

OPTIMA HIGH EFFICIENCY (HE) AND SUPER EFFICIENCY (SE) OVERHEAD RADIANT TUBE HEATERS

SERVICE & COMMISSIONING

CONTENTS:

- 1 RECOMMENDATIONS
 - 2 BURNER ASSEMBLY PARTS
 - 3 COMMISSIONING PROCEDURE
 - 4 LOCKOUT
 - 5 SETTING BURNER PRESSURE
 - 6 FAULT FINDING GUIDE
 - 7 FINAL CHECKS
 - 8 ROUTINE MAINTENANCE
 - 9 REMOVAL OF COMPONENTS
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1 RECOMMENDATIONS

Under normal working conditions it is recommended that the Optima Heater is regularly maintained to ensure long life and efficient operation. Normally, maintenance is required only once per year. In dusty or dirty conditions more frequent maintenance is desirable. Servicing work must be carried out by a qualified gas service engineer.

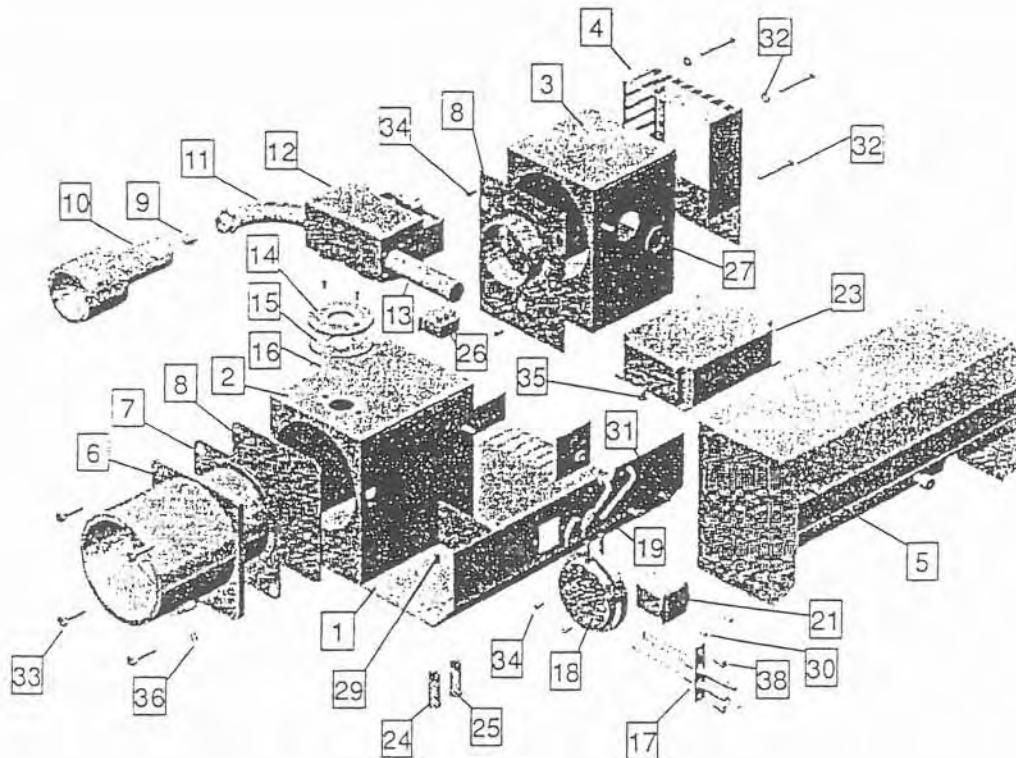
IMPORTANT: -

When maintaining or servicing the Optima Series heater:-

- (a) Never rest anything, especially ladders against heater.
- (b) Isolate gas and electrical supplies before commencing any service work.

2 BURNER ASSEMBLY PARTS

FIG. 1 BURNER ASSEMBLY



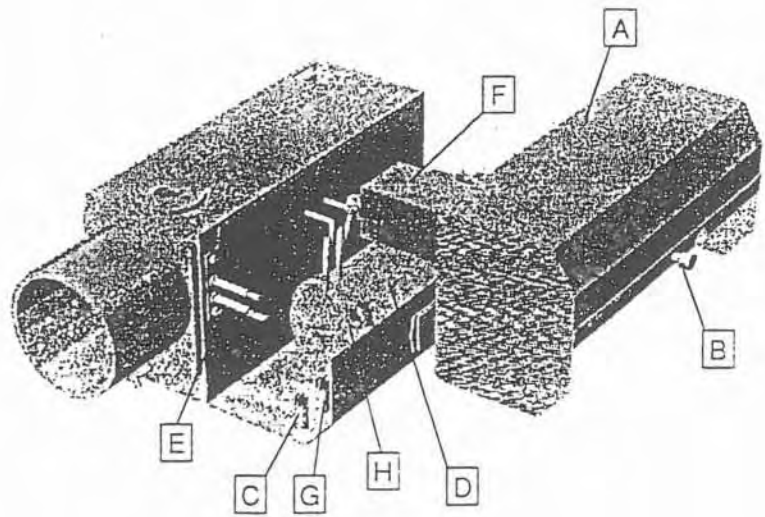
NB:- Wiring harness not shown

ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Burner Base Plate	14	Inspection Window Housing	27	Grommet
2	Combustion Chamber	15	Inspection Gasket	28	Gasket
3	Air Intake Chamber	16	Micaglass	29	Earth Stud
4	Air Intake Grille	17	Electrode Assembly	30	Pop Rivet 1/8
5	Lid	18	Pressure Switch	31	Set Pin M4 x 6
6	Support Casting	19	Tubing (Silicone)	32	Set Pin M5 x 60
7	Cross Current Deflector	20	Impulse Line Stud	33	Set Pin M6 x 20
8	Orifice Plate - See Tech Data Sheet	21	Mains Input Socket	34	Self Taper No.6 x 3/8
9	Injector - See Tech Data Sheet	23	Sequence Controller	35	Push Fastener
10	Burner Head	24	Red Neon Light	36	Grubscrew
11	Flexible Gas Connection	25	Amber Neon	37	M5 Retainer Washer
12	Gas Valve	26	Fan Plug	38	Set Pin M4 x12
13	Gas Inlet Pipe				

3 COMMISSIONING PROCEDURE

- 3.1 Inspect installation and ensure that it has been carried out in accordance with the installation instructions.
- 3.2 Ensure that electrical and gas supplies are isolated.
- 3.3 The gas supply should be purged and tested for soundness in accordance with the British Standards BS6891:1988, EGIM/16, BCG Report IM/2, and any other British Standard and Codes of Practice.
- 3.4 Open isolating valve. Remove burner lid by unlocking retractable fastener (B), see Fig 3. Ensure all internal components and connections are securely made.
- 3.5 Switch on the electrical supply to the heater and observe the correct start up sequence as follows:-
- 3.6 The (red) mains lamp (C) will illuminate. The vacuum switch checking relay (inside sequence controller) (D) will 'pull in' and the ID fan will start to run.
- 3.7 The air pressure switch (H) will prove that a vacuum is present.
- 3.8 Safe start checks are carried out automatically and a purge period of approximately 9 seconds will commence.
- 3.9 At the end of the purge period the ignition sequence will commence.
- 3.10 The spark ignition will be energised producing a spark at the ignition electrode (E). The gas shut off valve (F) will be energised at the same time.
- 3.11 If ignition is successful the flame is detected by the flame sensing probe (E) and the ignition spark switched off.
- 3.12 The 'Burner On' (amber) lamp (G) indicates that the gas safety control valves are energised.

FIG. 3 COMMISSIONING



A	Burner Lid	E	Electrode Assembly
B	Retractable Fastener	F	Multi Functional Gas Valve
C	Red Mains-On Lamp	G	Amber Burner-On Lamp
D	Sequence Controller	H	Air Pressure Switch

4 LOCKOUT

- 4.1 If ignition is unsuccessful the gas safety control valve is closed and the spark ignition de-energised after approximately 5 to 7 seconds.
- 4.2 After an unsuccessful ignition attempt the sequence controller will 'lockout'.
- 4.3 The red mains lamp only will remain illuminated and the fan will continue to run.
- 4.4 To reset this 'lockout' condition, switch off the power supply to the heater, and after 15 seconds restore it, if lockout re-occurs, investigate cause. (See Section 6 Fault Finding Guide).

If at any time after completion of the start up sequence loss of flame should occur, the sequence controller will attempt to re-ignite. Failure to do so will cause lock-out.

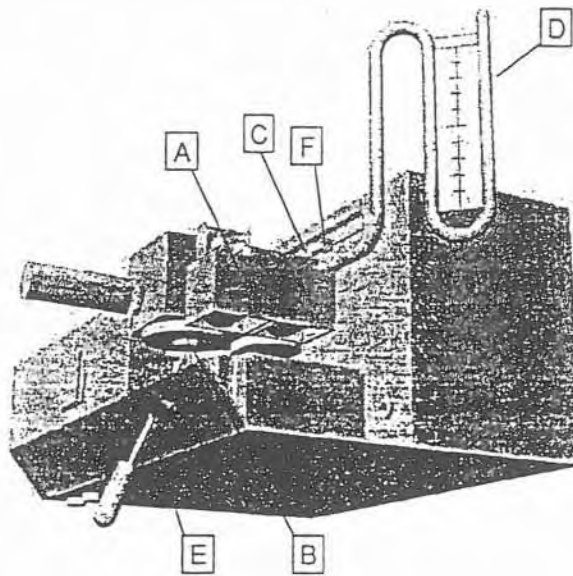
5 SETTING BURNER PRESSURE

- 5.1 (See Fig. 5). Isolate gas and electric supply.
- 5.2 Remove pressure test point screw (F) and connect a 'U' tube manometer (D) to the pressure test nipple (C) located on the side of the gas valve body (A).
- 5.3 Reconnect electrical and gas supply and start heater.

Using a suitable screw-driver, adjust the pressure regulator - clockwise to decrease the pressure until the correct figure is shown, given in Table One: TDS72 and Table Two: TDS55.

- 5.4 Switch off the heater by pulling out the mains input connector.
- 5.5 Disconnect 'U' tube manometer (D) and refit screw in pressure test nipple (C).

FIG. 5 SETTING BURNER PRESSURE



A	Gas Valve	D	Monometer
B	Governor Adjustment Screw	E	Access Hole
C	Jet Pressure Test Point	F	Pressure Test Point Screw

6 FAULT FINDING GUIDE

Symptoms	Possible Cause	Remedy
1. BURNER WILL NOT START		
1.1 Red 'Mains On' light does not illuminate.	(a) External controls, thermostats, time switch etc., not calling for heat.	(a) Adjust controls
	(b) Fuse blown.	(b) Check for short circuit in wiring or individual electrical components
1.2 Red light illuminates.	(a) Fan connector plug not fully engaged	(a) Check all connections.
	(b) Loose electrical connection.	(b) Check all connections.
	(c) Fan seized or faulty motor.	(c) Replace fan, re-commission heater, especially checking gas pressure settings.
	(d) Sequence Controller relay failing to pull in and/or hold in.	(d) Check 1.2e below if satisfactory, replace sequence controller.
	(e) Vacuum switch not returning to normal (switched off) position).	(e) Replace vacuum switch.
1.3 Fan starts but burner does not attempt ignition.	(a) Insufficient vacuum generated by fan.	(a) Clean fan blades with soft bristle brush.
	(b) Blocked emitter tube.	(b) Clean emitter tube internally
	(c) Combustion chamber permitting air leakage.	(c) Examine condition of joint between chamber and air intake chamber.
	(d) Vacuum impulse line between combustion chamber and vacuum switch insecure or defective.	(d) Fix securely in place.
	(e) Vacuum switch 'pulls in' but electronic sequence controller does not proceed to programme ignition sequence.	(e) Replace burner sequence controller unit but first check that the cause of failure is not a short on output circuit, by measuring resistance between pins 2 and 7 of burner control unit; a reading of 10,000 OHMS indicates short circuit on gas valve burner indicator light
1.4 Burner proceeds to ignition stage (normally indicated by audible spark gas valve energised and 'burner on' light illuminated) but burner does not light.	(a) No spark	(a) Check electrode for cracks - replace if necessary. Check high tension connections are secure. Check spark gap is 3.5 +/- 0.5mm. If no high tension output electronic controller, replace controller.
	(b) Gas safety valve faulty or defective.	(b) Replace solenoid operator section of gas valve.
	(c) Insufficient gas pressure	(c) Replace solenoid operator section of gas valve.
	(d) Burner injector blocked.	(d) Clean burner injector.
2. Burner lights but shuts down after a few seconds.	(a) Inadequate flame signal. This can be verified by connecting a sensitive microammeter in series with the violet wire which passes through the combustion chamber bulkhead. The correct reading should be 5uA +/- 1uA.	(a) Replace flame electrode. Check connections to electrodes and terminal 4 of electronic sequence controller plug. Replace the electronic sequence controller.
	(b) Flame unstable	(b) Check cleanliness of burner and set burner pressure as per section 5.
	(c) Inadequate gas supply. Observe burner gas pressure with all heaters operating.	(c) If gas pressure drops below that indicated on the data badge, examine gas supply pipework for excessive pressure loss.
	(d) Insufficient vacuum at combustion chamber causing vacuum switch to cut off.	(d) Clean fan blades with soft bristle brush. Inspect tube internally and clean if necessary (see servicing instructions).
3. Heater shuts down after operating for a period of time.	Refer to 2a and 2d.	If problem persists, replace vacuum switch.

7 FINAL CHECKS

- 7.1 Check the operation of the flame safeguard equipment as follows:
 - 7.1.1 With the heater running normally, switch off the gas supply at the appliance isolating valve.
 - 7.1.2 Observe that the amber 'Burner-On' lamp extinguishes within one second.
 - 7.1.3 After a purge, a period of approximately 9 seconds, the heater should attempt to re-light and if the gas isolating valve is still off, lock-out will occur.
 - 7.1.4 Re-connect gas supply and start heater.
- 7.2 Check the operation of the vacuum proving switch as follows:
 - 7.2.1 With the heater running normally, pull out the three pin fan connection plug. The fan will slow down and stop. Within 3 seconds the burner should shut off.
 - 7.2.2 Observe for for at least 20 seconds that there is not attempt to re-light.
 - 7.2.3 Replace fan plug and observe the heater standard re-ignition process.
 - 7.2.4 Replace burner lid and ensure that it is locked via a spring pin.
 - 7.2.5 Hand these instructions to the user and explain how to operate the heater.
- 7.3 For fans which are fitted with a down draught diverter assembly, check that all products of combustion enter the down-draught diverter using a smoke test (BS-5440 Pt 1).

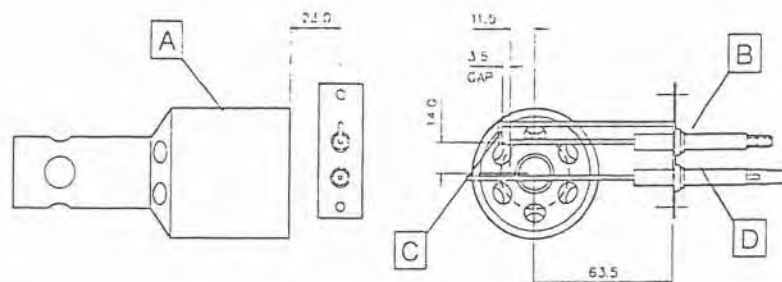
NOTE

It will be noted that heaters have a tendency to bow when hot, this is normal and quite acceptable.

8 ROUTINE MAINTENANCE

- 8.1 TUBES
 - 8.1.1 Remove burner and fan assemblies as detailed in section 9.1. Detach return bend by slackening grub screws and with drawing from tubes.
 - 8.1.2 Remove turbulators. Inspect radiant tubes internally. If there is any appreciable build up of dust or deposits clean them internally by passing rods and a suitable scraper through them, or use an industrial vacuum cleaner with long extension tube.
- 8.2 REFLECTORS
 - 8.2.1 If necessary the reflectors may be cleaned with a soft cloth and detergent in water.
 - 8.2.2 Dirty reflectors on the HE Series will increase the heat radiation upwards into the roof space by 3 to 4%.
- 8.3 ELECTRODE ASSEMBLY
 - 8.3.1 Inspect burner electrode assembly and ensure correct spark gap of $3.5\text{mm} \pm 0.5\text{mm}$ (See Fig. 6)
- 8.4 INJECTOR
 - 8.4.1 The injector must be free from blockage and clean. For removal and changing (See 9.4).
- 8.5 ID FAN
 - 8.5.1 Inspect the main fan impeller and remove any dust by brushing with a soft brush.
 - 8.5.2 Similarly, remove any dust from the finger guard covering the secondary (cooling) impeller and the mesh aperture in the motor cover.
 - 8.5.3 Ensure that the impeller turns freely and that there is no excessive play in the bearings.

FIG. 6 ELECTRODE DETAIL



- A Burner Head
- B Ignition Electrode
- C Spark Gap
- D Flame Electrode

9 REMOVAL OF COMPONENTS

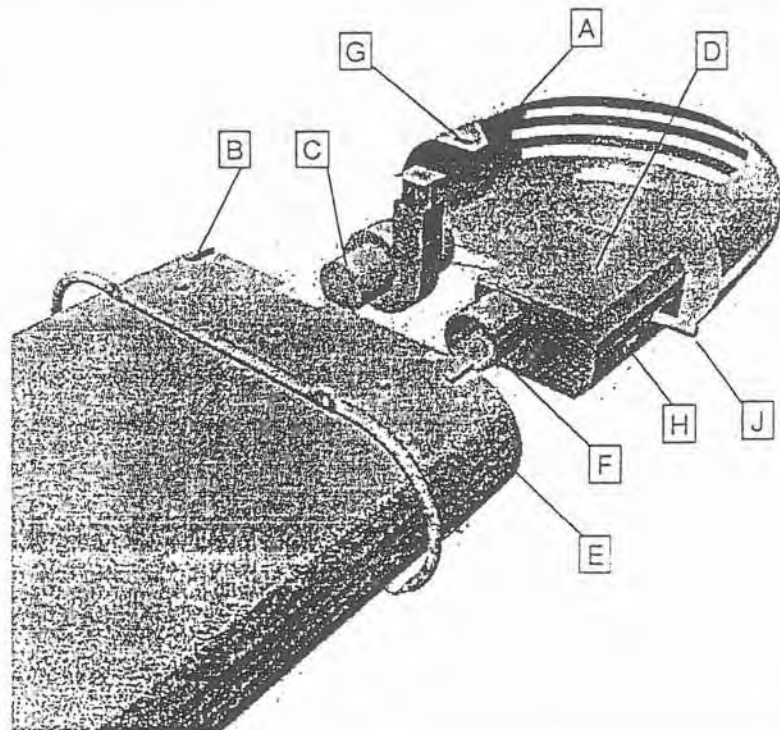
9.1 BURNER AND FAN

- 9.1.1 Isolate mains and gas supply.
- 9.1.2 For 'SE' range, remove burner end moulding, optional items (A) by releasing quick release fasteners (B). (See Fig. 9.1).
- 9.1.3 Disconnect electrical supply at burner mains inlet connection (H). Disconnect gas supply at union.
- 9.1.4 Disconnect fan and burner electric cable.
- 9.1.5 Slacken support grub screws (F) and retract burner assembly. Repeat for ID fan.

9.2 REMOVAL OF ELECTRODE ASSEMBLY

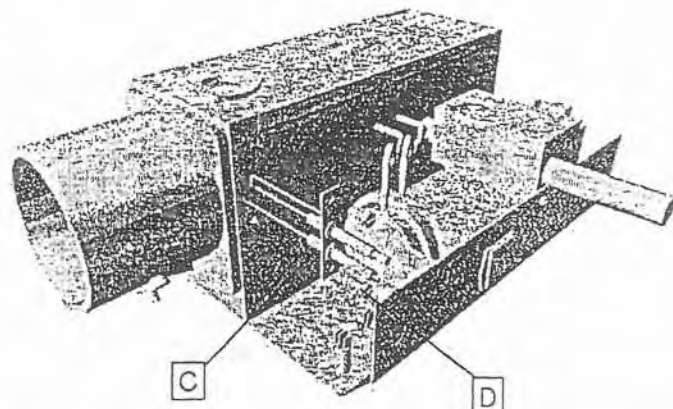
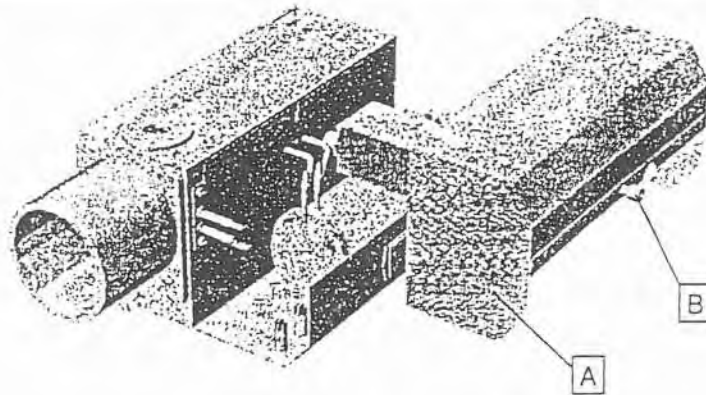
- 9.2.1 See Fig 9.2. Release spring fastener on burner lid (B). Lift lid vertically upwards and slide off. Remove fixing screws from electrode mounting flange (D). Remove electrical builet/spade connections, withdraw electrode assembly from combustion chamber.

FIG. 9.1 BURNER/FAN REMOVAL



- | | |
|-------------------------|---------------------------------------|
| A End Cover | F Casting Grub Screw |
| B Over Centre Fasteners | G End Cover Attachment Lug/Receptacle |
| C Fan | H Mains Plug |
| D Burner | J Gas Inlet |
| E Thermal Break | |

FIG. 9.2 REMOVAL OF ELECTRODE ASSEMBLY



- | |
|------------------------|
| A Lid |
| B Retractable Fastener |
| C Electrode Assembly |
| D Set Pin (M4 x 12) |

9.3 REMOVAL OF GAS VALVE

- 9.3.1 Remove burner assembly from the heater (See Fig. 9.1).
- 9.3.2 Remove burner lid. (See Fig. 9.2)
- 9.3.3 Remove air intake grille (A) by taking out fixing pins (B).
- 9.3.4 For ducted air assemblies, remove adaptor and body with same pins.
- 9.3.5 From inside air intake chamber (C), slacken off, but do not remove cheese head pins (D).
- 9.3.6 Remove gas valve retaining screws (E).
- 9.3.7 Disconnect electrical connections from gas valve.
- 9.3.8 Whilst supporting gas valve (J), slightly lift and withdraw air intake chamber (C) from combustion chamber (F).

Support valve and slightly lift, withdraw the air intake chamber away from combustion chamber (F).

NB: The air intake chamber has keyhole slots (G) to allow for removal whilst its retaining pins are still in position but slackened off.

(See Fig. 9.3b).

- 9.3.9 Screw off burner head anti-clockwise(H). Retract gas valve (J), complete with flexible gas connection (N) and jet from air intake chamber (C).

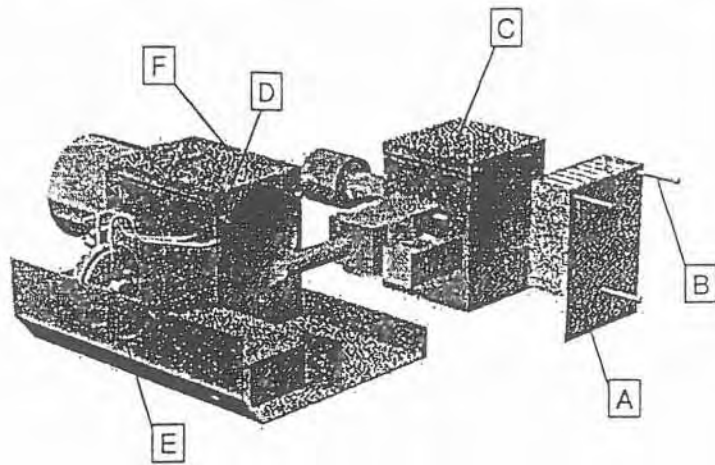
- 9.3.10 To disconnect flexible gas connection (N) from gas valve (J), hold valve body firmly in a vice and use hexagon fitting (O) to unscrew flexible gas connection. (See Fig. 9.3c).

Never use any other part of flexible connection to tighten or untighten as this may cause damage to the convoluted section.

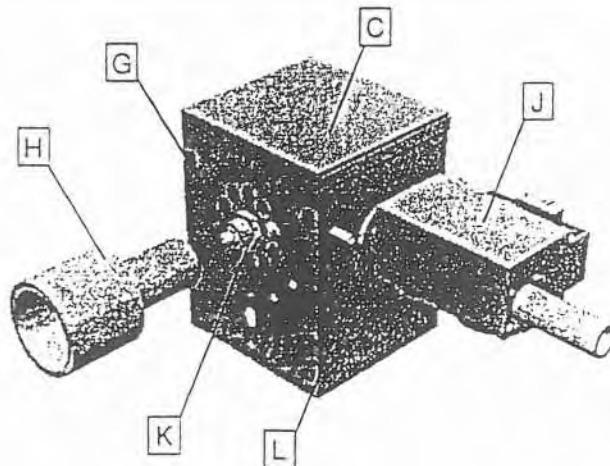
9.4 REPLACEMENT OF GAS INJECTOR

- 9.4.1 Remove gas valve as 9.3.
- 9.4.2 Hold securely the hexagonal part of the injector carrier (P). With a spanner, unscrew injector (B) from its carrier (C). When replacing ensure the injector is fully tightened in the carrier.
- 9.4.3 Make sure the correct injector size is used for the appropriate burner size. (See Tables One and Two in Section 2).

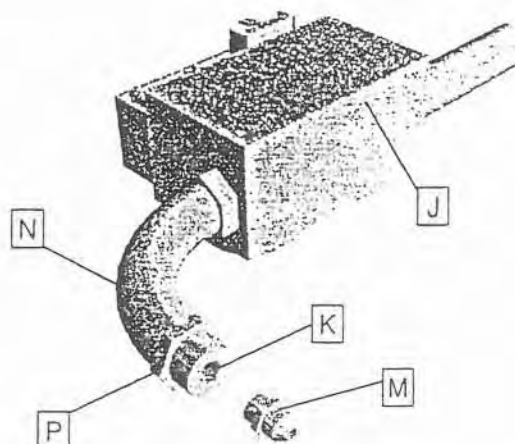
FIG. 9.3 GAS VALVE REMOVAL



9a



9b



9c

A	Air Intake Grille	K	3/8" BSPP Thread
B	Set Pins (M5 x 60)	L	Grommet
C	Air Intake Chamber	M	Jet
D	Set Pins (M4 x 16)	N	Flexible Gas Connection
E	Set Pins (M4 x 6)	O	Hexagon Fitting
F	Combustion Chamber	P	Injector Carrier
G	Key Hole Slots	Q	Burner or Plate
H	Burner Head	R	Self Tapping Screws
J	Gas Valve		

9.5 REPLACEMENT OF ELECTRONIC SEQUENCE CONTROLLER

- 9.5.1 Disconnect electrical supply.
- 9.5.2 Disconnect JST connection (D).
Disconnect ignition wire (B).
(See Fig 9.4).

9.6 REPLACEMENT OF VACUUM PROVING SWITCH

- 9.6.1 Disconnect electrical supply.
- 9.6.2 Disconnect the two silicon rubber tubes at the vacuum switch (A).
(See Fig 9.5). Disconnect the three push on electrical connectors on the side of the vacuum switch (B).
- 9.6.3 Remove two self tapping screws (D), affixing switch to bracket (E).

- 9.6.4 Replace in reverse to above, ensuring correct re-connection.

9.7 REMOVAL OF BURNER ORIFICE PLATE (SEE FIG. 9.3b)/FAN SPINNING

Remove two self tapping screws (R) which hold orifice plate (Q) to air intake chamber (C).

- 9.7.1 The fan spinning is attached to the fan housing by three M5 pozi-head fixing screws.

10. CONVERSION INSTRUCTIONS

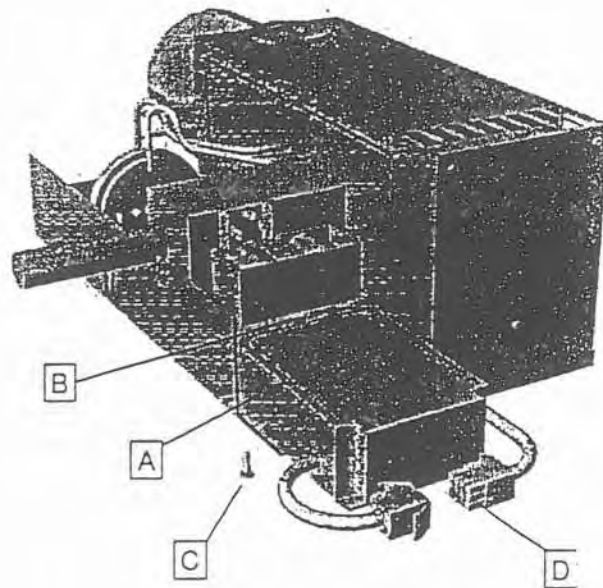
Conversion of any burner from one gas to another involves changing the gas jet, the burner orifice plate and, in some cases the fan spinning.

Refer to Sections 9.4, 9.7 and 9.8 for instructions on removal.

The correct components must be selected from Tables 1 and 2 shown in this section.

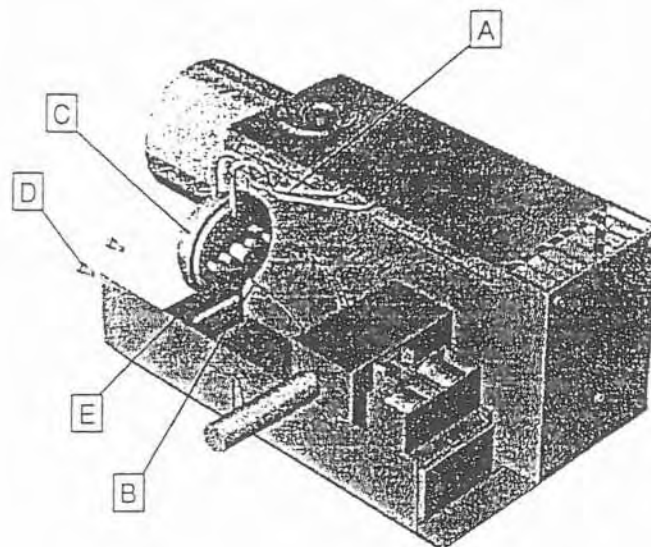
After conversion each burner must have a conversion data badge fitted.

FIG. 9.4 REMOVAL OF CONTROLLER



- | | |
|----------------------------------|------------------|
| A Electronic Sequence Controller | C Push clip |
| B Ignition Wire | D JST Connection |

FIG. 9.5 PRESSURE SWITCH REPLACEMENT



- | | |
|---------------------------------|-----------------------|
| A Silicon Tubes | D Self Tapping Screws |
| B Push-on Electrical Connectors | E Mounting Plate |
| C Air Pressure Switch | |

GROSS HEAT INPUT, KW	GAS TYPE					
	G20		G25		G31	
	JET, Ø	PRESSURE, mbar	JET, Ø	PRESSURE, mbar	JET, Ø	PRESSURE, mbar
38	5.3	10	5.5	12.5	3.5	24
37	5.3	8.8	5.5	11.3	3.5	20.9
36	5.3	7.8	5.5	10.3	3.5	19.5
35	5.2	9.7	5.5	10	3.3	22.4
34	5.2	9.1	5.5	9.5	3.3	21
33	4.8	10.4	5.2	12.2	3.2	22.5
32	4.8	9.3	5.2	11.0	3.2	20.5
31	4.8	8.5	5.2	10.1	3.2	19
30	4.8	7.7	5.2	9.2	3.2	17.6
29	4.8	7.0	5.2	8.4	3.2	16.3
28	4.5	8.8	4.8	11.6	3.0	21.2
27	4.5	7.4	4.8	9.9	3.0	19.7
26	4.5	6.5	4.8	8.9	3.0	18.3
25	4.1	12	4.5	12.5	2.8	22.4
24	4.1	10.5	4.5	10.8	2.8	20.6
23	4.1	9.4	4.5	9.5	2.8	18.6
22	4.1	8.3	4.5	8.2	2.8	16.8
21	4.1	7.5	4.5	7.5	2.8	16
20	3.8	10	4.1	11.2	2.5	24
19	3.8	8.5	4.1	9.5	2.5	17.9
18	3.8	7.4	4.1	8.3	2.5	16.1
17	3.8	6.4	4.1	7.2	2.5	14.4
16	3.8	5.5	4.1	6.2	2.5	11
15	3.3	10	3.6	10.7	2.2	22.8
14	3.3	8	3.6	8.6	-	-
13	3.3	6.7	3.6	7.2	-	-
12	3.3	5.5	3.6	5.9	-	-
11	3.3	4.5	3.6	4.9	-	-

COUNTRY		UNITED KINGDOM GB				
CATEGORY		I2H	I3P	I12H3P		
GAS TYPE		G20 Natural Gas	G31 Propane	G20 Natural Gas	G31 Propane	
SUPPLY PRESSURE mbar		20	37	20	37	
Injector Size mm Setting Pressure	Burner Size	SE/HE15	3.3 Ø /10 mbar	2.2 Ø /22.8 mbar	3.3 Ø /10 mbar	2.2 Ø / 22.8 mbar
		SE/HE20	3.8 Ø /10 mbar	2.5 Ø /24 mbar	3.8 Ø /10 mbar	2.5 Ø / 24 mbar
		SE/HE25	4.1 Ø /12 mbar	2.8 Ø /22.4 mbar	4.1 Ø /12 mbar	2.8 Ø / 22.4 mbar
		SE/HE28	4.5 Ø /8.8 mbar	3.0 Ø /21.2 mbar	4.5 Ø /8.8 mbar	3.0 Ø / 21.2 mbar
		SE/HE33	4.8 Ø /10.4 mbar	3.2Ø /22.5mbar	4.8 Ø /10.4 mbar	3.2Ø / 22.5mbar
		SE/HE35	5.2 Ø / 9.7 mbar	3.3 Ø /22.4 mbar	5.2 Ø / 9.7 mbar	3.3 Ø / 22.4 mbar
		SE/HE38	5.3 Ø / 10 mbar	3.5 Ø /24 mbar	5.3 Ø / 10 mbar	3.5 Ø / 24 mbar
Fan Orifice mm	Burner Size	SE/HE15	45 Ø	45 Ø	45 Ø	45 Ø
		SE/HE20	50 Ø	55 Ø	50 Ø	55 Ø
		SE/HE25	62 Ø	59 Ø	62 Ø	59 Ø
		SE/HE28	62 Ø	62 Ø	62 Ø	62 Ø
		SE/HE33	96 Ø	70 Ø	96 Ø	70 Ø
		SE/HE35	96 Ø	96 Ø	96 Ø	96 Ø
		SE/HE38	60 Ø	60 Ø	60 Ø	60 Ø
Burner Orifice	Burner Size	SE/HE15	M101440	M101440	M101440	M101440
		SE/HE20	M101446	M101449	M101446	M101449
		SE/HE25	M101441	M101443	M101441	M101443
		SE/HE28	M101447	M101439	M101447	M101439
		SE/HE33	M101448	M101444	M101448	M101444
		SE/HE35	M101442	M101444	M101442	M101444
		SE/HE38	M101445	M101445	M101445	M101445

COUNTRY		UNITED KINGDOM GB				
CATEGORY		I2H	I3P	I12H3P		
GAS TYPE		G20 Natural Gas	G31 Propane	G20 Natural Gas	G31 Propane	
SUPPLY PRESSURE mbar		20	37	20	37	
Injector Size mm Setting Pressure	Burner Size	SE/HE15	3.3 Ø / 10 mbar	2.2 Ø / 22.8 mbar	3.3 Ø / 10 mbar	2.2 Ø / 22.8 mbar
		SE/HE20	3.8 Ø / 10 mbar	2.5 Ø / 24 mbar	3.8 Ø / 10 mbar	2.5 Ø / 24 mbar
		SE/HE25	4.1 Ø / 12 mbar	2.8 Ø / 22.4 mbar	4.1 Ø / 12 mbar	2.8 Ø / 22.4 mbar
		SE/HE28	4.5 Ø / 8.8 mbar	3.0 Ø / 21.2 mbar	4.5 Ø / 8.8 mbar	3.0 Ø / 21.2 mbar
		SE/HE33	4.8 Ø / 10.4 mbar	3.2 Ø / 22.5 mbar	4.8 Ø / 10.4 mbar	3.2 Ø / 22.5 mbar
		SE/HE35	5.2 Ø / 9.7 mbar	3.3 Ø / 22.4 mbar	5.2 Ø / 9.7 mbar	3.3 Ø / 22.4 mbar
		SE/HE38	5.3 Ø / 10 mbar	3.5 Ø / 24 mbar	5.3 Ø / 10 mbar	3.5 Ø / 24 mbar
Fan Orifice mm	Burner Size	SE/HE15	42 Ø	45 Ø	42 Ø	45 Ø
		SE/HE20	62 Ø	65 Ø	62 Ø	65 Ø
		SE/HE25	96 Ø	96 Ø	96 Ø	96 Ø
		SE/HE28	68 Ø	96 Ø	68 Ø	96 Ø
		SE/HE33	96 Ø	96 Ø	96 Ø	96 Ø
		SE/HE35				
		SE/HE38	60 Ø	72 Ø	60 Ø	72 Ø
Burner Orifice	Burner Size	SE/HE15	M101461	M101463	M101461	M101463
		SE/HE20	M101465	M101470	M101465	M101470
		SE/HE25	M101466	M101466	M101466	M101466
		SE/HE28	M101467	M101467	M101467	M101467
		SE/HE33	M101468	M101468	M101468	M101468
		SE/HE35				
		SE/HE38	M101469	M101469	M101469	M101469

OPTIMA SERIES RANGE RATED BURNER SETTINGS - TABLE C

TDS79

GROSS HEAT INPUT, KW	GAS TYPE					
	G20		G25		G31	
	JET, Ø	PRESSURE, mbar	JET, Ø	PRESSURE, mbar	JET, Ø	PRESSURE, mbar
38	5.3	10	5.5	12.5	3.5	24
37	5.3	8.8	5.5	11.3	3.5	20.9
36	5.3	7.8	5.5	10.3	3.5	19.5
35	5.2	9.7	5.5	10	3.3	22.4
34	5.2	9.1	5.5	9.5	3.3	21
33	4.8	10.4	5.2	12.2	3.2	22.5
32	4.8	9.3	5.2	11.0	3.2	20.5
31	4.8	8.5	5.2	10.1	3.2	19
30	4.8	7.7	5.2	9.2	3.2	17.6
29	4.8	7.0	5.2	8.4	3.2	16.3
28	4.5	8.8	4.8	11.6	3.0	21.2
27	4.5	7.4	4.8	9.9	3.0	19.7
26	4.5	6.5	4.8	8.9	3.0	18.3
25	4.1	12	4.5	12.5	2.8	22.4
24	4.1	10.5	4.5	10.8	2.8	20.6
23	4.1	9.4	4.5	9.5	2.8	18.6
22	4.1	8.3	4.5	8.2	2.8	16.8
21	4.1	7.5	4.5	7.5	2.8	16
20	3.8	10	4.1	11.2	2.5	24
19	3.8	8.5	4.1	9.5	2.5	17.9
18	3.8	7.4	4.1	8.3	2.5	16.1
17	3.8	6.4	4.1	7.2	2.5	14.4
16	3.8	5.5	4.1	6.2	2.5	11
15	3.3	10	3.6	10.7	2.2	22.8
14	3.3	8	3.6	8.6	-	-
13	3.3	6.7	3.6	7.2	-	-
12	3.3	5.5	3.6	5.9	-	-
11	3.3	4.5	3.6	4.9	-	-