GREENSTAR 25/30/35 CDi

Draft Installation and Servicing Instructions

Wall mounted condensing boiler for central heating and mains fed domestic hot water

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

NATURAL GAS (G20): GC NUMBER ...

LIQUID PETROLEUM GAS (G31): GC NUMBER ...

GB/IE

INSTRUCTION MANUAL

INSTALLATION, COMMISSIONING & SERVICING

WORCESTER
Bosch Group

benchmark

Contents

Safety precautions

If you smell gas

- Turn off gas service cock at the meter.
- Open windows and doors.
- Do not operate any electrical switches.
- Extinguish any naked flames.
- Telephone your gas company.

If you smell fumes from the appliance

- Switch off appliance (see page 27).
- Open windows and doors.

Fitting and modifications

- Fitting of the appliance or any controls to the appliance may only be carried out by a competent engineer in accordance with the Gas Safety (Installation and Use) Regulations 1998.
- Flue systems must not be modified in any ways other than as described in the fitting instructions.
- This appliance is for use on sealed primary systems only.

Maintenance

- **The user is recommended:** to have the system regularly serviced in order to ensure that it functions reliably and safely.
- Use only original spare parts!

Combustible materials

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

Health and safety

- This appliance contains no asbestos products.
- There is no potential hazard due to the appliance being electrically unsafe.
- There are no substances used in the construction that are a potential hazard in relation to the COSHH Regulations (Control of Substances Hazardous to Health Regulations 1988).

Combustion air/Ambient atmosphere

- The combustion air/ambient atmosphere should be kept free of chemically aggressive substances (e.g. halogenated hydrocarbons which contain chlorine or fluorine compounds). This will prevent corrosion.

Instructions to the customer

- Explain to the customer how the appliance works and how to operate it.
- Advise the user that he/she must not make any modifications to the appliance or carry out any repairs on it.
- These instructions are to be left with the user or at the Gas meter.
- Important: These instructions apply in the UK only.

Symbols

Safety instructions in this document are identified by a warning-triangle symbol and are printed on a grey background.

Notes containing important information are identified by the symbol shown on the left. They are bordered by horizontal lines above and below the text.

1 Details of the appliance

1.1 EC Declaration of Conformity

This appliance is in accordance with the applicable requirements of the Gas Appliance Directive, Boiler Efficiency Directive, Electromagnetic Compatibility Directive and the Low Voltage Directive.

PIN	
Category UK	**$II_{2H\ 3P}$**
Appliance Type	**C_{13}, C_{33}**

Table 1

1.2 Standard package

- Gas condensing combination boiler for central heating and domestic hot water
- Fixings (screws etc.)
- Pre-plumbing manifold.

1.3 Description of appliance

- Wall-mounted appliance, siting not dependent on room size
- Natural gas models are low-emission appliances
- Bosch Heatronic control system
- Automatic ignition
- Modulating control
- Full safety systems incorporating Bosch Heatronic with flame ionisation monitoring, solenoid valves and temperature sensors
- Regulated speed fan
- Pre-mix burner
- Temperature control for central heating
- Temperature sensor in domestic hot water
- Safety temperature limiter in 24 V electrical circuit
- Variable pump
- Relief valve, pressure gauge, expansion vessel
- Flue gas temperature limiter (120 °C)
- Hot water priority circuit
- Plate-type heat exchange
- Condensate Trap.

1.4 Accessories

- Standard horizontal flue kit at 100 mm outside diameter for flues up to 4 m in length.
- Flue duct kits for horizontal (125 mm outside diameter) for flue lengths up to 16 m and vertical flue systems for flue lengths up to 16 m. Fitting instructions are sent with these kits.
- Heating programmers.

1.5 Casing dimensions

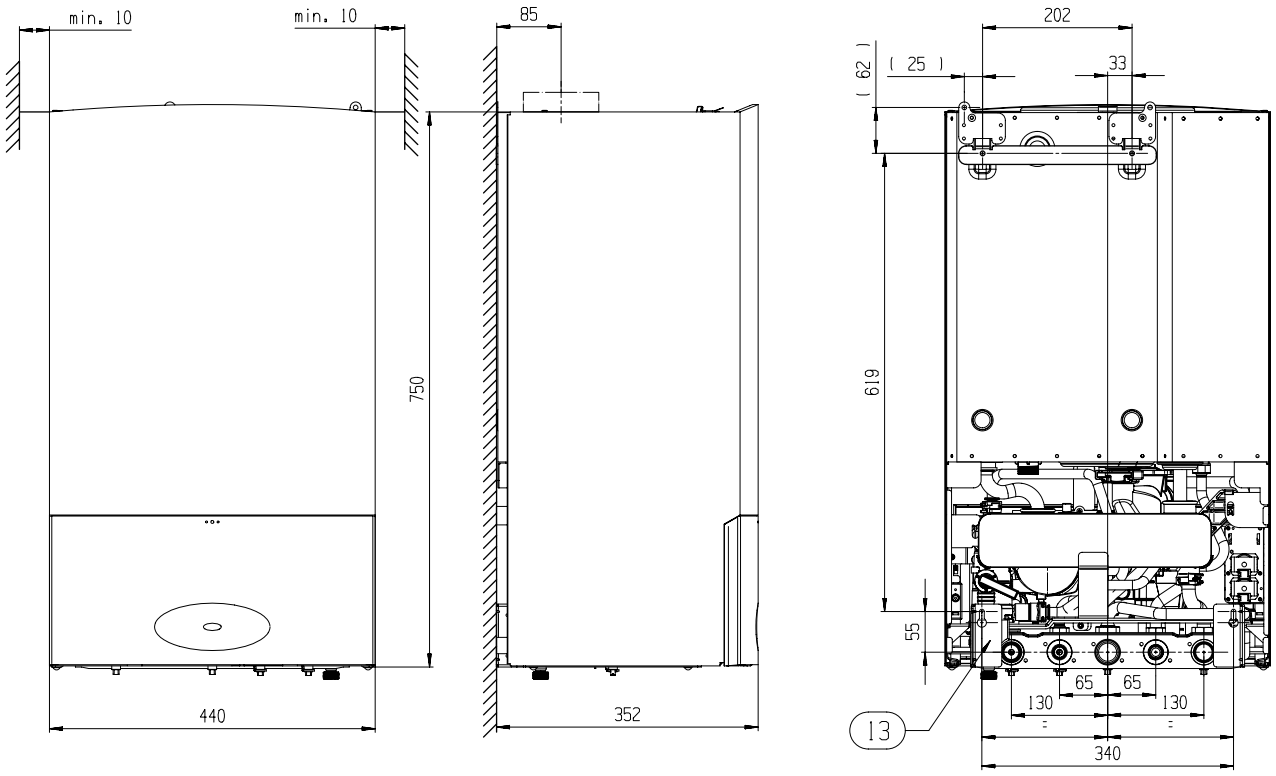


Fig. 1

1.6 Layout of appliance

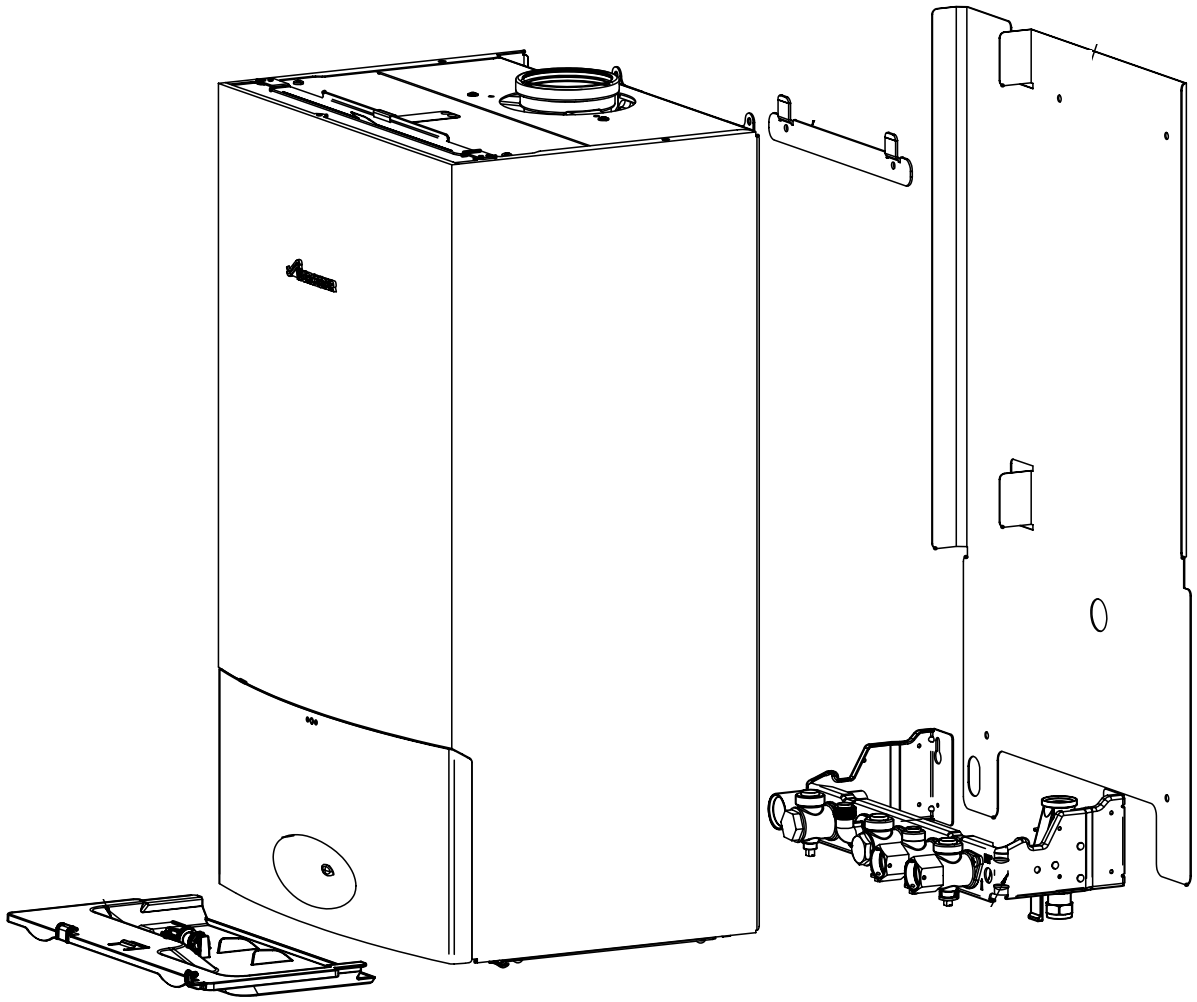


Fig. 2

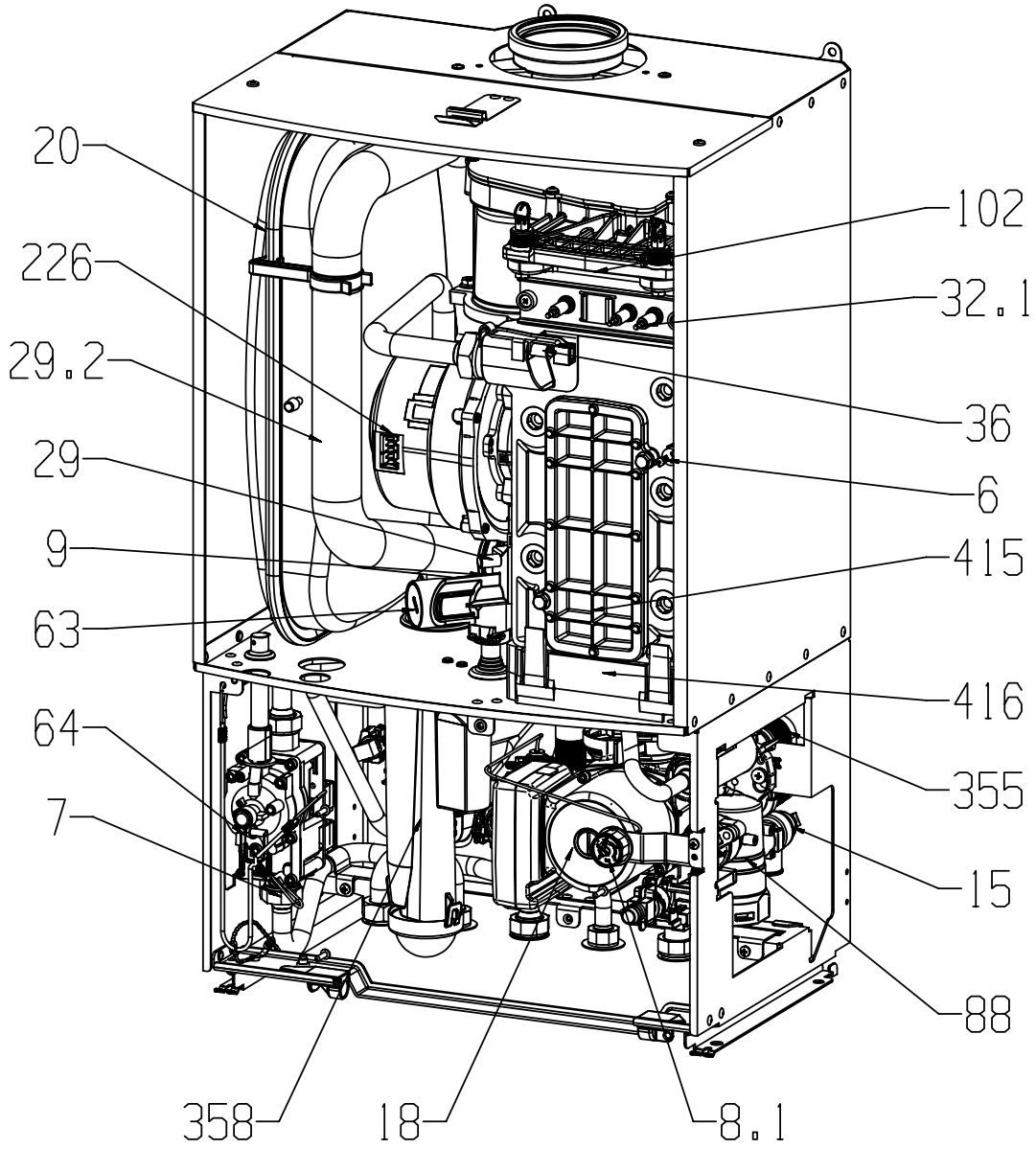


Fig. 3

6 Heat exchanger safety temperature limiter
7 Testing point for gas supply pressure
8.1 Pressure gauge
9 Flue gas temperature limiter
15 Relief valve
18 Pump
20 Expansion vessel
29 Air gas Mixer unit
29.2 Air intake pipe
32.1 Electrode assembly
36 Temperature sensor in CH flow
63 Adjustable gas flow restrictor
64 Adjusting screw for min. gas flow volume
88 3-way valve (combi)
102 Inspection window
226 Fan assembly
234 Testing point for flue gas
234.1 Testing point for combustion air
355 Plate-type domestic hot water heat exchanger
358 Condensate trap
415 Cover plate for cleaning access
416 Condensate collector

1.7 Function

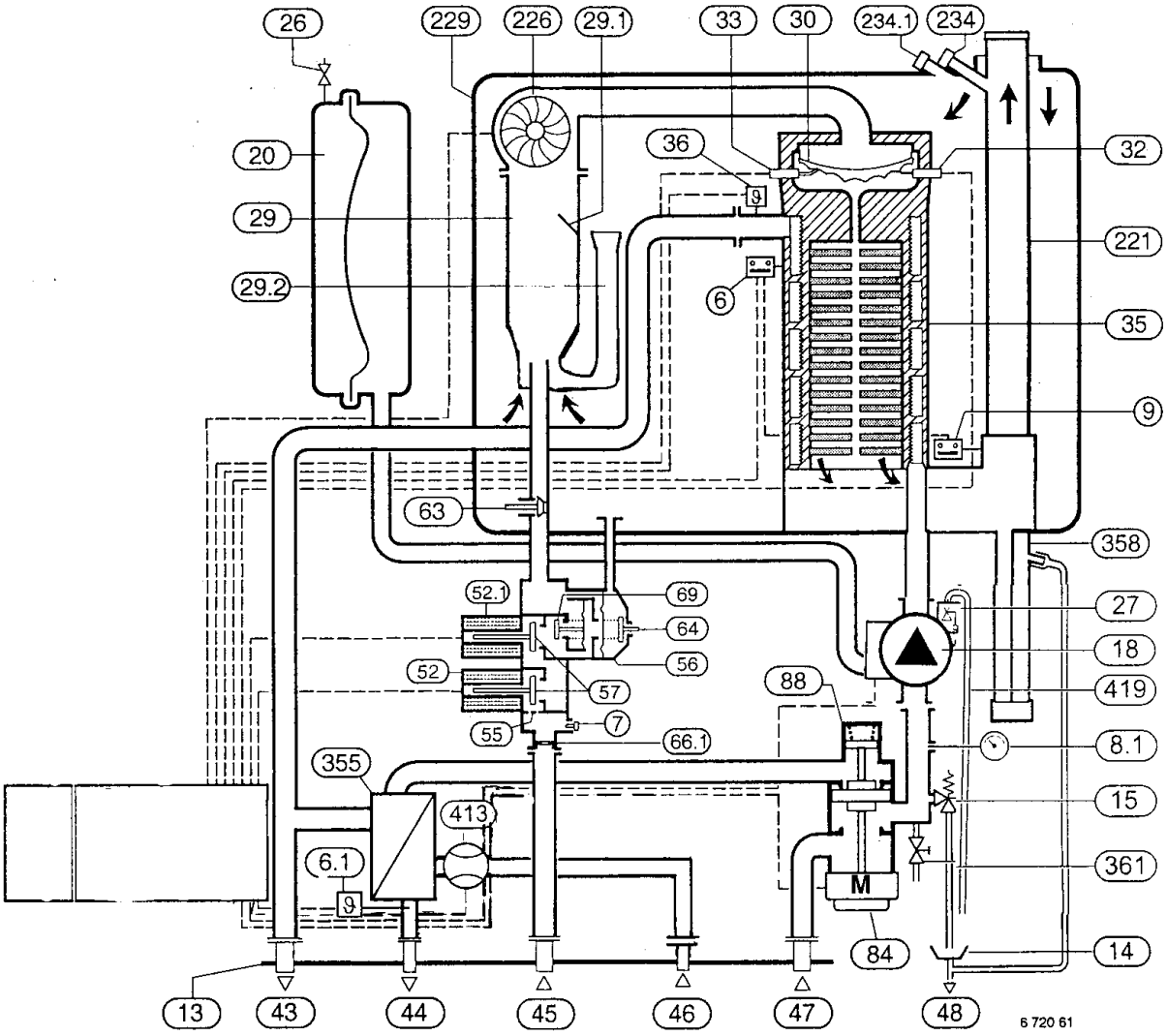


Fig. 4

6 Temperature limiter, heat exchanger
6.1 Hot water NTC sensor
7 Testing point for gas supply pressure
8.1 Pressure gauge
9 Flue gas temperature limiter
13 Manifold
15 Safety valve
18 Central heating pump
20 Expansion vessel
26 Charging Valve
27 Automatic vent
29 Mixer unit
29.1 Bi-metallic thermostat for combustion air compensation
29.2 Air intake pipe
30 Burner
32 Flame sensing electrode
33 Igniter electrode
35 Heat exchanger with cooled combustion chamber
36 Temperature sensor in CH flow
43 CH flow
44 Hot water flow
45 Gas inlet
46 Cold water inlet
47 CH return
52 Solenoid valve 1
52.1 Solenoid valve 2
55 Filter
56 Gas valve CE 427
57 Main valve disc
61 Reset button
63 Adjustable gas flow restrictor
64 Adjusting screw for min. gas inlet flow volume
69 Control valve
84 Motor
88 3-way valve
221 Flue duct
226 Fan
229 Inner casing
234 Testing point for flue gas
234.1 Testing point for combustion air
317 Display
355 Plate-type heat exchanger
358 Condensate trap
413 Flow meter (turbine)

1.8 Electrical wiring diagram

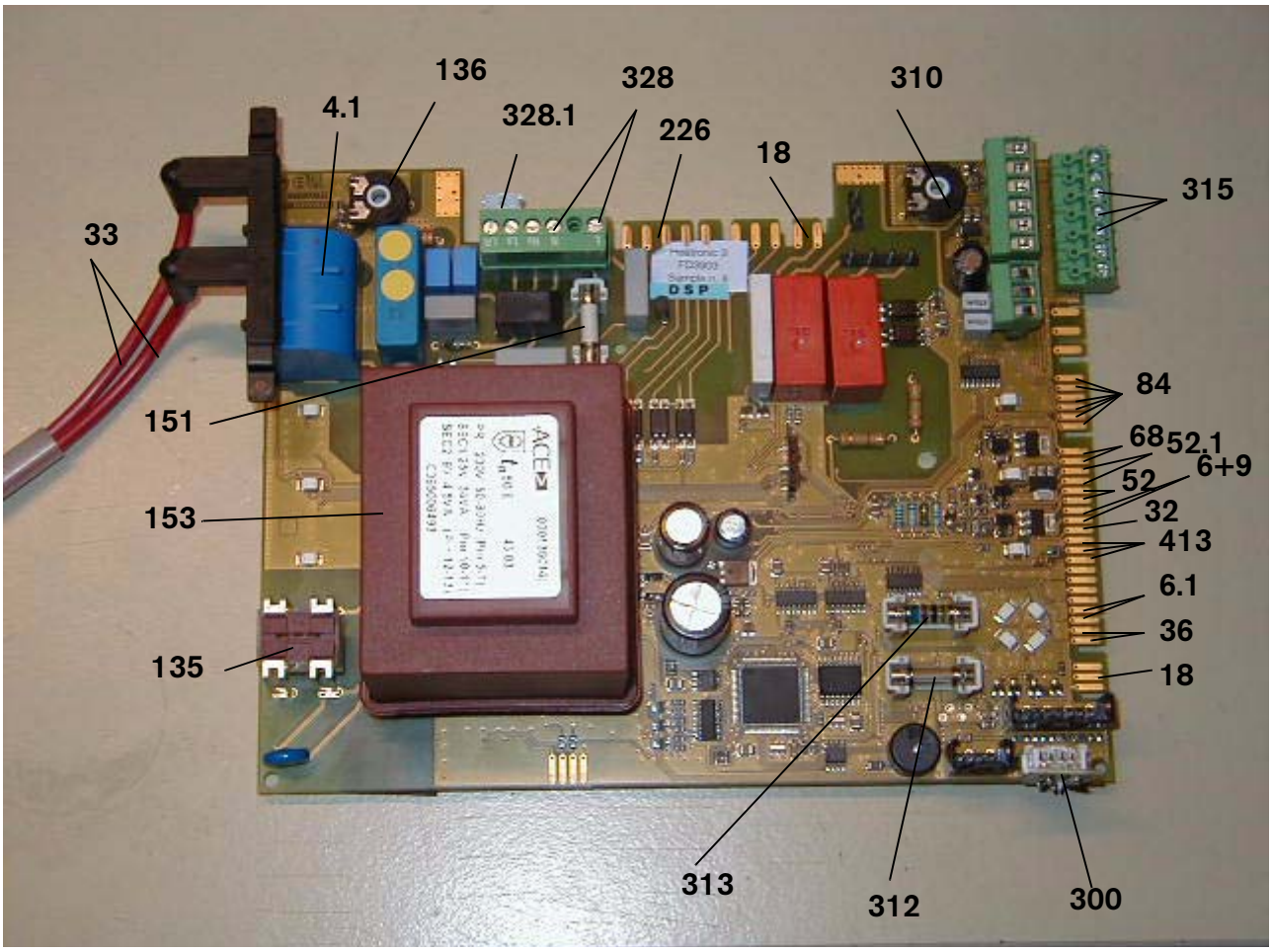


Fig. 5

4.1 Ignition transformer
6 Temperature limiter, heat exchanger
6.1 Hot water NTC sensor
9 Flue gas temperature limiter
18 Pump
32 Flame sensing electrode
33 Ignition electrode
36 Temperature sensor in CH flow
52 Solenoid valve 1
52.1 Solenoid valve 2
84 Motor, 3-way valve
135 Master switch
136 Temperature control for CH flow
151 Fuse, slow 2.5 A, AC 230 V
153 Transformer
226 Fan
300 Code plug
310 Temperature control for hot water
312 Fuse, slow T 1,6 A
313 Fuse, slow T 0,5 A
315 Terminal block for programmer
328 Terminal block for AC 230 V Mains supply
328.1 Link
413 Flow meter (turbine)

1.9 Technical data

	Units	ZWB 25-2 natural gas	ZWB 25-2 LPG gas	ZWB 30-2 natural gas	ZWB 30-2 LPG gas
Max. rated heat output net 40/30°C central heating	kW	26.8	26.8	32.1	32.1
Max. rated heat output net 50/30°C central heating	kW	26.6	26.6	31.8	31.8
Max. rated heat output net 80/60°C central heating	kW	25.0	25.0	30.0	30.0
Max. rated heat input net	kW	25.8	25.8	30,9	30,0
Min. rated heat output net 40/30°C	kW	7.6	8.6	7.6	8.6
Min. rated heat output net 50/30°C	kW	7.5	8.6	7.5	8.6
Min. rated heat output net 80/60°C	kW	6.7	7.7	6.7	7.7
Min. rated heat input net	kW	7.0	8.0	7.0	8.0
Max. rated heat output net, domestic hot water	kW	25.0	25.0	30,0	30,0
Max. rated heat input net, domestic hot water	kW	25.8	25.8	30,9	30,9
Maximum gas flow rate – After 10 minutes from lighting					
Natural gas G20 (CVnet 34.02 MJ/m^3)	m^3/h	2.6		3.2	
LPG (CVnet 88 MJ/m^3)	kg/h		2.0		2.4
Gas supply pressure					
Natural gas G20 (CVnet 34.02 MJ/m^3)	mbar	20	-	20	-
LPG (CVnet 88 MJ/m^3)	mbar		37		37
Expansion vessel					
Charge pressure	bar	0.75	0.75	0.75	0.75
Total capacity	l	10	10	10	10
Hot water specifications					
Hot water flow rate (factory setting)	l/min	9	9	11	11
Outlet temperature range	°C	40 - 60	40 - 60	40 - 60	40 - 60
Max. permissible water supply pressure	bar	10	10	10	10
Min. inlet pressure	bar	0.2	0.2	0.2	0.2
Specific flow rate	l/min	12.3	12.3	14.8	14.8
Flue					
Flue gas temp. 80/60°C, rated/min. load	°C	70/58	70/58	76/58	76/58
Flue gas temp. 40/30°C, rated/min. load	°C	51/33	51/33	55/33	55/33
Residual delivery pressure (inc. pressure drop in air intake duct)	Pa	70	70	70	70
CO_2 level at max. rated heat output	%	9.6	10.8	9.6	10.8
CO_2 level at min. rated heat output	%	9.0	10.5	9.0	10.5
NO_x-class		5	5	5	5
SEDBUK figure	Band	A	A	A	A
Condensate					
Max. condensation rate ($t_R = 30°C$)	l/h	2.3	2.3	2.7	2.7
pH-value, approx.		4.8	4.8	4.8	4.8
General Data					
Electrical power supply voltage	AC ... V	230	230	230	230
Frequency	Hz	50	50	50	50
Max. power consumption	W	110	110	120	120
Noise output level	dB(A)	43	43	45	45
Appliance protection rating	IP	X4D	X4D	X4D	X4D
Max. CH flow temperature	°C	nom. 90	nom. 90	nom. 90	nom. 90
Max. permissible operating pressure (CH)	bar	2.5	2.5	2.5	2.5
Permissible ambient temperatures	°C	0 - 50	0 - 50	0 - 50	0 - 50
Nominal capacity of appliance	l	3.75	3.75	3.75	3.75
Weight (excluding packaging)	kg	49	49	49	49

Table 2

	Units	ZWB 35-2 natural gas	ZWB 35-2 LPG gas		
Max. rated heat output net 40/30°C central heating Max. rated heat output net 50/30°C central heating Max. rated heat output net 80/60°C central heating	kW kW kW	32.1 31.8 30.0	32.1 31.8 30.0		
Max. rated heat input net	kW	30,9	30,0		
Min. rated heat output net 40/30°C Min. rated heat output net 50/30°C Min. rated heat output net 80/60°C	kW kW kW	7.6 7.5 6.7	8.6 8.6 7.7		
Min. rated heat input net	kW	7.0	8.0		
Max. rated heat output net, domestic hot water	kW	35,0	35,0		
Max. rated heat input net, domestic hot water	kW	35,0	35,0		
Maximum gas flow rate – After 10 minutes from lighting					
Natural gas G20 (CVnet 34.02 MJ/m^3)	m^3/h	3.7			
LPG (CVnet 88 MJ/m^3)	kg/h		2.7		
Gas supply pressure					
Natural gas G20 (CVnet 34.02 MJ/m^3)	mbar	20	-		
LPG (CVnet 88 MJ/m^3)	mbar		37		
Expansion vessel					
Charge pressure	bar	0.75	0.75		
Total capacity	l	10	10		
Hot water specifications					
Hot water flow rate (factory setting)	l/min	12	12		
Outlet temperature range	°C	40 - 60	40 - 60		
Max. permissible water supply pressure	bar	10	10		
Min. inlet pressure	bar	0.2	0.2		
Specific flow rate	l/min	16.7	16.7		
Flue					
Flue gas temp. 80/60°C, rated/min. load	°C	76/58	76/58		
Flue gas temp. 40/30°C, rated/min. load	°C	55/33	55/33		
Residual delivery pressure (inc. pressure drop in air intake duct)	Pa	70	70		
CO_2 level at max. rated heat output CO_2 level at min. rated heat output	% %	9.6 9.0	10.8 10.5		
NO_x-class		5	5		
SEDBUK figure	Band	A	A		
Condensate					
Max. condensation rate ($t_R = 30°C$)	l/h	2.7	2.7		
pH-value, approx.		4.8	4.8		
General Data					
Electrical power supply voltage	AC ... V	230	230		
Frequency	Hz	50	50		
Max. power consumption	W	130	130		
Noise output level	dB(A)	48	48		
Appliance protection rating	IP	X4D	X4D		
Max. CH flow temperature	°C	nom. 90	nom. 90		
Max. permissible operating pressure (CH)	bar	2.5	2.5		
Permissible ambient temperatures	°C	0 - 50	0 - 50		
Nominal capacity of appliance	l	3.75	3.75		
Weight (excluding packaging)	kg	49	49		

Table 3

Condensate analysis, mg/l

Ammonium 1.2	Nickel 0.15
Lead ≤ 0.01	Mercury ≤ 0.0001
Cadmium ≤ 0.001	Sulphate 1
Chromium ≤ 0.1	Zinc ≤ 0.005
Halogenated hydrocarbons ≤ 0.002	Tin ≤ 0.01
Hydrocarbons 0.015	Vanadium ≤ 0.001
Copper 0.028	pH-value 4.8

Table 4

Flue system

HORIZONTAL 100 mm – Standard			
Overall Diameter of Duct	**mm**	**100**	**Max. 6 m**
Flue Terminal / Duct Assembly Length	**mm**	**600**	
Extension Duct Length	**mm**	**1000**	

Table 5

ALTERNATIVE HORIZONTAL 125 mm FLUE SYSTEM			
Overall Diameter of Duct	**mm**	**125**	**Max. 16 m (including turret)**
Flue Terminal / Duct Assembly	**mm**	**1030**	

Table 6

VERTICAL 125 mm FLUE SYSTEM			
Overall Diameter of Duct	**mm**	**125**	**Max. 16 m**
Flue Terminal / Duct Assembly	**mm**	**1360**	

Table 7

Elbow - 90 ° Equivalent length 2 m
Bend - 45 ° Equivalent length 1m

Gas supply

Total length of gas supply pipe (metres)			**Pipe diameter (mm)**
3	**6**	**9**	
Gas discharge rate (m^3/h)			
8.7	**5.8**	**4.6**	**22**
18.0	**12.0**	**9.4**	**28**

Table 8

Domestic water performance

			ZWB 25	**ZWB 30**	**ZWB 35**
Domestic Water Flow Rate l/min	Temperature Rise	30 °C			
	Temperature Rise	35 °C			
	Temperature Rise	40 °C	9	11	12
Maximum Mains pressure		bar	10.0	10.0	10.0
Minimum Mains pressure		bar	0.2	0.2	0.2

Table 9

2 Installation regulations

Gas Safety (Installation & Use) Regulations 1998: All gas appliances must be installed by a competent person. Failure to install correctly could lead to prosecution.
The manufacturers notes must not be taken, in any way, as overriding statutory obligations.
The appliance must be installed in accordance with the current IEE Wiring Regulations, local Building Regulations, Building Standards (Scotland) (Consolidation), bye-laws of the local Water Company, Health and Safety Document 635 (Electricity at Work Regulations 1989) and any other local requirements.
Product Liability regulations indicate that, in certain circumstances, the installer can be held responsible, not only for mistakes on his part but also for damage resulting from the use of faulty materials. We advise the installer to avoid any risk by using only quality approved branded fittings.
The relevant British Standards should be followed i.e.

- BS 6798: Specification for the installation of gas fired hot water boilers of rated input not exceeding 60kW
- BS 5449: Central Heating for Domestic Premises
- BS 5546: Installation of gas hot water supplies for domestic purposes
- BS 5440:1: Flues and ventilation for gas appliances of rated input not exceeding 70 kW (net): Flues
- BS 5440:2: Flues and ventilation for gas appliances of rated input not exceeding 70 kW (net): Air Supply
- BS 6891: Installation of low pressure gas pipework installations up to 28mm (R1).
- BS 7074:1: Code of practice for domestic heating and hot water supply
- BS 7671: Requirements for Electrical Installation.

These instructions must be followed.

3 Installation

- Always turn off the gas cock before carrying out any work on components which carry gas.

Fixing of the appliance, gas and flue connections, commissioning of the system and electrical connections may only be carried out by competent persons authorised by CORGI.

3.1 Important remarks

- Appliance should only be installed in sealed central heating systems.
- To avoid gas formation in the system, galvanised radiators or pipes must not be used.
- If a room thermostat is used: do not fit a thermostatic radiator valve on the radiator in the primary room.
- Add a suitable anti-freeze fluid compatible with aluminium to the water in the central heating system. Suitable products are available from Betz-Dearborn Tel.: 0151 4209563 and Fernox Tel.: 01799 550811.
- In our experience, the addition of sealing agents to the water in the central heating system can cause problems (deposits in the heat exchanger). For that reason we advise against their use.

3.2 Domestic hot water

Any regulations specified by the local water company must be observed.

The final 600 mm of the mains cold water connection to the appliance should be made in copper tube only.

The appliance is suitable for a mains supply having a maximum pressure of 10 bar. A pressure reducing valve must be fitted, if necessary.

The hot water outlet temperature is set to be capable of achieving a maximum of 60°C. The maximum temperature and the frequency of the recharge of the heat store may be reset.

A water flow rate according tabel 9 will give a temperature rise of 40°C. If a higher rise is required then the flow must be reduced at the tap and the discharge temperature will rise up to the maximum set figure.

The temperature rise, up to the maximum set by the user, is automatically maintained by the modulation of the heat input. In winter, when the mains temperature is very low, the water flow, adjusted at the tap or shower, should be reduced to maintain the required delivery temperature.

It is suggested that long pipe runs to taps or showers be insulated to prevent the rapid cooling of the water.

All types of single lever mixer taps and thermostatic mixer units suitable for a mains pressure of up to 10 bar can be used.

The head of a loose-head shower must not be allowed to fall within 25 mm of the top the bath to prevent the risk of water being drawn back into the mains. Alternatively the shower must be fitted with an anti-syphonage device at the point of the flexible hose connections.

Over-rim bidets may be connected to the appliance provided that it is in accordance with the requirements of the local water company. The outlet(s) should be shrouded and unable to have any temporary hand held spray attached. No anti-syphonage arrangements are necessary.

In exceptionally hard water areas a device to prevent scale formation may be fitted or, alternatively, the maximum temperature reset to about 45°C which may reduce the risk of scale formation. The installation of a scale inhibitor assembly should be in accordance with the requirements of the local water company. Artificially softened water must not be used to fill the central heating system. An isolating valve should be fitted to allow for servicing.

Devices, such as water meters or back-flow prevention valves, capable of preventing the flow of expansion water must not be fitted unless separate arrangements have been made.

A Zilmet Z160 expansion vessel is the preferred type. A thread sealant compatible with potable water must be used. The vessel should be connected into the cold water mains inlet pipe as close as possible to the appliance.

3.3 Sealed systems

The appliance must not be operated without the system being full of water, properly vented and pressurised.

The expansion vessel has a volume of 10 litres and is charged to a pressure of 0.75 bar.

The water capacity of the system is shown in table 12, page 29. If a greater capacity is required then an additional expansion vessel must be fitted into the system return as close to the appliance as possible. The system pressure can be set up to a maximum of 1.5 bar with 1 bar being the normal setting.

If the system pressure is greater than 2.65 bar when the appliance is operating at maximum temperature then an additional expansion vessel must be fitted into the system return as close to the appliance as possible.

The filling point must be at low level and arranged as shown in figs. 6 and 7.

The pressure relief valve is set to operate at 3 bar.

There must be no connection to the mains without the approval of the local water company. All connections in the system must be capable of withstanding a pressure of up to 3 bar and the radiator valves conform to the requirements of BS 2767:10.

If Thermostatic Radiator Valves are fitted then it is recommended that the primary radiator (where the room thermostat is sited) is left open.

Repeated venting probably indicates a leak and this must be rectified to ensure the proper operation of the appliance.

No galvanised radiators or pipes must be used.

If any system water treatment is required then use only products suitable for use with Aluminium shall be used i.e Fernox- Copal or Superconcentrate or Sentinal X100, in accordance with the manufacturers instructions. The use of any other substances will invalidate the guarantee. The pH value of the system water must be less than 8 or the appliance guarantee will be invalidated.

Suitable products are available from Betz-Dearborn Tel.: 0151 4209563 and Fernox Tel.: 01799 550811

A drain cock to BS2879 must be fitted to the lowest point of the system.

IMPORTANT: Check that no dirt is left in the water pipework as this could damage the appliance. Thoroughly flush the heating system and the mains water supply before fitting the appliance to the wall in accordance with the recommendations of BS7593:1992.

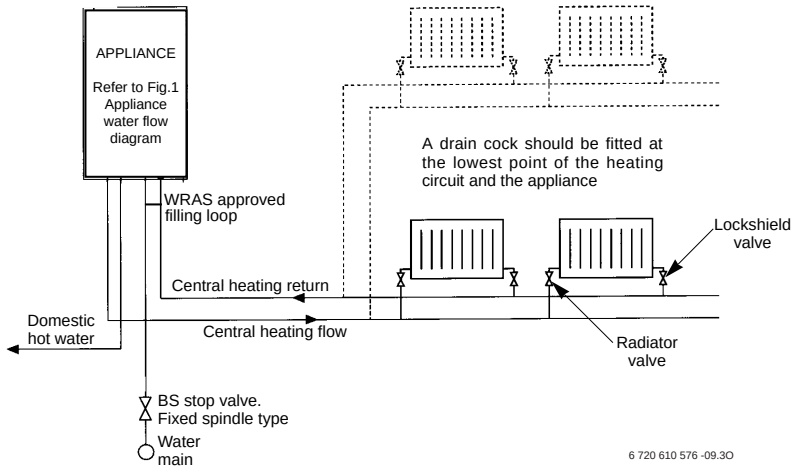


Fig. 6 Sealed primary water system

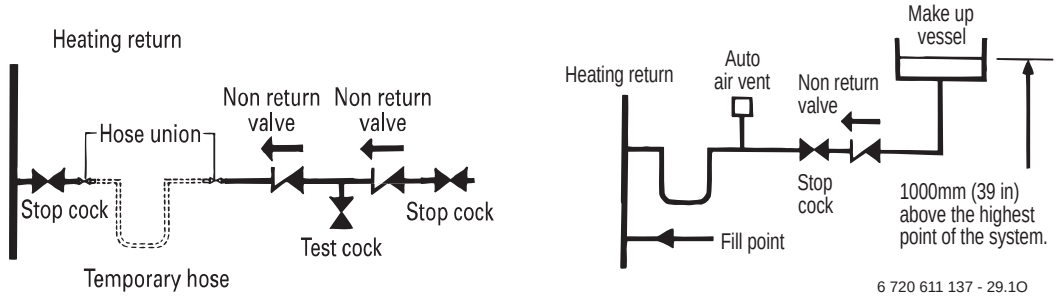


Fig. 7

3.4 Siting the appliance

Regulations concerning the Installation Site

- Relevant national regulations must be complied with section 3.8.1.
- Consult the installation instructions for details of minimum clearances required.

Combustion air

In order to prevent corrosion, the combustion air must not contain any corrosive substances.

Substances classed as corrosion-promoting include halogenated hydrocarbons which contain chlorine and fluorine compounds and are contained in some solvents, paints, adhesives, aerosol propellants and household cleaners, for example.

Surface temperature

The max. surface temperature of the casing and the flue is less than 85 °C.
This means that, no special safety precautions are required with regard to flammable building materials and fitted furniture. The specified clearances must be maintained.

Cupboard/Compartment

The appliance can be installed in a cupboard/compartment need for airing clothes providing that the requirements of BS6798 and BS5440:2 are followed. The low casing losses from the appliance eliminate the need for ventilation openings in the compartment.

3.5 Pre-piping the system

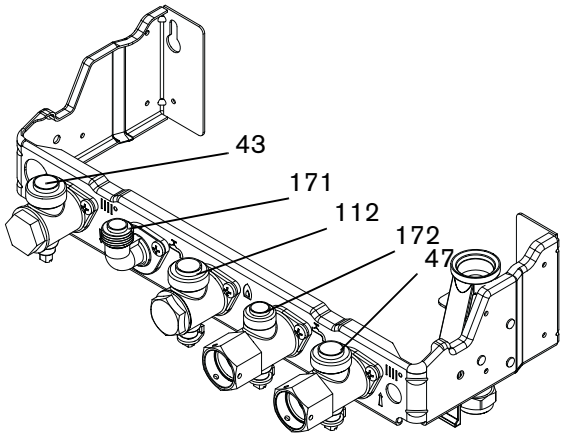


Fig. 8 Manifold

43 CH flow
47 CH return
112 Gas cock
171 Domestic hot water
172 Cold water inlet

- A drain tap should be fitted at the lowest point of the central heating system.
- WRAS approved filling loop must be fitted.

Charging Link (Filling Loop)

- Fully close the isolating valves on both the DHW inlet and CH return connections.
- Check that the boiler or Pre-filling Kit (7 716 192 282) is installed correctly onto the Manifold Assembly and the gas and water connections are tight.
- Unscrew the blanking plugs from both the DHW inlet and CH return connections.
- Place the filter inside the inlet side of the Charging Link ensuring that the filter mesh is inside the inlet.
- Fit the Charging Link assembly onto the DHW inlet and CH return connections.
  Do not insert the Charging Key at this stage.

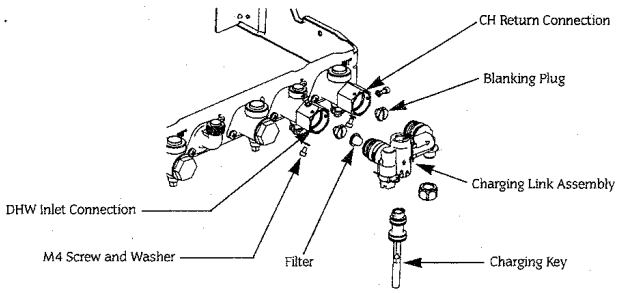


Fig. 9

- Ensure that the Charging Link is pushed in fully to the stop tabs on both sides of the Charging Link.

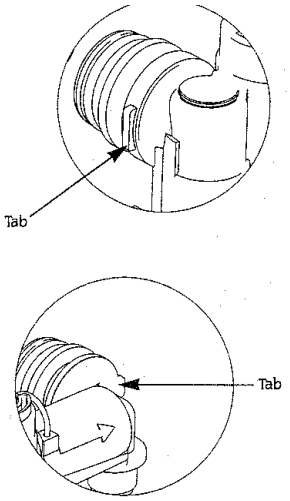


Fig. 10

- Fit two M4 screws complete with washers to each of the two connections. NB. It is not possible to access the third screw hole so this can be left.
  Do not attempt to turn the brass hexagon connectors.
- Ensure that the white plastic Control Screw on the Charging Link is turned fully into its closed possition, Fig. 11.
- Open the isolating valves on both the DHW inlet and CH return connections.
- Insert the Charging Key initially aligning the arrow on the key with the “unlock” symbol on the Charging Link body. Ensure that the key is inserted fully and turn to the “lock” position. Check that the key is secure Fig. 11.
- To fill the system from the DHW inlet turn the white plastic Control Screw on the Charging Link to the fully out position.
- Once the system has been filled turn the white Control Screw to its closed position and then remove the Charging Key by turning back to its “unlock” position and withdrawing. Store the Charging Key in the clip provided on the inside of the bottom panel. Fit the bottom panel in position.

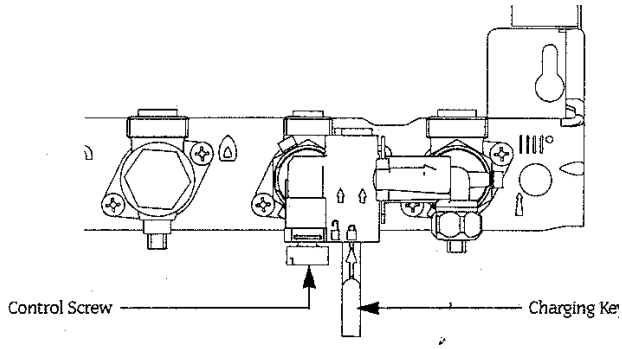
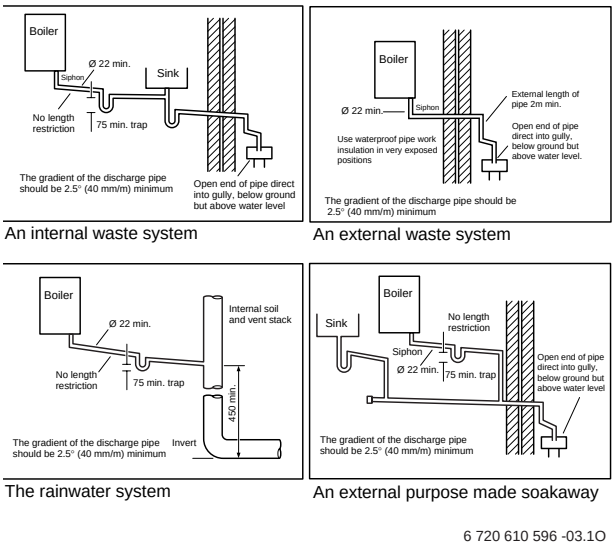


Fig. 11

Condensate Termination and Route

The condensate connection on the Worcester Bosch appliances is in 22 mm plastic. The pipe should be extended and run away from the appliance with a constant fall of 2.5 ° or 40 mm in every metre.

The condensate pipe can terminate into any of four areas:



An internal waste system

An external waste system

The rainwater system

An external purpose made soakaway

6 720 610 596 -03.1O

Fig. 12

Whilst all of the above methods are acceptable it is always the best practice to terminate the condense pipe via an internal waste system.This will eliminate the need for any external condensate pipe runs which can be susceptible to freezing in extreme weather.

External condensate pipework

All Worcester Bosch condensing boilers have within a syphonic condensate trap. Rather than the condensate constantly dripping into the discharge pipe, the condensate is collected into a trap which releases it in 100 ml quantities.
This will help prevent freezing occurring.

If there is no alternative and the condensate pipe has to be externally run, the following should be considered:

- The pipe run should take the shortest practical route.
- The pipework should be insulated with weather resistant insulation.
- The pipe should terminate as close as possible to the ground or drain, whilst still allowing the condensate to safely disperse. This would prevent wind blowing up the pipe.
- The pipework should be installed with the minimum of horizontal runs and with a downward slope of at least 2.5 °.

3.6 Fitting the appliance

Benchmark: For optimum performance after installation, this boiler and its associated central heating system must be flushed in accordance with the guidelines given in BS5793:1992 “Treatment of water in domestic hot water central heating systems”.

Unpacking

IMPORTANT HANDLING INSTRUCTIONS

- Two people should transfer the packaged appliance from the van to the point of installation
- Open the top of the carton, remove and place the component tray.
- Pull out the installation plate and the pre-plumbing manifold.
- Lie the packaged appliance on its back. (The back has “TRUCK HERE” printed on the carton)
- One person firmly holds the packaging while the other straddles the boiler and slides it from the packaging
- Two persons are then required to lift one end and stand the appliance upright with the flue at the top

Additional requirements for roof space installation

- Two people should use two step ladders and share lifting the unpacked boiler up to the loft hatch
- Where the boiler enters the loft space, tilt and slide the boiler on its back to the point of installation

Check the contents against the packing list.

Removing the outer case

The outer case is secured against unauthorised removal by two screws (electrical safety). Always secure the outer case with those screws again after refitting.

- Remove retaining screws (1).
- Slide the outer case upwards and then forwards to remove (2).
- Remove the wall mounting frame manifold kit and the flue duct connector from the boiler.
- Remove the plastic caps from the boiler connections.

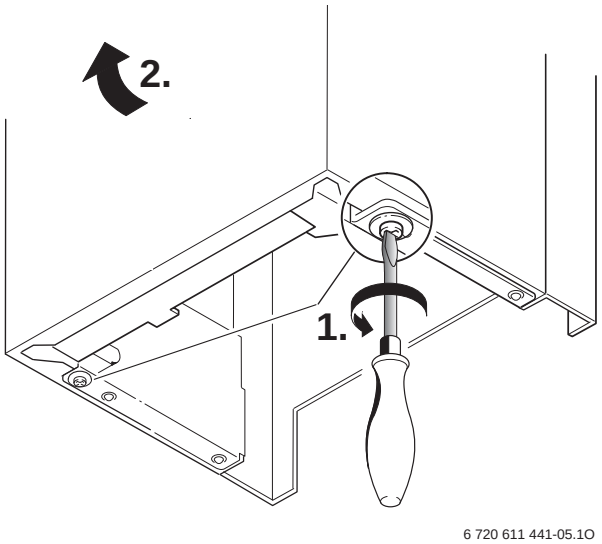


Fig. 13

Fixing the appliance

- Fit the washers onto the gas and water connections.
- Lift the boiler onto the wall-mounting frame. The lugs pass through the rectangular holes in the boiler back panel.
- Take care not to disturb the washers on the connections.

Connecting the flue duct

- Fit flue duct connector onto appliance flue spigot.
- Secure with screws pre-fitted to flue outlet on boiler unless additional screws are provided with flue system.

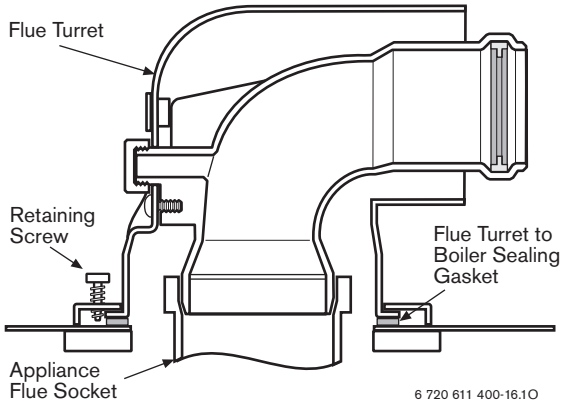


Fig. 14

- For remaining installation of flue assembly, refer to the relevant installation instructions.

3.7 Checking the connections

Water connections

- Check that the O-rings or seals are in place before tightening the connection.
- Turn on the service valves for central heating flow and return and fill the heating system through a WRAS approved filling loop.
- Check all seals and unions for leaks (testing pressure max. 3.0 bar as indicated by pressure gauge).
- Turn on cold water service cock and fill hot water system (testing pressure max. 10 bar).
- Check all connections for leaks.

Gas supply pipe

- Check that the seal is in place before tightening the connection.
- Turn off gas cock to protect gas valve against damage from excessive pressure.
- Check gas supply pipe.
- Release the pressure on the gas supply pipe.

3.8 Flue Systems

The only flue systems that may be used are those supplied with the boiler.
The flue system must be installed in accordance with the requirements of BS5440:1.

Standard 100 mm flue system

The standard concentric flue system provides for a horizontal length of up to 4 m. Full instructions for fitting this flue are in Subsection 3.8.2 “Installation of the flue”.

Alternative 125 mm diameter flue systems

Installation instructions for the alternative flue systems are sent with the appropriate flue kit.

Systems are available to give a maximum horizontal length of 16 m.

A vertical flue system up to a height of 16 metres is available.

45° and 90° flue bends can be used with a corresponding reduction in flue length of 2m for each 90° bend and 1 m for each 45° bend used.

IMPORTANT: Any horizontal flue system fitted to a condensing boiler must incline from the appliance at an angle of 1.6° (30 mm per metre length) to prevent condensate dripping from the flue terminal.

Note, the standard 100mm horizontal flue requires only a 0.5° incline from the boiler as the inner exhaust pipe is inclined at 2.5° inside the outer pipe.

This means that the clearance above the appliance must be increased to match the duct length.
Refer to fig. 1 on page 5.

3.8.1 Siting the Flue Terminal

The flue must be installed in accordance with BS 5440:1 and the Building Regulations. Flue terminals in carports and under balconies are to be avoided.
The terminal must be positioned so that it does not cause an obstruction nor the combustion products a nuisance. See fig. 15 and table 10.
The terminal will, at times, give out a plume of water vapour and consideration must be given to this when choosing a terminal position. Keep clear of security lighting, activated by passive infra-red sensing heads.
If the terminal is less than 2 m above a surface to which people have access then a guard must be fitted. The guard must be evenly spaced about the terminal with a space of 50 mm in each direction and fixed with plated screws.
A guard Type K6 for the standard horizontal flue, can be obtained from Tower Flue Components, Vale Rise, Tonbridge TN9 1TB.

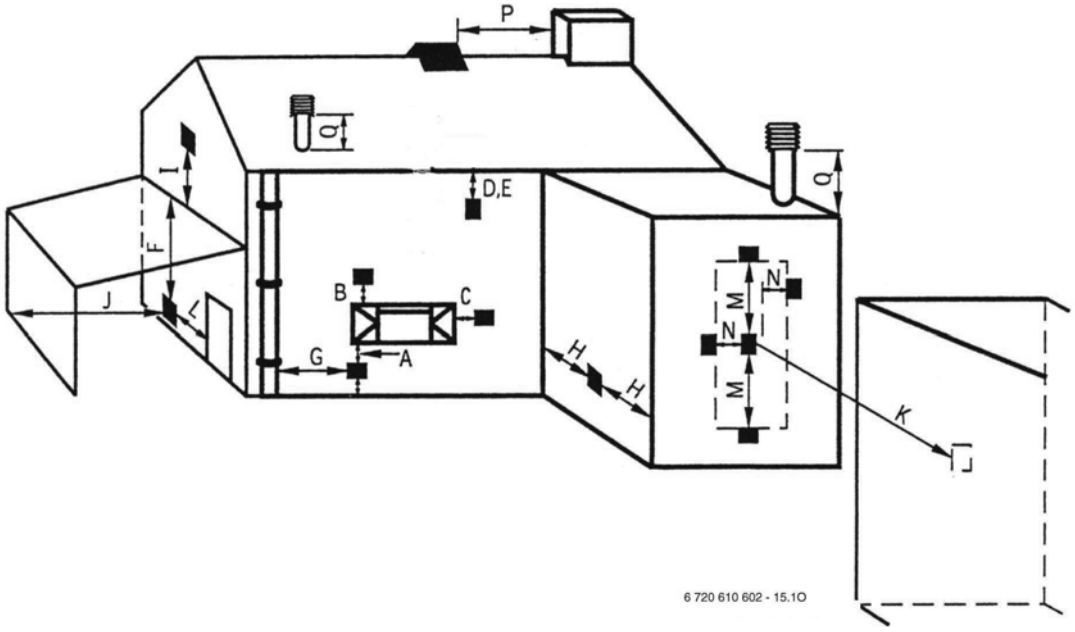


Fig. 15

Minimum dimensions of flue terminal positions (all types) (see fig 15. 15)

Dimension	Terminal Position (kW input expressed in net)	Balanced flues room sealed: Fanned draught
A[1)]	Directly below an opening, air brick, opening windows, etc.	300 mm
B1)	Above an opening, air brick, opening window, etc.	300 mm
C1)	Horizontally to an opening, air brick, opening window, etc.	300 mm
D	Below gutters, soil pipes or drain pipes	75 mm
E	Below eaves	200 mm
F [2)]	Below balconies or car port roof (lowest point)	200 mm
G	From a vertical drain pipe or soil pipe	150 mm
H	From an internal or external corner	300 mm
I	Above ground roof or balcony level	300 mm
J	From a surface facing the terminal	600 mm
K	From a terminal facing the terminal	1200 mm
L 2)	From an opening in the car port (e. g. door, window) into the dwelling	1200 mm
M	Vertically from a terminal on the same wall	1500mm
N	Horizontally from a terminal on the same wall	300 mm
O	From the wall on which the terminal is mounted	Not applicable - **Refer to separate vertical flue instructions.**
P	From a vertical structure on the roof	Not applicable - **Refer to separate vertical flue instructions.**
Q	Above intersection with roof	Not applicable - **Refer to separate vertical flue instructions.**

Table 10

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

3.8.2 Installation of the flue

The standard 100 mm diameter horizontal flue system is suitable for lengths up to 4 m.
Flues up to 730 mm do not require an extension duct assembly.
Flues between 1700 mm and 4000 mm require extension duct assemblies.

Standard 100 mm system comprise:

- Flue turret
- Flue turret clamp
- Terminal assembly
- Wall sealing gasket and cover plate.

Refer to Fig. 20.

Instructions for fitting other flue systems are packed with the relevant flue kit.
Check that the position chosen for the appliance is satisfactory Refer to Fig. 16.

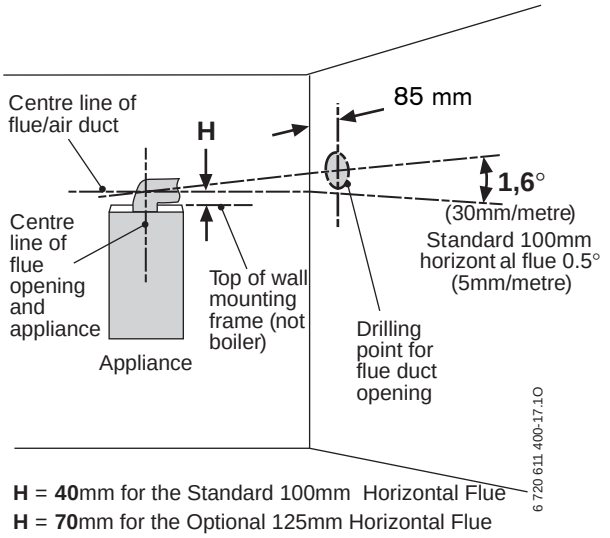


Fig. 16 Marking the position of a side flue opening. Note: ensure there is adequate access to the air/flue sampling points in the flue turret.

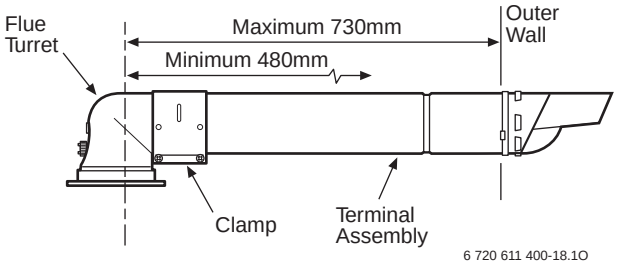


Fig. 17 Standard Flue

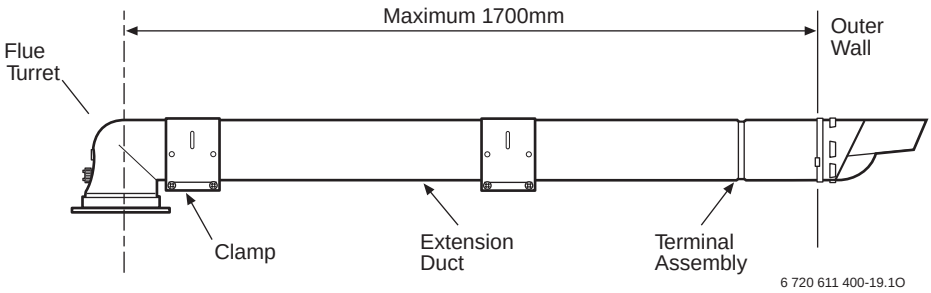


Fig. 18 Flue with one extension

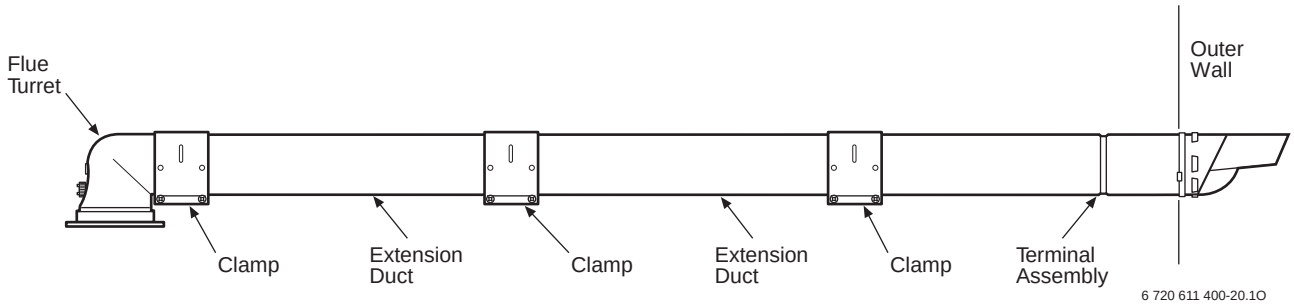


Fig. 19 Flue with extensions

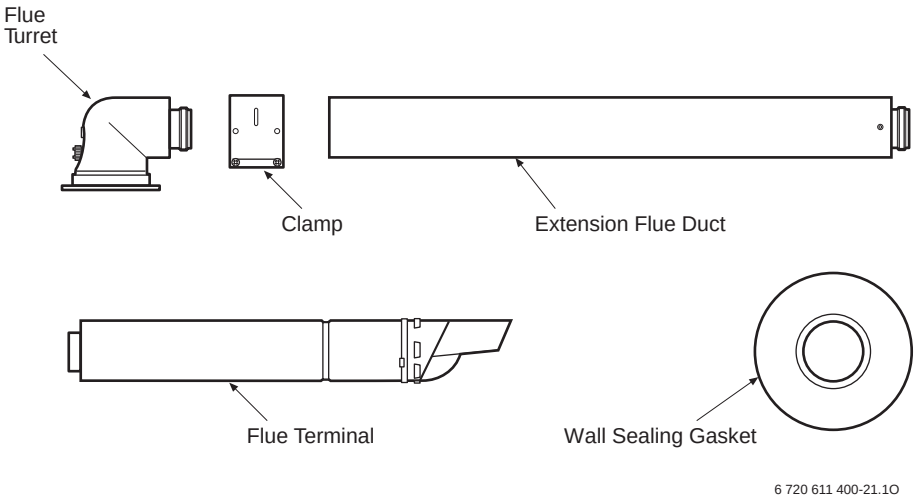


Fig. 20 Flue components

3.8.3 Flue duct preparation and assembly

Measure the flue length L. Refer to fig. 21, 22.

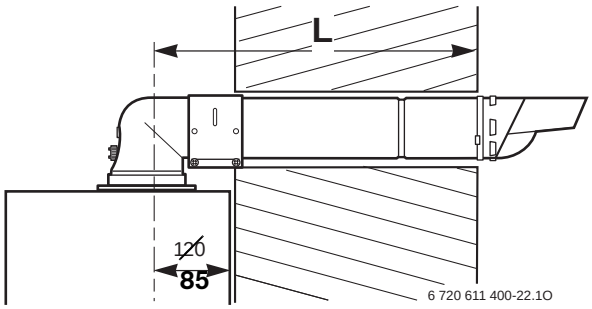


Fig. 21 Flue length - rear

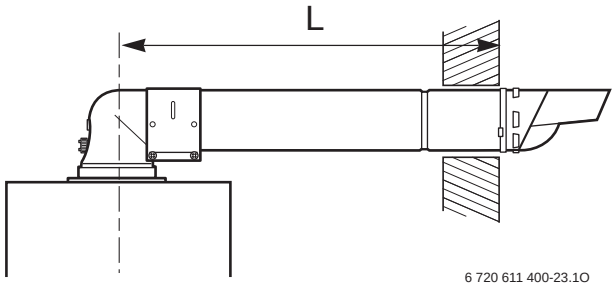


Fig. 22 Flue length - side

Measure 'L' from the end of the metal section of the flue terminal to the centre of the flue outlet on the boiler as shown in Fig. 21 & Fig. 22 and deduct 90mm from that measurement.

Cut both inner and outer flue pipe square at the opposite end to the terminal without creasing the tubes.

Remove any burrs before fitting the terminal to the turret.

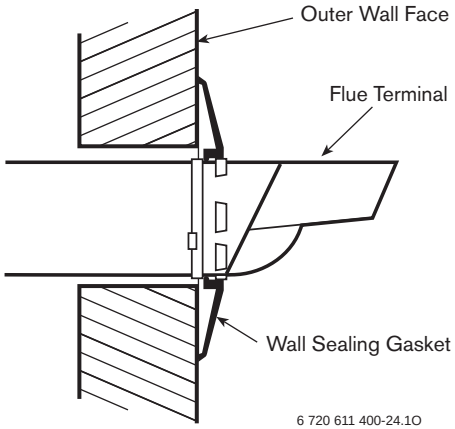


Fig. 23 Flue terminal position

Assemble flue system completely. Push the ducts fully together and clamp in the positions. The slope of the terminal outlet must face downwards.

The assembly will be made easier if a solvent free grease is lightly applied i.e Silicone lubricant, to the male end of the ducts.

NOTE: An inner wall sealing plate is provided which should be fitted to the ducts before assembly.

Push the assembly through the wall and fix the turret to the appliance with the screws prefitted to the boiler flue outlet. Refer to fig. 24.

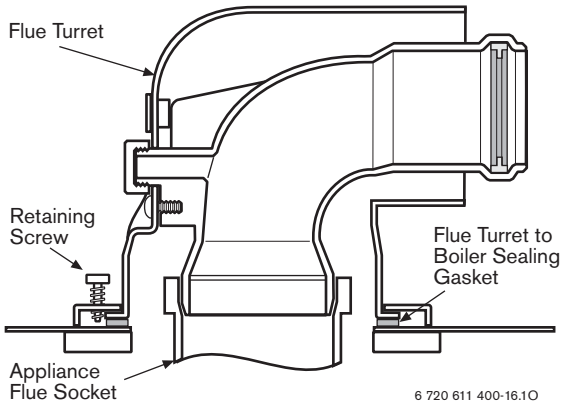


Fig. 24 Flue turret

Ensure that the turret is fully secured to the socket on the boiler.

If the terminal is within 2 m of the ground where there is access then an approved terminal guard must be fitted. The guard must give a clearance of at least 50 mm around the terminal and fixed with corrosion resistant screws.

4 Electrical connections

▶ Always disconnect the power supply to the appliance at the mains before carrying out any work on the electrical systems and components.

- ▶ Allow mains cable to protrude at least 50 cm from wall.
- ▶ To maintain the splash-proof (IP) design: cut the cable grommet hole size to match the diameter of the cable, see fig. 27.
- ▶ The appliance must be earthed.
- ▶ It must be possible to completely isolate the appliance with at least 3mm contact separation in both poles.

The wiring between the appliance and the electrical supply shall comply with current IEE Wiring Regulations (and any local regulations which apply) for fixed wiring to a stationary appliance.

- Supply: 230 V ~ 50 Hz, 150 Watts
- External fuse 3 A
- Any system connected to the boiler must NOT have a separate electrical supply.

4.1 Connecting the appliance

To gain access to the mains connection remove the drop down facia cover. The drop down cover is removed by lowering it to the horizontal position and pushing firmly upwards at the rear of the supports to release the cover. Lift cover from the appliance.

After installation (or in the event of an electrical fault) the electrical system shall be checked for short circuits, fuse failure, incorrect polarity of connections, earth continuity and resistance to earth.

- ▶ Remove fixing screw from the control box and lower the control box.

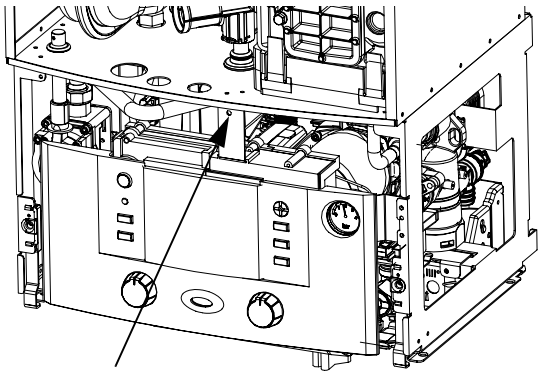
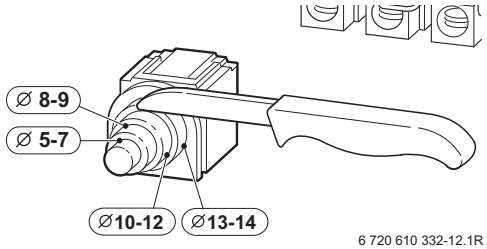


Bild 25

- ▶ Remove fixing screws and cover plate.

Bild 26

- ▶ Cut cable grommet to diameter of cable.



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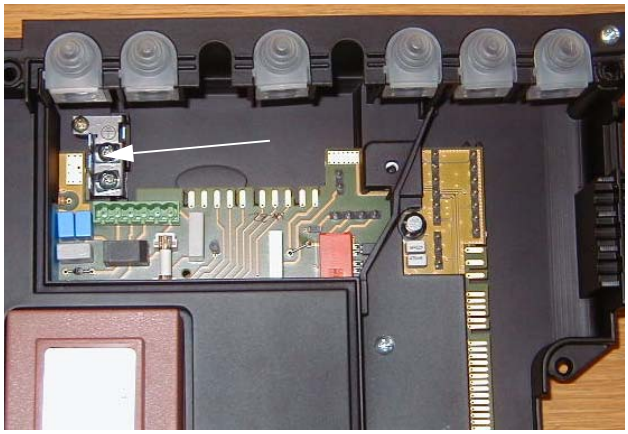
- ▶ Feed cable through cable grommet and connect the mains supply cable, see fig. 12, Pos 328. Earth connection see figure below.



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- ▶ Secure cable in cable grommet by means of cable grip.

- Put all cables to the control box through the cable grommet and secure.

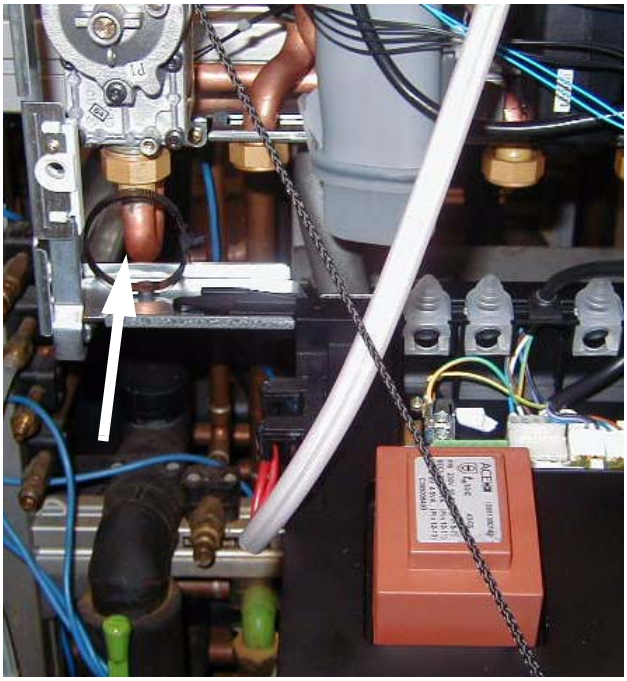


Fig. 29

4.2 Mains Voltage external controls connections

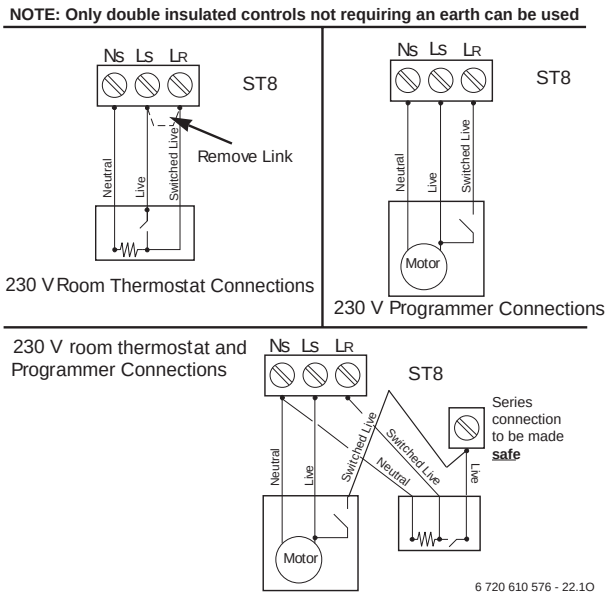


Fig. 30

Note: If an external timer is used then the domestic hot water pre-heat facility can only be isolated by actuating the ECO-button.

5 Commissioning

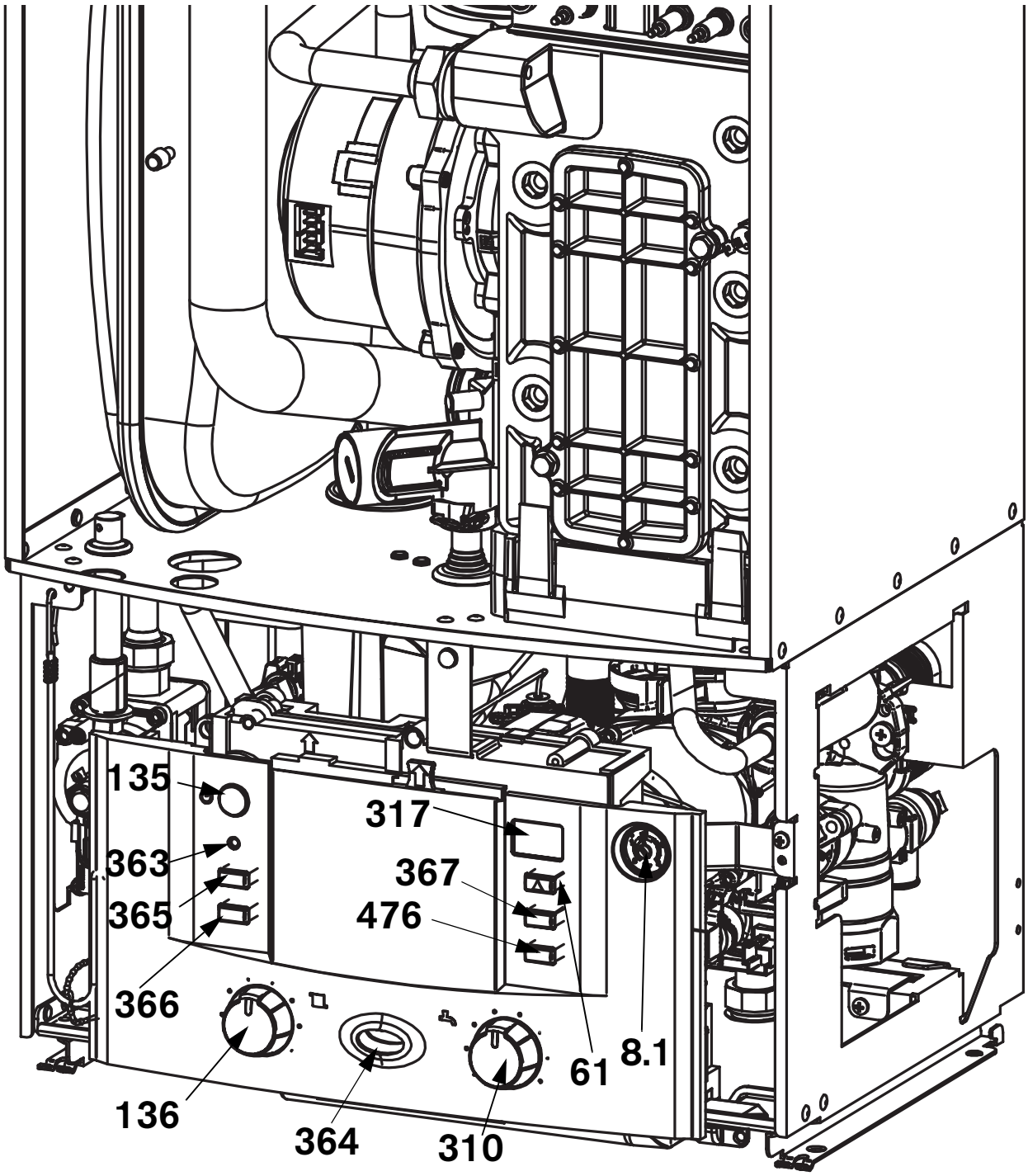


Fig. 31

8.1 Pressure gauge
61 reset button
135 Master switch
136 Temperature control for central heating
310 Temperature control for hot water
317 Multi function display
363 Indicator lamp for burner
364 Indicator lamp for power supply
365 Service button (min. heat output)
366 “Chimney sweep” button (max. heat output)
367 eco button
476 holiday button

5.1 Commissioning

Never run the appliance when empty or unpressurised.

The operational CO_2 level is set at the factory and no adjustment is necessary when installing a natural gas fired appliance.

Benchmark Water Treatment: For optimum performance after installation, this boiler and its associated central heating system should be flushed in accordance with the guidelines given in BS7593:1992 - Treatment of water in domestic hot water systems. Full instructions are supplied with proprietary cleansers sold for this purpose. If an inhibitor is to be used after flushing, it should be used in accordance with the inhibitor manufacturers instructions.

To drain the appliance shut the system valves and open the system drain point.

Suitable flushing agents and inhibitors are available from Betz/Dearborn Tel.: 0151 4209563, Fernox Tel.: 01799 550811 and Salamander Tel.: 0121 378 0952. Instructions for use are supplied with the these products.

- **Before commissioning, the gas supply pressure must be checked at the gas supply pressure test point (see page 6, fig. 2, item 7). Natural gas appliances must not be operated if the gas supply pressure is below 18 mbar or above 24 mbar. LPG appliances must not be operated if the supply pressure is not 37 mbar at the inlet to the appliance**.
- Pull out the condensation trap (358) and fill with approx. 0.75 l of water and refit. Refer to fig. 37.
- Adjust charge pressure of expansion vessel to static head of the central heating system (see page 29).
- Open all system radiator valves.
- Vent radiators.
- Refill heating system and set the pressure to 1 bar.
- Check that the gas type specified on the identification plate matches that of the gas supply.
- Turn on gas cock.

5.2 Switching the appliance on/off

Switching on

- Switch on the appliance at the master switch. The indicator lamp shows blue.

Switching off the appliance

- Switch off the appliance at the master switch. The blue indicator lamp goes out.

- Always disconnect the appliance from the power supply (fuse, circuit breaker) before carrying out any work on the electrical systems or components.

5.3 Switching on the central heating

- Turn the temperature control to set the flow temperature to a level appropriate to the type of central heating system:
  - Underfloor heating: e.g. setting **“3”** (approx. 50°C)
  - Low-temperature heating: setting **“6”** (approx. 75°C)
  - Central heating systems for flow temperatures up to 88 °C: setting **“max”**

  When the burner is alight, the **green** indicator lamp lights up.

5.4 System controls

- Set room thermostat to the desired room temperature.
- Set the thermostatic radiator valves to the desired settings.

5.5 Setting the domestic hot water temperature

The hot water temperature can be set to between approx. 40 °C and 60 °C.

Setting	Hot Water temperature
Turn fully anti-clockwise	approx. 40°C
e	approx. 55°C
Turn fully clockwise	approx. 60°C

Table 11

This temperature is not shown on the display.

5.6 Summer mode (hot water only)

With room thermostat

- Turn temperature control on the appliance anti-clockwise as far as the stop.
  The central heating is now turned off. The hot water function and the mains power supply for the heating programmer and timer remain switched on.

5.7 Frost protection

- Leave master switch switched on.

If the appliance is to be left for long periods switch the central heating on and set the room thermostat to 6°.

- Add a suitable anti-freeze fluid to the water in the central heating system.
  Suitable products are available from Betz/Dearborn Tel.: 0151 4209563, Fernox Tel.: 01799 550811 and Salamander Tel.: 0121 378 0952.

5.8 Pump anti-seize function

This function prevents the central heating pump seizing after long periods of inactivity.

Every time the pump is switched off, a timer is started. If after 24 hours the pump has not run again, it is switched on for a period of 5 seconds.

5.9 Fault Condition

A list of faults that may occur is given on page 39.

In the unlikely event of a fault occuring while the appliance is in operation the display flashes and a signal sounds.
You can shut off the signal by pressing any button.

If the display and the reset button are flashing:

- Press the reset button (61).
  The appliance then will sart up again.

If the appliance woun't start again:

- Switch the appliance off and then on again at the master switch.
  The appliance then will sart up again.

If the fault remains and can not be cleared by the reset button (61):

- Call for assistance, giving a description of the fault and, if possible, the fault code from the facia display.

6 Individual settings

6.1 Mechanical settings

6.1.1 Checking the size of the expansion vessel

Maximum pressure at maximum CH flow temperature is 2.5 bar. If the pressure is greater than this then fit an extra expansion vessel. Refer to table 12.

System Capacity – BS7074:1

Expansion Vessel Pressure and System Capacity			
Expansion Vessel		**litres**	**10**
Expansion Vessel Charge Pressure		**bar**	**0.75**
System pressure and capacity	**1 bar**	**litres**	**82**
	1.5 bar	**litres**	**46**

Table 12

6.1.2 Setting the central heating flow temperature

The central heating flow temperature can be set to between 35°C and 88°C.

With underfloor heating systems, observe the maximum permissible flow temperatures.

Control setting	CH flow temperature
1	approx. 35°C
2	approx. 43°C
3	approx. 51°C
4	approx. 59°C
5	approx. 67°C
6	approx. 75°C
max	approx. 88°C

Table 13

6.2 Setting the gas/air ratio

The appliance is set at the factory and adjustment to the CO_2 settings (gas/air ratio) is only required where the appliance has been stripped down and assembled or if the fan, burner or gas valve are replaced or the appliance has been converted to a different gas type, see section 7.

7 Converting the appliance to different gas types

The setting is factory sealed at maximum. Adjustment to the rated heat input and min. heat input is not necessary.

Checking the gas supply pressure

▶ Check the gas supply pressure at the gas supply pressure testing point.

Natural gas appliances must not be operated if the gas supply pressure is below 18 mbar or above 24 mbar.
LPG appliances must not be operated if the supply pressure is below or above 37 mbar.

Natural gas

- Appliances for **natural gas type G20** are factory set to Wobbe-Index 15 kWh/m^3 and 20 mbar supply pressure and sealed.

7.1 Setting the gas/air ratio

The gas/air ratio may only be adjusted on the basis of a CO_2 measurement at max. heat output and min. heat output using an electronic tester.

▶ Switch off the appliance at the master switch.
▶ Remove the outer case (see page 18, refer to fig. 13).
▶ Switch on the appliance at the master switch.
▶ Unscrew sealing plug from flue gas testing point (234). Refer to fig. 32.
▶ Insert testing probe about 135 mm into the flue gas testing point and seal testing point.

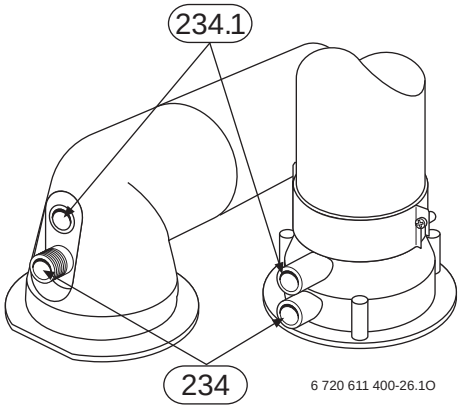
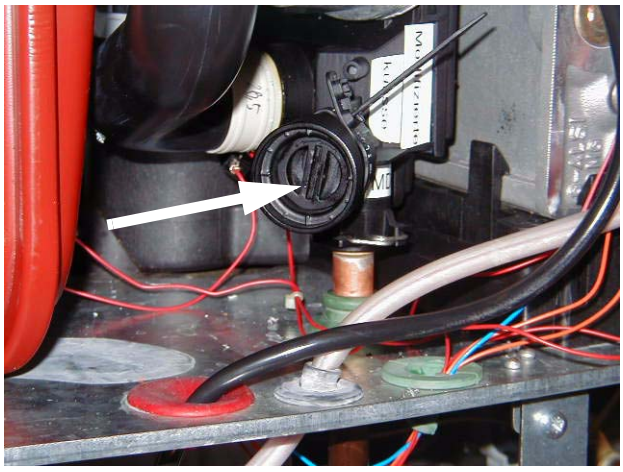


Fig. 32

▶ Press and hold the chimney sweep button as long as the button lights up.
▶ Turn the temperature control for central heating to max. right (max. rated heat output).
▶ Measure the CO_2 level.
▶ Adjust the gas flow restrictor (63) to obtain the CO_2 level given in Table 14. Refer to fig. 33.



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Gas Type	CO_2 reading at max. rated heat output	CO_2 reading at min. rated heat output
Natural gas type G20	9.6 %	9.0 %
LPG G31 (propane)	10.8 %	10.5 %

Table 14

- Turn the temperature control for central heating to max. left (min. rated heat output).
- Measure the CO_2 level.
- Remove the seal from the gas valve adjusting screw (64) and adjust the CO_2 level to the figure given in Table 14 for min. rated heat output.

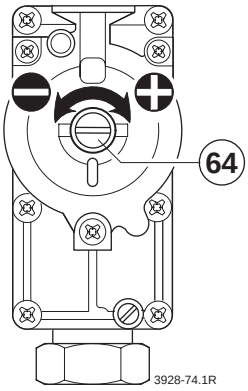

Bild 34

- Recheck the levels at min. and max. rated heat output and re-adjust if necessary.
- Press and hold the chimney sweep button for a short time (Normal mode).
- Remove testing probe from the flue gas testing point (234) and refit sealing plug.
- Re-seal gas valve adjusting screw and gas flow restrictor.
- Replace outer case and secure.

7.2 Testing combustion air/flue gas at set heat output

7.2.1 Testing the O_2 or CO_2 level in the combustion air

By testing the O_2 or CO_2 level in the combustion air the gas tightness of a type C_{13} or C_{33} **flue system** can be checked. The O_2 level must not be less than 20,6 %. The CO_2 level must not exceed 0,2 %.

- Press and hold the chimney sweep button for a short time (max. rated heat output). The button will flash.

In “chimney sweep” mode, the appliance switches to max. rated heat output. You then have 15 minutes in which to measure the levels. After that, the appliance switches back from “chimney sweep” mode to normal mode.

- Remove sealing plug from combustion air testing point (234.1, fig. 35).
- Insert testing probe about 80 mm into the testing point and seal testing point.

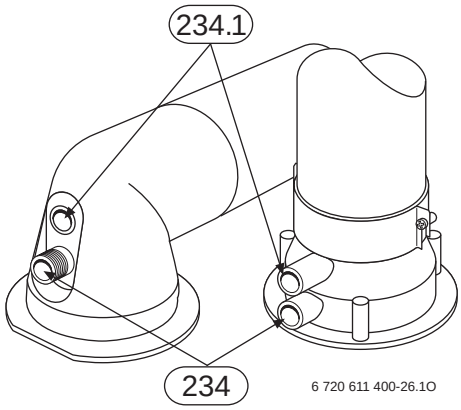

Fig. 35

- Measure O_2 and CO_2 levels.
- Refit sealing plug.
- Press and hold the service button for a short time (Normal mode).

7.2.2 Testing CO and CO_2

- Press and hold the chimney sweep button for a short time (max. rated heat output). The button will flash.

You have 15 minutes in which to measure the levels. After that, the appliance switches back from “chimney sweep” mode to normal mode.

- Remove sealing plug from flue gas testing point (234, Fig. 35).
- Insert testing probe about 135 mm into the testing point and seal testing point.
- CO- and CO_2 levels.
- Refit sealing plug.
- Press and hold the service button for a short time (Normal mode).

8 Maintenance

- Always disconnect the appliance from the electrical power supply (fuse, circuit breaker) before carrying out any work on the electrical systems or components.

- Always turn off the gas cock before carrying out any work on components which carry gas.

There is a special Service booklet for the Engineer, order no. XXXXXXXXXX, available to competent persons.

All safety and control systems are monitored by the Bosch Heatronic. In the event of a component fault, the display shows a fault code.

- The User should be recommended to have the appliance serviced regularly by a competent person (see Maintenance Contract).
- Use only genuine spare parts
- Refer to the Spare Parts List when ordering spare parts.
- Always renew seals and O-rings removed during servicing or repair work.
- Use only the following types of grease:
  - Water valve: WRAS approved silicon based grease
  - Unions: approved sealant.
- To drain the appliance shut the system valves and open the pressure relief valve.
- Upon completion of any electrical work check for earth continuity, correct polarisation and resistance to earth.

8.1 Description of servicing operations

The combustion performance must be checked before and after any servicing work on the combustion and burner components. Refer to section 7.2.

Domestic hot water

If the flow rate is too slow:

- ▶ remove the domestic hot water heat exchanger and replace,

-or-

- ▶ descale with a descaling agent approved for use on stainless steel.
- ▶ Before removing the heat exchanger shut the inlet valve and drain the hot water circuit.
- ▶ Use new seals when replacing the heat exchanger.

Primary Heat exchanger

There is a special accessory kit (no. 840) for cleaning the heat exchanger, order no. 7 719 001 996.

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

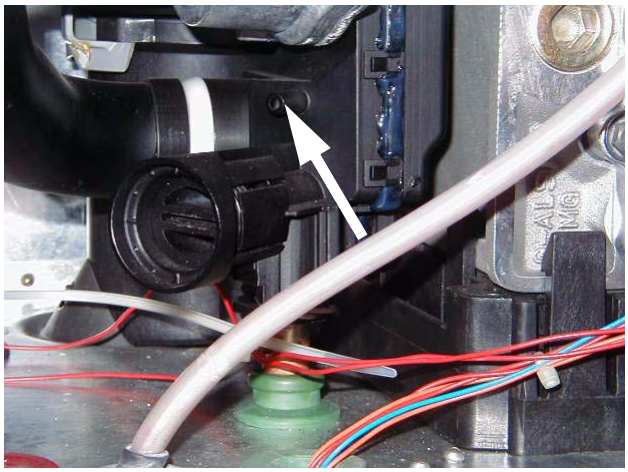

Fig. 36

The heat exchanger should only be cleaned if the control pressure is
2.7 mbar (25CDi)
3.9 mbar (30CDi)
5.4 mbar (35CDi)
(depression) or less.

- ▶ Remove cleaning access cover (415, page 6) and the metal plate below it, if present. Refer to fig. 2.
- ▶ Unscrew condensation trap and place suitable container underneath. Refer to fig. 37.
- ▶ Remove the fan and the burner as described in the text headed “Burner” (see page 35).

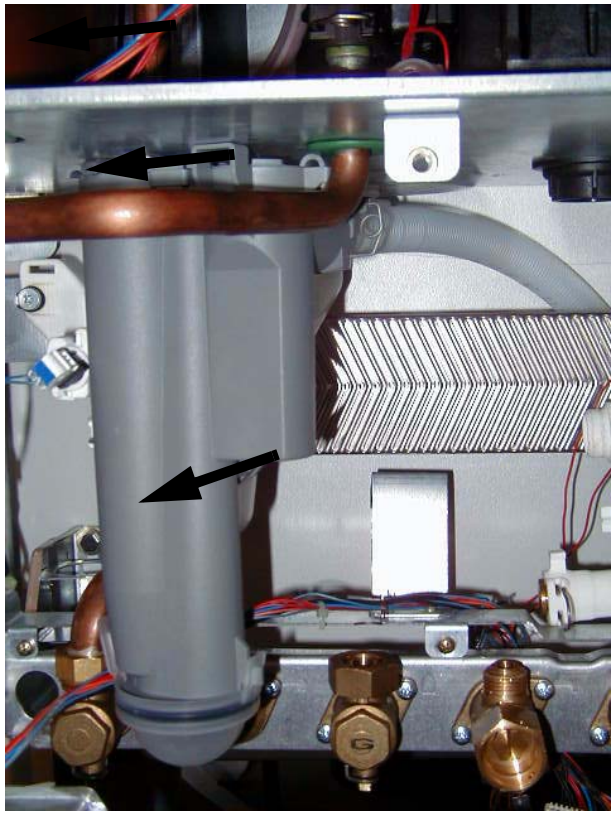

Fig. 37

- ▶ Loosen any deposits in the heat exchanger from top to bottom using the cleaning blade. Refer to fig. 38.

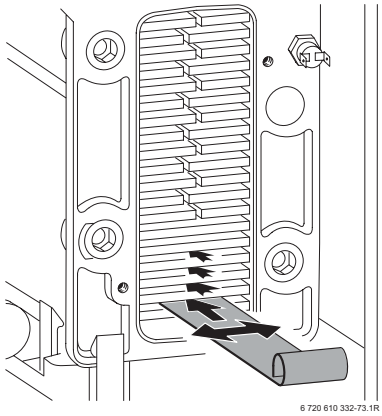

Fig. 38

- Clean the heat exchanger from top to bottom using the brush. Refer to fig. 39.

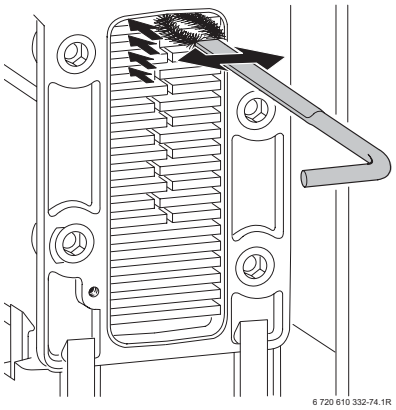

Fig. 39

- Flush the heat exchanger from the top. Refer to fig. 40.
- Clean out the condensate collector and trap connection (with other end of brush).

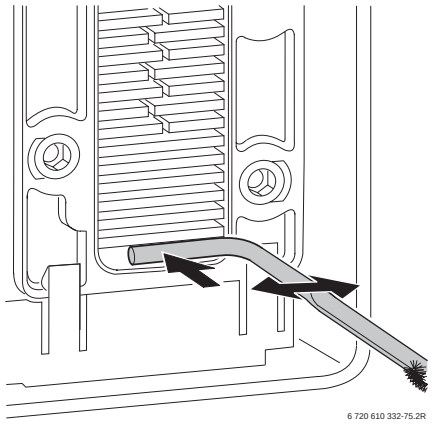

Fig. 40

- Refit the clean-out cover using a new seal and tighten screws to torque of approx. 5 Nm.

Burner

- Check that the gas cock is turned off and the master switch is in the OFF position.
- Remove the clips (1) and unscrew the two bolts (2). Refer to fig. 41.
- Unscrew and remove the two hexagon screws securing the fan (3).
- Slacken fully the rear securing bolt (4).
- Remove the burner coverplate.

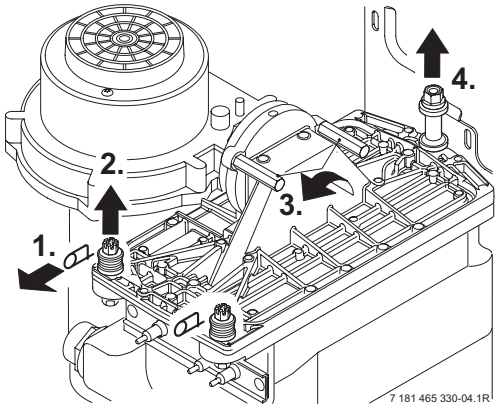

Fig. 41

- Remove burner and clean components. Do not use a wire brush. Refer to fig. 42.

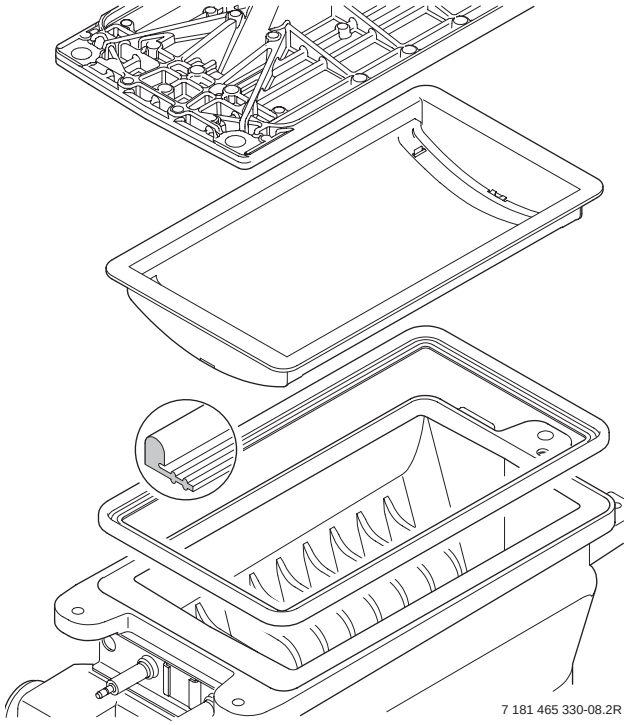

Fig. 42

- Re-assemble burner in reverse order using a new seal.
- Adjust gas/air ratio. Refer to section 7.2.

Condensation trap

In order to prevent spillage of condensate, the condensation trap should be completely removed.

- Unscrew condensation trap and check connection to heat exchanger is clear.

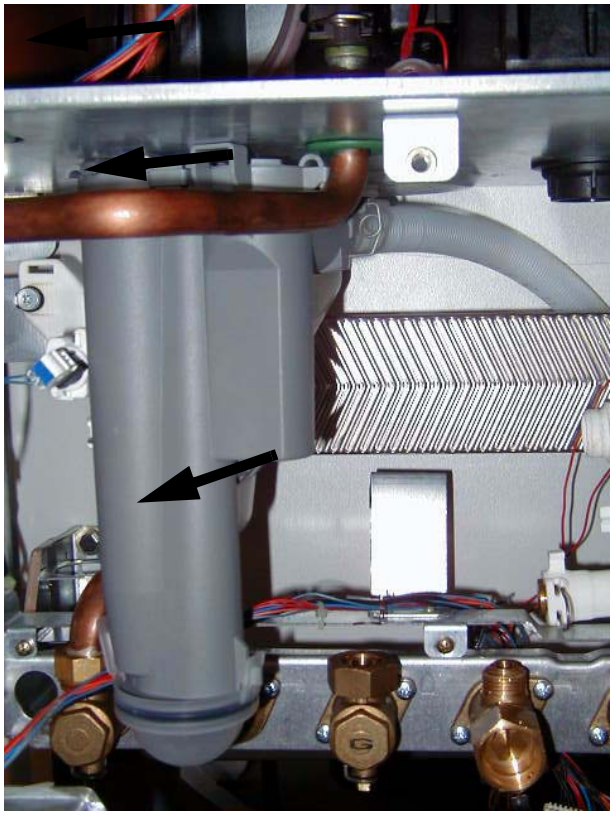

Fig. 43

- Remove screw of the dustbox. Remove the box and clean.

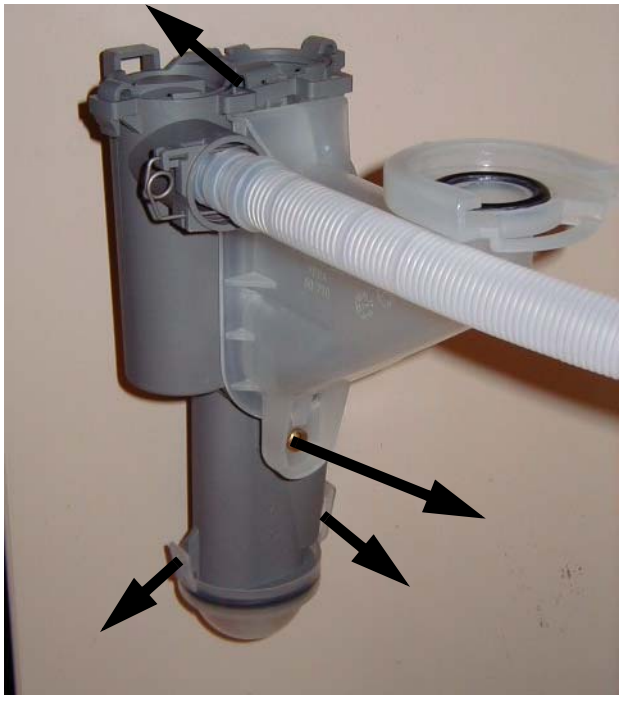

Fig. 44

- Remove upper and lower cover and clean.
- Refit the dustbox and fill with approx. 0.75 l of water and refit the condesation trap complete.

Diaphragm in mixer unit

- Take care not to damage diaphragm (443) when removing and refitting it.

- Open mixer unit (29).
- Carefully withdraw diaphragm (443) from fan intake tube and check for soiling and splits.

Electrode assembly

- Switch off the master switch.
- Pull off the leads from the electrodes. Refer to fig. 2.
- Unscrew the two fixing screws and carefully remove the electrode assembly.
- Clean the electrodes with a non-metallic brush. (The spark gap should be 4,5 mm ± 0,5 mm.)
- Replace and re-connect the assembly taking care not to mislay the inspection window.

Expansion vessel

The expansion vessel should be checked once a year.

- Depressurise appliance.
- If necessary, adjust expansion vessel charge pressure to static head of the heating system.

Heating system pressure

Fill the system using the WRAS approved filling loop.

- The pointer on the pressure gauge should be 1 bar.
- If the pointer is below 1 bar (when the system is cold), water should be added until the pointer is 1 bar again.
- **Max. pressure** of 2.5 bar when the heating system water is at maximum temperature must not be exceeded. If this pressure is exceeded then an extra expansion vessel must be fitted in the system return as close to the appliance as possible.
- If the system does not retain the pressure, the expansion vessel and the heating system should be checked for leaks.

Electrical wiring

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

8.2 Replacement of Parts

Before changing any components check that the gas is turned off and that the appliance is electrically isolated. When necessary close the system valves and drain the appliance.

Refitting is a reverse of the procedure for removal using new seals or o-rings as appropriate.

8.2.1 PCB control board and transformer

- ▶ Switch off the appliance.
- ▶ Disconnect appliance from the power supply.
- ▶ Unplug all connectors from the control box (inc. keyed plug).
- ▶ Remove screw holding power connector earth lead and remove earth lead.
- ▶ Remove fixing screw from the control box. Refer to fig. 26.
- ▶ Lower the control box.
- ▶ Unscrew earth lead.
- ▶ Unscrew screws from cover plate. Refer to fig. 26.

Fuses

Fuse, item 312, is only replaceable by removing the pcb.

Spare fuses are fixed to the connections cover.

A fuse pack is available: Part number 8 744 503 010 0.

8.2.2 Sensors

- ▶ Check that the appliance is electrically isolated.

Central Heating Flow Temperature Sensor – Item 36, fig. 3.

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

Safety Temperature Limiter – Item 6, fig. 3

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

Flue Temperature Limiter – Item 9, fig. 3.

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

Domestic Hot Water Temperature Sensor

- ▶ Check that the inlet water valve is closed and the domestic hot water circuit is drained.
- ▶ Release and pull-off the connector.
- ▶ Unscrew the sensor.

8.2.3 Gas Valve

- ▶ Check that the gas cock is turned off.
- ▶ Lower the control panel. Refer to fig. 25.
- ▶ Pull off the solenoid connections at the rear of the valve.
- ▶ Undo the union, within the inner casing, securing the valve to the gas/air tube.
- ▶ Remove the white plastic cap from the gas valve.
- ▶ Release the gas inlet union at the manifold assembly.
- ▶ Unscrew the two screws securing the gas valve assembly bracket to the back panel and withdraw the assembly.
- ▶ Transfer the bracket and inlet pipe assembly to the new gas valve.
- ▶ Check for gas soundness when the new gas valve has been fitted.
- ▶ Recheck the combustion performance as described in section 7.1.

8.2.4 Electrode assembly

- ▶ Refer to section 8.1.
- ▶ Use a new seal if the existing seal is damaged.

8.2.5 Pressure gauge

- ▶ Drain the appliance.
- ▶ Lower the facia.
- ▶ Twist the pressure gauge head anti-clockwise to release it from the casing.

- Disconnect the capillary head from the rear of the diverter valve by withdrawing the clip and pulling out the head.

8.2.6 Expansion vessel

- Drain the appliance.
- Undo the union connection at the base of the vessel.
- Unscrew the top and bottom fixing screws and remove the vessel.
- Set the pressure of the new vessel to that required by the system.

8.2.7 Pressure Relief Valve

- Drain the appliance.
- Disconnect the drain pipe from the valve.
- Pull-out the clip securing the valve.
- Pull-out the valve.
- Ensure that the replacement valve is fully entered before fitting the clip.

8.2.8 Primary Heat Exchanger

- Drain the appliance.
- Check that the gas supply is turned off.
- Check that the appliance is electrically isolated.
- Remove the fan assembly complete with the gas/air tube and mixer assembly.
- Remove the burner.
- Disconnect the sensors.
- Undo the central heating flow union.
- Undo the top connection of the pump.
- Undo the grey plastic cap, next to the top pump connection at the base of the heat exchanger.
- Unscrew and remove the condensate trap.
- Unscrew and remove the two screws securing the heat exchanger top bracket to the rear panel.
- Lift up the flue duct.
- Pull forward from the top and lift the heat exchanger from the casing.
- Transfer components, as necessary, to the new heat exchanger.
- Ensure that all the seals are in place and all of the connections are tight before re-commissioning the appliance.

9 Appendix

9.1 Fault Codes

Display code	Description	Remedy
A1	Pump seizing	
A3	Flue gas temperature limiter	
A7	Hot water NTC sensor defective.	Check hot water NTC sensor and connecting lead for circuit breaks/short circuits.
b1	Code plug not detected.	Insert code plug correctly, test and replace if necessary.
CC	Outside temperature sensor	
C6	Fan	
E2	CH flow NTC sensor defective	Check CH flow NTC sensor and connecting lead.
E9	Safety temp. limiter in CH flow has tripped.	Check system pressure, check safety temp. limiters, check pump operation, check fuse on pcb, bleed appliance.
EA	Flame not detected.	Is gas cock turned on? Check gas supply pressure, power supply, igniter electrode and lead, ionisation sensing electrode and lead, flue duct and CO2 level.
F0	Internal error.	Check electrical connector contacts, programmer interface module ignition leads are not loose; replace pcb if necessary.
F7	Flame detected even though appliance switched off.	Check electrode assembly, dry pcb. Flue clear?
FA	Flame detected after gas shut off.	Check gas valve and wiring to gas valve. Clean condensation trap and check electrode assembly. Flue clear?
Fd	Reset button pressed by mistake.	Press reset button again

Table 15

9.2 Short parts list

Key	Description	Qty GC	Spare part number
1	Sensor - Flue gas temp.	1	8 722 963 858 0
2	Sensor - CH flow temp.	1	8 714 500 087 0
3	Sensor - DHW flow temp.	1	8 714 500 054 0
4	Control board	1	
5	Gas valve	1	
6	Fan assembly	1	
8	Expansion vessel	1	
9	Relief valve	1	
10	Electrode assembly	1	
11	Electrode lead	1	
12	Pump	1	
13	Pressure gauge	1	
14	Burner skin seal	1	8 711 004 325 0
15	Transformer - facia	1	
17	3-way diverter valve	1	
19	Washer set Condensation Trap	1	
20	Fuse set	1	8 744 503 010 0
22	Domestic Hot Water Heat Exchanger	1	
23	Primary heat exchanger	1	

Table 16

9.3 Heating/hot water output settings (N.G)

Display code	Natural gas G20		
	Heat output kW	Heat input kW	Gas vol. flow rate (l/min at t_V/t_R = 80/60°C)
30			
40			
50			
60			
70			
80			
90			
100			

Table 17

9.4 Heating/hot water output settings (L.P.G)

Display code	Propane	
	Heat output kW	Heat input kW
40		
50		
60		
70		
80		
90		
100		

Table 18

9.5 Operational Flow diagrams

9.5.1 Domestic hot water function

9.5.2 Central heating function

6 720 611 676 (04.10)

INSTRUCTION MANUAL

INSTALLATION, COMMISSIONING & SERVICING

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Part Number: 6 720 611 676 (04.10)

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