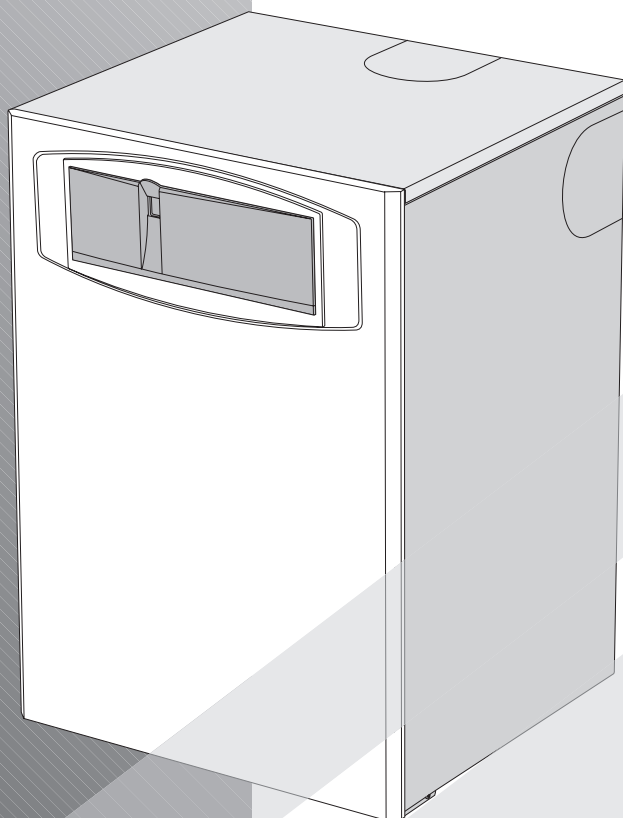


GREENSTAR HIGHFLOW 440

FLOOR STANDING RSF GAS-FIRED COMBINATION BOILER
FOR SEALED CENTRAL HEATING SYSTEMS AND MAINS FED DOMESTIC HOT WATER



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

NATURAL GAS (G20) : GC NUMBER 47-311-82

LIQUID PETROLEUM GAS (G31) : GC NUMBER 47-311-83

GB/IE

INSTRUCTION MANUAL INSTALLATION COMMISSIONING & SERVICING

benchmark

 **WORCESTER**
Bosch Group

CONTACT INFORMATION

WORCESTER, BOSCH GROUP:

MAIN RECEPTION: 01905 754624
MAIN FAX: 01905 754619
TECHNICAL: 08705 266241
SERVICE: 08547 256206
SPARES: 01905 752571
LITERATURE: 01905 752556
TRAINING: 01905 752526
SALES: 01905 752640
WEBSITE: www.worcester-bosch.co.uk

WATER TREATMENT:

FERNOX 01799 550811
www.fernox.com

SENTINEL 0151 420 9595
www.betzdearborn.com/sentinel

FLUE TERMINAL GUARDS:

TOWER FLUE COMPONENTS
VALE RISE, TONBRIDGE, TN9 1TB
TEL: 01732 351680
www.tfc-group.co.uk

IMPORTANT HANDLING INSTRUCTIONS:

It is advised that two people are involved in the transfer of the packaged appliance from the van to the point of installation.

A suitable truck should be used.

The boiler is secured to a wooden board with screws. It is advised that no attempt should be made to move the packaged appliance without the use of a suitable truck.

Before removing the carton it is advised that the top flaps are opened and the ancillary items removed and set to one side.

The carton can now be lifted off the boiler.

Remove the plastic bag protecting the boiler surfaces and place safely away from the working area.

Remove the boiler (complete with board) from the pallet before removing the securing screws.

The boiler is mounted on small wheels and can now be slid off the board and guided into the installation position.

Care should be taken not to damage any panels.

Two people are required to move the appliance from the board into the installation position.

GENERAL HANDLING GUIDELINES:

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

Store the appliance in a dry area prior to installation.

THIS BOILER IS NOT SUITABLE FOR ROOF SPACE INSTALLATION.

INSTALLATION & SERVICING INSTRUCTIONS

PLEASE READ THESE INSTRUCTIONS CAREFULLY BEFORE STARTING INSTALLATION.

THESE INSTRUCTIONS ARE APPLICABLE TO THE PRODUCT 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 & EIRE 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 TECHNICAL SUPPORT HELPLINE.

DISTANCE LEARNING AND TRAINING COURSES ARE AVAILABLE FROM WORCESTER, PART OF THE BOSCH GROUP.

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

ABBREVIATIONS:

∅	Diameter
NG	Natural Gas
LPG	Liquid Petroleum Gas
CH	Central Heating
DHW	Domestic Hot Water
TRV	Thermostatic Radiator Valve
IP	Ingress Protection
RS	Room sealed flue
N/A	Not allowed

SEDBUK Seasonal Efficiency for Domestic Boilers in the United Kingdom

SYMBOLS USED IN THIS MANUAL:



Domestic hot water



Programmer ON CH only



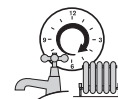
Central heating



Programmer ON DHW only



Room thermostat



Programmer ON CH and DHW



Frost thermostat



Cold water main supply



Wait time period



Electricity supply



Programmer/timer OFF



Fuel supply

CONTENTS

SAFETY & REGULATIONS

SAFETY PRECAUTIONS	2
INSTALLATION REGULATIONS	2

APPLIANCE INFORMATION

GENERAL INFORMATION	3
TECHNICAL DATA	4
LAYOUT & COMPONENTS	5

PRE-INSTALLATION

CLEANING PRIMARY SYSTEMS	6
MAINS SUPPLIES	7-8
WATER SYSTEMS & PIPEWORK	9-10
CONDENSATE & PRESSURE RELIEF PIPEWORK	11
BOILER LOCATION & CLEARANCES	12-13
MOUNTING FRAME CONNECTIONS	14
FLUE OUTLET POSITIONS	15
FLUE OPTIONS	16

INSTALLATION

UNPACKING THE BOILER	17
MOUNTING FRAME FIXING / FLUE OPENING	18
MOUNTING FRAME CONNECTIONS	19
FLUE INSTALLATION	20-21
CONDENSATE, GAS & WATER CONNECTIONS	22
FLUE CONNECTIONS	23
PRESSURE RELIEF VALVE OUTLET	24
ELECTRICS	25-26

COMMISSIONING

PRE-COMMISSIONING CHECKS	27
FILLING THE SYSTEM	28
STARTING THE APPLIANCE	29
WATER TREATMENT	30
FINISHING COMMISSIONING	31

SERVICING & SPARES

INSPECTION AND SERVICE	32-35
REPLACEMENT OF PARTS	36-40
SETTING THE GAS/AIR RATIO	41-42
SHORT PARTS LIST	43

CONVERSION KITS

L.P.G. CONVERSION	44
-------------------	----

FAULT FINDING & DIAGRAMS

ELECTRICAL WIRING DIAGRAM	45
CENTRAL HEATING FUNCTION	46
DOMESTIC HOT WATER FLOW FUNCTION	47
FAULT FINDING	48- 49

SAFETY &
REGULATIONS

APPLIANCE
INFORMATION

PRE-
INSTALLATION

INSTALLATION

COMMISSIONING

SERVICING
& SPARES

CONVERSION
KITS

FAULT FINDING
& DIAGRAMS

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.

BENCHMARK:

A Benchmark Log Book 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 Log Book 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). Where applicable, the CE mark indicates compliance with relative EU Directives.

COMBUSTIBLE AND CORROSIVE MATERIALS:

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

The combustion air must be kept clear of chemically aggressive substances, (halogenated hydrocarbons containing chlorine or fluorine compounds) which 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 these instructions and the relevant Installation Regulations.

Flue systems must not be modified in any way other than as described in the fitting instructions.

Any misuse or unauthorised modifications to the appliance, flue or associated components and systems could invalidate the warranty. The manufacturer accepts no liability arising from any such actions, excluding statutory rights.

SERVICING:

Advise the user to have the system regularly serviced 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 in the Benchmark Log Book after each service.

INSTALLATION REGULATIONS

Failure to install appliances correctly could lead to prosecution.

This appliance must be installed only by a competent person in accordance with, and comply to, the current: Gas Safety (Installation & Use) Regulations 1998, 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), IS 813 (Eire) and any other local requirements.

The relevant 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

BS6798 : 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 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, compounds (including flux and solder) and components used as part of the secondary domestic water system must be approved by WRAS.

Central heating water:

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

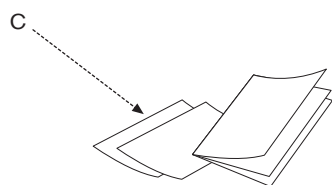
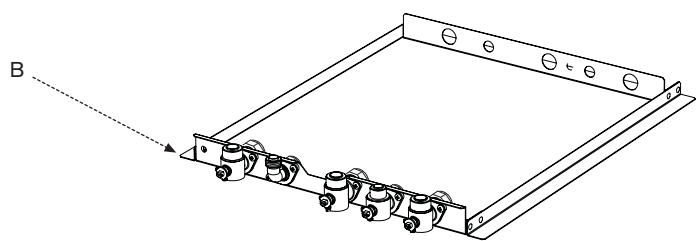
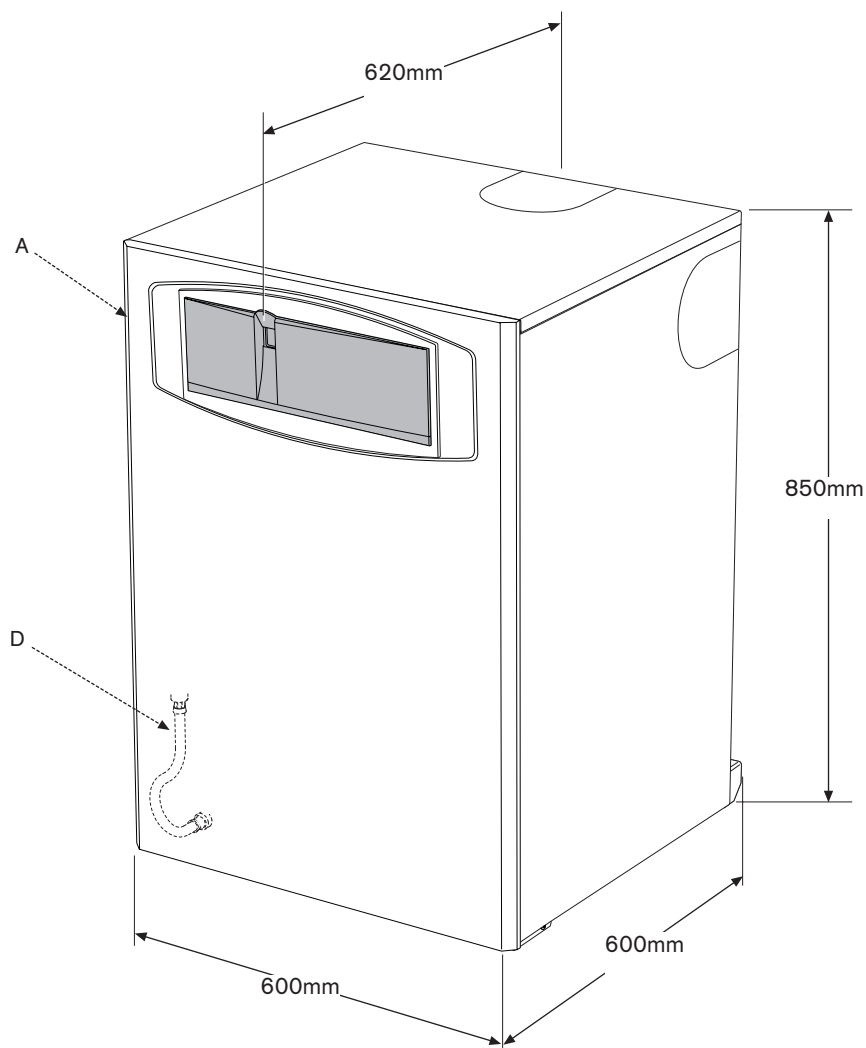
GENERAL INFORMATION

STANDARD PACKAGE:

- A - Floor standing gas fired combination boiler for central heating and mains fed domestic hot water.
- B - Mounting frame complete with pre-plumbing manifold assembly.
- C - Literature pack.
- D - Filling link, built-in. (WRAS approved).

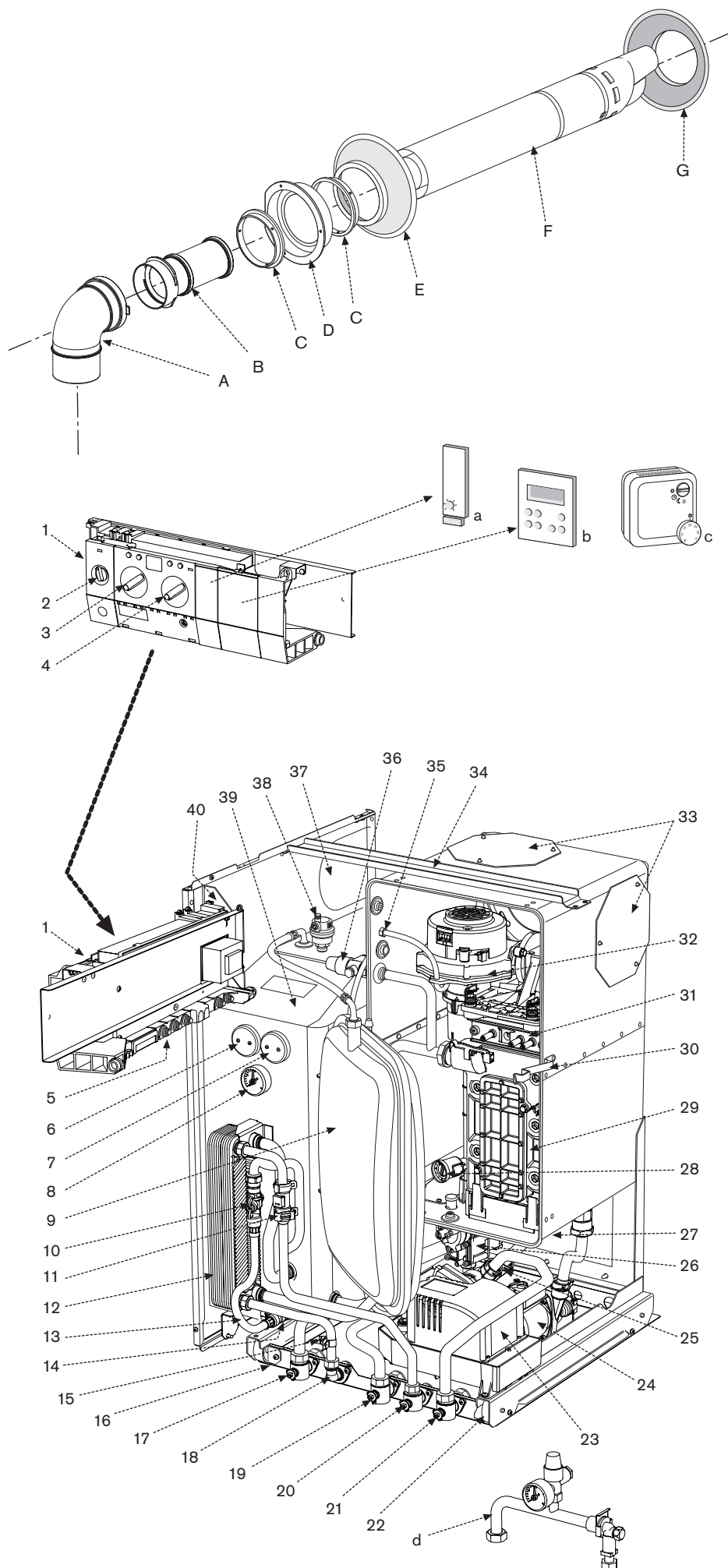
SPECIFICATIONS:

- Pre-wired and pre-plumbed.
- Galvanised steel inner frame.
- Bosch Heatronic 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.
- DHW flow sensor & temperature control.
- Integral water circulating pump with anti-seizure protection.
- Sealed primary system & pressure gauge display.
- Pressure relief valve.
- Flue gas temperature limiter.
- Plate-type DHW heat exchanger.
- Condensate trap & pump.



DESCRIPTION	UNITS	Natural Gas	L.P.G
Central Heating			
Max. rated heat output net 40/30°C	kW	31.2	31.2
Max. rated heat output net 50/30°C	kW	30.9	30.9
Max. rated heat output net 80/60°C	kW	29.2	29.2
Max. rated heat input net	kW	29.5	29.5
Min. rated heat output net 40/30°C	kW	8.4	11.6
Min. rated heat output net 50/30°C	kW	8.3	11.4
Min. rated heat output net 80/60°C	kW	7.4	10.5
Min. rated heat input net	kW	7.6	10.8
Max. flow temperature	°C	88	88
Max. permissible operating pressure	bar	2.65	2.65
Domestic Hot Water			
Max. rated heat input net	kW	29.5	29.5
Max. rated heat output	kW	29.2	29.2
Minimum flow rate to start	l/min	2.3	2.3
Minimum pressure for 20 l/min (±15%)	bar	1.5	1.5
Gas flow rate - Max. 10 minutes from lighting			
Natural Gas G20 (CVnet 34.02 MJ/m ³)	m ³ /h	3.1	-
Propane Gas (LPG) (CVnet 88 MJ/m ³)	kg/h	-	2.3
Gas supply pressure			
Natural Gas G20 (CVnet 34.02 MJ/m ³)	mb	20	-
LPG (Propane) Gas G31 (CVnet 88 MJ/m ³)	mb	-	37
Flue			
Flue Gas Temp. 80/60°C, rated min. load	°C	67/55	67/55
Flue Gas Temp. 40/30°C, rated min. load	°C	43/32	43/32
Residual delivery pressure (inc. pressure drop in air intake duct)	Pa	80	80
CO ₂ level at max. rated heat output	%	9.2	10.8
CO ₂ level at min. rated heat output	%	8.8	10.5
NO _x - classification	class	5	5
Condensate			
Max. condensation rate	l/h	2.5	2.5
pH value, approx.		4.8	4.8
Electrical			
Electrical power supply voltage	AC...V	230	230
Frequency	Hz	50	50
Max. power consumption	W	107	107
Expansion Vessel			
Charge Pressure	bar	0.75	0.75
Total Capacity	ltr	12	12
General Data			
SEDBUK (Band A)	%	91	92.2
Appliance protection rating (with programmer blanking plate fitted)	IP	20	20
Appliance protection rating (with fascia programmer fitted)	IP	20	20
Private ambient temperatures	°C	0 - 50	0 - 50
Nominal capacity of appliance	ltr	51	51
Noise output level (at maximum CH output)	dB(A)	37	37
Weight (excluding packaging)	kg	112	112

LAYOUT & COMPONENTS



The diagram opposite shows the controls in the servicing position and excludes the outer case, inner covers and wiring.

- 1 CONTROLS SUPPORT FRAME
- 2 BOILER ON/OFF SWITCH
- 3 DHW TEMPERATURE CONTROL
- 4 CH TEMPERATURE CONTROL
- 5 BOSCH HEATRONIC SERIES CONTROL BOARD
- 6 TANK TEMPERATURE SENSOR
- 7 TANK OVERHEAT THERMOSTAT
- 8 PRESSURE GAUGE
- 9 EXPANSION VESSEL
- 10 FILLING LOOP ISOLATION VALVE
- 11 WATER FLOW SENSOR TURBINE
- 12 DHW HEAT EXCHANGER
- 13 FILLING LOOP FLEXIBLE PIPE
- 14 BOILER/TANK DRAIN & CONNECTION POINT FOR FILLING LOOP
- 15 DHW FLOW SENSOR
- 16 MOUNTING FRAME
- 17 CH FLOW ISOLATION VALVE
- 18 DHW OUTLET
- 19 GAS ISOLATION VALVE
- 20 MAINS WATER INLET ISOLATION VALVE
- 21 CH RETURN ISOLATION VALVE
- 22 RUNNER WHEEL
- 23 CONDENSATE PUMP ASSEMBLY
- 24 CIRCULATING PUMP
- 25 DIVERTER VALVE
- 26 GAS VALVE
- 27 CONDENSATE TRAP
- 28 AIR/GAS ADJUSTMENT SCREW (SEALED)
- 29 HEAT EXCHANGER
- 30 RETAINING CLIP FOR EXPANSION TANK
- 31 GAS BURNER
- 32 COMBUSTION AIR FAN
- 33 FLUE BLANKING PLATE
- 34 CASING SUPPORT STRUT
- 35 FLUE GAS SAMPLING POINT
- 36 PRESSURE RELIEF VALVE
- 37 CASE 'KNOCK-OUT' PANEL - FLUE
- 38 AUTO-AIR VENT
- 39 DHW WATER STORAGE TANK
- 40 DATA LABEL

100mmØ HORIZONTAL CONDENSEFIT HIGHFLOW FLUE COMPONENTS (Kit Part No. 7 719 002 434)

- A - 93° ELBOW
- B - ELBOW EXTENSION
- C - LOCKRING
- D - RETAINING RING
- E - INNER WALL FLUE COLLAR
- F - TERMINAL ASSEMBLY
- G - OUTER WALL FLUE COLLAR

OPTIONAL ACCESSORIES (not supplied)

- a - TR212E NIGHT SETBACK MODULE
Part No. 7 744 901 136
- b - TWIN CHANNEL DIGITAL TIMER
Part No. 7 716 192 032
- c - TR2 ROOM TEMPERATURE CONTROLLER
Part No. 7 744 901 137
- d - FILLING LINK WITH PRESSURE GAUGE
Part No. 8-718-505-047

FLUE KITS:

- Vertical 100mmØ Part No. 7 719 002 435
- Vertical 125mmØ Part No. 7 719 002 437
- Horizontal 125mmØ Part No. 7 719 002 436

- NG to LPG CONVERSION KIT
Part No. 7 716 192 294

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.

USE 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:

- ▶ Fill the system with cold mains water to the recommended pressure and check for leaks.
- ▶ Open all drain cocks and drain the system.
- ▶ 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.
- ▶ Run the boiler and system at normal operating temperature in accordance with the manufacturer's instructions.
- ▶ Drain and thoroughly flush the system to remove the flushing agent and any debris.



ELECTRIC SUPPLY:

- Supply: 230V - 50Hz.
- Cable: PVC insulated 0.75mm² (24 x 0.2mm) temperature rated to 90°C.
- Protection IP20.
- External 5A fuse to BS1362.
- The appliance must be earthed.
- All pipes to the boiler must be cross-bonded.
- It must be possible to isolate the appliance from the electric supply with at least a 3mm contact separation in all poles supplying the appliance.
- Wiring between the appliance and the electrical supply must comply with IEE wiring regulations and any local regulations which may apply for fixed wiring to a stationary appliance.
- Any system connected to the boiler must not have a separate electricity supply.
- External controls must be double insulated mains voltage with no earth requirement.



WATER SUPPLY:

- Connections to the water supply must not be made without the authority of the local water company.
- The appliance cold water supply should be the first connection off the water main where possible.

Water Mains Pressure:

- Minimum dynamic mains water pressure 1.2 bar for maximum performance.
- Maximum mains fed water pressure 10 bar. If necessary, fit a pressure reducing valve.

IMPORTANT: Non-return, back flow prevention devices (including those associated with water meters) fitted to the mains water supply can cause a pressure build up which could damage the boiler and other household appliances.

- Where the water main supply has a non-return, back flow prevention valve fitted, a mini expansion vessel (A) should be connected to the mains water inlet pipe (B) between the non-return valve (C) and the boiler (D) as shown opposite.

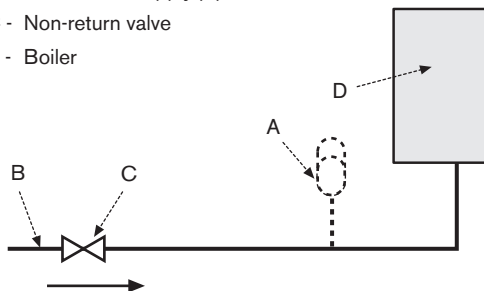
Use in hard water areas:

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

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

MAINS WATER EXPANSION VESSEL:

- A - Mini expansion vessel, part No. 7 716 192 105
- B - Water Main supply pipe
- C - Non-return valve
- D - Boiler





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 diameter of the gas supply pipe be less than that of the appliance inlet connection.
- The meter or regulator and pipework to the boiler 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.

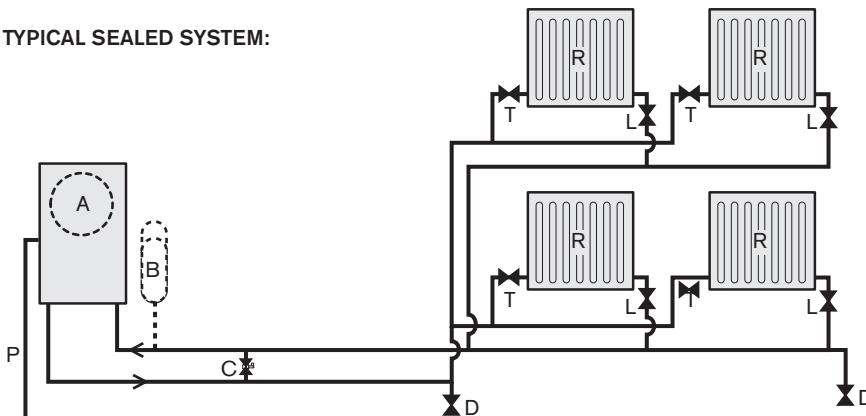
PRIMARY SYSTEM PLASTIC PIPEWORK:

- Any plastic pipework must have a polymeric barrier with 600mm (minimum) length of copper or steel pipe connected to the boiler.
- Do not use plastic pipework on sealed systems.
- 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. The pipework from the boiler to the blending valve must be in copper or steel (protected from corrosion).

PRIMARY SYSTEM/CONNECTIONS/VALVES:

- Do not use galvanised pipes or radiators.
- All system connections, taps and mixing valves must be capable of sustaining a pressure of 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 the radiator where the room thermostat is sited, this must be fitted with lockshield valves and left open. All installations should have TRV's fitted to radiators within the sleeping accommodation.
- Drain cocks are required at all the lowest points on the system.
- Air vents are required at all high points on the system.

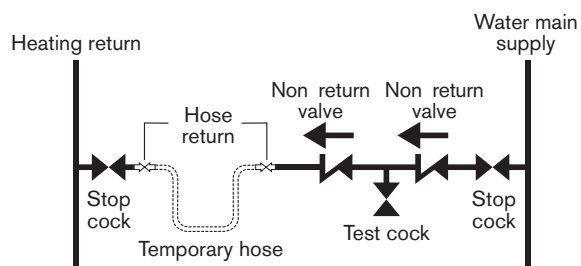
TYPICAL SEALED SYSTEM:



- A - Appliance expansion vessel
- B - Extra expansion vessel
- C - Automatic bypass valve
- D - Drain cock
- L - Lockshield valve
- P - Pressure relief discharge
- R - Radiators
- T - TRV

SEALED PRIMARY SYSTEM:

- Where the system volume is more than 100 litres or exceeds 2.65bar 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.



FILLING PRIMARY SYSTEMS:

- The CH sealed system must be filled using a WRAS approved filling loop or comply with the diagram opposite for system fill.
- The filling point must be at low level and must never be a permanent direct fixing to the mains water supply.

SHOWERS/BIDETS:

- If a shower head can be immersed in water or comes closer than 25mm from the top edge of a bath or shower tray spill over level then an anti-siphon device must be fitted to the shower hose.
- Bidets with direct hot & cold mains water can be used (with the approval of the local water authority) and must be the over rim flushing type with shrouded outlets to prevent the fitting of hand held sprays.

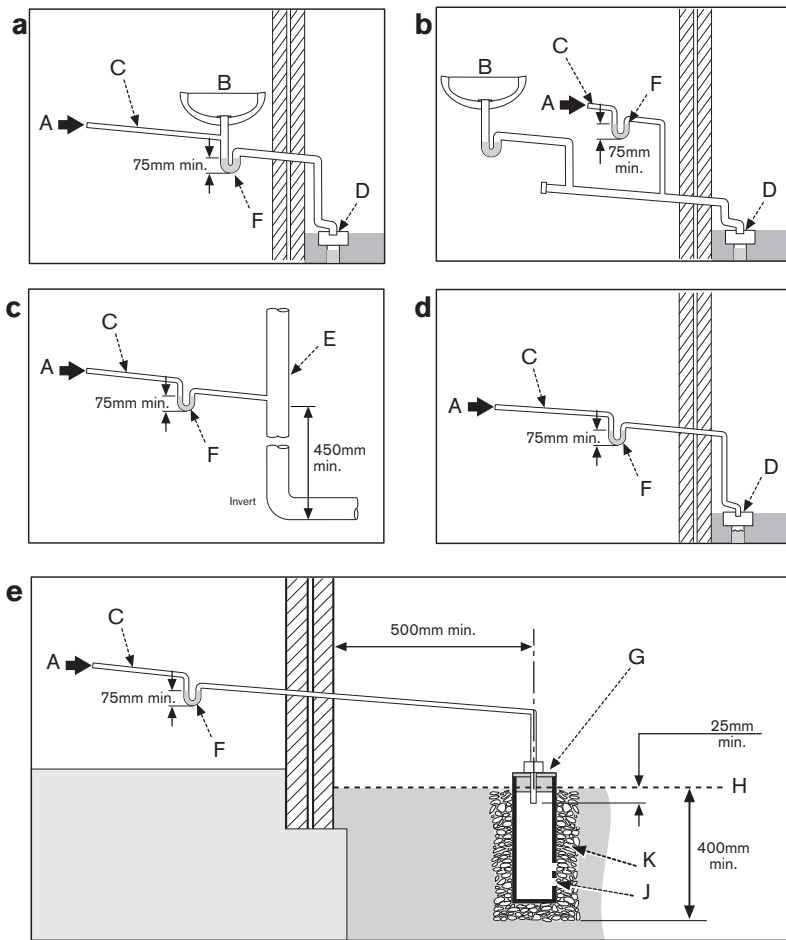
DOMESTIC HOT WATER:

- Taps and mixing valves must be capable of sustaining a pressure up to 10 bar.
- Hot water temperature and flow rate are affected by the size and insulation of pipework making up the distribution system and are controlled by the hot water tap and the water main inlet pressure. A mixing valve can be fitted if a more permanent setting is required.
- If using more than one outlet at once causes water flow starvation, fit flow balancing valves or Ball-O-Fix valves to the appropriate outlets.

CONDENSATE & PRESSURE RELIEF PIPEWORK

CONDENSATE PIPEWORK:

- The condensate pipe must be a minimum of 21.5mmØ plastic pipe.
- The condensate pipework must fall at least 50mm per metre towards the outlet and should take the shortest practicable route and not exceed 3 metres outside the building.
- The pipework must follow one of the options shown opposite (into a serviceable internal trap (min. 75mm) such as a sink/washing machine) and discharge direct into a vent stack (E) min. 450mm above pipe invert or into a gully (D) below ground but above the water level.
 - Internal sink/washing machine drain.
 - Internal waste drainage system.
 - Soil/vent stack.
 - External drainage system.
 - External condensate absorption point.
- Use waterproof pipe insulation in exposed positions and for external pipework.



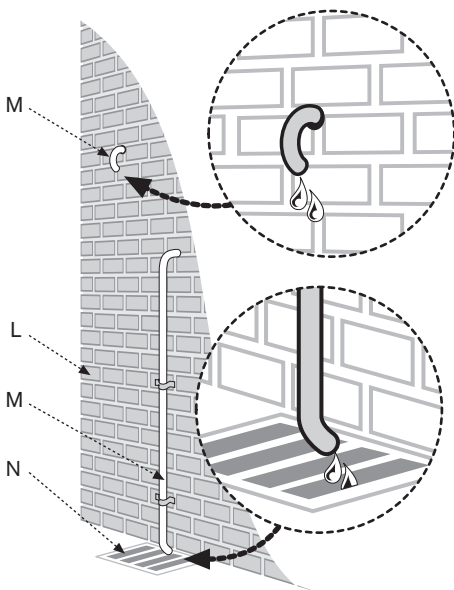
- A - Condensate from boiler.
- B - Sink.
- C - 21.5mmØ plastic condensate waste pipe.
- D - Gully.
- E - Internal soil and vent stack.
- F - Servicable condensate trap (75mm min).
- G - 300mm x 100mmØ sealed plastic tube.
- H - Ground level.
- J - Drainage holes 50mm from base of tube (12mmØ at 25mm centres) facing away from building.
- K - Limestone chippings.

PRESSURE RELIEF PIPEWORK:

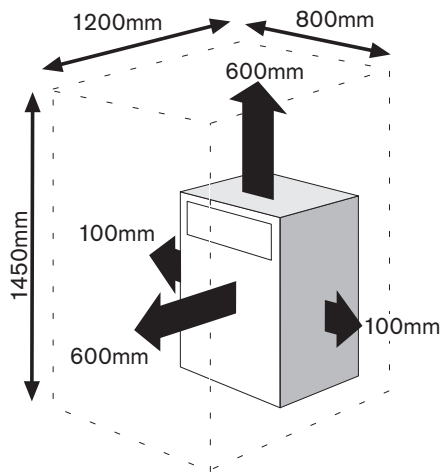
IMPORTANT: The pressure relief valve is a safety device for the boiler and if activated may discharge boiling water or steam through the relief valve drain pipe. Care should be taken when siting the outlet pipe so that it does not cause an obstruction or discharge above a window, entrance or other public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

- The pressure relief drain pipe (M) should be at least 15mm diameter copper pipe and run downwards away from the boiler and discharge 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 freezing.
- Use waterproof pipe insulation in exposed positions and for external pipework.

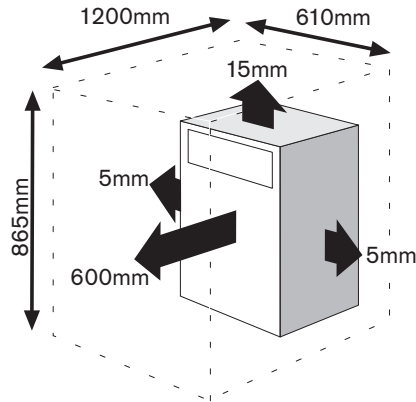
- L - Outside wall.
- M - Drain pipe.
- N - External drain.



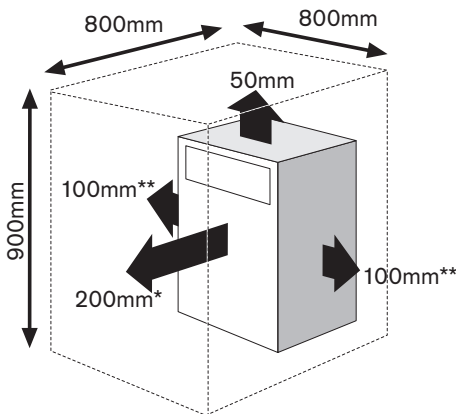
a: INSTALLATION CLEARANCES



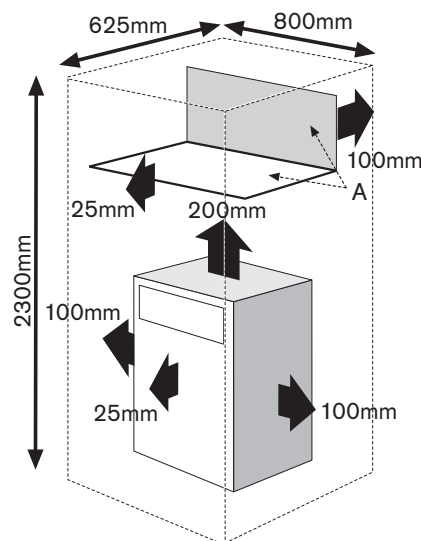
b: SERVICE CLEARANCES



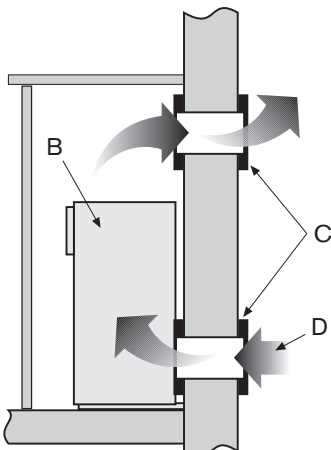
c: UNVENTED COMPARTMENT CLEARANCES



d: AIRING CUPBOARD CLEARANCES



e: VENTING COMPARTMENTS



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.
- The boiler is not suitable for external installation unless a suitable enclosure is provided.
- **THIS BOILER IS NOT SUITABLE FOR ROOF SPACE INSTALLATION.**

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.

a: INSTALLATION CLEARANCES:

Diagram 'a' shows the minimum space required to **install** the boiler only.

b: SERVICE CLEARANCES:

Diagram 'b' opposite shows the minimum space required to **service** the boiler only.

c: UNVENTED COMPARTMENT CLEARANCES:

Diagram 'c' shows the minimum space required to install and service the boiler inside an unvented compartment.

*Space required for unvented areas with a removable door or panel.

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.

d: AIRING CUPBOARD CLEARANCES:

Diagram 'd' opposite shows the minimum space required to install and service the boiler within an airing cupboard.

e: VENTING COMPARTMENTS:

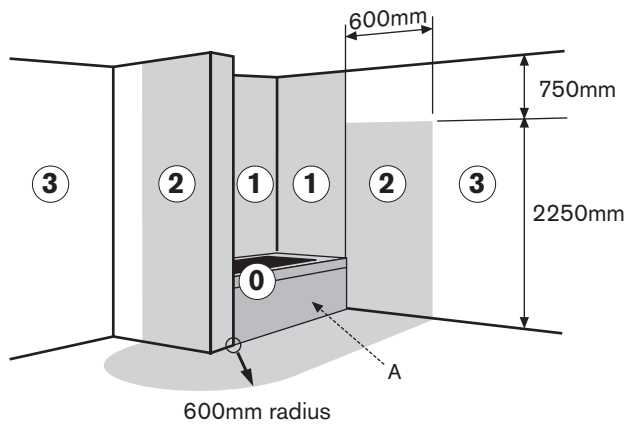
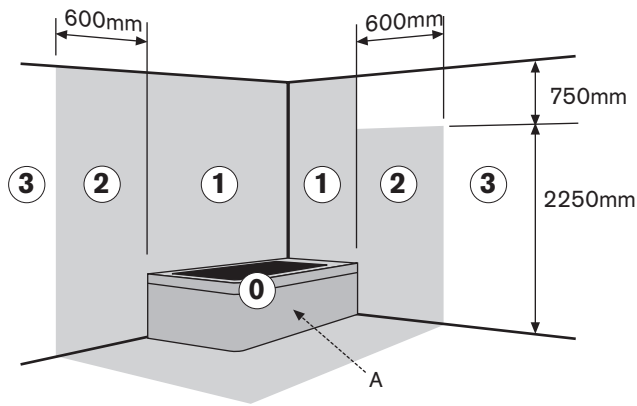
If the clearances are less than those stated for options 'c' & 'd' (above) then ventilation must be provided as described in BS 5440.

A minimum of 2 air vents (C) must be fitted, one at low level and another at high level onto the same wall using the same air for circulation.

Minimum free air required for venting:

For air directly from outside: 148cm² per vent.

For air from internal space/room: 296cm² per vent.



A - Bath or shower cubicle (zone 0)

BOILER LOCATION & CLEARANCES

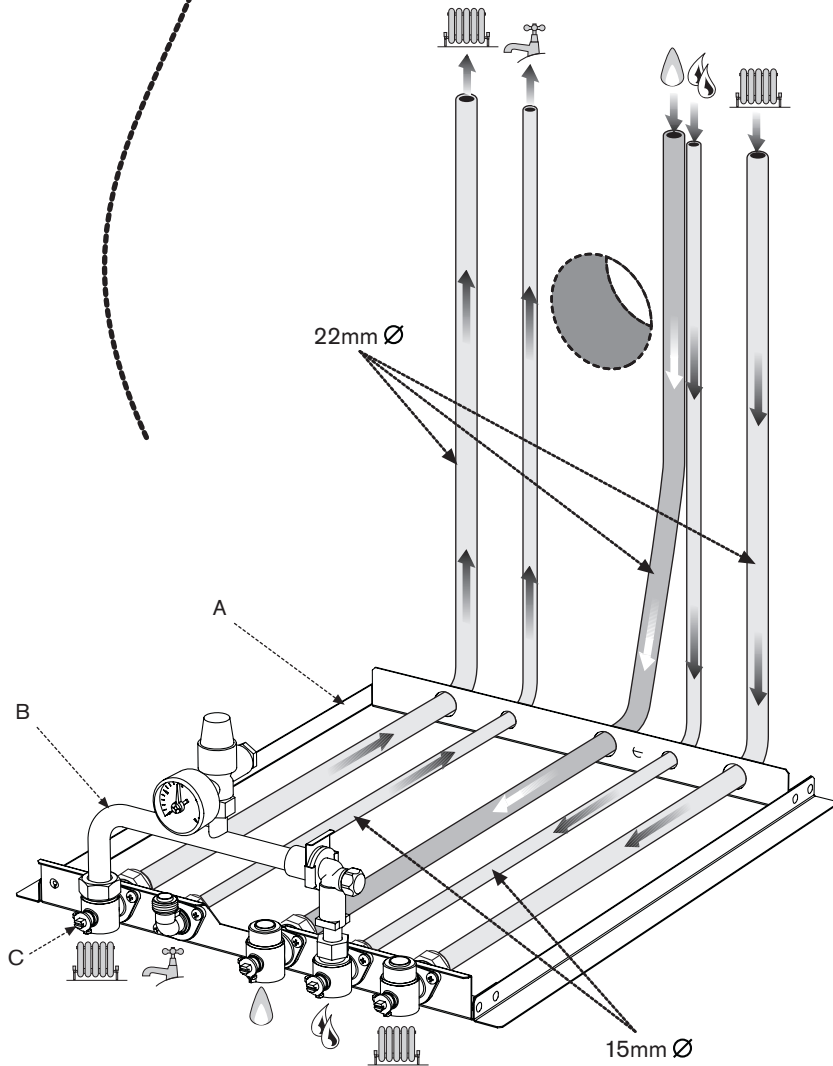
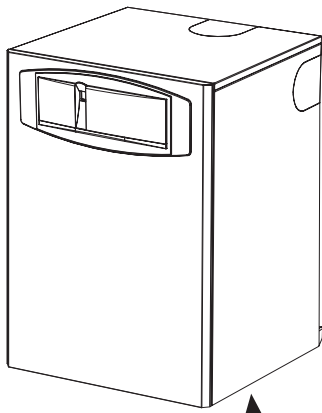
SHOWER / BATHROOMS:

The boiler **must not** be installed in zones 0, 1 or 2 or in the shaded areas shown on the diagrams opposite.

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.

PRE-
INSTALLATION



MOUNTING FRAME CONNECTIONS

CONNECTIONS:

Water: 22mm and 15mm compression fittings

Gas: 22mm compression fitting.

PRE-PLUMBING:

- With the mounting frame (A) installed, pipework can be connected to the valves on the plumbing manifold.
- The system can be filled (without the boiler being connected) using an optional charging link assembly (B).
- The valves can be closed enabling the DHW and CH systems to be tested.
- The boiler can be installed at a later date.

RUNNING PIPES BEHIND THE BOILER:

- The frame should sit against the wall (not the skirting board) with enough room for the pipework.
- Do not cross a pipe over another.
- The area around a rear flue outlet must be avoided.

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

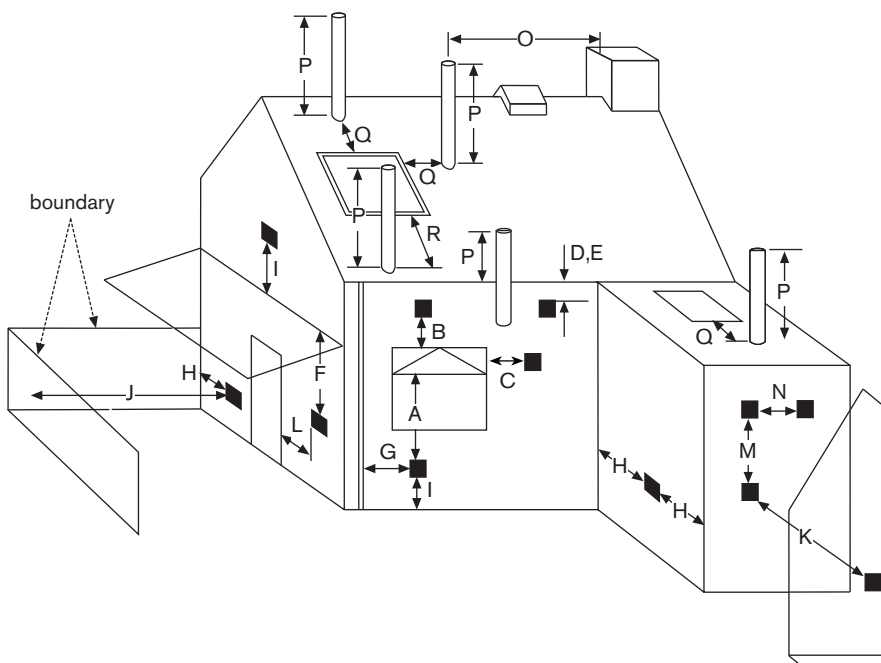
DRWG. REF:	TERMINAL POSITION (KW INPUT EXPRESSED IN NET)	DISTANCE
A ¹	Directly below an opening, air brick, opening windows, etc.	300mm
B ¹	Above an opening, air brick, opening window, etc.	300mm
C ¹	Horizontally to an opening, air brick, opening window, etc.	300mm
D	Below gutters, soil pipes or drain pipes	75mm
E	Below eaves	200mm
F ²	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 or to a boundary alongside the terminal	**300mm
I	Above ground, roof or balcony	300mm
J	From a surface or boundary facing the terminal	**600mm
K	From a terminal facing the terminal	1200mm
L ²	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 vertical non-combustible structure on the roof	*
P	Above intersection with roof	*
Q	Adjacent to windows or openings on pitched or flat roofs	600mm
R	Below windows or openings on a pitched roof only	2000mm

¹ In addition, the terminal should not be nearer than 150 mm (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.

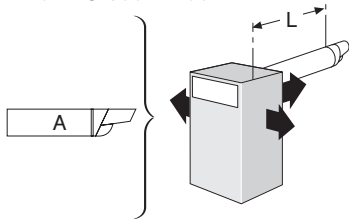
* See instructions supplied with vertical flue kits.

** Care should be taken to ensure the siting of a terminal does not cause a nuisance to adjoining properties.

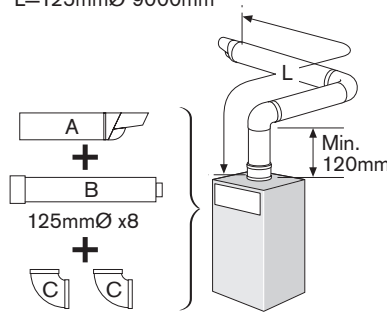


- Flue terminals must be positioned to avoid combustion products entering into buildings.
- The flue must be fitted and terminated in accordance with the recommendations of BS5440 : Part 1.
- The flue must not cause an obstruction.
- Discharge from the flue outlet must not be a nuisance.
- Flue gases have a tendency to plume and in certain weather conditions a white plume of condensation will be discharged from the flue outlet which could be regarded as a nuisance, for example, near security lighting.
- There should be no restriction preventing the clearance of combustion products from the terminal.
- 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 where 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' on the inside front cover for flue guard information.

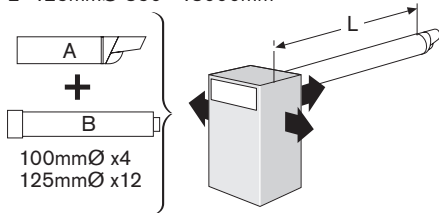
L=100mmØ 250 - 600mm
L=125mmØ 350 - 1200mm



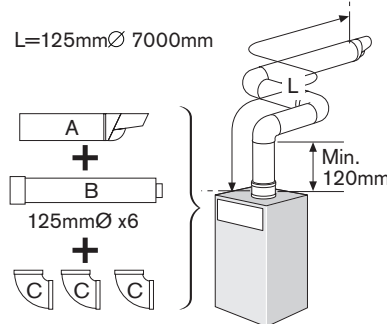
L=125mmØ 9000mm



L=100mmØ 400 - 4000mm
L=125mmØ 350 - 13000mm



L=125mmØ 7000mm



ROOM SEALED FLUE OPTIONS

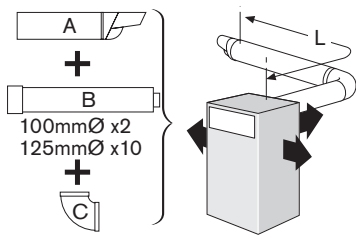
The diagrams (opposite) show the components used and the maximum flue length for each configuration of 100mm and 125mm Ø flues.

- Only straight flue sections can be reduced in length by cutting.
- The flue terminal end can be fitted from the inside or outside of the building.
- Horizontal 125mm Ø and Vertical 100mm and 125mm Ø flue kits are available with separate instructions. Contact your supplier or Worcester Bosch.

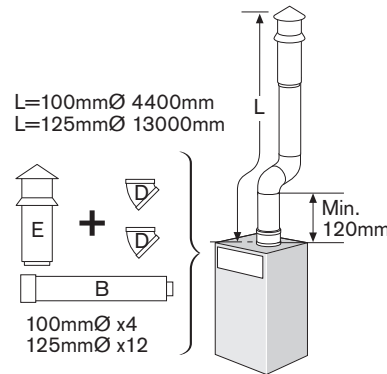
IMPORTANT:

All horizontal sections must rise away from the boiler by 52mm per metre (3°) to allow the condensate to drain back to the boiler.

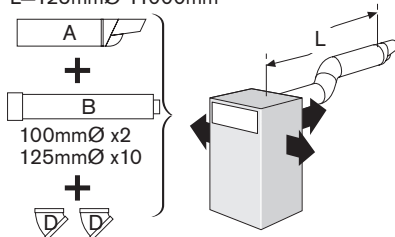
L=100mmØ 2000mm
L=125mmØ 11000mm



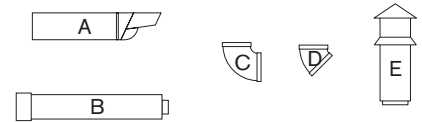
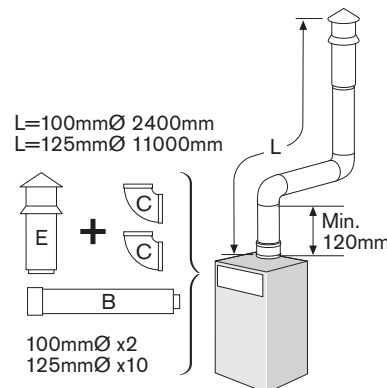
L=100mmØ 4400mm
L=125mmØ 13000mm



L=100mmØ 2000mm
L=125mmØ 11000mm



L=100mmØ 2400mm
L=125mmØ 11000mm



- A - Horizontal terminal
- B - Straight flue extension
- C - Flue bend 90° & 45°
- D - Flue bend 45°
- E - Vertical 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 Ø: 4000mm
- Horizontal 80/125mm Ø: 13000mm
- Vertical 60/100mm Ø: 6400mm
- Vertical 80/125mm Ø: 15000mm

Then reduce the total straight flue length for each extra flue bend (excluding the flue elbow) by:
2000mm for 90°
1000mm for 45°

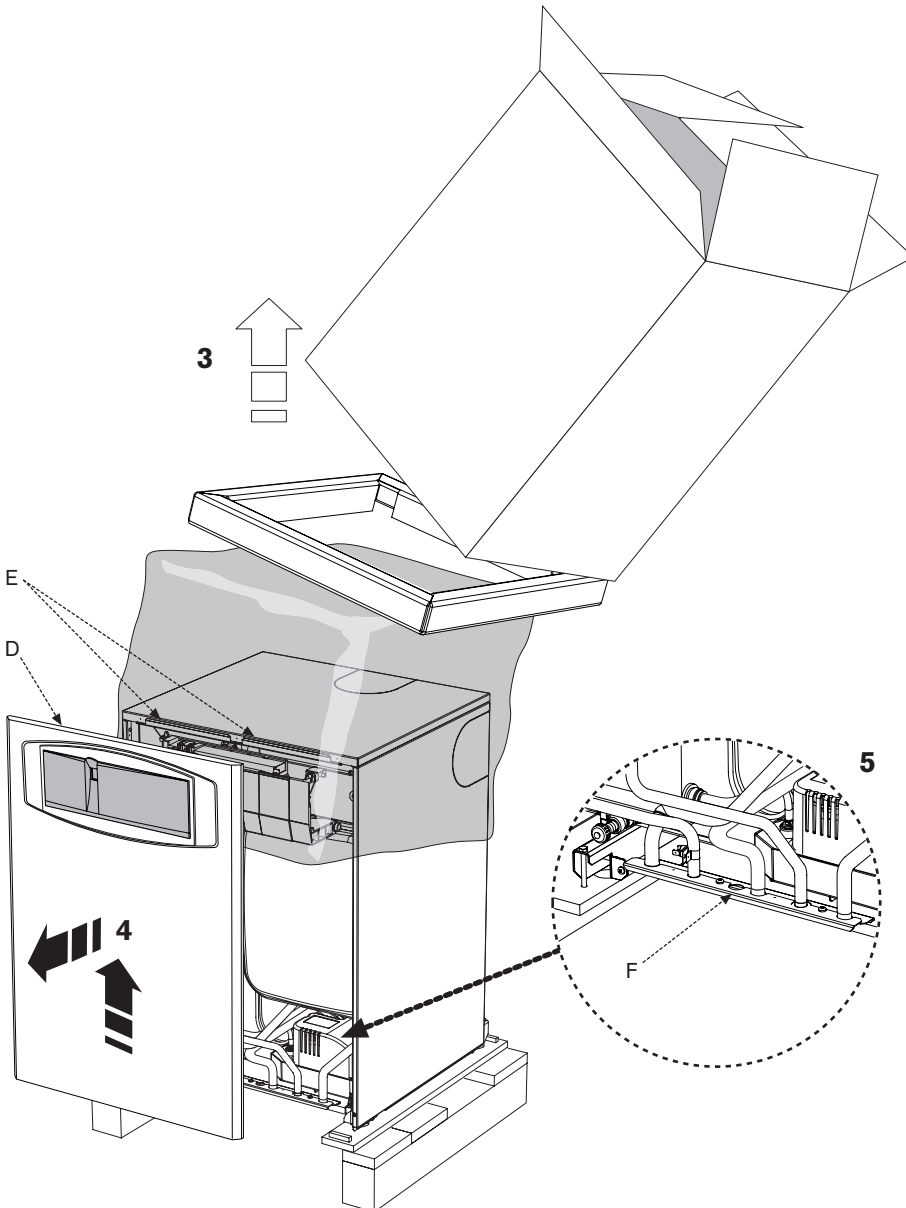
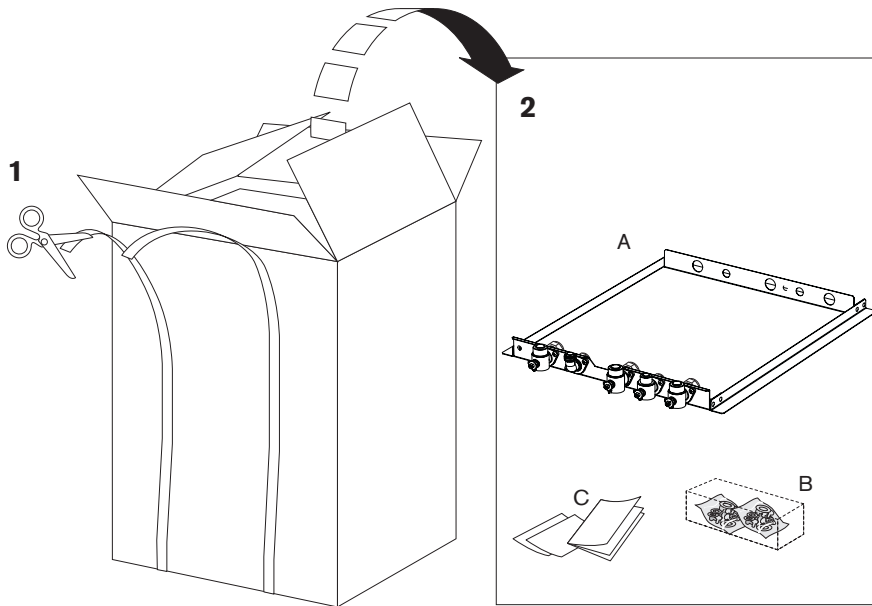
Flue Extension lengths:

- Horizontal & Vertical 60/100mm Ø: 1000mm
- Horizontal & Vertical 80/125mm Ø: 1030mm

Flue Terminal lengths:

- Horizontal 60/100mm Ø: 800mm
- Horizontal 80/125mm Ø: 1200mm
- Vertical 60/100mm Ø: 1140mm
- Vertical 80/125mm Ø: 1365mm

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



UNPACKING THE BOILER

Take care not to damage the boiler panels or the floor and note that the boiler may contain some water due to factory testing.

Unpacking:

- 1 ▶ Undo the ties securing the carton to the pallet
If a sharp implement is used, care must be taken not to pierce the carton or cause injury.
- 2 ▶ Before removing the carton it is advised that the top flaps are opened and the ancillary items (A, B & C) are removed and set to one side.
- 3 ▶ The carton can now be lifted off the boiler.
▶ Remove the plastic bag protecting the boiler surfaces and place safely away from the working area.
▶ Remove 2 screws at the rear of the board securing the board to the pallet.
▶ Slide the boiler and board off the pallet.
- 4 ▶ Grip the outer sides of the front panel (D) and pull up and away from retaining lugs (E).
▶ Remove securing screw at the front of the boiler.
▶ Remove remaining screws at the rear of the boiler.
▶ The boiler is mounted on small wheels and two people are recommended to move the boiler from the board taking care not to damage the panels or the floor.
- 5 ▶ Remove the split bracket (F) from the boiler pipework by releasing the two retaining screws.

At all times the correct method for handling heavy objects should be strictly observed.

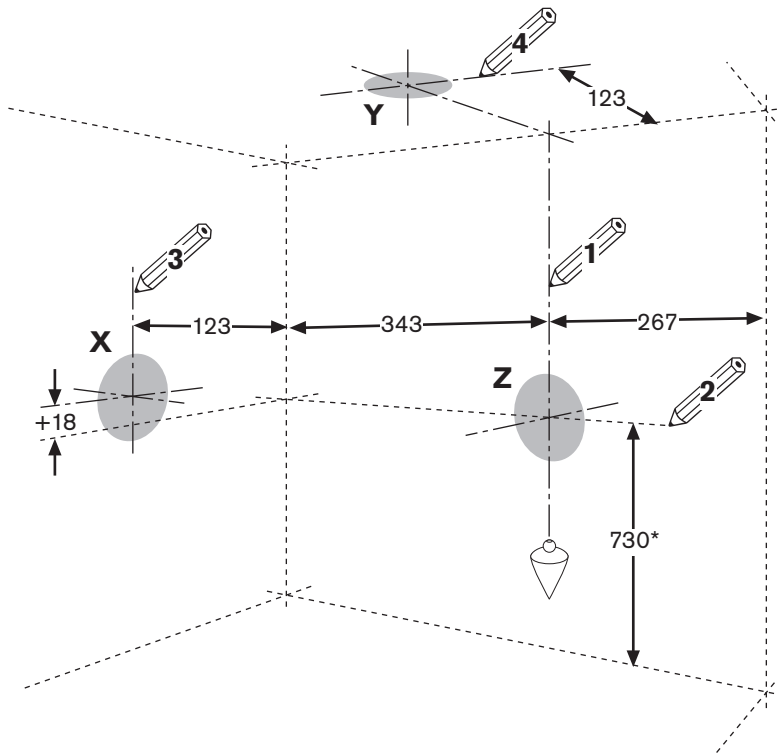
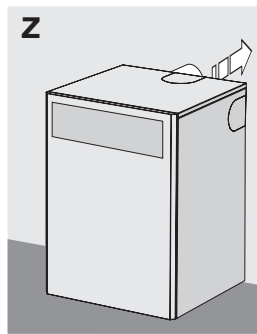
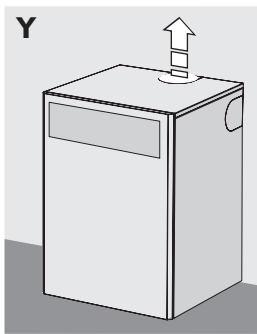
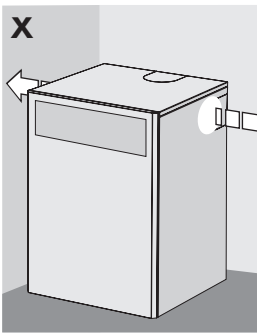
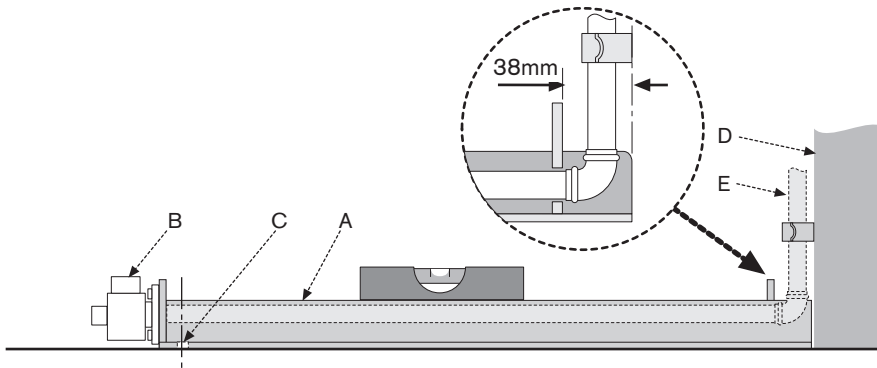
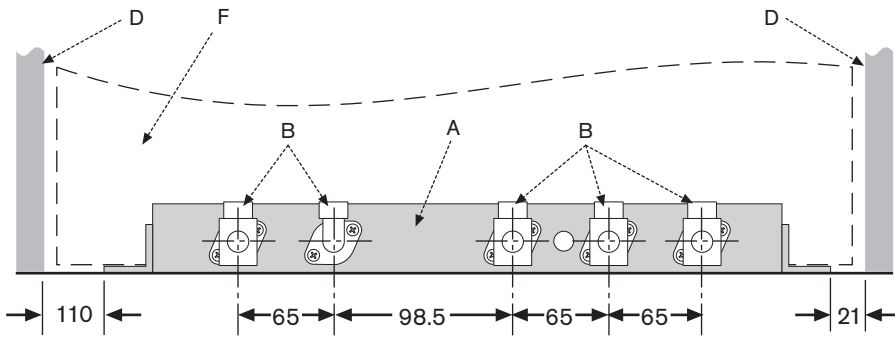
GENERAL HANDLING GUIDELINES:

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

THIS BOILER IS NOT SUITABLE FOR ROOF SPACE INSTALLATION.

- A - Mounting frame
- B - Installation pack
- C - Literature pack

All dimensions in mm



MOUNTING FRAME FIXING & FLUE OPENING

CAUTION: Ensure there are no pipes, electric cables, damp proof course 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.

MOUNTING FRAME/PIPEWORK POSITIONS:

- A - Mounting frame.
- B - Manifold connections.
- C - Mounting frame fixing point.
- D - Wall.
- E - Gas and water pipework (not supplied).
- F - Boiler.

FIXING THE MOUNTING FRAME:

- ▶ Position the mounting frame (A) on the floor against the wall with manifold connections (B) facing away from the wall (D) ensuring there is enough space for the pipework (E).
- ▶ Allow the minimum space from each side of the frame (A) for the boiler overhang (F) and minimum service clearance, as shown.
- ▶ Ensure the mounting frame is level and mark fixing points (C).
- ▶ Secure mounting frame (A) to the floor using appropriate fixings (not supplied).
- ▶ Clear any debris from the site.

FLUE OPENING:

- ▶ Follow the diagram opposite to mark the centre of the flue (1, & 2) for rear opening, (2 & 3) for side opening or (1 & 4) for top opening.

Measurements shown include the minimum service clearances.

*** IMPORTANT:** for horizontal flues, increase this height by 52mm for every 1000mm of horizontal length that the flue opening is away from the boiler

NOTE: all horizontal flue sections must rise away from the boiler by 52mm per meter to ensure that condensate flows back into the boiler for safe discharge via the condensate waste pipe.

- ▶ Cover the mounting frame manifold assembly (A) to protect the valves.
- ▶ Make an opening (X, Y or Z) through the wall using a core drill or similar at a size relative to the wall thickness as shown below:

Wall thickness	Flue opening 60/100mmØ
150 - 240mm	125mmØ
240 - 330mm	130mmØ
330 - 420mm	135mmØ
420 - 500mm	140mmØ

Where the flue terminal can only be fitted from inside the building, increase the opening to 150mmØ to allow the optional weather collar to fit through the opening.

- ▶ Clear away any debris.

MOUNTING FRAME

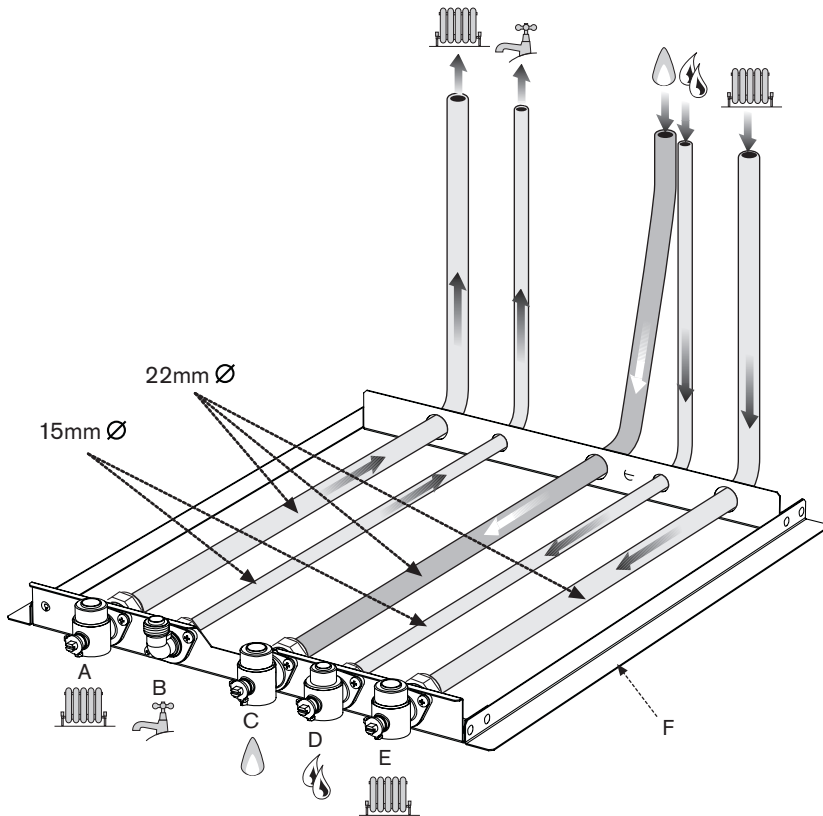
CONNECTIONS

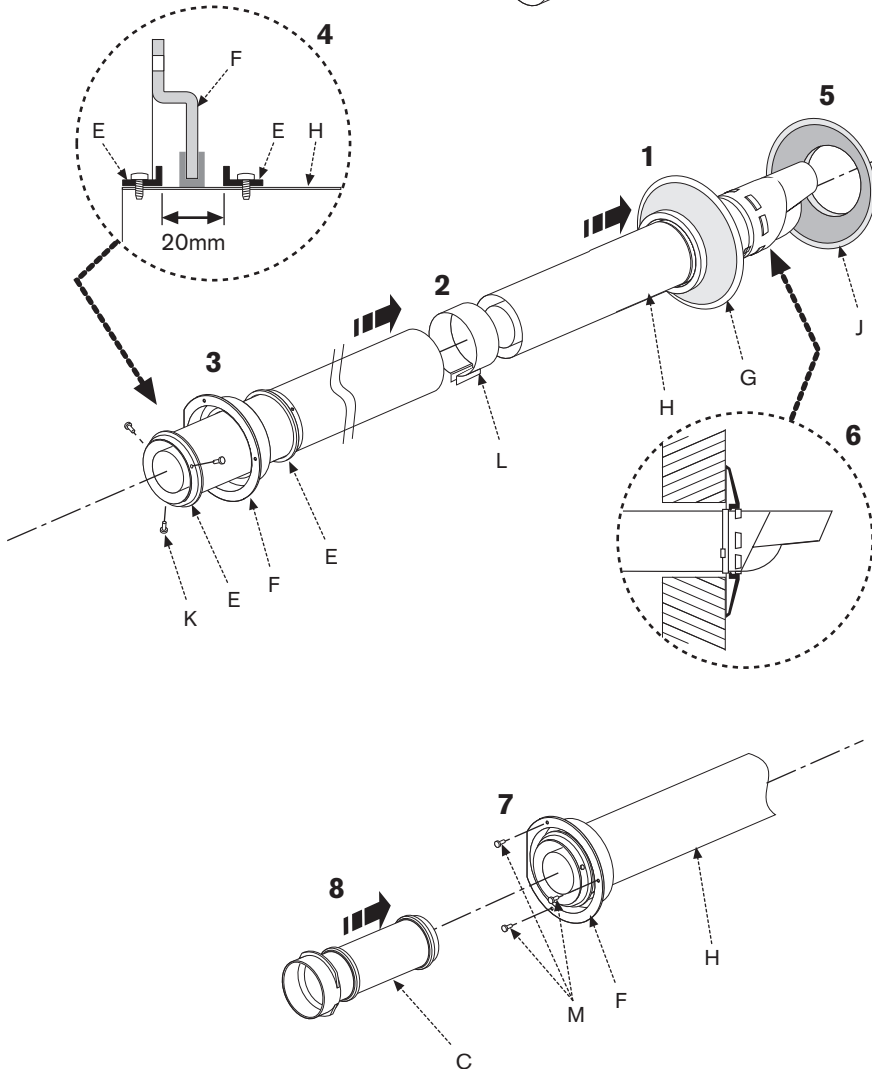
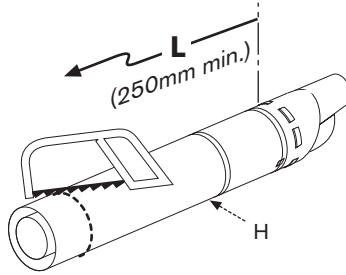
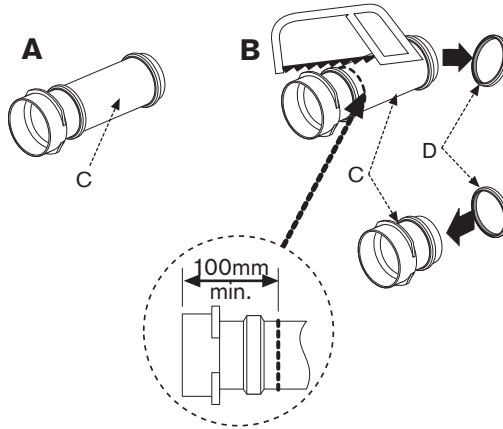
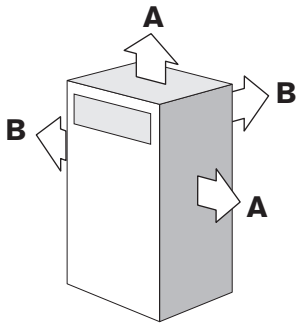
CAUTION: ISOLATE THE MAINS GAS SUPPLY BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS.

GAS AND WATER CONNECTIONS:

- ▶ Ensure all pipework is clean and each pipe is in the correct position as shown opposite.
- ▶ Push in each pipe in turn and tighten the fitting to secure.

- A - CH flow (22mm)
- B - DHW flow (15mm)
- C - Gas inlet (22mm)
- D - Mains water inlet (15mm)
- E - CH return (22mm)
- F - Mounting frame.





FLUE INSTALLATION

HORIZONTAL FLUE: (60/100mm diameter)

For vertical flues and 80/125mmØ horizontal flues, please refer to separate Flue Kit instructions.

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

FLUE OUTLETS (A & B):

A Use the elbow extension (C) at full length (uncut) for flue outlets (A).

Note: a minimum 300mm of straight flue length is required to accommodate the uncut elbow extension.

B Reduce the length of the elbow extension (C) for flue outlets (B) from the boiler.

Reducing the elbow extension length (C):

- ▶ Remove seal (D) from elbow extension (C).
- ▶ Cut square to mark, as shown, deburr and clean.
- ▶ Replace seal (D).

REDUCING FLUE TERMINAL LENGTH (H):

- ▶ Measure length required (L) from the end of the metal flue tube, as shown opposite. This distance must be 250mm or more.
- ▶ Mark out and cut both inner and outer tubes (H) square, taking care not to distort the tubes.
- ▶ Remove any burrs.

REDUCING AN EXTENDED FLUE LENGTH:

Only cut straight extension tubes:

- ▶ Mark flue to measure and cut both inner and outer tubes square, taking care not to distort the tubes.
- ▶ Remove any burrs.

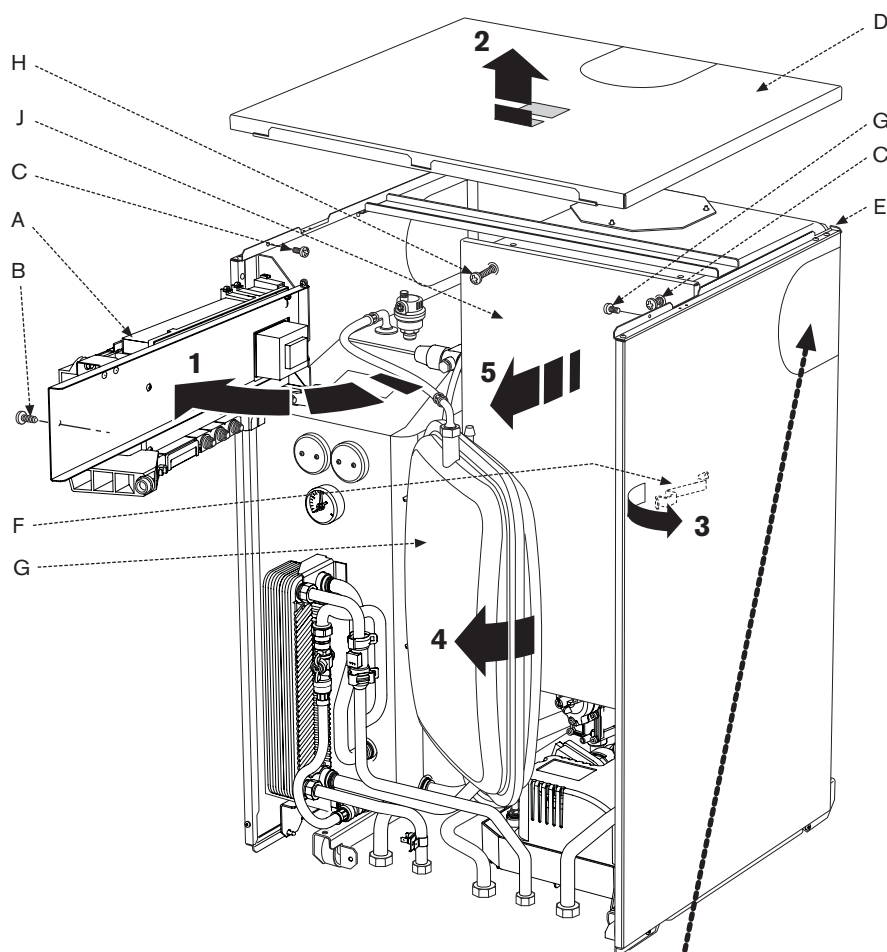
ASSEMBLING THE FLUE:

- 1 ▶ Slide inner collar (G) onto terminal (H).
- 2 Additional extensions or bends:
 - ▶ Push fit all extensions/bends/terminal together and secure connections with clamps (L).
- 3 ▶ Slide locking (E) and retaining ring (F) onto flue.
- 4 ▶ Position second locking (E) at the end of the flue and mark hole centres for each locking with 20mm spacing as shown.
 - ▶ Drill x6 holes at 2.6mm diameter.
 - ▶ Secure to flue with screws (K).

FITTING THE FLUE:

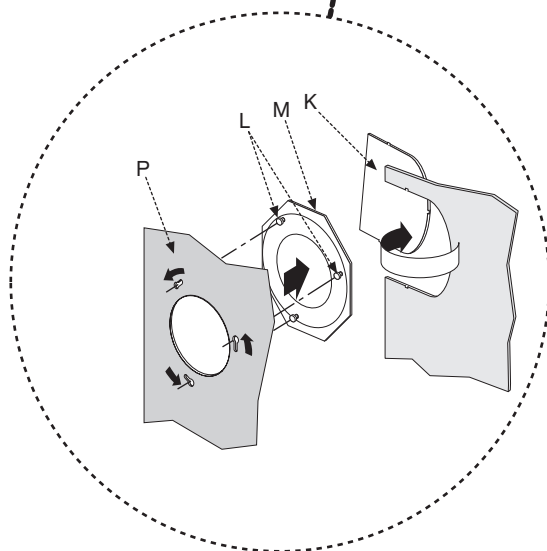
- 5 ▶ Fit the terminal (H) through the flue opening in the wall, exposing the plastic outlet section to the outside.
 - ▶ Fit the outer flue collar (J) over the notches to secure.
- 6 ▶ The slope of the terminal outlet must face downwards as shown.
- 7 ▶ Partially fit screws (M) into the retaining ring (F), do not tighten.
- 8 ▶ Slide elbow extension (C) into flue tube (H).

FLUE INSTALLATION



- 1 ▶ Remove retaining screw (B) to swing control panel assembly (A) outwards to its full extent.
- 2 ▶ Remove screws (C) from inside of casing.
 - ▶ Lift front of panel (D) to release.
 - ▶ Pull forwards to disengage rear retainer (E), then lift panel (D) away from boiler.
- 3 ▶ Pull clip (F) outwards to release expansion vessel (G).
- 4 ▶ Swing expansion vessel (G) outwards.

Note: for easier access to the inner case, the expansion vessel can be unhooked (by removing the retaining screw on the hinge) lowered and moved to the side. Take care not to overstretch the flexible pipe connections.
- 5 ▶ Release four screws (H) to remove the inner case cover (J).



CONVERT FROM REAR FLUE OUTLET:

The boiler is supplied ready to fit a rear flue outlet. To flue vertically or from the side of the boiler, follow the procedure below:

- ▶ Remove one of the outer casing 'knock-out' panels (K) for left, right or vertical flue fitting.
- ▶ Loosen blanking plate screws (L) from inside the inner boiler case (P).
- ▶ Rotate blanking plate (M), complete with gasket, to disengage and remove from the outside.
- ▶ Refit blanking plate (M) over rear flue outlet and tighten screws (L).

CONDENSATE, GAS & WATER CONNECTIONS

CONDENSATE CONNECTION:

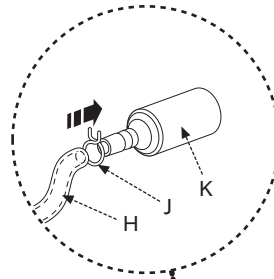
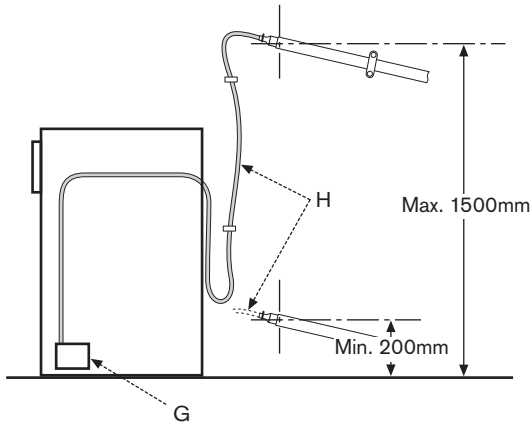
The condensate pump (G) fills up and periodically discharges through the flexible condensate pipe (H) 200mm to 1500mm from floor level. After this point the condensate continues down the 21.5mm plastic pipe to the outlet using gravity.

- ▶ Route and secure condensate waste pipe (H) to prevent kinking or restriction.
- ▶ Cut off any excess pipe (H).
- ▶ Fit the condensate waste pipe (H) to adaptor (K) and secure with clip (J).
- ▶ Connect adaptor (K) to 21.5mm plastic pipe and terminate into an internal waste trap.

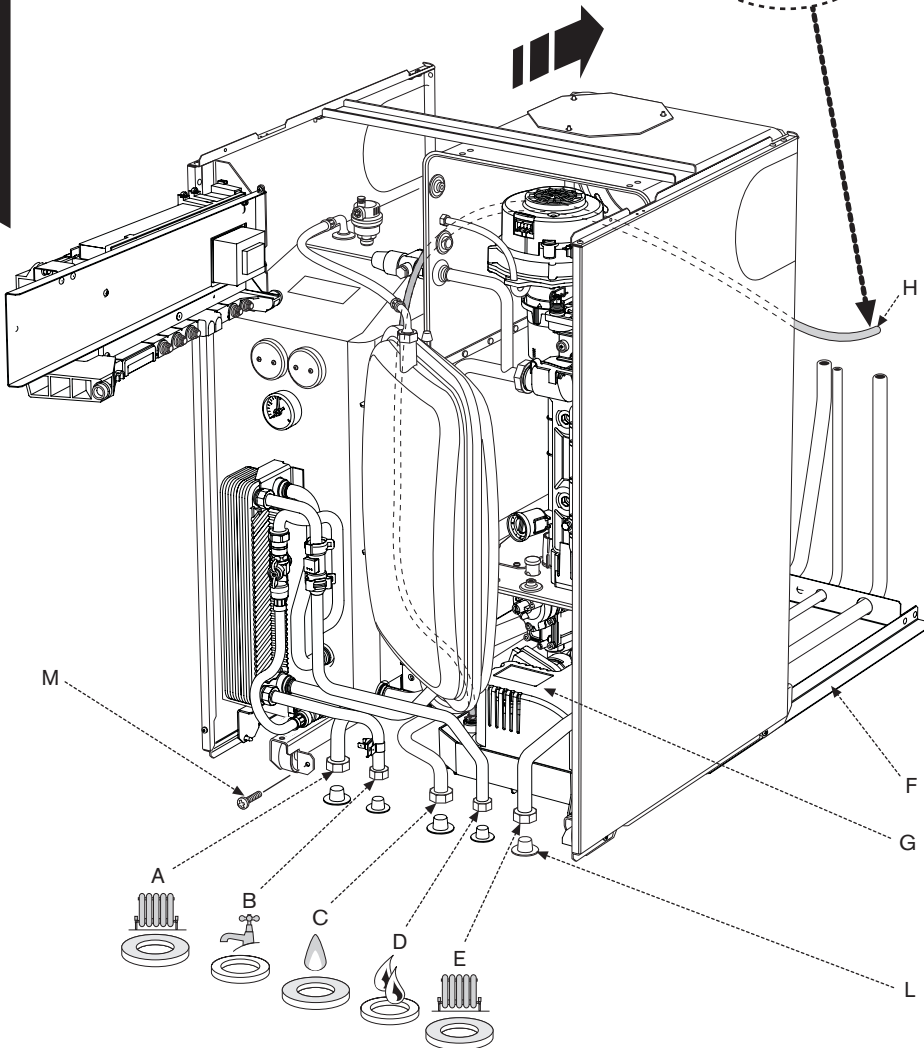
(See Pre-Installation section for condensate pipework running from the adaptor (K) to the discharge outlet).

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.



INSTALLATION



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

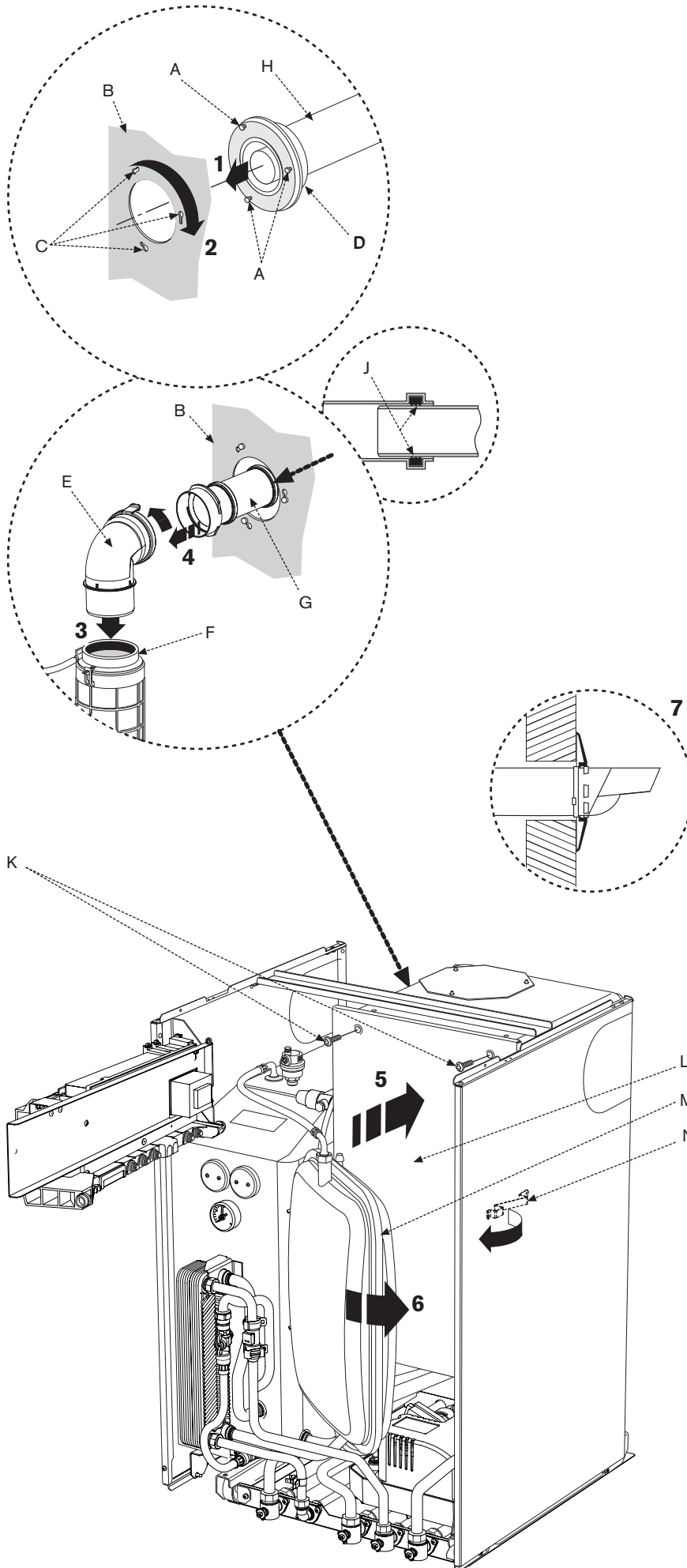
GAS AND WATER CONNECTIONS:

- ▶ Remove the transit bungs (L) from the gas & water connections (A, B, C, D & E) on the boiler and mounting frame.

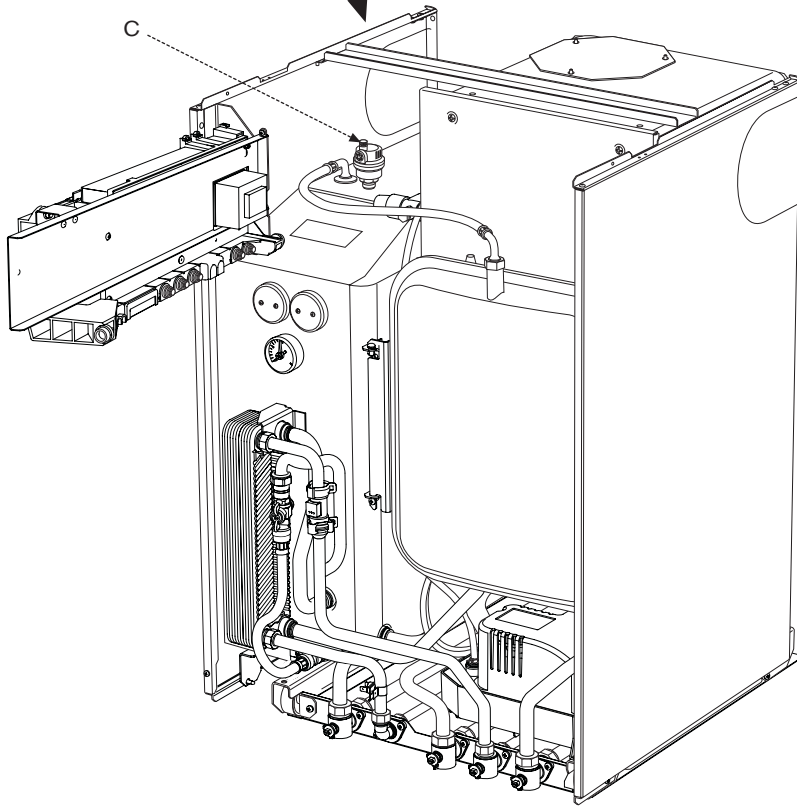
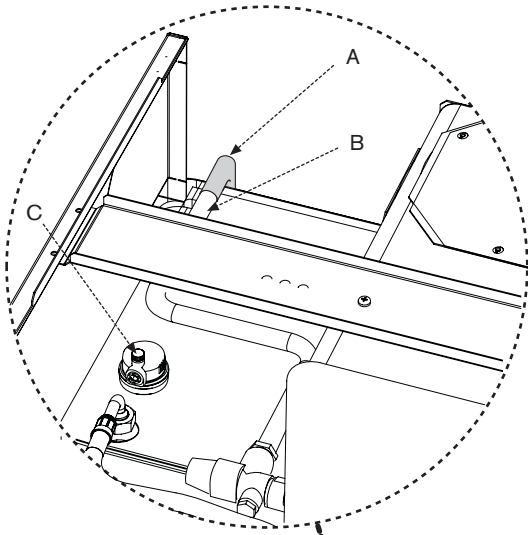
Note: that surplus water may be present due to factory testing.

- ▶ Ensure the area is clear of debris and manoeuvre the boiler rear wheels onto the outer rails of the mounting frame (F).
- ▶ Take care when moving the boiler to position the front wheels onto the rails and align the gas/water connections and the flue.
- ▶ Secure boiler to mounting frame (F) with screw (M)
- ▶ Place the 3 larger valve sealing washers (shown shaded) onto valves A, C & E.
- ▶ Place the 2 smaller valve sealing washers onto valves B & D.
- ▶ Ensure all pipework is clean.
- ▶ Tighten the compression fittings to secure:
 - A - CH flow (22mm).
 - B - DHW flow (15mm).
 - C - Gas inlet (22mm).
 - D - Mains water inlet (15mm).
 - E - CH return (22mm).

FLUE CONNECTIONS



- 1 ▶ Align the flue retaining ring (D) to the boiler internal casing (B)
 - ▶ Locate screws (A) into keyhole slots (C)
- 2 ▶ Rotate flue retaining ring (D) to lock into position
 - ▶ Tighten screws (A) to secure flue (H) to boiler internal casing (B)
- 3 ▶ Insert and push elbow (E) into flue adapter (F)
- 4 ▶ Pull the elbow extension tube (G) and clip to flue elbow (E) ensuring that the sealing rings (J) are still in contact with the inner flue tube
- 5 ▶ Refit inner case cover (L)
 - ▶ Secure using 4 screws (K)
- 6 ▶ Swing expansion vessel (M) inwards and secure with clip (N)
- 7 ▶ Ensure that the slope of the terminal outlet (outside) faces downwards as shown.



PRESSURE RELIEF VALVE OUTLET

Fitting the relief valve drain pipe:

- ▶ Connect a length of 15mm copper pipe (A) to the relief valve drain pipe (B).

The drain pipe (B) should be at least 15mm diameter and run down away from any electrics or other hazard.

IMPORTANT: The pressure relief valve is a safety device for the boiler and if activated may discharge boiling water or steam through the relief valve drain pipe.

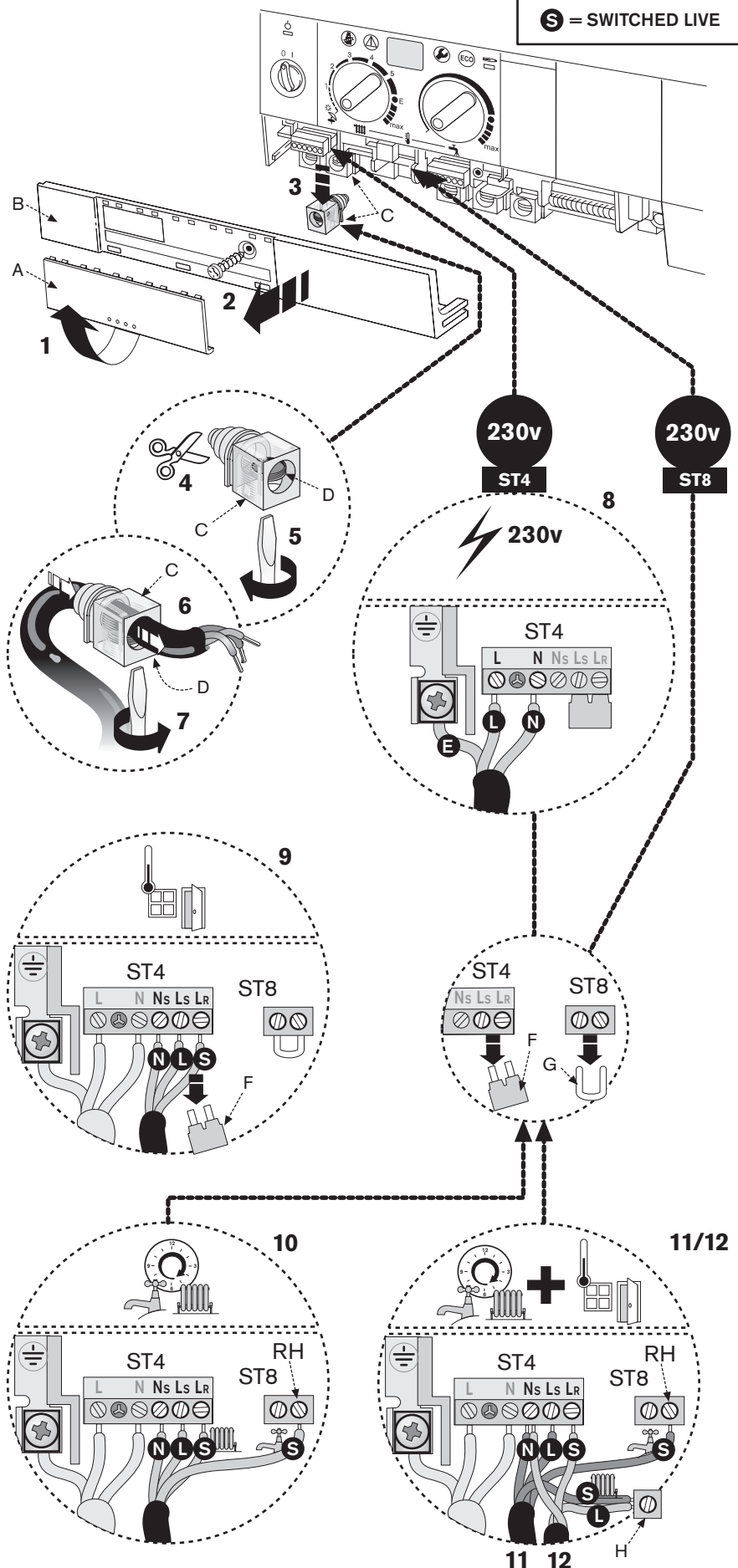
Auto air vent:

- ▶ Remove the auto air vent cap (C) and discard.

DANGER - 230v:
ISOLATE THE MAINS ELECTRICITY SUPPLY BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS.

IMPORTANT: OBSERVE ELECTRONIC STATIC DISCHARGE PRECAUTIONS. DO NOT TOUCH THE PCB CIRCUITS

- E** = EARTH
- L** = LIVE
- N** = NEUTRAL
- S** = SWITCHED LIVE



Access to electric control panel:

- 1 Unclip cover panel (A) from base as shown.
- 2 Unscrew and remove panel (B).
- 3 Unclip cable clamp (C).
- 4 Cut off the tapered cable entry to fit cable diameter required.
- 5 Turn cable retaining screw (D) anti-clockwise.
- 6 Fit cable through cable clamp (C), ensure there is ample cable to reach the connectors.
- 7 Turn cable clamping screw (D) clockwise to secure cable and replace clamp (C) into control panel.

8 Mains power 230v connection (ST4):

- ▶ Separate wires from cable end and strip to 6mm.
- ▶ Connect LIVE wire (Brown or Red) to terminal (L).
- ▶ Connect NEUTRAL wire (Blue or Black) to the terminal (N).
- ▶ Connect EARTH wire (Green/Yellow) to the connector (E).

9 External 230v room thermostat:

- ▶ Remove link (F) from connector block ST4.
- ▶ Connect NEUTRAL wire to terminal (Ns).
- ▶ Connect LIVE wire to terminal (Ls).
- ▶ Connect SWITCHED LIVE wire to terminal (LR).

10 External 230v programmer DHW & CH:

- ▶ Remove links (F & G) from connector blocks ST4 and ST8.
- ▶ Connect NEUTRAL wire to ST4 terminal (Ns).
- ▶ Connect LIVE wire to ST4 terminal (Ls).
- ▶ Connect CH SWITCHED LIVE to ST4 terminal (LR).
- ▶ Connect DHW SWITCHED LIVE to ST8 RH pole.

11/12 External 230v programmer DHW & CH AND Room Thermostat:

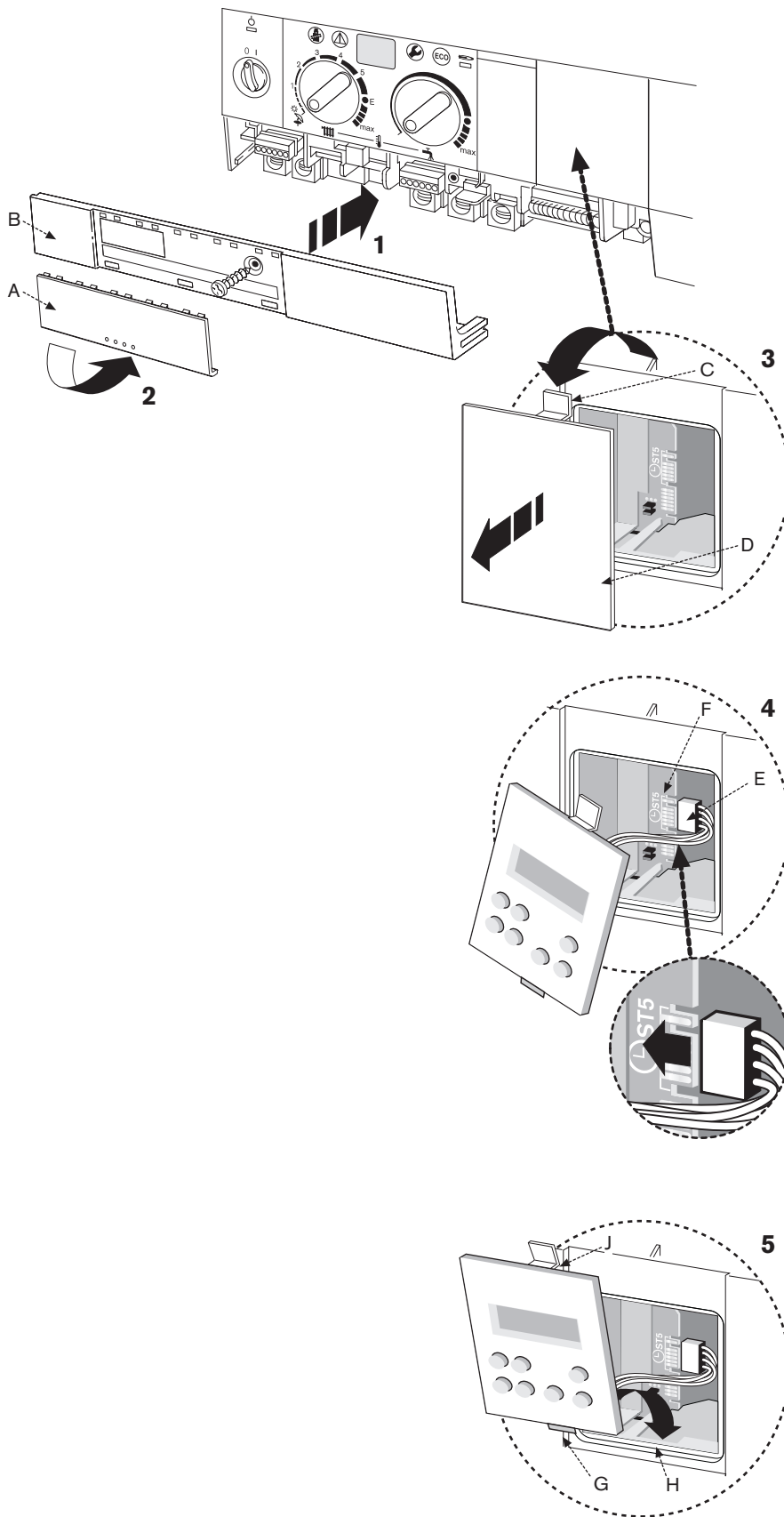
11 External 230v programmer DHW & CH:

- ▶ Remove links (F & G) from connector blocks ST4 and ST8. (Note, Series connector (H) not supplied).
- ▶ Connect NEUTRAL wire to ST4 terminal (Ns).
- ▶ Connect LIVE wire to ST4 terminal (Ls).
- ▶ Connect CH SWITCHED LIVE to terminal (H).
- ▶ Connect DHW SWITCHED LIVE to ST8 RH pole.

12 Room Thermostat:

- ▶ Connect NEUTRAL wire to ST4 terminal (Ns).
- ▶ Connect LIVE to terminal (H) and make connector (H) safe inside electrical cover (B).
- ▶ Connect SWITCHED LIVE to ST4 terminal (LR).

INSTALLATION

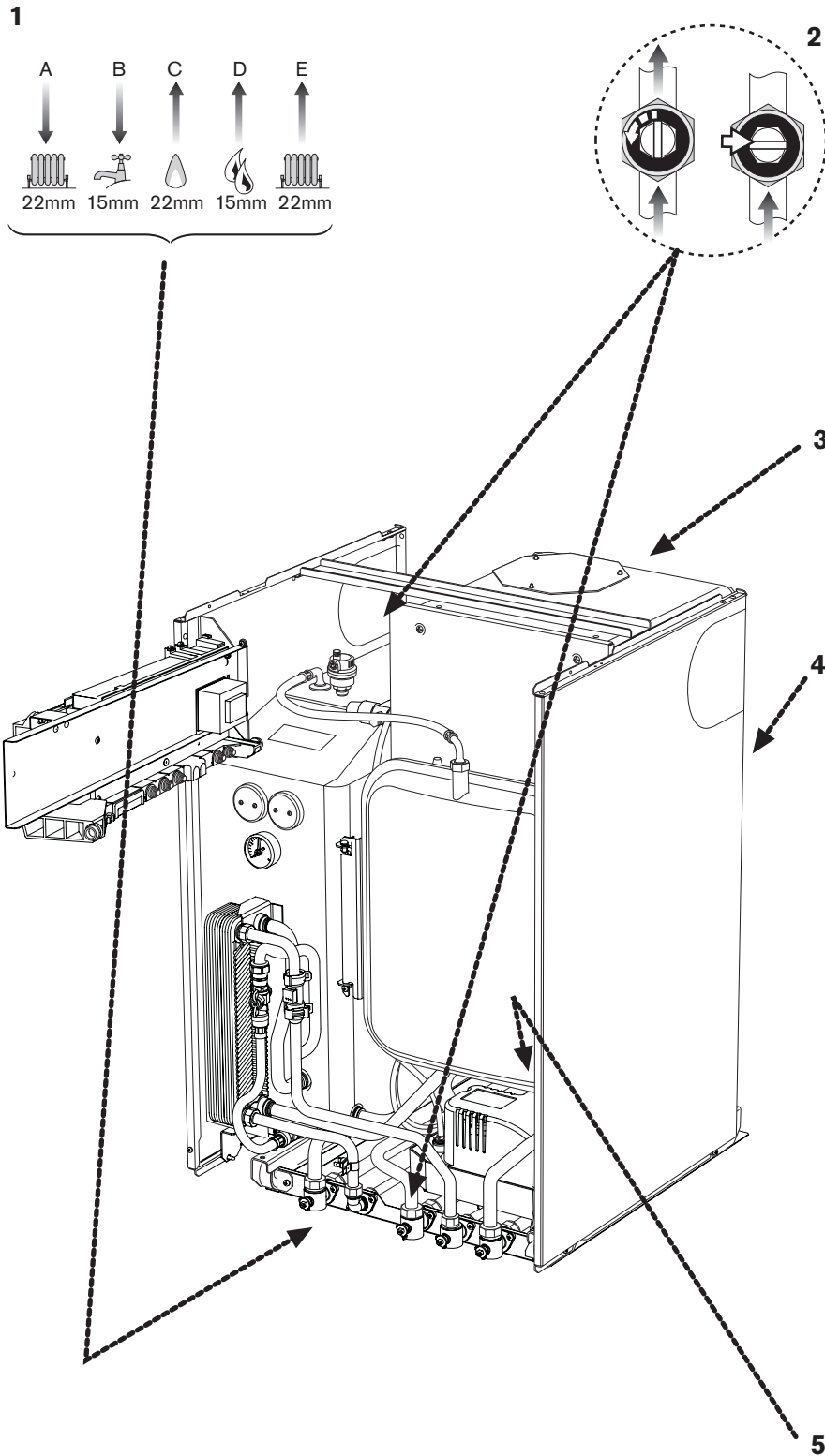


Refit electric control panel covers:

- 1 ▶ Refit panel (B) and secure with screw.
- 2 ▶ Locate lugs at top edge of panel (A) and clip in at base.

Fitting an optional programmer:

- 3 ▶ Pull tab (C) to remove the programmer blanking plate (D).
- 4 ▶ Attach programmer connector (E) onto circuit board (F) at 'ST5' shown with a clock symbol.
- 5 ▶ Locate programmer lower lug (G) into control panel slot (H) and check for trapped wires before clipping the top lug of the programmer (J) into the control panel.

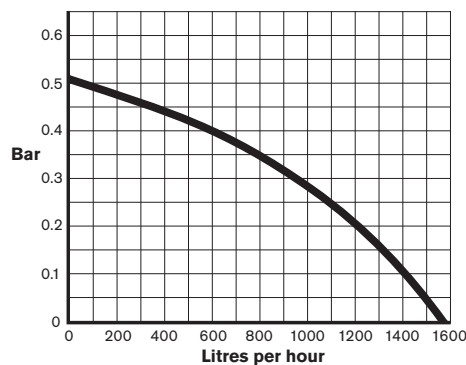


CAUTION: ISOLATE THE MAINS SUPPLIES BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS.

- 1 ▶ Check that the service and water pipes are connected to the correct valve on the manifold;
 - A - CH flow (22mm)
 - B - DHW flow (15mm)
 - C - Gas inlet (22mm)
 - D - Mains water inlet (15mm)
 - E - CH return (22mm)
- 2 ▶ Check the gas type specified on the identification plate matches that of the gas supply.
 - ▶ Turn on the main gas supply, check the gas pipework, connections and rectify any leaks.
- 3 ▶ Check the flue is correctly fitted and the connections are secure.
- 4 ▶ Check the condensate pipework is correctly fitted and connected.
- 5 ▶ Check the CH circulating pump is set to 3.

Note: The CH circulating heating pump is preset to number '3' and should not be altered. The diagram opposite shows the pump output.

IMPORTANT: If the boiler is not to be commissioned immediately then: after successfully completing all of the checks and any rectification work, close the water valves, shut off the gas supply and electrically isolate the boiler. Complete the installation part of the Guarantee Registration Card.



COMMISSIONING

FILLING THE SYSTEM

1 ▶ Turn on the water main and open the system valves (align slot vertically).

2 ▶ Open all radiator valves.

3 ▶ Unscrew the tank drain cap and connect the integral filling loop.

▶ Open the flow and tank drain valves as shown.

▶ Fill the system to a pressure up to 2 bar.

▶ Close the flow valve.

4 ▶ Vent all radiators, retighten when completed.

▶ Check the system and correct any leaks.

5 ▶ The boiler integral expansion vessel is pre-charged to 0.75bar (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.

If an extra expansion vessel is fitted to the central heating return, adjust this to the same pressure as the appliance internal expansion tank, refer to separate instructions with the extra expansion vessel.

6 ▶ Briefly open the pressure relief valve to test its operation.

7 ▶ Close the tank drain valve.

▶ Disconnect the integral filling loop.

▶ Connect a suitable hose to the tank drain ensuring safe disposal of the discharge.

▶ Open the tank drain valve to reduce the system pressure to the system pressure required, then close.

System pressure and capacity:

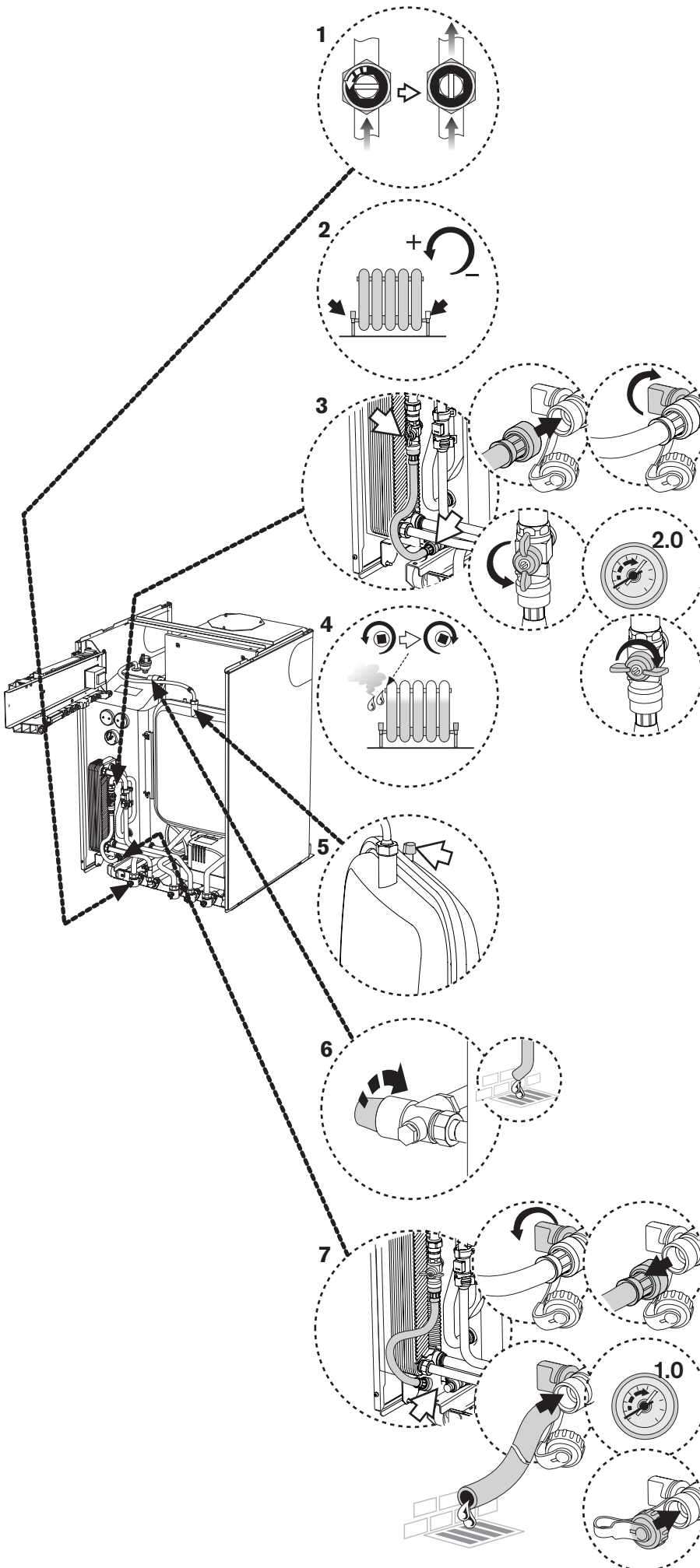
1 bar 82 litres.

1.5 bar 46 litres.

▶ Rotate the adjustable pointer on the pressure gauge to record the set system pressure.

▶ Disconnect the hose from the tank drain.

▶ Refit tank drain cap.



STARTING THE APPLIANCE

IMPORTANT: Never run the appliance when the appliance/system is unpressurised or empty.

Switching the appliance on/off:

- ▶ Check that switch (A) is in the '0' off position.
 - ▶ Turn on mains power supply.
 - ▶ Turn switch (A) from 0 (off) to I (on position).

The power on indicator (B) illuminates green and the burner on indicator (D) illuminates red.

Note: the boiler runs for 15 minutes at minimum heating output to fill the condensate trap, the display (C) alternates between 'II-' and the central heating flow temperature or 'I' & 'II-' if heating the internal DHW tank. This occurs if the mains supply has been interrupted.

 - ▶ To switch off the appliance, turn switch (A) anti-clockwise to the 0 position.

The power on indicator (B) extinguishes.

Checking gas inlet pressure:

- ▶ Connect a pressure gauge to the gas valve inlet test point (F).
 - ▶ Press button (E) until illuminated.
 - ▶ The gas inlet pressure (with all gas appliances working) must not be less than:
 - N.G. 18.5 mbar.
 - L.P.G. 37 mbar.

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

- ▶ Measure the gas rate at the gas meter after 10 minutes operation at maximum; see 'Technical Data' in the Appliance Information section.

Switching on the central heating:

- ▶ Turn the CH flow temperature control (G) clockwise.

Display (C) shows the CH flow temperature:

Control No.	CH flow temperature
1	approx. 35°C
2	approx. 43°C
3	approx. 51°C
4	approx. 59°C
5	approx. 67°C
E	approx. 75°C
max	approx. 88°C

NOTE: the boiler is designed with a differential of 20°C across the heating system.

To obtain the 'max' setting, the limit stop at the E setting has to be repositioned as follows:

- ▶ Remove cap (H) using a flat bladed screwdriver and refit with the raised point facing the centre of the switch, as shown.
- ▶ Turn control to max.

System controls:

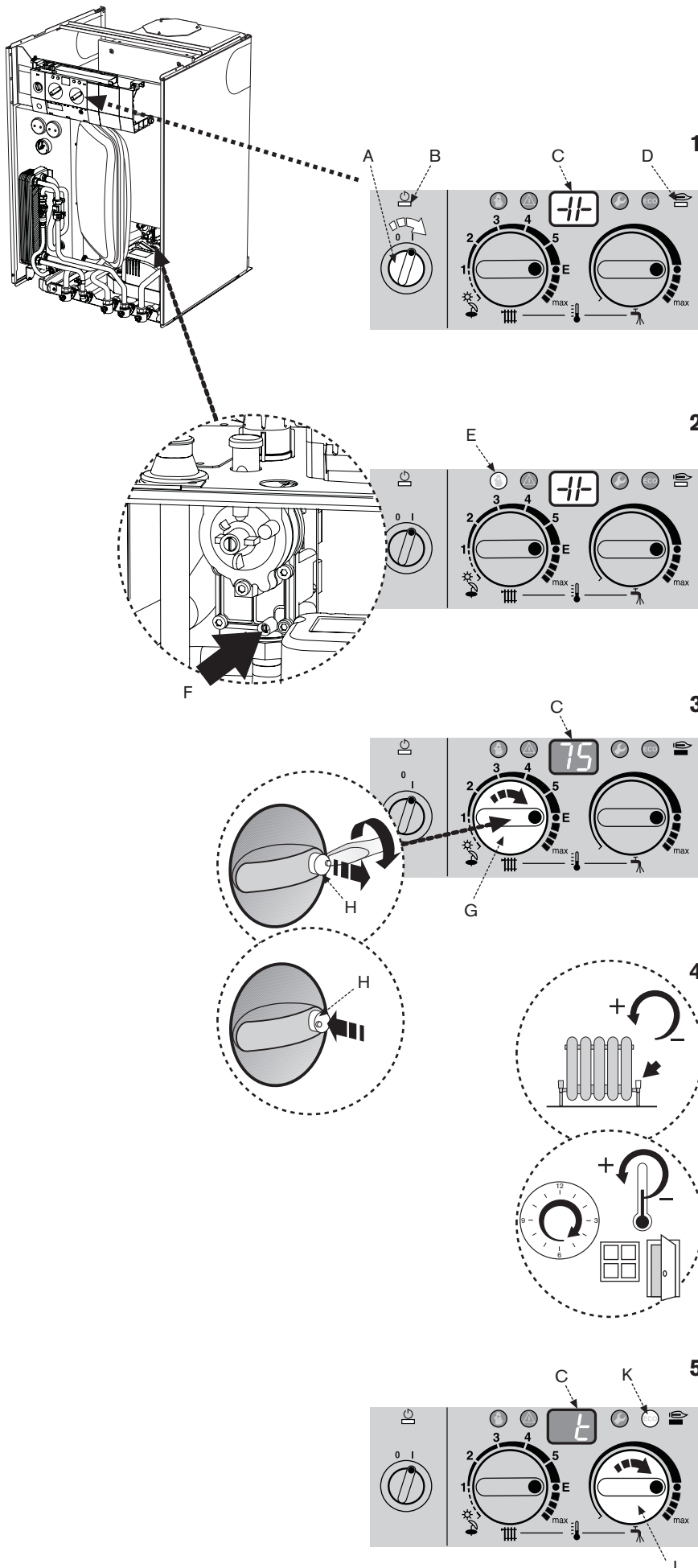
- ▶ Set the thermostatic radiator controls to required temperature.
 - ▶ Set the clock/programmer to continuously ON and room thermostat to maximum temperature.

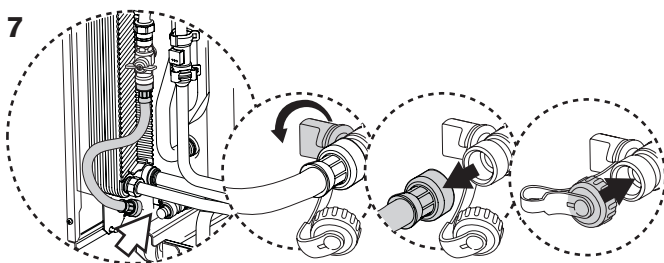
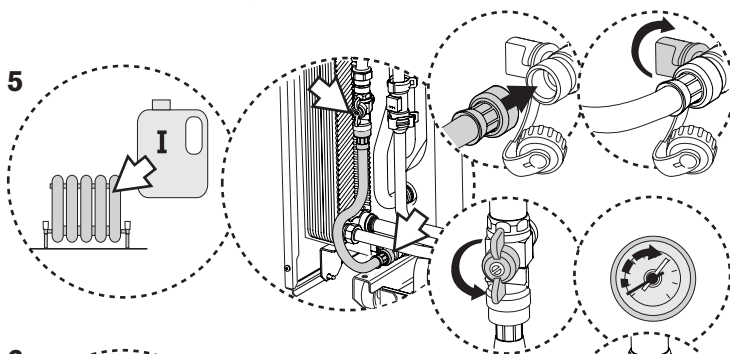
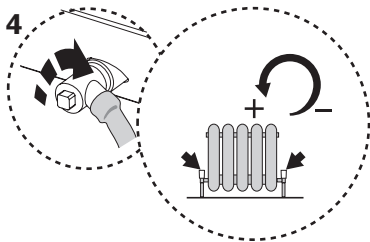
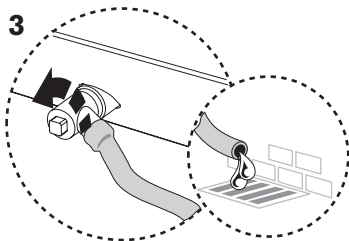
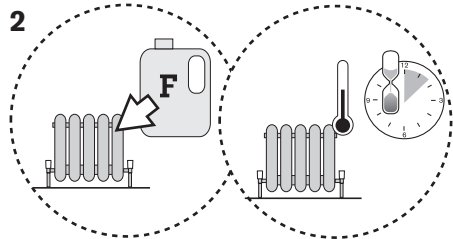
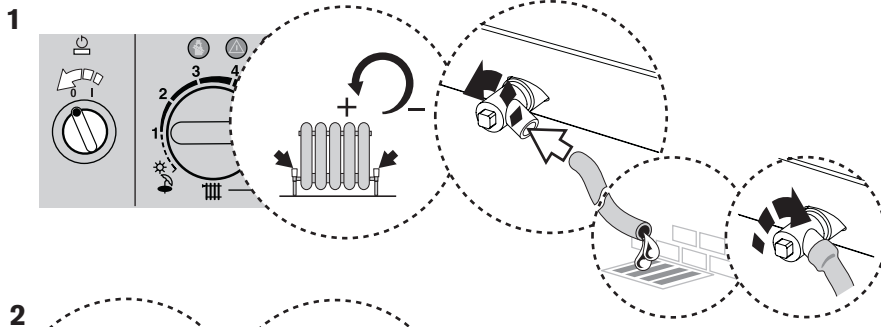
Setting DHW & Tank water temperature:

- ▶ Turn the DHW control (J) to select a hot water temperature between 45° and 65°C.

('I' displays when heating the internal DHW tank).

'ECO': The ECO indicator (K) illuminates when there is no DHW demand from the programmer.





WATER TREATMENT

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.

FLUSHING (Central Heating):

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

INHIBITOR (Central Heating):

- 4 ▶ Check drain cocks are closed and all radiator valves are open.
- 5 ▶ Add a suitable* inhibitor (I), (or combined inhibitor/anti-freeze if the system is exposed to freezing conditions) to the heating system in accordance with the manufacturers instructions.

The inhibitor or combined inhibitor/anti-freeze must not cause damage to the materials within the boiler (mild steel, stainless steel, copper and brass) and any other materials/components within the system.

 - ▶ Unscrew the tank drain cap and connect the integral filling loop.
 - ▶ Open the flow and tank drain valves as shown.
 - ▶ Fill the system to the pressure recorded on the pressure gauge.
 - ▶ Close the flow valve.
- 6 ▶ Vent the boiler and all radiators; retighten vents when complete.
- 7 ▶ Check and adjust the system pressure if required.
 - ▶ Close the tank drain valve.
 - ▶ Disconnect the integral filling loop.
 - ▶ Refit tank drain cap.
- 8 ▶ 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.

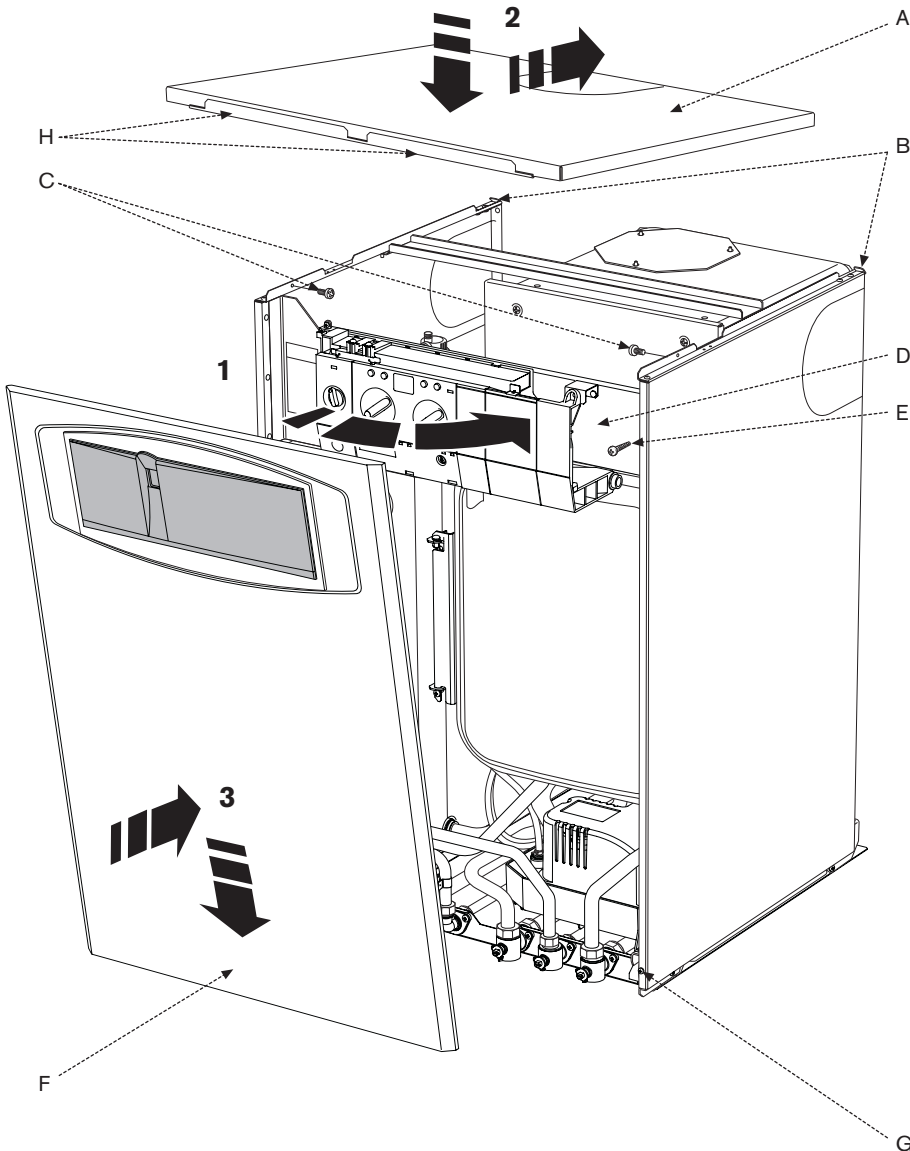
*** compatible with aluminium. The pH value of the system water must be less than 8 or the appliance guarantee will be invalidated.**

FINISHING COMMISSIONING

- 1 ▶ Engage top panel (A) onto rear retainers (B) and lower front of panel into position.
▶ Secure with screws (C).

- 2 ▶ Swing control panel assembly (D) into the boiler.
▶ Secure with screw (E).

- 3 ▶ Locate bottom corners of the front panel (F) into retainers (G).
▶ Hook top edge of panel (F) onto the retaining ledge (H).
▶ Lower into position to secure.



HANDOVER:

- ▶ Complete the Benchmark log book.
- ▶ Set up the controls and show the user how to operate all the controls shown in the User Guide.
- ▶ Instruct the customer how to repressurise the system.
- ▶ If the appliance is unused and exposed to freezing conditions, advise the customer of the precautions necessary to prevent damage to the boiler, system and building.

In the event of the appliance being inoperative, isolate the boiler 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 & 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.

NOTE: The appliance is set at the factory and adjustment to the CO₂ settings (gas/air ratio) is only required where the appliance has been stripped down and assembled or if the fan, burner or gas valve are replaced or the appliance has been converted to a different gas type. See 'Setting the gas/air ratio'.

INSPECTION:

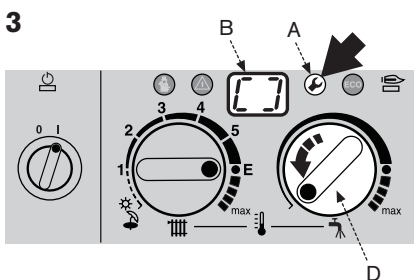
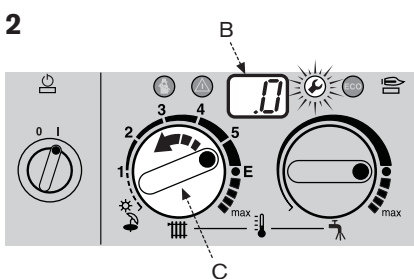
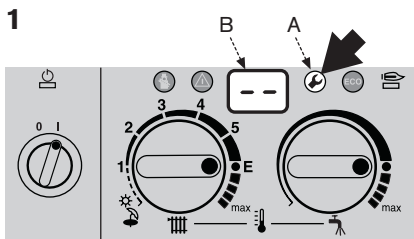
- ▶ Check that the terminal and terminal guard, if fitted, are clear and undamaged.
- ▶ If the appliance is in a compartment or cupboard check that the specified service space around the appliance is clear.
See 'Boiler Location & Clearances' under the Pre-Installation section for compartment clearances.
- ▶ Check all the joints and connections in the system and remake any that show signs of leakage. Refill and re-pressurise the system.
See 'Filling the System' and 'Water Treatment' under the Commissioning section.
- ▶ Operate the appliance and take note of any irregularities. Call up the last fault stored by the Bosch Heatronic, Service Function '0'.
Refer to 'Fault Finding' under the Fault Finding & Diagrams section for display codes and rectification procedures.

SERVICE FUNCTION:

- ▶ To select a service function (level 1 - service functions .0 to 4.9): press and hold button (A) until the display (B) shows '— —'.
- ▶ Turn the temperature control (C) to select the required function, in this case '0', as shown in display (B).

To delete the last fault code stored:

- ▶ Turn the DHW temperature control (D) anti-clockwise as far as the stop.
▶ Press and hold button (A) until the display shows '[]'.

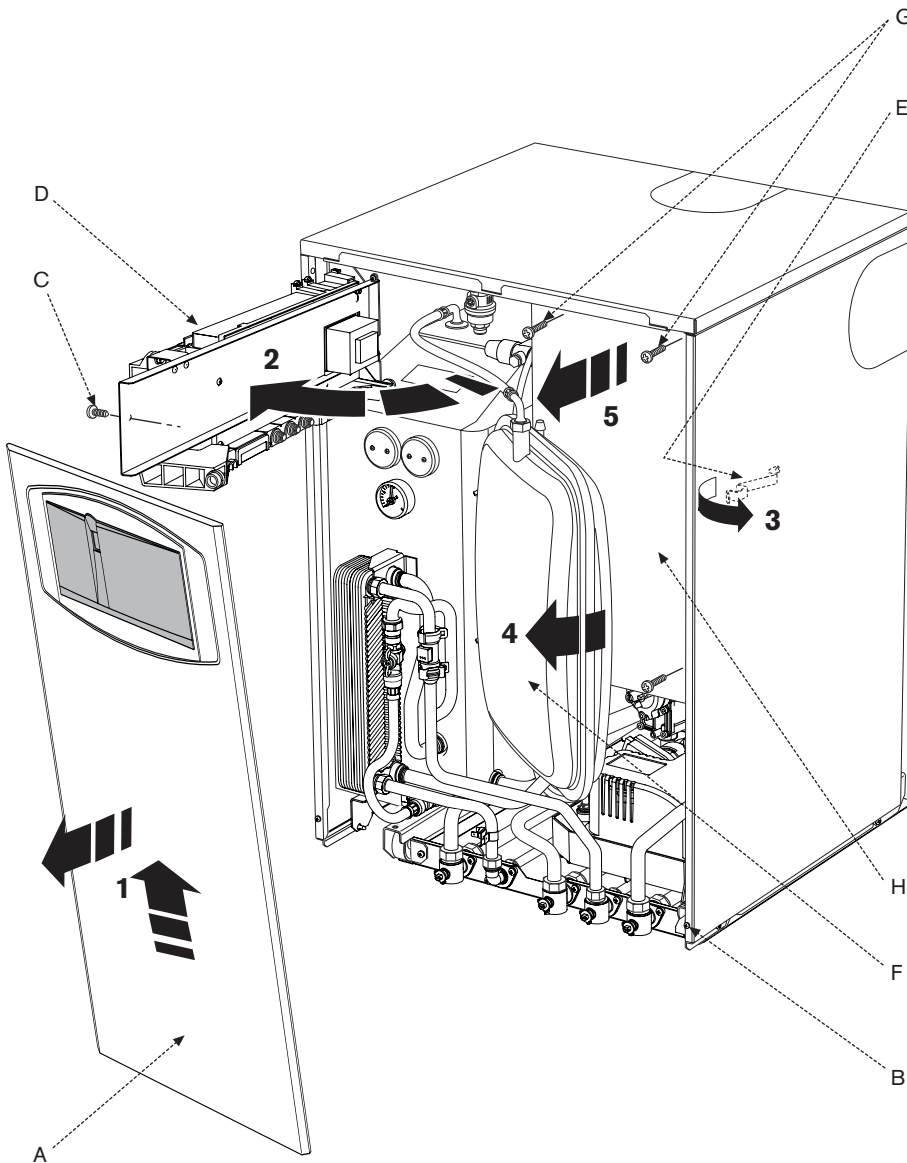


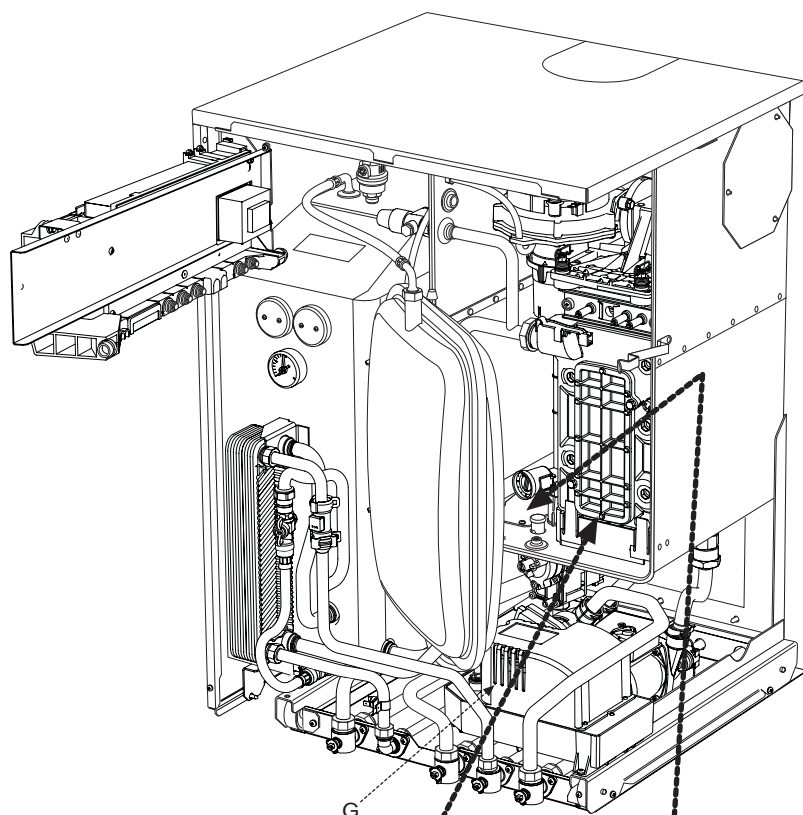
COMPONENT ACCESS:

- 1 ▶ Grip the outer sides of the front panel (A) and pull up and away from retaining lugs (B).
- 2 ▶ Remove retaining screw (C) to swing control panel assembly (D) outwards to its full extent.
- 3 ▶ Pull clip (E) outwards to release expansion vessel (F).
- 4 ▶ Swing expansion vessel (F) outwards.

Note: for easier access to the inner case, the expansion vessel can be unhooked (by removing the retaining screw on the hinge) lowered and moved to the side. Take care not to overstretch the flexible pipe connections.

- 5 ▶ Release four screws (G) to remove the inner case cover (H).





Checking the ionisation current:

- ▶ Select service function **3.3** (use the service function procedure as described in Service Function).

If the display shows **2** or **3**, the ionisation current is OK.

If the display shows **0** or **1**, the electrode assembly (A) must be cleaned or replaced:

- ▶ Pull off the leads from the electrodes.
 - ▶ Unscrew the two fixing screws and carefully remove the electrode assembly (A).
 - ▶ Clean the electrodes with a non-metallic brush. (The spark gap should be 4.5mm ±0.5mm).
 - ▶ Replace and re-connect the assembly taking care not to mislay the inspection window.

Primary Heat Exchanger:

There is a special accessory kit available (No. 840) specifically designed for cleaning the heat exchanger. If required order 7 719 001 996.

- ▶ Check control pressure on the air-gas mixer unit at max. rated heat output using an electronic manometer. See 'Setting the gas/air ratio'.

The heat exchanger should only be cleaned if the pressure is -2.2mbar or less.

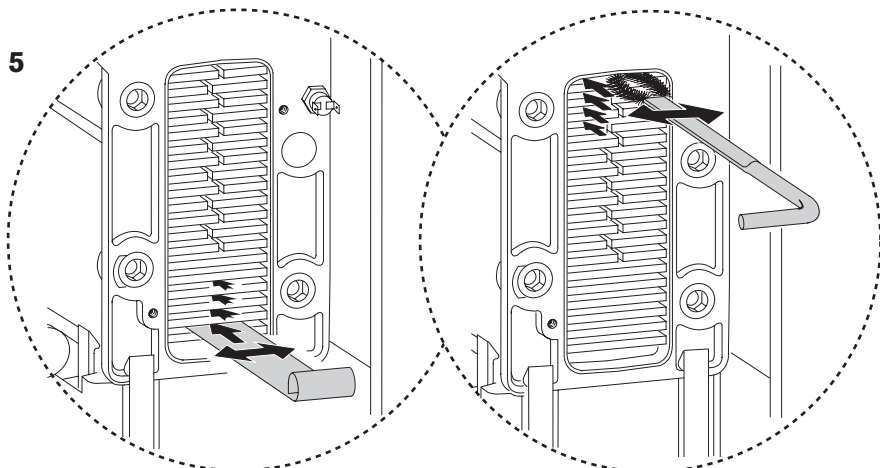
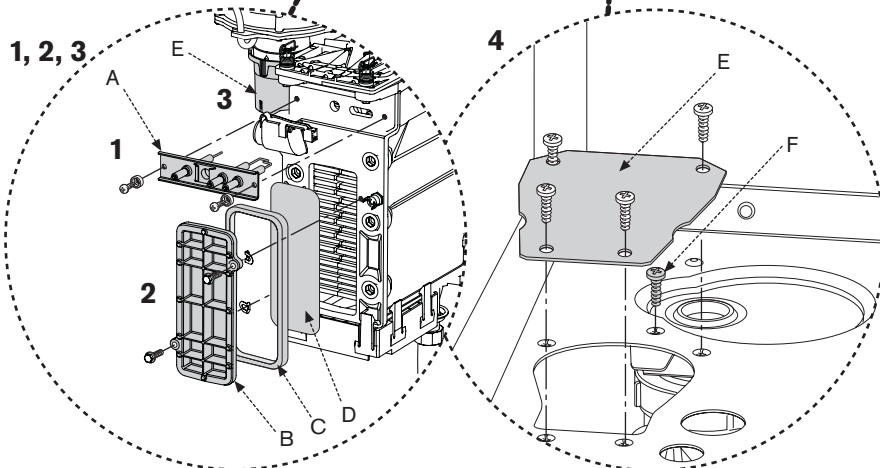
- ▶ Remove the cleaning access cover (B), seal (C) and metal plate (D) securing it, if present.
- ▶ Unscrew the condensation trap and place a suitable container underneath.

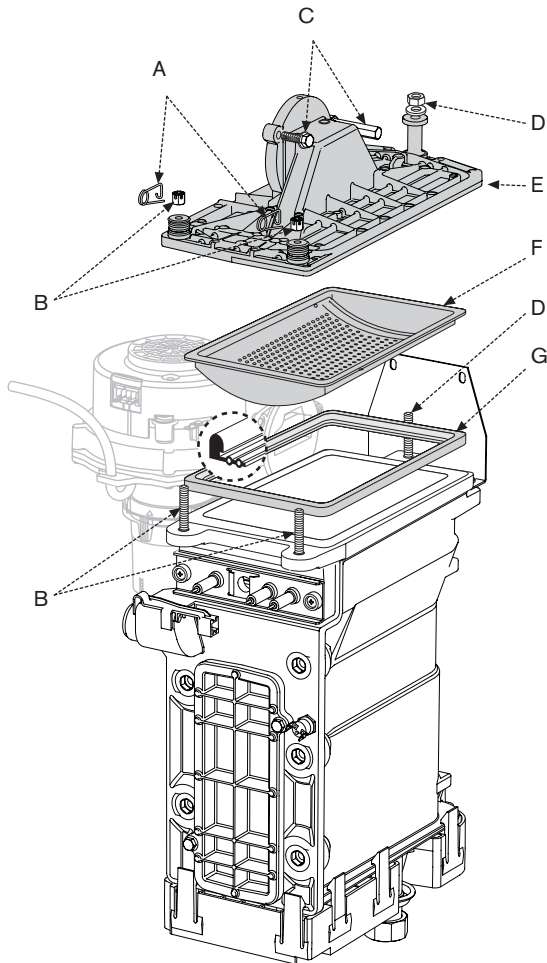
To Remove Condensate trap:

- ▶ Remove access panel (E) at the base of the inner casing.
- ▶ Remove screw (F) retaining bracket, rotate and push trap downwards until clear.
- ▶ Remove trap from boiler and disengage pipe to condensate pump (G).
- ▶ Clean trap and check that the connection to the heat exchanger is clear.
- ▶ After servicing the heat exchanger, fill the condensate trap with approximately 1/4 litre of water and refit in reverse order.

To Clean the Heat Exchanger:

- ▶ A Loosen any deposits in the heat exchanger from top to bottom using the cleaning blade.
 - ▶ Clean the heat exchanger from top to bottom using the brush.
 - ▶ Refit the clean out coverplates in reverse order using a new seal (C) and tighten screws to a torque of approximately 5 Nm.





Burner:

- ▶ Check that the boiler is completely isolated from the gas supply.
- 1 ▶ Remove the clips (A) and unscrew the two bolts (B).
 - ▶ Unscrew and remove the two hexagon screws (C) securing the fan.
 - ▶ Slacken fully the rear securing bolt (D).
 - ▶ Remove the burner cover plate (E).
- 2 ▶ Remove the burner (F) and clean the components.

Do not use a wire brush.

- ▶ Re-assemble burner in reverse order using a new seal (G).
- ▶ Adjust gas/air ratio. See 'Setting the gas/air ratio'.

MAX PRESSURE:

- ▶ When the heating system water is at maximum temperature, 2.65 bar must not be exceeded. If this pressure is exceeded then an extra expansion vessel must be fitted into the system return as close as possible to the appliance.
- ▶ If the system does not retain the pressure, the expansion vessel and the heating system should be checked for leaks.

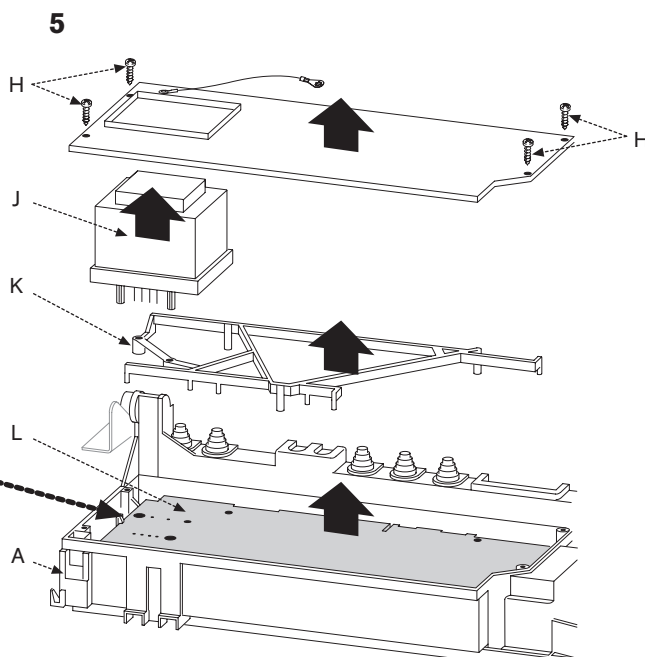
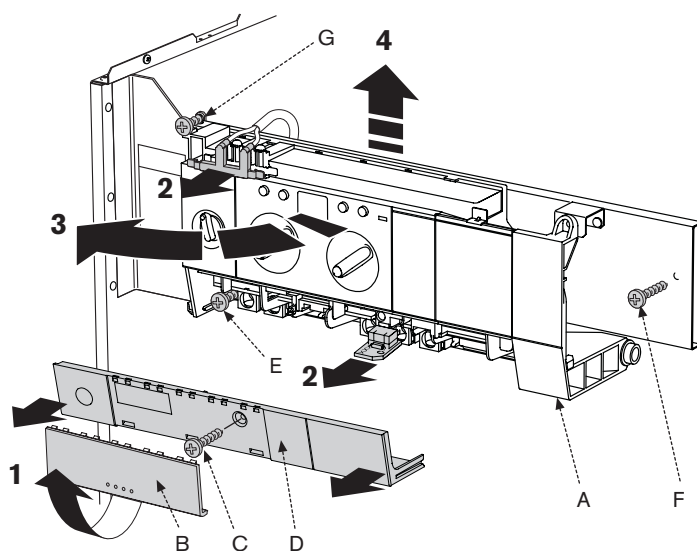
ELECTRICAL WIRING:

- ▶ Check the electrical wiring for physical damage and replace any damaged wires.

CAUTION: TURN OFF THE GAS SUPPLY AND ISOLATE THE MAINS SUPPLIES BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS. DRAIN THE BOILER/SYSTEM WHERE NECESSARY AND PROTECT ANY ELECTRICS FROM WATER INGRESS DURING COMPONENT REPLACEMENT.

IMPORTANT: Refit or replace any components removed from the appliance in the reverse order using new gaskets/'O' rings/sealant/heat transfer paste where necessary. Any 'O' ring or gasket that appears damaged must be replaced. Always check that any electrical connections are correctly made and that all screws are tight.

AFTER REPLACEMENT OF ANY COMPONENTS ALWAYS CHECK FOR GAS SOUNDNESS WHERE RELEVANT AND CARRY OUT FUNCTIONAL CHECKS AS DESCRIBED IN THE COMMISSIONING SECTION.



REPLACEMENT PARTS

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

DRAINING THE APPLIANCE:

- ▶ Turn off the heating flow and return valves at the appliance.
- ▶ Remove cap from drain valve on the tank and replace with hose connector.
- ▶ With a suitable hose fitted to the connector open the drain tap.
- ▶ Close the drain tap when the flow from the appliance has stopped and **replace cap**.

DHW CIRCUIT:

- ▶ Turn off the mains cold water supply at the appliance.
- ▶ Open a hot tap below the level of the appliance to drain the domestic hot water from the appliance.

NOTE: A small quantity of water may remain in some components even after the appliance has been drained. Protect any electrical components when removing items from the water circuits.

PCB CONTROL BOARD & TRANSFORMER:

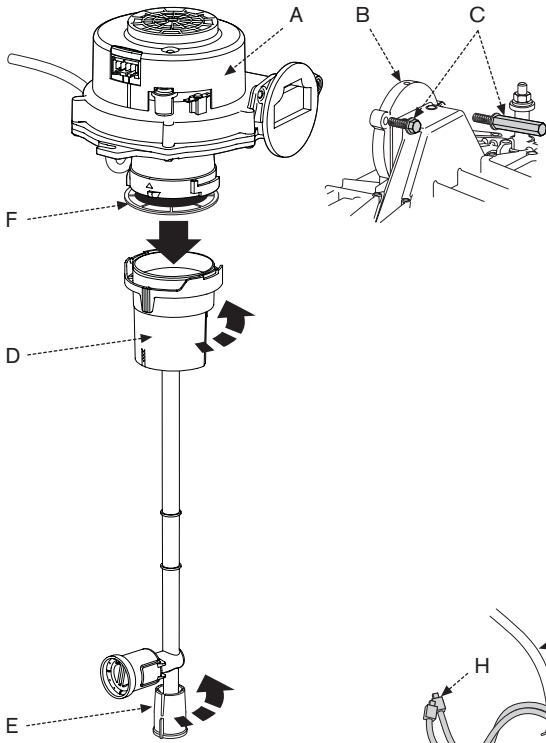
- ▶ Switch off and electrically isolate the boiler.
 - ▶ Remove boiler front panel.
- 1 ▶ Unclip cover (B).
 - ▶ Remove securing screw (C).
 - ▶ Slide cover (D) from control box (A).
 - 2 ▶ Unplug all connectors from the control box, including the code plug.
 - ▶ Slacken screw (E) and remove the power connector earth lead.
 - 3 ▶ Remove retaining screw (F) to swing control panel assembly (A) outwards to its full extent.
 - ▶ Unscrew earth lead.
 - 4 ▶ Remove retaining screw (G) and lift control panel assembly (A) away from the support hinge.
 - 5 ▶ Unscrew fixing screws (H) from cover plate.
 - ▶ Prise off cover plate (J).
 - ▶ Pull off transformer (K).
 - ▶ Remove PCB holder (L).
 - ▶ Remove the PCB control board (M).

Fuses:

- ▶ Remove the connections cover.
- ▶ The fuses are located adjacent to the mains connector block and connector ST18.

Fuse, item 312, is only replaceable by removing the PCB. Spare fuses are fixed to the connections cover. A fuse pack is available: Part No. 8 744 503 010 0.

REPLACEMENT PARTS



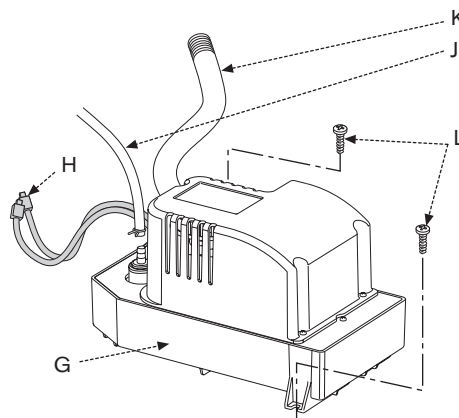
Fan Assembly:

- ▶ Undo lower pipe union on gas pipe (E).
- ▶ Remove fan lead and earth connector.
The earth connector has a positive clip fixing.
- ▶ Remove fixing screws attaching fan (A) to the burner cover (B).
- ▶ Remove fan (A) with gas pipe (E) and mixer unit (D).
- ▶ Twist mixer unit (D) with gas pipe (E) to separate from fan (A).

Flap Valve:

- ▶ Undo lower pipe union on gas pipe (E).
- ▶ Remove pipe (E) by pushing upwards and to the rear.
- ▶ Twist mixer unit (D) with gas pipe (E) to separate from fan (A).
- ▶ Remove flap valve (F) from within fan intake (A) and replace.

NOTE: Ensure the flap valve is fitted correctly with rubber flap upwards.



Condensate pump:

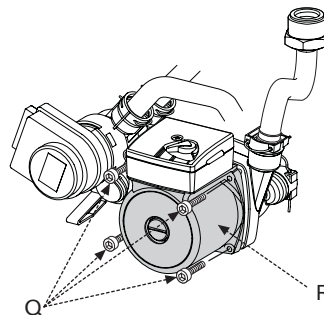
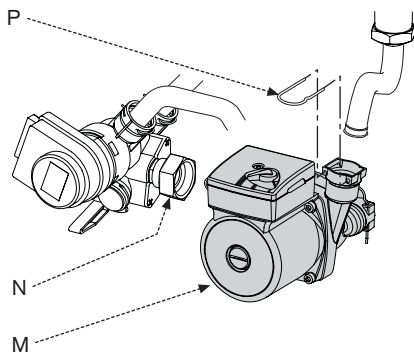
- ▶ Disconnect both inline electrical connectors (H) to the condensate pump (G).
- ▶ Remove 2 retaining screws (L).
- ▶ Remove 6mm flexible tube (J) from pump.
- ▶ Remove large flexible pipe (K) from condensate tank. Take care as there may be condensate remaining in the pipe.
- ▶ Carefully remove the condensate pump (G) from the boiler and pour any excess condensate into a suitable container for safe disposal.

Circulating pump:

- ▶ Unscrew the pump union nut (N), remove clip (P) at pump outlet.
- ▶ Carefully remove the pump (M) and disconnect the electric leads.

Alternatively:

- ▶ Release the 4 Allen screws (Q) to remove and replace the pump head (R).



Diverter valve:

- ▶ Turn off service cocks.
- ▶ Remove condensate pump (G).
- ▶ Unplug connector from 3-way valve motor (S).
- ▶ Remove clip (T) from diverter valve (V), disconnect central heating pipe (U) at isolation valve.
- ▶ Remove clip (W) from diverter valve and undo pump union nut (N).
- ▶ Remove diverter valve (S, V) from boiler.
- ▶ Remove clips retaining the two brass plugs in the body of the diverter valve (V). Replace plugs and clips into new valve.

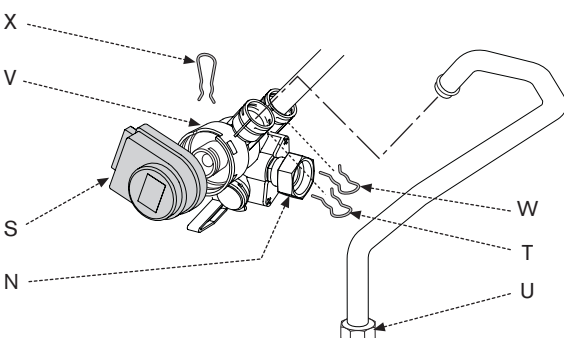
After refitting:

- ▶ Refill and re-pressurise the system.

See 'Filling the System' and 'Water Treatment' under the Commissioning section.

Diverter valve motor:

- ▶ Unplug connector from 3-way valve motor (S).
- ▶ Pull out retaining clip (X).
- ▶ Remove motor (S).



Sensors:

- ▶ Check that the appliance is electrically isolated.

Central heating flow temperature sensor (A):

- ▶ Pull off the connector.
- ▶ Release the sensor clip and withdraw the sensor.
- ▶ Apply heat transfer paste to the replacement sensor.

Safety temperature limiter (B):

- ▶ Pull off the connectors.
- ▶ Unscrew the sensor.

Tank sensors (C):

- ▶ Remove screws retaining plastic cover.
- ▶ Remove cover and disconnect 2 electrical connections.
- ▶ Unscrew 2 hexagon studs.
- ▶ Replace sensor coating surface with paste supplied.
- ▶ Re-assemble.

Tank overheat thermostat (D):

- ▶ Remove screws retaining plastic cover.
- ▶ Remove cover and disconnect 2 electrical connections.
- ▶ Unscrew 2 hexagon studs.
- ▶ Replace sensor coating surface with paste supplied.
- ▶ Re-assemble.

Flow sensor/flow regulator assembly (E):

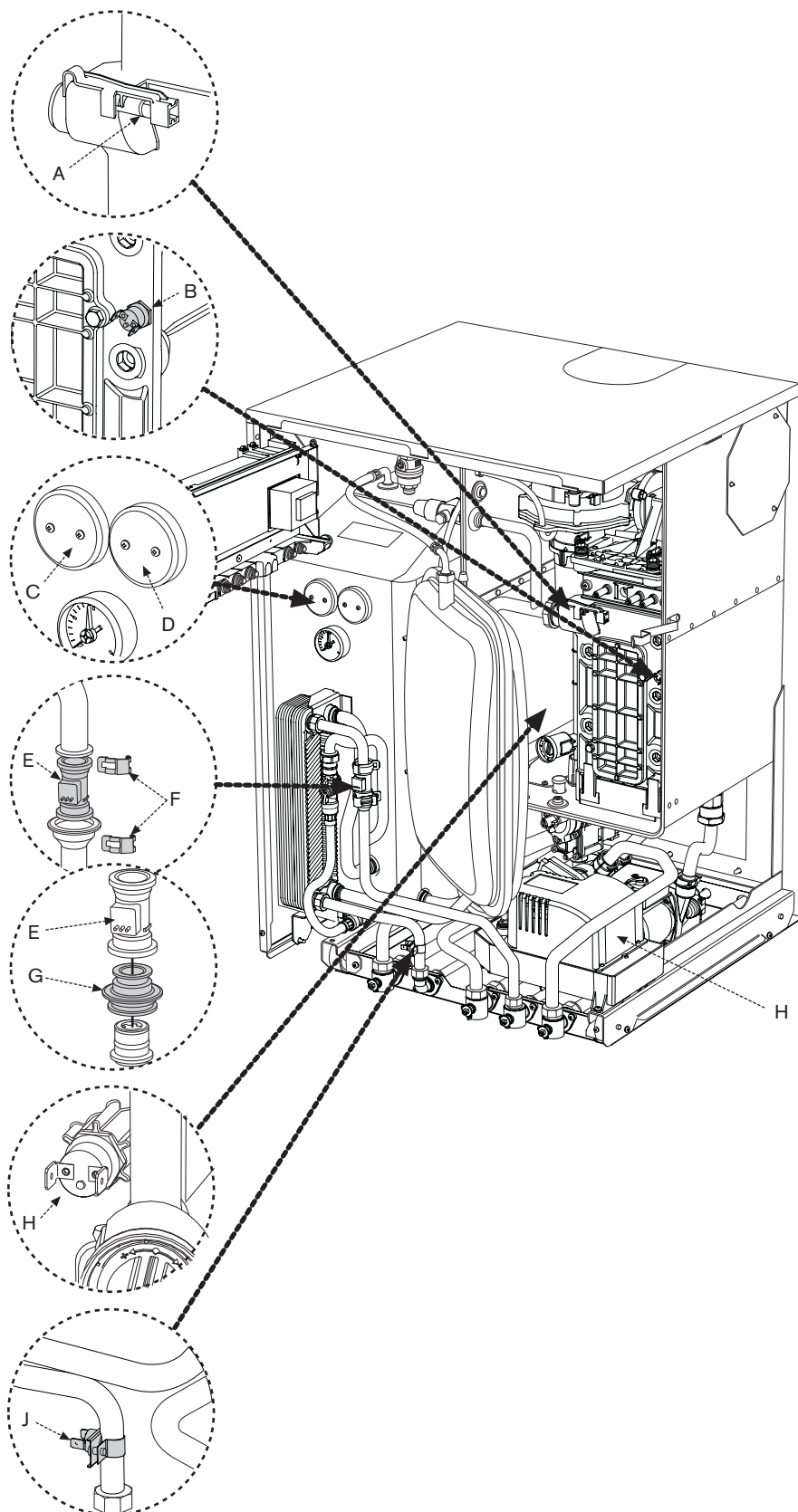
- ▶ Shut off mains water at inlet valve and drain DHW circuit.
- ▶ Disconnect inline connector.
- ▶ Remove 2 retaining clips (F).
- ▶ Remove flow sensor assembly (E).
- ▶ Remove brass housing with flow regulator (G) from sensor.
- ▶ Re-assemble ensuring that retaining clips are correctly positioned.

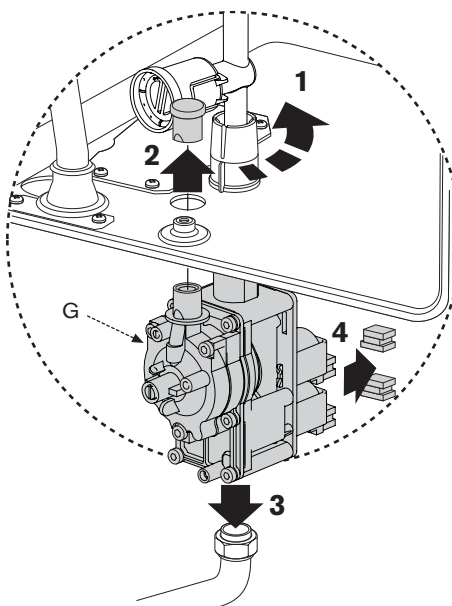
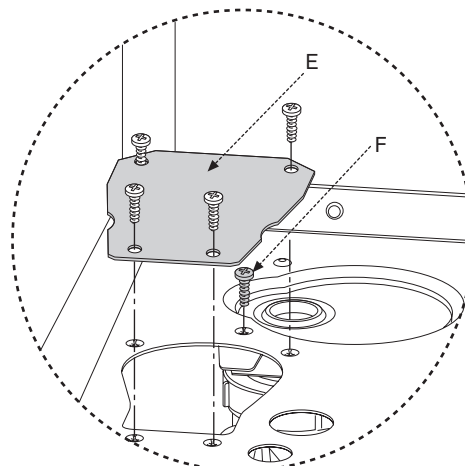
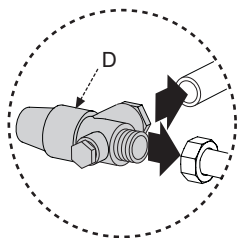
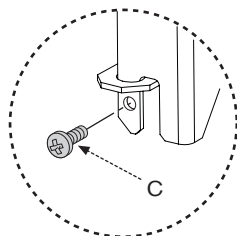
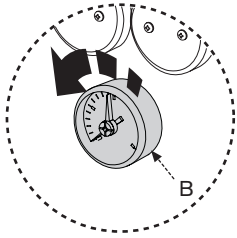
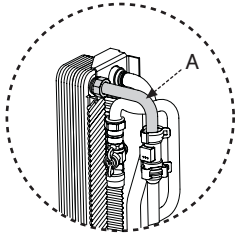
Flue Temperature limiter (H):

- ▶ Pull off the connector.
- ▶ Unscrew the sensor.

Domestic hot water temperature sensor (J):

- ▶ Release and pull-off the connector.
- ▶ Unscrew the bracket.
- ▶ Replace sensor coating surface with paste supplied.
- ▶ Re-assemble.





Domestic hot water heat exchanger:

- ▶ Before removing the heat exchanger shut the inlet valves, drain the hot water circuits and tank.
- The pipe (A) may be removed between the flow sensor outlet and the plate heat exchanger to improve access to the rear connections.*
- ▶ Use new seals when replacing the heat exchanger.

Pressure gauge:

- ▶ Drain the appliance.
- ▶ Twist the pressure gauge head (B) anti-clockwise until removed.

Expansion vessel:

- ▶ Drain the appliance.
- ▶ Move control panel into service position.
- ▶ Remove locking screw (C) from vessel bracket.
- ▶ Hinge pressure vessel out and lift from brackets.
- ▶ Undo the union connection at the top of the vessel.
- ▶ Set the pressure of the new vessel to that required by the system.

Pressure relief valve:

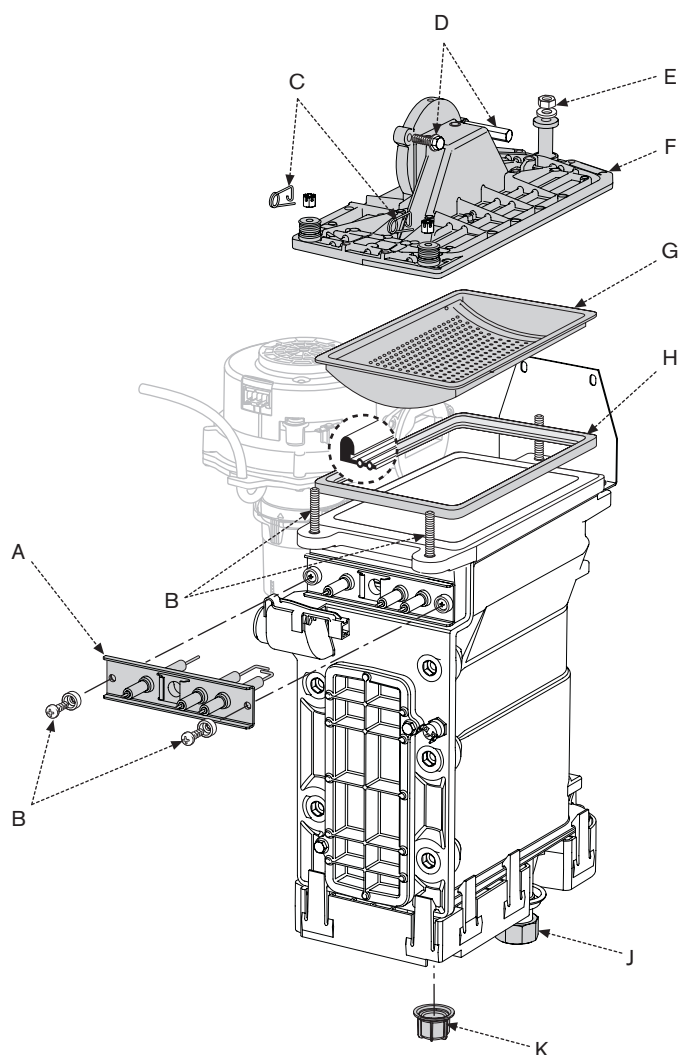
- ▶ Drain the appliance.
- ▶ Disconnect drain pipe from valve (D)
- ▶ Undo nut retaining valve to flow pipe.
- ▶ Remove valve.
- ▶ Replace sealing washer and fit a new valve.

Condensate trap:

- ▶ Move control and pressure vessel into service position.
- ▶ Remove inner case door.
- ▶ Remove access panel (E) at the base of the inner casing.
- ▶ Remove screw retaining trap (F) and push trap downwards until clear.
- ▶ Remove trap from boiler along with pipe to condensate pump.

Gas valve:

- ▶ Check that the gas cock is turned off.
 - ▶ Remove condensate pump.
 - 1 ▶ Undo the union, within the inner casing, securing the valve to the gas/air tube.
 - 2 ▶ Remove the white plastic cap from the gas valve (G).
 - 3 ▶ Release the gas inlet union at the gas valve.
 - 4 ▶ Pull off the solenoid connections at the rear of the gas valve.
 - ▶ Transfer the inlet pipe assembly to the new gas valve.
 - ▶ Check for gas soundness when the new gas valve has been fitted.
 - ▶ Re-check the combustion performance.
- See 'Setting the gas/air ratio'.*



REPLACEMENT PARTS

Electrode assembly:

- ▶ Switch off the master switch.
- ▶ Isolate appliance from the power supply.
- ▶ Move control panel into service position.
- ▶ Release 4 screws to remove inner case door.
- ▶ Pull off the leads from the electrodes.
- ▶ Unscrew the two fixing screws (B) and carefully remove the electrode assembly (A).
- ▶ Replace and re-connect the assembly taking care not to mislay the inspection window.

Burner:

- ▶ Check that the gas cock is turned off and the master switch is in the OFF position.
- ▶ Isolate appliance from the power supply.
- ▶ Remove the clips (C) and unscrew the two bolts.
- ▶ Remove springs.
- ▶ Unscrew and remove the 2 hexagon screws (D) securing the fan.
- ▶ Slacken fully the rear securing nut (E).
- ▶ Remove the burner coverplate (F).
- ▶ Remove the burner skin (G).
- ▶ Re-assemble the new burner in reverse order, inspect seal (H) for damage and replace if necessary.
- ▶ Check CO₂ settings. See setting the gas/air ratio.

Primary heat exchanger:

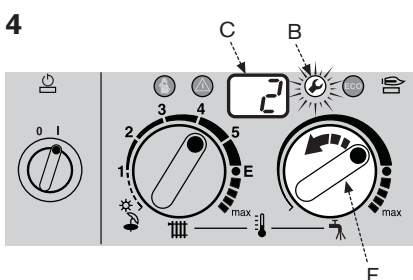
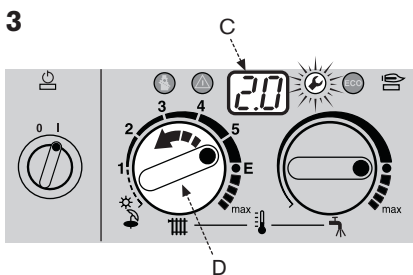
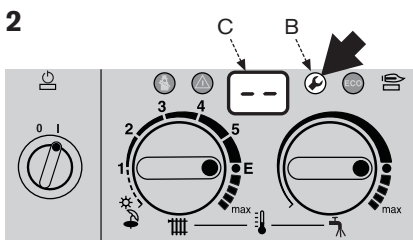
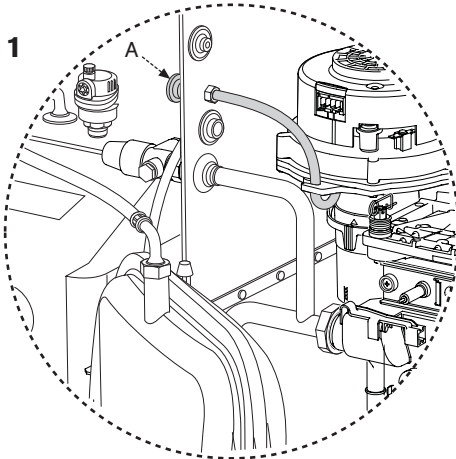
- ▶ Isolate appliance from the power supply.
- ▶ Turn off all isolation valves.
- ▶ Drain down appliance.
- ▶ Move control and pressure vessel into service position. To improve access, remove the pressure vessel.
- ▶ Remove inner case door.
- ▶ Remove fan assembly, burner, gas mixing tube.
- ▶ Disconnect and remove sensors connected to heat exchanger.
- ▶ Remove condensate trap.
- ▶ Remove internal flue elbow and tube from boiler sump.
- ▶ Disconnect return pipe union (J) at the base of the boiler heat exchanger.
- ▶ Remove plastic nut (K) from the base of the inner casing.
- ▶ Remove heat exchanger from inner casing.
- ▶ Ensure heat conductive paste is used on sensors when refitting.
- ▶ Check CO₂ settings. See 'Setting the gas/air ratio'.

SETTING THE GAS/AIR RATIO

IMPORTANT: The appliance is set at the factory and adjustment to the CO₂ settings (gas/air ratio) is only required where the appliance has been stripped down and assembled or if the fan, burner or gas valve are replaced or the appliance has been converted to a different gas type.

The gas/air ratio may only be adjusted on the basis of a CO₂ measurement at maximum and minimum heat output using an electronic tester.

Setting the gas ratio **MUST ONLY** be carried out by a competent person equipped with a combustion analyser conforming to BS 7927 and competent in its use.



- 1 ▶ Switch off the appliance at the master switch.
▶ Remove the outer case.
▶ Switch on the appliance at the master switch.
▶ Unscrew sealing plug from flue gas testing point (A).
▶ Connect testing probe to the flue gas testing point.
- 2 ▶ Press and hold button (B) until the display (C) shows -- . button (B) will illuminate.
- 3 ▶ Turn the temperature control (D) until the display (C) shows 2.0.
▶ After a short delay, the current operating mode setting will be displayed (0. = Normal Mode).
- 4 ▶ Turn the DHW temperature control (E) until the display (C) shows 2 (= max. rated heat output).
The display (C) and the (B) button will flash.

Continued overleaf . . .

SETTING THE GAS/AIR RATIO

- 5 ▶ Measure the CO₂ level.
- ▶ Prise off the seal on the gas flow restrictor.

GAS TYPE	CO ₂ reading at max. rated heat output.	CO ₂ reading at min. rated heat output.
Natural Gas Type H (G20)	9.2 ±0.2%	8.8 ±0.2%
LPG (propane) (G31)	10.8 ±0.2%	10.5 ±0.2%

▶ Adjust the gas flow restrictor (F) to obtain the CO₂ level given in the table above.

▶ Measure the CO level.

If the CO level is over 200ppm, the gas volumetric flow rate is too high. Reduce the gas flow rate on the adjustable gas flow restrictor until the CO level is below 100ppm.

▶ Re-adjust the CO₂ level if necessary.

- 6 ▶ Turn the temperature control (E) anti-clockwise until the display (C) shows 1 (= min. rated heat output).

The display and the button (B) will flash.

▶ Measure the CO₂ level.

- 7 ▶ Remove the seal from the gas valve adjusting screw (G) and adjust the CO₂ level to the figure given in the table above for **min.** rated heat output.

▶ Measure the CO level.

If the CO level is over 200ppm, the gas volumetric flow rate is too high. Reduce the gas flow rate on the gas flow restrictor (F) until the CO level is below 100ppm.

▶ Re-adjust the CO₂ level if necessary.

▶ Re-check the levels at min. and max. rated heat output and re-adjust if necessary.

- 8 ▶ Turn the temperature control (E) anti-clockwise as far as the stop so the display shows 0 (= Normal operating mode).

The display (C) and the button (B) will flash.

- 9 ▶ Press and hold the button (B) until the display (C) shows [].

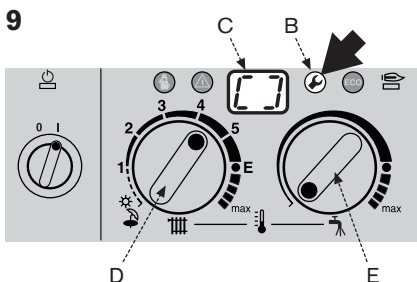
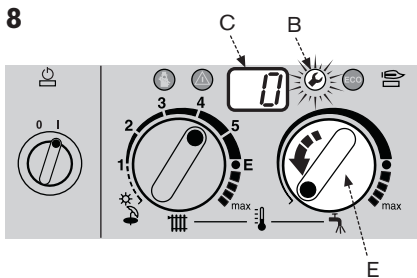
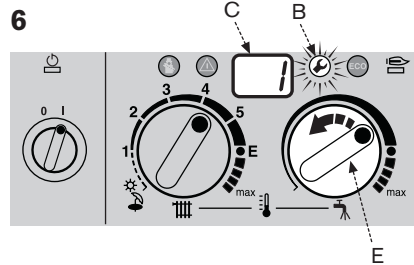
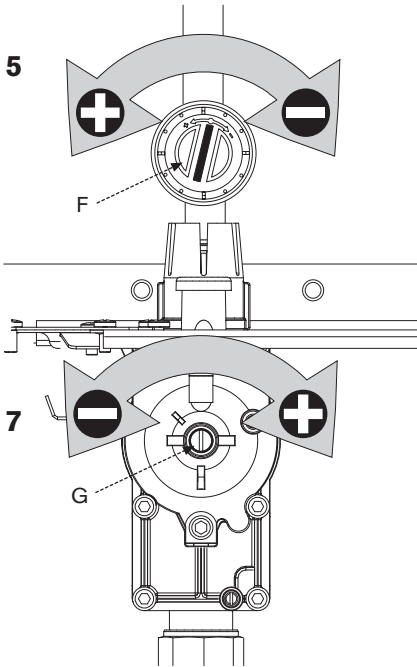
▶ Reset the temperature controls (D) and (E) to their original positions.

The display (C) will revert to the CH flow temperature.

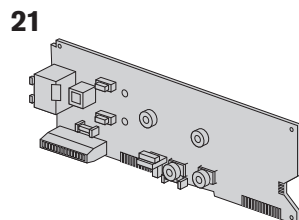
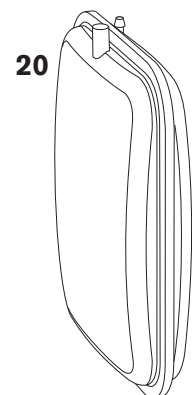
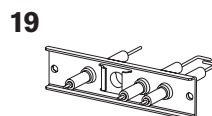
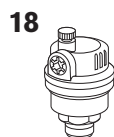
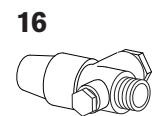
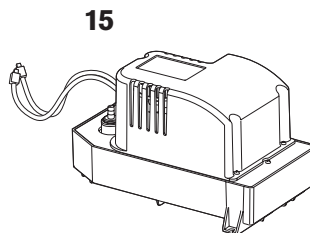
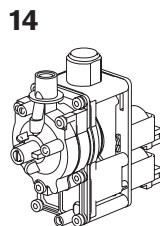
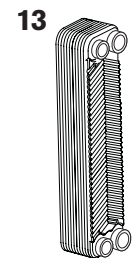
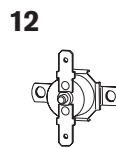
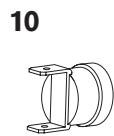
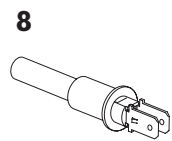
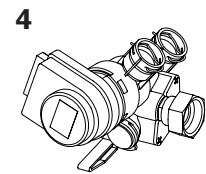
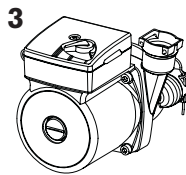
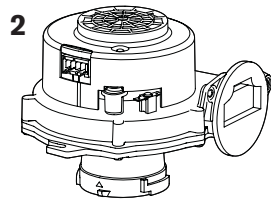
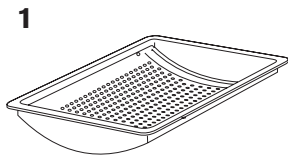
▶ Remove testing probe from the flue gas testing point and refit sealing plug.

▶ Re-seal gas valve adjusting screw and gas flow restrictor.

▶ Replace outer case and secure.



SHORT PARTS LIST



1 Burner:

Part No. 8 718 006 658 0 (GC No. E27 200)

2 Fan assembly:

Part No. 8 717 204 373 0 (GC No. E74 539)

3 Circulating Pump:

Part No. 8 717 204 443 0 (GC No. H21 229)

4 3-Way diverter valve:

Part No. 8 717 204 444 0 (GC No. H21 230)

5 Diverter valve motor:

Part No. 8 717 204 345 0 (GC No. E74 587)

6 Flow sensor:

Part No. 8 717 002 132 0 (GC No. H21 232)

7 Flow regulator:

Part No. 8 717 002 135 0 (GC No. H21 235)

8 Temperature sensor:

Part No. 8 714 500 087 0 (GC No. E74 536)

9 Temperature limit (Flue or heat exchanger):

Part No. 8 722 963 858 0 (GC No. H08 291)

10 Thermistor sensor (Tank):

Part No. 8 716 142 319 0 (GC No. 379 785)

11 Overheat thermostat (Tank):

Part No. 8 716 103 217 0 (GC No. E82 394)

12 DHW thermister:

Part No. 8 716 142 302 0 (GC No. 375 696)

13 Heat exchanger:

Part No. 8 715 406 975 0 (GC No. H21 236)

14 Gas valve:

Part No. 8 747 003 773 0 (GC No. H08 337)

15 Condensing Pump:

Part No. 8 717 204 445 (GC No. H21 238)

16 Pressure relief valve:

Part No. 8 716 142 416 0 (GC No. 386 789)

17 Pressure gauge:

Part No. 8 716 142 358 0 (GC No. 371 376)

18 Auto air vent:

Part No. 8 716 140 500 0 (GC No. E00 717)

19 Electrodes:

Part No. 8 718 107 078 0 (GC No. E74 535)

20 Expansion vessel:

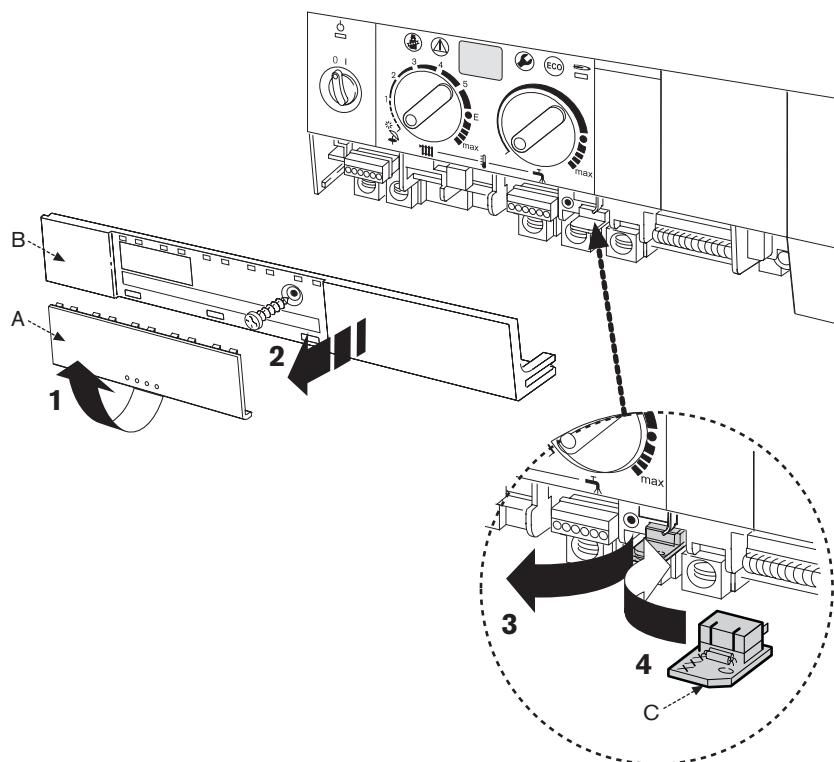
Part No. 8 715 407 288 0 (GC No. H21 242)

21 Printed circuit board:

Part No. 8 748 300 507 0 (GC No. H21 240)

Change code plug:

- 1 ▶ Unclip cover panel (A) from base as shown
- 2 ▶ Unscrew and remove panel (B).
- 3 ▶ Remove and dispose of old code plug.
- 4 ▶ Replace with new conversion code plug (C).
N.G. code plug number 421
L.P.G. code plug number 422
- ▶ Reposition panel (B) and secure with screw.
- ▶ Clip cover panel (A) back into place.



Change gas pipe:

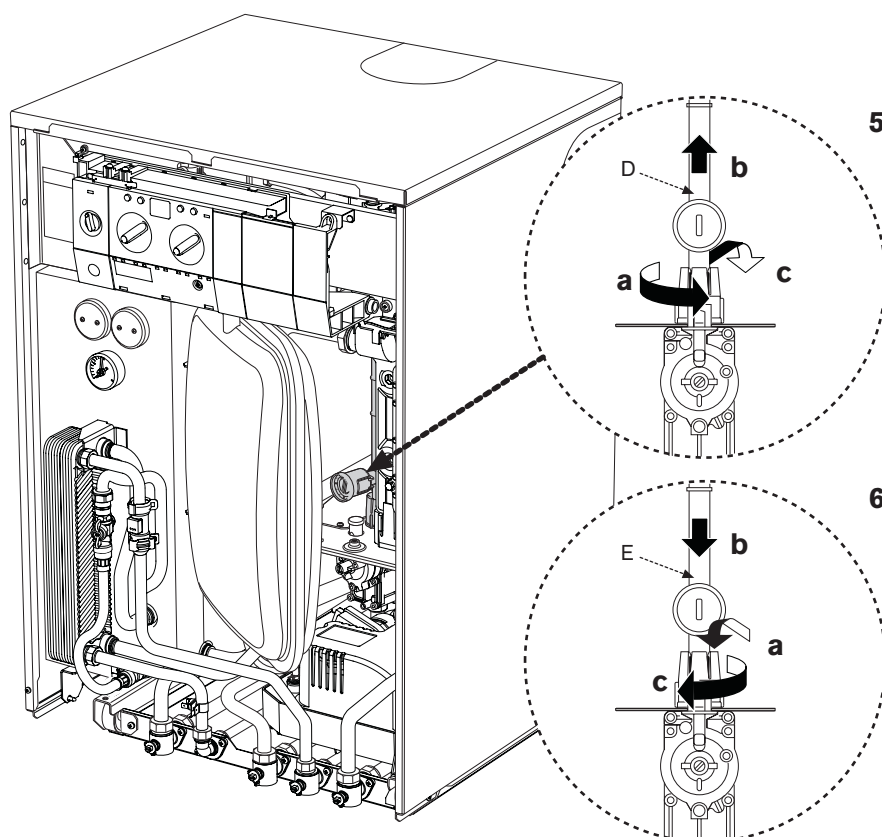
- 5 ▶ Rotate gas pipe (D) anti-clockwise, pull upwards and remove gas pipe.
- 6 ▶ Replace with new conversion gas pipe (E), push downwards and rotate clockwise to lock into position.

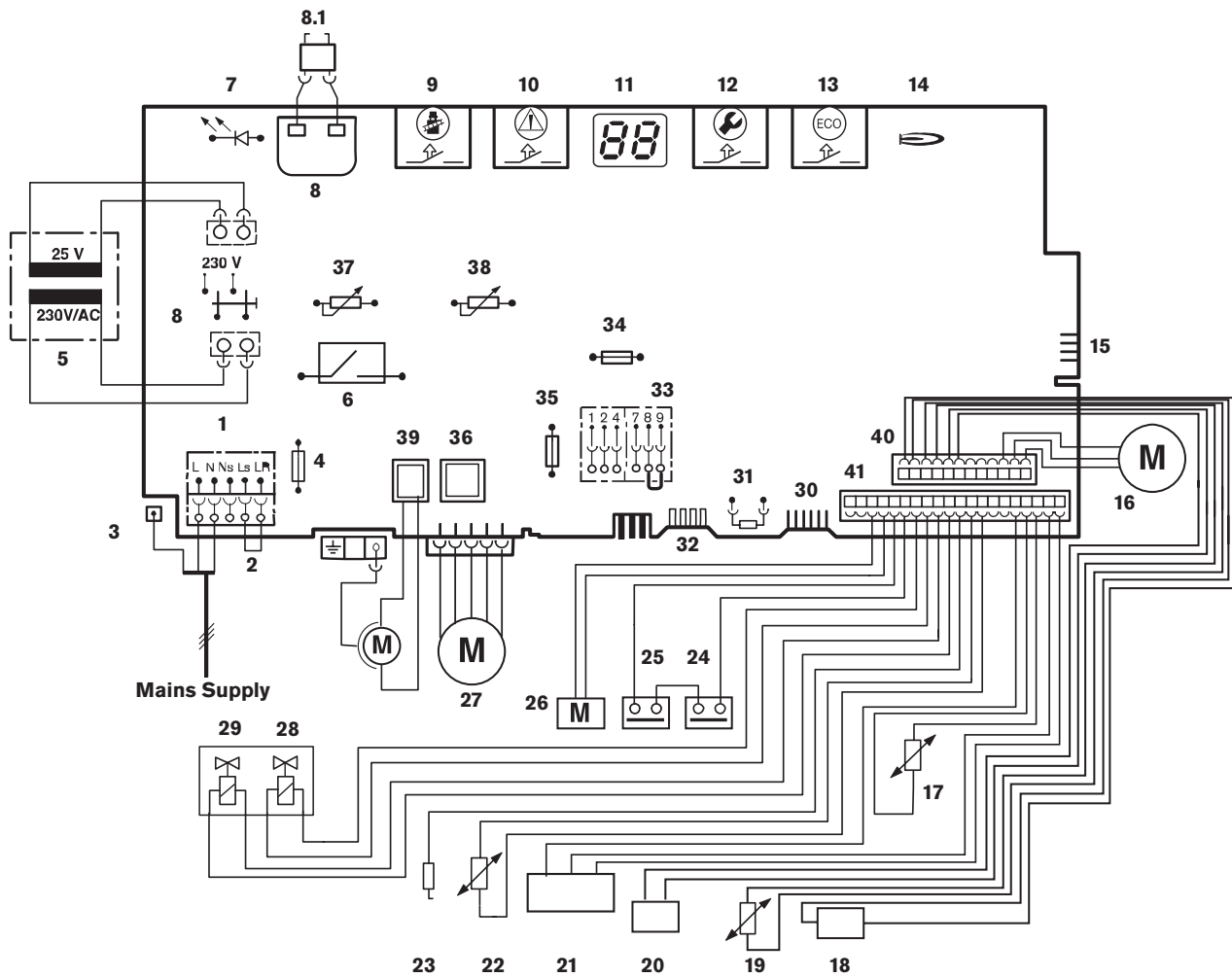
Conversion label:

- ▶ Replace existing label with new conversion label.

Adjust the CO₂ level:

See 'Setting the gas/air ratio' under **Servicing & Spares** section.





40. connector ST17 PIN 13 PIN 1

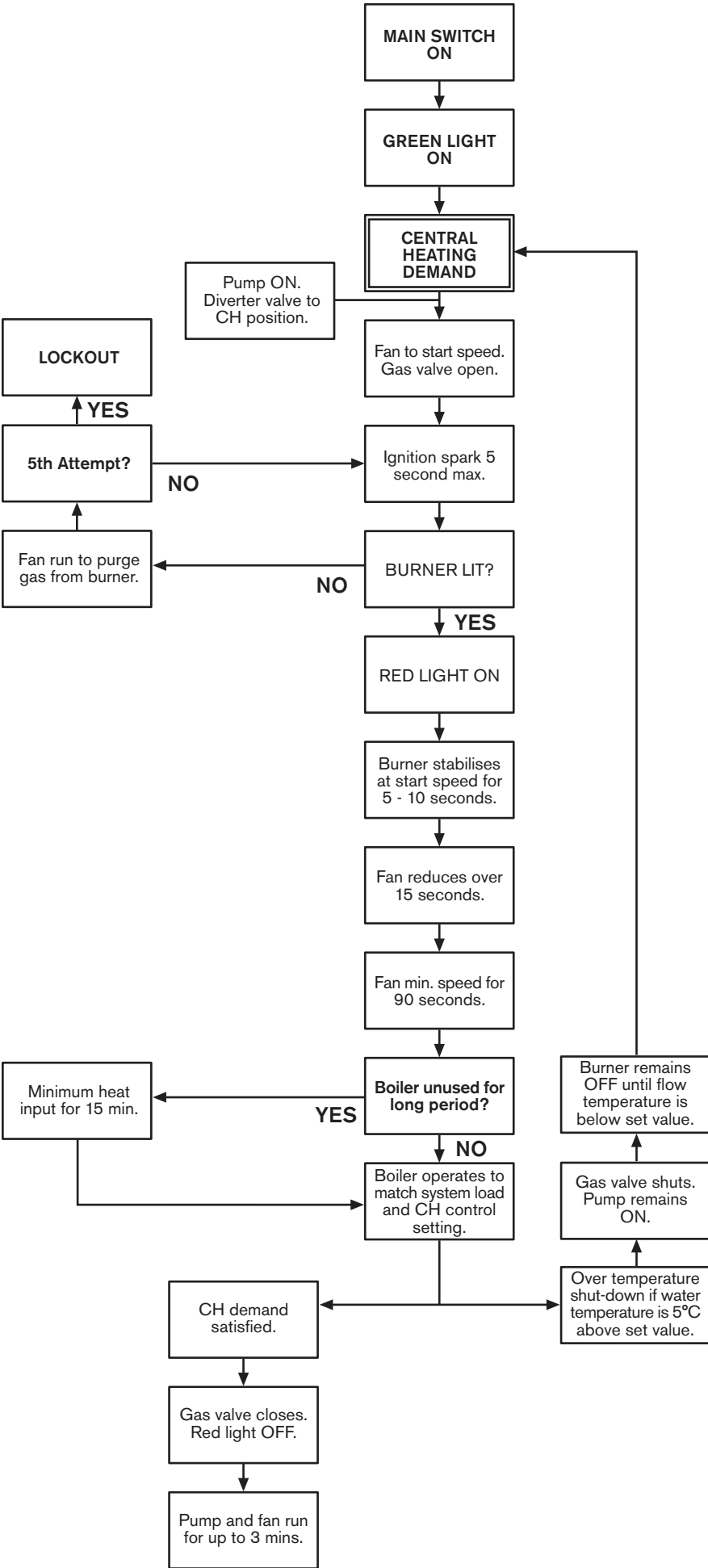
41. connector ST16 PIN 1 PIN 20

- 1. Terminal block, 230VAC mains supply.
- 2. Roomstat link.
- 3. Earth connection.
- 4. Fuse, slow 2.5A.
- 5. Transformer.
- 6. Master switch.
- 7. Indicator lamp for power supply.
- 8. Ignition transformer.
- 8.1. Ignition electrode.
- 9. 'Chimney sweep' button.
- 10. Reset button.
- 11. Digital display.
- 12. Service button.
- 13. 'ECO' indicator.
- 14. Indicator lamp for burner.
- 15. Connector for timer.
- 16. Motor, 3 way valve,
Pin 1 = blue, Pin 2 = violet, Pin 3 = yellow.

- 17. Hot water NTCsensor,
Pin 17 = yellow, Pin 18 = yellow.
- 18. Condensate end switch,
Pin 11 = blue, Pin 12 = blue.
- 19. Tank NTCsensor,
Pin 9 = pink, Pin 10 = pink.
- 20. Heat bank overheat stat,
Pin 7 = white, Pin 8 = white.
- 21. Flow turbine,
Pin 16 = black, Pin 19 = red, Pin 20 = yellow.
- 22. Central heating NTCsensor,
Pin 12 = red, Pin 13 = red.
- 23. Flame sensing electrode,
Pin 11 = blue.
- 24. Flue gas temp limiter,
Pin 6 = orange.
- 25. Heatex temp limiter,
Pin 5 = green.

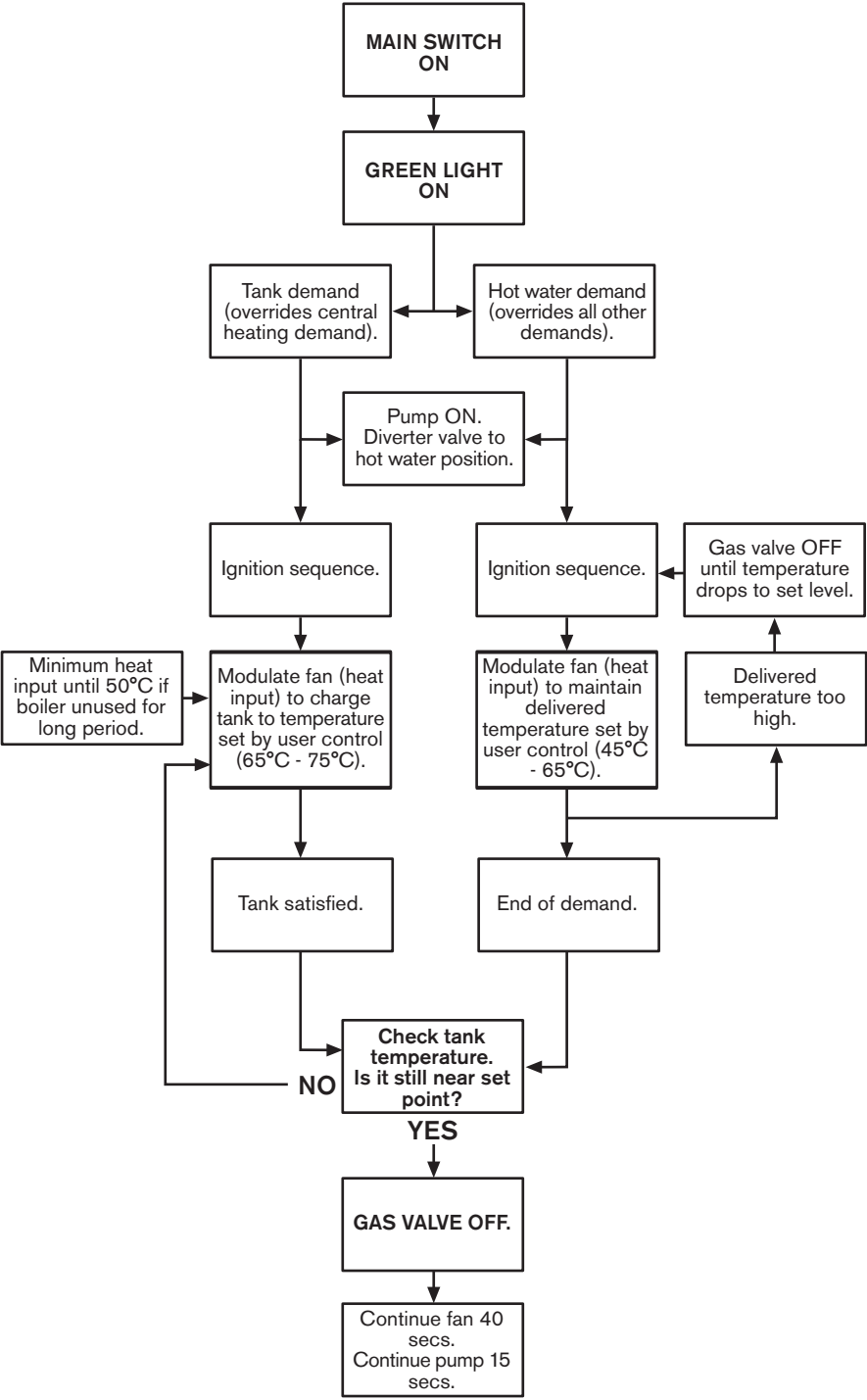
- 26. Under floor module,
Pin 3 = black, Pin 4 = red.
- 27. Fan & condensate pump 230 VAC.
- 28. Solenoid valve 1,
Pin 7 = brown, Pin 8 = brown.
- 29. Solenoid valve 2,
Pin 9 = violet, Pin 10 = violet.
- 30. Connector for programmer.
- 31. Code plug.
- 32. Diagnostic interface.
- 33. Terminal block for programmer.
- 34. Fuse, slow T1.6 A.
- 35. Fuse, slow T0.5 A.
- 36. 230 VAC hot water (time switch)
- 37. Temperature control for central heating.
- 38. Temperature control for hot water.
- 39. Circulating pump.
- 40. Connector ST17.
- 41. Connector ST16.

NOTE: The sequence ensures that the condensate siphon is not empty after long OFF periods.



DOMESTIC HOT WATER FLOW FUNCTION

NOTE: This diagram is a simplification of the function of the boiler (for example; the hot water demand is a complex decision based on flow rates and existing temperatures etc.).



FAULT FINDING

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 two-digit display. This is used to show normal operating information (as described in other sections), but during a fault, also provides fault-code information to help provide fault diagnostics. This covers most normal fault situations.

Display Code:	Fault description:	Check, repair/replace as necessary:
A5	Tank sensor fault	Tank sensor (8000 - 20000 ohms at room temperature). Wiring and connections to sensor.
A6	Link fault	Check link 8 to 9 in connector ST3.
A7	DHW sensor fault	DHW sensor (8000 - 20000 ohms at room temperature). Wiring and connections to sensor.
A8	Module fail	Night set back module TR212E and/or Roomstat TR2. Wiring and connections between modules.
b1	Code plug not detected	Code plug version, condition and fitting. If OK replace control board.
C1	Fan speed too low	Fan harness and connections. Fan. Otherwise replace control board.
d3	Terminals 8-9 not shorted at connector ST7	Safety overheat thermostat for underfloor heating system (if fitted). Otherwise fit link.
d5	Condensate pump failed	Mains supply to condensate pump. Condensate Pump unit. Continuity of all cables to pump unit.
d6	Tank overheat	Tank sensor is correctly fixed to tank Wiring and connections to sensor.
E2	CH flow sensor fault	CH flow sensor (8000 - 20000 ohms at room temperature). Wiring and connections to sensor.
E9	Safety overheat device tripped	All air vented. Water pressure above minimum. Leaks or blockage. Condition and attachment of CH flow sensor. Pump and associated wiring/connections. Connections and wiring to overheat thermostat devices. Otherwise replace control board.
EA	Flame not detected	Gas present and at correct pressure. Combustion CO2 level. Condition of flue. Ignition electrodes. Ignition harness and connections. Flame sense harness. Flame sense cables and connections. Gas valve. Otherwise replace control board.

Display Code:	Fault description:	Check, repair/replace as necessary:
F0	Internal error	Transformer. All connections to control board. Otherwise replace control board.
F7	Flame detected with no demand.	Gas valve Flame sense electrodes/cables Moisture on control board. Blocked condensate trap. Otherwise replace control board.
FA	Flame detected after gas. Gas valve switched off.	Cables and connections to gas valve. Condensate trap. Flue (for blockages). Otherwise replace control board.
Fd	Reset button pressed by mistake	Press reset button again.
P1, P2, P3, P1...	Please wait, initialisation in progress No central heating, hot water OK No hot water, central heating OK No functions Poor performance / noises Noisy Ignition	Replace fuse S12. Otherwise replace control board. Demand signal from roomstat/CH timer (or link fitted at ST4) CH channel of facia mounted programmer (if fitted). CH control knob position. Flow turbine Demand signal from DHW timer (or link fitted at ST 8). DHW channel of facia mounted programmer (if fitted). 230V fuse (S11). Transformer. Otherwise replace control board. Fan / fan harness. Sensors not fixed or out of specification. Gas pressure / blockage. Water pressure / blockage. CO ₂ mix. Flue blockage. Spark electrodes / cables. Gas valve. Gas supply. CO ₂ mix. Seals.

INSTRUCTION MANUAL INSTALLATION COMMISSIONING & SERVICING

www.worcester-bosch.co.uk

Worcester, Bosch Group

Cotswold Way, Warndon, Worcester WR4 9SW

Part Number: 6-720-611-730b (12.05)

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

