6.7 CO and combustion checks

The following combustion and flue integrity checks are mandatory from April 2014 and these values must be recorded on the Benchmark check list, at the back of this manual.

Once the gas rate and pressure have been confirmed as acceptable then the CO and combustion checks can be undertaken.

The flow chart is given for guidance, the details of the checks are given in the following sections:

- Checking flue integrity, refer to section 7.2, page 42
- Flue gas analysis, refer to section 7.6, page 44

NOTICE: BEFORE CO AND COMBUSTION CHECKS:

- Refer to section 6.5.1 and 6.5.2 to verify gas type, gas inlet pressure, and gas rate.
  Visually check the integrity of the whole flue system and confirm that all the components are correctly assembled, fixed and supported.
- The flue gas analyser must be the correct type as specified in BS 7967.
  Before use the analyser must have been calibrated as specified by the manufacturer.
  The installer must be competent in the use of the analyser.
  Check and zero the analyser in fresh air as specified by the manufacturer.
- The gas valve is factory set and must not be adjusted during commissioning if found to be out of tolerance, please contact the Worcester, Bosch Group help line 0330 123 3366.

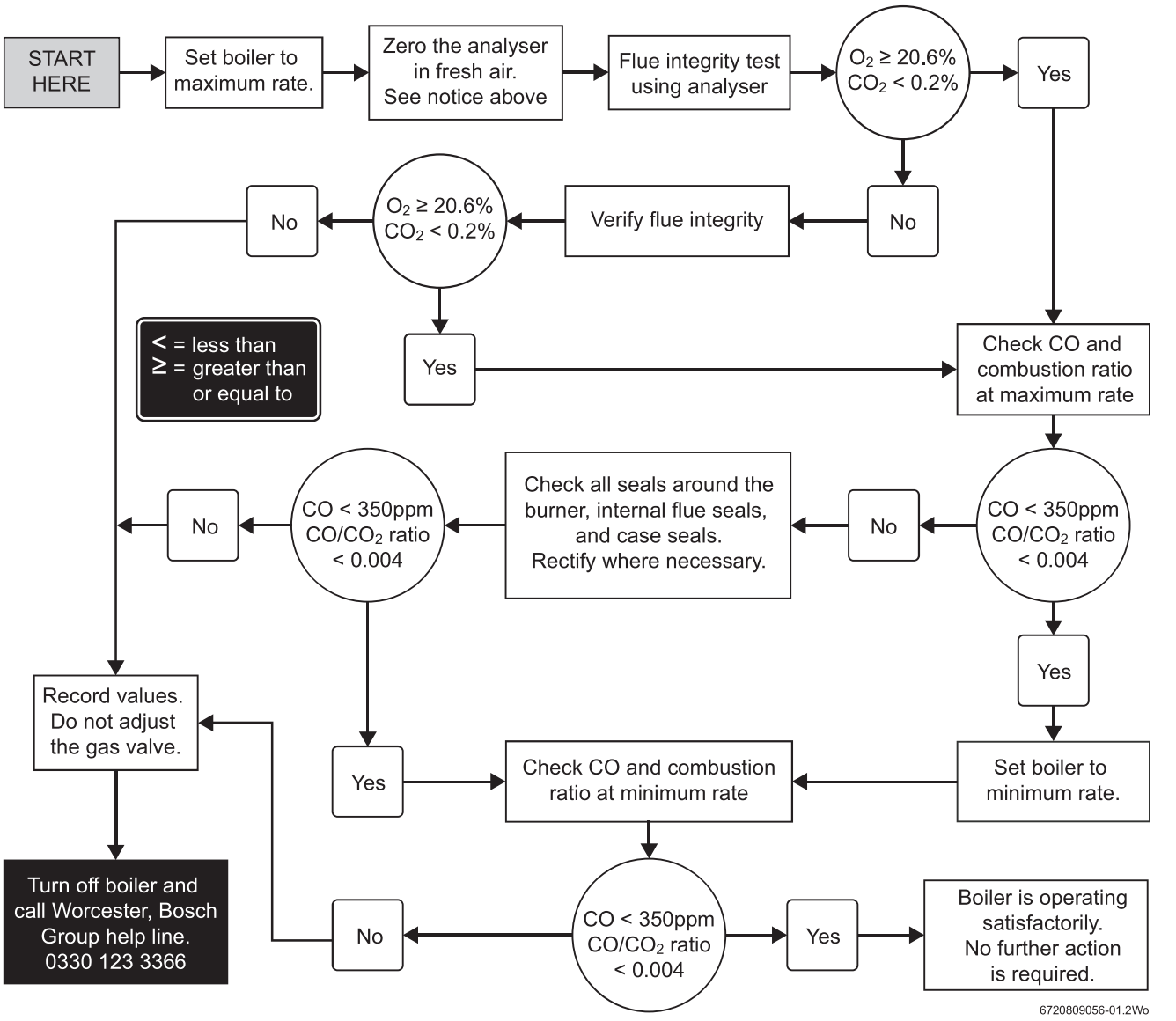


Fig. 61 Combustion check flow chart

6.8 Finishing commissioning

6.8.1 Replacing the boiler case:

1. Replace the boiler case.
2. Make sure that the securing points on top of the case are properly located.
3. Tighten the bottom two screws (2).

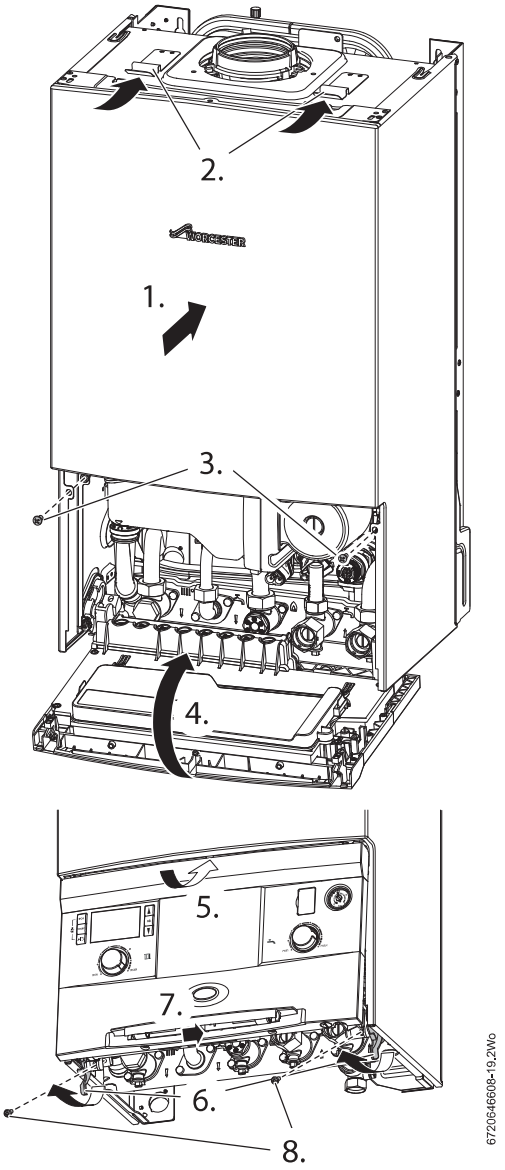


Fig. 62 Fitting case

6.8.2 Securing the control panel

4. Raise the control panel.
5. Push the control panel up to engage the top edge under the case.
6. Lift the catches with your fingers.
7. Press the bottom of the control panel back to engage with the catches
8. Secure the catch retaining screws underneath the boiler.

6.8.3 Fitting the fascia flap

1. Rotate the hinge to be in-line with the flap and present the flap assembly up to the fascia.
2. Push the pegs on the hinge into the three slots in the front of the fascia and close the flap.
3. Secure the flap to the fascia with the two screws provided.

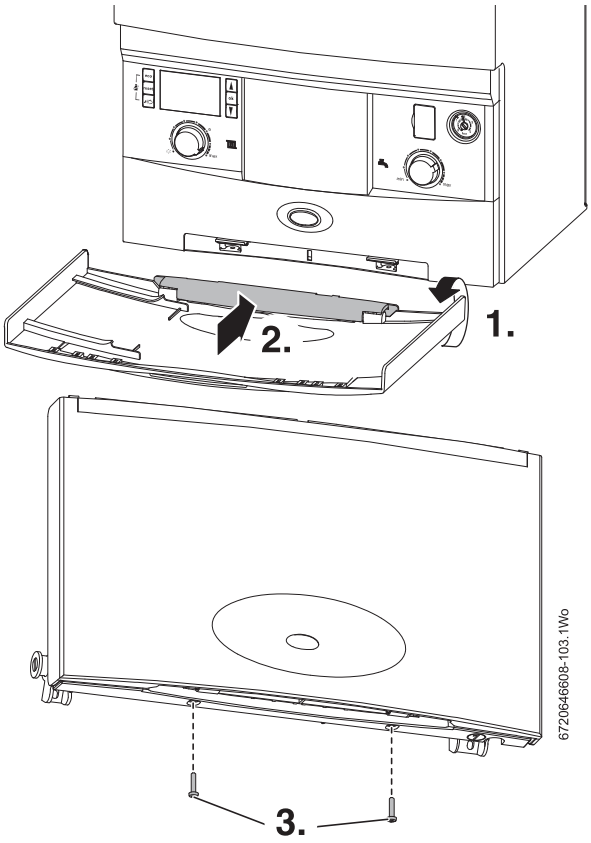


Fig. 63 Installing the fascia flap

6.8.4 Installing bottom panel

1. The bottom panel slides onto two ledges either side of the boiler frame.
2. Hold the panel up against the underside of the boiler. Please note the second plastic tab should be offered up to the boiler guides and not the rear tabs. Slide towards the rear, until there is no more movement.
3. Slide the panel forward until it is fully engaged.

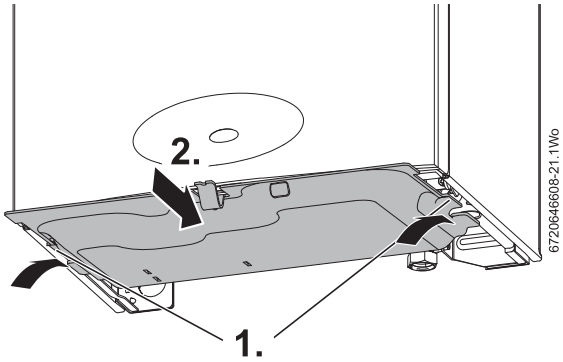


Fig. 64 Bottom panel installation

6.8.5 Hand over

- ▶ Complete the Benchmark Gas Boiler Commissioning Checklist at the back of this manual.
- ▶ Open the fascia flap by hinging the flap downwards using the curved hand hold in the centre of the flap.
- ▶ Set up the controls and show the customer how to operate all the controls shown in the User Guide plus any external controls.
- ▶ Instruct the customer on:
  - the need to repressurise the boiler occasionally and the pressure expected at the pressure gauge.
  - where to find and store the filling loop key.
  - location of the filling loop and system pressure gauge.
  - the use of the filling loop and how to repressurise the system.
  - how to use the TRVs.
  - how to reset the boiler.
- ▶ Show the customer the fault finding information in the User guide.
- ▶ Show the customer where the serial number/boiler information is when they call in with a problem (Benchmark checklist at the rear of the manual).
- ▶ Have you given the customer details of how to contact the installer/ gas emergency numbers.
- ▶ Have you shown the customer how to safely isolate the boiler
- ▶ Have you advised the customer where they can find information on the Worcester, Bosch Group website , www.worcester-bosch.co.uk.
- ▶ Advise the customer that the varying external temperatures will affect the output of the boiler, especially the DHW.
- ▶ Ensure that the User Guide and Installation, Commissioning and Service manual, with the Benchmark checklist and service record, is left with the boiler or homeowner.
- ▶ If the appliance is unused and exposed to freezing conditions, shut off all the mains supplies and drain the system and boiler, label accordingly.

6.8.6 Boiler guarantee

This boiler has a guarantee against faulty materials or workmanship for a period of two years from the date of installation subject to the following terms and conditions:

- During the period of this guarantee any components of the boiler which are proven to be faulty or defective in manufacture will be exchanged or repaired free of charge by Bosch Thermotechnology Ltd.
- The householder may be asked to prove the date of installation, that the boiler was correctly commissioned and, where appropriate, the first year's service has been carried out to the satisfaction of Bosch Thermotechnology Ltd., when requested. These should be documented as a part of the Benchmark Checklist.
- The boiler has been used only for the normal domestic purposes for which it was designed.

This guarantee does not affect your statutory rights.

Guarantee registration

Your Greenstar appliance carries a guarantee against faulty material or manufacture subject to Terms and Conditions.
Guarantee Registration can be completed:

- On-line
  - You can register on our website: www.worcester-bosch.co.uk/guarantee
- By phone
  - You can register by ringing 0330 123 2552
- By post
  - Please send your completed form to: Worcester, Bosch Group, Cotswold Way, Warndon, Worcester, WR4 9SW.

To read the full Terms & Conditions please visit us on-line at www.worcester-bosch.co.uk/guarantee.
Your statutory rights are not affected by the manufacturer's guarantee.

7 SERVICE AND SPARES

CAUTION: Mains supplies:
- ▶ Turn off the gas supply and isolate the electrical mains supply before starting any work on the appliance and observe all relevant safety precautions.

CAUTION: Component replacement:
- ▶ After replacement of a gas related component, where a gasket or seal has been disturbed or replaced, check for gas tightness using a gas sniffer/ analyser.
- ▶ Also after re-assembly, carry out the following checks:
  Fan pressure in section 7.5,
  Flue gas analysis in section 7.6.

NOTICE: Service work
- ▶ Service work must be carried out by a competent engineer, such as Gas Safe registered personnel!

NOTICE: FLUE GAS ANALYSER
- ▶ Service work must not be attempted if a flue gas analyser is not available.

- To ensure continued efficient operation the appliance must be checked at regular interval.
- The frequency of servicing will depend upon the particular installation conditions and usage, however, normally an annual service is recommended.
- The extent of the service work required by the appliance is determined by the operating condition of the appliance when tested by qualified engineers.
- After each service, the service interval record sheet at the rear of this manual, must be completed.

7.1 Inspection and service

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

7.2 Checking flue integrity

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

Flue gas sample point	1
Air inlet sample point	2

Table 26 Key to figure 65

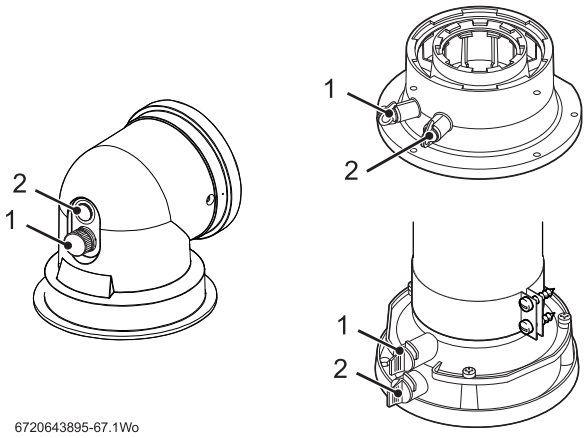


Fig. 65 Flue turret test points

With the boiler case on and the boiler running at maximum output (refer to section 7.5.1 “Setting the boiler maximum”).
- ▶ Insert the analyser probe into the air intake sample point.
- ▶ Ensure that the probe reaches the centre of the air intake, adjust the cone on the probe so that it seals the sample point and correctly positions the end of the probe.
- ▶ 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, e.g. missing or dislodged seals.

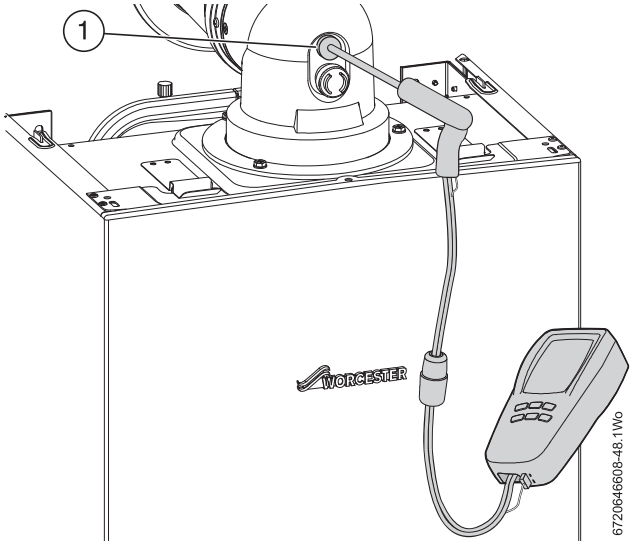


Fig. 66 Flue integrity test

7.3 Component access

To gain access to the components, remove the outer case:

1. Remove the two screws securing the control panel.
2. Release the two catches.
3. Pull the bottom of the control panel forward and down.
4. Lower the control panel into the service position
5. Undo and remove the two bottom retaining screws.
6. Lift the spring clips on top of the case.
7. Pull the case towards you to remove.

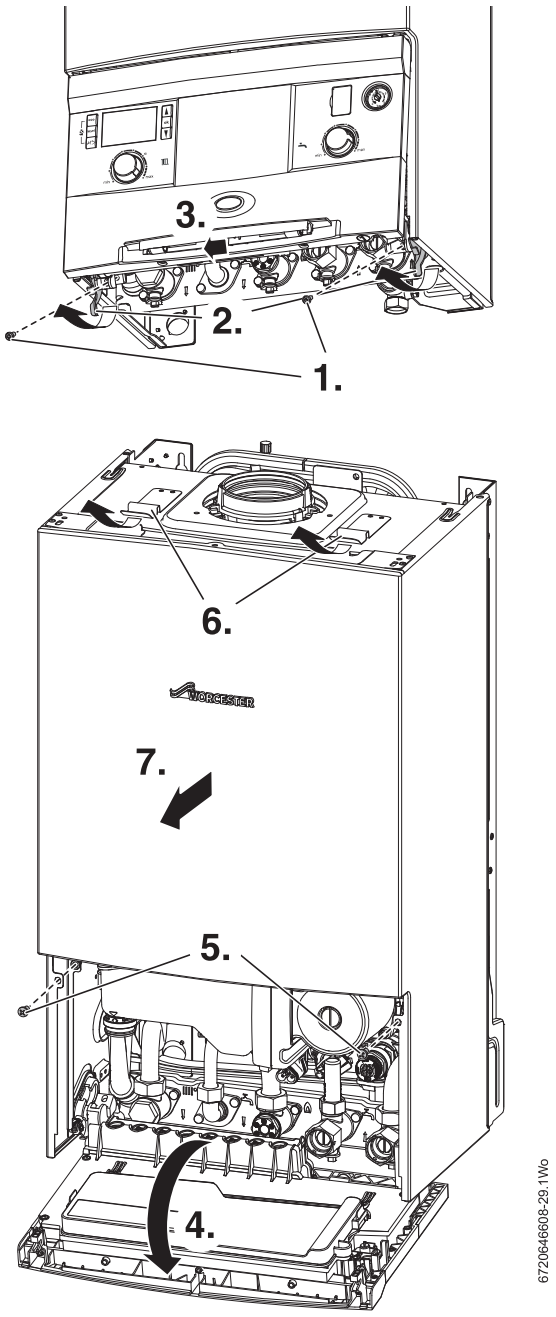


Fig. 67 Component access

7.4 Checking the gas inlet pressure

NOTICE: Gas inlet pressure

▶ Do not continue with the other checks if the correct gas pressure can not be achieved.

▶ Refer to section 6.5.1 and check that the gas working pressures in the system conform to the figures shown below:

	Allowed mbar pressure drop			
meter/ regulator	**across pipework**	**boiler inlet**	**across boiler**	**gas control valve**
Natural gas				
19 - 23	1	18 - 22	1.5	16.5 - 20.5
L.P.G.				
32 - 45	2.5	29.5 - 42.5	1.5	28 - 41
mbar range				

7.5 Fan pressure test

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

Before setting the boiler to maximum output for the fan pressure test, refer to figure 69:

▶ Switch the boiler off.
▶ Remove the combustion air intake pipe (1).
▶ Remove the fan pressure test point cover (2).
▶ Connect the digital manometer pipe (3) to the fan pressure test point (4).
▶ Replace the combustion air intake pipe.
▶ Switch the boiler on.
▶ Set the boiler to maximum output.

7.5.1 Setting the boiler to maximum

To set the boiler to maximum output, refer to figure 68:

1. With the control panel in the operating position, press and hold the eco and buttons together for at least five seconds.
   - The chimney sweep symbol (1) will be displayed at the top of the screen.
   - The word Max will flash at the bottom of the screen.
   - The boiler will take approximately 30 to 35 seconds to ramp up to maximum output.
   - Allow the boiler to stabilise at maximum output.

▶ Ensure that the fan/gas valve do not modulate.

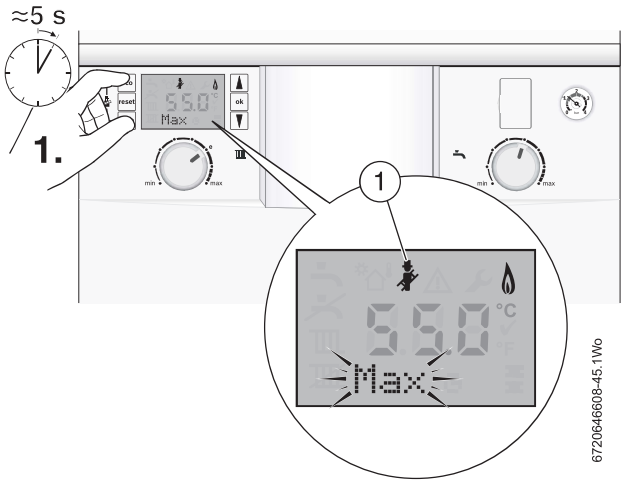


Fig. 68 Set boiler to maximum

When running at maximum output, and the water temperature is 65°C or less, the boiler will operate both the central heating and DHW circuits with the diverter valve in the mid position. It will be necessary to run sufficient water through the DHW circuit to ensure that the boiler will not cycle on low heating demands.
This is to allow sufficient time for the setting procedure. When the water temperature reaches 75°C the diverter valve will switch to CH only.

7.5.2 Fan pressure

- ▶ Remove the combustion air intake pipe [1]
- ▶ Remove the cover [2] from the fan pressure test point [4]
- ▶ Connect the pipe [3] from the digital manometer to the fan pressure test point [4]
- ▶ Refit the combustion air intake pipe

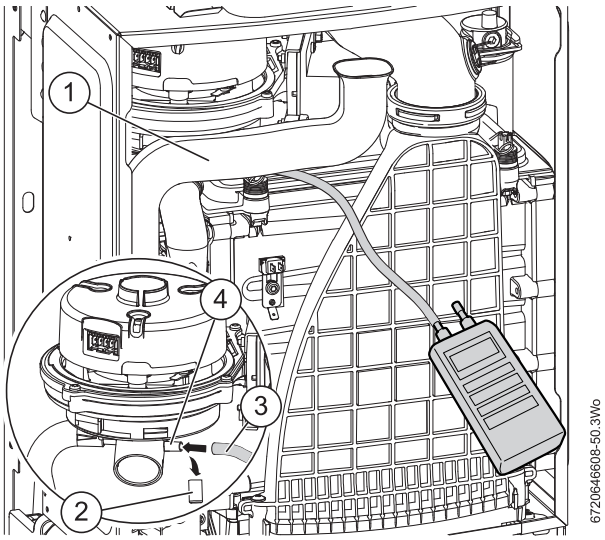


Fig. 69 Fan pressure test point

NOTICE: Fan pressure test
- ▶ The boiler must be run at maximum output for the fan pressure test and flue gas analysis.

With the combustion air intake pipe fitted and the boiler running at maximum output, measure the fan pressure:

- ▶ The pressure will read negative, refer to the chart in figure 70 below.

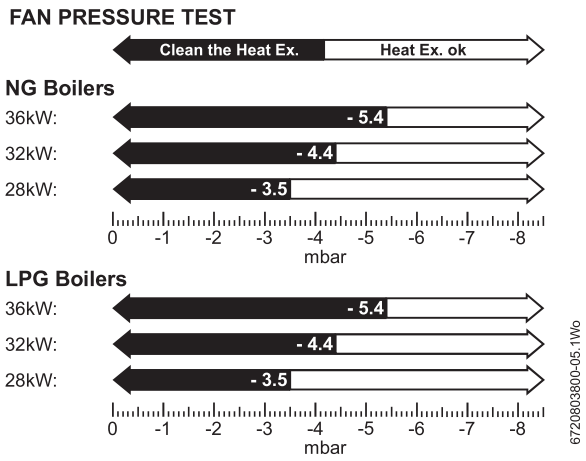


Fig. 70 Fan pressure readings

- ▶ If the manometer reading is in the white area of the chart the heat exchanger/exhaust path/siphon does not require attention.
- ▶ If the manometer reading is in the black area of the chart then carry out the following checks:
  - Check that the siphon is not blocked.
  - Check the exhaust paths for restrictions.
  - Clean the heat exchanger with a suitable cleaning tool, refer to section 7.7 - Cleaning the heat exchanger.
- ▶ Re-check the fan pressure readings.

If the boiler, after completing the above checks, fails the fan pressure test then contact Worcester, Bosch Group for advice.

- ▶ After the measurements are taken switch the boiler off.
- ▶ Remove the combustion air intake pipe.
- ▶ Disconnect the manometer and replace the test point cover.
- ▶ Replace the combustion air intake pipe.

7.6 Flue gas analysis

NOTICE: Combustion testing
- ▶ Combustion testing must be carried out by a competent person. Testing must not be attempted unless the person carrying out the combustion check is equipped with a calibrated Combustion Analyser conforming to BS 7927 and is competent in its use.

NOTICE: Gas inlet pressure
- ▶ Ensure that the gas inlet pressure has been checked and is satisfactory, refer to section 6.5.1

Combustion test

When running in maximum output, and the water temperature is 65°C or less, the boiler will operate both the central heating and DHW circuits with the diverter valve in the mid position. It will be necessary to run sufficient water through the DHW circuit to ensure that the boiler will not cycle on low heating demands.
This is to allow sufficient time for the setting procedure. When the water temperature reaches 75°C the diverter valve will switch to CH only.

- ▶ Connect the flue gas analyser to the flue gas sampling point (1) as shown in the figure below.
- ▶ Ensure that the probe reaches the centre of the flue gas exhaust, adjust the cone on the probe so that it seals the sample point and correctly positions the end of the probe.
- ▶ Press the eco and buttons together
  - The chimney sweep symbol will be displayed at the top of the screen.
  - "Max" will flash at the bottom of the screen.
  - The boiler will ramp up to maximum output in approximately 30 to 35 seconds.
- ▶ Run the boiler at maximum output for at least 10 minutes.
- ▶ Check the CO/CO_2 readings against the information in table 27.

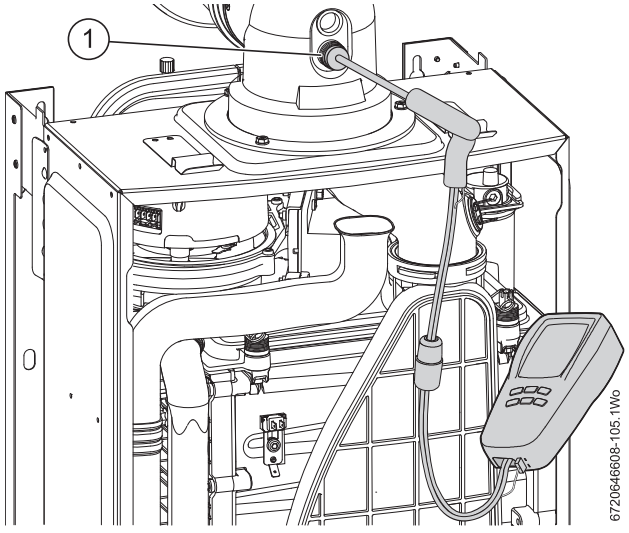


Fig. 71 Combustion test

- ▶ Set the boiler to minimum power by pressing the down arrow button.
  - "Min" will flash at the bottom left of the screen.
  - The boiler will take 30 to 35 seconds to ramp down to minimum output.
  - Allow the boiler to stabilise at minimum output.
- ▶ Check the CO/CO_2 readings against those in tables 27 and 28
- ▶ Return the boiler to maximum, by pressing the UP arrow button, and re-check the CO/CO_2.
  - "Max" will flash at the bottom left of the screen.
  - The boiler will take approximately 30 to 35 seconds to ramp up to maximum output.
  - Allow the boiler to stabilise at maximum output.
- ▶ If correct, press the ↩ button and the boiler will return to normal operation.
- ▶ Re-assemble and refit boiler case.

NOTICE: Minimum CO_2
- ▶ The minimum CO_2 reading must be at least 0.2 lower that the maximum CO_2 reading.

NG Appliances		
Output	**CO_2 Reading**	**CO Reading**
Maximum setting (measured after 10 minutes	Between 8.5 and 10.1.	Less than 200ppm
Minimum setting (measured after 10 minutes	A minimum 0.2 lower than the maximum reading taken but above 7.5%	Less than 50ppm

Table 27 NG CO/CO_2 settings

LPG Appliances		
Output	**CO_2 Reading**	**CO Reading**
Maximum setting (measured after 10 minutes	Between 9.8 and 11.1.	Less than 200ppm
Minimum setting (measured after 10 minutes	A minimum 0.2 lower than the maximum reading taken but above 8.5%	Less than 50ppm

Table 28 LPG CO/CO_2 settings

Example of a Natural Gas appliance reading:
- Maximum CO_2 reading taken = 9.5%
- The minimum CO_2 reading must be between 8.0% and 9.3% (a minimum 0.2 lower than the maximum reading of 9.5%)

If the CO_2 is out of tolerance then please check:
- ▶ the gas inlet pressure,
- ▶ the gas rate,
- ▶ the fan test pressure,
- ▶ the condition of burner,
- ▶ the flue and air intake, plus any possible blockages in the condensate disposal.
- ▶ for leaks or obstructions in the gas way,
- ▶ that the injector is clean.

After all checks have been and the CO_2 is still out of tolerance then the gas valve must be replaced.

7.7 Cleaning the heat exchanger

NOTICE: Gaskets and seals
- ▶ Replace the burner and electrode assembly gaskets and the Flueway sump seal after cleaning the heat exchanger.
  Do not attempt the cleaning procedure unless new gaskets and seals are available.

There is an optional tool available to assist in cleaning the heat exchanger, part number 7 746 901 479

The following items will have to be removed to gain access to the heat exchanger for cleaning:
- ▶ Lower the control panel into the service position.
- ▶ Remove the case.
- ▶ Disconnect electrical wires to the fan, ignition transformer, spark electrodes, flue overheat thermostat, main heat exchanger temperature sensor and flow pipe temperature sensor.
- ▶ Flueway
- ▶ Fan assembly
- ▶ Ignition transformer
- ▶ Spark electrode assembly
- ▶ Burner housing, burner and gasket

Refer to sections 7.8.10 to 7.8.14 for instructions on how to remove the items to gain access to the heat exchanger channels so that the heat exchanger can be cleaned

7.7.1 Cleaning the siphon

1. Protect the controller from water ingress and disconnect the black discharge hose from the wall frame connector.
2. Rotate the siphon body clockwise to release the bayonet connection.
3. Pull the siphon body down and away from the boiler.

- ▶ Empty the water and debris into a suitable container.
- ▶ Visually inspect the siphon to ensure that it is clean and free from debris.

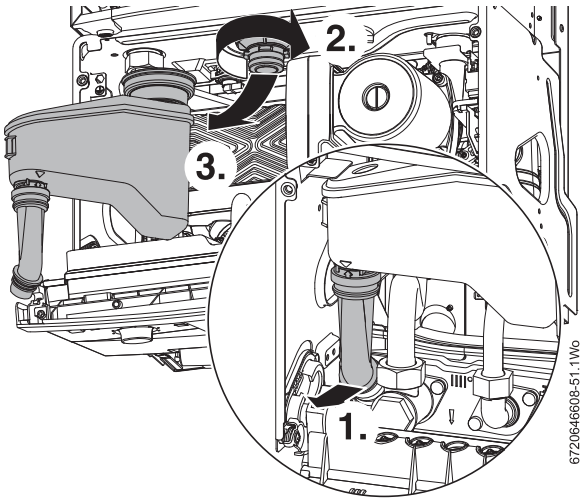


Fig. 72 Cleaning the siphon

Refitting the siphon
- ▶ Fill siphon with 200 to 250 millilitres of water.

1. Push the siphon up onto the sump assembly until it fully engages with the sump connection.

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

2. Twist the siphon to the left to secure the bayonet connection.
3. Push the black discharge hose, onto the wall frame connector, until fully engaged.

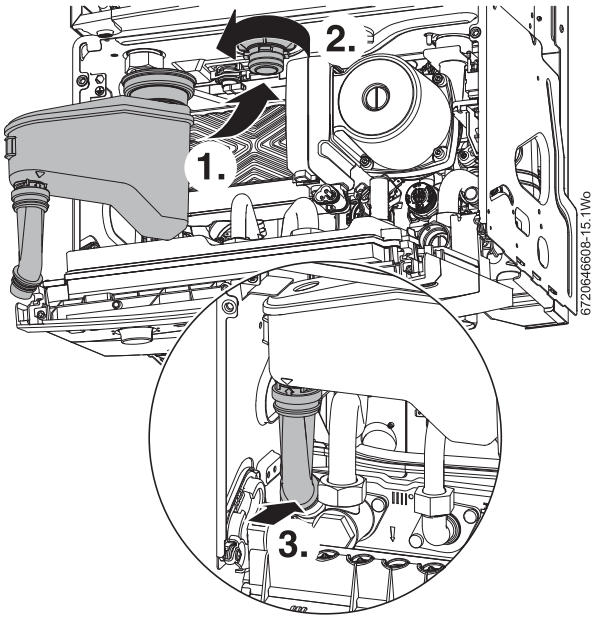


Fig. 73 Fitting siphon

7.7.2 Cleaning the primary heat exchanger

Single bladed tool and brush

Use a suitable blade to clean the heat exchanger channels.
There is an optional tool available to clean the heat exchanger, part number 7 746 901 479.

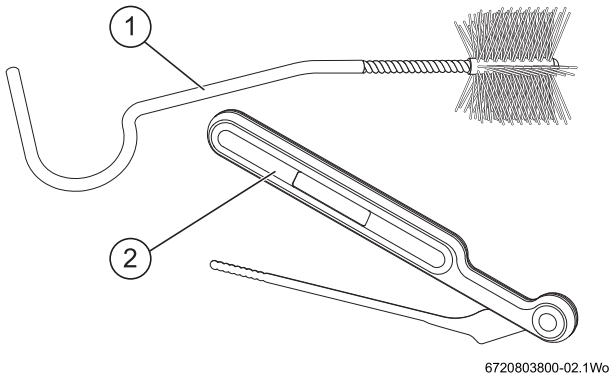


Fig. 74 Single-bladed cleaning tool and brush

- ▶ Visually inspect the inside of the heat exchanger by shining a torch from the top down into the sump area.
- ▶ When there is little or no light visible this would suggest that those channel(s) are restricted.
- ▶ It is recommended that all channels are cleaned.
- ▶ Remove the siphon and place a suitable container under the outlet to catch the water and debris.
- ▶ Protect the controller from water ingress.

To clean the rear and middle channel of the heat exchanger

1. Orient the cleaning tool (2) as shown in figure 75 and insert the tool into the rear or middle channels for cleaning.
2. Move the cleaning tool handle up and down motion, using the front edge of the heat exchanger as a pivot, to clean the channel.

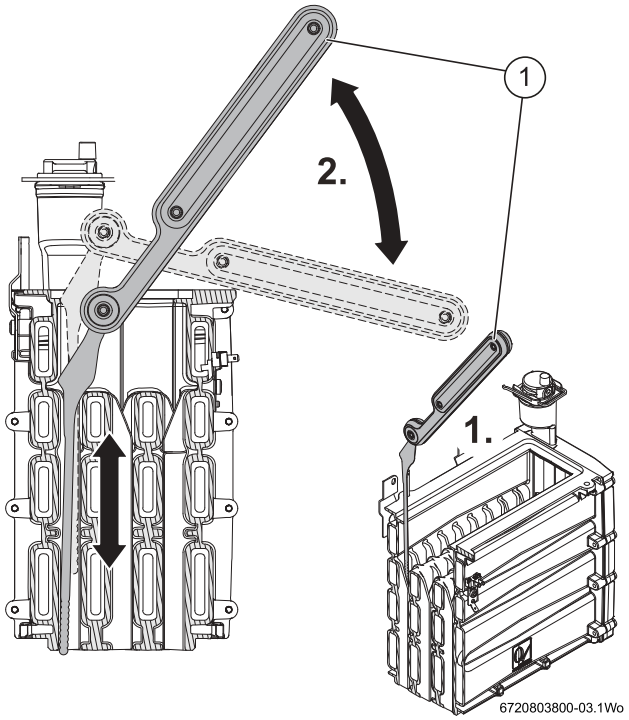


Fig. 75 Heat exchanger cleaning tool

To clean the front channel of the heat exchanger

3. Orient the cleaning tool (2) as shown in figure 76 and insert the tool into the front channel for cleaning.
4. Move the cleaning tool handle up and down motion, using the front edge of the heat exchanger as a pivot, to clean the channel.

- ▶ Use the brush to dislodge the debris and pour water down the channels to flush out the debris.

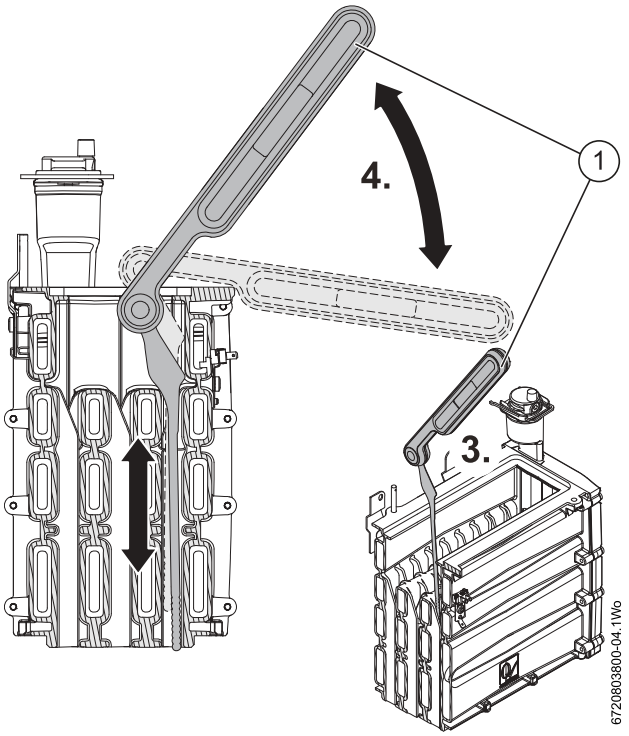


Fig. 76 Cleaning the front channels

On completion of the heat exchanger cleaning and re-assembly, perform the fan pressure test as described in section 7.5.2

7.8 Replacement of parts

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

CAUTION: Component replacement:
- Replace the burner housing gasket and the Flueway sump seal when re-assembling the heat exchanger. Do not reassembly the heat exchanger and Flueway until new gaskets and seals are available.
- After replacement of a gas related component, where a gasket or seal has been disturbed or replaced, check for gas tightness using a gas sniffer/ analyser.
- On re-assembly check all affected seals for cracks, hardness and deterioration. If damaged or in any doubt the seal must be replaced.
- Also after re-assembly, carry out the following checks: Fan pressure in section 7.5, Flue gas analysis in section 7.6.

7.8.1 Removing the outer case

Removing the bottom panel:

1. Pull the catch down.
2. Slide the panel forward and down to remove

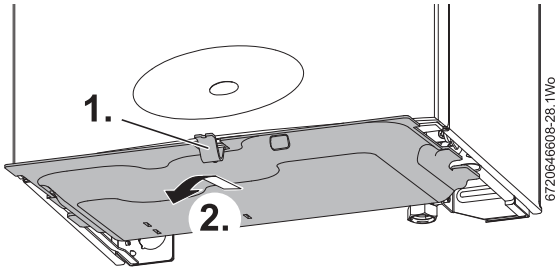


Fig. 77 Bottom panel

Removing the outer case:

1. Locate and remove the two screws under the front of the boiler.
2. Pull the two catches, located under the front of the boiler, down to release the control panel
3. Pull the bottom of the control panel forward slightly and down.
4. Allow the control panel to rotate down on the hinges.
5. Remove the two screws securing the bottom of the case.
6. Release the two catches on top of the boiler.
7. Pull the case towards you and remove.

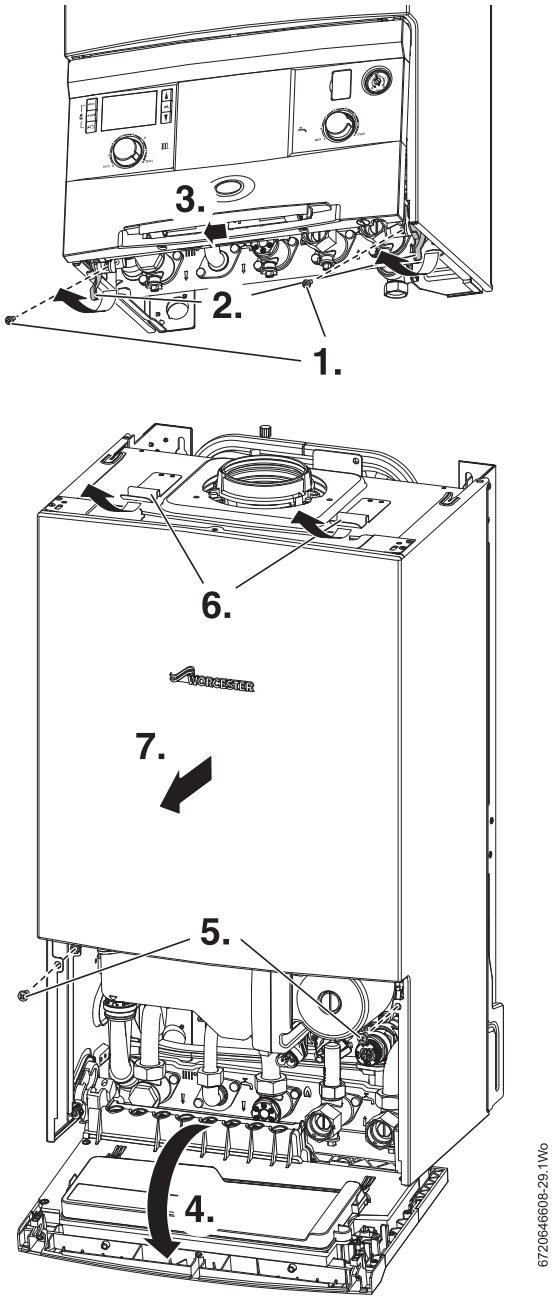


Fig. 78 Removing outer case

7.8.2 Draining the boiler

Many of the tasks in this section require that the boiler be isolated and drained.

1. Connect a suitable hose firmly to the drain point and run the hose outside to a suitable point or container.
2. Turn the drain valve a ¼ turn anticlockwise to open the drain. Turn the valve firmly clockwise to close.

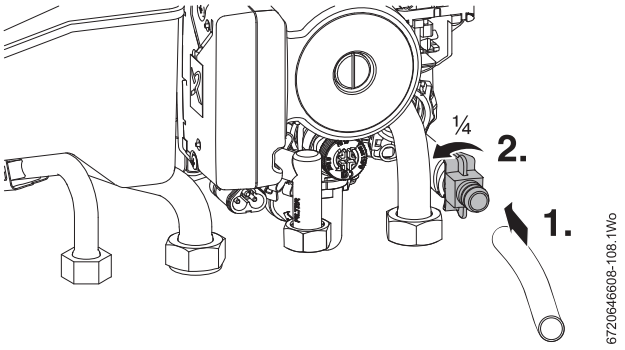


Fig. 79 Draining the boiler

7.8.3 Syphon removal

1. Disconnect the discharge hose from the wall frame connector.
2. Rotate the siphon body clockwise to release the bayonet connection.
3. Pull the siphon body down and away from the boiler.

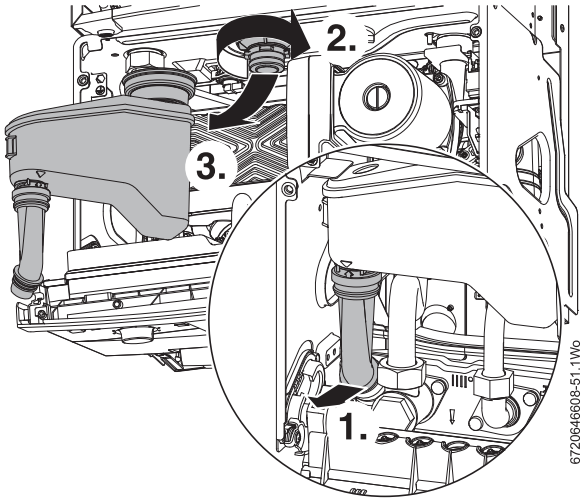


Fig. 80 Syphon removal

7.8.4 Primary sensor (CH NTC)

- ▶ Remove the combustion air inlet pipe from the pre-mix unit, rotate anti-clockwise and pull away from the fan assembly.
- ▶ Ease the gas pipe to the left.
- ▶ Disconnect the lead to the sensor.
- ▶ Remove the sensor by pulling forward.
- ▶ Replace the sensor onto the flow pipe.
- ▶ Connect the lead to the sensor.
- ▶ Re-fit the combustion air inlet pipe to the pre-mix unit.

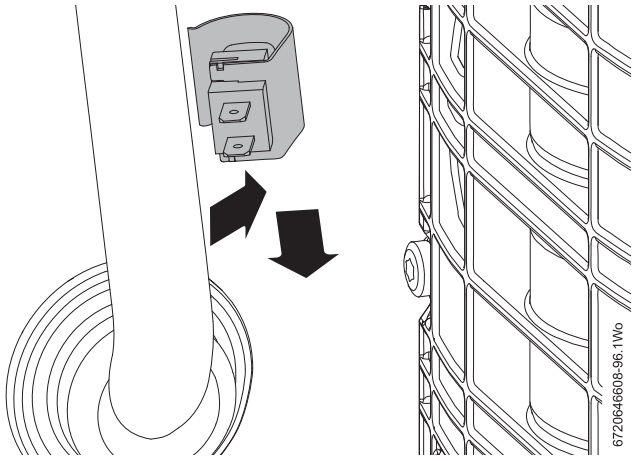


Fig. 81 Primary sensor

7.8.5 Maximum safety sensor (NTC)

- ▶ Disconnect the lead to the Maximum safety sensor.

1. Remove the screw securing the sensor.
2. Remove the sensor from the heat exchanger.

- ▶ When replacing the sensor, ensure that the assembly is properly located on the orientation pin.

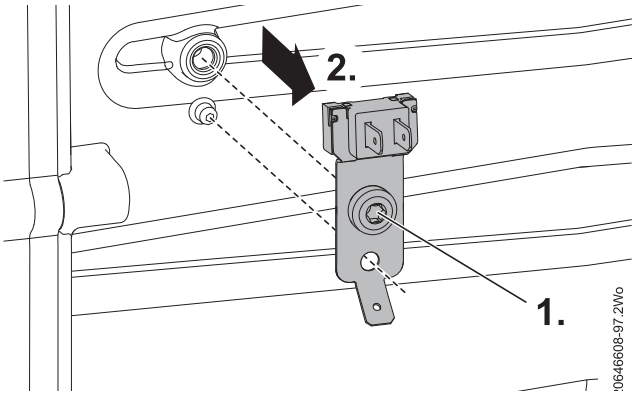


Fig. 82 Max safety sensor

7.8.6 Flue overheat thermostat

- ▶ Disconnect the lead to the flue overheat thermostat.

Take care not to damage the housing when removing the thermostat.

- ▶ Using a small screwdriver, gently prise the thermostat from the housing taking care not to damage the housing or grommet.

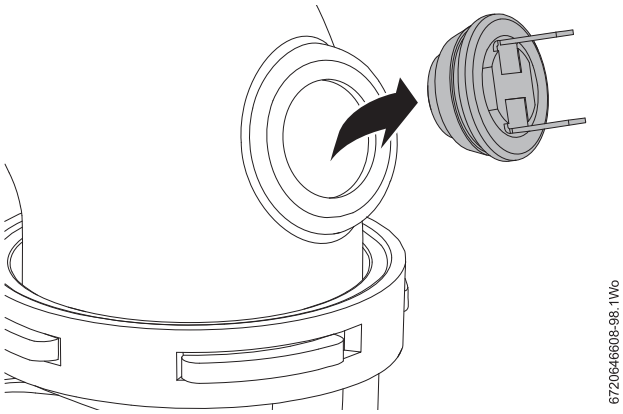


Fig. 83 Flue overheat thermostat

- ▶ To replace, push the thermostat and new grommet gently back into the opening until contact with the locating ridge is felt.
- ▶ The Flueway will have to be removed if the thermostat falls into the housing, refer to section 7.8.10.

7.8.7 Air Pressure Switch

NOTICE: Air Pressure Switch
- ▶ Ensure that the tube is reconnected to the Air Pressure Switch

To remove the Air pressure switch assembly:
- ▶ Slacken the two screws [1] but do not remove
- ▶ Remove the connector from the terminals [2]
- ▶ Disconnect the tube from the flue pipe
- ▶ Slide the assemble to left to release the retaining bracket
- ▶ Remove the assembly

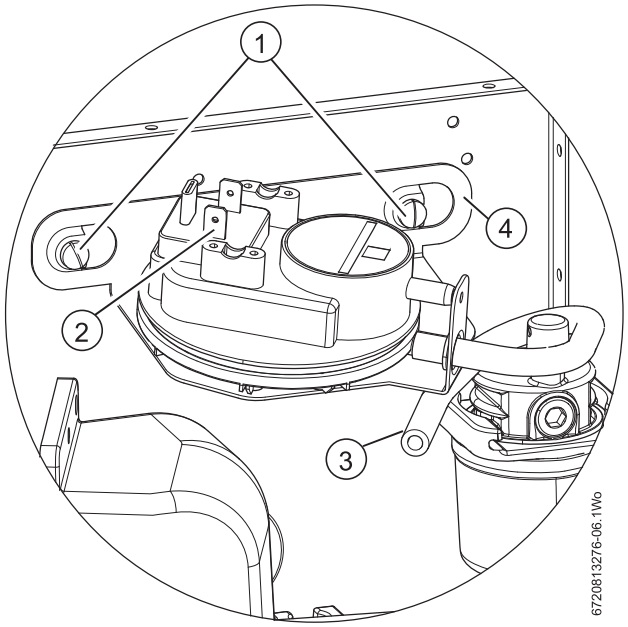


Fig. 84

To remove and replace the Air pressure switch:
- ▶ Remove the two screws [5] retaining the switch to the bracket [4].
- ▶ Disconnect the tube [3] from the switch.
- ▶ Fit the new switch to the bracket and secure with the two screws [5].
- ▶ Re-connect the tube [3] to the switch, ensuring routing is looped as in figure 84.
- ▶ Re-connect the connectors to the terminals [2].
- ▶ Align the Air pressure switch bracket [4] over the two screws [1] and slide the assembly to the right, tighten the screws to secure.

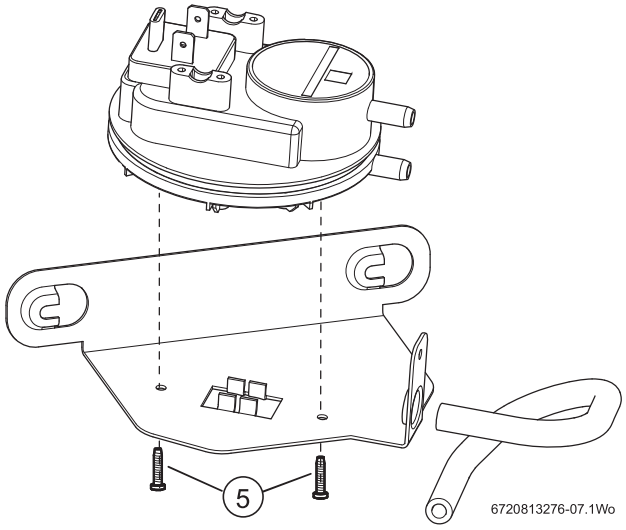


Fig. 85

7.8.8 Auto air vent

Ensure that the boiler has been fully drained.
1. Remove the spring clip completely.
2. Lift the air vent out of the housing and remove.

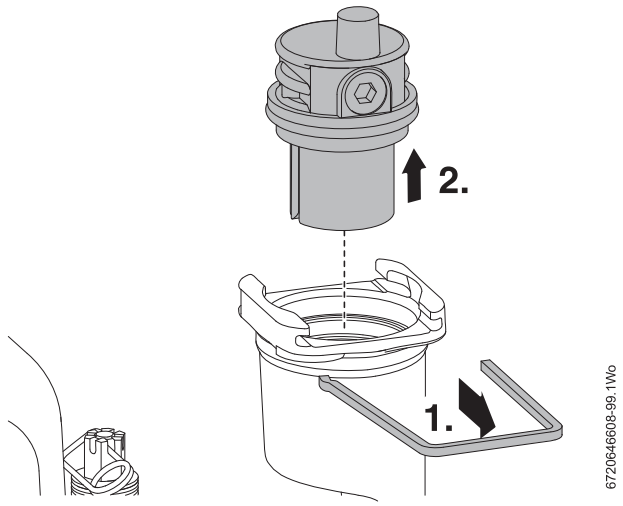


Fig. 86 Auto air vent

When re-assembling ensure that the “O” ring is fitted to the Auto air vent and NOT the heat exchanger, otherwise the Air vent will be difficult to fit.

Apply silicone grease to the “O” ring to ease assembly.

7.8.9 Gas valve

- ▶ Isolate the mains electrical supply and the gas supply at the boiler gas cock.
- ▶ Remove the combustion air inlet pipe.
- ▶ Disconnect the electrical connector from the valve

1. Remove the gas pipe from the top of the valve.
2. Undo the bottom gas pipe connection.
3. Remove the screw securing the gas valve.
4. Lift the gas valve to clear the bottom gas connection.
5. Pull the gas valve forward out of the boiler.

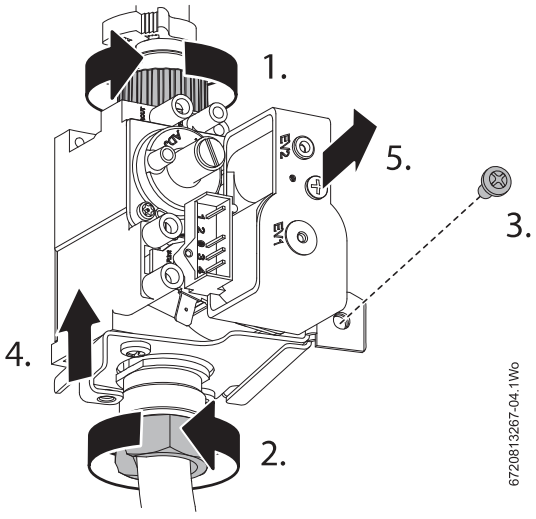


Fig. 87 Gas valve

- ▶ When fitting the new valve, start with the bottom gas connection and tighten by hand before making any other connections to the valve.
- ▶ Secure the valve with the screw.
- ▶ Tighten the bottom connection firmly with a suitable spanner.
- ▶ Connect the top gas pipe.
- ▶ Reconnect the electrical connector.
- ▶ Open the boiler gas isolator.
- ▶ Check all the gas connections for gas tightness.

7.8.10 Fan assembly

CAUTION: Component replacement:
- ▶ After replacement of a gas related component, where a gasket or seal has been disturbed or replaced, check for gas tightness using a gas sniffer/ analyser.
- ▶ On re-assembly check all affected seals for cracks, hardness and deterioration. If damaged or in any doubt the seal must be replaced.
- ▶ Also after re-assembly, carry out the following checks: Fan pressure in section 7.5, Flue gas analysis in section 7.6.

To remove the fan, disconnect the electrical mains and gas supplies, and remove the following components:

- Flueway
- Combustion air inlet pipe and gas pipe

Flueway removal

CAUTION: Flueway sump seal.
- ▶ Replace the sump seal every time that the Flueway to sump connection is disturbed.

1. Release the two screws securing the Flueway to the sump.
2. Using a screwdriver under the tabs (1) next to the screws, lever the Flueway up and pull the Flueway forward.
3. Rotate the exhaust pipe to the left and pull the Flueway down to separate from the exhaust pipe.

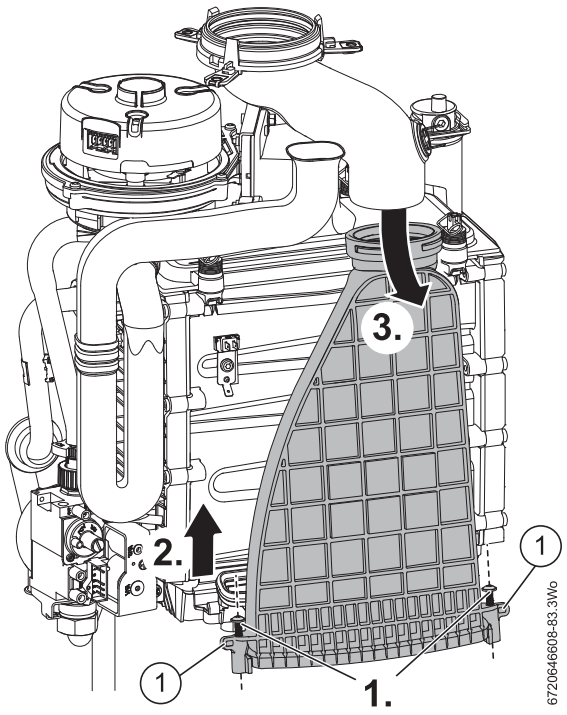


Fig. 88 Flueway removal

Remove the used seal

4. Discard the "tubular" seal [2] or the "moulded" seal [3], depending on which type is fitted and replace with the seal that is provided.

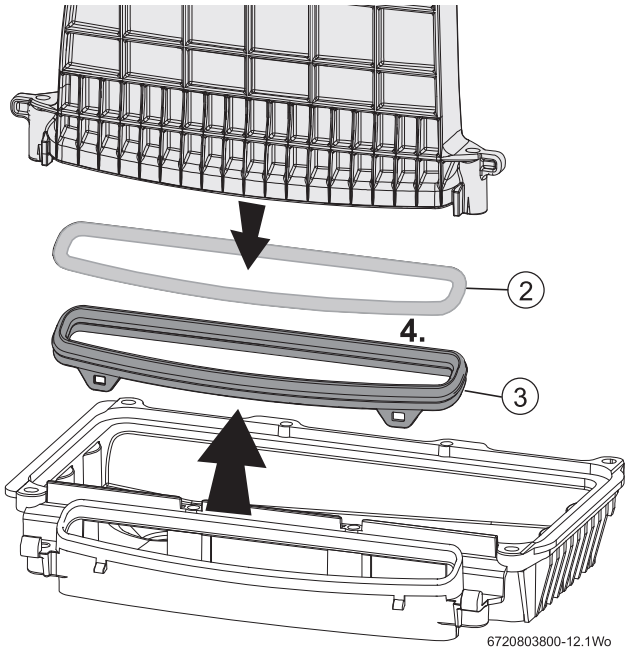


Fig. 89 Remove the existing seal

Fitting the "moulded" sump seal

1. Place the seal [3] on the sump interface.
2. Ensure that the lug flaps are mounted onto the sump lugs.

Before fitting the Flueway:

- ▶ Ensure that the seal is clean and free from debris.

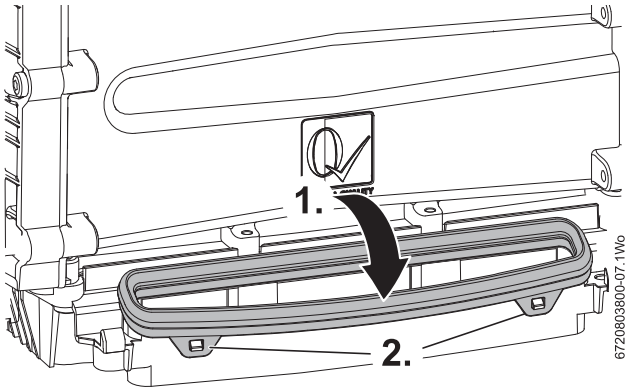


Fig. 90 Moulded style seal

Fitting the "tubular" sump seal

3. Fit the Flueway sump seal [2] into the Flueway. Ensure the seal is fitted fully into the recess in the underside of the Flueway.

Before fitting the Flueaway:

- ▶ Ensure that the seal is clean and free of debris.

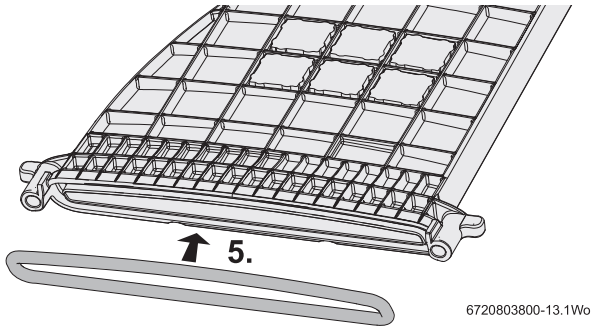


Fig. 91 Tubular style sump seal

Combustion air inlet and gas pipe disconnection

1. Rotate the combustion air inlet pipe anti-clockwise to release from the fan assembly and pull away from the fan.
2. Undo the top gas pipe connector at the gas valve.

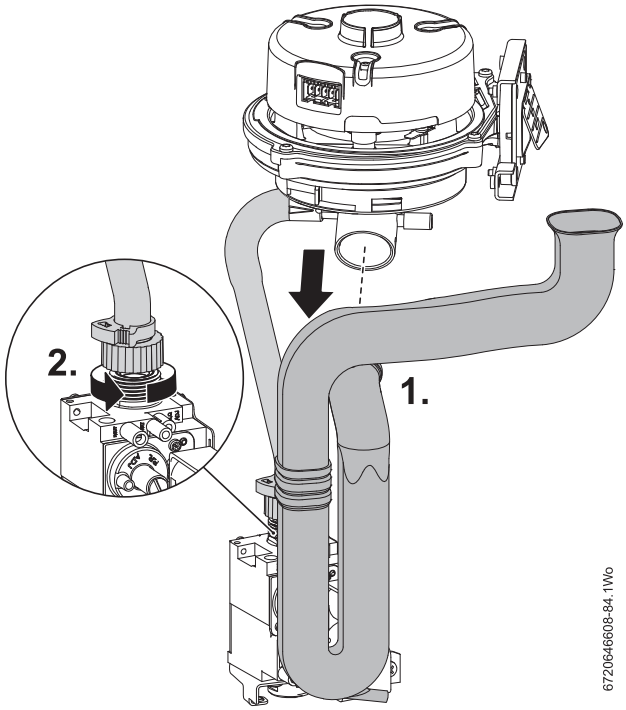


Fig. 92 Combustion air inlet pipe removal

Fan removal

The boiler case is shown removed to aid clarity.

3. Rotate the exhaust pipe anti-clockwise to gain access to the fan assembly securing screws.
4. Support the weight of the fan and remove the two screws securing the fan.

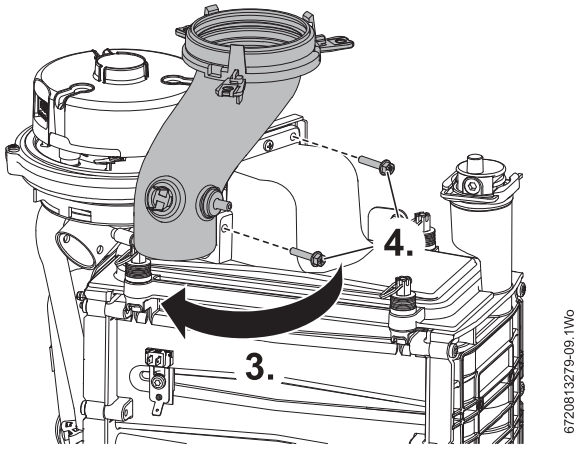


Fig. 93 Fan removal 1

5. Rotate the exhaust pipe clockwise.
6. Pull the fan assembly away from the mount, lift and rotate the fan towards you. Ensure that the front of the fan clears the left hand front castellated nut securing the burner housing.
7. Pull the gas pipe off the fan body connection, the pipe is secured by the interference fit between the pipe and connector.
8. Remove the electrical connector and earth from the fan.

When refitting the rubber gas pipe, ensure that the pipe is correctly oriented by aligning the notch in the pipe with the lug on the fan connector. Do not kink the pipe. There is a raised arrow on the pipe indicating the location of the notch.

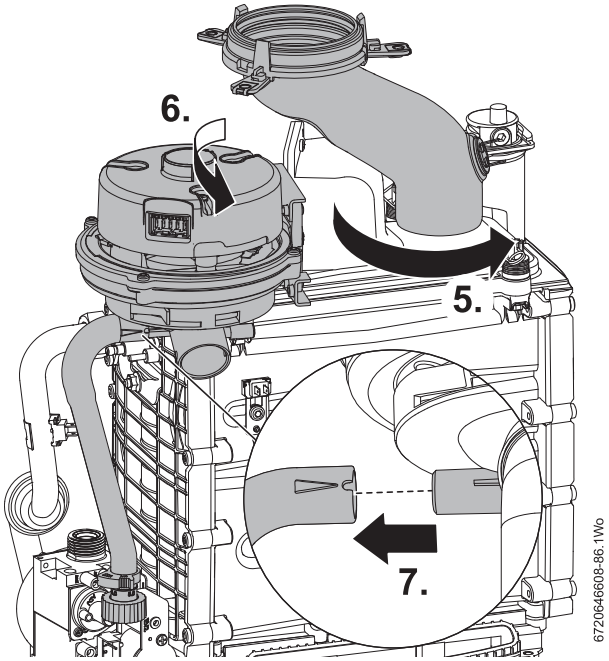


Fig. 94 Fan removal 2

7.8.11 Air/gas flap valve assembly

1. Remove the single screw securing the air/gas flap valve assembly.
2. Pull the flap assembly away from the housing.

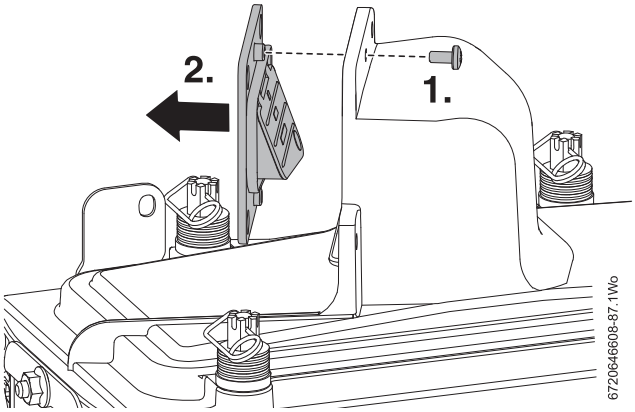


Fig. 95 Air/gas flap valve

7.8.12 Ignition transformer

To remove the ignition transformer

- ▶ Isolate the boiler electrically.
- ▶ Remove the combustion air inlet pipe.
- ▶ Ensure that the harness wires are disconnected from the transformer.
- ▶ Remove the electrode cables.
- ▶ Lift the transformer from the retaining clip.

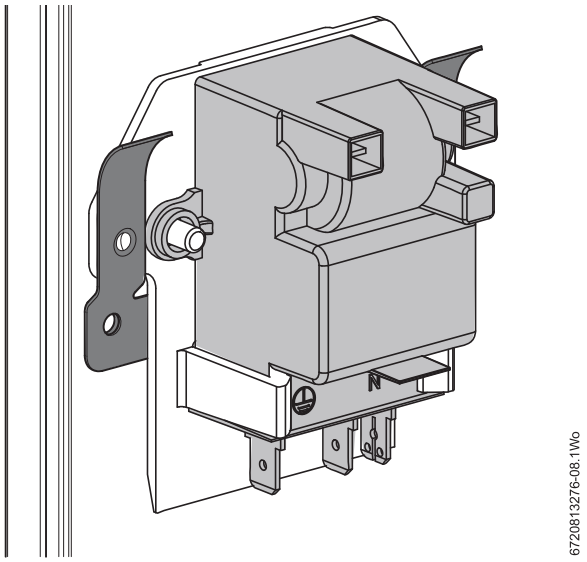


Fig. 96 Ignition transformer

7.8.13 Electrode assembly

CAUTION: Component replacement:

- ▶ After replacement of a gas related component, where a gasket or seal has been disturbed or replaced, check for gas tightness using a gas sniffer/ analyser.
- ▶ Also after re-assembly, carry out the following checks:
  Fan pressure in section 7.5,
  Flue gas analysis in section 7.6.

To remove the spark electrode assembly:

1. Undo and remove the two nuts securing the electrode assembly
2. Rotate the electrode assembly down and forward to remove from the Heat exchanger.

- ▶ Inspect the spark electrodes (2), ionisation probe (3) and ceramics for signs of contamination or damage, replace as necessary.
- ▶ If necessary, clean the spark electrodes and ionisation probe with a plastic scouring pad.
- ▶ Re-assemble with a new electrode gasket (1),

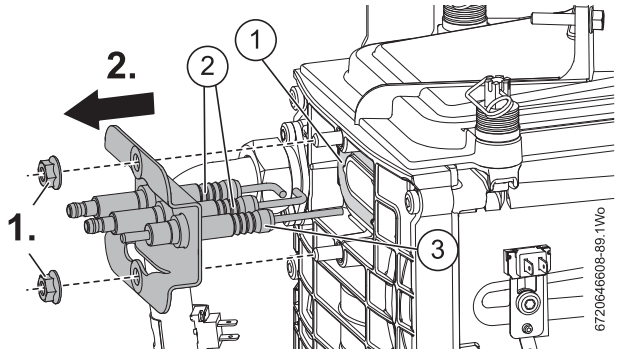


Fig. 97 Electrode assembly

7.8.14 Burner housing, burner/ gasket

The front two bolts retaining the burner housing are NOT captive and will drop out when the nuts are removed.

To remove the burner housing.

1. Release and remove the four spring pins from the castellated nuts.
2. Undo the front two castellated nuts/springs and remove and retain along with the front two bolts (1).
   Slacken the two rear castellated nuts/springs, but do not remove.

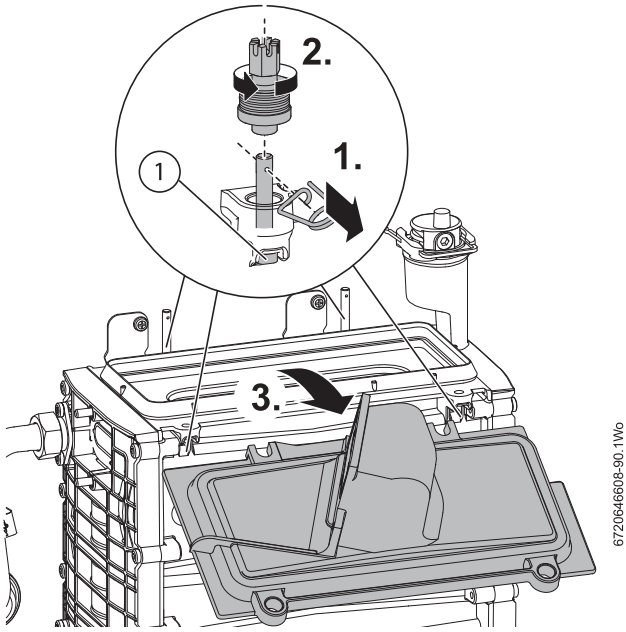


Fig. 98 Burner housing

3. Pull the burner housing up and forward to remove.

To remove the burner and gasket.

1. Lift the gasket (1) and burner mesh (2) from the heat exchanger body.

- ▶ When fitting the burner, ensure that the convex side of the burner faces down into the heat exchanger.
- ▶ Always fit a new gasket (1) when re-assembling the heat exchanger.

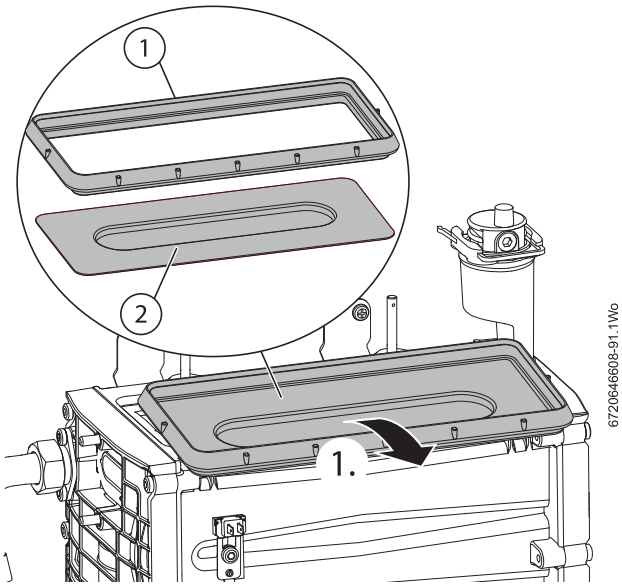


Fig. 99 Burner and gasket

7.8.15 Heat exchanger

Before removal:
- ▶ Isolate the electrical power to the boiler.
- ▶ Drain the boiler.

Heat exchanger disconnection

1. Undo the flow and return connections.
2. Pull both the flow and return pipes away from the heat exchanger.

▶ Replace the fibre washers (1) when replacing the heat exchanger.

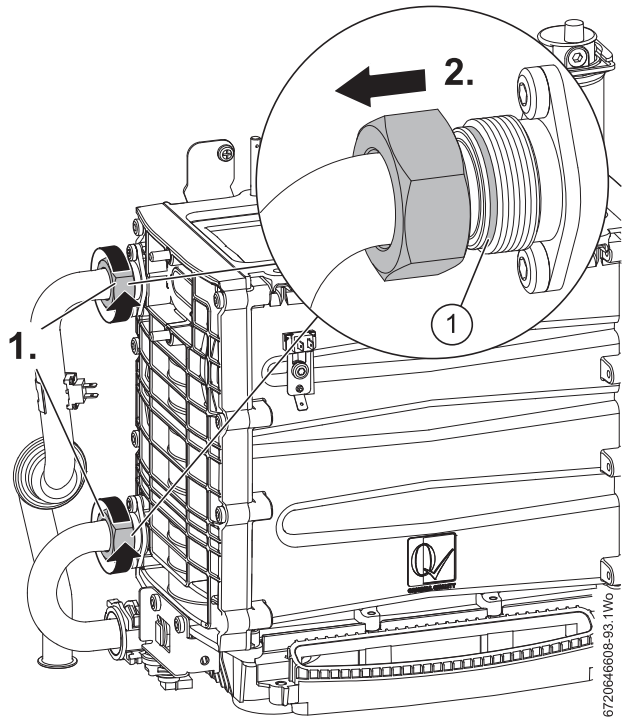


Fig. 100 Heat exchanger disconnection

Heat exchanger removal

- ▶ Ensure any electrical wires or connectors are removed.
- ▶ Remove the Auto air vent (refer to section 7.8.8) to ease removal of the heat exchanger

1. Unscrew the heat exchanger retaining nut.
2. Remove the heat exchanger retaining nut.
3. Remove the two screws securing the heat exchanger to the air box.
4. Lift the heat exchanger until the lower connection clears the hole in the air box.
5. Pull the heat exchanger towards you to remove.

CAUTION: Component replacement:
- ▶ After replacement of a gas related component, where a gasket or seal has been disturbed or replaced, check for gas tightness using a gas sniffer/ analyser.
- ▶ Also after re-assembly, carry out the following checks:
  Fan pressure in section 7.5,
  Flue gas analysis in section 7.6.

▶ Re-assemble in the reverse order.

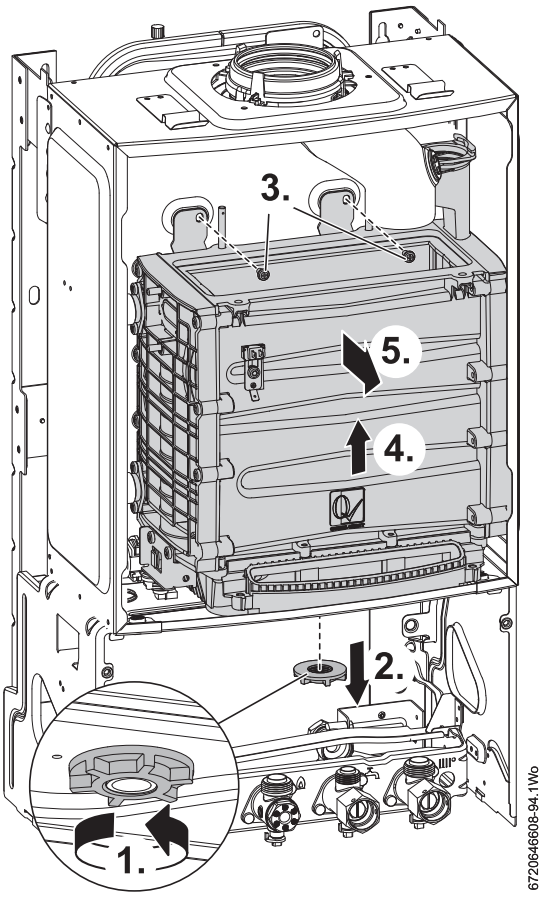


Fig. 101 Heat exchanger removal

7.8.16 Diverter valve motor and diverter valve removal

▶ Disconnect the lead from the diverter valve motor.

1. Pull the diverter valve motor from the housing.
2. Undo and remove the two screws from the diverter valve motor housing.
3. Pull the diverter valve motor housing from the diverter valve assembly.

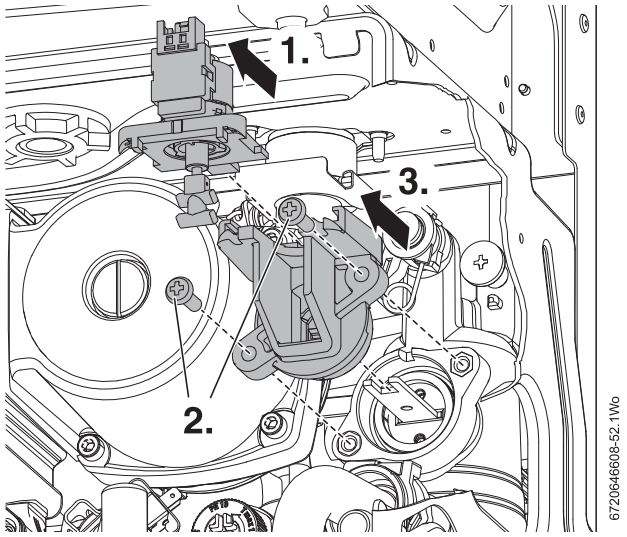


Fig. 102 Diverter valve

7.8.17 DHW Temperature sensor (NTC)

- ▶ Disconnect the electrical connector from the sensor.
- ▶ Unclip the sensor from the pipe.

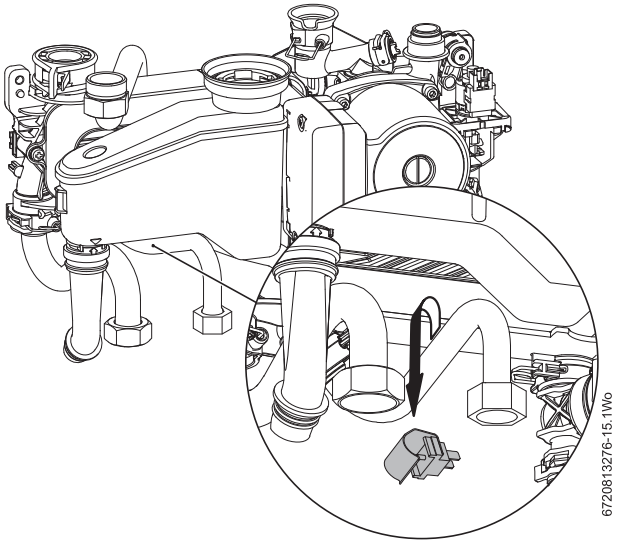


Fig. 103 DHW temperature sensor

7.8.18 Pump head

Before removal:

- ▶ Isolate the electrical power to the boiler.
- ▶ Drain the boiler.
- ▶ There may be water inside the pump. Protect any electrical items from water ingress.

1. Disconnect the main electrical connector from the bottom of the pump.
2. Remove the four screws securing the pump head.
3. Pull the pump free from the housing.

- ▶ Use a screwdriver to gently disconnect the three wire connector from the bottom of the pump.
- ▶ Ensure that the pump body is completely dry before fitting the new pump head, failure to do so may result in damage to the pump.

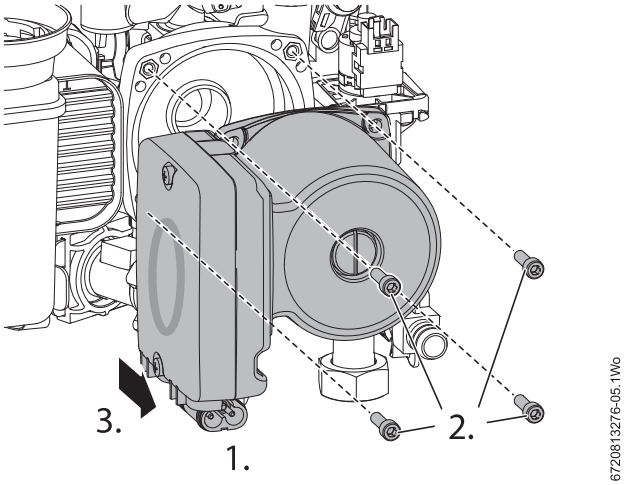


Fig. 104 Pump head removal

7.8.19 Flow sensor, flow restrictor and filter removal

- ▶ Isolate the cold mains and ensure that the DHW circuit is fully drained.
- ▶ Disconnect the electrical connection to the turbine.
- ▶ Undo the nut connecting the flow sensor assembly elbow to the Cold Mains isolating valve.

1. Remove the clip from the housing.
2. Pull the flow sensor assembly out.
3. Remove the flow regulator (1) from the turbine assembly (2).
4. Remove the clip from the flow sensor assembly.
5. Separate the elbow (3) from the turbine assembly (2).
6. Remove the filter (4).

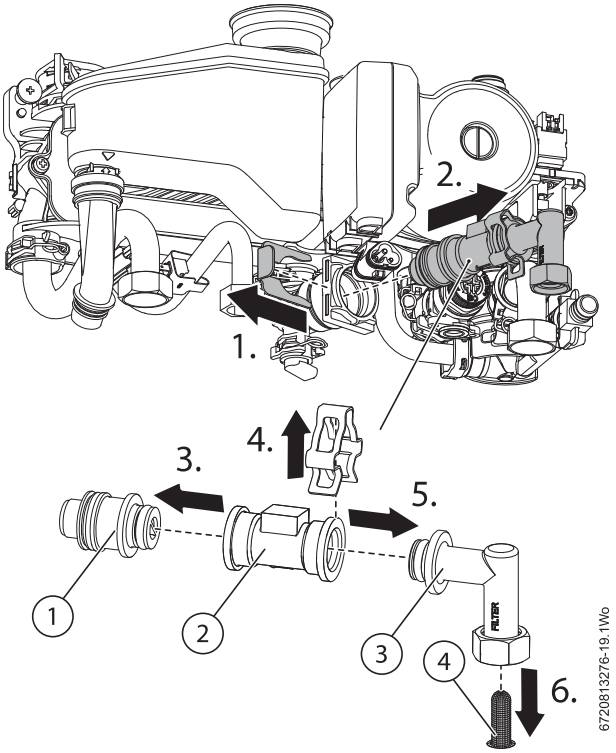


Fig. 105 Flow sensor assembly

7.8.20 Flow regulator

The flow regulator can be further broken down into:

1 - Spacer

2 - Flow regulator

3 - Flow regulator housing

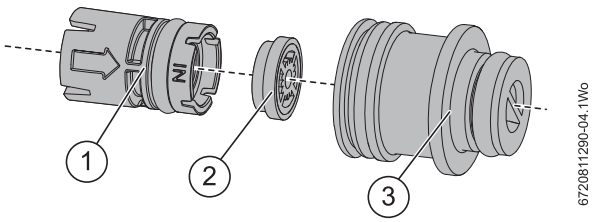


Fig. 106 Flow regulator assembly

7.8.21 Pressure gauge

▶ Ensure that the boiler is fully drained.

1. Carefully prise the lugs apart.
2. Remove the pressure gauge.
3. Withdraw the spring clip from the pressure sensing head housing.
4. Remove the pressure sensing head and pressure gauge capillary from the housing.

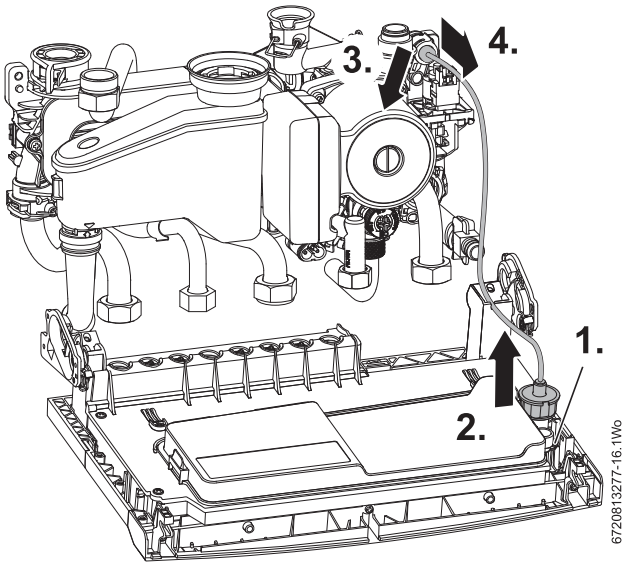


Fig. 107 Pressure gauge removal

7.8.22 Boiler return sensor (NTC)

▶ Isolate the boiler and ensure that the boiler is fully drained.

1. Withdraw the spring clip to release the sensor.
2. Pull the sensor down to remove from the housing.

▶ To refit follow the above actions in reverse.

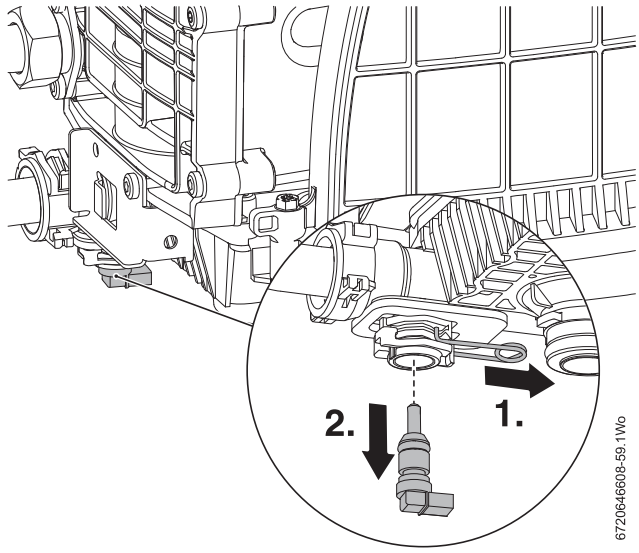


Fig. 108 Boiler return sensor

7.8.23 Drain tap

▶ Ensure that the boiler is full drained down.

▶ The drain tap rotates anti-clockwise for a ¼ turn to open.

1. Rotate the drain tap fully anti-clockwise passed the ¼ turn stop point to release.
2. Push in and withdraw from the housing.

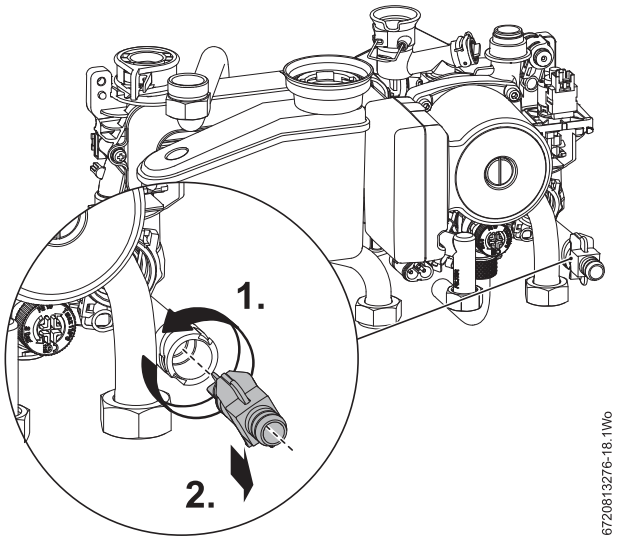


Fig. 109 Drain tap

7.8.24 CH pressure relief valve

▶ Isolate the boiler and ensure that the boiler is fully drained.

1. Release the knurled connector from the bottom of the PRV.
2. Pull the captive clip to the left to release the PRV.
3. Pull the Central Heating pressure relief valve out of the housing.

▶ Replace in reverse order, secure with the clip and mounting screws.

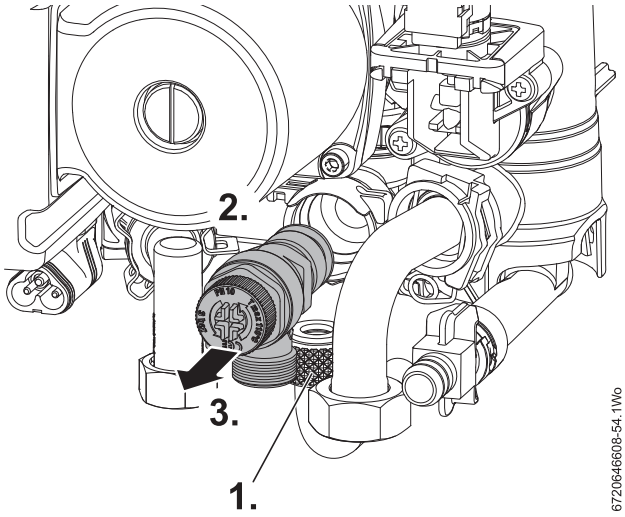


Fig. 110 PRV

7.8.25 DHW pressure relief valve

Before removal:
- ▶ Isolate the electrical power to the boiler.
- ▶ Drain the boiler.
- ▶ Isolate the cold water mains.

1. Release the retaining clip
2. Pull the pressure relief valve (1) with the deflector (2) from the housing.

▶ When replacing the DHW pressure relief valve, re-use the deflector from the old PRV.

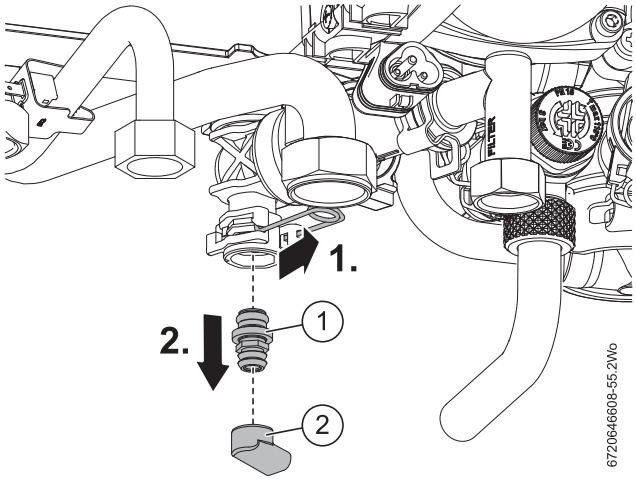


Fig. 111 DHW PRV

7.8.26 DHW plate heat exchanger

Before removal:
- ▶ Isolate the electrical power to the boiler.
- ▶ Isolate the cold water mains and drain DHW circuit within the boiler.
- ▶ Drain the boiler.

1. Undo and remove the retaining screw.
2. Rotate the left hand side of the heat exchanger towards you and slide out to the left.

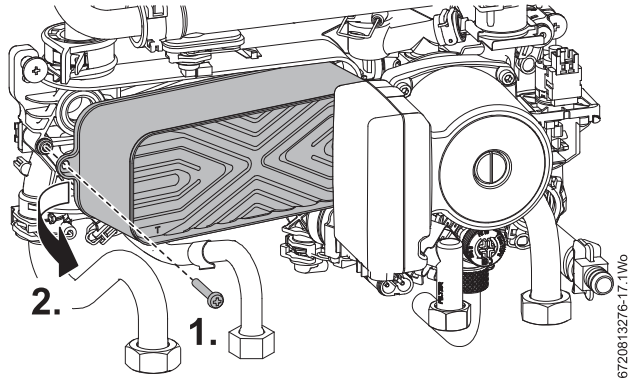


Fig. 112 Remove plate heat exchanger.

▶ When replacing the heat exchanger, ensure that any seals that have been disturbed are replaced.

7.8.27 Hydraulic block removal

Do not remove the hydraulic block assembly unless absolutely necessary.
Before removal:
- ▶ Isolate the electrical power to the boiler.
- ▶ Drain the boiler.
- ▶ Isolate the cold water mains and drain the DHW circuit within the boiler.

1. Squeeze the ratchet connector and rotate clockwise to release.
2. Release the pin on the expansion vessel connector at the pump assembly.
3. Pull the expansion vessel up and secure in raised position.
4. Remove the clip securing the pump return to the heat exchanger.
5. Remove the two screws securing the CH pressure relief valve mounting.
6. Remove the screws securing the hydraulic block assembly.

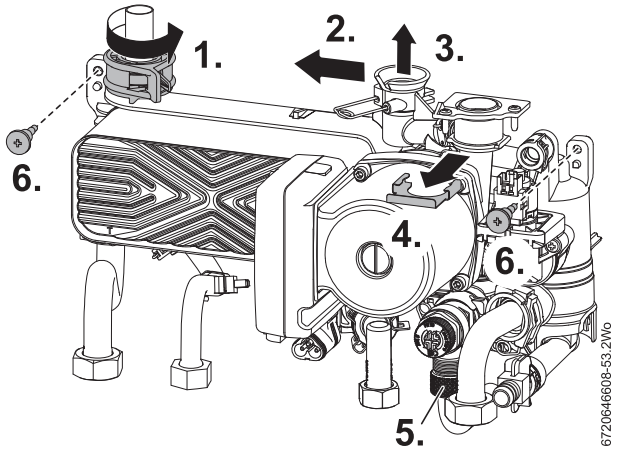


Fig. 113 Hydraulic block

7.8.28 Bypass valve

Remove the hydraulic block from the boiler.

1. Remove the clip on the return connection.
2. Remove the clip on the pump connection.
3. Remove the spring clip retaining the by-pass pipe.
4. Separate the return unit from the flow manifold.
5. Using a pair of pliers remove the by-pass valve.

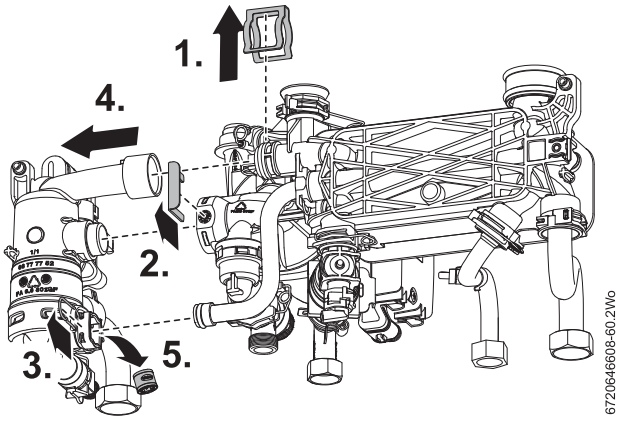


Fig. 114 Bypass valve

▶ When re-assembling, in reverse order, ensure that any seals that have been disturbed are replaced.

7.8.29 Access to boiler control components

1. Release the three captive screws retaining the installer access cover.
2. The access cover can now be removed with the flap.

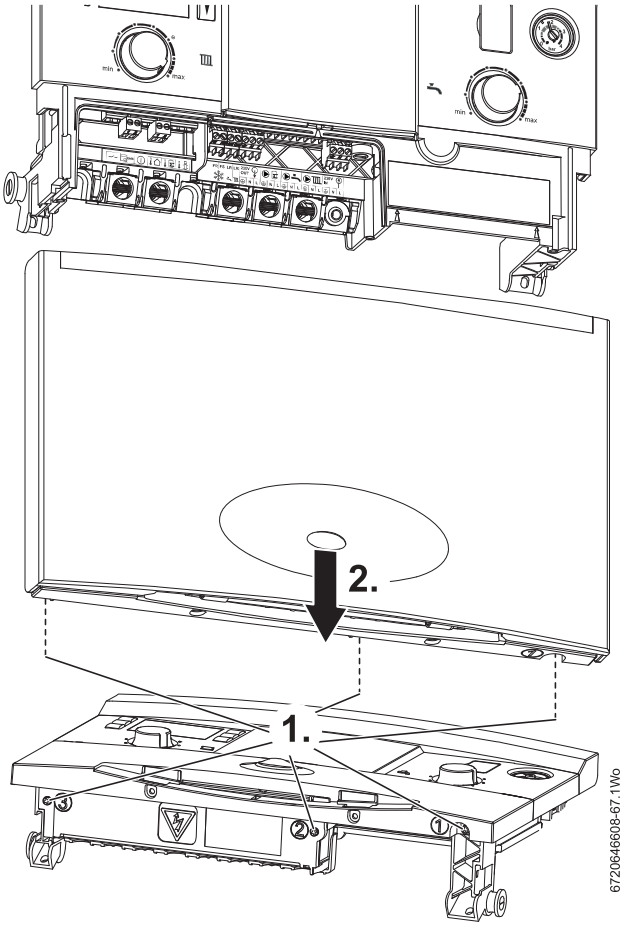


Fig. 115 Installer access cover

PCB fuse

The fuse is located next to the high voltage connectors and the spare fuse (1) is located on the back of the access cover.
To remove the fuse:

1. Push the top of the fuse holder up.
2. Rotate the top of the fuse holder anti-clockwise and remove.

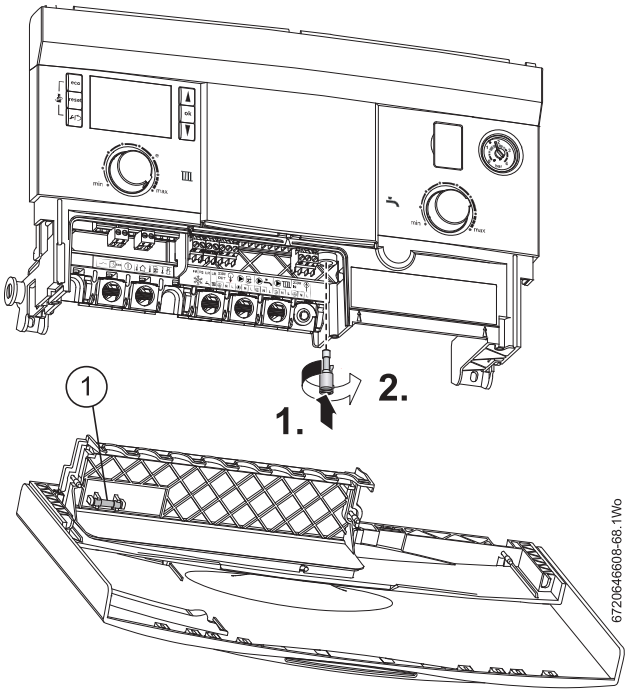


Fig. 116 Fuse holder

7.8.30 Replacing the control unit

The control unit is supplied in a plastic housing. The complete unit must be replaced.
The HCM must be exchanged from the old to the new control unit.

With the installer access cover removed:

1. Remove all the connectors
2. Slide out all the cable strain relief clamps

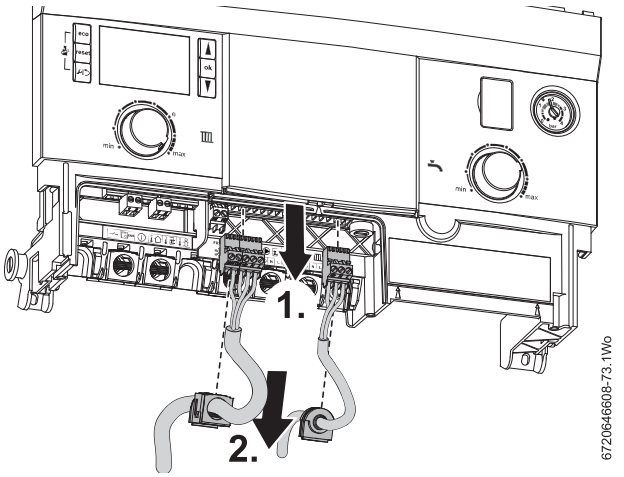


Fig. 117 Disconnect external connections

With the control unit in the service position:

1. Remove the single cover retaining screw.
2. Release the catches and remove the access cover.

▶ Lift the HCM (3) from the retainer and disconnect the cable, keep the HCM to fit into the new control unit.
▶ Disconnect and remove all cables and connectors from the control unit.
▶ Remove the pressure gauge, refer to section 7.8.21.

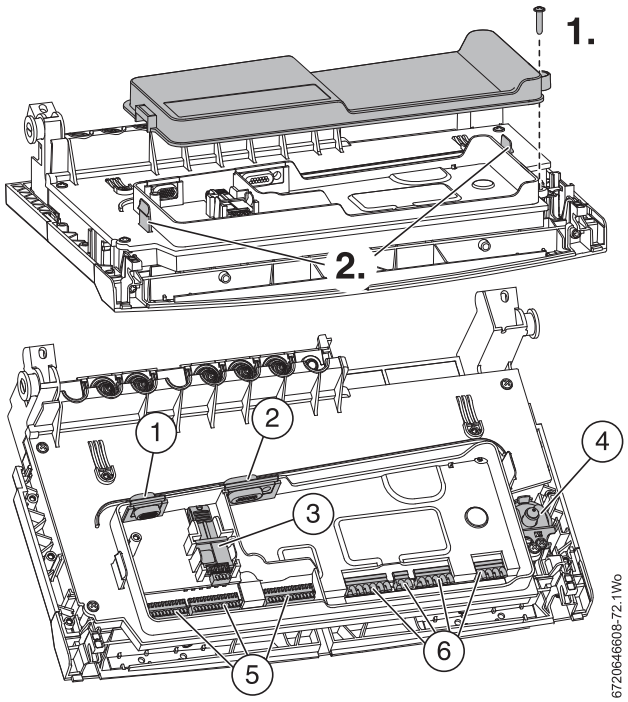


Fig. 118 Access to the cables

[1] Low voltage cable inlet
[2] Mains voltage cable inlet
[3] HCM - Heating Control Module
[4] Pressure gauge
[5] Low voltage connectors
[6] Mains voltage and earth connectors

Removing the control unit

- ▶ Support the control unit and detach the control unit support strap.

1. Release the two catches underneath the panel.
2. Hinge the control unit up to approximately a 45° angle.
3. Push inwards and upwards to disengage the control unit from the hinge supports.

- ▶ Remove the support strap from the control unit.
- ▶ Fit the new control unit in the reverse order.
- ▶ Attach support strap to the new control unit.
- ▶ Fit the HCM, removed from the old control unit, into the retainer and reconnect the cable.
- ▶ Reconnect all the cables previously disconnected under the access cover.

CAUTION: Earth cables must be reconnected.

- ▶ Replace the access cover and secure with the screw.
- ▶ Reconnect the cables previously disconnected under the installer access cover.
- ▶ Replace the installer access cover and secure with the three screws removed earlier.

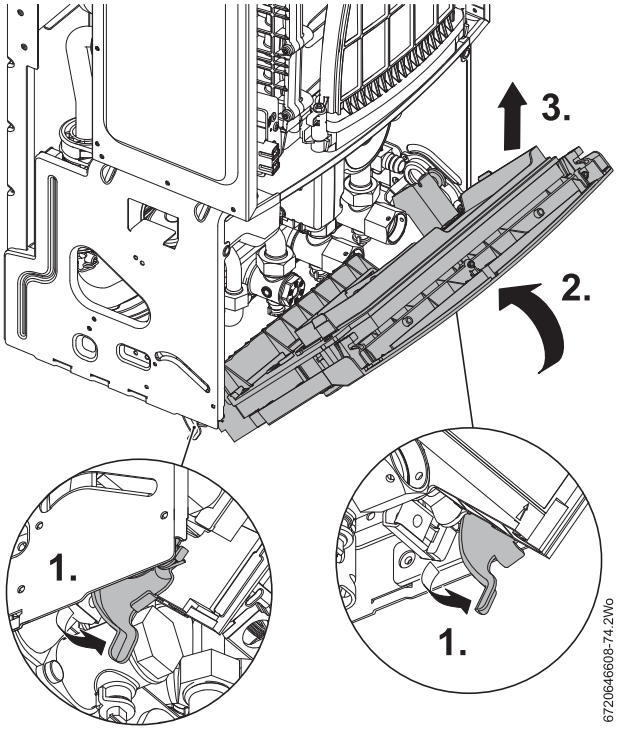


Fig. 119 Removing the controller

7.8.31 Expansion vessel

The expansion vessel can be replaced with the boiler in place if there is a side exit flue fitted and a minimum clearance of 450mm above the boiler casing.
If a vertical flue is fitted then a similar clearance to one side of the flue is required.

If the 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 pipe from the heating system as close as possible to the boiler.

Expansion vessel replacement (Boiler fitted)

- Isolate the power from the boiler.
- Lower the control panel into the service position.
- Isolate the boiler from the heating system using the service valves.
- Drain the boiler.
- At the pump manifold, release the clip and disconnect the expansion vessel.
- Pull the vessel up and out over the flue system or to one side if a vertical flue is fitted.
- Fit a new “O” ring to the replacement vessel and smear with silicone grease.
- Reassemble the expansion vessel into the wall frame and slide down the runners until the end pipe is reconnected into the pump manifold.
- Secure the pipe with spring clip

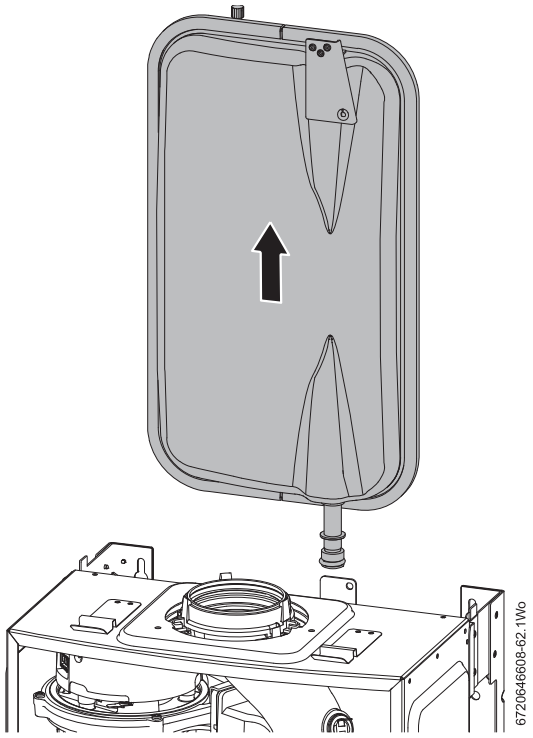


Fig. 120

Expansion vessel replacement (boiler Removed)

- Isolate the power from the boiler.
- Isolate the heating systems and gas connection using the service valves.
- Drain the boiler.
- Disconnect the electrical supply and any external controls.
- Disconnect the flue from the boiler.
- Undo the connections to the boiler at the service valves.
- Lower the control panel into the service position.
- At the pump manifold, release the clip and disconnect the expansion vessel.
- Lift the expansion vessel up to clear the pump manifold connection.
- Secure the expansion vessel to the wall frame by the bracket at the top.
- Undo the two screws at the bottom of the case.
- Release the clips at the top of the case and slide the case towards you to remove.
- Disconnect the pipes and siphon discharge hose from the plumbing manifold.
- Disconnect the PRV.
- Lift the boiler off the wall frame.

1. Remove the screw retaining the expansion vessel to the wall frame and lift the expansion vessel to clear the cross beam.
2. Pull the expansion vessel towards you and down to remove.

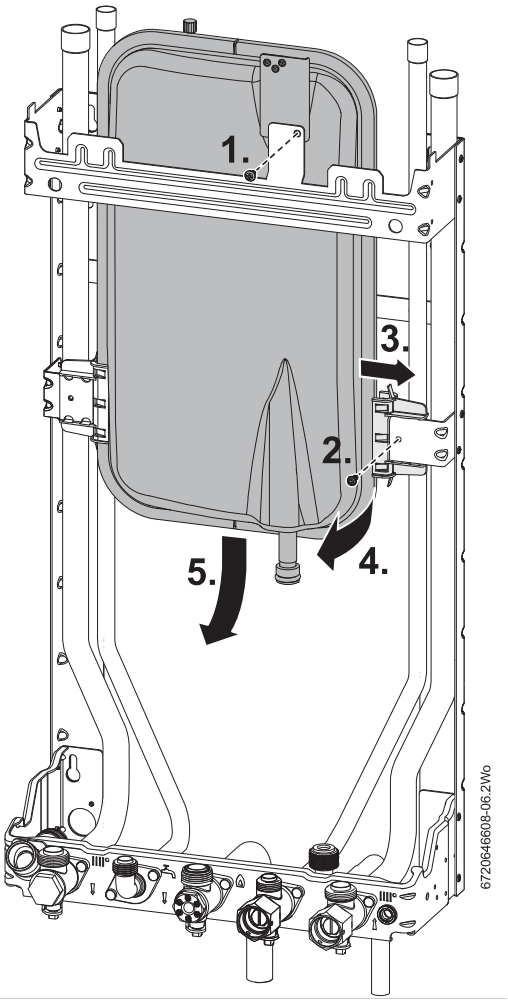
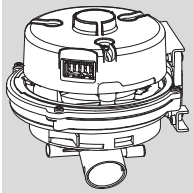


Fig. 121 Removing the expansion vessel

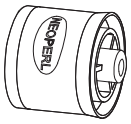
- Replace the expansion vessel in the reverse order.
- Follow the procedures in this manual for commissioning this product.

7.9 Short parts list

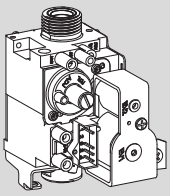
Fan 8 716 117 417



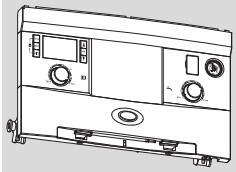
By pass valve 8 716 106 434 0



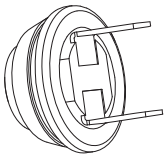
Gas Valve 8 718 600 04A 0



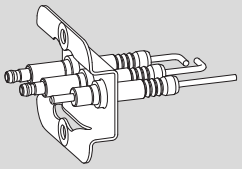
Control panel 8 737 909 49A 0



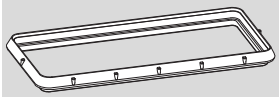
Flue overheat thermostat 8 717 206 213 0



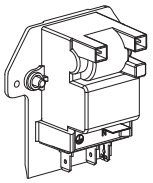
Electrodes (including gasket) 8 718 600 28A 0



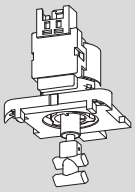
Burner seal 8 718 600 24A 0

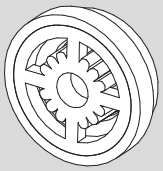


Spark generator
8 716 117 077

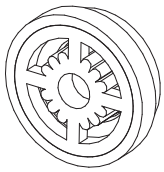


Diverter valve motor 8 718 682 839 0

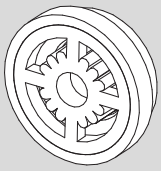




Flow regulator 10 litre
E-W-LP Light blue
8 718 684 212 0
Used on 28CDi Compact ErP

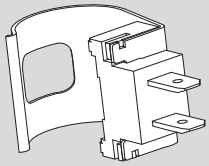


Flow regulator 11 litre
E-W-LP Brown
8 718 684 213 0
Used on 32CDi Compact ErP

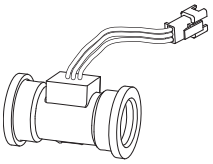


Flow regulator 13 litre
E-W-LP Olive green
8 718 688 409 0
Used on 36CDi Compact ErP

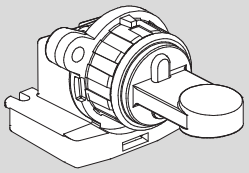
Flow NTC 8 718 688 801 0



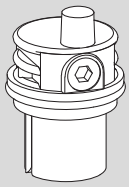
Flow turbine 8 717 002 132 0



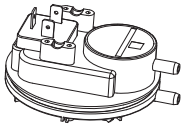
Diverter valve assembly 8 716 106 845 0



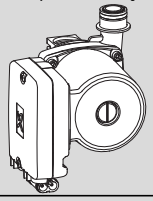
Auto Air Vent T 005 000 87A 0



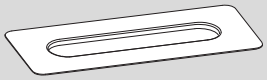
Air Pressure Switch
8 716 106 633 0



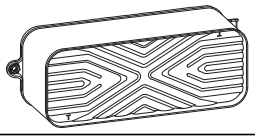
Pump assembly 8 716 117 628



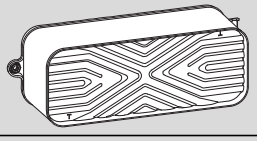
Burner 8 718 600 23B 0



Heat exchanger 18 plate 8 718 642 948 0
Used on 28CDi Compact ErP



Heat exchanger 22 plate 8 718 641 238 0
Used on 32 & 36CDi Compact ErP

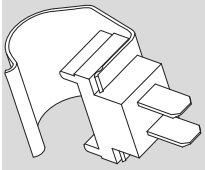


Pressure gauge 8 718 686 513 0

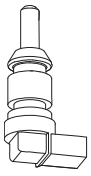
Expansion vessel 8 718 684 945 0

Pressure relief valve 3 bar 8 718 681 163 0

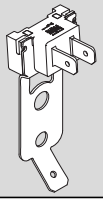
DHW NTC 8 716 010 809 0



Return temp. sensor (NTC) 8 718 684 323 0

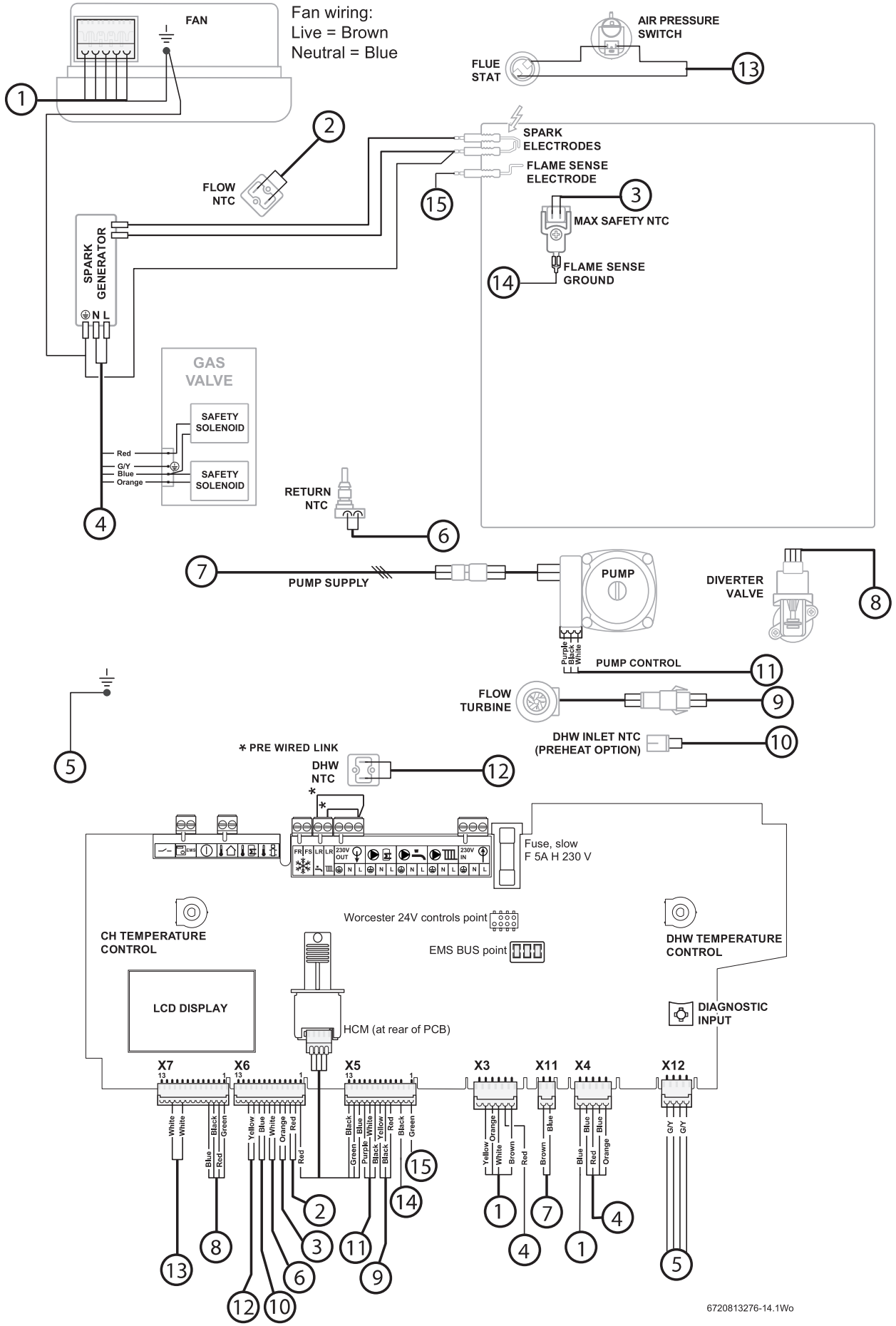


Max safety sensor NTC 8 718 685 483 0



8 FAULT FINDING AND DIAGNOSIS

8.1 Internal wiring diagram



8.2 Central heating function

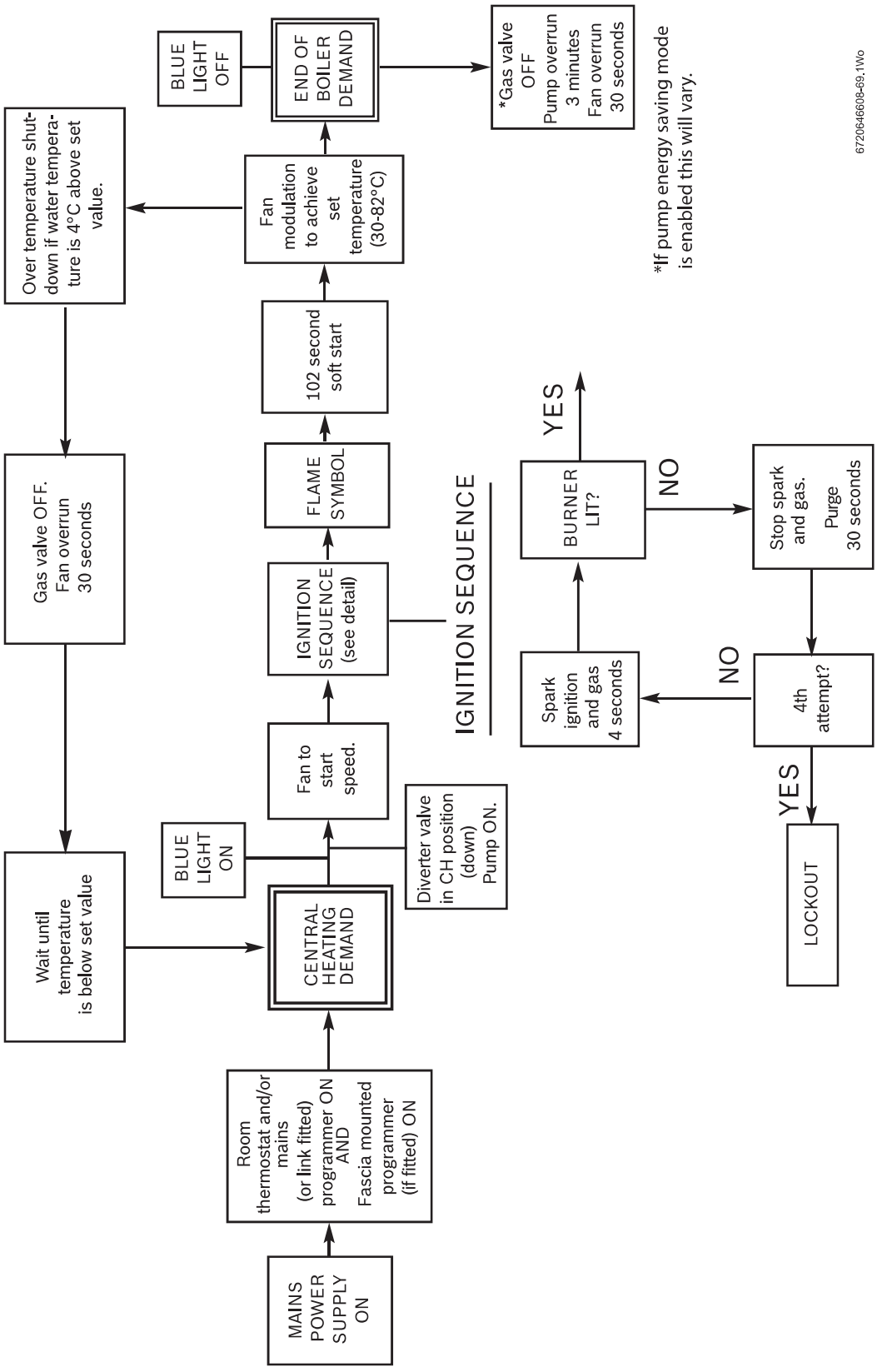


Fig. 122 Central Heating function

8.3 Preheat and DHW function

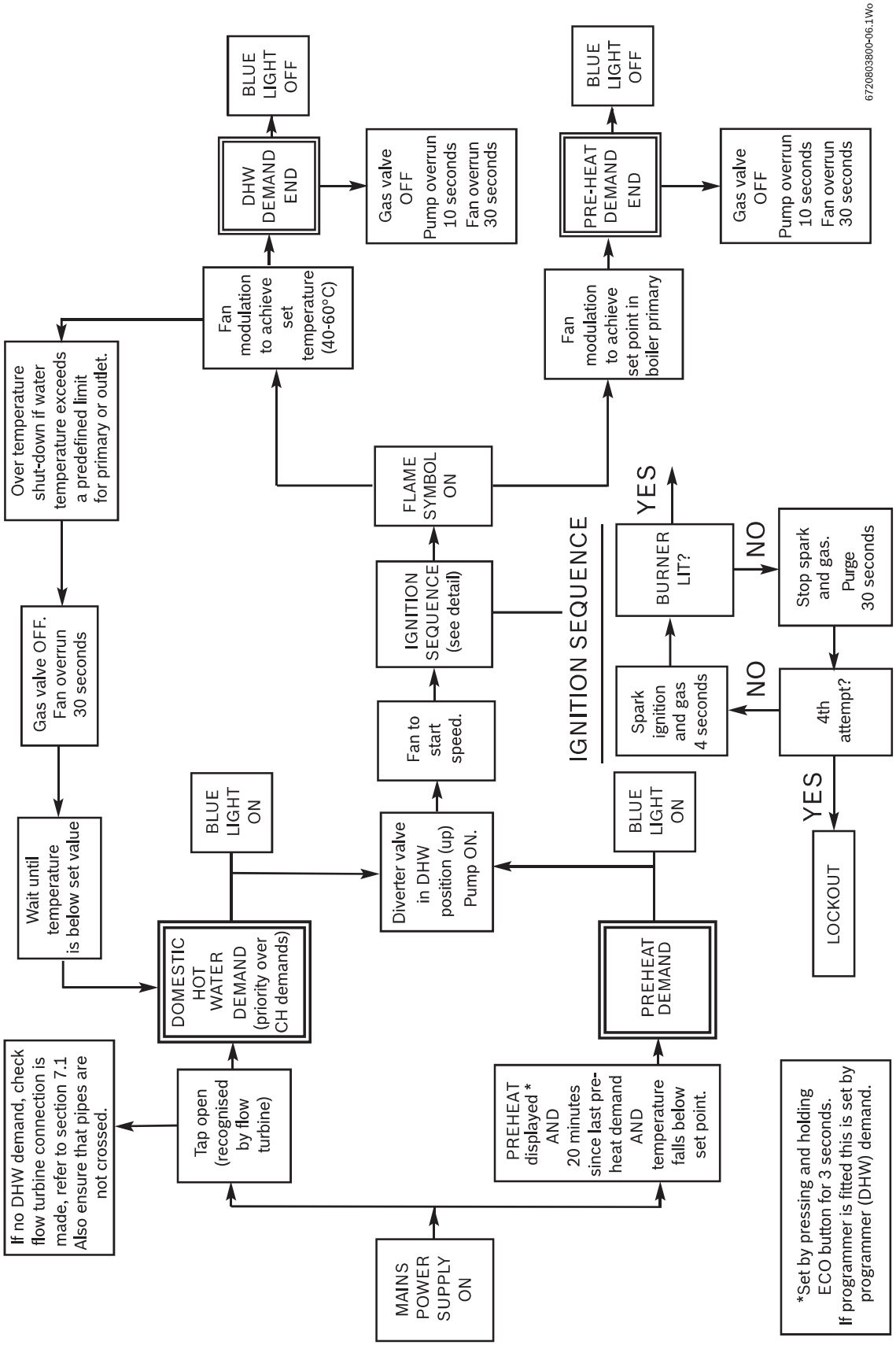


Fig. 123 PreHeat and DHW function

8.4 Protection function

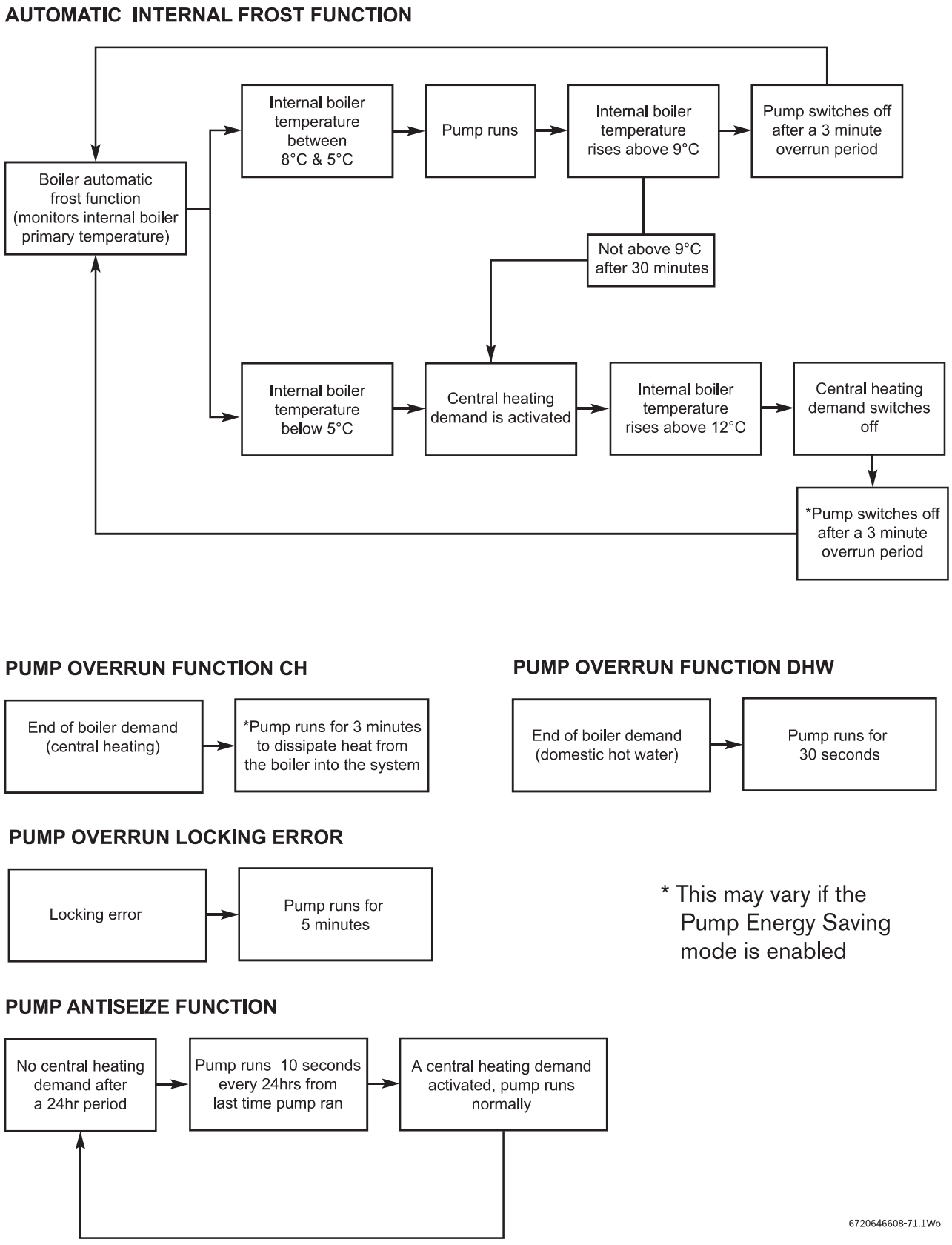


Fig. 124 Protection function

8.5 Information and service menus

STATUS CODES

During normal boiler operation various Status codes can be displayed by pressing the button.

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

These are not always faults, but just provide information concerning the current status of the boiler.

Status codes	Fault codes	
200		CH System is being heated
201		DHW system is being heated
202		Anti rapid cycle mode
203		System stand by
204		System waiting, primary flow temperature above setpoint
205		Waiting for airflow
207	CE	System pressure too low
208		Test mode active due chimney switch
210	E9	Flue-gas thermostat or Air pressure switch activated
211		TTB opened (thermal kickback device)
212		Safety or flow temperature rises too fast
213	D4	Temperature difference between supply and return exceeding limit
214	C7	Fan not running
215	C6	Fan running too fast
216	C6	Fan running too slow
217	C7	No airflow after defined period of time
218	E5	Flow temperature too high
219	E9	Safety sensor temperature too high
220	E9	Safety sensor shorted
221	E9	Safety sensor disconnected
222	E2	Flow sensor shorted
223	E2	Flow sensor disconnected
224	E9	MAX thermostat activated
225		Difference between flow and safety exceeding limit (bi-sensor only)
227	EA	No ionisation detected after ignition
228	F7	Ionisation current detected before burner-start
229	EA	Loss of ionisation signal during operation
230	EA	Ionisation signal out of bounds
231	FD	Mains power error - electrical power interruption
232	D3	external cut-off switch activated
233	9U	HCM problem
234	EA	Gas valve coil disconnected
237	C4	Airflow present during last 24 hours - fan running continuously
238	F0	Internal error - replace control board
239	F0	Watchdog relay error
240	D1	Return sensor shorted
241	D1	Return sensor disconnected
242 to 256	F0	Internal error call Bosch helpline 0330 123 3366
257	b7	Internal error - replace control board
258 & 259	F0	Internal error call Bosch helpline 0330 123 3366
260		No temperature rise after burner start
261	EA	First Safety timing error
262 & 263	F0	Internal error call Bosch helpline 0330 123 3366
264	C1	Airflow stopped during operation
265		Stand-by mode forced due to energy transfer limit
266	CE	No pressure variation detected after switching pump
267	F0	Watchdog time out error
268		Component test mode
269	EA	Ignition device activated too long
270		Power up mode
271	D4	Temperature difference between flow and safety sensor exceeding limit
272	F0	Internal error
273	C4	Airflow present during last 24 hours
274		Ionisation signal present during last 24 hours
276	E9	Flow temperature exceeded 95°
277	E9	Safety sensor temperature exceeded 95°
278	F0	Sensor test failed
279	F0	AD converter error, unstable measurement
280	F0	Recycle timing error
281	A1	Pump stuck or running in air
282	H5	No feedback from pump
283		Burner starting
284		Gas valve(s) opened, first safety time started
285	E9	Return temperature exceeded 95°C
286	D1	Return temperature too high
287	F0	Ionisation sensor shorted
288	CF	Water pressure sensor not connected or short-circuit to supply
289	CF	Water pressure sensor not connected or short-circuit to ground
290	F0	AD converter reference error
305		Anti fast cycle mode
306	FA	Ionisation detected after burner stop
307		Pump stuck
308		Pump running in air
309		CH & DHW system are being heated
310		CUS communication error
311		CUS locked
312		CUS blocked
313		CUS reported error condition
314		Mains disconnected during super lockout
315		Several times lack of water flow
316	E9	Flue gas sensor temperature too high
317	A3	Flue gas sensor shorted
318	E9	Flue gas sensor disconnected
321		Self-test of flue gas supervision
322		Code error
323	A8	EMS communication error
324		DHW-NTC defect
325		DHW-NTC not correctly installed
326		Storage-NTC defect
327		Reset-key stuck or short-circuit
328		Internal error
329	CE	No pressure variation detected after switching pump

Status codes	Fault codes	
332	E5	Supply sensor exceeded 110°C
333		Start temporarily not allowed due to flow error on CH
338	F0	Too many short burner starts without confirmation of water flow
341	D4	CH: supply and/or return temperatures rising too fast
342	D4	HW: supply temperature rising too fast
343	ED	CH: flue gas temperature rising but supply temperature not
344	ED	HW: flue gas temperature rising but supply temperature not
345	EF	Supply and/or return temperatures do not change after burner start
346	EC	Flue gas temperature rising too fast
347	E3	Return temperature higher than supply temperature (some time after burner start)
348	EE	HW: supply temperature too hot
349	EF	CH: Boil Detect, large delta T despite minimum burner load
350	E2	Flow sensor shorted 351 'E2' Flow sensor disconnected
353	--	Burn temporarily blocked due to no 20 minute continuous OFF time in last 24 hours.
354		Overpressure setting erased
357		Primary Heat Exchanger air venting program active - approx. 100 seconds
358		Three way valve kick
359		DHW outlet temperature too hot
364	FA	Gas valve EV2 leak test failed
365	Fb	Gas valve EV1 leak test failed
372		Temporarily ignoring CH requests to limit temperatures of the appliance components
373	8C	SuperLock caused by too frequent thermostat overheat detections during burning
374	8C	SuperLock caused by too frequent ionisation loss during burning
375	E4	Preheat sensor on DHW inlet Short Circuit
376	E4	Preheat sensor on DHW Inlet Open Circuit
380		Inlet temperature greater than DHW Outlet Set point
800	CC	Outdoor sensor defect
808	A7	Domestic hot water sensor defect
810		Domestic hot water remains cold
828		Water pressure sensor defect

8.5.1 Selecting the information menu

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

All menus time-out after two minutes and the display returns to the normal operation display, the display backlight turns off after another 30 seconds.

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

To enter Information menu:

1. Press the [↵] button to enter the information menu.

▶ A three figure boiler status code will be displayed along side the information menu number. Refer to status code table on page 65 for a description of the boiler status codes.

2. Use the [▲] and [▼] arrow buttons to scroll through the menu items.

▶ Press the [↵] button again to exit the Information menu.

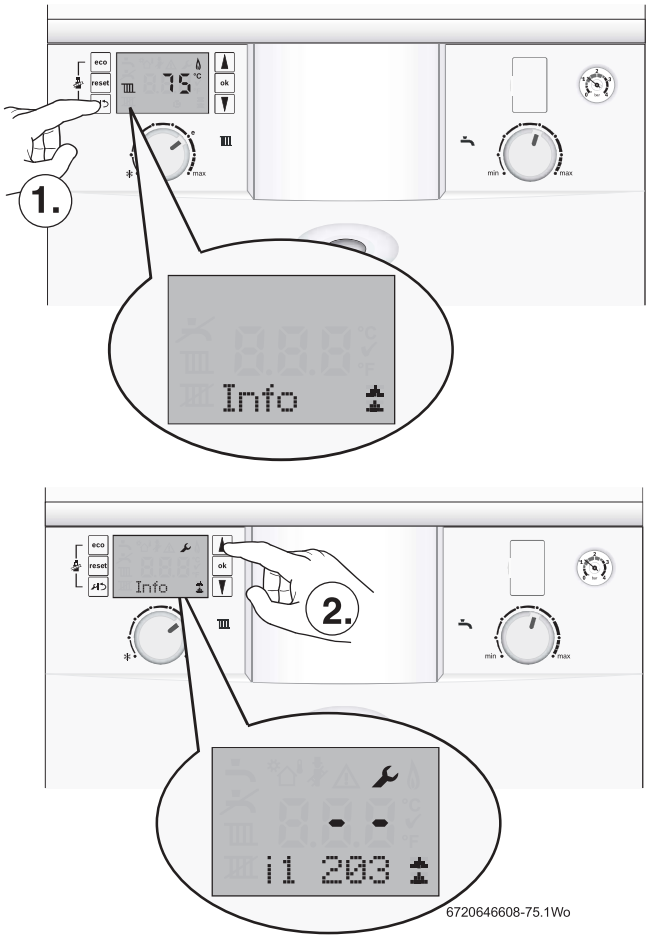


Fig. 125 Accessing the Information menu

i1	Current status	Every operation and mode of the boiler has a related boiler status code. The boiler status code is displayed on the screen as a three figure number. Refer to table on page 65 or error table for information on the boiler status codes.
i2	Last error	This can be viewed during normal operation. Displays the last diagnostic code with boiler status code.
i3	Maximum heating output	The maximum possible heat output is displayed in kW. The boiler may have the maximum output reduced via Menu 3.1A
i6	DHW flow rate at 40 °C temp. rise ± 15%.	The screen displays the current DHW flow rate in litres per minute to one decimal place.
i7	Supply temperature setpoint	This is the temperature set point for the primary flow from the main heat exchanger. (This will be zero during HW demand.)
i8	Ionization current	The ionization current should be equal to or greater than 35 µA (micro Amps) when boiler is at maximum rate.
i9	Flow temperature	This is the actual temperature from the main heat exchanger displayed in real time.

Table 29 Information menu listing

i10	Maximum temperature	This is the current temperature from the “Maximum safety sensor”. This sensor is mounted on the front of the heat exchanger.
i11	DHW flow temperature	The current DHW flow temperature.
i12	DHW temperature setpoint	This is the temperature selected via the Hot Water control knob on the fascia.
i14	Return temperature	The current temperature returned to the main heat exchanger.
i15	Outdoor temperature	Optional outdoor temperature sensor needs to be connected for this menu to be activated.
i16	Pump modulation	The current pump modulation is displayed as a percentage.
i17	Burner modulation	The current burner modulation is displayed as a percentage.
i18	Fan speed	The current fan speed is displayed in Hertz. The value is up-dated in real time.
i19	Time inputs	This indicates the status of the optional fascia mounted controls: 0 = CH off, DHW off 1 = CH off, DHW on 2 = CH on, DHW off 3 = CH on, DHW on
i20	Software version	Firmware version of the main control board.
i21	Software version	Firmware version of the fascia control display board
i22	Heat Control Module (HCM) number.	The last three digits of the HCM are displayed: 584 = 28kW Combi N.G. 585 = 28kW Combi L.P.G. 582 = 32kW Combi N.G. 583 = 32kW Combi L.P.G. 580 = 36kW Combi N.G. 581 = 36kW Combi L.P.G.
i23	Heat Control Module (HCM) version number.	For example “4”

Table 29 Information menu listing

8.5.2 Selecting service menus

1. Press and hold [⚙] and [ok] buttons together for one second, the display will show Menu 1.

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

2. Scroll up and down through the menus with the [▲] and [▼] buttons on the right hand side of display.

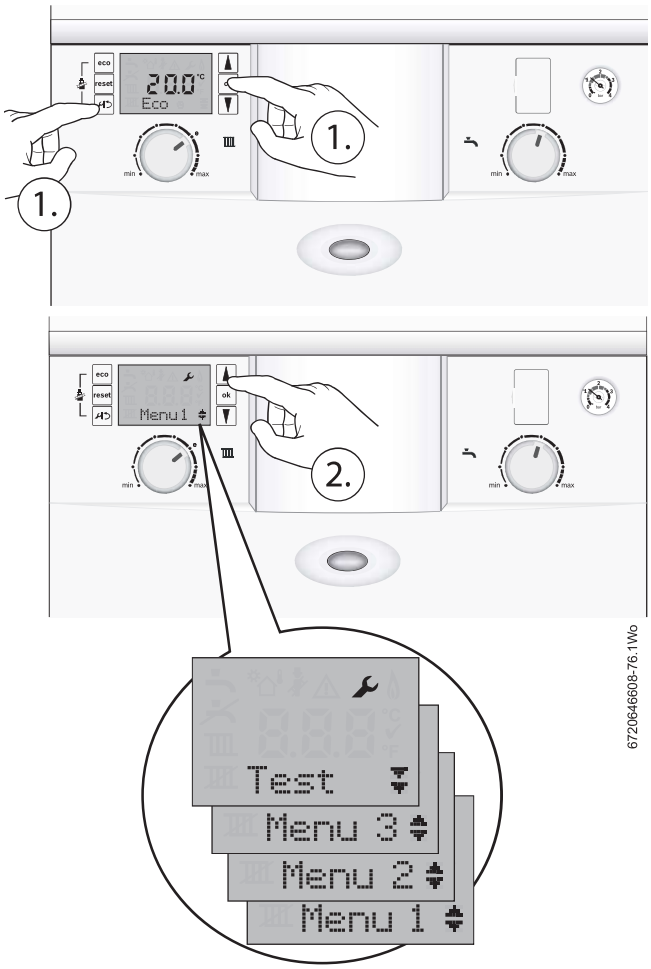


Fig. 126 Service menu selection

8.5.3 Menu 1 - System parameters

Not applicable for Greenstar CDi Compact ErP

Initially Menu 1 will be displayed, but will contain no options.

8.5.4 Menu 2 - Boiler parameters

1. Select Menu 2 via the [▲] and [▼] scroll buttons.
2. Press and hold the [ok] button for one second to enter Menu 2.

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

To modify setting, select the desired menu option (refer to table 30) and press the [ok] button, the option will flash.

Adjust the parameter using the [▲] and [▼] arrow buttons and press the [ok] button to confirm.

A ✔ will display for three seconds to confirm the update of the new value.

If the setting is confirmed please record the saved value in the empty box next to the relevant setting in Table 30.

The same process is used for adjusting all Menus 1, 2, 3 and Test.

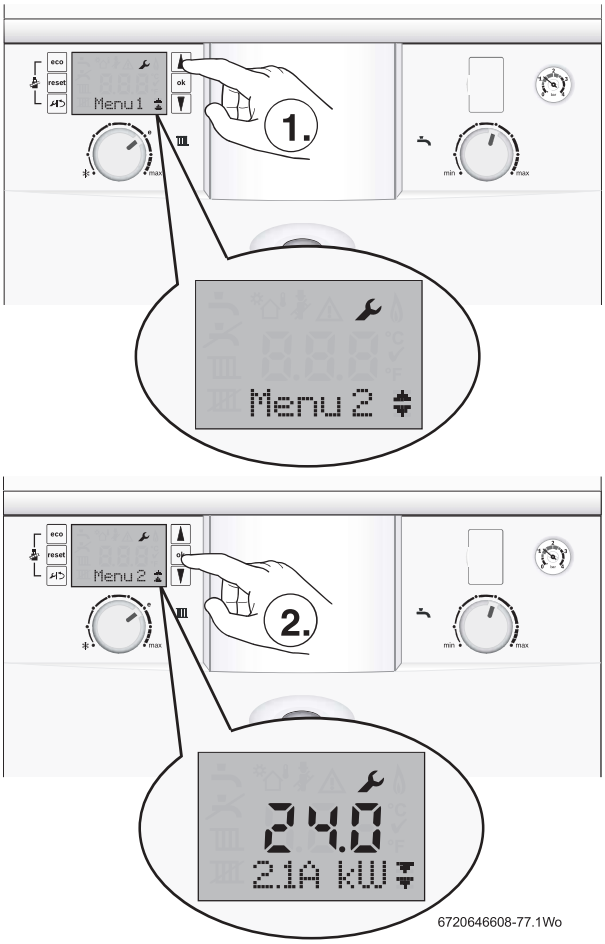


Fig. 127 Menu 2 selection

Para No.	Parameter	Description	Updated value
2.1A	Maximum power CH	Range rate the CH of the boiler. Adjustment in kW. The maximum is 24kW.	
2.1C	Pump head selection	Select the right pump map (load and modulation percentage) to suit the property. 0 = Variable speed setting 1 to 4 option pump maps	
2.1E	Pump energy saving mode	4 = mode ON, 5 = mode OFF	
2.1H	Minimum pump speed (pump speed at maximum CH burner load)	This parameter is only visible when 2.1C is set to 0. Then the min.pump speed can be set.	
2.1J	Maximum pump speed (pump speed at maximum burner load)	This parameter is only visible when 2.1C is set to 0. Then the max.pump speed can be set.	
2.2C	Air purge mode	This feature can be selected to purge the system and boiler of air. 0 = off, 1 = auto, 2 = on	
2.3B	Anti fast cycle time for CH	This sets the amount of time between stop and starts of the main heat exchanger. The default is 5 minutes, the range is 3 to 45 minutes.	
2.3C	Anti fast cycle flow temperature hysteresis (negative tolerance only)	This sets the temperature drop before the burner re-starts, 6°K is the default. This is used in conjunction with the “Anti fast cycle time” The range is from 2 to 15°K in 1°K steps.	
2.3F	CH delay after DHW demand	The default time is 1 minute and can be adjusted to be between 0 and 30 minutes. This feature helps to keep the DHW heat exchanger hot if frequent demands are made. The boiler will not burn extra gas. CH will not be heated during this set time period.	
2.5F	Service reminder time	Between 1 and 72 months can be set	
2.7A	Operation/fault indicator (blue light) activation	0 = The blue light will only operate as a flashing fault alert. 1 = The blue light will operate as a boiler operation and fault alert. This is set to 1 by default.	
2.9E	Turbine signal delay	Delay time set to ignore a temporary DHW demand. Maximum delay is three seconds which can be set in ¼ second increments, e.g. 0.5 seconds is displayed as 2 or 1 second as 4.	
2.9F	Pump post purge time for CH	The default pump overrun time is 3 minutes. This can set between 3 and 30 minutes. The actual time will be affected by the Pump Energy Saving mode.	

Table 30 Menu 2 parameters

8.5.5 Reset to factory settings

To reset any or all changes made in menu 2 back to the factory defaults setting:

NOTICE: Menu 3
- Any changes made in Menu 3 are not reset via these actions.

1. Press and hold the [spanner], [ok] and [▲] arrow button for at lest five seconds.
   The screen will then display code 8E with the spanner symbol.
2. Press the [reset] button and “Reset” will be displayed with the tick symbol for three seconds.
   After three seconds the screen will revert to the normal operation screen.

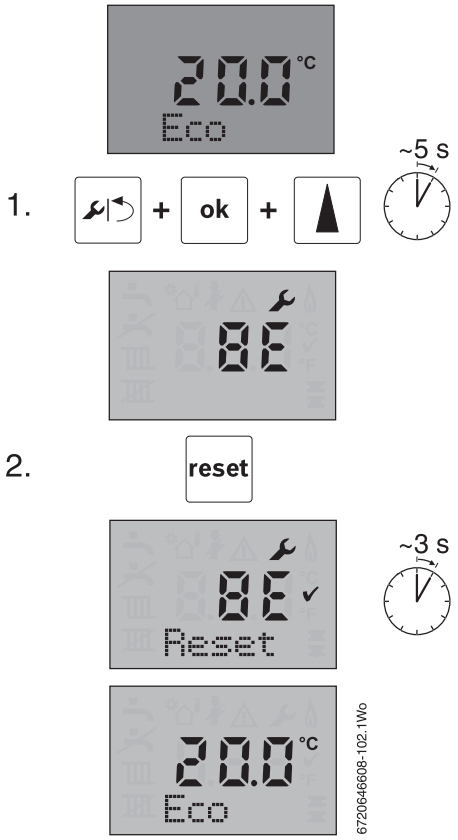


Fig. 128 Reset sequence

8.5.6 Menu 3 - Boiler maximum & minimum limits

The menu shows the boiler's minimum and maximum limits. Which can be adjusted in this menu.

The boiler will revert to adjusted settings in Menu 3 following a power interruption.

Menu 3 cannot be factory re-set.

1. Select menu 3 via the [▲] and [▼] scroll buttons.
2. Press and hold the [ok] button for at least 5 seconds to enter Menu 3.

To modify setting, select desired menu option (refer to table 31) via the [▲] and [▼] arrow buttons and press the OK button, the option will flash.

Adjust the parameters using the [▲] and [▼] arrow buttons and press the OK button to confirm.

A ✔ symbol will be displayed for three seconds to confirm the update of the new value.

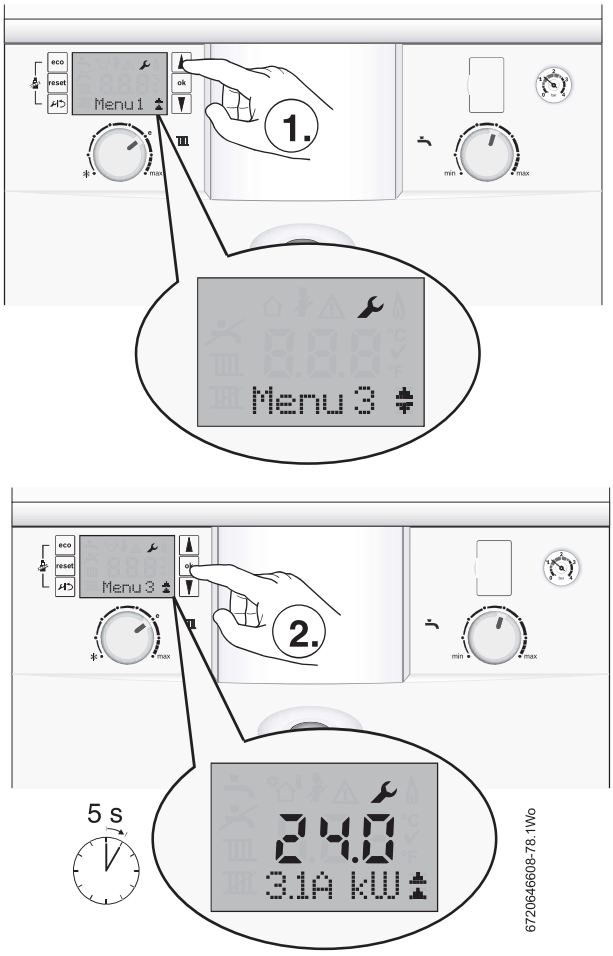


Fig. 129 Menu 3 selection

3.1A	Maximum heating output	The maximum heating output in kW can be set here. The output can be down rated. Note: When maximum boiler output is required for CO/CO_2 testing, this parameter is ignored and full power is delivered for the duration of the test.
3.2B	Maximum flow temperature	This limits the upper flow temperature of the central heating knob. Which is 82°C as a maximum. This can be down rated.
3.3D	Minimum boiler power for both heating and hot water.	This sets the minimum output, for example 7kW.

Table 31 Menu 3 parameters

8.5.7 Using the test menu

This menu enables the testing of the functionality of components in an ON/OFF mode.The duration of each test is up to 60 seconds.

1. Select menu TEST via the [▲] and [▼] scroll buttons.
2. Press the [ok] button for one second to enter TEST.

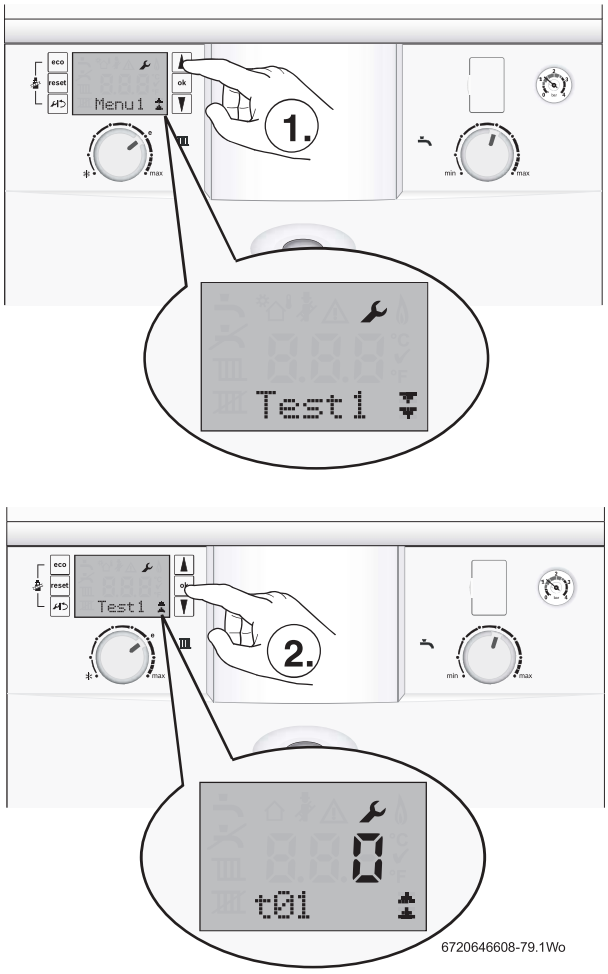


Fig. 130 Selecting test menu

Selecting a test component

Refer to table 32 and use the ▲ and ▼ arrow buttons to scroll through the various test options.

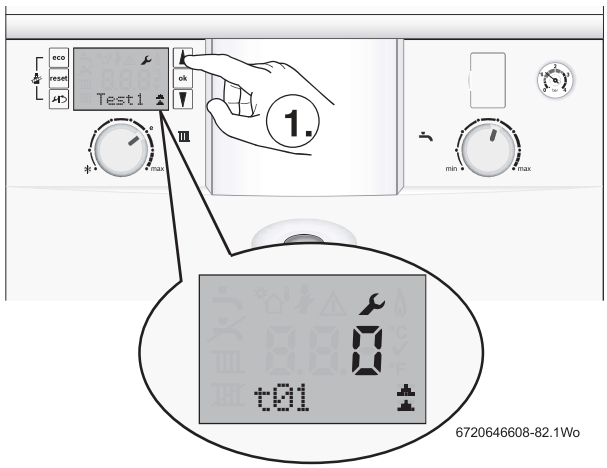


Fig. 131 Scroll through test options

Testing the component

- Select a component to test.
- Press the ok button, the value 0 will flash.
- Use the ▲ arrow button to change the value to a flashing 1.
- Press ok to confirm the change, the value 1 will stop flashing and a ✔ will displayed for 3 seconds.

The test will run for 30 to 60 seconds unless the value is changed back to 0 before that time, the test may take 10 seconds to start.

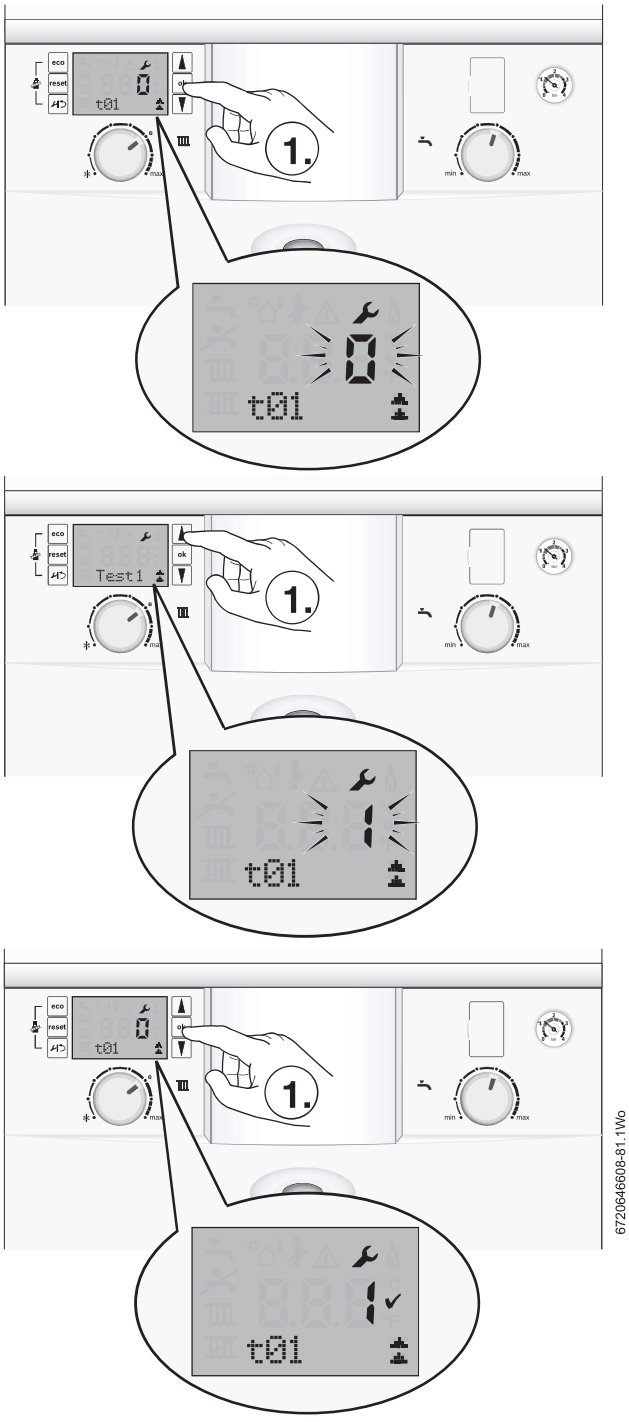


Fig. 132 Testing component

Resetting the test component

After completing the test:

- Press the ok button, the value 1 will flash.
- Press the ▼ arrow button, the value will change to a flashing 0.
- Press ok to confirm the change, a ✔ will display for 3 seconds.

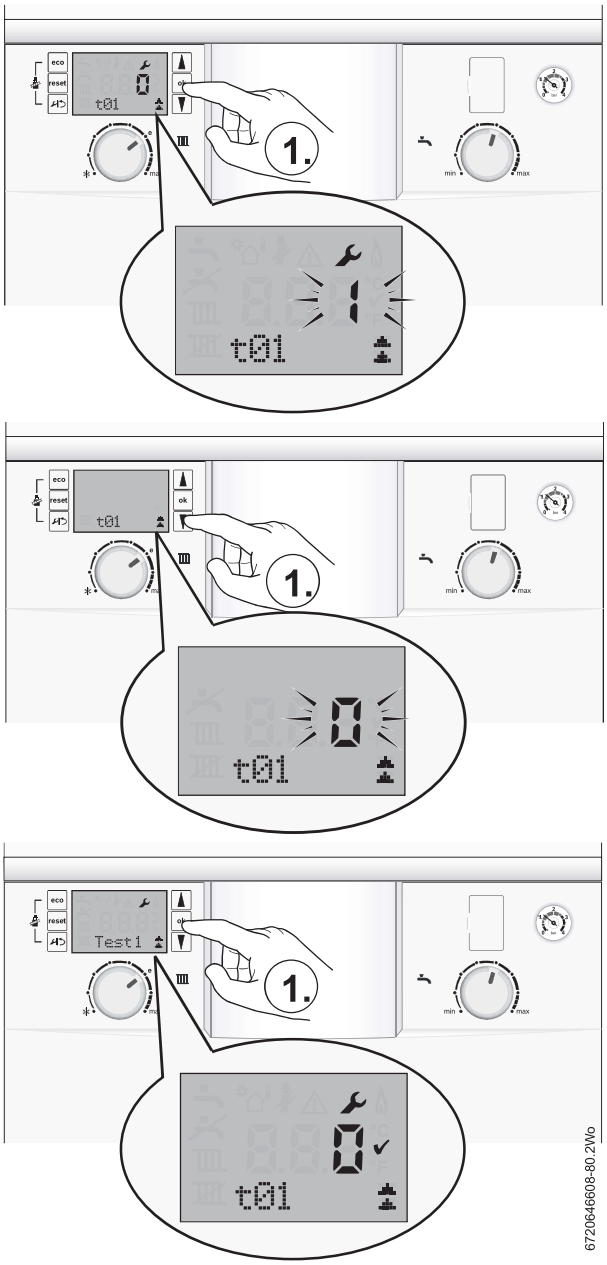


Fig. 133 Resetting test

Test	Note that it could be up to 10 seconds after the button is pressed before the selected component responds.	
t1	Igniter test. Checking the igniter spark.	The igniter will spark for a maximum of 30 seconds. The spark will be audible if the igniter is OK.
t2	Fan test. Checking the basic fan operation.	The fan will run for a maximum of 30 seconds. If the fan is OK then the fan will be heard running.
t3	Pump test. Checking the basic pump operation.	The pump will run for a maximum of 45 seconds. If the pump is OK then the pump will be heard running.
t4	Three way valve test. Test the operation of the diverter valve.	When 1 is selected via the test menu the diverter valve will move to the DHW position. When 0 is selected the valve will move to CH position.
t6	Ionisation oscillator test. Tests the flame detection circuit.	Ionisation circuit is switched on. An A.C. voltage of approximately 150 Volts can be measured between the ionisation probe and earth.

Table 32 Test menu

8.6 Fault codes

Should a fault develop with this boiler (or the system), the boiler will enter a locking or blocking condition, and fault code information will be generated as described in this section.

Locking error	The boiler display will flash a warning triangle and fault code. At the same time a (static) cause code will also be displayed. Manual intervention is required following clearance of the fault: ▶ Press the reset button on the boiler fascia
Blocking error	The boiler will stop operating with no fault data displayed. The cause code, in the info menu, is accessed by pressing the spanner/return button. The condition will clear automatically when the associated fault clears e.g. waiting for an area to cool. In some cases a blocking error has a defined time duration prior to changing to a locking condition.
Fault code	Alpha numeric number indicating the fault group
Cause code	Three digit number. During a blocking error (or normal operating status) it is not displayed, but accessed in the info menu via the spanner/return button. During a locking error the cause code flashes on the display.

Locking errors

Fault codes	Cause codes	Description	Reset type	Possible cause
9U	233	HCM (Heat Control Module)	Reset button	Problem with the code plug
b7	257	Internal error		Replace control board.
C6	215	Fan problem	Reset button	Fan running too fast
	216	Fan problem	Reset button	Fan running too slow
C7	214	Fan problem	Reset button	Fan not running
	217	No airflow after a defined period of time	Reset button	Fan not running or airflow blocked
D1	240	Return sensor error	Reset button	Sensor wet or damaged (the boiler will block for 300 secs before this condition).
	241	Return sensor error	Reset button	Sensor disconnected or damaged (the boiler will block for 300 secs before this condition).
	286	Return temperature too high	Reset button	Boiler overheat
E2	222	Flow sensor short circuit	Reset button	Flow sensor shorted or damaged.
	223	Flow sensor open circuit	Reset button	Flow sensor disconnected or damaged.
E5	218	Flow temperature too high	Reset button	Primary flow sensor overheated
	332	Primary flow sensor has exceeded 110°C	Reset button	Primary flow sensor overheated
E9	219	Safety sensor temperature too high	Reset button	The main heat exchanger has overheated. Maximum temperature 105C°
	220	Safety sensor short circuit	Reset button	Maximum temperature sensor on the main heat exchanger has failed.
	221	Safety sensor open circuit	Reset button	Maximum temperature sensor on the main heat exchanger has not been recognised.
	224	Max temperature thermostat activated	Reset button	Flue gas thermostat overheat
EA	227	No flame detected after ignition	Reset button	Failure of four ignition attempts. The boiler waits 30 seconds before another attempt is made.
	229	Loss of flame signal during operation	Reset button	An established flame has been extinguished. This could be caused by: • moisture in the sump, due to a blocked sump/condensate trap. • a strong wind into the flue.
	234	Gas valve error	Reset button	Gas valve coil disconnected
	261	Ignition timing error	Reset button	Flame not established during the first 4 seconds ignition period.

Table 33 Locking fault and cause code listing

Fault codes	Cause codes	Description	Reset type	Possible cause
F0	237 - 239 242 - 256 258 259 262 263 267 272 279 290	Internal error		Call Worcester, Bosch Group Technical helpline 0330 123 3366
	278	Sensor test failed	Reset button	On power up all safety sensors are checked. Check has failed.
	280	Recycle time error	Reset button	After the burner has stopped, the recycle mode purges gas from the heat exchanger before attempting to burn again. The software has 3.1 seconds to intervene before the boiler goes into this fault condition.
	338	Too many short burner starts without confirmation	Reset button	There is an error where the pump is not detecting water.
F7	228	Flame error	Reset button	False flame. Flame detected before burner start.
	328	Internal error		Replace control board
FA	306	False flame error	Reset button	Flame detected after burner stop
FD	231	Mains power error	Reset button	Electrical power interruption.
FA	364	Gas valve EV2 leak test failed	Reset button	Gas valve leak.
Fb	365	Gas valve EV1 leak test failed	Reset button	Gas valve leak.

Table 33 Locking fault and cause code listing

Blocking errors

Fault code	Cause code	Description	Possible cause
A1	281	Pump stuck or running in air	Little or no water in the system.
C1	264	Airflow stopped during operation	Fan has stopped.
C4	273	Airflow present during last 24 hours	Fan has been running continuously during the past 24 hours.
D1	240	Return sensor short circuit	Wet sensor. Blocking for 300 secs before going to Locking error (→ table 33).
	241	Return sensor disconnected	Blocking for 300 secs before going to Locking error (→ table 33).
D4	271	Temperature difference between flow and safety sensors exceeds limit	The temperature of the primary flow and the safety sensor on the WB7 should be within 15°C of each other.
E9	224	MAX thermostat activated	Flue gas thermostat overheat.
	276	Flow temperature exceeds 95°C	Primary overheat - boiler waits for temperature to reduce; if not it becomes a Locking error.
	277	Safety temperature exceeds 95°C	Main heat exchanger safety sensor overheat - boiler will wait for the temperature to reduce; if not it becomes a Locking error 219.
	285	Return temperature exceeds 95°C	The boiler will stop the burn and wait to see if it cools down. If after 2 seconds there is an increase in temperature the boiler will go to Locking error 286.
EA	227	No ionisation detected after ignition	No flame is detected. The boiler will block during 4 attempts before going to Locking fault.
EF	349	Central heating, boil detect. Large delta T despite minimum burner.	The boiler is operating at minimum burner load and there is a greater than 18°C Flow & Return temperature difference.
No code	212	Safety or flow temperature rises too fast	Air lock or reduced water content.
	213	Temperature difference between supply and return exceeding limit	Air lock or reduced water content.
	260	No temperature rise after burner starts	Sensor disconnected or no water content.
	380	Inlet DHW temperature higher than the DHW outlet temperature.	The output is blocked until the inlet temperature drops below the output temperature.

Table 34 Blocking codes

GAS BOILER SYSTEM COMMISSIONING CHECKLIST

This Commissioning Checklist is to be completed in full by the competent person who commissioned the boiler as a means of demonstrating compliance with the appropriate Building Regulations and then handed to the customer to keep for future reference.

Failure to install and commission according to the manufacturer's instructions and complete this Benchmark Commissioning Checklist will invalidate the warranty. This does not affect the customer's statutory rights.

Customer name:	Telephone number:
Address:	
Boiler make and model:	
Boiler serial number:	
Commissioned by (PRINT NAME):	Gas Safe register number:
Company name:	Telephone number:
Company address:	
	Commissioning date:
To be completed by the customer on receipt of a Building Regulations Compliance Certificate*	
Building Regulations Notification Number (if applicable):	

CONTROLS (tick the appropriate boxes)				
Time and temperature control to heating	Room thermostat and programmer/timer		Programmable room thermostat	
	Load/weather compensation		Optimum start control	
Time and temperature control to hot water	Cylinder thermostat and programmer/timer		Combination Boiler	
Heating zone valves	Fitted		Not required	
Hot water zone valves	Fitted		Not required	
Thermostatic radiator valves	Fitted		Not required	
Automatic bypass to system	Fitted		Not required	
Boiler interlock			Provided	

ALL SYSTEMS				
The system has been flushed and cleaned in accordance with BS7593 and boiler manufacturer's instructions			Yes	
What system cleaner was used?				
What inhibitor was used?		Quantity		litres
Has a primary water system filter been installed?	Yes		No	

CENTRAL HEATING MODE measure and record:			
Gas rate	m^3/hr	**OR**	ft^3/hr
Burner operating pressure (if applicable)	mbar	**OR** Gas inlet pressure	mbar
Central heating flow temperature			°C
Central heating return temperature			°C

COMBINATION BOILERS ONLY			
Is the installation in a hard water area (above 200ppm)?	Yes		No
If yes, and if required by the manufacturer, has a water scale reducer been fitted?	Yes		No
What type of scale reducer has been fitted?			

DOMESTIC HOT WATER MODE Measure and Record:			
Gas rate	m^3/hr	**OR**	ft^3/hr
Burner operating pressure (at maximum rate)	mbar	**OR** Gas inlet pressure at maximum rate	mbar
Cold water inlet temperature			°C
Hot water has been checked at all outlets	Yes	Temperature	°C
Water flow rate			l/min

CONDENSING BOILERS ONLY	
The condensate drain has been installed in accordance with the manufacturer's instructions and/or BS5546/BS6798	Yes

ALL INSTALLATIONS						
Record the following:	At max. rate:	CO	ppm	**AND**	CO/CO_2	Ratio
	At min. rate: (where possible)	CO	ppm	**AND**	CO/CO_2	Ratio
The heating and hot water system complies with the appropriate Building Regulations						Yes
The boiler and associated products have been installed and commissioned in accordance with the manufacturer's instructions						Yes
The operation of the boiler and system controls have been demonstrated to and understood by the customer						Yes
The manufacturer's literature, including Benchmark Checklist and Service Record, has been explained and left with the customer						Yes

Commissioning Engineer's Signature
Customer's Signature
(To confirm satisfactory demonstration and receipt of manufacturer's literature)

*All installations in England and Wales must be notified to Local Authority Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer.

benchmark COLLECTIVE MARK
THE MARK OF QUALITY FOR THE INSTALLATION, COMMISSIONING AND SERVICING OF DOMESTIC HEATING AND HOT WATER SYSTEMS

SERVICE RECORD

It is recommended that your heating system is serviced regularly and that the appropriate Service Interval Record is completed.

Service Provider

Before completing the appropriate Service Record below, please ensure you have carried out the service as described in the manufacturer's instructions. Always use the manufacturer's specified spare part when replacing controls.

SERVICE 01					Date:
Engineer name:					
Company name:					
Telephone No:					
Gas safe register No:					
Record:	At max. rate:	CO ppm	**AND**	CO_2 %	
	At min. rate: (Where Possible)	CO ppm	**AND**	CO_2 %	
Comments:					
Signature					

SERVICE 02					Date:
Engineer name:					
Company name:					
Telephone No:					
Gas safe register No:					
Record:	At max. rate:	CO ppm	**AND**	CO_2 %	
	At min. rate: (Where Possible)	CO ppm	**AND**	CO_2 %	
Comments:					
Signature					

SERVICE 03					Date:
Engineer name:					
Company name:					
Telephone No:					
Gas safe register No:					
Record:	At max. rate:	CO ppm	**AND**	CO_2 %	
	At min. rate: (Where Possible)	CO ppm	**AND**	CO_2 %	
Comments:					
Signature					

SERVICE 04					Date:
Engineer name:					
Company name:					
Telephone No:					
Gas safe register No:					
Record:	At max. rate:	CO ppm	**AND**	CO_2 %	
	At min. rate: (Where Possible)	CO ppm	**AND**	CO_2 %	
Comments:					
Signature					

SERVICE 05					Date:
Engineer name:					
Company name:					
Telephone No:					
Gas safe register No:					
Record:	At max. rate:	CO ppm	**AND**	CO_2 %	
	At min. rate: (Where Possible)	CO ppm	**AND**	CO_2 %	
Comments:					
Signature					

SERVICE 06					Date:
Engineer name:					
Company name:					
Telephone No:					
Gas safe register No:					
Record:	At max. rate:	CO ppm	**AND**	CO_2 %	
	At min. rate: (Where Possible)	CO ppm	**AND**	CO_2 %	
Comments:					
Signature					

SERVICE 07					Date:
Engineer name:					
Company name:					
Telephone No:					
Gas safe register No:					
Record:	At max. rate:	CO ppm	**AND**	CO_2 %	
	At min. rate: (Where Possible)	CO ppm	**AND**	CO_2 %	
Comments:					
Signature					

SERVICE 08					Date:
Engineer name:					
Company name:					
Telephone No:					
Gas safe register No:					
Record:	At max. rate:	CO ppm	**AND**	CO_2 %	
	At min. rate: (Where Possible)	CO ppm	**AND**	CO_2 %	
Comments:					
Signature					

SERVICE 09					Date:
Engineer name:					
Company name:					
Telephone No:					
Gas safe register No:					
Record:	At max. rate:	CO ppm	**AND**	CO_2 %	
	At min. rate: (Where Possible)	CO ppm	**AND**	CO_2 %	
Comments:					
Signature					

SERVICE 10					Date:
Engineer name:					
Company name:					
Telephone No:					
Gas safe register No:					
Record:	At max. rate:	CO ppm	**AND**	CO_2 %	
	At min. rate: (Where Possible)	CO ppm	**AND**	CO_2 %	
Comments:					
Signature					

*All installations in England and Wales must be notified to Local Authority Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer.

benchmark COLLECTIVE MARK
THE MARK OF QUALITY FOR THE INSTALLATION, COMMISSIONING AND SERVICING OF DOMESTIC HEATING AND HOT WATER SYSTEMS

WORCESTER, BOSCH GROUP:

TECHNICAL SUPPORT:	0330 123 3366
APPOINTMENTS:	0330 123 9339
SPARES:	0330 123 9779
LITERATURE:	0330 123 9119
TRAINING:	0330 123 0166
SALES:	0330 123 9669

Worcester, Bosch Group
Cotswold Way, Warndon, Worcester WR4 9SW.
Tel. 0330 123 9559

worcester-bosch.co.uk

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WORCESTER
Bosch Group