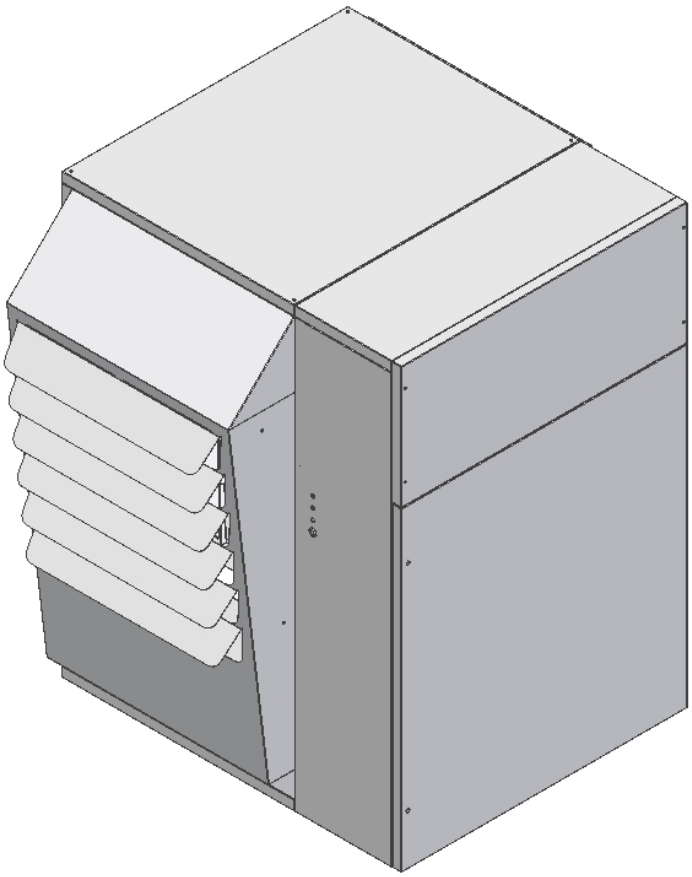
Gas fired room sealed unit heaters

TECHNICAL INFORMATION, ASSEMBLY INSTRUCTIONS, USE AND MAINTENANCE

RS/UHA RS/UHA-2 RS/UHA-4



CE

BENSON

BENSON HEATING
LUDLOW ROAD
KNIGHTON
POWYS,
LD71LP U.K.

August 2003

Benson Heating is a Division of Benson Climate Systems Ltd

COMPLIANCE NOTICES

The Benson RS/UHA range has been independently tested and assessed, and has been found to meet the Essential Requirement of the following European Directives:

Gas appliance Directive (90/396/EEC)
Machinery Directive (89/392/EEC)
Low Voltage Directive (73/23/EEC and 93/68/EEC)
Electromagnetic Compatibility Directive (98/336/EEC and 91/31/EEC)
Product Liability Directive (65/374/EEC)
The manufacturer has taken reasonable and practical steps to ensure that Benson RS/UHA Range of Heaters are safe and without risk when properly used. These heaters should therefore only be used in the manner and purpose for which they were intended, and in accordance with the recommendations detailed herewith.
The heaters have been designed, manufactured, assembled, inspected, and tested, with safety and quality in mind, there are certain basic precautions which the installer and user should be aware of, and they are strongly advised to read the appropriate sections of the information pack accompanying the heater, prior to installation or use.

Benson Heating supports all new products being supplied to their customers with a comprehensive information pack; this clearly defines mandatory instructions for the safe installation, use, and maintenance, of the appliance(s).

Where proprietary items are incorporated into Benson Heating products, detailed information and instructions are also provided as part of the information pack.

It is the responsibility of the installer, owner, user, or hirer, of such products supplied by Benson Heating, to ensure that they are familiar with the appropriate information/manuals, supplied by the manufacturer, and that they are suitably aware of the purpose of the manuals and the safety instructions. In addition, operators must be suitably trained in the use of the appliance so as to ensure its continued safe and efficient use.

Benson Heating has a commitment to continuous improvement, and therefore reserves the right to amend or change the specification of the RS/UHA Heater range subject to agreement from The Notified Body.

Contained within the text of the manual, the words '**Caution**' and '**Warning**' are used to highlight certain points.

Caution is used when failure to follow or implement the instruction(s) can lead to premature failure or damage to the heater or its component parts.

Warning is used when failure to heed or implement the instruction(s) can lead to not only component damage, but also to a hazardous situation being created where there is a risk of personal injury.

PIN NUMBER

Notified Body PIN Reference is 0694BN3750

Type	RS/UHA		RS/UHA-2		RS/UHA-4	
	Single Stage Burner Single Speed Fan		Two Stage Burner Single Speed Fan		Two Stage Burner Two Speed Fan	
	Single Stage	Code	Two Stage	Code	Dual Power	Code
1	RS/UHA 50	3NAGBER016	RS/UHA 50-2	3NAGB2C016	RS/UHA 50-4	3NAGB21016
2	RS/UHA 80	3NAGBER026	RS/UHA 80-2	3NAGB2C026	RS/UHA 80-4	3NAGB21026
3	RS/UHA 105	3NAGBER036	RS/UHA 105-2	3NAGB2C036	RS/UHA 105-4	3NAGB21036
4	RS/UHA 140	3NAGBER046	RS/UHA 140-2	3NAGB2C046	RS/UHA 140-4	3NAGB21046
5	RS/UHA 200	3NAGBER066	RS/UHA 200-2	3NAGB2C066	RS/UHA 200-4	3NAGB21066
6	RS/UHA 260	3NAGBER086	RS/UHA 260-2	3NAGB2C086	RS/UHA 260-4	3NAGB21086
7	RS/UHA 325	3NAGBER106	RS/UHA 325-2	3NAGB2C106	RS/UHA 325-4	3NAGB21106

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

The heater is supplied with a 2 year warranty on all parts.
In addition to this there is also a 10 year time related warranty on the combustion chamber.
The warranty commences from the date of despatch from the manufacturer, and is subject to the terms detailed within the manufacturer 'conditions of business'.

The warranty may be invalidated if:

a) The warranty registration/commissioning card has not been completed and returned to the manufacturer

b) The installation is not in accordance with the general requirements of this manual

c) The flue arrangement and air supply for the heater are not in accordance with the manufacturers recommendations, codes of practice, or similar standards

d) Air flow through the heater is not in accordance with the manufacturers technical specifications

e) Internal wiring on the heater has been tampered with or unauthorised service/repairs undertaken

f) The main electrical supply input to the heater has been interrupted during the heating mode

g) The heater has been subject to and affected by the ingress of water in any form

h) The heater is not operated at the rating(s) laid down in the manufacturers technical specifications

i) The heater has not been operated or used within the normal scope of its intended application

j) The manufacturer's recommended minimum service requirements have not been complied with

All warranty claims must contain the following information to enable processing to take place;

(1) Heater model
(2) Heater serial number
(3) Order reference/date of order, together with full installation details (name and address)
(4) Details or symptoms of fault
(5) Installers name and address.

Faulty parts must be returned to the manufacturer Spares Department, the address of which is provided on the rear cover of this manual. Any such parts will undergo inspection to verify the claim. Replacement parts supplied prior to this may be charged, and a credit supplied upon subsequent validation of the warranty claim. Consumable items are specifically not included within the scope of the warranty.

Notification is required immediately a fault is suspected. The manufacturer will not accept responsibility for any additional damage that has been caused, expense incurred, or consequential loss resulting from any failure of the heater(s).

Ensure that the heater is able to operate within the parameters shown on the data plate and the technical data within the manual.
Incorrect gas settings may lead to condensation within the combustion if to low, and overheating if to high both will cause damage to the heat exchanger.

Any reference made to Laws, Standards, Directives, Codes of Practice or other recommendations governing the application and installation of heating appliances and which may be referred to in Brochures, Specifications, Quotations, and Installation, Operation and Maintenance manuals is done so for information and guidance purposes only and should only be considered valid at the time of the publication. Manufacturer cannot be held responsible from any matters arising from the revision to or introduction of new Laws, Standards, Directives, Codes of Practice or other recommendations.

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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 100ºC)
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

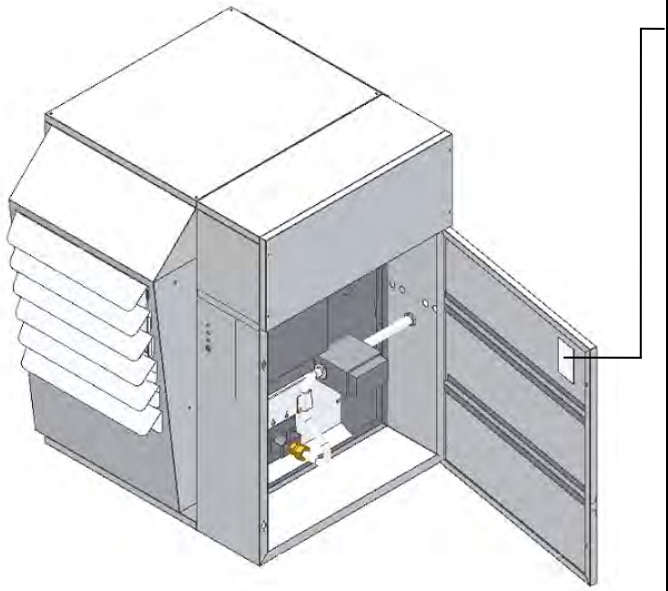
Flue spigot
A flue spigot (100mm) is situated at the rear of the heater for connection of flue pipes.

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 Benson Technical Dept. for a duplicate.
Check code and model is as data plate.

Position of data plate



Manufacturer CE

AIR HEATER

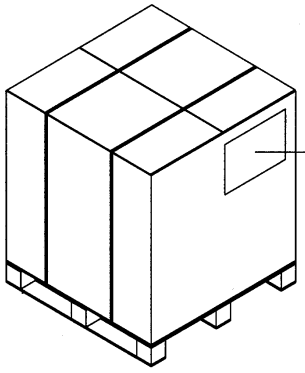
Model			
Serial Number			
Country		PIN	
Category		Code	
Type		Year	
Nominal heat INPUT			kW
Nominal heat OUTPUT			kW
Air Flow max			m^3/h
Electrical Supply			
Electrical power			W
Protection rating			
GAS TYPE			
Supply pressure	mbar		
Nozzle pressure	mbar		
Nozzle diameter	mm		
Gas consumption	m^3/h		

APPLIANCE PRESET FOR G20 NATURALGAS

Packing label position

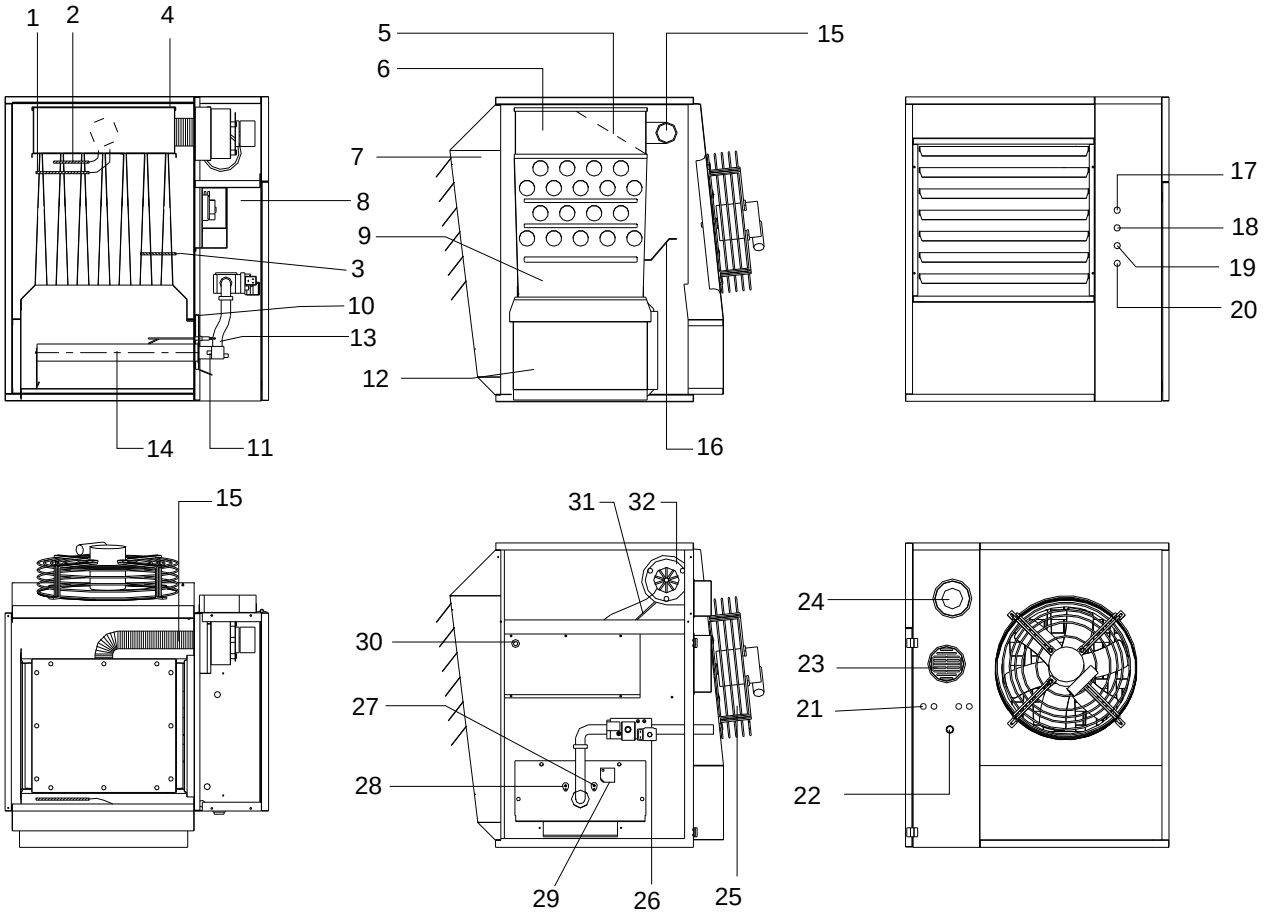
CE

Code
Model
Serial No



DESCRIPTION

Types 1 - 5

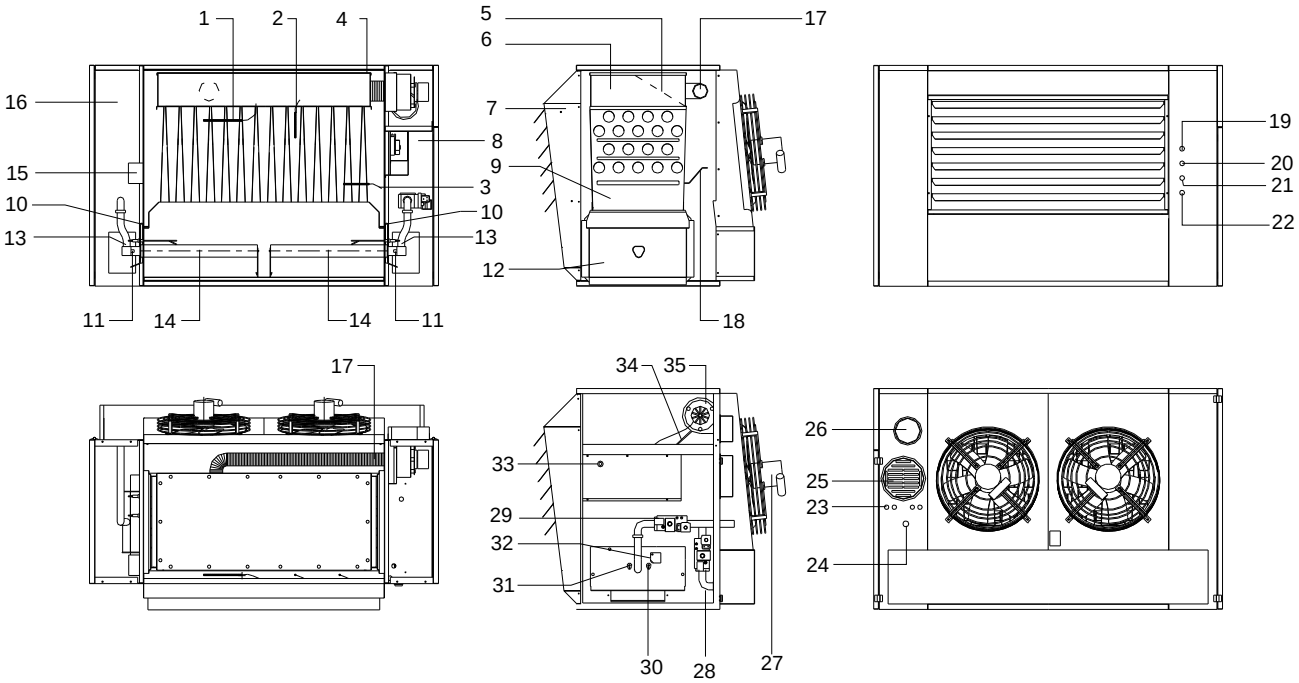


NOTE:

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

TECHNICAL DATA

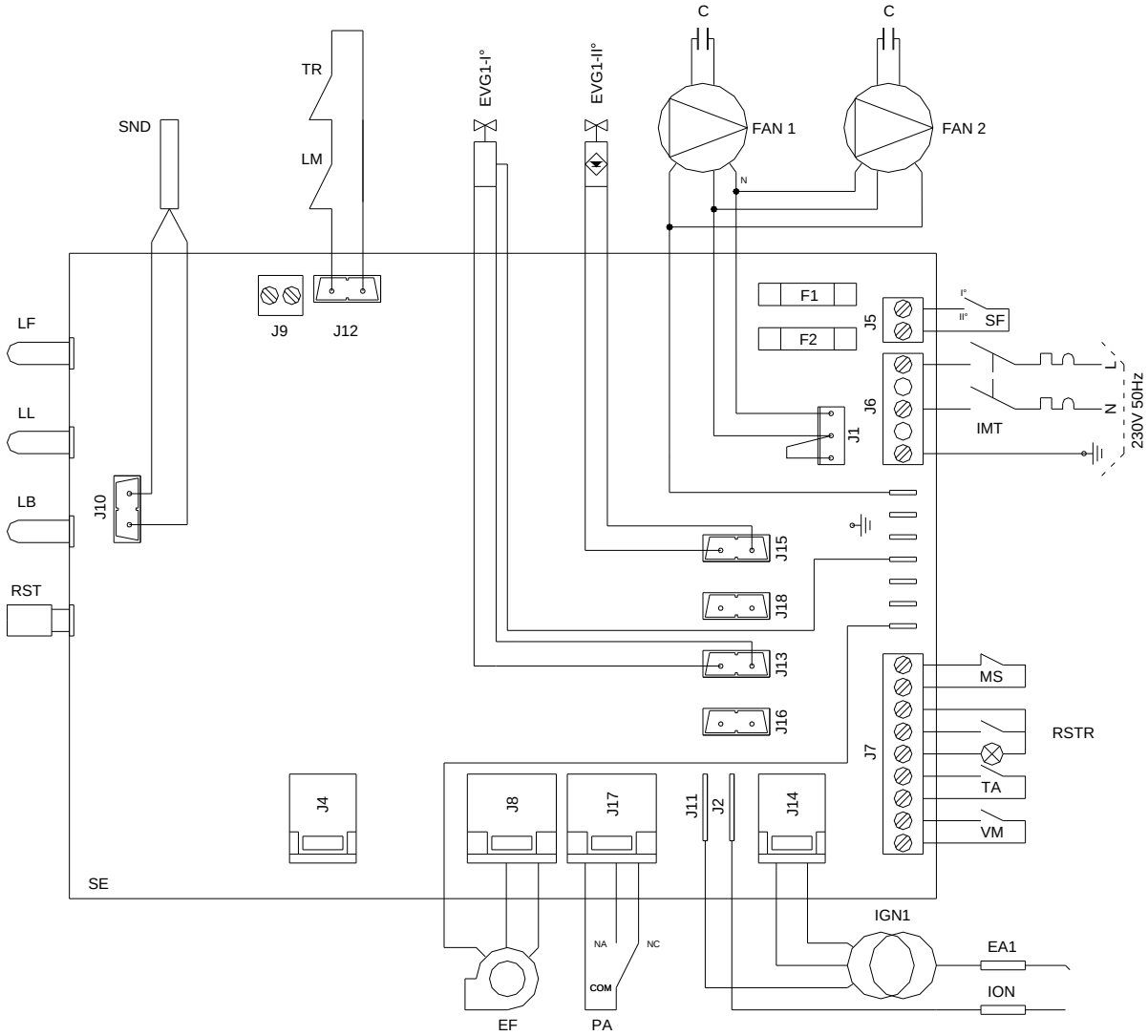
DESCRIPTION	TYPE							UNIT
	1	2	3	4	5	6	7	
HEAT OUTPUT	13,8	23,0	30,5	41,7	58,6	76,6	94,3	kW
	47.000	78.500	104.000	142.000	200.000	261.500	322.000	Btu
HEAT INPUT	15.0	25.4	33.8	46.3	65.0	85.0	104.7	kW
(Nett)	52.000	86.000	115.000	158.000	224.000	290.000	357.000	Btu
EFFICIENCY	92,0	90,1	90,2	90,1	90,1	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)	8.7	15.8	21.0	28.8	40.5	52.9	65.2	kW
(**Two Stage and Dual Power)**	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_{2H3P}							
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
	2.29	3.88	5.16	7.07	9.92	12.97	15.98	Ltrs/h
Consumption (min) (2)	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

(1) References:
Atmospheric pressure 1013 mBar
Gas temperature 15°C

(2) Atmospheric pressure 1013mBar

WIRING DIAGRAM SINGLE AND TWO STAGE

Type 1-2-3-4-5

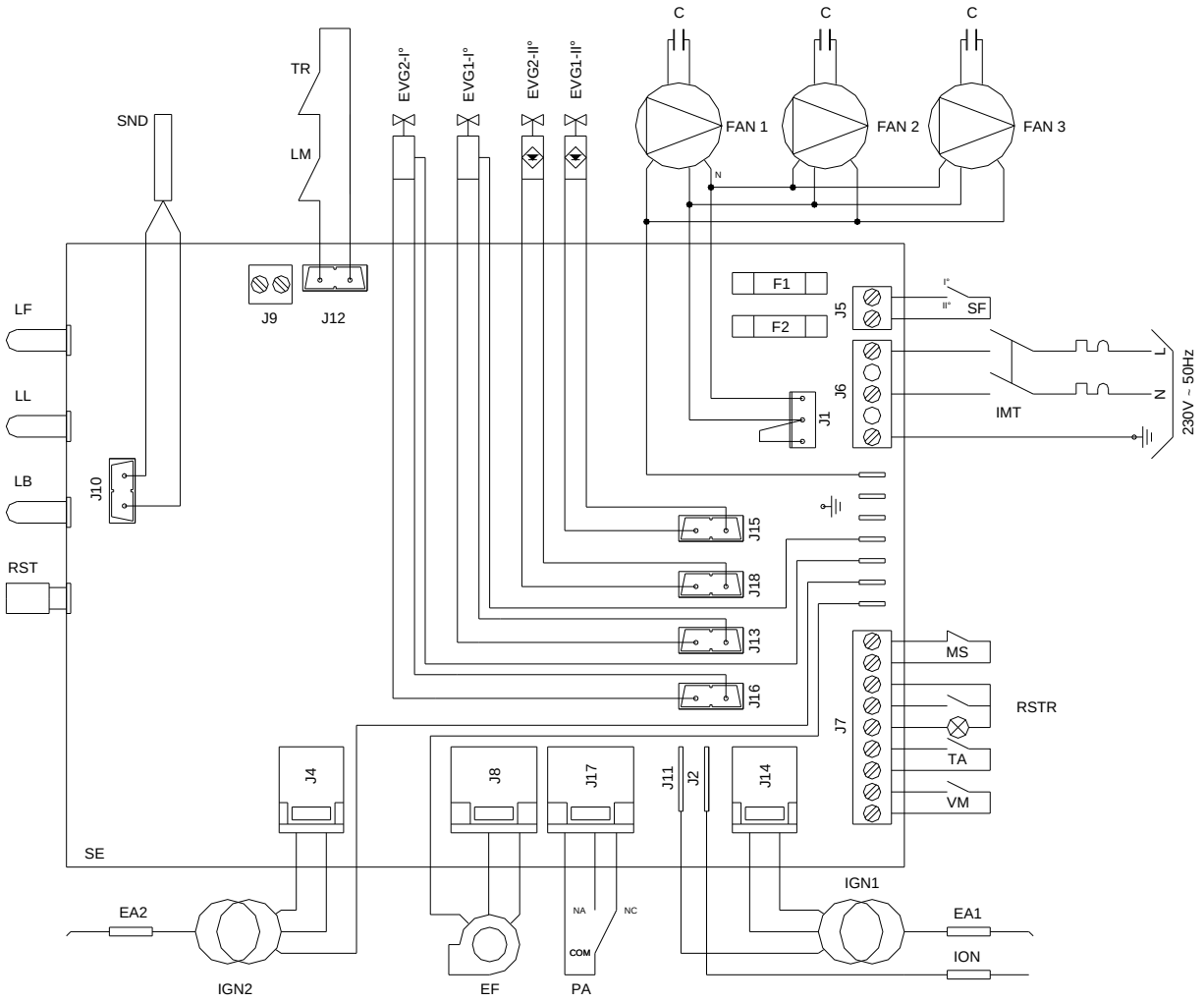


KEY

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 **(Two Stage version only)**
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 light
LB	Lockout indication
RST	Lockout reset
EF	Flue venter
PA	Differential pressure switch
IGN1	Ignition transformer
EA1	Spark electrode
ION	Ionisation probe
SE	Electrical control board
IMT (*)	Fused isolator
MS (*)	Fire damper connection (accessory)
RSTR (*)	Remote reset connection
TA (*)	Room thermostat connection
VM (*)	Fan switch connection
SF (*)	Second stage gas valve connection

(*) External to the heater customer supply

Type 6-7



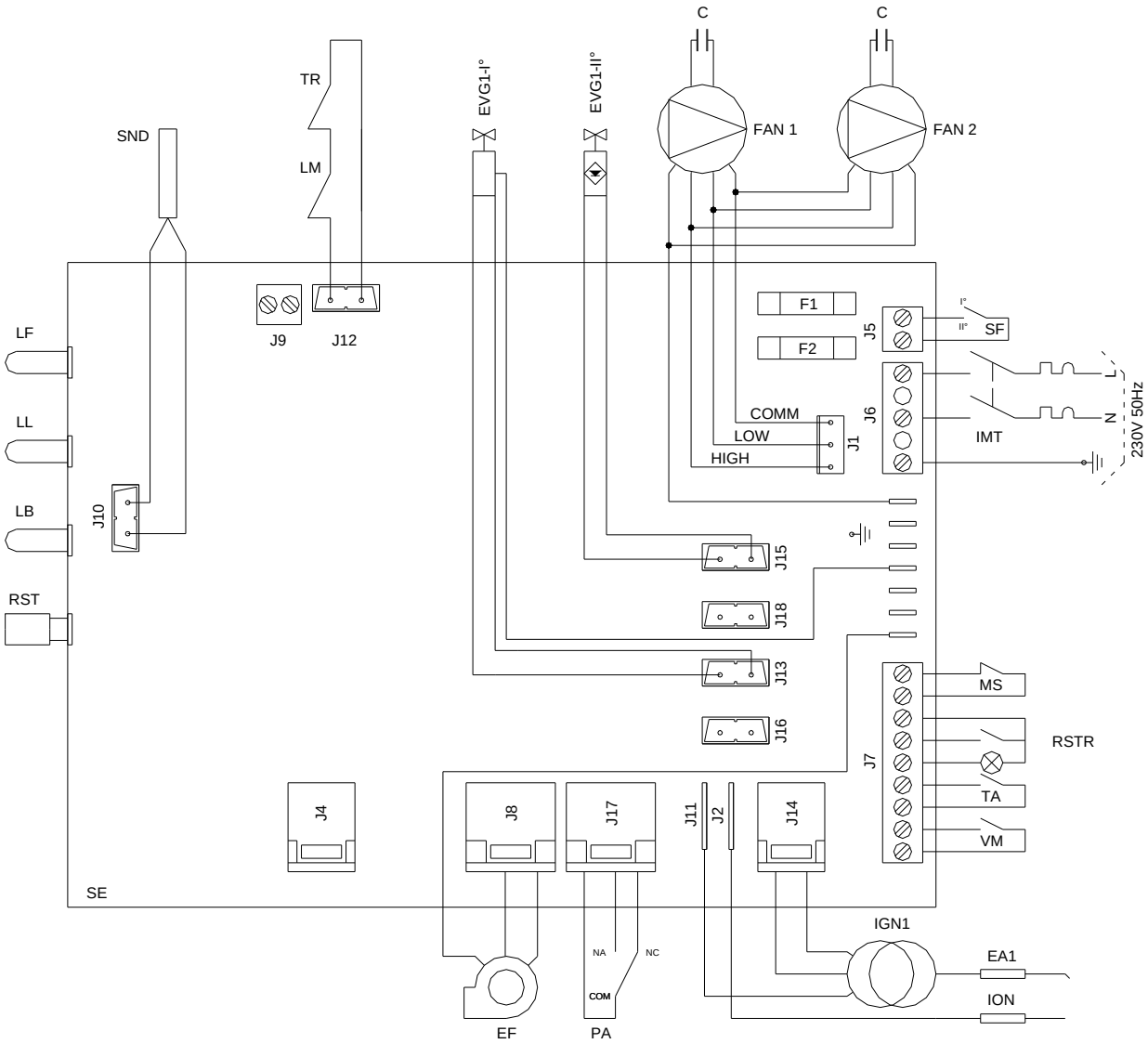
KEY:

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

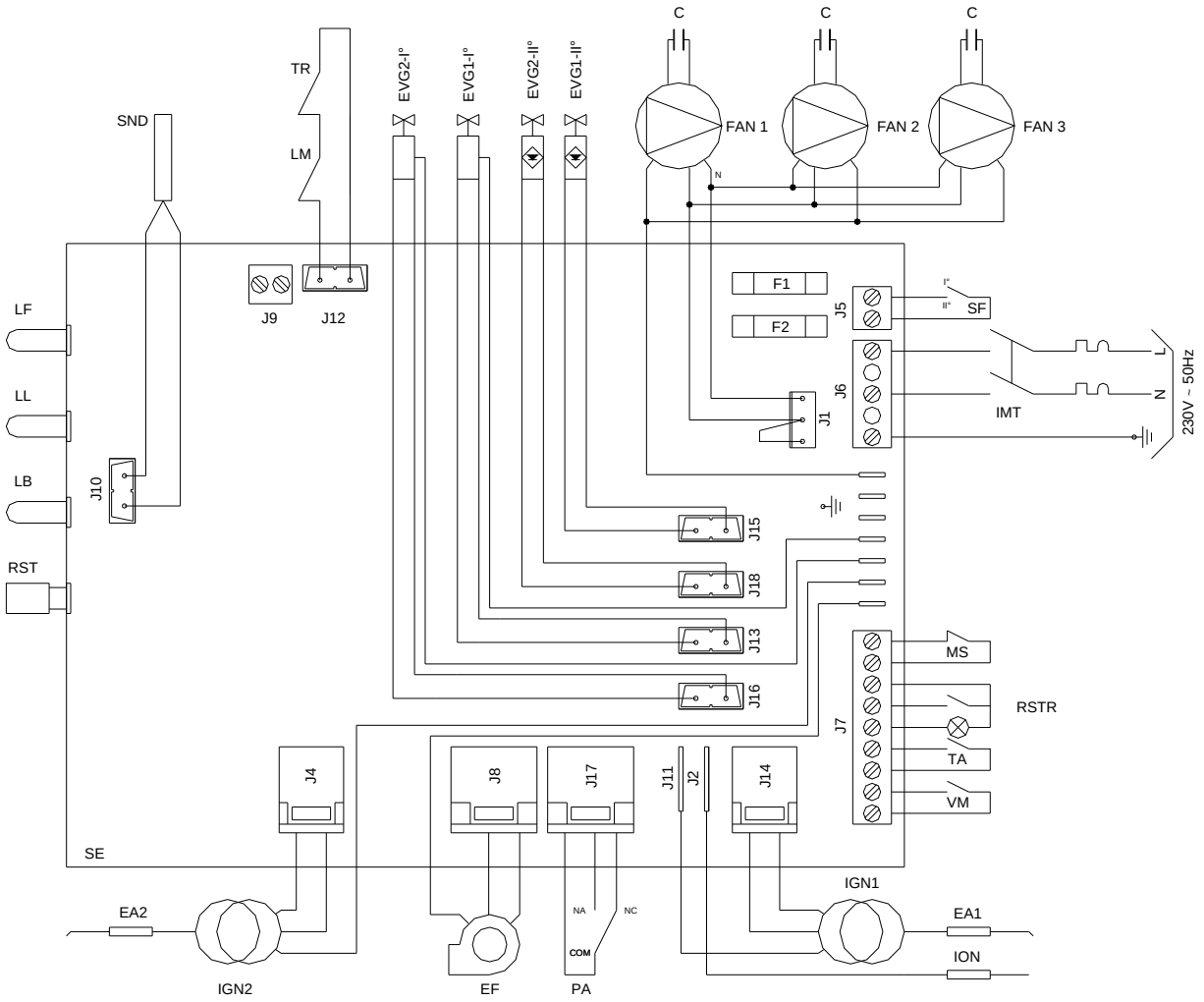


KEY

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



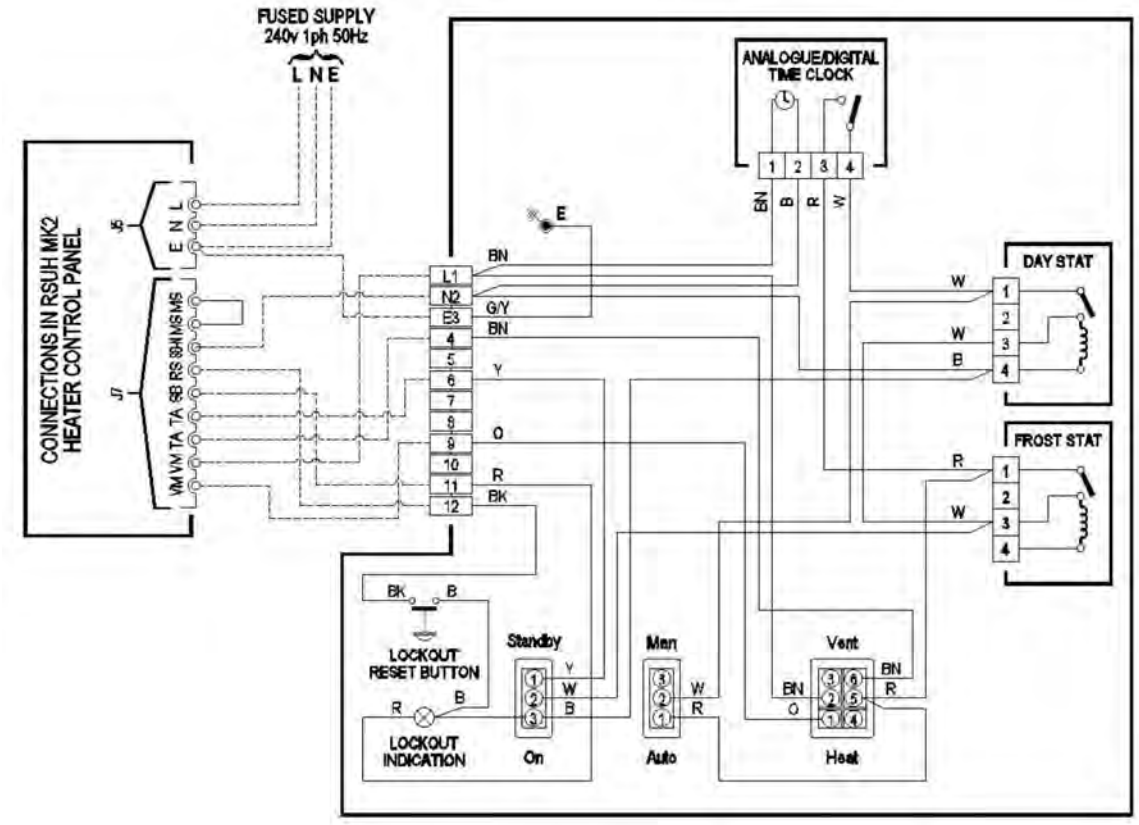
KEY:

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

Connection to CP2A



Key:

B	Blue	M	Magenta
BK	Black	O	Orange
BN	Brown	P	Purple
GR	Grey	R	Red
G	Green	W	White
K	Pink	Y	Yellow

This wiring to be completed by the installer

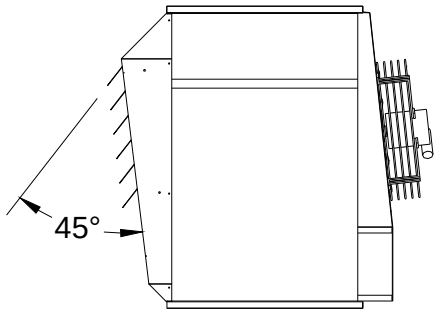
⚠ **READ THE INSTRUCTION MANUAL BEFORE PROCEEDING WITH THE INSTALLATION.**

⚠ **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 louvre 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

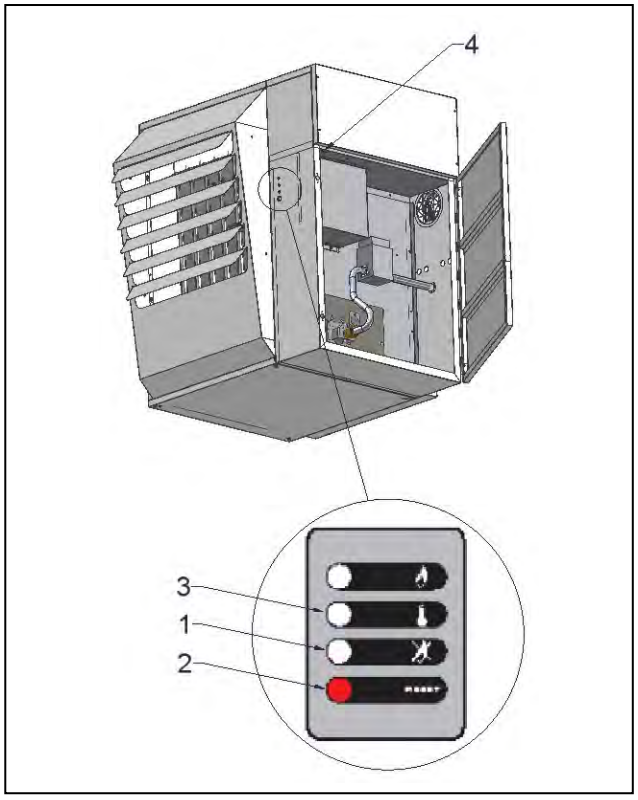
If a fault should occur with the heater the lights situated at the right hand side of the heater will be illuminated indicating the fault

- **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

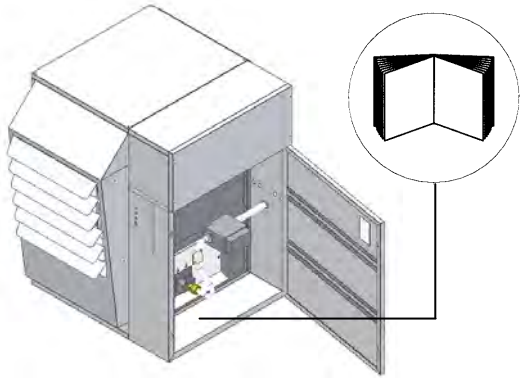


RECEIPT OF PRODUCT

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

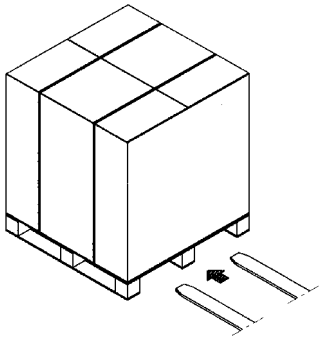
If any of these points are not satisfied then contact should be made with the Sales Office at manufacturer. In the case of claims for damage, this must be reported in writing within 24 hours of delivery, in order to comply with insurance



⚠ **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 safety.**

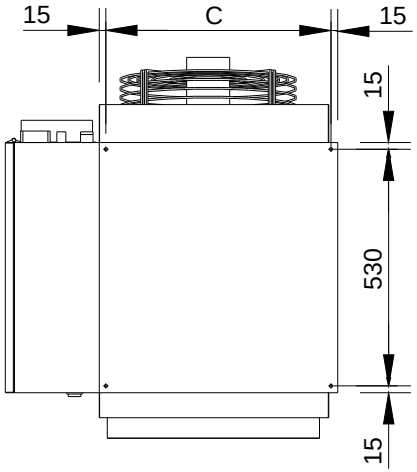
TRANSPORT

⚠ 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



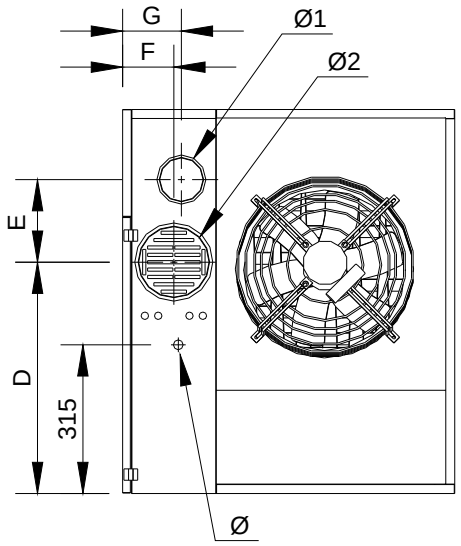
DIMENSION

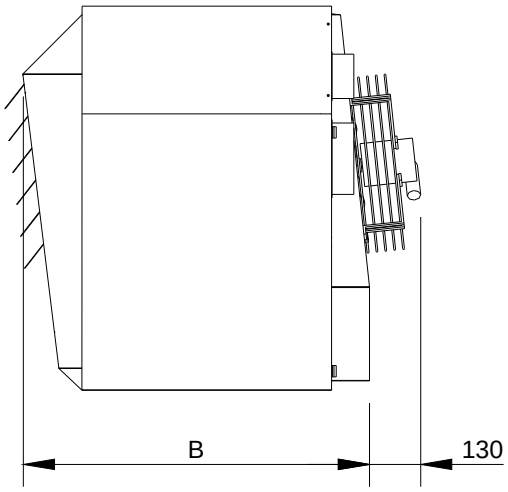
Heater types 1, 2, 3, 4, 5

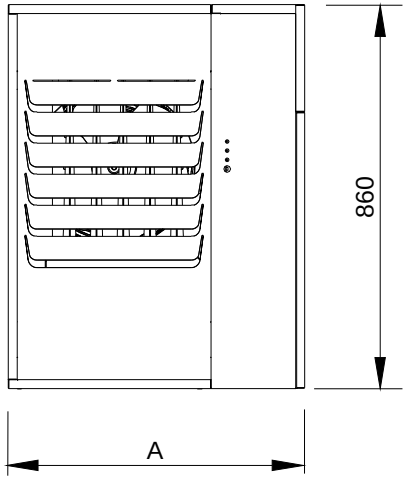


Type	1	2	3	4	5
A [mm]	610	665	745	925	1170
B [mm]	770	770	770	770	820
C [mm]	370	425	505	685	930
D [mm]	563	563	563	555	510
E [mm]	140	140	140	140	185
F [mm]	132	132	132	132	115
G [mm]	132	132	132	132	132
Ø1 [mm]	100 (1)	100 (1)	100 (1)	100 (1)	100 (2)
Ø2 [mm]	100 (1)	100 (1)	100 (1)	100 (1)	150 (2)
Ø [bsp]	½	½	½	½	¾
Nett weight [kg]	65	67	73	92	138

(1) female
(2) male

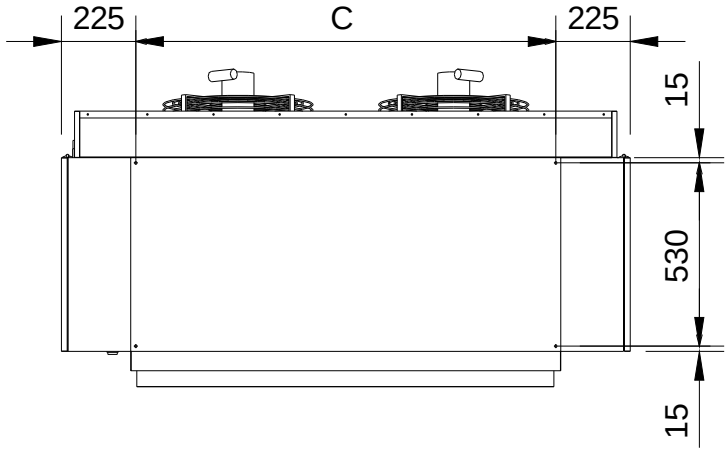




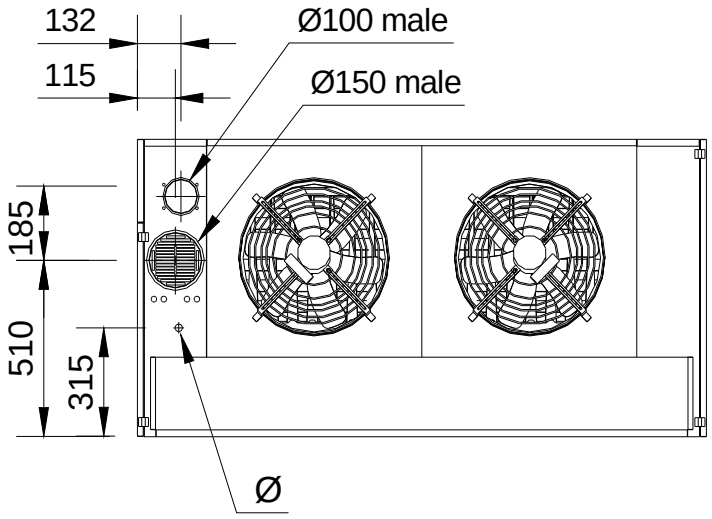


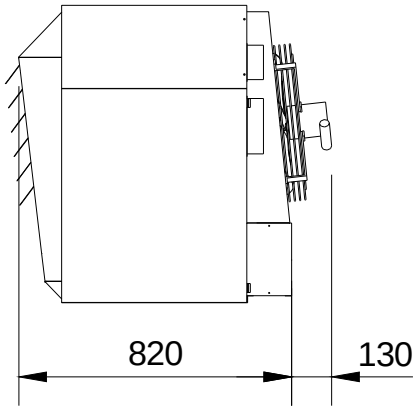
Note: Heater type 5 has two fans.

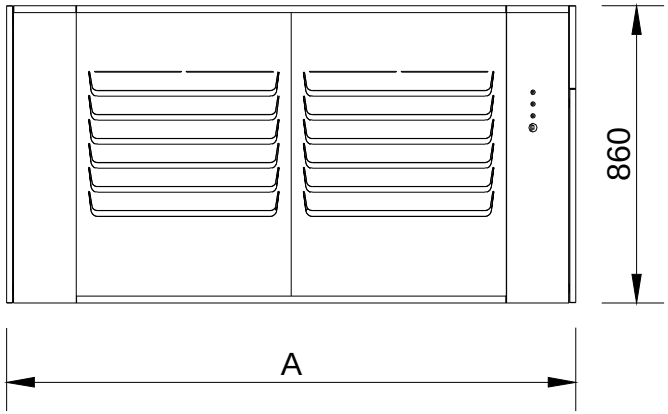
Heater types 6, 7



Type	6	7
A [mm]	1720	1960
C [mm]	1270	1510
Ø [bsp]	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 65ºC

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

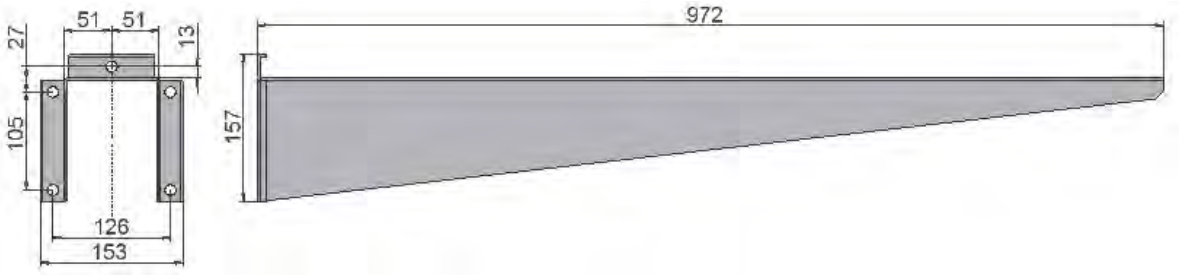
The heater must be installed so that it is level, supports for the heater must be sufficiently robust to withstand the weight of the heater and any ancillary equipment
Any combustible material adjacent to the heater or flue system must be so placed or shielded so that its surface temperature does not exceed 65^{o}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.

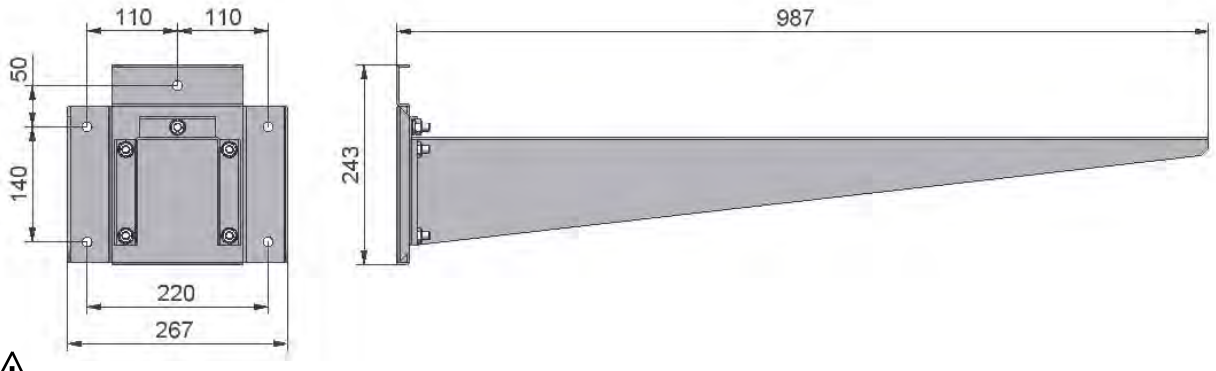
WARNING
SUSPENSION OF RSUHA HEATERS ARE SUPPLIED WITH SUPPORT CHANNELS (LOCATED INSIDE THE CONTROL PANEL DOOR) IF THEY ARE TO BE SUSPENDED
HEATERS MUST NOT BE SUSPENDED BY THE TOP PANEL OF THE HEATER
REMOVE THE KNOCKOUTS LOCATED IN THE BASE PANEL (NEXT TO WALL BRACKET FIXING SCREWS) INSERT 10MM DROP 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:

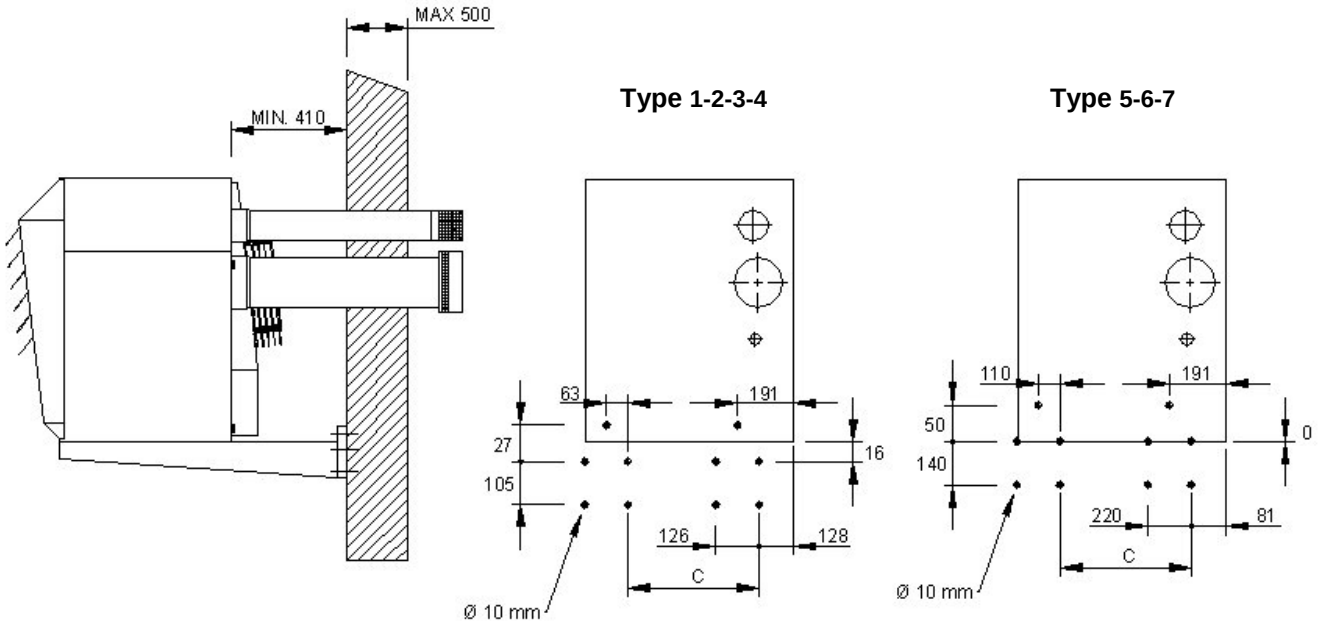
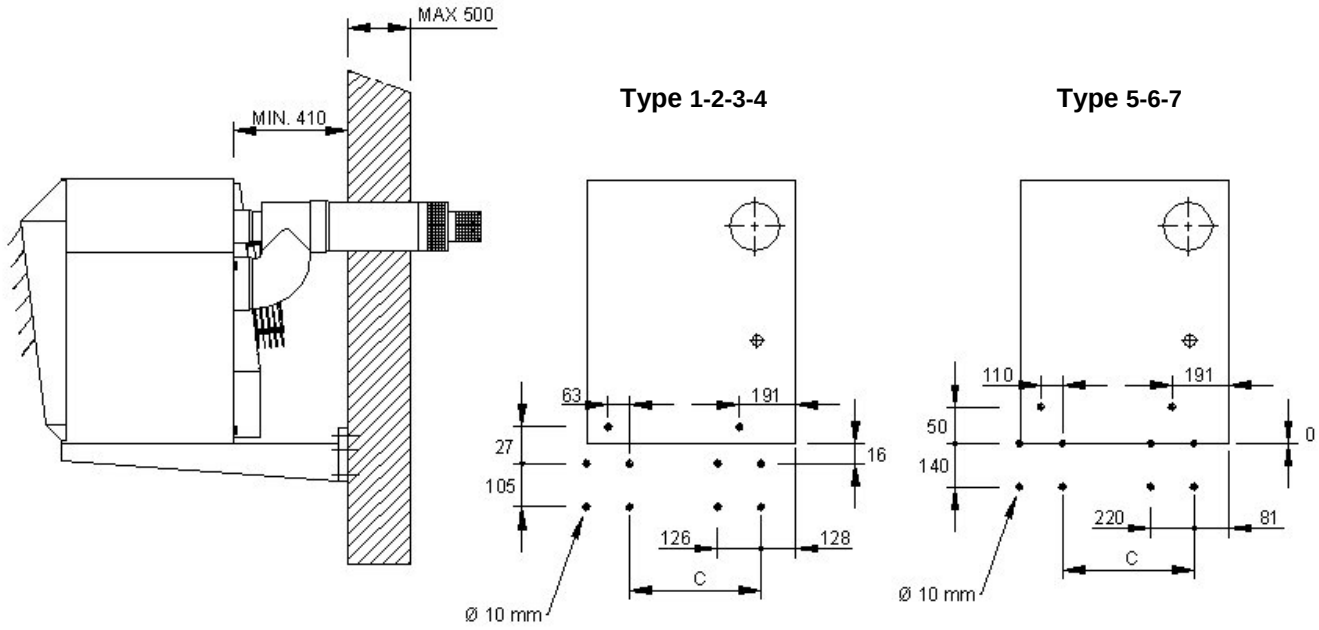
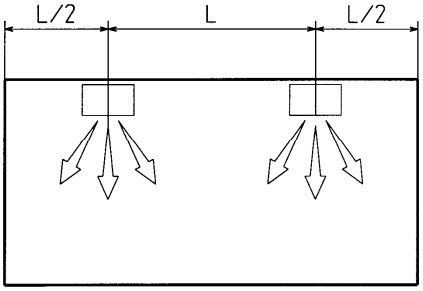


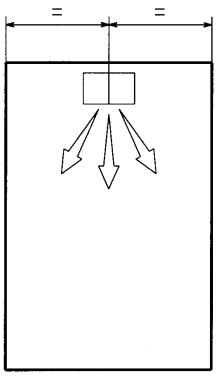
Diagram showing the installation limits for horizontal concentric flue options when using wall support brackets:



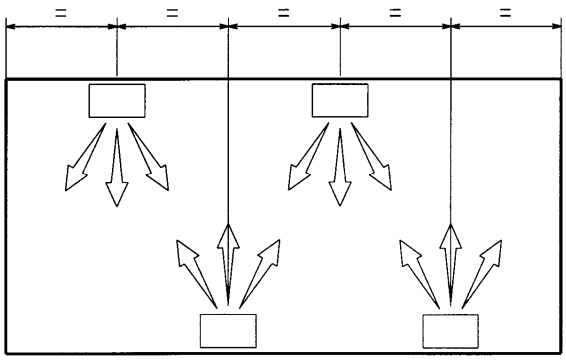
Type	1	2	3	4	5	6	7
C	370	425	505	685	530	1337	1577

Examples of positioning in small and medium spaces

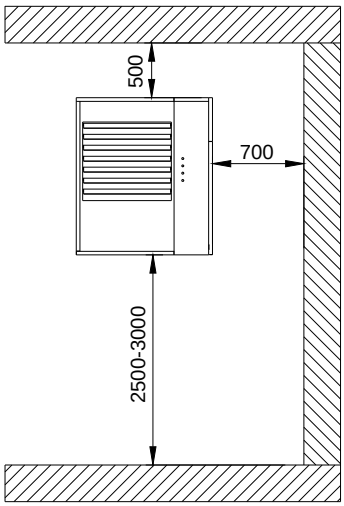


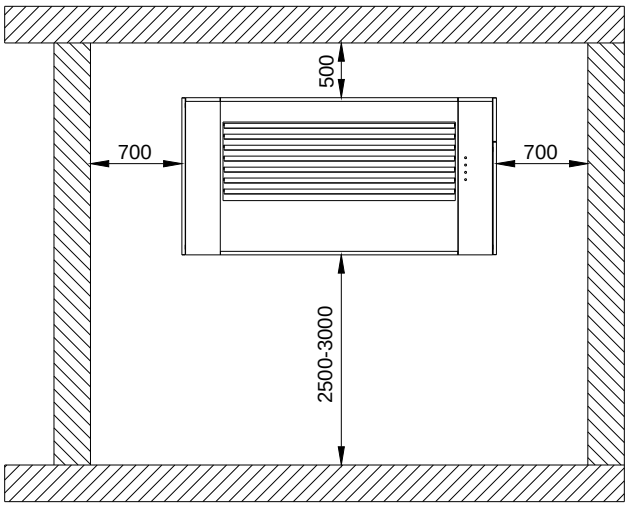


Examples of positioning in large areas



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 set to work with (G20) Natural Gas.
A (G31) propane conversion kit is also available.

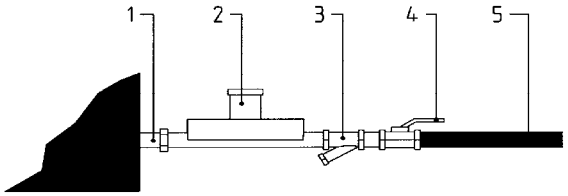
Before connecting up it is necessary to make sure that:

- The correct type of gas is that for which the equipment has been set up is available.
- The gas pipes are clean and free of 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** Male1/2" bsp thread on the type 1 ÷ 4 heaters and 3/4" BSP on the type 5 ÷ 7 heater
2. **Pressure stabiliser*** (required to ensure the correct pressure of combustible gas).
3. **Filter*** (required to prevent impurities which may be present in the gas line from entering the equipment 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.
5. **Gas Pipe**

(*) **Customer supply**



⚠ **WARNING!**
When a LPG supply is used it is advisable to install a first pressure reducer close to the liquid gas tank to reduce the pressure to 1.5 bars and a second pressure reducer near to the heater installation to bring the pressure down from 1.5 bars to 40 mbar.
A third reducer (see position 2) mounted in proximity to the equipment ensures the correct pressure is provided.

Note
Reference to The Institute of Gas Engineers publications Utilisation Procedures IGE/UP1 and IGE/UP2 together with reference to BS6891 is strongly advised.
To prevent any problems which could arise due to a 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
IMPORTANT NOTICE TO INSTALLERS

Installers should satisfy themselves that the gas pipework installation is carried out in accordance with all current legislation, Codes of Practice and recommendations .
Additionally it may be necessary to protect the gas valves which form part of the heater or burner assembly from potential pipe contamination particularly, but not exclusively , where copper gas pipework is used.

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

FLUE AND COMBUSTION OPTIONS

Room sealed unit heaters are suitable for installation with the following flue configurations : **B_{22} - C_{12} - C_{32} .**

Option B_{22}

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 C_{12}

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 that 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 C_{32}

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

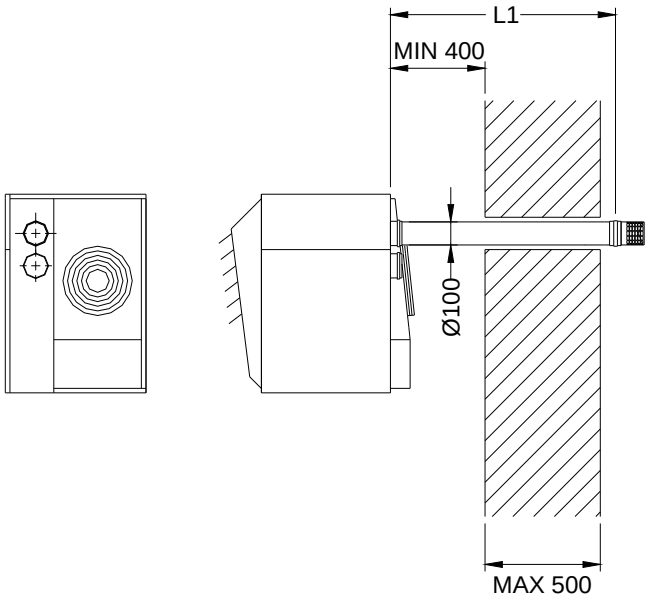
The outlet must be through the roof and must be made with concentric pipes

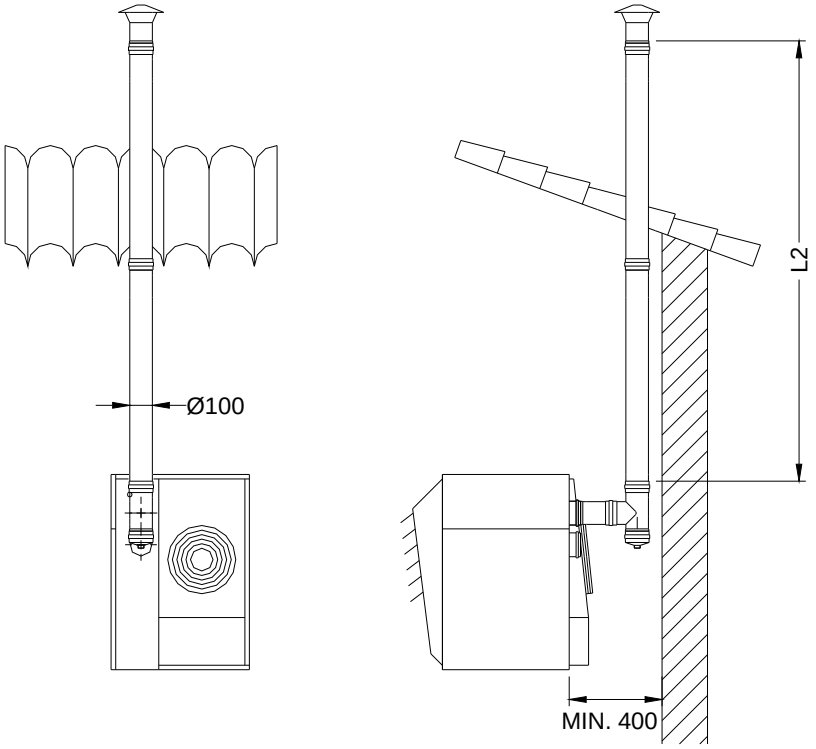
- The flue pipe and combustion air inlet should be metal smooth bored pipe with a diameter of not less that both the flue and combustion spigot connections on the heater

- 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.

B_{22}: Installation showing dimensions with flue terminal external to building and internal combustion air



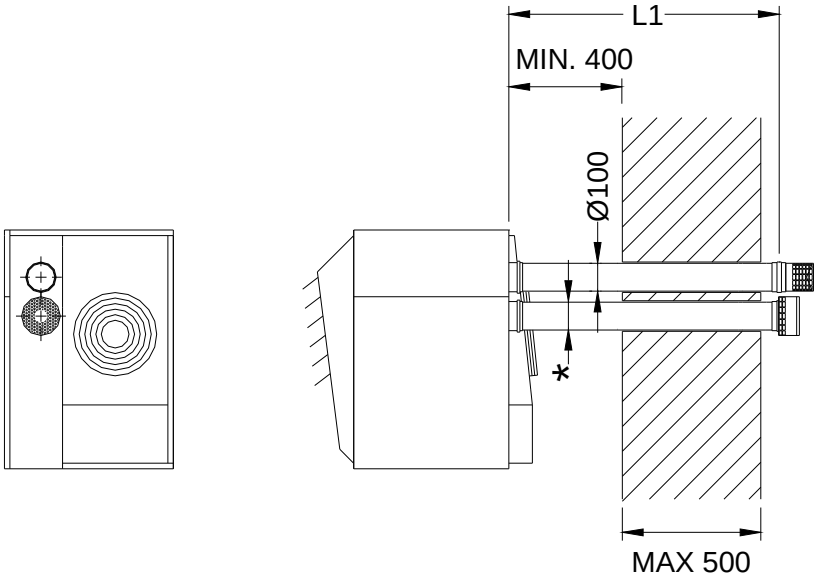


MAXIMUM FLUE LENGTHS:

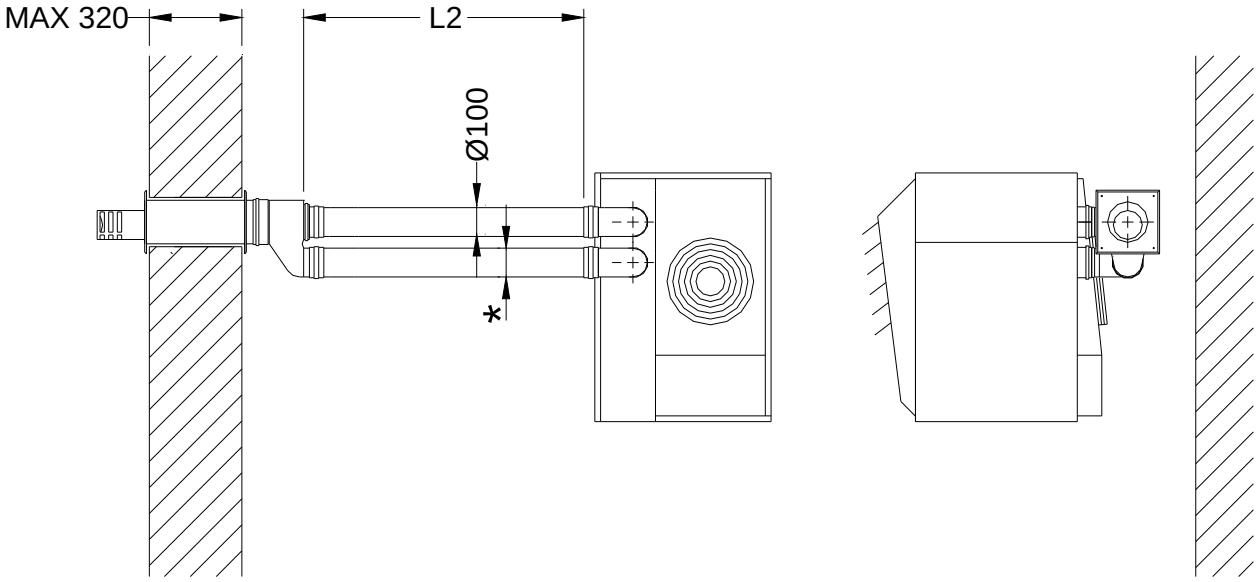
TYPE	UNIT	FLUE EXIT HORIZONTAL		FLUE EXIT VERTICAL	
		L1 MIN.	L1 MAX.	L2 MIN.	L2 MAX.
1	m	1,00	5,00	1,00	10,00
2	m	1,00	5,00	1,00	10,00
3	m	1,00	5,00	1,00	10,00
4	m	1,00	5,00	1,00	10,00
5	m	1,00	5,00	1,00	10,00
6	m	1,00	5,00	1,00	10,00
7	m	1,00	5,00	1,00	10,00

- 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 .

C_{12}: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**

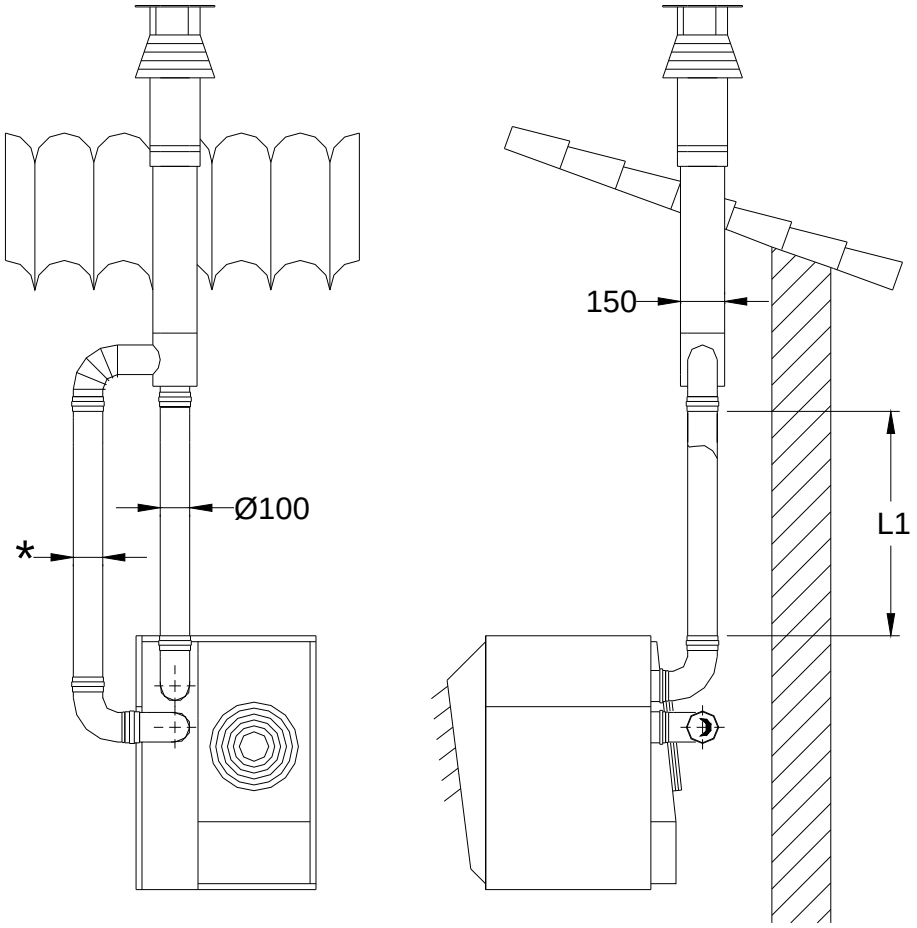


MAXIMUM FLUE LENGTHS:

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 .

C_{32} Installation showing vertical concentric flue terminal roof installation combustion air external to building



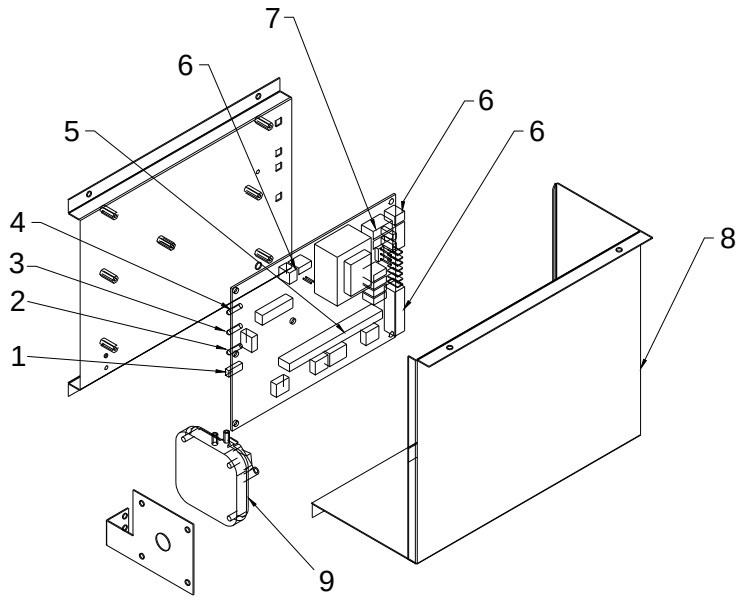
✳	100 mm **type 1 – 2 – 3 – 4**
	150 mm **type 5 – 6 – 7**

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.

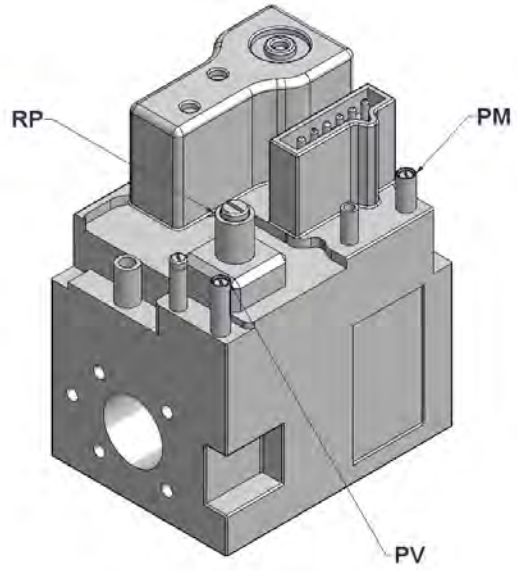
STOPPING

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.

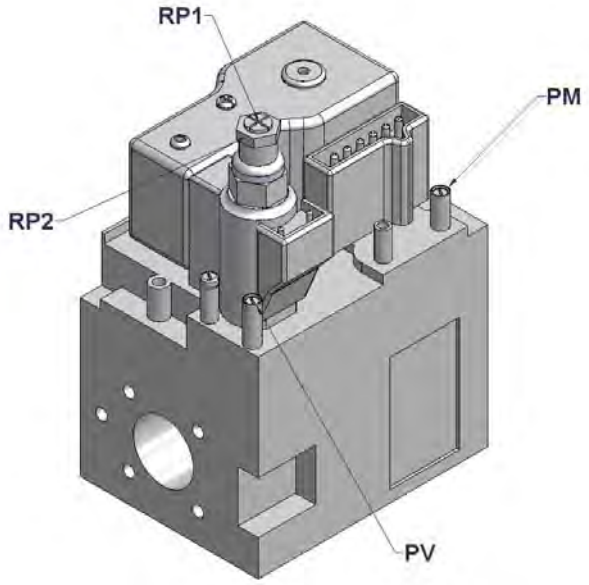
WARNING
If Heater is to be switched off for a Long Period set ON/STANDBY switch to STANDBY.
Isolate at mains electrical supply
Isolate the gas supply.

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

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.

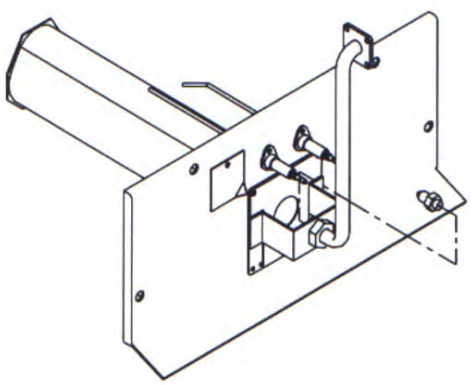
CHANGE INJECTORS:

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

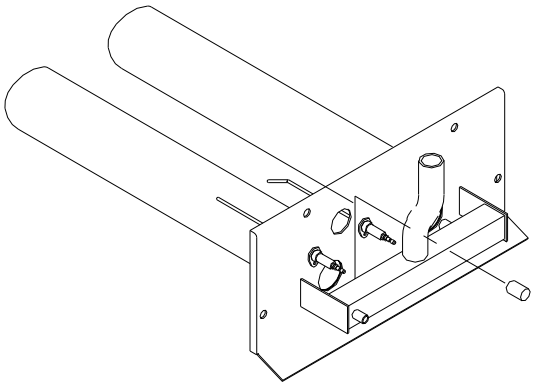
Propane Gas (G31)

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

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.

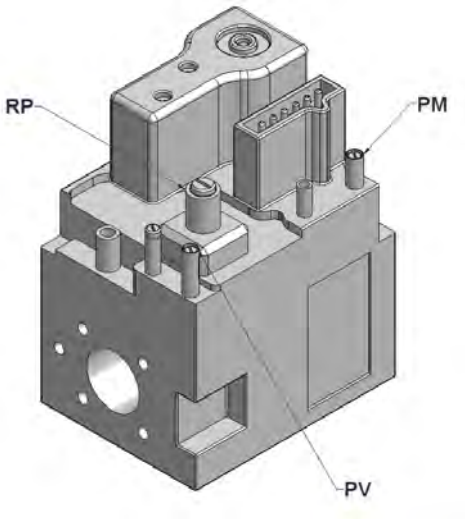
⚠ Check the size of the nozzles and the pressure correspond to that shown on the data plate
When the conversion is complete place the transfer with the correct gas pressure on to the manifold as supplied in the conversion kit.
Test for gas soundness on completion
Ensure new aluminium washers are fitted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

GAS PRESSURE SETTINGS

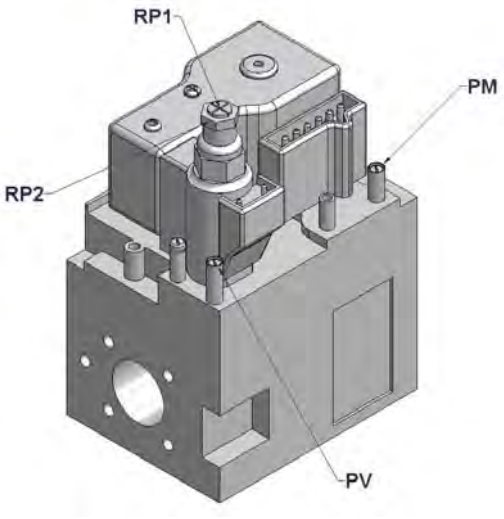
To regulate the gas inlet pressure:
- Connect a manometer onto the gas valve test point (**PM**)
- Adjust the inlet gas supply regulator (customer installation) to pressure indicated on data plate::

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

RS/UHA



RS/UHA-2 RS/UHA-4



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

⚠ **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:
Gas valve head pressure setting high fire Propane G31:

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:

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

Heater types (1, 2, 3, 4, 6)

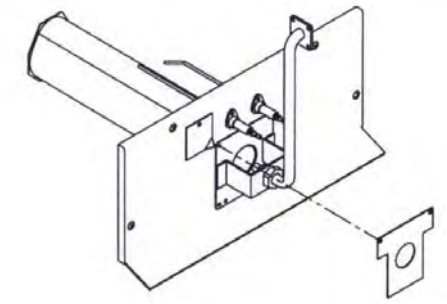
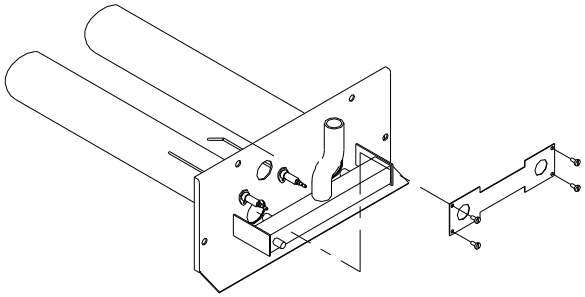


Diagram showing the fitting of a diaphragm plate for the primary air for two burner manifolds

Heater types (5, 7)



⚠ **WARNING the diaphram 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.

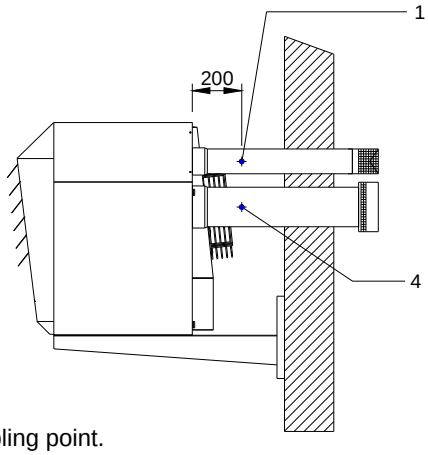
- Check that there are no gas leaks
- Check that the gas rate is correct using a meter.
- Check injector pressure is correct.
- Check temperature rise is correct to data plate.
- Check the operation of the control and limit thermostats TR, SND, LM.
- Check that the room thermostat operates the burner 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.

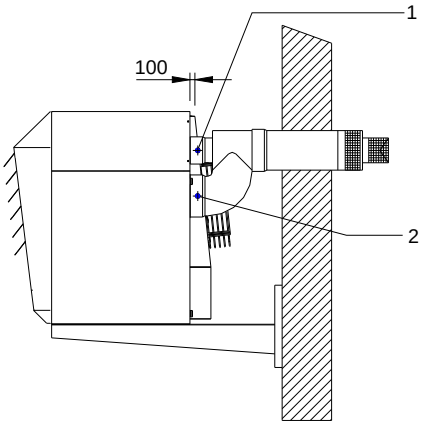
MAINTENANCE

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.

COMBUSTION PRODUCT SAMPLING

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





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**

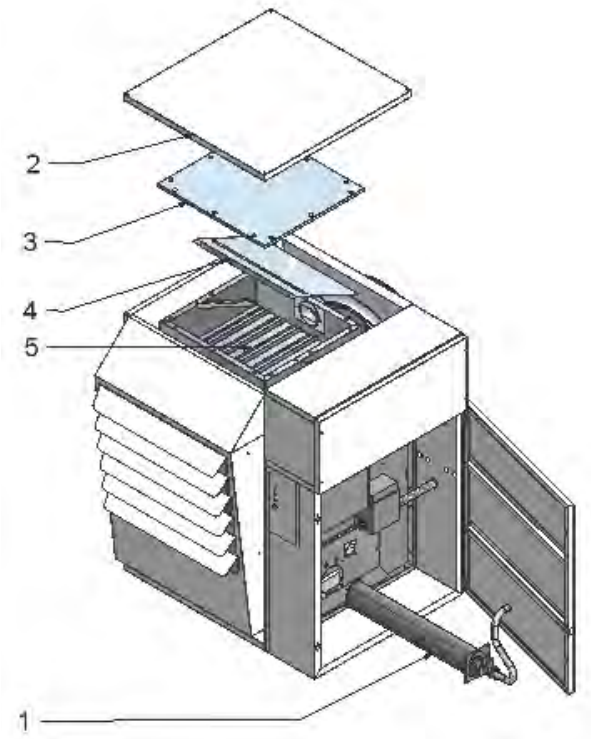
Ensure that the horizontal fins are set so as to evenly distribute the air in the area to be heated they should opened to a minimum of 45 degrees this will ensure that there is sufficient air flow over the combustion chamber and avoid nuisance over heat lockout .For this reason it is also important to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

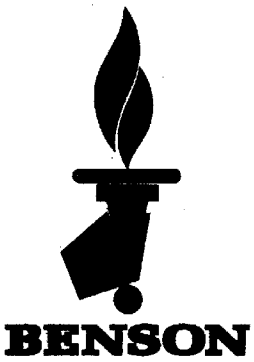
If heater is not working firstly check the following:

- Check electrical supply
- Check gas pressure
- Check gas pressure is a 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. *Flue venter working* *No indication lights on*	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 *Flue venter not working* *No indication lights on*	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

	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.
	Heat exchanger dirty	Check heat exchanger
Burner shuts down *No indication lights on*	Pressure differential switch not operating	Check air intake pipes are not blocked . Check flue pipes are not blocked check operation of flue venter
	Faulty differential pressure switch	Replace differential pressure switch
	Room thermostat in hot air flow	Check position of thermostat
The burner goes out due to the intervention of the thermostat SND; and is restarted automatically when heater has cooled down *Yellow light on.*	Excessive heat exchanger temperature	Check that the gas type is suitable for heater Check gas pressure Check head pressure. Check injector size is correct for the heater
	Excessive air temperature due to poor air flow.	Check that the fan blades are clean. Check that the horizontal and (vertical if fitted) louvres are sufficiently open (see installation). Check fan is operating correctly with sufficient air flow.
	Faulty SND thermostat or faulty fan control I	Change SND thermostat or fan control I
The burner goes out due to the intervention of the thermostat TR. and is restarted automatically when heater has cooled down *Yellow light on.*	Excessive heat exchanger temperature	Check that the gas type is suitable for heater Check gas pressure Check head pressure. Check injector size is correct for the heater
	Excessive air temperature due to poor air flow.	Check that the fan blades are clean. Check that the horizontal and (vertical if fitted) louvres are sufficiently open (see installation). Check fan is operating correctly with sufficient air flow
	Faulty thermostat	Change thermostat
Burner goes out due to the intervention of the LIMIT thermostat (LM). *Yellow light flashing*	Excessive heat exchanger temperature	Check that the gas type is suitable for heater Check gas pressure Check head pressure. Check injector size is correct for the heater
	Excessive air temperature due to poor air flow.	Check that the fan blades are clean.

	Excessive air temperature due to poor air flow	Check that the horizontal and (vertical if fitted) louvres are sufficiently open (see installation). Check fan is operating correctly with sufficient air flow
	Faulty Thermostat	Change thermostat
	Faulty fan	Check fan capacitor Check fan motor.
	Fan faulty intervention of thermal overload	Check electrical absorption Replace fan motor.
	Faulty FAN operation	Change fan control or SND thermostat
Heater at lockout. *Red lamp illuminated*	Faulty ignition	Check that the gas type is suitable for heater Check gas pressure Check head pressure. Check injector size is correct for the heater
	Ionisation probe faulty	Check electrical connection to the probe. Check probe Change ionization probe.
	Faulty ignition probe	Change ignition electrode
	Faulty solenoid	Change solenoid
	Dirty gas filter	Clean filter
Control box will not reset. *Red light illuminated*	Faulty flame control module	Change control module check electrical connections
Fan works intermittently	Faulty FAN operation	Change fan control or SND thermostat
	Insufficient gas pressure	Check that the gas type is suitable for heater Check gas pressure Check head pressure. Check injector size is correct for the heater
The fan does not work	Faulty FAN operation	Change fan control or SND thermostat
	Faulty fan	Check fan operation Check fan motor.
Heater works continuously without reaching the required temperature	Heater to small for application Insufficient gas pressure	Re check heat output required for application Check that the gas type is suitable for heater Check gas pressure Check head pressure. Check injector size is correct for the heater
	Dirty heat exchanger	Clean heat exchanger



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