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HYDRONIC GAS SYSTEM BOILER 18kW

BOSCH CONDENS 5000W

ZSB18 - 2A

BOSCH

Installation and Servicing Instructions

6 720 646 195a (2010/11)

Contents

1 KEY TO SYMBOLS AND SAFETY PRECAUTIONS

1.1 Explanation of symbols

Warning symbols

Safety instructions in this document are framed and identified by a warning triangle which is printed on a grey background.

Electrical hazards are identified by a lightning symbol surrounded by a warning triangle.

Signal words indicate the seriousness of the hazard in terms of the consequences of not following the safety instructions.

- **NOTICE** indicates possible damage to property or equipment, but where there is no risk of injury.
- **CAUTION** indicates possible injury.
- **WARNING** indicates possible severe injury.
- **DANGER** indicates possible risk to life.

Important information

Notes contain important information in cases where there is no risk of personal injury or material losses and are identified by the symbol shown on the left. They are bordered by horizontal lines above and below the text.

Additional symbols

Symbol	Meaning
▶	a step in an action sequence
→	a reference to a related part in the document or to other related documents
•	a list entry
–	a list entry (second level)

Tab. 1 Symbols

SYMBOLS USED IN THIS MANUAL

	Domestic hot water
	Central heating
	Hot water storage cylinder
	Domestic cold water supply
	Electrical supply
	Gas supply

Tab. 2 Commonly used symbols

PLEASE READ THESE INSTRUCTIONS CAREFULLY BEFORE STARTING INSTALLATION.

This installation manual is only applicable to the model of boiler stated on the front cover of this manual.

This boiler must be installed by an authorised person only. Failure to install this boiler correctly could lead to prosecution.

If you are in any doubt contact the Robert Bosch technical hotline on:

1300 30 70 37 AU or 0800 54 33 52 NZ

Please leave these instructions, completed installation checklist and user manual with the customer after installing the boiler.

The checklist can be found in the back pages of this manual.

Abbreviations used in this manual:

Ø	Diameter
NG	Natural gas
LPG	Liquefied petroleum gas
CH	Central heating
DHW	Domestic hot water
PCB	Printed circuit board
PRV	Pressure relief valve
NTC	Negative temperature coefficient (sensor)
IP	Ingress protection
RCD	Residual current device
TRV	Thermostatic radiator valve
approx.	Approximate
BSP	British standard pipe
pH	Potential hydrogen
PVC	Poly vinyl chloride
RSF	Room sealed flue
kPa	kilo Pascals

Tab. 3 Abbreviations

1.2 Safety precautions

If you smell gas:

- **CALL** THE FEDERAL GOVERNMENTS SAFETY HOTLINE ON 13 17 92
- **LPG BOILERS** CALL THE SUPPLIER‘S NUMBER ON THE SIDE OF THE LPG TANK/CYLINDER
- **TURN OFF** THE ECV (EMERGENCY CONTROL VALVE) AT THE METER
- **DO NOT** TURN ELECTRICAL SWITCHES ON OR OFF
- **DO NOT** STRIKE MATCHES OR SMOKE
- PUT OUT NAKED FLAMES
- OPEN DOORS AND WINDOWS
- KEEP PEOPLE AWAY FROM THE AFFECTED AREA

Boiler operation

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.

Service checklist

The Service Checklist places responsibilities on both manufacturers and installers. The purpose is to ensure that customers are provided with the correct equipment for their needs, that it is installed, commissioned and serviced in accordance with the manufacturer's instructions by authorised persons and meets the requirements of the appropriate building regulations. The service checklist can be used to demonstrate compliance with building regulations and should be provided to the customer for future reference.

Combustion and corrosive materials

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

Chemically aggressive substances can corrode the boiler and invalidate any warranty.

Fittings and modifications

Fitting the boiler and any controls may only be carried out by an authorised person.

Flue systems must not be modified in any way other than as described in the fitting instructions. Any misuse or unauthorised modifications to the boiler, flue or associated components and systems could invalidate the warranty. The manufacturer accepts no liability arising from any such actions, excluding statutory rights.

Servicing

Advise the user to have the system serviced annually by an authorised person. Approved spares must be used to help maintain the economy, safety and reliability of the boiler.

Important

The service engineer must complete the Service Record at the rear of this manual after each service.

Installation regulations

All gas boilers must be installed by an authorised person in accordance with AS 3000, AS 5601 and building regulations of relevant states and territories.

Failure to install boilers correctly could lead to prosecution.

Standards

Where no specific instruction is given, reference should be made to the following standards:

- AS 5601 Gas Installations,
- AS 1596 LPG storage and handling,
- AS 4552 Gas fired water heaters for hot water supply and/or central heating,
- AS/NZS 3000 Electrical Installations,
- AS1697 Installation and maintenance of steel pipe systems for gas,
- AS 4032 Water supply - valves for the control of hot water supply temperatures,
- AS 3498 Authorization requirements for plumbing products - water heaters and hot-water storage tanks.
- AS 1910 Water supply - float control valves for use in hot and cold water, AS 3500 National plumbing and drainage code.

Liquefied petroleum gas

A boiler using LPG gas must not be installed in a room or internal space below ground level unless one side of the building is open to the ground.

Boiler features and checklist

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

Check list **- Hardware literature pack:**	**Qty.**
Installation instructions	1
User instructions	1
Warranty card	1
Sealing pack:	1
- Compression nut 22mm	3
- Compression ring 22mm	3
- Compression nut 15mm	3
- Compression ring 15mm	3
- Fibre washer 18.6 x 13.5 x 1.5	2
- Fibre washer 23.9 x 17.2 x 1.5	2
- Bonded washer 3/4“ for gas	1
Adapter, 22mm to R¾	3
Adapter, 15mm to R½	1
Syphon assembly	1
Warranty return envelope	1

Tab. 4 Checklist

2 Boiler information

2.1 Boiler

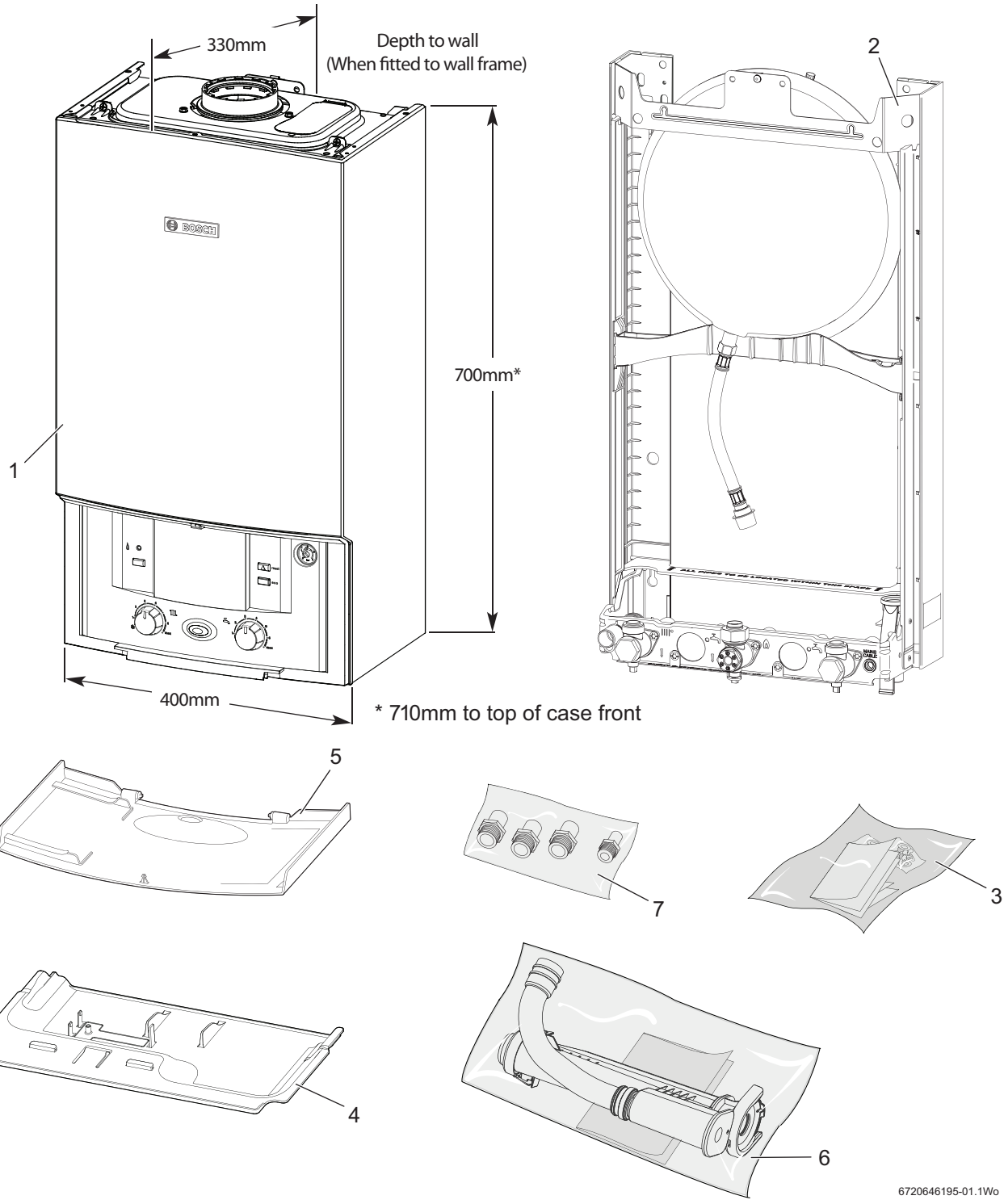


Fig. 1 Boiler carton contents

Standard package:			
1	Hydronic system boiler	5	Fascia panel
2	Wall mounting frame	6	Syphon assembly
3	Hardware literature pack (see checklist)	7	Metric to Imperial adapter pack
4	Bottom panel		

2.2 Technical data

Description	Natural gas	
	UNIT	18kW
Gas flow rate - Max. 10 minutes from lighting		
Natural gas G20	MJ/h	73.84
Liquefied petroleum gas (LPG)	kg/h	-
Central heating		
Maximum rated heat input (net)	kW	18.48
Minimum heat input	kW	5.54
Max. rated heat output 40/30 °C	kW	19.28
Max. rated heat output 50/30 °C	kW	19.11
Max. rated heat output 80/60 °C	kW	18
Max. flow temperature	°C	82
Max. flow temperature to cylinder (with integral optional diverter valve)	°C	75
Max. permissible operating pressure	kPa	250
Available pump head at 21 °C system temp. rise	m	2.0
Flue		
Flue gas temp. 80/60 °C, rated/min. load	°C	70/60
Flue gas temp. 40/30 °C, rated/min. load	°C	48/34
CO_2 level at max. rated heat output (after 30 min)	%	9.8
CO_2 level at min. rated heat output (after 30 min)	%	9.2
NOx class		4
Condensate		
Maximum condensate rate	l/h	1.5
pH value, approx.		4.8
Electrical		
Electrical power supply voltage	a.c. V	240
Frequency	Hz	50
Maximum power consumption	W	140
General data		
Star Rating		
Permissible ambient temperatures	°C	0 - 50
Nominal capacity of boiler	litre	3.9
Noise output level (Max central heating)	dBA	42
Packaged boiler weight	kg	41
Total boiler weight	kg	37.5
Lift weight	kg	27.1
Efficency		

Tab. 5 Technical data Condens 5000

2.3 Layout

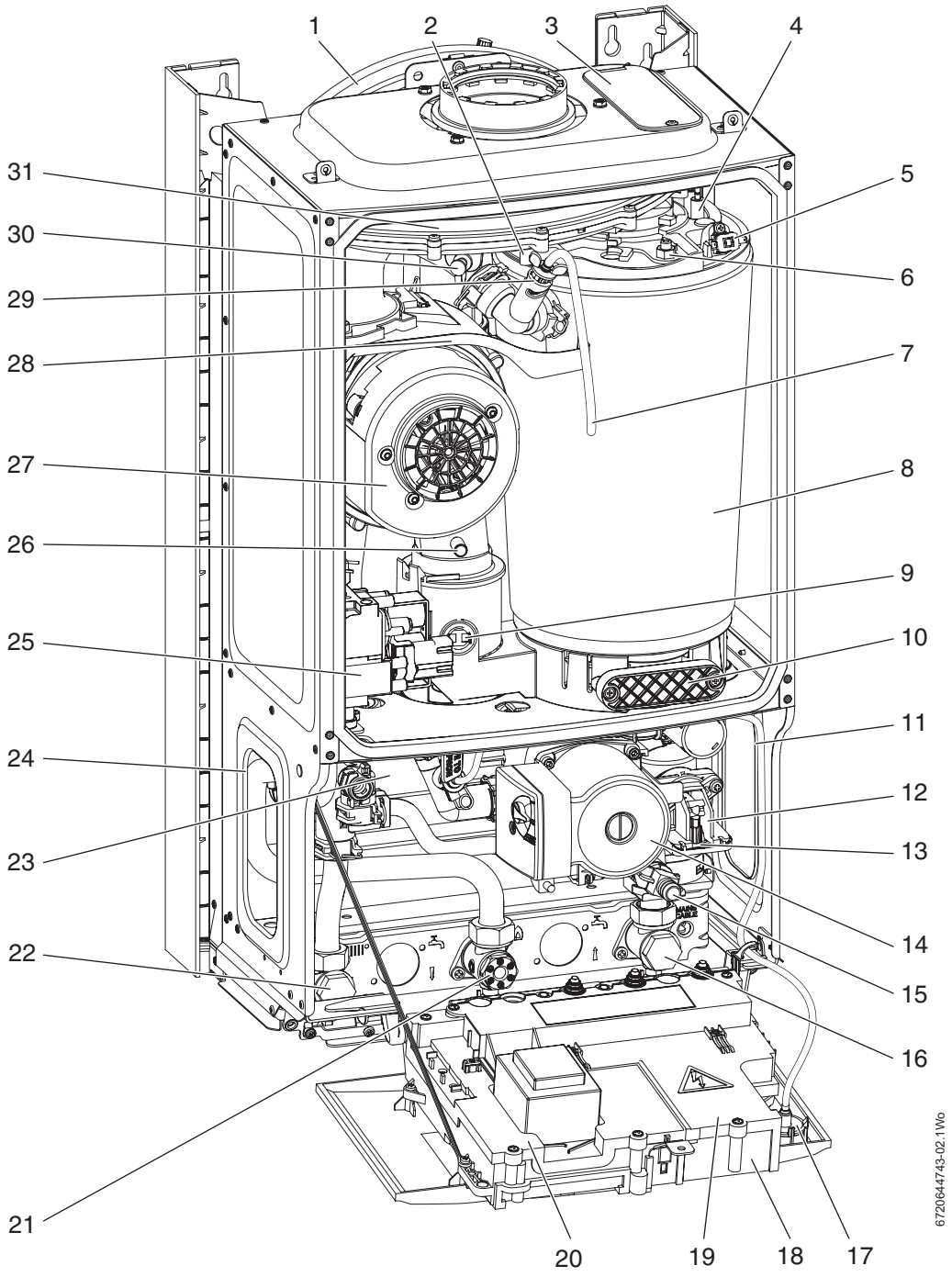


Fig. 2 Main boiler components

1	Expansion vessel	23	Hydraulic block mounting plate
2	Sensor - boiler flow	24	Left side hand-hold for lifting boiler
3	Removable panel - for servicing	25	Gas valve
4	Electrode assembly	26	Flue air pressure switch connection (not used)
5	Overheat thermostat	27	Fan
6	Securing nut - air/gas manifold clamp	28	Fan guard
7	Silicon tube - heat exchanger air vent	29	Manual vent point
8	Heat exchanger	30	Fan pressure test point
9	Flue over heat thermostat	31	Air/gas manifold
10	Access panel - heat exchanger/sump cleaning	32	Compact hydraulic - left mounting point
11	Right side hand-hold for lifting boiler	33	Flow connector from heat exchanger
12	Diverter valve assembly (body)	34	Expansion vessel hose connection point
13	Diverter valve actuator (stepper motor)	35	Auto air vent
14	Pump	36	Return connection to heat exchanger
15	Drain point	37	Flow turbine housing (not used)
16	CH return isolator	38	Unused port
17	System pressure gauge	39	Compact hydraulic - right mounting point
18	Control panel (in service position)	40	Pressure relief valve
19	Cover - external wiring connections	41	CH return connection to service valve
20	Cover - transformer and PCB	42	Internal by-pass
21	Gas inlet connection BSP ¾ inch thread	43	CH flow connection to service valve
22	CH flow isolator	44	Pressure gauge connection point

Tab. 6 Boiler components

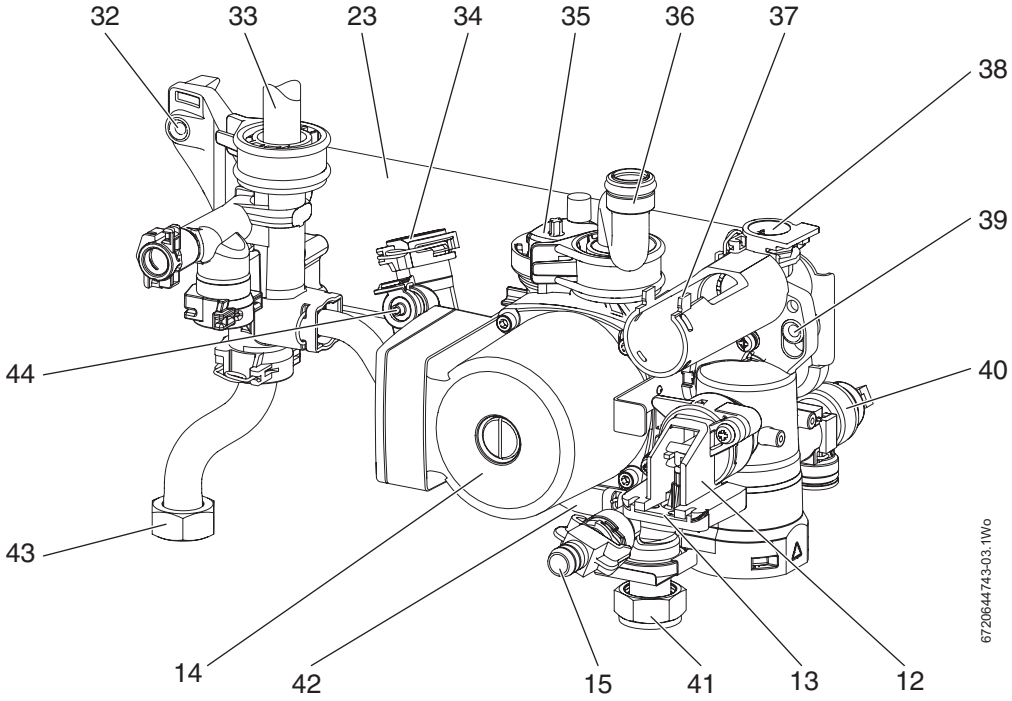


Fig. 3 Hydraulic block components

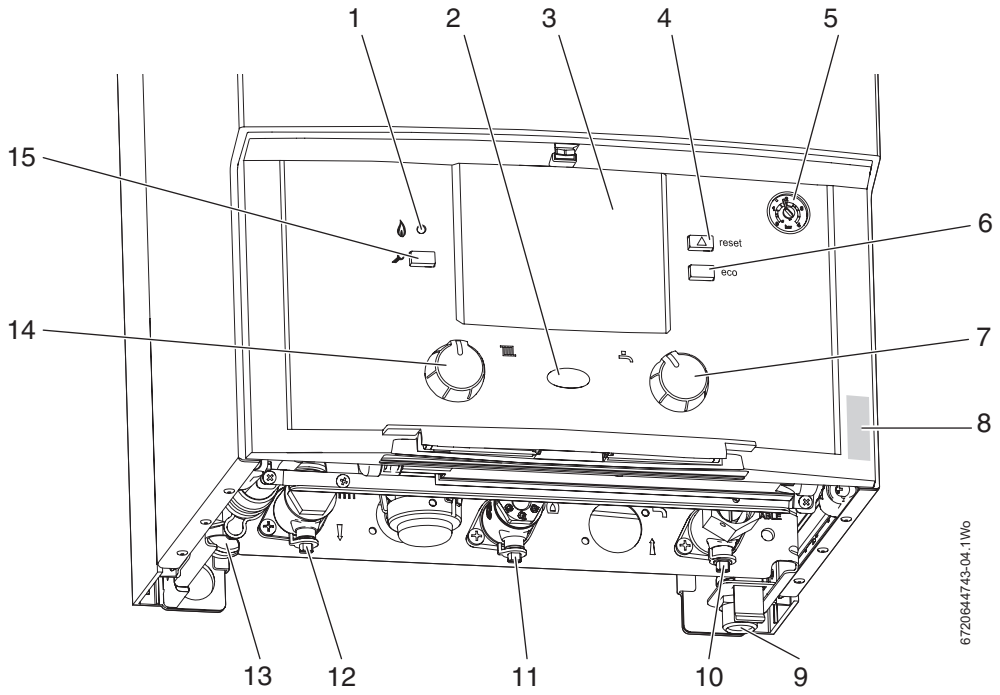


Fig. 4 Additional components

1	Burner ON indicator light (green)	9	PRV pipe connection point
2	Power ON/OFF indicator/fault diagnostic light (blue)	10	CH return isolator
3	Position for optional programmer	11	Gas inlet connection BSP ¾ inch thread
4	Reset button	12	CH flow isolator
5	System pressure gauge	13	Condensate connection
6	ECO button (not used)	14	CH temperature control
7	DHW temperature control*	15	Service mode button
8	Boiler identification label		

Tab. 7 Additional boiler components

* The DHW temperature control is only operational when the “optional internal diverter valve” is fitted.

3 Pre-installation

3.1 Cleaning primary systems

NOTE:

- All the following pre-installation sections must be read and requirements met before starting boiler or flue installations.

CAUTION:

- Isolate the mains supplies before starting any work and observe all relevant safety precautions.

NOTE:

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 boiler will invalidate the warranty.

Before cleaning the system:

- Ensure the system and pipe work are in good working order.
- **Where possible keep the existing boiler/circulating pump in place when flushing the system.**

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

Flushing the system

- Fill the system with cold water and check for leaks.
- Open all drain points and drain the system.
- Close drain points and add a suitable flushing agent **compatible with aluminium** at the correct strength for the system conditions in accordance with the manufacturer‘s instructions.
  The pH value of the system water must be less than 8 or the boiler guarantee will be invalidated.
- Circulate the flushing agent before the boiler is fired up.
- Run the boiler/system at normal operating temperature as directed by the manufacturer of the flushing agent.
- Drain and thoroughly flush the system to remove the flushing agent and debris.
- It may be necessary to use a power flushing machine to aid the cleansing procedure in some circumstances.
- Close the drain points and refill with fresh water and a suitable inhibitor.
- Vent any air from the boiler and system.

Inhibitor

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 manufacturer‘s guidelines.

WARNING: Sealing agents

- The addition of sealing agents to the system water is not permitted as this may block the heat exchanger.

3.2 Mains supply

3.2.1 Electrical supply

- Supply: 240V - 50 Hz, 140 Watts
- Cable: PVC insulated 0.75 mm^2 (24 x 0.2 mm) temperature rated to 90 °C.
- External 3A fuse.
- The boiler must be earthed.
- This boiler must not be connected to a three phase supply.
- IPX4D.
- Wiring must comply with AS/NZS 3000 Electrical Installations.

3.2.2 Equipotential (earth) bonding

Main equipotential bonding is carried at the origin of the electrical installation.

Supplementary bonding is carried out in an area of increased shock risk e.g. bathrooms.

Metal pipes can be used as bonding conductors if joints are metal to metal and electrically continuous.

Wiring regulations require that extraneous conductive parts must be connected to the main electrical earth.

The main bonding of incoming metallic services must be as close as practical to their entry point, before any branch pipe work and a maximum of 600mm from an internal meter.

Earth bond conductors must be copper and the same size as other earth bonding conductors and not be less than 10mm^2.

The earth bond conductors must be permanently fixed to the metal pipes with clamps and labels in a visible position to allow for inspection.

3.2.3 Gas supply

- Boilers using natural gas (NG) must be connected to a governed meter.
- Liquefied petroleum gas (LPG) must be connected to a regulator or governed meter.
- Installation and connection of the gas supply to the boiler must be in accordance with AS 5601.
- Under no circumstance should the size of the gas supply pipe be less than the inlet on the boiler.
- The meter or regulator and pipe work to the meter must be checked, preferably by the gas supplier. This is to ensure that the equipment is in good working order and can meet the gas flow and pressure requirements and demand from any other appliance being served.

3.3 Water system and pipe work

Plastic pipe work:

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

Primary systems connections/valves:

- All system connections, taps and mixing valves must be capable of sustaining a pressure up to 3 bar.
- Bosch recommends that thermostatic radiator valves (TRV's) be used on all radiators within the sleeping accommodation but not the radiator where the room thermostat is sited. This must be fitted with lock-shield valves and left open.
- A drain point is required at the lowest part of the system.
- An air vent is required at all the high points in the system.

The boiler is equipped with an automatic internal by-pass.

Sealed primary system:

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

- The CH sealed system must be filled using an approved filling loop or comply with figure 5 for system fill.
- Where the system volume is more than 100 litres or exceeds 265 kPa at maximum heating temperature, an extra expansion vessel (2) must be fitted as close as possible to the boiler in the central heating return.
- Pressurise the extra expansion vessel (2) to the same figure as the expansion vessel built into the boiler.
- **Do not use galvanised pipes or radiators**.

System fill

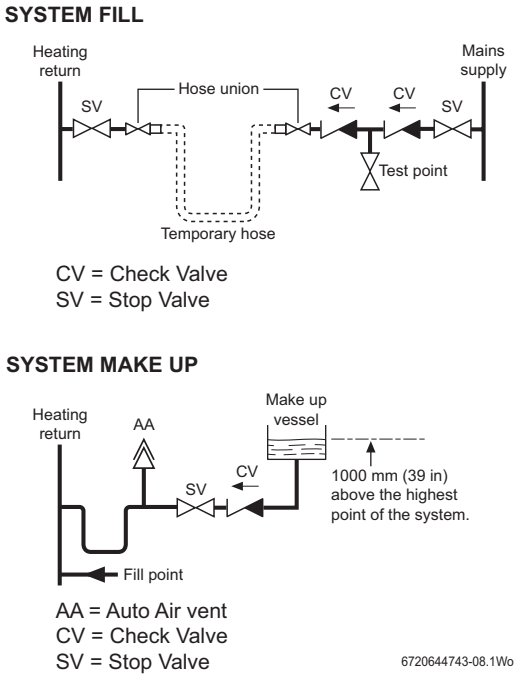


Fig. 5 System fill

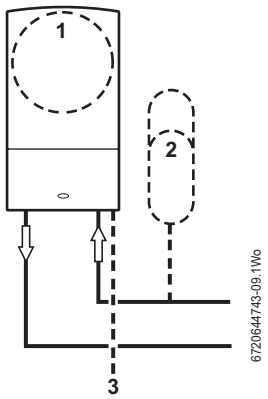


Fig. 6 Additional expansion vessel

1	boiler expansion vessel - CH
2	Extra expansion vessel - CH return
3	Pressure relief discharge

Tab. 8 Key to fig. 5

S and Y plan systems:

NOTE: The boiler is fitted with its own internal bypass.

1	Diverter valve
2	Radiator valve (flow)
3	Lock shield valve (return)
4	Bypass

Tab. 9

NOTE:

- A drain point should be fitted at the lowest part of the heating circuit and beneath the boiler.

Optional diverter valve

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

S plan layout

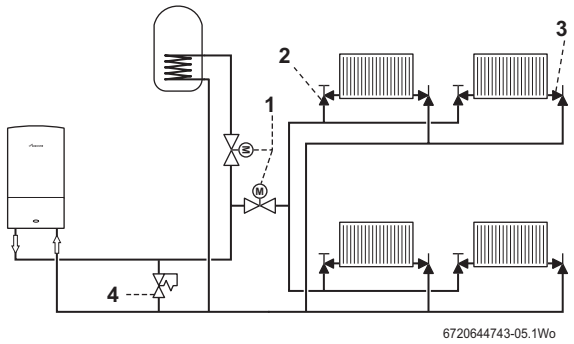


Fig. 7 S plan

Y plan layout
with external diverter valve

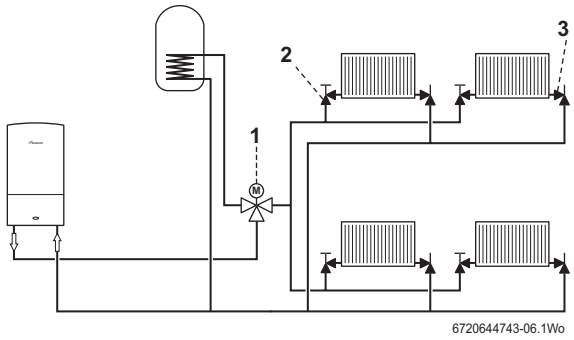


Fig. 8 Y plan

System layout
with optional internal diverter valve
(not supplied with boiler)

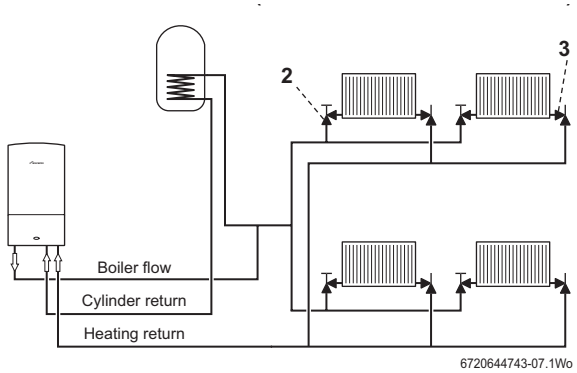


Fig. 9 System layout

3.4 Condensate pipe work

NOTE:

- Where a new or replacement boiler is being installed and freezing conditions are possible, access to an internal “gravity discharge” point should be one of the factors considered in determining boiler location.
- The condensate pipe must be a minimum of 40 mm Ø plastic pipe.
- The condensate pipe work must fall at least 50 mm per metre towards the outlet and should take the shortest practicable route.
- Ensure that there are no blockages in the pipe run.

Key to condensate illustrations	
1	Condensate discharge
2	Air gap (20mm)
3	Tundish
4	Self sealing device
5	Dishwasher connection
6	Vent stack

3.4.1 Internal connections

Where there is the possibility of freezing conditions and In order to minimise the freezing risk during prolonged cold spells, the following methods of installing 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 soil and vent stack. A suitable permanent connection to the foul waste pipe should be used.

A self sealing device should be incorporated in the drainage path, if possible, in an upright position.
A tundish should be used as a suitable air gap just before the self sealing device. The self sealing device can be used on a gradient as long as it preceded by a vertically mounted tundish.

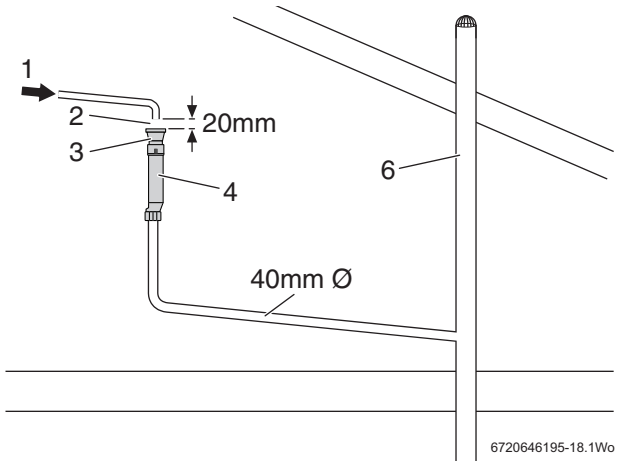


Fig. 10 Disposal to soil vent stack - vertical position

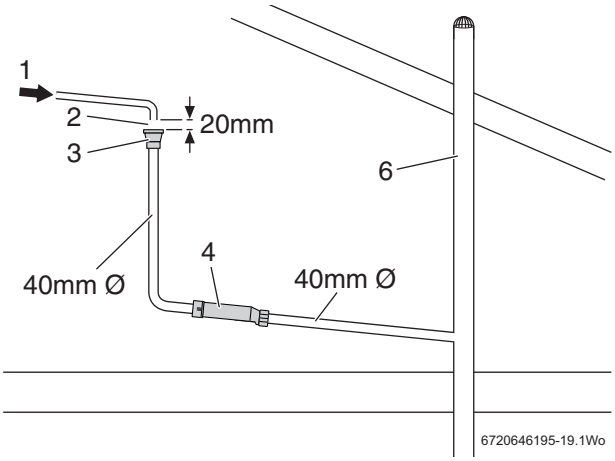


Fig. 11 Disposal to soil vent stack - on gradient

Alternatively if the first option is not possible an internal kitchen or bathroom waste pipe can be used.

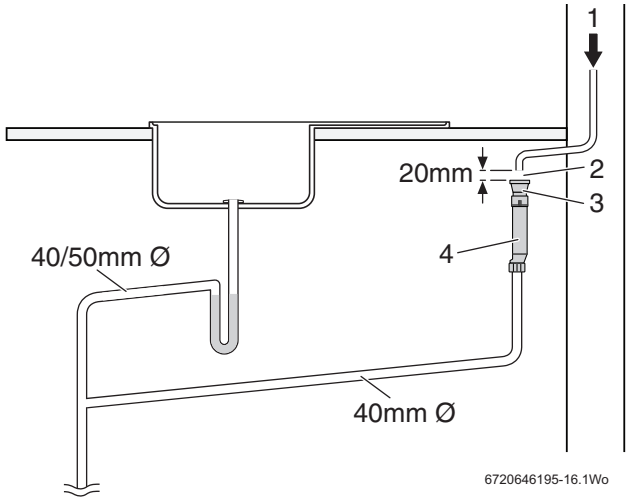


Fig. 12 Disposal to a waste pipe

A washing machine waste pipe or bifurcated pipe etc. can also be used.

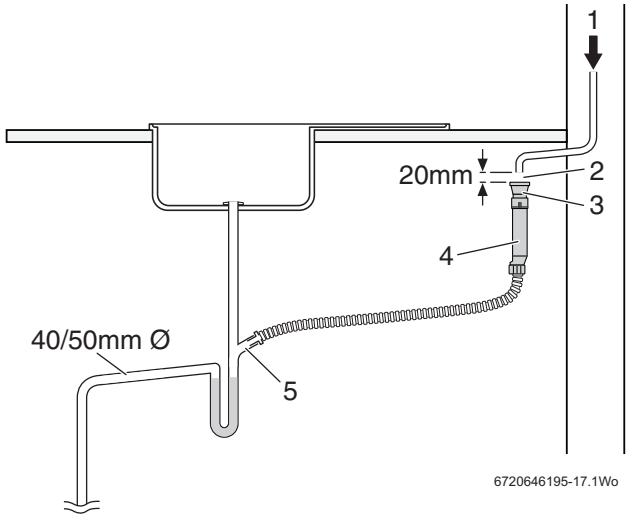


Fig. 13 Bifurcated pipe disposal

3.5 Pressure relief drain line

NOTE:

- The PRV is a safety device for the boiler and if activated may discharge boiling water steam through the relief valve drain line.
- Care should be taken when siting the drain line 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 valve and control valve shall be fitted with a drain line that shall be of copper or other suitable pipping and be of a diameter not smaller than the nominal size of the valve outlet as per AS/NZS 3500.
- Drain line (1) should be finished with a partial bend, near the outlet to face the external wall (as shown) to help prevent freezing.

1. Pressure relief discharge pipe can be between 200 and 300mm above a paved area
2. Pressure relief discharge pipe can be between 75 and 300mm when discharging into a gravel pit of not less than 100mm diameter.

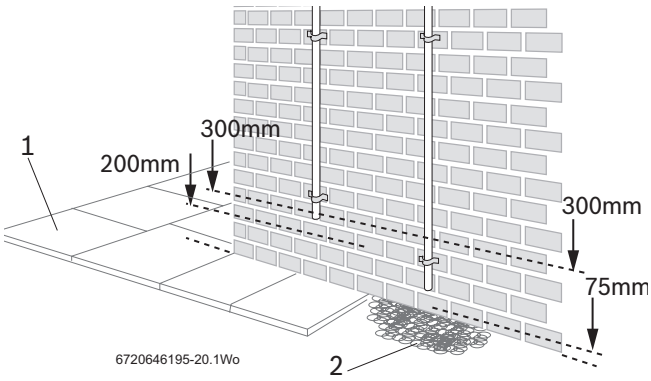


Fig. 14 Pressure relief pipe work

1	Paved area
2	Gravel pit not less than 100mmØ

Tab. 10 Key to fig 14

3.6 Boiler location and clearances

3.6.1 Installation

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

NOTE:
No surface protection is required against heat transfer from the boiler

3.6.2 Servicing clearances - ventilated compartment

Figure 15 shows the minimum space required to install and service the boiler in a ventilated compartment.

- If a boiler is installed in a compartment with clearances less than shown in the tables 14, 15, or 16 ventilation is required. Refer to table 11 for ventilation requirements.

Vent position	To room or internal space	Direct to outside
High level	Minimum free area 122 cm^2	Minimum free area 61 cm^2
Low level	Minimum free area 122 cm^2	Minimum free area 61 cm^2

Tab. 11 Compartment ventilation

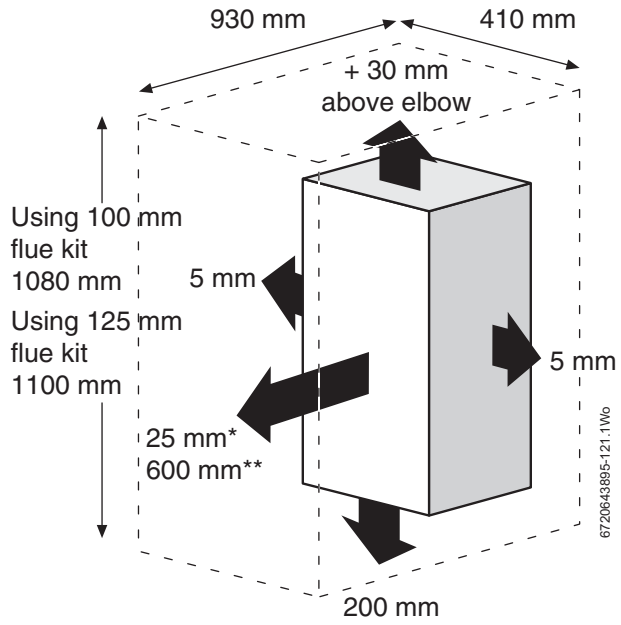


Fig. 15 Ventilated compartment

*	Minimum clearance to removable door
**	Minimum clearance required for servicing

Tab. 12 Minimum clearances

3.6.3 Compartments

- 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 to separate the boiler from the airing space.
  The material can be perforated up to a maximum hole size of 13mm.

3.6.4 Boiler clearances - Unventilated compartments

The tables below show the options for the minimum space required to install and service the boiler inside an unventilated compartment.

Tab. 13

3.6.5 Installation clearances - unventilated compartments

CAUTION: Clearances

- Top and bottom clearances must not be reduced below the values shown in table 14 as they are the minimum clearances required for servicing.

Unventilated compartment installation clearances (millimetres)			
The suggested total unventilated compartment minimum clearances are:			
Side	Above	Below	Front (to removable door)
400	170 approx. (30 above the elbow)	200	100

Tab. 14 Minimum unventilated compartment clearances

If side clearances are reduced (millimetres)			
If total side clearance is reduced to: (combined left and right clearances excluding the boiler)	Increase height clearances to (approx): (combined top and bottom clearances excluding the boiler)	OR	Front clearance (to removable door) must be increased to:
350	441		129
300	523		161
250	617		200
200	717		243
150	856		295
100	1012		358
50	1202		434

Tab. 15 Reduced side clearances

If front clearance is reduced (millimetres)			
If front clearance (to removable door) is reduced to:	Increase overall height clearances to approx: (combined top and bottom clearances excluding the boiler)	OR	Increase total side clearance to: (combined left and right clearances excluding the boiler)
50	511		505
25	596		569

Tab. 16 Reduced front clearances

3.7 Plumbing manifold

3.7.1 Connections

WARNING: If fitting an optional integral diverter valve.

- Refer to the “optional integral diverter valve” installation instructions.

Heating System	¾ inch BSP thread compression fittings
Gas	¾ inch BSP thread

Tab. 17

Use the fittings supplied in the hardware literature pack.

- If the boiler pipes are to be run behind the boiler ensure that the pipes pass through the slot in the white cardboard guide. This is fitted to the frame.

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

Fig. 16 Pipe dimensions

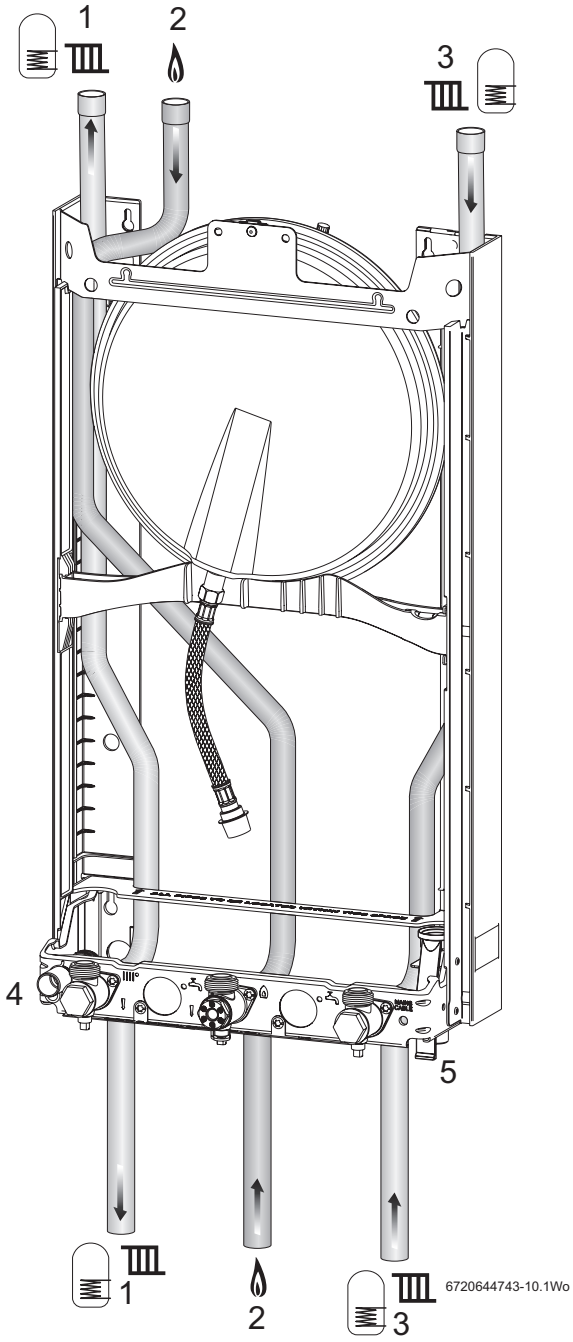


Fig. 17 Plumbing manifold

#	Function	From left case edge	Ø of pipe connections
1	CH flow	70 mm	¾ BSP
2	Gas	200 mm	¾ BSP
3	CH return	330 mm	¾ BSP
4	Condensate	35 mm	22mm
5	Pressure relief valve	367 mm	½ BSP

Tab. 18 Key to figures 16 & 17

3.8 Flue options

The Condens 5000W series has the option of three horizontal RSF (60/100 telescopic, 60/100 extended telescopic and 80/125) flue systems and two vertical RSF (60/100 or 80/125) flue systems:

The flue systems have different maximum flue lengths

The page opposite shows some possible flue configurations.

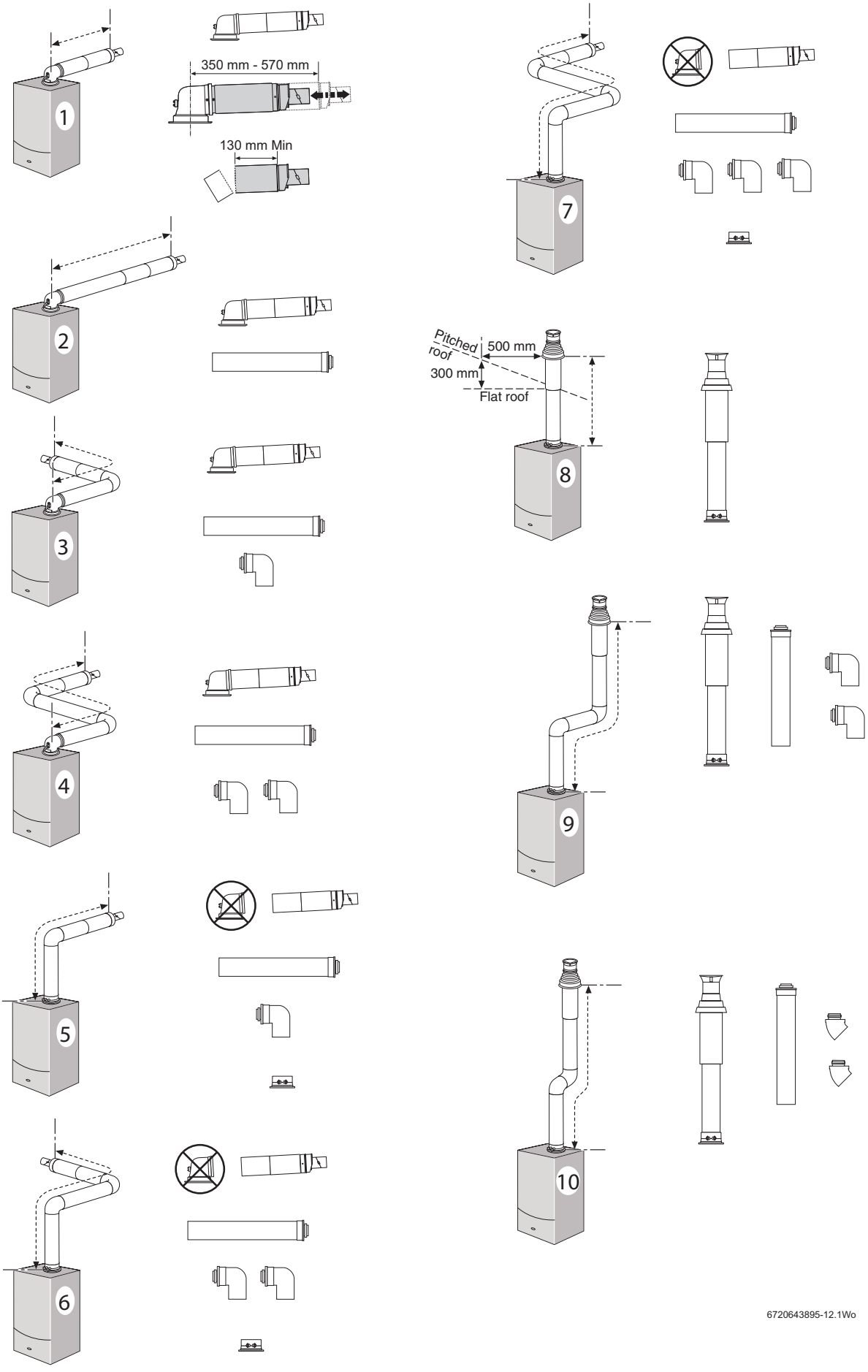
Table 19 below shows the maximum straight length of flue available to the installer after the effective lengths of the bends have been taken into account from each flue option on the page opposite.

NOTE: Effective flue lengths:

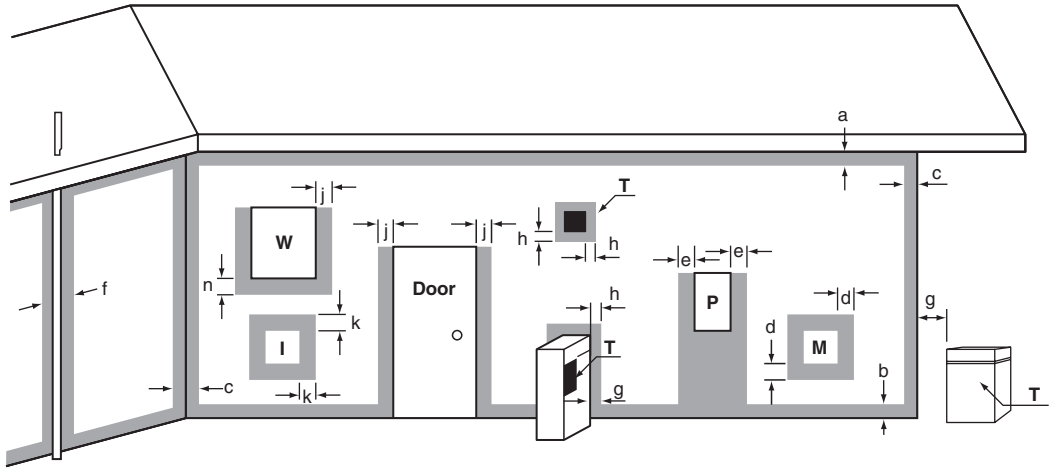
- each 90° bend used is equivalent to 2 metres of straight flue
- each 45° bend used is equivalent to 1 metre of straight flue

			Maximum straight flue length available (mm)	
Flue type		Boiler i System	60/100	80/125
1	Telescopic horizontal flue assembly	All	570	1,070
2	Horizontal flue extension	All	4,600	13,000
3	Horizontal flue with 1 x 90° bend	All	2,600	11,000
4	Horizontal flue with 2 x 90° bends	All	N/A	9,000
5	High level horizontal flue with 1 x 90° bend	All	2,600	11,000
6	High level horizontal flue with 2 x 90° bends	All	N/A	9,000
7	High level horizontal flue with 3 x 90° bends	All	N/A	7,000
8	Vertical balanced flue assembly	All	6,400	15,000
9	Vertical balanced flue with 2 x 90° bends	All	2,400	11,000
10	Vertical balanced flue with 2 x 45° bends	All	4,400	13,000

Tab. 19 Flue options


1
350 mm - 570 mm
130 mm Min
2
3
4
5
6
7
Pitched roof
500 mm
300 mm
Flat roof
8
9
10
6720643895-12.1Wo

3.9 Flue terminal positions



Use as a guide only. Refer to AS5601 or local gas fitting rules for specific locations

T = Flue terminal **M** = Gas meter **W** = Window
I = Mechanical air inlet **P** = Electricity meter or fuse box Shaded area indicates prohibited area 6720646195-02.1Wo

Fig. 18 Flue terminal positions

NOTE:

- The location of the flue terminal must comply with the clearances shown on this page. If you are unsure about clearances not indicated here, in general refer to AS5601 or your local authority. In Western Australia refer to the SECWA rules and regulations.
- All measurements are the minimum clearances required.
- Terminals must be positioned so to avoid combustion products entering the building.

NOTE: Install a fire proof back board if installing on combustible surfaces.

The fixing method must be sufficient to hold the weight of the boiler.

Ref.	Item	Min. Clearance mm
a	Below eaves, balconies and other projections (Appliances over 50MJ/h)	300
b	From the ground, above a balcony or other surface	300
c	From a return wall or external corner	300
d	From a gas meter	1000
e	From an electricity meter or fusebox/breaker panel	500
f	From a drain pipe or soil pipe	75
g	Horizontally from any building structure or obstruction facing a flue terminal	500
h	From any other flue terminal, cowl or combustion air intake	300
j	Horizontally from any opening window, door, non-mechanical air inlet or other opening into a building with the exception of sub-floor ventilation	300
k	From a mechanical air inlet including a spa blower.	1000
n	Vertically below an opening window, non-mechanical air inlet or any other opening into a building with the exception of sub-floor ventilation	500

Tab. 20

4 Installation

WARNING: All the previous “pre-installation” sections must be read and the requirements met before starting boiler or flue installation.

4.1 Unpacking the wall frame and ancillary items

CAUTION: Lifting and carrying.

- Only lift a manageable weight, or ask for help.
- Bend the knees and keep the back straight with feet apart, when lifting or putting down heavy objects.
- Do not lift and twist at the same time.
- Lift and carry object close to the body.

1. Wall mounting frame
2. Wall mounting template
3. Inner packaging
4. Installer pack
5. Bottom panel
6. Front fascia
7. Syphon assembly
8. Adapter pack

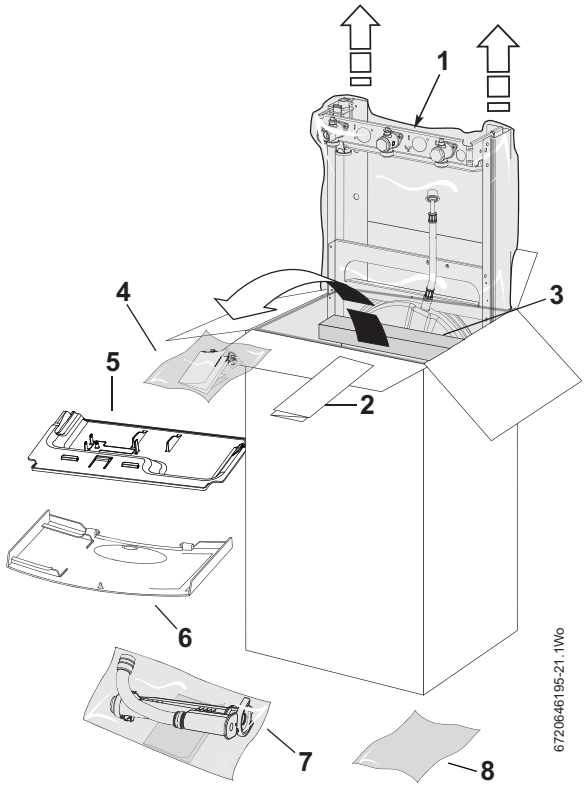


Fig. 19 Unpacking

Handling instructions:

- It is advised that two people are used to carry the carton from the van to the point of delivery.
- Once the carton has been delivered, the outer carton is removed first. Care should be taken when releasing the straps. If a sharp implement is used make sure the outer carton is not pierced and that the implement is used in such a way so that it may not cause personal injury.
- All sharp objects must be covered or the blade retracted after use and put away in a safe place. Care should be taken when lifting the boiler from the base and the proper technique for safe lifting of any heavy object should be strictly observed.

NOTE:

- **Before installing the boiler, ensure that the system has been cleaned as explained on page 11**.

1. Remove straps and open the top of the boiler packaging.
2. Remove the wall mounting frame (1) and wall mounting template (2) and from the packaging.
3. Remove the boiler bottom panel (5), front fascia (6), hardware literature pack (4) and syphon assembly (7) from the carton.

4.2 Wall mounting template & flue opening

WARNING: Before drilling
Ensure there are no pipes, electrical cables or other hazards.

Safety

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

Fixing the wall mounting frame

- The boiler template shows the relative positions of the flue and the top and bottom fixing of the mounting frame.

1. Fix the template to the wall in the desired position.
2. Drill 4 holes for the wall mounting frame through the template.

The wall mounting template has been sized to allow for minimum clearances of 5mm sides, 200mm base and 30mm above a 100mm Ø flue elbow.

Rear flue outlet

- The drawing opposite shows the boiler template with the flue centre lines of both the 100 mm and 125 mm flue systems.

3. Mark centre line of flue to be used (3); the external Ø of the hole can also be marked if required.

- If a 100 mm diameter flue is to be used, a 125 mm Ø hole is required. However, if using the weather sealing collar by pushing it through from inside the property, then a 150 mm diameter hole is required to accommodate this.
- The flue turret of the 100 mm flue has an in-built 3° angle.
- If extensions are to be added then the complete flue must rise at an angle of 3°.
- The 125 mm Ø flue system will require the flue to rise at an angle of 3°.
- Drill hole using a core drill or similar.

Side outlet:

4. Mark from the centre line of the wall template to the wall which the flue will pass through (4).

- Allow for a rise of 52mm per metre length of flue, to give a 3° angle.
- Clear any debris from the site.

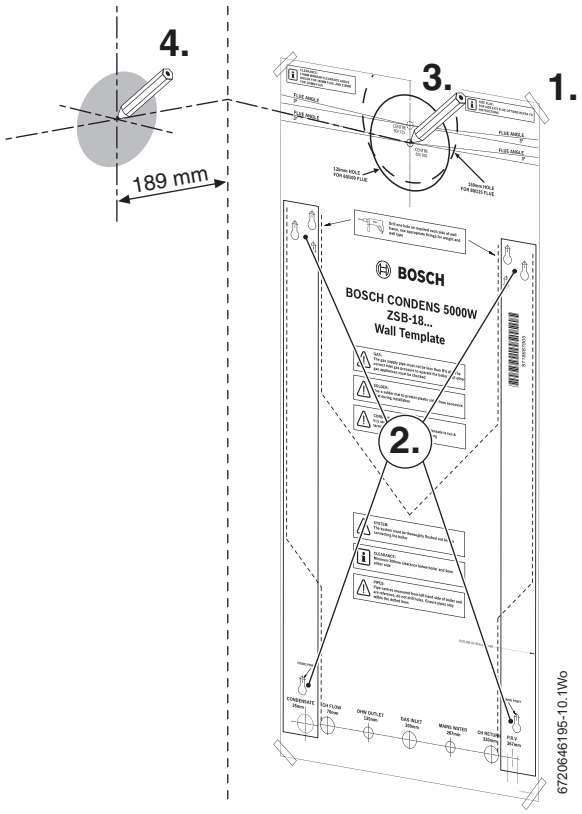


Fig. 20 Marking the flue position

4.3 Unpacking the boiler

1. Outer carton
2. Inner sleeve (unwrap from front)
3. Packing base
4. Protective wrapping
5. boiler outer case

- ▸ Remove outer carton (1) and place safely away from the working area.
- ▸ With the outer packaging removed and the inner sleeve (2) still in place gently lay the boiler on its back.
- ▸ The boiler will lie at an angle to the floor to allow the boiler outer casing (5) to be removed.
- ▸ The inner sleeve (2) opens as shown in figure 23.
- ▸ Remove the protective wrapping (4).

1. Undo but do not remove the two screws at the bottom of the boiler
2. Undo the two screws at the top (see fig. 24).
3. Remove the outer case (5).

- ▸ Remove any packaging within the boiler and the packaging base (3).

CAUTION: Hanging the boiler

- ▸ Remove the plastic strip fitted to pipes before hanging the boiler.

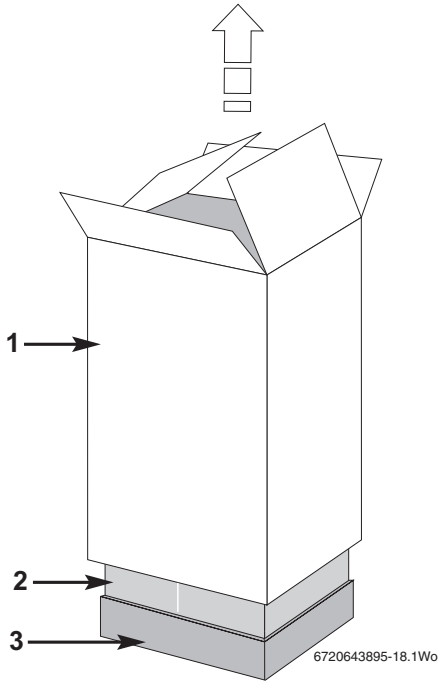


Fig. 21 Remove outer carton

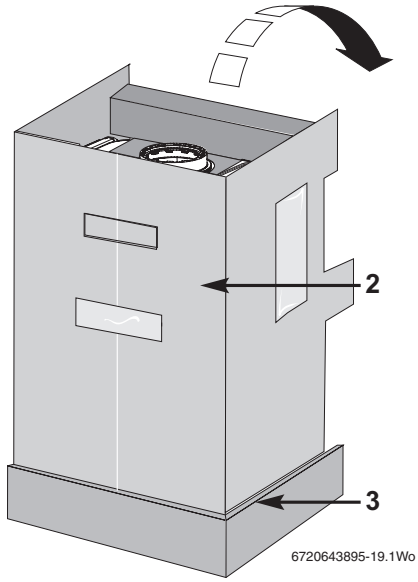


Fig. 22 Lay boiler down

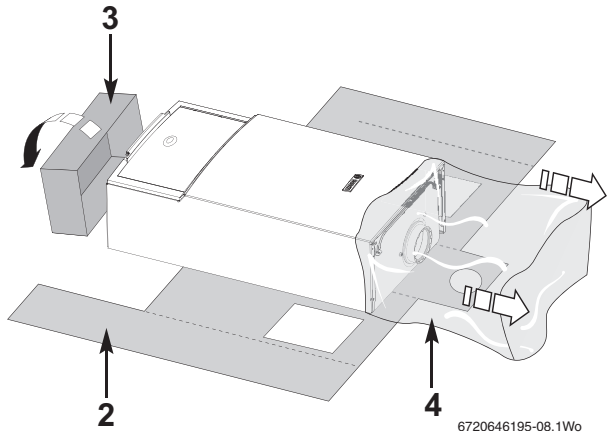


Fig. 23 Remove packaging

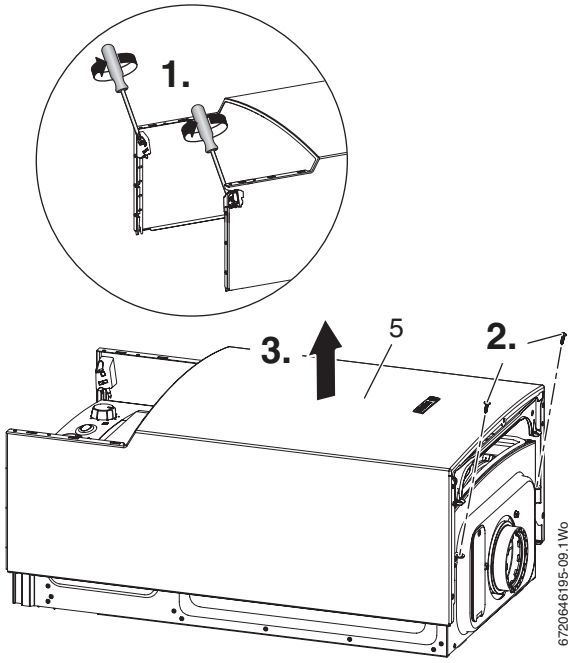


Fig. 24 Outer case screw removal

4.4 Boiler connections

CAUTION: Isolate the mains gas supply before starting any work and observe all relevant safety precautions.

NOTE: Diverter valve

- If the optional integral diverter valve kit is required, fit the kit now before hanging the boiler on the wall frame.

Metric to imperial adapters

- Before mounting the wall frame, fit the metric to Imperial adapters to the central heating and gas isolators
- Remove the nut and olive from the back of the isolator.
- Refer to figure 25 and fit the nut and olive onto the adapter and mount onto the back of the isolators.

1. Central heating isolation valve
2. Gas isolation valve
3. Compression ring
4. Compression nuts
5. Metric to imperial adapter (22mm to R¾)

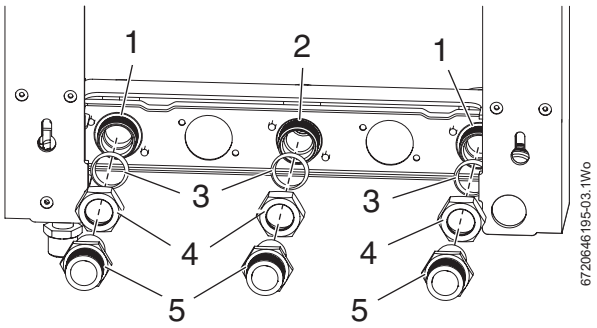


Fig. 25 Adapter fitting

Wall mounting frame

- Remove wall mounting template and secure the wall mounting frame to the wall with the appropriate fixings for the boiler weight and wall type.
- System pipes may be run vertically upwards behind the boiler or below it. See plumbing manifold section on page 19.

1. CH flow BSP 20
2. Gas inlet BSP 20
3. CH return BSP 20

The bonded washer supplied is for the gas connection only.

- Fit sealing washers to service valves before hanging boiler.
- Fit the metric to imperial (15mm to R½) adapter (4) to the pressure relief valve connection (1).
- Assemble the compression nut (3) and ring (2) onto the adapter (4) and fit to the PRV connection (1).

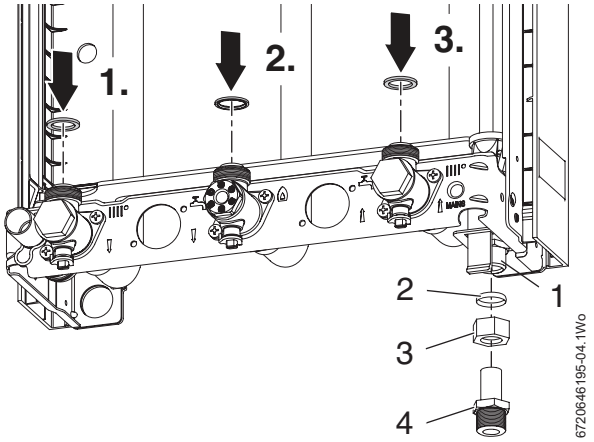


Fig. 26 Sealing washers

NOTE: Before hanging the boiler onto the wall mounting frame ensure that the pressure relief valve connection is in the down position.
This is located on the right hand side of the wall frame at the rear.
Apply a smear of silicone lubricant to the seal to ease connection later.

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

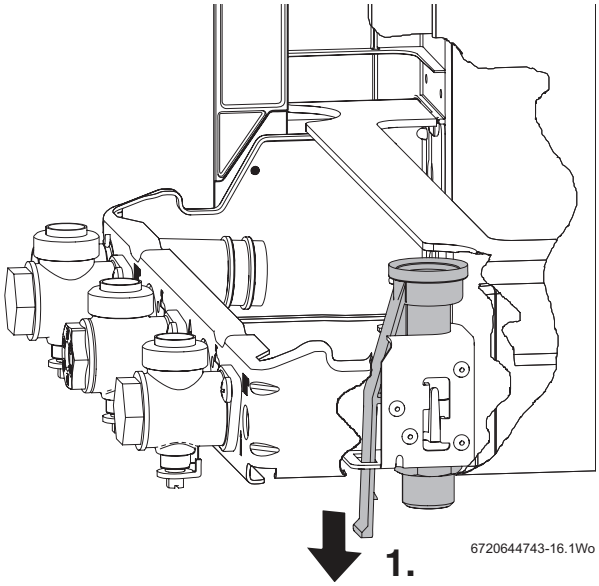


Fig. 27 PRV connection in the down position

Hanging the boiler

CAUTION: Caps or plastic strip fitted to pipes must be removed before hanging the boiler.

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

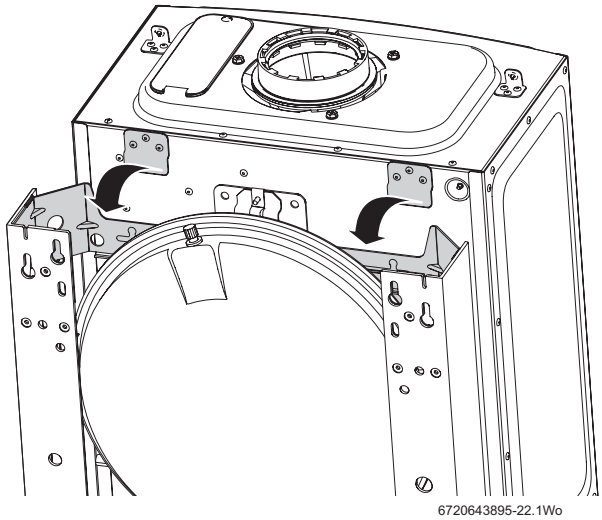


Fig. 28 Hanging the boiler

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

To ease assembly of components, apply silicone lubricant to sealing surfaces.

PRV connection

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

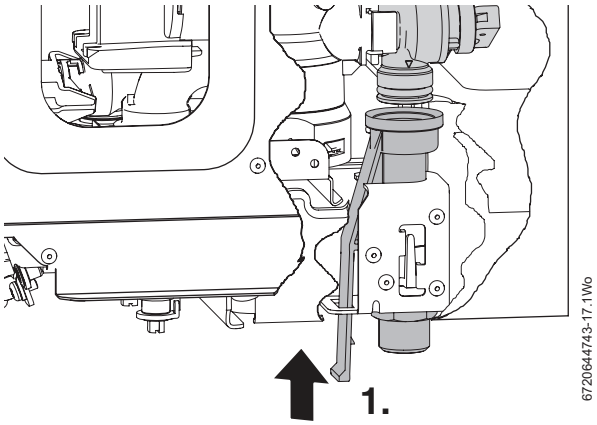


Fig. 29 PRV in the up position

- Remove the screw from the control panel retaining bracket and lower the control panel into the service position.
- Make connections to the heating system.
  Connect the gas supply to the boiler gas isolation valve ¾ inch BSP compression fitting.

Expansion vessel connection

To connect the expansion vessel flexible pipe to the hydraulic manifold situated to the left of the pump:

- Remove and discard the plastic cap from the expansion vessel flexible pipe.

1. Refer to figure 30, release the retaining clip.
2. Remove and discard the orange plastic blanking plug from the pressure vessel connection at the hydraulic manifold.

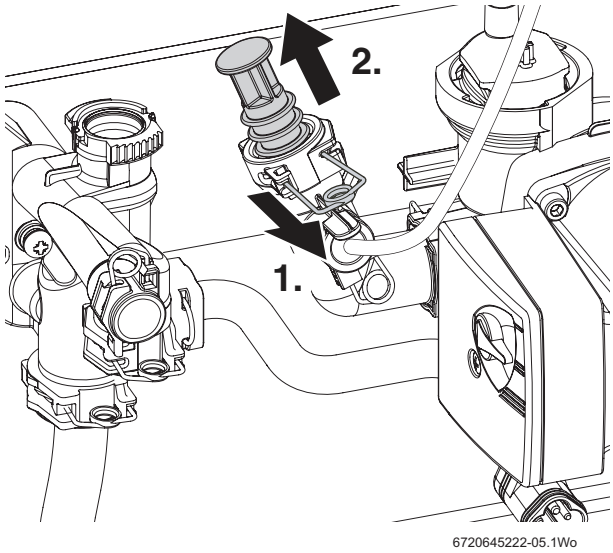


Fig. 30 Blanking plug

1. Refer to figure 31 and insert the expansion vessel flexible pipe it to the fitting on the pump.
2. Secure in place with the wire retaining clip.

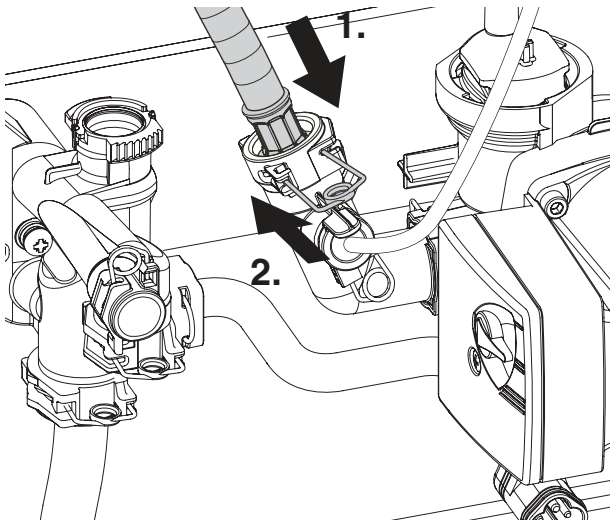


Fig. 31 Expansion vessel hose connection

- Connect the pressure relief drain pipe to ½ inch BSP joint using the compression nut and olive supplied in the literature/hardware pack.

4.5 Flue installation

Horizontal flue (60/100mm Ø)

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

To ease assembly of flue components, apply silicone lubricant to sealing surfaces.

Basic instructions for the 60/100mm Ø flue are shown below.

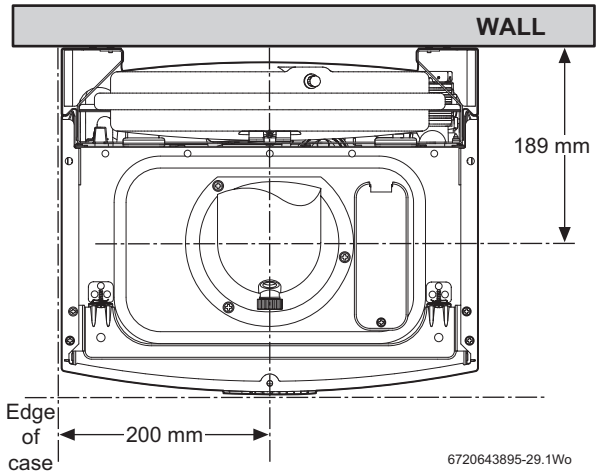


Fig. 32 Flue turret centre

4.5.1 Measuring the flue (standard flue)

- Measure from the outside of the wall to the centre line of the flue turret to determine length L.
- Subtract 50mm from the length L to give the correct dimension to the flue elbow connection.
- If the length L falls within the telescopic range of 350 to 570mm, then no cutting will be required.
- If the required length is less than 350mm the standard telescopic flue can be modified, refer to following section.
- If the required length is greater than 570mm, then flue extensions will have to be used. Refer to the 60/100 Horizontal Flue Instruction manual provided in the telescopic flue kit.

Adjusting the telescopic flue length

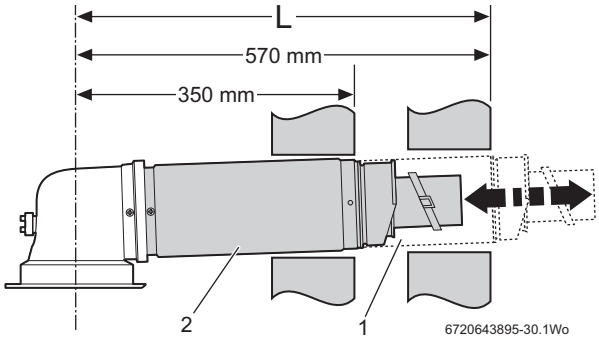


Fig. 33 Standard telescopic flue

Extend tube (1) by withdrawing from tube (2) to achieve the flue length required, between 350 - 570mm.

Secure with screw provided and seal joint with the aluminium tape supplied.

4.5.2 Reducing the telescopic flue length

Ensure that the “top” label is facing up before securing the flue section to the turret.

The flue terminal must be fitted with the 'top' label uppermost to allow the correct fit and use of the plume management system.

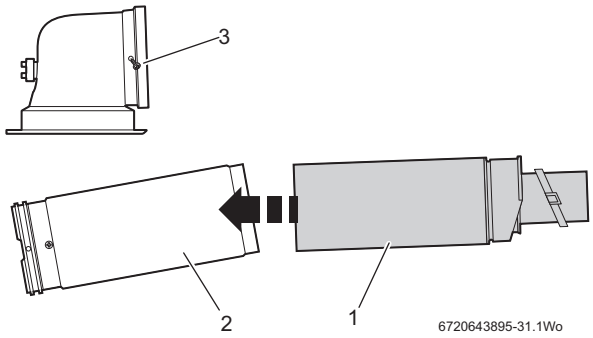


Fig. 34 Reducing the standard terminal

- Remove securing screws (3) to detach the terminal assembly from the turret.
- Slide terminal section (2) from the terminal assembly and discard.
- To use terminal (1) without cutting remove the location lug (4) on the inner flue tube (5) and remove any burrs.

To reduce the flue length further

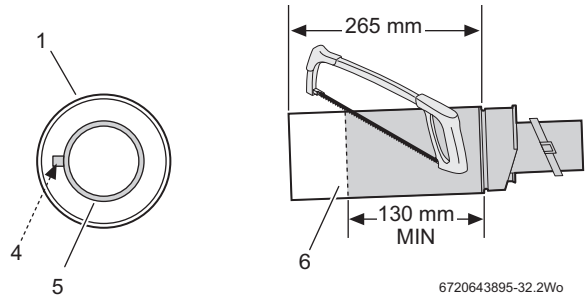


Fig. 35 Further reduction

- Mark the length required for the terminal as shown (min. 130mm) and cut square, taking care not to damage the tubes.
- Remove any burrs and chamfer the outer edge of the tubes to assist ease of connection and prevent seal damage.

The aluminium tape is not required when reducing the terminal.

4.5.3 Installing the telescopic flue

Refer to figure 36.

1. Set the flue length to the distance required, secure with screws provided.
2. Seal the joint with the aluminium tape provided.
3. Slide the inner wall seal onto the terminal.
4. If fitting from inside the building; slide the outer wall seal onto the terminal.

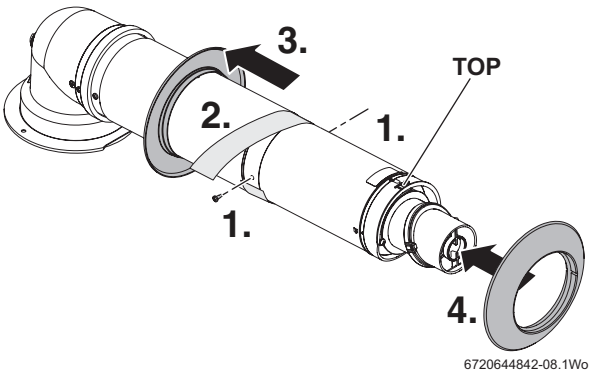


Fig. 36 Telescopic flue

The turret securing screws are from the boiler and are not in flue kit.

Refer to figures 37 & 38.

1. Remove the three inner flue tube retaining screws (2). The inner tube will be held in place in the boiler.
2. Check the boiler flue seal is correctly seated and apply silicone grease.
3. Position terminal through the flue opening in the wall to the outside of the building by the distance shown.
4. Align the flue turret to the boiler flue outlet with flat facing (1) to the rear of the boiler.
   The flue turret should be pushed straight down, on to the boiler.

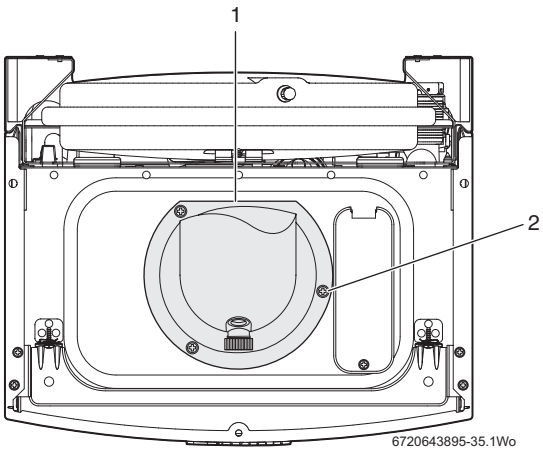


Fig. 37 Aligning the turret

- ▸ Fit the screws removed in step 1 to secure flue turret.
- ▸ If fitting the outer seal from outside the building, slide the outer wall seal onto the terminal as shown.

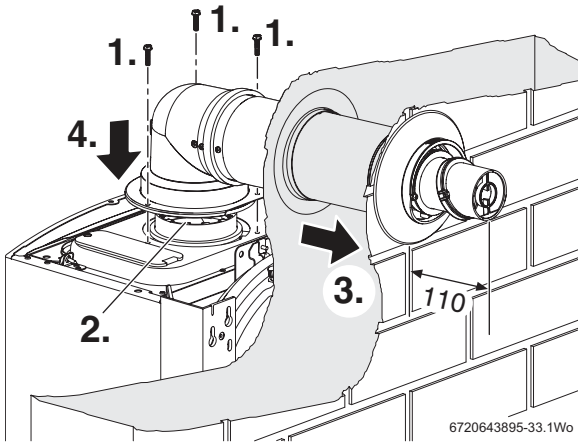


Fig. 38 Telescopic flue installation

For more information refer to the 60/100 horizontal flue kit instruction manual

Additional notes and reminders

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

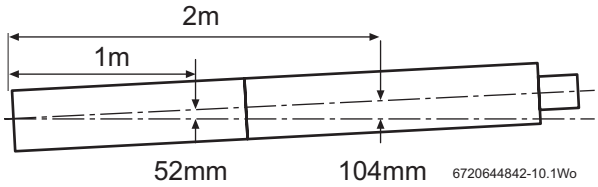


Fig. 39 Slope for condensate disposal

4.5.4 Flue terminal plume re-direction

The flue discharge can be re-directed allowing some plume redirection control, alternatively, a complete plume management system can be fitted to the flue terminal.

Re-directing the flue discharge

1. Remove screws (1) and rotate the terminal end (2) through 180°.

NOTE: Do not rotate the complete terminal assembly.

1. Refit the terminal end (2) and secure with screws (1).
2. Loosen screws (3) and rotate the entire outlet assembly to redirect the plume. Tighten screws (3) to secure in the required position.

The flue terminal outlet has built-in stops to limit rotation for horizontal fluing to allow condensate to run back into the boiler for safe disposal. Do not attempt to force beyond the limit stops.

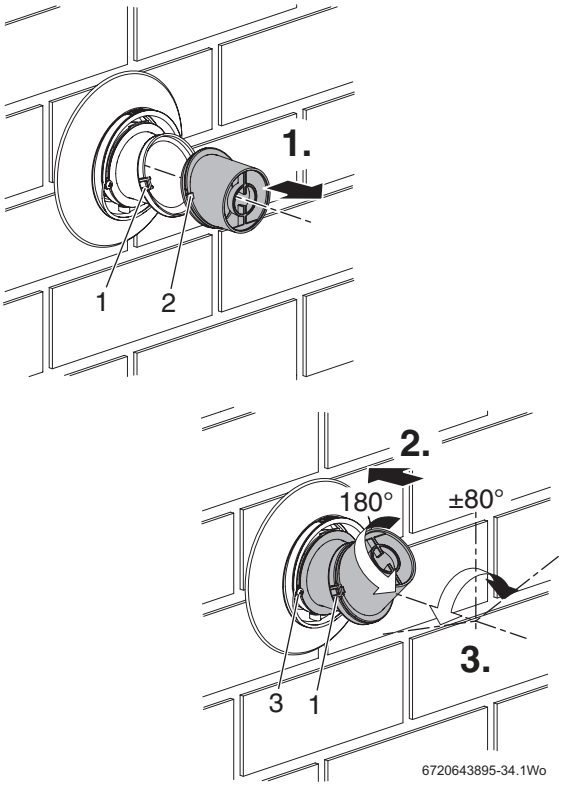


Fig. 40 Plume redirection

NOTE: Outlet position

- The flue terminal outlet position must follow those stated in the relevant boiler instruction manual.
  When redirecting the flue discharge the outlet terminal must be at least 1500mm from any opening in the direction of the discharge to prevent combustion products from entering the building.

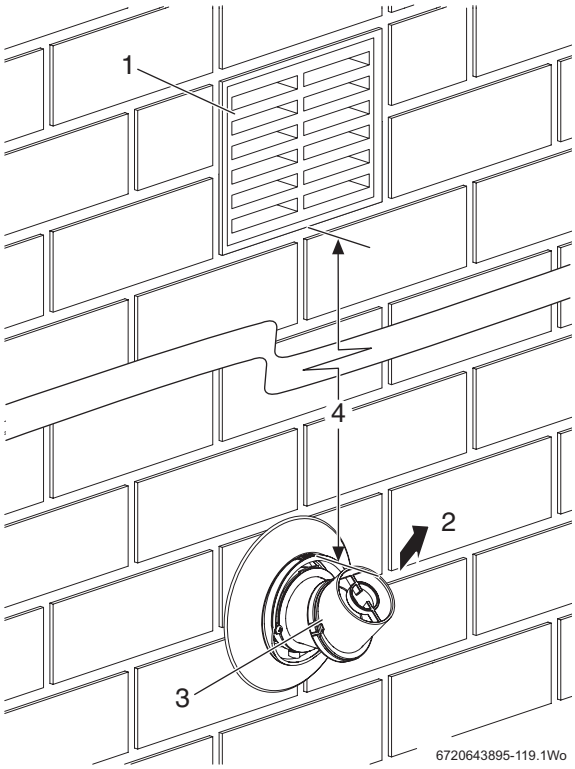


Fig. 41 Plume distance to opening

1	Opening in building
2	Flue discharge
3	Plume deflector
4	Minimum 1500mm from an opening in the building

Tab. 21 Key to figure 41

4.6 Condensate connection

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

• Ensure that the condensate drain is a 20mm Ø plastic pipe. The pipe must fall at least 50mm per metre towards the outlet.

Do not use lubricants or sealing compounds.

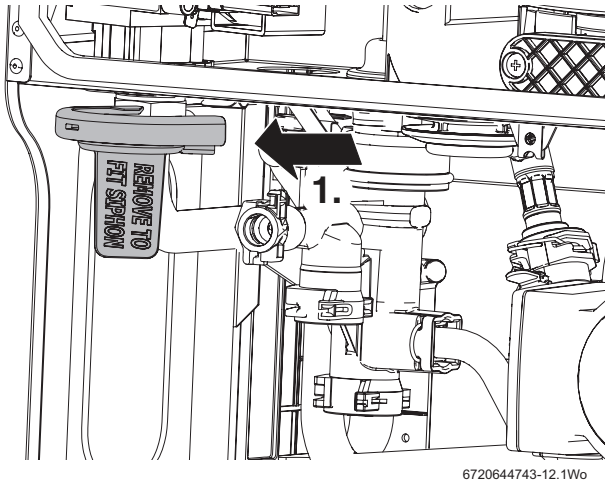


Fig. 42 Remove blanking cap

1. Remove the sump blanking cap from the sump.

▸ Fill syphon with 200 to 250 millilitres of water.

NOTE: Move the fan lead, DHW NTC sensor lead and ignition cable out of the way when fitting the syphon to ensure that they do not become trapped.

2. To fit the syphon assembly:

▸ Remove orange seal retainer and discard.

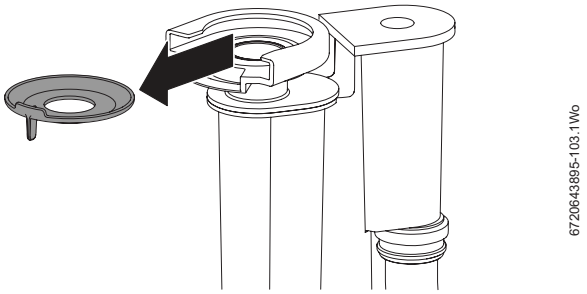


Fig. 43 Syphon detail

▸ Push the syphon onto the sump assembly, until the lug on the sump is fully engaged with the slot on the back of the syphon assembly and the clip is engaged in the top of the syphon.

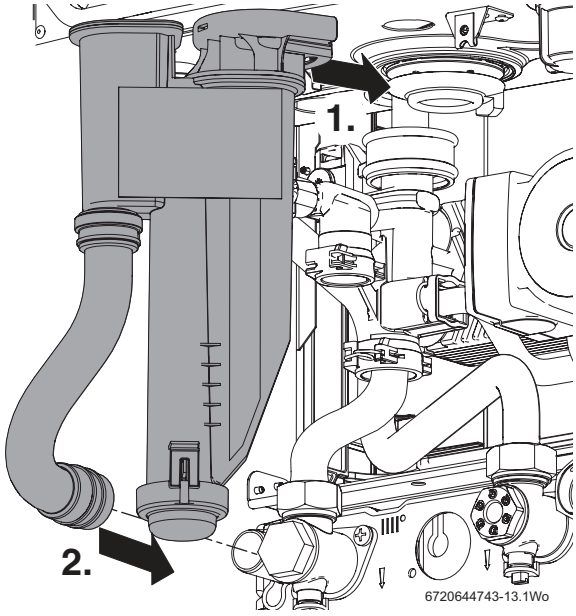


Fig. 44 Fitting syphon

NOTE: Do not use solvents, adhesive or lubricant when pushing the pipe onto the rubber connector.

3. Push the discharge hose, onto the wall frame connector, until fully engaged.

Maintenance

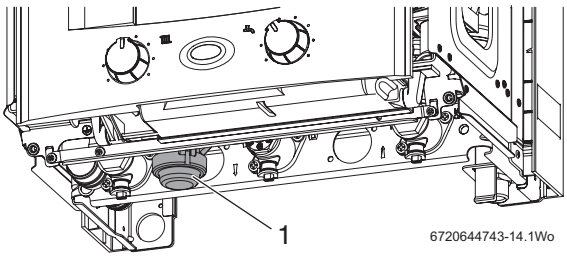


Fig. 45

There is no need to remove the syphon assembly for cleaning.

To drain debris from the syphon, during the annual service:

▸ Release the clips and remove the drainage cap from the bottom of the syphon.

▸ Empty the debris and condensate from the syphon into a suitable container.

▸ Re-fit the drainage cap to bottom of the syphon.

4.7 Electrical

CAUTION: Isolate the mains electricity

- ▸ Remove the plug from the mains socket to isolate the electrical supply before starting any work on the boiler and observe all relevant safety precautions.

The boiler is pre-wired with a 1½ metre mains supply cable.
A spare strain relief block is supplied in case the pre-wired cable is not used.

The mains supply to the boiler must be either:

- The mains electrical supply to the boiler and system wiring centre must be common and through a three pin plug and socket.

Access to electrical connections

- ▸ Remove boiler casing to access control panel.

Refer to figure 46.

1. Remove the screw securing the control panel.
2. Lower the control panel into the horizontal service position.

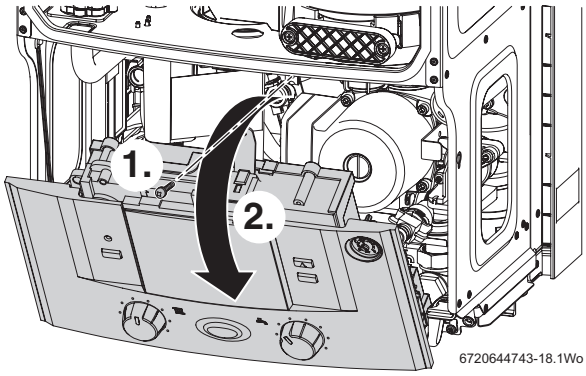


Fig. 46 Moving control panel into the service position

When stripping wires always ensure copper strands do not fall into the control box.

Refer to figure 47.

1. Unscrew the three screws in the control panel.
2. Remove the connections cover.

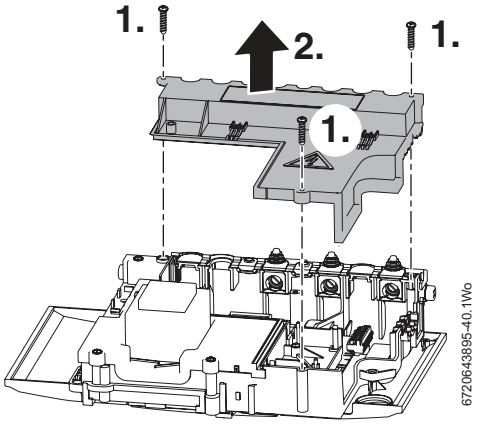


Fig. 47 Removing the connection cover

SI1	Fuse F1 2.5A
SI2	Fuse F2 0.5A
SI3	Fuse F3 1.5A
ST6	Frost thermostat connection
ST10	Mains in & external controls connections
ST19	EMS bus connection

Tab. 22

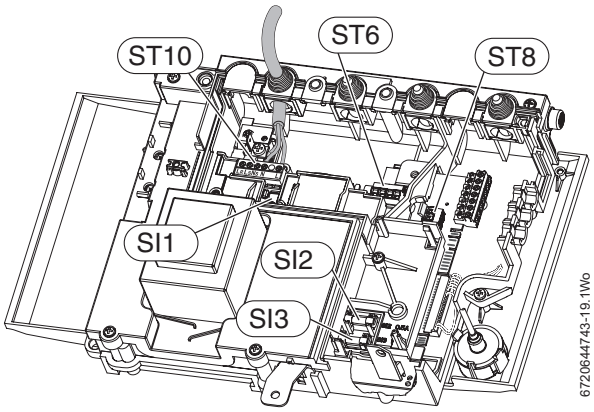


Fig. 48 Electrical connector information

System wiring centre connection (ST10)

Remove the link between L_R and L_S on ST10.

- Connect the LIVE feed wire from terminal (LS) to the LIVE on the system wiring centre.
- Connect NEUTRAL wire from terminal (NS) to the neutral on the system wiring centre.
- Connect SWITCHED LIVE wire from terminal (LR) to the boiler demand on the system wiring centre.

A pump is already fitted to the boiler!
No other pump should be fitted.

- Refit the control panels removed earlier.

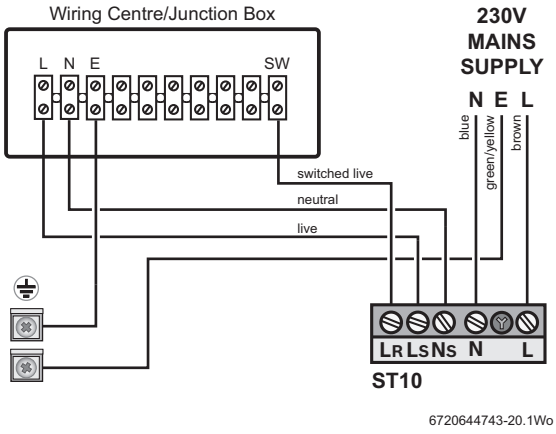


Fig. 49 Wiring centre

NOTE:

- External diverter valve(s) and all other 240V parts are not supplied with the boiler.
- A fascia mounted programmer/timer cannot be fitted unless optional integral diverter valve is used.
- Refer to manufacturers' instructions when connecting external parts to the wiring centre.
- Robert Bosch cannot be held responsible for wiring errors.
- There is an option to fit an internal diverter valve. This also requires fitting an extra harness and a code plug change. See "optional diverter valve" instructions supplied with the integral diverter valve kit.
- Option integral diverter valve kits: 18kW - 7 716 192 568
- This option is covered in the fault finding guide on page 61 of these instructions.

Optional external frost stat connection (ST6)

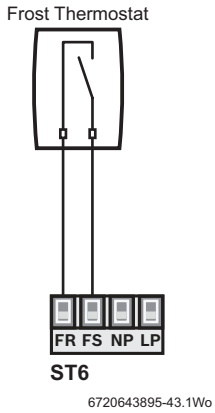


Fig. 50 Frost Thermostat

- Connect frost thermostat cables to terminals F_S and F_R.
- These are not polarity sensitive.

5 Commissioning

5.1 Pre-commissioning checks

CAUTION: Isolate the mains electricity supply before starting any work and observe all relevant safety precautions.

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

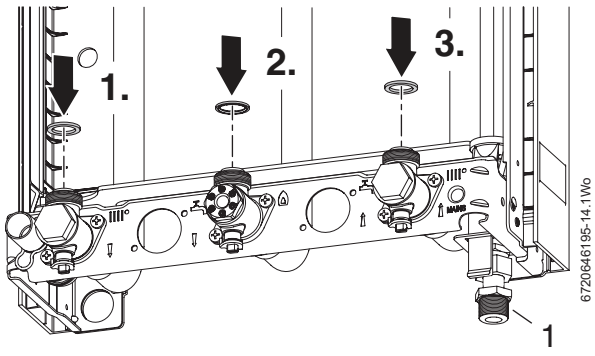


Fig. 51 Pipe fittings

- Ensure that the washers have been fitted to the water connections and the bonded washer to the gas connection on the manifold.

1. - CH Flow ¾ inch BSP thread
2. - Gas inlet ¾ inch BSP thread
3. - CH Return ¾ inch BSP thread

- Is the PRV adapter fitted (1)
- Check the gas type specified on the identification plate (1), on the inside of the flap, matches that of the gas supply.

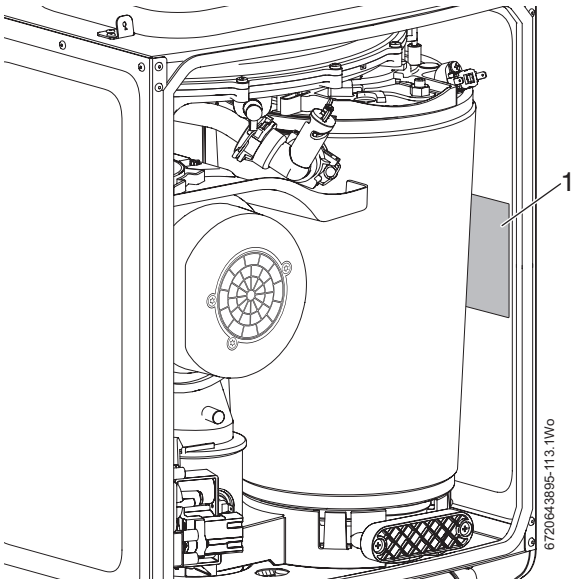


Fig. 52 Identification plate

- Turn on the main gas supply, check the gas pipe work connections and rectify any leaks.
- Check that the condensate pipe (1) has been connected to the syphon.

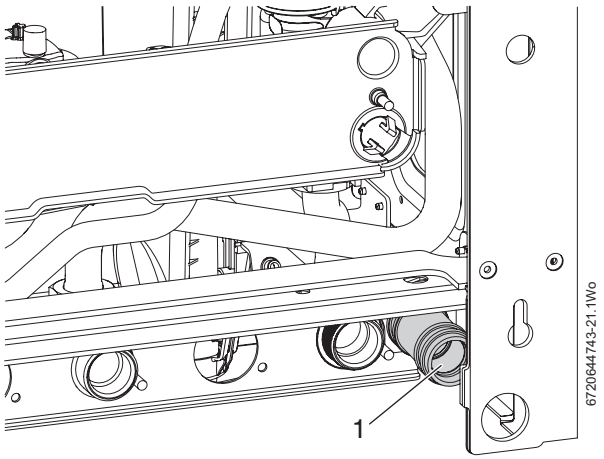


Fig. 53 Syphon connection

- Referring to figure 54, check pressure relief drain pipe (1) is correctly fitted and securely tightened.

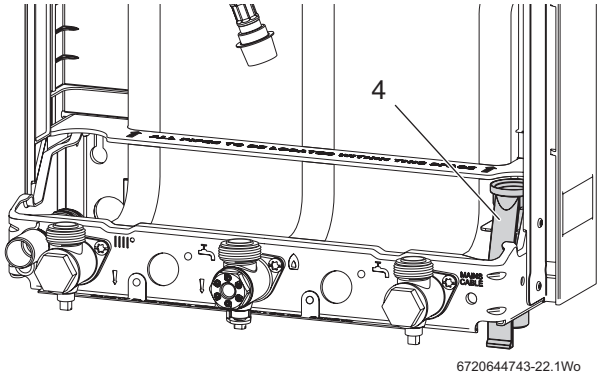


Fig. 54 Pressure relief drain pipe

NOTE: If the boiler is not to be commissioned immediately then, after successfully completing all of the checks and any rectification work:

- Close the gas valve
- Close the water shut off valve
- Isolate the gas supply
- Isolate the electricity supply
- Label appropriately

5.2 Filling the system

1. Turn on the water main and open the system valves.
2. Open all radiator valves.
3. Fill the system via an approved filling loop to between 150 and 200 kPa then turn the valve anti-clockwise to close.
4. Vent (1) any air from the boiler heat exchanger using a suitable container to collect any water. Ensure tube outlet (2) is directed away from the fan or any other electrical component to prevent any water damage. Also place a suitable cover over the fan to prevent any spillage of water on to electrical connections. Ensure the cover is removed after venting.

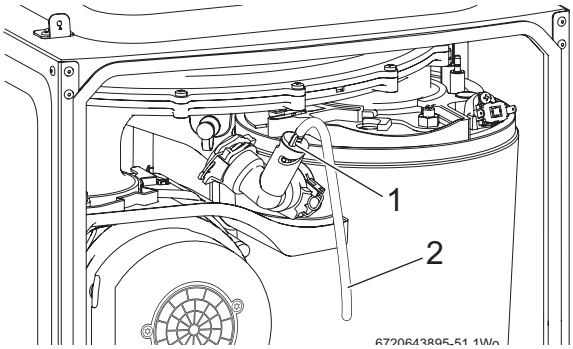


Fig. 55 Venting

5. Vent all radiators, tighten when completed and check the system and correct any leaks.

- The boiler integral expansion vessel is pre-charged to 75 kPa(equal to a static head of 7.5m (22ft). A Schraeder type valve is fitted to the expansion vessel to allow for pressure adjustment if required.
- If an extra expansion vessel is fitted to the central heating return, adjust this to the same pressure as the boiler internal expansion vessel, refer to separate instructions with the extra expansion vessel.

6. Briefly open the pressure relief valve to test its operation.
7. If required increase system pressure back to between 150 to 200 kPa.
8. Rotate the adjustable pointer on the pressure gauge to record the set system pressure.
9. Isolate and remove filling loop connection to system .

5.3 Water treatment

NOTE:

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

Flushing (CH):

- Switch off the boiler.
- Open all drain points and drain the system while the boiler is hot.
- Close drain points and add a suitable flushing agent at the correct strength for the system condition in accordance with the manufacturer's instructions.
- Run the boiler/system at normal operating temperature for the time stated by the manufacturer of the flushing agent.
- Drain and thoroughly flush the system to remove the flushing agent and debris.

Inhibitor (CH):

- Check drain points are closed and all radiator valves are open before adding a suitable inhibitor compatible with aluminium (or combined inhibitor/ anti-freeze if the system is exposed to freezing conditions) to the heating system water in accordance with the manufacturers instructions.

The pH value of the system water must be less than 8 or the boiler warrantee will be invalidated.

- Fill system via an approved filling loop to between 150 and 200 kPa.
- Vent all radiators; tighten vents when complete.
- Vent any air from the boiler heat exchanger using a suitable container to collect any water.
- Ensure tube outlet is directed away from the fan or any other electrical component to prevent damage. Also place a suitable cover over the fan to prevent any spillage of water onto electrical connections. Ensure the cover is removed after venting.
- Vent all radiators.
- Re-pressurise if necessary.
- Set all controls to maximum.
- Record the date when the inhibitor was added to the system on the warrantee card.

NOTE:

- The concentration of inhibitor in the system should be checked every 12 months or sooner if content is lost.
- The addition of sealing agents to the system water is not recommended as this can cause problems with deposits left in the heat exchanger.

5.4 Starting the boiler

CAUTION: Running the boiler

- Never run the boiler when the system is empty or partially filled.

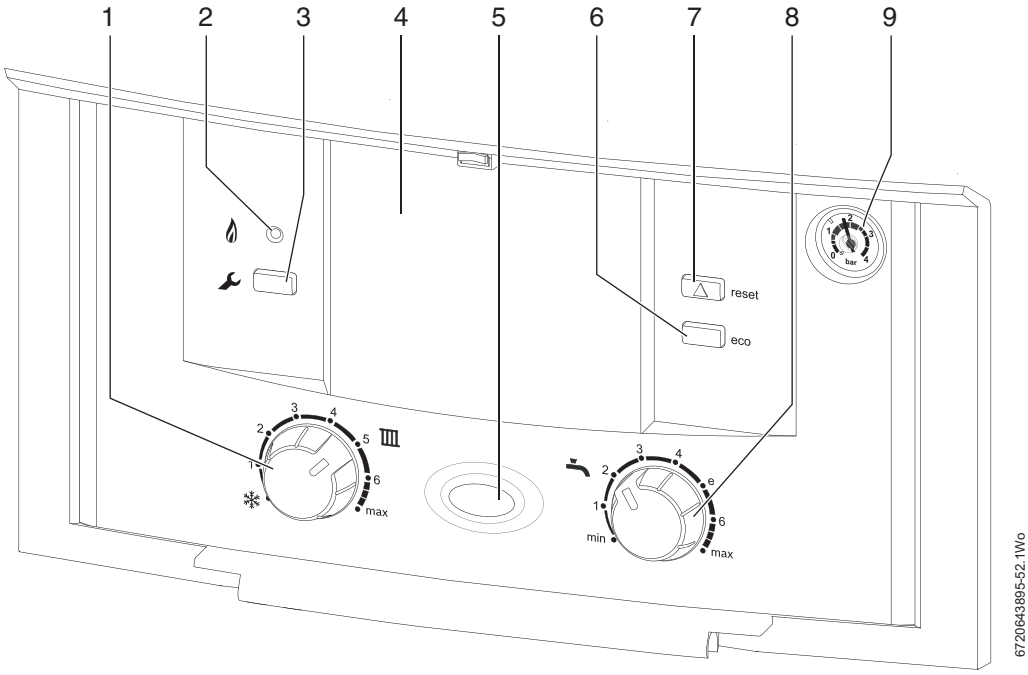


Fig. 56 Control panel

Switching the boiler on/off:

- Turn on mains power supply, the power on indicator (5) illuminates blue.
- Turn on any external controls
- Set the thermostatic radiator controls to maximum temperature
- Set the clock/programmer to continuously ON and the room thermostat to maximum temperature

1	Central heating temperature control
2	Burner indicator (green)
3	Service button
4	Cover or optional Programmer
5	Power ON and fault indicator (blue)
6	ECO button - not used
7	Reset button
8	DHW temperature control (only operational when option integral diverter valve is fitted)
9	System pressure gauge

Tab. 23 Control panel legend

Turn the boiler CH temperature control (1) to maximum. The burner on indicator (2) illuminates green when the burner has lit.

If the boiler fails to light, the blue power indicator (5) and reset button (7) will flash.

NOTE: Reset

- Do not press the blue power indicator (5) to reset the boiler.

To reset press and hold the reset button (7) for more than two seconds. The boiler will be reset.

5.5 Commissioning

NOTE: The combustion settings on this gas-fired boiler have been checked, adjusted and preset at the factory for operation on the gas type defined on the data plate.
No measurement of the combustion values is necessary provided there is a meter installed allowing the gas rate to be checked.
Do not adjust the air/gas ratio valve!

Having checked:

- That the boiler has been installed in accordance with the installation instructions.
- The integrity of the flue system and flue seals, as described in section 6.3 of this manual.
- The integrity of the boiler combustion circuit and relevant seals.

5.5.1 Checking the gas inlet pressure

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

Measuring the inlet pressure

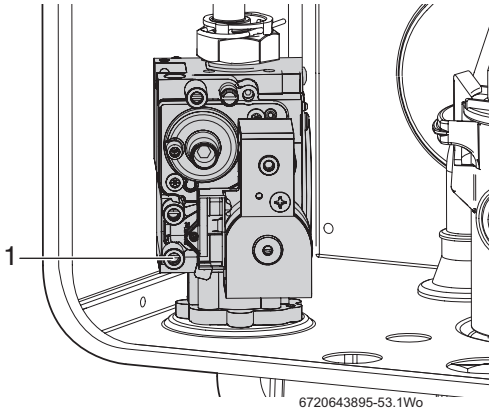


Fig. 57 Inlet pressure test point

- Close gas isolation valve.
- Slacken the screw in the inlet pressure test point (1) and connect a manometer.
- Open gas isolation valve.
- Measure the pressure with the boiler running at maximum.
  - Press service button for more than ten seconds and set CH temperature to maximum.
  - The service button will illuminate continually and the blue power indicator will pulse five times.
- Check the gas supply working pressure at the gas valve conforms to values shown in Fig. 58.

Ensure inlet pressure is satisfactory with all other gas appliances working.

Gas pressure within the system

Refer to the figures below for natural gas pressures.

The pressure at the boiler must not be less than the pressure read at the meter minus 0.03 kPa.

If the pressure drops are greater than shown below, then this would indicate a problem with the pipe work or connections within the system.

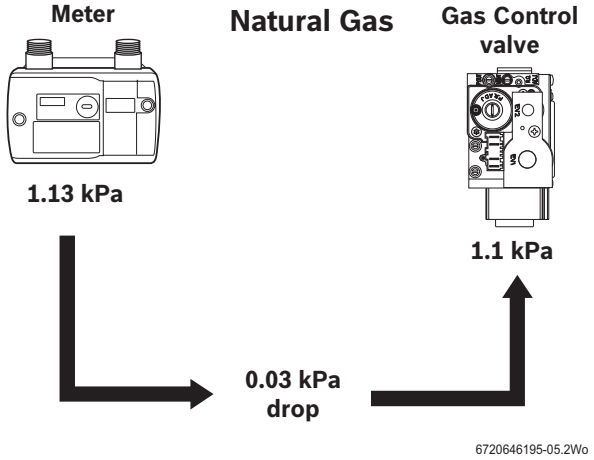


Fig. 58 Natural gas pressures

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

5.5.2 Checking the gas rate

- The gas rate should be measured at the gas meter after 10 minutes operation at maximum.
  See technical data section at the front of this manual.
- Where a gas meter is not available (e.g. LP gas) the CO/CO_2 must be checked to the units shown in the setting of the air/gas ratio, refer to section 6.6.
- If pressure and gas rate are satisfactory press the service button again and the boiler will return to normal operation.
  - If left in the service mode the control will return to normal operation after 15 minutes.
- Close the gas isolation valve.
- Remove the manometer.
- Re-seal the screw in the gas inlet pressure test point.
- Open the gas isolation valve.
- Ensure that there are no gas leaks.
- Replace the outer case.

5.5.3 Domestic hot water:

Controlling the hot water temperature:

NOTE: DHW

- The hot water temperature can only be controlled when the “optional diverter valve” kit is fitted.

The hot water temperature can be set to between approximately 40°C and 60°C using the DHW temperature control.

5.6 Finishing commissioning

5.6.1 Replace outer casing:

- Replace outer casing making sure that the securing points are properly located.
- Replace top two screws (1).
- Tighten bottom two screws (2).

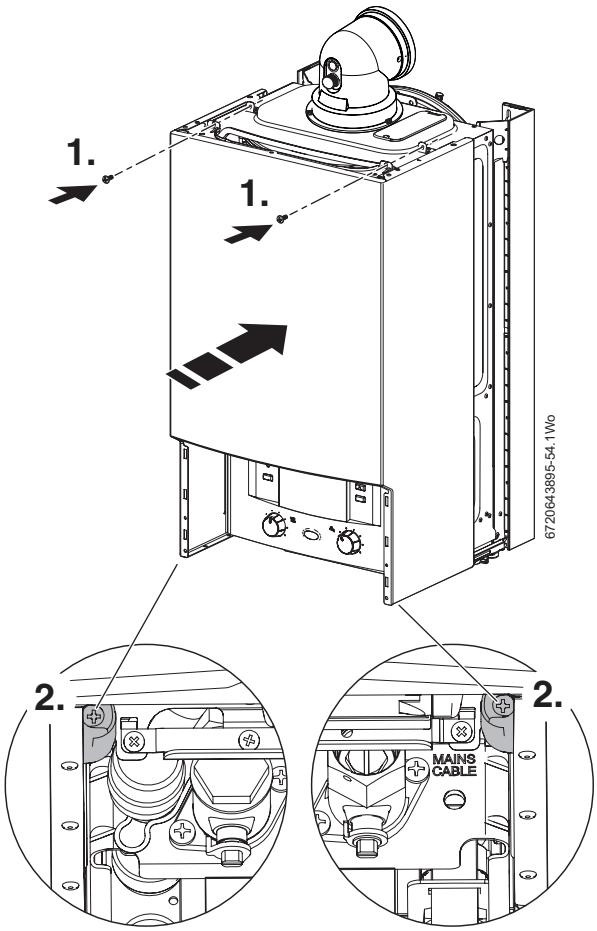


Fig. 59 Fitting case

5.6.2 Fitting fascia flap

- Present the flap up to the boiler with the hinge pins facing the boiler.
- Engage the left hand pin into the grey pivot. The hinge pin and pivot hole are both square, rotate the flap to ensure that the pin is located in the pivot.
- Support the flap in your left hand and with your right hand, bend the right side down. This should enable you to engage the right hand pin in the pivot. Rotate the flap to ensure that the pins and pivots are located securely.
- Close the flap.

5.6.3 Installing bottom panel

- The bottom panel slides onto two ledges (C) either side of the boiler frame.
- Hold the panel up against the underside of the boiler and slide towards the rear, until there is no more movement.
- Slide the panel forward until it is fully engaged.

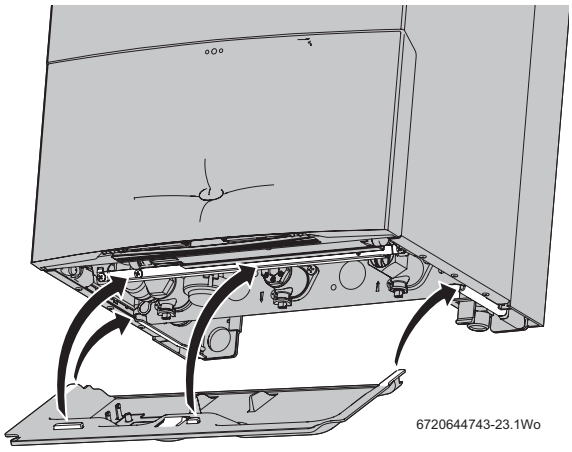


Fig. 60 Bottom panel installation

NOTE: Every time the power to the boiler is turned off and on, the boiler enters a learning mode and may take some time to optimise the boiler performance. This time is variable and is dependant on hot water and central heating demand.

5.6.4 Handover

- Complete the gas boiler commissioning checklist.

The checklist can be found at the rear of these instructions.

- Open the fascia cover by gently pressing the centre top of the cover.
- Set up the controls and show the user how to operate all the controls shown in the user guide.
- Ensure that the user guide is left with the customer.

6 Service and spares

6.1 Inspection and service

CAUTION: Turn off the gas supply and isolate the mains supplies before starting any work and observe all relevant safety precautions.

NOTE: Components

- After replacement of any components always check for gas tightness where relevant and carry out functional checks as described in commissioning. Damaged O-rings or gaskets must be replaced.

NOTE: Service work must only be carried out by an authorised person.

NOTE: Do not attempt a service if a CO/CO_2 analyser is not available.

- To ensure the continued efficient operation of the boiler it must be checked at regular intervals.
- The frequency of servicing will depend upon the particular installation conditions and usage however, an annual service is recommended.
- The extent of the service required is determined by the operating condition of the boiler.
- The service interval record sheet at the rear of these instructions must be completed after each service.

Inspection

1. Check that the terminal and the terminal guard, if fitted, are clear and undamaged.
2. If the boiler is in a compartment or cupboard check that the specified service space around the boiler is clear.
3. Check all the joints and connections in the system and remake any that show signs of leakage. Refill and re-pressurise if applicable as described in Commissioning.
4. Operate the boiler and take note of any irregularities. Refer to fault finding for rectification procedures.

Component access

1. Removing outer case
   - Remove bottom panel by pushing it fully back and then pulling it forward and down to remove.
   - Undo and remove two screws (1) securing boiler casing at the top of the boiler.
   - Undo but do not remove the two screws (2).
   - Pull case forward and remove.

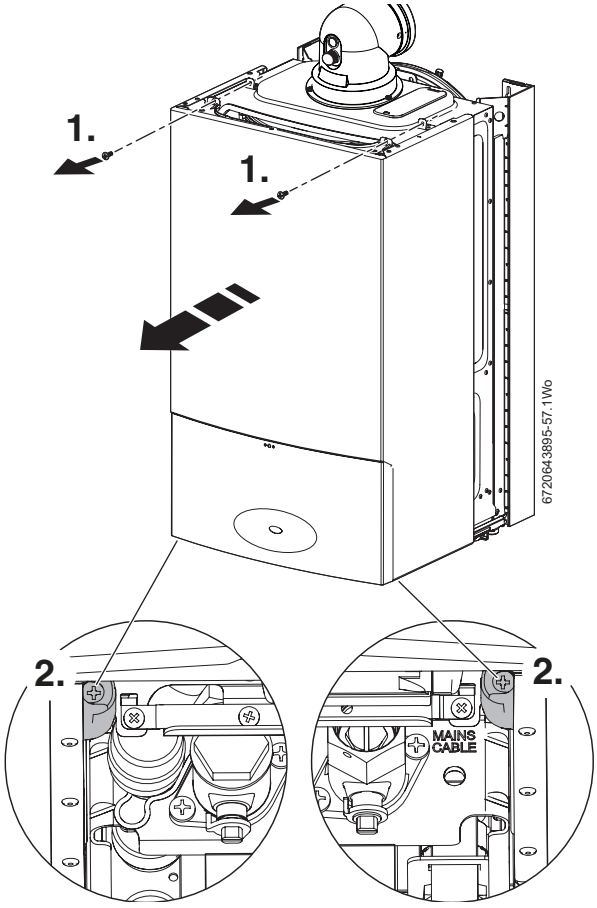


Fig. 61 Remove outer case

2. Lowering boiler control to the service position:
   - Remove screw (1) securing the control panel.
   - Pull the panel (2) forward into the service position.

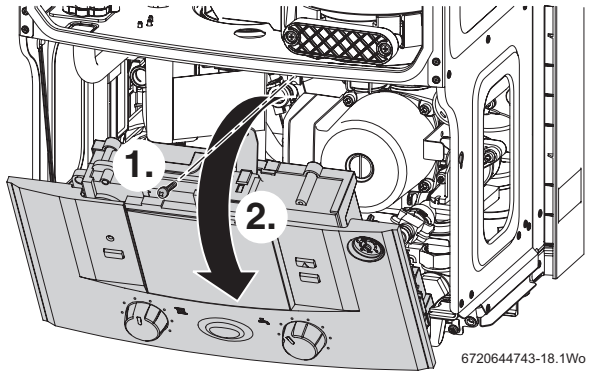


Fig. 62 Control panel into service position

6.2 Check the gas inlet pressure

Refer to section 5.5.1 for more information

NOTE:

- Ensure that the gas inlet pressure is satisfactory with all other gas appliances working.
- Do not continue with the other checks if the correct gas inlet pressure can not be achieved.

- Check the gas supply working pressures in the system conform to the readings shown in the table below:

Natural gas pressure	
at the meter/regulator	at the gas control valve
1.13 to 2.75kPa	1.1 kPa min.

6.3 Checking flue integrity

The integrity of the flue system and performance of the boiler can be checked via the flue.

Air intake sample point	1
Flue gas sample point	2

Tab. 24 Key to figure 63

- With the boiler case on and the boiler running at maximum.
- Insert the analyser probe into the air intake.
- Allow the readings to stabilise and check that:
  - O_2 is equal to, or greater than 20.6%
  - CO_2 is less than 0.2%
- If the readings are outside these limits then this indicates that there is a problem with the flue system or combustion circuit.

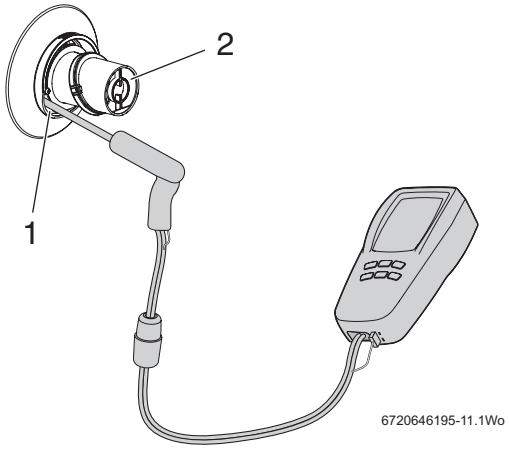


Fig. 63 Flue integrity test

6.4 Fan pressure test

This test is to determine if the heat cell requires cleaning/attention.

Setting the boiler to maximum

1. Press and hold service button for more than 10 seconds
2. Set the CH temperature to maximum.
   - The service button will illuminate continually and the blue power indicator will pulse 5 times.
   - The boiler will stay in this mode for 15 minutes unless the service button is pressed again.

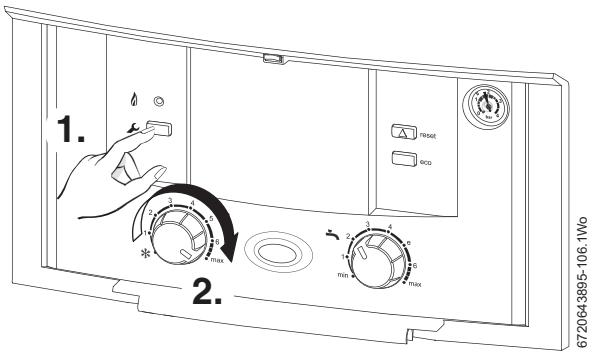


Fig. 64 Set boiler to maximum

Fan pressure

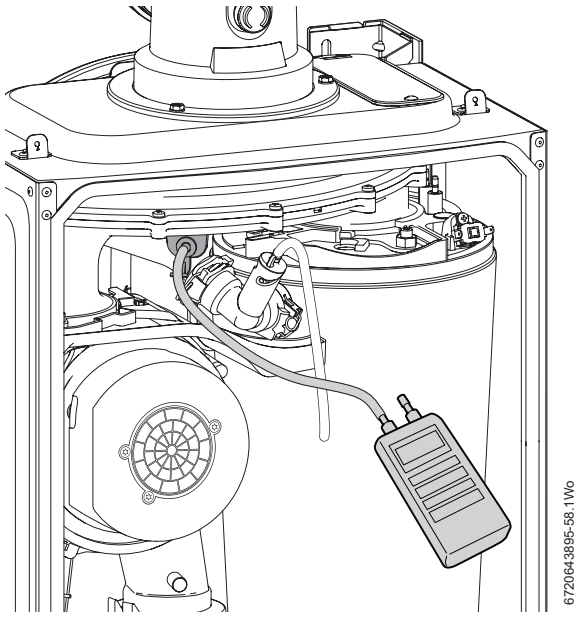


Fig. 65 Fan pressure test point

- Remove the cover and connect a digital manometer to the fan pressure test point.
- After measurement replace test point cover.
- The pressure will read negative, refer to the chart in figure 66.

NOTE:
The boiler must be run at maximum output for fan pressure test and the flue gas analysis.

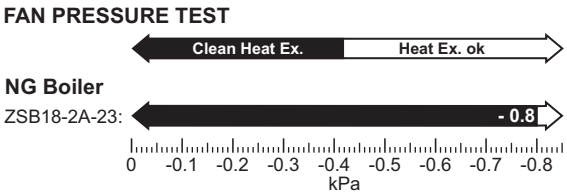


Fig. 66 Fan pressure readings

If the boiler fails the fan pressure test then before adjusting the air/gas ratio, try the following:

- Check the syphon is not blocked.

1. Remove the screws securing the sump cover.
2. Remove the sump cover.
3. Clean the sump and heat exchanger with a suitable brush

- Check the exhaust path and flue for restriction.
- Re-check the fan pressure readings

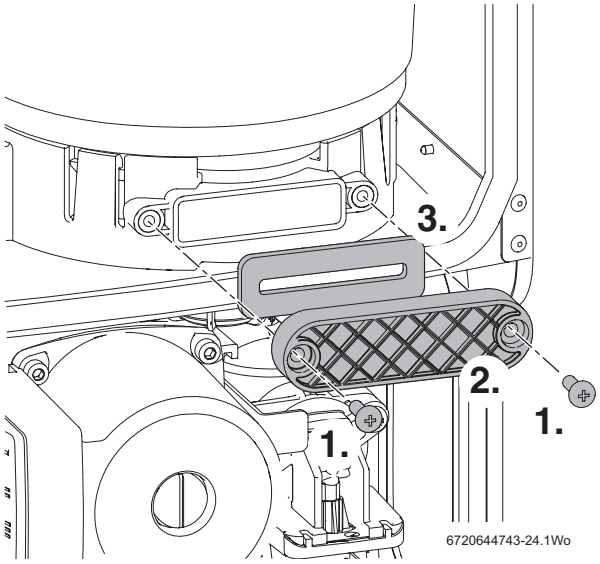


Fig. 67 Sump access

6.5 Flue gas analysis

Combustion test:

Air inlet sample point	1
Flue gas sample point	2

Tab. 25 Key to figure 68

- Connect the flue gas analyser to the flue gas sampling point as shown in the figure below.
- Run the boiler at maximum output for at least 10 minutes.
- Check the CO/CO_2 readings against the information in table 26 CO/CO_2 settings.

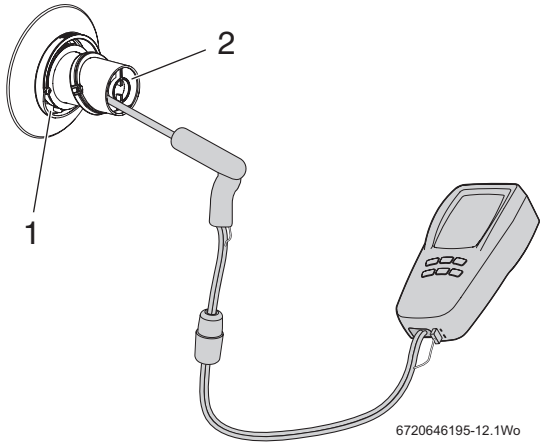


Fig. 68 Combustion test

If the boiler fails the combustion test, check:

1. Air intake for restriction
2. Diaphragm in the fan, for correct operation
3. Cleanliness of the heat cell, plus blockages in the condensate disposal

6.6 Setting the air/gas ratio

NOTE: Setting of the gas ratio must be carried out by an authorised person. Setting of the gas ratio must not be attempted unless the person carrying out the test is equipped with a combustion analyser and is competent in it's use.

6.6.1 Setting the CO/CO_2

When running in the service mode, the boiler will operate the central heating. This is to allow sufficient time for the setting procedure.

- Refer to section 5.6.1 and ensure that the gas inlet pressure is correct before continuing.
- To adjust the CO/CO_2 it will be necessary to first operate the boiler at maximum output.

1. Press and hold down the service button for more than 10 seconds until illuminated.
   The blue power indicator will pulse 5 times.
2. Turn central heating control to maximum; the boiler will then go to maximum output.

The control will resume normal operation after 15 minutes or if the service button is pressed for more than a second.

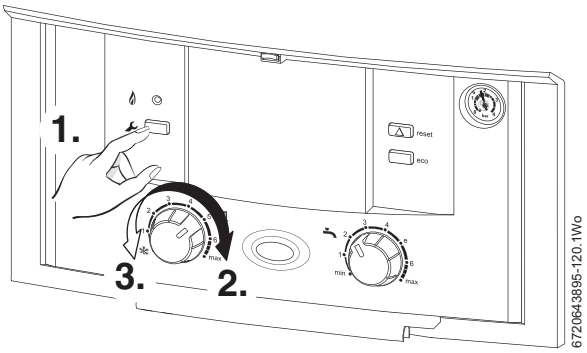


Fig. 69 Setting the boiler

- Refer to table 26 and check the CO/CO_2 at maximum and if required adjust for maximum using a 2.5mm Allen key.
- Check CO is less than 200ppm.

3. Set the central heating control to minimum.

- The boiler will go to minimum power.
- Measure the CO/CO_2 and check against table 26 below.
  If required set the minimum CO/CO_2 via adjuster (2) on the gas valve until the correct measurement is set:
  - Remove dust cap with flat bladed screw driver.
  - Using a 4mm Allen key adjust CO_2.
  - Replace the dust cap.
- Check that the CO is less than 200ppm.
- Return to maximum and re-check the CO/CO_2.
  If correct, press the service button;
  the button will cease to be illuminated and the blue power indicator will be permanently illuminated.
- Re-assemble and refit boiler case.

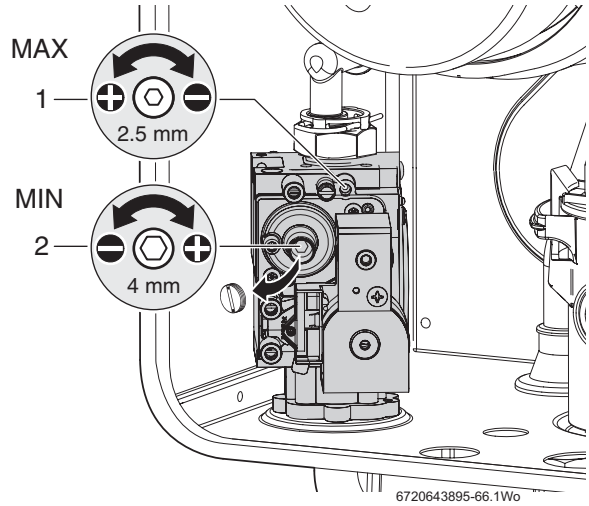


Fig. 70 Gas valve adjustment

CO/CO_2 settings for Codens 5000W **CO/CO_2 should be measured after 10 minutes.**		
Gas type	CO_2 max.	CO_2 min.
Natural gas	9.8% ± 0.5	9.2% ± 0.5
NOTE: When checking an existing boiler the tolerance is ± 0.5. If checking after cleaning or component replacement or for adjustment when the reading obtained is outside the tolerances given above, then the tolerance is ± 0.2.		
CO - less than 200 ppm (0.002 ratio)		

Tab. 26 CO/CO_2 settings

6.7 Cleaning the heat exchanger

NOTE: Combustion testing

- Combustion testing must be carried out by an authorised person. Testing must not be attempted unless the person carrying out the combustion check is equipped with a combustion analyser and competent in its use.

NOTE: CO/CO_2 checks

- If the joint between the air/gas manifold and heat exchanger is disturbed the sealing gasket must be replaced . After completing the service of the boiler, the CO/CO_2 must be checked and set to the limits shown in “setting the air/gas ratio” on page 43.

There is an accessory kit available designed for cleaning the heat exchanger, part number: 7 716 192 312.

- Isolate the power to the boiler and remove outer case and base panel.

1. Refer to figure 71 and remove the clip from gas valve outlet.

If the plastic elbow can not be easily removed, undo the nut to push the plastic elbow out of the fitting.

2. Pull the gas outlet elbow free from the gas valve.

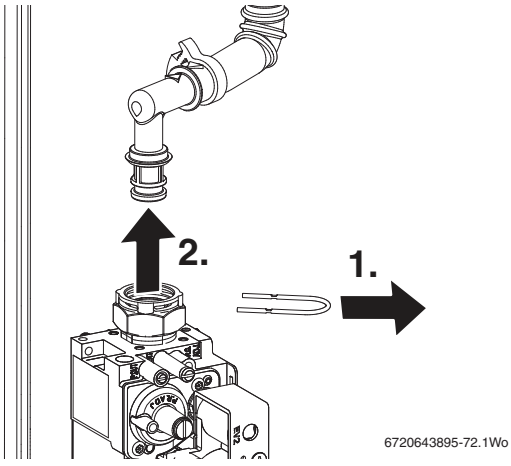


Fig. 71 Gas valve connection

- Remove electrical connector and earth wire from fan.

To prevent damage to the electrodes when removing the air/gas manifold, disconnect the leads to the electrodes.

- Disconnect spark electrode and flame sensor connections.

1. Refer to figure 72 and undo the securing nut on the top of the heat exchanger and remove the retaining plate assembly.

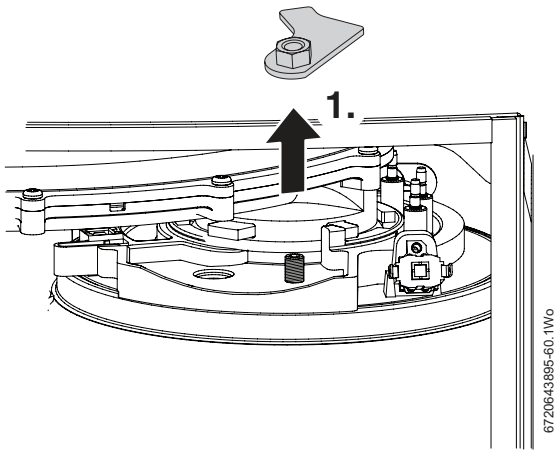


Fig. 72 Securing nut

1. Refer to figure 73 and rotate fan and air/gas manifold assembly around the top of the heat exchanger until it stops at the lug.

- Lift up assembly and remove from boiler.

2. Remove the cover panel by removing retaining screw.

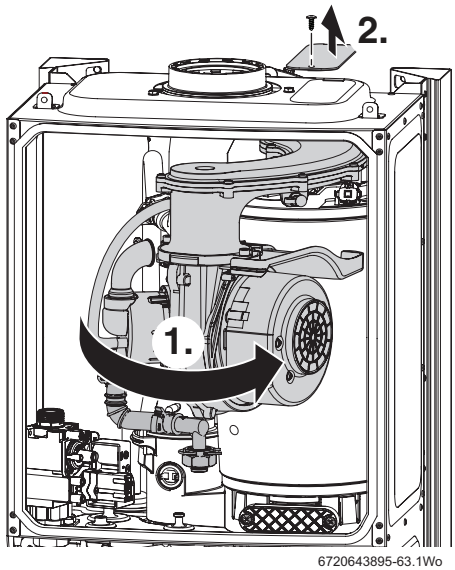


Fig. 73 Rotate air/gas manifold

Burner removal

Refer to figure 74.

1. Remove clamping plate.
2. Remove spark/flame electrode assembly and seal from the top of the heat exchanger.
3. Remove burner.

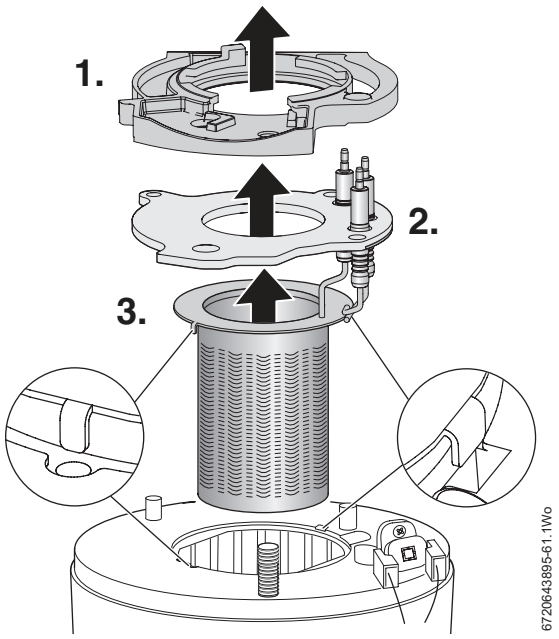


Fig. 74 Burner removal

Checking and cleaning the electrode assembly:

NOTE: Cleaning

- Do not use wire wool to clean the electrodes

- Inspect the condition of the electrodes and ceramics, replace if necessary.
- Use a plastic scouring pad to clean the electrodes.

Baffle removal

Refer to figure 75.

1. Remove top baffle.
2. Remove lower baffle.

If the lower baffle is stuck, it may be necessary to use the “baffle removal tool” from the heat exchanger cleaning kit part number: 7 716 192 312, as shown in figure 75.

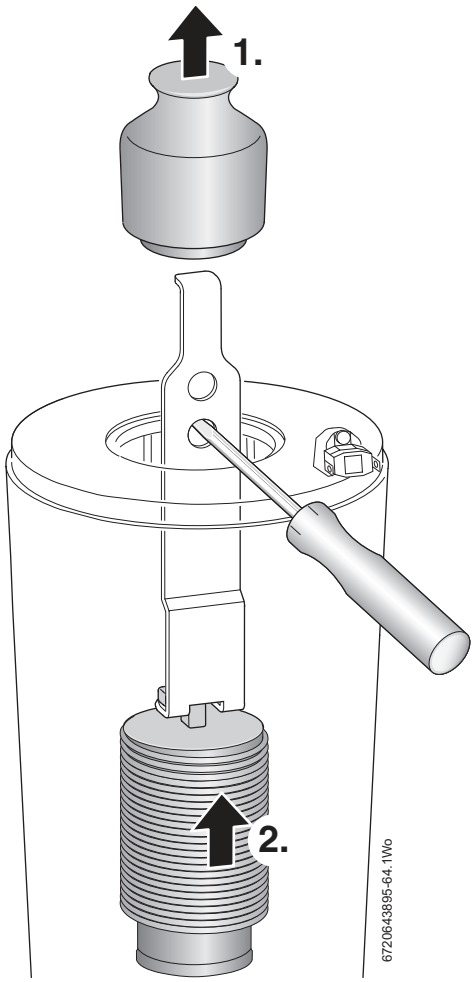


Fig. 75 Baffle removal

Access cover removal

Refer to figure 76.

1. Remove the two pozi-drive screws
2. Remove the access cover
3. Remove the gasket.

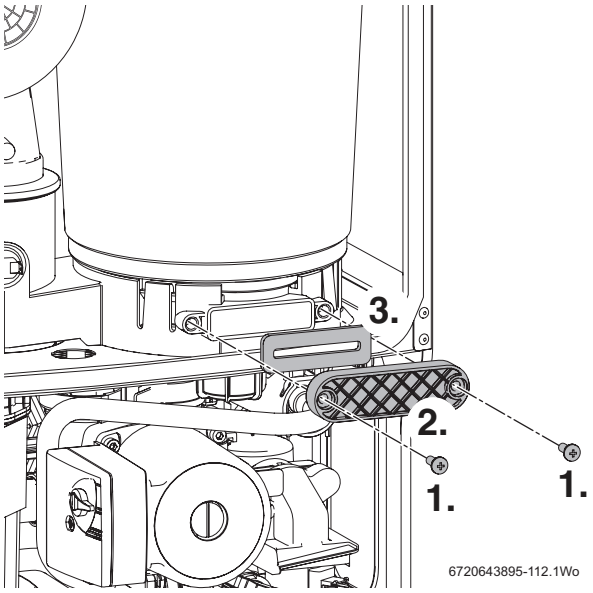


Fig. 76 Access cover removal

Cleaning the primary heat exchanger

Refer to figure 77.

- Access the heat exchanger flue ways by inserting the cleaning brush (7 716 192 312) through the top access hole in the casing, removal of panel shown in figure 73.
- Clean heat exchanger flue ways using the cleaning brush removing any debris from the access point in the sump.
- Clean around the sealing surface on the sump.
- Replace the access cover.
- Using a suitable container to collect water from syphon connection at the base of the boiler flush heat exchanger with water.
- Re-assemble ensuring that the lower baffle (2) and the top baffle (1) are refitted correctly.
- Refer to figure 74 when re-fitting the burner to ensure that it fits centrally within the heat exchanger and location tabs are situated in location holes.
- Ensure that the seal is replaced with a new seal and ensure that the seal is correctly fitted.
- Check the syphon unit is clean before refitting to boiler.
- Reassemble and check combustion as stated in “setting the air/gas ratio” section on page 43.

The heat exchanger does not have to be removed for cleaning.
The heat exchanger is shown removed from the boiler to illustrate cleaning more clearly.

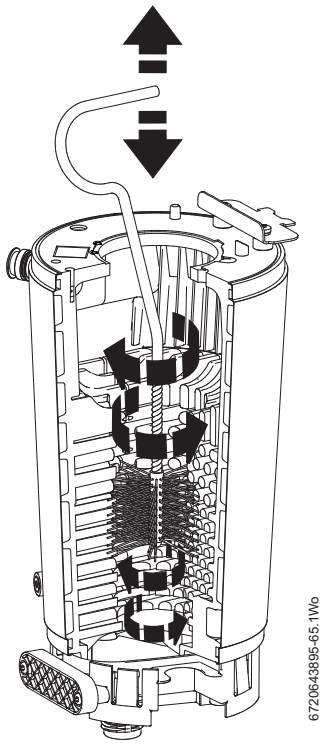


Fig. 77 Cleaning heat exchanger

NOTE: Heat exchanger baffles
The baffles (1) and (2) must be refitted into the heat exchanger in the order shown in figure 75. Failure to do so may result in damage to the boiler.

NOTE: CO/CO_2 checks

- If the joint between the air/gas manifold and heat exchanger is disturbed the sealing gasket must be replaced .
- After completing the service of the boiler, the CO/CO_2 must be checked and set to the limits shown in “setting the air/gas ratio” on page 43.
- When replacing the burner gasket ensure that the clamping plate is fully tightened down to the heat exchanger.

Cleaning the syphon

There is no need to remove the syphon to clean.

To drain debris from the syphon, release the clips and remove the drainage cap from the bottom of the syphon.

Catch the debris and condensate from the syphon into a suitable container.

6.8 Replacement of parts

CAUTION: Turn off the gas supply and isolate the mains supplies before starting any work and observe all relevant safety precautions.

NOTE: Replacing components

- After replacement of any components always check for gas tightness where relevant and carry out functional checks as described in commissioning. Damaged O-rings or gaskets must be replaced.

6.8.1 Removing outer case

1. Undo the two screws securing the top of the boiler casing.
2. Undo the two screws securing the bottom of the boiler casing.

- Pull case forward and remove.
  To remove bottom tray, pull forward on the tag on the underside of the tray.

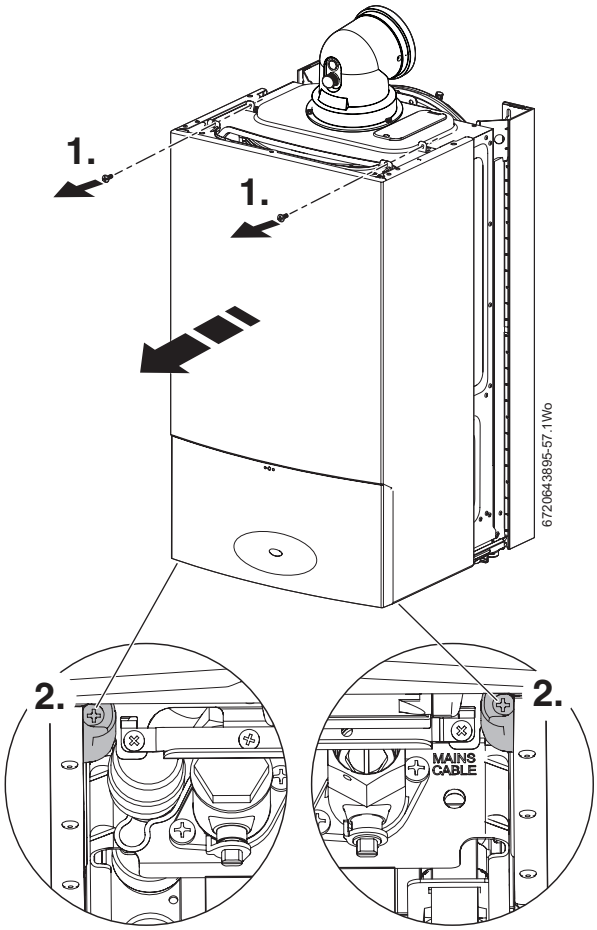


Fig. 78 Remove outer case

To gain access to the following components the outer case has to be removed:

- Primary sensor
- Overheat thermostat
- Flue limit thermostat

6.8.2 Primary sensor

Refer to figure 79 for removal.

1. Remove electrical connection by pulling upwards. Squeeze retaining clip on plastic moulding of sensor and pull back and up until clear of pocket in heat exchanger.
2. Pull forward to remove completely.

- Coat new sensor with heat conductive paste and replace.

6.8.3 Overheat thermostat

Refer to figure 79 for removal.

- Remove two electrical connectors from thermostat.

3. Slacken and remove fixing screw and thermostat (3).

- When replacing ensure thermostat sits correctly on surface of the casting with the left hand side of thermostat sitting up against the shoulder.

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

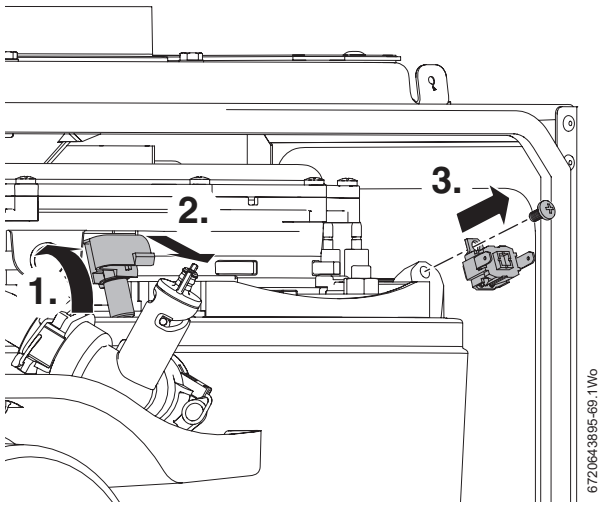


Fig. 79 Primary sensor and overheat thermostat

6.8.4 Flue overheat thermostat (with grommet)

To remove and replace the thermostat either:

- Using a small terminal screwdriver, prise the thermostat and grommet from the plastic housing. Take care not to damage the grommet or plastic housing.

-or-

1. Release the flue connection from the sump.
2. Push the flue tube up.

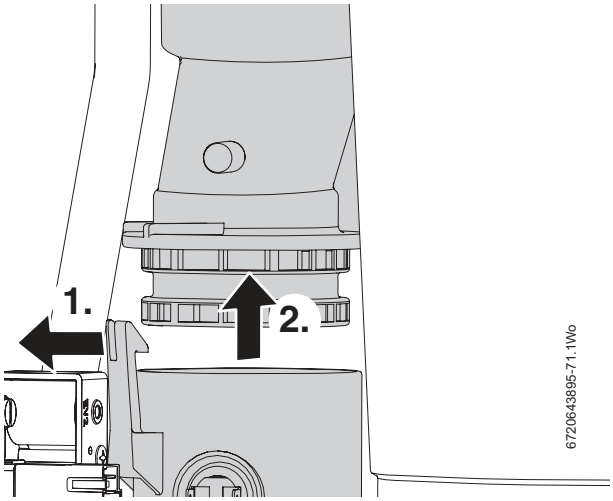


Fig. 80 Lower exhaust section

- Remove electrical connections.
- Push the flue limit thermostat in from the sump.
- Retrieve the thermostat from the sump well.

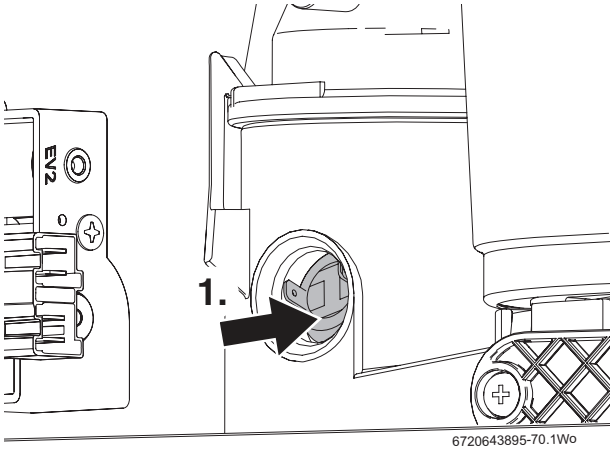


Fig. 81 Remove thermostat

To replace, push the thermostat and grommet gently back into the opening until contact with the locating ridge is felt.

6.8.5 Moving controls to service position

To remove the following components require the control box must be moved in to the service position:

- Gas valve
- Syphon
- PCB
- Fuse
- Transformer

NOTE: Replacement of the gas valve must not be carried out if a CO/CO_2 analyser is not available.

1. Remove the screw securing control panel.
2. Gently pull the panel forward.

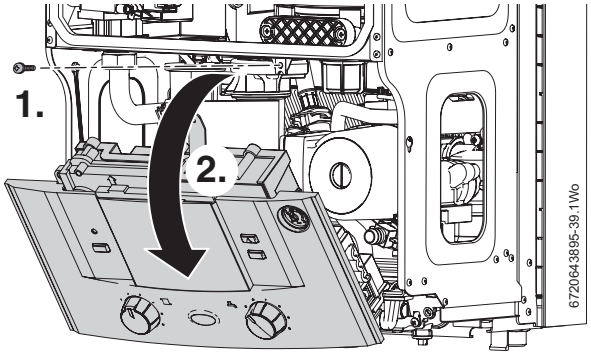


Fig. 82 Control panel to service position

6.8.6 Gas valve

Refer to figure 83

- Isolate gas supply at boiler isolating valve.

1. Remove wire clip from the gas valve outlet.
2. Move the gas pipe free from the gas valve.
   If the pipe will not come out, unscrew the nut to aid removal.

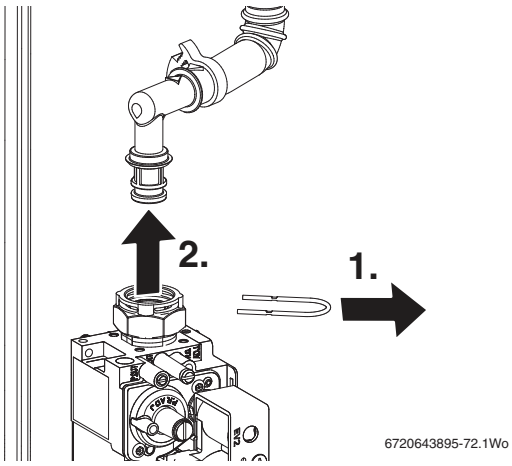


Fig. 83 Gas valve upper connection

Refer to figure 84

1. Undo bottom gas connection to gas valve.
2. Undo two securing screws on the underside of casing.

- Disconnect electrical connections.
- Move valve up and forward out of boiler.
- Replace valve with new seals and check for gas tightness.

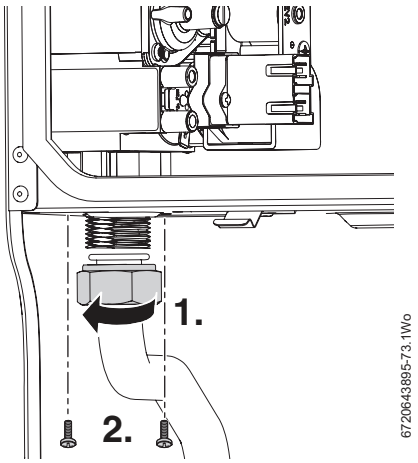


Fig. 84 Gas valve lower connection

NOTE: The valve will require setting; follow procedure “setting the air/gas ratio”.

6.8.7 Air/gas manifold and fan assembly

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

- Fan electrode assembly
- Burner
- Heat exchanger

NOTE: CO/CO_2 checks

- If the joint between the air/gas manifold and heat exchanger is disturbed the sealing gasket must be replaced .
  After completing the service of the boiler, the CO/CO_2 must be checked and set to the limits shown in “setting the air/gas ratio” on page 43.

- Remove electrical connector and earth wire the from fan.
- Remove wire clip from gas valve outlet then move gas pipe free from the gas valve (see figure 83).

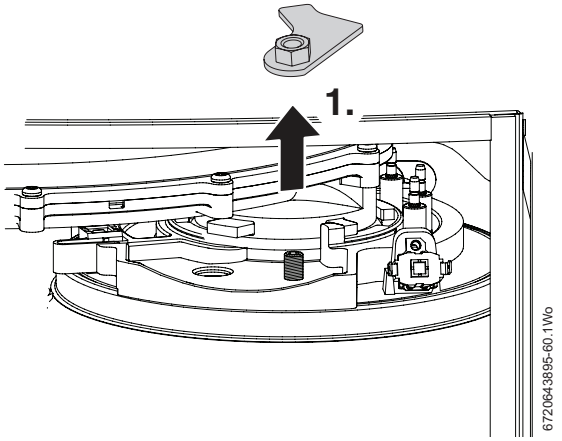


Fig. 85 Retaining plate

- Undo the securing nut at the top of the heat exchanger and remove the retaining plate assembly (1).

Disconnect spark electrodes and flame sensor connection.
This will prevent damage to the electrodes and sensor when the air/gas manifold is rotated.

- Rotate fan and air/gas manifold assembly (1.) around the top of the heat exchanger until the lug on the air/gas manifold is visible.

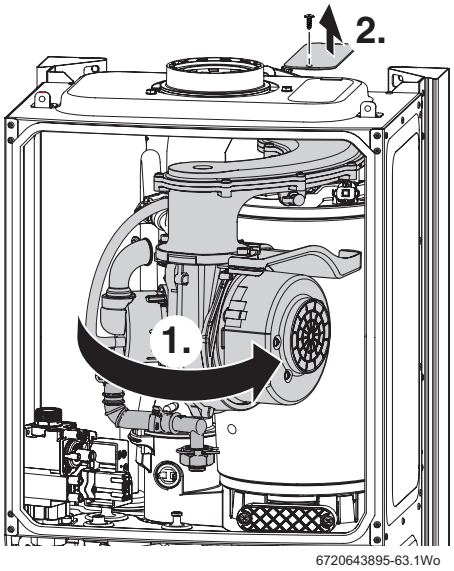


Fig. 86 Rotate the air/gas manifold assembly

- Lift up assembly and remove from boiler.

NOTE: After re-assembly, check the CO/CO_2 levels as described in section 6.6 Setting the air/gas ratio.

6.8.8 Fan

- Remove the air/gas manifold from the boiler as described in the previous section.

1. Remove two screws retaining the fan to the air/gas manifold.
2. Remove the air/gas manifold.
3. Remove the screw holding the retaining plate.
4. Remove the retaining plate.
5. Remove three screws and the mixing chamber.

Re-assemble with new fan ensuring seals are correctly fitted.

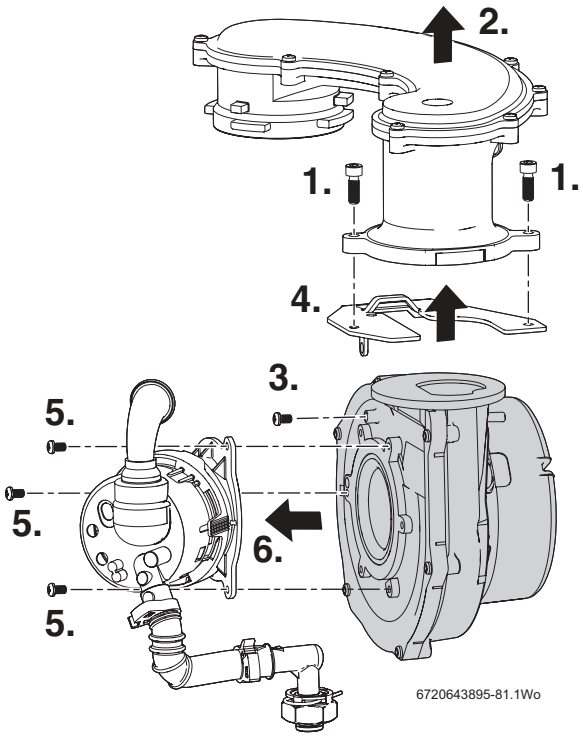


Fig. 87 Dismantling the air/gas manifold assembly

Flap valve assembly

There is no need to remove the mounting flange from the fan assembly just to gain access to the flap.

- Twist the mixing chamber clockwise to release from the mounting flange.
- Pull the mixing chamber off the mounting flange.

1. Pull the rubber flap off the flap valve assembly.

- To replace the flap valve:
  - Press the two lugs on the back of the flap into the two slots in the flap valve assembly.
- Push the mixing chamber back onto the mounting flange and twist anti-clockwise to secure.

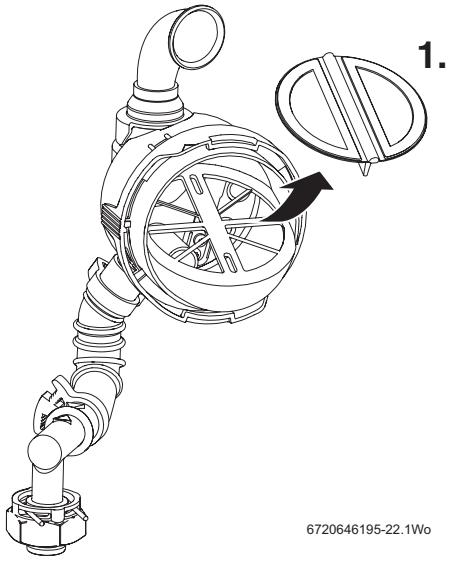


Fig. 88 Flap valve assembly

6.8.9 Electrode assembly and burner

Refer to figure 89.

- Disconnect spark electrodes and flame sensor connection.
- Remove clamping plate.

1. Remove spark/flame electrode assembly from heat exchanger.
2. Remove the seal from the top of the heat exchanger.
3. Remove the burner.

- Replace new burner in correct position.
- Ensure that burner tabs, as shown in figure 89, fit correctly their respective locations.

NOTE: CO/CO_2 checks

- If the joint between the air/gas manifold and heat exchanger is disturbed the sealing gasket must be replaced .
- After completing the service of the boiler, the CO/CO_2 must be checked and set to the limits shown in “setting the air/gas ratio” on page 43.

- Ensure that the new seal is fitted.

CAUTION: Clamping plate

- Ensure that the clamping plate is firmly tightened down on top of the heat exchanger.

- Replace the clamping plate.

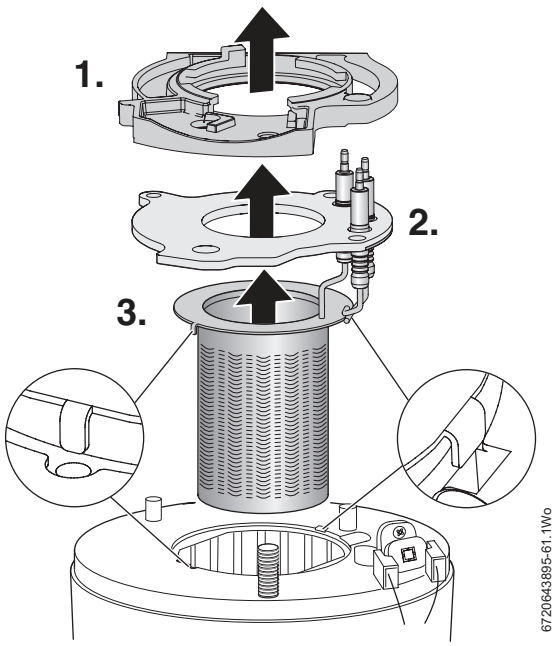


Fig. 89 Electrode assembly and burner

6.8.10 Heat exchanger

- Isolate flow and return valves then drain the boiler.
- Remove syphon.

Refer to figure 90.

1. Remove the clip from plastic elbow on the flow pipe.
2. Move flow pipe away from heat exchanger.

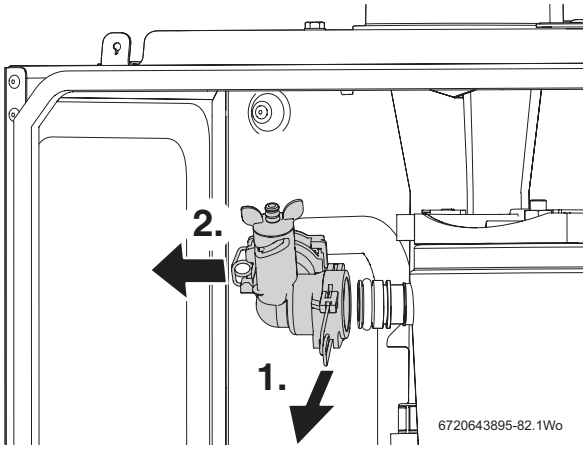


Fig. 90 Flow pipe removal

Refer to figure 91

1. Remove the three screws securing the turret to the top of the boiler.
2. Turn the upper exhaust connector clockwise to release from the hook.
3. Move the upper exhaust connector down.

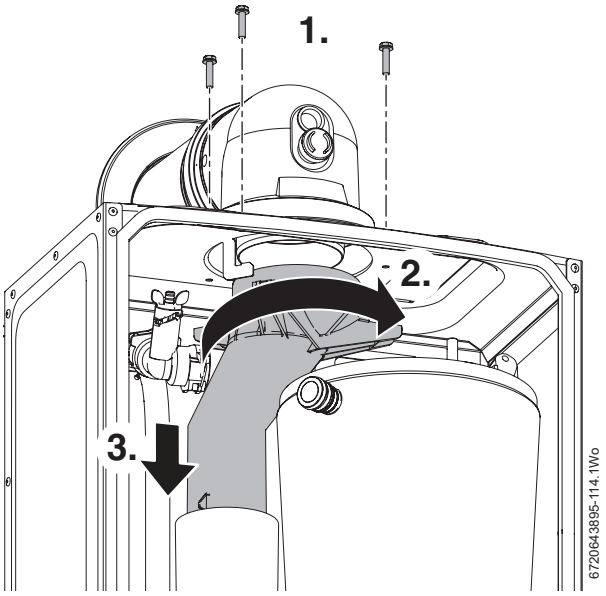


Fig. 91 Upper exhaust assembly

Refer to figure 92.

1. Release the clip.
2. Move the lower exhaust connector up

▸ Remove the complete exhaust assembly.

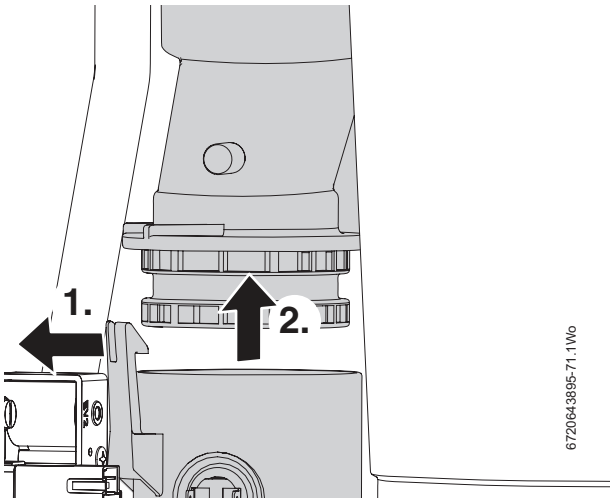


Fig. 92 Release lower exhaust connection

Refer to figure 93.

1. Unscrew the plastic nut.
2. Remove the nut from the bottom of the boiler.
3. Rotate lever to release the return pipe.

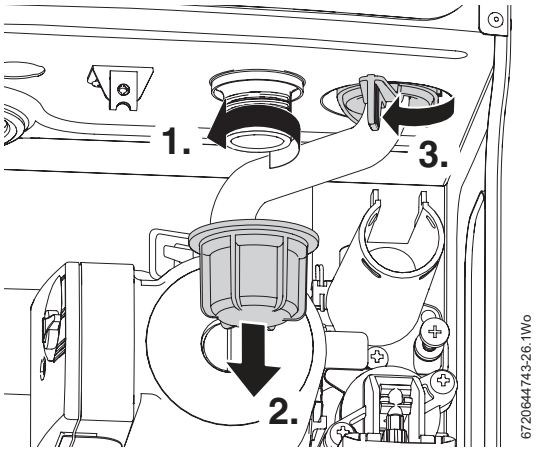


Fig. 93 Release the sump

Refer to figure 94.

1. Lift the heat exchanger up to clear.
2. Move the heat exchanger forward from the case.

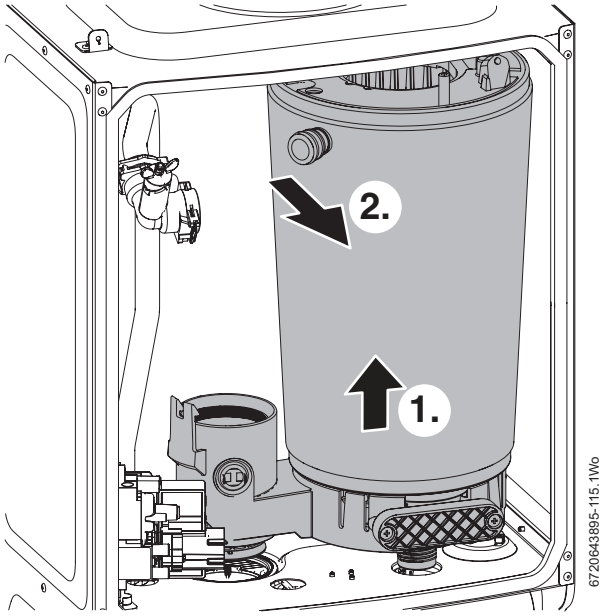


Fig. 94 Heat exchanger removal

▸ Reassemble and check combustion as stated in the gas conversion section. 6.6.

NOTE: CO/CO_2 checks

- ▸ If the joint between the air/gas manifold and heat exchanger is disturbed the sealing gasket must be replaced .
- ▸ After completing the service of the boiler, the CO/CO_2 must be checked and set to the limits shown in “setting the air/gas ratio” on page 43.

6.8.11 Access to boiler control components

1. Remove three screws.
2. Remove cover from control.

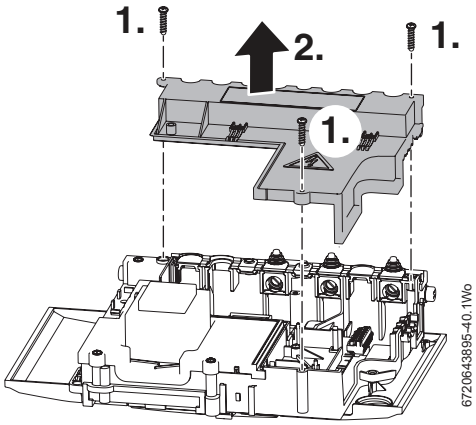


Fig. 95 Removing the connection cover

6.8.12 PCB Fuse

- Remove fuse holder with fuse F1 (1) from the PCB and replace a new fuse.

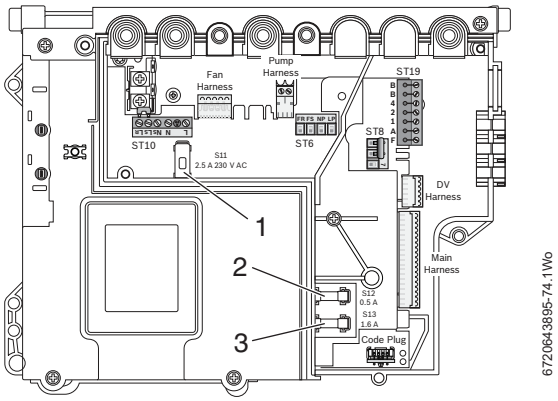


Fig. 96 Fuse locations

- Spare fuses are clipped into the underside of the electrical cover.

1. T1.6L 250V
2. T2.5H 250V
3. T500L 250V

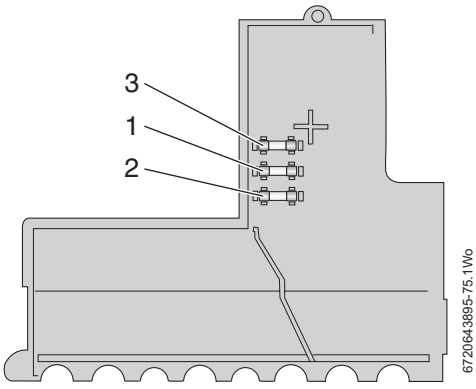


Fig. 97 Spare fuses

6.8.13 Transformer/PCB

Refer to figure 98.

- Disconnect all electrical connections from the control.

1. Remove five screws retaining the rear panel of the control.
2. Remove the rear panel.
3. Remove the transformer cover.

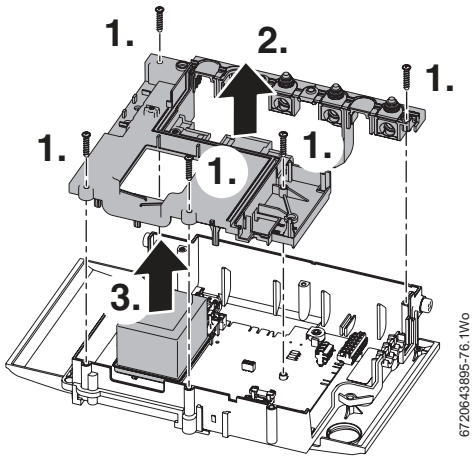


Fig. 98 Transformer/PCB access

Refitting the control board cover:

- Ensure that all wires are fully within the control board.
- Align the front right hand corner of the cover with the front right hand corner of the control board.
- Align the rear right hand .
- Holding the cover level, slide the cover onto the control board, ensuring that the incoming cables, at the top, are held clear.

6.8.14 Replacing controls

NOTE:
- Do not replace the control unit if a CO/CO_2 analyser is **NOT** available.

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

Refer to figure 99.

1. Remove all electrical connections from the control PCB including where cables run through restraints. These can be unclipped from the plastic moulding noting their position.
2. Carefully remove the system pressure gauge from the fascia by parting the plastic retaining lugs securing the gauge in place. Take care not to damage or kink the capillary tube.
3. Remove the code plug . The code plug should be left attached to the frame of the boiler by its plastic safety thread.

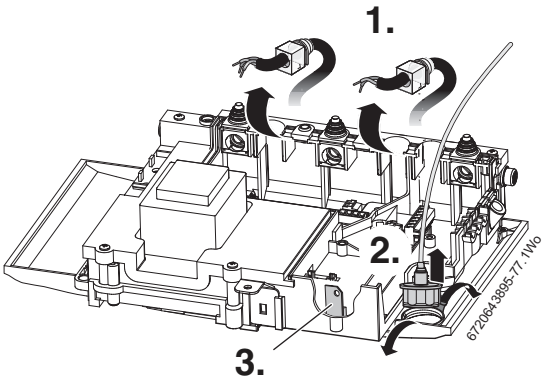


Fig. 99 Replacing the controls

Refer to figure 100.

1. Remove the three screws retaining the front fascia making sure to support the fascia when removing the last screw.
2. Remove the front fascia.

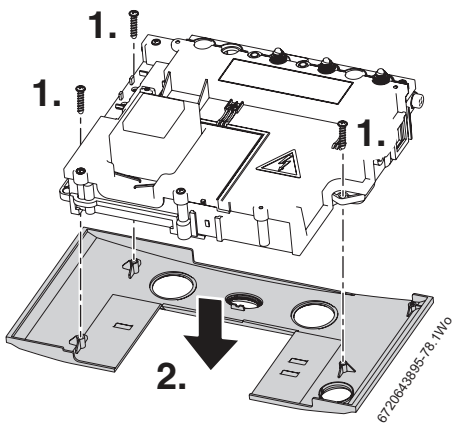


Fig. 100 Fascia removal

Refer to figure 101.

1. Using a suitable tool, press the button upwards.
2. Slide the control support bracket to the left.

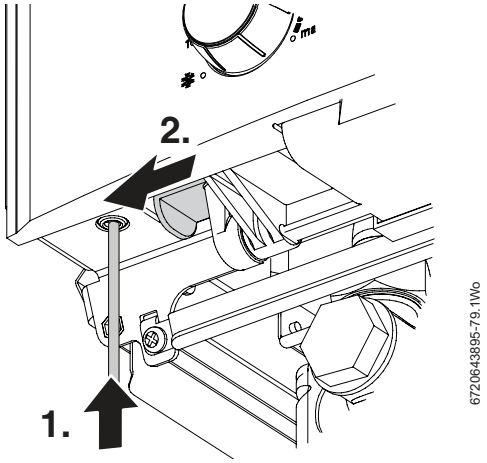


Fig. 101 Release control panel

Refer to figure 102.

- Support the control and unclip control support cable (1) from the boiler frame.
- Remove the support cable and fit to the new control.
- Remove appropriate cable restraints from the new control box.

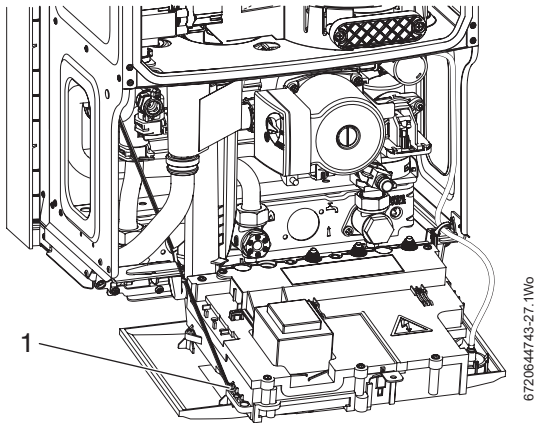


Fig. 102 Release support cable

- Fit control to the boiler.
- Re-connect support cable (1) to the boiler and all electrical connections and system to the new control.
- Ensure that the code plug is re-fitted to the new control. If this is not done, the boiler will indicate an error and will not function.
- Replace the fascia to the new control and secure the system pressure gauge back in the fascia .

NOTE:
- After re-assembly, check the CO/CO_2 levels as described in section 6.6 “air/gas ratio setting”.

6.8.15 Syphon removal

To release the syphon from the sump:

1. Disconnect the discharge hose at the plumbing manifold.
2. Using a screwdriver, disengage the retaining clip on top of the syphon.
3. Pull the syphon towards you and remove the complete assembly.

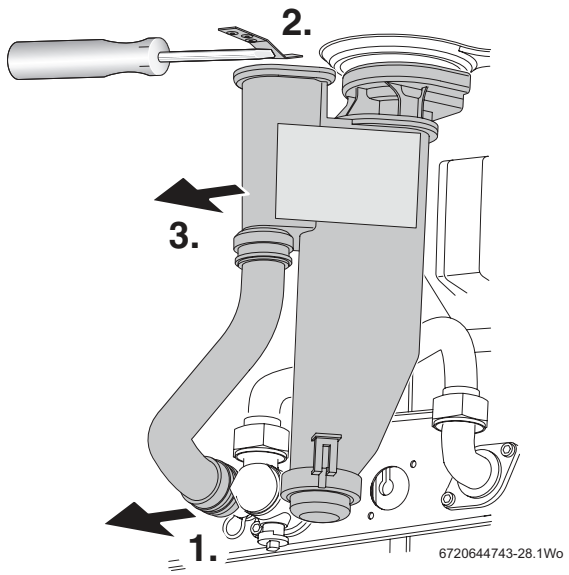


Fig. 103 Syphon removal

6.8.16 Diverter valve motor (If fitted)

- Connect electrical power to the boiler.
- Enter the service mode to ensure that the diverter valve is in the mid position (there is no need to drain the boiler).
- Electrically isolate the boiler.
- Remove diverter valve cover, if fitted.
- Disconnect the electrical connector from the diverter valve motor.

1. Pull the motor assembly towards you.
   The assembly will slide free from the valve.

- To fit the new diverter valve motor, slide the body into the housing.
- Ensure that “H” section of the motor actuator is fitted correctly into valve body.
- Re-connect the electrical connection.
- Re-fit the protective cover (if available).

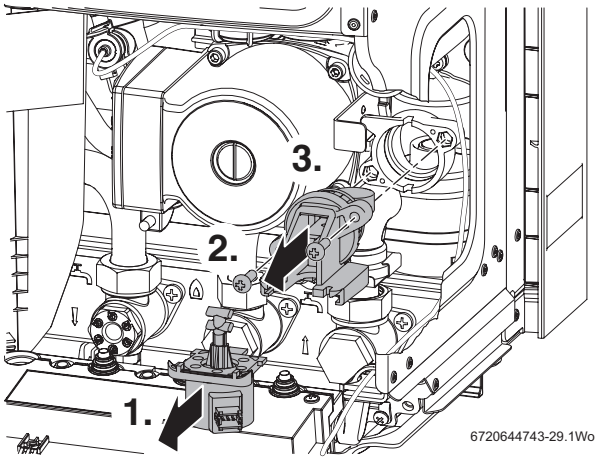


Fig. 104 Diverter valve and motor

6.8.17 Diverter valve (If fitted)

- Ensure the boiler has been fully drained.
- Disconnect the electrical connector from the diverter valve motor.
- Remove the diverter valve cover, if fitted.

2. Undo the two screws holding the valve to the plastic housing.
3. Withdraw the valve and clean the valve chamber if necessary.

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

6.8.18 Auto air vent

Removal of the syphon assembly will give access to the auto air vent. Refer to page 55.

- Ensure the boiler has been fully drained.
- Use a screwdriver or similar to rotate the air vent anticlockwise, as shown below.

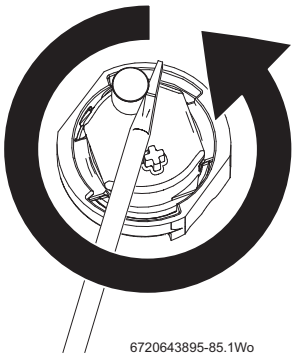


Fig. 105 Auto air vent

1. Lift the air vent (1) out of the housing and remove.

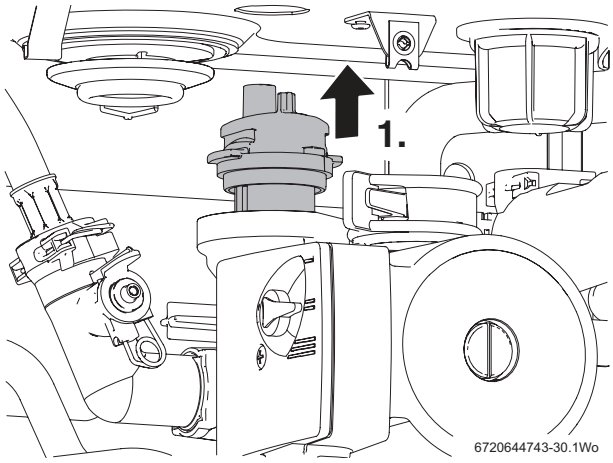


Fig. 106 Auto air vent removal

NOTE:
- The “O” ring must be fitted to the Auto air vent and not the hydraulic block otherwise the auto air vent will be difficult to fit.
- Apply silicone lubricant to the “O” ring to ease assembly.

- To refit, follow the above in reverse order.

6.8.19 Pump head

- Ensure the boiler is fully drained).
- Disconnect the electrical connection from the bottom of the pump.

NOTE: Water damage
- Protect the control unit from water ingress when removing the pump head.

1. Remove the four Allen bolts securing the pump at each corner.
2. Gently pull the pump towards you and remove.

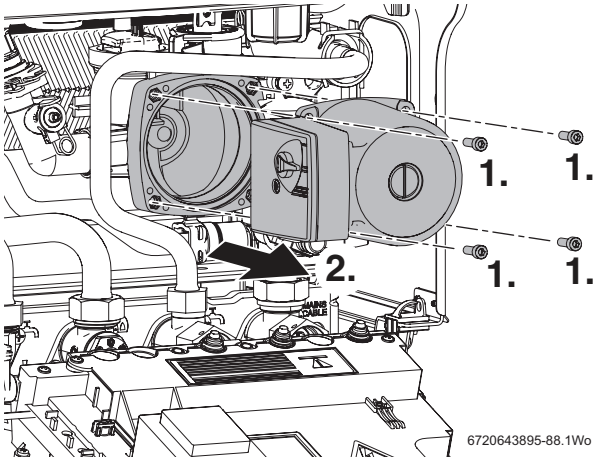


Fig. 107 Pump head removal

- To refit, follow the above in reverse.

6.8.20 Drain tap

- Ensure the boiler has been fully drained.

1. Rotate the drain tap fully anticlockwise.
2. Withdraw the drain tap from its housing

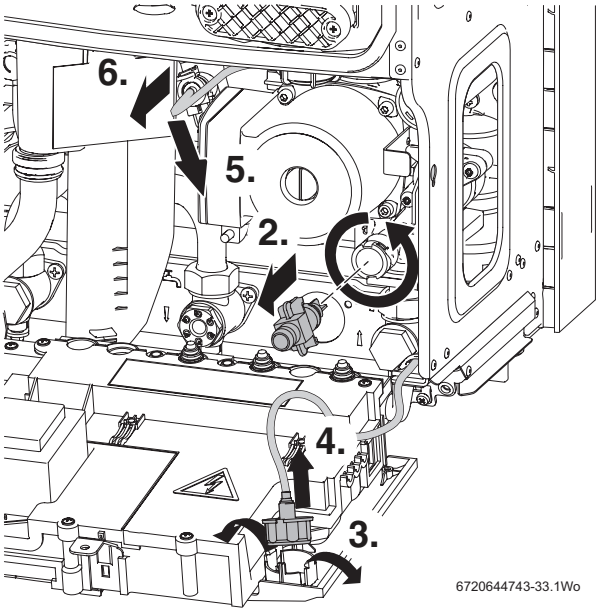


Fig. 108 Drain tap

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

6.8.21 Pressure gauge

- Refer to figure 108
- Ensure the boiler has been fully drained.

3. Prise the lugs apart (3) securing the pressure gauge to the fascia.
4. Remove the gauge (4) taking care not to damage or kink the capillary.
5. Withdraw the spring clip from the pressure sensing head housing.
6. Remove the pressure sensing head and pressure gauge capillary from the housing.

NOTE: Heat damage
- Route the plastic capillary tube away from the pump to ensure that the pipe is not melted against the hot pump body.

- To refit, follow the above in reverse. Do not forget to fit the washer from the capillary when fitting a replacement gauge.

6.8.22 Hydraulic block removal

Remove the syphon assembly.
Refer to syphon assembly removal page 55

- Ensure the boiler has been fully drained.
- Disconnect the electrical connections to the NTC sensor and pump.
- Undo the nuts securing the copper water pipes to the manifold (there is no need to remove the gas pipe).

1. Release the spring clips securing these water pipes to the plastic housing and remove the pipes.

- Release the spring clip securing the expansion vessel pipe to the plastic housing and remove the pipe.
- Release the spring clip securing the pressure gauge sensing head to the plastic housing and remove the sensing head.
- Release the locking devices that secure the two copper water pipes leading to the combustion chamber by squeezing the two tabs together and rotating anticlockwise (viewed from above).

This is not essential but makes the removal of the block easier.

- Remove the rubber pipe connecting the sump and remove the syphon.

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

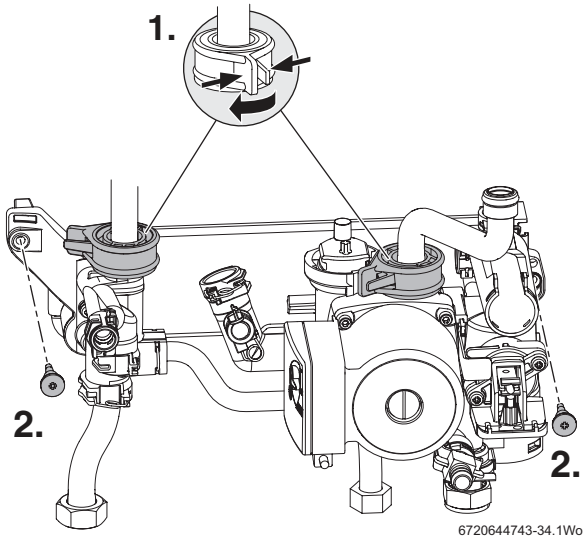


Fig. 109 Hydraulic block removal part 1

3. Lift the left hand side of the block slightly.
4. Manoeuvre the block out, starting at the right hand side.

- Take care not to snag the harness.

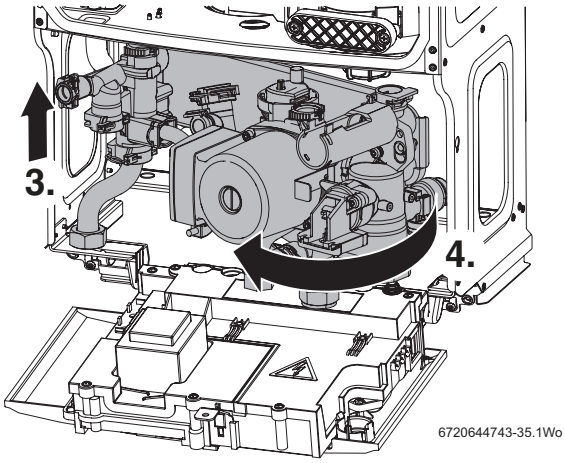


Fig. 110 Hydraulic block removal part 2

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

6.8.23 CH Pressure relief valve

- Remove the hydraulic block from the boiler (see removing the hydraulic block).

1. Release the spring clip from the pressure relief valve housing.
2. Withdraw the pressure release valve from its housing.

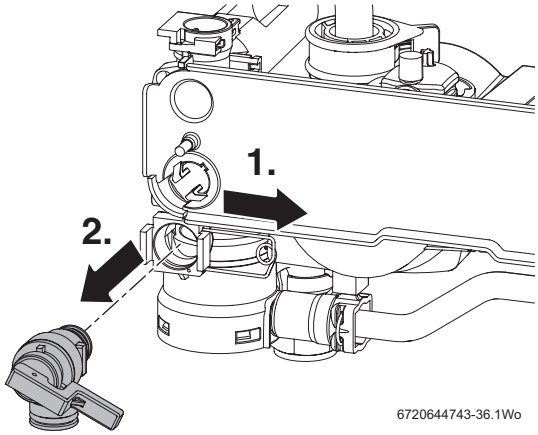


Fig. 111 PRV removal

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

6.8.24 Bypass valve

1. Remove the two spring clips at either end of the copper bypass pipe.

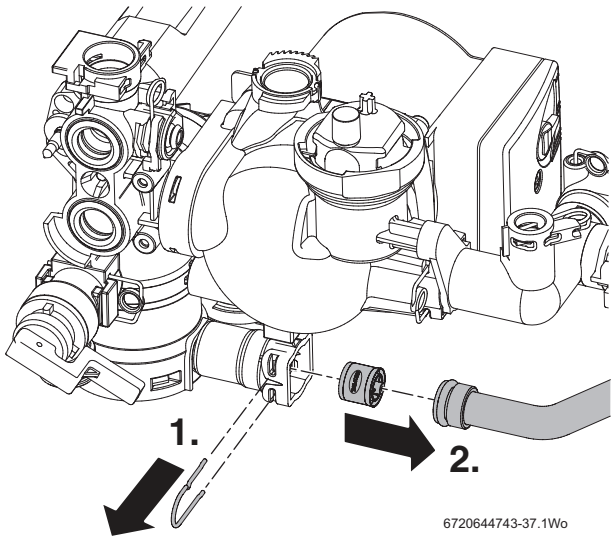


Fig. 112 Removing the bypass valve

- Undo the screw securing the left hand plastic housing to the heat exchanger.
- Move the housing to the left to free up the one end of the pipe.
- Remove the pipe from the right hand housing to reveal the bypass valve.

2. Using a pair of pliers, pull out the bypass valve from the housing

- To refit, follow the above in reverse. Ensure any seals renewed.

6.8.25 Expansion vessel

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

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

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

Expansion vessel replacement (boiler in place)

- Isolate mains power from the boiler.
- Lower the control panel to the service position.
- Isolate the boiler from the heating system (and cylinder return if internal diverter valve is fitted) using service valves.
- Drain the boiler.
- At the pump manifold, release the clip and disconnect the expansion vessel hose.

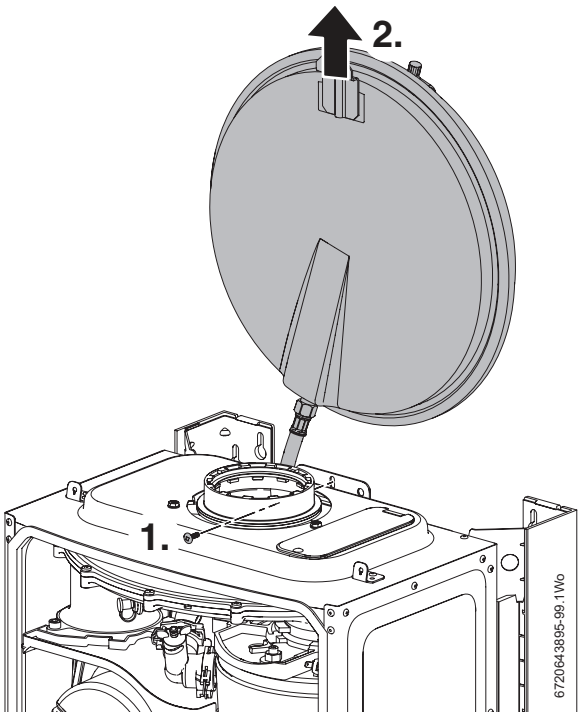


Fig. 113 Removing the expansion vessel

1. Remove screw (1) retaining the vessel to the top of the boiler casing.
2. Move the vessel up (2) and out over the flue system or to one side if fitted with a vertical flue.

- Remove the flexible hose from the expansion vessel and fit to the replacement vessel using a new seal.
- Reassemble expansion vessel into wall frame and reconnect the flexible pipe to pump manifold and secure with the clip.

Expansion vessel replacement (removing the boiler)

- Isolate electrical supply.
- Isolate system and gas connections at the service valves.
- Drain the boiler.
- Disconnect electrical supply and any external controls.
- Disconnect flue connection from the boiler.
- Undo connection to boiler at the service valves.

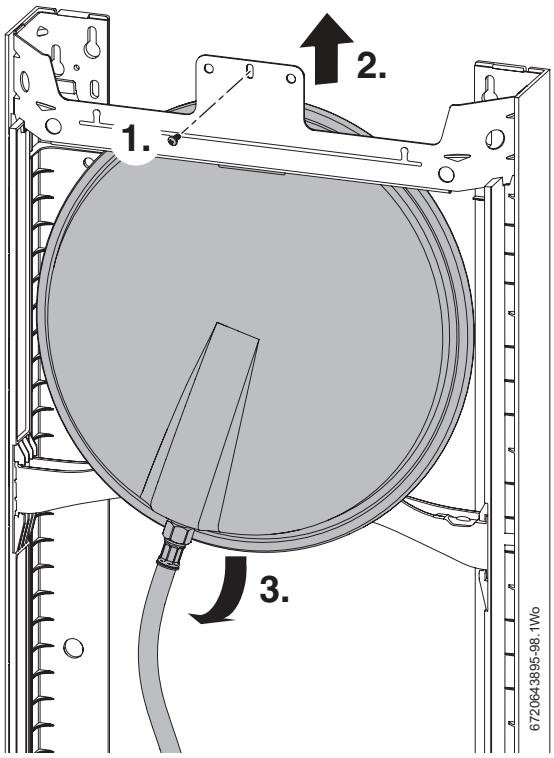


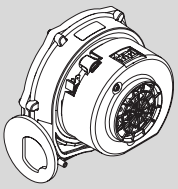
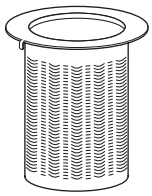
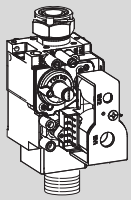
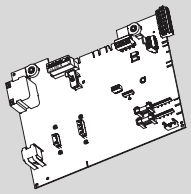
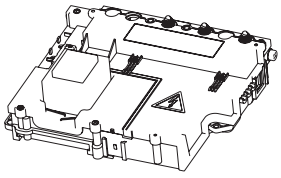
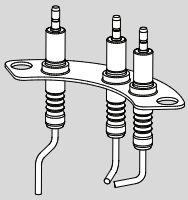
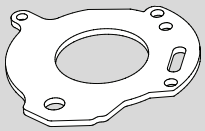
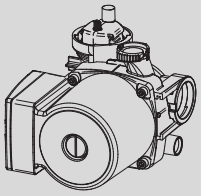
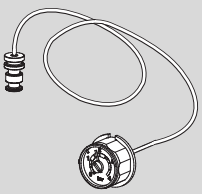
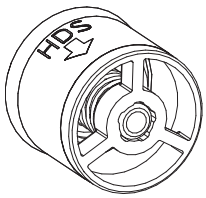
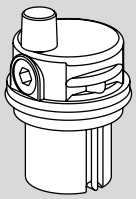
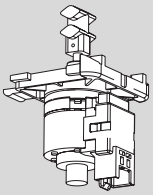
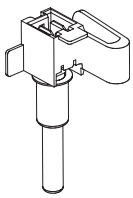
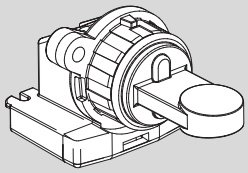
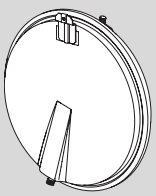
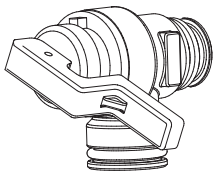
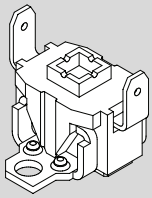
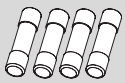
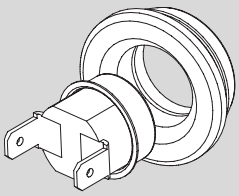
Fig. 114 Removing expansion vessel from wall frame

- Release the clip from expansion vessel connection to the pump manifold.
- Carefully lift the boiler off the mounting frame.

1. Remove the expansion vessel retaining screw.
2. Lift the expansion off the cross beam.
3. Move the expansion vessel towards you to remove.

- Replace expansion vessel in the reverse order and refit the boiler to the mounting frame.
- Follow the commissioning procedure in this manual.

6.9 Short parts list

 Fan 8 717 204 453 0	 Burner 8 718 120 619 0	 Gas valve 8 716 111 325 0
 Control board HT3 Bus enabled 8 748 300 650 0	 Control box assembly 8 717 207 937	 Electrodes (including gasket) 8 718 107 087 0
 Gasket - burner 8 716 110 534 0	 Seal - Inner case/mantel 8 716 106 635 0	 Pump assembly 3 speed 8 716 106 355 0
 Pressure gauge 8 718 224 344 0	 By-pass valve 8 716 106 434 0	 Automatic air vent 8 716 106 445 0
 Diverter valve motor 8 716 106 847 0	 Control sensor - primary 8 716 106 688 0	 Diverter valve assembly 8 716 106 845 0
 Expansion vessel 8 716 105 545 0	 Pressure relief valve 8 716 106 431 0	 High limit stat 8 707 206 196 0
 Fusing element set 8 744 503 010 0 Containing fuses: 3.15 Amp 2.5 Amp 1.6 Amp 0.5 Amp	 Seals kit 8 716 107 224 0	 Flue overheat thermostat (grommet type) 8 716 206 213 0

Tab. 27

7 Fault finding and diagnosis

7.1 Fault finding

This fault finding information is for guidance only. Robert Bosch cannot be held responsible for costs incurred by incorrectly diagnosed faults.

The electronic control system for this boiler incorporates a blue central indicator. This normally confirms the permanent mains supply but, by flashing at different rates during a fault, provides a guide to the cause as listed.

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

Preliminary electrical system checks are the first electrical checks to be carried out during a fault-finding procedure. On completion of the Service/Fault-Finding task which has required the breaking and remaking of electrical connections, check:

(a) Earth continuity,
(b) Short circuit check,
(c) Polarity and
(d) Resistance to earth.

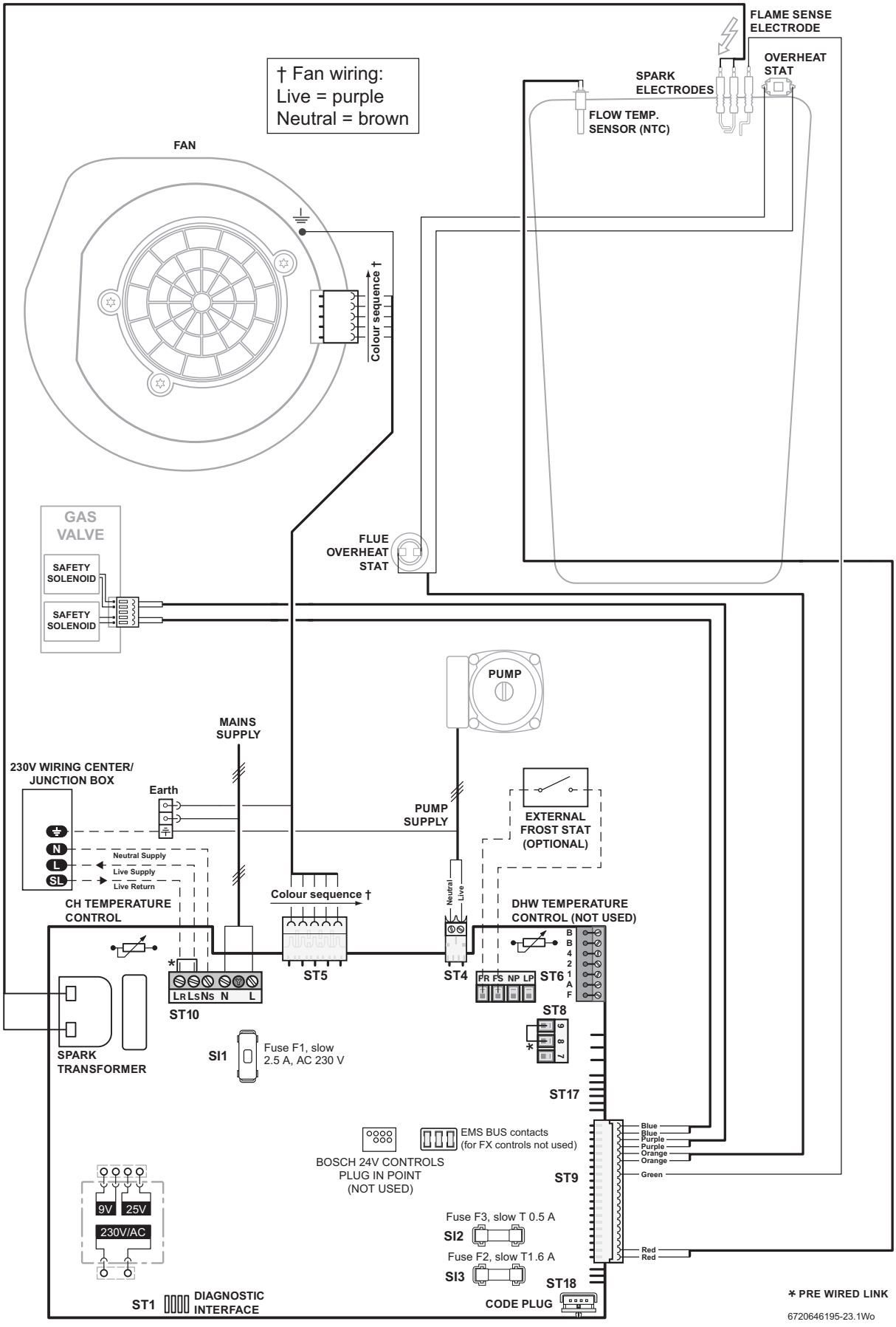
Blue light indication	Lockout reset button	Fault	Possible solution/check
Off	Off	No power at control board	Permanent mains supply to boiler. Fuse F1 - 2.5A or Fuse F3 - 0.5A. Transformer (primary coil below 60 Ω, both secondary coil below 10 Ω). Otherwise replace control board.
On	Off	Boiler not operating during central heating demand	Live demand at ST10-L_R (from external room thermostat/timer) Fascia mounted timer (if fitted) CH knob in winter position Control board
		Boiler operating without live demand at ST10-L_R (from external room thermostat timer)	Some older thermostats (containing capacitors) may give a low voltage return at ST10-L_R when the thermostat contacts are open. Check that there is no permanent live at ST10-L_R from another source.
		Boiler not operating during any demand.	Fan Control board

Tab. 28

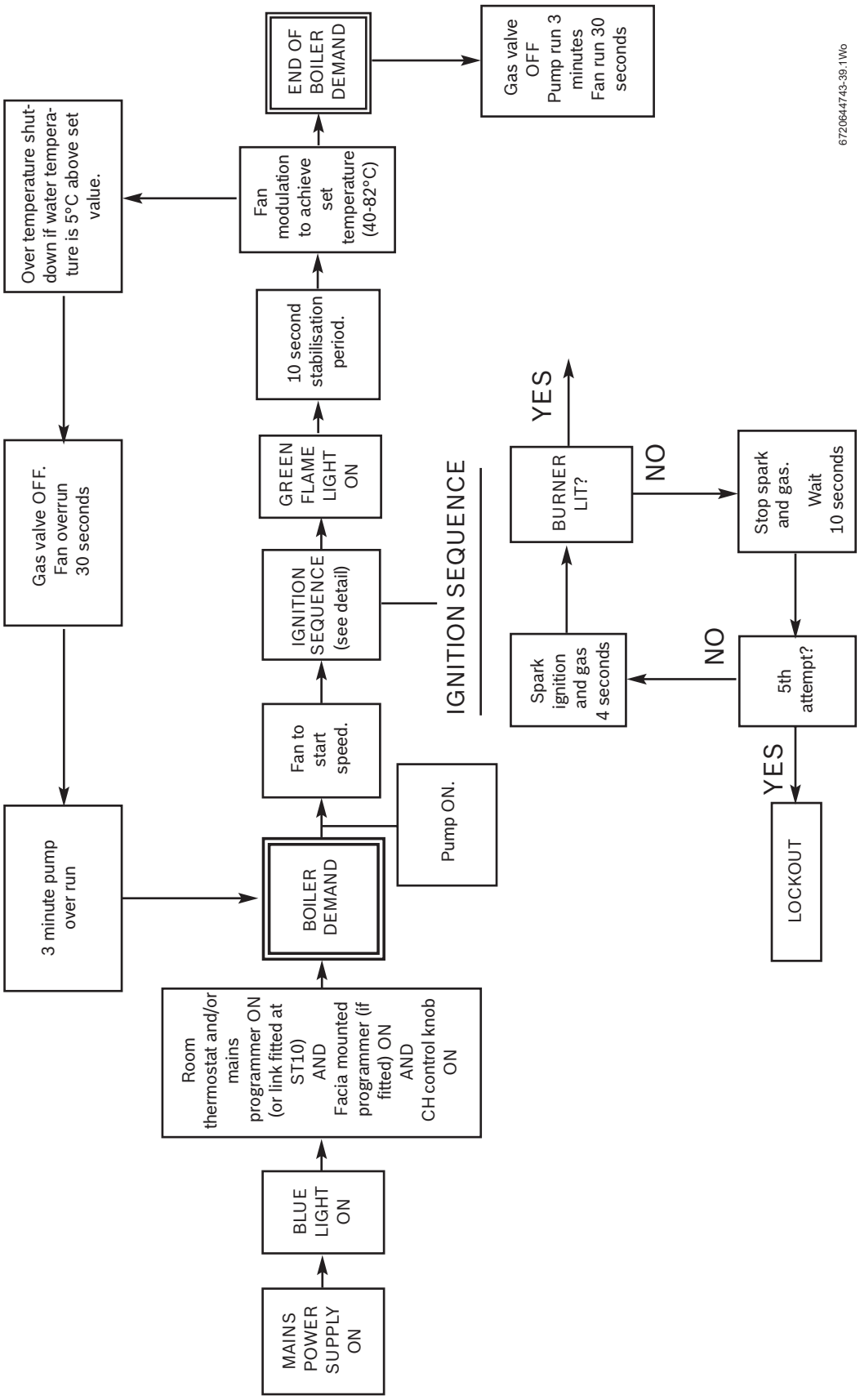
Blue light indication	Lockout reset button	Fault	Possible solution/check
Slow flash (mostly off, flashes on)	Flashing (reset required)	Ignition lockout	▶ Gas present and at correct pressure? ▶ Gas valve – Check that there is 35V d.c. to each solenoid – Check the resistance of each solenoid: Top solenoid = 380 Ω ± 10% (342 - 418 Ω) Bottom solenoid = 190 Ω ± 10% (171 - 209 Ω) ▶ Combustion CO_2 level. ▶ Flue condition. – Blocked flue? ▶ Blocked condensate pipe or frozen condensate. ▶ Gas valve adjustment. ▶ Ignition electrodes/harness/connections. – Check for condition and continuity ▶ Otherwise replace control board
Slow flash (mostly on, flashes off)	Flashing (reset required)	Flue overheat	▶ Heat exchanger baffles removed and not refitted.
Fast flash	Off	Volatile lockout - Fan does not run	▶ Temperature sensors – Check condition and continuity of leads/sensors ▶ Fan – 230V a.c. across the live (purple) and neutral (brown) ▶ Fan lead – Check continuity ▶ Code plug – Is code plug missing or not inserted properly.
2 pulses	No light	Not a fault code	Service mode selected to minimum, press service button to return to normal
5 pulses	No light	Not a fault code	Service mode selected to maximum, press service button to return to normal

Tab. 28

7.1.1 Circuit diagram

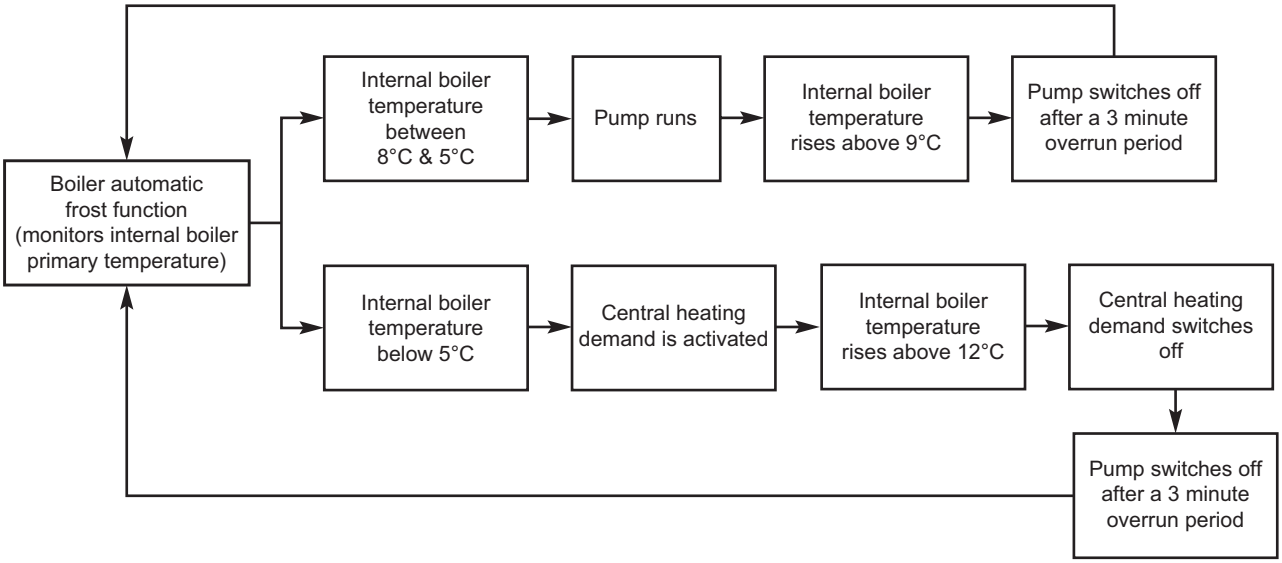


7.2 Boiler function

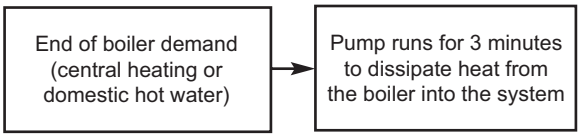


7.3 Protection function

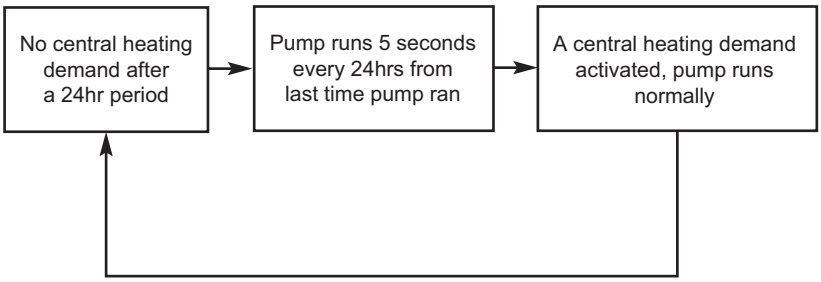
AUTOMATIC INTERNAL FROST FUNCTION



PUMP OVERRUN FUNCTION



PUMP ANTISEIZE FUNCTION



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Notes

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