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**INTRODUCTION**
Thank you for choosing our condensing oil boiler, please read the following carefully.

**To the installer**
This manual must be left with the householder by the installer who will instruct the user on the boiler operation.

**To the user**
Please read the user section of this manual to familiarise yourself with the boiler operation

**WARRANTY**

***WARRANTY FOR YOUR BOILER MUST MEET THE FOLLOWING CONDITIONS OR YOUR WARRANTY MAY BE INVALID***

Warranty on the Heat Exchanger: 5 Years (Excludes labour)
Warranty on Burner and Controls: 2 Years

**CONDITIONS OF WARRANTY:**
1. Boiler MUST BE **installed** by an OFTEC registered engineer, if not permission will be required by building control.
2. Boiler MUST BE **commissioned** after installation by an OFTEC registered engineer.
3. Boiler MUST BE **serviced** every 12 months after installation by an OFTEC registered engineer.
4. Installer MUST COMPLETE an **Installation/Commission Form**, which will be found along with your manual and this, must then be returned to the address on the warranty form. Failure to return this form may invalidate your warranty.

**WHAT IS A CONDENSING BOILER AND HOW DOES IT WORK?**
On all standard boilers the flue gases that go up the chimney have quite a high temperature (200°C / 260°C) and are made up of a few different types of gases. A condensing boiler is designed so that these flue gases pass through a stainless steel heat exchanger connected to the boiler. These flue gases transfer heat to the water contained in the secondary heat exchanger.

This results in (a) increasing the temperature of the water returning to the main boiler
(b) Converting some of the flue gases into condensate
(c) Lowers the exit flue gas temperatures considerably (Less than 85°C)

This all results in increased efficiency in the boiler and therefore a saving on oil.

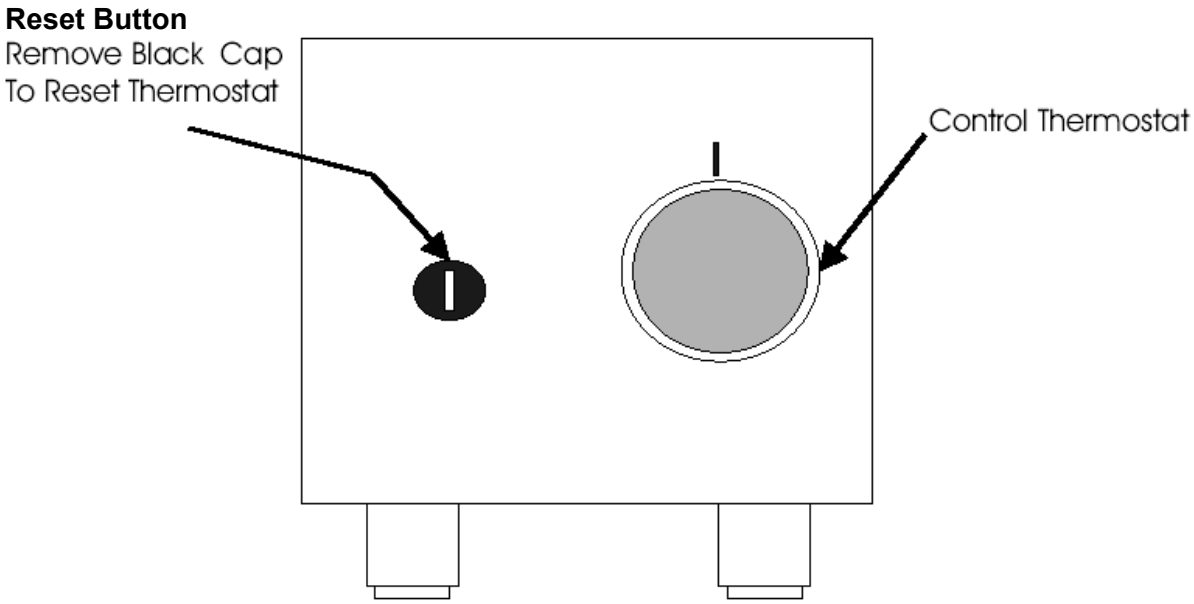
**IMPORTANT CHANGES TO BOILER MANAGEMENT:**
**Annual Service** –This is very important in order to keep the flue ways clean and ensure the boiler is correctly set.

**Quarterly Check** – empty and clean the condensing trap (Fig.4)

Always ensure that the condensate is flowing freely through the outlet into the drain. This can get dirty and block flow or it can freeze in extreme conditions.

**Plume** – a condensing boiler, which produces a white plume from the flue into the air. This is caused by the low flue gas temperatures mixing with the colder air outside.

**Best performance:**
Radiator Heating System - Flow Temperature 70°C - Return Temperature 50°C
Underfloor Heating System - Flow Temperature 50°C - Return Temperature 40°C
*Note: return temperature should never be less than 40°C*




## BOILER OPERATION

The Boiler Control Thermostat responds to the temperature of the water within the boiler and switches power to the burner when heat is required.
The burner has an independent control system which regulates the firing and (shut-off) of the burner.

Automatic firing of the burner will occur when the water temperature within the boiler falls below the control thermostat set point which will continue to run until the water temperature rises to the temperature set on the boiler control thermostat.

## SWITCHING THE BOILER ON

- Check there is water in the system.
- Check radiator valves are on.
- Turn on oil supply.
- Switch electrical supply to the boiler on (including time clock) and then set the boiler control thermostat to recommend setting.

## BOILER CONTROLS

### BOILER CONTROL THERMOSTAT

The temperature of the water within the boiler is controlled and maintained by the ***Boiler Control Thermostat*** located on the boiler control panel.

### TEMPERATURE SETTINGS:

The Boiler Control Thermostat has a range of 50°C to 80°C. The recommended setting for the boiler control thermostat is:

| | |
|---|---|
| **WINTER** | **Heating and hot water supply 80°C** |
| **SUMMER** | **Domestic hot water supply 65°C** |

It is not recommended to operate the boiler with a thermostat setting of less than 60°C as this will precipitate corrosion, thus reducing the life of the boiler.

### HIGH LIMIT STAT

The high limit lockout will occur when the water within the boiler is or has overheated e.g. reached a temperature above that set on the high limit thermostat.

### TO RESET THE BOILER

When the boiler has had time to cool, unscrew black cap and press button on the control panel to reset.

### LOCKOUT INDICATOR: RED

The lock out indicator will illuminate when the burner has failed to fire, e.g. No fuel or an electrical fault. Wait for two minutes then press the manual reset button (coloured red – Fig 1) on the control box to reset.

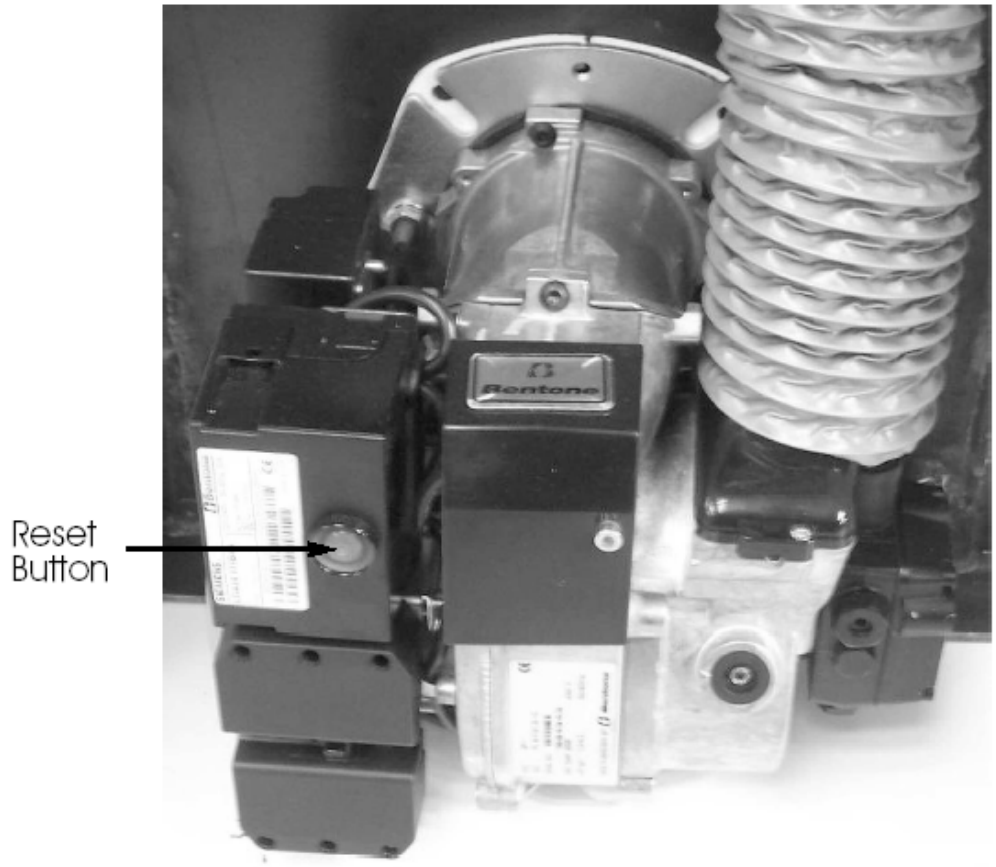



Fig. 1

**SWITCHING THE BOILER OFF**
The boiler can be switched off at anytime using one of the following:

- Turn the boiler control thermostat to the **OFF** position
- Switch the mains (electrical supply) to **OFF**
- Set the control system to **OFF** (e.g. Time Clock)

**PLEASE NOTE:** For longer periods of shutdown e.g. while away on holiday, switch **OFF** the mains (electrical supply) and turn **OFF** the OIL supply.
If shutdown occurs during cold weather ensure boiler is protected against frost damage.

**BURNER LOCKOUT**
The burner has an independent control system (Burner Control Box); this includes a flame detector (Photocell), which senses the presence of a flame. In the event of a flame failure, the burner control box activates a second re-ignition sequence. Should the photocell not detect a flame presence within 15 seconds the burner goes to LOCKOUT and shuts down.

Continued **LOCKOUTS** are a result of a fault in the operation of the boiler and can be attributed to following examples:

- An interruption of the fuel supply.
- Electrical Supply Fault e.g. Extreme low voltage.
- Failure of a burner component.
- A fault within the heating system.
- Burner combustion not being correct.

The Burner Reset button on the Control Box illuminates to indicate that a lockout has occurred.

In the event of the Burner locking out, do not attempt to restart the Burner by pressing the Reset Button on the Burner Control Box for at least 2 minutes. A Bi-metallic timer within the Control Box has a minimum cooling time of 45 seconds thus the 2 minute interval will ensure that this Bi-metallic timer has cooled and is therefore in a position where it may be reset.

**RESTARTING AFTER LOCKOUT**
When lockout has occurred, inspect for any obvious causes e.g. oil leaks. Also check the fuel line from the tank to the boiler and that any oil shut off valve has not been inadvertently closed.

**RESTART**

- Check there is adequate oil in the storage tank.
- Check oil supply valves are open
- Switch on heating system (e.g. Time Clock)
- Press the Burner Reset Button on the burner Control Box, which will be illuminated. The Burner Reset Button (illuminated)(Fig 1) will go out and the burner will commence the ignition start sequence. After 15 seconds the Burner should fire normally.

**PLEASE NOTE:** Should the Burner not start, the lockout indicator, on the Control Box/Burner Reset Button will illuminate again.

- Wait at least 3 minutes and press the Burner Reset Button again.

Failure to start a second time indicates a fault requiring attention.

In the event of a second failure to start:

- Switch off electrical supply
- Call service engineer.

**REGULATIONS**
The installation of oil-fired boilers should comply with the following standards and codes of practice:

- BS5449 Forced circulation hot water heating systems for domestic use.
- BS5410-Part 1 Oil installations up to 45kw
- BS7593 Water treatment of hot water central heating systems
- BS7671 Electrical Regulations
- Building Regulations Part 1L and J 2002 England and Wales, Part F Scottish Regulations and Technical Booklet L Northern Ireland.
- OFTEC Codes of Practice Published or Recommended.

After installing, the system needs to be flushed with a cleanser like Fernox Heavy Duty Restore, for fast-acting removal of lime scale, black sludge (magnetite) and other deposits from the boiler and the central heating system. Then add a Fernox protector to give long-term protection of the central heating system against internal corrosion lime scale formation.

**WATER CONNECTIONS**
Only two connections for the heating and hot water system on a standard condensing boiler:
1. Flow from top of boiler (Fig.2) and return to top of stainless steel heat exchanger (Fig.2).
2. The PVC pipe (fig 3) is 21.5mm Ø and should continue from the condensate trap in side the boiler casing, which should be plumbed to an external source ensuring one of the following options:
   - Internal waste drainage system
   - Soil/vent stack
   - External Drainage system
   - External condensate absorption point

**NOTE:** condensate pipe work must fall at least 50mm per metre towards the outlet ensuring all joints are leak proof.

***WARNING: the condensate trap must be filled with water prior to starting the boiler to stop flue gases escaping***



Fig. 2

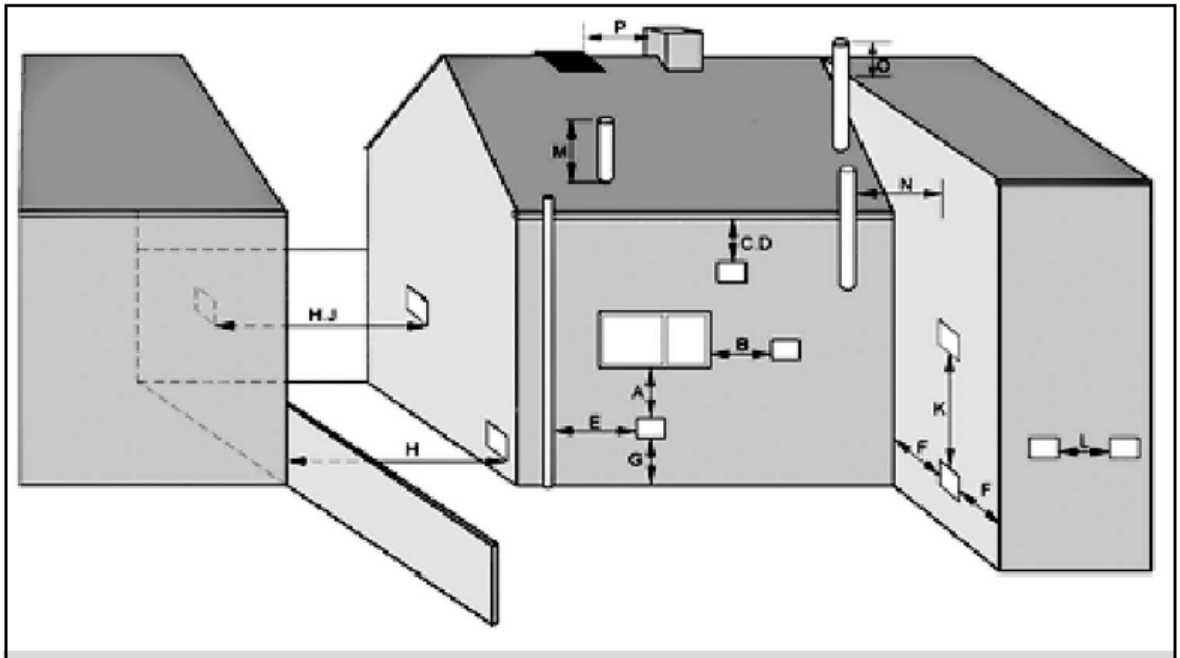


Fig. 3

**BOILER LOCATION**

Sound levels should be discussed with the householder, as some people may be sensitive to low noise levels in a small room, as is may appear more annoying than in larger rooms. Please Note installation should take i**nto account of flue position (see diagram).**

**RECOMMENDED FLUE POSITION**

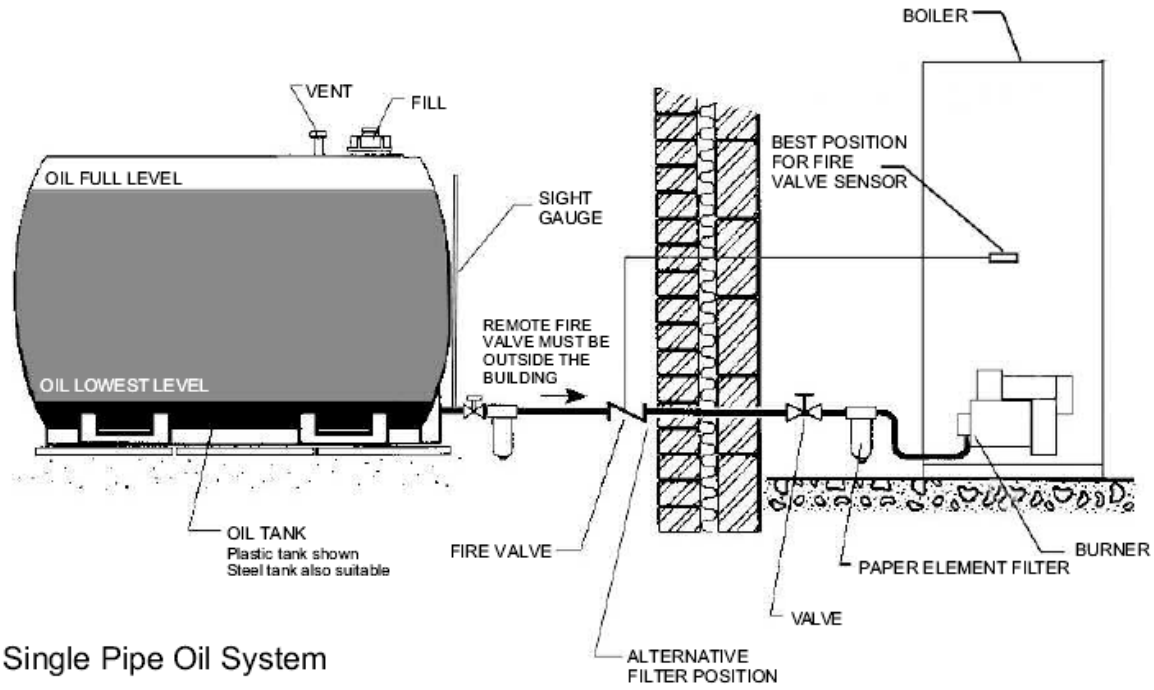



Please Note where the terminal is within 1 metre of any plastic material, such material should be protected from the effects of the combustion products of the fuel.

***IMPORTANT 35 SECOND CLASS D GAS OIL MUST NOT BE USED FOR BALANCED FLUES.***

| Ref | Min. Position | mm |
|---|---|---|
| A | Directly below an opening, air brick, opening window etc. | 600 |
| B | Horizontally to an opening , air brick, opening window etc. | 600 |
| C | Below a gutter, eaves or balcony with protection. | 75 |
| D | Below a gutter or a balcony without protection. | 600 |
| E | From vertical sanitary pipework. | 600 |
| F | From an internal or external corner. | 600 |
| G | Above ground or balcony level. | 600 |
| H | From a surface or a boundary facing the terminal. | 600 |
| J | From a terminal facing the terminal. | 1200 |
| K | Vertically from a terminal on the same wall. | 1500 |
| L | Horizontally from a terminal on the same wall. | 750 |
| M | Above the highest point of an intersection with the roof. | 600 |
| N | From a vertical structure on the side of the terminal. | 750 |
| O | Above a vertical structure less than 750mm. | 600 |
| P | From a ridge terminal to a vertical structure on the roof. | 1500 |

## OIL SUPPLY

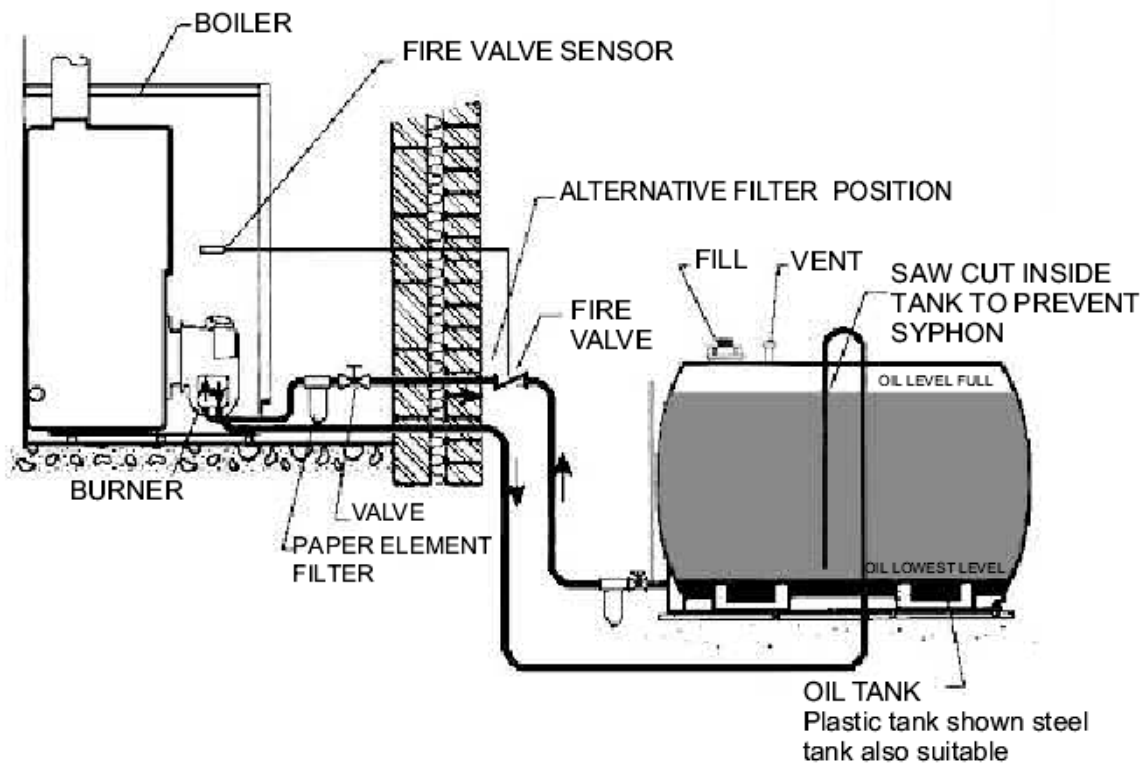


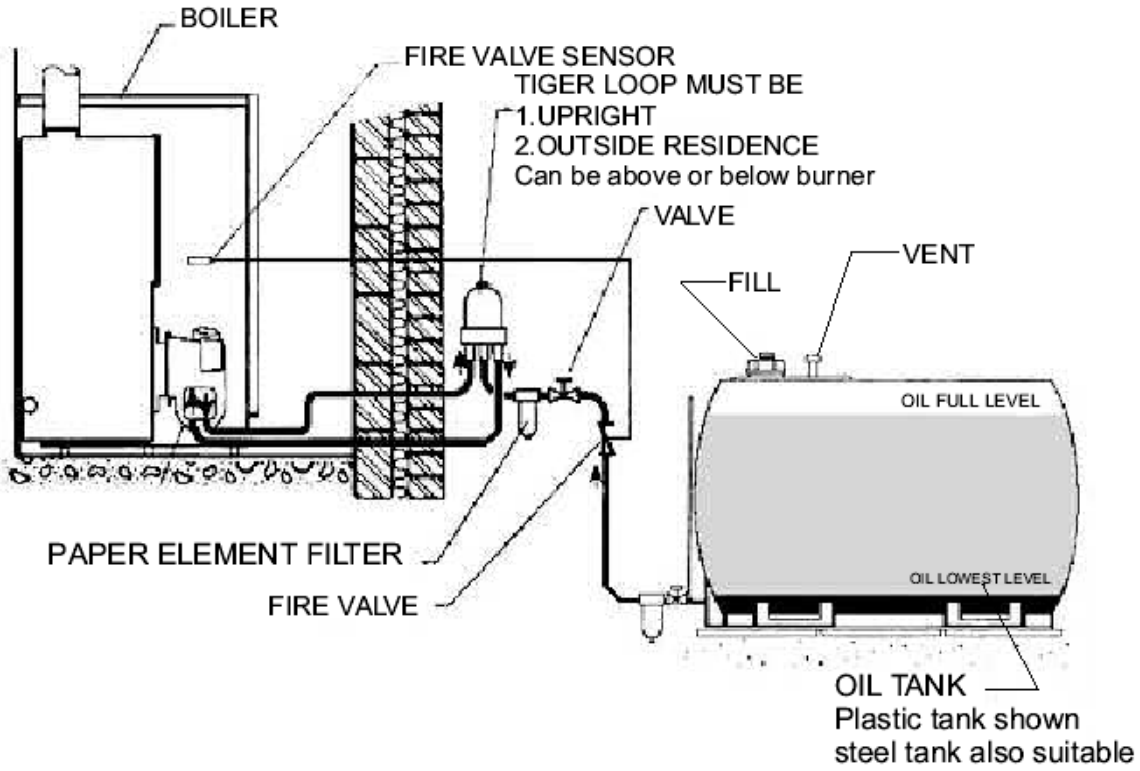

Single Pipe Oil System

TYPICAL SYSTEM SHOWN

## OIL SUPPLY

Diagrams of twin pipe oil supply systems



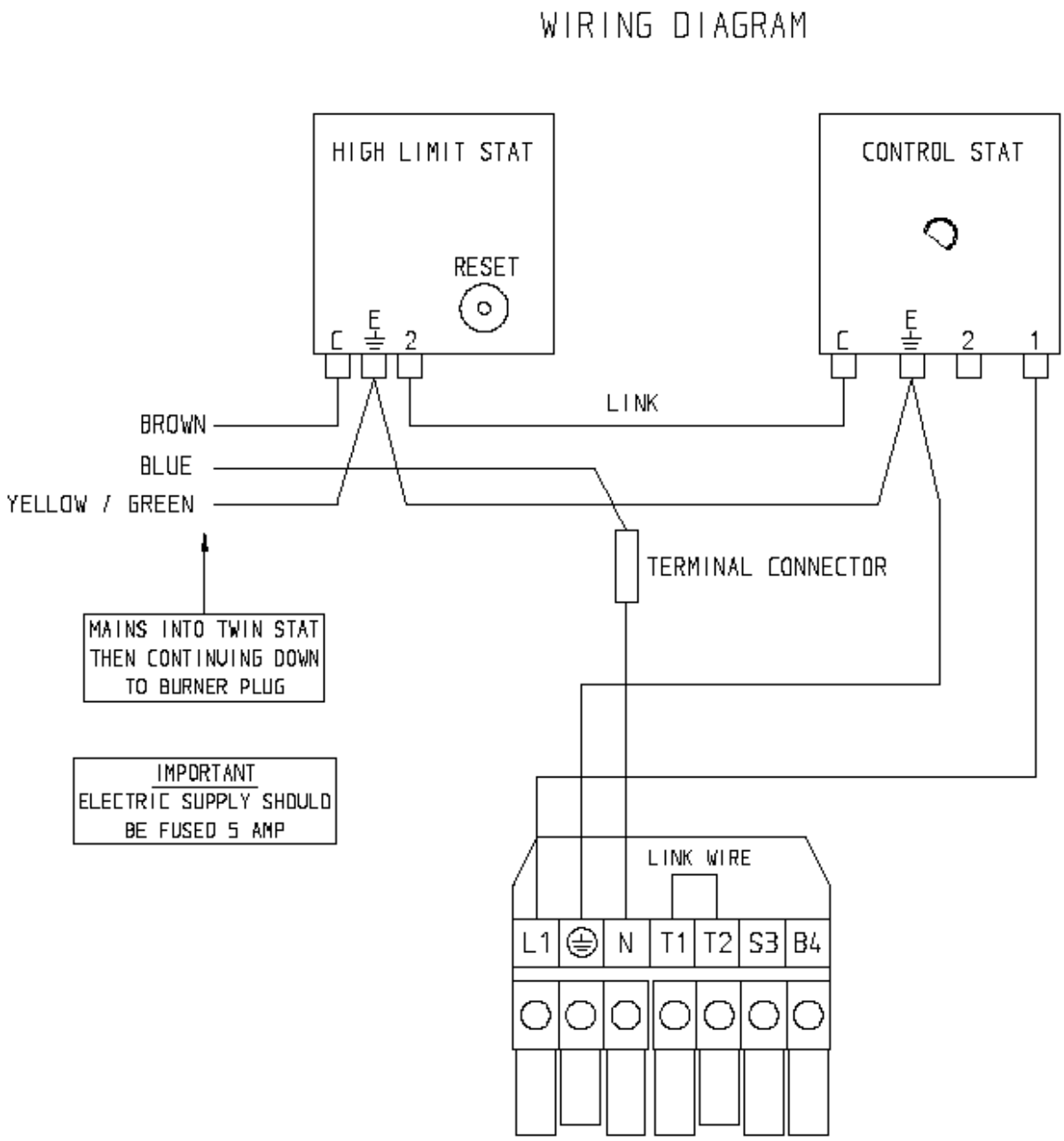

A flexible oil pipe is supplied to connect the burner to the incoming oil supply pipe.

IMPORTANT NOTES:

- If sitting oil tank above burner height, use single supply pipe only.
- If sitting oil tank below burner height, use twin pipe supply or Tiger loop.
- Please refer to Burner Manual for conversion to oil pump for two pipe system.

## ELECTRICAL ENTRY

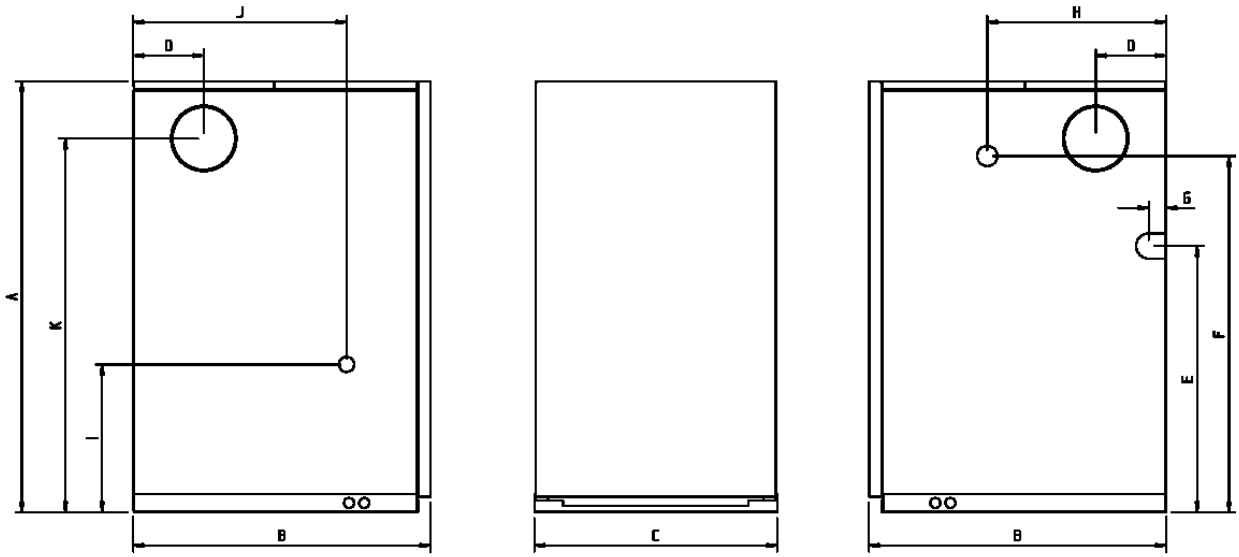
The electrical supply to the boiler must be wired using a double pole-isolating switch 230v/50hz, fused 5 amps. The mains supply must be connected with the boiler dual stat, the supply will then continue down to the burner control box. The burner is supplied with a three wire cable plug which allows disconnection for maintenance.



## BOILER SPECIFICATIONS FOR AMBASSADOR (KITCHEN)

| DIMENSION | 15/21 Kw | 21/27 Kw | 27/38 Kw | 35/50 Kw |
|---|---|---|---|---|
| A | 854 | 854 | 854 | 995 |
| B | 589 | 589 | 589 | 657 |
| C | 421 | 481 | 481 | 581 |
| D | 140 | 140 | 140 | 115 |
| E | 560 | 528 | 528 | 628 |
| F | 706 | 706 | 706 | 889 |
| G | 35 | 35 | 35 | 35 |
| H | 355 | 355 | 355 | 370 |
| I | 293 | 293 | 293 | 293 |
| J | 423 | 423 | 423 | 491 |
| K | 741 | 741 | 741 | 889 |

DIMENSIONS ARE IN (mm.)




LEFT HAND VIEW FRONT VIEW RIGHT HAND VIEW

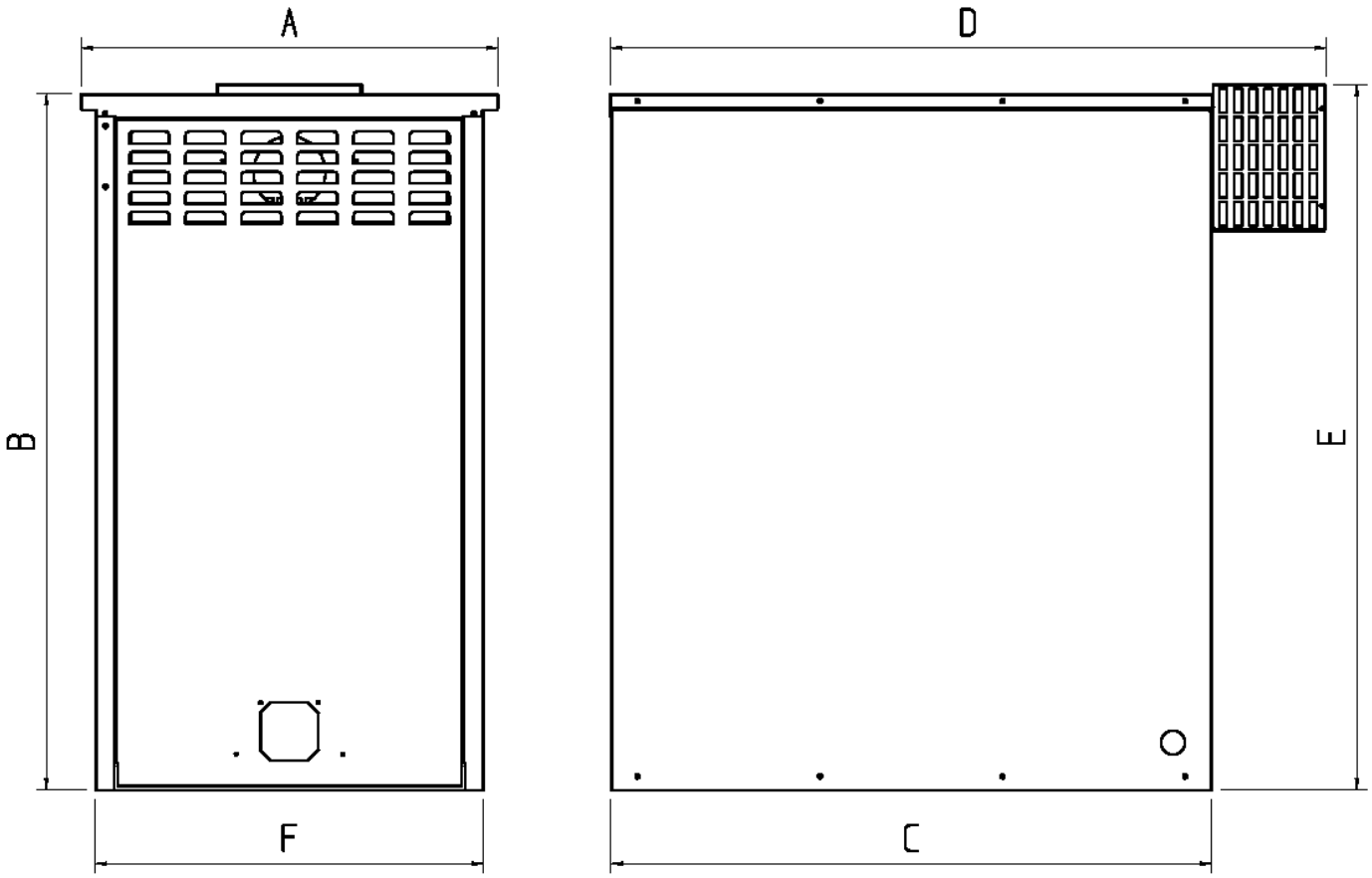
### General Data

Electrical Supply. 240w-50hz
Fuel: 28 Second
Maximum Control Thermostat Setting 85°C
Maximum Operating Pressure:
Draught Limit

Oil Supply Connection ¼" BSP
High Limit Stat: Manual Reset

3 Bar – 45psi – 28m Static head room 92ft
Min 12.5 $Nm^2$ – 0.05" WG
Max 33.0 $Nm^2$ – 0.12" WG

## BOILER SPECIFICATION FOR COUNTRYMAN OUTDOOR




| DIMENSIONS | 15/21 Kw | 21/27 Kw | 27/38 Kw |
|---|---|---|---|
| A | 521 | 521 | 521 |
| B | 868 | 868 | 868 |
| C | 750 | 750 | 750 |
| D | 894 | 894 | 894 |
| E | 880 | 880 | 880 |
| F | 485 | 485 | 485 |

DIMENSIONS ARE IN (mm.)

### General Data

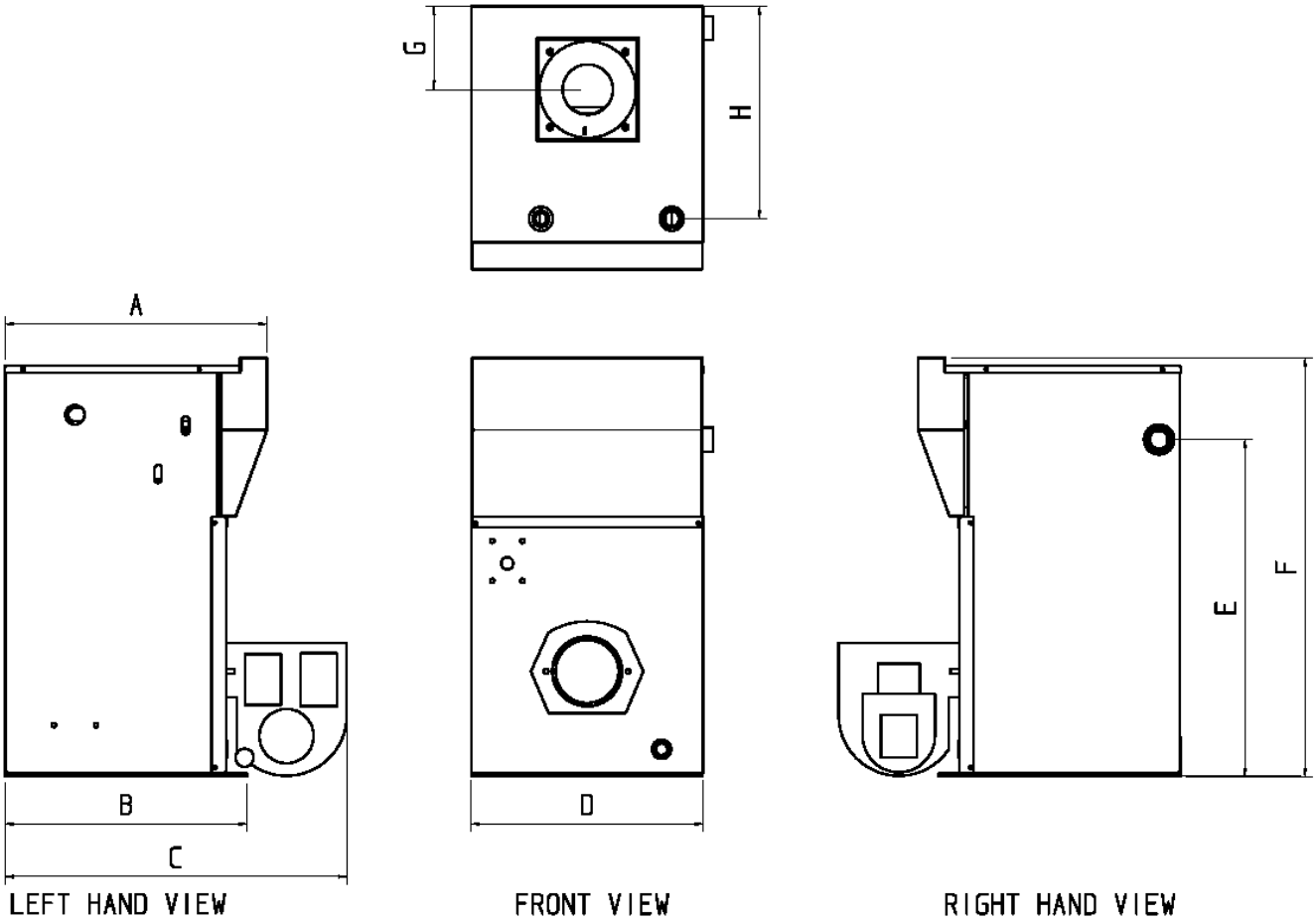
| | |
|---|---|
| Electrical Supply. 240w-50hz | Oil Supply Connection ¼" BSP |
| Fuel: 28 Second | High Limit Stat: Manual Reset |
| Maximum Control Thermostat Setting 85°C | |
| Maximum Operating Pressure: | 3 Bar – 45psi – 28m Static head room 92ft |
| Draught Limit | Min 12.5 $Nm^2$ – 0.05" WG |
| | Max 33.0 $Nm^2$ – 0.12" WG |

**Note:** 28 sec fuel must only be used on Countryman boiler

## BOILER SPECIFICATION FOR CONSUL BOILERHOUSE

| DIMENSION | 15/21 KW | 21/27 KW | 27/38 KW |
|---|---|---|---|
| A | 436 | 440 | 440 |
| B | 402 | 402 | 402 |
| C | 568 | 568 | 568 |
| D | 385 | 453 | 453 |
| E | 559 | 527 | 527 |
| F | 694 | 694 | 694 |
| G | 138 | 142 | 142 |
| H | 352 | 357 | 357 |

DIMENSIONS ARE IN (mm.)




### General Data

Electrical Supply. 240w-50hz

Fuel: 28 Second

Maximum Control Thermostat Setting 85°C

Maximum Operating Pressure:

Draught Limit

Oil Supply Connection ¼" BSP

High Limit Stat: Manual Reset

3 Bar – 45psi – 28m Static head room 92ft

Min 12.5 $Nm^2$ – 0.05" WG

Max 33.0 $Nm^2$ – 0.12" WG

## SERVICING INSTRUCTIONS

A competent service engineer OFTEC registered should be appointed on an annual basis.

- Remove inspection door, burner and baffle assembly
- Brush down the inside of the heat exchanger and vacuum out debris
- Clean baffle assembly
- Pull out inserts from stainless steel heat exchanger and clean before replacing. Ensure stainless steel heat exchanger is thoroughly cleaned.
- Empty and clean condensing trap (Fig.4)
- Inspect and clean burner assembly, and replace with new nozzle (see burner manual)
- Renew any insulation e.g. inspection door or inside base of heat exchanger
- Reassemble baffles and replace inspection door.
- Replace paper oil filters
- Test oil pressure and test combustion.

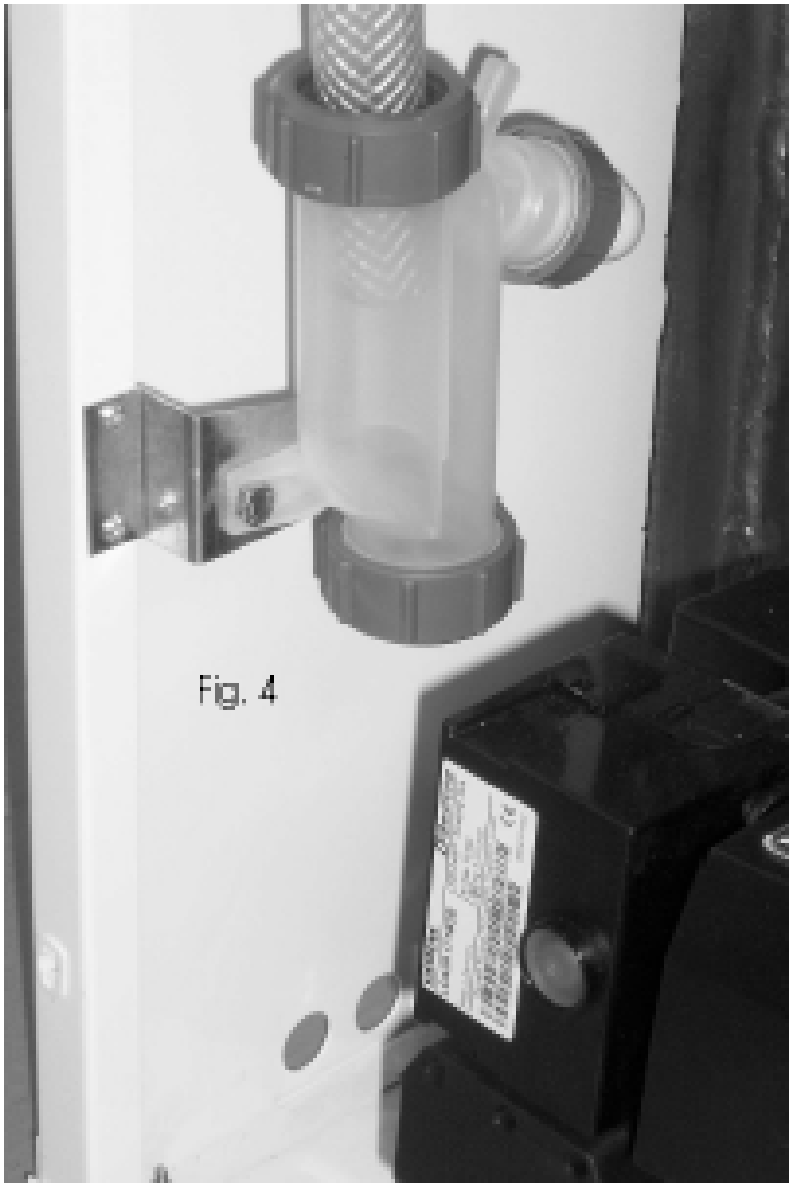
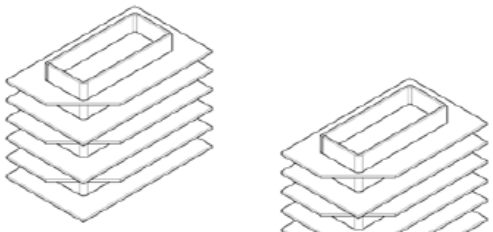
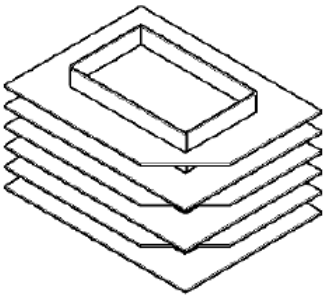


Fig. 4

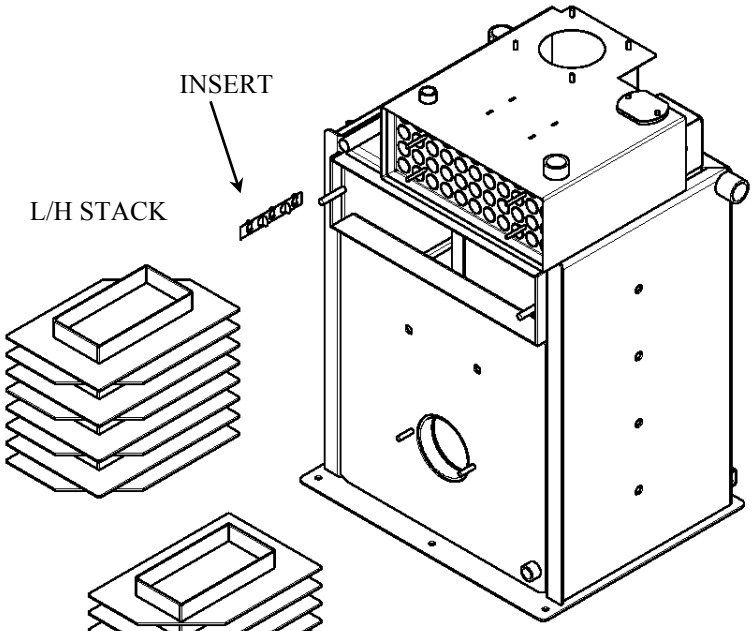
## BAFFLE ASSEMBLY



2 SET OF BAFFLES
27/38 KW BOILER

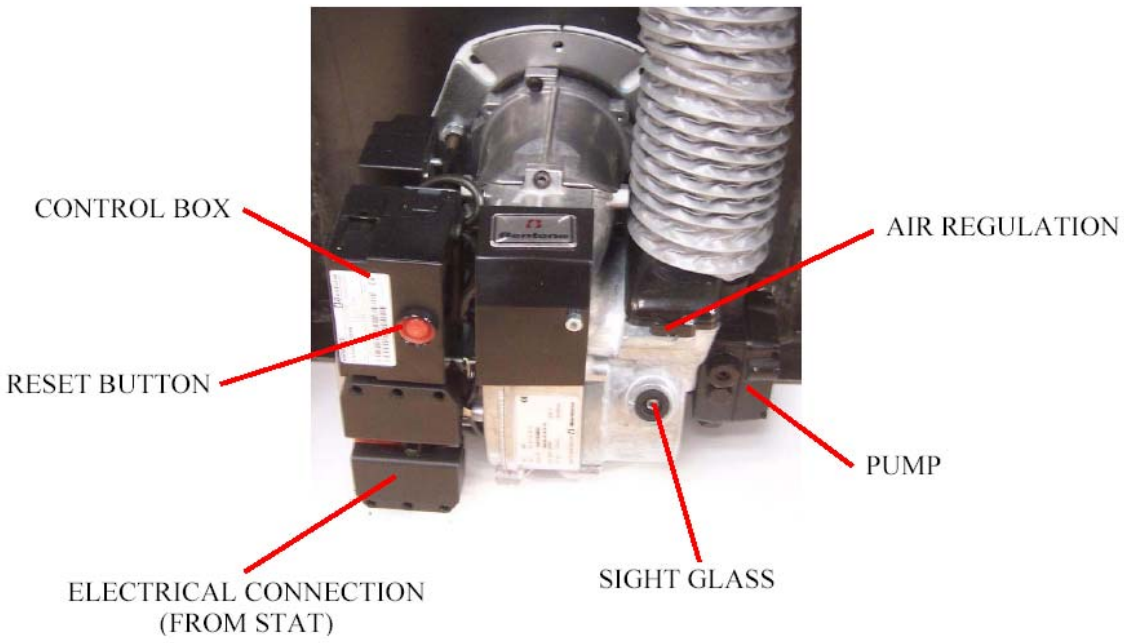


1 SET OF BAFFLES
15/21 KW
&
21/27 KW
BOILERS



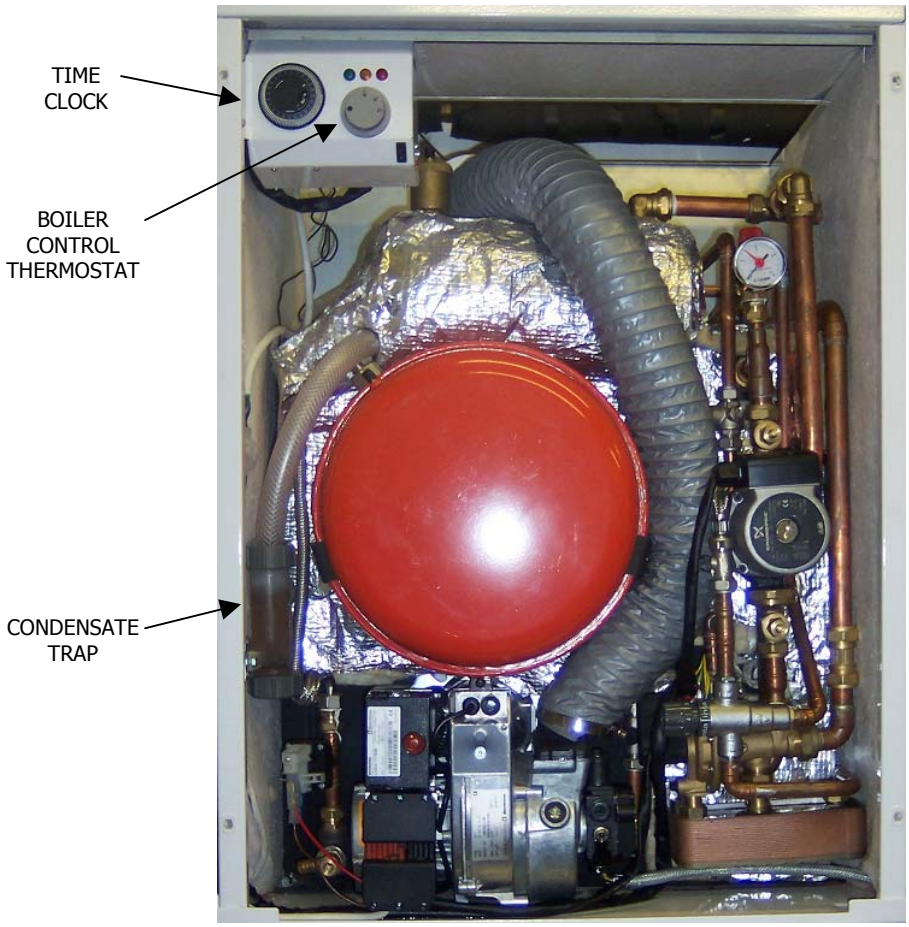

35/50 KW BOILER
2 SET OF BAFFLES
8 NO. L/H STACK
7 NO. R/H STACK

| BOILER SIZE | NO. OF INSERTS FROM L/H SIDE OF CONDENSER | REMAINING TUBES WITHOUT INSERTS |
|---|---|---|
| 15/21 KW | 10 | 6 |
| 21/27 KW | 15 | 9 |
| 27/38 KW | 21 | 12 |
| 35/50 KW | 28 | 16 |



# BURNER SETTINGS

| **BOILER MODEL** | | **15/21** | **21/27** | **27/38** | **35/50** |
|---|---|---|---|---|---|
| MAXIMUM OUTPUT | Btu/hr | 72000 | 92000 | 130000 | 170000 |
| | Kw/hr | 21 | 27 | 38 | 50 |
| FACTORY SETTING | Btu/hr | 63000 | 82000 | 113000 | 160000 |
| | Kw/hr | 18.5 | 24 | 33 | 46 |
| NOZZLE SIZE | | 0.55 80 deg H | 0.65 80 deg H | 0.85 80 deg H | 1.2 80 deg H |
| OIL PRESSURE | Bar | 8 | 8 | 8 | 8 |
| BURNER AIR SETTING | | 7 | 12 | 15 | 3.5 |
| SMOKE | | 0 | 0 | 0 | 0 |
| $CO^2$ | % | 11.5 | 12 | 12 | 11 |
| FLUE GAS TEMPERATURE | °C | 80 | 87 | 87 | 87 |
| WATER INLET/RETURN | mm | 22 | 22 | 22 | 28 |
| WATER OUTLET/FLOW | mm | 22 | 22 | 22 | 28 |
| CONDENSATE FLOW | mm | 22 pvc rigid pipe | 22 pvc rigid pipe | 22 pvc rigid pipe | 22 pvc rigid pipe |
| ELECTRICAL POWER | 230/240 volt – 50 Hz – fused at 5 amp | | | | |
| MAX OPERATING PRESS | Bar | 2.5 | 2.5 | 2.5 | 2.5 |
| BOILER EFFICIENCY* | % | 98 | 99 | 100 | 99 |
| SEDBUK A RATING | % | 93.5 | 93.5 | 94 | 93.2 |
| * Please Note – Boiler Efficiency – Schedule 2 of Rules (Efficiency) Regulation 1993 | | | | | |




**BOILER OPERATION**

The Boiler Control Thermostat responds to the temperature of the water within the boiler and switches power to the burner when heat is required.
The burner has an independent control system which regulates the firing and (shut-off) of the burner.

Automatic firing of the burner will occur when the water temperature within the boiler falls below the control thermostat set point which will continue to run until the water temperature rises to the temperature set on the boiler control thermostat.

**SWITCHING THE BOILER ON**

- Check there is water in the system.
- Check radiator valves are on.
- Turn on oil supply.
- Switch electrical supply to the boiler on (including time clock) and then set the boiler control thermostat to recommend setting.
- Ensure condensate trap is filled with water before operation

## BOILER CONTROLS

### BOILER CONTROL THERMOSTAT

The temperature of the water within the boiler and the store is controlled and maintained by the ***Boiler Control Thermostat*** located on the boiler control panel.

**Mixer Valve** – the mixer valve can be adjusted to the desired hot water temperature setting, which the householder requires. The valve is graduated between 1 to 5, the greater the number the hotter the water.

### TEMPERATURE SETTINGS:

The Boiler Control Thermostat has a range of 50°C to 80°C.
**BUT THE BOILER CONTROL THERMOSTAT MUST BE SET AT 80°C AT ALL TIMES**
**PLEASE NOTE A ROOM STAT MUST BE FITTED**

### MAINS INDICATOR: GREEN

The mains indicator will illuminate when the mains supply to the boiler is on and system charge is above 0.5 bar, the boiler is protected by a low pressure cut off switch.

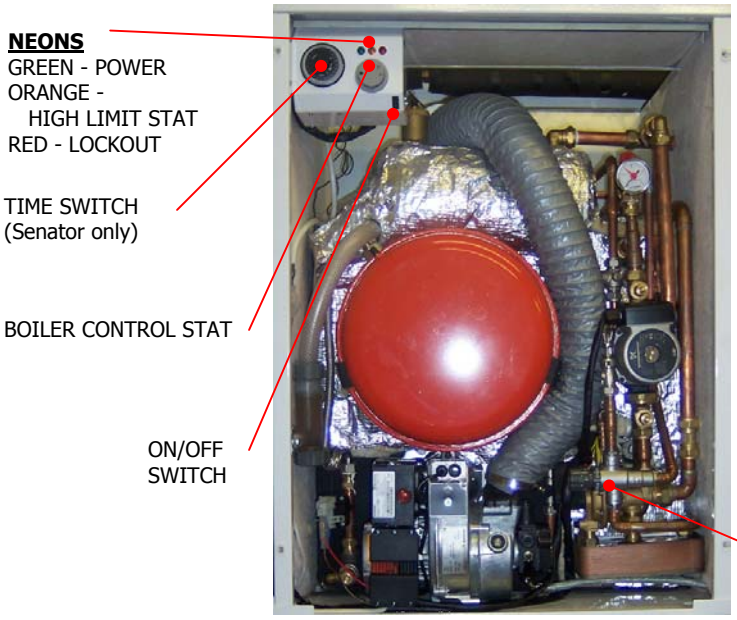
### HIGH LIMIT STAT INDICATOR: ORANGE

The high limit indicator will illuminate when the water within the boiler is or has overheated e.g. reached a temperature above that set on the high limit thermostat.
THIS INDICATES THAT THE THERMOSTAT NEEDS TO BE RESET TO START THE BOILER.
When the boiler has had time to cool, the manual reset button (coloured red) on the control panel will need to be pressed in to reset. If the high limit thermostat continues to trip, contact your installer, as there may be a fault with the central heating system.

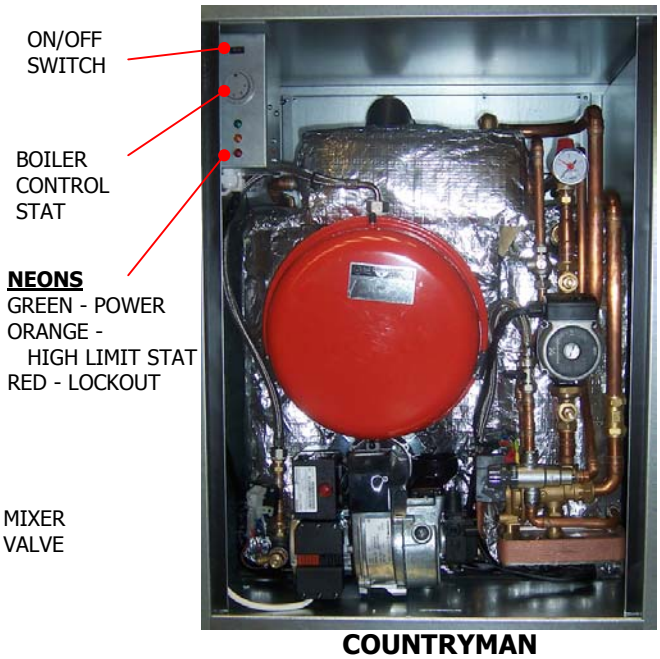
### LOCKOUT INDICATOR: RED

The lock out indicator will illuminate when the burner has failed to fire, e.g. No fuel or an electrical fault.

**PLEASE NOTE**: The reset button on the burner will illuminate on the burner control box at the same time. Reset by pressing the reset button on the burner control box.

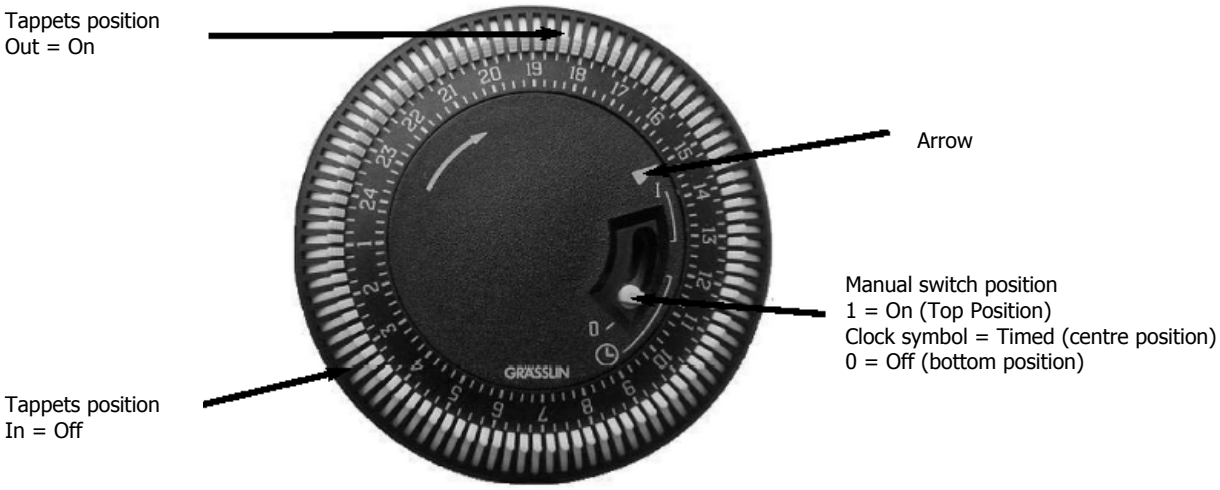



**SENATOR**




**COUNTRYMAN**

## BUILT IN TIME SWITCH (SENATOR COMBI ONLY)




### SETTING TIME SWITCH UP

The outer dial should be set to the current time. Rotate the dial slowly in a clockwise direction, until the correct hour is approaching the arrow marked on the dial.

### MANUAL SWITCH OPERATION

The manual switch will provide On/Timed/Off Control, thereby allowing manual control of the heating without disrupting the timed (tappet) settings.

### PROGRAMME SWITCH TIMES

One tappet is equal to 15 minutes, set the number of tappets to the outer edge of the dial, equal to the duration of time heating is required to be switched on.

**SWITCHING THE BOILER OFF**
The boiler can be switched off by turning the rocker switch, located on the underside of the control panel, to the OFF position.

**PLEASE NOTE:** For longer periods of shutdown e.g. while away on holiday, switch **OFF** the mains (electrical supply) and turn **OFF** the OIL supply.
If shutdown occurs during cold weather ensure boiler is protected against frost damage.

**BURNER LOCKOUT**
The burner has an independent control system (Burner Control Box); this includes a flame detector (Photocell), which senses the presence of a flame. In the event of a flame failure, the burner control box activates a second re-ignition sequence. Should the photocell not detect a flame presence within 15 seconds the burner goes to LOCKOUT and shuts down.

Continued **LOCKOUTS** are a result of a fault in the operation of the boiler and can be attributed to following examples:

- An interruption of the fuel supply.
- Electrical Supply Fault e.g. Extreme low voltage.
- Failure of a burner component.
- A fault within the heating system.
- Burner combustion not being correct.

The Burner Reset button on the Control Box illuminates to indicate that a lockout has occurred.

In the event of the Burner locking out, do not attempt to restart the Burner by pressing the Reset Button on the Burner Control Box for at least 2 minutes. A Bi-metallic timer within the Control Box has a minimum cooling time of 45 seconds thus the 2 minute interval will ensure that this Bi-metallic timer has cooled and is therefore in a position where it may be reset.

**RESTARTING AFTER LOCKOUT**
When lockout has occurred, inspect for any obvious causes e.g. oil leaks.
Also check the fuel line from the tank to the boiler and that any oil shut off valve has not been inadvertently closed.

**RESTART**

- Check there is adequate oil in the storage tank.
- Check oil supply valves are open
- Switch on heating system (e.g. Time Clock)
- Press the Red Burner Reset Button on the burner Control Box, which will be illuminated. Both burner reset button (illuminated) and the lockout indicator on the Control Panel will go out and the burner will commence the ignition start sequence. After 15 seconds the Burner should fire normally.

**PLEASE NOTE:** Should the Burner not start, the lockout indicator, on the Control Panel and Burner Reset Button will illuminate again.
- Wait at least 3 minutes and press the Burner Reset Button again.
Failure to start a second time indicates a fault requiring attention.

In the event of a second failure to start:

- Switch off electrical supply
- Call service engineer.



## REGULATIONS

The installation of oil-fired boilers should comply with the following standards and codes of practice:

- BS5449 Forced circulation hot water heating systems for domestic use.

- BS5410-Part 1 Oil installations up to 45kw

- BS7593 Water treatment of hot water central heating systems

- BS7671 Electrical Regulations

- Building Regulations Part 1L and J 2002 England and Wales, Part F Scottish Regulations and Technical Booklet L Northern Ireland.

- OFTEC Codes of Practice Published or Recommended.

After installing, the system it needs to be flushed with a cleanser like Fernox Heavy Duty Restore, for fast-acting removal of lime scale, black sludge (magnetite) and other deposits from the boiler and the central heating system. Then add a Fernox protector to give long term protection of the central heating system against internal corrosion lime scale formation.

## PROTECTION OF DOMESTIC HOT WATER

WE recommend that appropriate water softening equipment is fitted in hard water areas. Check with local water authority if in doubt.

## WATER CONNECTIONS

The following connections are required:

- Heating Flow
- Heating Return
- Mains
- Overflow
- Hot Water
- PVC Condensate Pipe




**COUNTRYMAN OUTDOOR**

HEATING FLOW
HEATING RETURN
MAINS
OVERFLOW
HOT WATER




MAINS
OVERFLOW
HOT WATER
HEATING
HEATING RETURN

**SENATOR KITCHEN**

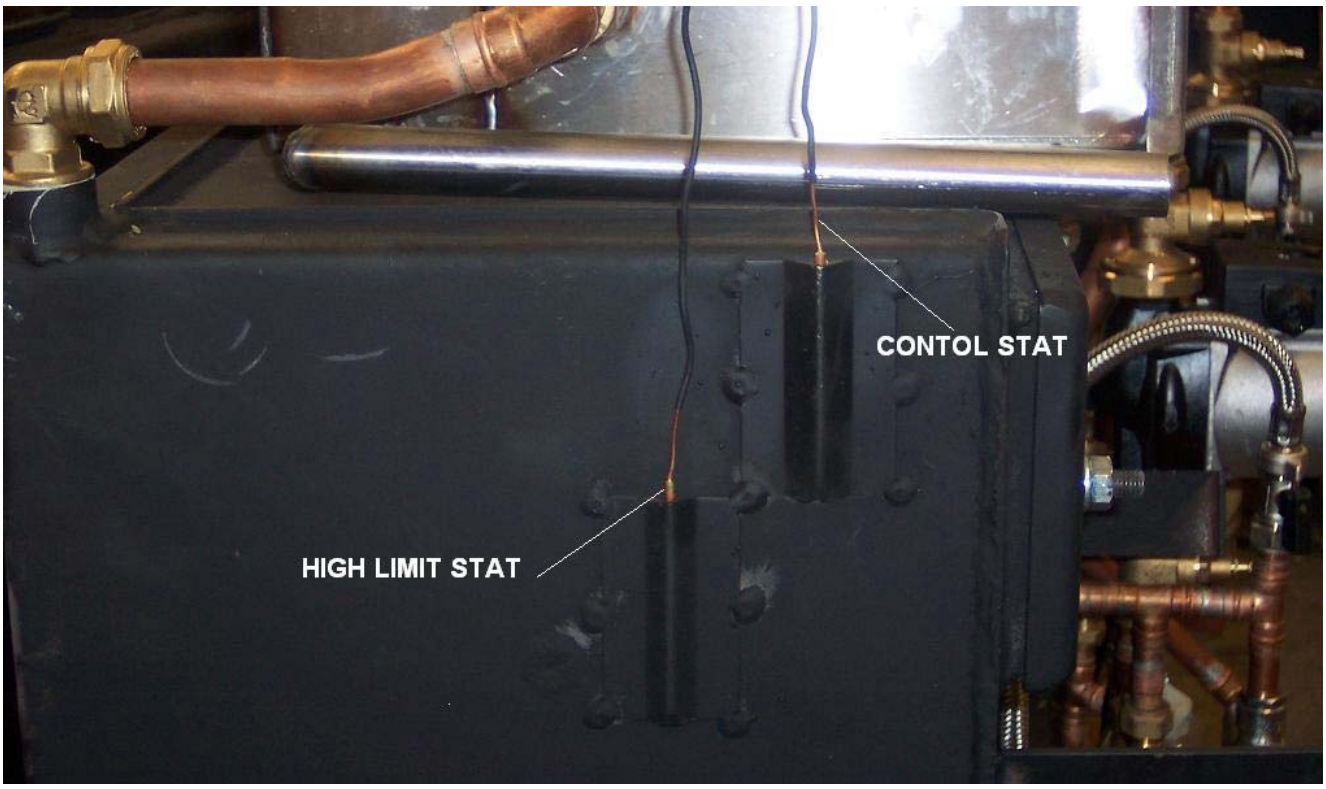
## INSTALLATION

### SERVICE REQUIREMENTS
The boilers are serviced through an access panel at the front. A service access space of at least 700mm should be made available at the front of the boiler.

### THE HEARTH
The temperature of the surface below the boiler is less than 85°C. If the floor under the boiler is of combustible material, then protection such as steel should be fitted between the boiler and the floor.

Consideration should be given to the weight of the filled boiler; the floor must provide adequate support. Please consult the building regulation for safe floor loadings.

### CONTROL PANEL
The boiler control panel is factory fitted prior to despatch. The phials of the Control and High Limit Thermostat are inserted into the pockets situated on the left hand side of the boiler heat exchanger.




### ELECTRICAL ENTRY

The electrical supply to the boiler must be 230v/50hz, fused at 5 amps. Connection of the appliance and any system controls, to the mains supply, must be a common isolator and must be fused at 5A maximum.

This must be fixed wired to a double pole-isolating switch that has a maximum contact separation of 2mm in both poles. The isolator should be clearly marked showing it's purpose, and preferably positioned close to the boiler.

## PREFORMED PIPEWORK

- 1 of 22mm section labelled Heating Flow
- 1 of 15mm section labelled Mains
- 1 of 15mm section labelled Hot Water
- 1 of 15mm section labelled Overflow
- 1 of 22mm section labelled Heating Return

Preformed pipes, on the senator Combi, can exit on the left or right hand side of the casing. Please ensure that if flueing low level balanced flue from the side of the casing of the boiler, that the preformed pipes are exiting on the opposite side to which the flue is exiting.

The preformed pipe on the Countryman Combi exits at the rear of the casing Base.

## SEALED SYSTEM

This boiler operates on a sealed system. A pressure relief valve operating at 3 bar is fitted.

The overflow pipe must terminate in compliance with current building regulations.

The boiler is supplied with a 12-litre expansion vessel. It is the installer's responsibility to ensure adequate provision is made for expansion within the heating system and to install extra capacity if required. Damage to components caused by over expansion may not be covered by warranty.

Unsuitable pipe work and fittings and factors such as sediment or residue left in the system, may cause damage to your boiler and it's components and may not be covered by warranty.

## PLASTIC PIPE

PLEASE NOTE: When using plastic pipe on heating system, a minimum of 2 metres of copper pipe must be used off the boiler, before connecting to plastic pipe.

***PLASTIC PIPE MUST NOT IN ANY CIRCUMSTANCES BE CONNECTED DIRECTLY TO THE BOILER***

## CAPACITIES OF EXPANSION VESSELS

| | | | |
|---|---|---|---|
| Safety valve setting @ | 3 | 3 | 3 |
| Vessel charge and Initial System Pressure (BAR GUAGE) | 0.5 | 1 | 1.5 |
| LITRES | LITRES | LITRES | LITRES |
| 5 | 2.1 | 2.7 | 3.9 |
| 50 | 4.2 | 5.4 | 7.8 |
| 75 | 6.3 | 8.2 | 11.7 |
| 100 | 8.3 | 10.9 | 15.6 |
| 125 | 10.4 | 13.6 | 19.5 |
| 150 | 12.5 | 16.3 | 23.4 |
| 175 | 14.6 | 19.1 | 27.3 |
| 200 | 16.7 | 21.8 | 31.2 |
| 225 | 18.7 | 24.5 | 35.1 |
| 250 | 20.8 | 27.2 | 39.0 |
| 275 | 22.9 | 30.0 | 42.9 |
| 300 | 25.0 | 32.7 | 46.8 |
| 325 | 27.0 | 35.7 | 50.7 |
| 350 | 29.1 | 38.1 | 54.6 |
| 375 | 31.2 | 40.9 | 58.5 |
| 400 | 33.3 | 43.6 | 62.4 |
| 425 | 35.4 | 46.3 | 66.3 |
| 450 | 37.5 | 49.0 | 70.2 |
| 500 | 41.6 | 54.5 | 78.0 |
| Multiplying factor for other systems Volumes | 0.0833 | 0.109 | 0.156 |

## EXPANSION VESSEL SIZING

Bs7074: Part1 :1989 gives full details of accurate method of calculating the required expansion vessel capacity, assuming that full and accurate design information is available, particularly total system water content. However, in practice, it is often not possible to calculate the system water contents with any certainty, and therefore estimates must be made.

The following volume approximations can be used to give a reasonable estimate of total system volume.

| | |
|---|---|
| COMBI | 61.5 LITRES |
| KW RATING | 21/27 |
| SMALL BORE PIPEWORK | 1 Litre Per Kw of System Output |
| STEEL PANEL RADIATORS | 8 Litre Per Kw of System Output |
| LOW WATER CAPACITY RADIATORS MODERN TYPE | 2 Litre Per Kw of System Output |
| HOT WATER CYLINDER | 2 Litres |

**Note:** As an approximation, BS7074: Part1 suggests that figures of 12 litres/kw of boiler output could be used to estimate total system water content – this would be generous for most systems.

## EXPANSION VESSEL SIZING

Having determined the total system water content, expansion vessel sizing can be considered. Taking into account the other system design factors

Full details of expansion vessel sizing and models available are given in the expansion vessel data sheet. However, expansion vessels are supplied pre-charges at 1 bar (suitable for system static heads up to 15 metres) and the safety valve normally pre-set at 3 bar (British Specification). For standard conditions therefore, the above table can be used to select the required expansion vessel volume.

**NB:** Please note the above information (EXPANSION VESSEL SIZING) is only a guide therefore we do not accept responsibility for sizing of systems and this does not over rule British Standards always refer back to BS7074: Part1 if in doubt.

## FILLING THE SYSTEM

Prior to filling, the system must be thoroughly flushed using a cleaning agent. The system must then be vented of all air and recharged to maximum of 1.5 bar.

## CONVENTIONAL FLUE INSTALLATION

The boiler is supplied as standard for use with conventional flue.
The chimney must comply with building regulations and BS 5410. Factory made insulated chimneys are covered by BS 4543 Parts 2 & 3.

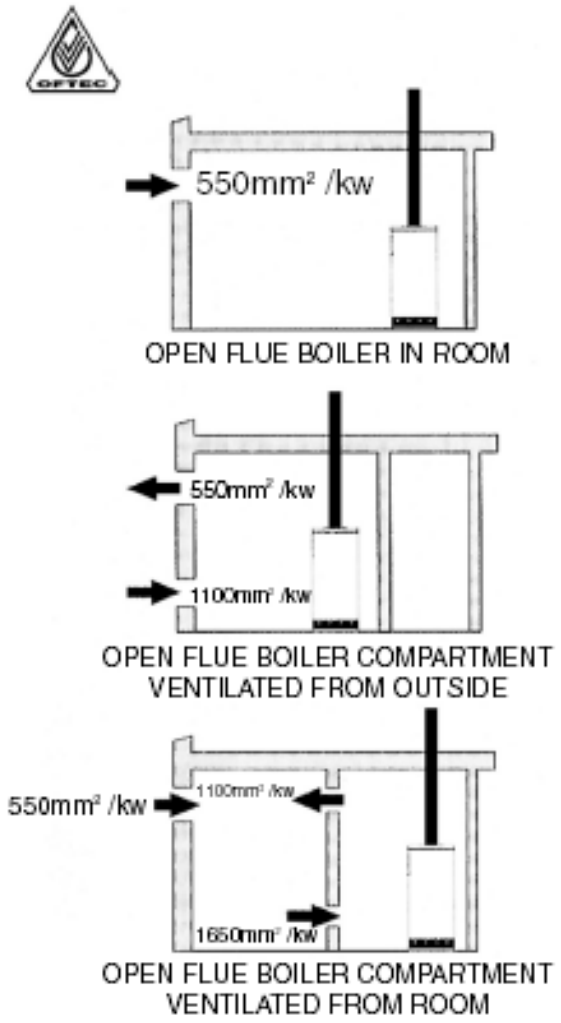
Notes on Conventional Flue:

1. **Liner** – A stainless steel flue liner of diameter to suit the boiler is recommended
2. **Flue Pipe** – can be of vitreous enamel or stainless steel
3. **Bends** – Bends in the flue pipe should not be greater than 135 degrees.
4. **Insulation** – Insulation between the flue pipe and brick chimney, is recommended to minimize the occurrence of condensation.
5. **Cowls** – Cowls and pots that may restrict the flue should not be used.
6. **Draught Stabilisers** – Chimneys over 6 metres high may produce excessive draught (over 4mm w.g.). Draught stabilisers may be required.
7. **Length** – Before bends are applied, length of flue must be at least 600mm.

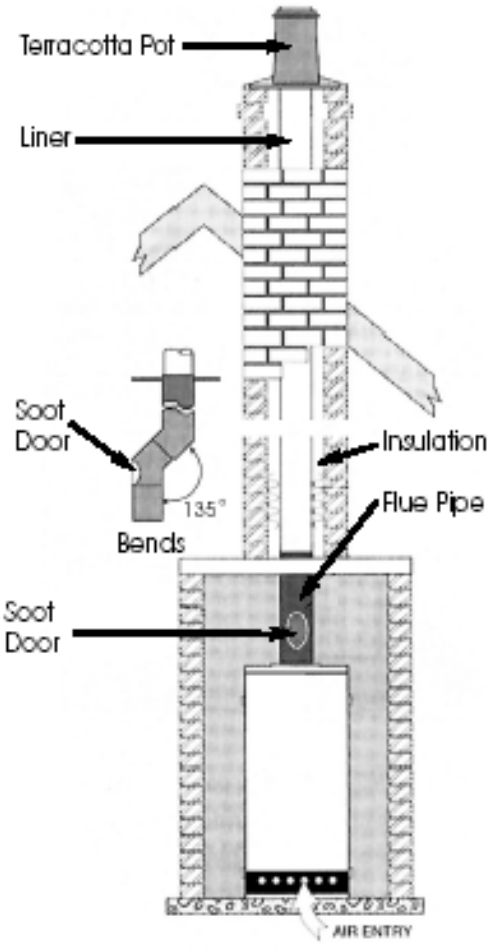
## COMBUSTION AIR SUPPLY – CONVENTIONAL FLUE

*CONVENTIONAL FLUES MUST BE SUITABLE FOR CONDENSING BOILERS*

INFORMATION SUPPLIED BY OFTEC




Conventional Flue - Typical Arrangement



## ELECTRICAL CONNECTION (SENATOR KITCHEN COMBI)

The electrical supply to the boiler must be wired to a double pole - isolating switch 240v/50hz, fused at 5 amps. A multi 3-pin plug is included with the boiler, which connects with the boiler control panel.

The burner is supplied with 4-wire cable plug, which allows disconnection for maintenance.

## CONTROL OPTIONS

A Room Thermostat must be fitted for the boiler to work correctly.
A Frost Thermostat may be required this should be assessed when installing the boiler

## INTEGRAL TIME CLOCK (SENATOR KITCHEN COMBI ONLY)

The integral time clock controls the heating function. The domestic hot water function is permanently on and controlled by a heating control thermostat.

## INSTALLATION OF A ROOM THERMOSTAT

Connect a room thermostat to terminal 3 and 4 on the 8 way connect strip inside the boiler control panel and discard link wire. If neutral wire is required for room thermostat, connect neutral wire to terminal 6 on the 8 way connect strip.

## INSTALLATION OF A TIME CLOCK OR PROGRAMMABLE ROOM STAT

Connect a remote time clock or programmable room stat to 3 and 4 on the 8 way connect strip, inside the boiler control panel and then disregard link wire.

The internal time clock can be switched to continuously on, or a link wire can be connected to 4 and 5 on the 8 way connect strip to disable integral time clock.

## INSTALLATION OF FROST THERMOSTAT

Connect a frost thermostat to terminal 5 and 3 on the 8 way connect strip inside the boiler control panel. If neutral wire is required for frost thermostat, connect to terminal 6 on the 8 way connect strip.

## ELECTRICAL CONNECTION (COUNTRYMAN OUTDOOR COMBI)

The electrical supply to the boiler must be wired to a double pole - isolating switch 240v/50hz, fused at 5 amps. A multi 6-pin plug is included with the boiler, which connects with the boiler control panel.

The burner is supplied with 4-wire cable plug, which allows disconnection for maintenance.

## CONTROL OPTIONS

A Room Thermostat must be fitted for the boiler to work correctly.
A Frost Thermostat may be required this should be assessed when installing the boiler

## INSTALLATION OF A TIME CLOCK OR PROGRAMMABLE ROOM STAT (COUNTRYMAN OUTDOOR COMBI ONLY)

Installation of external time clock or programmable room thermostat to Countryman Combi. The boiler comes with a multi 6-pin plug. The electrical supply must be sent directly to the boiler, off the fused spur and not interrupted by any forms of control i.e. time switch or programmable room thermostat. The electrical supply to the time switch or programmable room thermostat is supplied from the boiler. The connections to the muti pin plug are as follows:

PIN 1 = Earth
PIN 2 = Neutral
PIN 3 = Live
PIN 4 = Electrical supply out from boiler to time switch or programmable room thermostat
PIN 5 = Switch supply back from the time switch or programmable room thermostat

The External Time Clock controls the heating function. The domestic hot water function is permanently on and controlled by Heating Control Thermostat.

## INSTALLATION OF A ROOM THERMOSTAT

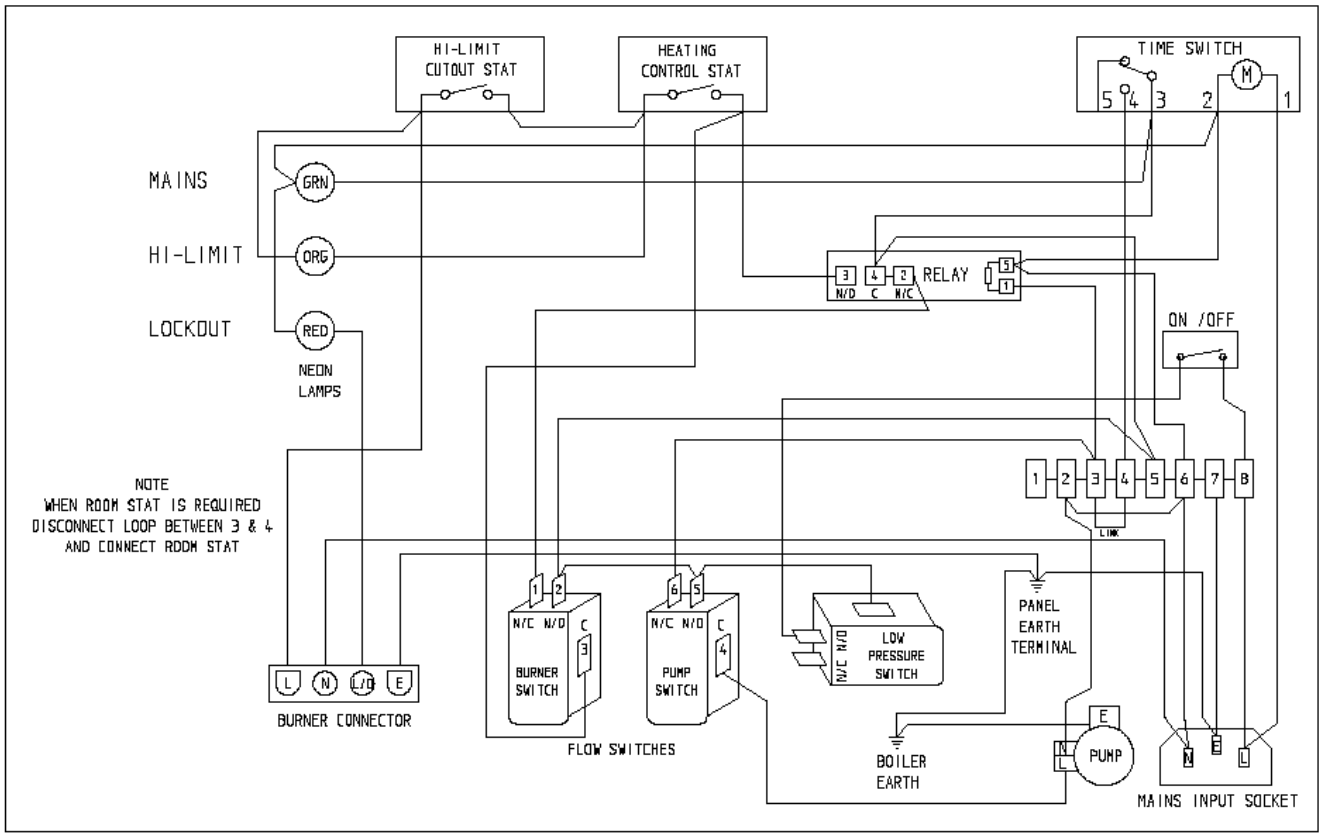
Connect a room thermostat to terminal 3 and 4 on the 8 way connect strip inside the boiler control panel and discard link wire. If neutral wire is required for room thermostat, connect neutral wire to terminal 6 on the 8 way connect strip.

## INSTALLATION OF FROST THERMOSTAT

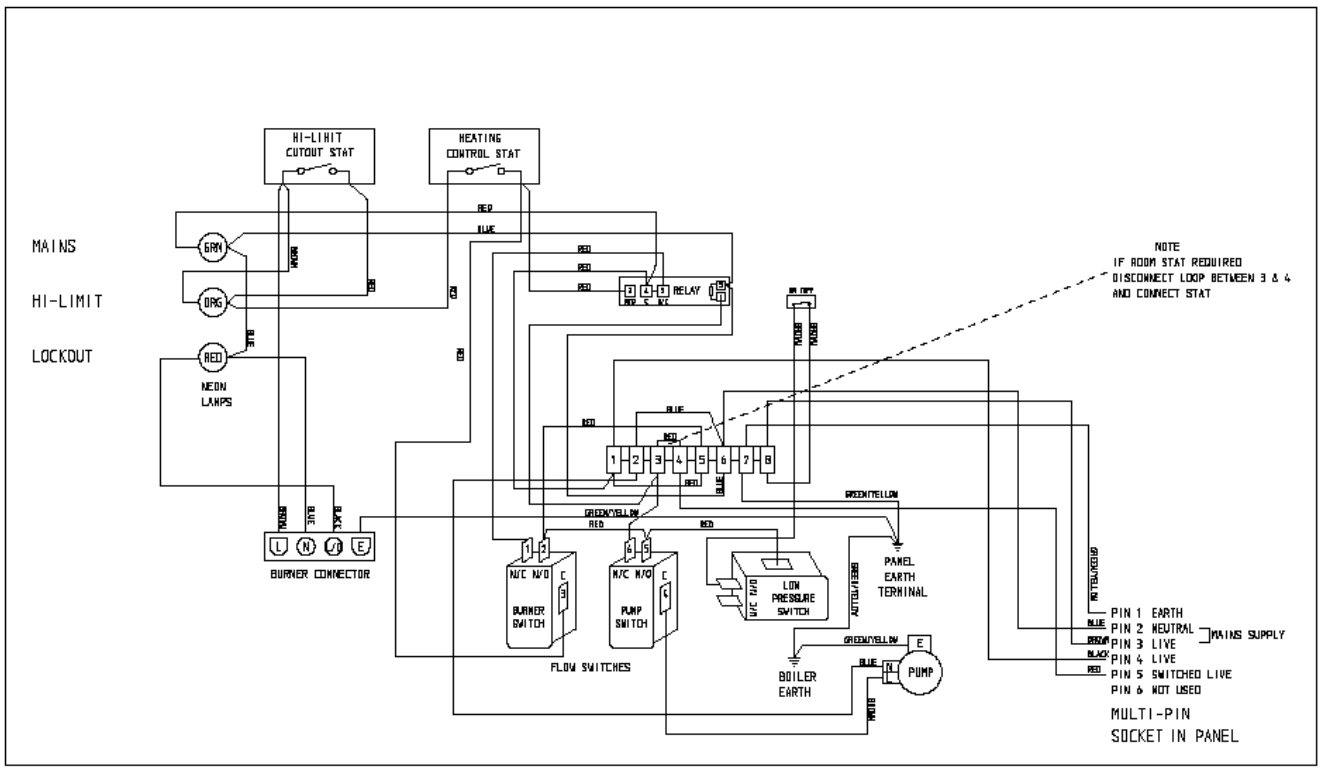
Connect a frost thermostat to terminal 5 and 3 on the 8 way connect strip inside the boiler control panel. If neutral wire is required for frost thermostat, connect to terminal 6 on the 8 way connect strip.

## WIRING DIAGRAM

## SENATOR COMBI




## COUNTRYMAN COMBI



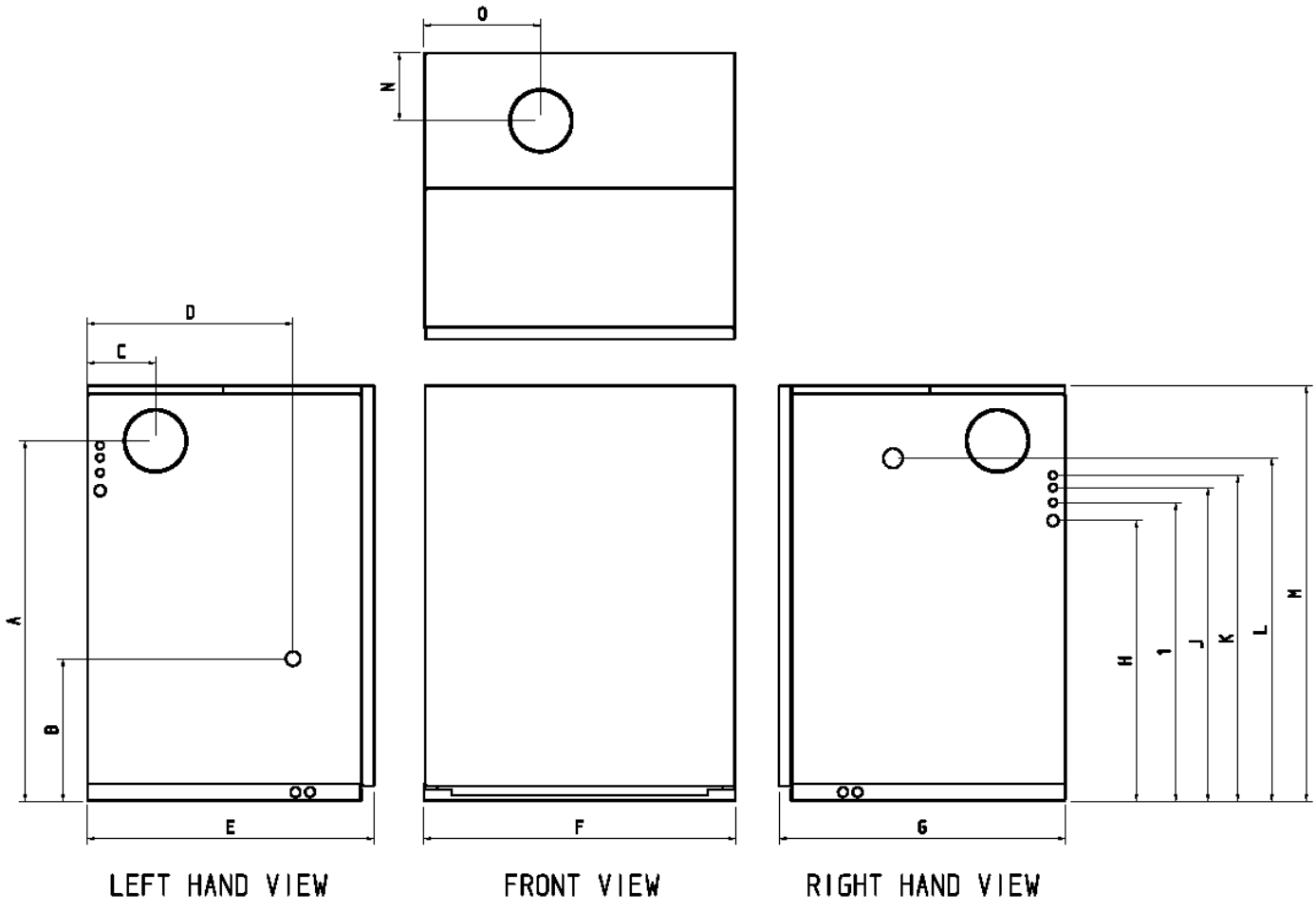
**COMBI SENATOR KITCHEN MODELS TECHNICAL SPECIFICATION**

| DIMENSIONS | 15/21 KW | 21/27 KW | 27/38 KW |
|---|---|---|---|
| A | 741 | 741 | 741 |
| B | 293 | 293 | 293 |
| C | 140 | 140 | 140 |
| D | 423 | 423 | 423 |
| E | 589 | 589 | 589 |
| F | 641 | 641 | 641 |
| G | 589 | 589 | 589 |
| H | 577 | 577 | 577 |
| I | 614 | 614 | 614 |
| J | 645 | 645 | 645 |
| K | 670 | 670 | 670 |
| L | 705 | 705 | 705 |
| M | 854 | 854 | 854 |
| N | 140 | 140 | 140 |
| O | 240 | 240 | 240 |

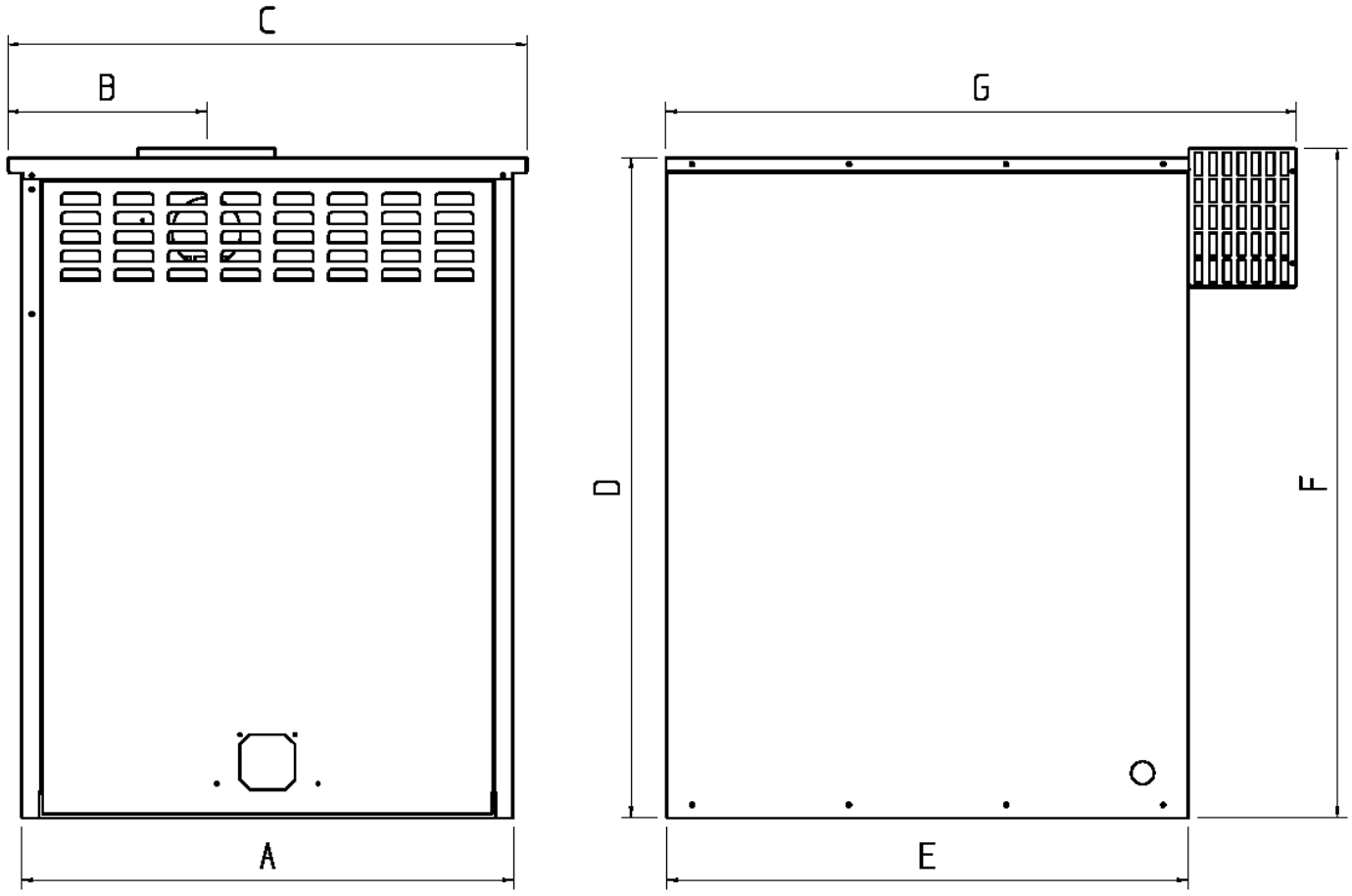
DIMENSIONS ARE IN (mm.)

## General Data

Electrical Supply. 240w-50hz
Fuel: 28 Second
Maximum Control Thermostat Setting 85°C
Expansion Vessel Capacity 12 Litres
Conventional Size 100-125mm
Oil Supply Connection ¼" BSP
High Limit Stat: Manual Reset
Maximum Operating Pressure
Spring Safety Valve @ 3 bar
Thermostatic Mixer Valve 30°C – 70°C



**COMBI COUNTRYMAN OUTDOOR MODELS TECHNICAL SPECIFICATION**




| DIMENSIONS | 15/21 KW | 21/27 KW | 27/38 KW |
|---|---|---|---|
| A | 645 | 645 | 645 |
| B | 260 | 260 | 260 |
| C | 681 | 681 | 681 |
| D | 868 | 868 | 868 |
| E | 684 | 684 | 684 |
| F | 880 | 880 | 880 |
| G | 827 | 827 | 827 |

DIMENSIONS ARE IN (mm)

## General Data

Electrical Supply. 240w-50hz
Fuel: 28 Second
Maximum Control Thermostat Setting 85°C
Expansion Vessel Capacity 12 Litres
Thermostatic Mixer Valve 30°C – 70°C
Oil Supply Connection ¼" BSP
High Limit Stat: Manual Reset
Maximum Operating Pressure
Spring Safety Valve @ 3 bar

## COMMISSIONING & SERVICING INSTRUCTIONS

A competent service engineer OFTEC registered should be appointed on an annual basis.

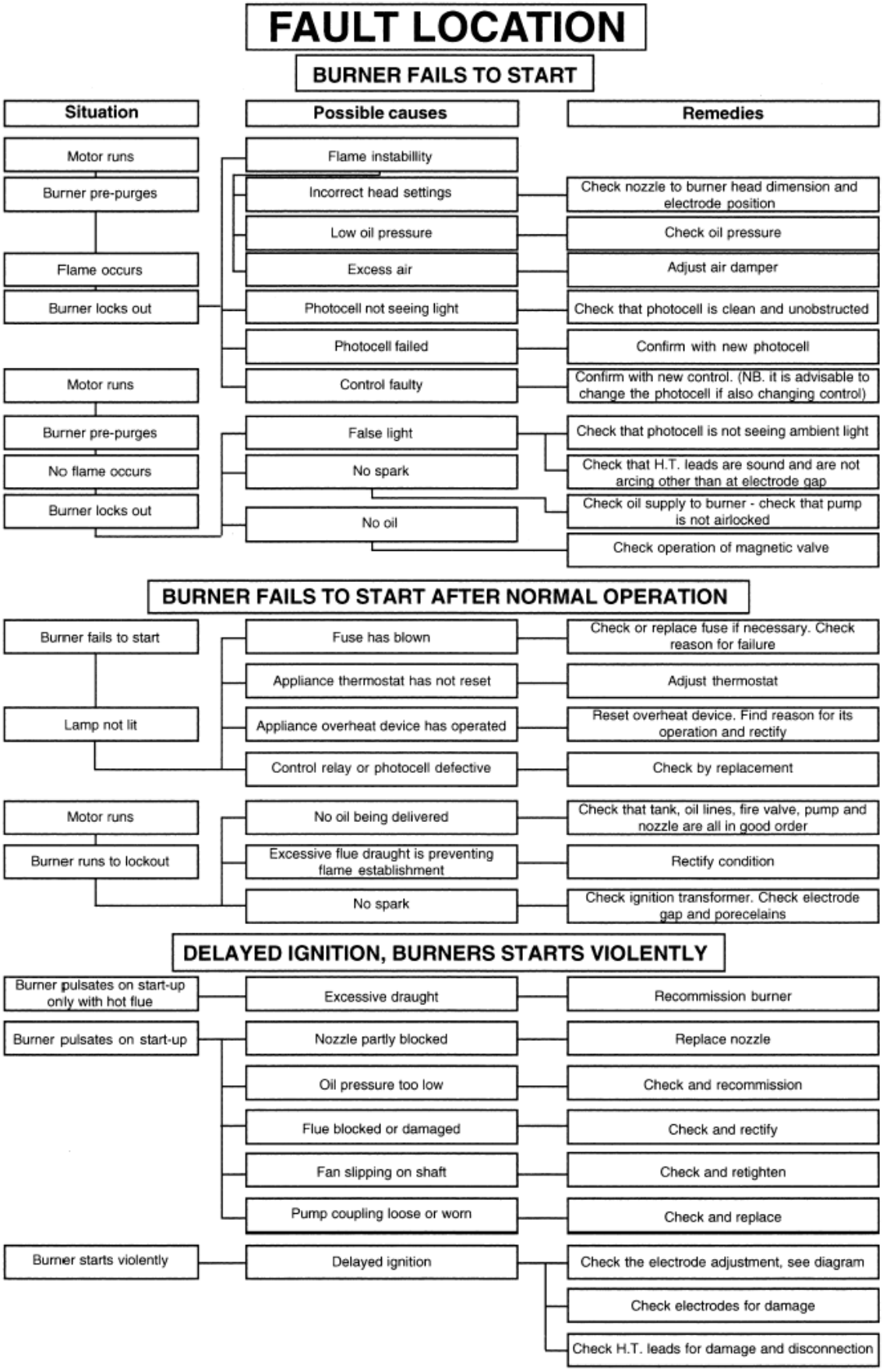
- Isolate Power to the boiler
- De-pressurise heating system and check expansion vessel pre-charge is the same as the cold fill pressure, of the heating system. Expansion vessel pre-charge must not exceed 1.5 bar.
- Remove inspection door, burner and baffle assembly
- Brush down the inside of the heat exchanger and vacuum out debris
- Clean baffle assembly
- Pull out inserts from stainless steel heat exchanger and clean before replacing. Ensure stainless steel heat exchanger is thoroughly cleaned.
- Empty and clean condensing trap
- Inspect and clean burner assembly, and replace with new nozzle (see burner manual)
- Renew any insulation e.g. inspection door or inside base of heat exchanger
- Reassemble baffles and replace inspection door.
- Replace paper oil filters
- Turn electrical supply to the boiler to ON.
- Set central heating controls so they are calling for heat.
- Set burner pump pressure.
- Allow time for the boiler to reach normal operating temperature.
- Check the smoke reading.
- Measure the $Co^2$
- Measure net flue gas temperature.
- Check domestic hot water flow and hot temperature is acceptable to the householder.

**PLEASE NOTE**: Reducing the air supply into the burner air inlet shutter, decrease the flue gas temperature and increases the $Co^2$



## BOILER WILL NOT START

Check if mains electricity supply is reaching boiler control panel, making sure control thermostat is turned on and time clock is calling for heat. Mains indicator green should be illuminated. If green light is not illuminated and fuse has been checked then heating system charge may be low, check black needle on pressure, located inside boiler cabinet (top right hand side) is reading 1 bar or more. If not depressurised, refer to fault diagnosis.



**NO HEATING OR HOT WATER**

- Check there is power to the boiler, has fuse blown? If yes replace and test, if fuse continues to blow check circulation pump is not passing heating water into circulation pump electrical box.
- Is the system pressure below 1 bar on black needle on pressure gauge? If yes recharge system pressure by opening the filling loop valve slowly, until black needle indicator reads (approx 1 bar)
- Green neon NOT illuminated. Place rocker switch to the ON position located on the control panel. (Check system is pressurised)
- Green and orange neon illuminated. Reset start by pushing red button in, next to the On/Off rocker switch on the control panel. Vent air from the system. Re-check system pressure charge.
- Orange neon illuminates regularly when in heating mode, check calibration of control stat and replace if out of range.
- Green and red neon illuminated, refer to Burner Locked Out (Page 5)

**NO D.H.W, BUT SOME WHEN HEATING ON**

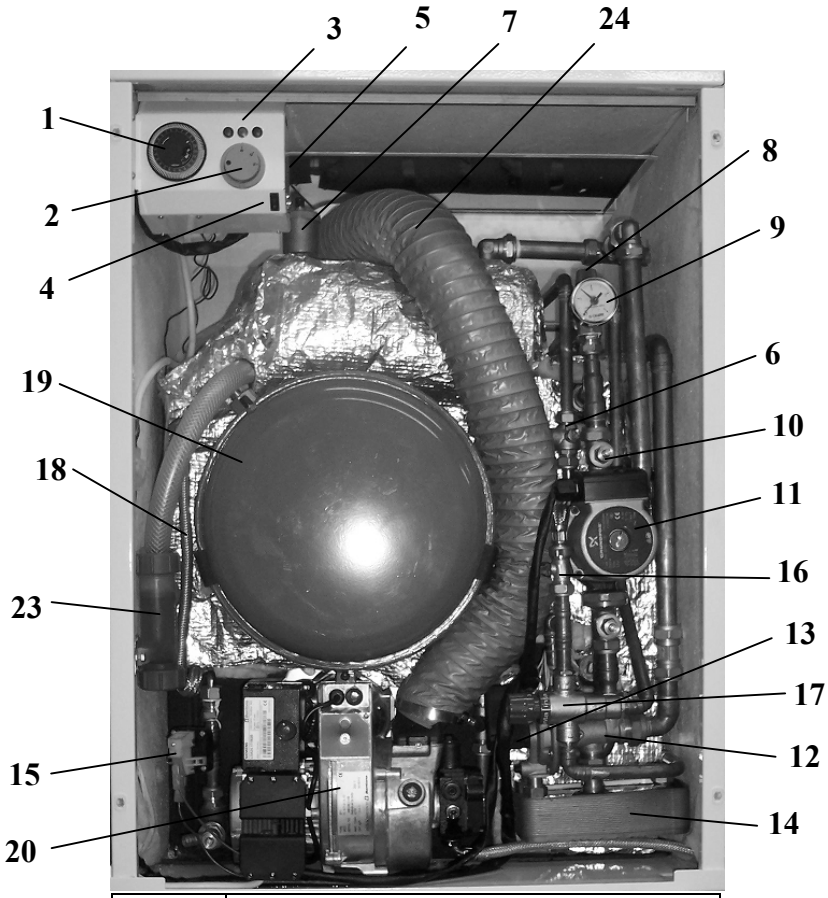
Turn time switch to the off position and open hot tap. If boiler doesn't fire up when Temp drops approximately 1-2 minutes, remove micro switch from diverter valve, by removing circlip located at the bottom of the switch (if micro switch is not attached to the diverter valve, it could be damaged, this would prevent the burner and circulation pump coming on). If not check electrical connection to switches to check that burner and circulation pump are coming on. If not check electrical connection to switches and replace if faulty. If micro switches are working correctly, check that cap is on plunger, If cap is not and has been dislodged refit cap and check that plunger is moving out, when tap is open, if not replace diaphragm.

**NO D.H.W, HEATING FUNCTION CORRECTLY**

- Check 15mm pipe coming off plate heat exchanger, that goes to mixer valve is hot. If not there could possibly be a blockage in the plate heat exchanger i.e. lime scale. If this is the case descale if possible, or replace and check appropriate water softening equipment has been fitted.

- Check 15mm pipe coming off plate heat exchanger going to mixer valve is hot. But 15mm coming out of the mixer valve is not hot. Rotate mixer valve control knob in and out, as valve may have stuck. If this does work remove, clean and replace if faulty.

## SENATOR KITCHEN COMBI PARTS LIST




| ITEM | DESCRIPTION |
|---|---|
| 1 | INTERNAL TIME SWITCH |
| 2 | CONTROL THERMOSTAT |
| 3 | GREEN NEON |
| | ORANGE NEON |
| | RED NEON |
| 4 | ROCKER SWITCH |
| 5 | HIGH LIMIT THERMOSTAT |
| 6 | FLOW REGULATOR |
| 7 | AIR VENT |
| 8 | SAFETY RELIEF VALVE |
| 9 | PRESSURE GAUGE |
| 10 | GATE VALVES |
| 11 | GRUNFOSS PUMP |
| 12 | DIVERTER VALVE DIAPHRAGM |
| 13 | MIRCO SWITCHES |
| 14 | PLATE HEAT EXCHANGER |
| 15 | LOW PRESURE SWITCH |
| 16 | FILLING LOOP |
| 17 | THERMOSTAT MIXER VALVE |
| 18 | EXPANSION VESSEL HOSE |
| 19 | 12 LITRE EXPANSION VESSEL |
| 20 | BURNER |
| 21 | DOOR INSULATION KIT (NOT SHOWN) |
| 22 | BASE INSULATION KIT (NOT SHOWN) |
| 23 | CONDENSATE TRAP |
| 24 | SNORKEL TUBE |