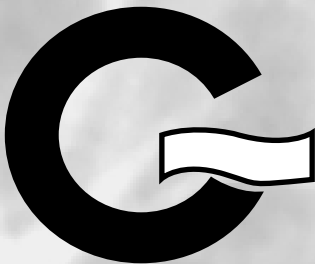


# *Gledhill High Efficiency Combination Boiler*

*Model: GB35C*

## **DESIGN, INSTALLATION AND SERVICING INSTRUCTIONS**



### **THE GAS SAFETY (INSTALLATION AND USE) REGULATIONS**

**In your own interest and that of safety, it is  
law that all gas appliances are installed by  
competent persons and in accordance with the  
above regulations.**

# IMPORTANT NOTES

## GENERAL

ISSUE 5: 06-08

The Gledhill GB35C is a fully automatic gas fired wall mounted high efficiency condensing combination boiler. This room sealed and fan assisted boiler is designed to provide both central heating and mains pressure domestic hot water. The boiler GB35C is set to give a maximum output 28.9kW (condensing) for central heating and 35.6kW for domestic hot water.

The boiler is only suitable for use in fully pumped sealed heating systems and the controls give priority to domestic hot water.

Once the controls are set, the boiler operates automatically and the boiler controller will automatically activate the frost protection program to prevent the boiler from freezing. The boiler is supplied with a filling loop and an integral central heating programmer.

## IMPORTANT NOTES

- This boiler is suitable only for installation in GB and IE and should be installed in accordance with the rules in force
- This boiler is for use when supplied with Natural Gas (G20) only at 20mbar in GB & IE only from a governed gas supply meter
- Appliance category: I2H
- Appliance types: C13, C33, C53

These instructions cover the following boiler models and only apply to the appliances sold and installed in Great Britain (GB) and Ireland (IE). This appliance has been certified for safety and therefore these instructions must be followed. Both the appliance and the Installation Instructions must not be modified unless recommended and approved by Gledhill Water Storage Limited in writing. Any alteration not approved by Gledhill Ltd., could invalidate the certification as well as the boiler warranty and may also infringe the current issue of statutory requirements i.e. "The Gas Safety (Installation and use) Regulations 1998" in GB and current addition of I.S. 813 "Domestic Gas Installations" in IE.

"In your own interest, and that of safety, 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."

## CONTROL OF SUBSTANCES HARMFUL TO HEALTH

When working with insulation materials, avoid inhalation as it may be harmful to health, Avoid contact with skin, eyes, nose and throat. Use disposable protection. Dampen the material and ensure that the area is well ventilated.

## INSTALLATION INSTRUCTIONS

These instructions are an integral part of the appliance and must be read before installing or lighting the appliance. Also to comply with the current issue of the Gas Safety (Installation and Use) Regulations, these instructions must be handed to the user on completion of the installation.

**Gledhill Water Storage Limited**  
**Sycamore Estate**  
**Squires Gate**  
**Blackpool**  
**Lancs**  
**FY4 3RL**

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# 1.0 IMPORTANT INFORMATION

## 1.1. BUILDING REGULATIONS AND COMMISSIONING

The Building Regulations (England & Wales) require that the installation of a heating appliance be notified to the relevant Local Authority Building control Department. From 1st April 2005 this can be achieved via a Competent Person Self Certification Scheme as an option to notifying the Local Authority directly. Similar arrangements will follow for Scotland and will apply in Northern Ireland from 1st January 06.

CORGI operates a Self Certification Scheme for gas heating appliances.

Gledhill fully supports the industries aims to improve the standards of installation and commissioning of central heating systems in UK and to encourage the regular servicing of all central heating systems to ensure safety and efficiency.

Building Regulations require that the heating installation shall comply with the manufacturer's instructions. A commissioning checklist is provided on Page 51 and it is important that this is completed by the competent installer. This check list only applies to installations in dwellings or (some related structures defined in the Regulations)

## 1.2. GAS TESTING, CERTIFICATION AND CE MARK

This boiler has been tested and certified for safety and performance. It is important that no alteration is made to the boiler unless it is approved in writing by Gledhill Water Storage Ltd. It meets the requirements of Statutory Instrument 'The Boiler (Efficiency) Regulations 1993 No 3083' and is deemed to meet the requirements of Directive 92/42/EEC on the energy efficiency requirements for new hot water boilers fired with liquid or gaseous fuels.

The boiler has been certified by the Notified body 'Advantica 0087' and the production is certified by the notification body 'BSI 0086'. The CE mark on the appliance shows compliance with:

- (a) Directive 90/396/EEC on the approximation of laws relating to appliances burning gaseous fuels.
- (b) Directive 73/23/EEC on the harmonisation of laws of the Member States relating to electrical equipment designed for use within certain voltage limits.
- (c) Directive 89/336/EEC on the approximation of the laws of Member States relating to electromagnetic compatibility.

## 1.3. SPARE PARTS

When replacing spare parts on this appliance, remember to use only spare parts that you can be assured conform to the safety and performance specifications of the manufacturer. Do not use reconditioned or copy parts that have not been clearly authorised by Gledhill Water Storage Ltd.

## 1.4. HANDLING AND STORING THE APPLIANCE

This appliance should be handled carefully to avoid damage and any manual handling/lifting operations will need to comply with the requirements of the Manual Handling Operations Regulations issued by the H.S.E.

During the appliance installation it will be necessary to employ caution and assistance whilst lifting as the appliance or component exceeds the recommended weight for a one man lift.

Take care to avoid trip hazards, slippery or wet surfaces. In certain situations it may be necessary to use mechanical handling aids.

If the unit needs to be stored prior to installation it should be stored upright in a dry environment and on a level base.

## 1.5. SYSTEM INSTALLATION

In GB the installation must be carried out by a CORGI Registered installer and it must be carried out in accordance with the latest edition of the following relevant requirements:-

- Gas Safety (Installation and Use) Regulations
- The Building Regulations, The Building Regulations (Scotland), The Building Regulations (Northern Ireland) – as appropriate
- The Water Fittings Regulations or Water Byelaws in Scotland
- Health & Safety Document No. 635 – The Electricity at Work Regulations 1989.
- The current IEE Wiring Regulations

The installation should also conform to the relevant requirements of following British Standards and Codes of Practices:-

- BS 5440 Part 1 - Flues
- BS 5440 Part 2 - Ventilation
- BS 5449 - Forced circulation hot water systems
- BS 5546 - Installation of hot water supplies for domestic purposes
- BS 7074 - Expansion vessels and ancillary equipment for sealed water systems
- BS 6798 - Installation of gas fired hot water boiler
- BS 6891 - Gas installation
- BS 7593 - Treatment of water in domestic hot water central heating systems
- IGE/UP/7/1998

In IE, the installation must be carried out by a competent Person and installed in accordance with the current edition of I.S.813 "Domestic Gas Installations"; the current Building Regulations and reference should be made to the current ETCI rules for electrical installations. The following BS standards give valuable additional information:-

- BS 5449 - Forced circulation hot water systems
- BS 5546 - Installation of hot water supplies for domestic purposes
- BS 7074 - Expansion vessels and ancillary equipment for sealed water systems
- BS 7593 - Treatment of water in domestic hot water central heating systems

## 1.6. WARNINGS

- (a) **Gas Leak or Fault**  
If a gas leak or fault exists or is suspected, turn the boiler mains electricity supply off and turn off the gas supply at the meter. Consult your local gas company or your local installation/servicing company.
- (b) **Clearances**  
If fixtures are positioned close to the boiler, space must be left as shown in figure 4.3, section 4.4. Enough space must also be left in the front of the boiler to allow for servicing.
- (c) **Sheet Metal Parts**  
This boiler contains metal parts (Case & components) and therefore care should be taken when handling and cleaning, with particular regard to edges.
- (d) **Sealed Components**  
This boiler uses a fully premix burner with an air/gas ratio controller therefore the burner input i.e. CO and CO<sub>2</sub> settings and the burner off set pressure are factory set and sealed and require no onsite adjustments during installation or routine servicing.

Under no circumstances should the user should interfere with the sealed components as this could result in a potentially dangerous situations arising. If sealed components in the appliance are replaced and/or re-commissioned in the field then these must be done strictly in accordance with manufacturer's instructions and these components must be re-sealed.

## 1.7 EQUIPMENT SELECTION

This information is provided to assist generally in the selection of equipment. Responsibility for selection and specification of our equipment must, however, remain that of our customers and any expert or consultants concerned with the installation(s). Therefore please note that:-

- (a) We do not therefore accept any responsibility for matters of design selection or specification for the effectiveness of an installation containing one of our products.
- (b) All goods are sold subject to our Conditions of Sale which are set out in the Appendix to this document.

## 1.8 ELECTRICITY SUPPLY FAILURE

- (a) This boiler must be earthed and the boiler will not work without an electricity supply (Class I appliance).
- (b) Reset any external controls to resume normal operation of the central heating.
- (c) Normal operation of the boiler should resume when the electrical supply is restored. If the boiler does not resume normal operation turn the mains switch off and on. If the boiler does not resume normal operation after this, the overheat thermostat may have operated. The overheat thermostat would only operate under abnormal conditions and, under these circumstances it would be advisable to consult your installation/servicing company.

## 1.9 PROTECTION AGAINST FREEZING

- (a) The boiler has a built in frost protection programme as long as the electricity and gas are left switched on. The boiler controller operates the burner and the system pump when the temperature inside the boiler falls below 5°C.
- (b) Any other exposed areas of the heating and hot water system should be protected as normal by a separate frost thermostat / pipe thermostat
- (c) If the mains electricity and gas supplies to the boiler system are to be turned off for any long periods during severe weather, it is recommended that the whole system including the boiler should be drained to avoid risk of freezing. In this case ensure that the immersion heater in the cylinder (if fitted) is also switched off.
- (d) Contact your installation/service company as draining, refilling and pressurising of a sealed heating system MUST be carried out by a competent person.
- (e) As a safety feature, the boiler will stop working if the condensate drain becomes blocked. During freezing conditions this may be due to ice forming in the condensate drain if this has been installed external to the house. Ice blockage should be released by use of warm cloths on the pipe. Contact your installation/service company if the fault persists.

## 1.10 BOILER INSTALLATION IN A COMPARTMENT OR CUPBOARD

If the boiler is fitted into a compartment or cupboard, it does not require ventilation openings. However, do not use the compartment or cupboard for storage.

## 1.11 BOILER CASING

Do not remove or adjust the casing in any way, as incorrect fitting may result in incorrect operation or failure to operate at all.

## 1.12 CONDENSATE DRAIN

The condensate drain must not be modified or blocked. See section 4.4 (e) for further details.

# IMPORTANT INFORMATION

## 1.13 PLUMING FROM THE FLUE TERMINAL

This is a high efficiency condensing boiler and the flue gas temperature will be low. Therefore like all condensing boilers this appliance will produce a plume of condense in cool weather. It is normal and not a fault condition, but this should be taken into account when positioning the boiler / flue terminal.

## 1.14 CLEANING

This boiler contains metal parts and therefore care should be taken when handling and cleaning, with particular regard to edges.

The boiler casing can be cleaned using a mild liquid detergent with a damp cloth and then a dry cloth to polish. Do not use any form of abrasive or solvent cleaner as you may damage the finish.

## 1.15 MAINTENANCE AND SERVICING

This appliance must be serviced and installed by a competent person e.g. CORGI Registered installer. All CORGI registered installers carry a CORGI ID Card and have a registration number. You can call CORGI direct on 01256 372300.

For the continued efficient and safe operation of the boiler, it is recommended that it is checked and serviced at regular intervals. The frequency of service will depend upon the installation condition and usage, but in general, once a year is recommended.

If this boiler is installed in a rented property, there is a duty of care imposed on the owner of the property by the current issue of the Gas Safety (Installation and Use) regulations, Section 35.

The installation/service engineer should complete the commissioning check list and service record log on completion of commissioning and service work.

## 1.16 REPLACEMENT PARTS

Free of charge replacement for any faulty components are available from Gledhill Ltd during the in-warranty period (normally 12 months).

After this the spares can be obtained direct from Gledhill Ltd using the 'Speed Spares' service. Help and advice is also available from our Technical Help Line on 08449 310000.

Please quote the name, model and serial number of the appliance as well as your CORGI registration details when requesting help or ordering spares. The name and model will be on the name badge on the front of the appliance and the serial number is shown on the information label on the bottom right hand side inner panel.

## 1.17 CONTINUOUS IMPROVEMENTS

In the interest of continuously improving the Gledhill Boiler range, Gledhill Water Storage Ltd reserves the right to modify the product without notice and in these circumstances this booklet which is accurate at the time of printing should be disregarded.

### 2.1 DESCRIPTION

The Gledhill GB35C is a fully automatic, wall mounted gas fired, high efficiency condensing combination boiler (Figure 2.1). It is a room sealed fan assisted appliance and suitable for sealed central heating system and mains pressure domestic hot water only. The maximum outputs of the boiler are: -

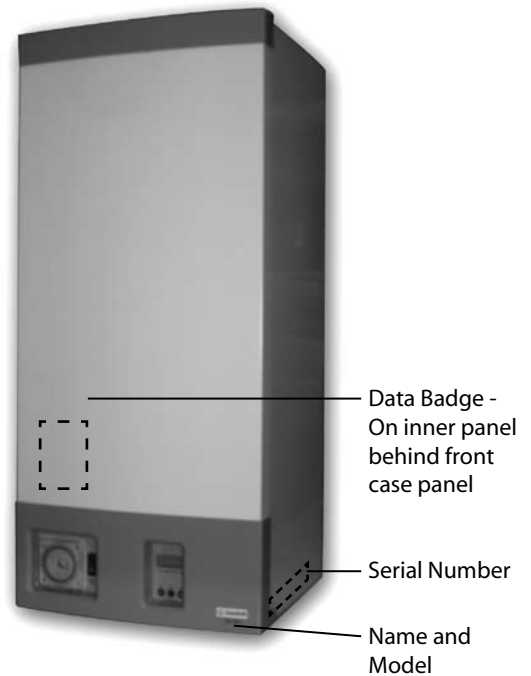
For central heating: 26.0 kW (Condensing) / 28.9kW (Non-Condensing)  
For domestic hot water: 35.6 kW

It is designed for use on Natural Gas (G20), and governed meter supply only. It is only suitable for use on fully pumped sealed heating systems and the controls give priority to domestic hot water. The boiler is supplied with a fling loop and a central heating programmer.

The boiler must be installed with one of the purpose designed Gledhill flue systems such as the standard balanced flue kit part no GT461. Various flue extensions, bends, vertical flue kits and plume management kits are available as optional extras. These are detailed in a separate manual.

The boiler data badge gives details of the model, serial number, thermal data and the Gas Council number and is situated on the inner door panel. It is visible when the front panel is removed. The unique boiler model is shown on the front case panel and the serial number is shown on the information label on the bottom right hand side inner panel (Figure 2.1).

**Figure 2.1**

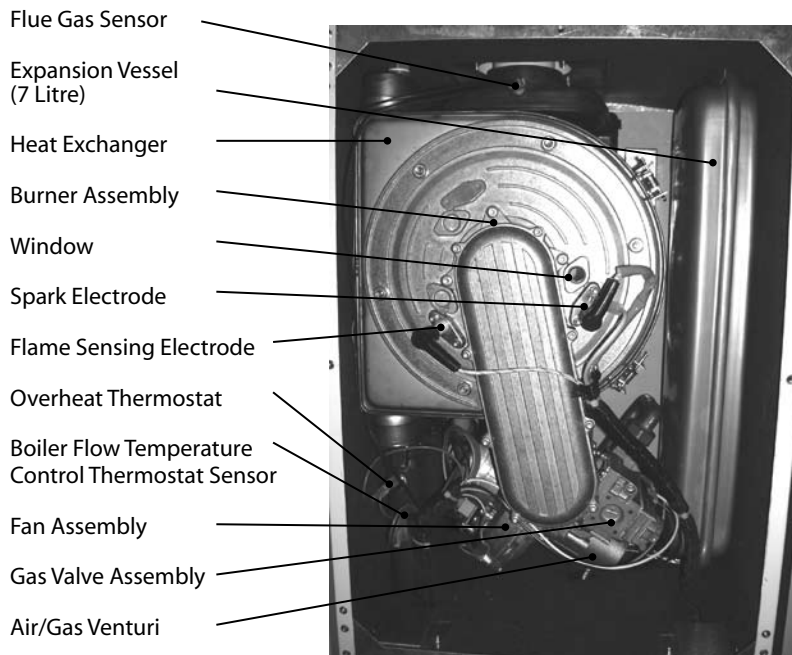


## 2.0 TECHNICAL INFORMATION

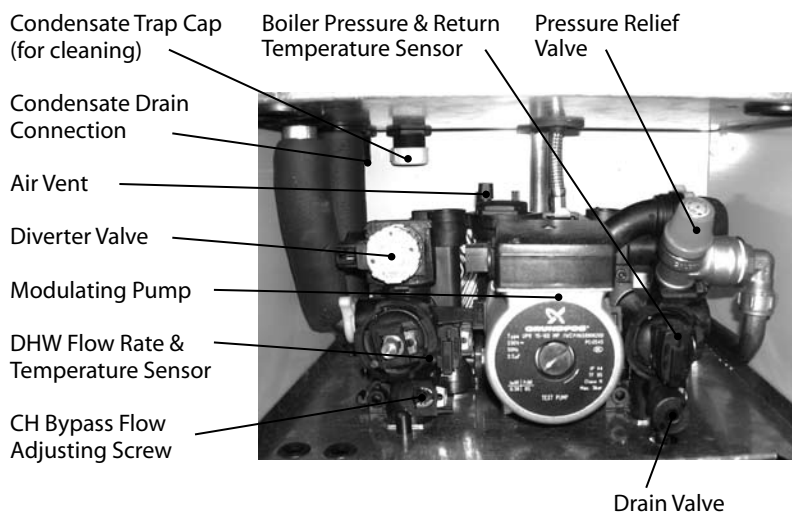
### 2.2 OPERATION

The main components of the boiler are shown in figures 2.2a and 2.2b. The status of the boiler and the central heating and hot water demands and the corresponding boiler functions are indicated on the 4 x 7 segment display as described in section 2.2.(e).

**Figure 2.2a**



**Figure 2.2b**





### a) Central heating mode (Figure 2.3)

The demand for central heating is generated when both the programmer and the room thermostat are calling for heat. The demand for central heating ceases if either the programmer or the room thermostat stops calling for heat. Hot water has priority and therefore if a hot water heating demand is active, a central heating demand will not be accepted.

When a central heating demand is sensed and accepted, the 3-port diverter valve is moved to the central heating mode and the pump circulates the water through the primary circuit and its speed is regulated to maintain the boiler return temperature measured by sensor, S4, at a pre-set value (60°C).

The burner ignition sequence will start when the flow temperature measured by sensor, S4, is below the pre-set limit. Once the burner ignites the fan speed controls the gas rate to maintain the heating flow temperature at the preset value of 80°C. When the boiler flow temperature exceeds the preset value, the burner will switch off and a minimum 4 min delay occurs (an anti-cycle function) before the burner will automatically relight. During this period, the pump will continue to run.

When the central heating demand ceases, the burner is switched off and the pump continues to run for a period of 3 minutes pump overrun period. After the pump overrun period, the pump is switched off and the 3-port diverter valve moves to the hot water mode.

### (b) Domestic hot water mode (Figure 2.4)

Hot water has priority. A hot water demand at any hot water terminal fitting will override any central heating demand.

The controller senses the hot water flow by means of a solid state (S3) flow switch and moves the 3-way diverter valve to the hot water mode. This allows the pump to circulate the primary water through the plate heat exchanger.

The burner will light automatically and the temperature of domestic hot water is controlled by the DHW flow rate and temperature sensor S3.

When the domestic hot water demand ceases, the burner will switch off and the diverter valve will remain in the domestic hot water mode unless there is a demand for central heating. However the central heating will not start until a 40 second delay period has expired.

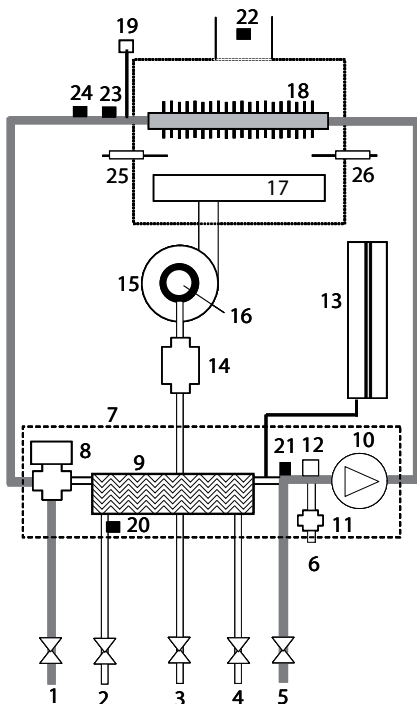


Figure 2.3 Central heating circuit

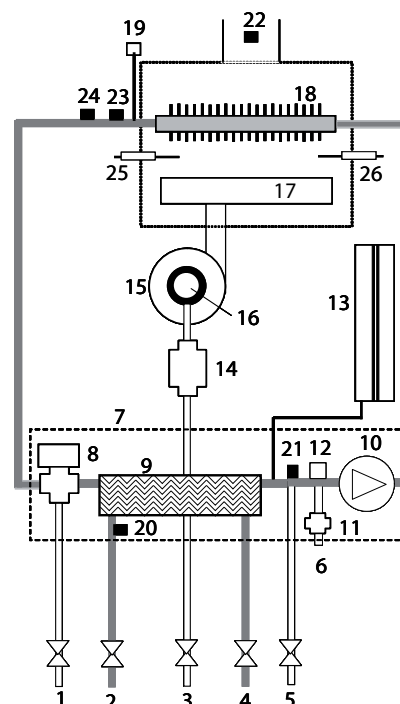


Figure 2.4 Domestic hot water circuit

- |   |  |   |
|---|--|---|
| 1. Central heating (CH) flow                | 2. Domestic hot water (DHW) outlet     | 3. Gas inlet                            |
| 4. Cold water (CW) inlet & Filter/Regulator | 5. Central heating (CH) return         | 6. Pressure relief valve discharge      |
| 7. Hydro-block assembly                     | 8. 3 port diverter valve assembly      | 9. Plate heat exchanger                 |
| 10. Pump                                    | 11. Pressure relief valve (PRV)        | 12. Automatic air vent                  |
| 13. Expansion vessel                        | 14. Gas valve                          | 15. Fan                                 |
| 16. Venturi assembly                        | 17. Burner                             | 18. Primary heat exchanger              |
| 19. Manual air vent                         | 20. DHW temperature & flow sensor (S3) | 21. Temperature & pressure sensor (S4)  |
| 22. Flue gas temperature sensor (S2)        | 23. Safety (OHT) sensor                | 24. Boiler flow temperature sensor (S1) |
| 25. Spark electrode                         | 26. Flame sensing electrode            |   |

## 2.0 TECHNICAL INFORMATION

### (c) Frost protection mode

The boiler has a built in frost protection function. This function can be deactivated by removing the jumper from pins 1 & 9 on connector J3 on the controller PCB (see section 4). When the boiler is in the frost protection mode, its status is shown on the front panel display.

If the boiler temperature drops below 10°C, the pump is switched on and the diverter valve is moved to the central heating mode.

If the boiler temperature drops below 5°C after switching on the pump, then the burner is switched on and modulated to minimum power level. The burner continues to burn at minimum power level until the boiler temperature rises above 15°C. After this the burner is switched off and the pump continues to run for a period of 1 minute, after which the pump is also switched off.

### b) Pump protection mode

The pump is switched on for about 1 minute every 36h to prevent it sticking. To allow this to operate the electricity supply and boiler on/off switch must not be switched off. If the property is left unoccupied unless the system has been drained off

### e) 4 x 7 Segment display functions

The 4 digit display is shown and described in section 3. The individual segments of the 1st digit and the dots indicate the status of the appliance functions. The 2nd, 3rd and 4th digits display the heating system pressure in bars. The push buttons are used for diagnostics and for setting central heating flow and domestic hot water temperatures. This is described in detail in sections 3 & 6 of this manual.

## 2.3 TECHNICAL DATA (Table 2.1)

Outer case (Overall dimensions)		Appliance type		C <sub>13</sub> , C <sub>33</sub> , C <sub>53</sub>
Casing height	850 mm	Appliance category		I <sub>ZH</sub>
Casing height including flue	1000 mm	Heat input – CH ( Net )	Maximum	26.3 kW
Casing width	380 mm		Minimum	7.5 kW
Casing depth	385 mm	Heat input – CH ( Gross )	Maximum	29.2 kW
Minimum clearances			Minimum	8.3 kW
Above casing	200 mm	Heat output – CH ( Non Condensing )	Maximum	26.0 kW
Below casing	200 mm		Minimum	7.4 kW
Front (In operation)	20 mm	Heat output – CH ( Condensing )	Maximum	28.9 kW
Front (For servicing)	600 mm			
L.H. Side	20 mm	Heat input – DHW ( Gross )	Maximum	40.0 kW
R.H. Side	20 mm			
Weights		Heat output - DHW	Maximum	35.6 kW
Packaged boiler carton	50.0 kg	Inlet pressure (Natural Gas – G20)		20 mbar
Installation lift weight	45.0 kg	Max gas rate (After 10 mins)		3.6 <sup>(2)</sup> m <sup>3</sup> /h
Connections		Flue gasses mass flow rate		16.21 g/s
Gas supply	22mm copper	NO <sub>x</sub> Class	5 (< 70 mg/kWh to EN483)	
Central heating flow	22mm copper	SEDBUK Rating	90.7 %, A Class	
Central heating return	22mm copper			
CW mains inlet	15mm copper	Electrical Data		
DHW flow	15mm copper	Supply		230V~ 50Hz
Pressure relief discharge	15mm copper	Power consumption		155 W
Condensate drain	21/22 mm plastic	Electrical protection		IPX0 D
Flue terminal dimensions	Diameter	100 mm		External fuse rating
	Projection	125 mm		Internal fuse rating
Central Heating (Primary) Circuit		DHW Circuit		
Safety discharge (PRV) setting	3.0 bar	Operating pressure	Maximum	8.0 bar
Maximum operating pressure	2.5 bar		Minimum	<0.2 bar
Minimum operating pressure	0.5 bar	DHW flow rate 'D' specified @ 30K rise		17.2 l/min
Recommended operating range	1 – 2 bar	Minimum working flow rate		2.0 l/min
CH flow temperature (adjustable)	40 – 80°C	DHW flow temperature <sup>(1)</sup>		35 – 65°C
Integral Expansion Vessel (For CH only)				
Minimum pre-charge pressure	0.5 bar			
Nominal capacity of exp. vessel	7.0 litres	Maximum condensate flow rate: 2.94 l/h		
Maximum capacity of CH system	125 litres	Pump Characteristics: See figure 4.6		
Water content of the boiler	2.6 litres	CO <sub>2</sub> at maximum	Case on	9.25 - 9.85%
		DHW heat input	Case off	9.05 - 9.65%

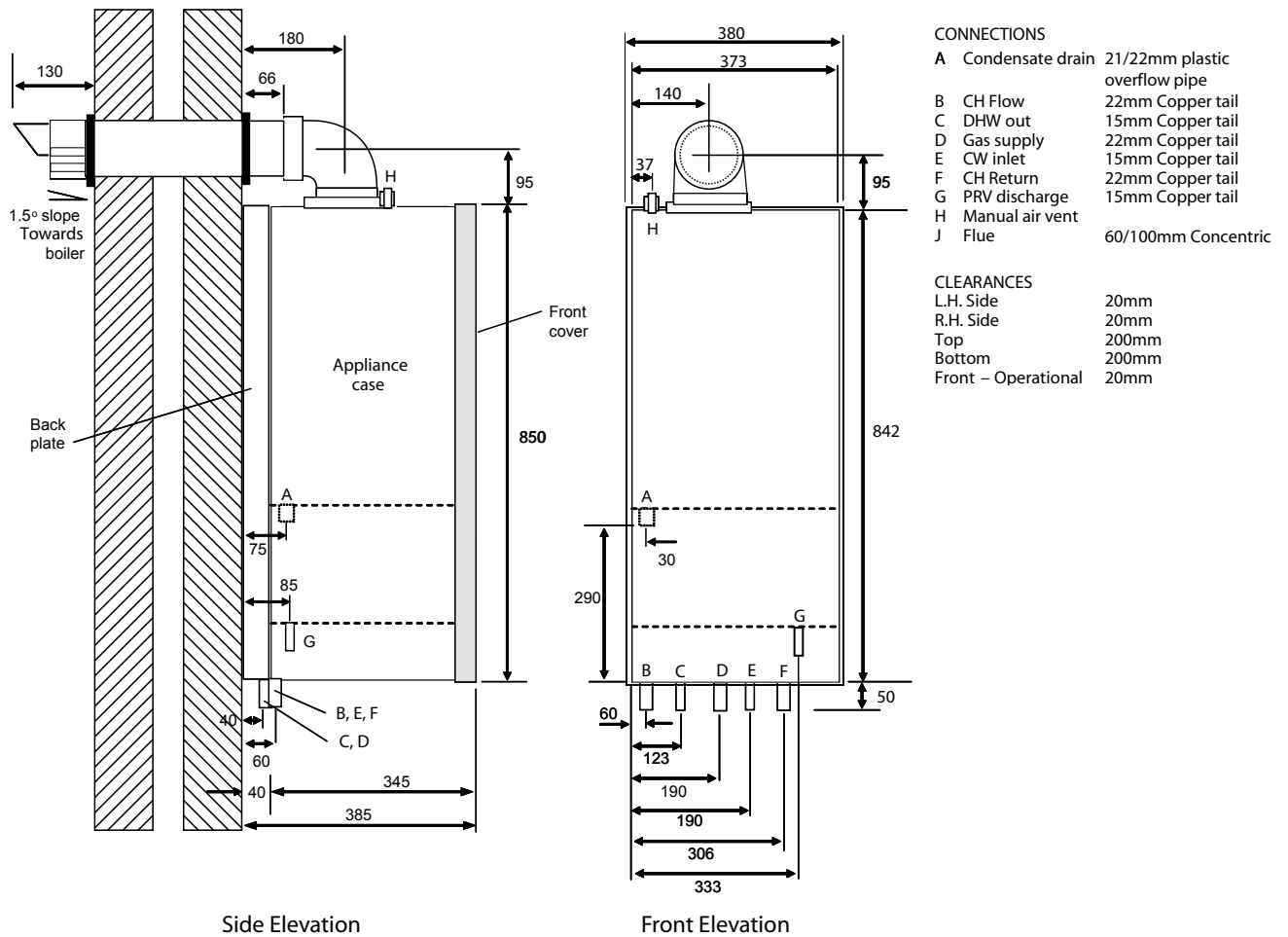
(1) Adjustable but flow rate dependent

(2) Based on CV of 40MJ/m<sup>3</sup>

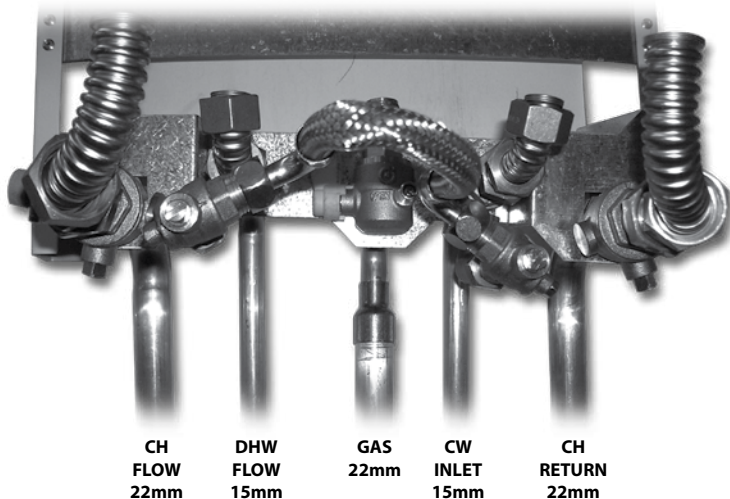
## 2.4 PRINCIPAL DIMENSIONS AND FIXINGS (FIGURES 2.6 AND 2.7)

The appliance dimensions and positions of pipe connections are shown in figure 2.6. The back plate connection arrangements is shown in figure 2.7

**Figure 2.6 - Dimensions/Connection Details**

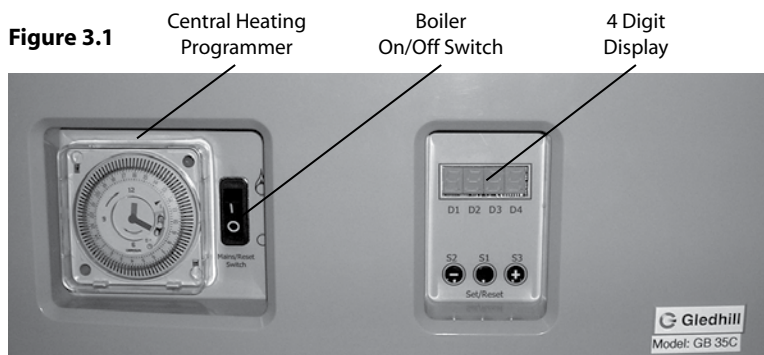


**Figure 2.7 - Boiler Mounting Back Plate (view from front)**



## 3.0 USER CONTROLS

The user controls consist of a central heating programmer, boiler 'on-off' switch and a 4 digit display as shown in figure 3.1. The boiler 'on-off' switch should be left in the ON position which is indicated by a flame symbol for normal operation, otherwise the built in boiler frost protection will not function. The four digit display indicates the status of the boiler and the pressure in the heating system. The push buttons below the display are used for setting and resetting the controller and these functions are shown in figures 3.3A and 3.3B. For further details see the 'User Instruction Manual' supplied with this appliance.



### 3.1 CENTRAL HEATING PROGRAMMER (FIGURE 3.2)

The programmer controls the central heating system only and can be set to control at 15 minute intervals. The 3 position switch allows the central heating to be either permanently off, timed or constantly on.

#### a) Constant (top) position:

The heating will be on constantly irrespective of the position of the tappets. The central heating will only be controlled by the main appliance controls and/or any external controls e.g. room thermostat.

#### b) Timed (Central position):

The heating will operate according to the position of the tappets and will be controlled during the on period by the main appliance controls and/or room thermostat.

#### c) Off (Bottom position):

No central heating available.

**Note:** Domestic hot water will operate on demand irrespective of the position of the 3 position switch.

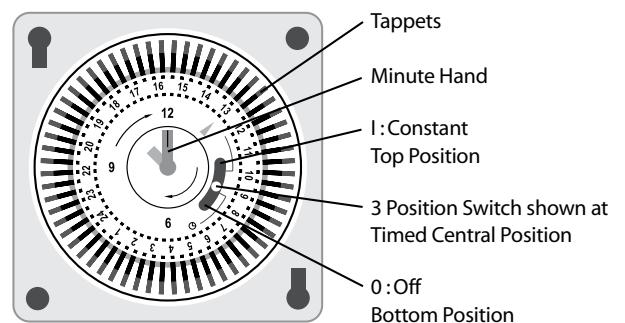
#### To set the time of day:

Turn the minute hand clockwise to align the pointer with the correct time to the nearest 15 minutes ensuring that AM/PM is considered. DO NOT at any time attempt to rotate the bezel anti-clockwise.

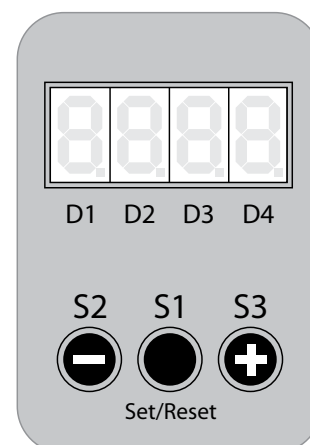
#### To set heating times:

Decide the central heating 'on' and 'off' times of the day the central heating is required. Move the 3 position switch to the timed (central) position. The central heating will operate when the tappets are set to the outer edge of the bezel. Each tappet represents 15 minutes. Therefore set the tappets towards the outer edge for the time periods the heating is required to be 'on' and set the tappets towards the centre for the time heating is required to be 'off'.

**Figure 3.2**



**Figure 3.3a**



Boiler Display Indicator

## 3.2 LIGHTING THE BOILER

Switch the appliance on/off switch to on position. The dot D1 will begin to flash to indicate that the controller is active and the 2 – 4 digits will show the system pressure in bar (e.g. P2.1 system pressure is 2.1 bar).

The boiler will light automatically when either a hot water tap is opened or when the central heating is called on. The central heating is controlled by the programmer on the boiler and the remote room thermostat. For central heating to function, both the programmer and the room thermostat must be calling for heat. The hot water and the central heating demands are indicated by the vertical bars of the first segment display (D1).

When the burner is lit, the dot D1 will be on constant and the 2 – 4 digits will show the system pressure in bar (e.g. P2.1).

A fault is indicated by flashing dot 'D2' and the fault code is displayed on the digital display. To reset press 'Set/Reset' button S1. The flashing 'P' indicates low system pressure. If the fault persists contact your installer/service provider. The control and digital display functions are described in detail in section 10.

## 3.3 TO TURN THE BOILER OFF

The boiler is fully automatic in operation. However if necessary, the boiler can be switched off permanently by turning the on-off switch to OFF position. This is not generally recommended as it will switch off the pump protection facility, which is likely to lead to the pump being 'stuck' when the boiler is switched back on.

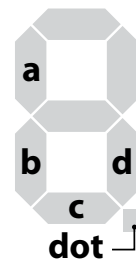
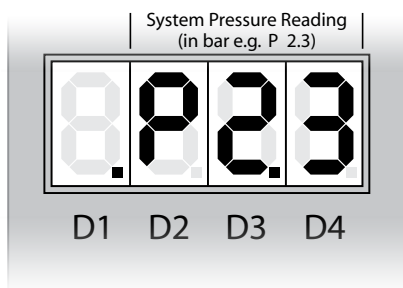
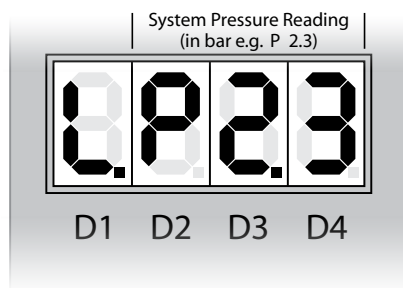


Figure 3.3b



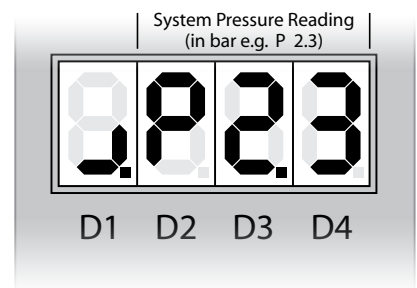
(a) Standby Mode

Dot D1: FLASHING In standby mode  
Display shows system pressure e.g. P 2.3



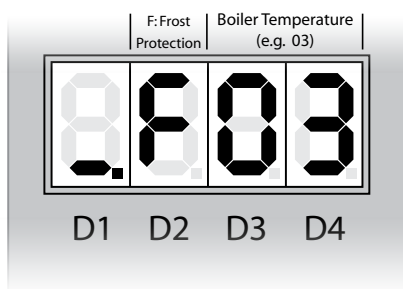
(b) Hot Water Draw-Off Mode

Dot D1 : ON - Burner is lit  
Bar 'a' : ON - Hot water demand active  
Bar 'b' : ON - Hot water demand active  
Bar 'c' : ON - Boiler pump on  
Display shows system pressure e.g. P 2.3



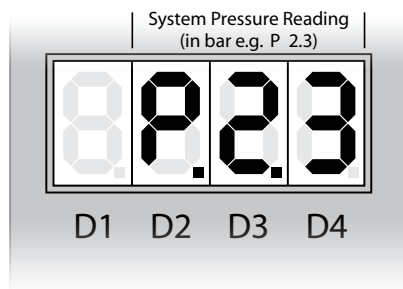
(c) Central Heating Mode

Dot D1 : ON - Burner is lit  
Bar 'c' : Boiler pump on  
Bar 'd' : Central heating demand active  
Display shows system pressure e.g. P 2.3



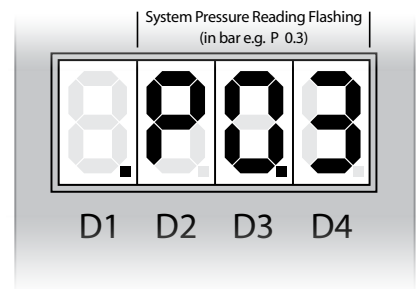
(d) Automatic frost protection mode

Dot D1: Flashing - In standby mode  
Dot D1: ON - Burner is live  
Bar C Lit - Boiler pump on  
Display 'F': Constant - Frost protection Level 1  
Display 'F': Flashing - Frost protection Level 2  
Display shows boiler temperature e.g. F 03



(e) Safety Lockouts

Dot D2: Flashing - Lockout error  
Press reset button 'S1' to clear  
Dot D1: ON - Blocking error  
Switch appliance off and on to clear  
Display shows system pressure e.g. P 2.3



(f) Low System Pressure Reading

System pressure display flashing -  
Low system pressure:  
Arrange for system to be topped up by a competent person

## 4.0 SYSTEM DESIGN AND PLANNING INFORMATION

### 4.1 IMPORTANT NOTICES

- The boiler is supplied in one pack. The flue and fixing jig/brackets are supplied separately.
- This boiler is for use on G20 natural gas only. The boiler is certified to the current issue of EN483, EN626 and EN 677 for performance and safety. It is important that no alteration is made to the boiler, without the written permission of Gledhill Ltd.

The Gledhill GB35C Combination Boiler is a 'Water Bylaws Scheme – Approved Product'.

In GB it is necessary to comply with the Water Supply (Water Fittings) regulations 1999 (or for Scotland, The Water Bylaws 2000, Scotland).

To comply with the Water Regulations your attention is drawn to 'The Water Regulations' guide published by the Water Regulations Advisory Services (WRAS) which gives full details of the requirements.

In IE the requirements given in the current edition of the I.S.813 and the current Building regulations must be followed..

- In GB, the installation of this boiler must be carried out by a competent person e.g. CORGI Registered installer and must comply with the relevant requirements of :-

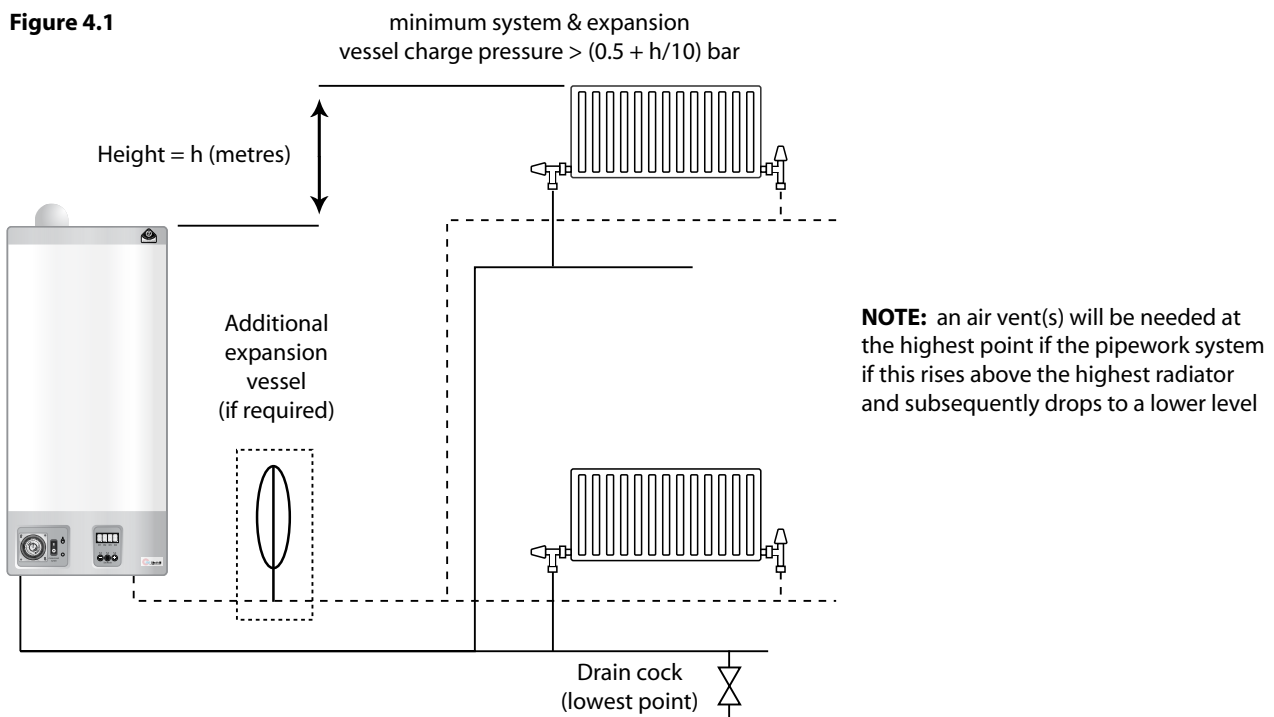
Manufacturer's instructions supplied

The Gas Safety (Installation and use) Regulations, The Building Regulations and local Water Company Bylaws. The Health and Safety at Work Act, Control of Substances Hazardous to Health, The Electricity at Work Regulations and any other applicable local regulations.

The detailed recommendations are contained in the current issue of BS5440 Pts. 1 & 2; BS 5449; BS 5546; BS 7074 Part 1; BS 6700; BS 6798; BS 6891, BS 7593, IGE/UP/7/1998

- In IE, the installation must be carried out by a Competent Person and installed in accordance with the current edition of I.S.813 "Domestic Gas Installations", the current Building Regulations and reference should be made to the current ETCI rules for electrical installations.
- When installing the boiler, care should be taken to avoid any possibility of personal injury when handling sheet metal parts.
- Refer to Manual Handling Operations, 1992 regulations.

**Figure 4.1**



### 4.2 CENTRAL HEATING CIRCUIT & SYSTEM

#### a) Central heating system

The Gledhill GB35C combination boiler is suitable for fully pumped sealed systems only. The sealed heating system is shown schematically in figure 4.1. The sealed system installation must comply with the appropriate requirements of current issues of BS5449, BS6759, BS6798 and BS7074.

A draining tap or taps conforming to the current issue of BS 2879, must be provided at all the low points of the system to allow the entire central heating system to be drained.

It is recommended that manual air vents are provided at all the high points of the system.

The minimum initial (cold) system and expansion vessel pressure must be at least 0.5 bar greater than  $h/10$  (see figure 4.1). For example if height of the system high point above the boiler is 7m, then the minimum charge pressure should be greater than 1.2 bar ( $7/10 + 0.5 = 1.2$  bar). This will minimise the chances of the system entraining air and/or 'kettleing' noises from the boiler during operation.

#### b) Treatment of water in the heating system

All central heating systems will be subject to corrosion unless an appropriate water treatment is applied. This will deteriorate the efficiency of the system as the corrosion sludge accumulates within the system risking damage to equipment such as the pump, valves and boiler. It will also give rise to boiler noise and circulation problems. The system commissioning, cleansing and dosing must comply with BS7593 requirements.

When upgrading existing systems it is necessary that the system is cleaned prior to treatment in order to remove any sludge and reduce the likelihood of these deposits damaging the new components.

When fitting new systems flux may be present within the system, which can lead to damage of system components.

All systems must be thoroughly drained and flushed out. The recommended flushing and cleansing agents are Betz-Dearbon Sentinel X300 or X400 and Fernox Superfloc Universal Cleanser which should be used in accordance with the manufacturer's instructions.

The only system additives recommended are Betz-Dearbon Sentinel X100 and Fernox-Copal and these should be used following the inhibitor manufacturer's instructions. It is important to check that the inhibitor concentration after installation, system modification and at every service is in accordance with the manufacturer's instructions.

#### Important Notes:-

- Failure to flush and add inhibitor correctly to the system at the correct concentration recommended in the manufacturers instructions will invalidate the appliance warranty.
- Failure to fit a suitable system filler in existing systems will also invalidate the appliance warranty.
- In the case of an existing installation, the system MUST be thoroughly flushed before installing the new boiler. Power flushing is the recommended option for existing installations because all high efficiency boilers have smaller waterways than traditional boilers. A suitable system filter (e.g. Spirovent SV3-025-T) fitted in the boiler return is STRONGLY recommended in new systems and must be fitted in existing systems.
- It is imperative when draining down to the primary boiler circuit that any heating circuit debris is not drawn into the boiler waterways. Before refilling, the system filter should be cleaned

#### c) System bypass

The boiler is fitted with an integral bypass valve for the central heating circuit as shown in figure 4.2. The bypass should be adjusted so that when the boiler is in the central heating mode, the temperature difference across the boiler is between 11 and 20°C. The boiler flow and return temperature can be measured using the digital display of the boiler.

When adjusting the bypass valve, it is important to ensure that the central heating circuit flow rate is sufficient to heat all the radiators uniformly and simultaneously.

Figure 4.2



Bypass Adjuster

#### d) System Controls

A 24 hour electro-mechanical programmer is supplied fitted to the boiler. Further external controls e.g. room thermostat and thermostatic radiator valves should be fitted to comply with the relevant requirements of Part L1 of the Building Regulations. For further information see:-

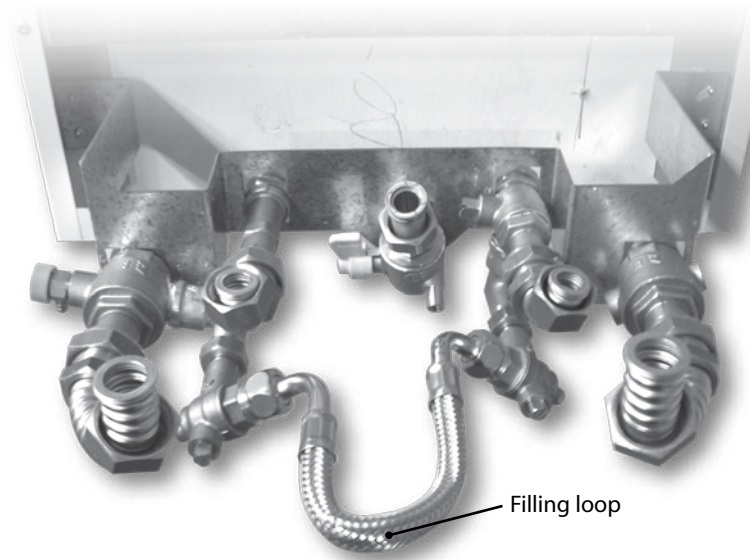
- The current issues of Approved Documents L1A & L1B
- The Domestic Heating Compliance Guide
- GIL 59, 2000: Central heating system specification (CheSS)
- GPG 302, 2001: Controls for domestic central heating system and hot water. BRECSU.

## 4.0 SYSTEM DESIGN AND PLANNING INFORMATION

### (e) System filling and topping procedure

The appliance is supplied with connections points on the mains cold water inlet and central heating return isolating taps as shown in figure 4.3 to which the filling loop kit supplied can be temporarily fitted. The system pressure will be indicated on the appliance digital display.

**Figure 4.3**

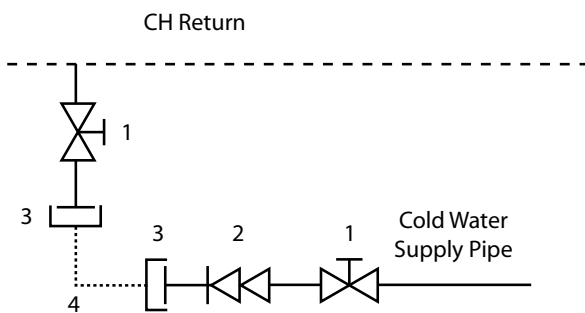


If an alternative filling method is used for filling and topping up the water loss from the system then it must be fitted in an accessible position and it must be:-

- In accordance with all relevant water supply regulations and use approved equipment i.e. Guidance G24.2 and recommendation R24.2 of the 'Water Regulations Guide'. Typical filling arrangements are shown in figure 4.4. if installed in GB
- In accordance with the current edition of I.S. 813. if installed in IE

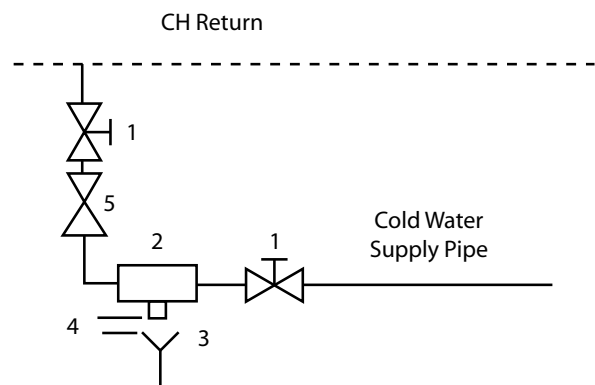
In GB, the sealed primary circuit may be filled or replenished by means of a temporary connection between the circuit and the cold water supply, provided a 'Listed' i.e. WRAS approved double check valve or some other no less effective back flow prevention device is permanently connected at the inlet to the circuit and the temporary connection is removed after use.

**Figure 4.4**



#### **Sealed System Filling Method - 1**

1. Control / Isolating Valve
2. Double check valve
3. Hose unions
4. Temporary connection



#### **Sealed System Filling Method - 2**

1. Control / Isolating Valve
2. Type C A Backflow Prevention Device
3. Tundish
4. Air Gap
5. Pressure regulator (optional)



## 4.0 SYSTEM DESIGN AND PLANNING INFORMATION

### (f) Central heating circuit expansion vessel

The seven litre appliance expansion vessel (see figure 2.2a) is supplied pre-charged to 1.0 bar. Therefore the minimum cold fill pressure should be 1.0bar. The vessel is suitable for the correct operation of central heating system capacities up to 70 litres. For greater system capacities an additional expansion vessel must be fitted (as shown in Figure 4.1). For guidance, the expansion vessel volumes are given in Table 4.1

In GB: The expansion vessel must conform to the current issues of BS4814 and BS7074 Parts 1 and 2. It must be connected to the central heating return pipe and sized according to BS5449 and BS7074 Part 1.

In IE: Refer to the current edition of I.S.813.

**Table 4.1 - Expansion Vessel Volume Required**

Safety Valve Setting (bar)	3.0								
Vessel Charge Pressure (bar)	0.5			1.0			1.5		
Initial (cold) Fill Pressure (bar)	0.5	1.0	1.5	2.0	1.0	1.5	2.0	1.5	2.0
Total System Capacity (l)	Expansion Vessel Volume (litres)								
25	2.1	3.5	6.5	13.7	2.7	4.7	10.3	3.9	8.3
50	4.2	7.0	12.9	27.5	5.4	9.5	20.6	7.8	16.5
75	6.3	10.5	19.4	41.3	8.2	14.2	30.9	11.7	24.8
100	8.3	14.0	25.9	55.1	10.9	19.0	41.2	15.6	33.1
125	10.4	17.5	32.4	68.9	13.6	23.7	51.5	19.5	41.3
150	12.5	21.0	38.8	82.6	16.3	28.6	61.8	23.4	49.6

### (g) Pressure relief valve/discharge pipe

A non-adjustable system safety valve set at 3 bar is fitted to the appliance (figure 4.5). All discharge pipework, fittings, etc should be suitable for pressures greater than 3 bar and temperatures greater than 100°C.

The pressure relief discharge pipe should not be less than 15mm diameter. It should run continuously downwards and discharge outside the building, preferably at low level over a drain. It should be routed and terminated in such a way that no hazard occurs to people or damage is caused to wiring or electrical components. The end of the pipe should terminate facing down and towards the wall (or be provided with a suitable guard).

The discharge must not be above a window, or other public access way. When choosing a location consideration should always be given to the possibility that boiling water/steam could discharge from this pipe.

### (H) Pump characteristics

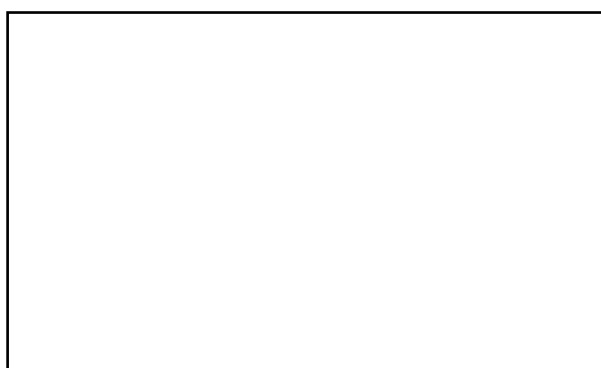
The boiler is fitted with a modulating Grundfos UPR 15-60 pump. The pump operates at maximum speed when in the boiler is in DHW mode and modulates when the boiler is in the central heating mode.

The pressure flow characteristics of the pump (available for the central heating circuit) are shown in figure 4.6.

**Figure 4.5**



**Figure 4.6 - Pump Characteristics**



## 4.0 SYSTEM DESIGN AND PLANNING INFORMATION

### 4.3 DOMESTIC HOT WATER CIRCUIT

#### a) General

All domestic hot water (DHW) circuits, connections, fittings, etc. should be fully in accordance with the relevant standards and water supply regulations. For further information refer to:

In GB: Guidance G17 to G24 and recommendations R17 to R24 of the Water Regulations Guide.

In IE: The current addition of I.S. 813.

When the domestic water system includes any device which prevents water from expanding back towards the supply (e.g. check valves, loose jumpered stopcock, water meter, water treatment device), then a mini expansion vessel which has been approved for use in domestic water systems must be fitted in the circuit (e.g. Zilmet 160ml, R1/2 15bar). If the hot water expansion is not accommodated, then high pressure can develop in the circuit, which may damage fittings and devices in that circuit (figure 4.7).

The maximum working pressure for the domestic hot water circuit of the boiler is 8 bar, therefore all pipework, connections, fittings, etc. should be suitable for pressures in excess of 8 bar. A pressure reducing valve (PRV) must be fitted for pressures in excess of 8 bar or lower if any other components/fittings (e.g. shower valves) require a lower working pressure. In practice it is recommended that a PRV set to 3 bar is fitted for pressures above 5 bar. In general, ideal pressure for these types of systems has been found to be between 2-3 bar.

#### b) Terminal fittings

The boiler supplies mains pressure hot water therefore all terminal fittings must be suitable for mains pressure hot water.

It is recommended that flow regulators are fitted to all taps/showers etc in line with flow rates set out in Section 8.1 of the NHBC Standards BS 6700

If a shower is supplied from this appliance, then it should be the thermostatic type suitable for use with combi boilers.

#### c) Hot water flow rates

The appliance is not fitted with a flow regulator. The appliance will deliver hot water at a maximum flow rate of 14.7 l/min at 35°C temperature rise. (This is equivalent to 17.2 l/min at 30°C temperature rise).

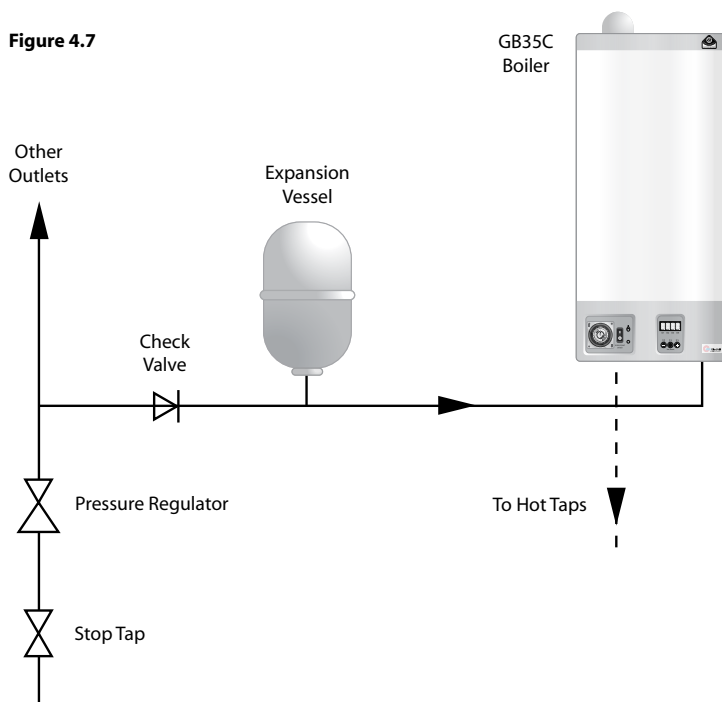
#### d) Hard water areas

The Building Regulations L1A: New Dwellings/L1B: Existing Dwellings and the requirements set out in the Domestic Heating Compliance Guide specify that "where the mains water hardness exceeds 200ppm provision should be made to treat the feed water to water heaters and the hot water circuit of combination boilers to reduce the rate of accumulation of lime scale".

To comply with this requirement the hardness of the mains water should be checked by the installer and if necessary a suitable in-line scale inhibitor should be fitted at a suitable point in the cold water supply to the appliance.

If scale should ever become a problem the plate heat exchanger is easily isolated and quickly replaced with a service exchange unit which can be obtained at nominal cost from Gledhill.

Figure 4.7



## 4.4 SITE REQUIREMENTS

### a) Boiler Location

The boiler may be installed in any room to any suitable wall which is capable of carrying its weight with the flue passing through an outside wall or roof and discharging to atmosphere allowing satisfactory removal of combustion products and providing adequate air supply. However particular attention is drawn to:-

- The requirements of the current issue of BS7671 with respect to the installation of a boiler in a room containing a bath or a shower. Any electrical switch or boiler control using mains electricity supply should be so sited that a person using the bath or a shower cannot touch it. The electrical provisions of the Building Standards (Scotland) Regulations are applicable to such installations in Scotland.
- If the boiler is to be installed in a timber frame building, it should be fitted in accordance with the Institute of Gas Engineers document IGE/UP/7/1998 'gas Installation in timber Frame Housing'. If in doubt, ask local gas utility company or Gledhill Water Storage Ltd.

This boiler is not suitable for fitting outdoors. It should be fitted within the building unless otherwise protected by a suitable enclosure i.e. garage or out house. If the boiler is sited in an unheated space then it is recommended that the boiler 'on-off' switch is always left in the 'ON' position to give frost protection. It may also be necessary to install additional frost protection device to protect other parts of the system.

The boiler may be fitted inside a cupboard or a compartment without any air vents. The appliance will run sufficiently cold without ventilation. The installation in cupboards must comply with BS 5440: Part 2 which refers to room sealed appliances installed in compartments.

The boiler must be mounted on a flat vertical wall, which is sufficiently robust to take its total weight of 50 kg. The overall dimensions are shown in fig 2.6 and the clearances required are shown in figure 4.8.

### b) Clearances

The boiler should be positioned and installed so that at least the minimum clearances shown in figure 4.8, are provided for servicing and correct operation. Additional clearances will be useful around the boiler during installation and servicing.

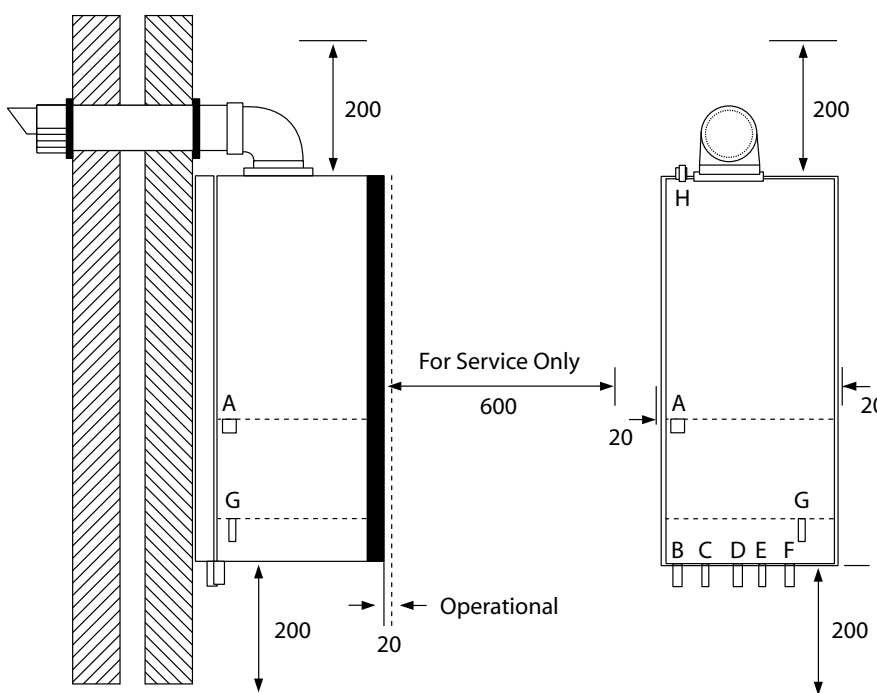
For flue installations where external access is not practical, consideration will need to be given to the space required to install the flue internally, which may require clearances larger than those specified in figure 4.8.

### c) Ventilation Requirements

The boiler is room sealed, so when it is installed in a room or space, a permanent air vent is not required.

If the boiler is installed in a compartment, a permanent air vent is not required. However there is no need for existing air vents to be removed.

**Figure 4.8 - Minimum Clearances Required for Installation & Service**



## 4.0 SYSTEM DESIGN AND PLANNING INFORMATION

### d) Gas Supply

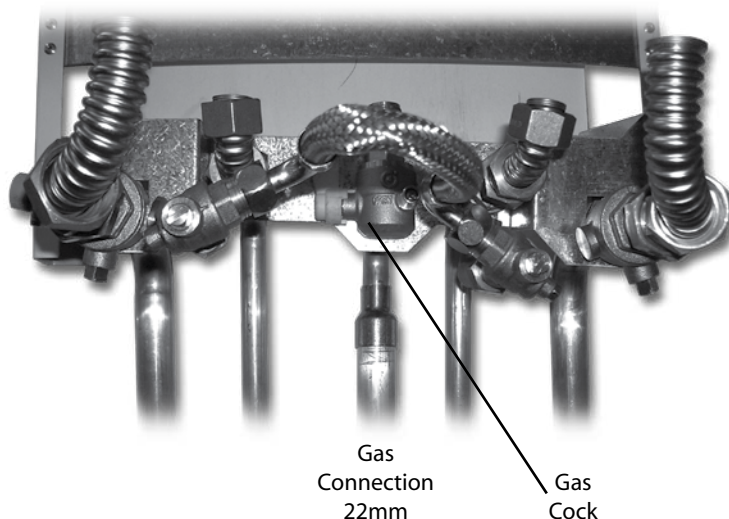
The Local Gas Supplier should be consulted at the installation planning stage in order to establish the availability of an adequate supply of gas. An existing service pipe **MUST NOT** be used without prior consultations with the gas supplier. A gas meter can only be connected by the Local Gas Supplier or by his Contractor.

An existing meter should be of sufficient size to carry the maximum boiler input (40kW, see table 2.1 – Technical data) plus the demand of any other installed gas appliances, (BS 6891:1988). The supply from the governed meter must provide a steady inlet working pressure of 20mbar at the boiler.

The gas supply line must be purged. **WARNING:** before purging open all doors and windows and also extinguish any cigarettes, pipes and any other naked lights. The complete gas installation must be tested.

The connection to the appliance is a 22mm copper tail located at the rear of the gas service cock (figure 4.9). Do not use a pipe of smaller diameter than the boiler gas connection.

Figure 4.9



### e) Condensate Drain

The boiler condensate outlet will accept 21 or 22mm O.D. (3/4") plastic pipe (see figure 4.10). A plastic drain pipe must be fitted to the boiler to allow discharge of condensate to a suitable drain. The drain pipe should have a fall of at least 2° (1:20) away from the boiler and must not rise at any point along its length. The pipe should be a minimum of 20mm diameter and supported using suitably spaced clips in line with the manufacturers installation instructions

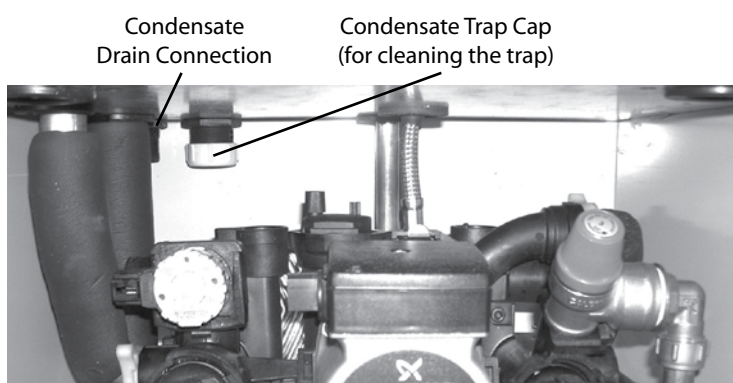
Condensate should, if possible, be discharged into the internal household drainage system. If this is not practical, the discharge can be made externally into the household drainage system or a purpose designed soak away.

Condensate is slightly acidic and the discharge pipe should be run in a suitable pipe material e.g. PVC, PVC-U, PVC-C, ABS or PP. Metal pipework is **NOT** suitable for use in a condensate drainage system. If the condensate pipe connects to a waste/drain pipe this must also be a suitable pipe material.

Any condensate discharge pipework external to the building or in an unheated space must be insulated to protect against frost. It is also recommended that the pipe diameter is increased to 32mm for the same reason.

Typical condensate discharge pipe run arrangements are shown in figure 4.11.

Figure 4.10



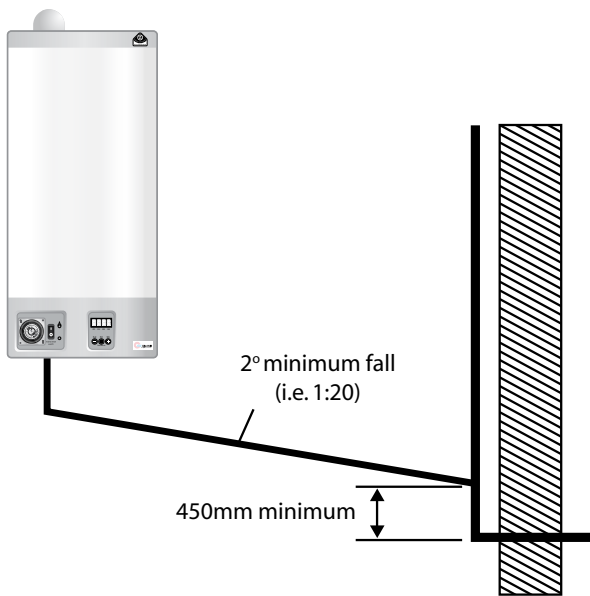
## 4.0 SYSTEM DESIGN AND PLANNING INFORMATION

### Notes:

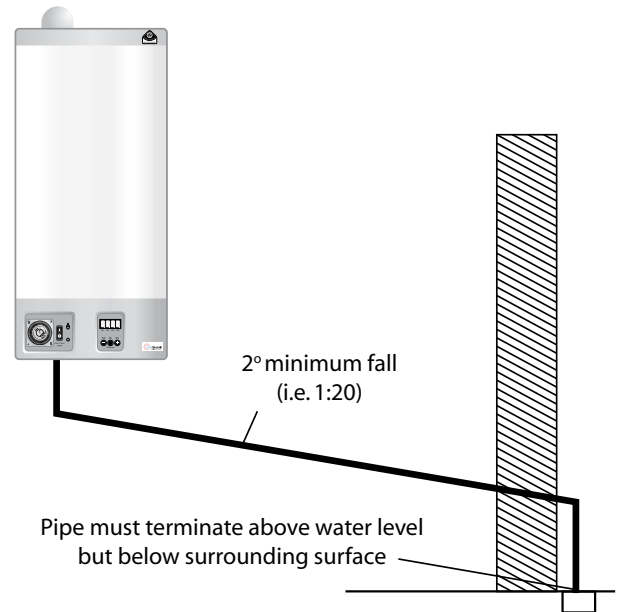
- The Condensate trap inside the boiler casing must be manually filled with water after installing the boiler (i.e. before the first firing) and before commissioning the system.
- Failure to install the condensate discharge pipework correctly will affect the reliable operation of the boiler.

Figure 4.11

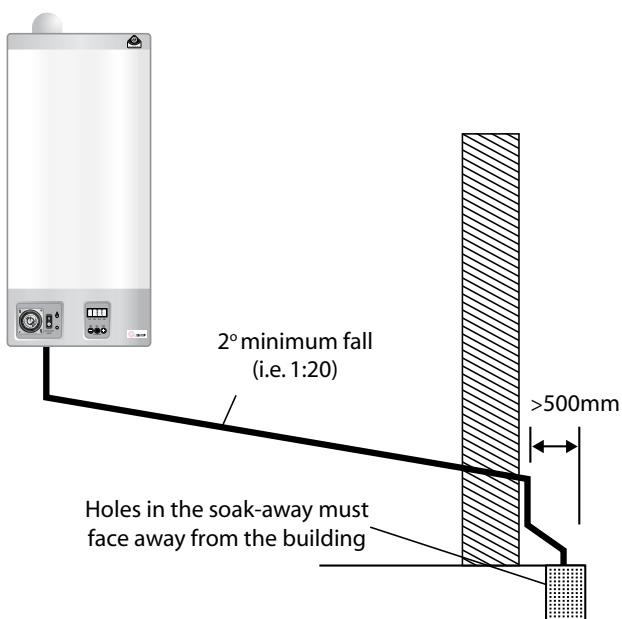
(a) Connection to an internal soil and vent pipe



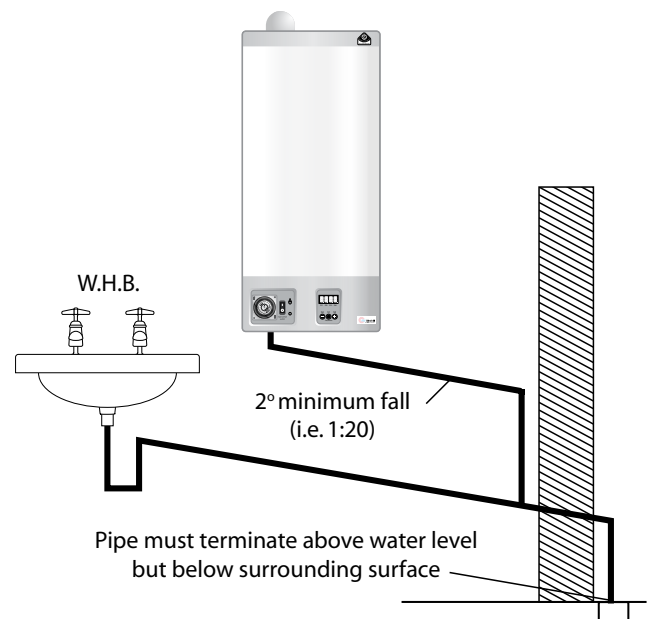
(b) Termination to drain or gully



(c) Termination to a soak-away



(d) External termination via internal waste discharge branch



- Note:** If the waste pipe connects into a soil and waste pipe the boiler must be fitted above the flood over level of a suitable sanitary fitting or the condense pipe must incorporate a tundish to prevent a backup in to the boiler in the case of a drain blockage.

## 4.0 SYSTEM DESIGN AND PLANNING INFORMATION

### 4.5 FLUE LOCATION AND VENTILATION

#### a) Flue Position and Length

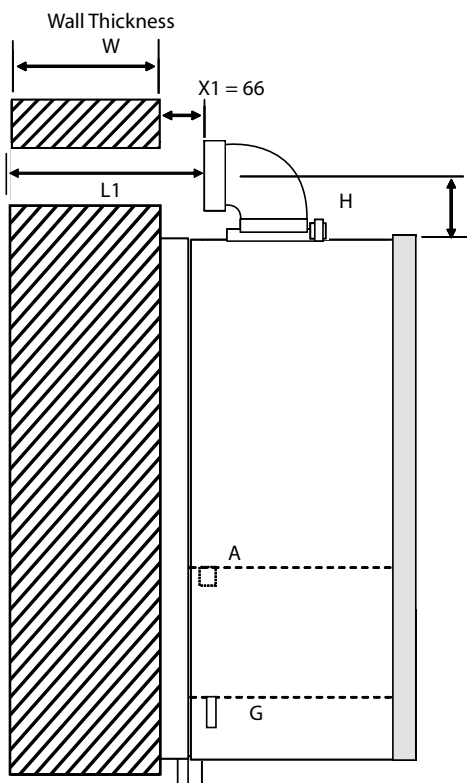
The flue installation procedures, location of flue terminals, flue kit options etc are described in detail in the 'Gledhill High Efficiency Condensing Combination Boiler Flue design & Installation Manual' which is also supplied with the boiler and should be read along with these instructions prior to installation.

The standard flue is fitted on the top of the boiler as shown in figure 4.12a. The minimum dimensions 'L' required for rear, LH side and RH side are different and must be measured and compared against the standard flue supplied with the boiler to check if it is suitable. The minimum dimension 'X' corresponding to the minimum clearances and wall thickness 'W' (see figures 4.12a – 4.12d) can be calculated as follows: -

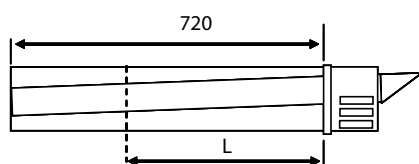
Rear outlet:  $L1 \text{ (mm)} = W + 66 + 45 = W + 111,$   
 RH side outlet:  $L2 \text{ (mm)} = W + 110 + 20 + 45 = W + 175,$   
 LH side outlet:  $L3 \text{ (mm)} = W + 22 + 20 + 45 = W + 87,$

An extended flue system can be installed with the addition of extension kits [see section 4.5 (b) ]. The flue system must always be designed and installed to have a continuous fall towards the boiler of at least  $1\frac{1}{2}^\circ$  (i.e. 18mm per metre run).

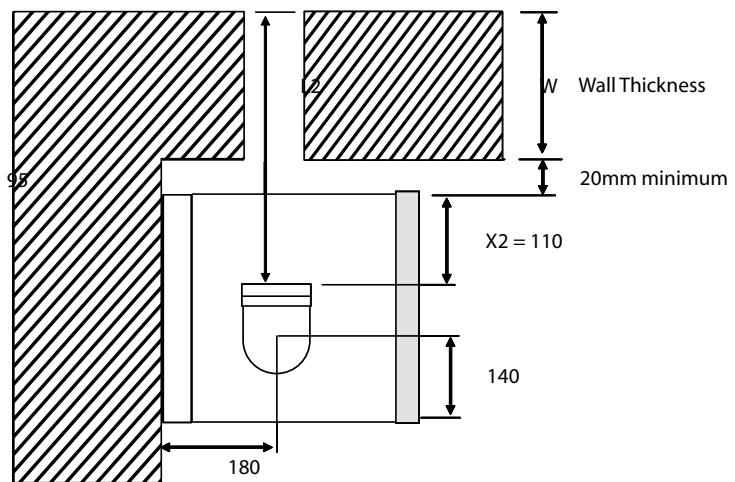
The flue can be installed from inside the building when access to the outside wall face is not practical.



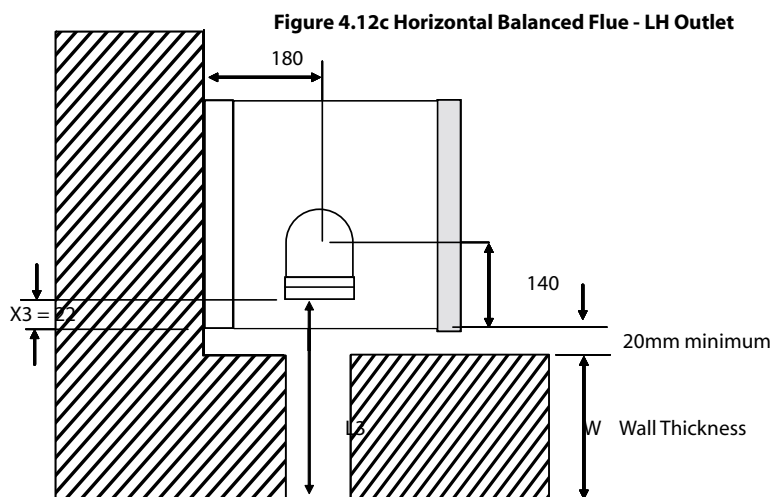
**Figure 4.12a**  
Horizontal Balanced Flue - Rear Outlet



**Figure 4.12d**  
Standard Horizontal Balanced Flue Terminal



**Figure 4.12b** Horizontal Balanced Flue - RH Outlet



**Figure 4.12c** Horizontal Balanced Flue - LH Outlet

**Note:** the terminal can be installed level as the internal flue already incorporates the necessary fall (as shown)

## 4.0 SYSTEM DESIGN AND PLANNING INFORMATION

### b) Flue Options

The concentric flue system options and kits available for the this boiler are listed below in table 4.2. The flue installation procedures, location of flue terminals, additional flue kits options etc are described in detail in the 'High Efficiency Condensing Combination Boiler Flue Design and Installation Manual' which is also supplied with the boiler.

The concentric flue system can be extended to a maximum equivalent length of 4.9 meters (excluding the flue terminal and spigot elbow on the appliance) after the flue elbow fitted to the appliance. This can be horizontal or vertical but the allowances listed in table 4.3 must be made for each component fitted.

Description	Part Number
Standard Horizontal Flue Kit	GT461
Vertical Flue Terminal Kit - Pitched	AFB001
Flat Roof Flue Kit	AFB010
Ridge Terminal Flue Kit	AFB020

Description	Equivalent Length (m)
2m Flue Extension	2.0
1m Flue Extension	1.0
0.5m Flue Extension	0.5
45° Flue Bend	1.5
90° Flue Bend	1.9

### c) Terminal Position

The minimum acceptable siting dimensions for the terminal for obstructions, other terminals and ventilation openings are shown in figure 4.13 ( See also 'Gledhill Combi Boiler Flue Manual'). The dimensions are measured from the edge of the terminal.

The terminal **MUST** be located so that it is exposed to external air, allowing unobstructed flow of air across it at all times.

**This is a high efficiency condensing boiler and therefore some plumbing will occur from the flue outlet. This should be taken in to consideration when selecting the position for the terminal.**

Carports or similar extensions of roof only, or roof and one wall, require special consideration with respect to any openings e.g. doors, vents or windows under the roof. Care is required to protect the roof if it is made of plastic sheeting. If the carport has a roof and two walls, then seek advice from the local gas supply company before installing a boiler.

### d) Terminal Guard

A terminal guard is required if a person could come into contact with the terminal or the terminal could be subject to damage. The terminal guard is required for horizontal flue terminals below 2m above the ground floor or accessible by the general public from windows, balconies etc.

If a terminal guard is required, it must be positioned to provide minimum of 50mm clearance from any part of the terminal and be central over the terminal.

A terminal guard for this boiler is shown in figure 4.14 and is available from Gledhill Water Storage Ltd quoting part number GF199.

## 5.0 BOILER INSTALLATION

### 5.1 UNPACKING OF BOILER

**Important Note:** With regard to the Manual Handling Operations, the following lift operation exceeds the recommended weight for a one man lift.

Place the boiler carton horizontal as indicated on the packaging labels. Cut and remove the securing straps and lift off the carton sleeve. Place aside any loose components until required.

Remove the two securing screws at the bottom of the front panel and carefully lift off the front panel from the two retaining lugs at the top. Place the front panel in a safe place.

Undo the water and gas connections (these are hand tight only) between the back plate manifold and the boiler connections. Place aside safely the connector washers as these will be required later. Carefully lift the boiler from the back fixing plate by first sliding it towards the top to disengage it from the fixing brackets. Place the boiler on its back in a safe place.

### 5.2 BOILER FIXING

#### a) Wall Template

A wall template is supplied with the boiler. This should be used to mark the boiler fixings and the flue outlet and for checking the minimum clearances required. Check the flue outlet/pipe run/terminal position does not clash with any structural members before finalising the boiler position.

#### b) Flue hole cutting

The standard horizontal flue is designed with an internal fall of 30mm/metre towards the boiler for disposal of condensate. If the standard flue length alone is being used then a flue hole of diameter 105mm can be cut in the position marked on the wall template.

For standard side flues the horizontal flue centre line on the wall template should be extended to the side wall, and the vertical centre of the flue hole marked at 180mm from the back wall.

For installations with external access, a 105mm diameter core drill can be used and for installations with internal access only, a 125mm diameter core drill should be used.

When using extension pipes with the horizontal rear flue, a core drill size of 125mm should be used to allow the extension pieces through the wall to slope at 18mm/metre (1½°) towards the boiler. If necessary remove the wall template whilst drilling the flue hole.

For extended side flues, the flue hole centre should be determined by extending the dashed inclined line on the template to the side wall. This dashed line is drawn at 18mm/metre (1½°) rise from the boiler. Where this line reaches the side wall, a horizontal line should be marked. The vertical centre line of the flue should then be marked at 180mm from the back wall (see figure 4.12).

To allow for the flue passing through the wall at this angle a 125mm hole should be drilled irrespective of internal or external installation.

#### c) Hanging the back plate

If previously removed, reposition the wall template and mark the position of the fixing holes for the back plate.

Mark and drill the fixing holes and secure the back plate to the wall ensuring that the boiler brackets on the back plates are level in the horizontal plane.

#### d) Boiler fixing

**Important Note:** With regard to the Manual Handling Operations, the following lift operation exceeds the recommended weight for a one man lift.

Having previously secured the back plate assembly to the wall, lift the boiler into position in the following manner:-

Lean the top of the boiler slightly to the wall and with the sides inline with the back plate assembly lift the boiler about 50mm above the back plate assembly on the wall. Allow the boiler to slowly move downward and towards the backplate until it is engaged simultaneously in both the top and bottom brackets on the back plate assembly.

Insert the washers between the valves on the back plate manifold assembly and the boiler connections. Tighten all the connections.

### 5.3 CONNECTIONS

#### a) Heating/DHW pipe connections

The central heating, cold water, domestic hot water and gas pipes can be connected to the appropriate copper tails as shown in figure 2.7 (Page 11).

**Note:** The pipe connections can also be made before the boiler is fixed to the back plate assembly.

#### b) Pressure relief valve discharge

Run the discharge from the pressure relief valve outlet in 15mm copper (minimum) to outside the building. See section 4.2 (g) for further details.

#### c) Condensate drain connection

Connect the condensate drain to the trap outlet pipe (see figure 4.9) located in the hydro-block chamber of the boiler. Undo the screw securing the wiring panel to the boiler and swing it open to gain access to the condensate drain connection.

The connection will accept 21 or 22mm O.D. plastic pipe which should discharge internally into the household drainage system. If this is not possible, discharge into an outside drain is acceptable. (See section 4.2(e) for further details.



### 6.1 GENERAL

The boiler must be permanently connected to a 230V~, 50Hz supply and it **MUST BE EARTHED**.

In GB: All external wiring to the boiler must be in accordance with the latest I.E.E. Wiring Regulation, and any local regulations which may apply.

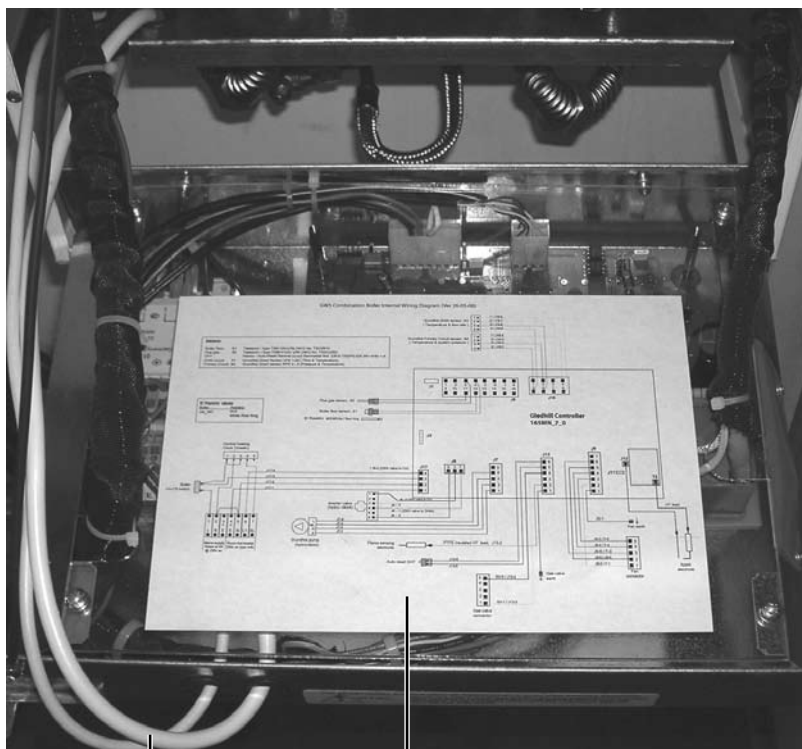
In IE: Reference should be made to the current addition of the ETCI rules.

There must be only one common isolator for the boiler and its control system, and it must provide complete electrical isolation via a double pole isolator with 3mm contact separation in both poles and fused at 5A maximum..The fused spur box should be readily accessible and located within 1 metre of the appliance and it should be identified as to its use.

Alternatively the connection can be made through an un-switched shuttered socket and 5A fused 3-pin plug both to the current issue of BS 1363, provided they are not used in a room containing a bath or shower.

In the event of an electrical fault after installation of the appliance, preliminary electrical checks must be carried out i.e. Earth Continuity, Short Circuit, Polarity, and Resistance to Earth.

**Figure 6.1**



Mains supply and  
room thermostat  
cable route

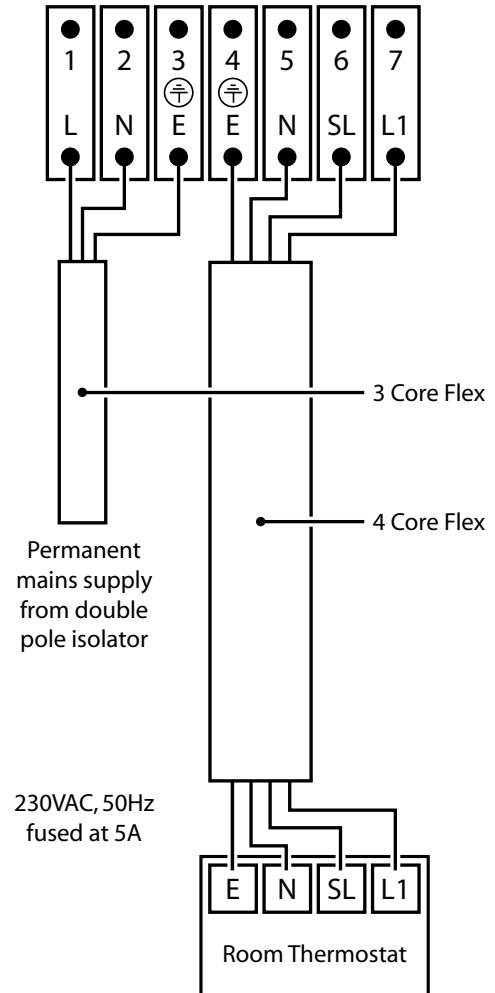
Control panel cover  
& wiring diagram

## 6.0 ELECTRICAL WIRING

### 6.2 EXTERNAL CONTROLS AND MAINS SUPPLY

- a) The Gledhill GB35C combination boiler is fitted with the wiring terminals inside the control panel as shown in figures 6.1 and 6.2. The access to these terminals is gained as follows: -
- Remove the front cover by removing the two screws at the bottom (front) and then lifting it off the two lugs on the top.
  - Open the hinged control panel by first unscrewing the retaining screw (top left hand side).
  - Remove the plastic cover by first unscrewing the retaining screws.
- b) Observe all terminal markings and colour codes as shown in figure 6.2 and table 6.1. Ensure that all flexible cables are routed through the strain relief cable clamp (at the bottom) and the entry holes in the control panel as shown in figure 6.1. Also ensure that there is enough slack in the cable between the strain relief clamp and the wiring terminals so that the control panel can swing through 180° without straining i.e. pulling on the cables.
- c) The controller in this boiler is phase sensitive. Therefore if mains supply 'Live' and 'neutral' are reversed, then the controller will not function and an error message will be displayed.
- d) A permanent 230V ac, 50Hz supply via a double pole isolator must be connected to terminals 'L', 'N' and 'E' as shown in figure 6.2.
- e) The boiler is supplied with an electro-mechanical central heating programmer fitted. However a room thermostat must be connected to the boiler terminals for central heating to function. Any external controls must meet the relevant requirements of Building Regulations Parts L1A and L1B (see also section 4.2 (d)).
- f) Carry out the preliminary electrical checks below after wiring and before switching on the supply: -
- The insulation resistance to earth of mains cables.
  - Test the earth continuity and short circuit of cables
  - Test the polarity of mains.

**Figure 6.2 - Permanent Mains Supply and Room Thermostat Wiring**



**Table 6.1 Description of Boiler Wiring Terminals**

Terminal	Description
1 - L	Mains (L) supply - 230V ~ 6A rated cable (0.75mm <sup>2</sup> )
2 - N	Mains (N) supply - 230V ~ 6A rated cable (0.75mm <sup>2</sup> )
3 - E	Mains (GND, E) supply - 0V ~ 6A rated cable (0.75mm <sup>2</sup> )
4 - E	(GND, E) supply to room thermostat - 0V ~ 6A rated cable (0.75mm <sup>2</sup> )
5 - N	Neutral (N) supply to room thermostat - 230V ~ 6A rated cable (0.75mm <sup>2</sup> )
6 - SL	Switched Live (SL) supply to room thermostat - 230V ~ 6A rated cable (0.75mm <sup>2</sup> )
7 - L1	Live (L) supply to room thermostat - 230V ~ 6A rated cable (0.75mm <sup>2</sup> )

## 7.1 GENERAL

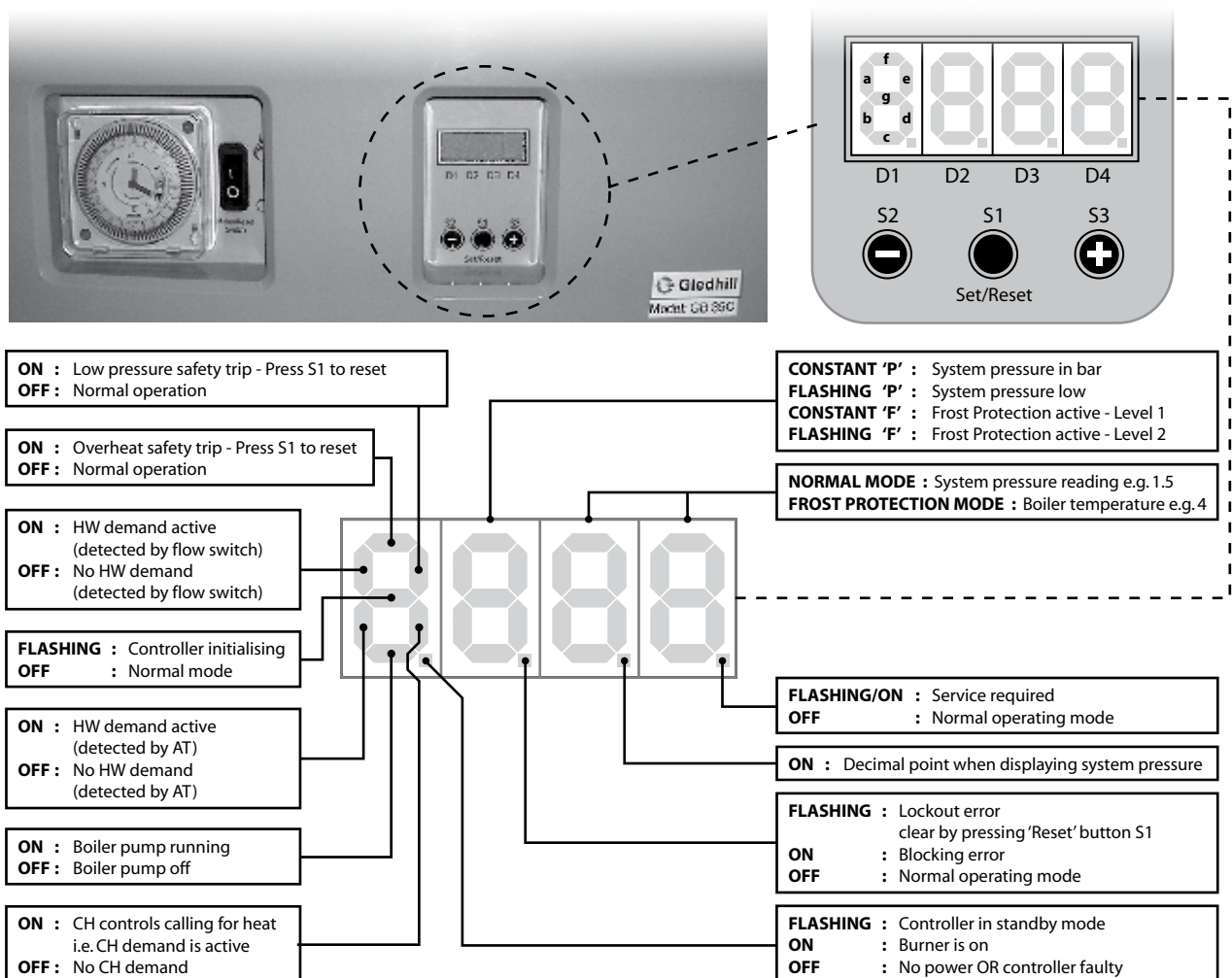
Commissioning should be carried out by a competent person in accordance with the current issue of BS6798 / The Building Regulations. Make sure that the system has been thoroughly flushed out with cold water. Refill the system with water, making sure that all the air is properly vented from the heating system and the boiler. The boiler vent valve is located on top of the boiler (near the flue connection). A suitable hose should be connected to the boiler vent valve for purging the air from the boiler, Before operating the boiler check that all external controls are calling for heat.

This boiler is designed for use in a sealed system. Therefore fill the sealed system until the pressure reading on the boiler display (see section 3) registers the design pressure (or the recommended pressure of 1 bar). Clear any air locks and check for leaks. Check the operation of the safety valve, preferably by allowing the water pressure to rise until the valve lifts. This should be within  $\pm 0.14$  bar of the preset pressure of 3.0 bar. Where this is not possible a manual check should be carried out. The system pressure should then be reduced to the initial design pressure.

### Important Notes:

- To prevent corrosion in the system and to prevent deterioration of the efficiency of the system and components, it is important that the system commissioning, cleansing and dosing should comply with BS7593 requirements before it is handed over to the customer (see also section 4.2 (b)).
- Failure to flush and add inhibitor to the system will invalidate the appliance warranty.

Figure 7.1 - Boiler Controls and Display



## 7.0 COMMISSIONING

### 7.2 COMMISSIONING THE BOILER

- a) Ensure the boiler DHW inlet valve is in the open position. Open the mains water supply to the boiler and fill the DHW system. Check for soundness.
- b) Open all hot water taps and purge the DHW system. After purging the system close all hot water taps.
- c) Ensure that the filling loop is connected.
- d) Ensure that the central heating (CH) programmer is in off position i.e. the slider switch on the programmer is in '0' (bottom) position and the room thermostat is turned down i.e. it is not calling for heat.
- e) Switch on the mains supply to the boiler. The display (figure 7.1) will show boiler in standby mode i.e. dot 'D1' will be flashing and digits 2 – 4 will show system pressure e.g. 'P0.1'.
- f) Open the CH circuit valves and filling loop valves to fill, the primary /CH system vent all radiators and pressurise the system to 1.0 bar as indicated on the boiler display. During filling and venting ensure that the boiler is also vented. The boiler air vent is located near to the front left hand side on the top of the boiler casing. It is recommended that a suitable hose be fitted to drain the water during purging.
- g) The system must be flushed in accordance with BS 7593 and the flushing agent manufacturers instructions. See also section 4.2 (b). Under no circumstances should the pressure relief valve be used for draining the appliance and/or the system.
- h) Connect a suitable pressure gauge to the appliance gas supply isolating valve pressure test point. Turn the gas supply on and check that the supply pressure is at least 20 mbar. Purge according to BS 6891, and check for gas tightness upon completion.
- i) Hinge the control panel upward (if open) and secure it by tightening the securing screw. Refit the case front panel and tighten the two securing screws at the bottom.
- j) The CH flow temperature and DHW temperatures are factory set to 80oC and 60oC respectively. These should not need to be changed but in exceptional circumstances following the procedure outlined in section 10 of this manual.

### 7.3 SETTING THE CH PROGRAMMER

Refer to section 3.1 of these instructions.

## 7.4 CHECKING THE BOILER FUNCTIONS

This appliance is factory set and sealed. No adjustments are necessary. Access to sealed inner casing panel is not required.

### a) Domestic hot water

Fully open a hot water tap. The boiler will sense the hot water demand and the burner will light. This will be indicated on the display as follows: -

- bar 'a' and/or bar 'b' will be ON to indicate that the HW demand is active
  - bar 'c' will be ON to indicate that the boiler pump is on
  - dot 'D1' will be on to indicate that the burner is on.
  - Digits 2 – 4 will display system pressure e.g. 'P1.6'
- } as shown in 'figure 7.1'  
(Page 27)

If the burner fails to light after 3 ignition attempts, ignition lockout will occur. To reset the appliance the central button (S1) beneath the display should be pressed.

With the boiler in operation for approximately 5 – 10 minutes check that the gas supply pressure is maintained at 20 mbar. Recheck with all other gas appliances also in operation.

The water outlet temperature will be automatically regulated to about 60°C. Check that the temperature stays approximately constant as the hot water tap is gradually closed and the boiler switches off (if CH not calling) when the hot water tap is closed.

If necessary the gas rate can be checked after running the boiler for 10 minutes with all other gas appliances and pilot lights (if any) in the dwelling turned off. The approximate value of the gas rate is 3.6 m<sup>3</sup>/h.

If suitable equipment allows, a measurement of the CO<sub>2</sub> can be obtained to further check the correct operation of the appliance. This can be taken from the flue sampling point located on the boiler flue turret elbow or the vertical flue adapter. Check that the readings are consistent with the details contained in the Technical Data Section 3 of these instructions.

Upon completion, shut the DHW tap, replace the sampling point cap and remove the gas pressure gauge. Check that the gas pressure sensing point is gas tight.

### b) Central heating

Ensure that the central heating timer and the room thermostat are calling for heat and all radiators are open i.e. being heated. Also no hot water taps should be open during this measurement. The boiler will now be operating in the CH mode and this will be indicated on the display as follows: -

- bar 'd' will be ON to indicate that the CH demand is active
  - bar 'c' will be on to indicate that the boiler pump is on
  - dot 'D1' will be on to indicate that the burner is on
  - Digits 2 – 4 will display system pressure e.g. 'P1.6'
- } as shown in 'figure 7.1'  
(Page 27)

With the CH timer and room thermostat calling for heat, fully open all the radiator valves and allow the heating system to heat up. Balance the radiators as necessary giving the required temperature difference across the heating system and set the bypass valve if necessary.

Allow the system to achieve full temperature and then switch off and isolate the appliance. Drain the system whilst still hot from the lowest part of the system ensuring all parts of the system are emptied. Fill and vent and treat the system as described previously.

### c) User Controls

Check that all external controls e.g. room thermostat and the central heating programmer are fully functional and give the expected response to the user operation.

Check the operation of the on/off switch and the appliance reset button on the boiler. When the burner is lit, the dot 'D1' will be on constantly. A fault is indicated by flashing dot 'D2'. To reset press 'set/reset' button S1.

## 7.0 COMMISSIONING

### 7.5 COMPLETION

- a) Instruct the user in the operation of the boiler and the system including the integral central heating programmer and the room thermostat. The explanation should include the sequence of operation.
- b) The central heating flow temperature and the domestic hot water outlet temperature are factory set. These should not normally require any adjustments. However if in exceptional circumstances this is necessary then this can be done following procedures outlined in section 10 of this document.
- c) Carefully read and complete all sections of the Benchmark Commissioning Checklist at the rear of this publication that are relevant to this appliance and the installation. These details are required in the event of any warranty work. The publication **MUST** be handed to the user for safe keeping and each subsequent regular service visits should be recorded. In addition for IE it is necessary to complete a 'Declaration of Conformity' to indicate compliance to I.S.813 and an example of this is given in the current edition of I.S.813.
- d) Hand over the 'Users Operating, Installation and Servicing Instructions' giving advice on the necessity of regular service.

## 8.1. General

### **IMPORTANT**

**DO NOT TAMPER WITH THE APPLIANCE OR BREAK ANY SEALS ON THE PRE-SET CONTROLS (BURNER OFFSET PRESSURE AND THROTTLE SETTINGS) OF THE APPLIANCE. IF IT IS NECESSARY TO REPLACE ANY OF THE SEALED PARTS, THEN THESE SHOULD BE REPLACED BY FACTORY SET AND SEALED PARTS SUPPLIED BY GLEDHILL LTD.**

For reasons of safety and economy, it is recommended that the boiler is serviced annually. Service must be carried out by a competent person who is also Corgi registered. After servicing, complete the relevant Interval Record section of the Benchmark Commissioning Checklist in this manual.

Measurement of the products of combustion can be achieved by connection of a probe to the combustion analyser test point on the flue elbow connecting the boiler to the flue system. Before commencing with a service or replacement of parts the boiler should be isolated from the electrical supply and the gas supply should be turned off at the gas isolation valve. All routine service requirements can be achieved by the removal of the front cover, inner casing panel and lower casing panel as described in section General 9.1. Unless stated otherwise parts are replaced in the reverse order of removal. Servicing should always include the removal of any debris from the condensate trap. After completing any servicing of gas carrying components ALWAYS test for gas soundness and carry out a functional test of the controls.

It is recommended that all subsequent service calls are recorded on the Service Interval Record section of the Benchmark Checklist in this manual.

Details from the Benchmark Checklist and Service Interval Record will be required when requesting warranty work. Failure to provide these details or the lack of a current service will delay a warranty visit and may incur a charge for the visit.

## 8.2. Spark & Flame sensing electrodes

For access refer to section 9.1 General.

Remove the spark plug style connector from the electrode and earth lead in the case of the spark electrode. Remove the two retaining screws with a Torx T20 driver, carefully withdraw the electrode from the combustion chamber. Inspect the tips for damage, clean away any debris and check the spark gap is 3.5-4.5mm. Check the electrode gasket for signs of damage and replace if necessary.

## 8.3. Burner

For access refer to section 9.1 General and 9.4 Burner Sub Assembly.

Clean the burner with a soft brush taking great care not to damage the front insulation. DO NOT use wire or sharp instruments to clean the holes in the burner. Inspect the burner for any signs of damage.

Removal of the burner is not necessary during a normal service.

**NOTE: IF THE BURNER HAS TO BE REMOVED IT WILL REQUIRE A NEW GASKET WHEN REFITTED.**

When replacing the assembly ensure the sealing grommet is correctly fitted.

## 8.4. Combustion Chamber and Heat Exchanger

For access refer to section 9.1 General and 9.4 Burner Sub Assembly

Remove loose debris from the combustion chamber using a soft brush and vacuum cleaner. Carefully flush any remaining debris by pouring water through to the condensate trap (ensuring the water is kept away from electrical components).

## 8.5. Condensate Drain

For access refer to section 9.1 General

Remove the yellow cap from the bottom of the trap and remove any solids found. Remove the flexible condense pipe connection from the bottom of the heat exchanger and the drain connection downstream of the condensate trap. Remove the condensate trap and flush water through the trap to remove any remaining solids. Reassemble the trap and connection ensuring a watertight seal is achieved. Always top up the trap seal before operating the boiler.

## 8.6. Inner Casing Panel Seal Check

For access refer to section 9.1 General

Check the condition of the seal, replace as required. To replace remove the old seal, thoroughly clean the casing surfaces. Fit the new seal, it is supplied to the correct length.

## 8.7. Combustion Check

Once the appliance has been reassembled (apart from the front panel) connect a CO<sub>2</sub> combustion analyser to the test point on the flue elbow. details of the acceptable CO<sub>2</sub> readings are shown in Technical Data ('Table 2.1' on Page 10)

## 8.8 DHW Filter/Flow regulator

The DHW filter is located in the isolating valve located on the incoming cold water supply underneath the hydraulic monoblock compartment (2nd from right). Shut off the isolating valve by turning the head anti clockwise and then unscrew and remove the access plug located at 90° to the isolating valve head using a flat headed screwdriver. Pull out the filter/flow regulator by using a pair of pin nose pliers in the cross bar provided.

## 9.0 CHANGING PARTS

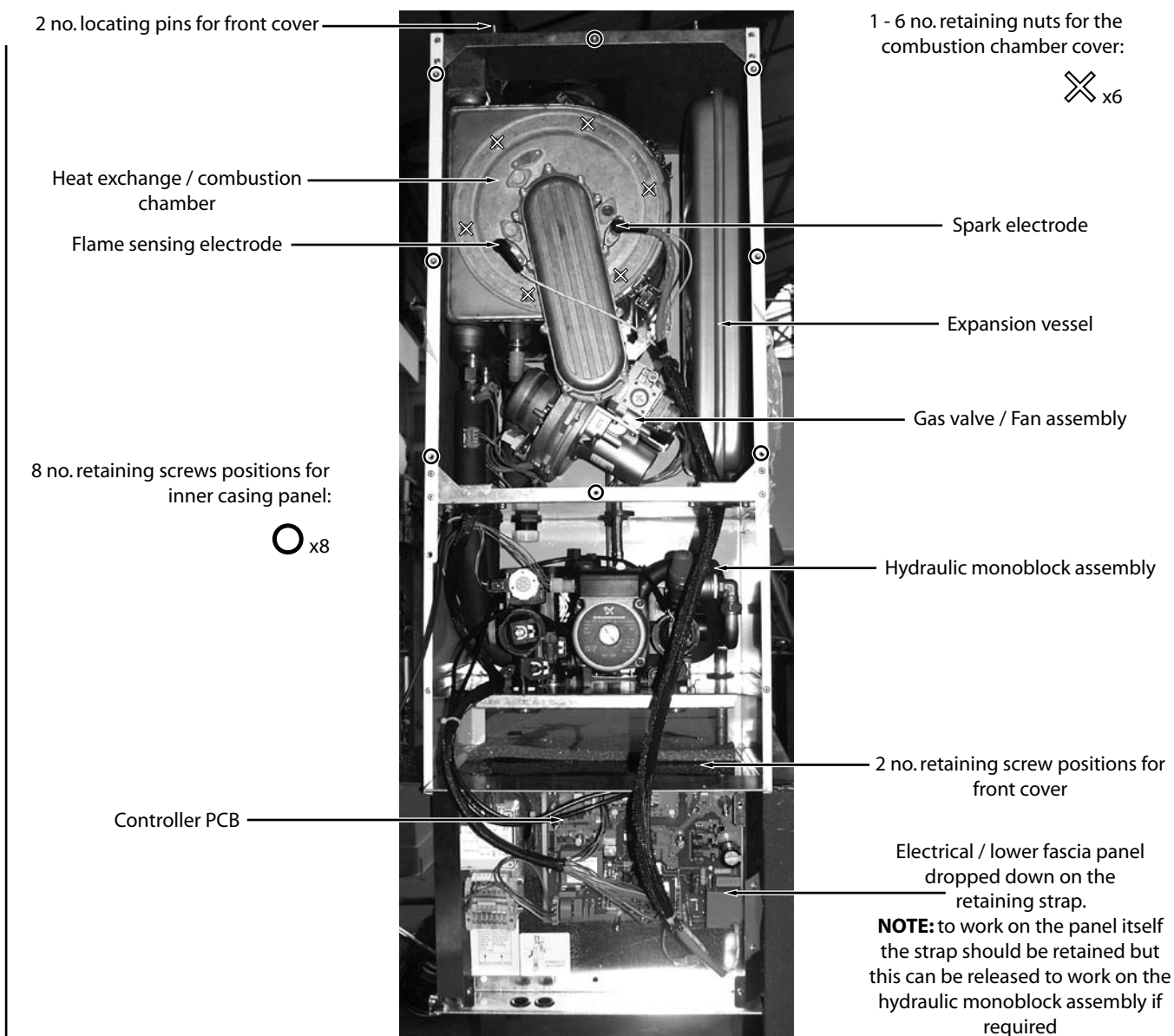
### 9. CHANGING PARTS

#### 9.1 GENERAL

A competent person must carry out replacement of parts. Before replacing any parts the boiler must be isolated from the mains electric supply and the gas must be turned off at the service valve on the boiler. Unless stated otherwise parts are replaced in the reverse order of removal. After replacing any parts always test for gas soundness and if necessary carry out a functional test of the controls.

For replacement of parts the front cover will need to be removed and the electrical/lower fascia panel will need to be dropped down on the retaining strap after releasing the screw to the L.H. side using a pozi type screwdriver. When access is required to the boiler compartment the inner casing panel will also need to be removed. The front cover is held with 2 no locating pins at the top and 2 no retaining screws at the bottom. The retaining screws should be removed from the bottom using a pozi type screw driver and the panel lifted clear of the locating pins. To remove the inner casing panel undo the eight retaining screws holding the inner casing panel using a pozi screw driver. Take care not to damage the seal.

**NOTE: The gas valve and Venturi are a single assembly which is factory set and sealed. This must not be tampered with and must be changed as a single assembly.**





### 9.2 SPARK & FLAME SENSING ELECTRODES

For access refer to section 9.1 General.

Remove the spark plug style connector from the electrode (and push fit spade connector from the earth lead in the case of the spark electrode). Remove the two retaining screws with a Torx T20 driver, carefully withdraw the electrode from the combustion chamber.

### 9.3 SPARK AND FLAME SENSING LEADS

For access refer to section 9.1 General.

Remove the clear plastic cover from the inside of the electrical/lower fascia panel by removing the 4 retaining screws using a pozi type screwdriver. Disconnect the spark electrode lead by removing the spark plug type connector off the electrode and pulling off the spade connector from the spark generator in the PCB. In the case of the earth lead simply pull off the push fit spade connectors from the spark electrode and the PCB. Disconnect the flame sensing electrode lead by removing the spark plug type connector off the electrode and removing the stocko crimp connector from the 6 way plug after releasing the side clip and removing the plug from the PCB. Pull out completely the whole three wire harness having first removed the 2 screws using a pozi type screw driver and the protective metal plate where the harness passes from the boiler compartment to the hydraulic mono block compartment.



**NOTE:** To remove the stocko crimp connector from the plug push down using an electrical screwdriver in the slot provided to release spring and allow removal of the stocko crimp and the lead.

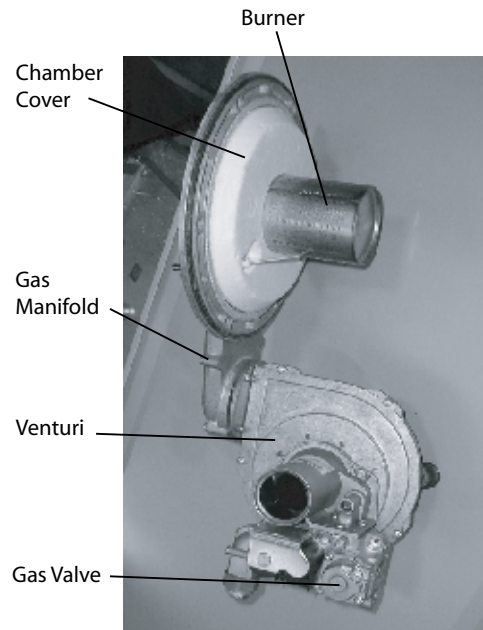
**NOTE:** The spark lead, flame sensing lead and earth lead are supplied as a single harness and should always be replaced completely if any single item needs replacing.

## 9.0 CHANGING PARTS

### 9.4 BURNER SUB ASSEMBLY

For access refer to section 9.1 General.

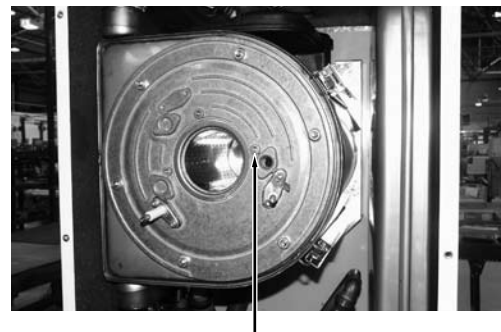
The burner, fan, gas valve and venturi form part of a sub-assembly that must be removed before one of them can be replaced. To remove the sub-assembly remove the 2 no electrical plugs from the fan and gas valve and remove the 2 no earth connections from the gas valve and fan. Remove the gas connection using a 30mm open ring spanner, then the six nuts securing the combustion chamber front cover with a 10mm AF spanner. Carefully withdraw the sub assembly from the combustion chamber.



#### 9.4.1 BURNER

Remove the three screws securing the gas manifold to the combustion chamber cover with a Torx T25 driver to release the burner. The burner can then easily be pushed out from the combustion chamber cover.

Note: When replacing the burner check that the 'D' shape cut out is located correctly over the equivalent shaped projection provided in the combustion chamber cover and fit a new rubber gasket.



Combustion chamber cover screws

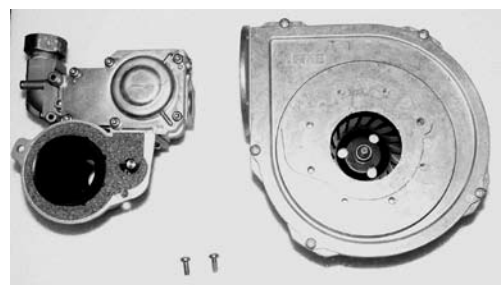
#### 9.4.2 FAN/GAS VALVE AND VENTURI ASSEMBLY

Remove the two screws holding the gas valve and venturi assembly to the fan using a Torx T25 driver then remove the four nuts securing the fan to the gas manifold with a 8mm A F spanner. Check and replace any seals and gaskets as necessary. Be particularly careful not to damage the cork gasket between the fan and the gas valve and venturi assembly and check when re-assembling each of these items that they are correctly aligned

**NOTE:** The ribbed gasket on the gas manifold should always go at the top where this component connects to the combustion chamber cover.

If replacing the gas valve and venturi assembly it will be necessary to remove the incoming gas tail piece by removing the 4 no screws using a pozi drive type screw driver. When removing the tail piece take care not to lose or damage the 'O' ring seal.

**NOTE: The gas throttle on the air/gas venturi (ie CO2 level) and offset pressure settings of the gas valve fitted to this boiler are factory set and sealed. These settings must not be adjusted. When required the whole assembly must only be replaced by a factory set and sealed replacement supplied by Gledhill Ltd. After replacing the gas valve the combustion CO2 must always be checked at the point provided on the flue. (See commissioning section of the manual for details).**



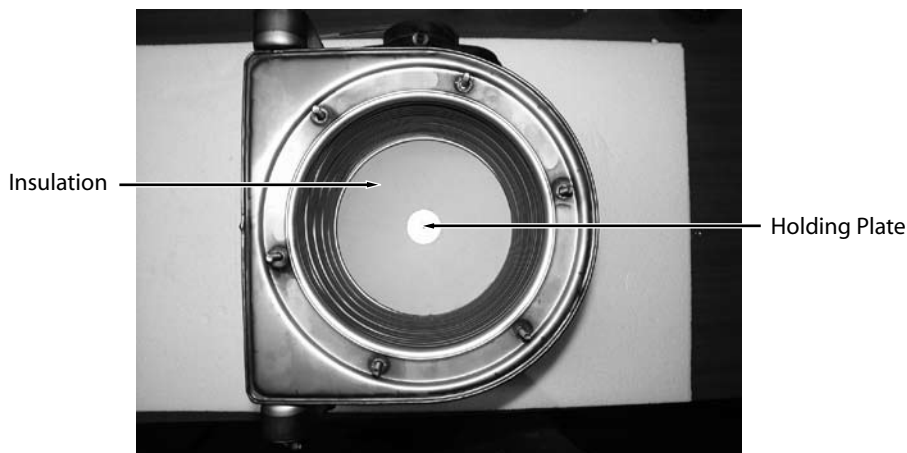


# REPLACEMENT OF PARTS

## 9.6 HEAT EXCHANGER INSULATION

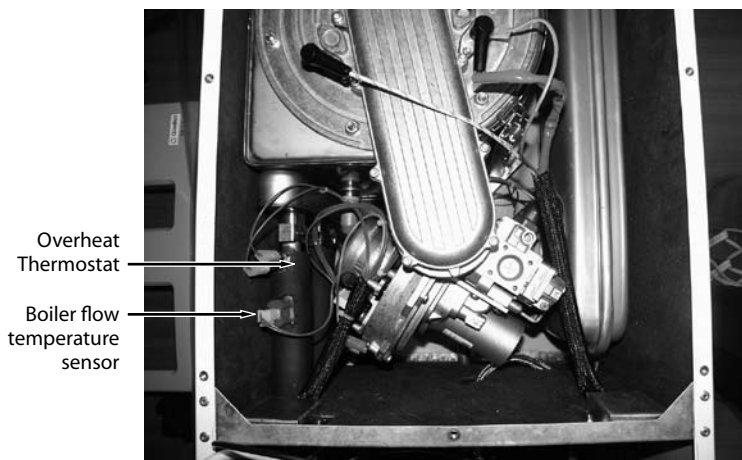
For access refer to section 9.1 General and 9.4 Burner Sub-Assembly. After breaking down the assembly as described in the above sections and removing the burner remove the spark electrode by removing the 2 retaining screws using a pozi type screw driver and lift off the insulation from the back of the combustion chamber cover. Check the position of electrodes on re-assembly.

To remove the insulation to the rear of the combustion chamber release the holding plate with a 2.5mm allen key turning anti clockwise and the pull out the insulation.



## 9.7 OVERHEAT THERMOSTAT

For access refer to section 9.1 General. Pull off the 2 no electrical spade connectors from the thermostat and unscrew using a 17mm AF spanner.



## 9.8 BOILER FLOW TEMPERATURE CONTROL SENSOR

For access refer to section 9.1 General. Squeeze in the retaining clip on the side of the electrical connector and pull out. Pull back the insulation and using one hand on each side of the pipe push off with your thumbs the spring type D clip on the pipe which is holding the sensor in position.

## 9.9 EXPANSION VESSEL

For access refer to section 9.1 General and for draining procedure section 9.5 Heat Exchanger. After ensuring the appliance is drained down release the flexible connecting pipe from the hydraulic monoblock assembly by pulling the spring clip forward and pulling the pipe upwards out of the monoblock and up through the seal separating the boiler and hydraulic monoblock compartments. Pull the expansion vessel towards the front of the boiler compartment slightly and then tilt the top forwards to allow it to be removed.

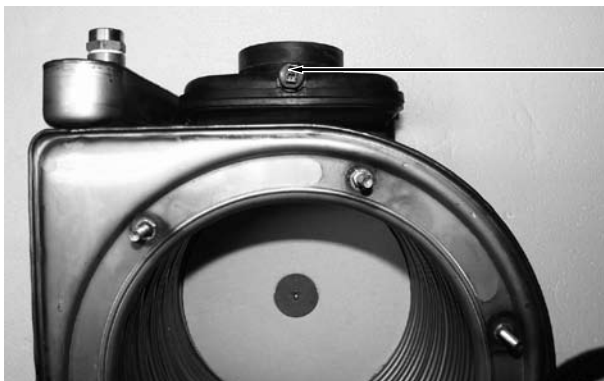
**NOTE:** Check the air pressure of the new expansion vessel at the Schrader type connector provided at the top of the expansion vessel and adjust if necessary before fitting. When fitting the new expansion vessel check the 'O' ring is in place on the connecting pipe before pushing into the hydraulic monoblock and refitting the spring clip.



Expansion vessel connector

## 9.10 FLUE GAS SENSOR

For access refer to Section 9.1 General. Squeeze in the retaining clip on the side of the electrical connector and pull forward to remove. Unscrew the sensor itself using a 15mm AF spanner.



Flue gas sensor  
(electrical connection not shown)

### 9.11 CONTROLLER PCB

For access refer to section 9.1 General. Remove the clear plastic cover from the inside of the electrical/ lower fascia panel by removing the 4 retaining screws using a pozi type screwdriver. Remove all the wiring plugs/spade connectors from the PCB after noting the 2 spade connector locations.

**NOTE:** There is a need on all, other than the spade connectors, to release the retaining clip before carefully removing the various plug in electrical connectors. The plugs are all unique so cannot be inserted incorrectly. DO NOT use the wires to pull out the plugs.

Release the PCB itself by unscrewing the 5 no chrome supports/stand offs using a 5mm AF spanner.

### 9.12 FUSE

For access refer to section 9.1 General. The fuse is located in the bottom left hand corner of the controller PCB. To replace pull out from its holder.

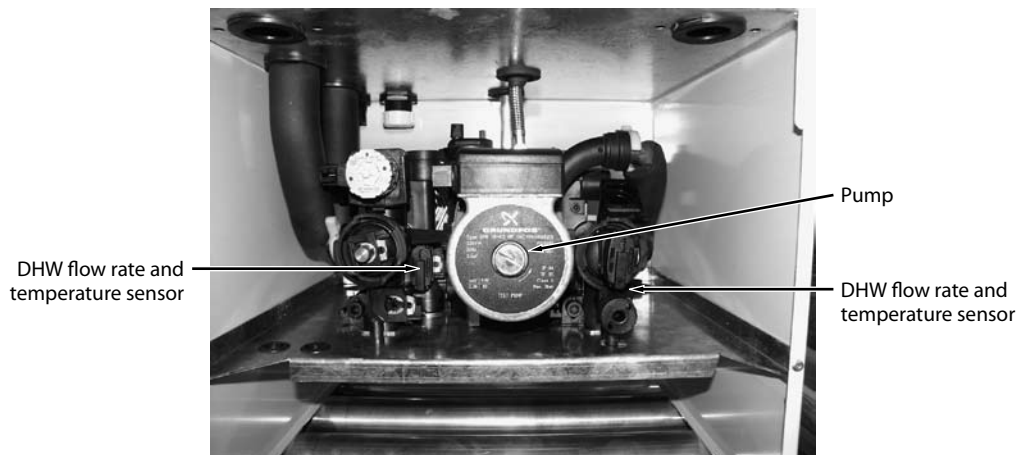


### 9.13 DHW FLOW RATE AND TEMPERATURE SENSOR

For access refer to section 9.1 General

Drain down the DHW side of the appliance by shutting off the isolating valve on the pipework below the hydraulic monoblock compartment and opening the DHW taps. Then release the spring clip by pushing to the right, pull out the sensor and then pull the electrical connector out of the sensor.

Note: The original 'O' ring will remain within the housing and will need to be removed to allow the 'O' ring provided with the new sensor to fit/seal. The sensor is direction sensitive and must only be fitted with the electrical socket at the top.



## 9.14 BOILER PRESSURE AND RETURN TEMPERATURE SENSOR

As the original DHW Flow Rate and Temperature Sensor – section 9.13

## 9.15 PUMP

For access refer to Section 9.1 General and for draining procedures Section 9.5 Heat Exchanger. After ensuring the appliance is drained down remove the electrical plug by squeezing the clip on the back of the plug and pulling out to the left.

Disconnect the pump head by unscrewing the 4 retaining bolts using a 4mm allen key and pulling forwards.

## 9.16 SAFETY RELIEF VALVE

For access refer to Section 9.1 General and for draining procedures Section 9.5 Heat Exchanger. After ensuring the appliance is drained down loosen the 15mm compression joint connecting the discharge pipe to the outlet elbow connected to the valve using a 24mm AF spanner.

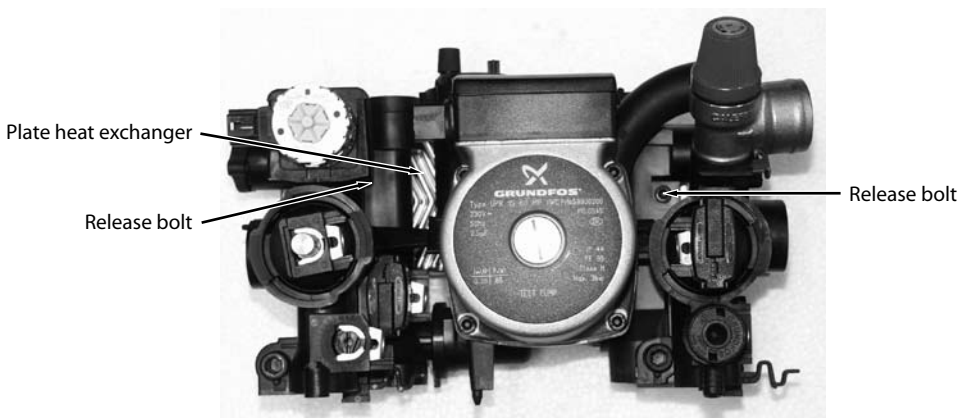
Then release the spring clip retaining the valve on the hydraulic monoblock by pulling to the right and then lift out the valve and elbow.

**NOTE:** Disconnect the male iron/copper outlet elbow from the old valve and re-use on the new one.

## 9.17 PLATE HEAT EXCHANGER

For access refer to Section 9.1 General and for draining procedures Section 9.5 Heat Exchanger. Also isolate and drain down as necessary the hot and cold water domestic system.

After ensuring the appliance and the water systems are drained down release the 2 retaining bolts holding the PHE in position using a 4mm allen key. Using both hands over the top of the hydraulic monoblock pull the PHE backwards and then up and over the top of the hydraulic monoblock, after having unscrewed the cap on the automatic air vent to allow the necessary clearance. There are 4 washers to seal the PHE connections which will be retained in each of the hydraulic monoblock connections. These will need to be replaced. These can easily be removed by pushing forward your finger into the centre of the washer and then pulling it backwards.



### 9.18 HYDRAULIC MONOBLOCK

If it should ever prove necessary the whole of the hydraulic monoblock can be removed and replaced. For access refer to Section 9.1 General and for draining down procedures Section 9.5 Heat Exchanger. Also isolate and drain down as necessary the hot and cold water domestic systems.

Release/pull off all the electrical and mechanical connections to the hydraulic monoblock within the compartment by following the instructions elsewhere in this section for each of the components/connections. Release also the 4 no pipework connections from the base of the hydraulic monoblock by releasing the spring clips. Release the hydraulic monoblock from the base of the compartment by unscrewing the 4 retaining screws using a pozi type screwdriver and releasing the 2 securing clips by turning anti clockwise with a 6mm allen key. Pull up and forward to remove the hydraulic monoblock from the compartment.

### 9.19 DRAIN OFF TAP

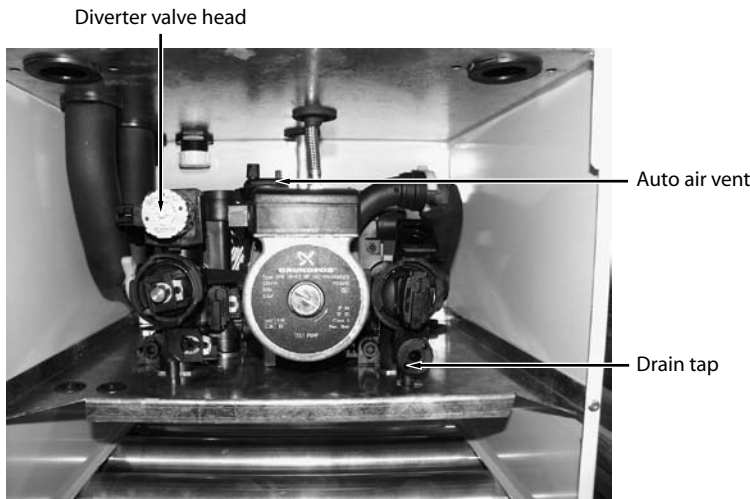
For access refer to Section 9.1 General and for draining procedures Section 9.5 Heat Exchanger. After ensuring the appliance is drained down, release the spring clip retaining the tap by pulling to the right and pull out (forward) the drain off tap.

### 9.20 DIVERTOR VALVE HEAD

For access refer to Section 9.1 General and for draining procedures Section 9.5 Heat Exchanger. After ensuring the appliance is drained down, push down the retaining clip on the front of the electrical plug and pull to the left to remove. Remove the actuator by moving the front of the head 45° to the right and then pulling up and out of the valve.

### 9.21 AUTOMATIC AIR VENT (TO HYDRAULIC MONOBLOCK)

For access refer to Section 9.1 General and for draining procedures Section 9.5 Heat Exchanger. After ensuring the appliance is drained down turn the whole of the automatic air vent anti clockwise through 45-55° to release then pull up and remove.

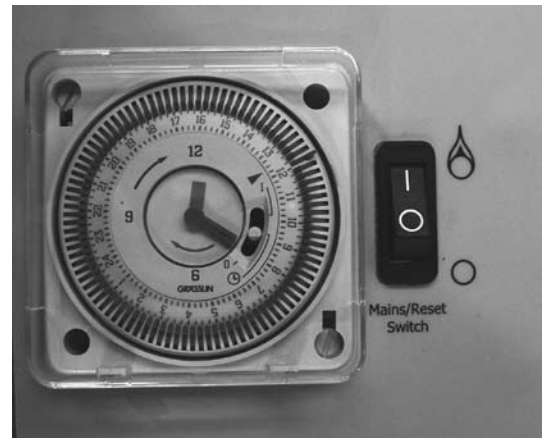


### 9.22 CENTRAL HEATING CLOCK

For access refer to Section 9.1 General. Remove the clear plastic cover and release the two holding screws located in the top left and bottom right hand corners by turning anti clockwise ¼ turn. Pull out the clock from the panel and remove the 4 spade connectors at the base of the clock having first made a note of their positions.

### 9.23 ON-OFF SWITCH

For access refer to Section 9.1 General. Remove the clear plastic cover from the inside of the electrical/ lower fascia panel by removing the 4 retaining screws using a pozi type screwdriver. Remove the 2 spade connectors from the rear of the switch, squeeze in the holding tabs on each end of the switch and push through the panel.





## 10. FAULT FINDING

### 10.1 INITIAL CHECK

- e) Check that gas, water and electrical supplies are available at the boiler.
- f) The electricity supply should be 230V~ 50Hz. The preferred minimum gas pressure is 20mbar. The boiler pressure should be pressurised to 0.5bar minimum when the boiler and the CH system are cold and no more than 2.5 bar when the system is hot.
- g) Carry out electrical system checks. i.e. Earth continuity, Resistance to earth, Short circuit and Polarity with suitable meter. Note: These checks should be repeated after any fault finding and servicing.
- h) Ensure that all external controls are calling for heat and check all external and internal fuses.
- i) Before carrying out any servicing or replacement of parts, ensure that the gas and the electricity supplies are isolated.

### 10.2 APPLIANCE CONTROLLER

The boiler is fitted with an integrated single PCB controller for reliability. This PCB controls all boiler functions and is also equipped with a 4 digit, 7 segment display and push buttons on the front of the boiler as shown in figure 10.1. The display shows the system status and can be used to display the diagnostic information as described in the following sections.

The push buttons can be used to enter the parameter menu and to change the parameters. The push button S1 (Labelled 'set/reset') is also used to clear locking errors and reset the controller.

#### 10.2.1 Normal (Level-0 i.e. Default) Display Functions

The information displayed on the 4 digit, 7 segment display in the normal user (Level-0) mode is shown in figure 10.2. If no input is detected from the push buttons when the display is in levels 1 and 2 mode for a period of about 30 seconds, it will automatically revert to default level-0 mode.

Figure 10.1 - Controller Display

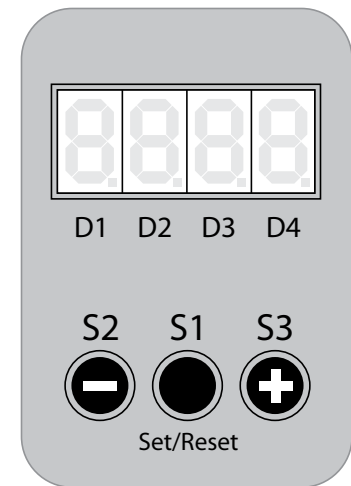
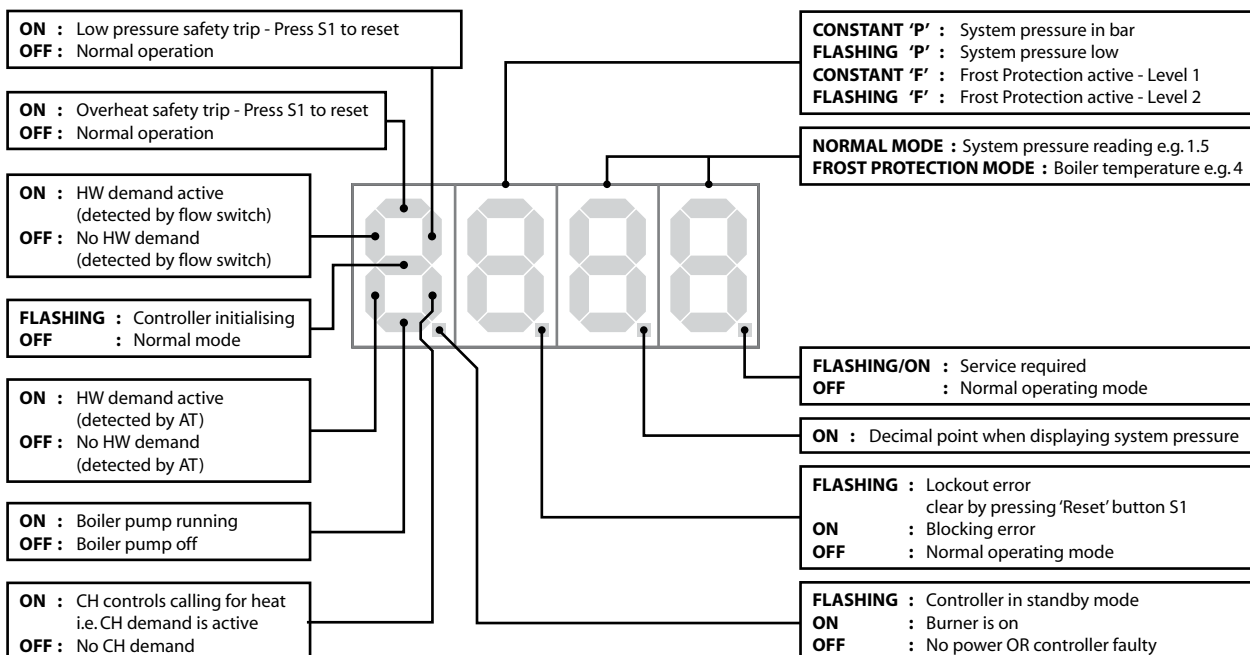


Figure 10.2 - Level\_0 Display Functions



## 10.2.2 Level-1 (Interrogation Mode) Display Functions

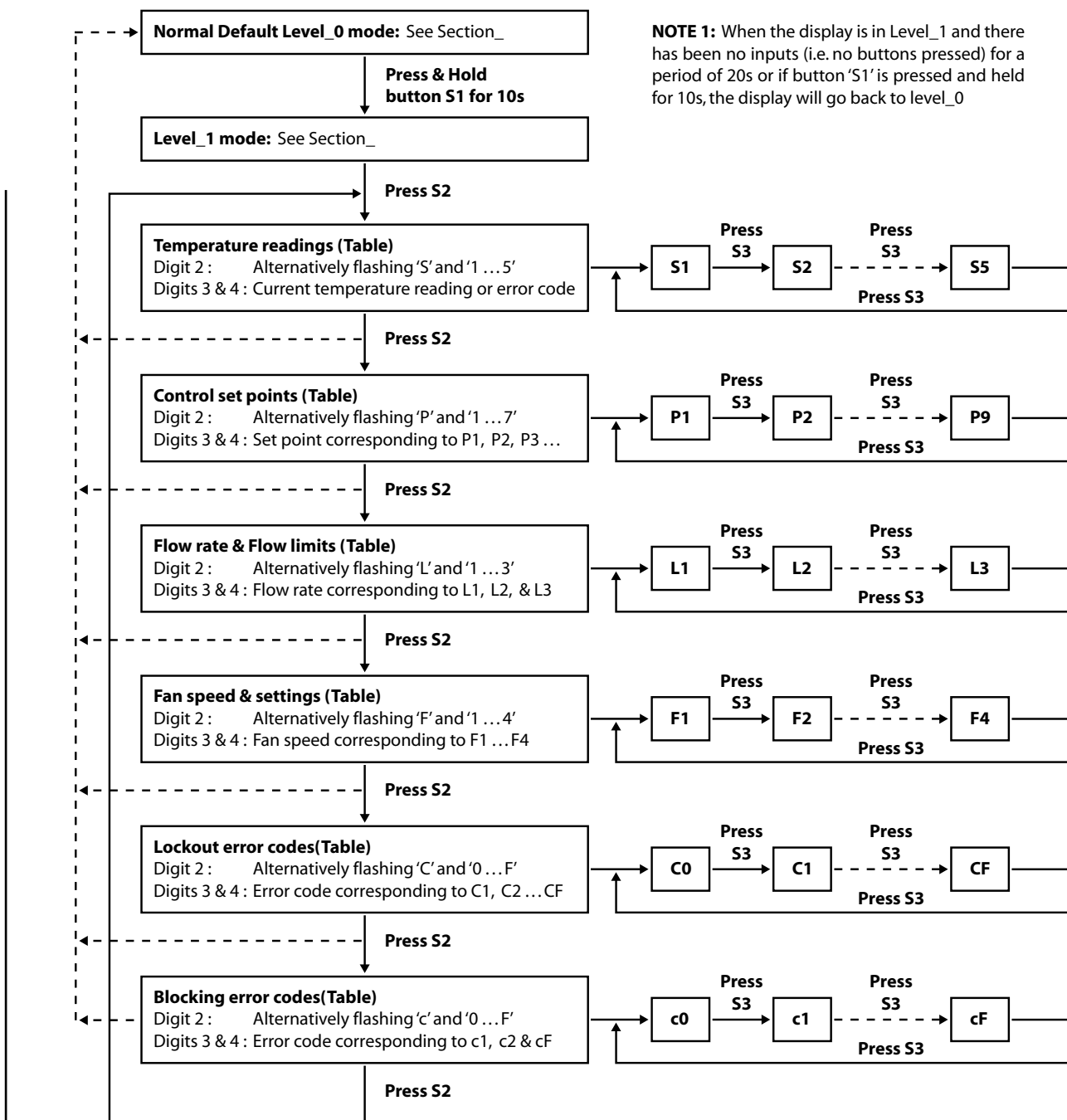
The level\_1 is intended for use by the service engineers and is used to display the boiler circuit temperatures, set points and errors. The information flow diagram for level\_1 is shown below in figure 10.3. Push buttons S2 and S3 are used to select the parameters vertically and horizontally respectively.

The level\_1 is accessed by pressing and holding push button S1 for a minimum of 10 second(s). The controller display will go back to default level if either there has been no input (i.e. buttons pressed) for 30s or if push button S1 is pressed and held for 10s.

When the controller is in Level-1 mode, the following information can be displayed as described below:-

- i.) **Current sensor temperatures**
- ii.) **Control set points**
- iii.) **DHW flow rate and limits**
- iv.) **Fan speeds**
- v.) **Blocking error code history**
- vi.) **Locking error code history**

Figure 10.3 - Level\_1 Display Flow Diagram



**i.) Current boiler temperatures**

When the controller display is in level\_1, the temperature display mode is selected by scrolling the mode by pressing button S2 until 'S' flashes on digit 2 of the display. The sensor number is selected by pressing button S3. The temperature sensors used in the boiler are listed in table 10.1.

The sensor number is displayed by alternatively flashing 'S' and number (1...5) on digit 2 of the display. The current temperature reading corresponding to the selected sensor is displayed on digits 3 and 4 of the display. If the sensor selected is faulty, then 'En' is displayed on digits 3 & 4 where 'n' is the error type as shown in table 10.1.

Table 10 : 1 Description of Temperature Sensors		
Sensor	Description	Error Codes
S1	Boiler flow temperature	E1 : sensor or cable shorted
S2	Flue gas temperature	E2 : sensor or cable open circuit
S3	DHW flow temperature	E3 : reading > 99°C
S4	Boiler return temperature	
S5	Appliance ID resistor	

**ii.) Control set points**

When the controller display is in level\_1, the temperature control set point mode is selected by scrolling the mode by pressing button S2 until 'P' flashes on digit 2 of the display. The required set point is selected by pressing button S3. The control set points available for display are listed in table 10.2.

The selected control set point is displayed by alternatively flashing 'P' and number (1...9) on digit 2 of the display. The corresponding set point is displayed on digits 3 and 4 of the display.

Table 10 : 2 Temperature & Pressure Control Set Points			
Number	Description	Default Value	Range
P1	Boiler thermostat off setting - CH	75°C	55 - 80°C
P2	Boiler thermostat off setting - HW	82°C	
P3	Boiler thermostat differential	10°C	
P4	Hot water outlet temperature	50°C	50 - 60°C
P5	CH temperature return	60°C	40 - 65°C
P6	Low pressure limit	0.5 bar	
P7	High pressure limit	3.0 bar	

**iii.) DHW flow rates**

When the controller display is in level\_1, the DHW flow rate interrogation mode is selected by scrolling the mode by pressing button S2 until 'L' flashes on digit 2 of the display. The required set point is selected by pressing button S3. The hot water flow rate information that can be displayed is shown in table 10.3.

The selected hot water flow information is displayed by alternatively flashing 'L' and number (1...2) on digit 2 of the display. The corresponding set point is displayed on digits 3 and 4 of the display.

Table 10 : 3 Domestic Hot Water Flow Rate Display Data		
Number	Description	Default Value
L1	Current DHW flow rate (l/min)	n/a
L2	Minimum boiler on DHW flow rate	2.5 l/min
L3	Minimum boiler off DHW flow rate	2.0 l/min

#### iv.) Fan speeds

When the controller display is in level\_1, the current fan speed interrogation mode is selected by scrolling the mode by pressing button S2 until 'F' flashes on digit 2 of the display. The required fan speed set point is selected by pressing button S3. The hot water flow rate information that can be displayed is shown in table 10.4.

The selected fan speed parameter is displayed by alternatively flashing 'F' and number (1...5) on digit 2 of the display. The corresponding fan speed reading is displayed on digits 3 and 4 of the display.

Table 10 : 4 Fan Speed Information Display		
Number	Description	Default Value
F1	Current fan speed (RPM/100)	n/a
F2	Minimum fan speed setting (RPM/100)	1920
F3	Maximum fan speed setting_DHW (RPM/100)	5700
F4	Maximum fan speed setting_CH (RPM/100)	4440
F5	Ignition fan speed setting (RPM/100)	4000

#### v.) Locking errors

When the controller display is in level\_1, the current lockout error code and history can be interrogated by scrolling the display by pressing button S2 until 'C' flashes on digit 2 of the display. The button S2 is used to cycle between the faults.

The error code is displayed by alternatively flashing 'C' and number (0...F) on digit 2 of the display. The corresponding internal error code number is displayed on digits 3 and 4 of the display.

There are 16 fault codes stored in order of occurrence. The fault code 'C0' is the current or last fault code and the fault code 'CF' is that happened the longest time ago.

When no fault is stored at the displayed fault number, an 'FF' is displayed. It is also possible that 'EE' is displayed for an internal error number. This means that the controller is busy reading the memory. The lockout error codes are listed in table 10.5.

The non volatile locking errors can only be cleared by pressing the reset button S1.

#### vi.) Blocking errors

When the controller display is in level\_1, the current blocking error code and history can be interrogated by scrolling the display by pressing button S2 until 'c' flashes on digit 2 of the display. The button S2 is used to cycle between the faults.

The blocking error code is displayed by alternatively flashing 'c' and a number (0...F) on digit 2 of the display. The corresponding internal error code number is displayed on digits 3 and 4 of the display.

There are 16 fault codes stored in order of occurrence. The fault code 'c0' is the current or last fault code and the fault code 'cF' is that happened the longest time ago.

When no fault is stored at the displayed fault number, an 'FF' is displayed. It is also possible that 'EE' is displayed for an internal error number. This means that the controller is busy reading the memory. The blocking error codes are listed in table 10.5.

The blocking errors will automatically disappear when the error is cleared.

**vii.) Warning errors**

The warning errors will not stop the appliance working. If a warning error occurs, the controller will use fault tolerant algorithm to keep the appliance working although full service may not be available.

The warning errors are listed in table 10.5.

**Table 10.5 Error Codes**

<b>LOCKING ERRORS 'C'</b>		<b>BLOCKING ERRORS 'C'</b>	
0	E2PROM READ ERROR	31	REFHI_TOO_LO_ERROR
1	IGNIT ERROR	32	REFHI_TOO_HI_ERROR
2		33	REFLO_TOO_LO_ERROR
3		34	REFLO_TOO_HI_ERROR
4		35	
5	GV_RELAY_ERROR		
	OR MECHANICAL OHT OPEN	36	FLAME_ERROR_2
6	SAFETY_RELAY_ERROR	37	
7		38	FS_NOT_OPEN_ERROR
8	FAN_ERROR	39	FS_NOT_CLOSED_ERROR
9	RAM_ERROR	40	
10	WRONG_EEPROM_SIGNATURE	41	
11	CH_MAX_ERROR	42	CH_MAX_BLOCK_ERROR
12	E2PROM_ERROR	43	
13	STATE_ERROR	44	PHASE_ERROR
14	ROM_ERROR	45	50HZ_ERROR
15	OVERHEAT_ERROR	46	FAULTY_EARTH_ERROR
16	15MS_XRL_ERROR	47	WD_COMMUNICATION_ERROR
17	SENS_DIFF_ERROR	48	APPLIANCE_SELECTION_ERROR
18	T_MAX_LOCK_ERROR	49	MULTIPLE_SENSOR_ERROR
19	STACK_ERROR	50	SENSOR_00_OPEN
20	FLAME_OUT_TOO_LATE_ERROR	51	SENSOR_01_OPEN
21	FLAME_ERROR_1	52	SENSOR_02_OPEN
22	20MS_XRL_ERROR	53	SENSOR_03_OPEN
23	41MS_ERROR	54	SENSOR_04_OPEN
24	TOO_MANY_FLAME_FAILURES	55	SENSOR_05_OPEN
25	FLAME_FLAG_CPL_ERROR	56	SENSOR_06_OPEN
26	WD_DATABYTE_CPL_ERROR	57	SENSOR_07_OPEN
27	FLAG_BYTE_INTEGRITY_ERROR	58	SENSOR_00_SHORTED
28	AD_HI_CPL_ERROR	59	SENSOR_01_SHORTED
29	AD_LO_CPL_ERROR	60	SENSOR_02_SHORTED
30	REGISTER_ERROR	61	SENSOR_03_SHORTED
		62	SENSOR_04_SHORTED
		63	SENSOR_05_SHORTED
		64	SENSOR_06_SHORTED
		65	SENSOR_07_SHORTED
		66	RESET_BUTTON_ERROR
		255	NO_ERROR
<b>WARNING ERRORS</b>			
0	T_BOILER_FLOW_OPEN		
1	T_FLUE_OPEN		
2			
3	T_BOILER_RETURN_OPEN		
4	T_HW_OPEN		
5	T_BOILER_FLOW_SHORTED		
6	T_FLUE_SHORTED		
7			
8	T_BOILER_RETURN_SHORTED		
9	T_HW_SHORTED		
10	P_SYSTEM_OPEN		
11	P_SYSTEM_SHORTED		
12	HW_FLOW_OPEN		
13	HW_FLOW_SHORTED		
255	NO_ERRORS		

# SPARE PARTS

## 10.2.3 Level-2 Display Functions

The level\_2 is intended for use by the service engineers only and it is used to change the pre-set values e.g. central heating flow temperature.

The level-2 menu is accessed by simultaneously pressing and holding the push buttons S2 and S3 for at least 10s. The dot 'D4' will be lit when level-2 is menu is selected.

The controller display will go back to default level-1 if either there has been no input (i.e. no buttons pressed) for 30s or if push button S1 is pressed and held for 10s.

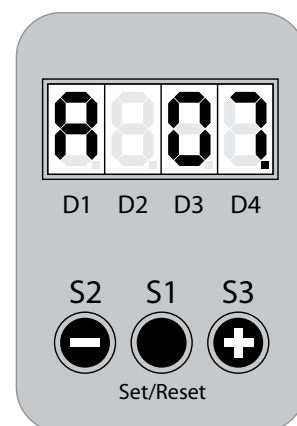
When the controller is in Level-2 mode, the following information can be displayed as described below: -

- i.) Boiler type (model) setting
- ii.) Boiler flow temperature – when in central heating mode
- iii.) Boiler temperature difference – when in central heating mode
- iv.) DHW flow temperature

### i.) Boiler type (model) setting

The boiler wiring loom contains an 6K8 ohm ID resistor. For the controller to function correctly the boiler type set on the controller must correspond to the ID resistor. The boiler type '07' is factory set. However if a PCB is replaced then the boiler type must be set as described below.

- Select Level – 2 mode on the controller using procedure described above. Level – 2 mode is indicated by dot 'D4'.
- Cycle the display by pressing buttons S2 (minus) or S3 (plus) until 'A' is displayed on the first digit and the current boiler model is displayed on digits 3 and 4 e.g. as '07'.
- To change the boiler model, press and hold button S1 until the dot 'D4' starts flashing. Select the boiler using buttons S2 or S3. Press and hold button S1 to confirm selection.
- If the selected boiler model matches the ID resistor fitted, the dot 'D4' will stop flashing.
- If the selected boiler model does not match the ID resistor fitted, the dot 'D4' will continue to flash and third digit will display flashing character 'E' (error).
- If the boiler model selection is correct, then the controller will use the boiler model specific data e.g. fan speeds, set points etc. If the model selection is incorrect, then the controller will not allow the boiler to function i.e. will generate lockout condition with appropriate error code(s)..

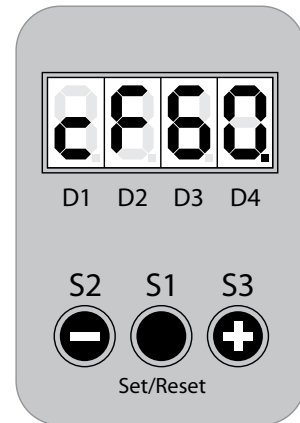


## ii.) Changing temperature settings

The standard appliance is supplied with the central heating flow temperature, central heating circuit temperature difference and the domestic hot water outlet temperature settings factory set at the default values shown in Table 10.2. However, in the unlikely event it is required these can be changed within the pre-set limits when the controller is in level-2. The procedure for selecting level-2 is described above.

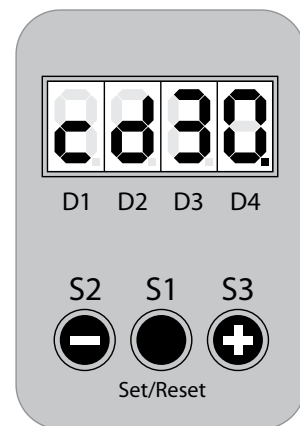
When in Level – 2, the central heating flow temperature can be changed as follows: -.

- Cycle the display using buttons S2 or S3 until 'cF' is displayed on the two left hand digits and the current temperature setting is displayed on the two right hand digits e.g. as '60'.
- To change the CH temperature, press and hold button S1 until the dot 'D4' starts flashing. Select the temperature using buttons S2 or S3. Press and hold button S1 to confirm selection. The controller will only allow the temperature settings to be changed within the preset limits.
- When the selected temperature setting is confirmed, the dot 'D4' will stop flashing and will be on constantly. The controller will now use the new temperature settings for controlling the central heating functions.



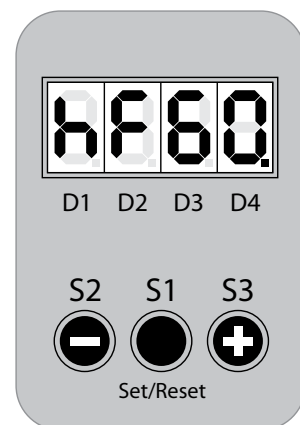
(iii.) When in Level – 2, the central heating temperature difference can be changed by following procedure: -.

- Cycle the display using buttons S2 or S3 until 'cd' is displayed on the two left hand digits and the current temperature difference setting is displayed on the two right hand digits e.g. as '30'.
- To change the CH temperature difference, press and hold button S1 until the dot 'D4' starts flashing. Select the temperature using buttons S2 or S3. Press and hold button S1 to confirm selection. The controller will only allow the temperature settings to be changed within the preset limits.
- When the selected temperature setting is confirmed, the dot 'D4' will stop flashing and will be on constantly. The controller will now use the new temperature settings for controlling the central heating functions.



(iv.) When in Level – 2, the DHW flow temperature can be changed by following procedure: -.

- Cycle the display using buttons S2 or S3 until 'hF' is displayed on the two left hand digits and the current temperature setting is displayed on the two right hand digits e.g. as '60'.
- To change the DHW temperature, press and hold button S1 until the dot 'D4' starts flashing. Select the temperature using buttons S2 or S3. Press and hold button S1 to confirm selection. The controller will only allow the temperature settings to be changed within the preset limits.
- When the selected temperature setting is confirmed, the dot 'D4' will stop flashing and will be on constantly. The controller will now use the new temperature settings for controlling domestic hot water temperature.



### 10.3 COMPUTER SOFTWARE

If further analysis is required the appliance functions, detailed fault diagnostics and the design parameters can be accessed/changed by Gledhill Engineers using specialist software/equipment.

### 10.4 INTERNAL WIRING DIAGRAM

The appliance wiring diagram is shown in figure 10.4. Ensure that wiring details are followed when a PCB, wiring harness or components are changed.

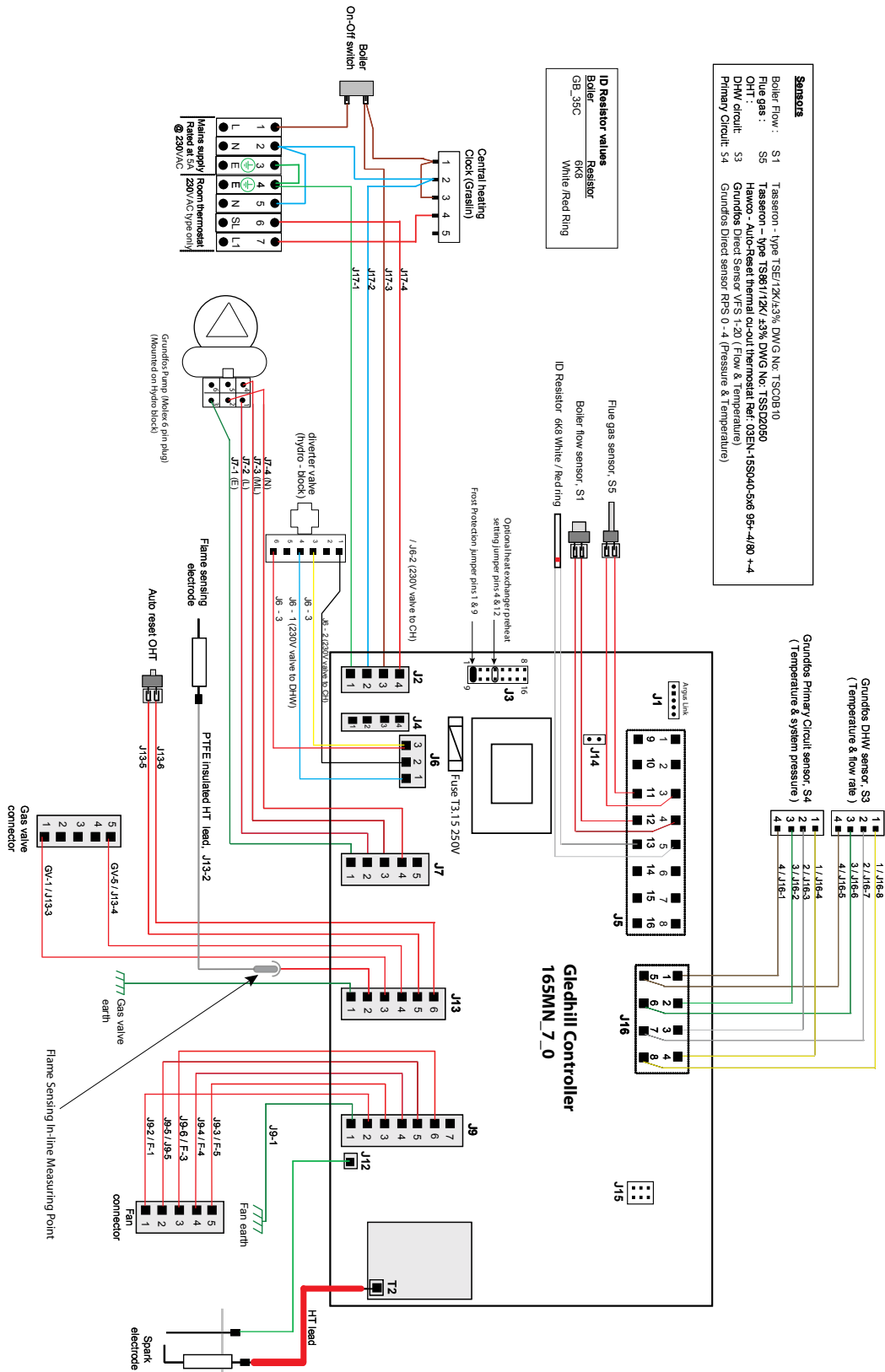


Figure 10.4 - GWS Combination Boiler Internal Wiring Diagram

**Sensors**

Boiler Flow :	S1	Taserson - type TSE/12K/43% DWG No: TSC0810
Flue gas :	S5	Taserson - type TSE/12K/43% DWG No: TSC0260
DHW :	S3	Hanco - Auto-Reset Thermal cut-out thermostat Ref: 05EN-155040-5X6 951-4/80 +4
Primary Circuit:	S4	Grundfos Direct Sensor PPS 0-20 (Flow & Temperature) Grundfos Direct sensor PPS 0-4 (Pressure & Temperature)

**ID Resistor values**

Boiler Resistor	6K8
Gas 39C	White Red Ring









BENCHMARK No. | | | | | | | |

# GAS BOILER COMMISSIONING CHECKLIST

BOILER SERIAL No. \_\_\_\_\_ NOTIFICATION No. \_\_\_\_\_

**CONTROLS** To comply with the Building Regulations, each section must have a tick in one or other of the boxes

TIME & TEMPERATURE CONTROL TO HEATING	ROOM T/STAT & PROGRAMMER/TIMER <input type="checkbox"/>	PROGRAMMABLE ROOMSTAT <input type="checkbox"/>
TIME & TEMPERATURE CONTROL TO HOT WATER	CYLINDER T/STAT & PROGRAMMER/TIMER <input type="checkbox"/>	COMBI BOILER <input type="checkbox"/>
HEATING ZONE VALVES	FITTED <input type="checkbox"/>	NOT REQUIRED <input type="checkbox"/>
HOT WATER ZONE VALVES	FITTED <input type="checkbox"/>	NOT REQUIRED <input type="checkbox"/>
THERMOSTATIC RADIATOR VALVES	FITTED <input type="checkbox"/>	
AUTOMATIC BYPASS TO SYSTEM	FITTED <input type="checkbox"/>	NOT REQUIRED <input type="checkbox"/>

### FOR ALL BOILERS CONFIRM THE FOLLOWING

THE SYSTEM HAS BEEN FLUSHED IN ACCORDANCE WITH THE BOILER MANUFACTURER'S INSTRUCTIONS?

THE SYSTEM CLEANER USED \_\_\_\_\_

THE INHIBITOR USED \_\_\_\_\_

### FOR THE CENTRAL HEATING MODE, MEASURE & RECORD

GAS RATE  m<sup>3</sup>/hr  ft<sup>3</sup>/hr

BURNER OPERATING PRESSURE (IF APPLICABLE)  N/A  mbar

CENTRAL HEATING FLOW TEMPERATURE  °C

CENTRAL HEATING RETURN TEMPERATURE  °C

### FOR COMBINATION BOILERS ONLY

HAS A WATER SCALE REDUCER BEEN FITTED? YES  NO

WHAT TYPE OF SCALE REDUCER HAS BEEN FITTED? \_\_\_\_\_

### FOR THE DOMESTIC HOT WATER MODE, MEASURE & RECORD

GAS RATE  m<sup>3</sup>/hr  ft<sup>3</sup>/hr

MAXIMUM BURNER OPERATING PRESSURE (IF APPLICABLE)  N/A  mbar

COLD WATER INLET TEMPERATURE  °C

HOT WATER OUTLET TEMPERATURE  °C

WATER FLOW RATE  lts/min

### FOR CONDENSING BOILERS ONLY CONFIRM THE FOLLOWING

THE CONDENSATE DRAIN HAS BEEN INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS? YES

### FOR ALL INSTALLATIONS CONFIRM THE FOLLOWING

THE HEATING AND HOT WATER SYSTEM COMPLIES WITH CURRENT BUILDING REGULATIONS

THE APPLIANCE AND ASSOCIATED EQUIPMENT HAS BEEN INSTALLED AND COMMISSIONED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS

IF REQUIRED BY THE MANUFACTURER, HAVE YOU RECORDED A CO/CO<sub>2</sub> RATIO READING? N/A  YES  CO/CO<sub>2</sub> RATIO

THE OPERATION OF THE APPLIANCE AND SYSTEM CONTROLS HAVE BEEN DEMONSTRATED TO THE CUSTOMER

THE MANUFACTURER'S LITERATURE HAS BEEN LEFT WITH THE CUSTOMER

**COMMISSIONING ENG'S NAME** PRINT \_\_\_\_\_ CORGI ID No. \_\_\_\_\_

SIGN \_\_\_\_\_ DATE \_\_\_\_\_

CONDENSING COMBI BOILER

# SERVICE INTERVAL RECORD

It is recommended that your heating system is serviced regularly and that you complete the appropriate Service Interval Record Below.

**Service Provider.** Before completing the appropriate Service Interval Record below, please ensure you have carried out the service as described in the boiler manufacturer's instructions. Always use the manufacturer's specified spare part when replacing all controls

**SERVICE 1** DATE \_\_\_\_\_  
ENGINEER NAME \_\_\_\_\_  
COMPANY NAME \_\_\_\_\_  
TEL No. \_\_\_\_\_  
CORGI ID CARD SERIAL No. \_\_\_\_\_  
COMMENTS \_\_\_\_\_  
SIGNATURE \_\_\_\_\_

**SERVICE 2** DATE \_\_\_\_\_  
ENGINEER NAME \_\_\_\_\_  
COMPANY NAME \_\_\_\_\_  
TEL No. \_\_\_\_\_  
CORGI ID CARD SERIAL No. \_\_\_\_\_  
COMMENTS \_\_\_\_\_  
SIGNATURE \_\_\_\_\_

**SERVICE 3** DATE \_\_\_\_\_  
ENGINEER NAME \_\_\_\_\_  
COMPANY NAME \_\_\_\_\_  
TEL No. \_\_\_\_\_  
CORGI ID CARD SERIAL No. \_\_\_\_\_  
COMMENTS \_\_\_\_\_  
SIGNATURE \_\_\_\_\_

**SERVICE 4** DATE \_\_\_\_\_  
ENGINEER NAME \_\_\_\_\_  
COMPANY NAME \_\_\_\_\_  
TEL No. \_\_\_\_\_  
CORGI ID CARD SERIAL No. \_\_\_\_\_  
COMMENTS \_\_\_\_\_  
SIGNATURE \_\_\_\_\_

**SERVICE 5** DATE \_\_\_\_\_  
ENGINEER NAME \_\_\_\_\_  
COMPANY NAME \_\_\_\_\_  
TEL No. \_\_\_\_\_  
CORGI ID CARD SERIAL No. \_\_\_\_\_  
COMMENTS \_\_\_\_\_  
SIGNATURE \_\_\_\_\_

**SERVICE 6** DATE \_\_\_\_\_  
ENGINEER NAME \_\_\_\_\_  
COMPANY NAME \_\_\_\_\_  
TEL No. \_\_\_\_\_  
CORGI ID CARD SERIAL No. \_\_\_\_\_  
COMMENTS \_\_\_\_\_  
SIGNATURE \_\_\_\_\_

**SERVICE 7** DATE \_\_\_\_\_  
ENGINEER NAME \_\_\_\_\_  
COMPANY NAME \_\_\_\_\_  
TEL No. \_\_\_\_\_  
CORGI ID CARD SERIAL No. \_\_\_\_\_  
COMMENTS \_\_\_\_\_  
SIGNATURE \_\_\_\_\_

**SERVICE 8** DATE \_\_\_\_\_  
ENGINEER NAME \_\_\_\_\_  
COMPANY NAME \_\_\_\_\_  
TEL No. \_\_\_\_\_  
CORGI ID CARD SERIAL No. \_\_\_\_\_  
COMMENTS \_\_\_\_\_  
SIGNATURE \_\_\_\_\_

**SERVICE 9** DATE \_\_\_\_\_  
ENGINEER NAME \_\_\_\_\_  
COMPANY NAME \_\_\_\_\_  
TEL No. \_\_\_\_\_  
CORGI ID CARD SERIAL No. \_\_\_\_\_  
COMMENTS \_\_\_\_\_  
SIGNATURE \_\_\_\_\_

**SERVICE 10** DATE \_\_\_\_\_  
ENGINEER NAME \_\_\_\_\_  
COMPANY NAME \_\_\_\_\_  
TEL No. \_\_\_\_\_  
CORGI ID CARD SERIAL No. \_\_\_\_\_  
COMMENTS \_\_\_\_\_  
SIGNATURE \_\_\_\_\_



# Gledhill (Water Storage) Ltd

AMD, JUNE 2008

## CONDITIONS OF SALE & GUARANTEE TERMS

1. Gledhill (Water Storage) Ltd ("We" or "Gledhills") only do business upon the Conditions which appear below and no other. Unless we so agree in writing these Conditions shall apply in full to any supply of goods by us to the exclusion of any Conditions or terms sought to be imposed by any purchaser. These Conditions of Sale and Warranty Terms override those which are contained on the Invoice Forms and all Sales are now subject to these Conditions of Sale and Warranty terms only.

### 2. PRICE

Once an order or call off has been accepted the price will be held for three months **but if delivery is extended beyond that period at the customer's request, then we reserve the right to amend the price when necessary.** The company reviews its pricing annually to adjust for changes in our cost base. We reserve the right to alter prices at any time for severe movements in raw materials (mainly copper and steel). If there is to be a change we will give customers at least four weeks notice but anything delivered after that date will be at the revised price. An order may not be cancelled or varied after acceptance without the written consent of the company. Such cancellation or variation shall be subject to such reasonable charges as may be appropriate.

### 3. SPECIFICATION

The goods are supplied in accordance with the Specifications (if any) submitted to the Purchaser and any additions and alterations shall be the subject of an extra charge. Any goods not so specified shall be in accordance with our printed literature or the literature of any of our component suppliers (subject to any modifications made since publication). If we adopt any changes in construction or design of the goods, or in the specification printed in our literature, the Purchaser shall accept the goods so changed in fulfilment of the order.

### 4. PAYMENT

The invoice price of goods shall be payable within 30 days of despatch by us of our invoice for the goods or such longer time as may be stated by our quotation or invoice. If we receive payment in full on or before the due date we will allow an appropriate settlement discount except where we have quoted a special net price. If payment is not received in full on or before the due date we shall be entitled in addition to the invoice price to:

- (i) payment of a sum equal to any increase in the copper price supplement applicable to the particular goods sold between the date of receipt of order and the date of receipt of payment in full; and
- (ii) interest on any part of the invoice price unpaid after the due date at the rate of 3% per annum over the base rate for the time being of HSBC Bank plc.

### 5. TIME

We give estimates of delivery dates in good faith and time of delivery is not nor shall be made of the essence of any contract nor shall we be liable for any loss or damage occasioned by delay in delivery.

### 6. DELIVERY

We deliver free normally by our own vehicles within 25 miles of any of our manufacturing depots. Delivery to any place more than 25 miles from one of our manufacturing depots may be subject to our quoted delivery charges. We reserve the right to make delivery of goods contained in one order by more than one consignment and at different times. Where a period is agreed for delivery and such period is not extended by our Agreement, the Purchaser shall take delivery within that period. If the Purchaser fails to take delivery, we shall be entitled at the Purchaser's risk and expense to store the goods at the Purchaser's premises or elsewhere and to demand payment as if they had been despatched. Off loading at point of delivery shall be the responsibility of and be undertaken by the Purchaser.

### 7. SHORTAGES OR DAMAGE

Goods must be inspected before signature of delivery note and any damage, shortage or discrepancy noted on the delivery note and the goods returned on the same vehicle. The buyer must also give us immediate written notice of the damage, shortage or discrepancy so that we may prompt investigation.

### 8. RETURN OF GOODS

Goods may not be returned to the Company except by prior written permission of an authorised officer of the Company and such return shall be subject to payment by the Purchaser of handling and re-stocking charges, transport and all other costs incurred by the Company.

### 9. COMPANY LIABILITY AND GUARANTEE

9.1. Subject to the terms of these Conditions of Sale and Guarantee Terms Gledhills provide Guarantees in respect of specific products as set out in this clause.

9.2. Each Guarantee is strictly conditional upon the following:-

9.2.1. Complaints must be given to us immediately, before any action is taken, as responsibility cannot be accepted if repairs or renewals are attempted on site without our written approval.

9.2.2. The unit has been installed in accordance with our installation and service instructions and all relevant codes of practice and regulations in force at the time of installation.

9.2.3. All necessary inlet controls and safety valves have been fitted correctly.

9.2.4. The unit has only been used for the storage of potable water supplied from the public mains.

9.2.5 Where appropriate the unit has been regularly maintained as detailed in the installation and service instructions

9.2.6. Defects caused by corrosion or scale deposits are not covered by any Guarantee.

9.2.7. Where we agree to rectify any defect we reserve the right to undertake the work on our own premises.

9.3. Guarantees are provided in respect of specified goods supplied by Gledhills as follows:-

#### (a) Domestic and Commercial Open Vented Cylinders and Tanks.

The copper storage vessel is guaranteed for ten years and if it proves to be defective either in materials or workmanship, we will either repair or supply replacement at our option with the closest substitute in the case of any obsolete product to any address in Great Britain.

(i) free of all charge during the first year after delivery by us.

(ii) thereafter at a charge of one-tenth of the then current list price and any copper price supplement and delivery charge during the second year after delivery by us and increasing by a further one-tenth on the second and subsequent anniversary of delivery by us.

#### (b) Domestic Mains Fed Products [Primary Stores]

The copper storage vessel is guaranteed for five years and if it or any integral pipework as part of the storage vessel assembly proves to be defective either in materials or workmanship, we reserve the right to either repair or supply replacements or the closest possible substitute in the case of any obsolete product and will collect and deliver to any address in England, Wales and Scotland (excluding all Scottish Islands).

(i) free of all charge during the first year after delivery by us.

(ii) thereafter at a charge of one-fifth of the then current list price or any copper price supplement and delivery charge during the second year after delivery by us increasing by a further one-fifth on the second and subsequent anniversary of delivery by us.

#### (c) Integrated Boiler and Storage Vessel Products and Stand Alone Boilers

In the case of the GulfStream range of products and the Gledhill boiler range of products, Gledhill guarantees the heat exchanger (boiler) for material and construction faults for two years. THE RESPONSIBILITY FOR THE EXECUTION OF THIS GUARANTEE LIES WITH THE INSTALLER.

The guarantee becomes null and void if the appliance is used incorrectly, or in the event of proven negligence or incorrectly implemented repairs **OR FAILURE TO CARRY OUT THE RECOMMENDED INSPECTION/ MAINTENANCE.** The guarantee also becomes null and void if changes are made to the appliance without our knowledge, or if the serial number on the appliance is removed or made illegible.

The annual service must be carried out by a competent installer in accordance with the advice given by Gledhill and using Gledhill approved parts.

#### (d) Stainless Steel Unvented Cylinders

Gledhill guarantee the components including controls, valves and electrical parts for two years from the date of purchase. IT SHOULD BE NOTED THAT THE FACTORY FITTED TEMPERATURE AND PRESSURE RELIEF VALVE MUST NOT BE REMOVED OR ALTERED IN ANY WAY OR THE GUARANTEE WILL NOT BE VALID. GLEDHILL WILL NOT BE RESPONSIBLE FOR ANY CONSEQUENTIAL LOSS OR DAMAGE HOWEVER IT IS CAUSED.

The guarantee for the stainless steel vessel is for twenty five years if the original unit is returned to us **AND PROVIDED THAT:**

(i) It has been installed as per the Design, Installation & Servicing Instructions, relevant standards, regulations and codes of practice.

(ii) It has not been modified, other than by Gledhill.

(iii) It has not been subjected to wrong or improper use or left uncared for.

(iv) It has only been used for the storage of potable water.

(v) It has not been subjected to frost damage.

(vi) The benchmark log book is completed after each annual service.

(vii) The unit has been serviced annually.

It should be noted that the guarantee does not cover:

- the effects of scale build up
- any labour charges associated with replacing the unit or parts.

If the stainless steel vessel proves to be defective either in materials or workmanship we reserve the right to either repair or supply replacements or the closest possible substitute in the case of any obsolete product and will collect and deliver to any address in England, Scotland and Wales (excluding all islands):

(i) free of charge during the first year after delivery by us.

(ii) thereafter at a charge of one twenty fifth of the then current list price during the second year after delivery by us and increasing by a further one twenty fifth on the second and subsequent anniversary of delivery by us.

#### ACTION IN THE EVENT OF FAILURE

If the stainless steel cylinder develops a leak we will ask for a deposit against the supply of a new one. This will be refunded if the failure is within the terms of the warranty when it has been examined by us.

#### (e) Solar Panels and ancillary equipment

Gledhill provides a five year warranty for defects in the collectors (except broken glass and collector accessories eg metal edgings). If the collector demonstrably fails to meet one of the requirements of the standard DIN 4757 part 3 we will replace it free of charge based on the date of invoice. We can not be responsible for damage caused by mechanical stress and/or changes caused by weather related influences. The warranty excludes minor surface damage that does not affect performance or malfunction due to improper assembly or installation.

#### Please note:

- Installation must have been carried out by a licensed specialized company (heating contractor or plumber) following the version of installation instructions in force.

- Gledhill or its representative was given the opportunity to check complaints on site immediately after any defect occurred.

- Confirmation exists that the system was commissioned properly and that the system was checked and maintenance was performed annually by a specialised company licensed for this purpose.

#### (f) Components of our products other than Storage Vessels and Integral Pipework.

We will either extend to the purchaser the same terms of warranty as we are given by the manufacturer of the component or if the manufacturer does not give any warranty, replace free of charge any component which becomes defective within two years after the date of the delivery by us and is returned to us at the purchaser's expense but we shall not meet the cost of removal or shipping or return of the component or any other cost charges or damages incurred by the purchaser.

If the appliance manufactured by Gledhill incorporates a factory fitted scale inhibitor then during the period

of three years from the date of delivery Gledhill will replace, free of charge, any plate heat exchanger fitted in the appliance as original equipment in which scale formation occurs that materially reduces the effectiveness of the plate heat exchanger. This guarantee does not extend to any other component installed within the Gledhill appliance or elsewhere in the Purchasers domestic water system.

9.4.

9.4.1. In respect of goods supplied by us and in respect of any installation work carried out by or on our behalf, our entire liability and the purchaser's sole remedies (subject to the Guarantees) shall be as follows:-

- (a) We accept liability for death or personal injury to the extent that it results from our negligence or that of our employees
- (b) Subject to the other provisions of this clause 9 we accept liability for direct physical damage to tangible property to the extent that such damage is caused by our negligence or that of our employees, agents or subcontractors.
- (c) Our total liability to the purchaser over and above any liability to replace under the Guarantees (whether in contract or in tort including negligence) in respect of any one cause of loss or damage claimed to result from any breach of our obligations hereunder, shall be limited to actual money damages which shall not exceed £20,000 provided that such monetary limit shall not apply to any liability on the part of ourselves referred to in paragraph (a) above
- (d) Except as provided in paragraph (a) above but otherwise not withstanding any provision herein contained in no event shall we be liable for the following loss or damage howsoever caused and even if foreseeable by us or in our contemplation:-
  - (i) economic loss which shall include loss of profits, business revenue, goodwill or anticipated savings
  - (ii) damages in respect of special indirect or consequential loss or damage (other than death, personal injury and damage to tangible property)
  - (iii) any claim made against the purchaser by any other party (save as expressly provided in paragraph (b) above)
- (e) Except in respect of our liability referred to in paragraph (a) above no claim may be made or action brought (whether in contract or in tort including negligence) by the purchaser in respect of any goods supplied by us more than one year after the date of the invoice for the relevant goods.
- (f) Without prejudice to any other term we shall not be liable for any water damage caused directly or indirectly as a result of any leak or other defect in the goods. We cannot control the conditions of use of the goods or the time or manner or location in which they will be installed and the purchaser agrees to be fully responsible for testing and checking all works which include the goods at all relevant times (up to, including and after commissioning) and for taking all necessary steps to identify any leaks and prevent any damage being caused thereby.
- (g) Nothing in these Conditions shall confer on the purchaser any rights or remedies to which the purchaser would not otherwise be legally entitled

#### 10. LOSS OR INJURY

Notwithstanding any other provision contained herein the purchaser's hereby agree to fully indemnify us against any damages losses costs claims or expenses incurred by us in respect of any claim brought against us by any third party for:-

- (a) any loss injury or damage wholly or partly caused by any goods supplied by us or their use.
- (b) any loss injury or damage wholly or partly caused by the defective installation or substandard workmanship or materials used in the installation of any goods supplied by us.
- (c) any loss injury or damage in any way connected with the performance of this contract.
- (d) any loss resulting from any failure by the purchaser to comply with its obligations under these terms as to install and/or check works correctly.

**PROVIDED** that this paragraph will not require the purchaser to indemnify us against any liability for our own acts of negligence or those of our employees agents or sub-contractors

**FURTHER** in the case of goods supplied by us which are re-sold and installed by a third party by the purchaser it will be the sole responsibility of the purchaser to test the goods immediately after their installation to ensure that inter alia they are correctly installed and in proper working order free from leaks and are not likely to cause any loss injury or damage to any person or property.

#### 11. VARIATION OF WARRANTY AND EXCLUSION

Should our warranty and exclusion be unacceptable we are prepared to negotiate for variation in their terms but only on the basis of an increase in the price to allow for any additional liability or risk which may result from the variation.

Purchasers are advised to insure against any risk or liability which they may incur and which is not covered by our warranty.

#### 12. RISK AND RETENTION OF TITLE

- (a) goods supplied by us shall be at the Purchaser's risk immediately upon delivery to the Purchaser or into custody on the Purchaser's behalf or to the Purchaser's Order. The Purchaser shall effect adequate insurance of the goods against all risks to the full invoice value of the goods, such insurance to be effective from the time of delivery until property in the goods shall pass to the Purchaser as hereinafter provided.
- (b) property in the goods supplied hereunder will pass to the Purchaser when full payment has been made by the Purchaser to us for :-
  - (i) the goods of the subject of this contract.
  - (ii) all other goods the subject to of any other contract between the Purchaser and us which, at the time of payment of the full price of the goods sold under this contract, have been delivered to the Purchaser but not paid for in full.
- (c) until property in the goods supplied hereunder passes to the Purchaser in accordance with paragraph (2) above.
  - (i) the Purchaser shall hold the goods in a fiduciary capacity for us and shall store the same separately from any other goods in the Purchaser's possession and in a manner which enables them to be identified as our goods.
  - (ii) the Purchaser shall immediately return the goods to us should our authorised representative so request. All the necessary incidents associated with a fiduciary relationship shall apply.
- (d) the Purchaser's right to possess the goods shall cease forthwith upon the happening of any of the following events, namely :-
  - (i) if the Purchaser fails to make payment in full for the goods within the time stipulated in clause 4 hereof.
  - (ii) if the Purchaser, not being a company, commits any act of bankruptcy, makes a proposal to his or her creditors for a compromise or does anything which would entitle a petition for a Bankruptcy Order to be presented.
  - (iii) if the Purchaser, being a company, does anything or fails to do anything which would entitle an administrator or an administrative receiver or a receiver to take possession of any assets or which would entitle any person to present a petition for winding up or to apply for an administration order.
- (e) the Purchaser hereby grants to us an irrevocable licence to enter at any time any vehicle or premises owned or occupied by the Purchaser or in the possession of the Purchaser for the purposes of repossessing and

recovering any such goods the property in which has remained in us under paragraph (2) above. We shall not be responsible for and the Purchaser will indemnify us against liability in respect of damage caused to any vehicle or premises in such repossession and removal being damaged which it was not reasonably practicable to avoid.

- (f) notwithstanding paragraph (3) hereof and subject to paragraph (7) hereof, the Purchaser shall be permitted to sell the goods to third parties in the normal course of business. In this respect the Purchaser shall act in the capacity of our commission agent and the proceeds of such sale :-
  - (i) shall be held in trust for us in a manner which enables such proceeds to be identified as such, and:
  - (ii) shall not be mixed with other monies nor paid into an overdrawn bank account.We, as principal, shall remunerate the Purchaser as commission agent a commission depending upon the surplus which the Purchaser can obtain over and above the sum, stipulated in this contract of supply which will satisfy us.
- (g) in the event that the Purchaser shall sell any of the goods pursuant to clause (6) hereof, the Purchaser shall forthwith inform us in writing of such sale and of the identity and address of the third party to whom the goods have been sold.
- (h) if, before property in the goods passes to the Purchaser under paragraph (2) above the goods are or become affixed to any land or building owned by the Purchaser it is hereby agreed and declared that such affixation shall not have the effect of passing property in the goods to the Purchaser. Furthermore if, before property in the goods shall pass to the Purchaser under paragraph (2) hereof, the goods are or become affixed to any land or building (whether or not owned by the Purchaser), the Purchaser shall:-
  - (i) ensure that the goods are capable of being removed without material injury to such land or building.
  - (ii) take all necessary steps to prevent title to the goods from passing to the landlord of such land or building.
  - (iii) forthwith inform us in writing of such affixation and of the address of the land or building concerned.The Purchaser warrants to repair and make good any damage caused by the affixation of the goods to or their removal from any land or building and to indemnify us against all loss damage or liability we may incur or sustain as a result of affixation or removal.
  - (i) in the event that, before property in the goods has passed to the Purchaser under paragraph (2) hereof, the goods or any of them are lost, stolen, damaged or destroyed :-
  - (ii) the Purchaser shall forthwith inform us in writing of the fact and circumstances of such loss, theft, damage or destruction.
  - (iii) the Purchaser shall assign to us the benefit of any insurance claim in respect of the goods so lost, stolen, damaged or destroyed.

#### 13. NON-PAYMENT

If the Purchaser shall fail to make full payment for the goods supplied hereunder within the time stipulated in clause 4 hereof or be in default of payment for any other reason then, without prejudice to any of our other rights hereunder, we shall be entitled to stop all deliveries of goods and materials to the Purchaser, including deliveries or further deliveries of goods under this contract. In addition we shall be entitled to terminate all outstanding orders.

#### 14. VALUE ADDED TAX

All prices quoted are exclusive of Value Added Tax which will be charged at the rate ruling at the date of despatch of invoice.

#### 15. TRADE SALES ONLY

We are only prepared to deal with those who are not consumers within the terms of the Unfair Contract Terms Act 1977, the Sale of Goods Act 1979 and the Supply of Goods and Services Act 1982. Accordingly any person who purchases from us shall be deemed to have represented that he is not a consumer by so purchasing.

#### 16. JURISDICTION

The agreement is subject to English law for products delivered in England and Scottish law for products delivered in Scotland and any dispute hereunder shall be settled in accordance therewith dependent upon the location.

