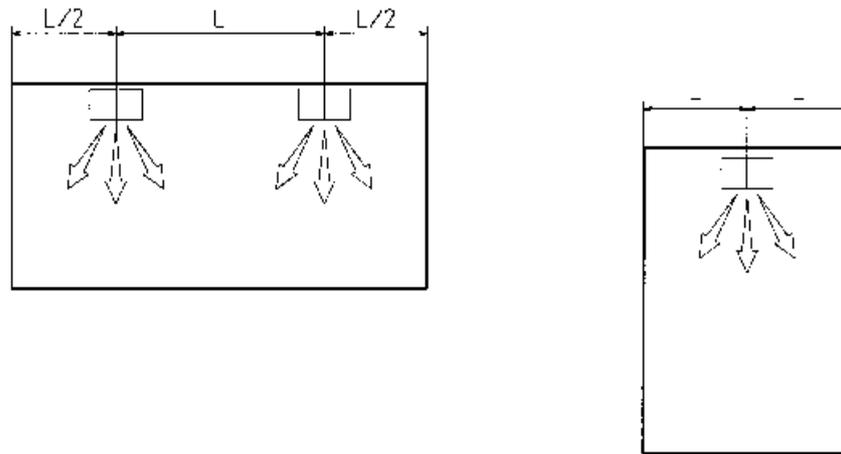


Diagram showing the installation limits for horizontal concentric flue options when using wall support brackets:

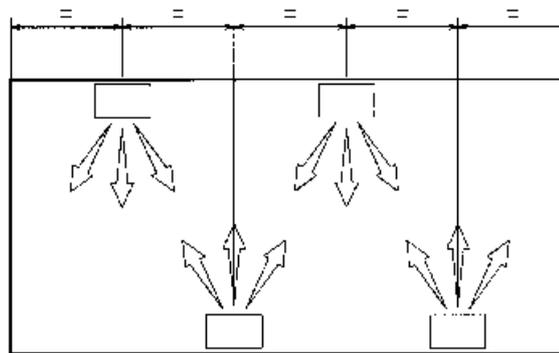


Type	PA16	PA26	PA36	PA46	PA66	PA86	PA106
C	370	425	505	685	930	1337	1577

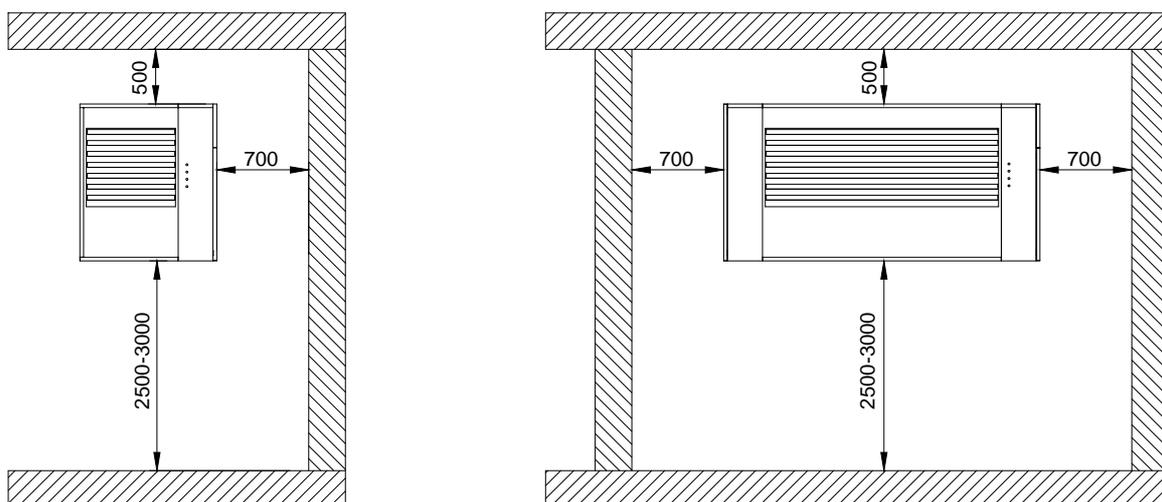
Examples of positioning in small and medium spaces



Examples of positioning in large areas



Installation heights and minimum distances from walls and ceilings



GAS CONNECTION

Connection of the heater to the gas supply, whether Natural gas LPG, must be carried in compliance with the installation laws and by qualified personnel. The warm air heater is factory set to work with (G20) Natural Gas. A (G31) Propane and (G30) Butane kits are also available.

Before connecting the heater it is necessary to make sure that:

- The correct type of gas is that for which the equipment has been set up for is available.
- The gas pipes are clean and free from debris.

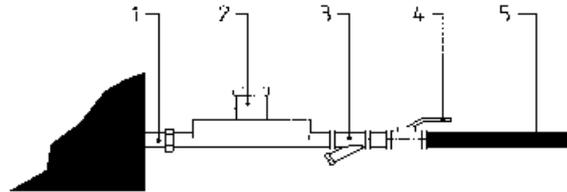
- The gas supply and meter are capable of delivering the required volume of gas to ensure the correct burner pressure can be achieved. See TECHNICAL DATA.
- The diameter of the pipework from the isolating cock to the burner must not be less than the diameter of the connection into the multiblock.



An approved gas jointing compound must be used on all joints and unions and the system purged and tested for soundness prior to final connection

1. **Threaded Gas pipe connector** Male 1/2" BSP thread on (type 1 ÷ 4) and 3/4" on (type 5 ÷ 7).
2. **Pressure stabiliser*** (required to ensure the correct gas pressure at valve).
3. **Filter*** (Advised to prevent impurities which may be present in the gas line from entering the gas valve and also to permit simple inspection and maintenance).
4. **Isolating Cock***: Each heater supply must be fitted with a separate isolating cock positioned adjacent to and upstream of the union which must be sited outside the heater the cock should be of the 90° turn type should be clearly marked OPEN/CLOSED and should be installed so as to fall to the closed position.
5. **Gas Pipe (*)**

(*) Customer supply



WARNING!

When a LPG supply is used it is advisable to install a first stage pressure reducer close to the LPG tank to reduce the pressure to 1.5 Bar and a second pressure reducer near to the heater installation to bring the pressure down from 1.5 Bar to 40 mbar max. A third reducer (2) mounted in proximity to the heater ensures the correct pressure is provided.

Note

To prevent any problems which could arise due to loss of pressure it is advisable to install a minimum pressure switch to shut down the heater in the event of gas pressure failure.



WARNING!

As there have been recorded instances of the deposition of copper sulphide dust within the valves and orifices of gas appliances as a direct result of a reaction between the hydrogen sulphide contained in some natural gasses and copper pipe we recommend that the heater(s) should not be connected to any natural gas pipe distribution system which utilizes copper pipework, including final connections. Instead steel pipework should be used throughout.

In the event that it is impractical to use steel pipework or where installers are obliged or insist on using elements of copper pipework within the installation then we strongly recommend that the gas supplier be consulted as specific conditions and requirements may be necessary.

FLUE AND COMBUSTION OPTIONS

Room sealed unit heaters are suitable for installation with the following flue configurations : **B₂₂** - **C₁₂** - **C₃₂** .

Option B₂₂

In this configuration the heater is connected to a single flue pipe to discharge the products of combustion outside the building either through the roof or through a wall

The combustion air is taken from inside the room

- The flue pipe should be metal smooth bored pipe with a diameter of not less than the flue spigot connection on the heater

- All joints should be sealed
- It must be properly secured so as to remain stable at all times
- It must have a wind shielded and rain proof terminal
- The flue should not exceed the length limits indicated in the following pages
- There must be adequate ventilation in the room as per current legislation.

Option C₁₂

In this configuration the heater is connected by two pipes, One discharging the products of combustion and the other bringing the combustion air from outside the building in which the heater is located

The outlet must be through the wall and may be made with two separate pipes or with concentric pipes

- The flue pipe and combustion air inlet should be metal smooth bored pipe with a diameter of not less than both the flue and combustion spigot connections on the heater

- All joints should be sealed
- It must be properly secured so as to remain stable at all times
- It must have a wind shielded and rain proof terminal
- The flue should not exceed the length limits indicated in the following pages
- There must be adequate ventilation in the room as per current legislation

Option C₃₂

In this configuration the heater is connected by two pipes, One discharging the products of combustion and the other bringing the combustion air from outside the building in which the heater is located

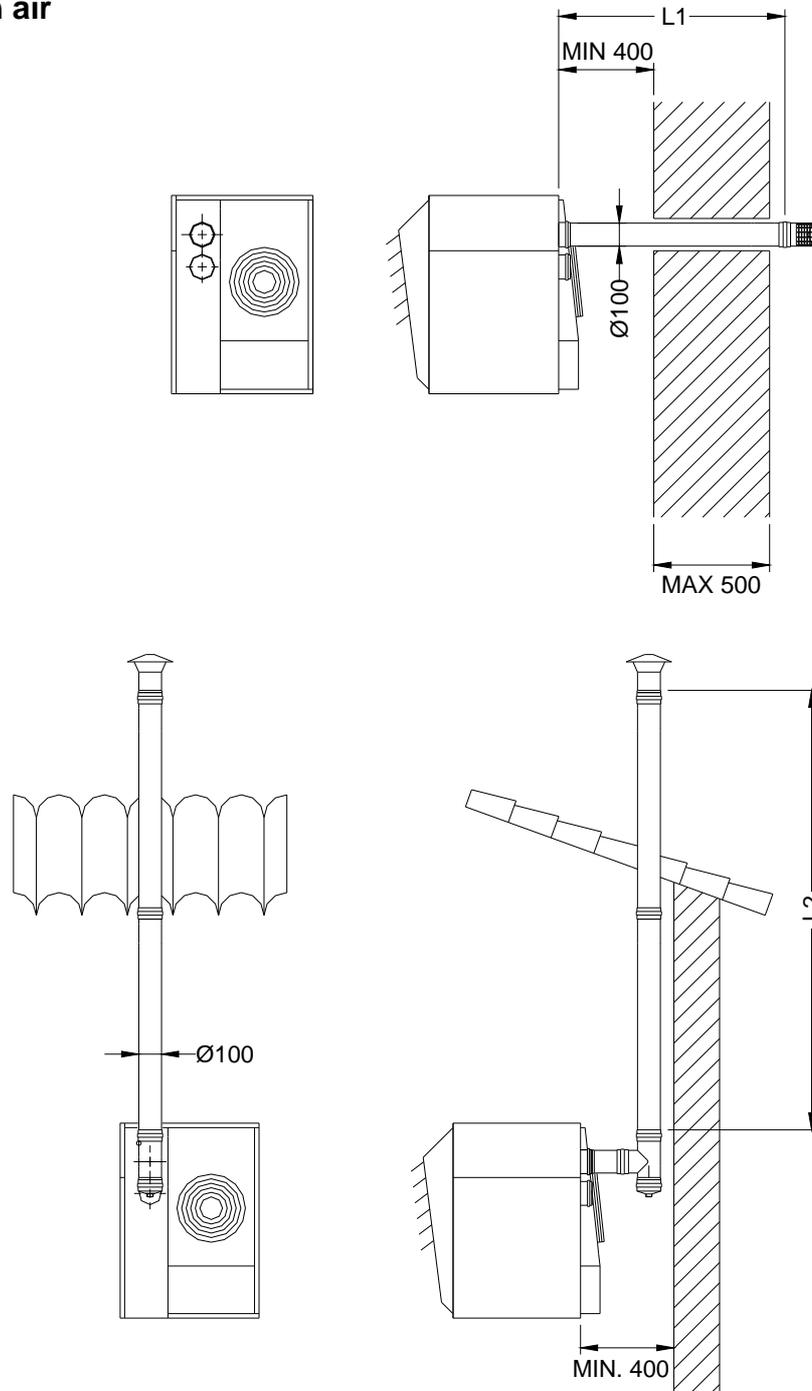
The outlet must be through the roof and must be made with concentric pipes

- The flue pipe and combustion air inlet should be metal smooth bored pipe with a diameter of not less than both the flue and combustion spigot connections on the heater

- All joints should be sealed
- It must be properly secured so as to remain stable at all times
- It must have a wind shielded and rain proof terminal
- The flue should not exceed the length limits indicated in the following pages

The following pages show installation diagrams of the above configurations.

B₂₂: Installation showing dimensions with flue terminal external to building and internal combustion air

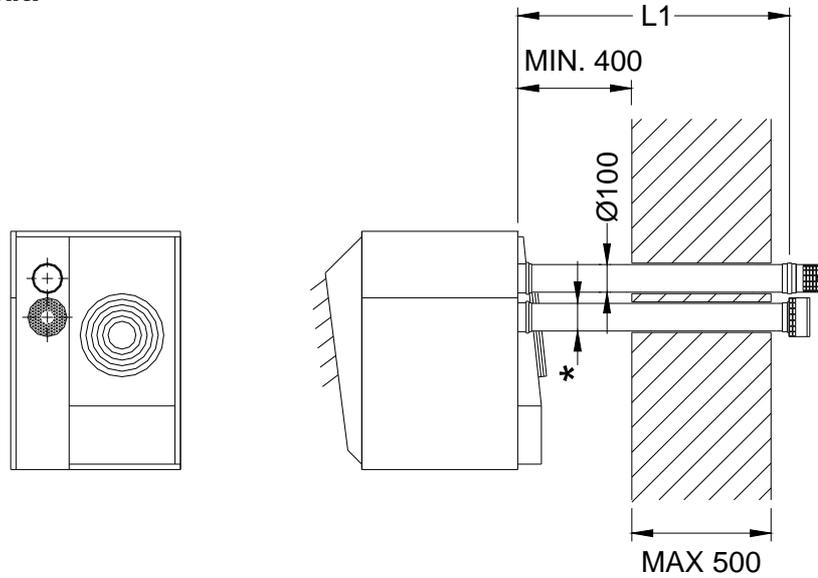


MAXIMUM FLUE LENGTHS:

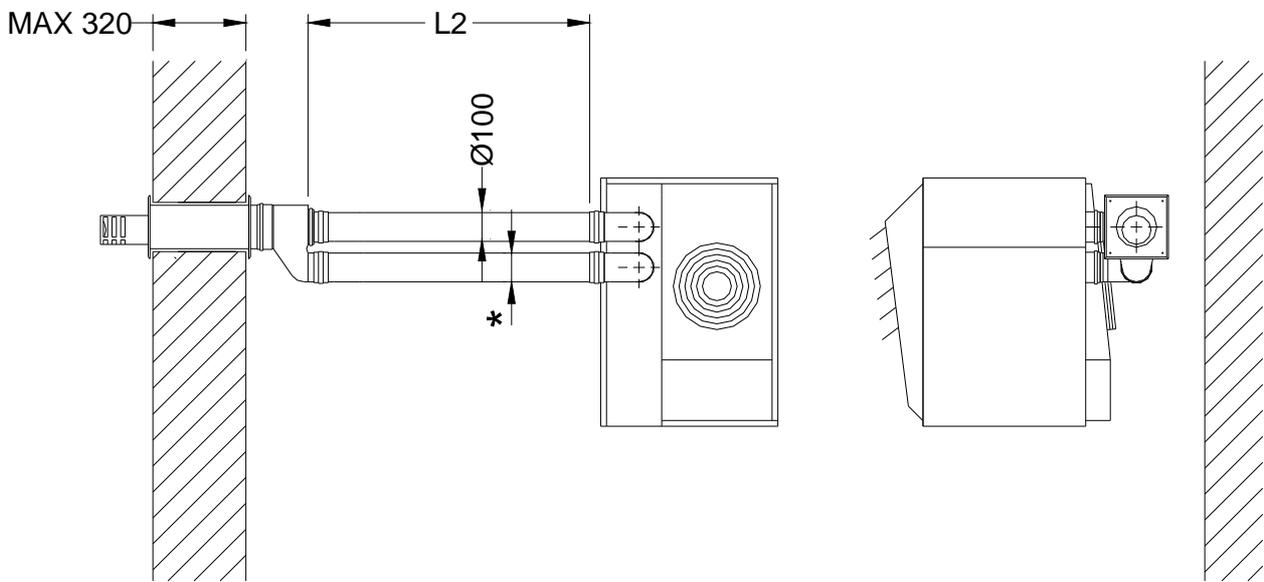
TYPE	UNIT	FLUE EXIT HORIZONTAL		FLUE EXIT VERTICAL	
		L1 MIN.	L1 MAX.	L2 MIN.	L2 MAX.
1	m	1,00	5,00	1,00	10,00
2	m	1,00	5,00	1,00	10,00
3	m	1,00	5,00	1,00	10,00
4	m	1,00	5,00	1,00	10,00
5	m	1,00	5,00	1,00	10,00
6	m	1,00	5,00	1,00	10,00
7	m	1,00	5,00	1,00	10,00

- Only flue components and accessories supplied by the manufacturer should be used on installation.
- In installations where condensation in the flue pipes is likely to be a problem consideration should be made for the fitting of drain to the flue installation .
- Each bend corresponds to about 0,8-1 meters of straight pipework.
- Provision should be made for adequate ventilation for combustion and ventilation purposes .

C₁₂: Installation showing both horizontal concentric flue discharge, and horizontal independent pipe kit.



*	100 mm type 1 – 2 – 3 – 4
	150 mm type 5 – 6 – 7

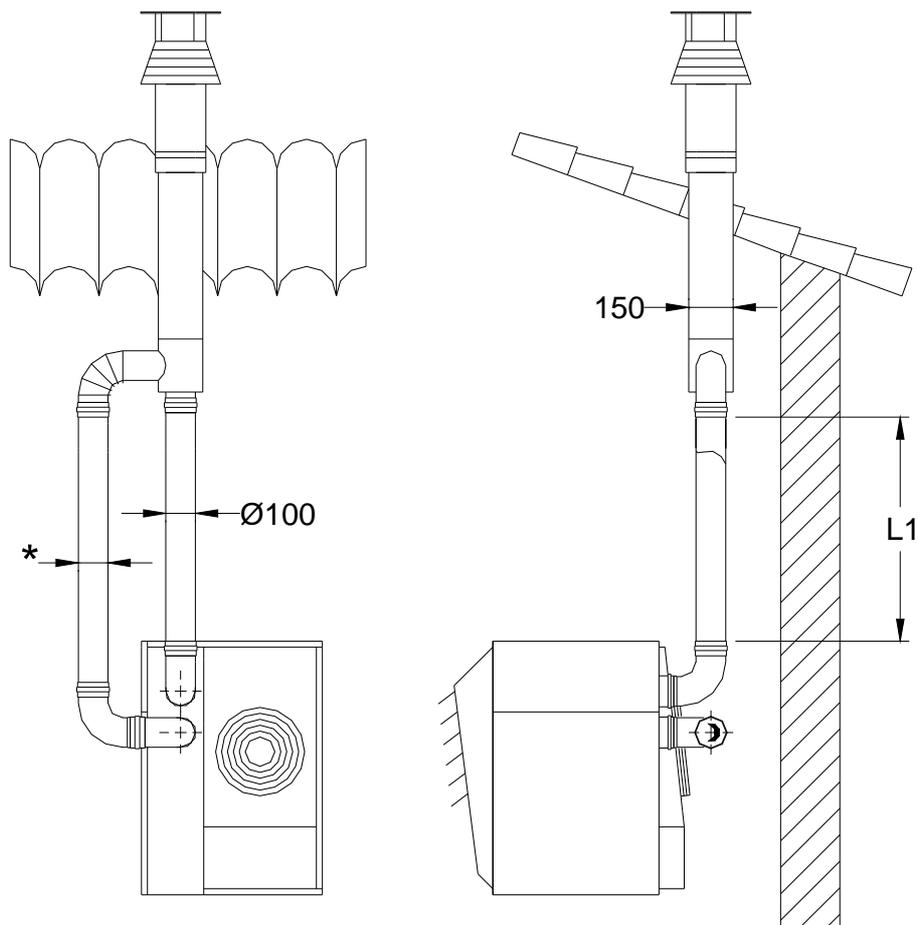


MAXIMUM FLUE LENGTHS:

TYPE	UNIT	INDEPENDENT PIPE KIT		HORIZONTAL CONCENTRIC FLUE	
		L1 MIN.	L1 MAX.	L2 MIN.	L2 MAX.
1	m	1,00	2,50	1,50	2,50
2	m	1,00	2,50	1,50	2,50
3	m	1,00	2,50	1,50	2,50
4	m	1,00	2,50	1,50	2,50
5	m	1,00	2,50	1,50	2,50
6	m	1,00	2,50	1,50	2,50
7	m	1,00	2,50	1,50	2,50

- Only flue components and accessories supplied by the manufacturer should be used on installation.
- In installations where condensation in the flue pipes is likely to be a problem consideration should be made for the fitting of drain to the flue installation .
- Each bend corresponds to about 0,8-1 meters of straight pipework.
- Provision should be made for adequate ventilation .

C₃₂ Installation showing vertical concentric flue terminal roof installation combustion air external to building



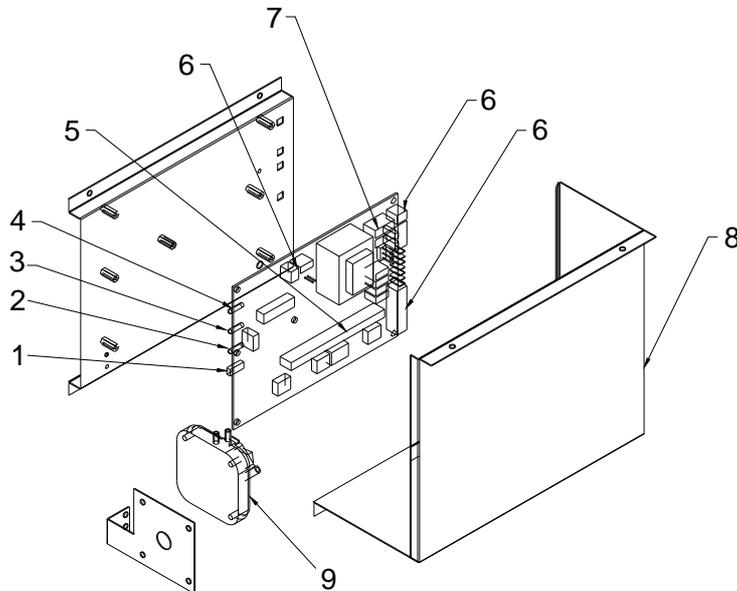
*	100 mm type 1 – 2 – 3 – 4
	150 mm type 5 – 6 – 7

MAXIMUM FLUE LENGTH:

TYPE	UNIT	VERTICAL ROOF TERMINAL	
		L1 MIN.	L1 MAX.
1	m	0	10,00
2	m	0	10,00
3	m	0	10,00
4	m	0	10,00
5	m	0	10,00
6	m	0	10,00
7	m	0	10,00

- Only flue components and accessories supplied by the manufacturer should be used on installation.
- In installations where condensation in the flue pipes is likely to be a problem consideration should be made for the fitting of drain to the flue installation .
- Each bend corresponds to about 0,8-1 meters of straight pipework.
- Provision should be made for adequate ventilation.

ELECTRICAL PANEL WITH CIRCUIT BOARD



1. Lockout reset
2. Red lockout indication light
3. Yellow temperature indication light
4. Green operating light
5. Flame control circuit
6. Controls connection
7. Safety fuses
8. Control box cover
9. Pressure differential switch

ELECTRICAL CONNECTION

The heaters are supplied with the electric panel fitted and pre wired Connection is required to

- The mains electrical supply
 - A room thermostat
 - Or accessories such as a remote control panel.
- All electrical wiring and connections must be in accordance with the relevant European, National, and Local regulations as well as to IEE Standards.

! Ensure that the Electric and gas supplies are turned off before any electrical work is carried out on the heater.

Also ensure that wiring cannot make contact with any metal surfaces liable to be subject to high temperatures, and where insulation of the wiring could be impaired as a result of such contact.

All the heaters must be earthed.

! The main electrical supply must not be switched off or disconnected as a method for stopping the heater, the exception to this is in the event of an emergency, or when the heater has been allowed to cool sufficiently to prevent any damage from being sustained to the heater or its controls (ie: during servicing).

Claims for damage will not be considered if they have resulted from incorrect wiring or the incorrect use of the heater

Each heater requires a permanent 230V 50Hz 1ph electrical supply, which must be wired through a Fused Isolator fitted with a fuse of the correct rating

The correct supply connection points for the live, neutral, and earth are clearly indicated on the wiring diagram mounted inside the wiring box cover.

Wiring diagrams are also detailed within this manual.

The electrical supply isolator should be mounted adjacent to the air heater in an easily accessible position to allow for servicing isolation, or emergency shut off.

! **Ensure that the mains isolator is turned OFF before undertaking any electrical on the heater. Access to the electrical panel is gained by opening the right hand heater side panel.**

The cover to the electrical panel can be removed by undoing the screws which secure it to the panel. A copy of the wiring diagram is affixed to the inside of the cover.

! **Ensure that all connections are secure and that there are no loose strands which could bridge across the terminals.**

One electrical panel per heater is required, unless heaters are specified for multiple heater control applications. On no account should more than one heater be connected to a single time switch or thermostat. The only exception to this is when a control panel suitable for multiple heater applications is supplied by the manufacturer, in which case the wiring diagram supplied with the control panel should be read in conjunction with the existing wiring diagram.

Any ancillary electrical items e.g. room thermostats, time switches, remote panels etc, must be wired into the heater electrical circuit in accordance with the diagrams provided

 **When external controls operate to switch the heater OFF, power to the heater should remain to allow the fan to continue to operate to sufficiently cool the heater thereby preventing damage to the heat exchanger.**

WARNING!
THESE HEATERS ARE NEUTRALLY SWITCHED

ELECTRICAL TABLE

Type	Electrical Supply (V-50Hz)	Electrical Power (kW)	Maximum current (A)	Line Fuse (1) (A)	Live conductor (2) (mm ²)	Earth conductor (2) (mm ²)
1	230V 50Hz~	0,155	6	6,3 (5x20 mm) T	1,5	1,5
2	230V 50Hz~	0,165	6	6,3 (5x20 mm) T	1,5	1,5
3	230V 50Hz~	0,225	6	6,3 (5x20 mm) T	1,5	1,5
4	230V 50Hz~	0,345	6	6,3 (5x20 mm) T	1,5	1,5
5	230V 50Hz~	0,440	6	6,3 (5x20 mm) T	1,5	1,5
6	230V 50Hz~	0,600	10	6,3 (5x20 mm) T	1,5	1,5
7	230V 50Hz~	0,670	10	10 (5x20 mm) T	1,5	1,5

(1) Included with the heater

(2) The supply cables size should ensure a fall in voltage of less than 5% over a length of 30 meters

PRE COMMISSIONING CHECKS

The following pre-commissioning checks should be undertaken, having first ensured that the gas and electrical supplies are turned off.

- Check that all panels and fasteners are secure and in place.
- Check that the heater is mounted safely.
- Check that the flue is sealed, secured, and adequately supported.
- Check that the fan is free to rotate, that the fan is secured to its shaft, and that the guards and fan assembly are all in place and properly secured
- Check that the heater is installed so that it is not tilted and remains square.
- Check that the outlet louvres are set to offer minimum resistance to air flow.

INITIAL START UP SINGLE STAGE

VENTILATION

- Switch on mains supply to the equipment
- Set On/ Standby switch to ON

Set the remote control panel switch to VENT check that fans rotation is correct

HEAT

- Set the remote control panel to HEAT
- Set the room thermostat to the desired temperature
- The flue venter will start, activating the differential pressure switch

After a short period ignition takes place after one minute the air flow fan will start

When desired room temperature is reached the burner will stop the fan will overrun for approximately 3-4 minutes.

IGNITION

- Connect the manometer on the pressure test point on the gas manifold
- Set mains isolator to On
- Open gas isolator cock
- Set the on/standby switch to 'On'
- Set heat/vent switch to Heat
- Set the room thermostat to the desired temperature
- Reset any lockout in the system as indicated by the red or yellow lights

The flue venter will start up activating the differential pressure switch.

The heater will pre purge the combustion chamber the electronic control box will supply the ignition electrode and the gas valve simultaneously.

If the gas line has not been correctly purged ignition may not take place at the first attempt resulting in lockout of the burner.
Reset button and repeat.



Before each attempt at ignition it is necessary to wait at least 10 seconds

When the burner has ignited check the manometer and, adjust gas pressure setting to pressure indicated on data plate, adjust by turning the solenoid valve screw on gas valve.

- Check the gas consumption reading corresponds with that indicated in the TECHNICAL DATA section
- Set on/standby switch to 'standby'. When heater is sufficiently cool Isolate electrical supply Isolate gas supply

Remove the manometer and ensure the screw at the test point is tightened to avoid any gas leaks

- Open the gas isolating cock Switch on electrical supply
Set the room thermostat to the desire temperature.

The heater is now ready for operation.



WARNING!

The heater must only be operated with the burner compartment door(s) closed.

STOPPING

To stop the heater using only the room thermostat. Set it to the minimum temperature. Fan will stop after about 3-4 minutes. If required, switch off the mains current at the isolator.



WARNING

**If Heater is to be switched off for a Long Period set ON/STANDBY switch to STANDBY.
Isolate at mains electrical supply
Isolate the gas supply.**

INITIAL START UP TWO STAGE AND DUAL POWER

VENTILATION

- Switch on mains supply to the equipment
- Set On/ Standby switch to ON

Set the remote control panel switch to VENT check that fans rotation is correct

HEAT

The heater has a two stage gas valve and will operate on high or low fire, the fan is single speed

- Set the remote control panel to HEAT
- Set the high and low room thermostats to the desired temperatures

The high fire thermostat should be set at a temperature approximately 3 degrees lower than the low fire (control) thermostat setting,

- The flue venter will start, activating the differential pressure switch. After a short period ignition takes place and after 30 seconds the air flow fan will start

The heater will initially start in high fire operation. When the set temperature on the high fire thermostat is reached the gas valve will turn down to low fire and the heater will continue to operate in low fire until the desired room (control) temperature is reached.

The burner will shut down and the fan will overrun for approximately 3 minutes.

IGNITION

- Connect the manometer on the pressure test point on the gas manifold
- Set mains isolator to On
- Open gas isolator cock
- Set the on/standby switch to 'On'
- Set heat/vent switch to Heat
- Set the thermostats to the desired temperature's
- Reset any lockout in the system as indicated by the red or yellow lights

The flue venter will start up activating the differential pressure switch.

The heater will pre purge the combustion chamber the electronic control box will supply the ignition electrode and the gas valve simultaneously.

If the gas line has not been correctly purged ignition may not take place at the first attempt resulting in lockout of the burner.

Reset button and repeat.

Before each attempt at ignition it is necessary to wait at least 10 seconds

When the burner has ignited check the manometer and, adjust gas pressure high low settings to the pressure's indicated on the data plate, and in the manual provided adjust by turning the solenoid valve adjusters RP1 RP2 on gas valve.

- Check the gas consumption reading corresponds with that indicated in the TECHNICAL DATA section
- Set on/standby switch to 'standby'. When heater is sufficiently cool Isolate electrical supply Isolate gas supply

Remove the manometer and ensure the screw at the test point is tightened to avoid any gas leaks

- Open the gas isolating cock Switch on electrical supply

Set the room (control) thermostat to the desire temperature. The heater is now ready for operation.



WARNING!

The heater must only be operated with the burner compartment door(s) closed.

STOPPING

To stop the heater using only the room (control) thermostat. Set it to the minimum temperature. Fan will stop after approximately 3-4 minutes.

If required, switch off the mains current at the isolator.

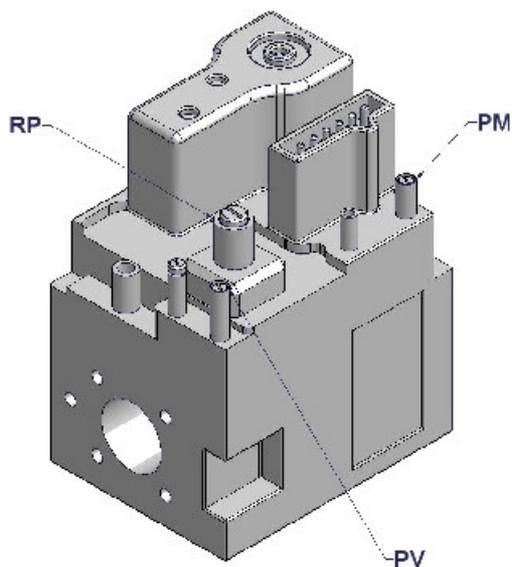


WARNING

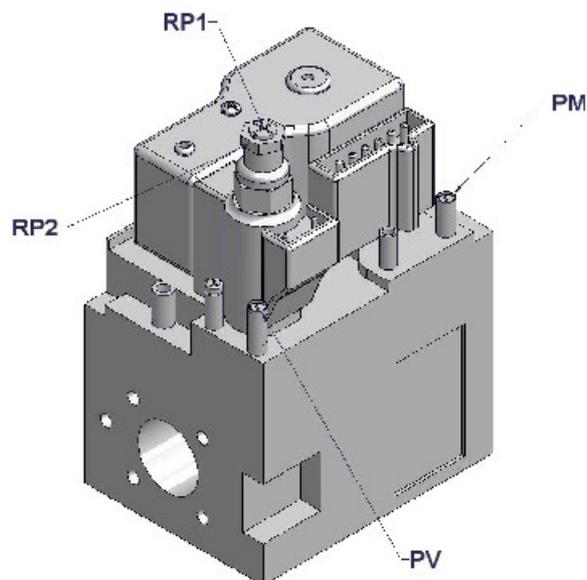
If Heater is to be switched off for a Long Period set ON/STANDBY switch to STANDBY. Isolate at mains electrical supply Isolate the gas supply.

GAS SOLENOID VALVES

Model SIT 840 (single stage)



Model SIT 843 (two stage)



- PM** Main inlet pressure test point
- PV** Head pressure test point
- RP** Pressure adjusting screws
- RP1** Cross cut screw low fire adjuster
- RP2** Hexagonal screw high fire adjuster

GAS CONVERSION

The heaters are supplied ready for use with (G20) Natural Gas set as per the table below. Conversion kits are available from the manufacturer

Natural Gas H (G20)

TYPE	1	2	3	4	5	6	7	
Number of injectors	1	1	1	1	2	2	4	N°
Diameter of injector	310	410	480	555	500	540	450	mm/100
Gas supply pressure	20							mBar
Head pressure high fire	12,0	13,0	13,0	13,0	10,0	13,0	10,5	mBar
Head pressure low fire (two stage–dual power)	6,0	7,0	6,5	6,5	7,0	6,5	5,0	mBar

BEFORE CHANGING INJECTORS ENSURE GAS SUPPLY IS ISOLATED

To convert to Propane G31, Butane G30

1. Change injectors
2. Adjust the inlet gas pressure
3. Adjust the head pressure gas
4. Fit primary air diaphragm (if required)
5. Fit adhesive label indicating gas type
6. Ensure settings are correct as per manual.

CHANGE INJECTORS:

To change injectors

Unscrew the natural gas injectors and replace with the correct size injectors for propane as shown in the table below:

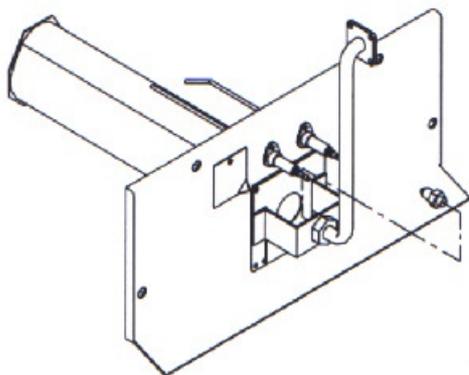
Propane Gas (G31)

TYPE	1	2	3	4	5	6	7	
Number of injectors	1	1	1	1	2	2	4	N°
Diameter of injectors	190	250	280	335	285	320	255	mm/100

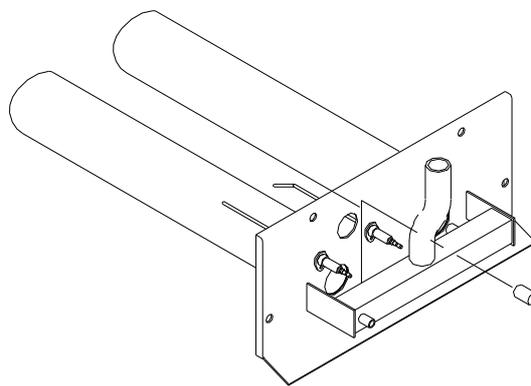
Butane Gas (G30)

TYPE	1	2	3	4	5	6	7	
Number of injectors	1	1	1	1	2	2	4	N°
Diameter of injectors	190	250	280	335	285	320	255	mm/100

Replacing injector in the manifold heater
(Type 1, 2, 3, 4, 6)



Replacing injectors 2per manifold for heater
(Type 5, 7)



! Check that the size of the injector corresponds to that on the data plate.

! Check the size of the nozzles and the pressure correspond to that shown on the data plate
When the conversion is complete place the transfer with the correct gas pressure on to the manifold as supplied in the conversion kit.
Test for gas soundness on completion
Ensure new aluminium washers are fitted (type 5-7).

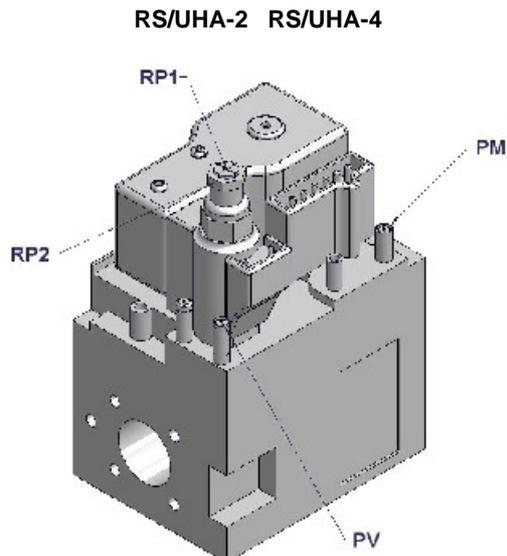
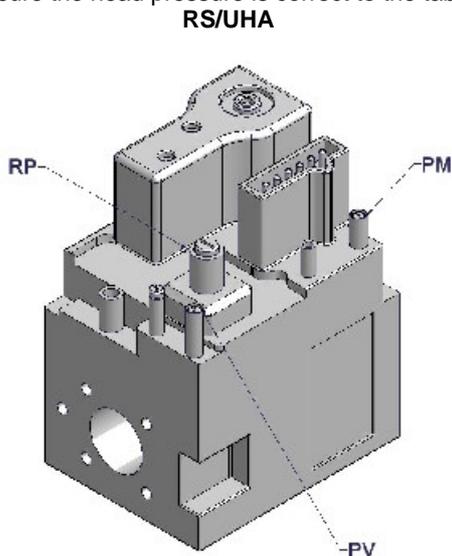
GAS PRESSURE SETTINGS

To regulate the gas inlet pressure:

- Connect a manometer onto the gas valve test point (**PM**)
- Adjust the inlet gas supply regulator (customer installation) to pressure indicated on data plate::

To regulate the head pressure:

- Connect the manometer to the head pressure test point (**PV**)
- Ensure the head pressure is correct to the tables provided



Propane gas (G31)

TYPE	1	2	3	4	5	6	7	
Gas supply pressure	37							mBar
Head pressure max	35,5	35,0	35,5	35,5	34,5	35,5	34,5	mBar
Head pressure min (two stage -dual power)	17,0	18,0	18,5	18,0	18,0	18,0	18,5	mBar

Butane gas (G30)

TYPE	1	2	3	4	5	6	7	
Gas supply pressure	37							mBar
Head pressure max	29,5	29,0	29,0	28,5	29,0	29,0	28,5	mBar
Head pressure min (two stage -dual power)	16,0	16,5	16,5	16,5	16,5	16,5	16,5	mBar



WARNING Inlet gas pressure must not exceed 60mbar at the gas valve inlet

SINGLE STAGE

Gas valve settings Propane G31

For operation on propane it will be necessary to exclude the pressure regulation of the gas valves by the method shown. Screw adjuster **RP** to the bottom:

TWO STAGE AND DUAL POWER

Gas valve regulation Propane G31, Butane G30:

Gas valve head pressure setting high fire Propane G31, Butane G30:

When setting the gas pressure for propane high fire (second stage) contact **SF** should be closed the high fire pressure adjusting screw on the gas valve must be excluded.

Connect a manometer on test point **PV**

Remove the plastic cover from the adjuster **RP1** **RP2**. With a screw driver hold the adjuster **RP1** stationary and using a spanner, screw adjuster **RP2** clockwise to the bottom of the thread until the correct pressure according to the data plate is achieved.

Gas valve head pressure setting low fire Propane G31, Butane G30:

When setting the gas pressure for propane low fire (first stage) contact **SF** should be open. The low fire pressure should be adjusted to the settings shown on the data plate and the data in the manual provided by adjusting screw **RP1**.

Clockwise increases the pressure.

Anti clockwise to decrease the pressure.

On completion replace the plastic cover and seal with paint.

Remove manometer ensuring that the test point screw is gas tight.

 **On heaters with 2 gas valves the above must be carried out on both valves.**

Diaphragm assembly:

Diagram showing the fitting of a diaphragm plate for the primary air single burner manifold

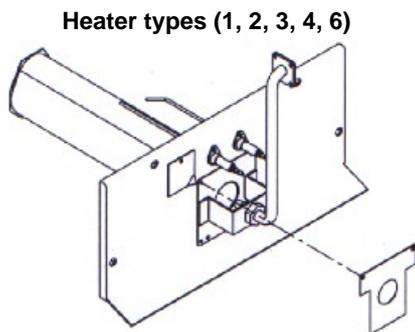
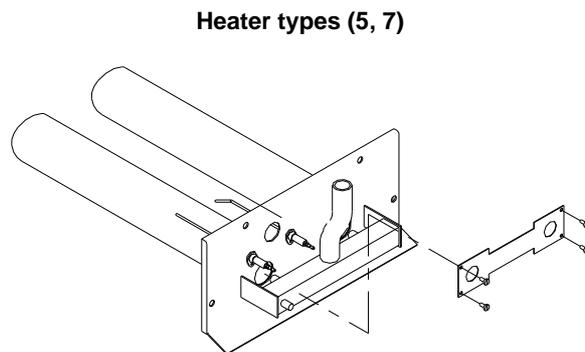


Diagram showing the fitting of a diaphragm plate for the primary air for two burner manifolds



 **WARNING the diaphragm plates should only be used when using propane gas G31 .**

Gas conversion label:

Once a heater has been converted to Propane ensure that the correct label is fitted to the burner over top of the one fitted in the factory covering it completely.

 **ATTENTION!**

It is recommended that the diameter of the nozzles be checked and that the pressure corresponds to that on the data plate provided.

Ensure that all of the additional gas components are correct for the installation (Including storage tank pipes and pressure valves etc).

Ensure that the pressure regulators are re sealed after carrying out the conversion

THERMOSTAT

The heater is supplied with thermostats to control the FAN OPERATION AND LIMIT functions.

• FAN OPERATION (SND)

When the air near the sensor SND reaches the set temperature (30°C) which is approximately 30 seconds after ignition the electrical contact closes and starts the fan.

When the air temperature close to the sensor drops below the set temperature (30°C) and about 3-4 minutes after the burner switches off the fan will stop. This prevents cold air flows when the burner starts and stops.

Fan control SND TR function is connected in parallel through the control box to the fan operation SND

• FAN CONTROL THERMOSTAT (SND - TR)

If the air reaches the set temperature due to a fault in the air circulation (SND – TR) thermostat (70°C), will shut down the burner and the yellow light on the front of the heater will illuminate. Once the heater has sufficiently cooled down the thermostat will reset and the light will go out

Continual operation should be investigated.

• LIMIT THERMOSTAT (LM)

When due to a fault the air temperature near the sensor exceeds the set value and reaches (100°C), the yellow indicator light will flash and the burner will shut down. The overheat limit switch will have to be manually reset.

CHECKS

To ensure that the heater is working correctly certain criteria need to be checked. Start up heater and check the following

- Check that the fan starts approximately 30 seconds after ignition of the burner.

When the heater is at its full efficiency after about 20 minutes the following checks should be made

Check that the horizontal fins are correctly set so as to give the optimum heating performance and the air flow is sufficient to cool the heat exchanger. Ensure where vertical fins are installed they are also open and not restricting the air flow.

- Check that there are no gas leaks
- Check that the gas rate is correct using a meter.

- Check injector pressure is correct.
- Check temperature rise is correct to data plate.
- Check the operation of the control and limit thermostats TR, SND, LM.
- Check that the room thermostat operates the burner not the fan.
- Check that the motor absorption is not more than stated on data plate.
- Check that the flue venter and axial fan are working correctly.
- Check that the fan runs on 3–4 minutes after the burner has shut down.
- Check output corresponds to that on the data plate.
- Check that there is no condensate in the flue gasses.

MAINTENANCE

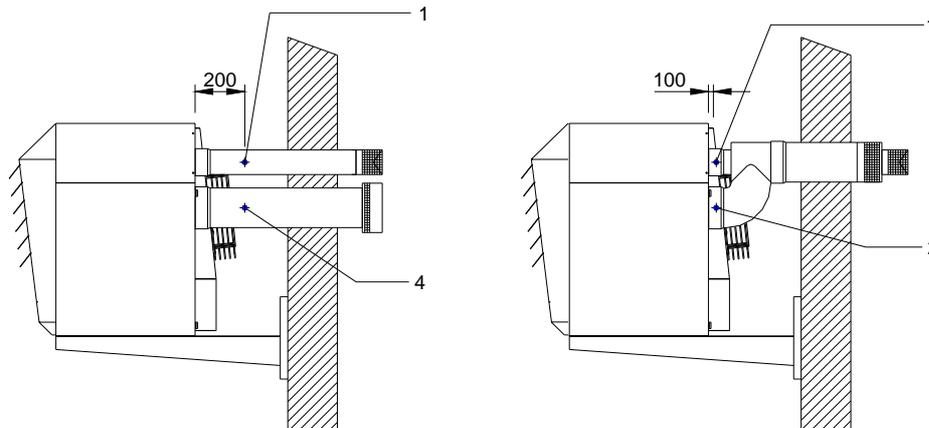
WARNING!

It is a requirement that only qualified personnel are allowed to carry out installation commissioning or servicing.

Before commencing any maintenance or servicing work the heater must be shut down and allowed to cool, and have the gas and electric supplies to it turned off at the supply cock and isolator respectively.

In order to carry out analyses of the Flue gasses sample points must be made at the following dimensions See Diagram.

COMBUSTION PRODUCT SAMPLING



1. Flue gas sampling point.
2. Combustion air sampling point.

• CLEANING THE FLUE DISCHARGE AND AIR INTAKE PIPES

The cleaning of the flue and air intake pipes consists of the removal of any dust and debris inside the pipes.

• CLEANING THE FAN

The cleaning of the fan assembly consists of clearing any dust or debris from the fan blades, motor, and protective guard.

• FLUE VENTER CLEANING

The cleaning of the flue venter consists of the cleaning of dust from the fan blades.

• LIMIT THERMOSTAT

Check the limit thermostat operation once a year by removing the TEST link and checking that the burner has extinguished.

• BURNER BAR CLEANING

The burner bar should be removed from its housing and the tube(s) should be cleaned with a brass wire brush and any dust or debris blown clear with a compressed air gun. Any tubes gaskets or seals that are damaged should be replaced.

• AIR FLOW FINS

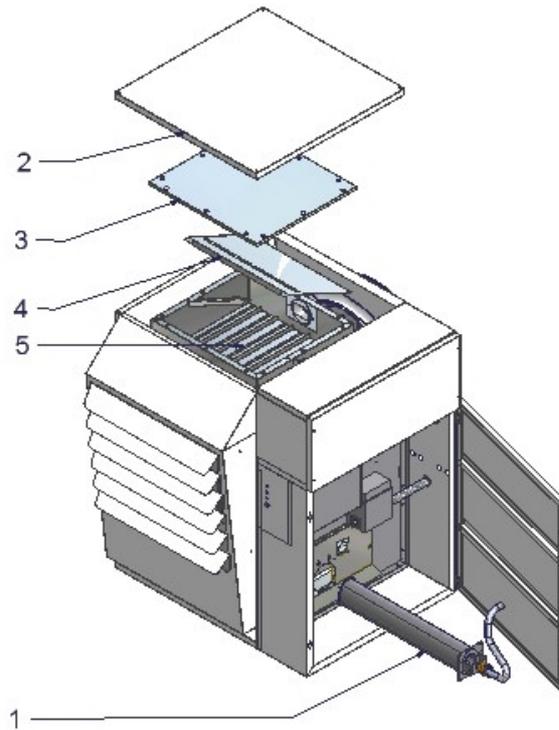
Ensure that the horizontal fins are set so as to evenly distribute the air in the area to be heated they should be opened to a minimum of 45 degrees this will ensure that there is sufficient air flow over the combustion chamber and avoid nuisance over heat lockout. For this reason it is also important to ensure that the vertical louvres if fitted are also open and clean.

- **POSITIONING OF IGNITION ELECTRODE AND IONISATION PROBE**

It is important that the spark electrode and the ionisation probe are correctly positioned over the burner bars to ensure good ignition and flame detection. The probe and electrode should 3- 4 mm from the burner bar.

- **CLEANING THE HEAT EXCHANGER**

The heat exchanger should only be cleaned by suitably qualified personnel. It is recommended that the heat exchanger be cleaned once a year prior to the start of the heating season. The following procedure should be carried out:



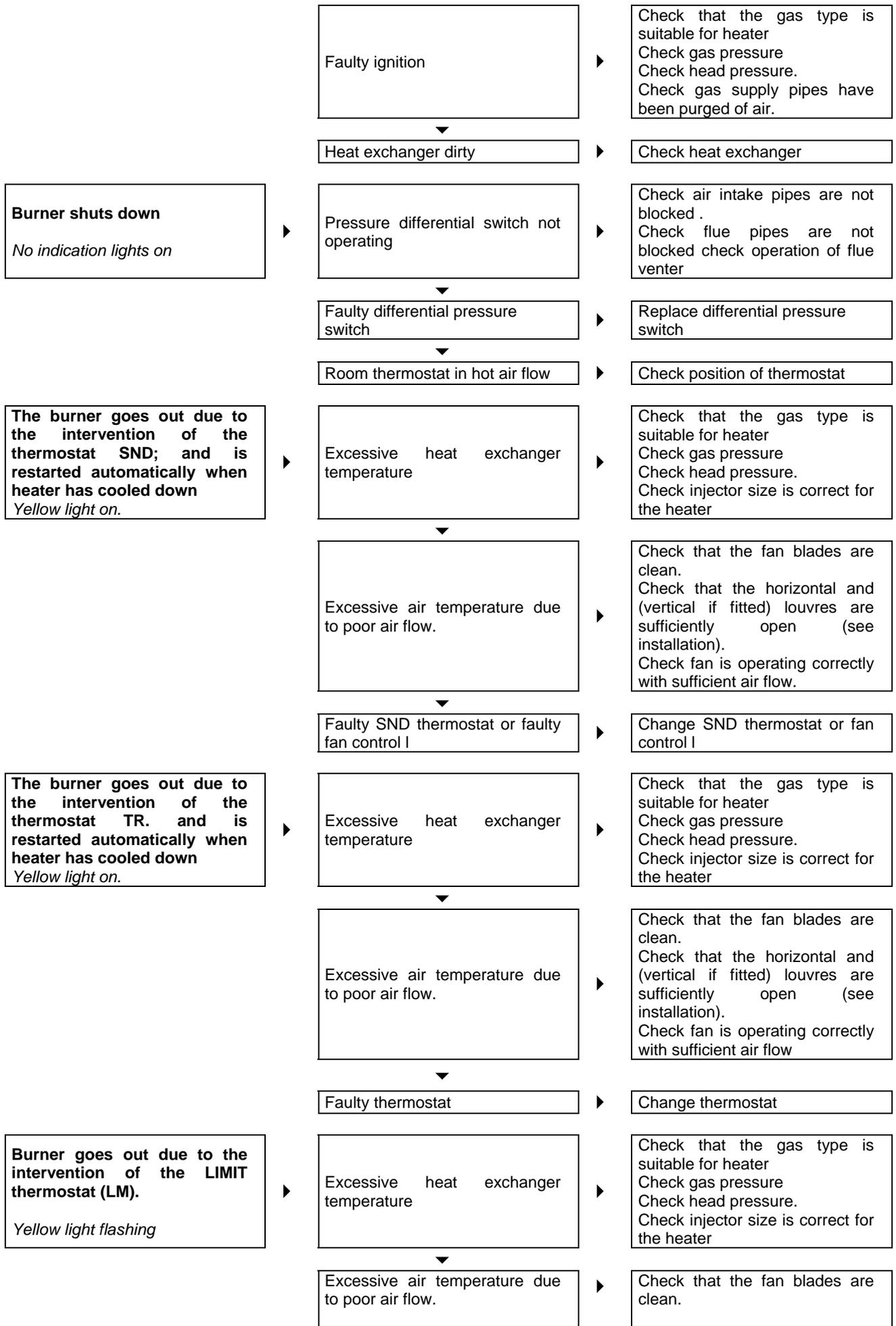
- Remove burner **(1)** from its housing after first having disconnected the gas solenoid valve;
- Remove top panel **(2)**;
- Remove inspection door **(3)**;
- Remove flue manifold **(4)**;
- Brush clean the heat exchanger elements **(5)**;
- With a vacuum remove any soot deposits from the elements **(5)**;
- Clean all heat exchanger external surfaces;
- Re assemble in reverse order ensuring that there is a good seal replacing any seals and gaskets as necessary.

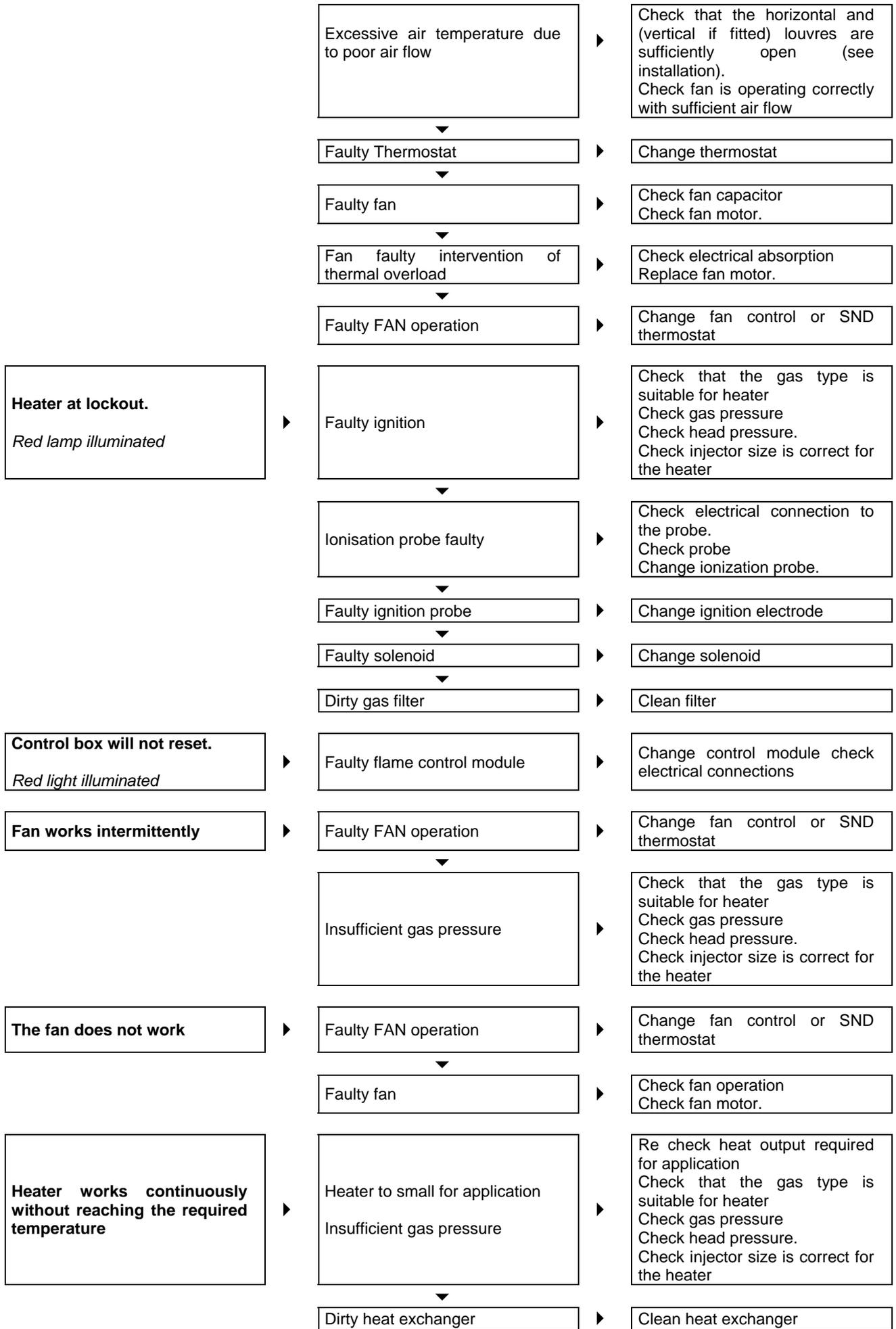
FAULT FINDING

If heater is not working firstly check the following:

- Check electrical supply
- Check gas pressure
- Check gas pressure is as stated in Technical Data

FAULT	CAUSE	SOLUTION
No operation	▶ No electrical supply	▶ Check main isolator. ▶ Check supply cables. ▶ Check line fuses. ▶ Check electrical connections
No spark ignition. <i>Flue venter working</i> <i>No indication lights on</i>	▶ Differential pressure switch not working	▶ Check flue pipe and combustion air pipe are clear
	▼ Faulty differential pressure switch	▶ Replace differential pressure switch
	▼ Poor connection at pressure switch	▶ Check air pipes ▶ Check electrical connection ▶ Check that the air pipes are condensate free
	▼ Faulty flue venter	▶ Change flue venter
	▼ Faulty control box	▶ Change control box
	▼ Faulty ionization electrode	▶ Check the electrode is not cracked or damaged ▶ Check the probe
No ignition <i>Flue venter not working</i> <i>No indication lights on</i>	▶ Room thermostat open	▶ Check room thermostat
	▼ Faulty flue venter	▶ Change flue venter
	▼ Faulty control box	▶ Change control box
Burner lights but cuts out after 5 seconds	▶ Phase and Neutral inverted	▶ Check polarity of electrical supply
	▼ Faulty ionization probe	▶ Check electrical connection to the probe. ▶ Check probe ▶ Change ionization probe.
	▼ Faulty ignition	▶ Check that the gas type is suitable for heater ▶ Check gas pressure ▶ Check head pressure. ▶ Check gas supply pipes have been purged of air.
Explosive start up	▶ Faulty ignition electrode	▶ Change ignition electrode
	▼ Incorrect electrode position	▶ Reposition electrode correctly over the burner bar
	▼ Faulty burner tube	▶ Change burner tube
	▼ Faulty ignition transformer	▶ Change transformer







FLEXIHEAT UK LTD

Flexible Heating & Dehumidification Solutions

01202 822221

www.flexiheatuk.com

Since the company is constantly engaged in making improvements to its production, the appearance and dimensions, technical data and equipment and accessories may be subject to alterations.