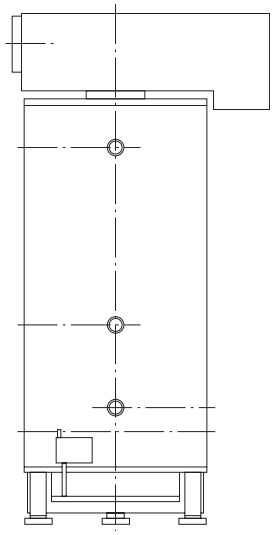

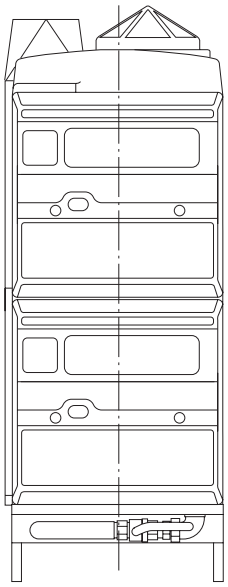

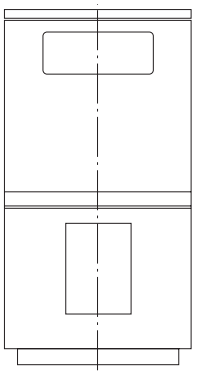

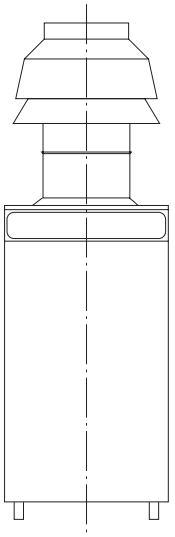

Sherborne Series Boilers

Room Sealed, Fully Modulating, Pre-Mix, Gas Fired Boilers for Heating and Domestic Hot Water Installations

Installation, Commissioning and Servicing Instructions

S70c - FULLY CONDENSING
S65 - HIGH EFFICIENCY

NATURAL GAS I_{2H}
LPG-PROPANE I_{3P}

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.

Sherborne Series Boilers

**Room Sealed, Fully Modulating, Pre-Mix,
Gas Fired Boilers for Heating and Domestic
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Installation, Commissioning and Servicing Instructions

S70c - FULLY CONDENSING
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LPG-PROPANE I_{3P}

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

THE SHERBORNE BOILER IS INTENDED FOR USE AS A COMMERCIAL APPLIANCE & CAN BE OPERATED AS EITHER ROOM SEALED OR OPEN FLUE.

THIS BOILER IS 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) EC-87/01/20, (BED) BE-87/01/02.
PRODUCT IDENTIFICATION No. 87BM20.

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FIGURES **PAGE**

1.0 INTRODUCTION

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

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

1.3 The Sherborne range of boilers consists of two models;

Sherborne S65 - a **high efficiency**, gas fired, fully modulating, wall mounted room sealed central heating/ hot water boiler with an output of 13.6 - 64kW.;

Sherborne S70*c* - a **condensing**, gas fired, fully modulating, wall mounted room sealed central heating/ hot water boiler with an output of 13.6 - 71.3kW

1.3.1 The burner fitted to the boiler is of the fan assisted pre-mix type. Operation is initiated by a full sequence ignition control that incorporates a Hot Surface Ignition system and rectification supervision of the flame across the range of outputs.

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

1.3.3 The Sherborne range of boilers can be wall or frame mounted and are intended for the heating of Commercial / Industrial premises. It may also be used to supply hot water for premises via an indirect cylinder.

1.3.4 The Sherborne range of boilers has a low water content and water flow rates MUST be maintained at or above the recommended levels shown in **Section 8** and Figure 2.2.

1.4 The boiler is suitable for connection to open vented fully pumped systems and un-vented (pressurised) heating systems. On un-vented systems, care must be taken to ensure all extra safety requirements are satisfied and that the relevant interlocks will shut the boiler(s) off should a high or low pressure fault occur.
Note: The boiler is not suitable for direct connection to domestic hot water supplies or gravity circulation systems.
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. Consult Hamworthy Heating Technical Department for help or assistance if in doubt.

1.5 The Sherborne range of boilers can be installed in banks of up-to three units with either reverse return water flow, (optional kits available) or with single pipe headers, (non HHL supply). See Figure 1.1. for **typical schematic layout**. – illustrative only.
The Hamworthy preferred system configuration is to run a 'Primary Loop' circuit thus preventing changes in system performance affecting flow rates through boiler (s).
For installations of more than three units in a single bank, consult Hamworthy Heating Technical Department for help or assistance.

1.6 The boiler is supplied in four packages.

- boiler assembly
- accessory pack assembly
- control panel
- flue assembly

1.7 Options

1.7.1 Boiler sequencer kit for timed remote control of single and multiple boilers with external compensation and separate domestic hot water and space heating zone control. Refer to individual kit instructions for details.

1.7.1.1 External air temperature sensor
1.7.1.2 Internal room temperature sensor

1.7.2 Flue kits (see Section 6.1)

1.7.3 Mounting frames are available for single, double and triple bank configuration. For installations of more than three units in a single bank, consult Hamworthy Heating Technical Department for help or assistance.

1.7.4 Optional reverse return header kits are available for double and triple bank configuration. These kits are wall/frame mounted, allowing installation to the system prior to installing the boiler and can incorporate all necessary valves, inter connecting pipework, and flexible flow and return connections. Refer to individual kit instructions for details.

1.7.5 Sequencing Interface Module - Hamworthy Heating can supply an interface module fitted within the boiler control panel to enable the remote fully modulating control of the boiler via a 0-10V analogue control signal from a non-HHL control system. An interface module will be required for each boiler, and a 0-10V control signal will be required for each boiler. Refer to sections 8.12.3 and 9.4 for further details.

Figure 1.1 Boiler Installation (Typical)

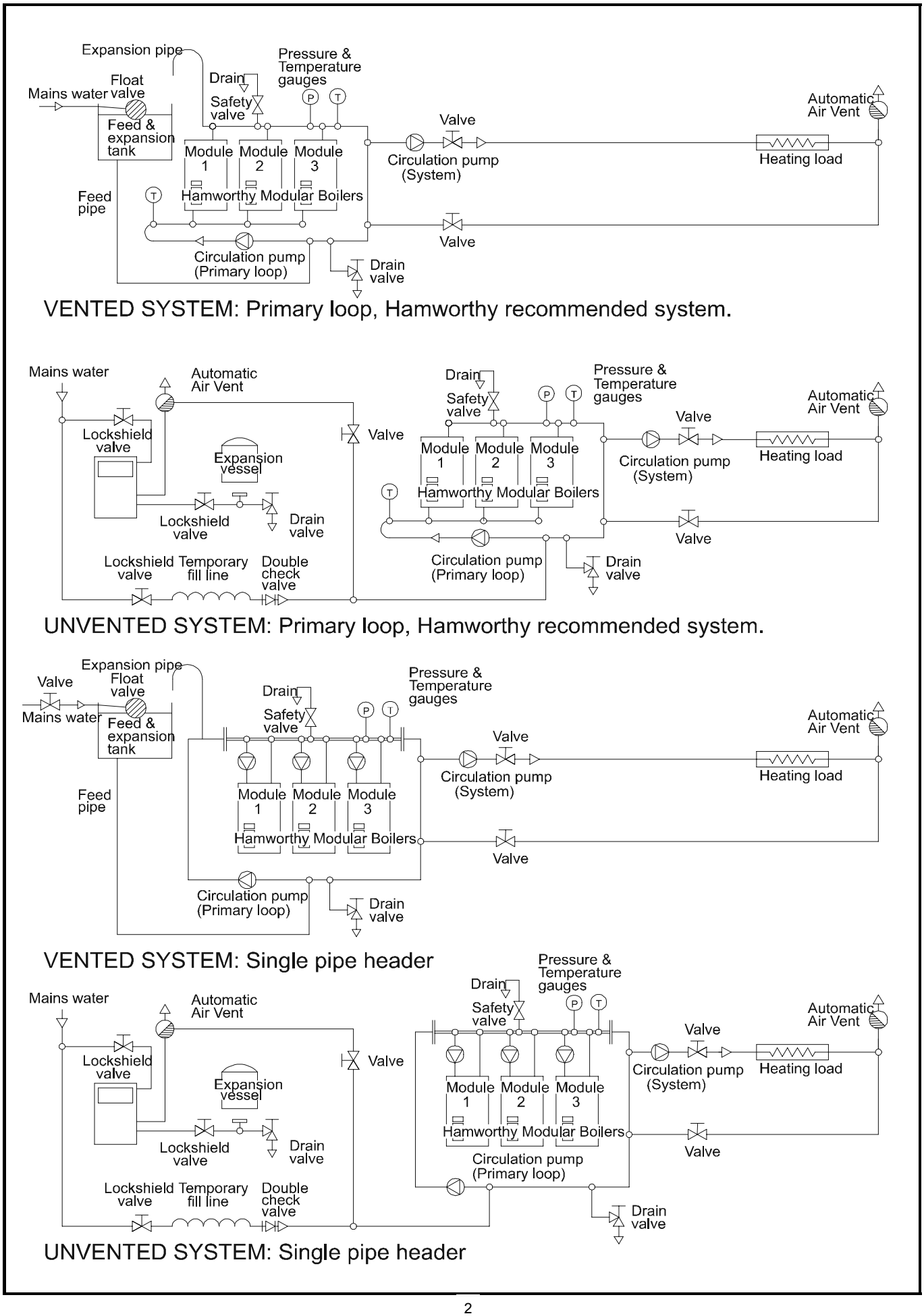
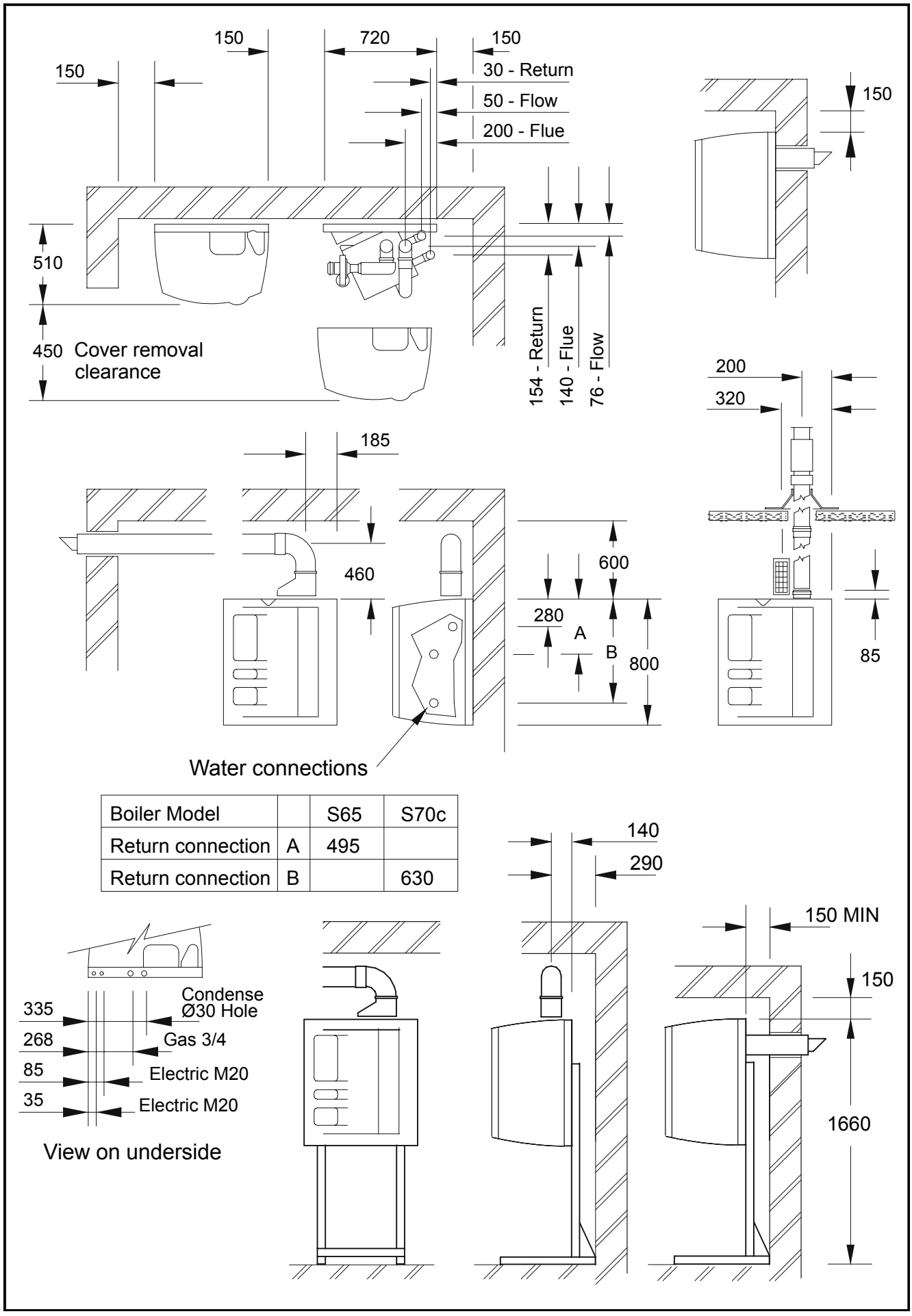


Figure 2.1 Boiler Dimensions/Clearances



Boiler Model		S65	S70c
Return connection	A	495	
Return connection	B		630

2.0 TECHNICAL DATA

2.1 The Sherborne range of boilers can be installed as a single unit or in modular form with up-to three modules using HHL supplied equipment. Where the installation comprises a mixture of S65 and S70c boilers, balancing valves should be fitted to the boiler(s) in order to adjust the pressure drop and hence the water flow rate through each type of boiler. For installations of more than three units in a single bank, consult Hamworthy Heating Technical Department for help or assistance.
The boiler data plate giving details of model and serial number is located on the inner casing.

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

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

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

2.3 Screw threads: All screw threads used in the Sherborne range of boilers conform to the following:-

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

Figure 2.2 Performance and General Data Information – Natural Gas

GENERAL DATA	Sherborne S65	**Sherborne S70*C***
Boiler Input kW (Gross) - maximum	77.7	
Boiler Input kW (Nett) - maximum	70.0	
Boiler Input kW (Gross) - minimum	15.5	
Boiler Input kW (Nett) - minimum	14.5	
Boiler Output kW -minimum	13.6	
Boiler Output kW (condensing) - maximum		71.3
Boiler Output kW (non condensing)- maximum	64.0	66.6
FLUE DATA		
Nominal Flue Dia. mm	Single pipe = 100, dual concentric = 80/125 or 100/150	
Approx. Flue Gas Temperature (condensing) °C	--	55
Approx. Flue Gas Temperature (non-condensing) °C	140	65
Approx. Flue Gas Vol. @ 9.0 – 9.5% CO_2 & NTP(Dry) m^3/h	114	
Nox corrected (daf) mg/kWh [ppm]	44 [25]	
GAS DATA		
Nominal Gas Inlet Press. mbar	20	
Maximum Gas Inlet Press. mbar	25	
Minimum Gas Inlet Press. mbar	12.5	
Gas Flow Rate -maximum m^3/h	7.4	
Gas Inlet Connection Pipe Thread Size	Rp¾"	
WATER DATA		
Water Connections (F&R)	1 ¼ " BSPT	
Waterside Pressure Loss @ 11°C ΔT Rise mbar	220	520
Waterside Pressure Loss @ 15°C ΔT Rise mbar	120	280
Maximum Water Pressure bar g	7.0	
Water Content (not including pipework) litres	4.0	5.0
System Design Flow Rate @ 11°C ΔT Rise l/s	1.39	1.45
Minimum Flow Rate @ 15°C ΔT Rise l/s	1.02	1.05
Shipping Weight (excluding flue) kg	78.0	85.5
ELECTRICAL DATA		
Normal Supply Voltage	230V AC 50Hz (175W max.)	
Start and Run Current	< 1A	

NOTE ! Boiler outputs based on European test conditions – the maximum ΔT for the Sherborne boiler is 15°C. Flue gas volumes are based on a flue gas temperature of 0°C at 1013mbar

3.0 GENERAL REQUIREMENTS

3.1 Related Documents.

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

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

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

British Standards

BS 5440: Part 1: Specification for installation of flues.
Part 2: Specification for installation of ventilation for gas appliances.
BS 6644: Installation of Gas Fired Hot Water Boilers - 60 kW to 2MW.
BS 6700: Design, installation, testing and maintenance of services supplying water for domestic use.
BS 6880:Part 1, 2 & 3: Code of practice for low temperature hot water heating systems of output greater than 45 kW.
BS 7074:Part 1: 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.

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.

Third edition of the 1956 Clean Air Act Memorandum.
Department of the Environment, Scottish Development Department & Welsh Office.

3.2 Feed Water Quality

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

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

It is recommended that the system 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 Sherborne 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 Sherborne range of boilers operate with flow/return temperatures of 50/35°C (condensing) or 80/65°C (high efficiency) to ensure that the correct output as given in Figure 2.2. is achieved.

If the temperature/flowrates of the application cannot meet those given in Figure 2.2. it may be necessary to incorporate mixing valves and shunt pumps to ensure that the boiler will operate satisfactorily.
Figure 2.2. shows recommended and minimum water flows required with the associated pressure losses. The control system and valves, where fitted, should be regulated to avoid lower flows occurring. **The flow corresponding to 15°C temperature rise across the boiler is the minimum recommended at any time.**

3.4 Time Clock Control

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

NOTE! Time clocks should not interrupt live, neutral or earth connections, see **Section 9.0: ELECTRICAL SUPPLY** for details. See Figure 9.1 for wiring details.

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**
3) Modular boiler installation running at 82°C flow temperature and 11°C rise across system. Minimum head required = 4.3 metres or 0.42 bar.
4) Modular boiler installation running at 82°C flow temperature and 15°C rise across system. Minimum head required = 9.4 metres or 0.92 bar. See **Section 8.11** for Pressurised Water Systems.

4.0 LOCATION

4.1 (See Figures 2.1. & 2.2. for dimensions /clearances and weights.) The location chosen for the boiler **MUST** permit the provision of a satisfactory flue system and an adequate air supply. The location must also provide adequate space for servicing and air circulation around each unit. This includes any electrical trunking laid along the floor and to the appliance.
The boiler can be mounted directly onto a wall or supported off a floor via a frame (optional HHL supply). In either case the mounting surface should be a non combustible flat and level surface capable of supporting the weight of the boiler when full of water and any additional ancillary equipment.
It is recommended that the boiler is secured to the wall using M10 Rawlbolts (non HHL supply).

Any combustible material adjacent to the boiler and the flue system must be so placed or shielded to ensure that its temperature does not exceed 65°C.

Further details regarding boiler location are given in **BS 6644. & BS 5440 part 2.**

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**. 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 & IGE/UP/1A** as appropriate.

5.4 Boosted Supplies

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

5.5 Boiler House Control Valve

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

5.6 Boiler Gas System Leak Check

The incoming mains gas supply must be capable of supplying gas to the boiler at the required pressure and volume, under all firing conditions. An isolating valve and union is supplied for each boiler and is accessible at the bottom left hand side.

Although the boiler receives a gas leak check prior to leaving the factory, transport and installation may cause disturbance to unions, fittings and assemblies etc.

During commissioning, a further test for soundness **MUST** be carried out on the boiler gas pipework and components.

Note:- Main Gas Supply Pressure -
Nat Gas - 20mbar
Propane - 37mbar

6.0 FLUE SYSTEM

Detailed recommendations for flue systems are given in **BS 6644, BS 5440, IGE/UP/10.**
All flue discharges for plant exceeding 150kW output must comply with the Third edition of the 1956 Clean Air Act Memorandum.
The following notes are intended to give general guidance only.

6.1 Flue System General Requirements

The Hamworthy Sherborne boiler is designed for use with the following flue systems supplied by Hamworthy - see Figures 6.1.1, 6.1.2, 6.1.3 & 6.1.4:

80/125mm concentric room sealed, balanced flue system for rear through the wall discharge.
100/150mm concentric, room sealed, balanced flue system for remote discharge, horizontal or vertical – maximum length 7m.
100mm separate air and flue ducts, room sealed, balanced flue system for remote discharge – maximum length 10m.
100mm flue duct, for connection to an open flue (chimney) system – maximum length 10m.
Flue systems should be designed with reference to **BS 5440 part 1**, **IGE/UP/10** and **Third Edition of the 1956 Clean Air Act Memorandum.**
Flue installations can be configured to suit a number of applications, see Figures 6.1.1, 6.1.2, 6.1.3 & 6.1.4: but must comply with one of the following options:
Room Sealed.
Type C13: Horizontal balanced flue. – Fig 6.1.1.
Type C33: Vertical balanced flue. – Fig 6.1.2.
Type C53: Separate intake and discharge ducts terminating in different pressure zones. – Fig 6.1.3.
Open Flue.
Type B23: Intake from ventilated plant room and discharge via horizontal/vertical flue. – Fig 6.1.4.

WARNING
The Sherborne boiler is a High Efficiency/ Condensing boiler and in certain conditions 'pluming' will be visible from the flue terminal.
Should pluming be a concern, the flue system design should discharge at high level.

Care should be taken to ensure that the flue is installed such that any condensation is continuously drained back to the boiler or any resultant low points in the flue system. Horizontal flue runs should be kept to a minimum and must be inclined at 2° upwards in the direction of the exhaust gas flow. All joints should be such that any condensation is directed back down the slope.

6.2 Condense Drain

The boiler is provided with a condense drain suitable for connection to 22mm plastic waste pipe (not supplied), which must be connected to a tundish (not supplied).
Discharge piping from a tundish should be of a synthetic material due to the mild acidity of the condensate (pH 3-5), with all discharge piping having a minimum fall of 30mm/m away from the boiler. Consideration should be given to possible freezing of condense water traps and pipework. This must be avoided at all times by routing pipework within the building, where possible.

6.3 Design Waste Gas Volume and Temperature

Where the boiler(s) discharge into an open flue system, it is recommended that the volume and temperature of the waste gases used for design of the flue system are as shown in Figure 2.2.

6.4 Maximum Length of Flue Duct.

For single boiler installations the maximum allowable linear equivalent length of straight smooth bore tube for both (air supply and flue discharge) twin duct, and concentric systems is approximately 10m and 7m respectively. This dimension relates to the distance between the boiler and the discharge terminal. The table below nominates the equivalent length of flue tube. Components can be combined in any order provided that the total equivalent length of flue does not exceed the maximum. **Note:** if the maximum stated lengths of flue are exceeded the boiler will not achieve maximum output.

Figure 6.4 Flue Resistance

Equivalent tube lengths.	
Component	Length m
Straight tube ø100mm per m	1
45° bend ø100mm	2.25
90° bend ø100mm	4.10
Concentric straight tube ø80/125mm per m	1
Concentric straight tube ø100/150mm per m	1
Concentric 45° bend ø100/150mm	1.30
Concentric 90° bend ø100/150mm	2.20

6.5 Disconnection

Each boiler is fitted with a telescopic appliance connector, enabling the boiler to be disconnected from the flue system.
NOTE! The flue system must be self supporting and not present a risk to people in or around the building.
See **Section 13: SERVICING** 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 in accordance with **BS 5440 part 1**, **IGE/UP/10** and **Third Edition of the 1956 Clean Air Act Memorandum.**

When the application requires the flue discharge to terminate below 2 m above ground level, the use of a terminal guard is required.

Figure 6.1.1. - Horizontal Balanced Flue

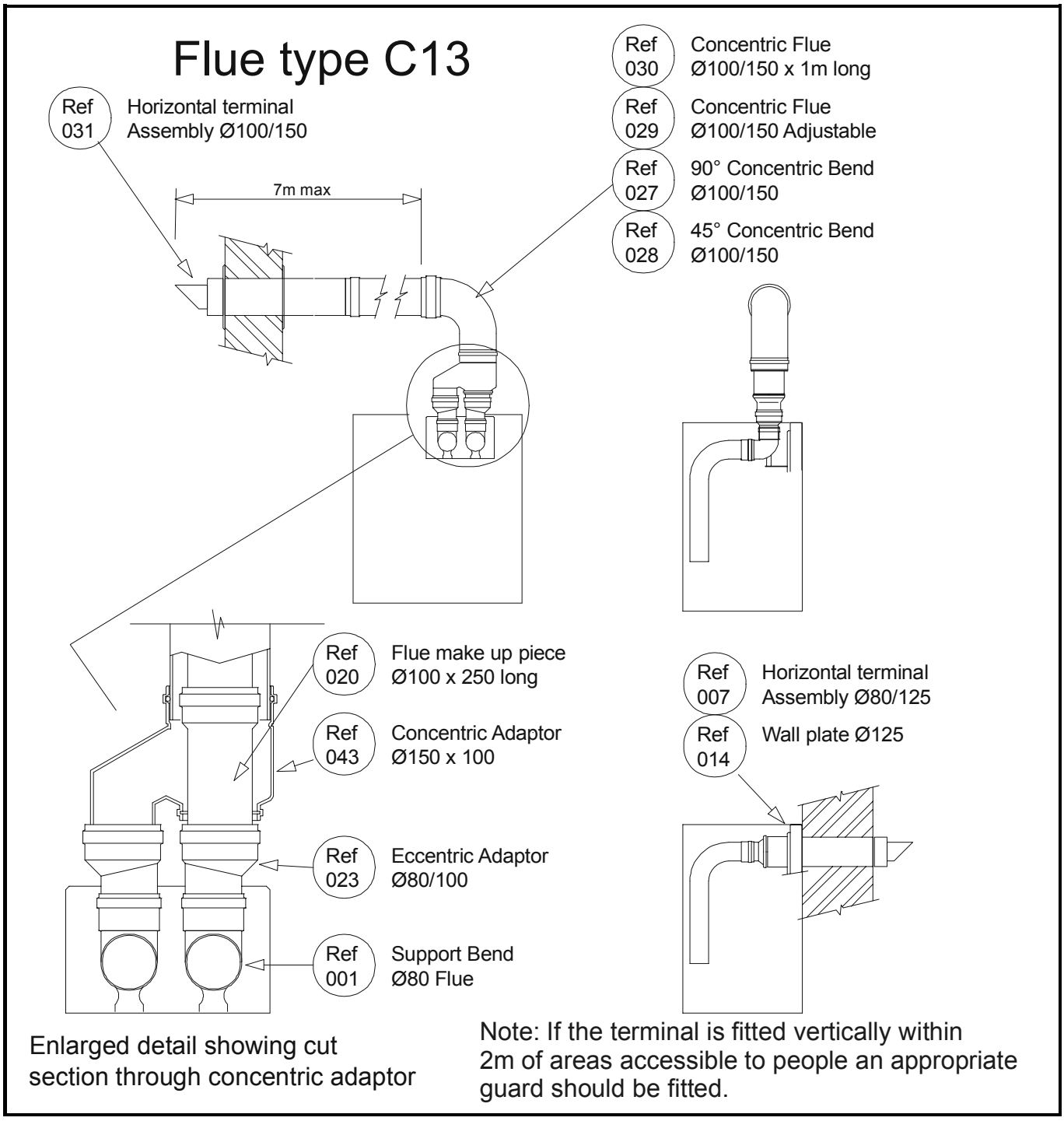


Figure 6.1.2. - Vertical Balanced Flue

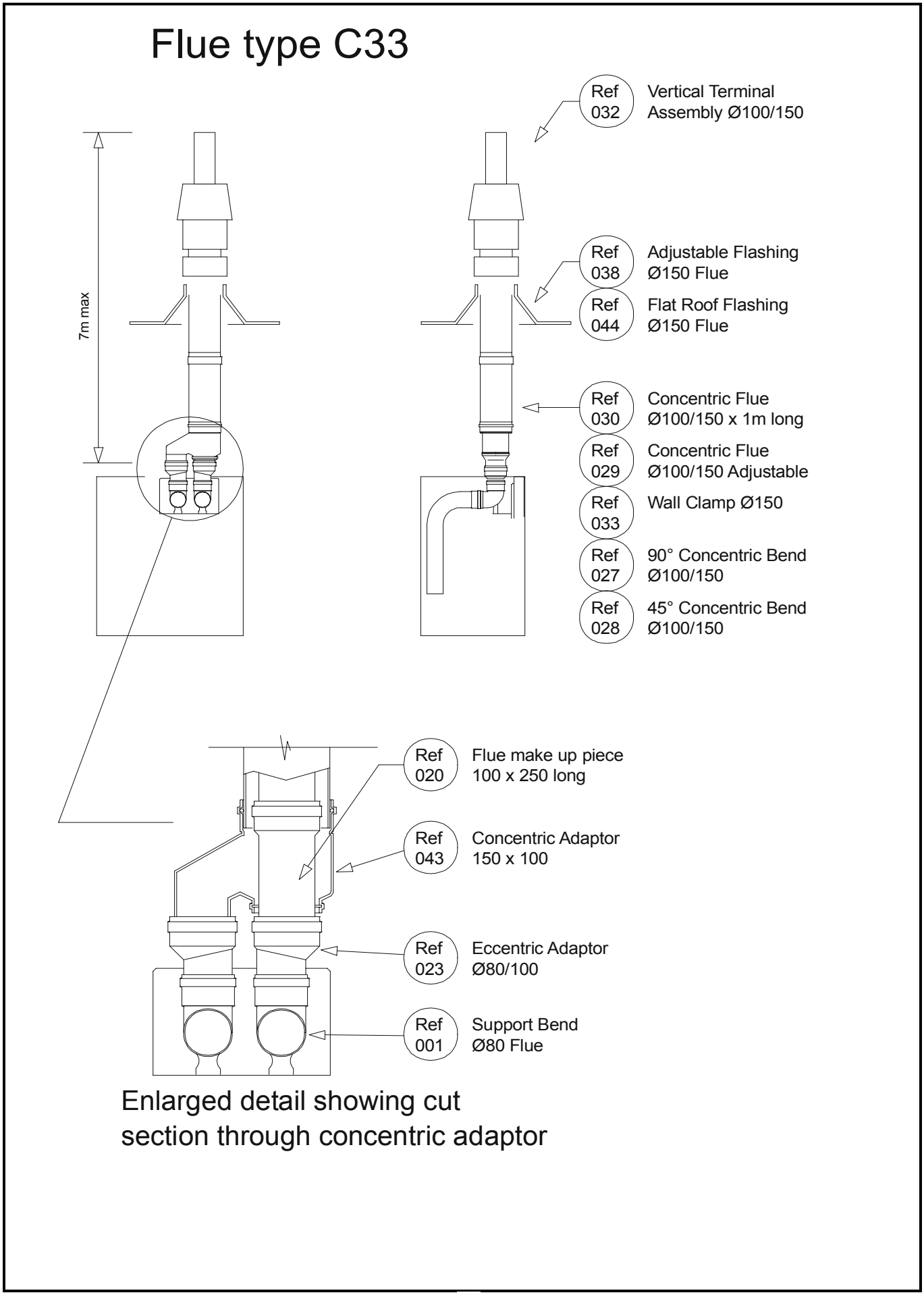


Figure 6.1.3. - Separate intake and Discharge Ducts

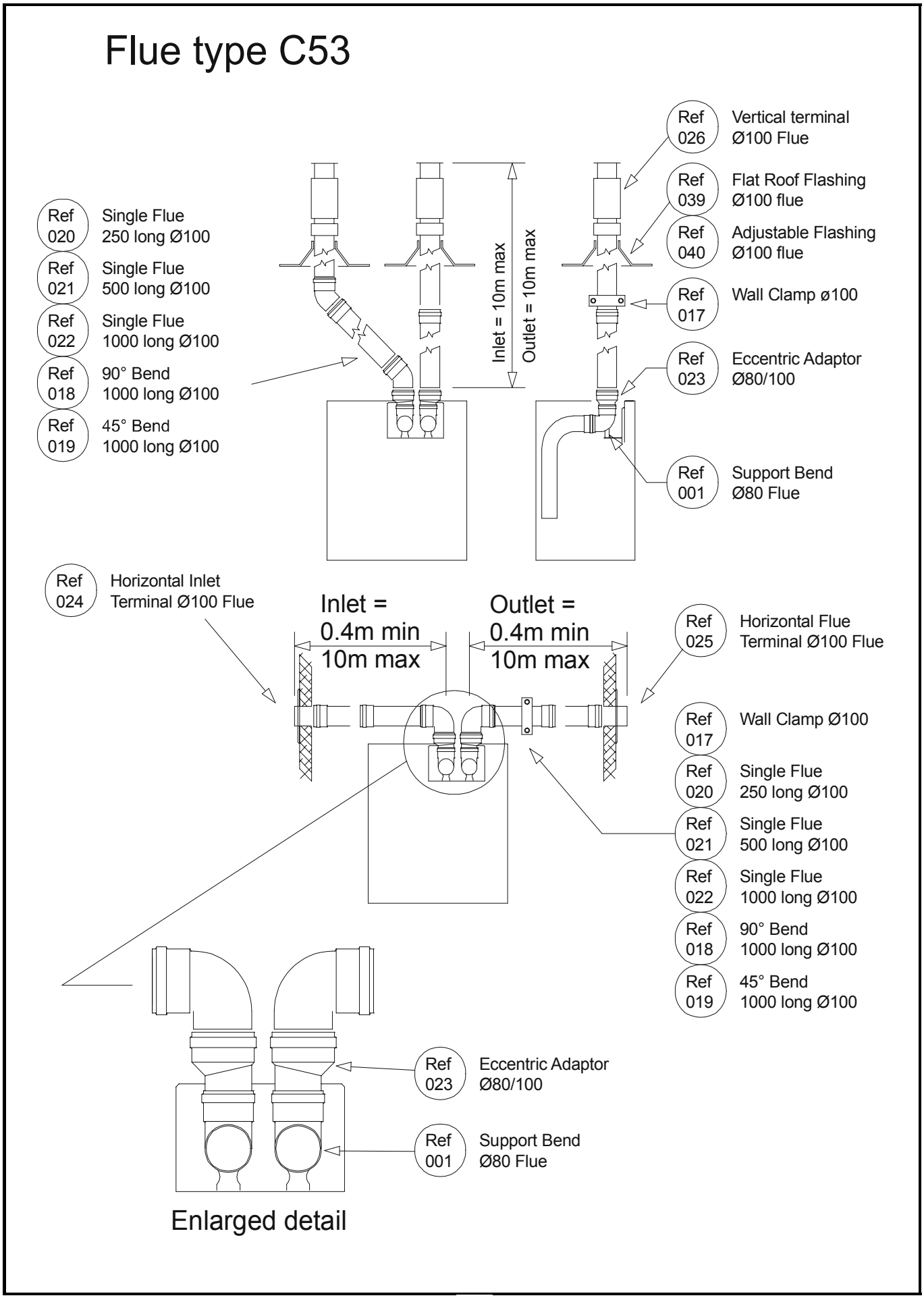
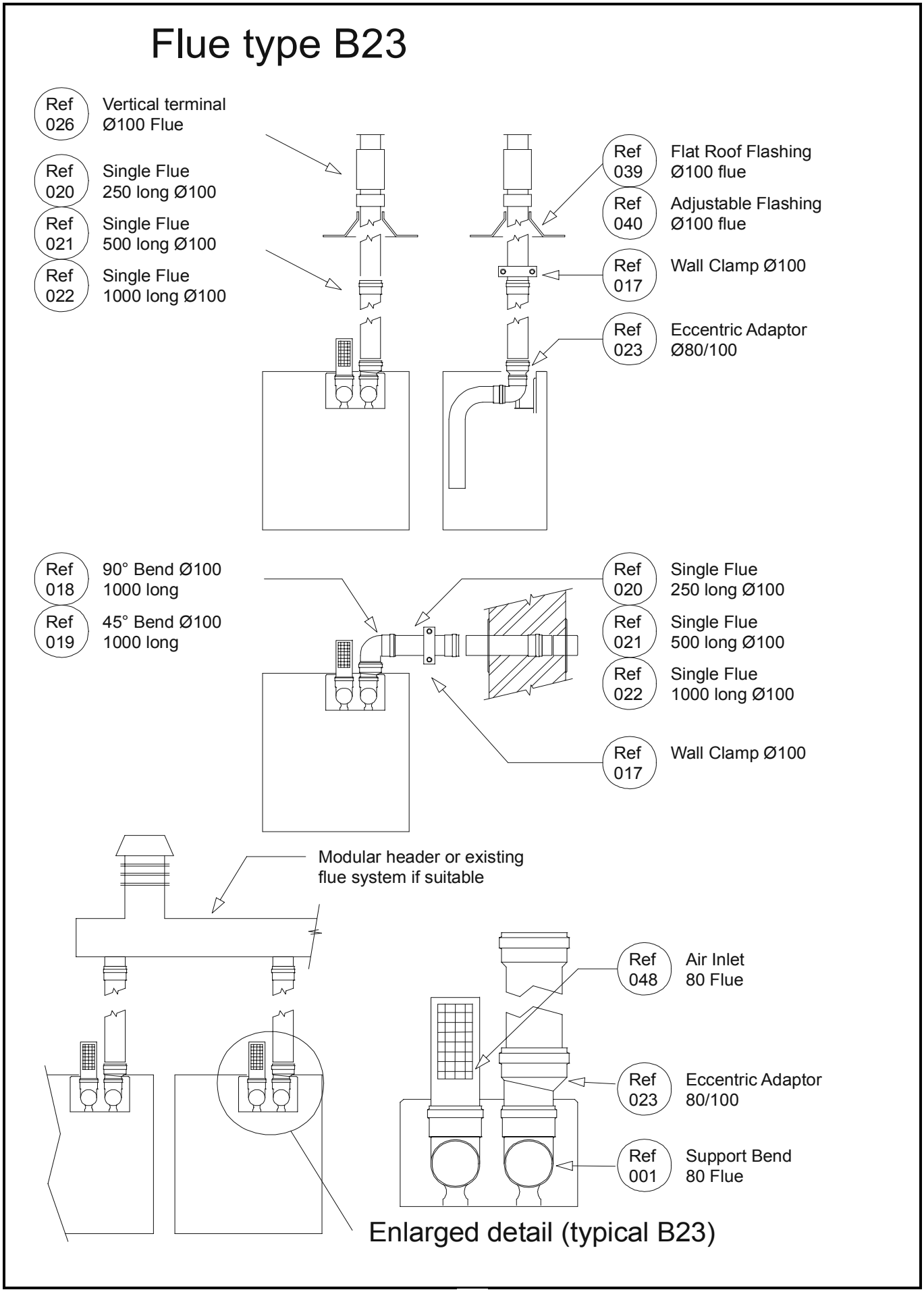


Figure 6.1.4. - Intake from Ventilated Plant Room and Discharge via Horizontal/Vertical Flue



6.7 Surface Temperatures

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

6.8 Flue System Location

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

7.0 AIR SUPPLY

Detailed recommendations for air supply and ventilation requirements are given in **BS 6644**, and **BS 5440:Part 2**. 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 where applicable, and general ventilation, in addition to that required for any other appliance.

7.1 Air Supply By Natural Ventilation (Open-flue installation only)

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

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

1) At floor level (or 100mm above floor level) = 25°C.
2) At mid-level (1.5m above floor level) = 32°C.
3) At ceiling level (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) **550cm^2 per boiler.**
High Level - (outlet) **275cm^2 per boiler.**

7.2 Air Supply (Room-sealed installation)

If the Sherborne boiler is installed as a room-sealed boiler **within a room** there is no requirement for the room to have additional ventilation.
If the Sherborne boiler is installed as a room-sealed boiler **within a cupboard or compartment**, the enclosure shall be provided with both high and low level air vents sized in accordance with the following.

Figure 7.2 Minimum Air Vent Requirements per Boiler Installed in a Compartment

Vent position	Compartment ventilated to:	
	Room or inter-nal space	Direct to out-side air
	cm^2 /boiler	**cm^2 / boiler**
High level	700	350
Low level	700	350

7.3 Air Supply By Mechanical Ventilation (Open-flue installation only)

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

1) Mechanical inlet and mechanical extract can be utilised providing the 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 7.3 Mechanical Ventilation Flow Rates …. (Open flue installation only)

Forced / in-duced	Flow rate per 1000kW total rated heat input (Gross)	
	Inlet air (Combustion ventilation)	Extract air (ventilation)
	m³/s.	m³/s.
Volume	0.90	0.60

8.0 WATER CIRCULATION SYSTEM

8.1 General

The Sherborne boiler has a low water content and the requirements of minimum water flow are given in **Section 8.8: Minimum Water Flow Rates** and Figure 2.2. Recommendations for the water circulation system are given in **BS 6644** and **CP 342**. The following notes are of particular importance:-
1) In a combined central heating and hot water system, the hot water storage vessel must be of the indirect cylinder or calorifier type. The hot water storage vessel should be insulated preferably with not less than 75mm (3 in) thick mineral fibre, or its thermal equivalent.
2) Circulating pipework not forming part of the useful

heating surface should be insulated to help prevent heat loss and possible freezing, particularly where pipes are run through roof spaces and ventilated cavities. Cisterns situated in areas, which may be exposed to freezing conditions, should also be insulated. Insulation exposed to the weather should be rendered waterproof

3) Drain valves must be located in accessible positions which permit the draining of the whole system, including the boiler and hot water storage vessel.

4) Each boiler has R1¼ male flow and return connections within the boiler casing to allow the connecting pipework to be routed up or down after removing the respective cutout in the boiler casing. Should the pipes be routed down, provision **MUST** be made to fit a commissioning vent (manual or automatic) to the boiler flow connection.

Boilers should be connected to flow and return headers. Headers which 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. See Figure 1.1. for typical layouts.

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

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

8.2 Pressure Relief Valve (Safety Valve)

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

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

8.3 Open Vent and Cold Feed Pipe

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

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

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

Figure 8.3. Cold Feed and Vent Pipe Sizes

Boiler Output	Feed	Vent
60kW - 150kW	25	32
150kW - 300kW	32	38

8.4 Altitude Gauge (Water Pressure Gauge)

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

8.5 Thermometer

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

8.6 Drain Valves

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

8.7 Circulating Pump

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

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

8.8 Minimum Water Flow Rates

Minimum water flow rates are shown in Figure 2.2. 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 Waterside Pressure Drop

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

8.10 Controls

8.10.1.1 Temperature Controls

The temperature of the water outflow can be set between 65 and 90°C on high efficiency boilers and 30 and 90°C on condensing boilers. - see Figure 8.10. A temperature limiter, (hand reset limit thermostat) is also fitted to the boiler and is set at 100°C.
NOTE! To accommodate modular boiler installations, the limit thermostat is adjustable up to a maximum of 110°C. The minimum difference between control thermostat and temperature limiter **must never** be less than 10°C.

8.10.2 Water Flow Controls

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

8.10.3 Frost Protection

If the Hamworthy boiler sequencer with an outside temperature sensor is not used, consideration should be given to fitting a frost thermostat set at approximately 4°C.

8.11 Unvented Systems

See Figure 1.1. for typical layout of an Unvented (Pressurised) 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 (metres).
2) System volume - if it is not known a general rule of thumb of 10 litres/kW of installed boiler power can be used.
3) Maximum flow temperature (°C).
4) Maximum system hot working pressure, generally given in bar gauge.

From the above information Hamworthy Heating can size the pressurisation 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.

8.12.1 Boiler Control Schemes

8.12.2 Single Boiler Installations

For single boiler installations the Sherborne range of boilers can be operated in fully modulating mode, controlled from a simple time-clock or BMS system via a remote stop/start loop. – see Figure 8.12.

8.12.3 Modular Boiler Installations

For modular installations of the Sherborne range of boilers, Hamworthy Heating can supply an optional Milton fully modulating boiler sequencer control system.
This system comprises of a wall mounted Master control which communicates with the boilers, water temperature sensor, room sensor (optional) and outside temperature sensor (optional), and optionally can control separate domestic hot water and heating zones. The Milton incorporates diagnostic and data logging capabilities. For further information, contact Hamworthy Heating for details.

Alternatively, the Sherborne boilers can be set to a high/low mode of operation for sequence control, via the remote stop/start control loop and a high/low control loop, by a non HHL control system. – see Figure 8.12.

In order to enable remote fully modulating boiler control by a non-HHL control system Hamworthy Heating can also supply an optional Sequencing Interface Module fitted within each boiler's control panel. This interface module will control the boiler firing rate based on the level of a 0-10V analogue signal from the external control system. A 0-10V output from the external control system will be required for each boiler.

Where a modular installation comprises of a combination of condensing and high efficiency Sherborne boilers, **the condensing boilers should always lead the firing sequence.**

9.0 ELECTRICAL CONNECTIONS

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 cable. (Size 0.75mm^2 csa). Boilers are normally supplied suitable for 230 volts, 50 Hz. Boiler fuse rating is 1 A. External fuses should be 6 A. for all boilers.

Figure 8.10 Controls Housing showing Temperature Controls

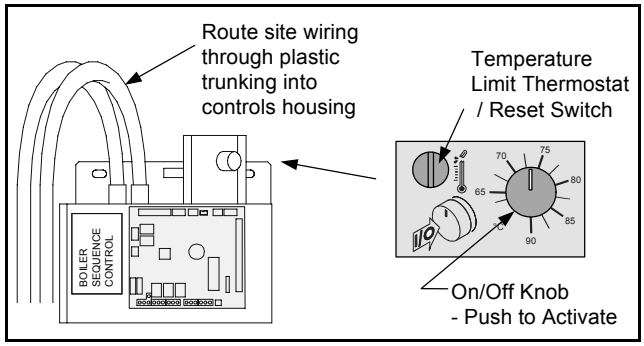
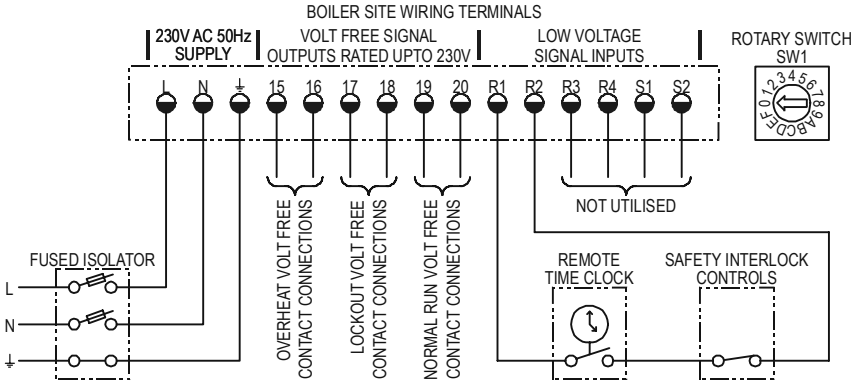
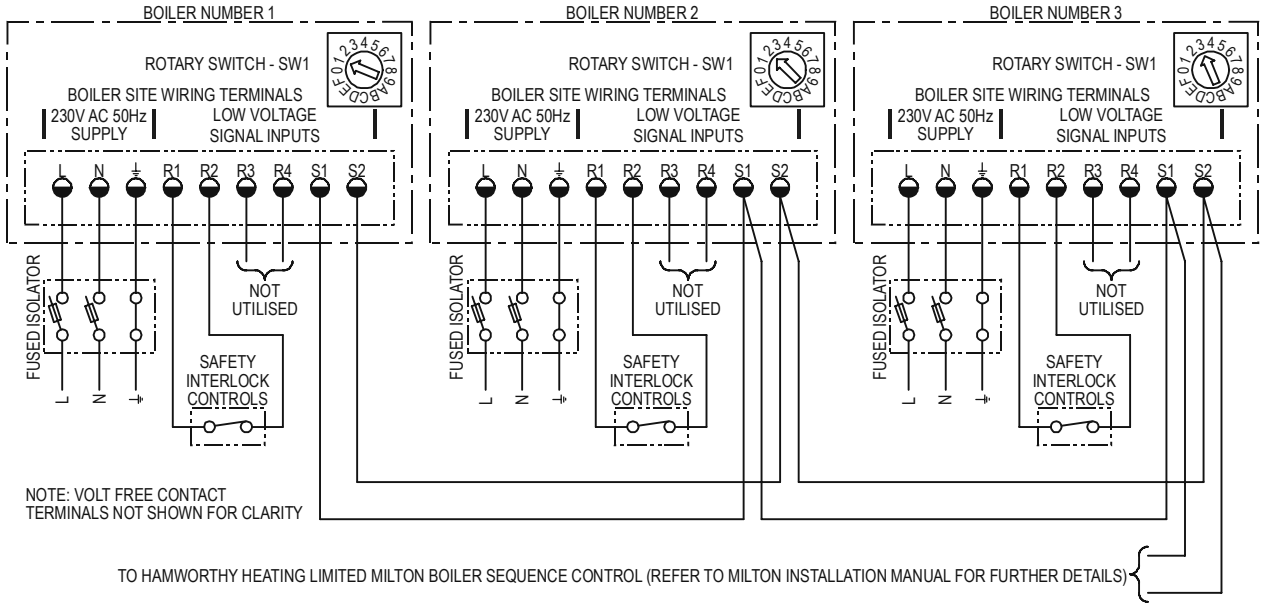


Figure 8.12 Site Wiring Diagram (Page 1 of 2)

1) SINGLE BOILER INSTALLATION, FULLY MODULATING OPERATION VIA REMOTE TIME CLOCK CONTROL.
NOTE: ROTARY SWITCH 'SW1' ON BOILER CONTROL PANEL MAIN PCB - POSITION '0' SETS BOILER TO FULLY MODULATING OPERATION.



2) MULTIPLE BOILER INSTALLATION, FULLY MODULATING SEQUENCED OPERATION VIA HAMWORTHY HEATING LIMITED MILTON BOILER SEQUENCE CONTROL.
NOTE: ROTARY SWITCH 'SW1' ON BOILER CONTROL PANEL MAIN PCB - POSITIONS '1' THROUGH '9' SETS BOILER TO MILTON SEQUENCED OPERATION, AND SETS THE BOILER FIRING ORDER.



3) MULTIPLE BOILER INSTALLATION, HIGH/LOW SEQUENCED OPERATION VIA NON HAMWORTHY HEATING LIMITED BOILER SEQUENCE CONTROL.
NOTE: ROTARY SWITCH 'SW1' ON BOILER CONTROL PANEL MAIN PCB - POSITION 'A' SETS BOILER TO TO HIGH/LOW SEQUENCED OPERATION.

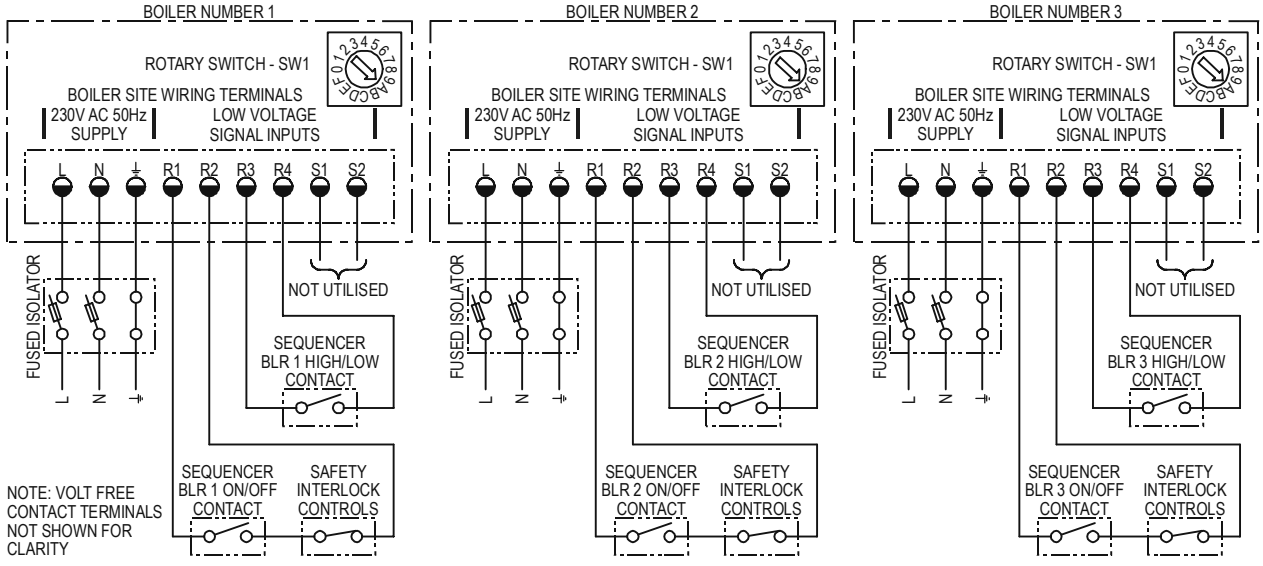


Figure 8.12 Site Wiring Diagram (Page 2 of 2)

4) MULTIPLE BOILER INSTALLATION, FULLY MODULATING SEQUENCED OPERATION VIA 0-10V ANALOGUE CONTROL SIGNALS FROM A NON HAMWORTHY HEATING LIMITED BOILER SEQUENCE CONTROL SYSTEM, UTILISING OPTIONAL HAMWORTHY HEATING LIMITED SEQUENCING INTERFACE MODULES.
NOTE: ROTARY SWITCH 'SW1' ON BOILER CONTROL PANEL MAIN PCB - POSITION '1' SETS BOILER TO REMOTE FULLY MODULATING SEQUENCED OPERATION. ROTARY SWITCH 'SW1' ON SEQUENCING INTERFACE MODULE PCB - POSITION '0' FOR 0-10V ANALOGUE CONTROL SIGNAL OPERATION.

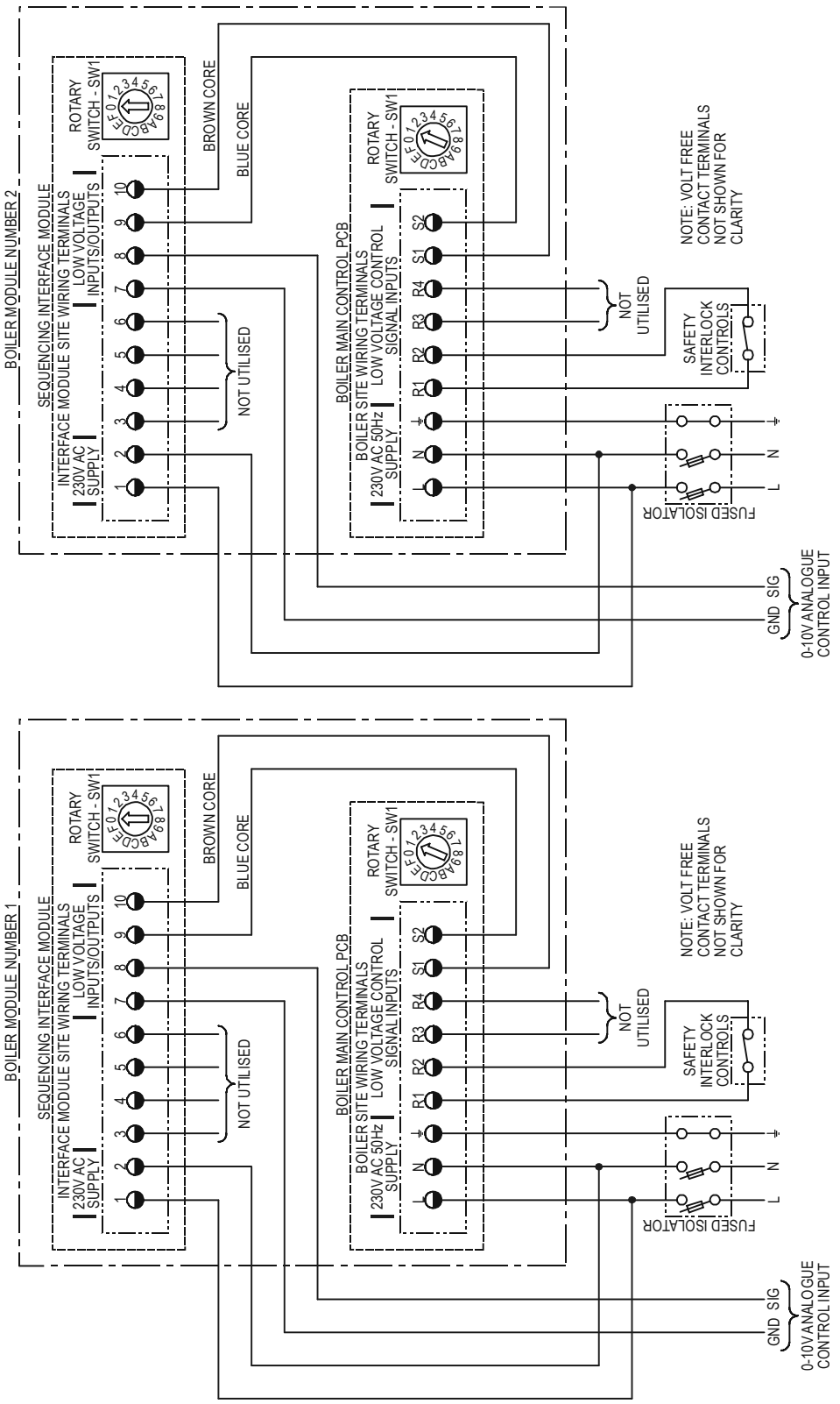
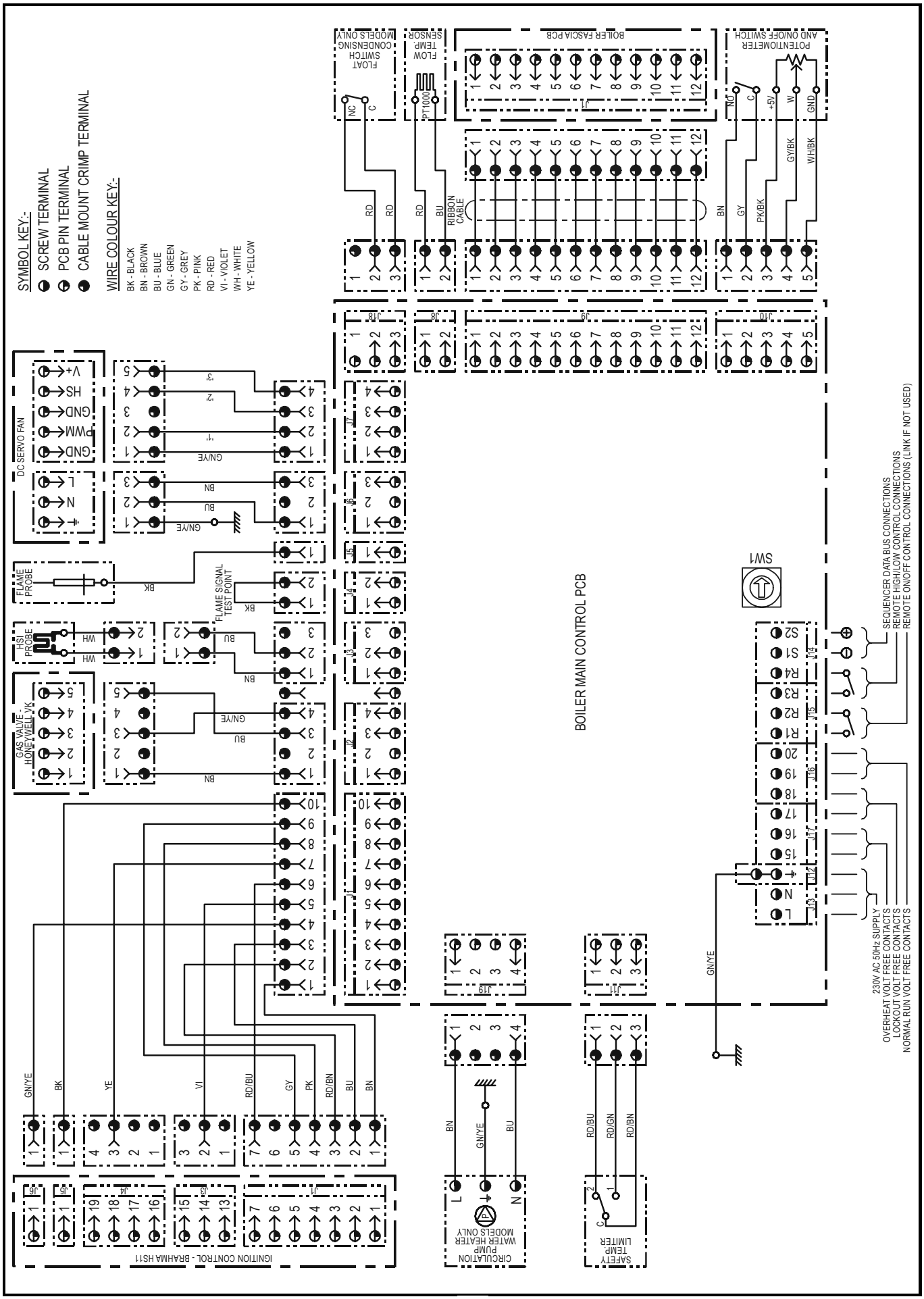


Figure 9.1 Wiring Schematic



9.1 Electrical Supply Connections

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

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

NOTE! It must be possible to isolate Volt free contact electrical supplies where fitted (see note in control panel). Further details regarding connection to the electricity supply are given in **BS EN 60335, Part 1 or BS 3456, Part 201**.

The power supply to the boiler should not be switched by a time clock. The Sherborne boiler has a remote stop/start loop, which can be used to operate the boiler under a timed regime. This remote loop requires a volt free contact for operation. A 12V dc signal is supplied by the boiler for this circuit to function. The remote high/low control loop, if utilised, operates in the same manner. Refer to Figures 8.12 and 9.1 for wiring connection details. See **BS 6644** for further information. Do not modify this circuit in any way.

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 any service or maintenance procedures are carried out.

9.3 Cable Installation

Access to the controls is achieved by removing the boiler cover. The wall frame contains two 20mm dia sockets on the bottom left hand side, for electrical cable conduit anchorage prior to entering the boiler cabinet. Internally the boiler is provided with two 20mm dia. flexible conduits connecting the wall frame to the control panel.

All site cables must be routed through the flexible conduits to terminate in the control panel.

Care must be taken to ensure correct connections are made to the relevant terminals before applying power. Refer to Figures 8.12 and 9.1 for wiring connection details.

9.4 Sequencing Interface Module (Optional)

The interface module is supplied fitted to the boiler control panel and with the control connections to the boiler main control PCB made. The interface module requires a 230V ~ 50Hz L & N supply. The interface module PCB fuse rating is T250mA. It is recommended that the interface module is supplied from the same mains isolator as the boiler it is fitted to.

A 0-10V analogue control signal from the external sequence control system is required, ground and signal connections. The interface module is configured to give a linear response to the 0-10V signal between 2.0V (20% rate) and 10.0V (100% rate). Below the 2.0V the boiler will operate at 20% rate until the input signal falls below 0.3V at which point the boiler is shut down. There is ±0.1V switching hysteresis.

The sequencing interface module incorporates a 10way plug/socket screw terminal block to make the site wiring connections. Refer to Figure 8.12 for wiring connection details.

10.0 BOILER ASSEMBLY AND INSTALLATION

10.1 General

Each boiler is normally despatched to site in four packs.
Pack 1 – the boiler assembly.
Pack 2 – the accessory pack assembly
Pack 3 - the control panel assembly.
Pack 4 - the flue assembly.

The boiler should be positioned to allow at least the minimum clearances detailed in Figure 2.1 which allows access for pipework and servicing requirements.

10.1.1 Free Standing Frame - If the boiler is supplied with a free standing frame kit, assemble the free standing frame as per the instructions supplied with the kit, prior to assembly of the boiler.

10.2 Mounting The Boiler To The Wall

10.2.1 Select the position of the boiler on the wall (or the position the free standing frame) ensuring that the minimum clearances nominated in Figure 2.1 are achievable - **refer to section 4.**
Carefully open Pack 2 and remove the fixing template from the carton. Position the template on the wall in the selected location ensuring it is level both horizontally and vertically.
10.2.2 Mark the position of **five** wall plate fixing holes, **the centre (keyhole) must be used together with four others (2 on each side).** Mark the position of the flue hole for rear exit if applicable. Drill the fixing holes and fit an M10 Rawlbolt (not HHL supply) to the centre fixing. Locate the wall plate onto the centre fixing bolt and secure the wall plate using the remaining fixings, ensuring that it is level. If the boiler is to be mounted onto a free standing frame, fasten the wall plate to the top 4 holes in the 2 frame uprights using 4 M10x65 bolts, nuts and washers supplied with the free standing frame kit.
10.2.3 If the rear flue exit is being used, core drill the hole for the flue pipe (150mm dia.). For all other flue installations refer to **section 10.3.**
10.2.4 Carefully remove the boiler body assembly from Pack 1 and stand the unit on the floor with the water connections to the right hand side. Disconnect the pressure feedback tube from the gas valve – see Figure 11.2. Remove the 2 – M6 nuts securing the burner/fan assembly to the front of the heat exchanger – see Figure 11.1, and carefully remove the burner assembly, taking

care not to damage the probes or burner. Place the burner assembly in a safe location. Fit the wall frame to the wall plate using the four M6 nuts provided – see Figure 11.1. Locate the compression/BSP adapter fitting for the gas inlet pipe from the accessory pack and screw well down in the appropriate socket of the wall frame using suitable sealant. Select the gas inlet pipe and loosely fit the long vertical leg to the wall frame connection – see Figure 10.6. Lift the boiler module onto the wallplate, engaging the lugs on the right hand side of the casing adjacent to the water connections, onto the pins on the right hand side of the wallplate – see Figure 11.1. Take care not to hit the gas inlet pipe. **Caution the assembly weighs approx. 60kg and should be lifted by two people. Alternatively, two lifting eyes are provided for use with suitable lifting equipment.** The pins are of different lengths to assist with engagement. Fit the burner assembly back into the heat exchanger using its existing fastenings. Swing the boiler module back to the wallplate whilst carefully aligning the short horizontal leg of the gas inlet pipe with the compression fitting on the inlet to the gas valve. Once the gas inlet pipe is correctly engaged, the boiler module can be finally secured to the wall plate at the left-hand bracket using the M10 nut and bolt supplied. Tighten the compression fittings to provide a gas tight seal. A soundness check on these joints must be carried out.

10.3 Connection of Boiler(s) to the Flue System

Dependent on boiler installation a number of flue options are available refer to Figures 6.1. **In all instances, the flue must be obtained from Hamworthy or in the case of connection to an open flue system, the ducts up to the chimney must be obtained from Hamworthy.**
The maximum allowable length of the flue must be determined in accordance with **section 6.4**. It is also important, for service requirements, that the flue system is fully self-supporting and that prior to commissioning a check has been made to ensure that the pipe is clear and free from obstruction.

10.3.1 Connection of Through Wall Horizontal Balanced Flue Terminal – 80/125mm.

The flue terminal should be cut to length as detailed in Figure 10.3.1 Wall Mounted option or Figure 10.3.1.1 Frame Mounted option. Check all measurements before cutting and **take care not to damage the inner tube when cutting the outer tube.**
Note: Deburr both tube ends and ensure that the cuts are square. Failure to carry out this operation carefully may result in damage to the flue seals when assembling the flue system.
From the outside of the building, offer the outer wall sealing plate up to the cut hole and position it such that there is a 2° slope from the terminal to the boiler connection to allow any condensate to run back to the boiler. Mark the four securing holes, drill and plug the holes and secure the wall plate. From the inside of the building, offer the inner wall sealing plate up to the cut hole and position it such that there is a 2° slope from the terminal to the boiler connection to allow any condensate to run back to the boiler. Check the position of the wall plate using the flue support cradle located on the 2 – M6 studs on the wall frame. Mark the four securing holes, drill and plug the holes. Fit the flue terminal from the inside of the building ensuring the correct position of the terminal discharge – see Figure 10.3.1 or Figure 10.3.1.1 and fit the inner wall sealing plate over the flue, securing it to the wall.

Fit the flue support cradle over the end of the flue pipe, then fit the flue concentric adaptor to the rear of the flue protruding into the boiler. Ensure that the orientation of the terminal is correct at the terminal outlet and that the concentric adaptor is fully engaged onto the flue.

Figure 10.3.1 Connection of Flue System (Concentric Ducts Horizontal) - Wall Mounted Option

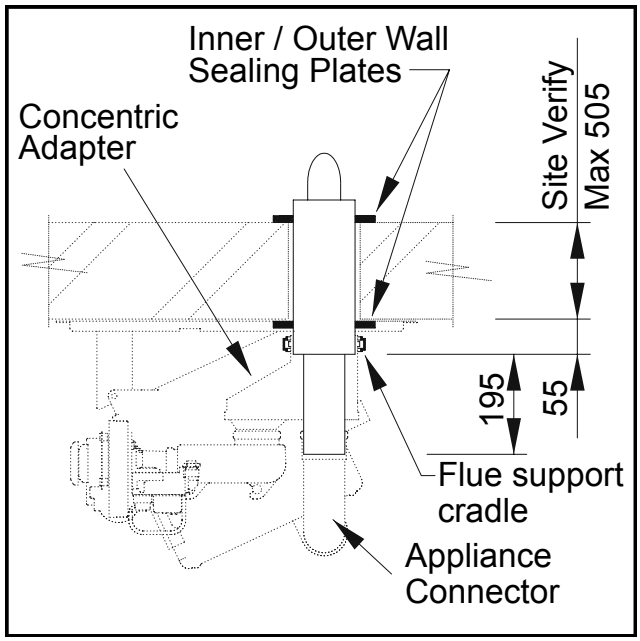
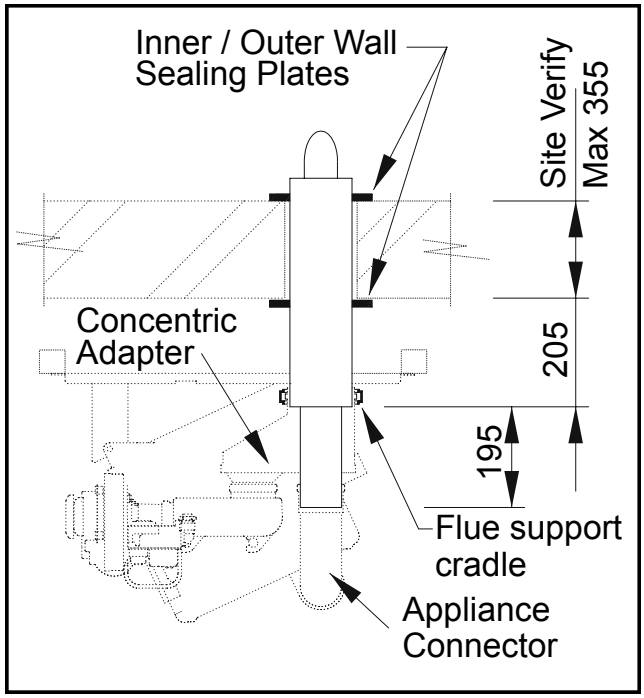


Figure 10.3.1.1 Connection of Flue System (Concentric Ducts Horizontal) - Frame Mounted Option



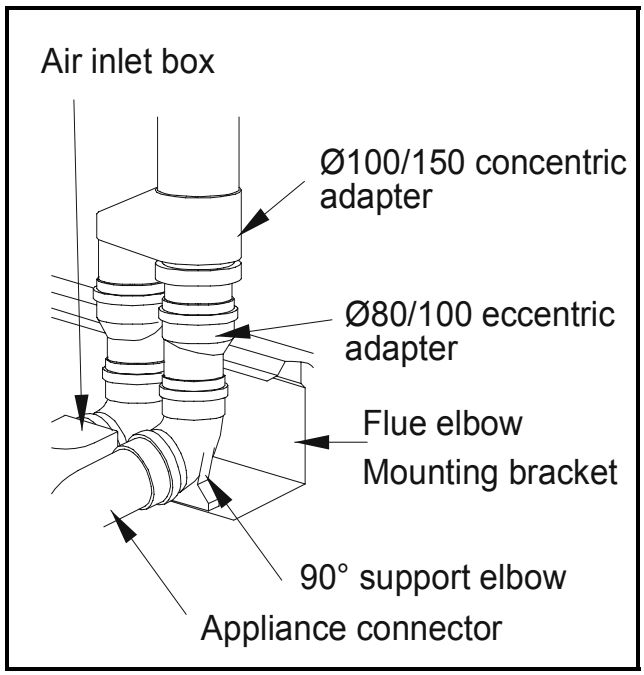
Secure the flue support cradle to the wall frame with 2 – M6 nuts ensuring that the concentric adaptor is located in the support cradle. Engage the air inlet box onto the left hand connection of the concentric adaptor as shown in Figure 10.3.1 Wall Mounted option or Figure 10.3.1.1 Frame Mounted option. Fit the appliance connector duct between the flue outlet in the aluminium boiler casing and the flue duct. The vertical leg of this duct is telescopic to assist with installation. Whilst carrying out
Having fitted the flue system to the boiler, carefully refit the burner assembly and secure to the heat exchanger using the 2 – M6 nuts previously removed taking care not to damage the probes or the burner flange gasket see Figure 10.2.
Reconnect the pressure feedback tube to the gas valve.

The above procedure ensures that all seals are correctly located and provide gas tight joints.

10.3.2 Connection of Extended Lengths of Horizontal/Vertical Balanced Flue – 100/150mm.

Having established the flue termination point, a hole 170-180mm dia. should be made through the wall or roof.
Note: the flue support cradle is not required for this installation and should be discarded.
Refer to Figures 6.1.1, 6.1.2, and 10.3.2 Secure the flue elbow mounting bracket to the wall frame using 3 – M6 nuts and washers. Locate the two 90° elbows onto the mounting bracket lugs and fit the appliance connector duct between the flue outlet in the aluminium boiler casing and the 90° discharge support elbow. The vertical leg of this duct is telescopic to assist with installation. Insert the 90° inlet support elbow into the air inlet box. Insert the 80 to 100mm adaptors into the outlets of the two 90° elbows and engage the twin pipe to concentric adaptor into the left hand (air) 100mm tube and orientate such that the discharge socket is coaxial with flue discharge adaptor. Fit the flue make up piece through the socket into the flue discharge adaptor after which either a 90° concentric elbow or straight vertical section can be fitted. Fit the remaining flue components on route to the terminal discharge ensuring a minimum 2° slope and that the flue system is self-supporting using wall brackets where necessary. In terminating the flue system, ensure that the joint through the wall / roof is made good and weatherproofed. Whilst carrying out the above procedure ensure that all seals are correctly located and provide gas tight joints.
The top of the plastic boiler cover has a D shaped recess that marks the position of the vertical flue exit point. Using a suitable fine toothed hacksaw or jigsaw, carefully cut around the inside of the recess to provide the flue outlet.
Having fitted the flue system to the boiler, carefully refit the burner assembly and secure to the heat exchanger using the 2 – M6 nuts previously removed taking care not to damage the probes or the burner flange gasket see Figure 10.2.
Reconnect the pressure feedback tube to the gas valve.

Figure 10.3.2 Connection of Flue System (Concentric Ducts Vertical)



10.3.3 Connection of Twin Pipe Horizontal/ Vertical Room Sealed –100mm

Note: the flue support cradle is not required for this installation and should be discarded.
Refer to Figures 6.1.3 and 10.3.3. Secure the flue elbow mounting bracket to the wall frame using 3 – M6 nuts and washers. Locate the two 90° elbows onto the mounting bracket lugs and fit the appliance connector duct between the flue outlet in the aluminium boiler casing and the 90° discharge support elbow. The vertical leg of this duct is telescopic to assist with installation. Insert the 90° inlet support elbow into the air inlet box. Insert the 80 to 100mm adaptors into the outlets of the two 90° elbows. Fit the remaining flue components on route to the terminal discharge ensuring a minimum 2° slope and that the flue system is self supporting using wall brackets where necessary. In terminating the flue system, ensure that the joint through the wall / roof is made good and weatherproofed. The top of the plastic boiler cover has a D shaped recess that marks the position of the vertical flue exit point. Using a suitable fine toothed hacksaw or jigsaw, carefully cut around the inside of the recess to provide the flue outlet.
Having fitted the flue system to the boiler, carefully refit the burner assembly and secure to the heat exchanger using the 2 – M6 nuts previously removed taking care not to damage the probes or the burner flange gasket see Figure 10.2.
Reconnect the pressure feedback tube to the gas valve.

Figure 10.3.3 Connection of Flue System (Separate Ducts)

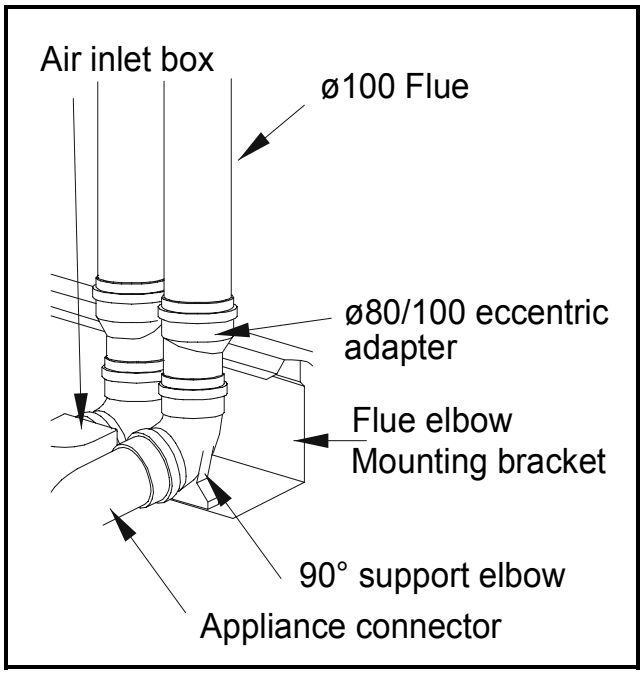
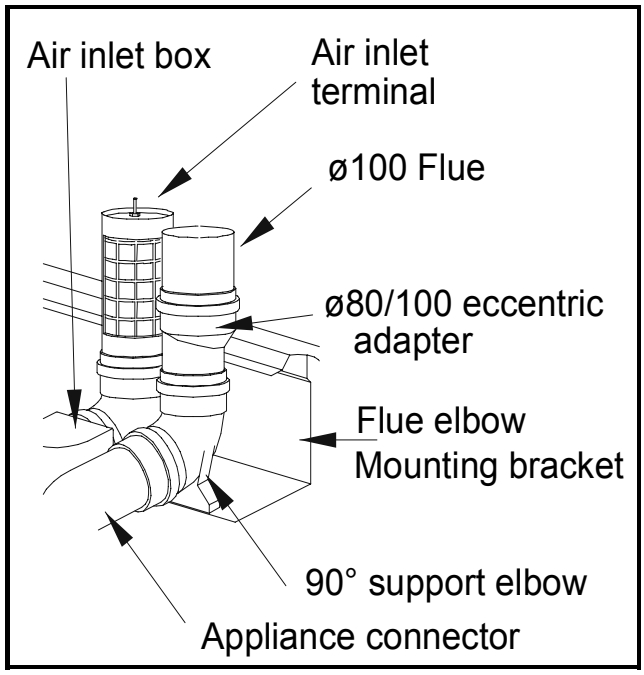


Figure 10.3.4 Connection of Single Pipe (Open Flue)



10.3.4 Connection of Single Pipe Horizontal/ Vertical Open Flue – 100mm

Note: the flue support cradle is not required for this installation and should be discarded.

Refer to Figures 6.1.4 and 10.3.4. Secure the flue elbow mounting bracket to the wall frame using 3 – M6 nuts and washers. Locate the 90°-discharge elbow onto the right hand mounting bracket lug and fit the appliance connector duct between the flue outlet in the aluminium boiler casing and the 90° elbow. The vertical leg of this duct is telescopic to assist with installation. Locate the air inlet terminal into the left hand 90° elbow. Fit the remaining flue components on route to the terminal discharge ensuring a minimum 2° slope and that the flue system is self supporting using wall brackets where necessary. In terminating the flue system, ensure that the joint through the wall / roof is made good and weatherproofed. The top of the plastic boiler cover has a D shaped recess that marks the position of the vertical flue exit point. Using a suitable fine toothed hacksaw or jigsaw, carefully cut around the inside of the recess to provide the flue outlet.

Having fitted the flue system to the boiler, carefully refit the burner assembly and secure to the heat exchanger using the 2 – M6 nuts previously removed taking care not to damage the probes or the burner flange gasket see Figure 10.2.

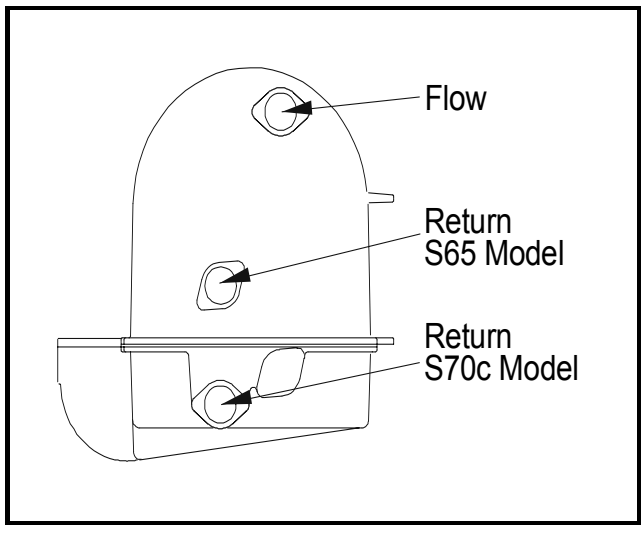
Reconnect the pressure feedback tube to the gas valve.

10.4 Water Connections

See Figure 10.4. Care must be taken when installing water system pipework that undue stress is avoided on the boiler flow and return connections. It is recommended that unions are fitted local to the boiler and outside of the casing, to permit future servicing requirements. Fully closing valves must not be connected to both flow and return pipes unless the boiler is fitted with an individual, correctly sized and positioned safety valve. It is recommended that a 3-way 'T' 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.

To ensure that the flow and return pipework are retained within the boiler casing, **it is recommended that swept bends are not used.** To achieve this use 1 1/4" elbows or tees.

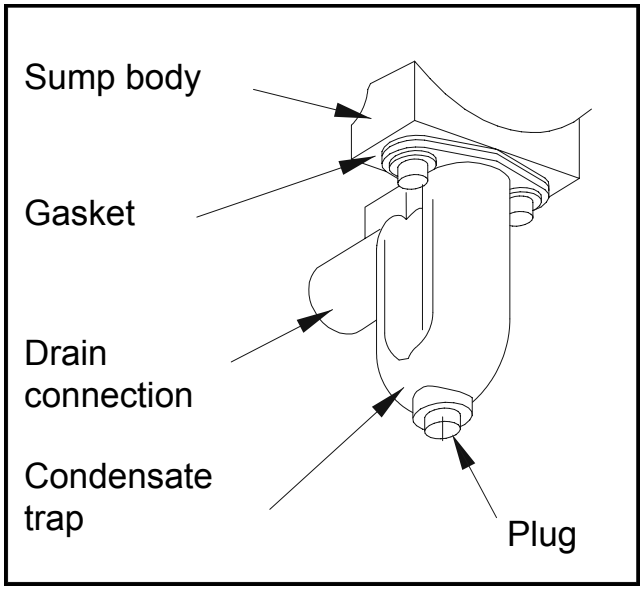
Figure 10.4 Water Connections



10.5 Condense Trap Connection

Select the condense trap kit from the Accessory Pack. The condense trap is fitted to all boiler models. Secure the trap to the sump casting using the gasket and 2 M6 screws provided. Fit the 1/4" BSP cap head plug. The trap is suitable for connection to 22mm plastic waste pipe (not HHL supply) with the waste pipe being routed through the aperture in the wall frame adjacent to the gas connection. A small amount of sealant must be used on the waste pipe connection to the condense trap – see Figure 10.5.

Figure 10.5 Condense Trap



10.6 Gas Connection

Assemble the gas isolating valve and union assembly to the wall frame and connect the gas supply to the Rc 3/4" connection on the isolating valve - see Figure 10.6 / Page 23.

10.7 Fitting the Control Panel

S70c Models

The S70c differs from the S65 in that it is fitted with a condense level float switch. This float switch is factory fitted and care must be taken not to damage it during assembly or when removing packaging. Before fitting control panel ensure that float switch is oriented correctly as shown in Figure 10.7.

S65 and S70c Models

Secure the control panel to the two lower heat exchanger mounting bolts with 2 - M10 nuts & washers provided. Remove the front screw and loosen the rear screw securing the fascia panel to the control panel body. Carefully withdraw the fascia panel and secure on the two hooks on the control panel body. Secure the conduit adapters to the wall frame and the control panel and fit the flexible conduits. Feed the cables through the conduits, connecting to the appropriate connections on the PCB. - see Figures 8.12 and 9.1 for wiring connection details.

Care must be taken to ensure correct connections are made to the relevant terminals and that the cables are routed as shown before applying power. (**S70c model** - Feed the wires from the condense level float switch, which can be found taped to the side of the boiler, through the grommet in the rear of the control panel and connect to the control panel main PCB – refer to Figure 9.1.)

Remove the clip on the thermostat pocket and insert the control and limit thermostat sensors into the pocket and secure with the clip.

Connect the flame sensing probe lead to the sensing probe and connect the plug and socket for the HSI.

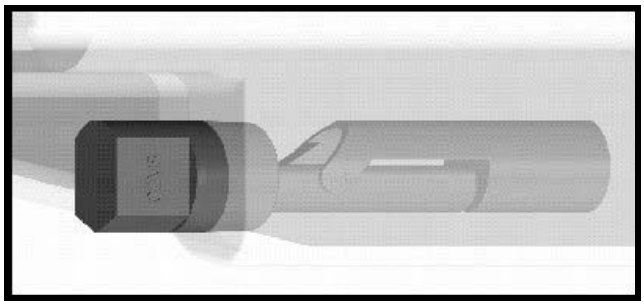
Connect the respective plugs to the fan and gas valve.

Locate rotary switch 'SW1' on the control panel main PCB (located to the right of the wiring terminals). Using a small bladed screwdriver set the switch to the correct position for the installation – refer to Figure 8.12 for details.

N**ote:** Correct setting of the rotary switch is essential as incorrect setting could prevent operation of the boiler

Refit and secure the controls panel front cover.

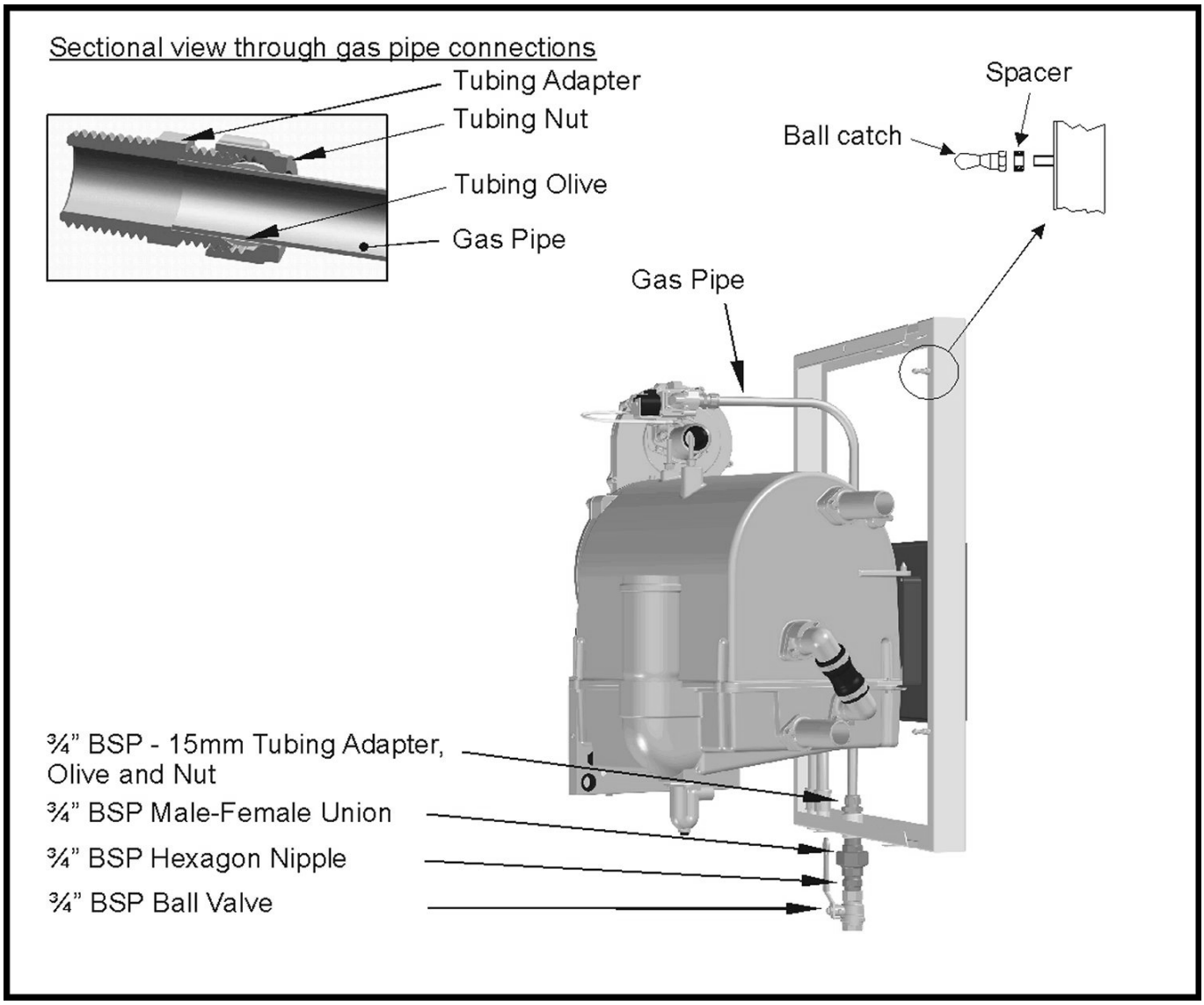
Figure 10.7 Float switch orientation



10.8 Fitting the Front Cover

Place spacer over mounting stud and affix ball catch in four places—see fig 10.6. Fit the boiler cover onto the ball catches and secure in place with the captive M5 securing screw located centrally at the top of the cover.

Figure 10.6 Gas Pipe Fitting



11.0 COMMISSIONING AND TESTING

For general layout of boiler, refer to Figure 11.1

11.1 Electrical Installation

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

Access to the controls is achieved by removing the screw on the top of the outer cover and pulling the cover away from the wall. The cover is located on the wall frame by four ball studs. Connections to the boiler should pass through the 2 x 20mm conduit connections located at the bottom left hand side of the wall frame. 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 connections are marked with Live, Neutral and Earth connections. See Figure 8.12 and 9.1 for details.

IMPORTANT :- READ THE WARNING NOTE REGARDING EXTERNAL VOLTAGES.

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** 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 treatment 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

Only competent persons registered for working on non domestic gas appliances should attempt the following: Before attempting to commission any boiler, ensure that personnel involved are aware of what action is about to be taken and begin by making the following checks:-
1) Flueway passages to chimney are clear.
2) Adequate ventilation as per **Section 7: AIR SUPPLY** exists in the boiler house or compartment/ room.
3) The system is fully charged with water, ready to receive heat. All necessary valves are open and the pump is circulating water.
4) The pipework and valve arrangement is installed to Hamworthy Heating recommendations in such a way that water flow rates will be in accordance with Figure 2.2.
5) The gas supply pipework is clear of any loose matter, tested for soundness and purged to **BS 6891 or IGE/UP/1 & IGE/UP/1A** as appropriate.
6) The condensate discharge is connected to a drain.

11.5.1 Boiler Checks Prior to Lighting

NOTE! Refer to Figure 2.2. for Natural Gas maximum inlet pressure for normal operation.

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

1) Ensure the gas supply is connected but turned to the "OFF" position. Any unions or fittings are correctly tightened and test points are closed.
2) Ensure electricity is connected but switched “OFF”. The plug/socket fan & gas valve connections are correctly located and that the thermostat bulbs are fully inserted into the pocket. Test the operation of the temperature limiter by firmly pressing the button (in controls fascia.), removing the clip and bulb from the pocket and carefully applying a heat source to the bulb. The reset button should operate. If satisfactory, refit the bulb in the pocket and secure with the clip.
3) Check setting of both temperature limiter and control thermostat. The temperature limiter must not be set above 100°C maximum. Adjust if required, by turning the setting screw in the direction ±. Set control thermostat to required temperature.
4) With the fascia panel removed and hung on the clips, access the terminal connections at the bottom of the main PCB. Figure 9.1 shows the correct location of incoming wires. Check for correct setting of rotary switch ‘SW1’ on the control panel main PCB – refer to Figure 8.12 for details. Remove the wire link on connector ‘J4’ (black wire) on the PCB and insert a multi-meter set to read DC µA..
5) The Sherborne boiler is fully modulating, with the output dependant upon the control thermostat demand, hence to achieve max output the system must be cold.

Figure 11.1 Boiler Layout

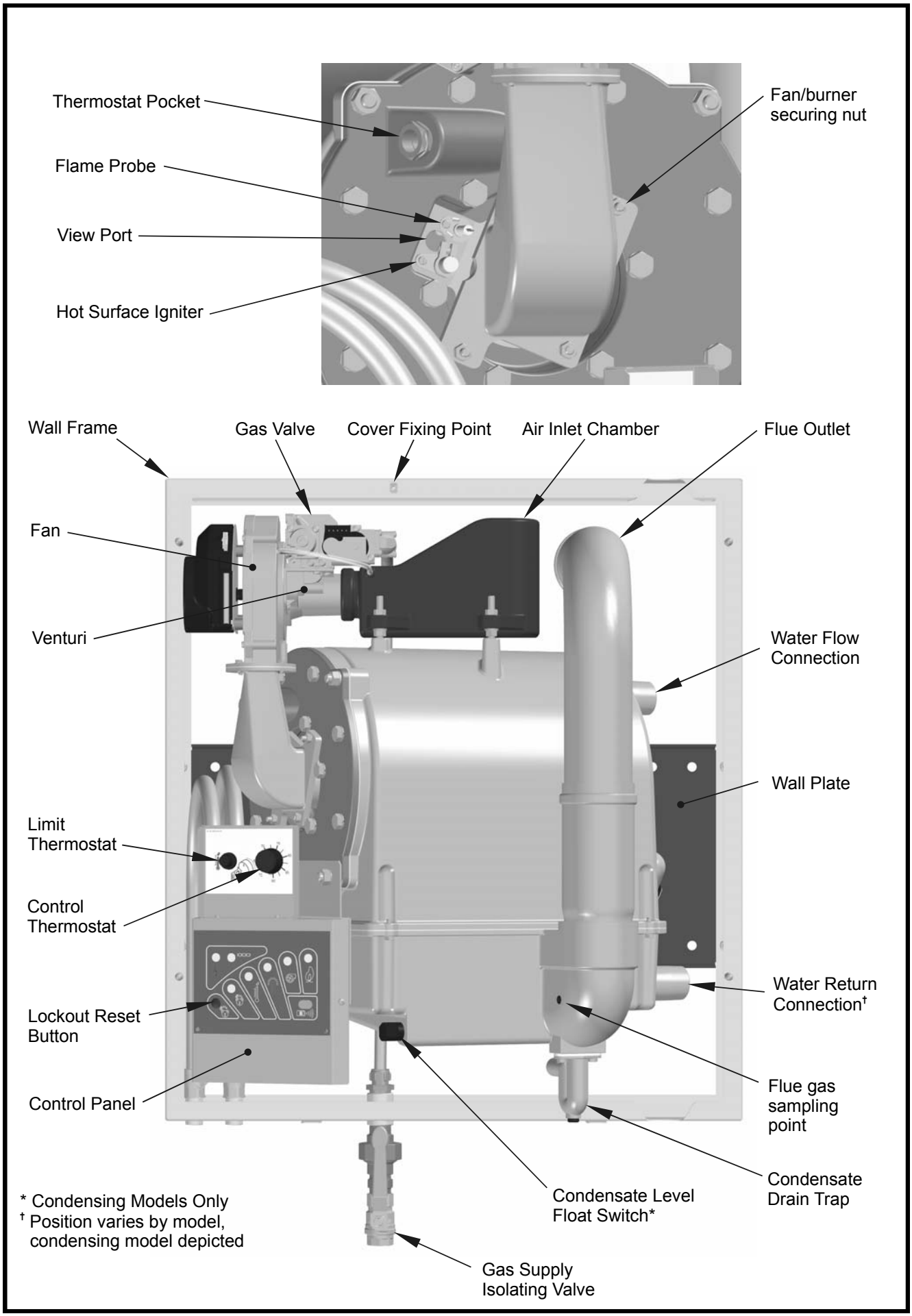


Figure 11.2 Gas Valve ~ Venturi Arrangement

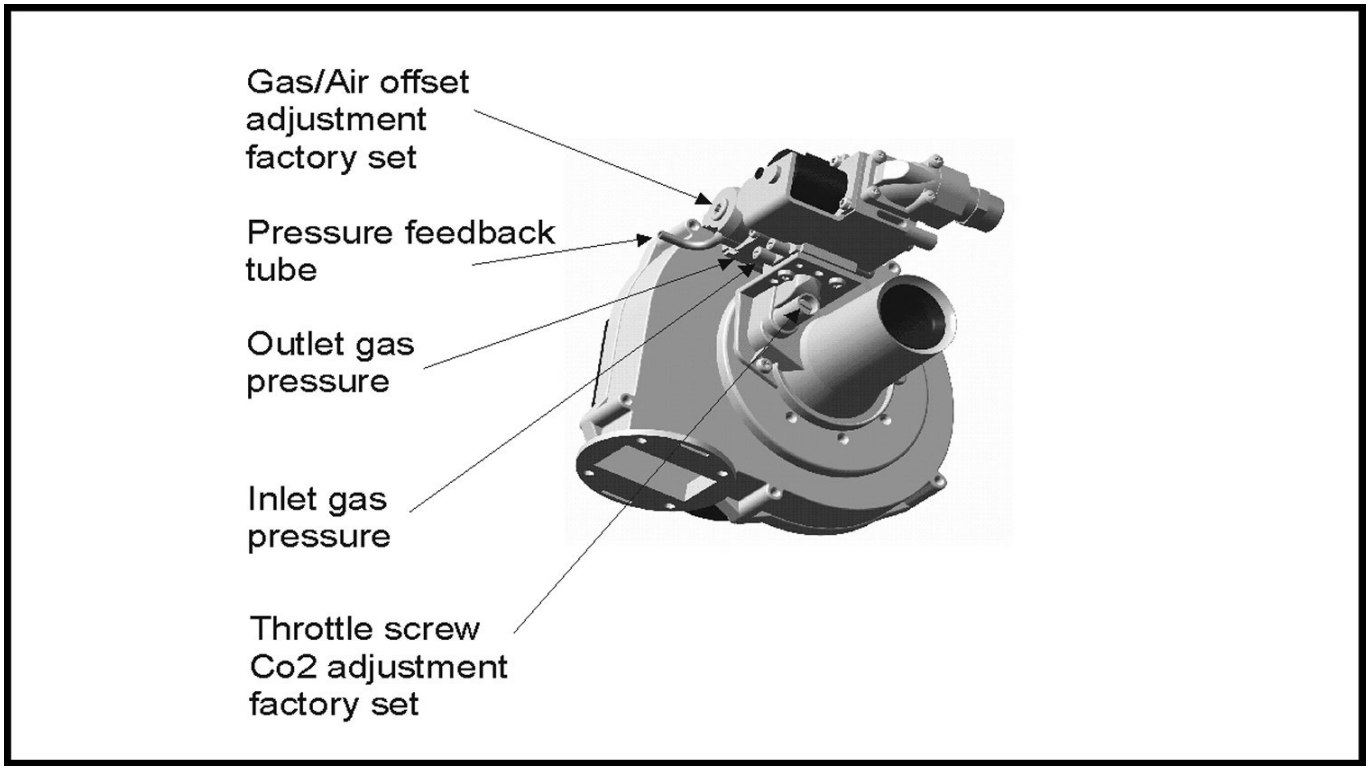
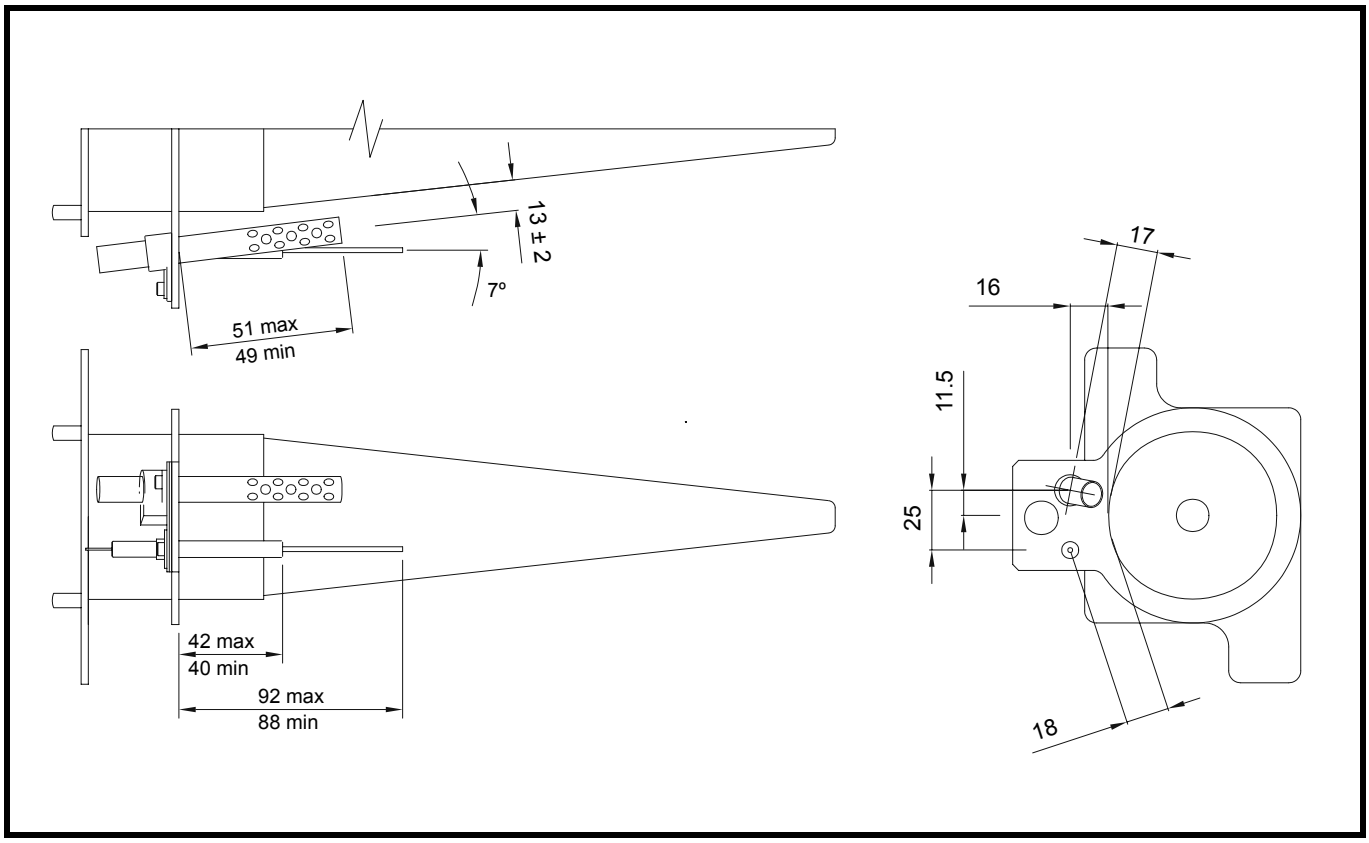


Figure 11.5 Position of Probes on Burner Assembly



11.5.2 Procedure For Initial Lighting

Ensure gas service valve is in the "OFF" position and the electricity supply to the boiler is isolated. Remove the fascia on the control panel and secure on the two hooks on the panel body. Rotate SW1 until the arrow points towards 'A' -- refer to fig 9.1. Link terminals R1 to R2 and R3 to R4 -- refer to fig 9.1. (Note this linking scheme will operate the boiler at full rate, to achieve running at reduced rate remove link between R3 and R4). Energise electrical supply and press lockout button on fascia to re-set the controls, (wait at least 15 seconds before pressing again if the lockout neon is not extinguished). Press the control thermostat knob to switch on the boiler and turn fully clockwise. The combustion fan will start and run for a purge period (approximately 20 seconds). During this time the 'fan on' neon should illuminate. After a delay, the HSI system will operate causing the igniter to glow (visible through the viewing port) for a period (approximately 10 seconds). As the gas service valve is closed, the controls should go to lockout after a further 5 seconds (red neon on fascia illuminated). If the above occurs correctly, OPEN the service valve and press re-set button on fascia.

After the purge period the ignition should be initiated and main gas valve will energise lighting the main burner. **Note!** the multi-meter should be reading at least 2µA. The boiler will operate at its start rate for 15 seconds before commencing modulation.

11.5.3 After the boiler has operated for approximately 10 minutes, press the control thermostat knob to switch off the boiler, and connect a manometer to the pressure test point **on the gas valve inlet**. Re-light the module checking the inlet pressure, see Figure 2.2. **No adjustment of the gas valve is permissible.**

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

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

Switch "OFF" the module, disconnect the manometer and close the pressure test point. Record all readings for future reference on the relevant commissioning sheet.
Isolate the electrical supply and rotate SW1 to set the required mode of operation for the boiler. Make/Break links R1 to R4 as dictated by site requirements. Re-energise electrical supply and switch on the boiler and allow system to warm up sufficiently to check operation of control thermostat.

If an optional Sequencing Interface Module is fitted to the boiler control panel turn rotary switch 'SW1' on the boiler main control PCB to position '1' for fully modulating sequenced operation. Also ensure that the rotary switch 'SW1' on the Sequencing Interface Module PCB is set to position '0'.

11.5.4. A combustion check must be taken when first commissioning the boiler. To achieve the specified combustion results, a plugged sample hole is provided in the sump casting panel adjacent to the flue outlet.

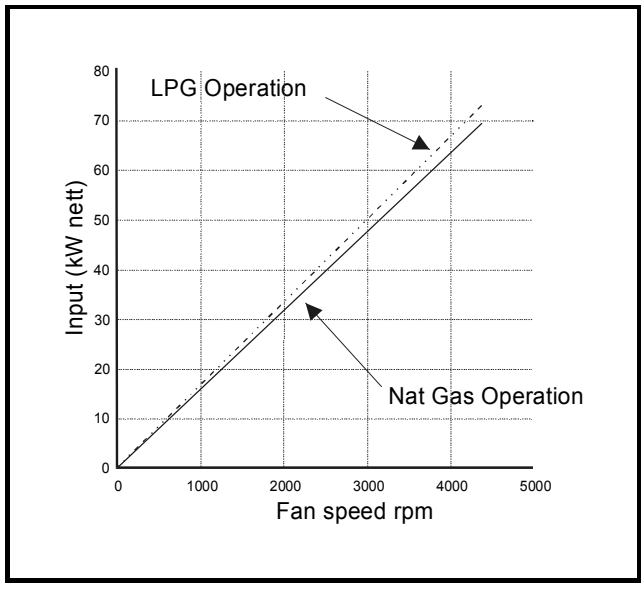
NOTE! Care should be exercised if the boiler is firing as the flue can achieve temperatures which can cause injury if touched.
Combustion figures for Natural Gas should be as follows :-

CO_2 = 8.5-9.0% (Dry flue gas)
O_2 = 5 - 6%
CO = 0-65ppm: However figure should not exceed 200ppm under normal operating conditions.

Note an approximation of boiler heat input implied from the displayed fan speed can be determined using figure 11.5.4. For exact determination a gas meter should be used.

For LPG Propane firing - See Appendix 'A'.

Figure 11.5.4 Fan Speed VS Boiler Input



11.5.5 To check for correct operation of the controller, break the multi-meter µA circuit. The boiler should lockout after approximately one second. Check that the flame has been extinguished. With the fascia panel removed, dis-connect the multi-meter and replace wire link and front cover. Wait at least 15 seconds before pressing re-set button on fascia to re-set controller. After a waiting period the boiler will light and run normally.

11.6 External Controls

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

11.7 Installation Noise

In order to avoid the possibility of noise from the installation, care should be taken to follow the manufacturer's instructions. Particular attention should be paid to minimum water flow rates. If in doubt contact the manufacturer.

11.8 User Instructions

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

12.0 FAULT FINDING

12.1 Fault Finding

12.1.1 Safety Features Summary

Should the control thermostat fail, the temperature limiter will trip thus creating an immediate shutdown regardless of firing mode. An overheat neon on the controls fascia will indicate this condition has occurred. If, after pushing the overheat reset button, the neon on the fascia does not extinguish and the boiler does not fire up, it could be that the boiler is still too hot, i.e. the limit thermostat has not re-set - see Figure 11. Allow the boiler to cool down. An investigation should be carried out to ascertain the reason for the overheating. An obvious reason would be too low a water flow rate through the boiler.

The flame is under constant supervision by the burner sequence controller. This is accomplished by measuring the flame's ability to rectify an AC current. If the flame diminishes for whatever reason and the rectified current drops below the controllers minimum detection current (1.2 µA DC), the controller will induce a lockout within 1 second, which will require a manual re-set (situated on the controls fascia) to re-start the control sequence - see Figure 11. Failure to establish and detect a flame during the light up sequence, results in burner shutdown and lockout within 5 seconds. If the boiler continues to lockout, then an investigation must be made to ascertain the cause. See Figures 12.1 to 12.4 for possible corrective scenarios. False flame signals at the start and during purge will cause the boiler to lockout.

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

12.1.2 Fault Finding Procedures

General fault finding is shown in Figures 12.1 to 12.4. If the boiler still cannot be operated satisfactorily after following the chart, consult the local office of Hamworthy Heating for assistance.

12.1.3 Possible Causes Of Boiler Lockout

1) Ignition failure due to no power at the Hot Surface Igniter.
2) Ignition failure due to faulty gas valve.
3) Ignition failure due to broken igniter or flame probe lead.
4) No ignition due to faulty controller.
5) Ignition failure due to blockage in the flue or air ducts.
6) Ignition failure due to gas supply problem.

13.0 SERVICING

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

13.1 Regular annual servicing is recommended, preferably by a Hamworthy appointed person, to ensure trouble free operation. Although cleaning of flueways may not be necessary on a yearly basis, it is important that all controls and safety features are checked for correct operation.
NOTE! Measuring flue gas CO_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 Annual Service

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

1) Remove the screw on the top of the outer cover and pull the cover away from the wall. The cover is located on the wall frame by four ball studs.
2) Disconnect the flame probe lead at the probe, and the igniter lead at the plug and socket. Unplug the connectors from the fan (two) and the gas valve. Disconnect the 15mm gas connection to the gas valve inlet.
3) Remove the front screw and loosen the rear screw securing the fascia panel to the controls panel body. Carefully withdraw the fascia panel and secure on the two hooks on the control panel body. Unplug the condense level switch from the PCB and feed the connector through the grommet in the rear of the controls panel (S70C only). Refit the fascia panel.
4) Remove the 2 – M10 nuts and washers securing

the controls panel to the heat exchanger, remove the controls panel and locate it on the left hand cover support bracket on the bottom of the wallframe.
5) Disconnect the pressure feedback tube from the gas valve. Remove the 4xM5 screws/nuts securing the fan/venturi/gas valve assembly to the transition duct. **Note** the use of a spacer on the screw/nut nearest to the heat exchanger casting. Withdraw the assembly from the air inlet duct. Remove the 2xM5 screws securing the venturi/gas valve assembly to the fan. Clean the fan impellor and venturi tube with a soft brush if necessary.
6) Remove the 2 – M6 nuts securing the burner assembly to the front of the heat exchanger – see Figure 11.1 and carefully remove the burner assembly, taking care not to damage the probes or burner.
7) Remove the single socket cap head screws securing the igniter and flame probe to the burner flange. Carefully withdraw the igniter and probe. Remove the loose flange and Mica sight glass noting the position for re-assembly. Check condition of the igniter assembly and probe for damage, clean or replace as required.
8) Remove the 2 x M6 nuts securing the transition duct to burner and separate the components.
9) Check the burner and clean using a soft brush if required (if possible use compressed air to blow out the dust inside the burner tube). Alternatively the burner tube can be washed using a soapy water solution. Tap the burner flange firmly downwards on a block of wood to dislodge any residual debris from inside the burner tube. A damaged burner should be replaced. (Fit the igniter and probe to the burner flange to check the respective positions - See Figure 11.5)

Re-assemble in reverse order checking the condition of gaskets and replace if necessary.

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

Carry out a combustion check by testing the flue gas CO_2 and CO levels as detailed in **Section 11.4**.

13.3 Two Year Service

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

To clean the heat exchanger, either ;
the sump must be removed. In the case of the S70C model this requires the boiler to be isolated from the system and drained down.
Or the heat exchanger must be removed from the aluminium casing, having isolated the boiler from the system and drained down. This is best achieved by lifting the boiler module off the wall plate. Go to **Section 13.3.2.**
13.3.1 Disengage the appliance flue connector from the sump casting. Remove the 2xM6 screws securing the condense trap to the sump and disconnect the section of pipe routed back to the wall frame.
S65 Model – support the sump from underneath and remove the 4xM6 securing nuts. Lower the sump casting to expose the heat exchanger and baffles.
S70C Model - having drained the system down, remove the return (lower) connection and heat exchanger connecting pipe from the rear of the boiler secured by M8 nuts and washers – see Figure 10.4. **Note**, there is an 'O' ring used on each fitting.
Support the sump from underneath and remove the 4xM6 securing nuts. Lower the sump casting and secondary heat exchanger assembly to expose the heat exchanger and baffles.
To clean the heat exchanger(s), the use of a high pressure water hose (40-80 psi) is recommended with the resultant discharge being collected in a suitable receptacle.

Primary Heat Exchanger - using the high pressure hose, insert the cleaning nozzle into the burner opening. Switch on the pump and traverse the full length and circumference of the heat exchanger to remove any deposits
Condensing Heat Exchanger - using the high pressure hose, traverse the exposed top and side of the heat exchanger angling the sump to drain.
13.3.2 Should a high pressure hose not be available, the respective heat exchanger will have to be removed from the aluminium casing after isolating from the flow and return water pipework. This involves drain down and the removal of all fittings from the rear of the boiler, secured by M8 nuts and washers – see Figure 10.4. **Note**, there is an 'O' ring used on each fitting.
Each module holds approximately 4 - 5 litres of water and weighs 50 - 60kg (depending on model). It is **strongly recommended** that a minimum of two people are on hand to lift the module from the wall. Alternatively, two lifting eyes are provided for use with suitable lifting equipment.
13.3.3 Carefully place the module onto two blocks of wood so that the heat exchanger front casting is supported off the floor to protect from damage.
Remove the 4xM10 nuts securing the front casting to the aluminium casing and carefully lift the casing vertically upwards away from the heat exchanger. Unhook the stainless steel springs and remove the 16 stainless steel baffle plates to expose the finned tube bank. Wire brush both sides of the baffles to remove any deposits.
Thoroughly wire brush the finned tubes.

13.3.5 Re assemble in reverse order and refit heat exchanger to the casing using a new gasket. Replace the water connection gaskets on the rear of the boiler. Re-connect the water connections using new 'O' rings. Carefully lift the module back onto the wall plate and secure with the M10 nut and bolt on the left hand side mounting. Re-fit the system pipework and check for soundness.

Figure 12.1. Fault Finding Procedures.

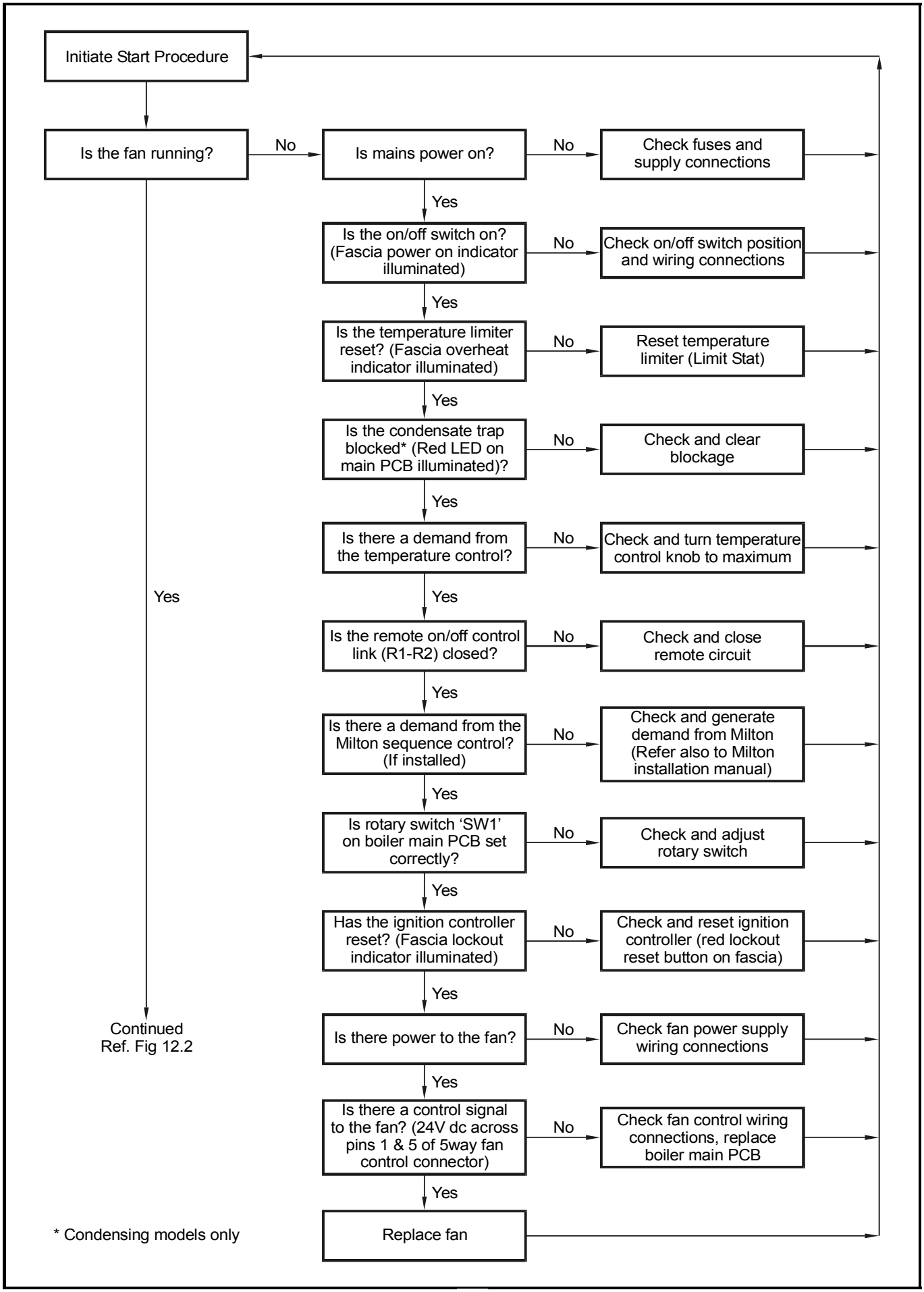


Figure 12.2. Fault Finding Procedures.

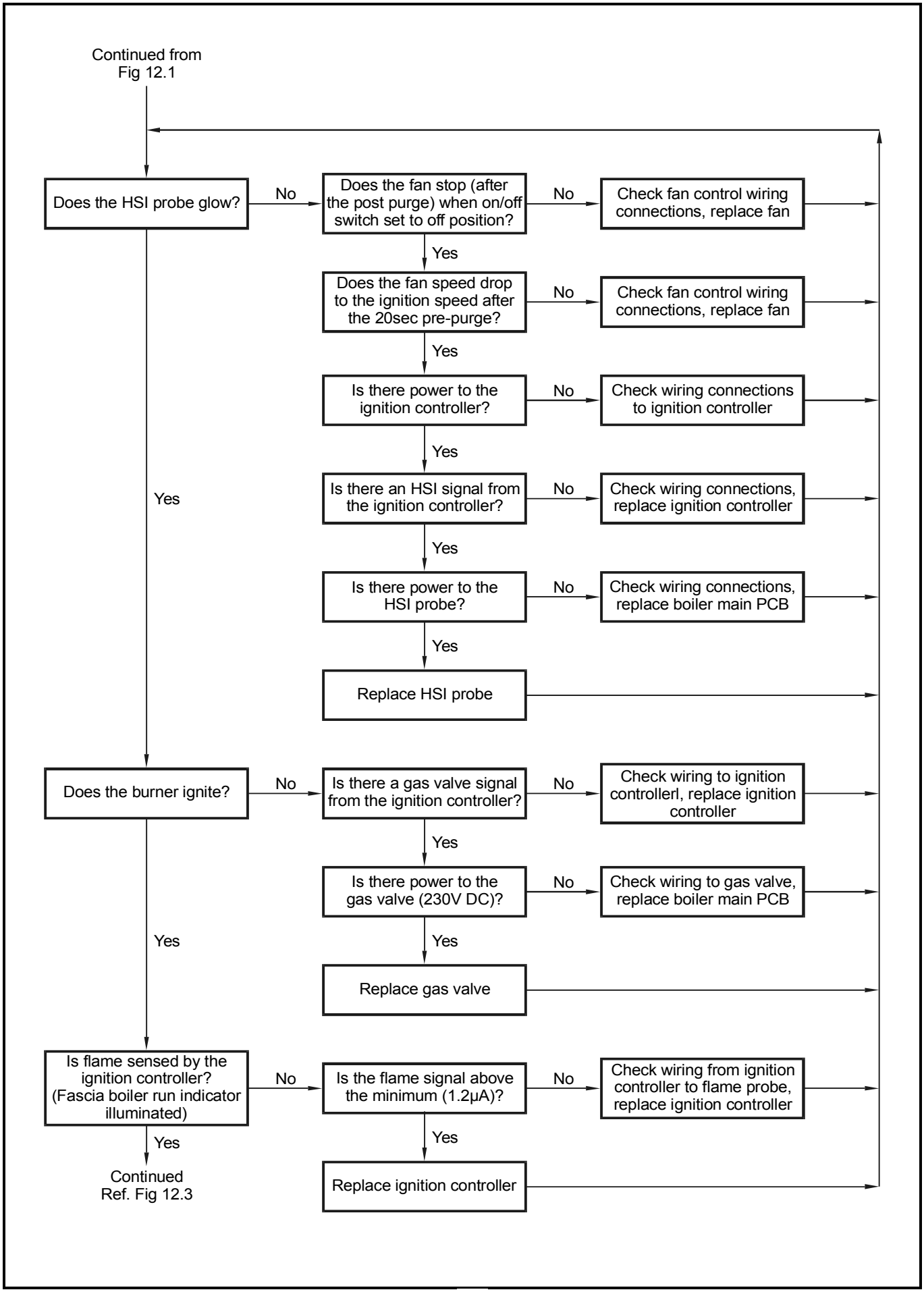


Figure 12.3. Fault Finding Procedures.

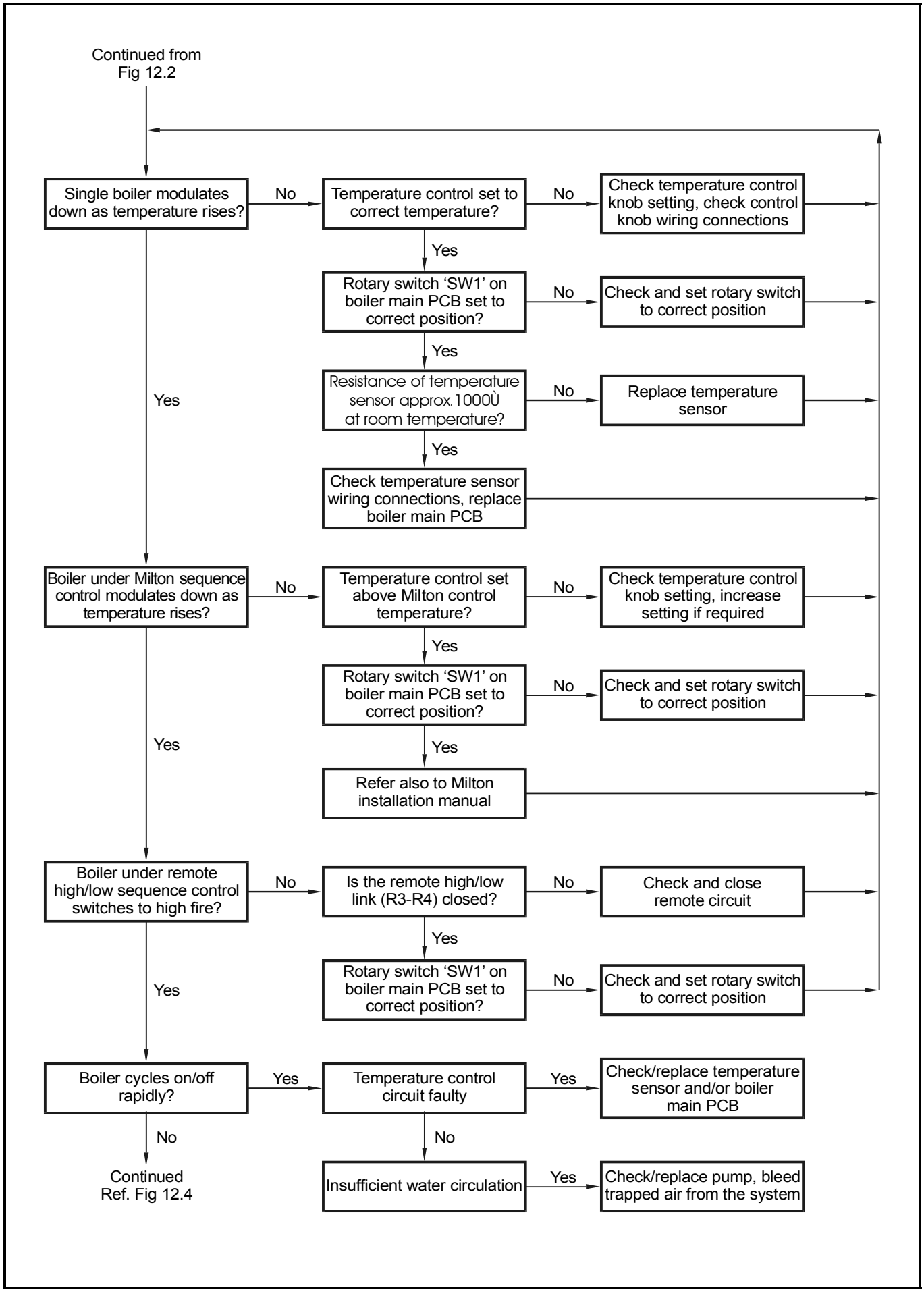
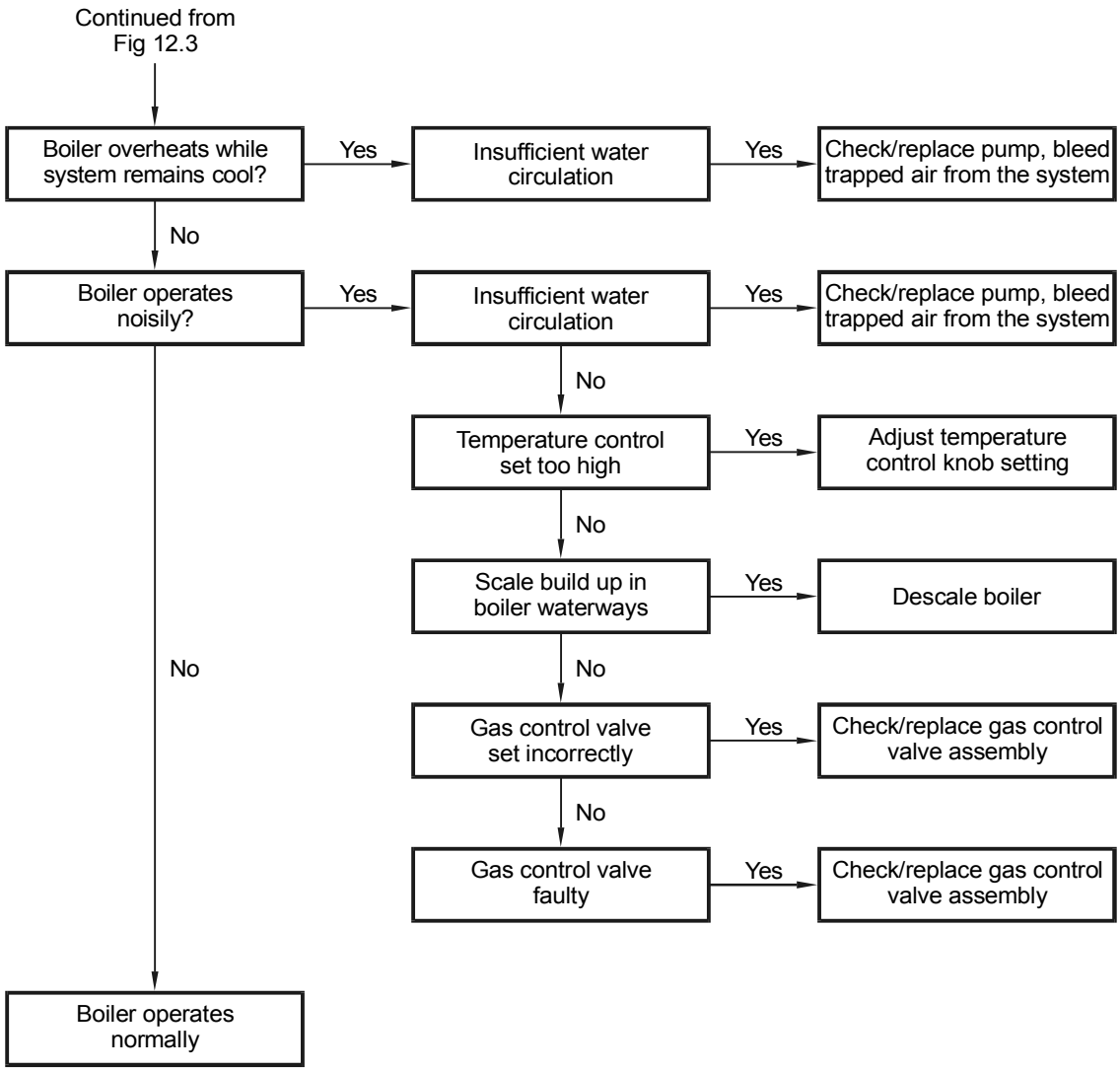


Figure 12.4. Fault Finding Procedures.



Boiler Fault Indication Certain boiler fault conditions are indicated by a sequence of flashes of the fascia fan running indicator	
Number of Flashes	Fault Condition
1 Flash	Ignition Lockout
2 Flashes	Fan Fault (Running at wrong speed or running when should be stopped)
3 Flashes	Condensate Drain Trap Blocked (Condensing models only)
4 Flashes	Overheat (high limit thermostat tripped)
5 Flashes	Premature flame detection (Flame sensing circuit fault)

13.4 Re assemble the fan/transition/burner assembly using new gaskets where necessary, and refit in reverse order. **Test all gas joints broken or disturbed for soundness before firing**. Re-light the boiler, check and adjust the combustion as described in **Section 11.4.**

Check thermostat settings and adjust if required.

Re-fit the boiler cover and tidy floor around boiler as necessary.

14.0 REPLACEMENT OF FAILED COMPONENTS

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

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

To access the components, remove the screw on the top of the outer cover and pull the cover away from the wall. The cover is located on the wall frame by two ball studs.

14.1 Hot Surface Igniter and Flame Probe Assembly. Part Nos. 563801011 & 533805010

Note :- the igniter and probe ceramics are very fragile. Reference to Figure 11.5 shows position of the igniter and flame probe assembly. Unplug the igniter from the harness and remove the single socket cap head screw securing the igniter to the burner flange. Carefully withdraw the igniter, renew as required and generally remove any loose sooty deposits, clean as required. Replace igniter and secure socket cap head screw holding the igniter to the burner flange. Disconnect the flame sensing probe connection, remove the single socket cap head screw securing the probe to the burner flange and carefully withdraw the probe. Renew as required and generally remove any loose sooty deposits, clean as required.
Note – do not remove both securing screws as the separate flange and Mica sight glass will become detached.

14.2 Control Thermostat Renewal

The thermostat consists of a potentiometer and remote sensor**. Part nos. 563901312 & 533901378**.

To replace the thermostat or sensor, the following procedure must be followed.
NOTE! Record existing temperature setting of thermostat for reference before removal. Remove the clip securing the thermostat phials in the pocket and carefully remove thermostat phials. Remove the screw securing the fascia panel to the controls housing and carefully lower the front panel and hang on the two hooks provided on the control panel body. Disconnect the sensor cable plug 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 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 clockwise and fit the tightening the collet nut. Fit the indicator disc aligning the mark with ‘max’ on the graduation scale. Refit and secure the fascia panel.
Run the boiler and turn the thermostat up and down to check for correct operation. Set thermostat to previously noted setting.

14.3 Temperature Limiter (Limit Stat) Renewal. Part Nos. 533901179

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. Remove the bulb from the heat exchanger pocket and check the operation of the device by carefully applying a heat source to the bulb. Set temperature limiter to 100°C and re-assemble temperature limiter ensuring correct cable notation. Refer to thermostat diagram if terminal identification differs from those given in Figure 9.1 (Boiler schematic wiring diagrams).

14.4 Main Gas Valve / Venturi Part No. 533903033

Note: the gas valve and venturi are supplied as a matched and factory set assembly and must not be tampered with or adjusted.
1) To replace the gas valve/venturi it is preferable to remove the complete fan assembly.
2) Unplug the connectors from the fan (two) and the gas valve. Remove the 4xM4 screws securing the die-cast gas valve inlet elbow to the gas valve taking care not to loose the ‘O’ ring.
3) Disconnect the pressure feedback tube from the gas valve. Remove the 4xM5 screws/nuts securing the fan/venturi/gas valve assembly to the transition duct. **Note** the use of a spacer on the screw/nut nearest to the heat exchanger casting. Withdraw the assembly from the air inlet duct.
4) Remove the 2xM5 screws securing the venturi/ gas valve assembly to the fan noting the cork sealing gasket.
5) Remove the copper feedback connecting elbow

from the gas valve and refit to the replacement valve using a thread sealant. When replacing the gas valve, it is advisable to renew the `O` ring. See recommended spares section for Part Nos.
For LPG applications, ensure that the gas orifice plate is undamaged and fitted into the recess in the gas valve outlet. (Refer fig 11.2). Do not over tighten screws in gas valve body.
7) Re-assemble in reverse order using new gaskets where necessary and ensuring correct orientation of the gas valve. Ensure electrical plugs are firmly and correctly located. Switch on gas and power supply and check for integrity of all joints using a proprietary leak detector. Ensure gas valve operation is correct and safe before continuing.
6) Re-light the boiler, check and adjust the combustion as detailed in **Section 11.4**

14.5 Fan Assembly
Part No. 563901376

1) To replace the fan it is preferable to remove the complete gas valve/venturi and fan assembly.
2) Unplug the connectors from the fan (two) and the gas valve. Disconnect the 15mm gas connection to the gas valve inlet.
3) Remove the 4xM5 screws/nuts securing the fan/ venturi/gas valve assembly to the transition duct. **Note** the use of a spacer on the screw/nut nearest to the heat exchanger casting. Withdraw the assembly from the air inlet duct.
4) Remove the 2xM5 screws securing the venturi/ gas valve assembly to the fan noting the cork sealing gasket.
5) Re-assemble in reverse order using new gaskets where necessary. Ensure all screws are tightened and electrical plugs are firmly and correctly located.
6) Re-light the boiler, check and adjust the combustion as detailed in **Section 11.4**

14.6 Ignition Sequence Controller.
Part No. 533901379

1) Remove the front screw and loosen the rear screw securing the fascia panel to the controls panel body. Carefully withdraw the fascia panel and secure on the two hooks on the control panel body.
2) Disconnect the plug connectors from the ignition pcb, remove the 2xM4 securing screws and withdraw the control.
3) Re-assemble in reverse order.
4) Re-light the boiler and check for operation by turning the thermostat up and down.

14.7 Main control PCB
Part No. 533901380 – (S65) Nat Gas
Part No. 533901381 – (S70c) Nat Gas
Part No. 533901415 – (S65) LPG
Part No. 533901416 – (S70c) LPG

1) Remove the front screw and loosen the rear screw securing the fascia panel to the controls panel body. Carefully withdraw the fascia panel and secure on the two hooks on the control panel body. Disconnect the plug connectors from the main PCB. Carefully remove the board from the plastic support pillars and withdraw the control.
2) Re-assemble in reverse order.
Re-light the boiler and check for operation by turning the thermostat up and down.

15.0 RECOMMENDED SPARES

Please Note! To ensure the correct spare parts are despatched by our spares department, it is imperative that the complete Boiler/Control Panel Serial Numbers are given. The Boiler Serial Number is located on the Data Plate affixed to the aluminium casing. The Electrical Serial Number is located on the mounting bracket of the Control panel. These numbers **MUST** be quoted when ordering spare parts.

SPARES ITEM	**PART NO.**
ELECTRICAL ITEMS	
Fuse - T1A Slow Blow 5dia x 20mm - Boiler main PCB control fuse 'F1' (RH)	533922006
Fuse - F1A Fast Blow 5dia x 20mm - Boiler main PCB fan supply fuse 'F2' (LH)	747225941
Fuse - T250mA Slow Blow 5dia x 20mm - Sequencing Interface Module	533922008
Boiler main PCB (S65) Nat Gas	533901380
Boiler main PCB (S70c) Nat Gas	533901381
Boiler main PCB (S65) LPG	533901415
Boiler main PCB (S70c) LPG	533901416
Fascia PCB	533901382
Ignition Sequence Controller	533901379
Fan assembly	533901376
Control Thermostat Sensor	533901378
Control Thermostat Potentiometer & cable assembly	563901312
Sequencing Interface Module	533901421
MECHANICAL ITEMS	
Burner Assembly	563301029
Spares Gasket Set	563605209
Small Service Kit	563605293
Gas Valve / Venturi	533903033
Gas Orifice Plate – LPG	531101010
Hot Surface Igniter	563801011
Flame Sensing Probe	533805010
Temperature Limiter	533901179
Gasket - Burner to Heat Exchanger	531201007
Fan/Venturi Gasket	531201067
Flue Seal 50Ø	532511035
Flue Seal 80Ø	532511036
Flue Seal 100Ø	532511037
Viewing port (sight glass)	539907001

For service or spares please contact :-

Hamworthy Heating Ltd.
Fleets Corner
Poole
Dorset BH17 0HH

Phone No. 01202 662500
Fax. No. 01202 665111
Service 01202 662555
Spares 01202 662525
Technical ..... 01202 662527 / 28

Appendix A
Sherborne

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 GUIDES.

1.0 INTRODUCTION

The operation of the Sherborne range of boilers on LPG-Propane (3^{rd} family)I_{3P} is similar to that on Natural Gas (2^{nd} 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 addition of a main gas orifice located in the gas valve outlet – see Figure 11.2.

b) Relevant labels are replaced to indicate the appropriate gas for which the boiler is set up to fire.
c) The nominal gas inlet pressure for propane should be 37mbar.

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.

2.2 Performance and General Data Information – LPG Propane

GENERAL DATA		Sherborne S65	Sherborne S70*c*
Boiler Input kW (Gross)	- maximum	76.0	
Boiler Input kW (Nett)	- maximum	70.0	
Boiler Input kW (Gross)	- minimum	15.2	
Boiler Input kW (Nett)	- minimum	14.0	
Boiler Output kW	-minimum	13.6	
Boiler Output kW (condensing 50)	- maximum		71.4
Boiler Output kW (non condensing)- maximum		64.0	66.5
FLUE DATA			
Nominal Flue Dia. mm		Single pipe = 100, dual concentric = 80/125 or 100/150	
Approx. Flue Gas Temperature (condensing) °C		--	55
Approx. Flue Gas Vol. @ 10.5 – 11.5% CO_2 & NTP(Dry) m^3/h *		102	
GAS DATA			
Nominal Gas Inlet Press.	mbar	37	
Maximum Gas Inlet Press.	mbar	45	
Gas Flow Rate -maximum	m^3/h (kg/h)	2.9 (5.5)	
Gas Inlet Connection Pipe Thread Size		Rp¾"	

11.0 COMMISSIONING AND TESTING

11.5.4 Combustion Checks

Combustion figures for Propane should be as follows :-

CO_2 = 9.5-10.0% (Dry flue gas)
O_2 = 5-6%
CO = 0-50ppm: However figure should not exceed 200ppm under normal operating conditions.

USEFUL USER INFORMATION

INSTALLER	SITE ADDRESS

DATE OF COMMISSIONING:

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

NOTES:

NOTES:

NOTES:

Notes

Connect direct

Direct Dial Telephone and Fax Numbers

Hamworthy
HEATING & HOT WATER PRODUCTS

- boilers
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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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- 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**

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tel: **02890 849826** fax: **02890 847443**

Website

www.hamworthy-heating.com

Associate Companies, Offices and Agents throughout the World.