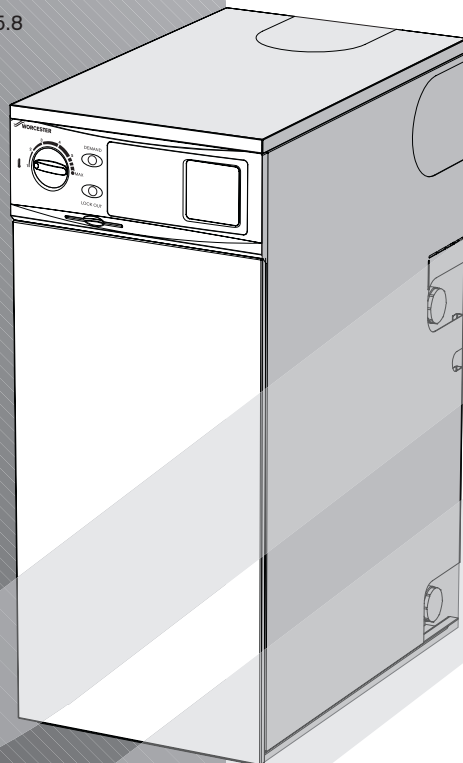


GREENSTAR DANESMOOR 18/25kW

FLOOR STANDING OIL-FIRED CONDENSING BOILER
CONVENTIONAL FLUE & ROOM SEALED FLUE

FOR FULLY PUMPED OPEN VENT OR SEALED CENTRAL HEATING SYSTEMS AND DOMESTIC
HOT WATER CYLINDERS

Patent pending:
Application number 0327645.8



THE APPLIANCE IS FOR USE WITH 28 SECOND KEROSENE
ONLY

GB

**INSTRUCTION MANUAL
INSTALLATION COMMISSIONING
& SERVICING**

 **WORCESTER**
Bosch Group

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FLUE TERMINAL GUARDS:

WORCESTER BOSCH
Part Number: 7-716-190-050

CONVENTIONAL FLUE MANUFACTURERS:

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Selkirk Manufacturing Ltd. (SF Ltd.), 01271 326633

CONDENSATE PUMP MANUFACTURERS:

ASPEN 01323 848842

OIL FIRING TECHNICAL ASSOCIATION:

OFTEC 0845 6585080
www.oftec.org

IMPORTANT HANDLING INSTRUCTIONS:

It is advised that more than one person is involved in the transfer of the packaged appliance from the van to the point of installation.

It is advised that no attempt should be made to move the packaged appliance without the use of a suitable truck.

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.

Store the appliance in a dry area prior to installation.

INSTALLATION & SERVICING INSTRUCTIONS

PLEASE READ THESE INSTRUCTIONS CAREFULLY BEFORE STARTING INSTALLATION.

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

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

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

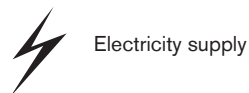
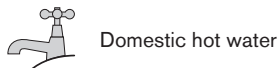
IF YOU ARE IN ANY DOUBT CONTACT WORCESTER BOSCH TECHNICAL HELPLINE. DISTANCE LEARNING AND TRAINING COURSES ARE AVAILABLE FROM WORCESTER BOSCH.

PLEASE LEAVE THESE INSTRUCTIONS WITH THE USER OR WITH THE APPLIANCE AFTER INSTALLATION OR SERVICING.

ABBREVIATIONS USED IN THIS MANUAL:

∅	Diameter
CH	Central Heating
DHW	Domestic Hot Water
TRV	Thermostatic Radiator Valve
IP	Ingress Protection
CF	Conventional flue
RS	Room sealed flue
N/A	Not allowed
SEDBUK	Seasonal Efficiency for Domestic Boilers in the United Kingdom
OFTEC	Oil Firing Technical Association for the Petroleum Industry

SYMBOLS USED IN THIS MANUAL:



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
FLUE OUTLET POSITIONS	14
CONVENTIONAL FLUE	15
ROOM SEALED FLUE OPTIONS	16

INSTALLATION

UNPACKING THE BOILER	17
PIPEWORK POSITIONS & FLUE OPENING	18
BOILER INSTALLATION	19
FLUE INSTALLATION	20
COMBUSTION CHAMBER	21
PIPEWORK CONNECTIONS	22
OIL BURNER & PUMP	23
REFIT COMPONENTS	24
ELECTRICS	25-30

COMMISSIONING

PRE-COMMISSIONING CHECKS	31
FILLING THE SYSTEM	32
STARTING THE APPLIANCE	33-36
WATER TREATMENT	36
FINISHING COMMISSIONING	37

SERVICING & SPARES

INSPECTION AND SERVICE	39-42
SHORT PARTS LIST	43

CONVERSION KITS

N/A

FAULT FINDING & DIAGRAMS

FAULT FINDING	44-45
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SAFETY &
REGULATIONS

APPLIANCE
INFORMATION

PRE-
INSTALLATION

INSTALLATION

COMMISSIONING

SERVICING
& SPARES

CONVERSION
KITS

FAULT FINDING
& DIAGRAMS

SAFETY PRECAUTIONS

OIL SMELLS, LEAKS OR FUMES FROM THE APPLIANCE:

- ▶ Extinguish any naked flames
- ▶ Open windows and doors
- ▶ Isolate the electrical supply
- ▶ Isolate the fuel supply to the boiler
- ▶ Contact boiler engineer.

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 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 OFTEC registered personnel) using approved spares, to help maintain the economy, safety and reliability of the appliance.

INSTALLATION REGULATIONS

Failure to install appliances correctly could lead to prosecution.

The appliance should be installed by a competent person. The person installing the appliance should be aware of the Health and Safety at Work Act and take appropriate action to ensure that the regulations are adhered to. In order to give optimum efficiency and trouble free operation the appliance must be commissioned by a qualified OFTEC engineer.

The compliance with a British Standard does not, of itself, confer immunity from legal obligations. In particular the installation of this appliance must be in accordance with the relevant requirements of the following British Standards and regulations in respect of the safe installation of equipment.

BS 5410: part 1: Code of practice for Oil Fired Boilers.

BS 799: part 5: Specification for Oil Storage Tanks.

BS 7593: Code of Practice for treatment of water in domestic hot water central heating systems.

BS 5449: part 1: Specification for forced circulation hot water central heating for domestic premises.

BS 5955: part 8: Specification for the installation of thermoplastic pipes and associated fittings for use in domestic hot and cold water services and heating systems.

BS 7291: Thermoplastic pipes and associated fittings for hot and cold water for domestic purposes and heating installations in buildings.

BS 7074: part 1: Application, selection and installation of expansion vessels and ancillary equipment for sealed water systems.

BS 7671: IEE Wiring Regulations, current edition.

The Building Regulations Part J and L1 England and Wales; Part F and Part J Section III Scotland; Part L and Part F Northern Ireland.

Local water company bye-laws.

The Control of Pollution (Oil) Regulations.

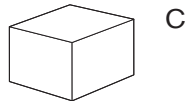
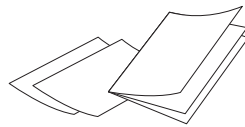
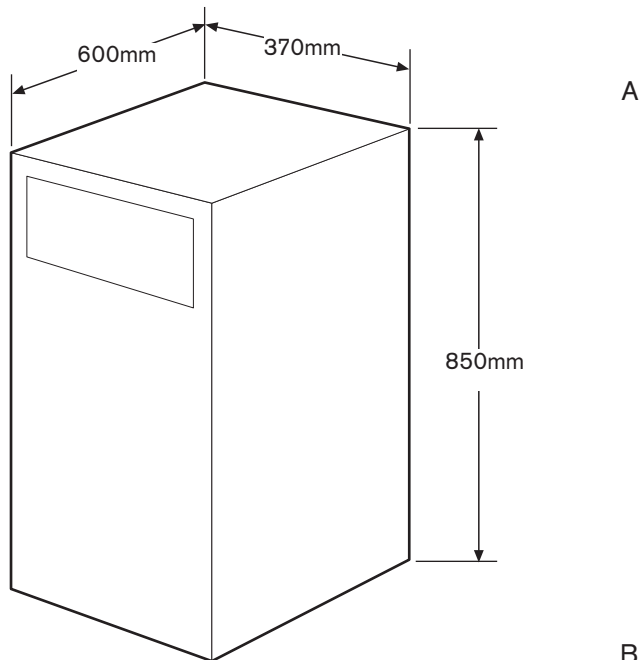
OFTEC Standards.

To ensure that the installation will perform to the highest standards, the system and components should conform to those mentioned in these instructions.

GENERAL INFORMATION

STANDARD PACKAGE:

- A - Floor standing oil fired condensing boiler
- B - Literature pack
- C - Hardware pack including:
 - Condensate trap



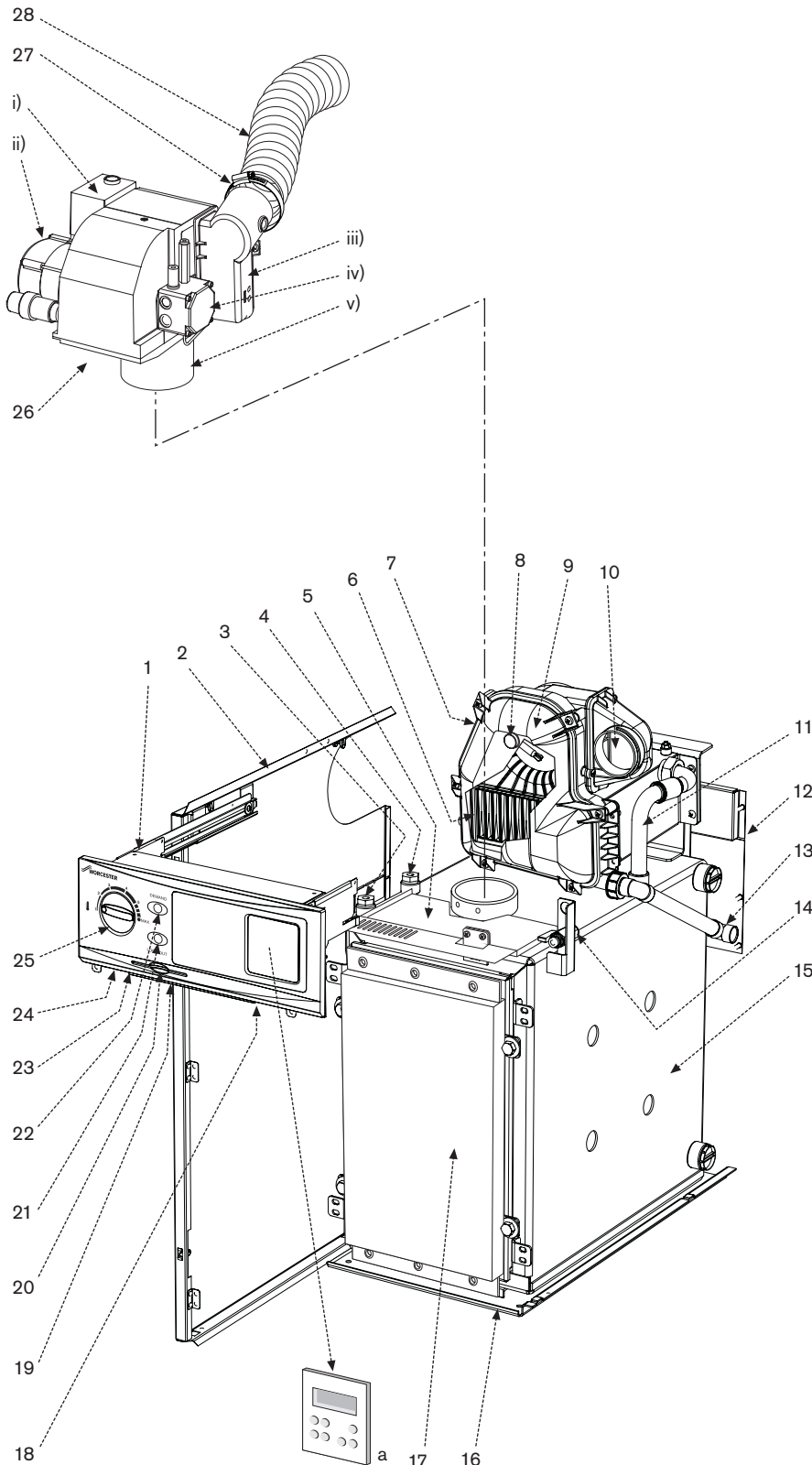
DESCRIPTION	UNITS	18/25kW
Central Heating		
Primary water capacity (total)	litres	24.5
Maximum static head	metres	30
Minimum static head	metres	1
Water side resistance (20°C difference)	mbar	57
Max. permissible sealed system operating pressure	bar	2.65
Flue		
Exit flue gas mass flow	kg/hr	40
Pipework connections		
Fuel line (compression)	mm	10
CH flow	inch BSP	1
CH return	mm	22
CH vent (Optional)	inch BSP	1
CH drain	inch BSP	1
Condensate (polypropylene)	mm	21.5
Electrical		
Electrical power supply voltage	AC...V	230
Frequency	Hz	50
Max. power consumption	W	155
Thermostats		
Boiler flow temperature range (cut in/cut out)	°C	55/81
CH control thermostat differential	°C	5
Boiler high limit thermostat set point	°C	95
Boiler manual reset overheat thermostat set point	°C	105
Flue reset overheat thermostat set point	°C	110
General Data		
Maximum hearth temperature	°C	<100
SEDBUK (Band A)	%	92.9
Appliance protection rating (with programmer blanking plate fitted)	IP	20
Appliance protection rating (with fascia programmer fitted)	IP	20
Weight (excluding packaging)	kg	119

The diagram opposite excludes the top, front and RH side casing panels.

- 1 CONTROL BOX ASSEMBLY
- 2 CASING SIDE PANEL
- 3 CH CONTROL & HIGH LIMIT MANUAL RESET THERMOSTATS
- 4 OVERHEAT THERMOSTAT (AUTOMATIC RESET)
- 5 OIL DRIP TRAY
- 6 SECONDARY HEAT EXCHANGER
- 7 MANUAL RESET FLUE OVERHEAT THERMOSTAT
- 8 FLUE GAS SAMPLING POINT
- 9 FLUE MANIFOLD ACCESS COVER
- 10 AIR INLET CASING (RS)
- 11 HEAT EXCHANGER FLOW PIPE
- 12 REAR CABINET SUPPORT BRACKET
- 13 CONDENSATE OUTLET
- 14 FUEL ISOLATING VALVE
- 15 PRIMARY HEAT EXCHANGER
- 16 BASE PLATE
- 17 COMBUSTION CHAMBER ACCESS DOOR
- 18 CONTROL BOX
- 19 OVERHEAT RESET BUTTON
- 20 QUICK REFERENCE GUIDE SLOT
- 21 LOCK-OUT INDICATOR
- 22 DEMAND INDICATOR
- 23 FLUE OVERHEAT RESET BUTTON
- 24 LOCK-OUT RESET BUTTON
- 25 CH TEMPERATURE CONTROL
- 26 STERLING 50 BURNER
 - i) Control box
 - ii) Motor
 - iii) Air intake casing
 - iv) Oil pump
 - v) Blast tube
- 27 CLIP - AIR INTAKE HOSE (RS)
- 28 AIR INTAKE HOSE (RS)

OPTIONAL ACCESSORIES (not supplied)

- a - 7 day TWIN CHANNEL DIGITAL TIMER
Part No. 7 716 190 031



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



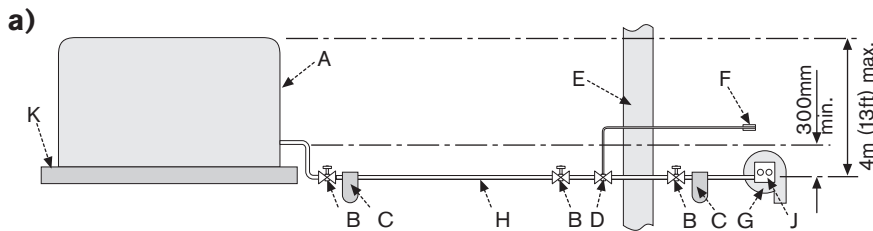
ELECTRIC SUPPLY:

- 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.

- A - oil storage tank
- B - isolating valve
- C - oil filter
- D - fire valve to BS5410
- E - external wall
- F - fire detection element
- G - oil burner
- H - oil supply pipe
- J - oil pump
- K - full base (plastic tanks)
- L - non-return valve
- M - de-aerator

Note: All dimensions are in metres unless stated otherwise.

The maximum pipe run figures are based on using copper pipe with an inside diameter of 2mm less than the Ø.



MAXIMUM PIPE RUN FOR SINGLE PIPE GRAVITY FEED SYSTEM

HEAD	10mmØ	12mmØ	HEAD	10mmØ	12mmØ
0.5	12	30	2.5	62	100
1.0	25	69	3.0	74	100
1.5	37	91	3.5	87	100
2.0	49	100	4.0	99	100

MAINS SUPPLIES

OIL SUPPLY:

- Plastic or steel tanks should be installed to BS5410. A steel tank should conform to BS799: part 5 and arranged with a slope of 1 in 24 away from the outlet valve with a sludge cock at its lower end.
- Do not use galvanised steel tanks or pipework for the oil supply system.
- Do not use soldered joints on the oil supply pipework as this could cause a hazard in the event of a fire.

a) Single pipe gravity feed system:

The oil storage tank (A) must be positioned so that the oil level does not exceed 4 metres above the level of the burner oil pump (J) and in addition the oil level must be at least 300mm above the oil pump (J). Where the maximum oil level in the oil storage tank exceeds 4 metres, a head breaking device must be installed between the tank (A) and the burner oil pump (J).

b) Double pipe sub-gravity feed system:

Maximum suction height 3.5 metres. Non-return valves must be fitted to the inlet and return oil line between the oil pump (J) and oil storage tank (A).

c) Single pipe suction lift with de-aerator

Maximum suction height 3.5 metres. The oil tank (A) must be positioned below the oil pump (J). Create an inlet and return loop between the de-aerator (M) and oil pump (J).

A non-return valve must be incorporated within the de-aerator or fitted to the oil line between the oil storage tank (A) and the de-aerator (M).

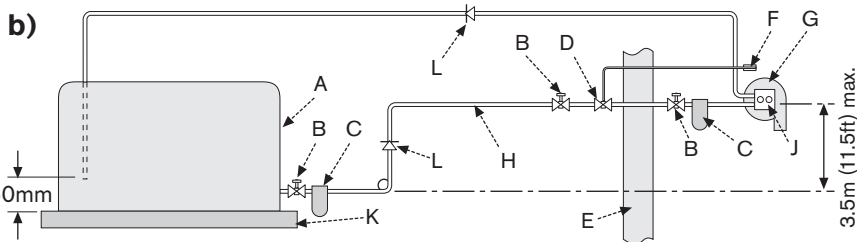
A top feed oil tank fitted with a de-aerator using an internal non-return valve should have any non-return valve/s fitted in the base of the tank to the suction line removed to assist purging air from the oil line.

Pipework

- ▶ Use copper pipe of the correct diameter according to the information shown opposite. Use flexible hoses to connect to the oil pump (J).
- ▶ Lay the oil supply pipe (H) as straight and level as possible to avoid air pockets and unnecessary friction losses. Route away from the boiler access door or other hot surfaces.
- ▶ Install a manual isolating valve (B) to the oil supply pipe (H), as close to the oil storage tank (A) as possible.
- ▶ Fit an oil filter (C) to the oil supply pipe, near the oil storage tank. If there is doubt about the internal condition of the oil supply pipe, fit an additional oil filter (recommended paper filter element) close to the boiler, but not inside the boiler casing.
- ▶ Fit a fire valve in accordance with BS5410. The fire valve (D) should be fitted externally to the building with a fire detection element (F) located within the appliance case.

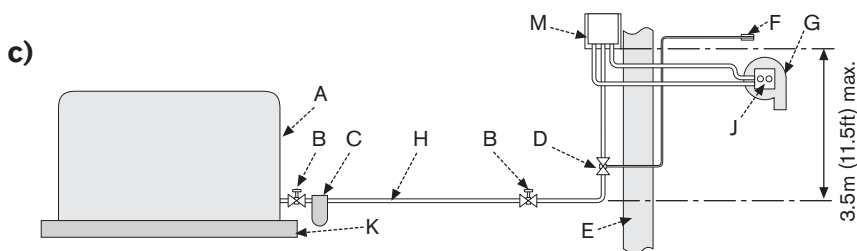
A capillary type valve provides a neat and simple installation. Alternatively, a fusible link or electrical system may be used.

Under no circumstances should a combination isolating/fire valve be used as the sole fire protection device.



MAXIMUM PIPE RUN FOR DOUBLE PIPE SUB-GRAVITY FEED SYSTEM

HEAD	10mmØ	12mmØ	HEAD	10mmØ	12mmØ
0	50	100	2.0	26	66
0.5	44	100	2.5	20	50
1.0	38	95	3.0	14	37
1.5	32	80	3.5	8	22

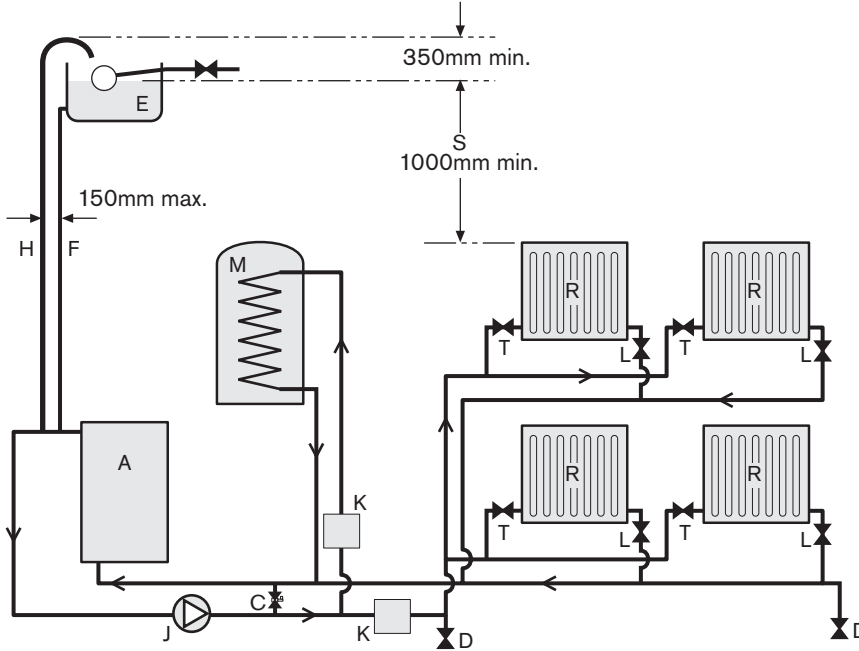


MAXIMUM PIPE RUN FOR SINGLE PIPE SUCTION LIFT WITH DE-AERATOR

HEAD	FUEL FLOW RATE				HEAD	FUEL FLOW RATE			
	2.5kg/h 8mmØ	5kg/h 8mmØ	10kg/h 8mmØ	10kg/h 10mmØ		2.5kg/h 8mmØ	5kg/h 8mmØ	10kg/h 8mmØ	10kg/h 10mmØ
0	100	55	26	100	2.0	60	30	14	65
0.5	95	45	23	100	2.5	45	25	11	50
1.0	80	40	20	90	3.0	35	15	8	35
1.5	70	35	17	75	3.5	25	10	5	20

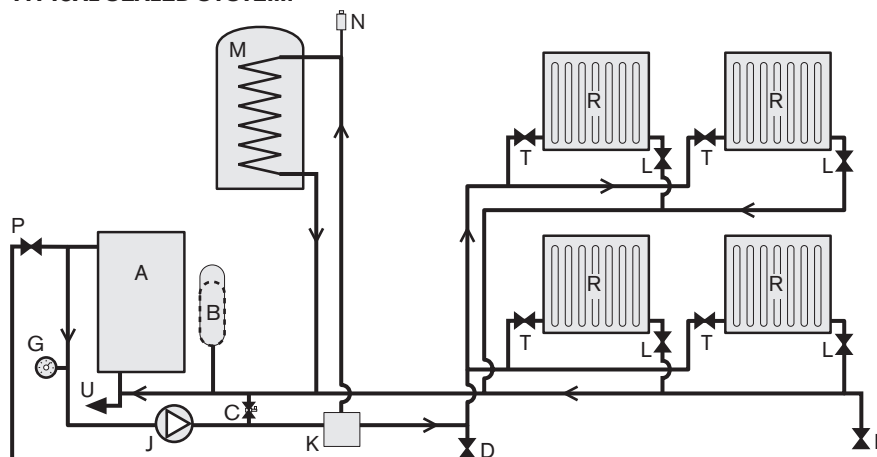
The table and illustration above is a guide only and does not in any way override the de-aerators manufacturers instructions.

TYPICAL OPEN VENT SYSTEM:



- | | | |
|----------------------------|----------------------------|-------------------------------|
| A - appliance | G - pressure gauge | N - automatic air vent |
| B - expansion vessel | H - heating vent 22mmØ min | P - pressure relief discharge |
| C - automatic bypass valve | J - circulating pump | R - radiators |
| D - drain cock | K - zone valve | S - static head |
| E - expansion tank | L - lockshield valve | T - TRV |
| F - cold feed 15mmØ min | M - hot water cylinder | U - to filling system |

TYPICAL SEALED SYSTEM:



PRIMARY SYSTEM PLASTIC PIPEWORK:

- Any plastic pipework must have a polymeric barrier with 1000mm (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
- An automatic bypass valve must be connected between the heating flow and return where TRV's are used on all radiators
- Drain cocks are required at all the lowest points on the system
- Air vents are required at all high points on the system.

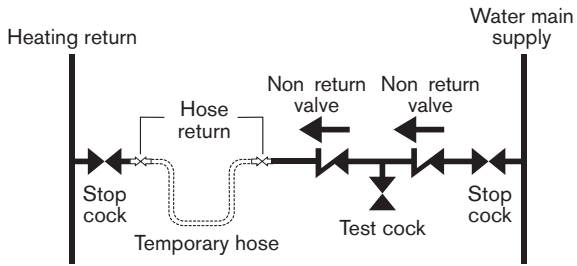
OPEN VENT PRIMARY SYSTEM:

- The cold feed (F) and expansion tank (E) must be positioned to provide a static head (S) of at least 1 metre above the highest point in the heating system to the water level in the expansion tank (E)
- The heating vent (H) and cold feed (F) pipes must rise continuously from the appliance.
- The heating vent pipe (H) must be at least 22mmØ and 350mm above the waterline in the cold feed and expansion tank (E).

FULLY PUMPED SEALED PRIMARY SYSTEM:

- A pressure relief valve (P) (spring loaded safety valve set to operate at 3 bar) must be fitted to the heating flow pipe as close as possible to the boiler or onto one of the boiler top 1" BSP outlets
- An expansion vessel (B) must be fitted to the heating return pipe close to the boiler and pressurised for the system volume according to the instructions supplied with the vessel
- A pressure gauge (G) (3 bar min.) must be fitted to the heating flow pipe or one of the boiler 1" BSP outlets
- An automatic air vent (N) must be fitted.

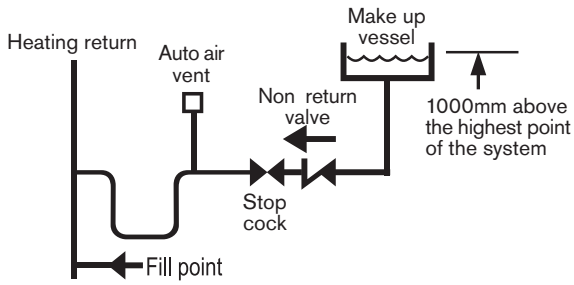
PRE-INSTALLATION



FILLING PRIMARY SYSTEMS:

- Filling the system must comply with one of the methods shown opposite
- The filling point must be at low level and must never be a permanent direct fixing to the mains water supply
- Filling loops must be WRAS approved.

PRE-
INSTALLATION



CONDENSATE & PRESSURE RELIEF PIPEWORK

CONDENSATE PIPEWORK:

- ▶ The condensate pipe must be a minimum of 21.5mmØ polypropylene 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:

a - Internal waste drainage system

b - Soil/vent stack

c - External drainage system

d - External condensate absorption point

- ▶ Use waterproof pipe insulation in exposed positions and for external pipework

IMPORTANT: Condensate pipework must not leak and must discharge into a condensate trap filled with water before the boiler is started to prevent the possibility of potentially harmful flue products escaping via the condensate route.

A - Condensate from boiler

B - Sink

C - 21.5mmØ polypropylene condensate pipe

D - Gully

E - Internal soil and vent stack

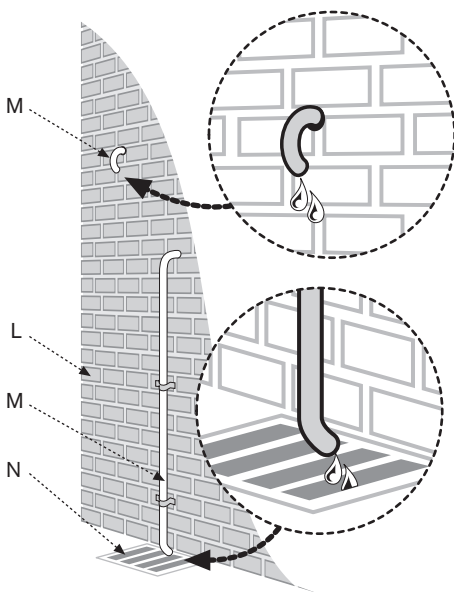
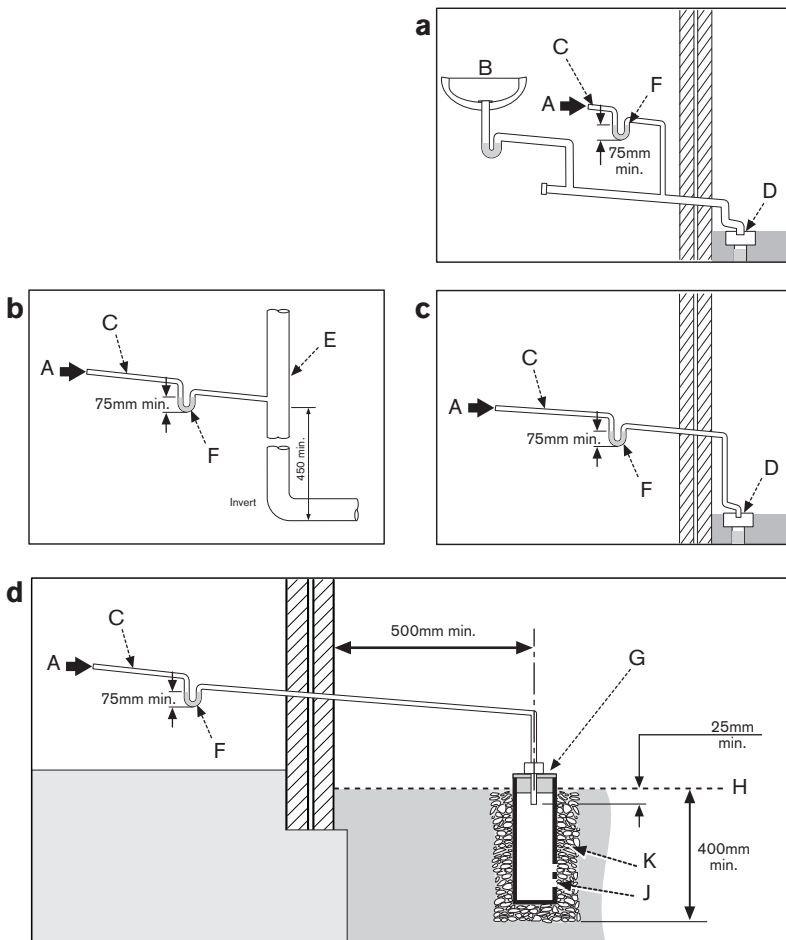
F - Condensate trap (75mm min)

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.

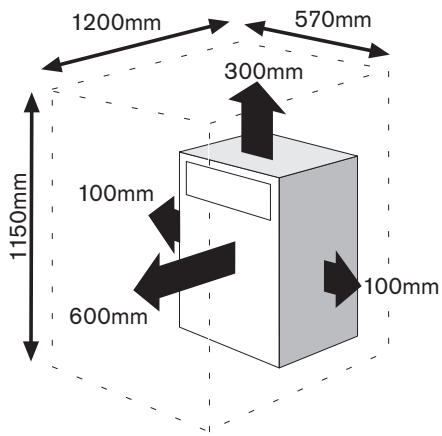
- ▶ The pressure relief drain pipe (M) should be at least 15mm diameter copper pipe and run downwards away from the boiler and discharge away from any electrics or other hazard, preferably to an external drain or soakaway
- ▶ Pipe (M) should be finished with a partial bend, near the outlet to face the external wall (as shown) to help prevent freezing
- ▶ Use waterproof pipe insulation in exposed positions and for external pipework

L - Outside wall

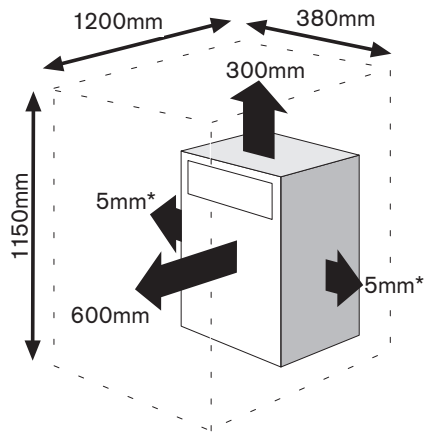
M - Drain pipe

N - External drain

a: RECOMMENDED INSTALLATION CLEARANCES



b: SERVICE CLEARANCES



BOILER LOCATION & CLEARANCES

- This boiler is only suitable for installing internally within a property at a suitable location onto a fixed rigid non-combustible surface at the same size as the boiler and capable of supporting the boiler weight.
- The boiler must be installed on a flat level surface to ensure condensate does not enter the primary heat exchanger.
- The boiler is not suitable for external installation unless a suitable enclosure is provided.
- Roof space installations must fully conform to BS5410 part 1 section 4.6.9

Open flue model (CF):

- In order to ensure clean and efficient combustion an adequate supply of air must be delivered to the combustion chamber.
- To provide sufficient air a suitable inlet must be provided into the room or space in which the boiler is situated, minimum size 110cm² for 18/25kW appliances.

An air brick or other form of continuous air supply may have to be built into the installation in order to ensure an adequate supply of air.

- If the appliance is to be installed in a confined space or compartment two air vents are required, one at high level and one at low level.

The minimum free area of each vent is shown opposite and depends whether the air is taken from another room or from outside the building.

- Where the air is taken from another room that room must contain an air inlet as described above.

Room sealed balanced flue model (RS):

The appliance does not require a separate vent for combustion air.

- Installation in cupboards or compartments require permanent vents for cooling purposes, one at high level and one at low level, either direct to outside air or to a room.
- Both vents must pass to the same room or be on the same wall to the outside air.

The minimum air vent free area is given in the table opposite.

a: INSTALLATION CLEARANCES:

Diagram (a) shows the minimum space recommended to **install** the boiler only.

b: SERVICE CLEARANCES:

Diagram (b) shows the minimum space required to **service** the boiler only.

The appliance is suitable for an under worktop installation providing that the worktop above the boiler (min.10mm clearance) is removable for maintenance and the front of the boiler is not enclosed

** Remove the flue 'knock-out' panel sections if this clearance is less than 75mm.*

MINIMUM AIR VENT AREA (cm²) FOR APPLIANCES INSTALLED IN A COMPARTMENT:

¹Internal air to and from a space/room inside the building. ²External air to and from directly outside the building

kW	Conventional flue:				Room Sealed flue:			
	Internal ¹ ventilation		External ² ventilation		Internal ¹ ventilation		External ² ventilation	
	High Level (D)	Low Level (C)	High Level (D)	Low Level (C)	High Level (D)	Low Level (C)	High Level (D)	Low Level (C)
18/25	220	330	110	220	220	220	110	110

BOILER LOCATION & CLEARANCES

c: COMPARTMENTS:

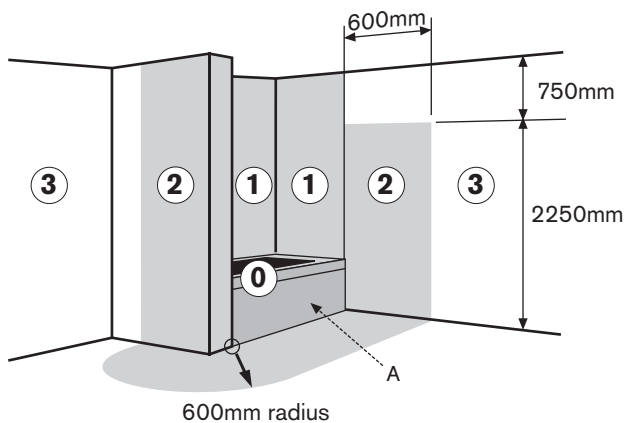
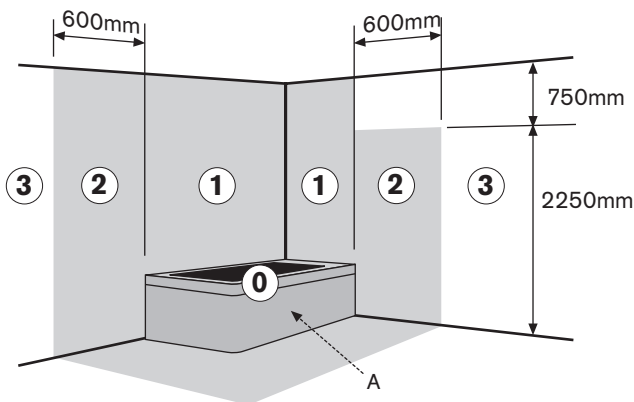
Follow the requirements of BS5410 and note:

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

Venting compartments:

There must be sufficient clearance around the appliance to allow proper circulation of ventilation air. The clearances required for installation and servicing will normally be adequate for ventilation.

- Ventilation must be provided for boilers fitted into compartments as described in BS 5410
- Free air must not be taken from a room or internal space containing a bath or shower and must not communicate with a protected area such as a hall, stairway, landing, corridor, lobby, shaft etc.
- Air vents must allow access for clean free air and must be sited to comply with the flue terminal position requirements.
- Air ducting runs must not exceed 3m.
- Low level air vents must be less than 450mm from the floor.
- A warning label must be added to the vents with a statement to the effect: "Do not block this vent. Do not use for storage".



A - Bath or shower cubicle (zone 0)

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: conventional flued boilers must not be fitted in a bathroom.

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.

Minimum dimensions (mm) of flue terminal positions for oil-fired appliances:

TERMINAL POSITION	CF	RS(H)	RS(V)
A Below an opening (1, 2)	N/A	600	N/A
B Horizontally to an opening (1, 2)	N/A	600	N/A
C Below a plastic/painted gutter, drainage pipe or eaves if combustible material protected	N/A	75	N/A
D Below a balcony or a plastic/painted, gutter, drainage pipe or eaves without protection to combustible material (3)	N/A	600	N/A
E From vertical sanitary pipework	N/A	300	N/A
F From an external or internal corner or from a surface or boundary alongside the terminal	N/A	300	N/A
G Above ground or balcony level	N/A	300*	N/A
H From a surface or boundary facing a terminal	N/A	600**	N/A
J From a terminal facing the terminal	-	1200	-
K Vertically from a terminal on the same wall	N/A	1500	N/A
L Horizontally from a terminal on the same wall	-	750	-
M Above the highest point of an intersection with the roof	600	-	600
N From a vertical structure on the side of the terminal	750	-	750
O Above a vertical structure less than 750mm from the side of the terminal	600	-	600
P From a ridge terminal to a vertical structure on the roof	1500	-	N/A

- Not applicable

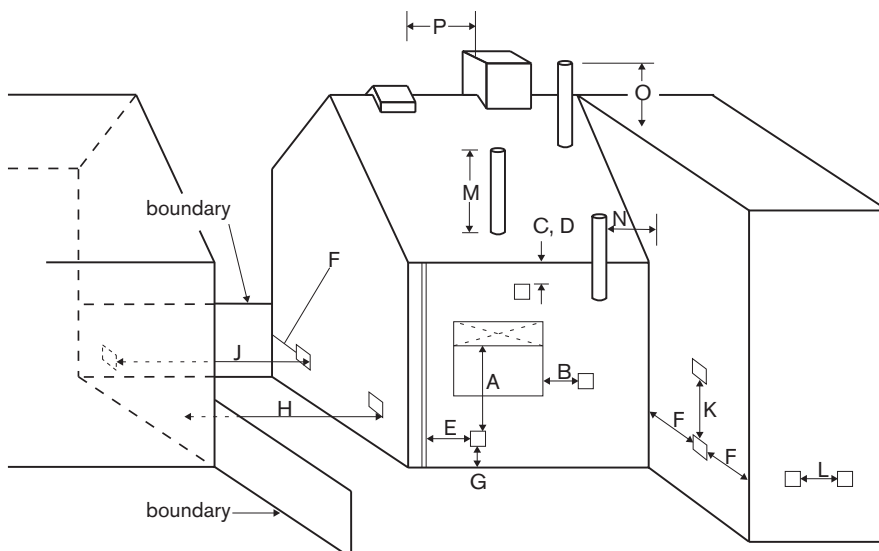
N/A Not allowed

CF Conventional flue

RS(H) Room Sealed Horizontal flue

RS(V) Room Sealed Vertical flue

- 1 An opening means an openable element, such as an openable window, or a permanent opening such as a permanently open air vent.
- 2 Notwithstanding the dimensions above, a terminal should be at least 300mm from combustible material, e.g. a window frame.
- 3 A way of providing protection of combustible material would be to fit a heat shield at least 750mm wide.



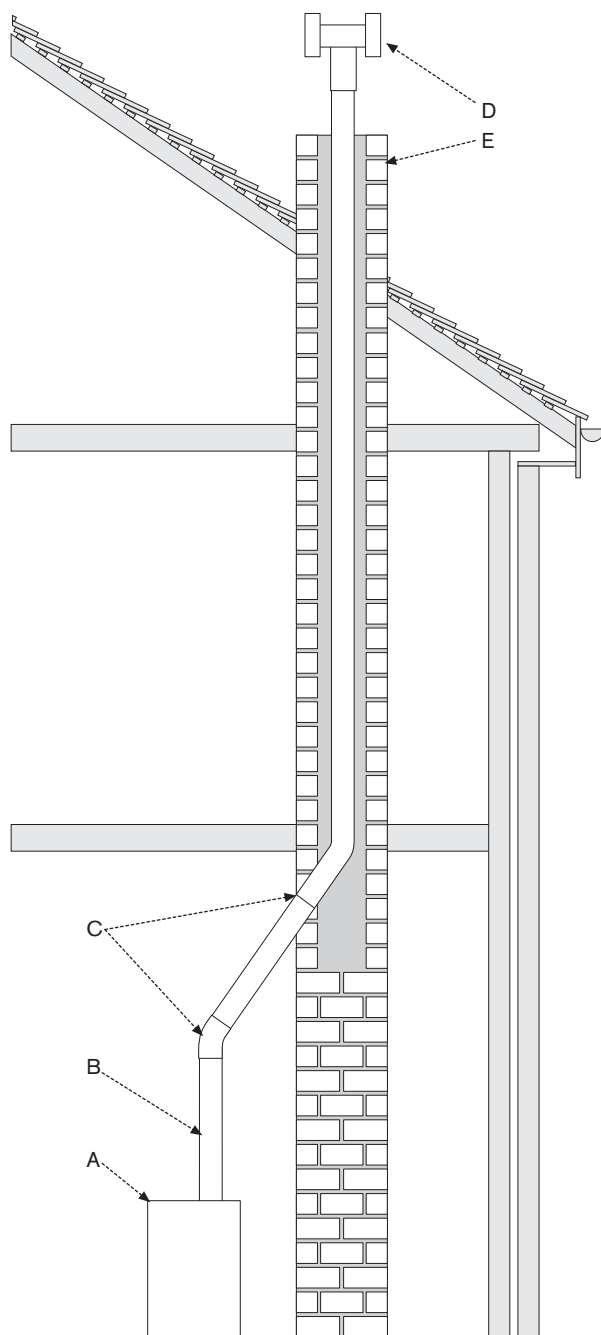
FLUE OUTLET POSITIONS

- 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 BS5410
- 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 5410:1
- 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.

- The following additional guidelines (from part L Exceptions Guidance Document) are recommended when determining the flue outlet position:
 - Avoid discharging flue gases into car ports or narrow passageways
 - *Minimum distance of the flue terminal to a facing wall, fence, building or property boundary is 2500mm
 - **Minimum distance of the flue terminal from above ground is 2100mm where directed to a public footpath, private access route or a frequently used area and 2500mm from a car parking area.

CONVENTIONAL FLUE



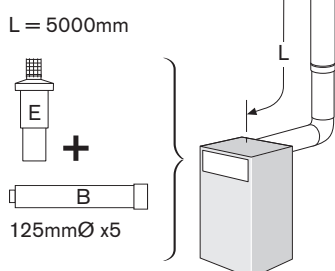
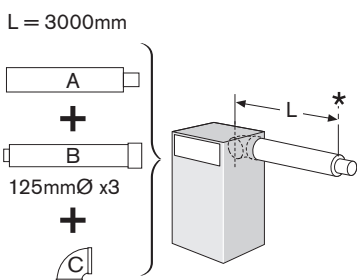
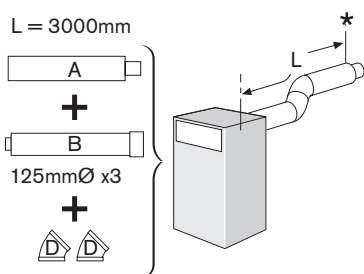
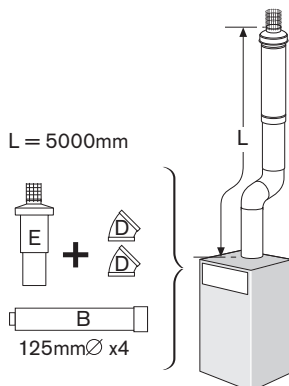
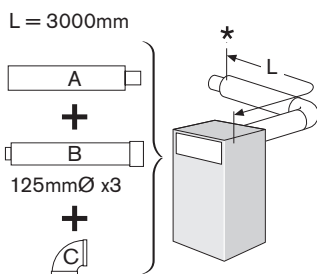
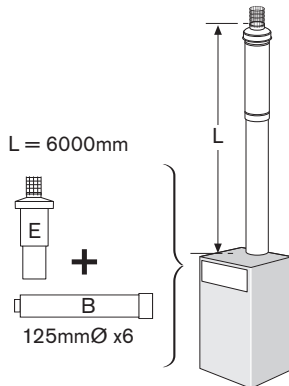
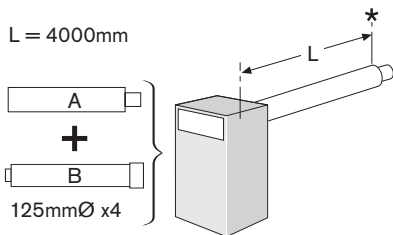
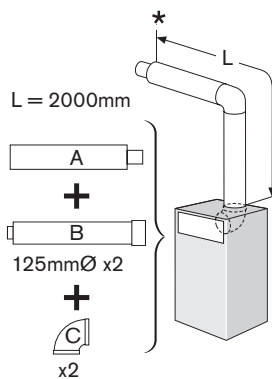
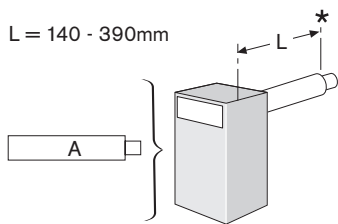
- A - Boiler
- B - Flue
- C - Max. 2 bends at 135°
- D - Anti down-draught terminal
- E - Chimney

- Open (conventional) flued appliances must not be installed in a bedroom, bathroom or bedsitting room
- The flue system must be in accordance with BS5410 : Part 1 and the current Building Regulations
- The flue must be constructed of materials suitable for the use of condensing combustion products
- External flue systems must be of the insulated type
- Brick and masonry chimneys must be lined with a suitable non-combustible material and properly jointed to withstand the effects of the working temperature (minimum rating of material 120°C) of the appliance and any condensate which may form
- All flue joints must be sealed to prevent the leakage of condensate and combustion products
- Ensure that joints are made so that the condensate runs away and is not collected within the joint

NOTE: The flue can be increased in size from the boiler take off point providing the joint is correctly sealed. Never reduce the flue diameter from the boiler take off point

- The flue should be vertical and contain as few bends as possible, a maximum of two 135° bends should be used
- The flue outlet must be extended beyond the eaves of the building and where possible, above the apex
- Fit a suitable anti down-draught terminal where down draughts are experienced.

Manufacturers of conventional flue systems suitable for this appliance are listed under 'Contact Information' on the inside front cover.



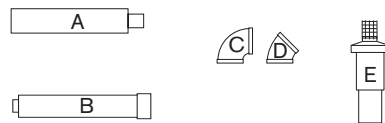
ROOM SEALED FLUE OPTIONS

The diagrams (opposite) show the components used and the maximum flue length (L) for each flue configuration.

- To achieve the maximum flue length (L), a flue section will have to be reduced in length.
- Only the flue terminal or straight flue extensions can be reduced in length by cutting.
- The flue terminal end can be fitted from the inside or outside of the building.

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.



- A - Horizontal terminal
- B - Straight flue extension
- C - Flue bend 90°
- D - Flue bend 45°
- E - Vertical Terminal Kit (incl. 90° elbow)

Calculating the flue length:

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

Horizontal 80/125mmØ: 4000mm (excluding 120mm of terminal extending outside the building)

Vertical 80/125mmØ: 6000mm (including the vertical flue kit 90° elbow)

Then reduce the total straight flue length for each extra flue bend (excluding the vertical flue kit 90° elbow) by:

1000mm for 90°

500mm for 45°

Flue Extension lengths:

Horizontal & Vertical 80/125mmØ: 1000mm overall length.

Effective length when engaged into sockets within the flue run is 950mm

Flue Terminal lengths:

Horizontal 80/125mmØ: 720mm

Vertical 80/125mmØ: 1080mm + cage

* to outside wall.

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

UNPACKING THE BOILER

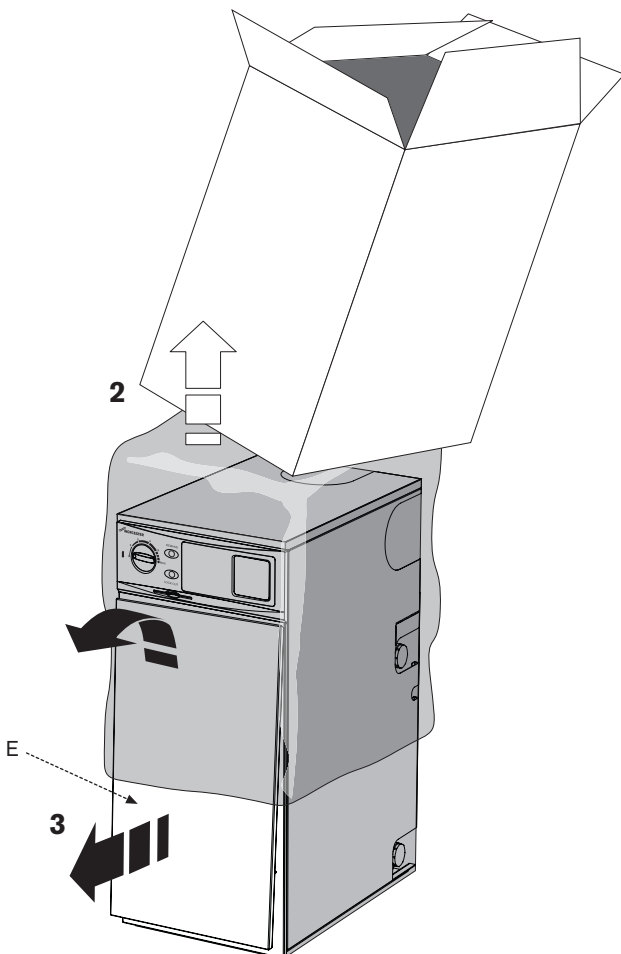
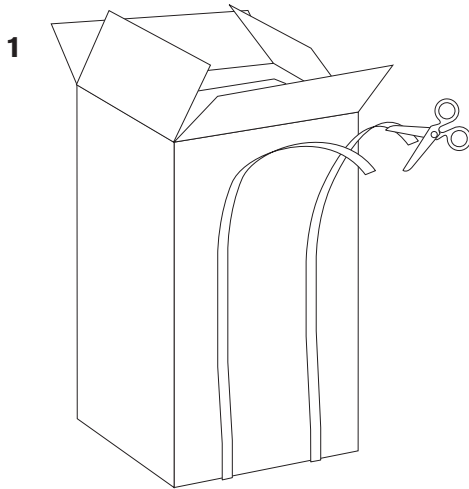
Unpacking:

- 1 Cut the ties securing the carton taking care not to pierce the carton or cause personal injury
- 2 Open the top flaps of carton and lift carton up and away from the boiler
 - ▶ Remove the plastic bag and upper front protection cover from the boiler and place safely aside
- 3 ▶ Pull base of front panel (E) away from the boiler to disengage ball stud connectors
 - ▶ Lift front panel (E) upwards off the top supporting ledge and store safely away from the working area
 - ▶ At least two or more persons are required to move the boiler, taking care not to damage the boiler, panels or the floor.

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.



PIPEWORK POSITIONS & 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.

PIPEWORK POSITIONS:

A to D (opposite) show the pipe positions from the front of the boiler:

- A - CH flow/heating vent 1"Ø BSP
- B - Primary drain/cold feed 1"Ø BSP
- C - CH return 22mmØ copper
- D - Flue outlet

NOTE: For servicing purposes, keep the condensate and pressure relief discharge pipes away from components and pipework connections.

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.

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

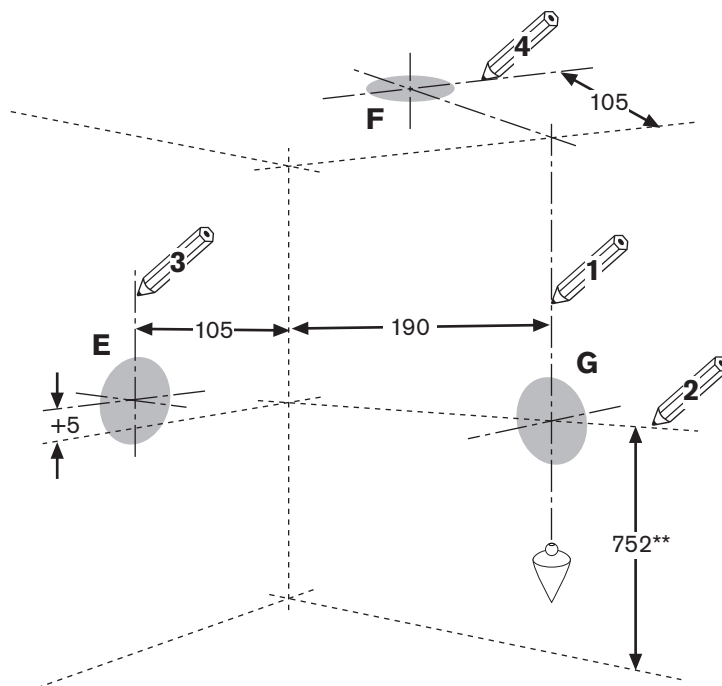
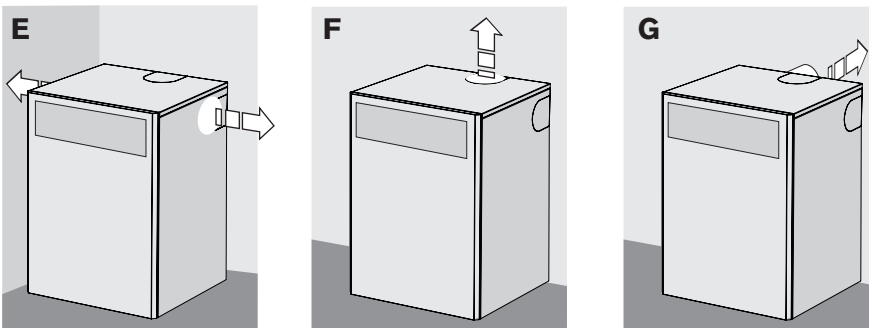
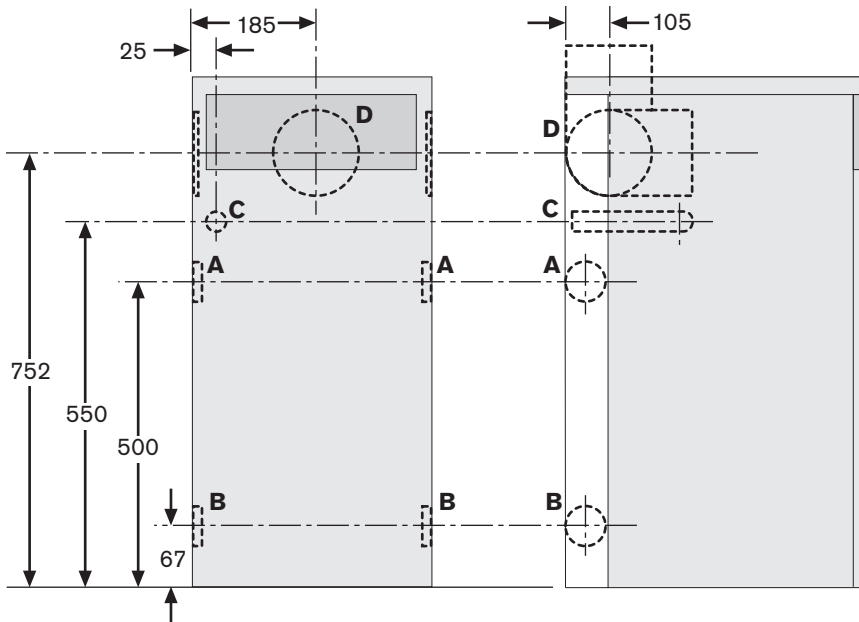
NOTE: all horizontal flue sections must rise away from the boiler by 52mm per meter to ensure that condensate flows back into the boiler for safe discharge via the condensate waste pipe.

- ▶ Make an opening (E, F or G) through the wall using a core drill or similar at a size relative to the wall thickness as shown below:

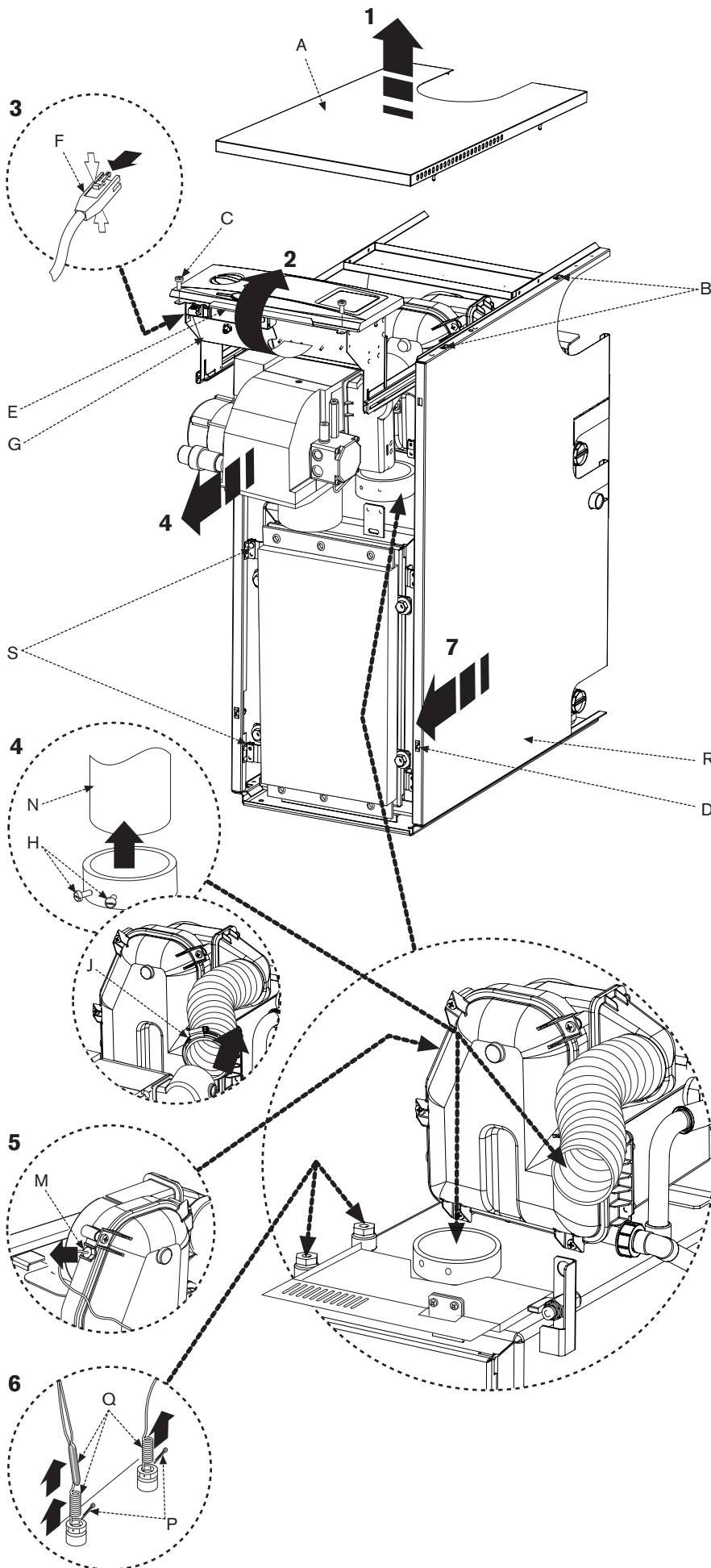
125mmØ flue:

Wall thickness	Flue hole size
150 - 240mm	155mmØ
240 - 330mm	160mmØ
330 - 420mm	165mmØ
420 - 500mm	170mmØ

- ▶ Clear away any debris

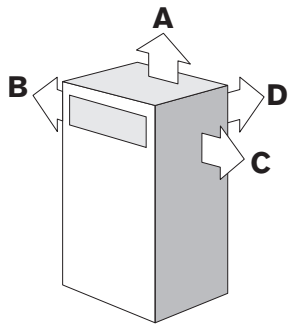


BOILER PANEL REMOVAL

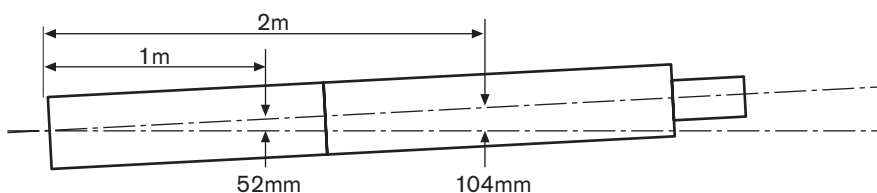
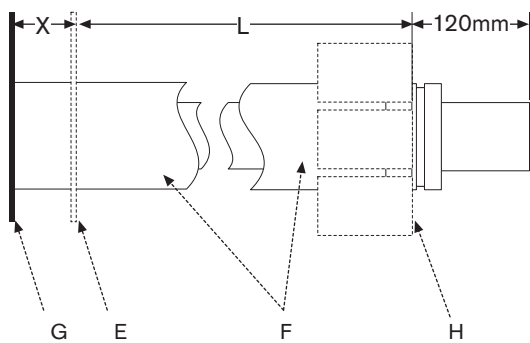
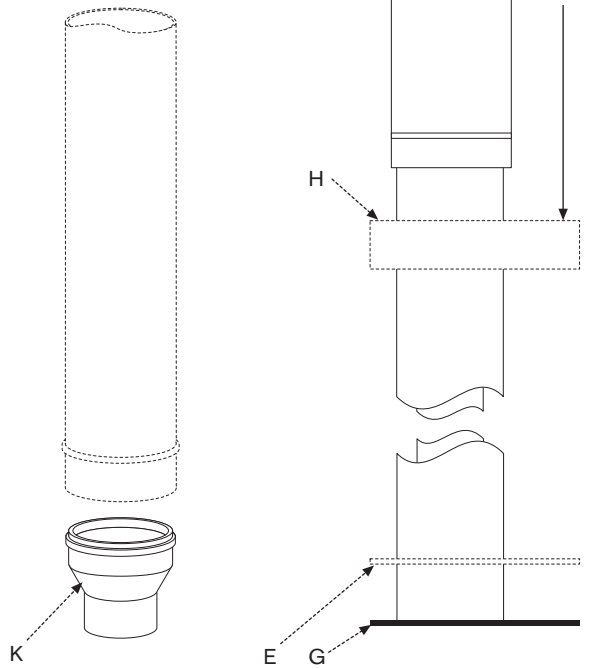


- 1 Lift the top panel (A) upwards to disengage the ball stud connections (B) and remove
- 2 ▶ Remove securing screws (C) from each side
▶ Slide control box (G) outwards to its full extent
▶ Pivot control box (G) upwards and secure in the position as shown
- 3 Depress locking ears to unplug burner lead (F) from control box (G)
- 4 ▶ Release burner retainers (H)
▶ Loosen clip (J) and disconnect the air inlet pipe
▶ Lift burner up to release blast tube (N) from heat exchanger and store safely away from the boiler
- 5 ▶ Release split pin to remove the flue thermostat (M) from the flue hood
- 6 ▶ Release split pins (P)
▶ Carefully remove the overheat thermostat phial (Q) (automatic reset) from the rear heat exchanger thermostat pocket
▶ Carefully remove the CH control thermostat and High Limit manual reset thermostat phials (Q) from the front heat exchanger thermostat pocket
- 7 ▶ Unscrew side panel (R) retaining screws (S) from both sides
▶ Slide both side panels together with the top support bracket and control box (G) forwards to release the side panel retaining lugs
▶ Remove and store safely away from the boiler.

Note: to enable the panels to stand upright, reposition and secure the control box (G) to the side panels.



- E - Boiler outer casing
- F - Outer flue tube
- G - Outer/elbow connection
- H - Outside wall/roof
- K - CF adaptor



FLUE INSTALLATION

The flue can exit the boiler from outlets A, B, C or D allowing vertical (RS & CF) and horizontal (RS low or high level) flues to be fitted. (CF position 'D' only).

Refer to the separate flue installation instructions supplied with the flue kits available for this boiler:

RS FLUE KITS & COMPONENTS 80/125mmØ (not supplied):

- Horizontal flue kit: Part No. 7-716-190-031
- Vertical flue kit: Part No. 7-716-190-032
- Extension kit (1 metre) x1: Part No. 7-716-190-033
- Inline elbow 90° x1: Part No. 7-716-190-034
- Inline elbow 45° x2: Part No. 7-716-190-035
- Horizontal terminal guard: Part No. 7-716-190-050

CF FLUE KITS 80/100 & 103mmØ (not supplied):

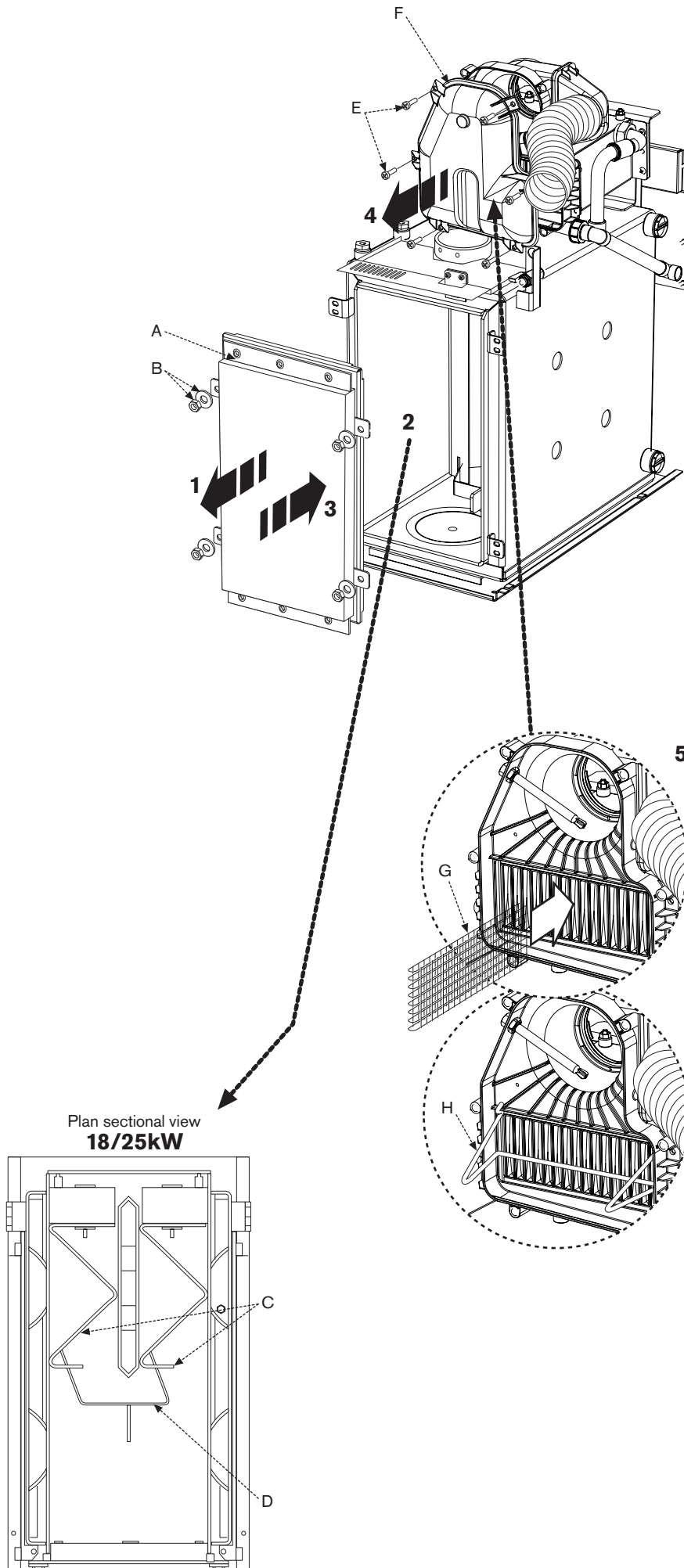
- CF Vertical flue kit: Part No. 7-716-190-036

INSTALLATION NOTES:

- ▶ Ensure all flue seals are in good condition and seated properly
- ▶ To ease assembly of flue components, grease seals lightly with the solvent-free grease supplied
- ▶ Use flue clamps to support the flue system

IMPORTANT: The boiler is not designed to take the weight of the flue system, this must be supported externally to the boiler.

- ▶ All horizontal flue sections must rise by at least 52mm for each meter away from the boiler to ensure that condensate flows back into the boiler for safe discharge via the condensate waste pipe.

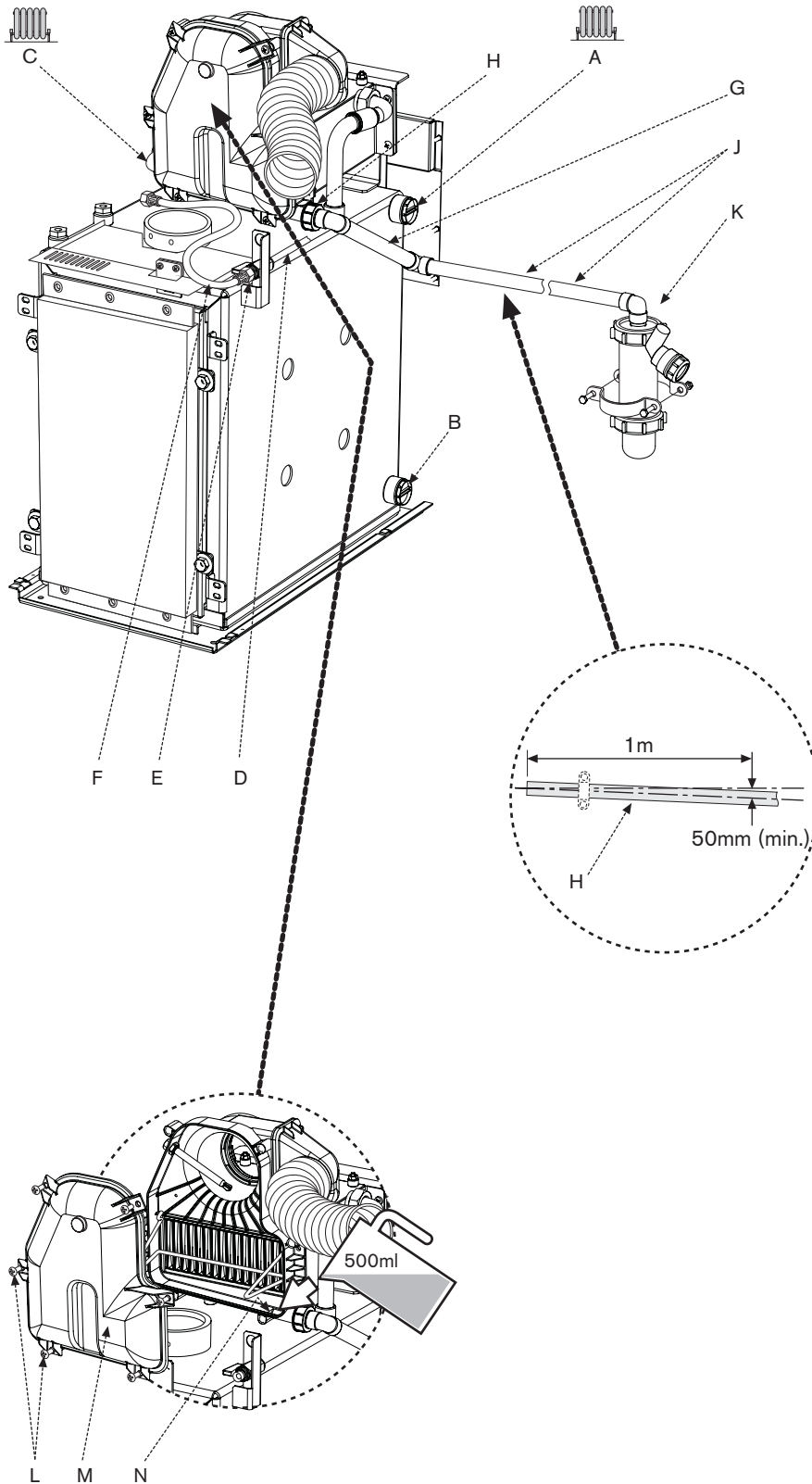


Combustion chamber:

- 1 ▶ Release retaining nuts and washers (B)
 - ▶ Remove combustion chamber access door (A)
- 2 Ensure the baffles (C) and baffle retainer (D) are correctly fitted for the boiler output as shown in the plan view opposite
- 3 ▶ Refit combustion chamber door (A)
 - ▶ Secure with nuts and washers (B) and tighten until the door is firmly secured, do not overtighten the nuts
- 4 ▶ Unscrew screws (E) and remove flue manifold access cover (F)
- 5 ▶ Check that all the baffles (G) and baffle retainer (H) are correctly fitted to the secondary heat exchanger.

INSTALLATION

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



- A - CH flow/heating vent 1"Ø BSP
- B - Primary drain/cold feed 1"Ø BSP
- C - CH return 22mmØ copper
- D - Oil supply pipe (10mmØ) - not supplied
- E - Oil pipe isolating valve
- F - Flexible oil pipe
- G - Condensate outlet (21.5mmØ) - supplied
- H - Flue manifold condensate outlet
- J - Condensate pipe - not supplied
- K - Condensate trap with wall clamp - supplied

WATER CONNECTIONS:

- ▶ Remove the transit bungs from the pipework connections on the boiler.
- Note: that surplus water may be present due to factory testing.*
- ▶ Ensure all pipework is clean
- ▶ Align water pipework and connect
- ▶ Check that all unused sockets have been plugged.

OIL SUPPLY CONNECTIONS:

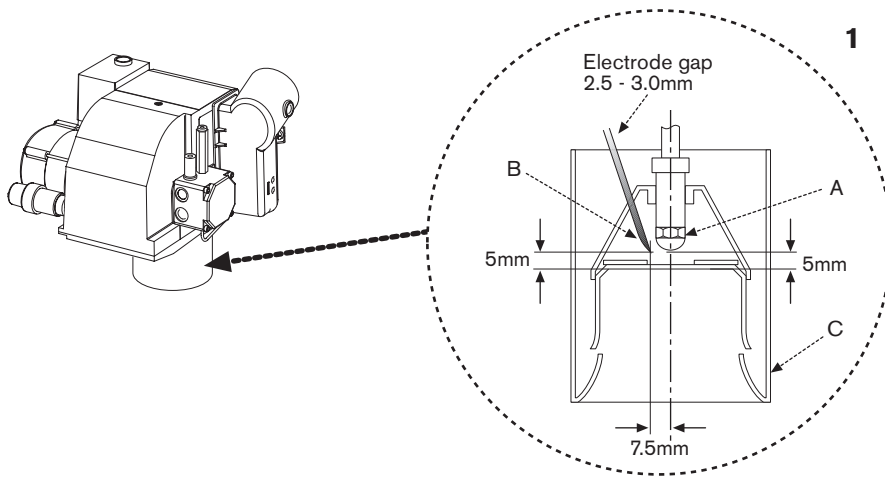
- ▶ Route the oil supply pipe (D) along either side of the boiler as required and connect to the isolating valve (E), ensure the valve is closed
- ▶ Connect the flexible oil pipe (F) to the isolating valve (E).

CONDENSATE CONNECTION:

- ▶ Measure condensate pipe (G), mark and cut square to length required
- ▶ Fit sealing washer to condensate waste pipe (G) and connect to the flue manifold outlet (H)
- ▶ Connect 21.5mm polypropylene pipe (J) (not supplied) to the condensate waste pipe (G) and condensate trap (K) before terminating to waste
- ▶ Secure the water trap (K) with clamp supplied
- ▶ Ensure that the condensate pipe runs away from the boiler at a constant fall of 50mm (min.) for every metre
- ▶ Seal all condensate pipe joints.
- ▶ **Carefully pour 500ml of water into the condensate collection (N) to fill condensate trap**
- ▶ Check the water is running away and the condensate pipework joints are water tight
- ▶ Refit manifold access cover (M) and secure with screws (L).

IMPORTANT:

The condensate trap must be correctly filled to prevent the possibility of potentially harmful flue products escaping via the condensate pipework.



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

- 1 ▶ Check the nozzle (A) and electrode (B) settings are correct for the relevant burner as shown opposite
- ▶ Ensure nozzle (A) is aligned central within the combustion head (C)
- ▶ Inspect for any visible defects

OIL PUMP:

Connecting the oil pump for a single pipe system:

- 1 ▶ Remove oil pump inlet plug (1)
- ▶ Connect the flexible oil pipe inlet hose to the pump inlet and tighten to secure.

Connecting the oil pump for a double pipe system:

- 1 ▶ Remove oil pump inlet plug (1)
- ▶ Connect the flexible oil pipe inlet hose to the pump inlet and tighten to secure

a) DANFOSS BFP 11 L3:

- ▶ Remove pump front cover (A) ensuring a suitable receptacle is used to catch any oil residue

- ▶ Remove changeover screw (B)

- ▶ Remove horseshoe washer (C)

- ▶ Refit changeover screw (B)

- ▶ Reposition front cover (A) and secure

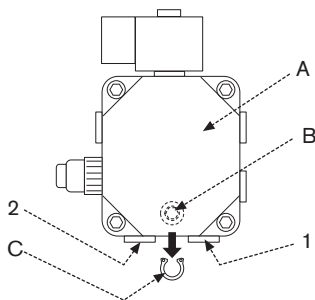
- ▶ Remove oil pump return plug (2)

b) SUNTEC AS47C:

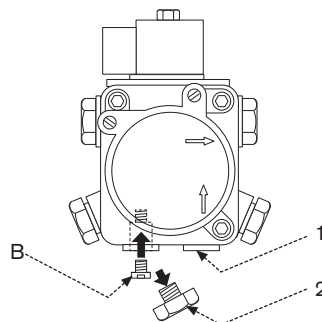
- ▶ Remove return port plug (2) and insert grub screw (B)

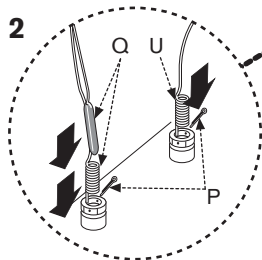
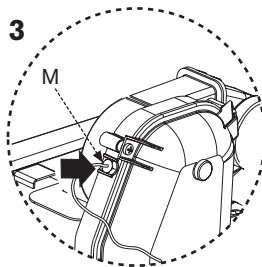
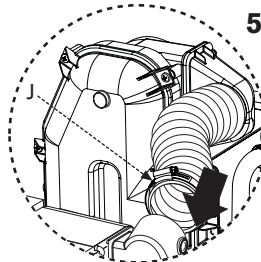
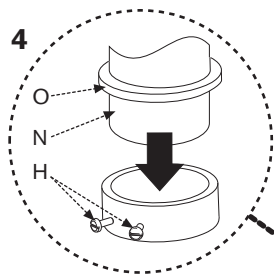
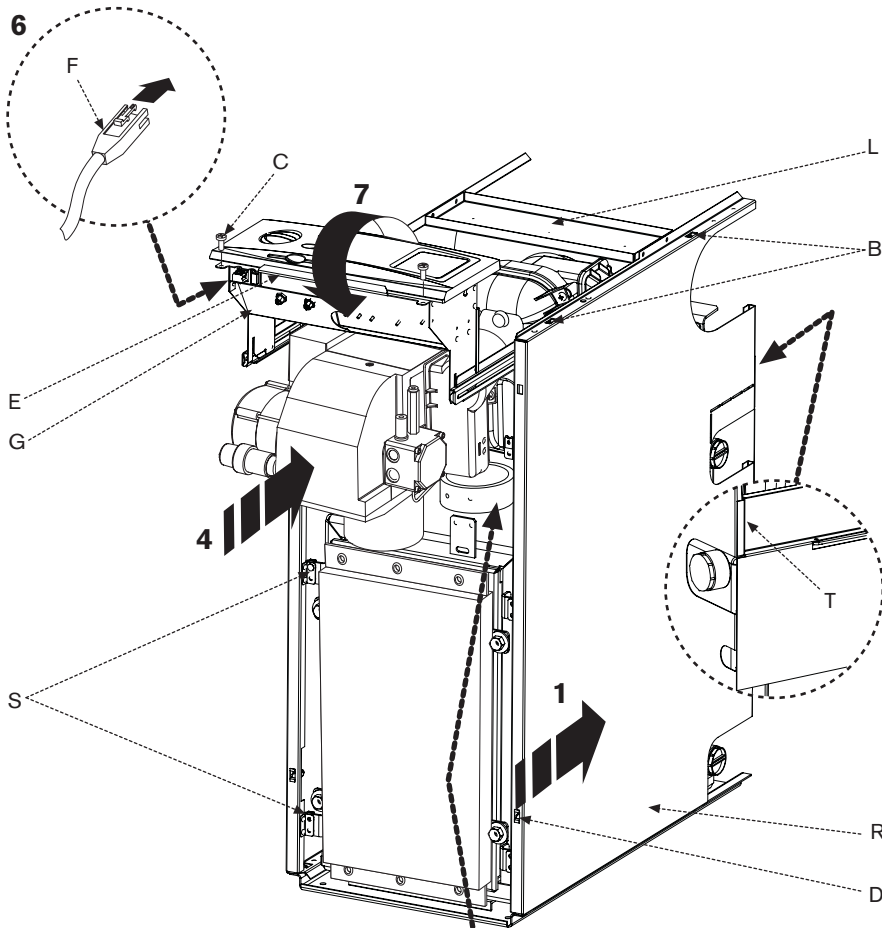
- 2 ▶ Connect the flexible oil pipe return hose to the pump return and tighten to secure.

a) DANFOSS BFP 11 L3 OIL PUMP



b) SUNTEC AS47C OIL PUMP





REFIT COMPONENTS

- 1 ▶ Slide side panels (R) and top support bracket (L) together with control box (G) along base rails and push to secure into the retaining lugs on the baseplate and align with the lugs on the rear support panel (T)
 - ▶ Release control box (G) if secured
 - 2 ▶ Carefully replace the CH control and high limit manual reset thermostats (Q) into the front thermostat pocket and the auto reset overheat thermostat (U) into the rear thermostat pocket
 - ▶ Refit split pins (P) to secure
 - 3 ▶ Carefully replace the flue thermostat (M) into the flue hood and refit split pin to secure
 - 4 ▶ Align burner blast tube (N) into boiler housing tube with gasket (O) correctly fitted
 - ▶ Push firmly down to compress the gasket (O)
 - ▶ Tighten burner retainers (H) sufficiently to ensure a good seal
- IMPORTANT:**
 Ensure the gasket is a good seal between the burner blast tube and the boiler housing to prevent flue gases escaping from the combustion chamber into the room.
- 5 ▶ Attach air duct pipe and tighten clip (J) to secure to the burner air intake
 - 6 ▶ Plug burner lead (F) into control box (G)
 - 7 ▶ Pivot control box (G) and slide into boiler casing.

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

Access to 230v connections:

- 1 Release screws (B) and remove cover panel (C) from control box (A)
- 2 ▶ Release screw (D) from cable clamp (E)
 - ▶ Pull inner clamp part (F) outwards
 - ▶ Feed sufficient power cable (G) through the cable clamp (E) and secure grip with screw (D)
 - ▶ Separate wires from cable end and strip to 6mm

230v connections:

- 3 ▶ Connect **LIVE** wire (Brown or Red) to terminal (L)
- ▶ Connect **NEUTRAL** wire (Blue or Black) to terminal (N)
- ▶ Connect **EARTH** wire (Green/Yellow) to the terminal (⏏)

Route the power cable to the connection point avoiding any potentially hot surfaces with sufficient cable to move the control box into the service position. Open the control box into the service position to check the cable length and routing.

Any external device connected to the boiler must take its power supply from the boiler only and must NOT have a separate supply. See the following pages of electrical diagrams for details of different systems.

External 230v programmer:

- 4 ▶ Remove link (K)
- ▶ Connect wires as shown

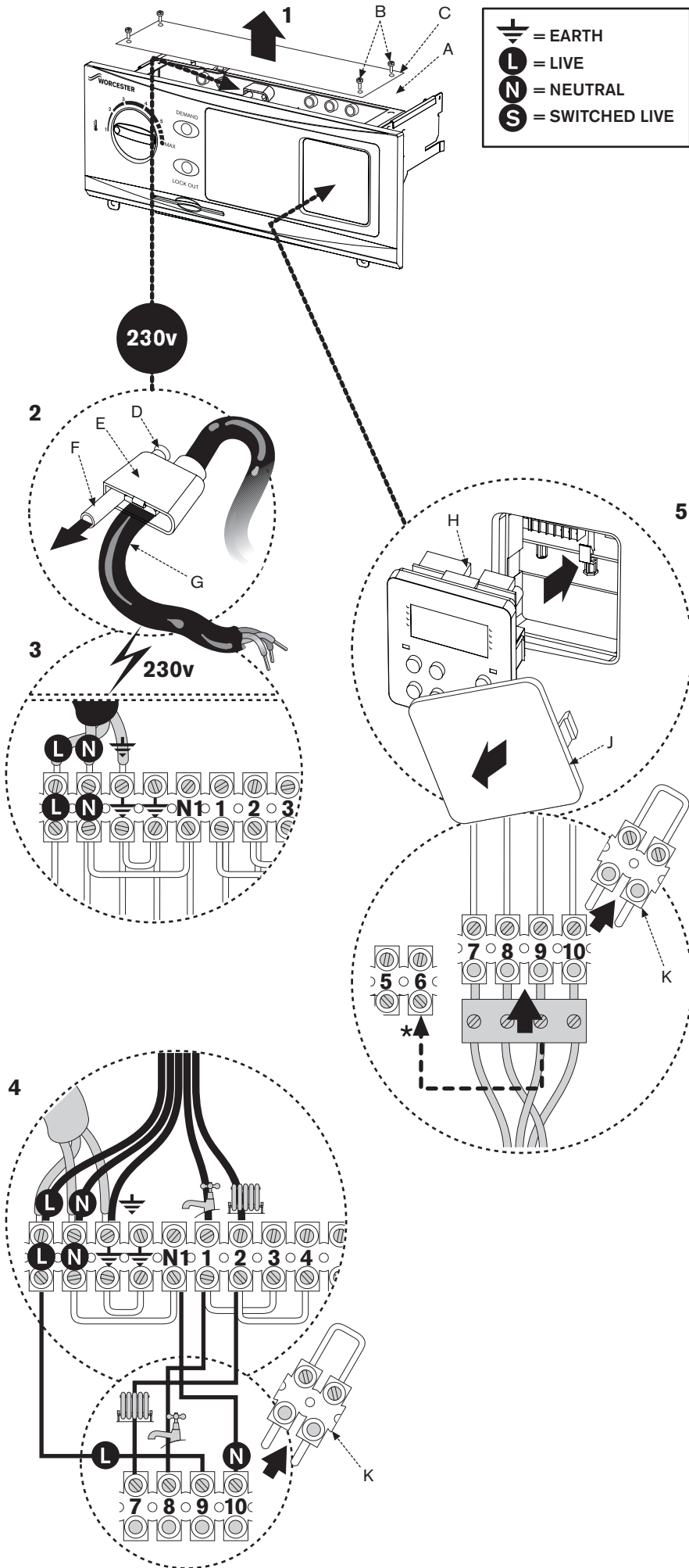
Optional Worcester 230v programmer:

- 5 ▶ Remove blanking plate (J)
- ▶ Set the pin on the rear of the programmer to 'pumped'
- ▶ Remove link (K)
- ▶ Clip programmer (H) into position and plug into the terminal as shown

**Note; for 3 port valve systems only, move the orange wire from terminal 9 to terminal 6.*

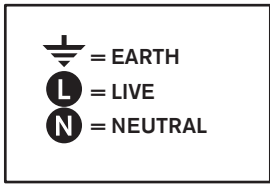
Refit electric control panel cover:

- ▶ Refit cover panel (C) to control box (A) and secure with screws (B)



INSTALLATION

ELECTRICS

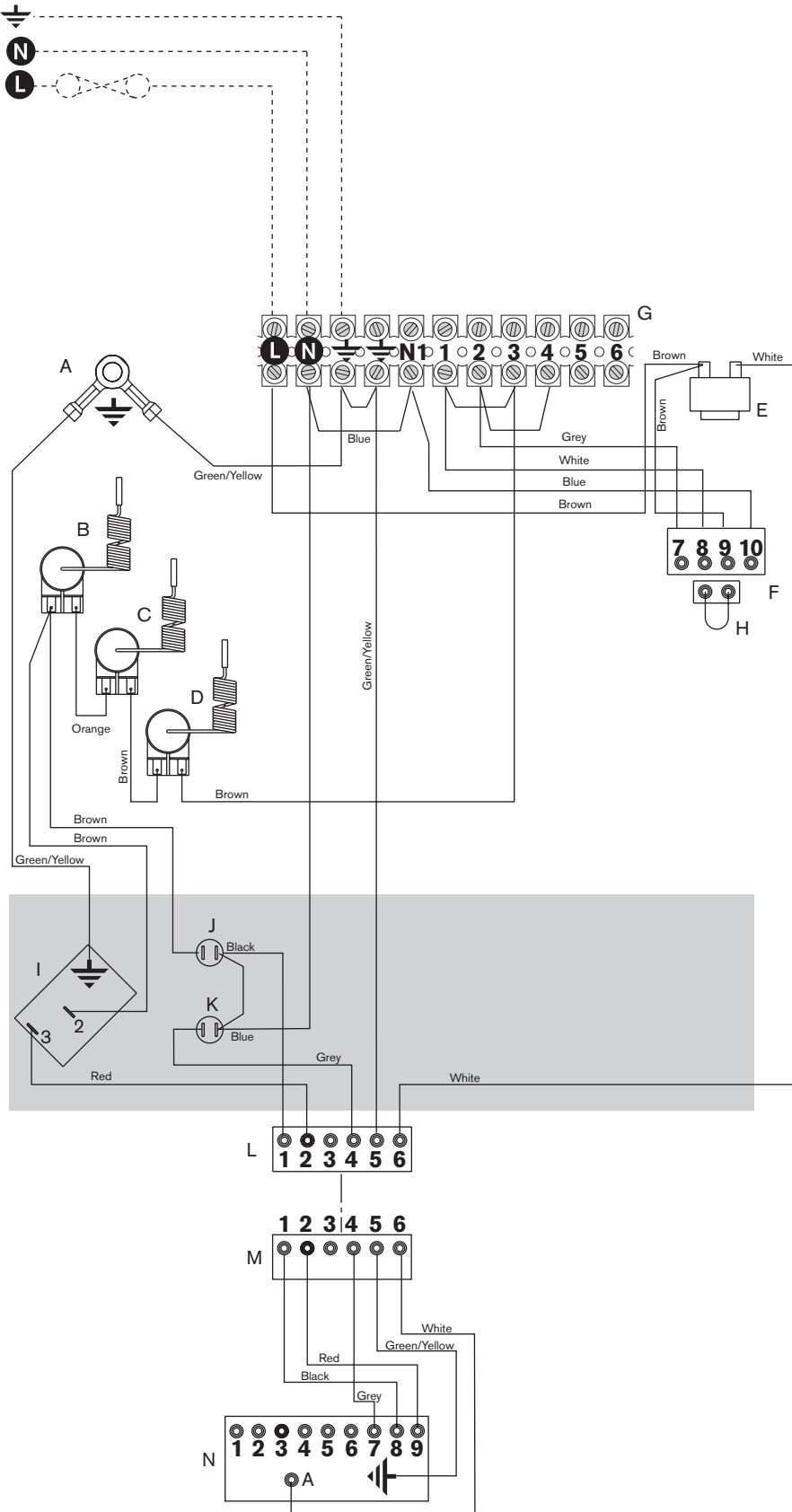


230v STANDARD WIRING DIAGRAM:

Key to components:

- A - EARTH STUD
- B - HIGH LIMIT THERMOSTAT
- C - BOILER MANUAL RESET THERMOSTAT
- D - FLUE MANUAL RESET THERMOSTAT
- E - LOCKOUT RESET SWITCH
- F - INTERNAL PROGRAMMER CONNECTOR
- G - TERMINAL CONNECTOR BLOCK
- H - LINK CONNECTOR
- I - CH CONTROL THERMOSTAT
- J - DEMAND NEON
- K - LOCKOUT NEON
- L - BURNER CONTROL SOCKET
- M - BURNER CONTROL PLUG-IN CONNECTOR
- N - BURNER CONTROL BOX

INSTALLATION



PRE-WIRED REMOTE 2 OR 3 PORT VALVE CONTROL SET USING INTERNAL PROGRAMMER:

Key to components:

- O - REMOTE JUNCTION BOX (10-way) to connect the following:
 - ▶ Mains wiring 230V 50Hz
 - ▶ Hot water tank thermostat
 - ▶ Room thermostat
 - ▶ System water valves
 - ▶ Circulating pump
- P - 230v WORCESTER PROGRAMMER (fitted into fascia panel)
- F - INTERNAL PROGRAMMER CONNECTOR
- G - TERMINAL CONNECTOR BLOCK
- H - LINK CONNECTOR

Remote (10 way) junction box (O) requirements:

- ▶ the junction box (O) must be a terminal block type, current rated to at least 5 amps
- ▶ a 5 amp fuse must be fitted to the mains supply
- ▶ the junction box (O) must be fitted externally to the boiler
- ▶ link 1 to 3 must be removed from the boiler terminal connector block (G)

A frost thermostat can also be connected to the remote junction box if required.

Programmer (P) requirements:

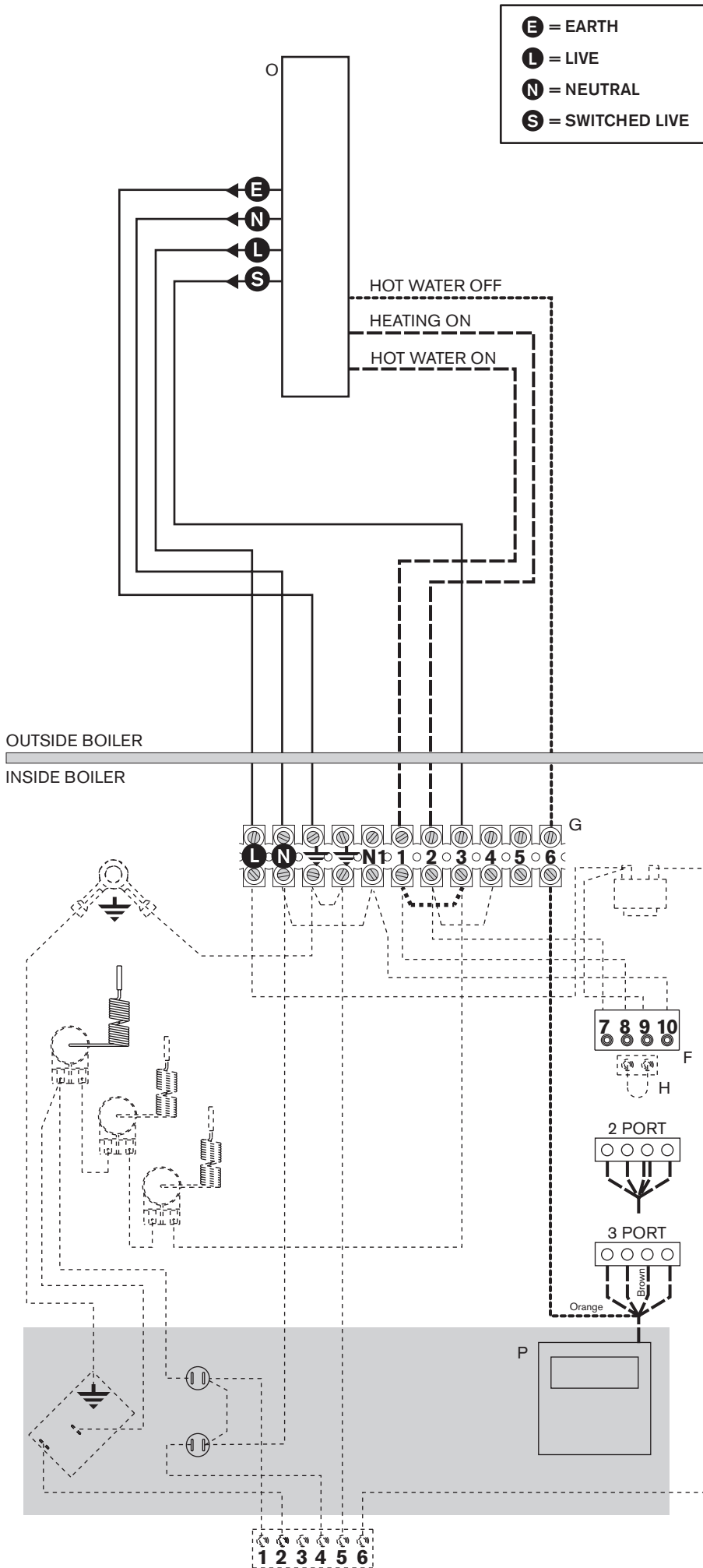
2 and 3 port valve control sets:

- ▶ set the pin on the rear of the programmer to 'pumped'
- ▶ remove the link plug (H)
- ▶ connect the plug from programmer (P) into connector (F)
- ▶ connect terminal 1 from the boiler terminal block (G) to the 'HOT WATER ON' at the remote junction box (O)
- ▶ connect terminal 2 from the boiler terminal block (G) to the 'HEATING ON' at the remote junction box (O)

3 port valve control set only:

A 3 port valve control set also requires a live feed from 'HOT WATER OFF' switch position:

- ▶ remove the orange wire from terminal 9 and pull back through the tie wraps. (Ensure that the brown wire is firmly secured in terminal 9)
- ▶ connect the orange wire to terminal 6 on the boiler terminal block (G)
- ▶ connect terminal 6 on the boiler terminal block (G) to the 'HOT WATER OFF' connection at the remote junction box (O).



INSTALLATION

ELECTRICS

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

PRE-WIRED REMOTE 2 OR 3 PORT VALVE CONTROL SET USING REMOTE PROGRAMMER:

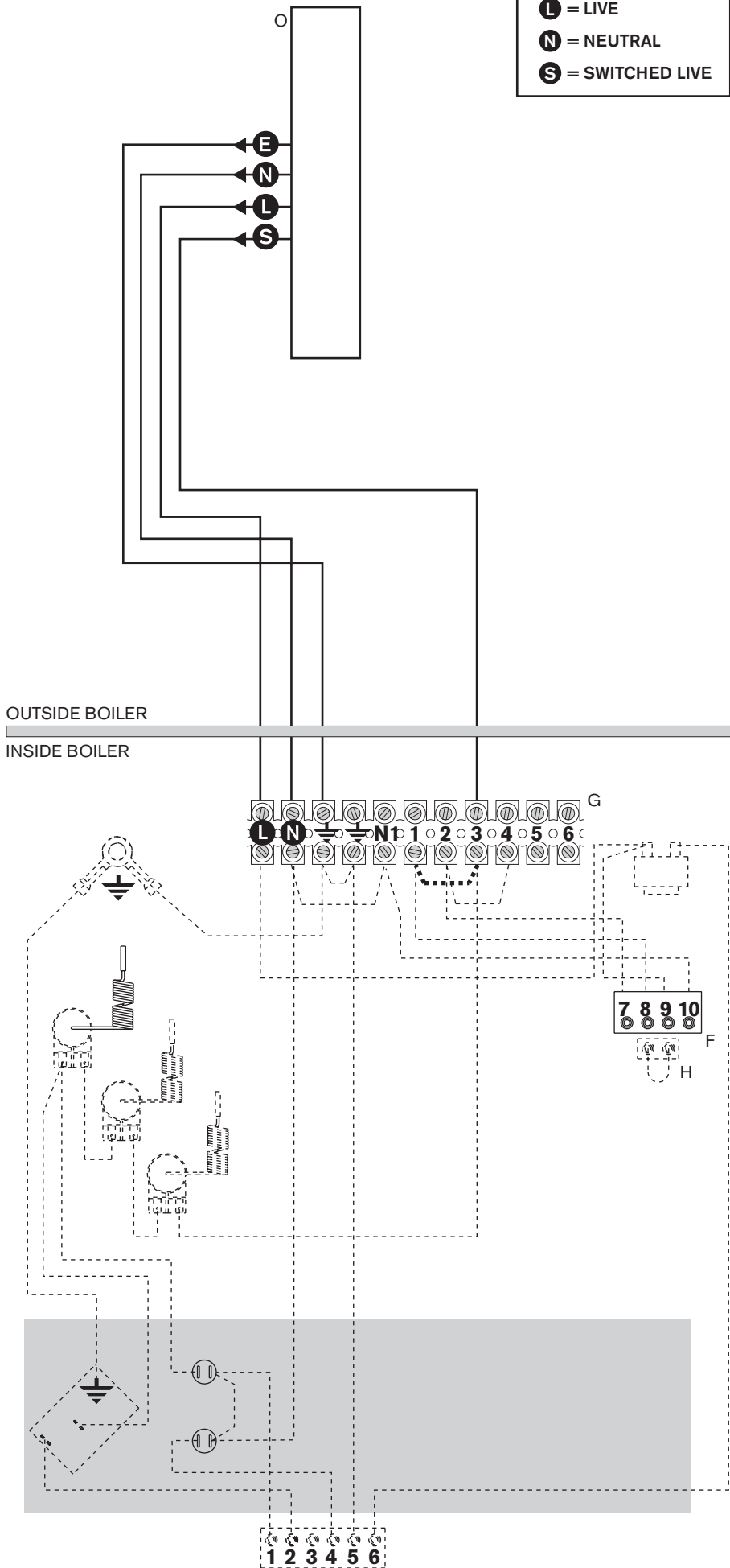
Key to components:

- O - REMOTE JUNCTION BOX (10-way) to connect the following:
 - ▶ Mains wiring 230V 50Hz
 - ▶ Hot water tank thermostat
 - ▶ Room thermostat
 - ▶ System water valves
 - ▶ Circulating pump
 - ▶ External programmer
- F - INTERNAL PROGRAMMER CONNECTOR
- G - TERMINAL CONNECTOR BLOCK
- H - LINK CONNECTOR

Remote (10 way) junction box (O) requirements:

- ▶ the junction box (O) must be a terminal block type, current rated to at least 5 amps
- ▶ a 5 amp fuse must be fitted to the mains supply
- ▶ the junction box (O) must be fitted externally to the boiler
- ▶ link 1 to 3 must be removed from the boiler terminal connector block (G)

A frost thermostat can also be connected to the remote junction box if required.



ELECTRICS

2 PORT VALVE CONTROL SET:

Key to components:

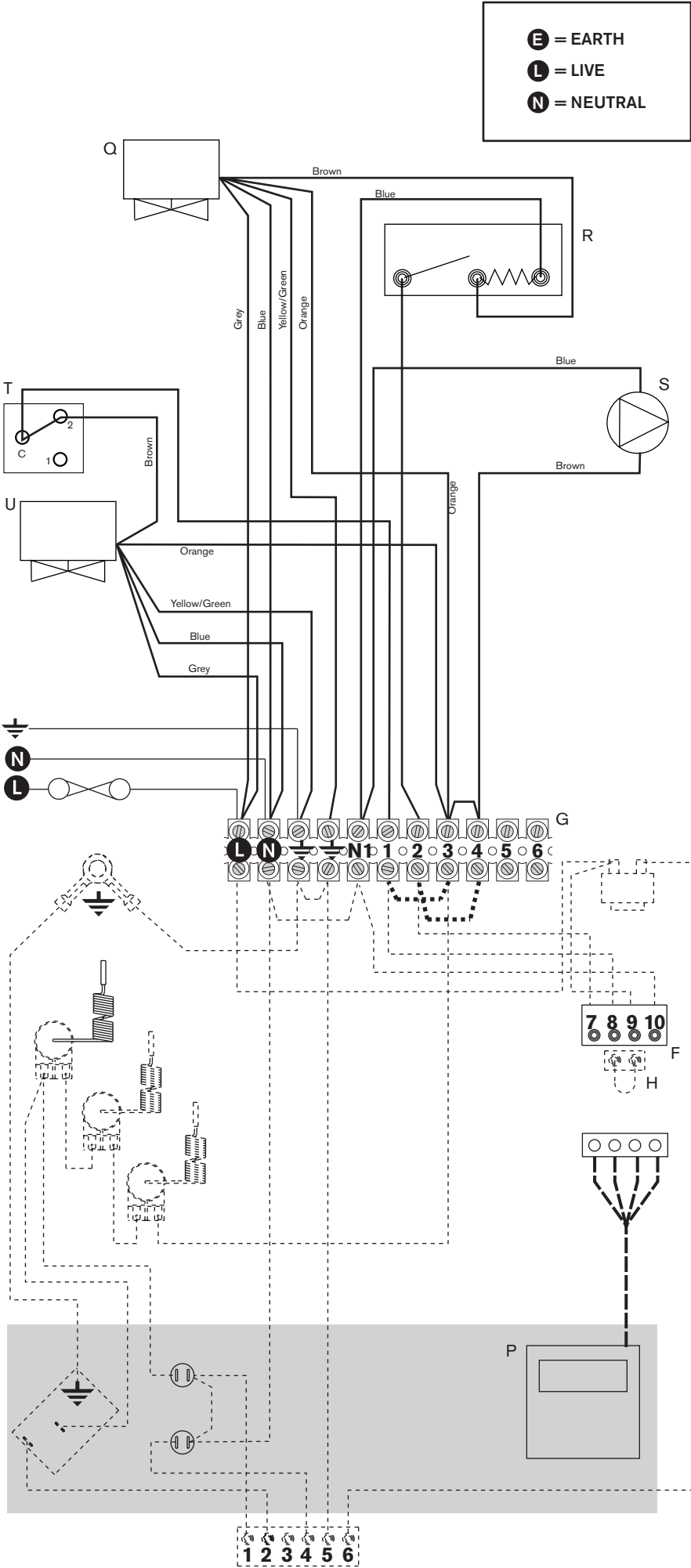
- Q- CH ZONE VALVE
- R - ROOM THERMOSTAT
- S - CIRCULATING PUMP
- F - INTERNAL PROGRAMMER CONNECTOR
- G- TERMINAL CONNECTOR BLOCK
- H - LINK CONNECTOR
- T - HOT WATER CYLINDER THERMOSTAT
- U - HOT WATER VALVE
- P - OPTIONAL 230v WORCESTER PROGRAMMER (fitted into fascia panel)

Terminal connector block (G):

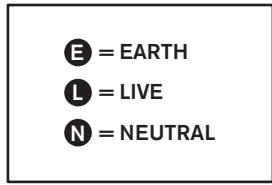
- ▶ remove link 1 to 3
- ▶ remove link 2 to 4
- ▶ make link 3 to 4

Optional 230v programmer (P) requirements:

- ▶ set the pin on the rear of the programmer (P) to 'pumped'
- ▶ remove the link plug (H)
- ▶ connect the plug from programmer (P) into connector (F).



INSTALLATION



ELECTRICS

3 PORT VALVE CONTROL SET:

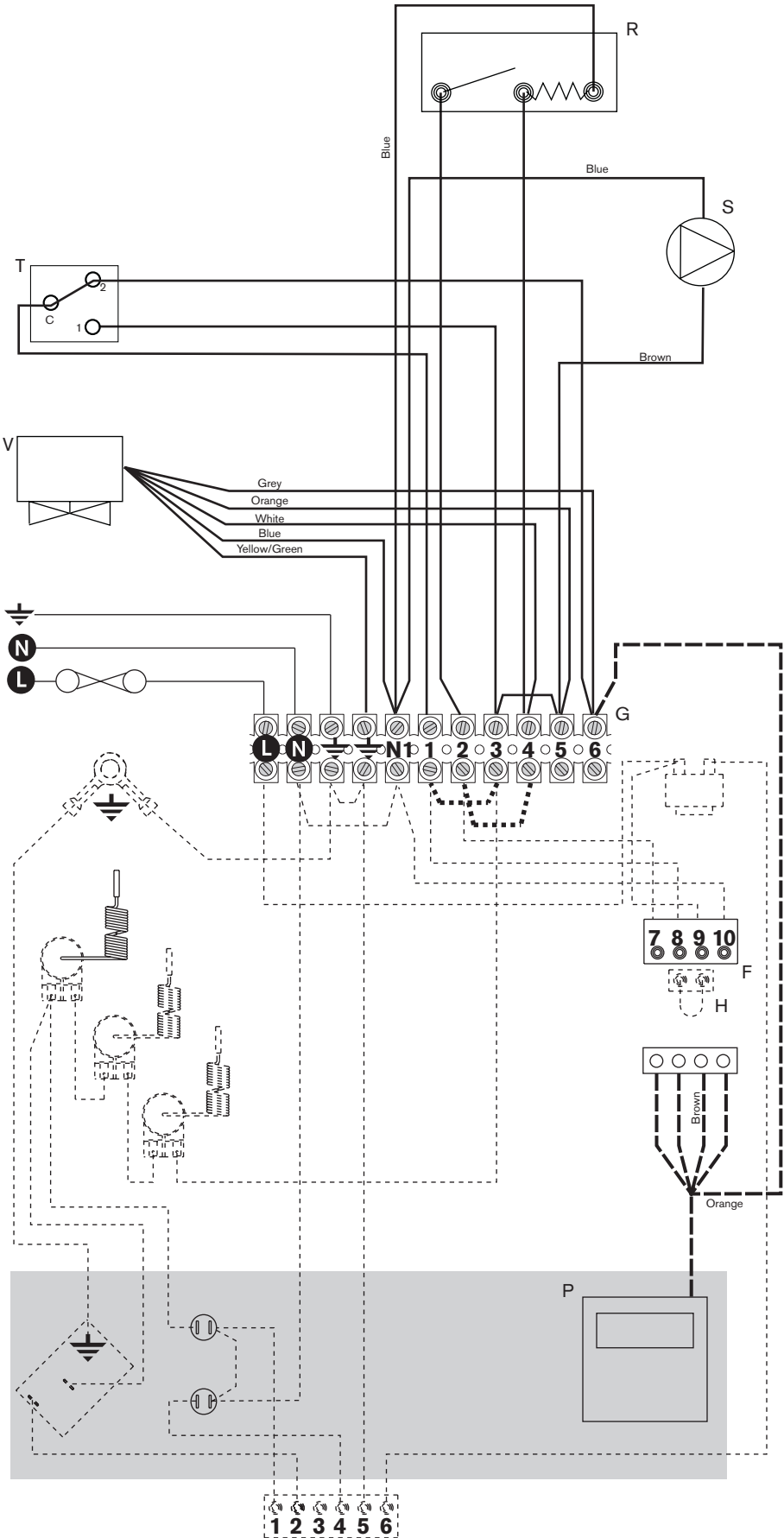
- Key to components:**
- R - ROOM THERMOSTAT
 - S - CIRCULATING PUMP
 - F - INTERNAL PROGRAMMER CONNECTOR
 - G - TERMINAL CONNECTOR BLOCK
 - H - LINK CONNECTOR
 - T - HOT WATER CYLINDER THERMOSTAT
 - V - MID-POSITION VALVE
 - P - OPTIONAL 230v WORCESTER PROGRAMMER (fitted into fascia panel)

Terminal connector block (G):

- ▶ remove link 1 to 3
- ▶ remove link 2 to 4
- ▶ make link 3 to 5

Optional 230v programmer (P) requirements:

- ▶ set the pin on the rear of the programmer (P) to 'pumped'
- ▶ remove the link plug (H)
- ▶ connect the plug from programmer (P) into connector (F)
- ▶ move the 'Orange' wire from terminal 9 to terminal 6.

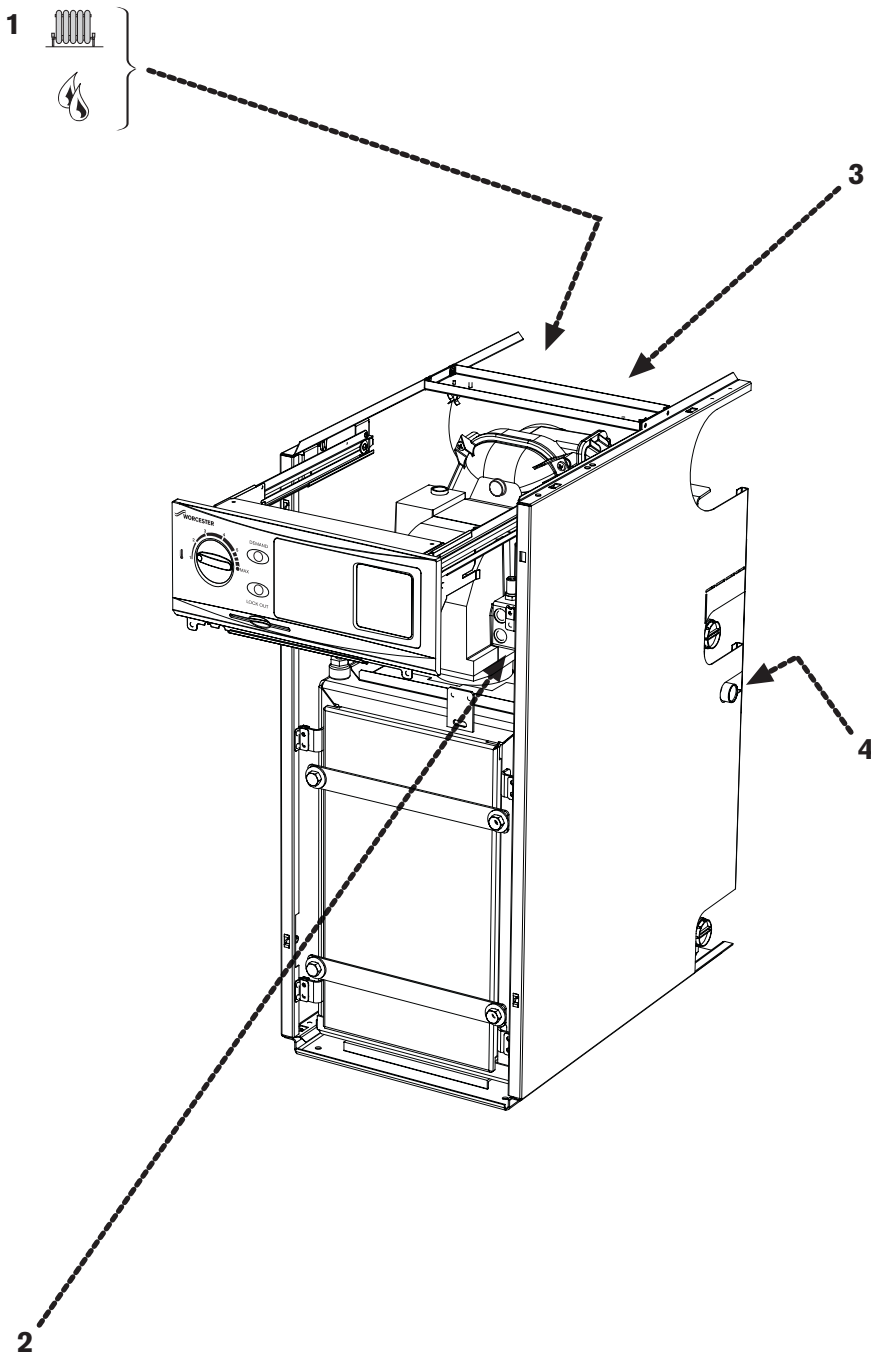


PRE-COMMISSIONING CHECKS

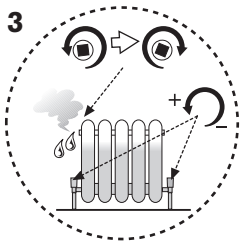
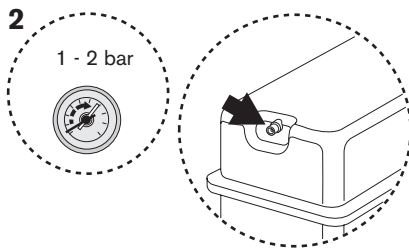
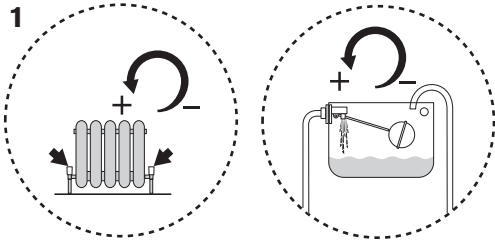
CAUTION: ISOLATE THE MAINS SUPPLIES BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS.

- 1 ▶ Check that the service and water pipes are connected correctly
▶ Check that all unused sockets are plugged
- 2 ▶ Check that the oil supply is 28 sec Kerosene and that the pipework is connected correctly to the oil pump
▶ Turn on the main oil supply valve at the tank and check the oil supply 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
▶ Check the condensate trap is filled with water.

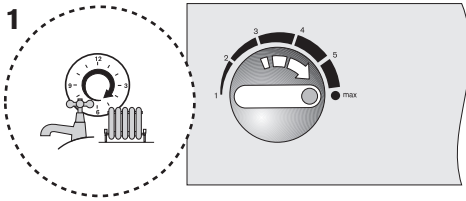
IMPORTANT: If the boiler is not to be commissioned immediately then:
after successfully completing all of the checks and any rectification work, close the water valves, shut off the oil supply and electrically isolate the boiler.
Complete the 'Installation' part of the Guarantee Registration Card.



FILLING THE SYSTEM



- 1 ▶ Open all system and radiator valves
▶ Turn on the water main stop cock
▶ Open vented systems only; turn on the water to the system header tank and allow the system to fill
- 2 ▶ Sealed systems only;
▶ Fill the system to between 1 and 2 bar pressure via a WRAS approved filling link
▶ Check the expansion vessel pressure and adjust if necessary using the Schrader type valve
- 3 ▶ Vent all radiators, retighten when completed
▶ Check the system and rectify any leaks



IMPORTANT: Never run the appliance when the appliance/system is unpressurised (sealed systems) or empty.

- 1 ▶ Check the oil supply is correctly fitted and in good working order before turning on the oil supply valves to the boiler.
 - ▶ Turn on the main oil supply valve at the tank and draw off at least 2½ litres of oil until a steady flow of clear uncontaminated oil can be seen as follows:

• **Single pipe gravity feed systems:**

- ▶ Disconnect the flexible oil pipe and open the isolating valve to discharge the oil into a suitable container.
- ▶ When completed, close the isolating valve, reconnect the flexible oil pipe.

• **Double pipe sub-gravity feed systems and single pipe suction lift with de-aerator:**

Air will be automatically vented when the boiler is started up.

- ▶ Prime the oil supply pipework to prevent oil pump damage on single pipe systems with de-aerator using long oil pipe runs.
- ▶ To prime a de-aerator, disconnect the flexible oil inlet hose (nearest to the de-aerator) and place in a container of the same oil fuel. Place an empty container to collect oil from the oil inlet pipe connection of the de-aerator. Prime the de-aerator and reconnect the flexible oil inlet hose.

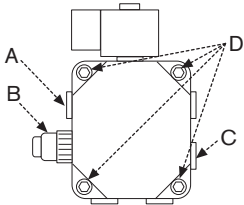
- ▶ Open the isolating valve and the oil pump bleed valve (A) to discharge into a suitable container once the boiler is started up.

- ▶ Switch on the electricity supply to the boiler
- ▶ Set the programmer to ON for CH and DHW
- ▶ Turn on the boiler CH control thermostat
- ▶ Allow the burner to run through to 'lock-out' indicated by the illumination of the lockout indicator (E)
- ▶ Wait 2 minutes then press the lockout reset button (F)
- ▶ Repeat the procedure at least 3 times or until a steady stream of oil, without air, runs from the bleed port, then relock bleed port (A)
- ▶ Switch off the boiler
- ▶ Remove the oil pump filter, clean with kerosene and refit

The internal filter is accessed by removing the oil pump cover on the Danfoss BFP 11 L3 and Suntec AS47C

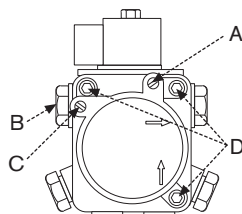
- ▶ Safely dispose of the container/discharge.

**DANFOSS
BFP 11 L3 OIL PUMP**

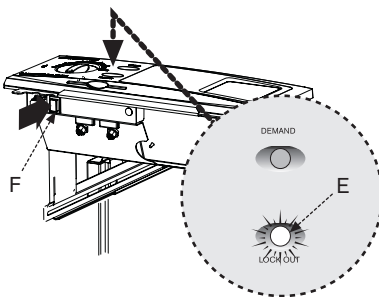


- A - Bleed & pressure gauge port
- B - Pressure adjustment
- C - Vacuum gauge port
- D - Retaining screws - cover

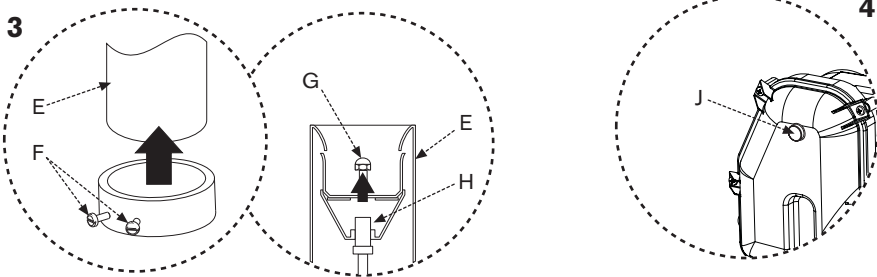
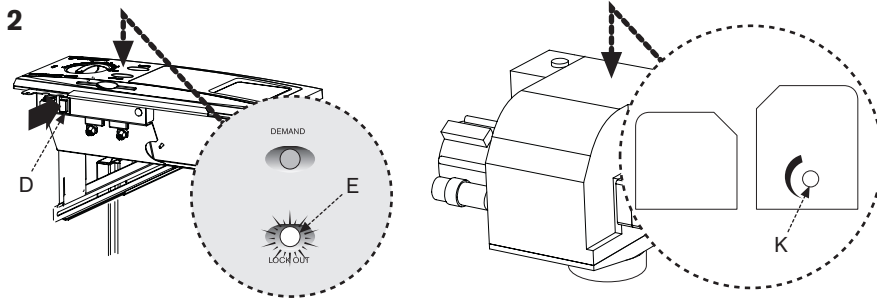
**SUNTEC
AS47C OIL PUMP**



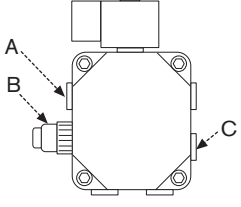
BURNER LOCKOUT:



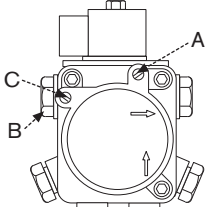
COMMISSIONING



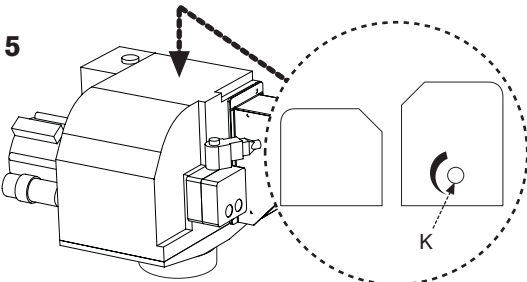
**DANFOSS
BFP 11 L3 OIL PUMP**



**SUNTEC
AS47C OIL PUMP**



- A - Bleed & pressure gauge port
- B - Pressure adjustment
- C - Vacuum gauge port



**NOMINAL BOILER RATING AT NORMAL OPERATING TEMPERATURE
USING 28sec KEROSENE:**

NOZZLE	OIL PUMP PRESSURE (p.s.i.)	FUEL FLOW RATE		APPROX. FLUE GAS TEMP °C	%CO ₂	APPROX. AIR SETTING	APPLIANCE			
		Kg/h	l/h				INPUT		OUTPUT	
							kW	Btu/hr	kW	Btu/hr

Bentone Sterling 50 Burner:

0.50 80°EH	130	1.56	1.98	72	11.5	4.25	18.6	63300	18.0	61400
0.55 80°EH	145	1.86	2.36	79	12.0	6.00	22.2	75100	21.5	73400
0.65 80°EH	150	2.17	2.75	82	12.5	8.00	25.8	87900	25.0	85300

STARTING THE APPLIANCE

- 2 ▶ Fit a suitable pressure gauge to port (A) on the oil pump
- ▶ Remove plastic cover from the burner casing
- ▶ Adjust the air shutter (K) and pump pressure (B) as shown in the table opposite. The burner should ignite following a pre-ignition period of approx. 15 seconds.

Boiler lockout indicator on:

If the boiler fails to establish a normal firing pattern or flame failure occurs the flame monitoring photocell mounted in the burner body will alert the burner control box to shut the burner down and provide a safe lockout state indicated by the illumination of the lockout indicator (E).

- ▶ Wait 2 minutes then press the lockout reset button (D) to initiate another start sequence
- ▶ Repeat procedure until a flame is established.

- 3 ▶ Start and run for 3 minutes then switch off
- ▶ Check for after-spurting from the nozzle, indicated by oil saturation on the blast tube (E)

If after-spurting occurs:

- ▶ release the burner retainers (F)
- ▶ remove the burner, hold vertical to unscrew the nozzle (G) and fill the nozzle holder (H) with oil
- ▶ refit nozzle (G) and burner
- ▶ restart and run for 3 minute intervals until after-spurting stops.

- 4 ▶ Start and run for 20 minutes
- ▶ Remove sampling point plug (J) to check the smoke reading is between 0-1. If the smoke level is above 1, check the combustion settings are correct and the oil nozzle is in good condition

Note; smoke readings may be inaccurate until the smoke from burning organic binder in the access door insulation has ceased.

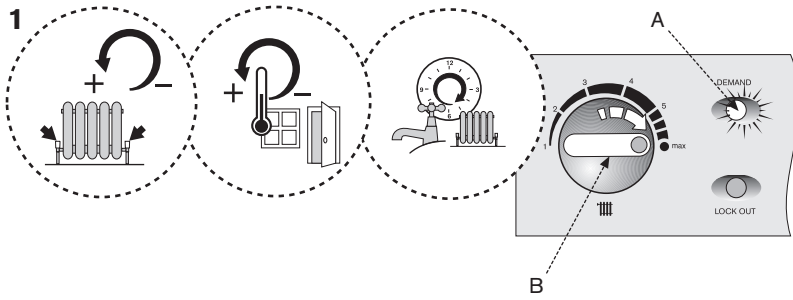
- ▶ Check the CO₂ levels and adjust the air shutter (K) setting according to the table opposite
- ▶ Check the flue gas temperature is close to the values shown in the table

If the flue gas temperature is too high and the baffles are correctly fitted, then reduce the oil pump pressure (B) 5-10p.s.i. to compensate for nozzle variations.

- ▶ Turn off the electrical supply
- ▶ Isolate the oil supply to the burner
- ▶ Remove the oil pressure gauge
- ▶ Refit the blanking plug (A)
- ▶ Check and rectify any oil leaks

- 5 ▶ Switch on the oil supply
- ▶ Switch on the electrical supply
- ▶ Restart the boiler and run for 5 minutes
- ▶ Recheck the CO₂ levels and if required, adjust the air shutter setting (K) according to the table opposite
- ▶ Repeat the fine tuning procedure (5) if required
- ▶ Refit the sampling point plug (J)
- ▶ Refit plastic cover to burner casing.

STARTING THE APPLIANCE

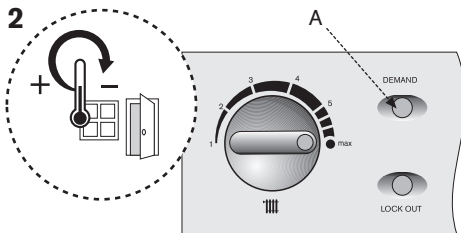


Central heating:

- ▶ Open all radiator valves
- ▶ Set room thermostat to maximum
- ▶ Set programmer to ON for CH & DHW
- ▶ Turn the CH thermostat control (B) to 'max'

The 'demand' indicator (A) should illuminate and the burner should be ON with the circulating pump.

- ▶ Ensure all radiators are heating up evenly and balance the system to the temperature difference required for the heating flow and return according to the heating load.



- ▶ Set the room thermostat to minimum

The 'demand' indicator light (A), burner and circulating pump should be off.

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 vented systems only: turn off the water to the system header tank
 - ▶ Open all radiator valves/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):

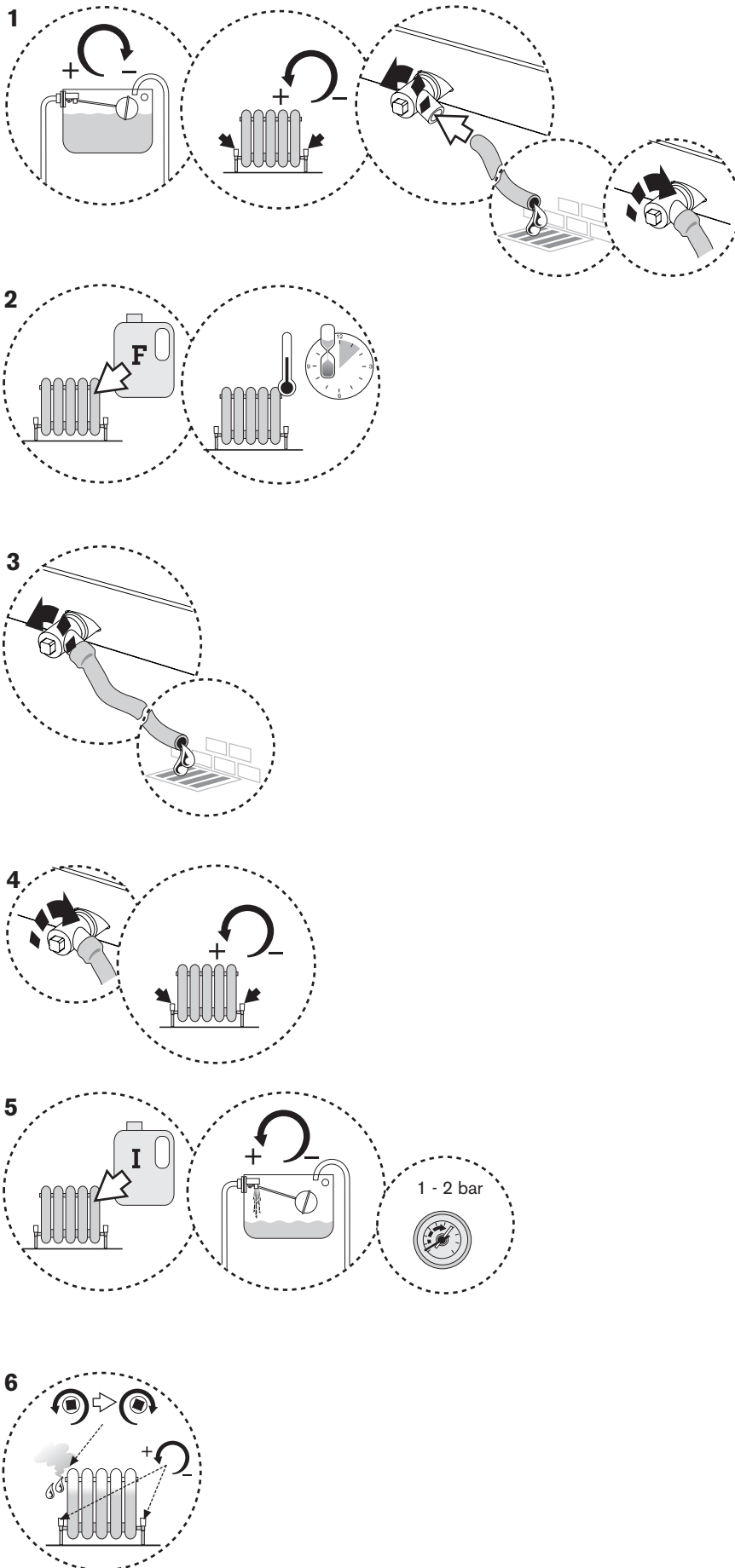
- 4 ▶ Check drain cocks are closed and all radiator valves are open
- 5 ▶ Add a suitable inhibitor (I), (or combined inhibitor/anti-freeze if the system is exposed to freezing conditions) to the heating system in accordance with the manufacturers instructions.

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.

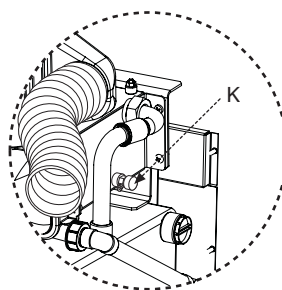
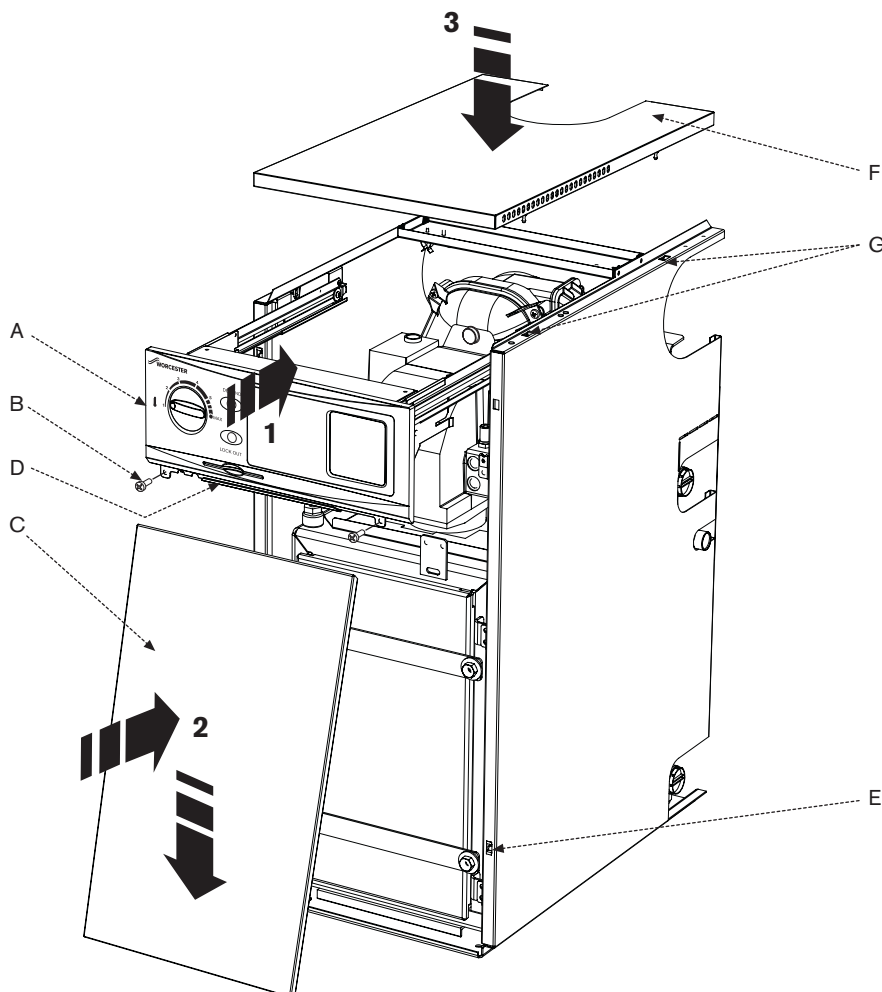
 - ▶ Open vented systems only: turn on the water to the system header tank and allow the system to fill
 - ▶ Sealed systems only: fill the system to between 1 and 2 bar via a WRAS approved filling loop
- 6 ▶ Vent the boiler and all radiators; retighten vents when complete
- 7 ▶ Record the date when the 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.



- 1 ▶ Slide control box (A) into the boiler
▶ Secure with screws (B)
- 2 ▶ Locate top edge of panel (C) onto the top supporting ledge (D) on the boiler
▶ Locate the ball stud connections (E) at the base of the front panel (C) and push towards the boiler to secure
- 3 Locate the top panel (F) onto the ball stud connections (G) and press down to secure.



Handover:

- ▶ Complete the Guarantee Registration Card
- ▶ Set up the controls and show the user how to operate all the controls shown in the User Guide
- ▶ Where applicable, 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.

Note: Release drain point (K) to drain the secondary heat exchanger.



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

Routine servicing:

To assist efficient boiler operation, the following should be carried out at least once a year.

- ▶ Carry out a pre-service check and note any operational faults:

▶ Pre-Service Check:

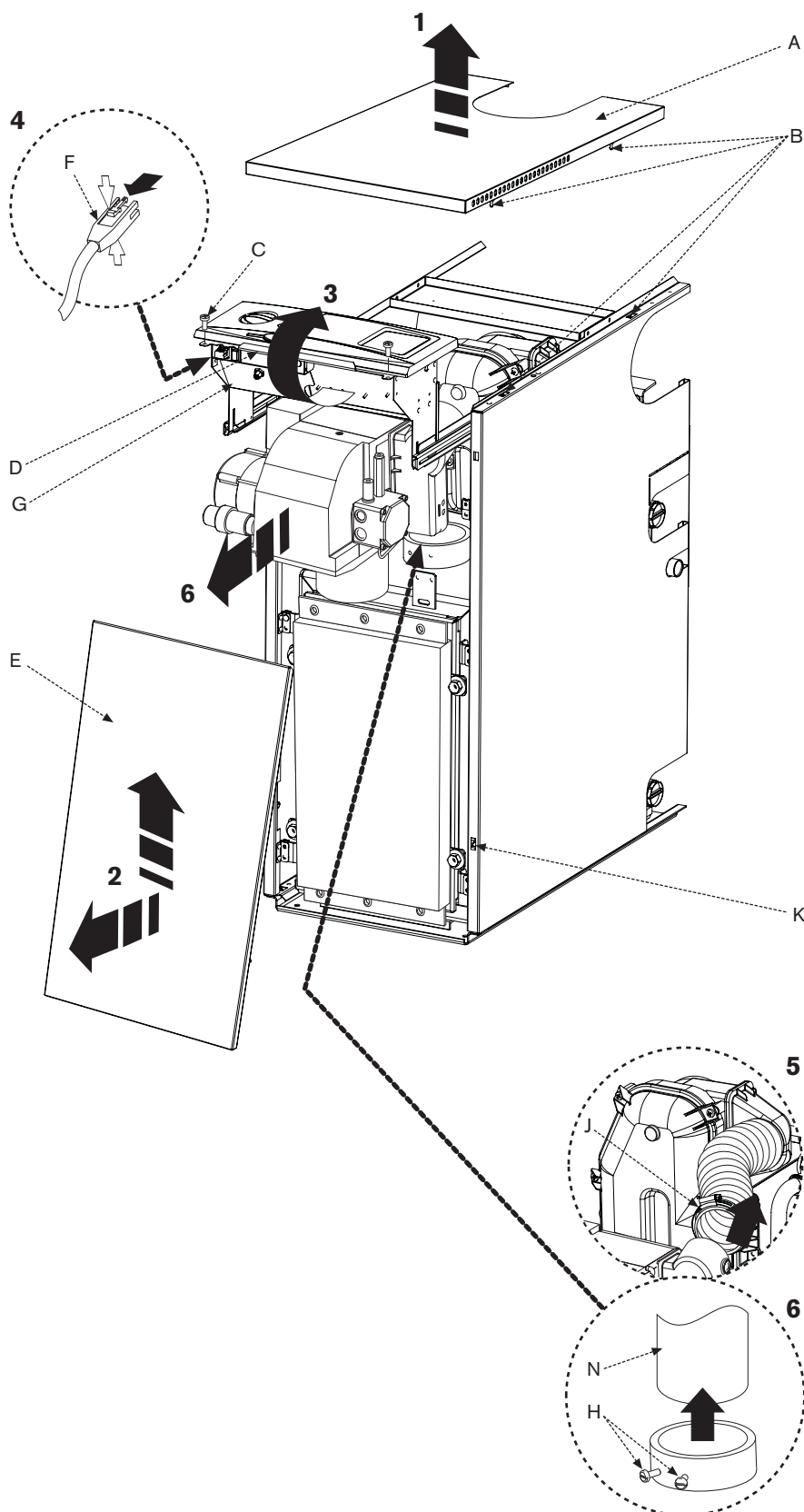
- 1 Lift the top panel (A) upwards to disengage the ball stud connections (B) and remove
- 2 ▶ Pull base of front panel (E) away from the boiler to disengage ball stud connectors (K)
 - ▶ Lift front panel (E) upwards off the supporting ledge (D) and store safely away from the working area
- 3 ▶ Remove securing screws (C) from each side of control box (G)
 - ▶ Slide control box (G) outwards to its full extent
 - ▶ Pivot control box (G) upwards and secure in the service position as shown

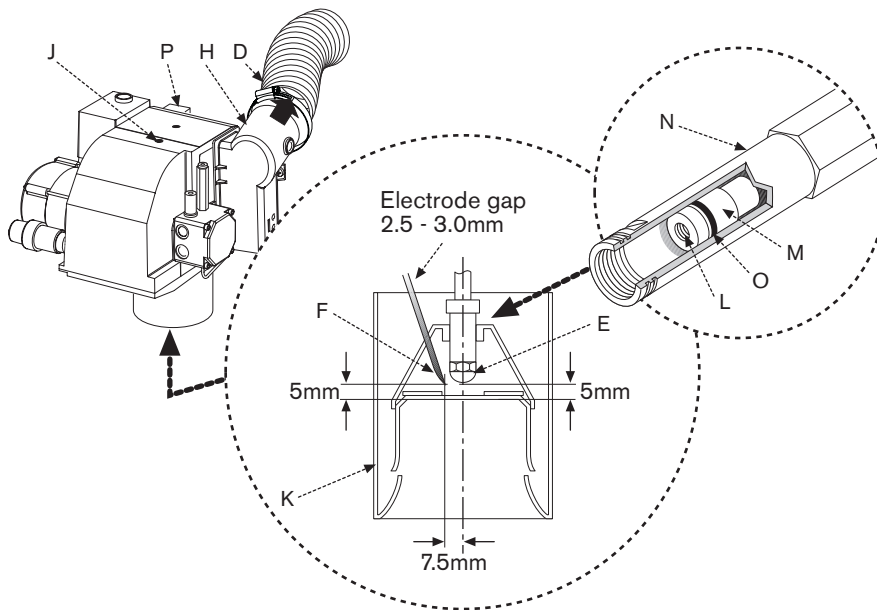
Operate the appliance and system and note any faults which may need to be corrected during the service.

- ▶ Switch off and electrically isolate the boiler.
- 4 Depress locking ears and unplug burner lead (F) from control box (G)
- 5 ▶ RS flue only; loosen clip (J) to detach air duct pipe
- 6 ▶ Unscrew burner retainers (H) to release the burner blast tube (N)
 - ▶ Lift burner away, taking care not to over strain the flexible oil pipe/s or connections.

See the following instructions for detail of some of the service requirements listed below:

- ▶ Check and clean the burner
- ▶ Replace burner nozzle and flexible oil pipe/s
- ▶ Check and clean the baffle retainers
- ▶ Check and clean the baffles
- ▶ Check and clean the heat exchanger surfaces
- ▶ Check the combustion chamber access door insulation board
- ▶ Check that the flue system is unobstructed and clean as necessary
- ▶ Clean or replace all oil filters.





1 Clean the Burner:

- ▶ Remove the air intake cover (H) by removing the M5 screws and clear any debris from the air intake and air damper.
- ▶ Separate the main body of the burner from the burner front by removing the M6 screw (J) using a 4mm allen key
- ▶ Check the condition of the gaskets between these parts and replace if necessary
- ▶ Note the position of the air damper adjustment and check the air damper moves freely
- ▶ Clean both sides of the fan impeller and remove any debris from the burner housing
- ▶ Check that the impeller rotates freely
- ▶ Reassemble the components

2 Inspection of Mechanical Shut-off Valve:

- ▶ Remove the combustion head (K) and thoroughly clean any deposits
- ▶ Remove the nozzle (E)
- ▶ Fasten an M5 screw, with a minimum length of 30mm, into the threaded hole (L) and pull the screw to withdraw the check valve (M)
- ▶ Check that the nozzle holder (N) is clear of any debris and clean if necessary
- ▶ Check that the three holes in the check valve (M) are clear of any debris. Check the condition of the 'O' ring (O). Discard the check valve if the holes cannot be cleared, if the unit is defective or if the 'O' ring is damaged and replace with a new one
- ▶ Refit the check valve
- ▶ Fit a new oil atomising nozzle (E) - **DO NOT dismantle the nozzle and DO NOT clean the nozzle tip**
- ▶ Check the electrodes (F) and reset if necessary as shown opposite
- ▶ Refit the combustion head. Check that the nozzle (E) lies central to the combustion head and the head settings are as shown
- ▶ Withdraw the photocell (P) from its housing and clean
- ▶ Remove the oil pump internal filter, clean in kerosene and reassemble

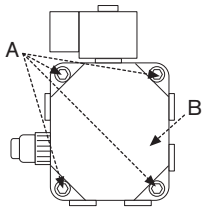
The internal filter is accessed by removing screws (A) and the oil pump cover (B) on the Danfoss BFP 11 L3 and Suntec AS47C

- ▶ **Replace the standard flexible oil line/s at every annual service to prevent the possibility of leakage due to ageing.**

- ▶ Reassemble the burner components
- ▶ Check the sponge O-ring seal located around the combustion head and replace if necessary.

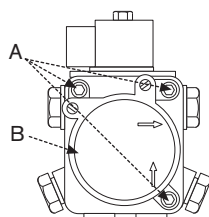
This seal must be in good condition since failure will cause flue gases to escape into the room.

**DANFOSS
BFP 11 L3 OIL PUMP**

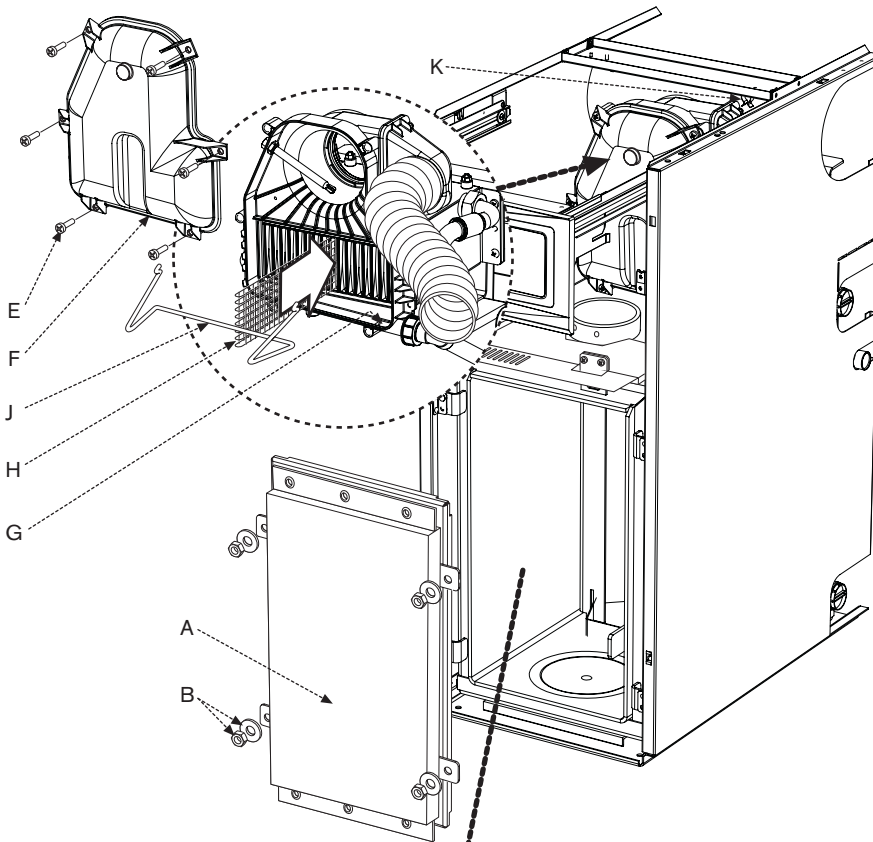


- A - Retaining screws - cover
- B - Cover - oil pump

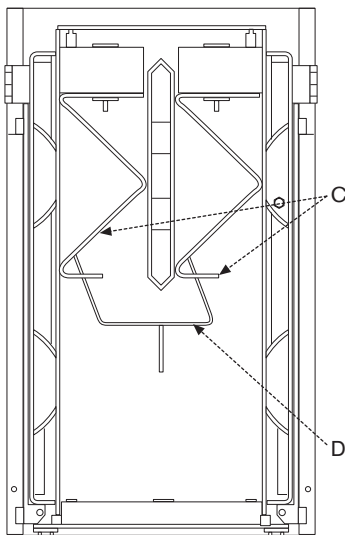
**SUNTEC
AS47C OIL PUMP**



INSPECTION AND SERVICE



Plan sectional view
18/25kW



External oil filter:

- ▶ Remove the paper element from the external oil filter and replace it. If the filter contains a washable element, thoroughly clean in kerosene and reassemble into the filter.

Clean the boiler:

Manifold access:

- ▶ Release screws (E) to remove the flue manifold access cover (F) and clear any debris
- ▶ Check the condensate route (G) is clear and clean the condensate trap and pipework
- ▶ Check and clean the flue system if necessary
- ▶ Remove the baffle retainer (J) and baffles (H) from the secondary heat exchanger
- ▶ Check and clean the secondary heat exchanger surfaces
- ▶ Clean the secondary heat exchanger baffles (H) if necessary and refit correctly
- ▶ Refill the condensate trap by pouring 500ml of water into the drain (G)
- ▶ Refit the baffle retainer (J)
- ▶ Check the seal on the manifold access cover (F) and replace if necessary
- ▶ Replace the flue manifold access cover (F) and secure with screws (E).

Combustion chamber:

- ▶ Release the M10 retaining nuts and washers (B) and remove combustion chamber access door (A)
- ▶ Check the fibreglass rope seal on the combustion chamber access door (A) and replace if necessary
- ▶ Remove and check the baffle retainer (D)
- ▶ Remove the baffles (C), clean and check the condition of the baffles and the acoustic insulation. Replace any baffles or insulation pads considered to be badly corroded/degraded.
- ▶ Thoroughly clean all of the heat exchanger surfaces using a suitable brush and clear all loose debris from the combustion chamber
- ▶ Check the condition of the combustion chamber access door insulation; if the insulation is damaged the door assembly must be replaced
- ▶ Refit the items in reverse order, ensure the baffles (C) and baffle retainer (D) are correctly fitted as shown in the plan view opposite
- ▶ Refit combustion chamber access door (A)
- ▶ Secure with nuts and washers (B) and tighten until the door is firmly secured.

Fire valve:

- ▶ Check that the oil supply pipe has a fire valve fitted externally to the building with a fire detection element located within the appliance case. A fire valve clip (K) is provided for this purpose.

Re-commission the burner:

- 1 ▶ Align burner blast tube (N) into the boiler housing tube with the gasket (O) correctly fitted
 - ▶ Push firmly down to compress the gasket (O)
 - ▶ Tighten burner retainers (H) sufficiently to ensure a good seal
 - ▶ Refit flexible air hose and secure with clip (J)

IMPORTANT:

Ensure the gasket is a good seal between the burner blast tube and the boiler housing to prevent flue gases escaping from the combustion chamber into the room.

- 2 ▶ Plug burner lead (F) into control box (G)

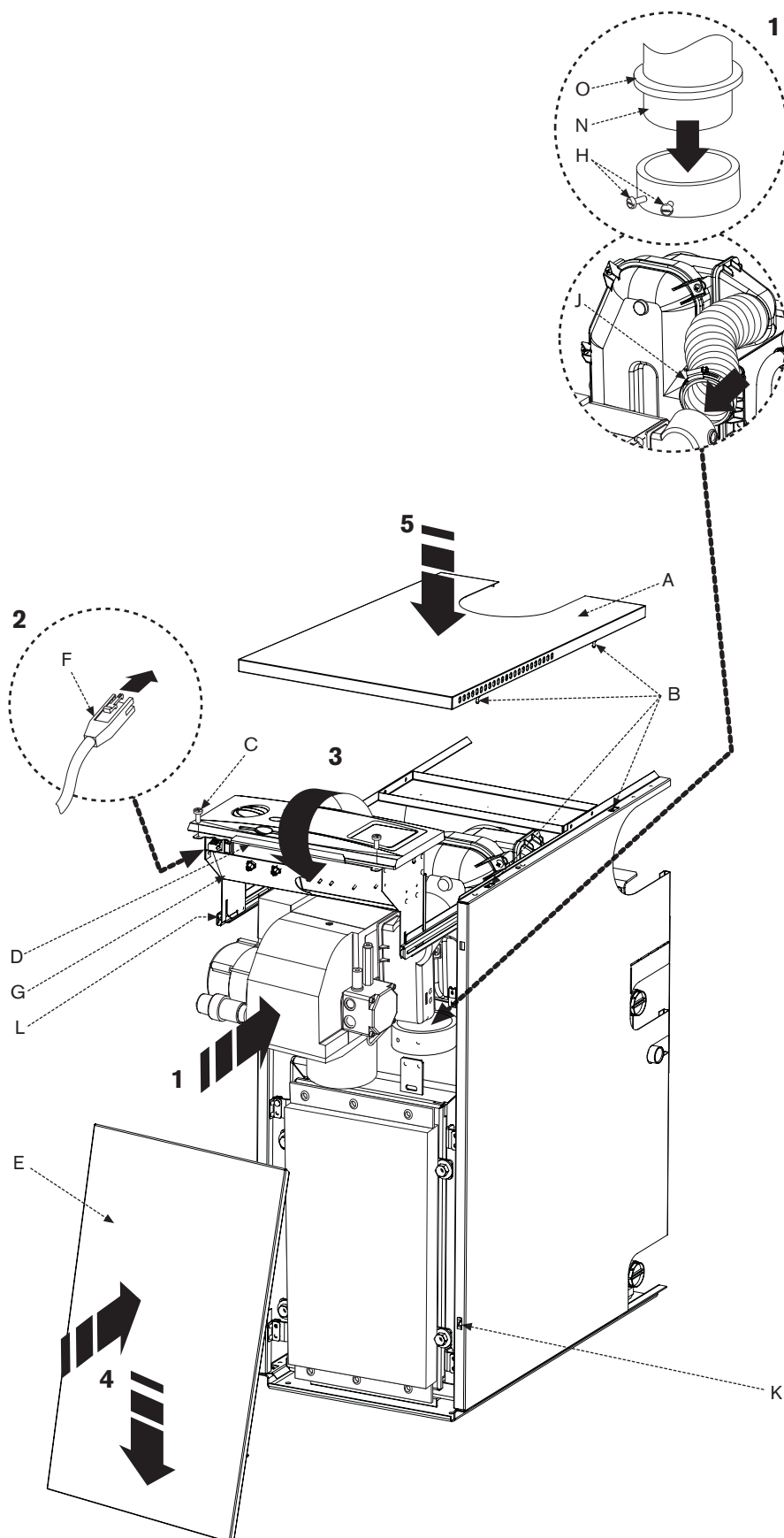
Re-commission the burner as described in 'STARTING THE APPLIANCE' under the Commissioning section.

Refit panels:

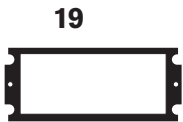
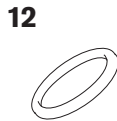
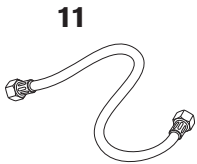
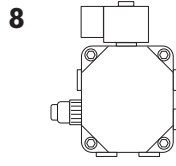
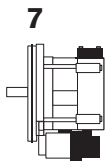
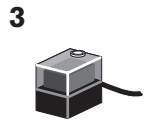
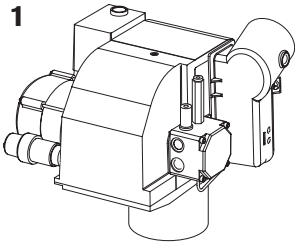
- 3 ▶ Unlock support (L) to pivot control box (G) and slide into the boiler
 - ▶ Secure with screws (C)
- 4 ▶ Locate top edge of panel (E) onto the top supporting ledge (D) on the boiler
 - ▶ Locate the ball stud connections (K) at the base of the front panel (E) and push towards the boiler to secure
- 5 Locate the top panel (A) onto the ball stud connections (B) and press down to secure.

After service handover:

- ▶ Make a note of the date of any water treatment
- ▶ Set the controls back to the users requirements
- ▶ If the appliance is unused and exposed to freezing conditions; shut off all the mains supplies, isolate the boiler and drain the system and boiler, including the secondary heat exchanger.



SHORT PARTS LIST



1 Burner - Sterling 50

Part Number: 8-716-108-571-0

2 Combustion head - burner

Part Number: 8-716-108-573-0

3 Control box Satronic DKO 970

Part Number: 8-716-142-396-0

4 Photocell Satronic MZ770s

Part Number: 8-716-156-692-0

5 Control box base Satronic S98 12 pole

Part Number: 8-716-142-782-0

6 Ignition electrode

Part Number: 8-716-156-683-0

7 Motor

Part Number: 8-716-156-645-0

8 Oil pump - Danfoss BFP 11 L3

Part Number: 8-716-142-736-0

9 Transformer (Excludes cable)

Part Number: 8-716-156-696-0

10 Mechanical shut-off valve

Part Number: 8-716-156-658-0

11 Flexible oil line kit

Part Number: 8-716-106-346-0

12 Burner 'O' ring gasket

Part Number: 8-716-140-902-0

13 Heating control thermostat

Part Number: 8-716-107-621-0

14 Auto reset High Limit thermostat

Part Number: 8-716-107-623-0

15 Manual reset High Limit thermostat

Part Number: 8-716-107-625-0

16 Manual reset flue thermostat

Part Number: 8716-107-624-0

17 Cleaning brush

Part Number: 8-716-109-478-0

18 Manifold access cover seal

Part Number: 8-716-107-536-0

19 Secondary Heat Exchanger gasket

Part Number: 8-716-108-103-0

PROBLEM	CAUSE	REMEDY
LOCKOUT:		
Pulsation on start	CF - Flue draught incorrect Combustion settings incorrect Faulty nozzle	CF - Check flue draught Set up as in installation instructions Replace nozzle
Intermittent lockout	Bad electrical connection Intermittent flame detection fault Downdraught	Check control box/electrical connections See flame detection fault Extend flue or fit a downdraught cowl
Burner motor fails to operate	Faulty motor or electrical supply to motor Control box fault	Check for 230v at motor plug during startup period Replace control box
Flame detection fault	Photocell filmed over (dirty) Photocell faulty Control box faulty	Clean Replace Replace
Air adjustment fault	Incorrect CO ²	Set up as in installation instructions
No oil from nozzle	No oil at pump Air in pump Nozzle blocked Faulty pump or drive Faulty mechanical shut off valve	Check and refill oil tank Check and clean filters & valves from oil tank to boiler Bleed pump Replace nozzle Replace Clean or replace
Ignition failure	Electrode settings incorrect Faulty ignition transformer Open circuit ignition Faulty control box or electrical connections not properly made	Set up as in installation instructions Replace Check and replace electrodes or high tension leads if necessary Correct electrical control box connections or replace control box
BURNER FAILS TO START	No power to boiler Faulty boiler thermostat Programmer open circuit Faulty control box	Check electrical / control circuit Check by temporarily linking out high limit and control thermostats Check by linking 8 & 9 on the connector Replace
HIGH SMOKE NUMBER	Air/flue intake blocked Incorrect combustion settings Oil pressure incorrect Incorrect components used on combustion head Faulty nozzle	Check & clear air/flue intake Set up as in installation instructions Adjust to correct pressure Check with installation instructions Replace nozzle

FAULT FINDING

BOILER LOCKOUT:

Indicated by the illumination of the 'Lockout' indicator on the fascia.

To reset, wait 2 minutes then press the lockout reset button.

PROBLEM	CAUSE	REMEDY
<p>FAULTY BOILER OPERATION:</p> <p>Noisy operation</p>	<p>Pump noise from air in pump or worn pump</p> <p>Worn motor bearings</p> <p>Fan out of balance</p>	<p>Bleed air from pump or replace pump</p> <p>Replace motor</p> <p>Replace fan</p>
<p>Boiling</p>	<p>Faulty boiler thermostat</p> <p>Short circuit boiler thermostat</p> <p>Thermostat bulb not fully home in pocket</p> <p>No primary water circulation</p>	<p>Replace if necessary</p> <p>Take out of circuit to check</p> <p>Ensure bulb is pushed fully home</p> <p>Check system / circulating pump</p>
<p>Short Cycling</p>	<p>Burner rating incorrect</p> <p>Boiler thermostat differential incorrect</p> <p>External controls not operating correctly</p>	<p>Correct burner rating</p> <p>Replace boiler thermostat</p> <p>Check and correct external controls</p>
<p>OIL SMELLS</p>	<p>Blocked flue, fumes on startup</p> <p>Oil soaked boiler, faulty burner operation, numerous lockouts</p> <p>Odour in boiler room, oil leaks from pipework, flexible hoses connections</p>	<p>CF - Check flue with gauge and seal/gaskets</p> <p>RS - Check seal / gaskets</p> <p>Rectify burner operation and lockouts</p> <p>Rectify oil leaks, replace components if necessary</p>

INSTRUCTION MANUAL INSTALLATION COMMISSIONING & SERVICING

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

The logo for Worcester Bosch Group, featuring a stylized wave icon to the left of the word "WORCESTER" in a bold, sans-serif font, with "Bosch Group" in a smaller font below it.

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