

FLAMRAD

GAS-FIRED INFRA-RED OVERHEAD RADIANT HEATERS

1. TECHNICAL DATA

Ratings: Natural Gas (G20 at 20mbar supply pressure)

Model	Heat Input kW	Heat Input Btu/hr	Injector Size mm dia	Pressure mbar Adjusted at Governor	Pressure ins WG Adjusted at Governor	Inlet Conn	Electricity Supply Automatic Models Only
RZ 506 MN	2 x 3kW	20,500	1.3 x 2	16.0	6.5	Rc 1/4	Manual only
RZ 514 MN	2 x 7kW	48,000	2.0 x 2	16.0	6.5	Rc 1/2	Manual only
RZ 703 MN	3.0	10,250	1.3	16.0	6.5	Rc 1/4	Manual only
RZ 703 AN	3.0	10,250	1.3	16.0	6.5	Rc 1/2	230V - 50Hz 3A
RZ 707 MN	7.0	24,000	2.0	16.0	6.5	Rc 1/2	Manual only
RZ 707 AN	7.0	24,000	2.0	16.0	6.5	Rc 1/2	230V - 50Hz 3A
RZ 711 MN	10.6	36,500	2.59	16.0	6.5	Rc 1/2	Manual Model
RZ 711 AN	10.6	36,500	2.59	16.0	6.5	Rc 1/2	230V - 50Hz 3A
RZ 713 MN	13.0	44,300	2.75	16.0	6.5	Rc 1/2	Manual model
RZ 713 AN	13.0	44,300	2.75	16.0	6.5	Rc 1/2	230V - 50Hz 3A
RZ 721 MN	21.0	72,000	2.59 x 2	16.0	6.5	Rc 1/2	Manual model
RZ 721 AN	21.0	72,000	2.59 x 2	16.0	6.5	Rc 1/2	230V - 50Hz 3A
RZ 727 MN	27.0	92,999	2.9 x 2	16.0	6.5	Rc 1/2	Manual model
RZ 727 AN	27.0	92,000	2.9 x 2	16.0	6.5	Rc 1/2	230V - 50Hz 3A

IMPORTANT:

Suffixes to Model No. A = Automatic; M = Manual Models; N = Natural Gas; P = Propane Gas

Ratings: Propane Gas (G31 at 37mbar supply pressure)

Model	Heat Input kW	Heat Input Btu/hr	Injector Size mm dia	Pressure mbar	Pressure ins WG	Inlet Conn	Electricity Supply Automatic Models Only
RZ 506 MP	2 x 3.5kW	24,000	0.9 x 2	35.0	14.8	Rp 1/4	Manual only
RZ 514 MP	2 x 7.6kW	52,000	1.4 x 2	35.0	14.8	Rp 1/4	Manual only
RZ 703 MP	3.5	12,000	0.9	35.0	14.8	Rp 1/4	Manual only
RZ 703 AP	3.5	12,000	0.9	35.0	14.8	Rc 1/2	230V - 50Hz 3A
RZ 707 MP	7.25	25,000	1.4	35.0	14.8	Rp 1/4	Manual only
RZ 707 AP	7.25	25,000	1.4	35.0	14.8	Rc 1/2	230V - 50Hz 3A
RZ 711 MP	11.0	36,500	1.65	35.0	14.8	Rp 1/4	Manual model
RZ 711 AP	11.0	36,500	1.65	35.0	14.8	Rc 1/2	230V - 50Hz 3A
RZ 713 MP	14.0	48,000	1.98	35.0	14.8	Rp 1/4	Manual model
RZ 713 AP	14.0	48,000	1.98	35.0	14.8	Rc 1/2	230V - 50Hz 3A
RZ 721 MP	21.5	72,750	1.65 x 2	35.0	14.8	Rc 1/2	Manual model
RZ 721 AP	21.25	72,750	1.65 x 2	35.0	14.8	Rc 1/2	230V - 50Hz 3A
RZ 727 MP	29.0	99,000	1.95 x 2	35.0	14.8	Rc 1/2	Manual model
RZ 727 AP	29.0	99,000	1.95 x 2	35.0	14.8	Rc 1/2	230V - 50Hz 3A

Manual Model Heaters:

The pilot flame must be adjusted to provide a flame length of 25mm (1 inch) on both natural gas and propane gas
This gives a heat input to the pilot of 0.3kW on natural gas and 0.38kW on propane gas.

MOUNTING THE HEATERS

The heaters must be mounted to give the following clearances from combustible materials

Model	mm Above	Inches Above	mm Behind	Inches Behind	mm At Sides	Inches At Sides	mm Below	Inches Below
RZ 506 & 514 RZ 703 & 707	1000	40	65	25	70	27	1500	60
RZ 711	1000	40	80	31	80	31	1800	71
RZ 713	1000	40	90	36	90	36	2000	79
RZ 721	1000	40	1200	48	1200	48	2500	99
RZ 727	1000	40	1500	60	1200	48	3000	118

If the distance from combustible materials quoted above cannot be achieved then the exposed areas of combustible materials must be protected by a non-combustible insulating material in accordance with the local fire precautions regulations.

Heater Mounting Heights - Minimum Distances from Floor

Important: Manual models may only be mounted at an angle of 45°

Model	15° Angle metres	15° Angle feet	45° Angle metres	45° Angle feet
RZ 506	N/A	N/A	2.8 - 3.4	9 - 11
RZ 514	N/A	N/A	3.0 - 4.0	9'6" - 13
RZ 703	Not Recommended	Not Recommended	2.2 - 3.2	7 - 10'6"
RZ 707	Not Recommended	Not Recommended	2.8 - 3.6	9 - 11'6"
RZ 711	Not Recommended	Not Recommended	4.0 - 4.2	13 - 14
RZ 713	4.8 - 5.8	16 - 19	4.2 - 4.9	14 - 16
RZ 721	5.8 - 7.6	19 - 25	5.1 - 6.1	17 - 20
RZ 727	7.6 - 10.6	25 - 35	6.1 - 7.2	20 - 24

Overall Dimensions

Model	Length	Width	Height	Weight
RZ 506	330mm (13")	470mm (18½")	445mm (17½")	5kg (11lbs)
RZ 514	500mm (19¾")	605mm(23.13/16")	480mm (18¾")	12.5kg (27½lbs)
RZ 703 Auto	470mm (18½")	245mm (10")	185mm (7¼")	3.0kg (6.6lbs)
RZ 703 Manual	340mm (13¾")	245mm (10")	305mm (12")	3.0kg (6.6lbs)
RZ 707	695mm (27½")	280mm (11")	254mm (10")	7kg (15lbs)
RZ 711	910mm (36")	280mm (11")	254mm (10")	9kg (19lbs)
RZ 713	1090mm (43")	280mm (11")	254mm (10")	10kg (23lbs)
RZ 721	1491mm (59")	280mm (11")	254mm (10")	15kg (34lbs)
RZ 727	1895mm (74½")	280mm (11")	254mm (10")	17kg (39lbs)

Important

These appliances must be installed and serviced by a competent person in accordance with the laws and regulations currently in force in the country of destination and with these instructions.

In the UK the installation must be in accordance with the relevant British Standards and Codes of Practice, the Gas Safety (Installation and Use) Regulations 1994, the Institution of Electrical Engineers Regulations for Electrical Installations, the Building Regulations, the Building Standards (Scotland) (Consolidation) Regulations, the Electricity at Work Act, the Health & Safety at Work Act 1974 and the Fire Precaution Act.

Total compliance with all regulations is a prerequisite of our warranty.

Before commencing installation check that the local distribution conditions, the nature of the gas, the gas pressure and the adjustment of the appliance are compatible with the details given on the appliance's data plate.

Ventilation

Air for combustion is taken from the area by the venturi effect of the heater's injector. The air for combustion should be uncontaminated and the minimum air requirement for the heaters should comply with those given in BS 6896.

The following information may be used as a guide:

- a) Natural ventilation (to be fitted at high and low level). When the air change range is less than 37.5m³/h/kW of the total rated heat input, either:
 - 1) 1.4cm² for each 1m³/h/kW below 37.5m³/h/kW
 - 2) 52cm² per hour per kW.
- b) Mechanical ventilation: minimum proven airflow 37.5m³/h/kW of total rated heat input.

Warning

Flamrad heaters must not be sited in areas prone to draughts and the ventilation of the area to provide fresh air should not cause draughts in the vicinity of the heaters.

Description of the Heater

Flamrad heaters are supplied fully assembled and tested.

The main component of the heater is the all steel, acid resistant, vitreous enamelled burner body with its integral venturi tube and connecting piece with the injector. The indented face ceramic burner plaques, which attain a surface temperature in excess of 900°C, are protected by high heat resistant metal heat enhance panels that increase the efficiency of the radiated heat effect. Each burner is fitted with a robust diecast aluminium sectional heat reflector.

Ignition of the burner is by spark electrode on the automatic models and flame monitoring and safety is by an ionization probe electrode. On manual models flame safety is by thermocouple and thermo-electric valve and ignition by means of a permanent pilot burner.

On automatic models gas control, ignition and flame safety is by means of a Honeywell combined valve and ignition system or, alternatively, by a Pactrol flame rectification system operating via a gas safety solenoid valve.

On manual models gas control is by a remote operated gas tap operating through a thermo-electric safety valve. Ignition of the main burner is from a permanent pilot burner.

The burner, heat reflector and gas control system are completely assembled as an integral unit ready for installation and connection to the gas and electrical supplies.

Installation

Mounting

Flamrad heaters may be mounted using the optional wall brackets bolted to the heater's mounting brackets, located at the top of the burner bodies. These wall brackets will give an angle of 45° when affixed to a vertical surface. The wall brackets **must** be ordered separately. Alternatively all models may be suspended by chain or metal strips from roof trusses and fixed to the heater's mounting brackets.

Note

Models 506 and 514 **must** be fitted so that their twin burners are mounted at 45° to the horizontal.

Models 703A, 707A and 711A **must** be fitted at an angle of 45°.

Models 713A, 721A and 727A **may** be fitted at 15° or 45°.

Manual models **must** be fitted at an angle of 45°.

The user instructions should be left at low level close to the operating chains or switch.

Gas Supply

The inlet connection to each natural gas Flamrad heater is by means of a female thread into the heater's gas governor. On propane gas heaters the inlet connection is by a male thread.

It is recommended that the final connection to each heater is made of soft copper tube or an appropriate flexible connection to BS6501 (minimum acceptable quality type B class 1). The pipe should be such that with the nominal load of the total installation the minimum natural gas pressure of 20mbar (8"WC) or 37mbar (14.8"WC) propane gas is available at the inlet to each heater. An isolating gas tap shall be fitted in the gas supply adjacent to each individual heater to allow for servicing.

Important

The complete installation must be tested for gas soundness.

Electrical Supply - Automatic Models only

230V - 50Hz fused at 3A for each individual heater.

This appliance must be earthed

The mains inlet control switch for the whole installation must be fitted at low level for the user to operate and the user operating instructions must be located adjacent to this switch. This switch shall have a contact separation of at least 3mm on all poles. An isolating electrical switch shall be fitted in the supply adjacent to each individual heater to allow servicing. The final 750mm (30") of supply cable to each heater shall be made in heat resistant three core insulated cable capable of withstanding 70°C (BS6500 Table 12). Ensure that the cable does not touch the heater and that its run is clear of the heater's products of combustion or where its temperature limits may be exceeded. The cable must be adequately secured into the cord anchorage to eliminate any strain upon the terminal connections.

Observe the IEE Wiring Guidelines

Commissioning

A complete inspection of the installation must be carried out to ensure that all gas and electrical supplies are correctly located and supported and that the installation has been installed in accordance with all the current regulations. Purge all pipework and test for soundness at all joints. Open all gas valves ensuring that the heater's ignition and flame sensing electrodes or pilot burner and thermocouple - on manual models - are correctly positioned. Set the thermostats and time switches to call for heat.

Testing

Turn off the gas supply to the heater at the heater's isolating tap and the electrical supply at its isolating switch. Connect a "U" tube pressure gauge to the heater's pressure test nipple. Turn on the gas supply and switch on the electrical supply to the heater or light the pilot burner. Observe that the lighting sequence is carried out. **See operating sequence below.** Check the heater's gas joints for soundness using a leak detection fluid and set the gas pressure by adjusting the heater's gas pressure regulator (natural gas models) or have the supply gas pressure regulator adjusted for propane supplies. **See specification table.** On automatic models with a Honeywell control in a propane gas installation the gas pressure regulator which is integral with the Honeywell control must be screwed fully home. In these cases a pressure of 35mbar (14"WC) should be achieved at the heater's pressure test point.

Note: The gas pressure must be adjusted with **all** the heaters in the installation operating.

Turn off the heater, disconnect the pressure gauge, reseal the pressure test nipple and test for soundness.

Test and adjust all the heaters in the installation.

Operating Sequence

Automatic Models

Ignition of the burner is initiated by energising the heater's control unit by switching on the mains electrical supply.

Pactrol Unit

The sequence starts with a purge time of 18 seconds. If a flame is detected by the flame sensor at this stage the Pactrol control will **go straight to lock-out.**

If a flame is **not** detected the unit will start the spark ignition and open the gas solenoid valve.

When the burner flame has been established the sparking will stop and the heater will operate as normal.

If a flame has not been established after a 24 second period of ignition sequence the Pactrol will close the gas solenoid valve, stop the sparking ignition sequence and go to **lock-out.**

The Pactrol can only be reset from **lock-out** by switching OFF the electrical supply and then switching it back ON.

Honeywell Unit

Generally speaking the sequence of operations for the Honeywell control unit is the same as those for the Pactrol.

Ignition normally takes 2½ to 3 seconds to commence following switch-on. The burner should ignite within a further 5 seconds and the ignition spark will continue for a further 9 seconds. Should a burner flame not be detected then the ignition will spark for about 26 seconds and then the unit goes to lock-out. Following a lock-out wait for 15 seconds before attempting a second switch on.

Operating Sequence

Manual Models

Single and In-Line Burner Models

Turn on the gas supply at the appliance isolating tap.

At the heater press in the button of the flame safety valve at the same time applying a lit taper or match to the pilot burner. When the pilot burner is alight continue to press the button on the flame safety valve for a further 20 - 30 seconds to establish the pilot flame. The flame should now stay alight when the button is released. Should the pilot's flame go out repeat the procedure, this time depressing the button for a longer period after lighting the pilot flame. If the pilot flame refuses to establish call a service engineer.

"V" Twin Burner Heaters - Models 506 and 514

The models 506 and 514 manual heaters are fitted with two flame safety valves in series in the heater's gas supply. Each should be operated individually in order to provide a gas supply to both burners.

Press in the button of the uppermost flame safety valve and apply the lighted taper to the appropriate pilot burner - observe to which pilot burner the flame safety valve is connected. Only after this pilot has been established can the second (lower) flame safety valve be activated.

Then press in the button of the second flame safety valve and light its pilot burner.

The heater can now be operated in the normal way; the twin burners operating as a single unit.

With the pilot flames established, ignition to the main burner is achieved by pulling on the ON length of the chain attached to the gas tap on the heater. **Do not operate this whilst standing close to the heater.**

Pulling the OFF length of the chain will turn the heater off but will leave the pilot burner alight ready for operating the heater when heat is called for later.

If the pilot burner goes out then gas cannot pass to the main burner until the pilot is re-established.

When heat is not required for long periods, over a holiday for example, turn off the gas at the heater's isolating tap. This will turn the gas off to both the main and pilot burners.

Servicing Instructions

Routine Servicing

Regular servicing of the heaters is essential to maintain their efficiency. This should be carried out annually or more often if the heaters are sited where there are dusty conditions.

Routine servicing may be carried out with the heater in situ as follows:

- a) **Isolate the heater from the gas and electrical supplies.**
- b) Blow compressed air across the face of the plaques.
- c) Blow compressed air into the burner's venturi opening.
- d) Examine the spark and detection electrodes for signs of decay or ceramic cracks. (Automatic Models).
- e) Turn on the gas and electrical supplies to the heater and check that it ignites correctly.
- f) Check and if necessary re-set the gas pressure.
- g) Check the operation of the pilot burner (manual models) and the state and position of the tip of the thermocouple. Check the tightness of the thermocouple's connection on the rear of the flame safety valve - this should be finger tight plus one half turn with a spanner. To overtighten will distort and destroy the connection.
- h) Check the ease of rotation of the ON/OFF cock on manual models. Dismantle and regrease the tap if necessary.
- j) Check the chain lever arm and adjust if necessary.
- k) Check ALL electrical leads and cable for wear, etc.

Fault Finding: The Operation of the Control Box - Automatic Models

After the heater is switched on there is a short delay whilst the control box checks there is no detected flame signal. The gas solenoid valve is then opened and the ignition electrode sparks rapidly. As soon as the flame detection electrode senses there is a flame on the surface of the burner the spark ceases and the control box continues to monitor the burner flame. If there is a subsequent loss of flame the control box immediately shuts off the gas solenoid valve and goes to lock out. It is then necessary to switch off the electrical supply to the heater and wait a few moments before switching it back on to re-start the ignition cycle.

If the heater fails to ignite then the following checks should be carried out:

Isolate the electrical supply to the heater.

- a) Check that gas is available at the heater at the required gas pressure.
- b) Check and tighten the electrical connections at the electrodes and control box.

Switch on the electrical supply to the heater, proceeding with care to the next stage.

- c) Check that the ignition spark electrode and flame detection electrode are in the correct position with their "sensing gaps" correctly set (3 - 4 mm). Check that their ceramic housing is in good order with no breaks or cracks. Check the intensity of the spark between the ignition electrode and its surrounding target.
- d) Ensure that the special cables connecting both electrodes to the control box are in good repair and that during the ignition cycle there are no stray sparks emanating from the ignition electrode's cable to any part of the heater.
- e) Should the ignition electrode spark and the burner ignite but fail to stay alight the polarity of the electrical supply may be incorrect. If the polarity has been reversed then the flame detection electrode will fail to detect the burner's flame.

If the above items are correct then the fault lies in the control box or, in the case of a Pactrol control, in the solenoid.

- f) If the igniter still does not spark replace the control box.
- g) If the burner ignites but the spark continues until the control goes to lock out then replace the control box
- h) Pactrol unit: if the solenoid valve fails to open the fault may lie with either the Pactrol unit or the solenoid actuator. Check the actuator first.
- j) Honeywell unit: if the built in solenoid valve fails to open replace the Honeywell unit.

Replacement of these parts is detailed under "Replacement of Components"

Fault Finding - Lightback. Automatic and Manual Models

Indications:

- a) Popping noise from the heater when lit.
- b) No visible flame or burning on the plaque face.
- c) A flame can be seen at the injector within the mouth of the venturi.

Causes

- a) The temperature of the plaque when lit is too high - possibly caused by too high a gas pressure. Reset the gas pressure.
- b) Faulty seal of the burner plaques to the burner's body.
- c) Broken or cracked plaque.

To rectify faults b) or c) it is necessary to remove the ceramic plaques from the body of the burner. The procedure to be carried out is detailed under "Replacement of Components". However, this type of repair must be carried out at the workbench and not with the heater in situ.

Replacement of Components

Removal and Replacement of the Burner's Ceramic Plaques. (See Drawing No.1)

When ordering replacement plaques include replacement plaque retention strips and new heat resistant felt strips on your order as most likely they will also need to be replaced.

Caution!

Under no circumstances should any attempt be made to remove or replace the ceramic plaques with the heater in its operating position.

Isolate the heater from the gas and electrical supplies.

- 1) Isolate the gas and electrical supplies to the heater by switching off the electrical supply at the heater's isolating switch and turning off the gas supply at the isolating tap situated before the heater's governor or control box.
- 2) Disconnect the gas supply at the union before the gas governor (natural gas); control box or flame safety valve (propane gas heater).
- 3) Disconnect the electrical supply lead (three core cable) from the control box (usually by unplugging the three-pin duraplug) and secure it in a safe position close to the heater - but not on the heater.
- 4) Remove the complete heater from its mounted position and place it on a workbench, burner plaques up.
- 5) Disconnect at the electrodes the special leads to the ignition and flame sensing electrodes. Unscrew the dome headed nuts (e) securing the heat regain panels (expanded metal - (f on Drawing No.1)) to the burner and lift off the stainless steel retaining strips (d), the locating strips and the heat regain panels.
- 6) Turn the heater over with the plaques now facing the bench top. Remove the 3 screws securing the burner's injector spider to the venturi mouth and pull the spider clear of the burner. Repeat on a twin-burner model.
- 7) Unscrew each of the screws securing the burner to the diecast reflector and slide the burner body clear. Place the burner plaques on a clean surface. (If the heater is a dual burner type also remove the cross over bridge - see Drawing No.3)
- 8) With the burner body face down (plaques to the bench surface) use a small screwdriver to prise the bent overlugs projecting through the burner's flanges from the plaque retaining strips to an upright position. Hold the burner body and lift upwards. The plaques and retaining strips should fall clear from the burner.
- 9) Turn the burner body over, gently blow or brush the interior clean taking care not to damage the ceramic felt strips. Replace them as a complete set if they are damaged.
- 10) Carefully set the replacement plaques in position ensuring that they bed onto the felt strips with no gaps between the individual plaques. Press new plaque retaining strips into place with the lugs projecting through the holes in the burner's flanges.
- 11) Carefully turn the burner over onto a clean surface and bend back the lugs to secure the plaque retaining strips.

- 12) Place the burner into position on the diecast reflector and secure with the screws. Refit the cross-over bridge if fitted. Replace the injector spider and secure using the three screws, ensuring that the injector is centralised in the venturi mouth. Refit the heat regain panels and secure the retaining strips using the dome headed nuts. Ensure that the heat regain panels will slide slightly laterally along the burner to allow for heat expansion. Refit the ignition electrode and flame sensing electrode leads. Check the electrodes for correct positioning.
- 13) Replace the heater in its mounted position and reconnect the gas supply pipe at the inlet union. Reconnect the mains electrical supply to the control box.
- 14) Follow the heater operating instructions to commence the ignition cycle.

Check all gas joints for leaks.

Replacement of the heater's control. Automatic models

Warning: Isolate the heater from the gas and electrical supplies.

Honeywell Control

- 1) Isolate the gas and electrical supplies to the heater by switching off the electrical supply at the heater's isolating switch and turning off the gas supply at the isolating tap situated before the heater's governor or control box.
- 2) Disconnect the electrical supply lead (three core cable) at the duraplug from the control and secure it in a safe position close to the heater.
- 3) Disconnect the special leads to the ignition and flame sensing electrodes at the control and secure them in a safe place close to the heater.
- 4) Disconnect the control from the gas supply - use a second spanner to prevent turning adjacent and connecting pipework or connections - at both the inlet and outlet of the control. Remove the control.
- 5) Fit the replacement control. Attach the special leads to the ignition and flame sensing electrode connections on the control. Reconnect the mains electricity cable (three core cable).
- 6) Attach a gas pressure gauge (water gauge) to the outlet pressure test nipple on the control.
- 7) Turn on the gas supply at the heater's isolating gas tap and switch on the electrical supply at the heater's isolating switch. Begin the ignition sequence.
- 8) Check and adjust the gas pressure at the heater by adjusting the control's gas governor - see specification table for the correct pressure. On propane gas installations the governor screw must be screwed fully home. A reading of 35mbar gas pressure (14" WC) is acceptable.
- 9) **Check all gas joints for leaks.**
- 10) Remove the gas pressure gauge, tighten the screw in the pressure test nipple. Check for gas leak.

Pactrol Control

- 1) Isolate the gas and electrical supplies to the heater by switching off the electrical supply at the heater's isolating switch and turning off the gas supply at the isolating tap situated before the heater's gas pressure regulator or control box.
- 2) Disconnect the electrical supply lead (three core cable) from the control box by unplugging the duraplug and securing it in a safe position close to the heater.
- 3) Locate the two slotted head-retaining pins on the top of the Pactrol control box and using a suitable screwdriver turn anti-clockwise until the retaining pins become free from the base of the control box.
- 4) This control box is the push-in type so gently ease the box from its base and remove.
- 5) Fit the replacement Pactrol control box ensuring that the retaining pins are correctly located and using a screwdriver turn the retaining pins clockwise until the control box is secure. Do not overtighten.
- 6) Reconnect the electrical supply lead (three core cable) to the control box. Switch on the electrical supply at the heater's isolating switch and turn on the gas supply at the isolating tap.
- 7) Follow the heater operating instructions to commence the ignition cycle.

Replacement of the Gas Solenoid Valve or Gas Pressure Regulator (Pactrol Control Only)

- 1) Isolate the gas and electrical supplies to the heater by switching off the electrical supply at the heater's isolating switch and turning off the gas supply at the isolating tap situated before the heater's gas pressure regulator.
- 2) Disconnect the three leads from the solenoid valve and secure in a safe place.
- 3) Disconnect the solenoid valve (or gas pressure regulator) from the heater's pipework - use a second spanner to prevent turning adjacent pipes or connections.

- 4) Fit the replacement solenoid (or gas pressure regulator) ensuring that the gas flow direction arrow is pointing towards the heater.
- 5) Reconnect the three leads to the connections on the solenoid valve. Switch on the electricity supply to the heater at the isolating switch and turn on the gas supply at the isolating tap.
- 6) Fit a gas pressure gauge (water gauge) to the pressure test nipple situated close to the heater's injector.
- 7) Follow the heater operating instructions to start the ignition sequence.
- 8) Check and adjust the gas pressure (see Technical Specification for the correct gas pressure). Remove the gas pressure gauge and refit the pressure test nipple screw.
- 9) **Check all gas joints for leaks.**

Replacement of the Heater's Controls - Manual Models

Thermocouple Replacement

- 1) Unscrew the nut at the rear of the flame safety device to disconnect the thermocouple.
- 2) Remove the hex head screw securing both halves of the pilot burner bracket. Remove the outer half of the pilot burner bracket.
- 3) Remove the thermocouple from the pilot burner
- 4) Remove the two hex nuts from the tip of the thermocouple and place them on the new thermocouple ensuring that the lower nut will be below and the upper nut above the pilot burner bracket.
- 5) Place the thermocouple in position in the pilot burner and adjust the nuts so that the thermocouple tip will be in the pilot's flame.
- 6) Replace the outer half of the pilot burner bracket and secure with the hex head screw.
- 7) Bend the thermocouple phial gently (about 25mm radius) and fit the thermocouple's contact end in the flame safety device.
- 8) Secure the contact end in the FSD by screwing in the nut finger tight plus a half turn using a spanner - to overtighten will distort the connection.

To Grease the ON/OFF Gas Tap

Isolate the heater from the gas supply

- 1) Turn the tap to the OFF position - fully clockwise.
- 2) Remove the split pin securing the operating arm to the gas tap spindle and remove the operating arm from the gas tap.
- 3) Using two spanners - one to hold the tap spindle in place - remove the hex nut from the rear of the tap and pull the cam washer from the tap.
- 4) Withdraw the tap plug from the tap body. Note the position of the hole in the plug relative to the tap body.
- 5) Clean the plug and interior of the tap body using a clean lint-free cloth and a suitable grease solvent. Wipe the plug and body dry, ensuring that there are no hard deposits of old grease in the plug's hole or in the body.
- 6) Regrease the plug sparingly using a high temperature gas tap grease. Replace the plug in the tap body and rotate it several times to distribute the grease. Withdraw the plug and if necessary remove all excess grease from the hole.
- 7) Refit the plug, cam washer and hex nut to secure the plug in its correct position. Tighten the hex nut.
- 8) Refit the operating arm and secure it with the split pin.

Turn on the gas supply and check the joints for gas leaks.

To replace the ON/OFF gas tap.

Isolate the heater from the gas supply.

It is recommended that this operation is carried out on a workbench and not with the heater in situ.

- 1) Disengage the heater from the gas supply at the gas pressure regulator inlet.
- 2) Remove the split pin and the operating arm from the gas tap spindle.
- 3) Disengage the thermocouple at the connection with the flame safety device.
- 4) Unscrew the compression joint nut at the flame safety device - pilot burner feed and withdraw the pilot supply tube.
- 5) Hold the body of the ON/OFF gas tap securely and unscrew the pipe fitting connecting the gas pressure regulator.
- 6) Unscrew the gas tap from the heater's gas inlet.

- 7) Using a suitable thread sealant fit the new gas tap and replace the flame safety device/pressure regulator assembly.
- 8) Reconnect the thermocouple and the pilot supply tube to the flame safety device.
- 9) Make the gas supply to the heater at the gas pressure regulator.

Turn on the gas supply to the heater and leak test all joints.

The Flame Safety Device (Valve) is not serviceable and should be replaced if faulty.

- 1) Remove the flame safety device by following the same procedure as for gas tap replacement.

Pilot Burner

NOTE: The pilot burner flame length is adjustable - removing the hex plug from the pilot burner body will reveal the slotted head of the pilot flame adjusting screw. Turn **clockwise** to reduce the flame length and **anti-clockwise** to increase it.

To Clean or Replace the Pilot Burner

- 1) Slightly slacken off the lower hex nut on the thermocouple tip.
- 2) Remove the hex screw securing the outer half of the pilot burner bracket and remove the outer half of the bracket.
- 3) The pilot burner head may now be removed from the bracket.
- 4) Clean the pilot burner head by blowing through the two flame ports and the body tube. If there is an excessive build up of dirt then replace the body.
- 5) Clean the pilot burner injector by blowing - **do not poke**.
- 6) Replace the pilot burner head in the correct position in the pilot bracket, ensuring that the aeration slide is in the **open** position. Also ensure that a flame port points towards the thermocouple tip and the other port points towards the heater burner.
- 7) Replace the outer half of the pilot burner bracket - with the rectangular opening over the aeration slot in the pilot burner body tube - and fix using the hex screw.
- 8) Tighten the lower hex nut on the thermocouple tip.
- 9) Check the operation of the pilot burner, the flame position on the thermocouple and the ignition of the heater burner.

Replacement of the Heater's Injector (see Drawing No.2)

Caution

Under no circumstances should the injector be replaced with the heater in its operating position.

Refer to the technical specification chart for details of the correct injector size.

If the injector is blocked for any reason it should not be cleared by poking wire or drills, etc., into the orifice.

If the blockage cannot be cleared by blowing then replace the injector by a new one.

- 1) **Isolate the gas and electrical supplies to the heater by switching off the electricity supply at the heater's isolating switch and turning off the gas supply at the isolating cock situated before the heater's governor or control box.**
- 2) Disconnect the gas supply at the union **before** the gas pressure regulator (natural gas) or control box (LP gas and Honeywell Control).
- 3) Disconnect the electrical supply lead (three core cable) from the control box and secure it in a safe place close to the heater - but **not on** the heater.
- 4) Remove the complete heater from its mounted position and place it, burner plaques down, on a workbench.
- 5) Unscrew the three screws securing the injector spider to the bell mouth opening on the burner and **pull** the spider and gas train clear from the burner. **On dual in-line burner heaters** also disconnect one of the connecting tube's unions to enable the second spider to be withdrawn from the burner.
- 6) Using a spanner hold the injector lock-nut in position and with a second spanner unscrew the injector from its carrier.
- 7) Select the correct replacement injector (see the Technical Specification Chart) and screw it into position. **Do not overtighten.**
- 8) Re-assemble the injector spider ensuring that the injector is centralised in the venturi mouth. Reconnect the connecting tube's union on a dual burner heater. Replace the heater in its mounted position.
- 9) Reconnect the heater to the gas supply. Reconnect the electricity supply cable to the control box. Switch on the electrical supply to the heater at the isolating switch and turn on the gas supply at the isolating tap.
- 10) Follow the heater operating instructions to start the ignition sequence.
- 11) **Check all gas joints for leaks**

Replacement of the Heater Cross Igniter Bridge (See Drawing No.3) Dual In-line Burner Heaters.

The cross igniter bridge has the effect of drawing over the gas flame from one burner to the other and is fitted only on dual in-line burner heaters.

Under no circumstances should this replacement be carried out with the heater in its operating position.

- 1) Isolate the gas and electrical supplies to the heater by switching off the electrical supply at the heater's isolating switch and turning off the heater's gas supply at the isolating tap situated before the heater's gas pressure regulator.**
- 2) Carry out procedures 2 to 6 as in plaque replacement. Remove the fixing screws from the bridge and replace the bridge. Secure it into position using the screws. Refit the heat regain panels. Carry out procedures 14 and 15 plaque replacement.**

Test all gas joints for leaks.

Spare Parts List

The following is a list of parts that may be required for repairing or servicing **Flamrad** heaters.

In order to obtain the correct part for your particular heater please quote all the details on the heater's data plate affixed to the end of the heater reflector.

Part Number Description

Honeywell controller
Pactrol control box
Solenoid valve
Gas pressure regulator ¼
Gas pressure regulator ⅜
Gas pressure regulator ½
Ignition electrode
Flame sensing electrode
Flame safety device - manual models
ON/OFF gas tap ½" bsp
ON/OFF gas tap ⅜" bsp
Manual operating arm for ½" tap
Manual operating arm for ⅜" tap
Pilot burner complete - manual models
Pilot burner shield - manual models
Cross lighting bridge

45° wall brackets

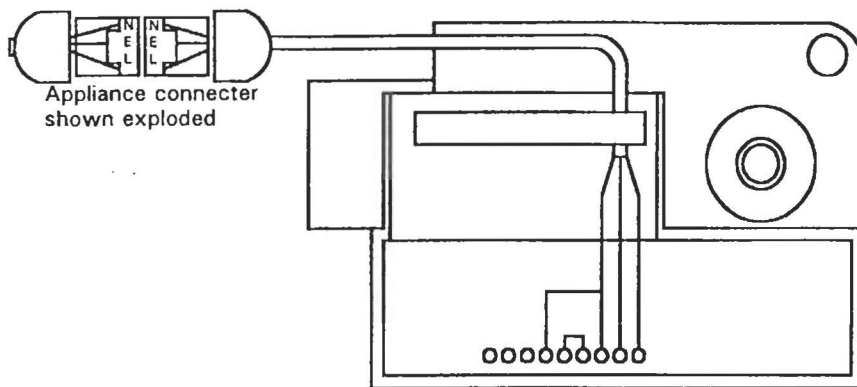
The following parts are supplied as kits:

Model Number Replacement plaques, sealing strips and fixing strips
Model Number Replacement heat enhancer expanded metal panels

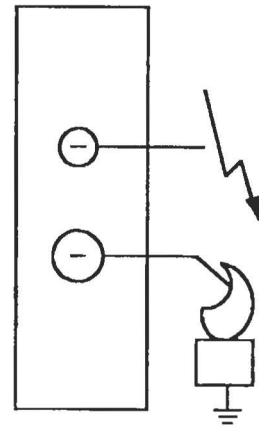
For replacement injectors please quote the model number of the appliance and the size as listed in the specification table.

Reznor UK Limited
Park Farm Road, Folkestone, Kent CT19 5DR
Tel: 01303 259141 Fax: 01303 850002

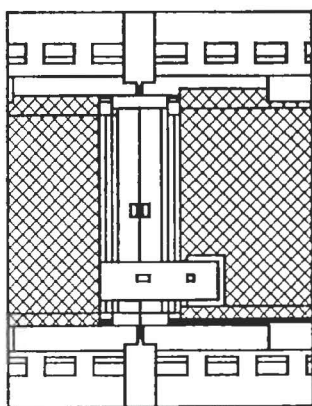
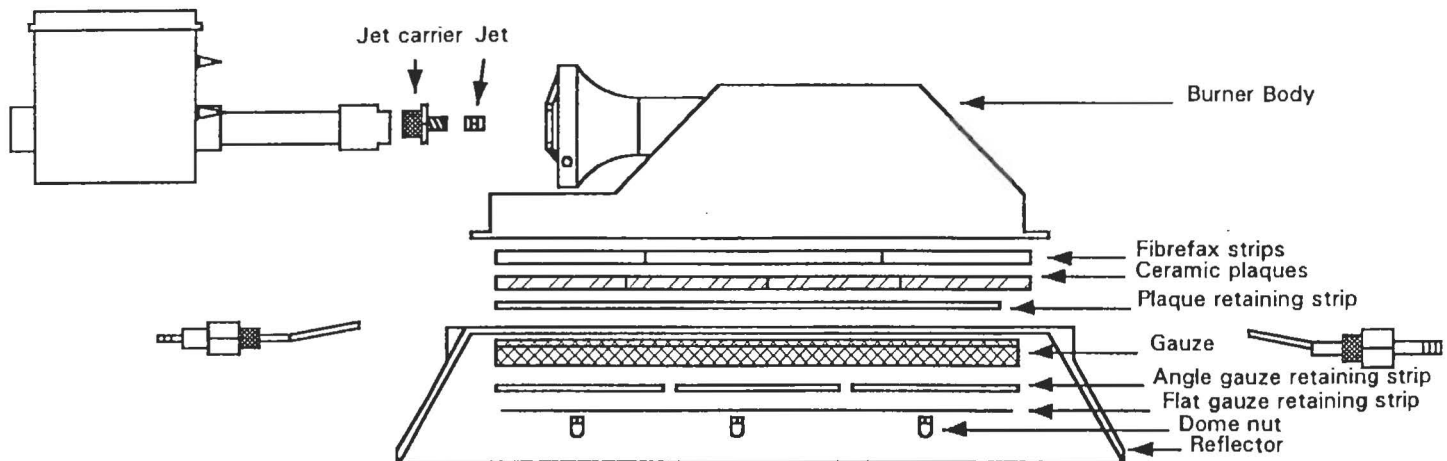
Wiring diagram for Honeywell
S4565P controller with VK4105A valves



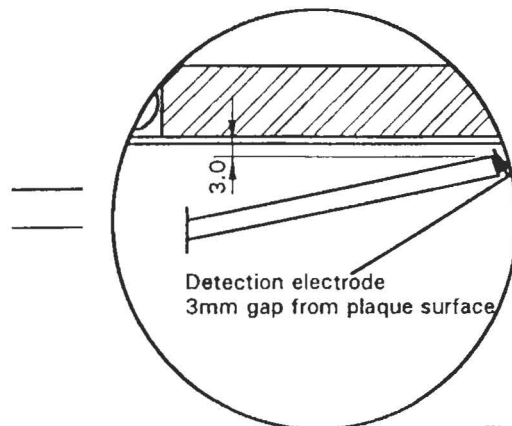
Side connections



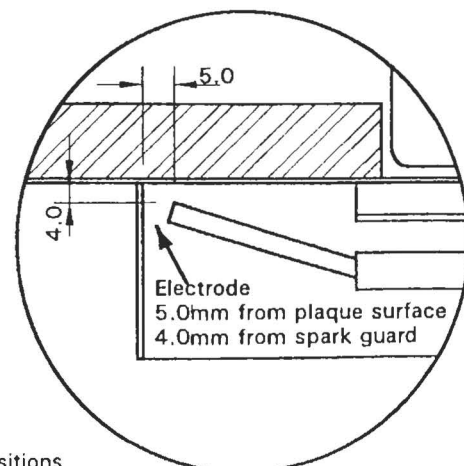
Heater components



Position of crossover bridge



Detection electrode
3mm gap from plaque surface



Electrode positions