

## **Wessex 100 M Series Boilers**

**High Efficiency, High/Low, Pre-Mix. Gas Fired,  
Modular Boilers for Heating and Domestic  
Hot Water Installations**

### **Installation, Commissioning and Servicing Instructions**

Wessex 100 M100, M200 & M300 Models

*NATURAL GAS I<sub>2H</sub>*  
*LPG-PROPANE I<sub>3P</sub>*

#### **IMPORTANT NOTE**

**THESE INSTRUCTIONS MUST BE READ  
AND UNDERSTOOD BEFORE INSTALLING,  
COMMISSIONING, OPERATING OR  
SERVICING EQUIPMENT**

# Customer Services

## Technical Enquiries



**01202 662527/662528**

To supplement the detailed technical brochures, technical advice on the application and use of products in the Hamworthy Heating range is available from our technical team in Poole and our accredited agents.

## Site Assembly



**01202 662555**

Hamworthy offer a service of site assembly for many of our products in instances where plant room area is restricted. Using our trained staff we offer a higher quality of build and assurance of a boiler built and tested by the manufacturer.

## Commissioning



**01202 662555**

Commissioning of equipment by our own engineers, accredited agents or specialist sub – contractors will ensure the equipment is operating safely and efficiently.

## Maintenance Agreements



**01202 662555**

Regular routine servicing of equipment by Hamworthy service engineers inspects the safety and integrity of the plant, reducing the risk of failure and improving performance and efficiency. Maintenance agreements enable our customers to plan and budget more efficiently.

## Breakdown service, repair, replacement



**01202 662555**

Hamworthy provide a rapid response breakdown, repair or replacement service through head office at Poole and accredited agents throughout the UK.

## Spare Parts



**01202 662525**

A comprehensive spare parts service is operated from our factory in Poole, providing replacement parts for both current and discontinued products. Delivery of parts and components is normally from stock within seven days. However, a next day delivery service is available for breakdowns and emergencies.

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*NATURAL GAS I<sub>2H</sub>*  
*LPG-PROPANE I<sub>3P</sub>*

**NOTE: THESE INSTRUCTIONS MUST BE READ AND UNDERSTOOD BEFORE  
INSTALLING, COMMISSIONING, OPERATING OR SERVICING EQUIPMENT.**

**THE WESSEX 100 M BOILER IS INTENDED FOR USE AS A COMMERCIAL APPLIANCE  
AND IS NOT CERTIFIED FOR USE IN DOMESTIC APPLICATIONS OR HABITABLE  
AREAS.**

**THIS BOILER IS FOR USE ON GROUP H NATURAL GAS (2<sup>ND</sup> FAMILY) I<sub>2H</sub> OR LPG-  
PROPANE (3<sup>RD</sup> FAMILY) I<sub>3P</sub>. PLEASE ENSURE RELEVANT INFORMATION REQUIRED  
WITHIN DOCUMENT IS FOUND RELATING TO SPECIFIC GAS TO BE FIRED BEFORE  
FIRING BOILER.**

THIS BOILER COMPLIES WITH ALL RELEVANT EUROPEAN DIRECTIVES.  
EC TYPE CERTIFICATE Nos. (GAD) BG/EC-87/98/79, (BED) BE-87/98/16.  
PRODUCT IDENTIFICATION No. 87AT79.

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## **1.0 INTRODUCTION**

**1.1** This boiler must be installed by a competent person holding 'CORGI' registration or equivalent. All installations **MUST** conform to the relevant Gas Safety and Building Regulations. Health & Safety requirements must also be taken into account when installing any equipment. Failure to comply with the above may lead to prosecution.

**1.2** This boiler is intended for use on Group H Natural Gas (2nd Family) and LPG-Propane (3rd Family). The information relating to propane firing is to be found in Appendix 'A' (p30). Boilers **MUST NOT** use gas other than that for which they are designed and adjusted.

**1.3** The Wessex 100 M is a gas fired, high-low, fan assisted, open flued central heating/hot water boiler comprising a burner and water tube bank assembly (Module). A maximum of three vertically stacked modules can be arranged into a single unit sharing a common flue

**1.3.1** The burner fitted to each module is of the fan assisted pre-mix type. Operation is initiated by a full sequence ignition control that incorporates a Hot Surface Ignition system and rectification supervision of the flame at both high and low output.

**1.3.2** Each of the boiler variations is designed for direct connection to a flue system. The Technical Data for the various arrangements is given in **Section 2**. The flue outlets from more than one unit may be connected to a single chimney. No draught diverter is fitted to the boiler nor is a fixed diverter required in the flue system. However a draught stabiliser is recommended for some installations

**1.3.3** The Wessex 100 M is floor mounted and is intended for the heating of Commercial and Industrial premises. It may also be used to supply hot water for these premises via an indirect cylinder.

**1.3.4** The Wessex 100 M has a low water content and water flow rates **MUST** be maintained at or above the recommended levels shown in **Section 8** (p9) and Figure 2.2 (p4).

**1.4** If the boiler is to be connected to an un-vented (pressurised) heating system, care must be taken to ensure all extra safety requirements are satisfied and that the relevant interlocks will shut the boiler(s) off should a high or low pressure fault occur.

The pressurisation unit must also incorporate a low level water switch which protects the water pumps and will directly or indirectly shut down the boiler plant should a low water condition occur. Consideration should also be given to the maximum working pressure of the boiler as given in **Section 2: TECHNICAL DATA** (p4). Consult Hamworthy Heating Technical Department for help or assistance if in doubt.

**1.5** The Wessex 100 M boiler is not suitable for direct connection to domestic hot water supplies or gravity fed heating systems.

**1.6** The Wessex 100 M boiler can be installed with either reverse return water flow, (optional kits available) or with single pipe headers, (not HHL supply). See Figure 1.1 (p2) for typical schematic layout.

### **BOILER VARIATIONS**

**Wessex 100 M100** - Single 100kW unit.

**Wessex 100 M200** - Single 200kW unit created by stacking 2 - 100kW modules vertically.

**Wessex 100 M300** - Single 300kW unit created by stacking 3 - 100kW modules vertically.

**1.7** The fully assembled unit is supplied covered with a protective sleeve. The flue assemblies for the M200 and M300 models are supplied in a separate pack.

### **1.8 Options**

**1.8.1** The Wessex 100 M has an optional kit for remote indication of the following volt free contact signals:

- a) Normal Run
- b) Overheat
- c) Lockout

**1.8.2** The Wessex 100 M has an optional kit for the indication of hours run at both high and total firing. Refer to individual kit instructions for details.

**1.8.3** Milton boiler sequence control system for timed remote control of single and multiple on/off and high/low boilers, with outside temperature compensation and optimum start.

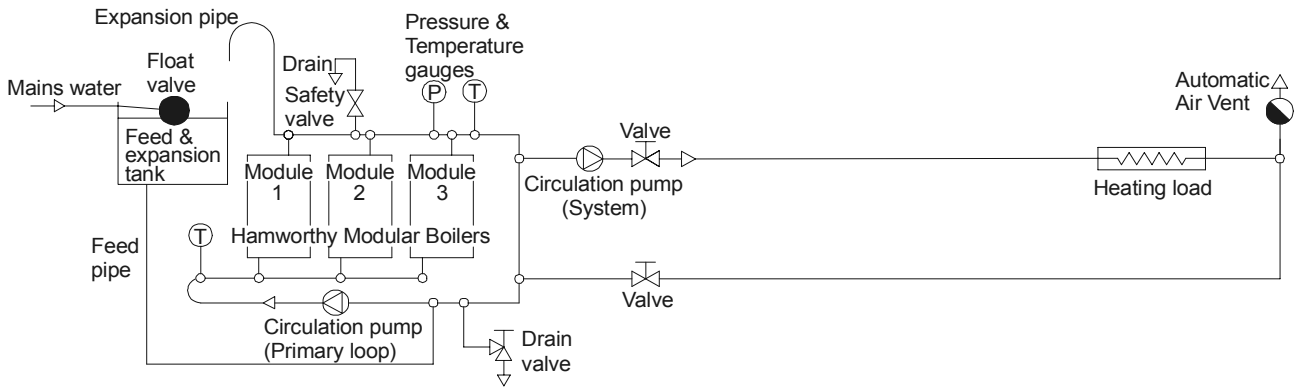
**Note:** Optional Hamworthy Heating Ltd Sequencing Interface Modules will be required, to be installed within the control panel of each boiler, to enable sequence control of the boilers by the Milton boiler sequence control.

Refer to Milton and Sequence Interface Module kit instructions for details.

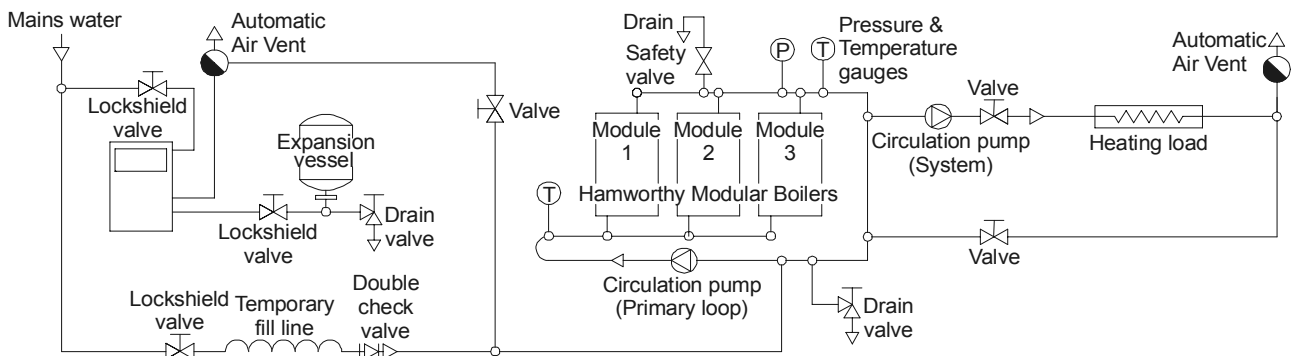
**1.8.4** Optional reverse return header kits are available for models M200 and M300 in both single and double and triple bank configuration. These kits are free-standing allowing installation to the system prior to installing the boiler and can incorporate all necessary valves, inter connecting pipework, and flexible flow and return connections. Refer to individual kit instructions for details.

**1.8.5** A high temperature option is available where flow temperatures up to a maximum of 120°C are required - see **Section 8.10.1.2** (p10).

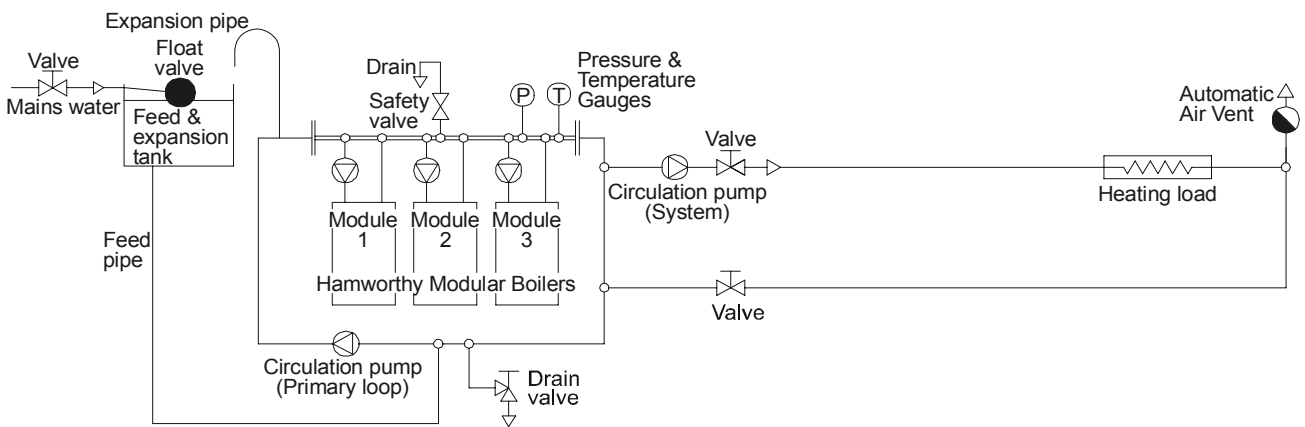
**Figure 1.1 Boiler Installation (Typical)**



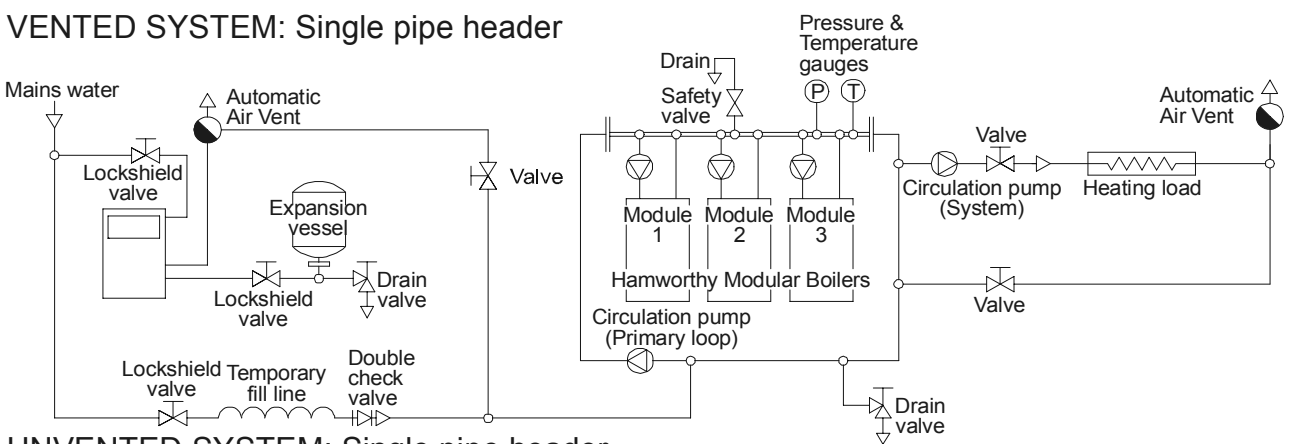
**VENTED SYSTEM: Primary loop, Hamworthy recommended system.**



**UNVENTED SYSTEM: Primary loop, Hamworthy recommended system.**



**VENTED SYSTEM: Single pipe header**



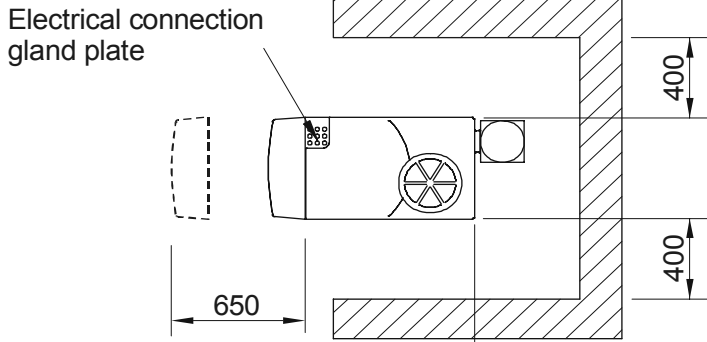
**UNVENTED SYSTEM: Single pipe header**



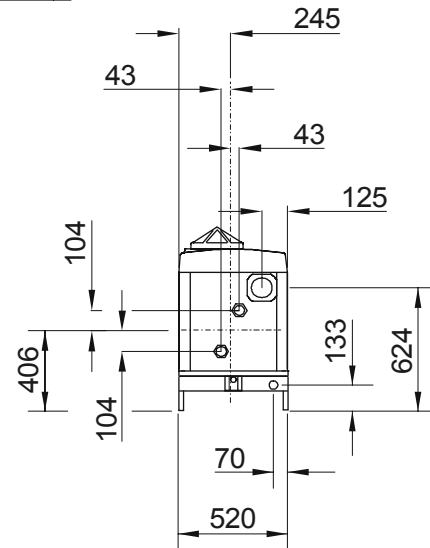
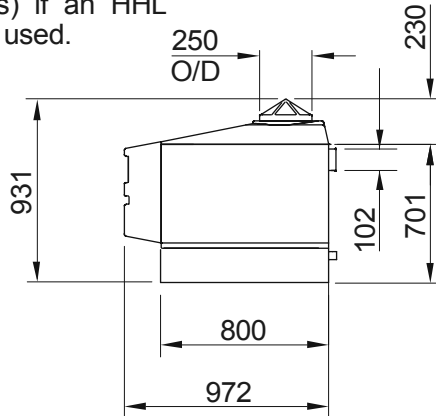
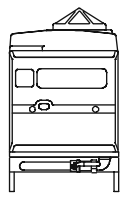
**Figure 2.1 Boiler Dimensions / Clearances**

Clearance dimensions around boiler are provided as guidance only to assess basic access requirements. Actual site clearance and conditions should be assessed prior to the installation of the boiler.  
 NOTE: The 400 clearance dimension along each side of the boiler can be reduced to a min. of 100 on one side

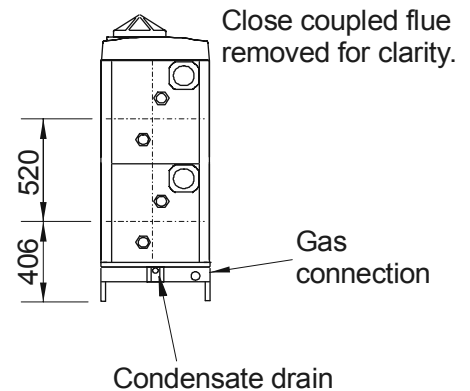
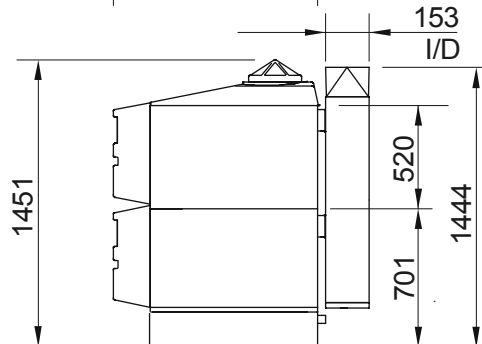
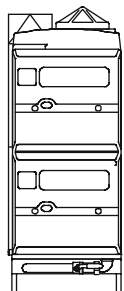
\* The 500 dimensions must be increased to 570 (without valves) or 720 (with valves) if an HHL Water Manifold Kit is used.



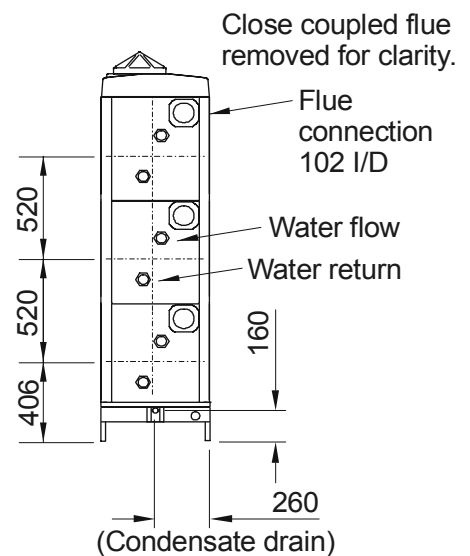
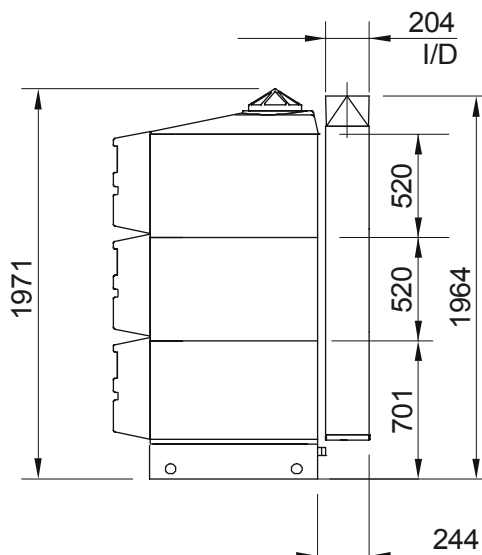
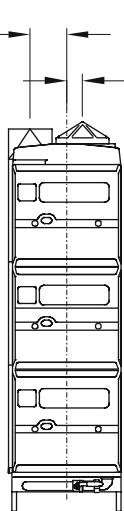
**M100 100kW**



**M200 200kW**



**M300 300kW**



## 2.0 TECHNICAL DATA

**2.1** The Wessex 100 M boiler can be installed as a single unit or in modular form. Each module has an independent door for access to the controls and other working components.

Overall dimensions are shown in Figure 2.1 (p3) Both single and multi boiler arrangements are shown.

It is recommended that a maximum of 9 boilers can be positioned on 520mm centres if required, Larger numbers should be split into two or more banks with

450mm between each bank. The boiler can also be installed in a 'stand alone configuration' if required.

**2.2** General Information and Technical Data relating to Natural Gas is shown in Figure 2.2.

Technical data relating to propane firing can be found in Appendix 'A' (p30).

**2.3 Screw threads:** All screw threads used in the Wessex 100 M boiler conform to the following:-

**ISO 7/1** or **ISO 228/1** for pipe threads where applicable. **ISO 262** for all general screw threads.

**Figure 2.2 Performance and General Data Information**

<b>GENERAL DATA</b>	<b>M100</b>	<b>M200</b>	<b>M300</b>
Boiler Input High Fire - kW (Gross)	118.3	236.6	354.9
Boiler Input High Fire - kW (Nett)	106.5	213.0	319.5
Boiler Output High Fire - kW	100	200	300
Boiler Output Low Fire - kW	50		
Shipping Weight (excluding flue boxes) - kg	125	225	325
<b>FLUE DATA</b>			
Nominal Flue Diameter. - mm	102 (4")	153 (6")	204 (8")
Approx. Flue Gas Temperature - °C	130		
Approx. Flue Gas Volume @ 9.0% CO <sub>2</sub> - m <sup>3</sup> /h*	147	293	440
<b>GAS DATA</b>			
Gas Inlet Connection	R1¼		
Nominal Gas Inlet Pressure - mbar	20		
Maximum Gas Inlet Pressure - mbar	25		
Gas Pressure Setting High Fire - mbar	8.6		
Gas Pressure Setting Low Fire - mbar	1.0		
Pressure Switch Setting (Normal) High Fire - mbar	1.2		
Pressure Switch Setting (Normal) Low Fire - mbar	0.4		
Gas Flow Rate High Fire - m <sup>3</sup> /h	11.21	22.42	33.63
Orifice Diameter - mm	11.9		
<b>WATER DATA</b>			
Water Connections (Flow and Return)	G1½ male		
Maximum Water Pressure - bar g	10		
Water Content (not including headers) - litres	5	10	15
Design Water Flow Rate @ 11°C ΔT Rise - litre/s	2.2	4.3	6.5
Waterside Pressure Loss @ 11°C ΔT Rise - mbar	480		
Minimum Water Flow Rate @ 15°C ΔT Rise - litre/s	1.6	3.2	4.8
Waterside Pressure Loss @ 15°C ΔT Rise - mbar	265		
<b>ELECTRICAL DATA</b>			
Normal Supply Voltage	230V ~ 50Hz		
Power Consumption (maximum) - W	150	300	450
Start and Run Current (per module) - A	<2A		

\* **NOTE!** Flue gas volumes are based on a gross flue gas temperature of 15°C at 1013.25mbar.

### **3.0 GENERAL REQUIREMENTS**

#### **3.1 Related Documents.**

**Gas Safety Installations and Use Regulations 1994- (As amended).** It is law that all gas appliances are installed by competent persons, in accordance with the above regulations. Failure to install appliances correctly could lead to prosecution. It is in your own interest, and that of safety, to ensure that this law is complied with.

The installation of the boiler **MUST** be in accordance with the relevant requirements of the Gas Safety Regulations, Building Regulations, IEE Regulations and the bylaws of the local water undertaking.

The installation should also be in accordance with any relevant requirements of the local gas region and local authority and the relevant recommendations of the following documents :-

#### **British Standards**

**BS 7074:** Application, selection and installation of expansion vessels and ancillary equipment for sealed water systems.

**Part 2:** Code of practice for low and medium temperature hot water systems.

**BS 6644:** Installation of Gas Fired Hot Water Boilers - 60 kW to 2MW.

**BS 6700:** Design, installation, testing and maintenance of services supplying water for domestic use.

**BS 6880: Part 1, 2 & 3:** Code of practice for low temperature hot water heating systems of output greater than 45 kW.

BS EN 60335, Part 1. Safety of Household & similar electrical appliances. BS 3456, Part 201: Electrical Standards.

**CP 342:** Centralised hot water supply. Part 2: Buildings other than individual dwellings.

#### **I. Gas E. Publications**

**IGE/UP/1** Soundness testing and purging of industrial and commercial gas installations.

**IGE/UP/1A** Soundness testing and direct purging of small low pressure industrial and commercial natural gas installations.

**IGE/UP/2** Gas installation pipework, boosters and compressors in industrial and commercial premises.

**IGE/UP/10** Installation of gas appliances in industrial and commercial premises. Pt. 1 flued appliances.

#### **Health and Safety Executive: -**

**Guidance note PM5** - Automatically controlled steam and hot water boilers.

#### **CIBSE Publications: - "CIBSE Guide"**

It is impractical in this document to specify all relevant information, but the following extracts from the above references are emphasized since failure to comply with these requirements will almost certainly result in an unsatisfactory installation.

#### **3.2 Feed water Quality**

If the boiler feed water has a high degree of hardness, it is recommended that the water be treated to prevent precipitation of scale or sludge in the boiler water passageways. Details of additives can be obtained from any reliable manufacturer of water treatment products or the local water authority.

It should be noted however, that even if the boiler water is of average hardness, not requiring treatment, subsequent draining of the system for repair or constant make-up water due to an undetected leak will cause additional deposits and gradual build-up of scale. It is essential, therefore that leaks are attended to promptly and draining is kept to an absolute minimum.

It is recommended that the system is flushed out at least twice with hot water before any treatment is added. If any doubt exists regarding the internal cleanliness of an old system, consideration should be given to the fitting of a coarse filter in the return pipework to the boilers.

#### **3.3 Adequate Water Flow**

The Hamworthy Wessex boiler is designed as a quick response, low water content unit, to run continuously with maximum reliability. Care should be taken in the initial design and layout having due regard for adequate water flow through the boilers and the influence of the system controls.

The Wessex boiler is a high efficiency appliance tested with flow/return temperatures of 80°C/65°C. It is recommended that the system design should ensure a minimum return temperature of 50°C.

If the temperature / flow rates of the application cannot meet those given in Figure 2.2 (p4). it may be necessary to incorporate mixing valves and shunt pumps to ensure that the boiler will operate satisfactorily.

Figure 2.2 (p4) shows recommended and minimum water flows required with the associated pressure

losses. The control system and valves, where fitted, should be regulated to avoid lower flows occurring. The flow corresponding to 15°C temperature rise across the boiler is the minimum recommended at any time.

### 3.4 Time Clock Control

In order to avoid local overheating and progressive calcium deposition at zero flow conditions where boilers are operated from time clocks, provision should be made for a 5 minute circulating pump over-run after the last boiler has ceased firing.

**NOTE!** Time clocks should not interrupt live, neutral or earth connections, see **Section 9.0: ELECTRICAL SUPPLY** (p11) for details. See Figures 8.12 (p12) and 9.1 (p13) for wiring details.

### 3.5 Minimum System Pressure

To comply with guidance note **PM5 (Health and Safety Executive)**, the minimum pressure requirements at the boiler are given below as examples: -

- 1) Single installed boiler running at 82°C flow temperature. Minimum head required is not less than 2 metres or 0.2 bar.
- 2) Single installed boiler running at 95°C flow temperature. Minimum head required = 5.1 metres or 0.5 bar. See **Section 8.10.1** (p10).
- 3) Modular boiler installation running at 82°C flow temperature and 11°C rise across system. Minimum head required = 4.3 metres or 0.42 bar.
- 4) Modular boiler installation running at 82°C flow temperature and 15°C rise across system. Minimum head required = 9.4 metres or 0.92 bar. See **Section 8.11** (p10) for Pressurised Water Systems.

## 4.0 LOCATION

**4.1** (See Figures 2.1 (p3) & 2.2 (p4) for dimensions / clearances and weights.) The location chosen for the boiler **MUST** permit the provision of a satisfactory flue system and an adequate air supply. The location must also provide adequate space for servicing and air circulation around each unit. This includes any electrical trunking laid along the floor and to the appliance.

Allow adequate space, this must not be less than 500mm at the rear, for flue and flow / return connections. Allow 650mm (minimum) in front of the boiler for servicing.

The boiler must be installed on a level non-combustible surface that is capable of adequately supporting its weight (when filled with water) and any ancillary equipment.

Any combustible material adjacent to the boiler and

the flue system must be so placed or shielded to ensure that its temperature does not exceed 65°C.

Further details regarding boiler location are given in **BS 6644**.

## 5.0 GAS SUPPLY

### 5.1 Service Pipes

The local gas region must be consulted at the installation planning stage in order to establish the availability of an adequate supply of gas. An existing service pipe must not be used without prior consultation with the local gas region.

### 5.2 Meters

A new gas meter will be connected to the service pipe by the local gas region, or a local gas region contractor. An existing meter should be checked, preferably by the gas region, to ensure that it is adequate to deal with the rate of gas supply required.

### 5.3 Gas Supply Pipes

Supply pipes must be fitted in accordance with **BS 6891** or **IGE/UP/2** as appropriate. Pipework from the meter to the boiler must be of adequate size. Do not use pipes of a smaller size than the boiler gas connection. The complete installation must be purged and tested for soundness as described in **BS 6891** or **IGE/UP/1** and **IGE/UP/1A** as appropriate.

### 5.4 Boosted Supplies

Where it is necessary to employ a gas pressure booster, the controls must include a low-pressure cut-off switch at the booster inlet. The local gas region must be consulted before a gas pressure booster is fitted.

### 5.5 Boiler House Control Valve

A manual valve for boiler house isolation shall be fitted in the gas supply line. It shall be clearly identified and readily accessible for operation, preferably by an exit.

### 5.6 Boiler Gas System Leak Check

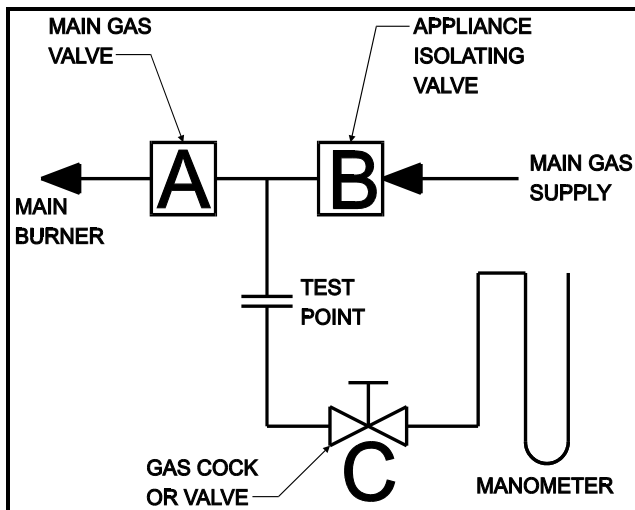
The Wessex 100 M boiler is supplied with a single gas pipe which exits the base tray at the rear left hand side, see Figure 2.1 (p3) for position. The incoming mains gas supply must be capable of supplying gas to the boiler at the required pressure and volume, under all firing conditions. An approved isolating valve and union should be installed for each boiler in a convenient and safe position and be clearly marked.

Ensure that the manual gas service valve is in the OFF position.

Although the boiler receives a gas leak check and gas train component integrity check prior to leaving the factory, transport and installation may cause disturbance to unions, fittings and gas valve assemblies etc. During commissioning a further test for soundness should be carried out on the boiler gas pipework and components. A procedure guide is given below refer to Figure 5.6. Care must be taken not to allow leak detection fluid (if used) on or near any electrical parts or connections.

**Note:** In the case of M200 & M300 appliances, the test detailed should be carried out on the entire assembly.

**Figure 5.6 Gas valve/pipework leak test procedure.**



**Note:** - Main gas supply pressure - G20 - 20mbar  
- G31 - 37mbar

#### To Check Valve B

- 1) Turn off the electrical power and gas to the appliance.
- 2) Connect the manometer to gas valve test point.
- 3) With A, B closed open C and monitor manometer over a 2 minute period, a rise indicates a leak on valve B.

#### To Check Valve A

- 1) Open C.
- 2) Open B to produce the main gas supply pressure between A and B.
- 3) Close B
- 4) System may be considered sound if over a period of 2 minutes any drop in pressure is less than 0.5 mbar (0.2" wg.).

**NOTE:** Allow a manometer stabilisation period of approximately 1-minute before each 2 minute check period. Following soundness tests close valve B and remove manometer connections and tighten test points.

## 6.0 FLUE SYSTEM

Detailed recommendations for flue systems are given in **BS 6644**, I. Gas E. Publication **IGE/UP/10** "Installation of gas appliances in industrial and commercial premises Pt 1 flued appliances".

The following notes are intended to give general guidance only.

### 6.1 General Requirements

The Hamworthy Wessex 100 M series of boilers are designed to be used with natural draught flues. Flue systems should be designed in accordance with current regulations and with reference to the **BS6644 & IGE/UP/10**. The following points should be noted:-

Due to the high thermal efficiency of the boiler, the flue gas temperature is approximately 130°C. Condensation in the flue is thus more likely to occur than with lower efficiency boilers. It is strongly recommended that twin-wall or insulated flue pipe is used on all installations. Care should be taken to ensure that the flue is installed such that any condensation is continuously drained. All flues should have a minimum slope of 2° upwards in the direction of the exhaust gas flow (no horizontal sections). All joints should be such that any condensation is directed back down the slope to an open drain connection in the flue. The drain pipe must be manufactured from a corrosion resistant material and be at least 15mm dia. It must also have a fall of at least 2-3° (approx. 3-5cm per metre) and connect to a drain via a waste trap.

An alternative to a conventional flue system is the Hamworthy Forston Fan Dilution system which is suitable for connection to the Wessex range of boilers. For further information contact Hamworthy Heating Technical Department.

### 6.2 Design Waste Gas Volume and Temperature

It is recommended that the volume and temperature of the waste gases used for design of the flue system be as shown in Figure 2.2 (p4).

### 6.3 Materials

Materials used for the flue system must be mechanically robust, resistant to internal and external corrosion, non-combustible and durable under the conditions to which they are likely to be subjected.

Consideration should be given to possible freezing of condense water traps and pipework. This must be avoided at all times.

## 6.4 Suction

The flue system should be designed to maintain atmospheric pressure or a slight suction at the boiler flue connection at all times (0.08 - 0.10 mbar).

It is recommended that a draught stabiliser is fitted to the flue system where the suction is likely to exceed 0.1mbar or the height of the flue exceeds 4metres.

## 6.5 Disconnection

Provisions should be made for disconnection of the flue pipe for servicing. It is advisable that bends are fitted with removable covers for inspection and cleaning as appropriate. **NOTE!** The flue system must be self supporting and not present a risk to people in or around the building.

See **Section 13: SERVICING** (p20) for further information.

## 6.6 Flue Discharge

The flue system must ensure safe and efficient operation of the boiler to which it is attached, protect the combustion process from wind effects and disperse the products of combustion to the external air.

The flue must terminate in a freely exposed position and be so situated as to prevent the products of combustion entering any opening in a building.

Where the flue diameter is less than 204mm (8") a terminal must be fitted. Where the flue is of a larger size consideration should be given to the fitting of a flue discharge terminal or grill to stop ingress of birds etc.

## 6.7 Surface Temperatures

Combustible materials in the vicinity of the boiler and flue shall not exceed 65°C during boiler operation. The flue shall not be closer than 50mm to any combustible material, except where it passes through such material with a non-combustible sleeve when the air gap may not be less than 25mm.

## 6.8 Flue System Location

The flue system must not be placed or fitted where there is undue risk of accidental damage to the flue pipe or undue danger to persons in the vicinity. Check that the flue and chimney are clear from any obstruction.

Wessex boilers are suitable for installation in a balanced compartment in accordance with the requirements of **BS 6644**. Consult Hamworthy Heating Technical Department for help or assistance if in doubt.

## 6.9 Condensate Discharge

Due to the high thermal efficiency of the boiler, condensation will occur within the boiler casing during firing from cold conditions. A drain with an integral trap is fitted to the rear centre of the appliance base tray to enable disposal of the condensate. Connection to the trap is Rp½. The drainpipe must be manufactured from a non-corrosive material and be at least 15.0mm dia. It must also have a fall of at least 3° (approx. 50mm per metre) and connect directly to a drain.

In addition to the above the M200 and M300 flue boxes are provided with a 22 dia drain stub pipe which should be connected in a similar manner via a suitable trap.

## 7.0 AIR SUPPLY

Detailed recommendations for air supply are given in **BS 6644**. The following notes are intended to give general guidance. In all cases there must be provision for an adequate supply of air for both combustion and general ventilation, in addition to that required for any other appliance.

**Note:** Combustion air for the appliance is drawn through the pyramid shaped air inlet located on the top cover. It **must** be ensured that this air inlet is kept open and free from blockage at all times.

### 7.1 Air Supply by Natural Ventilation

The boiler room must have, or be provided with, permanent air vents directly to the outside air, at high level and at low level. For an exposed boiler house, air vents should be fitted preferably on all four sides, but at least on two sides. Air vents should have negligible resistance and must not be sited in any position where they are likely to be easily blocked or flooded or in any position adjacent to an extraction system which is carrying flammable vapour. Grilles or louvres must be so designed that high velocity air streams do not occur within the space housing the boiler.

The air supplied for boiler house ventilation shall be such that the maximum temperatures within the boiler house shall be as follows:

- 1) At floor level (or 100mm above) = 25°C.
- 2) At mid-level (1.5m above floor level) = 32°C.
- 3) At ceiling level (or 100mm below) = 40°C.

Where both low and high level openings are used, the grilles shall have a total minimum free area of: -

Low Level (inlet): 540cm<sup>2</sup> plus 4.5cm<sup>2</sup> per Kilowatt in excess of 60kW total rated input.

High Level (outlet): 270cm<sup>2</sup> plus 2.25cm<sup>2</sup> per Kilowatt in excess of 60kW total rated input.

## 7.2 Air Supply by Mechanical Ventilation

Air supplied to the boiler room by Mechanical means should be as follows: -

- 1) Mechanical inlet and mechanical extract can be utilised providing design extraction rate does not exceed one third of the design inlet rate.
- 2) Mechanical extract ventilation with natural inlet ventilation **MUST NOT** be used.

**NOTE:** For Mechanical ventilation systems an automatic control should be provided to cut off the gas supply to the boiler, in the event of failure of air flow in either inlet or extract fans.

**Figure 7.2 Mechanical Ventilation Flow Rates**

Atmospheric Boilers	Flow rate per 1000kW total rated heat input (Gross)	
	Inlet air (Combustion ventilation)	Extract air (ventilation)
	m <sup>3</sup> /s.	m <sup>3</sup> /s.
Volume	1.10	0.45

## 8.0 WATER CIRCULATION SYSTEM

### 8.1 General

The Wessex Boiler has a low water content and the requirements of minimum water flow are given in **Section 8.8: Minimum Water Flow Rates** (p10) and Figure 2.2 (p4). Recommendations for the water circulation system are given in **BS 6644** and **CP 342**. The following notes are of particular importance:-

- 1) In a combined central heating and hot water system, the hot water storage vessel must be of the indirect cylinder or calorifier type. The hot water storage vessel should be insulated preferably with not less than 75mm (3 in) thick mineral fibre, or its thermal equivalent.
- 2) Circulating pipework not forming part of the useful heating surface should be insulated to help prevent heat loss and possible freezing, particularly where pipes are run through roof spaces and ventilated cavities. Cisterns situated in areas, which may be exposed to freezing conditions, should also be insulated. Insulation exposed to the weather should be rendered waterproof
- 3) Drain valves must be located in accessible positions which permit the draining of the whole system, including the boiler and hot water storage vessel.
- 4) Each boiler has G1½ male flow (indicated with a red spot) and return connections (indicated with a blue spot). Boilers should be connected by flow and return headers. Headers should be connected to the

system in a "reverse return" arrangement (the water flow in each header is in the same direction) to ensure equal flow in each module, or with a "single pipe header system". Figure 1.1 (p2) shows typical layouts.

5) Due to the higher pressure loss of the Wessex heat exchanger compared to the conventional boilers, it may be necessary to install a shunt pump or balancing valve to enable correct flow through the boiler.

6) Ideally, individual valves should be fitted to each module to enable isolation from the system, however, the arrangement must comply with the requirements of **BS 6644**. See **Section 10.3 Water Connections** (p14).

### 8.2 Pressure Relief Valve (Safety Valve)

The most important single safety device fitted to a boiler is its safety valve and each boiler, or in the case of a modular installation, each bank of boilers, must be fitted with a pressure relief valve to **BS 759** or **BS 6759** Part 1 and sized as shown in **BS 6644**.

**BS 6644** provides comprehensive information for the selection and location of safety valves and attention is drawn to the higher capacity requirements of safety valves for pressurised hot water systems.

### 8.3 Open Vent and Cold Feed Pipe

(See **BS 6644** for further information.)

Every boiler or group of boilers should have an open vent pipe and cold feed pipe installed between the boiler and the first water isolating valve. The minimum bore (mm) of these pipes per installation is as follows:-

The vent pipe must rise continually, must not be valved except by a design which when closed for maintenance the boiler is open to atmosphere. The pipe shall be protected against freezing where this might occur.

**Figure 8.3. Cold Feed and Vent Pipe Sizes**

Boiler Output	Feed	Vent
< 60 kW	19	25
60 kW - 150 kW	25	32
150 kW - 300 kW	32	38
300 kW - 600 kW	38	50

### 8.4 Altitude Gauge (Water Pressure Gauge)

Every boiler or group of boilers should be provided with a gauge complete with isolating cock. See Figure 1.1 (p2) for typical position.

## 8.5 Thermometer

See Figure 1.1 (p2) for typical position. A thermometer complete with pocket should be fitted in the pipework to indicate water flow temperature.

## 8.6 Drain Valves

Each boiler should have a 15mm NB drain valve (not H.H.L. supply) fitted to drain the boiler only. The heating system in total should have drain valves as recommended by **BS 6644**. See Figure 1.1 (p2) for recommended positions.

## 8.7 Circulating Pump

One or more circulating pumps will be required to circulate water around the boilers and heating system. Figure 2.2 (p4) shows the hydraulic resistance of the boiler. The pump should be sited to facilitate servicing. It is important to note that when Wessex boilers are used to replace boilers on an existing system, the pumps should be checked for performance against the new boiler waterside pressure drop to ensure that the minimum flow rate can be obtained. It is also important that the existing system be flushed through twice to remove any loose matter, which may have accumulated. If in any doubt regarding the cleanliness of the system, a coarse filter should be fitted in the return pipework to the boilers.

**NOTE:** If boilers are run off time clock control, a pump overrun (not HHL supply) should be fitted which must run for a minimum of 5 minutes on shut-down of the last boiler.

## 8.8 Minimum Water Flow Rates

Minimum water flow rates are shown in Figure 2.2 (p4). These flow rates should be maintained through the boiler at all times whilst the boiler is firing. If the water flow rate is allowed to fall below the minimum, the boiler heat exchanger could fail due to the resultant scale formation. Particular attention should be paid to the restriction of external flow circuits during periods of low heat demand.

## 8.9 Water Pressure Drop

The waterside hydraulic resistance (Pressure drop) is shown in Figure 2.2.

## 8.10 Control Schemes

### 8.10.1 Temperature Controls

Adjustable High and Low fire control thermostats are supplied with each boiler and should be set to operate within the range 50-90°C for standard applications. The setting of the Low fire thermostat is generally 3-5°C below the control (High fire) thermostat. A temperature limiter, (hand reset limit

thermostat) is also fitted to the boiler and must be set at 100°C.

### 8.10.1.2 High Temperature Option

If a higher water temperature is required (and the system head and components are suitable) the boiler can be supplied with a higher range temperature limiter which must not be set higher than 120°C. The control thermostat must not be set higher than 106°C and this will allow a maximum flow temperature of 120°C. It should be noted that at these flow temperatures, the approximate flue gas temperature will increase to 145°C.

**NOTE!** The minimum difference between control thermostat and temperature limiter **must never** be less than 10°C.

### 8.10.2 Water Flow Controls

Any external mixing valve/shunt pump or similar controls should **ALWAYS ENSURE** that the minimum water flow rate as shown in Figure 2.2 (p4) is maintained. If there is any doubt relating to site flow conditions it is suggested that a flow switch is fitted. The flow switch should be connected such that the boiler will shut down if insufficient flow occurs.

### 8.10.3 Frost Protection

Consideration should be given to fitting a frost thermostat set at approximately 4°C

## 8.11 Unvented Pressurised Systems

See Figure 1.1 (p2) for typical layout of a pressurised (Un-vented) Hot Water System.

In order to correctly size a pressurisation unit for any heating system certain parameters are required. These are: -

- 1) Static height of highest component in system.
- 2) System volume - if not known a general rule of thumb of 10 litres/kW installed boiler power can be used.
- 3) Maximum flow temperature, i.e. most systems run at 82°C.
- 4) Maximum system hot working pressure, generally given in barg.

From the above information Hamworthy Heating can size the pressure unit and also the expansion vessel required.

Care must be taken in sizing expansion vessels to ensure maximum acceptance factors are not exceeded. Normally manufacturers of vessels impose a limit of 0.5. This value must not be exceeded at any time during the operation of the boiler: this includes the over pressure condition should a safety valve lift.



Consideration should also be given to sizing of the safety valve(s) in the system. See **BS 6759: Part 1** for information.

See also **BS 6880: Part 1** for design considerations.

## 8.12 Modular Boiler Control Schemes

For modular installations of the Wessex 100M range of boilers, Hamworthy Heating can supply an optional Milton boiler sequence control system.

This system comprises a wall mounted 'Boiler Sequence Control' unit, and a 'Sequencing Interface Module' unit mounted to the fascia of each boiler's control panel, which provides on/off or high/low switching of the boiler. The Boiler Sequence Control communicates with the 'Sequencing Interface Modules' via a 2 wire data BUS. PT1000 type water flow temperature, optional room temperature and optional outside air temperature sensors are available, which are wired to the Boiler Sequence Control. Refer to Figure 8.12 (p12) and the Milton boiler sequence control and sequencing interface module instructions for further details.

Alternatively, the Wessex 100M boilers can be controlled on/off or high/low via the remote on/off and high/low control loops, by a non-HHL control system - see Figure 8.12 (p12).

## 9.0 ELECTRICAL SUPPLY

### **WARNING: THIS APPLIANCE MUST BE EARTHED.**

Wiring external to the boiler must be installed in accordance with the IEE Regulations and any local regulations, which apply. Wiring must be completed in heat resistant 3-core cable. (Size 1.0mm<sup>2</sup> csa). Boilers are normally supplied suitable for 230 volts, 50Hz. Fascia fuse rating is TA (T rated). External fuses should be 6A for all boilers.

The method of connection to the mains electricity supply must facilitate complete electrical isolation of the single boiler/battery with a contact separation of at least 3mm in all poles.

**This appliance must be isolated from the mains electricity supply in the event of electric arc welding being carried out on any connecting pipework.**

A mains isolator must be provided adjacent to the boiler in a readily accessible position. The supply should only serve the boiler.

**NOTE!** Volt free contact electrical supplies must also be isolated when fitted (see note on fascia). Further details regarding connection to the electricity

supply are given in **BS EN 60335, Part 1** or **BS 3456, Part 201**.

**The mains power supply MUST NOT be switched by a time clock.** The Wessex 100M boiler has a remote stop/start loop which can be used to operate the boiler(s) under a timed regime. The boiler control provides a 230V ~ signal that can be fed through a volt free contact for operation. Refer to Figures 8.12 (p12) and 9.1 (p13) for typical site wiring connections. See **BS 6644** for further information.

**DO NOT feed mains voltage onto the remote start stop or remote high/low control terminals.**

## 9.1 Site Wiring

Access to the controls is achieved by rotating the ¼ turn latches and removing the door. A 20mm dia. knockout is provided in each side panel if required for electrical connections. Any other routing of site cables should ensure that cables do not pass close to the boiler flue hood or that any cable trunking does not interfere with normal air circulation and supply ducts.

A removable bracket is supplied with every Wessex 100M boiler having three 20mm dia. holes for electrical cable anchorage. A plug and socket arrangement is utilised for the site terminal connections, the plug terminals being attached to the removable bracket.

**NOTE!** Rigid conduit **MUST NOT** be connected to the bracket as this will prevent removal. Care must be taken to ensure correct connections are made to the relevant terminals before applying power.

Refer to Figures 8.12 (p12) and 9.1 (p13) for typical wiring diagram.

## 9.2 Indication Signals and Volt Free Contacts

An optional kit is available to enable external indicator lights or alarms to derive signals for normal run, overheat and lockout.

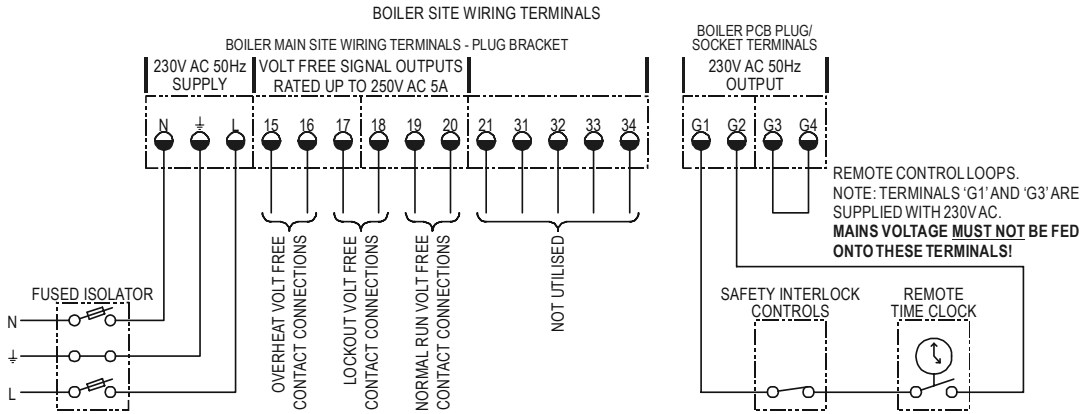
Refer to the individual kit instructions for electrical connections.

Each of these 230V signals are wired to relay bases on the PCB board. Once fitted, the relay change over contacts can be utilised to connect to a remote alarm or indicator via the connections provided.

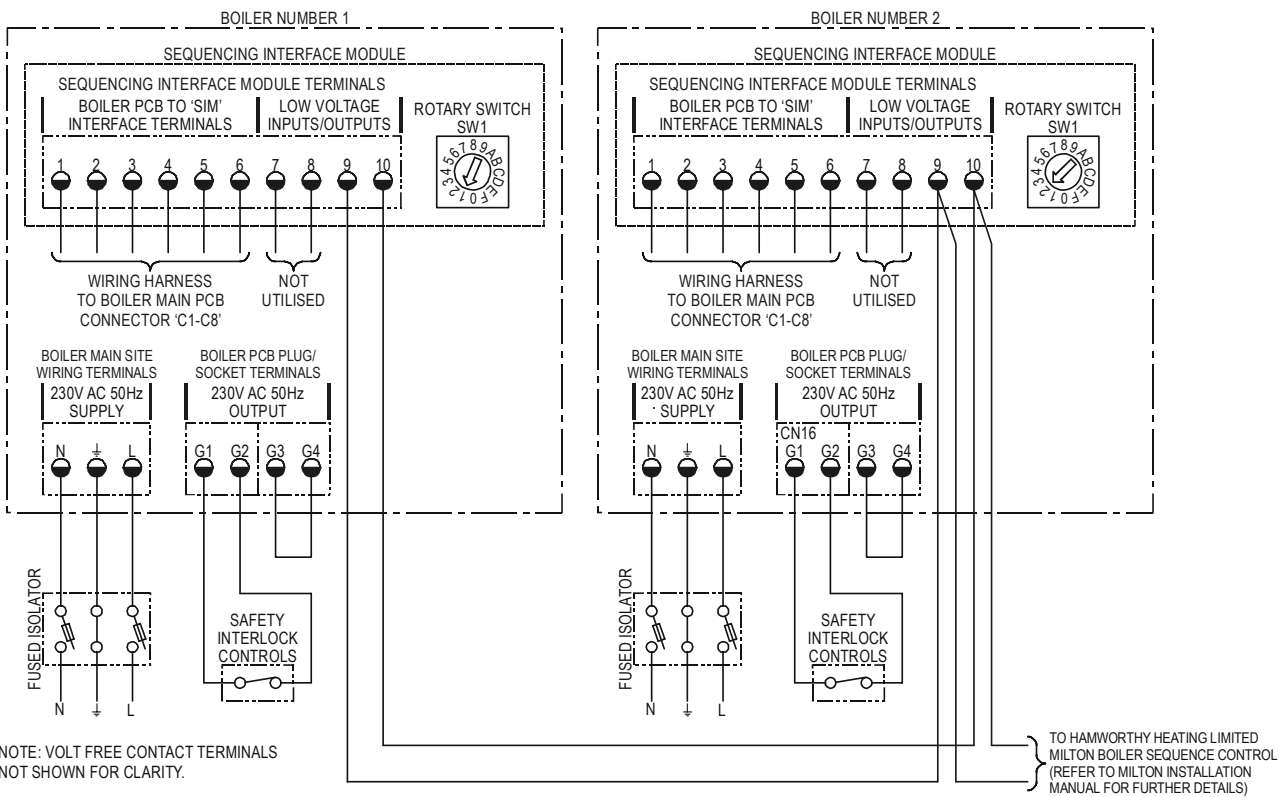
Note:- These external circuits **MUST** be isolated before any service or maintenance procedures are carried out.

**Figure 8.12 Site Wiring Diagram**

1) SINGLE BOILER INSTALLATION, ON/OFF OR HIGH/LOW OPERATION VIA REMOTE TIME CLOCK CONTROL.



2) MULTIPLE BOILER INSTALLATION, ON/OFF OR HIGH/LOW OPERATION VIA HAMWORTHY HEATING LIMITED MILTON BOILER SEQUENCE CONTROL.  
NOTE: ROTARY SWITCH 'SW1' ON THE SEQUENCING INTERFACE MODULE - POSITIONS '1' TO '9' SETS THE BOILER FIRING ORDER.



3) MULTIPLE BOILER INSTALLATION, ON/OFF OR HIGH/LOW OPERATION VIA NON HAMWORTHY HEATING LIMITED BOILER SEQUENCE CONTROL.

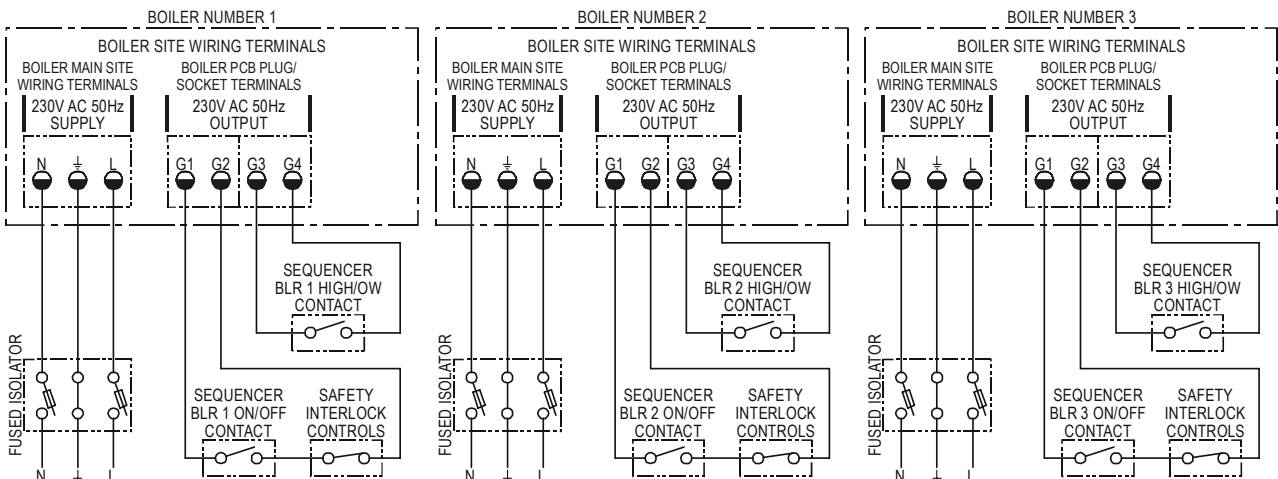
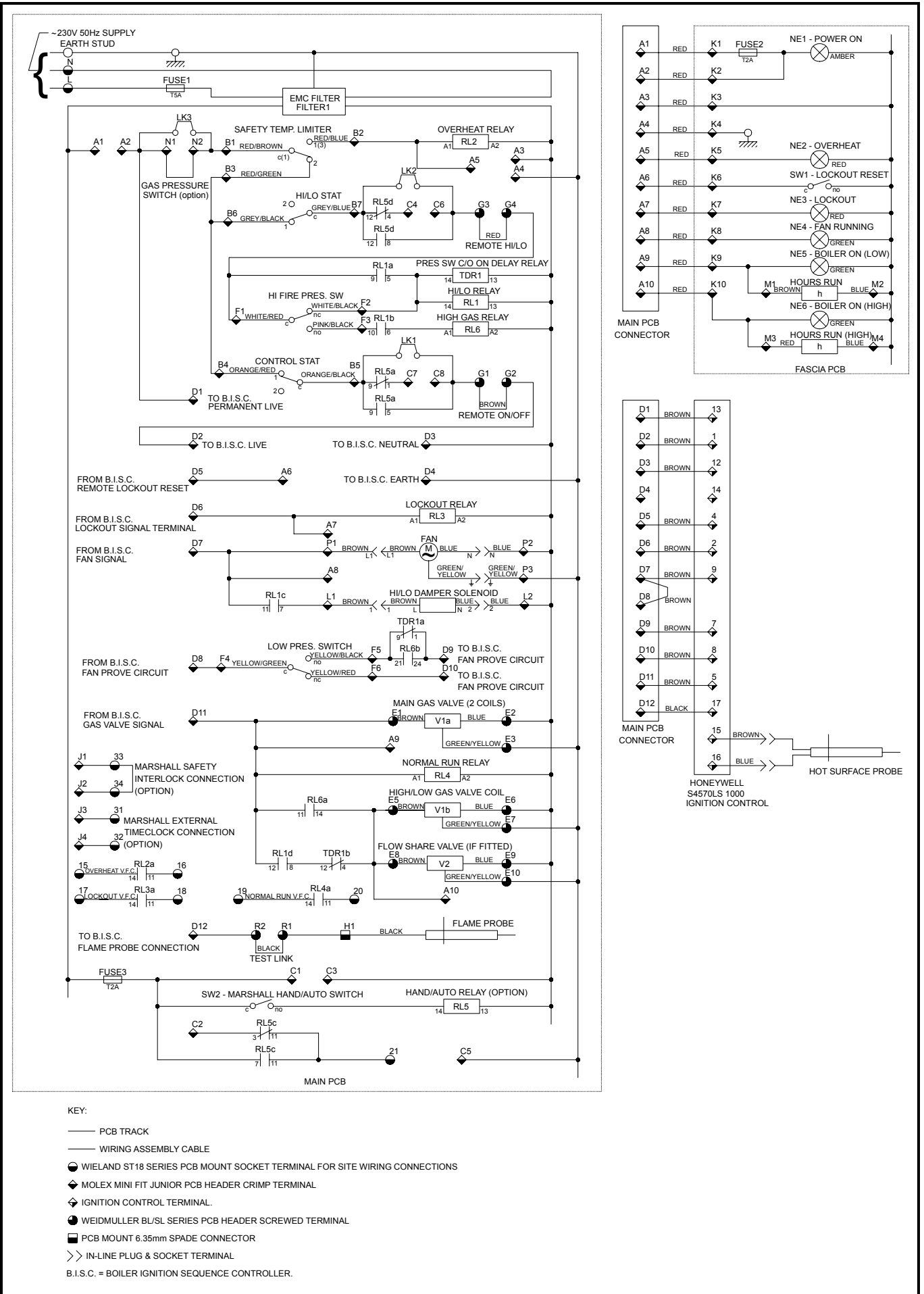


Figure 9.1 Wiring Schematic



### 9.3 Milton Boiler Sequence Control and Sequencing Interface Module (Optional)

Refer to the Milton boiler sequence control manuals for details of its installation.

The sequencing interface module is supplied as a kit for site assembly to the boiler control panel(s). Refer to the installation instructions supplied with the kit for assembly details.

The sequencing interface module incorporates a 10way plug/socket screw terminal block to make the site wiring connections. Refer to Figure 8.12 (p12) and the Milton boiler sequence control installation manual for wiring connection details.

**Note:** Each sequencing interface module is supplied with a 4 pole relay which is fitted to the relay base marked 'RL5' on the control panel main PCB. PCB jumper links marked 'LK1' and 'LK2' **MUST** also be removed from the control panel main PCB and discarded.

## **10.0 BOILER ASSEMBLY AND INSTALLATION**

### **10.1 General**

Each boiler is normally despatched to site as a pre-assembled unit for floor mounting and should be stored in a weatherproof place prior to installation. In the case of the M200 and M300 boilers, there will also be a pack containing the flue box system for each boiler.

The boiler should be positioned to allow at least the minimum clearances detailed in Figure 2.1 (p3) allowing rear access for pipework and flue connections.

During installation, care must be taken to prevent damage to the boiler casing panels prior to the contract completion.

### **10.2 Connection of Boilers to the Flue System.**

Notes on the recommendation for design of the flue system are given in **Section 6:FLUE SYSTEM**.

No fixed draught diverter is fitted to the boiler, nor is one required in the flue system. Flues must be constructed with suitable materials to resist corrosion against the acidic nature of the flue gases. Materials used in the joints must also resist attack.

For the M100, the flue connection is a spigot with an ID of 102mm, terminating at the rear of the boiler, see Figure 2.1 (p3). It is recommended that connection to a flue system is via an elbow off the boiler and a minimum vertical height of 1m.

For M200 and M300 models, the flue connection is a spigot with ID's of 153mm and 204mm

respectively, terminating at the rear of the boiler on top of the flue box adapter, see Figure 2.1 (p3). A minimum vertical height of 1m is recommended for the flue. The flue spigot provided is suitable for accepting twin-wall flue pipe. Sealing of the flue to the spigot should be made using a suitable caulking string and cold caulking compound.

It is important, for service requirements, that the flue system is fully self supporting. Check the flue and chimney are clear from obstruction.

### **10.2.1 Flue Kit Fitting.**

**Applicable for M200 and M300 boilers only.**

- 1) Affix self adhesive gasket onto the die cast flue sockets and loosely affix the Toro clamps over the outside edges of the socket.
- 2) Fit the flue sockets over the spigots on the flue box and tighten the Toro clamp until the socket lightly contacts the spigot.
- 3) Lift flue box into position ensuring that the flue sockets locate correctly onto the respective mounting studs on the rear face of the boiler casing. Fit nuts and washers and secure the sockets to the boiler case.
- 4) Loosen Toro clamp and remove flue box. It will be noted that the flue socket is provided with an internal shoulder. Apply a suitable sealing compound around this shoulder then refit the flue box ensuring that the spigot makes contact with the shoulder.
- 5) Re-tighten Toro clamps.

### **10.3 Water Connections**

See Figure 2.1 (p3). for position of water connections (flow and return). Care must be taken when installing water system pipework that undue stress is avoided on the boiler flow and return connections (identified by red and blue dots). It is recommended that unions are fitted local to the boiler to permit future servicing requirements. Fully closing valves must not be connected to both flow and return pipes unless the boiler is fitted with an individual, correctly sized and positioned safety valve. It is recommended that a 3-way 'L' port valve is fitted in the flow connection to allow an open vent situation should the boiler need to be fully isolated from the system.

Optional reverse return water manifold kits are available for models M200 and M300 Refer to **Section 1.8** (p1).

**11.0 COMMISSIONING AND TESTING**

For general layout of the boiler, refer to Figures 2.1 (p3) & 11.0.

**11.1 Electrical Installation**

Wiring **MUST** be checked by a suitably competent person. Power supply required is 230 volts 50 Hz single phase. An isolator correctly fused at 6A should be sited close to the boiler.

Access to the controls is achieved by rotating the two 1/4 turn latches and removing the door. Connections to the boiler should pass through the 9 x 20mm wiring gland plate. The boiler is supplied with a remote stop/start circuit for time clock operation. **Any other interlocks, i.e. Pressurisation unit, BEM System should be wired in series with the remote stop/start loop.**

The site wiring terminal rail is marked with Live, Neutral and Earth connections. See Figure 9.1 (p13) for details.

**IMPORTANT :- READ THE WARNING NOTE REGARDING EXTERNAL VOLTAGES.**

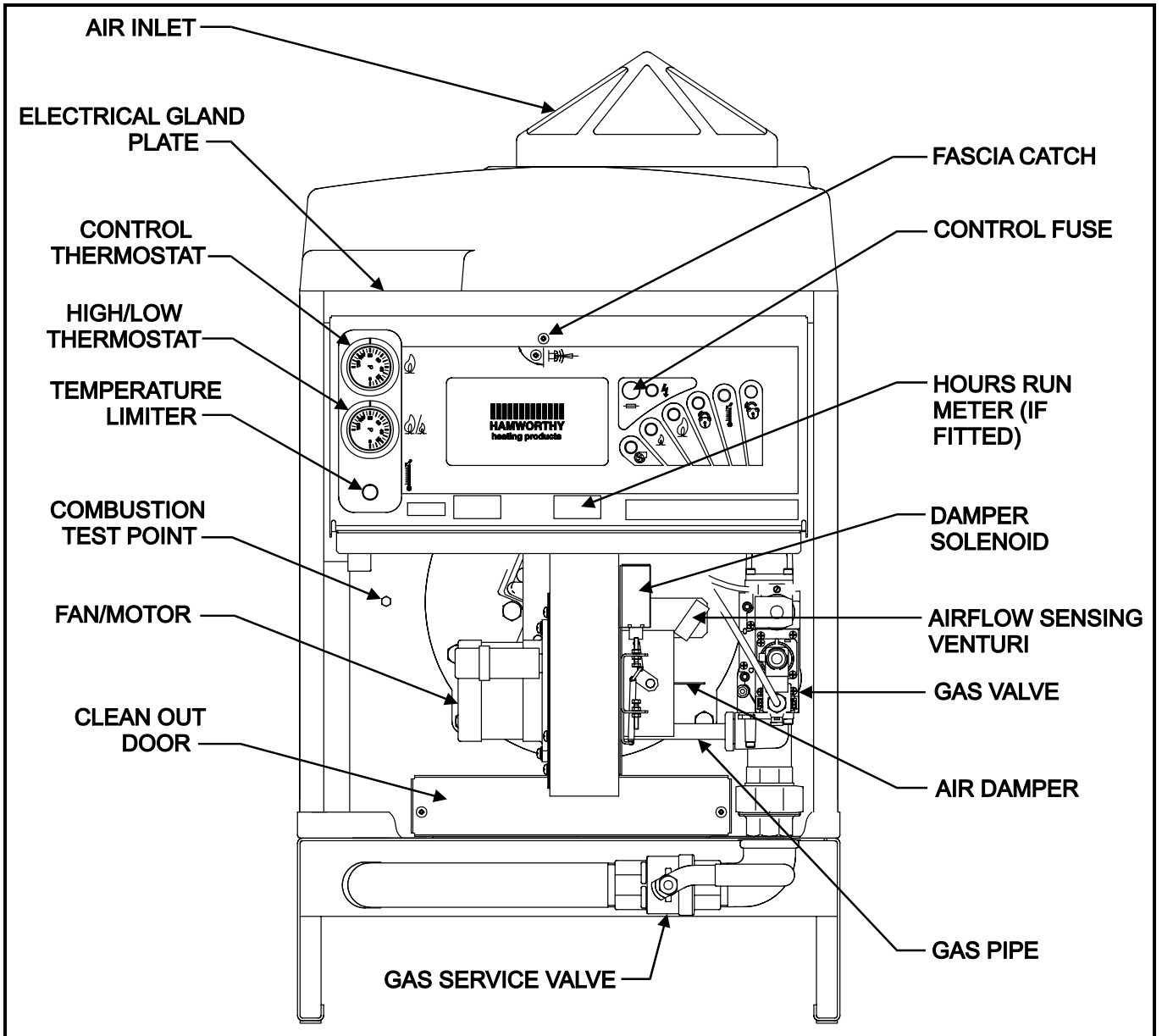
A schematic of the control circuit is shown in Figures 8.12 (p12) and 9.1 (p13).

**11.2 Gas Installation**

For design see **Section 5:GAS SUPPLY.**

The whole of the gas installation including the meter must be inspected and tested for soundness and purged in accordance with the recommendations of **BS 6891** or **IGE/UP/1, IGE/UP/1A** and **IGE/UP/2** as appropriate.

**Figure 11.0 General Layout (Front View)**



### 11.3 Water Circulation System

For design see **Section 8: WATER SYSTEM.**

The system should be thoroughly flushed out with cold water without the pump in position. Ensure all the valves are open.

With the pump fitted the system should be filled and air locks cleared. Vent the radiators and check for leaks.

If the system is unvented the pressurisation unit should not be utilised for the initial filling. This should be carried out using a WRC approved double check valve and temporary-filling loop.

In order to comply with local Water Authority Regulations, this loop must be disconnected when filling is complete. Water treatments should not be fed through the pressurisation unit unless permitted by the manufacturer.

Check the expansion vessel cushion pressure as detailed by the manufacturer's Installer's Guide.

### 11.4 Commissioning the Boiler

A competent person holding 'CORGI' registration MUST be responsible for the commissioning of this boiler. Before attempting to commission any boiler, ensure that personnel involved are aware of what action is about to be taken and begin by making the following checks: -

- 1) Flueway passages to chimney are clear.
- 2) Adequate ventilation as per **Section 7: Air Supply** (p8) exists in the boiler house.
- 3) The system is fully charged with water, ready to receive heat. All necessary valves are open and the pump is circulating water.
- 4) The pipework and valve arrangement is installed to Hamworthy Heating recommendations in such a way that water flow rates will be in accordance with Figure 2.2 (p4).
- 5) The gas supply pipework is clear of any loose matter, tested for soundness and purged.
- 6) The condensate discharge is connected to a drain.

#### 11.4.1 Boiler Checks Prior To Lighting

**NOTE!** Refer to Figure 2.2 (p4) for maximum gas inlet pressure for normal operation. Information relating to propane firing can be found in Appendix 'A' (p30).

- 1) Gas supply is connected but turned to the "off" position. Check that the ignition and probe leads are

connected correctly. Ensure Hot Surface igniter and sensing probe assembly are not cracked or broken.

- 2) Ensure electricity is connected but switched off and 2A fuse on boiler fascia removed. Check that the plug/socket gas valve PCB connection is correctly located and that the sensor and thermostat bulbs are fully inserted into the boiler pocket. Reset and test the operation of the temperature limiter by firmly reset pressing pin (in controls fascia), removing the clip and bulb from the pocket and carefully applying a heat source to the bulb. The reset button should operate. If satisfactory, refit the bulb in the pocket and secure with the clip.

- 3) If a Sequencing Interface Module is fitted to the boiler control panel, locate the hand/auto switch 'SW2' at the top of the boiler main PCB, and set it to the 'hand' position to override operation of the Sequencing Interface Module for the purposes of commissioning.

- 4) Check setting of both temperature limiter and control thermostat. The temperature limiter must be set at 100°C maximum. This can be achieved by removing plastic cover (unscrewing) if fitted. Drop down fascia on controls housing, undo holding nut and withdraw into the controls housing. Adjust if required and refit in reverse order to that above. Set control thermostat to required temperature. Ensure limits are set if required (refer to appendix B). Set Hi/Lo thermostat to required temperature. This is generally set 3-5°C below control thermostat temperature.

**NOTE!** It is generally recommended that the minimum return temperature to a non-condensing boiler is 50°C.

- 5) With the fascia panel down, access the terminal connections at the bottom of the main PCB. Figure 9.1 shows the correct location of incoming wires. Remove link on terminals R1 - R2 (black wire) on the PCB and insert a multi-meter set to read DC  $\mu$ A.

- 6) The Wessex boiler utilises both high and low fire gas rates, dependant upon the control thermostat demand, ignited by Hot Surface Ignition (HSI), see Figure 14.1 (p25). To ascertain which type of gas valve is fitted, refer to Figure 11.2 (p18). The method of low fire and high fire adjustment is explained on this data sheet. This procedure should be read and understood for later use when required.

- 7) Ensure air pressure switch sensing tubes are correctly fitted, without twists or kinks, between the switches in the control panel and the airflow-sensing device on the inlet damper assembly. Refer to Figure 14.2 (p25) for provisional pressure switch setting(s).

Ensure that the inlet damper mechanism is intact and free to operate over its range, see Figure 11.4.5 (p19).

#### 11.4.2 Procedure for Initial Lighting

Ensure gas service valve is in the "OFF" position. Replace 2A fuse in fascia. Press lockout button on fascia to re-set the controls, (wait at least 15 seconds before pressing again if the lockout neon is not extinguished). The combustion fan will start and run for a pre-purge period (approximately 30 seconds). During this time the 'fan on' neon should illuminate. After a delay and if airflow is proved, the HSI system will operate causing the igniter to glow red (visible through the viewing port). As the gas service valve is closed, the controls should go to lockout after approximately 40 seconds (red neon on fascia illuminated). If the above occurs correctly, OPEN the service valve and press re-set button on fascia.

After the pre-purge period the ignition should be initiated and main gas valve will energise lighting the main burner. **Note!** the multi-meter should be reading at least 2 $\mu$ A.

#### 11.4.3 Checking/Adjusting Inlet and Setting Pressures

After the boiler has operated for approximately 10 minutes, remove the 2A control fuse on the fascia, and connect manometers to the inlet and outlet pressure test points **on the gas valve**. Replace the fuse and re-light the module checking both the inlet and setting pressures, see Figure 2.2 (p4). If necessary adjust low fire and high fire gas pressures. Refer to Figure 11.2 (p18) for adjustment procedure of relevant gas valve fitted.

For Natural Gas the gas pressure governor control system is configured for a nominal gas inlet pressure of 20mbar measured at the inlet to the gas valve, with a maximum inlet pressure of 25mbar.

For propane firing models, the nominal gas inlet pressure is 37mbar with a maximum inlet pressure of 45mbar.

Remove the 2A control fuse, disconnect the manometers and close the pressure test points. Record all readings for future reference on the relevant commissioning sheet. Replace the 2A control fuse and allow system to warm up sufficiently to check operation of control thermostat.

**NOTE:** The above is a first order check. Final setting must be made using a gas meter.

#### 11.4.4 Combustion Check

A combustion check must be taken when first commissioning the boiler. To achieve the specified combustion results, the burner pressure may need trimming. A plugged sample hole is provided in the

front casing panel left hand side.

**NOTE!** Care should be exercised if the boiler is firing as the flue can achieve temperatures which can cause injury if touched.

Combustion figures for Natural Gas should be as follows for both High and Low firing under the following conditions :-

##### **With Casing Door Removed -**

CO<sub>2</sub> = 8.0-8.5% (Dry flue gas)

O<sub>2</sub> = 6-7%

CO = 0-100ppm: However figure should not exceed 200ppm under normal operating conditions.

##### **With Casing Door Fitted -**

CO<sub>2</sub> = 9.0-9.5% (Dry flue gas)

O<sub>2</sub> = 4-5%

CO = 0-100ppm: However figure should not exceed 200ppm under normal operating conditions.

The above figures also apply to propane firing - See Appendix 'A' (p30).

#### 11.4.5 Air Inlet Damper

The air inlet damper is 'Factory Set and sealed', and **must not be adjusted**. With the casing door removed, a CO<sub>2</sub> level of 9.0-9.5% should be achieved. Slight adjustments should be made to the burner pressure to achieve this performance at both High and Low fire. Refer to Figure 11.2 (p18) for the necessary adjustments.

Recheck the combustion figures and ensure that all connections on the damper mechanism are secure.

#### 11.4.6 Safety Checks

To check for correct operation of the ignition controller, break the multi-meter  $\mu$ A circuit (terminal R1-R2 on the main PCB), the boiler should lockout after approximately one second. Check that the flame has been extinguished. Remove multi-meter and replace wire link across terminals R1-R2. If a Sequencing Interface Module is fitted set the hand/auto switch 'SW2' on the boiler main PCB to the 'auto' position. Replace front cover. Wait at least 15 seconds before pressing re-set button on fascia to re-set controller. After a waiting period the boiler will light and run normally.

#### 11.5 External Controls

The external controls used in typical boiler installations, for both vented and unvented systems, are shown in Figure 1.1 (p2). If different systems or controls are to be used and there are any doubts as to the suitability, contact Hamworthy Heating Technical Department for advice.

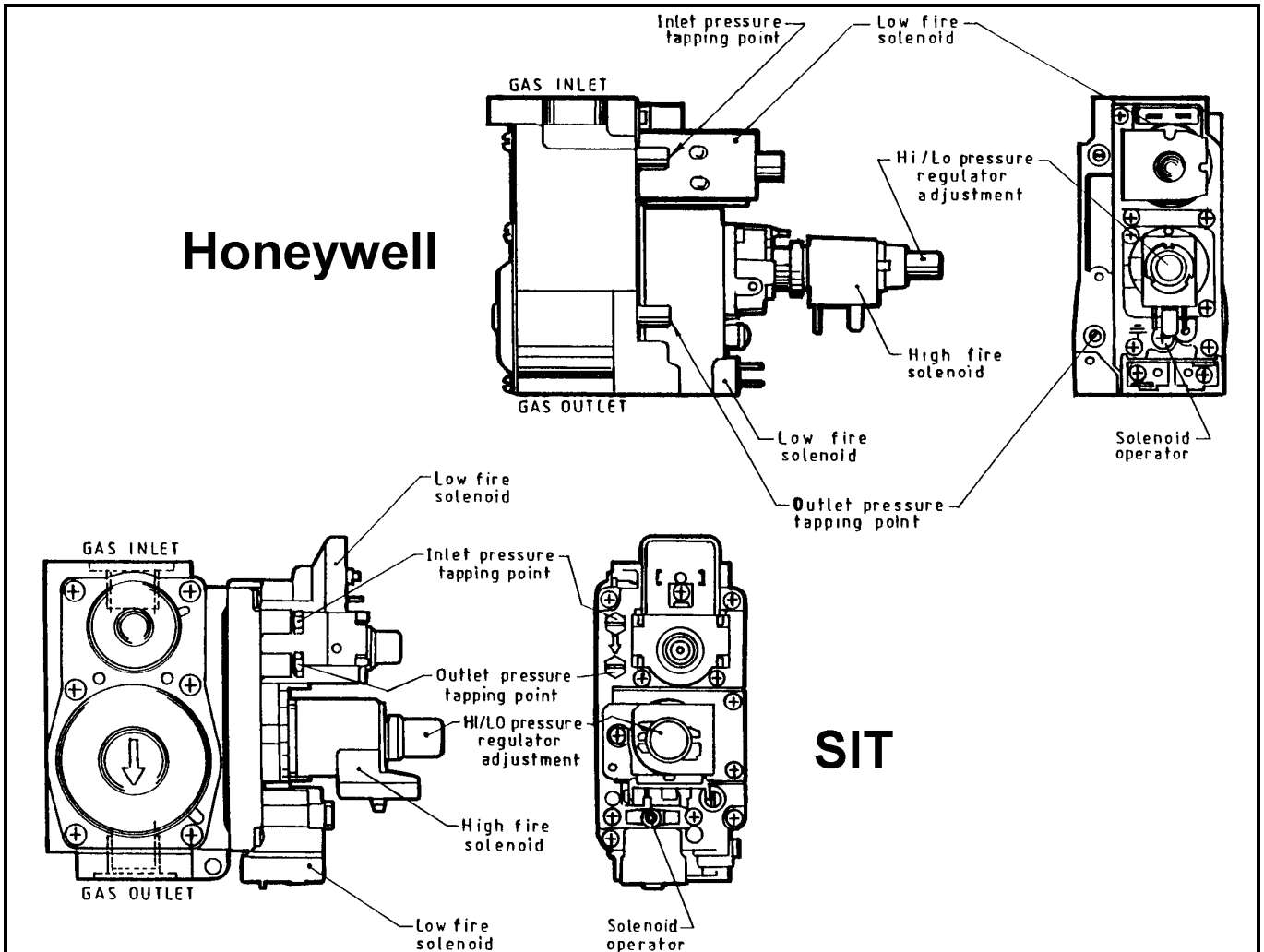
## 11.6 Installation Noise

In order to avoid the possibility of noise from the installation, care should be taken to follow the manufacturer's instructions. Particular attention should be paid to minimum water flow rates. If acoustic insulation is added to the boiler, care must be taken not to impede combustion or ventilation air flow. If in doubt contact the manufacturer.

## 11.7 User's Instructions

When the above is complete, the boiler owner or their representative should be made aware of the lighting and operating instructions fitted onto the top face of the control panel. A practical demonstration should be given describing each functional step. This Installer's Guide and User's Instructions should then be handed over and be kept in a safe place for easy reference.

Figure 11.4.3 Diagram of Automatic Gas Valves



### ADJUSTMENT PROCEDURE.

Refer to Figure 2.2 to determine the low fire and high fire gas pressures for the boiler being fired.

Information relating to propane firing can be found in Appendix 'A'.

Attach a manometer (suitable for 30mbar) onto the gas valve outlet pressure test point.

Light up the boiler. Then remove the protective cover from the Hi/Lo pressure regulator.

To adjust the high fire gas pressure, turn the outer nut on the hi/lo pressure regulator, c/w to increase pressure, anti c/w to decrease pressure.

To adjust the low fire gas pressure, remove link G3 - G4 on PCB. Nominally set the low fire gas pressure by rotating the inner crosshead screw, c/w to increase pressure, anti c/w to decrease pressure, whilst keeping the outer nut from rotating. Turn the boiler off then on again and fine trim the gas pressure.

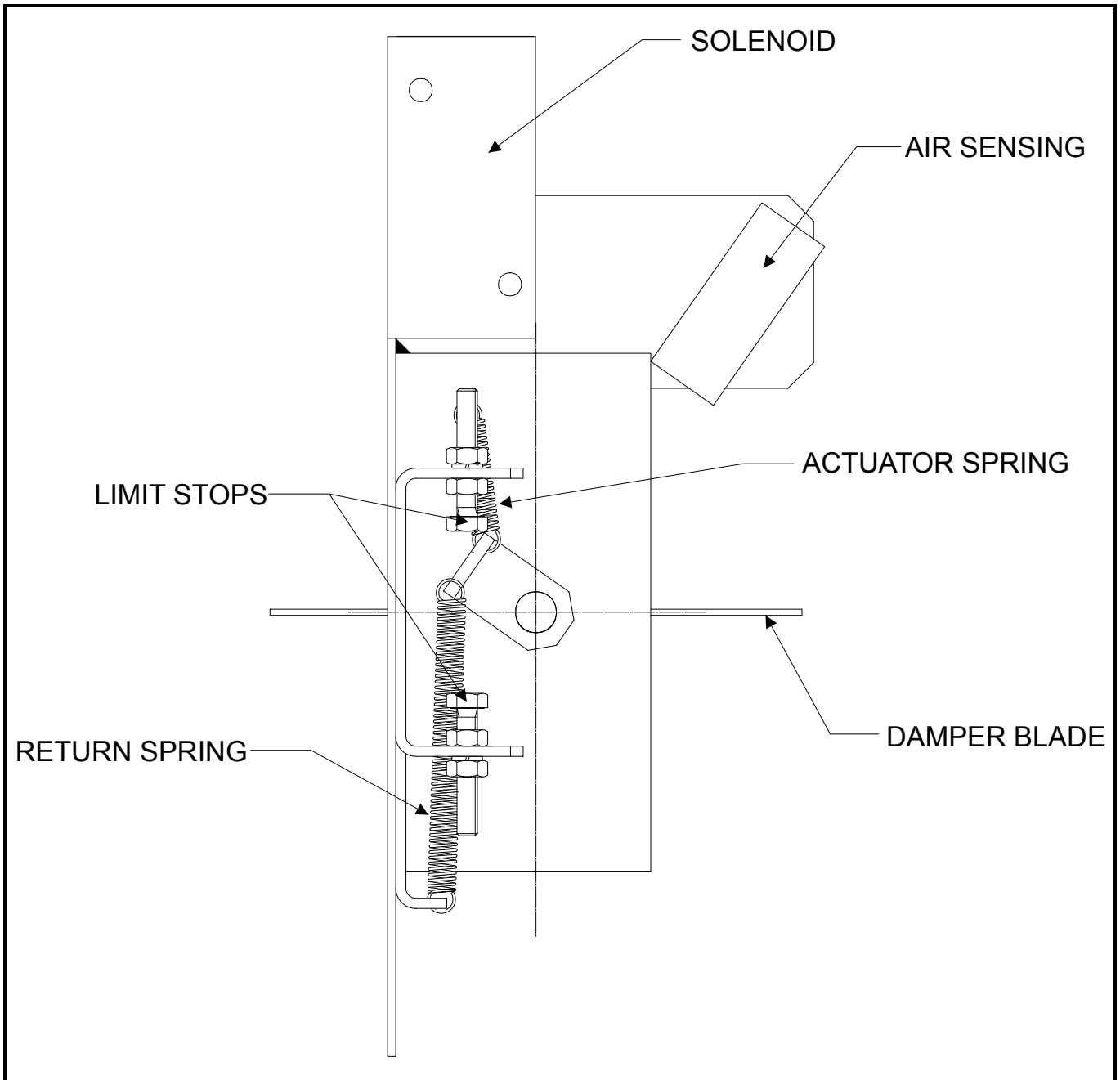
Insert the high fire link G3 - G4 on the PCB; the boiler should drive to high fire. Replace the protective cap on the Hi/Lo pressure regulator.

**Note! The low fire setting must always be set last of all. The valves operation may be incorrect if this is omitted.**

**Note!** It is also advisable to carry out this procedure with all boilers firing.



**Figure 11.4.5 Diagram of Damper Mechanism**



**12.0 FAULT FINDING**

**12.1 Safety Features Summary**

Should the control thermostat(s) fail, the temperature limiter will trip thus creating an immediate shutdown regardless of firing mode. An overheat neon on the controls fascia will indicate this condition has occurred. If, after pushing the reset button, the neon on the fascia does not extinguish and the boiler does fire up, it could be that the boiler is still too hot, i.e. the limit thermostat has not re-set. Allow the boiler to cool down. An investigation should be carried out to ascertain the reason for the overheating. An obvious reason would be too low a water flow rate through the boiler.

The flame is under constant supervision by the burner sequence controller. This is accomplished by measuring the flame's ability to rectify an AC current. If the flame diminishes for whatever reason and the rectified current drops below the controllers minimum detection current (0.7µA DC), the controller will induce a lockout within 1 second, which will require a manual re-set (situated on the controls fascia) to re-start the control sequence. Failure to establish and detect a flame during the light up sequence, results in burner shutdown and lockout within 5 seconds. If the boiler continues to lockout, then an investigation must be made to ascertain the cause. See Figure 12.2 (p21/22) for possible corrective scenarios. False flame signals at the start and during pre-purge will cause the boiler to lockout.

Pressure switches are fitted to monitor the correct operation of the fan and air inlet damper assembly at both High and Low fire. They ensure sufficient airflow through the boiler to facilitate correct combustion at all times. **Should the position of the air inlet damper be tampered with, the performance of the air pressure switches will be affected. Refer to Hamworthy Heating Ltd.** The control circuit is configured to establish a light/dark check thereby ensuring the switch is open (no air) before starting the fan. Once started, the circuit then checks that the switch has changed position (air proved) thus allowing the boiler to light and continue firing. Should the air supply fail at any time, the burner will immediately shut down and attempt a re-light, which if unsuccessful results in lockout.

Restoration of the power supply after an interruption, results in a full light up sequence to safely restart the burner. Power failure after a lockout, will not interfere with this condition when the supply has been restored.

To ensure safe operation, an optional low gas pressure switch is available. Should the gas pressure fall below the pre-set level, the appliance will not operate. Refer to kit instructions for details.

## 12.2 Fault Finding Procedures

General fault finding is shown in Figure 12.2 (p21/22). If the boiler still cannot be operated satisfactorily after following the chart, consult your local office of Hamworthy Heating for assistance.

## 12.3 Possible Causes of Boiler Lockout

- 1) Ignition failure due to no power at the hot surface igniter.
- 2) Ignition failure due to faulty gas valve.
- 3) Ignition failure due to broken igniter or flame probe lead.
- 3) No or low gas supply pressure.
- 4) No ignition due to faulty controller.

## 13.0 SERVICING

A competent person registered for working on non domestic gas appliances should check and ensure that the flue, its support and terminal, the ventilation to the boiler house, safety valve, drain, water filter if fitted, pressure gauge, etc.; are in a serviceable and working condition and still comply with the relevant standards and codes of practice - see **Section 3** (p5).

**13.1-Regular annual servicing is recommended**, preferably by a Hamworthy appointed person, to ensure trouble free operation. Although cleaning of flueways may not be necessary on a yearly basis, it is important that all controls and safety features are checked for correct operation. **NOTE!** Measuring flue gas CO<sub>2</sub> and gas temperatures will give an indication of the state of the boiler flueways and

waterways. Results should be compared with previously measured values to establish possible loss of efficiency.

**Note:** Should remedial work be carried out on a module, then the 2A control fuse **MUST** be removed from the non-firing module so as to prevent accidental operation in the event that the installation is required for ongoing heating requirements.

## 13.2 Annual Service

The procedure detailed relates to a single module and **MUST** be carried out on ALL individual modules which constitute a unit. Before servicing the boiler, the following procedure must be carried out :- **WARNING: Isolate all electrical supplies and turn off the gas service valve.**

1) Remove the front casing door by using a screwdriver to rotate the ¼ turn latches.

2) Remove the two bottom screws securing the control panel to the casing sides and swing the panel up. Secure the panel in the up-swung position by locating one of the mounting screws into the hank bush located on the left hand side panel approximately 80mm above the position from which the screw was originally removed.

3) Disconnect the flame probe lead at the probe, and the igniter lead at the plug and socket. Unplug the fan and solenoid cables from the bottom left of the control panel. Disconnect the pressure sensing tubes from the air flow sensing venturi, noting the relative positions.

4) Remove the gas pipe (refer Figure 14.5 p26) by unscrewing the fitting at the base of the gas valve. Push the pipe into the fan case, then drop down and remove. Discard sealing washer.

5) Remove the 4xM5 nuts securing the fan motor plate to the fan case and withdraw the motor complete with the fan impeller. Check the condition of the impeller and clean with a soft brush taking care not to dislodge any balance weights.

6) Remove the 2 x M6 nuts securing the fan case / burner assembly and carefully withdraw the burner from the heat exchanger. Remove the two nuts securing the swirler to the burner and the four bolts securing the fan case to the swirler. Check the condition of the swirler and clean if necessary with a soft brush taking care not to disturb the swirler blades. Similarly check and clean the fan casing / damper assembly taking care not to disturb the damper positioning.

7) Remove the single socket cap head screws securing the igniter and flame probe to the burner flange. Carefully withdraw the igniter and probe. Remove the loose flange and Mica sight glass

Figure 12.2a Fault Finding Procedures

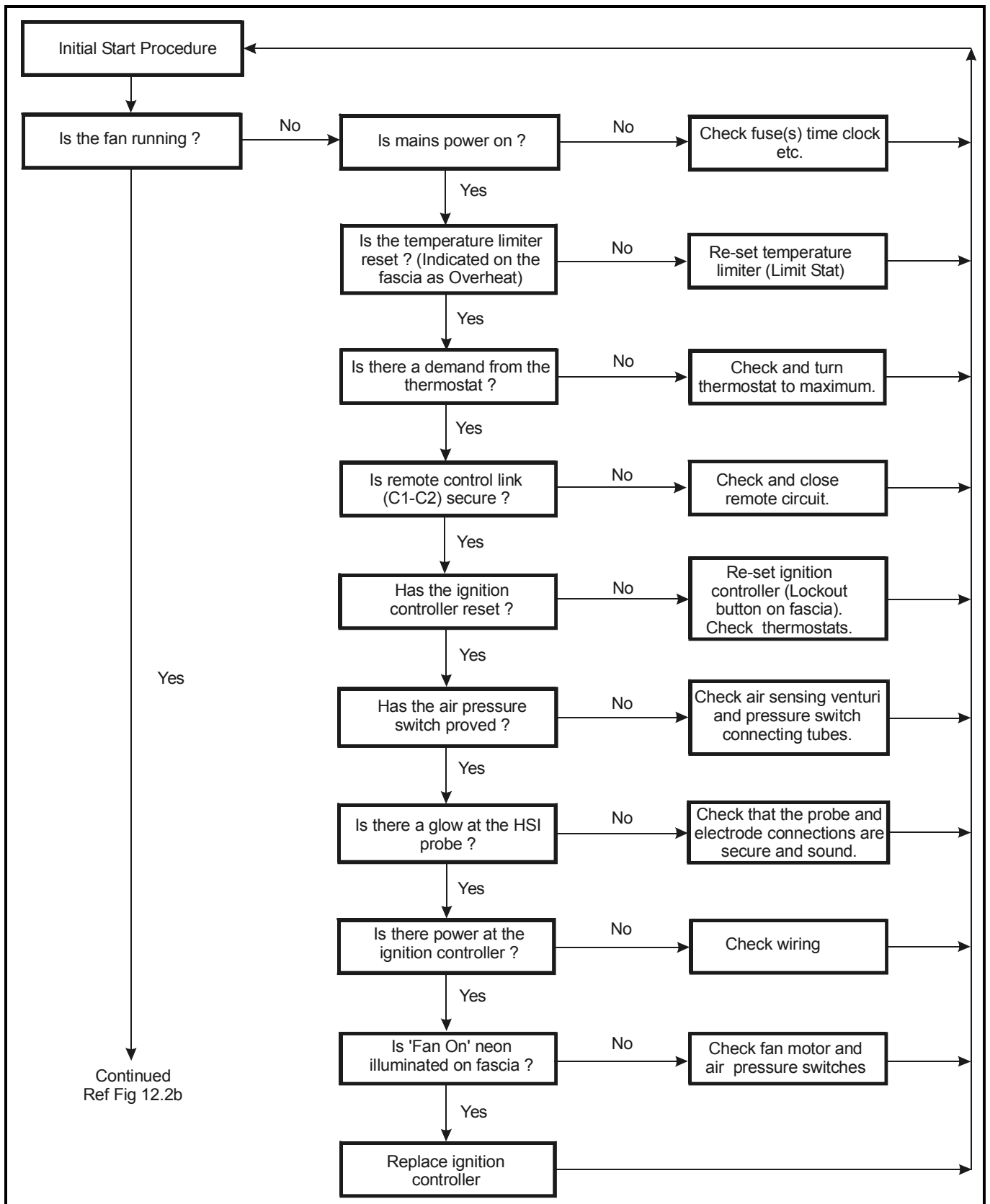
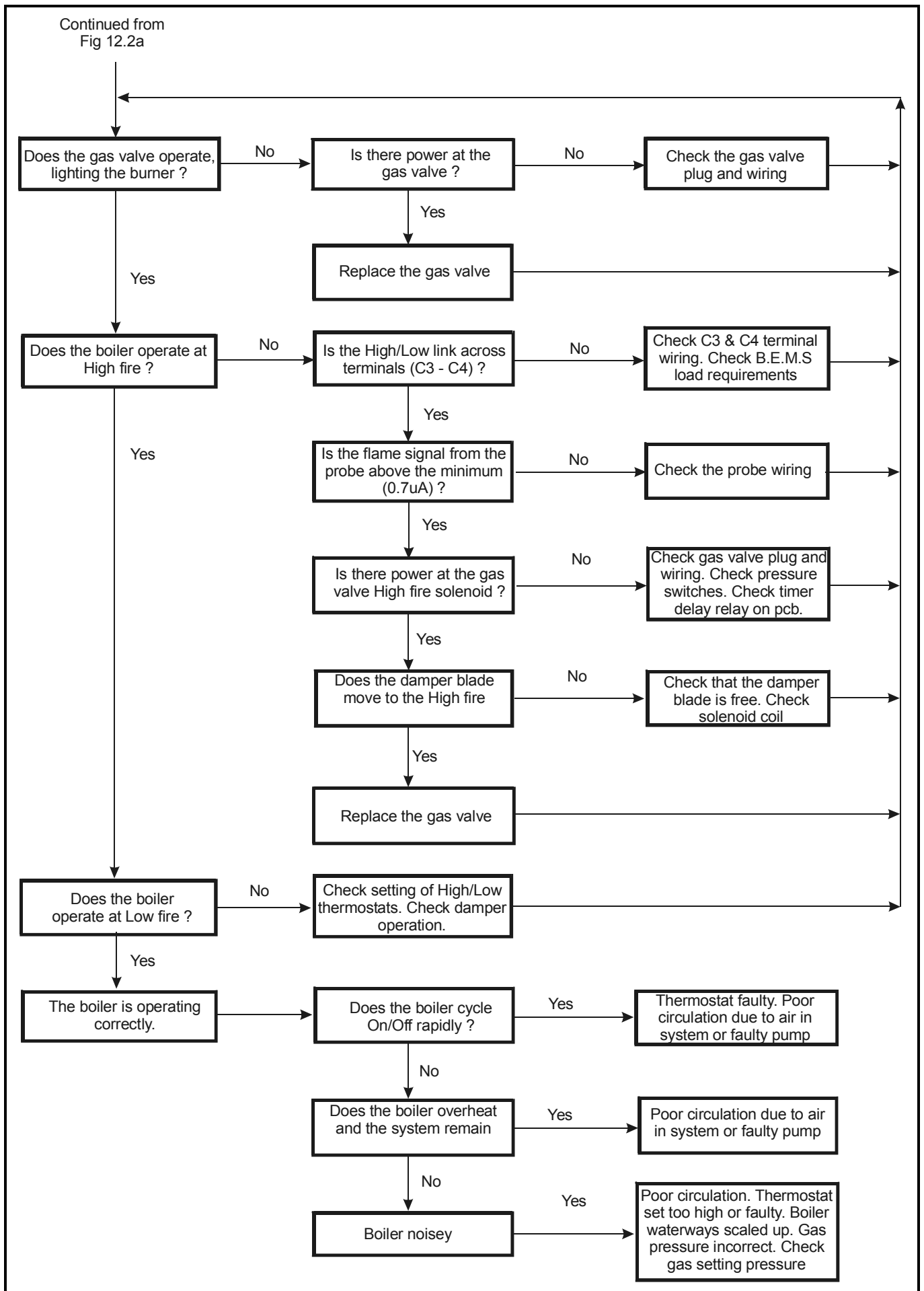


Figure 12.2b Fault Finding Procedures (Cont.)



noting the position for re-assembly. Check condition of igniter assembly and probe for damage, clean as required.

**8)** Check the burner and clean using a soft brush if required (if possible use compressed air to blow out the dust inside the burner tube). Alternatively the burner tube can be washed using a soapy water solution. Tap the burner flange firmly downwards on a block of wood to dislodge any residual debris from inside the burner tube. A damaged or cracked burner should be replaced. (Fit the igniter and probe to the burner flange to check the respective positions - See Figure 14.1 p25).

**9)** Remove the pressure sensing pipes from the air pressure switches noting the relative positions, blow through the tubes to check that they are clear and refit.

**10)** Check the position of the heat exchanger baffles and springs using a mirror and torch by removing the cleaning access door from the front panel below the heat exchanger. Should the baffles and springs need replaced, the heat exchanger assembly will have to be removed as described in **Section 13.3.1**.

Re-assemble in reverse order checking for damage to gaskets (replace if necessary) and renew the gas pipe sealing washer (refer to Figure 14.5 p26).

Refer to **Section 11, Commissioning and Testing** (p15), and test all gas joints broken or disturbed for soundness before firing.

Carry out a combustion check by testing the flue gas CO<sub>2</sub> and CO levels as detailed.

### **13.3 Two Year Service**

Repeat the annual service as previously described but do not refit any components to the heat exchanger.

To clean the heat exchanger, the use of a high pressure water hose (40-80 psi) is recommended. Refer to **Section 13.4**.

**13.3.1** Should a high pressure hose not be available, the respective heat exchanger will have to be isolated from the flow and return water pipework, drained down and all fittings removed from the G1½ inlet nipples. Each module holds approximately 5 litres of water and weighs 60kg. It is recommended that a minimum of two people are on hand to remove the heat exchanger. Remove the securing back nuts and withdraw the assembly by sliding it out on the internal runners.

**13.3.2** Take the module to a bench, unhook the stainless steel springs and remove the 16 stainless steel baffle plates to expose the finned tube bank. Wire brush both sides of the baffles to remove any deposits.

Thoroughly wire brush the finned tubes.

Re assemble in reverse order and refit heat exchanger module (Renew the self adhesive sealing strip around the casings heat exchanger mounting hole, and the two sealing washers on the heat exchanger nipples) Re connect system pipework and check for soundness.

Re assemble the fan/swirler/burner assembly and refit in reverse order. **Test all gas joints broken or disturbed for soundness before firing.** Re-light the boiler using instructions mounted on the top of the control panel. Check and adjust, the low fire and high fire gas pressures, refer to Figure 11.4.3 (p18) for correct settings. If necessary, refer to **Section 11.4, Commissioning The Boiler** (p16), for correct procedures.

**13.4** Using the high pressure hose, insert the cleaning nozzle into the opening in the centre of the heat exchanger casting. Switch on the pump and traverse the full length and circumference of the heat exchanger to remove any deposits. All water should discharge through the appliance drain.

Remove the cleaning access door from the front panel below the heat exchanger and remove all deposits.

Re assemble the fan/swirler/burner assembly and refit in reverse order.

**Test all gas joints broken or disturbed for soundness before firing.**

Re-light the boiler using instructions mounted on the top of the control panel. Check and adjust, the low fire/start gas and high fire gas pressures, refer to Figure 11.4.3 (p18) for correct settings. If necessary, refer to **Section 11.4, Commissioning The Boiler** (p16) for correct procedures.

Note the gas pressure and exhaust gas readings and compare with Figure 2.2 (p4) for Natural Gas or Appendix 'A' (p30) for LPG Propane, adjust as required. Ensure no gas leaks are evident from the gas connections, see Figure 5.6 (p7) for procedure.

Check thermostat settings and adjust if required.

Re-fit door and tidy floor around boiler as necessary.

## **14.0 REPLACEMENT OF FAILED COMPONENTS**

There are a number of components listed below which can be replaced simply and quickly by following the given procedure. In each case the operation of each replaced component must be checked by carrying out the appropriate part of the commissioning procedure. See **Section 11.0: COMMISSIONING & TESTING** (p15).

**NOTE: Isolate all electrical supplies to the boiler and turn off the gas supply before removing controls cover and commencing any servicing or component exchange procedure.**

(For the replacement and service of items outlined in section 14, it maybe advantageous to swing the control panel up as described in Section 13.2 clause 2) (p20).

### **14.1 Hot Surface Igniter and Flame Probe Assembly Part Nos. 563801006 & 533805010**

**Note :- the igniter and probe ceramics are very fragile.** Reference to Figure 14.1 (p25) shows position of the igniter and flame probe assembly. Unplug the igniter from the harness and remove the single socket cap head screw securing the igniter to the burner flange. Carefully withdraw the igniter, renew as required and generally remove any loose sooty deposits, clean as required. Replace igniter and secure socket cap head screw holding the igniter to the burner flange. Disconnect the flame sensing probe connection, remove the single socket cap head screw securing the probe to the burner flange and carefully withdraw the probe. Renew as required and generally remove any loose sooty deposits, clean as required. Ensure positions of components are as recommended in Figure 14.1 (p25). Note – do not remove both securing screws as the separate flange and Mica sight glass will become detached.

### **14.2 Air Pressure Switch Part No. 533901334**

The same type of pressure switch is used to monitor the operation of the fan in both High and Low fire operation. The pressure switches are mounted in the control panel and are identified - HI/LO.

Note and disconnect the electrical connections. Note and remove the flexible hoses from the switch, undo the 2 screws attaching the switch to its mounting bracket on the rear of the controls panel and withdraw the switch.

Replace the switch in the reverse order and set to the required setting - see Figure 14.2 (p25).

### **14.3 Control Thermostat Renewal, High/Low Part Nos. 339009345 or 533901178**

Alternative thermostat manufacturers may be used in the Wessex boiler controls assembly. However, the fitting and wire spade connections are physically identical as are the two thermostats for High and Low firing. The terminal identification may well be different from that shown on the wiring diagram inside the fascia. Please refer to the thermostat to ensure correct electrical connections are made and correct operation is obtained.

To replace the thermostat the following procedure must be followed. **NOTE!** Record existing temperature setting of thermostat for reference before removal. Remove the clip securing the thermostat phials in the pocket and carefully remove thermostat phials. Drop down fascia to reveal controls section. Remove the 'push on' spade connectors from the thermostat body noting position of coloured cables. Pull off the control knob and remove bezel. (**Note!** This may be retained by the two M3 screws holding the thermostat to its bracket). Check whether screws are of different type/length for re-assembly purposes before removing them. The thermostat body can now be removed by gently feeding capillary through the controls bulkhead. Fit the new thermostat and ensure the capillary is correctly located within the boiler pocket and close fascia. Do not force the bulb into the pocket by placing undue stress on the capillary. Refit the clip securing the thermostat phials in the pocket.

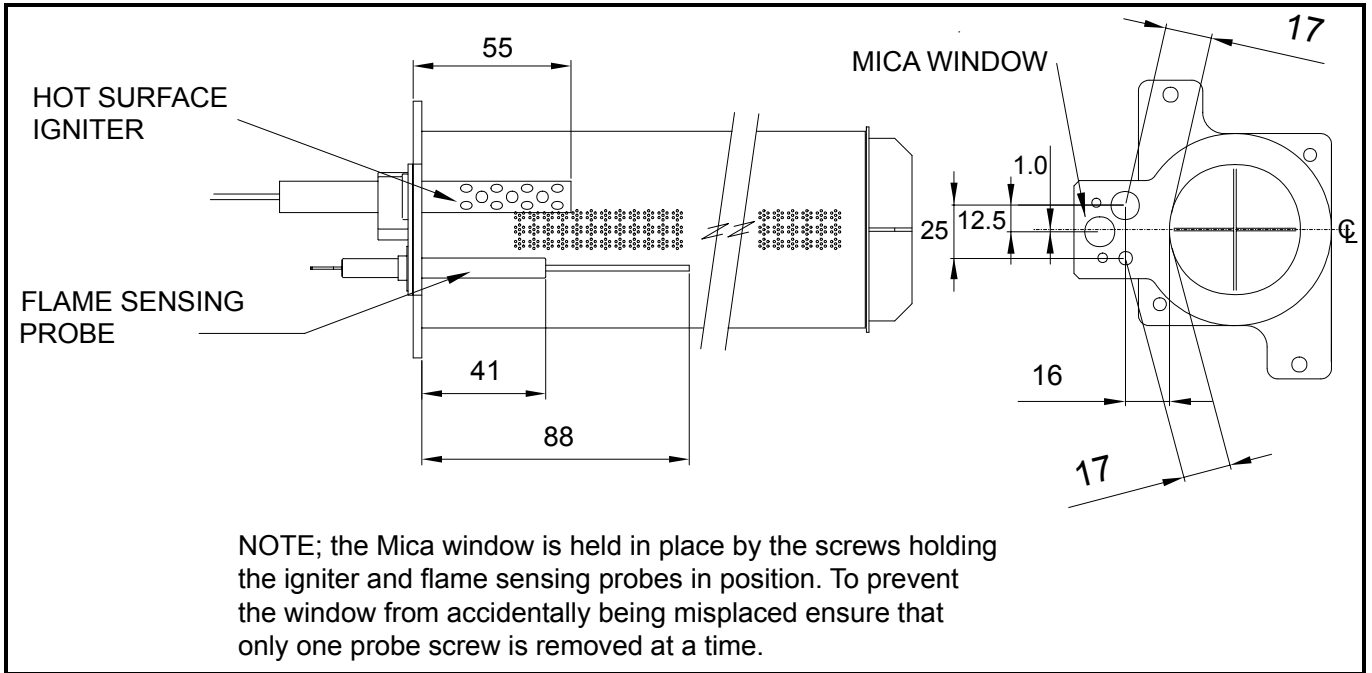
Run the boiler and turn the thermostat up and down to check for correct operation. Set thermostat to previously noted setting.

### **14.4 Temperature Limiter (Limit Stat) Renewal Part Nos. 533901179 or 339011044**

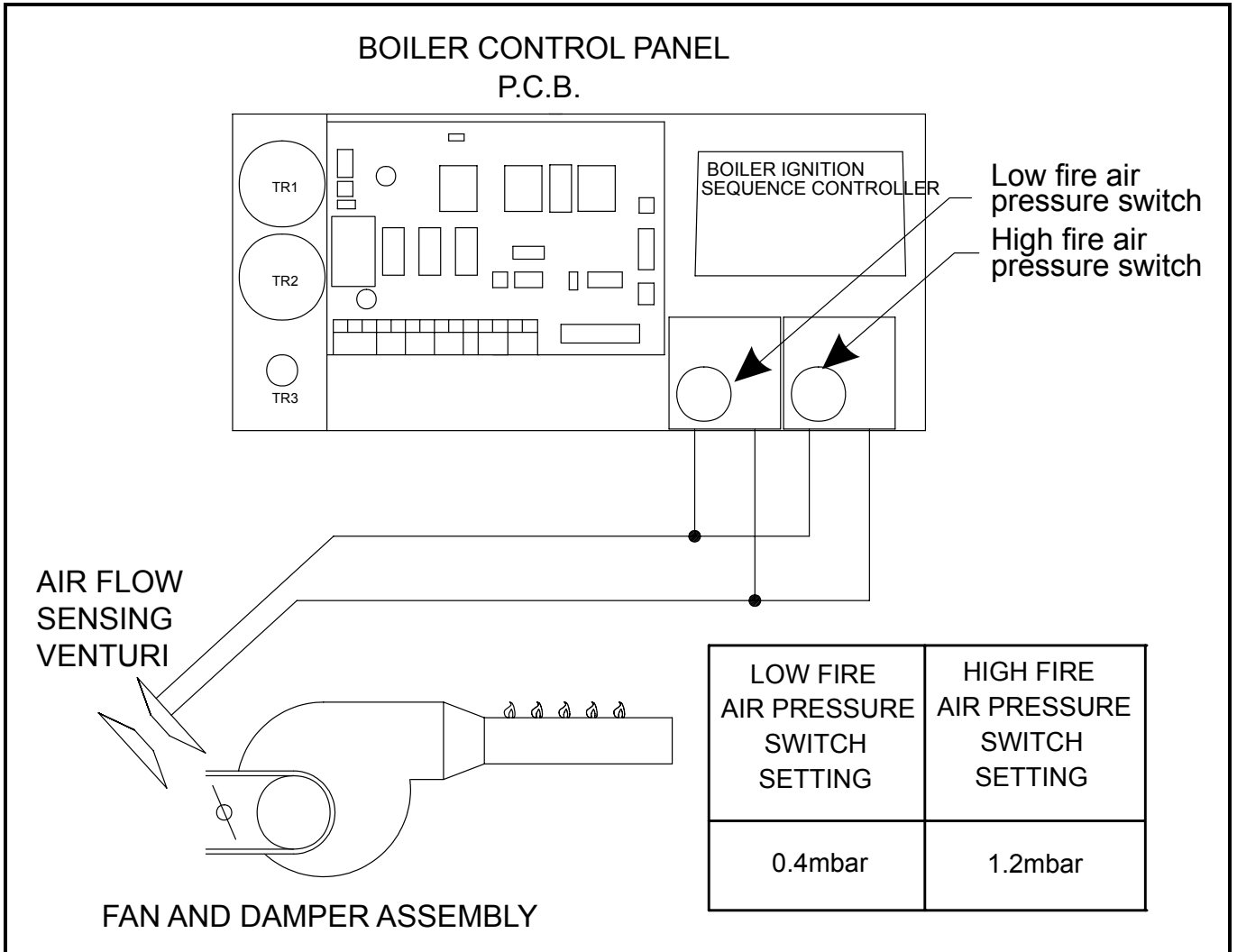
The temperature limiter renewal procedure follows that of the control thermostat with some minor differences. These are as below:-

Remove the 'push on' spade connections from the temperature limiter body noting position of coloured cables. Remove plastic cover (if fitted) and unscrew holding nut to detach temperature limiter from housing. Gently feed the capillary back through the controls bulkhead. Check the operation of the device by carefully applying a heat source to the bulb. Set temperature limiter to 100°C (for high temperature option, set to a maximum of 120°C). Re-assemble temperature limiter into controls housing ensuring correct cable notation. Refer to thermostat diagram if terminal identification differs from those given in Figure 9.1 (p13).

**Figure 14.1 Diagram of Hot Surface Igniter and Sensing Probe Assembly**



**Figure 14.2 Pressure Sensing Tubes**



## 14.5 Main Gas Valve Part Nos. Refer to Hamworthy Heating

**NOTE!** Some gas valve components can be replaced without completely removing the whole assembly from the boiler. However, Hamworthy Heating strongly recommend that a new gas valve assembly is fitted to ensure safe, reliable operation of the boiler. Please refer to Hamworthy Heating Technical Department before attempting to remove components from the gas valve. Various types and manufacturers of gas valves are used. Refer to Figure 11.4.3 (p18) for particular valve fitted.

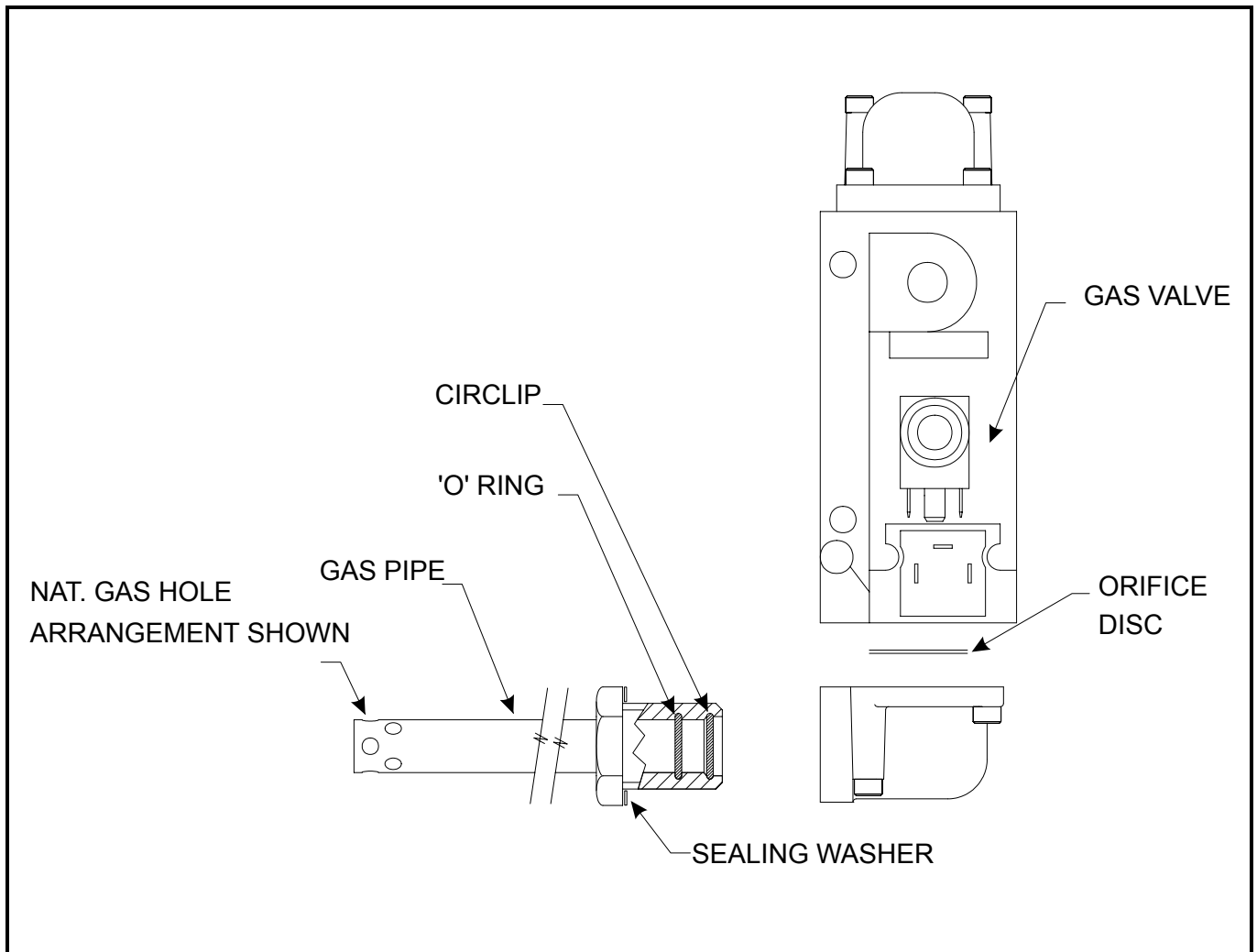
- 1) Ensure power and gas supplies are isolated.
- 2) Remove the two screws securing the control panel as described in Section 13.2 clause 2) (p20).
- 3) Remove the gas valve wiring plugs from the main valve and HI/LO operator by un-doing the securing screws and pulling firmly away from the valve.
- 4) Remove the four M5 cap head screws securing the gas valve to the diecast inlet elbow, taking care to support the weight of the valve. Withdraw the

valve and gas pipe. Remove the four M5 cap head screws securing the gas valve to the diecast outlet elbow. When replacing the gas valve, it is advisable to renew the 'O' ring seals sealing both ends. See recommended spares section for Part Nos. **Ensure that the gas orifice plate is undamaged and fitted into the recess in the die cast outlet elbow.** (Refer Figure 14.5). Do not over tighten cap head screws in gas valve body.

- 5) Replace assembly ensuring correct orientation of the gas valve. Ensure electrical plugs are firmly and correctly located and holding screws are tightened. Ensure that the gas flow is in the same direction as the arrow on the bottom of the valve. Switch on gas and power supply and check for integrity of all joints using a proprietary leak detector. Ensure gas valve operation is correct and safe before continuing. Refer to Figure 5.6 (p7) if necessary for valve integrity check procedure.

- 6) Re-light the boiler using instructions mounted on the top of the control panel. Check and adjust, the low fire and high fire gas pressures, refer to Figure 2.2 (p4) for correct settings. If necessary, refer to Section 11.4, **COMMISSIONING THE BOILER** (p16), for correct procedures.

Figure 14.5 Gas Pipe Fitting





#### **14.6 Motor Assembly (fan) Part No. 533901328**

Ensure power supply is isolated before removing the front cover and gaining access to the controls panel.

- 1) Unplug the fan harness from the socket below the control panel.
- 2) Undo the 4 M5 pozi head screws holding the motor assembly to the fan housing and remove complete motor and impeller unit.

Due to the media being handled, it is recommended that the complete fan motor and impeller assembly is replaced if a motor has failed. However the fan motor is available as a spare and can be used once the impeller and mounting plate from the failed assembly have been exchanged.

**Note :** a replacement gasket for the mounting plate will be required in this instance.

If required clean fan the impeller taking care not to bend or distort the blades.

- 3) Re-assemble unit in reverse order of dis-assembly taking care not to damage the fan gasket. Ensure all screws are tightened and re-fit plug/socket assembly.

#### **14.7 Fan and Damper Assembly**

After disconnecting the fan plug from the bottom of the control panel, carefully remove the pressure sensing tubes from the air flow sensor assembly on the air inlet damper, noting the relative positions. Unplug the electrical connection to the solenoid on the inlet air damper.

Remove the gas pipe from the gas valve outlet.

Remove the four M5 nuts securing the fan to the swirler body, taking care to support the weight of the fan assembly.

Remove the three M5 pozi screws securing the air inlet damper assembly to the fan body, taking care not to damage the damper assembly, see Figure 11.4.5 (p19). Refit the damper assembly to the new fan and assemble in reverse order, taking care to reconnect the pressure sensing tubes to the air flow sensor.

Plug the fan and solenoid into their respective sockets. Re-light the boiler and check for correct

operation of pressure switches. See Figure 14.2 (p25) for correct settings.

#### **14.8 Ignition Sequence Controller Part No. 533901312**

Ensure power supply is isolated before removing the front cover and gaining access to the control panel.

Unplug the electrical connections to the controller noting the orientation and relative positions. Remove the two pozi screws securing the controller to the control panel and withdraw. Fit the replacement unit in reverse order. Re-light the boiler and check for correct operation.

#### **14.9 Damper Solenoid Coil Part No. 533901321**

Ensure power supply is isolated before removing the front cover and gaining access to the controls panel.

- 1) Unplug the electrical connection from the solenoid coil.
- 2) Remove the two M4 socket cap head screws securing the solenoid to the damper bracket and replace the solenoid coil, see Figure 11.4.5 (p19).

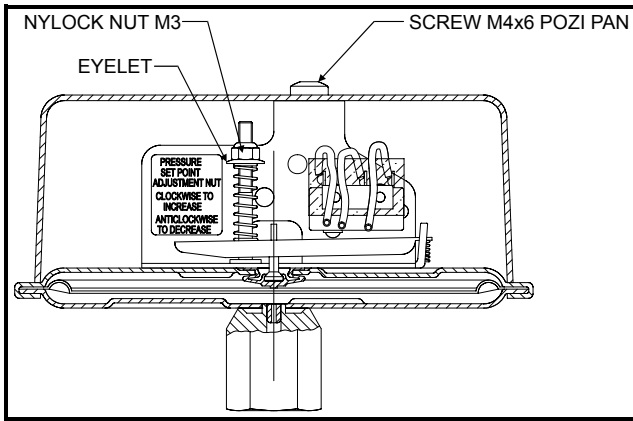
Re-light the boiler and check for correct operation.

#### **14.10 Low Gas Pressure Switch (Optional for top module only) Part No. 533901336**

Ensure power and gas supplies are isolated before removing the front cover and gaining access to the control panel. Remove the entire control panel to gain access at the rear.

- 1) Remove the cover on the gas pressure switch.
- 2) Note and disconnect the electrical connections.
- 3) Remove the gas pressure switch from the gas manifold and replace using a small amount of sealing compound. Tighten the connection and replace the electrical connections.
- 4) With the cover removed, turn the M3 nut clockwise to increase the set point and vice-versa (refer to Figure 14.10 p28). Seal the adjuster after setting and refit the cover.
- 5) Check for integrity at all joints using a proprietary leak detector.

**Figure 14.10 Gas Pressure Switch Adjustment**



Gas pressure switch setting:

Natural gas = 14mbar

Propane = 25mbar

**Operational check of gas pressure switch.**

- 1) Connect manometer to pressure tapping.
- 2) Close the gas service valve to lock up mains pressure. Reduce pressure by loosening inlet test point or the gas control valve until the desired pressure is achieved.
- 3) Determine operation of switch using a suitable multi-meter.

## **15.0 RECOMMENDED SPARES**

**Please Note!** To ensure the correct spare parts are despatched by our spares department, it is imperative that the complete Boiler/Control Panel Serial numbers are given. The Boiler Serial Number is located on the Data Plate affixed to the combustion chamber front panel. The Control Panel Serial Number is located inside the Control panel on the maximum power-rating label. These numbers **MUST** be quoted when ordering spare parts.

<b>SPARES ITEM</b>	<b>PART NO.</b>
<b>Electrical Items</b>	
Fascia Control Fuse - T2A .....	533922002
Main PCB Control Fuse - T5A.....	533901218
Sequencing Interface Module PCB Fuse - T250mA .....	533922008
Main PCB Assembly .....	563901192
Fascia PCB Assembly.....	563901193
Green Neon.....	533923002
Red/Amber Neon .....	533923001
Hours Run Meter .....	533901067
Ignition Sequence Controller.....	533901312
230V Single Pole Relay .....	533901204
230V Double Pole Relay .....	533901206
230V Four Pole Relay .....	533901296
230V Double Pole Time Delay Relay.....	533924001
Fan Motor (Spare).....	533901328
Air Pressure Switch.....	533901334
Damper Solenoid .....	533901321
Low Gas Pressure Switch .....	533901336
Gas Valve.....	REFER TO HAMWORTHY HEATING LIMITED
Sequencing Interface Module .....	533901421
<b>Mechanical Items</b>	
Burner Assembly.....	533301007
Set of Gaskets (Major Service) .....	563605165
Gas Orifice Plate - Natural Gas.....	531101007
Gas Orifice Plate - LPG Propane .....	531101009
Gas Valve 'O' Ring Joint .....	742111245
Hot Surface Igniter .....	563801006
Flame Probe.....	533805010
Control and High/Low Thermostat (Imit) .....	533901178
Control and High/Low Thermostat (L & G).....	339009345
Temperature Limiter (Imit).....	533901179
Temperature Limiter - High Temperature Option (L & G) .....	339011044
Gasket - Burner to Heat Exchanger .....	531201007
Gasket - Burner to Swirler.....	531201011
Gasket - Fan to Swirler .....	531201010
Silicone Rubber Seal (1m per module) .....	531214083
Fan Gasket.....	531201013

For service or spares please contact: -

**Hamworthy Heating Limited**  
**Fleets Corner**  
**Poole**  
**Dorset**  
**BH17 0HH**

**Phone Number .....** 01202 662500  
**Fax Number .....** 01202 665111  
**Service .....** 01202 662555  
**Spares.....** 01202 662525  
**Technical .....** 01202 662527 / 662528

## Appendix A Wessex 100 M Series

### INFORMATION RELATING TO PROPANE FIRING

**NOTE:-**

**LPG FUELS - IT IS STRONGLY RECOMMENDED THAT, ON LPG INSTALLATIONS, GAS DETECTION EQUIPMENT IS FITTED. THIS EQUIPMENT SHOULD BE POSITIONED NEAR THE BOILER AND AT LOW LEVEL. IT IS ALSO IMPORTANT THAT THE SPACE HOUSING THE BOILER IS ADEQUATELY VENTILATED AT HIGH AND LOW LEVEL. REFER TO MAIN INSTALLER'S GUIDE.**

#### **1.0 INTRODUCTION**

The operation of the Wessex 100 M range of boilers on LPG-Propane (3<sup>rd</sup> family) I<sub>3P</sub> is similar to that on Natural Gas (2<sup>nd</sup> family) I<sub>2H</sub> and the design and installation details described in the main body of the installer's guide should be followed. There are however, differences in the construction and setting of the propane fired boiler which are as follows: -

a) The main gas orifice (located in the gas valve outlet elbow) is replaced with that detailed in the Performance and General Data Information table below.

b) The gas pipe connecting the gas valve to the fan inlet must be replaced with the 'LPG' assembly.

c) The nominal gas inlet pressure for propane should be 37mbar.

d) Relevant labels are replaced to indicate the appropriate gas for which the boiler is set up to fire.

The following tables and paragraphs, using the same numbering system as the main installer's guide, highlight the different values and procedures to be used when firing propane, and should be used in conjunction with the Main Installer's Guide.

**Figure 2.2 Performance and General Data Information**

<b>GENERAL DATA</b>	<b>M100</b>	<b>M200</b>	<b>M300</b>
Boiler Input High Fire - kW (Gross)	118.3	236.6	354.9
Boiler Input High Fire - kW (Nett)	108.8	217.6	326.4
Boiler Output High Fire - kW	100	200	300
Boiler Output Low Fire - kW	50		
<b>FLUE DATA</b>			
Approx. Flue Gas Temperature - °C	130		
Approx. Flue Gas Volume @ 10.5 - 11.0% CO <sub>2</sub> - m <sup>3</sup> /h*	141	282	423
<b>GAS DATA</b>			
Gas Inlet Connection	R1¼		
Nominal Gas Inlet Pressure - mbar	37		
Maximum Gas Inlet Pressure - mbar	45		
Gas Pressure Setting High Fire - mbar	25.0		
Gas Pressure Setting Low Fire - mbar	5.0		
Gas Flow Rate High Fire - m <sup>3</sup> /h	4.45	8.90	13.36
Gas Flow Rate High Fire - kg/h	8.60	17.22	25.83
Orifice Diameter - mm	6.5		

\* **NOTE!** Flue gas volumes are based on a gross flue gas temperature of 15°C at 1013.25mbar.

#### **11.0 COMMISSIONING AND TESTING**

##### **11.4.3 Checking/Adjusting Inlet and Setting Pressures**

Refer to Section 11.4.3 (p17) embodied in the natural gas section of these instructions.

##### **11.4.4 Combustion Check**

Refer to Section 11.4.4 (p17) embodied in the natural gas section of these instructions.

## Appendix B Wessex 100 M Series

### CONTROL THERMOSTAT SETTING PROCEDURE

#### LANDIS AND GYR THERMOSTAT

Adjusting the limitation of angle of rotation only for thermostats with drum type setting knobs.

- 1) Pull the setting knob off of the thermostat spindle
- 2) Remove the spring clip and limit stop discs (1) and (2) from the inside of the setting knob.
- 3) Insert limit stop disc (1) into the setting knob so that its stop arm locks onto that rib having the guide number (5) which corresponds to the start value of the desired setting range.
- 4) Insert the limit stop disc (2) in the same manner, but this time choosing the rib and guide number

which corresponds to the end value of the desired setting range.

- 5) Replace spring clips, thus securing the limit stop discs.
- 6) Push the setting knob back onto the thermostat spindle so that the stop screw is located within the selected setting range.
- 7) Rotate the setting knob to the limit stops of both ends of the scale to check the adjusted range against the setting scale.

A Desired start value of the setting range in °C.  
Corresponding guide number for limit stop disc (1).  
B Desired end value of the new setting range in °C.  
Corresponding guide number for limit stop disc (2).

SETTING RANGE °C	LIMIT STOP DISC No		1	3	5	7	9	11	13	15	17	19	21	23	25	27
50-110	1	A	50	55	60	65	70	75	80	85	90	95	100	105	110	
	2	B		50	55	60	65	70	75	80	85	90	95	100	105	110

#### IMIT THERMOSTAT

- 1) Pull the setting knob off of the thermostat spindle.
- 2) Reposition the spring stop inside the control knob to the new setting.
- 3) Push the control knob back on the spindle and rotate to ensure the settings provide the correct desired setting range.

**IMPORTANT** When setting the adjustment of both thermostat control knobs it **must** be ensured that the boiler will not produce water with an outflow temperature of less than 50°C.

**USEFUL USER INFORMATION**

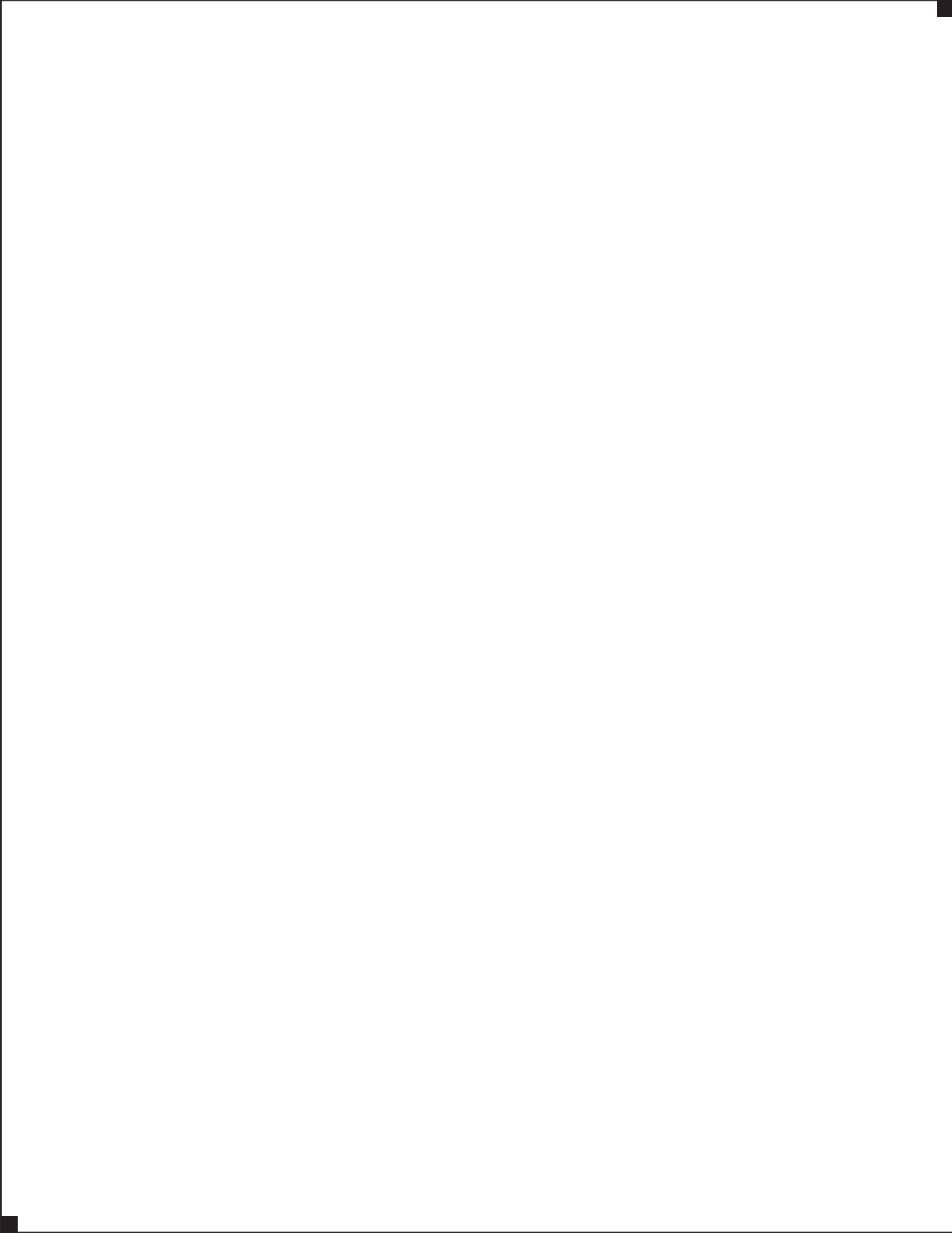
<b>INSTALLER</b>	<b>SITE ADDRESS</b>

**DATE OF COMMISSIONING:**

<b>BOILER TYPE</b>	<b>BOILER SIZE(S)</b>	<b>UNIT NO(S).</b>	<b>SERIAL NO(S).</b>	<b>FLUE</b>

**NOTES:**

# Notes



# Connect direct

Direct Dial Telephone and Fax Numbers



- boilers
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- pressurisation sets

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