

JETSTREAM

GASMISER

***High Efficiency
Swimming Pool and Spa Boiler***

INSTALLATION MANUAL

Issue 1

**These instructions must be left either with the user
or in the swimming plant room**

ALL GAS APPLIANCES MUST BE INSTALLED AND SERVICED
BY A CORGI REGISTERED ENGINEER

IMPORTANT - Please read these instructions carefully before commencement of installation as failure to comply with certain requirements could invalidate the unit warranty.

TABLE OF CONTENTS

1. GENERAL INSTRUCTIONS	
1.1 Description	2
1.2 Related Documents	3
1.3 Technical Data	3
2. BOILER CONNECTIONS	
2.1 General	5
2.2 Gas Supply	8
2.3 Water Systems	8
2.4 Air Supply and Flue System	14
2.5 Ventilation Air	17
2.6 Condensate Trap	17
2.7 Electrical Connections	17
3. INSTALLATION PROCEDURES	
3.1 Unpacking	19
3.2 Installation of Boiler - General	19
3.3 Mounting the Boiler	19
3.4 Installing Flue and Air Pipes	21
3.5 Condensate Drainage	26
3.6 Water System	26
3.7 Gas Supply	27
3.8 Electrical Supply	28
4. COMMISSIONING	
4.1 Initial Flushing	29
4.2 Gas Supply	29
4.3 Electrical Installation	29
4.4 S.I.T Novamix gas Valve	29
4.5 Hot Flushing	30
4.6 Adjustments/Checks	30
4.7 Handing Over to the User	32
5. FAULT FINDING	
5.1 Electrical Control Sequence	33
Fault Finding Diagram	35
Wiring Diagrams	
6. ROUTINE ANNUAL SERVICING	
6.1 General	37
6.2 Pre-Service Checks	37
6.3 Normal Servicing Items	38
6.4 Cleaning the Heat Exchanger	38
7. REPLACEMENT OF PARTS (SPARES LIST)	
7.0 General	39
7.1 Precautions	39
7.2 Access	39
7.3 Replacement Procedures	40
7.4 Electrical Components	40
7.5 Heat Exchangers and Burner Components	44

GENERAL INFORMATION

1.1 DESCRIPTION

The JETSTREAM GASMISER is a lightweight, wall mounted, gas fired, high efficiency condensing boiler. The flue system is room sealed and fan powered. The boiler is fired using a direct spark ignition system that is fully automatic.

The boiler is housed in an attractive stainless steel or white enamelled mild steel cabinet. The cabinet is not waterproof and therefore the boiler must not be placed where it could be exposed to rain or leaking water.

The boiler is available in two versions - A DIRECT version for connecting directly into the swimming pool filtration circuit or an INDIRECT VERSION suitable for connection to fully pumped, open vented or sealed systems. Gravity systems are not suitable. The DIRECT version is normally used for outdoor pools whereas the INDIRECT version is used for indoor pools where air heating is also required.

1.1.1 Boiler Layout

A key feature of the JETSTREAM GASMISER is its simplicity. The arrangement of the major components is as follows:

1. An inner enclosure that houses the fan, gas valve and differential air and gas pressure switch (the gas pressure switch is used on the 80 & 100 models only). This inner enclosure is room sealed and operates under a negative pressure when the boiler is running. The front door of this enclosure ensures that the enclosure is room sealed. Therefore, this door should be secure during the normal operation of the boiler.
2. A sealed electrical box is situated inside the inner enclosure. The electrical box houses the boiler control thermostat and the check card. It also houses the electrical connections to the external power supply.

1.1.2 Boiler Operation

The JETSTREAM GASMISER operates in the following way:

Air Flow

- Air is drawn into the boiler's inner compartment through a 50mm MU PVC pipe.
- The airflow is proved by a differential air pressure switch that monitors the pressure difference across the fan inlet.

Gas Flow

- Gas enters the boiler through the gas service cock and continues through the gas valve. The gas flow rate is regulated by the gas valve (gas orifice) so that the gas to air ratio is always the same. Therefore, if the air flow changes (due to flue blockage etc) the gas flow changes to give the same combustion mixture.
- Gas is mixed with combustion air at the fan inlet.

Combustion

- The gas/air mixture is drawn into the fan and forced down into the burner. The burner is located at the top of the heat exchanger.
- The gas/air mixture is ignited by a spark that is generated by the control system. The gas/air mixture then burns with a blue flame on the surface of the burner. As the products of combustion pass downward through the heat exchanger, they are cooled, exchanging heat with the water that is circulating up through the heat exchanger.

Condensate

- When the return water temperature is below 45° C, part of the water vapor in the combustion products will condense inside the heat exchanger, thus increasing the boiler efficiency.
- This condensate falls to the bottom of the heat exchanger where it is separated from the flue gases and exits from the boiler through the condensate drain. The condensate is slightly acidic (about the same acidity as vinegar) and should be piped in a plastic pipe. It is not harmful to the waste disposal system and may be disposed of as normal wastewater.

Exhaust Gases

- The products of combustion are piped in a 50mm MU PVC pipe to the outside. The temperature of the combustion products is usually 3 to 10° C above the temperature of the return water. The flue pipe should be terminated outside the building from where the combustion products cannot re-enter the building or any other adjacent building.

Controls

- The heating level may be controlled by one or a combination of more than one of the following: the boiler thermostat, room thermostats, hot water cylinder thermostats and programmer time clocks.

1.2 RELATED DOCUMENTS

The JETSTREAM GASMISER must be installed according to the current issue of:

- Gas Safety (Installation and Use) Regulations 1984 (as amended).
- Current IEE Wiring Regulations. BS7671
- For the country of installation Building Regulations.

1.3 TECHNICAL DATA

1.3.1 Performance Data

Model	DIRECT		INDIRECT	
	GM50D	GM100D	GM50I	GM100I
Heat Input – Standard Flue	16.8kW (57 kBTU/hr)	33.7kw 115kBTU/hr)	16.8kW (57 kBTU/hr)	33.7kW (115 kBTU/hr)
Heat Output 45/30 °C	15.6kW (53kBTU/hr)	30.6kW (104 kBTU/hr)	15.6kW (53 kBTU/hr)	30.6kW (104 kBTU/hr)
Heat Output 80/60 °C			14.6kW (50 kBTU/hr)	29.3kW (100 kBTU/hr)
Approx. Nat Gas rate after 10 mins alight – standard Flue	1.53 m³/hr (55.5 ft³/hr)	3.08 m³/hr (111.1 ft³/hr)	1.53 m³/hr (55.5 ft³/hr)	3.08 m³/hr (111.1 ft³/hr)
Minimum Recommended Water Flow through Boiler	0.25 L/s	0.5 L/s	0.25 L/s	0.5 L/s

- Building standards (Scotland) Regulations.
- The Bye Laws of the Local Water Undertaking.
- In addition, due account must be taken of the following Codes of Practice:

BS.6891:	Gas Supplies.
BS.6798:	Installation of Central Heating Boilers.
BS.5449:	Installation of Pumped Central Heating Boilers.
BS.5546:	Installation of Domestic Hot Water Supplies.
BS.5440:1	Flues.
BS.5440:2	Air Supply.
BS.7074:1	Expansion Vessels.

The following British Gas Publications should also be consulted:

- DM2 (for timber framed buildings).
- Guidance Notes for the Installation of Domestic Gas Condensing Boilers.
- Specification for Domestic Wet Central Heating Systems.

1.3.1 General Technical Data

Models	DIRECT		INDIRECT	
	GM50D	GM100D	GM50I	GM100I
LPG Injector Orifice Size	2.7mm	3.8mm	2.7mm	3.8mm
Natural Gas Orifice Size	3.5mm	4.9mm	3.5mm	4.9mm
Gas Orifice Pressure (Standard Flue)	100mm 10mbar 4.0in w.g.			
Gas Orifice Pressure (6m (20ft) flue)	9.0mbar	8.8mbar	9.0mbar	8.8mbar
Gas Input Pressure (Nat. Gas)	20 mbar			
System suitable for use with the boiler	All fully pumped open and sealed systems			
Max. operating flow temperature (all systems)	82°C			
Max. Head (open systems)	27m (88.6ft)			
Max. Pressure (sealed systems)	2.7 bar			
Min. Head (open systems)	2m (6.5ft)			
Min Pressure (sealed systems)	1 bar			
Temperature differential across boiler (recommended)	14°C			
Power Supply	230V, ~ 50HZ, Externally Fused at 3A			
Power Consumption	80W			
Weight: Empty	43kg	45kg	34kg	36kg
Full	44kg	47kg	35kg	38kg
Data Badge Position	Outside the front door of inner enclosure			
Water Content (Excluding by pass loop)	1.45 litres	1.8 litres	1.45 litres	1.8 litres
Overall Dimensions mm				
Height	940	1010	780	850
Width	715	715	290	490
Depth	280	280	480	280

BOILER CONNECTIONS

INDIRECT VERSION

2.1 GENERAL

2.1.1 Dimensions and Minimum Clearances

The JETSTREAM GASMISER must be installed with the following minimum clearances to allow for subsequent servicing and safe operation.

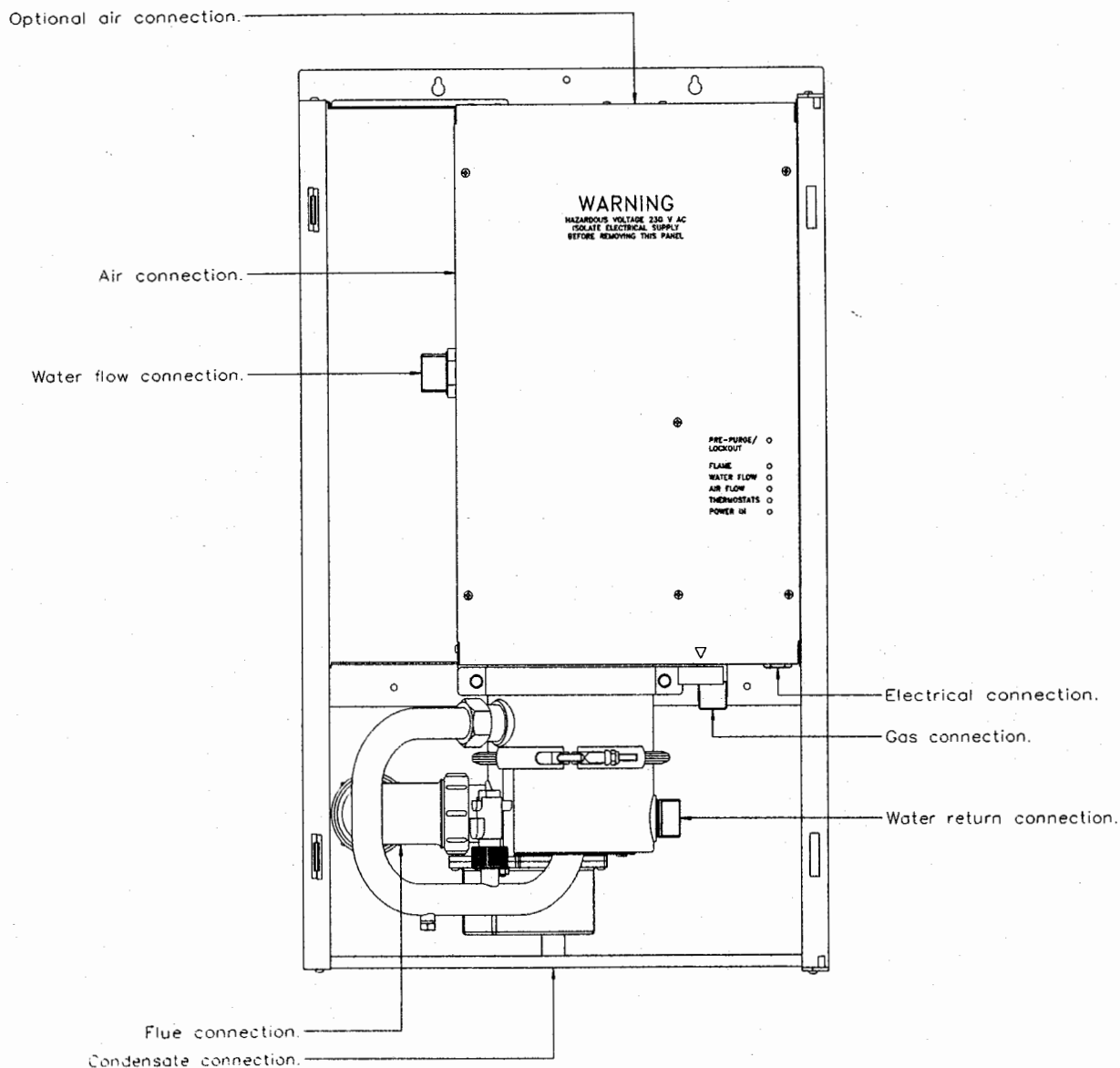
- Front - 520mm (20.5").
- Left Side - 15mm (0.6").
- Right Side - 15mm (0.6").
- Top - 200mm (8").
- Bottom - 200mm (8").

2.1.2 Service Connections

The following connections are shown below:

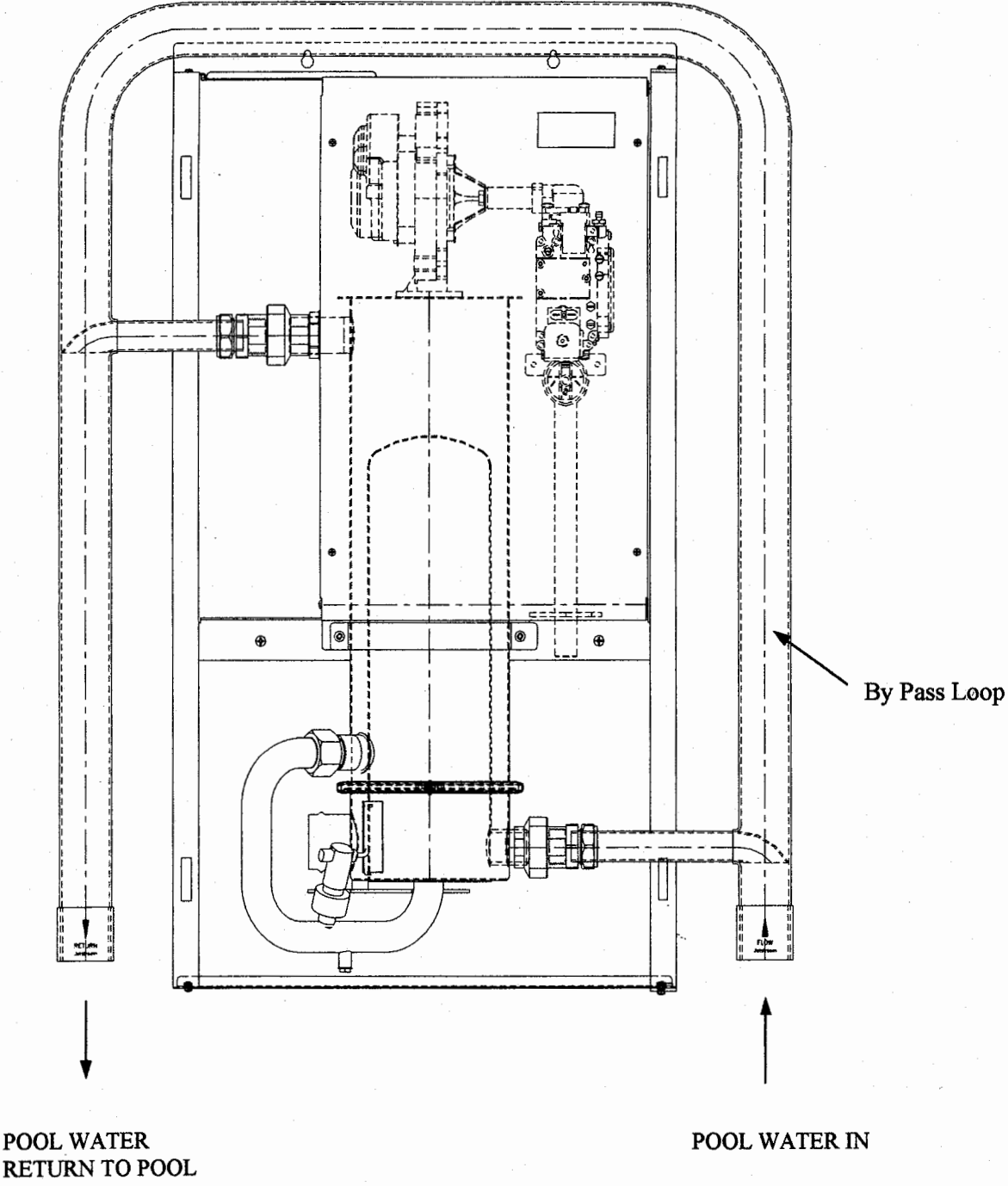
1. Electrical.
2. Gas.
3. Water.
4. Air.
5. Flue.

The installers gas pipe is to be connected to the gas service cock at ½ inch BSP female connection (minimum). Water flow and return pipes are connected at 1-inch BSP male connections. Electrical connections are made at a three way terminal block.



BOILER CONNECTIONS

DIRECT VERSION



DIRECT VERSION CONNECTS DIRECTLY INTO POOL OR SPA FILTRATION CIRCUIT

2.1.3 Installed Position

The JETSTREAM GASMISER is not suitable for external installation. The boiler may be installed in any room or internal space. However, particular attention is drawn to the current versions of the following regulations with respect to the installation of the boiler in a room or internal space containing a swimming pool, spa, bath or shower:

1. I.E.E Wiring Regulations.
2. In Scotland, the Electrical Provisions of the Building Regulations applicable in Scotland.

Where an appliance is installed in a room containing a swimming pool, spa, bath or a shower, any electrical switch or appliance control, utilizing mains electricity, should be so situated that a person using the facility cannot touch it.

Compartment installation is permitted, provided that such compartments are constructed in accordance with BS 6798.

The wall on which the boiler is mounted must be of suitable load bearing capacity and must be incombustible. If the boiler is to be installed in a timber framed building, it must be fitted in accordance with the British Gas publication DM2-Guide for Gas Installations in Timber Framed Housing.

Caution

It is recommended that the boiler not be installed on a studded or similar type wall as it is possible that the vibration from the fan would be amplified and transmitted to other parts of the building.

2.2 GAS SUPPLY

- A gas meter should be connected to the service pipe by the local gas supplier or their contractor. An existing meter should be checked preferably by the gas supplier

to ensure that the meter is adequate to deal with the rate of gas supply required.

- Installation pipes should be fitted in accordance with BS 6891.
- The gas supply pressure should be set to suit the pressure indicated on the boiler data badge.
- Supply pipes to the boiler must not be sized less than the boiler inlet connection ($\frac{1}{2}$ " BSP).
- Due consideration must be given to the effect of the appliance on the supply pressure to other gas appliances in the premises.

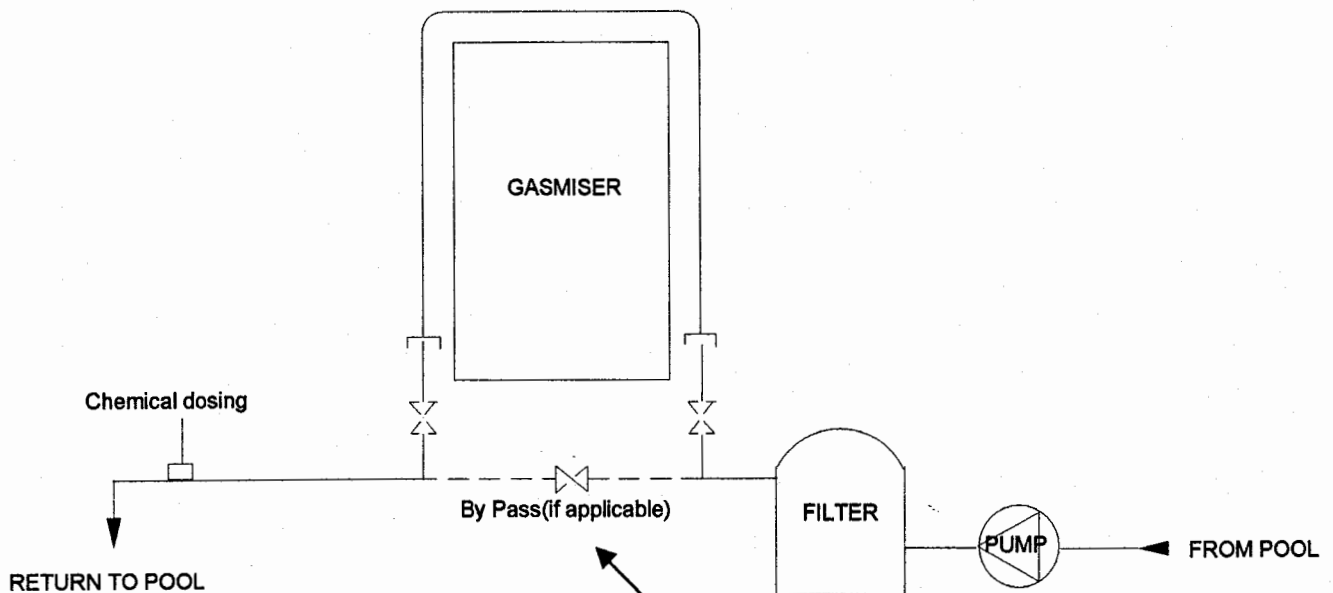
2.3 WATER SYSTEMS

2.3.1 DIRECT SYSTEM

JETSTREAM GASMISER Models with suffix D are intended for connection directly into the swimming pool or spa filtration circuit. The boiler is supplied with 1.5" connection unions and must be connected into the return to the pool after the filter. Particular attention should be taken of the correct flow direction through the boiler. The boiler incorporates a directional and volume flow switch and the boiler will not operate if the water flow is incorrect or inadequate.

CAUTION

Any chemical dosing system must be installed downstream of the boiler and pool water must be prevented from syphoning back into the boiler when the pump shuts off.



For pool filtration circuits with with 1.5" main flow and return pipework a By Pass is not required other than to facilitate servicing. For installation in larger circuit pipework a By Pass with balancing valves is required so as not to restrict the filtration flow rate.

SCHEMATIC FOR CONNECTING "DIRECT" VERSION INTO FILTRATION CIRCUIT

WARNING - CHEMICAL BALANCE OF WATER

It is important that the water pH value is maintained between 7.4 and 7.8 and the total alkalinity between 100 and 150 ppm. The warrantee will be void if corrosion occurs as a result of chemical inbalance.

2.3.2 INDIRECT SYSTEMS

The water pipes within the boiler are terminated at water cocks that have 1" BSP connections.

JETSTREAM GASMISER Models with suffix I are "Indirect Versiond" are intended for use on sealed water systems, provided the appropriate components required (see below) are included in the system.

The boiler may also be used with open, vented water systems including those with close-coupled feed and vents.

Only fully pumped systems can be used. Gravity systems are strictly not suitable.

System Requirements

- Any system must be thoroughly flushed clean of grease, dirt and debris prior to connection with the boiler.
- All water systems must be constructed to comply with requirements of the Local Water Authority.
- Only systems complying with the requirements of BS 5449 and BS 6798 should be used. The domestic hot water system should be in accordance with the relevant sections of BS 5446.
- Copper tubing should comply to BS 2871 Part 1.
- Jointing should be either with capillary or compression fittings.
- Pipes should have a gradient to ensure air is passed easily to vent points, and water flows readily to drain pipes.
- Draining taps must be located in accessible positions, which permit the draining of the whole system, including the boiler and the hot water storage vessel. Draining taps should be at least 15mm in nominal size and be in accordance with BS 2879.

- Air vent points must be fitted at all high points where air will naturally collect and must be sited to allow complete draining of the system.

System Bypass

- The system must be arranged so that there is always a minimum flow of 12 Litres/min when the boiler is running. This can be achieved using a radiator fitted with lockshield valves at the inlet and outlet, or by using a specially installed by-pass arrangement.

2.3.1 OPEN VENTED SYSTEMS

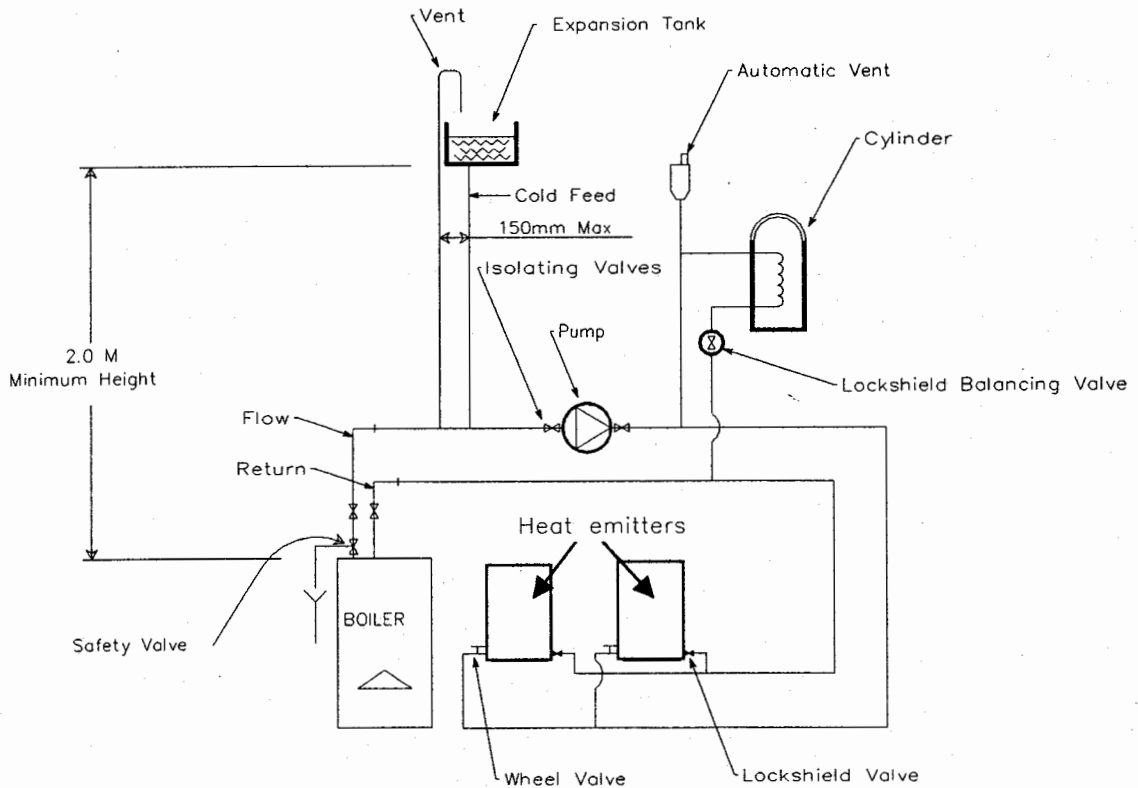
The drawing below shows a typical open vented system, which includes a close, coupled feed and vent.

Open Vented System Requirements

- In the diagram the vent and the cold feed are located on the water flow between the boiler and the pump.

- The minimum static pressure required at the water flow pipe is 2m. This static pressure is provided by the expansion tank when the cold feed is placed between the boiler and the pump.

- If the cold feed is not brought to the flow pipe at this point then it may be necessary to take account of the pressure loss across the heat exchanger when estimating the static pressure (and therefore the height at which the expansion tank must be placed).
- Refer to section 2.3.4 for the pressure loss characteristics of the heat exchanger.



CLOSE COUPLED SYSTEM

2.3.2 SEALED SYSTEMS

Sealed systems must be designed in accordance with BS 5449 and BS 7074 Part 1. Sealed systems must include the following components:

1. **A safety valve** fitted on the flow adjacent to the boiler. It must be non-adjustable and pre-set to 3 bar
2. **A drainpipe** must be attached to the safety valve. This drainpipe must be at least as big as the valve connection, and routed to drain in an area which is not hazardous and where it is not subjected to freezing.
3. **An expansion vessel** complying with BS 4814 and sized in accordance with the requirements of BS 5449 and BS 7074 Part 1. The vessel must be positioned on the inlet to the pump.
4. **A pressure gauge** with a fill indicator, readily visible. The pressure range of the gauge must be at least 0 to 4 bar.

5. **A filling point** which complies with local water authority requirements.
6. **A method of system make-up**, automatic or manual, which is in accordance with local water authority requirements.

NOTE

- There must be no permanent connection of mains water to the boiler water system.
- The installation must be designed to work with flow temperatures up to 110 °C.
- All components of the system including the cylinder coil (heat exchanger) of the indirect cylinder must be suitable for a working pressure of 3bar and a temperature of 110 °C.
- Care should be taken in making all connections that the risk of leakage is minimized.

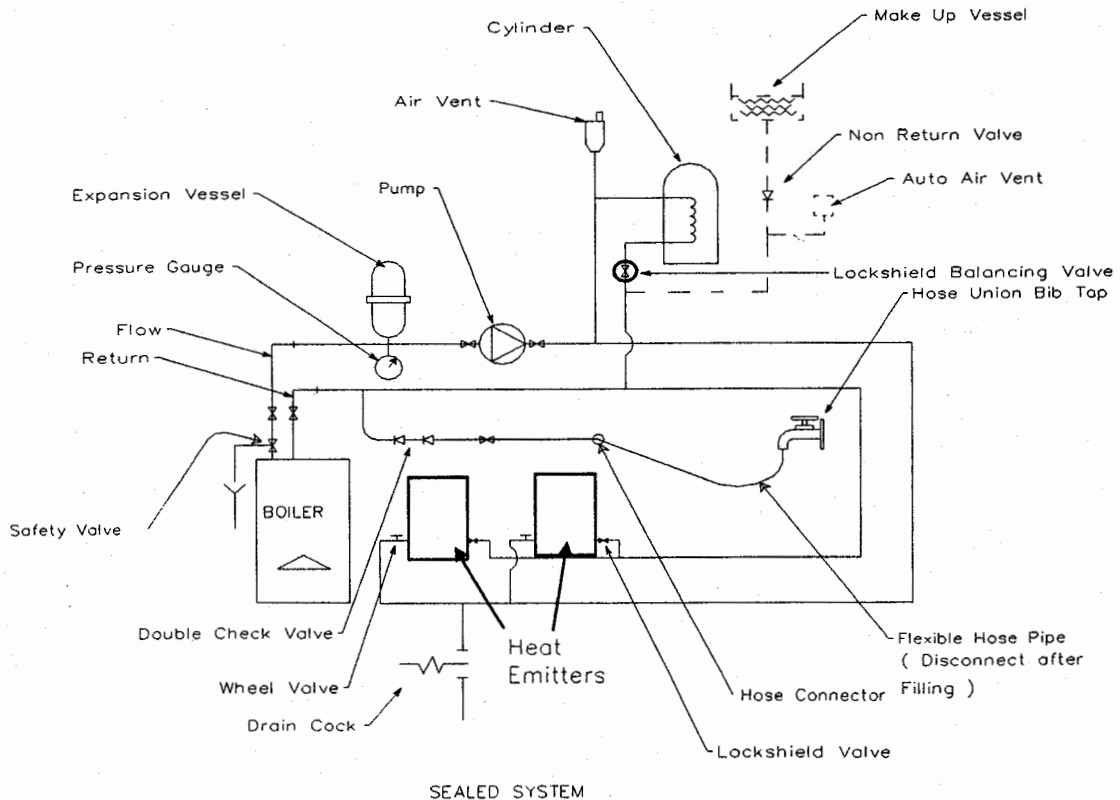


Table 2.1

Safety Valve Setting (bar)	3.0									
Vessel Charge Pressure (bar)	0.5				1			1.5		
Initial System Pressure (bar)	0.5	1	1.5	2	1	1.5	2	1.5	2	
Total water content of system	Expansion Vessel Volume (Litres)									
Litres										
25	2.1	3.5	6.5	13.7	2.7	4.7	10.3	3.9	8.3	
50	4.2	7.0	12.9	27.5	5.4	9.5	20.6	7.8	16.5	
75	6.3	10.5	19.4	41.3	8.2	14.2	30.9	11.7	24.8	
100	8.3	14.0	25.9	55.1	10.9	19.0	41.2	15.6	33.1	
125	10.4	17.5	32.4	68.9	13.6	23.7	51.5	19.5	41.3	
150	12.5	21.0	38.8	82.6	16.3	28.5	61.8	23.4	49.6	
175	14.6	24.5	45.3	96.4	19.1	33.2	72.1	27.3	57.9	
200	16.7	28.0	51.8	110.2	21.8	38.0	82.4	31.2	66.2	
250	20.8	35.0	64.7	137.7	27.2	47.5	103.0	39.0	82.7	
300	25.0	42.0	77.7	165.3	32.7	57.0	123.6	46.8	99.3	
350	29.1	49.0	90.6	192.8	38.1	66.5	144.0	54.6	115.8	
400	33.3	56.0	103.6	220.4	43.6	76.0	164.8	62.4	132.4	
450	37.5	63.0	116.5	247.9	49.0	85.5	185.4	70.2	148.9	
500	41.6	70.0	125.9	275.5	54.5	95.0	206.0	78.0	165.5	
For other system volumes - multiply system volume by this factor.	0.0833	0.140	0.259	0.551	0.109	0.109	0.412	0.156	0.331	

Table 2.1 gives the volume of the expansion vessel fitted on a sealed system. The volume obtained from the table is multiplied by a factor depending on the boiler water flow temperature. This factor is as follows:

The volume of the hot water system is used in Table 2.1 to size the expansion vessel. The following table gives approximate values for the volume of the typical system components.

Max. boiler flow temp.	Factor
93 °C or greater	1.00
Less than 93 °C but more than 88 °C	0.90
Less than 88 °C	0.80

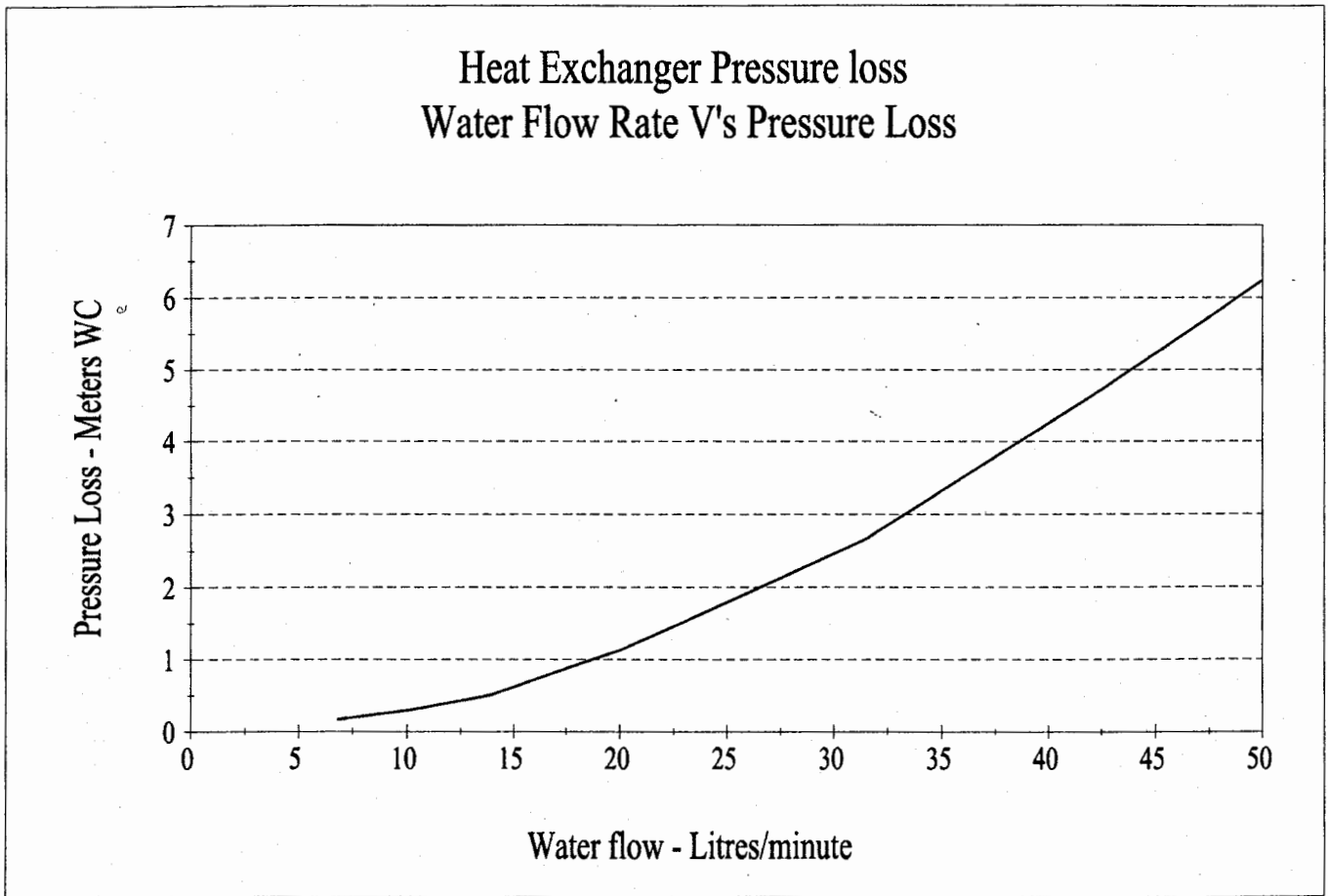
Component	Approx Volume
Boiler Heat exchanger	See Technical Data (Section 1.3)
Small bore pipework	1 litres per kw of system output
Micro bore pipework	7 litres total
Steel panel radiators	8 litres per kw of system output
Low water capacity rad's	2 litres per kw of system output

2.3.3 Hot Water System

- The hot water storage vessel must be of the indirect type (certain direct cylinders can be used provided they are suitably adapted by fitting an immersion calorifier).
- Direct cylinders must not be used.
- Further guidance is available in BS 5546.

2.3.4 Pump Selection

- The graph below shows the pressure loss across the heat exchanger for various water flows. Refer to this pressure loss graph when selecting a suitable pump.
- The pump should comply with BS 1394.
- Isolating valves should be placed as close as possible to the pump (on each side of the pump).



2.4 AIR SUPPLY AND FLUE SYSTEM

2.4.1 Design

The following components, shown below are supplied as an external kit. The air supply and flue systems can be made up using these components. Only specified pipes and fittings shall be used.

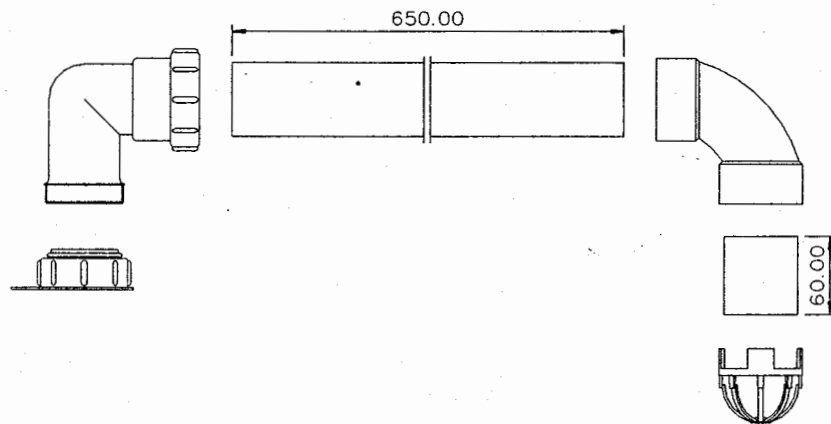
Flue

1. 90° Flue Elbow.
2. 650mm x 50mm (Internal diameter) plastic flue pipe.
3. Flue terminal.

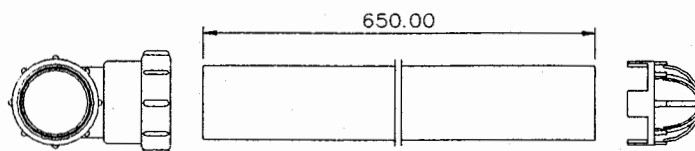
Air Inlet

1. One plastic nut (this connects the air inlet elbow to the boiler).
2. One 90° air inlet elbow.
3. 650mm x 50mm (ID) air inlet pipe.
4. Air inlet terminal.

Both the air inlet and the flue outlet must be from outside.



Air Inlet Connections



Flue Connections

2.4.2 Maximum Lengths

- The maximum allowable air inlet pipe length with this boiler is 6m (20ft). Three 90° bends in total may be used with this air inlet pipe length.
- The maximum allowable flue outlet pipe length with this boiler is 6m (20ft) Three 90° bends in total may be used with this flue outlet pipe length.
- If more than 6 bends are used in total on the flue and air inlet then 1.5m (5ft) should be subcontracted from the total length of flue and air inlet piping for each extra bend installed.

2.4.3 Clearances from Wall

The following clearances from walls must be given:

- Flue outlet – minimum clearance of 160mm.
- Air inlet- minimum clearance of 110mm.

2.4.4 Distance between Exhaust and Air Intake

- The terminations may be as far apart as is possible using the maximum allowable air inlet and flue outlet pipes as specified in section 2.4.2. The terminations must be on the same external wall.
- A minimum clearance of 250mm must be allowed between terminations.

2.4.5 General Installations

- All parts of the air inlet and flue outlet system must be constructed in accordance with BS5440: Part 1, except where specifically mentioned in these instructions.
- All pipework must be adequately supported at intervals of one metre.
- External wall faces and any internal faces of cavity walls must be made good.
- The flue outlet pipework must not be closer than 25mm to combustible material.

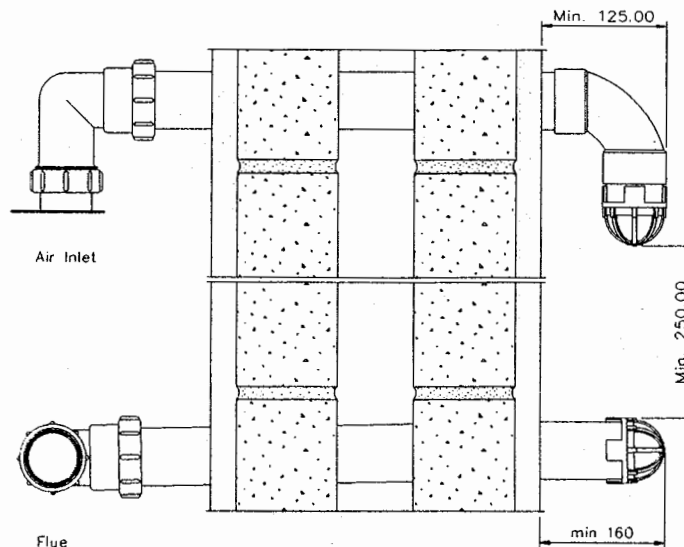
2.4.6 Slope

Horizontal flue outlet pipework must slope at least 2.5 degrees (approx. 45mm per meter run) towards the boiler may be vertical. Only swept elbows can be used.

Air inlet pipework can be:

1. Horizontal
2. Vertical

Sloping in a downward direction towards the boiler. In this case, rain etc. must be prevented from entering the pipe.



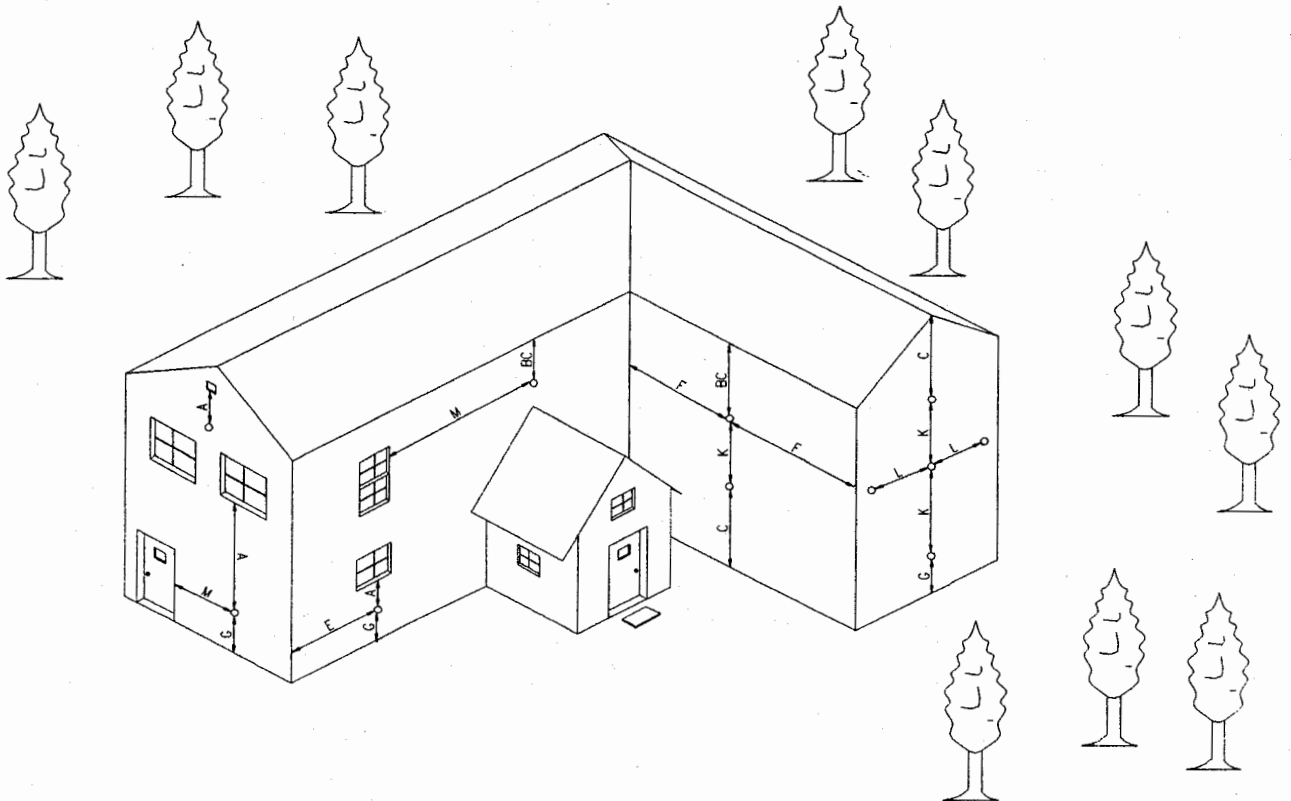
2.4.7 Terminations

- The air inlet terminal must face downwards.
- The exhaust terminal is designed to face outwards. However, if desired, the flue outlet terminal can face in any direction but must not be directed in the region of the air inlet.

The air inlet and exhaust terminals are subject to the requirements of BS5440: Part 1 for clearances from features of the building. The following table indicates the minimum clearances for the flue outlet and air inlet terminals.

- Do not place exhaust terminals in locations, which may cause damage to property (e.g. carports).

Dimension	Flue Terminal Clearance (mm)	Air inlet clearance (mm)
A. Below openable window, air brick, etc.	300	50
B. Below gutters, soil pipes, drain pipes.	75	75
C. Below eaves.	300	50
D. Below balconies.	200	50
E. From vertical drain or soil pipes.	75	50
F. From internal or external corner.	600	50
G. Above ground or roof.	300	100
H. From surface facing a terminal.	600	100
I. From terminal facing a terminal.	1200	1200
J. Vertically from terminal to same wall.	1500	1500
K. Horizontally from same wall.	300	300
L. Adjacent to opening.	300	300
M. Horizontally from same wall.	150	150



2.4.8 Terminal Guard

The temperature of the flue gases is not hazardous. However, if the installer decides that a terminal guard is necessary for other reasons (e.g. to protect the ends of the pipes from damage) then guards can be obtained from most gas heating supply merchants.

2.5 VENTILATION AIR

The JETSTREAM GASMISER is a room sealed appliance and therefore does not require purpose provided ventilation air for combustion.

2.5.1 Compartment Installation

In accordance with BS 5440: Part 2, when the boiler is installed in a compartment, purpose provided ventilation must be available for cooling purposes.

Boiler Model	Ventilated to:	
	Room or Internal space	Direct to Outside
Model 100	303 cm ²	152cm ²
Model 80	243 cm ²	122 cm ²
Model 60	182 cm ²	91 cm ²
Model 50	151 cm ²	76 cm ²

2.6 CONDENSATE TRAP

As the JETSTREAM GASMISER is a condensing boiler, it is fitted with a condensate trap at the base of the heat exchanger. The purpose of this trap is to:

1. Collect condensate and periodically release it into the drain.
2. Prevent exhaust gases exiting through the bottom of the heat exchanger in the case of a blocked exhaust flue.

2.6.1 Condensate trap connection

The condensate trap ends in a 22mm OD pipe stub. A plastic compression fitting should be used to join this stub to a 22mm OD plastic pipe.

(Do not reduce below 15mm ID within the building).

Use only plastic piping. Condensate should preferably be drained into the house sanitary waste system, or alternatively, into the rain water system. Condensate piping must be sealed to the outside.

2.6.3 Pipe Termination

Termination of the pipe must be externally at an open gully. Alternatively, discharge into a purpose made condensate soakaway can be considered. Existing or purpose built drains must use suitably corrosion resistant material as condensate is mildly acidic.

2.6.4 Freezing

Freezing of the termination and pipework must be prevented. To avoid freezing:

A minimum piping slope downwards towards the drain, of at least 2.5° (45mm per meter run), is essential.

Any drainage pipes outside the house must be at least 32mm internal diameter.

Note

Further guidance is given in the British Gas Publication 'Guidance Notes for the Installation of Domestic Gas Condensing Boilers'.

2.7 ELECTRICAL CONNECTIONS

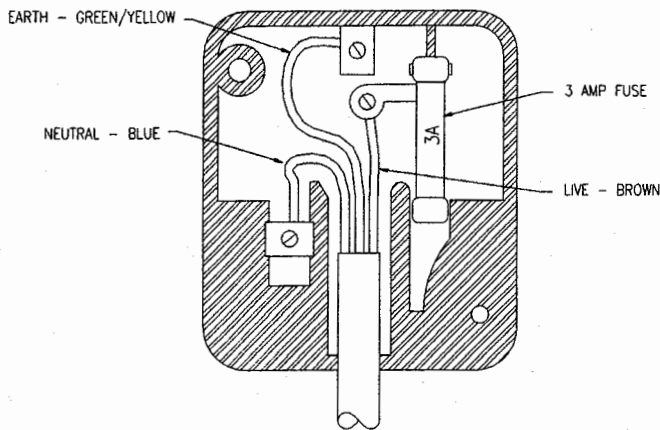
2.7.1 Requirements

- The boiler must be connected to a 220V, ~ 50HZ supply, fused at 3A.
- All external controls and wiring must be suitable for mains voltage. Wiring should be in 3 core PVC insulated cable not less than 24/0.2mm (0.75mm) to BS.6500 Table 16.
- Wiring external to the boiler must be in accordance with current I.E.E wiring regulations and local regulations.
- The connection point to the mains supply should be readily accessible and adjacent to the boiler, except for rooms containing a bath or shower. Refer to section 2.1.3.

2.7.2 Electrical Isolation of the Boiler

The method of connection to the mains electricity must facilitate complete electrical isolation of the boiler. This can be achieved by using:

- A 3-pin plug fused at 3A, wired as shown below and complying with the requirements of BS. 1363.
- By using a fused double pole switch, having at least a 3mm (1/8 inch) contact separation in both poles and which only services the boiler.



Warning

Reversal of the live and neutral connections will cause the control circuit to indicate loss of flame. The boiler will light for five seconds and then shut down if this occurs.

Pump Wiring

- The circulating pump should be wired to the external system controls (i.e time clocks). Alternatively the pump may be wired to an isolating switch (which would isolate both the boiler and the pump) or a 3-pin plug as described in section 2.7.2).

2.7.4 External Controls

- A Programmer may be used with zone valves to give independent control of central heating and hot water.
- System designs which allow the boiler to fire when there is no pumped circulation must not be used.

2.7.3 External Wiring and Controls

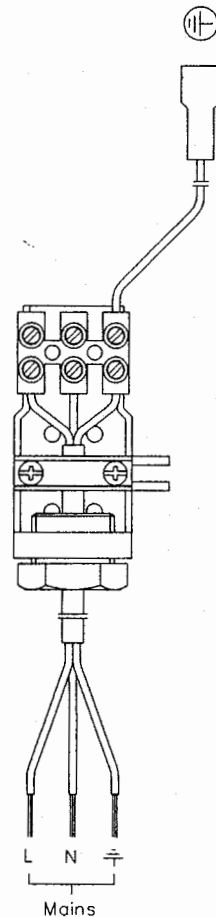
The boiler is not supplied with cables. Cables fitted for the mains and the pump must be connected to the terminals as follows:

Mains Cable

- The mains cable should be connected (see diagram opposite) as follows:

N (on connector) - Blue Wire (Neutral)
 L (on connector) - Brown Wire (Switch Live)
 E (on connector) - Yellow/Green (Earth)

- External controls such as room thermostats may be connected through the live L (see drawing across).



INSTALLATION PROCEDURES

3.1 UNPACKING

The boiler is supplied in one carton comprising the following. Unpack and check the contents.

1. Boiler.
2. Fixing Kit.
3. Flue Kit.

The fixing kit consists of:

1. Installation and Servicing Instructions.
2. Users Instructions.
3. Wall Mounting Bracket.
4. Wall mount template Drawing.
5. Gas service cock and union fitting.

3.1.2 Flue Kit

The flue exhaust kit contains the following:

1. 650mm x 50mm (diameter) plastic flue pipe.
2. Flue terminal.

Air Inlet

1. 650mm x 50mm (ID) air inlet pipe.
2. Air inlet terminal.

3.2 INSTALLATION OF BOILER GENERAL

- Read previous sections dealing with gas, flue and condensate connections and decide upon the position of the boiler.
- Ensure that the boiler is being mounted on a flat surface.
- Installation of the boiler is straightforward but consideration must be given to the flue and air pipes which must be pushed through walls and ceilings.
- Ensure that the front door of the inner enclosure (which is room sealed) is secure (6 screws).
- The order in which the components are installed will depend on the particular site conditions, but in general it will be easiest and

most accurate to firstly install the boiler and then make up the flue outlet pipe, air inlet pipe and electrical connections - this is the sequence described below.

Position the boiler on the wall with due consideration to the minimum clearances as shown in section 2.1 and proposed flue positions.

Mark through where the holes A, B, C, D, E for screws should be placed. Remove the boiler and drill the necessary holes (see following sections for details on drilling the holes). Place the wall plugs in the holes for the wall mounting bracket and the fixing holes. If preferred the wall mount template can be used.

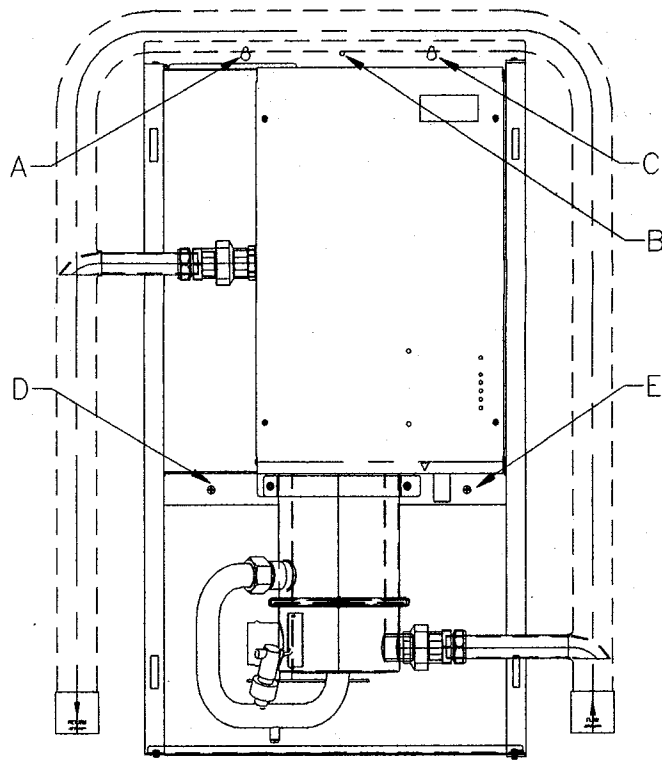
Note.

There are two locations indicated for the air intake. Select the most suitable one and mark for drilling.

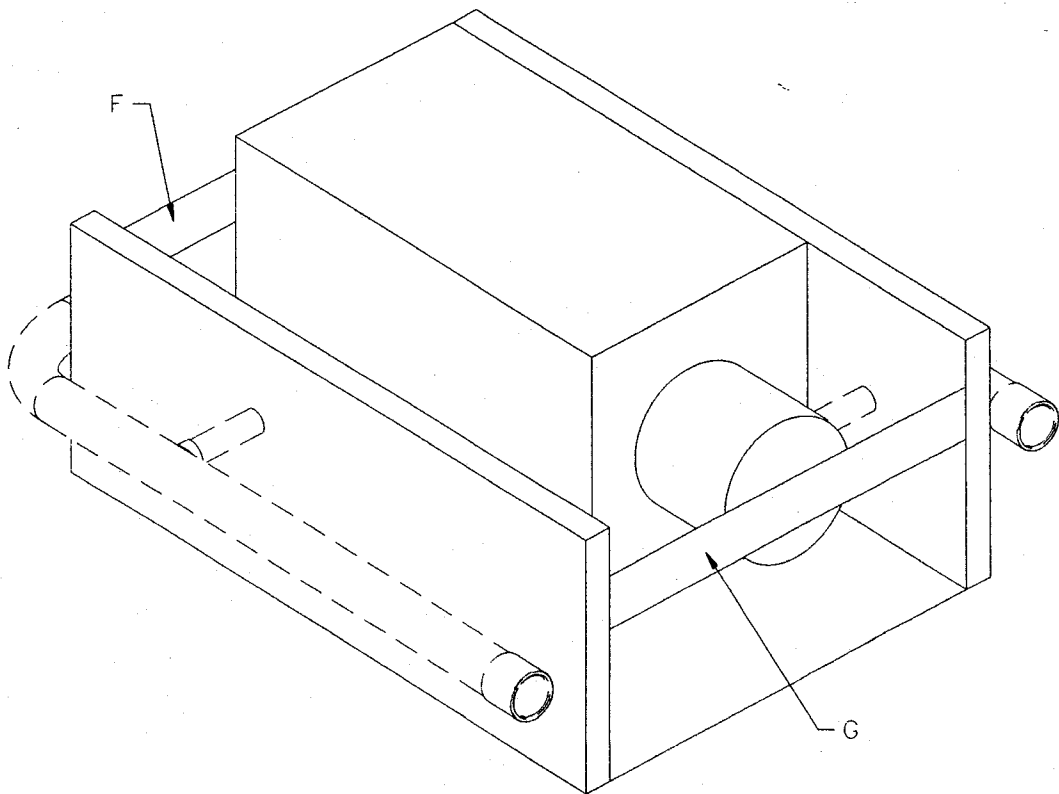
Only the side intake position may be used on the Direct version boiler.

3.3 MOUNTING THE BOILER

- Place the wall plugs in the holes for the fixing screws.
- Screw the two fixing screws (No. 12 x 2 inch) to within 8mm of the wall into the holes marked A and C shown overleaf.



- Lift the boiler using the supports F and G shown below.
- Screw in the remaining 3 fixing screws (No.12 x 2) to within 8mm of the wall into the holes marked B, D and E shown in the diagram above.
- Tighten all five screws.



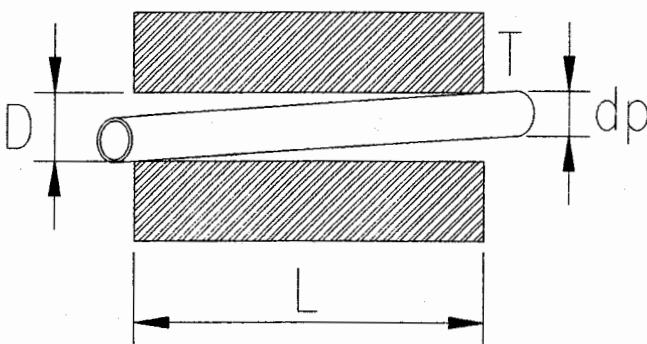
3.4 INSTALLING FLUE AND AIR PIPES

The exhaust flue pipe must slope downwards towards the boiler. This is best achieved by drilling an oversized hole through the wall which results in a 45mm slope per metre run of flue pipe. The flue outlet elbow can then be rotated to accommodate the slope.

- Two positions are provided for air intake (at the top and side of the inner enclosure). Chose the most suitable position for the installation and cover the alternative position using the metal plate and plastic rivets which are already installed in one of the air intake positions.
- If the installer uses the standard positions, as indicated on the template drawing, for air inlet and exhaust installation then these connections can now be built onto the boiler.
- If the standard connections are not being used then it is necessary to drill holes in the wall or ceiling. To allow access to drill the holes it may be necessary to remove the boiler. If the boiler is not removed then it should be protected so that debris cannot enter the appliance or plastic pipework.

3.4.1 Drilling Holes for the Air Inlet and Flue

- Outside diameter of the pipe, $dp = 56\text{mm}$.
- For 'horizontal' runs of flue pipe the holes must be oversized



Oversizing

For every 1m length of run through the wall (denoted by L on the drawing) the minimum diameter of the horizontal hole, D , must be $dp + 45\text{mm}$. This assumes that the pipe touches the wall at T . If not then D will have to be increased by the clearance from T .

Example

Wall depth $L = 750\text{mm}$

Diameter of pipe $dp = 56\text{mm}$

Diameter hole $D = 56 + [750/1000 \times 45] = 56 + 33.75 = 89.75\text{mm}$.

3.4.2 Assemble the Pipework

- Pipework must be assembled in accordance with section 2.4.
- Longer air inlet and flue pipes may be used if required. However, the maximum air inlet and flue pipes allowed with this boiler are 6m (20 ft).

The maximum allowable elbows with this length is 3 on the air intake and 3 on the exhaust.

Always thoroughly deburr all pipes and, most important, remove any shavings from within the pipe.

- When using the adhesive supplied, follow the instructions given on the tube.

Flue Assembly

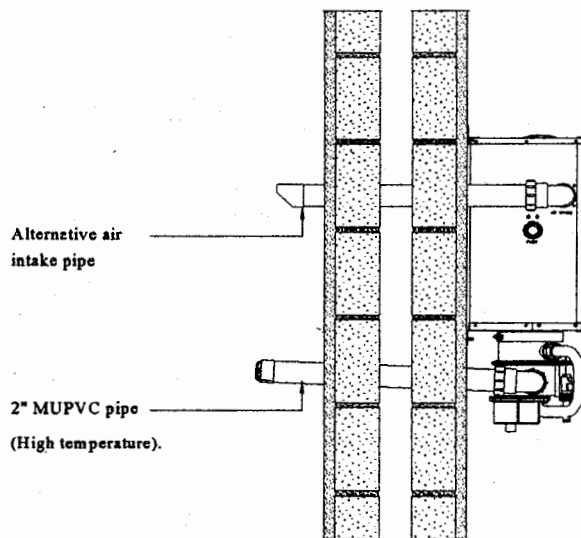
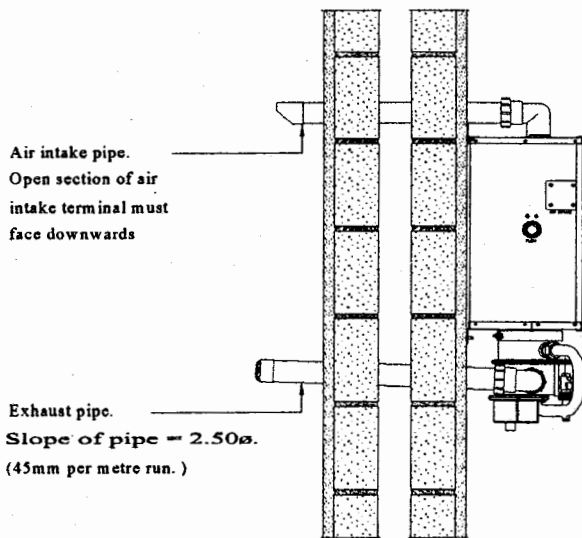
- Cut the air inlet pipe so that at a minimum it is long enough to go through the wall plus approx 140mm (to ensure minimum clearance outside the wall).
- Undo the plastic flue elbow from the boiler and push the flue pipe through the wall. Reassemble the flue elbow to the boiler.
- Assemble the flue pipe to the plastic flue elbow (supplied on the boiler) as follows.
- Push the plastic nut onto the pipe. Push the plastic ring and the rubber 'O' ring approx. 35mm onto the plastic pipe. Ensure that the sloping section of the rubber 'O' ring faces the elbow.
- Locate the pipe in the elbow. The elbow should fit against the rubber 'O' ring. Screw in the plastic nut.
- Attach the flue termination onto the end of the flue pipe.

Air Inlet Assembly

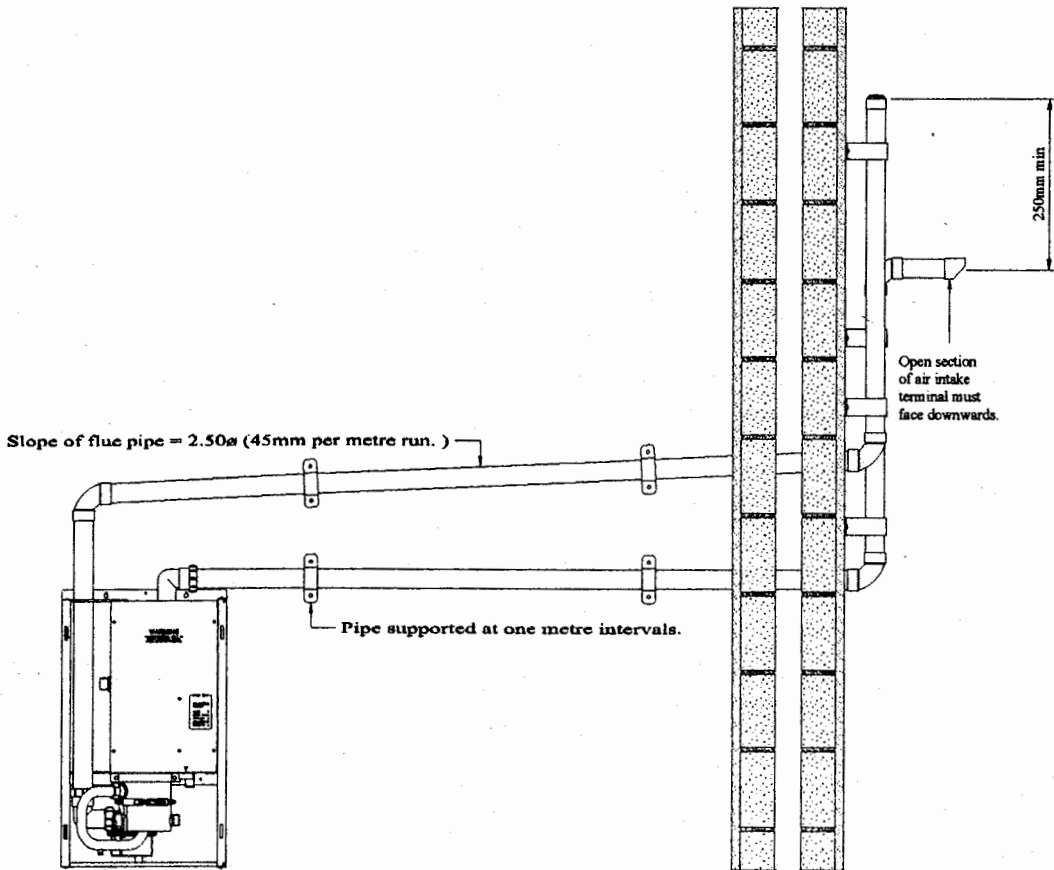
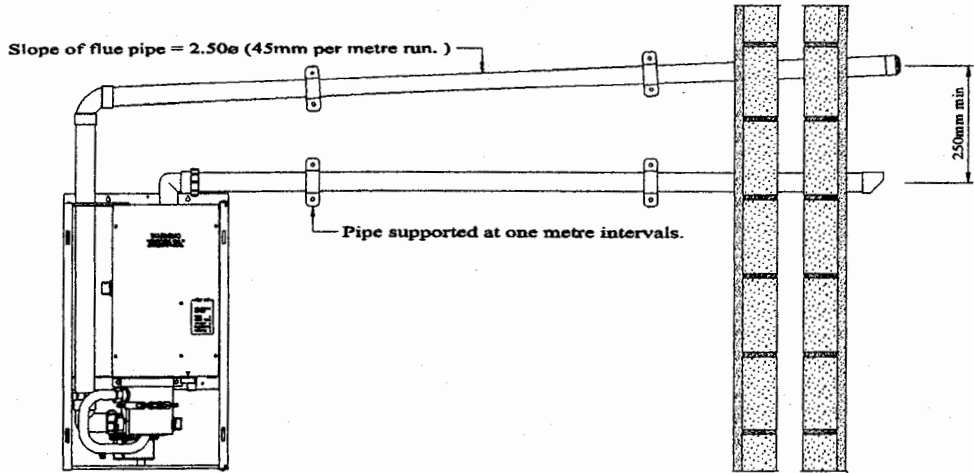
- Cut the air inlet pipe so that at a minimum it is long enough to go through the wall plus 160mm (to ensure minimum clearance outside the wall).
- Locate the air intake elbow in the hole in the inner enclosure and lock in place using the plastic fixing nut.
- Push the plastic air inlet pipe through the wall.
- Connect the air inlet pipe and elbow using the method of elbow assembly described in the flue assembly section on previous page.
- Attach the air intake termination to the air intake pipe outside the wall. The opening in the termination should face down

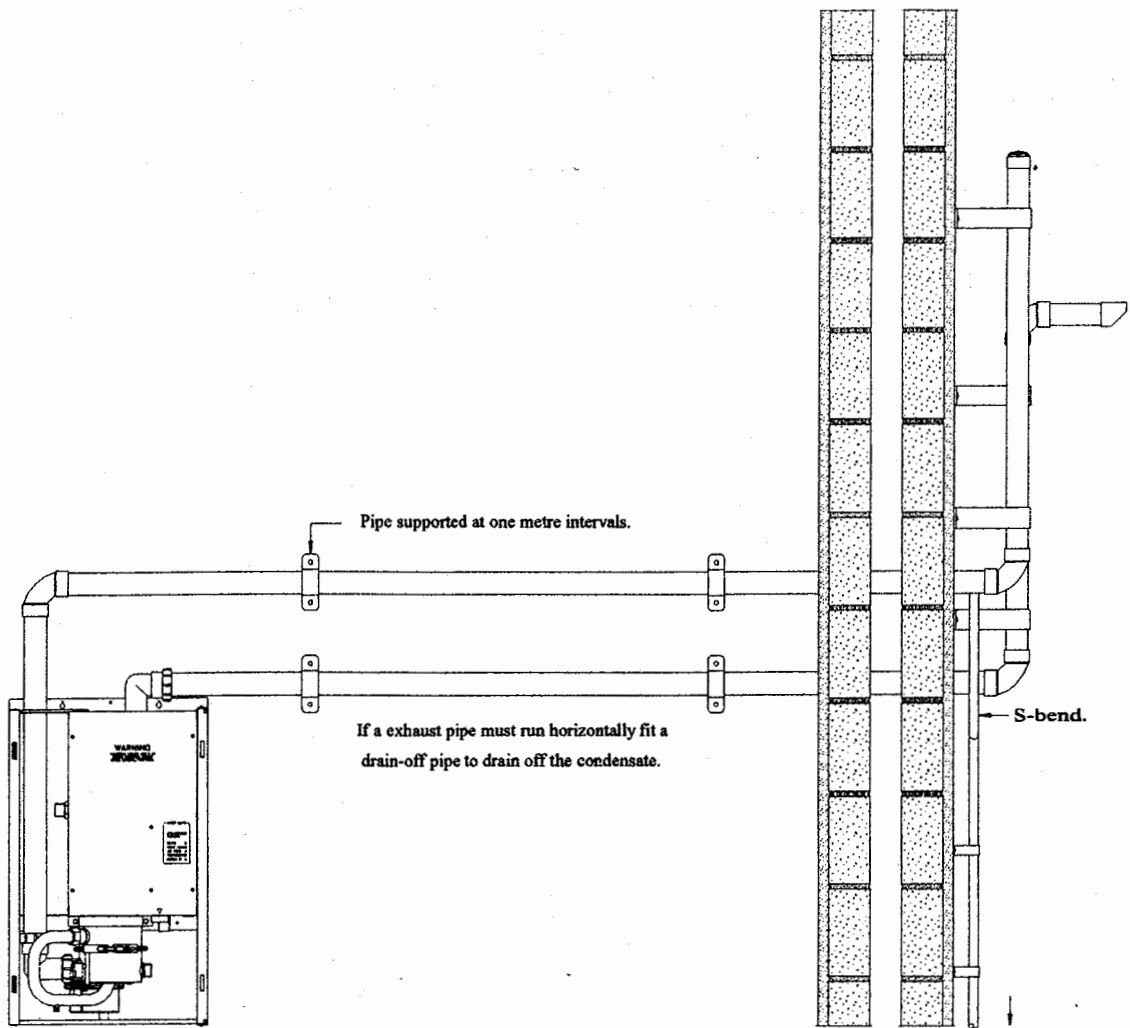
IMPORTANT

- When pushing pipes through walls ensure that grit and dust is not allowed to enter the pipe. Ensure pipes are fully engaged into sockets.
- Make good all holes.
- Support any pipes whose route could be displaced either of its own accord or by accident. Any horizontal or vertical run over 1m should always be supported.
- Check all connections for security and seal any joints whose soundness may be in doubt. It is equally as important to seal pipe joints on the air inlet as on the flue outlet.

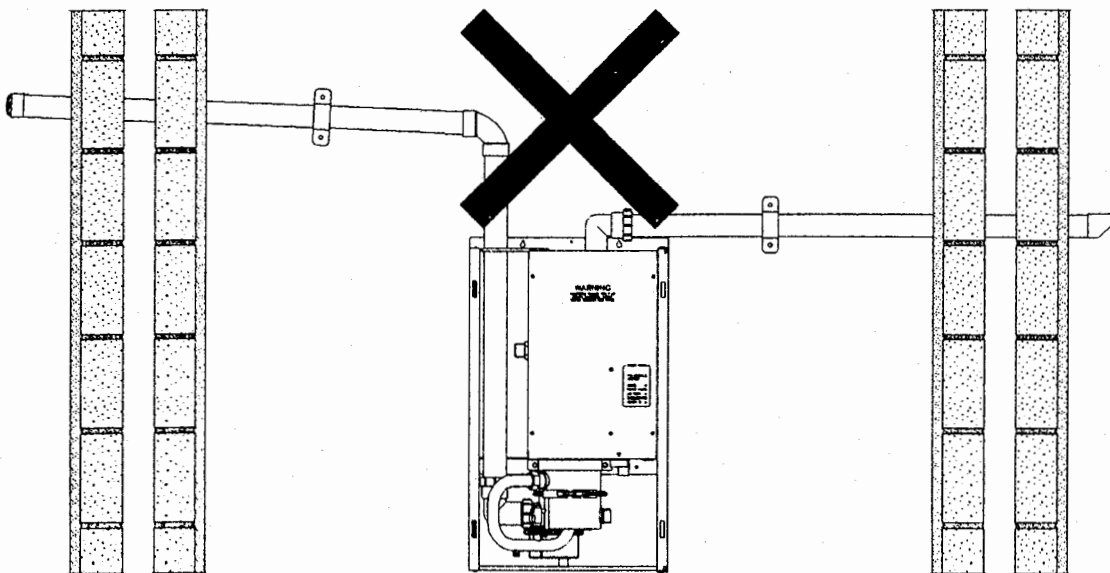


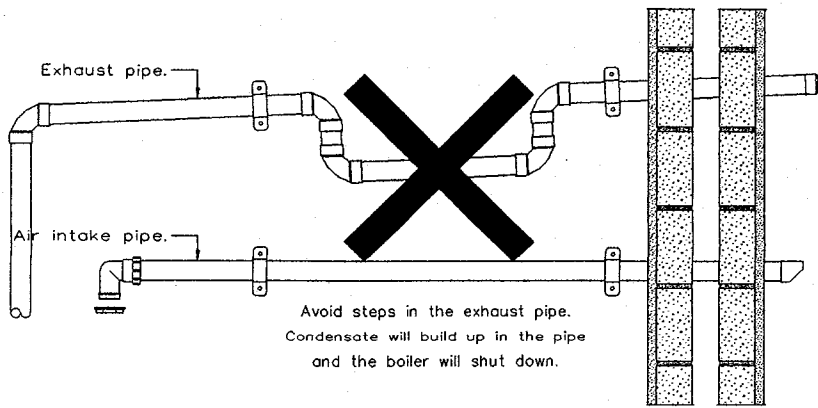
EXTENDED FLUES
AIR INTAKE: Up to 6M with three 90° bends.
EXHAUST: Up to 6M with three 90° bends.
MATERIAL: 2" MUPVC.



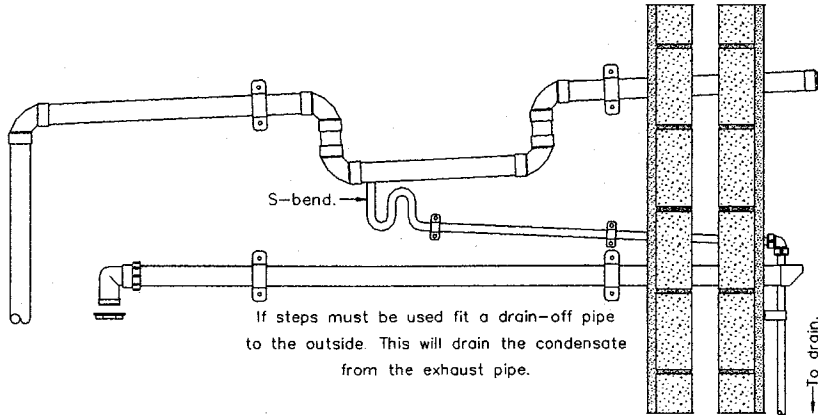


This arrangement will cause outside air to flow through the boiler when it is not running. This may cause excess moisture to be deposited in the inner enclosure.

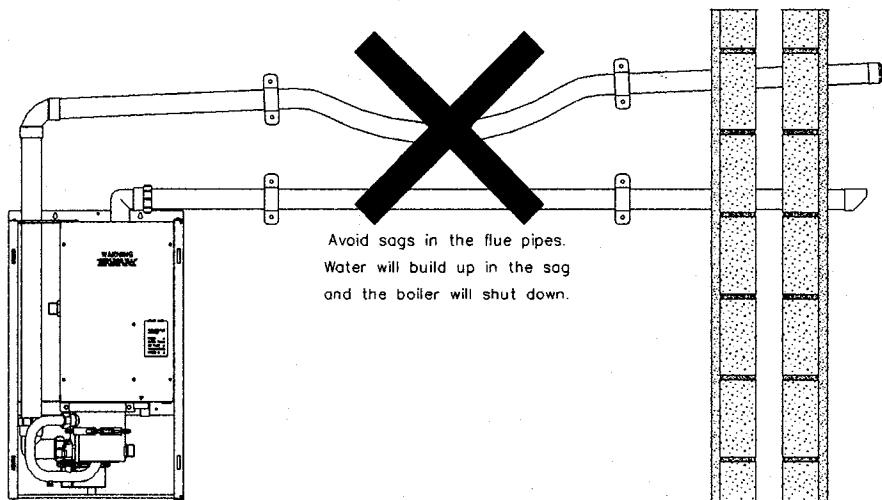




Avoid steps in the exhaust pipe.
 Condensate will build up in the pipe
 and the boiler will shut down.



If steps must be used fit a drain-off pipe
 to the outside. This will drain the condensate
 from the exhaust pipe.



Avoid sags in the flue pipes.
 Water will build up in the sag
 and the boiler will shut down.

3.5 CONDENSATE DRAINAGE

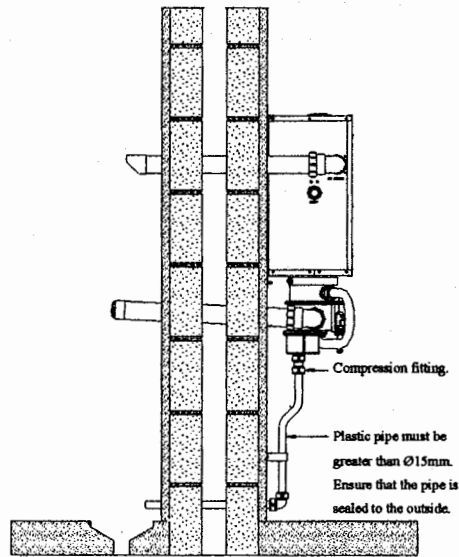
- Requirements for condensate drainage are given in section 2.6. Use only plastic pipe. Copper pipe is strictly not suitable.
- Attach the condensate pipe to the condensate trap using a compression fitting.
- Ensure that the condensate is piped to the outside.

Connection: 22mm OD plastic pipe

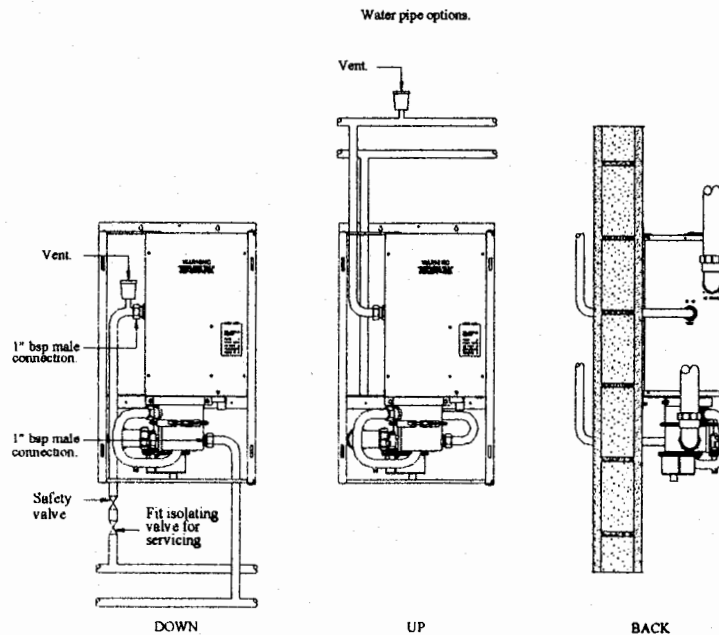
3.6 WATER SYSTEM

- Details of system requirements are given in Section 2.3.
- Connect the flow and return pipework to the boiler.
- The water pipes from the water system connecting to the boiler may be directed upwards, downwards or to the back.

Connections: 1" BSP Female.



CONDENSATE CONNECTION



Vents should be placed on high points in the heating system.

WATER CONNECTION

3.7 GAS SUPPLY

- Connect the gas service cock to the gas pipe which emerges at the bottom of the boiler.
- Connect the union fitting to the gas supply pipe.
- Connect the gas supply pipe to the end of the union fitting. Details of the system requirements are given in section 2.2.
Open the gas service cock.

Connection: The gas service cock supplied is a ½" 'high flow' unit. If replaced it must be of the same design or a larger size may be fitted.

3.8 ELECTRICAL SUPPLY

3.8.1 Important

- The electrical supply must be as specified in Section 2.7.
- The appliance must be earthed.

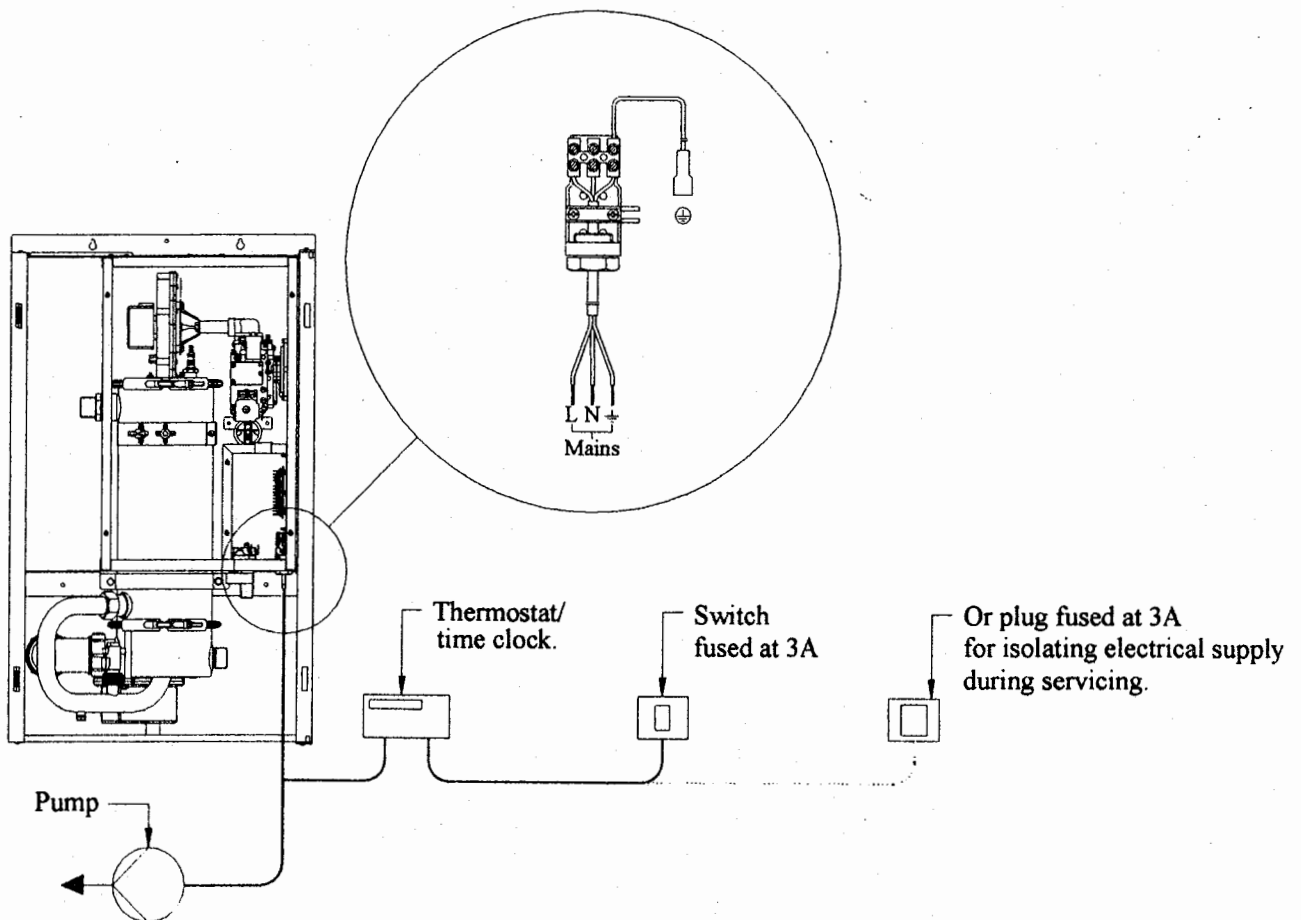
3.8.2 Installing Electrical Supply

- Undo the six M4 screws securing the front door of the inner enclosure. Remove the door..
- Undo the nut holding the terminal connector to the bottom of the electrical box and remove the terminal connector (shown below).
- Feed the cable through the plastic nut and hole in the electrical box vacated by the terminal.
- Feed the cable through the grommet and strain relief gland of the terminal connector.

- Connect the Live, Neutral, Earth to the terminals as follows: connect the Live to the terminal containing the brown wire; connect the Neutral to the terminal containing the Blue wire and the Earth to the terminal containing the green/yellow wire. Tighten the strain relief gland.
- Push the terminal connector back into the bottom of the electrical box and lock in place with the plastic nut.
- Check the seal around the front door of the inner enclosure is correct and intact. Replace the door.

NOTE

Ensure that connections are made such that if the cable slips in its anchorage the current carrying conductors become taut before the Earthing conductor.



ELECTRICAL CONNECTION

Or plug fused at 3A for isolating electrical supply during servicing.

Commissioning

The QUANTUM HEATSAVER contains components which could be damaged or blocked by grease and dirt, solder, etc., from the water system. The following commissioning procedures must be followed precisely.

4.1 INITIAL FLUSHING

- Disconnect the boiler from the system at the flow and return connections.
- Flush the entire system until clean water is discharged. This water should be free of dirt, flux, and solder, etc. The use of a flushing chemical is recommended, e.g. Fernox BC10. Sludge and scale must be removed from an existing system.
- Connect the boiler to the system and fill the system in accordance with section 2.3. At this stage, for sealed systems, fill to a pressure of about 2.7 bar.
- Check the entire system for water soundness.
If there are leaks to be rectified using flux and solder, then the system must be flushed again before proceeding.
- Reduce the pressure of the initial system design pressure for sealed systems, if applicable.
- Vent the system.

4.2 GAS SUPPLY

- The complete gas installation up to the boiler service cock must be checked for soundness as per BS 6891.

4.3 ELECTRICAL INSTALLATION

Carry out preliminary electrical safety checks, i.e.:

1. Earth continuity.
2. Polarity.
3. Resistance to Earth.
4. Short circuit using a suitable test meter.

4.4 S.I.T. NOVAMIX GAS VALVE

The S.I.T. Novamix gas valve operates in the following way

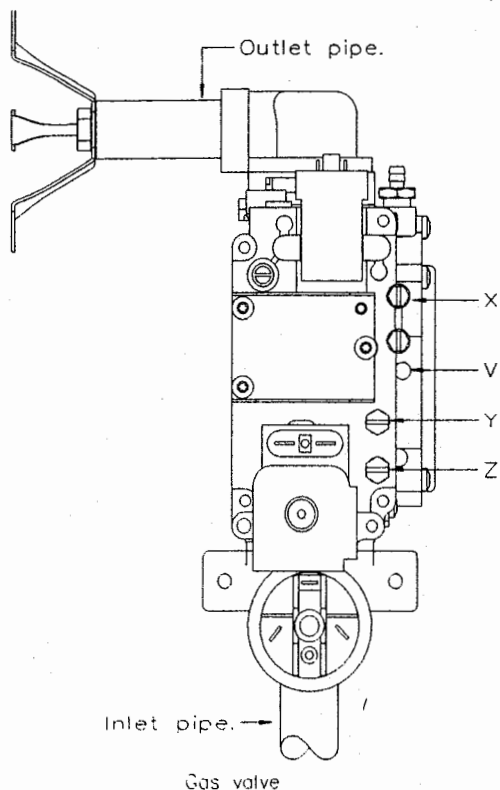
1. A restrictor is placed on the inlet to the fan. Airflow through the restrictor into the fan causes a pressure drop across the restrictor.
2. This pressure drop caused by air flowing through the restrictor is fed to the gas valve.
3. The gas valve amplifies this air pressure signal and provides a gas output pressure which is 3.5 times the air pressure.
4. If the airflow to the boiler is reduced (due to flue blockage, etc.) then the air pressure drop across the restrictor on the inlet to the fan is also reduced. This in turn reduces the gas output pressure and the gas flow.
5. In this way the ratio of the gas to air (i.e. the burning mixture) always remains constant.

4.4.1 Initial Firing and Measuring the Gas Output pressure

The gas output pressure depends on the air pressure drop across the restrictor on the inlet to the fan. This in turn depends on the airflow through the fan. Airflow varies with the flue (i.e. length and the number of elbows) and the voltage. The gas output pressure can be measured in the following way:

1. Purge the gas supply in accordance with BS 6391.
2. Ensure the gas cock is open.
3. Remove the front door of the inner enclosure.
4. Remove the screw from the test point marked on the gas control valve (X on the diagram overleaf) and attach a suitable gauge. This shows the air pressure when the boiler is running.
5. Turn on the electricity supply, set any external controls to call for heat and set the boiler control thermostat to maximum (rotate the knob on the boiler thermostat).

6. After about 4 to 8 seconds a spark will ignite the gas/air mixture at the burner.
7. Note the reading on the pressure gauge after a few minutes. This is the air pressure. Replace the screw in the air pressure test point.
8. Remove the screw from the pressure test point marked 'A' on the gas valve (Y on diagram below) and attach a suitable gauge. This shows the gas output pressure. (point Z gives the gas input pressure).
9. Relight the boiler and note the reading on the gauge. This shows the gas output pressure. (Gas input pressure can be measured at point Z).
10. Check the Performance Date Table in section 1.3.1 to check that the gas valve provides the correct gas pressure for the measured air pressure. If it does not consult Quantum.
11. We recommend that a combustion analyzer be used to check that the boiler is burning the correct mixture.
12. Check for gas soundness on the gas pipes and joints.
13. Remove the pressure gauge and replace the screw in the gas valve. Replace the front door of the inner enclosure.



4.5 HOT FLUSHING (indirect version only)

- Allow the system to heat up, while checking for water soundness.
- Turn off the boiler and flush the water system while still hot. Flush the system thoroughly with clean water. Follow the instructions provided with the cleaning agent.
- Refill the system adding a quality water treatment agent such as Fernox CP3. For sealed systems, fill the system to the required initial design pressure. (see section 2.3).

4.6 ADJUSTMENTS/CHECKS

- Light the boiler and allow it heat up.
- Adjust the water flow rate to give differential temperature of 12 to 15 deg C between the flow and return.
- Turn the control thermostat anticlockwise and note that the burner cuts out.
- Check the operation of any external controls.
- Remove the pressure gauge, replace the screw ensuring a gas tight seal.
- Check that the sealing tape around the front of the inner enclosure is intact. Locate the front door of the inner enclosure correctly and secure with 6 screws. The boiler is now room sealed. Close the front door of the boiler.

4.6.1 Programming the pool Thermostat (DIRECT VERSION ONLY)

Programming the 'SET POINT' (refer to diagram on following page)

Press key 'P' and release it, the 'SET' led will flash and the SET value will be shown in the display. To modify, press key 'UP' to increase value or key 'DOWN' to decrease it. These keys count one digit at a time but if the keys are pressed for more than one second, the value increases or decreases faster, and after pressing it for more than two seconds the value changes faster still. Exiting the 'SET POINT' programming mode happens automatically 5 seconds after the keys have been released.

Programming the 'PARAMETERS'

To access the operating parameters it is necessary to press and hold down 'P' key for about 5 seconds, after which the 'SET' led will flash and the code for the first parameter will be seen in the display. The 'P' key can now be released and by pressing 'UP' or 'DOWN' the desired parameter can be selected.

Once the parameter in which you intend to operate has been selected, to modify it press 'P' then release it, the set of the parameter will show up.

To modify the value press 'UP' or 'DOWN' to increase or decrease the value.

Once the desired value has been set, press and release

'P' and the selected parameter code can be read in the display.

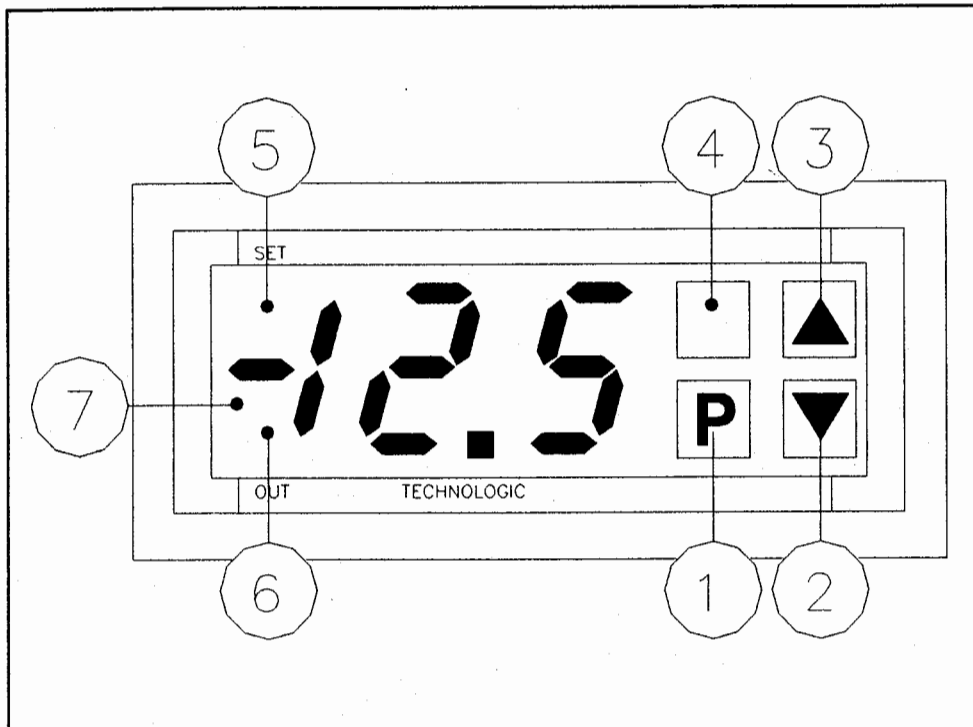
By pressing 'UP' or 'DOWN' it is therefore possible

To choose another one and modify it as mentioned previously.

To exit the programming mode, no key should be pressed for approximately 20 seconds, the control will automatically return to normal functioning mode

displaying the current pool water temperature.

- 1 - 'P' key : Used for set point setting and to program the functioning parameters.
- 2 - 'DOWN' key : Used to decrease the set point value or to select parameters.
- 3 - 'UP' key : Used to increase the set point value or to select parameters.
- 4 - Key not used.
- 5 - 'SET' led : Signals the set point programming (on) or the parameters programming mode (flashing)
- 6 - 'OUT' led : Signals a heat demand (on) or (off) no heat demand or (flashing) inhibited
- 7 - AL led : Signals alarm status (when fitted) on (on) or (off) off or (flashing) silenced.



4.7 HANDING OVER TO THE USER

It is important to fully explain the following to the user:

1. The procedure to light and turn off the boiler, including the way in which the electrical supply may be isolated if necessary.
2. The means of controlling the boiler. As the JETSTREAM GASMISER is a condensing boiler, it should be explained that the efficiency is higher at lower water return temperatures. However, it should also be pointed out that as the outside temperature falls, it might be necessary to increase the control thermostat setting to maintain required heating levels.
3. The function of the lockout feature must be explained as follows:
4. If one or more of the fault indicator lights (i.e. "Thermostats", "Air flow", "Water flow", "Flame") has failed to come on then this means that the boiler has failed to light and lockout has occurred. Turn off the electrical supply and wait for ten seconds. Turn on again and wait.

If the boiler goes to lockout again then check that the gas supply on.

If it is not possible to start up the boiler and the gas is on then the boiler should be isolated and a JETSTREAM service engineer should be called to rectify the fault. Indicate which lights have failed to come on.

4. Advise that the reduction in the water pressure reading on the gauge for sealed systems indicates a leak which should be rectified before further use.
5. Advise that for open systems there should always be water in the top up tank.
6. Advise that the appliance should be serviced at least once per year by a competent person.
7. Advise on frost precautions.
8. Hand over the user instructions.

FAULT FINDING

5.1 ELECTRICAL CONTROL SEQUENCE

When the external controls are calling for heat, power will be fed to the boiler at the live connection on the terminal block (see functional flow diagram).

This causes the 'power in' light on the check card to be illuminated. If all the temperature control thermostats (i.e. boiler thermostat, pool thermostat, high limit thermostats) are closed, then the "Thermostats" check light will come on and the following sequence will be initiated:

1. Provided the Normally Closed contact on the Air Pressure Switch is closed, the fan will start. Air is drawn from the outside into the inner enclosure (which operates under negative pressure) and blown into the burner by the fan.
2. When the fan reaches running speed the air flow pressure proving switch contactor will change over from the Normally Closed to the Normally Open contact. On the 100 model power will be fed through the gas pressure switch to ensure that there is sufficient gas flow. The "gas/air flow light will come on indicating that there is sufficient gas pressure and airflow for the boiler to fire. On the 50 model the "Air Flow" light will come on indicating that there is airflow to the boiler (the 50 model does not have a gas pressure switch).
3. If there is sufficient water flow through the boiler the water flow switch will close and the "Water flow" light will come on. If the airflow and water flow are correct the ignition sequence will start.
4. After a prepurge period of 4 to 8 seconds, (during which the the pre-purge lockout light will be on) the gas valve will open to allow gas to mix with the air at the suction side of the fan. The gas rate is proportional to the airflow (an air signal is passed from the inlet of the blower to the gas valve). Therefore the gas/air ratio remains

constant if the airflow changes (e.g. due to blockage in the flue).

5. The ignition spark will occur at the burner causing the gas/air mixture to ignite.

6. When the gas/air mixture ignites in the burner chamber, the flame is detected by the flame detector circuit on the control card. The "Flame" light comes on indicating that ignition has taken place and the control box is detecting a flame. The ignition spark is then stopped. Note that the ignition spark and flame are detected by the same electrode.

7. The boiler is now in normal running mode.

8. The burner will continue to fire until the gas valve interrupts the gas supply. The gas valve will be closed in the normal operation of the boiler in the following cases:

- Power to the boiler is interrupted by external controls.
- Power to the control box is interrupted by the temperature control thermostats (i.e. boiler thermostat, high limit stat).
- Power to the control box is interrupted by the water flow switch.

9. Power to the gas valve may also be interrupted by the temperature protection thermostats (i.e. flow overheat thermostat, flue overheat thermostat) and the flame sensor due to low gas pressure (on the 50 model). These occurrences are not part of the normal operation of the boiler and failure of the boiler due to these protection devices should be investigated. (The lockout light will then come on).

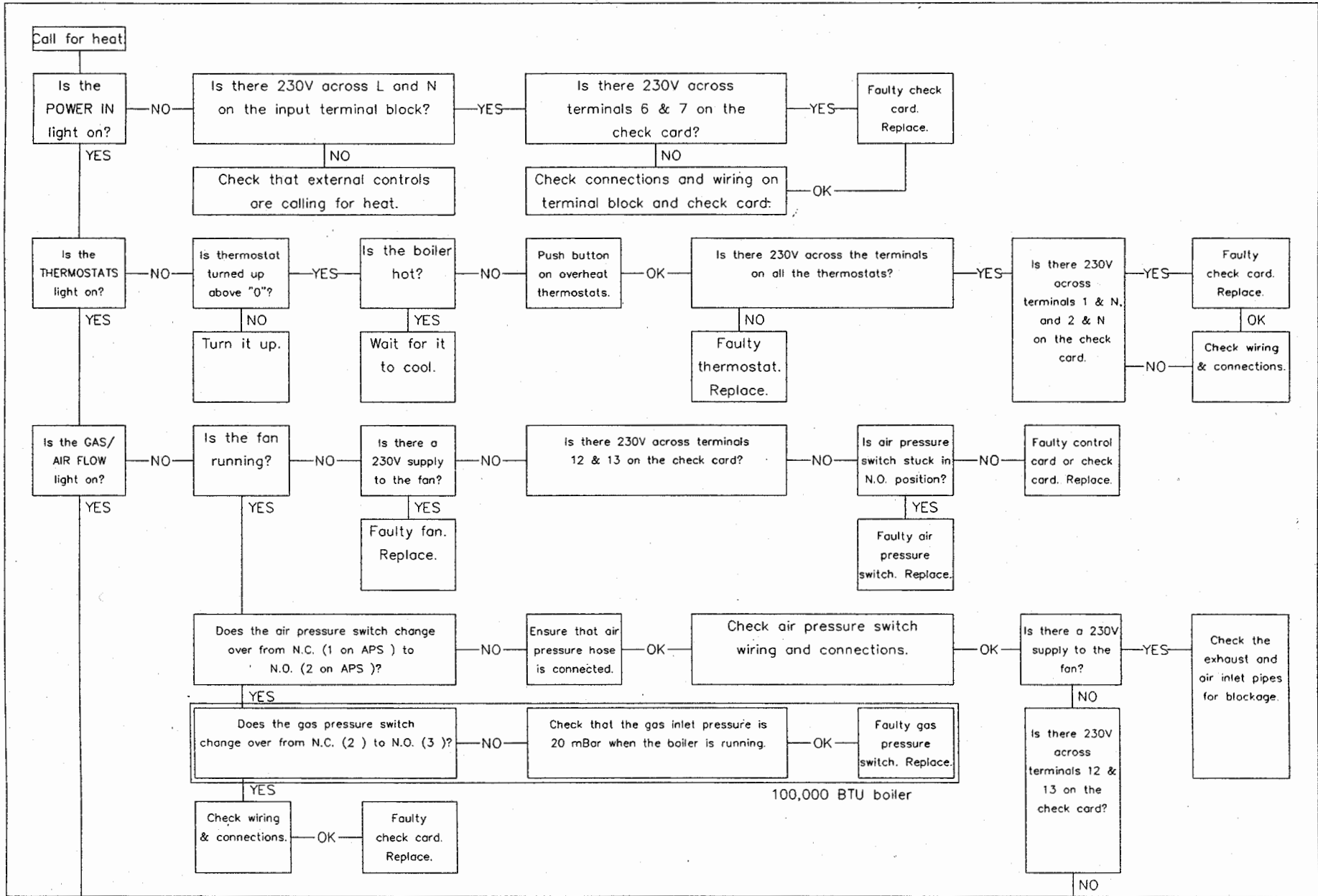
Any failure of the boiler to run through its start up sequence in the above manner or operate in its normal mode of operation should be investigated using the trouble shooting flow and wiring diagrams on the following pages.

5.1.1 Check Card

The check card contains the lights mentioned in the previous section. This check card is connected to the ignition control card. Always ensure that the control cards are securely connected. Terminals on the check card can be tested using a suitable multi-metre.

IMPORTANT

- Before attempting any electrical faultfinding, always carry out preliminary electrical system checks.
- On completion of any service or fault finding task which has required the breaking and remaking of electrical connections, the following checks must be completed:
 1. Earth Continuity.
 2. Polarity.
 3. Short Circuit.
 4. Resistance to Earth.



Incoming voltage is not high enough.
Consult with power company.

Is the
WATER FLOW
light on?

NO

Is there 230V across
terminals 14 & N and 15 & N
on the check card.

NO

Check heating system— ie.
Are the pumps operating?
Is there air in the system? etc.

OK

Faulty flow
switch.

YES

YES

Faulty check
card. Replace.

Is the
FLAME
light on?

NO

Does boiler
lockout after
5 seconds?

YES

Is the gas pressure at the gas
valve outlet ok?
See commissioning section 4.4.1.

YES

Check flame sensor.
Check for flame sensor short circuit.
Check for reversed electrical polarity.

OK

Faulty
control card
Replace.

NO

Check that the gas pressure is at
20 mbar at the gas valve inlet when
the boiler is running.

OK

Is there 230V between
terminals 3 & 4
on the check card?

YES

Check gas
valve wiring
& connections.

OK

Faulty solenoid
or gas valve.
Replace.

NO

Faulty control
card or check
card. Replace.

Is HT voltage
present?

NO

Is the spark
gap equal to
4mm?

NO

Does the boiler attempt to light
and lock-out immediately?

NO

Check burner.
Replace if
necessary.

NO

Faulty
control card.
Replace.

Reset gap or
replace
electrode.

YES

Possible installation fault.
Check exhaust pipe for water build-up.

NOTE

Please ensure that the check card is securely connected to the ignition control card.

FAULT FINDING CHART

ROUTINE (ANNUAL) SERVICING

In order to ensure continued efficient operation, it is recommended that the appliance be checked and serviced as necessary at regular intervals. Frequency of servicing will depend on the particular installation conditions and usage, but, in general, once per year should be adequate.

IMPORTANT

Service work must be carried out by competent persons.

6.1 GENERAL

If the tests prescribed in Section 6.2 prove satisfactory, then the routine servicing procedures can be restricted to removal and inspection of the electrodes and burner and cleaning of the condensate trap. Procedures for replacement of parts are given in Section 7.

NOTE

Isolate the electrical supply to the boiler before any servicing or replacement of parts.

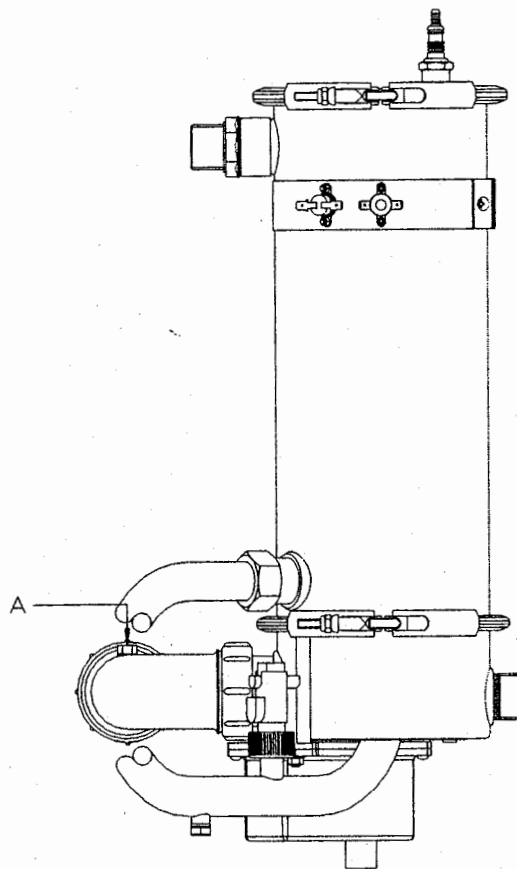
6.2 PRE-SERVICE CHECKS

6.2.1 Heat Exchanger Blockage Check

- Open the front door of the boiler.
- Ensure the gas cock is open.
- Light the boiler and wait for it to heat up.
- using a suitable temperature meter record the water flow and return temperatures.
- For new installations the temperature difference between the flow and return should be 14°C for a return temperature greater than 50°C.
- If the temperature difference between flow and return is greater than 20°C and the water flow through the boiler is at recommended levels (section 1.3.2) then the heat exchanger should be cleaned (section 6.4).

6.2.2 Exhaust Pipe Blockage

- If there is no blockage in the heat exchanger then the exhaust pipe can be tested for blockage.
- Remove the front door of the inner enclosure, six screws
- Remove the test point A on the flue (see diagram below). Attach a pressure gauge.
- The pressure recorded at 'A' should not be greater than 20 – 25 MM. If it is then the exhaust pipe should be checked for blockage.



6.2.4 General Boiler Checks

While the boiler is lighting check:

1. The CO and CO²
2. For soundness of the gas and gas/air pipework and joints (BS. 6891).
3. For soundness of water and condensate pipework and fittings.
4. That when the return water temperature is less than 40 °C, condensate flows freely and the condensate line is not obstructed.
5. That the boiler control thermostat functions correctly.
6. That the air inlet and flue outlet pipes do not leak (in or out) and the terminals are free from obstruction.

Turn off the boiler and allow to cool. Replace the plug in the flue. If the above tests are successful then it will only be necessary to service the items described in section 6.3.

6.3 NORMAL SERVICING ITEMS

6.3.1 Burner

- Isolate the electrical supply and turn off the gas supply at the gas service cock.
- Remove the burner (7.5.3).
- Handle the metal fibre burner material with care.
- Inspect for damage to the metal fibre material. Check for broken welds and for any blockage in the burner.
- Replace the burner if there are any problems.
- Check the burner gasket. Replace if necessary.
- Replace all components in reverse order.

6.3.2 Electrodes

- If the burner has been removed then the electrodes are easily accessible. If not, gain access to the electrodes (7.5.1).
- Clean the electrodes and ensure that the spark gap is 4mm.
- Replace all components in reverse order.

6.3.3 Cleaning the condensate trap

- Locate the condensate trap behind and at the bottom of the heat exchanger.

- Remove the six screws holding the condensate trap to the heat exchanger. Note that the vessel may be full of water.
- Rinse this vessel thoroughly until clean.
- Replace all components in reverse order.

6.4 CLEANING THE HEAT EXCHANGER

- Remove the fan and burner assembly.
- Remove the condensate trap. Ensure that there is a water collection vessel under the condensate drainage point at the bottom of the heat exchanger.
- Pour water into the combustion chamber (using a hose or otherwise). The water will flow through the heat exchanger washing away any deposits.
- The water will then flow from the heat exchanger at the condensate drainage point.
- Note that the water will also flow from the heat exchanger at the flue outlet if the flue has been disassembled. Therefore, if the flue has been disassembled, ensure that there is a water collection vessel under the flue outlet.
- Replace components in reverse order.
- Contact JETSTREAM if it is not possible to free any obstruction in the heat exchanger.

IMPORTANT

- Relight and check for soundness of gas and water joints broken during servicing.
- Check that the sealing tape around the front of the inner enclosure is intact. Locate the front door of the inner enclosure correctly and secure with six screws. This ensures that the boiler is room sealed.
- Run the appliance and check for satisfactory operation.

REPLACEMENT OF PARTS

7.0 GENERAL

A competent person must always carry out replacement of parts.

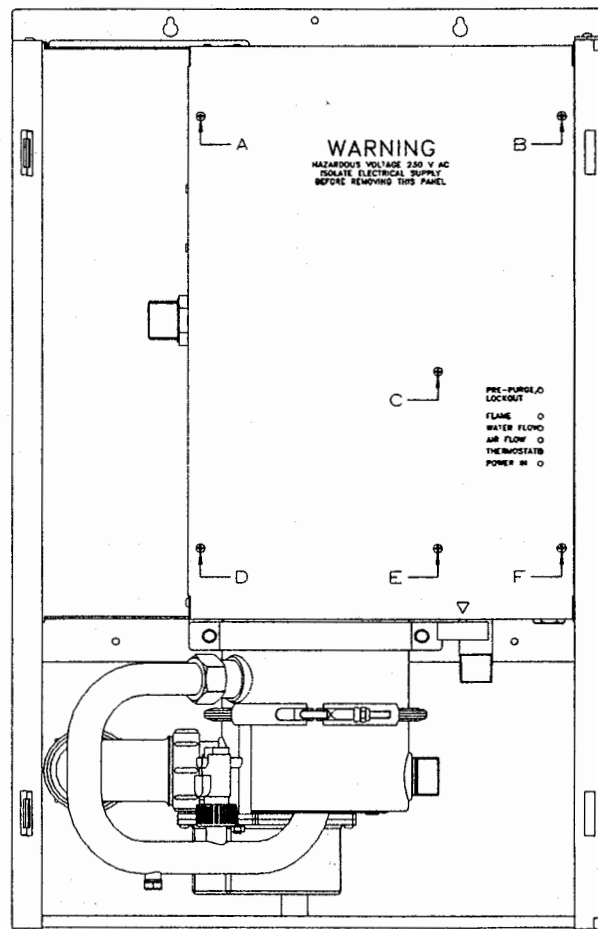
7.1 PRECAUTIONS

- Always switch off the mains electricity supply.
- Gain access to the appliance and turn off the gas at the appliance service cock.

7.2 ACCESS

7.2.1 Access to the Inner Enclosure & electrical box

- Open the front door of the boiler.
- Remove the six M4 screws A to F (see below) in the inner enclosure and remove the front panel or let it hang to the side in the case of the direct version.
- It is now possible to access any of the components contained in the inner enclosure and the electrical box. The electrical box is located at the bottom right hand corner of the inner enclosure.



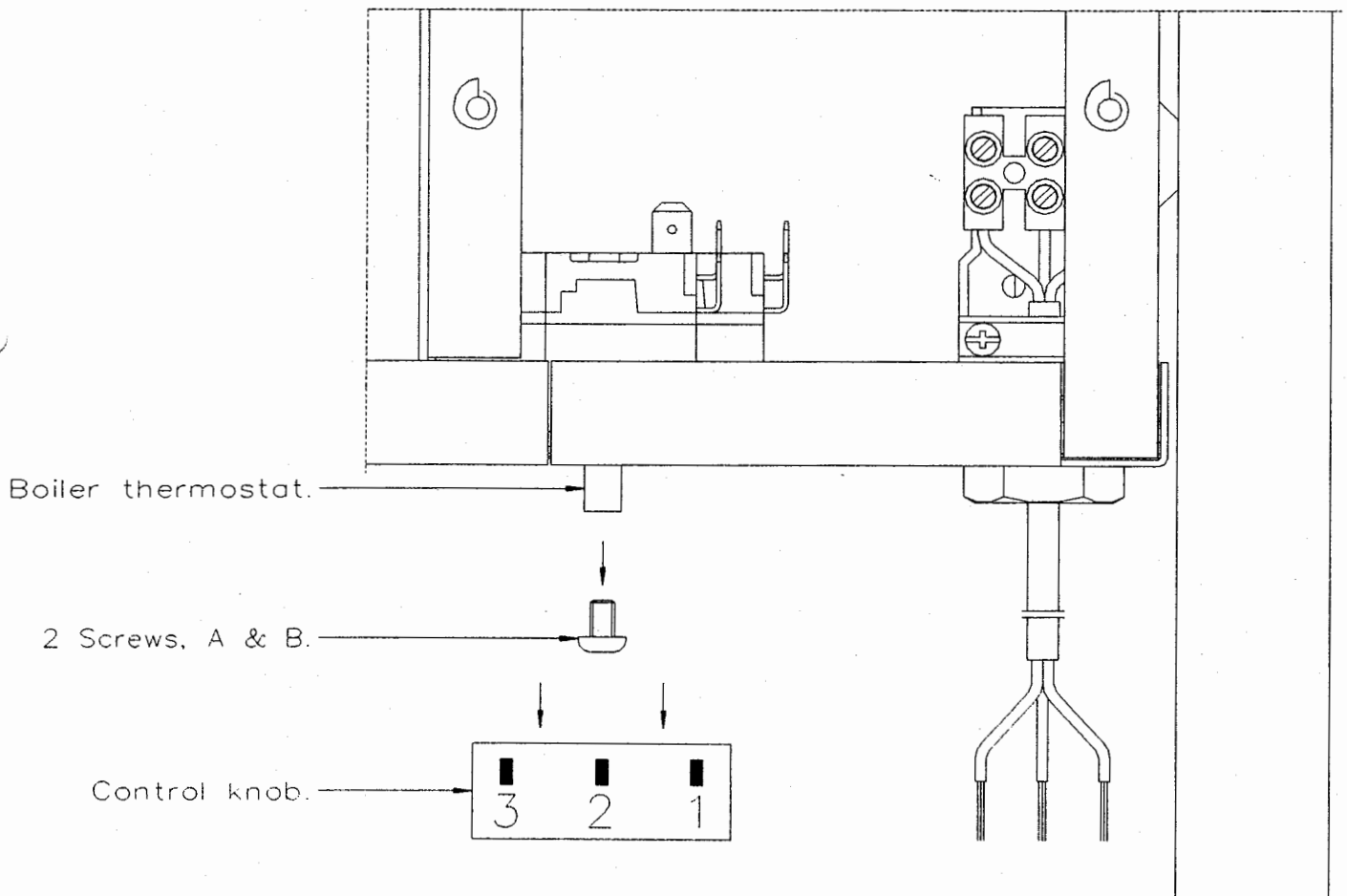
7.3 REPLACEMENT PROCEDURES

- Always replace in reverse order unless otherwise stated.
- Check that the seal around the front of the inner enclosure is correct and intact. Locate the front door of the inner enclosure and secure using six M4 screws. This ensures that the boiler is room sealed.
- Electrical connections must be remade in accordance with the Wiring Diagram (Section 5).
- Test the soundness of any gas carrying or water carrying joint broken during servicing procedures.

7.4 ELECTRICAL COMPONENTS

7.4.1 Boiler Control Thermostat.

- Gain access to the electrical box (7.2.1).
- Pull of the control knob under the inner enclosure.
- Remove the push on connectors from the poles of the thermostat.
- Remove the two M4 screws (indicated by A and B on the drawing below) which hold the boiler thermostat to the bottom of the electrical box.
- Remove the clip which holds the thermostat bulb in a pocket under the heat exchanger. Withdraw bulb.
- Withdraw the boiler thermostat from the electrical box. The thermostat bulb will come through the grommet at the bottom of the electrical box.
- Reassemble (7.3)
- Check for correct operation of the boiler thermostat.



7.4.2 Flue Overheat Thermostat

- Gain access to the electrical box (7.2.1)
- Remove the push on connectors from the
- Remove the push on connectors from the poles of the thermostat.
- Remove the two M4 screws which hold the flue overheat thermostat to the bottom of the electrical box.
- Remove the clip which holds the thermostat bulb in a pocket under the heat exchanger. Withdraw the bulb.
- Withdraw the flue thermostat from the electrical box . The thermostat bulb will come through the grommet at the bottom of the electrical box.
- Reassemble (7.3)

7.4.3 Surface Mounted Thermostats

Surface mounted thermostats (see drawing below) consist of:

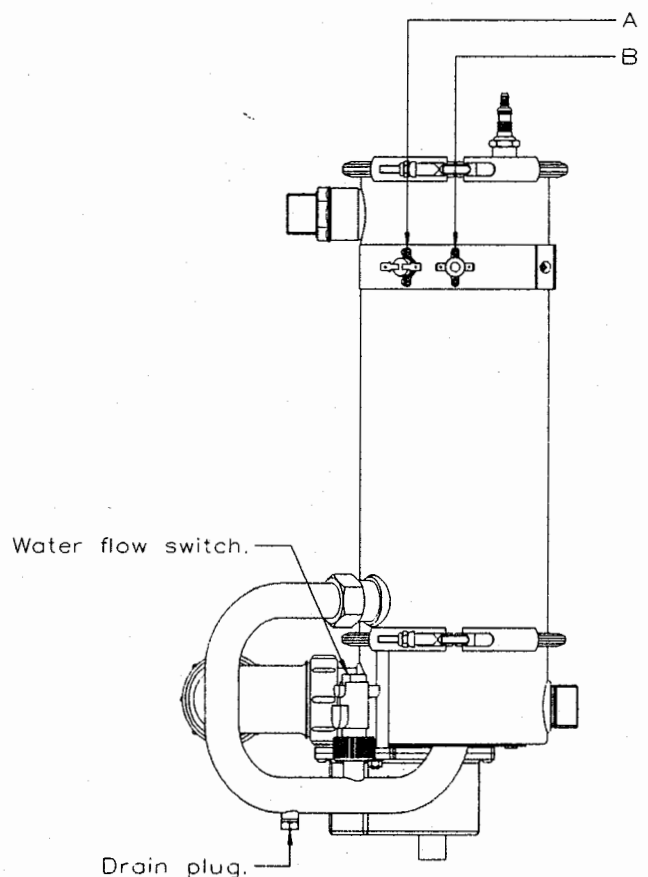
1. Flow high limit thermostat (A) .
 2. Flow overheat thermostat (B).
- Gain access to the inner enclosure (7.2.1).
 - Remove the push on connectors on the thermostat. Remove the two M3 nuts which hold the thermostats in place.
 - Reassemble (7.3).
 - When reassembling, apply heat sink compound between the thermostats and the metal backing.

7.4.4 Water Flow Switch

- Locate the water flow switch at the bottom of the heat exchanger.
- Isolate the boiler if there are isolating valves on the system. Otherwise the system must be drained down.
- Drain the water from the boiler at the water drainage point (see below). Ensure

that there is a water collection vessel under the drainage point.

- Unscrew the water flow switch from the waterway.
- Gain access to the electrical connections box (7.2.3).
- Remove the switch connectors (2.8mm push on type) from the check card at points 14 and 15.
- squeeze the strain relief grommet at the bottom of the electrical box and withdraw.
- Reassemble (7.3).
- Screw the replacement switch into the waterway. Note that the arrow on the switch must face in the direction of the flow, which in this case is away from the heat exchanger.
- Join the switch connectors to the check card.



7.4.5 Ignition Control Box

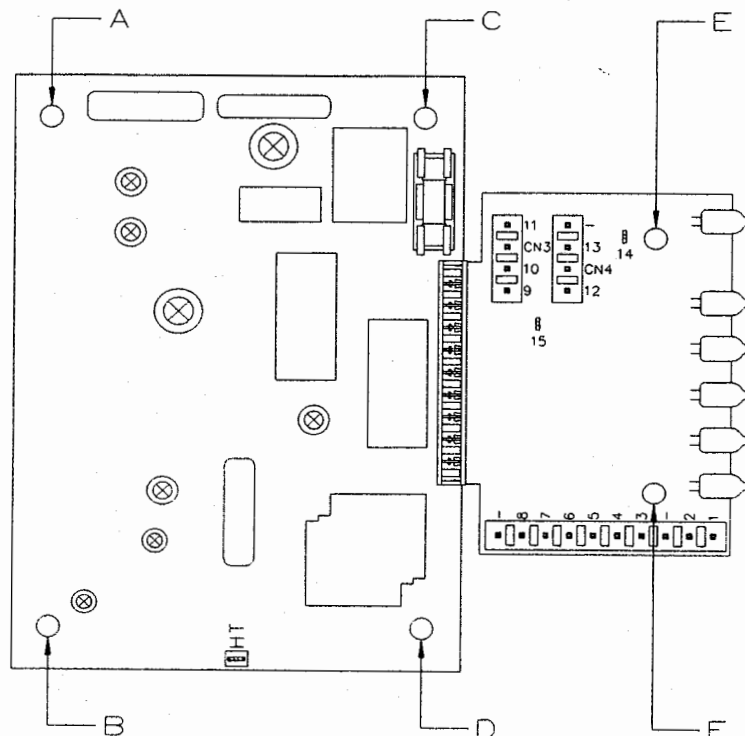
- Access the electrical box (7.2.1).
- Remove the ignition lead
- Carefully grip the control card and the check card (which are connected together) at the top and bottom edges and withdraw both from the supports at A to F (see below).
- Remove the two cards from the electrical box. (Note that there is no need to remove the wiring connectors from the check card).
- Carefully detach the ignition card from the check card.
- Reassemble (7.3).
- Check for correct operation of the new ignition control card.

7.4.6 Air Pressure Switch

- Access the inner enclosure (7.2.1).
- Remove the 3 push on connectors.
- Remove the two M4 screws and the air pressure sensing tube.
- Reassemble (7.3). Push the air pressure sensing connection onto the air pressure switch at the connection marked P2.
- Check the operation of the boiler.

7.4.7 Check Card

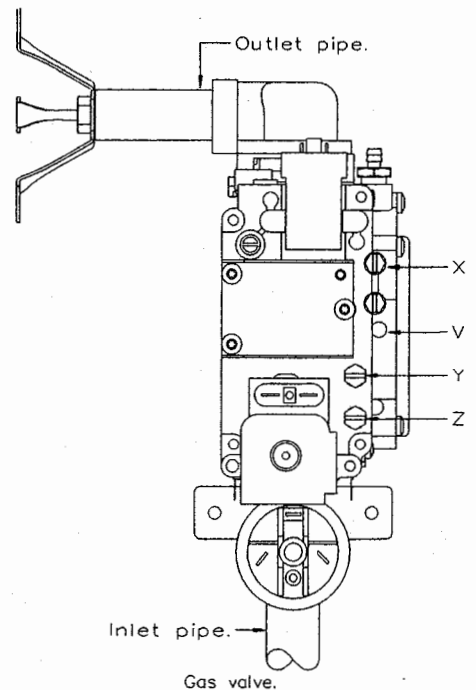
- Access the inner enclosure (7.2.1).
- Carefully grip the check card at the top and bottom edges and withdraw from the two supports.
- Detach the check card from the ignition control card. They are joined through a pin connector at the back of the ignition card.
- Remove the wiring connectors from the check card.
- Reassemble (7.3).
- When re-connecting the two cards, support the back of the ignition card.



7.4.8 Gas Control Valve

- Turn off the gas supply at the gas service cock.
- Gain access to the inner enclosure (7.2.1).
- Remove the wiring plug from the lower solenoid. Remove the upper solenoid (2 M4 screws). Detach the wiring plug.
- Undo the union which secures the gas valve to the gas inlet pipe.
- Remove the two M4 Phillips screws that secure the gas valve to the top of the inner enclosure and the four M5 screws which secure the gas inlet pipe to the bottom of the gas valve.
- Withdraw the gas valve and brackets.
- Remove the eight M5 allen bolts which secure the brackets to either side of the gas valve.
- Reassemble in reverse order. (7.3)
- Remove the grey cover from the gas valve adjustment screw. Remove the screw from the air pressure sensing connection (shown as 'x' across) and connect a suitable gauge.
- Light the boiler and measure the air pressure.
- Consult the graph of air pressure V's gas output pressure in the commissioning section to find the required gas output pressure for the measured air pressure.
- Remove the gauge and replace the screw.
- Remove the screw from the gas output pressure sensing point (shown as 'Y' across) and attach the gauge. Relight the boiler.
- The gas output pressure is adjusted by turning the offset screw anti-clockwise (shown as 'v' across) to increase pressure.
- Adjust the gas output pressure to the value read from the graph of air pressure V's gas output pressure in the commissioning section.

- Remove the gauge and replace the screw in the pressure test point. Continue with the normal reassembly (7.3) of the boiler.



7.4.9 Gas Pressure Switch (100 model only)

- Gain access to the inner enclosure (7.2.1).
- Remove the two push on electrical connectors.
- Unscrew the gas pressure switch from the gas inlet pipe.
- Reassemble (7.3).

7.4.10 Pool Water Thermostat

- Gain access to the inner enclosure (7.2.1)
- Remove the wiring connections from the Rear of the thermostat.
- Remove the brackets holding the thermostat into to the enclosure cover and remove it with its gasket.
- Replace the gasket if damaged.
- Reassemble (7.3)

7.5 HEAT EXCHANGER FAN AND BURNER COMPONENTS

7.5.1 Electrode

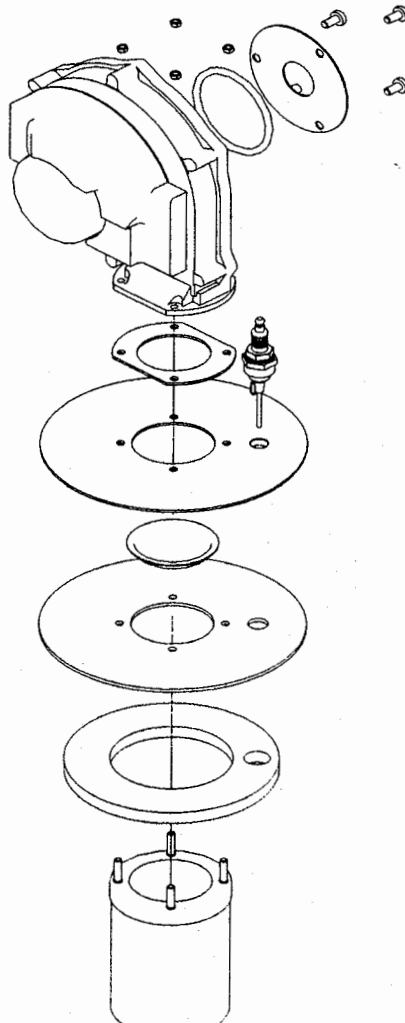
- Gain access to the inner enclosure (7.2.1).
- Disconnect the push on connector on the electrode.
- Remove the electrode by unscrewing the larger of the nuts on the electrode.
- Reassemble (7.3).

Note: The spark gap (4mm) can be checked by removing the electrode which allows the spark gap to be examined.

7.5.2 Fan

- Access the inner enclosure.
- Remove the electrical connector from the fan.
- Remove the lead from the electrode.
- Remove the air pressure sensing tube.

- Undo the V-clamp enough to allow the burner plate to be detached from the top of the heat exchanger.
- Unscrew and remove the spark electrode (7.5.1).
- Lift the fan and burner assembly until it touches the top of the inner enclosure. Tilt the fan and burner assembly towards the gas valve. Rotate the assembly anti-clockwise through approx. 180°. Withdraw the burner and fan assembly from the inner enclosure.
- Remove the four M5 bolts that hold the fan to the burner and burner top plate.
- Detach the fan
- Reassemble (7.3). The diagram below shows how the fan, electrode and burner should be assembled.
- Check for correct operation of the fan.



SPARE PARTS

7.5.3 Burner

- Gain access to the inner enclosure (7.2.1).
- Remove the fan (7.4.7).
- With the removal of the fan, the burner and burner top plate assembly are also removed from the boiler.
- Detach the burner top plate from the main burner body by sliding the top plate over the studs attached to the burner body.
- Check the burner gasket and replace if necessary.
- Reassemble (7.3).

7.5.4 Heat Exchanger

- Gain access to the inner enclosure (7.2.1)
- Isolate if there are isolating valves on the system. Otherwise the system must be drained down.
- Drain the water from the boiler at the water drainage point. Ensure that there is a water collection vessel under the drainage point.
- Undo the water valve union on the flow and remove the washer. Undo the 1.5" bushing and the 1" BSP locknut.
- Undo and remove the casing support bracket that joins the left and right outer casing panels.
- Undo the water connection on the return.
- Remove the fan (7.5.2).
- Remove the surface mounted thermostats (7.4.3).
- Remove the gas control valve (7.4.8).
- Detach the flue pipe from the flue elbow and remove the flue elbow.
- Undo the drainage connection from the condensate trap. Remove the trap (7.5.5).
- Remove the flow switch (7.4.4).
- Remove the capillaries (part of the boiler control and flue overheat thermostats) from the pockets under the heat exchanger.
- Remove the 4 M4 screws which hold the detachable section of the inner enclosure in position.
- Remove the detachable section of the inner enclosure and the heat exchanger can then be removed.
- Remove the heat exchanger retaining band.

- Withdraw the bottom of the heat exchanger until it swivels into a horizontal position.
- Pull the heat exchanger to the right until the sleeve on the flow connection is released. Lift the boiler upwards (keeping it horizontal) until the flow connection comes through the hole. Withdraw the heat exchanger.
- Remove the thermostat support band (M5 philips screw).
- Undo the 1-inch nut securing the water pipe to the outside of the heat exchanger. Withdraw the water pipe from the heat exchanger. Check the o-ring on the top of the water pipe and the red fibre washer between the water pipe and the outside of the heat exchanger. Replace if necessary.
- Reassemble (7.3).
- When reassembling water connections, ensure that the connections are sealed (e.g. seal using PTFE tape).
- When reassembling the thermostat support band, ensure that heat sink compound is applied under the band and under the thermostats.

7.5.5 CONDENSATE TRAP

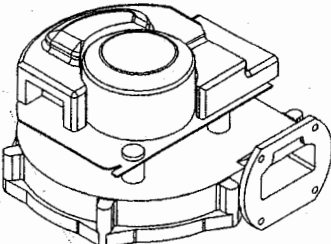
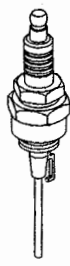
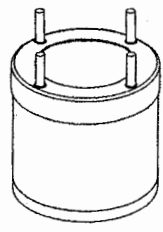
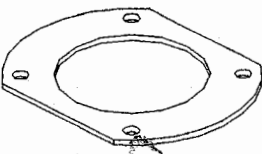
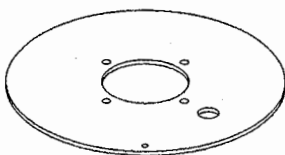
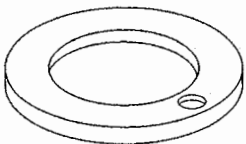
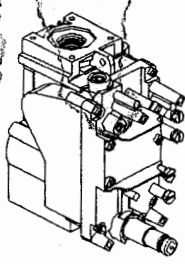
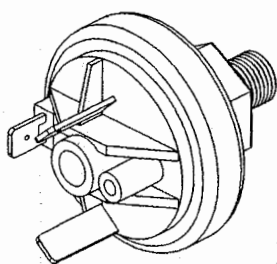
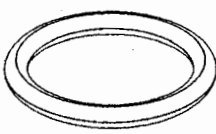
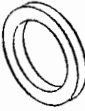
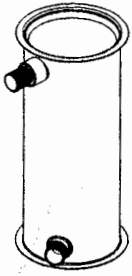
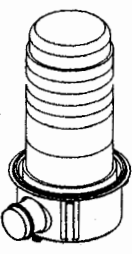
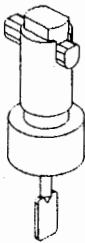

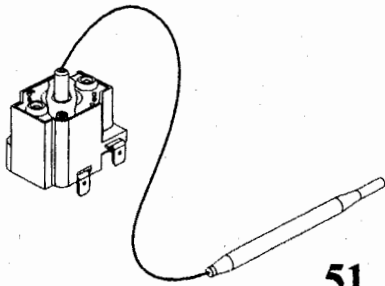
- Locate the condensate trap at the back of the heat exchanger.
- Undo the compression fitting joining the condensate trap from the condensate waste pipe.
- Remove the six screws securing the condensate trap to the bracket on the heat exchanger.
- Reassemble (7.3).

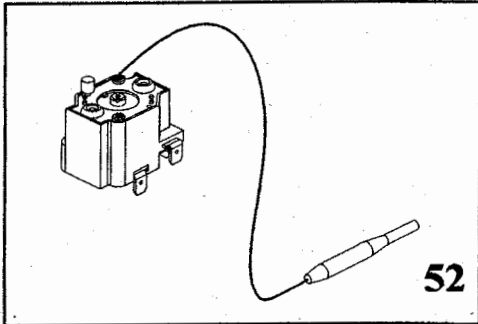
7.5.6 HT Ignition Lead

- Gain access to the inner enclosure and the electrical box (7.2.1)
- Remove the lead from the electrode and the ignition control box.
- Reassemble (7.3).

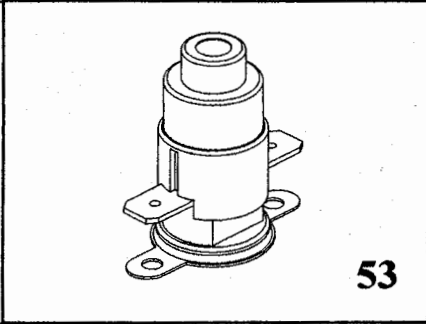
Item No.	Quantity.	Description
1	1	Fan
2	1	Spark electrode
3	1	Burner body
7	1	Fan Gasket
8	1	Gasket
10	1	Heat shield
15	1	Gas valve
21	1	Gas pressure switch (100 only)
24	2	Gas valve 'O' ring
26	1	Pressure switch gasket
27	1	Heat exchanger outer
28	1	Heat exchanger inner
31	1	Flow switch
33	1	Plenum gasket
51	1	Flue overheat thermostattat
52	1	Flow overheat thermostat
53	1	Flow high limit thermostsat
54	1	Boiler Control Thermostat
55	1	Air Pressure Switch
56	1	Ignition control card
57	1	Check card
60	1	HT Ignition lead
61	1	Pool Water Thermostat (Direct version only)

SPARE LIST

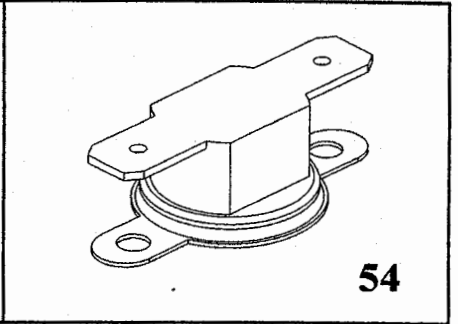
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 31	 33	 51



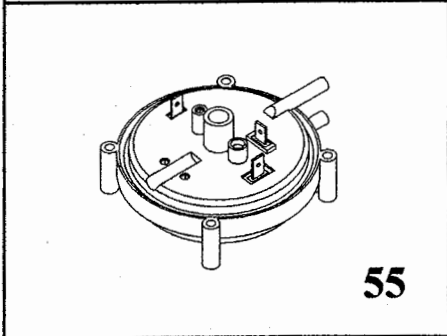
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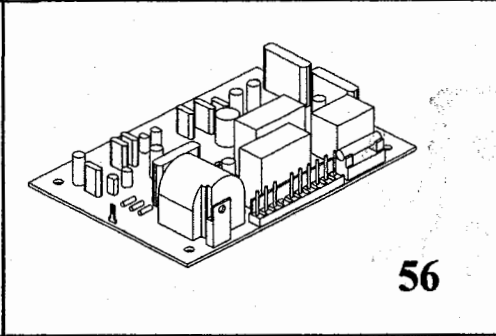
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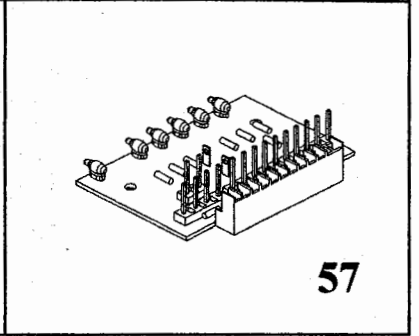
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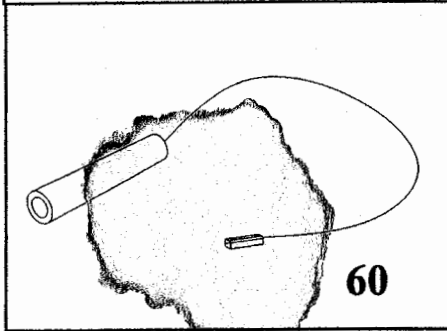
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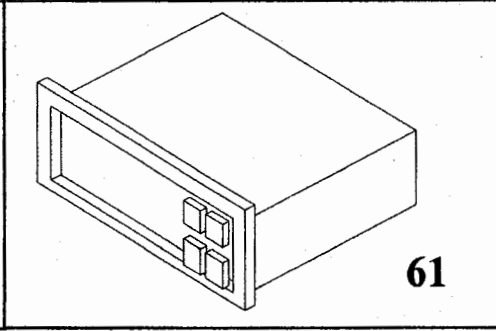
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