

# GREENSTAR 12i System / 24i System

WALL HUNG RSF GAS-FIRED CONDENSING BOILER

FOR SEALED CENTRAL HEATING SYSTEMS AND INDIRECT FED

DOMESTIC HOT WATER



THE APPLIANCE IS FOR USE WITH  
NATURAL GAS OR L.P.G. (Cat II 2H3P TYPE C13 & C33)

NATURAL GAS:

WORCESTER GREENSTAR 12i System GC NUMBER 41-311-67

WORCESTER GREENSTAR 24i System GC NUMBER 41-311-68

LIQUID PETROLEUM GAS:

WORCESTER GREENSTAR 12i System GC NUMBER 41-311-69

WORCESTER GREENSTAR 24i System GC NUMBER 41-311-70

GB/IE

**INSTRUCTION MANUAL**  
**INSTALLATION, COMMISSIONING**  
**& SERVICING**

 **WORCESTER**  
Bosch Group

 **benchmark**

## CONTACT INFORMATION

### WORCESTER BOSCH:

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### WATER TREATMENT:

FERNOX 01799 550811  
[www.fernox.com](http://www.fernox.com)

SENTINEL 0151 420 9595  
[www.betzdearborn.com/sentinel](http://www.betzdearborn.com/sentinel)

### FLUE TERMINAL GUARD:

TOWER FLUE COMPONENTS  
VALE RISE  
TONBRIDGE  
TN9 1TB

**STORE THE APPLIANCE IN A DRY  
AREA PRIOR TO INSTALLATION.**

#### LIFTING AND CARRYING PRECAUTIONS:

- Lift only a manageable weight, or ask for help.
- When lifting the boiler, bend the knees, and keep the back straight and feet apart.
- Do not lift and twist at the same time.
- Lift and carry the boiler close to the body
- Wear protective clothing and gloves to protect from any sharp edges

## INSTALLATION & SERVICING INSTRUCTIONS

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

THESE INSTRUCTIONS ARE APPLICABLE TO THE WORCESTER BOSCH 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 COMPETENT PERSON. FAILURE TO INSTALL CORRECTLY COULD LEAD TO PROSECUTION.

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

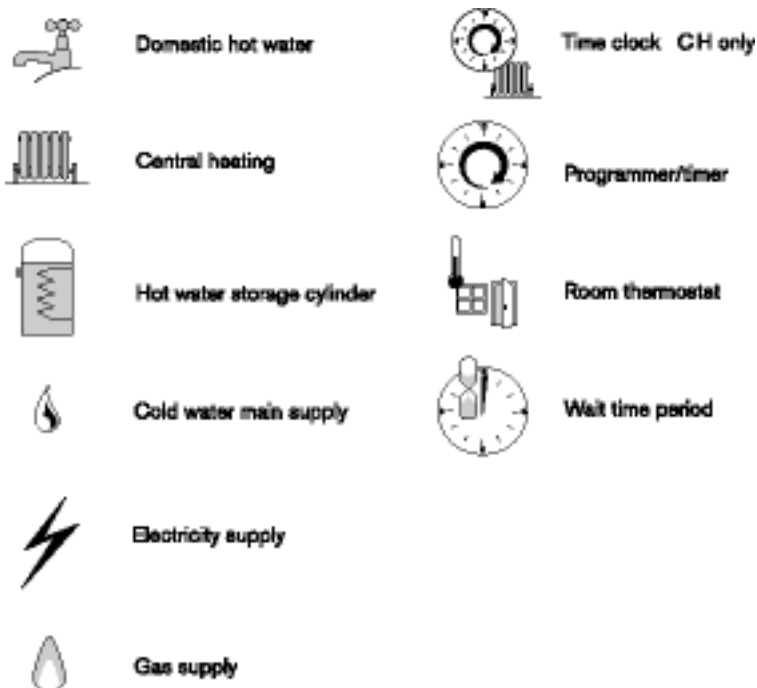
DISTANCE LEARNING AND TRAINING COURSES ARE AVAILABLE FROM WORCESTER BOSCH.

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

#### ABBREVIATIONS USED IN THIS MANUAL:

Ø Diameter  
NG Natural Gas  
LPG Liquid Petroleum Gas  
CH Central Heating  
DHW Domestic Hot Water  
IP Ingress Protection  
SEDBUK Seasonal Efficiency of Domestic Boilers in the United Kingdom

#### SYMBOLS USED IN THIS MANUAL:



## SAFETY & REGULATIONS

SAFETY PRECAUTIONS & SYMBOLS	3
INSTALLATION REGULATIONS	3

## APPLIANCE INFORMATION

GENERAL INFORMATION	4
TECHNICAL DATA	5
LAYOUT & COMPONENTS	6-7

## PRE-INSTALLATION

CLEANING PRIMARY SYSTEMS	8
MAINS SUPPLY	9
WATER SYSTEMS & PIPEWORK	10
CONDENSATE PIPEWORK	11
PRESSURE RELIEF PIPEWORK	12
BOILER LOCATION & CLEARANCES	13-14
PLUMBING MANIFOLD	15
FLUE TERMINAL POSITIONS	16
FLUE OPTIONS	17

## INSTALLATION

UNPACKING THE WALL FRAME	18
WALL MOUNTING TEMPLATE / FLUE OPENING	19
UNPACKING THE APPLIANCE	20
BOILER CONNECTIONS	21-22
FLUE INSTALLATION	23-25
CONDENSATE CONNECTION	26
ELECTRICAL	27
POSITION OF WIRED COMPONENTS	28

## COMMISSIONING

PRE-COMMISSIONING CHECKS	29
FILLING THE SYSTEM	30
STARTING THE APPLIANCE	31
WATER TREATMENT	32
COMMISSIONING	33
FINISHING COMMISSIONING	34

## SERVICING & SPARES

INSPECTION AND SERVICE	35-40
REPLACEMENT OF PARTS	41-50
SETTING THE GAS /AIR RATIO	51
SHORT PARTS LIST	52

## CONVERSION KITS

L.P.G. CONVERSION	53-54
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## FAULT FINDING & DIAGNOSIS

FAULT FINDING	55
CH FUNCTION	56
PROTECTION FUNCTION	57

ADDITIONAL INSTRUCTIONS FOR FITTING OPTIONAL DIVERTER VALVE CAN BE FOUND AT THE REAR OF THIS MANUAL

## SAFETY PRECAUTIONS

IF YOU SMELL GAS:

- X **DON'T** SMOKE OR STRIKE MATCHES
- X **DON'T** TURN ELECTRICAL SWITCHES ON OR OFF
- ✓ **DO** PUT OUT NAKED FLAMES
- ✓ **DO** OPEN DOORS AND WINDOWS
- ✓ **DO** KEEP PEOPLE AWAY FROM THE AREA AFFECTED
- ✓ **DO** TURN OFF THE CONTROL VALVE AT THE METER
- ✓ **DO** CALL YOUR GAS COMPANY



A Benchmark Checklist is provided by the manufacturer for the installer to complete including their **CORGI** registration number to confirm that the boiler has been installed, commissioned and serviced according to the manufacturer's instructions.

**IMPORTANT:** The completed Benchmark Checklist will be required in the event of any warranty work and may be required by the local Building Control Inspector.

### HEALTH & 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).

### COMBUSTIBLE 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, such as halogenated hydrocarbons containing chlorine or fluorine compounds can corrode the appliance and invalidate any warranty.

### FITTING & MODIFICATIONS

Fitting the appliance and any controls to the appliance may only be carried out by a competent engineer in accordance with the Gas Safety (Installation and Use) Regulations 1998.

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 engineer (such as British Gas or CORGI registered personnel) using approved spares, 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

Gas Safety (Installation & Use) Regulations 1998:  
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:

The relevant British Standards should be followed, including:

BS7074:1 : Code of practice for domestic and hot water supply

BS6891 : Installation of low pressure gas pipework up to 28mm (R1)

BS5546 : Installation of gas hot water supplies for domestic purposes

EN:12828 : 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

BS 6798 : Installation of gas fired boilers of rated input up to 70kW (net)

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

L.P.G. Installation:

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 buildings:

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.

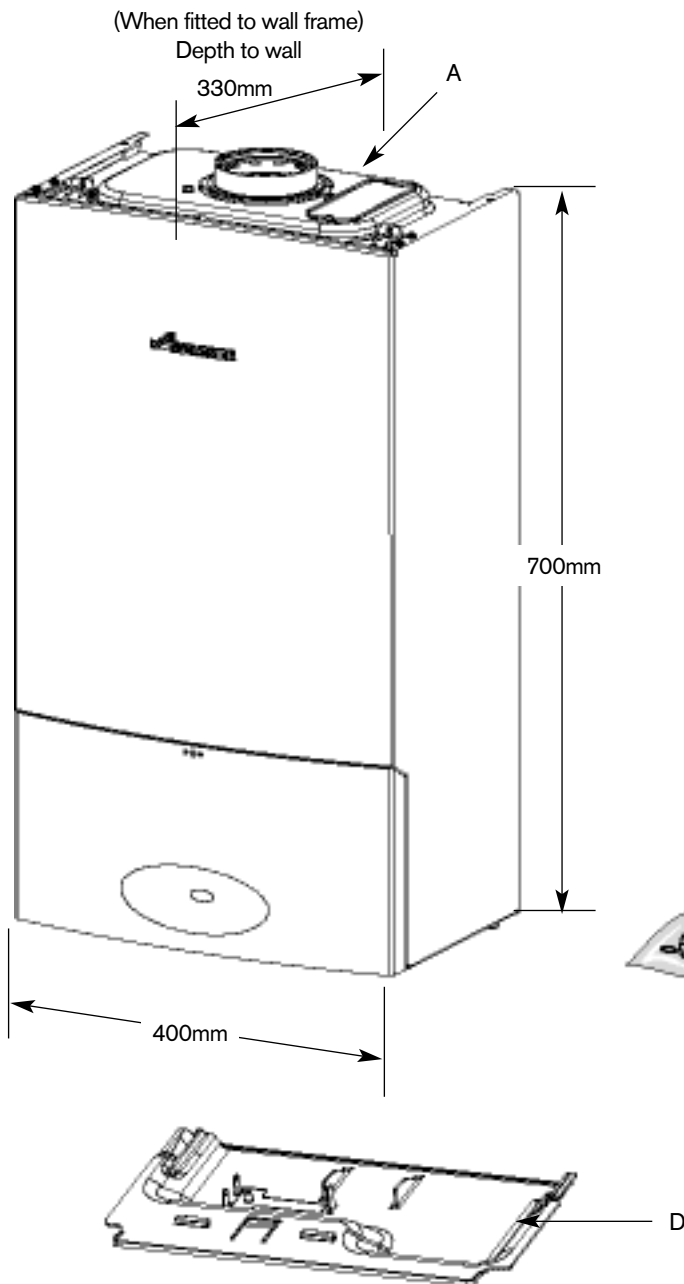
Potable water:

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.

## GENERAL INFORMATION

### STANDARD PACKAGE:

- A - Wall hung gas fired condensing boiler for central heating and indirect domestic hot water
- B - Boiler support frame/pre-plumbing jig
- C - Hardware literature pack
- D - Bottom Panel



### SPECIFICATIONS:

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

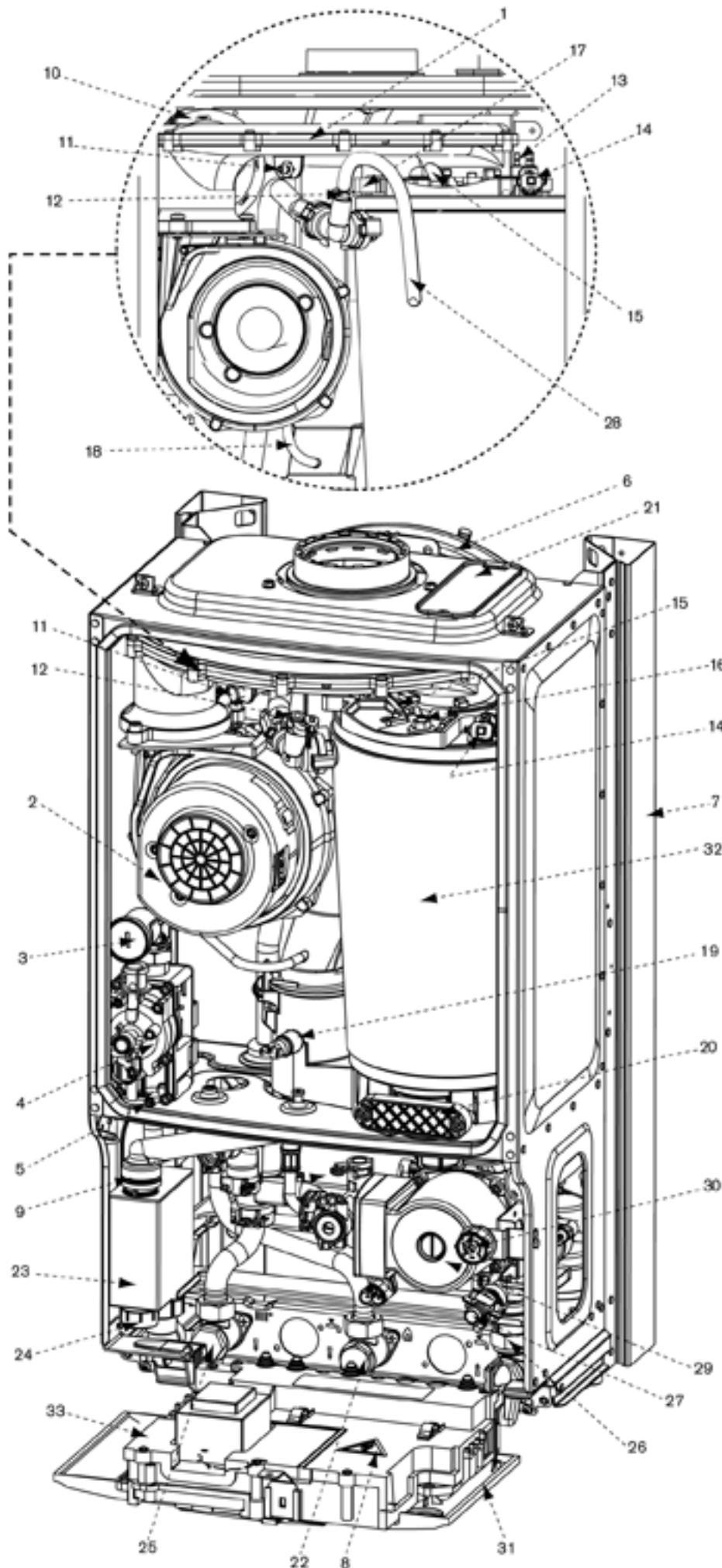
# TECHNICAL DATA

APPLIANCE  
INFORMATION

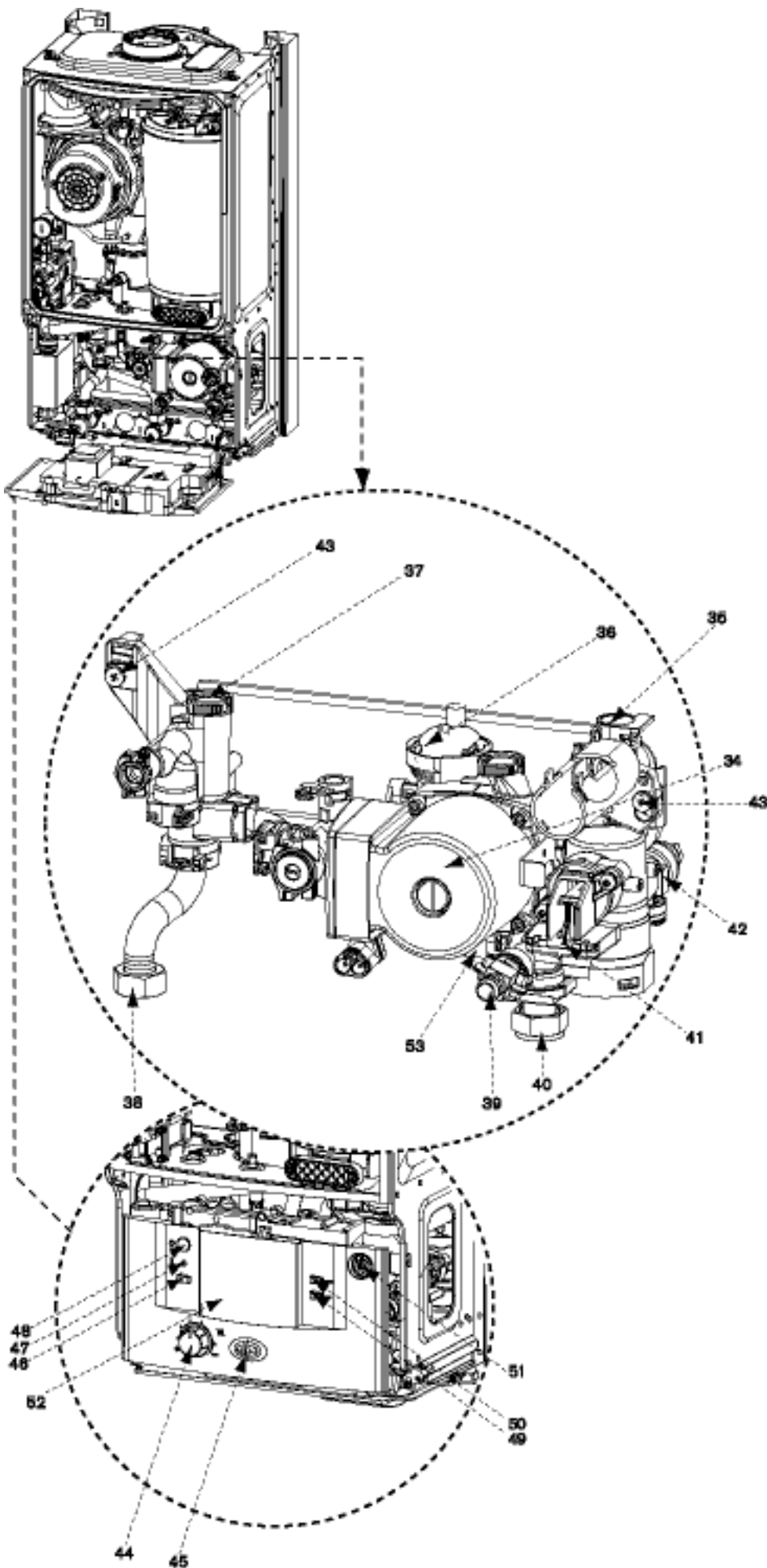
DESCRIPTION	UNITS	NATURAL GAS		L.P.G.	
		12i System	24i System	12i System	24i System
Gas flow rate - Max. 10 minutes from lighting					
Natural Gas G20	m3/h	1.33	2.67	-	-
Propane Gas (LPG)	kg/h	-	-	0.46	1.91
Central Heating					
Max. rated heat input	KW	12.32	24.62	12.32	24.62
Min. heat input	KW	3.70	7.38	5.95	9.64
Max. rated heat output 40/30°C	KW	12.85	25.67	25.67	25.67
Max. rated heat output 50/30°C	KW	12.74	25.45	12.74	25.45
Max. rated heat output 80/60°C	KW	12	24	12	24
Max. flow temperature	°C	82	82	82	82
Min. output	°C	4.0	7.90	6.37	10.3
Max. flow temperature to cylinder (when used with integral optional diverter valve)	°C	75	75	75	75
Max. permissible operating pressure	bar	2.5	2.5	2.5	2.5
Available pump head at 21°C system temperature rise	m	2.0	2.0	2.0	2.0
Flue					
Flue Gas Temp. 80/60°C, rated/min. load	°C	62/56	78/63	62/57	79/64
Flue Gas Temp. 40/30°C, rated min. load	°C	41/33	54/35	43/35	55/38
CO <sub>2</sub> level at max. rated heat output	%	9.8	9.8	11.0	11.0
CO <sub>2</sub> level at min. rated heat output	%	9.2	9.2	10.5	10.5
NOx - class		5	5	5	5
Condensate					
Max. condensation rate	l/h	0.93	2.0	0.93	2.0
pH value, approx.		4.8	4.8	4.8	4.8
Electrical					
Electrical power supply voltage	AC...V	230	230	230	230
Frequency	Hz	50	50	50	50
Max. power consumption	W	140	140	140	140
General Data					
SEDBUK	band	A	A	A	A
Appliance protection rating	IP	X4D	X4D	X4D	X4D
Permissible ambient temperatures	°C	0-50	0-50	0-50	0-50
Nominal capacity of appliance	ltr	3.9	3.9	3.9	3.9
Noise output level (Max central heating)	dB(A)	42	42	42	42
Packaged boiler weight	kg	44.4	44.4	44.4	44.4
Total boiler weight	kg	39.5	39.5	39.5	39.5
Lift weight	kg	27.1	27.1	27.1	27.1
SEDBUK	%	90.1	90.2	91.4	92.0

## LAYOUT & COMPONENTS

The diagram opposite shows the controls in the servicing position and excludes the outer case.



- 1 AIR / GAS MANIFOLD
- 2 FAN
- 3 AIR / GAS ADJUSTMENT SCREW
- 4 GAS VALVE
- 5 INLET PRESSURE TEST POINT
- 6 EXPANSION VESSEL
- 7 WALL MOUNTING FRAME
- 8 COVER FOR EXTERNAL WIRING CONNECTIONS
- 9 CONDENSATE CONNECTION FROM HEAT EXCHANGER
- 10 FLUE PRESSURE SWITCH
- 11 FAN PRESSURE TEST POINT
- 12 MANUAL VENT POINT
- 13 IGNITION AND FLAME SENSE ELECTRODES
- 14 OVERHEAT THERMOSTAT
- 15 FLAME VIEWING MIRROR
- 16 SECURING NUT, AIR / GAS MANIFOLD CLAMP
- 17 SENSOR - BOILER FLOW
- 18 FLUE AIR PRESSURE SWITCH CONNECTION
- 19 FLUE OVERHEAT THERMOSTAT
- 20 ACCESS POINT FOR CLEANING HEAT EXCHANGER/SUMP
- 21 REMOVABLE TOP CASE PANEL FOR SERVICING
- 22 GAS INLET CONNECTION 22mm COMPRESSION
- 23 TRAP / SYPHON
- 24 TRAP / SYPHON OUTLET CONNECTION ( 22mm PLASTIC PIPE)
- 25 FLOW
- 26 RETURN
- 27 DRAIN POINT
- 28 SILICONE TUBE (USE TO VENT AIR FROM HEAT EXCHANGER)
- 29 PUMP
- 30 SYSTEM PRESSURE GAUGE
- 31 CONTROL PANEL IN SERVICE POSITION
- 32 HEAT EXCHANGER
- 33 ACCESS COVER FOR TRANSFORMER & PCB



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:N)



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

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

## CLEANING PRIMARY SYSTEMS

**IMPORTANT:** 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:

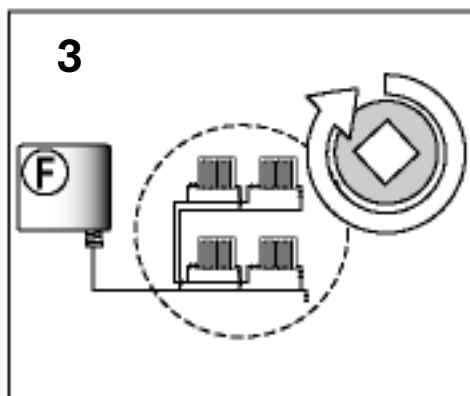
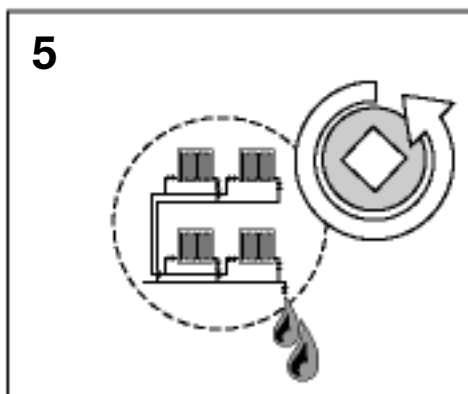
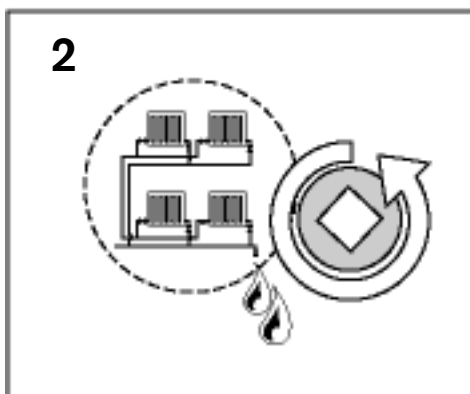
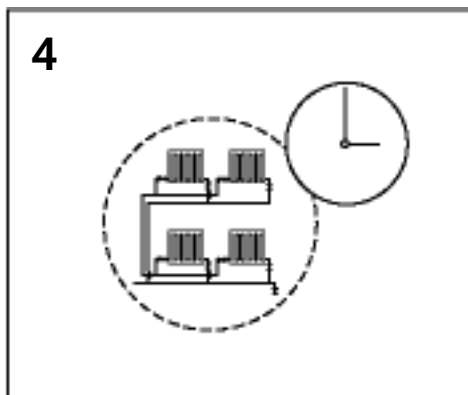
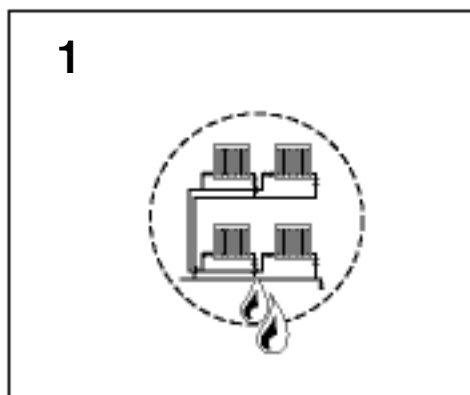
ENSURE THE SYSTEM AND PIPEWORK IS IN GOOD WORKING ORDER

KEEP THE EXISTING BOILER/ CIRCULATING PUMP WHERE POSSIBLE OR USE A POWER FLUSHING MACHINE TO AID THE CLEANSING PROCEDURE BEFORE INSTALLING A NEW BOILER.

### CLEANING THE PRIMARY SYSTEM:

- 1 Fill the system with cold water and check for leaks.
- 2 Open all drain cocks and drain the system.
- 3 Close drain cocks and add a suitable flushing agent at the correct strength for the system condition in accordance with the manufacturer's instructions.
  - ▶ Circulate the flushing agent before the boiler is fired up.
- 4 Run the boiler/system at normal operating temperature as directed by the manufacturer of the flushing agent.
- 5 Drain and thoroughly flush the system to remove the flushing agent and debris.

PRE-  
INSTALLATION



### KEY



Valve



Flushing  
Agent

## MAINS SUPPLY

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### ELECTRIC SUPPLY:

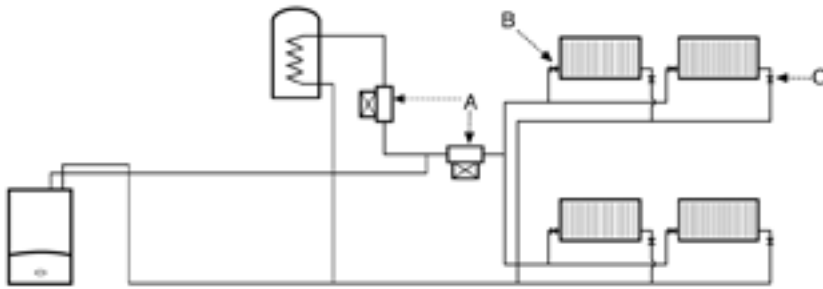
- Supply: 230V - 50Hz, 50 watts not including pump.
- Cable: PVC insulated 0.75mm<sup>2</sup> (24 x 0.2mm) temperature rated to 90°C.
- External 3A fuse to BS1362.
- The appliance must be earthed.
- IPX4D.
- All pipes to the boiler must be cross-bonded.
- Mains supply to the boiler and system wiring centre must be through one common fused double pole isolator situated adjacent to the appliance.
- Wiring must comply with IEE wiring regulations and any local regulations which may apply to fixed wiring to a stationary appliance.
- Any system connected to the boiler must not have a separate electrical supply.



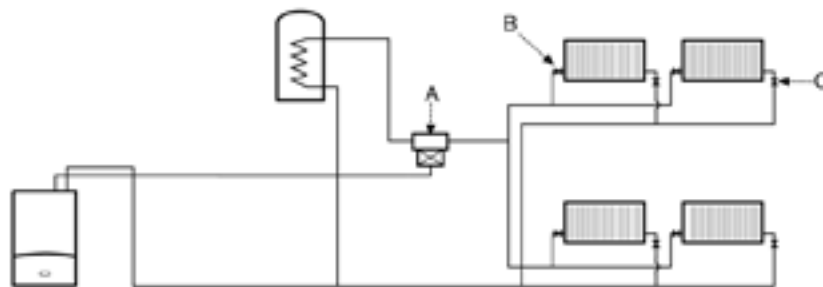
### GAS SUPPLY:

- Boilers using NG must be connected to a governed meter.
- LPG boilers must be connected to a regulator.
- Installation and connection of the gas supply to the boiler must be in accordance with BS6891.
- Under no circumstances should the size of the gas supply pipe be less than that of the appliance inlet connection.
- The meter or regulator and pipework to the meter must be checked, preferably by the gas supplier, to ensure it 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.

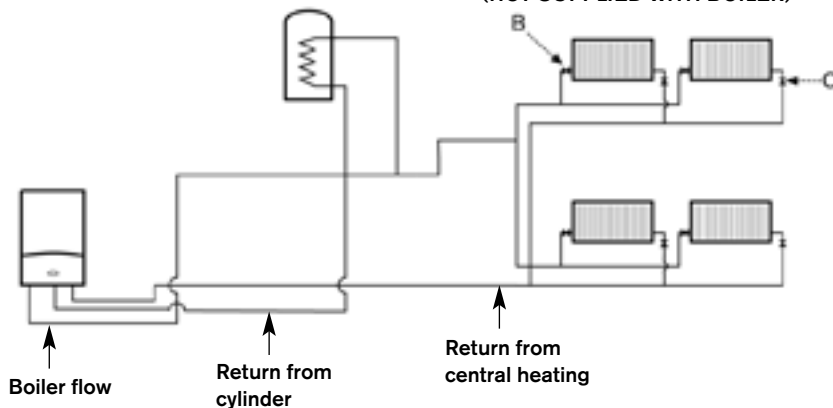
S PLAN LAYOUT



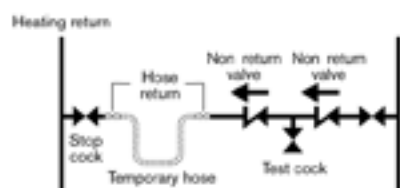
Y PLAN LAYOUT  
WITH EXTERNAL DIVERTER VALVE



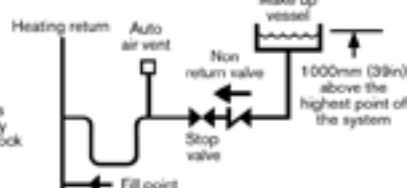
SYSTEM LAYOUT  
WITH OPTIONAL INTERNAL DIVERTER VALVE FITTED  
(NOT SUPPLIED WITH BOILER)



SYSTEM FILL



SYSTEM MAKE UP



## PLASTIC PIPEWORK & UNDER FLOOR HEATING:

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

## 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.
- On new installations TRV's must be used on all radiators except where a room thermostat is sited. On all installations they should at least be fitted in the sleeping areas. See note below on open radiator/bypass
- A drain cock is required at the lowest point on the system.
- An air vent is required at the highest point on the system.

## S and Y PLAN SYSTEM:

- NB The boiler is fitted with its own internal bypass.**

A Diverter Valve

B Radiator Valve (Flow)

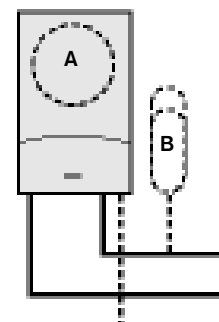
C Lockshield Valve (Return)

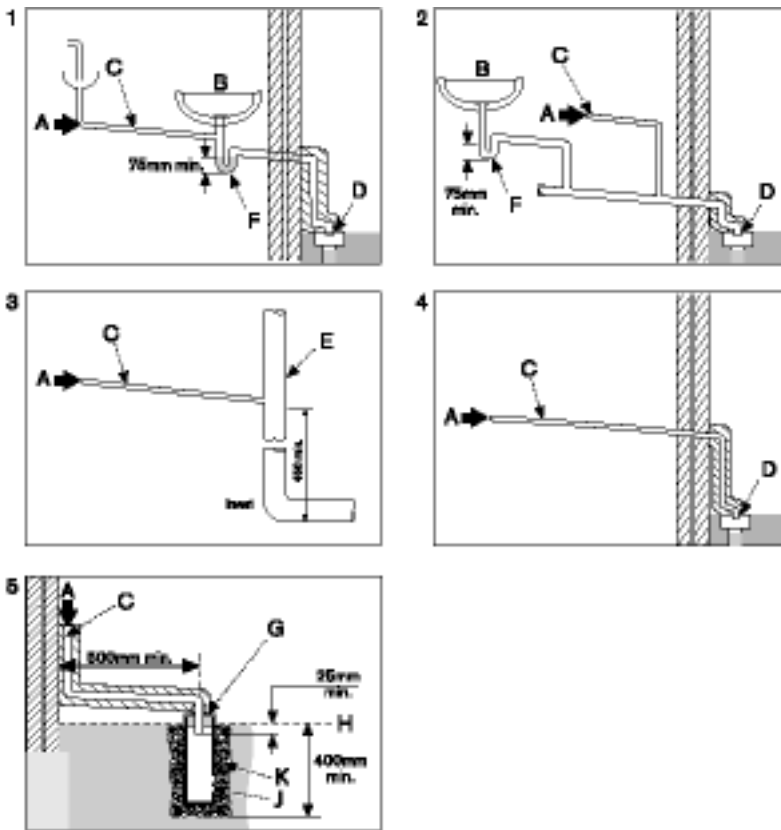
- NB A drain cock should be fitted at the lowest point of the heating circuit and beneath the appliance.**

## OPTIONAL INTERNAL DIVERTER VALVE:

This boiler is designed to operate on a sealed system only. The boiler will require a second return pipe from the water cylinder to the wall mounting frame and terminate in 15mm copper pipe.

- The CH sealed system must be filled using a WRAS approved filling loop or comply with the diagram opposite for system fill.
- Where the system volume is more than 100 litres or exceeds 2.65 bar at maximum heating temperature, an extra expansion vessel (B) must be fitted as close as possible to the appliance in the central heating return.
- Pressurise the extra expansion vessel (B) to the same figure as the expansion vessel built into the appliance.
- Do not use galvanised pipes or radiators.**





## CONDENSATE PIPEWORK:

- The condensate pipe must be a minimum of 22mmØ plastic pipe.
- The condensate pipework must fall at least 50mm per metre towards the outlet and should take the shortest practicable route.
- The pipework must follow one of the options shown opposite into an internal serviceable trap (min. 75mm) such as a sink/washing machine waste or discharge direct into a vent stack (E) 450mm min. above pipe invert, or into a gulley (D) below ground but above the water level.
- Use waterproof pipe insulation in exposed positions and for external pipework.

**IMPORTANT:** Ensure there are no blockages in the pipe run.

- 1 Internal sink/washing machine drain
- 2 Internal waste drainage system
- 3 Soil/vent stack
- 4 External drainage system
- 5 External condensate absorption point

- A - Condensate from boiler  
 B - Sink  
 C - 22mmØ plastic condensate pipe  
 D - Gulley  
 E - Internal soil and vent stack  
 F - Serviceable waste trap (75mm min)  
 G - 300mm x 100mmØ sealed plastic tube  
 H - Ground level  
 J - Drainage holes 50mm from base of tube (12mmØ at 25mm centres) facing away from building  
 K - Limestone chippings

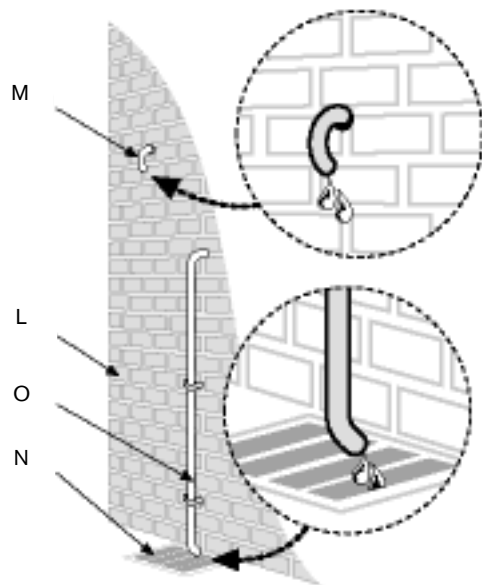
## PRESSURE RELIEF PIPEWORK:

**IMPORTANT:** 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 (M) from the boiler should be at least 15mm diameter copper pipe and run downwards away from any electrics or other hazard, preferably to an external drain or soakaway.
- Pipe (M) should be finished with a partial bend, near the outlet to face the external wall (as shown) to help prevent hazard.

PRE -  
INSTALLATION

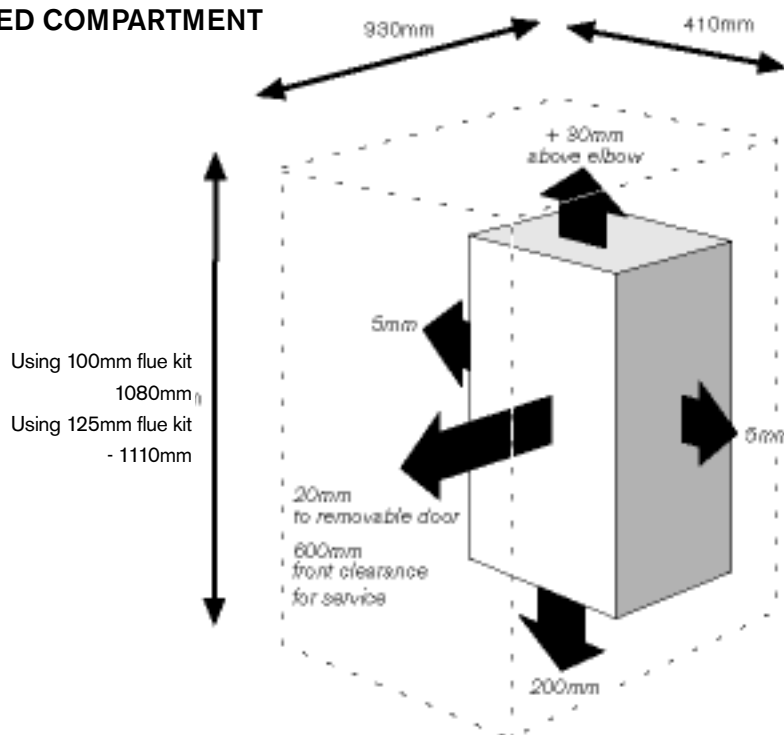


L - Outside wall

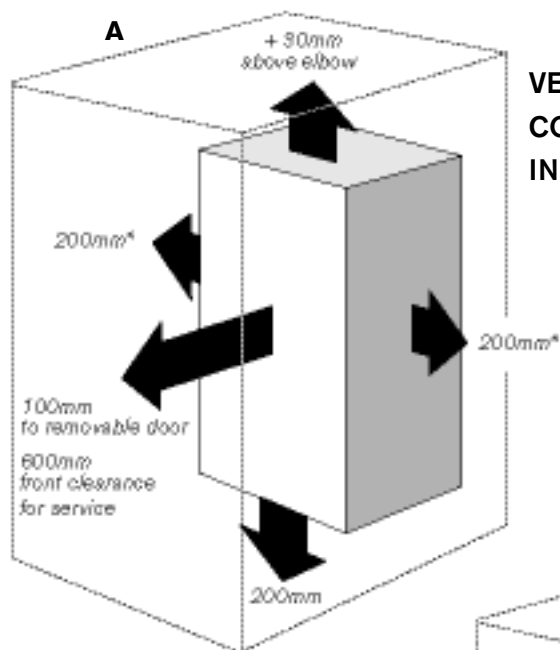
O,M - Drain pipe

N - External drain

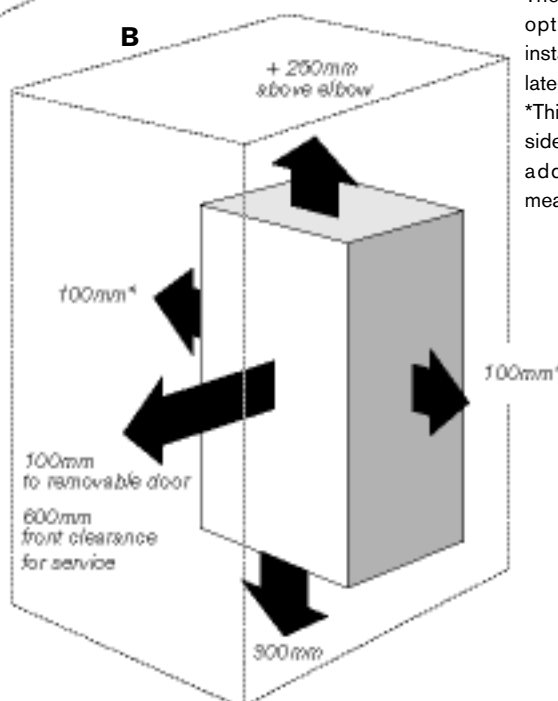
## SERVICING CLEARANCES VENTED COMPARTMENT



PRE -  
INSTALLATION



## VENTILATION FREE COMPARTMENTS INSTALLATION CLEARANCES



## BOILER LOCATION & CLEARANCES

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

### 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 perforated material (maximum hole sizes of 13mm) to separate the boiler from the airing space.

### BOILER CLEARANCES:

The diagram opposite shows the minimum space required to install and service the boiler.

If a boiler is installed in a compartment with clearances less than shown in the diagrams A and B, ventilation is required. Refer to tables below for ventilation requirements.

12 & 24 kW		
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>

### BOILER CLEARANCES - UNVENTILATED COMPARTMENTS:

The diagrams (A and B) opposite show two options for the minimum space required to install and service the boiler inside an unventilated compartment.

\*This space can be reduced to 50mm for one side only as long as both the side clearances add up to the total of both the side measurements shown or more.

## CLEARANCES

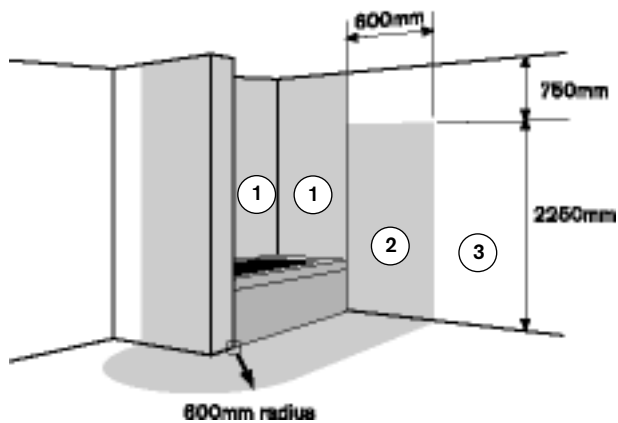
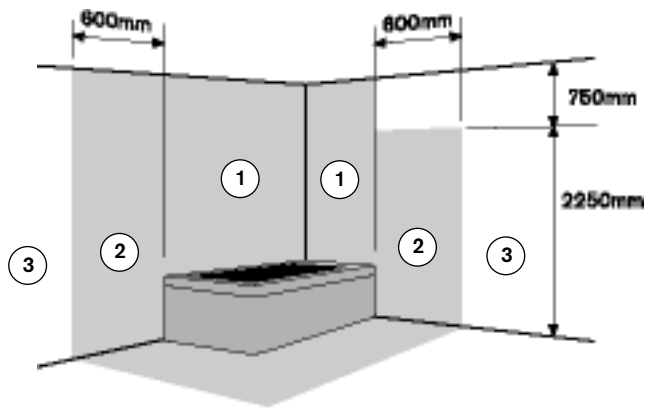
### BATHROOMS:

The boiler can be installed in zones ② or ③.

See *IEE wiring regulations*.

**IMPORTANT:** any switch or appliance control using mains electricity must not be able to be touched by a person using the bath or shower.

Electrical switches, fused spur and socket outlets must not be situated in the bathroom.



## CONNECTIONS:

Heating System: 22mm compression fittings

Gas: 22mm compression fittings

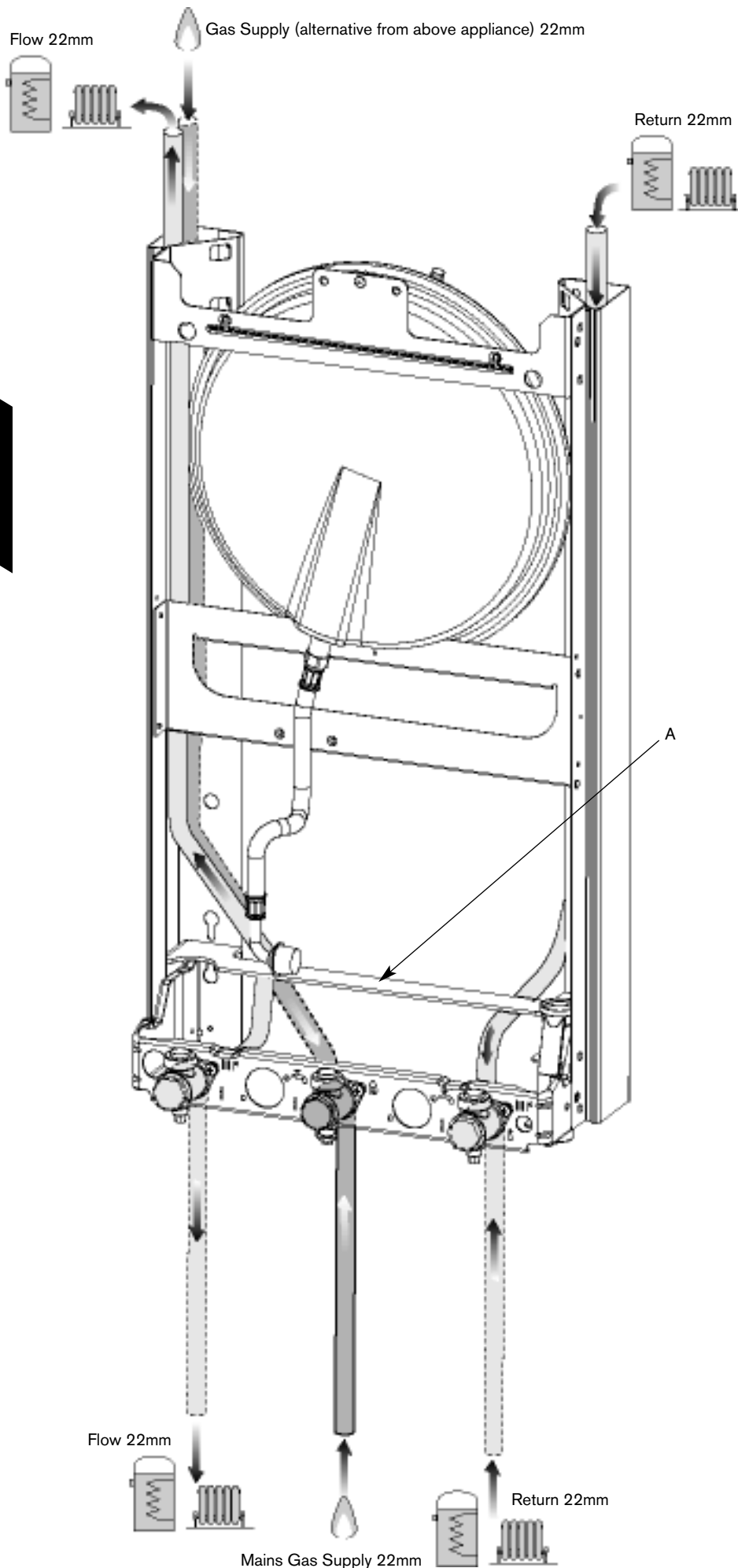
Use the fittings supplied in the Lit/Hardware pack.

- If the boiler pipes are to be run behind the appliance ensure that the pipes pass through the slot in the yellow plastic guide (A). This is fitted to the boiler frame.

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

## IMPORTANT: IF FITTING OPTIONAL INTEGRAL DIVERTER VALVE

Disregard this page and refer to the correct version for installing the integral diverter valve in the **ADDITIONAL INFORMATION** section at the back of this book.



PRE -  
INSTALLATION



Minimum dimensions of flue terminal positions for balanced room sealed flues with fanned draught:

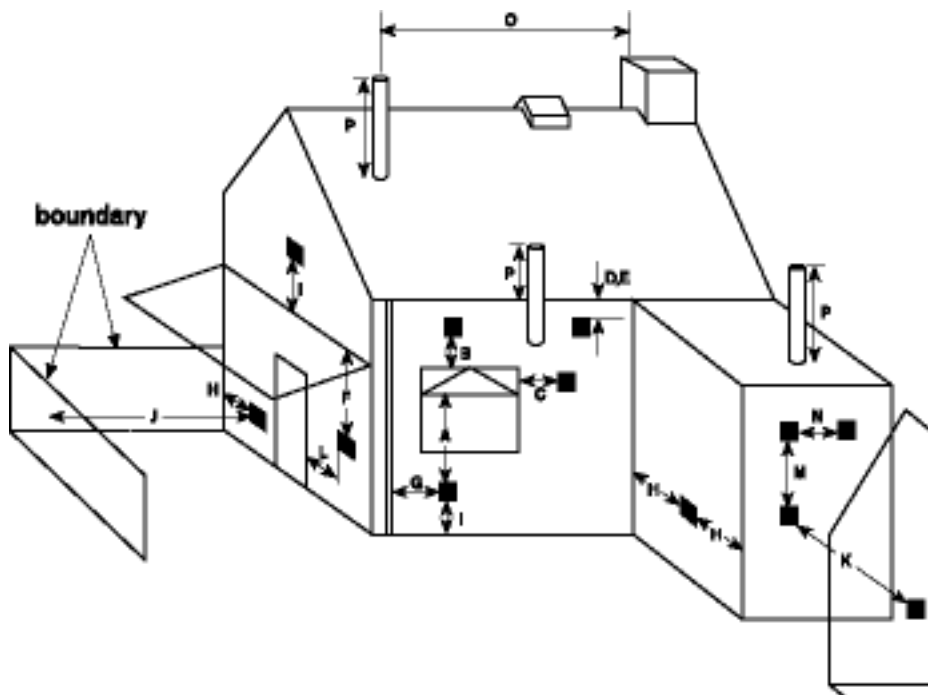
DRWG. REF:	TERMINAL POSITION	DISTANCE
A <sup>1</sup>	Directly below an opening, air brick, opening windows, etc.	300mm
B <sup>1</sup>	Above an opening, air brick, opening window, etc.	300 mm
C <sup>1</sup>	Horizontally to an opening, air brick, opening window, etc.	300 mm
D	Below gutters, soil pipes or drain pipes	75mm
E	Below eaves	200mm
F <sup>2</sup>	Below balconies or car port roof (lowest point)	200mm
G	From a vertical drain pipe or soil pipe	150mm
H	From an internal or external corner	300mm
I	Above ground, roof or balcony	300mm
J	From a surface facing the terminal	600mm
K	From a terminal facing the terminal	1200mm
L <sup>2</sup>	From an opening in the car port (e.g. door, window) into the dwelling	1200mm
M	Vertically from a terminal on the same wall	1500mm
N	Horizontally from a terminal on the same wall	300mm
O	From a non combustible vertical structure on the roof	✱
P	Above intersection with the roof	✱

- The flue must be fitted and terminated in accordance with the recommendations of BS5440 : Part 1.
  - The flue must not cause an obstruction.
  - Discharge and any noise from the flue outlet must not cause a nuisance.
  - Flue gases have a tendency to plume and in certain weather conditions a white plume of condensation will be discharged from the flue outlet. This could be a nuisance, for example, near security lighting.
  - The air inlet/outlet duct and the terminal of the boiler must not be closer than 25mm to any combustible material.
- Detailed recommendations on protection of combustible materials are given in BS 5440:1.
- A protective terminal guard must be fitted if the terminal is 2m or less above a surface to which people have access.
- The guard must be spaced equally (minimum 50mm) around the flue and fixed to the wall with plated screws.
- See Contact Information (inside front cover).

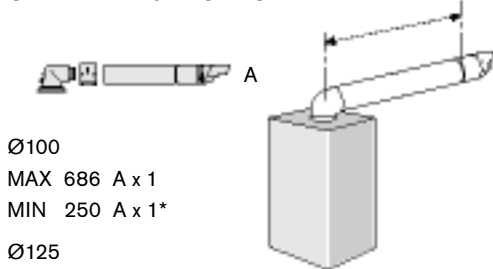
1 In addition, the terminal should not be nearer than 150mm (fanned draught) to an opening in the building fabric formed for the purpose of accommodating a built-in element such as a window frame.

2 Not recommended.

✱ See instructions supplied with vertical flue kits.



## STANDARD FLUE HORIZONTAL



Ø100

MAX 686 A x 1

MIN 250 A x 1\*

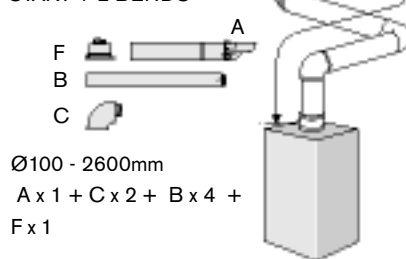
Ø125

MAX 1070 A x 1

MIN 250 A x 1\*

\* Requires cutting

## MAXIMUM FLUE VERTICAL START + 2 BENDS



Ø100 - 2600mm

A x 1 + C x 2 + B x 4 +

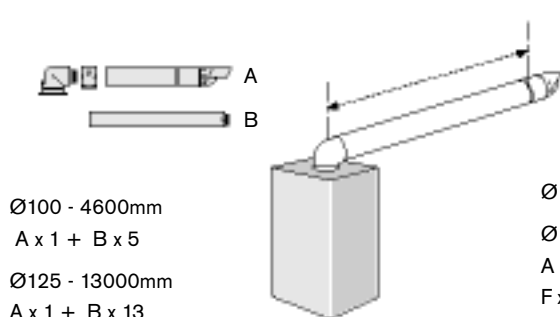
F x 1

Ø125 - 11000mm

A x 1 + C x 2 + B x 13 +

F x 1

## MAXIMUM FLUE HORIZONTAL



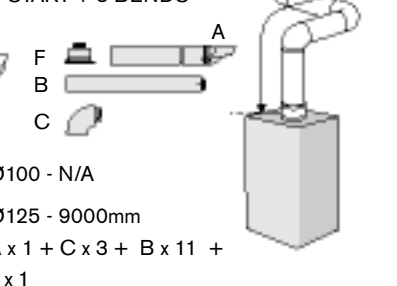
Ø100 - 4600mm

A x 1 + B x 5

Ø125 - 13000mm

A x 1 + B x 13

## MAXIMUM FLUE VERTICAL START + 3 BENDS



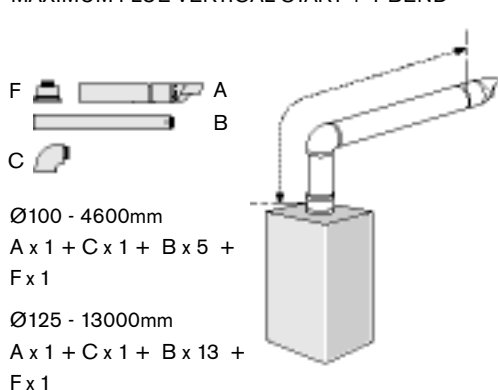
Ø100 - N/A

Ø125 - 9000mm

A x 1 + C x 3 + B x 11 +

F x 1

## MAXIMUM FLUE VERTICAL START + 1 BEND



Ø100 - 4600mm

A x 1 + C x 1 + B x 5 +

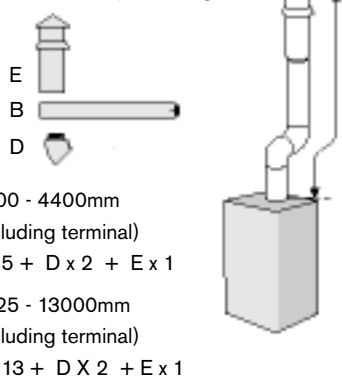
F x 1

Ø125 - 13000mm

A x 1 + C x 1 + B x 13 +

F x 1

## MAXIMUM FLUE VERTICAL WITH 2 x 45° BENDS



Ø100 - 4400mm

(including terminal)

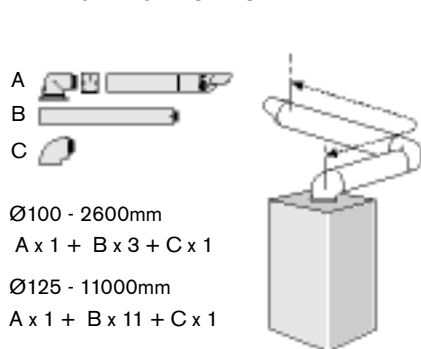
B x 5 + D x 2 + E x 1

Ø125 - 13000mm

(including terminal)

B x 13 + D x 2 + E x 1

## MAXIMUM FLUE HORIZONTAL + 1 BEND



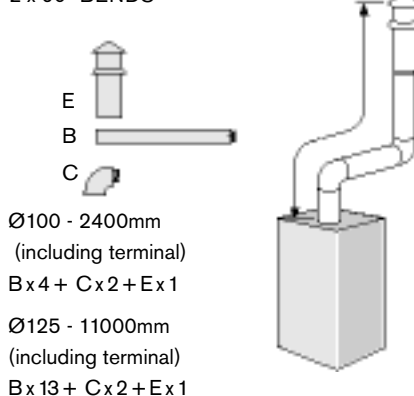
Ø100 - 2600mm

A x 1 + B x 3 + C x 1

Ø125 - 11000mm

A x 1 + B x 11 + C x 1

## VERTICAL FLUE WITH 2 x 90° BENDS



Ø100 - 2400mm

(including terminal)

B x 4 + C x 2 + E x 1

Ø125 - 11000mm

(including terminal)

B x 13 + C x 2 + E x 1

## FLUE OPTIONS

- The diagrams (opposite) show the components used and the maximum flue length for each configuration of 100mm and 125mm flues.
- Shaded flue components indicate the standard 100mm horizontal flue.
- Only straight flue sections can be reduced in length and cut.
- The flue terminal end can be fitted from the inside or outside of the building.
- Fixing kits are supplied with the flue extension kits.
- Horizontal 125mm and Vertical 100mm and 125mm flue kits are available with separate instructions. Contact your supplier or Worcester Bosch.



A - Standard horizontal flue (100mm diameter shown)

B - Straight flue extension

C - Flue bend 90°

D - Flue bend, 45°

E - Vertical terminal (vertical adaptor supplied with terminal)

F - Vertical adaptor (used with horizontal terminal)

Calculating the flue length:

Measure the total flue length required, noting that the maximum straight flue length including the terminal is:

Horizontal 60/100mm: 4600mm

Horizontal 80/125mm: 13000mm

Vertical 60/100mm: 6400mm

Vertical 80/125mm: 15000mm

Then reduce the total straight flue length for each extra flue bend (excluding the flue elbow) by:

2000mm for 90°

1000mm for 45°

Flue Extension lengths:

Horizontal & Vertical 60/100mm: 960mm

Horizontal & Vertical 80/125mm: 1000mm

Flue Terminal lengths:

Horizontal 60/100mm: 800mm including terminal

Horizontal 80/125mm: 1200mm

Vertical 60/100mm: 1140mm to top of terminal

Vertical 80/125mm: 1365mm to top of terminal

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

## UNPACKING WALL FRAME AND ANCILLARY ITEMS

### LIFTING AND CARRYING PRECAUTIONS:

- Lift only a manageable weight, or ask for help.
- When lifting or putting things down, bend the knees, and keep the back straight and feet apart.
- Do not lift and twist at the same time.
- Lift and carry objects close to the body

A - Straps

B - Outer carton

C - Installer pack

D - Bottom panel

E - Wall mounting frame

F - Wall template (in wall frame protective wrapping)

G - Inner packaging

### 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, the outer carton is removed first. 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 may 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 are now removed. Care should be taken when lifting the boiler from the base and the proper technique for safe lifting of any heavy object should be strictly observed.

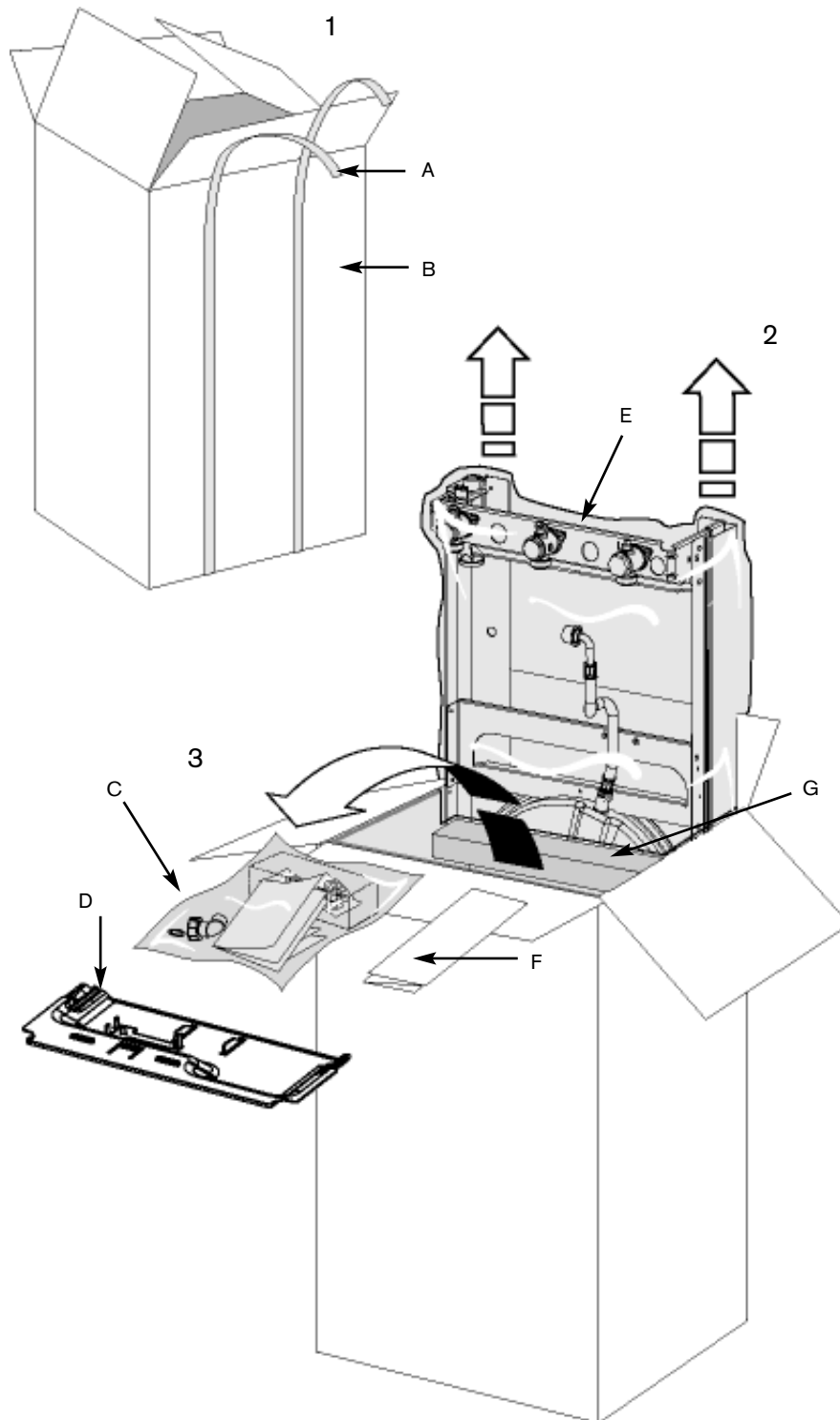
Additional requirements for roof space installation:

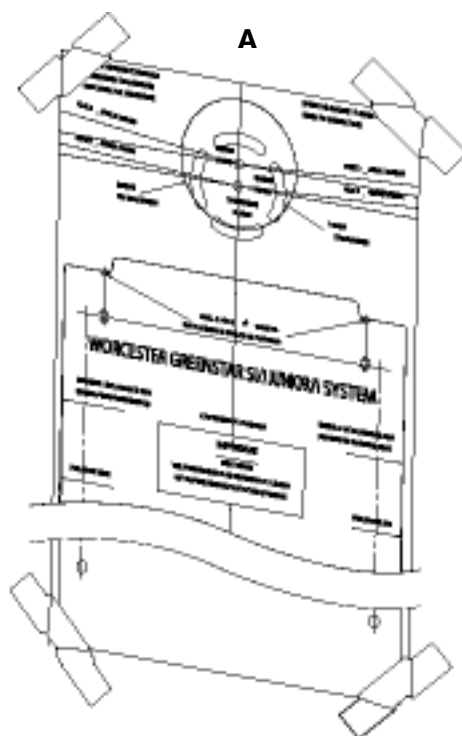
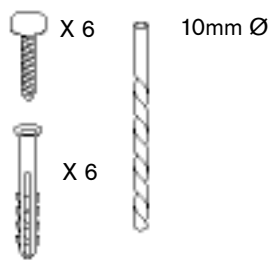
- The boiler should be first unpacked before ascending ladder to loft space.
- Two sets of steps should be used.
- Two people should share the lifting of the boiler up to the loft hatch, where the boiler is entered into the loft space tilted and slid on its back into the loft.

Once the appliance is removed from its packaging check the contents against the packing list.

**Before installing appliance ensure system has been cleaned as explained on page 8.**

- ▶ **1.** Remove straps (A) and open the top of the boiler packaging.
- ▶ **2.** Remove template (F) and wall mounting frame (E) from the packaging.
- ▶ **3.** Remove boiler bottom panel (D) and installer pack (C).





## WALL MOUNTING TEMPLATE

### FLUE OPENING

**CAUTION:** Ensure there are no pipes, electric cables, damp proof courses or other hazards before drilling.

#### 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.
- ▶ Fix the template to the wall in the desired position (A).
- ▶ Drill 4 holes for the wall mounting frame through the template (2).

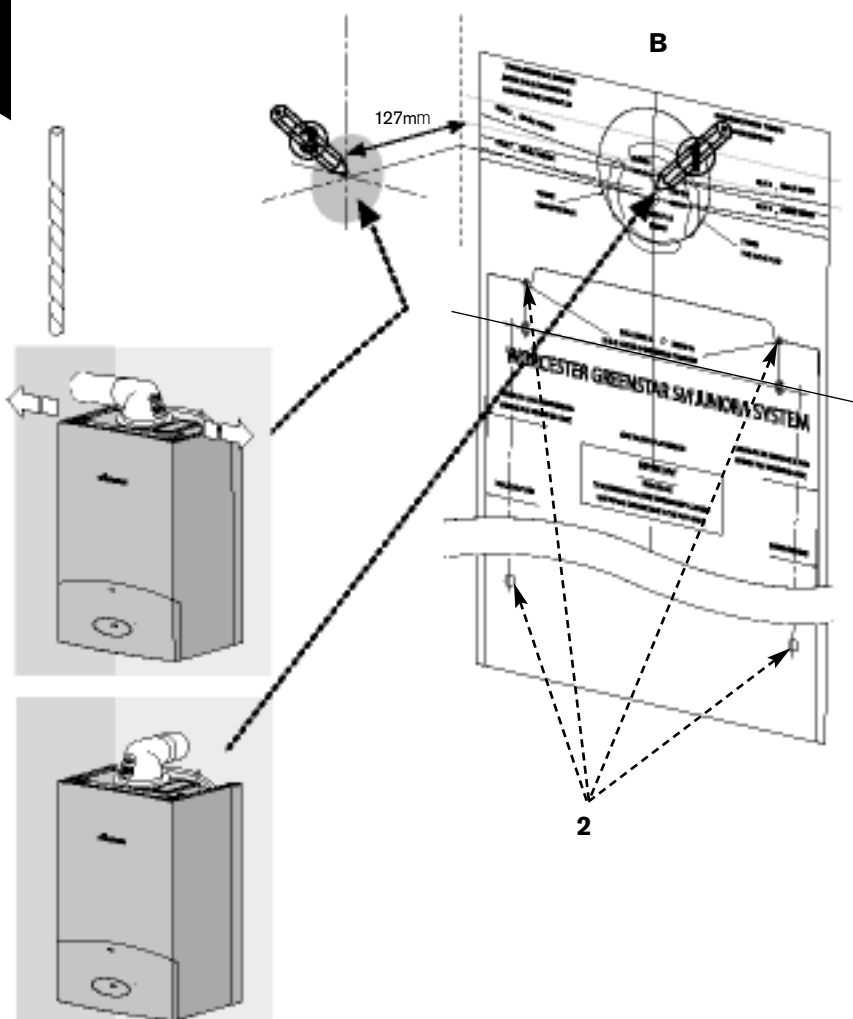
**NOTE:** The template has been sized to allow for minimum clearances of 5mm sides, 200mm base and 30mm above a Ø100mm flue elbow.

#### REAR FLUE OUTLET

- The drawing (B) opposite shows the boiler template with the flue centre lines of both the 100mm and 125mm flue systems.
- ▶ Mark centreline of flue to be used (1) the external diameter of the hole can also be marked if required.
- If a Ø100mm diameter flue is to be used, a 125mm diameter hole is required. However, if using the weather sealing collar by pushing it through from inside the property, then a 150mm diameter hole is required to accommodate this.
- The terminal section of the 100mm flue has an inbuilt 3° angle. If extensions are to be added then the complete flue must rise at an angle of 3°.
- The 125mm Ø flue system will require the flue to rise at an angle of 3°.
- ▶ Drill hole using a core drill or similar.

#### SIDE OUTLET:

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

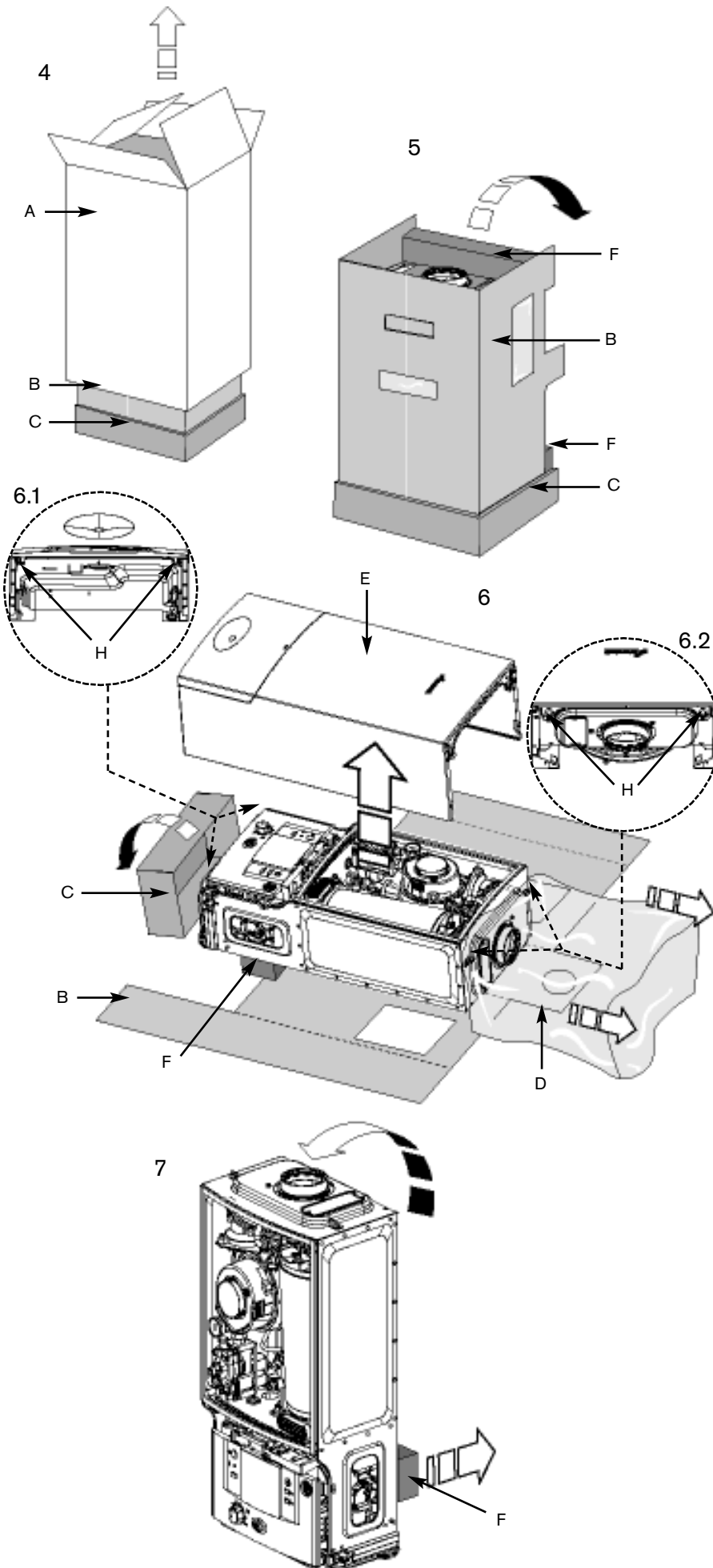


## UNPACKING THE APPLIANCE

- A - Outer carton
- B - Inner sleeve (unwraps from front)
- C - Packaging base
- D - Protective wrapping
- E - Appliance outer case
- F - Protective inner packaging

- ▶ **4.** Remove outer carton (A) and place safely away from the working area.
- ▶ **5.** With the outer packaging removed and the inner sleeve (B) still in place gently lay the boiler on its back.
- ▶ **6.** The boiler will lie at an angle to the floor to allow the boiler outer casing (E) to be removed. The inner sleeve (B) opens as shown. Remove the protective wrapping (D) and undo the four screws, two at the bottom of the boiler (H) and two at the top (H) (see diagrams 6.1 and 6.2). Remove any packaging within the boiler and the packaging base (C).
- ▶ **7.** Stand boiler upright and remove the protective inner packaging (F) at the rear of the boiler.

**If fitting the optional integral diverter valve, the copper pipe within the kit should be fitted to the boiler before hanging on the wall mounting frame. See "OPTIONAL DIVERTER VALVE" Section in these instructions or the instructions supplied with the optional diverter valve kit.**



Do not lift by the  
air gas manifold.

3

## BOILER CONNECTIONS

### IMPORTANT: IF FITTING OPTIONAL INTEGRAL DIVERTER VALVE

Disregard this and the following page and refer to the correct version for installing the integral diverter valve in the **ADDITIONAL INFORMATION** section at the back of this book.

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

### GAS AND WATER CONNECTIONS:

- ▶ Remove template and secure the wall mounting frame to the wall with the fixings supplied.
- ▶ System pipes may be run vertically upwards behind the boiler or below it. See Plumbing Manifold Section on page 15.

A - Flow (22mm), B - Return (22mm),  
C - Gas inlet (22mm)

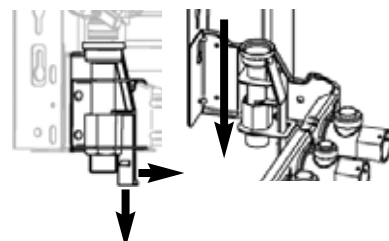
- ▶ 1. Fit sealing washers to service valves before hanging boiler.

### IMPORTANT:

Before hanging the boiler onto the wall mounting frame ensure that the pressure relief valve connection is in the **DOWN** position. This is located on the right hand side of the wall frame at the rear.

- ▶ 2. Pull the extended tab/lever forward and down until there is no further travel.

2



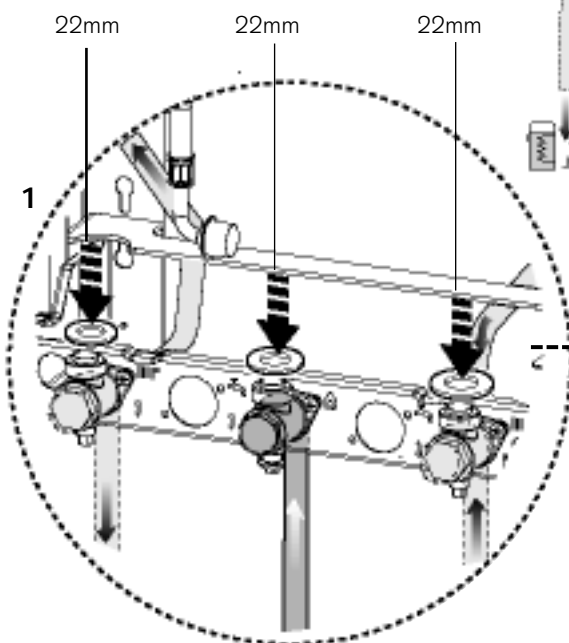
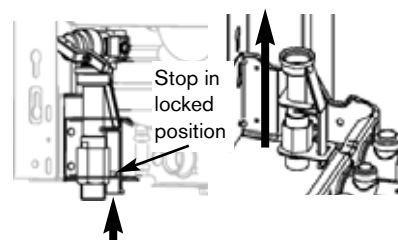
- ▶ 3. Hang the boiler on to the wall mounting frame by the two brackets positioned left and right at the top rear of the appliance. Do not lift the appliance by the air gas manifold. There are two handling holes incorporated into the inner casing left and right in the lower section of the appliance.

### IMPORTANT:

The pressure relief connector must be repositioned after the boiler has been correctly mounted to the wall mounting frame.

- ▶ 4. Push the lever on the pressure relief connector **UP** until the stop on the inside of the handle is over the shoulder of the metal bracket to secure in place.

4



## BOILER CONNECTIONS

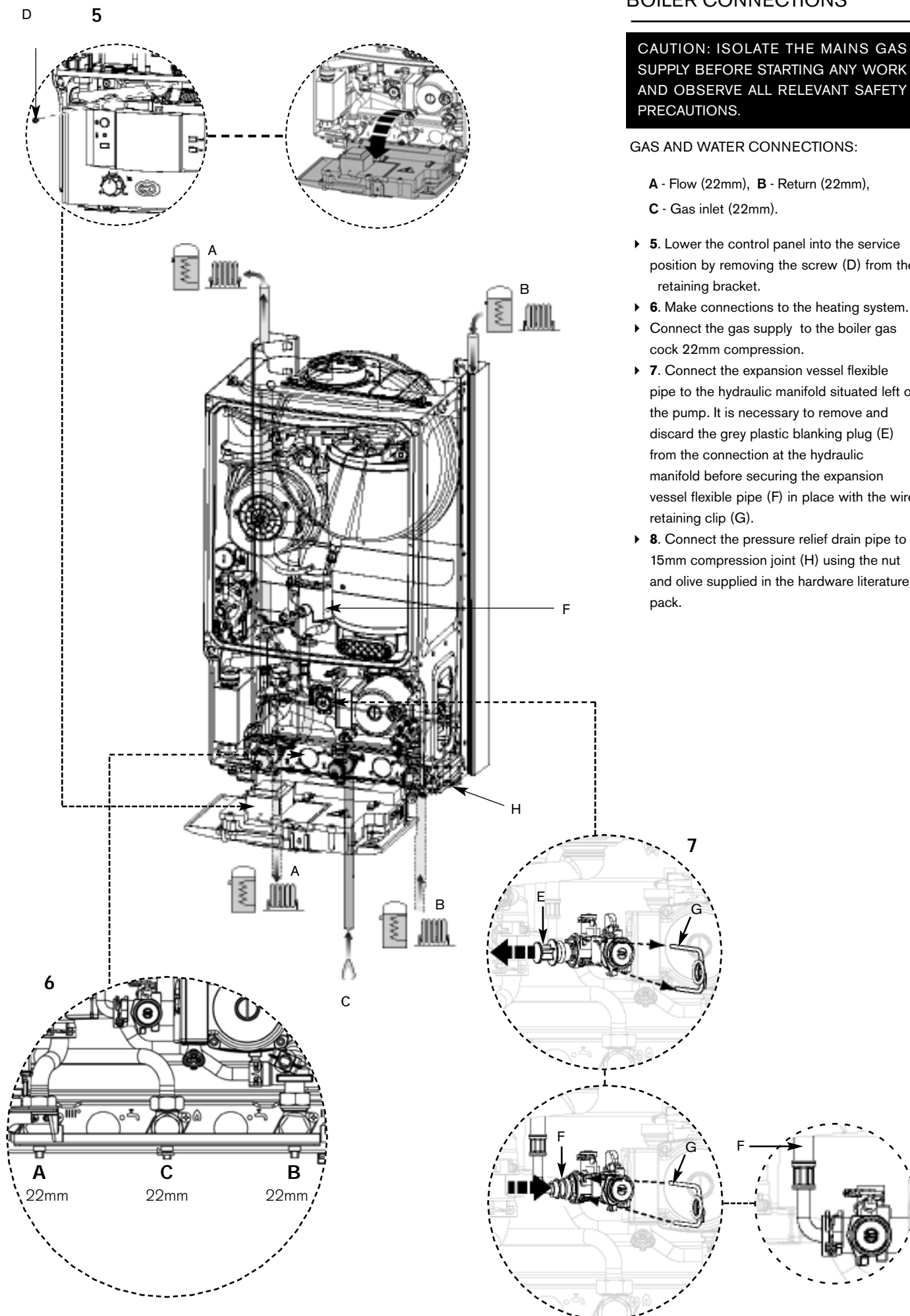
**CAUTION: ISOLATE THE MAINS GAS SUPPLY BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS.**

GAS AND WATER CONNECTIONS:

**A** - Flow (22mm), **B** - Return (22mm),  
**C** - Gas inlet (22mm).

- ▶ **5.** Lower the control panel into the service position by removing the screw (D) from the retaining bracket.
- ▶ **6.** Make connections to the heating system.
- ▶ Connect the gas supply to the boiler gas cock 22mm compression.
- ▶ **7.** Connect the expansion vessel flexible pipe to the hydraulic manifold situated left of the pump. It is necessary to remove and discard the grey plastic blanking plug (E) from the connection at the hydraulic manifold before securing the expansion vessel flexible pipe (F) in place with the wire retaining clip (G).
- ▶ **8.** Connect the pressure relief drain pipe to 15mm compression joint (H) using the nut and olive supplied in the hardware literature pack.

INSTALLATION



## HORIZONTAL FLUE

### (60/100mm diameter)

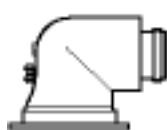
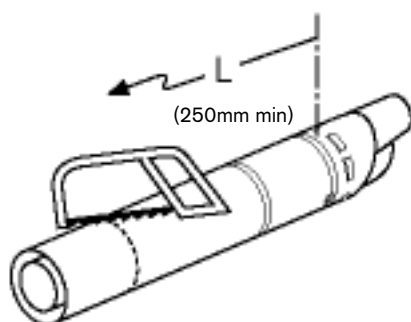
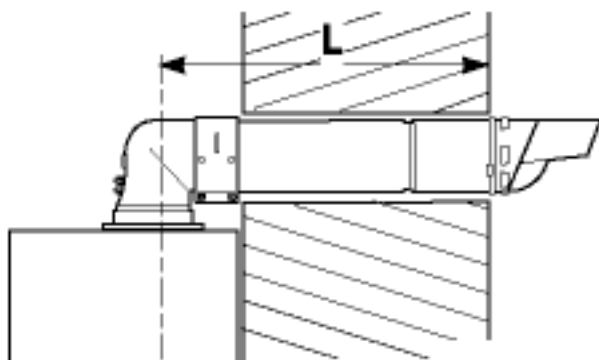
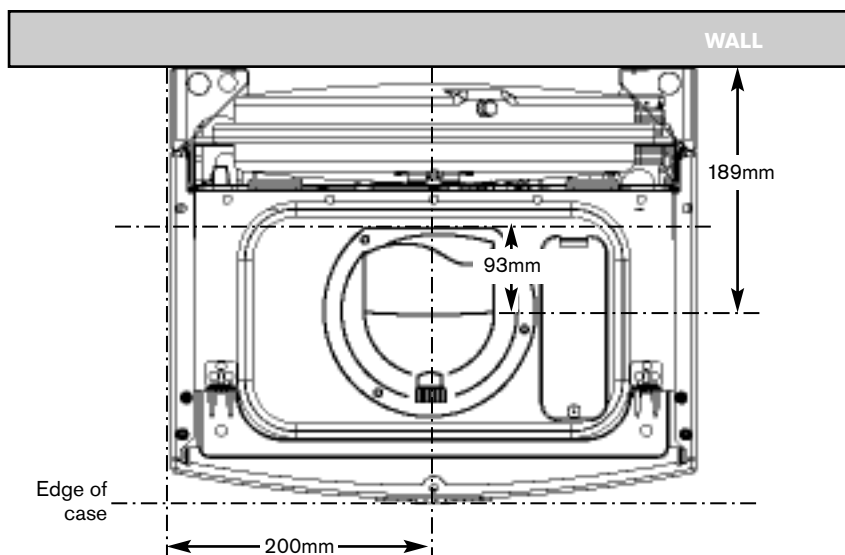
For vertical flues and 80/125mm horizontal flues, please refer to separate instructions supplied with the flue kit.

NOTE: to ease the assembly of flue components, apply silicone lubricant to sealing surfaces.

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

### MEASURING THE FLUE (Standard Flue):

- ▶ Measure from the outside wall to the centre line of the flue turret.
- ▶ Subtract 93mm from the length L to give the correct dimension to the flue elbow connection.
- ▶ The terminal section should be cut to this dimension, however it must not be cut shorter than 250mm.
- ▶ After cutting, the end must be square and free from burrs to prevent damage to the flue seals.



Turret



Clamp



Flue



## FLUE INSTALLATION

### MEASURING THE FLUE (Extension Flue Kits):

#### ONLY CUT EXTENDED FLUE LENGTHS

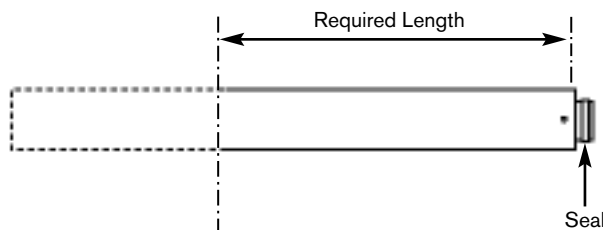
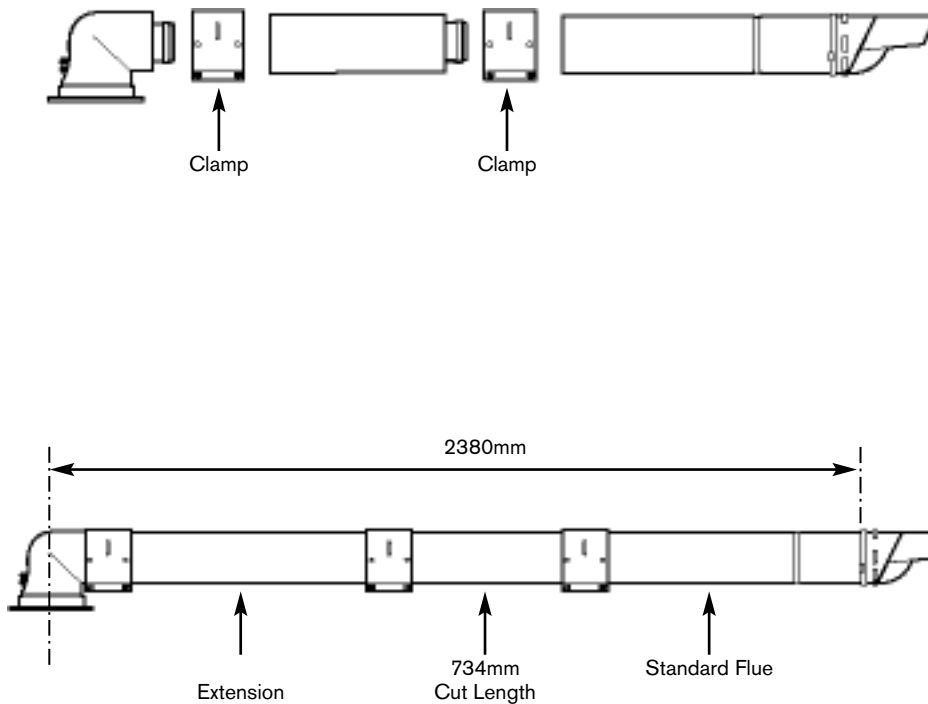
- ▶ As with the Standard Flue measure from the outside wall to the centre line of the flue turret.
- ▶ Subtract the length of the Standard Flue and turret (725mm) from length L.
- ▶ Subtract the full length 1m extension(s) from the figure.
- ▶ Cut one of the 1m extensions to the remainder.
- ▶ Cut both tubes square taking care not to distort the tubes.
- ▶ Remove any burrs.

#### EXAMPLE:

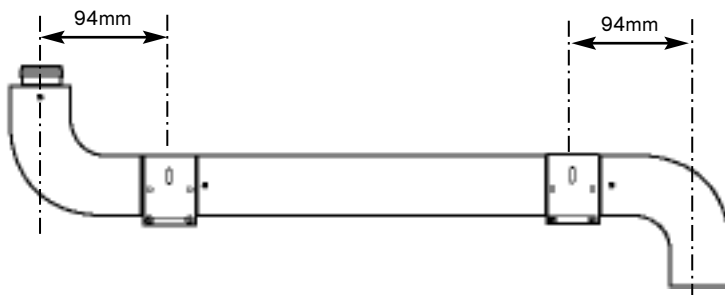
Length L	=	2380mm
Subtract Standard Flue+Turret	=	686mm
Subtract Full Extension	=	960mm
Cut Length	=	734mm

NOTE: The minimum length a flue extension can be cut to is 100mm

INSTALLATION



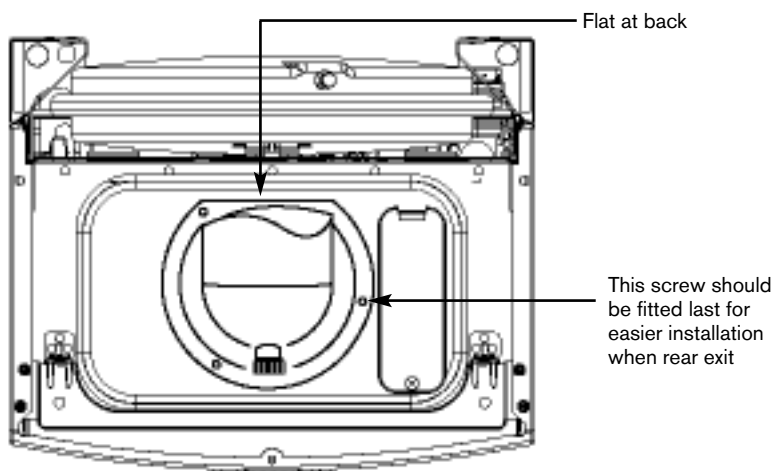
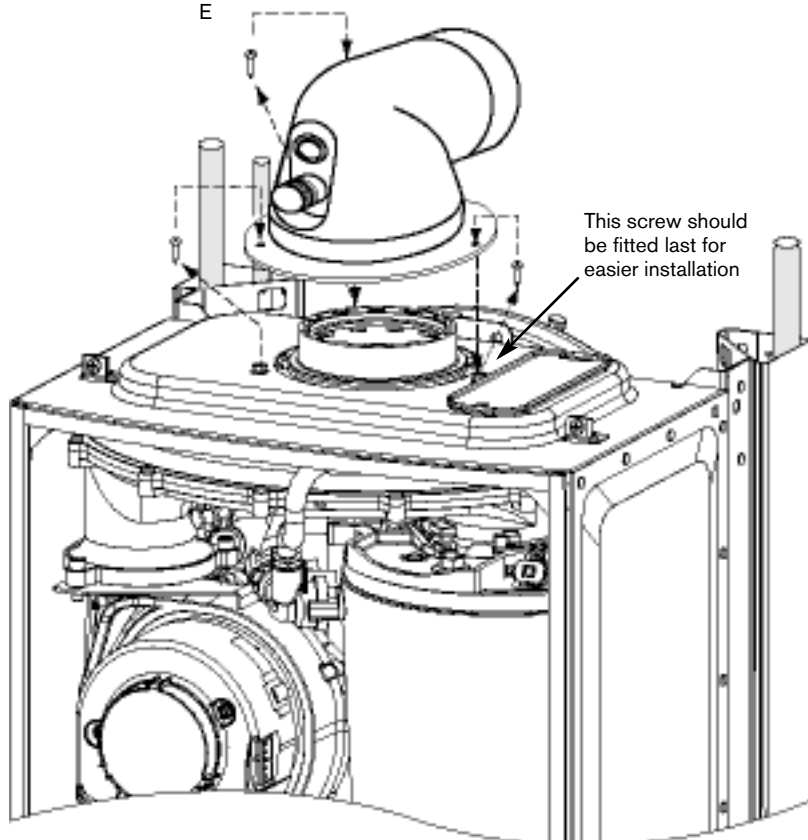
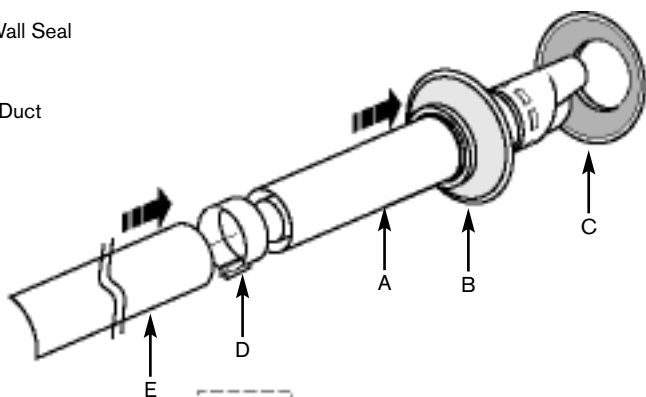
NOTE: Where extensions are reduced, cut length which **DOES NOT** contain the seal.



#### ADDITION OF FLUE BENDS:

When flue bends are being used an allowance of 98mm per bend must be allowed from the centre line of the bend. In the example shown using a flue extension with 2 bends will achieve a total length of 1148mm.

- A - Standard Flue
- B - Internal Wall Seal
- C - External Wall Seal
- D - Clamp
- E - Extension Duct



## FLUE INSTALLATION

### ASSEMBLING THE FLUE

- 1 Slide inner collar (B) onto terminal (A)
- 2 Additional extensions or bends:  
Push fit all extensions/bends/terminal together and secure connections with clamps (D). The slope of the terminal outlet must face downwards.

### FITTING THE FLUE

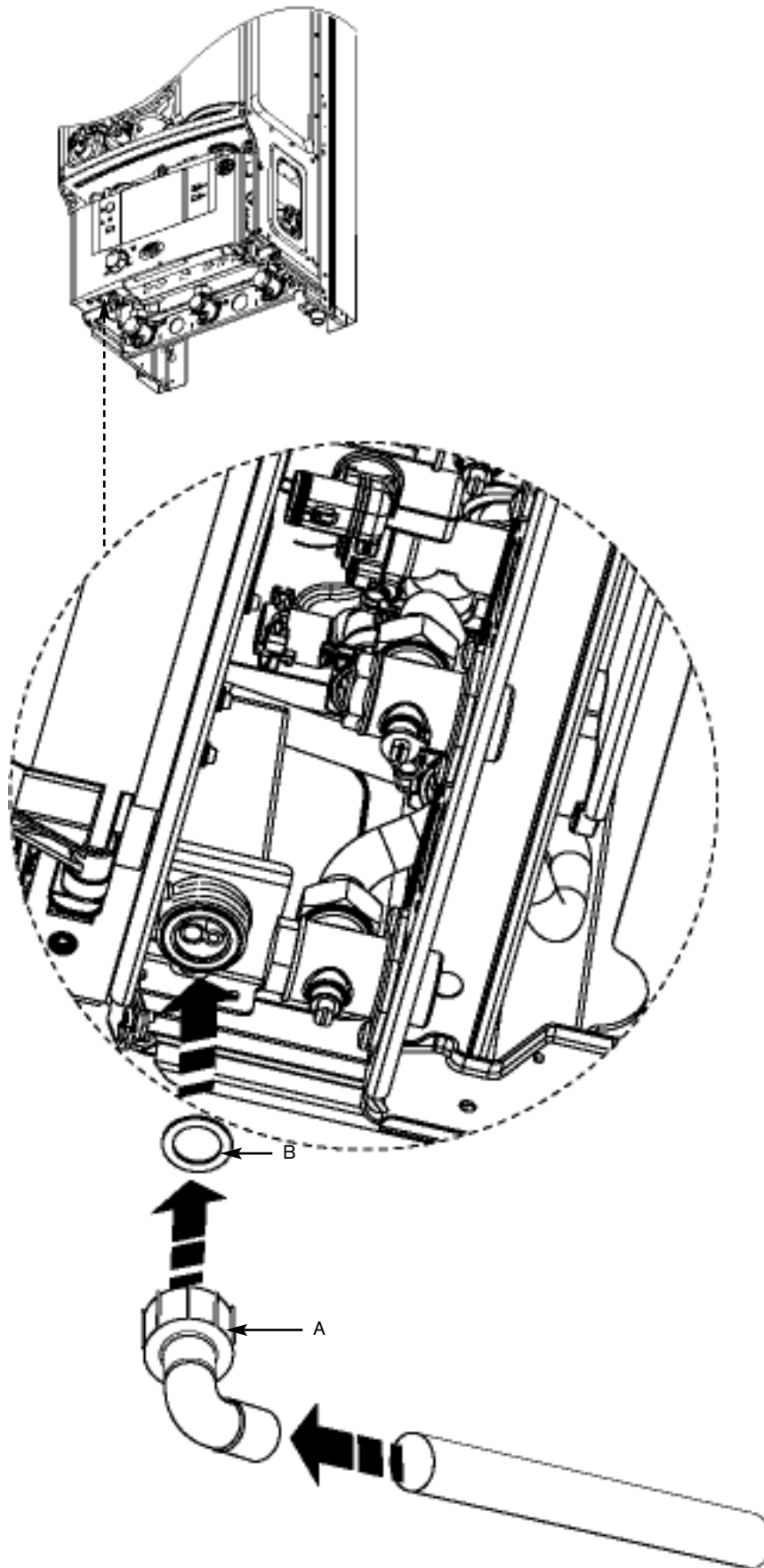
- 3 Fit the terminal (A) through the flue opening in the wall, exposing the plastic outlet section to the outside and fit the outer flue collar (C) over the notches to secure.
- 4 Assemble elbow to boiler using the three screws (see below).  
*Note: Screws are in boiler not in flue kit.*

### FITTING THE ELBOW:

- Flue elbow should push directly down and not be twisted into correct position.
  - ▶ Remove the 3 inner flue tube retaining screws. The inner tube will be held in place in the appliance.
  - ▶ Fit turret onto appliance and retain with the three removed screws.
- NOTE:** The clamping plate flat should be at the rear of the appliance.

### ADDITIONAL NOTES AND REMINDERS:

- Ensure that all cut lengths are square and free from burrs.
- The flue, when assembled, is fully sealed and components are pushed home.
- The flue is set at an angle of 3° or 52mm per 1m length.



## CONDENSATE CONNECTION:

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

*Note: any external condensate pipework should be protected with weather resistant insulation to help prevent freezing.*

- Ensure that the condensate drain is 22mm diameter plastic pipe. It must fall at least 50mm per metre towards the outlet.
- An adapter in 22mm pipe is contained in the fitting pack (A) along with sealing washer (B).

INSTALLATION

## IMPORTANT: IF FITTING OPTIONAL INTEGRAL DIVERTER VALVE

**Now fit the diverter valve.** For installation refer to FITTING THE DIVERTER VALVE in the ADDITIONAL INFORMATION section at the back of the book. You must then disregard the following 3 pages concerning ELECTRICAL and PRE-COMMISSIONING CHECKS and refer to the correct versions that follow FITTING THE DIVERTER VALVE in the ADDITIONAL INFORMATION section at the back of this book.

**CAUTION: ISOLATE THE MAINS ELECTRICITY SUPPLY BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS**

**Note: Mains supply to the boiler and system wiring centre must be through a common fused double pole isolator situated adjacent to the appliance. The isolator must have a contact separation of 3mm minimum in all poles.**

Access to electrical connections:

Remove boiler casing to access control panel.

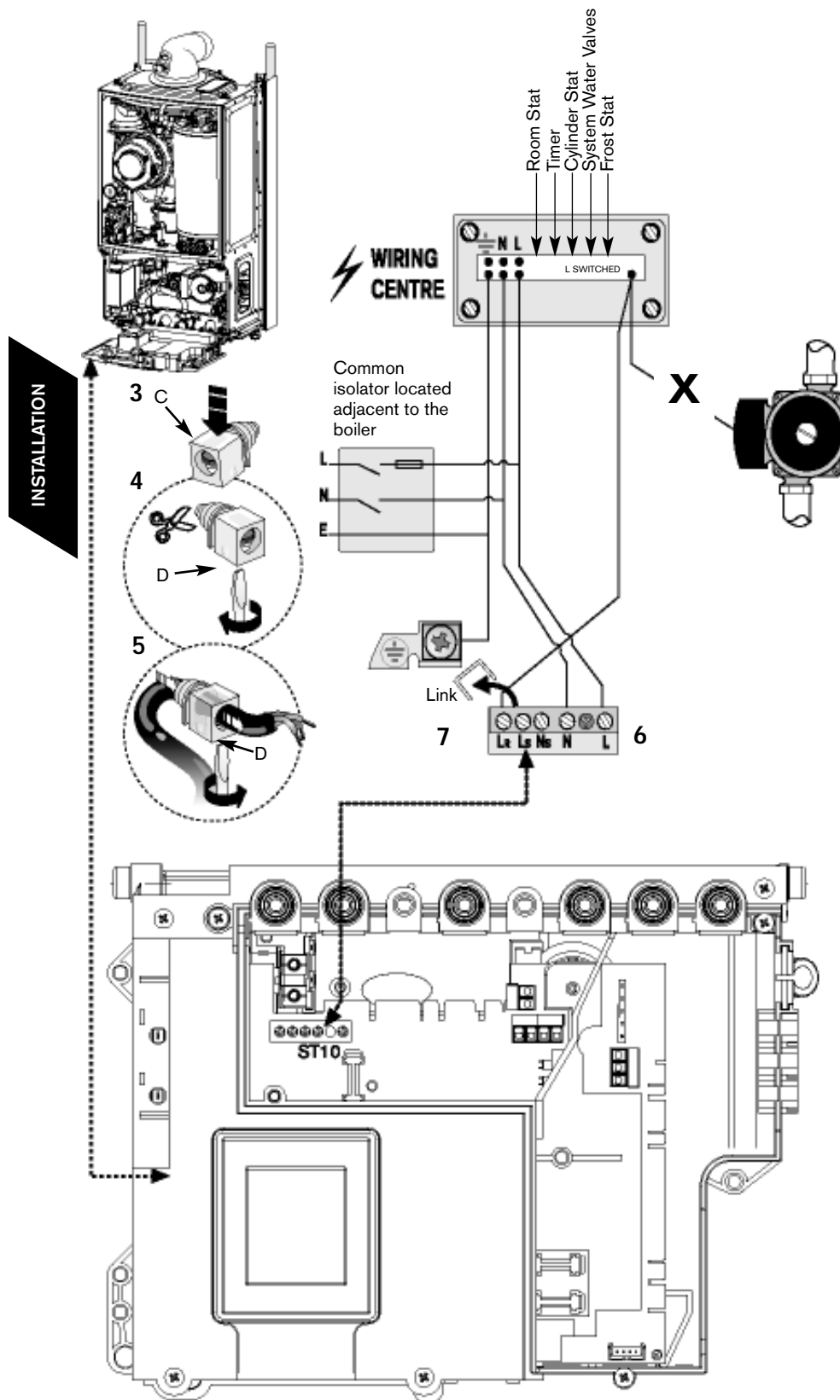
- 1 Unscrew screw (A) and lower the control box into the horizontal position.
- 2 Unscrew the three screws (B) in the control panel and pull off the connections cover.
- 3 Unclip cable clamp (C).
- 4 Cut off the tapered cable entry to fit cable diameter required.
- 5 Turn cable retaining screw (D) anti-clock-wise. Run cable over the main crossbar and through the cable clamp (C), ensuring there is ample cable to reach the connectors. Turn cable clamping screw (D) clockwise to secure cable and replace clamp (C) into control panel.
- 6 Mains power 230v connection (ST10):
  - ▶ 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 the connector
 NOTE: Earth cable to be longer so that it pulls out last if mains cable is snagged.
- 7 Boiler demand live (from external wiring centre) (ST10):
  - ▶ NOTE: An external pump must not be used.
  - ▶ Remove link.
  - ▶ Connect SWITCHED LIVE to terminal (Lr).
- 8 Refit control panel cover:
  - ▶ Refit control panel with screws (B).
  - ▶ Bring the control panel to its upright position and fix with screw (A).

#### NOTES:

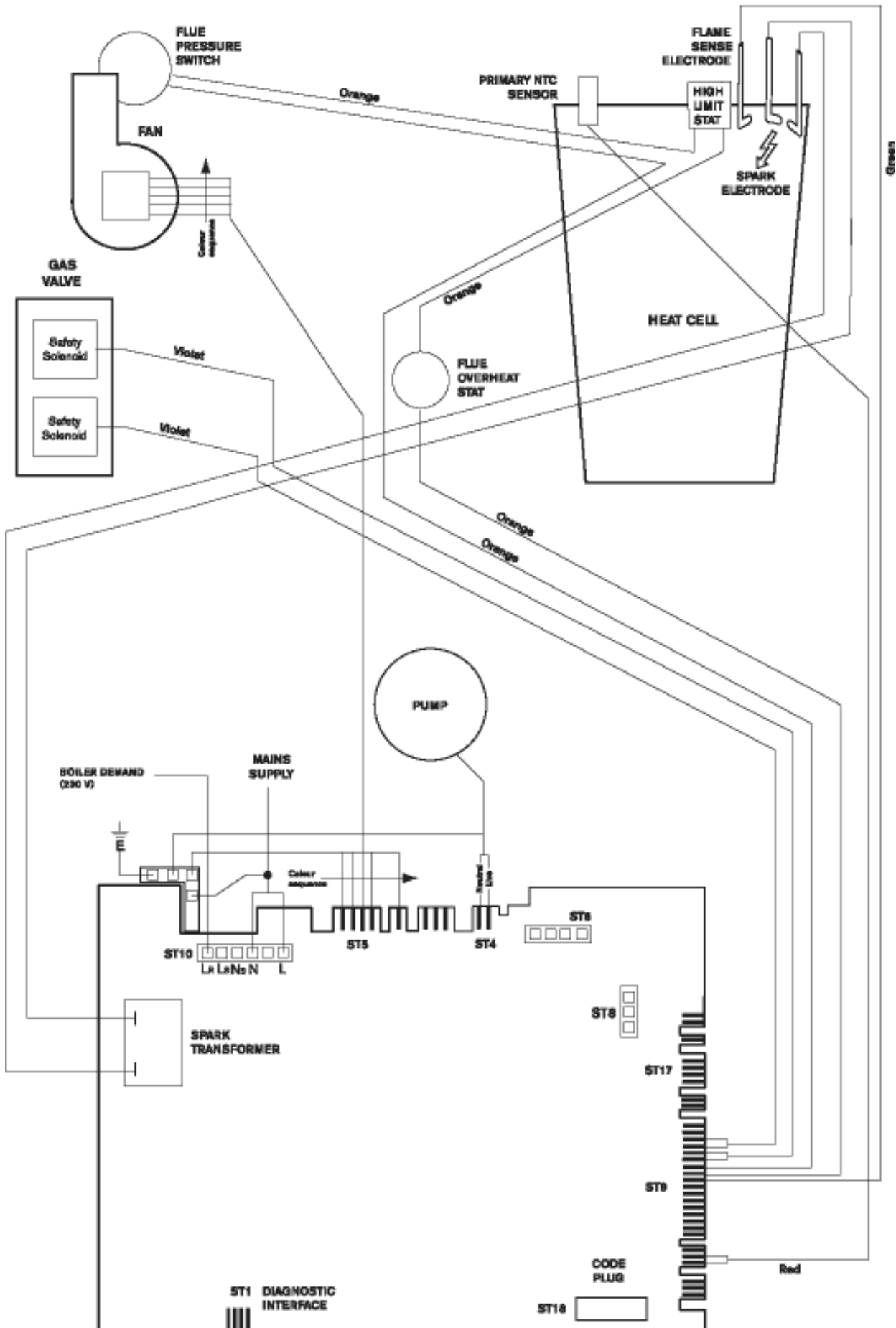
- External diverter valve(s) and all other 230V parts are not supplied with the boiler.
- A fascia mounted programmer/timer should not be fitted unless optional integral diverter valve is used (see instructions at the rear of this manual).
- Refer to manufacturers instructions when connecting external parts to the wiring centre. Worcester, Bosch cannot be held responsible for wiring errors.
- There is an option to fit an internal diverter valve. This also requires fitting an extra harness and a code plug change. See "Optional Diverter Valve" Section in these instructions or the instructions supplied with the integral diverter valve kit.

This option is also covered in the Fault

Finding Guide on page 54 of these instructions.



## POSITION OF WIRED COMPONENTS



## CHECKS

**CAUTION: ISOLATE THE MAINS SUPPLIES BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS**

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

A - Flow (22mm)

B - Return (22mm)

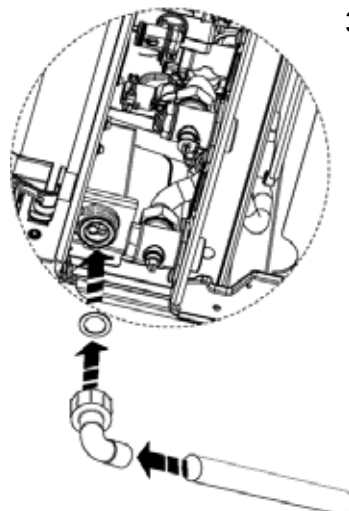
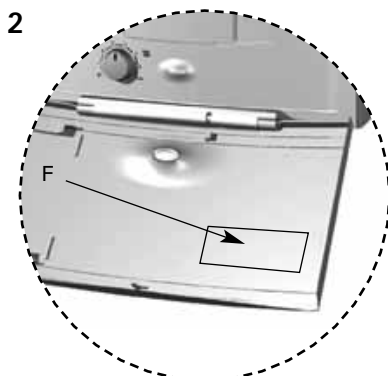
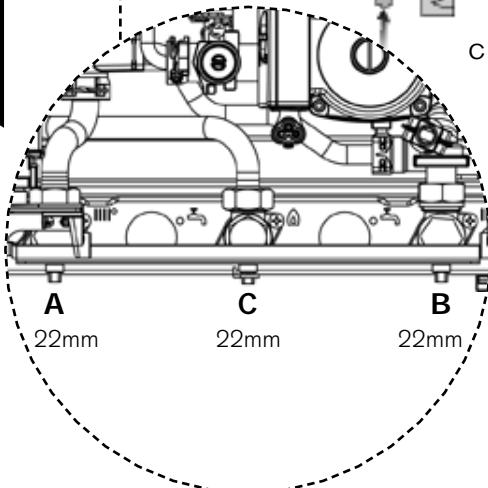
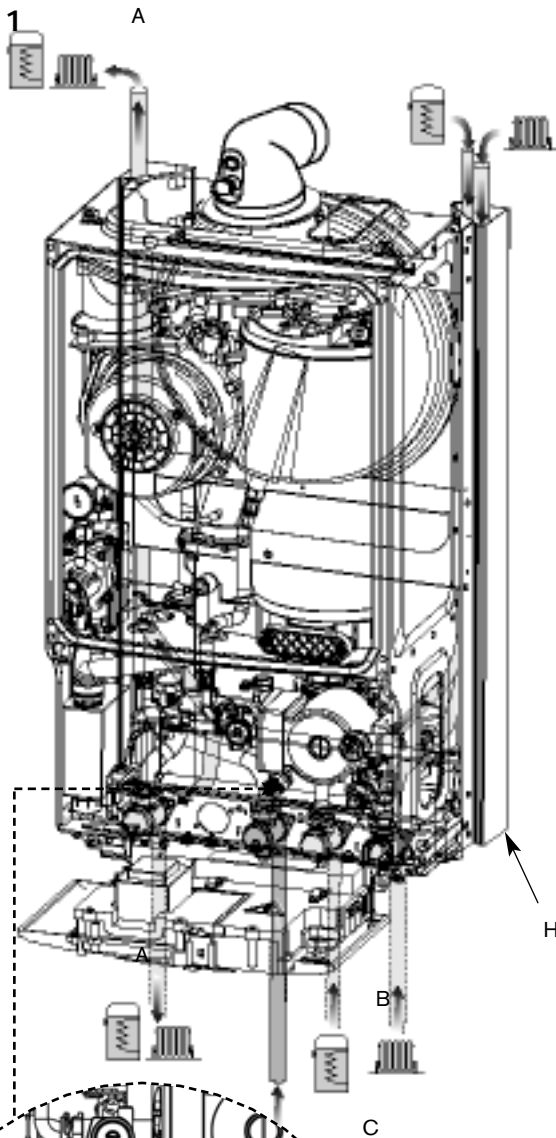
C - Gas inlet (22mm)

- 2 Check the gas type specified on the identification plate (F) matches that of the gas supply. Turn on the main gas supply, check the gas pipework connections and rectify any leaks.

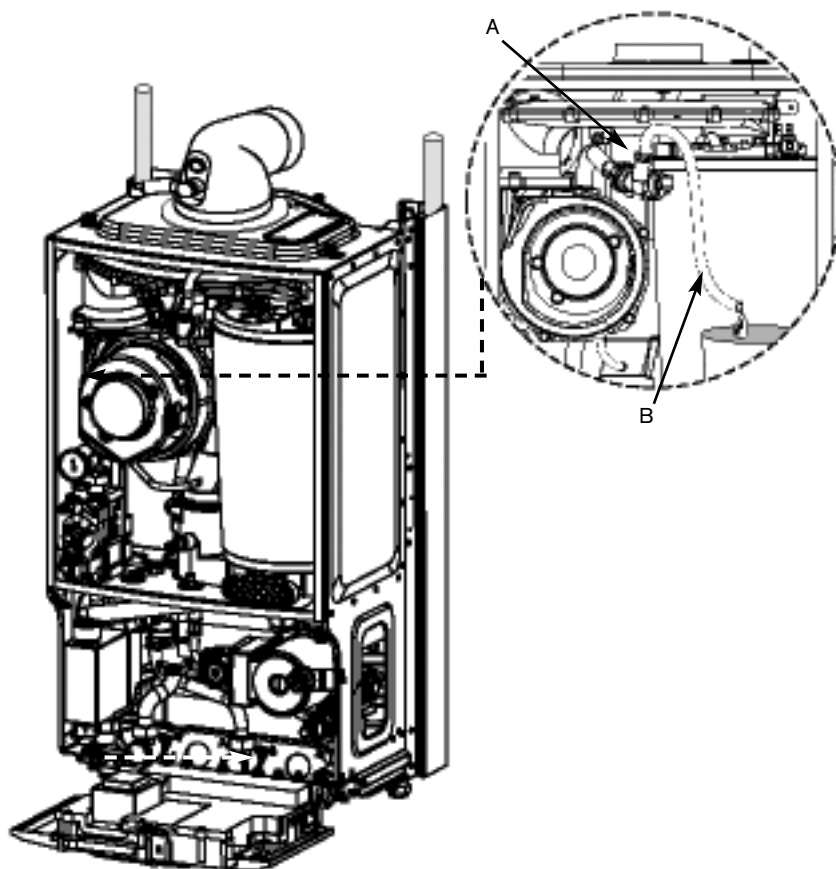
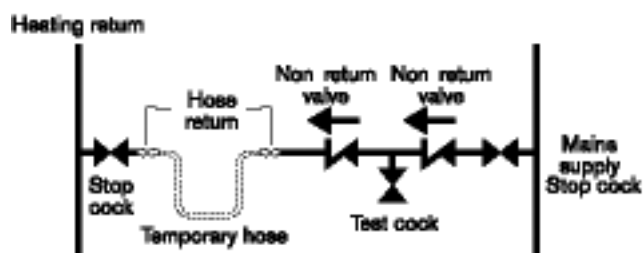
- 3 Check that the condensate pipe has been connected to the syphon.

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

- 4 Check pressure relief drain pipe (H) is correctly fitted and securely tightened.



### SYSTEM FILL



- 1 Turn on the water main and open the system valves.
- 2 Open all radiator valves.
- 3 Fill the system via a WRAS approved filling loop.
- 4 Vent (A) any air from the boiler heat exchanger using a suitable container to collect any water. Ensure tube outlet (B) 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.**
- 5 Vent all radiators, re-tighten when completed and check the system and correct any leaks.
- 6 The boiler integral expansion vessel is pre-charged to 0.75 bar (equal to a static head of 7.5m (22ft). A Schraeder type valve is fitted to the expansion vessel to allow for pressure adjustment if required.
- 7 If an extra expansion vessel is fitted to the central heating return, adjust this to the **same pressure** as the appliance internal expansion vessel, refer to separate instructions with the extra expansion vessel.
- 8 Briefly open the pressure relief valve to test its operation.
- 9 If required increase system pressure back to 1 bar.
- 10 Rotate the adjustable pointer on the pressure gauge to record the set system pressure.
- 11 Isolate and remove filling loop connection to system.

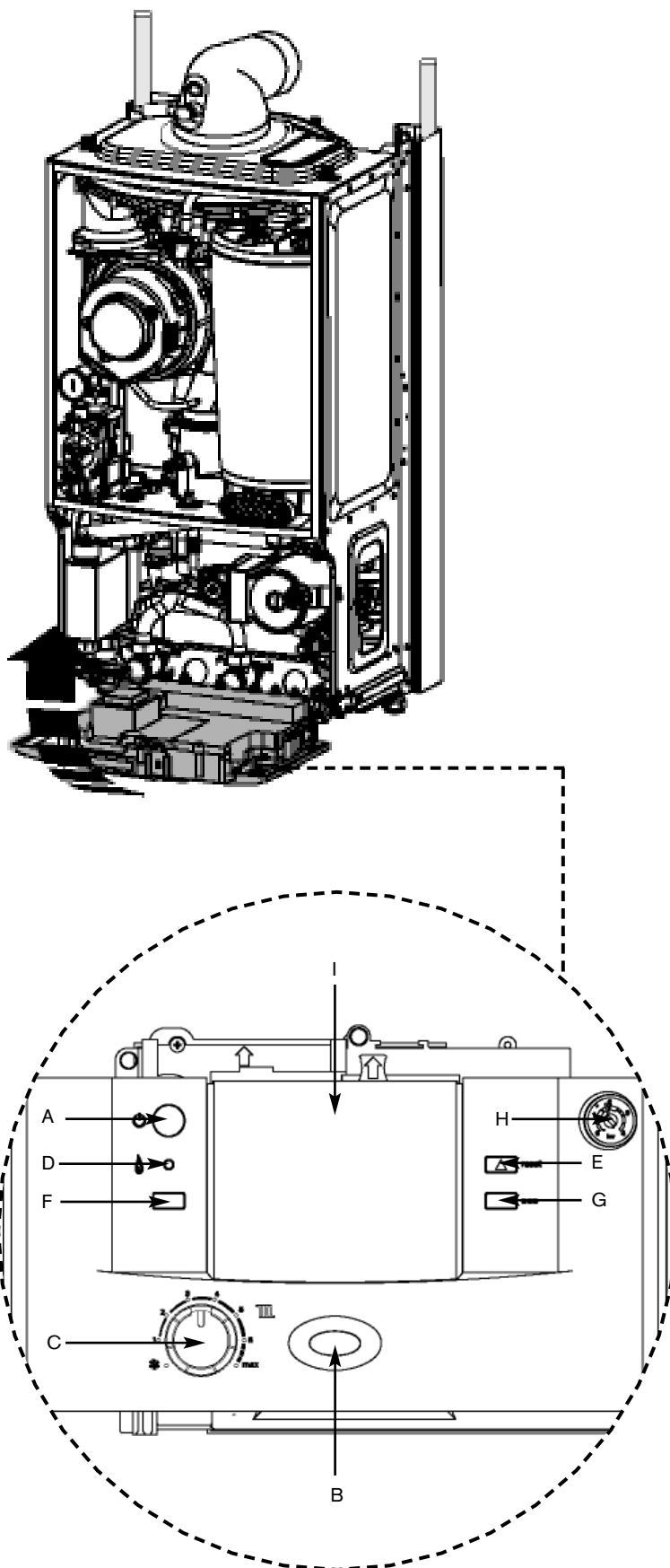
## STARTING THE APPLIANCE

**IMPORTANT:** Never run the appliance when the appliance/system is empty or partially filled.

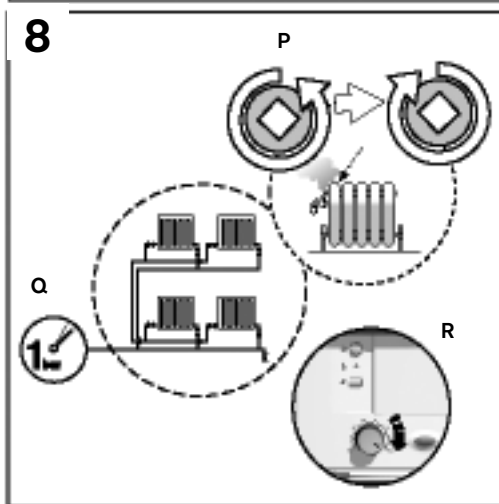
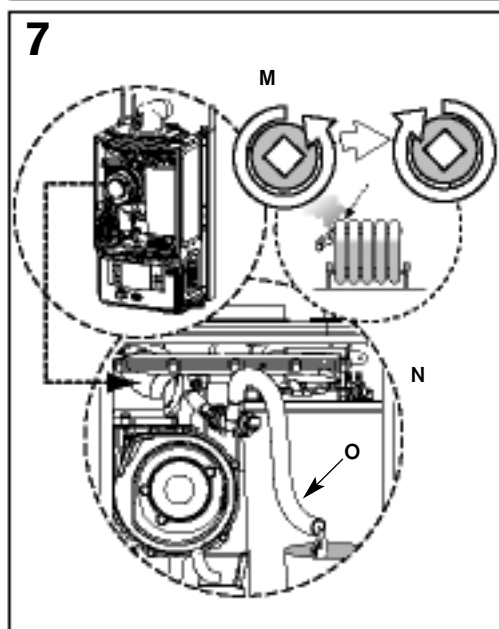
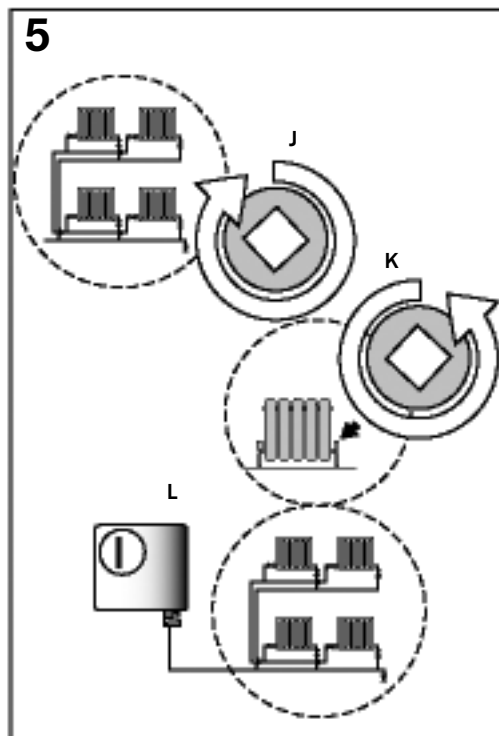
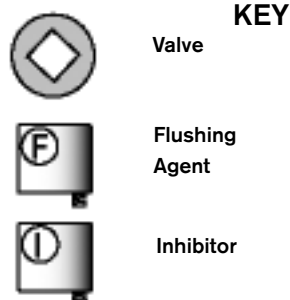
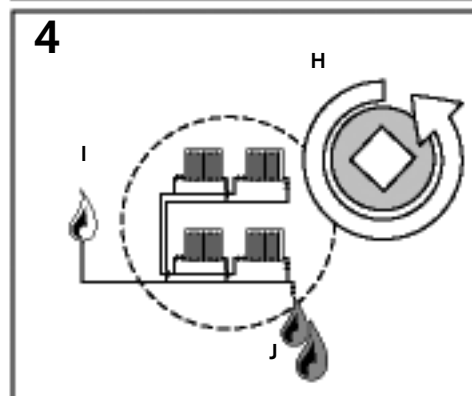
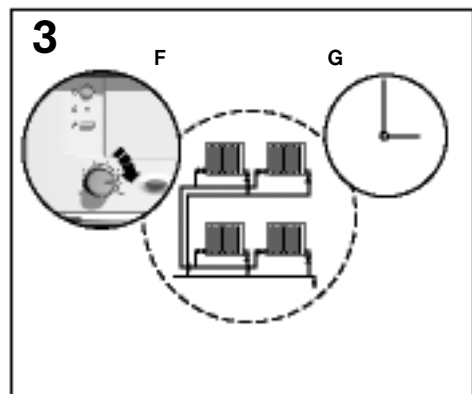
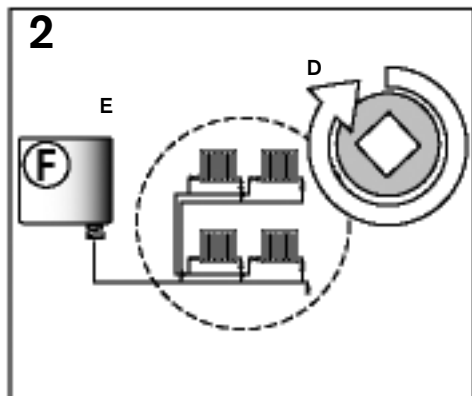
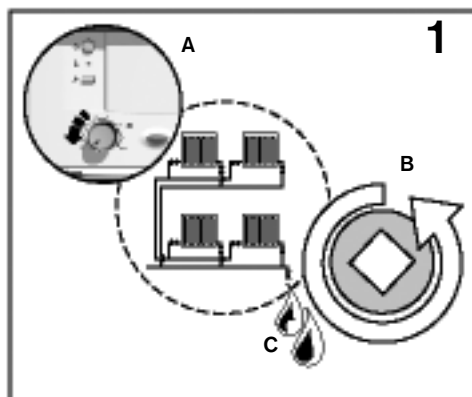
Switching the appliance on/off:

- 1 ▶ Turn on mains power supply
  - ▶ 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
- 2 A - On/off button  
 B - On/off and fault indicator (BLUE)  
 C - Central heating temperature control  
 D - Burner indicator (GREEN)  
 E - Reset button  
 F - Service button  
 G - Not used  
 H - System pressure gauge  
 I - Cover or optional programmer
- ▶ Press power button (A) and the power on indicator (B) illuminates BLUE.
- 3 ▶ Turn the boiler thermostat control (C) to maximum. The burner on indicator (D) illuminates GREEN when the burner has lit.
- 4 ▶ If the boiler fails to light the BLUE power indicator (B) and reset button (E) will flash alternately.  
 To reset press and hold the reset button (E) for 2 seconds. The boiler will be reset.

**CAUTION: DO NOT PRESS POWER INDICATOR (B) TO RESET BOILER.**







**IMPORTANT:** 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.

**ENSURE THAT THE SYSTEM HAS BEEN CLEANED AS ON PAGE 8 OF THESE INSTRUCTIONS.**

## FLUSHING (Central Heating):

- 1 Switch off the boiler (A).
- ▶ Open all drain cocks (B) and drain the system (C) while the appliance is hot.
- 2 Close drain cocks (D) and add a suitable flushing agent (E) at the correct strength for the system condition in accordance with the manufacturer's instructions.
- 3 Run the boiler/system at normal operating temperature (F) for the time stated by the manufacturer of the flushing agent (G).
- 4 Drain (H) and thoroughly flush the system to remove the flushing agent and debris (I).

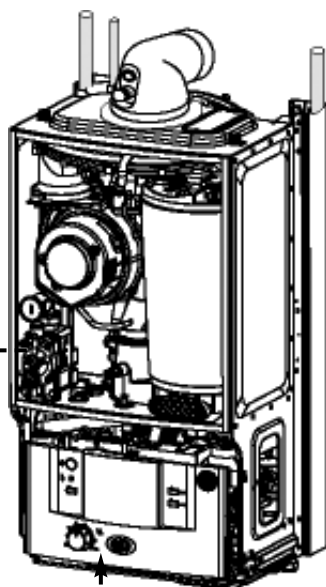
## INHIBITOR (Central Heating):

- 5 Check drain cocks are closed (J) and all radiator valves are open (K) before adding a suitable inhibitor (L) in accordance with the manufacturer's instructions.
- 6 Fill system via a WRAS approved filling loop to between 1 and 2 bar.
- 7 Vent all radiators; retighten vents when complete (M). Vent any air from the boiler heat exchanger using a suitable container to collect any water (N).
- ▶ Ensure tube outlet (O) is directed away from the fan or any other electrical component to prevent damage. Also place a suitable cover over the fan to prevent any spillage of water onto electrical connections. Ensure the cover is removed after venting.
- 8 Vent all radiators (P) and primary side of the hot water cylinder.
- ▶ Re-pressurise if necessary to 1 bar (Q).
- ▶ Set all controls to maximum (R).
- ▶ Record the date when the inhibitor was added to the system on the guarantee card.

**NOTE:** The concentration level 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.

**\* compatible with aluminium. The pH value of the system water must be less than 8 or the appliance guarantee will be invalidated.**



## WHEN RUNNING IN SERVICE MODE

**NOTE:** When fitted with the optional diverter valve (not supplied) and running in service mode, the boiler will operate both central heating and hot water circuits.

If fitted to an S or Y plan system, the system must only be run in central heating mode.

## THE COMBUSTION FOR THE APPLIANCE IS FACTORY SET.

**NO ADJUSTMENT IS REQUIRED IF THE GAS INLET PRESSURE IS CORRECT.**

### CHECKING GAS INLET PRESSURE:

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

### SETTING THE BOILER TO MAXIMUM:

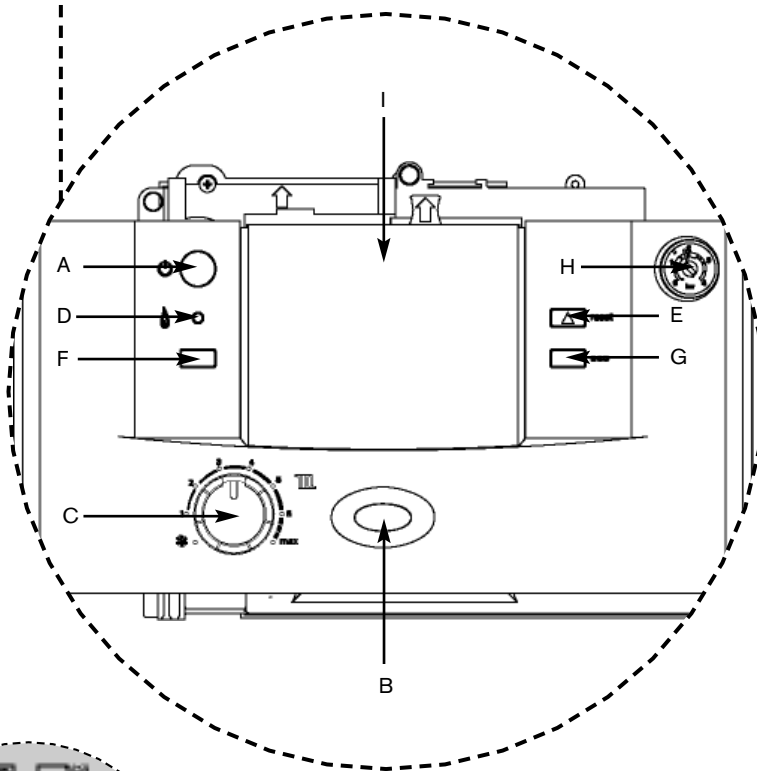
- 1 Press service button (F) for 10 seconds and set temperature to maximum.
  - The service button will illuminate continually and the blue power indicator will flash quickly.

### MEASURING THE INLET PRESSURE:

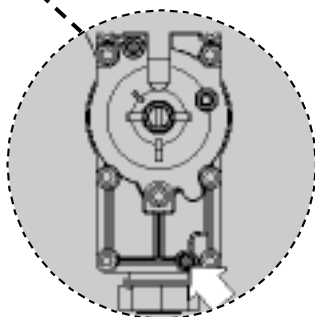
- 2 Slacken the screw in the inlet pressure test point and connect a manometer.
  - ▶ Measure the pressure with the boiler running at maximum.
  - ▶ Check the gas supply working pressure at the gas valve inlet point:
    - N.G. 18.5 mbar (minimum)
    - L.P.G. 37 mbar (minimum)
  - ▶ The gas rate should be measured at the gas meter after 10 minutes operation at maximum. See technical data section at the front of this manual.
  - ▶ Ensure inlet pressure is satisfactory with all other gas appliances working.
  - ▶ Replace controls cover. **NOTE:** This boiler is designed with a differential of 20°C across the heating system.

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

- ▶ If pressure is satisfactory press the service button (F) again and the boiler will return to normal operation.
- If left in the service mode the control will return to normal operation after 15 minutes.
- ▶ Re-seal the screw in the gas inlet pressure test point.



- A - On/off button
- B - On/off and fault indicator (BLUE)
- C - Temperature control
- D - Burner indicator (GREEN)
- E - Reset button
- F - Service button
- G - Not used
- H - System pressure gauge
- I - Cover or optional programmer



Inlet Test Nipple

ne boiler has been factory set, so there could be no need to adjust any controls.

### REPLACE OUTER CASING:

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

Replace top two screws (A).

Retighten bottom two screws (B).

### INSTALLING BOTTOM PANEL:

The bottom panel slides onto two ledges (C) either side of the boiler frame.

Hold the panel up against the underside of the boiler and slide towards the rear until it is fully engaged.

### HANDOVER:

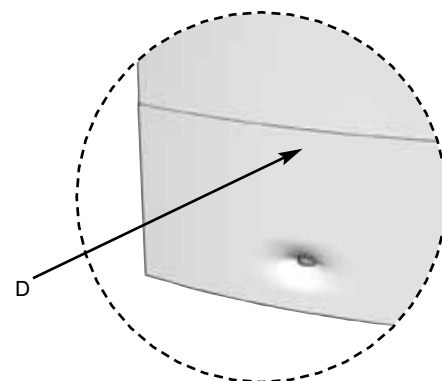
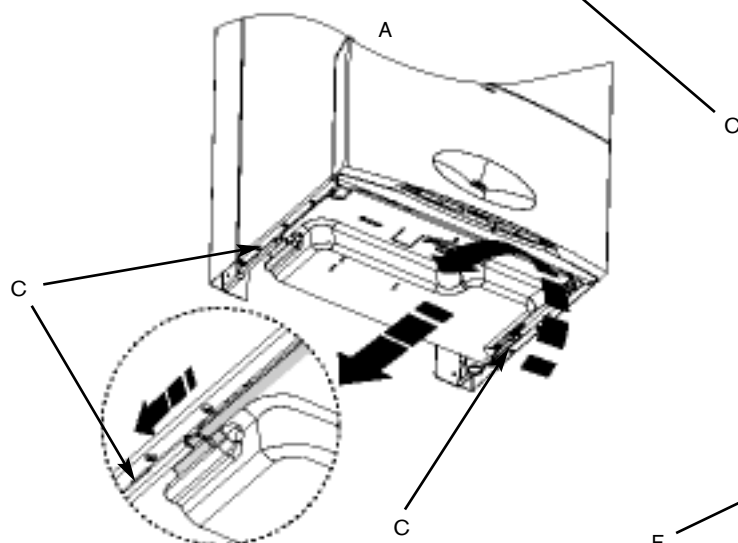
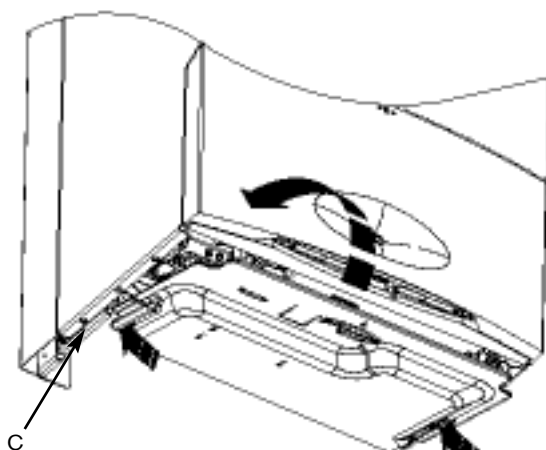
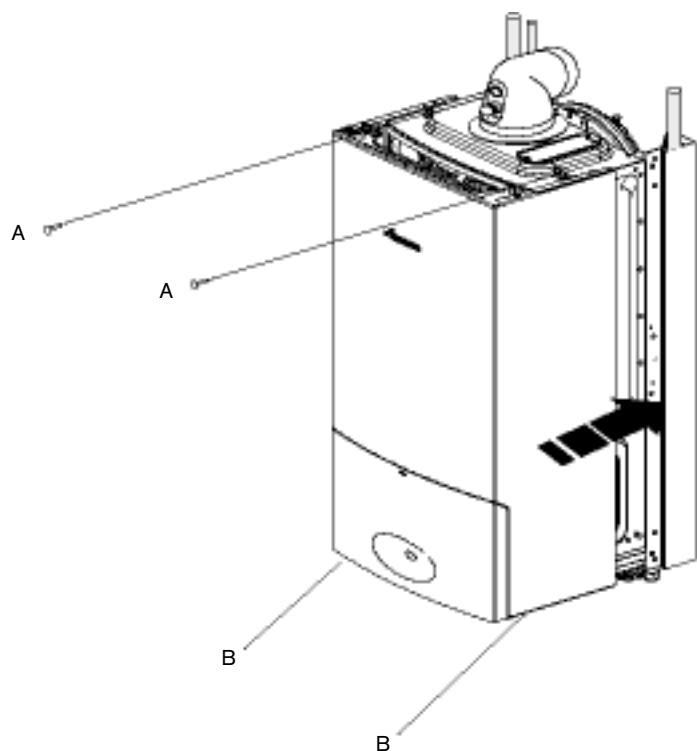
Complete the Benchmark checklist.

Open the fascia cover by gently pressing the centre top of the cover (D).

Set up the controls and show the user how to operate all the controls shown in the User Guide.

Place the user guide into the tray (E) on the inside of the fascia cover.

If the appliance is unused and exposed to freezing conditions, shut off all the mains supplies and drain the system and boiler.



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

**IMPORTANT: AFTER REPLACEMENT OF ANY COMPONENTS ALWAYS CHECK FOR GAS SOUNDNESS WHERE RELEVANT AND CARRY OUT FUNCTIONAL CHECKS AS DESCRIBED IN COMMISSIONING. ANY O-RING OR GASKET THAT APPEARS DAMAGED MUST BE REPLACED.**

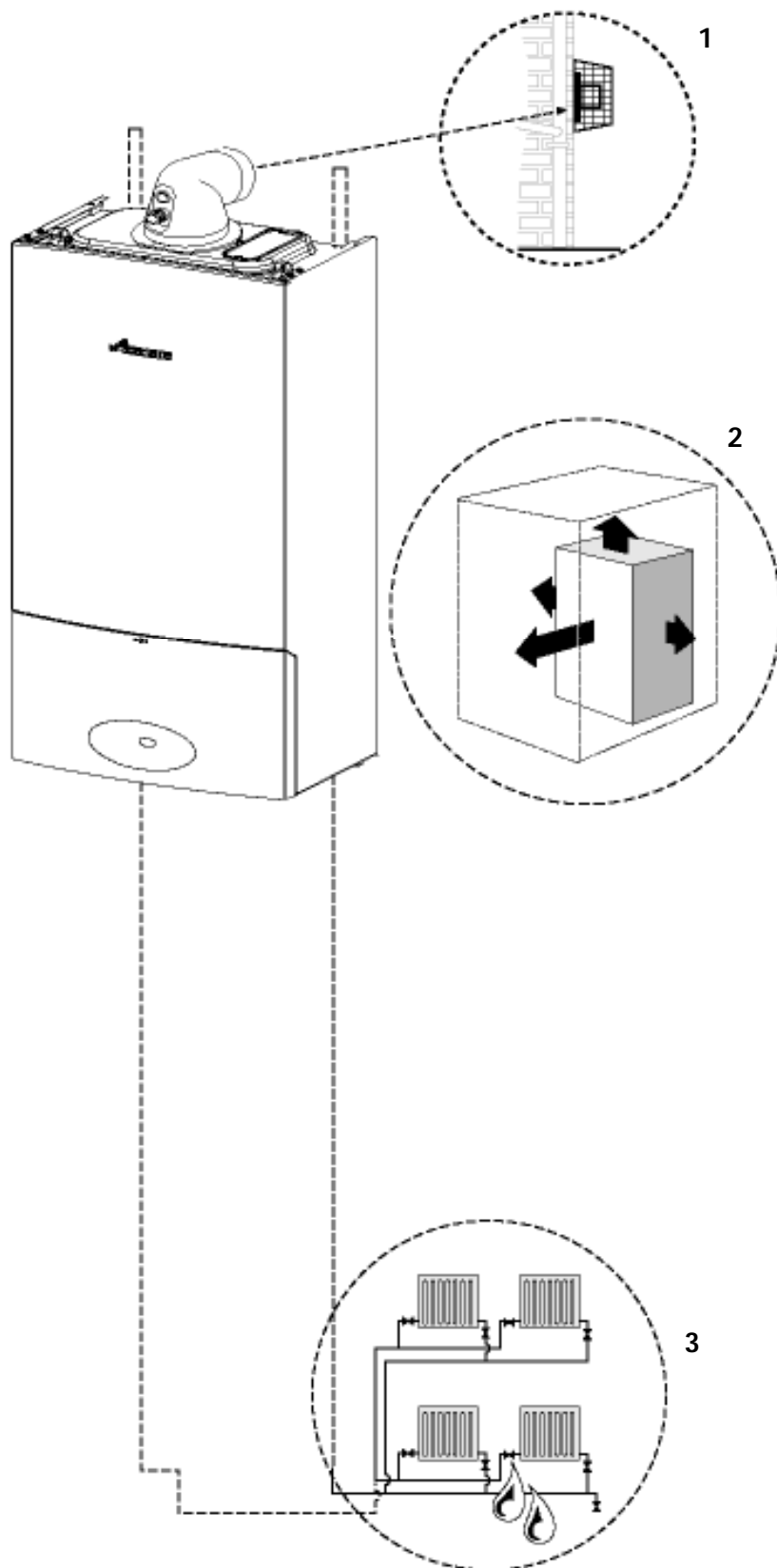
## INSPECTION AND SERVICE

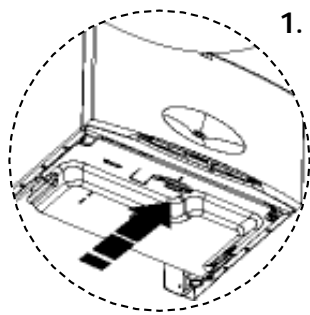
**IMPORTANT: Any service work must be carried out by competent registered engineers such as British Gas or Corgi registered personnel.**

- 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.**

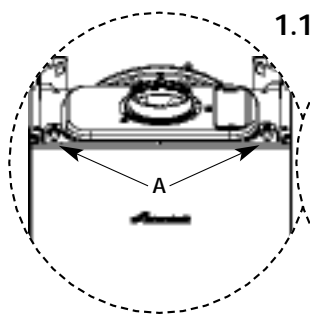
### Inspection

- 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.
- ▶ Operate the appliance and take note of any irregularities.  
Refer to Fault Finding for rectification procedures.

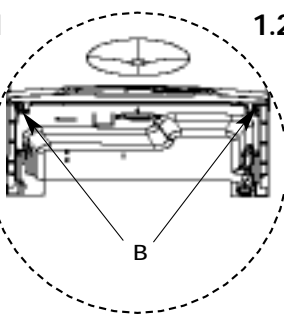




1.



1.1



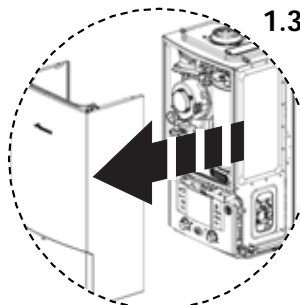
1.2

## INSPECTION AND SERVICE

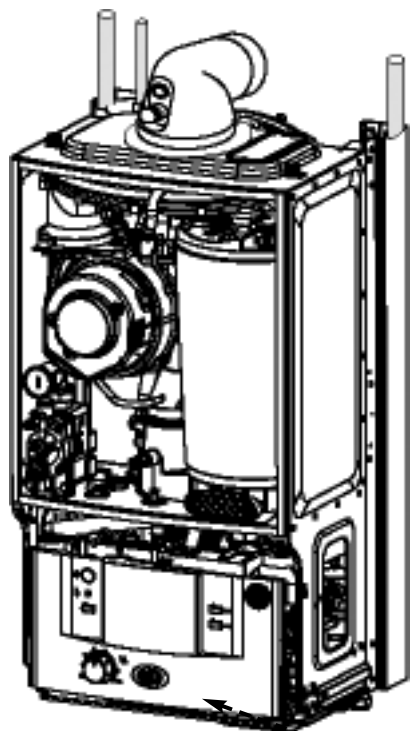
### Component Access

#### 1. Removing outer case

1. Remove bottom panel by pulling it forward and off.
- 1.1 Undo and remove 2 screws (A) securing boiler casing at the top of the appliance.
- 1.2 Undo but do not remove the 2 screws (B) securing boiler casing at the bottom of the appliance.
- 1.3 Pull case forward and remove.

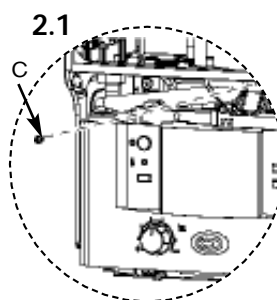


1.3

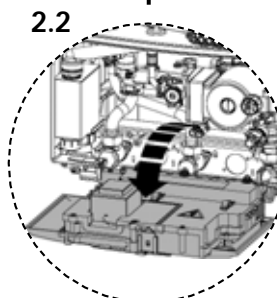


#### 2. Adjusting boiler control to service position

- 2.1 Remove screw (C) securing control.
- 2.2 Gently pull forward until it comes to rest in service position.



2.1



2.2

#### Primary Heat Exchanger

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

- 3 Check fan pressure at the test point next to the fan using an electronic manometer.
  - ▶ The boiler must be run at maximum output. Pressure will read negative and be greater than:
 

Natural gas	LPG
12i System - 3.1 mbar	12i System - 4.9 mbar
24i System - 3.1 mbar	24i System - 4.1 mbar
  - ▶ Pressures measured below these figures will indicate that the heat exchanger will require cleaning.

### Setting Boiler to Maximum.

NOTE: When running in the service mode, the boiler will operate both the Central Heating and DHW circuits. This is to allow sufficient time for the setting procedure.

#### WHEN RUNNING IN SERVICE MODE

NOTE: When fitted with the optional diverter valve (not supplied) and running in service mode, the boiler will operate both central heating and hot water circuits.

If fitted to an S or Y plan system, the system must only be run in central heating mode.

It will be necessary to run water through the DHW circuit to ensure that the boiler will not cycle on low heating demands.

- A - On/off button
- B - On/off and fault indicator (BLUE)
- C - Central heating temperature control
- D - Burner indicator (GREEN)
- E - Reset button
- F - Service button
- G - Not used
- H - System pressure gauge
- I - Cover or optional programmer

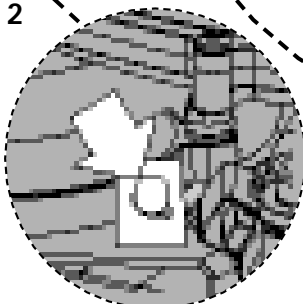
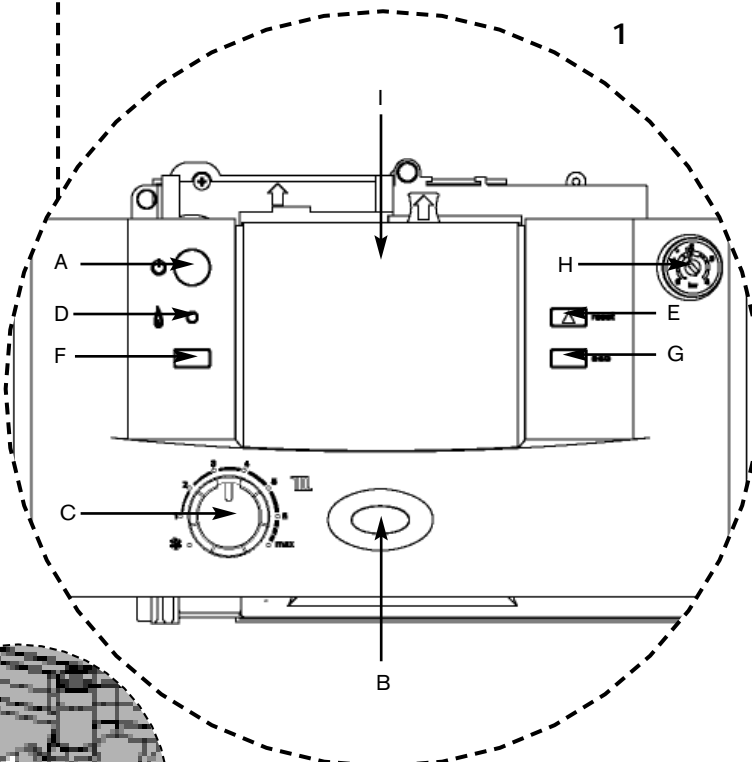
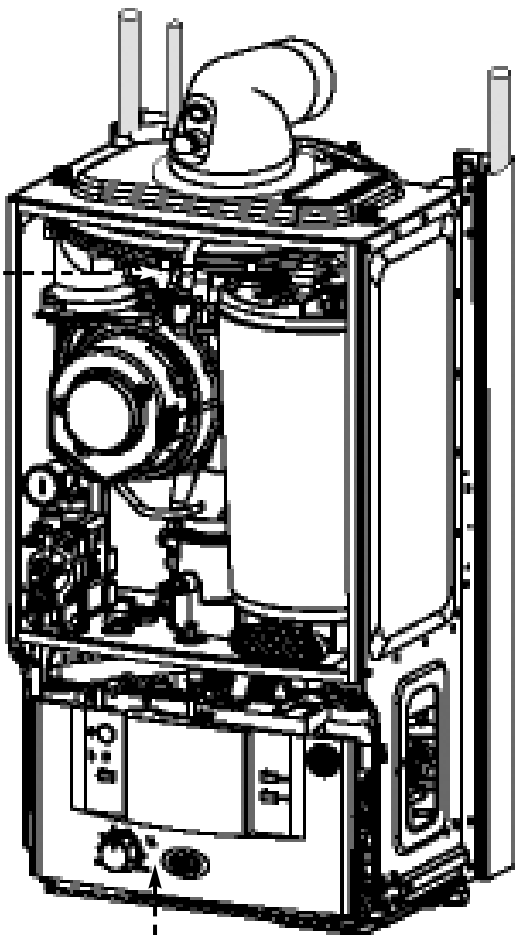
- 1 Press and HOLD service button (F) for 10 seconds and set temperature to maximum.
  - The service button will illuminate continually and the blue power indicator will flash quickly.
  - The boiler will stay in this mode for 15 minutes unless the service button is pressed again.
- 2 Pull the cover off and connect a manometer to the fan pressure test point.
  - ▶ After measurement replace test point cover.

Pressure will read **negative** and be greater than:

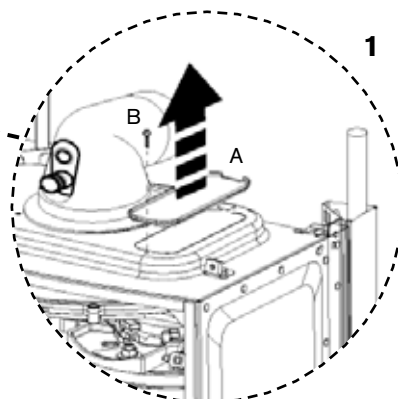
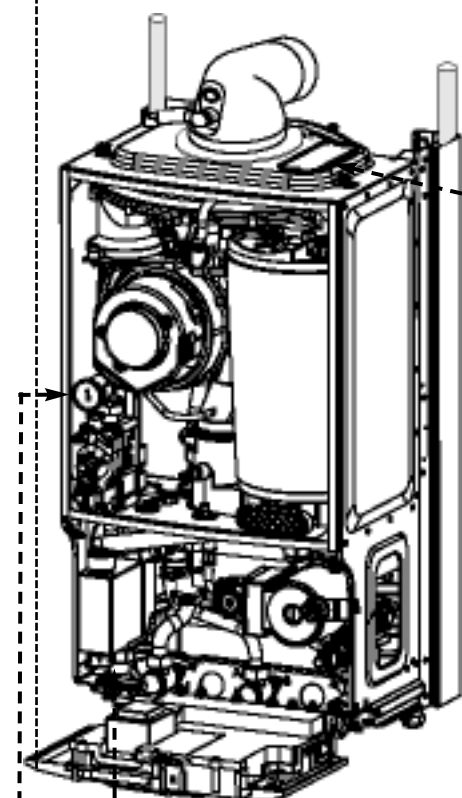
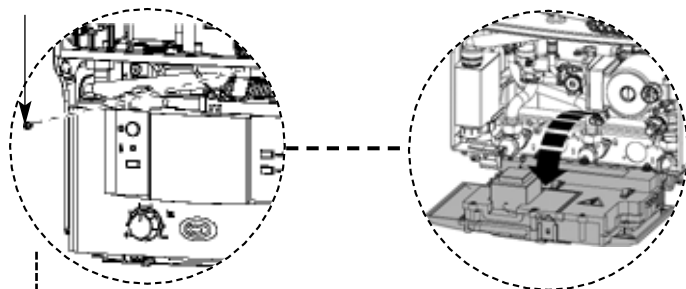
Natural gas	LPG
12i System - 3.1 mbar	12i System - 4.9 mbar
24i System - 3.1 mbar	24i System - 4.1 mbar

- Pressures measured below these figures will indicate that the heat exchanger will require cleaning.

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



Remove control retaining screw



## INSPECTION AND SERVICE

COMBUSTION TESTING MUST BE CARRIED OUT BY A COMPETENT PERSON. IT 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 IT'S USE.

**IMPORTANT:** IF THE JOINT BETWEEN THE AIR/GAS MANIFOLD AND THE HEAT EXCHANGER IS DISTURBED THE SEALING GASKET MUST BE REPLACED.

### To Clean the Heat Exchanger

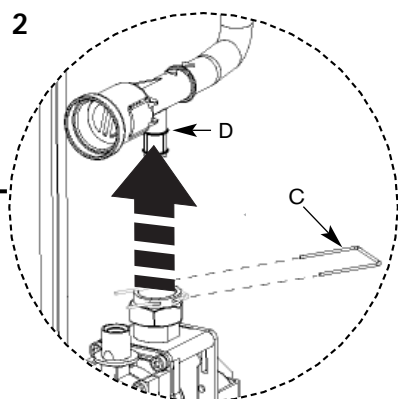
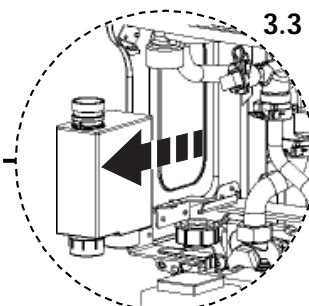
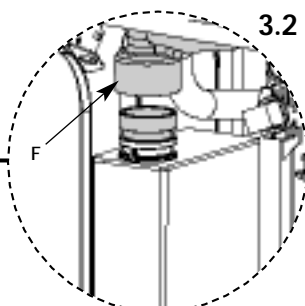
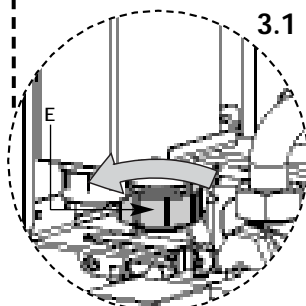
- 1** With outer case and base panel removed and the power isolated from the appliance, remove the cover panel (A) by removing the retaining screw (B).
- 2** Remove clip (C) from gas valve outlet.
  - ▶ Pull gas adjustment assembly (D) free from the plastic connection on the gas valve.
  - ▶ Pull gas adjustment assembly (D) forward to clear case.

### Removing Siphon

- 3.1** Undo plastic nut (E) on the siphon outlet. Drop condensate tube away from siphon.
- 3.2** Remove hose (F).
- 3.3** Remove siphon

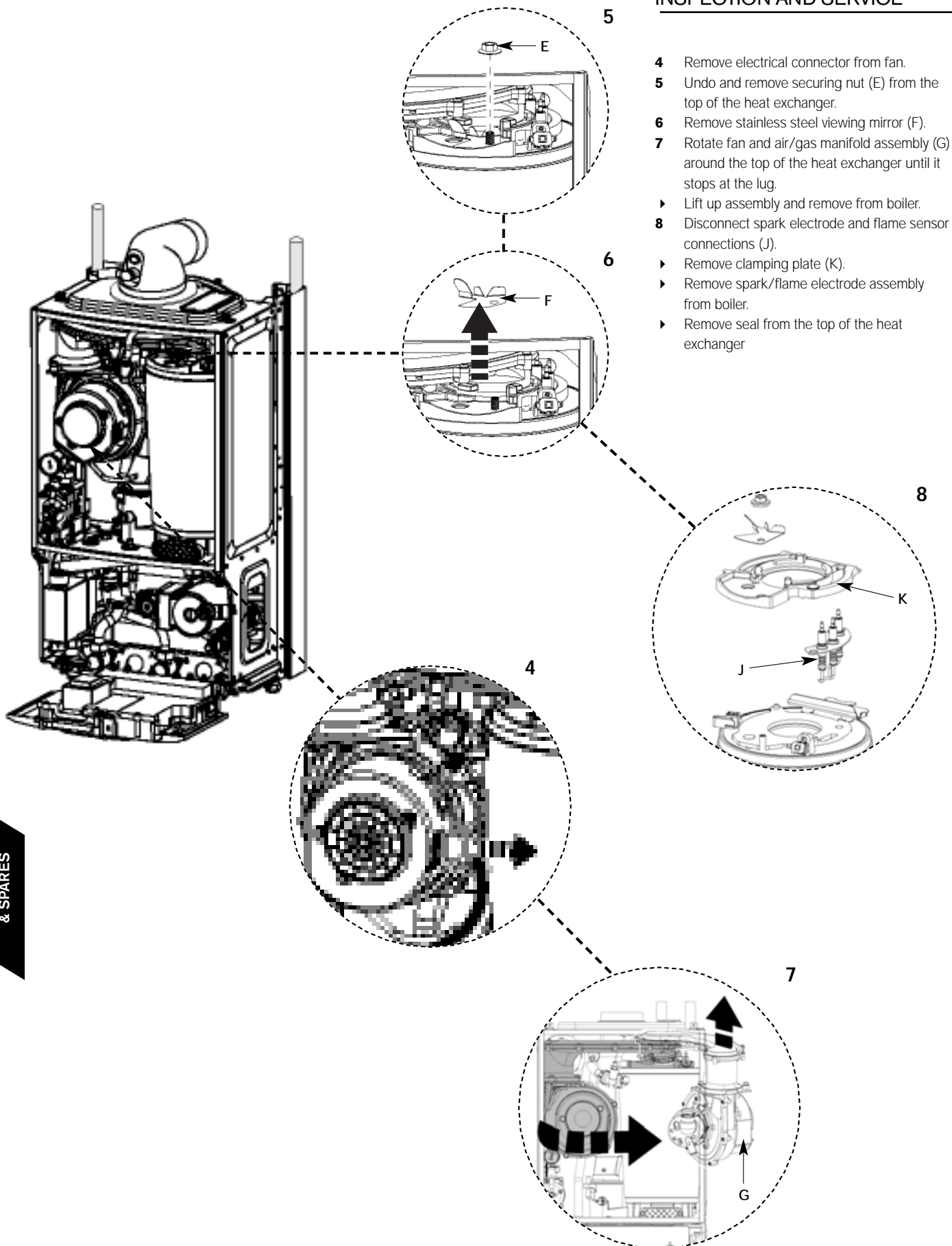
### Siphon

- The siphon body is transparent so contents can be examined for any blockage.
- ▶ If necessary flush with clean water.

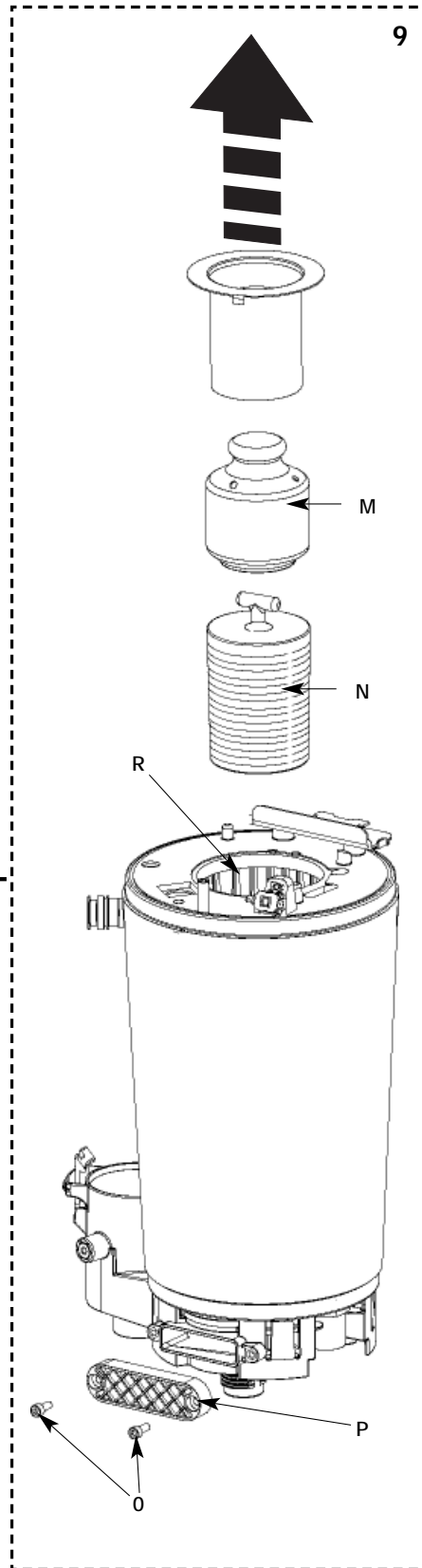
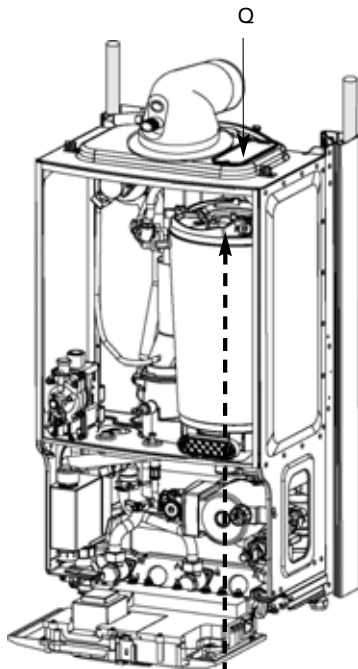


SERVICING  
& SPARES

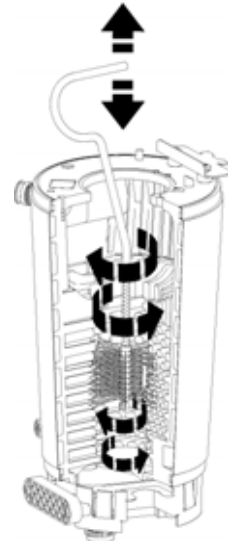
## INSPECTION AND SERVICE







- 9 Remove burner (L).
- ▶ Remove top baffle (M).
- ▶ Remove baffle (N).
- ▶ Remove the two hexagon headed screws (O) retaining the access cover (P) on the sump.
- ▶ Access the heat exchanger flue ways by inserting the soft brush (7 716 192 312) through the top access hole in the casing (Q).
- ▶ Clean heat exchanger flue ways (R) using the cleaning brush (7 716 192 312) removing any debris from the access point in the sump.



Clean around sealing surface on sump and replace access cover (P). Using a suitable container to collect water from siphon connection at the base of the boiler flush heat exchanger with water.

- ▶ Re-assemble ensuring that baffles (N) and (M) are refitted correctly.
- ▶ When re-fitting the burner ensure that it fits centrally within the heat exchanger and location tabs are situated in location holes.
- ▶ **Ensure seal is replaced with new seal and is correctly fitted.**
- ▶ Check the siphon unit for blockage before refitting to boiler.
- ▶ **Reassemble and check combustion as stated in the gas conversion section.**

NOTE: To show the heat exchanger more clearly it has been shown external to the appliance

**THE BAFFLES (N) AND (M) MUST BE REFITTED INTO THE HEAT EXCHANGER AS SHOWN IN 9. FAILURE TO DO SO MAY RESULT IN DAMAGE TO THE BOILER**

**IMPORTANT: IF THE JOINT BETWEEN THE AIR/GAS MANIFOLD AND THE HEAT EXCHANGER IS DISTURBED THE SEALING GASKET MUST BE REPLACED.**

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

**IMPORTANT: AFTER REPLACEMENT OF ANY COMPONENTS ALWAYS CHECK FOR GAS SOUNDNESS WHERE RELEVANT AND CARRY OUT FUNCTIONAL CHECKS AS DESCRIBED IN COMMISSIONING. ANY O-RING OR GASKET THAT APPEARS DAMAGED MUST BE REPLACED.**

## REPLACEMENT OF PARTS

### 1. Removing outer case

- 1.1 Undo 4 screws (A) securing boiler casing.
- 1.2 Pull case forward and remove.
  - ▶ To remove bottom tray, pull forward on the tag on the underside of the tray.

**The following components can be replaced with the outer case removed:**

**Primary sensor  
Overheat thermostat  
Flue limit thermostat**

### 2. Primary sensor

- ▶ Remove electrical connection (B) by pulling upwards. Squeeze retaining clip on plastic moulding (C) and pull sensor (D) upwards until clear of pocket in heat exchanger.
- ▶ Coat new sensor with heat conductive paste and replace.

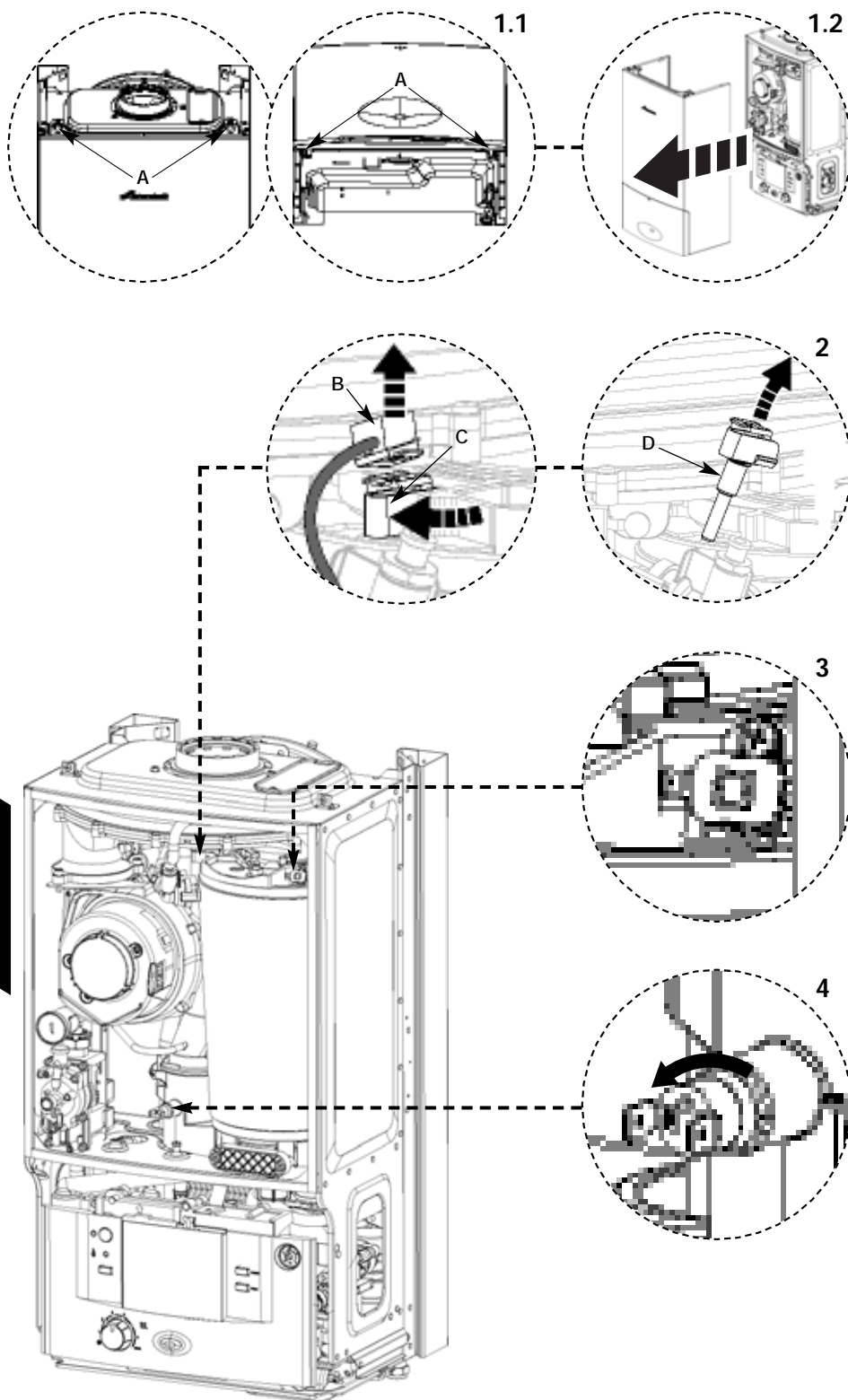
### 3. Overheat thermostat

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

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

### 4. Flue overheat thermostat

- ▶ Remove electrical connections.
- ▶ Unscrew thermostat from flue.



Access to the following components require the control to be moved in to the service position:

Gas valve  
Siphon  
PCB fuse  
Transformer

## 5. Moving boiler control to service position

5.1 Remove screw (A) securing control.

5.2 Gently pull forward.

## 6. Gas valve

▶ Isolate gas supply at boiler gas cock.

6.1 Remove wire clip from gas valve outlet then pull gas adjustment assembly free from plastic connector and pull forward clear of case.

6.2 Undo bottom gas connection to gas valve.

6.3 Undo two securing screws (C) on the underside of casing.

▶ Pull valve up and forward out of boiler.

▶ Disconnect electrical connections.

▶ Replace valve with new seals and check for gas soundness.

**Note:** The valve will require setting; follow procedure "Setting the gas/air ratio" in the gas conversion section.

## 7. Gas adjuster

▶ Isolate gas supply at boiler gas cock.

▶ Repeat step 6.1 above.

▶ Twist retaining clip (D) to release then remove clip and tube.

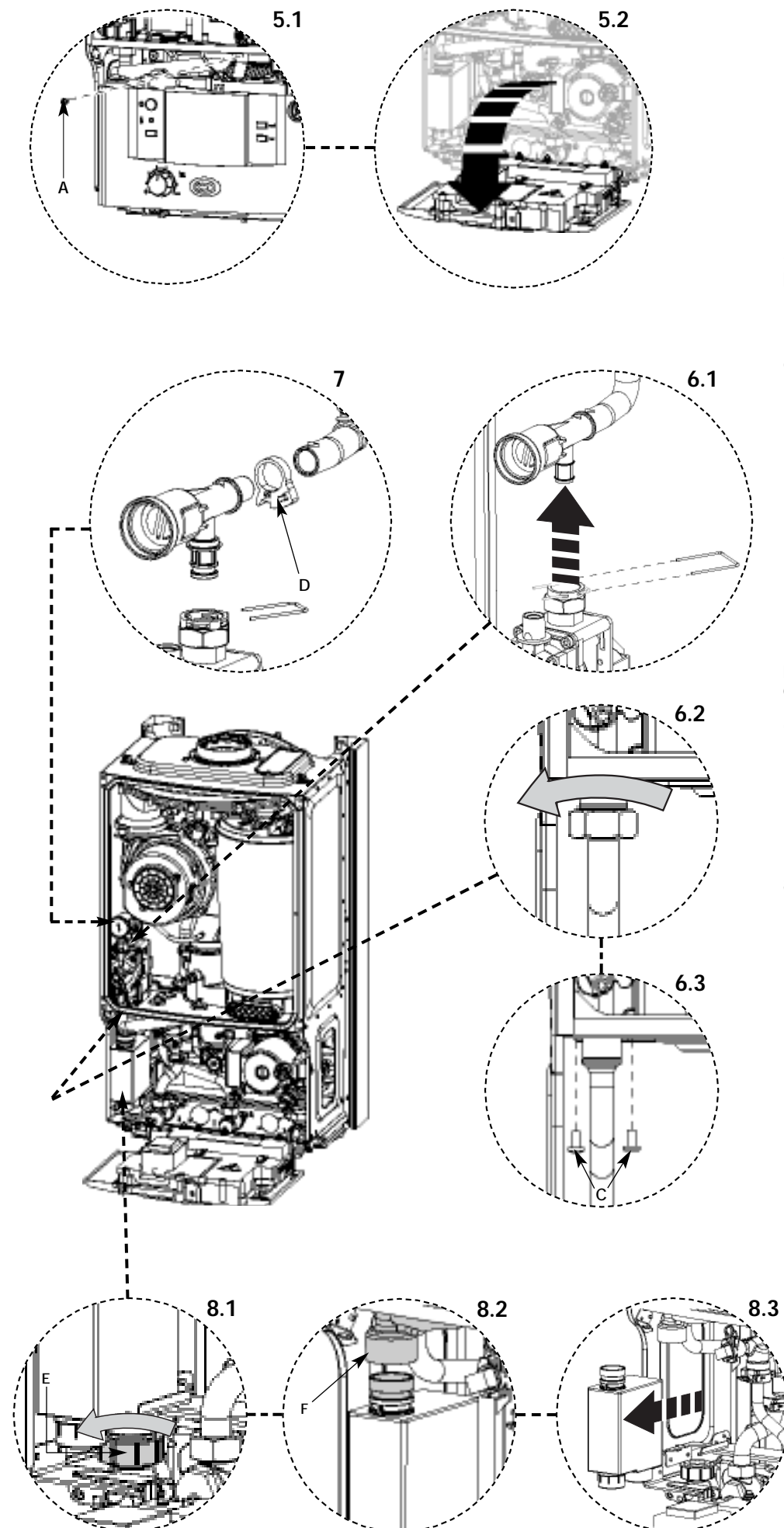
▶ Refit new adjuster and secure with clip.

## 8. Siphon

8.1 Undo plastic nut (E) on the siphon outlet. Drop condensate tube away from siphon.

8.2 Remove hose (F).

8.3 Remove siphon.



## 9. Access to boiler control components

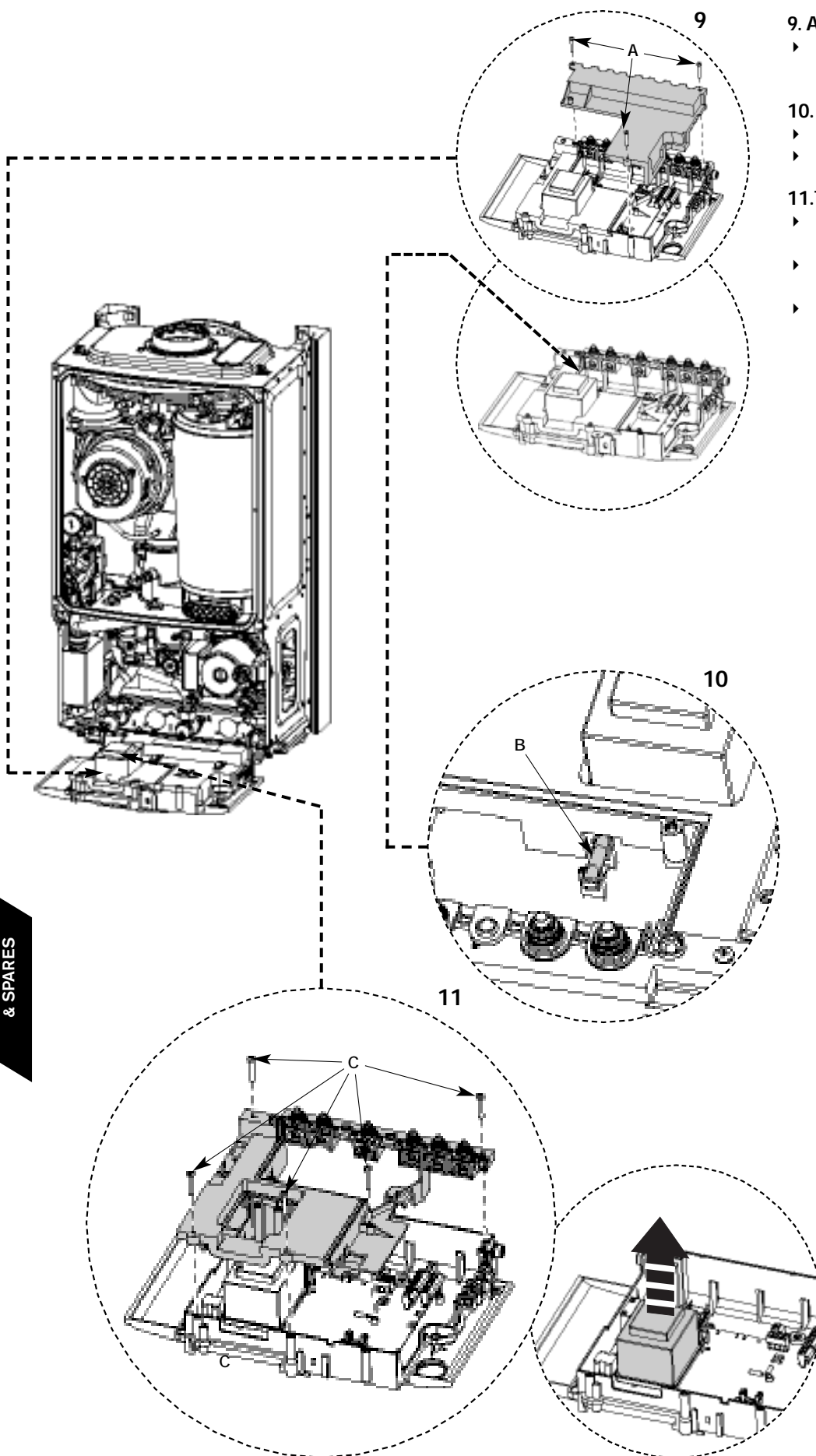
- ▶ Remove 3 screws (A) and remove cover from control.

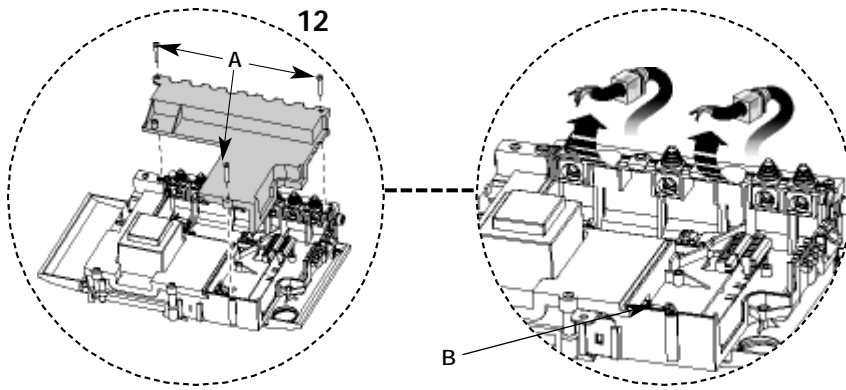
## 10. PCB fuse

- ▶ Remove fuse (B) from the PCB and replace.
- ▶ There is a spare fuse clipped into the cover.

## 11. Transformer

- ▶ Disconnect all electrical connections from the control.
- ▶ Remove 5 screws (C) retaining the rear panel of the control and remove panel.
- ▶ Pull transformer upwards from PCB.





## 12. Replacing control

The control is supplied within its plastic housing. The complete unit must be replaced.

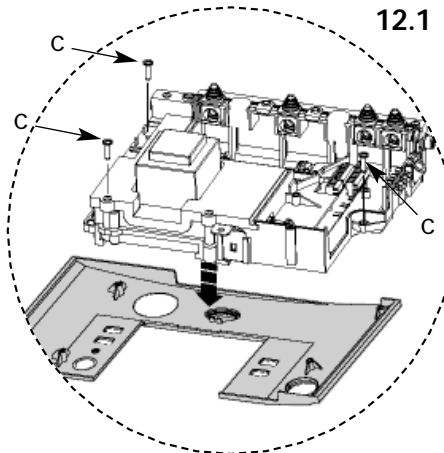
- ▶ Remove ALL electrical connections from the control PCB including where cables run through restraints. These can be unclipped from the plastic moulding noting their position.
- ▶ Remove the code plug (B). The code plug should be left attached to the frame of the boiler by its plastic safety thread.

12.1 Remove the 3 screws (C) retaining the front facia making sure to support the facia when removing the last screw.

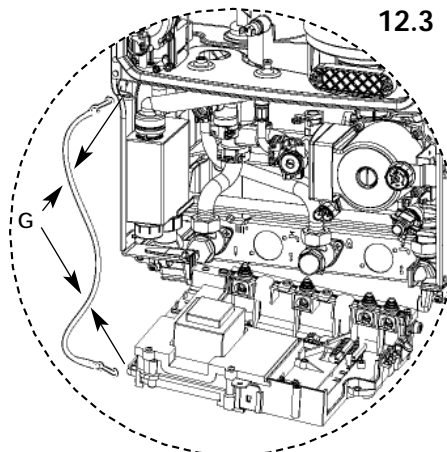
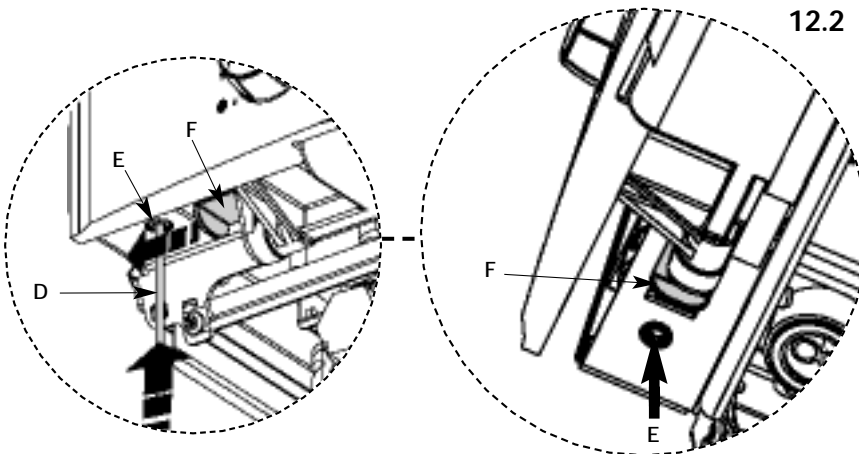
12.2 Using a suitable tool (D), press the button (E) upwards and slide the control support bracket (F) to the left.

12.3 Support the control and unclip control support cable (G) from the boiler frame.

- ▶ Remove the support cable and fit to the new control.
- ▶ Remove appropriate cable restraints from the new control box.
- ▶ Fit control to the boiler.
- ▶ Re-connect support cable to the boiler and all electrical connections to the new control.



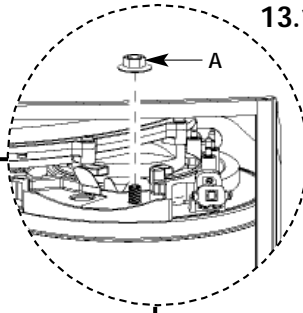
**IMPORTANT: ENSURE CODE PLUG IS RE-FITTED TO THE NEW CONTROL. IF THIS IS NOT DONE THE BOILER WILL INDICATE ERROR AND WILL NOT FUNCTION.**





## REPLACEMENT OF PARTS

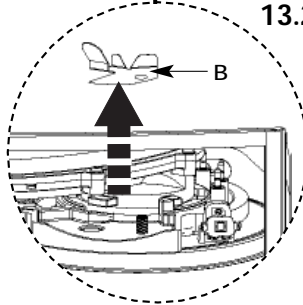
13.1



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

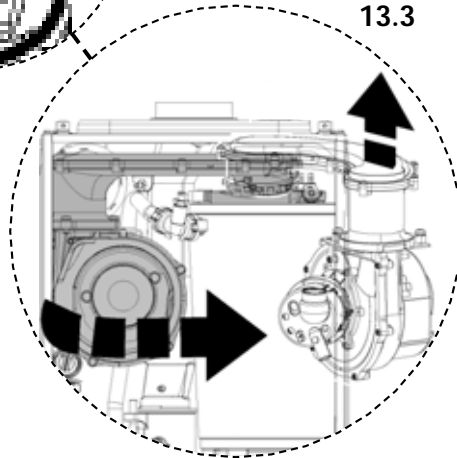
Pressure switch  
Fan  
Electrode assembly  
Burner  
Heat exchanger

13.2



**IMPORTANT: IF THE JOINT BETWEEN THE AIR/GAS MANIFOLD AND THE HEAT EXCHANGER IS DISTURBED THE SEALING GASKET MUST BE REPLACED.**

13.3



### 13. Air / gas manifold and fan assembly

- Remove electrical connector from fan.
- Remove wire clip from gas valve outlet then pull gas adjustment assembly free from plastic connector and pull clear of case. See 6.1.

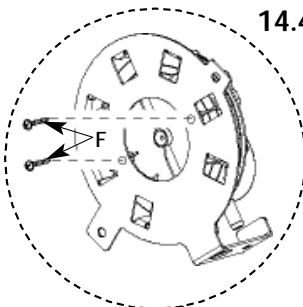
13.1 Undo and remove securing nut (A) from the top of the heat exchanger.

13.2 Remove stainless steel viewing mirror (B).

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

- Lift up assembly and remove from boiler.

14.4



### 14. Pressure switch

14.1 Remove electrical connections (C).

14.2 Slacken top retaining screw and remove bottom screw. (D).

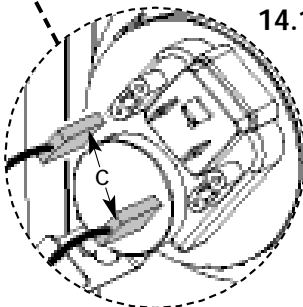
14.3 Remove tube (E).

14.4 Remove 2 screws (F) retaining pressure switch to bracket.

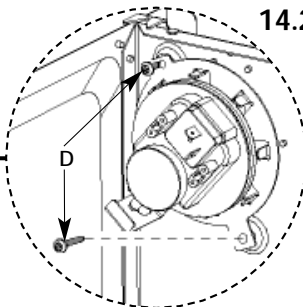
- Refit new pressure switch to bracket.

**IMPORTANT: ENSURE TUBE IS REFITTED TO PRESSURE SWITCH**

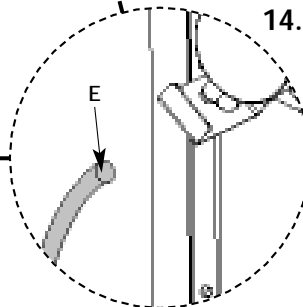
14.1

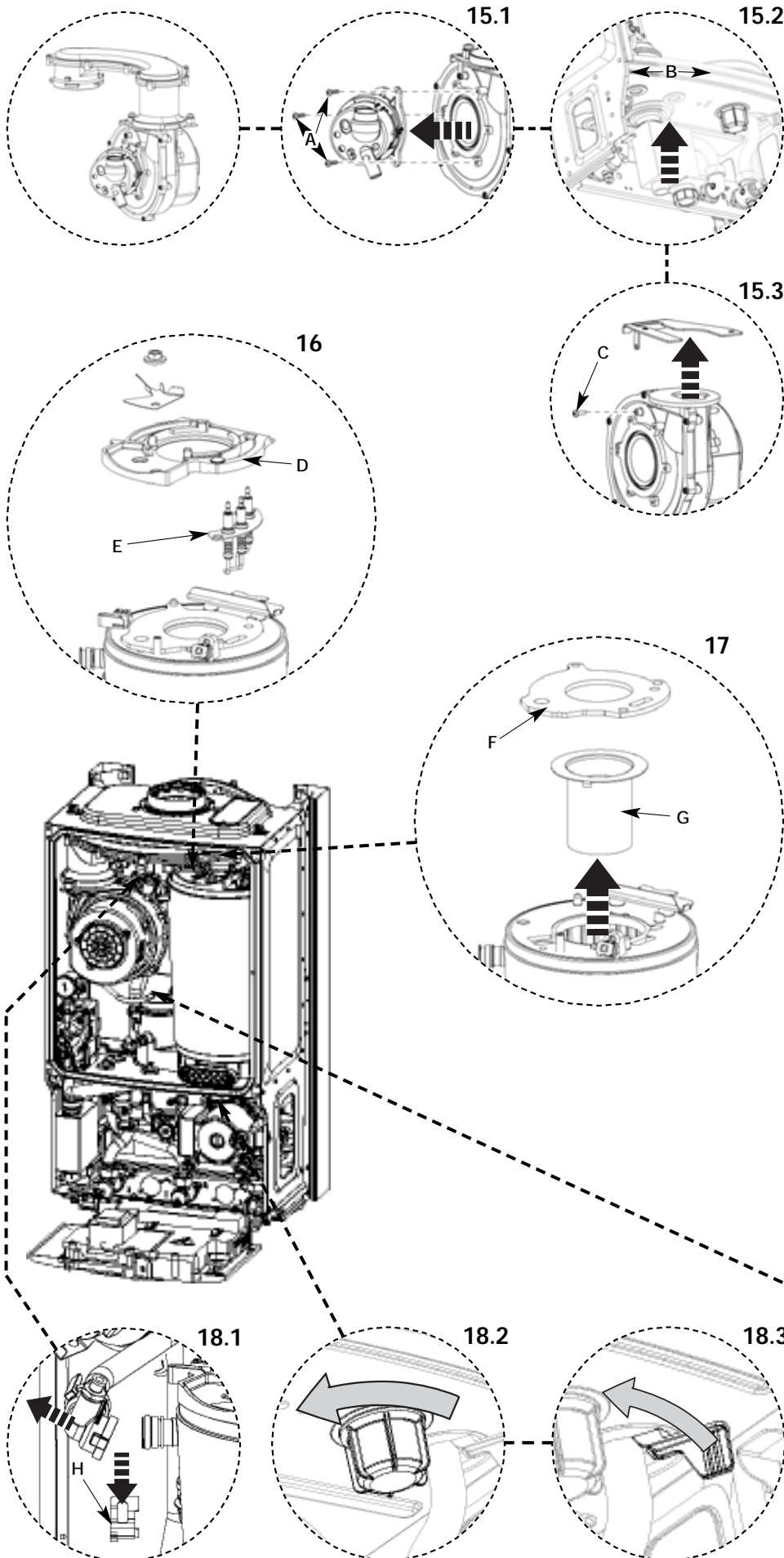


14.2



14.3





## 15. Fan

- 15.1 Remove 3 screws (A) retaining mixing chamber.
- 15.2 Remove 2 screws (B) retaining the fan to the air/gas manifold.
- 15.3 Remove screw (C) retaining plate and remove.
  - ▶ Re-assemble with new fan ensuring seals are correctly fitted.

## 16. Electrode assembly

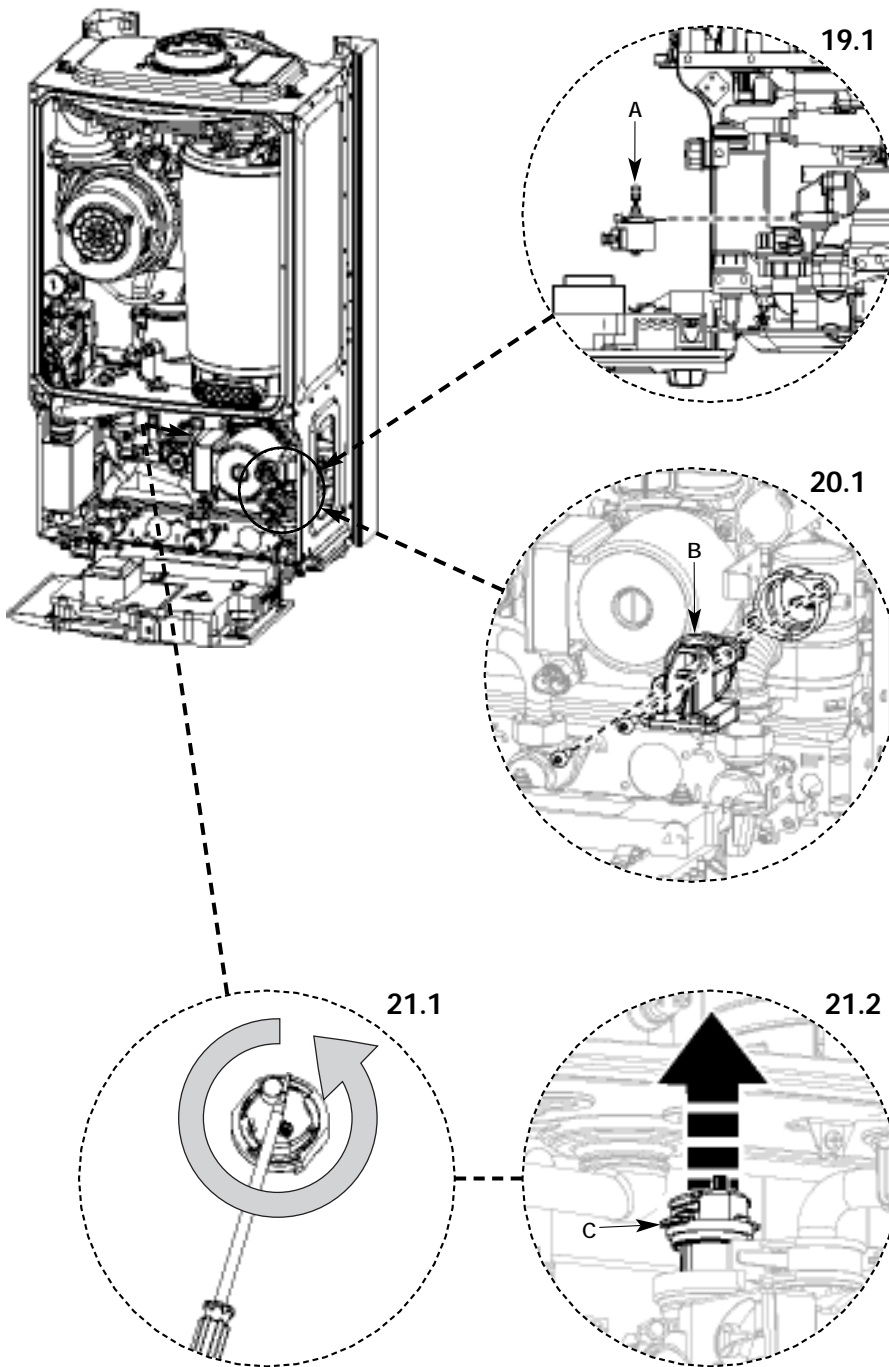
- ▶ Disconnect spark electrodes and flame sensor connection.
- ▶ Remove clamping plate (D).
- ▶ Remove spark/flame electrode assembly (E) from heat exchanger.

## 17. Burner

- ▶ Remove seal (F) from the top of the heat exchanger.
- ▶ Remove burner (G).
- ▶ Replace new burner in correct position.
- ▶ Ensure that burner tab fits correctly into hole.
- ▶ Ensure that the seal is replaced with a new one.

## 18. Heat Exchanger

- ▶ Isolate flow and return valves then drain the boiler.
- ▶ Remove siphon.
- 18.1 Remove clip from plastic elbow on the flow pipe and pull flow pipe away from heat exchanger.
- 18.2 Remove plastic nut from the bottom of the boiler.
- 18.3 Rotate lever to release return pipe.
- 18.4 Undo flue connection from sump.
  - ▶ Pull heat exchanger assembly up to clear.
  - ▶ Reassemble and check combustion as stated in the gas conversion section.



## 19. Diverter valve motor (if fitted)

- ▶ Ensure the appliance is in service mode (there is no need to drain the appliance).
- ▶ Disconnect the electrical connector from the diverter valve motor.

19.1 Pull the motor assembly (A) towards you. The assembly will slide free from the valve.

- ▶ To refit, follow the above in reverse.

## 20. Diverter valve

- ▶ Ensure the appliance has been fully drained (see draining the appliance).
- ▶ Disconnect the electrical connector from the diverter valve motor.
- ▶ Undo the two screws holding the valve to the plastic housing.

20.1 Withdraw the valve (B) and clean the valve chamber if necessary.

- ▶ To refit, follow the above in reverse. Ensure any seals that have been disturbed are renewed.

## 21. Auto air vent

- ▶ Ensure the appliance has been fully drained (see draining the appliance).

21.1 Use a screwdriver or similar to rotate the air vent anticlockwise.

21.2 Lift the air vent (C) out of the housing and remove.

- ▶ To refit, follow the above in reverse.



### 22. Pump head

- ▶ Ensure the boiler is fully drained (see draining the appliance).
- ▶ Disconnect the electrical connection from the bottom of the pump.

**22.1** Remove the four Allen bolts (A) securing the pump at each corner.

**22.2** Gently pull the pump towards you and remove.

- ▶ To refit, follow the above in reverse.

### 23. Pressure gauge

- ▶ Ensure the appliance has been fully drained (see draining the appliance).
- ▶ Withdraw the spring clip from the pressure sensing head housing.
- ▶ Undo the nut on the rear of the pressure gauge.
- ▶ Remove the pressure sensing head and pressure gauge capillary from the housing.
- ▶ To refit, follow the above in reverse. **DO NOT** omit the washer from the capillary when fitting a replacement gauge.

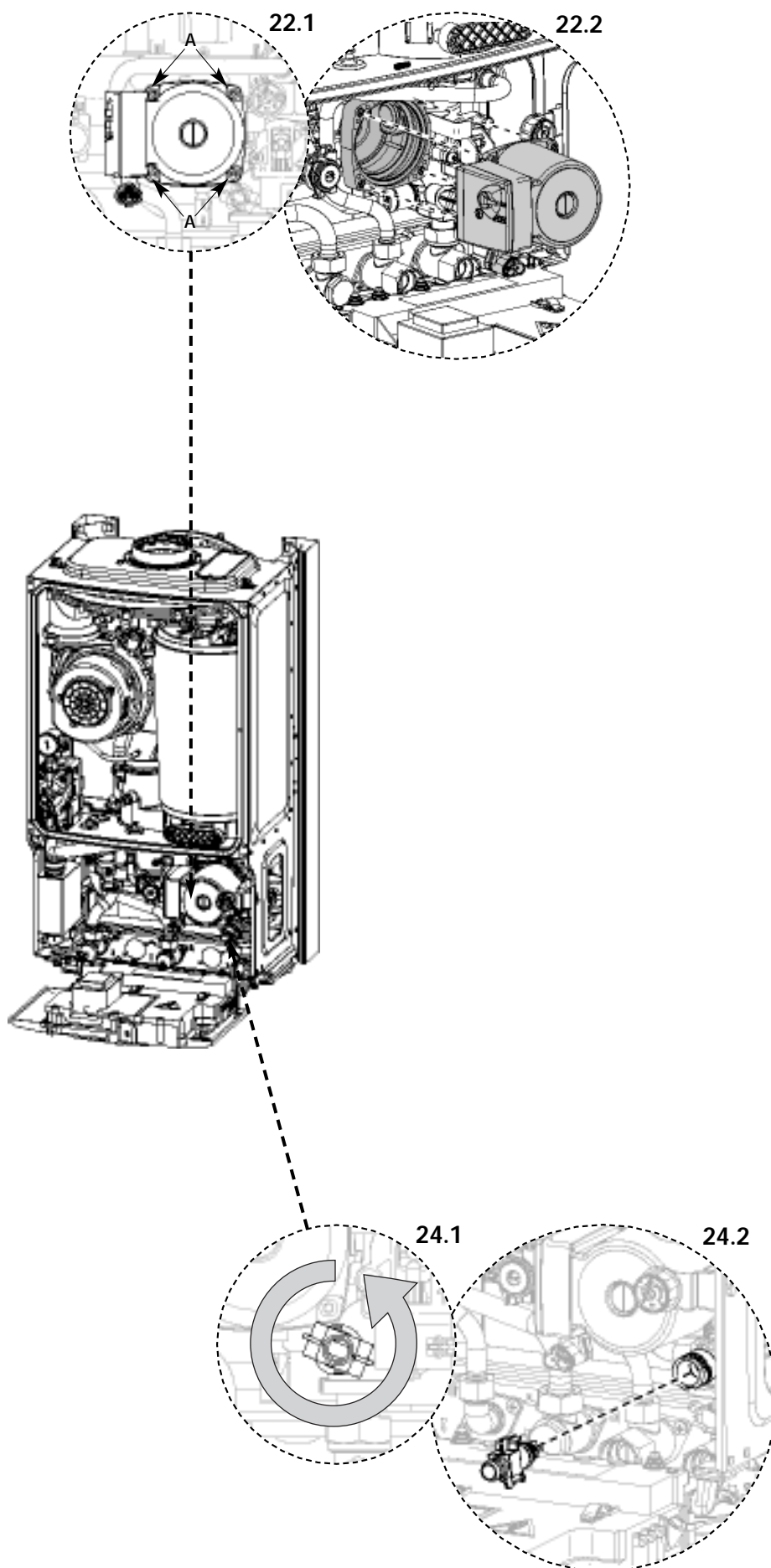
### 24. Drain tap

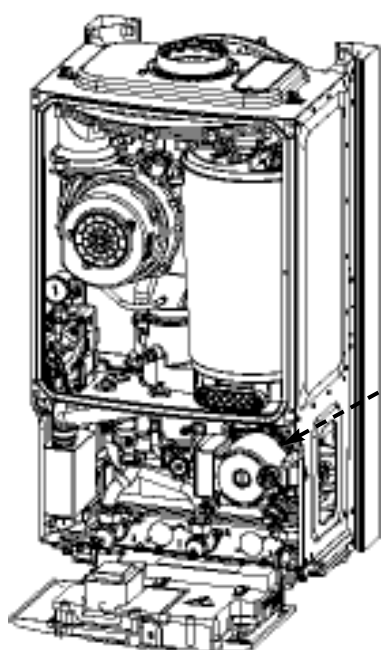
- ▶ Ensure the appliance has been fully drained (see draining the appliance).

**24.1** Rotate the drain tap fully anticlockwise.

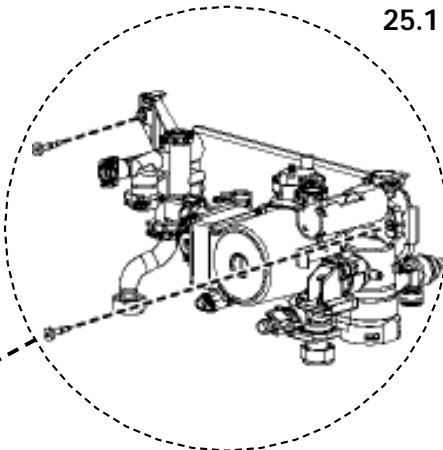
**24.2** Withdraw the drain tap from its housing

- ▶ To refit, follow the above in reverse. Ensure any seals that have been disturbed are renewed.

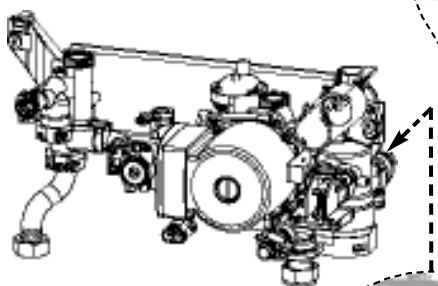
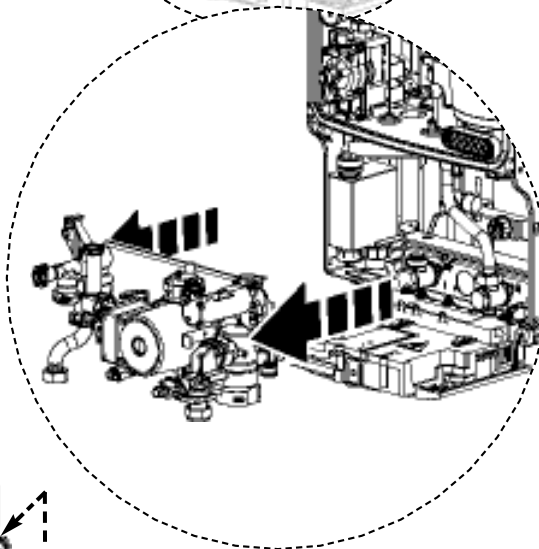
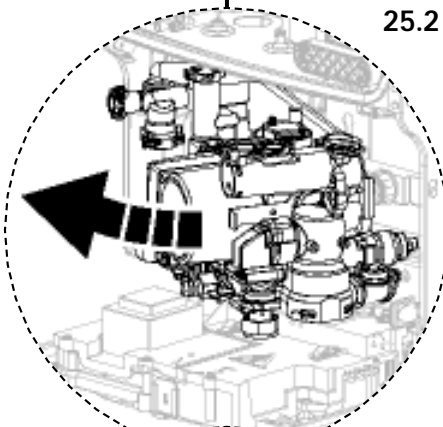




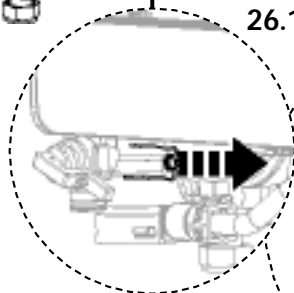
25.1



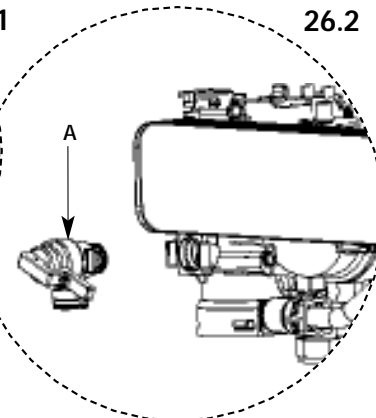
25.2



26.1



26.2



## REPLACEMENT OF PARTS

### 25. Hydraulic Block

- ▶ Ensure the appliance has been fully drained (see draining the appliance).
- ▶ Disconnect the electrical connections to the pump.
- ▶ Undo the nuts securing the copper water pipes to the manifold (there is no need to remove the gas pipe)
- ▶ Release the spring clips securing these water pipes to the plastic housing and remove the pipes.
- ▶ Release the spring clip securing the expansion vessel pipe to the plastic housing and remove the pipe.
- ▶ Undo the nut securing the pressure gauge to its bracket and remove the gauge.
- ▶ Release the locking devices that secure the two copper water pipes leading to the combustion chamber by squeezing the two tabs together and rotating anticlockwise (viewed from above).
- ▶ Remove the rubber pipe connecting the sump and remove the sump. NOTE: this is not essential but makes the removal of the block easier.

**25.1** Undo the two screws securing the hydraulic block to the chassis (located top left / top right of the housing)

**25.2** Lift the left hand side of the block slightly, then manoeuvre the block out, starting with the right hand side.

- ▶ Take care not to snag the harness or pressure gauge bracket.

**NOTE:** the block will still contain a small amount of water, which will spill if the block is tilted.

- ▶ To refit, follow the above in reverse. Ensure any seals that have been disturbed are renewed.

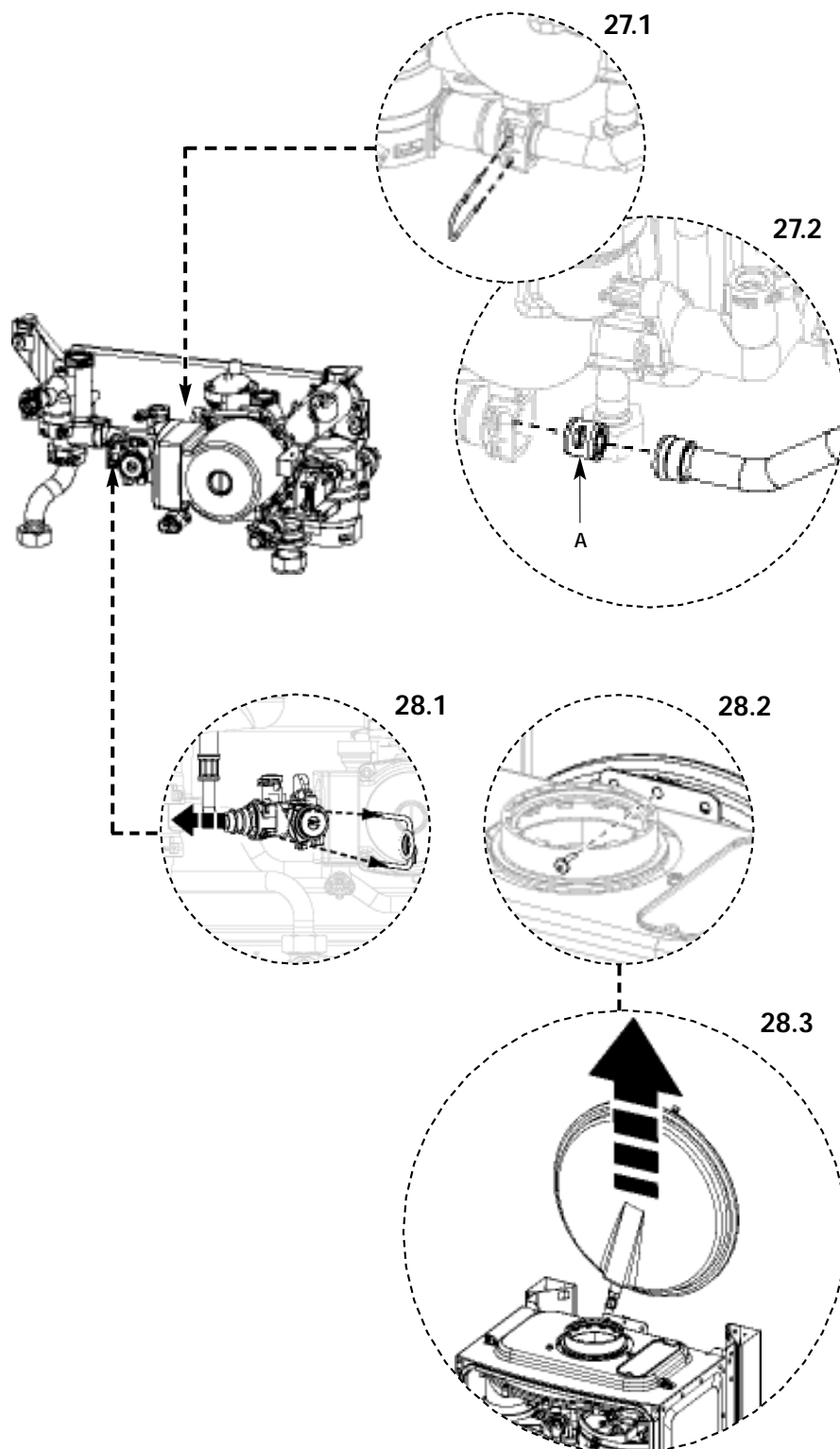
### 26. CH pressure relief valve

- ▶ Remove the hydraulic block from the boiler (See Removing the Hydraulic Block).

**26.1** Remove the spring clip from the pressure relief valve housing.

**26.2** Withdraw the pressure release valve (A) from its housing.

- ▶ To refit, follow the above in reverse. Ensure any seals that have been disturbed are renewed.



## 27. Bypass valve

- ▶ Remove the Hydraulic block from the boiler (See Removing the Hydraulic Block).
- 27.1** Remove the two spring clips at either end of the copper bypass pipe.
  - ▶ Undo the screw securing the left hand plastic housing to the heat exchanger
  - ▶ Move the housing to the left to free up one end of the pipe.
  - ▶ Remove the pipe from the right hand housing to reveal the bypass valve.
- 27.2** Using a pair of pliers, pull out the bypass valve (A) from the housing.
  - ▶ To refit, follow the above in reverse. Ensure any seals that have been disturbed are renewed.

## 28. Expansion vessel

The expansion vessel can be replaced with the boiler in position if there is a side exit flue fitted and there is a minimum clearance of 340mm above the boiler casing. If vertical flue is fitted then a similar clearance to one side and the flue is required.

If clearance is not available, the boiler will need to be removed from the mounting frame to gain access to the expansion vessel.

Alternatively a second vessel of at least the capacity of 7lts can be fitted to the return from the heating system as close as possible to the boiler.

### Expansion vessel replacement (Boiler in place)

- ▶ Isolate mains power from the boiler.
- ▶ Place the controls in service position.
- ▶ Isolate the boiler from the heating system (and cylinder return if internal diverter valve is fitted) using service valves.
- ▶ Drain boiler.
- 28.1** Remove clip from expansion vessel connection.
- 28.2** Remove screw retaining the vessel to the top of the boiler casing.
- 28.3** Pull the vessel up and out over the flue system or to one side if fitted with a vertical flue.
  - ▶ Remove the flexible hose from the expansion vessel and fit to the replacement vessel using a new seal. Ensure that the connection to the boiler will be pointing to the right hand side of the appliance when fitted.
  - ▶ Reassemble expansion vessel into boiler and connect flexible pipe to boiler.

### Removing boiler

- ▶ Isolate electrical supply.
- ▶ Isolate system and gas connections at the service valves.
- ▶ Drain boiler.
- ▶ Disconnect electrical supply and any external controls.
- ▶ Disconnect flue connection from the boiler.
- ▶ Undo connection to boiler at the service valves.
- ▶ Remove clip from expansion vessel connection to the boiler.
- ▶ Gently raise the boiler off the mounting frame.
- ▶ Replace expansion vessel and refit the boiler to the mounting frame.
- ▶ Follow the commissioning procedure in this manual.

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 CONVERSION IS EQUIPPED WITH A COMBUSTION ANALYSER CONFORMING TO BS 7927 AND IS COMPETENT IN ITS USE.

## 1. Setting the CO<sub>2</sub>

**Note:** When running in the service mode, the boiler will operate both the central heating & DHW circuits. This is to allow sufficient time for the setting procedure. It will be necessary to run water through the DHW circuit to ensure that the boiler will not cycle on low heating demands.

- 1.1 Connect manometer to inlet pressure point on the gas valve.
- ▶ To adjust the CO<sub>2</sub> it will be necessary to first operate the boiler at maximum output.
  - ▶ Press and hold down the service button (A) for 10 seconds until illuminated. The blue power indicator will flash.

- 1.2 Turn the temperature control to maximum; the boiler will then go to maximum output.

**Note:** The control will resume normal operation after 15 minutes or if the service button is pressed for over a second.

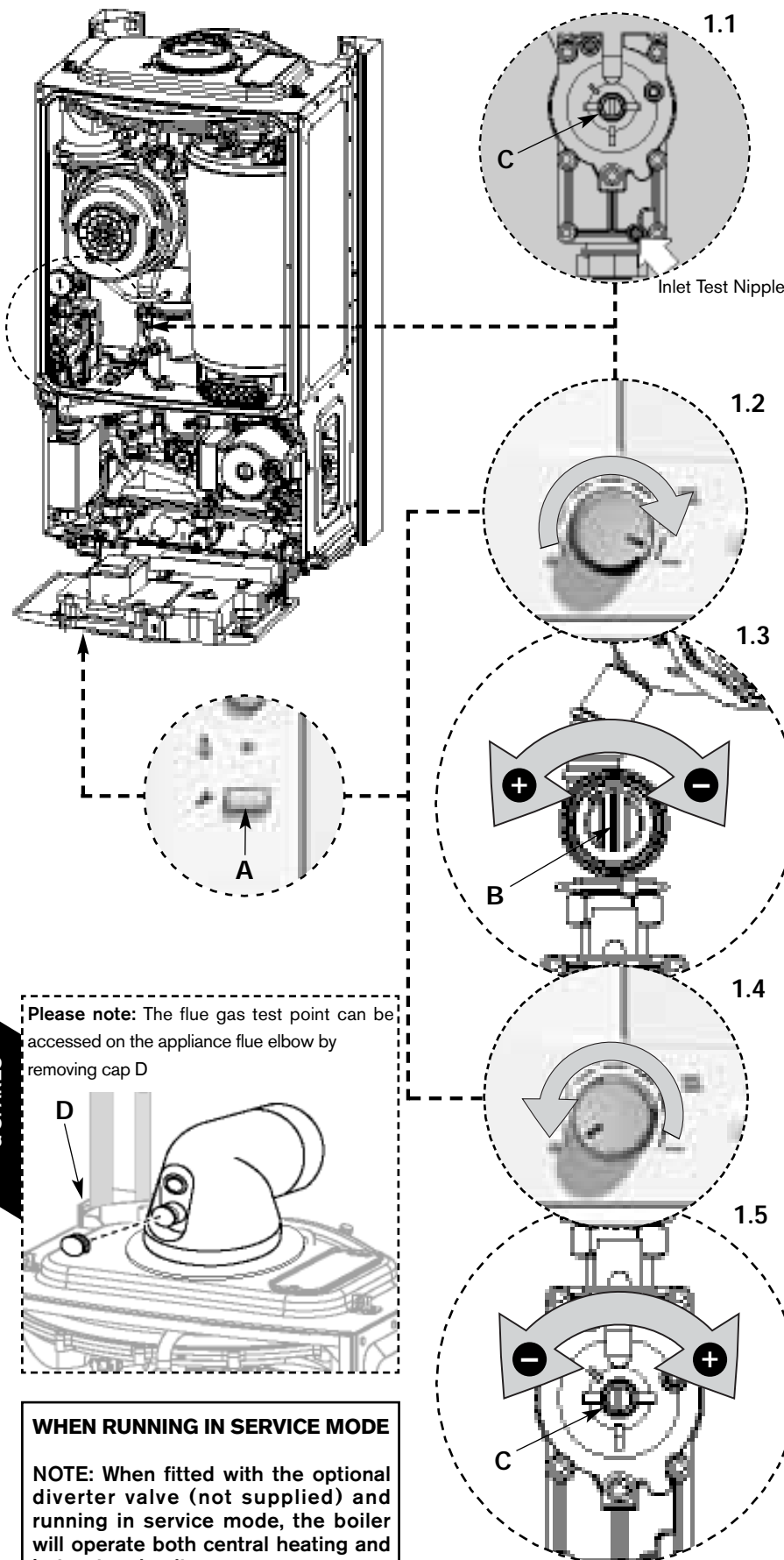
- 1.3 Using a flat blade screwdriver set the CO<sub>2</sub> via adjuster (B) using table below.

### CO<sub>2</sub> settings

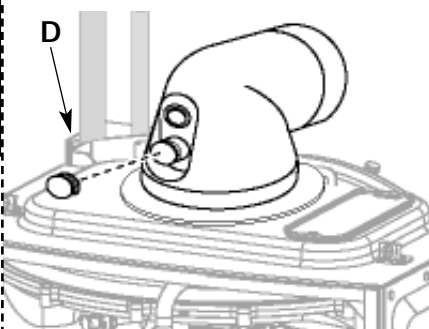
**Note.** CO<sub>2</sub> should be measured after 10 minutes

Gas type	CO <sub>2</sub> setting maximum	CO <sub>2</sub> setting minimum
Natural gas	9.8% ±0.2	9.2% ±0.2
LPG	11.0% ±0.2	10.5% ±0.2

- ▶ Check CO is less than 200ppm.
  - ▶ Measure the inlet pressure; it should be no less than 18.5mb for natural gas and 37mb for LPG.
- 1.4 Set the temperature control to minimum. This will make the boiler go to minimum power.
- 1.5 Measure the CO<sub>2</sub>; it should now be at the figure for minimum output. If not adjust (C) on the gas valve until correct.
- ▶ Return to maximum and re-check the CO<sub>2</sub>. If correct press and hold down the service button for 2 seconds; the button will cease to be illuminated and the blue power indicator will be permanently illuminated.
  - ▶ Remove manometer and re-seal inlet pressure point on gas valve.
  - ▶ Fit new plastic sealing cover on to outlet adjuster (B).
  - ▶ Fit white cover over valve adjuster (C) and secure with black security tag.
  - ▶ Remove red arrow from data plate and fit new one in correct position for gas type.
  - ▶ Re-assemble and refit boiler case.
  - ▶ Re-connect mains electrical supply and check boiler operation as stated in the commissioning section.
  - ▶ Fit new label from kit over existing label on the appliance bottom panel.



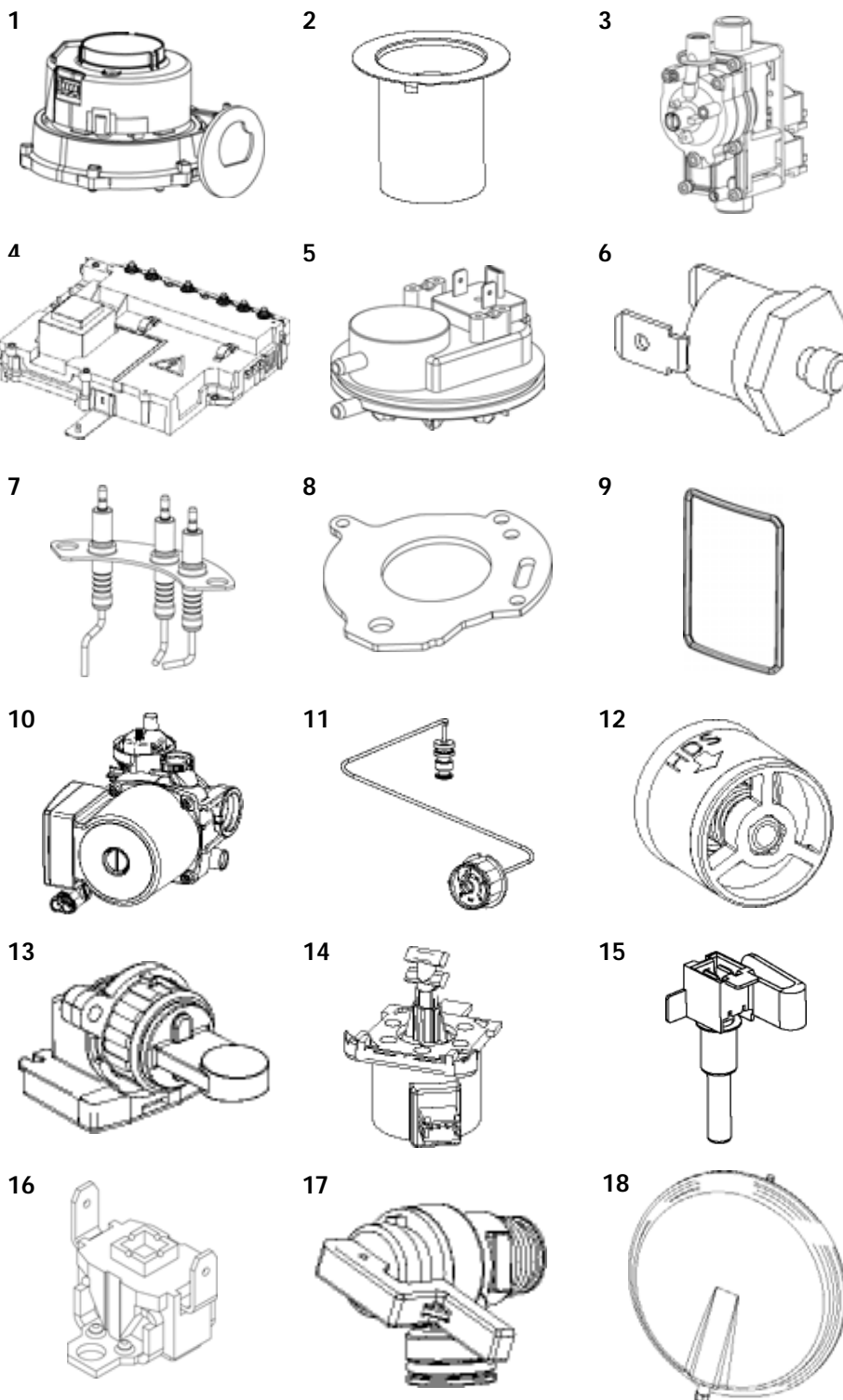
**Please note:** The flue gas test point can be accessed on the appliance flue elbow by removing cap D



### WHEN RUNNING IN SERVICE MODE

**NOTE:** When fitted with the optional diverter valve (not supplied) and running in service mode, the boiler will operate both central heating and hot water circuits.

If fitted to an S or Y plan system, the system must only be run in central heating mode.



## SHORT PARTS LIST

- 1 Fan**  
WORCESTER Part No. **8 717 204 453 0**  
GC No. **H26 536**
- 2 Burner**  
WORCESTER Part No. **8 718 120 609 0**  
GC No. **H26 538**
- 3 Gas valve**  
**NG** WORCESTER Part No. **8 716 107 052 0**  
**NG** GC No. **H26 540**  
**LPG** WORCESTER Part No. **8 716 107 053 0**  
**LPG** GC No. **H26 539**
- 4 Control box**  
WORCESTER Part No. **8 717 207 667 0**  
GC No. **H02 525**
- 5 Air pressure switch**  
WORCESTER Part No. **8 716 106 633 0**  
GC No. **H26 543**
- 6 Temperature limit sensor**  
WORCESTER Part No. **8 722 963 858 0**  
GC No. **H08 291**
- 7 Electrodes**  
WORCESTER Part No. **8 718 107 087 0**  
GC No. **H26 544**
- 8 Gasket - burner/electrodes**  
WORCESTER Part No. **8 716 106 506 0**  
GC No. **H26 545**
- 9 Seal - inner case/mantel**  
WORCESTER Part No. **8 716 106 635 0**  
GC No. **H26 546**
- 10 Pump assembly 3 speed**  
WORCESTER Part No. **8 716 106 355 0**  
GC No. **H02 527**
- 11 Pressure gauge**  
WORCESTER Part No. **8 717 208 107 0**  
GC No. **H02 528**
- 12 By-pass valve**  
WORCESTER Part No. **8 716 106 434 0**  
GC No. **H02 532**
- 13 Diverter valve assembly**  
WORCESTER Part No. **8 716 106 845 0**  
GC No. **H02 533**
- 14 Diverter valve motor**  
WORCESTER Part No. **8 716 106 847 0**  
GC No. **H02 534**
- 15 Control sensor - primary**  
WORCESTER Part No. **8 716 106 688 0**  
GC No. **H26 542**
- 16 High limit stat**  
WORCESTER Part No. **8 707 206 196 0**  
GC No. **H26 584**
- 17 Valve - pressure relief**  
WORCESTER Part No. **8 716 106 431 0**  
GC No. **H09 750**
- 18 Expansion vessel**  
WORCESTER Part No. **8 716 105 545 0**  
GC No. **H05 206**

ISOLATE MAINS ELECTRICAL SUPPLY AND REMOVE OUTER CASE AS SHOWN ON PAGE 41.

THE CONVERSION MUST BE CARRIED OUT BY A COMPETENT PERSON. IT MUST **NOT** BE ATTEMPTED UNLESS THE PERSON CARRYING OUT THE CONVERSION IS EQUIPPED WITH A COMBUSTION ANALYSER CONFORMING TO BS 7927 AND IS COMPETENT IN ITS USE.

**Important:** The appliance shall not be installed into a room or internal space below ground level when it is intended for use with LPG (propane - G31). This does not preclude the installation into a room or space which is a basement on one side of the building but open to ground on the opposite side.

### Installation Regulations

In addition to those specified in the main booklet the following standard applies when converting to an LPG appliance: **BS 5842 Domestic Propane Gas Burning Installations.**

All conversions will require the air gas ratio to be set correctly for the gas used. The procedure for setting the air gas ratio is at the rear of these instructions. See index.

### 1. Moving boiler control to service position

► Remove boiler case, as described on Page 36.

1.1 Remove screw (A) from retaining bracket.

1.2 Lower control panel into service position.

### 2. Code plug

#### Code plugs

With internal diverter valve:

12kW NG - 112

12kW LPG - 113

With external diverter valve:

12kW NG - 108

12kW LPG - 109

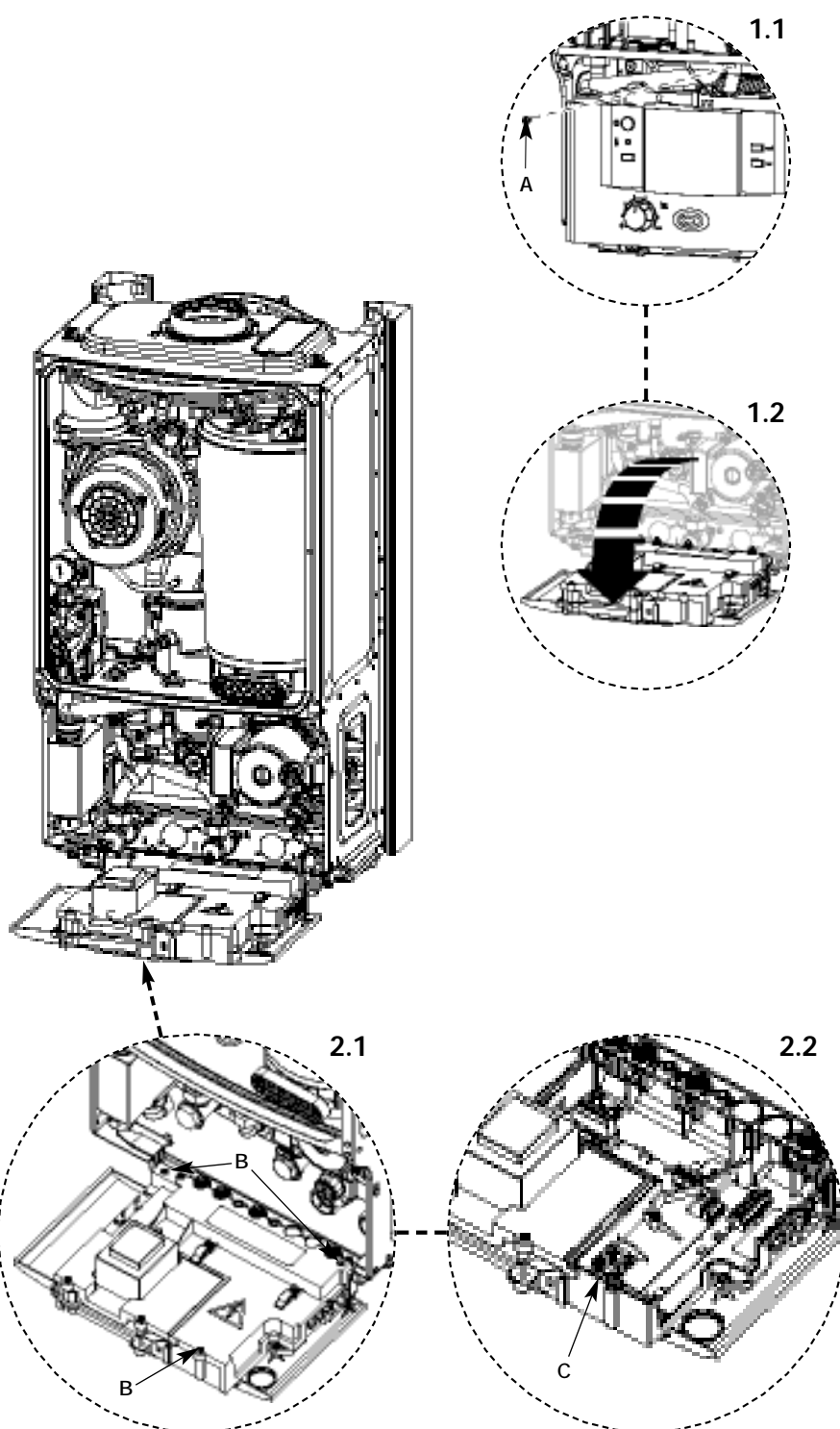
2.1 Remove 3 screws (B) retaining plastic cover at rear of control box and remove.

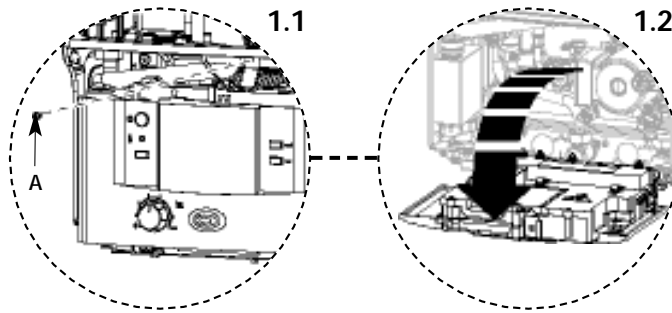
2.2 Replace code plug (C) with new one supplied with conversion kit.

► Replace plastic cover.

► Place control in normal position and secure with screw.

THE GAS / AIR RATIO MUST BE RESET AFTER CONVERSION. THE PROCEDURE CAN BE FOUND IN THE REPLACEMENT PARTS SECTION OF THIS MANUAL.





ISOLATE MAINS ELECTRICAL SUPPLY AND REMOVE OUTER CASE AS SHOWN ON PAGE 41.

THE CONVERSION MUST BE CARRIED OUT BY A COMPETENT PERSON. IT MUST **NOT** BE ATTEMPTED UNLESS THE PERSON CARRYING OUT THE CONVERSION IS EQUIPPED WITH A COMBUSTION ANALYSER CONFORMING TO BS 7927 AND IS COMPETENT IN ITS USE.

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All conversions will require the air gas ratio to be set correctly for the gas used. The procedure for setting the air gas ratio is at the rear of these instructions. See index.

#### 1. Moving boiler control to service position

- ▶ Remove boiler case, as described on Page 36.
- 1.1 Remove screw (A) from retaining bracket.
- 1.2 Lower control panel into service position.

#### 2. Gas valve

- ▶ Isolate gas supply at boiler gas cock.
- 2.1 Remove wire clip from gas valve outlet then pull gas adjustment assembly free from plastic connector and pull forward clear of case.
- 2.2 Undo bottom gas connection to gas valve.
- 2.3 Undo two securing screws (B) on the underside of casing.
  - ▶ Pull valve up and forward out of boiler.
  - ▶ Disconnect electrical connections.
  - ▶ Fit plastic retaining nut to the outlet of the gas valve from the kit and hand tighten.
  - ▶ Replace valve with new seals.
  - ▶ Check for gas soundness.

#### 3. Gas adjuster

- ▶ Twist retaining clip (C) to release then remove clip and tube.
- ▶ Refit new adjuster and secure with clip. Coloured red for LPG or black for NG.

#### 4. Code plug

- 4.1 Remove 3 screws (D) retaining plastic cover at rear of control box and remove.
- 4.2 Replace code plug (E) with new one supplied with conversion kit.
  - ▶ Replace plastic cover.
  - ▶ Place control in normal position and secure with screw.

#### Code plugs

With internal diverter valve:

24kW NG - 114

24kW LPG - 115

With external diverter valve:

24kW NG - 110

24kW LPG - 111

THE GAS / AIR RATIO MUST BE RESET AFTER CONVERSION. THE PROCEDURE CAN BE FOUND IN THE REPLACEMENT PARTS SECTION OF THIS MANUAL.



**NOTE :** This fault finding information is for guidance only. Worcester Bosch 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.

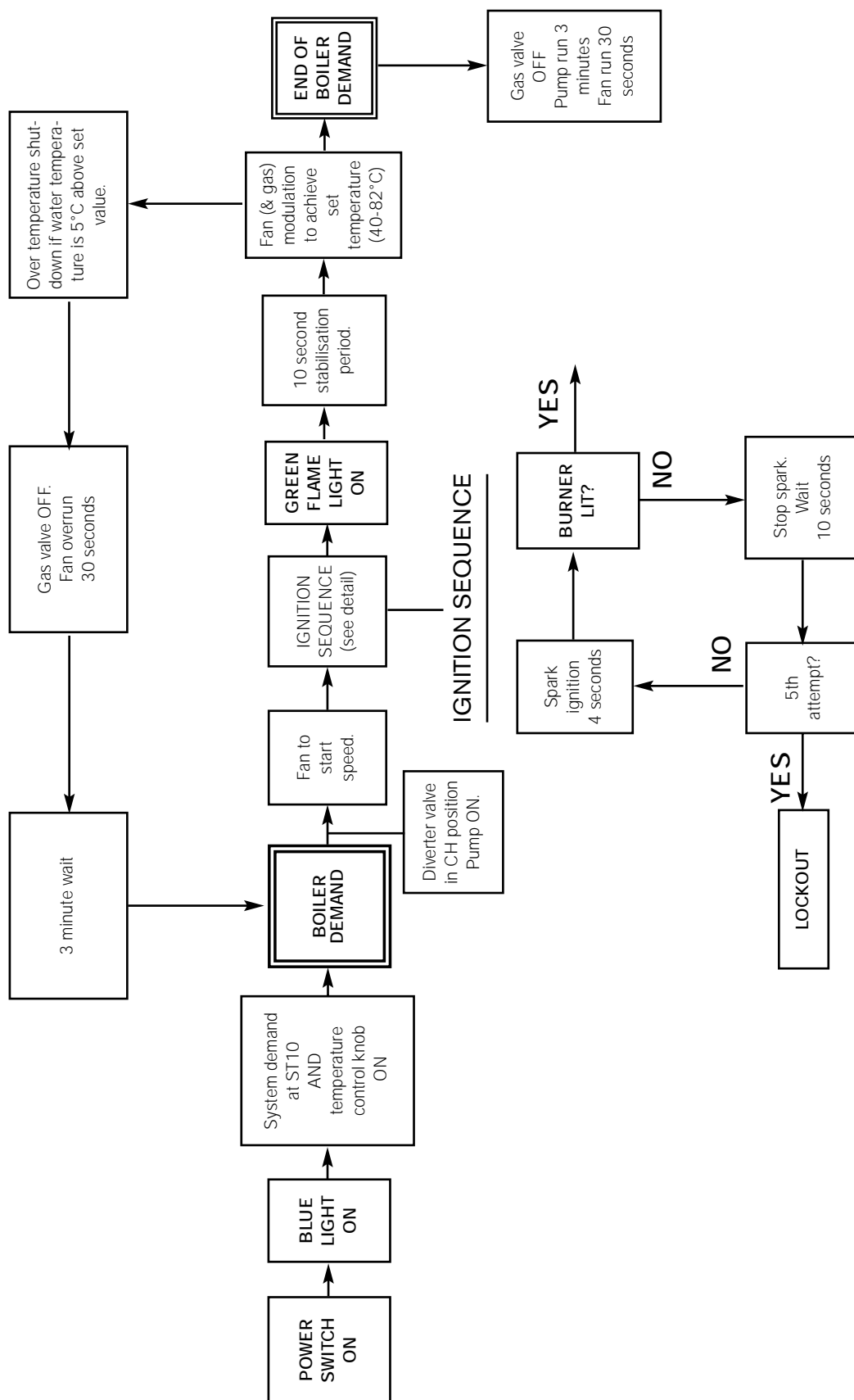
This fault finding system assumes that the appliance has been operating normally until the time of failure (i.e. not a first installation error).

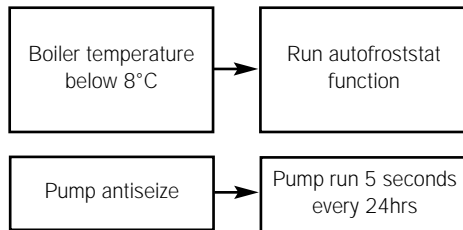
**PRELIMINARY CHECKS :** Preliminary electrical system checks are the first electrical checks to be carried out during a fault-finding procedure. On completion of the Service/Fault-Finding task which has required the breaking and remaking of electrical connections, check (a) EARTH CONTINUITY, (b) SHORT CIRCUIT CHECK, (c) POLARITY and (d) RESISTANCE TO EARTH.

Blue light indication	Lockout reset button	Fault	Possible solution/check
Off	Off	No power at control board	Permanent mains supply to boiler. Boiler mains switch. Fuse 4, 2.5A or Fuse 6, 0.5A Transformer (both coils below 100Ω). Otherwise replace control board.
On	Off	Boiler not operating during central heating demand (HW ok)	External diverter valve. External timer or room stat OR <b>If optional diverter valve is fitted:</b> Temperature control in frost protection position. Live demand at ST10-LR (external CH demand). Facia mounted timer (if fitted). Diverter valve. Control board.
		Boiler not operating during hot water demand (CH ok).	External diverter valve. External timer or cylinder stat OR <b>If optional diverter valve is fitted:</b> Short circuit across ST8 from cylinder stat/timer. Facia mounted timer (if fitted). Diverter valve. Control board.
		Boiler not operating during any demand.	Temperature control in frost protection position. Live demand at ST10-LR (from external system). Control board. OR <b>If optional diverter valve is fitted:</b> Timer. Control board.
Slow flash (normally off, flashes on)	Flashing (reset required)	Ignition lockout	Gas present and at correct pressure. Combustion CO <sub>2</sub> level. Flue condition. Ignition electrodes / harness / connections. Gas valve (coils 140-190Ω) / low voltage harness connection. Otherwise replace control board.
Slow flash (normally on, flashes off)	Flashing (reset required)	Flue overheat	Heat exchanger blocked. Heat exchanger baffles removed and not refitted.
		Heat exchanger overheat	Water pressure. All air vented. Pump / harness / connections. Water leaks / blockages. Safety thermostats / low voltage wiring harness / connections. Otherwise replace control board.
		Flue blockage	Blockage in flue system.
Fast flash	Off	Volatile lockout	Temperature sensor (8000-20,000Ω). Low voltage wiring harness / connections to sensor. Fan / fan harness / connections to fan. Code plug fitted.
Fast flash	Flashing	Internal fault	Replace control board
2 pulses	No light	Not a fault code	Service mode selected to min, press service button to return to normal.
5 pulses	No light	Not a fault code	Service mode selected to max, press service button to return to normal.



Disregard this and the following page and refer to the correct versions for CENTRAL HEATING and DHW FUNCTIONS in the ADDITIONAL INFORMATION section at the back of this book.





# ADDITIONAL INSTRUCTIONS FOR GREENSTAR 12i System / 24i System WITH OPTIONAL INTEGRAL DIVERTER VALVE

WALL HUNG RSF GAS-FIRED CONDENSING BOILER  
FOR SEALED CENTRAL HEATING SYSTEMS AND INDIRECT FED  
DOMESTIC HOT WATER



#### DIVERTER KIT NUMBERS:

12kW 7 716 192 408

24kW 7 716 192 409

#### KIT CONTENTS:

1 COPPER RETURN PIPE

1 BRASS SERVICE VALVE

1 15mm COMPRESSION NUT

1 15mm OLIVE

1 DIVERTER VALVE MOTOR

1 DIVERTER MOTOR HARNESS

2 SCREWS

2 CODE PLUGS

#### FOR 12kW i System KIT:

12i System NATURAL GAS 112

12i System LPG 113

#### FOR 24kW i System KIT:

24i System NATURAL GAS 114

24i System LPG 115

THE APPLIANCE IS FOR USE WITH  
NATURAL GAS OR L.P.G. (Cat II 2H3P TYPE C13 & C33)

#### NATURAL GAS:

WORCESTER GREENSTAR 12i System GC NUMBER 41-311-67

WORCESTER GREENSTAR 24i System GC NUMBER 41-311-68

#### LIQUID PETROLEUM GAS:

WORCESTER GREENSTAR 12i System GC NUMBER 41-311-69

WORCESTER GREENSTAR 24i System GC NUMBER 41-311-70

GB/IE

**THESE ADDITIONAL  
INSTRUCTIONS  
MUST BE USED IN  
CONJUNCTION WITH  
THE MAIN  
INSTRUCTION MANUAL  
INSTALLATION, COMMISSIONING  
& SERVICING**

## CONNECTIONS:

Heating System: 22mm compression fittings

Gas: 22mm compression fittings

Cylinder Return 15mm compression fittings

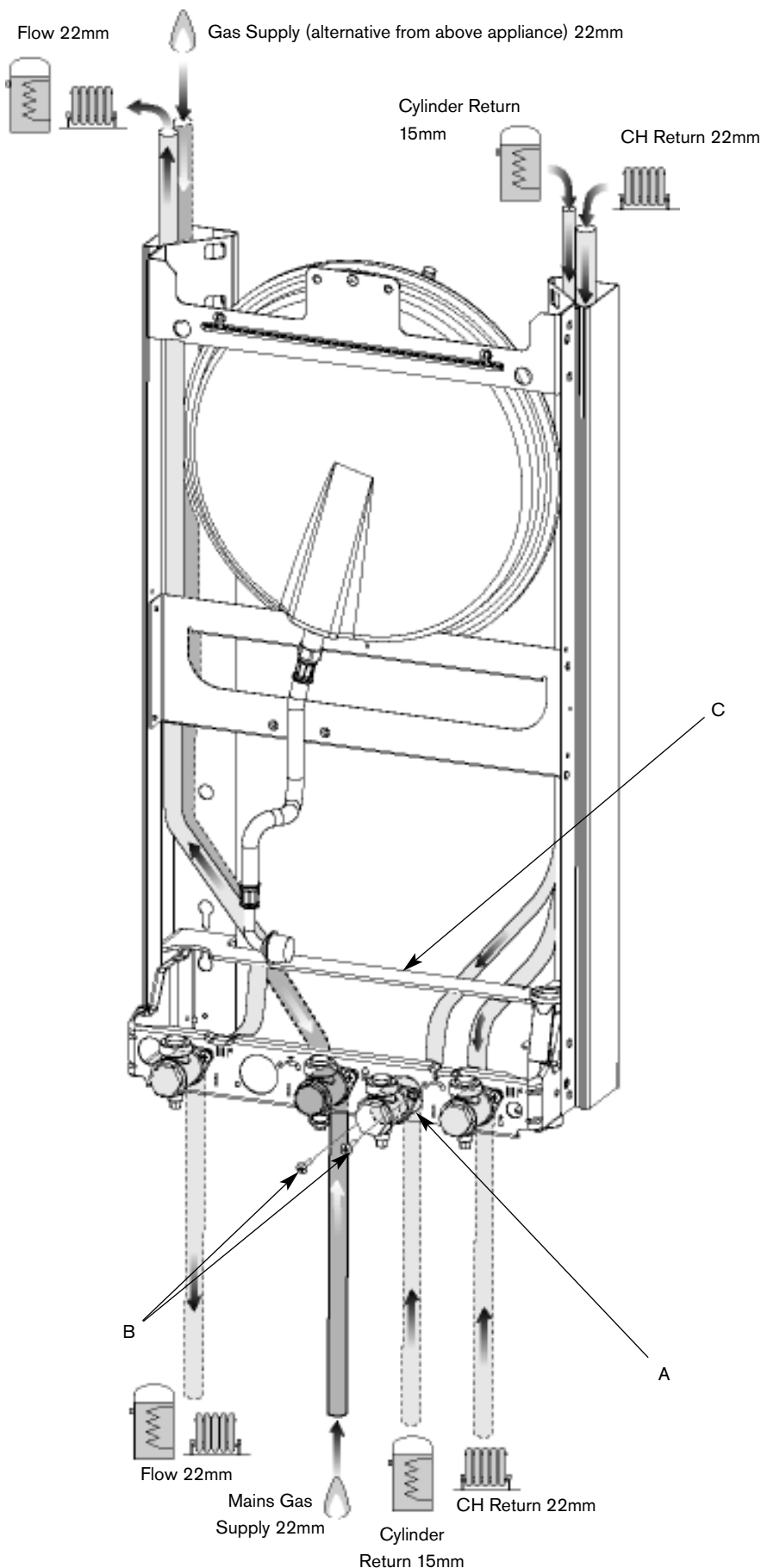
Use the fittings supplied in the Lit/Hardware pack and the Optional Diverter Valve Kit.

- Before the wall mounting frame is fitted to the wall you must first assemble the service valve (A) included in the Optional Diverter Valve Kit and secure to the wall mounting frame as shown with the two screws (B) supplied.
- If the boiler pipes are to be run behind the appliance ensure that the pipes pass through the slot in the yellow plastic guide (C). This is fitted to the boiler frame.

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

**NOW RETURN TO THE MAIN INSTRUCTIONS PAGE 16 TO CONTINUE INSTALLATION.**

PRE -  
INSTALLATION

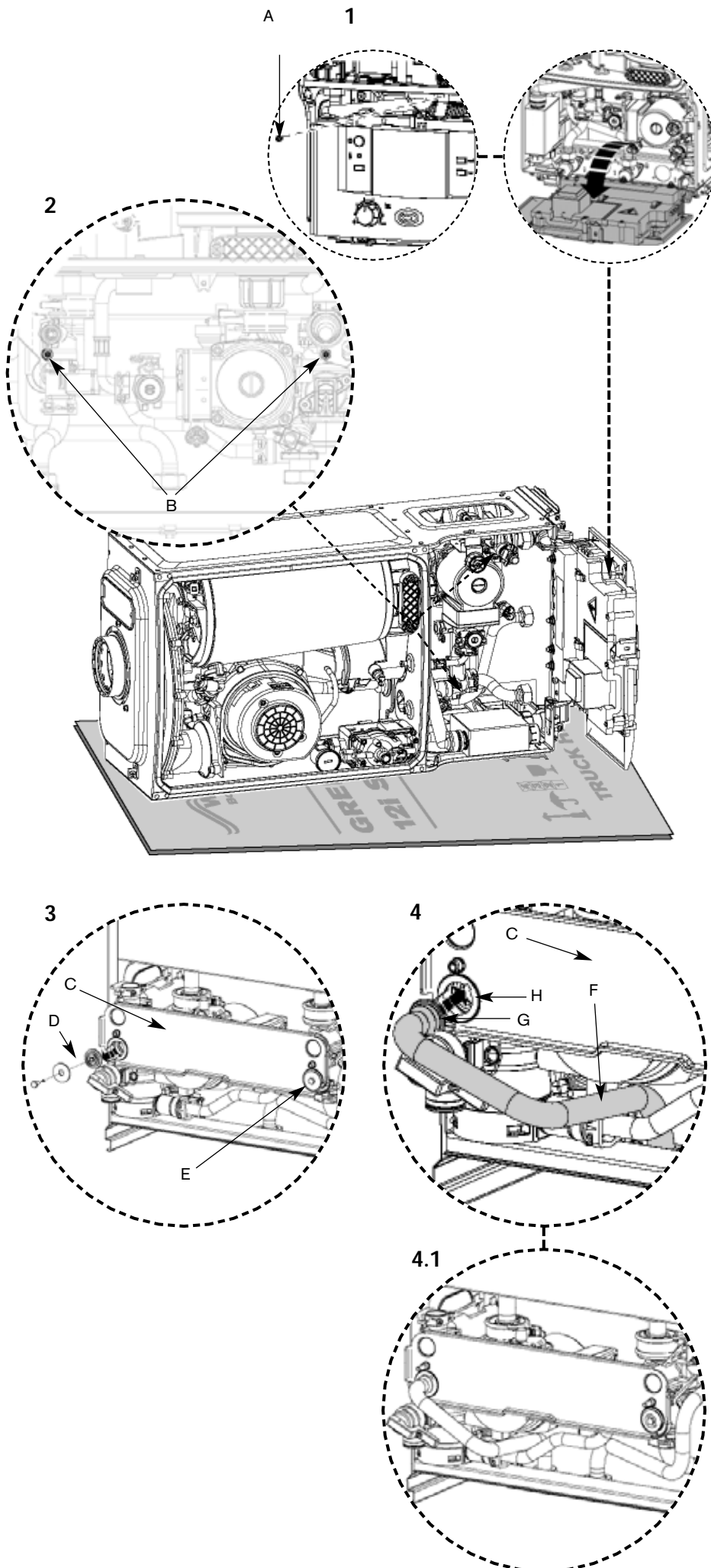


**IMPORTANT: THE FOLLOWING MUST BE COMPLETED BEFORE THE BOILER IS MOUNTED ON THE WALL MOUNTING FRAME**

## ASSEMBLY OF THE INTERNAL HOT WATER RETURN PIPE TO THE BOILER

Using the boiler packaging as protection turn the boiler on its left hand side to facilitate assembly of the hot water return pipe.

- ▶ **1.** Move the control panel into the service position by removing the screw (A) from the retaining bracket.
- ▶ **2.** Loosen the two retaining screws (B) to free the back clamping plate on the hydraulic block (C) shown in 3.
- ▶ **3.** Remove the brass bung assembly (D) from the hydraulic block by removing the screw and sliding it free from the flange on the clamping plate (C). Make sure that the other brass bung assembly (E) is retained in place.
- ▶ **4.** Remove the copper pipe (F) from the Optional Integral Diverter Valve Kit and feed the flat end of the pipe through the rear of the boiler as shown. Before fitting the pipe, check that the seal is in position on the plastic moulding. Slide the flat end of the pipe (G) under the flange (H) on the hydraulic block clamping plate (C) making sure that it is located correctly.
- ▶ Re-tighten the clamping plate by re-tightening the two screws (B) as shown in fig: 2.
- **4.1** On completion the pipe assembly should look as shown.



Do not lift by the  
air gas manifold.

7

## BOILER CONNECTIONS

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

### GAS AND WATER CONNECTIONS:

- ▶ Remove template and secure the wall mounting frame to the wall with the fixings supplied.
- ▶ System pipes may be run vertically upwards behind the boiler or below it. See Plumbing Manifold Section on page 15.

A - Flow (22mm)

B - CH return (22mm)

C - Gas inlet (22mm)

D - Cylinder return (15mm)

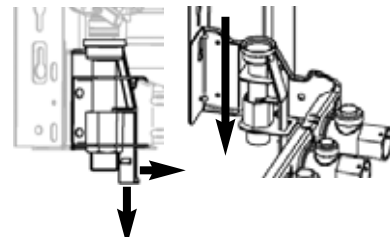
- ▶ 5. Fit sealing washers to service valves before hanging boiler.

### IMPORTANT:

Before hanging the boiler onto the wall mounting frame ensure that the pressure relief valve connection is in the DOWN position. This is located on the right hand side of the wall frame at the rear.

- ▶ 6. Pull the extended tab/lever forward and down until there is no further travel.

6



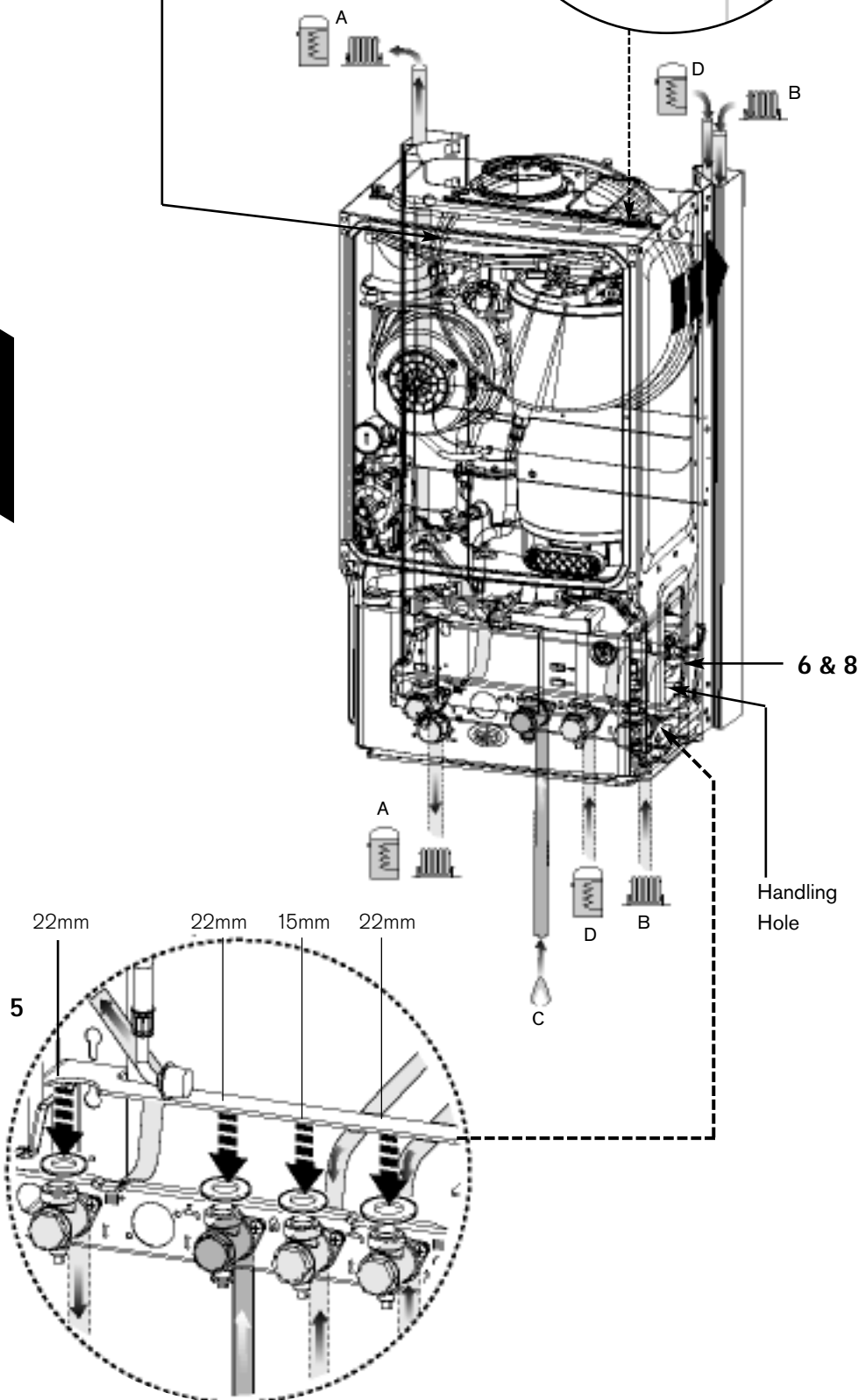
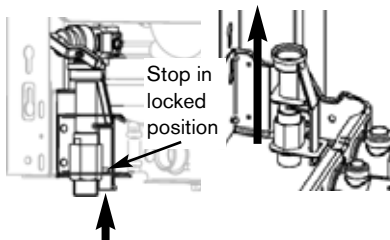
- ▶ 7 Hang the boiler on to the wall mounting frame by the two brackets positioned left and right at the top rear of the appliance. Do not lift the appliance by the air gas manifold. There are two handling holes incorporated into the inner casing left and right in the lower section of the appliance.

### IMPORTANT:

The pressure relief connector must be repositioned after the boiler has been correctly mounted to the wall mounting frame.

- ▶ 8. Push the lever on the pressure relief connector UP until the stop on the inside of the handle is over the shoulder of the metal bracket to secure in place.

8



## BOILER CONNECTIONS

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

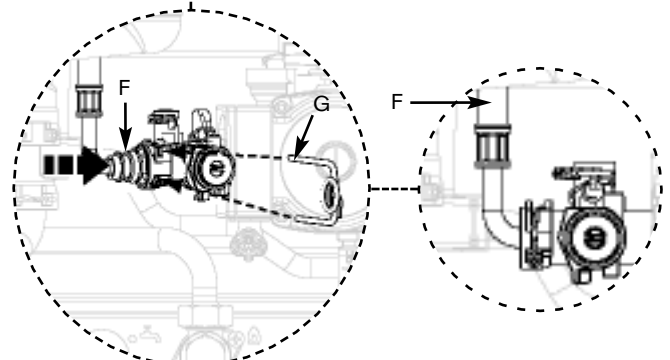
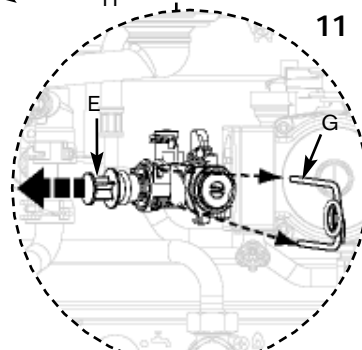
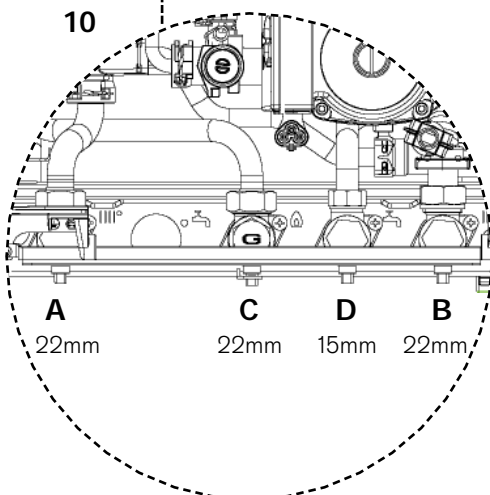
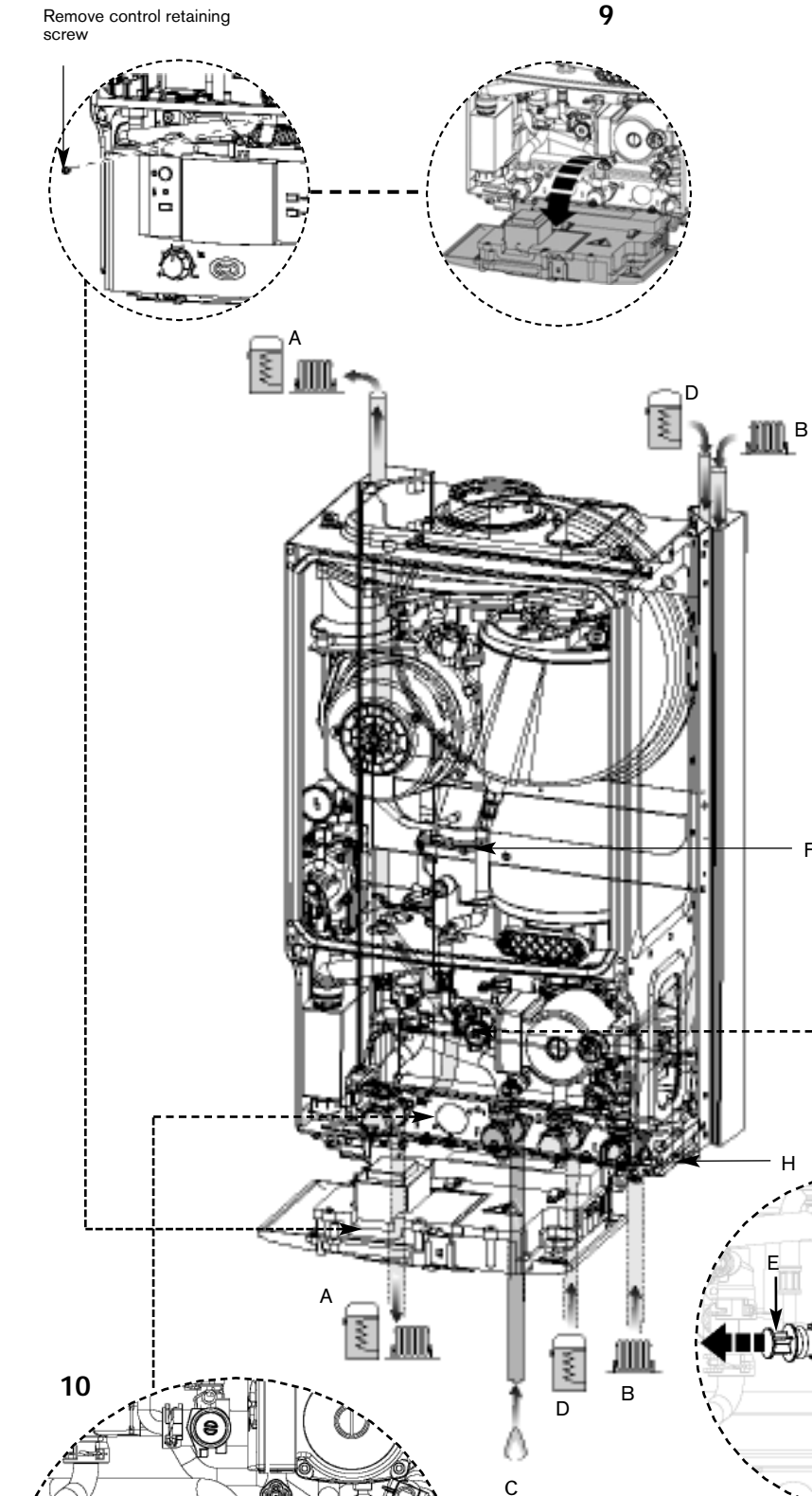
### GAS AND WATER CONNECTIONS:

- A - Flow (22mm),
- B - CH return (22mm),
- C - Gas inlet (22mm),
- D - Cylinder return (15mm).

- ▶ **9.** Lower the control panel into the service position by removing the screw from the retaining bracket.
- ▶ **10.** Make connections to the heating system.
- ▶ Connect the gas supply to the boiler gas cock 22mm compression.
- ▶ **11.** Connect the expansion vessel flexible pipe to the hydraulic manifold situated left of the pump. It is necessary to remove and discard the gray plastic blanking plug (E) from the pressure vessel connection at the hydraulic manifold before securing the expansion vessel flexible pipe (F) in place with the wire retaining clip (G).
- ▶ **12.** Connect the pressure relief drain pipe to 15mm compression joint (H) using the nut and olive supplied in the hardware literature pack.

**NOW RETURN TO THE MAIN INSTRUCTIONS PAGE 23 (FLUE INSTALLATION) TO CONTINUE INSTALLATION.**

INSTALLATION



## FITTING THE DIVERTER VALVE

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

### FITTING THE DIVERTER VALVE MOTOR:

- ▶ **1.** Remove the diverter blanking plate (A) by pulling it forwards to free it from its location.
- ▶ **2.** Replace with the diverter valve motor (B) by pushing it in until it clicks securely into place.
- ▶ **3.** After removing the cover at the rear of the control box (see ELECTRICAL and POSITION OF WIRED COMPONENTS on the following pages) connect the electrical harness from the kit to the control (ST17) see ELECTRICAL and POSITION OF WIRED COMPONENTS on the following pages.
- ▶ **4.** Remove the code plug from the control and cut the tie to the boiler chassis so that it can be completely discarded and replace with the one from the kit making sure that it is secured to the boiler chassis (see ELECTRICAL on the following page).

### Code plug numbers

12kW i System Kit:

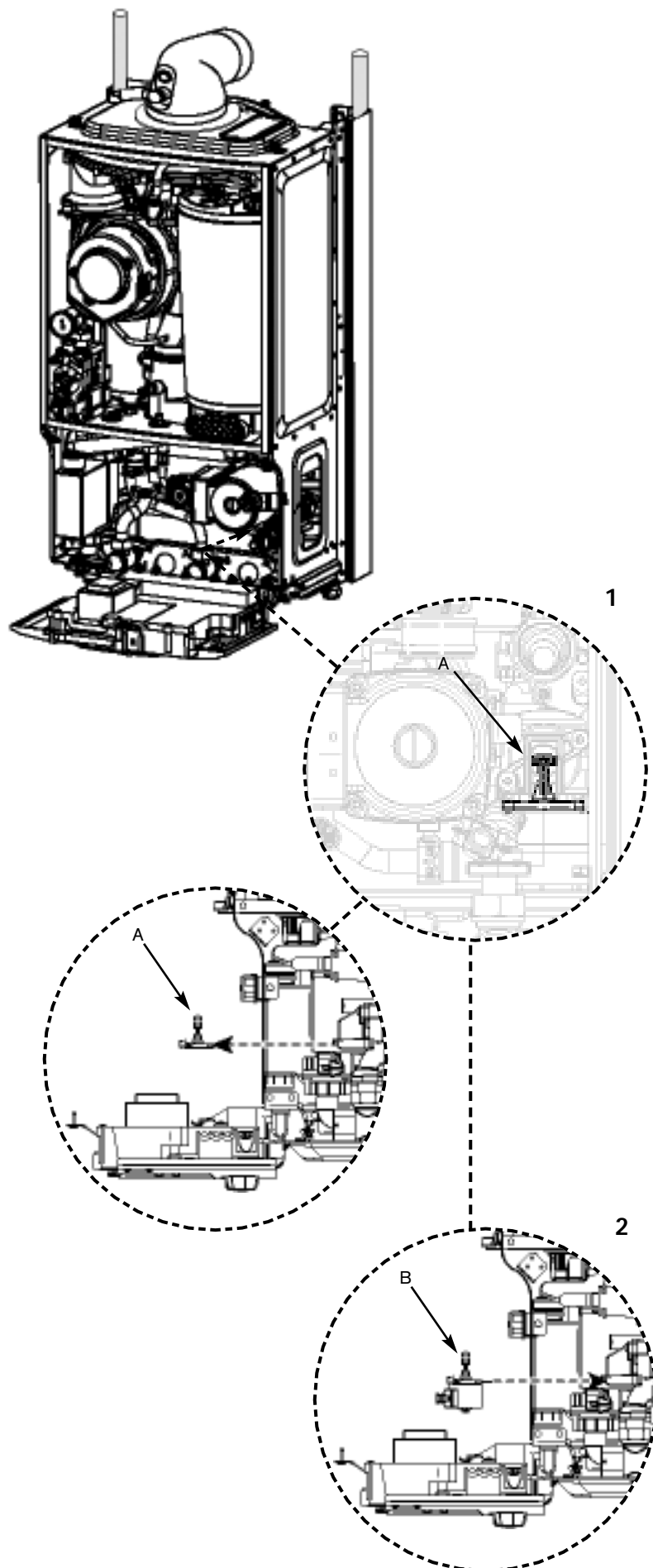
12i System NATURAL GAS 112

12i System LPG 113

24kW i System Kit:

24i System NATURAL GAS 114

24i System LPG 115





**CAUTION: ISOLATE THE MAINS ELECTRICITY SUPPLY BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS**

*Note: Mains supply to the boiler must be through a fused double pole isolator situated adjacent to the appliance. The isolator must give a contact separation of 3mm minimum all poles.*

*There should be no external wiring centre.*

*Facia mounted twin channel programmer must be used.*

*Models available: 7 716 192 038, 7 716 192 039, 7 716 192 041.*

**Access to electrical connections:**

Remove boiler casing to access control panel.

Unscrew screw (A) and lower the control box into the horizontal position.

Unscrew the three screws (B) in the control panel and pull off the connections cover.

Unclip cable clamp (C).

Cut off the tapered cable entry to fit cable diameter required.

Turn cable retaining screw (D) anti-clockwise.

Run cable over the main crossbar and through the cable clamp (C), ensuring there is ample cable to reach the connectors.

Turn cable clamping screw (D) clockwise to secure cable and replace clamp (C) into control panel.

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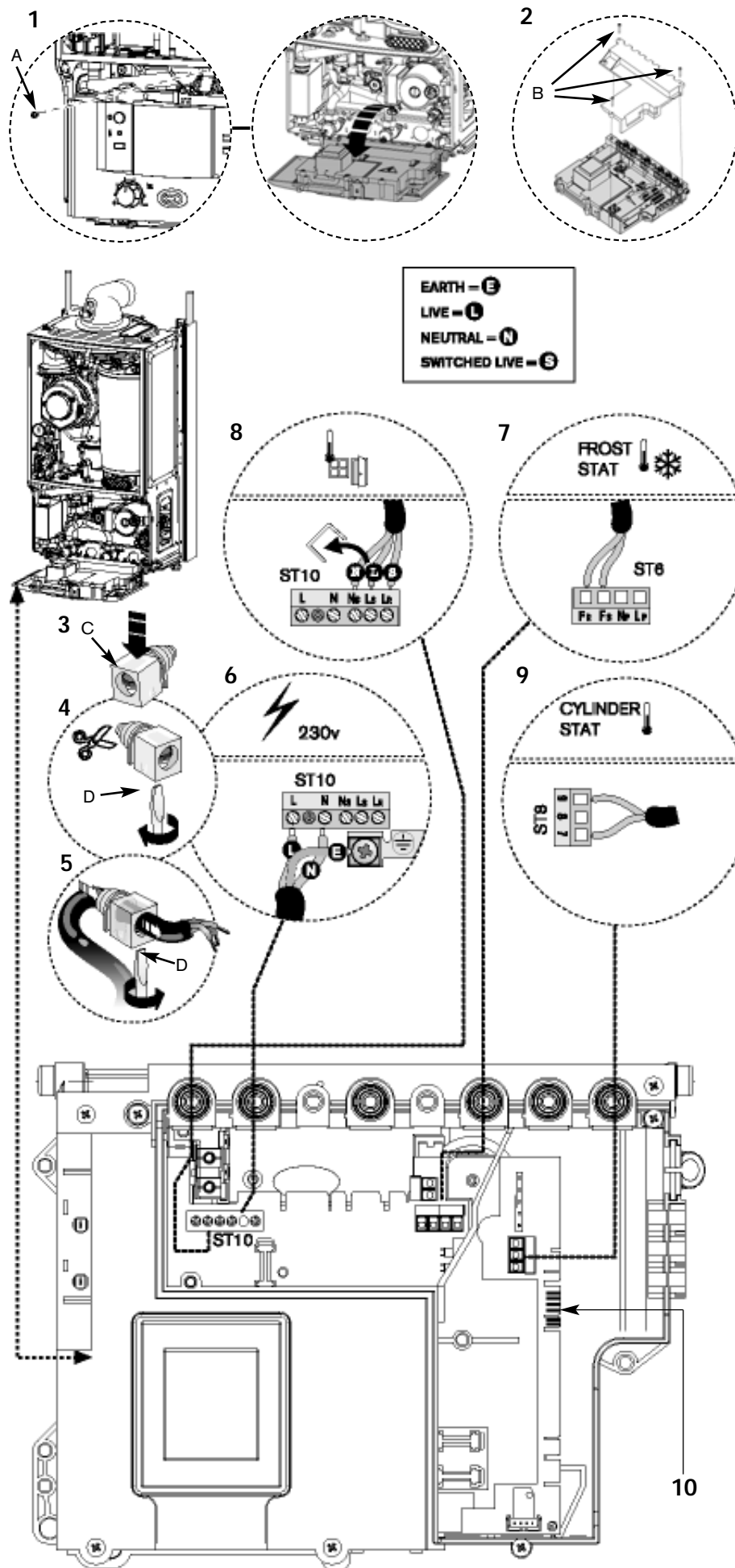
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### Central heating channel

230V room stat if required with timer

7 716 192 038 (ST10):

Remove link

Connect room stat LIVE supply to terminal (Ls)

Connect room stat LIVE return to terminal (Lr)

Connect room stat NEUTRAL to terminal (Ns)

NOTE: If timer 7 716 192 039 or 7 716 192 041 is used, the roomstat is incorporated in the transmitter. Therefore keep link fitted.

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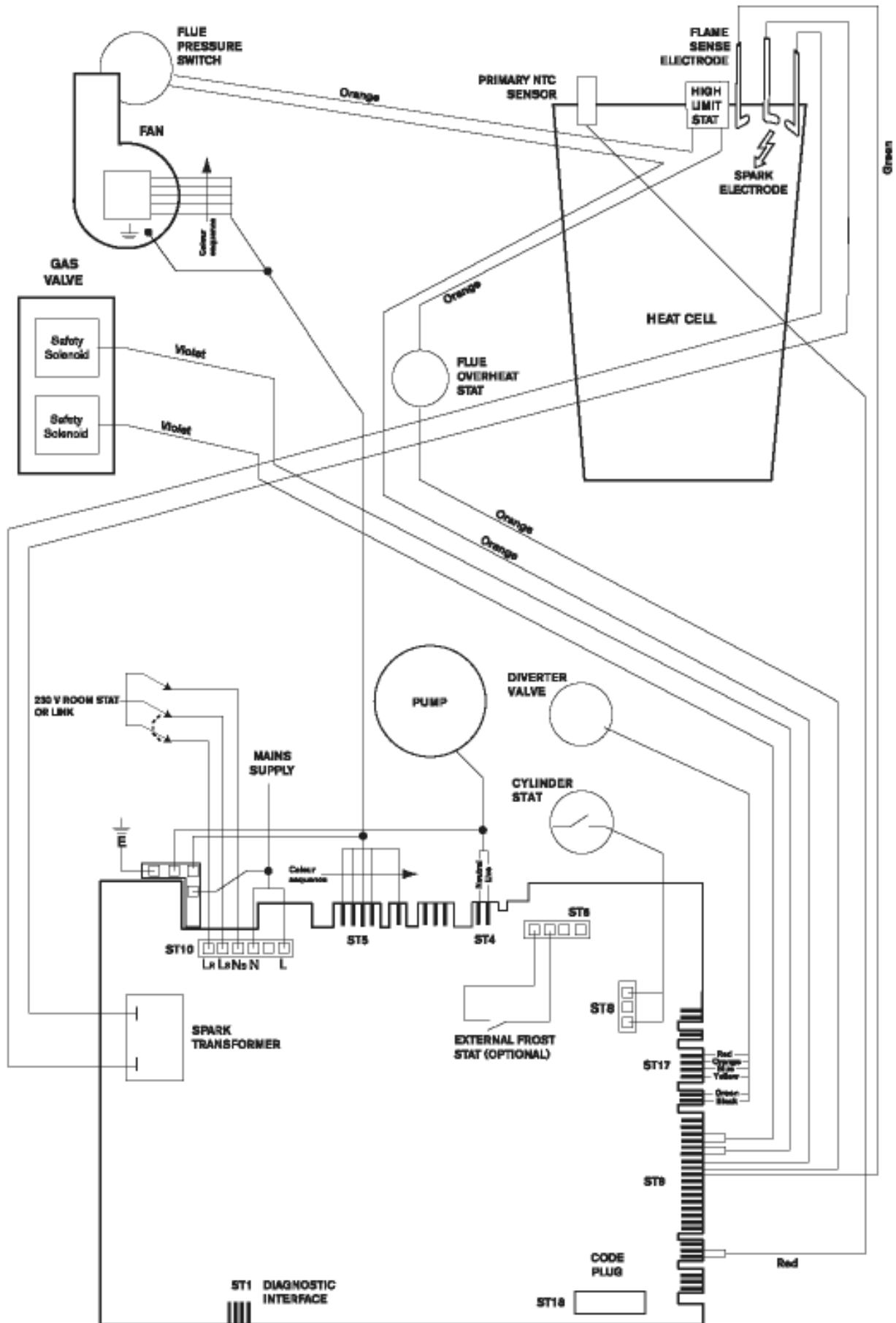
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## COMPONENTS



## CHECKS

**CAUTION: ISOLATE THE MAINS SUPPLIES BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS**

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

A - Flow (22mm)  
B - CH Return (22mm)  
C - Gas inlet (22mm)  
D - Cylinder Return (15mm)

- 2 Check the gas type specified on the identification plate (F) matches that of the gas supply. Turn on the main gas supply, check the gas pipework, connections and rectify any leaks.

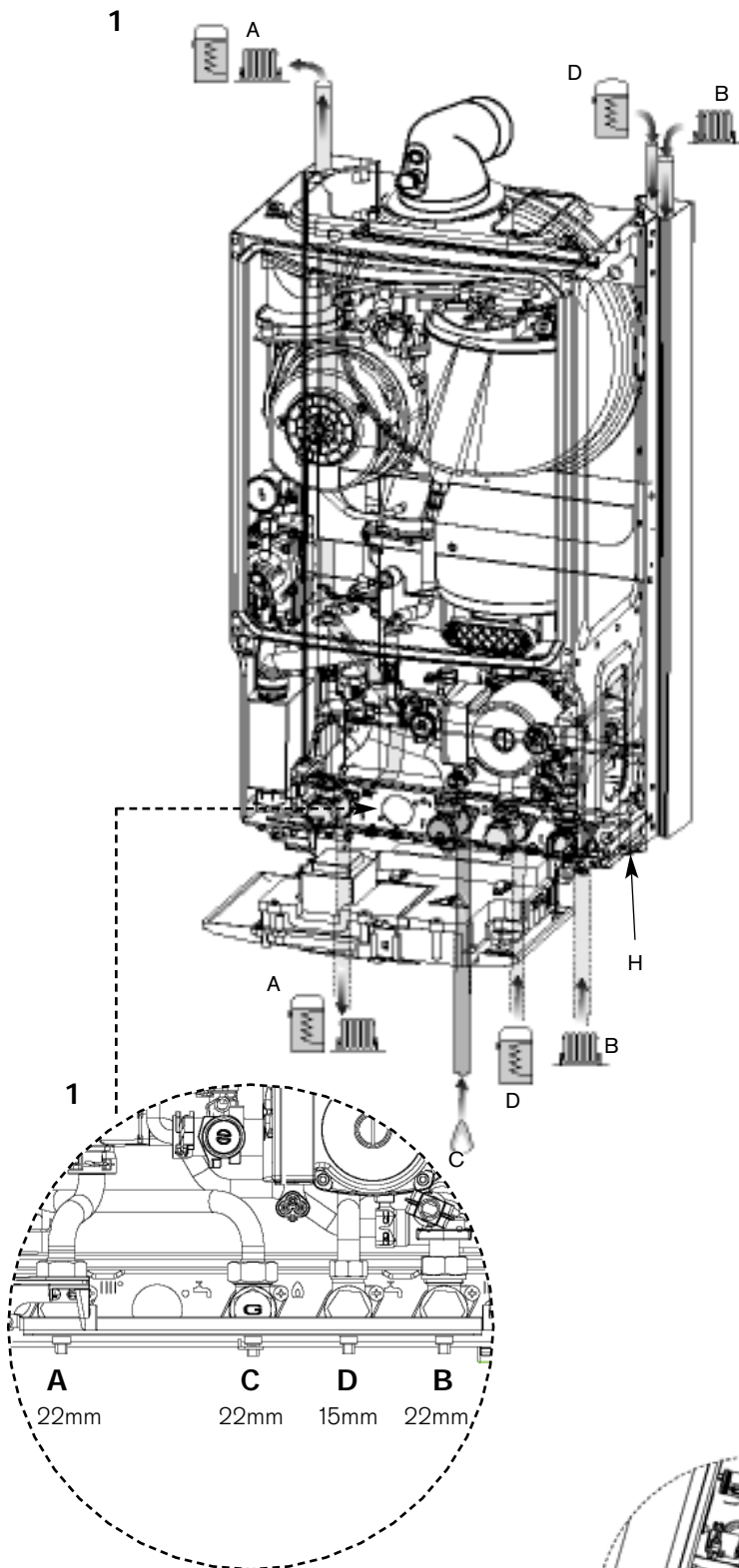
- 3 Check that the condensate pipe has been connected to the syphon.

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

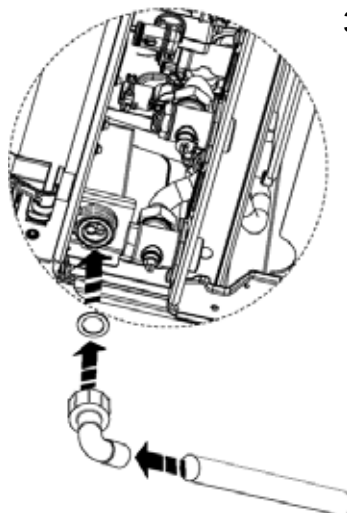
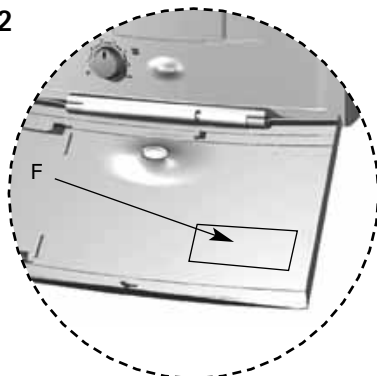
- 4 Check pressure relief drain pipe (H) is correctly fitted and securely tightened.

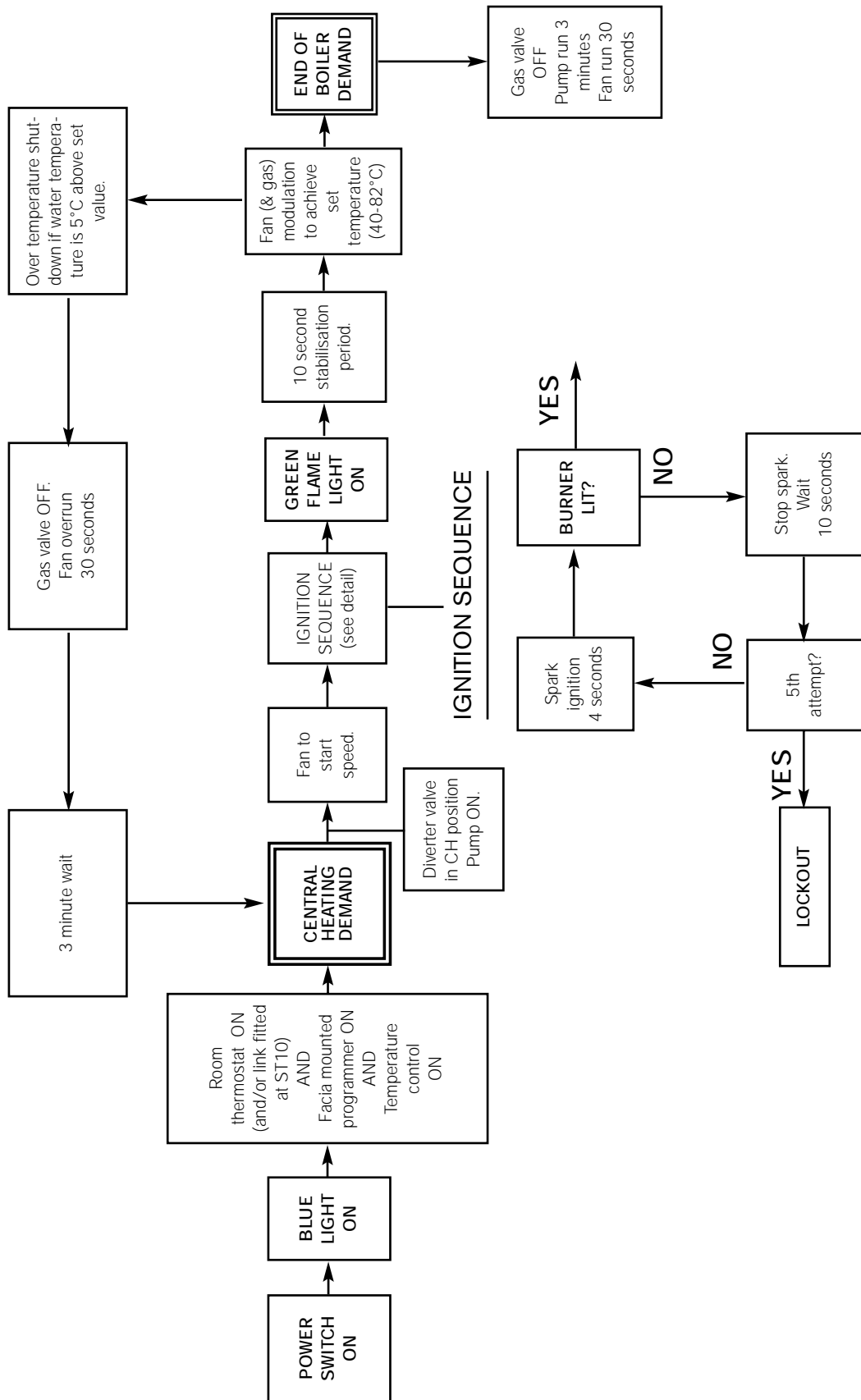
**NOW RETURN TO THE MAIN INSTRUCTIONS PAGE 30 (FILLING THE SYSTEM) TO CONTINUE INSTALLATION.**

3



2







# **INSTRUCTION MANUAL**

## **INSTALLATION, COMMISSIONING & SERVICING**

### **EXCELLENCE COMES AS STANDARD**

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Cotswold Way, Warndon, Worcester WR4 9SW.

Tel. 01905 754624 Fax. 01905 754619

Worcester, Bosch Group is a trading name of BBT Thermotechnology UK Ltd.

[www.worcester-bosch.co.uk](http://www.worcester-bosch.co.uk)

8 716 107 375a (02.05)

