

Certikin 100 & 100W Condensing *Pool Heaters*

Installation, Service & User Instructions



| | | |
|------------|---------|----------|
| Model: | MBC100N | MBC100NW |
| Serial No: | | |

GC No. 47 555 02 and 47 555 17
WRc No. 95 110 46

CE
0087

Note to the Installer: **Natural gas Only**
Please leave these Instructions adjacent to the meter.

benchmark
Malvern Boilers supports
the Benchmark code of practice

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1: USER INSTRUCTIONS

1:1 Important Safety Notes

To obtain the best possible performance and trouble free operation from your Heater, it is important that you read these instructions carefully. Your Pool Heater has built-in safety features, which are detailed in the relevant section of this manual.

If it is known or suspected that a fault exists on the Heater, it **MUST NOT** be used until the fault has been corrected by a competent engineer (see **Section 1:10**, Trouble Shooting - Failure to Start)

It is essential that these instructions are strictly followed for safe and economic operation. Failure to observe these instructions may invalidate your right to free breakdown cover during the guarantee period.

We recommend that you keep these instructions in a place near your Heater for easy reference.

1:2 Connections

Your Heater should be connected to an electrical supply complying with the Electrical Wiring Regulations (BS7671): as well as a gas supply complying with BS6891; and an appropriate flue system.

ALWAYS SWITCH OFF THE ELECTRICAL SUPPLY before removing any of the covers for cleaning.

If any part of the Heater or its flue is modified then the guarantee will be invalidated.

1:3 Quick Start

Check the Electricity and Gas supplies to the Heater are on. If the Pool Pump is not controlled by the Heater, turn it on. Turn on the Heater by turning the Pool Temperature Control Knob clockwise to show the required Pool temperature, the Heater will fire.

If the Heater fails to light see **Section 1:10**, Trouble Shooting - Failure to Start)

1:4 Summary of Controls (left to right)

Heater Pressure Gauge

Normal - The needle should be in the area indicated as **** NORMAL ****, if low, re-pressurise, see **Section 1:5**

Flashing - The Pool Heating Demand is Met, the pool is up to temperature.

Pool Temperature Control Knob

16°C to 41°C (60°F to 106°F)

Off - There is no Pool Heating Demand, pool heating is off.

Pump - Runs Pool Pump only, if connected via heater. 'P' is indicated on Pool Temperature Display.

- **Pool +** - Setting for pool temperatures. Requested temperature is displayed when setting, actual Pool Temperature is displayed after 3 seconds.

- **Spa +** - Setting for Spa Temperatures. Required temperature is displayed when setting, actual Spa Temperature displayed after 3 seconds.

(NOTE: The Heater is delivered set to display in Fahrenheit. For a Centigrade display, see **6:3 Commissioning Section of Installation Instructions**)

Pool Temperature Mechanical Stop

Stop – This can be used to obtain a repeatable setting and to limit maximum pool temperature. To set, loosen the screw, adjust as required and then re-tighten.

Pool Temperature Display

Display - Normally shows the actual Pool Temperature, but also displays the Setting Temperature and a Setting Dot lit whilst being adjusted. The display is also used for commissioning and diagnostic purposes.

Heating Demand LED - GREEN

(Only in use when heating system connected)

Off - There is no Heating Demand, heating is switched off.

On - There is a Heating Demand, heating is on but not yet up to temperature.

Flashing - The Heating Demand is met, heating is up to temperature.

Heating Temperature Control Knob

(Only used when heating system connected)

Off - There is no Heating Demand, heating is switched off.

Normal - Normal setting for heating, it can be adjusted lower if required.

(NOTE: Supplied set for Pool Priority. It will satisfy the Pool Temperature before supplying full Heating. To change the priority, see **6:3 Commissioning Section of the Installation Instructions**)

Filter LED - YELLOW

On - Pool Filter Blocked - Insufficient pressure, possibly due to a blocked pool filter. The heater will not run.

Flashing - Clean Pool Filter - The filter may require back washing. The heater will run. Can be reset by turning the Pool Temperature knob off and back on again.

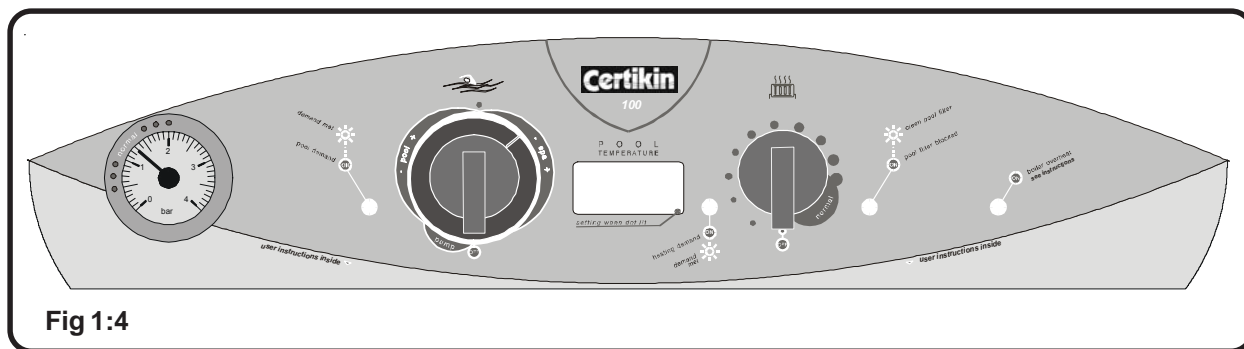


Fig 1:4

Heater Overheat LED - ORANGE

On - Heater Overheat - This indicates that the Heater has overheated and shut down. See Overheat Reset instructions below.

Overheat Reset 100 Only

In the unlikely event of an Overheat it will necessary to obtain the assistance of a competent person to reset the thermostat.

Turn the Mains supply off. Remove the single fixing screw holding the Electrical Chassis and pull it out, hanging it on the back support. Remove the Controls Cover and locate the Reset Switch on the side of the Control Chassis. Turn it off then back on again.

Replace all the panels in reverse order.

If the Heater repeated overheats a Service Engineer should be called to inspect the Heater.

Overheat Reset - 100W Model Only

In the unlikely event of an Overheat it will necessary to obtain the assistance of a competent person to reset the thermostat.

The procedure is detailed in **Section 8:2:18**

If the Heater repeated overheats a Service Engineer should be called to inspect the Heater.

Automatic Frost Protection

The Heater will automatically run a Frost Protection routine if the temperature falls below 3°C (37°F). The Pool Temperature Display will show 0°C. This will include the use of the Pool Pump if it is connected to the Heater.

1:5 Re-Pressurising

Connect a Mains Water supply then connect the free end of the braided flexible hose (the Filling Loop) (**see Fig.1.5**) to the incoming mains connector.

Open the Valve to the supply, then, slowly open the Valve on the Base Panel until the Pressure Gauge shows 1 Bar.

Close both valves then disconnect the Filling Loop.

1:6 Running the Pool Pump

If this option has been installed the Heater can run the Pool Pump on its own. Turn the Pool Temperature Control Knob to 'Pump', just next to Off.

1:7 Switching the Heater Off - temporarily

The Heater may be stopped by turning the Pool Temperature Control Knob and/or the Heating Temperature Control Knob to OFF on Control Panel.

1:8 Switching off for the Winter

Turn both Temperature Control Knobs to Off. If the built in Frost Protection is required do not isolate the Heater from its electrical supply. If the Heater is to be shut off for the Winter, it is advisable to have it thoroughly serviced when first shut down. Thorough cleaning will minimise corrosion during the idle period.

1:9 Maintenance

For normal cleaning of the outside casing, simply wipe with a dry cloth. To remove stubborn marks and stains, wipe with a damp cloth and finish off with a dry cloth. **DO NOT** use abrasive cleaning materials. A spray of WD40 or similar will also help to protect it.

The Heater must be serviced every year by a qualified service engineer.

1:10 Trouble Shooting - Failure to Start

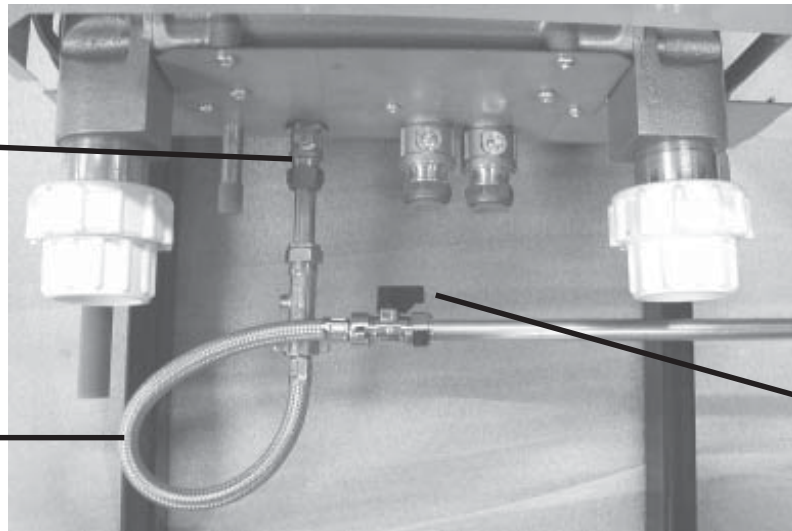
If the Heater fails to start, adopt the following procedure:-

1. Check that the Pool pump is operating and that the Filter lamp is not illuminated.
2. Check that the Heater Control Thermostat is set high enough to be "ON" and that the Pool Demand lamp is on.

100

First Valve

Filling Loop



Second Valve

100W

Second Valve

Filling Loop

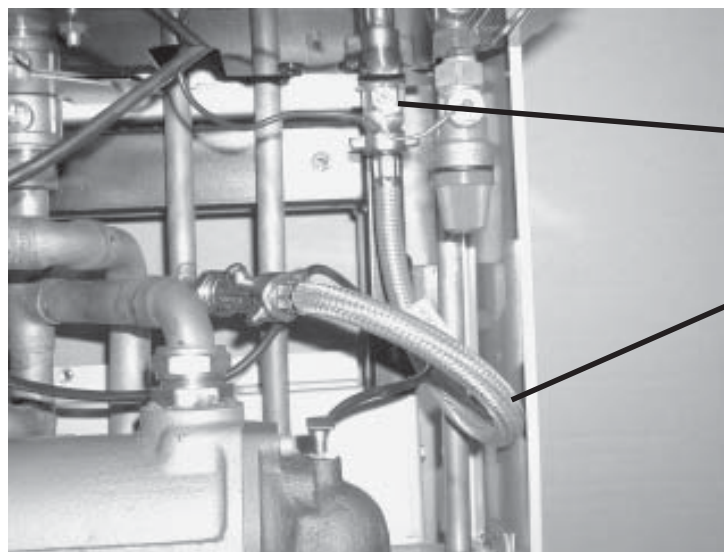


Fig 1:5

3. Check whether the Heater Overheat light on the control fascia is glowing, if so it indicates an overheat situation. **(See Section 1:4)** If the Heater repeatedly overheats a Service Engineer should be called to inspect the Heater.

1:11 Service

To ensure efficient and reliable operation of the Heater it is essential that the Heater is serviced every year. The Manufacturer recommends this is prior to starting the Heater each season.

1:12 Water Quality

Chemical imbalance can cause severe damage to your Heater and associated equipment. Maintain the pool water pH between 7.4 and 7.6 and ensure that the free chlorine levels are within the range recommended by the chemicals manufacturer for your size of pool. Check the Filter regularly and keep the pool free of debris such as leaves and grass cuttings.

2 INSTALLATION

2:1 Introduction

This Manual covers Operation, Installation, Commissioning and Maintenance of the 100 and 100plus Condensing Pool Heater.

The Pool Heater is :-

- Designed for heating pools and Spas by utilising an internal water to water heat exchanger.
- Incorporates its own sealed system components; pressure vessel, filling loop, safety valve, and pressure gauge.
- Can also be used for space heating.
- The 100 Plus also provides Instantaneous Hot Water.
- Supplied with a manual reset limit thermostat.
- Suitable for new installations and for replacing existing Heaters.
- Includes an internal automatic bypass to accommodate all likely Space Heating designs.

These Instructions are for a Gas Fired, Condensing Pool Heater which are room sealed and fan assisted on the flue side. The flue system available is Twin Pipe, horizontal total combined length of 22 metres or vertical, up to a total length of 30 metres. The ignition system is fully automatic. The 100 plus incorporates electronic gas modulation.

The Heater casing is of polyester powder coated enamelled zinc coated steel.

Includes all the components required for a sealed system including a pump and is designed for the connection of an optional Heating or Hot Water system.

It includes a pump overrun device and an automatic bypass valve.

There is no requirement for a scale reducer to be fitted to the cold water mains supply to the 100 Plus.

The Heater contains integral frost protection, the Heater will fire if the temperature within it approaches 4 to 5 degrees Centigrade. It will do this even when turned to Off, and can only be inhibited by removing the Permanent Live supply to the Heater.

Adequate arrangements for completely draining the system, by provision of drain cocks MUST be provided.

2:2 Standards & Regulations Gas Safety (Installation and Use) Regulations, (as amended).

It is the law that all gas appliances are installed by a competent person (e.g. a CORGI registered operative) 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 the law is complied with. The installation of the Heater MUST also be in accordance with the current I.E.E.. Wiring Regulations, the Local Building Regulations, Building Standards (Scotland), the Bye Laws of the Local Water Undertaking, any relevant requirements of the Local Authority, and Health and Safety document No 635, "Electricity at Work Regulations".

Detailed recommendations are contained in the following British Standard Codes of Practice.

Codes of Practice.

BS.6798 Installation of gas fired hot water Heaters of rated input not exceeding 70kW.

BS.5449:1 Forced circulation hot water systems (small bore and microbore domestic central heating systems).

BS.5546 Installation of gas hot water supplies for domestic purpose (2nd Family Gases).

BS.5440: Part1. Flues (for gas appliances of rated input not exceeding 60kW).

BS 6891 Specification for installation of low pressure gas pipework.

BS 7074:1 Application, selection and installation of expansion vessels and ancillary equipment for sealed water systems.

Building Regulations Part L1.

IMPORTANT. It is important that no external control devices are directly connected to this appliance - unless covered by these 'Installation and Servicing Instructions' or otherwise recommended by the manufacturer. If in doubt, please enquire.

Any direct connection of a control device not recommended by the manufacturer could infringe the Gas Safety (Installation & Use) Regulations, the above regulations and the normal appliance warranty.

Manufacturer's notes must NOT be taken, in any way, as overriding statutory obligations.

Location of Heater

The Heater MUST be installed vertical and securely fixed. **The Heater is not suitable for an external installation**

Important Notice

If the Heater is to be fitted in a timber framed building it should be fitted in accordance with the British Gas publication 'Guide for Gas Installations in Timber Frame Housing', reference DM2. If in doubt, advice must be sought from the Local Gas Region of British Gas.

The Heater may be installed in any room or internal space. Particular attention is drawn to the requirements of the current I.E.E Wiring regulations and, in Scotland, the electrical provisions of the Building Regulations applicable to Scotland with respect to the installation of the Heater in a room or internal space containing a bath or shower.

Where a room sealed appliance is installed in a room containing a bath or shower then the appliance and any electrical switch or appliance control, utilising mains electricity should be so situated that it cannot be touched by a person using the bath or shower.

Where installation will be in an unusual location then special procedures may be necessary and BS.6798 gives detailed guidance on this aspect.

A compartment used to enclose the Heater MUST be designed and constructed specially for this purpose. An existing cupboard, or compartment, may be used provided it is modified for the purpose. Details of essential features of cupboard compartment design, including airing cupboard installations are given in BS.6798.

In siting the Heater, the following limitations MUST be observed:

1. The position selected for installation MUST allow adequate space for servicing in front of the Heater and for air circulation around the Heater.

2. This position MUST also permit the provision of a satisfactory balanced flue termination.

3. This position MUST also permit the provision of a satisfactory connection to the condensate drain.

2:3 If Combined With A Heating System

The Controls provide a water temperature control for use with a heating system, the Heating Demand Knob. It requires an switched live from the Heating controls to be connected to Heating Demand, as shown in the Wiring Diagram and a pipe circuit to be connected to the two rear tappings of the Heater in place of the Air Vent and Drain.

It is essential that the size of the expansion vessel in the Heater is sufficient for the proposed system Depending upon the Priority set

(See commissioning Section 6:1) the Pool or The Heating will be brought up to temperature first.

Typical circuits are as **Fig 2:3**.

2:4 Heater Controls

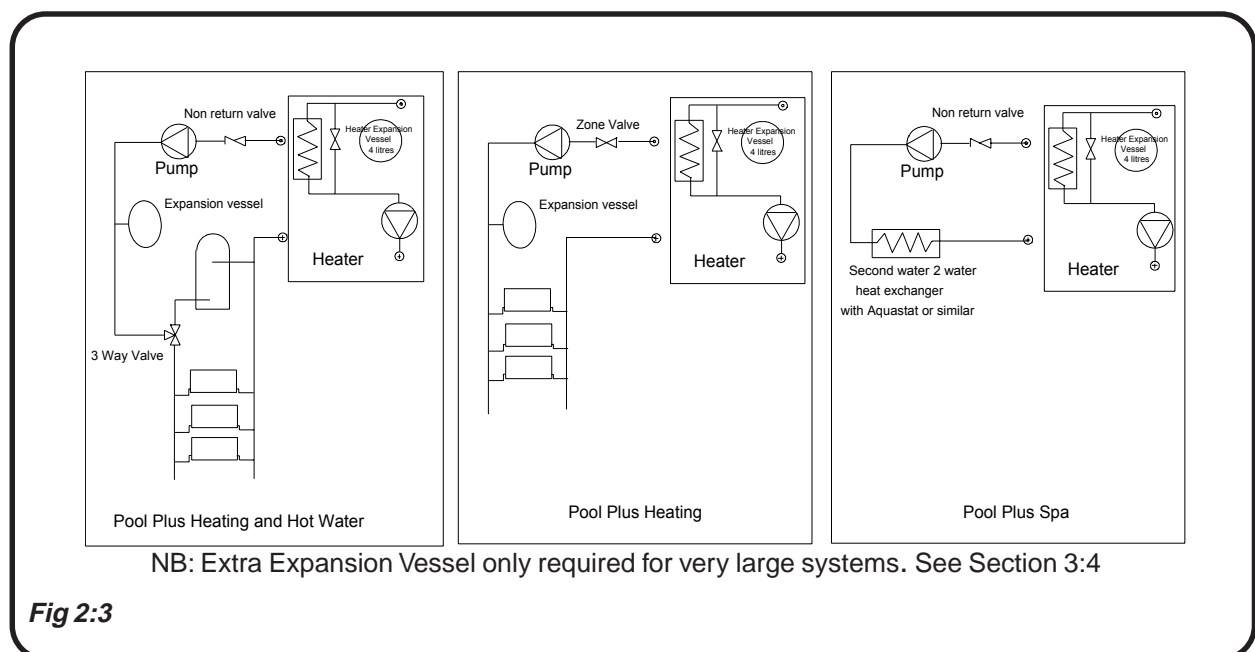
This Heater uses a control specifically designed for it and it has the following features:

A highly accurate Pool Thermostat , 16°C to 41°C (60°F to 106°F)

A Heater Thermostat. Fixed for Pool, 84°C, variable for Heating 60 - 82°C.

A Frost Thermostat which runs the Internal and Pool Pump at 3°C or below but then fires the Heater alone if the temperature has not risen sufficiently.

A Return Thermostat operating an internal bypass for condensation reduction.



An Over Temperature Thermostat (Overheat).
 Internal Pump control with run on.
 Pool Pump control with run on and out-of-season exercise. (Requires external contactor)
 Pool Temperature and Setting display. Engineer selectable °C or °F.
 User Indicators for Pool, Heating, Overheat, and Service.
 Engineer indicators of all switched outputs for simple diagnosis.
 Priority selection of Pool or Heating, engineer selectable.
 Memory of: Filter occurrences.
 Sensor failure detection and indication.
 Control self checking with fault indication.

For more detail see the **Commissioning (6:1) and Fault Finding (7:1) sections.**

2:5 Gas Supply

The Local Gas Region 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 consultation with the Local Gas Region, or by a local Gas region contractor. An existing meter should be checked preferably by the Gas region, to ensure that the meter is adequate to deal with the rate of gas supply required.
 Installation pipes should be fitted in accordance with BS.6891
 Do NOT use pipes of a smaller size than the Heater inlet gas connection.

3 FLUEING

Detailed recommendations for flueing are given in BS.5440: 1. The following notes are intended for general guidance.

1. Be aware of the plume from the flue and the wetting effect it has to adjacent property.
2. The flue can be taken upwards, left, right or to the rear of the appliance.
3. The Heater is supplied with a Twin Pipe flue suitable for terminating on an outside wall 1 metre away. More complex and lengthy flues are possible, please consult the Flue Application Guide for designs and the components.
4. The Heater MUST be installed so that the terminal is exposed to external air.
5. It is important that the terminal allows the free passage of air across it at all times.

6. The acceptable spacing from the terminal to obstructions and ventilation openings are specified in Table 1.
7. Because the flue gases and terminal are at very low temperature it is not necessary to fit a Terminal guard to protect against burns. If a guard is required for any other reason the following is recommended.

For the **Twin Flue** Terminal:

Model B (black plastic coated).

For the **Single Flue** Terminal:

Model H (black plastic coated).

All are available from:

Tower Flue Components Ltd.

Tower House.

Vale Rise.

Tonbridge

KENT

TN9 1TB

01732 351555

| Terminal Position | Minimum |
|-------------------------------|---------|
| Below window or vent | 300 mm |
| Below gutter or pipes | 75 mm |
| Below eaves | 200 mm |
| Below balcony or roof | 200 mm |
| From a window | 200 mm |
| From vertical pipe | 75 mm |
| From corners | 300 mm |
| Above ground, roof or balcony | 300 mm |
| From facing surface | 600 mm |
| From facing terminal | 1200 mm |
| From opening under a car port | 1200 mm |
| Vertically from a terminal | 1500 mm |
| Horizontally from a terminal | 300 mm |

Table 1.

IMPORTANT.

It is absolutely ESSENTIAL to ensure, in practice, that products of combustion discharging from the terminal cannot re-enter the building, or any other adjacent building, through ventilators, windows, doors, other sources of natural air infiltration or forced ventilation/air conditioning.

If this should occur, the appliance MUST be turned OFF IMMEDIATELY and the Local Gas Region consulted.

3:1 Air Supply

It is NOT necessary to have a purpose provided air vent in the room or internal space in which the Heater is installed.

Where the Heater is installed in a cupboard or compartment no air vents are required. However the User may wish to ensure that is ventilated to provide air circulation.

3:2 Water Supply

The central heating system should be in accordance with the relevant recommendations given in BS.6798, BS 7593:1992 and, in addition, for smallbore and microbore systems - BS.5449:1.

The domestic hot water system, if applicable, should be in accordance with the relevant recommendations of BS.5546.

Copper tubing to BS 2871:1 is recommended for water carrying pipework.

The Mains Water supply should be clean and able to produce the required flow rate, see the Technical Data. New pipework must be flushed through before connecting.

The 100W incorporates a strainer and flow regulator set to 8.5 l/m on the Cold Water Mains Inlet, this can be removed in countries with warm climates. The Inlet pressure should not exceed 10 bar, a reducer should be fitted if it does.

Any hot water storage cylinder MUST be of the indirect type and should preferably be manufactured of copper.

The hot water cylinder, & ancillary pipework, not forming part of the useful heating surface should be lagged, to prevent heat loss and any possible freezing, particularly where pipes run through roof spaces and ventilated underfloor spaces.

Draining taps MUST be located in accessible positions, which permit the draining of the whole system, including Heater and hot water storage vessel. Draining taps should be at least ½ in. nominal size and be in accordance with BS.2879.

3:3 Condensate Drain

Refer to Fig. 1:5, 5:1, and 10:2

A condensate drain is provided on the Heater, this drain must be connected to the household drainage point, or soakaway on site. All pipework and fittings in the condensate drainage system MUST be made of plastic. Refer to British Gas publication "Guidance notes for installation of domestic condensing boilers"

The drain outlet on the Heater is :
Polypipe, 21.5mm pushfit overflow pipe.

3:4 Sealed Systems

The Pool Heater is supplied with an Expansion Vessel (see Technical Data for details), a Pressure Gauge, a Safety Valve and Filling Loop following the guidelines given in the Code of Practice BS 7074 :1.

Please check that the supplied Expansion Vessel is adequate for the proposed system. The following procedure is suggested.

1. Choose a vessel pressure by taking the static head of the system, adding 0.3 bar, and taking the nearest larger figure.
2. Select the Vessel Volume from the table below by finding the System Volume and Vessel Pressure.
3. Choose that size or larger from the manufacturers' range.

| Vessel Pressure Bar | System Volume Litres | | | | |
|---------------------|----------------------|----|----|-----|-----|
| | 50 | 60 | 70 | 100 | 150 |
| 0.5 | 4 | 4 | 8 | 8 | 12 |
| 1.0 | 8 | 8 | 8 | 12 | 18 |
| 1.5 | 8 | 12 | 12 | 18 | 24 |

Table 2.

A design as detailed below should be used for the filling connection, it utilises a BS 1010 stop valve, a double non-return valve and filling loop fitted at low level and should be installed with the approval of the local Water Undertaking.

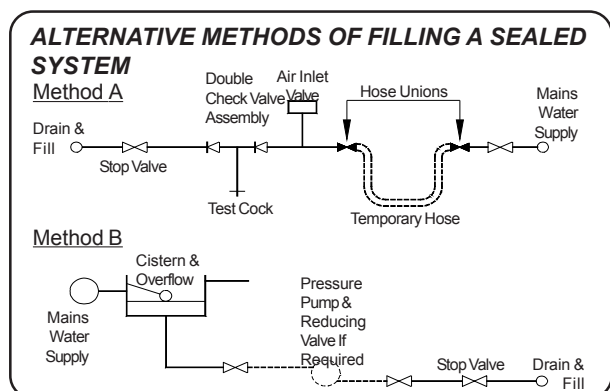


Fig. 3:4

3:5 Electricity Supply

Wiring external to the appliance MUST be in accordance with the current I.E.E. Wiring Regulations and any Local Regulations that apply.

The Heater is supplied for 230V ~ 50Hz. Single phase. Fuse rating is 3A.

The method of connection to the mains electricity supply MUST facilitate complete electrical isolation of the Heater, preferably by the use of a fused double pole switch having a 3mm (1/8in.) contact separation in both poles and servicing only the Heater and system controls.

The point of connection to the mains should be readily accessible and adjacent to the Heater, except that, for shower room installations, the point of connection to the mains MUST be situated outside the bathroom.

Note. Where a room sealed appliance is installed in a room containing a basin or shower, the appliance, any electrical switch or appliance control utilising mains electricity should be so situated that it

cannot be touched by a person using the bath or shower.

4. INSTALLATION WIRING

4:1 Wiring

The designs below are in order of preference, the Quick Fit Pool Control Panel (CCP02) being the easiest, quickest and most comprehensive solution.

Design 4 is the least preferred as it does not utilise all the features of the Heater Control.

Heater Connections are shown prefaced with 'HTR' in the diagrams below.

| # | DESIGN | NOTES |
|---|---------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | | <p>Utilising the CCP02 "Quick Fit" Oil Pool Heater Control</p> <p>Takes full advantage of all the features of the Certikin Oil Pool Heater. Provides the fastest installation</p> <p>Pool Pump control providing overrun and Frost Protection action.</p> <p>Optional connections for Lights and Space Heating all provided.</p> |
| 2 | <p>RELAY Rated to suit pump</p> <p>More than 3 A</p> <p>Up to 3 A</p> <p>T.S = Time switch HTR = Oil Heater</p> | <p>Takes full advantage of all the features of the Certikin Oil Pool Heater. Considerable installation time.</p> <p>Pool Pump control providing overrun and Frost Protection action.</p> <p>Optional Space Heating only available with more wiring.</p> <p>Optional Lighting only available with more wiring.</p> <p>IMPORTANT: Remove link, Live to Pool Demand, in Oil Heater</p> |
| 3 | <p>T.S = Time switch HTR = Oil Heater</p> | <p>Limited application of Certikin Oil Pool Heater.</p> <p>Moderate installation time.</p> <p>No Pool Pump control, Overrun or Frost Protection action.</p> <p>Optional Space Heating only available with more wiring.</p> <p>Optional Lighting only available with more wiring.</p> <p>IMPORTANT: Remove link, Live to Pool Demand, in Oil Heater</p> |
| 4 | <p>T.S = Time switch HTR = Oil Heater</p> | <p>Non-preferred application of Certikin Oil Pool Heater.</p> <p>Moderate installation time.</p> <p>No Pool Pump control, overrun or Frost Protection action.</p> <p>Optional Space Heating only available with more wiring.</p> <p>Optional Lighting only available with more wiring.</p> |

Fig. 4:1

4:2 Installation Of Heater

Suggested procedure:

1. Position to suit system and terminal limitations.
2. Mark & Drill Flue hole(s). (see **Fig. 4:8**).
3. Remove the Electrical Tray and the Lower Case from Heater module.
4. Plumb tails to pool, gas heating and hot water.
5. Test for leaks.
6. Replace the Lower Case and Electrical tray.

Space Required for Installation and Service.

| | | |
|---------------|-------|--------|
| Right or Left | 30 mm | 1 in. |
| Above | 30mm | 1 in. |
| Below | 25mm | 1 in. |
| In Front | 450mm | 18 in. |

Table 3

4:3 Fixing the Heater

1. Position to suit system and terminal limitations.
2. Secure the frame, vertical, to the wall or floor with the brackets provided..
3. Mark the wall or ceiling for the flue exit points and core drill the wall to give a 0 to 3 degree slope down towards the Heater. The recommended core drill is 90mm for the Twin Pipe.

4:4 Terminal

The terminal can be fixed vertical or horizontal. The flue pipe must always be connected to the extended outlet of the terminal. The spacing is 120mm and a core drill of 90mm is recommended. **See Fig. 4:8**

4:5 Twin Pipe Assembly

All the Twin Pipe components for this appliance are lightweight plastic and utilise a push-fit system. Very few fasteners are required and their use is detailed on the instructions provided with the components.

Important:

All Twin Pipe Installations must comply with the following.

1. The Flue pipe must slope back to the Heater by three degrees (1 in 20) on all horizontal runs. The air pipe can be above or below horizontal.

2. Flue Pipes must be supported every 1000mm, minimum.
3. All connections should be made with the Socket end furthest from the heater.
4. Use the supplied CentraCerin or Silicone Grease to ease the fitting of sections.
5. The combined Equivalent Length of Air and Flue should not exceed 22m horizontal, or 30m vertical and including any terminal parts.
6. The straight equivalent lengths of bends in a horizontal design are as follows:
45 degrees, 1.3m.
90 degrees, 4m.

For more complex designs please see the details provided with the components

It is recommended that:

1. That 45 degree bends are always used with vertical flues and where possible used in preference to 90 degree bends in horizontal installations.
2. Straight Flue pieces may be reduced in length by cutting square. It will ease assembly if the cut edge is cleaned, chamfered and greased before insertion.

4:6 Plumbing

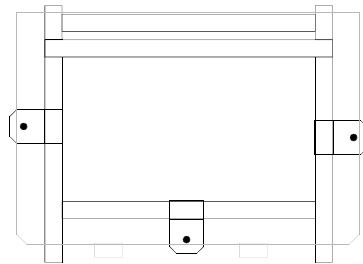
Prepare the flow and return pipe work on the base of the Heater. If the requirement for Space Heating exceeds 50,000 Btu/h (15kW), the Flow and Return pipework from the Heater must be 28mm until the heat load allows smaller bore pipework.

New pipework must be flushed through before connecting.

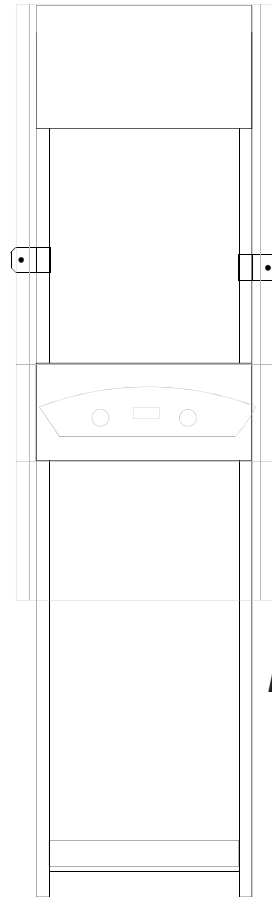
4:7 Gas Connection

The 15mm gas connection point is provided. A minimum of 20mb. (8in. w.g.) must be available at the Heater inlet, with the Heater and other connected appliances firing. Check for gas soundness (B.S. 6891: 1988) in pipework to Heater using a manometer. Open the gas cock. Gas soundness within the Heater should be checked using sense of smell and/or leak detection fluid. Check the burner bar pressure with a manometer connected to the control and adjust if required with the pressure regulator.

FIXING POSITIONS



PLAN VIEW



FRONT VIEW

Suggested fixings
3 into the floor OR
2 into the wall.

Fig.4:3

TWIN FLUE POSITIONS

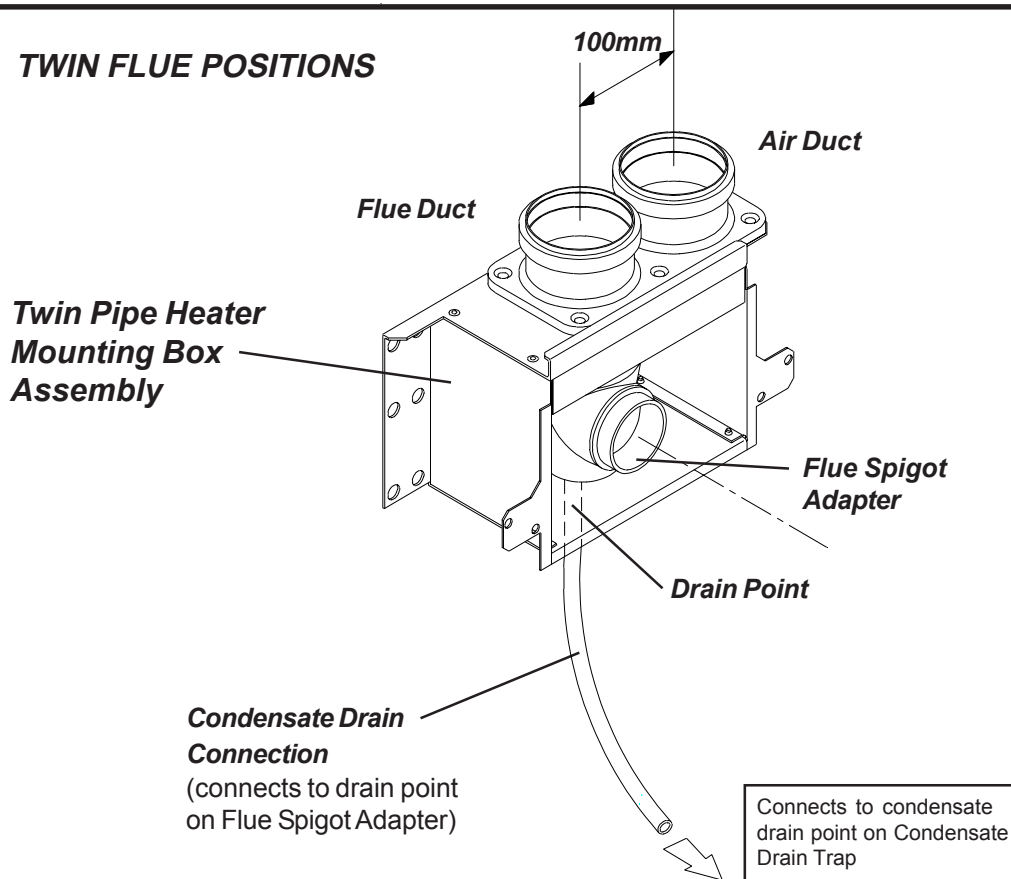


Fig.4:5

4:8 Condensate Connection

The position of the plastic condensate drain pipe is shown in **Fig 5:1**

Where possible an internal termination of the Condensate discharge pipework should be used.

Installation pipework must be in plastic to a suitable drain location with a gradient of 2.5° (45mm/ meter run) minimum. If connected to another drainage trap, an air break is required between the Heater drain and that trap. (**See Fig.10:2**). Internal runs must be in a minimum of 19mm pipe. External runs MUST be made in a minimum of 32mm pipe, starting inside the building, and if possible insulated to defer problems from freezing.

Whichever method is used it should be checked during commissioning to prove there is a leakfree working connection from the Heater to the drain. The simplest way to do this is to carefully pour some water into the Heater flue and check it emerges at the drain.

The British Gas booklet "Guidance for the installation of Domestic Condensing Boilers" should also be referred to.

5 SPACE HEATING

5:1 Typical Radiator System Design

General Principals

No special requirements are need for the selection of radiators, normal sized radiators are acceptable.

The Manufacturer recommends using a programmable room thermostat, alternatively a separate room thermostat and timeswitch can be used.

The Heaters include a pump overrun device so it is essential that there is an open circuit for water to flow between the flow and return. An Automatic Bypass is incorporated in the appliance which should be sufficient for most system designs.

The Heater includes integral frost protection. If the temperature approaches freezing it will first try and use the heat in the pool by running the Pool Pump. If this does not raise the temperature it will run the Heater. It will do this even when turned to Off, and can only be inhibited by removing the Permanent Live supply to the Heater.

Thermostatic radiator valves can be used.

The Heater Pump is factory set at Speed 3 and should not be alterered.

The Heater waterside is completely copper so all

good corrosion inhibitors are suitable. Inhibitor is not required for Pool only applications.

The design temperature difference across the Heater for optimum operating efficiency is 20°C. If thermostatic valves or zone valves are used ensure the minimum flow shown in the **Technical Data on page 1** is possible.

5:2 Electrical Connections

WARNING: The appliance MUST be earthed.

All wiring for the Heater and system controls MUST conform to I.E.E. Wiring Regulations, and work should be tested using a suitable meter, for Earth Continuity, Polarity, Short Circuit and Resistance to Earth.

The supply must be through a common isolator, a double pole 3A fused isolating switch with a contact separation of 3mm minimum on both poles. The cable used should be no less than 0.75mm² to BS.6500 PVC, 3 core, and fixed ensuring the earth connection is longer than the Live and Neutral.

Access to the Heater connections is made by sliding out the bottom tray which is held by magnets, removing the single screw retaining the Electrical Tray then releasing the screws retaining the Chassis Cover.

The Heater internal wiring is shown in **Fig.5:2a & Fig. 5:2b**.

Connections are made by push fit connectors Connections are as follows :-

3 Way Terminal

Earth
Neutral
Permanent Live

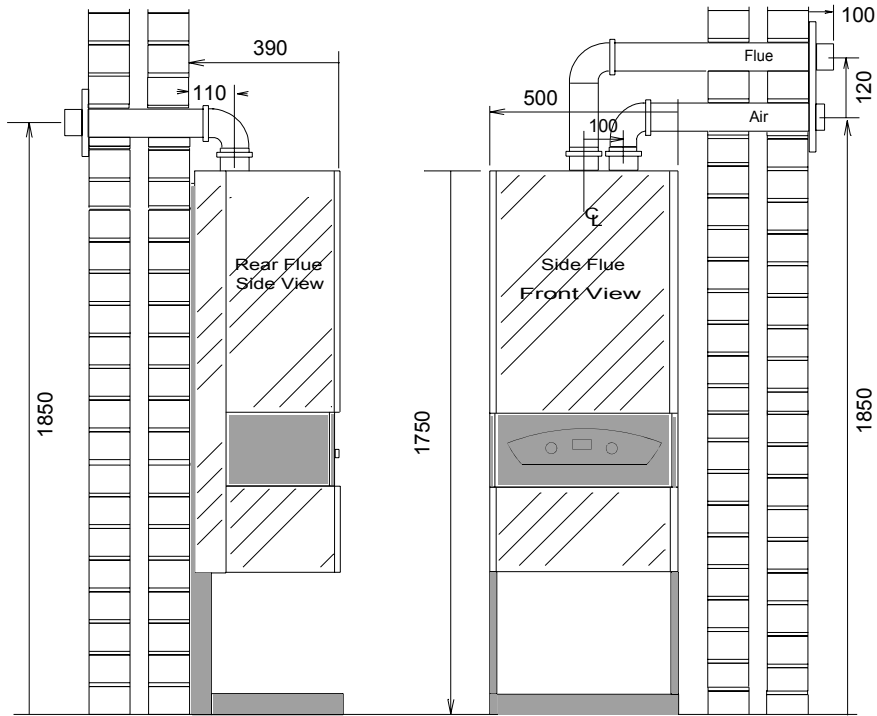
4 Way Terminal

Pool Pump
Neutral
Heating Demand
Pool Demand

A link is factory fitted between the Permanent Live and the Pool Demand and should be removed if a separate switched supply is provided for Pool Heating.

For systems using an external programmer, the electrical wiring should follow the relevant control manufacturer's recommendations, with the switched live from the controls returning to Pool Demand and/or Heating Demand in the 4 way push-fit connector.

INSTALLATION DIMENSIONS FLUE POSITIONS AND SERVICE ACCESS



Twin pipe
 Suggested core drill 90mm
 Equilant lengths: Minimum 200mm
 Maximum 22m horizontal
 Maximum 30m vertical
 90° bend = 4.0m 45° bend = 1.3m

Service Access
 Front 450mm Above 30mm
 Sides 30mm

Fig 4:8

100

HEATER HYDRAULIC SCHEMATICS

100W

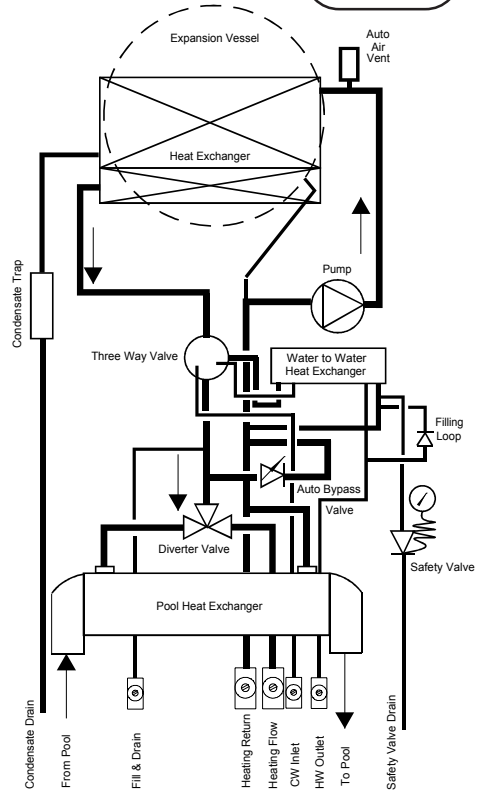
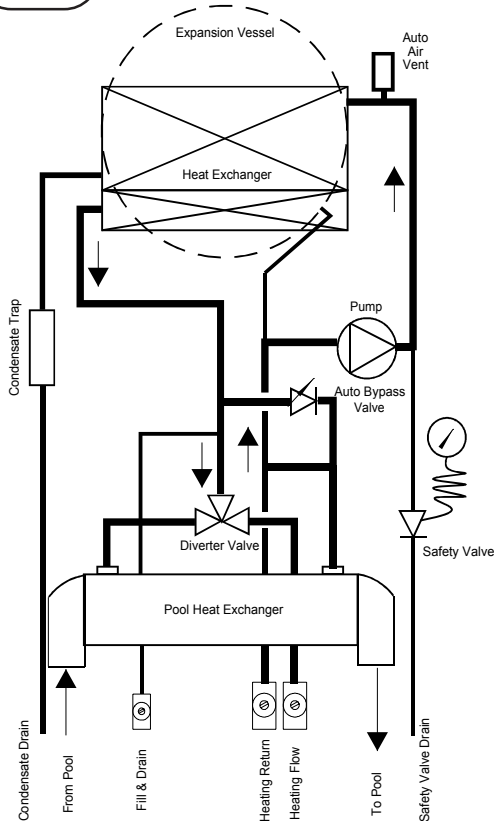
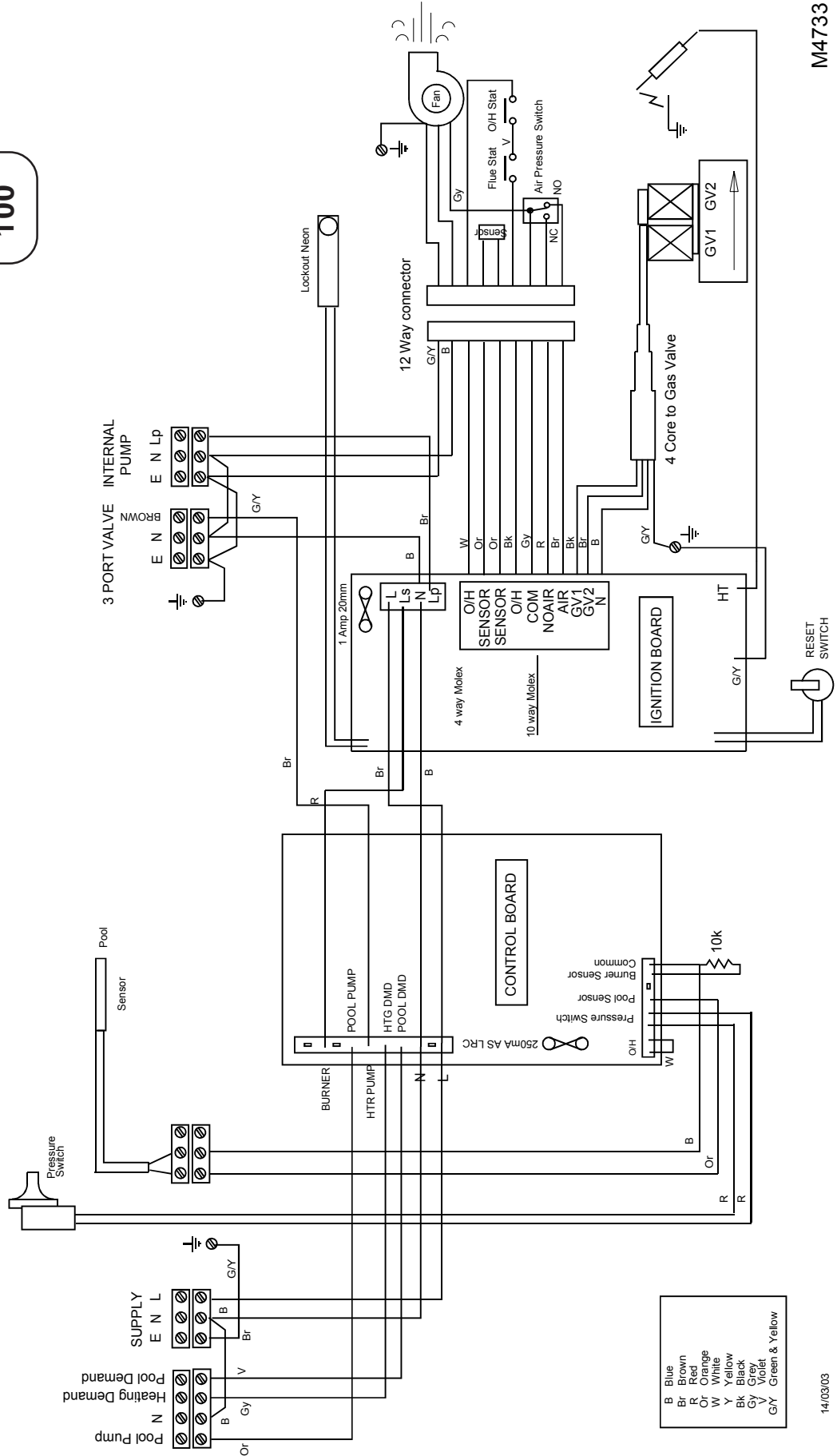


Fig. 5:1

SCHEMATIC WIRING

100



M4733

Fig.5:2a

14/03/03

SCHEMATIC WIRING

100W

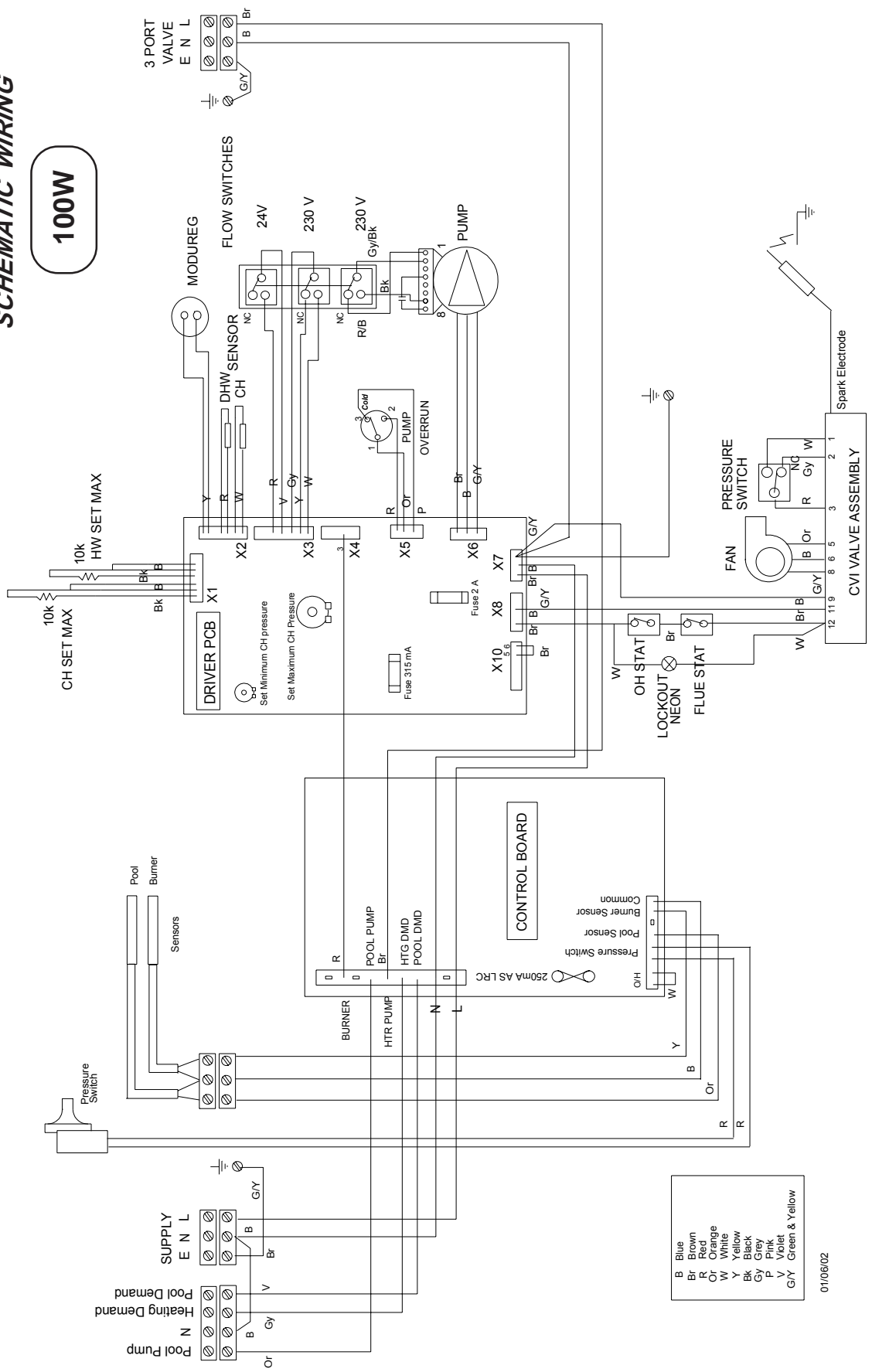


Fig.5:2b

6. COMMISSIONING

6.1 General Information

For Systems with Space Heating

The elimination of air from systems is essential to minimise the occurrence of heat exchanger and general system noise.

Metal swarf and flux chemicals make a very aggressive mixture, the destructive nature of which can be drastically reduced by flushing. Consequently this is a mandatory step in the commissioning procedure.

Low water content, fabricated Heaters are vulnerable to damage by air, particularly when the system water is 'hard'. (Contains a lot of dissolved calcium salts). The result of this damage is evident in noisy Heaters and reduced service life.

Removal of air from a system mainly takes place when the water is stopping, starting or not moving at all. It is removed most easily when it is in large bubbles, but the action of the pump is to chop it up so that it becomes a foam, which is extremely difficult to remove.

Two or three second bursts on the pump at the initial stage will reduce the risk of foam formation.

Sloping the pipe runs towards the vent points will greatly aid air removal. Sloping pipes are not just a feature of gravity systems but can greatly aid the pumped system because air can move towards a vent when the pump stops.

Air is dissolved in water but is released when heated. Always run a system at maximum temperature for at least 15 minutes to enable this potential problem to be removed during commissioning.

6.2 Procedure

MODEL 100 ONLY: If the Heater has just been filled with very cold water, the built in Frost Thermostat could attempt to fire it, if it has a permanent live and no switched live, this is completely normal. It is recommended that the gas cock is turned off during this early stage.

Pool Only Systems

There is an Automatic Air Vent inside the Heater, ensure that the cap is open before filling with mains water through the Filling Loop.

With the gas off, run the heater to circulate the water and remove the air. Turning the supply on and off will pulse the pump and help the air to rise to the Automatic Air Vent.

When completely clear of air, re-pressurise and remove filling loop.

Turn the gas back on. The Heater is ready for use. The Heater is fitted with automatic ignition and will start when the gas cock is open, Mains is connected to the Heater and the controls are calling for heat.

For the Model 100 only: It has a built in delay, and the Heater can be held off for 120 seconds. However, for commissioning purposes, switching off using the System Isolating Switch will avoid the delay.

For Systems with Space Heating

It is strongly suggested that the following stages of commissioning are followed, and not an immediate connection of all services. This procedure prevents substantial amounts of air being dispersed through the system as small bubbles.

Carry out electrical tests as stated in Electrical Connections if not already done so.

With all radiator valves open, fill the system from the Filling Loop, but do not start the pump.

With the temporary hose connected, fill from the mains supply, then follow the procedure below.

Check for water soundness and rectify where necessary.

DO NOT TURN ON GAS

Drain the system by opening all draincocks. This will flush the system of flux and swarf.

Pour $\frac{3}{4}$ of the inhibitor in and fill the system with clean water and vent air from radiators and pipework.

Pour in all the inhibitor, and fill to required pressure plus 0.3 bar to allow for venting.

Switch on the electrical supply to the Heater and switch the programmer ON.

Switch OFF after about five seconds and vent all points again.

Repeat this for 5 minutes.

Re-pressurise if required.

Turn on pump (do not turn on gas) and run for at least 30 minutes.

Stop pump at five minute intervals and vent until no more air can be removed and air noises are no longer produced at the Heater. While the system is venting check again for water soundness.

TURN ON THE GAS

Check for gas soundness (BS 6891) in pipework to the Heater using a manometer.

Open the gas cock and after purging the system, the Heater will light automatically.

Run the system at maximum thermostat setting.

Gas soundness within the Heater should be checked using sense of smell and/or leak detection fluid.

Continue running for 15 minutes, venting every 5 minutes.

The Main Valve gradually raises the pressure to the set point. Allow at least 60 seconds for the Model 100 and 100 seconds for the Model 100W for the final pressure to stabilise. NB The Pilot has no adjustment.

IMPORTANT. It is essential when setting the burner pressure that the inlet pressure is at least 20 mbar with the Heater and any other connected appliances running.

Check the burner pressure is correct by using a manometer connected to the control. **(See the Datable inside the cover, the chart below and Fig.6:2a & 6:2b)**

The pump speed is set by the Manufacturer at £ and should not be changed.

Re-pressurise to required pressure.

With the system hot, check again for water soundness. Refit the case to the Heater. Add remainder of corrosion inhibitor. If there is a Space Heating system balance in the normal way to obtain even heating of all radiators.

If fitted, set the cylinder thermostat to 60°C, or lower if preferred.

Complete the Logbook and pass to the user when explaining and demonstrate the operation of the system. Their instructions are in the first pages of this Installation Instructions.

Note: The Heater is fitted with a syphon trap that includes a blocked drain detection device. This is to safeguard the Heater and help defer the effects from the possible freezing of the condensate pipework in extreme weather.

The user should be made aware of this feature and, that in the event of blocked condensate pipework, for example frozen condensate pipework, the Heater will automatically stop functioning. It will start again as soon as the blockage has cleared.

COMMISSION CHECK LIST (HYDRAULIC)

The key points which must be observed closely, are shown below.

- * With radiator valves and vents open fill the system.
- * **Do not use pump. Do not light gas**
- * Check for and rectify leaks.
- * Drain to flush system.
- * Refill system, adding $\frac{3}{4}$ of the inhibitor.
- * **Do not light Heater.**
- * Vent all radiator and air release points.
- * Run pump for 5-10 second bursts and revert.
- * **Do not light Heater.**
- * Run pump for at least 30 minutes.
- * Stop at 5 minute intervals to vent.
- * Continue venting until no more air noise can be heard.
- * Light Heater and run at max thermostat setting. Continue for 15 minutes, venting every 5 minutes.
- * Add remainder of inhibitor.

Rating Table(1040 Btu/ft³) (38.8 MJ/m³)

| <i>kW</i> | <i>Btu/h</i> | <i>sec/ft³</i> | <i>m³/2 mins</i> |
|-----------|--------------|---------------------------|-----------------------------|
| 22 | 75064 | 49.9 | 0.0680 |
| 24 | 81888 | 45.7 | 0.0742 |
| 26 | 88712 | 42.2 | 0.0804 |

Table 6:2

100 GAS VALVE

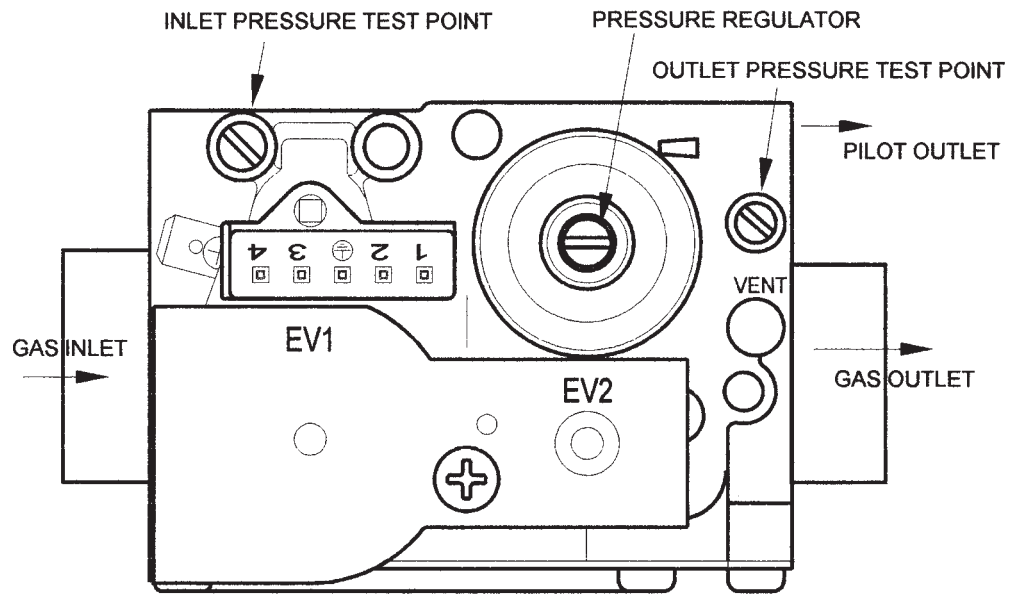


Fig 6:2a

100W GAS VALVE

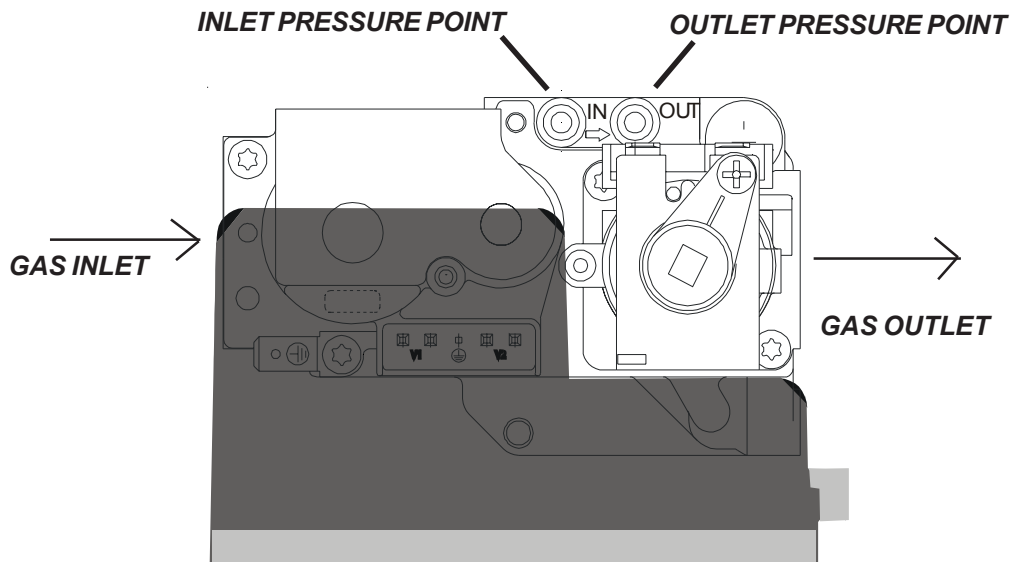


Fig 6:2b

6.3 SETTING UP THE CONTROLS

It is recommended that you familiarise yourself with the functions of the Control. These are detailed in the **User Instructions Section**, and the **Heater Control Section**.

There are two options that should be set to suit the user and it also recommended that the Fault Logs are cleared.

1. The display is factory set for Fahrenheit Centigrade, it can be altered to show Centigrade.
2. If the Heater is also providing Space Heating/DHW, the factory setting of Pool priority may want to be changed to Heating priority. Priority means, whichever is chosen has to be up to temperature before it heats the other.

These settings can be altered, and other data viewed in 'Setup Mode'

PROCEDURE TO ENTER SETUP MODE

To enter Setup Mode turn both Temperature Control Knobs to OFF.

The following must be carried out within 5 seconds.

1. Turn on the Mains supply to the Heater.
2. Turn the Pool Temperature Control Knob ON.
3. Turn the Heating Temperature Control Knob ON.
4. Turn the Pool Temperature Control Knob OFF.
5. Turn The Heating Temperature Control Knob OFF.

The Control is now in 'Setup Mode' and displaying the Heater temperature. Additional data is displayed as the Pool Temperature Knob is rotated. **See Fig. 6:3 & Table 6:3**

Settings that can be altered are changed by turning the Heating Temperature Control Knob On or Off.

To leave 'Setup Mode' and retain the new settings, turn off the Mains supply for a few seconds at any time.

Note: At power-up the Display is also used to show fault conditions. If an unexpected display is shown please check the Fault Finding Section 10:2.

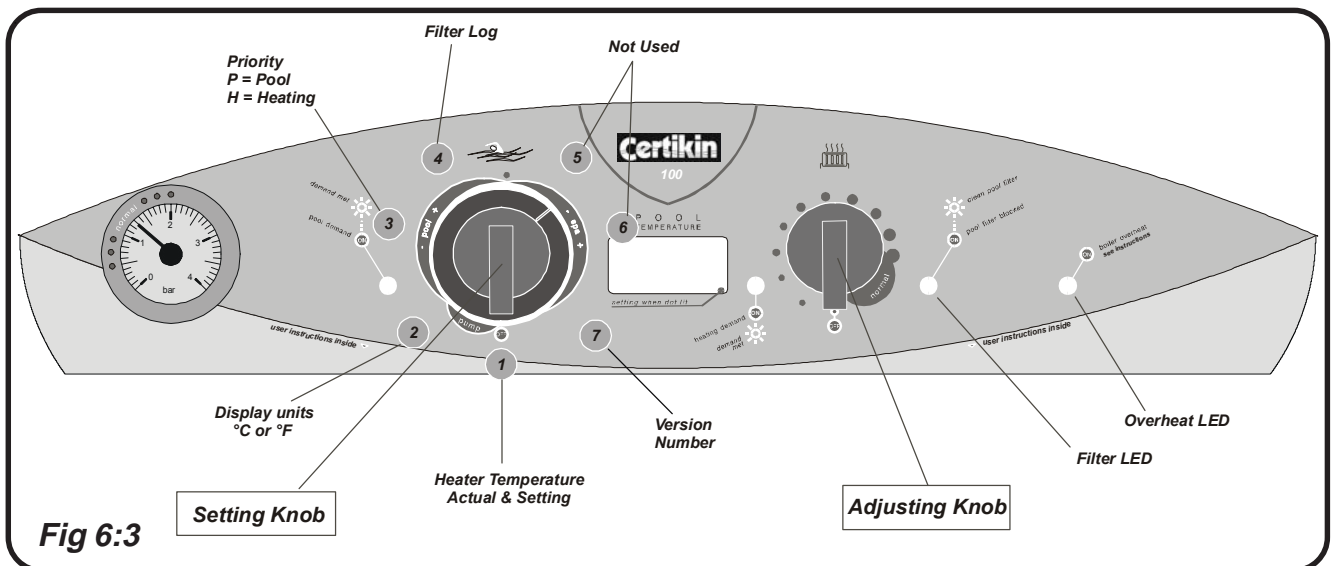


Fig 6:3

Table 6:3. Control Display in Setup Mode.

| Setting | Heating Knob On or Off | | Fascia Indicator |
|-------------------------|------------------------|--------------------|----------------------|
| 1 Heater temperature * | Actual temperature | Set temperature | e.g 20 & 70 |
| | Factory setting | Alternative | |
| 2 Display Units | °F = Fahrenheit | °C = Centigrade | °C or °F |
| 3 Priority | P = Pool | H = Heating | P or H |
| 4 Filter Pressure log # | Number of Operations | Resets to zero | Yellow Filter LED On |
| 5 Not used | | | |
| 6 Not used | | | |
| 7 Version Number | — | — | e.g. 010 |

* In this position with the Pool Temperature Control off, the Heater can be run for test purposes, if there is a Space Heating demand, by turning On the Heating Temperature Control Knob.

Reset the log by turning the Heating Temperature Control Knob On or Off.

6.4 Pump Pressure Switch

The pressure switch, ensures that the heater operates only when the filter pump is in operation. It is factory set at 0.12 bar (1.75 PSI) for deck level installations. When the heater is located below the level of the spa or pool, it may be necessary to reset the pressure switch to compensate for the no-flow static head. If it is necessary to reset the pressure switch, we recommend the following procedure:

PUMP PRESSURE SWITCH ADJUSTMENT

1. With pump and heater on, turn adjustment knob **clockwise** until a click is heard from the gas valve.
2. Turn adjustment knob **counter clockwise** $\frac{1}{4}$ turn.
3. Turn pump off and on several times. Heater should shut off immediately. If it does not, repeat steps above until proper adjustments is made.

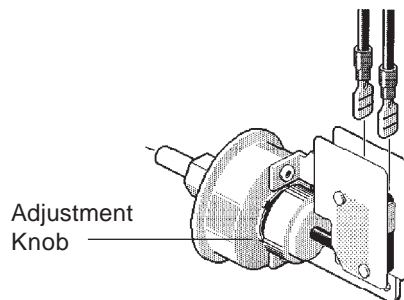


Fig. 6:4a

NOTE: If heater is installed outside of the limits shown below, a flow switch must be used in place of the pressure switch when mounted and wired adjacent to the heater.

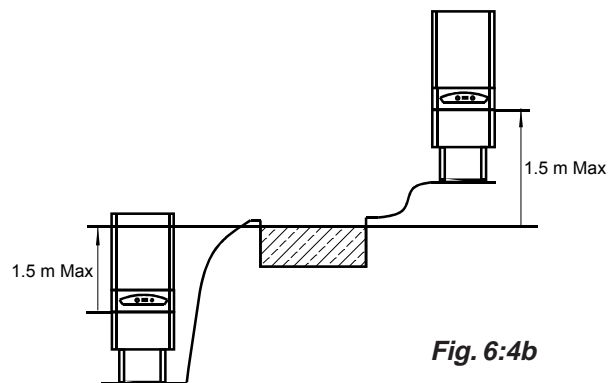


Fig. 6:4b

TWO SPEED PUMPS

In some cases, the flow on the low speed is insufficient to operate the heater. This is apparent when the pressure switch cannot be further adjusted or if the heater makes banging noises. In these cases, the pump must be run at high speed when heating the water.

CAUTION: Do not operate the heater without the function of a properly adjusted pressure switch or flow switch.

6.5 Responsibility

It is the responsibility of the Installer to ensure that the Heater is properly commissioned. It is essential that the commissioning procedures detailed in this manual are carried out by a qualified engineer.

7: FAULT FINDING

7:1 Heater Control

If the Heater fails to start, make the following checks.

1. Is the mains electricity supply switched On?
2. Is there a Demand for Pool or Space Heating?
3. For Space Heating is the Heater Thermostat set to the desired temperature?
6. Check the fuses which should have been fitted to the mains electricity supply to the Timeswitch/Heater. If the fuse has blown. Replace it. If it blows again, call a Service Engineer.
7. Is the Filter LED lit? If it is, check Pool Pump is running and the Filter is not blocked.
8. Is the Overheat LED lit? If it is press the Reset on the Control Panel.

If the fault is not permanently corrected by one of these actions it is likely that a component is faulty and will need replacing. This should only be carried out by someone competent to do so.

IMPORTANT - ELECTRICAL SAFETY

IT IS ESSENTIAL THAT BEFORE ANY PANELS ON COMPONENTS ARE REMOVED FROM THE HEATER, THAT THE MAINS ISOLATOR IS SWITCHED OFF.

7:1:1 Control Fault Diagnostics

Before commencing a diagnosis it is recommended that you familiarise yourself with the functions of the Controls. These are detailed in the **Users Instructions Section 1:4** and in **Heater Control, Section 2:4** The Control will diagnose and display most of its own faults.

Self Check

The Control does a full self check during power up. It also briefly lights all the LEDs and the Temperature Display so they can be checked for operation.

Demand Inputs

The front panel LEDs for Pool Demand and Heating Demand are triggered from the Mains Inputs and the chosen Priority. If they are not lit check the supplied voltage, connections and Priority setting.

Relay Outputs

LEDs on the Control Board, beside the relays, are directly connected to the relay outputs and show if there is an output voltage to the Burner, Internal Pump or Pool Pump. If they are not lit check the output voltages, if correct replace the board. If lit, check voltage at the component, replace if correct.

Displayed Faults

The Control board detects and displays certain fault conditions. The display alternates between two codes.

| Display | Reason | Action |
|----------|-------------------------------------|----------------------------------------------------------|
| Err / No | <i>Control board fault.</i> | Power Off then On again. If not corrected replace board. |
| Oc / thb | <i>Boiler sensor Open Circuit.</i> | Check connections, if correct, replace sensor. |
| Oc / thp | <i>Pool sensor Open Circuit.</i> | Check connections, if correct, replace sensor. |
| Sc / thb | <i>Boiler sensor Short Circuit.</i> | Check connections, if correct, replace sensor. |
| Sc / thp | <i>Pool sensor Short Circuit.</i> | Check connections, if correct, replace sensor. |

Log

The Control keeps a log of the number of times the Pressure Switch operates. These can be examined and reset to zero in Setup Mode. The Temperature Display units and Priority can also be checked and altered in this mode.

Setup Mode

To enter Setup Mode turn both temperature control knobs to OFF.

The following must be carried out within 5 seconds.

To enter Setup Mode turn both Temperature Control Knobs to OFF.

The following must be carried out within 5 seconds.

1. Turn on the Mains supply to the Heater.
2. Turn the Pool Temperature Control Knob ON.
3. Turn the Heating Temperature Control Knob ON.
4. Turn the Pool Temperature Control Knob OFF.
5. Turn The Heating Temperature Control Knob OFF.

The Control is now in 'Setup Mode' and displaying the Heater temperature.

The Display can now show additional data as the Pool Temperature Knob is rotated. **See Fig 7:1 and Table 7:1**

Settings that can be altered can be changed by turning the Heating Temperature Control Knob On or Off.

To leave 'Setup Mode' and retain the new settings, turn off the Mains supply for a few seconds at any time.

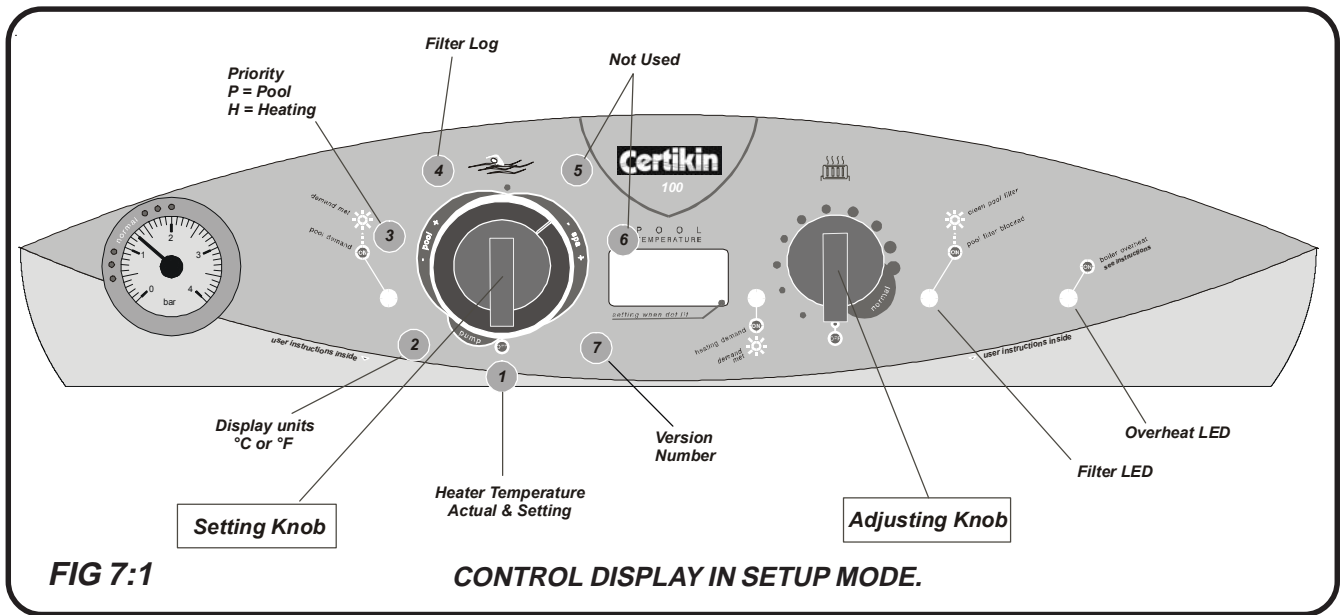


TABLE 7:1

| Setting | | Heating Knob On or Off | | Fascia Indicator |
|---------|-----------------------|------------------------|--------------------|----------------------|
| 1 | Heater temperature * | Actual temperature | Set temperature | e.g 20 & 70 |
| | | Factory setting | Alternative | |
| 2 | Display Units | °F = Fahrenheit | °C = Centigrade | °C or °F |
| 3 | Priority | P = Pool | H = Heating | P or H |
| 4 | Filter Pressure log # | Number of Operations | Resets to zero | Yellow Filter LED On |
| 5 | Not used | | | |
| 6 | Not used | | | |
| 7 | Version Number | — | — | e.g. 010 |

* In this position with the Pool Temperature Control off, the Heater can be run for test purposes, if there is a Space Heating demand, by turning On the Heating Temperature Control Knob.

Reset the log by turning the Heating Temperature Control Knob On or Off.

7.2 Ignition Faults Model 100 Only

WARNING: BEFORE COMMENCING OR COMPLETING ANY ELECTRICAL WORK ON THE APPLIANCE, IT IS RECOMMENDED THAT THE BASIC SAFETY CHECKS FOR EARTH CONTINUITY, SHORT CIRCUIT, POLARITY AND RESISTANCE TO EARTH ARE MADE. ALL WORK CARRIED OUT SHOULD FOLLOW GUIDELINES LAID DOWN BY THE I.E.E.

The Ignition sequence in the Heater is straight forward and faults can easily be traced if these simple steps are followed.

*Demand to Heat
Pool Thermostat closed
Boiler Thermostat closed
Ignition Control energised
Flue Stat closed
Overheat Stat closed
Trap not blocked
Pressure Switch open
Fan energised.
Pilot Ignition
Main Burner Ignition*

If there is a request to heat the Pool, or if connected, the Space Heating, a mains signal will appear at the POOL DEMAND or HTG DEMAND connector in the Heater.

For Pool Heating

If the Pool Thermostat Board finds the Pool is below the set temperature it will put mains on the BURNER connection of the Pool Thermostat Board. This is indicated by the LED on the Pool Thermostat Board. This is connected to the Ignition Board at its Ls, (Switched Live) connection and the boiler will then start its ignition process.

For Space Heating (if connected)

If the Pool Thermostat Board finds the Pool is up to temperature or it has been set for Heating Priority, it will put mains on the BURNER and HTR PUMP connections. This is indicated by the LEDs on the Pool Thermostat Board. The BURNER signal is connected to the Ignition Board at its Ls, (Switched Live) connection and the boiler will then start its ignition process. The HTR PUMP signal is used to move the 3 way valve to Heating.

Ignition

Both the 100 and the 100W follow the same sequence however there are indicators on the 100 to show these steps. The description below uses the 100 to describe the process.

Lamps on the edge of the Ignition Board indicate the stages in the ignition sequence. Please refer to the table inside the Heater.

Permanent live has to be connected to the L terminal then the **Power** lamp lights.

A call for heat powers the Ls terminal and the **Running** and **Pump** lamps light.

Provided the Flue Stat, Overheat Stat and Heater are cold, the fan starts up. The pressure switch detects the correct airflow and that the condensate drain is not blocked then, switches over. This is indicated by the **Fan** lamp illuminating.

The **Pilot** lamp illuminates, the pilot gas valve opens and the Ignition Control Board provides a spark at the pilot electrode. *(If the L and N supply are reversed the Heater will not progress beyond pilot ignition. This is indicated by the **Phase Reversed** neon behind the knob lighting.)*

The pilot flame is detected and the Ignition Control Board stops sparking and then energises the main gas valve and the **Burner** lamp is illuminated.

The pilot flame lights the burner, and it stays alight until turned off by the control thermostat, system controls, or in the case of a fault condition a safety thermostat.

The flue thermostat will trip if the flue exceeds a pre-set temperature. The overheat thermostat will trip if the water flow rate is insufficient, both are indicated by the **Lockout** lamp illuminating.

NOTE: The Heater has a built-in delay timer. It is indicated by the **Running** lamp flashing.

For testing, switching the Mains Supply off for a few seconds, then back on again will reset the delay.

Fault Diagnosis

The fault Diagnosis chart shows the normal and fault sequences for the Ignition Board indicator lamps.

To diagnose a fault, use the following procedure.

- Turn off the system Mains supply.
- Set all thermostats and timers to a call for heat position.
- Turn on the system Mains supply and watch the Ignition Board indicator lamps.

Compare the lamps with the diagnosis chart opposite to determine the fault and cause.

INDICATOR LIGHTS

100

| | | Fascia Indicators | | | | | Hidden phase reversed |
|-------|---------|-------------------|-----|-------|--------|---------|-----------------------|
| power | running | pump | fan | pilot | burner | lockout | |
| ~ | ⚡ | ⊖ | ⚙️ | 🔥 | 🔥🔥🔥 | 🚫 | |
| * | * | * | * | * | * | | |
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| * | * | * | * | * | * | | * |

Working conditions

- Normal operation, boiler firing
- Normal operation, boiler thermostat hot
- Normal operation, *running* flashing, boiler in delay mode (120 seconds)
- Normal operation, system satisfied, pump running on (120 seconds)
- Normal operation, no demand

Fault conditions

- Live and Neutral reversed
- Boiler not firing, controls calling
- Safety thermostat tripped.
- NB: Pump runs continuously
- No switched Live (Ls)
- No power to pump
- Air Pressure Switch not satisfied
- Stuck in delay mode if more than 120s
- Pilot valve not energised
- Pilot not established.
- Pilot not established

Cause

- No permanent Live
- Reset Overheat by turning boiler stat to off then on
- Reset Flue Stat on flue hood.
- OR
- Insufficient water flow OR Faulty Overheat Stat
- Blocked flue OR Faulty Fan OR Faulty Flue Stat.
- OR
- Flow & return reversed.
- Switched live from controls absent.
- Faulty Control board.
- Condensate trap blocked.
- OR
- Flue blocked OR Faulty Fan OR APS.
- OR
- Flue blocked OR Faulty Fan OR APS.
- OR
- Control board failed.
- Mains not applied to GY1
- No gas
- OR
- No spark OR No flame sense
- OR
- Faulty Control board OR HT lead.
- Live and Neutral reversed.

NOTE: There are other combinations of lamps that can take place during a failure.

* = Lit ⚡ = Flashing (*) = Lit or Not lit

Fig 7:2a

By using the flow charts basic problems can be identified.
 If the particular fault cannot be immediately identified, follow the charts from beginning to end
 Before commencing, always check that the Mains is ON and the system controls are calling for heat, the gas cock is open.
 Test the electrical system for short circuit, polarity, and resistance before attempting any electrical fault finding.

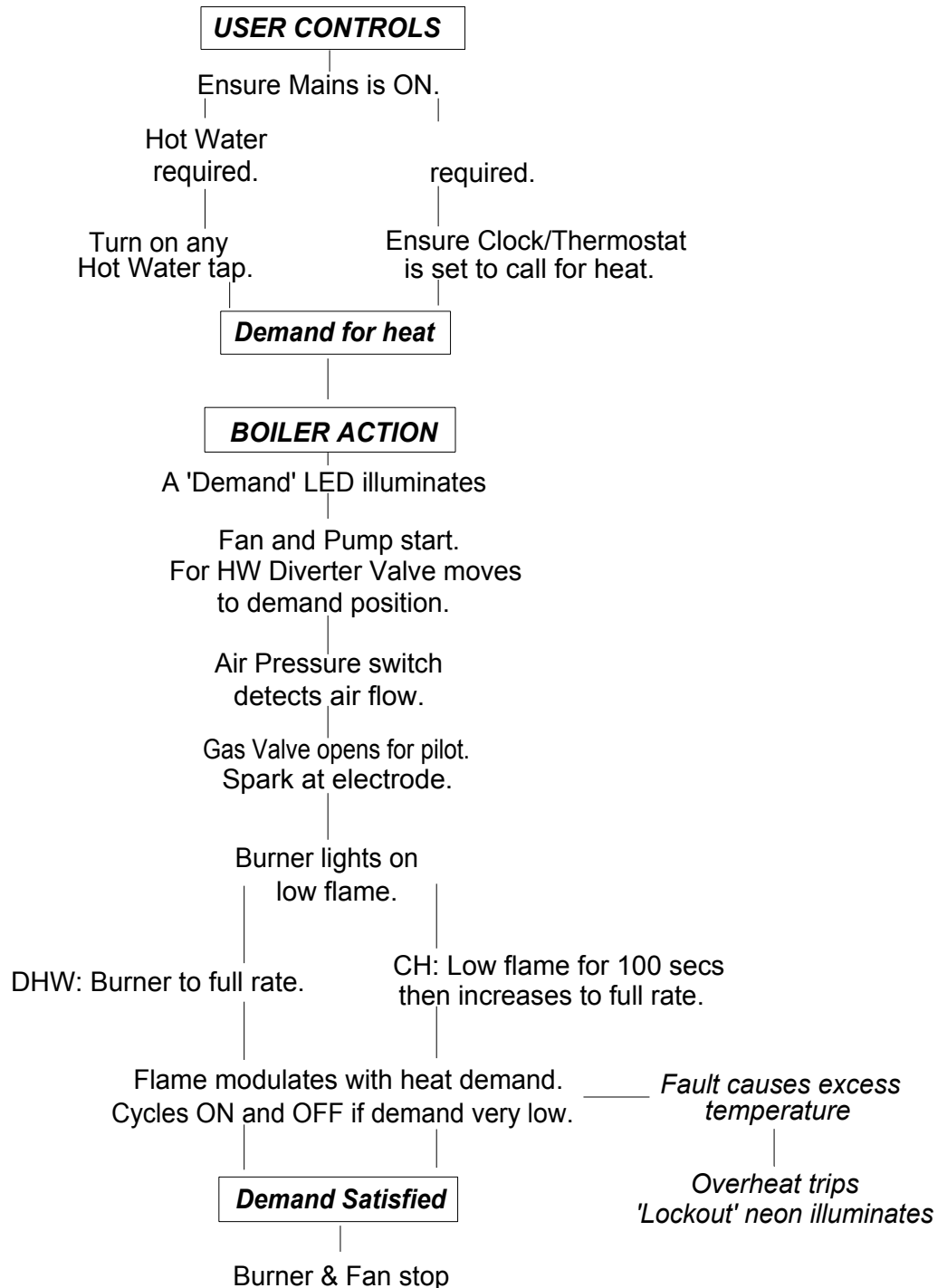
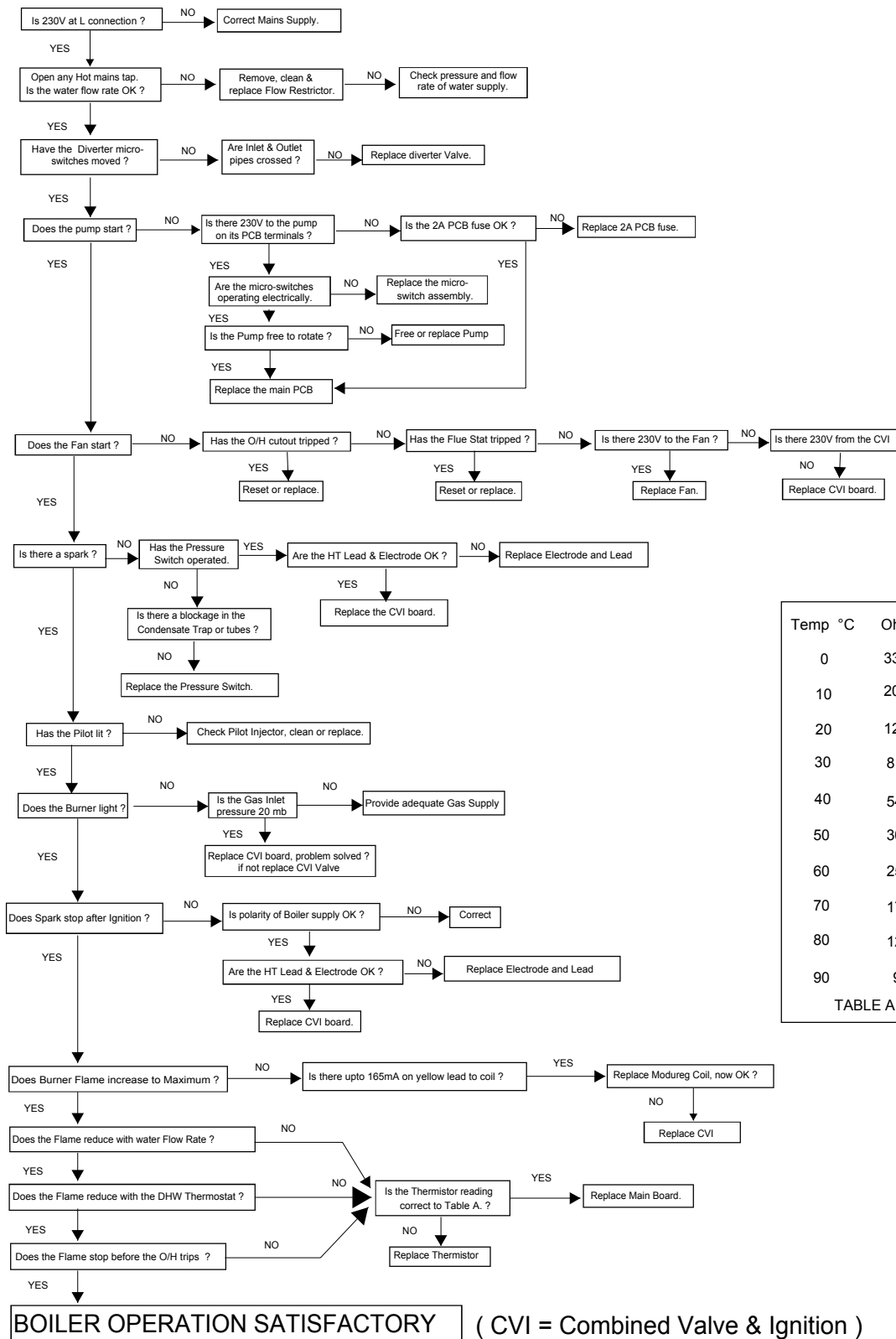


Fig. 7:2b

FAULT FINDING Hot Water Operation

Start with system and boiler cold, with the power ON and no Hot Water taps open. Then Use a hot tap to operate the boiler.



| Temp °C | Ohms |
|---------|-------|
| 0 | 33118 |
| 10 | 20198 |
| 20 | 12676 |
| 30 | 8176 |
| 40 | 5406 |
| 50 | 3657 |
| 60 | 2526 |
| 70 | 1780 |
| 80 | 1277 |
| 90 | 931 |

TABLE A

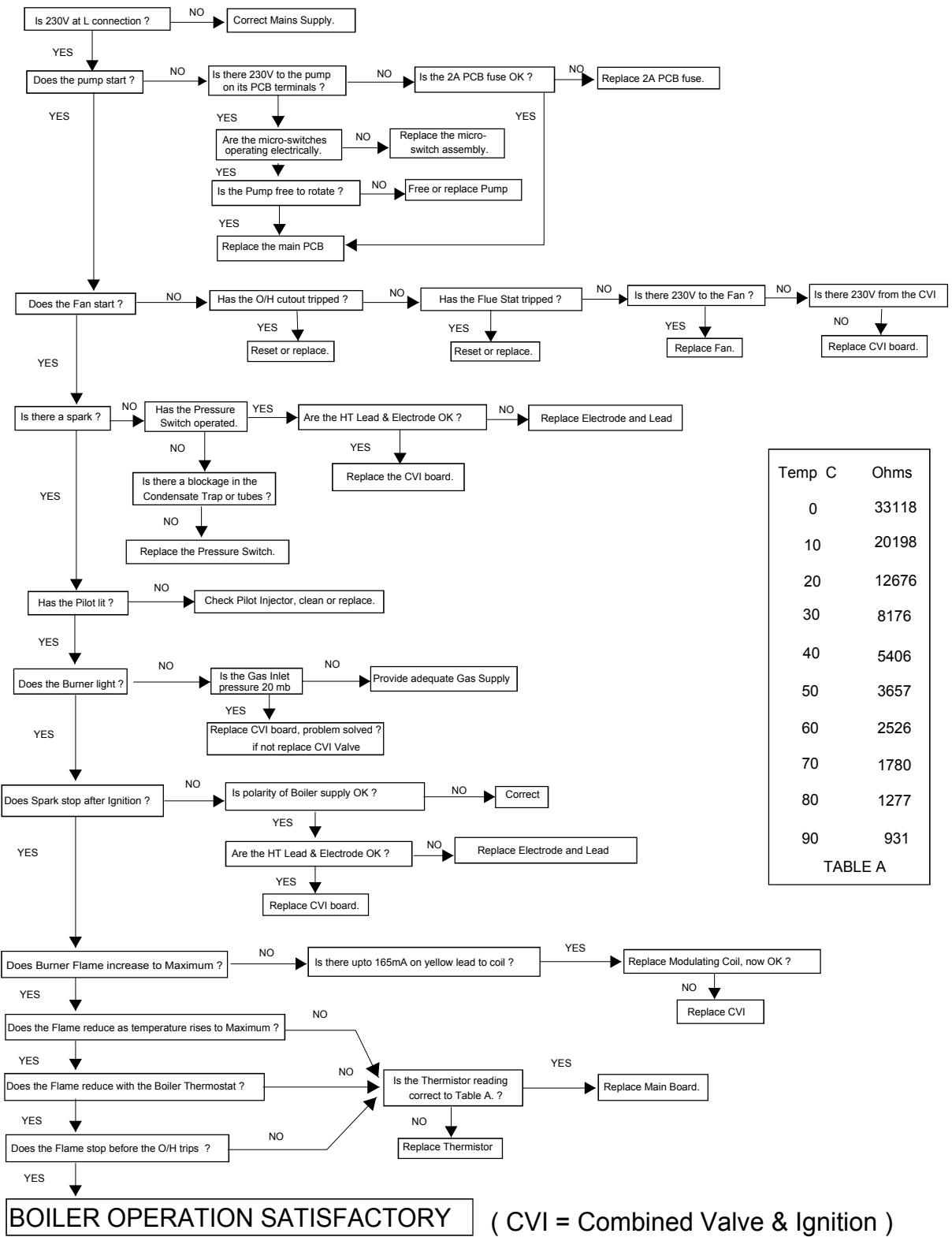
Fig 7:2c

FAULT FINDING Pool or Space Heating Operation

100W

Start with system and boiler cold, with the power ON and no Hot Water taps open.

Set the system controls to call for heat.



| Temp C | Ohms |
|--------|-------|
| 0 | 33118 |
| 10 | 20198 |
| 20 | 12676 |
| 30 | 8176 |
| 40 | 5406 |
| 50 | 3657 |
| 60 | 2526 |
| 70 | 1780 |
| 80 | 1277 |
| 90 | 931 |

TABLE A

Fig. 7:2d

8. SERVICING

8.1 Heater Servicing

Health and Safety Statement :

This product contains no asbestos.

Routine

To ensure continued efficient operation of the appliance it is recommended that it is checked and serviced at regular intervals.

The frequency of servicing will depend upon the particular installation and usage but in general once per year should be adequate.

It is law that any service work should be carried out by Corgi registered personnel.

1. Clean burner and combustion chamber.
2. Check pilot and burner gas supply.
3. Check condition of ignition sensing probe.
4. Check Heater pipework joints for leaks.
5. Check the case seals.
6. Check condensate pipework for leaks.
7. Check heat exchangers, and the flue and air duct are clear of any obstruction, and not leaking.
8. Check the Fan and its seal.
9. Check and clear the condensate exit on the secondary heat exchanger by removing the Condensate Outlet and the Inspection Covers (**Fig. 10:1**).
10. Check and clear the condensate syphon.

Follow the procedures given in Changing Components for parts removal in addition to the following notes.

Heat Exchangers

Remove the panel in front of the secondary heat exchanger to gain access to inner inspection panels on the secondary and to view the primary (the lowest inspection panel also gives a view of the primary). Also view from beneath the primary. Clean as required. If in doubt, drain the system and remove for inspection.

Condensate Syphon

With a suitable bowl to catch the water, unscrew the drain cap(s) on the underside of the Syphon Trap and drain the water. Remove any solids and replace the cap(s). (**See Fig 10:3**)

8.2 Changing Components

THERE ARE NO REPAIRABLE ITEMS, IF NOT WORKING AN ITEM MUST BE REPLACED.

The Heater is in two major sections, the Case, and the Electrical Chassis, The Major Components Diagram shows where the items are to be found. (pages 23-24)

Inside the Electrical Chassis

1. Control Boards.
2. Gas Valve.
3. Pump
4. Safety Valve
5. Pressure Gauge.

For the 100W only

6. Divertor Valve
7. Water to Water Heat Exchanger.
8. DHW Sensor.
9. Inlet Flow regulator and strainer.

Behind the Case

1. Fan.
2. Air Pressure Switch.
3. Flue Thermostat.
4. Control Sensor.
5. Overheat Cut-off Device.
6. HT Lead.
7. Pilot Assembly.
8. Burner.
9. Main Injector.
10. Combustion Chamber Insulation.
11. Primary Heat Exchanger.
12. Secondary Heat Exchanger.

For the 100W only

13. Pump Overrun Thermostat.

Servicing inside the Electrical Chassis

To Remove the Electrical Chassis

- Disconnect the electrical supply from the Heater and system.

For the 100W only:

Remove the single fixing screw.

- Slide the Electrical Tray forward a short way, then lower onto the bracket if support required.
- Remove the cover over the components.
- If complete removal required, disconnect all the leads and remove the plastic nut holding the Pressure Gauge retainer.

DO NOT STRAIN THE CABLES, USE THE SUPPORT PROVIDED.

8.2.1 Control boards

- Lower the Electrical Tray.
- Remove the screws that retains the inner cover. Disconnect all the leads from the board to be changed.

For the Pool Thermostat Only:

- Remove the Control Knobs.
 - **For the 100 Control Board Only:**
 - Release the Overheat Reset Switch.
 - Slide out the board to be changed.
 - Re-assembly is the reverse.
- NOTE** Replace the rear restraint to the Pool Thermostat board before re-fitting the board connectors.

For the 100W Control Board Only:

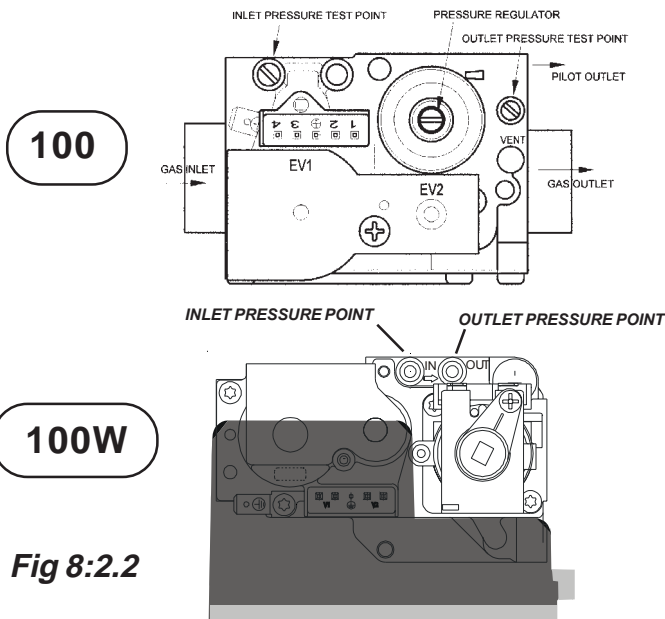
- Adjust the burner pressures. See **CVI PRESSURE SETUP** in CVI Valve section below.

8.2.2 Gas Valve - 100 Model Only

- Lower the Electrical Tray.
- Turn the Gas Cock off.
- Pull off the electrical connector from the Gas Valve.
- Release the pilot feed tube.
- Undo the four shoulder bolts at each end of the valve.

TAKE CARE TO SUPPORT THE VALVE AS IT IS RELEASED.

- Replacement is the reverse.
- When secure, attach a manometer to the burner pressure tapping on the right hand side of the valve.
- The Pilot Adjuster is factory set.
- Turn on gas and electrical supply.
- The gas valve slowly opens to its setting ensure it has fully opened before adjusting.
- Set burner gas pressure with the governor. (see **Technical Data** inside of cover.)



Model 100W Only:

832.3 Sequence Controller

- Remove the Electrical Tray.
- Identify the CVI valve, the red pod beside it contains the Sequence Controller.
- Prise off the multiway connectors from the CVI Sequence Controller pod.
- Pull off the HT Lead from the Controller.
- Pull the pod away, and replace.
- Re-assembly is the reverse.

8.2.4 CVI Valve

- Remove the Electrical Tray.
- Turn the Gas Cock off.
- Pull off the red pod.
- Pull off the two leads from the Modureg solenoid.
- Release the pilot feed tube (8mm AF).
- Undo the two screws holding the valve lower retainer.
- Undo the gas cock.
- Undo the four shoulder bolts and remove the flange to the gas cock.
- Release the CVI outlet connector, and withdraw valve.
- Re-assembly is the reverse.

CVI Pressure Set Up

- Check Inlet pressure is at least 20 mbar when operating.
- Remove the grey cover.
- Remove one of the yellow leads from the Modureg and its grey plastic cover.
- Attach a manometer to the outlet pressure tapping.
- Set to Hot Water Only, turn on a tap and check burner gas pressure is 1.8 mbar. Adjust the 9mm brass nut on the Modureg to correct.
- Replace the yellow lead and the boiler will go to high fire, 11.3 mbar. Adjust with the nylon 7mm nut on the Modureg whilst pressing down on its shaft.
- Replace the grey cover.
- Ensure the system controls are calling for POOL demand and set a Pool temperature to bring on the Heater. The Heater will fire at low rate for 100 seconds. Adjust the small potentiometer on the Driver board to 5.0 mbar.
- After 100 seconds the boiler will go to high fire, adjust the large potentiometer on the driver board to the desired maximum output, factory setting 11.3 mbar.

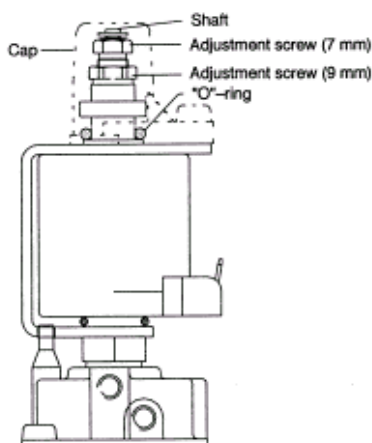


Fig 8:2.4

8.2.5 Pressure Gauge

- Remove the Electrical Tray.
- Loosen the Plastic Nut that holds Gauge retainer.
- Squeeze the top and bottom latches on the gauge, and push out of its retainer.
- Valve off the Flow and Return connections.
- Release the pressure in the boiler.
- Unscrew the pressure sensor, it may need a temporary plug to avoid leaks.
- Re-assembly is the reverse.

8.2.6 Pump

- Remove the Electrical Tray.
- Close the CH Flow and CH Return valves.
- Drain the boiler through the Fill and Drain Valve.
- Disconnect the cable at the Pump including those in the terminal strip opposite the capacitor.
- Remove the terminal strip from the old pump.
- Undo the Pump nuts and remove the Pump.
- Re-assembly is the reverse,
- Note a brown and blue have a black sleeve and these go to terminal 1 and 2 respectively. The black goes to 7.
- Ensure the fibre washers are in place.

8.2.7 Diverter Valve

- Remove the Electrical Tray.
- Close the CH Flow and CH Return valves.
- Close the DHW Cold In valve and open a Hot tap to drain the pipework.
- Drain the boiler through the Fill and Drain Valve.
- Remove the circlip on the Diverter Valve to release the switching head.
- Undo the five water connections to the valve and remove.

- Replace unit with new or factory exchange unit.
- Re-assembly is the reverse, ensure the fibre washers are in place.

8.2.8 Safety Valve

- Remove the Electrical Tray.
- Close the CH Flow and CH Return valves.
- Drain the boiler through the Fill and Drain Valve.
- Remove the Pressure Gauge from the Safety Valve.
- Undo the water connections to the Safety Valve and remove.
- Re-assembly is the reverse, ensure the fibre washer is in place.

8.2.9 Water to Water Heat Exchanger

- Remove the Electrical Tray.
- Close the CH Flow and CH Return valves.
- Close the DHW Cold In valve and open a Hot tap to drain the pipework.
- Drain the boiler through the Fill and Drain Valve.
- Remove pump and pipes for easy access.
- Undo the four water connections to the heat exchanger and pull clear.
- Re-assembly is the reverse, ensure the fibre washer is in place.

8.2.10 Flow Regulator and Strainer

- Remove the Electrical Tray.
- Close the Cold Water In valve.
- Open a Hot tap to drain the pipework.
- Remove the Mains Cold In Valve.
- Carefully prise out the Flow Regulator and Strainer (boiler side).
- Clean Strainer and restrictor.
- Re-assembly is the reverse.

8.2.11 DHW Temperature Sensor

- Remove the Electrical Tray.
- Remove the electrical connection from the DHW Temperature Sensor and unclip from pipe.
- Re-assembly is the reverse.

8.2.12 Removing the Case

- Lower the Electrical Tray.
- Undo the two M5 screws at the base of the Case.
- Lift the Case straight up about half an inch (12mm).
- Gently pull the Case straight forward off the hidden studs at the top of the Heater. (The cover hangs on two studs in keyhole slots)

- Examine the sealing strip for damage and replace if necessary.
- Place the Case somewhere safe from damage

IMPORTANT: FAILURE TO CORRECTLY LOCATE THE APPLIANCE CASE COULD RESULT IN LEAKAGE OF COMBUSTION PRODUCTS INTO THE ROOM.

8.2.13 Fan Assembly

- Lower the Electrical Tray.
- Remove the Case.
- Undo the wing nut holding the Fan Protection Hoop.
- Pull the electrical connectors off the Fan.
- Gently pull the pressure tubing off the tappings on the Flue Hood.
- Undo the two screws holding the Flue Hood and slide forward and away.
- Re-assembly is the reverse.

8.2.14 Air Pressure Switch

- Lower the Electrical Tray.
- Remove the Case.
- Pull the electrical connectors off the Air Pressure Switch.
- Gently pull the pressure tubing off the both tappings on the switch.
- Undo the M4 nut and wing nut holding the Air Pressure Switch to its bracket on to the Back Panel
- Lift off its studs and rotate out of its bracket.
- Re-assembly is the reverse.

8.2.15 Flue Thermostat

- Lower the Electrical Tray.
- Remove the Case.
- To replace pull the electrical connectors off the Flue Thermostat.
- To reset press Red Button.
- Re-assembly is the reverse.

8.2.16 Pump Overrun Thermostat

- Remove the Electrical Tray.
- Remove the Case.
- Note the three wire colours and positions.
- Pull the electrical connectors off the Pump Overrun Thermostat.
- Undo the two M4 screws holding the Thermostat.
- Re-assembly using Heat Sink Compound is in the reverse order.

8.2.17 Control Sensor

- Lower the Electrical Tray.
- Remove the Case.
- Unclip the sensor.
- Pull the electrical connectors off the Control sensor.
- Re-assembly is the reverse.

8.2.18 Overheat Cut-off Device

- Lower the Electrical Tray.
- Remove the Case.
(To Reset, Press Red Button)
- Pull the electrical connectors off the Over heat Cut-off device.
- Unscrew from its mounting.
- Re-assembly is the reverse.
- Lower the Electrical Tray.

8.2.19 Electrode and HT Lead

- Lower the Electrical Tray.
- Remove the Case.
- To Replace pull off the HT lead from the Control Board/Sequence Controller.
- Undo the left and right screws holding the Front Burner Baffle.
- Remove the front baffle.

For the 100 Only:

- Release the tube nut holding the electrode to the Pilot Burner.
- Carefully withdraw the Electrode and HT Lead.

For the 100W Only:

- Push the Electrode towards the burner and pull down and clear.
- Re-assembly is the reverse.

8.2.20 Pilot Assembly

- Lower the Electrical Tray.
- Remove the Case.
- Undo the left and right screws holding the Front Burner Baffle and remove. If access is restricted also remove the lower baffle.
- Release the tube nut holding the electrode to the Pilot Burner.
- Undo the Pilot tube from the Pilot Assembly and gently lever downwards away from the Pilot. It has to be removed and replaced with the injector clipped into position. Undo the two screws retaining the Pilot Assembly.
- Re-assembly is the reverse

NB The pilot is **not** adjustable.

8.2.21 Burner

- Lower the Electrical Tray.
- Remove the Case.
- Remove the Front Baffle.
- Remove the Combustion Chamber front by releasing the four screws.
- Undo the Pilot tube from the Pilot Assembly and gently lever downwards away from the Pilot. It has to be removed and replaced with the injector clipped into position.
- Pull off the HT lead.
- Pull the Burner forward off the two studs at the rear.
- Remove the Pilot Assembly.
- Re-assembly is the reverse.

8.2.22 Main Injector

- Lower the Electrical Tray.
- Remove the Case.
- Remove the Burner.
- Undo the Main Injector from the manifold.
- Re-assembly is the reverse.

8.2.24 Combustion Chamber Insulation

- Lower the Electrical Tray.
- Remove the Case.
- Remove the Front Baffle, then undo the four M5 screws holding the lower baffle onto the Back Panel
- Remove the Burner, as in 10.
- Undo the four screws holding the Chamber to the Back Panel and lower downwards and away.
- Replace the Insulation Panels in the Chamber.
- Re-assembly is the reverse.

8.2.25 Primary Heat Exchanger

- Lower the Electrical Tray.
- Remove the Case.
- Remove the front baffle.
- Remove or cover the Burner.
- Remove the Combustion Chamber.
- Unclip the Control sensor.
- Pull off the wires to the Overheat Cut Out device.
- Drain the Heater of water.
- Undo the flow and return connections to the Heat Exchanger and lower away.
- Re-assembly is the reverse.

8.2.26 Secondary Heat Exchanger

- Lower the Electrical Tray.
- Remove the Case.
- Remove the Flue Thermostat.
- Remove the Fan Assembly.
- Drain the Heater of water.
- Undo the flow and return connections to the secondary Heat Exchanger.
- Release the Condensate connection clamping plate.
- Undo the four screws holding the Secondary Heat Exchanger to the Back Panel and lift away.
- Re-assembly is the reverse.

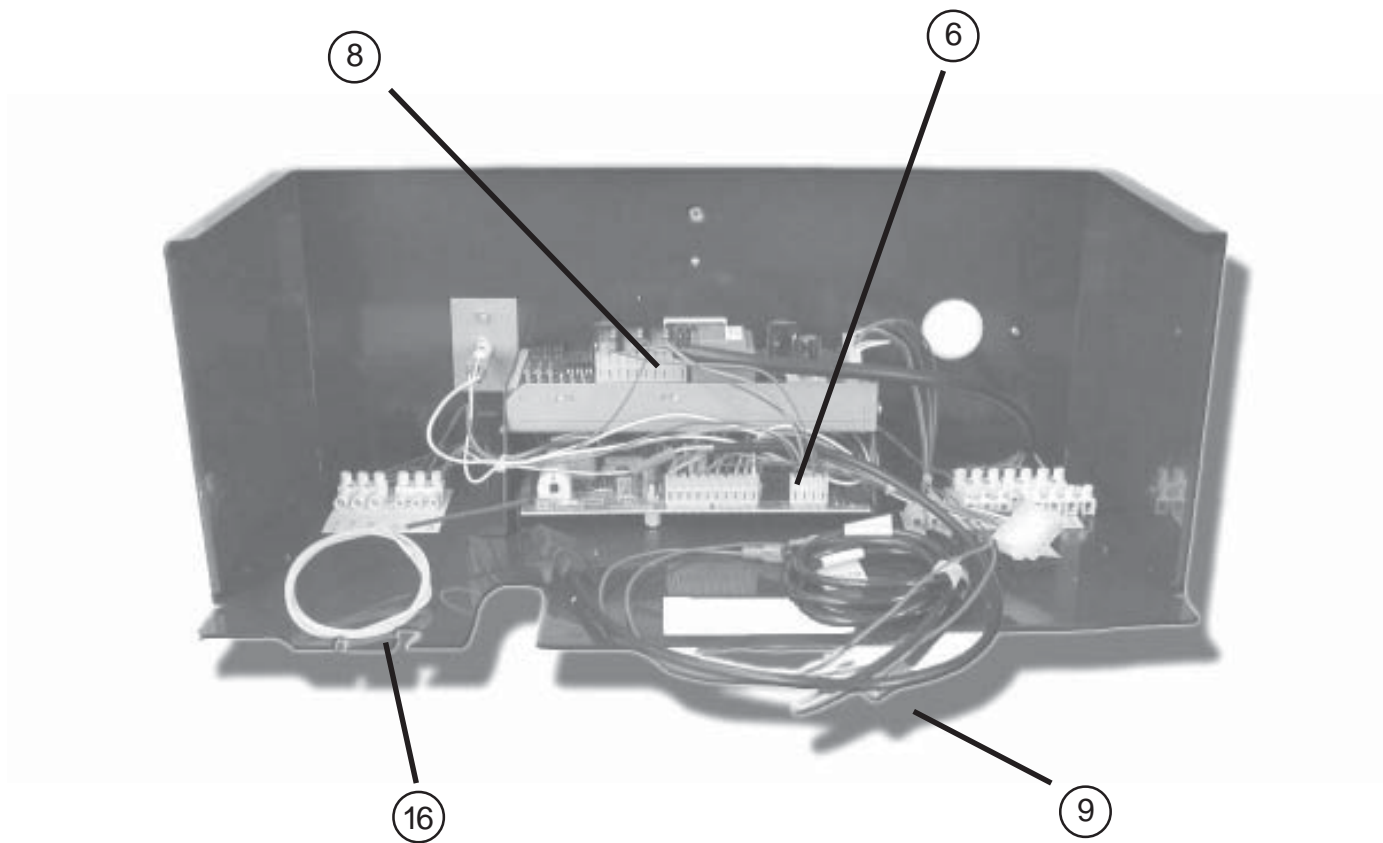
9. PARTS

9.1 Spares

| Key | Item | Part Number | GC Number |
|-----|-------------------------------------|-------------|-----------|
| 1 | Primary Heat Exchanger | M0593 | |
| 2 | Secondary Heat Exchanger (17 kW) | M0797 | |
| 3 | Burner (Model 100) | M3727 | |
| 3 | Burner (Model 100W) | M3728 | |
| 4 | Ceramic Board Set | M1089 | 106 404 |
| 5 | Fan Assembly | M0910 | 106 435 |
| 6 | Ignition Board (Model 100) | M4750 | |
| 6 | Driver Board (Model 100W) | M0614 | 173072 |
| 8 | Contol Board | M4735 | |
| 9 | Pool or Heating Sensor | SPCOH2/002 | |
| 10 | Sequence Controller | M0672 | 173066 |
| 11 | Gas Valve (Model 100) | M3783 | |
| 12 | Gas Valve (Model 100W) | M0671 | |
| 13 | Air Pressure Switch | M4176 | |
| | Main Injector (4.1mm) | M0919 | 106 386 |
| 14 | Overheat Thermostat (Model 100) | M3781 | 379 314 |
| 15 | Overheat Thermostat (Model 100W) | M0868 | 173068 |
| | Pilot Injector (Model 100) | 7709 | 386 673 |
| | Pilot Injector (Model 100W) | M0663 | 381656 |
| | Electrode (Model 100) | 7710 | 386 744 |
| 16 | HT Lead Assembly (Model 100) | M3895 | |
| 17 | Electrode & Lead (Model 100W) | M0666 | |
| | Pilot Assembly (Model 100) | 7716 | 381 865 |
| | Pilot Assembly (Model 100W) | M0662 | 106437 |
| 18 | Flue Thermostat | 7717 | 379 308 |
| 19 | Clip-on Sensor (22mm) | M3338 | |
| 20 | Clip-on Sensor (15mm) | M3337 | |
| 21 | Condensate Trap | M3805 | |
| 22 | Safety Valve | M0480 | 379831 |
| 23 | Three Way Valve | M0608 | 173071 |
| 24 | Pressure Gauge | SPCOH2/003 | |
| 25 | Expansion Vessel | M0610 | |
| 26 | Plate Water to Water Heat Exchanger | M0612 | 106436 |
| 27 | Grundfos Pump | M0623 | 383722 |
| 28 | Pool Water to Water Heat Exchanger | M4374 | |
| 29 | Pool Pump Pressure Switch | 651284 | |
| 30 | Bypass Valve | M1091 | |
| 31 | Diverter Valve | M4531 | |

9:2 Electrical Components

100 & 100W



10 **DIAGRAMS**
10:1 **Major Components**

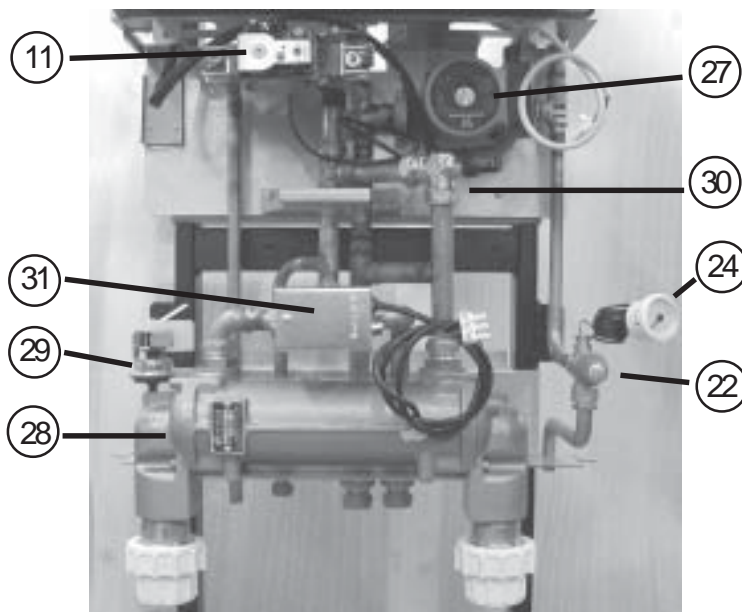
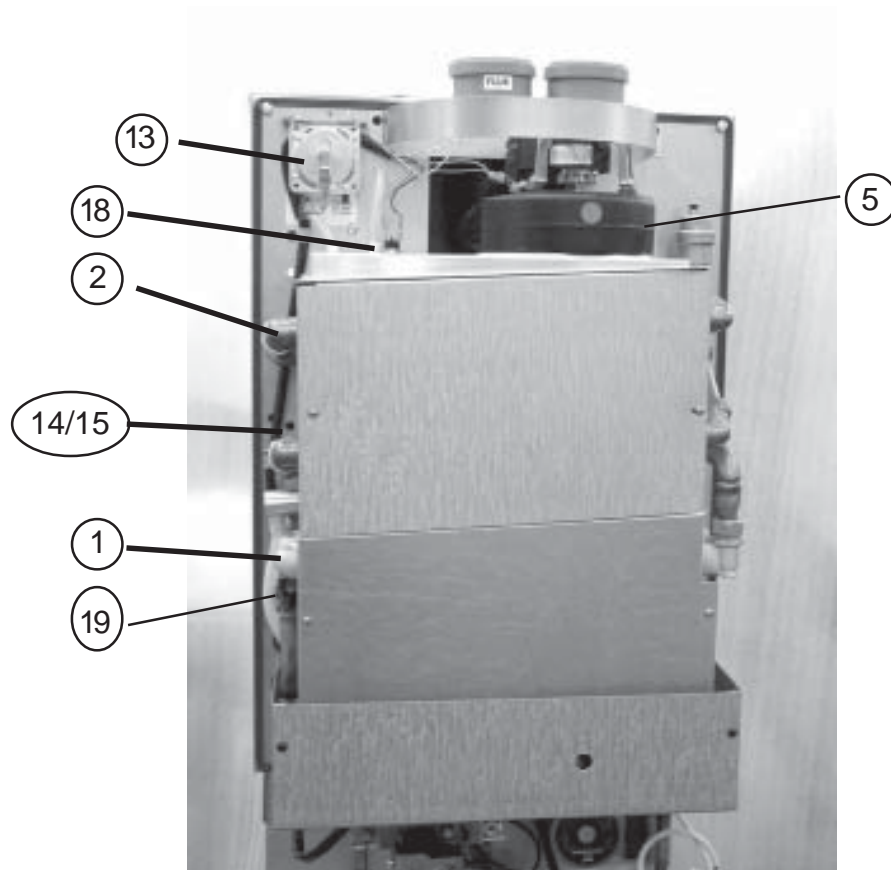


Fig.10:1

10:2 Example Condensate Disposal Methods

Note: Internal - minimum 19mm pipe
External - minimum 32mm pipe

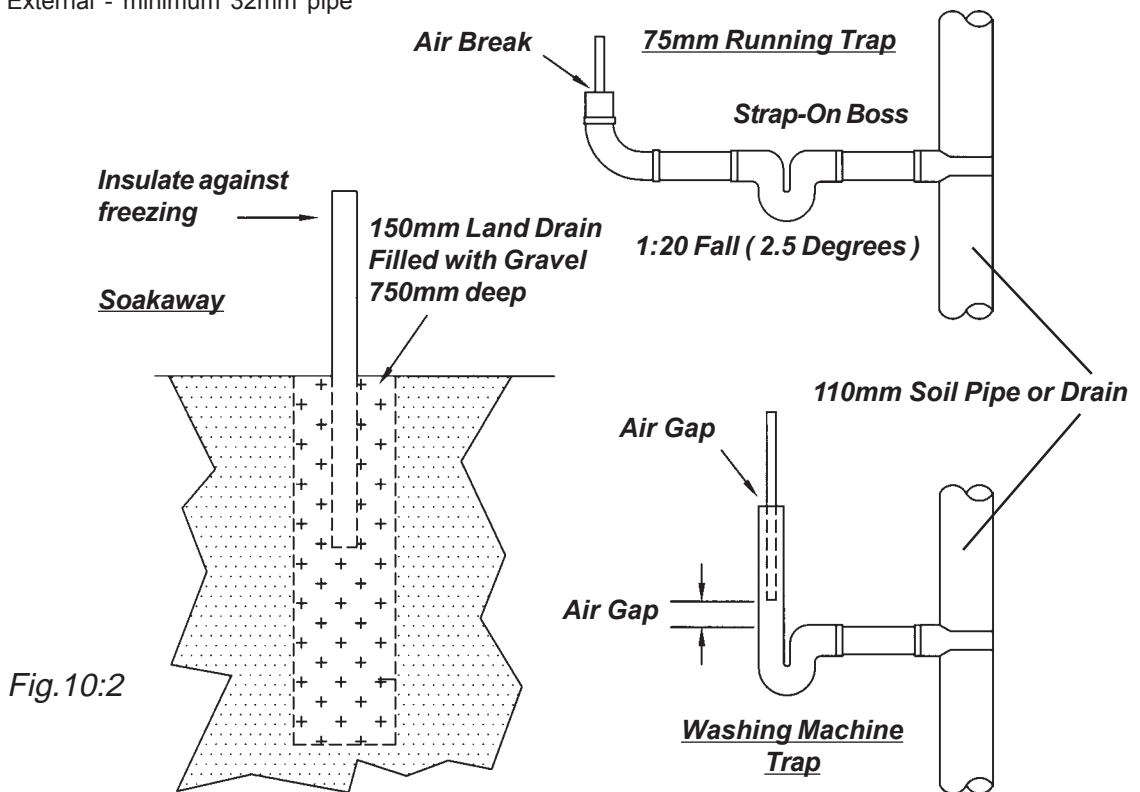


Fig.10:2

10.3 Condensate Drain Trap

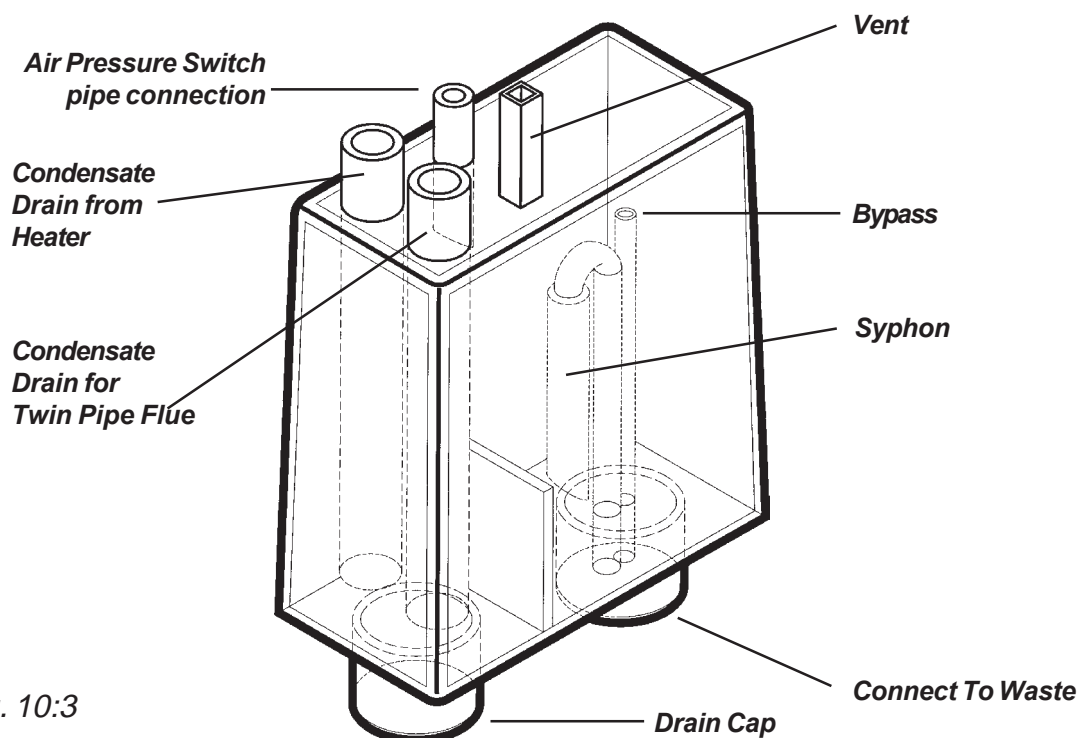


Fig. 10:3

