# DORCHESTER
# DBF 70 & DBF 100
# HOT WATER
# STORAGE HEATERS

## Installation, Commissioning and Maintenance Instructions

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

**THIS HEATER IS FOR USE ON 2nd FAMILY GASES ONLY.**

**THIS HEATER HAS BEEN TESTED TO COMPLY WITH THE GAS APPLIANCES DIRECTIVE (90/396/EEC)**
**CERTIFICATION No. EC - 87/04/16**

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## 1.0 INTRODUCTION

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

**1.2.** The Dorchester DBF range is intended for use on Natural Gases (2nd family) only and **MUST NOT** use gas other than for which it was designated and adjusted.

**1.3.** The Dorchester DBF is approved for use with domestic water under The Water Supply (Water Fittings) Regulations 1999 in England and Wales and the Water Byelaws 2000, Scotland. It comprises a steel storage tank of which all surfaces in contact with the domestic water are coated with a hygienic vitreous enamel coating, ensuring that the quality of the water is not impaired, corrosion protection is via impressed current anodes which are fitted as standard to all models. Heat input is by means of a modulating gas burner. The appliance is intended for the heating of domestic water in Commercial and Industrial premises. It is designed for direct connection to a room sealed or conventional flue system. Domestic water outlet temperature is regulated by means of a control thermostat which, for normal operation, should be set to a minimum value of 60°C. (Reference appendix A3 control of Legionella). Overheat protection is provided by a limit thermostat, with thermal reset normally set at 85°C.

**1.4.** If the appliance is to be connected to an un-vented (pressurised) system, care must be taken to ensure all extra safety requirements are satisfied and that the relevant interlocks will render the appliance safe should a fault occur.

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## 2.0 RECIEPT & HANDLING

**2.1.** The Dorchester DBF is delivered in two or more packages, the tank is wrapped in polythene and mounted on a steel pallet, it is intended that the appliance will remain on the pallet throughout its working life. The burner is packaged in a separate carton. Dependent upon client specification a flue package may or may not be included.

**2.2.** The steel base is designed to accept the forks of a standard hand pallet truck for general manoeuvring into the installation area.

**2.3** Final positioning can be achieved by placing a bar through the pallet holes and levering into desired location.

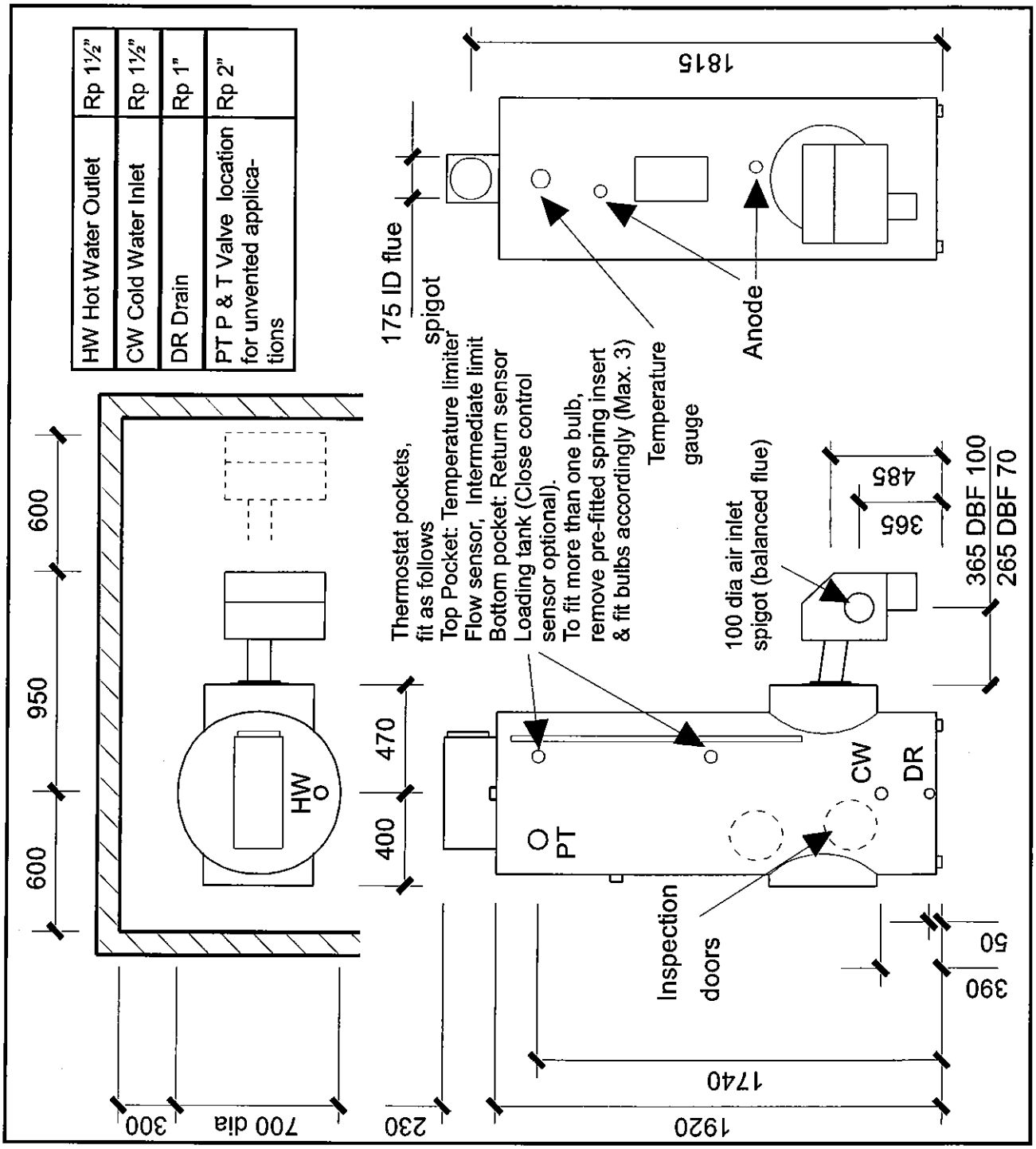
## 3.0 LOCATION & PREPARATION

**3.1.** The water heater should be located such that a satisfactory flue system can be connected. An adequate air supply must be provided for combustion and ventilation and sufficient space for servicing provided. (reference Figure 3.1.).

The heater must be installed on a level non combustible surface which is sufficient to support its weight when filled with water. (reference section 13.0.)

Any combustible material adjacent to the water heater and flue system must be so placed or shielded as to ensure that its temperature does not exceed 65° C (150° F).

**Figure 3.1. - General layout and dimensional data.**



## 4.0. GAS SERVICES

### 4.1. Service Pipes

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

### 4.2. Meters

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

### 4.3. Gas Supply Pipes

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

The incoming mains gas supply must be capable of supplying gas to the appliance at the required pressure and volume, under all firing conditions. An approved isolating valve and union should be installed for each appliance in a convenient and safe position and be clearly marked.

### 4.4. Boosted Supplies

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

### 4.5. Boiler House Control Valve

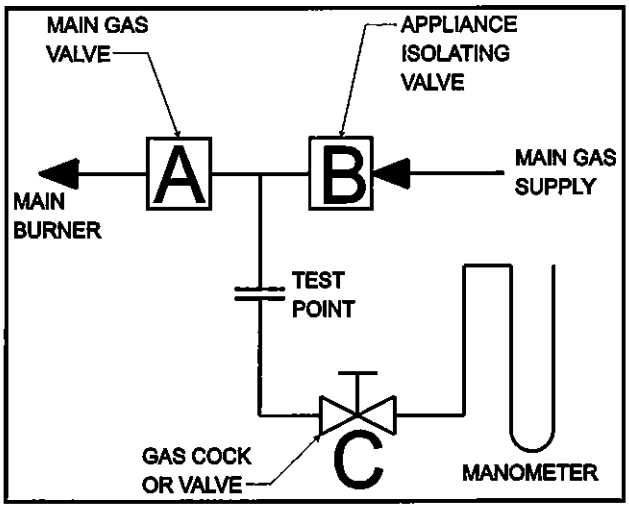
A manual valve for boiler house isolation shall be fitted in the gas supply line. It shall be clearly identified and readily accessible for operation, preferably by an exit.

### 4.6. Appliance Gas System Leak Check

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

Although the appliance receives a gas leak check and gas train component integrity check prior to leaving the factory, transport and installation may cause disturbance to unions, fittings and gas valve assemblies etc. During commissioning a further test for soundness should be carried out on the gas pipework and components. A procedure guide is given below, refer to figure 4.6. Care must be taken not to allow leak detection fluid (if used) on or near any electrical parts or connections.

**Figure 4.6. - Gas valve/pipework leak test procedure.**




**TO CHECK A**

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

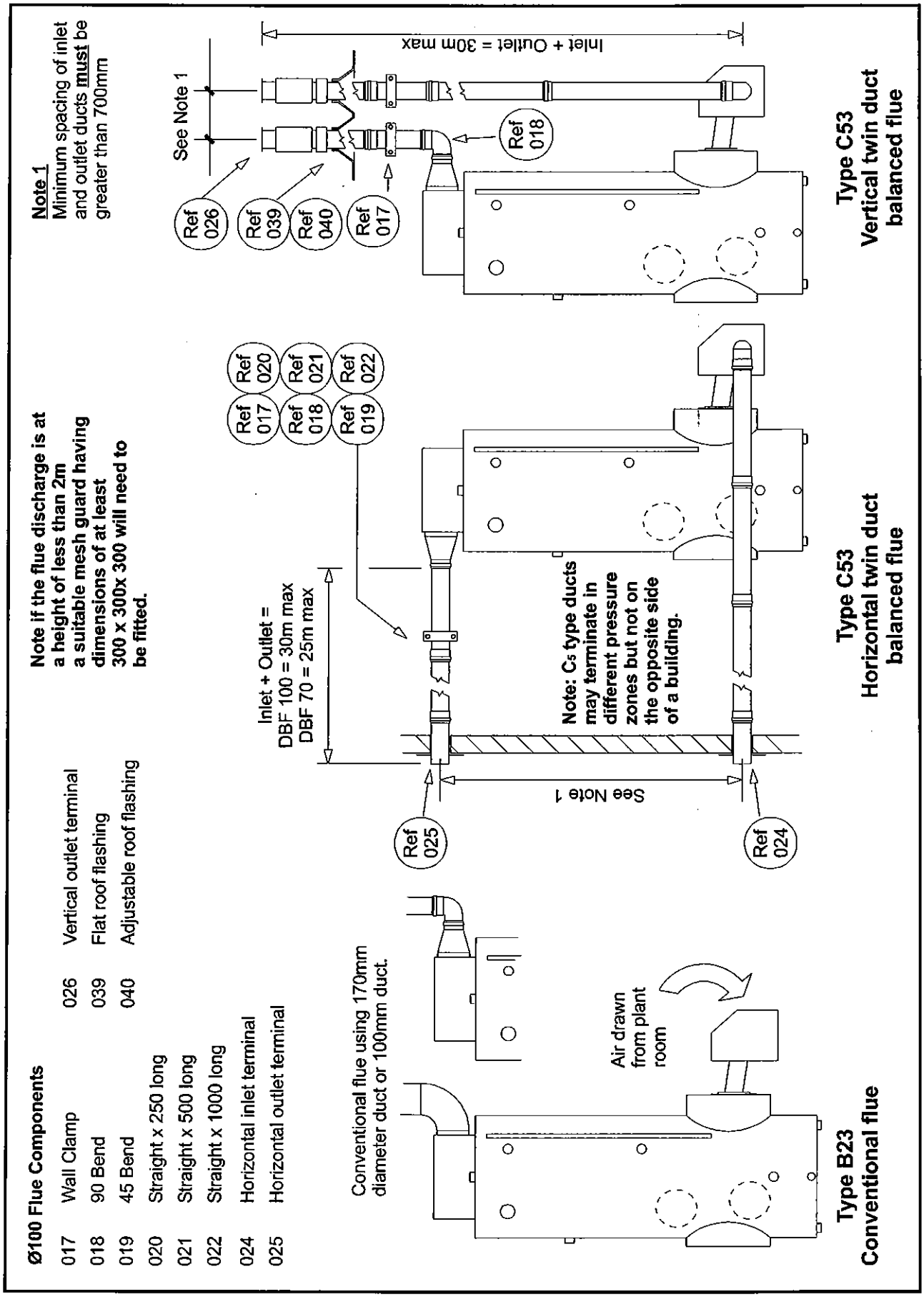
**Note:-** Allow a manometer stabilisation period of approximately 1 minute before each 2 minute check period.
Following soundness tests close valve B and remove manometer connections and tighten test points.

**Note:-**
Main Gas Supply Pressures
Natural Gas - 20mbar

**TO CHECK B**

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

**Figure 5.0. - Typical flue configurations.**



## 5.0. FLUE SYSTEM

Detailed recommendations for flue systems are given in **BS 6644, BS 5440, IGE/UP/10.**
All flue discharges for plant exceeding 150kW output must comply with the Third edition of the 1956 Clean Air Act Memorandum.
The following notes are intended to give general guidance only. Figure 5.0. illustrates typical flue configurations.

### 5.1. Flue System General Requirements

Flue systems should be designed with reference to **BS 5440 part 1, IGE/UP/10** and **Third Edition of the 1956 Clean Air Act Memorandum.**

The Dorchester DBF is designed for use with the following flue types:

**Balanced Flue (Room Sealed).**
Type C53: Separate (Hamworthy supply) 100mm diameter intake and discharge ducts terminating in different pressure zones.

**Conventional Flue.**
Type B23: Air intake from ventilated plant room and discharge via horizontal/vertical flue.

Care should be taken to ensure that the flue is installed such that any condensation is continuously drained back to a suitable collection and drain point in the flue system. Horizontal flue runs should be kept to a minimum and must be inclined at 2° upwards in the direction of the exhaust gas flow. All joints should be such that any condensation is directed back down the slope. Note there is no provision to fit a condensate drain into the combustion chamber of the DBF.

### 5.2. Design Waste Gas Volume and Temperature

Where the appliance discharges into an open flue system (B23), it is recommended that the volume and temperature of the waste gases used for design of the flue system are as shown in Figure 13.0.

### 5.3. Maximum Length of Flue Duct (C53 balanced flue).

The maximum allowable linear equivalent length of straight smooth bore tube for air supply + flue discharge (twin duct) is approximately 30m for the DBF100 and 25m for the DBF 70. Figure 5.3 nominates the equivalent length of flue tube. Components can be combined in any order provided that the total equivalent length of flue does not exceed the maximum. **Note:** if the maximum stated lengths of flue are exceeded the appliance will not achieve maximum output.

**Example 1 (Dorchester DBF 100)**

| Duct details | Equivalent length |
|---|---|
| 5m inlet duct | 5.0m |
| 1 x 90 elbow | 6.0m |
| 4m discharge duct | 4.0m |
| 2 x 90 elbow | 12.0m |
| Total equivalent length | 27.0m < 30 ok |

**Figure 5.3. - Flue resistance**

| Equivalent tube lengths. | DBF 70 | DBF 100 |
|---|---|---|
| Component | Length m | |
| Straight tube ø100mm per m | 1.0 | 1.0 |
| 45° bend ø100mm | 3.6 | 3.5 |
| 90° bend ø100mm | 6.2 | 6.0 |

**Example 2 (Dorchester DBF 70)**

| Duct details | Equivalent length |
|---|---|
| 2m inlet duct | 2.0m |
| 2 x 45 elbow | 7.2m |
| 3m discharge duct | 3.0m |
| 2 x 90 elbow | 12.4m |
| Total equivalent length | 24.6m < 25 ok |

### 5.4. Flue Discharge

The flue system must ensure safe and efficient operation of the boiler to which it is attached, protect the combustion process from wind effects and disperse the products of combustion to the external air.
The flue must terminate in a freely exposed position and be so situated as to prevent the products of combustion entering any opening in a building in accordance with **BS 5440 part 1, IGE/UP/10** and **Third Edition of the 1956 Clean Air Act Memorandum.** Figure 5.4. provides guidance on terminal location.

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

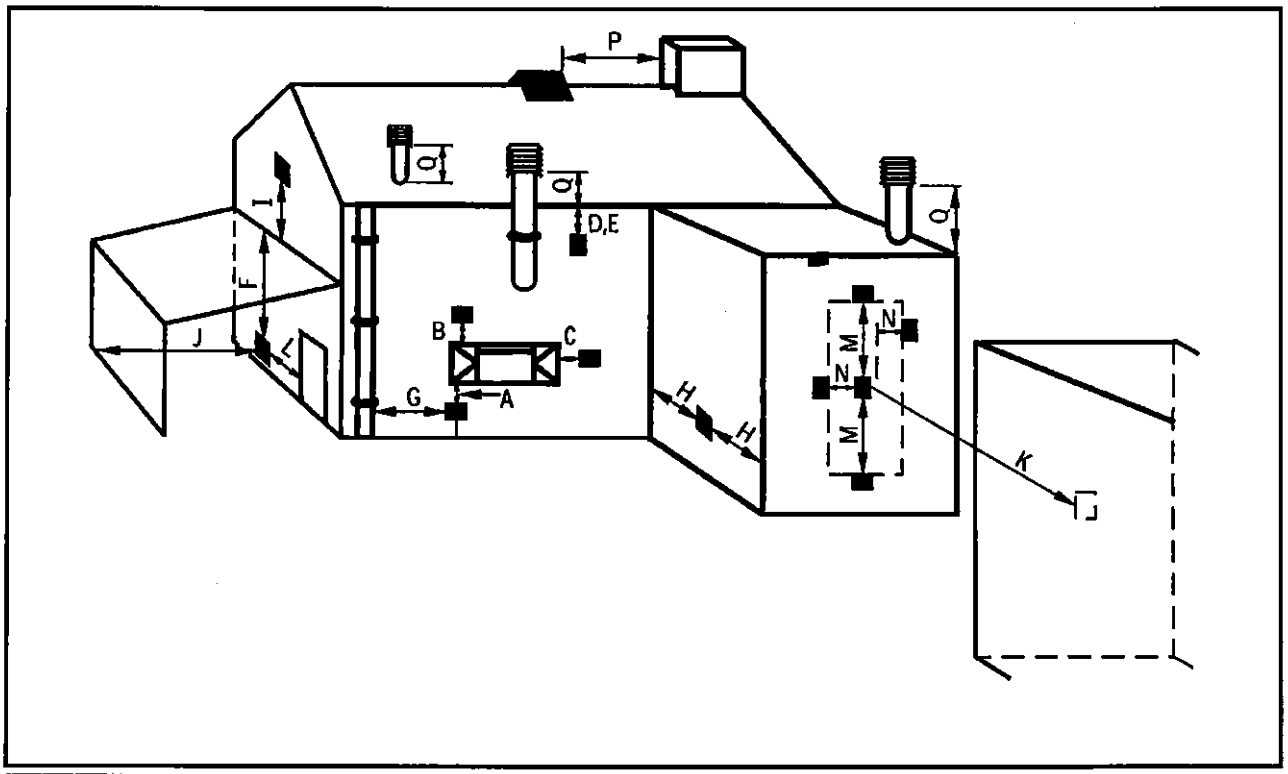
### 5.5. Surface Temperatures

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

### 5.6. Flue System Location

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

**Figure 5.4. - Flue terminal positions**




| Dimensions | Terminal Position | Balanced Flue Room Sealed | Open Flue |
|---|---|---|---|
| A | Directly below an opening, air brick, opening window etc | 300 | 300 |
| B | Above an opening, air brick, opening window etc | 300 | 300 |
| C | Horizontally to an opening, air brick, opening window etc | 300 | 300 |
| D | Below gutters, soil pipes or drain pipes | 75 | 75 |
| E | Below eaves | 200 | 200 |
| F | Below balconies or car port roof | 200 | 200 |
| G | From a vertical drain pipe or soil pipe | 150 | 150 |
| H | From an internal or external corner | 300 | 200 |
| I | Above ground roof or balcony level | 300 | 300 |
| J | From a surface facing the terminal | 600 | 600 |
| K | From a terminal facing the terminal | 1200 | 1200 |
| L | From an opening in the car port (e.g. door, window) into the dwelling | 1200 | 1200 |
| M | Vertically from a terminal on the same wall | 1500 | 1500 |
| N | Horizontally from a terminal on the same wall | 300 | 300 |
| O | From the wall on which the terminal is mounted | N/A | 50 |
| P | From a vertical structure on the roof | N/A | N/A |
| Q | Above intersection with roof | N/A | 150 |

**Note: The above values represent minimum required dimensions.**

## 6.0 .AIR SUPPLY

Detailed recommendations for air supply and ventilation requirements are given in **BS 6644**, and **BS 5440:Part 2**. The following notes are intended to give general guidance. In all cases there must be provision for an adequate supply of air for both combustion where applicable, and general ventilation, in addition to that required for any other appliance.

### 6.1. Air Supply By Natural Ventilation (Open-flue installation only)

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

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

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

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

Low Level - (inlet) **550cm$^2$ per boiler.**
High Level - (outlet) **275cm$^2$ per boiler.**

### 6.2. Air Supply (Room-sealed installation)

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

**Figure 6.2. Minimum air vent requirements per boiler installed in a compartment**

| Vent position | Compartment ventilated to: | |
|---|---|---|
| | Room or internal space | Direct to outside air |
| | **cm$^2$ /boiler** | **cm$^2$ / boiler** |
| High level | 700 | 350 |
| Low level | 700 | 350 |

### 6.3. Air Supply By Mechanical Ventilation (Open-flue installation only)

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

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

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

**Figure 6.3. Mechanical ventilation flow rates .... (Open flue installation only)**

| Forced / induced | Flow rate per 1000kW total rated heat input (Gross) | |
|---|---|---|
| | Inlet air (Combustion ventilation) | Extract air (ventilation) |
| | m$^3$/s. | m$^3$/s. |
| Volume | 0.90 | 0.60 |

## 7.0. WATER PIPEWORK INSTALLATION

### 7.1. Dead legs

Dead legs to water draw-off points should be as short as possible and in no case should they exceed the lengths laid down in the Water Byelaws. The Water Byelaws state that the maximum lengths of pipe supplying a hot water draw-off tap measured along the axis of the pipe from the heater, cylinder or tank or from a secondary circuit are as listed below:-

Pipes not greater than 19 mm ID - max dead leg length 12 m.

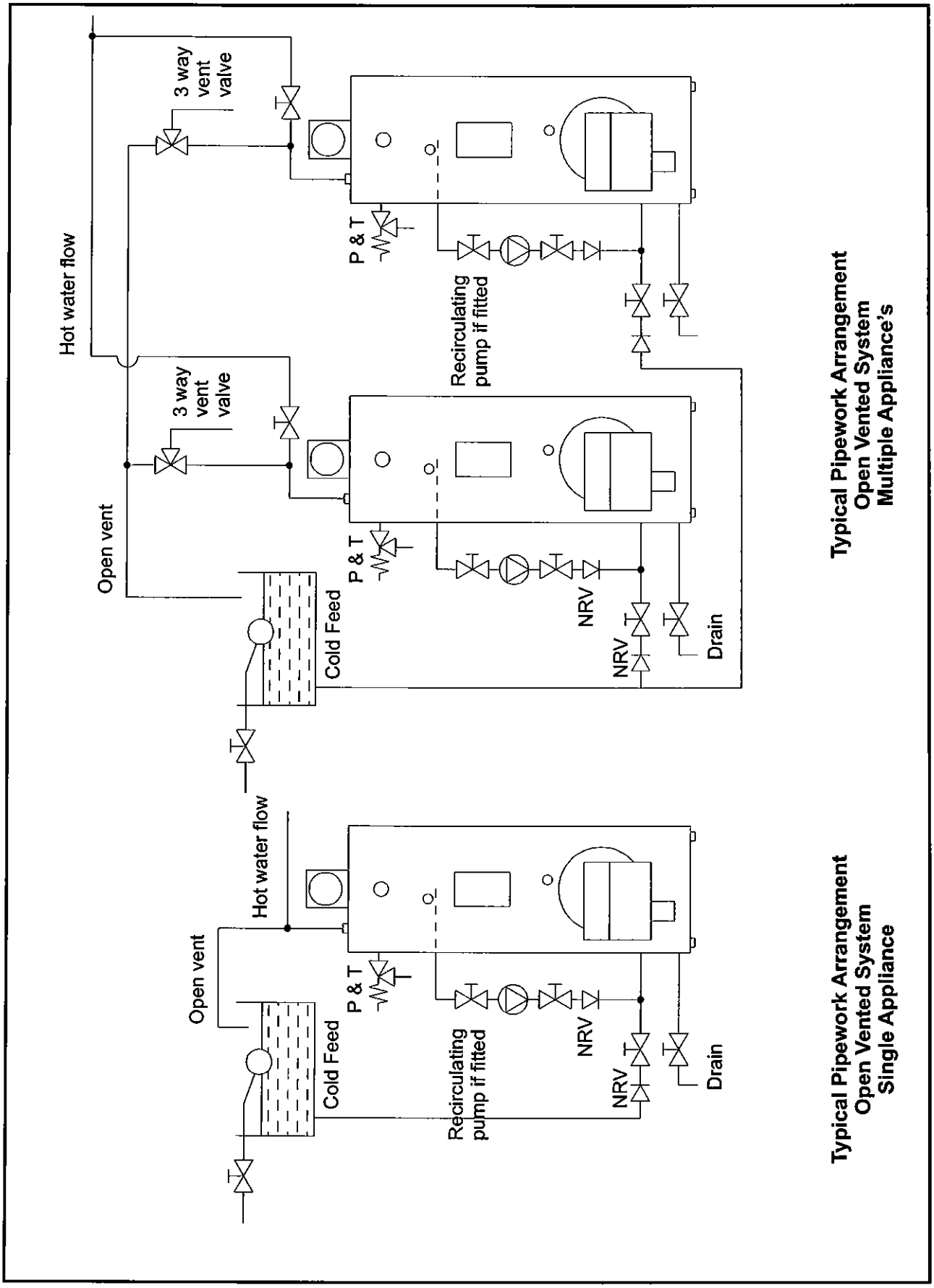
Pipes in range 10-24 mm ID - max dead leg length 7.6 m.

Pipes greater than 25 mm ID - max dead leg length 3 m.

### 7.2. Open vented systems

For typical installation applications refer to figure 7.2.1.
The hot water flow pipe(s) from each heater must be fitted with a relief valve ¾" in diameter (20 mm) and an open vent 1¼" in diameter (32 mm). The vent should rise to discharge over the feed cistern. No isolating valves should be fitted between the water heater and the draw-off point for relief valve and vent.

**Figure 7.2.1. - Typical installation: Open vented system.**



### 7.3. Unvented Systems

Refer to figure 7.3.1. Any un-vented installation must follow the essential safety requirements of the **Buildings Regulations part G3 Section 2.** This document further states that the system should be designed by appropriately qualified engineers and fitted by approved installers.
The cold feed un-vented kit(s) offered by Hamworthy Heating comprise a valve train assembly incorporating expansion relief valve, non-return valve, strainer and pressure reducing valve plus a suitably sized expansion vessel compatible with potable water and, sized for the unit and local pipework ref figure 7.3.1. A temperature/pressure relief valve is also supplied which follows the sizing recommendations from the valve supplier. This ensures adequate protection even with low incoming water mains pressures.
For comprehensive recommendations on the design, installation and testing of water supply services, attention is drawn to the appropriate sections of **BS 6700.**

**Note:** The maximum hot working head of the Dorchester DBF is 6 bar g. (61.2 metres).

#### 7.3.1. Unvented Controls.

#### 7.3.1.1. Secondary Hot Water Side.

The pressure temperature relief valve must be fitted directly into the vessel at the location indicated in figure 7.2.1.
Remove the plastic cover from the vessel exposing the top connection point. Remove the 2" BSP plug and screw the P & T, relief valve into this position using a suitable WRAS approved jointing compound.
The installation of pipework from the P & T, relief valve outlet should conform to the recommendations given in **BS6700** and any other relevant codes of practice.

#### 7.3.1.2 Cold Water Feed Side

For typical installation applications refer to figure 7.3.1. The Hamworthy Heating valve train is sized to provide flow rates of approximately 4800 l/h under the assumed conditions of 2 bar incoming mains water pressure and 1 bar static back pressure resulting from the highest distribution lines above the vessel and flow resistances of the system.
Potential flows will increase with higher mains pressures up to the 3.5 bar preset regulator pressure. However due to the many variables involved it is recommended that the flow rate of 4800 l/h is considered the maximum.
An expansion vessel that is pre-charged at 3.5 bar and sized to accept the water expansion volume from a Dorchester and its local associated pipework is supplied with each un-vented Dorchester.
If the water train is serving a large distribution system additional expansion vessels may be required and the acceptance volume V2 can be calculated as follows.

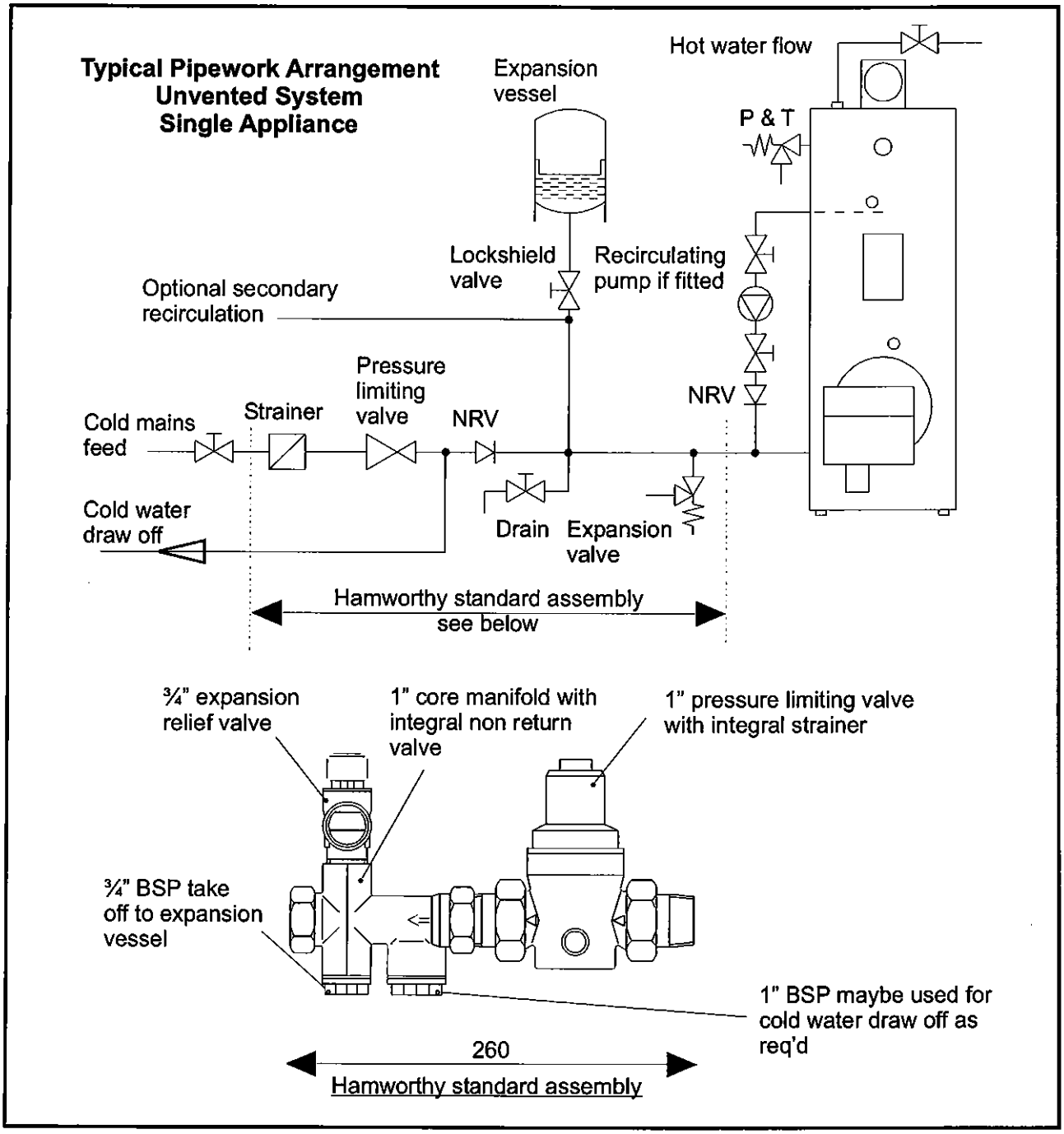
$$V2 = \frac{e_t \times V1}{1 - \left( \frac{Pc}{Pw} \right)}$$

Where $e_t$ is the expansion factor which for a 65°C rise = 0.02.
V1 is the volume of the entire system including the heater.
Pc is the absolute expansion vessel cushion pressure normally preset to 4.5 bar. Absolute = (3.5 bar gauge + 1 bar.)
Pw is the absolute working pressure and is the same value as that of the expansion relief valve setting 6 bar. Absolute = (5 bar gauge + 1 bar.)
V2 is the volume of the required expansion vessel.

### 7.4. Loading Tanks

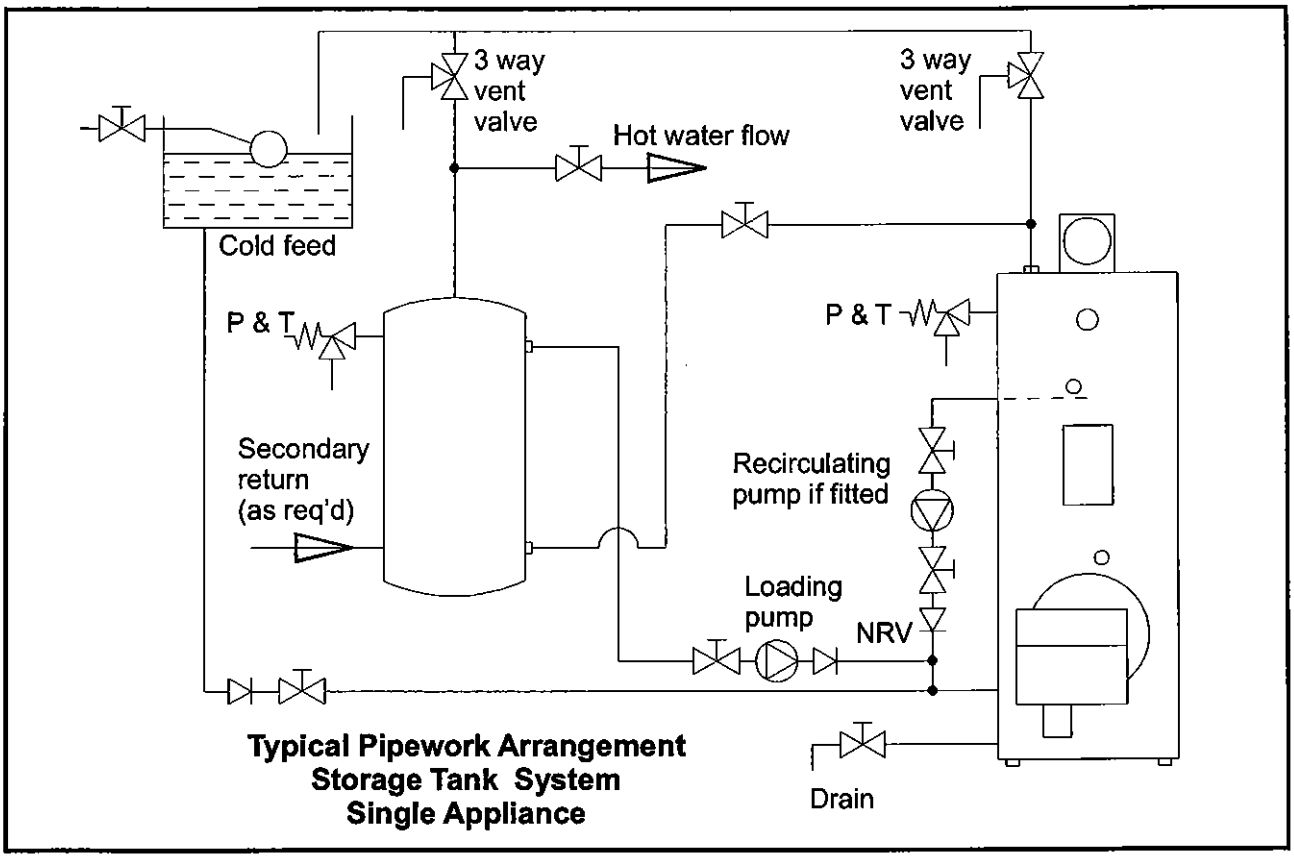
For peak flows in excess of the Dorchester stored water capacity additional tanks can be connected to provide additional storage, refer figure 7.4.1. for typical application.

**Figure 7.3.1. - Typical installation: Unvented system.**




| **Dorchester DBF 100 and 70 models** | |
|---|---|
| **Cold water feed side** | |
| Pressure limiting valve (set to 3.5 bar) with integral strainer. | HHL PART No 531902006 |
| Expansion relief valve (set to 5 bar) | HHL PART No 531905003 |
| Check valve | HHL PART No 531911030 |
| Expansion vessel | (40 litre) HHL PART No 532712070 |
| **Secondary hot water side** | |
| Pressure temperature relief valve (set to 6 bar and 90°C +5 –0) | HHL PART No **331905185** |

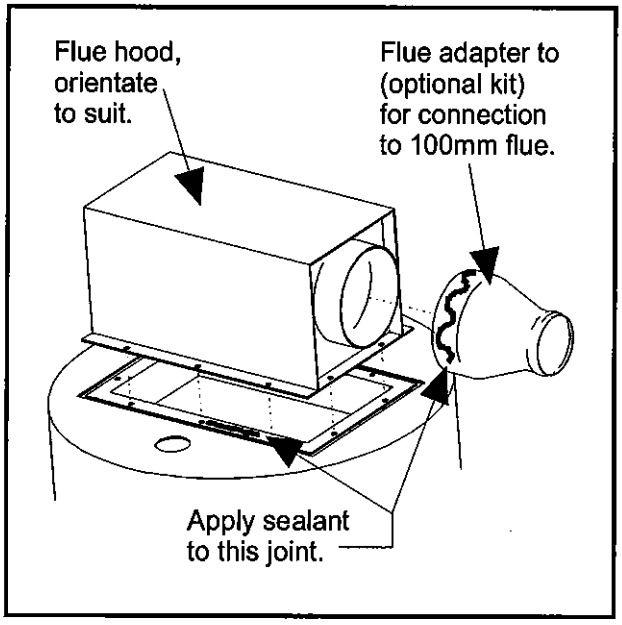
**Figure 7.4.1. - Typical installation: Loading tank system.**



## 8.0. INSTALLATION AND ASSEMBLY

### 8.1. Mechanical Assembly

1) Position tank in the desired position ensuring that adequate space will be available for future servicing and connection of services.
2) Apply a bead of silicon sealant around the mating flange of the flue hood and orientate the hood onto the tank in the desired position. Secure in place using 10 off nuts and washers, ensuring that the hood is bolted down evenly. If using Hamworthy 100mm flue, fit the flue adapter as follows. Apply a bead of silicon sealant around the outer face of the tapered flue adapter and slide the adapter into the socket on the flue hood. Drill at even spacing and affix in place with self tapping screws.
**Note:** If using conventional flue use same process as previously described to connect into the socket on the flue hood.




3) Place the burner flange gasket onto the four mounting studs and fit the burner onto the mounting plate securing in place with the 4 off nuts and washers supplied in installers kit.
4) Locate the 7 pin plug connected to the flying lead from the water tank control box and connect to the corresponding socket on the rear plate of the burner housing.
5) Remove the cover from the grey cable trunking.
6) Locate the temperature limiter on the back plate of the burner housing and carefully straighten out the capillary. Fit the sensor into the **uppermost** pocket on the tank and track the capillary through the cable trunking.
7) Plug the flow and return sensors into the burner and fit the flow sensor (identified by the longer cable) into the **top** pocket of the tank. Fit the return sensor into the pocket located **midway** up the tank. Track both sensor cables through the grey cable trunking.

Ensure that all sensors are securely located in position and retained in place with the spring clip, and that the trailing cables are not subject to any strain.
Ensure that all sensors are in contact with the wall of the pocket to achieve maximum thermal transfer.

### 8.2. Electrical Connection

**Power to the water heater control box is derived from the burner and fed via the 7 way plug and flying lead, refer figure 8.2.**

The burner must be adequately earthed and installed as required by the current local Safety and Electrical Regulations, and any National or International Standards that apply.

**IMPORTANT: MAINS POWER SUPPLY MUST BE CONNECTED TO THE BURNER AND NOT TO WATER HEATER CONTROL PANEL**

It is vital that all safety requirements are met. In case of any doubt, ask for an accurate inspection of the electrics by suitably qualified and competent personnel, since the manufacturer cannot be held liable for damages that may be caused by failure to adequately earth the burner.

The use of adaptors, multiple outlet sockets and/or extension cables to connect the burner to the electrical mains is **NOT** permitted.

An omni polar isolating switch must be provided for connection to the electrical mains as required by current Safety and Electrical Regulations.

The use of any electrically powered component requires the observance of some basic safety rules. For example:

- Do not touch the burner with wet or damp parts of the body and/or with bare feet.
- Do not pull on electrical cables.
- Do not leave the burner exposed to weather (rain, sun, etc.) unless expressly required to do so.
- Do not allow children or inexperienced people to use the burner.

The burner input cable shall not be replaced by the user. In case of damage to the cable, switch off the burner and contact suitably qualified and competent personnel to arrange for a replacement.

### 8.3 Gas Connection

Before installation it is recommended that all the fuel supply system pipes be carefully cleaned inside to remove any foreign matter that might impair the burner operation.

Before the burner is commissioned, suitably qualified

and competent personnel should inspect the installation to ensure that:

a. The gas delivery line and train are in compliance with the current local Regulations, including any National or International Standards that may apply.
b. All gas connections are tight.
c. The boiler room ventilation openings are such that they ensure the air supply flow matches or exceeds that required by the current local Regulations, including any National or International Standards that may apply, and in any case are sufficient for proper combustion.

**DO NOT** use gas pipes to earth electrical equipment.
**NEVER** leave the burner connected when not in use.
**ALWAYS** close off the gas valve.
When the burner is to be left out of use for some time, the fuel supply tap or taps should be closed off.
In the case of prolonged absence of the user, the main gas delivery valve to the burner should also be closed off.

Precautions if you smell gas:

a. DO NOT operate electrical switches, the telephone, or any other item likely to generate sparks.
b. Immediately open doors and windows to create an air flow to purge the room or area.
c. Close off all the gas valves.
d. Contact suitably qualified and competent personnel.

To avoid dangerous conditions such as the development of toxic or explosive mixtures, **DO NOT** obstruct the ventilation openings of the room or area where gas appliances are installed.

Before commencing the installation, ensure that the gas supply is turned off and that all electrical supplies to the burner are also disconnected.

The position of the inlet on the Gas Inlet Pipe is shown in figure 8.3 below

When connecting to the gas inlet be sure to use a proprietary thread sealing compound. Ensure the connecting pipe is of adequate size and free from swarf, dirt or debris.

Always include a manually operated shut-off valve in the gas train when carrying out the installation. This is required to isolate the burner for maintenance and servicing, or for when the burner is taken out of use for prolonged periods.

**8.4 Filling the System.**

After installation of the water system has been completed, open the main water supply valve, flush the system and fill the heater. Open the hot water taps and allow air to escape from the system. When the system is free of air close the hot water taps and check for leaks on all the water heater connections including the drain cock and control and limit thermostat pockets.

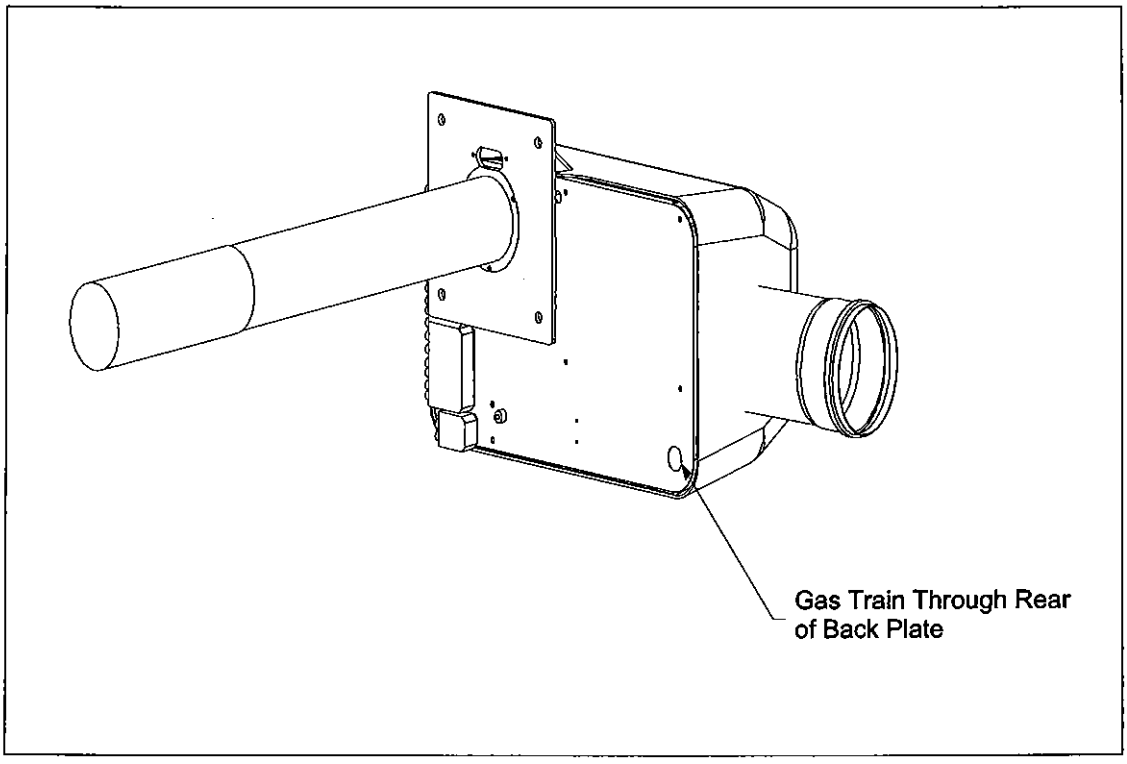
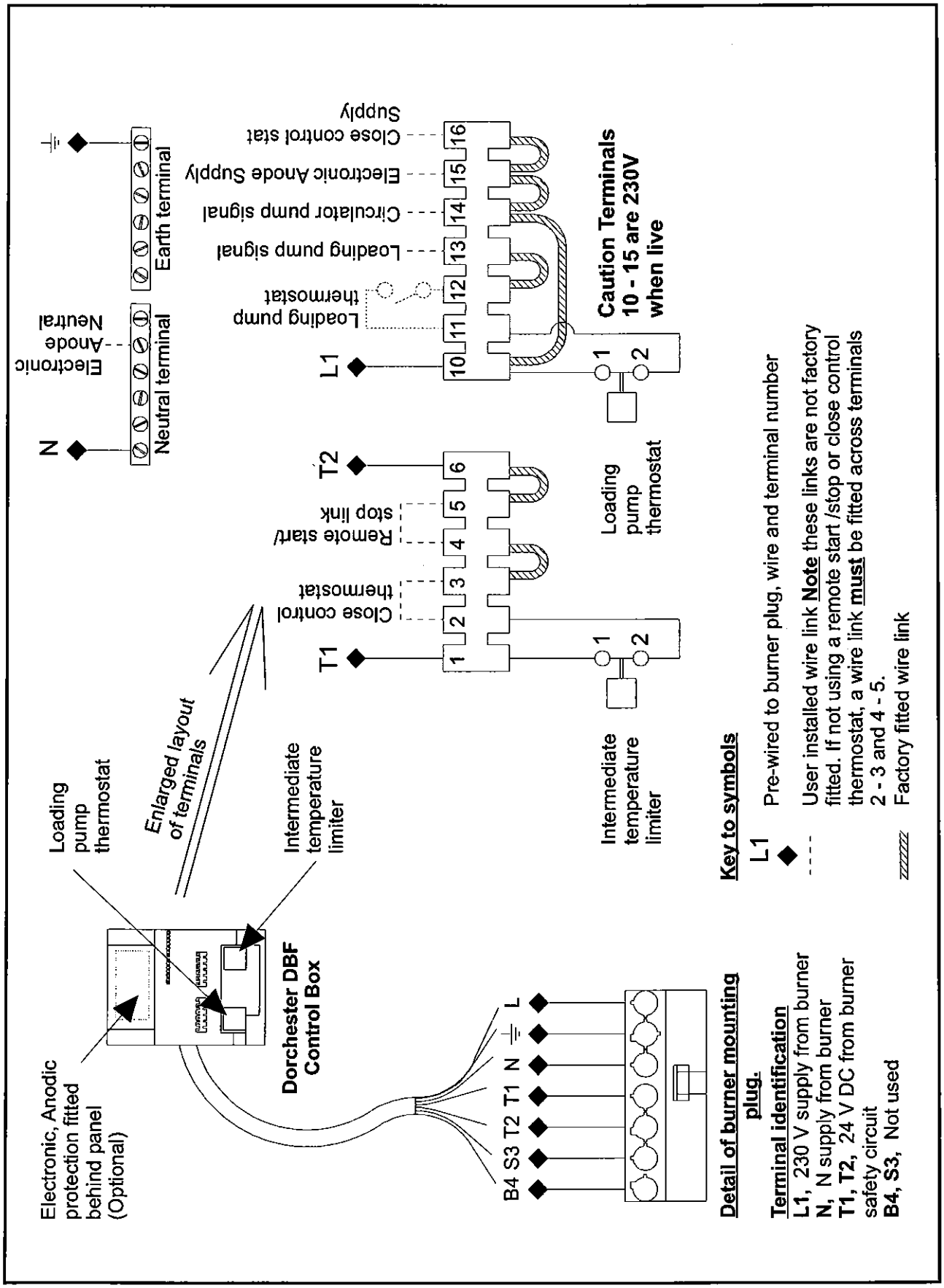



**Figure 8.3 Gas Valve Inlet Position.**

**Figure 8.2 - Electrical connection and wiring details.**



## 9.0. COMMISSIONING & TESTING

### 9.1. Preliminary Checks

Before attempting to commission any heater ensure that any personnel involved are aware of what action is to be taken and begin by making the following checks:-

a) Flueway passages to the chimney are clear.
b) Adequate ventilation exists in the boiler house - reference section 6.
c) The system is vented fully charged with water and ready to receive heat.
d) The gas supply pipework is clear of any loose matter, tested for soundness and purged.

Gas supply is connected but turned off, gas cock is closed, unions are tightened (with any seals in position), test points are tight, burners are correctly installed.

### 9.2. Setting the Temperature Control

#### 9.2.1. Temperature Limiting

Temperature limitation is via two independent limiters. The main temperature limiting thermostat is fitted underneath the burner cover with its corresponding sensor fitted into the upper thermostat pocket located on the appliance, refer figure 3.1. The limiter is set to a fixed value of 85°C.
An adjustable intermediate temperature limiter is fitted within the Dorchester control box, remove cover to gain access, refer figure 8.2. for location. With its corresponding sensor fitted into the top thermostat pocket on the appliance. The intermediate temperature limiter is of the thermal resetting type and will enable the unit to re-fire once the temperature of stored water falls below the set threshold. The desired reset temperature can be set by firstly removing the two screws holding the body of the temperature limiter onto the mounting plate, then retracting the body to expose the setting screw and calibrated graduation.

NOTE: In the event of the primary overheat temperature limiter being activated, the complete heater installation should be inspected to trace and isolate the cause of the problem before any further firing takes place.

#### 9.2.2. Control Thermostat

The stored hot water temperature is monitored and regulated by two sensors (flow, return) connected directly to the burner. The flow sensor is located in the top pocket of the tank whilst the return sensor is mounted in the lower pocket, refer figure 3.1.
The desired stored water temperature is set via the burner front panel, guidance on how to set values are given in the Section 9.7 of these instructions. Stored water temperature can be set between 35°C and 75°C however Hamworthy's recommendations are that the temperature should be regulated such that bacteria are eradicated, refer to notes in appendix A relating to the control of Legionella bacteria.

#### 9.2.3. Loading Pump Thermostat

A pre-wired loading pump thermostat may be fitted within the control box by removing the wire link between terms 11 and 12, refer to figure 8.2. The purpose of the thermostat is (response) to ensure that the stored water is at sufficient temperature prior to running the loading pump. The user should fit a thermostat (non HHL supply) into the loading tank to provide a (call) signal when replenishment is needed.
The desired temperature can be set by firstly removing the two screws holding the body of the loading pump thermostat onto the mounting plate, then retracting the body to expose the setting screw and calibrated graduation.

#### 9.2.4. Close Control Thermostat

Hamworthy offer an optional close controlled thermostat kit capable of controlling the burner to maintain a stored water temperature at approximately ± 1°, if using this kit refer to Appendix B for fitting and operation instructions. If this kit is to be fitted then the installer should first remove the wire link in the control box across terminals 2 and 3, referring to figure 8.2.

### 9.3. Remote Start / Stop

A remote start / stop signal rated at 24V DC is provided for connection to a suitable BMS. Should the remote function be required the installer should first remove the wire link in the control box across terminals 4 and 5, referring to figure 8.2.

### 9.4. Burner Commissioning

Before attempting to light the burner, suitably qualified and competent personnel should inspect the installation to ensure the following:

a. That all electrical safety circuits are made and the electrical installation has been carried out according to the instructions in this manual.
b. There must be an adequate ground to the burner and the Live and Neutral should be correctly connected.
c. The gas pipe work is of a suitable size for the burner requirements and the installation has been checked for leaks and fully purged.

### 9.5 Firing the Burner

Press the **On/Off** button on the Burner Display Panel (See Fig. 9.7) and after a few seconds the burner should start to pre-purge before ignition commences. Following ignition the fan will stay at ignition rate for a short period as the burner is pre-programmed with a step-control. It will not reach maximum fan speed for at least 90 seconds after ignition.

If a lockout condition occurs, refer to the Status Display Lockout Codes Table in Section 12.0 to identify the cause.

If other faults occur, refer to the Fault Finding Flowchart in Section 12.0.

If repairs are deemed to be necessary refer to your Installer or contact Hamworthy Heating Technical Department.

### 9.6. Shutting Down the Burner

To switch off the burner, press the **On/Off** switch on the Burner Display Panel. The burner should shut down immediately. **Note: Pressing the On/Off switch does not completely isolate the burner from the mains.**

If required, an external timing device can be attached to the burner to switch it off remotely.

### 9.7 Burner Control and Adjustment

#### 9.7.1 Fan Speeds

The fan speeds for the Dorchester DBF range of burner are pre-set and should not require adjustment. Although max/min speeds can be adjusted if required, adjustment of the ignition speed is not recommended as this may affect the reliability of operation.

#### 9.7.2 Starting Up

AS WITH ALL FORCED DRAUGHT BURNER SYSTEMS THE DORCHESTER D SERIES PREMIX BURNER MUST BE SET UP CORRECTLY TO ENSURE SATISFACTORY AND RELIABLE OPERATION

Note: The air pressure switch on this burner is factory set and should not require adjustment.

Before attempting to light the burner for the first time, suitably competent personnel should inspect the installation to ensure the following;

a) That all electrical safety circuits are made and the electrical installation has been carried out according to the instructions in this manual.
b) There must be an adequate ground to the burner and the Live and Neutral should be correctly connected.
c) The gas pipe work is of a suitable size for the burner requirements and the installation has been checked for leaks and fully purged.

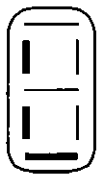
On turning on the burner the display should be as shown in Figure 9.7 below.

Press the On/Off button and after a few seconds the burner should start to pre-purge. Ignition will commence and the fan will stay at ignition speed for 10 seconds. The burner is pre-programmed with a step-control, so it will not reach maximum fan speed for approximately 90 seconds.

Once the burner has reached maximum fan speed check the $CO_2$ levels. These should be the same as shown in the table below:

| CO | $CO_2$ |
|---|---|
| <10ppm | 9.4%±0.2 |

Drive the fan speed manually to the minimum setting. This is done by pressing and holding down for 3 seconds the hidden button below the 'STATUS' figure at the same time as the '-' (minus) button. See Fig. 9.7 below. The 'STATUS' figure will now show;



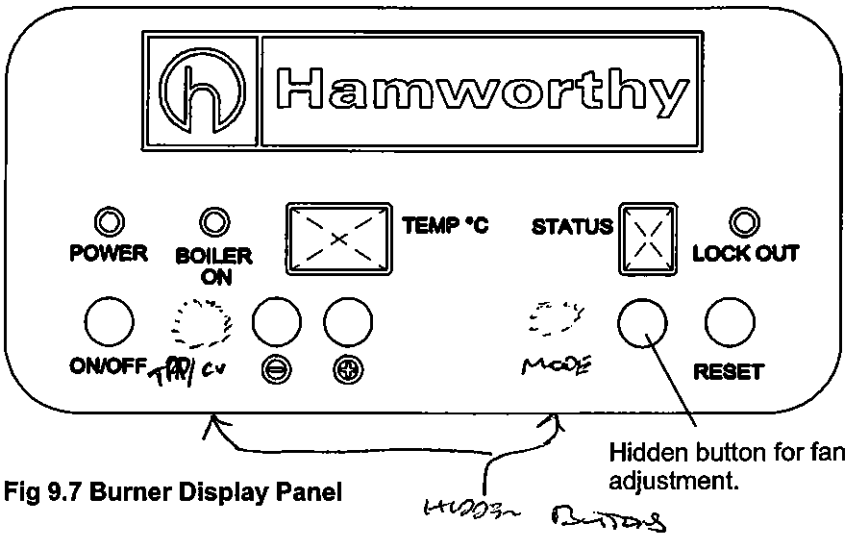




**Fig 9.7 Burner Display Panel**

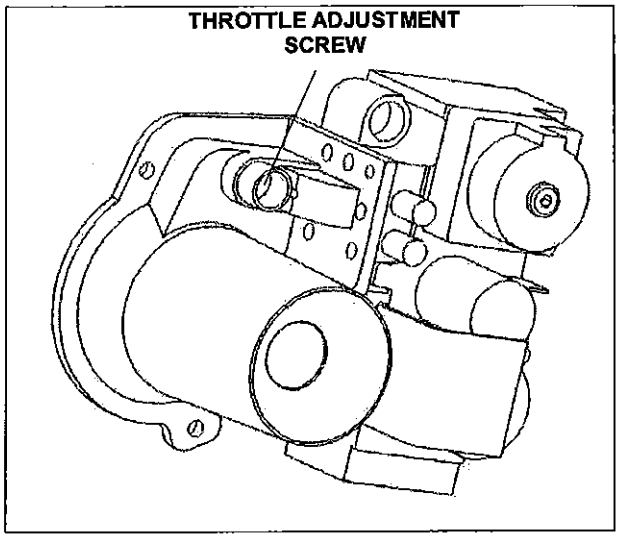
Check for adequate flue gas temperature (See Fig. 13). The $CO_2$ should now be as shown in the table below.

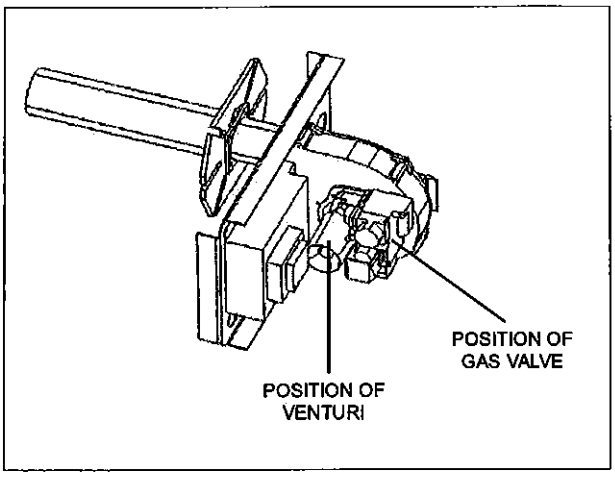
| CO | $CO_2$ |
|---|---|
| <10ppm | 9.3%±0.2 |

**9.8 Burner Adjustment**

If adjustments are required to obtain the correct flue gas temperature and $CO_2$ levels, do this by carrying out the following steps;

a. Manually drive the fan speed to maximum by pressing the hidden button and simultaneously the '+' (plus) button. Hold them both down for 3 seconds. The STATUS display should now read **'H'**.
b. To increase the $CO_2$ levels at the maximum fan speed, first remove the black plastic throttle security cover. Below this is the 3mm Allen key screw for throttle adjustment. To increase the $CO_2$ , turn the throttle screw anti-clockwise a quarter turn at a time, checking the levels constantly until the desired level is reached.
c. To decrease $CO_2$ levels at the maximum fan speed, turn the throttle screw clockwise a quarter turn at a time.
d. Manually drive the fan speed back to minimum by pressing the hidden button and simultaneously the '-' (minus) button. Again, hold them both down for 3 seconds.
e. Recheck the flue gas temperature and $CO_2$ levels
f. To increase $CO_2$ levels at the minimum fan speed, first remove the dust cover from the regulator on the gas valve. Below this is the white plastic torx offset adjustment screw. Turn the screw clockwise a quarter turn at a time, checking the levels constantly until the desired level is reached.
g. To decrease the $CO_2$ levels at the minimum fan speed, turn the screw anti-clockwise a quarter turn at a time, checking the levels constantly until the desired level is reached.
h. Replace the gas valve security cover.
i. Manually drive the fan speed back to maximum by pressing the hidden button at the same time as the '+' (plus) button. Once again, hold them both down for 3 seconds. Check $CO_2$ / rating.
j. Recheck the flue gas temperature and $CO_2$ at minimum rate to make sure that they are still correct. If required the flue gas temperature should be adjusted by altering the minimum fan speed.
k. When finished, replace both security dust covers over the adjustment screws.



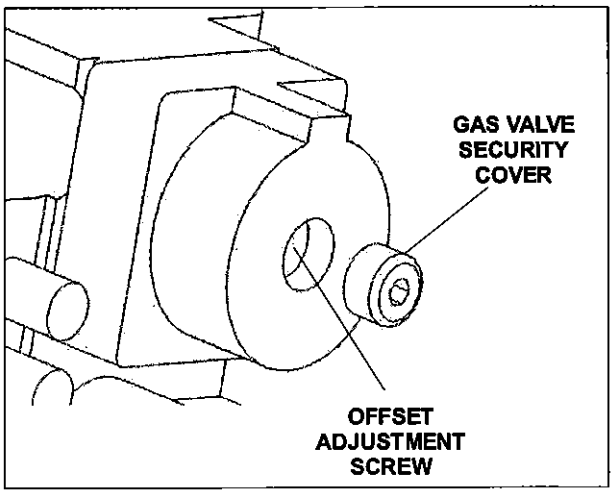




**Figure 9.8 - Throttle and Gas Valve Adjustment**

## 10.0 SERVICING AND MAINTENANCE

The maintenance operations listed below must be carried out at least once a year. In the case of seasonal servicing, it is recommended that the maintenance operations are carried out at the end of each heating season.

In the case of continuous operation, the maintenance operations should be carried out every six months.

In all cases, the work should only be carried out by suitably trained and qualified personnel.

**NOTE: ALL OPERATIONS ON THE BURNER MUST BE CARRIED OUT WITH THE POWER DISCONNECTED.**

a. Disconnect the electricity and gas supplies from the burner.
b. Examine and clean the gas filter cartridge and replace if necessary.
c. Remove the burner.
d. Check the burner head for any signs of damage or degrading.
e. Examine the condition of the electrodes and check that they are clean, undamaged, and not loose. If necessary, remove, clean and then refit them (Note: Do not over-tighten when refitting as this can damage the insulation!). For the correct spark gap and position of the electrodes, refer to Figures 10.1 and 10.2.
f. Examine all gasket material and check for any signs of damage or degrading. If necessary, replace them, but always use the correct type.
g. Check all electrical connections and cables to ensure that they are all sound, undamaged and have not worked loose.
h. Remove and clean the flexible tube to the air pressure switch and check that this is functioning correctly.
i. If required, clean the combustion air fan.
j. Refit all parts and reconnect the electricity and gas supplies.
k. Check for gas soundness and electrical safety before switching on.
l. Switch on the burner and check for correct operation.
m. Check the combustion CO and $CO_2$ levels at both the minimum and maximum fan speeds as described in Section 9.7 and adjust if necessary.

If it is necessary to replace any parts, refer to Section 11.0 for the correct part numbers.

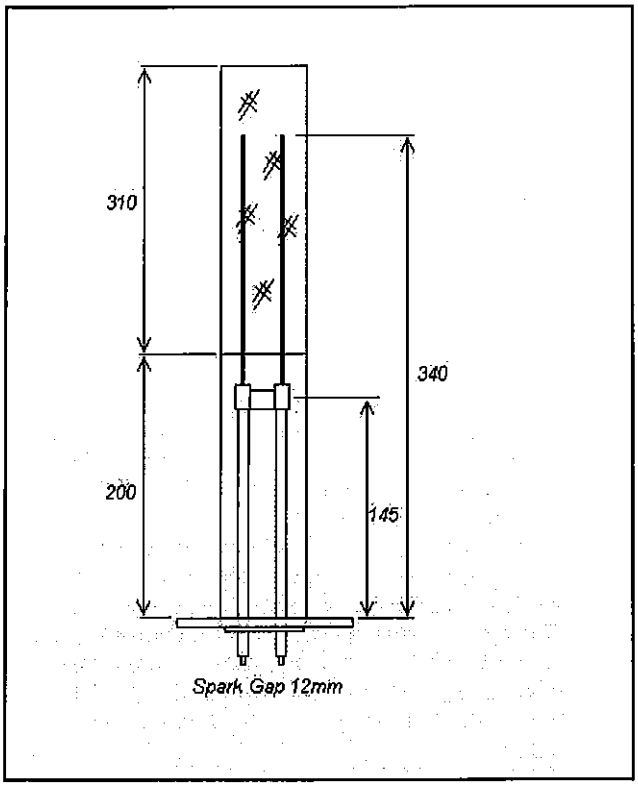



**Figure 10.1 - Spark Gap and Electrode Positions for a Dorchester D70 burner**

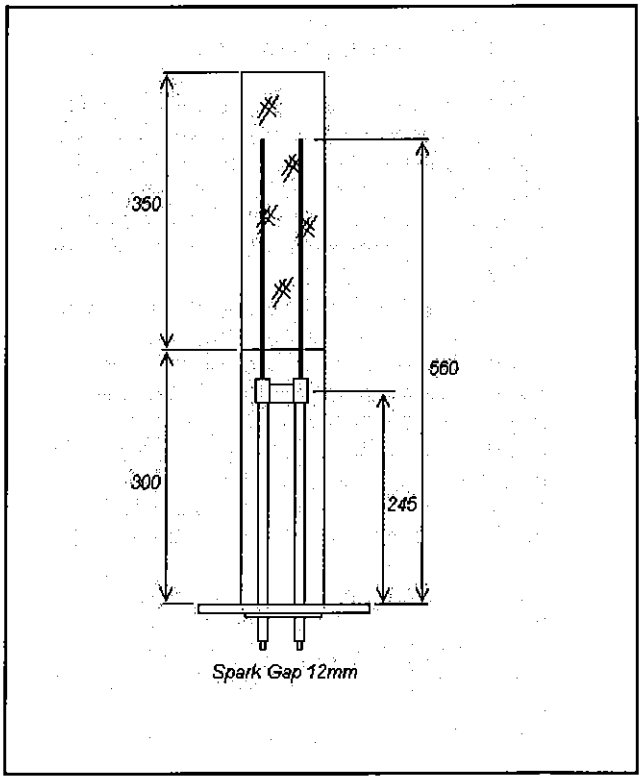



**Figure 10.2 - Spark Gap and Electrode Positions for a Dorchester D100 burner**

## 11.0 REPLACEMENT PARTS

**Dorchester D70 Replacement Parts**

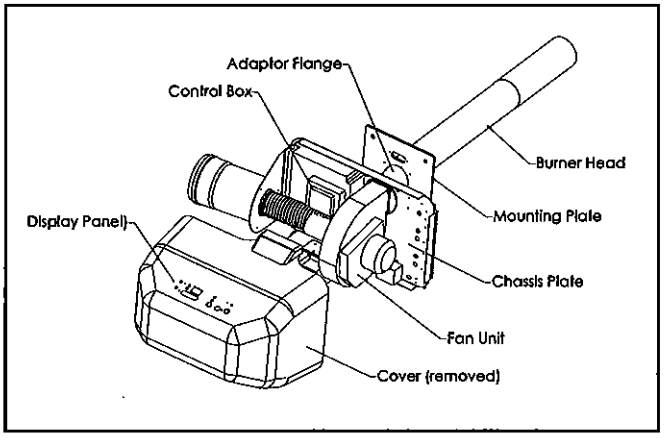



**Figure 11.1 – Exploded View of D70 Burner**

### 11.1 D70 Burner Minor Replacement Parts

| | |
|---|---|
| Mounting Plate Gasket | 533306091 |
| Adaptor Manifold Gasket Set | 533306092 |
| Burner Head Electrodes | 533306093 |

### 11.2 D70 Burner Major Replacement Parts

| | |
|---|---|
| Burner Head | 533306094 |
| Mounting Plate | 533306095 |
| Adaptor Manifold | 533306096 |
| Back Plate | 533306097 |
| Control Box | 533306098 |
| Fan Unit | 533306099 |
| Gas Valve | 533306100 |
| Venturi | 533306101 |
| Back Cover | 533306102 |

**Dorchester D100 Replacement Parts**

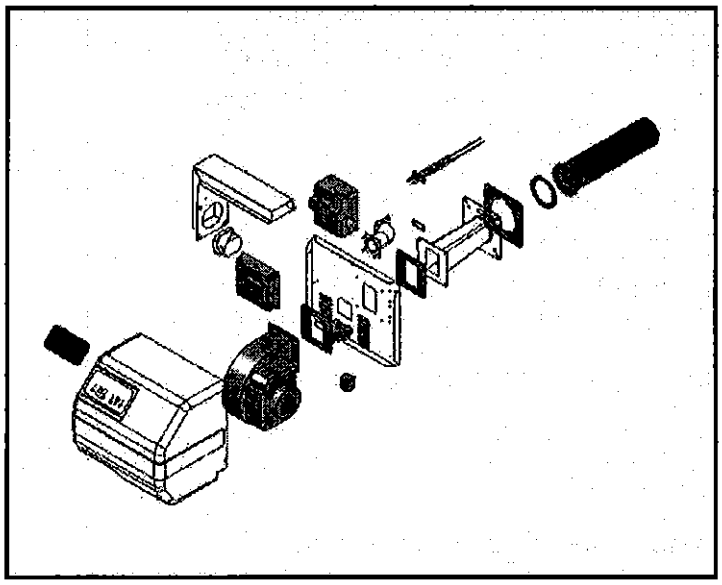


**Figure 11.2 – Exploded View of D100 Burner**

### 11.3 Dorchester D100 Burner Spares

| | |
|---|---|
| Control Display | 533306055 |
| Temperature Limiter | 533306056 |
| Electrode Gasket | 533306057 |
| Air Pressure Switch | 533306073 |
| Control Box | 533306105 |
| Gas Valve | 533306066 |
| Fan Unit | 533306067 |
| Mounting Plate Gasket | 533306068 |
| Burner Head Gasket | 533306069 |
| Fan Gasket | 533306070 |
| Burner Head | 533306104 |
| Inlet Gas Flange kit | 533306072 |
| Burner Electrode Assy | 533306103 |

Not shown in exploded view

| | |
|---|---|
| Display PCB | 533306059 |
| Lock-out PCB | 533306060 |
| Volt Free Relay | 533306061 |
| Relay housing | 533306062 |
| Temperature Sensor 1.5m | 533306063 |
| Temperature Sensor 2.5m | 533306064 |

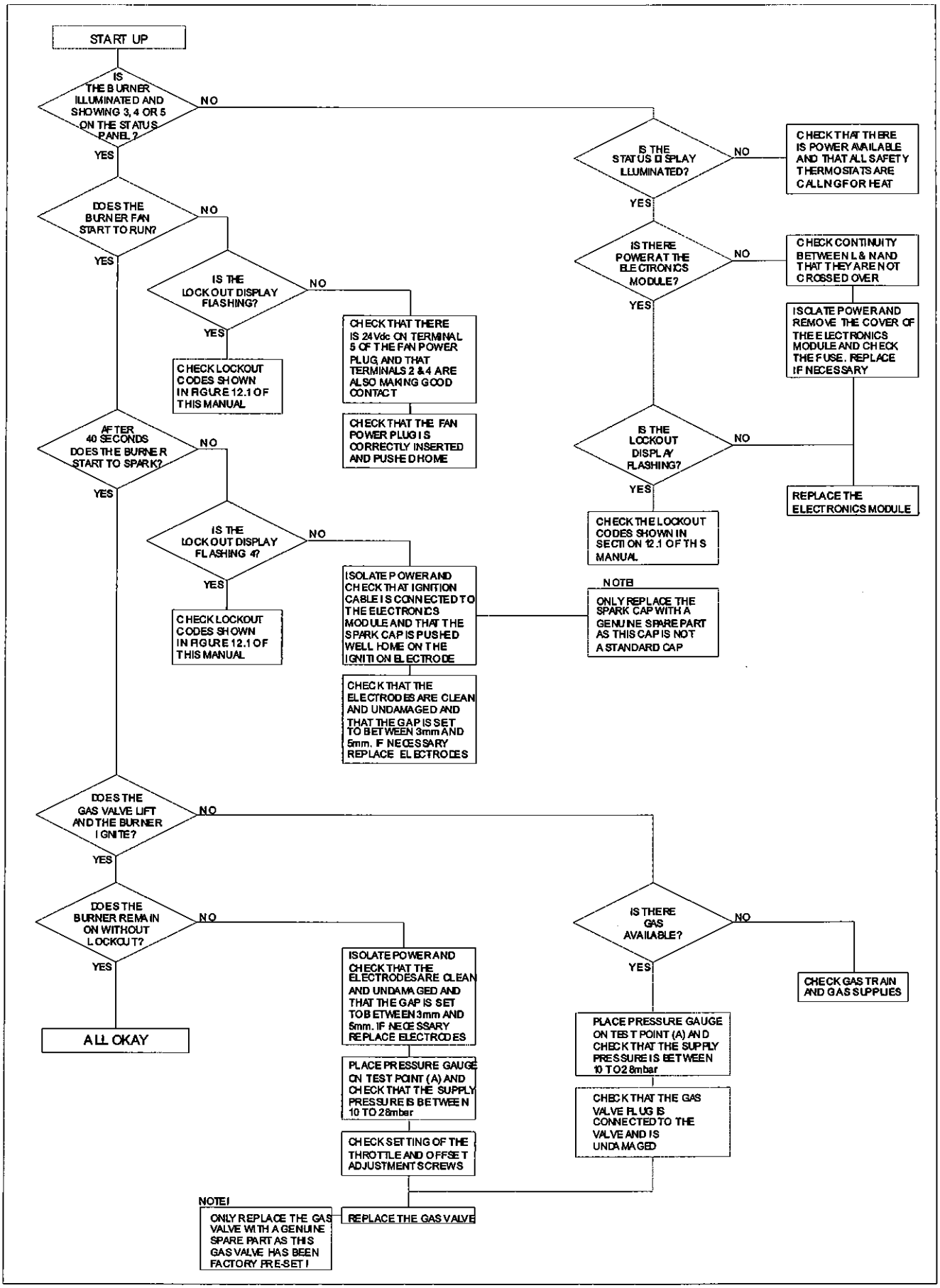
## 12.0 FAULT FINDING

If the equipment still cannot be operated satisfactorily after following these instructions, consult Hamworthy Heating Technical Department for assistance.

**Figure 12.1 - Status Display Lock Out Codes**

| | Parameter Code | Lock Out Condition |
|---|---|---|
| 0 | | Interrupted or short-circuited boiler FLOW temperature sensor (NTC1)<br><br>Interrupted or short-circuited boiler RETURN temperature sensor (NTC2) |
| 1 | 1CA<br><br>1CB<br><br>1CC | Boiler FLOW temperature sensor (NTC1) higher than lock out temperature.<br>Boiler RETURN temperature sensor (NTC2) higher than lock out temperature.<br>Hot water tank temperature sensor (NTC3 - if fitted) higher than lock out temperature. |
| 2 | 1CG<br><br>1CD, 1CF<br><br>1CE, 1CH | Boiler FLOW (NTC1) and RETURN (NTC2) temperature sensors have been exchanged.<br>Boiler FLOW (NTC1) and RETURN (NTC2) temperature sensors are not equal in rest position.<br>Boiler FLOW (NTC1) and RETURN (NTC2) temperature sensors are too high while running. |
| 3 | 2BH, 2BI, 2BJ, 2BK | Too many gradient interventions at boiler FLOW (NTC1) temperature sensor per heat demand. |
| 4 | | No flame signal after all ignition attempts. |
| 5 | | Flame error in operation. |
| 6 | | Flame on in rest position. |
| 7 | | Parameters programmed incorrectly. |
| 8 | 1AH, 1AK | Fan not switched off when in stand-by. |
| 9 | 1AI | Speed control is activated when in operation. |
| A | 1AI | Fan does not start to run. |
| B | | Parameters programmed incorrectly. |
| C | | Gas valve not connected or defective. |
| D | | Gas valve circuit test incorrect. |
| E | | Mains voltage control problem. |
| F | | Software fault/EMC interference. |
| H | | Electronics module out of order. |

**Figure 12.2 - Fault Finding Flowchart**



## 13.0 TECHNICAL AND PERFORMANCE DATA

| GENERAL DATA | | WATER HEATER MODEL | |
|---|---|---|---|
| | | DBF 70 | DBF 100 |
| Appliance Input (maximum) | - kW (Gross) | 81.9 | 119.9 |
| Appliance Input (maximum) | - kW (Nett) | 73.8 | 108.0 |
| Appliance Output (heat to water) | - kW | 70 | 100 |
| **FLUE DATA** | | | |
| Nominal Flue Diameter. | - mm | B23: ø100 mm or ø170 mm<br>C53: ø100 mm | |
| Approx. Flue Gas Temperature | - °C | 150 | 150 |
| Approx. Flue Gas Vol. @ 9.0 – 9.5% $CO_2$ & NTP(Dry) | - $m^3/h$ | 103 | 146 |
| **GAS DATA** | | | |
| Gas Type | | I2H Nat Gas | |
| Nominal Gas Inlet Press. | - mbar | 20 | |
| Maximum Gas Inlet Press. | - mbar | 25 | |
| Minimum Gas Inlet Press. | - mbar | 17.5 | |
| Gas Flow Rate -maximum | - $m^3/h$ | 8.04 | 11.43 |
| **WATER DATA** | | | |
| Storage Capacity | - litres | 355 | 355 |
| Continuous output at 45°C temperature rise | - litres/h | 1340 | 1900 |
| Recovery time 10° to 60°C | - minutes | 17.6 | 12.3 |
| Maximum Water Pressure | - bar g | 6 | 6 |
| **PHYSICAL DATA** | | | |
| Weight Empty excluding burner | - kg | 385 | 395 |
| Weight Full | - kg | 735 | 745 |
| **ELECTRICAL DATA** | | | |
| Normal Supply Voltage | | 230V AC 50Hz | |
| Start and Run Current | | < 1A | < 1A |
| **FAN DATA** | | | |
| Ignition rate speed | - rpm | 3600 | 2700 |
| Minimum rate speed | - rpm | 3600 | 2700 |
| Maximum rate speed | - rpm | 4780 | 3700 |

**Note:** NTP = 1013.25 mbar @ 15°C

## Appendix A: Related documents and standards

### A.1. Related Documents.

**Gas Safety Installations and Use Regulations 1998- (As amended).** It is law that all gas appliances are installed by competent persons in accordance with the above regulations. Failure to install appliances correctly could lead to prosecution. It is in your own interest, and that of safety, to ensure that this law is complied with.

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

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

### A.2. British Standard Codes of Practice

**BS 6644** - Installation of gas fired hot water boilers - 60 kW to 2 MW.

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

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

**BS 6891** - Installation of low pressure gas pipework of up to 28 mm (R1) in domestic premises. For larger installations see **IGE/UP/2** and **IGE/UP/10** below.

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

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

**CP 342** - Centralised hot water supply, Part 2 - buildings other than individual dwellings.

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

### I. Gas E. Publications

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

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

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

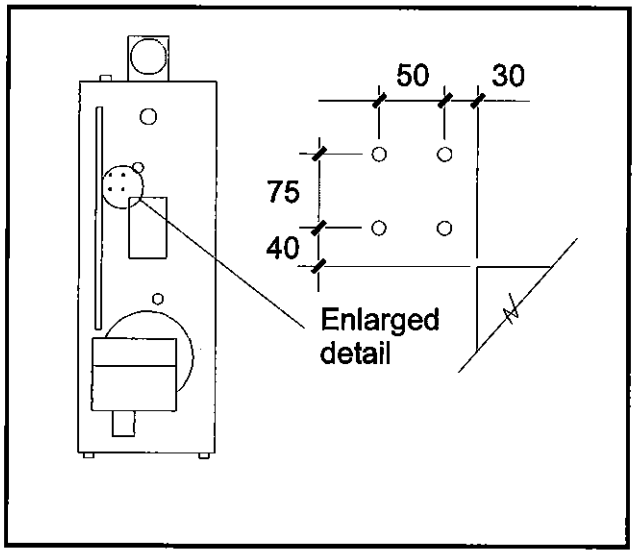
**IGE/UP/10** Installation of gas appliances in industrial and commercial premises **Part 1** flued appliances.

### A.3. Control of Legionella Bacteria in Water Systems Approved Codes of Practice

The Approved Code of Practice applies to the control of legionella bacteria in any undertaking involving stored water. Additionally harmful bacteria such as legionella pneumophila (biological agents) are subject to controls of the **Control of Substances Hazardous to Health Regulations 1999** (COSHH).

**Appendix B: Close Control thermostat kit.**

Ensure that the electrical supply to the appliance is isolated.




**B1.0. Installation**

1) Drill 4 off 3.4 mm diameter holes in the heater outer panel as shown in the figure above.

2) Remove the control box cover and the front cover of the close control thermostat housing.

3) Remove the cover off of the grey trunking.

4) Fix the thermostat box to the side of the water heater using the 4 off self tapping screws supplied in the kit.

5) Feed the three flying leads from the thermostat box into the grey trunking. Break out the flow sensor and fit it to the pocket located midway up the tank. Ensure that the sensor is fully engaged and then retain in place with the spring clip. Feed the other two cables into the control box using the glands and nuts provided.

6) Connect the three core cable to the supply terminal 16, neutral and earth, refer figure 8.2. Remove the blade crimps from the two core cable and bare sufficient conductor for connection into terminals 2 and 3, refer figure 8.2.

7) replace the control box cover and front panel on the close control thermostat control box ensuring that no wires are trapped.

8) Replace the cover on the grey cable trunking.

**B2.0. Commissioning**

**1)** Switch on the electrical supply to the appliance. The close control thermostat will be energised and the digital display will illuminate showing the water temperature in °C. The heater may fire depending on the set point of the thermostat. If the thermostat is calling for heat, a green light in the upper left-hand corner of the display will flash under the label **"reverse"**.

**B2.1. Adjusting the Set Point.**

1) The set point of the thermostat can be adjusted in 0.1°C intervals between 40 and 80°C, but should normally be set around 60°C.

2) Press **SEL** button until display shows **"St1"** Release button and the current set point will flash. If no other buttons are pressed, the display will continue to flash for approximately 1 minute then revert to current water temperature.

3) Press **SEL** button again (if one minute has elapsed) and while the set point is flashing press either the ▲ button to increase or the ▼ button to decrease the set point. One press will change the set point by 0.1°C or holding the button down will rapidly change the set point.

4) When required value is set press the **SEL** button immediately to enter the new value.

**B2.2. Adjusting the Switching Differential.**

1) The switching differential of the thermostat can be adjusted in 0.1°C intervals between 0.1 and 99.9.

2) Press **PRG/mute** button for approximately 10 seconds until **"P1"** is displayed. **"P1"** is the code for the switching differential. There are other codes available (P14, P25, P26, P27) but these must not be changed from the original setting. If, following the pressing of the **PRG/mute** button one of these additional code numbers is shown on the display use the s or t buttons to scroll the display to **"P1"**.

3) With **"P1"** shown, press the **SEL** button and the value of **"P1"** will be shown on the display. Use the ▲ and ▼ buttons to change the differential. One press will change the differential by 0.1°C or holding the button down will rapidly change the differential. For the thermostat to achieve the desired control, the differential should be set between 1 and 10.

4) When the required value is set press the **SEL** button to confirm the setting and the code **"P1"** will re-appear. To return to the normal temperature display, press the **PRG/mute** button.

**B3.0. Operation**

Having adjusted the set point on the close control stat it is necessary to reset the switching point on the burner control system so that hunting does not occur between the two systems. Referring to the burner instructions reset the burner switching point so that it

is approximately 5 degrees above that of the close control stat set point.
The heater will turn off at the set point value and turn on again at the value of the set point less the differential. As each system has individual characteristics, it will be necessary to fine-tune the thermostat settings to give the desired control. It is always preferable to use the largest switching differential possible to maintain the flow temperature from the heater between acceptable tolerances. A differential of 1 may result in rapid cycling of the heater.

**B3.1.** Example: if the heater flow temperature is to be maintained at an average of 60°C, initially adjust the set point to 62°C and the differential to 4. The heater will then switch off at 62°C and switch on at 58°C. Allow the heater to cycle a number of times and monitor the water temperatures on the thermostat display.

If the flow temperature rises above 63°C reduce the set point by 1°C and reduce the differential by 1°C. If the flow temperature drops below 57°C, reduce the differential by 1°C. Allow the heater to further cycle a number of times and monitor the display. Continue to adjust the thermostat as necessary.

**Notes.**

If the temperature sensor fails or becomes disconnected, the display will show "**Er0**".

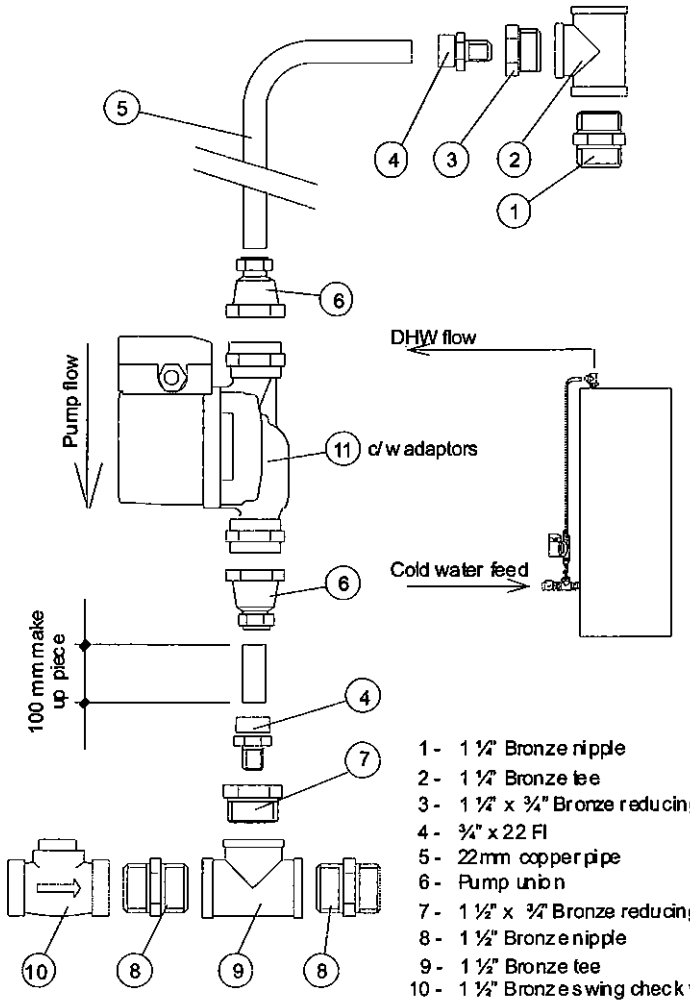
The factory set values are:

| | |
|---|---|
| Set Point | 60°C |
| Differential | 4°C |

## Appendix C: Recirculation Kit.

Assemble the circulation kit by referencing figure C.1.
Note: cut the 100 mm x 22 mm tube make up piece from the longest leg of the tube supplied with the kit.
Ensure that the direction markers on the pump and swing check valve are aligned correctly as per the diagram.

**Figure C.1. - Recirculation pump kit installation**




1 - 1 ¼" Bronze nipple
2 - 1 ¼" Bronze tee
3 - 1 ¼" x ¾" Bronze reducing bush
4 - ¾" x 22 Fl
5 - 22mm copper pipe
6 - Pump union
7 - 1 ½" x ¾" Bronze reducing bush
8 - 1 ½" Bronze nipple
9 - 1 ½" Bronze tee
10 - 1 ½" Bronze swing check valve

## Appendix D - SETTINGS AND PARAMETERS

### D1.1 User Settings

Normally the burner control will be programmed in such a way that the user can enter any changes directly. The information on the display depends on the operational status. Exceptions are lock-outs, and the setting options already being activated. The user can enter the following changes:

| Function | Button Combination | Parameter | Limits | Description |
|---|---|---|---|---|
| On / off | On / Off Button | Bit 76543210<br>5CI, xxxxxx1x<br>5CI, xxxxxx0x | | On: Heat demand enabled<br>Off; All heat demands are disabled except for frost protection. The display will only show "-". |
| DHW Eco / Comfort | Mode button | 5CI, xxxxxxx1<br>5CI | | Eco: The boiler is not pre-heated.<br>Comfort: The boiler is pre-heated. |
| Change ch | Tap/ch button<br>+ and - button | 5AA | 2EA..2EB | Setpoint is blinking and can be changed using + and - key. |
| Change dhw | Tap/ch button<br>+ and - button | 5AB | 2CA..2CB<br>2DA..2DB | Instantaneous<br>Storage Tank |

### D1.2 Installer Settings

The installer level is reached by pressing the service and reset buttons together for 3 seconds. Activation of the installer level is indicated by all LED indicators flashing up. The installer level cannot be reached if the Dorchester DBF is in lock-out or if the changing of the setpoint for dhw/ch is active.

If the installer menu is started for the first time, the security code for this level has to be entered. If a wrong code is given, the burner control will exit the installer level immediately and re-start. If the code is entered correctly, the various setting options can be gone through. If other changed settings have to be entered at the installer level within a time-span of 10 minutes, the security code does not have to be entered a second time.

By repeatedly pressing the service button, the various menu items can be scrolled. The service display shows the item involved, while its value is shown in the temperature display. Changes can then be entered by pressing the + and - button. However, changes are not stored until they are confirmed by pressing the reset button for 3 seconds. This will cause the burner control to re-start. If no button is pressed during 1 minute, the burner will return to the normal situation, the user, without storing any changes that were entered. The following parameters can be set at the installer level:

| Step | Setting | Parameter | Description |
|---|---|---|---|
| 0 | Installer Code | | For access to the installer settings, the security code should be entered (15). |
| 1 | Boiler type | Bit 76543210<br>5CI, 000xx0xx<br>5CI, 00xxx1xx<br>5CI, 01xxx0xx<br>5CI, 10xxx0xx | 0: ch & plate heat exchanger<br>1: ch & external hot water tank<br>2: only dhw<br>3: only ch |
| 2 | Pump continuous | 5CI, xxxx0xxx<br>5CI, xxxx1xxx | 0= only pump overrun<br>1= pump continuously active via ch-circuit |
| 3 | Maximum fan speed CH | 5BA | This is a percentage of the absolute maximum fan speed limits: 5CD..5CC |
| 4 | Maximum fan speed DHW | 5BB | Limits: 5CD..100% |
| 5 | Minimum flow temperature for the CH curve | 5BC | 10..25°C |
| 6 | Minimum outside temperature for the CH curve | | |

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Installer Settings Continued...

| Step | Setting | Parameter | Description |
|---|---|---|---|
| 7 | Maximum outside temp. for CH curve | 5BE | 15..30°C |
| 8 | Post-running time of pump after CH operation | 5BF | 1.. Par 5 CH minutes |
| 9 | Post-running time of pump after sanitary water operation | 5BG | 1.. Par 5 CH minutes |
| A | Three way valve position | 5CI, xxx0xxxx<br>5CI, xxx1xxxx | 0 ▶ motor energised ▶ CH circuit<br>1 ▶ motor energised ▶ DHW circuit |
| C | Step modulation | 5CJ, xxxxxxx0<br>5CJ, xxxxxxx1 | 0= Step modulation CH off<br>1= Step modulation CH on |
| E | Minimum flow temperature during OT ch demand | 5BH | 30..60°C; If the OT thermostat demands a flow temperature below this value, the heat demand is ignored |

**D1.3 Manufacturer Settings**

The manufacturer level is reached by pressing tap/ch and mode buttons together for 3 seconds when the burner control is already active at the installer level. Activation of the manufacturer level is indicated by flashing up of all LED indicators and blinking of the service and temperature display.

When the manufacturer level is started for the first time, the security code for this level should be entered. If this is done incorrectly, the burner will re-start immediately and become active at the user level again. A code entered correctly remains valid for 10 minutes, as for the installer level.

The various menu items can be scrolled by repeatedly pressing the service button. The actual step will be shown on the service display, while the value can be read from the temperature display. Changes can then be entered by pressing the + and - button. However, changes are only stored by pressing the reset button for 3 seconds. The control will then re-start, after which the changes are effective. If no button is pressed for 1 minute, the control will return to the normal situation, without storing any changes. The following settings can be entered at the manufacturer level:

| Step | Setting | Parameter | Description |
|---|---|---|---|
| 0 | Manufacturer code | | To gain access to the manufacturer settings, the security code should be entered first (9) |
| 1 | Maximum fan speed (absolute) | 5CA | 5..60 (hundreds) |
| 2 | Maximum fan speed (absolute) | 5CA | 0 / 25 / 50 / 75 (decimals) |
| 3 | Upper limit installer setting maximum CH fan speed | 5CC | 5CD..100% of the absolute maximum |
| 4 | Lower limit installer setting maximum DHW fan speed | 5CB | 1..100% of the absolute maximum |
| 5 | Lower limit installer setting maximum CH fan speed | 5CD | 1..5CC of the absolute maximum |
| 6 | Start-up fan speed at CH demand | 5CG | 1..100% of the absolute maximum |
| 7 | Start-up fan speed at DHW demand | 5CF | 1..100% of the absolute maximum |
| 8 | Minimum fan speed in operation | 5CE | 10..100% of the absolute maximum |
| 9 | Maximum pump post-running time | 5CH | 1..40 minutes |
| A | Anti-cycling time | 5CI, xx0xxxxx<br>5CI, xx1xxxxx | 0= short time (parameter 2EI)<br>1= long time (parameter 2EJ) |

### D1.4 Test Mode

At the user level, the control can be forced into a test mode. This function is intended to simplify gas valve settings. No modulation will take place during the test mode, only temperature limitation. After 10 minutes (2GC) the test mode will stop automatically.

| Display | Button Combination | Function |
|---|---|---|
| L | Service and - button | Burner on with minimum fan speed. |
| h | Service and + button | Burner on with maximum fan speed CH |
| H | Service and + button<br>+ and - button | Burner on with maximum fan speed DHW<br>Switch off test mode |

In the test-mode the boiler is always running over the central heating circuit.

## NOTES