

# INSTALLATION, COMMISSIONING AND SERVICING INSTRUCTIONS

## WALL HUNG RSF GAS FIRED CONDENSING BOILER

# GREENSTAR Ri

FOR OPEN VENTED AND SEALED CENTRAL HEATING SYSTEMS AND  
INDIRECT MAINS FED DOMESTIC HOT WATER



The appliance is for use with Natural Gas or L.P.G. (Cat II 2H3P type C13, C33 & C53)		
	Model	GC Number
Natural Gas	12 Ri	41-311-63
	15 Ri	41-311-75
	18 Ri	41-311-77
	24 Ri	41-311-65
Liquid Petroleum Gas	12 Ri	41-311-64
	15 Ri	41-311-76
	18 Ri	41-311-78
	24 Ri	41-311-66



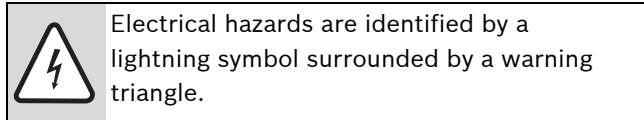
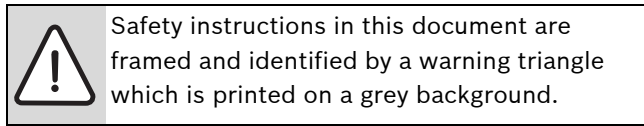
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# 1 KEY TO SYMBOLS AND SAFETY PRECAUTIONS

## 1.1 EXPLANATION OF SYMBOLS

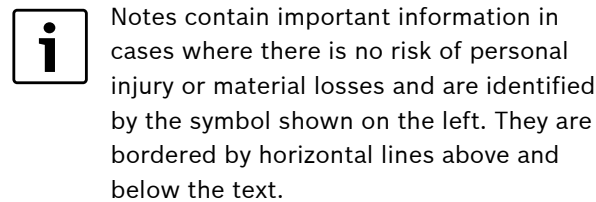
### WARNING SYMBOLS



Signal words indicate the seriousness of the hazard in terms of the consequences of not following the safety instructions.

- **NOTICE** indicates possible damage to property or equipment, but where there is no risk of injury.
- **CAUTION** indicates possible injury.
- **WARNING** indicates possible severe injury.
- **DANGER** indicates possible risk to life.

### IMPORTANT INFORMATION









### ADDITIONAL SYMBOLS

Symbol	Meaning
▶	a step in an action sequence
→	a reference to a related part in the document or to other related documents
•	a list entry
–	a list entry (second level)

Tab. 1 Symbols

### SYMBOLS USED IN THIS MANUAL

	Domestic Hot Water
	Central Heating
	Hot Water Storage Cylinder
	Domestic Cold Water Supply
	Electrical Supply
	Gas Supply

Tab. 2 Commonly used symbols

### PLEASE READ THESE INSTRUCTIONS CAREFULLY BEFORE STARTING INSTALLATION.

THESE INSTRUCTIONS ARE APPLICABLE TO THE WORCESTER APPLIANCE MODEL(S) STATED ON THE FRONT COVER OF THIS MANUAL ONLY AND MUST NOT BE USED WITH ANY OTHER MAKE OR MODEL OF APPLIANCE.

THE INSTRUCTIONS APPLY IN THE UK ONLY AND MUST BE FOLLOWED EXCEPT FOR ANY STATUTORY OBLIGATION.

THIS APPLIANCE MUST BE INSTALLED BY A GAS SAFE REGISTERED, COMPETENT PERSON. FAILURE TO INSTALL CORRECTLY COULD LEAD TO PROSECUTION.

IF YOU ARE IN ANY DOUBT CONTACT THE WORCESTER TECHNICAL HELPLINE.

DISTANCE LEARNING AND TRAINING COURSES ARE AVAILABLE FROM WORCESTER.

PLEASE LEAVE THESE INSTRUCTIONS WITH THE COMPLETED BENCHMARK CHECKLIST, (OR A CERTIFICATE CONFIRMING COMPLIANCE WITH IS 813, EIRE ONLY) AND THE USER MANUAL WITH THE OWNER OR AT THE GAS METER AFTER INSTALLATION OR SERVICING.

THE BENCHMARK CHECKLIST CAN BE FOUND IN THE BACK PAGES OF THE INSTALLATION MANUAL.

ABBREVIATIONS USED IN THIS MANUAL:

∅	Diameter
NG	Natural Gas
LPG	Liquid Petroleum Gas
CH	Central Heating
DHW	Domestic Hot Water
PRV	Pressure Relief Valve
NTC	Negative Temperature Coefficient (sensor)
IP	Ingress Protection
RCD	Residual Current Device
TRV	Thermostatic Radiator Valve
WRAS	Water Regulations Advisory Scheme
SEDBUK	Seasonal Efficiency of Domestic Boilers in the United Kingdom

Tab. 3 Abbreviations

### 1.2 SAFETY PRECAUTIONS

#### IF YOU SMELL GAS:

- ▶ **CALL** NATIONAL GAS EMERGENCY SERVICE ON 0800 111 999
- ▶ **LPG BOILERS** CALL THE SUPPLIER'S NUMBER ON THE SIDE OF THE LPG TANK
- ▶ **TURN OFF** THE ECV (EMERGENCY CONTROL VALVE) AT THE METER/REGULATOR
- ▶ **DO NOT** TURN ELECTRICAL SWITCHES ON OR OFF
- ▶ **DO NOT** STRIKE MATCHES OR SMOKE
- ▶ PUT OUT NAKED FLAMES
- ▶ OPEN DOORS AND WINDOWS
- ▶ KEEP PEOPLE AWAY FROM THE AFFECTED AREA

#### BOILER OPERATION:

**This boiler must only be operated by a responsible adult who has been instructed in, understands, and is aware of the boiler's operating conditions and effects.**



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 [centralheating.co.uk](http://centralheating.co.uk) for more information.

#### HEALTH AND SAFETY

The appliance contains no asbestos and no substances have been used in the construction process that contravene the COSHH Regulations (Control of Substances Hazardous to Health Regulations 1988).

#### COMBUSTION AND CORROSIVE MATERIALS

Do not store or use any combustible materials (paper, thinners, paints etc.) inside or within the vicinity of the appliance.

Chemically aggressive substances can corrode the appliance and invalidate any warranty.

#### FITTING AND MODIFICATIONS

Fitting the appliance and any controls to the appliance may only be carried out by a competent engineer in accordance with the current Gas Safety (Installation and Use) Regulations.

Flue systems must not be modified in any way other than as described in the fitting instructions. Any misuse or unauthorised modifications to the appliance, flue or associated components and systems could invalidate the warranty. The manufacturer accepts no liability arising from any such actions, excluding statutory rights.

#### SERVICING

Advise the user to have the system serviced annually by a competent, qualified Gas Safe registered engineer. Approved spares must be used to help maintain the economy, safety and reliability of the appliance.

#### IMPORTANT

The service engineer must complete the Service Record on the Benchmark Checklist after each service.

#### INSTALLATION REGULATIONS

Current Gas Safety (Installation & Use) Regulations:

All gas appliances must be installed by a competent person in accordance with the above regulations. Failure to install appliances correctly could lead to prosecution.

The appliance must be installed in accordance with, and comply to, the current: Gas Safety Regulations, IEE Regulations, Building Regulations, Building Standards (Scotland) (Consolidation), Building Regulations (Northern Ireland), local water by-laws, Health & Safety Document 635 (The Electricity at Work Regulations 1989) and any other local requirements.

**British Standards:**

Where no specific instruction is given, reference should be made to the relevant British Standard codes of Practice.

- BS7074:1 Code of practice for domestic and hot water supply
- BS6891 Installation of low pressure gas pipe work up to 28mm (R1)
- BS5546 Installation of gas hot water supplies for domestic purposes
- EN12828 Central heating for domestic premises
- BS5440:1 Flues and ventilation for gas appliances of rated heating not exceeding 70kW (net) : Flues
- BS5440:2 Flues and ventilation for gas appliances of rated heating not exceeding 70kW (net) : Air Supply
- BS7593 Treatment of water in domestic hot water central heating systems
- BS6798 Installation of gas fired boilers of rated input up to 70kW (net)

**Irish Standards**

The relevant Irish standards should be followed, including:

- ECTI National rules for electrical installations
- IS 813:2002 for Domestic Gas Installations.

**LPG Installations**

An appliance using L.P.G. must not be installed in a room or internal space below ground level unless one side of the building is open to the ground.

**Timber framed building:**

Where the boiler is to be fitted to a timber framed building the guidelines laid down in BS5440: Part 1 and IGE "Gas Installations in Timber Frame Buildings" should be adhered to.

**Potable water:**

All seals, joints and compounds (including flux and solder) and components used as part of the secondary domestic water system must be approved by WRAS.

**CH Water:**

Artificially softened water must not be used to fill the central heating system.

**BOILER FEATURES AND CHECKLIST**

- Pre-wired and pre-plumbed
- Galvanised steel inner frame
- Digital control system
- Automatic ignition
- Direct burner ignition electrodes
- Built-in frost protection
- Built-in fault finding diagnostics
- Modulating automatic gas valve
- Combustion air fan with speed regulator
- CH temperature sensor & control
- External pump anti-seizure protection
- Flue gas temperature limiter
- Condensate syphonic trap

<b>CHECK LIST</b>	
<b>- HARDWARE LITERATURE PACK:</b>	<b>Qty.</b>
Greenstar Ri Installation, Commissioning and Servicing Instructions	1
Users Instructions	1
Consumer Guarantee Card	1
Sealing Pack:	1
- Compression Nut 22mm	3
- Compression Ring 22mm	3
Elbow assembly pack	1
- Elbow Assembly	1
- Fibre Washer	1

Tab. 4 Hardware lit pack - checklist

## 2 APPLIANCE INFORMATION

### 2.1 APPLIANCE

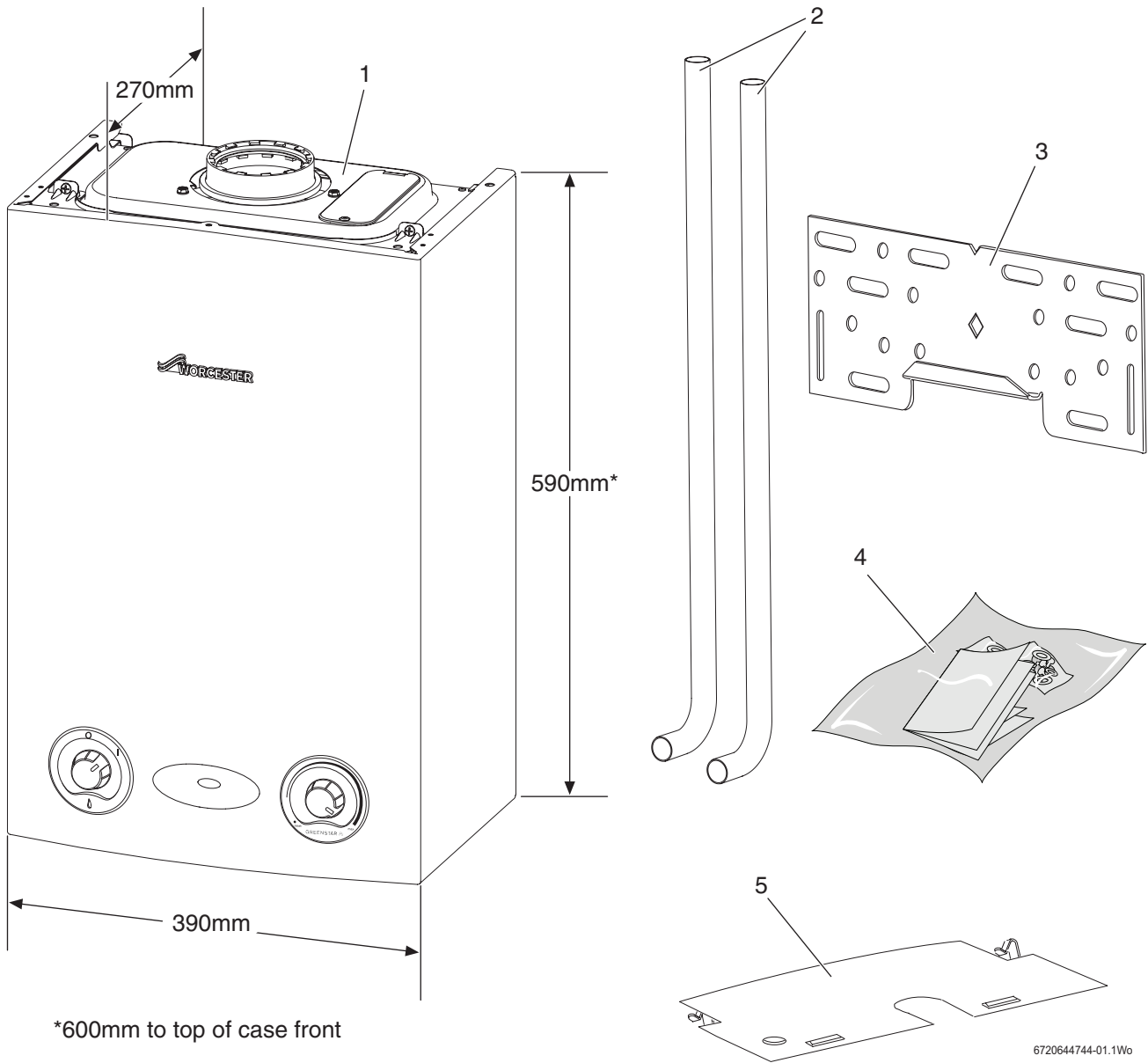


Fig. 1 Appliance

STANDARD PACKAGE:	
1	Wall hung gas fired condensing regular boiler for central heating and domestic hot water
2	Tail pipes - water
3	Wall plate
4	Hardware literature pack (see checklist)
5	Bottom panel

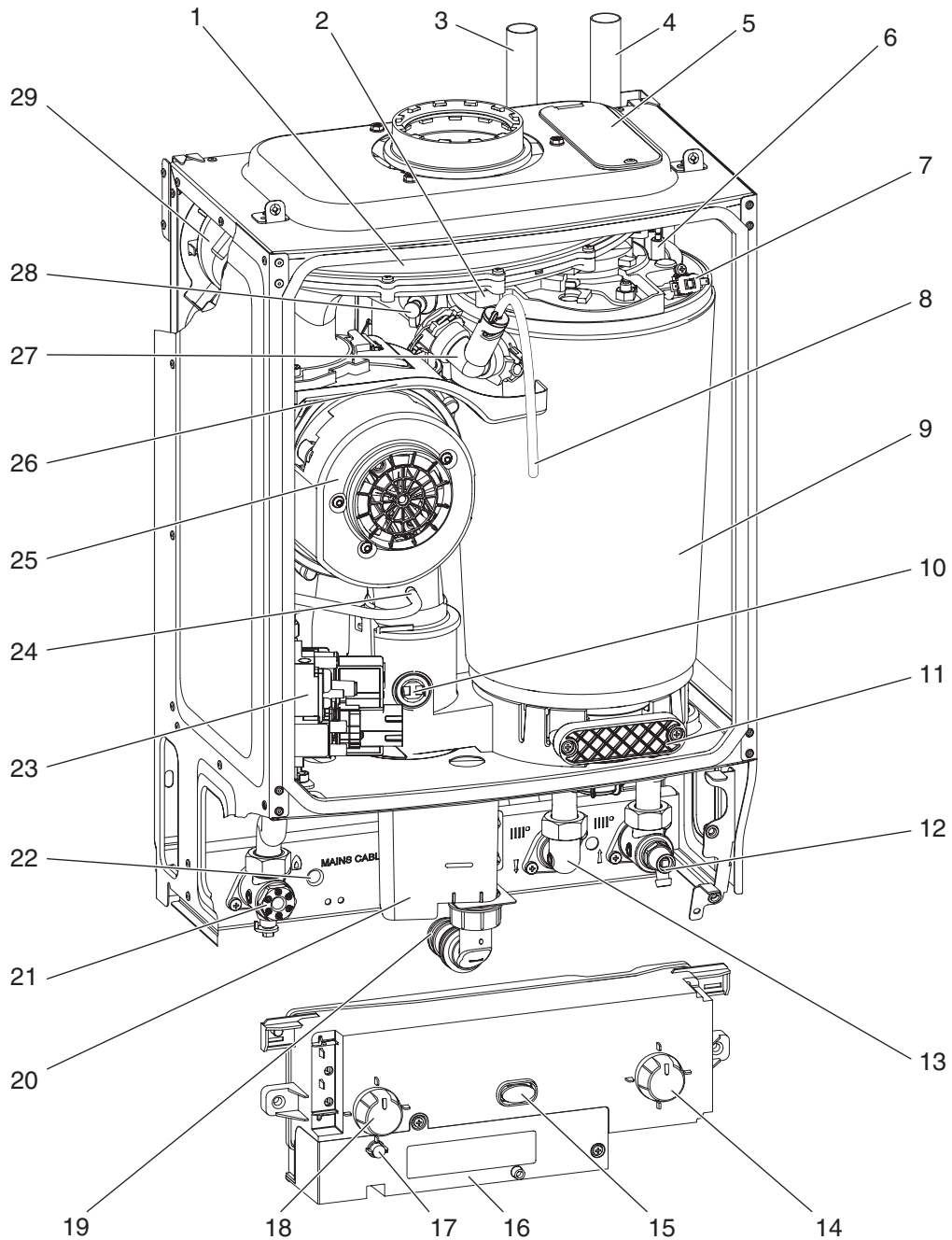
Tab. 5

## 2.2 TECHNICAL DATA

DESCRIPTION	NATURAL GAS				LPG				
	UNIT	12Ri	15Ri	18Ri	24Ri	12Ri	15Ri	18Ri	24Ri
<b>Gas flow rate - Max. 10 minutes from lighting</b>									
Natural Gas G20	m <sup>3</sup> /h	1.3	1.63	1.96	2.6	-	-	-	-
Propane Gas (LPG)	kg/h	-	-	-	-	0.96	1.20	1.44	1.91
<b>Central Heating</b>									
Max. rated heat input (net)	kW	12.32	15.40	18.48	24.62	12.32	15.40	18.48	24.62
Min. heat input	kW	3.45	4.62	5.54	7.38	5.95	5.95	9.64	9.64
Max. rated heat output 40/30 °C	kW	12.85	16.06	19.28	25.67	12.85	16.06	19.28	25.67
Max. rated heat output 50/30 °C	kW	12.74	15.92	19.11	25.45	12.74	15.92	19.11	25.45
Max. rated heat output 80/60 °C	kW	12	15	18	24	12	15	18	24
Max. flow temperature	°C	82	82	82	82	82	82	82	82
Max. permissible operating pressure	bar	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Available pump head at 21 °C system temp. rise	m	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
<b>Flue</b>									
Flue gas temp. 80/60 °C, rated/min. load	°C	62/56	66/58	70/60	78/63	62/57	66/59	71/61	79/64
Flue gas temp. 40/30 °C, rated/min. load	°C	41/33	44/33	48/34	54/35	43/35	46/36	49/37	55/38
CO <sub>2</sub> level at max. rated heat output (after 30 min)	%	9.65	9.8	9.8	9.8	11.0	11.0	11.0	11.0
CO <sub>2</sub> level at min. rated heat output (after 30 min)	%	8.65	9.2	9.2	9.2	10.5	10.5	10.5	10.5
NOx class		5	5	4	5	5	5	4	5
NOx rating	mg/kWh	39	60	84	66	44	60	84	66
<b>Condensate</b>									
Maximum condensate rate	l/h	0.93	1.2	1.5	2.0	0.7	0.9	1.2	1.5
pH value, approx.		4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
<b>Electrical</b>									
Electrical power supply voltage	a.c. V	230	230	230	230	230	230	230	230
Frequency	Hz	50	50	50	50	50	50	50	50
Maximum power consumption	W	50	50	50	50	50	50	50	50
<b>General data</b>									
SEDBUK	band	A	A	A	A	A	A	A	A
Appliance protection rating	IP	20	20	20	20	20	20	20	20
Permissible ambient temperatures	°C	0 - 50	0 - 50	0 - 50	0 - 50	0 - 50	0 - 50	0 - 50	0 - 50
Nominal capacity of appliance	litre	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Noise output level (Max central heating)	dBA	39	42.7	43.7	41	39	42.7	43.7	41
Packaged boiler weight	kg	31	31	31	31	31	31	31	31
Total boiler weight	kg	27.4	27.4	27.4	27.4	27.4	27.4	27.4	27.4
Lift weight	kg	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6
SEDBUK	%	90.1	90.1	90.1	90.2	91.4	91.4	91.4	92.0

Tab. 6 Technical data Ri

2.3 BOILER MAIN COMPONENTS



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1	Air/Gas Manifold	16	Wiring connections cover
2	Sensor - Boiler flow	17	Burner indicator (green)
3	Flow pipe	18	Boiler ON/OFF switch
4	Return pipe	19	Condensate connection
5	Removable servicing panel	20	Syphon / Trap
6	Electrode assembly	21	Gas inlet connection
7	Overheat thermostat	22	Mains cable inlet
8	Silicon tube - Heat Exchanger air vent	23	Gas Valve
9	Heat Exchanger	24	Flue air pressure switch connection
10	Flue overheat thermostat	25	Fan
11	Access panel - Heat Exchanger/Sump cleaning	26	Fan guard
12	Return connector with drain point	27	Manual vent point
13	Flow connector	28	Fan pressure test point
14	Boiler Temperature control and Reset knob	29	Air pressure switch
15	Power and fault indicator (blue)		



## 3 PRE-INSTALLATION

### 3.1 CLEANING PRIMARY SYSTEMS



**NOTICE:** All the following Pre-Installation sections must be read and requirements met before starting boiler or flue installations.



**CAUTION:** Isolate the mains supplies before starting any work and observe all relevant safety precautions.



**NOTICE:** Debris from the system can damage the boiler and reduce efficiency. Failure to comply with the guidelines for the use of water treatment with the appliance will invalidate the appliance warranty.

#### BEFORE CLEANING THE SYSTEM:

- ▶ **Ensure that the system and pipe work is in good working order.**
- ▶ **Where possible keep the existing boiler/circulating pump in place when flushing the system.**

#### FOLLOW THE GUIDANCE OF BS7593:

Treatment of water in domestic hot water central heating and also the flushing guidelines below.



**NOTICE:** Artificially softened water must not be used to fill the central heating system.

#### FLUSHING THE SYSTEM

- ▶ Fill the system with cold water and check for leaks.
- ▶ Open all drain cocks and drain the system.
- ▶ Close drain cocks and add a suitable flushing agent **compatible with aluminium** at the correct strength for the system conditions in accordance with the manufacturer's instructions.  
**The pH value of the system water must be less than 8 or the appliance guarantee will be invalidated.**
- ▶ Circulate the flushing agent before the boiler is started.
- ▶ Run the boiler/system at normal operating temperature as directed by the manufacturer of the flushing agent.
- ▶ Drain and thoroughly flush the system to remove the flushing agent and debris.
- ▶ It may be necessary to use a power flushing machine to aid the cleansing procedure in some circumstances.
- ▶ Close the drain cocks and refill with fresh water and a suitable inhibitor.
- ▶ Vent any air from the boiler and system.

#### INHIBITOR

Add a suitable inhibitor or combined inhibitor/anti-freeze, if the system is exposed to freezing conditions, to the heating system in accordance with the DWTA code of practice and manufacturer's guidelines.



#### **WARNING:** Sealing agents

- ▶ The addition of sealing agents to the system water is not permitted as this can cause problems with deposits left in the heat exchanger.

#### USE IN HARD WATER AREAS:

Normally there is no need for water treatment to prevent scale formation as the maximum temperature of the HW heat exchanger is limited in the electronic circuit.

In areas where temporary water hardness exceeds 200 ppm, consideration may need to be given to the fitting of a scale prevention device. In such circumstances, the advice of the local water authority should be sought.

### 3.2 MAINS SUPPLY

#### 3.2.1 ELECTRICAL SUPPLY

- Supply: 230V - 50 Hz, 140 Watts
- Cable: PVC insulated 0.75 mm<sup>2</sup> (24 x 0.2 mm) temperature rated to 90 °C.
- External 3A fuse to BS1362.
- The appliance must be earthed.
- Do not connected the appliance to a 3 phase supply.
- IP20.
- Wiring must comply with the latest edition of BS 7671 (IEE wiring regulations).

#### 3.2.2 GAS SUPPLY

- Boilers using Natural Gas (NG) must be connected to a governed meter.
- Liquid Petroleum Gas (LPG) must be connected to a regulator.
- Installation and connection of the gas supply to the boiler must be in accordance with BS6891.
- Under no circumstance should be size of the gas supply pipe be less than 22 mm.
- The meter or regulator and pipe work to the meter must be checked, preferably by the gas supplier. This is to ensure that the equipment is in good working order and can meet the gas flow and pressure requirements, in addition to the demand from any other appliance being served.



#### **WARNING:** GAS SUPPLY PIPE SIZING

18Ri & 24Ri models

- ▶ Under no circumstances should the size of the gas supply pipe be less than 22mm.



#### **NOTICE:** 12Ri & 15Ri models

- ▶ Provided that the correct gas supply working pressure and gas rate can be achieved (see technical data on page 7, Check gas inlet pressure on page 39, also refer to B.S. 6891)
- ▶ Then it may be possible to reduce the gas supply pipe diameter to 15mm.
- ▶ Generally the appliance would need to be within 3 to 4 metres of the gas meter. However, this will depend upon the distribution pipe size and route.

### 3.3 WATER SYSTEMS AND PIPE WORK

#### PLASTIC PIPE WORK:

- Any plastic pipe work must have a polymeric barrier with 600mm (minimum) length of copper pipe connected to the boiler.
- Plastic pipe work used for underfloor heating must be correctly controlled with a thermostatic blending valve limiting the temperature of the circuits to approximately 50 °C.

#### PRIMARY SYSTEMS CONNECTIONS/VALVES:

- All system connections, taps and mixing valves must be capable of sustaining a pressure up to 3 bar.
- Radiator valves should conform to BS2767:10.
- All other valves should conform to BS1010.
- Thermostatic radiator valves (TRV) must be used on all radiators within the sleeping accommodation. The radiator where the room thermostat is sited must be fitted with lock-shield valves and left open.
- A drain cock is required at the lowest point in the system.
- An air vent is required at all high points in the system.

#### SEALED PRIMARY SYSTEM:

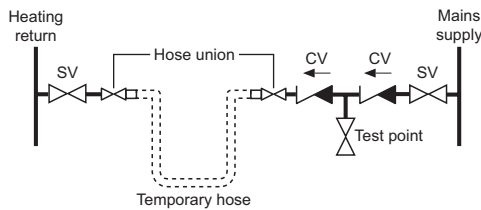


**NOTICE:** Artificially softened water must not be used to fill the central heating system.

- The CH sealed system must be filled using a WRAS approved filling loop or comply with figure 2 for system fill.
- An expansion vessel, of a size suitable for the system, must be fitted as close as possible to the appliance in the central heating return.
- Also fit a pressure gauge, a 3 bar pressure relief valve and stop cock (fixed cylinder type or sealed system approved connection).
- Do not use galvanised pipes or radiators.**

#### SYSTEM FILL

##### SYSTEM FILL



CV = Check Valve      AA = Auto Air vent  
SV = Stop Valve      CV = Check Valve

##### SYSTEM MAKE UP



6720644743-08:1W0

Fig. 2 System fill/System make-up

#### S AND Y PLAN SYSTEMS:



##### NOTICE: Bypass

- Generally a bypass is not necessary on a Y plan system as one of the ports is open to flow.

1	Static head - Minimum static head 250mm measured from the highest point in the heating system (top surface of the appliance or the highest point in the heating system) to the water level in the feed and expansion tank
2	Heating vent (22mm minimum)
3	Primary cold feed (15mm minimum)
4	Diverter/Zone valve
5	Pump, maximum power 90 Watts
6	Automatic bypass
7	Radiator valve (Flow)
8	Lock shield valve (Return)
9	Expansion vessel
10	Pressure gauge
11	3 bar pressure relief valve
12	Stop cock

Tab. 7 Key to figures 3, 4 & 5



**NOTICE:** A drain cock should be fitted at the lowest point of the heating circuit and beneath the appliance.

#### FULLY PUMPED SEALED SYSTEM:

The central heating sealed system must be filled using a WRAS approved filling loop or comply with figure 2 for System fill.

S PLAN LAYOUT

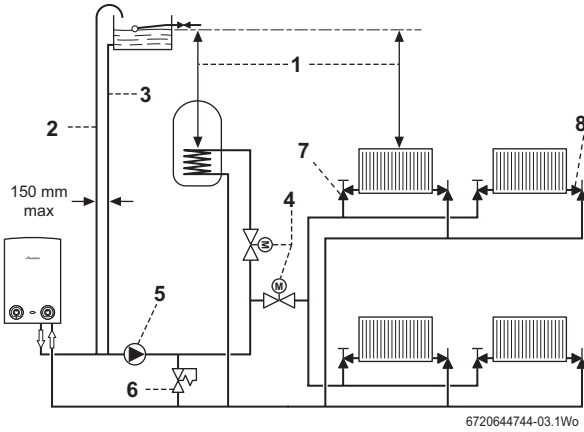


Fig. 3 S plan

Y PLAN LAYOUT

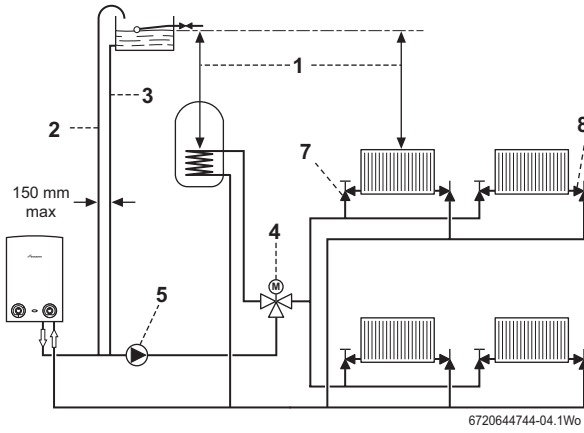


Fig. 4 Y plan

SEALED SYSTEM Y PLAN LAYOUT

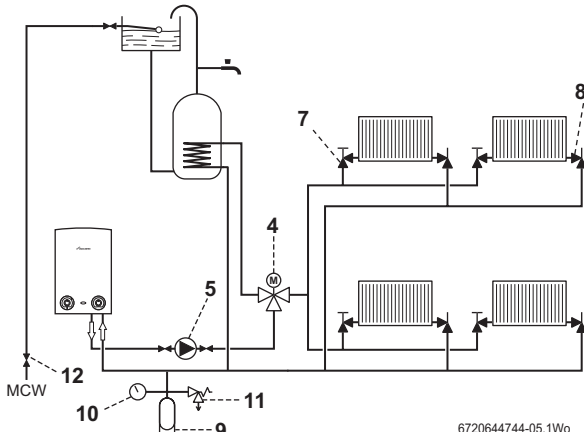


Fig. 5 Sealed system

NEW BUILD SYSTEM LAYOUTS

The latest Part L1a regulation for new installations require separate zone controls for the central heating.

Open vent with two heat zones

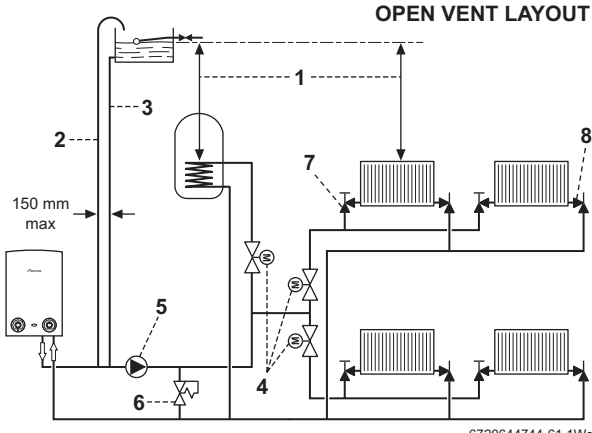


Fig. 6

Sealed system with two heat zones

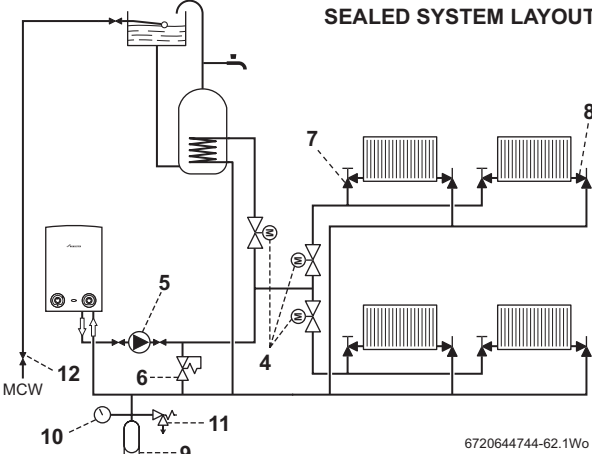


Fig. 7

### 3.4 CONDENSATE PIPE WORK

**NOTICE:**

- ▶ Where a new or replacement boiler is being installed, access to an internal “gravity discharge” point should be one of the factors considered in determining boiler location.
- ▶ The condensate pipe must be nominally 22mm Ø plastic pipe.
- ▶ The condensate pipe work must fall at least 52mm per metre towards the outlet and should take the shortest practicable route.
- ▶ Ensure there are no blockages in the pipe run.

Key to condensate illustrations	
1	Condensate discharge from boiler
2	Soil and vent stack
3	Minimum 450mm and up to three storeys
4	Visible air break at plug hole
5	Sink or basin with integrated overflow
6	75mm sink waste trap
7	Condensate pump
*	Condensate trap of 75mm already incorporated into the boiler

Tab. 8

#### 3.4.1 INTERNAL CONNECTIONS

In order to minimise risk of freezing during prolonged cold spells, the following methods of installing condensate drainage pipe should be adopted, in order of priority.

Wherever possible, the condensate drainage pipe should be routed and terminated so that the condensate drains away from the boiler under gravity to a suitable internal foul water discharge point such as an internal soil and vent stack. A suitable permanent connection to the foul waste pipe should be used.

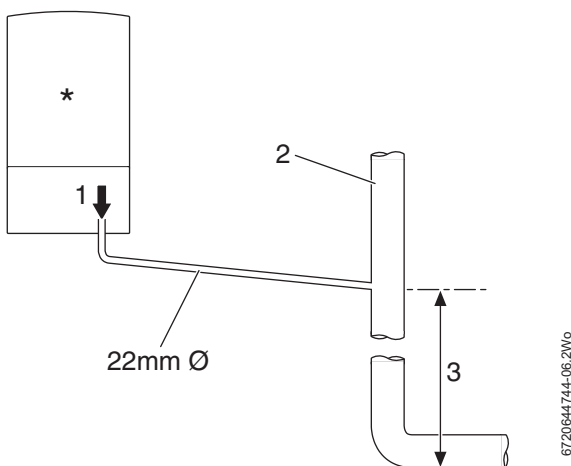


Fig. 8 Disposal to soil vent stack

Alternatively if the first option is not possible an internal kitchen or bathroom waste pipe, washing machine waste pipe etc. can be used. Ensure that the condensate drain pipe is connected “down stream” of the waste trap.

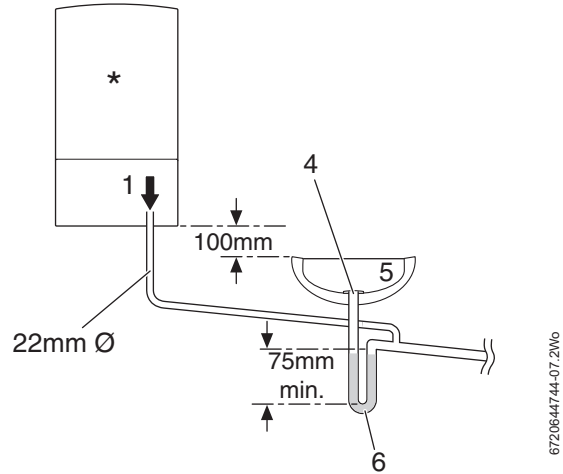


Fig. 9 Disposal to a waste pipe

#### CONDENSATE PUMP

Where “gravity discharge” to an internal termination is not physically possible, or where very long internal runs would be required to reach a suitable discharge point, condensate should be removed using a proprietary condensate pump, of a specification recommended by the boiler or condensate pump manufacturer.

The pump outlet pipe should discharge to a suitable internal foul water discharge point such as an internal soil and vent stack, internal kitchen or bathroom waste pipe, washing machine waste pipe etc. A suitable permanent connection to the foul waste pipe should be used.

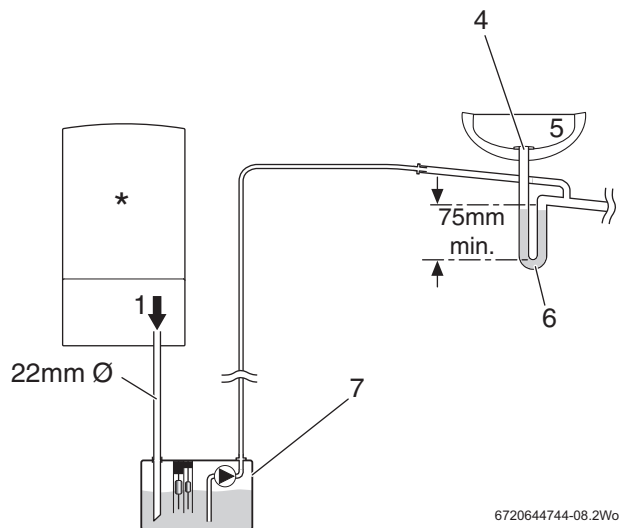


Fig. 10 Condensate pump disposal

3.4.2 EXTERNAL CONNECTIONS

**NOTICE:** Freezing conditions

- ▶ Pipe work length should be kept to a minimum and the route as vertical as possible.
- ▶ Weather proof insulation must be used.

**NOTICE:** Condensate waste

- ▶ Care should be taken when siting a soak-away to avoid obstructing existing services.

Continued - Key to condensate illustrations	
8	PVCu strap on fitting
9	100mm Ø minimum plastic pipe
10	Drainage holes
11	Limestone chippings
12	Bottom of sealed tube
13	Insulate and increase pipe size
14	Pipe work transition
15	External air break
16	Air gap
17	External rain water pipe into foul water
18	43mm 90° male/female bend
*	Condensate trap of 75mm already incorporated into the boiler

Tab. 9

If no other discharge method is possible then the use of an externally run condensate drainage pipe terminating at a suitable foul water discharge point, or purpose-designed soak away, may be considered. If this method is chosen then the following measures should be adopted:

- ▶ The external run be kept as short as possible and not exceed three metres.
- ▶ The pipe should be run internally as far as possible before going externally and the pipe diameter should be increased to 32mm before it passes through the wall to the exterior. The pipe should be insulated using suitable waterproof and weather resistant insulation.
- ▶ The external pipe should take the shortest and least exposed route to the discharge point, and should "fall" as steeply as possible away from the boiler, with no horizontal runs in which condensate might stand.
- ▶ The use of fittings, elbows etc. should be kept to a minimum and any internal "burrs" on cut pipe work should be removed so that the internal pipe section is as smooth as possible.

FITTING AN EXTERNAL AIR BREAK

- Refer to figure 11 when a rain water down pipe is used to dispose of condensate.
- An air break must be installed in the 43mm pipe work, between the boiler condensate outlet and the drainpipe, outside the property, to avoid flooding during adverse weather conditions.

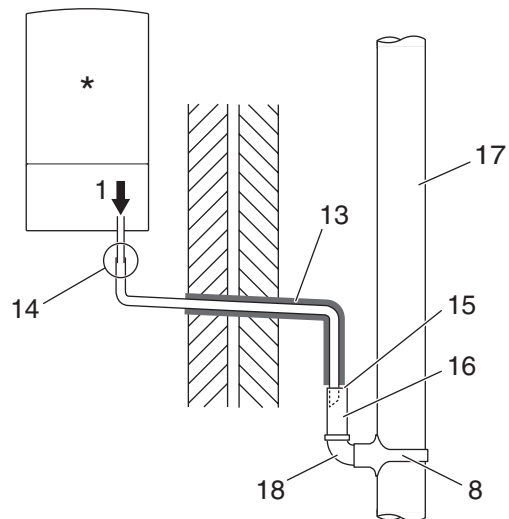


Fig. 11 Disposal into a rainwater down pipe



Condensate drainage pipe can be run above or below ground.

Where the pipe terminates over an open drain or gully, the pipe should terminate below the grating level, but above water level, in order to minimise "wind chill" at the open end.

The use of a drain cover (such as those used to prevent blockage by leaves) may offer further protection from wind chill.

Pipe drainage will be improved if the end is cut at 45° as opposed to a straight cut.

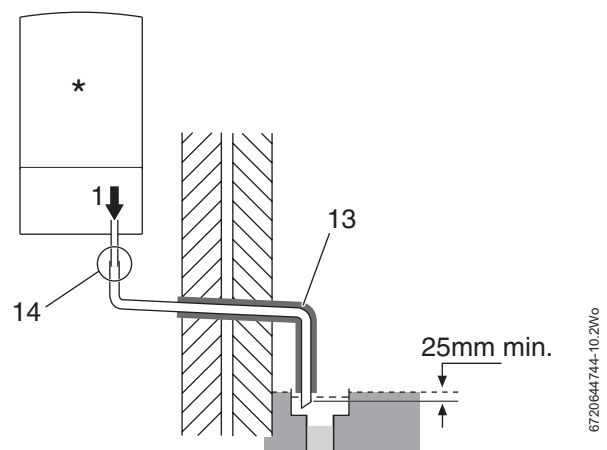


Fig. 12 External disposal

**CONDENSATE SOAK AWAY**

- The condensate drainage pipe may be run above or below the ground to the soak away. The examples shown on this page run above ground.
- The soak away must use a 100mm Ø plastic tube with two rows of three 12mm holes on 25mm centres and 50mm from the bottom of the tube. The holes must face away from the house.
- The tube must be surrounded by at least 100mm of limestone chippings to a depth of 400mm.



Minimum hole size for the condensate soak away must be 400mm deep by 300mmØ .

In situations where there are likely to be extremes of temperature or exposure, the use of a proprietary trace-heating system for external pipe work, incorporating an external frost thermostat, should be considered. If such a system is used, the requirement to use 32mm pipe does not apply. However, all other guidance above and the instructions for the trace heating system, should be closely followed.



**NOTICE: Unheated internal areas.**

- ▶ Internal pipe runs in unheated areas such as lofts, basements and garages should be treated as external runs.

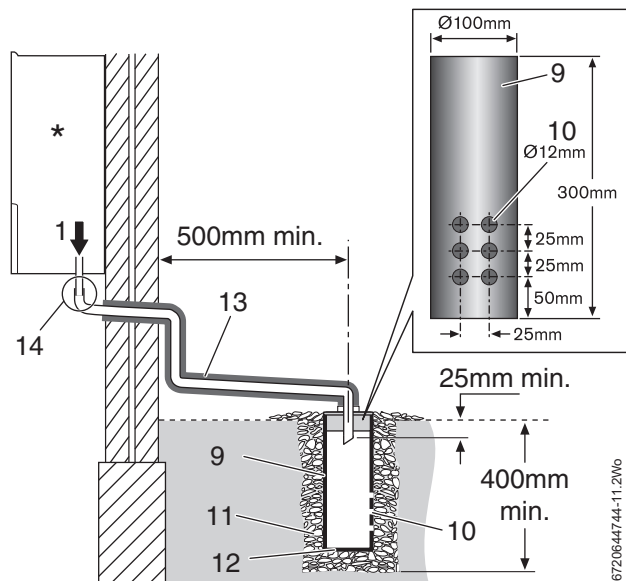


Fig. 13 Soak away

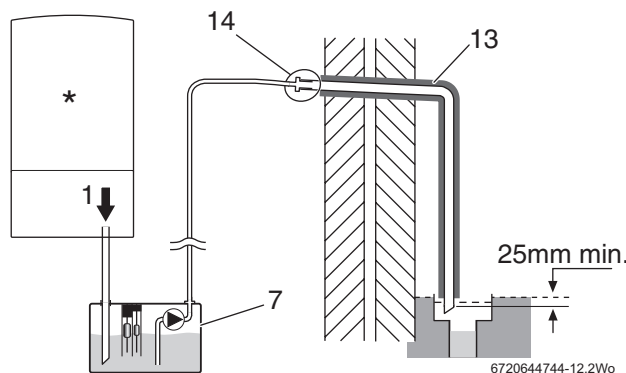


Fig. 14 Condensate pump to external disposal

**3.5 PRESSURE RELIEF PIPE WORK**



**NOTICE:**

- ▶ The pressure relief valve is a safety device for the boiler and if activated may discharge boiling water steam through the relief valve drain pipe.
- ▶ Care should be taken when siting the outlet pipe so that it does not cause an obstruction or discharge above a window, entrance or other public access where it could cause a hazard.

- The pressure relief drain pipe (1) from the boiler should be at least 15mm diameter copper pipe and run downwards, away from any electrical equipment or other hazard, preferably to an external drain or soak away.
- Pipe (1) should be finished with a partial bend, near the outlet to face the external wall (as shown) to help prevent freezing.

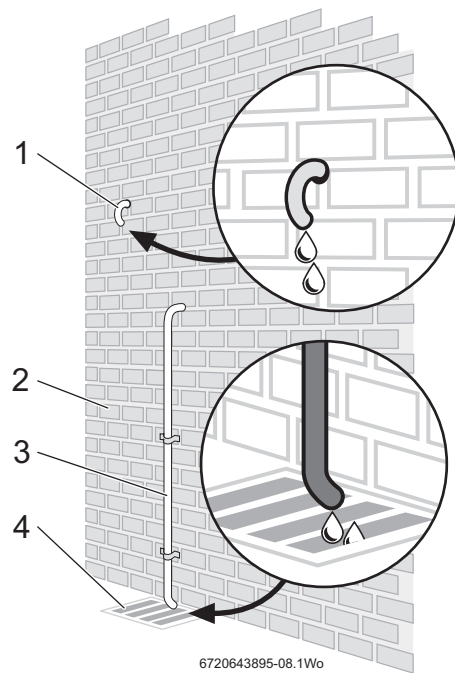


Fig. 15 Pressure relief pipe work


2	Outside wall
1,3	Drain pipe
4	External drain

Tab. 10 Key to fig 7

### 3.6 BOILER LOCATION AND CLEARANCES

#### 3.6.1 INSTALLATION

This boiler is only suitable for installing internally within a property at a suitable location onto a fixed, rigid surface at least the same size as the boiler and capable of supporting the boiler weight.

	<p><b>NOTICE:</b> No surface protection is required against heat transfer from the boiler</p>
---	---

#### 3.6.2 SERVICING CLEARANCES - VENTILATED COMPARTMENT

Figure 16 shows the minimum space required to install and service the boiler in a ventilated compartment.

- If a boiler is installed in a compartment with clearances less than shown in the tables 13, 14, or 15 ventilation is required. Refer to table 11 for ventilation requirements.

Vent position	To room or internal space	Direct to outside
High level	Minimum free area 122 cm <sup>2</sup>	Minimum free area 61 cm <sup>2</sup>
Low level	Minimum free area 122 cm <sup>2</sup>	Minimum free area 61 cm <sup>2</sup>

Tab. 11 Compartment ventilation

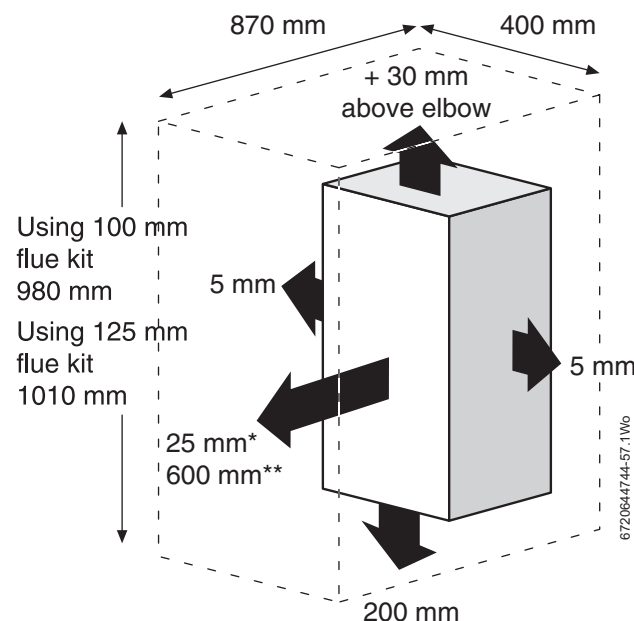


Fig. 16 Ventilated compartment

*	Minimum clearance to removable door
**	Minimum clearance required for servicing

Tab. 12 Minimum clearances

#### 3.6.3 COMPARTMENTS:

Follow the requirements of BS6798 and BS5440 Part 2 and note:

- Minimum clearances must be maintained.
- An access door is required to install, service and maintain the boiler and any ancillary equipment.
- If fitting the boiler into an airing cupboard use a non-combustible material to separate the boiler from the airing space.  
The material can be perforated up to a maximum hole size of 13mm.

#### 3.6.4 BATHROOMS

The boiler may only be installed outside the shaded area.

Additional RCD (Residual Current Device) protection may be required.

Refer to the latest IEE wiring regulations.

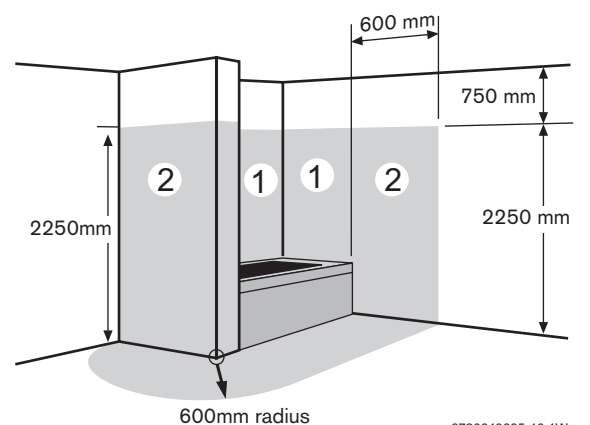
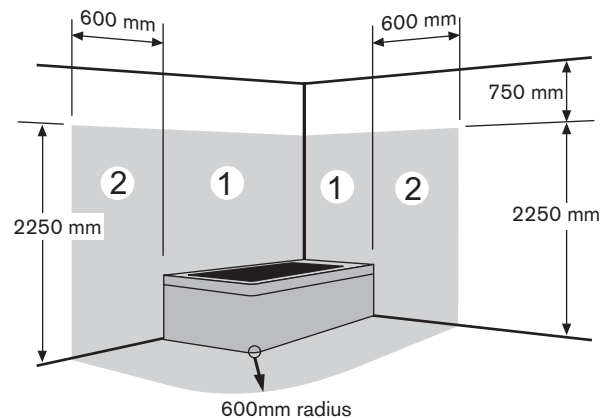



Fig. 17 Bathroom installations

**3.6.5 BOILER CLEARANCES- UNVENTILATED COMPARTMENTS**

The tables below show the options for the minimum space required to install and service the boiler inside an unventilated compartment.

**3.6.6 INSTALLATION CLEARANCES - UNVENTILATED COMPARTMENTS**

	<p><b>CAUTION: CLEARANCES</b></p> <p>▶ Top and bottom clearances must not be reduced below the values shown in table 13 as they are the minimum clearances required for servicing.</p>
---	--

<b>Unventilated Compartment Installation Clearances (millimetres)</b>			
The suggested total unventilated compartment minimum clearances are:			
Side	Above	Below	Front (to removable door)
400 mm	170 mm approx. (30 mm above the elbow)	200 mm	100 mm

Tab. 13 Minimum unventilated compartment clearances

<b>If Side Clearances are Reduced (millimetres)</b>			
If total side clearance is reduced to: (Combined left and right clearances excluding the appliance)	Increase height clearances to (approx.): (Combined top and bottom clearances excluding the appliance)	OR	Front clearance (to removable door) must be increased to:
350	441		129
300	523		161
250	617		200
200	717		243
150	856		295
100	1012		358
50	1202		434

Tab. 14 Reduced side clearances

<b>If Front Clearance is Reduced (millimetres)</b>			
If front clearance (to removable door) is reduced to:	Increase overall height clearances to (approx.): (Combined top and bottom clearances excluding the appliance)	OR	Increase total side clearance to: (Combined left and right clearances excluding the appliance)
50 mm	511 mm		505 mm
25 mm	596 mm		569 mm

Tab. 15 Reduced front clearances



### 3.7 PLUMBING MANIFOLD

#### 3.7.1 CONNECTIONS

Heating System	22mm compression fittings
Gas	22mm compression fittings

Use the fittings supplied in the Hardware literature pack:

- Use the 22mm copper pipes (1 & 2) provided with the appliance, as shown in the diagram opposite.
- If the flow and return pipes are to be run behind the appliance it may be an advantage to connect the pipes before hanging on the wall especially if space is limited.



Further guidance on pipe routing can be found printed on the boiler template (supplied with the boiler).

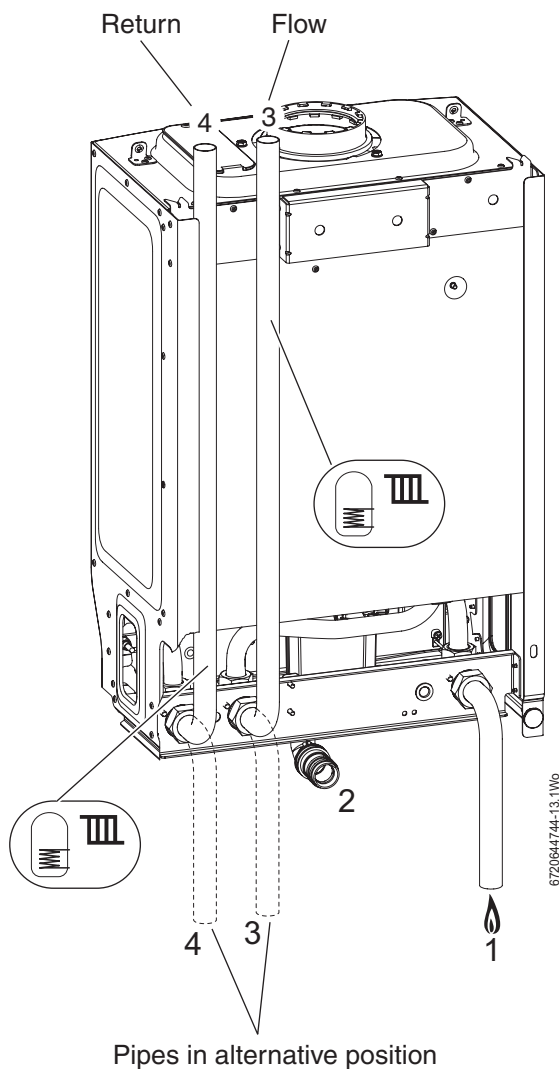


Fig. 18 Plumbing manifold


#	Function	From left case edge	Diameter of pipe
1	Gas	55 mm	22 mm
2	Condensate	210 mm	22 mm
3	Cylinder & CH Flow	285 mm	22 mm
4	Cylinder & CH Return	350 mm	22 mm

Tab. 16 Key to figures 18 & 19




Fig. 19 Pipe work dimensions

### 3.8 FLUE OPTIONS

 **CAUTION:** Non accessible flue systems:

- ▶ Where a flue system is not going to be accessible, provision must be made for service and inspection.
- ▶ Voids containing concealed flues must have at least one inspection hatch no less than 300mm square.
- ▶ Flue joints within the void must not be more than 1.5 metres from the edge of the inspection hatch.
- ▶ Inspection hatches should be located at changes of direction.
- ▶ If this is not possible, bends should be viewable from both directions.

 **NOTICE:** Effective flue lengths:

- ▶ each 90° bend used is equivalent to 2 metres of straight flue
- ▶ each 45° bend used is equivalent to 1 metre of straight flue



Plume management kits are available for the 60/100 horizontal flue system. Refer to the manual supplied with the plume management kits for complete installation instructions

#### FLUE LENGTHS

The flue systems have different maximum flue lengths

The Greenstar series has the option of two horizontal 60/100 RSF (telescopic and longer telescopic) and one horizontal 80/125 RSF (telescopic) flue system and two vertical RSF (60/100 or 80/125) flue systems:

The next page shows various fluing options.

Refer to the Flue options in table 17 for the straight flue lengths required to achieve the maximum flue length.

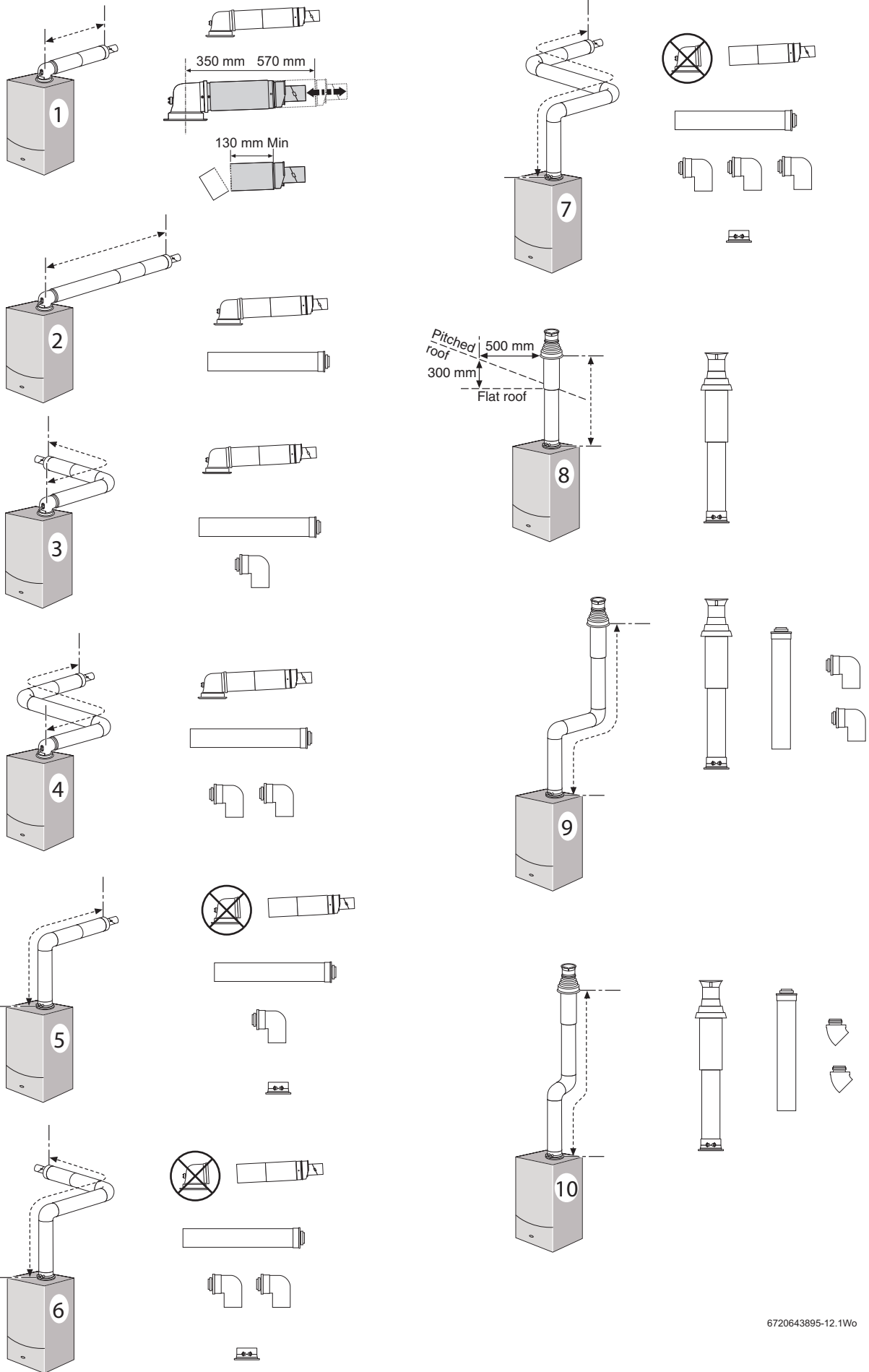


Ri boilers		Maximum total flue length (mm)	
		60/100	80/125
FLUE TYPE			
1	Telescopic horizontal flue assembly	570	1,070
	Longer telescopic horizontal flue assembly	790	N/A
2	Horizontal flue extension	4,600	13,000
3	Horizontal flue with 1 x 90° bend	2,600	11,000
4	Horizontal flue with 2 x 90° bends	N/A	9,000
5	High level horizontal flue	4,600	13,000
6	High level horizontal flue with 2 x 90° bends	2,600	11,000
7	High level horizontal flue with 3 x 90° bends	N/A	9,000
8	Vertical balanced flue assembly	6,400	15,000
9	Vertical balanced flue with 2 x 90° bends	2,400	11,000
10	Vertical balanced flue with 2 x 45° bends	4,400	13,000

Tab. 17 Flue options

Part number	Flue	Description
7 716 191 082	60/100	Telescopic horizontal flue assembly
7 716 191 171	60/100	Longer telescopic horizontal flue assembly
7 719 003 702	80/125	Telescopic horizontal flue assembly
7 719 002 430	60/100	Vertical flue assembly
7 719 002 431	80/125	Vertical flue assembly

Tab. 18 Flue option part numbers



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### 3.9 FLUE TERMINAL POSITIONS

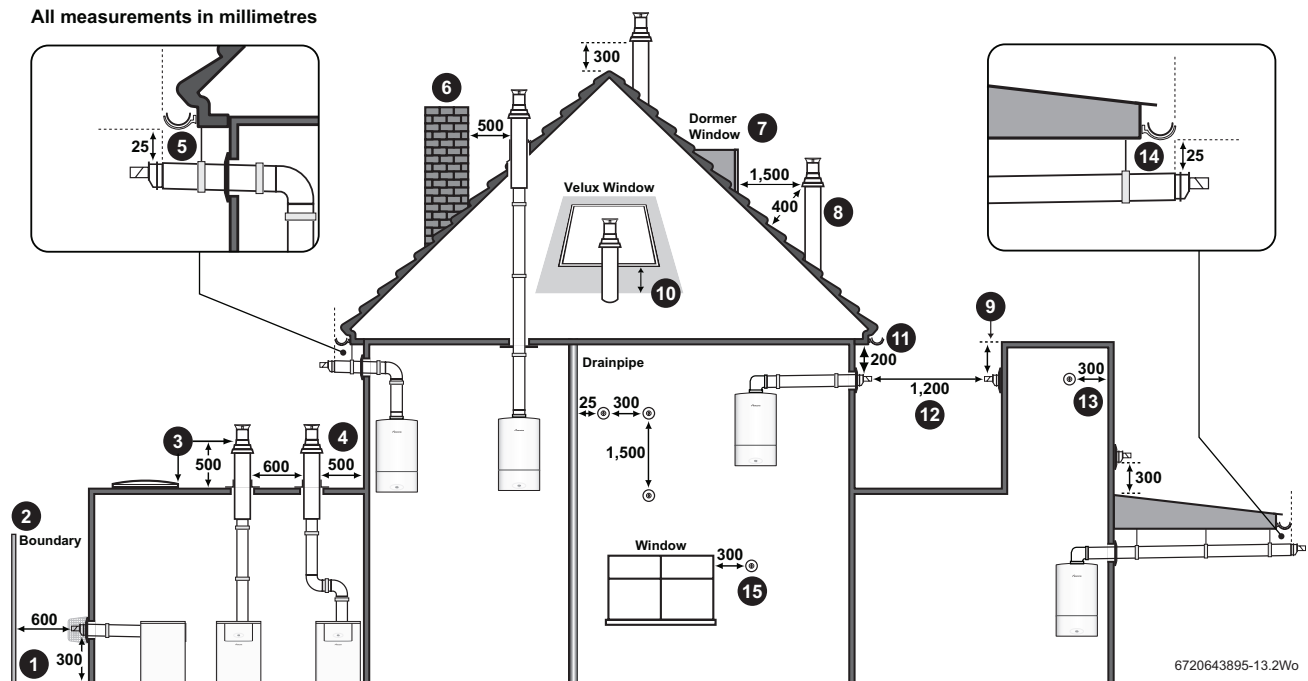


Fig. 20 Flue terminal positions



**NOTICE:**

- ▶ All measurements are the minimum clearances required.
- ▶ Terminals must be positioned so to avoid combustion products entering the building.
- ▶ Support the flue at approximately one metre intervals and at a change of direction, use suitable brackets and fittings (Flue bracket part numbers.: 100mm - 7 716 191 092, 125mm - 8 716 110 272).

**Key to illustration**

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. Flue clearance must be at least 300 mm from the ground. Terminal guards must be fitted if the flue is less than 2 metres from the ground or if a person could come into contact with the flue terminal.</li> <li>2. 600 mm distance to a boundary, unless it will cause a nuisance. BS 5440: Part 1 recommends that care is taken when siting terminals in relation to boundaries.</li> <li>3. 600 mm minimum clearance from a skylight to a vertical flue.</li> <li>4. Vertical flue clearance, 500 mm to non-combustible building material, and 1,500 mm clearance to combustible building material.</li> <li>5. The dimension below eaves, gutters, pipes and drains can be reduced to 25 mm, as long as the flue terminal is extended to clear any overhang. Any external flue joints must be sealed with a suitable silicon sealant.</li> <li>6. 500 mm clearance to any vertical structure on a roof, 600 mm to room sealed flue or 1,500 mm to an open flue.</li> <li>7. 1,500 mm between a vertical flue terminal and a window or dormer window.</li> </ol> | <ol style="list-style-type: none"> <li>8. 400mm from a pitched roof or in regions with heavy snow fall 500 mm.</li> <li>9. The flue cannot be lower than 1,000 mm from the top of a light well due to the build up of combustion products.</li> <li>10. 2,000 mm below a Velux window, 600 mm above or to either side of the Velux window.</li> <li>11. 200 mm below eaves and 75 mm below gutters, pipes and drains.</li> <li>12. 1,200 mm between terminals facing each other.</li> <li>13. 300 mm to an internal or external corner.</li> </ol> |
|---|--|



Installations in car ports are not recommended.

14. The dimension below eaves, balconies and car ports can be reduced to 25 mm, as long as the flue terminal is extended to clear any overhang. Any external flue joints must be sealed with suitable silicon sealant.
15. 300 mm above, below and either side of an opening door, air vent or opening window.

### 3.10 PLUME TERMINAL POSITIONS

All measurements in millimetres

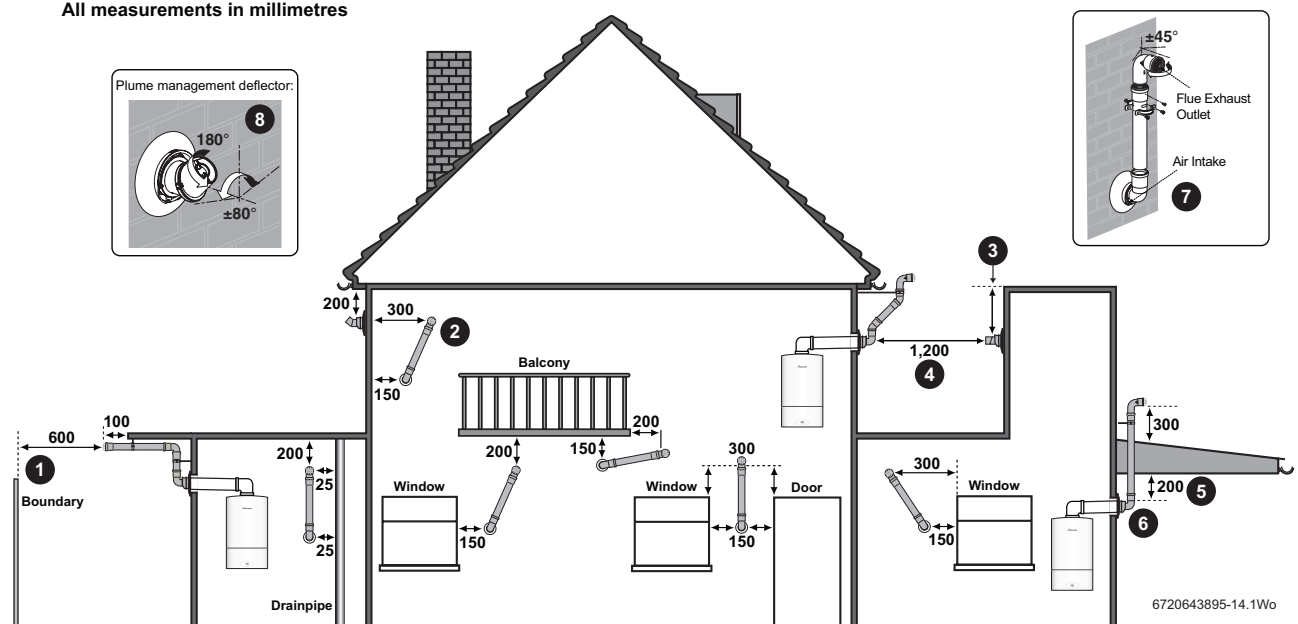


Fig. 21 Plume terminal positions



#### NOTICE:

- ▶ Maximum effective plume management length = 4,500mm.
- ▶ Additional 90° bends = 1,500mm of straight pipe and additional 45° bends = 750mm of straight pipe.
- ▶ Minimum plume management length = 500mm.
- ▶ All measurements are the minimum clearances required.
- ▶ Refer to figure 20 for all concentric flue terminal positions unless the flue position is specified on the figure above “Plume terminal positions”.
- ▶ Terminals must be positioned so to avoid combustion products entering the building.
- ▶ Support the flue at approximately one metre intervals and at a change of direction, use suitable brackets and fittings.

#### Key to illustration

1. 600 mm distance to a boundary, unless it will cause a nuisance. BS 5440: Part 1 recommends that care is taken when siting terminals in relation to boundaries.
2. Internal/external corners. The air intake clearance can be reduced to 150 mm providing the flue exhaust outlet has a 300 mm clearance.
3. The flue cannot be lower than 1,000 mm from the top of the light well due to the build up of combustion products.
4. 1,200 mm between air intake and facing terminal.
5. Clearance no less than 200 mm from the lowest point of the balcony or overhang.
6. 1,200 mm from an opening in a car port on the same wall i.e. door or window leading into dwelling. 600 mm to a surface facing a terminal.
7. Using a Plume Management Kit the air intake measurement can be reduced to 150 mm providing the flue exhaust outlet has a 300 mm clearance. Plume kits running horizontally must have a 10° fall back to the boiler for proper disposal of condensate. For details on specific lengths see relevant boiler Technical & Specification information.
8. This feature allows some basic plume re-direction options on a standard telescopic horizontal flue terminal. 300 mm minimum clearances to a opening e.g. window. However the minimum clearance to an opening in the direction that the plume is directed in, should be increased to 1,500 mm. Where the flue is less than 150 mm to a drain pipe and plume re-direction is used the deflector should not be directed towards the drainpipe.



Installations in car ports are not recommended.

## 4 INSTALLATION

**WARNING:** All the previous “Pre-Installation” sections must be read and the requirements met before starting boiler or flue installation.

### 4.1 UNPACKING THE WALL FRAME AND ANCILLARY ITEMS

**CAUTION: LIFTING AND CARRYING**

- ▶ Only lift a manageable weight, or ask for help.
- ▶ Bend the knee and keep the back straight with feet apart, when lifting or putting down heavy objects.
- ▶ DO NOT lift and twist at the same time.
- ▶ Lift and carry object close to the body.

1. System flow and return pipes - 22mm x 2
2. Wall mounting plate
3. Installer pack
4. Bottom panel
5. Inner wrap and wall template

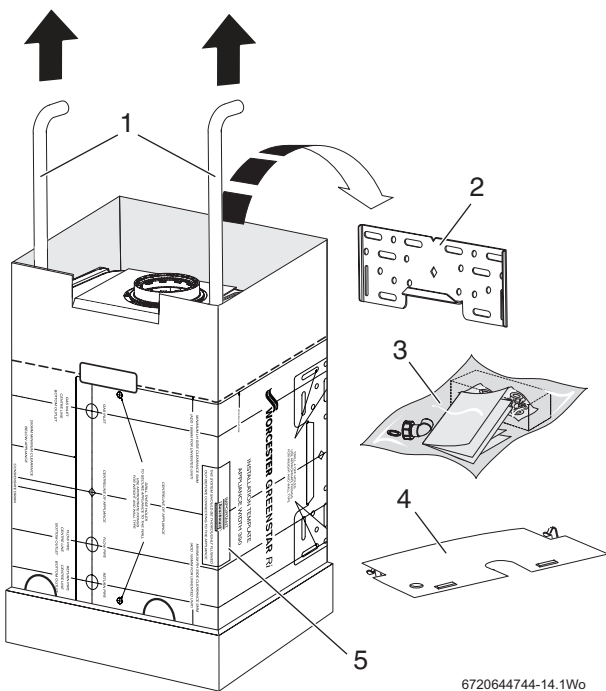


Fig. 22 Unpacking

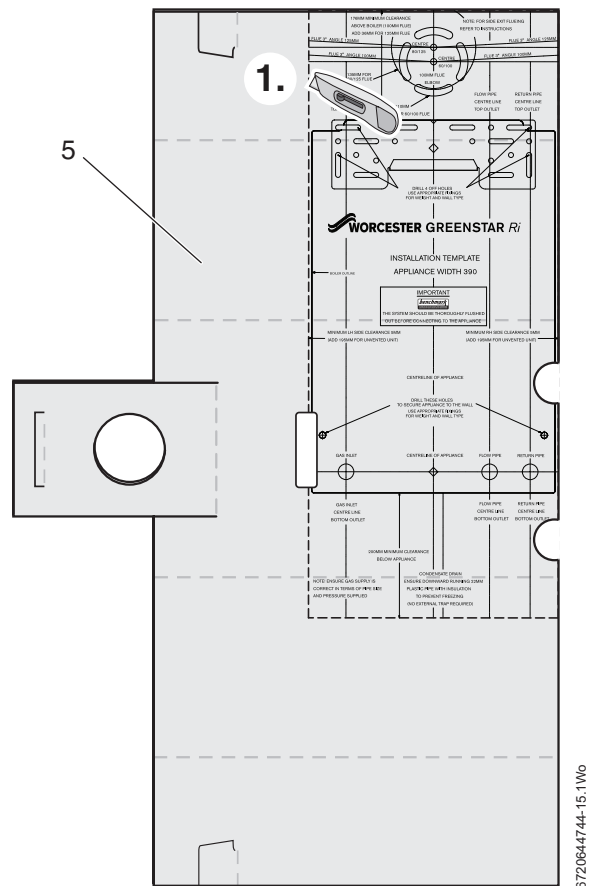


Fig. 23 Wall mounting template

#### IMPORTANT HANDLING INSTRUCTIONS:

- It is advised that two people are used to carry the carton from the van to the point of delivery.
- Once the carton has been delivered, remove the outer carton. Care should be taken when releasing the straps. If a sharp implement is used, make sure the outer carton is not pierced and that the implement is used in such a way so that it will not cause personal injury.
- All sharp objects must be covered or the blade retracted after use and put away in a safe place. The wall mounting frame, Installer pack, template and bottom panel can now be removed. Care should be taken when lifting the boiler from the base and the proper technique for safe lifting of any heavy object must be strictly observed.

#### Additional requirements for roof space installation:

- The boiler must be first unpacked before ascending ladder to loft space.
- Two sets of steps should be used.
- Two people should share the lifting of the boiler up to the loft hatch, where the boiler is entered into the loft space tilted and slid on its back into the loft.
- Once the appliance is removed from its packaging check the contents against the packing list.

**Before installing the appliance, ensure that the system has been cleaned as explained on page 9.**

## 4.2 WALL MOUNTING TEMPLATE & FLUE OPENING



**WARNING: BEFORE DRILLING:**  
ENSURE THAT THERE ARE NO PIPES,  
ELECTRICAL CABLES, DAMP PROOF  
COURSES OR OTHER HAZARDS .

### SAFETY:

All relevant safety precautions must be undertaken. Protective clothing, footwear, gloves and safety goggles must be worn as appropriate.

### FIXING THE MOUNTING FRAME:

- ▶ The boiler template shows the relative positions of the flue and the top and bottom fixing of the mounting frame.
1. Fix the template to the wall in the desired position.
  2. Drill four holes for the wall mounting frame through the template.  
Drill two holes for the bottom fixing screws.



The template has been sized to allow for minimum clearances of 5mm sides, 200mm base and 30mm above a 100mm diameter flue elbow.

### REAR FLUE OUTLET

- ▶ The drawing opposite shows the boiler template with the flue centre lines of both the 100 mm and 125 mm flue systems.
3. Mark centre line of flue to be used (3); the external diameter of the hole can also be marked if required.
- ▶ If a 100 mm diameter flue is to be used, a 125 mm diameter hole is required. However, if using the weather sealing collar by pushing it through from inside the property, then a 150 mm diameter hole is required to accommodate this.
  - ▶ The flue turret of the 100 mm flue has an in-built 3° angle.
  - ▶ If extensions are to be added then the complete flue must rise at an angle of 3°.
  - ▶ The 125 mm diameter flue system will require the flue to rise at an angle of 3°.
  - ▶ Drill hole using a core drill or similar.

### SIDE OUTLET:

4. Mark from the centre line of the wall template to the wall which the flue will pass through (4).
- ▶ Allow for a rise of 52mm per metre length of flue, to give a 3° angle.
  - ▶ Clear any debris from the site.

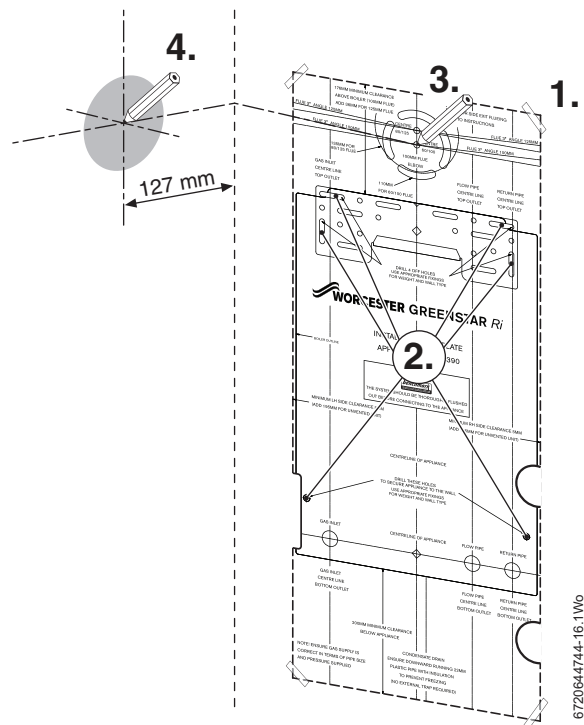


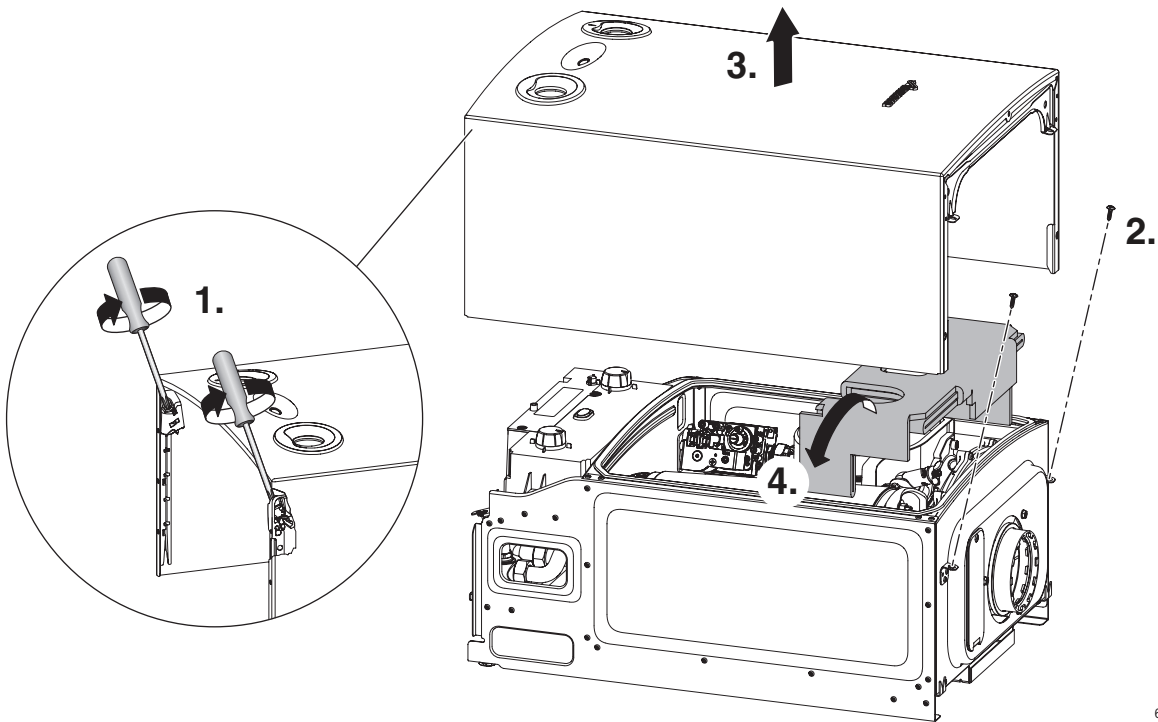
Fig. 24 Marking the flue position

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### 4.3 OUTER CASE REMOVAL

1. Undo the two captive screws securing boiler casing at the bottom of the appliance.
2. Undo the two screws securing boiler casing at the top of the appliance.
3. Pull case upwards.
4. Remove cardboard packing piece from appliance.

With the outer case removed the appliance is suitable for a one man lift (<25kg).



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Fig. 25 Case removal



### 4.4 BOILER CONNECTION



**CAUTION:**

- ▶ ISOLATE THE MAINS GAS SUPPLY BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS.



**WARNING:**

- ▶ Caps fitted to pipes must be removed before hanging the boiler

**GAS AND WATER CONNECTIONS:**

- ▶ Remove wall mounting template and secure the wall mounting frame to the wall with the appropriate fittings for the boiler weight and wall type.
- ▶ If there is greater than 600mm clearance below the appliance it is possible to fit the flow and return pipes, supplied, with the boiler installed on the wall.
- ▶ If clearance is less than 600mm below the appliance it may be necessary to fit the flow and return pipes before hanging the appliance.

1. Gas inlet (22mm)
2. Condensate
3. Flow (22mm)
4. Return (22mm)



**NOTICE:**

- ▶ Lift the boiler using the handling holes at either side of the frame. Do not lift the boiler by the air gas manifold or control box.

System pipes may be run vertically upwards behind the boiler or below it.



**NOTICE:**

- ▶ If pipes require reducing in length this is best done before they are fitted to the boiler.

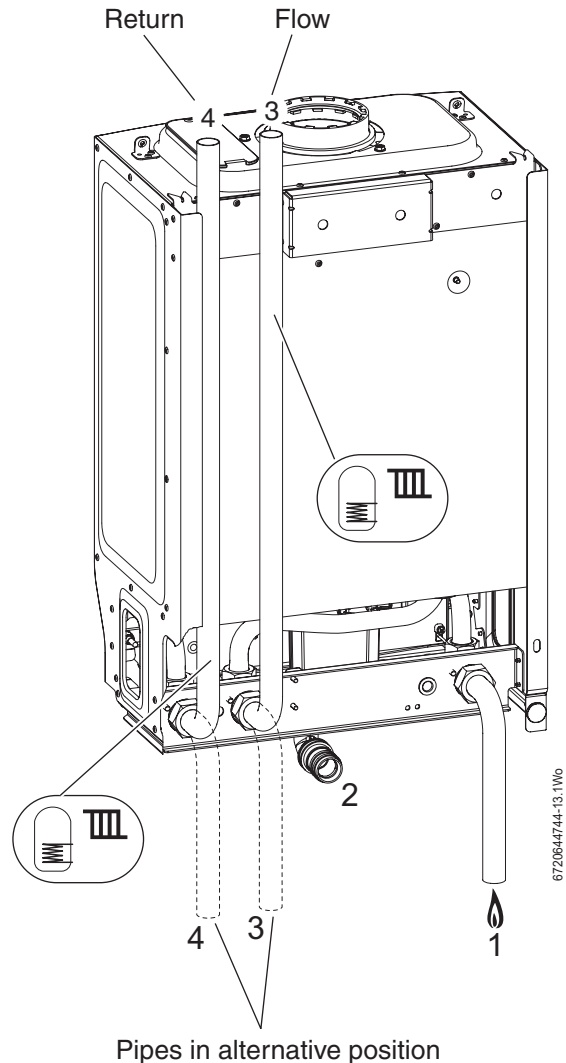


Fig. 26 Plumbing manifold

- ▶ Lift the boiler onto the wall plate.
- ▶ Level vertically using the feet (1) at the bottom rear of the boiler casing.
- ▶ Fit retaining screws through the holes (2) in the boiler frame to secure the boiler.
- ▶ Make connections to the heating system pipes.

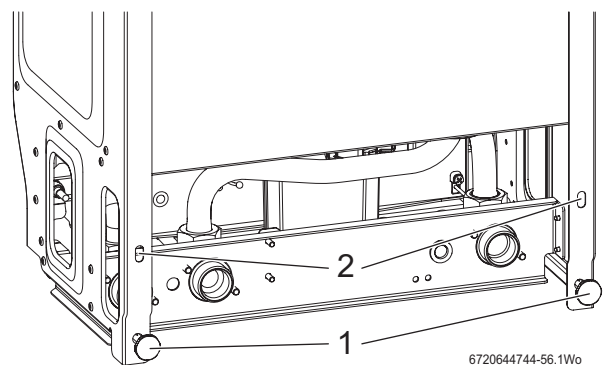


Fig. 27 Levelling and securing detail

**4.4.1 CONDENSATE CONNECTION**

Never terminate or discharge into any open source, including; sink, bath, shower, bidet, toilet etc.

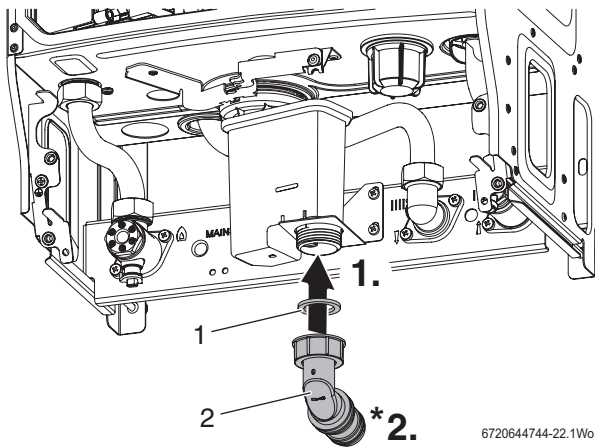
**NOTICE:** Condensate disposal

- ▶ Follow the recommendations given in section 3.4 “Condensate pipe work” for all condensate disposal installation.
- ▶ Ensure that the condensate pipe work falls at least 50mm per metre towards the outlet.
- ▶ \* Do not use solvents, adhesive or lubricant when pushing the pipe onto the rubber connector.

Figure 29 gives the pipe work dimensions with respect to the mounting surface.

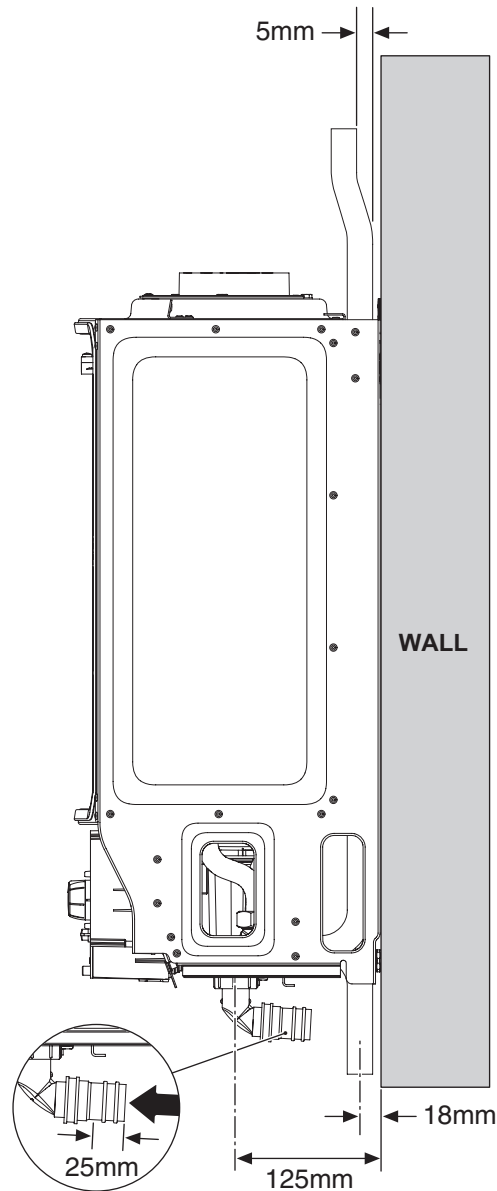
A sealing washer (1) and 22mm adaptor (2) are supplied in the fitting pack

1. Fit washer (1) inside the plastic nut and attach firmly to the connection on the syphon.
2. Connect the condensate disposal pipe work to the elbow (2), refer to figure 29 and insert the condensate pipe 25mm into the elbow.



6720644744-22.1W6

Fig. 28 Condensate connections



6720644744-19.1W6

Fig. 29 Pipe work dimensions

## 4.5 FLUE INSTALLATION

### HORIZONTAL FLUE (60/100mm diameter)

For vertical flues and 80/125mm horizontal flues, please refer to separate instructions supplied with the flue kit.



To ease assembly of flue components, apply silicone lubricant to sealing surfaces.

Basic instructions for the 60/100mm diameter flue are shown below.

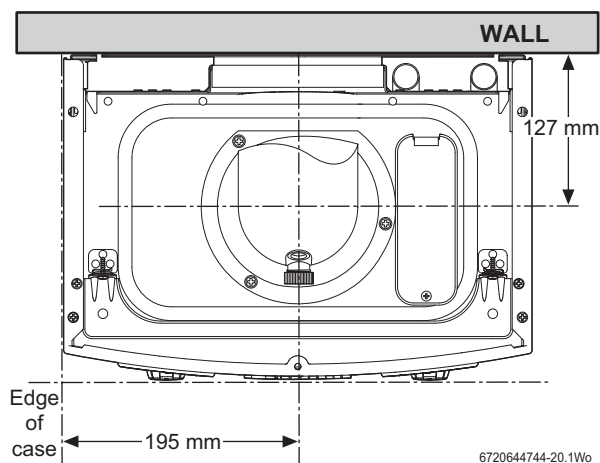


Fig. 30 Flue turret centre

#### 4.5.1 MEASURING THE FLUE (STANDARD FLUE):

- ▶ Measure from the outside of the wall to the centre line of the flue turret to determine length L.
- ▶ Subtract 50mm from the length L to give the correct dimension to the flue elbow connection.
- ▶ If the length L falls within the telescopic range of 350 to 570mm or 570 to 790mm using the longer telescopic flue, then no cutting will be required.
- ▶ If the required length is less than 350mm the standard telescopic flue can be modified, refer to fig. 32.
- ▶ If the required length is greater than 570mm, then the longer telescopic flue, giving a range of 570 - 790mm, can be used
- ▶ If the required length is greater than 790mm, then flue extensions will have to be used. Refer to the 60/100 Horizontal Flue Instruction manual provided in the telescopic flue kit.
- ▶ Refer to section 3.8 for flue options.

#### Adjusting the telescopic flue length:

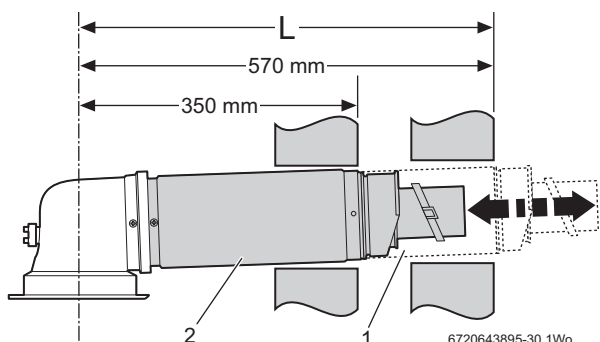


Fig. 31 Standard telescopic flue

Extend tube (1) by withdrawing from tube (2) to achieve the flue length required, between 350- 570mm.

Secure with screw provided and seal joint with the aluminium tape supplied.

#### 4.5.2 REDUCING THE TELESCOPIC FLUE LENGTH:



Ensure that the “TOP” label is facing up before securing the flue section to the turret.

The flue terminal MUST be fitted with the 'TOP' label uppermost to allow the correct fit and use of the plume management system.

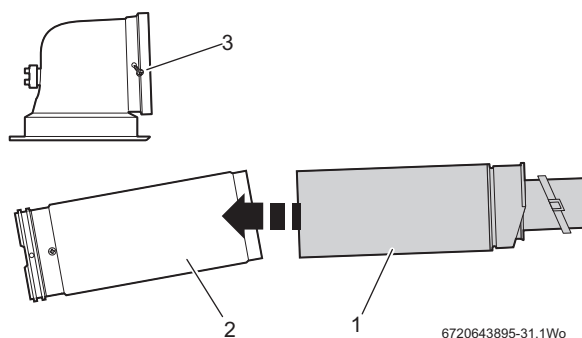


Fig. 32 Reducing the standard terminal

- ▶ Remove securing screws (3) to detach the terminal assembly from the turret.
- ▶ Slide terminal section (2) from the terminal assembly and discard.
- ▶ To use terminal (1) without cutting remove the location lug (4) on the inner flue tube (5) and remove any burrs.

#### To reduce the flue length further:

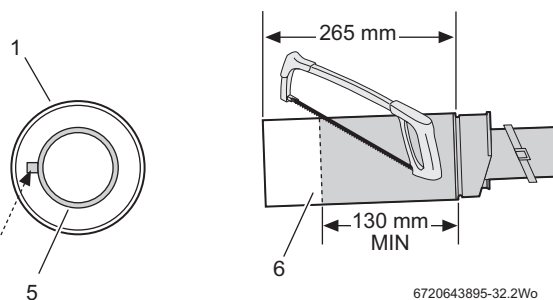


Fig. 33 Further reduction

- ▶ Mark the length required for the terminal as shown (min. 130mm) and cut square, taking care not to damage the tubes.
- ▶ Remove any burrs and chamfer the outer edge of the tubes to assist ease of connection and prevent seal damage.



The aluminium tape is not required when reducing the terminal.

**4.5.3 INSTALLING THE TELESCOPIC FLUE:**

Refer to figure 34.

1. Set the flue length to the distance required, secure with screws provided.
2. Seal the joint with the aluminium tape provided.
3. Slide the inner wall seal onto the terminal.
4. If fitting from inside the building; slide the outer wall seal onto the terminal.

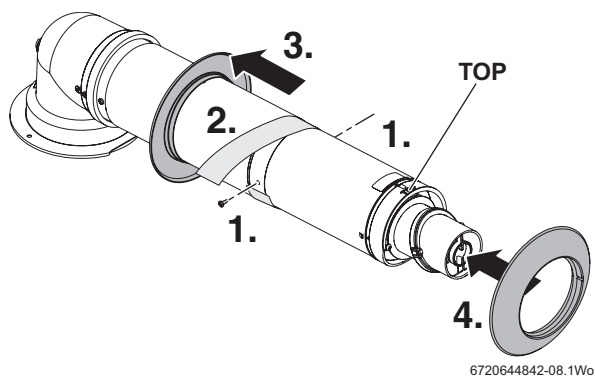


Fig. 34 Telescopic flue



The turret securing screws are from the boiler and are not in flue kit.

Refer to figures 35 & 36.

1. Remove the three inner flue tube retaining screws (2). The inner tube will be held in place in the appliance.
2. Check the boiler flue seal is correctly seated and apply silicone grease.
3. Position terminal through the flue opening in the wall to the outside of the building by the distance shown.
4. Align the flue turret to the boiler flue outlet with flat facing (1) to the rear of the boiler. The flue turret should be pushed straight down, on to the boiler.

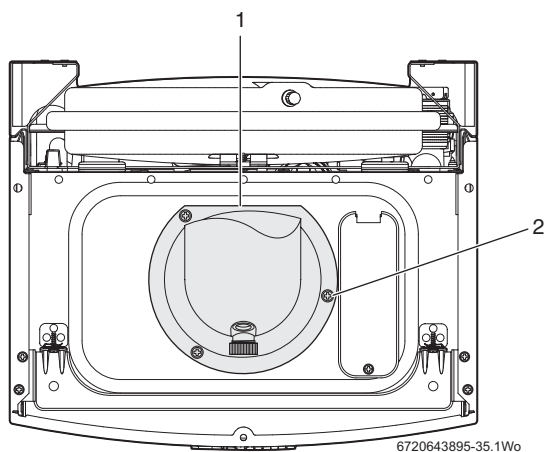


Fig. 35 Aligning the turret

- ▶ Fit the screws removed in step 1 to secure flue turret.

- ▶ If fitting the outer seal from outside the building, slide the outer wall seal onto the terminal as shown.

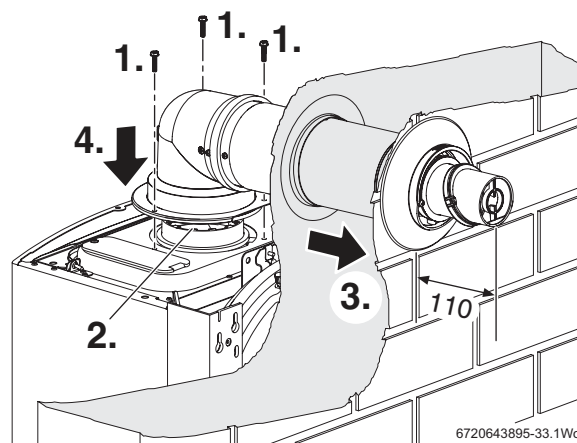


Fig. 36 Telescopic flue installation



For more information refer to the 60/100 Horizontal Flue kit Instruction Manual

**ADDITIONAL NOTES AND REMINDERS:**

- Ensure that all cut lengths are square and free from burrs.
- The flue is sealed when assembled correctly and the components are pushed fully home.
- The flue is set at an angle of 3° or 52mm per metre length.
- Support the flue at approximately one metre intervals and at a change of direction, use suitable brackets and fittings (Flue brackets 100mm x 6 part number: 7 716 191 173, Flue bracket 125mm part number : 7 716 191 174)

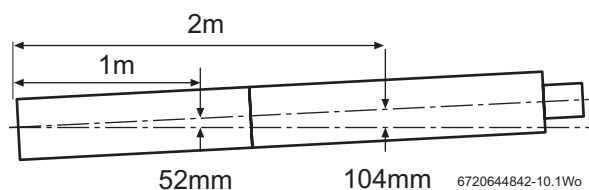



Fig. 37 Slope for condensate disposal

**4.5.4 FLUE TERMINAL PLUME RE-DIRECTION:**


The flue discharge can be re-directed allowing some plume redirection control, alternatively, a complete plume management system can be fitted to the flue terminal.

**RE-DIRECTING THE FLUE DISCHARGE**

1. Using a suitable tool, unclip (1 & 2) the terminal end and rotate through 180°.

 **NOTICE:** DO NOT rotate the complete terminal assembly.

1. Refit to the terminal, ensuring that the clips (1 & 2) are engaged and secure.
2. Loosen screws (3) and rotate the entire outlet assembly to redirect the plume. Tighten screws (3) to secure in the required position.

 The flue terminal outlet has built-in stops to limit rotation for horizontal flues to allow condensate to run back into the boiler for safe disposal. Do not attempt to force beyond the limit stops.

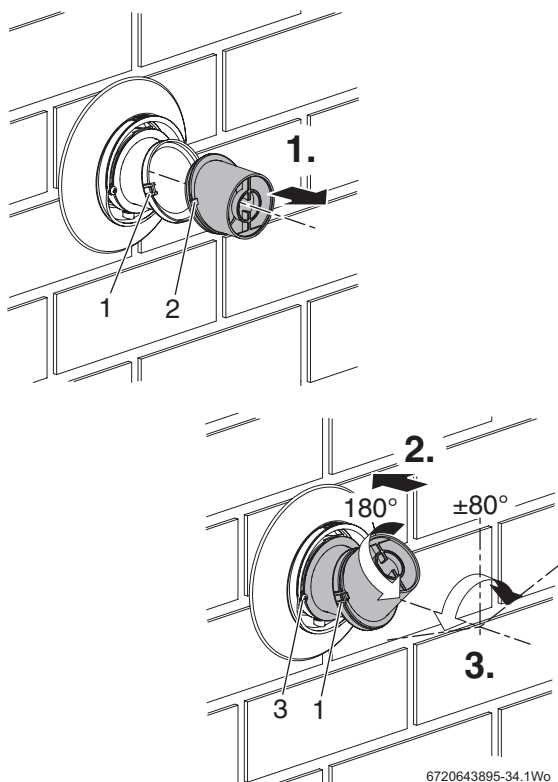



Fig. 38 Plume redirection

 **NOTICE:** Outlet position

- ▶ The flue terminal outlet position must follow those stated in the relevant appliance instruction manual. When redirecting the flue discharge the outlet terminal must be at least 1500mm from any opening in the direction of the discharge to prevent combustion products from entering the building.

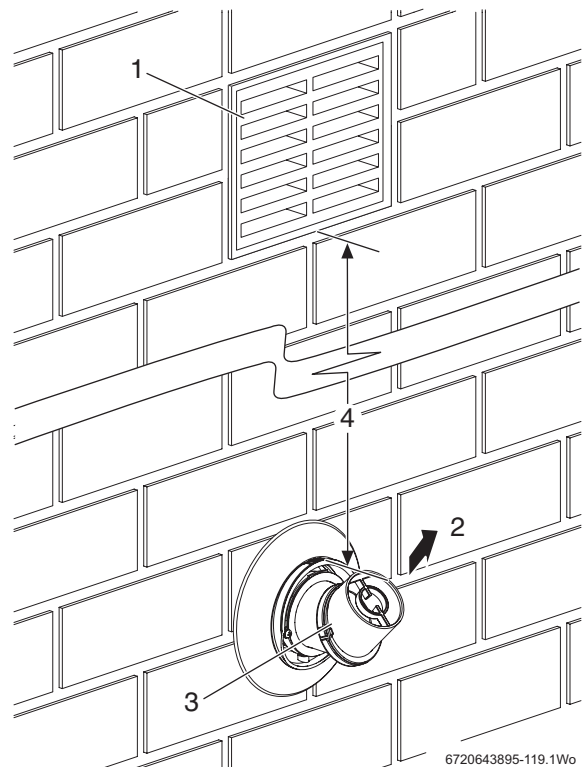


Fig. 39 Plume distance to opening

1	Opening in building
2	Flue discharge
3	Plume deflector
4	Minimum 1500mm from an opening in the building

Tab. 19 Key to figure 39

▶

## 4.6 ELECTRICAL CONNECTIONS



**CAUTION:** Isolate the mains electrical supply before starting any work and observe all relevant safety precautions.



The boiler is already wired with a mains supply cable.  
A spare strain relief block is supplied in case the pre-wired cable is replaced.<sup>1</sup>

- ▶ The mains supply to the boiler and system wiring centre must be common, and through either a fused double pole isolator or a fused three pin plug and unswitched socket.
- ▶ The isolator/socket, where practicable, should be situated next to the boiler.
- ▶ The isolator must have a contact separation of 3mm minimum in both poles.
- ▶ Any system connected to the boiler must not have a separate electrical supply.
- ▶ External fuse rating 3A.

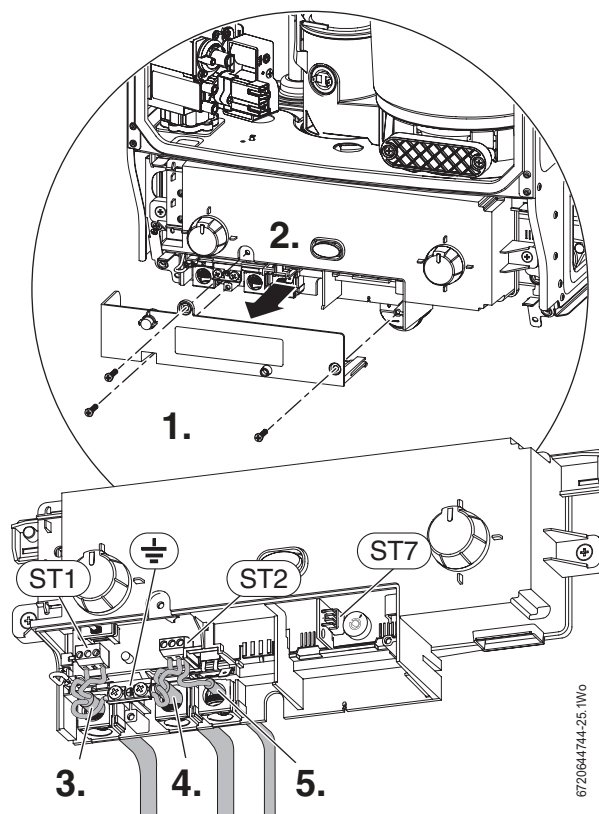
### ACCESS TO ELECTRICAL CONTROL PANEL:

- ▶ Remove boiler casing to access control panel.
  1. Unscrew the three screws in the control panel.
  2. Remove the connections cover.
- ▶ Unclip cable clamp.
- ▶ Cut off the tapered cable entry to fit cable diameter required.
- ▶ Turn cable retaining screw anticlockwise
- ▶ Run cable through the hole in the main crossbar marked "mains cable" and through the cable clamp, ensure there is ample cable to reach the connectors.
- ▶ Turn cable clamping screw clockwise to secure cable and replace clamp into control panel.
- 3. Mains power 230v connection (ST1):
  - Separate wires from cable end and strip to 6mm
  - Connect LIVE wire to terminal (L)
  - Connect NEUTRAL wire to the terminal (N)
  - Connect EARTH wire to earth bracket
- 4. External Pump (ST2): Max power 90 W
  - Connect NEUTRAL wire to terminal (Np)
  - Connect LIVE wire to terminal (Lp)
  - Connect EARTH wire to earth bracket
- 5. Boiler Demand (from external wiring centre) (ST2):
  - Connect SWITCHED LIVE wire to terminal (LR).



### NOTICE: SYSTEM PUMP

- ▶ THE SYSTEM PUMP MUST BE CONNECTED TO THE APPLIANCE FOR THE PUMP OVER-RUN FUNCTION.



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Fig. 40 Wiring detail

**NEW COMPLETE SYSTEM INSTALLATIONS**

If a new complete heating system is installed in a new build property or it is a first time installation in an existing property, the heating systems must conform to current building regulations Part L1a or L1b.

All new heating systems in dwellings must have at least two heating zones. Each of these zones will be controlled by a thermostat and zone valve.

The exception to this are single storey, open plan dwellings where the living area is more than 70% of the total useable floor area. Then this type of dwelling can be controlled as one zone.

An alternative would be individual electronically controlled TRVs. Hot water supplied would require separate time and temperature control.

For dwellings with a floor area over 150m<sup>2</sup>, separate time and temperature control for each zone is required. All radiators must have TRVs fitted in all rooms except bathrooms and rooms with thermostats.

**EXISTING INSTALLATIONS**

For boiler replacements on an existing system, it is not necessary to zone the upstairs and downstairs differently, compliance with the zone requirements can be achieved by a single room thermostat or programmable room thermostat.

While the system is drained down, TRVs must be fitted to all rooms except the bathrooms and the room with the thermostat.

**EXTERNAL WIRING CENTRE**

System components wired into terminal strip in accordance with system manufacturers instructions.

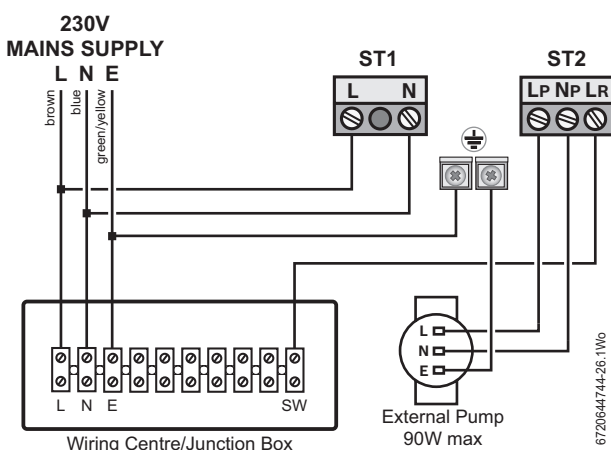


Fig. 41 External wiring centre

Refit electric control panel covers:

- ▶ Refit panel and secure with screws.

## 5 COMMISSIONING

### 5.1 PRE-COMMISSIONING CHECKS

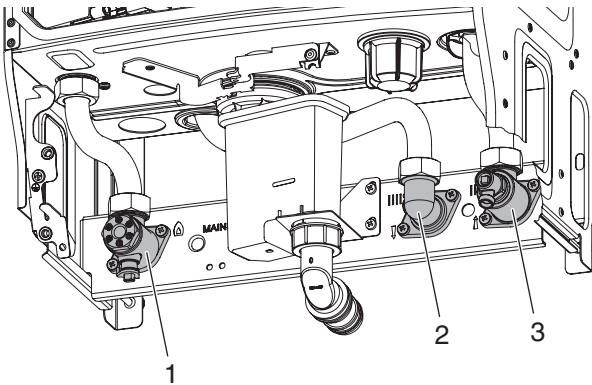


**WARNING: ELECTRIC SHOCK**

- ▶ ISOLATE THE MAINS SUPPLIES BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS

- ▶ Check that the gas service pipe and water pipes are connected to the correct position on the manifold.

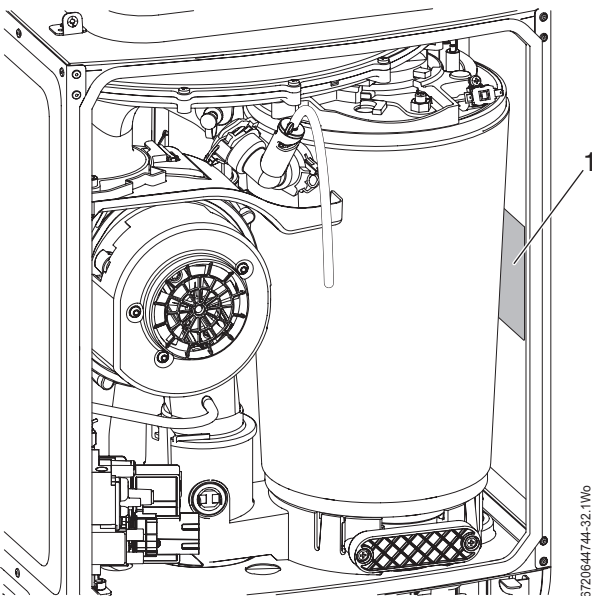
1. Gas inlet (22mm)
2. Flow (22mm)
3. Return (22mm)



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Fig. 42

- ▶ Check the gas type specified on the identification plate (1) matches that of the gas supply.



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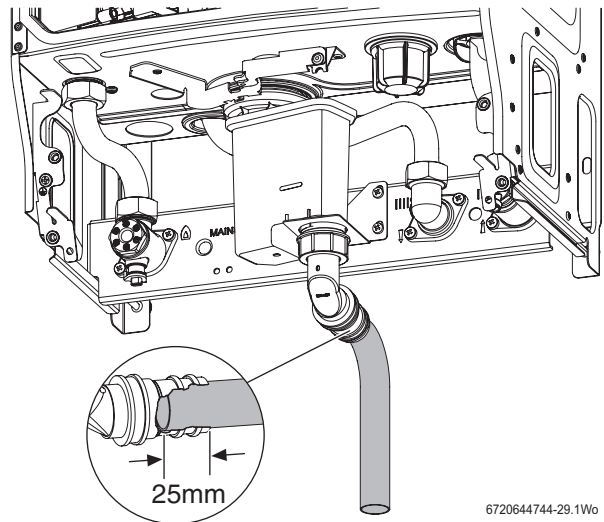
Fig. 43 Data plate location

- ▶ Turn on the main gas supply, check the gas pipe work, connections and rectify any leaks.



**NOTICE:** Do not use solvents, adhesive or lubricant when pushing the pipe onto the rubber connector.

- ▶ Check that the condensate pipe has been connected to the syphon.
- ▶ Ensure that the condensate pipe has been inserted at least 25mm into the elbow



6720644744-29.1Wo

Fig. 44 Condensate connection



If the boiler is not to be commissioned immediately then, after successfully completing all of the checks and any rectification work, shut off the gas and water supply and electrically isolate the boiler.



## 5.2 FILLING THE SYSTEM

Open vented systems:

- ▶ Ensure all system and boiler drain points are closed.
- ▶ Open all radiator valves.
- ▶ Turn on the water supply to the system header tank and allow the system to fill.

Sealed systems:

- ▶ Fill the system via a WRAS approved filling loop to 1 bar then turn the valve anti-clockwise to close.

Opened vented and sealed systems:

- ▶ Vent (1) any air from the boiler heat exchanger using a suitable container to collect any water. Ensure tube outlet (2) is directed away from the fan or any other electrical component to prevent any water damage. Also place a suitable cover over the fan to prevent any spillage of water on to electrical connections. Ensure the cover is removed after venting.

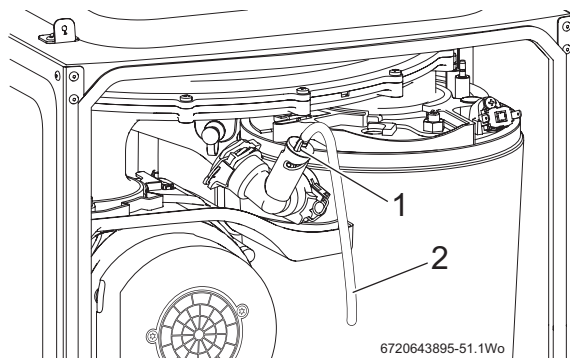


Fig. 45 Venting

- ▶ Vent all radiators and the primary side of the hot water cylinder, tighten when completed and check the system and correct any leaks.

Sealed systems only:

- ▶ If required increase system pressure back to 1 bar.
- ▶ Isolate and remove filling loop connection to system.

## 5.3 WATER TREATMENT



**NOTICE:**

- ▶ ARTIFICIALLY SOFTENED WATER MUST NOT BE USED TO FILL THE CENTRAL HEATING SYSTEM.

**ENSURE THAT THE SYSTEM HAS BEEN CLEANED AS ON PAGE 9 OF THESE INSTRUCTIONS.**

**FLUSHING (Central Heating):**

- ▶ Switch off the boiler.
- ▶ Open all drain cocks and drain the system while the appliance is hot.
- ▶ Close drain cocks and add a suitable flushing agent at the correct strength for the system condition in accordance with the manufacturer's instructions.
- ▶ Run the boiler/system at normal operating temperature for the time stated by the manufacturer of the flushing agent.
- ▶ Drain and thoroughly flush the system to remove the flushing agent and debris.

**INHIBITOR (Central Heating):**

- ▶ Check drain cocks are closed and all radiator valves are open before adding a suitable inhibitor compatible with aluminium (or combined inhibitor/anti-freeze if the system is exposed to freezing conditions) to the heating system water in accordance with the manufacturers instructions.



The pH value of the system water must be less than 8 or the appliance warrantee will be invalidated.

- ▶ Fill system as described in section 5.2 opposite.
- ▶ Set all controls to maximum.
- ▶ Record the date when the inhibitor was added to the system on the warrantee card.



**NOTICE:**

- ▶ The concentration of inhibitor in the system should be checked every 12 months or sooner if system content is lost.
- ▶ The addition of sealing agents to the system water is not recommended as this can cause problems with deposits left in the heat exchanger.

## 5.4 STARTING THE APPLIANCE

**CAUTION: RUNNING THE APPLIANCE**

- ▶ Never run the appliance when the appliance/system is empty or partially filled.

- ▶ If the boiler fails to light and the boiler goes to flame lock-out, the BLUE power indicator (2) will flash.



**NOTICE: RESET**

- ▶ Do not press the blue power indicator to reset the boiler.

3. To reset the lockout turn the boiler thermostat control to minimum, then passed minimum where the control knob will click at reset position, wait 5 seconds then turn to maximum. The boiler will be reset.

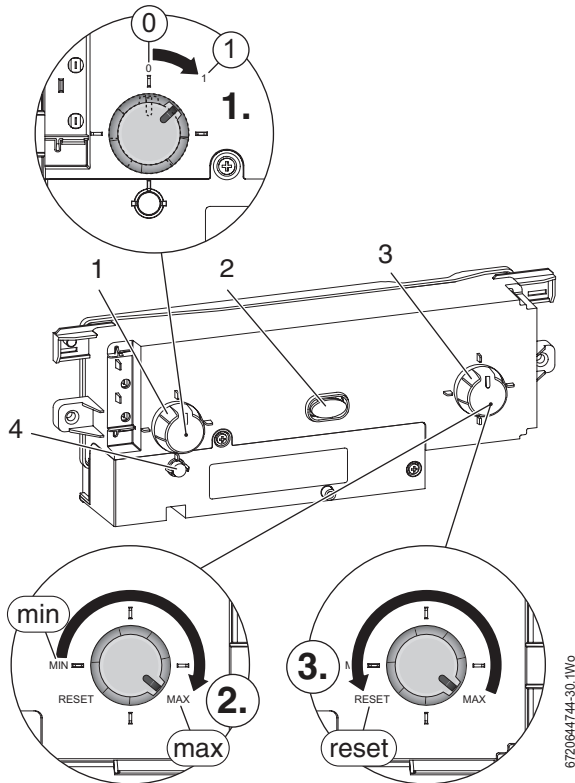


Fig. 46 Boiler controls

Switching the appliance ON/OFF:

- ▶ Turn on mains power supply, the power on indicator (2) illuminates BLUE.
  - ▶ Turn on any external controls
  - ▶ Set the thermostatic radiator controls to maximum temperature
  - ▶ Set the clock/programmer to continuously ON and the room thermostat to maximum temperature
1. Turn Power ON/OFF knob (1) from 0 (OFF position) to I (ON position), after 2 seconds the Power ON indicator (2) illuminate.

1	Power ON/OFF knob
2	Power ON and fault indicator (Blue)
3	Central heating temperature control
4	Burner indicator (Green)

Tab. 20 Control panel legend

2. Turn the boiler CH temperature control (3) to maximum. The burner on indicator (4) illuminates GREEN when the burner has lit.

## 5.5 COMMISSIONING



**NOTICE:** The combustion settings on this gas-fired boiler have been checked, adjusted and preset at the factory for operation on the gas type defined on the data plate. No measurement of the combustion values is necessary provided there is a meter installed allowing the gas rate to be checked. **DO NOT ADJUST THE AIR/GAS RATIO VALVE.**

Having checked:

- ▶ That the boiler has been installed in accordance with the installation instructions.
- ▶ The integrity of the flue system and flue seals, as described in section 6.3 of this manual.
- ▶ The integrity of the boiler combustion circuit and relevant seals.

### 5.5.1 CHECKING THE GAS INLET PRESSURE

The inlet pressure to the appliance must be checked using the following procedure:

#### MEASURING THE INLET PRESSURE

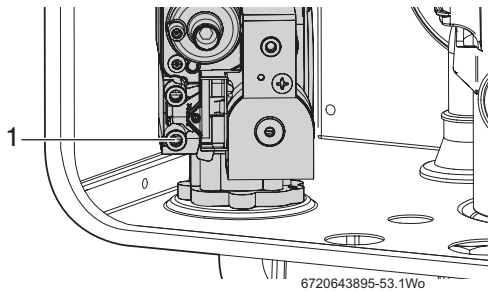


Fig. 47 Inlet pressure test point

- ▶ Close gas isolation valve.
- ▶ Slacken the screw in the inlet pressure test point (1) and connect a manometer.
- ▶ Open gas isolation valve.
- ▶ Measure the pressure with the boiler running at maximum.
  - Refer to section 6.4 to set the boiler to maximum output.
  - The boiler will stay at maximum for 15 minutes.
  - Return the boiler to normal after the checks.
- ▶ Check the gas supply working pressure at the gas valve conforms to values shown in Fig. 48 or Fig. 49.



Ensure inlet pressure is satisfactory with all other gas appliances working.

#### GAS PRESSURE WITHIN THE SYSTEM

Refer to the figures below for natural gas or L.P.G gas pressures.

The pressure at the boiler must not be less than the pressure read at the meter minus:

- 1 mbar for Natural Gas
- 2.5 mbar for L.P.G.

The pressure drop from the meter to the gas valve must not be more than:

- 2.5 mbar for Natural Gas
- 4 mbar for L.P.G.

If the pressure drops are greater than shown below, then this would indicate a problem with the pipe work or connections within the system.

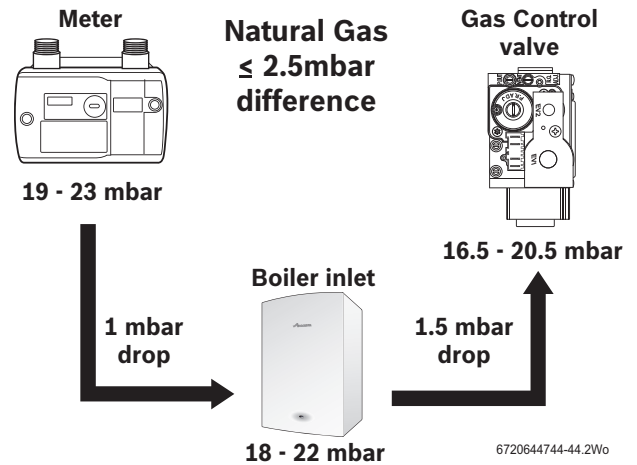


Fig. 48 Natural gas pressures

≤ Equal to or less than .....

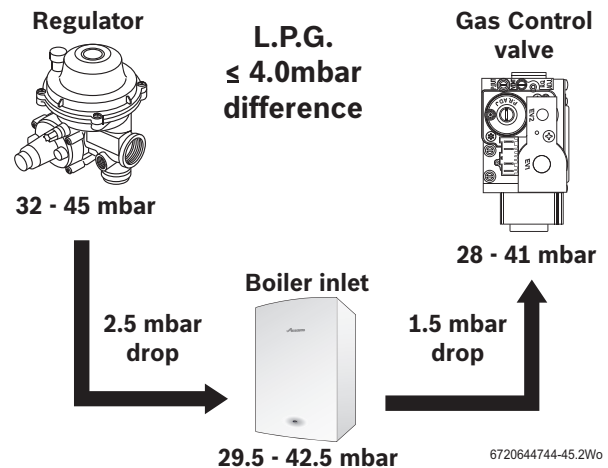


Fig. 49 L.P.G. pressures



**NOTICE:** Do not continue commissioning until the correct gas pressure is achieved.

### 5.5.2 CHECKING THE GAS RATE

- ▶ The gas rate should be measured at the gas meter after 10 minutes operation at maximum. See technical data section at the front of this manual.
- ▶ Where a gas meter is not available (e.g. L.P.G.) the CO/CO<sub>2</sub> must be checked to the units shown in the setting of the air/gas ratio, refer to section 6.6.
- ▶ If pressure and gas rate are satisfactory press the service button and the boiler will return to normal operation.
  - If left in the service mode the control will return to normal operation after 15 minutes.
- ▶ Close the gas isolation valve.
- ▶ Remove the manometer.
- ▶ Re-seal the screw in the gas inlet pressure test point.
- ▶ Open the gas isolation valve.
- ▶ Ensure that there are no gas leaks.
- ▶ Replace the outer case.

## 5.6 FINISHING COMMISSIONING

### 5.6.1 REPLACE THE OUTER CASE:

Replace outer casing making sure that the securing points are properly located.

1. Replace top two screws.
2. Re-tighten bottom two screws.

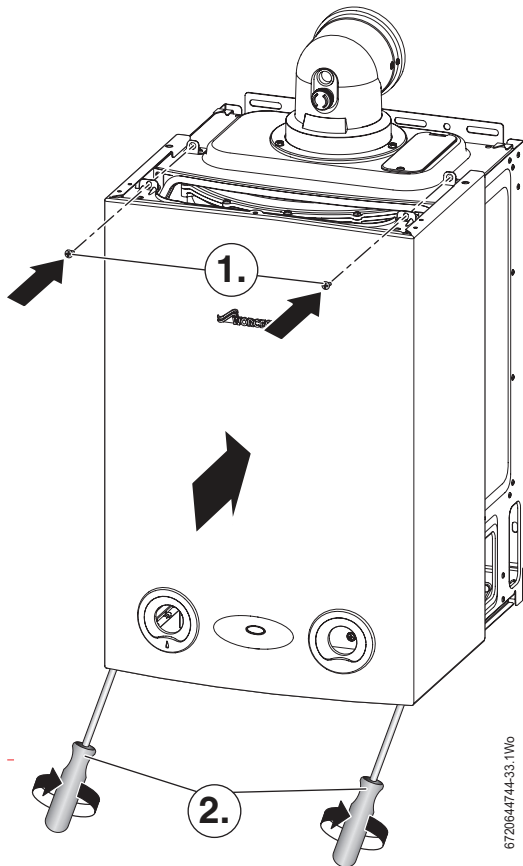


Fig. 50 Replacing outer case

### 5.6.2 INSTALL THE BOTTOM PANEL

The cut out in the bottom panel fits easily over the syphon elbow and outlet, however care should be taken not to disturb any sealed components.

1. Hook the lip at the back of the bottom panel over the angled edge at the base of the connections manifold.
2. Gently push up into position and clip into place over the two lugs

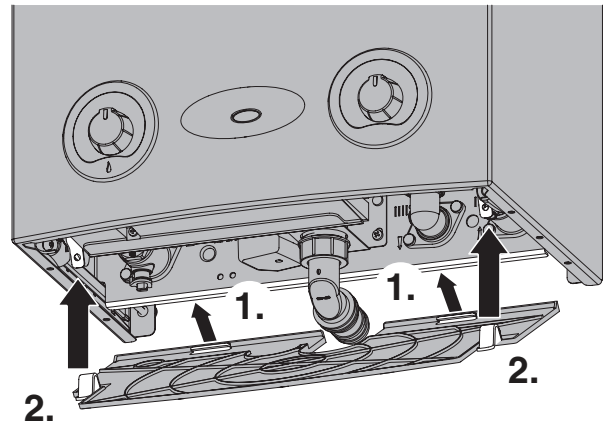


Fig. 51 Bottom panel

### 5.6.3 HAND OVER

- ▶ Complete the Benchmark Gas Boiler Commissioning Checklist.



The Benchmark Checklist can be found at the rear of these instructions.

- ▶ Set up the controls and show the user how to operate all the controls shown in the User Guide.
- ▶ Ensure that the User guide is left with the boiler or homeowner.
- ▶ If the appliance is unused and exposed to freezing conditions, shut off all the mains supplies and drain the system and boiler.

## 6 SERVICE AND SPARES

### 6.1 INSPECTION AND SERVICE



**CAUTION:** TURN OFF THE GAS SUPPLY AND ISOLATE THE MAINS SUPPLIES BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS.



**NOTICE:** COMPONENTS.

- ▶ After replacement of any components always check for gas tightness where relevant and carry out functional checks as described in Commissioning. Damaged O-rings or gaskets must be replaced.



**NOTICE:** Service work must be carried out by a competent registered engineer, such as British Gas or Gas Safe registered personnel!



**NOTICE:** SERVICE MUST **NOT** BE ATTEMPTED IF A CO/CO<sub>2</sub> ANALYSER IS **NOT** AVAILABLE.

- To ensure the continued efficient operation of the appliance it must be checked at regular intervals.
- The frequency of servicing will depend upon the particular installation conditions and usage however, an annual service is recommended.
- The extent of the service required by the appliance is determined by the operating condition of the appliance when tested by fully qualified engineers.
- The service interval record sheet at the rear of these instructions must be completed after each service.

#### INSPECTION

1. Check that the terminal and the terminal guard, if fitted, are clear and undamaged.
2. If the appliance is in a compartment or cupboard check that the specified service space around the appliance is clear.
3. Check all the joints and connections in the system and remake any that show signs of leakage. Refill and re-pressurise if applicable as described in Commissioning, section 5.2.
4. Operate the appliance and take note of any irregularities. Refer to Fault Finding on page 58 for rectification procedures.

#### COMPONENT ACCESS

Removing outer case

1. Undo and remove two screws securing boiler casing at the top of the appliance.
  2. Undo but do not remove the two screws securing boiler casing at the bottom of the appliance.
- ▶ Pull case forward and remove.

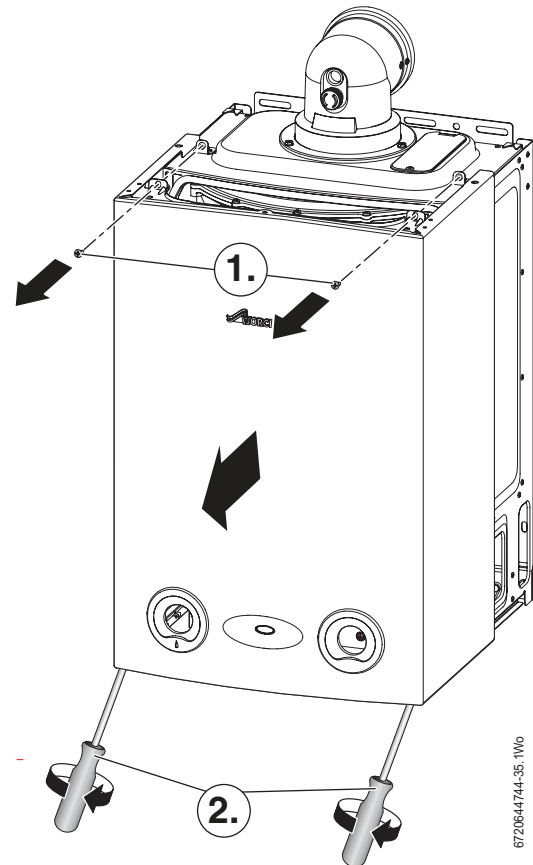


Fig. 52 Remove outer case

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**LOWERING THE BOILER CONTROLS TO THE SERVICE POSITION:**

1. Remove two screws securing the control.
2. Pull the control forward.
3. Lower the control to align the slots at the top of the control with the lugs on the boiler framework.
4. Hang control on two lugs on boiler framework.

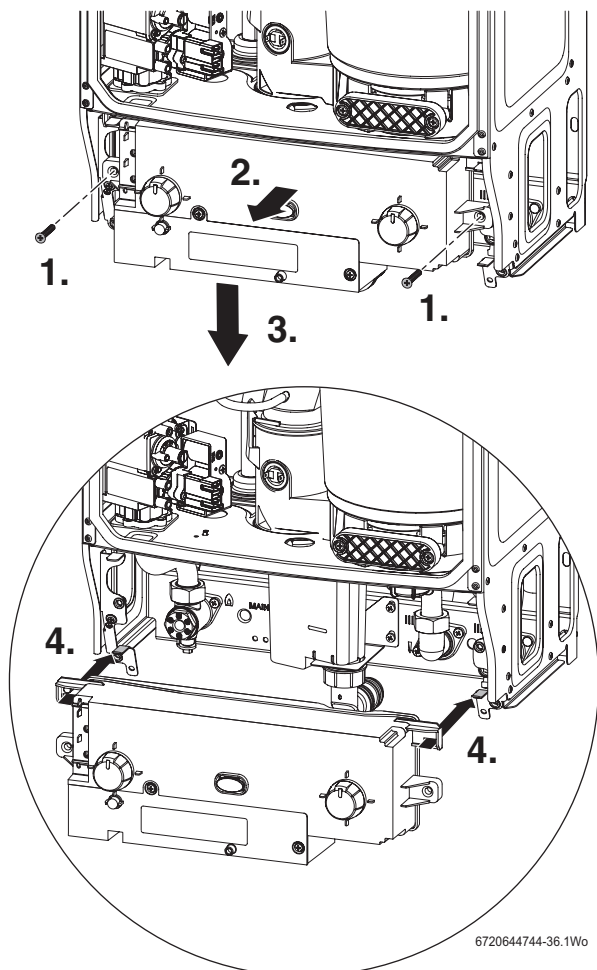


Fig. 53 Control panel into service position

## 6.2 CHECKING GAS INLET PRESSURE

Refer to section 5.5.1 for more information

**NOTICE:**

- ▶ Ensure that the gas inlet pressure is satisfactory with all other gas appliances working.
- ▶ Do not continue with the other checks if the correct gas inlet pressure can not be achieved.

▶ Check the gas supply working pressures in the system conform to the readings shown in the table below:

Natural gas				
Allowed mbar pressure drop				
meter/ regulator	across pipe work	boiler inlet	across boiler	gas control valve
19 - 23	1	18-22	1.5	16.5 - 20.5
L.P.G.				
32 - 45	2.5	29.5 - 42.5	1.5	28 - 41
mbar range				

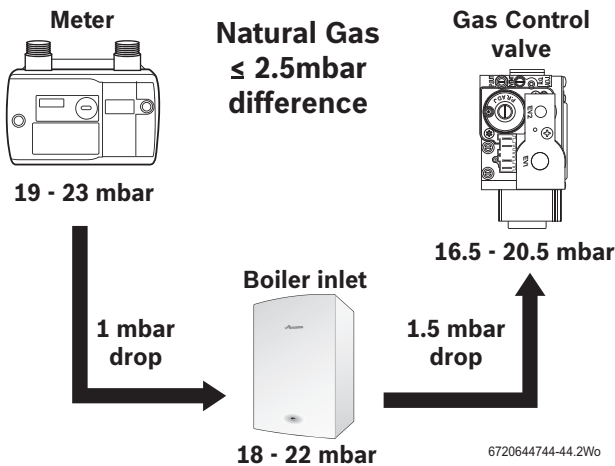


Fig. 54 Natural gas pressures

≤ Equal to or less than .....

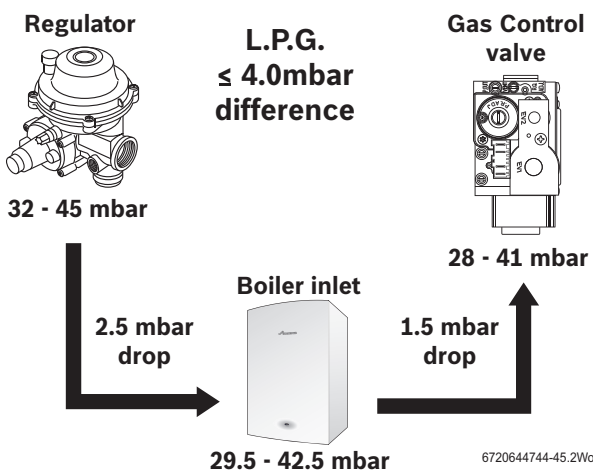


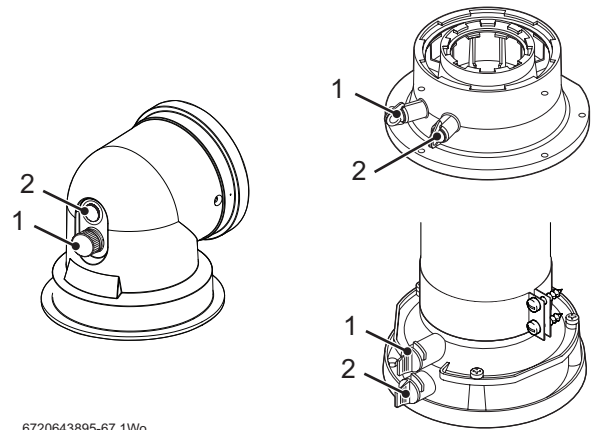
Fig. 55 L.P.G. pressures

## 6.3 CHECKING FLUE INTEGRITY

The integrity of the flue system and performance of the boiler can be checked via the flue turret sample points.

Flue gas sample point	1
Air inlet sample point	2

Tab. 21 Key to figure 56



6720643895-67.1Wo

Fig. 56 Flue test points

- ▶ With the boiler case on and the boiler running at maximum.
- ▶ Insert the analyser probe into the air intake test point.
- ▶ Allow the readings to stabilise and check that:
  - O<sub>2</sub> is equal to, or greater than 20.6%
  - CO<sub>2</sub> is less than 0.2%
- ▶ If the readings are outside these limits then this indicates that there is a problem with the flue system or combustion circuit, e.g. missing or dislodged seals.

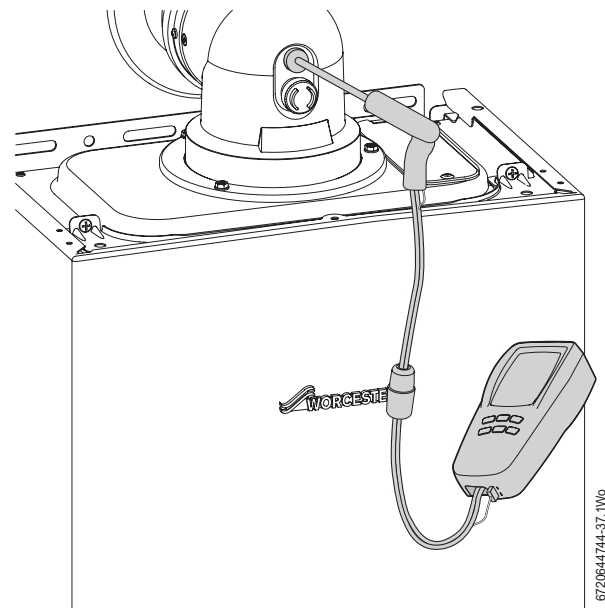


Fig. 57 Flue integrity test

## 6.4 FAN PRESSURE TEST



This test is to determine if the heat cell requires cleaning/attention.

### SETTING THE BOILER TO MAXIMUM

1. Remove the three screws retaining the control cover.
2. Remove the control cover.
3. Remove the plastic tool clipped inside the cover.
4. Insert the tool into the switch.
5. Using the tool set the mode switch to maximum output.

Ensure the boiler is powered up and there is a demand from the external controls.

The power indicator will flash and the boiler will stay in this mode for 15 minutes if no further change is made to the switch.

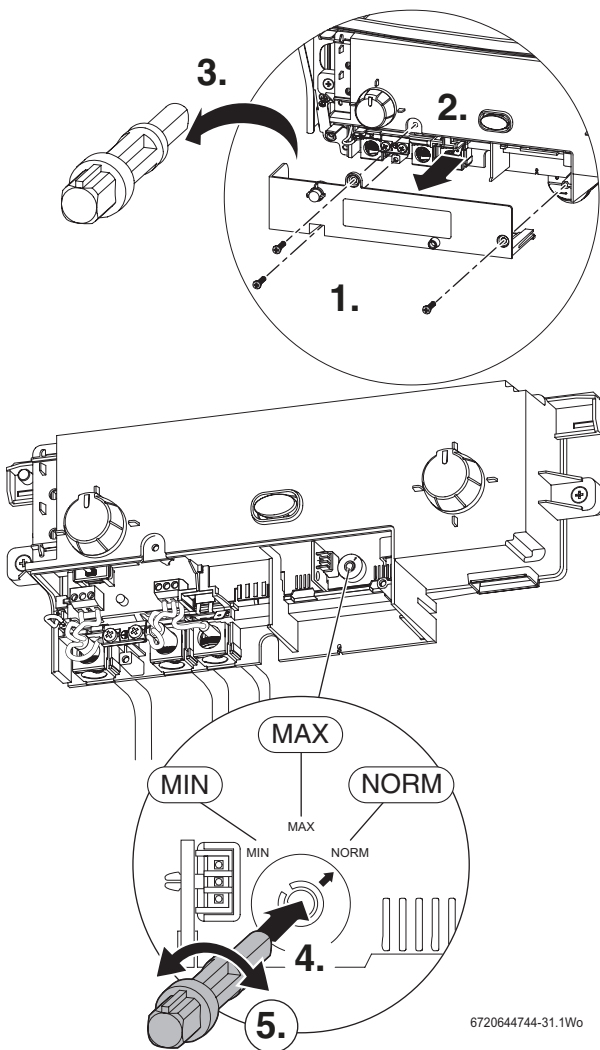


Fig. 58 Setting the boiler to maximum

### FAN PRESSURE TEST

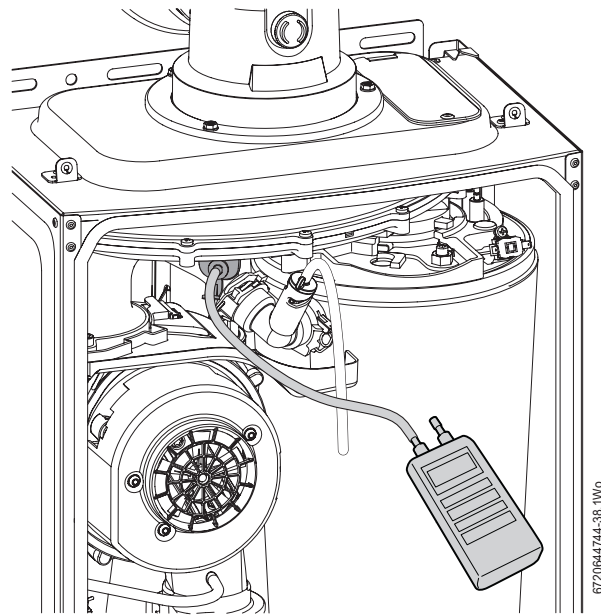


Fig. 59 Fan pressure test

- ▶ Remove the cover and connect a digital manometer to the fan pressure test point.
- ▶ The pressure will read negative, refer to the chart in figure 60.
- ▶ After measurement replace test point cover and return mode switch to normal.
- ▶ Replace the control cover.
- ▶ Replace outer case.



**NOTICE:**

The boiler must be run at maximum output for Fan Pressure test and the Flue Gas analysis.

### FAN PRESSURE TEST

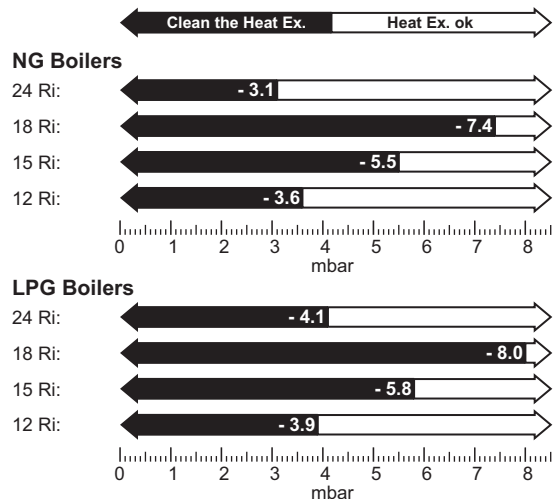


Fig. 60 Fan pressure readings



If the boiler fails the fan pressure test then before adjusting the air/gas ratio, try the following:

- ▶ Check the syphon is not blocked.
- 1. Remove the screws securing the sump cover.
- 2. Remove the sump cover.
- 3. Clean the sump with a suitable brush.
- ▶ Check the exhaust path and flue for restriction.
- ▶ Re-check the Fan Pressure readings

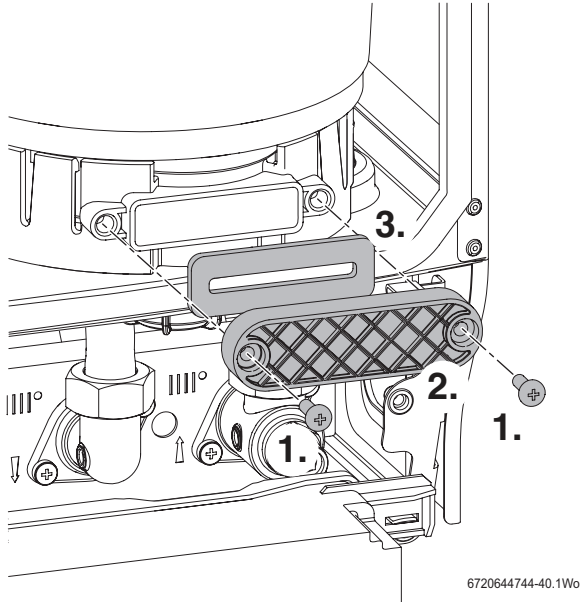


Fig. 61 Sump access

## 6.5 FLUE GAS ANALYSIS

### COMBUSTION TEST:



Ensure that the gas inlet pressure has been checked and is satisfactory, refer to section 5.5.1

- ▶ Connect the flue gas analyser to the flue gas sampling point as shown in the figure below.
- ▶ Run the boiler at maximum output for at least 10 minutes.
- ▶ Check the CO/CO<sub>2</sub> readings against the information in table 22 CO/CO<sub>2</sub> settings on page 42.

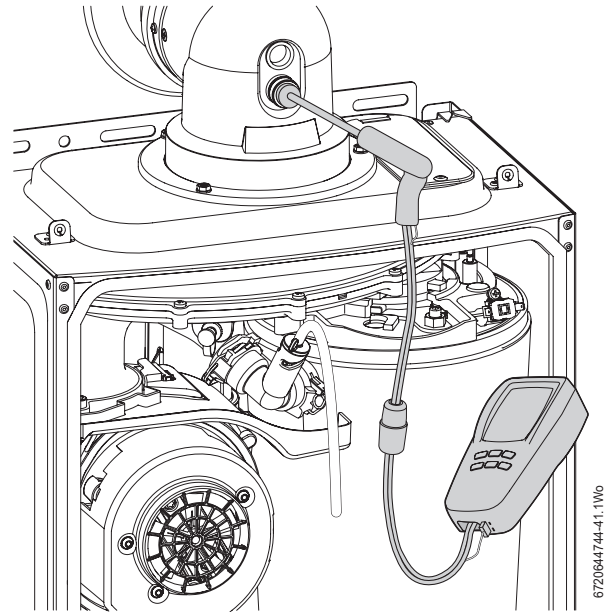


Fig. 62

If the boiler fails the combustion test, check:

1. Air intake for restriction
2. Diaphragm in the fan, for correct operation
3. Cleanliness of the heat cell, plus blockages in the condensate disposal.

## 6.6 SETTING THE AIR/GAS RATIO



**NOTICE:** THE SETTING OF THE GAS RATIO MUST BE CARRIED OUT BY A COMPETENT PERSON. SETTING OF THE GAS RATIO MUST NOT BE ATTEMPTED UNLESS THE PERSON CARRYING OUT THE TEST IS EQUIPPED WITH A COMBUSTION ANALYSER CONFORMING TO BS 7927 AND IS COMPETENT IN ITS USE.

### 6.6.1 SETTING THE CO/CO<sub>2</sub>

- ▶ Refer to section 6.2 and ensure that the gas inlet pressure is correct before continuing.
- ▶ To adjust the CO/CO<sub>2</sub> it will be necessary to first operate the boiler at maximum output.
- ▶ Refer to section 6.4 for setting the boiler to maximum and minimum output.
- ▶ Refer to table 22 and check the CO/CO<sub>2</sub> at maximum. If required set the maximum CO/CO<sub>2</sub> via adjuster (1) on the gas valve using a 2.5mm Allen key.
- ▶ Check CO is less than 200ppm.
- ▶ Set the control to minimum.
- ▶ The boiler will go to minimum power.
- ▶ Measure the CO/CO<sub>2</sub> and check against table 22. If required set the minimum CO/CO<sub>2</sub> via adjuster (2) on the gas valve until the correct measurement is set:
  - Remove dust cap with flat bladed screw driver.
  - Using a 4mm Allen key adjust CO<sub>2</sub>.
  - Replace the dust cap.
- ▶ Check that the CO is less than 200ppm.
- ▶ Return the boiler control to maximum and re-check the CO/CO<sub>2</sub>. If correct, set the boiler control to normal “NORM”.
- ▶ Re-fit the control cover
- ▶ Re-fit boiler outer case.

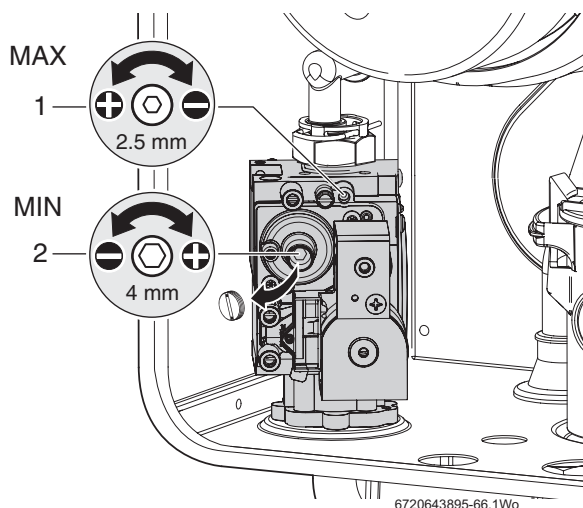


Fig. 63 Gas valve adjustment

### CO/CO<sub>2</sub> settings for Greenstar Ri

CO/CO<sub>2</sub> should be measured after 10 minutes.

Gas type	CO <sub>2</sub> max.	CO <sub>2</sub> min.
Natural gas 12 Ri	9.65% ± 0.5	8.65% ± 0.5
Natural gas 15/18/24 Ri	9.8% ± 0.5	9.2% ± 0.5
L.P.G.	11.0% ± 0.5	10.5% ± 0.5

**NOTE:** When checking an existing appliance the tolerance is ± 0.5.

If checking after cleaning or component replacement or for adjustment when the reading obtained is outside the tolerances given above, then the tolerance is ± 0.2.

**CO - less than 200 ppm (0.002 ratio)**

Tab. 22 CO/CO<sub>2</sub> settings

## 6.7 CLEANING THE HEAT EXCHANGER



**NOTICE: COMBUSTION TESTING**

- ▶ Combustion testing must be carried out by a competent person. Testing must not be attempted unless the person carrying out the combustion check is equipped with a Combustion Analyser conforming to BS 7927 and is competent in its use.



**NOTICE: CO/CO<sub>2</sub> CHECKS**

- ▶ If the joint between the Air/Gas manifold and heat exchanger is disturbed the sealing gasket must be replaced.
- ▶ After completing the service of the appliance, the CO/CO<sub>2</sub> must be checked and set to the limits shown in “Setting the air/gas ratio” on page 42.



There is a special accessory kit available specifically designed for cleaning the heat exchanger. If required order 7 716 192 312.

- ▶ Isolate the power to the appliance and remove outer case and base panel.

1. Refer to figure 64 and remove the clip from gas valve outlet.



If the plastic elbow can not be easily removed, undo the nut to push the plastic elbow out of the fitting.

2. Pull the gas outlet elbow free from the gas valve.

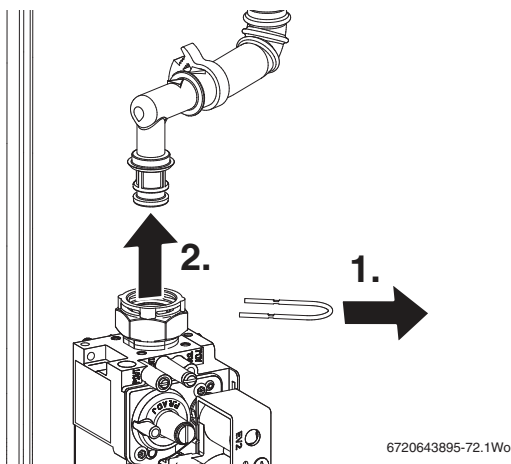


Fig. 64 Gas valve connection

- ▶ Remove electrical connector and earth wire from fan.



To prevent damage to the electrodes when removing the air/gas manifold, disconnect the leads to the electrodes.

- ▶ Disconnect spark electrode and flame sensor connections.

1. Refer to figure 65 and undo the securing nut on the top of the heat exchanger and remove the retaining plate assembly.

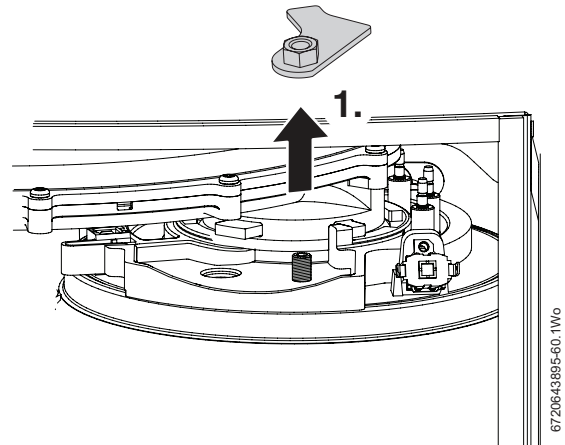


Fig. 65 Securing nut

1. Refer to figure 66 and rotate fan and air/gas manifold assembly around the top of the heat exchanger until it stops at the lug.

- ▶ Lift up assembly and remove from boiler.

2. Remove the cover panel by removing retaining screw.

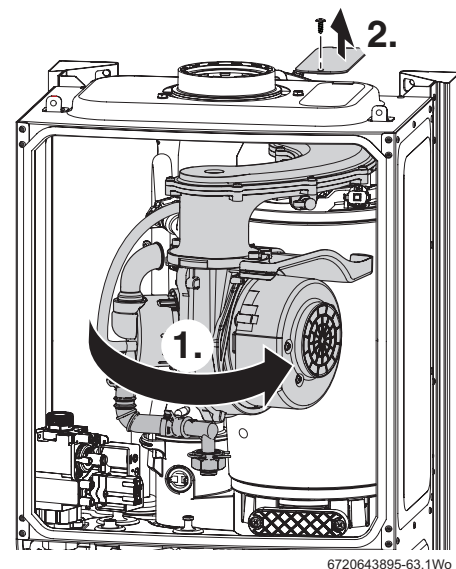


Fig. 66 Rotate air/gas manifold

**BURNER REMOVAL**

Refer to figure 67

1. Remove clamping plate.
2. Remove spark/flame electrode assembly and seal from the top of the heat exchanger.
3. Remove burner.

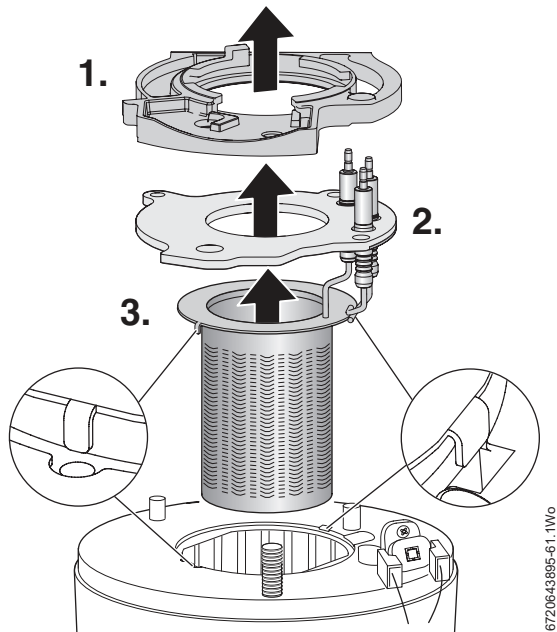


Fig. 67 Burner removal

**Checking and cleaning the electrode assembly:**

	<p><b>NOTICE:</b> Cleaning</p> <ul style="list-style-type: none"> <li>▶ Do not use wire wool to clean the electrodes</li> </ul>
--	---

- ▶ Inspect the condition of the electrodes and ceramics, replace if necessary.
- ▶ Use a plastic scouring pad to clean the electrodes.

**BAFFLE REMOVAL**

Refer to figure 68.

1. Remove top baffle.
2. Remove lower baffle.



If the lower baffle is stuck, it may be necessary to use the “Baffle removal tool” from the heat exchanger cleaning kit - 7 716 192 312, as shown in figure 68.

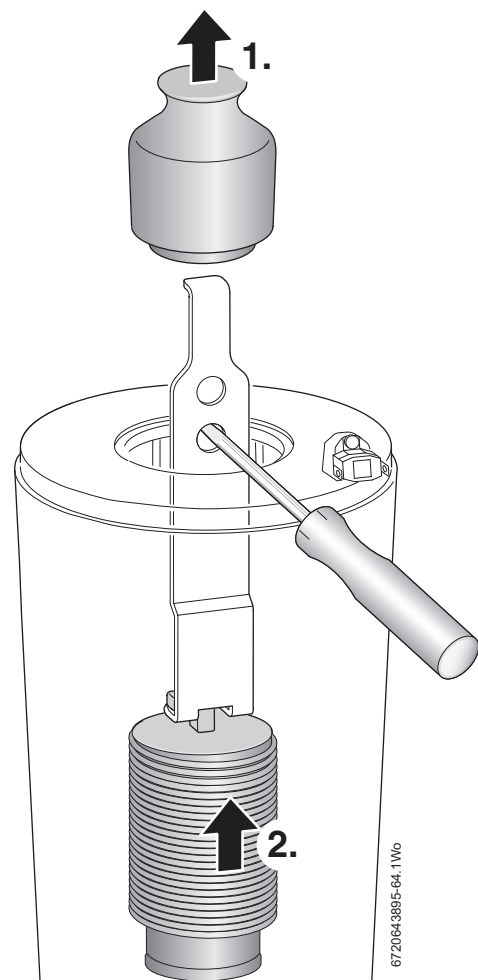


Fig. 68 Baffle removal

## ACCESS COVER REMOVAL

Refer to figure 69.

1. Remove the two pozi-drive screws
2. Remove the access cover
3. Remove the gasket.

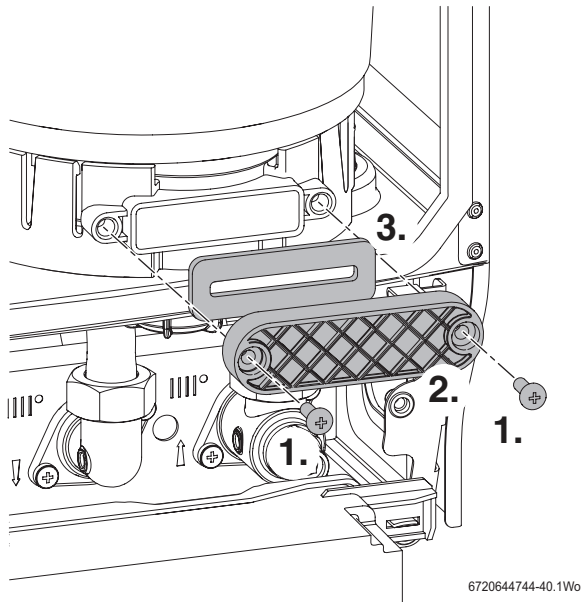


Fig. 69 Access cover removal

## CLEANING THE PRIMARY HEAT EXCHANGER

Refer to figure 70.

- ▶ Access the heat exchanger flue ways by inserting the cleaning brush (7 716 192 312) through the top access hole in the casing, removal of panel shown in figure 66.
- ▶ Clean heat exchanger flue ways using the cleaning brush removing any debris from the access point in the sump.
- ▶ Clean around the sealing surface on the sump.
- ▶ Replace the access cover.
- ▶ Using a suitable container to collect water from syphon connection at the base of the boiler flush heat exchanger with water.
- ▶ Re-assemble ensuring that the lower baffle (2) and the top baffle (1) are refitted correctly.
- ▶ Refer to figure 67 when re-fitting the burner to ensure that it fits centrally within the heat exchanger and location tabs are situated in location holes.
- ▶ Ensure that the seal is replaced with a new seal and ensure that the seal is correctly fitted.
- ▶ Check the syphon unit is clean before refitting to boiler.
- ▶ Reassemble and check combustion as stated in "SETTING THE AIR/GAS RATIO" section on page 42.



THE HEAT EXCHANGER DOES NOT HAVE TO BE REMOVED TO CLEAN.

The heat exchanger is shown removed from the boiler to illustrate cleaning more clearly.

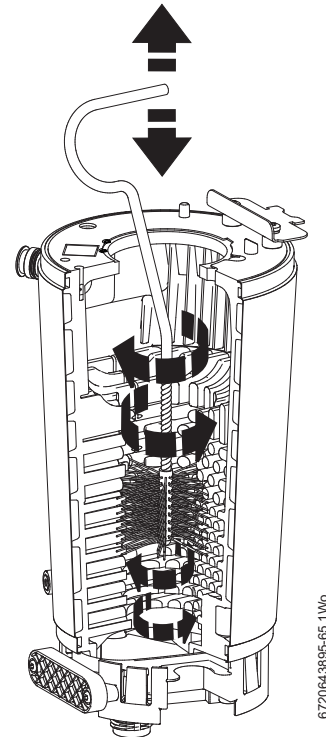


Fig. 70 Cleaning heat exchanger



**NOTICE:** Heat exchanger baffles.

The baffles (1) and (2) must be refitted into the heat exchanger in the order shown in figure 68. Failure to do so may result in damage to the boiler.



**NOTICE:** CO/CO<sub>2</sub> CHECKS

- ▶ If the joint between the Air/Gas manifold and heat exchanger is disturbed sealing gasket must be replaced.
- ▶ After completing the service of the appliance, the CO/CO<sub>2</sub> must be checked and set to the limits shown in "Setting the air/gas ratio" on page 42.
- ▶ When replacing the burner gasket ensure that the clamping plate is fully tightened down to the heat exchanger.

### 6.7.1 SYPHON REMOVAL AND CLEANING

---



Remove the syphon assembly to clean.

---

To release the syphon from the sump:

1. Undo the plastic nut on the bottom of the syphon and move the condensate pipe away from the syphon.
  2. Remove the two screws retaining the syphon bracket.
  3. Remove the bracket.
  4. Remove the screw and release the syphon retaining clamp
  5. Swing the clamp completely to the left away from the syphon
  6. Pull the syphon towards you and remove from the sump connection.
- ▶ Empty the contents of the syphon into a suitable container.
  - ▶ Flush the syphon through with clean water

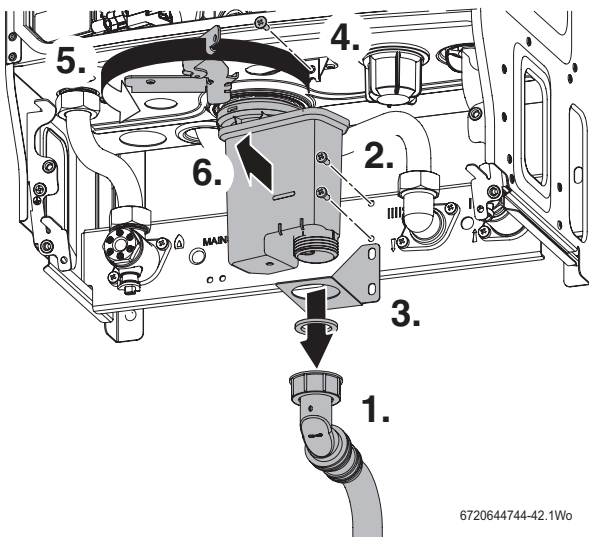


Fig. 71 Syphon removal

## 6.8 REPLACEMENT OF PARTS



**CAUTION:** TURN OFF THE GAS SUPPLY AND ISOLATE THE MAINS SUPPLIES BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS.



**NOTICE:** REPLACEMENT OF COMPONENTS.

- ▶ After replacement of any components always check for gas tightness where relevant and carry out functional checks as described in Commissioning. Damaged O-rings or gaskets must be replaced.

### 6.8.1 REMOVING THE OUTER CASING

- ▶ Remove bottom tray by pressing the tabs (2) in, at the front underside of the boiler.
- ▶ Lower the panel.
- ▶ Pull the panel forward, off the retaining ledge (1) at the back of the boiler.

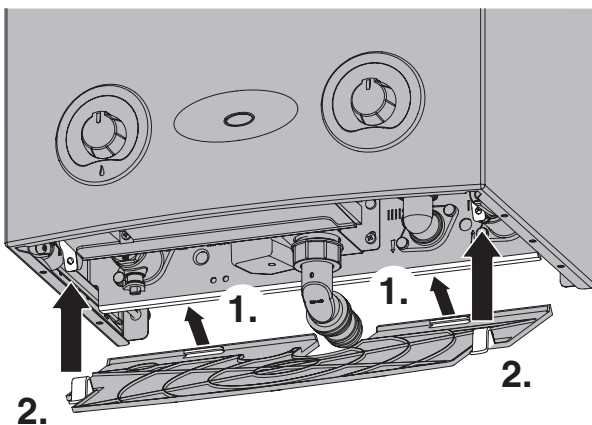


Fig. 72 Remove bottom panel

1. Undo the two screws securing the top of the boiler casing.
  2. Undo the two screws securing the bottom of the boiler casing.
- ▶ Pull case forward and remove.

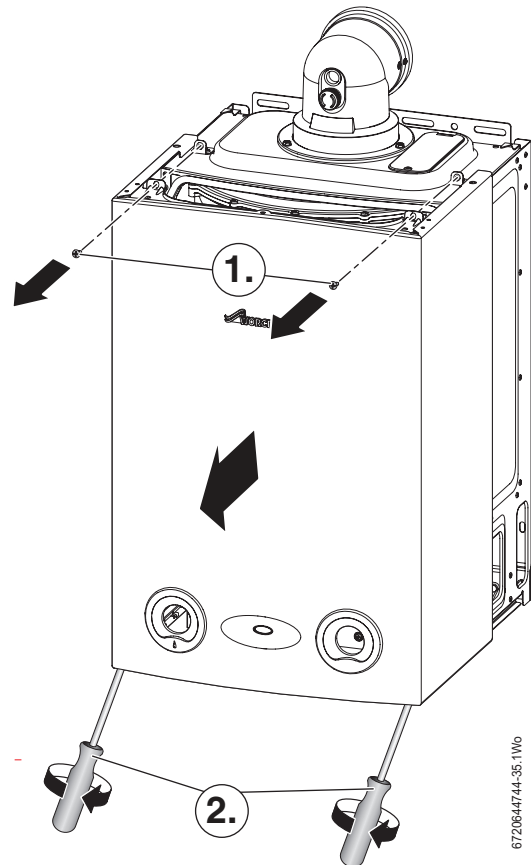


Fig. 73 Remove outer case

**6.8.2 PRIMARY SENSOR (CH NTC)**



To gain access to the following components the outer case has to be removed:

- ▶ Primary sensor
- ▶ Overheat thermostat
- ▶ Flue limit thermostat

Refer to figure 74 for removal.

1. Remove electrical connection by pulling upwards. Squeeze retaining clip on plastic moulding of sensor and pull back and up until clear of pocket in heat exchanger.
  2. Pull forward to remove completely.
- ▶ Coat new sensor with heat conductive paste and replace.

**6.8.3 OVERHEAT THERMOSTAT**

Refer to figure 74 for removal.

- ▶ Remove two electrical connectors from thermostat.
3. Slacken and remove fixing screw and thermostat (3).
- ▶ When replacing ensure thermostat sits correctly on surface of the casting with the left hand side of thermostat sitting up against the shoulder.



It is essential that the mating surface of the thermostat is coated with heat conductive paste.

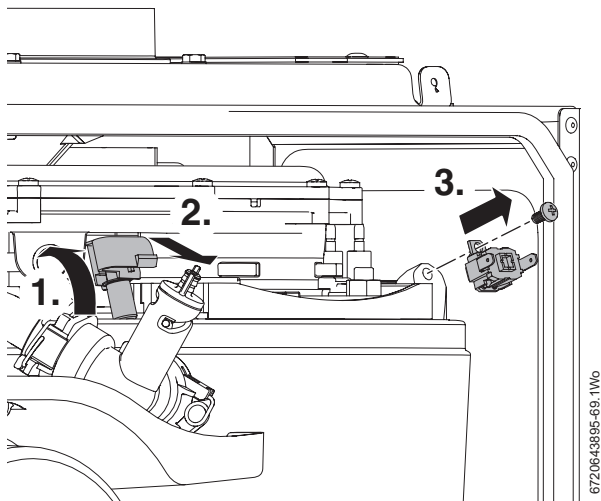


Fig. 74 Primary sensor and overheat thermostat

**6.8.4 FLUE OVERHEAT THERMOSTAT (WITH GROMMET)**

To remove and replace the thermostat either:

- ▶ Using a small terminal screwdriver, prise the thermostat and grommet from the plastic housing. Take care not to damage the plastic housing.

-or-

1. Release the flue connection from the sump.
2. Push the flue tube up.

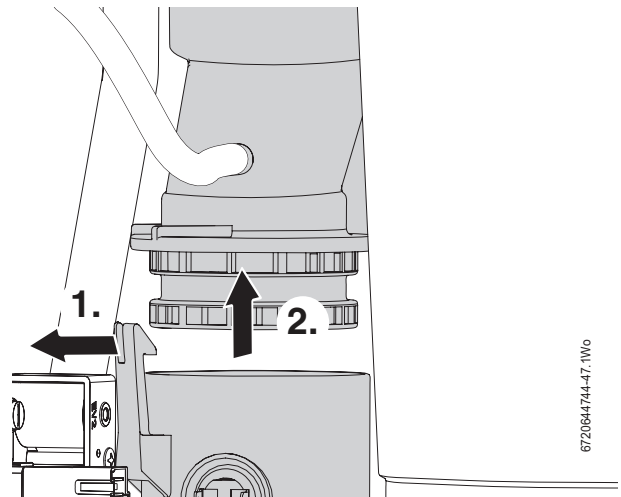


Fig. 75 Lower exhaust section

- ▶ Remove electrical connections.

1. Push the flue limit thermostat in from the sump.

- ▶ Retrieve the thermostat from the sump well.

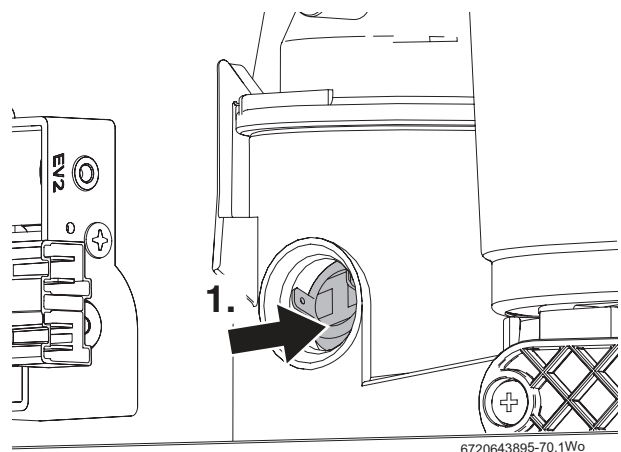


Fig. 76 Remove thermostat

To replace, push the thermostat and new grommet gently back into the opening until contact with the locating ridge is felt.



### 6.8.5 LOWERING THE BOILER CONTROLS TO THE SERVICE POSITION:

1. Remove two screws securing control.
2. Pull the control forward.
3. Lower the control to align the slots at the top of the control with the lugs on the boiler framework.
4. Hang control on two lugs on boiler framework.

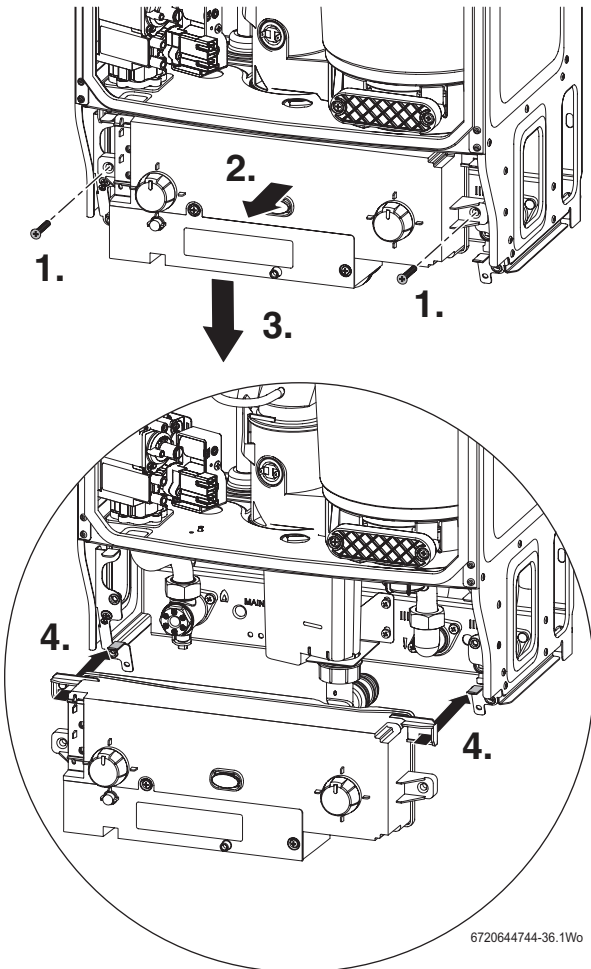


Fig. 77 Control panel into service position

### 6.8.6 GAS VALVE

Refer to figure 78

- ▶ Isolate gas supply at boiler gas cock.
1. Remove wire clip from the gas valve outlet.
  2. Pull the gas pipe free from the gas valve.  
If the pipe will not pull out, unscrew the nut to aid removal.

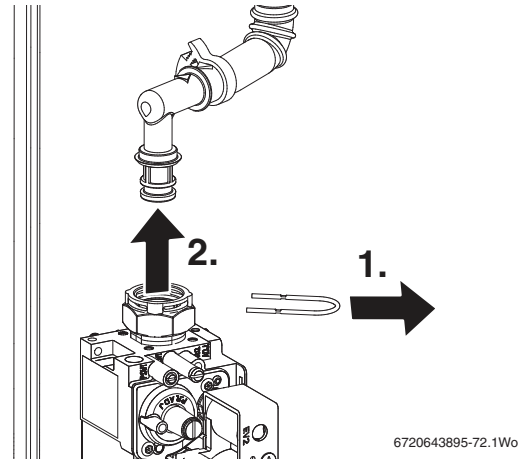


Fig. 78 Gas valve upper connection

Refer to figure 79

1. Undo bottom gas connection to gas valve.
  2. Undo two securing screws on the underside of casing.
- ▶ Disconnect electrical connections.
  - ▶ Pull valve up and forward out of boiler.
  - ▶ Replace valve with new seals and check for gas tightness.

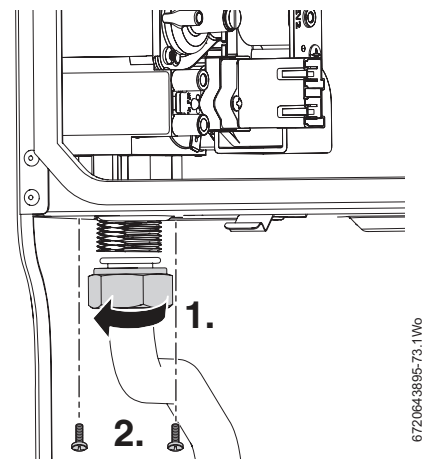


Fig. 79 Gas valve lower connection

**NOTICE:** The valve will require setting; follow procedure “Setting the air/gas ratio”.

6.8.7 AIR/GAS MANIFOLD AND FAN ASSEMBLY



The following components require the air/gas manifold and fan assembly to be removed:

- ▶ Fan electrode assembly
- ▶ Burner
- ▶ Heat exchanger



**NOTICE:**

- ▶ If the joint between the Air/Gas manifold and heat exchanger is disturbed sealing gasket must be replaced.
- ▶ After re-assembly the combustion must be checked using the procedure in the section "Setting the Air/Gas ratio". Measurement and setting (if necessary) of the gas ratio must not be attempted unless the person is equipped with a combustion analyser conforming to BS 7927 and is competent in its use.

- ▶ Remove electrical connector and earth wire the from fan.
- ▶ Remove wire clip from gas valve outlet then pull gas pipe free from the gas valve (see figure 78).

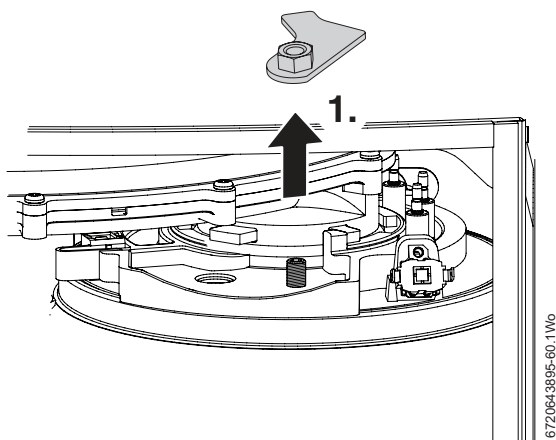


Fig. 80

- ▶ Undo the securing nut at the top of the heat exchanger and remove the retaining plate assembly (1).



Disconnect spark electrodes and flame sensor connection. This will prevent damage to the electrodes and sensor when the air/gas manifold is rotated.

- ▶ Rotate fan and air/gas manifold assembly (1.) around the top of the heat exchanger until the lug on the air/gas manifold is visible.

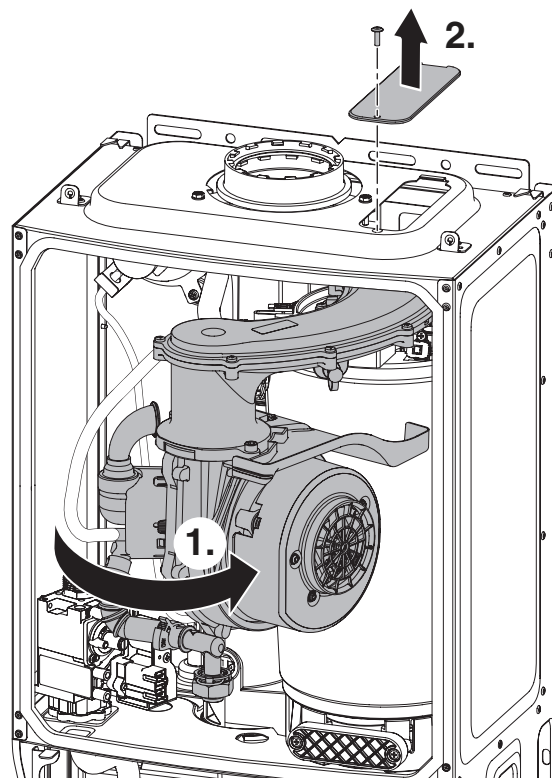


Fig. 81 Rotate the air/gas manifold assembly

- ▶ Lift up assembly and remove from boiler.



**NOTICE:** After re-assembly, check the CO/CO<sub>2</sub> levels as described in section 6.6 Setting the air/gas ratio.

**6.8.8 AIR PRESSURE SWITCH**



**NOTICE:** Pressure switch

- ▶ Ensure that the tube is reconnected to the pressure switch

1. Remove the electrical connections.
2. Slacken the top retaining screw and remove the bottom screw.
3. Disconnect the tube.
4. Remove the Air pressure switch assembly

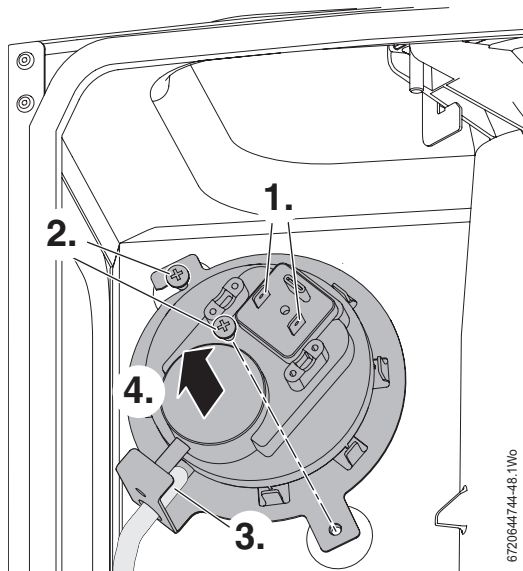


Fig. 82 Air pressure switch

1. Remove the two screws retaining the pressure switch to the bracket.
2. Refit the new Air pressure switch to the bracket.

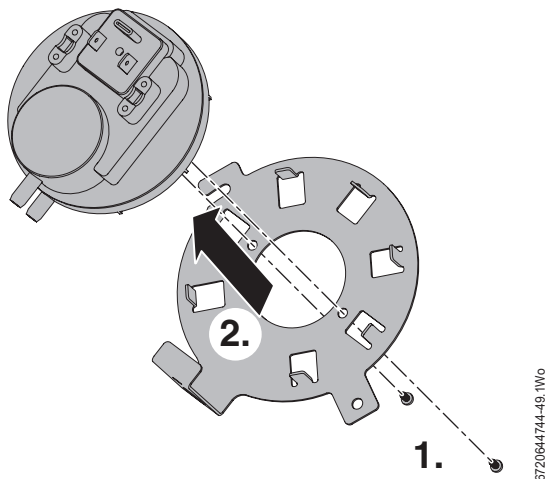


Fig. 83 Air pressure switch bracket



**NOTICE:** After re-assembly, check the CO/CO<sub>2</sub> levels as described in section 6.6 Setting the air/gas ratio.

**6.8.9 FAN**

- ▶ Remove the air/gas manifold from the boiler as described in the previous section.

1. Remove two screws retaining the fan to the air/gas manifold.
2. Remove the air/gas manifold.
3. Remove the screw holding the retaining plate.
4. Remove the retaining plate.
5. Remove three screws and the mixing chamber.

Re-assemble with new fan ensuring seals are correctly fitted.

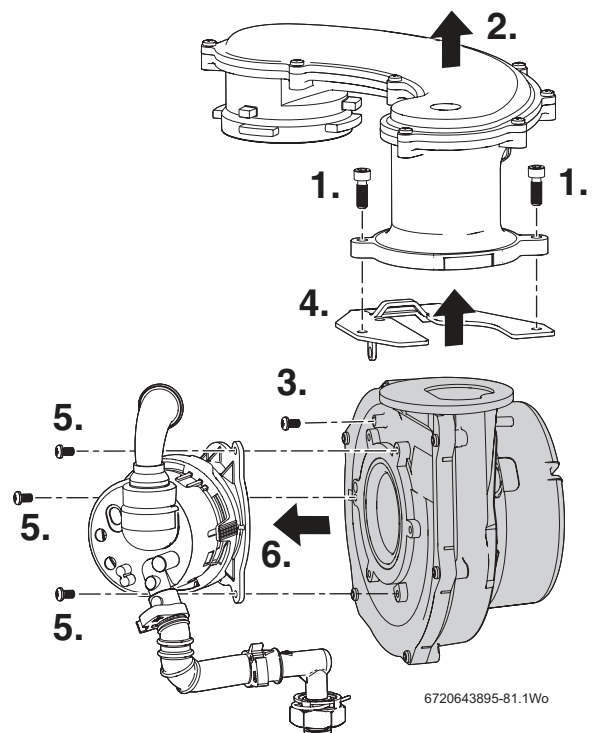


Fig. 84 Dismantling the air/gas manifold assembly

**FLAP VALVE ASSEMBLY**

1. Twist the mounting flange clockwise to release.
  2. Pull mounting flange off the flap valve assembly.
  3. Pull rubber flap off flap valve assembly.
- ▶ To replace the flap valve:
- Press the two lugs on the back of the flap into the two slots in the flap valve assembly.

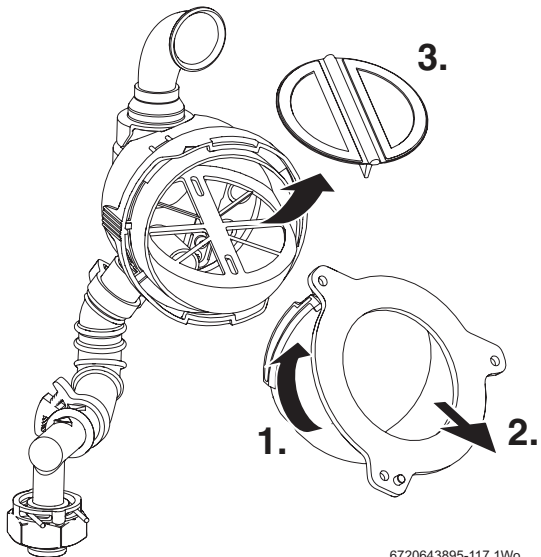


Fig. 85 Flap valve assembly

**6.8.10 ELECTRODE ASSEMBLY AND BURNER**

Refer to figure 86.

- ▶ Disconnect spark electrodes and flame sensor connection.
  - ▶ Remove clamping plate.
1. Remove spark/flame electrode assembly from heat exchanger.
  2. Remove the seal from the top of the heat exchanger.
  3. Remove the burner.
- ▶ Replace new burner in correct position.
  - ▶ Ensure that burner tabs, as shown in figure 86, fit correctly their respective locations.

	<p><b>NOTICE:</b> Heat exchanger seal</p> <ul style="list-style-type: none"> <li>▶ If the joint between the Air/Gas manifold and heat exchanger is disturbed sealing gasket must be replaced.</li> <li>▶ After re-assembly the combustion must be checked using the procedure in the section 6.6 “Setting the Air/Gas ratio”.</li> </ul>
--	--

- ▶ Ensure that the seal is fitted.

	<p><b>CAUTION:</b> Clamping plate</p> <ul style="list-style-type: none"> <li>▶ Ensure that the clamping plate is firmly tightened down on top of the heat exchanger.</li> </ul>
--	---

- ▶ Replace the clamping plate.

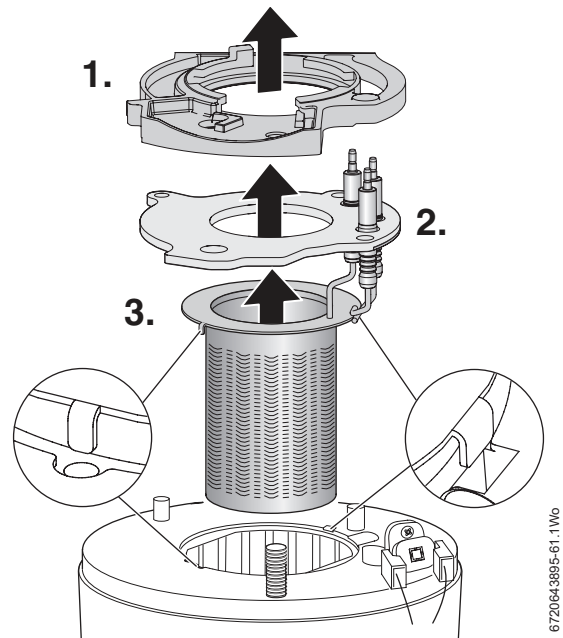


Fig. 86 Electrode assembly and burner

### 6.8.11 HEAT EXCHANGER

- ▶ Drain the system.
- ▶ Remove syphon.
- ▶ Remove the air/gas manifold and fan.

Refer to figure 87.

1. Remove the clip from plastic elbow on the flow pipe.
2. Pull flow pipe away from heat exchanger.

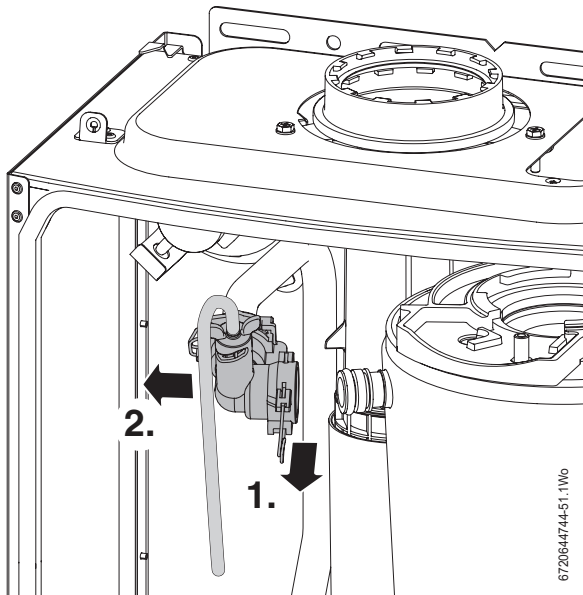


Fig. 87 Flow pipe removal

Refer to figure 88

1. Remove the three screws securing the turret to the top of the boiler.
2. Turn the upper exhaust connector anticlockwise to release from the hook.
3. Pull the upper exhaust connector down.

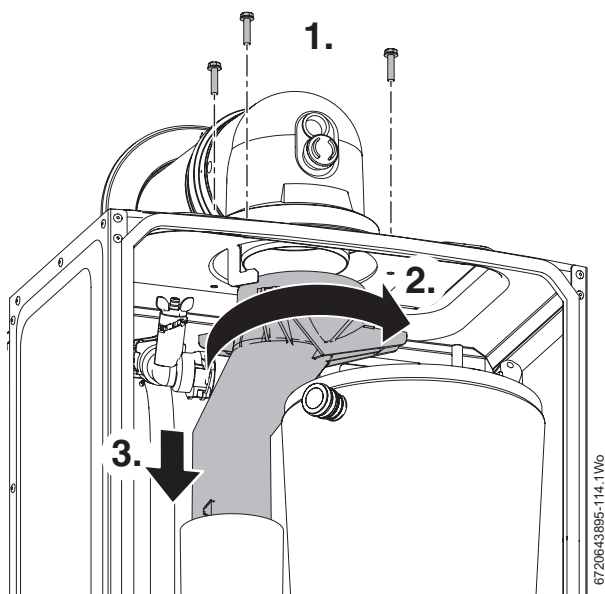


Fig. 88 Upper exhaust assembly

Refer to figure 89.

1. Release the clip.
  2. Move the lower exhaust connector up
- ▶ Remove the complete exhaust assembly.

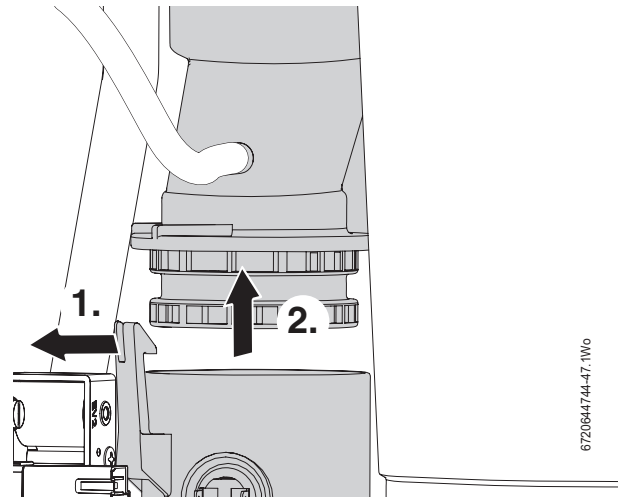


Fig. 89 Release lower exhaust connection

Refer to figure 90.

1. Unscrew the plastic nut.
2. Remove the nut from the bottom of the boiler.
3. Rotate lever to release the return pipe.

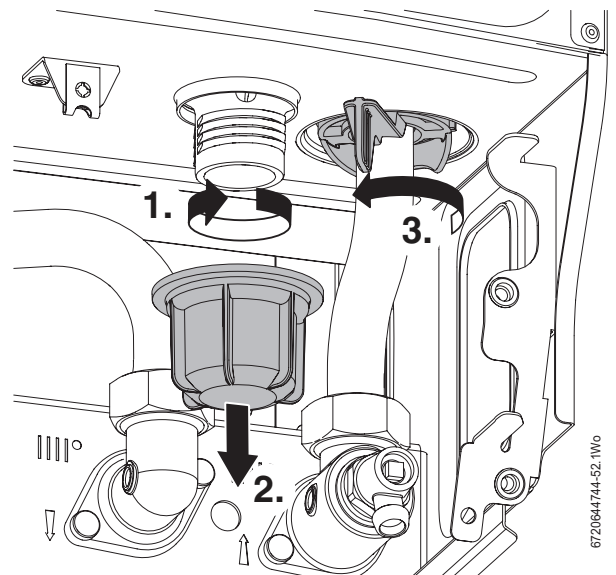


Fig. 90 Sump connections

Refer to figure 91.

1. Lift the heat exchanger up to clear.
2. Pull the heat exchanger forward from the case.

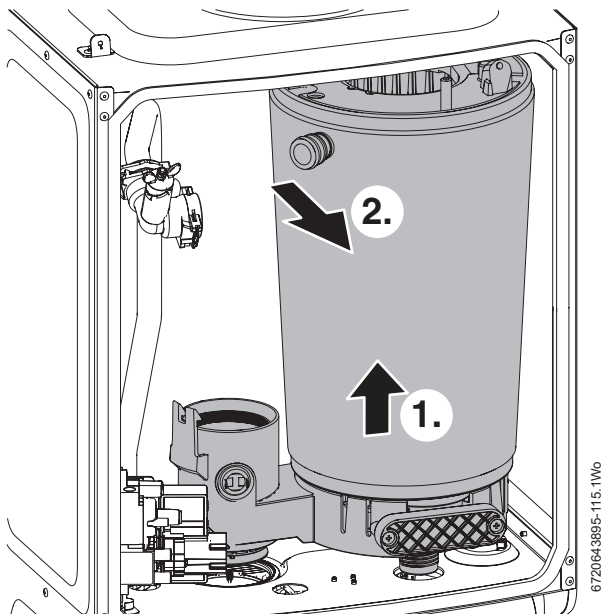


Fig. 91 Heat exchanger removal

- ▶ Reassemble and check combustion as stated in the air/gas ratio section. 6.6.

!

**NOTICE: CO/CO<sub>2</sub> CHECKS**

- ▶ If the joint between the Air/Gas manifold and heat exchanger is disturbed sealing gasket must be replaced.
- ▶ After completing the service of the appliance, the CO/CO<sub>2</sub> must be checked and set to the limits shown in "Setting the air/gas ratio" in section 6.6.

**6.8.12 ACCESS TO BOILER CONTROL COMPONENTS**

1. Remove three screws.
2. Remove cover from control.

**6.8.13 PCB FUSE**

- ▶ Remove fuse holder with fuse F1 (1) from the control and replace with a new fuse.



A spare 2A fuse for F1 clipped onto the inside of the cover.

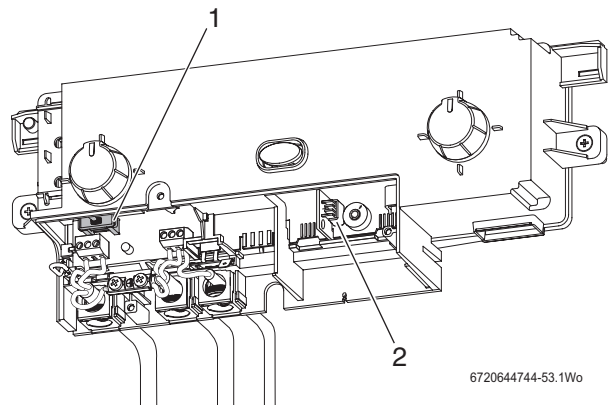
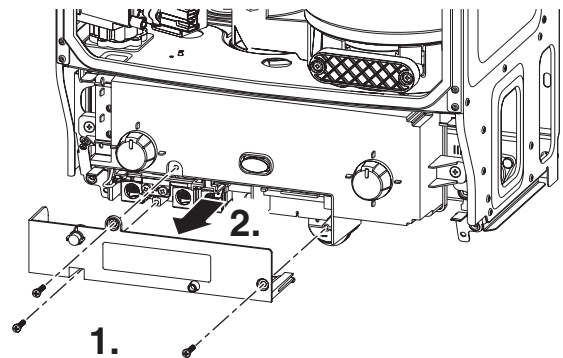


Fig. 92 Removing the connection cover

**6.8.14 CODE PLUG**

Refer to figure 92 for code plug replacement:

- ▶ Gently pull the code plug from the socket (2).
- ▶ The code plug should be left attached to the frame of the boiler by its plastic safety thread.

### 6.8.15 TRANSFORMER/PCB

To change either the PCB, F2 fuse or transformer:

- ▶ Remove two screws securing the control.
  - ▶ Pull the control forward.
  - ▶ Lower the control to align the slots at the top of the control with the lugs on the boiler framework.
  - ▶ Hang control on two lugs on boiler framework.
1. Unscrew the three screws in the control panel.
  2. Remove the connections cover and disconnect all electrical connections from the control.
  3. Remove the control from the boiler.
  4. Remove the four screws retaining the rear panel of the control.
  5. Remove the rear panel.
  6. Remove the transformer cover.

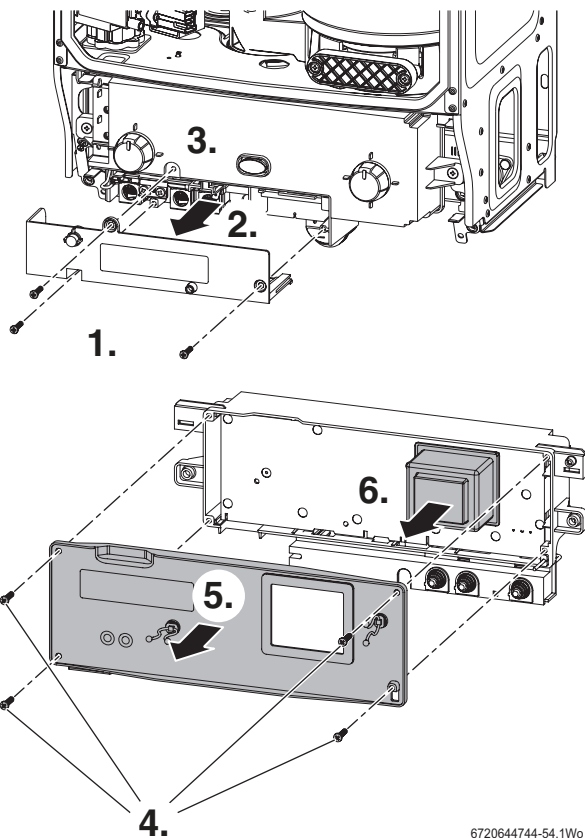


Fig. 93 Transformer/PCB access

7. Remove the printed circuit board.
  - ▶ Remove the code plug from the old control board.
  - ▶ Fit the code plug into the new control board.
  - ▶ Re-assemble in reverse order.

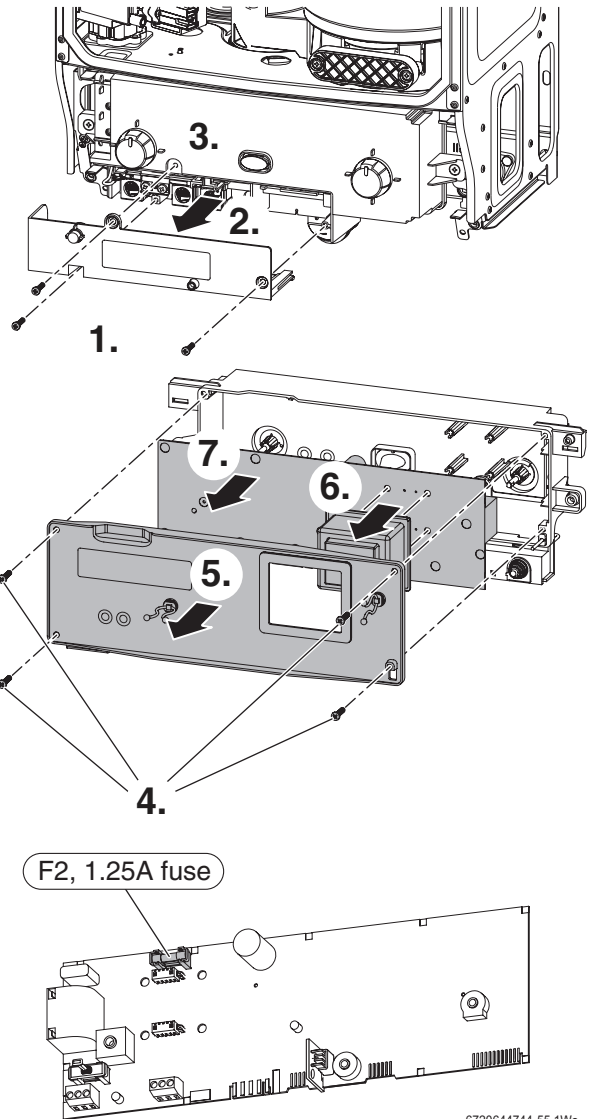


Fig. 94 Change PCB/Fuse location



**NOTICE: CODE PLUG**

- ▶ Ensure that the code plug is fitted to the new control.
- ▶ The appliance will indicate an error and will not function correctly.



**NOTICE: CO/CO<sub>2</sub>**

- ▶ After completing the service of the control, the CO/CO<sub>2</sub> must be checked and set to the limits shown in “Setting the air/gas ratio” in section 6.6.

### 6.8.16 SYPHON REMOVAL

To release the syphon from the sump:

1. Undo the plastic nut on the bottom of the syphon and move the condensate pipe away from the syphon.
2. Remove the two screws retaining the syphon bracket.
3. Remove the bracket.
4. Remove the screw and release the syphon retaining clamp
5. Swing the clamp completely to the left away from the syphon
6. Pull the syphon towards you and remove from the sump connection.

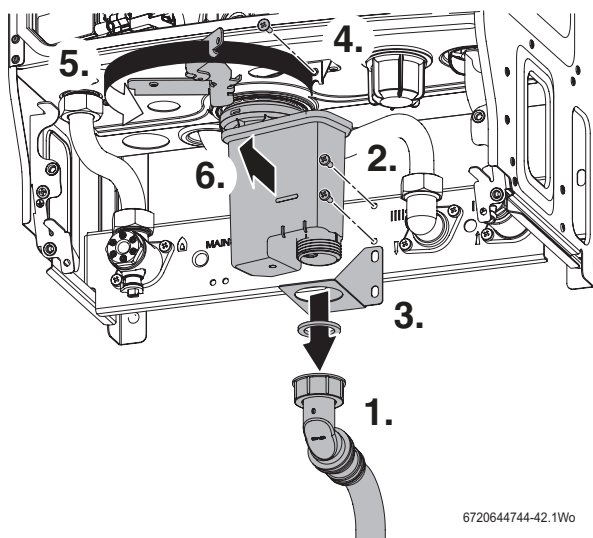
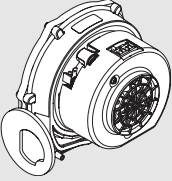
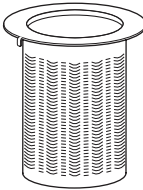
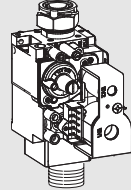
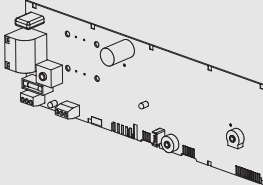
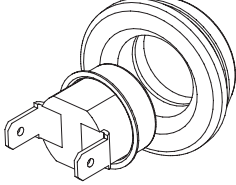
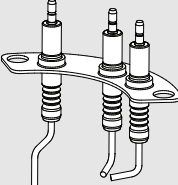
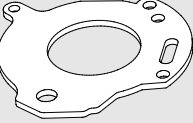
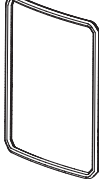
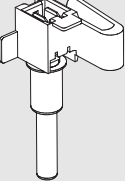
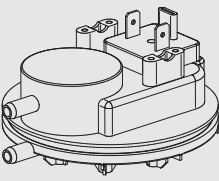
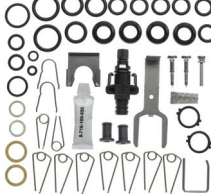
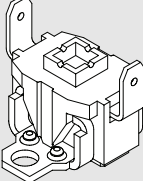

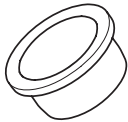



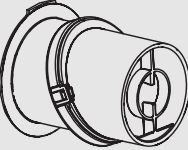
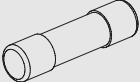
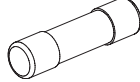


Fig. 95 Syphon removal



6.9 SHORT PARTS LIST

 <p>Fan 8 716 116 067 0 GC No. H26 536</p>	 <p>Burner 12 &amp; 15Ri: 8 718 120 616 0 GC No. H26 537 18 &amp; 24Ri: 8 716 120 619 0 GC No. H26-538</p>	 <p>Gas Valve 12/15/18 &amp; 24Ri 8 716 111 325 0 GC No. H26 540</p>
 <p>Control board 8 718 687 164 0 H26-541</p>	 <p>Flue overheat thermostat (grommet type) 8 710 506 267 0</p>	 <p>Electrodes (including gasket) 8 718 107 087 0</p>
 <p>Gasket - burner WB6 8 716 110 534 0</p>	 <p>Seal - Inner case/mantel 8 716 106 635 0 H26-545</p>	 <p>Flow temperature sensor - (NTC) 8 716 106 688 0 GC No. H26 542</p>
 <p>Air pressure switch 8 716 106 633 0 G.C. No. H26 543</p>	 <p>Seals kit 8 716 107 224 0 GC No. H10 876</p>	 <p>High limit stat 8 707 206 196 0 GC No. H26 584</p>
<p>Flue sample plug - vertical adapter 8 710 506 199 0</p> 	 <p>Flue sample plug - air intake 8 716 111 253 0</p>	 <p>Flue sample plug - gas outlet 8 716 111 252 0</p>
 <p>Sump gasket 8 716 113 829 0</p>	 <p>O ring - Syphon 8 716 113 851 0</p>	 <p>Terminal end 8 718 681 828 0</p>
 <p>Fuse F1 8 716 156 000 0 GC No. E27-716</p>	 <p>Fuse F2 8 716 156 001 0</p>	

Tab. 23

## 7 FAULT FINDING AND DIAGNOSIS

### 7.1 FAULT FINDING



This fault finding information is for guidance only. Worcester cannot be held responsible for costs incurred by persons not deemed to be competent.

The electronic control system for this boiler incorporates a blue central indicator. This normally confirms the permanent mains supply but, by flashing at different rates during a fault, provides a guide to the cause as listed.

This fault finding system assumes that the appliance has been operating normally until the time of failure (i.e. not a first installation error).

**PRELIMINARY CHECKS :** Preliminary electrical system checks are the first electrical checks to be carried out during a fault-finding procedure. On completion of the Service/Fault-Finding task which has required the breaking and remaking of electrical connections, check:

- (a) EARTH CONTINUITY,
- (b) SHORT CIRCUIT CHECK,
- (c) POLARITY and
- (d) RESISTANCE TO EARTH.

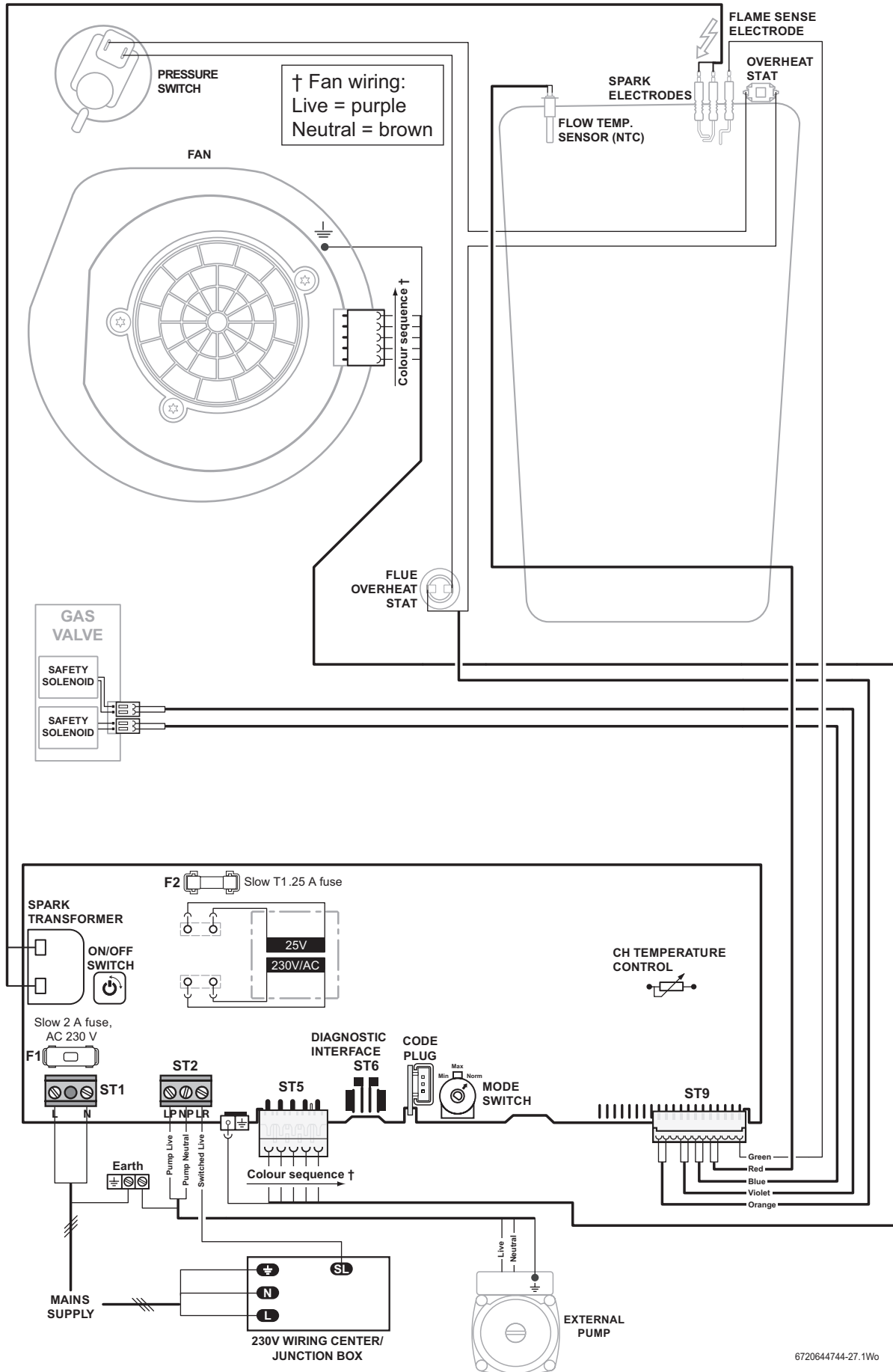
Blue light indication	Fault	Possible solution/check
No light	No power at control board	Permanent mains supply to boiler. Boiler mains switch ON. Fuse F1 - 2A Slow blow. Fuse F2 - 1.25A Anti-surge. Transformer (both coils below 100 Ω). Otherwise replace control board.
Light ON	Boiler ON but not operating during demand	Live demand at ST2 terminal L <sub>R</sub> - is there a demand? Manual bypass is open. If CH is working check HW controls If HW is working check CH controls (i.e. external diverter valve, frost stat, room stat/programmer). Otherwise replace board.
Slow flash (mostly off, flashes on)	Ignition lockout	<ul style="list-style-type: none"> <li>▶ Gas present and at correct pressure?</li> <li>▶ Gas valve                             <ul style="list-style-type: none"> <li>- Check that there is 35V d.c. to each solenoid</li> <li>- Check the resistance of each solenoid: Top solenoid = 380 Ω ± 10% (342 - 418 Ω) Bottom solenoid = 190 Ω ± 10% (171 - 209 Ω)</li> </ul> </li> <li>▶ Combustion CO<sub>2</sub> level.</li> <li>▶ Flue condition.                             <ul style="list-style-type: none"> <li>- Blocked flue?</li> </ul> </li> <li>▶ Blocked condensate pipe or frozen condensate.</li> <li>▶ Gas valve adjustment.</li> <li>▶ Ignition electrodes/harness/connections.                             <ul style="list-style-type: none"> <li>- Check for condition and resistance of leads (approximately 2100 Ω)</li> </ul> </li> <li>▶ Otherwise replace control board</li> </ul>

Tab. 24 Fault finding

Blue light indication	Fault	Possible solution/check
Slow flash (mostly on, flashes off)	Flue overheat	Flue temperature too high. ▶ Heat exchanger baffles removed and not refitted.
	Heat exchanger overheat	▶ Heat exchanger blocked ▶ Water pressure ▶ All air vented ▶ Pump/harness/connections. ▶ Water leaks/blockage ▶ Safety thermostats/low voltage wiring harness/connections ▶ Otherwise replace control board
	Flue pressure switch	Blockage in the flue system.
Fast flash	Volatile lockout (sensor, fan or code plug)	▶ Temperature sensors – Check condition and continuity of leads – Check resistance of sensor (8k - 20k $\Omega$ ) ▶ Fan – 230V a.c. across the live (purple) and neutral (brown) ▶ Fan lead – Check continuity ▶ Code plug – Is code plug missing or not inserted properly.
2 pulses		Service mode switch in min. position
5 pulses		Service mode switch in max. position

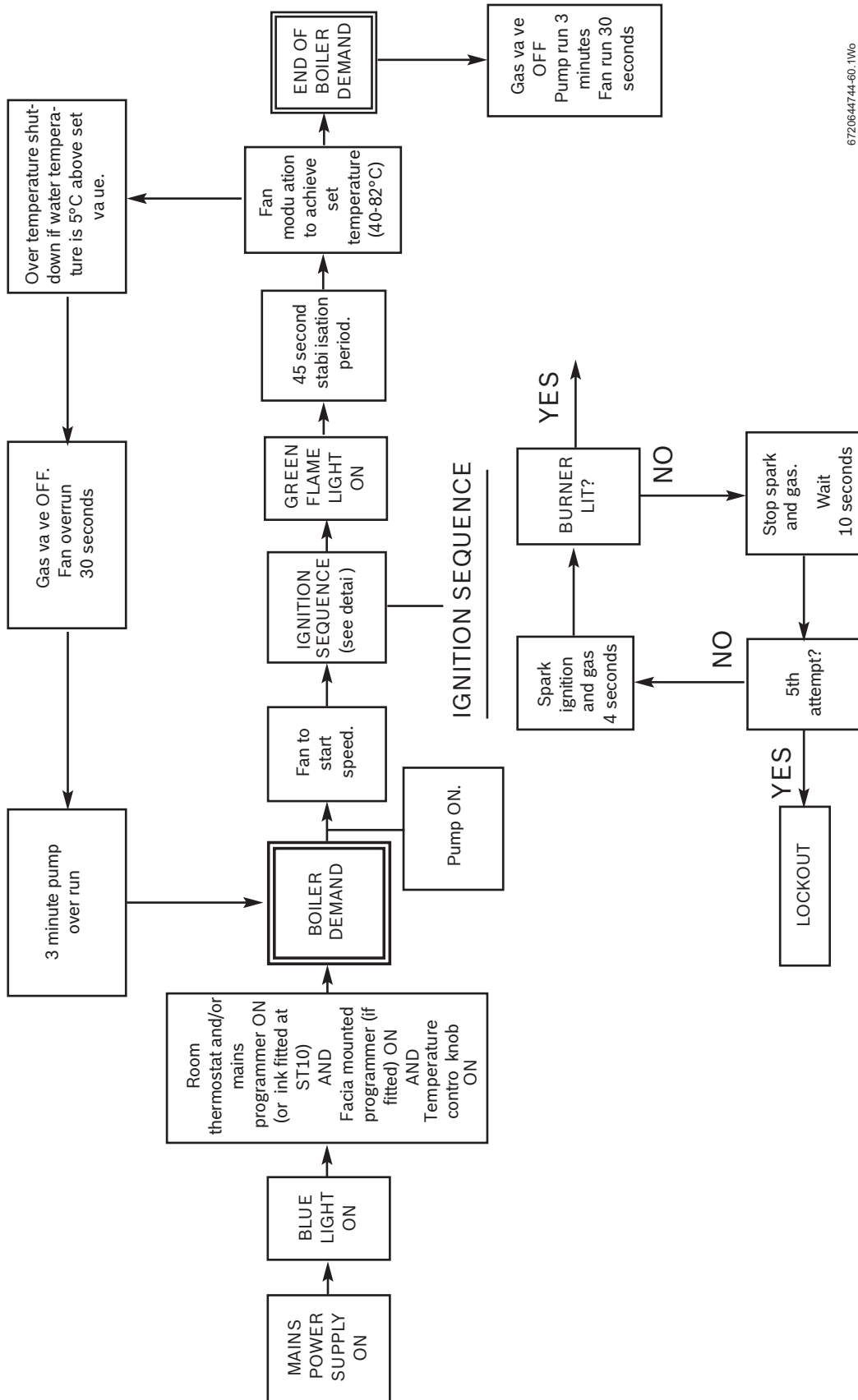
Tab. 24 Fault finding

7.1.1 INTERNAL WIRING DIAGRAM



6720644744-27.1W6

7.2 BOILER FUNCTION

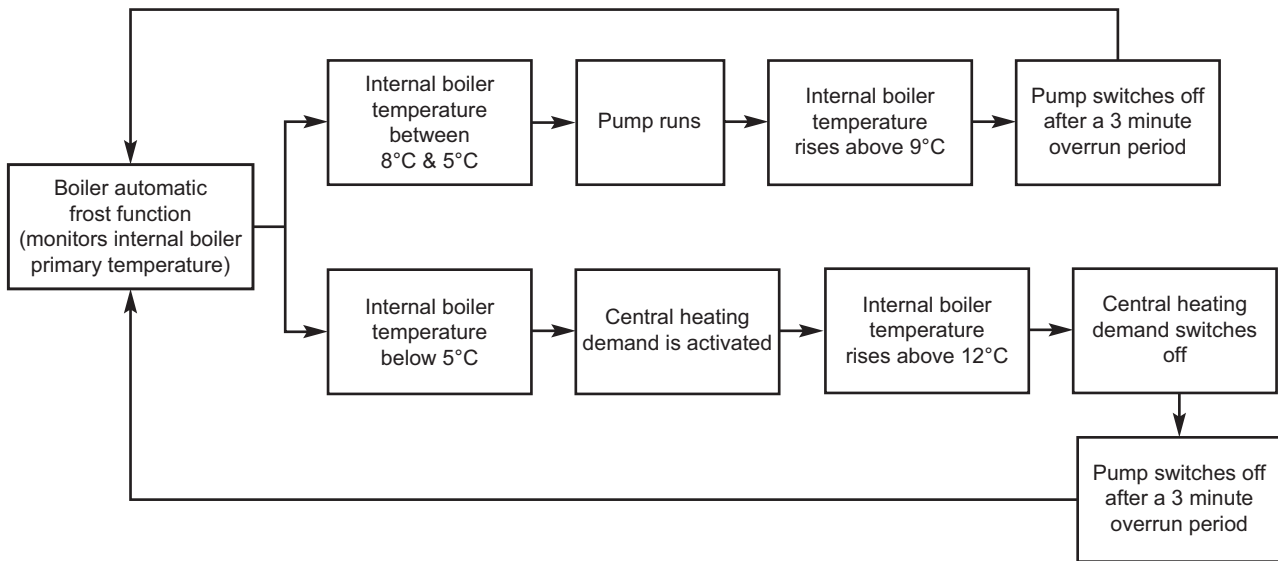


6720644744-60.1W0

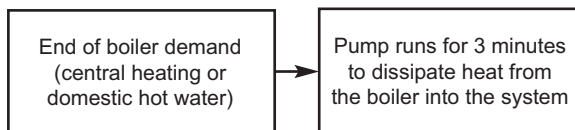
Fig. 96 Boiler function

### 7.3 PROTECTION FUNCTION

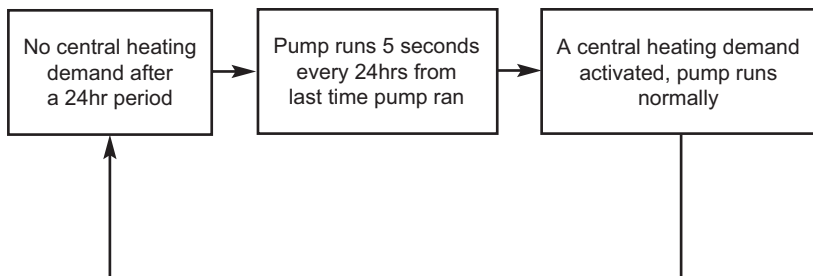
#### AUTOMATIC INTERNAL FROST FUNCTION



#### PUMP OVERRUN FUNCTION



#### PUMP ANTISEIZE FUNCTION



6720643895-111.1Wo

Fig. 97 Protection function

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# NOTES

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## NOTES





# Service Record

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

## Service Provider

Before completing the appropriate Service Record below, please ensure you have carried out the service as described in the manufacturer's instructions.

Always use the manufacturer's specified spare part when replacing controls.

### Service 1

Date: \_\_\_\_\_

Engineer Name: \_\_\_\_\_

Company Name: \_\_\_\_\_

Telephone No. \_\_\_\_\_

Gas Safe Register No. \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Signature: \_\_\_\_\_

### Service 2

Date: \_\_\_\_\_

Engineer Name: \_\_\_\_\_

Company Name: \_\_\_\_\_

Telephone No. \_\_\_\_\_

Gas Safe Register No. \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Signature: \_\_\_\_\_

### Service 3

Date: \_\_\_\_\_

Engineer Name: \_\_\_\_\_

Company Name: \_\_\_\_\_

Telephone No. \_\_\_\_\_

Gas Safe Register No. \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Signature: \_\_\_\_\_

### Service 4

Date: \_\_\_\_\_

Engineer Name: \_\_\_\_\_

Company Name: \_\_\_\_\_

Telephone No. \_\_\_\_\_

Gas Safe Register No. \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Signature: \_\_\_\_\_

### Service 5

Date: \_\_\_\_\_

Engineer Name: \_\_\_\_\_

Company Name: \_\_\_\_\_

Telephone No. \_\_\_\_\_

Gas Safe Register No. \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Signature: \_\_\_\_\_

### Service 6

Date: \_\_\_\_\_

Engineer Name: \_\_\_\_\_

Company Name: \_\_\_\_\_

Telephone No. \_\_\_\_\_

Operative ID No. \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Signature: \_\_\_\_\_

### Service 7

Date: \_\_\_\_\_

Engineer Name: \_\_\_\_\_

Company Name: \_\_\_\_\_

Telephone No. \_\_\_\_\_

Gas Safe Register No. \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Signature: \_\_\_\_\_

### Service 8

Date: \_\_\_\_\_

Engineer Name: \_\_\_\_\_

Company Name: \_\_\_\_\_

Telephone No. \_\_\_\_\_

Gas Safe Register No. \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Signature: \_\_\_\_\_

### Service 9

Date: \_\_\_\_\_

Engineer Name: \_\_\_\_\_

Company Name: \_\_\_\_\_

Telephone No. \_\_\_\_\_

Gas Safe Register No. \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Signature: \_\_\_\_\_

### Service 10

Date: \_\_\_\_\_

Engineer Name: \_\_\_\_\_

Company Name: \_\_\_\_\_

Telephone No. \_\_\_\_\_

Gas Safe Register No. \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Signature: \_\_\_\_\_

# GAS BOILER SYSTEM COMMISSIONING CHECKLIST

This Commissioning Checklist is to be completed in full by the competent person who commissioned the boiler as a means of demonstrating compliance with the appropriate Building Regulations and then handed to the customer to keep for future reference.

Failure to install and commission according to the manufacturer's instructions and complete this Benchmark Commissioning Checklist will invalidate the warranty. This does not affect the customer's statutory rights.

Customer Name \_\_\_\_\_ Telephone Number \_\_\_\_\_

Address \_\_\_\_\_

Boiler Make and Model \_\_\_\_\_

Boiler Serial Number \_\_\_\_\_

Commissioned by (print name) \_\_\_\_\_ Gas Safe Register Number \_\_\_\_\_

Company Name \_\_\_\_\_ Telephone Number \_\_\_\_\_

Company Address \_\_\_\_\_

Commissioning Date \_\_\_\_\_

## To be completed by the customer on receipt of a Building Regulations Compliance Certificate\*:

Building Regulations Notification Number (if applicable) \_\_\_\_\_

## CONTROLS Tick the appropriate boxes

Time and Temperature Control to Heating Room Thermostat and Programmer/Timer  Programmable Room Thermostat  Load/Weather Compensation  Optimum Start Control

Time and Temperature Control to Hot Water Cylinder Thermostat and Programmer/Timer  Combination Boiler

Heating Zone Valves Fitted  Not Required

Hot Water Zone Valves Fitted  Not Required

Thermostatic Radiator Valves Fitted  Not Required

Automatic Bypass to System Fitted  Not Required

Boiler Interlock Provided

## ALL SYSTEMS

The system has been flushed and cleaned in accordance with BS7593 and boiler manufacturer's instructions Yes

What system cleaner was used? \_\_\_\_\_

What inhibitor was used? \_\_\_\_\_ Quantity  litres

## CENTRAL HEATING MODE Measure and Record:

Gas Rate  m<sup>3</sup>/hr OR  ft<sup>3</sup>/hr

Burner Operating Pressure (if applicable)  mbar OR Gas Inlet Pressure  mbar

Central Heating Flow Temperature  °C

Central Heating Return Temperature  °C

## COMBINATION BOILERS ONLY

Is the installation in a hard water area (above 200ppm)? Yes  No

If yes, and if required by the manufacturer, has a water scale reducer been fitted? Yes  No

What type of scale reducer has been fitted? \_\_\_\_\_

## DOMESTIC HOT WATER MODE Measure and Record:

Gas Rate  m<sup>3</sup>/hr OR  ft<sup>3</sup>/hr

Burner Operating Pressure (at maximum rate)  mbar OR Gas Inlet Pressure (at maximum rate)  mbar

Cold Water Inlet Temperature  °C

Hot water has been checked at all outlets Yes  Temperature  °C

Water Flow Rate  l/min

## CONDENSING BOILERS ONLY

The condensate drain has been installed in accordance with the manufacturer's instructions and/or BS5546/BS6798 Yes

If the condensate pipe terminates externally has the pipe diameter been increased and weatherproof insulation fitted? Yes

## ALL INSTALLATIONS

If required by the manufacturer, record the following CO<sub>2</sub>  % OR CO  ppm OR CO/CO<sub>2</sub> Ratio

The heating and hot water system complies with the appropriate Building Regulations Yes

The boiler and associated products have been installed and commissioned in accordance with the manufacturer's instructions Yes

The operation of the boiler and system controls have been demonstrated to and understood by the customer Yes

The manufacturer's literature, including Benchmark Checklist and Service Record, has been explained and left with the customer Yes

Commissioning Engineer's Signature \_\_\_\_\_

Customer's Signature \_\_\_\_\_

(To confirm satisfactory demonstration and receipt of manufacturer's literature)

\*All installations in England and Wales must be notified to Local Authority Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer.



**WORCESTER, BOSCH GROUP:**

TECHNICAL SUPPORT:	0844 892 3366
APPOINTMENTS:	0844 892 3000
SPARES:	01905 752571
LITERATURE:	0844 892 9800
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SALES:	01905 752640

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6 720 644 744b (2011/08)



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