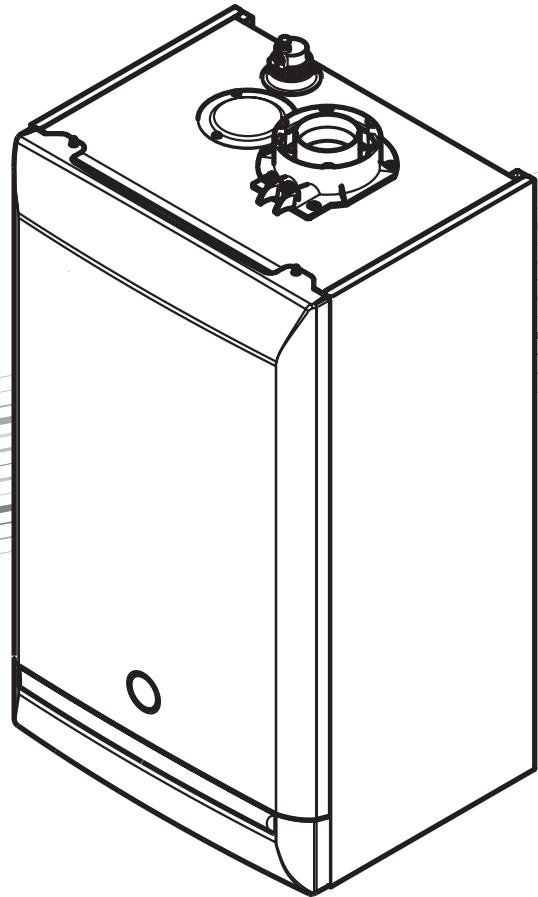


BAXI

Installation & Servicing Instructions



Megaflo System HE A Range

Gas Fired Wall Mounted Condensing Boiler

These instructions include the Benchmark Commissioning Checklist and should be left with the user for safe keeping.

Natural Gas

Baxi Megaflo System 15 HE A

G.C.N° 41 075 55

Baxi Megaflo System 18 HE A

G.C.N° 41 075 56

Baxi Megaflo System 24 HE A

G.C.N° 41 075 57

Baxi Megaflo System 28 HE A

G.C.N° 41 075 58

Baxi Megaflo System 32 HE A

G.C.N° 41 075 59

The Benchmark Scheme

Benchmark places responsibilities on both manufacturers and installers. The purpose is to ensure that customers are provided with the correct equipment for their needs, that it is installed, commissioned and serviced in accordance with the manufacturer's instructions by competent persons and that it meets the requirements of the appropriate Building Regulations. The Benchmark Checklist can be used to demonstrate compliance with Building Regulations and should be provided to the customer for future reference.

Installers are required to carry out installation, commissioning and servicing work in accordance with the Benchmark Code of Practice which is available from the Heating and Hotwater Industry Council who manage and promote the Scheme. Visit www.centralheating.co.uk for more information.

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The Company Secretary, Baxi Heating UK Ltd, The Wyvern Business Park, Stanier Way, Derby, DE21 6BF.

Full acknowledgement of author and source must be given.

WARNING: Any person who does any unauthorised act in relation to a copyright work may be liable to criminal prosecution and civil claims for damages.

Building Regulations and the Benchmark Commissioning Checklist

Building Regulations (England & Wales) require notification of the installation of a heating appliance to the relevant Local Authority Building Control Department. From 1 April 2005 this can be achieved via a Competent Persons Self Certification Scheme as an option to notifying the Local Authority directly. Similar arrangements will follow for Scotland and will apply in Northern Ireland from 1 January 2006.

CORGI operate a Self Certification Scheme for gas heating appliances.

These arrangements represent a change from the situation whereby compliance with Building Regulations was accepted as being demonstrated by completion of the Benchmark Logbook (which was then left on site with the customer).

With the introduction of Self Certification Schemes, the Benchmark Logbook is being withdrawn. However, a similar document in the form of a commissioning checklist and service interval record is incorporated at the back of these instructions.

This company is a member of the Benchmark initiative and fully supports the aims of the programme. Its aim is to improve the standards of installation and commissioning of central heating systems in the UK and to encourage the regular servicing of all central heating systems to ensure safety and efficiency.

Building Regulations require that installations should comply with manufacturer's instructions. It is therefore important that the commissioning checklist is completed by the installer. The relevant section of Building Regulations only relates to dwellings. Therefore the checklist only applies if the appliance is being installed in a dwelling or some related structure.

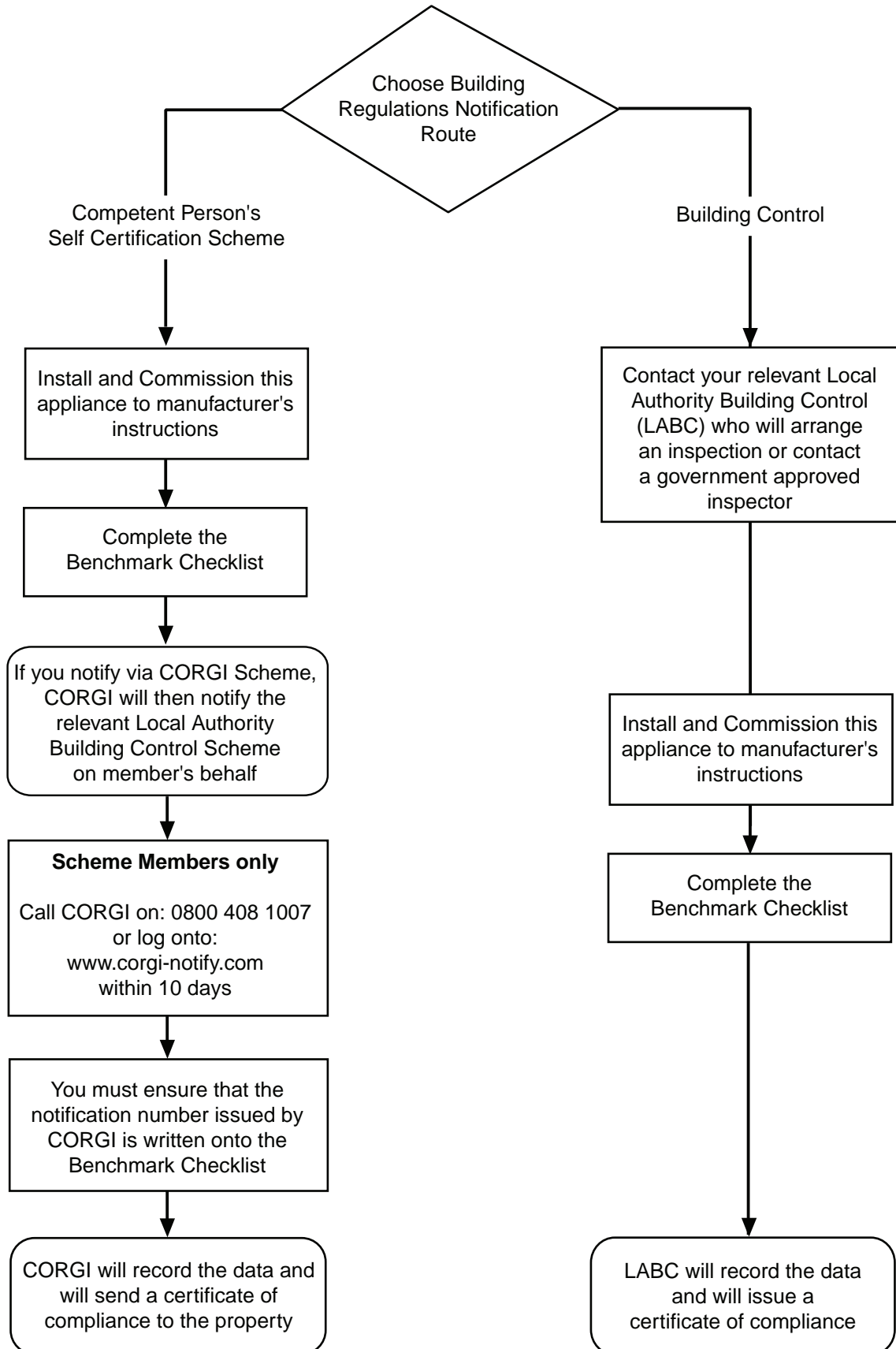
The flowchart opposite gives guidance for installers on the process necessary to ensure compliance with Building Regulations.

"Baxi" supports



ISO 9001
FM 00866

This product has an energy rating (A) on a scale of A to G.
For more information see www.boilers.org.uk. This is a certification mark.



IMPORTANT - Installation, Commissioning, Service & Repair

This appliance must be installed in accordance with the manufacturer's instructions and the regulations in force. Read the instructions fully before installing or using the appliance.

In GB, this must be carried out by a competent person as stated in the Gas Safety (Installation & Use) Regulations.

Definition of competence: A person who works for a CORGI registered company and holding current certificates in the relevant ACS modules, is deemed competent.

In IE, this must be carried out by a competent person as stated in I.S. 813 "Domestic Gas Installations".

The addition of anything that may interfere with the normal operation of the appliance without express written permission from the manufacturer or his agent could invalidate the appliance warranty. In GB this could also infringe the Gas Safety (Installation and Use) Regulations.

Warning - Check the information on the data plate is compatible with local supply conditions.

All CORGI registered installers carry a CORGI identification card and have a registration number. You can check your installer is registered by telephoning 0800 915 0485 or writing to:-

1 Elmwood,
Chineham Business Park,
Crockford Lane,
Basingstoke. RG24 8WG

or check online at www.trustcorgi.com

The boiler meets the requirements of Statutory Instrument "The Boiler (Efficiency) Regulations 1993 N° 3083" and is deemed to meet the requirements of Directive 92/42/EEC on the energy efficiency requirements for new hot water boilers fired with liquid or gaseous fuels:-

Type test for purpose of Regulation 5 certified by:
Notified Body 0085.

Product/Production certified by:
Notified Bodies 0085 & 0086.

For GB/IE only.

This company declare that no substances harmful to health are contained in the appliance or used during appliance manufacture.

The appliance is suitable only for installation in GB and IE and should be installed in accordance with the rules in force, and only used in a suitably ventilated location.

In GB, the installation must be carried out by a CORGI Registered Installer. It must be carried out in accordance with the relevant requirements of the:

- Gas Safety (Installation & Use) Regulations.
- The appropriate Building Regulations either The Building Regulations, The Building Regulations (Scotland), Building Regulations (Northern Ireland).
- The Water Fittings Regulations or Water Byelaws in Scotland.
- The Current I.E.E. Wiring Regulations.

Where no specific instructions are given, reference should be made to the relevant British Standard Code of Practice.

In IE, the installation must be carried out by a competent Person and installed in accordance with the current edition of I.S. 813 'Domestic Gas Installations', the current Building Regulations and reference should be made to the current ETCI rules for electrical installation.

All systems must be thoroughly flushed and treated with inhibitor (see section 6.2).

Codes of Practice - refer to the most recent version

In GB the following Codes of Practice apply:

Standard	Scope
BS 6891	Gas Installation.
BS 5546	Installation of hot water supplies for domestic purposes.
BS 5449	Forced circulation hot water systems.
BS 6798	Installation of gas fired hot water boilers.
BS 5440 Part 1	Flues.
BS 5440 Part 2	Ventilation.
BS 7074	Expansion vessels and ancillary equipment for sealed water systems.
BS 7593	Treatment of water in domestic hot water central heating systems.

In IE the following Codes of Practice apply:

Standard	Scope
I.S. 813	Domestic Gas Installations.
The following standards give valuable additional information;	
BS 5546	Installation of hot water supplies for domestic purposes.
BS 5449	Forced circulation hot water systems.
BS 7074	Expansion vessels and ancillary equipment for sealed water systems.
BS 7593	Treatment of water in domestic hot water central heating systems.

General

The following advice should be adhered to, from when first handling the boiler to the final stages of installation, and also during maintenance.

Most injuries as a result of inappropriate handling and lifting are to the back, but all other parts of the body are vulnerable, particularly shoulders, arms and hands. Health & Safety is the responsibility of EVERYONE.

There is no 'safe' limit for one man - each person has different capabilities. The boiler should be handled and lifted by TWO PEOPLE.

Do not handle or lift unless you feel physically able.

Wear appropriate Personal Protection Equipment e.g. protective gloves, safety footwear etc.

Preparation

Co-ordinate movements - know where, and when, you are both going.

Minimise the number of times needed to move the boiler - plan ahead.

Always ensure when handling or lifting the route is clear and unobstructed. If possible avoid steps, wet or slippery surfaces, unlit areas etc. and take special care on ladders/into lofts.

Technique

When handling or lifting always use safe techniques - keep your back straight, bend your knees. Don't twist - move your feet, avoid bending forwards and sideways and keep the load as close to your body as possible.

Where possible transport the boiler using a sack truck or other suitable trolley.

Always grip the boiler firmly, and before lifting feel where the weight is concentrated to establish the centre of gravity, repositioning yourself as necessary. See the 'Installation' section of these instructions for recommended lift points.

Remember

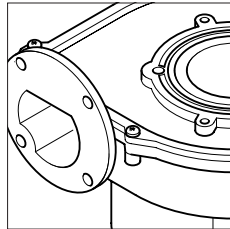
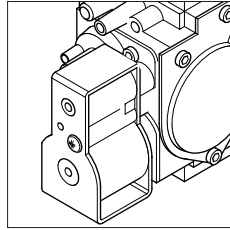
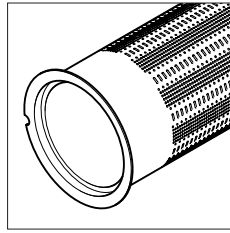
The circumstances of each installation are different. Always assess the risks associated with handling and lifting according to the individual conditions.

If at any time when installing the boiler you feel that you may have injured yourself STOP !!
DO NOT 'work through' the pain - you may cause further injury.

IF IN ANY DOUBT DO NOT HANDLE OR LIFT THE BOILER - OBTAIN ADVICE OR ASSISTANCE BEFORE PROCEEDING !!

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1.0 Introduction

1.1 Description

1. The Baxi Megaflo System HE A is a fully automatic gas fired wall mounted condensing system boiler. It is room sealed and fan assisted.

2. The boiler is set to give a maximum output of :-

15 models -	15 kW
	16.2 kW (Condensing)
18 models -	18 kW
	19.4 kW (Condensing)
24 models -	24 kW
	25.9 kW (Condensing)
28 models -	28 kW
	30.3 kW (Condensing)
32 models -	32 kW
	34.4 kW (Condensing)

3. It is designed for use on Natural Gas (G20).

4. The boiler incorporates a circulating pump and expansion vessel. It is suitable for use only on fully pumped sealed systems.

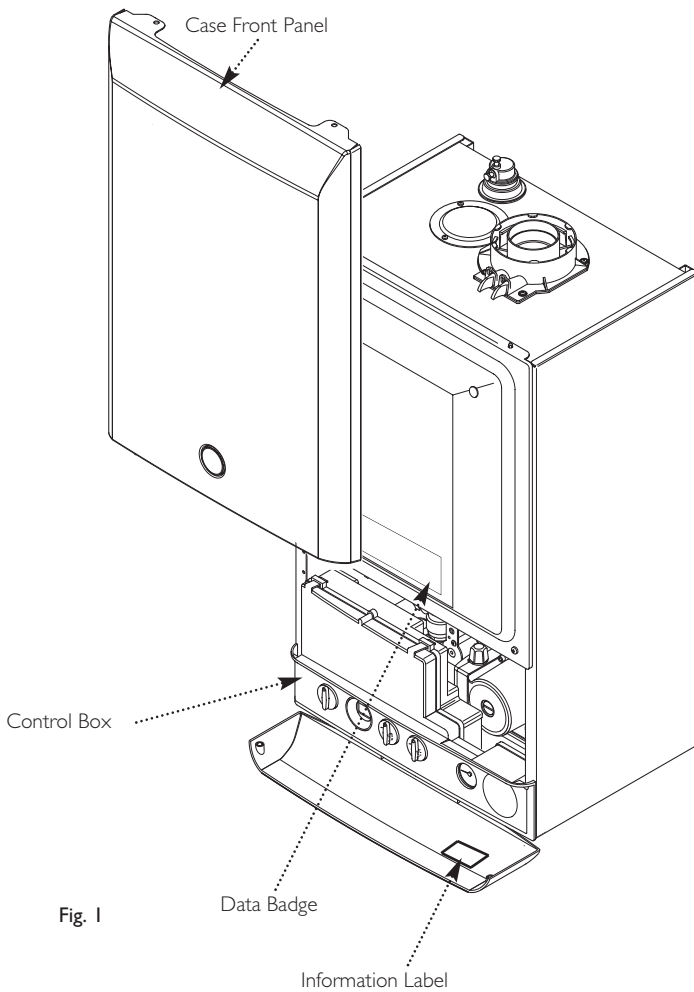
5. The boiler data badge gives details of the model, serial number and Gas Council number and is situated on the inner door panel. It is visible when the case front panel is removed (Fig. 1).

6. The boiler model name and serial number are also shown on the information label on the rear of the lower door panel. This is for user reference.

7. The boiler is intended to be installed in residential / commercial / light industrial E.M.C. environments on a governed meter supply only.

8. The boiler must be installed with one of the purpose designed flues such as the standard horizontal telescopic flue kit, part no. 5118069.

9. **All systems must be thoroughly flushed and treated with inhibitor (see section 6.1).**



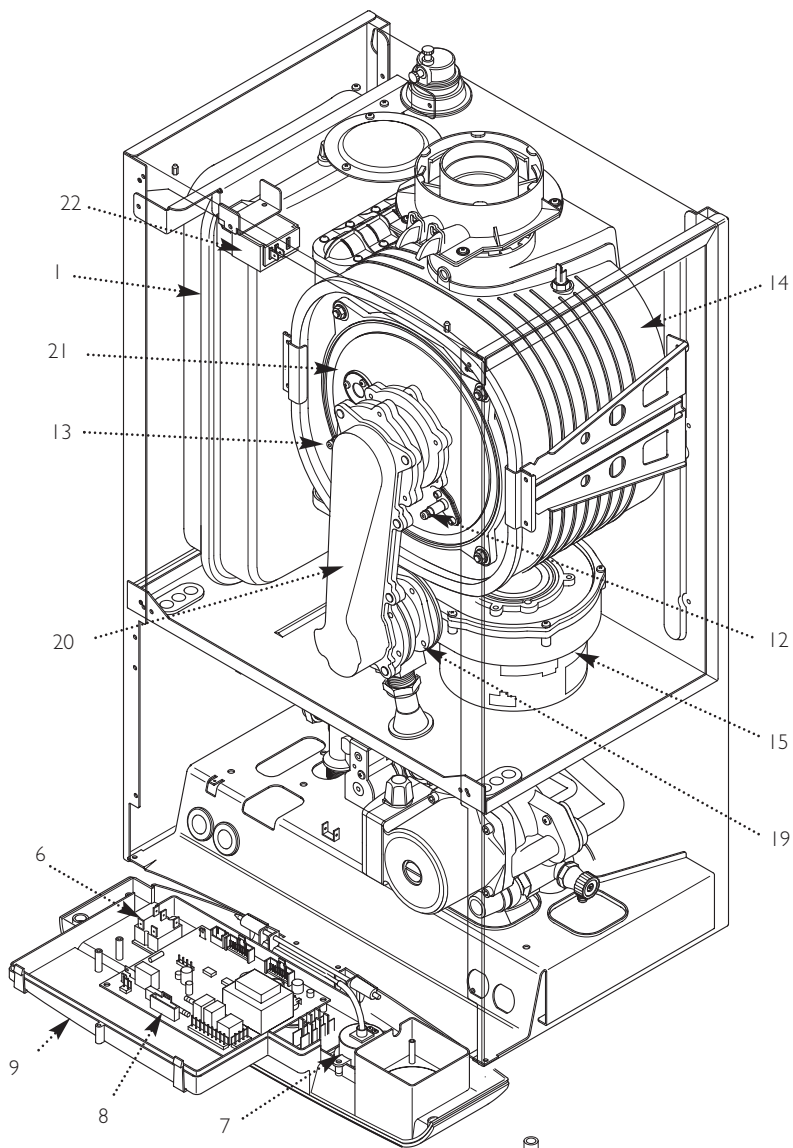
1.2 Contents of Pack

The pack contains:-

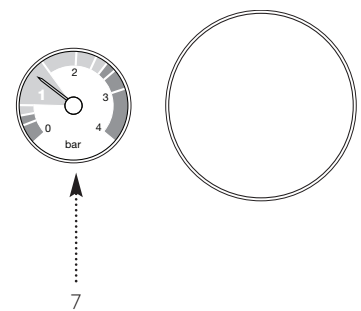
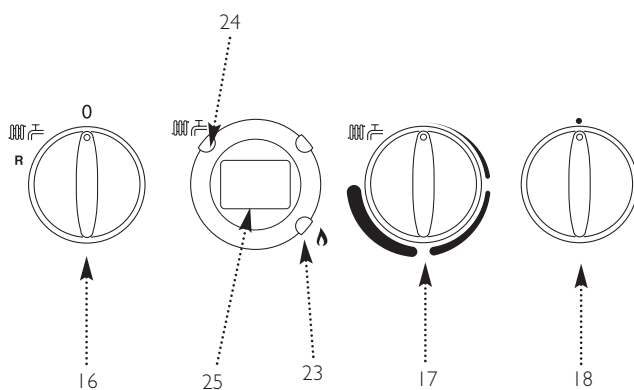
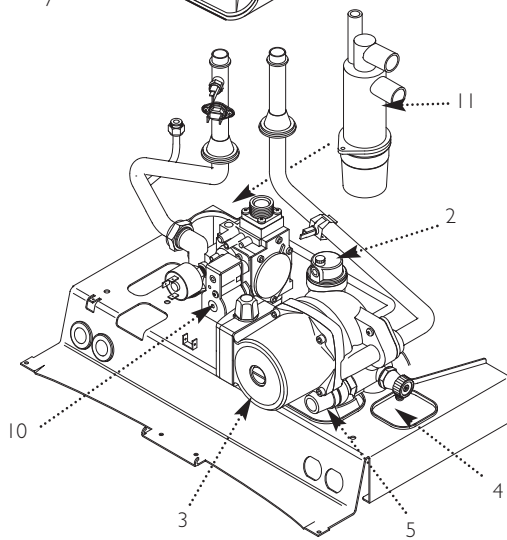
- Boiler
- Wall Plate (including taps)
- Set of Pipe Connections
- Template & 'Quick Fit' Guide
- Literature Pack

2.0 General Layout

2.1 Layout



1. Expansion Vessel
2. Automatic Air Vent
3. Circulation Pump
4. Drain Off Point
5. Pressure Relief Valve
6. Selector Switch
7. Central Heating System Pressure Gauge
8. PCB
9. Control Box
10. Gas Valve
11. Condensate Trap
12. Flame Sensing Electrode
13. Spark Electrode
14. Primary Heat Exchanger
15. Fan Assembly
16. On/Off/Reset Selector Switch
17. Central Heating Temperature Control
18. Calibration Control
19. Venturi
20. Air/Gas Collector
21. Combustion Box Cover & Burner
22. Igniter
23. Burner On Light
24. Central Heating Mode Light
25. Display



3.0 Appliance Operation

3.1 Operating Mode (Fig. 2)

1. With a demand for heating or hot water, the pump circulates water through the primary circuit. If the pressure is at least 0.5 bar the ignition sequence will start.

2. When the flow temperature exceeds the setting temperature, a 3 minute delay occurs before the burner relights automatically (anti-cycling). The pump continues to run during this period.

3. When the demand is satisfied the burner is extinguished and the pump continues to run for a period of 3 minutes (Pump Overrun).

IMPORTANT: When the selector switch is in the '0' (Off) position the electrical supply to the boiler is isolated. The boiler will not operate.

3.2 Frost Protection Mode

1. The frost protection mode is integral to the appliance and functions when the selector switch (see Section 2.1) is in the ON position (ON). If the system temperature falls below 5° C then the boiler will fire on its minimum setting until a flow temperature of 30° C is reached. Further protection can be incorporated by using a system frost thermostat.

3.3 Pump Protection

1. With the selector switch (see Section 2.1) in the ON position (ON) the pump will automatically operate for 1 minute in every 24 hours to prevent sticking.

Boiler Primary Circuit

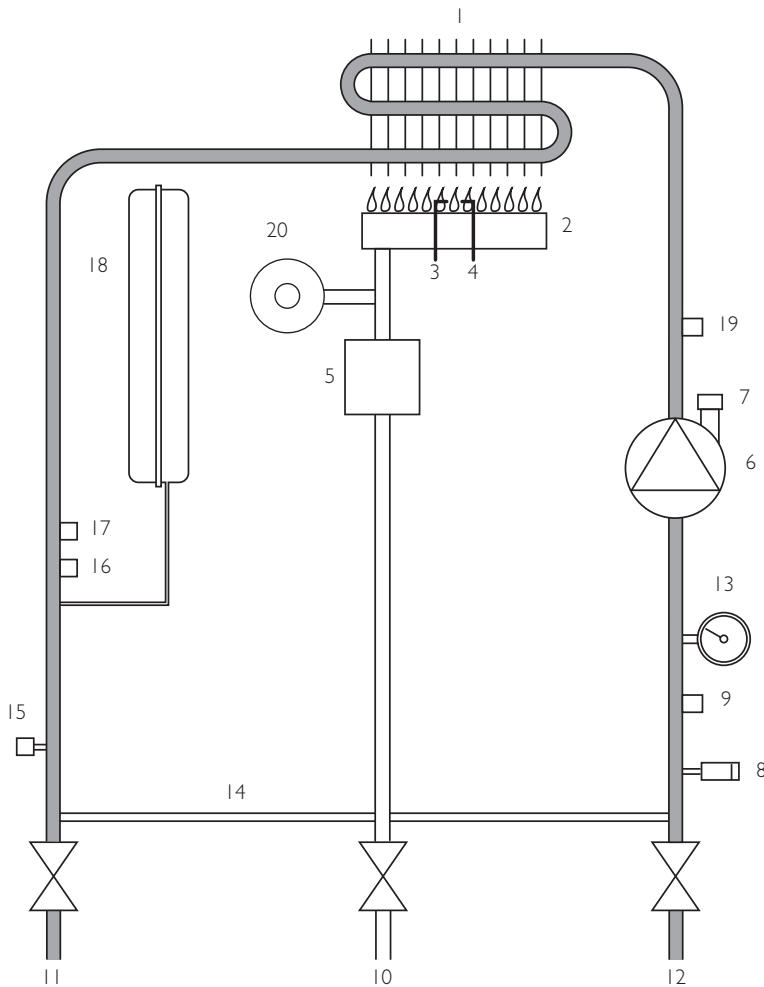


Fig. 2

Key

- 1 Heat Exchanger
- 2 Burner
- 3 Ignition Electrode
- 4 Flame Sensing Electrode
- 5 Gas Valve
- 6 Pump
- 7 Automatic Air Vent
- 8 Pressure Relief Valve
- 9 Boiler Drain Point
- 10 Gas Inlet
- 11 Boiler Flow
- 12 Boiler Return
- 13 Pressure Gauge
- 14 Automatic By-Pass
- 15 Water Pressure Sensor
- 16 Safety Thermostat
- 17 Temperature Sensor
- 18 Expansion Vessel
- 19 Return Temperature Sensor
- 20 Fan

4.1 Megafluo System 15, 18, 24, 28 & 32 HE A

Appliance Type	C ₁₃	C ₃₃	C ₅₃
Appliance Category	CAT I _{2H}		
Heat Input (Net)		Max	Min
15 model	kW	15.4	4
18 model	kW	18.5	4.3
24 model	kW	24.7	7
28 model	kW	28.9	9.7
32 model	kW	32.8	9.7
Heat Input (Gross)		Max	Min
15 model	kW	17.1	4.4
18 model	kW	20.5	4.8
24 model	kW	27.4	7.8
28 model	kW	32.1	10.8
32 model	kW	36.4	10.8
Heat Output (Non-Condensing)		Max	Min
15 model	kW	15	3.9
18 model	kW	18	4.2
24 model	kW	24	6.8
28 model	kW	28	9.4
32 model	kW	32	9.4
Heat Output (Condensing)		Max	Min
15 model	kW	16.2	4.2
18 model	kW	19.4	4.5
24 model	kW	25.9	7.4
28 model	kW	30.3	10.2
32 model	kW	34.4	10.2
Max Gas Rate	(Natural Gas - G20) (After 10 mins)		
15 model	m ³ /h	1.69	
18 model	m ³ /h	1.95	
24 model	m ³ /h	2.61	
28 model	m ³ /h	3.1	
32 model	m ³ /h	3.48	
Injector	(Natural Gas - G20)		
15 model	4.5mm		
18 model	5.7mm		
24 model	7.5mm		
28 model	12mm		
32 model	12mm		

Inlet Pressure	(Natural Gas - G20)	
mbar	20	
Electrical Supply	230V~ 50Hz (Appliance must be connected to an earthed supply)	
Power Consumption		
15 model	130W	
18 model	140W	
24 model	150W	
28 & 32 models	160W	
Electrical Protection	IPX5D	
External Fuse Rating	3A	
Internal Fuse Rating	F2L	
Condensate Drain	To accept 21.5mm (3/4 in) plastic waste pipe	
Flue Terminal	Diameter	100mm
Dimensions	Projection	125mm
Connections	copper tails	
Gas Supply	-	22mm
Central Heating Flow	-	22mm
Central Heating Return	-	22mm
Pressure Relief Discharge	-	15mm
Outercase Dimensions		
Casing Height	-	780mm
Overall Height Inc Flue Elbow	-	965mm
Casing Width	-	450mm
Casing Depth	-	345mm
Clearances		
Above Casing	200 mm Min	
Below Casing	200 mm Min	
Front	450 mm Min (For Servicing)	
Front	5 mm Min (In Operation)	
L.H. Side	5 mm Min	
R.H. Side	5 mm Min (In Operation)	

NO_x Class	5	
Central Heating Primary Circuit Pressures		
Safety Discharge	bar	
Max Operating	3	
Min Operating	2.5	
Recommended Operating Range	0.5 - 2	
Pump	Available Head See graph below	
Expansion Vessel	- (Integral with appliance)	
Min Pre-charge Pressure	bar	
	0.5	
	litre	
Max Capacity of CH System	125	
Primary Water Content of Boiler (unpressurised)	2.5	
Temperatures	Flow Temp (adjustable)	
	25°C to 80°C max (± 5°C)	
Weights		
	15 & 18	24
Packaged Boiler Carton	43.6kg	44.2kg
Installation Lift Weight	38.6kg	39.2kg
	28 & 32	
Packaged Boiler Carton	46kg	
Installation Lift Weight	41kg	

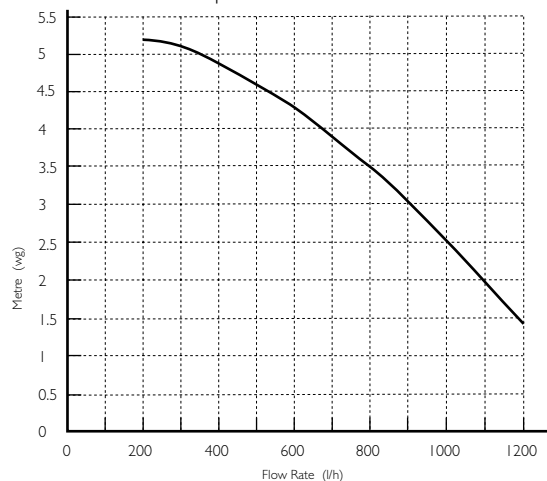
SEDBUK Declaration

The seasonal efficiency (SEDBUK) for all models is:-

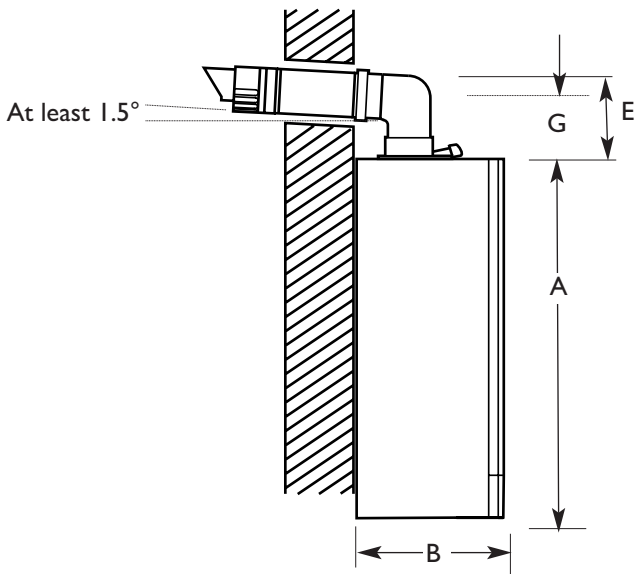
91.2% Band A

This value is used in the UK Government's Standard Assessment Procedure (SAP) for energy rating of dwellings. The test data from which it has been calculated have been certified by 0087.

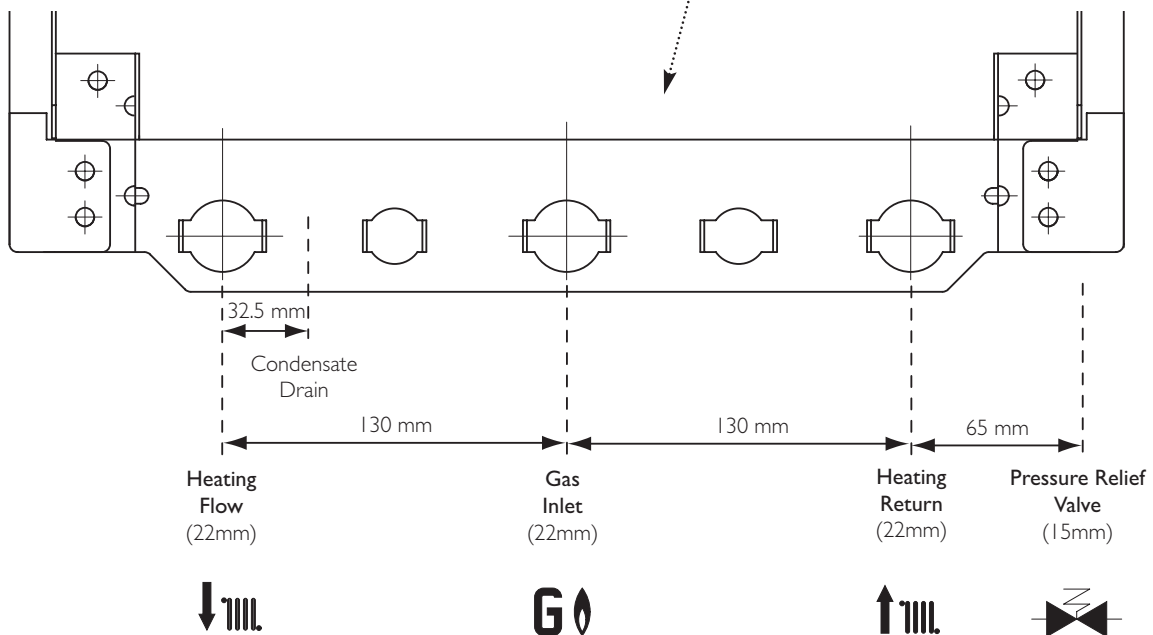
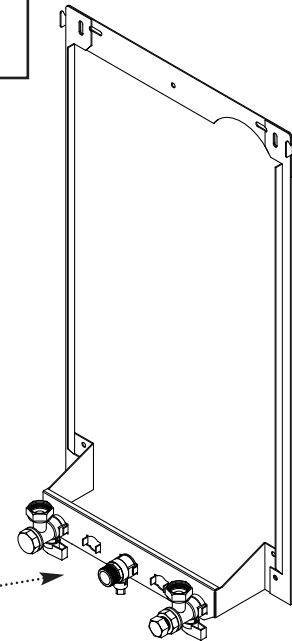
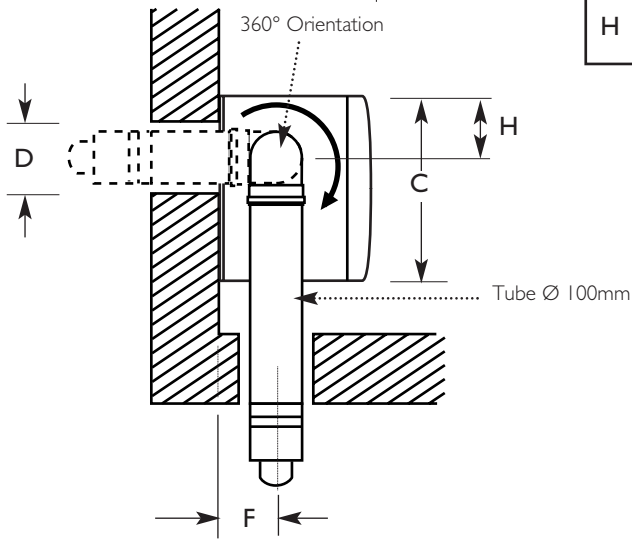
Pump - Available Head



5.0 Dimensions and Fixings



Dimensions	
A	780mm
B	345mm
C	450mm
D	116mm Ø Min.
E	185mm (207mm for 80/125mm flue systems)
F	145mm
G	131mm
H	180mm



6.0 System Details

6.1 Central Heating Circuit

1. The appliance is suitable for fully pumped SEALED SYSTEMS ONLY.

Treatment of Water Circulating Systems

- All recirculatory water systems will be subject to corrosion unless an appropriate water treatment is applied. This means that the efficiency of the system will deteriorate as corrosion sludge accumulates within the system, risking damage to pump and valves, boiler noise and circulation problems.
- When fitting new systems flux will be evident within the system, which can lead to damage of system components.
- All systems must be thoroughly drained and flushed out. Using, for example Betz-Dearborn Sentinel X300 or X400 or Fernox Superfloc Universal Cleanser. They should be used following the flushing agent manufacturer's instructions.
- System additives - corrosion inhibitors and flushing agents/descalers should comply to BS7593 requirements, e.g. Betz-Dearborn Sentinel X100 and Fernox-Copal which should be used following the inhibitor manufacturer's instructions.

Failure to flush and add inhibitor to the system will invalidate the appliance warranty.

- It is important to check the inhibitor concentration after installation, system modification and at every service in accordance with the manufacturer's instructions. (Test kits are available from inhibitor stockists.)
 - For information or advice regarding any of the above contact Technical Enquiries.
-

6.2 Bypass

1. The boiler is fitted with an automatic integral bypass.

6.3 System Control

1. For optimum operating conditions, the heating system into which the boiler is installed should include a control system.
 2. Such a system will comprise of a timer control and separate room or cylinder thermostats as appropriate.
 3. The boiler should be controlled so that it operates on demand only.
 4. Operation of the system under control of the boiler thermostat & TRV's only does not produce the best results.
-

6.4 System Filling and Pressurising

1. A filling point connection on the central heating return pipework must be provided to facilitate initial filling and pressurising and also any subsequent water loss replacement/refilling.

2. The filling method adopted must be in accordance with all relevant water supply regulations and use approved equipment.

3. Your attention is drawn to:
for GB: Guidance G24.2 and recommendation R24.2 of the Water Regulations Guide.
for IE: the current edition of I.S. 813 "Domestic Gas Installations".

4. The sealed primary circuits may be filled or replenished by means of a temporary connection between the circuit and a supply pipe, provided a 'Listed' double check valve or some other no less effective backflow prevention device is permanently connected at the inlet to the circuit and the temporary connection is removed after use.

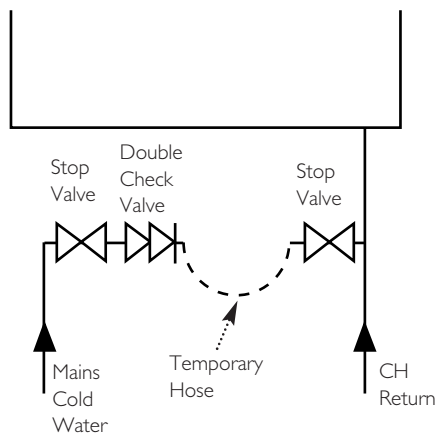


Fig. 3

6.5 Expansion Vessel

1. The appliance expansion vessel is pre-charged to 0.5 bar. Therefore, the minimum cold fill pressure is 0.5 bar. The vessel is suitable for correct operation for system capacities up to 125 litres. For greater system capacities an additional expansion vessel must be fitted. For GB refer to BS 7074 Pt 1. For IE, the current edition of I.S. 813 "Domestic Gas Installations".

6.6 Pressure Relief Valve (Fig. 4)

1. The pressure relief valve is set at 3 bar, therefore all pipework, fittings, etc. should be suitable for pressures in excess of 3 bar and temperature in excess of 100°C.

2. The pressure relief discharge pipe should be not less than 15mm dia, run continuously downward, and discharge outside the building, preferably over a drain. It should be routed in such a manner that no hazard occurs to occupants or causes damage to wiring or electrical components. The end of the pipe should terminate facing down and towards the wall.

3. The discharge must not be above a window, entrance or other public access. Consideration must be given to the possibility that boiling water/steam could discharge from the pipe.

4. A remote relief valve kit is available to enable the boiler to be installed in cellars or similar locations below outside ground level (kit no. 5121379).

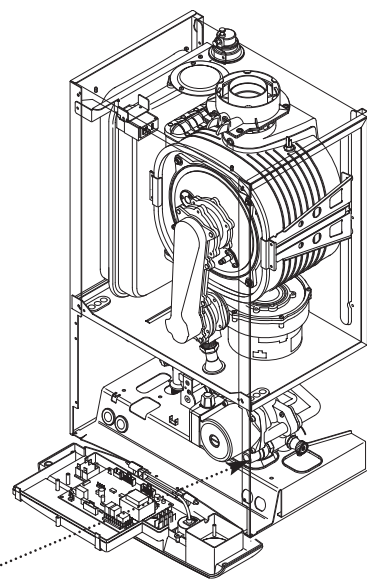
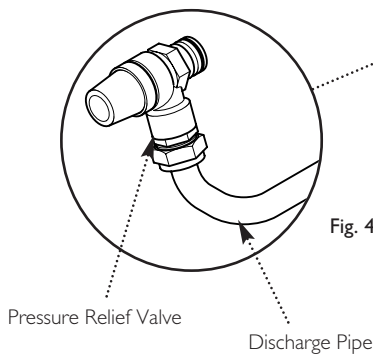


Fig. 4



7.0 Site Requirements

7.1 Location

1. The boiler may be fitted to any suitable wall with the flue passing through an outside wall or roof and discharging to atmosphere in a position permitting satisfactory removal of combustion products and providing an adequate air supply. The boiler should be fitted within the building unless otherwise protected by a suitable enclosure i.e. garage or outhouse. (The boiler may be fitted inside a cupboard-see Section 7.3).

2. If the boiler is sited in an unheated enclosure then it is recommended to leave the ON/OFF Selector Switch in the On position.

3. If the boiler is fitted in a room containing a bath or shower reference must be made to the relevant requirements. In GB this is the current I.E.E. Wiring Regulations and Building Regulations.

In IE reference should be made to the current edition of I.S. 813 "Domestic Gas Installations" and the current ETCI rules.

4. If the boiler is to be fitted into a building of timber frame construction then reference must be made to the current edition of Institute of Gas Engineers Publication IGE/UP/7 (Gas Installations in Timber Framed Housing).

7.2 Clearances (Figs. 5 & 6)

1. A flat vertical area is required for the installation of the boiler.

2. These dimensions include the necessary clearances around the boiler for case removal, spanner access and air movement. Additional clearances may be required for the passage of pipes around local obstructions such as joists running parallel to the front face of the boiler.

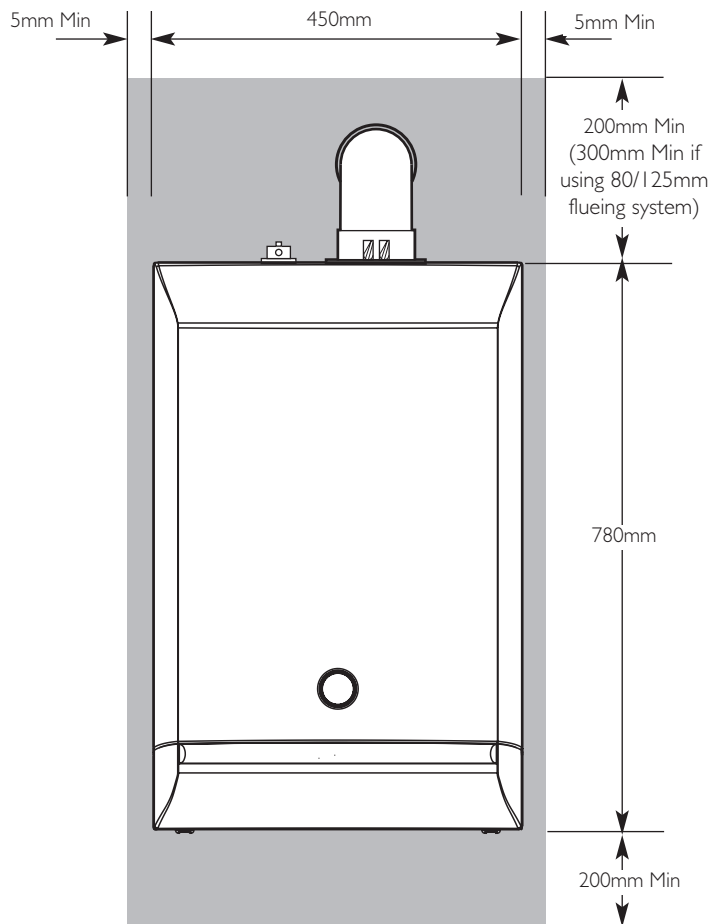


Fig. 5

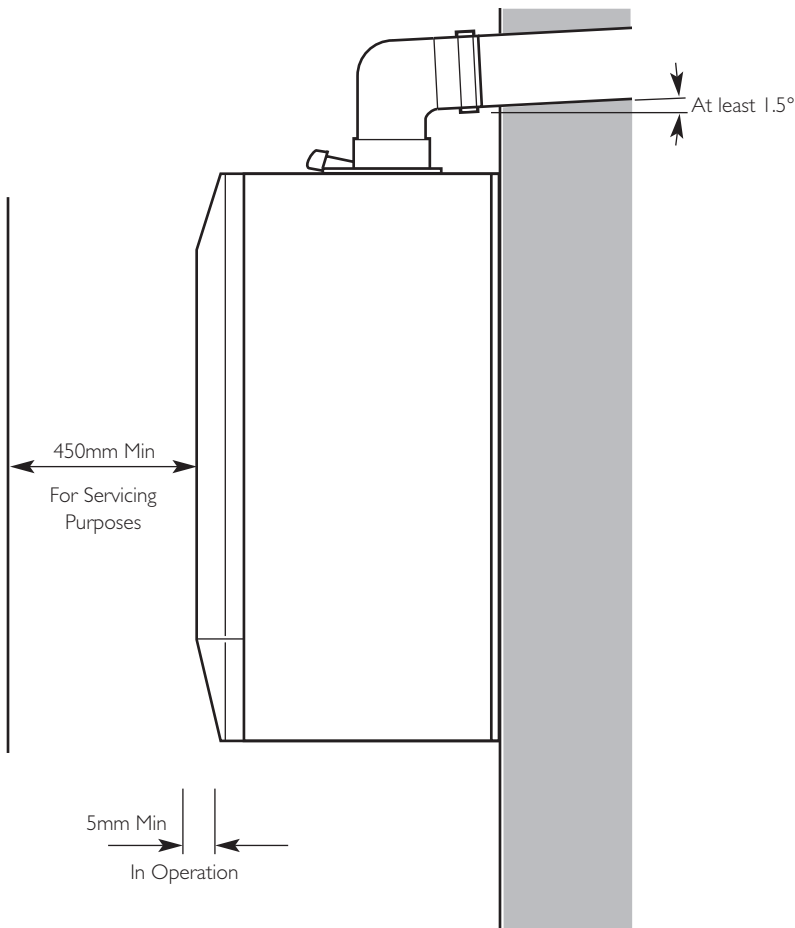


Fig. 6

7.0 Site Requirement

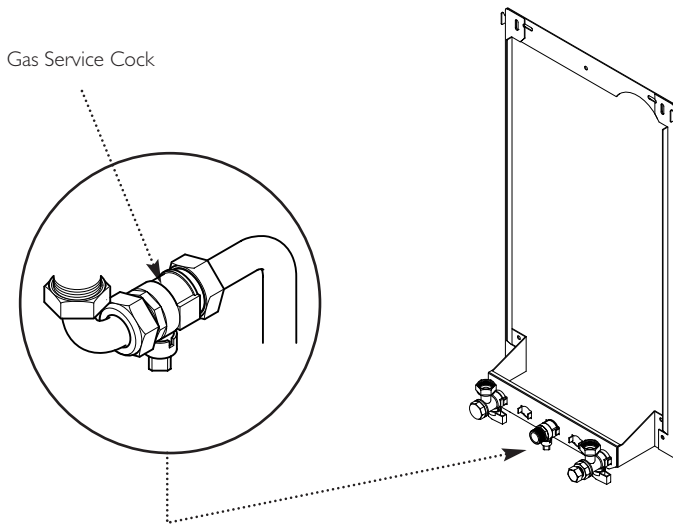


Fig. 7

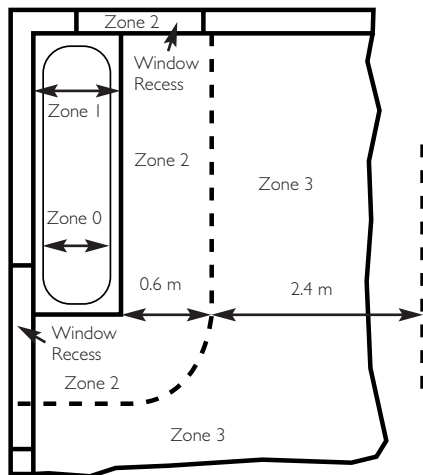


Fig. A In GB Only

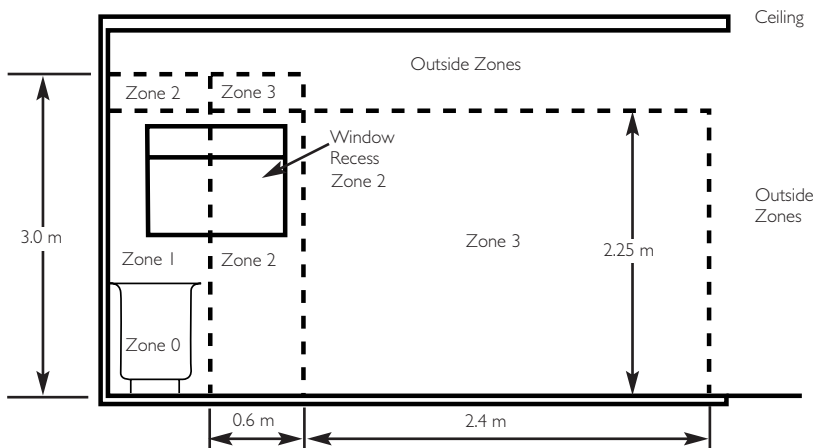


Fig. B In GB Only

7.3 Ventilation of Compartments

1. Where the appliance is installed in a cupboard or compartment, no air vents are required.
2. BS 5440: Part 2 refers to room sealed appliances installed in compartments. The appliance will run sufficiently cool without ventilation.

7.4 Gas Supply

1. The gas installation should be in accordance with the relevant standards. In GB this is BS 6891. In IE this is the current edition of I.S. 813 "Domestic Gas Installations".
2. The connection to the appliance is a 22mm copper tail located at the rear of the gas service cock (Fig. 7).
3. Ensure that the pipework from the meter to the appliance is of adequate size, and the demands of any other gas appliances in the property are taken into consideration. Do not use pipes of a smaller diameter than the boiler gas connection (22mm).

7.5 Electrical Supply

1. External wiring must be correctly earthed, polarised and in accordance with relevant regulations/rules. In GB this is the current I.E.E. Wiring Regulations. In IE reference should be made to the current edition of ETCL rules.
2. The mains supply is 230V ~ 50Hz fused at 3A.

NOTE: The method of connection to the electricity supply must facilitate complete electrical isolation of the appliance.

Connection may be via a fused double-pole isolator with a contact separation of at least 3mm in all poles and servicing the boiler and system controls only.

3. When the system includes an indirect domestic hot water cylinder it is recommended that a cylinder thermostat is used in conjunction with a 3 port 2 position valve or 2 port zone valve.

7.6 Bath & Shower Rooms

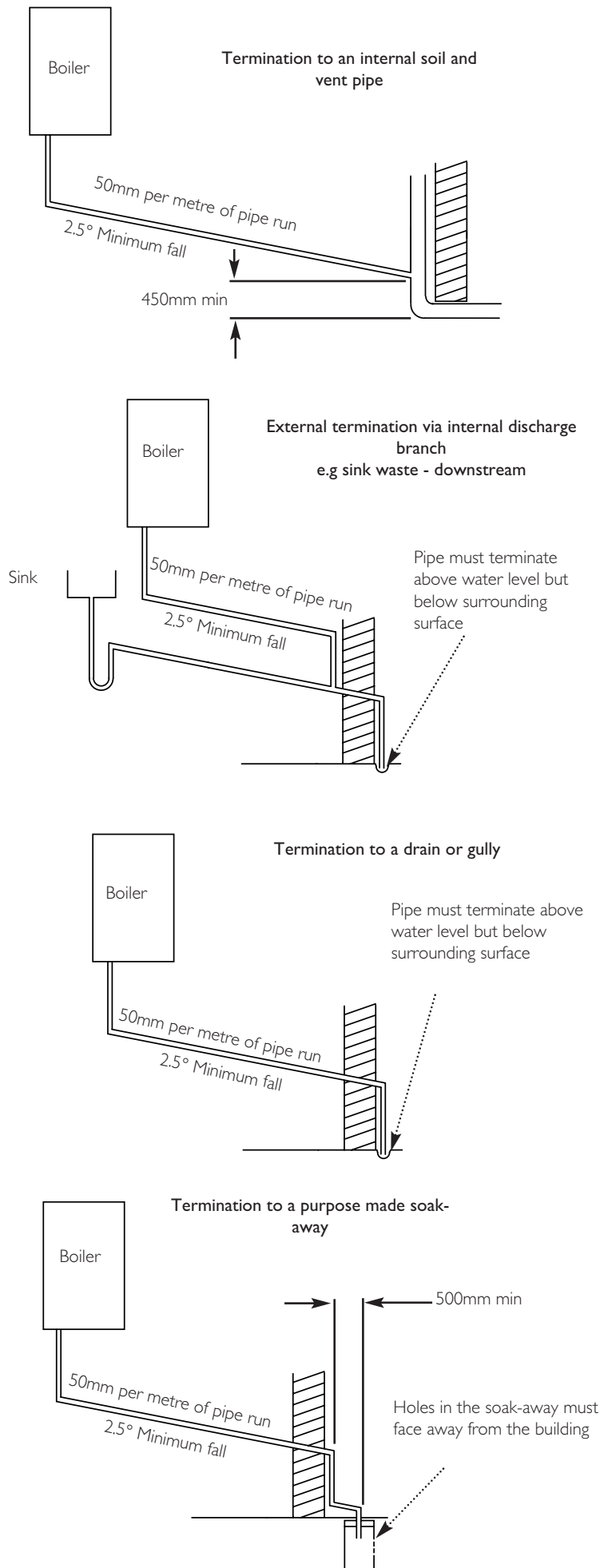
1. If the boiler is fitted in a room containing a bath or shower and **NOT FITTED** with any optional integral timer or thermostat, it can be fitted in zone 2, (Figs. A & B shows zone dimensions for a bathtub. For other examples refer to Section 601 of the Current I.E.E. Wiring Regulations) reference must be made to the relevant requirements. In GB this is the current I.E.E. Wiring Regulations and Building Regulations. In IE reference should be made to the current edition of I.S. 813 "Domestic Gas Installations" and the current ETCL rules.

7.0 Site Requirements

7.7 Condensate Drain

FAILURE TO INSTALL THE CONDENSATE DISCHARGE PIPEWORK CORRECTLY WILL AFFECT THE RELIABLE OPERATION OF THE BOILER

The condensate discharge pipe **MUST NOT RISE** at any point along its length. There **MUST** be a fall of **AT LEAST 2.5°** (50mm per metre) along the entire run.



1. The condensate outlet will accept 21.5mm ($\frac{3}{4}$ in) plastic overflow pipe which should generally discharge internally into the household drainage system. If this is not possible, discharge into an outside drain is acceptable.

2. Ensure the discharge of condensate complies with any national or local regulations in force.

BS 6798:2000 & Part H1 of the Building Regulations give further guidance.

3. The discharge pipe should be run in a proprietary drain pipe material e.g. PVC, PVC-U, ABS, PVC-C or PP.

4. Metal pipework is **NOT** suitable for use in condensate discharge systems.

5. The pipe should be a minimum of 21.5mm diameter and must be supported using suitably spaced clips to prevent sagging.

6. It is advisable to keep the condensate pipe internal.

7. External runs greater than 3 metres or runs in cold areas should use 32mm waste pipe.

8. If the boiler is fitted in an unheated location the entire condensate discharge pipe should be treated as an external run.

9. In all cases discharge pipe must be installed to aid disposal of the condensate. To reduce the risk of condensate being trapped, as few bends and fittings as possible should be used.

10. When discharging condensate into a soil stack or waste pipe the effects of existing plumbing must be considered. If soil pipes or waste pipes are subjected to internal pressure fluctuations when WC's are flushed or sinks emptied then back-pressure may force water out of the boiler trap and cause appliance lockout.

Examples are shown of the following methods of termination:-

- i) to an internal soil & vent pipe
- ii) via an internal discharge branch (e.g. sink waste)
- iii) to a drain or gully
- iv) to a purpose made soakaway

A ^a	Directly below an opening, air brick, opening windows, etc.	300
B ^a	Above an opening, air brick, opening window etc.	300
C ^a	Horizontally to an opening, air brick, opening window etc.	300
D	Below gutters, soil pipes or drain pipes.	25
E	Below eaves.	25
F	Below balconies or car port roof.	25
G	From a vertical drain pipe or soil pipe.	25
H	From an internal or external corner.	25
I	Above ground, roof or balcony level.	300
J	From a surface or boundary line facing a terminal.	600
K	From a terminal facing a terminal (Horizontal flue).	1200
	From a terminal facing a terminal (Vertical flue).	600
L	From an opening in carport (e.g. door, window) into the dwelling.	1200
M	Vertically from a terminal on the same wall.	1500
N	Horizontally from a terminal on the same wall.	300
R	From adjacent wall to flue (vertical only).	300
S	From an adjacent opening window (vertical only).	1000
T	Adjacent to windows or opening on pitched and flat roofs.	600
U	Below windows or openings on pitched roofs.	2000

^a In addition, the terminal should be no nearer than 150 mm to an opening in the building fabric formed for the purpose of accommodating a built-in element such as a window frame. See BS 5440 Pt. 1.

NOTE: The distance from a fanned draught appliance terminal installed parallel to a boundary may not be less than 300mm in accordance with the diagram below

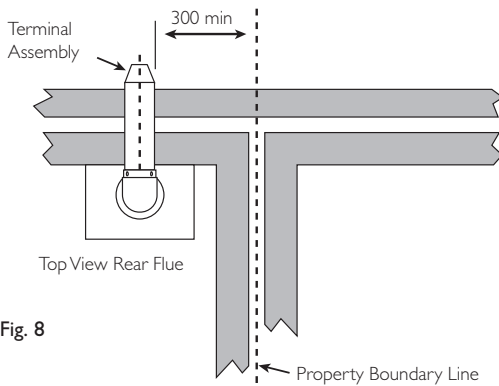


Fig. 8

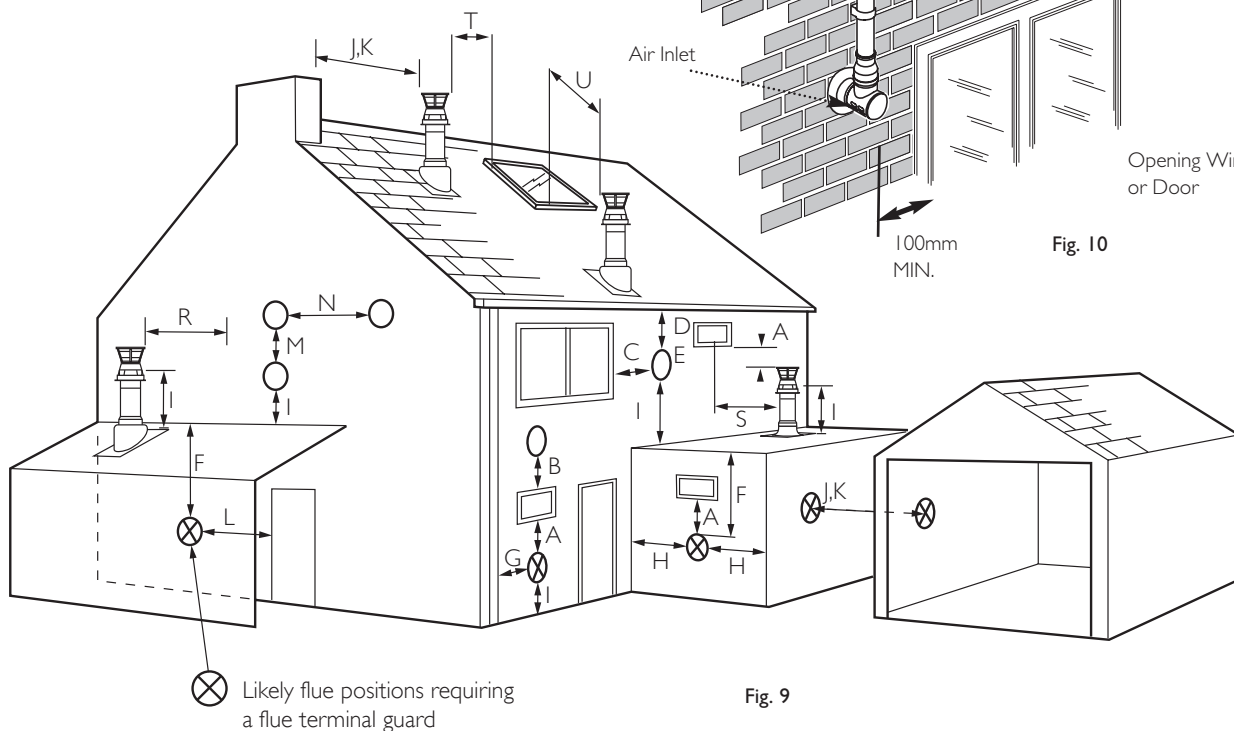


Fig. 9

7.0 Site Requirements

7.8 Flue

NOTE: Due to the nature of the boiler a plume of water vapour will be discharged from the flue. This should be taken into account when siting the flue terminal.

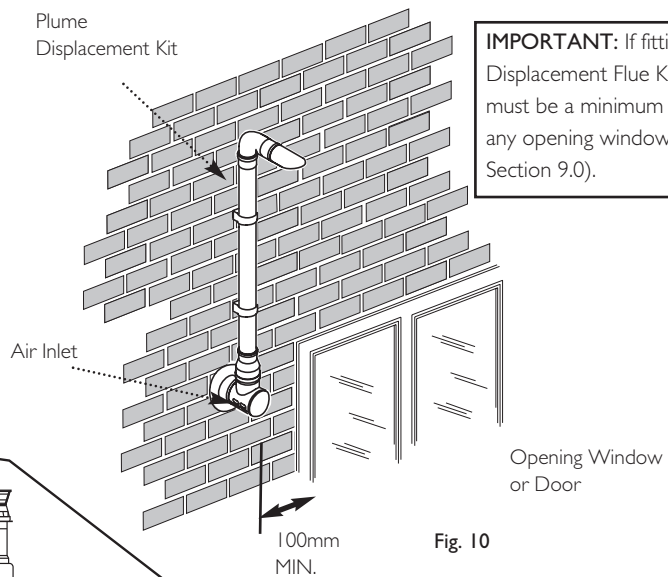
1. The following guidelines indicate the general requirements for siting balanced flue terminals. For GB recommendations are given in BS 5440 Pt 1. For IE recommendations are given in the current edition of I.S. 813 "Domestic Gas Installations".

2. If the terminal discharges onto a pathway or passageway, check that combustion products will not cause a nuisance and that the terminal will not obstruct the passageway.

3. If a terminal is less than 2 metres above a balcony, above ground or above a flat roof to which people have access, then a suitable terminal guard must be provided.

IMPORTANT:

- Only **ONE** 25mm clearance is allowed per installation.
- Under car ports we recommend the use of the plume displacement kit.
- The terminal position must ensure the safe and nuisance - free dispersal of combustion products.



IMPORTANT: If fitting a Plume Displacement Flue Kit, the air inlet must be a minimum of 100mm from any opening windows or doors (see Section 9.0).

Fig. 10

8.0 Flue Options

8.1 Horizontal Flue Systems

1. The standard flue is suitable only for horizontal termination applications.
2. All fittings should be fully engaged. The approximate engagement is 40mm. Apply soap solution to the seal on each fitting to aid assembly.
3. Maximum permissible equivalent flue lengths are:-

	(60/100)
Horizontal Concentric (15/18 models)	15 metres

	(60/100)
Horizontal Concentric (24/28/32 models)	10 metres

	(80/125)
Horizontal Concentric (all)	20 metres

4. Any additional "in line" bends in the flue system must be taken into consideration.

Their equivalent lengths are:-

Concentric Pipes:

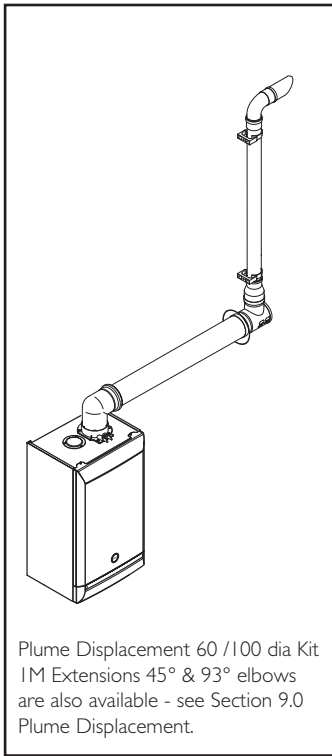
135° bend	0.5 metres
93° bend	1.0 metres

Twin Flue Pipe

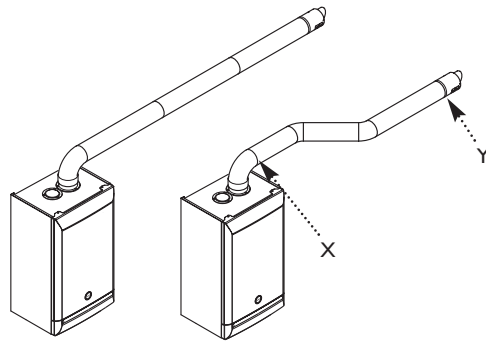
135° bend	0.25 metres
91.5° bend	0.50 metres

The elbow supplied with the standard horizontal telescopic flue kit is not included in any equivalent length calculations

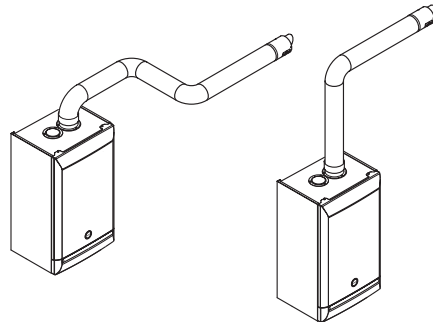
NOTE: Flue length is measured from point X to Y as shown.



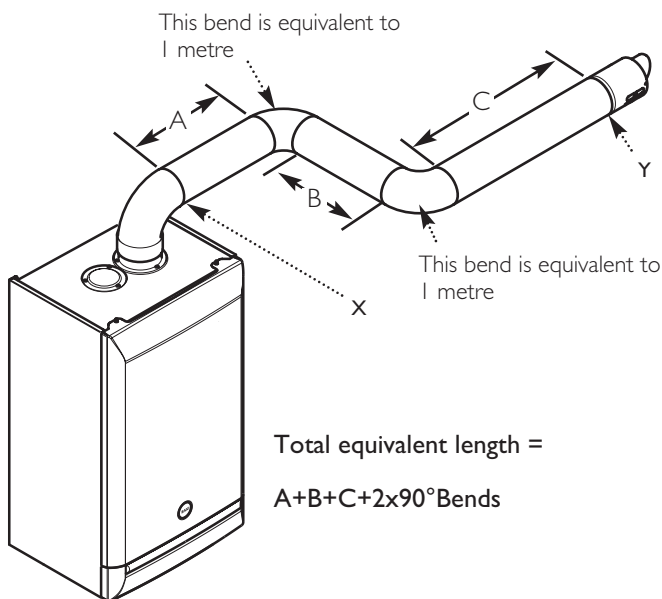
Plume Displacement 60 / 100 dia Kit
IM Extensions 45° & 93° elbows
are also available - see Section 9.0
Plume Displacement.



Horizontal
Flues



NOTE: Horizontal flue pipes should always be installed with a fall of at least 1.5° from the terminal to allow condensate to run back to the boiler.



8.0 Flue Options

8.2 Twin & Vertical Flue Systems

1. Maximum permissible equivalent flue lengths are:-

	(60/100)	(80/125)
Vertical Concentric	10 metres	20 metres
Vertical Twin Pipe	15 metres	

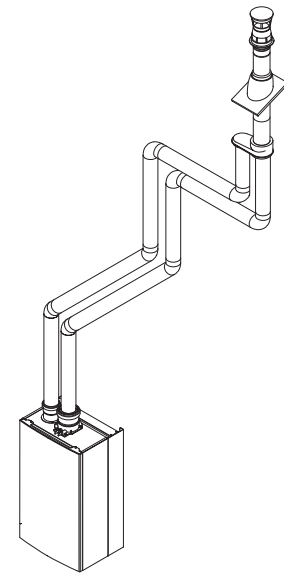
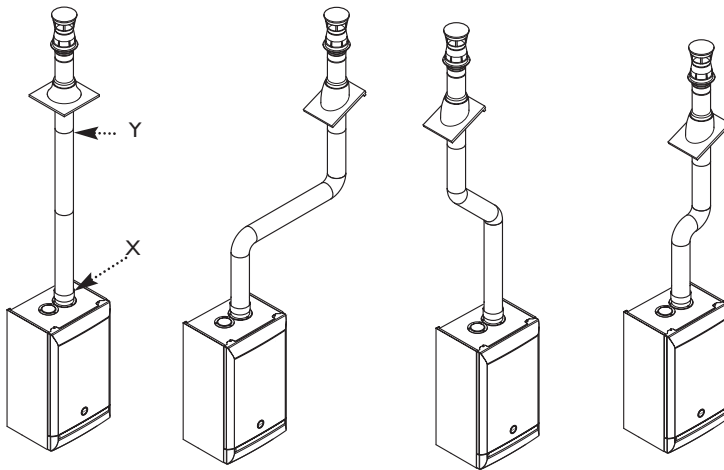
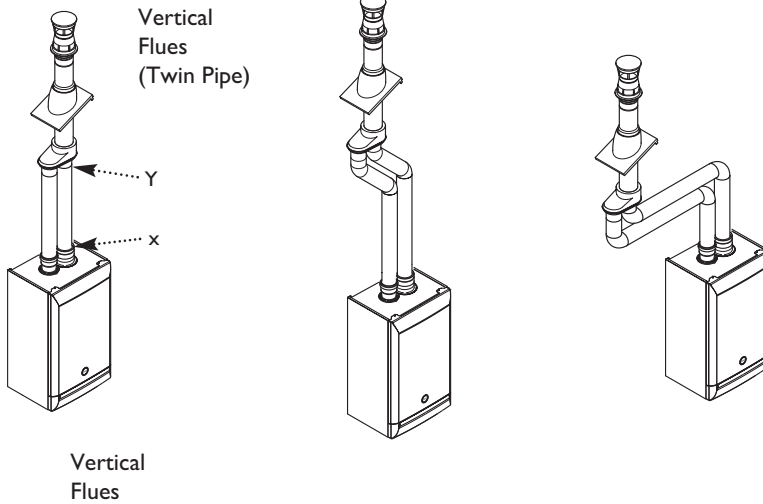
2. Any additional "in line" bends in the flue system must be taken into consideration.

Their equivalent lengths are:-

Concentric Pipes:		
135° bend		0.5 metres
93° bend		1.0 metres
Twin Flue Pipe		
135° bend		0.25 metres
91.5° bend		0.50 metres

The elbow supplied with the standard horizontal telescopic flue kit is not included in any equivalent length calculations

NOTE: Flue length is measured from point X to Y as shown.

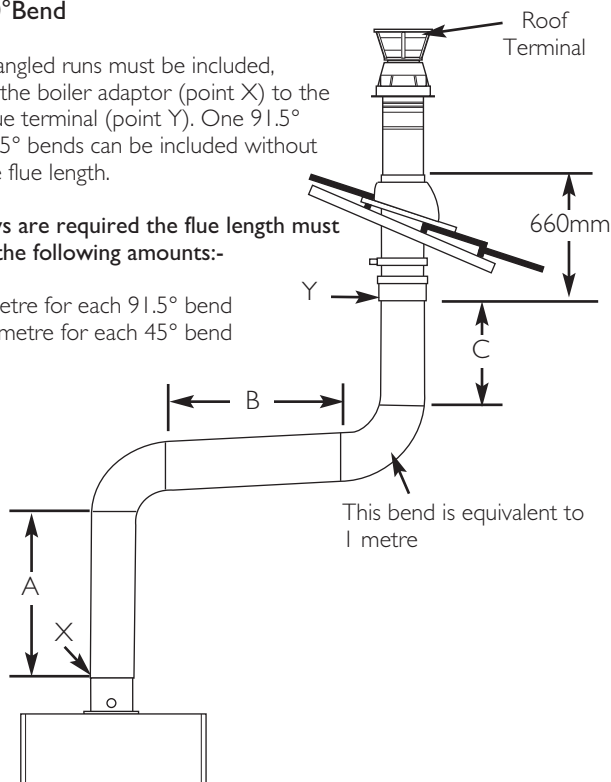


Total Equivalent Length = A+B+C+1x90°Bend

All vertical and angled runs must be included, measured from the boiler adaptor (point X) to the joint with the flue terminal (point Y). One 91.5° bend or two 135° bends can be included without reduction of the flue length.

If further elbows are required the flue length must be reduced by the following amounts:-

1 metre for each 91.5° bend
0.5 metre for each 45° bend



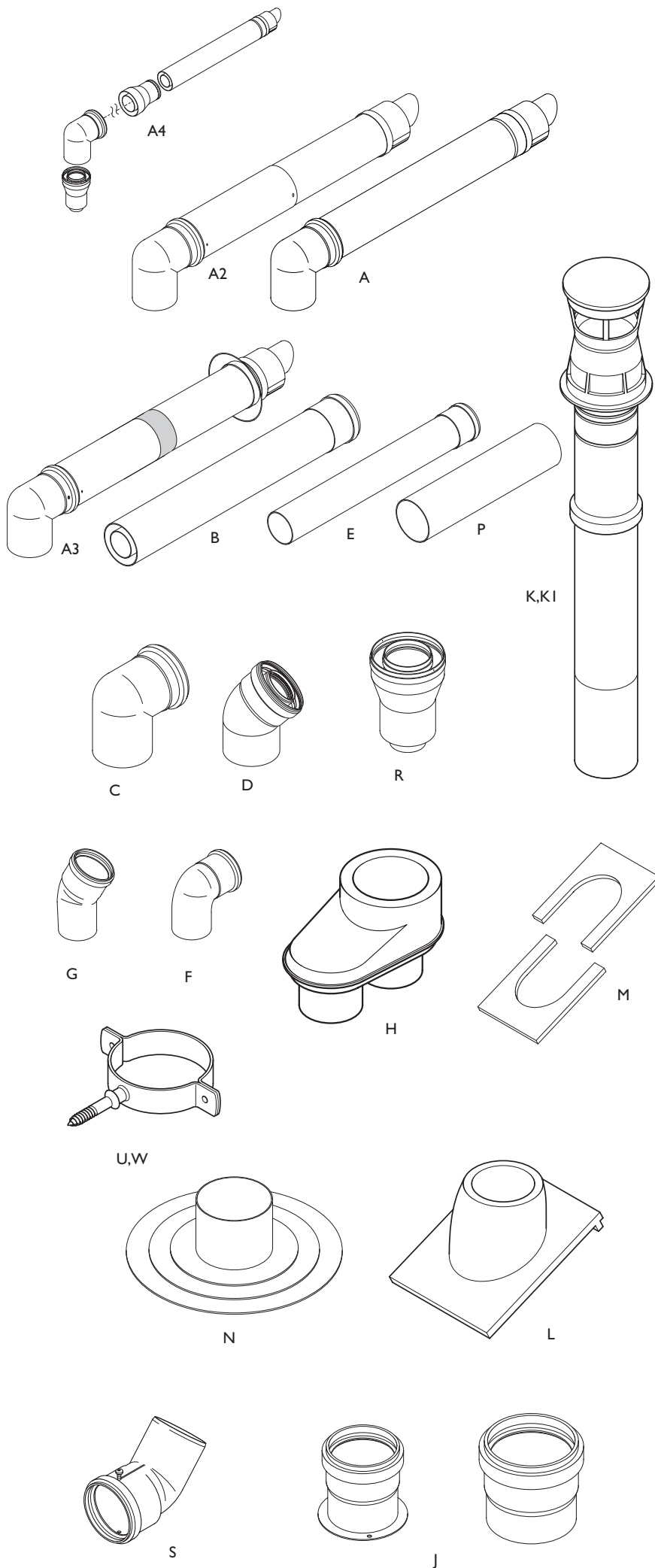
The total equivalent length for this example is = 6.5 metres.

AIR DUCT		
Equivalent Length Value	N° of fittings/pipes	Sub total
1m extension		
135°bend		
91.5°bend		
Equivalent Length Air Duct = 6.5m		

FLUE DUCT		
Equivalent Length Value	N° of fittings/pipes	Sub total
1m extension		
135°bend		
91.5°bend		
Equivalent Length Flue Duct = 6.5m		

8.0 Flue Options

8.3 Flue Accessories



Key Accessory Size Code No

FLUE GROUP A

Concentric Flue System 100mm diameter

A3	Telescopic Internal Flue Kit	315-500mm	5119654
A2	Telescopic Flue (incl elbow)		5118069
A	Horizontal Flue Terminal (incl elbow)		5118489
B	Flue Extension	1000mm	5111074
C	Flue Bend	93°	5111075
D	Flue Bend (pair)	135°	5111085
U	Pipe Support (painted)	100mmØ	5111080
R	Vertical Flue Adaptor		5111070
P	Wall Liner		5111067
S	Flue Terminal Deflector		5111068

FLUE GROUP N

Twin Flue System 80mm diameter

E	Flue Extension (pair)	1000mm	5111087
F	Flue Bend (pair)	90°	5111072
G	Flue Bend (2 pair)	135°	5111086
J	Vertical Flue Boiler Adaptor Kit		5111079
H	Vertical Flue Adaptor		5111084
W	Pipe Support (pair)	80mm	5111081

FLUE GROUP G

Flue System 80/125mm diameter

A4	Horizontal Flue Kit		5118580
B	Straight Extension Kit	1000mm	5118584
D	Bend Kit (pair)	135°	5118597
C	Bend	91.5°	5118588

FLUE GROUP A, N, G

Vertical Flue Kits

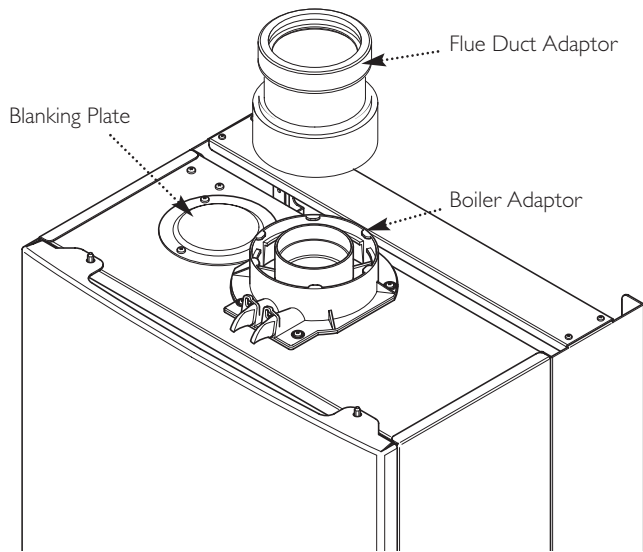
K	Vertical Flue Terminal (use with 5111070)		5111078
KI	Vertical Flue Terminal		5118576
L	Pitch Roof Flashing	25°/50°	5122151
M	Roof Cover Plate		246143
N	Flat Roof Flashing		246144

8.0 Flue Options

For Twin Flue Systems fit the adaptors as follows:-

8.4 Flue Duct Adaptor

1. Engage the flue adaptor on the boiler adaptor, making sure that it is pushed down as far as possible.



8.5 Air duct adaptor

1. Undo the screws securing the blanking plate to the boiler top panel. Discard the plate.

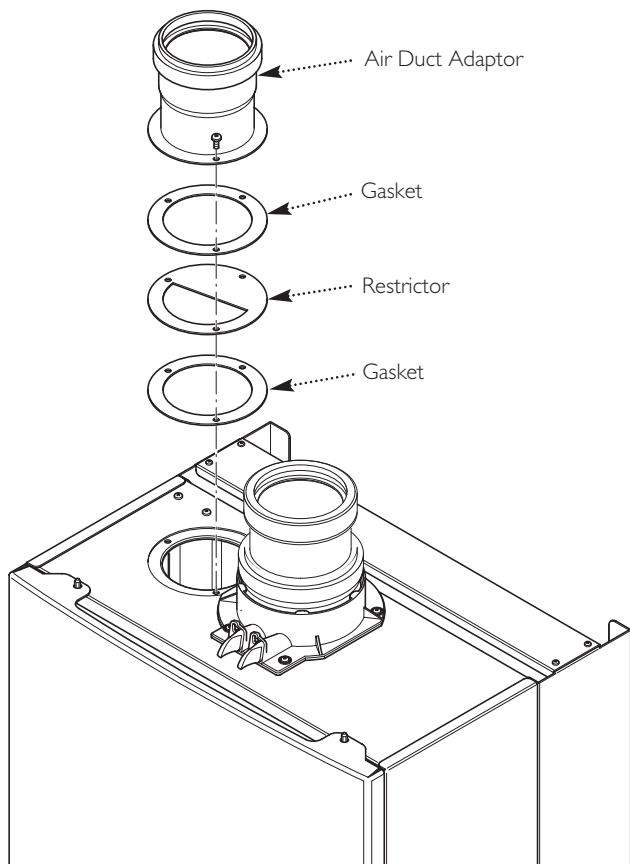
2. There are three restrictor plates supplied in the kit. One marked '23' can be discarded. The one marked '27' must be used on the 15/18 kW (models). The third restrictor is for all other models in the range. **The restrictors MUST be positioned as shown in the diagrams below.**

3. Take one of the gaskets supplied in the kit and place on the boiler top panel.

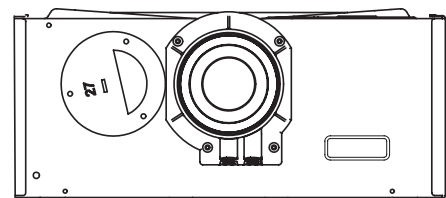
4. Align the appropriate restrictor as shown. Position the second gasket over the restrictor.

5. Using the screws previously removed secure the inlet adaptor to the top panel.

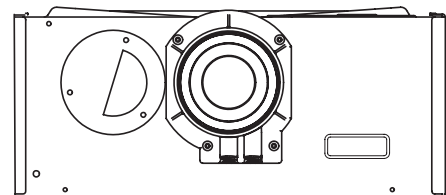
6. Continue to fit the twin flue system.



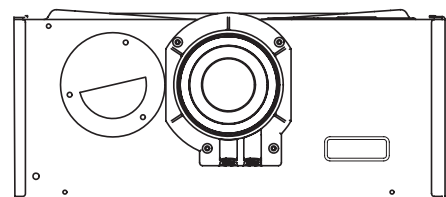
Position of Restrictor



15/18 kW models



24 kW models



28/32 kW models

8.0 Flue Options

8.6 For Roof Terminals

1. In the case of a pitched roof 25 - 50 degrees, position the lead tile to replace/flash over existing roof tiling. Make an aperture in the roof suitable for the lower tube of the roof terminal and ensure the integrity of the roof cover is maintained. The adjustable plastic collar can either be positioned on the lead tile or the lower tube of the roof terminal prior to the final positioning of the vertical flue through the tile. Check the collar is correctly located to suit required roof pitch (either 25° to 38° or 37° to 50°). From inside the roof adjust the flue to a vertical position and secure to the roof structure with the clamp supplied.

2. For flat roof installations the aluminium flashing must be incorporated into the roof covering and the appropriate aperture made in the roof decking. The vertical flue is lowered onto the flashing making sure the collar of the flue locates securely with the flashing. (A mastic seal may be necessary). From inside the roof, adjust the flue to a vertical position and secure to the roof structure with the clamp supplied.

IMPORTANT: If the boiler is not fitted immediately after the flue system, temporary precautions must be taken to prevent rain entry into the room of installation. Any precautionary measures must be removed prior to commissioning the boiler.

8.7 Flue Dimensions

The standard horizontal telescopic flue kit allows for lengths between 315mm and 500mm from elbow to terminal (Fig. 11).

The maximum permissible equivalent horizontal flue length is:

- 10 metres (60/100 system, 24/28/32 models)
- 15 metres (60/100 system, 15/18 models)
- 20 metres (80/125 system, all models)

8.8 Flue Trim

1. The rubber flue trim supplied may be fitted to either the outside wall or on the inner wall of installation.

8.9 Terminal Guard (Fig. 12)

1. When codes of practice dictate the use of terminal guards, they can be obtained from most Plumbers' and Builders' Merchants.

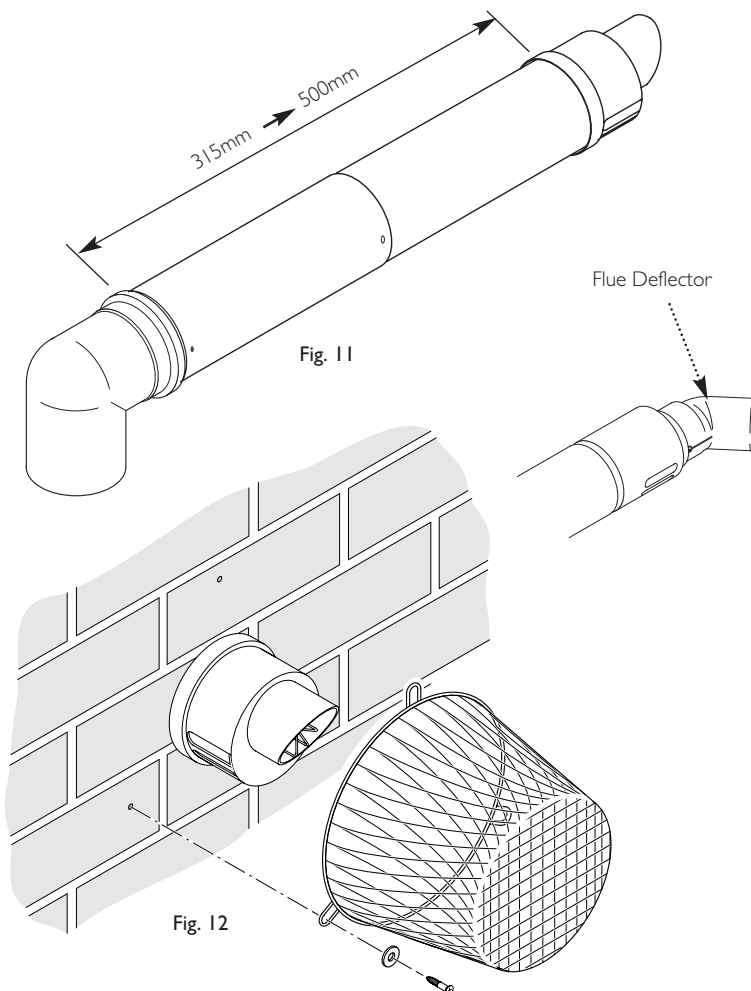
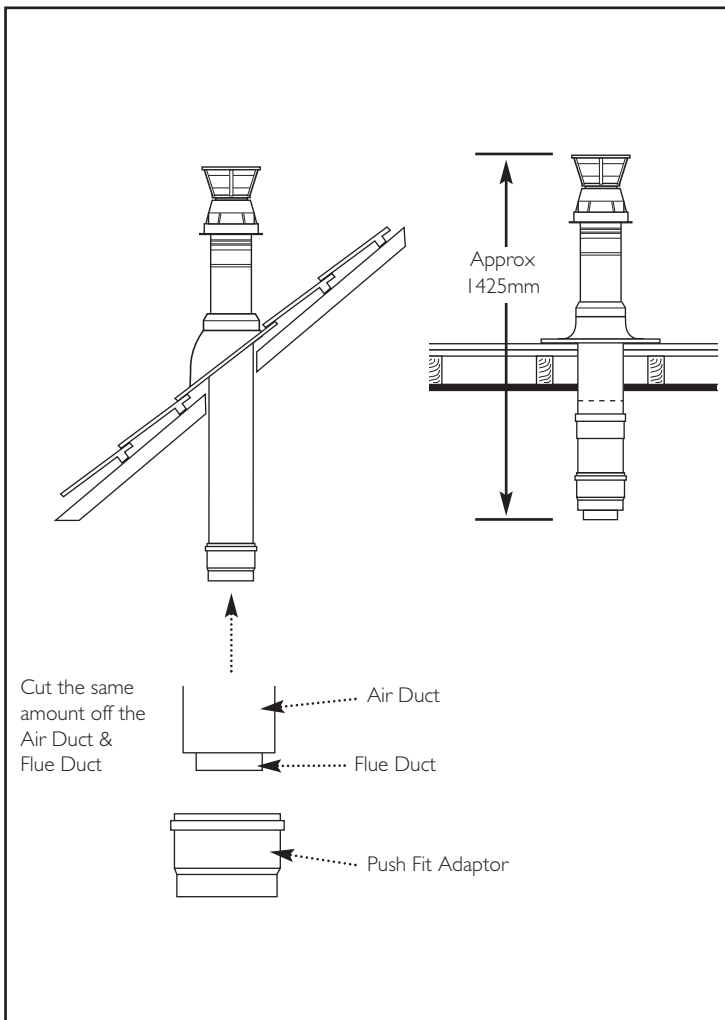
2. There must be a clearance of at least 50mm between any part of the terminal and the guard.

3. When ordering a terminal guard, quote the appliance name and model number.

4. The flue terminal guard should be positioned centrally over the terminal and fixed as illustrated.

8.10 Flue Deflector

1. If required, push the flue deflector over the terminal end and rotate to the optimum angle for deflecting plume. Secure the deflector to the terminal with screws provided.



9.0 Plume Displacement

9.1 Plume Displacement Kit (Fig. 14)

Kit No 5118638

Content of kit

- 1 0.9m 60/100 Concentric Flue
- 1 1m 60 Dia Exhaust Flue Pipe
- 1 Adaptor
- 2 60 Dia Support Brackets
- 1 93° Elbow/Plume Outlet Assembly
- 1 Flexible Flue Trim
- 3 "O" Rings
- 1 'Jubilee' Clip
- 1 Elbow

1. This kit is recommended for installations where the condensate plume emitted from the flue may cause a nuisance or affect the surroundings.

2. The terminal must be positioned outside the building with the air inlet facing downward and outlet connection upwards.

3. The plume outlet must always be at least 45° to the wall, with the 'peak' uppermost to prevent rain entry (Figs. 15 & 16), and be at least 2 metres above ground level. It must be secured as shown in Fig. 10. The plume outlet must also be at least 500mm from the air inlet in any direction (Fig. 16).

NOTE: The outlet must be positioned so that any condensate plume is directed away from adjacent surfaces. There must be a constant fall along the entire length of the flue system from the outlet back to the boiler.

4. It is possible to reduce or increase (with the addition of extensions) the length of either or both the 60/100 concentric and 60Ø exhaust.

5. Standard concentric flue extension kits may be added between the boiler elbow and the terminal assembly.

6. The minimum length of the concentric flue is 100mm when measured from the edge of the flue elbow.

IMPORTANT: The maximum equivalent length of concentric flue is:- **8 metres (24/28/32)**
14 metres (15/18)

Additional bends may be fitted in the concentric flue, but the equivalent length must be reduced by 1 metre (93° elbow) or 0.5 metres (45° elbow).

7. 60Ø 1 metre extensions (including support bracket), and additional 93° & 45° elbows are available. Any additional 93° & 45° elbows must be accounted for when calculating flue lengths.

NOTE: Permitted positions of the plume outlet relative to doors, windows etc. are the same as for conventional concentric flues as detailed in the main Installation & Servicing Instructions and BS5440 Pt. 1. It is **NOT** necessary to fit a terminal guard over the air inlet or the plume outlet.

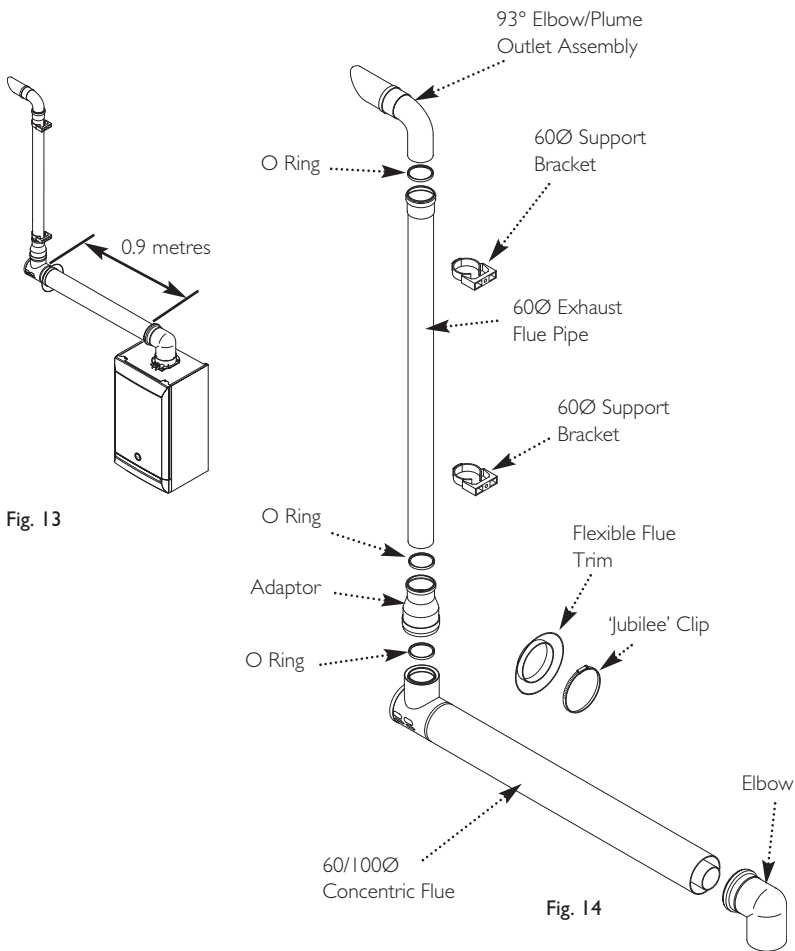


Fig. 13

Fig. 14

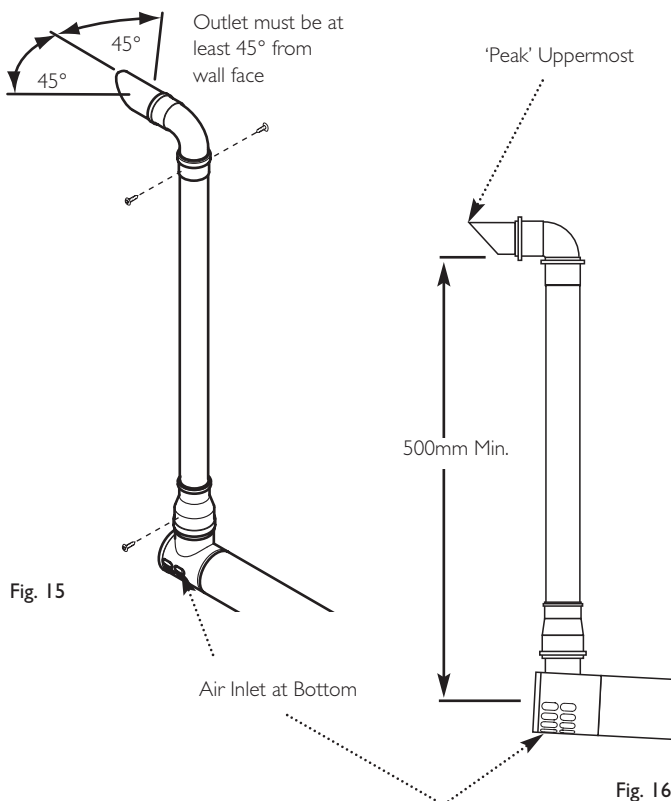


Fig. 15

Fig. 16

9.0 Plume Displacement

9.2 Determining Permissible Lengths

In the graph the solid line diagonal represents the relationship between the concentric flue assembly (and any extensions) and the 60Ø exhaust (and any extensions or additional bends).

Example 1 - Not Permissible

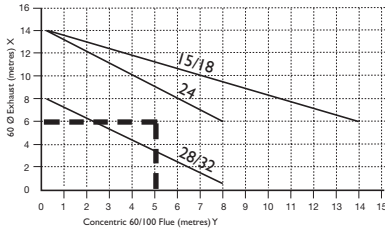
If, for instance, a concentric length of 5 metres was required and the 60Ø exhaust needed to be 6 metres the graph shows that this combination would NOT be permissible as the intersection point would be above the solid diagonal line.

Example 2 - Flue Lengths OK

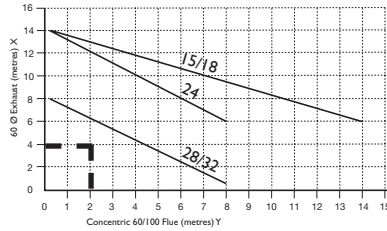
Where both lengths have been determined they can be applied to the graph to check that the installation is permissible. For example, if it was known that 2 metres of concentric flue and 4 metres of 60Ø exhaust were required, the values could be applied to the graph as shown in Example 2. As the point of intersection of the dotted lines is below the solid diagonal line, the combination of lengths is shown to be acceptable.

Example 3 - Flue Lengths OK

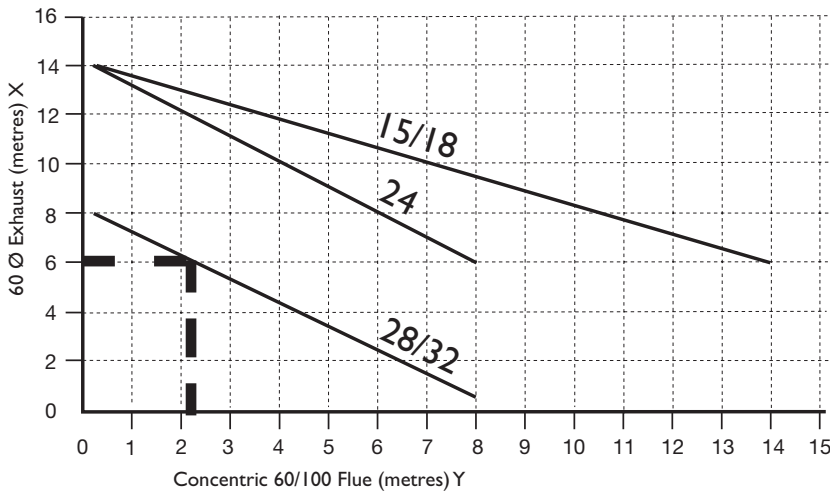
In the example shown, assume that the concentric part of the flue needs to be 2.3 metres long. Find the position of '2.3' on the horizontal axis of the graph and then project upwards to the solid diagonal line. This is represented by the vertical thick dotted line. Where this dotted line intersects with the solid diagonal line on the graph, project across to the vertical axis. As can be seen this corresponds with 6 metres. Therefore, the total equivalent length of the 60Ø exhaust can be up to 6 metres. Any elbow equivalencies must be accounted for i.e. 93° elbows are equal to 1 metre, each 45° elbow to 0.5 metres.



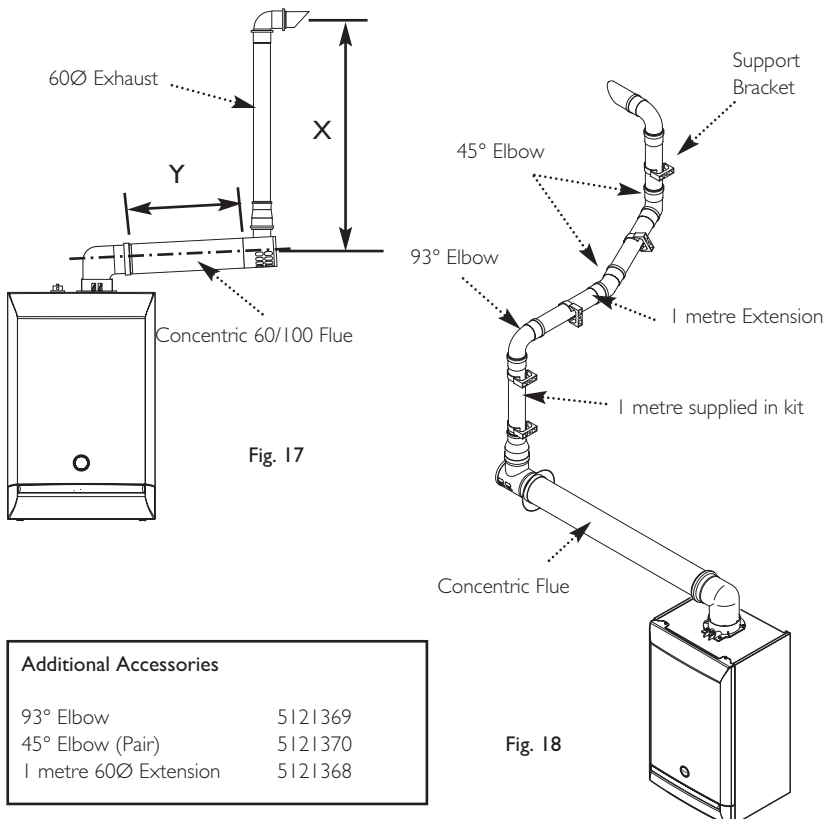
Example 1
Flue Lengths - Not Permissible



Example 2
Flue Lengths - OK



Example 3
Flue Lengths - OK



Additional Accessories

93° Elbow	5121369
45° Elbow (Pair)	5121370
1 metre 60Ø Extension	5121368

Flue Length - Worked Example Baxi Megafluo System 28 HE A

In Fig. 18 opposite an additional 93° elbow and pair of 45° elbows have been included in the 60Ø exhaust. Also 3 straight extension pieces have been used.

To calculate total length:-

Length of 60Ø supplied in kit =	1 metre
3 x 1 metre Extensions =	3 metres
1 x 93° Elbow =	1 metre
2 x 45° Elbow =	1 metre (0.5 metres each)

Total 60Ø = 6 metres

After consulting the table in Example 3 it can be determined that the concentric flue could be up to approximately 2.3 metres long.

9.0 Plume Displacement

9.3 General Fitting Notes

1. Cut a hole in the external wall which the concentric flue assembly will pass through. The hole should allow the flue to fall back to the boiler at an angle of 1.5° to 3°.
2. When completed the terminal must be at least 2 metres above ground level (Fig. 19).
3. Measure and cut to size the concentric assembly and any extensions that are being used.
4. Insert the concentric assembly through the hole from outside the building.
5. If required, the flexible flue trim should be fitted prior to this as it cannot be fitted after. Use the large 'Jubilee' clip to secure the trim to the flue (See Fig. 20, trim shown dotted), with the screw part of the clip at the bottom.
6. Connect any extensions or elbows that are being used to the concentric assembly. Engage the extension, elbow or concentric assembly in the boiler flue elbow. Fit the boiler flue elbow to the boiler adaptor.
7. Ensure that the concentric assembly and any extensions fall back to the boiler at an angle of 3° and that the external air inlet is to the bottom.
8. Use suitable brackets to support the concentric assembly and any extensions, and make good inside and outside.
9. The 60Ø exhaust can now be fitted. Slide the adaptor over the plain end of the 60Ø exhaust (Fig. 22) and engage the exhaust in the terminal. Slide the adaptor down over the spigot. Mark and drill the adaptor, using a 2mm bit, as shown in Fig. 21. Secure the adaptor to the spigot using one of the screws supplied.
10. If it is necessary to shorten the 60Ø exhaust or any of the extensions, the excess material must be cut from the plain end of the pipe.
11. Determine the position of the 60Ø exhaust and mark on the wall a suitable position for the support bracket. If extensions are being used, a support bracket is supplied in each kit.
12. Drill the wall, and fit the bracket(s) using the plug and screw provided.
13. Mark and drill the 60Ø exhaust, using a 2mm bit, as shown in Fig. 23. Complete the installation of the 60Ø exhaust, securing in the brackets.
14. Fit the 93° elbow/plume outlet and secure with the two remaining screws supplied. Ensure the plume outlet is at least 45° to the wall and that the 'peak' is uppermost (Fig. 24).

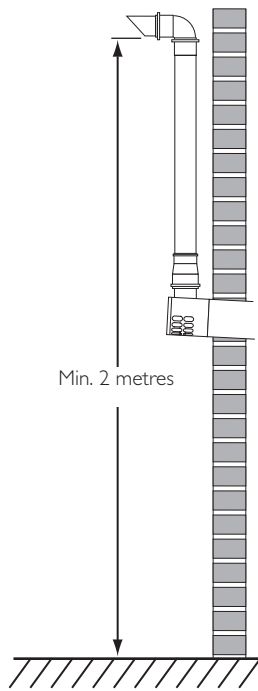


Fig. 19

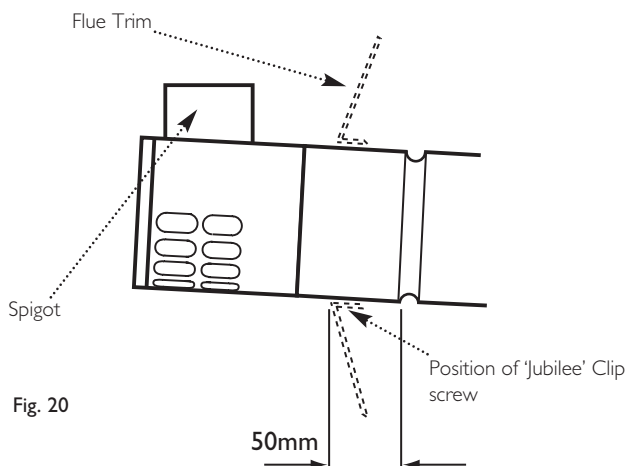


Fig. 20

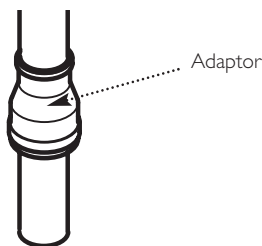


Fig. 22

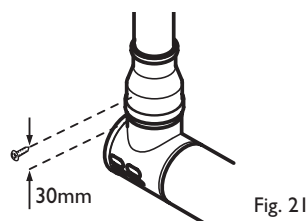


Fig. 21

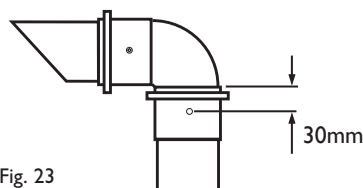


Fig. 23

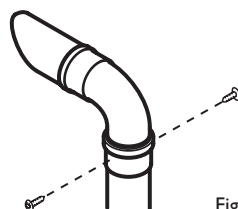
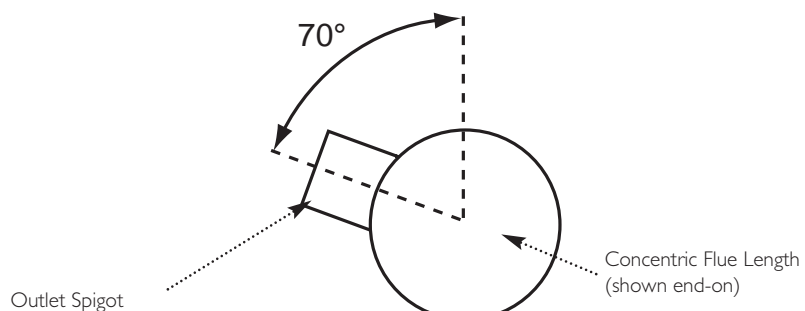
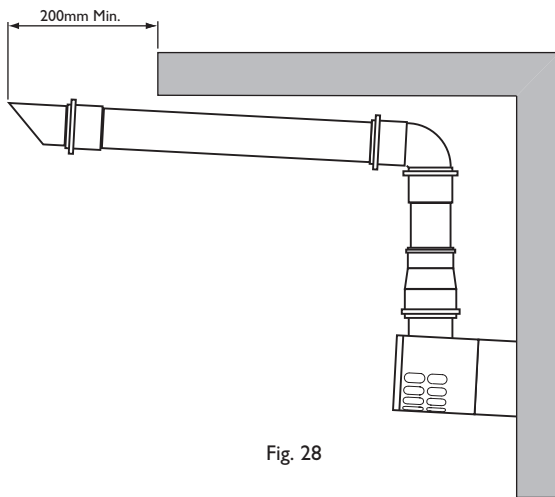
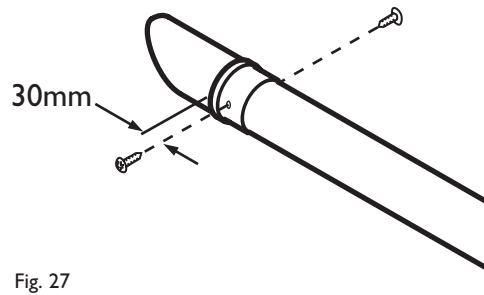
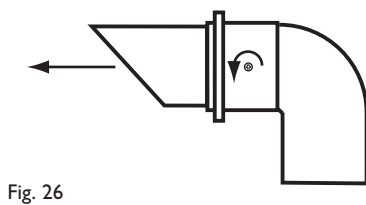
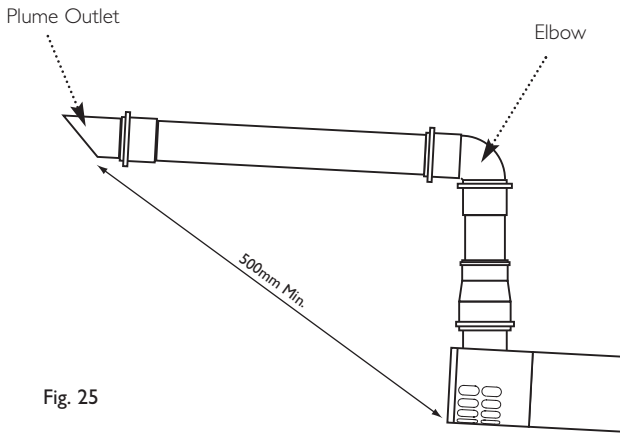


Fig. 24

9.0 Plume Displacement

9.3 General Fitting Notes (cont.)



15. For aesthetic purposes it is permissible to route the 60Ø exhaust in an enclosed box, but the air inlet and plume outlet **MUST** remain in free air.

16. It is also possible to separate the plume outlet from the 93° elbow to allow the flue to be installed as shown in Fig. 25.

17. To do this, first slacken the two screws retaining the plume outlet to the elbow, and remove the outlet (Fig. 26). The elbow can now be used to connect the vertical to horizontal 60Ø exhaust (Fig. 25). Retighten the screws in the elbow.

18. The outlet can now be fitted into the female end of an 60Ø extension piece. It must be secured using two of the screws supplied in the bag with the 'Jubilee' clip.

19. Mark the female end of the extension at 30mm as shown in two positions, directly opposite each other (Fig. 27).

20. Using a suitable bit (e.g. 2mm), drill through the extension and outlet. Secure using two of the screws supplied.

21. The remaining screw must be used to secure the adaptor to the concentric terminal.

22. When the plume outlet is positioned under a balcony or other projection (Fig. 28) it must protrude at least 200mm (it is not necessary to extend it further than this).

23. When under balconies or projections it is permissible to rotate the concentric flue length up to 70°, clockwise or anti-clockwise (Fig. 29), if there is insufficient space to connect vertically.

24. This will allow the connection of the exhaust to the outlet spigot.

25. All other minimum & maximum dimensions must be adhered to, and the air inlet positioned such that it will not be subject to rain entry.

10.0 Installation

10.1 Unpacking & Initial Preparation

The gas supply, gas type and pressure must be checked for suitability before connection (see Section 7.4).

NOTE: a small amount of water may drain from the boiler in the upright position.

1. Remove staples, open flaps and remove the cardboard sheet. Remove the polystyrene side pieces and literature. Two people can then lift out the boiler (Figs. 30 & 31).
2. After considering the site requirements (see Section 7.0) position the fixing template on the wall ensuring it is level both horizontally and vertically.
3. Mark the position of the two most suitable fixing slots for the wall plate and boiler lower fixing holes. It is preferable to use the vertical fixing slots.
4. Mark the position of the centre of the flue hole (rear exit). For side flue exit, mark as shown (Fig. 32).
5. If required, mark the position of the gas and water pipes. Remove the template.
6. Cut the hole for the flue (minimum diameter 116mm).
7. Drill the wall as previously marked to accept the wall plugs supplied. Secure the wall plate using the fixing screws.
8. Using a spirit level ensure that the plate is level before finally tightening the screws.
9. Connect the gas and water pipes to the valves on the wall plate using the copper tails supplied. Ensure that the sealing washers are fitted between the connections.

10.2 Flushing

1. Connect a tube to the central heating flow or return pipe (Fig. 33).
2. Flush thoroughly (see System Details, Section 6.2).

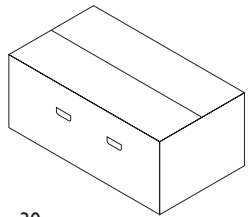


Fig. 30

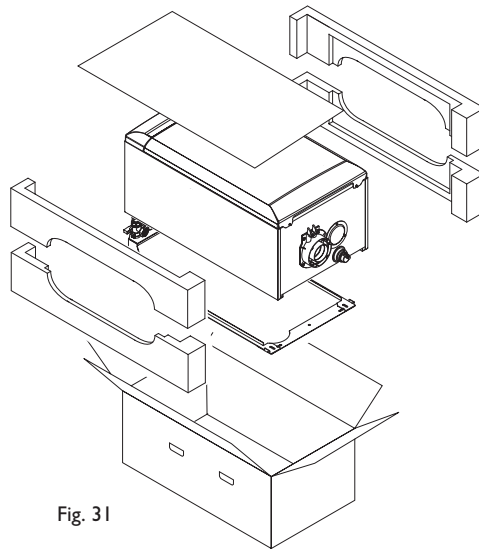
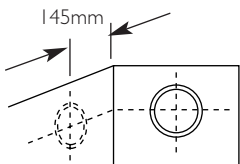


Fig. 31



For Side Flue Exit

Fig. 32

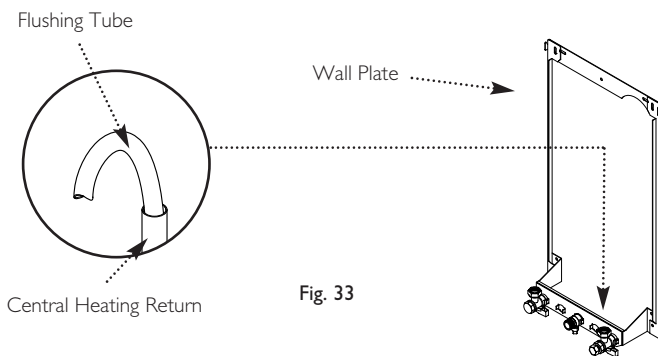


Fig. 33

10.0 Installation

10.3 Fitting The Boiler

1. Remove the sealing caps from the boiler connections.

NOTE: A small amount of water may drain from the boiler once the caps are removed.

2. Lift the boiler as indicated by the shaded areas. The boiler should be lifted by TWO PEOPLE. Engage the slots at the top rear of the boiler on the wall plate (Fig. 34) (see **Safe Manual Handling** page 5).

3. Insert the sealing washers between the valves and pipes on the wall plate and the boiler connections. The rubber washers must be used on the gas connection.

4. Tighten all the connections.

10.4 Fitting the Pressure Relief Discharge Pipe (Fig. 35)

1. Remove the discharge pipe from the kit.
2. Determine the routing of the discharge pipe in the vicinity of the boiler. Make up as much of the pipework as is practical, including the discharge pipe supplied.
3. The pipework must be at least 15mm diameter and run continuously downwards to a discharge point outside the building. See section 6.7 for further details.
4. Utilising one of the sealing washers, connect the discharge pipe to the adaptor and tighten the nut.
5. Complete the discharge pipework and route it to the outside discharge point.

IMPORTANT: Make all soldered joints before connecting to the pressure relief valve.

10.5 Condensate Drain (see section 7.7)

1. Connect the condensate drain to the trap outlet pipe.

Ensure the discharge of condensate complies with any national or local regulations in force (see British Gas "Guidance Notes for the Installation of Domestic Gas Condensing Boilers").

2. The connection will accept 21.5mm ($\frac{3}{4}$ in) plastic overflow pipe which should generally discharge internally into the household drainage system. If this is not possible, discharge into an outside drain is acceptable.

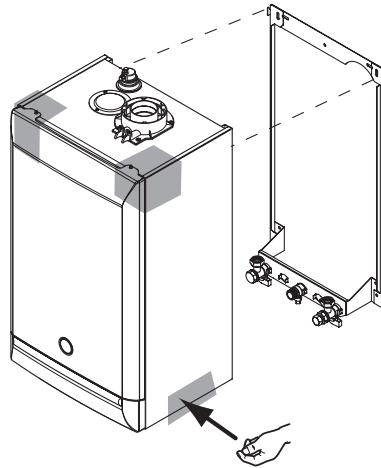
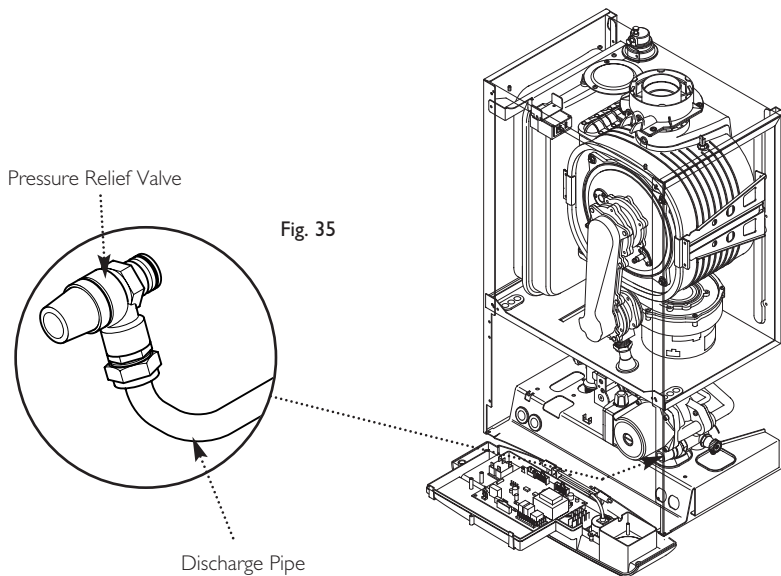


Fig. 34



10.0 Installation

10.6 Fitting The Flue

HORIZONTAL TELESCOPIC FLUE

1. There are two telescopic sections, the Terminal Assembly and the Connection Assembly, a roll of sealing tape and two self tapping screws. A 93° elbow is also supplied. The outer duct of the Connection Assembly is painted white. On the Terminal Assembly the outer duct is unpainted.

2. The two sections can be adjusted to provide a length between 315mm and 500mm (Fig. 36) when measured from the flue elbow (there is 50mm engagement into the elbow).

3. Locate the flue elbow on the adaptor at the top of the boiler. Set the elbow to the required orientation (Fig. 38).

NOTE: The flue elbow is angled at 93 degrees to ensure a fall back to the boiler.

4. Measure the distance from the outside wall face to the elbow. This dimension will be known as 'X' (Fig. 37).

5. If the distance from the flue elbow to the outside face of the wall ('X' in Fig. 37) is less than 250mm the Connection Assembly can be discarded and the Terminal Assembly fitted directly into the elbow.

6. In instances where the dimension 'X' (Fig. 37) is between 250mm and 315mm it will be necessary to shorten the Terminal Assembly by careful cutting to accommodate walls of these thicknesses.

7. To dimension 'X' add 50mm. This dimension to be known as 'Y'.

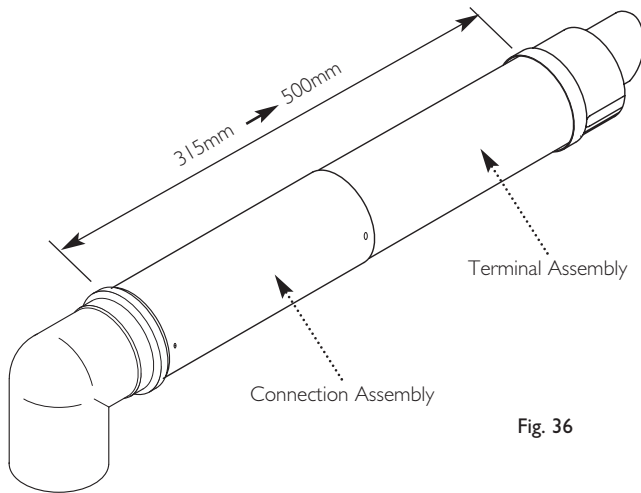


Fig. 36

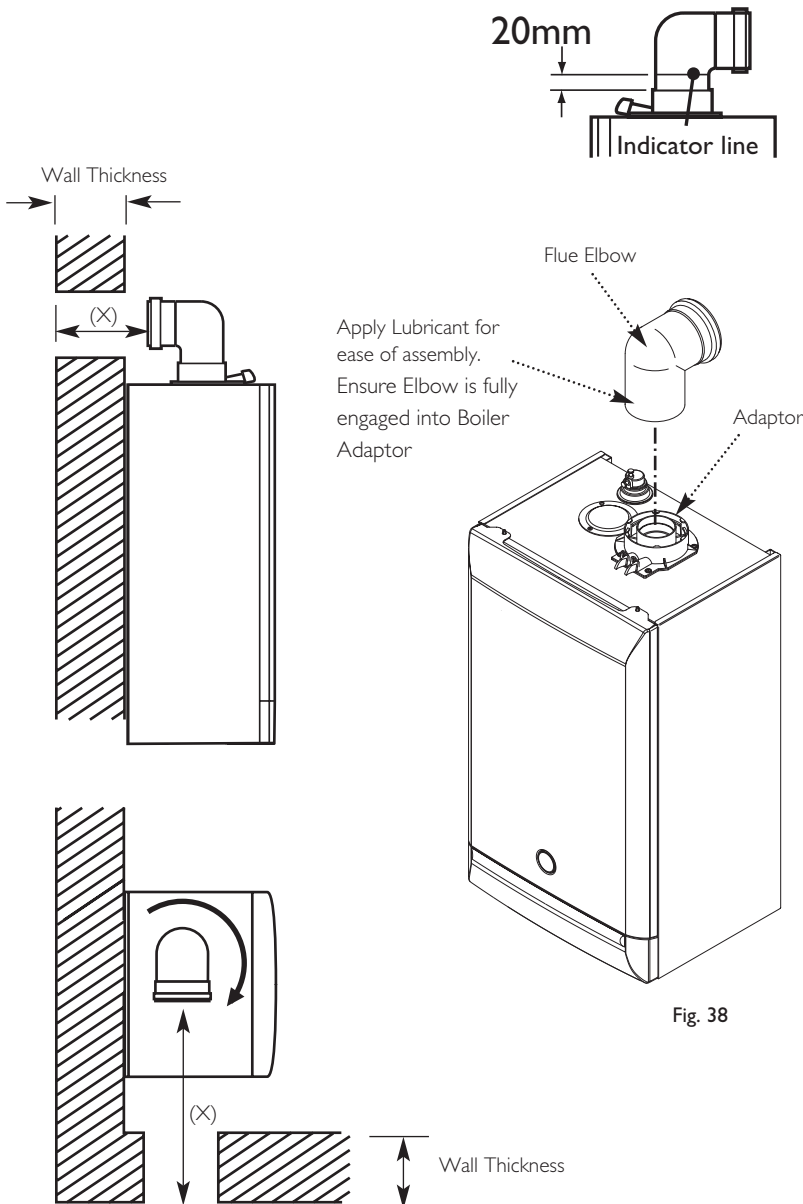


Fig. 38

Fig. 37

10.0 Installation

10.6 Fitting the Flue (Cont)

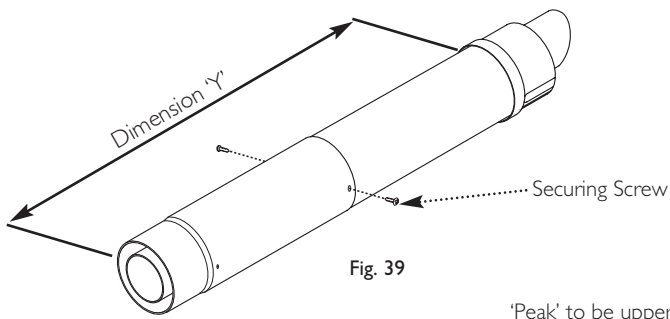


Fig. 39

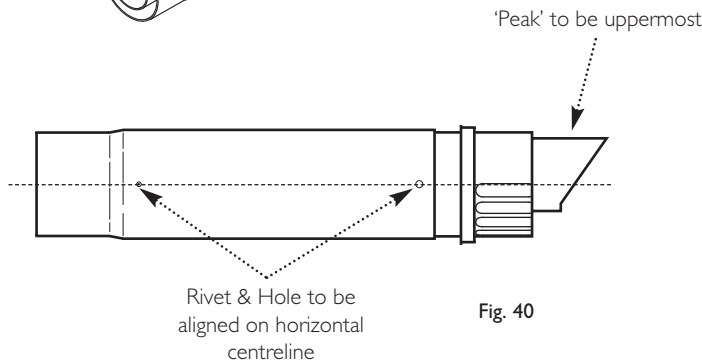


Fig. 40

Apply Lubricant for ease of assembly. Ensure Flue is fully engaged into Flue Elbow

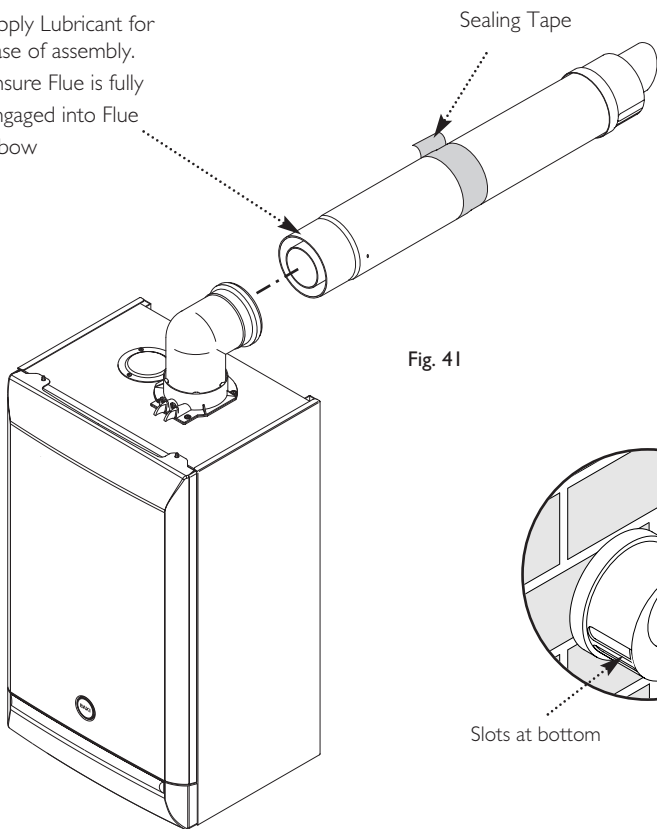


Fig. 41

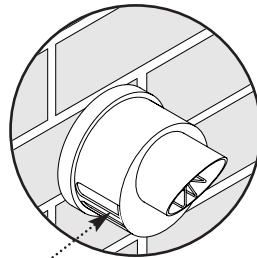


Fig. 42

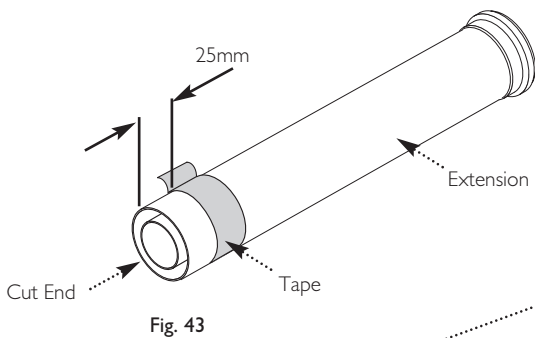


Fig. 43

Apply Lubricant for ease of assembly. Ensure Extension is fully engaged into Boiler Adaptor

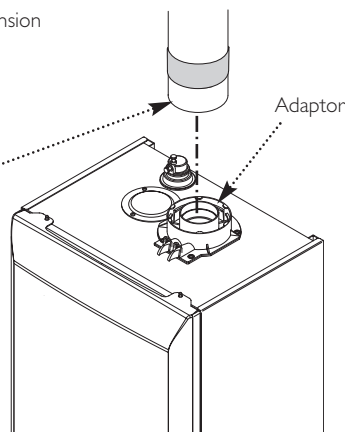


Fig. 44

8. Adjust the two telescopic sections to dimension 'Y' (Fig. 39). Ensure that the rivets and holes in the Connection Assembly are aligned horizontally (Fig. 40).

9. Using a 2mm bit, drill through the holes at the end of the Connection Assembly into the Terminal Assembly and secure them together using the screws supplied (Fig. 39). Seal the joint with the tape provided (Fig. 41).

10. Remove the flue elbow and insert the flue through the hole in the wall. Refit the elbow to the boiler adaptor, ensuring that it is pushed fully in (Fig. 38).

11. Draw the flue back through the wall and engage it in the elbow. It may be necessary to use soap solution or similar to ease assembly of the elbow adaptor and flue (Fig. 41).

12. Ensure that the terminal is positioned with the slots to the bottom (Fig. 42).

IMPORTANT: It is essential that the flue terminal is fitted as shown to ensure correct boiler operation and prevent water entering the flue.

13. Make good between the wall and air duct outside the building.

14. Fit the flue trim if required, and if necessary fit a terminal guard (see Section 8.8 & 8.9).

CONCENTRIC VERTICAL FLUE

15. Once the length of the vertical concentric extension has been determined mark and carefully cut off the excess material. The cut end **MUST** be square and free of burrs to ensure correct insertion into the boiler adaptor.

16. Measure 25mm from the end of the flue extension and apply a length of tape around the outer duct (Fig. 43).

17. Engage the extension into the adaptor up to this position (Fig. 44). Once the installation of the flue is complete and all support brackets are securely in place remove the tape.

10.0 Installation

10.7 Making The Electrical Connections

The boiler is fitted with a 1.3m length of 3 core of cable. This can be connected to the fused 3A 230V 50Hz supply.

NOTE: Both the Live and Neutral connections are fused.

To connect an external control proceed as follows:-

1. Slacken the fascia panel securing screws and lift the outercase panel so that its securing tabs are clear of the fascia. Remove the panel.
2. Completely undo the screws securing the fascia panel and hinge it down (Fig. 45).
3. Undo the terminal block cover securing screw and remove the cover (Fig. 45).
4. Slacken the unused cable clamp on the LH side of the boiler chassis (Fig. 46). Insert the external control wiring through the clamp and route it to the terminal block.
5. Refer to the instructions supplied with the control.

IMPORTANT: The external control **MUST** be suitable for 230V switching and fused 3A maximum.

6. Remove the link between terminals 1 & 2. The switched output from the external control must be connected to terminal 1. (Fig. 47).
7. Ensure that the external control input cable(s) have sufficient slack to allow the control box to drop down. Tighten the cable clamp on the boiler chassis.
8. Replace the terminal block cover, routing the external control input cable(s) through the second cut-out.

10.8 Preliminary Electrical Checks

1. Prior to commissioning the boiler preliminary electrical system checks should be carried out.
2. These should be performed using a suitable meter, and include checks for Earth Continuity, Resistance to Earth, Short Circuit and Polarity.

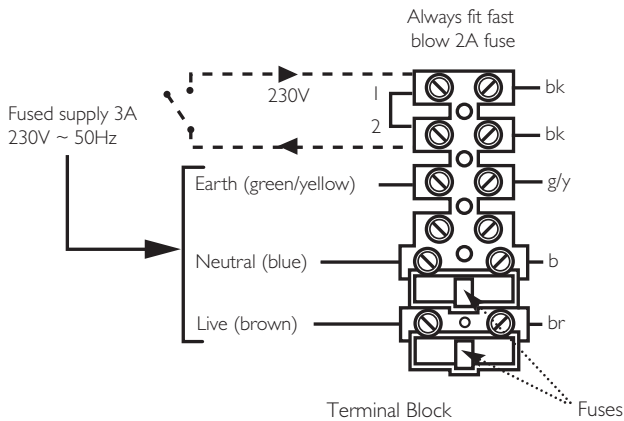
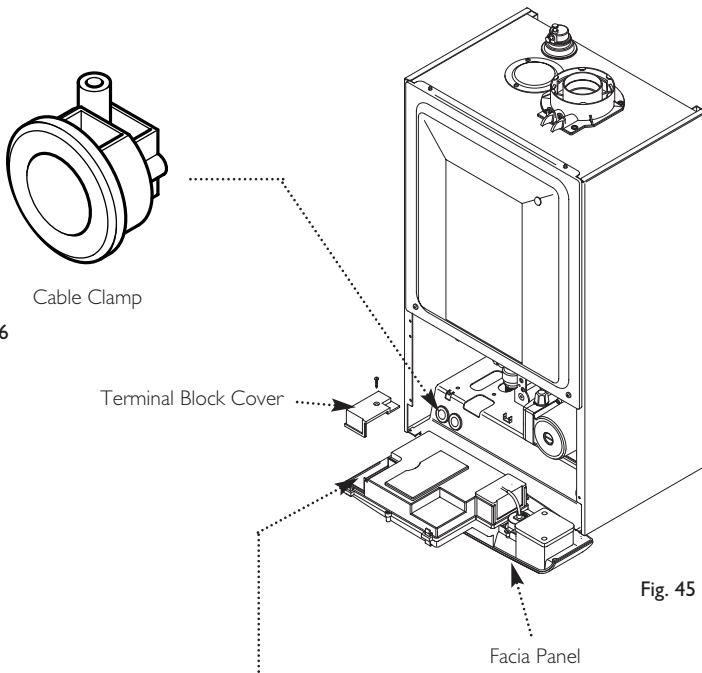


Fig. 47

11.0 Commissioning

11.1 Commissioning the Boiler

1. Reference should be made to BS 5449 Section 5 when commissioning the boiler.

2. At the time of commissioning, complete all relevant sections of the Benchmark Checklist at the rear of this publications.

IMPORTANT: The heat exchanger air vent on top of the boiler (Fig. 48) **MUST** be opened before filling the primary system.

3. Ensure that the filling loop is connected and open, then open the heating flow and return valves on the boiler.

4. Open the screw on the automatic air vent on the pump body (Fig. 49).

5. The system must be flushed in accordance with BS 7593 (see Section 6.2) and the flushing agent manufacturers instructions.

6. Pressurise the system to 1.5 bar then close and disconnect the filling loop.

7. Turn the gas supply on and purge the system according to in GB BS 6891 and in IE I.S. 813 "Domestic Gas Installations".

8. Test for gas soundness.

9. Hinge the fascia panel upwards and refit the case front panel. Tighten the securing screws.

10. Turning the temperature control knob will set the relevant temperature. When the knob is turned the display will alter and show the selected temperature. After a few seconds the display reverts to show the current boiler temperature (Fig. 51).

Heat Exchanger Automatic Air Vent

Fig. 48

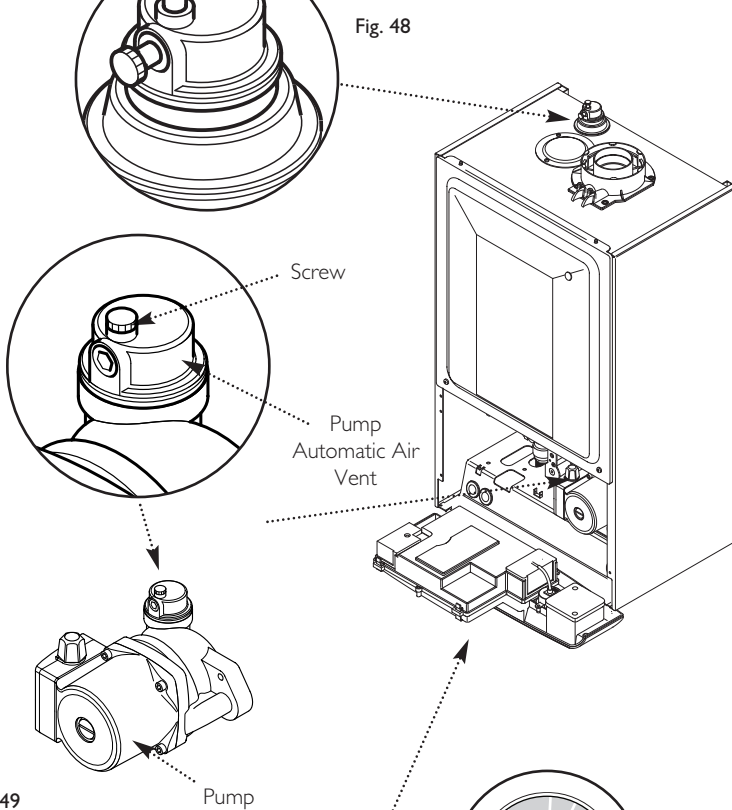


Fig. 49

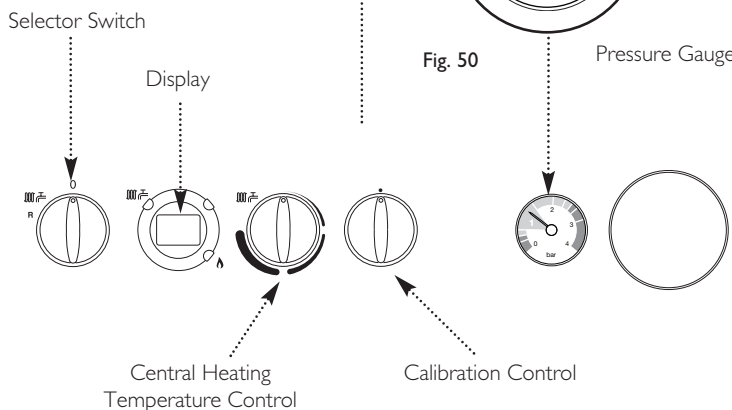
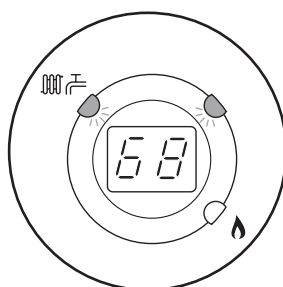
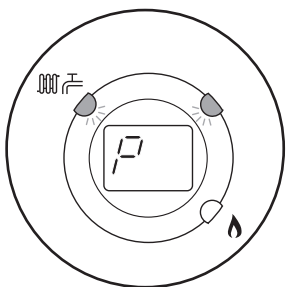
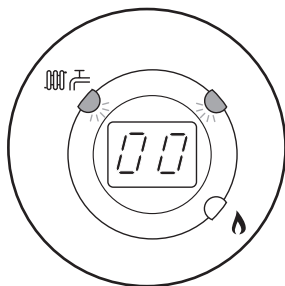
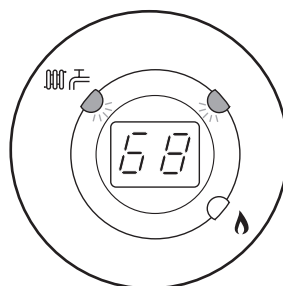
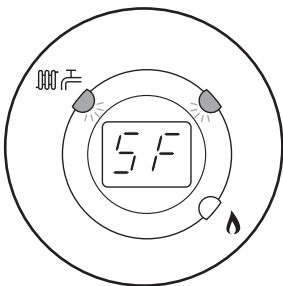
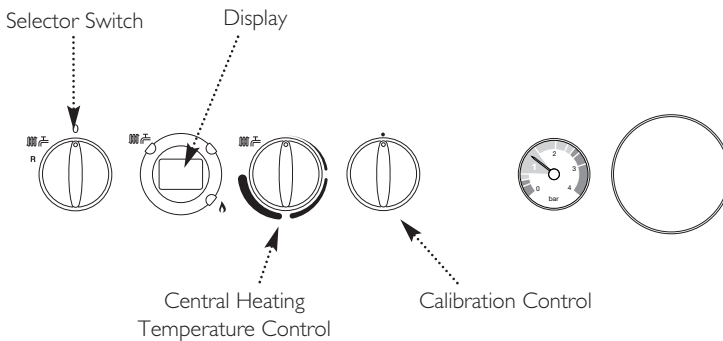
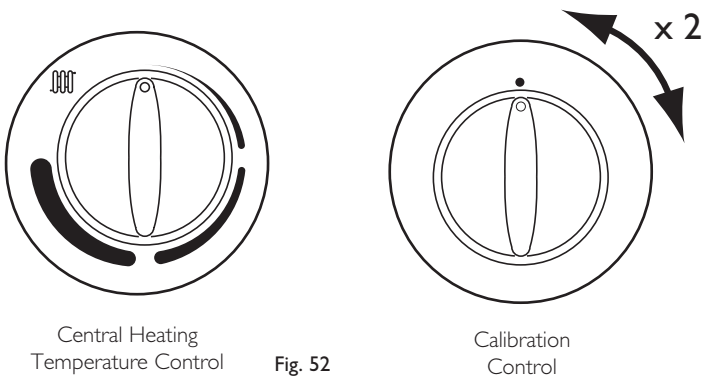


Fig. 50

Fig. 51

11.2 Checking



1. The gas valve is factory set and the burner pressure cannot be measured as it is altered by suction of the fan and modulates as demand on the boiler alters. The gas supply pressure should be 20mb.

2. If necessary the gas rate may be checked after running the boiler for 10 minutes with any other appliances and pilot lights turned off.

3. Ensure that the integral timer and any external controls are calling for heat, and the selector switch is in the central heating and hot water position (SF). The current boiler temperature is shown on the display.

4. To check the gas rate it is necessary to set the boiler to 'Calibration Mode'.

5. Turn both temperature control knobs fully anticlockwise, then quickly turn the Calibration Control knob 1/4 clockwise twice and back fully anticlockwise (Fig. 52).

6. The display will now alternate between 'SF' and the current boiler temperature and both green LEDs will flash (Figs. 53 & 54).

7. Turn CH temperature control knob fully clockwise. As the knob is turned the display will change from '0' to '00' (Fig. 55) indicating maximum rate, then revert to 'P' alternating with the current boiler temperature (Figs 56 & 57).

8. A gas rate measurement may now be made. Approximate values are:-

15 model	1.69 m ³ /h
18 model	1.95 m ³ /h
24 model	2.61 m ³ /h
28 model	3.1 m ³ /h
32 model	3.48 m ³ /h

9. The 'Calibration Function' is active for 20 minutes unless the maximum CH temperature is exceeded.

10. The function can be disabled at any time by turning the Calibration Control knob.

12.0 Completion

12.1 Completion

1. Instruct the user in the operation of the boiler and system including external controls, explaining the operational sequence.
2. Set the central heating and hot water temperature control knobs to the requirements of the user.
3. Carefully read and complete all sections of the Benchmark Commissioning Checklist at the rear of this publication that are relevant to the appliance and installation. These details will be required in the event of any warranty work. The publication must be handed to the user for safe keeping and each subsequent regular service visit recorded.
4. For IE, it is necessary to complete a "Declaration of Conformity" to indicate compliance with I.S. 813. An example of this is given in I.S. 813 "Domestic Gas Installations". This is in addition to the Benchmark Commissioning Checklist.
5. Hand over the Users Operating, Installation and Servicing Instructions giving advice on the necessity of regular servicing.

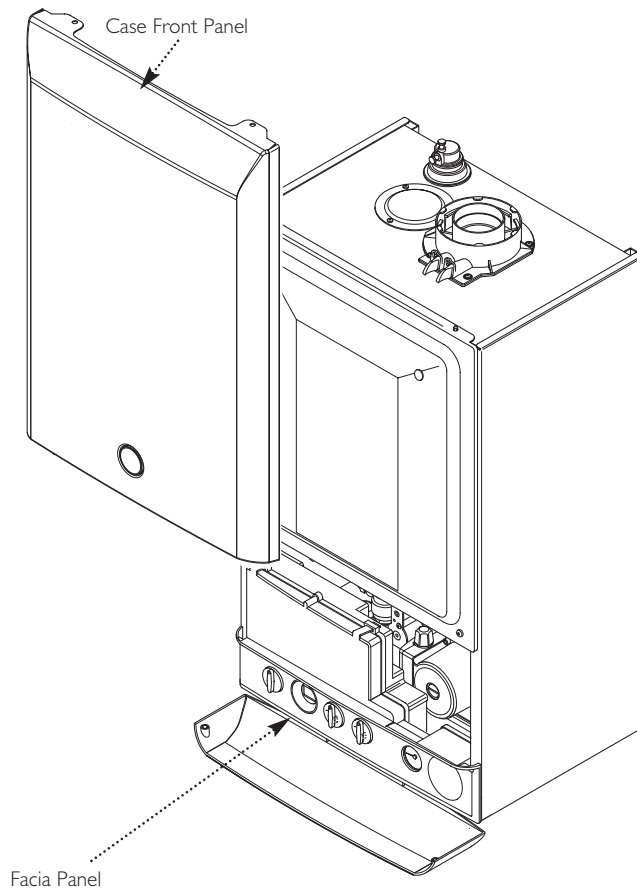


Fig. 58

13.1 Annual Servicing

1. For reasons of safety and economy, it is recommended that the boiler is serviced annually. Servicing must be performed by a competent person in accordance with B.S. 7967-4:2007.

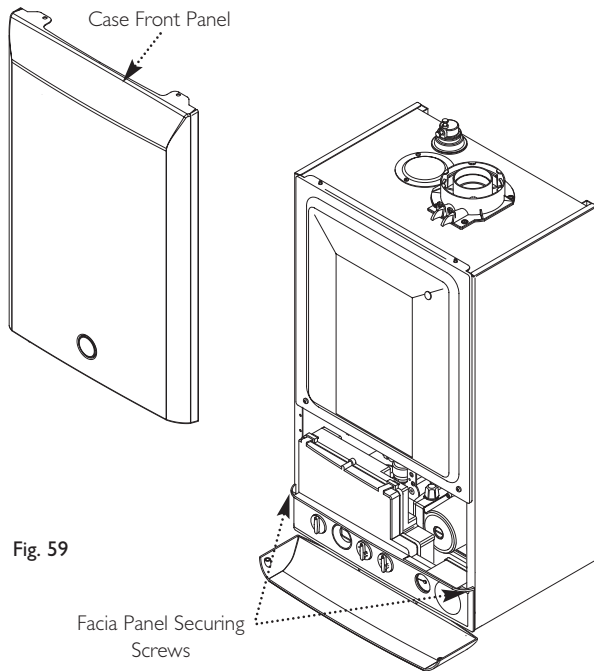


Fig. 59

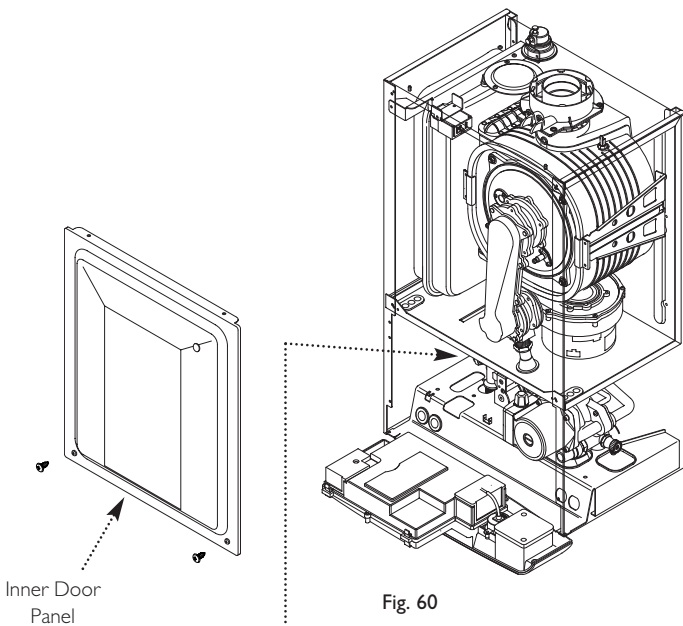


Fig. 60

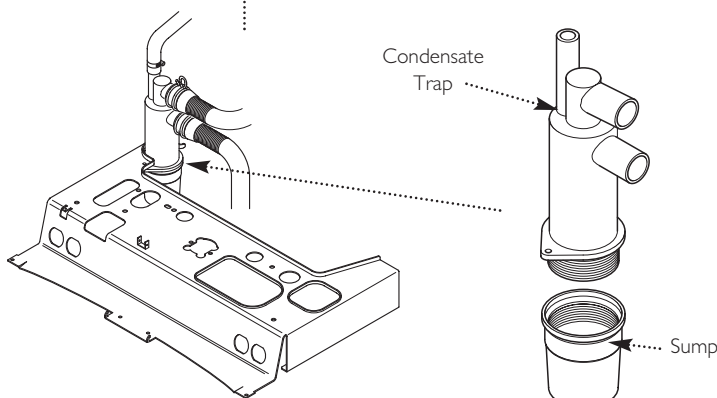


Fig. 61

If a suitably calibrated combustion analyser is available it may not be necessary to perform a full strip down of the appliance. Proceed as follows.

Check for/inspect:-

Evidence of leakage of products of combustion

Water leaks

Heat stress

Deterioration such as corrosion

Visible condition of seals and joints

Flue system and ventilation

Condensate drain system

Operation at designed maximum heat input

If the above are satisfactory perform a combustion check. The CO/CO₂ ratio must be less than 0.004 and the CO₂ should be 8.7% ± 0.2 (max. rate) and 8.4% ± 0.2 (min. rate). This can be adjusted - see Section 15.0 - if the readings are incorrect. When correct combustion readings cannot be achieved by adjustment a full strip down must be performed - see below. Carefully check items such as the burner, injector and heat exchanger for blockage or damage, rectifying as necessary. Re-check the combustion. Once satisfactory readings have been achieved and any other defects corrected complete the relevant Service Interval Record section of the Benchmark Commissioning Checklist at the rear of this publication.

Where no suitable analyser is available a strip down service must be performed as described below.

2. After servicing, complete the relevant Service Interval Record section of the Benchmark Commissioning Checklist at the rear of this publication.

If a full strip-down is to be performed proceed as follows:-

3. Ensure that the boiler is cool.

4. Ensure that both the gas and electrical supplies to the boiler are isolated.

5. Slacken the screws securing the facia panel. Lift the outercase panel so that its securing tabs are clear of the facia. Remove the panel, allowing the facia to hinge down (Fig. 59).

6. Remove the screws securing the inner door panel. Lift the panel slightly to disengage it from the studs on top of the case (Fig. 60).

7. Unscrew the sump from the bottom of the condensate trap assembly (Fig. 61).

8. Remove any deposits from the sump and trap. Clean as necessary and replace the sump.

13.1 Annual Servicing (Cont)

9. Undo the nut on the gas inlet pipe to the venturi (Fig. 63) and pull the sensing pipe off the fan.

10. Disconnect the electrode leads, noting their position, and the fan electrical plugs (Fig. 62).

11. Undo the four nuts retaining the combustion box cover to the heat exchanger.

12. Carefully draw the fan, collector and cover assembly forward, being careful to retain the injector in the venturi (Figs. 62 & 63).

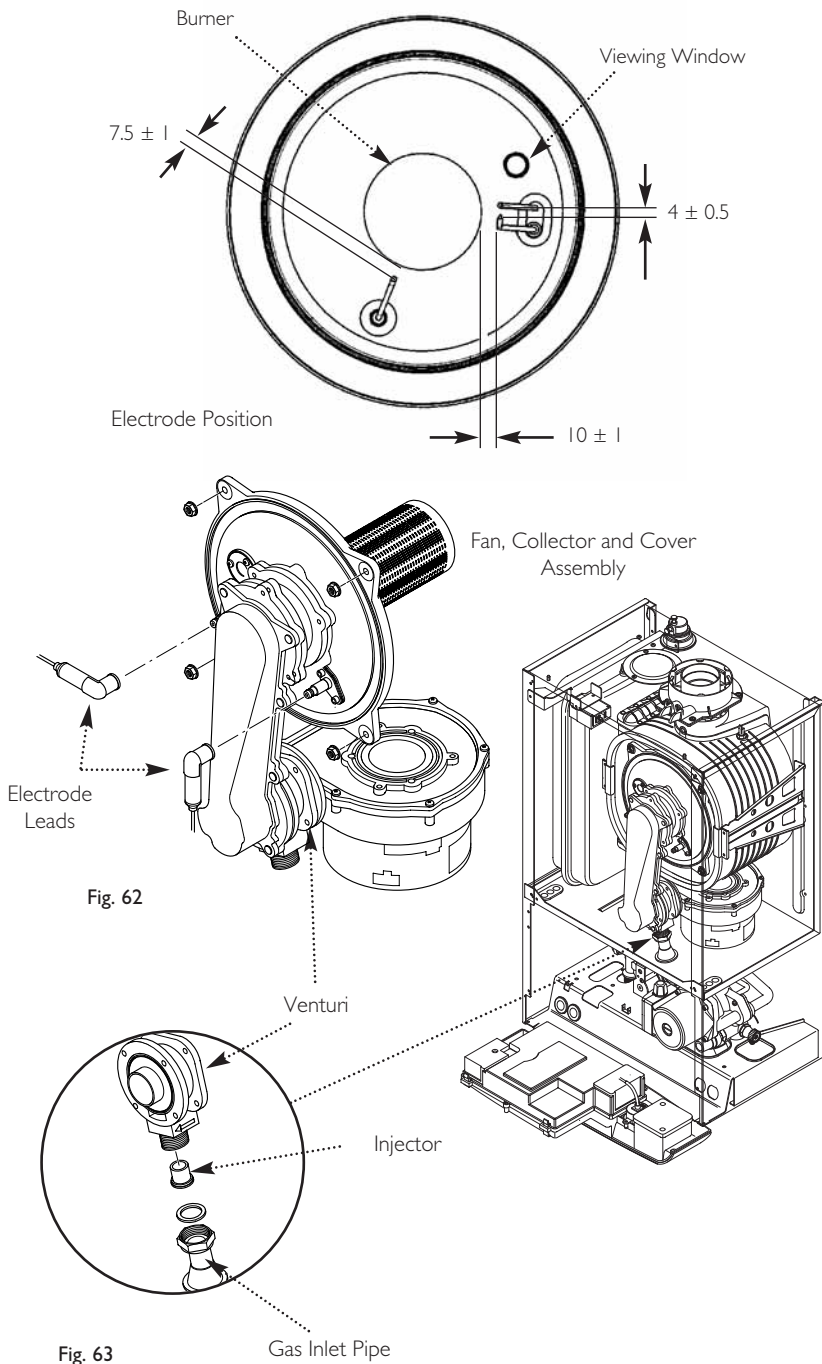
13. Clean any debris from the heat exchanger and check that the gaps between the tubes are clear.

14. Inspect the burner, electrodes position and insulation, cleaning or replacing if necessary. Clean any dirt or dust from the air box.

15. Reassemble in reverse order.

NOTE: The sensing pipe must be reconnected to the fan, not the venturi.

16. Complete the relevant Service Interval Record section of the Benchmark Commissioning Checklist at the rear of this publication and then hand it back to the user.



14.0 Changing Components

IMPORTANT: When changing components ensure that both the gas and electrical supplies to the boiler are isolated before any work is started. When the component has been changed turn the selector switch fully anticlockwise against the spring pressure to the reset position and hold for 5 seconds to reset the boiler before recommissioning.

See Section 13.1 "Annual Servicing" for removal of case panel, door etc.

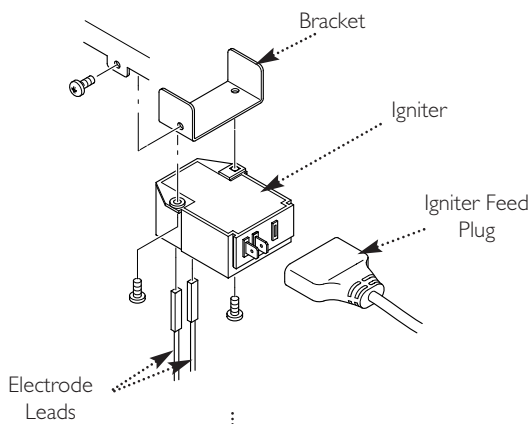
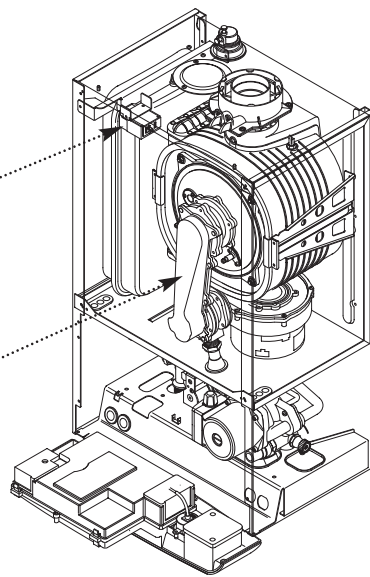


Fig. 64



14.1 Igniter (Fig. 64)

1. Disconnect the igniter feed plug and the electrode leads, noting their positions.
2. Undo the screw securing the bracket to the boiler.
3. Remove the igniter and transfer the bracket to the new component.
4. Reassemble in reverse order.

14.2 Spark and Sensing Electrodes (Fig. 66)

1. Disconnect the electrode leads, noting their positions.
2. Remove the retaining screws securing each of the electrodes to the combustion box cover and remove the electrodes.
3. Check the condition of the sealing gaskets and replace if necessary. Reassemble in reverse order.

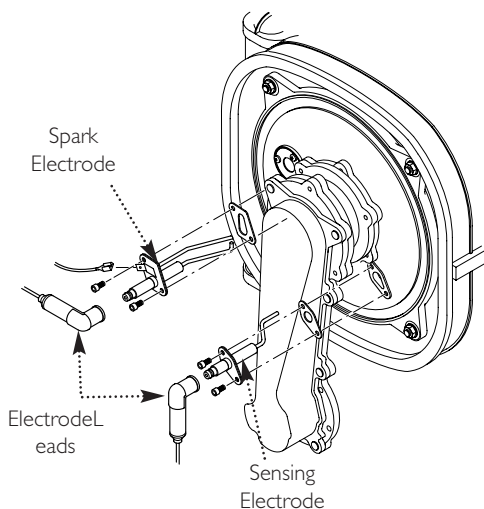


Fig. 65

14.0 Changing Components

14.3 Fan (Fig. 66)

1. Undo the nut on the gas inlet pipe to the venturi (Fig. 67) and pull the sensing pipe off the fan.
2. Disconnect the electrode leads, noting their position and disconnect the fan electrical plugs.
3. Undo the screws securing the collector to the extension piece.
4. Remove the collector and fan assembly, being careful to retain the injector in the venturi.
5. Undo the screws securing the fan to the venturi and fit the new fan. On 18 models ONLY transfer the fan inlet flange to the new fan. Replacing the seal if necessary.
6. Examine the burner gasket and replace if necessary.
7. Reassemble in reverse order, ensuring that the injector is in place and the sensing pipe is connected to the fan.

14.4 Venturi (Fig. 66)

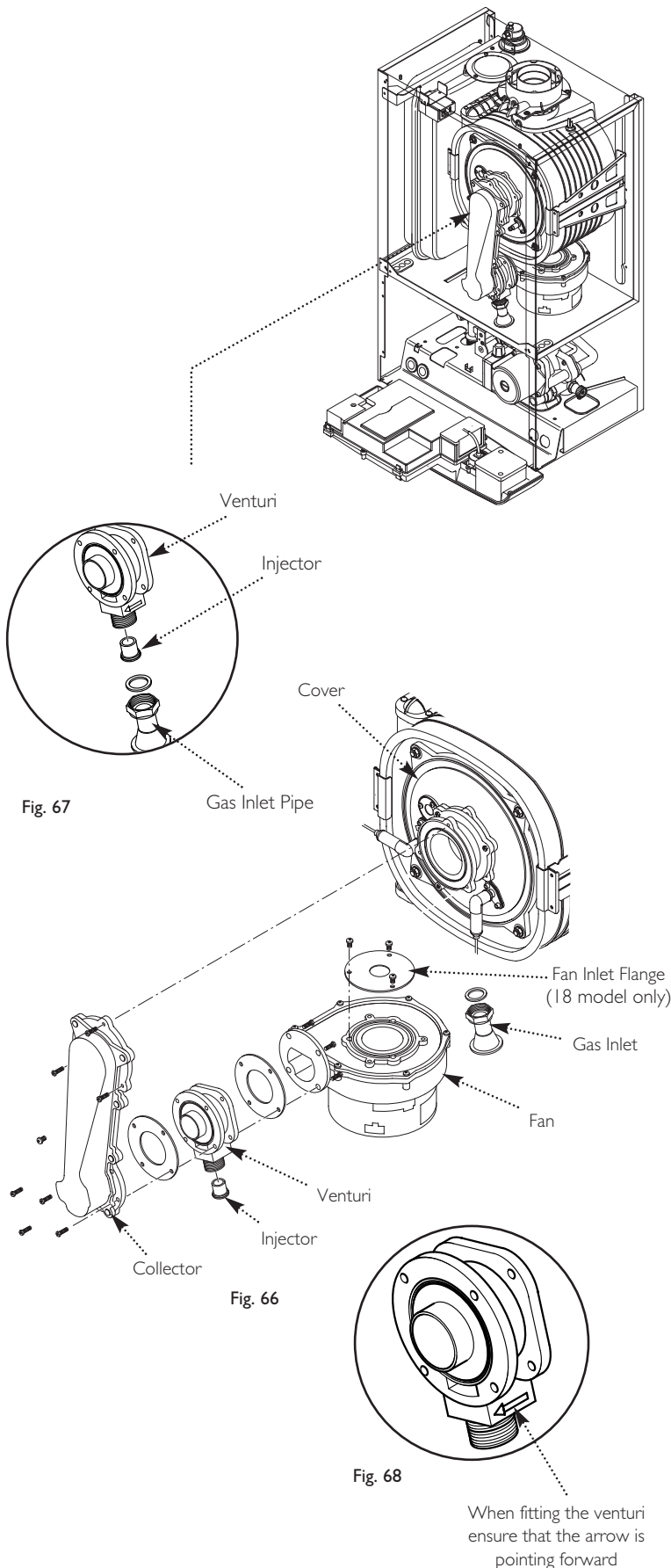
1. Remove the collector and fan assembly as described in section 14.3.
2. Extract the injector from the venturi.
3. Undo the screws securing the fan to the venturi and the venturi to the collector.

IMPORTANT: When fitting the new venturi, ensure the arrows on its base point into the collector (Fig. 68).

4. Examine the seals and burner gasket, replace if necessary.
5. Reassemble in reverse order, ensuring that the injector is in place.

14.5 Injector (Fig. 66)

1. Remove the collector and fan assembly as described in section 14.3.
2. Extract and replace the injector and reassemble in reverse order.



14.0 Changing Components

14.6 Burner (Fig. 69)

1. Undo the screws securing the collector to the venturi and extension piece. Remove this extension piece from the cover (on 24 models).
2. Withdraw the burner from the cover and replace with the new one.
3. Examine the gasket, replacing if necessary.
4. Reassemble in reverse order.

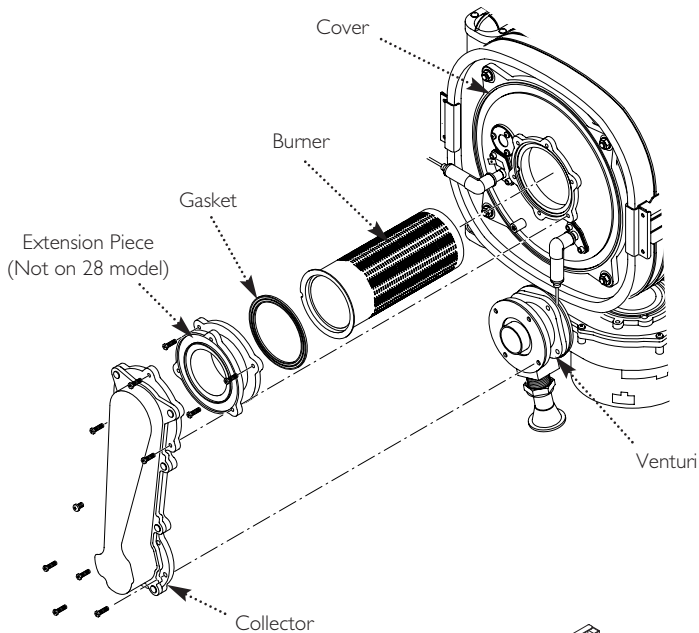


Fig. 69

14.7 Insulation (Fig. 70)

1. Remove the electrode leads, noting their positions. Also remove the electrodes as described in section 14.2.
2. Undo the screws securing the collector to the venturi and the nuts holding the cover to the heat exchanger. Draw the collector and cover assembly away.
3. Remove the cover insulation piece.
4. Fit the new insulation carefully over the burner and align it with the slots for the electrodes.
5. The rear insulation is retained by a screw and large washer, remove these and draw the insulation out of the heat exchanger.
6. Examine the cover seal and replace if necessary.

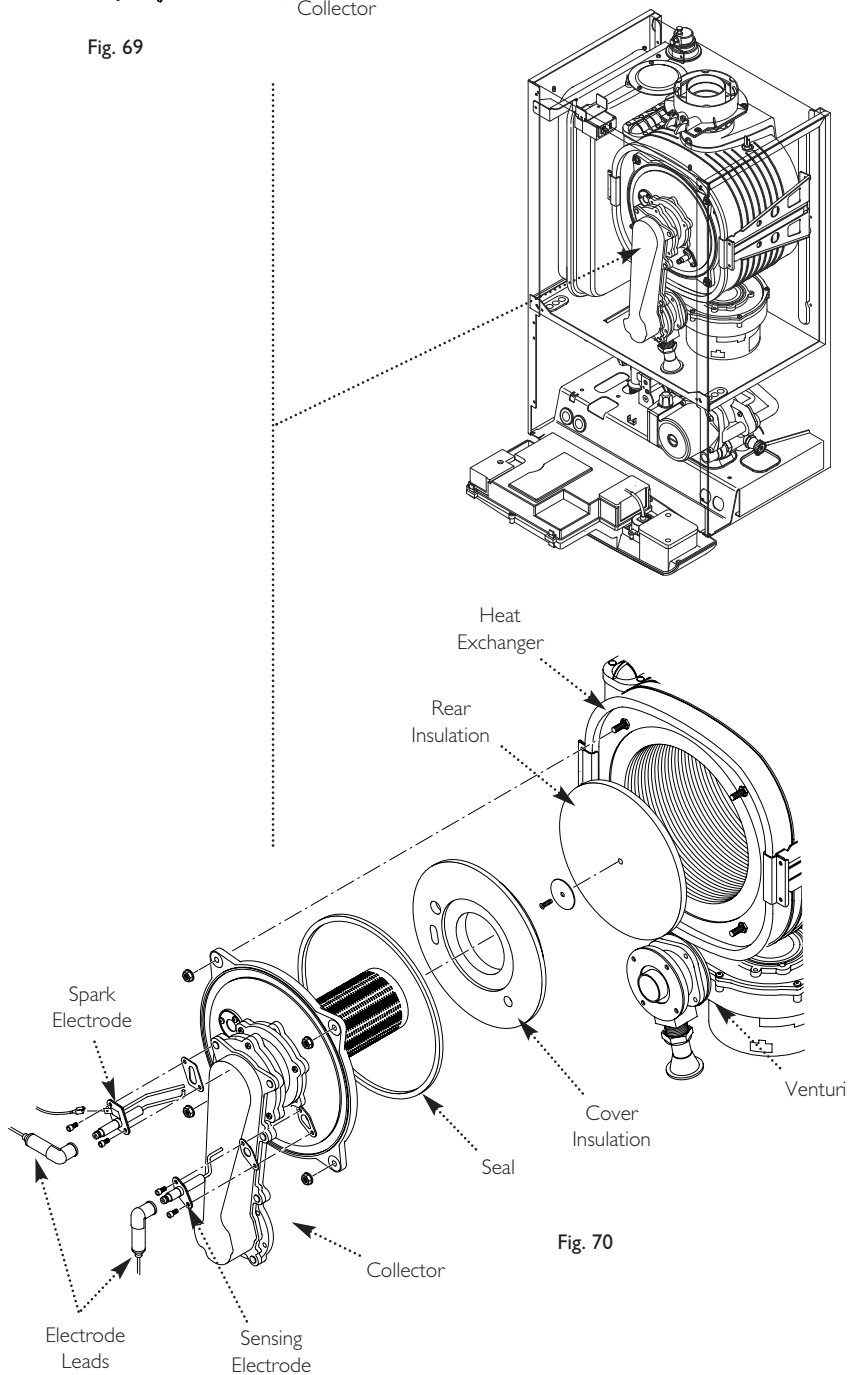
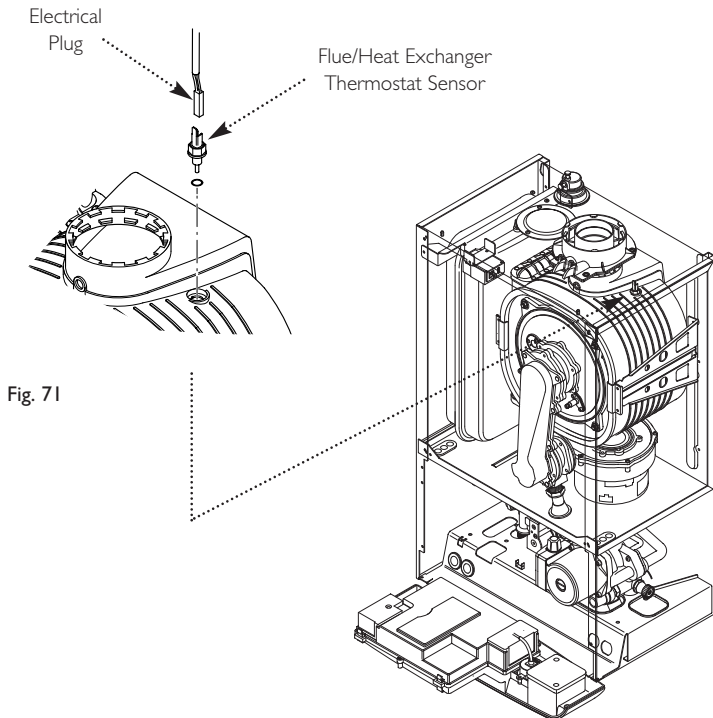


Fig. 70

14.0 Changing Components

14.8 Flue/Heat Exchanger Thermostat Sensor (Fig. 71)

1. Ease the retaining tab on the sensor away and disconnect the electrical plug.
2. Turn the sensor 90° anticlockwise to remove - it is a bayonet connection.
3. Reassemble in reverse order.

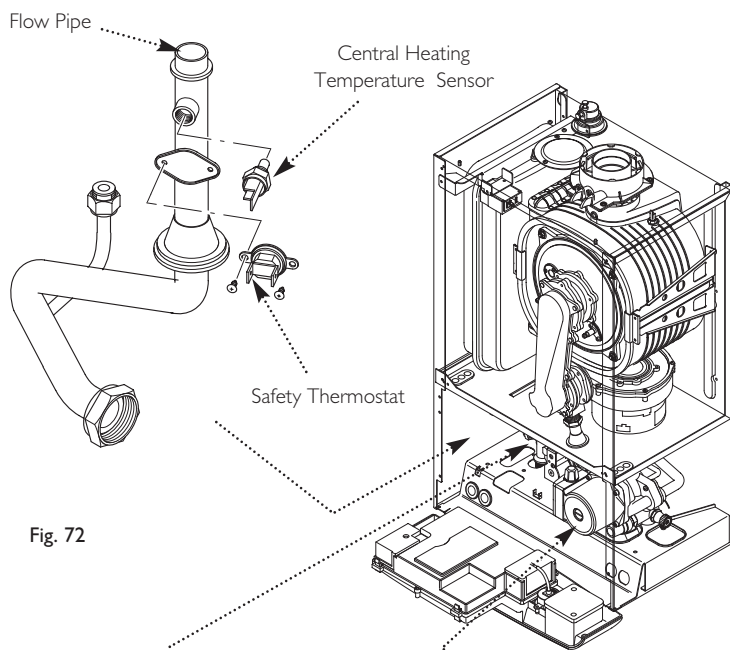


14.9 Water Pressure Sensor (Fig. 73)

1. Drain the primary circuit.
2. Disconnect the two wires from the sensor.
3. Undo the nut on the flow pipe securing and sealing the sensor.
4. Remove the sensor, examine the sealing washer, replacing if necessary.
5. Reassemble in reverse order. The component is not polarised - either wire will fit each terminal.

14.10 Central Heating Temperature Sensor (NTC) (Fig. 72)

1. Ease the retaining tab on the sensor away and disconnect the electrical plug.
2. Unscrew the sensor from its pocket and reassemble in reverse order. The plug will only fit one way.

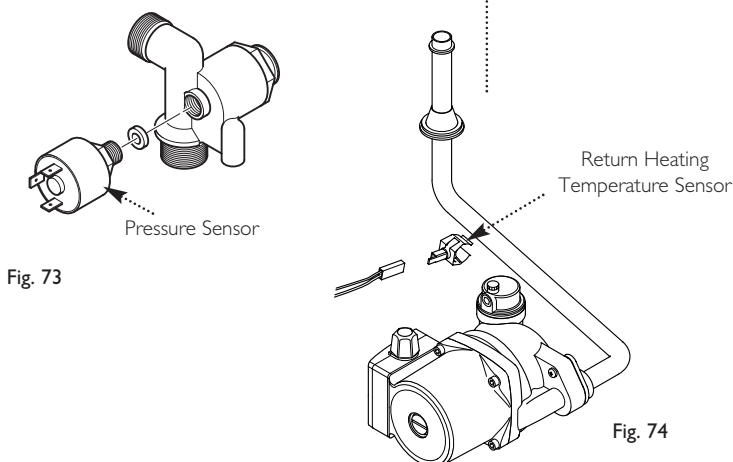


14.11 Safety Thermostat (Fig. 72)

1. Pull the plug off the thermostat.
2. Remove the screws securing the thermostat to the mounting plate on the flow pipe.
3. Reassemble in reverse order, ensuring that the plug is pushed fully on.

14.12 Return Heating Temperature Sensor (Fig. 74)

1. Ease the retaining tab on the sensor away and disconnect the electrical plug.
2. Prise the sensor retaining clip off the pipe and remove the sensor from the clip.
3. Reassemble in reverse order.



14.0 Changing Components

14.13 Pump - Head Only (Fig. 75)

1. Drain the primary circuit and remove the socket head screws securing the pump head to the body and draw the head away.
2. Undo the screw on the pump wiring cover and remove the cover. Using a suitable flat bladed screw driver press the cable securing levers downwards to release each wire after noting their position.
3. A standard replacement Grundfos 15-60 head can now be fitted. Connect the pump wiring to the new head. **The pump speed must be set to 3** (Fig. 76).
4. Reassemble in reverse order.

14.14 Pump - Complete (Fig. 77)

1. Drain the primary circuit.
2. Undo the two screws securing the body to the pipe and manifold and draw the pump forwards.
3. Undo the screw on the pump wiring cover and remove the cover. Using a suitable flat bladed screw driver press the cable securing levers downwards to release each wire after noting their position.
4. Unscrew the automatic air vent from the pump body.
5. Connect the wiring to the new pump. Examine the 'O' ring seals on the return pipe and manifold, replacing if necessary.
6. Fit the air vent to the pump body and reassemble in reverse order.

14.15 Automatic Air Vent (Fig. 77)

1. Drain the primary circuit and unscrew the automatic air vent from the pump body.
2. Examine the 'O' ring seal, replacing if necessary, and fit it to the new automatic air vent.
3. Reassemble in reverse order.

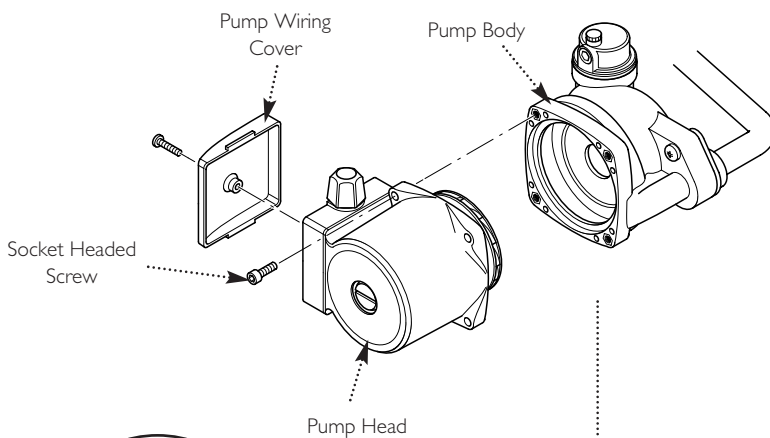
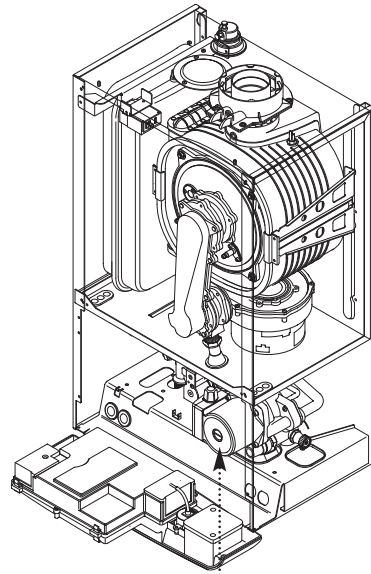
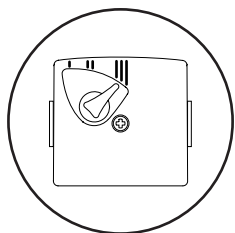


Fig. 75



Pump Setting

Fig. 76

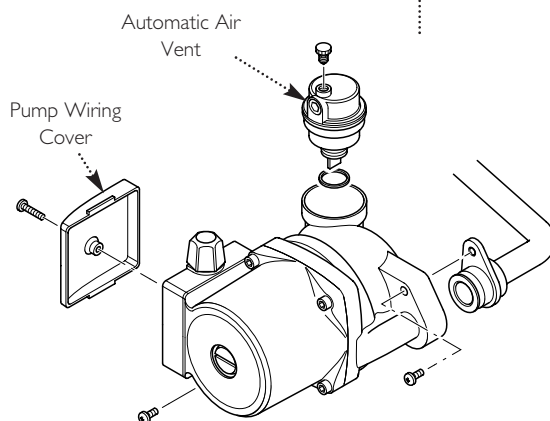


Fig. 77

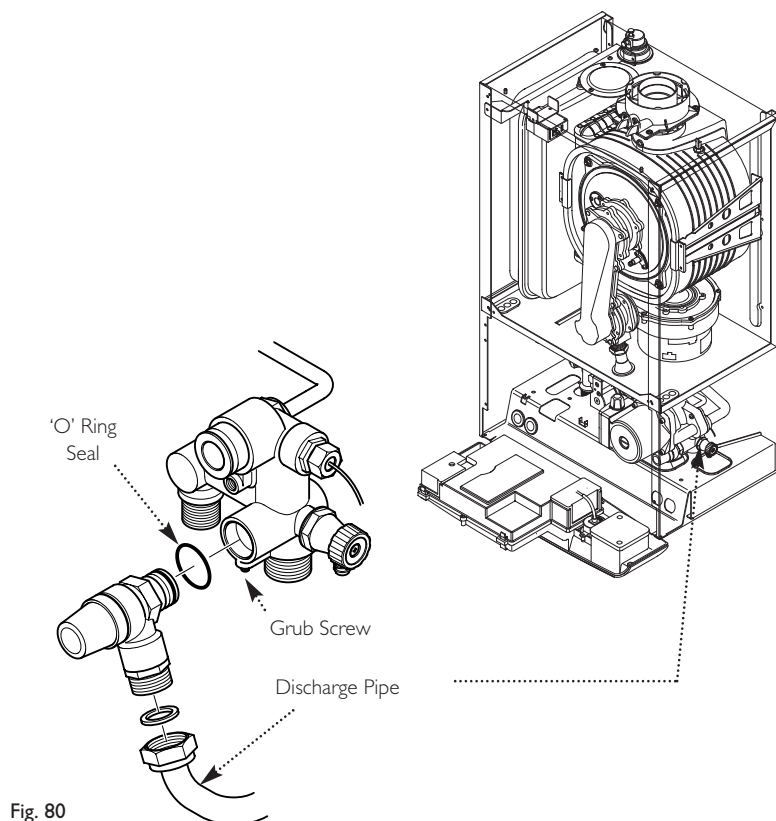
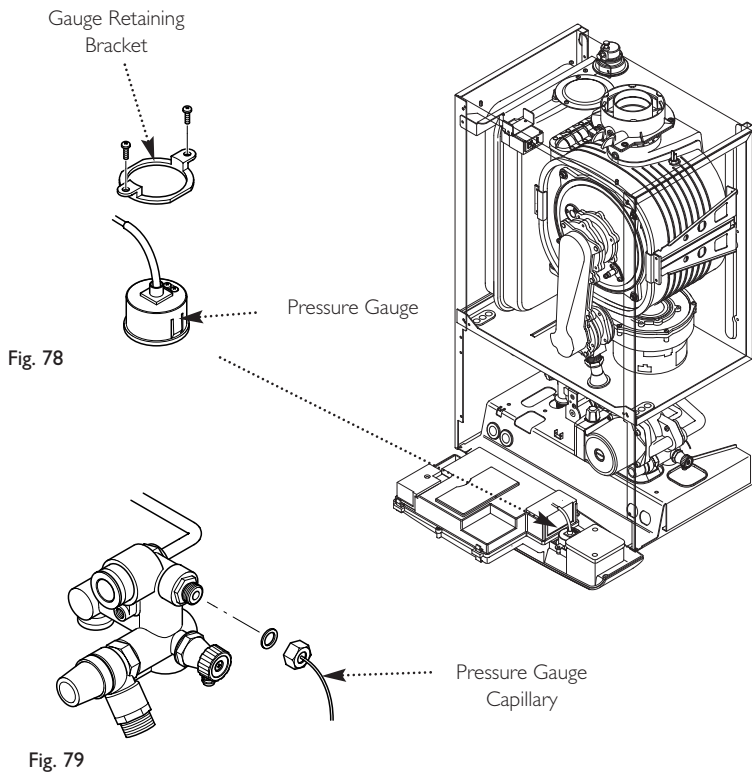
14.0 Changing Components

14.16 Pressure Gauge (Figs. 78 & 79)

1. Drain the primary circuit and undo the nut on the pressure gauge capillary.
2. Undo the screws securing the gauge retaining bracket.
3. Remove the bracket and gauge assembly. Depress the barbs on the side of the gauge and remove the retaining bracket.
4. Examine the sealing washer, replace if necessary.
5. Reassemble in reverse order.

14.17 Pressure Relief Valve (Fig. 80)

1. Drain the primary circuit.
2. Disconnect the discharge pipe from the valve. Using a suitable hexagon key undo the grub screw sufficiently to release the valve.
3. Note the orientation of the valve, rotate it and withdraw it from the manifold.
4. Fit the new valve and 'O' ring seal and set to the previously noted orientation. Reassemble in reverse order.



14.18 P.C.B. (Fig. 81)

1. Note the settings of the temperature control knobs, rotate them fully anticlockwise and carefully pull them off the drive pins.
2. Completely undo the screws securing the control box cover and release the cover retaining barbs from their slots. Disengage the rear of the cover from the control box hinge pin (Fig. 81).
3. Note the position of all plugs and wires on the P.C.B. and disconnect them.
4. Undo the securing screws and remove the P.C.B. Transfer the control knob drive pins to the new P.C.B. and turn them fully anticlockwise.
5. Reassemble in reverse order, ensuring that the temperature controllers are reset to their previous positions.

14.19 Selector Switch (Fig. 82)

1. Note the setting of the selector switch knob and carefully pull it off the facia.
2. Completely undo the screws securing the control box cover and release the cover retaining barbs from their slots. Disengage the rear of the cover from the control box hinge pin (Fig. 81).
3. Note the position of the electrical connections and the orientation of the switch. Remove the electrical connections.
4. Remove the screws securing the switch to the facia panel.
5. Fit the new switch, ensuring that it is correctly positioned and reassemble in reverse order.

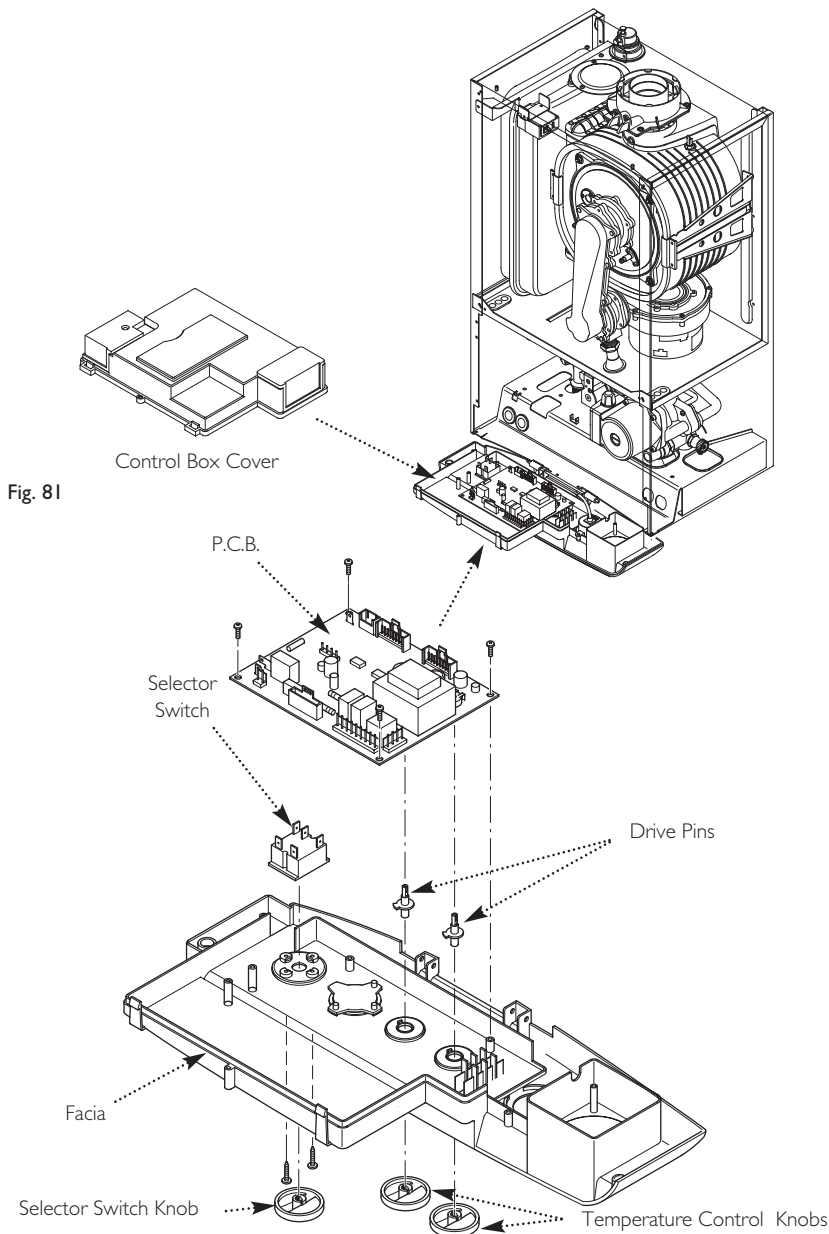


Fig. 82

14.0 Changing Components

14.23 Gas Valve (Fig. 83)

IMPORTANT: After replacing the valve the CO₂ must be checked and adjusted as detailed in Section 15.0 Combustion Check. Only change the valve if a suitable calibrated combustion analyser is available.

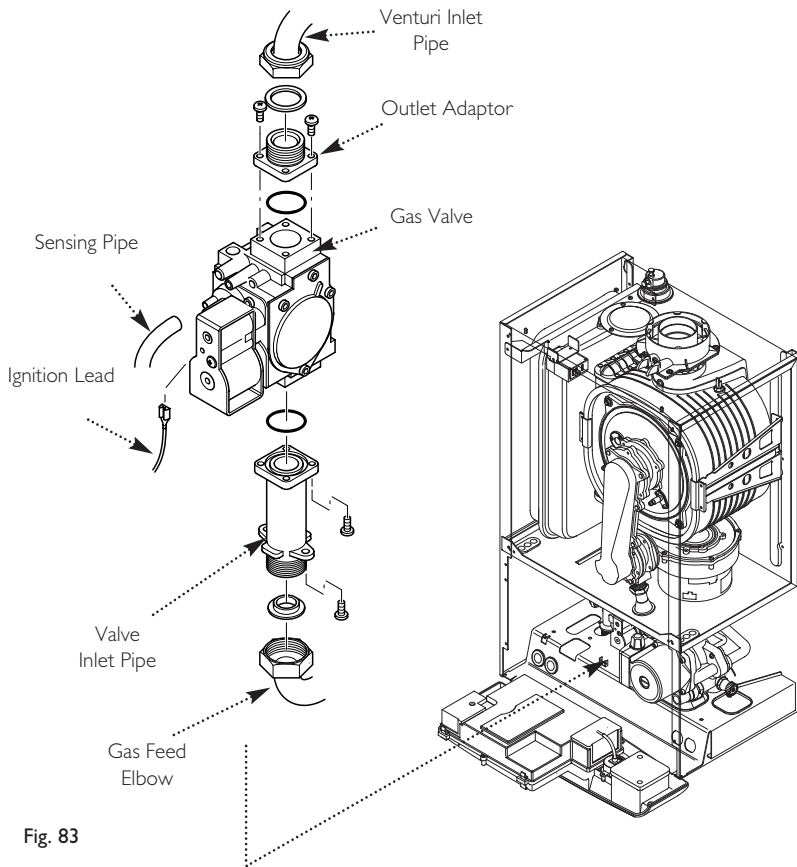


Fig. 83

1. Turn the gas cock off and undo the nut on the gas feed elbow under the boiler.
2. Remove the screws securing the inlet pipe flange to the boiler bottom panel.
3. Pull off the earth lead and sensing pipe.
4. Undo the nut on the venturi inlet pipe and slacken the nut on the venturi. Ease the pipe aside and remove the gas valve.
5. Remove the outlet adaptor and inlet pipe and transfer them to the new valve. Examine the 'O' ring seals, replace if necessary.
6. Reassemble in reverse order.

NOTE: To assist the boiler to light prior to final setting, use a suitable hexagon key to wind out the Gas/Air adjustment screw until it is flush with the valve body, then turn the screw 4 full turns clockwise (Fig. 84). If the boiler will not light, or the correct CO₂ cannot be achieved contact the 'heateam' technical helpline.

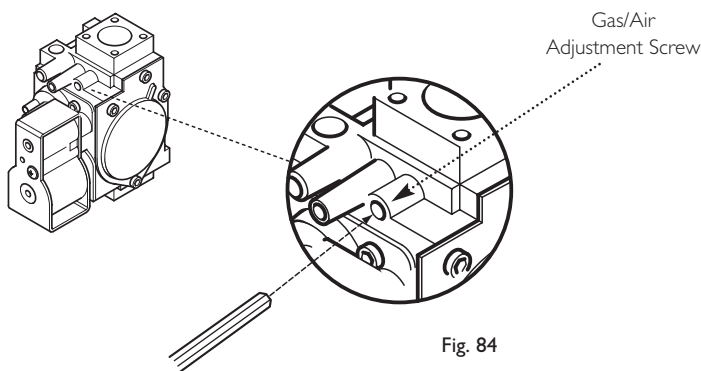


Fig. 84

14.24 Expansion Vessel (Fig. 85)

1. Drain the primary circuit and undo the nut on the vessel connection pipe.
2. Undo and remove the locknut securing the vessel spigot to the boiler air box.
3. Remove the bracket and vessel from the boiler.
4. Locate the retaining bracket on the upper flange of the vessel and fit to the boiler.
5. Reassemble in reverse order.

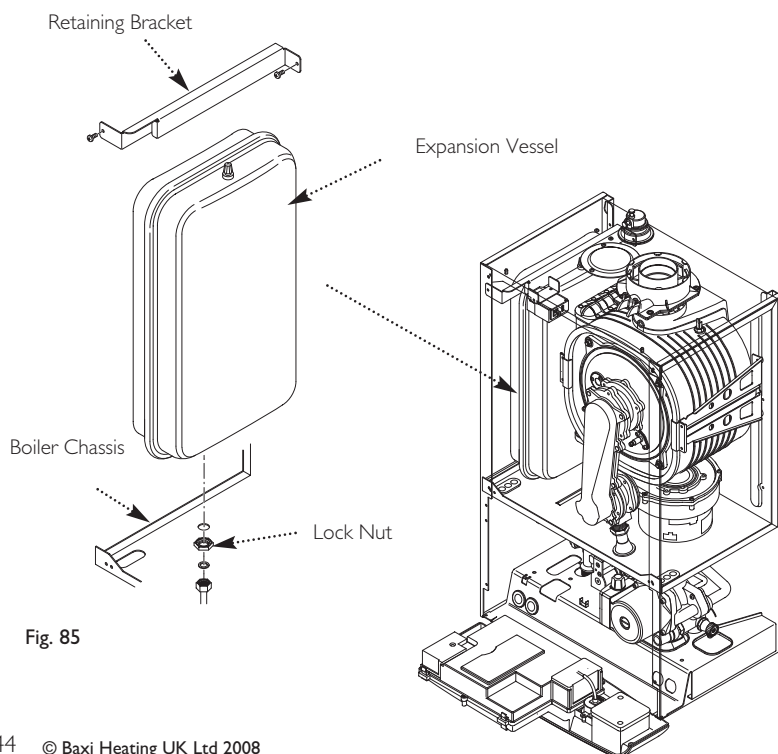


Fig. 85

15.0 Combustion Check

15.1 Checking the CO₂

IMPORTANT: The CO₂ must be only be checked and adjusted if a suitable calibrated combustion analyser is available.

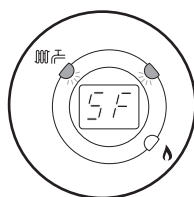
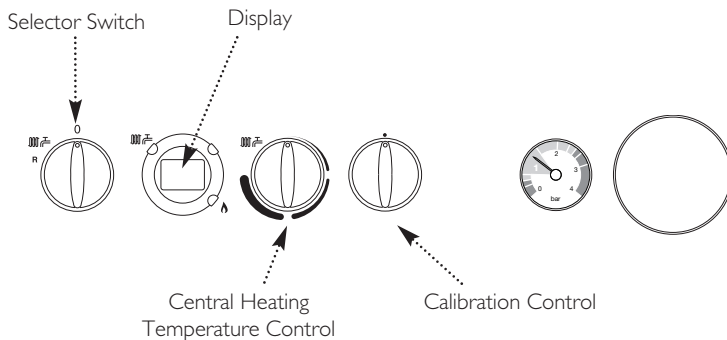
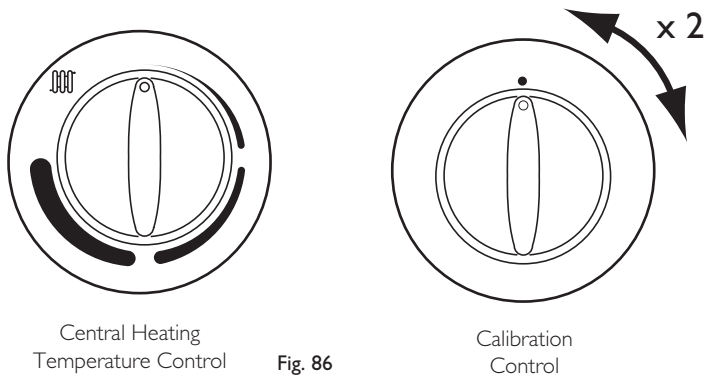


Fig. 87

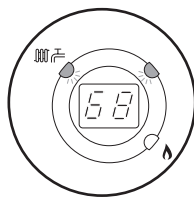


Fig. 88

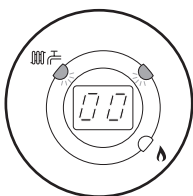


Fig. 89

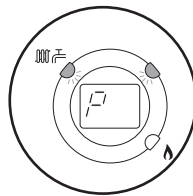


Fig. 90

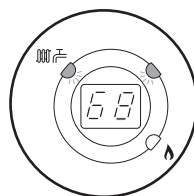


Fig. 91

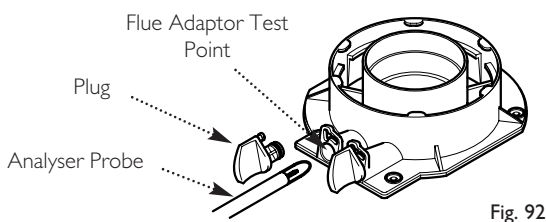


Fig. 92

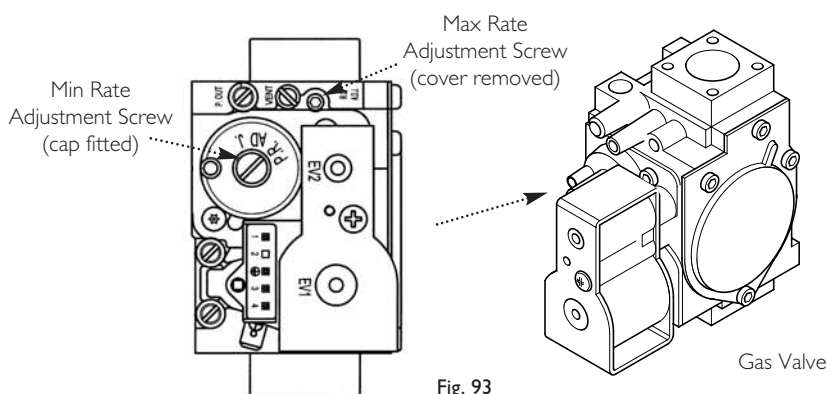


Fig. 93

1. The combustion (CO₂) may be checked using a suitably calibrated analyser after running the boiler for several minutes.

2. To do this it is necessary to set the boiler to 'Calibration Mode'.

3. Ensure that all external controls are calling for heat. The actual current boiler temperature is shown on the display.

4. Turn both temperature control knobs fully anticlockwise, then quickly turn the Calibration Control knob 1/4 clockwise twice and back fully anticlockwise (Fig. 86).

5. The display will now alternate between 'SF' and the current boiler temperature and both green LEDs will flash (Figs. 87 & 88).

6. Turn the CH temperature knob fully clockwise. As the knob is turned the display will change, indicating the fan speed.

7. The display will show '00', indicating maximum rate, then revert to 'P' alternating with the current boiler temperature (Figs. 89, 90 & 91).

8. Remove the plug from the flue adaptor test point. Insert the analyser probe and allow time for the reading to settle (Fig. 92).

The CO₂ should be 8.7% ± 0.2

9. It is possible to alter the CO₂ by adjustment of the gas valve. Remove the plastic cover from the 'Max Rate' adjustment screw. At maximum rate the 'Max. Rate' adjustment screw should be turned, using a suitable hexagon key, until the correct reading is obtained (Fig. 93). Turning clockwise will reduce the CO₂. Anti-clockwise will increase the CO₂.

10. The CO₂ must then be checked at minimum rate. Turn the CH temperature knob fully anticlockwise. As the knob is turned the display will change, indicating the fan speed.

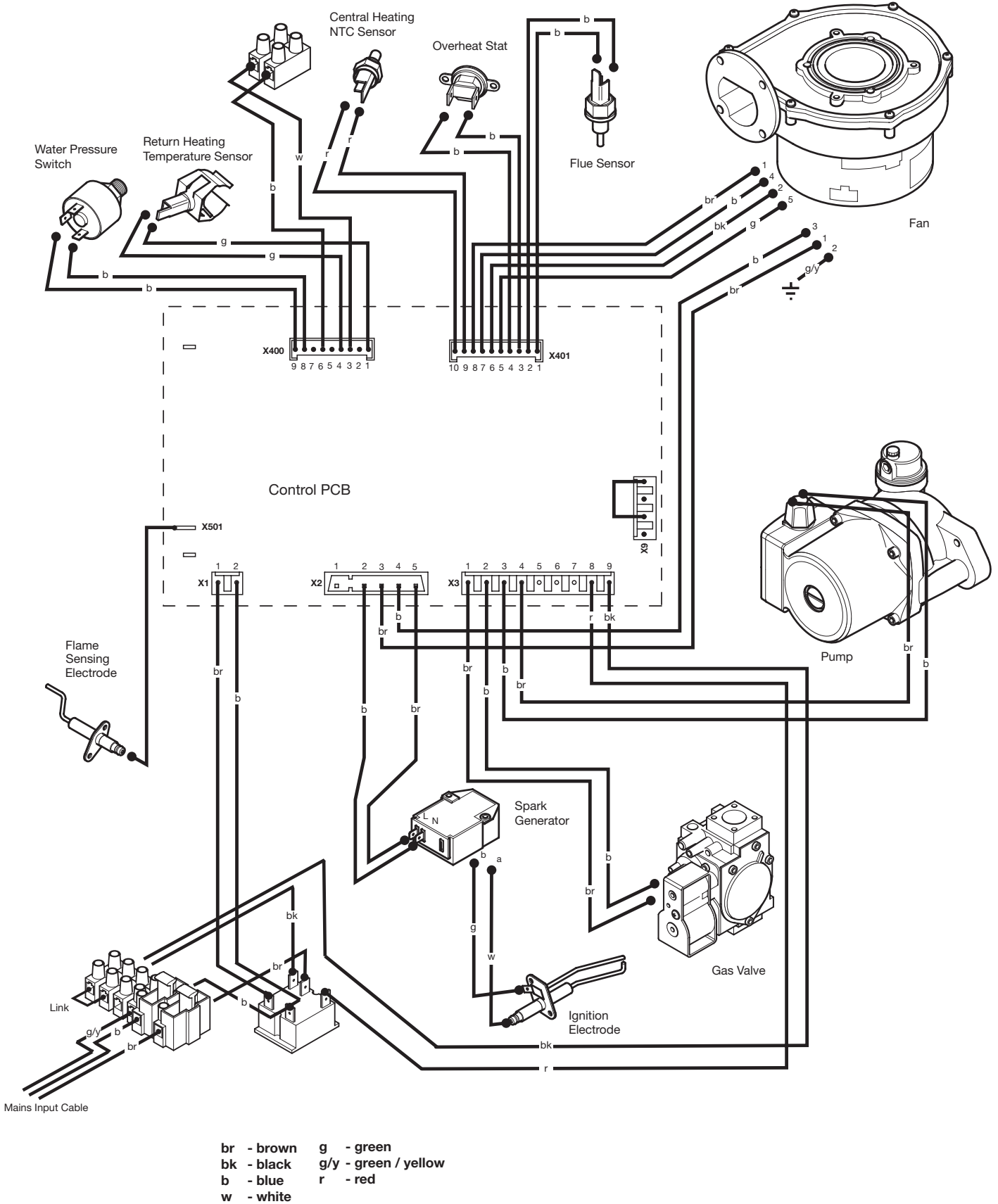
When the display reads '0' the boiler runs at minimum rate.

The CO₂ should be 8.4% ± 0.2.

11. With the boiler on minimum, the 'Min. Rate' adjustment screw must be altered, using a suitable hexagon key, after removing the cap (Fig. 93). Turning anti-clockwise will reduce the CO₂. Clockwise will increase the CO₂. If the CO₂ is reset at either boiler rate it must be rechecked at the other rate and also adjusted if required.

12. The 'Calibration Function' is maintained for 20 minutes unless the maximum CH temperature is exceeded. The function can be disabled at any time by turning the Calibration Control knob.

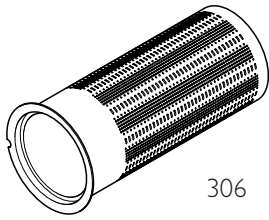
16.1 Illustrated Wiring Diagram



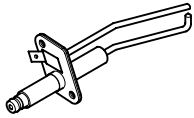
17.0 Short Parts List

Short Parts List

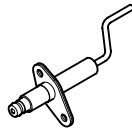
Key No.	Description	Manufacturers Part No.
302	Flue Thermostat	5114747
306	Bumer (15/18) Bumer (24/28) Bumer (32)	5122149 5114697 5114698
311	Fan	5114684
315	Igniter Electrode	5114702
316	Sensing Electrode	5114703
415	Pump	248042
419	Water Pressure Switch	5114748
420	Overheat Thermostat	5114729
421	NTC Sensor	5114725
422	Gas Valve	5114734
434	NTC Sensor (Return)	5114725
503	PCB 15 PCB 18 PCB 24 PCB 28 PCB 32	5122457 5122458 5118297 5118642 5122459
504	Pressure Gauge	248090



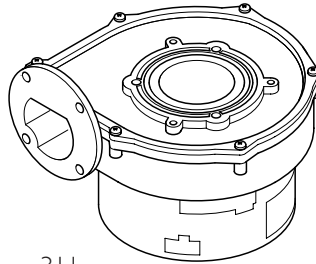
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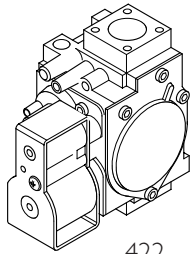
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316



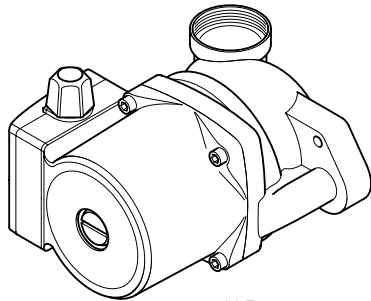
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422



419



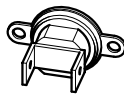
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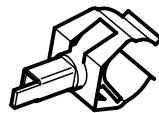
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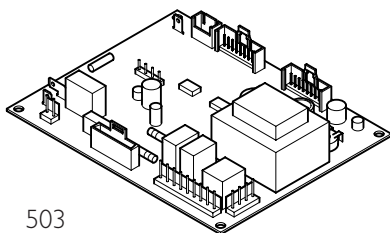
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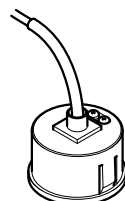
420



434



503



504

18.0 Fault Finding

NOTE: When instructed to turn the selector to the reset position turn the selector switch fully anticlockwise against the spring pressure to the reset position and hold for 5 seconds to reset the boiler.

18.1 Initial Fault Finding Checks

1. Check that gas, water and electrical supplies are available at the boiler.
2. Electrical supply = 230V ~ 50 Hz.
3. CH water system pressurised to 0.5 bar minimum when the boiler is cold.
4. The preferred minimum gas pressure is 20 mbar.
5. Carry out electrical system checks, i.e. Earth Continuity, Resistance to Earth, Short Circuit and Polarity with a suitable meter.

NOTE: These checks must be repeated after any servicing or fault finding.

6. Ensure all external controls are calling for heat and check all external and internal fuses. Before any servicing or replacement of parts, ensure the gas and electrical supplies are isolated.

18.2 Error Codes

1. If a fault occurs on the boiler an error code may be shown by the facia display.
2. The codes are either two or three digit, preceded by the letter 'E'. For example, code E133 will be displayed by 'E1' alternating with '33'. E20 is shown as 'E' then '20'

E20 and E28 indicate faulty components.

E110 shows overheat of the primary water and E130 overheat of the flue system.

E119 is displayed when the primary water pressure is less than 0.5 bar.

E133 indicates that the gas supply has been interrupted, ignition has failed or the flame has not been detected.

E125 is displayed in either of two situations:-

- i) If within 15 seconds of the burner lighting the boiler temperature has not changed by 1°.
 - ii) If within 10 minutes of the burner lighting the boiler temperature twice exceeds the selected temperature by 30°.
- In these instances poor primary circulation is indicated.

3. By turning the selector switch to the 'Reset' position for a minimum of 5 seconds when E110, E130 & E133 are displayed it is possible to relight the boiler.

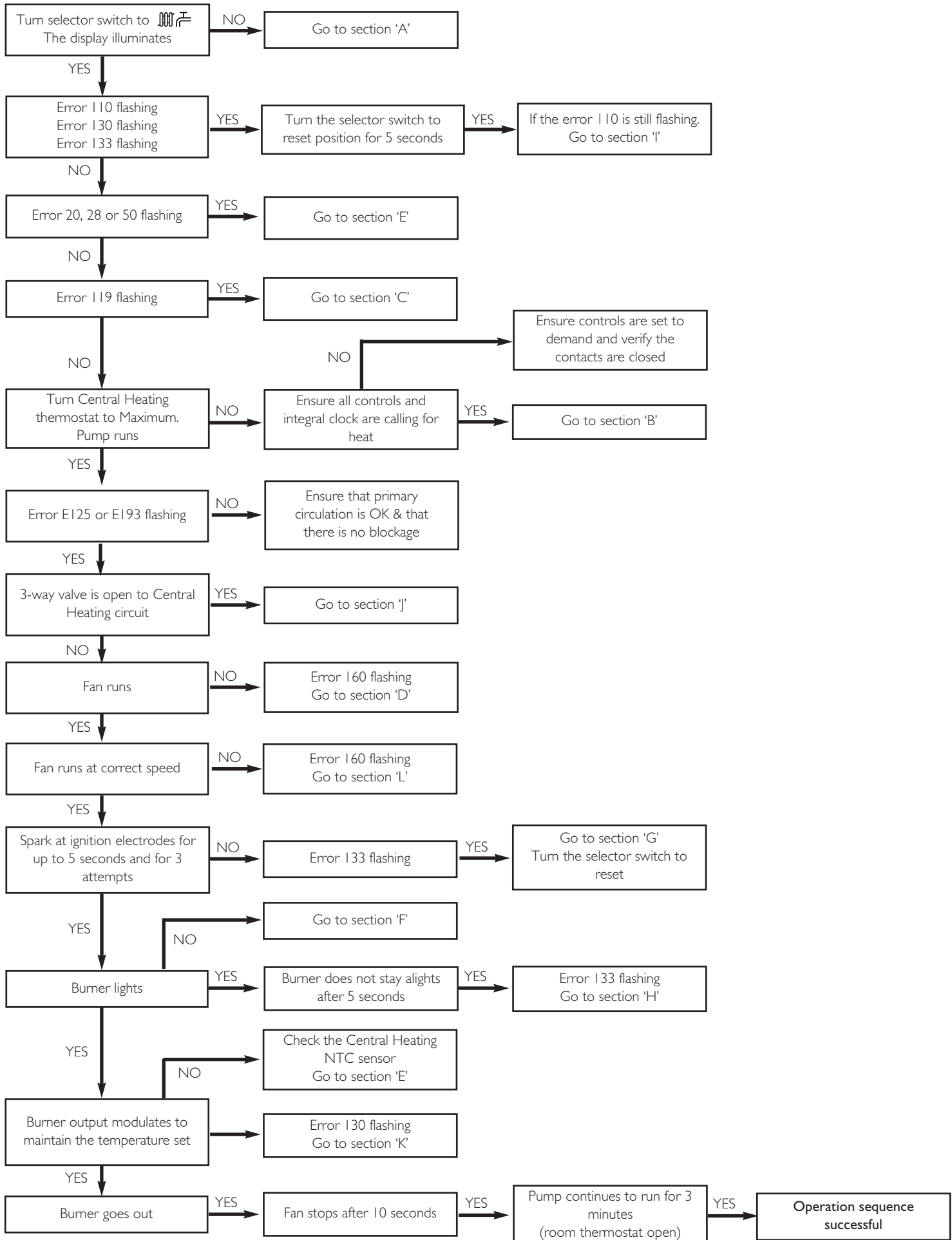
4. If this does not have any effect, or the codes are displayed regularly further investigation is required.

Table Of Error Codes

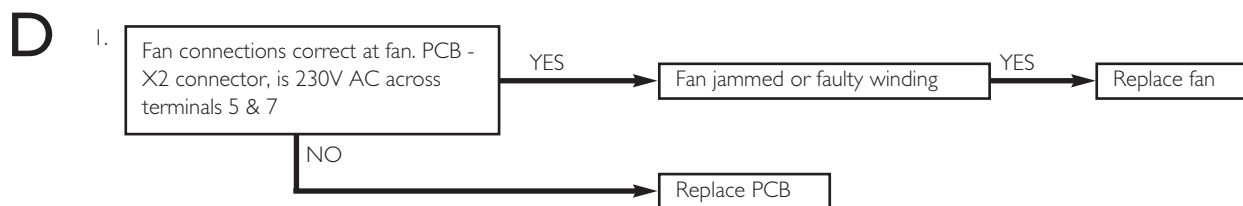
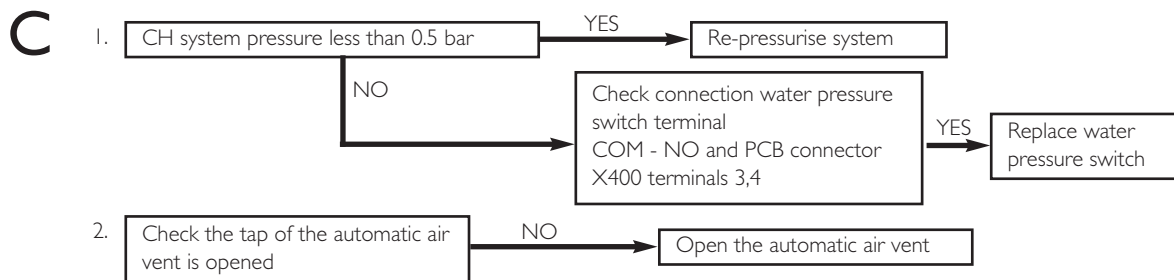
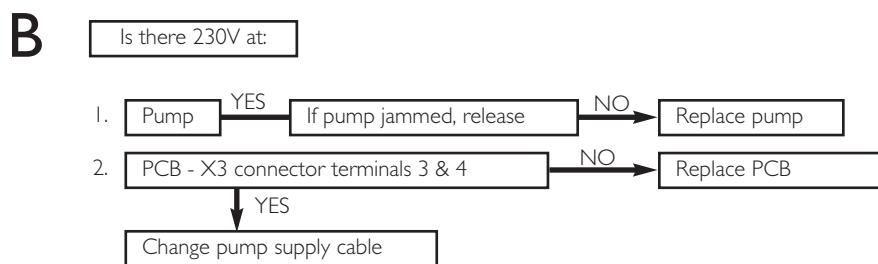
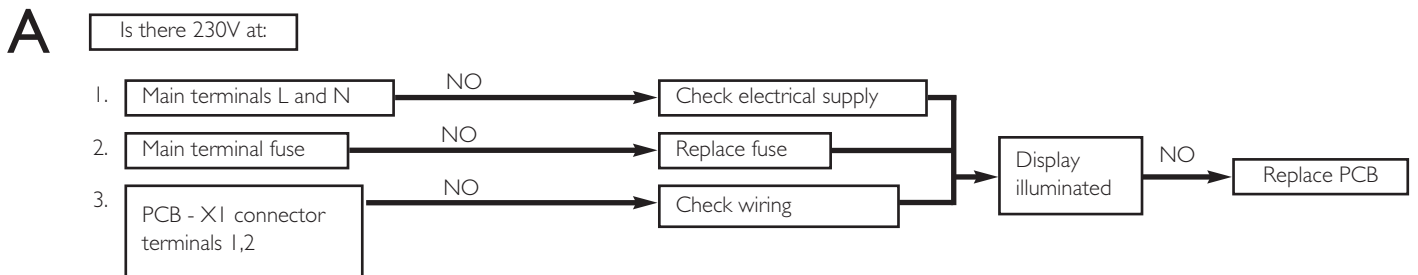
E20	Central Heating NTC Fault
E28	Flue NTC Fault
E110	Safety Thermostat Operated
E119	Water Pressure Switch Not Operated
E125	Circulation Fault (Primary Circuit)
E130	Flue NTC Operated
E133	Interruption Of Gas Supply or Flame Failure
E160	Fan or Fan Wiring Fault
E193	Pre-Circulation Fault

Refer to Section 16.0 "Illustrated Wiring Diagram" for position of terminals and components

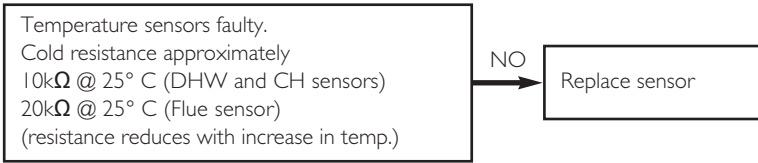
Central Heating - Follow operational sequence



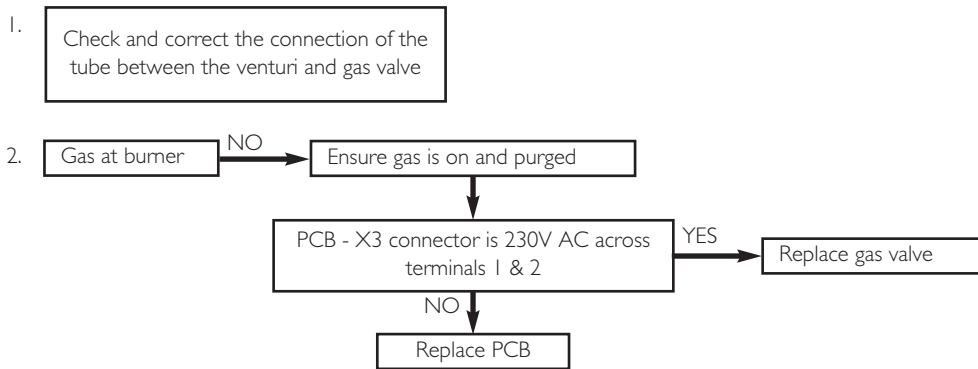
Fault Finding Solutions Sections



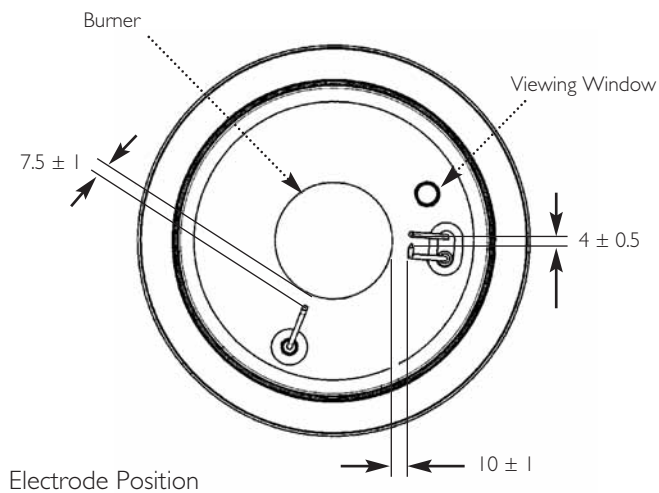
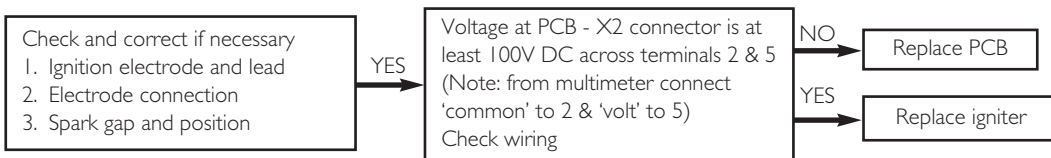
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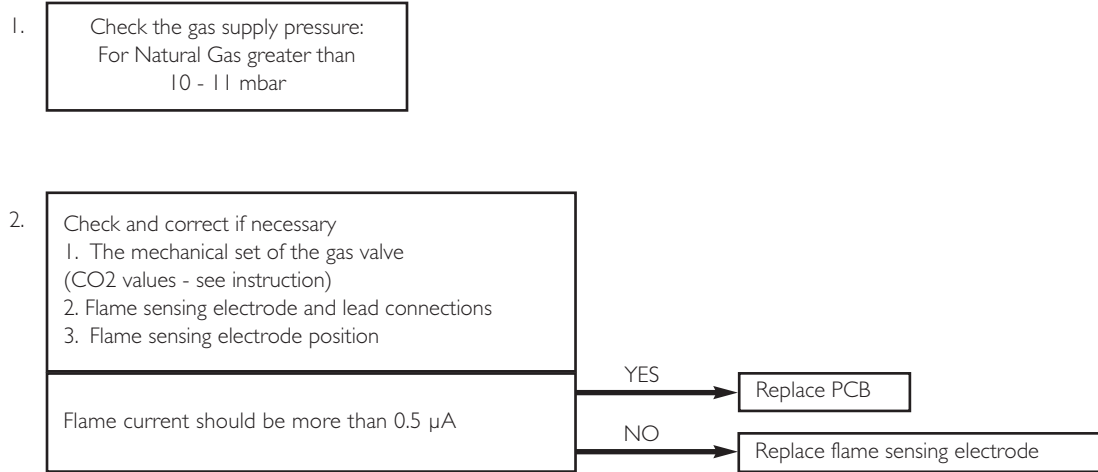
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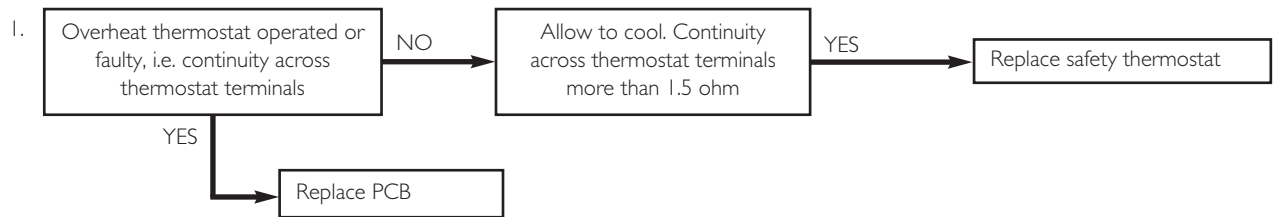
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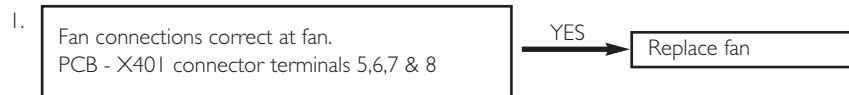
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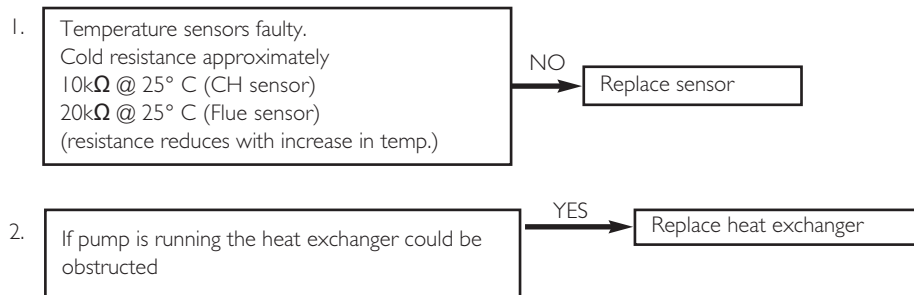
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