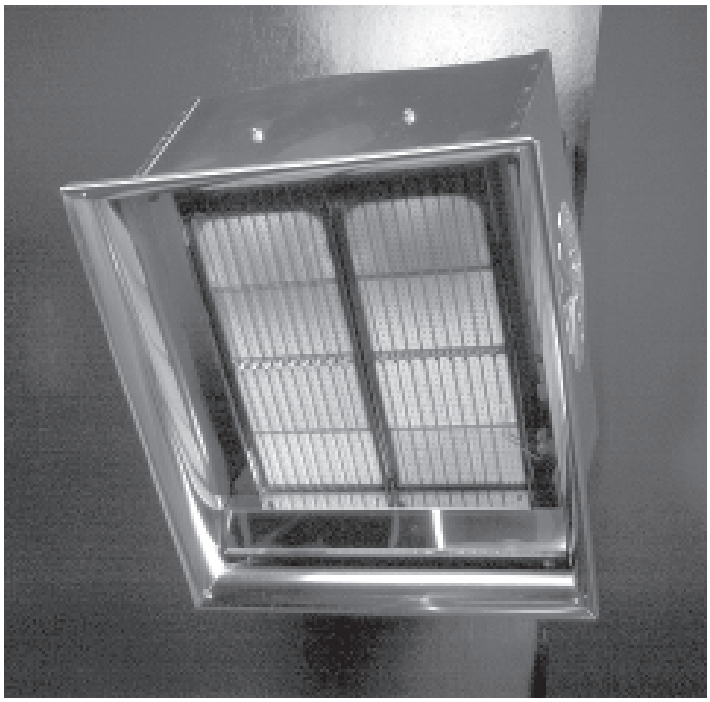
AMBIRAD
ENERGY EFFICIENT HEATING SYSTEMS

USER INFORMATION INSTALLATION AND SERVICING INSTRUCTIONS FOR DR SERIES RADIANT GAS HEATERS.



These instructions are valid for heaters supplied in the UK (GB) and Ireland (IE) only. If these country symbols are not present on the appliance, please refer to the technical instructions in this publication. These provide the necessary information concerning the modification of the appliance to the conditions of use for the country.

CE

0087

USER INSTRUCTIONS

This unflued, gas fired, overhead radiant heater is designed for use in industrial and commercial buildings such as warehouses, manufacturing plants, aircraft hangers, service garages, etc.

NOT FOR RESIDENTIAL USE!

Do not use in the home, sleeping quarters, attached garages, etc.

The manufacturer cannot anticipate every use which may be made of their heaters. Check with your local fire safety authority if you have questions about local regulations.

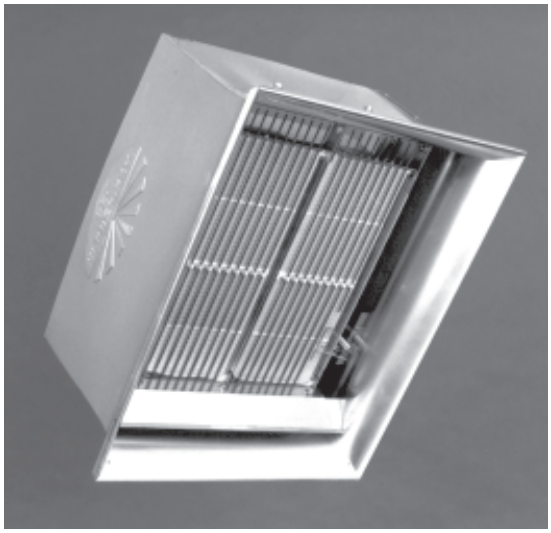
IMPORTANT

This heater *must* be installed and serviced by a trained gas service technician only! Conversion of the heater for use with other gases must be carried out by a trained gas service technician.

Read these instructions carefully before attempting to install, operate or service the heater.

Failure to comply with these warnings and instructions, and those on the heater, could result in personal injury, death, fire, asphyxiation and/or property damage. Retain these instructions for future reference.

GENERAL INFORMATION



The following information should be reviewed before using or installing this heater:

The heater features a fully automatic ignition and control system. When the power is supplied to the heater the gas valve opens, allowing gas to enter the burner. A spark is generated at the ignition electrode and this is used to ignite the gas.

The electrodes are also used to monitor the flame. When the flame has been established the sparking ceases and the heater commences normal operation.

If a flame is not established, the spark is interrupted after a few seconds and the gas valve closes. The heater will then lockout, and will not make another attempt to ignite. The power supply to the heater must be switched off and then switched back on again before another ignition attempt is made.

WARNING

DO NOT STORE OR USE PETROL OR OTHER INFLAMMABLE VAPOURS AND LIQUIDS IN THE VICINITY OF THIS OR ANY OTHER APPLIANCES.

WARNING

THIS APPLIANCE MUST BE EARTHED

WARNING

DO NOT TOUCH THE IGNITION OR FLAME DETECTION ELECTRODES OR ANY PART OF THE IGNITION/FLAME DETECTION CIRCUIT WHILE POWER IS CONNECTED TO THE HEATER. THESE PARTS CARRY HIGH VOLTAGES AT ALL TIMES AND WILL GIVE AN ELECTRIC SHOCK IF TOUCHED.

OPERATING INSTRUCTIONS

SWITCHING ON THE HEATER

1. Ensure that the gas supply to the heater is turned on.
2. Ensure that the thermostat and/or timeclock is calling for heat.
3. Switch on the electrical supply and the ignition sequence will commence.
   There is a delay of approximately ten seconds. The burner is then ignited by the electrical spark.
4. If ignition fails, the control unit will lockout and another ignition attempt will not be made.
5. If lockout occurs, shut off the power supply and restore after 30 seconds. If lockout re-occurs more than three times, switch off heater and call service technician.

SWITCHING OFF THE HEATER

Switch off the electrical supply to the heater. The burner will be extinguished.

If the heater is to be switched off for an extended period, (in excess of one month) it is recommended that both electrical and gas supplies are turned off.

SERVICING

The heater requires an annual service in order to ensure continued safe and efficient operation. Service procedures are described on page 8 of this manual. Servicing should be carried out by a trained gas service technician.

GENERAL SPECIFICATION

MODEL	NOMINAL INPUT (kW)	INJECTOR SIZE (mm)		BURNER PRESSURE (mbar)		GAS CONN. SIZE	NO. OF BURNER	WIDTH (mm)	HEIGHT (mm)	DEPTH (mm)	WEIGHT (kg)
		Nat. Gas (G20)	Propane (G31)	Nat. Gas (G20)	Propane (G31)						
DR 30	8.8	2.25	1.6	15	25	1/2"	1	314	575	289	8.2
DR 50	14.6	2.1	1.5	15	25	1/2"	2	479	575	289	12.2
DR 60	17.6	2.25	1.6	15	25	1/2"	2	479	575	289	12.2
DR 80	23.5	2.1	1.5	15	25	1/2"	3	645	575	289	16.3
DR 90	26.4	2.25	1.6	15	25	1/2"	3	645	575	289	16.3
DR 100	29.3	2.35	1.65	15	25	1/2"	3	645	575	289	16.3
DR 120	35.2	2.25	1.6	15	25	1/2"	4	810	575	289	20.4
DR 130	38.1	2.35	1.65	15	25	1/2"	4	810	575	289	20.4
DR 150	44	2.25	1.6	15	25	1/2"	5	975	575	289	24.5
DR 160	46.9	2.35	1.65	15	25	1/2"	5	975	575	289	24.5

INSTALLATION INSTRUCTIONS

The installation should be carried out by a qualified installer.

Before installation, check that the local distribution conditions, nature of gas and pressure, and adjustment of the appliance are compatible.

Notwithstanding their limited scope, the appliances should be installed in accordance with the relevant provisions of the following regulations:

UNITED KINGDOM

Gas Safety (Installation and Use) Regulations 1984 and BS6891:1988. Due account should be taken of any obligations arising from the Health and Safety at Work etc Act 1974, the current Building Regulations, the current I.E.E. Regulations and other relevant codes of practice.

IRELAND

I.S.3212:1987, ICP 4, I.S.327. Due account should be taken of any obligations arising the current Building Regulations, the current I.E.E. Regulations and other relevant codes of practice.

VENTILATION

The space to be heated must be ventilated to remove the products of combustion and provide an adequate supply of fresh air. Ventilation may be provided by natural or mechanical means. The minimum air volume requirement should comply with B.S. 6896: 1987.

In general we recommend that the volume of fresh air entering the building should be at least 37.5 m^3/h per kilowatt of total rated heat input.

EXAMPLE: *One DR 30 is rated at 8.79Kw*

Ventilation requirement = 8.79 x 37.5 m^3/h

= 329.62 m^3/h

SITING THE HEATER

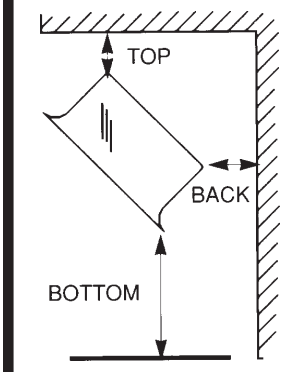
Whenever possible, fit the heater at recommended fixing height above floor level (see Table below).

When considering heater position, ensure that the required minimum clearances between the various heater surfaces and combustible materials are preserved (see Table below).

Extended parabolic reflectors are available for all heater models. When these are fitted the higher mounting heights given in the table must be maintained.

Note : Fixing heights are measured from the centre of the heater face.

MOUNTING HEIGHTS AND CLEARANCES

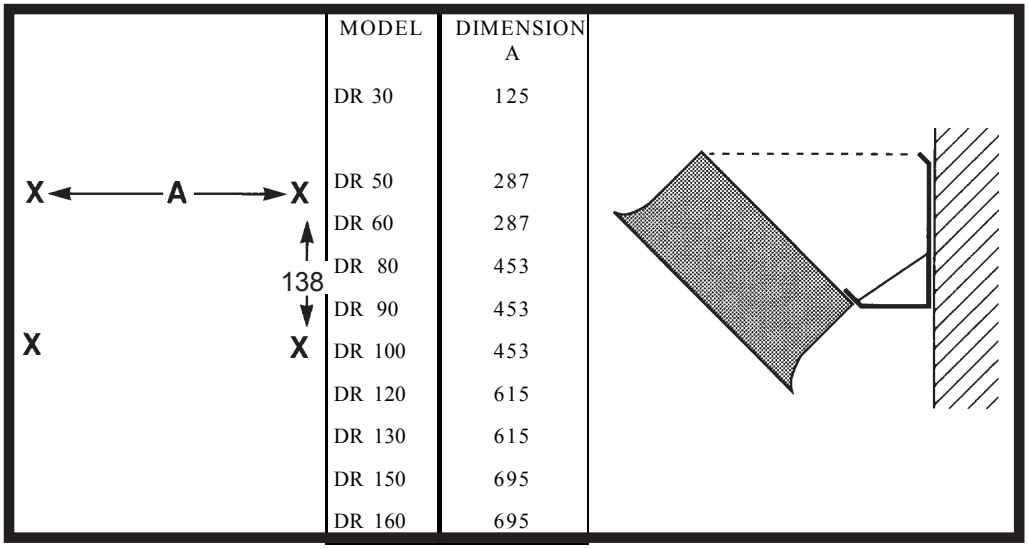


MODEL	MOUNTING HEIGHT		CLEARANCES TO COMBUSTIBLES			
	STANDARD REFLECTOR	PARABOLIC REFLECTOR	TOP	BACK	SIDES	BELOW
DR 30	3.80	4.30	0.62	0.20	0.75	1.85
DR 50	4.20	5.50	1.03	0.20	0.75	1.85
DR 60	4.50	6.10	1.03	0.20	0.75	1.85
DR 80	5.00	6.40	1.23	0.20	1.20	2.51
DR 90	5.50	7.00	1.23	0.20	1.20	2.51
DR 100	6.00	7.60	1.23	0.40	1.20	2.51
DR 120	7.00	8.20	1.33	0.40	1.20	3.08
DR 130	7.50	8.50	1.33	0.40	1.20	3.08
DR 150	8.00	9.20	1.54	0.40	1.30	3.38
DR 160	8.50	10.00	1.54	0.40	1.30	3.38

MOUNTING HEATERS USING WALL BRACKET SET

A set of wall brackets is supplied with each heater. These brackets allow mounting angles between 30° and 45° to the horizontal, and heaters must not be installed, on walls, at angles outside this range.

1. Place brackets in proposed heater position on the wall. Check that they are properly aligned and mark in hole positions for fixing screws (See Table below). Drill holes, fit plugs and use screws to fix brackets in position.
2. Fix each bottom side of the heater to the bottom side of its respective wall bracket, using the nuts and bolts that are provided. Connect top sides of heater to bracket using the S-hooks and chain.



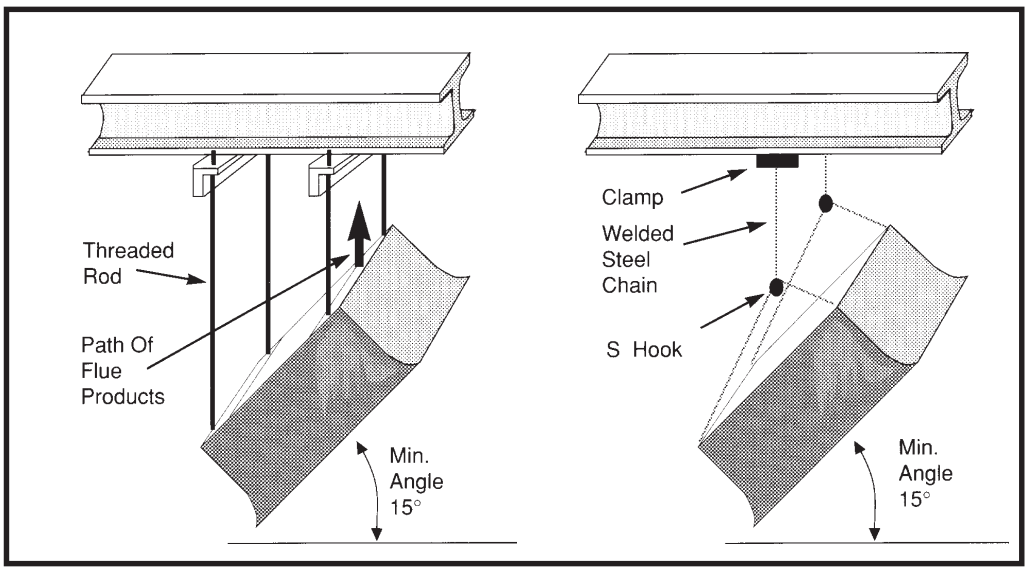
MODEL	DIMENSION A
DR 30	125
DR 50	287
DR 60	287
DR 80	453
DR 90	453
DR 100	453
DR 120	615
DR 130	615
DR 150	695
DR 160	695

OTHER MOUNTING METHODS

Heaters may be suspended from roof structures by other methods. The drawing below illustrates the more commonly used methods for mounting the heaters. Some local codes or application conditions, such as draughts that could cause units to swing, stipulate that if flexible gas connectors are used then the heaters must be rigidly mounted.

THE HEATER FACE MUST NOT MAKE AN ANGLE OF LESS THAN 15° WITH HORIZONTAL.

The flue outlet area of the heater must remain free of obstructions at all times. Gas pipework or electrical cables must never be used to lend mechanical support to the heater.



GAS SUPPLY

The gas supply to the heater must terminate in an isolation cock. This will allow the heater to be disconnected for maintenance or repair.

All pipework must be supported and installed in accordance with the regulations listed on page 4 and to provide the operating gas pressure and volume for the appliance. Pipes of a smaller size than the heater inlet gas connection must not be used.

The final connection is made to the heater gas valve. This has an Rp 1/2" ISO 7 thread (1/2" B.S.P. internal thread). A flexible metallic hose conforming to B.S. 6501: Part 1: 1991 (minimum specification type B Class 1) may be used for this purpose. This must be kept clear of the flue products opening at the top of the heater.

Take care when making the final connection to the gas valve not to apply excessive turning force to the gas valve. The valve inlet may be held using a 40mm spanner.

GAS PRESSURE

The following information is valid for heaters supplied in the UK and Ireland using either natural gas or propane fuel. Please check heater data plate and packaging to verify fuel type. (Information on converting heaters for use in other European countries is given in a section at the end of this manual. See page 11.)

MAXIMUM INLET GAS PRESSURE - 20 mbar for Natural Gas
37 mbar for Propane

The gas pressure governor has been factory pre-set to give the following heater operating pressures:

15 mbar for Natural gas (G20)

25 mbar for Propane (G31).

ELECTRICAL INSTALLATION

THIS APPLIANCE MUST BE EARTHED

A 220/24OV 50Hz single phase supply is required.

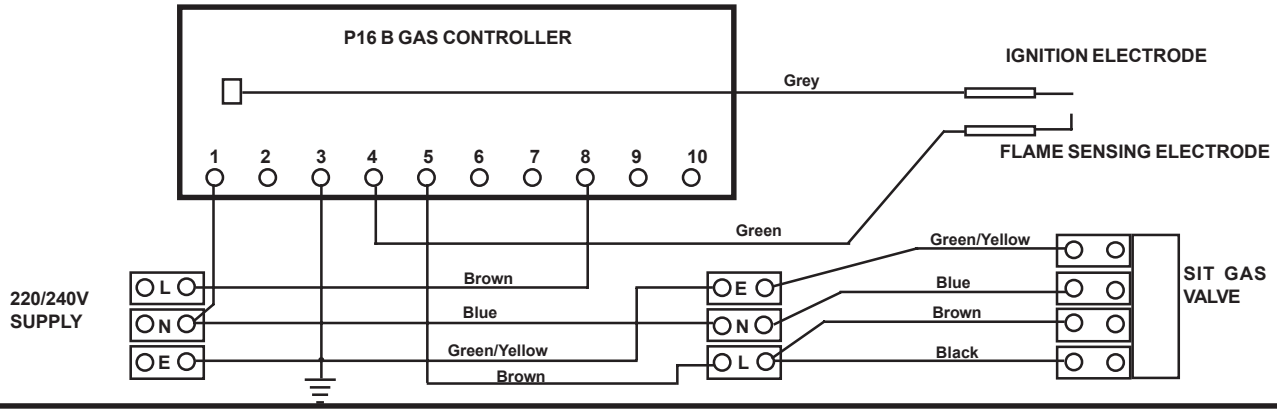
All wiring must comply with I.E.E. and local authority recommendations. The wires in the mains lead used on this appliance are coloured in accordance with the following code :

Green and Yellow	Earth
Blue	Neutral
Brown	Live

The method of connection to the electricity supply must facilitate complete isolation and should preferably be made via a fused double pole isolator having a contact separation of at least 3mm in all poles and supplying the appliance only. Alternative connection may be made via fused three pin plug and unswitched, shuttered socket both complying with the requirements of B.S. 1363.

Ensure that Live, neutral and earth are connected correctly as the flame detection circuit will not operate correctly if the polarity of the supply is reversed.

HEATER CONTROL WIRING



PRE-COMMISSIONING CHECK

Inspect ceramic plaques to ensure that none have been damaged. If any cracks are detected, the heater must not be commissioned until the affected burner unit has been replaced (See Servicing Section).

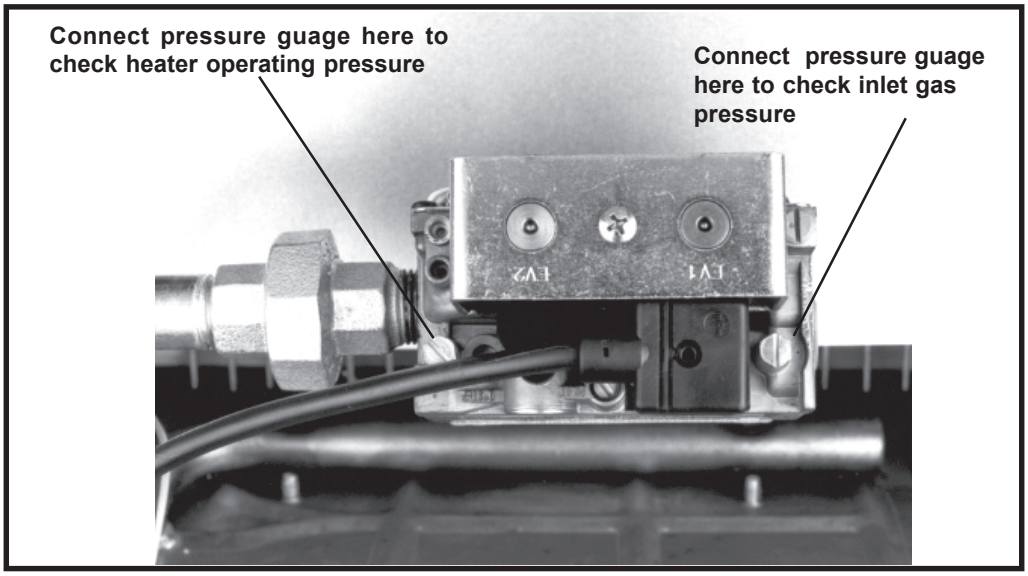
COMMISSIONING

1) Ensure that service cock to heater is turned off.

2) Purge air from gas supply and test for gas soundness in accordance with the relevant standards. (see page 4)

3) Check that all electrical connections are made to the heater and that the unit has a sound earth connection.

4) Remove operating pressure test point screw (located on outlet of the gas valve.). Connect pressure gauge.



5) Open the gas service cock.

6) Switch on the power to the heater via remote electrical switch. After a purge period lasting a few seconds, the solenoid valves will open and the heater will come into operation having been lit by the electrical spark.

7) Check heater operating gas pressure. This should be:

   15 mbar for natural gas or 25 mbar for propane.

   The pressure governor on the gas valve has been factory pre-set to the correct operating pressure. If the correct operating pressure is not measured then it may be necessary to re-adjust this. Please see page 12 for details of how this is done.

   When the correct pressure is measured, switch off the heater. Remove pressure guage. Replace and tighten test point screw.

8) Test supply between service cock and heater for gas soundness.

9) Fit low level lighting instruction plate.

   The heater is now ready for use.

SERVICING

WARNING

DO NOT TOUCH THE IGNITION OR FLAME DETECTION ELECTRODES OR ANY PART OF THE IGNITION/ FLAME DETECTION CIRCUIT WHILE POWER IS CONNECTED TO THE HEATER. THESE PARTS CARRY HIGH VOLTAGES AT ALL TIMES AND WILL GIVE AN ELECTRIC SHOCK IF TOUCHED.

Annual maintenance is normally sufficient unless abnormal site conditions necessitate that such work be carried out at more frequent intervals e.g. dusty environment etc.

The procedure outlined below should be followed: -

1) Turn OFF electrical isolating switch and gas cock.

2) Remove dirt and other deposits from all heater surfaces. Low pressure compressed air may be used to clean ceramic plaques and venturies. The air hose pressure should not exceed 200 kPa or 30psi.

3) Remove and clean injectors, if necessary, using an 11mm spanner.

4) Check that :-

   all ceramic plaques are free from cracks or other damage.

   the heater fixing arrangements are satisfactory.

   the flue products outlet is free of obstructions.

   the minimum clearances between the various heater surfaces and combustible materials are preserved.

5) Re-commission heater as outlined in section on commissioning.

6) Switch OFF the heaters. Close gas service cock if heaters are not to be used for an extended period.

TROUBLE-SHOOTING

1) Power is connected to the heater but nothing happens.

Remedy:

Check electrical supply and all electrical connections. If this reveals nothing, it is likely that the gas controller has failed. Replace controller.

2) The electrode sparks but the heater fails to ignite.

Remedy :

Check the heater inlet gas pressure (test point on gas valve). This should be at least 18mbar for natural gas or 30mbar for propane.

Check electrode spacing (recommended gap = 3mm)

Check operation of gas valve. Replace if necessary.

Replace controller if the valve is not defective.

3) The heater ignites satisfactorily but *switches off* after a short period.

Remedy :

Check electrode spacing (recommended gap = 3mm, 3mm clearance should also be maintained to the surface of the ceramic plaques.)

If this does not resolve the problem, replace controller.

4) A burner does not reach its normal operating temperature (orange colour) and a loud *roaring* noise is audible.

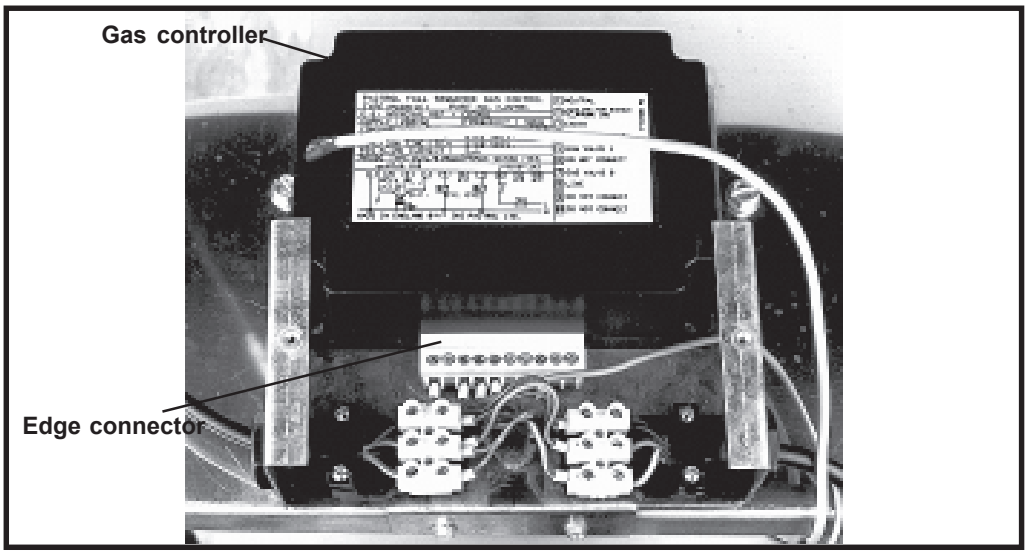
Remedy :

This indicates that the bumer *has flashed back.* The condition is caused by damage to the ceramic plaques.

Replace the affected burner unit.

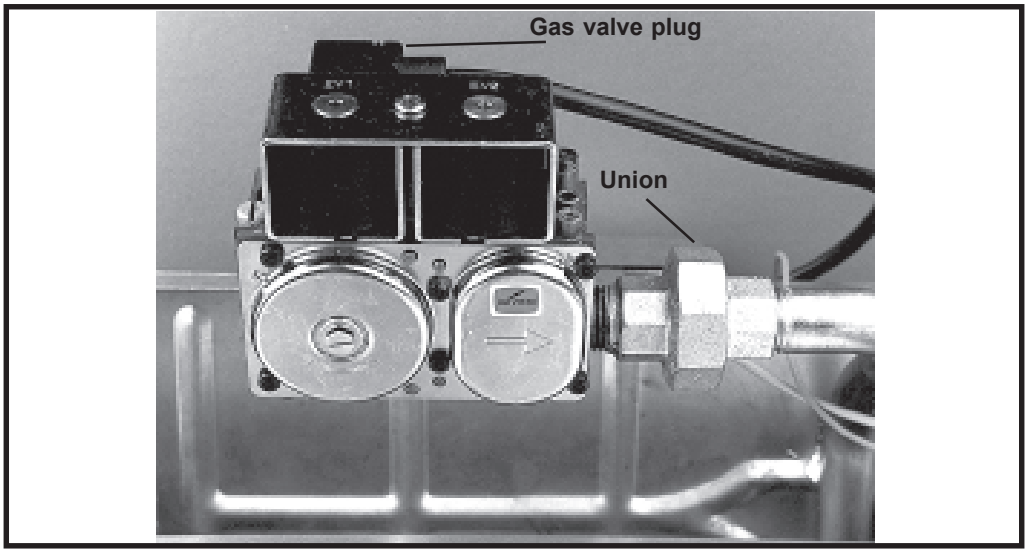
REPLACEMENT PROCEDURES

Replacement of gas controller.



1. Switch off electrical supply
2. Unscrew the machine screws which retain the cover of the control enclosure. Remove cover.
3. Disconnect the spark electrode lead from the control box terminal.
4. Unscrew the two machine screws which retain the gas controller in place. Disconnect the edge connector from the controller. Lift controller clear
5. Replace controller and re-assemble.
6. Re-commission heater.

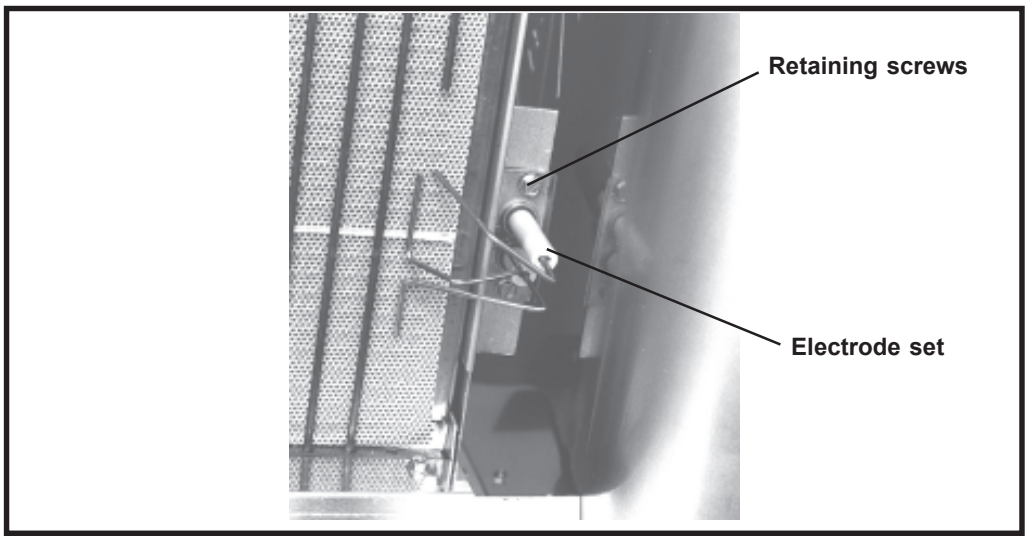
Replacement of gas valve



1. Switch off electrical and gas supplies
2. Disconnect gas valve plug from gas valve.
3. Disconnect flexible connector from gas valve
4. Open the “union” which connects gas train to heater mainfold
5. Remove gas valve.
6. Replace valve and re-commission heater.

Replacement of Electrode set

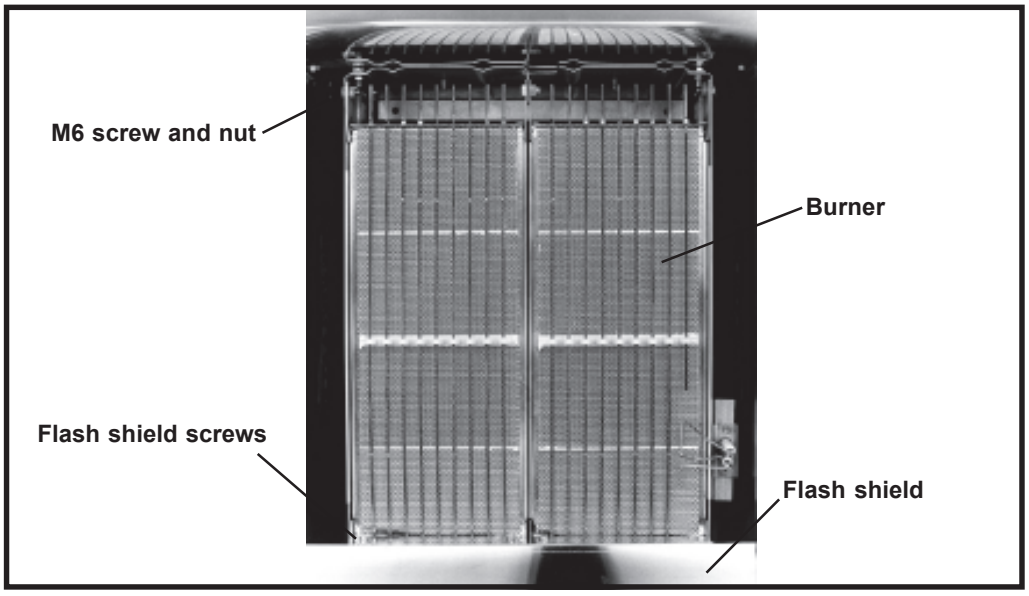
If electrodes are damaged, they must be replaced complete with holder.



1. Switch OFF electrical supply and gas service cock
2. Disconnect leads from electrodes.
3. Remove electrode set from mounting bracket by unfastening the retaining screws.
4. Replace with new electrode set.
5. Re-assemble and re-commission the heater.

Replacement of Burner

If the ceramic plaques are damaged, it is necessary to replace the entire burner unit.
The procedure is as follows:



1. Remove screws which retain the flash shield to the burners.
2. Remove the flash shield
3. Remove the four 6 mm nuts and bolts which retain the burner unit to the heater frame
4. Remove burner and replace
5. Replace the flash shield
6. Re-commission the heater

CONVERTING HEATERS FROM ONE GAS TO ANOTHER

Heaters which carry the I_{2H} marking on the data badge are suitable for use on Natural Gas in the following countries without modification:

United Kingdom, Ireland, Austria, Denmark, Finland, Italy, Portugal, Spain Sweden, Switzerland

Heaters which have the I_{3P} and inlet gas pressure of 37mbar marking on the data badge are suitable for use on LPG (Propane) in the following countries without modification:

United Kingdom, Ireland, France, Portugal, Spain, Switzerland

These heaters may also be used in the following countries where the propane supply pressure is 50mbar:

Austria, Germany, Netherlands, Spain

The operating pressure should be checked and reset to 25mbar during commissioning of the heaters (see page 7).

They are also suitable for use where the propane supply pressure is 30mbar:

Denmark, Finland, Netherlands and Sweden

The operating pressure should be checked and reset to 25mbar during commissioning of the heaters (see page 7).

Heaters which are to be used in **France and Belgium** with Natural Gas must be converted to I_{2E+} category heaters by changing the gas valve for a valve which includes a flow restrictor instead of a governor.

Heaters for use in **Germany** with Natural Gas require to be converted to I_{2ELL} category appliances. These are physically identical to the I_{2H} heaters except that a change of injectors is required when the appliances are to be used on group LL gases (G25 @ 20 mbar). The operating gas pressure of the burner must be reset to 15 mbar after the injectors have been changed.

NOTE: *The DR 50 and DR 80 models are not suitable for use with group LL gases.*

Heaters for use in the **Netherlands** with Natural Gas must be converted to I_{2L} category appliances. This requires that the injectors be changed to the sizes given below. The operating pressure must also be adjusted to 15 mbar after the injectors have been changed. This must be done while the heater is supplied with Natural Gas (G25) at an inlet pressure of 25 mbar.

INJECTOR SIZES

MODEL	INJECTOR SIZE I2H, I2E+ and I2ELL HEATERS (Nat. Gas - G20)		INJECTOR SIZE I2L AND I2ELL HEATERS USING GROUP L AND LL GASES (Nat. Gas - G25)		INJECTOR SIZE I3P HEATERS (LPG - Propane - G31)		NUMBER OF INJECTORS
	(mm)	Marking	(mm)	Marking	(mm)	Marking	
DR 30	2.25	A	2.5	G	1.6	D	1
DR 50	2.1	B	2.35	C	1.5	E	2
DR 60	2.25	A	2.5	G	1.6	D	2
DR 80	2.1	B	2.35	C	1.5	E	3
DR 90	2.25	A	2.5	G	1.6	D	3
DR 100	2.35	C	2.6	H	1.65	F	3
DR 120	2.25	A	2.5	G	1.6	D	4
DR 130	2.35	C	2.6	H	1.65	F	4
DR 150	2.25	A	2.5	G	1.6	D	5
DR 160	2.35	C	2.6	H	1.65	F	5

CONVERTING A HEATER FROM NATURAL GAS (I2H) TO LPG(I3P)

1) If the heater is already installed, switch off the gas and electricity and remove the heater to ground level.
2) Remove the injectors.
3) Replace the injectors with the correctly sized injectors for propane (see table).
4) Re-install heater and connect electrical and gas supply.
5) Connect gas pressure gauge to operating pressure test point on the outlet of the gas valve (see section on commissioning).
6) Switch on the heater.
7) Read the operating pressure from the pressure gauge. This must be adjusted to **25 mbar.**
8) Remove the sealing ring on the governor adjusting screw. Turn the screw clockwise to increase the gas pressure to 25mbar. (see section on pressure adjustment on page 13)
9) When the operating pressure has stabilised at **25 mbar**, switch off the heater.
10) Remove pressure gauge and replace pressure test point screw.
11) Re-seal the governor adjusting screw using the sealing ring.
12) Replace or amend the heater data badge to show that it has been adjusted for LPG.

CONVERTING A HEATER FROM LPG(I3P) TO NATURAL GAS (I2H)

1) If the heater is already installed, switch off the gas and electricity and remove the heater to ground level.
2) Remove the injectors.
3) Replace the injectors with the correctly sized injectors for Natural gas. (see table on preceeding page).
4) Re-install heater and connect electrical and gas supply.
5) Connect gas pressure gauge to operating pressure test point on the outlet of the gas valve (see section on commissioning).
6) Switch on the heater.
7) Read the operating pressure from the pressure gauge. This must be adjusted to **15 mbar.**
8) Remove the sealing ring on the governor adjusting screw. Turn the screw anti-clockwise to reduce the gas pressure to 15mbar.
9) When the operating pressure has stabilised at **15 mbar**, switch off the heater.
10) Remove pressure gauge and replace pressure test point screw.
11) Re-seal the governor adjusting screw using the sealing ring.
12) Replace or amend the heater data badge to show that it has been adjusted for Nat. gas.

CONVERTING A HEATER FOR OPERATION ON NATURAL GAS (I2E+) IN FRANCE OR BELGIUM

Follow the procedure outlined above for conversion of a heater for operation on Natural gas.

The gas valve on the heater (SIT valve model 0.830.040) must be replaced with a different valve (SIT valve model 0.830.010). This valve incorporates a gas flow adjuster instead of a governor. Follow the procedure outlined in section "Replacement of gas valve".

The operating pressure must be adjusted to **15mbar** as described above.

Seal the flow rate adjuster screw using the sealing ring.

Replace or amend the heater data badge to show that it has been adjusted.

WARNING: The inlet gas pressure must not exceed 20mbar for G20 or 25mbar for G25 on heaters equipped with flow adjuster.

CONVERTING A HEATER FOR OPERATION ON GROUP LL NATURAL GAS (I2ELL) IN GERMANY

Follow the procedure outlined above for conversion of a heater for operation on Natural gas.

Replace the injectors with the correctly sized injectors for Group LL Natural gas. (see table on page 11).

Adjust the operating pressure to 15mbar using the procedure given on the previous page.

Seal the flow rate adjuster screw using the sealing ring.

Replace or amend the heater data badge to show that the heater has been adjusted.

CONVERTING A HEATER FOR OPERATION ON NATURAL GAS (I2L) IN THE NETHERLANDS

Follow the procedure outlined the previous page for conversion of a heater for operation on Natural gas.

Replace the injectors with the correctly sized injectors for Group L Natural gas. (see table on page 11).

With an inlet gas pressure of 25 mbar, adjust the operating pressure to 15mbar using the procedure given on the previous page.

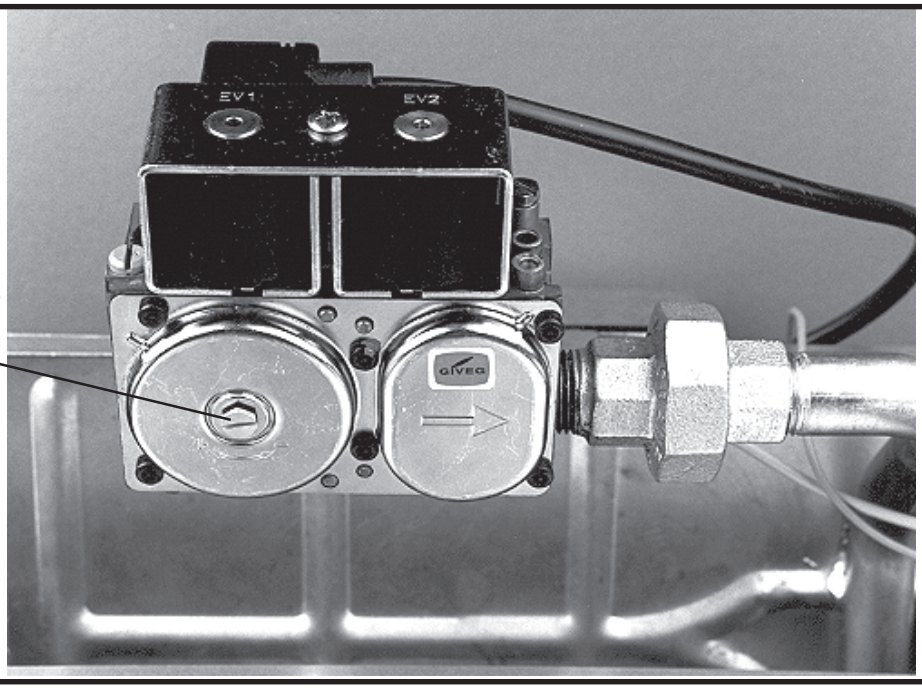
Seal the flow rate adjuster screw using the sealing ring.

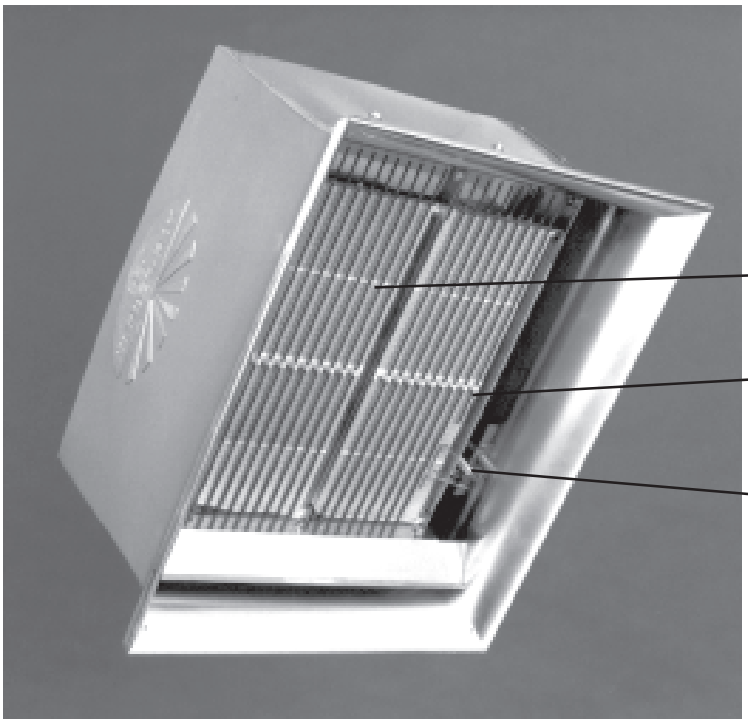
Replace or amend the heater data badge to show that the heater has been adjusted.

ADJUSTING THE GAS PRESSURE

The gas pressure is adjusted using the pressure adjusting screw on the SIT valve. On valve type 0.830.040 with governor the screw is rotated clockwise to increase the pressure. On valve type 0.830.010 with flow adjuster the screw is rotated anti-clockwise to increase the pressure.

The pressure adjusting screw is covered by a sealing ring. This must be removed prior to making any adjustments and replaced afterwards.





SPARE PARTS REFERENCE LIST

PART*

Rayhead

Rods

Gas valve model SIT 0.830.040

Gas valve model SIT 0.830.010

Gas controller model P16B

Electrode set (3 prong)

Injector 1.5mm

Injector 1.6mm

Injector 1.65mm

Injector 2.1mm

Injector 2.25mm

Injector 2.35mm

Injector 2.5mm

Injector 2.6mm

*Contact manufacturer for stock numbers

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