

INSTRUCTION MANUAL

INSTALLATION, COMMISSIONING & SERVICING

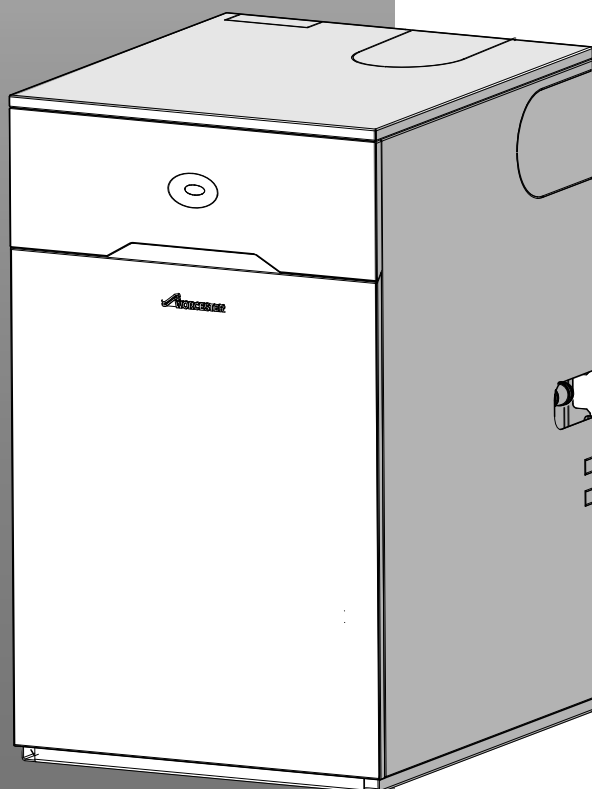
FLOOR STANDING OIL FIRED CONDENSING COMBINATION BOILER

CONVENTIONAL FLUE & ROOM SEALED FLUE

GREENSTAR HEATSLAVE II

12/18, 18/25 & 25/32

FOR SEALED CENTRAL HEATING SYSTEMS WITH MAINS FED DOMESTIC
HOT WATER



THE APPLIANCE IS FOR USE WITH KEROSENE
(28 SECOND OIL) ONLY

UK

 **WORCESTER**
Bosch Group

INSTALLATION & SERVICING INSTRUCTIONS

SYMBOLS USED IN THIS MANUAL:



Domestic hot water



Central heating



Room thermostat



Frost thermostat



Wait time period



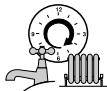
Programmer/timer OFF



Programmer ON CH only



Programmer ON DHW only



Programmer ON CH and DHW



Cold water main supply



Electricity supply

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.

PLEASE READ THESE INSTRUCTIONS CAREFULLY BEFORE STARTING INSTALLATION.

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

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

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

COMPLYING WITH THE BUILDING REGULATIONS:

This heating appliance forms part of the controlled services for the building. It is law that all controlled services for buildings must comply with building regulations. You must be able to satisfy your Local Authority Building Control Body (LABC) that the work carried out concerning the installation and commissioning of this heating appliance has been carried out to a satisfactory standard.

OFTEC operate a competent persons scheme and registered installers are able to certify that their work complies with building regulations. Under the scheme;

- OFTEC must be informed about every installation.
- OFTEC will issue a building regulations compliance certificate to the householder and will notify the LABC.

OFTEC provide controlled document forms CD10 and CD11 for use during installation and commissioning respectively.

Other organisations operate self-certification schemes e.g. NAPIT and BESCA Ltd. and it may be possible for installers who are members of these organisations to self certify their work.

Alternatively you must submit a building control notice to the LABC before installing any boiler. The LABC will then arrange regular inspection visits during the work to ensure that the installation complies with the regulations.

IF YOU ARE IN **ANY DOUBT** CONTACT THE WORCESTER TECHNICAL HELPLINE ON:
0844 892 3366.

DISTANCE LEARNING AND TRAINING COURSES ARE AVAILABLE FROM WORCESTER.

PLEASE LEAVE THESE INSTRUCTIONS WITH THE COMPLETED COMMISSIONING FORM AND THE USER MANUAL WITH THE OWNER OR WITH THE APPLIANCE AFTER INSTALLATION OR SERVICING. THE SERVICE INTERVAL RECORD CAN BE FOUND ON THE BACK PAGE OF THIS MANUAL.

ABBREVIATIONS USED IN THIS MANUAL:

Ø	Diameter
CH	Central Heating
DHW	Domestic Hot Water
DCW	Domestic Cold Water
TRV	Thermostatic Radiator Valve
IP	Ingress Protection
CF	Conventional flue
BF	Balanced flue
N/A	Not allowed
SEDBUK	Seasonal Efficiency of Domestic Boilers in the United Kingdom
OFTEC	Oil Firing Technical Association for the Petroleum Industry
IEE	Institute of Electrical Engineers
LABC	Local Authority Building Control Body

STORE THE APPLIANCE IN A DRY AREA PRIOR TO INSTALLATION.

WATER TREATMENT:

FERNOX	01799 550811 fernox.com
SENTINEL	0800 389 4670 sentinel-solutions.net

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SAFETY &
REGULATIONS

APPLIANCE
INFORMATION

PRE -
INSTALLATION

INSTALLATION

COMMISSIONING

SERVICING
& SPARES

FAULT FINDING
& DIAGNOSIS

SAFETY PRECAUTIONS

OIL FUMES OR LEAKS FROM THE APPLIANCE:

- ✓ Extinguish any naked flames.
- ✓ Open windows and doors.
- ✓ Isolate the electrical supply.
- ✓ Isolate the fuel supply to the boiler.
- ✓ Rectify fault.

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.

IMPORTANT:

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

INSTALLATION REGULATIONS

Failure to install appliances correctly could lead to prosecution.

The appliance must 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, in 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 1254-2: Copper and copper alloys plumbing fittings part 2: Fittings with compression ends for use with copper tubes.

BS 7671: IEE Wiring Regulations, current edition.

BS 1362: Specification for general purpose fuse links for domestic and similar purposes.

The Building Regulations Part G, Part J and L1 England and Wales; Part F, Part G 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.

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

Installations in Eire (Republic of Ireland)

The Installation must be performed by a competent and suitably trained person in accordance with the following Eire regulations.

Current Building Regulations - Republic of Ireland

ETCI rules for electrical installation

For further guidance see:

OFTEC Technical book three -

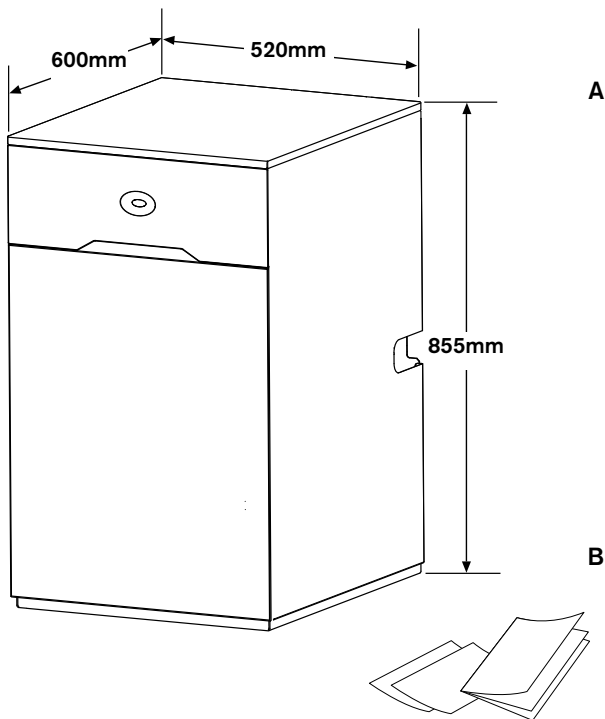
Regional requirements: Republic of Ireland

GENERAL INFORMATION

STANDARD PACKAGE:

A - Floor standing oil fired condensing combination boiler for sealed domestic central system heating and mains fed domestic hot water.

B - Literature pack.



APPLIANCE
INFORMATION

Check List

Item	Qty
Greenstar Heatslave II Installation/Serviceing	
Instructions.....	1
Users Instructions	1
Hardware Pack.....	1

TECHNICAL DATA

DESCRIPTION	UNITS	12/18	18/25	25/32
Central Heating				
Primary water capacity (total)	litres	62	63	64
Available pump head (20°C difference) at max. output	metres water	4.7	4.0	4.2
Max. permissible system operating pressure in accordance with WRAS guidelines	bar	2.5	2.5	2.5
Flow restrictor	colour	Lime	Beige	Grey
Domestic Hot Water				
Maximum flow rate (±15%)	litres/min	15	18	22
Minimum inlet pressure (dynamic) for maximum flow rate	bar	1.5	1.2	1.6
Maximum hot water temperature rise for 90 litres draw off (@max flow rate)	°C	40	40	40
Flue				
Exit flue gas mass flow	kg/hr	29	40	51
Pipework connections				
Fuel line (compression)	mm	10	10	10
CH flow	mm	22	22	28
CH return	mm	22	22	28
Water main inlet	mm	15	15	15
DHW outlet	mm	22	22	22
CH drain	hose connection			
Condensate (polypropylene)	mm	21.5	21.5	21.5
Electrical				
Electrical power supply voltage	AC...V	230	230	230
Frequency	Hz	50	50	50
Max. power consumption (running)	W	230	230	260
Sensors & Thermostats				
CH control range	°C	50/82	50/82	50/82
Slave tank control range	°C	55/84	55/86	55/88
Boiler manual reset overheat set point	°C	105	105	105
Flue manual reset overheat thermostat set point	°C	110	110	110
Tank manual reset overheat thermostat set point	°C	95	95	95
General Data				
Maximum hearth temperature	°C	<100	<100	<100
SEDBUK 2009	%	89.4	89.2	89.0
Appliance protection rating (with programmer blanking plate fitted)	IP	20	20	20
Appliance protection rating (with fascia programmer fitted)	IP	20	20	20
Weight (excluding packaging)	kg	124	126	128

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

A

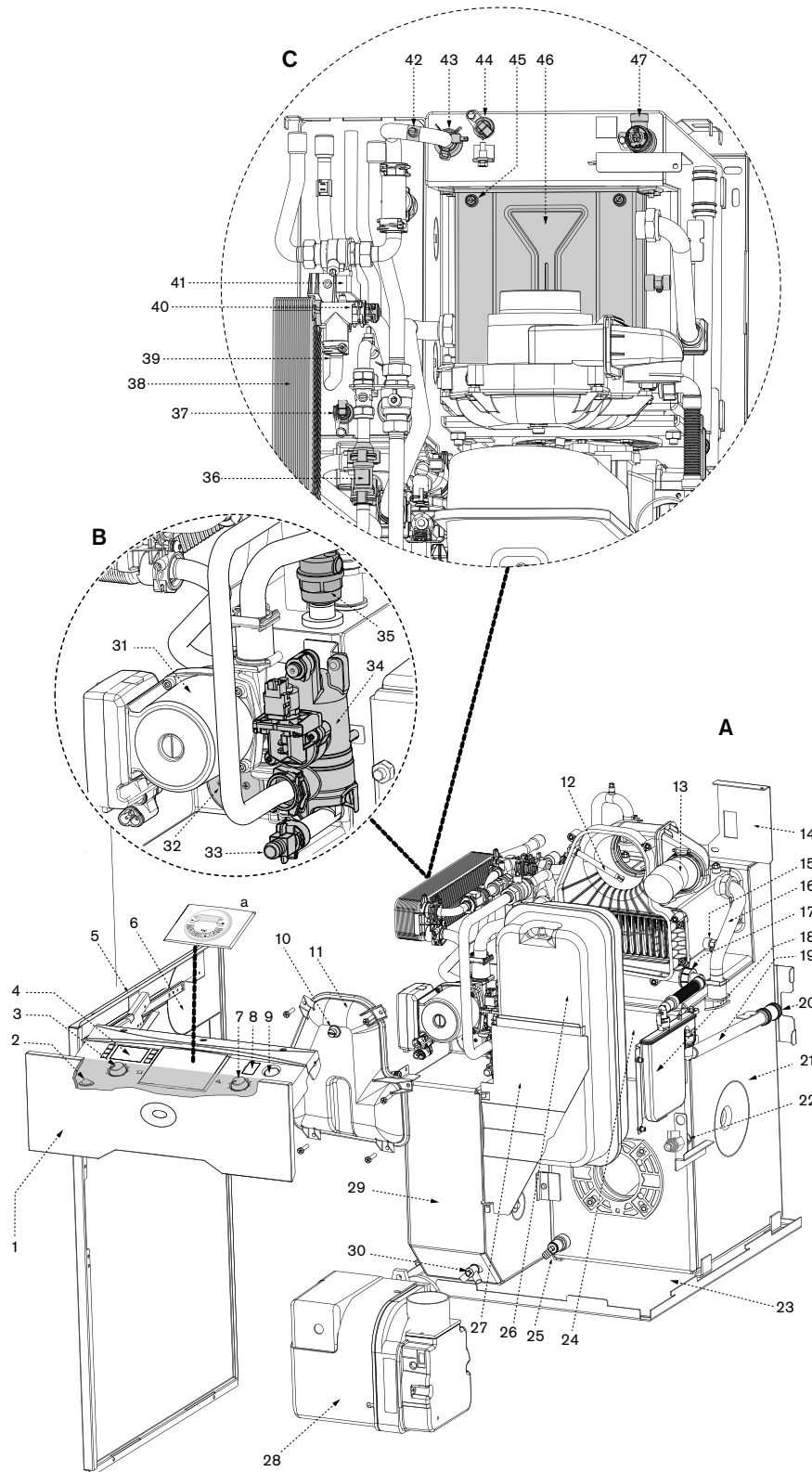
- 1 CONTROL BOX ASSEMBLY
- 2 SERVICE BUTTON
- 3 CH TEMPERATURE CONTROL KNOB
- 4 LCD DISPLAY
- 5 CASING SIDE PANEL
- 6 FLUE "KNOCK-OUT" SECTION
- 7 TANK TEMPERATURE CONTROL KNOB
- 8 DIAGNOSIS PORT - WORCESTER ENGINEER
- 9 SYSTEM PRESSURE GAUGE
- 10 FLUE GAS SAMPLING POINT
- 11 FLUE MANIFOLD COVER
- 12 FLUE OVERHEAT THERMOSTAT PHIAL
- 13 AIR INLET CASING FLEXIBLE AIR DUCT (CONNECTING TO AIR INTAKE ON BURNER)
- 14 CASING SUPPORT BRACKET
- 15 SECONDARY HEAT EXCHANGER DRAIN
- 16 HEAT EXCHANGER FLOW PIPE
- 17 CONDENSATE OUTLET
- 18 CONDENSATE TRAP
- 19 CONDENSATE DRAIN PIPE
- 20 FLEXIBLE CONDENSATE DRAIN PIPE CONNECTION
- 21 PRIMARY HEAT EXCHANGER
- 22 OIL ISOLATING VALVE
- 23 BASE PLATE AND OIL DRIP TRAY
- 24 COMBUSTION CHAMBER ACCESS DOOR AND ONE PIECE Baffle SET LOCATION
- 25 PRIMARY HEAT EXCHANGER DRAIN
- 26 EXPANSION VESSEL
- 27 EXPANSION VESSEL BRACKET/DATA LABEL
- 28 RIELLO RDB 2.2 BURNER (ALL OUTPUTS)
- 29 HEATSLAVE TANK
- 30 HEATSLAVE TANK DRAIN
- a OPTIONAL FASCIA MOUNTED PROGRAMMERS AVAILABLE (not supplied with the appliance)

B

- 31 CIRCULATING PUMP
- 32 MANUAL RESET TANK OVERHEAT THERMOSTAT
- 33 DRAIN POINT
- 34 DIVERTER VALVE ASSEMBLY
- 35 AUTOMATIC AIR VENT

C

- 36 DHW FLOW TURBINE
- 37 TANK TEMPERATURE SENSOR (NTC)
- 38 DHW HEAT EXCHANGER
- 39 DHW PRESSURE RELIEF VALVE
- 40 DHW PRESSURE RELIEF VALVE
- 41 MAINS INLET TEMPERATURE SENSOR (NTC)
- 42 PRIMARY MANUAL AIR VENT
- 43 FLOW TEMPERATURE SENSOR (NTC)
- 44 PRIMARY HEAT EXCHANGER SAFETY SENSOR (NTC)
- 45 SECONDARY HEAT EXCHANGER MANUAL AIR VENT
- 46 SECONDARY HEAT EXCHANGER
- 47 PRESSURE RELIEF VALVE



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.

FLUSH THE EXISTING SYSTEM WITH A POWER FLUSHING MACHINE OR WITH A CHEMICAL CLEANER BEFORE INSTALLING NEW COMPONENTS.

WE RECOMMEND THE USE OF A MAGNETIC SYSTEM FILTER SUCH AS THE WORCESTER GREENSTAR SYSTEM FILTER OR FILTERS FROM FERNOX AND SENTINEL.

CLEANING THE PRIMARY SYSTEM:

- ▶ Cleanse the system in accordance with BS 7593.
- ▶ 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.

MAINS SUPPLY



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.
- Refer to IEE regulations for cross bonding requirements.
- It must be possible to isolate the appliance from the electrical supply with at least a 3mm contact separation in both 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 electrical supply.



WATER SUPPLY:

The following are general requirements and if necessary the advice of the local water company should be sought before fitting the appliance.

- The appliance cold water supply should be the first connection off the water main where possible.

Water Mains Pressure:

Minimum dynamic mains water pressure for maximum performance.

12/18kW	18/25kW	25/32kW
1.5 bar	1.2 bar	1.6 bar

- Maximum mains fed water pressure 10 bar. If necessary, fit a pressure reducing valve.

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

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

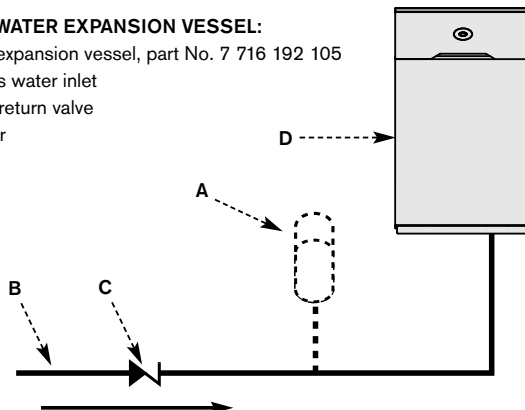
Use in hard water areas:

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

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

MAINS WATER EXPANSION VESSEL:

- A - Mini expansion vessel, part No. 7 716 192 105
- B - Mains water inlet
- C - Non-return valve
- D - Boiler



OIL SUPPLY

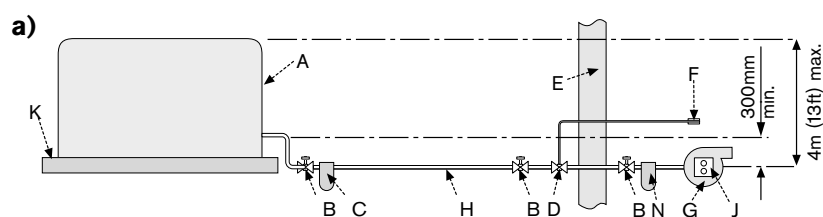
- | | | | |
|---|-----------------------------------|---|---|
| A | - Oil storage tank. | H | - Oil supply pipe. |
| B | - Isolating valve. | J | - Oil pump. |
| C | - Oil strainer & water separator. | K | - Full base (plastic tanks). |
| D | - Fire valve to BS 5410. | L | - Non-return valve. |
| E | - External wall. | M | - De-aerator. |
| F | - Fire valve sensor. | N | - Oil filter (70µm max filtration size) |
| G | - Oil burner. | | |

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.

OIL SUPPLY :

- This appliance is suitable for kerosene (28 second oil) only, no other fuel must be used.
- Plastic or steel tanks should be installed to BS 5410. A steel tank should conform to BS 799: part 5 and have 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.

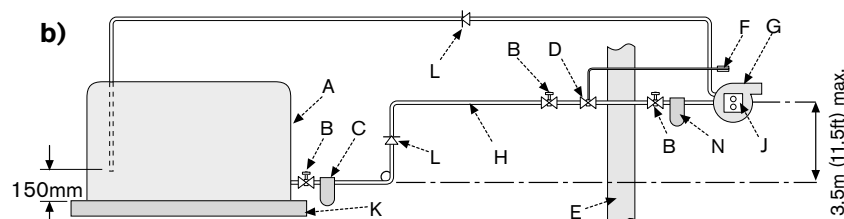


a) Single pipe gravity feed system:

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).

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



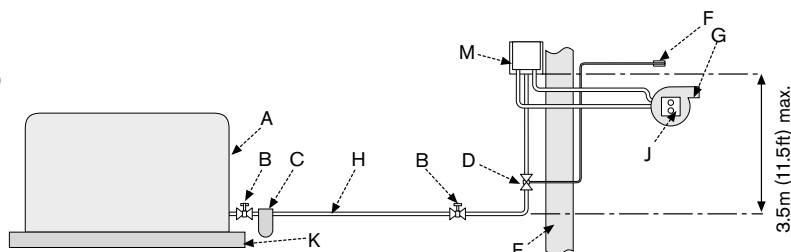
b) Double pipe sub-gravity feed system:

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).

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

c)



OIL SUPPLY

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).

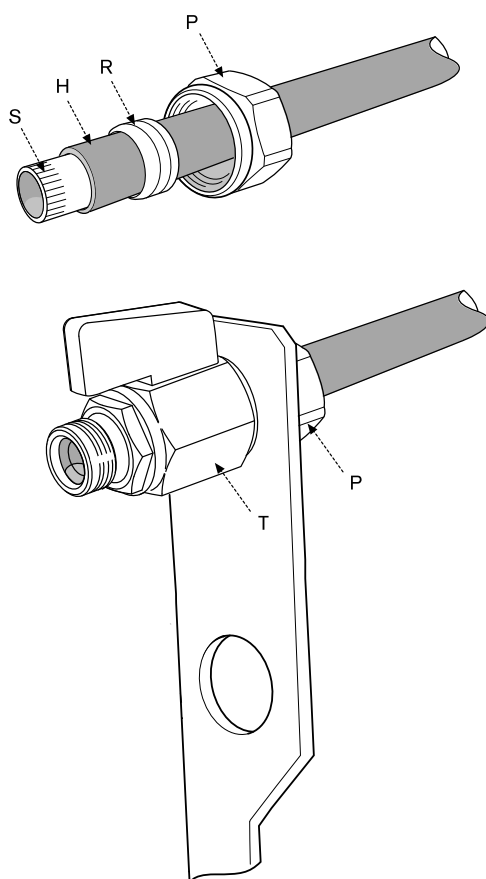
A non-return valve must be incorporated within the de-aerator or fitted to the oil line between the oil storage tank (A) and the de-aerator (M).

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

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-aerator manufacturers instructions.



Pipework

- ▶ Use copper pipe of the correct diameter according to the information shown opposite.
- If using soft copper pipe (R220) with a compression fitting, an insert must be used to prevent the pipe from collapsing or distorting when the fitting is tightened.
- ▶ Slide nut (P) and olive (R) onto the oil supply pipe (H).
- ▶ Slide insert (S) into the pipe.
- ▶ Offer the pipe to the fitting (T) and tighten the nut (P).
- ▶ 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 strainer and water separator (C) to the oil supply pipe, near the oil storage tank. Fit an additional oil filter (N, 70µm max filtration size with the filter element to be of the disposable media (paper) type) close to the boiler, but not inside the boiler casing.
- ▶ Fit a fire valve in accordance with BS 5410. The fire valve (D) should be fitted externally to the building with the fire valve sensor (F) located within the appliance case using the clip located under the right hand side of the cross brace at the top of the boiler.

A fire valve with a shut off temperature of 85°C or higher must be fitted to avoid the possibility of nuisance shut offs.

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.

IMPORTANT: The boiler should not be allowed to operate with a return temperature of less than 30°C when the system is up to operating temperature.

PRIMARY SYSTEM PLASTIC PIPEWORK:

- Any plastic pipework used for the CH system must have a polymeric barrier, complying with BS 7921 and installed to BS 5955 with 1000mm (minimum) length of copper or steel pipe connected to the boiler.
- Plastic pipework used for underfloor heating must be correctly controlled with a thermostatic blending valve limiting the temperature of the circuits to approx. 50°C with 1000mm (minimum) length of copper or steel pipe connected to the boiler, and a 20k differential must be maintained at the appliance.

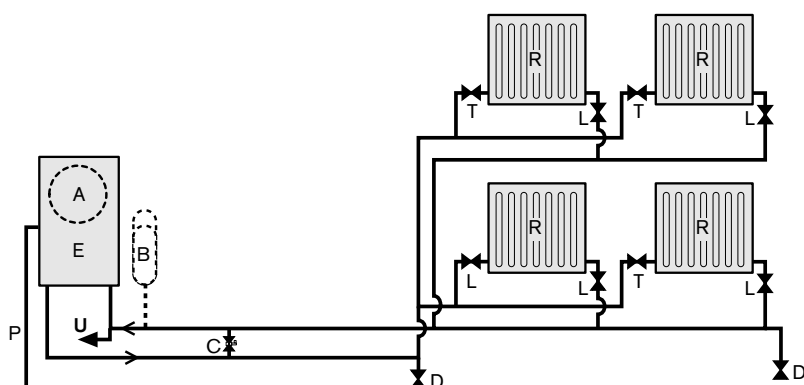
PRIMARY SYSTEM/CONNECTIONS/VALVES:

- 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 BS 2767:10.
- All other valves should conform to BS 1010.
- An automatic bypass valve must be connected between the heating flow and return pipes if TRVs are used on radiators or motorised zone valves are present that cut off CH circulation. This must be fitted to give at least a 3m circuit when activated.
- Drain cocks are required at all the lowest points on the system.
- Air vents are required at all high points on the system.

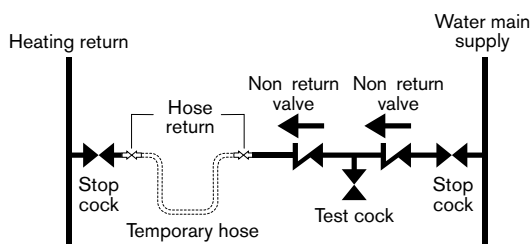
SEALED PRIMARY SYSTEM:

- Where the system volume is more than 180 litres at 0.5 bar or exceeds 2.65 bar at maximum heating temperature an extra expansion vessel (B) must be fitted as close as possible to the appliance in the central heating return.
- Pressurise the extra expansion vessel (B) to the same figure as the expansion vessel (A) built into the appliance.

TYPICAL SEALED SYSTEM



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



FILLING PRIMARY SEALED 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 links must be WRAS approved.

SHOWERS/BIDETS:

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

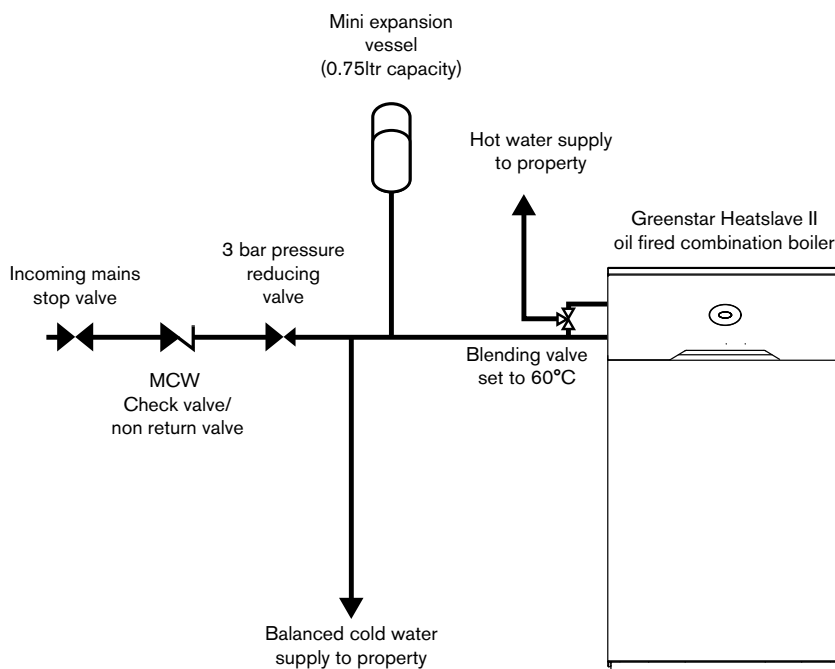
DOMESTIC HOT WATER:

Plastic pipework

- Any plastic pipework used for the DHW system must have a polymeric barrier, complying with BS 7921 and installed to BS 5955 with 1000mm (minimum) length of copper or stainless steel pipe connected to the boiler.
- Before installing plastic pipework, the pipe manufacturer's literature should be consulted.
- To prevent the temperature & pressure exceeding the limits advised by the pipe manufacturer, a pressure reducing valve must be used to prevent the incoming water pressure exceeding 3 bar (maximum). Also a mini expansion vessel must be fitted to absorb the expanding water and a blending valve set to 60°C must be fitted before the DHW plastic pipework.
- When selecting plastic pipework for use with domestic water supply, it should be ensured that it is compliant with all current local & national legislation & regulations, including building regulations part G, BS 7291 - 1, 2 & 3: 2006, BS 8000 - 15-15: 1990 and information.

GENERAL:

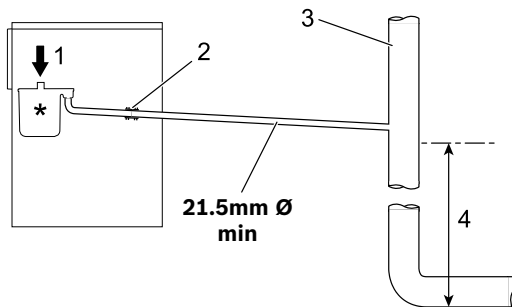
- Taps and mixing valves must be capable of sustaining a pressure up to 10 bar in accordance with the Water Regulations as they will be operating at mains water pressure.
- Hot water temperature and flow rate are affected by the size and insulation of pipework making up the distribution system and are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



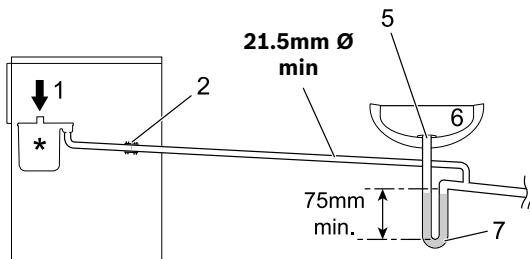
CONDENSATE PIPEWORK INTERNAL CONNECTION

INTERNAL CONNECTIONS

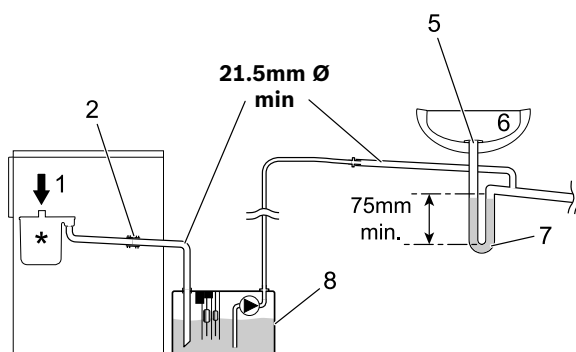
Disposal to soil vent stack



Disposal to a waste pipe



Condensate pump disposal



Key to diagrams:

1. Condensate discharge from boiler
2. Universal connector
3. Soil and vent stack
4. Minimum 450mm and up to three storeys
5. Visible air break at plug hole
6. Sink or basin with integrated overflow
7. 75mm sink waste trap
8. Condensate pump

CONDENSATE PIPEWORK:

- Where a new or replacement boiler is being installed, access to an internal "gravity discharge" point should be one of the factors considered in determining boiler location.
- The condensate pipe must be nominally 21.5mm Ø polypropylene pipe.
- The condensate pipe work must fall at least 52mm per metre towards the outlet and should take the shortest practicable route.
- Ensure there are no blockages in the pipe run.

Internal connections:

- In order to minimise risk of freezing during prolonged cold spells, the following methods of installing a condensate drainage pipe should be adopted, in order of priority.
- Wherever possible, the condensate drainage pipe should be routed and terminated so that the condensate drains away from the boiler, under gravity, to a suitable internal foul water discharge point such as an internal soil and vent stack.
- A suitable permanent connection to the foul waste pipe should be used.
- Alternatively if the first option is not possible an internal kitchen or bathroom waste pipe, washing machine waste pipe etc. can be used.

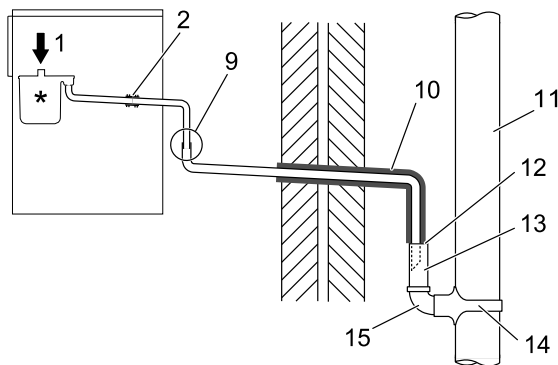
Condensate pump:

- Where "gravity discharge" to an internal termination is not physically possible, or where very long internal runs would be required to reach a suitable discharge point, condensate should be removed using a proprietary condensate pump, of a specification recommended by the boiler or condensate pump manufacturer.
- The pump outlet pipe should discharge to a suitable internal foul water discharge point such as an internal soil and vent stack, internal kitchen or bathroom waste pipe, washing machine waste pipe etc.
- A suitable permanent connection to the foul waste pipe should be used.

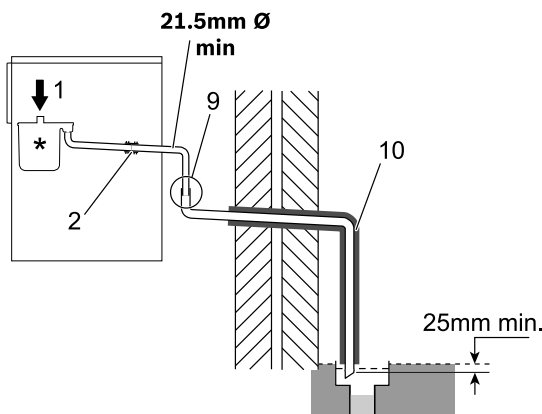
CONDENSATE PIPEWORK EXTERNAL CONNECTION

EXTERNAL CONNECTIONS

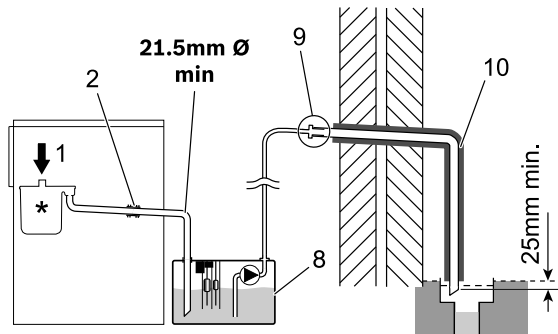
Disposal into a rainwater down pipe



External Disposal



Condensate pump to external disposal



Key to diagrams continued:

- 9. Pipe work transition
- 10. Insulate and increase pipe size
- 11. External rain water pipe into foul water
- 12. External air break
- 13. Air gap
- 14. PVCu strap on fitting
- 15. 43mm 90° male/female bend

CONDENSATE PIPEWORK RUN EXTERNALLY:

- Pipe work length should be kept to a minimum and the route as vertical as possible.
- Weather proof insulation must be used.
- Care should be taken when siting a soakaway to avoid obstructing existing services.
- The condensate pipe work must fall at least 52mm per metre towards the outlet and should take the shortest practicable route.
- Ensure there are no blockages in the pipe run.

External connections:

- If no other discharge method is possible then the use of an externally run condensate drainage pipe terminating at a suitable foul water discharge point, or purpose designed soak away, may be considered.
- If this method is chosen then the following measures should be adopted:
 - ▶ The external run be kept as short as possible and not exceed three metres.
 - ▶ The pipe should be run internally as far as possible before going externally and the pipe diameter should be increased to 32mm before it passes through the wall to the exterior.
 - ▶ The pipe should be insulated using suitable waterproof and weather resistant insulation.
 - ▶ The external pipe should take the shortest and least exposed route to the discharge point, and should "fall" as steeply as possible away from the boiler, with no horizontal runs in which condensate might stand.
 - ▶ The use of fittings, elbows etc. should be kept to a minimum and any internal "burrs" on cut pipe work should be removed so that the internal pipe section is as smooth as possible.

Fitting an external air brake:

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

NOTE: Condensate drainage pipe can be run above or below ground.

- Where the pipe terminates over an open drain or gully, the pipe should terminate below the grating level, but above water level, in order to minimise "wind chill" at the open end.
- The use of a drain cover (such as those used to prevent blockage by leaves) may offer further protection from wind chill.
- Pipe drainage will be improved if the end is cut at 45° as opposed to a straight cut.

PRE -
INSTALLATION

Key to diagrams continued:

17. Drainage holes

18. Limestone chippings

19. Bottom of sealed tube

CONDENSATE SOAK AWAY:

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

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

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

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

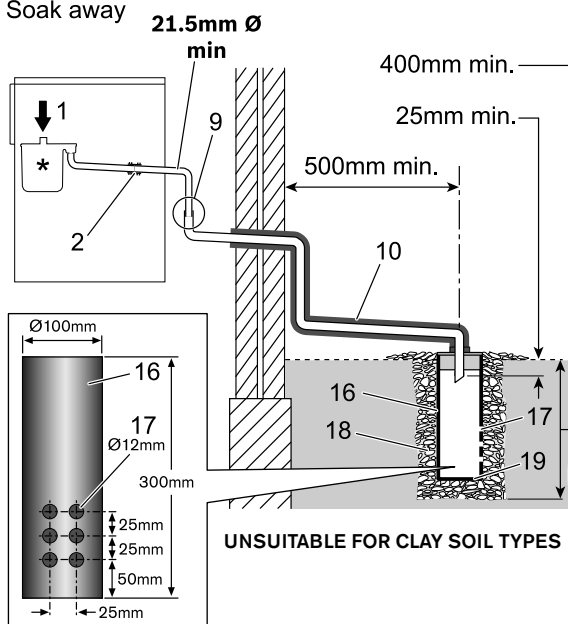
Making it safe:

- Condensate pipework must not leak, freeze or block up.
- Fill trap with water to check for leaks.
- Do not dispose of condensate into water recovery systems.

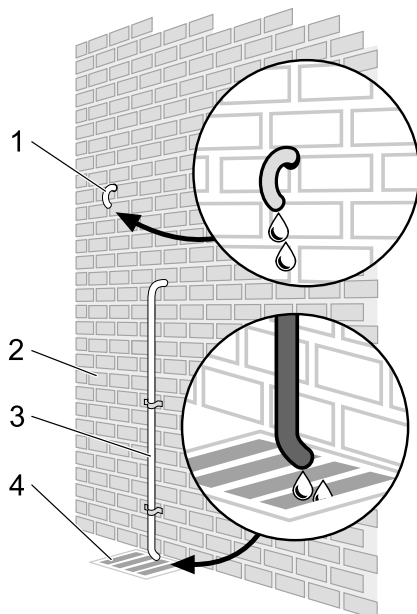
PRESSURE RELIEF PIPEWORK:

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

Soak away

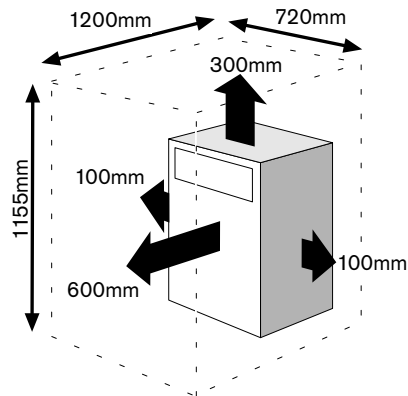


PRESSURE RELIEF PIPEWORK

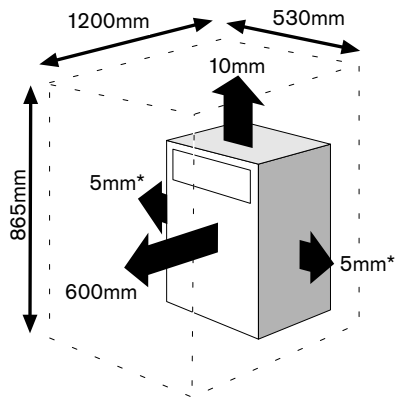


- 2 - Outside wall.
1_3 Drain pipe.
4 - External drain.

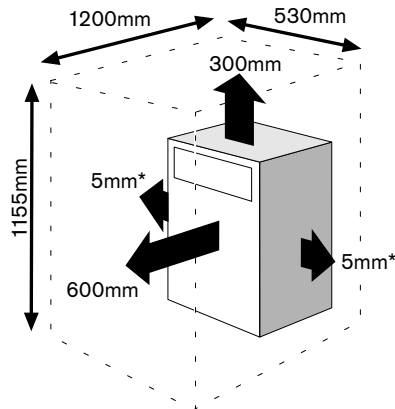
a: RECOMMENDED INSTALLATION CLEARANCES



b: ANNUAL SERVICE CLEARANCES



c: MAINTENANCE & REPAIR CLEARANCES



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

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

Conventional flue				
kW	Internal ¹ ventilation		External ² ventilation	
	High Level	Low Level	High Level	Low Level
12/18	198	279	99	198
18/25	275	413	138	275
25/32	352	528	176	352

Room Sealed flue:				
kW	Internal ¹ ventilation		External ² ventilation	
	High Level	Low Level	High Level	Low Level
12/18	198	198	99	99
18/25	275	275	138	138
25/32	352	352	176	176

BOILER LOCATION &

CLEARANCES

- This boiler is only suitable for installing internally within a property at a suitable location onto a fixed rigid surface of 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 BS 5410 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.

CF minimum air inlet sizes**

Output	12/18kW	18/25kW	25/32kW
Size cm ²	99	138	176

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 carry out an annual service.

c: MAINTENANCE & REPAIR CLEARANCES:

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

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

** Due to changes to BS 5410 and modern building design, these figures no longer incorporate the adventitious ventilation allowance.

BOILER LOCATION &

CLEARANCES

COMPARTMENTS:

Follow the requirements of BS 5410 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.
- Combustion 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."

SHOWER / BATHROOMS:

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

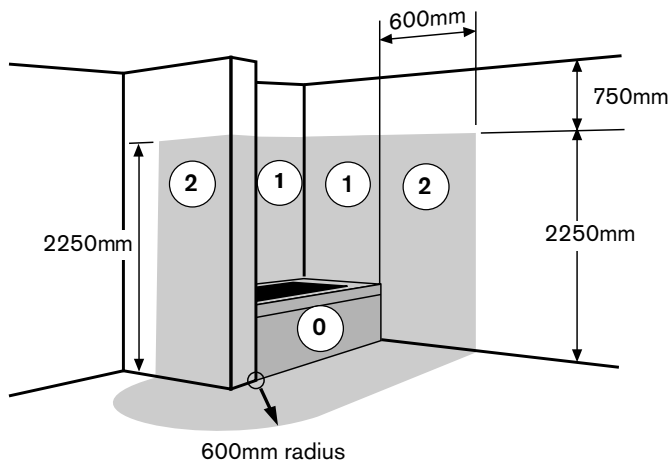
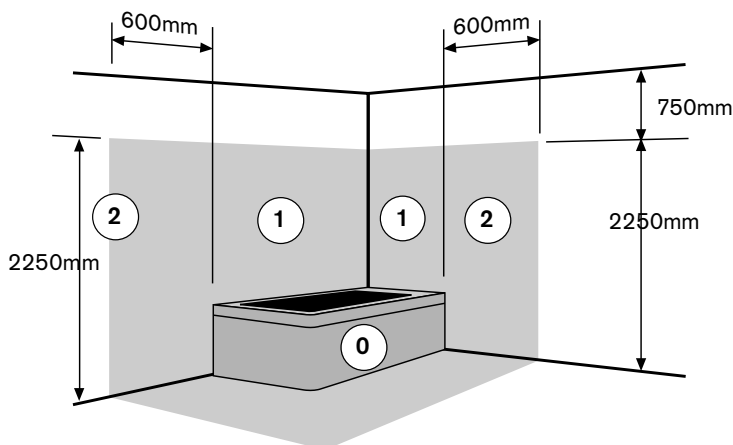
IMPORTANT: conventional flued boilers must not be fitted in a bathroom.

IMPORTANT: any 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 fitted in the bathroom.

In all cases the IEE wiring regulations must be consulted.

All pipework in bathrooms and shower rooms must be cross bonded.



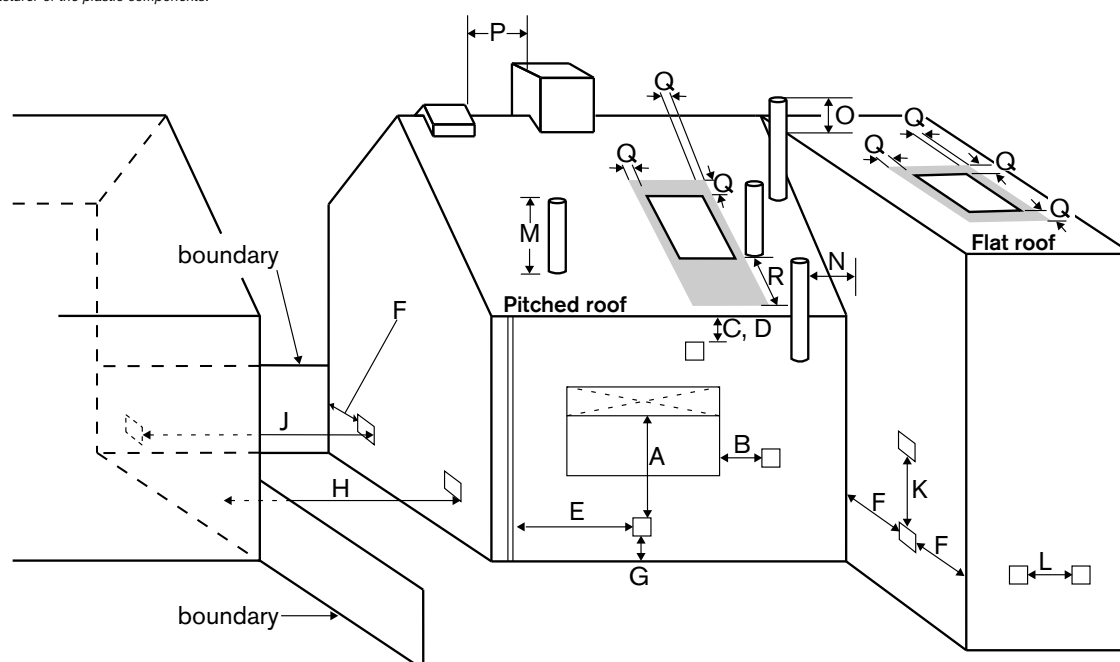
Minimum dimensions of flue terminal positions for oil fired appliances:

TERMINAL POSITION	CF	RS(H)	RS
A ^{1,2} Directly below an opening, air brick, opening window, etc	N/A	600mm	N/A
B ^{1,2} Horizontally to an opening, air brick, opening window, etc	N/A	600mm	N/A
C Below a plastic/painted gutter, drainage pipe or eaves if combustible material protected	N/A	75mm	N/A
D ³ Below a plastic/painted gutter, drainage pipe or eaves without protection to combustible material	N/A	600mm	N/A
E From vertical sanitary pipework	N/A	300mm	N/A
F From an external or internal corner or from a surface or boundary alongside the terminal	N/A	300mm	N/A
G Above ground or balcony level	N/A	300mm*	N/A
H From a surface or boundary facing the terminal	N/A	600mm**	N/A
J From a terminal facing the terminal	—	1200*mm	—
K Vertically from a terminal on the same wall	N/A	1500mm	N/A
L Horizontally from a terminal on the same wall	—	750mm	—
M Above the point of highest intersection with the roof	600mm	—	600mm
N From a vertical structure on the side of the terminal	750mm	—	750mm
O Above a vertical structure less than 750mm from the side of the terminal	600mm	—	600mm
P From a ridge terminal to a vertical structure on the roof	1500mm	—	N/A
Q Above or to the side of any opening on a flat or sloping roof	300mm	—	300mm
R Below any opening on a sloping roof	1000mm	—	1000mm

Key: — Not applicable, N/A Not allowed, CF Conventional flue, RS(H) Room Sealed Horizontal flue, RS(V) Room Sealed Vertical flue.

Notes:

1. Terminals should be positioned so as to avoid products of combustion accumulating in stagnant pockets around the building or entering into buildings.
2. Vertical structure in N, O and P includes tank or lift rooms, parapets, dormers etc.
3. Terminating positions should be at least 1.8m from an oil storage tank unless a wall with at least 30 min fire resistance and extending 300mm higher and wider than the tank is provided between the tank and the terminating position.
4. Where a flue is terminated less than 600mm away from a projection above it and the projection consists of plastics or has a combustible or painted surface, then a heat shield of at least 750mm wide should be fitted.
5. If the lowest part of the terminal is less than 2m above the ground, balcony, flat roof or other place to which any person has access, the terminal should be protected by a guard.
6. Notwithstanding the dimensions given above, a terminal should not be sited closer than 300mm to combustible material. In the case of a thatched roof, double this separation distance should be provided. It is also advisable to treat the thatch with a fire retardant material and close wire in the vicinity of the flue.
7. It is essential that a flue or chimney does not pass through the roof within the shaded area delineated by dimensions Q and R.
8. Where protection is provided for plastic components, such as guttering, it is essential that this is to the standard specified by the manufacturer of the plastic components.



FLUE TERMINAL 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 stainless steel terminal guard, Part No: 7 716 190 050, must be fitted if the terminal is 2m or less above a surface where people have access.

See 'Contact Information' on the back 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 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.
- **Minimum distance of the flue terminal to a facing wall, fence, building or property boundary is 2500mm.

PRE -
INSTALLATION

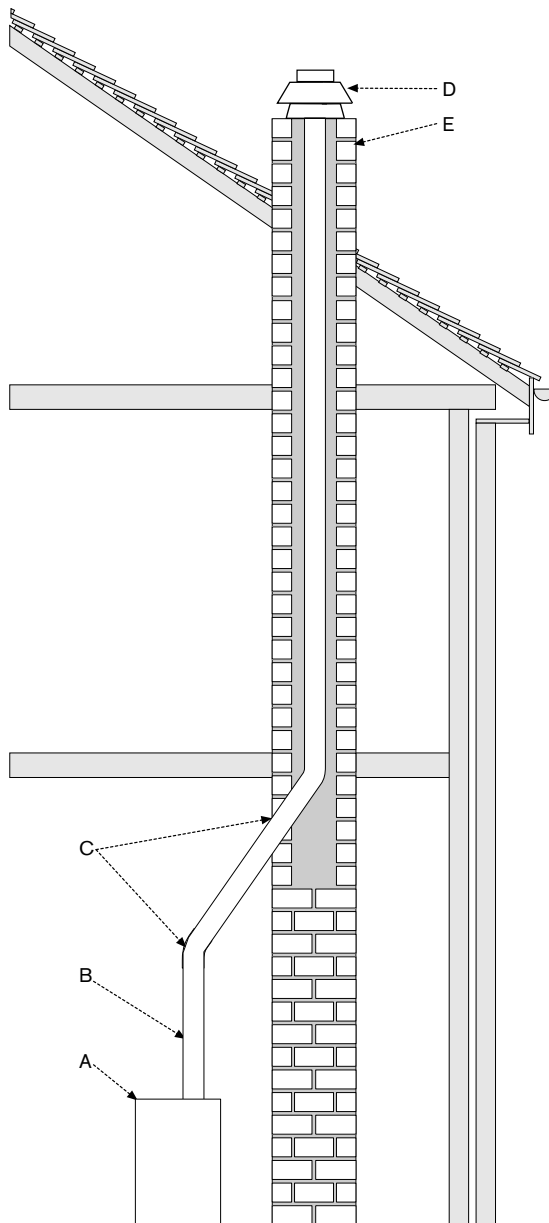
CONVENTIONAL FLUE

- Open (conventional) flued appliances must not be installed in a bedroom, bathroom or bedsitting room.
- The flue system must be in accordance with BS 5410 : Part 1 and the current Building Regulations.
- The flue must be constructed of materials suitable for use with 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.

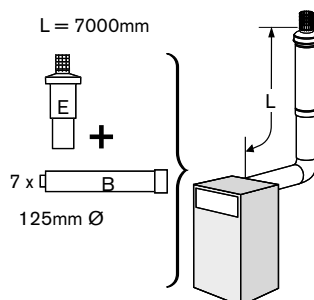
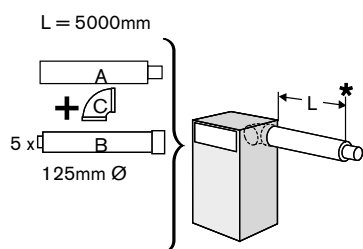
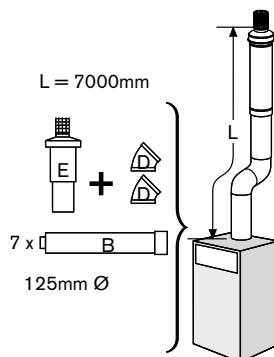
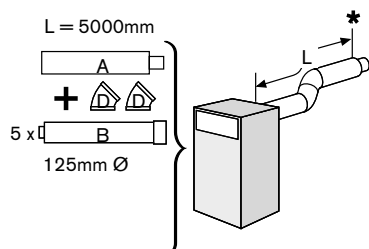
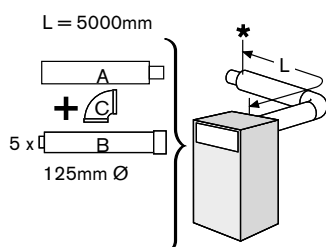
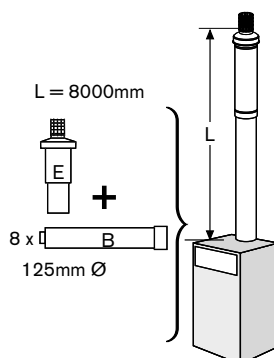
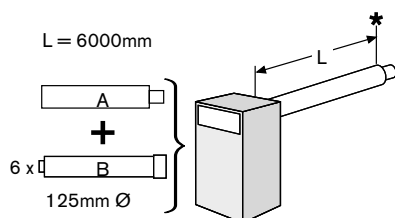
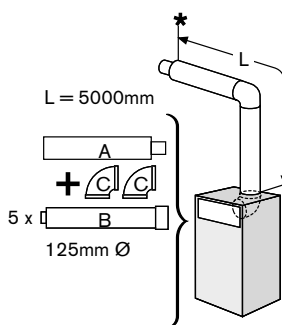
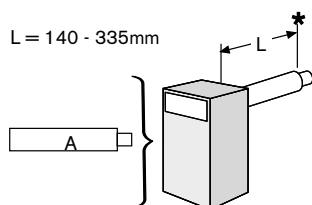
NOTE: The flue can be increased in size from the boiler take off point providing the joint is correctly sealed. Never reduce the flue diameter from the boiler take off point.

CF Sizing:

- Worcester CF flexi flue kit =100mm (all models).
For sizing of other manufacturer's flues contact the supplier.
- Because the flue operates at a lower temperature on a condensing boiler compared to that of a conventional appliance, the flue draught will be lower. Typically the draught will be between 0.5mmwg and 4.4mmwg, measured with the flue warm but the burner not firing. The actual figure will vary depending on weather conditions, flue height and position.
- 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.



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



ROOM SEALED FLUE OPTIONS

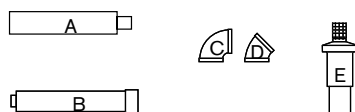
The diagrams (opposite) show the components used and the maximum flue length (L) for each flue configuration.

In all cases L is measured from the outside of the boiler casing.

- 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 80/125mm Ø: 6000mm (excluding 120mm of terminal extending outside the building)

Vertical 80/125mm Ø: 8000mm (measured from the boiler top panel).

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 80/125mm Ø: 1000mm overall length.

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

Flue Terminal lengths:

Horizontal 80/125mm Ø: 720mm

Vertical 80/125mm Ø: 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

LIFTING AND CARRYING PRECAUTIONS:

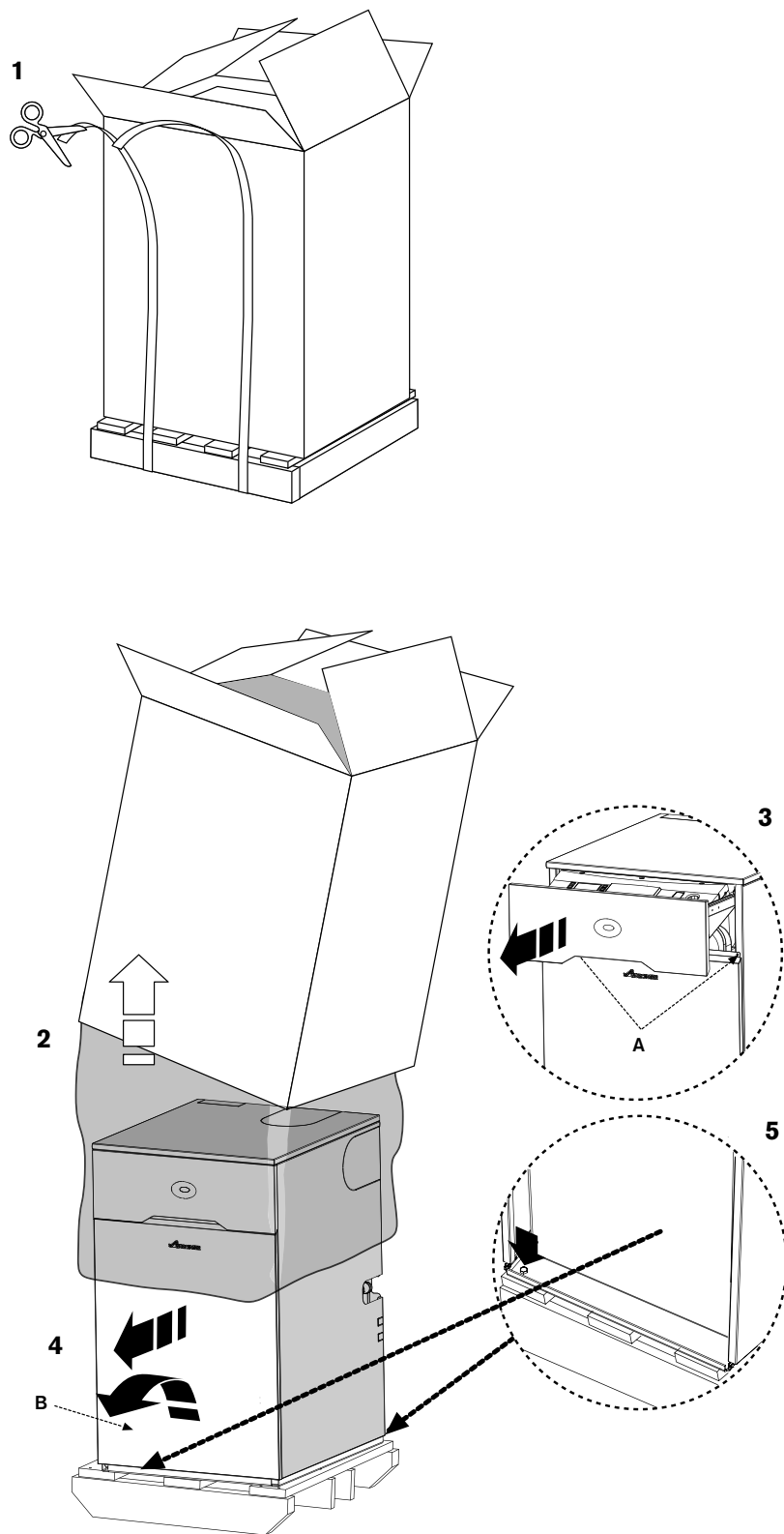
- Lift only a manageable weight, or ask for help.
- When lifting or putting things down, bend the knees, and keep the back straight and feet apart.
- Do not lift and twist at the same time.
- Lift and carry objects close to the body.
- Wear protective clothing and gloves to protect from any sharp edges.

Unpacking:

It is advised that two or more persons are involved in the transfer of the packaged boiler from the van to the point of delivery.

- 1 ▶ Once the packaged boiler has been delivered, the outer carton is removed first. Care should be taken when releasing the straps. If a sharp implement is used make sure the outer carton is not pierced and that the implement is used in such a way so that it may not cause personal injury. All sharp objects must be covered or the blade retracted after use and put away in a safe place.
- 2 ▶ 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 control box drawer forward and remove the 2 screws (A) from the front panel.
- 4 ▶ Lift front panel (E) upwards slightly to disengage and remove. Store safely away from the working area.
- 5 ▶ Remove the bolts securing the boiler to the transport pallet.
 - ▶ Two or more persons are required to remove the boiler from the pallet 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.



All dimensions in mm

PIPEWORK POSITIONS &

FLUE OPENING

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

SAFETY:

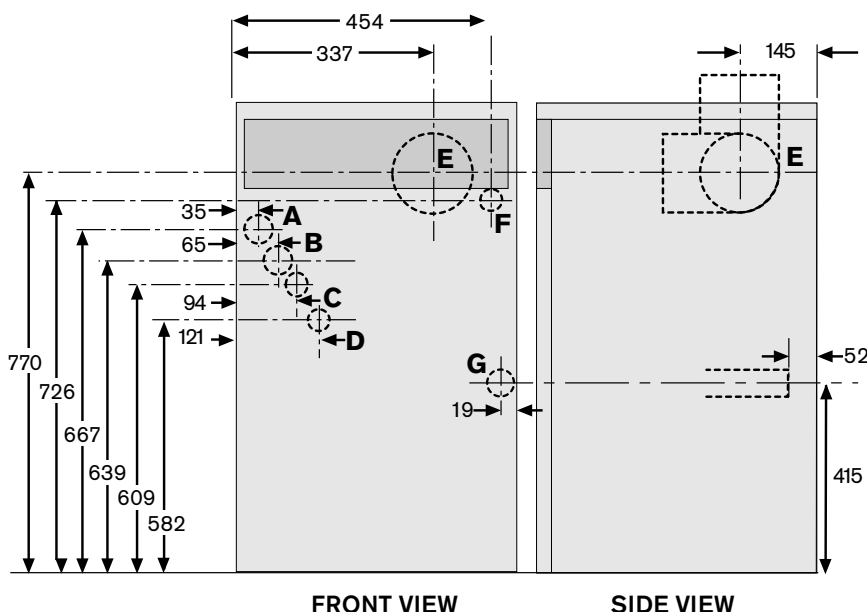
All relevant safety precautions must be undertaken. Protective clothing, footwear, gloves and safety goggles must be worn as appropriate.

PIPEWORK POSITIONS:

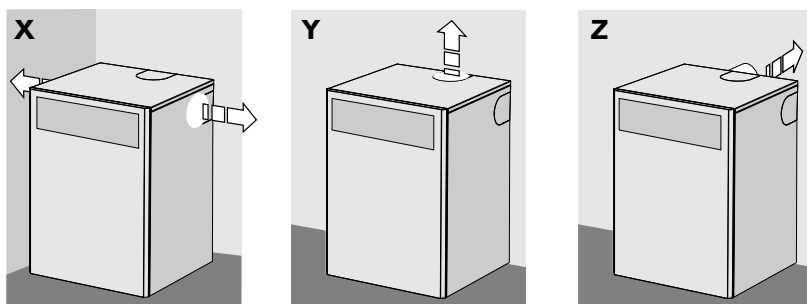
A to H (opposite) show the flue and pipe positions:

- A - CH flow 22mmØ copper (28mmØ on 25/32kW model)
- B - DHW flow 22mmØ copper
- C - DCW mains water inlet 15mmØ
- D - CH return 22mmØ copper (28mmØ on 25/32kW model)
- E - Flue outlet
- F - Pressure relief pipe 15mmØ
- G - Condensate outlet 21.5mmØ

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



INSTALLATION



FLUE OPENING:

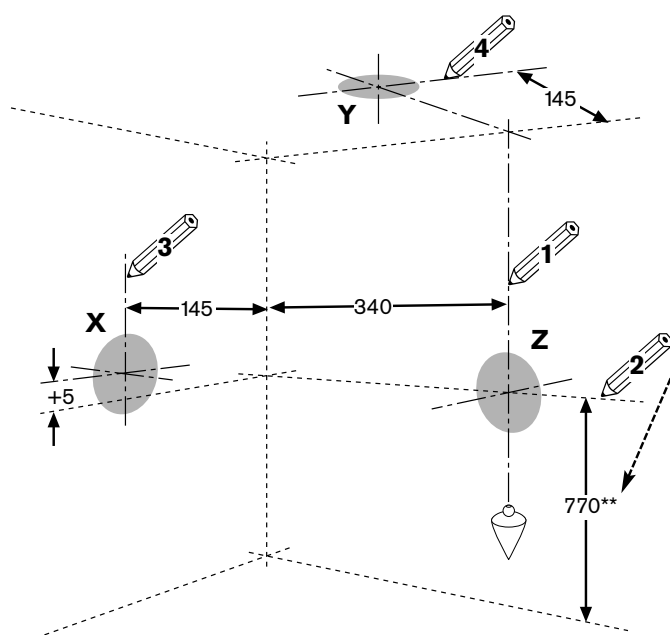
- Follow the diagram opposite to mark the centre of the flue (1, & 2) for rear opening, (2 & 3) for side opening or (1 & 4) for top opening.

**** IMPORTANT:** for horizontal flues, increase this height by 5.2mm for every 100mm of horizontal length that the flue opening is away from the boiler.

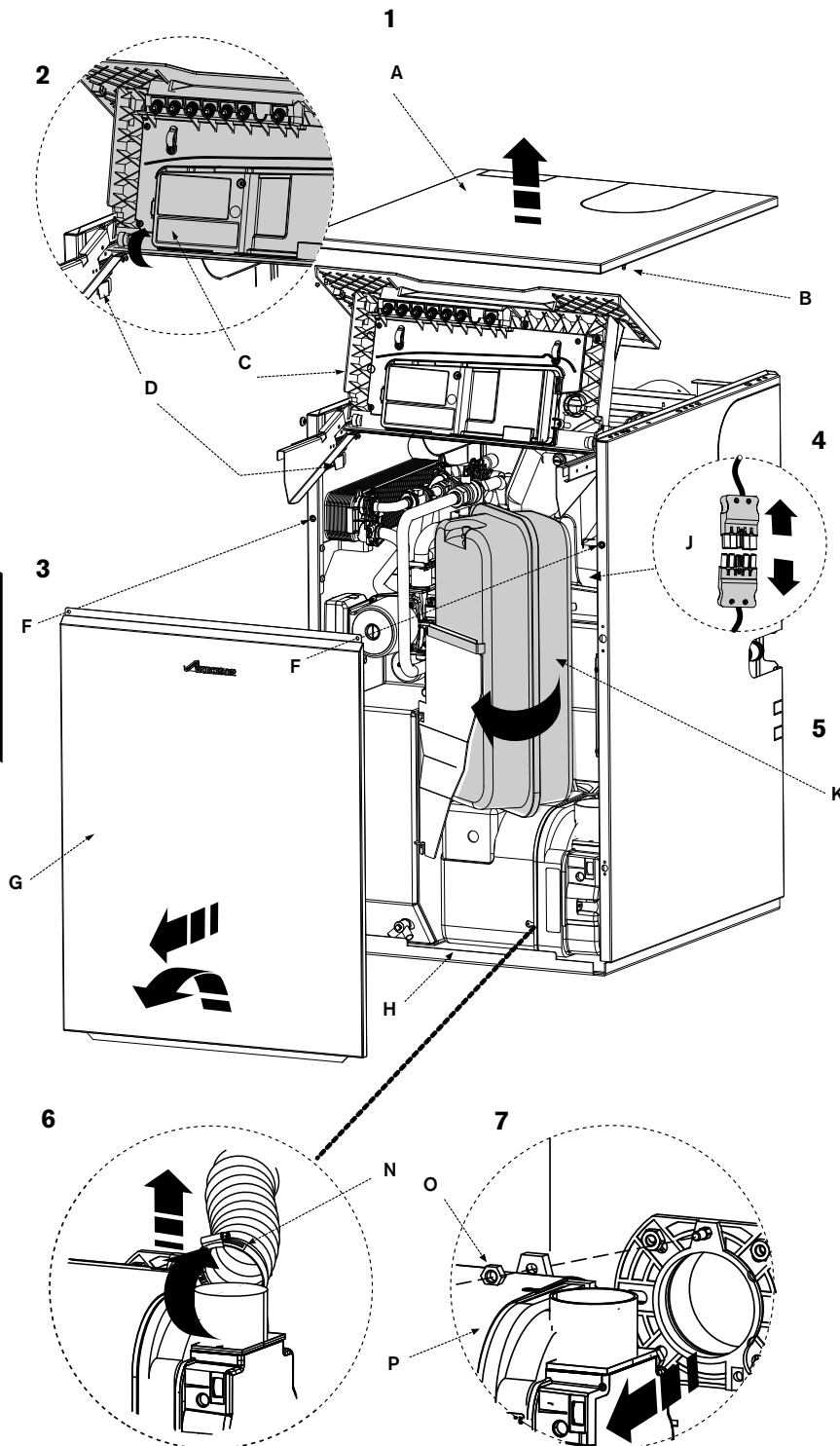
NOTE: All horizontal flue sections must rise away from the boiler by 52mm per metre to ensure that condensate flows back into the boiler for safe discharge via the condensate waste pipe.

- Make an opening (X, Y or Z) through the wall using a core drill or similar at a size relative to the wall thickness as shown below:

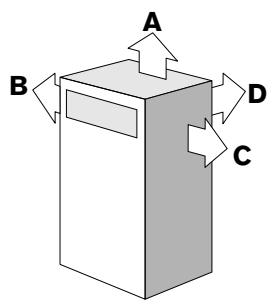
125mmØ flue:	
Wall thickness	Flue hole size
150 - 240mm	155mmØ
240 - 330mm	160mmØ
330 - 420mm	165mmØ
420 - 500mm	170mmØ



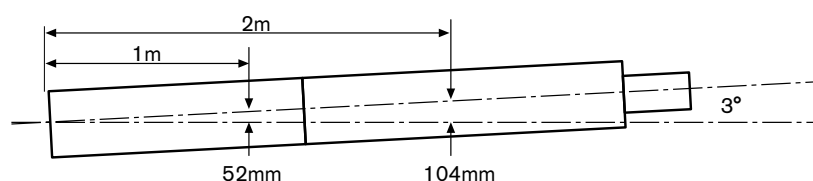
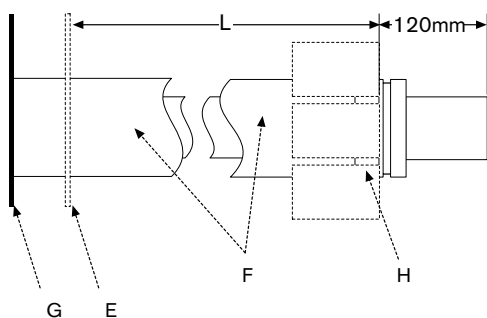
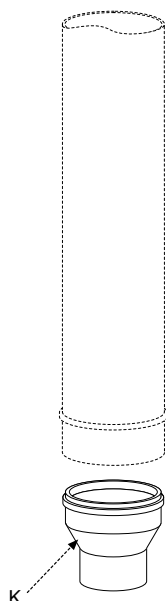
BOILER INSTALLATION



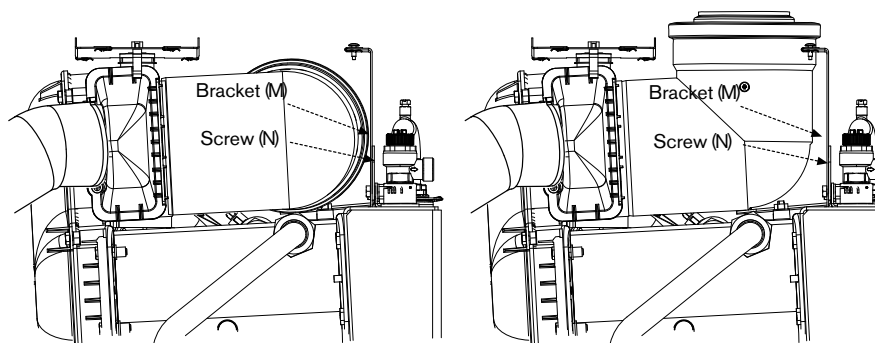
- 1 ▶ Lift the top panel (A) upwards to disengage the ball stud connections (B) and remove.
 - ▶ Remove the installation and literature packs.
- 2 ▶ Pull control box drawer (C) forward.
 - ▶ Depress the two levers (D), one on either side, to release the control box and pull fully forward.
 - ▶ Swivel the complete control box assembly upwards.
- 3 ▶ Remove front panel securing screws (F) from each side.
 - ▶ Lift panel (G) slightly to free it from the lip (H) on the baseplate and remove.
- 4 ▶ Unplug burner lead (J) from control box (C).
- 5 ▶ Swivel the expansion vessel (K) on its support bracket out of the boiler taking care not to snag any electrical cables or kink the flexible hose.
- 6 ▶ Loosen air duct pipe clip (N) and disconnect the air duct pipe.
- 7 ▶ Unscrew burner retaining nut (O) and remove the burner (P) and store safely away from the boiler.



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



The retaining bracket (M) must be fitted if a flue elbow is used on the boiler flue outlet.



FLUE INSTALLATION

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

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

INSTALLATION NOTES:

- ▶ When connecting a flue elbow directly to the boiler flue outlet, loosen the flue elbow retaining bracket screws (N) before fitting the flue elbow. Insert the flue elbow with its clamp loosely fitted, then tighten the bracket screws (N). Clamp the elbow when adjusted to its required orientation. If using an extension or horizontal terminal onto the boiler flue outlet, remove the flue elbow retaining bracket (M).
- ▶ 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.
- ▶ A clamp should be installed for every 1m and at every change of direction.

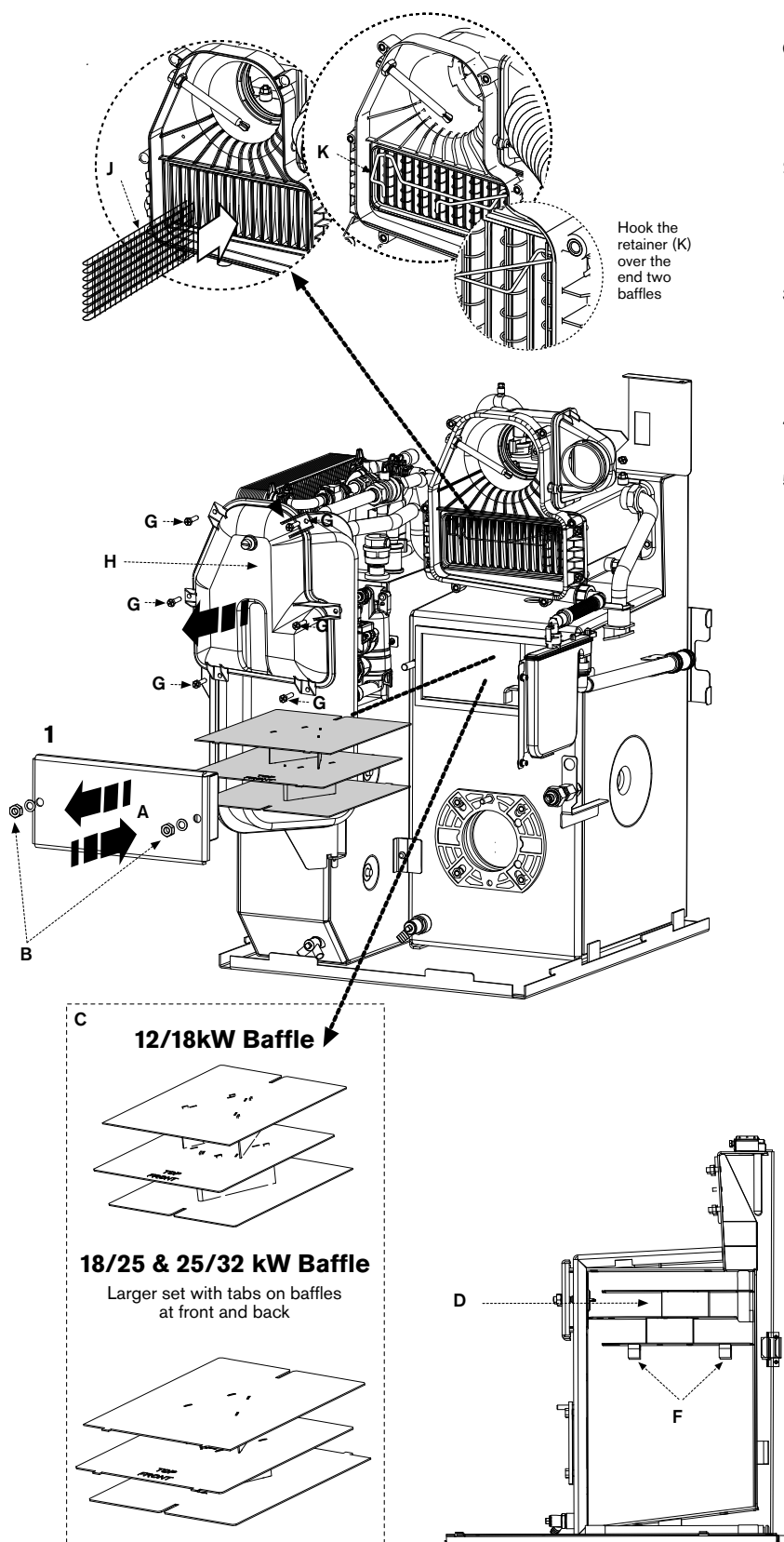
IMPORTANT: The boiler is not designed to take the weight of the flue system, this must be supported externally to the boiler.

- ▶ All horizontal flue sections must rise by at least 52mm for each metre away from the boiler to ensure that condensate flows back into the boiler for safe discharge via the condensate waste pipe.
- ▶ The horizontal terminal must be installed at 3° to ensure that the condensate drains back to the boiler whilst also preventing rain ingress down the air duct.

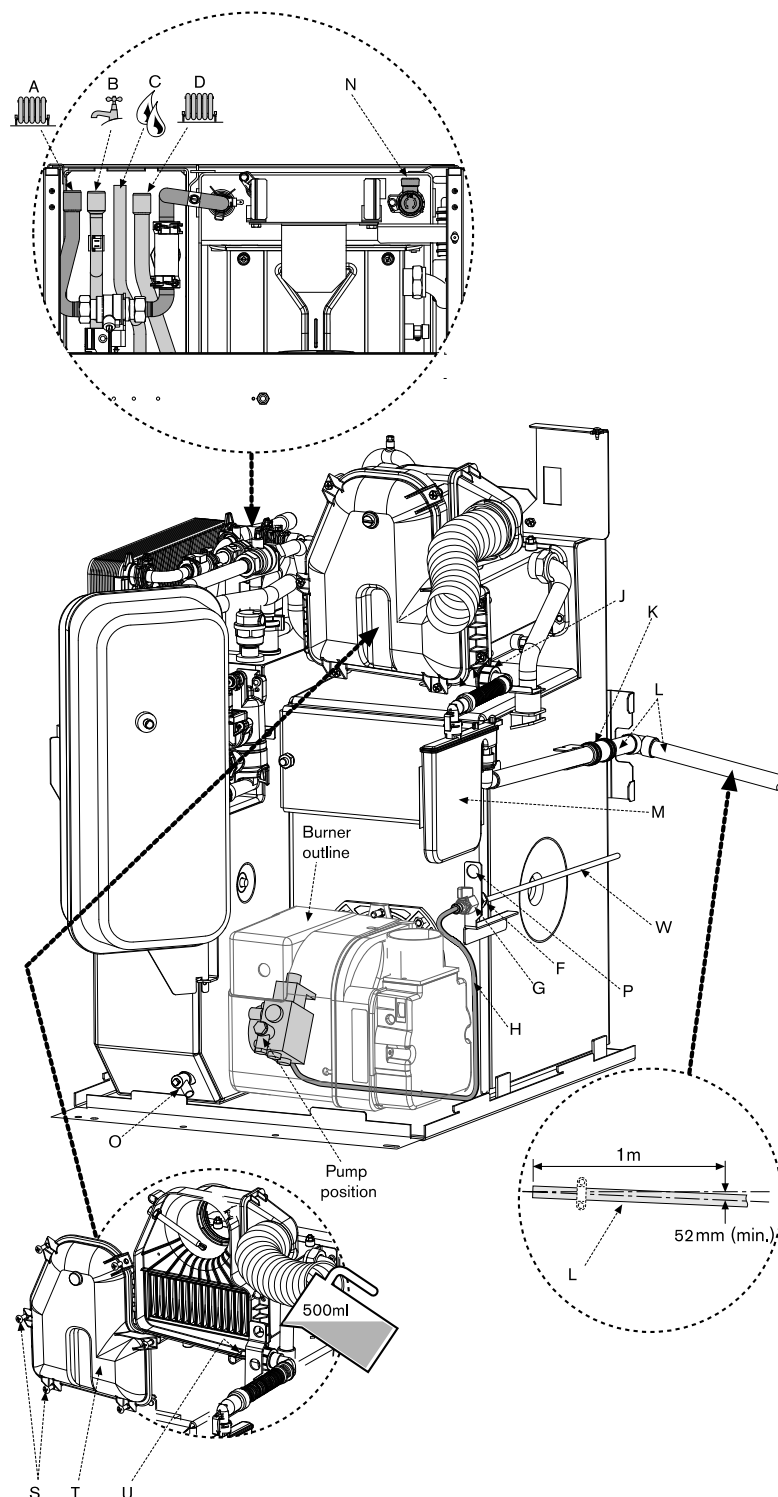
COMBUSTION CHAMBER

Combustion chamber:

- 1 ▶ Remove the retaining nuts and washers (B).
- ▶ Remove combustion chamber/baffle access door (A).
- 2 ▶ Ensure one piece baffle set (C) is in the right location (D), correctly resting on the baffle rests (F) on either side of the combustion chamber and pushed securely into place.
- 3 ▶ Refit combustion chamber door (A).
IMPORTANT: Secure with nuts and washers (B) and tighten until the chamber door is firmly secured, do not over tighten the nuts.
- 4 ▶ Unscrew screws (G) and remove flue manifold access cover (H).
- 5 ▶ Check that all the baffles (J) and baffle retainer (K) are correctly fitted to the secondary heat exchanger.



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



PIPEWORK CONNECTIONS

- A - CH flow 22mmØ copper (28mmØ on 25/32 models)
- B - DHW flow 22mmØ
- C - DHW water main inlet 15mmØ
- D - CH return 22mmØ copper (28mmØ on 25/32 models)
- F - 10mmØ oil supply connection
- G - Oil isolating valve (10mmØ)
- H - Flexible oil hose*
- J - Flue manifold condensate outlet
- K - Condensate outlet and flexible push fit connect (21.5mmØ) - supplied
- L - Condensate pipe - not supplied
- M - Condensate trap - supplied
- N - Pressure relief (15mmØ)
- O - Drain
- P - Fixing point for optional return oil pipe

WATER CONNECTIONS:

- Ensure all pipework is clean.

NOTE: That surplus water may be present due to factory testing.

- Align water pipework and connect.
- Check that all unused sockets have been capped.

OIL SUPPLY CONNECTIONS:

- Route the oil supply pipe (W) along either side of the boiler as required and connect to the isolating valve (G) and ensure the valve is closed.

***NOTE:** Replace flexible hose at annual service to prevent possible oil leakage.

- Connect the flexible oil hose (H) to the isolating valve (G).

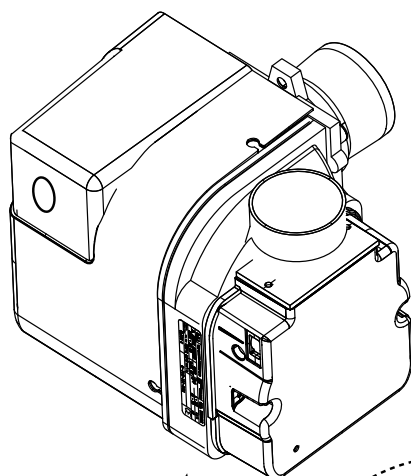
CONDENSATE CONNECTION:

- Connect 21.5mm polypropylene pipe (L) (not supplied) to the condensate waste pipe flexible push fit connector (K) and terminate to waste.
- Do not use any solvents, adhesives or lubricants when pushing the pipe into the rubber connector (K).
- Ensure that the condensate pipe runs away from the boiler at a constant fall of 52mm (min.) for every metre.
- Seal all condensate pipe joints.
- Carefully pour 500ml of water into the condensate collection (U) to fill condensate trap.
- Check the water is running away and the condensate pipework joints are water tight.
- Check the flue manifold seal is undamaged and seated correctly.
- Refit flue manifold access cover (T) and secure with screws (S).

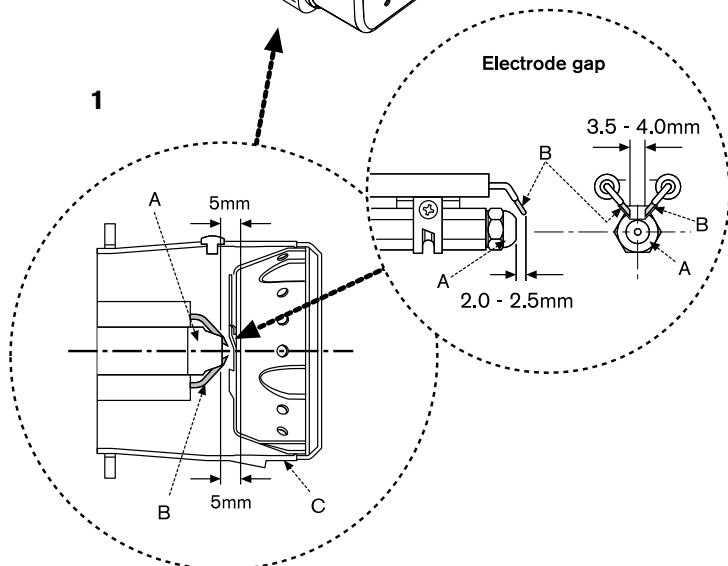
IMPORTANT: The condensate trap must be correctly filled to prevent the possibility of potentially harmful flue products escaping via the condensate pipework.

PRESSURE RELIEF CONNECTION:

- Connect the pressure relief pipe (N) to a copper discharge pipe (15mmØ min.).



1



Electrode gap

3.5 - 4.0mm

2.0 - 2.5mm

OIL BURNER & PUMP

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

OIL BURNER:

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

2 IMPORTANT: Before removing or fitting a nozzle (A), loosen screw (D) and move the electrodes (B) forward.

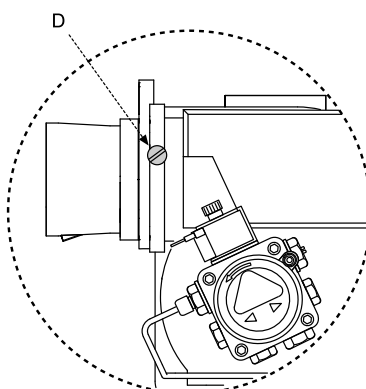
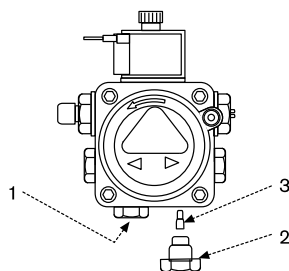
After refitting check that the electrode gaps are correct, as shown opposite.

NOTE: the 12/18 model has a brass deflection washer and locating circlip behind the nozzle. These must be in place for the correct operation of the burner.

IMPORTANT: Whenever replacing the combustion head, ensure that the photocell is lined up with the sight hole.

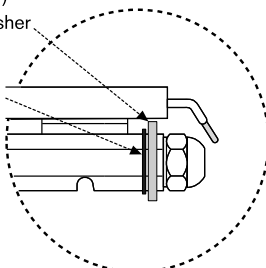
2

RIELLO RDB OIL PUMP



(on 12/18 model only)
Brass air deflector washer

Locating circlip



OIL PUMP:

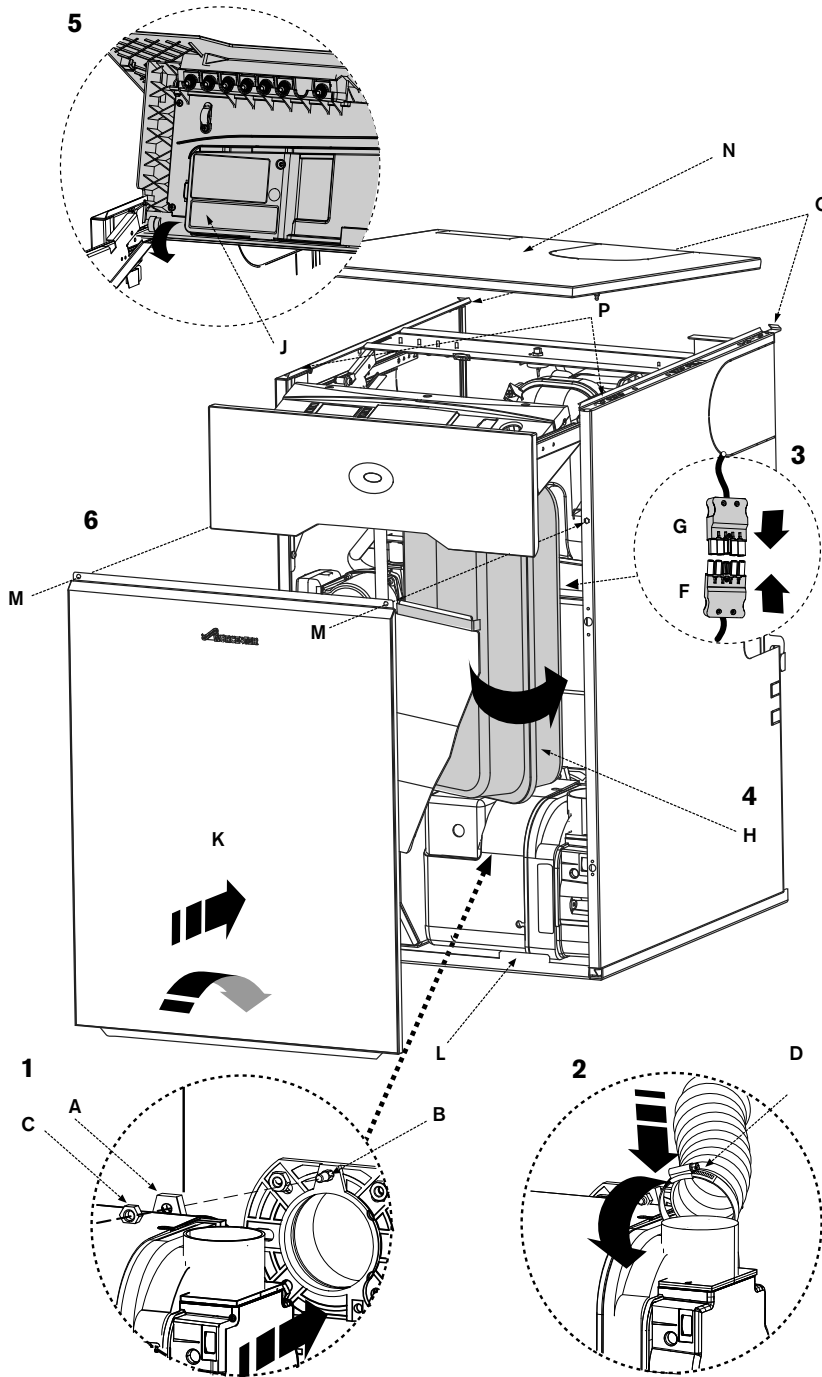
Connecting the oil pump for a single pipe system:

- ▶ The pump is factory set for single pipe operation with the flexible oil pipe fitted.
- ▶ Check connections before use.

Converting the oil pump for a double pipe system:

- 1 ▶ Check the inlet pipe connection (1).
- ▶ Unscrew return plug (2).
- ▶ Screw in by-pass screw (3).
- 2 ▶ Connect the flexible oil pipe **return** hose (not supplied) to the oil pump and return pipe fixing (D on page 24) and tighten to secure.

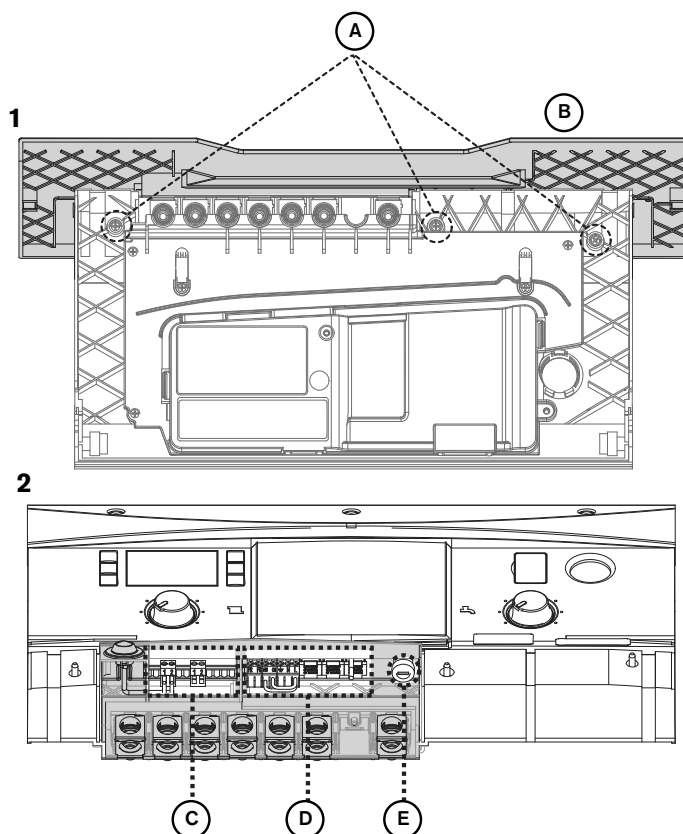
REFITTING COMPONENTS



- 1 ▶ Align burner combustion head into the boiler collar.
- ▶ Locate the burner retainer (A) over the threaded lug on the collar (B), push the burner firmly into the flange and secure in place with the retaining nut (C). Tighten sufficiently but do not over tighten.
- ▶ Check that the burner is seated correctly on its mounting flange and that the oil hose/s are routed correctly as shown on page 27.

IMPORTANT: Ensure the o-ring seal between the burner collar and mounting flange is in good condition to prevent flue gases escaping from the combustion chamber into the room.

- 2 ▶ Refit the flexible air duct and secure with clip (D).
- 3 ▶ Plug burner lead (F) into connector (G).
- 4 ▶ Swivel the expansion vessel (H) back into position taking care not to kink the flexible hose or snag electric cables.
- 5 ▶ Refit control box.
 - ▶ Rotate the box towards you (J).
 - ▶ Slide control box drawer back into position.
- 6 ▶ Refit panels.
 - ▶ Locate bottom edge of panel (K) onto the bottom supporting ledge (L) on the boiler.
 - ▶ Secure panel (K) with screws (M).
- 7 ▶ Locate top panel (N) onto brackets at rear if the side panels (O). Locate ball stud connections (P) and press down to secure.



ELECTRICS

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

**IMPORTANT: OBSERVE ELECTRO-STATIC
DISCHARGE PRECAUTIONS.
DO NOT TOUCH THE PCB CIRCUITS.**

- The boiler is pre-fitted with a mains supply cable.
- The mains electrical supply to the boiler must be through a fused double pole isolator situated, where practicable, adjacent to the boiler.
- The isolator must have a contact separation of 3mm minimum in both poles.
- Any additional equipment connected to the boiler must not have a separate electrical supply.
- External fuse rating 5A.

IMPORTANT: When wiring mains and control cables ensure that the cable has sufficient length for the control box to be slid forward and tilted over.

Access to electrical connections:

Access to all wiring connections are via the Installer access cover at the bottom front of the control board.

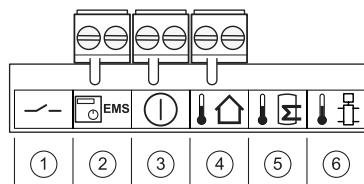
- 1 ▶ Release the 3 captive screws (A) and remove the Installer access cover (B).

Electrical connections:

- 2 C. Low voltage connections.
D. Mains voltage connections.
E. Fuse carrier.

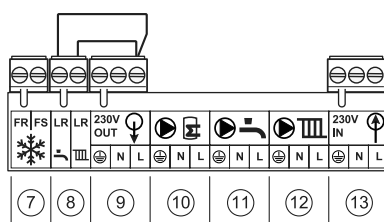
NOTE: DHW LR switched live:

This input provides the live feed in from a connection for a proprietary twin channel control to time the tank reheat function on the DHW. All Worcester twin channel digital controls provide this functionality, but the link is required for them to function.



Low voltage terminal strip	
1	NOT USED
2	EMS bus connections
3	Service mode switch
4	Outdoor compensation sensor
5	NOT USED
6	NOT USED

Pre wired links



Mains voltage terminal strip	
7	External 230V AC frost thermostat
8	230 V.A.C. switched live inputs
9	230 V.A.C. mains output to wiring centre
10	NOT USED
11	NOT USED
12	NOT USED
12	Boiler 230 V.A.C. mains supply

ELECTRICS



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

MOUNTING OPTIONAL PLUG-IN CONTROLS:

Removing the blanking plate:

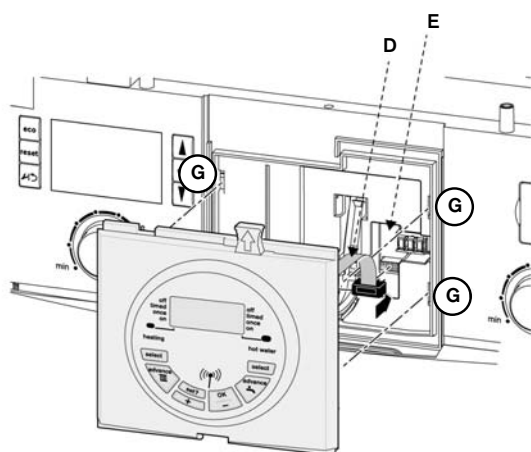
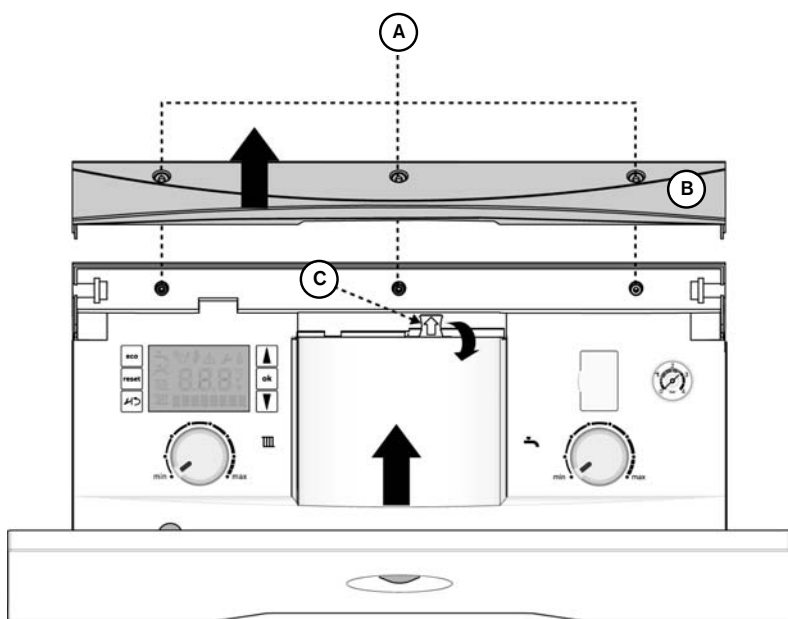
The control panel must be pulled fully forward to gain access to the top cover panel (refer to page 24 for access to the control panel).

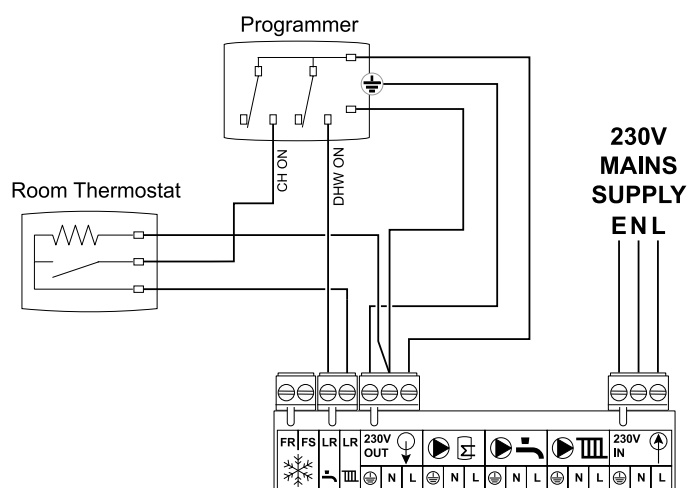
- 1 ▶ Release the 3 captive screws (A) and remove the access cover (B).
- ▶ Use the tab (C) to lift and also press down on the bottom edge of the blanking plate and at the same time push the blanking plate upwards to release it from the clips on the control panel.
- ▶ Pull the blanking plate forwards to remove.

Fitting the programmer/timer:

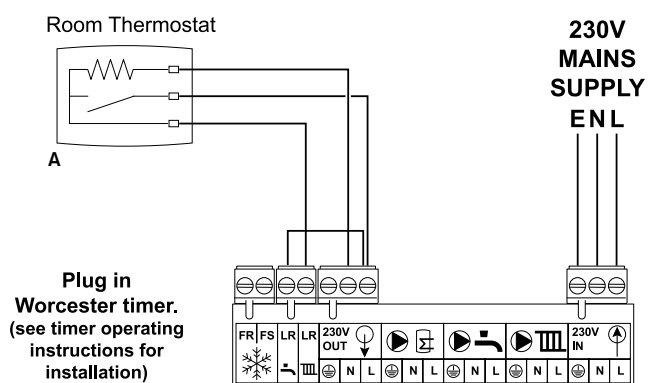
- 2 ▶ Connect the ribbon cable to the socket (D) in the control panel, ensuring the cable will fit into the recess (E) in the control panel.
- ▶ Align the clips on the back of the programmer/timer with the slots (G) in the control panel and push in to engage the clips into the 4 slots.
- ▶ Pull the programmer/timer downwards to secure into place.
- ▶ Replace the top access cover (B) securing in position with the 3 screws (A).

NOTE: Weather Compensation:
For information about Weather
Compensation see page 34.

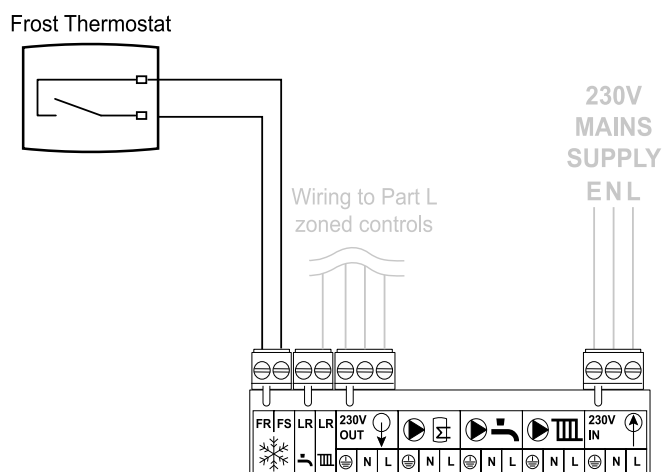




External 230V Twin Channel Programmer and Room Thermostat

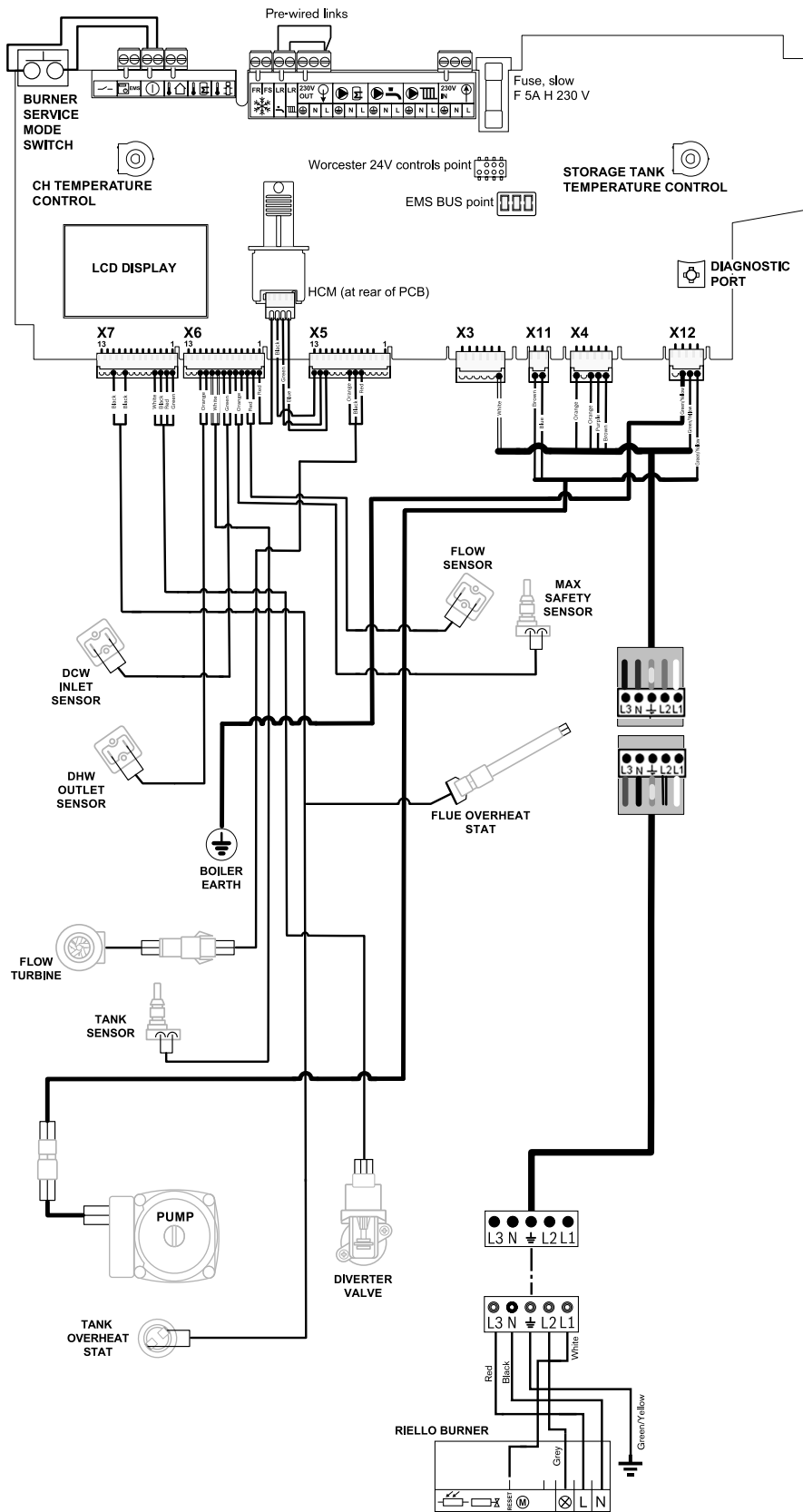


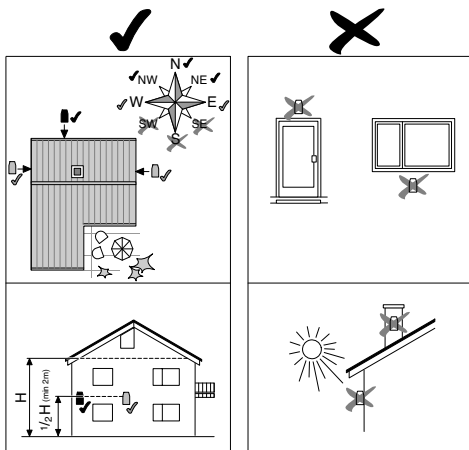
Room Thermostat and Plug In Twin Channel Programmer



Optional External 230V AC Frost Stat Connection for protection of system pipework in unheated air space

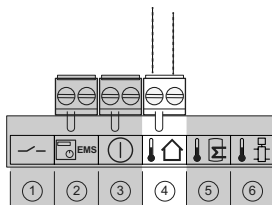
▶	Connect frost thermostat cables to terminals Fs & Fr.
●	These connections are not polarity sensitive.
●	The Boiler internal frost protection will bring on the burner if required.





Weather compensation sensor optimum siting indicated by black tick.

The sensor is wired directly into the control box via terminal 4 in the low voltage terminal strip (see page.30).



WEATHER COMPENSATION

The appliance will modulate the CH flow temperature based on the outside temperature when an outdoor sensor is connected to the outdoor sensor connection on the control board and the weather compensation is active.

This is designed for use with a system that has thermostatic radiator valves and a room thermostat.

The appliance will operate at lower temperatures when there is a lower heat load because the building is losing less heat due to higher external temperatures. This means that the appliance is running more efficiently as it is operating for longer at condensing temperatures.

The weather compensation curve can be adjusted to tune the flow temperature to suit the particular installation.

The appliance is supplied with the weather compensation deactivated.

Weather compensation activation:

The weather compensation is activated via menu 1 of the text display.

- ▶ Select Menu 1 via ▲ ▼ scroll buttons.
- ▶ Press OK button.
- ▶ Select W1 via ▲ ▼ scroll buttons.
- ▶ Press OK button.
- ▶ Set W1 to 1 via ▲ scroll button.
- ▶ Press OK button.

The weather compensation is now active and the appliance will check for the presence of an outdoor sensor and deactivate the CH flow temperature modulation if a sensor is not detected. When weather compensation is activated but an outdoor sensor is not fitted/detected, the warning triangle and H03 will be displayed on the LCD display.

The heating curve:

The CH flow temperature has an upper limit of 82°C (this can be capped via the CH control knob setting) and a lower limit of 50°C, (it is recommended that the CH knob is set to 82°C for the weather compensation to operate most effectively).

The default settings for the curve are point A = 90°C and point B = 40°C, this gives a 80°C flow at -4°C outdoor temperature and a 50 °C flow at 14°C outdoor temperature which should be suitable for typical systems.

Point A is the projected value for the flow temperature at -10°C outdoor temperature and point B is the projected value for the flow temperature at +20°C outdoor temperature, (these values dictate the angle of the slope only they are not CH flow temperature limits).

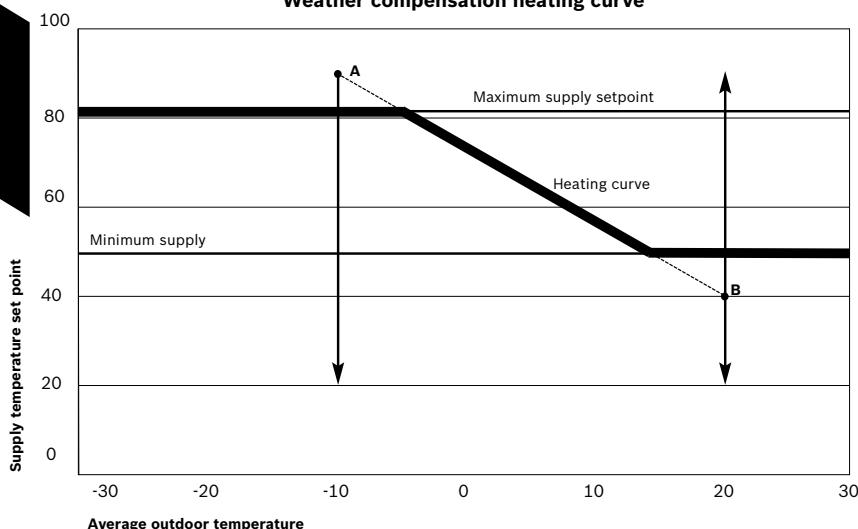
Frost protection:

The normal condition for the appliance is that the weather compensation frost protection is turned Off.

If required the frost protection is activated via Menu 1 W5 of the text display, 0 = OFF, 1 = ON.

On Activation of the weather compensation frost protection if the outdoor temperature is less than 5°C the system frost protection is activated the same as if an external frost thermostat was activated.

Weather compensation heating curve



Adjusting the heating curve

- The weather compensation curve can be adjusted via the text display by adjusting the projected flow temperature at -10°C (point A), Menu 1 W2 (pA), and 20°C (point B), W4 (pB), enabling the slope as well as the position of the curve to be adjusted to suit the installation.
- Point A and B can be set between 90 and 20°C but point A must always be greater than point B.

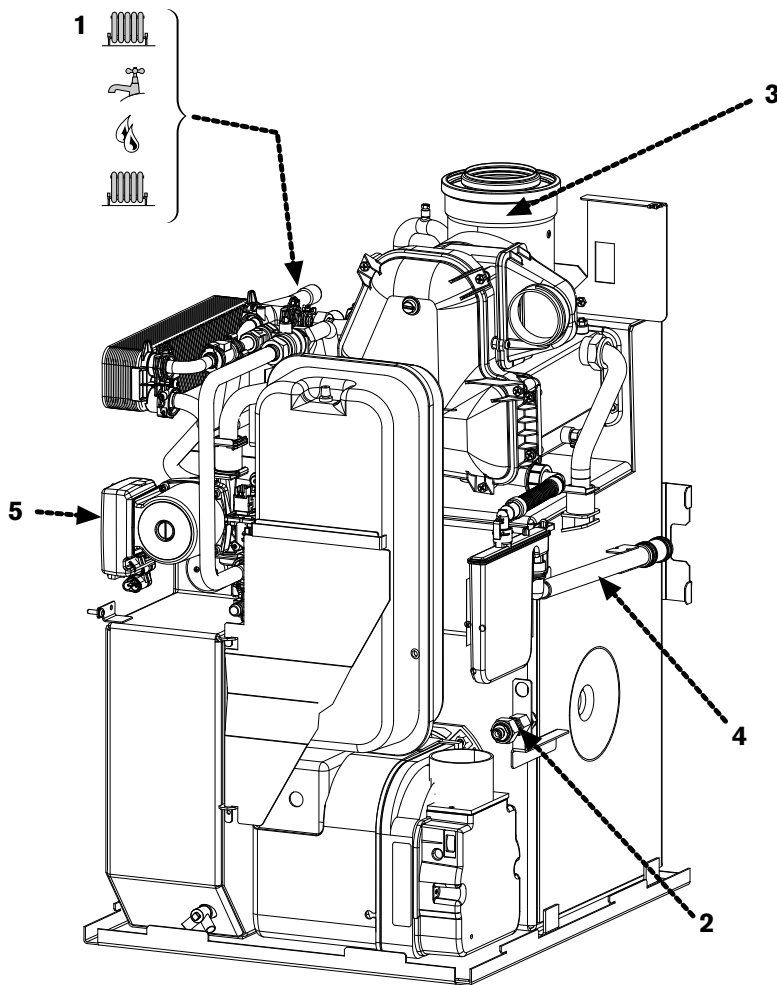
Outdoor sensor error

- If during weather compensation the outdoor sensor is open circuit or closed circuit the CH flow temperature modulation is deactivated and the CH flow temperature set to the CH control knob setting, a warning triangle and H03 are displayed on the LCD.
- The appliance will monitor the outdoor sensor input and if the sensor returns to normal then the flow temperature modulation will be reactivated and the LCD warning triangle and H03 are turned Off, (there may be a 10 second delay).

Average outdoor temperature

- To stop rapid fluctuations the outdoor temperature used for CH flow temperature modulation is an average value taken over a ten minute period.
- When an outdoor sensor is first detected the sensor value is taken to be the outdoor temperature, subsequent to this the outdoor temperature will be adjusted every 10 minutes using an average outdoor temperature value from the previous 10 minute period.

PRE-COMMISSIONING CHECKS - APPLIANCE



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.
- 2 ▶ Check that the oil supply is kerosene and that the pipework is connected correctly to the oil pump via the supplied flexible oil hose (see correct routing for flexible hose on page 27).

- ▶ Turn on the main oil supply valve at the tank, check the oil supply pipework and connections. Rectify any leaks.

NOTE: Replace flexible hose at annual service to prevent possible oil leakage.

- 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.

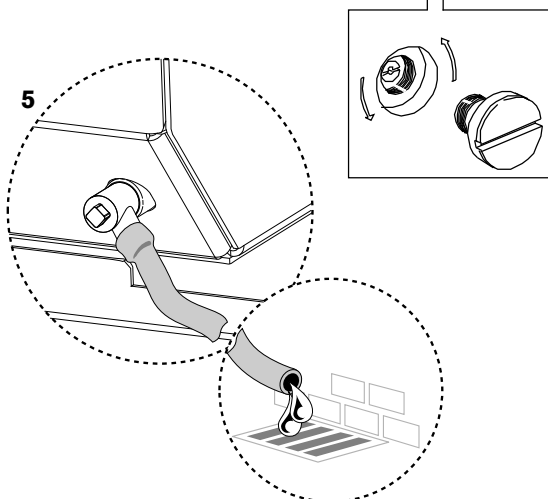
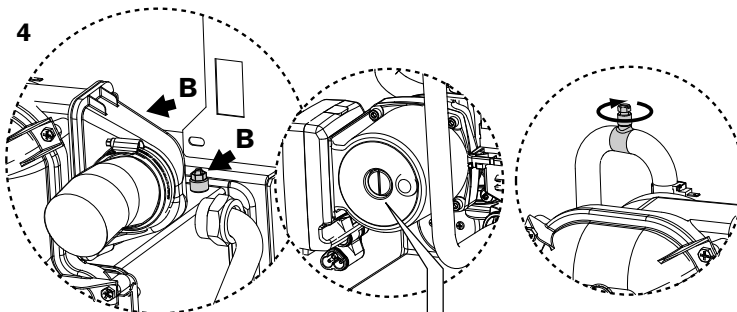
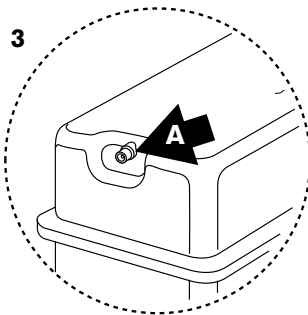
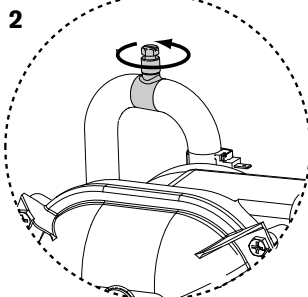
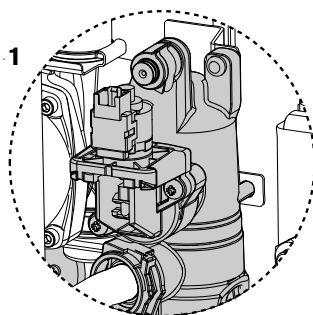
- 5 ▶ Check the CH circulating pump is set to 3.

NOTE: The CH circulating pump is preset to number 3 and should not be altered.

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, and complete a CD10 or equivalent to inform the LABC of the installation.



FILLING THE SYSTEM

- 1 ▶ The diverter valve will sit in mid-position when the boiler has no demand and is powered up.
- 2 ▶ Loosen the flow pipe manual air vent screw.
- 3 ▶ Check and if required, adjust the expansion vessel pressure using the Schraeder type valve (A).

The charge pressure of the built-in 12 litre expansion vessel is 0.5 bar as dispatched, which is equivalent to a static head of five metres. At 1 bar pressure the vessel will provide 107 litres expansion capacity, the boiler has a primary water capacity of between 62 and 64 litres and therefore additional system expansion capacity may be required.

Total system volume (litres)	Initial system pressure (bar)	Initial charge pressure (bar)
180	0.5	0.5
107	1.0	0.5
138	1.0	1.0

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

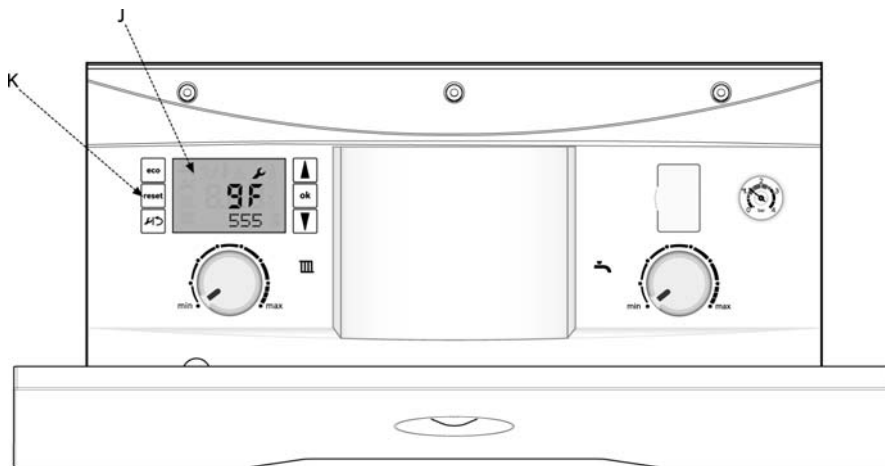
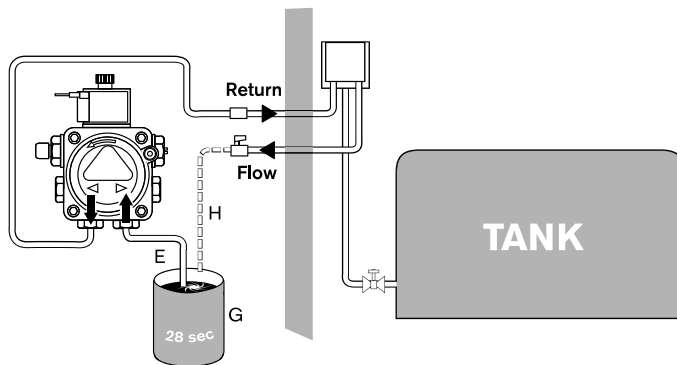
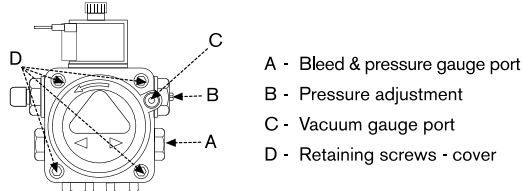
- 4 ▶ Open all system and radiator valves.
 - ▶ Turn on the water main stop cock.
 - ▶ Close the flow pipe manual air vent when water is vented.
 - ▶ Fill the system to between 1 and 2 bar pressure via a WRAS approved filling link. Monitor the pressure gauge during venting and repressurise if required.
 - ▶ Check air is being discharged from the automatic air vents.
 - ▶ Vent all radiators, retighten when completed, check the system and correct any leaks.
 - ▶ Bleed air from both of the secondary heat exchanger air vents (B) and flow pipe air vent.
 - ▶ Bleed air from the pump using the pump bleed screw.
- 5 ▶ Connect a suitable hose to the Heatslave tank drain. Open the drain valve to reduce the system to the correct pressure, then close the drain valve. Ensure safe disposal of the discharge.
- 6 ▶ Check system and rectify any leaks.

STARTING THE APPLIANCE

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

1

RIELLO RDB OIL PUMP



- 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:

- **The oil supply to the boiler should be primed before the burner is operated to avoid unnecessary pump wear.**
- **The use of an oil suction pump will prime and flush through any oil supply set up simply and easily, alternatively the following procedures can be used.**

▶ Single pipe gravity feed systems:

- ▶ Disconnect the flexible oil hose and open the isolating valve to discharge the oil into a suitable container.

NOTE: Replace flexible hose at annual service to prevent possible oil leakage.

- ▶ If a top entry tank has been used the pipework will need to be primed before the oil will discharge under gravity.
- ▶ When completed, close the isolating valve, reconnect the flexible oil hose.

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

- ▶ To prime a de-aerator, disconnect the flexible oil inlet hose (E) from the isolation valve and place in a container of kerosene (G). Connect a spare flexible oil hose (H), to discharge into container (G). Open the isolating valve, turn on the power to the boiler and set the programmer to ON. Prime the de-aerator until there is a steady flow of oil into container (G). Turn off the boiler then reconnect the flexible oil inlet hose (E).

- ▶ Turn on the boiler, the oil level in the de-aerator will drop as the oil is used until the oil is drawn from the tank. If the de-aerator empties and the burner locks out before the oil is drawn from the tank, prime the de-aerator again.

When the oil reaches the pump, bleed the air from the pump as follows:

- ▶ Open the isolating valve and the oil pump bleed port (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 lockout indicated by the control panel LCD display (J) showing code **9F 555**.

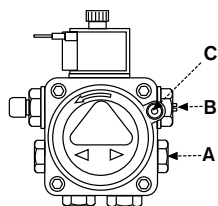
If no oil comes out of the port valve A, then re-prime the oil line as detailed above.

- ▶ Wait 2 minutes then press the lockout reset button (K).
- ▶ Repeat the procedure 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.

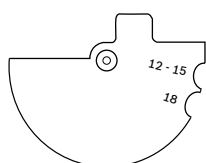
The internal filter is accessed by removing the oil pump cover.

- ▶ Safely dispose of the container/discharge.

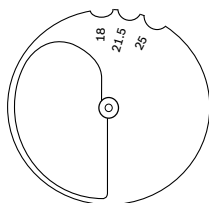
RIELLO RDB OIL PUMP



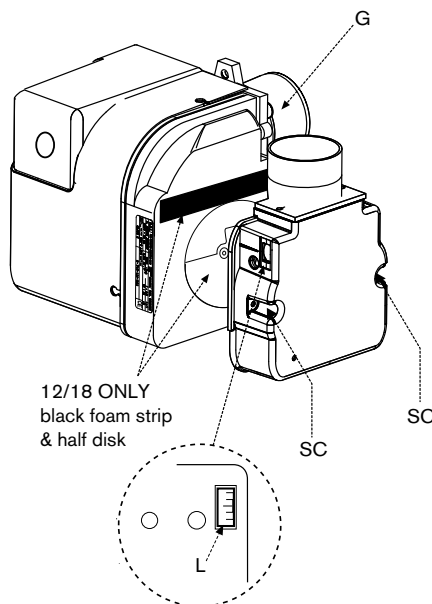
- A - Bleed & pressure gauge port
- B - Pressure adjustment
- C - Vacuum gauge port



12/18kW



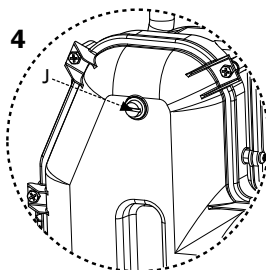
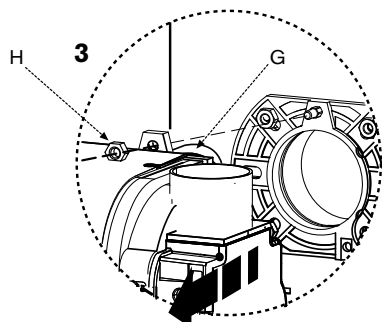
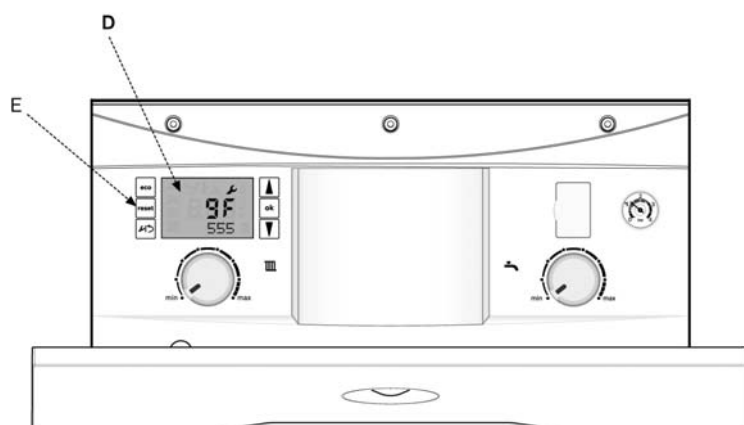
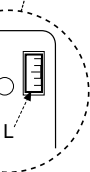
18/25kW



12/18 ONLY
black foam strip
& half disk

SC

SC



STARTING THE APPLIANCE

- 2 ▶ Fit a suitable pressure gauge to port (A) on the oil pump.

IMPORTANT:

If changing the burner output, ensure the position of the air damper disk is correct for the desired output. Refer to the table on the following page.

▶ 12/18 & 18/25 - RIELLO RDB 2.2

Adjust position of the air damper disc to suit the burner output (see chart on page 44), located as shown in the diagram opposite. Access is by loosening the two star screws (SC) to release the air inlet manifold.

• 25/32 - RIELLO RDB 2.2

No damper disk is fitted to the 25/32kW burner.

- ▶ Adjust the air shutter (L) and pump pressure (B) as shown opposite. The burner should ignite following a pre-ignition period of approximately 15 seconds.

NOTE: The MO535 MRF control box has an 3.5 second delay before the start of the pre-ignition.

Boiler lockout:

If the burner 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 on the control panel LCD display (D) by code 9F 555.

- ▶ Wait two minutes then press the lockout reset button (E) 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 combustion head (G).

If after-spurting occurs:

- ▶ Release the burner retainer nut (H).

- ▶ Remove the burner, combustion head (G) and electrodes, hold the burner vertical to unscrew the nozzle and fill the nozzle holder with oil.

- ▶ Refit nozzle, electrodes, combustion head (G) and the burner.

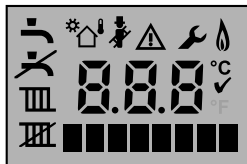
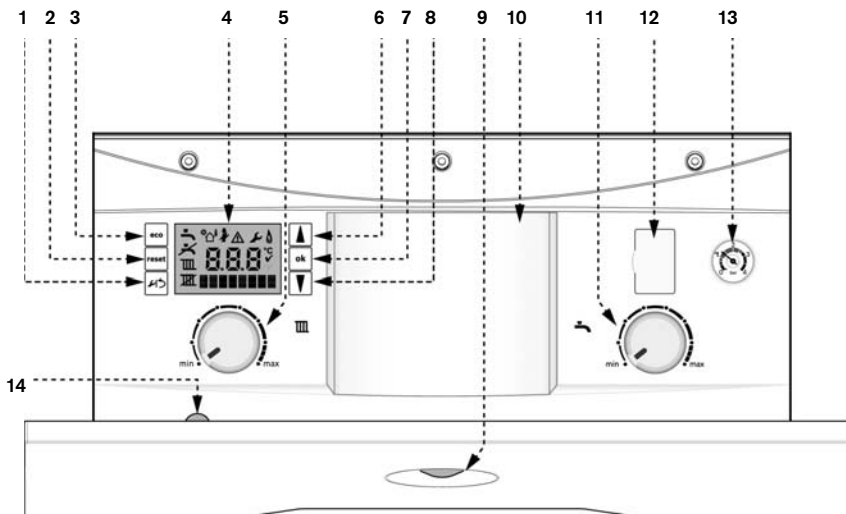
- ▶ Restart and run for 3 minute intervals until after-spurting stops.

- 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.

STARTING THE APPLIANCE



Boiler start up screens:

1. All the symbols are displayed for approximately 2 seconds.



2. Internal test screen.



3. Primary temperature from the heat exchanger displayed.

Control board:

- 1 Spanner/return button
- 2 Reset button
- 3 ECO button
- 4 Boiler LCD display
- 5 Central heating temperature control
- 6 Scroll up button
- 7 OK - Select/confirmation button
- 8 Scroll down button
- 9 Operation and fault indicator (blue)
- 10 Position for optional programmer
- 11 Hot water temperature control
- 12 Diagnostic port
- 13 System pressure gauge
- 14 Burner service mode button

Switching the appliance on/off:

- ▶ Turn on the mains power supply, initially the 'Boiler start up screens' will be displayed (refer diagram opposite:)
- ▶ Turn on any external controls.
- ▶ Set the thermostatic radiator controls to maximum.
- ▶ Set the clock/programmer to continuously ON and the room thermostat to maximum temperature

The blue operation/fault indicator light will be illuminated when there is a demand for heat and hot water.

- ▶ Turn the boiler CH temperature control (5) to maximum.

If the boiler fails to light, a flashing fault code will be displayed.

NOTE: Do not press the blue operation/fault indicator (9) to reset the boiler.

- ▶ To reset the boiler, press the reset button (2), the 'tick' symbol will be displayed briefly for a successful reset.

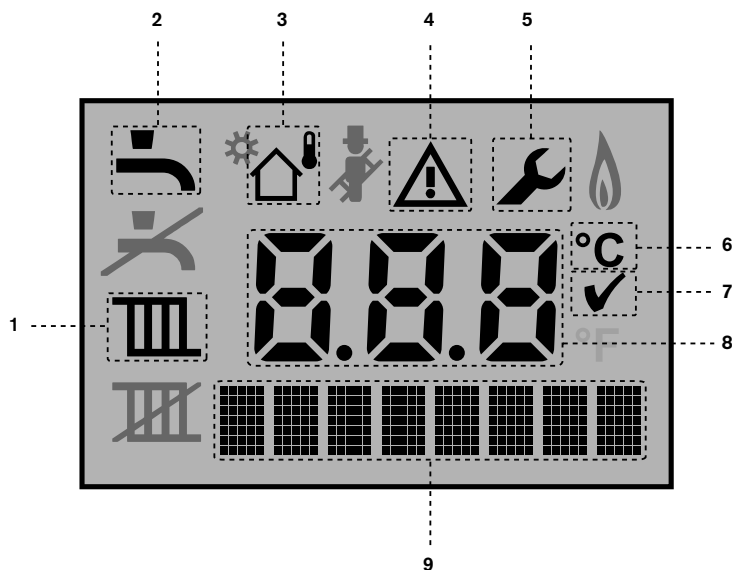
Boiler start up screens:

On initial start up, the following screens are displayed:

- 1 ▶ All the symbols are displayed for approximately 2 seconds.
- 2 ▶ The control will run an internal test.
- 3 ▶ When the internal test has been successfully performed, this screen is displayed:
 - ▶ The boiler is in stand-by.
 - ▶ The flow temperature sensor indicates the primary temperature from the heat exchanger (not the target set point).
- 4 ▶ If no adjustments are made for 30 seconds, the back light is turned off.
 - ▶ As soon as an adjustment is made, the screen will light up and the relevant information will be displayed

COMMISSIONING

STARTING THE APPLIANCE



Screen display:

All possible screen symbols are displayed briefly during start up. Extended diagnostic features have rendered the greyed out symbols not required for the operation of this appliance.

- 1 Central heating symbol**
Displays this symbol during CH demand.
- 2 Hot water symbol**
Displays this symbol during DHW demand (DHW flow rate > 2ltr per minute) and tank reheat.
- 3 Weather Compensation active symbol**
Displays this symbol only if a Weather Compensation sensor has been fitted to the appliance and is active.
- 4 Alert symbol**
Displays with the boiler status code and diagnostic code during a fault condition.
- 5 Service mode symbol**
Displays when in the service menu.
- 6 Centigrade symbol**
Displays next to the temperature reading.
- 7 Confirmation symbol**
This symbol confirms a manual change.
- 8 Alpha/Numerical display**
Displays a temperature or boiler status code.
- 9 Text display**
Displays ECO or diagnostic code.

Status Code		
200	CH active	The Central Heating system is being heated.
201	DHW active	The Domestic Hot Water is being heated/tank is being heated.
202	CH Anti rapid-cycle mode	Time delay to prevent rapid-cycling of the boiler on the room thermostat.
203	System stand-by	The boiler has no demands.
204	System waiting	Primary flow temperature is above set point.
270	Power up mode	The boiler is ON, warming up and running self check routines. This lasts approximately 35 seconds.
358	Three way valve anti-seize	Anti-seize operation. If the diverter valve has not moved in 24 hours, the valve is operated to prevent seizing, duration approximately 10 seconds.

Status codes:

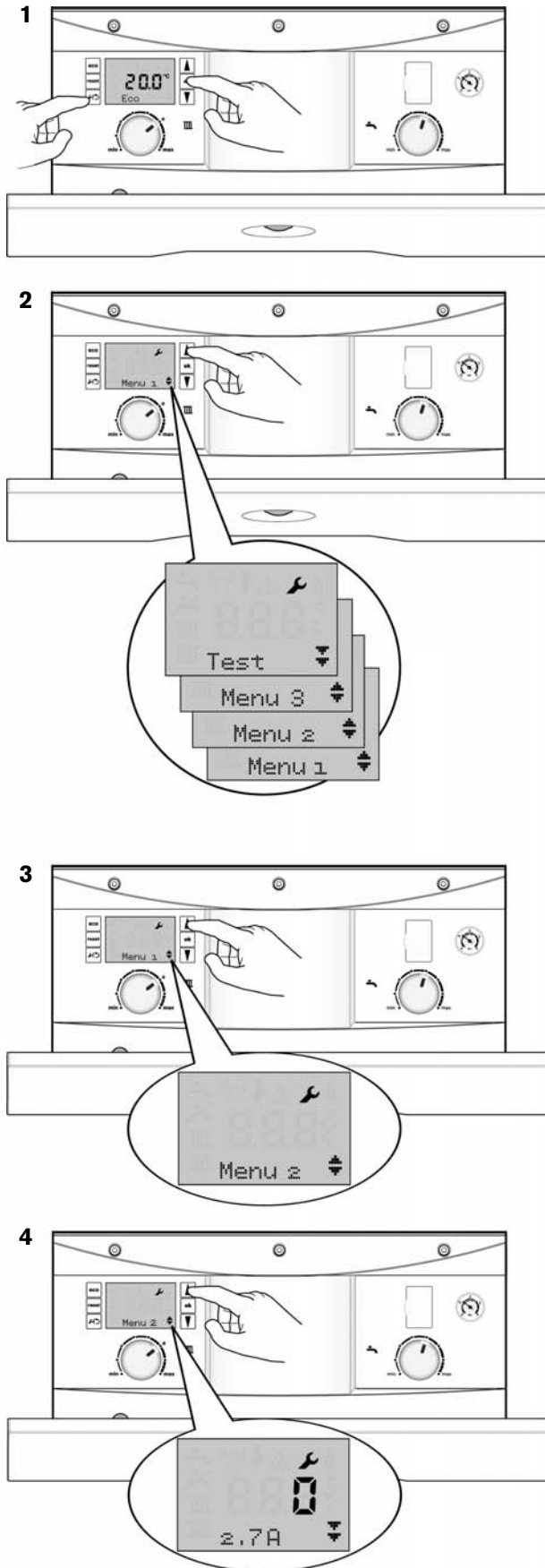
During normal operation various status codes can be displayed by pressing the service button.



The first screen of the information menu displays the current status code, this will change as the boiler runs through the various modes and sequences.

These are not faults, but provide information concerning the current status.

STARTING THE APPLIANCE



Selecting Service Menus:

- 1 ▶ Press and hold and buttons together for 1 second, the display will show Menu 1.

Double up or down arrows indicate that the menu can only be scrolled up or down.

An up and down arrow indicates position in the menu where options can be scrolled either up or down.

- 2 ▶ Scroll up and down through the menus with the arrow buttons.

Menu 2 - Boiler parameters:

- 3 ▶ Select Menu 2 via the and arrow buttons.
- ▶ Press and hold the OK button, for 1 second to enter Menu 2.

The menu lists the boiler parameters, which can be adjusted in this menu.

To modify setting:

- 4 ▶ Select the desired menu option using the arrow buttons (refer to the table below) and press the OK button, the option will flash.
- ▶ Adjust the parameter using the up and down arrow buttons and press the OK button to confirm.

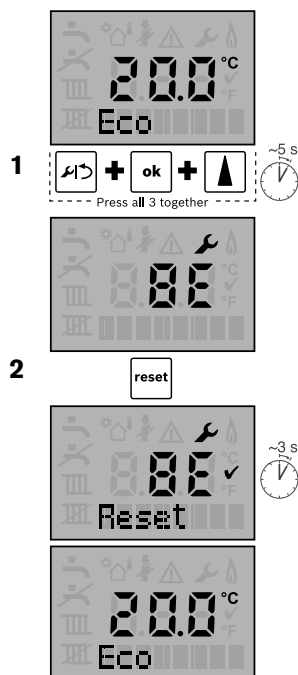
A tick will appear on the display for 3 seconds to confirm the update of the new value.

The same process is used for adjusting Menus 1 & 2.

Menu 2 parameter.

2.7A	Demand /fault indicator (blue light) activation	0 = The blue light will only operate as a flashing fault alert. 1 = The blue light will operate as a boiler demand light and fault alert. This is set to 1 by default.
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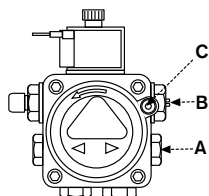
STARTING THE APPLIANCE

**Reset to factory settings:**

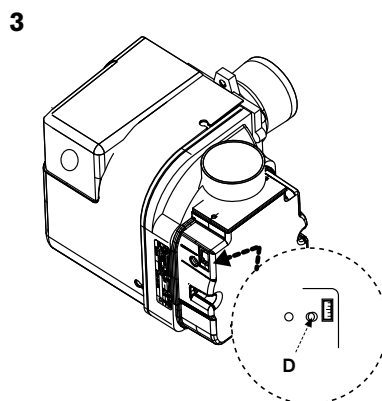
To reset any or all changes made in Menu 2 back to the factory default setting:

NOTE: Any changes made to Menu 1 are not reset by these actions.

- 1 ▶ Press and hold the and buttons for at least 5 seconds. The screen will then display code BE with the spanner symbol.
- 2 ▶ Press the button and 'reset' will be displayed with the tick symbol for 3 seconds. After 3 seconds the display will revert to the normal operation screen.

**RIELLO
RDB OIL PUMP**


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

**Finish pre-commissioning boiler checks:**

- ▶ Check the CO₂ levels and adjust the air shutter (L) 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.

3 ▶ 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 (D) to obtain the correct CO₂ level.
- ▶ Refit the sample point cap (hand tighten only, do not over tighten) and refit the burner cover.

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

NOZZLE	OIL PUMP PRESSURE (Bar/Psi)	FUEL FLOW RATE		APPROX. FLUE GAS TEMP °C	%CO ₂	APPROX. AIR SETTING	INPUT	OUTPUT	AIR DAMPER DISC SETTING	BURNER HEAD
		Kg/h	l/h				(APPLIANCE) kW	(APPLIANCE) kW		
Boiler 12/18 RDB 2.2										
0.35 80°SR	9/132	1.04	1.32	64	11.0	3.0	12.3	12.0	12/15	LD2X Short
0.45 60°ES	7.5/110	1.28	1.63	73	11.5	3.5	15.4	15.0	12/15	LD2X Short
0.55 80°EH	7.8/115	1.54	1.96	76	12.0	5.5	18.5	18.0	18	LD2X Short
Boiler 18/25 RDB 2.2										
0.50 80°ES	8.5/125	1.58	1.96	75	11.0	4.5	18.5	18.0	18	LD2SX Short
0.60 60°ES	8.5/125	1.84	2.33	77	12.0	2.5	22.1	21.5	21.5	LD2SX Short
0.75 80°ES	7.5/110	2.15	2.72	82	12.0	3.75	25.7	25.0	25	LD2SX Short
Boiler 25/32 RDB 2.2										
0.75 80°ES	7.5/110	2.15	2.72	80	11.5	4.5	25.7	25.0	N/A	T2 Short
0.75 80°ES	10/147	2.37	3.0	81	12.0	4.0	28.3	28.5	N/A	T2 Short
0.85 80°EH	9.5/140	2.58	3.27	83	12.5	4.5	30.8	32.0	N/A	T2 Short

WATER TREATMENT

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

FLUSHING (Central Heating):

- 1 ▶ Switch off the boiler.
 - ▶ Open all radiator valves/drain cocks (C) and drain the system while the appliance is hot.
 - ▶ Close drain cocks (C).
- 2 ▶ Add a suitable flushing agent and refill the system at the correct strength for the system condition in accordance with the manufacturer's instructions.
 - ▶ Vent the boiler (there are two vent points (A) at the top of the secondary heat exchanger (only one may be in use, the other may be obscured by side fluing) and one on the flow pipe . Always vent (A) and the vent screw (B) on the pump and all radiators.
 - ▶ Run the boiler/system at normal operating temperature for the time stated by the flushing agent manufacturer.
- 3 ▶ Drain and thoroughly flush the system and boiler (C) to remove the flushing agent and debris.

INHIBITOR (Central Heating):

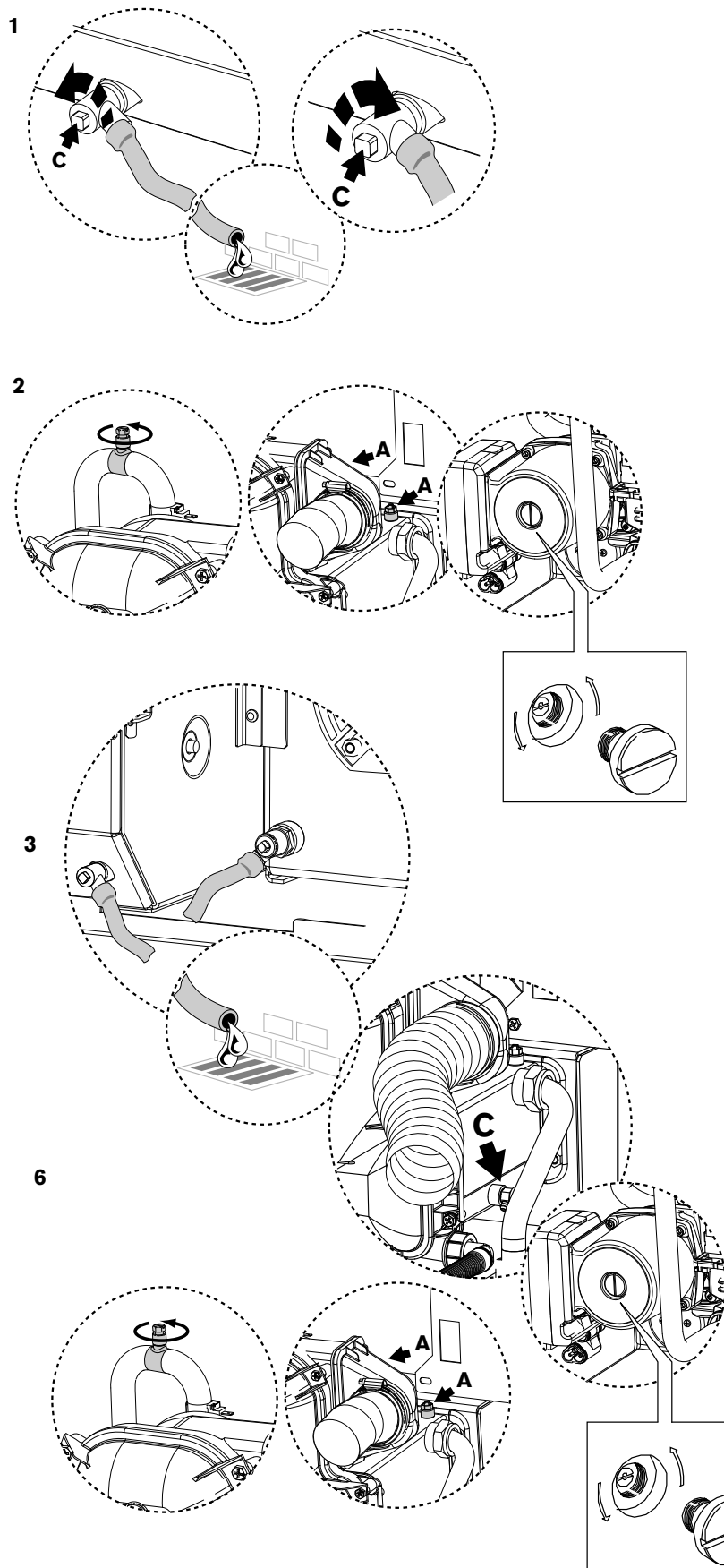
- 4 ▶ Check drain cocks and manual air vents are closed and all radiator valves are open.
- 5 ▶ Add a suitable inhibitor, (or combined inhibitor/anti-freeze if the system is exposed to freezing conditions) to the heating system in accordance with the manufacturers instructions.

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.

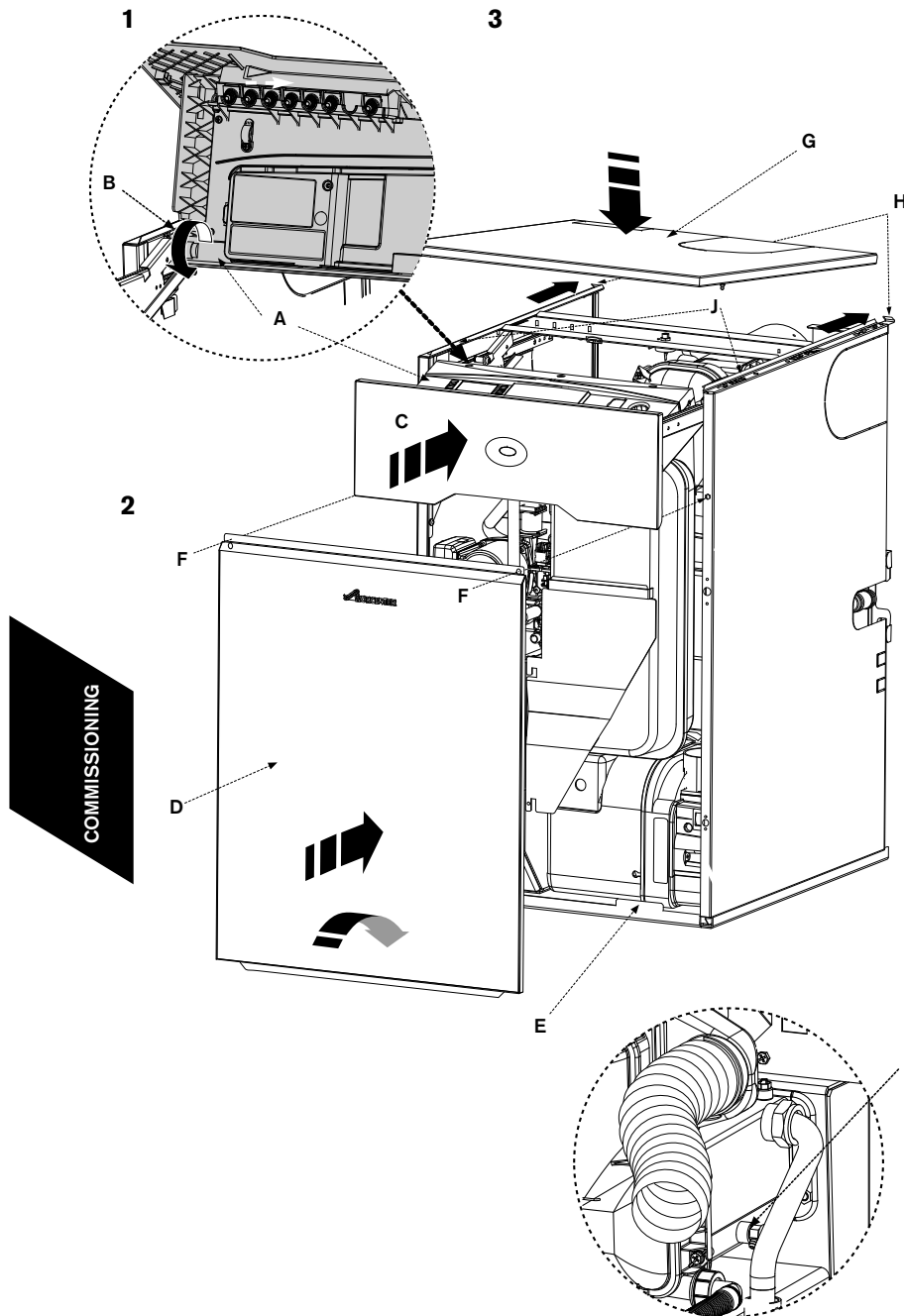
- ▶ Fill the system to between 1 and 2 bar via a WRAS approved filling loop. Check the system pressure during venting and repressurise if necessary.
- 6 ▶ Vent the boiler, there are two vent points (A) at the top of the secondary heat exchanger, and one in the flow pipe. Always vent (A) and the vent screw (B) on the pump 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 advised as this can cause problems with deposits left in the heat exchanger and invalidate the appliance and heat exchanger warranty .



FINISHING COMMISSIONING - APPLIANCE



- 1 ▶ Rotate the control box (A) towards you (B).
▶ Slide back into position (C).
- 2 ▶ Locate the bottom edge of the front panel (D) onto the supporting ledge off the baseplate (E) and secure in place with screws (F).
- 3 ▶ Locate the top panel (G) onto the brackets at the rear of the boiler (H) and locate the ball stud connections (J) and press down to secure.

Always apply pressure at the edges of the boiler panels when securing to avoid accidental damage.

Handover:

- ▶ Complete the Guarantee Registration Card, Combustion Record (at the rear of this manual) and CD11 or an equivalent commissioning form.
- ▶ Set up the controls and show the user how to operate all the controls shown in the User Guide and all system controls.
- ▶ Where applicable, instruct the customer how to repressurise the system.
- ▶ If the appliance is unused and exposed to freezing conditions, shut off all the mains supplies 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 maintain 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:

- ▶ Lift the top panel (A) upwards to disengage the ball stud connections (B) and pull forward to remove.

- ▶ Pull the control box (C) all the way forwards.

- ▶ Depress the two levers (D), one on either side, to release the control box and pull fully forward and swivel control box upwards.

- ▶ Remove securing screws (E) from front panel (G).

- ▶ Lift panel (G) upwards off the supporting ledge (H) and store safely away from the working area.

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.

- ▶ Unplug burner lead (J) from control box Lead (K).

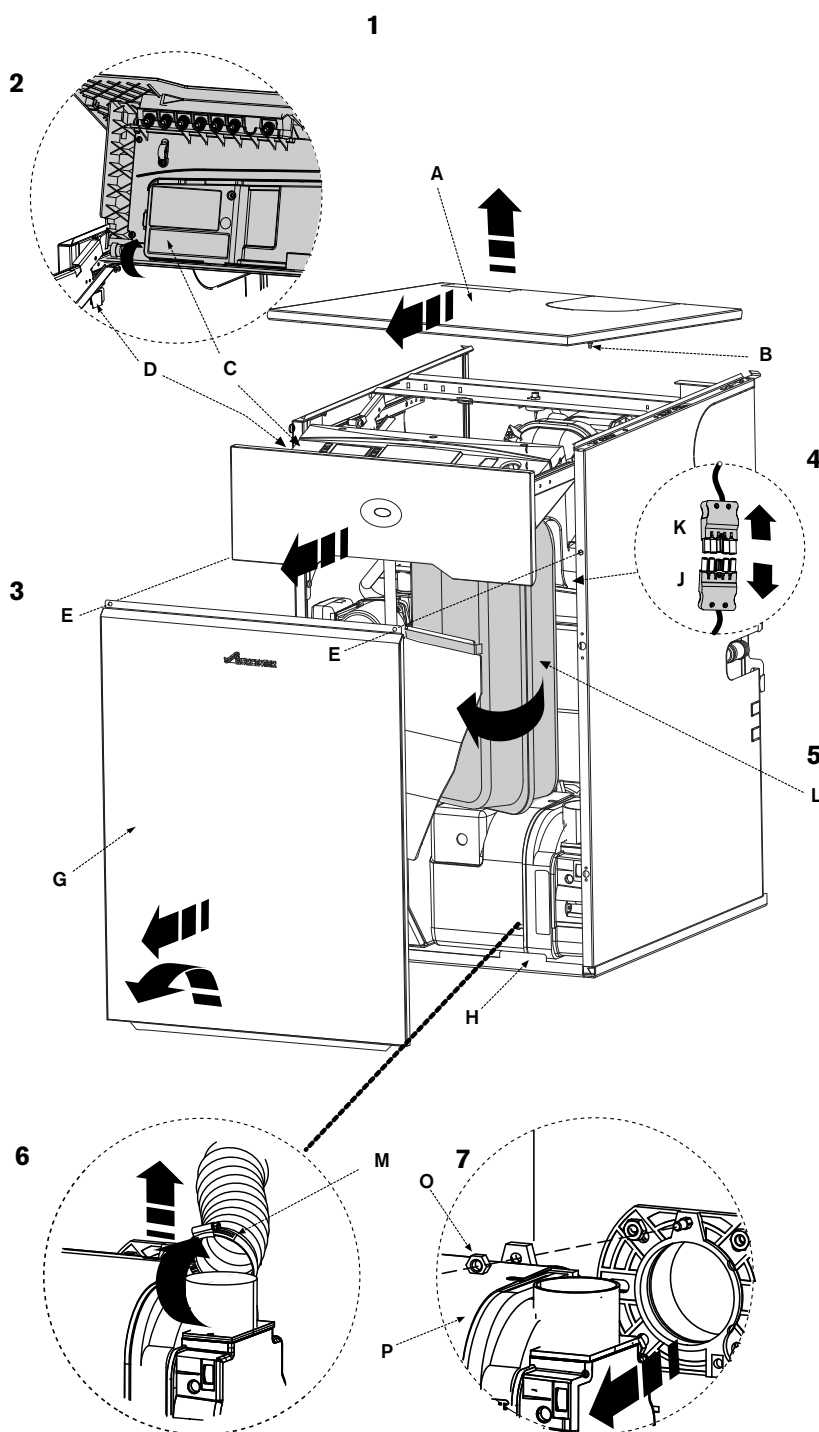
- ▶ Swivel the expansion vessel (L) on its support bracket out of the boiler taking care not to snag any electrical cables or kink the flexible hose.

- ▶ Loosen air duct pipe clip (M) and disconnect the air duct pipe.

- ▶ Unscrew burner retaining nut (O) and remove the burner (P) and store safely away from the boiler.

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 hose/s.
- ▶ Check and clean the baffle retainers.
- ▶ Check and clean the baffles.
- ▶ Check and clean the heat exchangers 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.
- ▶ Check that the condensate system is not obstructed, clean and refill the condensate trap as necessary.



Clean the Burner:

- ▶ Loosen the 2 hex head screws and remove the air intake cover (A) and clear any debris from the air intake and air damper.
- ▶ Disassemble the burner to allow access to the fan impeller.
- ▶ 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.
- ▶ Remove the combustion head (B) and thoroughly clean any deposits.

IMPORTANT: Before removing or fitting a nozzle (C), loosen screw (D) and move the electrodes (E) forward.

After refitting check that the electrode gaps are correct, as shown opposite.

- ▶ Remove the nozzle (C).
- ▶ Check the nozzle holder is clear of any debris and clean if necessary.
- ▶ Fit a new oil atomising nozzle (C).

DO NOT dismantle the nozzle and DO NOT clean the nozzle tip.

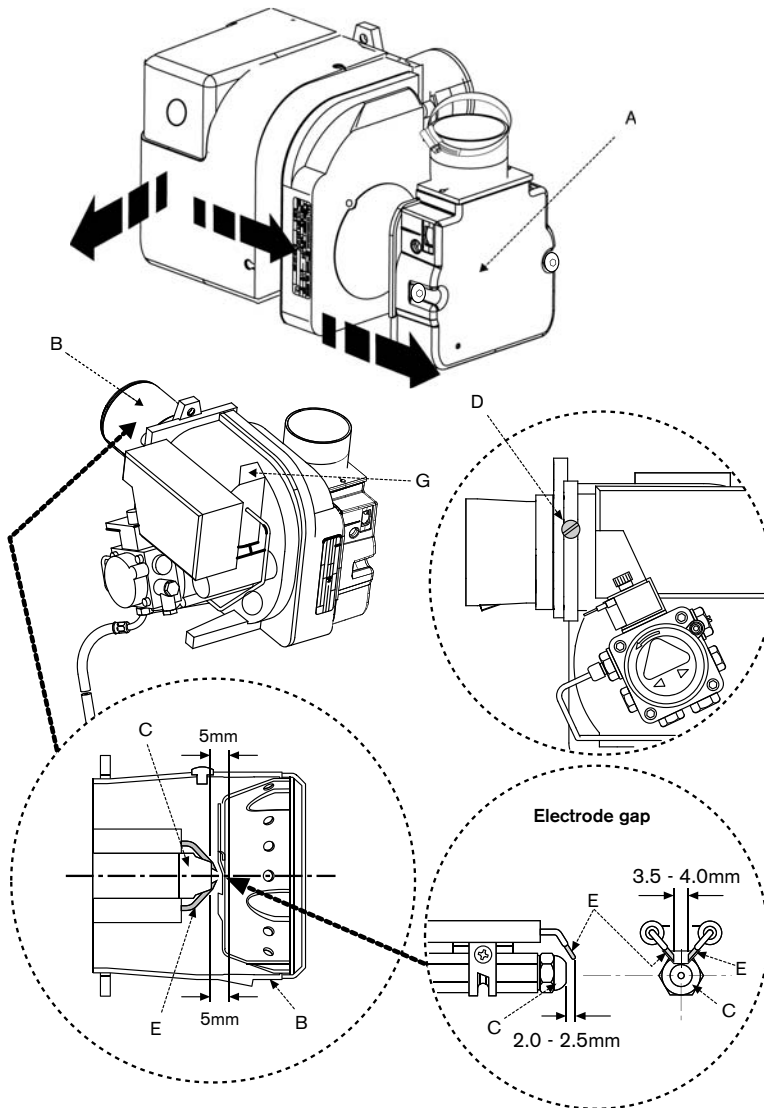
- ▶ Check the electrodes (E) and reset if necessary as shown opposite.

NOTE: The 12/18 model has a brass air deflection washer and locating circlip behind the nozzle. These must be in place for the correct operation of the burner.

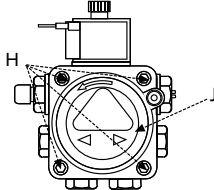
- ▶ Refit the combustion head (B). Check that the nozzle (C) is central in the combustion head (B) and the head settings are as shown. Ensure that the photocell is lined up with the sight hole.
- ▶ Withdraw the photocell (G) from its housing and wipe clean.
- ▶ Remove the oil pump internal filter, clean in kerosene and reassemble.

The internal filter is accessed by removing screws (H) and the oil pump cover (J).

- ▶ 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 O-ring seal located around the combustion head and replace if necessary. **This seal must be in good condition, seal failure will cause flue gases to escape into the room.**



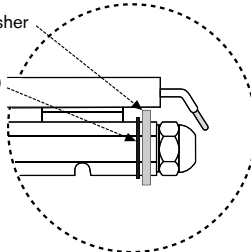
RIELLO RDB OIL PUMP

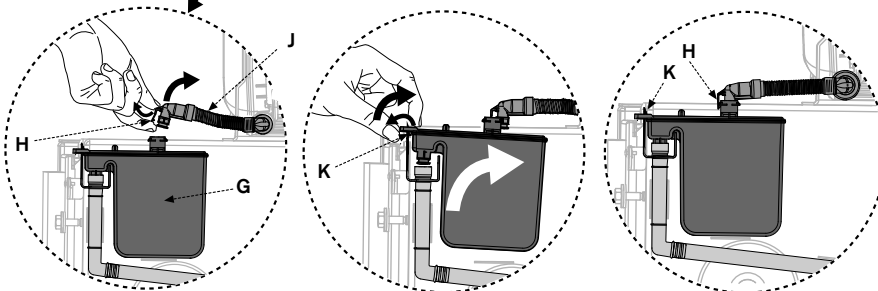
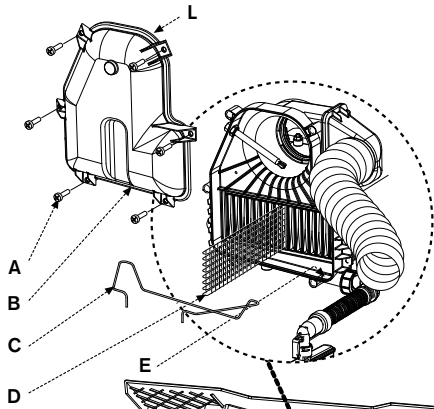
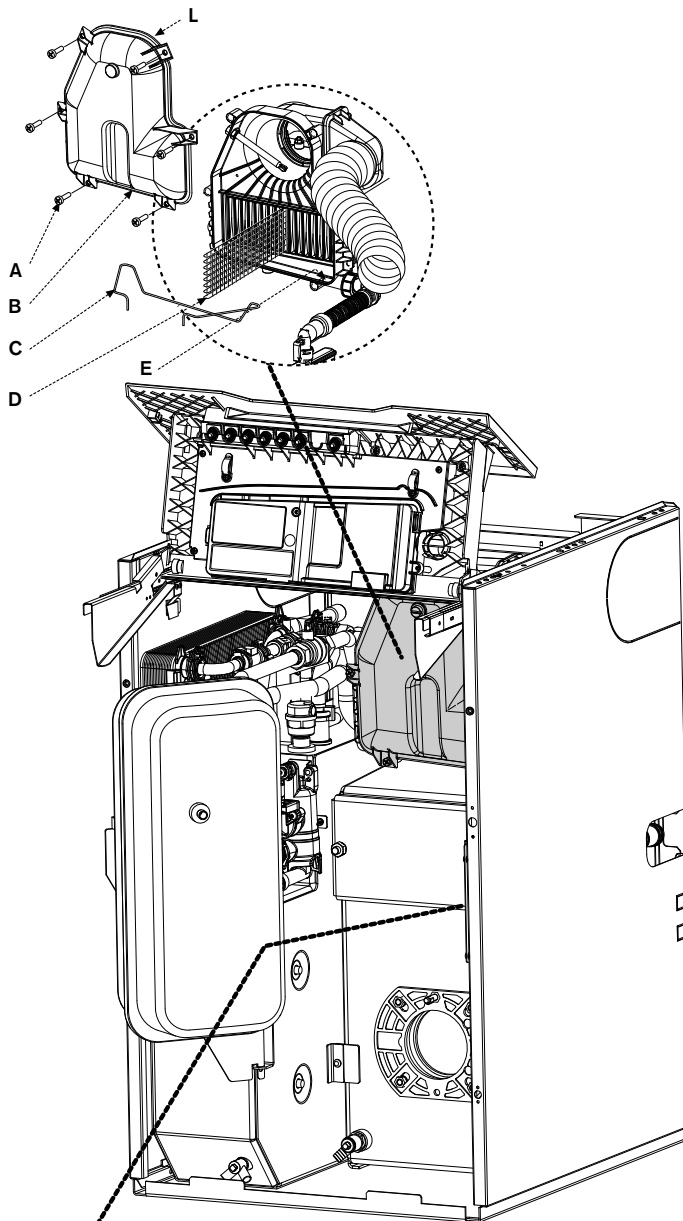


- H - Retaining screws - cover
- J - Cover - oil pump

Brass air deflection washer

(on 12/18 model only)
Locating circlip





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 (A) to remove the flue manifold access cover (B) and clear any debris.
- ▶ Check the flue system and clean if necessary.
- ▶ Remove the baffle retainer (C) and baffles (D) from the secondary heat exchanger.
- ▶ Check and clean the secondary heat exchanger surfaces.

NOTE: Do not use wire brushes and cleaning agents to clean the stainless steel secondary heat exchanger components.

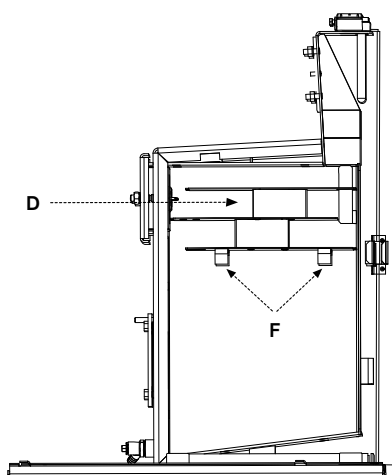
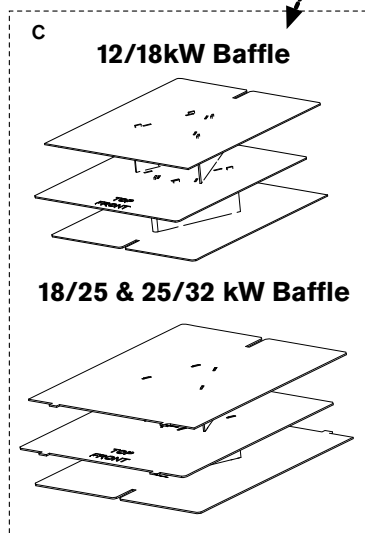
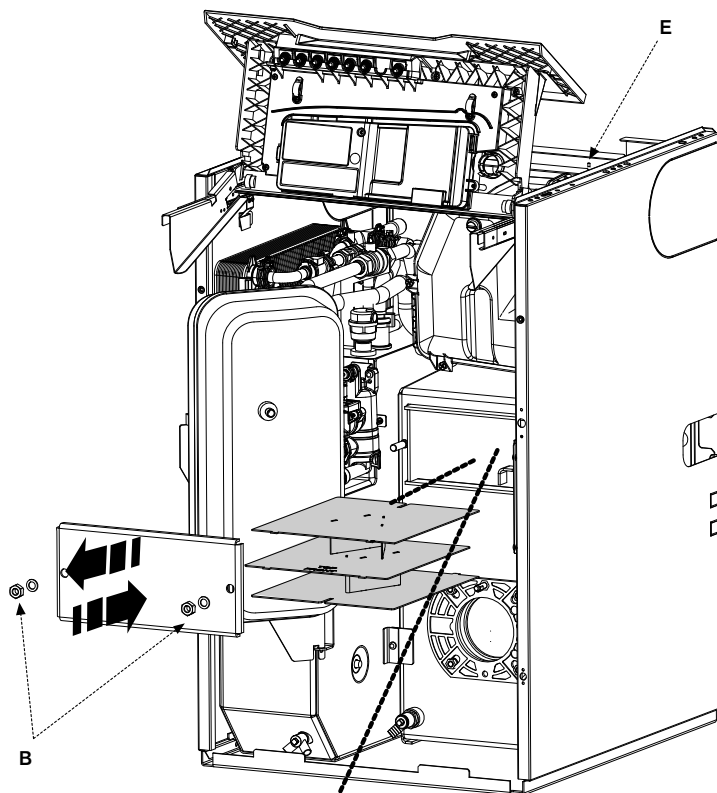
- ▶ Check the condensate route (E) is clear.
- ▶ The condensate trap (G) should be removed and checked for debris.
- ▶ Release the pipe locking tab (H) and disconnect the flexible pipe (J) from the top of the trap and move the flexible pipe up away from the trap.
- ▶ Release the trap locking tab (K) and move the trap up and back to remove from its mountings.
- ▶ Clean the trap by flushing with water.
- ▶ Check the O ring seals and replace if necessary, grease the seals with a solvent free grease.
- ▶ Refit the trap making sure that the locking tabs are locked in place.
- ▶ Pour 500ml of water into drain (E) to refill the condensate trap and check that the condensate discharge pipe is discharging.
- ▶ Clean the secondary heat exchanger baffles (D) if necessary and refit correctly.
- ▶ Refit the baffle retainer (C).
- ▶ Check the seal on the manifold access cover (L) and replace if necessary.
- ▶ Refit the flue manifold access cover (B) and secure with screws (A).

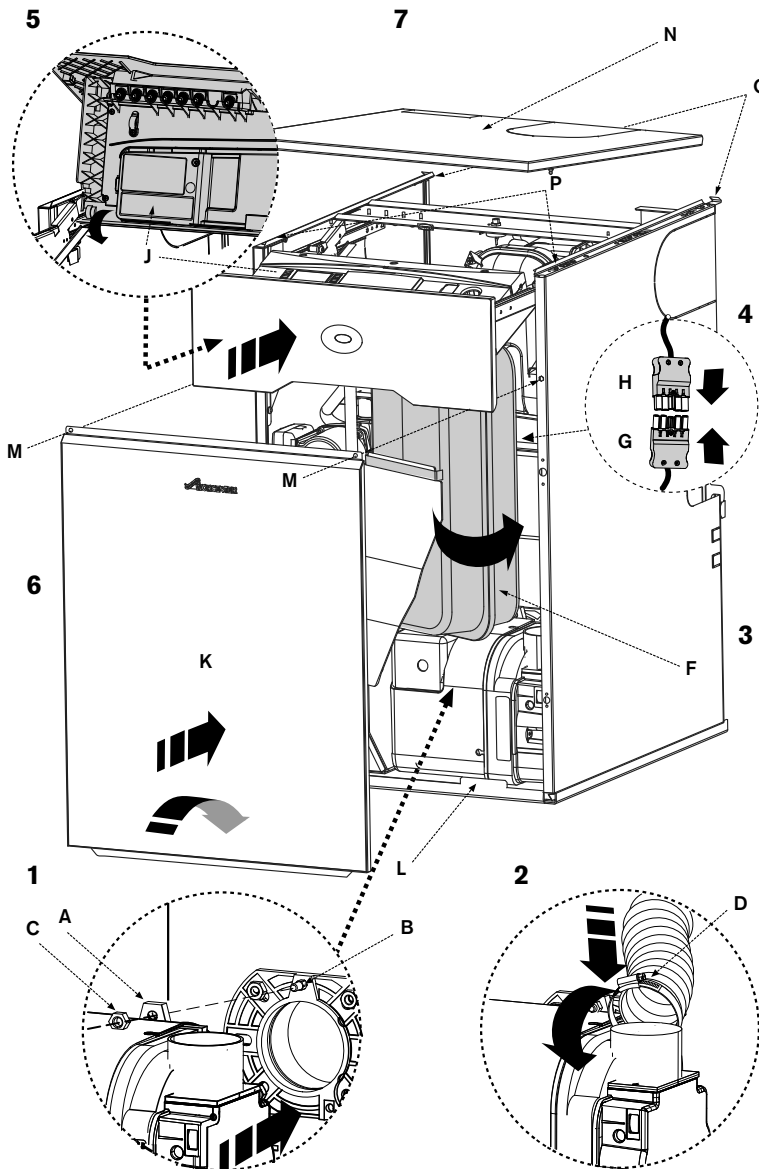
Combustion chamber:

- ▶ Remove the retaining nuts and washers (A).
 - ▶ Remove combustion chamber/baffle access door (B).
 - ▶ Check the fibreglass rope seal on the combustion chamber/baffle access door (B) and replace if necessary.
 - ▶ Remove the one piece baffle set (C), clean and check the condition of the baffles. Replace baffle set if 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/baffle access door insulation. If the insulation is damaged the door assembly must be replaced.
 - ▶ Refit the one piece baffle set (C) making sure it is in the right location (D), correctly resting on the baffle rests (F) on either side of the combustion chamber and pushed securely into place.
 - ▶ Refit combustion chamber door (B).
- IMPORTANT:** Secure with nuts and washers (A) and tighten until the chamber door is firmly secured, do not over tighten the nuts.

Fire valve:

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





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

NOZZLE	OIL PUMP PRESSURE (Bar/Psi)	FUEL FLOW RATE Kg/h l/h	APPROX. FLUE GAS TEMP °C	%CO ₂	APPROX. AIR SETTING	INPUT (APPLIANCE) kW	OUTPUT (APPLIANCE) kW	AIR DAMPER DISC SETTING	BURNER HEAD
Boiler 12/18 RDB 2.2									
0.35 80°SR	9/132	1.04 1.32	64	11.0	3.0	12.3	12.0	12/15	LD2X Short
0.45 60°ES	7.5/110	1.28 1.63	73	11.5	3.5	15.4	15.0	12/15	LD2X Short
0.55 80°EH	7.8/115	1.54 1.96	76	12.0	5.5	18.5	18.0	18	LD2X Short
Boiler 18/25 RDB 2.2									
0.50 80°ES	8.5/125	1.58 1.96	75	11.0	4.5	18.5	18.0	18	LD2SX Short
0.60 60°ES	8.5/125	1.84 2.33	77	12.0	2.5	22.1	21.5	21.5	LD2SX Short
0.75 80°ES	7.5/110	2.15 2.72	82	12.0	3.75	25.7	25.0	25	LD2SX Short
Boiler 25/32 RDB 2.2									
0.75 80°ES	7.5/110	2.15 2.72	80	11.5	4.5	25.7	25.0	N/A	T2 Short
0.75 80°ES	10/147	2.37 3.0	81	12.0	4.0	28.3	28.5	N/A	T2 Short
0.85 80°EH	9.5/140	2.58 3.27	83	12.5	4.5	30.8	32.0	N/A	T2 Short

Re-commission the burner:

- 1 ▶ Align burner combustion head into the boiler collar.
- ▶ Locate the burner retainer (A) over the threaded lug on the collar (B), push the burner firmly into the flange and secure in place with the retaining nut (C). Tighten sufficiently but do not over tighten.
- ▶ Check that the burner is seated correctly on its mounting flange and that the oil hose/s are routed correctly as shown on page 27.

IMPORTANT: Ensure the o-ring seal between the burner collar and mounting flange is in good condition to prevent flue gases escaping from the combustion chamber into the room.

- 2 ▶ Refit the flexible air duct and secure with clip (D).
- 3 ▶ Swivel the expansion vessel (F) back into position taking care not to kink the flexible hose or snag electric cables.
- 4 ▶ Plug burner lead (G) into connector (H).
- ▶ Connect an oil pressure gauge to the oil pump, run the burner and check the oil pressure is correct for the required boiler output. Check that the smoke reading is between 0 and 1, if the smoke reading is above 1 check the air setting. If the air setting is correct check that the burner has been reassembled correctly. Allow the boiler to warm up then check the combustion settings are correct as indicated in the table below, adjust the CO₂ if necessary using the air shutter. When the combustion is correct turn off the boiler, remove the pressure gauge and refit the blanking plug and plastic cover.

Refit control box:

- 5 ▶ Rotate the box towards you (J).
- ▶ Slide control box drawer back into position.

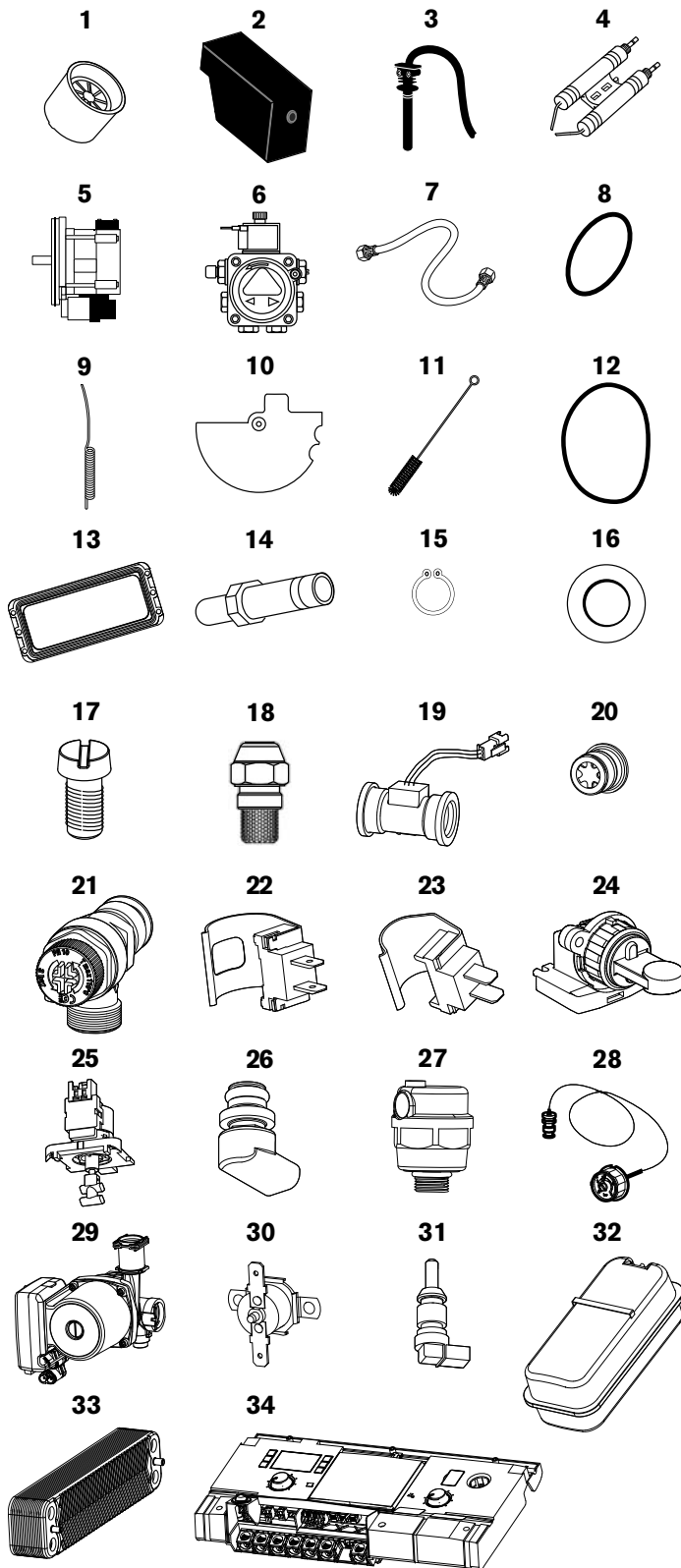
Refit panels:

- 6 ▶ Locate bottom edge of panel (K) onto the bottom supporting ledge (L) on the boiler.
- ▶ Secure panel (K) with screws (M).
- 7 ▶ Locate top panel (N) onto brackets at rear if the side panels (O). Locate ball stud connections (P) and press down to secure.

After service handover:

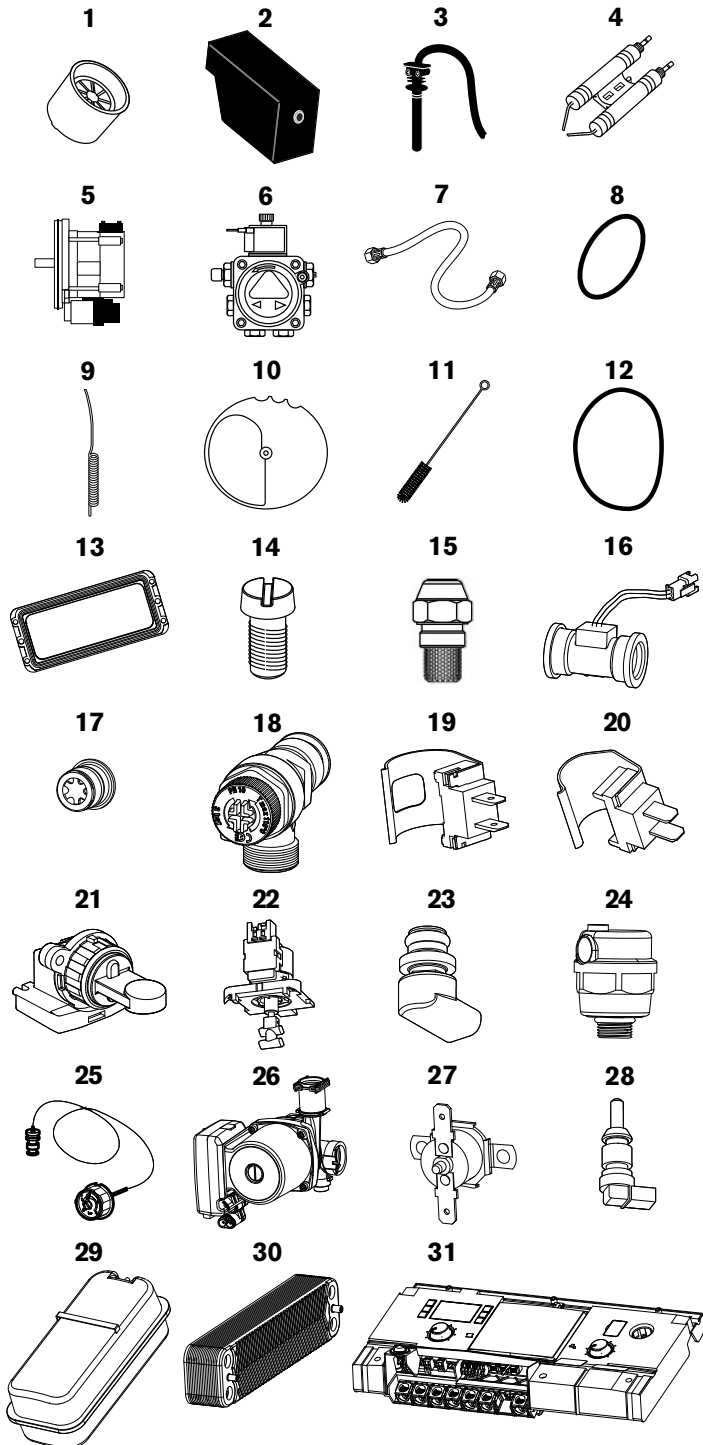
- ▶ Make a note of the date of any water treatment.
- ▶ Set the controls back to the users requirements.
- ▶ Complete the service interval record at the back of this manual and a CD11 or an equivalent form.
- ▶ If the appliance is unused and exposed to freezing conditions; shut off all the mains supplies, isolate the boiler and drain the system and boiler, including the secondary heat exchanger.

SHORT PARTS LIST 12/18



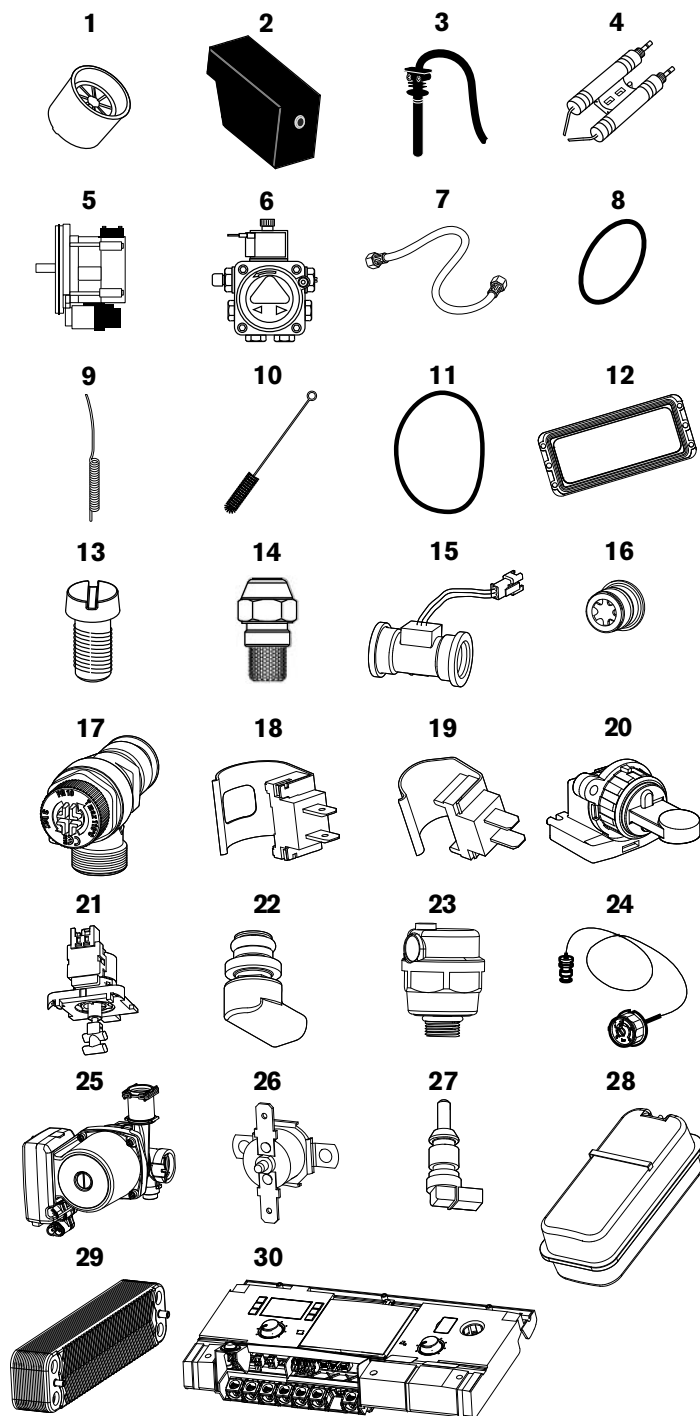
1 Combustion head - LD2X SH12/18	8 716 112 731 0
2 Control box MO535 MRF	8 718 682 250 0
3 Photocell	8 716 109 193 0
4 Ignition electrode	8 716 109 211 0
5 Motor	8 716 110 522 0
6 Oil pump - Riello RDB	8 718 689 342 0
7 Flexible oil hose kit	8 716 115 310 0
8 Burner 'O' ring	8 716 109 341 0
9 Manual reset flue thermostat	8 716 107 624 0
10 Air damper disc 12 15-18	8 718 690 377 0
11 Cleaning brush	8 716 109 428 0
12 Manifold access cover seal	8 716 107 536 0
13 Secondary Heat Exchanger gasket	8 718 690 792 0
14 Nozzle holder	8 716 116 638 0
15 Circlip	8 716 112 773 0
16 Brass air restrictor washer	8 716 112 729 0
17 Flue sample point screw	8 718 682 081 0
18 Oil nozzle	
0.35 80° SR (12kW output)	8 716 156 679 0
0.45 60° ES (15kW output)	8 716 114 545 0
0.55 80° EH (18kW output)	8 716 156 671 0
19 Flow turbine	8 717 002 132 0
20 Flow regulator 15 litre (Lime)	8 708 500 407 0
21 Pressure relief valve	8 718 681 163 0
22 18mm Pipe NTC	8 718 688 801 0
23 15mm Pipe NTC	8 716 010 809 0
24 Diverter valve assembly	8 716 106 845 0
25 Diverter valve motor	8 718 682 839 0
26 DHW Pressure relief valve	8 717 401 029 0
27 Auto air vent	8 718 684 401 0
28 Pressure gauge	8 718 686 357 0
29 Pump assembly 12/18 & 18/25	8 718 682 790 0
30 Manual reset tank thermostat	8 718 690 548 0
31 Wet sensor	8 718 684 323 0
32 Expansion vessel	8 716 107 660 0
33 Plate heat exchanger	8 716 108 212 0
34 Control box	8 718 689 480 0

SHORT PARTS LIST 18/25

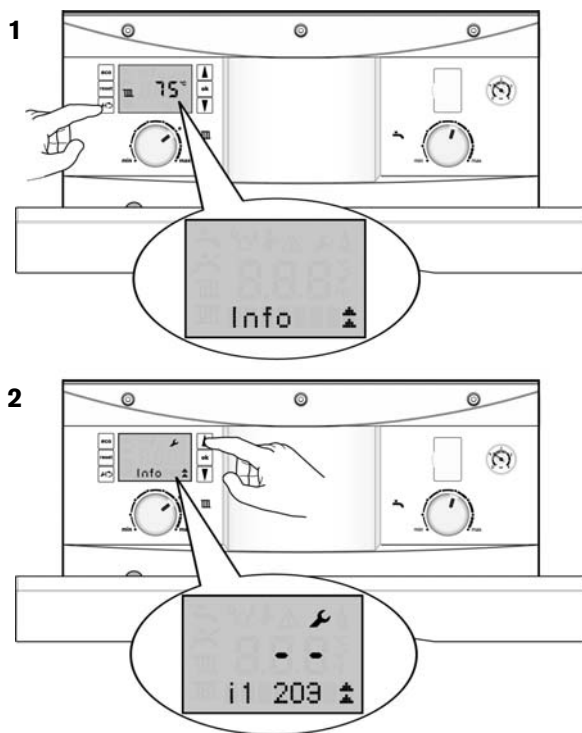


1 Combustion head - LD2SX 18/25	8 718 682 170 0
2 Control box MO535 MRF	8 718 682 250 0
3 Photocell	8 716 109 193 0
4 Ignition electrode	8 716 109 211 0
5 Motor	8 716 110 522 0
6 Oil pump - Riello RDB	8 718 689 342 0
7 Flexible oil hose kit	8 716 115 310 0
8 Burner 'O' ring	8 716 109 341 0
9 Manual reset flue thermostat	8 716 107 624 0
10 Air damper disc 18 21.5-25	8 718 690 458 0
11 Cleaning brush	8 716 109 428 0
12 Manifold access cover seal	8 716 107 536 0
13 Secondary Heat Exchanger gasket	8 747 009 725 0
14 Flue sample point screw	8 718 682 081 0
15 Oil nozzle	
0.50 80° ES (18kW output)	8 716 156 671 0
0.60 60° ES (21.5kW output)	8 716 156 680 0
0.75 80° ES (25kW output)	8 716 109 387 0
16 Flow turbine	8 717 002 132 0
17 Flow regulator 20 litre (Beige)	8 717 002 135 0
18 Pressure relief valve	8 718 681 163 0
19 18mm Pipe NTC	8 718 688 801 0
20 15mm Pipe NTC	8 716 010 809 0
21 Diverter valve assembly	8 716 106 845 0
22 Diverter valve motor	8 718 682 839 0
23 DHW Pressure relief valve	8 717 401 029 0
24 Auto air vent	8 718 684 401 0
25 Pressure gauge	8 718 686 357 0
26 Pump assembly 12/18 & 18/25	8 718 682 790 0
27 Manual reset tank thermostat	8 718 690 548 0
28 Wet sensor	8 718 684 323 0
29 Expansion vessel	8 716 107 660 0
30 Plate heat exchanger	8 716 108 212 0
31 Control box	8 718 689 480 0

SHORT PARTS LIST 25/32



1 Combustion head - T2 SH 25/32	8 716 112 780 0
2 Control box MO535 MRF	8 718 682 250 0
3 Photocell	8 716 109 193 0
4 Ignition electrode	8 716 109 211 0
5 Motor	8 716 110 522 0
6 Oil pump - Riello RDB	8 718 689 342 0
7 Flexible oil hose kit	8 716 115 310 0
8 Burner 'O' ring	8 716 109 341 0
9 Manual reset flue thermostat	8 716 107 624 0
10 Cleaning brush	8 716 109 428 0
11 Manifold access cover seal	8 718 682 849 0
12 Secondary Heat Exchanger gasket	8 718 688 799 0
13 Flue sample point screw	8 718 682 081 0
14 Oil nozzle	
0.75 80° ES (25 & 28.5kW output)	8 716 109 387 0
0.85 80° EH (32kW output)	8 716 156 644 0
15 Flow turbine	8 717 002 132 0
16 Flow regulator 25 litre (Grey)	8 718 681 198 0
17 Pressure relief valve	8 718 681 163 0
18 18mm Pipe NTC	8 718 688 801 0
19 15mm Pipe NTC	8 716 010 809 0
20 Diverter valve assembly	8 716 106 845 0
21 Diverter valve motor	8 718 682 839 0
22 DHW Pressure relief valve	8 717 401 029 0
23 Auto air vent	8 718 684 401 0
24 Pressure gauge	8 718 686 357 0
25 Pump assembly 25/32	8 718 690 009 0
26 Manual reset tank thermostat	8 718 690 548 0
27 Wet sensor	8 718 684 323 0
28 Expansion vessel	8 716 107 660 0
29 Plate heat exchanger	8 716 108 212 0
30 Control box	8 718 689 480 0



Information Menu listing:

i1	Current status	Every operation and mode of the boiler has a related boiler status code. The boiler status code is displayed on the screen as a 3 figure number. Refer to page 39 or error table for information on the boiler status code.
i2	Last error	This can be viewed during normal operation. Displays the last diagnostic code with boiler status code.
i3	Maximum CH output	The maximum possible CH output is displayed in kW.
i4	Maximum DHW output	The maximum possible DHW output is displayed in kW.
i6	DHW flow rate	The screen displays the current DHW flow rate in 0.1l/m units.
i7	CH flow temperature set point	This is the temperature set point for the primary flow from the main heat exchanger. This will be zero during HW demand.
i9	Flow temperature	This is the actual temperature from the main heat exchanger displayed in real time (rounded to 0.5°C units).
i10	Maximal temperature	This is the current temperature from the 'maximal safety sensor' displayed in real time (rounded to 0.5°C units). The sensor is mounted on the top of the primary heat exchanger.
i11	DHW flow temperature	Current DHW flow temperature displayed in real time (rounded to 0.5°C units).
i12	DHW temperature setpoint	This is the thermal store temperature, selected via the Hot Water control knob on the fascia, displayed in real time (rounded to 0.5°C units).
i13	Thermal store current temperature	This is the thermal store current temperature (rounded to 0.5°C units).
i14	DCW inlet temperature	Current DCW inlet temperature displayed in real time (rounded to 0.5°C units).
i15	Out door temperature	This is the out door temperature displayed in real time (rounded to 0.5°C units). Only available if a Weather Compensation sensor has been fitted and Weather Compensation is active.
i19	Time inputs	This indicates the status of the optional fascia mounted controls: 0 = CH off, DHW off 1 = CH off, DHW on 2 = CH on, DHW off 3 = CH on, DHW on
i20	Software version	CBS software version of main PCB.
i21	Software version	HIS software version of the HIS PCB.
i22	HCM number	HCM last 3 digits displayed: 391 = 12/18kW 390 = 18/25kW 301 = 25/32kW
i23	HCM version number	For example '4'

FAULT FINDING & DIAGNOSIS

INFORMATION MENU

Selecting the Information Menu:

The Information Menu is a 'read only' menu. Information about the boiler is displayed here, some of the values are updated in real time to give the current status of the boiler.

All menus time-out after 2 minutes and the display returns to the normal operation display, the display backlight turns off after another 30 seconds and goes into stand-by mode.

Double up or down arrows indicate that the menu can only be scrolled up or down, an up arrow combination indicates position in the menu where options can be scrolled either up or down.

To enter the Information Menu:

- 1 ▶ Press the button to enter the Information Menu.
 - A 3 figure boiler status code will be displayed alongside the Information Menu number. Refer to page 39 for a description of the boiler status codes.
- 2 ▶ Use the and arrow buttons to scroll through the menu items.
- 3 ▶ Press the button again to exit the Information Menu.

FAULT FINDING & DIAGNOSIS SERVICE MENU S

Selecting Service Menus:

- 1 ▶ Press and hold the  and  buttons together for 1 second, the display will show Menu 1.
- Double up or down arrows indicate that the menu can only be scrolled up or down, an up and down arrow combination indicates positions in the menu where options can be scrolled either up or down.
- 2 ▶ Scroll up and down through the menus with the  and  arrow buttons on the right hand side of the display.

Menu 1 system parameters:

Initially Menu 1 will be displayed.

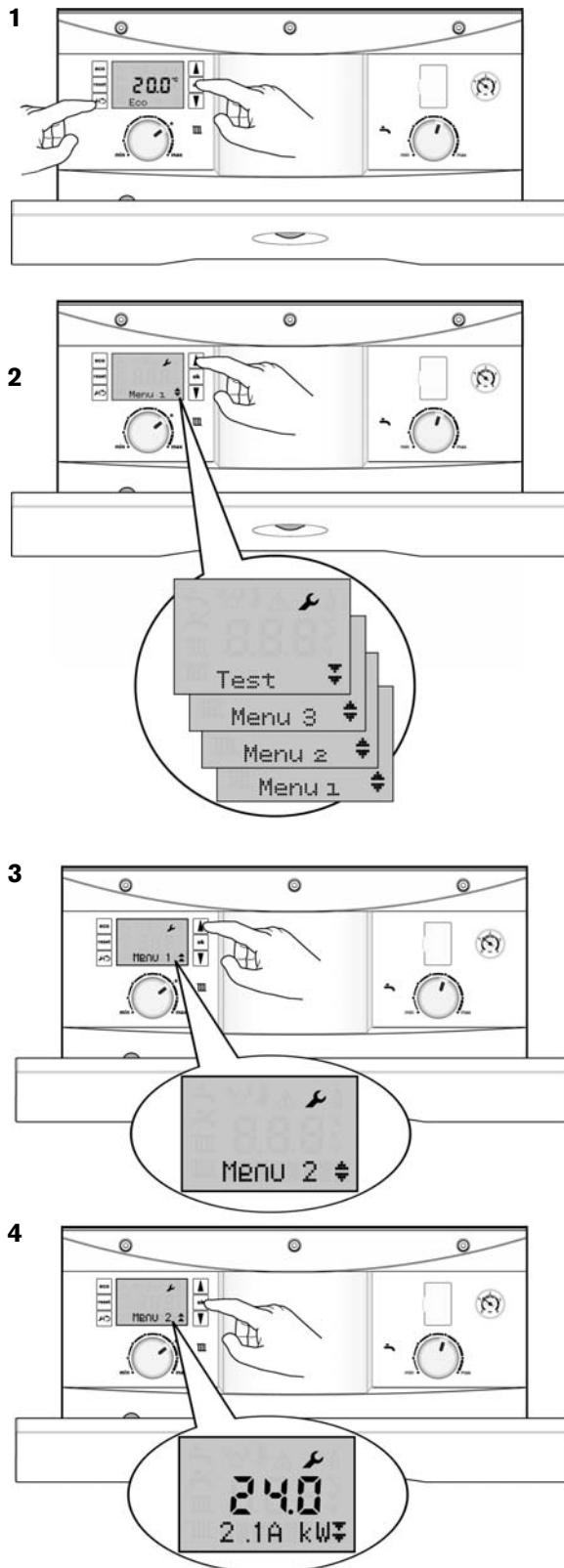
1.W1	Weather Compensation Functionality	Enable.
1.W2	Weather Compensation Functionality	Point A (@-10°C)
1.W3	Weather Compensation Functionality	Point B (@+20°C)
1.W4	Weather Compensation Functionality	System frost protection enable.

Menu 2 boiler parameters:

- 3 ▶ Select Menu 2 via the   arrow buttons.
- 4 ▶ Press and hold the  button for 1 second to enter Menu 2.
- The menu lists the boiler parameters, that can be adjusted in this menu.
- ▶ To modify the setting, select the desired menu option and press the  button, the option will flash.
- ▶ Adjust the parameter using the   arrow buttons and press the  button to confirm.
- A  will display for 3 seconds to confirm the update of the new value.

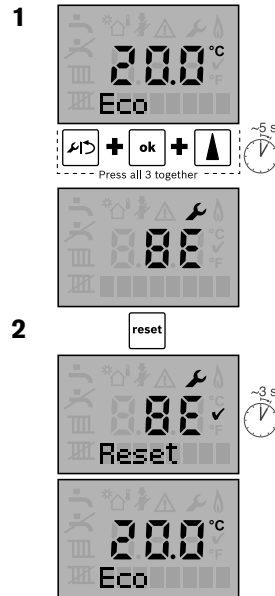
2.7A	Demand/fault LED (blue light) activation	0 = The blue light will only operate as a flashing fault alert. 1 = The blue light will operate as a boiler operation and fault alert. This is set to 1 by default.
------	--	---

NOTE: Menus 3 and Test are empty and are not used on this appliance.



FAULT FINDING & DIAGNOSIS

RESET & LOCKING ERROR



Reset to factory settings:

To reset changes made in Menu 2 back to the factory default setting:

NOTE: Any changes made to Menu 1 are not reset by these actions.

- 1 ▶ Press and hold the and buttons for at least 5 seconds. The screen will then display code BE with the spanner symbol.
- 2 ▶ Press the button and 'reset' will be displayed with the tick symbol for 3 seconds. After 3 seconds the display will revert to the normal operation screen.

Locking Error:

Should a fault develop with this boiler (or the system), the boiler will enter into a Locking or Blocking condition.

Locking condition:

- The boiler display will flash a warning triangle.
- An alpha numeric **fault code** will be displayed indicating the fault group.
- A 3 digit **cause code** will flash on the display during a Locking error.

Manual intervention is required following clearance of the fault.

- ▶ Press the reset button on the boiler fascia.

Fault Codes - Locking error:

Fault code	Cause code	Description	Reset type	Possible cause
9U	233	BCM (Boiler Control Module)	Reset button	Code plug missing or defective.
E2	222	Flow sensor short circuit	Reset button	Flow sensor shorted or damaged.
	223	Flow sensor open circuit	Reset button	Flow sensor disconnected or damaged.
E5	218	Flow temperature too high	Reset button	Primary sensor overheated.
	332	Primary flow has exceeded 105°C	Reset button	Primary sensor overheated.
E9	219	Safety temperature too high	Reset button	The main heat exchanger has overheated. Maximum temperature 105°C.
	220	Safety sensor short circuit	Reset button	Maximum temperature sensor on the main heat exchanger has failed.
	221	Safety sensor open circuit	Reset button	Maximum temperature sensor on the main heat exchanger has not been recognised.
	210	Max temperature thermostat activated	Reset button	Flue gas or tank thermostat overheat. Reset the overheat thermostat before resetting the appliance.
F0	239	Internal error		Probable PCB fault.
	241-255			
	259			
	262			
	267			
	279	Sensor test failed	Reset button	On power up all safety sensors are checked. Check has failed.
	290			
	278	Sensor test failed	Reset button	On power up all safety sensors are checked. Check has failed.

FAULT FINDING & DIAGNOSIS

BLOCKING ERROR

Fault Codes - Blocking error:

Fault code	Cause code	Description	Possible cause
D4	271	Temperature difference between flow and safety sensors exceeds limit	The temperature of the primary flow and the safety sensor on the main heat exchanger should be within 15°C of each other.
E9	276	Flow temperature exceeds 95°C	Primary overheat - boiler waits for temperature to reduce; if not it becomes a Locking error.
	277	Safety temperature exceeds 95°C	Main heat exchanger safety sensor overheat - boiler waits for temperature to reduce; if not it becomes a Locking error 219.
No code	212	Safety or flow temperature rises too high	Air lock or reduced water content.
	380	Inlet DCW temperature higher than DHW outlet temperature	The output is blocked until the inlet temperature drops below the output temperature.
	359	DHW outlet or storage tank exceeds 90°C	Pump and burner are blocked until temperature drops to < 89°C.
F0	263	Appliance powered off with Locking fault present	Locking fault present when powered off.

Blocking Error:

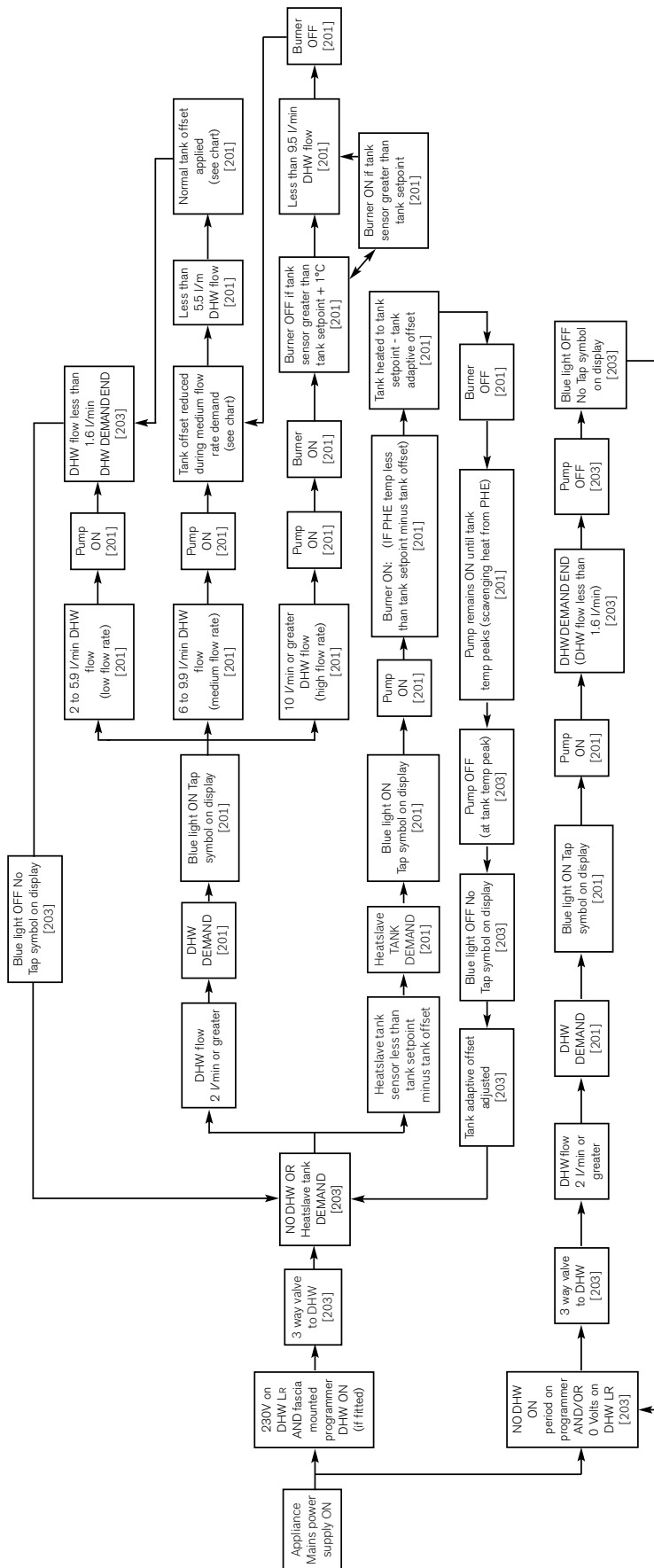
Should a fault develop with this boiler (or the system), the boiler will enter into a Locking or Blocking condition.

Blocking condition:

- The boiler will stop operating and no fault code will be displayed.
- An alpha numeric **fault code** is accessed in the info menu by pressing the  spanner/return button.

NOTE: Unlike a Locking error, during a Blocking error (or normal operating status), a fault code is not automatically displayed.

- A 3 digit **cause code** is also accessed in the info menu by pressing the  spanner/return button.
- The condition will clear automatically when the associated fault clears e.g. waiting for an area to cool.
- In some cases a Blocking error has a defined time duration prior to changing to a Locking condition.



Tank offset chart

Demand conditions:	Comfort setting	Eco setting
With no other demands	8	10
With medium DHW flow rate	4	8
With DHW burn	4	8
With CH burn	6	6

NB: The demands run in parallel therefore the tank can demand during a DHW demand and will reheat the tank, (e.g. during a low flow rate DHW demand). Likewise a greater than 10 l/min DHW demand during the tank scavange period will fire the burner to satisfy the demand.

if DHW is OFF on the programmer and/or there is 0 volts on DHW LR then the appliance will still supply DHW using the heat stored in the tank, but it will not reheat the tank, therefore the amount of water available is limited but is adequate for washing up, filling basins etc.

The 3WV rests in DHW position unless there is a current CH demand with no DHW or tank demand.

The DHW feeds in DHW, provided there is a certain ON demand with no DHW or tank demand. The DHW and tank demands override any CH demand, if the burner is ON for CH and a DHW/tank demand starts that requires a burn, the burner will remain ON whilst the demand transfers over to DHW.

NB: Numbers in square brackets are the cause code of the current appliance operation, visible in the service menu slot 1 (i1), the burner will remain on command transfers over to E1111.

Key:

Tank Heatslave internal thermal store.

3WV 3 way valve (diverter valve).

PHE Primary heat exchanger.

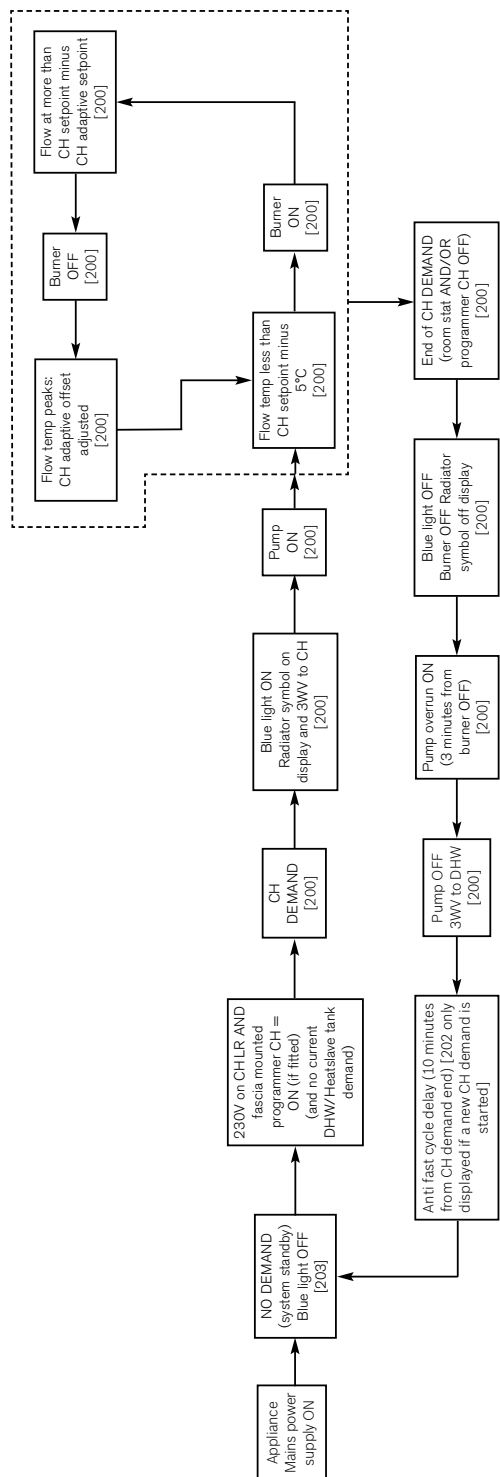
Tank setpoint

Tank setpoint
The target temperature for the tank – the driver has a control knob setting the tank temperature.

Tank offset
The amount the tank can cool before a tank reheating demand is triggered.

Tank adaptive offset
The amount the tank can cool before a tank reload demand is triggered. The learnt value for switching the burner off so that the tank peak temp after scavenging heat from the PHE after burner shut down = tank setpoint.

The appliance will adjust this value during operation so that the tank setpoint is achieved automatically (this will take a few tank rehear cycles), after any burner output changes or if the burner output drops between services.



NB: Numbers in square brackets are the cause code of the current appliance operation, visible in the service menu slot 1 (i1).

Key:

3WV

CH setpoint

CH adaptive offset

Anti fast cycle delay

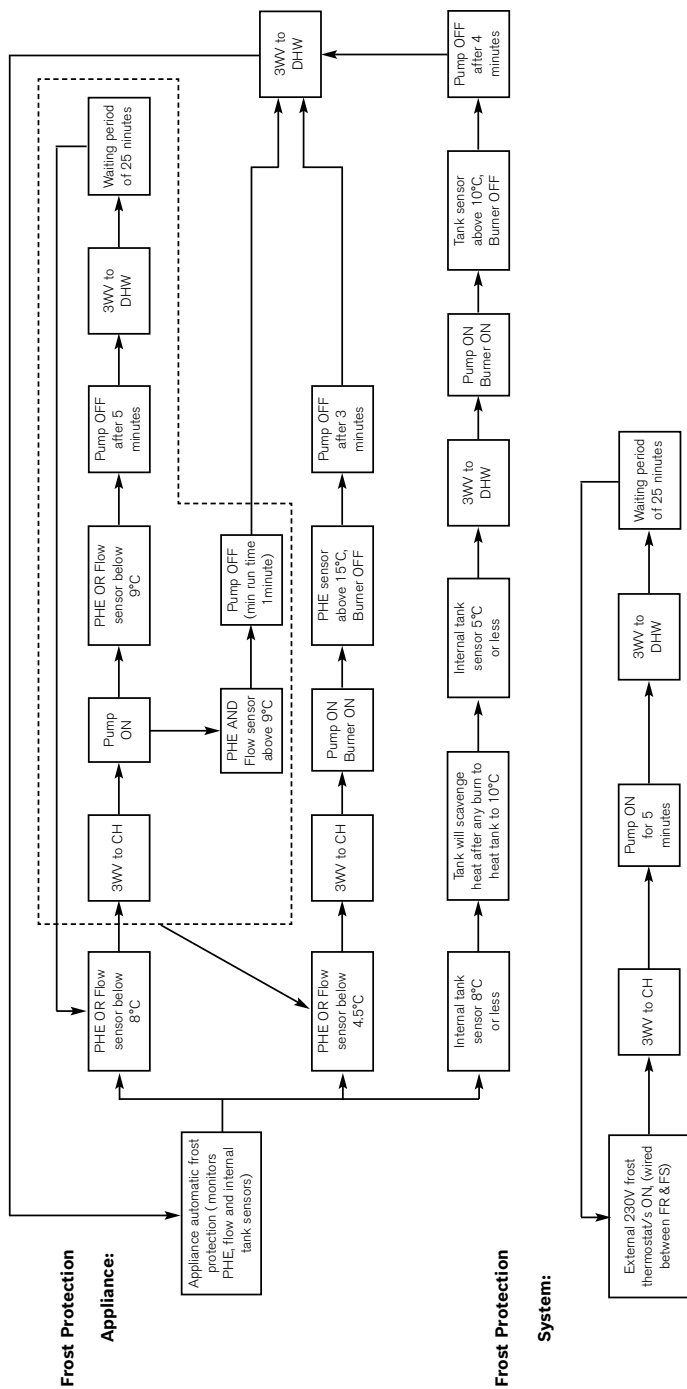
3 way valve (diverter valve).

The target flow temperature set on the CH fascia control knob.

The learnt offset temperature applied to the CH flow so that the peak flow temperature after burner

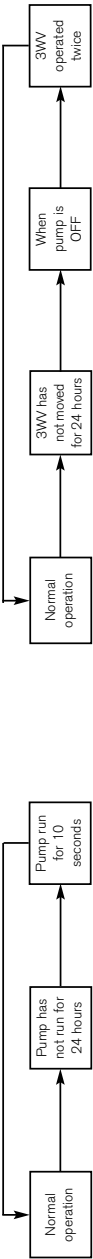
OFF = CH setpoint.

To stop the appliance short cycling if a room stat is intermittently calling or is poorly positioned, there is a 10 minute delay for CH demands timed from the last CH demand end.

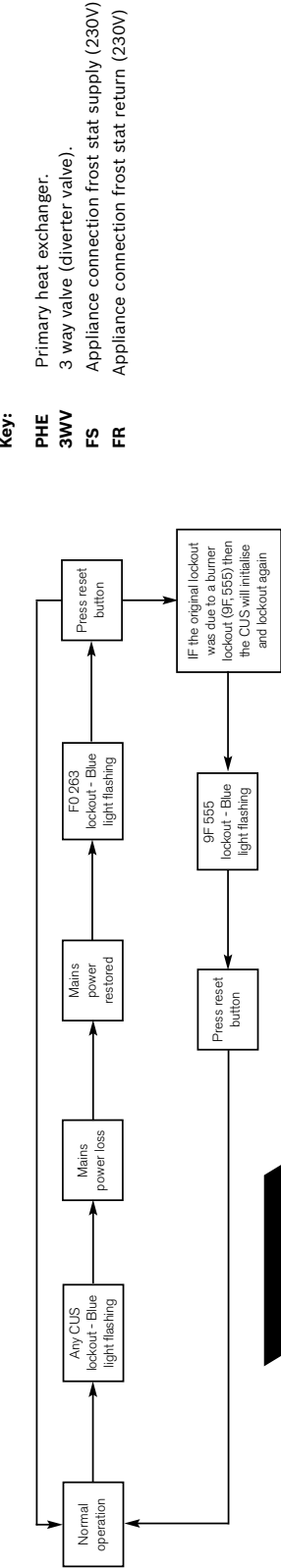


NB: During system frost protection the external frost stat only activates circulation of the water to protect the vulnerable pipework, the burner will be activated if either internal sensor temperature drops below 4.5°C.
The cause code will be 203 and the blue light will be OFF during all frost protection functions.

Component antiseize functions:

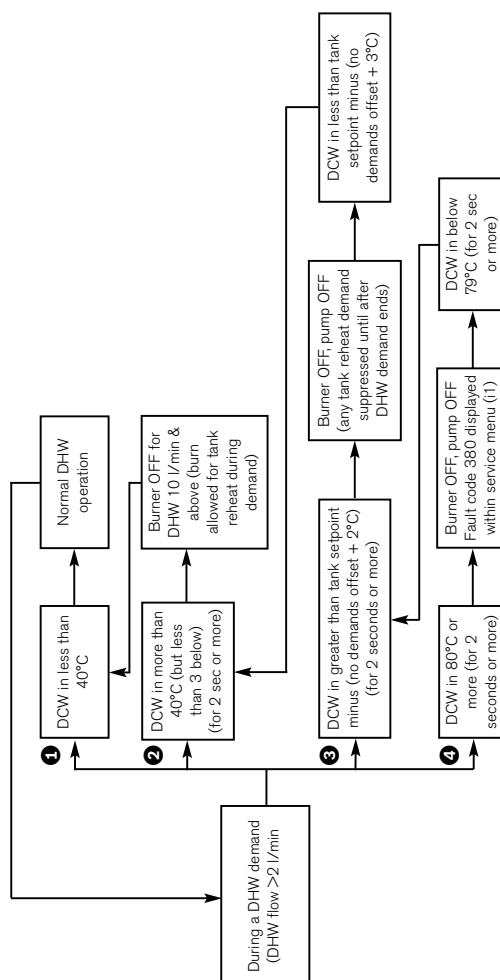


Power interruption during lockout



Solar compatability

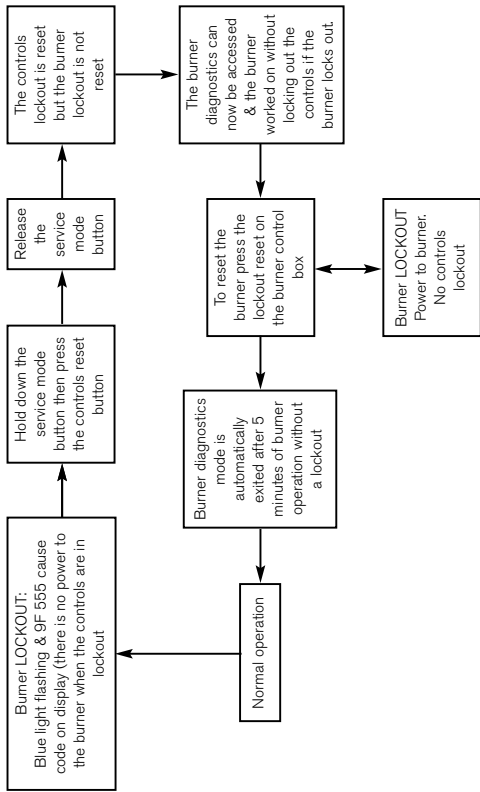
- 1 Normal operation: the tank will cool more slowly for the same DHW performance if the DCW is above normal DCW temperature, thus saving fuel.
- 2 Solar tank hot; therefore the burner will not be required at high DHW flow rate and the tank will boost the solar heated water if the temperature drops.
- 3 Solar tank will satisfy the DHW requirements; therefore the appliance allows the water to pass straight through without taking any action apart from monitoring the temperatures. To utilise the solar panels to their maximum potential, the solar tank thermostat will need to be set high and the Heatslave II DHW setting low.
- 4 Solar tank overheat: DCW above solar tank limit, appliance will not operate pump or burner and fault code will be displayed within the service menu.



Burner diagnostic mode:

Service/installation engineers only.

To access the Burner control box diagnostics or to use the burner reset button to reset the burner, the burner diagnostic mode must be activated as follows:

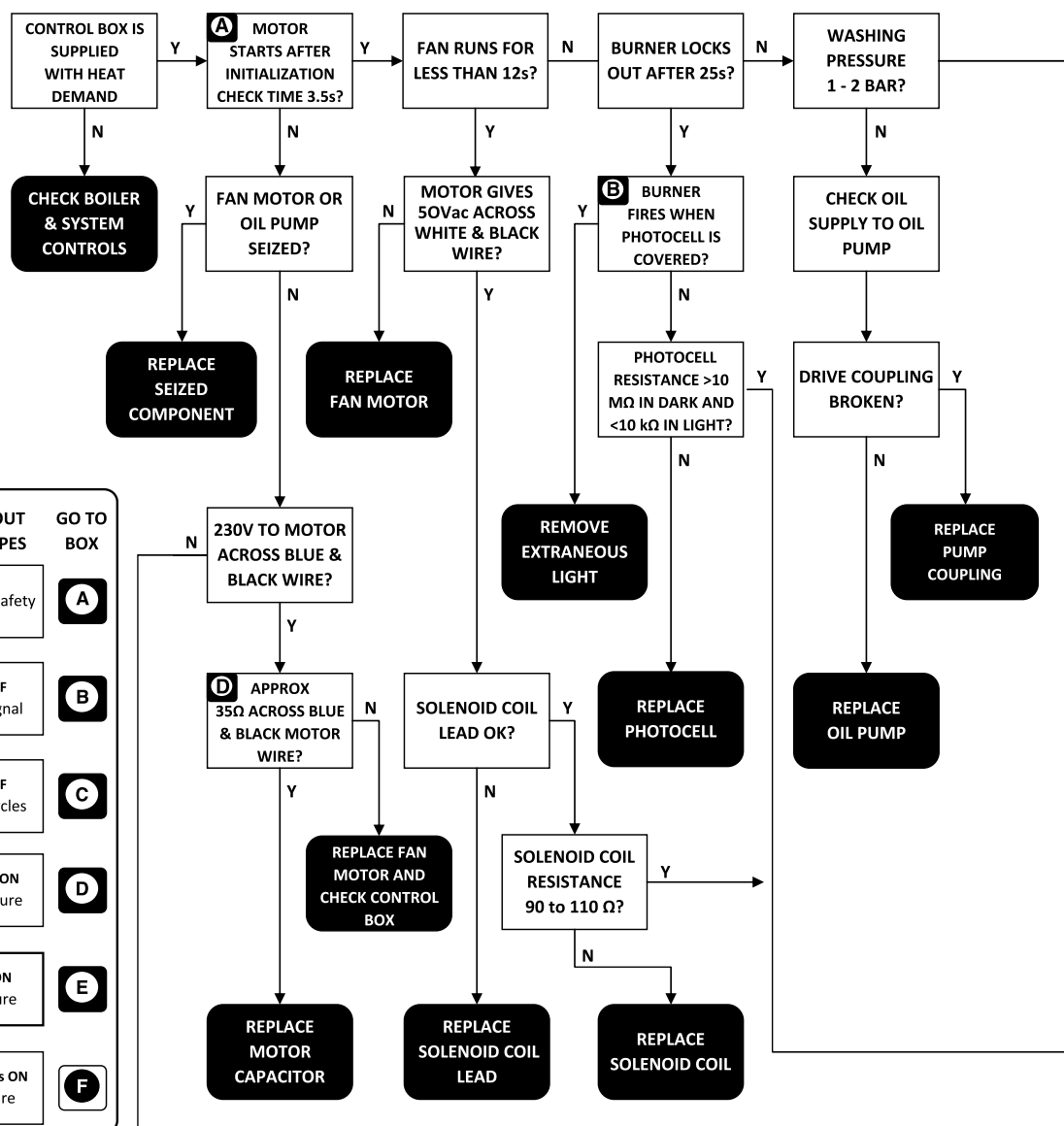


NB: The burner diagnostics mode can be manually exited at any time when the burner is locked out by holding down the service mode button whilst pressing the controls reset button.

Fault code 9F 556: If burner lockout is reset 5 times in one demand period using the fascia reset button the controls will lockout with a new code: 9F 556. This is to protect the burner components against over use of the reset and requires a power down of the appliance to reset. The burner control box also has this facility, if the reset button is operated 5 times the control box will not reset until the power has been interrupted to the burner.

RIELLO MO535 MRF DIGITAL CONTROL BOX FAULT FINDING LOGIC

CONTROL BOX IN LOCKOUT LED CODE - LOCKOUT TYPES	GO TO BOX
RED steady ON Lock-out for no flame after safety time	A
RED 0.5s ON / RED 0.5s OFF Lock-out for false flame signal	B
RED 0.2s ON / RED 0.2s OFF Lock-out for max n° of recycles	C
RED 2.5s ON / ORANGE 0.5s ON Lock-out for fan motor failure	D
RED 2.5s ON / GREEN 0.5s ON Lock-out for oil-valve failure	E
ORANGE 0.5s ON / GREEN 0.5s ON Lock-out for eeprom failure	F

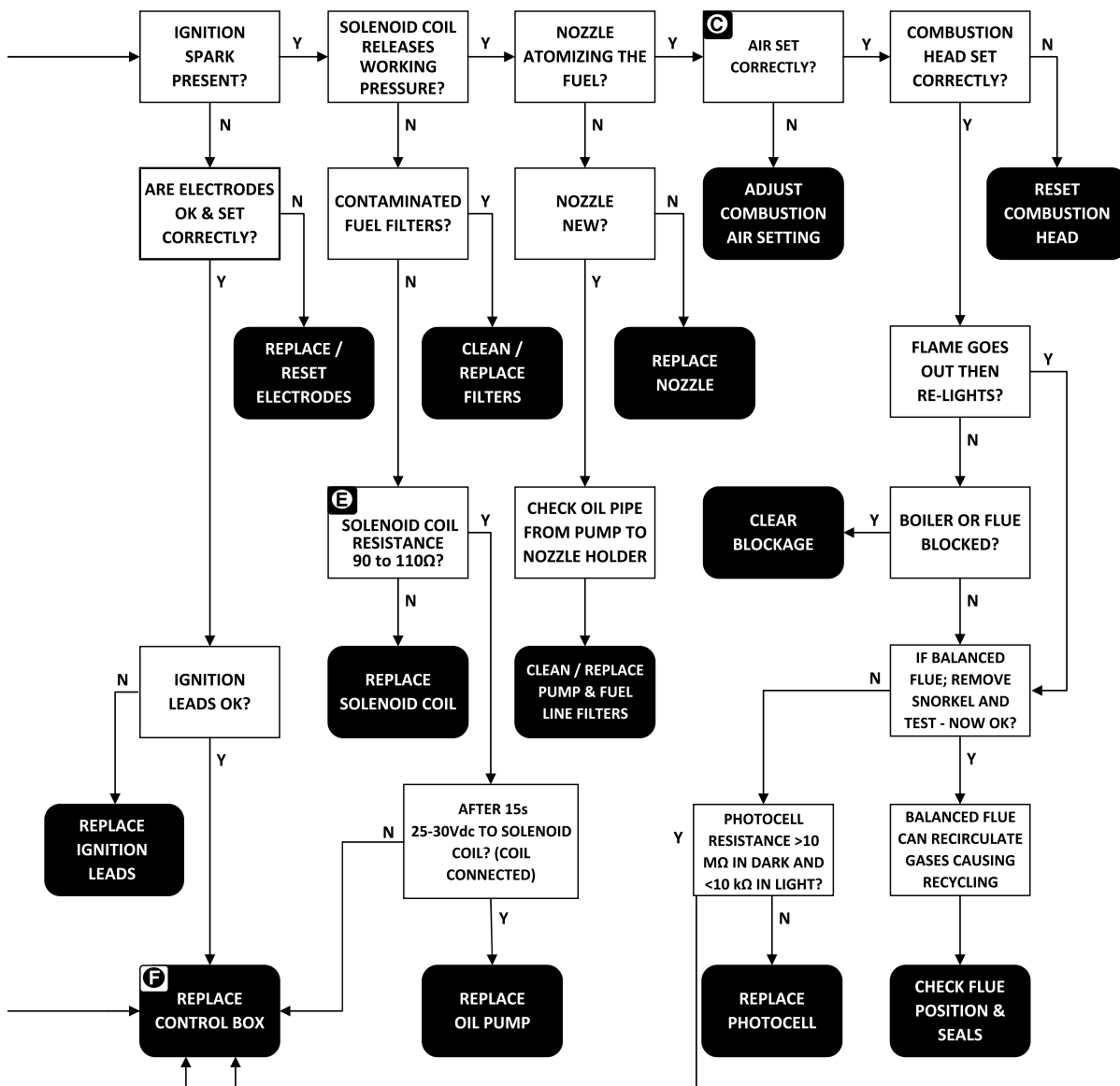


These fault finding charts are provided to assist competent and suitably qualified engineers to locate and rectify faults. Whilst every effort has been taken to ensure the information given is correct and complete we cannot guarantee that every eventuality has been covered. Worcester, Bosch Group cannot be held responsible for costs incurred by persons not deemed to be competent.

CONTROL BOX IN STANDBY LED CODE - ANOMALY TYPES

GREEN 0.5s ON / GREEN 2.5s OFF Pre-heating time	Fit pre-heater link
GREEN 0.5s ON / RED 0.5s ON Anomaly for presence of extraneous light	Lock out after 25s
ORANGE steady ON Anomaly for presence of abnormal frequency supply	When anomaly appears during pre-purge, burner remains in pre-purge. When anomaly appears after ignition, burner remains in operation. When anomaly disappears burner restarts.
ORANGE 0.2s ON / GREEN 0.2s ON Control box internal error	
GREEN 0.2s ON / RED 0.2s ON Anomaly for reset push-button or remote reset failure	Remote reset / push button is activated for more than 60s. When anomaly appears burner doesn't stop

FAULT FINDING LOGIC FOR RIELLO DIGITAL CONTROL BOXES



LIGHT DIAGNOSIS FEATURE (FLAME STRENGTH INDICATOR)

(see instruction manual)

Sequence for enable / disable

This can only be carried out during operation (burner running)

- Press and hold the reset button for 15-20 sec.
LED - GREEN blink 2 times
- Release the reset button
LED - GREEN OFF
- Press the reset button 1 time for enable or 2 times for disable
LED - GREEN blink ON then OFF with every correct press and release

After 10 sec GREEN led blinking for times programmed (0.5s ON / 0.5s OFF)

LIGHT DIAGNOSIS - GREEN flashes

- acceptable - 1 to 2
- good - 3 to 4
- very good - 5 to steady on

HEATSLAVE II BOILER COMMISSIONING CHECKLIST

BOILER MODEL _____ **SERIAL No.** _____

COMMISSIONING ENGINEER

COMMISSIONING CHECKS

COMPANY NAME:	PUMP PRESSURE (PSI):
ADDRESS:	CO ₂ %: CO. ppm:
ENGINEERS NAME:	SMOKE READING:
SIGNATURE:	F.G.T.°C:
DATE:	FLUE PRESSURE:
	BURNER MODEL:

CONTROLS To comply with the Building Regulations, each section must have a tick in one or other of the boxes

TIME & TEMPERATURE CONTROL TO HEATING	ROOM T/STAT & PROGRAMMER/TIMER ☐	PROGRAMMABLE ROOMSTAT ☐
TIME CONTROL TO HOT WATER	PROGRAMMER/TIMER ☐	
HEATING ZONE VALVES	FITTED ☐	NOT REQUIRED ☐
THERMOSTATIC RADIATOR VALVES	FITTED ☐	
AUTOMATIC BYPASS TO SYSTEM	FITTED ☐	NOT REQUIRED ☐

CONFIRM THE FOLLOWING:

THE CONDENSATE DRAIN HAS BEEN INSTALLED IN ACCORDANCE WITH THE INSTRUCTIONS	YES ☐
OIL TYPE USED IS KEROSENE	YES ☐
THE SYSTEM HAS BEEN FLUSHED IN ACCORDANCE WITH THE INSTRUCTIONS?	YES ☐
THE SYSTEM CLEANER USED:	
THE INHIBITOR USED:	
HAS A WATER SCALE REDUCER BEEN FITTED?	YES ☐ NO ☐
WHAT TYPE OF SCALE REDUCER HAS BEEN FITTED?	

FOR THE DOMESTIC HOT WATER MODE, MEASURE & RECORD:

WATER FLOW RATE _____ lts/min

CONFIRM THE FOLLOWING:

THE HEATING AND HOT WATER SYSTEM COMPLIES WITH CURRENT BUILDING REGULATIONS	NO ☐ YES ☐	
THE APPLIANCE AND ASSOCIATED EQUIPMENT HAS BEEN INSTALLED AND COMMISSIONED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS	NO ☐ YES ☐	
HAVE YOU RECORDED A CO/CO ₂ RATIO READING?	N/A ☐ YES ☐	CO/CO ₂ RATIO
THE OPERATION OF THE APPLIANCE AND SYSTEM CONTROLS HAVE BEEN DEMONSTRATED TO THE CUSTOMER	NO ☐ YES ☐	

IMPORTANT: LEAVE THIS MANUAL WITH THE HOMEOWNER

SERVICE INTERVAL RECORD

It is recommended that the heating system is serviced regularly and that you complete the appropriate Service Interval Record Overleaf.

Service Provider.

Before completing the appropriate Service Interval Record overleaf, please ensure you have carried out the service as described in this manual. Always use Worcester, Bosch Group specified spare parts.

SERVICE 1 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

OFTEC REG No.

PUMP PRESSURE: psi CO₂%:NOZZLE CHANGED? YES ☐ NO ☐

F.G.T. °C FLUE PRESSURE:

COMMENTS

SIGNATURE

SERVICE 3 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

OFTEC REG No.

PUMP PRESSURE: psi CO₂%:NOZZLE CHANGED? YES ☐ NO ☐

F.G.T. °C FLUE PRESSURE:

COMMENTS

SIGNATURE

SERVICE 5 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

OFTEC REG No.

PUMP PRESSURE: psi CO₂%:NOZZLE CHANGED? YES ☐ NO ☐

F.G.T. °C FLUE PRESSURE:

COMMENTS

SIGNATURE

SERVICE 7 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

OFTEC REG No.

PUMP PRESSURE: psi CO₂%:NOZZLE CHANGED? YES ☐ NO ☐

F.G.T. °C FLUE PRESSURE:

COMMENTS

SIGNATURE

SERVICE 9 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

OFTEC REG No.

PUMP PRESSURE: psi CO₂%:NOZZLE CHANGED? YES ☐ NO ☐

F.G.T. °C FLUE PRESSURE:

COMMENTS

SIGNATURE

SERVICE 2 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

OFTEC REG No.

PUMP PRESSURE: psi CO₂%:NOZZLE CHANGED? YES ☐ NO ☐

F.G.T. °C FLUE PRESSURE:

COMMENTS

SIGNATURE

SERVICE 4 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

OFTEC REG No.

PUMP PRESSURE: psi CO₂%:NOZZLE CHANGED? YES ☐ NO ☐

F.G.T. °C FLUE PRESSURE:

COMMENTS

SIGNATURE

SERVICE 6 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

OFTEC REG No.

PUMP PRESSURE: psi CO₂%:NOZZLE CHANGED? YES ☐ NO ☐

F.G.T. °C FLUE PRESSURE:

COMMENTS

SIGNATURE

SERVICE 8 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

OFTEC REG No.

PUMP PRESSURE: psi CO₂%:NOZZLE CHANGED? YES ☐ NO ☐

F.G.T. °C FLUE PRESSURE:

COMMENTS

SIGNATURE

SERVICE 10 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

OFTEC REG No.

PUMP PRESSURE: psi CO₂%:NOZZLE CHANGED? YES ☐ NO ☐

F.G.T. °C FLUE PRESSURE:

COMMENTS

SIGNATURE

If the boiler does not give complete satisfaction, before calling for a service engineer, the installer should check the following:

General checks

1. Is there 230V across the boiler live and neutral terminals?
2. Is the polarity correct? (230V across live and earth, 0V across neutral and earth)
2. Is the air bled from the primary system?
3. Is the air bled from the oil supply?
4. Is the flue sized and routed correctly?

Boiler runs straight to lockout

1. Has the oil line been purged of air.
2. Where an air eliminator is used in conjunction with a top feed oil tank the non-return valve, (if fitted), should be removed from the oil dip pipe.

Boiler locks out at the start of a demand

(Heating off overnight for example)

1. If an air eliminator is being used, check that there are no leaks that allow air to be pulled into the oil supply.
2. If a two pipe oil supply is being used, has a non-return valve been fitted to the inlet pipe? Refer to the instructions for guidelines.

No domestic hot water

1. Is the mains water in connected to the 15mm isolation valve?
2. Is there a domestic hot water demand from the programmer and has the tank reached temperature?

No domestic hot water (external programmer)

1. Is there 230V on  ?



2. Refit link between  and  . If the DHW now operates correctly



there is a problem with the external programmer and/or its wiring.

No central heating

1. Are both programmer and room thermostat on demand for central heating?
2. Is the room thermostat wired correctly?

No central heating (external programmer)

1. Is there 230V on  ?



2. Refit link between  and  . If the CH now operates correctly



there is a problem with the external programmer and/or its wiring.

UNDER NO CIRCUMSTANCES MUST AN APPLIANCE BE LEFT TO OPERATE WITH ANY CONTROL LINKED OUT OR OVER RIDDEN.

CONTACT INFORMATION

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