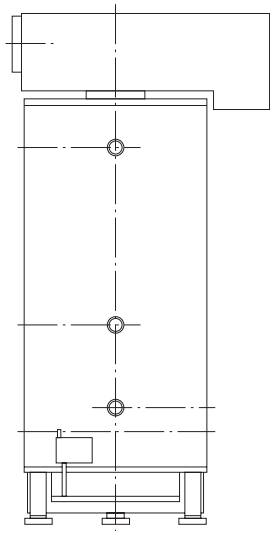

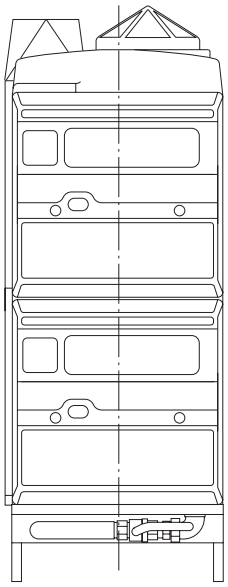

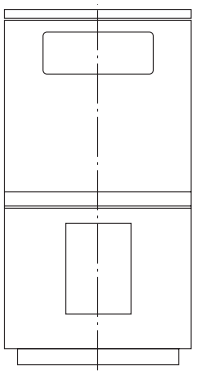

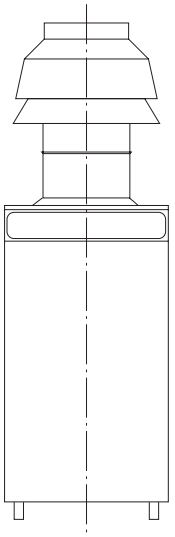

# Warmwell Series Boilers

**Cast Iron, Atmospheric, Condensing, Modular Boilers with Automatic Ignition for Heating and Domestic Hot Water Installations**

## Installation, Commissioning and Servicing Instructions

Warmwell 60, 80, 95 120 & 140 Models

**IMPORTANT NOTE**

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

Hamworthy

HEATING & HOT WATER PRODUCTS

# 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.

# Warmwell Series Boilers

**Cast Iron, Atmospheric, Condensing, Modular Boilers with Automatic Ignition for Heating and Domestic Hot Water Installations**

## Installation, Commissioning and Servicing Instructions

Warmwell 60, 80, 95 120 & 140 Models

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

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

**W80 AND W120 SUITABLE FOR USE ON GROUP H NATURAL GAS ($2^{ND}$ FAMILY) $I_{2H}$.**

**W60, W95 AND W140 SUITABLE FOR USE ON GROUP H NATURAL GAS ($2^{ND}$ FAMILY) $I_{2H}$ OR LPG-PROPANE ($3^{RD}$ FAMILY) $I_{3P}$.**

**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-87/95/47, (BED) BE-87/97/38.
PRODUCT IDENTIFICATION No. 87AQ47.

**PUBLICATION NO. 500001091**
**ISSUE 'F'**
**SEPT 2004**

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**FIGURES** **PAGE**

## 1.0 INTRODUCTION

**1.1** A competent person holding 'CORGI' registration or equivalent must install this boiler. 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** These instructions are for Group H Natural Gas (2nd Family) and LPG -Propane (3rd Family). The information relative to propane firing is to be found in Appendix 'A' (p41). Boilers **MUST NOT** use gas other than that for which they were designed and made.

**1.3** The Warmwell is an atmospheric, gas fired boiler manufactured from horizontal cast iron sections, nippled at alternate ends. These sections are mounted on a fabricated mild steel basket assembly, which houses the burner bar and igniter assemblies. A unique radiant baffle is fitted beneath the burner bars, protecting the floor below and reducing heat lost by the boiler. The condensing section is attached to the rear of the boiler assembly. It is arranged such that the flue gases and condensate run in a co-current flow path. This design ensures the heat exchanger is continually flushed of any salts which may form therefore ensuring no re-entrainment of flue gases which could increase acidic levels leading to aggressive condensate. The heat exchanger utilises proven materials both in the waterways (copper) and flueways (aluminium). No special water additives are required in the waterways, normal water treatment should be adequate.

An exhauster unit pulls the flue gases through both heat exchangers and supplies adequate pressure for the connection to a header. The flue spigot is angled at 45° allowing a 45° flue piece (supplied by others) to be rotated through 180° permitting vertical or horizontal connection as required.

**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 met 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** (p5). Consult Hamworthy Heating Technical Department for help or assistance if in doubt.

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

**1.6** The Warmwell boiler can be installed with either reverse return water flow layout or with single pipe header layout. See Figure 1.1 (p2) for typical schematic layout.

**1.7** It is good practice in all heating installations to use some form of water treatment to reduce formation of lime scale and black iron oxide sludge. The very high efficiencies produced by the Warmwell Boiler can easily be reduced by lime scale formation. If a pressurised unit is used, it is prudent to include an hours run meter to give an indication of pump running time and hence raw water make-up. Any leaks should be attended to as soon as possible to avoid calcium salt build up within the boiler waterways.

The Warmwell range is available with Hi/Lo operation as standard. See **Section 11.0 COMMISSIONING AND TESTING** (p24) for procedure.

### 1.8 Options

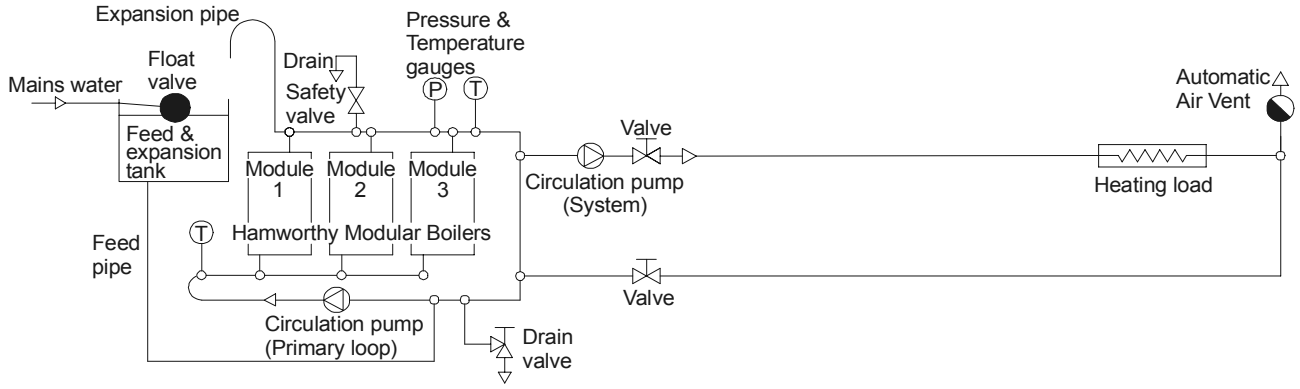
**1.8.1** Optional reverse return header kits, comprising a pre-designed arrangement of components, are available for modular installations of all Warmwell boiler models, and also combinations of Warmwell and Purewell boilers. Please contact Hamworthy Heating for information.

**1.8.2** 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.

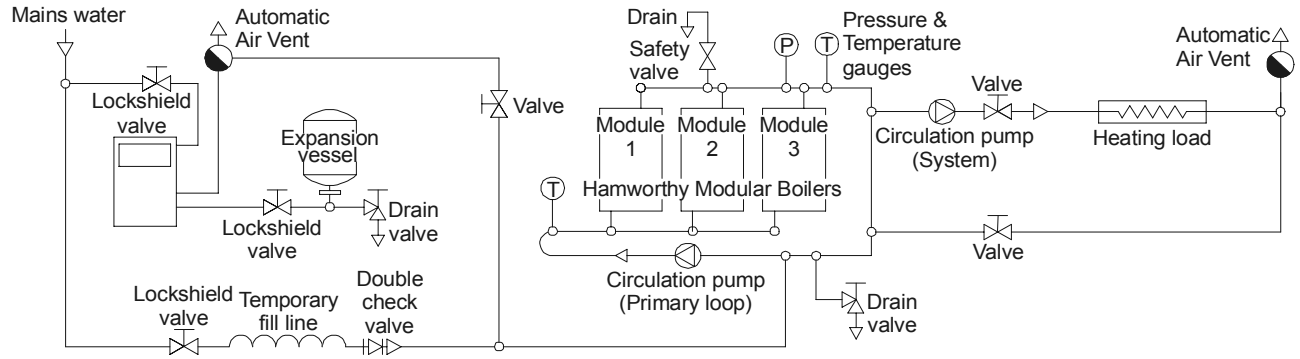
**Note:** Optional Hamworthy Heating Ltd Sequencing Interface Modules will be required, to be installed within the control panel of each boiler, to enable sequence control of the boilers by the Milton boiler sequence control.

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

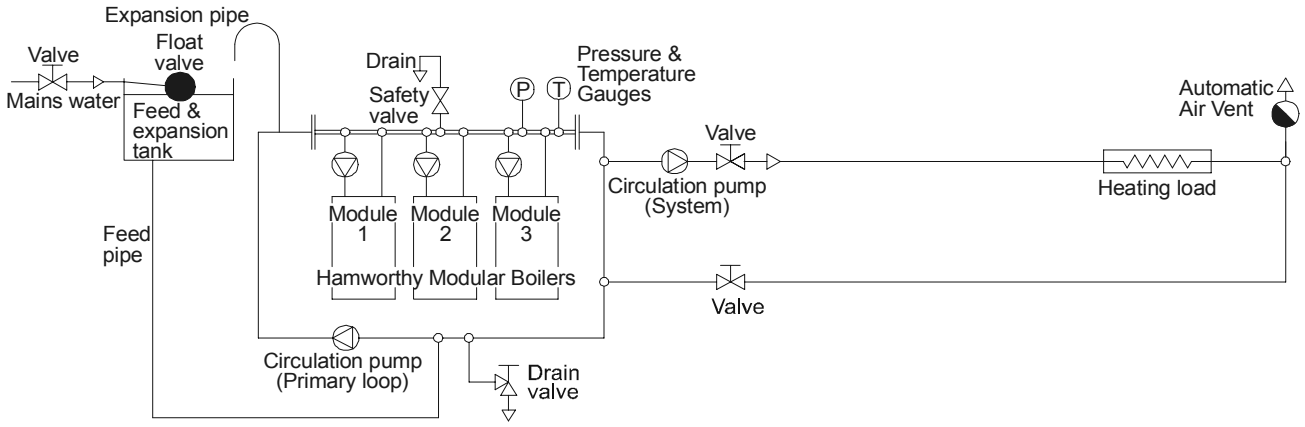
**Figure 1.1 Boiler Installation (Typical)**



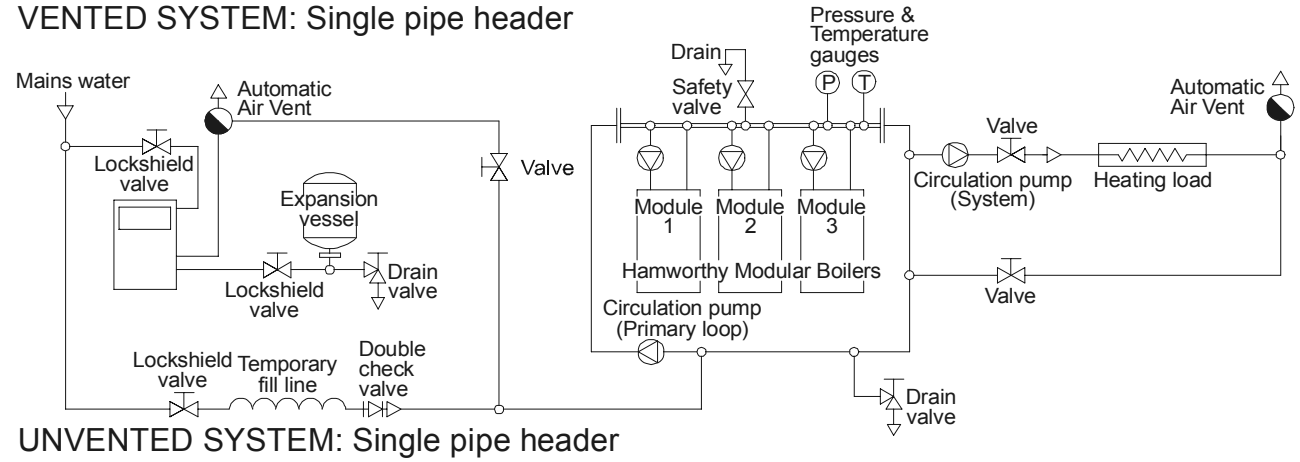

VENTED SYSTEM: Primary loop, Hamworthy recommended system.




UNVENTED SYSTEM: Primary loop, Hamworthy recommended system.




VENTED SYSTEM: Single pipe header




UNVENTED SYSTEM: Single pipe header

**Figure 2.1 Boiler Dimensions / Clearances**

| | Boiler Model | | | |
|---|---|---|---|---|
| | **60** | **80/95** | **120** | **140** |
| Approx. Dry Weight kg | 285 | 335 | 395 | 450 |
| A - Boiler Height (Casing) mm | 872 | 872 | 1060 | 1060 |
| B - Gas Connection Height mm | 769 | 769 | 957 | 957 |
| C - Return Connection Height mm | 953 | 1047 | 1141 | 1235 |
| D - Gas Connection - (BS21) | R¾ | R¾ | R1 | R1 |
| E - Flow Connection Height mm | 573 | 667 | 761 | 855 |
| F - Flue Outlet Dia. mm | 152 | 152 | 152 | 152 |

**Note!** For modular applications, the top casing from the 60, 80 and 95 models can only be fitted to Purewell 40 - 80kW range, likewise the 120 and 140 model top casing can only be fitted to Purewell 95 - 120kW range. If a different mix is required the Warmwell will have to be installed in stand-alone form.

The 533 centres relate to boilers close coupled in modular form. For stand-alone applications a minimum of 150mm should be allowed between casings (space baskets 200mm apart).

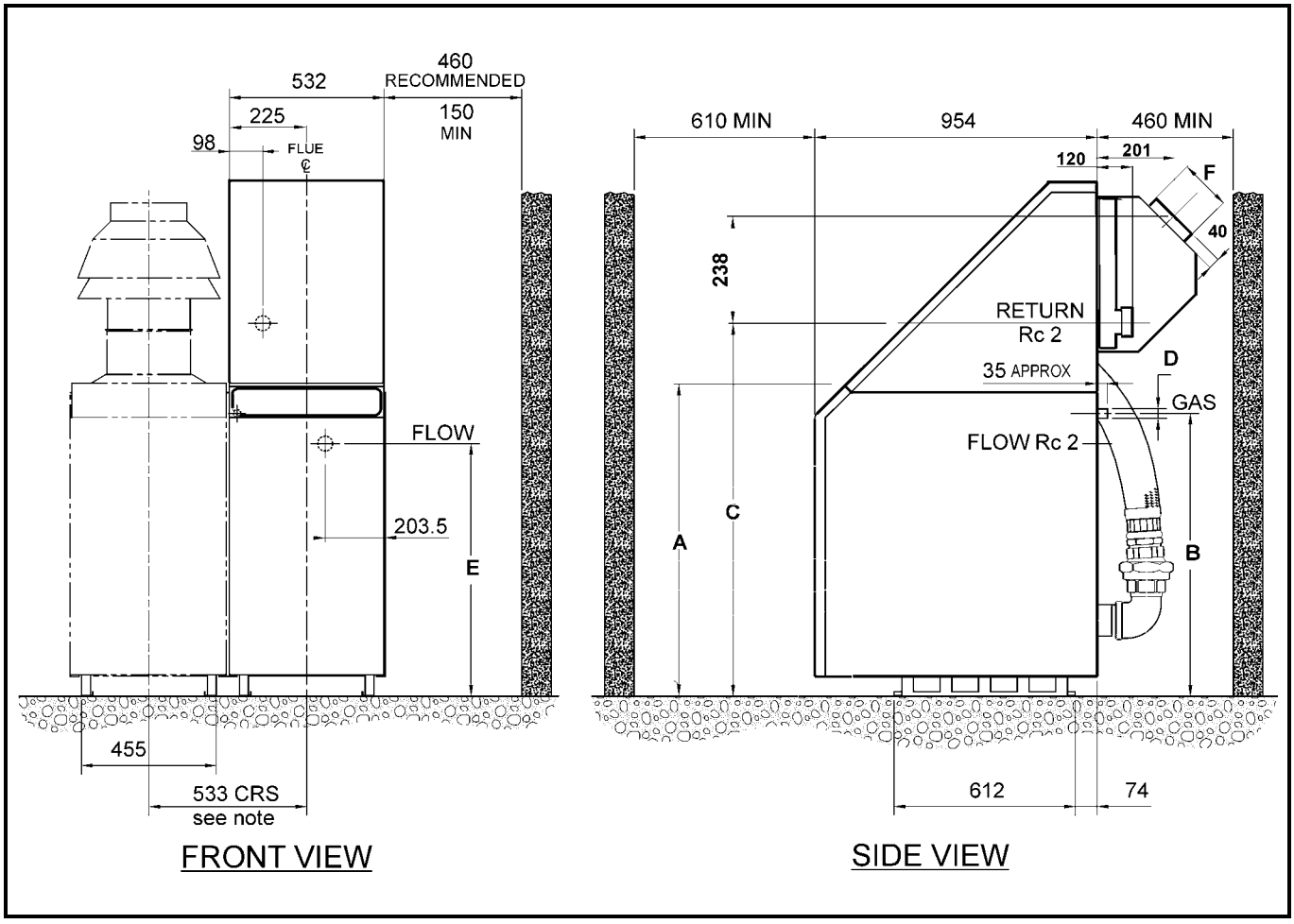


**Figure 2.2 Performance and General Data Information**

| **GENERAL DATA** | **60** | **80** | **95** | **120** | **140** |
|---|---|---|---|---|---|
| Boiler Input High Fire - kW (Gross) | 63.4 | 86.5 | 101.0 | 132 | 150.0 |
| Boiler Input High Fire - kW (Nett) | 57.1 | 78 | 90.9 | 119 | 135.0 |
| Boiler Input Low Fire - kW (Gross) | 39.0 | 33.3 | 38.6 | 55 | 46.6 |
| Boiler Input Low Fire - kW (Nett) | 35.1 | 30 | 34.8 | 50 | 42.0 |
| Boiler Output High Fire (Condensing) - kW | 59.0 | 78 | 93.0 | 120 | 135.0 |
| Boiler Output High Fire (Non-Condensing - kW | 54.0 | 72.5 | 86.0 | 117 | 128.0 |
| Boiler Output Low Fire (Condensing) - kW | 36.3 | 31.2 | 35.5 | 50 | 41.9 |
| Boiler Output Low Fire (Non-Condensing) - kW | 33.2 | 27.0 | 32.9 | 45 | 39.8 |
| **FLUE DATA** | | | | | |
| Nominal Flue Diameter. - mm | 150 | | | | |
| Approx. Flue Gas Temperature (Condensing) - °C | 45 | 45 | 45 | 45 | 45 |
| Approx. Flue Gas Temperature (Non-Condensing) - °C | 65 | 65 | 65 | 65 | 65 |
| Approx. Flue Gas Volume @ 9.0% $CO_2$ - $m^3/h$* | 82.8 | 111.0 | 132.0 | 173.5 | 197.2 |
| **GAS DATA** | | | | | |
| Gas Inlet Connection | R¾ | | | | R1 |
| Nominal Gas Inlet Pressure - mbar | 20 | | | | |
| Maximum Gas Inlet Pressure - mbar | 25 | | | | |
| Gas Manifold Pressure High Fire - mbar | 12.5 | 10.7 | 9.5 | 11.6 | 11.0 |
| Gas Manifold Pressure Low Fire - mbar | 5.0 | 1.9 | 1.5 | 2.0 | 1.2 |
| Pressure Switch Setting (Normal) High Fire - mbar | 1.8 | 0.9 | 2.4 | 3.0 | 2.4 |
| Pressure Switch Setting (Normal) Low Fire - mbar | 1.5 | 0.4 | 1.5 | 0.4 | 0.4 |
| Gas Flow Rate High Fire - $m^3/h$ | 5.92 | 7.9 | 9.44 | 12.6 | 14.10 |
| Injector Marking / Dia. - mm | 3.1 | 3.75 | 4.2 | 4.1 | 4.4 |
| No. Burner Bars / Injectors | 4 | 4 | 4 | 5 | 5 |
| **WATER DATA** | | | | | |
| Water Connections | Flow - Rc2 Return - Rc2 | | | | |
| Maximum Water Pressure - bar g | 6 | | | | |
| Water Content - litres | 36 | 43 | 43 | 50 | 57 |
| Minimum Water Flow Rate @ 15°C ΔT Rise - litre/s | 0.94 | 1.21 | 1.46 | 1.91 | 2.15 |
| Waterside Pressure Loss @ 15°C ΔT Rise - mbar | 35.0 | 63.0 | 86.0 | 158.0 | 206.0 |
| Design Water Flow Rate @ 20°C ΔT Rise - litre/s | 0.70 | 0.91 | 1.10 | 1.43 | 1.61 |
| Waterside Pressure Loss @ 20°C ΔT Rise - mbar | 17.6 | 32.0 | 50.0 | 91 | 117.7 |
| Minimum Water Flow Rate @ 22°C ΔT Rise - litre/s | 0.64 | 0.83 | 1.00 | 1.30 | 1.46 |
| Waterside Pressure Loss @ 22°C ΔT Rise - mbar | 15.0 | 24.0 | 41.0 | 75 | 97.0 |
| **ELECTRICAL DATA** | | | | | |
| Normal Supply Voltage | 230V ~ 50Hz | | | | |
| Power Consumption (maximum) - W | 190 | | | | |
| Shunt Pump Output (optional) | 230V ~ 50Hz fused @ 2A | | | | |

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

## 2.0 TECHNICAL DATA

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

The Warmwell boiler can be installed as a single unit or in modular form where a 'multi' casing reduces required floor area. Each boiler has an independent door for access to the controls and other working components.

It is recommended that a maximum of 6 boilers can be positioned on 533mm (21") centres if required. Larger numbers should be split into two or more banks with 150mm (6") between each bank. **NOTE!** To install modular units on 533mm (21") centres, the casing support rail or spacing plates should be fitted between each boiler before bolting together. See **Section 10.1: General Installation of Boilers** (p16) Ref.: - spacing plates for further information. See Figure 2.1 (p3) re: - coupling of Warmwell and Purewell boilers. 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 (p4). Technical data relating to propane firing can be found in Appendix 'A' (p41).

**2.3 Screw threads**: All screw threads used in the Warmwell boiler conform to the following: -

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

## 3.0 GENERAL REQUIREMENTS

### 3.1 Related Documents

**Gas Safety Installations and Use Regulations 1998, (As amended).** It is law that competent persons in accordance with the above regulations install all gas appliances. 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 6891:** Installation of low pressure gas pipework of up to 28mm in domestic premises (for larger installations see **IGE/UP/1**, **IGE/UP/1A** and **IGE/UP/2**)

**BS 6644:** Installation of Gas Fired Hot Water Boilers - 60kW 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 45kW.

**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 emphasised 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 were of average hardness, not requiring treatment, subsequent draining of the system for repair or constant make-up water due to an undetected leak would cause additional deposits and gradual build-up of scale. It is essential therefore, those leaks are attended to promptly and draining is kept to an absolute minimum.

It is recommended that the system be flushed out at least twice before any water 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 Warmwell 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 Warmwell boiler is tested with flow/return temperatures of 50/30°C to ensure condensing takes place thus achieving the correct output. The boiler can also be used in the high efficiency mode with flow/return temperatures of 80/60°C, i.e. non-condensing where it will provide the lower heat output as given in Figure 2.2 (p4).

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. See Figure 3.3.

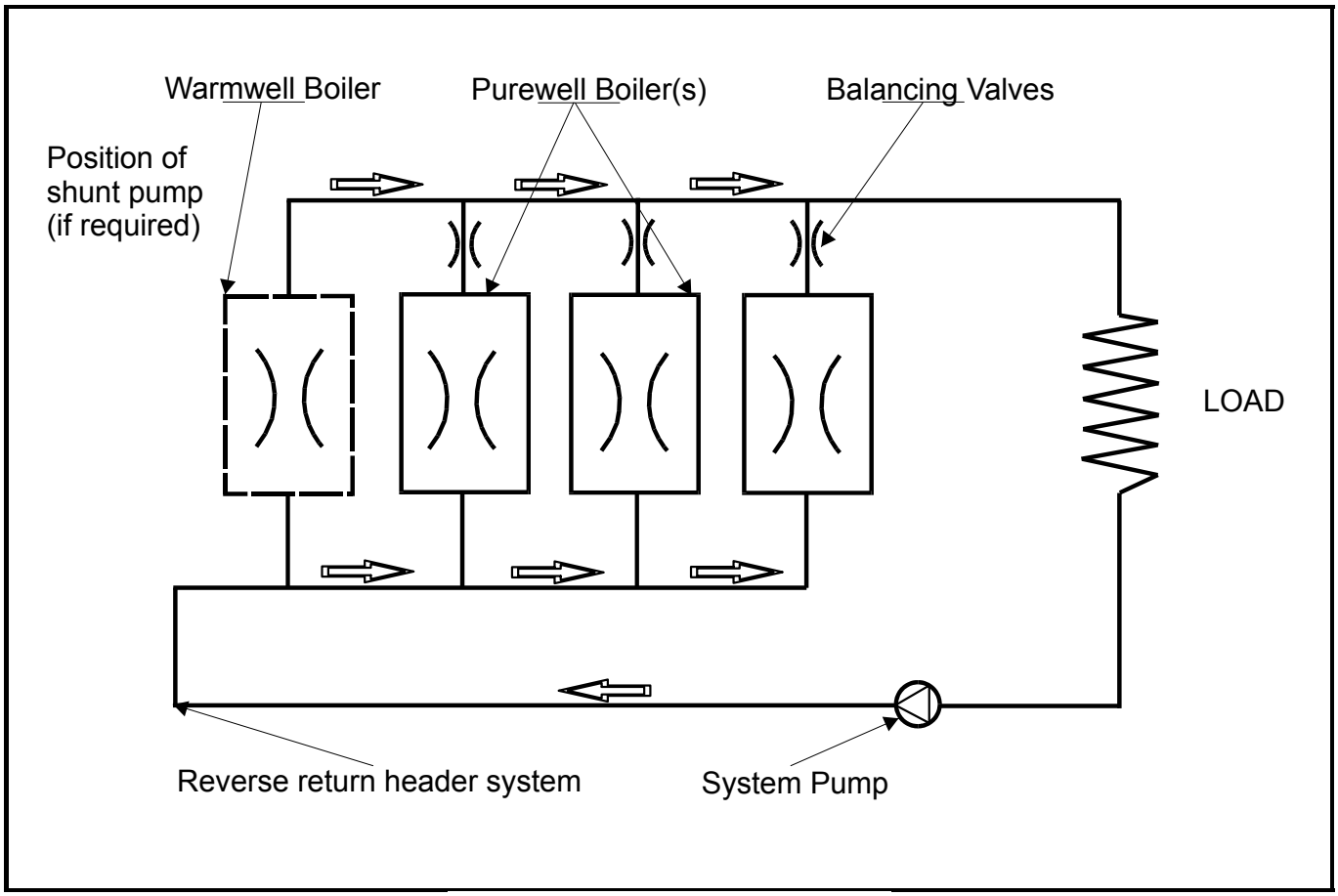
The pressure loss though the Warmwell boiler is generally higher than the equivalent Purewell unit. It therefore may be necessary to incorporate balancing valves where these units are mixed on the same header. See Figure 3.3.
Figure 2.2 (p4) shows recommended and minimum water flows required. The control system and valves, where fitted, should be regulated to avoid lower flows occurring. The flow corresponding to 22°C temperature rise across the boiler is the minimum recommended at any time. For boiler pressure drop see Figure 2.2 (p4).

### 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** (p13) for details. See Figure 9.1 (p15) for wiring details.

**Figure 3.3 Balancing of Mixed Boiler Systems**



### 3.5 Minimum System Water 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** (p12).
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 20°C rise across system. Minimum head required = 9.4 metres or 0.92 bar. See **Section 8.11** (p12) for Pressurised Water Systems.

## 4.0 LOCATION

**4.1** See Figure 2.1 (p3) for dimensions/weights and clearances. 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.

Allow adequate space, this must not be less than 460mm at the rear, for flow and return connections. Also allow at least 460mm on one side, the other side must be no less than 150mm. Allow 610mm (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.

For further details regarding boiler location refer to **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.

See Figure 5.3 (p8) for recommended gas flows in pipes.

### 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

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. Care must be taken not to allow leak detection fluid on or near any electrical parts or connections (If used). See Figure 5.6 (p9) - Gas valve/pipework leak check 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.

**Figure 5.3 Gas Flow in Pipes**

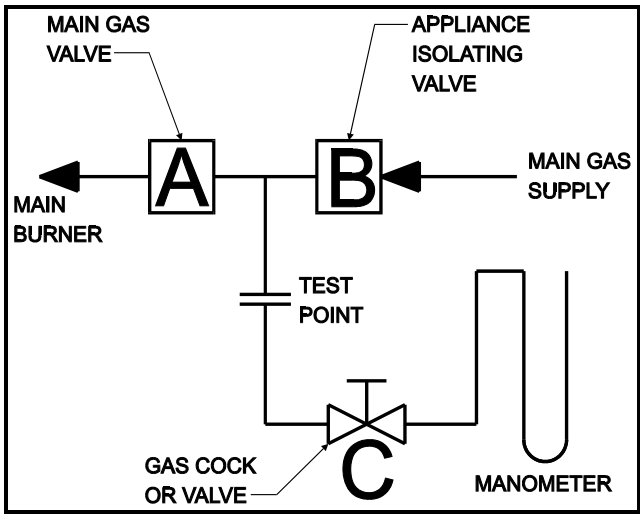
| Total Gas Input $m^3/hr$ | Maximum length of gas pipe (Metres) | | | | | | |
|---|---|---|---|---|---|---|---|
| NB | 20mm | 25mm | 40mm | 50mm | 65mm | 80mm | 100mm |
| 4.73 | 10 | 42 | - | - | - | - | - |
| 5.92 | - | 25 | 180 | 820 | - | - | - |
| 7.10 | - | 16 | 120 | 540 | - | - | - |
| 8.27 | - | 11 | 85 | 380 | - | - | - |
| 9.44 | - | - | 62 | 280 | 900 | - | - |
| 11.19 | - | - | 42 | 185 | 580 | - | - |
| 12.36 | - | - | 33 | 145 | 470 | - | - |
| 14.1 | - | - | 25 | 110 | 345 | - | - |
| 18.88 | - | - | 12 | 56 | 180 | - | - |
| 22.38 | - | - | - | 38 | 120 | 750 | - |
| 24.72 | - | - | - | 30 | 96 | 600 | - |
| 28.20 | - | - | - | 22 | 72 | 440 | - |
| 33.57 | - | - | - | 15 | 47 | 290 | - |
| 37.08 | - | - | - | 11 | 37 | 235 | - |
| 42.30 | - | - | - | - | 27 | 170 | 810 |
| 44.76 | - | - | - | - | 24 | 150 | 730 |
| 49.44 | - | - | - | - | 19 | 115 | 570 |
| 56.40 | - | - | - | - | 14 | 86 | 430 |
| 61.80 | - | - | - | - | 11 | 71 | 340 |
| 70.50 | - | - | - | - | - | 51 | 245 |
| 74.16 | - | - | - | - | - | 46 | 220 |
| 84.60 | - | - | - | - | - | 34 | 165 |

The above table expresses pipe lengths from gas meter to appliance which will produce approx. 1mbar pressure loss. This table must be used in conjunction with losses of various fittings fitted in the gas line shown below.

| Fitting Type(NB) | 20mm | 25mm | 40mm | 50mm | 65mm | 80mm | 100mm |
|---|---|---|---|---|---|---|---|
| Per elbow | 0.5m | 0.5m | 1.0m | 1.5m | 2.0m | 2.5m | 3.5m |
| Per Tee | 0.5m | 0.5m | 1.0m | 1.5m | 2.0m | 2.5m | 3.5m |
| Per 90°Bend | 0.3m | 0.3m | 0.3m | 0.5m | 0.5m | 1.0m | 1.5m |

For example: - 2 Purewell 120kW Boilers being fed by 65mm NB pipe with 6 elbows between gas meter and boiler header can have a maximum length of 72m - (6 x 2m) = 60 metres run to achieve a 1mbar loss.
**Note! Information above is based on IM/16.**

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




**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. **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 Warmwell 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 I.Gas. E. **IGE/UP/10** "Installation of gas appliances in industrial and commercial premises Pt 1 flued appliances." The following points should be noted: -

**1)** Flue gas temperatures from traditional boilers will be typically 150-200°C which gives buoyancy thus tending to balance resistances through the boiler and primary/secondary flueways. Condensing boilers (in condensing mode) have flue gases at/or approaching water return temperatures. These gases will be in a saturated condition, therefore continuous condensation in the flueways must be expected.
**2)** The flue system must be self-supporting in the correct position to enable its removal for boiler cleaning (condensing heat exchanger only).
**3)** Boilers should be located as near to the chimney as possible, the nearest being not more than 2m (6ft) away.
**4)** The flue system should be designed to achieve a negative suction at all times on all modules in a bank. For optimum performance, draught conditions should be between -0.05 to -0.125mbar. In some instances, mechanical assistance may be necessary. The boilers are suitable for connection to a fan diluted flue system, refer to I.Gas.E. **IGE/ UP/10**, "Installation of gas appliances in industrial and commercial premises Pt 1 flued appliances."
**5)** Warmwell boilers are suitable for installation in a balanced compartment in accordance with the requirements of **BS6644**. Consult Hamworthy Heating Technical Department for help or assistance if in doubt.

### 6.2 Design Waste Gas Volume and Temperature

The flue gas temperature will be dependant on the system return temperature - Figure 2.2 (p4) gives maximum and minimum temperatures based on non-condensing and condensing modes. It should be assumed that there would be no buoyancy aid from the hot gas leaving the boiler. It is therefore recommended that the flue resistance should not exceed 0.25mbar.

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 Flue Condensation

Care should be taken to ensure the flue is installed in such a way that condensation produced on start up or during normal run is piped to an appropriate drain via the condense trap supplied, discharging into a tun-dish (not supplied).

The discharge piping from a tun-dish shall slope at least 30mm/m.

### 6.4 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.

Condense will be produced in normal operation of the Warmwell boiler. The materials used in the flue construction must be suitable for saturated flue gas and assembled such that condense naturally drains to traps and does not `leak' from joints.

Discharge piping from a tun-dish should be of a synthetic material due to the mild acidity of the condensate (pH 3-5). Consideration should be given to possible freezing of condense water traps and pipework. This must be avoided at all times. Insulate condense pipes if freezing temperatures are likely to be encountered.

### 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.

See section **13: SERVICING** (p33) 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.

### 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.

**NOTE!** The flue **MUST** be self-supporting. Check that the flue and chimney are clear from any obstruction.

Where the flue diameter is less than 200mm (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.

## 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.

### 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 or 100mm above floor level = 25°C.
2) At mid-level (1.5m above floor level) = 32°C.
3) At or 100mm below ceiling level) = 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$^2$ plus 4.5cm$^2$ per kilowatt in excess of 60kW total rated input.

High Level (outlet) 270cm$^2$ plus 2.25cm$^2$ 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**

| | Flow rate per 1000kW total rated heat input (Gross) | |
|---|---|---|
| Atmospheric Boilers | Inlet air (Combustion ventilation) | Extract air (ventilation) |
| | m³/s. | m³/s. |
| Volume | 1.10 | 0.45 |

## 8.0 WATER CIRCULATION SYSTEM

### 8.1 General

The Warmwell Boiler has a low water content and the requirements of minimum water flow are given in **Section 8.8:Minimum Water Flow Rates** (p12) 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 (3in) 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 one Rc2 BS21 flow and one Rc2 BS21 return tapping. Flow and return headers should connect boilers but sufficient length of connecting pipe should be allowed to clear the casing before connecting into the headers. The 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. Figure 1.1 (p2) shows typical layout.

**5)** Due to the higher pressure losses of the Warmwell heat exchanger compared to the Purewell, it may be necessary to install a shunt pump or balancing valve to enable correct flow through these combined boiler systems. See Figure 3.3 (p6).

### 8.2 Pressure Relief Valve (Safety Valve)

Each boiler, or in the case of a modular installations, each bank of boilers, must be fitted with a pressure relief valve to **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 shown in Figure 8.3.

**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 |

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

### 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 Warmwell 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.

### 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 (p4).
**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.

### 8.10 Control Schemes

#### 8.10.1 Temperature Controls

An electronic control thermostat using a 10kΩ NTC thermistor temperature sensor is incorporated within the boiler controls. A potentiometer is used to adjust the control thermostat set point between the range 25 to 95°C. The potentiometer also acts as the boiler on/off switch via a push and release action. An additional potentiometer (fitted to the boiler main control PCB) provides a temperature offset below the main control set point for high/low control switching, which can be adjusted up to 10°C below the main set point (5°C recommended).

If the boiler is required to run in condensing mode the return temperature should be between 30-45°C. The control thermostat should therefore be set at 45-55°C. This will be dependent on boiler water flow-rate and hence ΔT achieved.

If a higher water temperature is required, and providing sufficient head on the water system is available, the thermostat may be adjusted to operate up to 95°C.

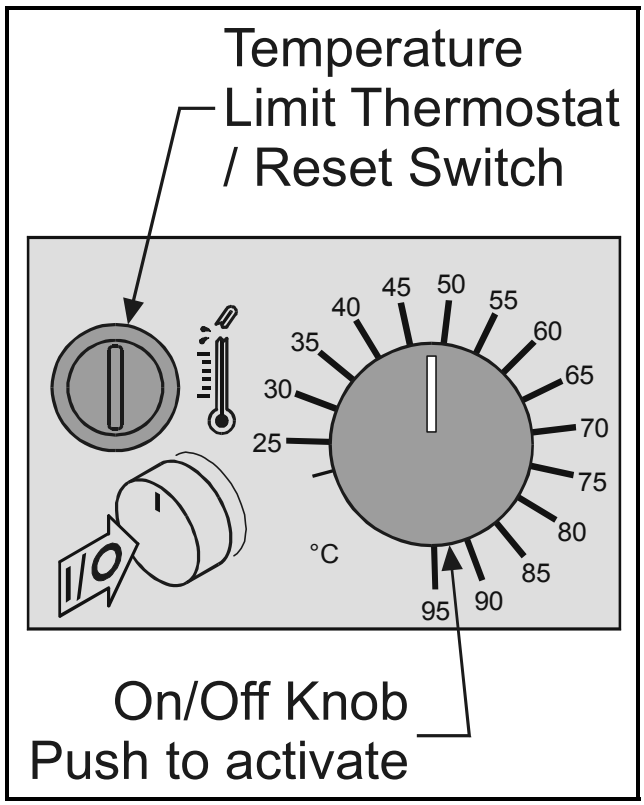
A standard electro-mechanical temperature limiter, (hand reset limit thermostat) is also fitted to the boiler and must be set at 100°C.

**NOTE!** To meet the requirements of the EN standard the temperature limiter's maximum setting should be 100°C. The minimum difference between control thermostat and temperature limiter **MUST NOT** be less than 10°C.

#### 8.10.2 Water Flow Controls

Any external mixing valves or similar controls should **ALWAYS** ensure that the minimum water flow rate shown in Figure 2.2 (p4) is maintained.

**Figure 8.10.1 Temperature Controls and Boiler On/Off Switch**




#### 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. For system design refer to **BS 7074 Part 2**.

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 boiler installations, 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 and the Milton boiler sequence control and sequencing interface module instructions for further details.

Where a modular installation comprises of a combination of Purewell and Warmwell boilers, the Warmwell condensing boilers should always be the lead boilers.

Alternatively, the 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 (p14).

## 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 1.0mm² csa). Boilers are normally supplied suitable for 230 volts, 50Hz. Internal fuse rating is 6.3A (T rated). External fuses should be 10A for all single boiler sizes.

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**, especially if a single header pump kit is utilised. The Warmwell 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 (p14) and 9.1 (p15) for typical site wiring connections. See **BS 6644** for further information. **DO NOT feed mains voltage onto these terminals.**

### 9.1 Site Wiring

Access to the controls is achieved by rotating the ¼ turn latch 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 Warmwell 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 (p14) and 9.1 (p15) for typical wiring diagram.

### 9.2 Indication Signals and Volt Free Contacts

Volt free contacts are provided to enable external indicator lights or alarms to derive signals for normal run, overheat and lockout.

**Note:-** These external circuits **MUST** be isolated before obtaining access to the controls for any service or maintenance procedures to be carried out.

### 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 (p14) and the Milton boiler sequence control installation manual for wiring connection details.

**Figure 8.12 Site Wiring Diagram**

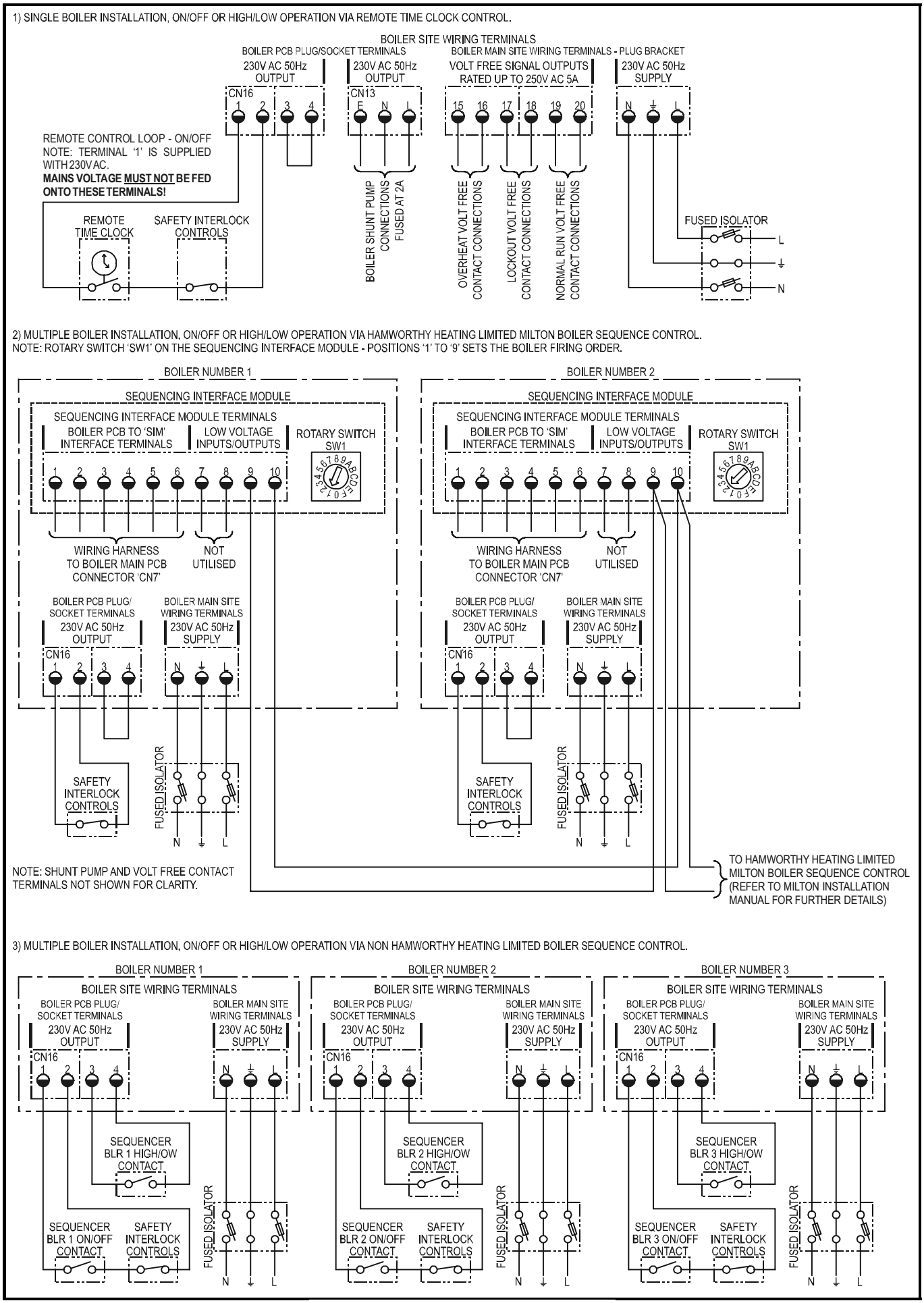
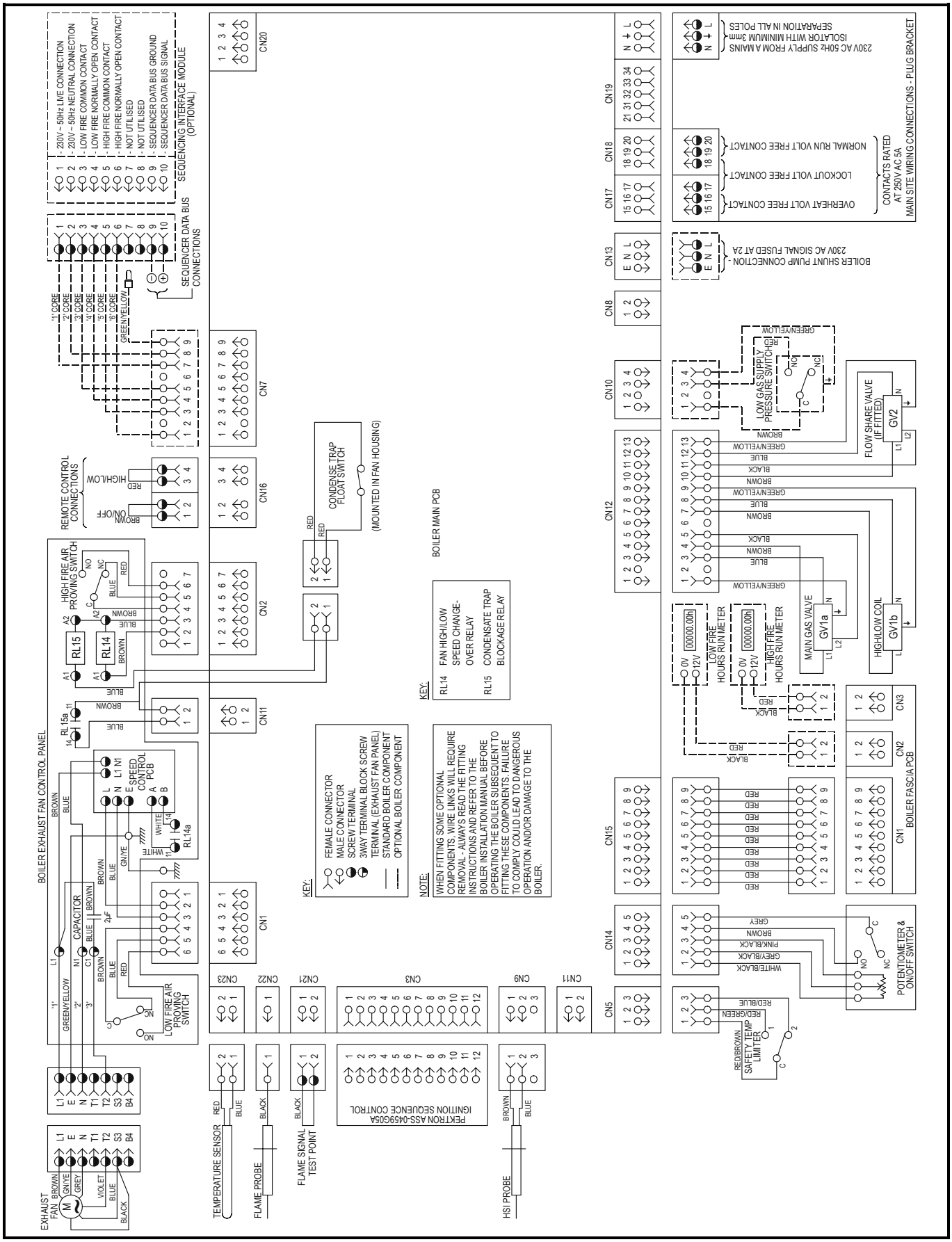


**Figure 9.1 Wiring Schematic**




**NOTE! Maximum rating of volt free contact(s) is 3 Amperes Resistive**

WARNING! External voltage MUST NOT be applied to remote stop/start terminals CN16 or high/low control loop terminals CN16 or any terminals on the fascia. **NOTE! *** Volt free contacts may have separate supply. Ensure all power supplies are completely isolated prior to working on the electrical circuits of this appliance.

**Note:** For correct operation of the sequencing interface module a number of wire links **MUST** be removed from the boiler main PCB - refer to **Section 11.5** clause 8) (p27) for details.

## 10.0 BOILER ASSEMBLY AND INSTALLATION

### 10.1 General

Each boiler is despatched to site as follows: -

**1)** Heat exchanger & basket including burners and gas valve(s) etc. on a pallet.
**2)** Casing complete with assembly instructions.
**3)** Control panel assembly.
**4)** Condensing section assembly (fitted to item 2).

Further details of each individual assembly are given below: -

**1)** Factory tested heat exchanger casting assembly complete, including insulation wrap, gas valve assembly including pre-wired plug assembly. The gas connection pipe & insulation wrap are supplied separately and should be fitted to the boiler as shown. **THE GAS PIPE MUST NOT BE USED TO MANOEUVRE OR POSITION THE BOILER.**

**NOTE!** Consideration must be given to the weight of the boiler (See Figure 2.1 p3), before lifting. It is recommended that the boiler is moved complete with pallet and positioned correctly. The pallet can then be dismantled and the boiler slid into position.

**2)** Casing including all screws, fasteners etc. to permit site assembly. Instructions are included in each box to show method of assembly. Two sizes are manufactured: small casing for the 60 and 95 boilers and large casing for the 140 boiler.

The condensing section casing is supplied separately. See assembly instructions in **Section 10.7** (p19).

**NOTE!** When installing a multi-casing set the spacing plates must be used to correctly space the boilers approx. 3mm apart prior to fitting the casing. (See label attached to the basket fixing.)

It is recommended that all mechanical work is carried out prior to fitting the casing assembly, this will reduce possible damage to the panels.

The casing assembly includes a component list, which is also shown in Figure 10.7 (p22/23). You should check to ensure that all parts are supplied prior to assembly.

**3)** Control panel assembly including fascia bezel and exhaust fan control panel with pressure switches. These assemblies will be suited to the desired controls variant and include any optional extras required. Refer to Figure 10.7 (p22/23) for fitting instructions. Ensure all thermostat capillaries are inserted and correctly located into the top of the boiler. The controls assembly also incorporates a socket which matches the gas valve wiring plug. Care must be taken to ensure both plug and gland plate are correctly located and fixed in position by the screws provided.

**4)** A 45° flue elbow (not HHL supply) may be located in the flue spigot at the rear of the boiler. This elbow can be rotated to give vertical or horizontal flue discharge. Ensure the flue pipework is adequately sealed against condense leakage. In condensing mode the flue gases are saturated and will contain slightly acidic water which must be channelled into drains and not allowed to drip from seams.

The condensing section may be despatched separately, if required, and can be site assembled onto the cast iron heat exchanger on site. Figure 10.6 (p20) shows method of assembly.
Care must be taken in order not to damage the copper tubes or fan assembly during erection.

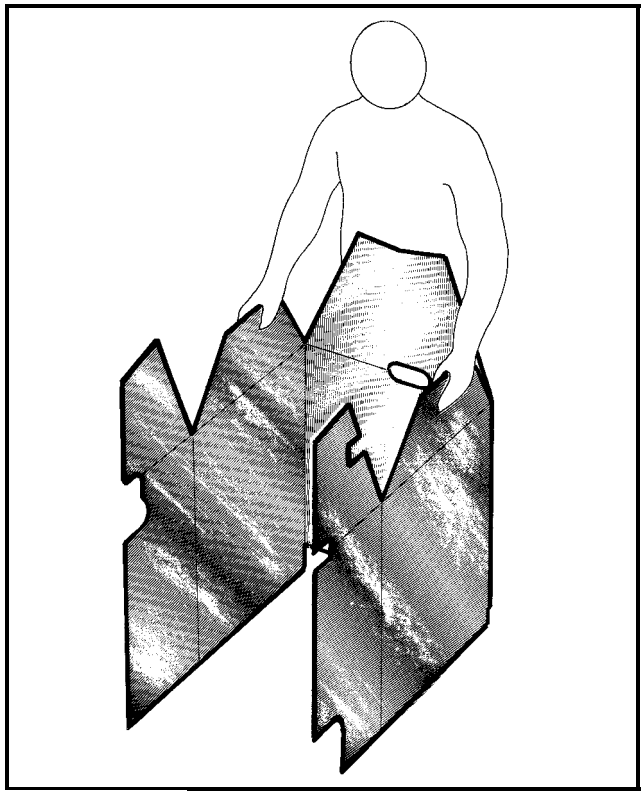
All the necessary cabling and pressure sensing tubes are supplied ready to attach to the controls housing when fitted. Please follow assembly instructions regarding these attachments, as incorrect connection will result in commissioning problems at a later stage. See Figure 11.5 (p28) for further details.

### 10.2 Heat Exchanger Insulation Fitting Instructions

#### 10.2.1 Primary Heat Exchanger Insulation

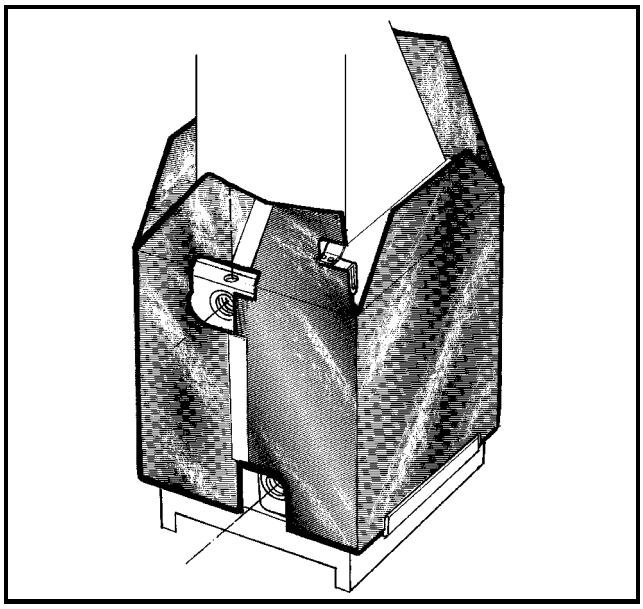
With reference to Figure 10.2.1a - Unfold blanket and offer up to the boiler as shown. Ensure gas pipe cutout is positioned to the left and that the 'petals' are uppermost. Sit the insulation blanket onto the basket ensuring a snug fit.

**Figure 10.2.1a**



Reference to Figure 10.2.1b - Insulation should be folded around boiler such that its rear edges meet in the centre. Ensure flow and return connections are clear and unobstructed.

**Figure 10.2.1b**

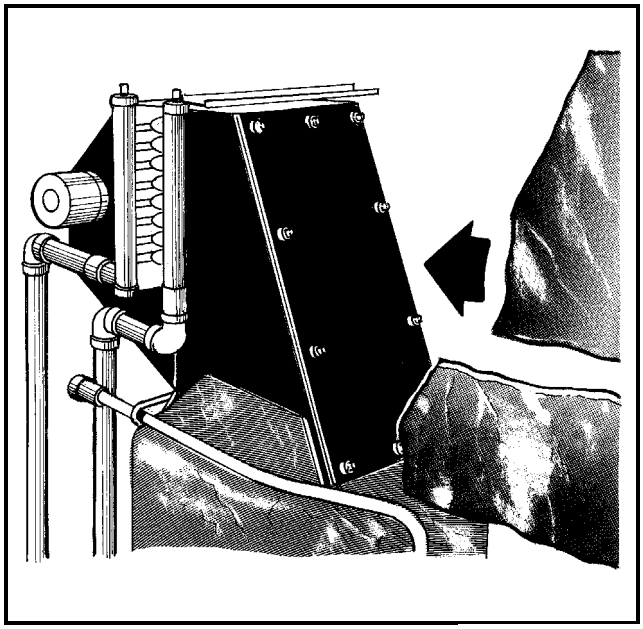


Apply foil tape down join. Leave 'petals' in upright position at the sides for installation of secondary heat exchanger insulation. Mould the rear 'petal' into the shape of the boiler and fold the front 'petal' such that the access door is not covered. Use foil tape to secure joins and folds whilst ensuring gas pipe bracket and thermostat pocket are clear and unobstructed.

**10.2.2 Secondary Heat Exchanger Insulation**

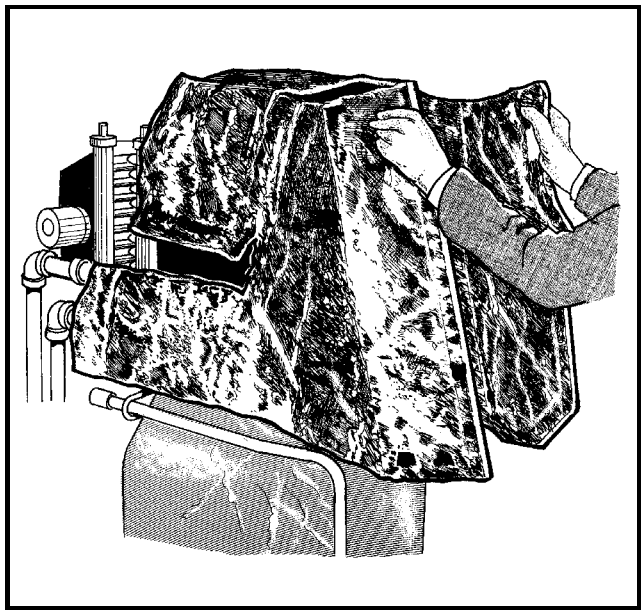
Refer to Figure 10.2.2a - Offer insulation jacket to transition duct as shown. Ensure insulation is not snagged or ripped by any sharp objects.

**Figure 10.2.2a**



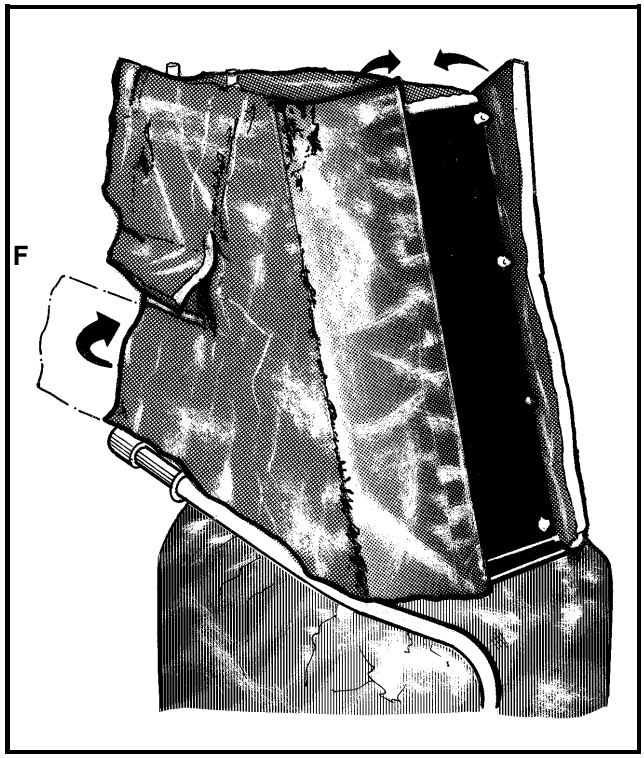
Refer to Figure 10.2.2b - Fit jacket over the transition duct and secondary heat exchanger. Ensure the two air vents protrude through the jacket. Feed jacket between the two M6 studs, which will eventually hold the casing support bar.

**Figure 10.2.2b**



Refer to Figure 10.2.2c - Close flaps around bottom of secondary heat exchanger. Ensure unit is completely covered. The insulation jacket should not cover the stainless steel collector hood.

**Figure 10.2.2c**




Seal all joints with tape provided. Loosely close the front flaps covering the inspection door. Place two pieces of tape on front split to allow access to the inspection door.

**10.3 Gas Pipe Fitting Instructions**

Refer to Figure 10.3a - Remove half union and gas valve from gas train. Ensure gas valve/manifold bracket does not suffer undue stress/movement. Affix half union and gas valve assembly to gas pipe as shown using proprietary sealing compound. Ensure gas valve lever is correctly orientated. Offer gas pipe to boiler as shown. Bracket should be mounted as shown. Bracket position will be dependent on boiler size.

**Figure 10.3a**

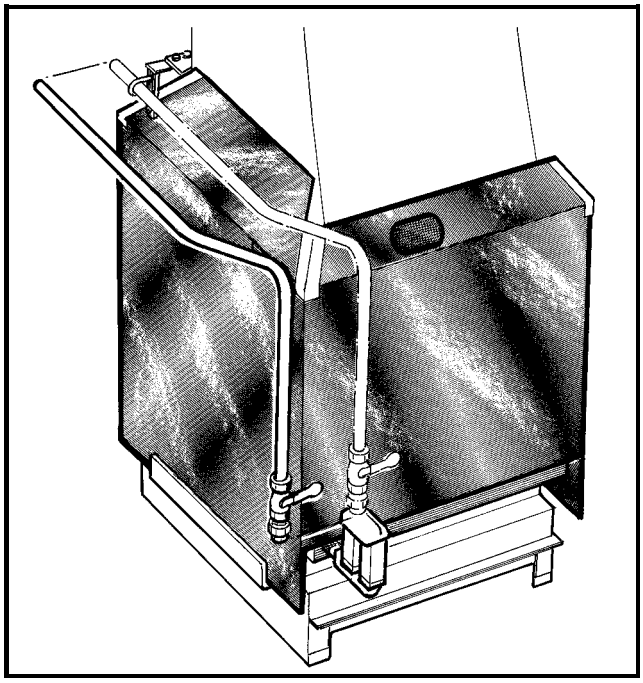


Figure 10.3b shows the pipe clamp fitted to Warmwell 95, 120 and 140kW boilers.

**Figure 10.3b**

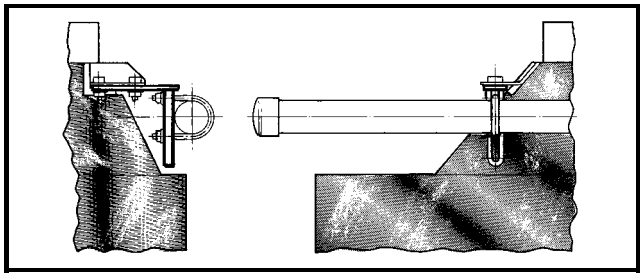
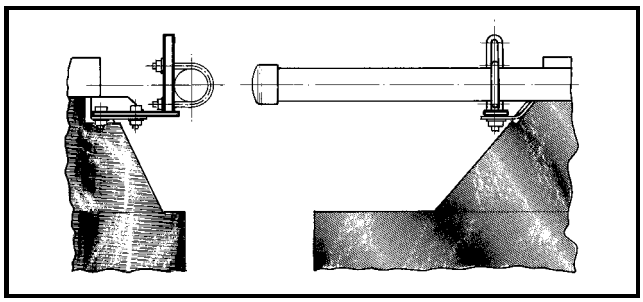


Figure 10.3c shows the pipe clamp fitted to Warmwell 60kW boilers.

**Figure 10.3c**



Tighten screws ensuring 'U' clamp threads do not damage insulation. It may be necessary to remove the bottom thread of the 'U' clamp with the bracket in lower position as it may foul the draught hood. Ensure no undue stress is placed on the gas pipe/ manifold and ensure pipe is vertical/horizontal before clamping in position.

**10.4 Connection of Boilers to the Flue System**.

Notes on the recommendation for design of the flue system are given in **Section 6:FLUE SYSTEM** (p9).

It is recommended that each individual condensing boiler have its own flue if possible. Due consideration should be given to obtain constant draught conditions if possible at the boiler discharge.

Flueways must be designed with continuous falls to low points where a suitable condensation trap should be fitted. All joints in the flue should be fitted such that condense drains into the preceding flue pipe without leakage.

Some of the flue may be under slight positive pressure therefore escaping vapour may condense on the outer skin of the flue. Again, all joints should therefore be suitably sealed against leakage.

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.

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

**10.5 Gas Connection**

The Warmwell boiler is supplied with a gas pipe which exits the casing at the rear after installation, 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, under all firing conditions. For sizing information see Figure 5.3 (p8). An approved isolating valve & union should be installed for each boiler in a convenient and safe position and be clearly marked.

**10.6 Water Connections**

See Figure 2.1 (p3) for position of water connections (flow and return). An R½ BS21 plug is fitted local to the return connection for the fitting of a drain valve (not HHL supply). Care must be taken when installing water system pipework that undue stress is avoided on the boiler flow and return connections. The return connection is fitted to the copper header on the heat exchanger. **WHEN ATTACHING PIPEWORK TO THIS HEADER IT IS IMPERATIVE THAT NO UNDUE STRESS IS PLACED ON THE Rc2 BS21 CONNECTIONS.**

The header must be suitably supported when screwing in and tightening pipework to this header. It is recommended that unions be fitted locally 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 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.

The secondary & primary heat exchangers can be dispatched separately if required, and will require assembly on site. Refer to Figure 10.6 (p20).

This is achieved as follows: -

**1)** Carefully unpack secondary heat exchanger assembly. A flexible pipe assembly connects both heat exchangers together and is normally dispatched fitted onto the primary heat exchanger.

**2)** Ensure rope seal is aligned within rope groove on the top casting. Screw on four M8 nuts & washers onto the tie rods. Gently lower the transition duct onto the top casting - ensure rope seal does not move. Fit M8 nuts & washers to restrain the assembly, **DO NOT TIGHTEN AT THIS STAGE.**

**3)** Connect the flexible pipe to the secondary heat exchanger and tighten - **TAKE CARE NOT TO DAMAGE OR PLACE UNDUE STRESS ON THE COPPER TUBES OR HEADERS**. Tighten nuts onto the transition duct. **Do not over tighten otherwise lugs will be distorted.** Lock M8 nuts together. Remove transition duct cover and visually inspect rope seal integrity.

**4)** Ensure all connections are watertight starting at the base. Re-fit transition duct cover and continue installation.

### 10.7 Casing and Controls Assembly

For assembly of casing and controls refer to Figure 10.7 (p22/23).

#### 10.7.1 Multi casings

**Note:** Where boilers are in Modular form, i.e. MW420 (3 x 140kW), a multi-casing pack is provided for each additional boiler. For example: a triple boiler module will require: - 1 off single casing pack plus 2 off multi-casing packs. If the bottom support rail (item 19) has not been pre-assembled, the following procedure must be taken: -

**1)** Loosen the nuts that clamp the basket assemblies of the 2 boilers together, (1 front and 1 rear). Remove the bolt, spacer and nut assembly.

**2)** Position the bottom support rail (item 19) between the boiler baskets. Assemble to boiler baskets using 2off M6 screws, nuts and shake proof washers (items 18, 9 & 10).

**3)** Select the rear support rail (item 21) and fit 6off 'U' nuts (item 15), 4off in the 2 lower pairs of holes and 2off in the angle bracket at the top. Fix the rear support rail to the bottom support rail, using 2off M6 screws and washers (items 18 and 10).

**4)** Select the front support rail (item 22) and fit the 2off door location brackets (item 5) using 4off M6 screws and spring washers (items 13 and 14). Fit 2off 'U' nuts (item 15) to the top 45° return. Fix the front support rail to the bottom support rail, using 2off M6 screws and washers (items 18 and 10).

**5)** Select the top support rail (item 20) and fit 2off 'U' nuts (item 15) to the pair of holes at the rear end. Fix the top support rail to the front and rear support rails using 6off No.8 self tapping screws (item 16).

#### 10.7.2 Single and multi-casings.

**6)** Select the side panels (items 1 and 2) and fit the 2off door location brackets (item 5) using 4off M6 screws and spring washers (items 13 and 14). Fit 'U' nuts (item 15) to the 2 holes at the rear of each panel as shown. Fix the side panels to the boiler basket using M6 nuts and shake proof washers (items 9 and 10).

**7)** Fit the back panel (item 3) using 4off No.8 self tapping screws (item 16). **DO NOT FULLY TIGHTEN THE SCREWS.**

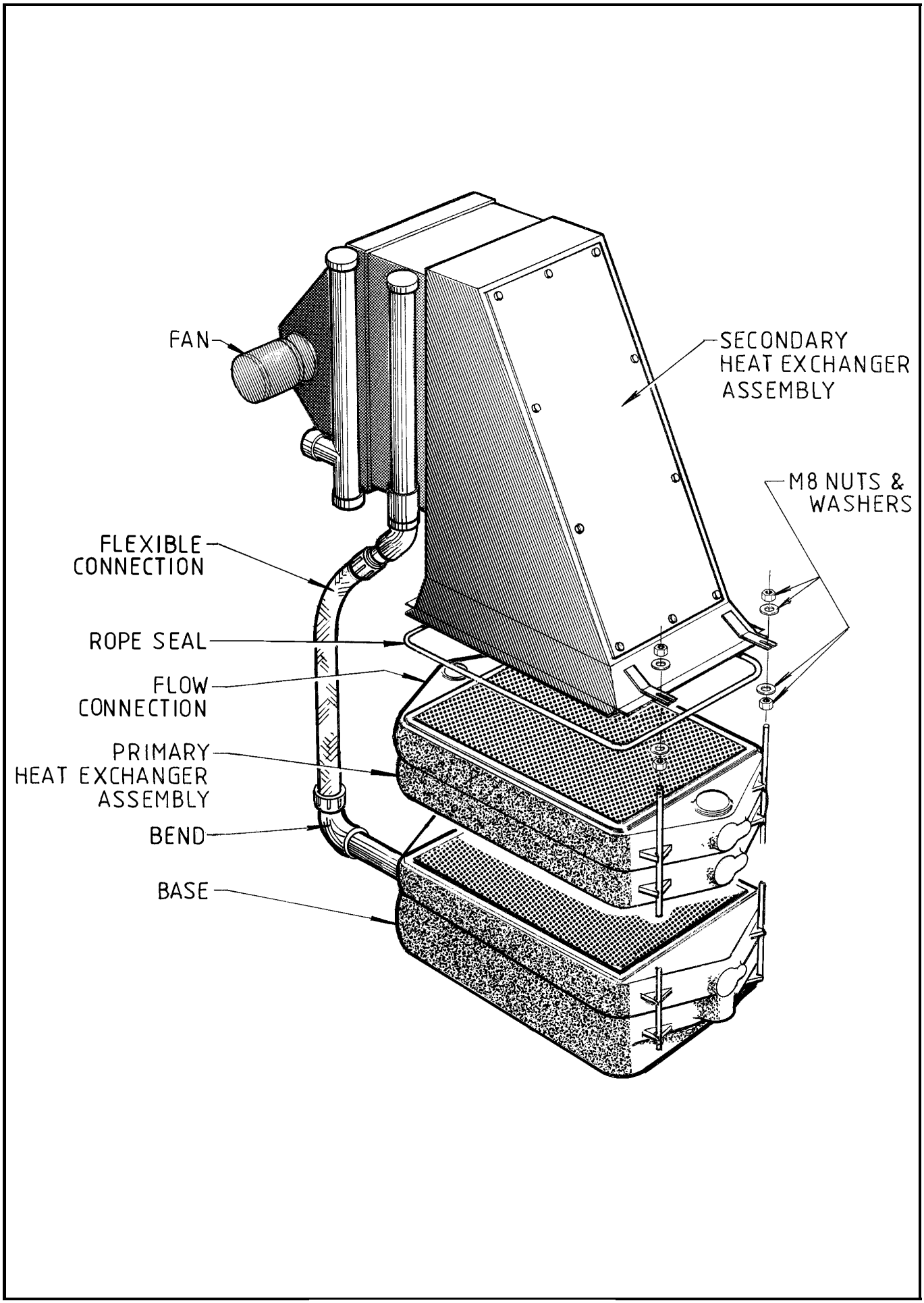
**8)** Select the control panel (item 6). Permanent pilot boilers only, fit the door catch bracket to the control panel using the 2off M6 screws, nuts and washers supplied with the panel as shown. Loosely fit 4off M6 nuts and washers (items 9 & 10) to the pressed-in studs at the top front end of the side panels (or multi-casing frame set) as shown. Fit the control panel by passing the right hand side behind the pressed-in studs and pulling the panel forwards to engage the studs into the slots in the right hand side of the panel. Push the left of the control panel backwards to engage the studs on that side into the slots in the panel. Tighten the 4off M6 nuts.

#### 10.7.3 Warmwell top casing.

**1)** Tighten the 4off screws fixing the back panel to the side panels.

**2)** Select the appropriate side panel support (item 34 or 35) dependent on boiler model. Discard the unused item. Fit 'U' nuts (item 15) to the holes at each end of the side panel support. Fit 2off M6 nuts and plain washers (items 9 and 36) to the M6 studs located on the top of the Warmwell boiler secondary

**Figure 10.6 - Assembly of Secondary Heat Exchanger onto Primary Heat Exchanger if Supplied Separately**



heat exchanger. Fit the side panel support to the M6 studs and loosely secure with the remaining M6 nuts and plain washers. Leave the fastenings loose at this stage to allow adjustment of the height of the side panel support.

**3)** Select the left hand and right hand upper side panels (items 30 & 31) and fit 4off ball studs, spacers, M5 screws and shake proof washers (items 7, 8, 11 & 12 – supplied with the Purewell lower casing kit) to the 2 holes in the bottom return of each panel. Fit 4off 'U' nuts (item 15) to the 2 holes in the inner return on the angled edge of each side panel. Fit the upper side panels to lower side panels (or multi casing frame set) of the Purewell lower casing kit ensuring that the ball studs locate correctly in the matching latches fitted to the top return of the lower side panels.

**4)** Adjust the height of the side panel support such that its top face fits just below the top return of the upper side panels, and securely fasten the M6 nuts. Secure the side panels to the side panel support with 2off No.8 self tapping screws (item 16).

**5)** Select the exhaust fan control panel (item 37 – supplied with the fan control and condense trap kit – HHL part no. 563605201) and place between the angled front edges of the upper side panels. Secure to the 4off 'U' nuts using 4off No.8 self tapping screws (item 16). **Note:** It is advisable at this stage to make the electrical connections between the boiler control panel, exhaust fan control panel and exhaust fan, and the sensing tube connections.

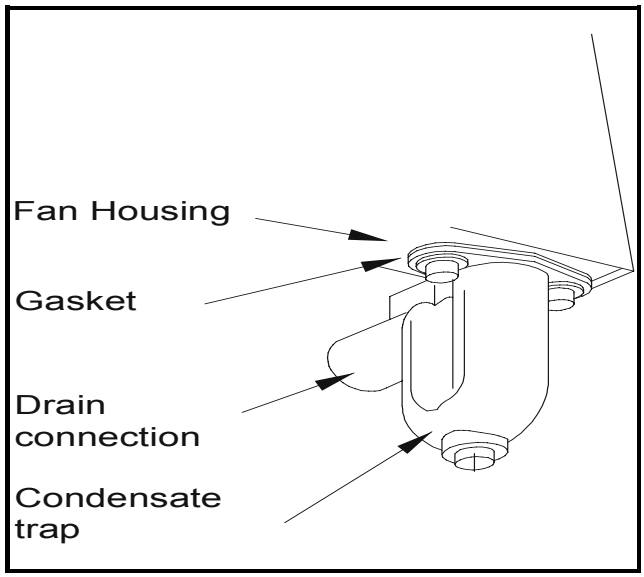
**6)** Select the upper top panel and fit 4off ball studs, spacers, M5 screws and shake proof washers (items 7, 8, 11 & 12) to the 4 holes in the bottom returns. Fit the upper top panel to the upper side panels ensuring that the ball studs locate correctly in the matching latches fitted to the top returns of the upper side panels.

**7)** Select the upper front panel and fit 4off ball studs, spacers, M5 screws and shake proof washers (items 7, 8, 11 & 12) to the 4 holes in the bottom returns. Fit the upper front panel to the upper side panels ensuring that the ball studs locate correctly in the matching latches fitted to angled front returns of the upper side panels.

**8)** Select the door panel (item 4) and fit the 2off location pins, M4 screws, nuts and shake proof washers (items 23, 24, 25 & 26), to the 2 holes in the rear return. Select the fascia bezel (item 27) supplied with the control panel. Remove the paper liner from the self-adhesive foam tape affixed to the rear of the bezel, and fit to the door aperture as shown ensuring correct orientation and a strong bond to the surface of the door panel. To fit the door, locate the slotted holes in the bottom onto the location brackets (item 5). Pivot the door backwards until the location pins engage fully into the mating holes in the front edge of the side panels (or multi casing frame set). Turn the quarter turn latch in the centre of the door panel to lock it in place.

**9)** Condense Trap Connection
Select the condense trap kit from the fan control & condense trap kit, and fit the ¼ BSP plug into the base of the trap using suitable sealant. Secure the trap to the fan housing using the gasket and 2 off each M5 nuts and washers provided. The trap is suitable for connection to 22mm plastic waste pipe (not HHL supply) with the waste pipe being routed down to a local tundish. A small amount of sealant must be used on the waste pipe connection to the condense trap – see Figure 10.7.3a.

**Figure 10.7.3a - Condensate Trap**




**10)** Float Switch Connection
Remove the condense level float switch from the fan control and condense trap kit and fit to the tapping in the fan housing taking care to seal the threads with PTFE tape and also to secure the switch in the correct orientation as shown in Figure 10.7.3b below. Connect the condense level float switch plug to the adjacent socket on the rear face of the side panel.

**Figure 10.7.3b - Float Switch**

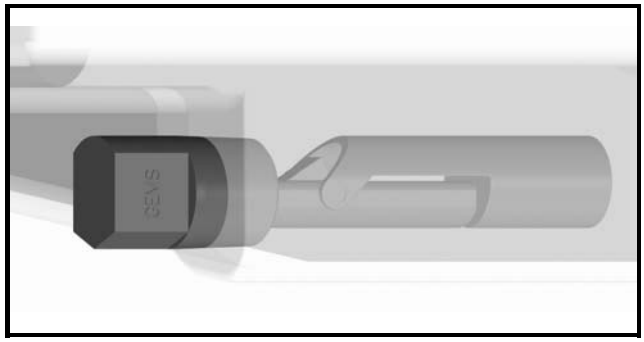
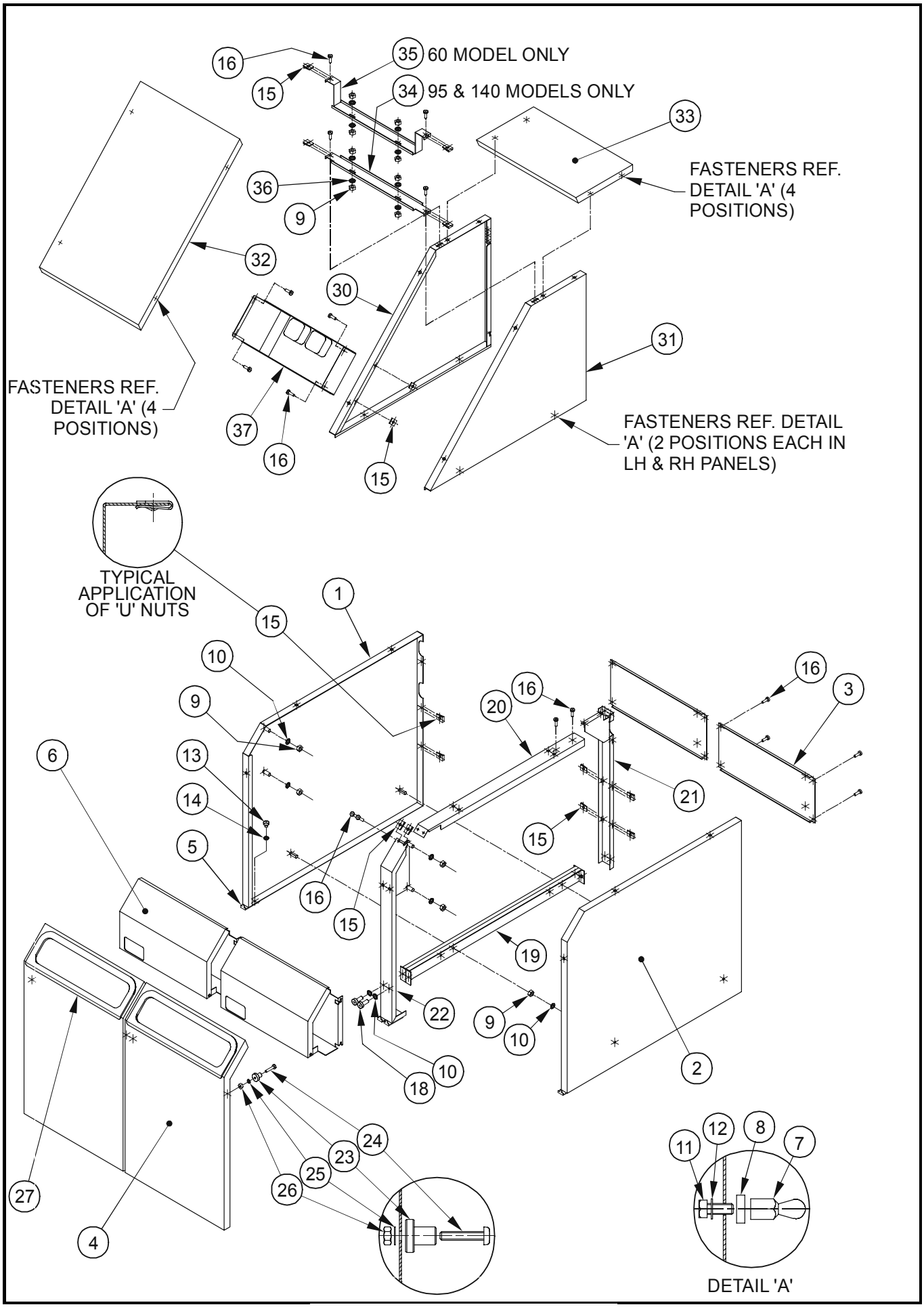


**Figure 10.7 Exploded View of Casing Set**



**Parts List of Figure 10.7 - Inventory of Warmwell Casing Set.**

**Warmwell lower casing assembly**

| Item | Description | Quantity (Single Casing Kit) | Quantity (Multi Casing Kit) |
|---|---|---|---|
| 1 | Left hand side panel | 1 | - |
| 2 | Right hand side panel | 1 | - |
| 3 | Back panel | 1 | 1 |
| 4 | Door panel | 1 | 1 |
| 5 | Door location bracket | 2 | 2 |
| 6 | Control panel | 1 | 1 |
| 7 | Ball stud fastener | 4 | 4 |
| 8 | Spacer for ball stud fastener | 4 | 4 |
| 9 | M6 hexagon nut | 8 | 6 |
| 10 | M6 internally serrated shake proof washer | 8 | 4 |
| 11 | M5 x 12mm hexagon head screw | 4 | 4 |
| 12 | M5 internally serrated shake proof washer | 4 | 4 |
| 13 | M5 x 6mm pozi-drive pan head screw | 4 | 4 |
| 14 | M5 spring washer | 4 | 4 |
| 15 | ‘U’ nut for no.8 self tapping screw | 4 | 10 |
| 16 | No.8 x ½” self tapping screw | 6 | 12 |
| 17 | Top panel | 1 | 1 |
| 18 | M6 x 16mm pozi-drive pan head screw | - | 6 |
| 19 | Bottom support rail | - | 1 |
| 20 | Top support rail | - | 1 |
| 21 | Rear support rail | - | 1 |
| 22 | Front support rail | - | 1 |
| 23 | Door location pin | 2 | 2 |
| 24 | M4 x 20 pozi-drive pan head screw | 2 | 2 |
| 25 | M4 internally serrated shake proof washer | 2 | 2 |
| 26 | M4 hexagon nut | 2 | 2 |
| 27 | Fascia bezel | 1 | 1 |

**Warmwell top casing assembly**

| Item | Description | Quantity |
|---|---|---|
| 7 | Ball stud fastener | 8 |
| 8 | Spacer for ball stud fastener | 8 |
| 9 | M6 hexagon nut | 4 |
| 11 | M5 x 12mm hexagon head screw | 8 |
| 12 | M5 internally serrated shake proof washer | 8 |
| 15 | ‘U’ nut for no.8 self tapping screw | 6 |
| 16 | No.8 x ½” self tapping screw | 6 |
| 30 | Left hand top side panel | 1 |
| 31 | Right hand top side panel | 1 |
| 32 | Upper front panel | 1 |
| 33 | Upper top panel | 1 |
| 34 | Side panel support (95 and 140 models) | 1 |
| 35 | Side panel support (60 model) | 1 |
| 36 | M6 plain washer | 4 |
| 37 | Exhaust fan control panel | 1 |

## 11.0 COMMISSIONING AND TESTING

For general layout of boiler refer to Figure 11.0.

### 11.1 Electrical Installation

A suitably competent person MUST check wiring. Normal supply required is 230 volts AC, single phase, 50 Hz. An isolator correctly fused at 10A should be sited close to the boiler.

Access to the controls is achieved by rotating the ¼ turn latch and removing the door. Connections to the boiler should pass through the 3 x 20mm wiring gland plate. If a single header pump kit is used then this power source must be constant and not switched by any time clock. 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 (p15) for details.
**IMPORTANT READ THE WARNING NOTE REGARDING EXTERNAL VOLTAGES.**

The terminal rail is of the plug/socket type and can be unplugged for wiring if required.

The main PCB is provided with four T rated fuses to protect the following circuits – see Figure 11.1 (p26).

| | |
|---|---|
| Main PCB | F1 – T6.3A |
| Boiler controls | F2 – T2A |
| Shunt Pump | F3 – T2A |
| Sequencing Interface Module | F4 – T2A |

A schematic of the electrical control circuit(s) is shown in Figure 9.1.

The fan motor is pre-wired to a plug/socket assembly and must be connected to the controls assembly as shown in Figure 9.1 (p15).

### 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.

### 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)** If necessary, remove the inspection cover and ensure the boiler flueways are clear. Ensure secondary heat exchanger passages are clear and clean. Re-fit the cover.

**3)** Adequate ventilation as per **Section 7: Air Supply** (p10) exists in the boiler house.

**4)** The system is fully charged with water, ready to receive heat. All necessary valves are open and the pump is circulating water. Ensure secondary heat exchanger is purged of air.

**5)** 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).

**6)** The gas supply pipework is clear of any loose matter, tested for soundness and purged.

### 11.5 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' (p41).

**NOTE! -** All propane boilers are fitted with a low gas pressure switch (set at 20mbar). Should the gas supply pressure fall below this level, the boiler **will not** operate.

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

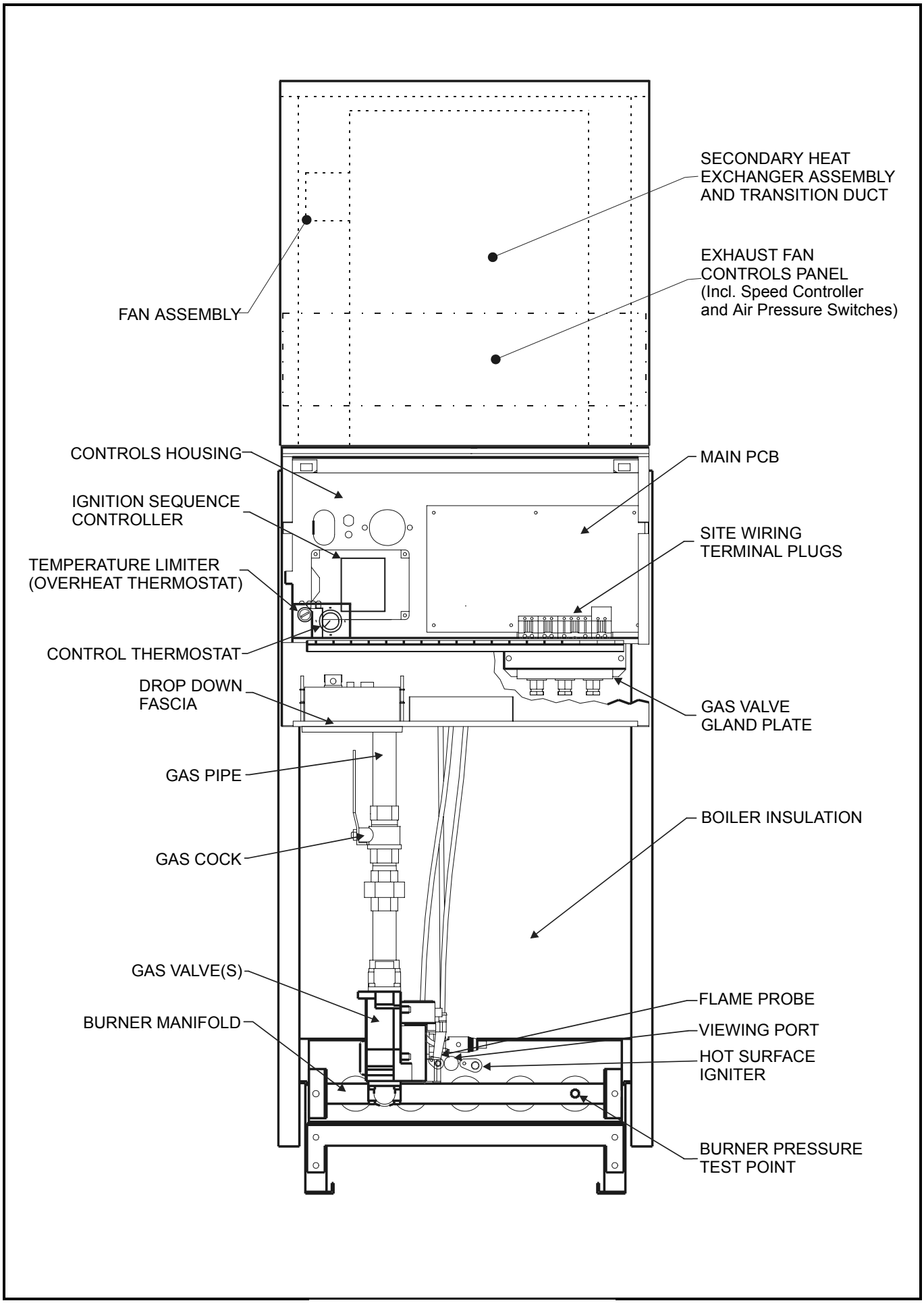
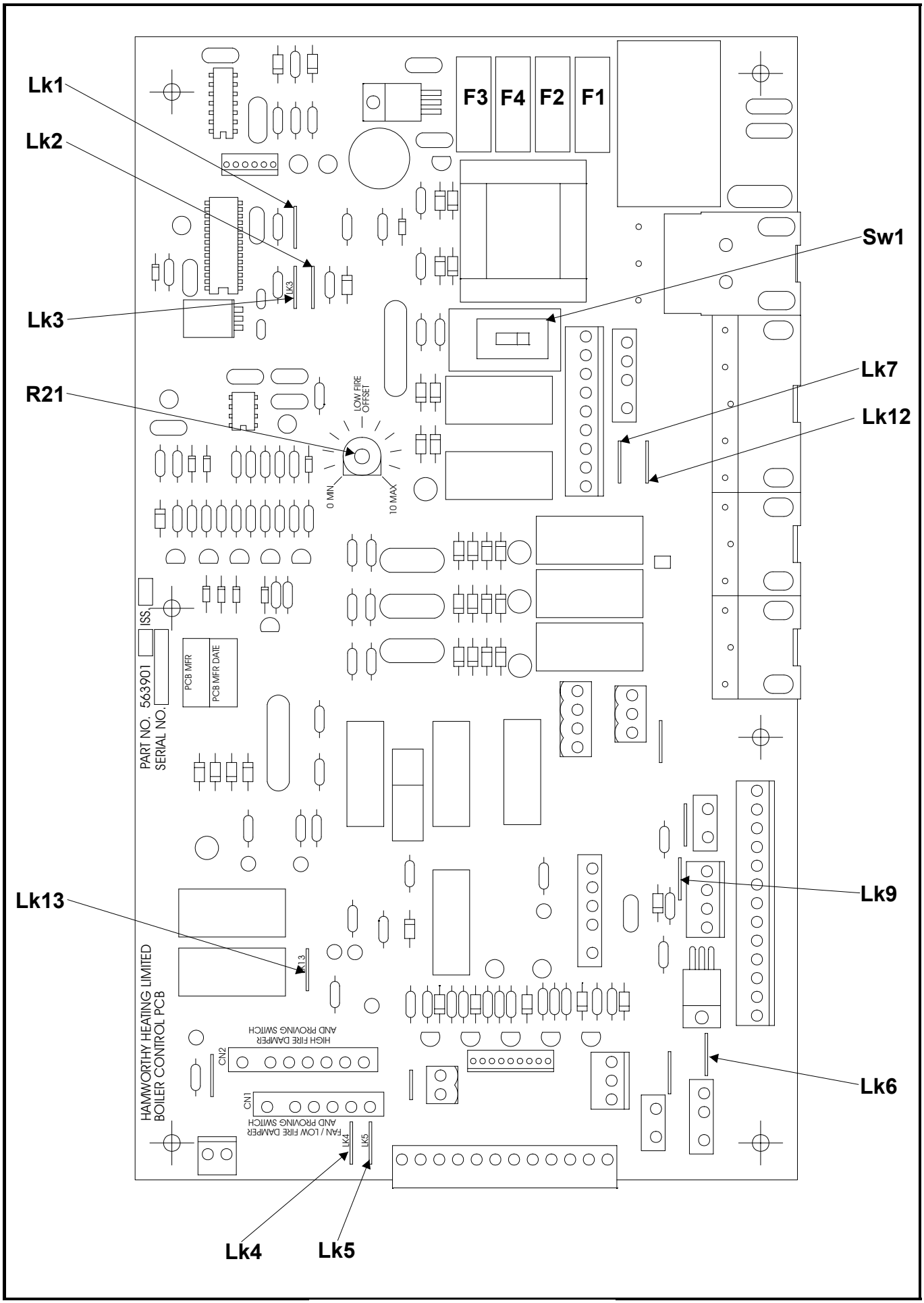


**Figure 11.1 Main PCB Layout**



**1)** Gas supply is connected but turned to the "off" position. Any unions or fittings are correctly tightened, test points are closed, burners correctly positioned, injectors are in place (of correct size) and tight and 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, the gas valve PCB connection is correctly located and that the sensor and thermostat bulbs are fully inserted into the boiler pocket. Reset temperature limiter by firmly pressing pin (in controls housing.)

**3)** If a sequencing interface module is fitted to the boiler control panel, locate and the hand auto switch 'SW1' on the boiler main PCB (refer to Figure 11.1 p26), 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 from the factory unless otherwise instructed. Set thermostat to required temperature.

**5)** Drop down fascia on the controls housing to reveal access to the main PCB. Figure 9.1 (p15) shows the correct location of incoming wires. Remove the plug connection CN21 from the main PCB and replace the link by inserting a multi-meter set to read DC µA. Carefully remove high/low plug connection CN16 from the main PCB, this will ensure burner stays at start rate (low fire) when fired.

**6)** The Warmwell fully automatic boiler utilises a low fire start gas rate ignited by hot surface igniter (HSI), see Figure 14.1. To ascertain which type of gas valve is fitted and the method of low fire and high fire adjustment, refer to Figure 11.7. You should familiarise yourself with this procedure for use later when required.

**7)** If a single header pipe kit is fitted, ensure that the shunt pump is connected to the plug connection CN13 on the main PCB. The run on timer is preset to 5 minutes. Check that the fuse on the main PCB is fitted and sound.

**8) IMPORTANT:- PRIOR TO LIGHTING UP THE BOILER, THE SAFETY LINKS ON THE MAIN PCB MUST BE REMOVED AS DETAILED, TO ENSURE SAFE OPERATION OF THE BOILER – REFER TO FIGURE 11.1. THE LINKS MUST BE CAREFULLY CUT USING A SMALL PAIR OF ELECTRICAL SIDE CUTTERS AND THE RESULTANT LOOSE LINKS MUST BE REMOVED FROM THE PCB SO AS NOT TO CAUSE AN ELECTRICAL SHORT.**

**8.1** Check that LK2, LK3, LK4, LK5, LK6, LK10, & LK13 have been factory removed.

**8.2** For optional sequencing interface module control cut LK7 & LK12.

**8.3** For low gas pressure switch (Propane boilers) cut LK9.

**9)** Ensure pressure switch sensing tubes are correctly fitted, without twists or kinks. Refer to Figure 2.2 (p4) for provisional (factory set) pressure switch settings. Refer to Figure 11.5 (p28) for pressure switch locations.

### 11.6 Procedure for Initial Lighting

Ensure gas service cock is in the "off" position. Press the control thermostat knob to switch 'on' the boiler. Press lockout button on fascia to re-set timer (wait at least 15 seconds before pressing again if lockout neon does not go out. After a delay the HSI neon should illuminate on the fascia and the igniter should be visible through the viewing port on the burner front plate. As the gas service cock is closed, the controls should go to lockout after approximately 3 seconds (amber neon on fascia lit). If the above occurs correctly, open service cock and press reset button on fascia.

After a delay, the ignition should be visible and the main gas valve should energise, lighting the main burner. Turn the control thermostat to the required flow temperature. **NOTE!** The multi-meter should be reading at least 1µA.

### 11.7 Gas Pressure Adjustment and Combustion Checks

After the boiler has operated for approximately 10 minutes, press the control thermostat knob to switch 'off' the boiler. Open the pressure test point screw on the burner manifold and fit a manometer (suitable for 30mbar - Natural Gas or 50mbar - Propane). Check low fire (start rate) against pressure shown in Figure 2.2 (p4) or Appendix 'A' (p41). If necessary adjust low fire pressure (refer to Figure 11.7a p29 for relevant gas valve fitted).

Having checked the low fire pressure, **carefully** adjust the differential (low fire offset) R21 (see Figure 11.1 p26) between high and low fire (0 to 10° C) on the main PCB. A recommended setting is 5°C.

Re-fit high/low plug connection CN16 to the main PCB and check the high fire gas pressure against that shown in Figure 2.2 (p4) or Appendix 'A' (p41). If necessary adjust high fire governor to suit. Occasionally this high fire adjustment can influence the low fire (start rate), therefore remove plug connection CN16 and check low fire pressure again. Adjust if required. Repeat until low and high fire pressures are as shown in Figure 2.2 (p4) or Appendix 'A' (p41).

**Cont: Page 31**

**Figure 11.5 Pressure Sensing Tube / Fan Plug Assembly**

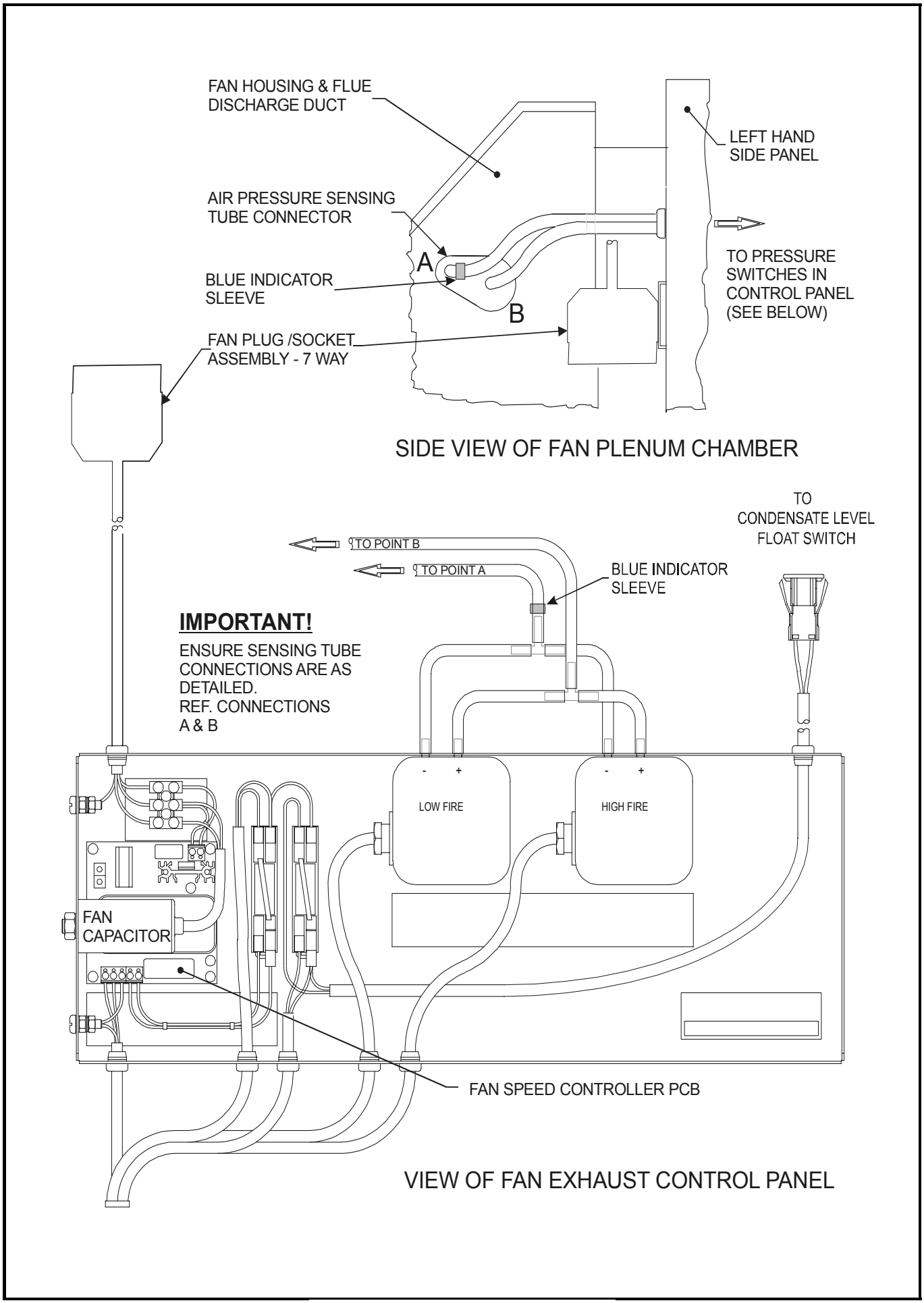
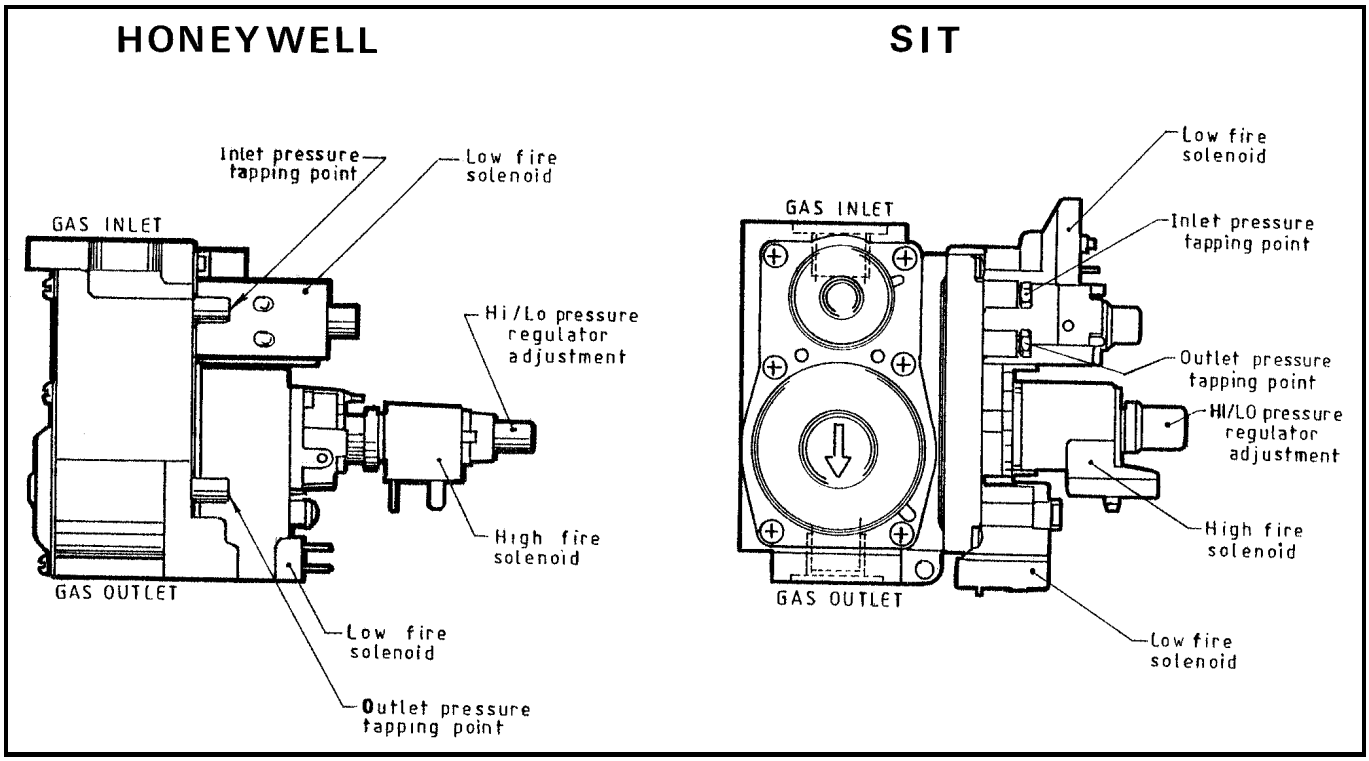


**Figure 11.7a Diagram of Automatic Gas Valves**




**ADJUSTMENT PROCEDURE.**

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

Fit a manometer (suitable for 30mbar) onto manifold test point.

Light 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.

To adjust low fire/start gas pressure, remove the link between terminals C3 and C4 (CN16); nominally set the low fire/start gas pressure by rotating the inner cross-head screw, whilst keeping the outer nut from rotating. Turn the boiler off then on again and fine trim the pressure.

Insert or make high fire link on terminals C3 and C4 (CN16); the boiler should now drive to high fire. Replace protective cap on Hi/Lo gas valve.

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

**Note!** It is also advisable to carry out this procedure with all the boilers firing. The long-term reliability of the ignition system may well be reduced unless this procedure is carried out correctly.

**Figure 11.7b Diagram of 'Hi' Flow Gas Valve Assembly (Natural Gas Only)**

**WARMWELL 120 and 140kW Automatic**

The 'Flowshare' gas valve assembly is designed to pass the correct quantity of gas at the nominal inlet pressure of 20mbar and a maximum inlet pressure of 25mbar.

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

Fit a manometer (suitable for 30mbar) onto gas manifold pressure tapping point.

Light the boiler. Remove protective cap from the Hi/ Lo pressure regulator.

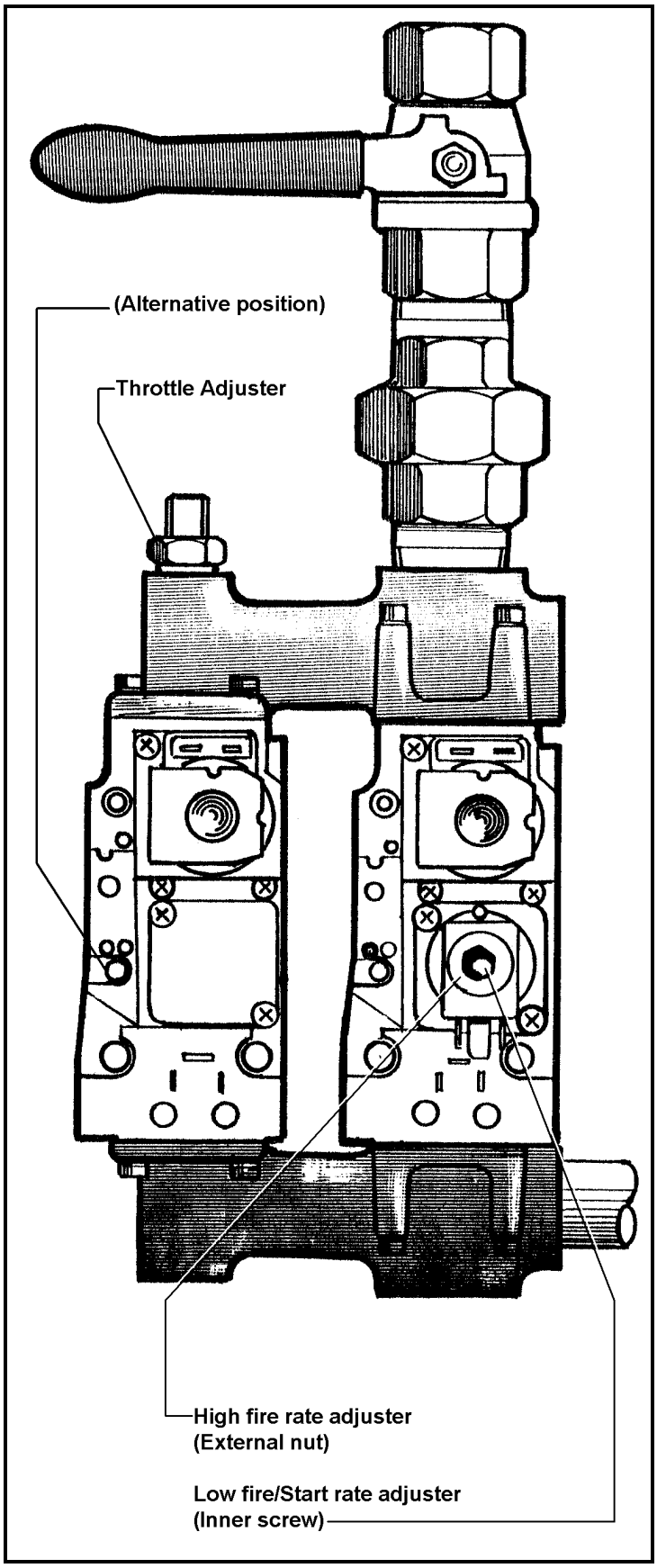
Turn the Hi/Lo valve high fire pressure regulator (outer nut) clockwise until the pressure stops increasing. Loosen Throttle locking nut (if fitted) and rotate the throttle valve adjuster screw until the manifold pressure is a approx. 0.5mbar greater than the required high fire gas pressure.

Tighten the locking nut (if fitted) on the throttle adjuster screw.

Turn the Hi/Lo valve high fire rate adjuster anti-clockwise to fine trim the high fire pressure.

Refer to Figure 11.6a for procedure on how to adjust valves for correct low fire/start gas pressures.

**NOTE! Honeywell valves shown in diagram.**



For Natural Gas the gas pressure governor control system is configured for a nominal gas inlet pressure of 20mbar with a maximum inlet pressure of 25mbar. The Warmwell 120 and 140 boiler is fitted with a unique flow share gas valve arrangement. Refer to Figure 11.7b (p30) to establish method of adjustment of the by-pass throttle arrangement. **NOTE!** The by-pass valve throttle **MUST** only be used as a coarse adjuster, the main control **MUST** always be accomplished by the high/low control valve.

For Propane firing boilers, the nominal gas inlet pressure is 37mbar, with a maximum inlet pressure of 47mbar. All Propane firing boilers are fitted with a low gas pressure switch (set at 20mbar). Should the gas supply pressure fall below this level, the boiler **will not** operate. All Propane firing boilers are fitted with a single gas valve providing high and low control. Refer to Figure 11.7a (p29).

Remove manometer and close pressure test point. Record all readings for future reference on relevant commissioning sheet. Allow system to warm up sufficiently to check operation of control thermostat.

A combustion check must be taken when first commissioning the boiler. A plugged sample hole is provided in the top of the stainless steel collector hood. **NOTE!** Care should be exercised if the boiler is firing as the flue can achieve temperatures which can produce injury if touched.

Combustion figures for Natural Gas should be as follows: -

$CO_2$ = 7-8% condensing or 8-9% non-condensing (Dry flue gas).
CO = 0-50 ppm: however figure should not exceed 200 ppm under normal operating conditions.

Details of the flue gas composition relating to propane firing can be found in Appendix 'A' (p41).

### 11.8 Temperature Limiter (Limit Thermostat)

Reset and test the operation of the temperature limiter by firmly pressing the button (in the 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.

Check temperature limiter setting. Removing plastic cover (unscrewing) can achieve this if fitted. Undo holding nut and withdraw into the controls housing. Adjust if required and replace in reverse order to above.

### 11.9 Safety Checks

To check for correct operation of the controller, break the multi-meter µA circuit (remove plug connection CN21 from 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 to the plug CN21. If a sequencing interface module is fitted set the hand/auto switch 'SW1' on the boiler main PCB (refer to Figure 11.1 p26) to the 'auto' position. 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.

### 11.10 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 to the inside of the boiler door. A practical demonstration should be given describing each functional step. In particular, care should be taken to ensure that the discharge from the condensate trap, at the rear of the appliance, is free from blockage. This Installer's Guide and User's Instructions should then be handed over and be kept in a safe place for easy reference.

## 12.0 FAULT FINDING

### 12.1 Safety Features Summary

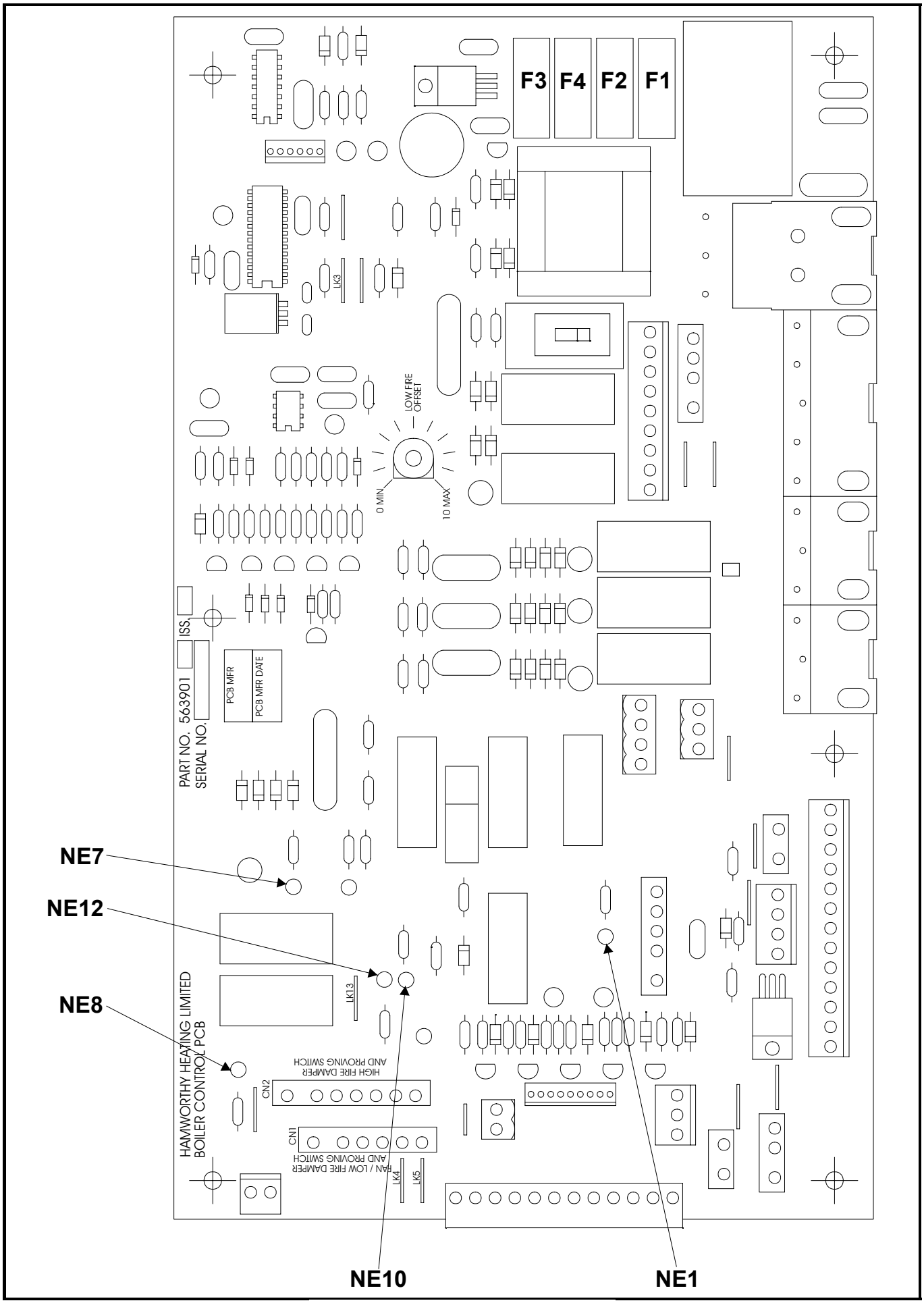
The main PCB is fitted with neons to indicate correct operation of the boiler functions – refer to Figure 12.1 (p32).

Should the control thermostat fail, causing an overheat condition, the temperature limiter will trip thus creating an immediate shutdown regardless of firing mode. An overheat neon on the **controls fascia** will indicate that this condition has occurred. The door will have to be removed to permit access to the temperature limiter re-set pin. If, after pushing the pin in, the light on the fascia does not go out and the boiler does not light up, it could be that the boiler is still too hot, i.e. the control thermostat has not re-set. 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 logic 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 (0.7µA DC), the controller will induce a non-volatile lockout which will require a manual re-set (situated on the controls fascia) to re-start the control sequence. See Figure 12.2 (p34/35) for possible corrective scenarios.

Pressure switches are fitted to monitor the correct operation of the induced draught fan fitted to the Warmwell. It ensures sufficient air is pulled through the boiler to facilitate correct combustion. The

**Figure 12.1 Boiler Function Neons**



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 (full air) thus allowing the boiler to light and continue firing. Prior to the ignition sequence starting, the fan has to operate the air pressure switch and prove airflow. With the thermostat calling for heat, neon NE7 on the main PCB will be illuminated, indicating power to the exhaust fan.

Once the fan is running, neon NE10 on the main PCB will be illuminated – indicating that the low fire airflow has been detected. A 20 second pre-purge will commence, subsequent to which the green HSI LED on the control panel fascia will illuminate. After approximately 10 seconds the green Low Fire LED on the control panel fascia will illuminate, indicating the opening of the low fire gas valve. On ignition the green HSI LED on the fascia will be extinguished.

Should there be a demand for hi fire, neon NE8 on the main PCB will be illuminated, indicating the changeover to the High Fire fan speed. Subsequently, neon NE12 on the main PCB will be illuminated, indicating that the High Fire airflow has been detected. Simultaneously, the green High Fire LED on the control panel fascia will illuminate. The boiler should now be operating at High Fire.

A float switch is fitted to monitor the level in the condense trap. Should the trap fail to discharge condensate, the switch will operate and cause the boiler to shut down. The condense trap should be inspected regularly and cleaned out if necessary.

All Propane firing boilers are fitted with a low gas pressure switch (set at 20mbar). Should the gas supply pressure fall below this level, the boiler **will not** operate. Refer to Appendix 'A' (p41) to check operation of the low gas pressure switch.

**12.2 Fault Finding Procedures**

General fault finding is shown in Figure 12.2 (p34/35). 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 faulty igniter.
2) Ignition failure due to faulty gas valve.
3) No or low gas supply pressure.
4) No ignition due to faulty controller.
5) Ignition failure due to faulty damper mechanism.
6) Condensate trap blocked.

**13.0 SERVICING**

**13.1** Regular annual servicing is recommended 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 $CO_2$ 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.

**13.2 Before** servicing the boiler, the following procedure must be carried out: - **WARNING: Isolate the electrical supply and turn off the gas service cock to the boiler module being serviced.**

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

**2)** Turn off gas service cock, (fitted upstream of gas control valve) and carefully drop down the fascia of the controls housing.

**3)** Undo both screws on gas valve gland plate, situated under controls assembly, and carefully disconnect the plug from the PCB. Withdraw the cable and plug assembly.

**4)** Disconnect igniter and probe leads carefully. A protective boot will require pulling back to reveal the sensing probe connector.

**5)** Slacken union below gas service cock and release. Slacken and remove nuts/washers holding gas valve and manifold assembly. Remove manifold assembly taking care not to damage high/ low gas solenoid.

**6)** Carefully remove burner assembly by pulling burner front plate. Check condition of igniter assembly and probe for damage. Clean as required. Check burner bars and clean using a soft brush if required (if possible use compressed air to blow out the dust inside the bar). Damaged or cracked burner bars should be replaced. To replace an individual bar will require drilling out the rivets holding it on to the front plate. A replacement burner bar will be supplied with clinch nuts and screws to fix onto the front plate.

**13.3** The boiler flueways can now be cleaned as follows:-

**1)** Carefully remove sloping front panel by pulling both edges around the centre position. Remove the top casing front panel secured by spring latches. Insert a screwdriver into the slot in the 7 way plug and socket assembly connected to the fan. The plug can then be pulled away from the socket. Disconnect the electrical connections from the main PCB (CN1, CN2 & CN11), and carefully withdraw the cables from the rear of the panel. Disconnect the float switch cable via the push fit connector. Note the relative positions and disconnect the flexible hoses from the pressure switches. Remove the exhaust fan control panel from the top side panels

**Figure 12.2a Fault Finding Procedures**

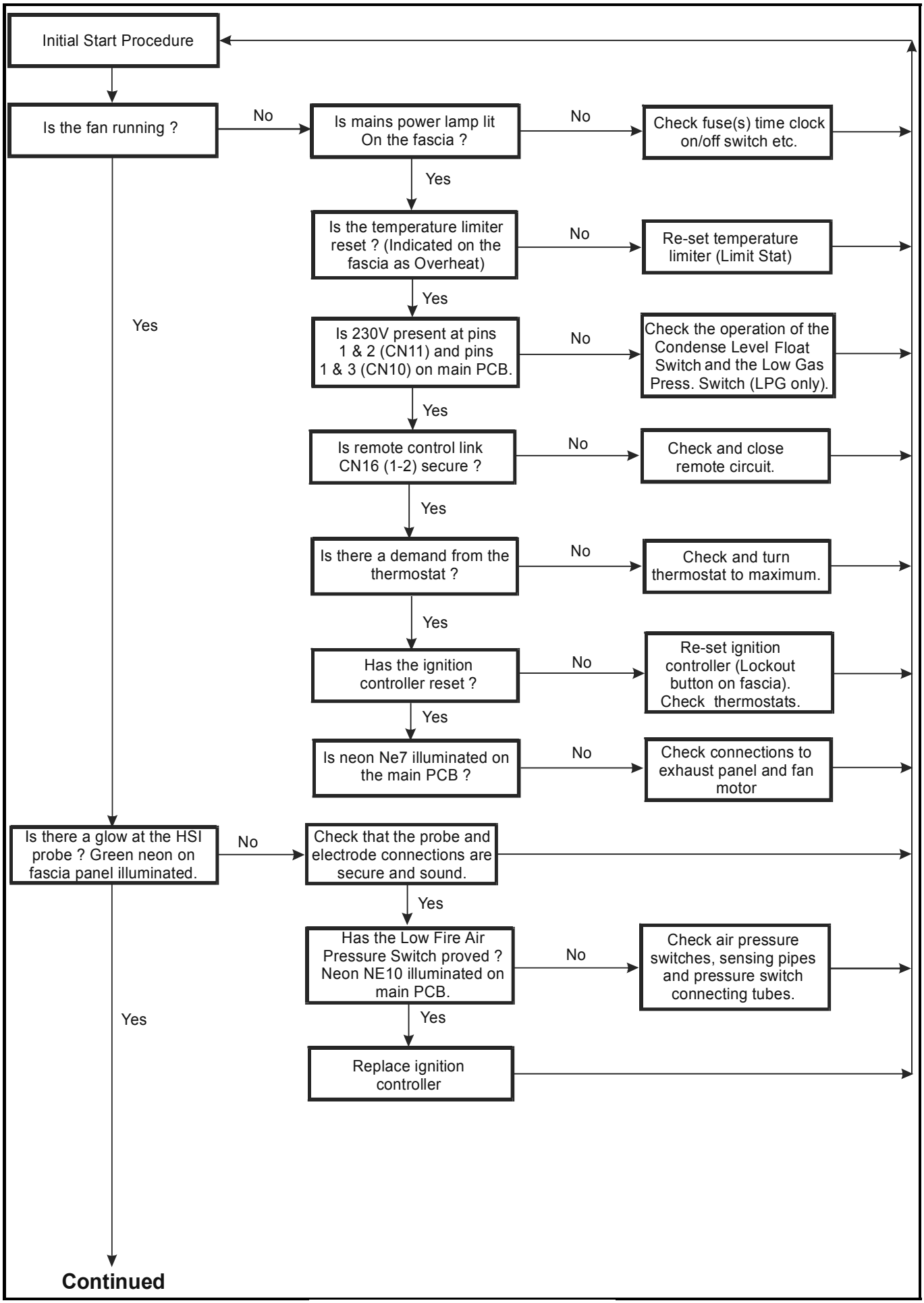
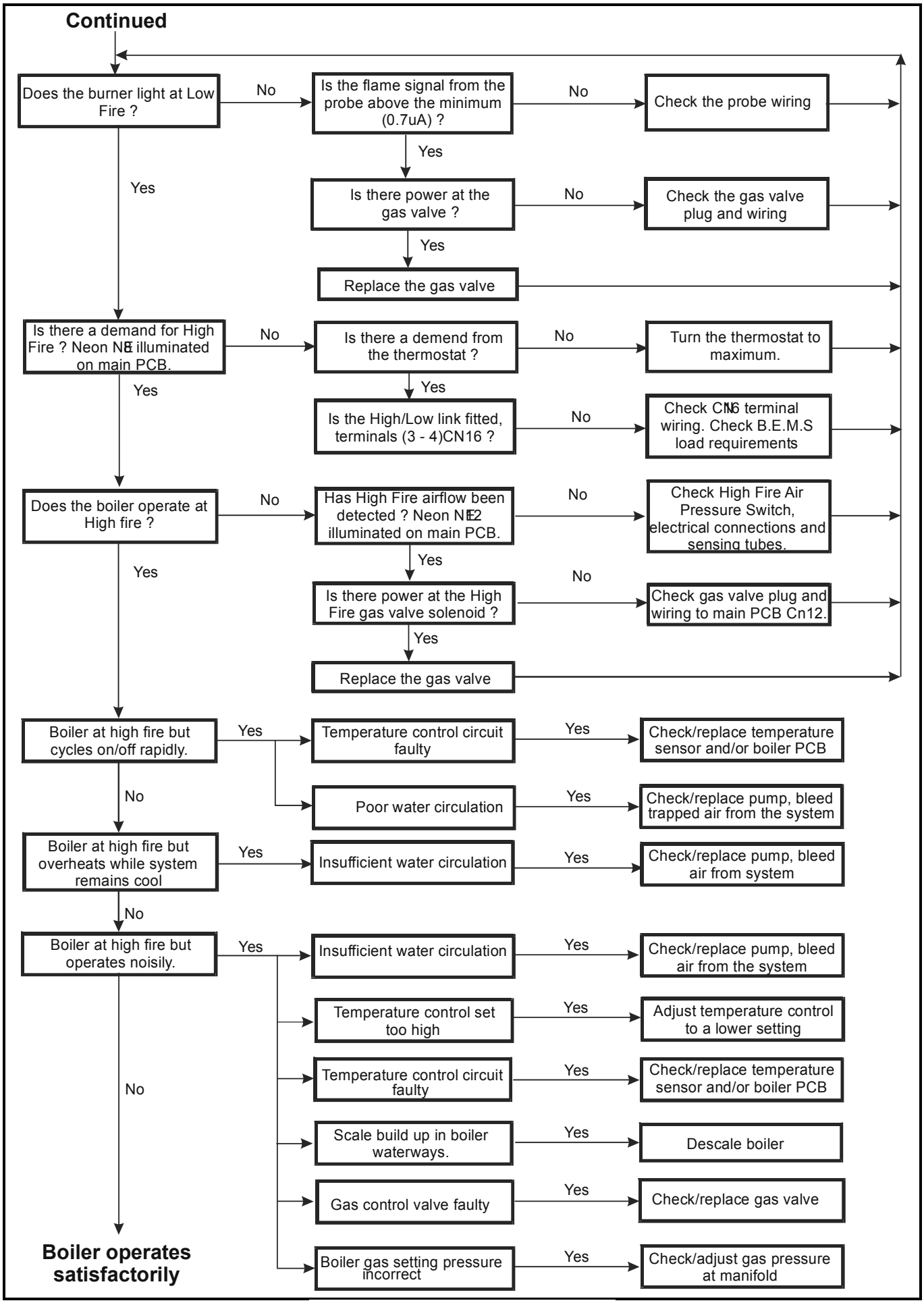


**Figure 12.2b Fault Finding Procedures (Cont.)**



(secured by 4 screws). This will give access to the transition duct cover. Remove nuts to gain access to the flueways (insulation jacket should be carefully prised open to reveal duct).

**2)** The boiler flueways are now exposed and can be brushed through diagonally in both directions to remove deposits from the cast iron finned surfaces. Check secondary heat exchanger surfaces and wash if required. Re-assemble the boiler in the reverse order to that shown above. Ensure a new seal is fitted to the cover to ensure a gas tight seal. Before replacing the burner bar assembly, lift out both halves of the radiant reflector and brush off any dust and fallen deposits accumulated on it. Also clean the area under the reflector before re-placing it in its correct location. Re-assemble the burner bar assembly, ensuring correct location on the rear support bracket.

**3)** Check all gas connections are tightened securely before opening the gas service cock. Switch on the electricity supply and re-light the boiler following the correct procedure on the inside of the door.

**4)** Take gas pressure and exhaust gas readings and compare with Figure 2.2 (p4) for Natural Gas or Appendix 'A' (p41) for LPG Propane, adjust as required. Ensure no gas leaks are evident from the gas connections, see Figure 5.6 (p9) for procedure. Check thermostat settings and adjust if required.

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

**6)** Check the operation of the condense trap and clean if necessary by removing the trap and flushing through with fresh water.

## 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 carrying out the appropriate part of the commissioning procedure must check the operation of each replaced component. See **Section 11.0: Commissioning and Testing** (p24).

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

### 14.1 Igniter Assembly

Reference to Figure 11.0 (p25) shows position of igniter assembly. To remove assembly disconnect the plug/socket on the supply lead and remove the screw securing the igniter to the burner front panel. Figure 14.1 (p37) shows diagram of igniter assembly and relevant components and part numbers. Renew components as required and generally remove any loose sooty deposits and clean as required. Ensure positions of components are as recommended in Figure 14.1 (p37).

### 14.2 Pressure Switch

Two pressure switches are used to monitor the induced draught fan at Hi/Lo operation. The pressure switches are mounted on the exhaust fan control panel mounted on the upper casing, and are identified - HI/LO.

Remove the top casing front panel secured by spring latches. Remove the pressure switch cover, note and disconnect the electrical connections – See Figure 11.5 (p28). Note and remove the flexible hoses from the switch, undo the 2 screws attaching the switch to the control panel and withdraw the switch.

Replace the switch in the reverse order and set to the required setting - see Figure 2.2 (p4). Seal the adjuster once set.

### 14.3 Control Thermostat Renewal.

The thermostat consists of a potentiometer and remote sensor. Part Nos. 563901258 & 533901350

**NOTE!** Record existing temperature setting of thermostat for reference before removal.

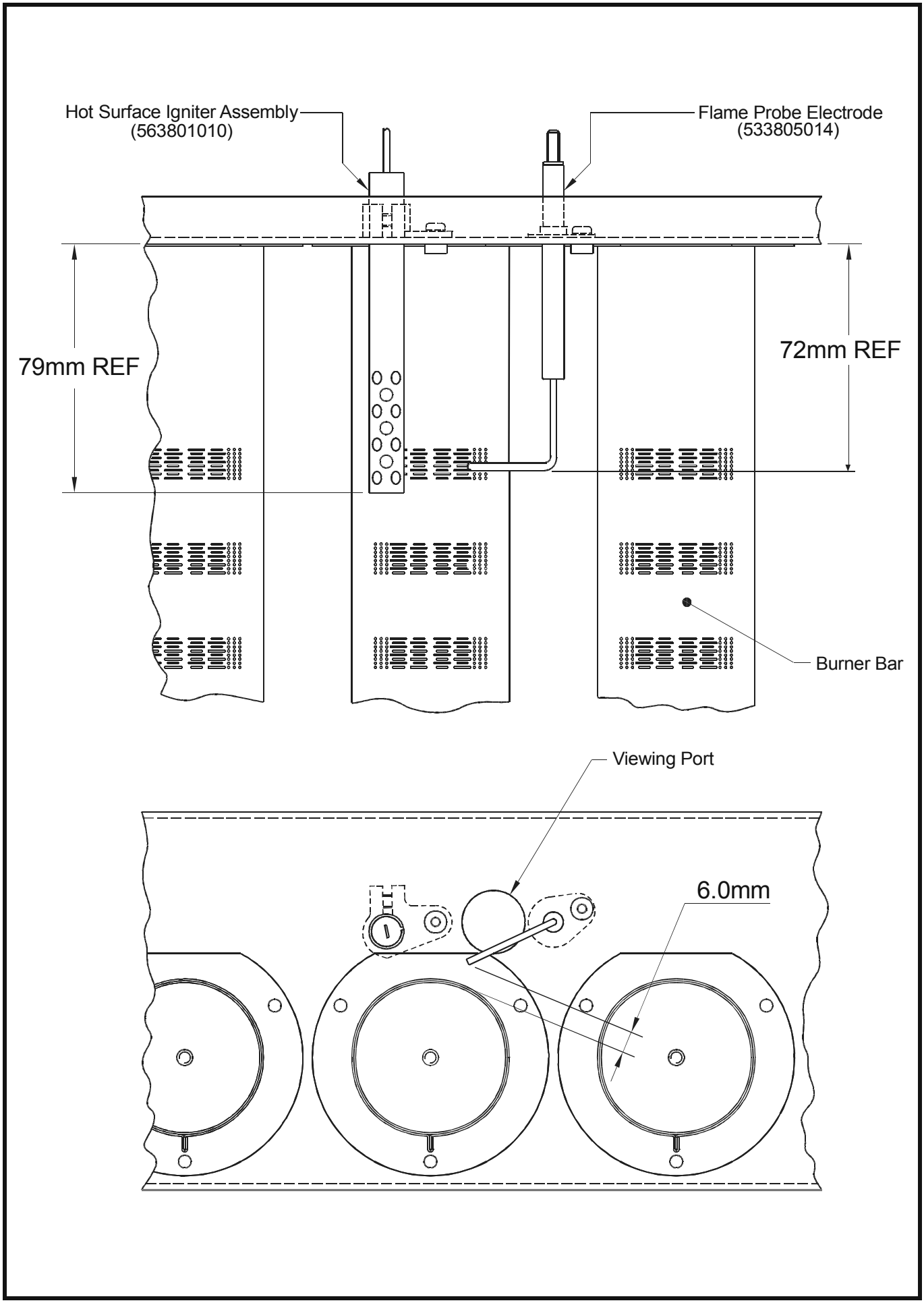
Prise the top panel from the side panels (secured by spring latches) and lift boiler top panel to reveal thermostat pocket. Carefully remove thermostat phials. Drop down fascia to reveal controls section. Disconnect the sensor cable plug (CN23) from the PCB and remove the sensor. Prise out the indicator disc from the centre of the control knob and loosen the collet nut securing the knob to the shaft. Pull off the control knob and undo the securing nut on the central spindle. Disconnect the potentiometer cable plug (CN14) from the PCB and remove the potentiometer. Replace components in reverse order ensuring that the sensor is correctly located within the pocket. Do not force the bulb into the pocket. When replacing the potentiometer knob, rotate the shaft fully anti-clockwise and fit the knob with the locating pip aligned with the 20°C graduation. Fit the indicator disc aligning the mark with the graduation. Close fascia and re-fit top panel correctly.

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

### 14.4 Temperature Limiter (Limit Stat) Renewal Part No. 339011044 or 533901179

The temperature limiter renewal procedure follows

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



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. Re-set temperature limiter to 100°C. Check the operation of the device by carefully applying a heat source to the bulb. Re-assemble temperature limiter into controls housing ensuring correct cable notation. Refer to the thermostat diagram if terminal identification differs from those given in Figure 9.1 (p15).

**14.5 Main Gas Valve.**

**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.

**NOTE!** Only gas valves with an identical Type No. may be used for replacement. Please contact Hamworthy Heating spares Dept. for further information.

Various types and manufacturers of gas valves are used. Refer to Figure 11.7a (p29) for particular valve(s) fitted.

**1)** Ensure power and gas supplies are isolated.

**2)** Remove the gas valve wiring plugs from the gas valve(s) – secured by M3 screws through the plug body. **NOTE!** The position of the relevant electrical cables should be noted, especially on the 95 & 120kW boilers. Undo the union connection and 8mm nuts holding the gas valve/manifold assembly to front plate, this will allow the whole assembly to be removed from the boiler.

**3)** Remove the gas valve by unscrewing cap head screws holding valve to pipework. NOTE! The position of the relevant electrical cables should be noted, especially on the Warmwell 140 boiler. When replacing the gas valve, it is advisable to renew the `O` ring seals sealing both ends. See **SECTION 15.0 Recommended Spares** for Part Nos. Note that the `O` ring fitted to the 60 & 95kW (Natural Gas) and all propane models, is different to that used on the 140kW (Natural Gas) model. Do not over tighten cap head screws in gas valve body. Ensure electrical plugs are firmly and correctly located and holding screws are tightened.

**4)** Replace assembly ensuring correct orientation of the gas valve. Ensure that the gas flow is in the same direction as the arrow on the bottom of the valve. Refit all external components. Switch on gas and power supply and check for integrity of all joints using a proprietary leak detector. Ensure gas valve (s) operation is correct and safe before continuing. Refer to **Section 5.6** (p7) if necessary for valve integrity check procedure.

**5)** Re-light the boiler using instructions on the inside of the door. Check and adjust, the low fire/ start gas and high fire gas pressures, refer to Figure 2.2 (p4) for Natural Gas or Appendix 'A' (p41) - propane firing, for correct settings. Re-set throttle valve position, if replaced, see Figure 11.7b (p30) for procedure. If necessary, refer to **Section 11.4 Commissioning the Boiler** (p24), for correct procedures.

**14.6 Fan Assembly**

Ensure power supply is isolated. Access to the rear of the boiler is required to service this item.

**NOTE!** The 7 way plug and socket assembly requires a 'tool' to disengage the locking mechanism. A screwdriver should be inserted into the slot in the plug and socket assembly. The plug can then be pulled away from the socket.

Undo the 4 nuts holding the motor assembly to the fan housing and remove complete motor and impeller unit.

Due to the aggressive media being handled, it is recommended that the complete fan motor and impeller assembly be replaced if a motor has failed.

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

Re-assemble unit in reverse order of dis-assembly. **NOTE!** All models utilise a capacitor start and run motor. Before replacing motor due to possible failure, ensure the capacitor is functioning correctly (located in the exhaust fan control panel).

Ensure all screws are tightened and re-fit plug/ socket assembly.

Periodically check the fan volute, which is inside the plenum chamber. This will require removal of the stainless steel plenum chamber at the rear of the boiler. Ensure flue is supported before removal.

The fan volute is fitted internally and fixed to the plenum by the pressure tapping connection assembly. **NOTE!** Connect pressure-sensing tubes to their relevant positions to achieve correct operation of the pressure switches.

See Figure 11.5 (p28) for tube/switch assembly layout.

Re-fit the fan assembly ensuring the gasket between the fan fixing plate and plenum is replaced if damaged. Spin the fan to ensure the impeller is free. Ensure the fan plug and socket assembly is securely fitted and locked together. Re-light the boiler and check for correct operation of pressure switches. See Figure 2.2 (p4) for correct settings.

**14.7 Fan Speed Controller**

Ensure power supply is isolated. Remove the top casing front panel secured by spring latches. Insert a screwdriver into the slot in the 7 way plug and socket assembly connected to the fan. The plug can then be pulled away from the socket. Disconnect the electrical connections from the main PCB (CN1, CN2 & CN11), and carefully withdraw the cables from the rear of the panel. Disconnect the float switch cable via the push fit connector. Note the relative positions and disconnect the flexible hoses from the pressure switches. Remove the exhaust fan control panel from the top side panels (secured by 4 screws). Remove the fan speed controller cover (secured by 2 screws)

Note the positions of the electrical connections on the PCB and carefully disconnect the leads from the screw terminal rail - See Figure 9.1 (p15). From the rear of the exhaust fan control panel, remove the 4 screws securing the PCB. Replace components in reverse order. **NOTE!** The replacement speed controller is factory set !

Re-light the boiler using instructions on the inside of the door. and check for correct operation at both High and Low fire. See Figure 2.2 (p4) for correct settings. If necessary, refer to Section **11.4 Commissioning the Boiler** (p24), for correct procedures.

## 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 gas manifold inside the door. 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.

| SPARES ITEM | PART NO. |
|---|---|
| **Electrical Items** | |
| Main fuse (F1) on PCB. – T6.3A | 533901221 |
| PCB fuses (F2, F3 & F4) – T2A | 533922002 |
| Sequencing Interface Module PCB Fuse - T250mA | 533922008 |
| Relays (RL14 & RL15) | 533901204 |
| Flame sensing probe lead | 533901259 |
| Main PCB | 563901293 |
| Fascia PCB | 563901237 |
| Thermostat sensor (incl. 600mm long leads) | 533901350 |
| Potentiometer (incl. PCB harness) | 563901258 |
| Ignition Sequence Controller | 533901344 |
| Hours Run Meter | 563901273 |
| Fan speed controller | 563901296 |
| Fan Assembly (Complete) | 533901229 |
| Pressure Switch (High & Low Fire) | 747146550 |
| Float Switch | 563901327 |
| Sequencing Interface Module | 533901421 |
| **Mechanical Items** | |
| Single Burner Bar | 533301003 |
| Heat Exchanger Nipple | 330502033 |
| Injector Copper Washer | 339008347 |
| Gas Valve 'O' Ring Joint (60 & 95kW only) | 742111245 |
| Gas Valve 'O' Ring Joint (140kW only) | 742122069 |
| HSi Igniter | 563801010 |
| Flame Probe | 533805014 |
| Temperature Limiter (Imit) | 533901179 |
| Temperature Limiter (L & G) | 339011044 |

**NOTE! For any service/replacement parts (Especially Gas Valves) the boiler Serial No. (on Data Plate inside boiler) MUST be quoted.**

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 Warmwell Automatic Ignition**

**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 Warmwell range of boilers on LPG-Propane (3rd family) $I_{3P}$ is similar to that on Natural Gas (2nd family) $I_{2H}$ 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 injectors (located in the gas manifold) are replaced with those detailed the Performance and General Data Information table below.
b) The nominal gas inlet pressure for propane should be 37mbar.
c) 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**

| **GENERAL DATA** | **60** | **95** | **120** | **140** |
|---|---|---|---|---|
| Boiler Input High Fire - kW (Gross) | 63.4 | 101.0 | N/A | 150.0 |
| Boiler Input High Fire - kW (Nett) | 58.4 | 93.0 | N/A | 138.1 |
| Boiler Input Low Fire - kW (Gross) | 30.3 | 42.3 | N/A | 49.8 |
| Boiler Input Low Fire - kW (Nett) | 27.8 | 39.0 | N/A | 45.8 |
| Boiler Output High Fire (Condensing) - kW | 59.0 | 93.0 | N/A | 135.0 |
| Boiler Output High Fire (Non-Condensing) - kW | 54.0 | 86.0 | N/A | 128.0 |
| Boiler Output Low Fire (Condensing) - kW | 28.1 | 38.9 | N/A | 44.8 |
| Boiler Output Low Fire (Non-Condensing) - kW | 25.8 | 36.0 | N/A | 42.4 |
| **FLUE DATA** | | | | |
| Approx. Flue Gas Temperature (Condensing) - °C | 45 | 50 | N/A | 50 |
| Approx. Flue Gas Temperature (Non-Condensing) - °C | 60 | 70 | N/A | 70 |
| Approx. Flue Gas Volume @ 9.0% $CO_2$ - $m^3/h$* | 85 | 125 | N/A | 201 |
| $CO_2$ - % | 8.5 | 9.5 | N/A | 8.5 |
| **GAS DATA** | | | | |
| Nominal Gas Inlet Pressure - mbar | 37 | | | |
| Maximum Gas Inlet Pressure - mbar | 45 | | | |
| Gas Manifold Pressure High Fire - mbar | 15.0 | 17.0 | N/A | 24.0 |
| Gas Manifold Pressure Low Fire - mbar | 4.0 | 3.0 | N/A | 2.5 |
| Pressure Switch Setting (Normal) High Fire - mbar | 1.8 | 2.4 | N/A | 3.0 |
| Pressure Switch Setting (Normal) Low Fire - mbar | 1.5 | 1.5 | N/A | 0.6 |
| Gas Flow Rate High Fire - $m^3/h$<br>- kg/h | 2.4<br>4.6 | 3.8<br>7.2 | N/A | 5.7<br>10.7 |
| Injector Marking / Dia. - mm | 2.3 | 2.9 | N/A | 2.9 |

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

### 11.5 BOILER CHECKS PRIOR TO LIGHTING

IMPORTANT!
Check that link LK9 has been removed from the main PCB. Refer to Figure 11.1 (p26) and **Section 11.4** (p24).

Ensure that the gas supply is connected but turned to the 'OFF' position. Remove the cover on the low gas pressure switch and connect a multi-meter across terminals 'C & NO' - to measure circuit continuity.

Connect a manometer suitable for 50mbar to the pressure tapping on the switch body and gradually turn 'ON' the gas supply. The switch should operate at approximately 20mbar - noted on the multi-meter.

Turn 'OFF' the gas supply and undo the pressure test point on the gas valve inlet and allow the gas pressure to fall. The switch should operate at approximately 20mbar - noted on the multi-meter.

#### 11.5.1 Gas Pressure Adjustment

After approximately 30 minutes of normal firing, connecting a manometer to test point on the manifold should check the manifold gas pressure. Minor adjustments to the appliance governor may be necessary to correct for site gas pressure conditions.

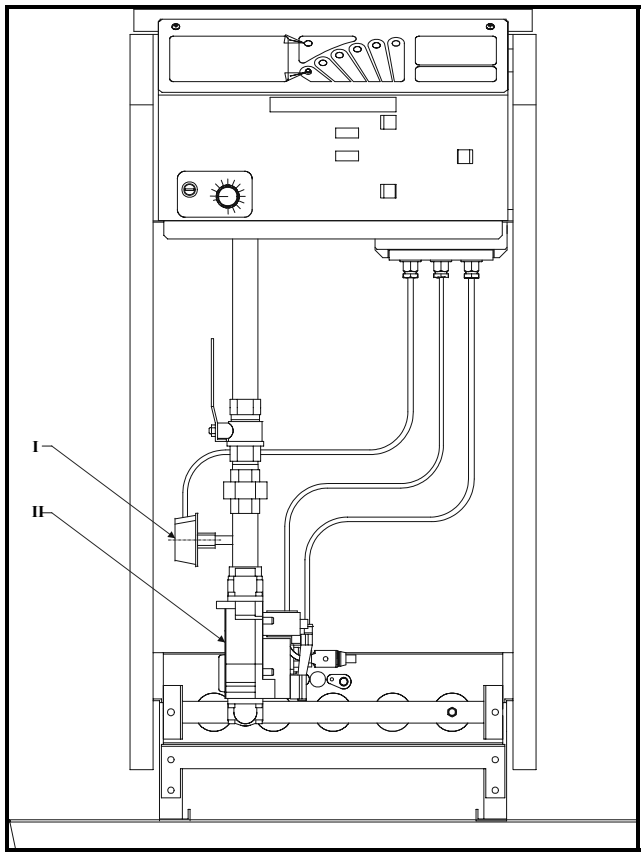
**NOTE:** The above is a first order check. Final setting must be made using a gas meter.

#### 11.5.2 Combustion Checks

A flue gas sampling point is provided in the front boiler casing (see Figure 11.0 p25). To check combustion take a flue gas sample from each module test point and for reference $CO_2$ measurements should be between 8.0% and 11.5% or 9.0 to 4.0% $O_2$ (dependant upon model). Normal CO levels should not exceed 200ppm.

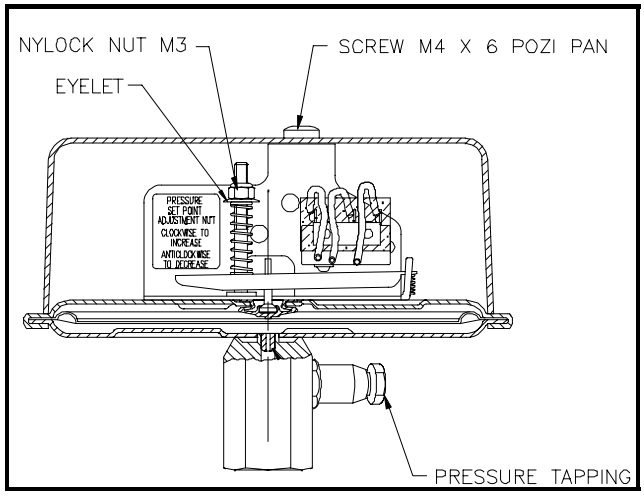
**NOTE:** All the above measurements refer to **dry flue gas** samples.

**Gas Pressure Switch Location**




Key: I - Gas Pressure Switch
II - Main Gas Valve

**Gas Pressure Switch Adjustment**




With the cover removed, turn the M3 nut clockwise to increase the set point and vice-versa. Seal the adjuster after setting.

## 15.0 RECOMMENDED SPARES

**MECHANICAL ITEMS** **PART No.**

Low Gas Pressure Switch..... 339009477

## USEFUL USER INFORMATION

| INSTALLER | SITE ADDRESS |
|---|---|
| | |

**DATE OF COMMISSIONING:**

| BOILER TYPE | BOILER SIZE(S) | UNIT NO(S). | SERIAL NO(S). | FLUE |
|---|---|---|---|---|
| | | | | |

**NOTES:**

**NOTES:**

# Notes

# Connect direct

## Direct Dial Telephone and Fax Numbers

Hamworthy
HEATING & HOT WATER PRODUCTS

- boilers
- controllers
- water heaters
- pressurisation sets

### Poole Office

Hamworthy Heating Limited
Fleets Corner, Poole, Dorset BH17 0HH England
Main switchboard tel: **01202 662500**

| | | |
|---|---|---|
| Technical enquiries | **01202 662527/662528** | **01202 665111** |
| Spare parts | **01202 662525** | **01202 665111** |
| Service department | **01202 662555** | **01202 662522** |

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FLUE & CHIMNEY SYSTEMS

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- packaged fan dilution systems
- bespoke flue components
- bespoke flue systems
- design and installation

### Birmingham Office

Hamworthy Heating Limited
Shady Lane, Great Barr, Birmingham B44 9ER
Main switchboard tel: **0121 360 7000** fax: **0121 325 2309**

General enquiries **0121 360 7000**

## Direct Email Addresses

**Customer Services** spares@hamworthy-heating.com
service@hamworthy-heating.com
technical@hamworthy-heating.com
sales.flues@hamworthy-heating.com

## Hamworthy Heating Accredited Agents

**North West England**
Gillies Modular Services
210-218 New Chester Road, Birkenhead, Merseyside L41 9BG
tel: **0151 666 1030** fax: **0151 647 8101**

**Scotland**
McDowall Modular Services
14-46 Lomond Street, Glasgow, Scotland G22 6JD
tel: **0141 336 8795** fax: **0141 336 8954**

**Southern Ireland**
HEVAC Limited
Naas Road, Dublin 12, Ireland
tel: **00 3531 141 91919** fax: **00 3531 145 84806**

**North East England**
Allison Heating Products
17 Beech Road, South Shields, Tyne & Wear NE33 2QH
tel: **0191 455 7898** fax: **0191 455 7899**

**Northern Ireland**
HVAC Supplies Limited
Unit 2, Antrim Line Business Park, Sentry Lane, Newtownabbey BT36 8XX
tel: **02890 849826** fax: **02890 847443**

## Website

# www.hamworthy-heating.com

Associate Companies, Offices and Agents throughout the World.