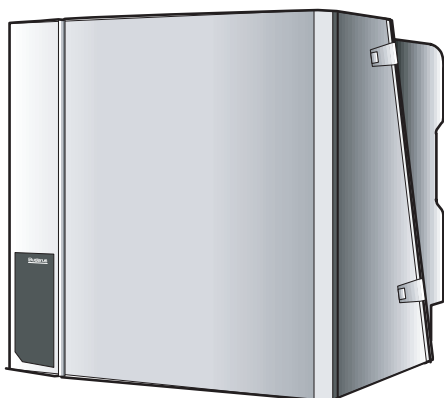
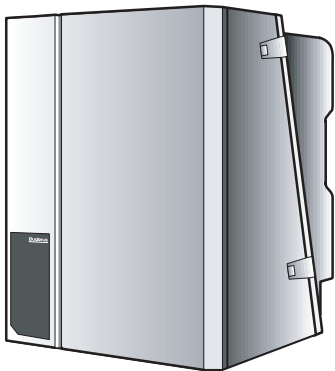


## Installation and servicing instructions

**Gas wall hung Boiler condensing  
Buderus 800 - 24/29/43/60 and  
Buderus 800 - 24T25/29T25 H/V**



**Buderus**





The boiler meets the basic requirements of the appropriate standards and directives.

Conformity has been substantiated by the proper documents which - together with the declaration of conformity - are filed with the manufacturer.

### **Subject to technical modifications !**

Constant development efforts may result in minor deviations in illustrations, functional steps and technical data.

### **Updating the documentation**

If you have suggestions for improvement or have found discrepancies, please do not hesitate to contact us.

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## Preface

These installation and servicing instructions apply to:  
Buderus wall-mounted condensing gas boilers  
800 – 24/29/43/60 and 800 – 24T25/29T25 H/V.

Model B<sub>23</sub>, B<sub>33</sub>, C<sub>13</sub>, C<sub>33</sub>, C<sub>43</sub>, C<sub>53</sub> and C<sub>73</sub>

800 – 24/29/43: Category GB II<sub>2H3P</sub> 20 mbar; 37 mbar  
(natural gas **H** and LPG)

In this document LPG = 3P-G31-37 mbar

800 – 60: Category GB I<sub>2H</sub> 20 mbar  
(natural gas **H**)

Power rating: 230 VAC, 50 Hz, IP4X

Fuse rating: 1.25 slow blow

### G. C. Appliance No. :

Buderus 800 – 24	41-110-19
Buderus 800 – 29	41-110-20
Buderus 800 – 24 T25/V	
Buderus 800 – 29 T25/V	
Buderus 800 – 24 T25/H	
Buderus 800 – 29 T25/H	
Buderus 800 – 43	41-110-14
Buderus 800 – 60	41-110-15

### Important general instructions for use

Only use the boiler in accordance with its designated use and the installation and servicing instructions. Servicing and repair must be carried out by CORGI registered installer. Only use the boiler in combinations and with the accessories and spare parts indicated in the installation and servicing instructions. Other combinations, accessories and consumables may only be used if they are expressly provided for the designated use and if system performance and safety are not affected in any way.

The boiler is suitable for connection to fully pumped, sealed water systems ONLY. Adequate arrangements for completely draining the system by provision of draining valves must be provided in the installation pipework.

Pipework from the boiler is routed downwards as standard, but may be routed upwards behind the boiler using the distance frame (supplied in a separate kit).

### Subject to technical modifications.

As a result of our policy of constant development, there may be small differences between illustrations, functional steps and technical data.



## BENCHMARK' Log Book

All Buderus gas fired boilers now include an installation, commissioning and service record log book. The details of the log book will be required in the event of any warranty work being requested.

Please complete the appropriate sections on completion of the installation and commissioning.

## Regulations and directives

It is law that all gas appliances are installed and serviced by a CORGI registered installer in accordance with the regulations. Failure to install appliances correctly could lead to prosecution. It is in your own interest, and that of safety, to ensure the law is complied with.

The installation of the boiler MUST be in accordance with the latest I.E.E. (**BS7671**) Wiring Regulations, local building regulations, water regulations, the building regulations and the Building Standard (Scotland) and any relevant requirements of the local authority.

Detailed recommendations are contained in the following British Standard Codes of Practice:

- BS. 5440:1** Flues (for gas appliances of rated input not exceeding 70 kW).
- BS. 5440:2** Ventilation (for gas appliances of rated input not exceeding 70 kW).
- BS. 5449** Forced circulation hot water systems.
- BS. 5546** Installation of gas hot water supplies for domestic purposes (2nd. family Gases).
- BS. 6798** Installation of gas fired hot water boilers of rated input not exceeding 60 kW.
- BS. 6891** Low pressure installation pipes.
- IGE/UP/1b** Tightness testing and purging domestic sized gas installations.

### Health and & Safety Document No. 635.

### The Electricity at Work Regulations, 1989.

The manufacturer's notes must not be taken, in any way, as overriding statutory obligations.

The design and construction of the Buderus wall-mounted condensing gas boilers 800 – 24/29/43/60 and 800 – 24T25 / 29T25 conforms to the basic specifications listed in the European directive governing gas-fired appliances 90/396/EEC, and with respect to EN 625, EN 483 and EN 677.



#### NOTE

Observe the corresponding technical rules and the building supervisory and statutory regulations when installing and operating the system.



#### WARNING!

Keep the burner-control unit housing CLOSED when working on water-bearing components.

**REMEMBER:** Please hand the log book back to the user.



#### NOTE

It is mandatory to clean and service the system once a year. This includes an inspection of the entire system to see if it is in full working order. Defects and faults must be eliminated immediately.



#### NOTE

When instructions aren't followed, warranty expires.

### Timber Framed Buildings

If the boiler is to be fitted in a timber framed building it should be fitted in accordance with the Institute of Gas Engineering document **IGE/UP/7:1998**.

### Bathroom Installations

This appliance is rated IP4X.

The boiler may be installed in any room or internal space, although particular attention is drawn to the requirements of the current IEE (**BS. 7671**) Wiring Regulations and, in Scotland, the electrical provisions of the building regulations applicable in Scotland, with respect to the installation of the boiler in a room or internal space containing a bath or shower.

If the appliance is to be installed in a room containing a bath or shower then, providing water jets are not going to be used for cleaning purposes (as in communal baths/showers), the appliance can be installed in Zone 3, as detailed in **BS. 7671**.

### Compartment Installations

A compartment used to enclose the boiler should be designed and constructed especially for this purpose.

An existing cupboard or compartment may be used, provided that it is modified for the purpose.

In both cases, details of essential features of cupboard/compartment design, including airing cupboard installation, are to conform to the following:

**BS 6798** (No cupboard ventilation is required - see 'Air Supply' for details).

It is not necessary to have a purpose-provided air vent in the room or internal space in which the boiler is installed. Neither is it necessary to ventilate a cupboard or compartment in which the boiler is installed, due to the low surface temperatures of the boiler casing during operation; therefore the requirements of **BS 6798, Clause 12**, and **BS 5440:2** may be disregarded.

The position selected for installation MUST allow adequate space for servicing in front of the boiler.

For the minimum clearances required for safety and subsequent service, see the wall mounting template. In addition, sufficient space may be required to allow lifting access to the wall mounting plate.

Wall-mounted condensing gas boilers must only be operated with the combustion air/flue gas systems especially devised and authorised for this type of boiler.

Observe the relevant standards, regulations and legislation of the country of final use.



**CAUTION**

Use this device for its intended purpose only.



**DANGER!**

**Notes relating to the heating system water.**

Thoroughly flush the system before it is filled with water. Use only untreated water or water treatment product such as Sentinel X100 to fill and top up the system.

When using water treatment, only products suitable for use with Buderus heat exchangers are permitted (eg Sentinel X100). Your warranty is at risk if an incorrect water treatment product is used in conjunction with this appliance. For more information, contact Buderus Product Support Department.

It is most important that the correct concentration of the watertreatment product is maintained in accordance with the manufacturer's instructions.

If the boiler is used in an existing system any unsuitable additives **MUST** be removed by thorough cleaning. **BS.7593:1992** details the steps necessary to clean a domestic central heating system.

In hard water areas, treatment to prevent lime scale may be necessary - however, the use of artificially softened water is **NOT** permitted.

Under no circumstances should the boiler be fired before the system has been thoroughly flushed.

- Do not use water softened in a salt bedding exchanger.
- Do not use inhibitors, anti-freeze or other additives.
- The expansion vessel must be of sufficient size.

When oxygen-permeable pipes are used (e. g. for floor heating systems) the system must be separated by means of heat exchangers. Unsuitable heating water promotes sludge formation and corrosion. This may cause malfunctions and damage in the heat exchanger.



**NOTE:**

**Notes relating to domestic hot water.**

- The domestic hot water service must be in accordance with **BS 5546** and **BS 6700**.
- The boilers are suitable for connection to most types of washing machine and dishwasher appliances.
- When connecting to suitable showers, ensure that:
  - a. The cold inlet to the boiler is fitted with an approved anti-vacuum or syphon non-return valve.
  - b. Hot and cold water supplies to the shower are of equal pressure.
- Where the water hardness exceeds 150 mg/litre, it is recommended that a proprietary scale reducing device is fitted into the boiler cold supply with the requirements of the local water company.



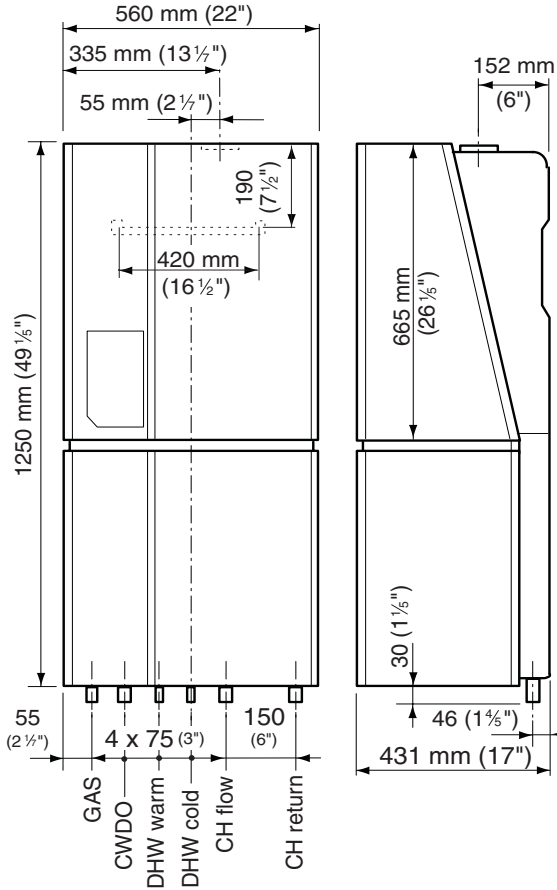
**CAUTION**

Provision must be made to accommodate the expansion of DHW contained within the appliance, if a non-return valve is fitted to the DHW inlet, as detailed in **BS. 6798: 5.4.3**.

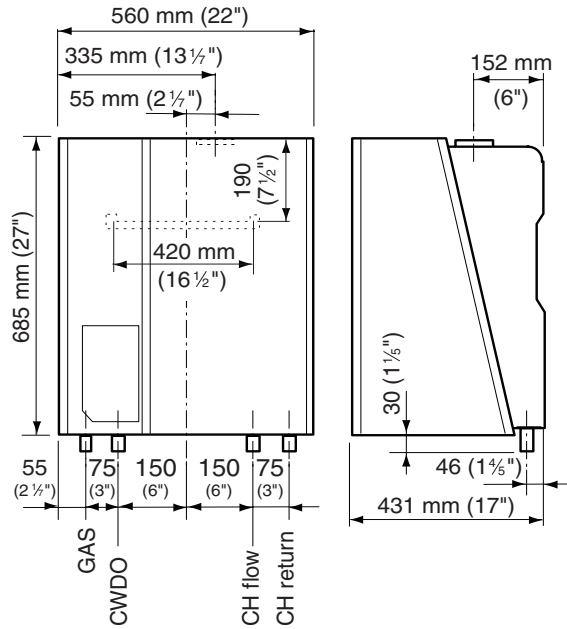
## 1 Installation

### 1.1 Dimensions, connections and assembly

800 - 24T25V / 800 - 29T25V

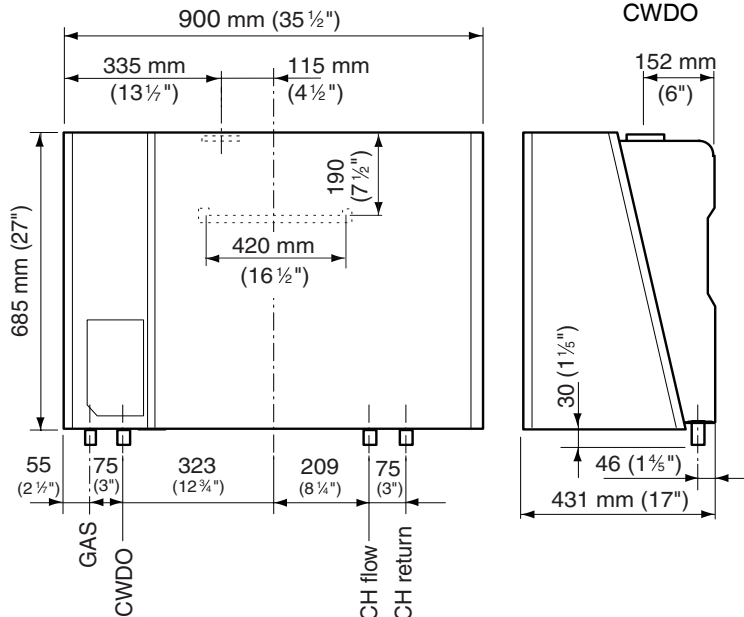


800 - 24 / 800 - 29

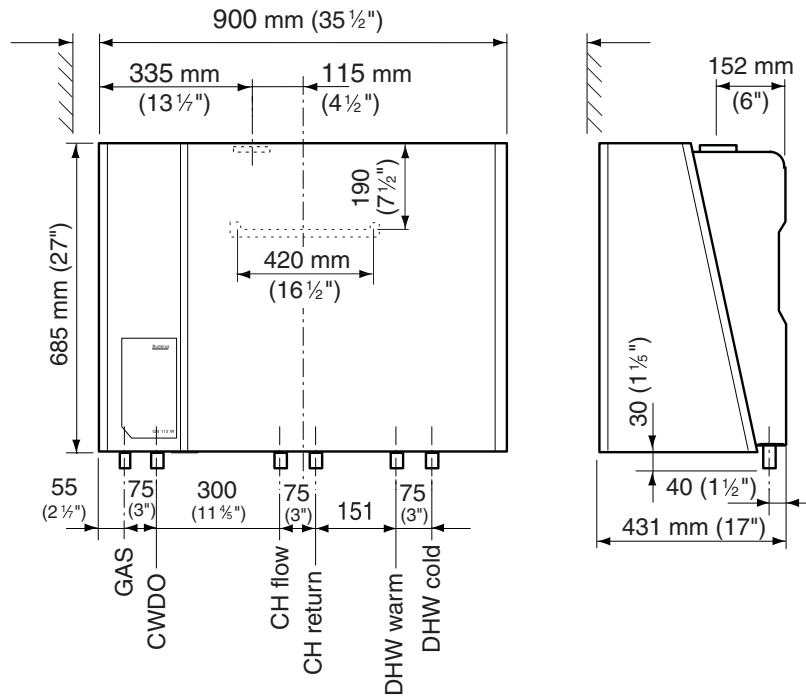


- DHW warm out = hot water outlet 15 mm dia.
- DHW cold in = cold water inlet 15 mm dia.
- GAS = gas connection R $\frac{1}{2}$  (800 - 24/29/43) and (800 - 24T25V/29T25V)  
gas connection R $\frac{3}{4}$  (800 - 60)
- CH return = boiler return line 28 mm dia.
- CH flow = boiler flow line 28 mm dia.
- CWDO = condensate water drain 32 mm dia.

800 - 43 / 800 - 60



## 800 - 24T25H / 800 - 29T25H



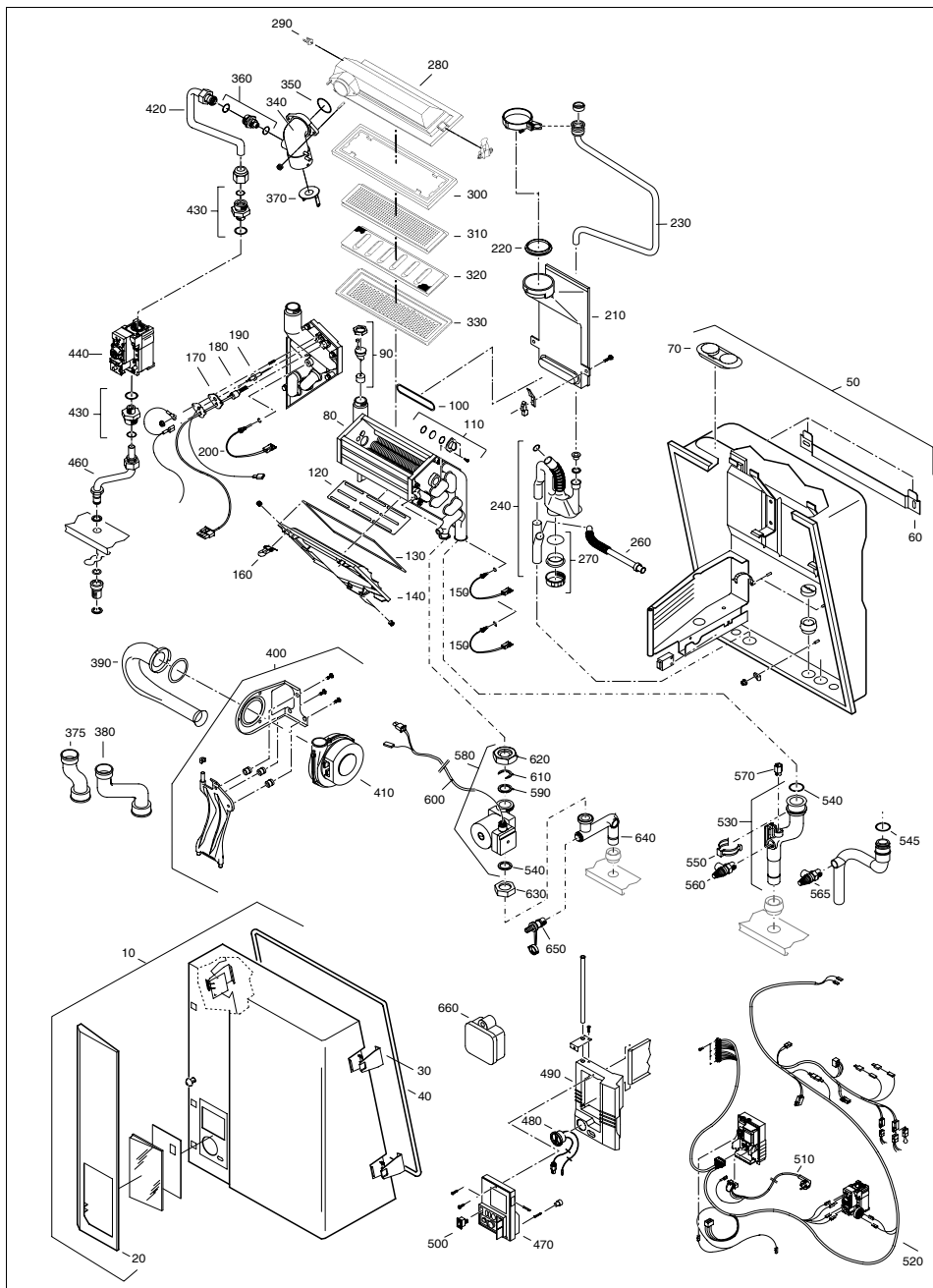
- DHW warm out = hot water outlet 15 mm dia.
- DHW cold in = cold water inlet 15 mm dia.
- GAS = gas connection R $\frac{1}{2}$  (800 - 24T25H/29T25H)
- CH return = boiler return line 28 mm dia.
- CH flow = boiler flow line 28 mm dia.
- CWDO = condensate water drain 32 mm dia.

Minimum side clearance required for all boilers is 100 mm (4")

# 1 Installation

## 1.2 Boiler assembly - exploded view

Single unit (type 800 – 24 / 800 – 29)



### Legend

- 10 Casing complete
- 20 Door
- 30 Casing clamp
- 40 Casing seal
- 50 Back panel
- 60 Mounting bracket
- 70 Seal lid for air vent
- 80 Heat exchanger
- 90 Revision set for air vent
- 100 Seal
- 110 Sight glas complete with sealing rings
- 120 Restriction plate
- 130 Seal for condensate collector
- 140 Condensate collector incl. seal
- 150 Sensor complete with O-ring
- 160 Mounting clip
- 170 Seal for hot surface ignitor/ionisation electrode
- 180 Hot surface ignitor
- 190 Ionisation electrode with cable and connector
- 200 Safety sensor-ntc complete
- 210 Flue gas collector
- 220 Lip ring seal DN 80mm
- 230 Condensate by-pass
- 240 Syphon complete
- 260 Safety valve pipe
- 270 Seal set for syphon
- 280 Burner housing
- 290 Burner thermostat 107 °C
- 300 Burner seal
- 310 Gas/air distribution plate
- 320 Secondary gas/air distribution plate
- 330 Burner plaque assembly
- 340 Gas/air manifold
- 350 O-ring gas/air manifold to burner
- 360 Gas injector, natural gas (G20) incl. O-ring
- 370 Air restrictor natural gas (G20)
- 375 Connection tube, fan/burner
- 380 Connection tube, fan/burner

- 390 Air inlet pipe incl. gasket
- 400 Support mounting bracket fan anti vibration
- 410 Fan
- 420 Connection pipe gas valve/burner
- 430 Connection nipple 3/4"x1/2" with O-ring
- 440 Gas unit
- 460 Gas inlet pipe 1/2"
- 470 Control uba
- 480 Temperature / pressure gauge

- 490 Bracket for uba
- 500 Power switch
- 510 230V cable
- 520 Cable harness complete
- 530 Supply pipe heat exchanger
- 540 O-ring
- 550 Spring clip heat exchanger/supply
- 560 Pressure relief valve
- 570 Non return valve R 1/4"
- 580 Pump

- 590 Gasket for pump DN 44 x 2.5
- 600 Pump power cable complete with connector
- 610 Ring
- 620 Nut for heat exchanger 1 1/2"
- 630 Nut for heat exchanger 1 1/2"
- 640 Return pipe
- 650 Filling-, draining valve
- 660 RTH converter



### 1.3 Flue Installation

#### 1.3.1 Siting the flue terminal

The flue must be installed in accordance with the recommendations of **BS. 5440-1:2000**.

Plumbing will occur at the terminal so terminal positions where this could cause a nuisance should be avoided.

The air supply and the flue gas exhaust must meet the applicable general regulations. Please consult the instructions provided with the flue terminal kits prior to installation.

The boiler **MUST** be installed so that the terminal is exposed to external air.

It is important that the position of the terminal allows the free passage of air at all times.

Minimum acceptable spacing from the terminal to obstructions and ventilation openings are specified in table 1.

If the terminal is fitted within 1000 mm of a plastic or painted gutter or within 500 mm of painted eaves, an aluminium shield of at least 1000 mm long should be fitted to the underside of the gutter or painted surface.

If the lowest part of the terminal is less than 2 metres above the level of the ground, balcony, flat roof or place to which any person has access, the terminal must be protected by a guard. Protective guards are available from Quinnell Barrett and Quinnell, Old Kent Road, London.

Ensure that the guard is fitted centrally.

The flue assembly shall be so placed or shielded as to prevent ignition or damage to any part of the building.

The air inlet/products outlet duct and the terminal of the boiler **MUST NOT** be closer than 25 mm (1") to combustible material. Detailed recommendations on the protection of combustible material are given in **BS. 5440- 1:2000**.



**NOTE**

It is absolutely essential to ensure, in practice, that products of combustion discharging from the terminal cannot re-enter the building or any other adjacent building through ventilators, windows, doors, other sources of natural air infiltration, or forced ventilation/airconditioning.

If this could occur the appliance **MUST** be turned off (with the owners permission), and labelled as unsafe until corrective action can be taken.

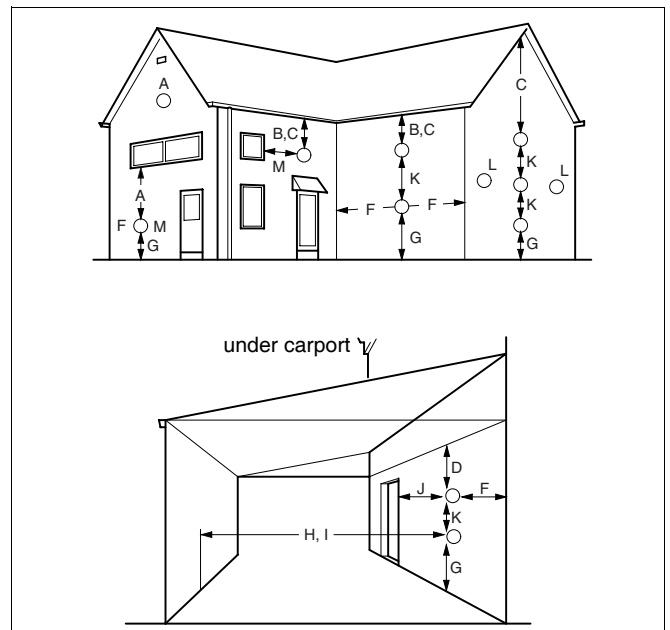


fig. 1 Flue terminal position

Terminal Position	Minimum Spacing
A. Directly below or alongside an opening window, air vent or other ventilation opening	300 mm (12")
B. Below guttering, drain pipes or soil pipes	75 mm (3")
C. Below eaves	200 mm (8")
D. Below balconies or a car port roof	200 mm (8")
E. From vertical drain pipes or soil pipes	150 mm (6")
F. From internal or external corners	300 mm (12")
G. Above adjacent ground, roof or balcony level	300 mm (12")
H. From a surface facing the terminal	600 mm (24")
I. From a terminal facing a terminal	1200 mm (48")
J. From an opening in a car port (e.g. door or window) into dwelling	1200 mm (48")
K. Vertically from a terminal on the same wall	1500 mm (60")
L. Horizontally from a terminal on the wall	300 mm (12")
M. Adjacent to opening	300 mm (12")

Table 1 Balanced flue terminal position

# 1 Installation

## 1.3.2 Air supply and flue gas exhaust in a closed installation

To ensure optimal operation, the 800 Series appliances must be connected to a Buderus wall-mounted or roof-mounted flue terminal. These terminals have been developed specifically for the 800 Series condensing gas boilers and have been comprehensively tested. The Buderus wall and roof-mounted flue terminal kits ensure trouble-free operation.

The following items for the flue (see fig. 2) are included in the delivery of the boiler:

- pos. 1: 1 Concentric bend 80/125;
- pos. 2: 1 Horizontal flue terminal 80/125;
- pos. 3: 1 Flue finishing kit.

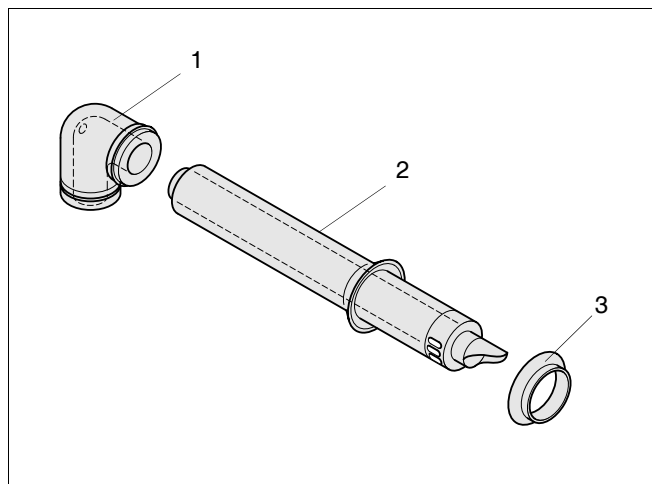


fig. 2 Horizontal flue pack

## 1.3.3 Maximum Flue length

The maximum pipe length of the air supply and flue gas exhaust pipes for the 800 Series condensing gas boilers (see table 2) is determined by the total pressure loss of all components in the flue gas exhaust / air supply system.

Maximum wall thickness without extensions is 550 mm. Maintain a minimum side wall clearance of 50 mm (see fig. 3).

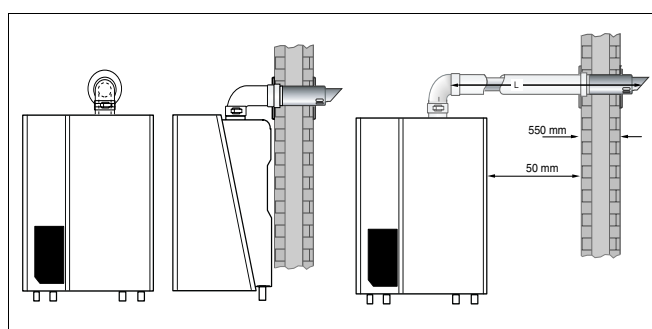


fig. 3 Side flue and rear flue installation

Boiler	Maximum pipe length	For every 90° bend the maximum pipe length has to be reduced by
800 – 24 / 24T25 H/V	L = 14 m	0 m
800 – 29 / 29T25 H/V	L = 14 m	0 m
800 – 43	L = 14 m	1.5 m
800 – 60	L = 9 m	1.5 m

Table 2 Pipe length

## 1.3.4 Additional flue parts

Additional flue parts (see table 3) can be ordered from your supplier.

Flue parts	Order No.
Concentric pipe, 500 mm long, adjustable	NE 83713
Concentric pipe, 1000 mm long, adjustable	NE 83714
Concentric bend 90°	NE 83715
Concentric bend 45°	NE 83716
24-43 kW adaptor plate	NE 79061
60 kW adaptor plate	NE 79064

Table 3 Additional flue parts

## 1.4 Items supplied with unit

- Check the contents against the packing list to ensure that nothing is missing.

### Requirements to be met by the place of installation



#### NOTE

Observe all statutory building regulations applying to the place of installation.



#### DANGER!

Inflammable materials or liquids must not be stored or used near wall-mounted condensing gas boilers. The site of installation must be frost-protected.

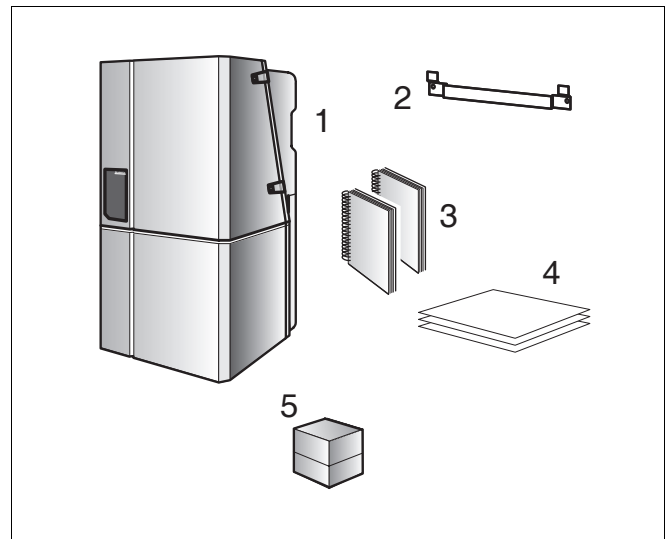


fig. 4 Items supplied with unit

Key to fig. 4:

- 1: wall-mounted condensing gas boiler
- 2: wall bracket
- 3: technical documents
- 4: wall-mounting template
- 5: screw fittings for connecting the boiler (heating system)  
gas service valve 1/2" (800-24/29/43)  
gas service valve 3/4" (800-60)

## 1.5 Gas boiler

Remove the packing and discard to ensure proper recycling. Do not remove the polystyrene foam bottom slab protecting the connection nozzles. During installation the gas boiler and the flue gas adapter must be protected to prevent site dirt from entering, e.g. using aluminum foil.



#### NOTE!

Note the clearance required to install the flue system (see chapter 1.8 "Flue installation"). Note the side wall minimum clearance of 100 mm. If a storage-type water heater is installed underneath, take care that the minimum clearances according to the installation instructions are adhered to.

- Fit the wall bracket.

### Removing the casing:

- Open the cover of the control panel (fig. 5, item 1).
- Remove the screw (fig. 5, item 2).
- Open the locks (fig. 5, item 3) with the radiator key (fig. 5, item 4).
- Release the clasps (fig. 5, item 5).
- Remove the boiler casing forwards (fig. 5, item 6).

**Do not carry the casing by the clasps !**

### Combination unit type 800 - 24T25V / 29T25V:

Vertical boilers:

- Pull forward the casing of the hot water reservoir and lift it clear from the top holders. This is only possible with the upper casing removed.
- Attach the gas boiler to the wall bracket (fig. 6).

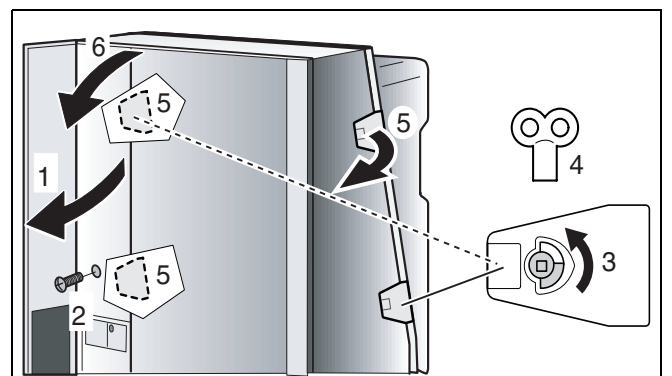


fig. 5 Removing the casing

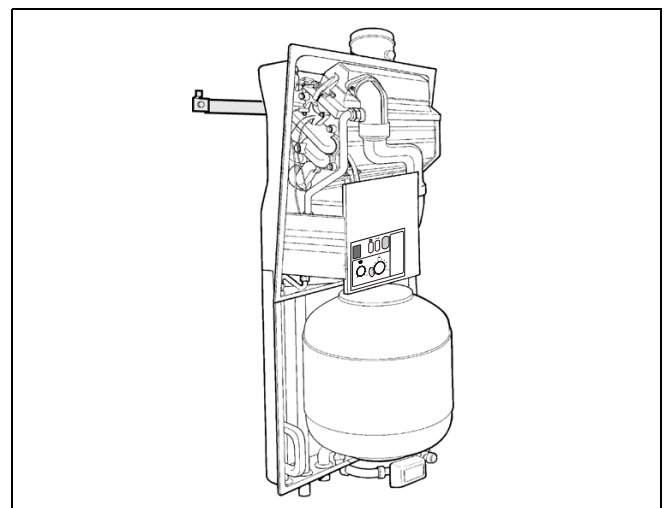


fig. 6 Installation

## 1.6 Water circulation system

The central heating system should be in accordance with **BS.6798** and, in addition, for smallbore and microbore systems, **BS.5449**.

## 1.7 Pipe connections

### 1.7.1 Heating circuit connection

On type 800 – 60 an automatic air-release valve must be fitted in the return line.

A servicing valve has to be installed in the flow and return lines to allow the gas boiler to be serviced and repaired.

Make sure that the expansion vessel, pressure relief valve and draining valve are installed between the gas service valve and the boiler.

In order to ensure an optimum and efficient operation of the heating system, care must be taken that the heating boiler always has the required minimum amount of circulation water.

In single-circuit systems the required minimum amount of circulation water can be provided e.g. by means of an bypass valve.

A bypass valve is not needed when a hydraulic shunt is installed.

Thoroughly flush pipes and radiators !

- For sizes of pipe connections please refer to the wall mounting template.
- Fit expansion vessel in compliance with the separate installation instructions  
or  
install the expansion vessel in the boiler return line.
- Fit the service valve in the flow and return lines (see subsection 1.1 on pages 6 and 7).
- Connect pipes free of tension.

### 1.7.2 Gas Supply

The gas installation must be installed in accordance with **BS6891**.



#### **CAUTION!**

Pipework from the meter to the boiler **MUST** be of adequate size.

The complete installation **MUST** be tested for gas tightness and purged as described in **IGE/UP/1b**.

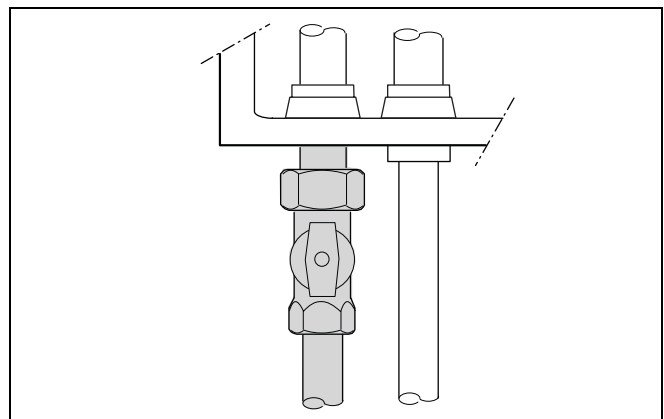


fig. 7 Gas connection

### 1.7.3 Gas connection



#### CAUTION!

Work on gas-bearing components may only be carried out by a CORGI registered installer.

- For the size of the pipe connection please refer to the wall mounting template.
- Connect the boiler to the gas supply in accordance with the relevant standards. Fit the supplied service valve in the gas feed line. Connect the pipe free of tension (fig. 7).

Fit a gas service valve with a size of R $\frac{3}{4}$  on type 800 – 60.

### 1.7.4 Hot water connection

#### On type 800 – 24/29/43/60:

Connect the external storage-type water heater in accordance with the appropriate installation instructions using the connection kit.

#### On type 800 – 24T25 H/V and 800 – 29T25 H/V:



#### CAUTION!

Do not use galvanised pipes or fittings. The hot water heat exchanger is made of copper and risks electrolytic corrosion.

When using plastic pipes, note the information provided by the pipe manufacturer. This particularly applies to the mode of connection recommended by manufacturer.

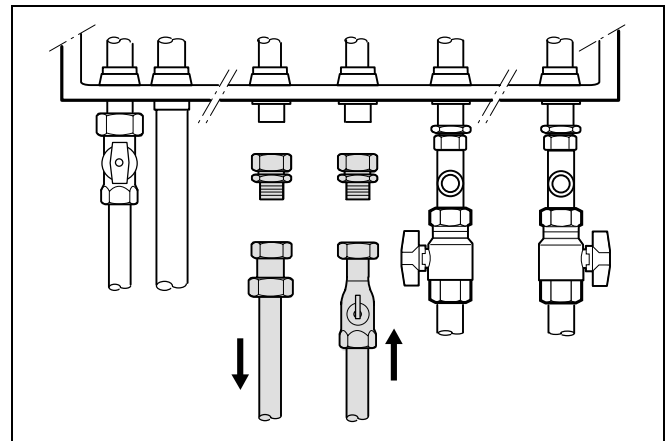


fig. 8 Hot water connection vertical boilers  
(type 800 – 24T25V / 800 – 29T25V)

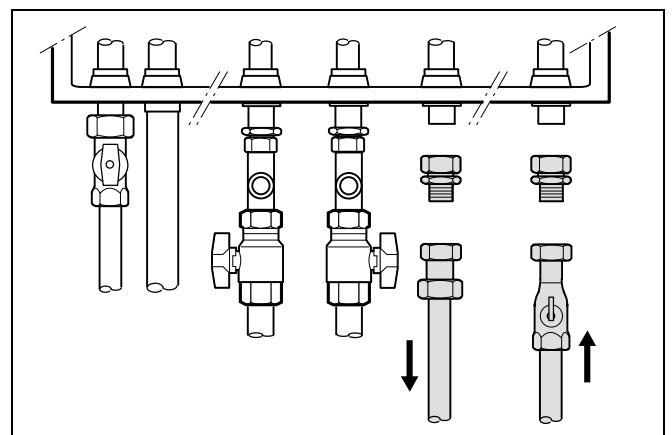


fig. 9 Hot water connection horizontal boilers  
(type 800 – 24T25H / 800 – 29T25H)

- In certain situations to prevent hammering within the system when closing taps, controls can be installed to counter act this action. For further information please contact Buderus.
- For the size of pipe connections please refer to the wall mounting template.

## 1.7.5 Condensate water drain



### NOTE!

The condensate water collecting in the gas boiler and possibly in the flue gas line must be drained. Local regulations must also be noted.

### When shorter aluminium flue-gas systems are used



### CAUTION!

If the flue gas adapter is made of aluminium, the sealing cap (fig. 12, item 1) MUST NOT be removed.

There is no integrated condensate water outlet in the flue gas adapter of the aluminium exhaust flue. The condensate water from the exhaust flue flows via the gas boiler and into the boiler's odour trap (syphon, see fig. 10).

### When longer aluminium flue-gas systems are used



### CAUTION!

If the flue gas adapter is made of aluminium, the sealing cap (fig. 12, item 1) MUST NOT be removed.

There is no integrated condensate water outlet in the flue gas adapter of the aluminium exhaust flue. The condensate water from the exhaust flue flows via the external condensate water outlet with odour trap (syphon, see fig. 11).

This additional component is required:

- from 10 m expanded overall length of exhaust flue with 800 Series to boiler size of 24 kW or
- from 5 m expanded overall length of exhaust flue with type 800 – 29, 800 – 43 and 800 – 60.

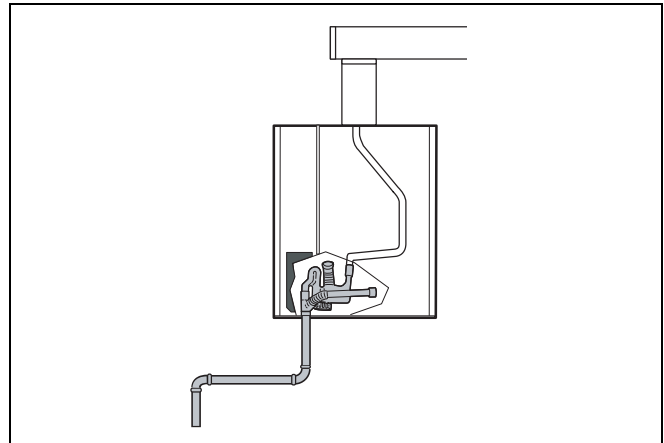


fig. 10 Condensate water outlet for exhaust flue systems made of aluminium

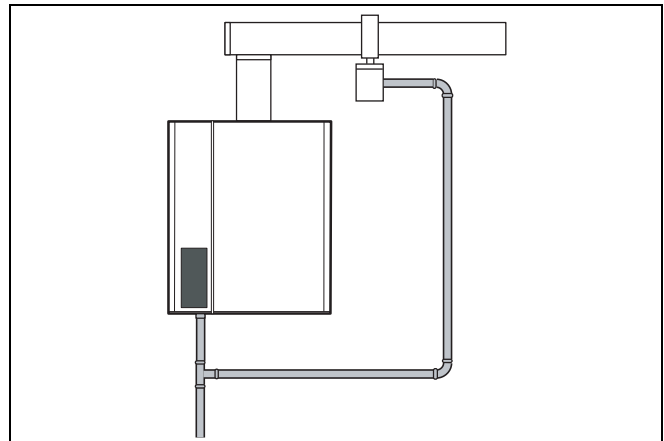


fig. 11 Condensate water outlet for longer exhaust flue systems made of aluminium

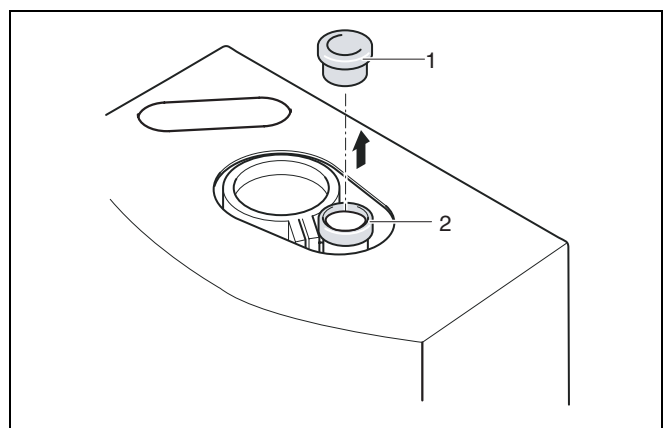


fig. 12 Remove sealing cap on condensate water bypass (applies only to boiler connection pieces made of plastic)

## 1.8 Flue installation

The only flue systems that may be used are those supplied by Buderus. The flue system must be installed in accordance with the requirements of **BS5440:1. 2000**.

### Standard 125 mm flue systems

See subsection 1.3.3 for the maximum horizontal straight length of each type boiler. Full instructions for fitting this flue are in Section 1.8.2: "Installation of the horizontal flue" on page 15.



#### IMPORTANT

Any horizontal flue system fitted to a condensing boiler must be inclined towards the appliance at an angle of 3% (30 mm per metre length) to prevent condensate dripping from the flue terminal.

This means that the clearance above the appliance must be increased to match the duct length. See figure on page 6.

#### 1.8.1 Fitting the boiler's adaptor plate

- Place the boiler's adaptor plate onto the boiler (fig. 13).
- Secure with 6 screws.

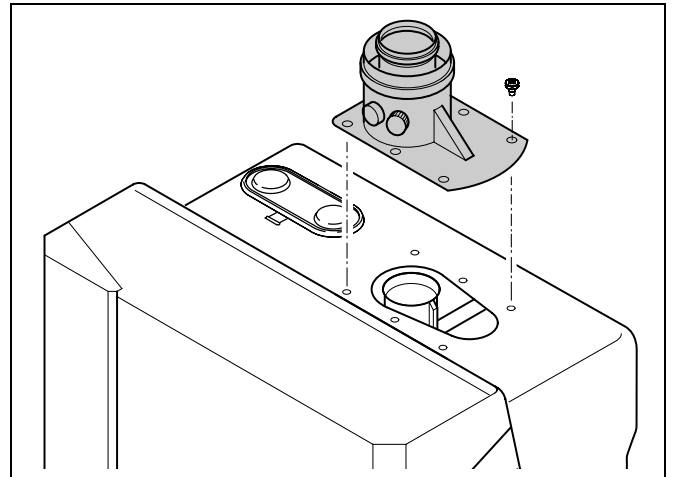


fig. 13 Adaptor plate

#### 1.8.2 Installation of the horizontal flue

The standard 125 mm diameter horizontal flue system is suitable for length up to 595 mm. Flue length above this will require extension duct assemblies.

See table 2 on page 10 for the maximum pipe length for each type boiler.

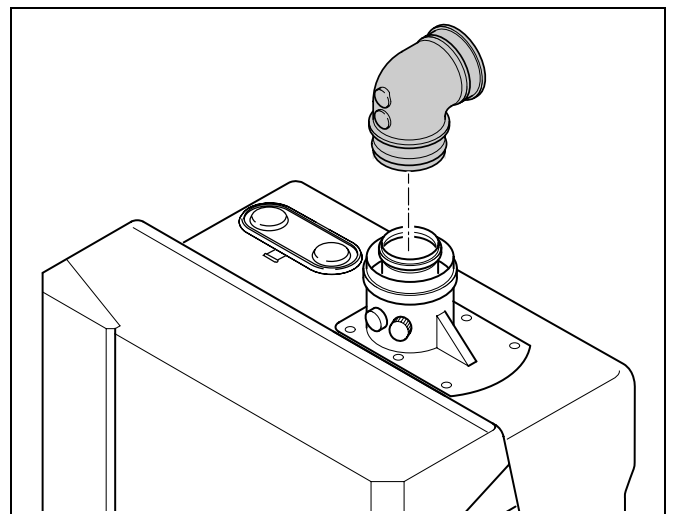


fig. 14 Elbow with flue gas testing point



#### NOTE

Use the wall-mounting template to help you mark the position of the side flue opening

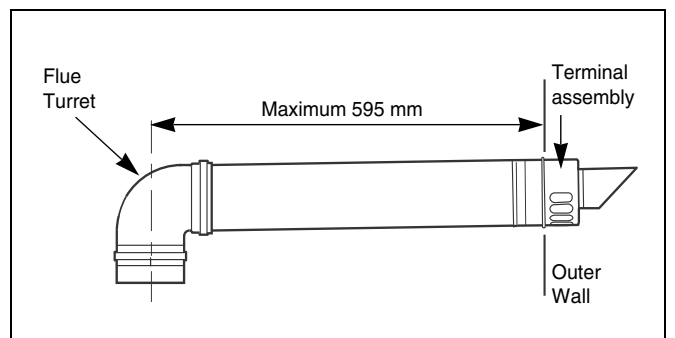


fig. 15 Standard flue

## 1.8.3 Flue duct preparation and assembly

- Measure the flue length L. Refer to figure 16.



**NOTE**

The flue must be inclined to the boiler.

- Mark of the lengths shown onto the ducts and cut the length. The cuts must be square and free from burrs. Terminal assembly outer (air) duct - L-70 mm, inner (flue) duct - L-50 mm. The measurement is made from the ridge at the terminal indicating the outer face of the wall. Refer to figure 18. Extension air duct - L-70 mm, flue duct - L-50 mm. The measurement is from the formed end.

- Assemble flue system completely. Push the ducts fully together. The slope of the terminal outlet must be face downwards. The assembly will be made easier if a solvent free grease is lightly applied to the male end of the ducts.



**NOTE**

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

- Push the assembly through the wall and slide the turret onto the flue connector. Refer to figure 14.
- Ensure that the turret is fully entered into the socket on the boiler. From the outside fix the flue finishing kit to the terminal and, after ensuring the duct is properly inclined towards the boiler, fix the finishing kit to the wall. If the terminal is within 2 m of the ground where there is access then an approved terminal guard must be fitted. The guard must give a clearance of at least 50 mm around the terminal and be fixed with corrosion resistant screws.

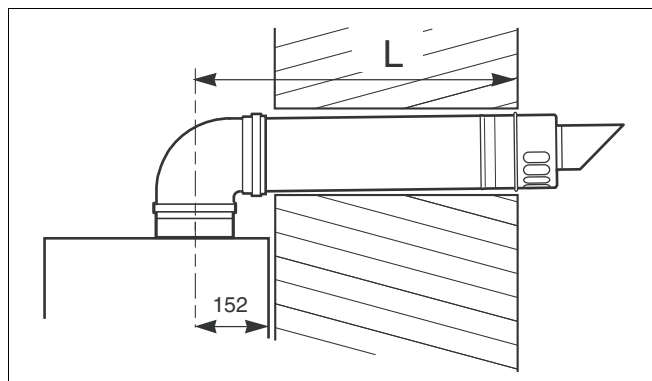


fig. 16 Flue length - rear

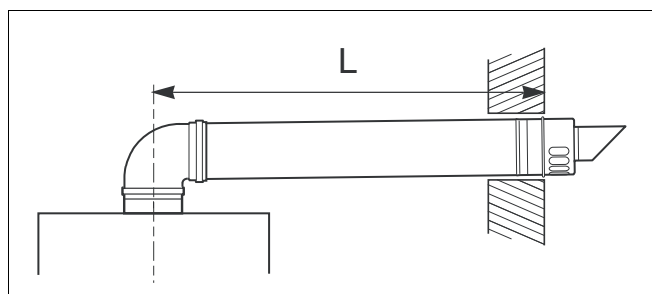


fig. 17 Flue length - side

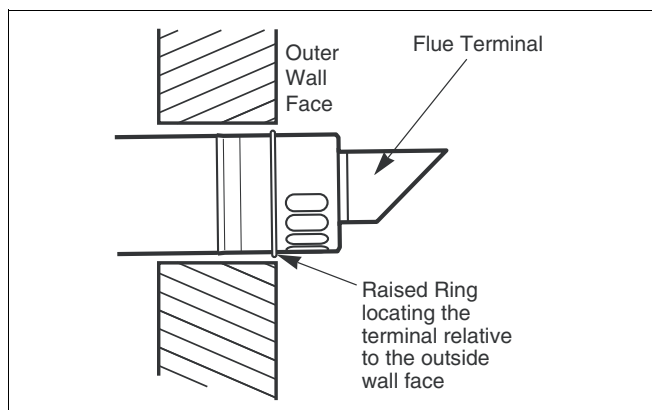


fig. 18 Flue terminal position



## 1.9 Electrical connections

### 1.9.1 Mains connection



#### NOTE

All Buderus boilers require a permanent live.

A mains supply of 230 V - 50Hz is required.

External controls are suitable for volt free or 230 V installation.

Wiring to the boiler **MUST** be in accordance with the current I.E.E. (**BS.7671**) Wiring Regulations and any local regulations.

Wiring should be a 3 core PVC insulated cable, not less than 0.75 mm<sup>2</sup> (24 x 0.2 mm), and to table 16 of **BS.6500**.

Connection must be made in a way that allows complete isolation of the electrical supply such as a double pole switch having 3 mm (1/8") contact separation in both poles, or by a three pin connector, serving only the boiler and system controls. This boiler is equipped with a double pole switch see fig. 19, item 1. The means of isolation must be accessible to the user after installation.

The electrical connection to the mains supply should be readily accessible and adjacent to the boiler.

If the supply cord is damaged, it must be replaced by a registered Corgi installer to avoid a hazard and must be an original spare part.

The electrical supply for both the boiler and the system must be taken from the same fused spur outlet.



#### WARNING!

Do not connect 230V to the connection block on the UBA.

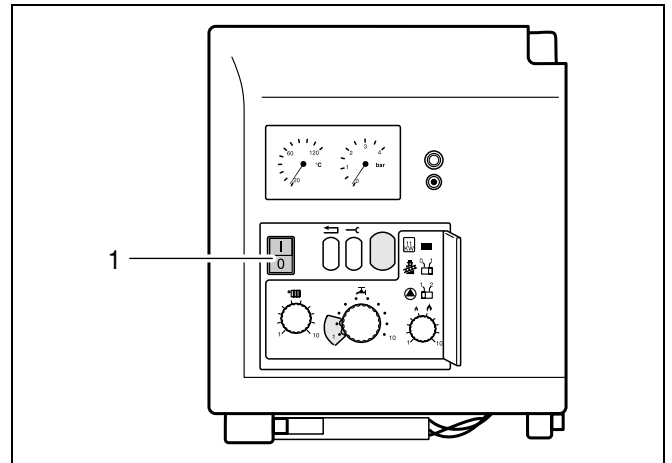


fig. 19 UBA

# 1 Installation

## 1.9.2 Wiring Diagram

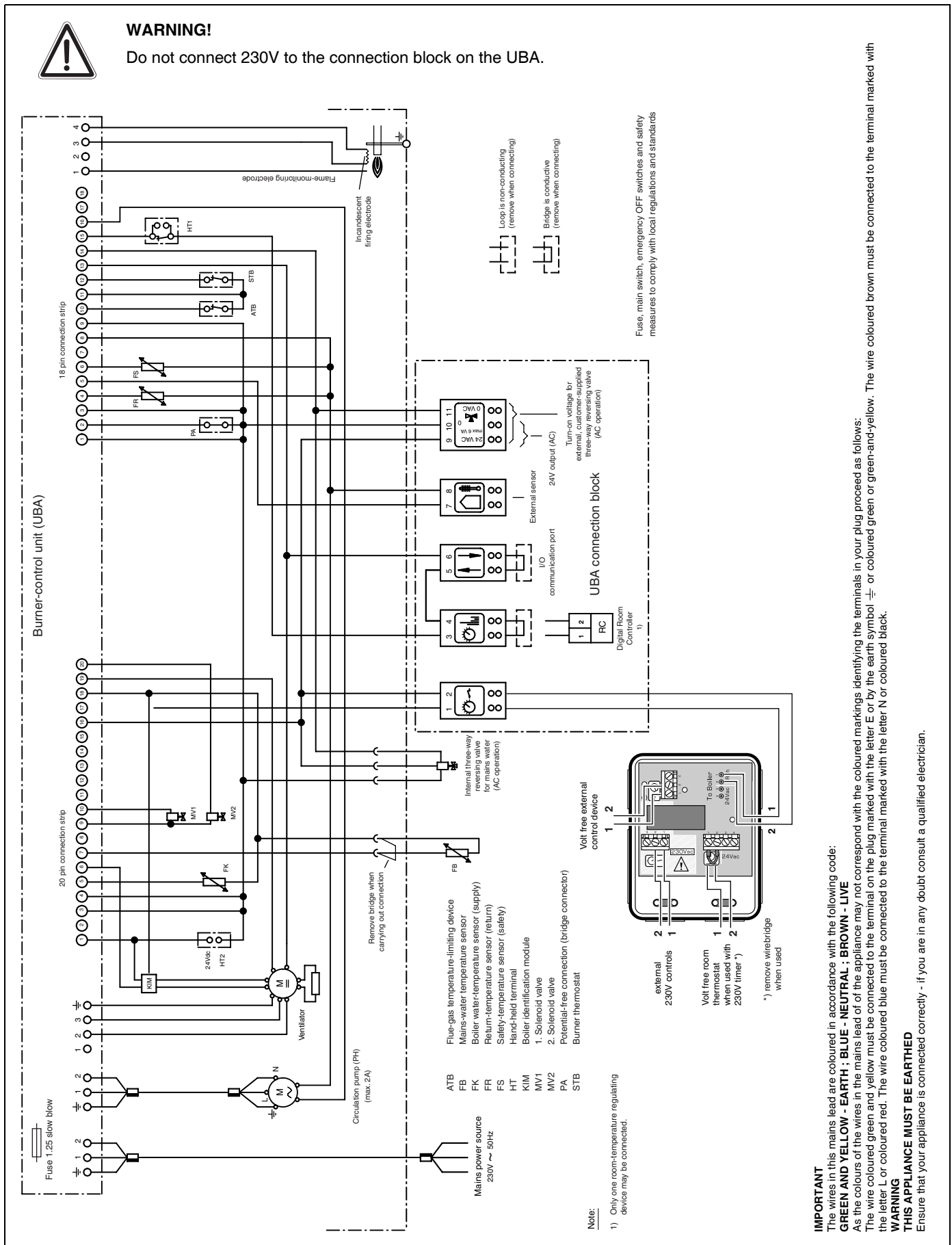


fig. 20 Wiring diagram

### 1.9.3 Connecting a three-way valve of an external storage-type water heater

- Three-way valve with plug:  
Connect the plug-and-socket connector to the plug of the external storage-type water heater (fig. 21).
- Three-way valve without plug:  
Connect the three-way valve to terminals 9 and 11 of the terminal strap (fig. 22, item 5).

### 1.9.4 External controls

The wall-mounted condensing gas boiler can be fitted with the following control devices:

- Buderus programmable room thermostat (see subsection 1.9.5).
- A room-temperature control device at 230V connected to the RTH converter (see subsection 1.9.6);
- ON/OFF temperature controller, volt free (see subsection 1.9.7);

If the boiler has to be temporarily put into operation without control unit, place a conducting bridge in terminal 1-2 and set the feed temperature and the required heating capacity on the UBA.

### 1.9.5 Buderus room temperature control device connection

- Remove the bridge in terminal 3-4 (fig. 22, item 2) and connect the control unit to the terminal strap.
- Remove the wire in terminal 1-2 (fig. 22, item 1).



#### NOTE

RTH converter is no longer in use.

### 1.9.6 230V room-temperature control device connection

- Remove the cover of the RTH converter (fig. 22, item 6).
- Lead the control device wire through the cable lead (fig. 22, item 8).
- Fix the wire to terminal 1 and 2 of the 230 Volt connection (fig. 22, item 9).
- Secure the wire with the bracket and the two screws onto the RTH converter.

### 1.9.7 Volt free external control device connection

- Remove the cover of the RTH converter (fig. 22, item 6).
- Lead the control device wire through the cable lead.
- Fix the wire to terminal 1 and 2 of the volt free connection (fig. 22, item 10).

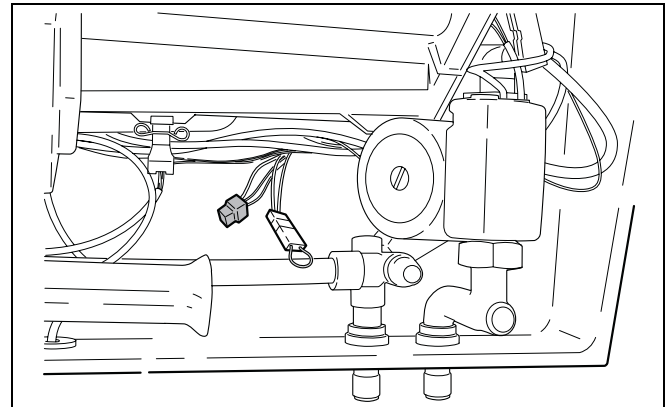


fig. 21 Connecting a three-way valve of an external storage-type water heater

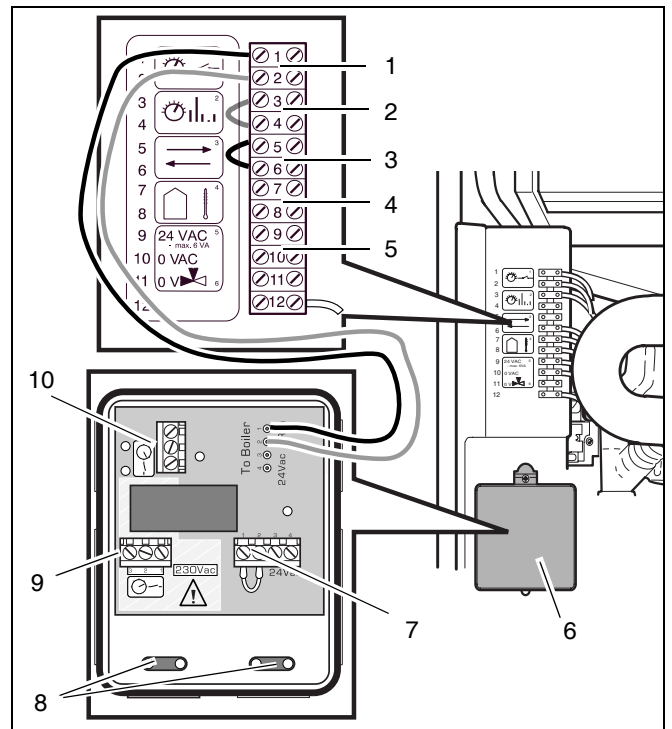


fig. 22 Connecting the control unit

Key to fig. 22:

- Item 1: ON/OFF temperature controller (non-conducting bridge)
- Item 2: Room temperature controller iRT (digital)
- Item 3: I/O port/communication port
- Item 4: Outdoor temperature sensor
- Item 5: Power supply 24 VAC/max: 6 VA switching voltage three-way valve (9+11)
- Item 6: RTH converter
- Item 7: 24 VAC connection
- Item 8: 230 VAC connection
- Item 9: Volt free connection

# 1 Installation

## 1.9.8 Service tool

The service tool allows you to determine the operating status of the boiler, check components and carry out fast fault diagnosis.

- Open the flap at the front of the boiler unit and insert the twin plug connector of the service tool into the sockets provided (fig. 23, item 1).

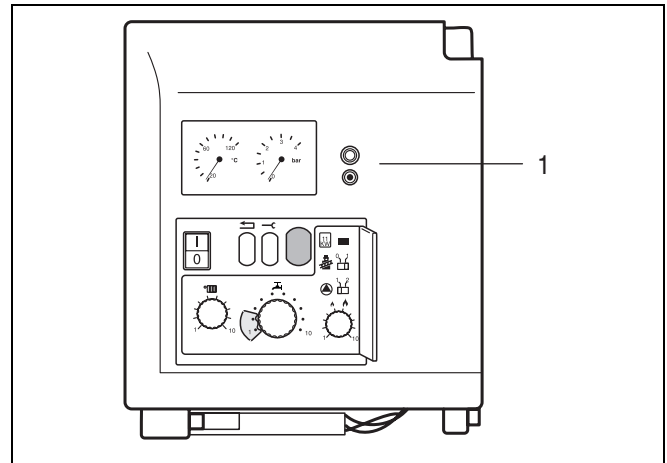
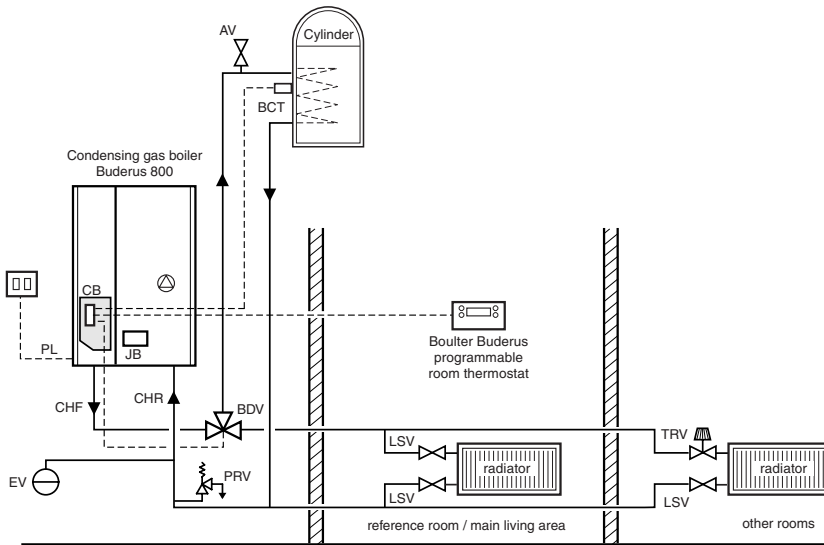


fig. 23 Service-tool connection

## 1.9.9 System examples

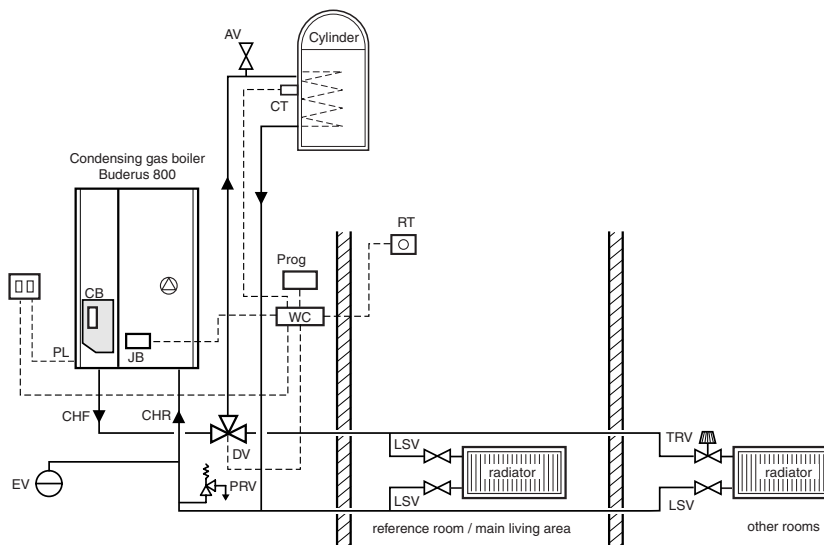
### Buderus 800 with Buderus controls



Key to abbreviations :

- AV = Air Vent
- BCT = Buderus cylinder thermostat
- BDV = Buderus diverter valve
- CB = Connection Block
- CHF = Central Heating Flow
- CHR = Central Heating Return
- EV = expansion vessel
- JB = Junction Box / RTH Relay
- LSV = Lockshield Valve
- PL = Permanent Live
- PRV = Pressure relief valve
- TRV = Thermostatic radiator valve

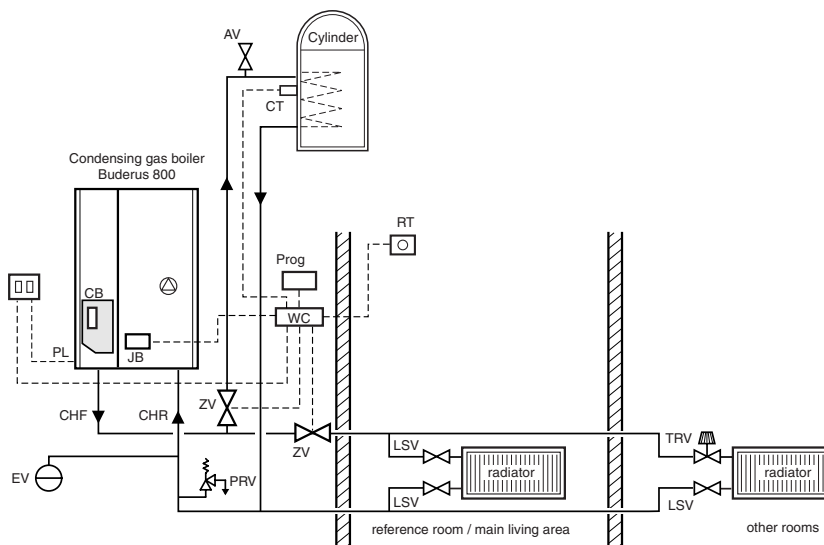
### Buderus 800 with external 230V connection



Key to abbreviations :

- AV = Air Vent
- CB = Connection Block
- CHF = Central Heating Flow
- CHR = Central Heating Return
- CT = Cylinder thermostat
- DV = Diverter valve
- EV = expansion vessel
- JB = Junction Box / RTH Relay
- LSV = Lockshield Valve
- PL = Permanent Live
- Prog = Programmer
- PRV = Pressure relief valve
- RT = Room Thermostat
- TRV = Thermostatic radiator valve
- WC = Wiring Centre

### Buderus 800 with external 230V connection and two port zone valves



Key to abbreviations :

- AV = Air Vent
- CB = Connection Block
- CHF = Central Heating Flow
- CHR = Central Heating Return
- CT = Cylinder thermostat
- EV = expansion vessel
- JB = Junction Box / RTH Relay
- LSV = Lockshield Valve
- PL = Permanent Live
- Prog = Programmer
- PRV = Pressure relief valve
- RT = Room Thermostat
- TRV = Thermostatic radiator valve
- WC = Wiring Centre
- ZV = Two port Zone Valve

## 2 Initial start-up

### 2.1 Preparing the boiler for operation

#### 2.1.1 Filling the heating system



#### WARNING

The wall-mounted condensing gas boiler must not be activated at this stage.

When using oxygen-permeable pipes (e.g. for floor heating), heat exchangers must be used to separate the system.

- Move the mechanical switch on the three-way valve to centre position (fig. 24) (applicable for 800-24T25 and 800-29T25 only) and systems with an external storage-type water heater.
- If necessary open the CH flow and CH return maintenance valves.
- Connect temporary hose of the filling loop (for pipe locations see page 6 and 7).
- Open both stop valves.

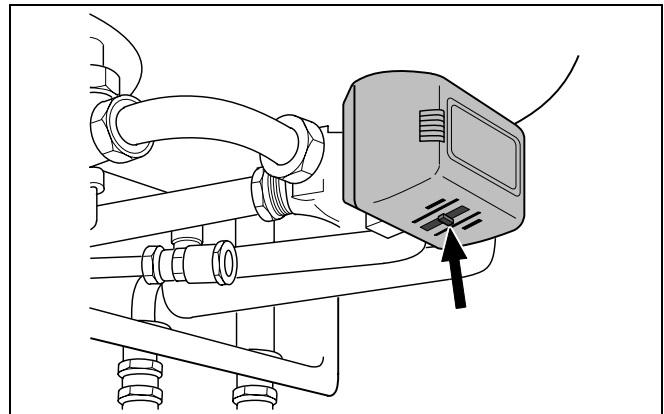


fig. 24 Mechanical switch on the three-way valve

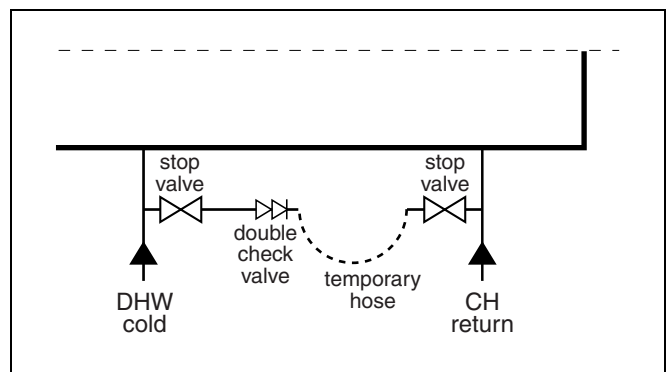


fig. 25 Connecting temporary hose

- Fill the system to a pressure of 1.0 to 1.2 bar (fig. 26, item 1). Max. water pressure is 2.0 bar.
- Shut both stop valves and disconnect the filling loop.

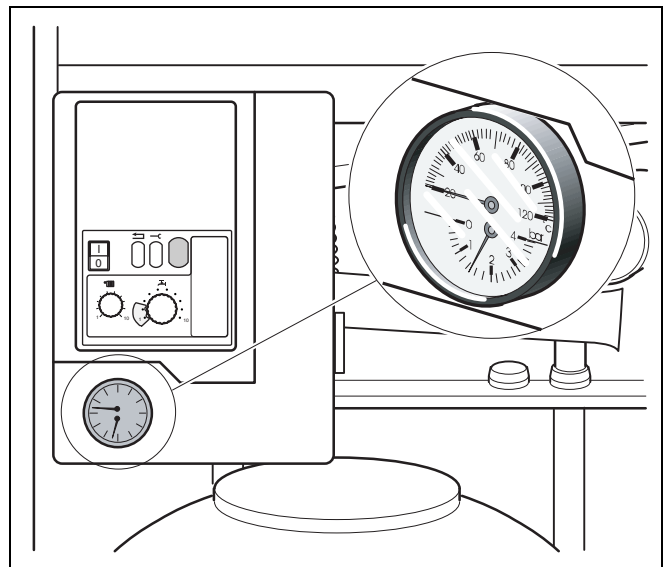


fig. 26 Pressure display

#### To drain the system take the following steps:

- Close the CH flow and the CH return service valve.
- Place hose on the draining tulle.
- Turn to drain the system.

### 2.1.2 Preparing the automatic air release valve

- Open the protective cap on the automatic air release valve one full turn (fig. 27).  
Should the air purging operation cause the pressure to drop below minimum, top up water.

### 2.1.3 Filling the hot water reservoir

- Open the cold water inlet on the service valve.
- Open the hot water valve until a full jet of water is flowing.

### 2.1.4 Filling the syphon with water

- Pull the hose from the condensate plate (fig. 28, item 1).
- Fill the syphon with water.
- Fit the hose to the condensate plate.

### 2.1.5 Checking for leaks

- Disconnect the system from power supply.
- Check all sections of gas pipework and connections for signs of leaks before starting up system for the first time. If a leak is detected during tightness testing, use an approved leak detector to check all connections for possible escapes.  
The product must be certified as a gas leak-testing agent. DO NOT allow the product to come into contact with electrical wiring.

### 2.1.6 Purging air from the gas supply pipe

- Loosen the screw plug on the gas connection and air purging test nipple on Honeywell gas units two turns (fig. 29, item 1), fully unscrew the plug on SIT gas units (fig. 30, item 1) and fit the hose.
- Purge system and appliance as per relevant procedures, **IGE/UP/1b**. Ensuring all safety requirements are met.

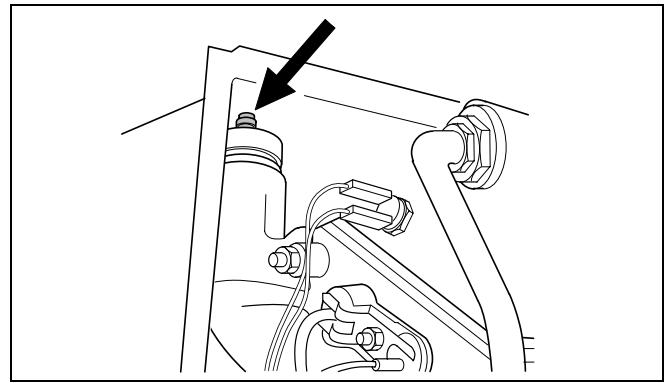


fig. 27 Automatic air release valve

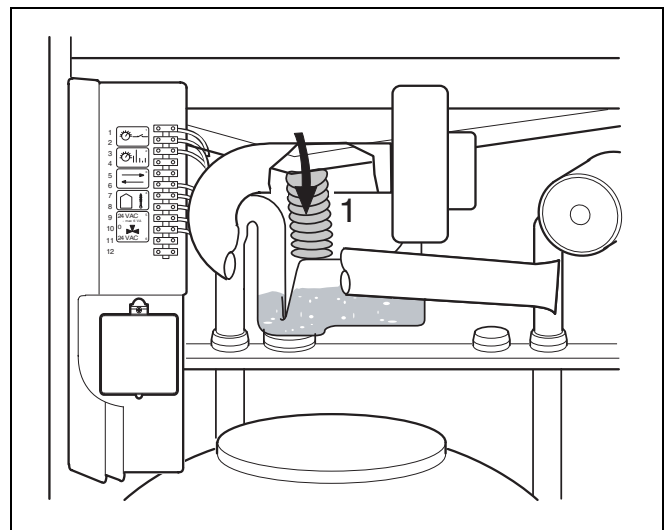


fig. 28 Filling the syphon with water

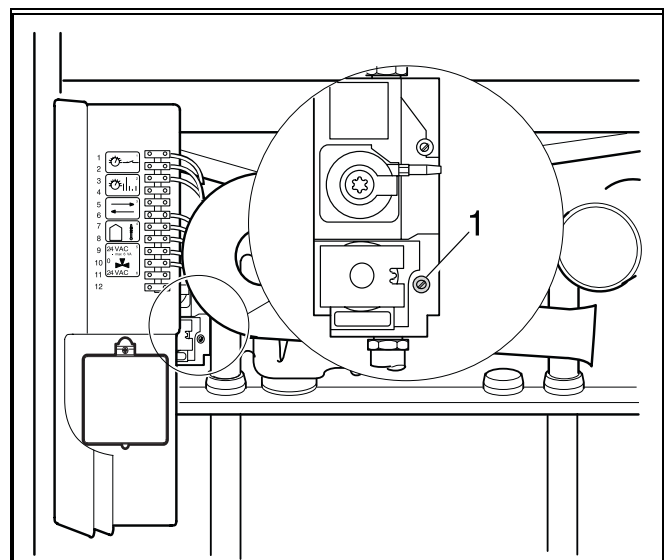


fig. 29 Purging the gas supply pipe (Honeywell gas units)

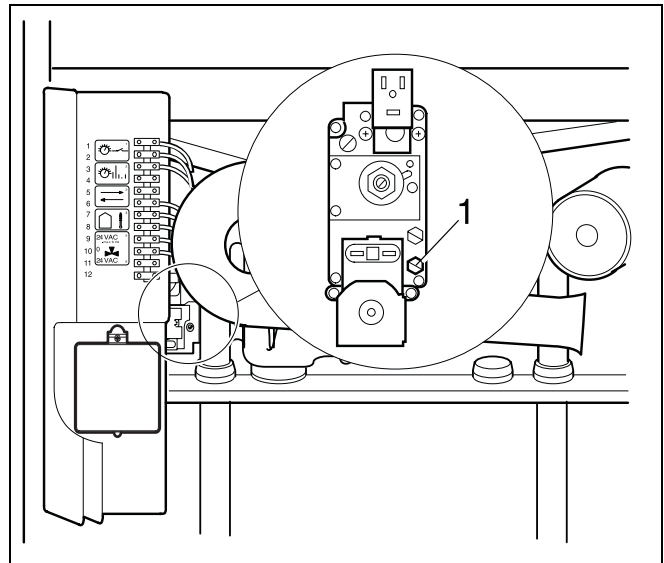


fig. 30 Purging the gas supply pipe (SIT gas units)

## 2.2 Start-up work

Type of gas	Factory setting of gas burners
Natural gas <b>E</b> (includes natural gas <b>H</b> )	When delivered ready for operation and set to Wobbe index 14.1 kWh/m <sup>3</sup> (referred to 15 °C, 1013 mbar), applicable for Wobbe index range 11.3 to 15.2 kWh/m <sup>3</sup> . Inscription on type of gas label: Category setting: G 20 - 2E_20 mbar Formerly: set to Wobbe index 15.0 kWh/m <sup>3</sup> (referred to 0 °C, 1013 mbar), applicable for Wobbe index range 12.0 to 15.7 kWh/m <sup>3</sup> .
LPG	After change-over (see Installation Instructions: "Changing to another type of gas") suitable for LPG. Inscription on type of gas label: Category setting: 3P G 31_30-50 mbar

Table 4 Gas burner factory settings

### 2.2.1 Checking the boiler equipment



**NOTE!**

The burner must only be put into operation with the correct injectors (table 5).

Gas boiler	Type of gas	Gas injector diameter [mm]	Air injector diameter [mm]
800-24 (24T25 H/V)	Natural gas <b>H</b>	4.65	21.55
	LPG	3.45	20.10
800-29 (29T25 H/V)	Natural gas <b>H</b>	5.00	23.30
	LPG	3.90	23.00
800-43	Natural gas <b>H</b>	6.40	29.30
	LPG	4.85	27.40
800-60	Natural gas <b>H</b>	8.00	36.40

Table 5 Gas and air injector diameters



## 2.2.2 Settings

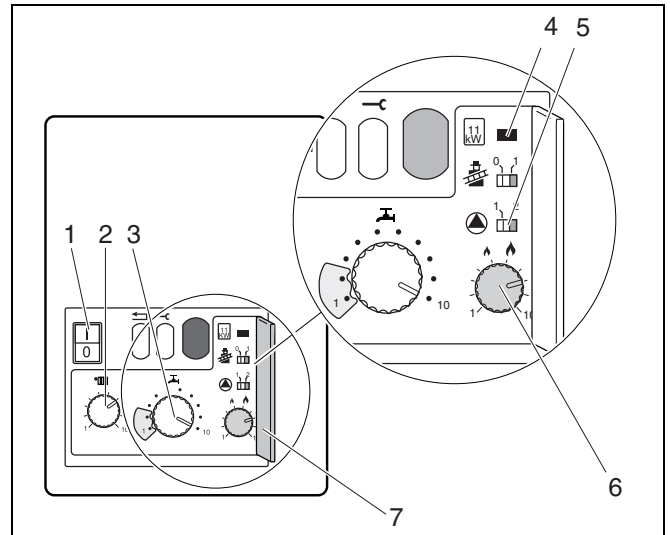


fig. 31 Controls

*Key to fig. 31*

- Item 1: Main switch*
- Item 2: Flow temperature controller*
- Item 3: Domestic hot water temperature controller*
- Item 4: Jumper 11/50 kW to limit capacity*
- Item 5: Pump over-run time switch*
- Item 6: Heating capacity controller*
- Item 7: Cover for second control level*

### Setting the flow temperature

- Set the controller (fig. 31, item 2) to the desired maximum flow temperature in accordance with the system design and table 6.  
Factory setting = 80 °C (controller position 10).

Controller position	Flow temperature in °C
1	40
2	44
3	48
4	53
5	58
6	62
7	67
8	71
9	76
10	80

Table 6 Flow temperature

## 2 Initial start-up

### With external storage-type water heater: set the hot water temperature

- Use the controller (fig. 31, item 3) to set the desired domestic hot water temperature in accordance with table 7.

Controller position	Domestic hot water temperature of external reservoir in °C
1	27
2	31
3	34
4	38
5	41
6	45
7	49
8	52
9	56
10	60

Table 7 Domestic hot water temperature



### Setting the heating capacity

- Open the cover of second control level (fig. 31, item 7).
- Set the heating capacity in accordance with the required heat demand (table 8) on the controller (fig. 31, item 6). Take into account the appropriate losses caused by the flue gas system (table 9).

Controller position	Heating capacity in kW (±5 %)			
	800-24 24T25	800-29 29T25	800-43	800-60
1	6.6	8.4	12.1	22.0
2	8.4	10.8	15.2	25.3
3	10.2	13.0	18.3	29.7
4	11.9	15.2	21.4	33.5
5	13.6	17.5	24.5	37.3
6	15.3	19.7	27.7	41.2
7	17.0	21.9	30.8	45.0
8	18.7	24.1	35.9	48.8
9	20.4	26.3	37.0	52.7
10	22.0	28.0	40.2	56.5

Table 8 Heating capacity

### Setting the pump over-run time

- Move the switch  (fig. 31, item 4) to position "1".  
Pump over-run time 4 minutes.  
Move the switch  to position "2" when the system is controlled in accordance with the room temperature and if parts of the system outside the detection area of the room temperature controller are at risk of freezing (e.g. radiators in the garage).  
Pump over-run time 24 hours (constant operation).

Pressure loss of flue gas system in Pa	Available portion of maximum capacity in %	
	800-24/29/43	800-60
20	98.5	98.5
30	97.8	98.0
40	97.1	97.4
50	96.4	96.9
60	95.6	96.3
70	94.8	95.8
80	–	95.2
90	–	94.7

Table 9 Capacity losses

### Connecting the hot water sensor FW

- Remove the bridge plug (fig. 32, item 1).  
Cable colours: black/white and lilac.
- Connect 3-m long extension cable (fig. 32, item 2) for the hot water sensor to the plug and fit sensor in the reservoir.

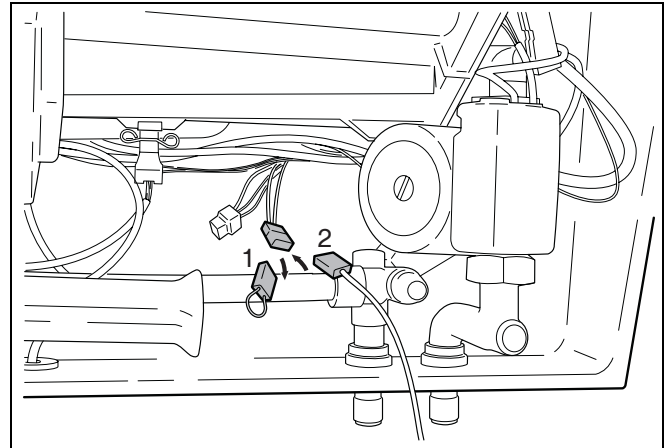


fig. 32 Hot water sensor FW for external storage-type water heater

### type 800 – 24T25 H/V and 800 – 29T25 H/V Setting the hot water flow limiter

- Set the desired value on the flow volume limiter (fig. 33),  
e.g. for 60 °C at 6 liters/min for type 800 – 24T25 or  
8 liters/min for type 800 – 29T25.

Turning to the right = reducing the flow volume

Turning to the left = increasing the flow volume

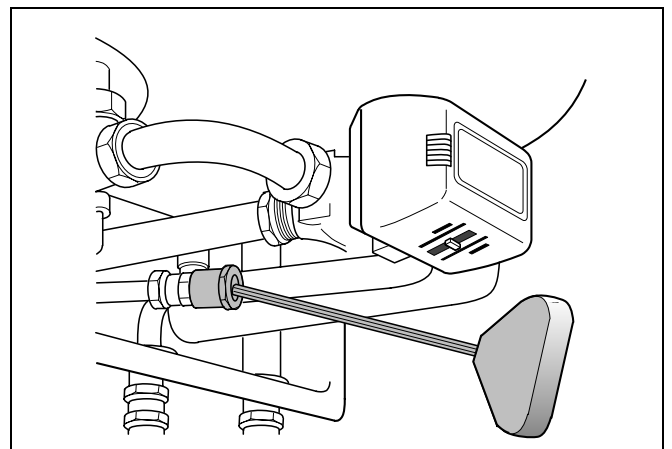


fig. 33 Hot water flow volume limiter

### 2.2.3 Measuring the gas supply pressure (flow pressure)

- Open at least one radiator thermostat valve.  
The gas boiler must not be turned on yet.
- Move the chimney sweeper switch (fig. 34) to position "1".  
On type 800 – 60 the full capacity is achieved after approx.  
one minute. Therefore measurements should be carried  
within one minute of boiler operation.
- Loosen the screw plug on the gas distribution pressure test  
nipple on Honeywell gas units (fig. 35, item 1) two turns,  
fully unscrew the plug on SIT gas units (fig. 36, item 1).
- Fit the measuring hose of the pressure gauge to the test  
nipple (fig. 35, item 2 or fig. 36, item 2).

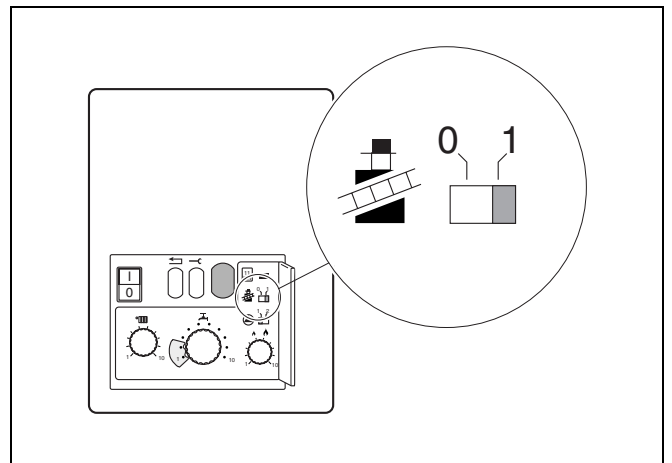


fig. 34 Chimney sweeper switch

## 2 Initial start-up

- Slowly open the gas service valve.
- Insert the mains plug and move the mains switch to "I". After about 30 seconds the burner will fire.
- Measure the gas distribution pressure and enter into the certificate.  
The gas distribution pressure must be min. 17 mbar, max. 25 mbar, rated distribution pressure 20 mbar for **natural gas H** and min. 30 mbar, max. 50 mbar, rated distribution pressure 37 mbar for **LPG**.
- Pull off the measuring hose and tighten up the screw plug on the test nipple.

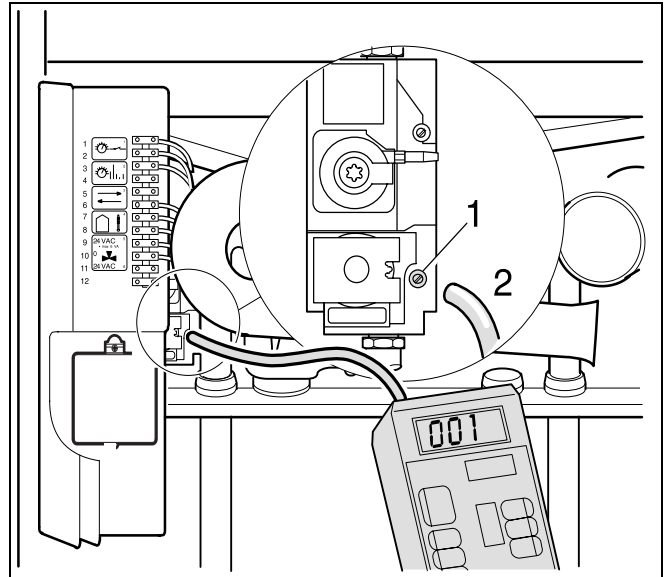


fig. 35 Measuring the gas distribution pressure (Honeywell gas units)



### NOTE!

If the required connection pressure is not available or too high, contact your gas supplier or TRANSCO.

Ensure all disturbed joints and connections are checked for gas tightness on completion of tasks.

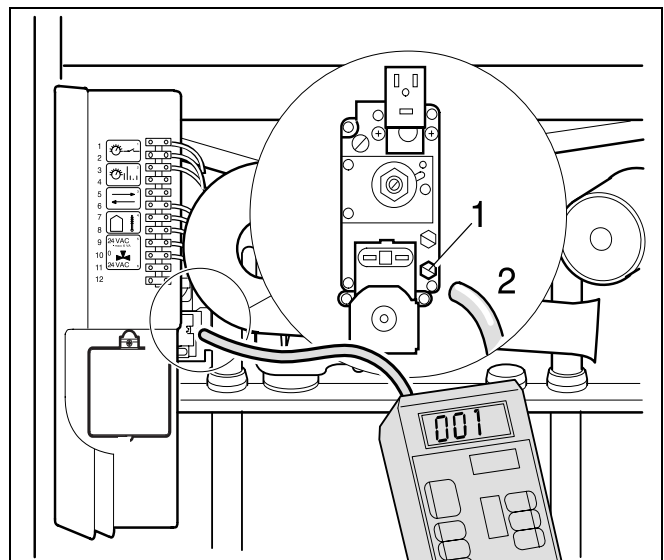


fig. 36 Measuring the gas distribution pressure (SIT gas units)

### 2.2.4 Checking and setting the gas/air ratio

The gas/air ratio can be checked and set in two different ways:

- using a pressure gauge;
- in accordance with the CO<sub>2</sub> content.

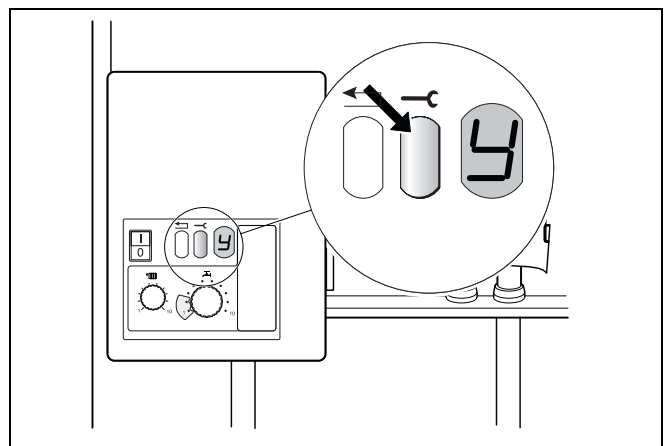


fig. 37 Service button

### Setting the gas/ratio using a pressure gauge:

- Move the mains switch and chimney sweeper switch to "0".
- Pull off the bottom hose attached P1 (fig. 38, item 1) and fit a hose with Tee in between.
- Connect the Tee to the negative port of the pressure gauge.
- Loosen the screw in the burner pressure measuring nipple on Honeywell gas units (fig. 38, item 2) two turns, completely unscrew the screw on SIT gas units (fig. 39, item 1).
- Connect the positive port of the pressure gauge with a hose to the burner pressure measuring nipple (fig. 38, item 2 or fig. 39, item 1).
- Move the mains switch to "I" and the chimney sweeper switch to "1".
- When the burner has fired after approx. 30 seconds, press the service button (fig. 37) until "Y" is shown on the display.
- Move the hot water temperature controller to "1".
- Read the differential pressure.  
The differential pressure ( $p_{\text{Gas}} - p_{\text{Air}}$ ) must be -5 Pa ( $\pm 5$  Pa) (display on the meter: -10 to 0 Pa).
- In case of gas/air ratio deviations, adjust by using the setscrew (fig. 38, item 3 or fig. 39, item 2).
- Set mains switch and chimney sweeper switch to "0".
- Remove the measuring equipment, tighten up the screw in the burner pressure measuring nipple, put the hose back on P1.
- Set the hot water temperature controller back to the original value.
- Move the mains switch to "I".

### Adjustment according to the CO<sub>2</sub> content (natural gas):

- The mains switch must be set to "I" and the chimney sweeper switch to "1".
- Press the service button (fig. 37) until "Y" is shown on the display.

### Full load

- Move the hot water temperature controller to "10".
- Measure and record the CO<sub>2</sub> content on the flue gas measuring point (fig. 40).

### Partial load

- Set the hot water temperature controller to "1".
- Measure and record the CO<sub>2</sub> content.  
The CO<sub>2</sub> content under partial load must be 0.7 % lower than the one under full load.  
If the measured value is too high or too low, use the setscrew of the gas burner unit (fig. 38, item 3 or fig. 39, item 2) to set the gas/air ratio under partial load.
- Set the hot water temperature controller to the original value.
- Set the chimney sweeper switch to "0".

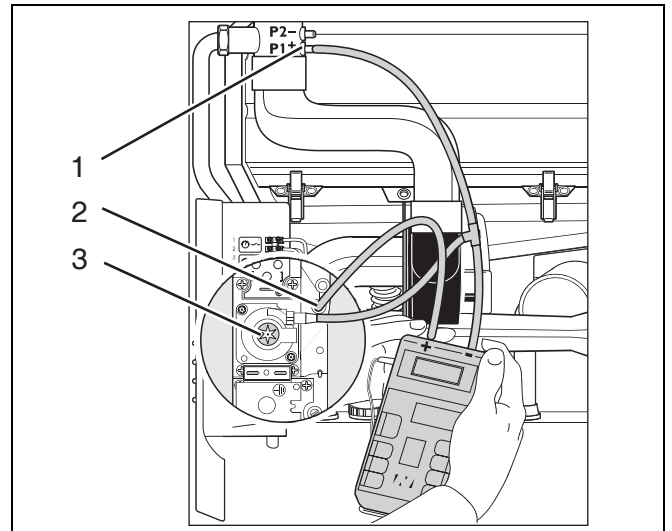


fig. 38 Checking and adjusting the gas/air ratio (Honeywell gas unit)

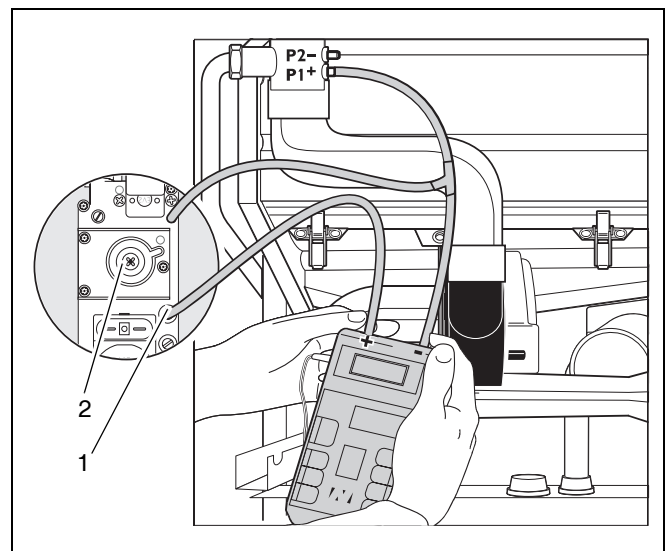


fig. 39 Checking and adjusting the gas/air ratio (SIT gas unit)

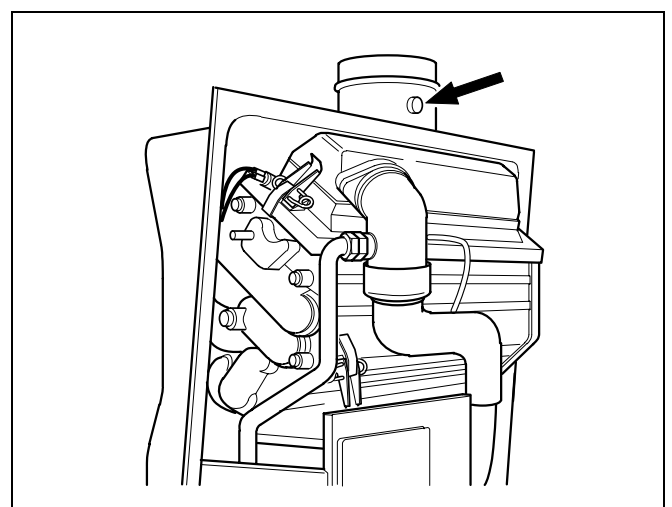


fig. 40 Flue gas measuring point

### 2.2.5 Checking for leaks in operational condition

- Check with the burner running, all joints across the entire gas route of the burner using a foaming agent. The agent must be certified as a gas leak test agent. Do not apply the agent to electrical connection cables.

### 2.2.6 Measuring the carbon monoxide content

Measuring point see fig. 40 on page 29.

The carbon monoxide values under vacuum must be smaller than 400 ppm and/or 0.04 Vol%.

Values around or exceeding 400 ppm indicate a faulty burner adjustment, a dirty gas burner or heat exchanger or a defective burner.

Find and eliminate the cause.

### 2.2.7 Checking the operation

During commissioning and the annual inspection and servicing routine the working order of all control, regulating and safety devices must be checked to see if they are correctly set (provided these devices can be adjusted).

#### Measuring the ionisation current

- Move the mains switch to "0".
- Loosen the plug-and-socket connector of the monitoring cable and connect the measuring device in series (fig. 41). Select on the measuring device the  $\mu\text{A}$  direct current range. The measuring device must have a resolution of at least 1  $\mu\text{A}$ .
- Move the mains switch to "I" and the chimney sweeper switch to "1".
- After the burner has fired, press the service button (fig. 37) until "Y" is shown on the display.
- Move the hot water temperature controller to "1".
- Measure the ionisation current. The ionisation current must be  $> 2 \mu\text{A}$  direct current under partial load.
- Enter the measurement in the certificate.
- Move the mains switch to "0".
- Remove the measuring device and restore the original condition of the plug-and-socket connection.
- Move the chimney sweeper switch to "0".
- Close the cover of the 2nd control level.
- Set the temperature on the hot water temperature controller to the desired value.
- Move the mains switch to "I".
- When the display shows "7" and the service button is pressed, the display turns to "c". Press the reset button until "r" is shown on the display.
- Close the cover.

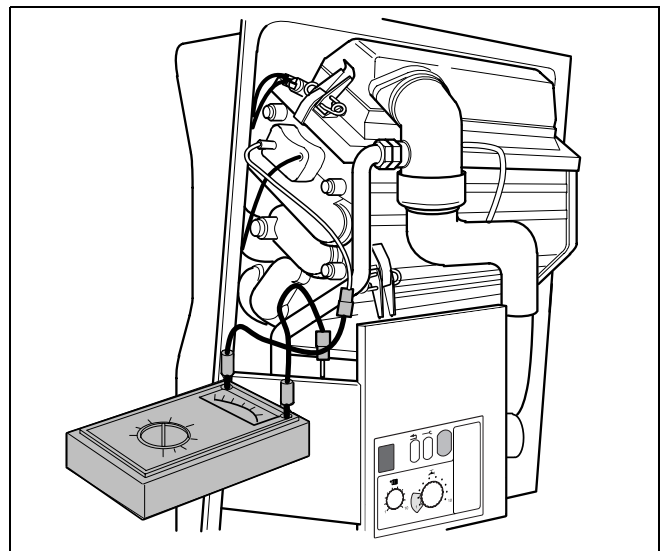


fig. 41 Measuring the ionisation current

### 2.2.8 Fitting the boiler casing

- Put the casing in place (fig. 42, item 1).
- Close (fig. 42, item 2) and lock the clasps (fig. 42, item 3) with the radiator key (fig. 42, item 4).
- Turn in the screw (fig. 42, item 5).
- Close the cover of the control panel (fig. 42, item 6).

**Do not carry the casing by the clasps !**

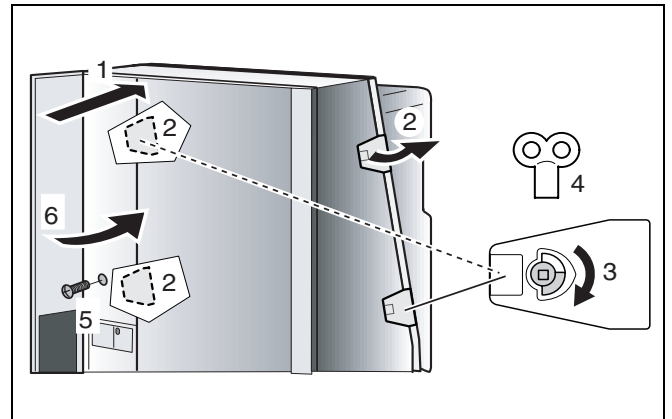


fig. 42 Fitting the boiler casing

### 2.2.9 Handing over

After completing the installation and commissioning of the system the installer should hand over to the householder by the following actions:

- Fill out the form at the end of this manual. This confirms that the system is properly set up, installed and commissioned and that it has been handed over in good working order.
- Hand the User Manual to the householder and explain his/her responsibilities under the relevant national regulations.
- Explain and demonstrate the lighting and shutting down procedures.
- The operation of the boiler and the use and adjustment of all system controls should be fully explained to the householder, to ensure the greatest possible fuel economy consistent with the household requirements of heating. Advise the User of the precautions necessary to prevent damage to the system and to the building in the event of the system remaining inoperative during frosty conditions.
- Explain the function and the use of the boiler heating controls.
- Explain the function of the boiler fault mode. Emphasise that if a fault is indicated, the boiler should be turned off and a registered local heating installer consulted.
- Explain and demonstrate the function of time and temperature controls, radiator valves etc., for the economic use of the system.

## 3 Inspection

### 3.1 Preparing the heating boiler for inspection

- Disconnect the system.



#### **DANGER OF FATAL INJURY**

due to electric shock when system is opened.

- Before opening the system: disconnect the heating unit at the emergency OFF switch or the corresponding circuit breaker of the house power supply.
  - Ensure that the heating system cannot be reconnected by accident.
- Remove the burner housing or cover from the heating boiler (fig. 5 on page 11).



#### **NOTE**

If the gas supply pipes are to be disconnected from the burner, the housing **MUST ONLY** be removed by a qualified service technician and checked for tightness on reassembly.

### 3.2 Checking for internal leaks

Check all internal pipework and controls for leaks using the appropriate methods as in **IGE/UP/1b**, using the correct leak detection fluid **DO NOT** come into contact with any electrical components.

### 3.3 Visual inspection

- Check all gas-bearing and water-bearing pipes for signs of corrosion (fig. 43).
- Replace corroded pipes if necessary.

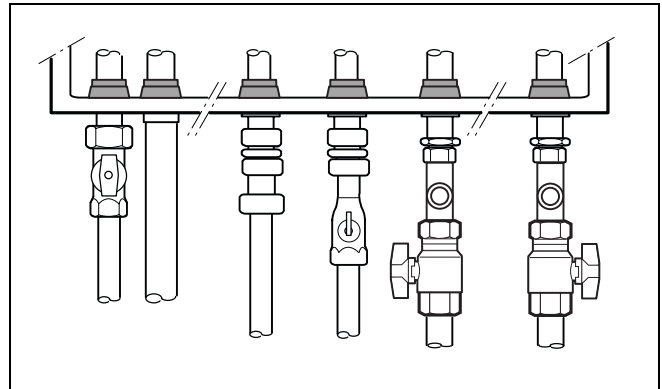


fig. 43 Visual inspection for signs of corrosion

For further information, please refer to subsection 7.2 "Inspection and service reports" on page 64 and fill out the **Benchmark**.



## 4 Maintenance

For further information, please refer to subsection 7.2 "Inspection and service reports" on page 64 and fill out the **Benchmark**.

### Preparations

- Disconnect the system from the power supply.
- Close the gas service valve.
- Remove the boiler casing (fig. 5 on page 11).

### 4.1 Cleaning the heat exchanger, burner and syphon

The heat exchanger can be cleaned with a brush and compressed air.

- Loosen the screw couplings of the gas injector (fig. 44, item 1).
- Pull off the hose leading to the fan (fig. 44, item 2).
- Pull off the hoses at the differential pressure measuring point (fig. 44, item 3).
- Pull off the wiring of the burner thermostat (fig. 44, item 4).

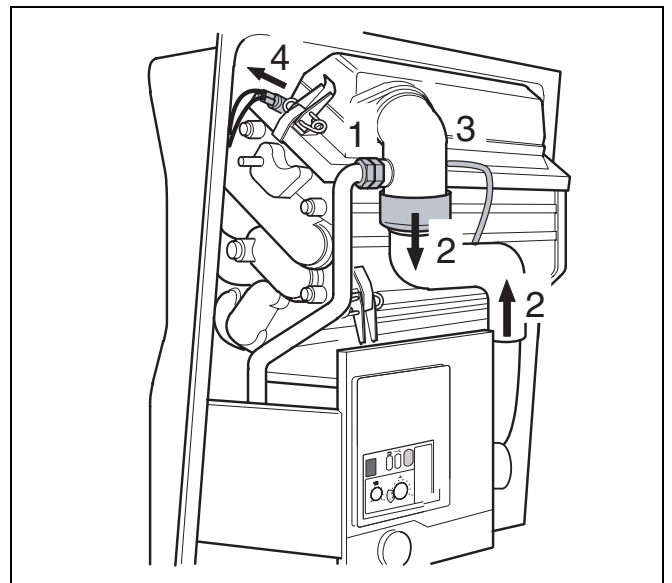


fig. 44 Disconnecting

- Pull off the plug of the fan (fig. 45, item 1).
- Turn and pull out the safety retainer of the fan (fig. 45, item 2).

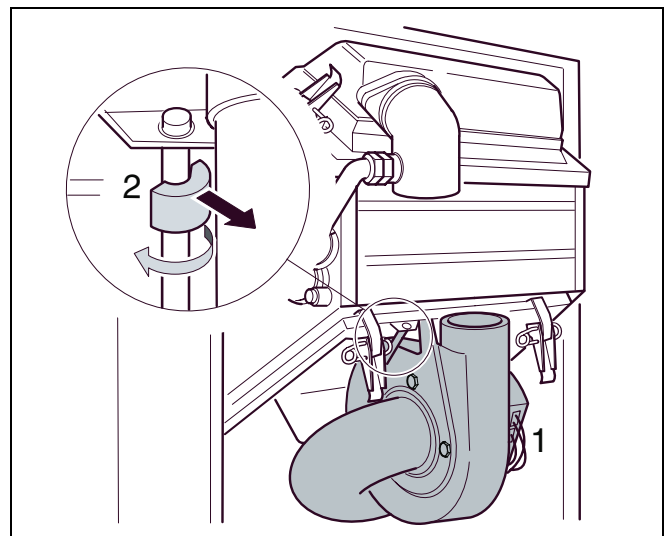


fig. 45 Removing the fan

## 4 Maintenance

- Push up the fan (fig. 46, item 1).
- Pivot the lower end of the fan forward (fig. 46, item 2) and take it out downwards and forwards (fig. 46, item 3).

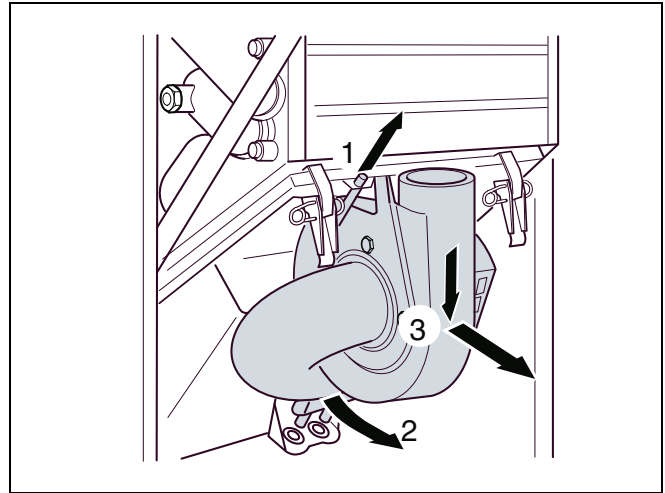


fig. 46 Removing the fan

- Loosen both retaining clamps (fig. 47, item 2) of the burner cover and remove the burner cover and burner (fig. 47, item 3).

### Cleaning by using a brush and compressed air

- Pull the syphon away from the condensate plate (fig. 47, item 1).
- Loosen the connection to the condensate water bypass (fig. 47, item 6).
- Loosen the retaining clamps (fig. 47, item 4) of the condensate plate and remove the condensate plate (fig. 47, item 5).

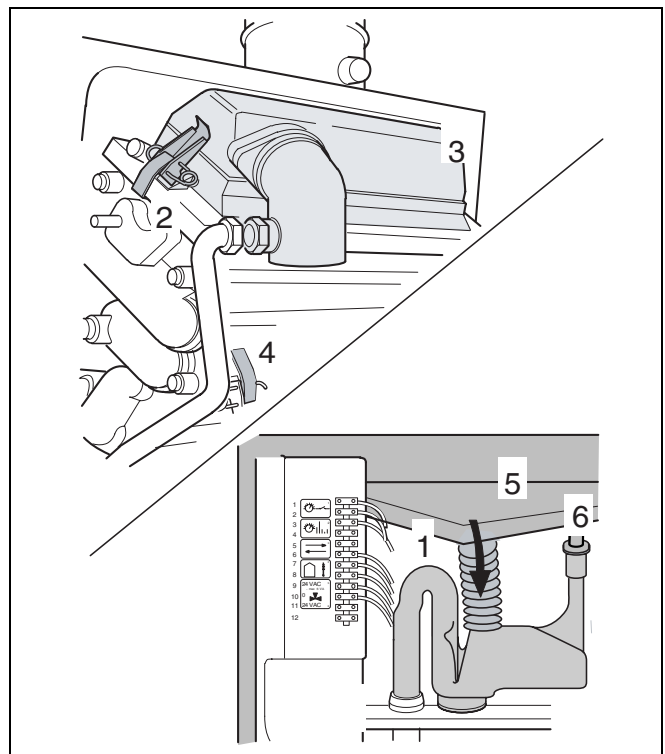


fig. 47 Removing the cover and condensate plate

- Pull out the baffle plate (fig. 48).

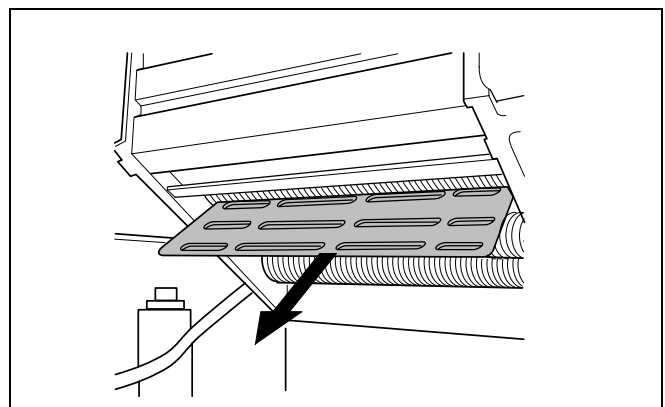


fig. 48 Baffle plate

- Clean the burner with a **soft** brush and compressed air (fig. 49).

**NOTE!**

The perforated plate (fig. 49, item 1) is only provided on type 800 – 24 and 800 – 24T25 models.

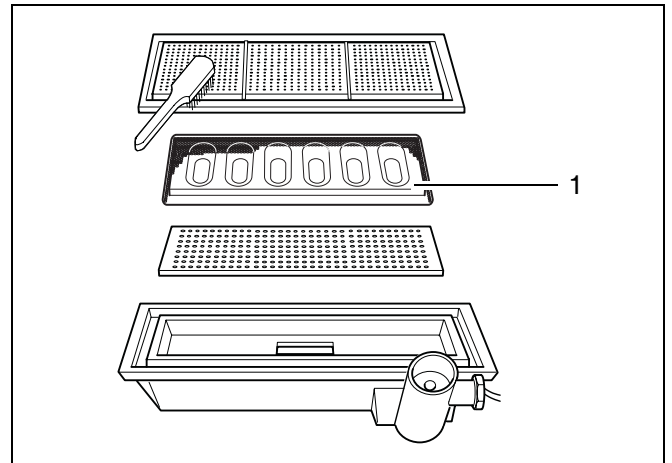


fig. 49 Cleaning the burner

- Clean the heat exchanger with a rib comb and compressed air.

**DANGER!**

The hot surface ignitor (fig. 50, item 1) is made of **fragile material**.

- Put all components back in place in reversed order.

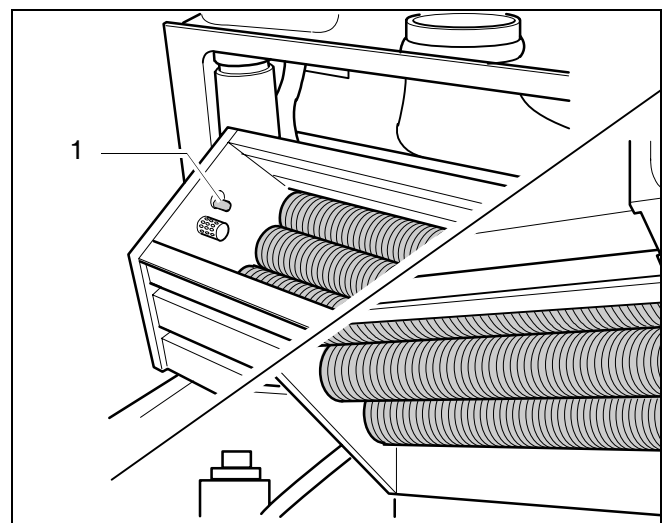


fig. 50 Cleaning the heat exchanger

- Remove and clean the syphon (fig. 51).  
Take care that the syphon cap is screwed on correctly.
- Fill with water before putting the syphon back in place.
- Put all components back in place in reversed order.

**When plastic boiler connectors are used:  
check the operation of the condensate water bypass**

- Inject water (e.g. using a spray bottle) into the left-hand flue gas measuring point (fig. 51) and check that the condensate water bypass is not obstructed.

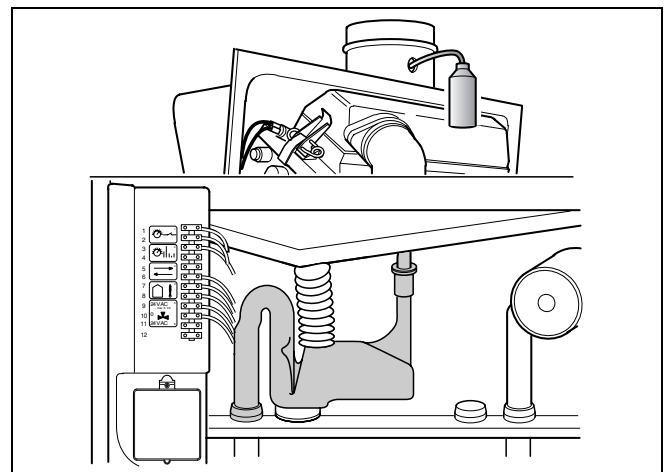


fig. 51 Checking the operation of the condensate water bypass

**When aluminium boiler connectors are used:  
check the sealing cap of the condensate water bypass.**

- Visual inspection to see if there is a white sealing cap on the condensate water bypass (fig. 52).

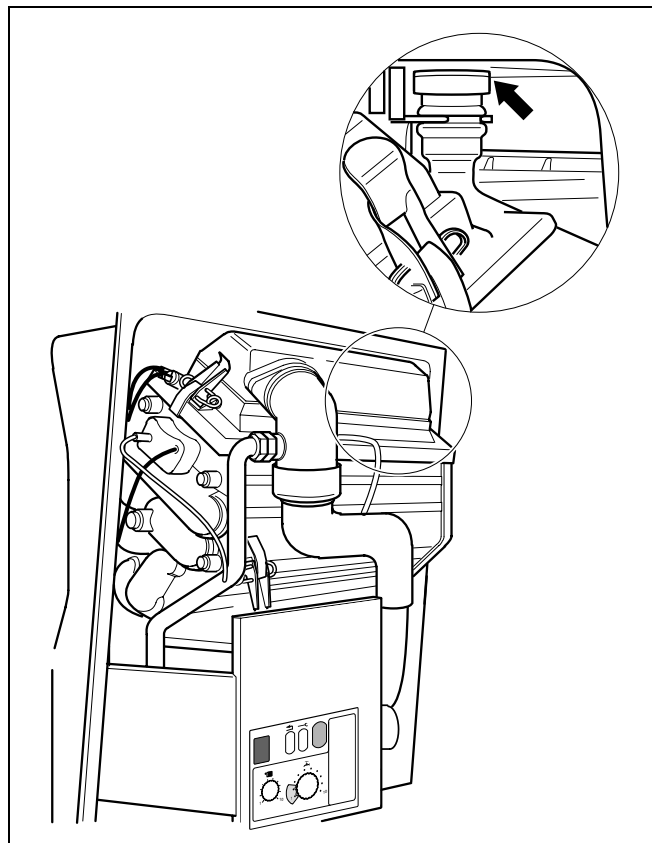


fig. 52 Condensate water bypass sealing cap

## 5 Servicing

### 5.1 Operating codes



**NOTE**

If the code displayed on the burner-control unit is not listed under the operating codes or fault warnings, the burner-control unit itself is malfunctioning.

Display	Display after pressing the service button	Meaning
□		<b>800 Series is ready for operation</b>
	R	Burner interval circuit, 10 minutes from start of burner
	C	Waiting for the three-way valve and/or pump to switch
	H	Ready for operation
	L	First safety period
	P; U	Safety period
	Y	Flow water temperature setting reached (switching difference +2 K)
-.		<b>800 Series runs in heating mode</b>
	R	Chimney sweep mode
	H	Normal heating mode
	Y	Service mode
=.		<b>800 Series runs in hot water mode</b>
	H	Normal hot water mode
r		<b>Reset</b> (after reset button has been pressed for 5 sec. UBA is reset to the switch-on condition)

## 5.2 Fault codes

Code	Meaning	
iE	<i>Flue gas thermostat (STB) has been tripped</i>	
Possible cause		Action
1	Water pressure is too low in the installation	Top up the system (see subsection 2.1.1)
2	Connection in cable harness defective or is getting too hot	Check cable harness and press "reset" until "r" appears in the display
3	Flue gas thermostat if present is defective or is getting too warm	Check the cable connections and press "reset" until "r" appears in the display. Replace if necessary

Code	Meaning	
zE	<i>Safety sensor exceeds 95 °C, blocked for 30 sec.</i>	
Possible cause		Action
1	Resistance in the installation is too high	Check if not all (thermostatic) radiator valves are clogged with dirt. Bypass is installed incorrectly
2	Safety sensor is faulty	Measure if resistance over the sensor is correct. If not replace safety sensor temporarily with another one (see subsection 5.3.9 and subsection 5.3.10)
3	Problem with the pump or pump cabling (no circulation)	Check if the pump cabling is faulty or if the pump is stuck (see subsection 5.3.7)
4	Water pressure is too low in the installation	Top up the system (see subsection 2.1.1)

Code	Meaning	
zF	<i>Temperature difference between the safety sensor and flow sensor is greater than or equal to 15 °K, blocked for 30 sec.</i>	
Possible cause		Action
1	Resistance in the installation is too high	Check if not all (thermostatic) radiator valves are closed or clogged with dirt
2	Safety sensor is dirty or faulty	Check the safety sensor for dirt. Measure if resistance over the sensor is correct. If not replace safety sensor temporarily with another one (see subsection 5.3.9 and subsection 5.3.10)
3	Flow sensor is dirty or faulty	Check the sensor, replace if necessary by temporarily connecting another one (see subsection 5.3.9 and subsection 5.3.10)
4	Problem with the pump or pump cabling (no circulation)	Check if the pump cabling is faulty or if the pump is stuck. Replace pump if necessary (see subsection 5.3.7 and subsection 5.3.8)
5	Water pressure is too low in the installation	Top up the system (see subsection 2.1.1)

Code	Meaning	
2P	<i>Safety sensor rises faster than 5 °C/sec., blocked for 30 sec.</i>	
Possible cause	Action	
1	Resistance in the installation is too high	Check if not all (thermostatic) radiator valves are closed or clogged with dirt
2	Safety sensor is dirty or faulty	Check the safety sensor for dirt. Measure if resistance over the sensor is correct. If not replace safety sensor by temporarily with another one (see subsection 5.3.9 and subsection 5.3.10)
3	External domestic hot water tank is too small for the boiler's capacity	Top up the system (see subsection 2.1.1)

Code	Meaning	
2U	<i>Temperature difference between the flow and return sensors is too high, blocked for 30 sec.</i>	
Possible cause	Action	
1	Resistance in the installation is too high	Check if not all (thermostatic) radiator valves are closed or clogged with dirt
2	Problem with the pump or pump cabling (no circulation)	Check if the pump cabling is faulty or if the pump is stuck (see subsection 5.3.7)
3	Water pressure is too low in the system	Top up the system (see subsection 2.1.1)
4	Return sensor is defective or the cabling is faulty	Measure the resistance of the sensor (see subsection 5.3.12)

Code	Meaning	
4R	<i>Flow sensor exceeds 100 °C</i>	
Possible cause	Action	
1	Flow sensor is dirty or faulty	Check the sensor, replace if necessary (see subsection 5.3.9 and subsection 5.3.10)
2	There is a problem with the pump or pump cabling (no circulation)	Check if the pump cabling is faulty or if the pump is stuck. Replace pump if necessary (see subsection 5.3.7 and subsection 5.3.8)
3	Water pressure is too low in the installation	Top up the system (see subsection 2.1.1)

Code	Meaning	
4C	<i>F2 fuse malfunction, or flue gas thermostat active</i>	
Possible cause	Action	
1	Water pressure is too low in the installation	Top up the system (see subsection 2.1.1)
2	Heat exchanger is dirty	Check for a dirty heat exchanger and clean if necessary (see subsection 4.1)
3	Flue gas retarder faulty or missing	Check if the flue gas retarder is installed in the heat exchanger

## 5 Servicing

Code	Meaning	
4F	<i>Flow sensor exceeds 100 °C</i>	
Possible cause		Action
1	Resistance in the installation is too high	Check if (thermostatic) radiator valves are clogged with dirt
2	Boiler capacity is too large for the installation	Adjust the boiler's capacity
3	Safety sensor is faulty	Check the sensor and measure if resistance over the sensor is correct. If not replace safety sensor (see subsection 5.3.9 and subsection 5.3.10)
4	Problem with the pump or pump cabling (no circulation)	Check if the pump cabling is faulty or if the pump is stuck (see subsection 5.3.7)
5	Water pressure is too low in the installation	Top up the system (see subsection 2.1.1)

Code	Meaning	
4L	<i>Short circuit in safety sensor</i>	
Possible cause		Action
1	Safety sensor is faulty	Check the sensor and measure if resistance over the sensor is correct. If not replace safety sensor (see subsection 5.3.9 and subsection 5.3.10)
2	A short or bad connection in the cable harness	Check the cable harness and/or connector of the sensor
3	UBA might be faulty	Check the UBA by temporarily connecting a different UBA (see subsection 5.3.5)

Code	Meaning	
4P	<i>Safety sensor has a loose connection or is defective</i>	
Possible cause		Action
1	Safety sensor faulty or disconnected	Check the sensor and measure if resistance over the sensor is correct. If not replace safety sensor (see subsection 5.3.9 and subsection 5.3.10)
2	A short or bad connection in the cable harness	Check the cable harness and/or connector of the sensor (see subsection 5.3.12)
3	UBA might be faulty	Check the UBA by temporarily connecting a different UBA (see subsection 5.3.5)

Code	Meaning	
4U	<i>Short circuit in flow sensor</i>	
Possible cause		Action
1	Flow sensor is dirty or faulty	Check the sensor, replace if necessary (see subsection 5.3.9 and subsection 5.3.10)
2	A short or bad connection in the cable harness	Check the cable harness and/or connector of the sensor (see subsection 5.3.12)



Code	Meaning	
4Y	<i>Flow sensor interrupted</i>	
Possible cause		Action
1	Flow sensor faulty or disconnected	Check the sensor and measure if resistance over the sensor is correct. If not replace safety sensor (see subsection 5.3.9 and subsection 5.3.10)
2	A short or bad connection in the cable harness	Check the cable harness and/or connector of the sensor (see subsection 5.3.12)

Code	Meaning	
5C	<i>Boiler shut down after connection with Service Tool</i>	
Possible cause		Action
1	Service tool connection	Press reset. If fault code remains than try to temporarily connect a different UBA (see subsection 5.3.5)
2	A short or bad connection in the cable harness	Check the cable harness and/or connector of the sensor (see subsection 5.3.12)
3	UBA might be faulty	Check the UBA by temporarily connecting an other UBA (see subsection 5.3.5)

Code	Meaning	
6R	<i>F1 fuse defective, or no ionisation message after ignition</i>	
Possible cause		Action
1	There is no flame, ionisation electrode doesn't glow, fan is turning	<ul style="list-style-type: none"> <li>– Check wiring of the hot surface ignitor, measure the resistance of the hot surface ignitor (should be between 50 and 300 Ohm). Replace hot surface ignitor if necessary (see subsection 5.3.15 and subsection 5.3.16)</li> <li>– Check the UBA's F1 fuse, replace if necessary</li> </ul>
2	There is no flame, ionisation electrode does glow, fan isn't turning	<ul style="list-style-type: none"> <li>– Check the fan and KIM connectors and the UBA fuses</li> </ul>
3	There is no flame, ionisation electrode and fan are working	<ul style="list-style-type: none"> <li>– Check and adjust the gas/air ratio (see subsection 2.2.4)</li> <li>– Check for 24 V~ on the gas valve during start up</li> <li>– Check the gas-supply pressure (see subsection 2.2.3), this should be higher than 20 mbar for natural gas.</li> <li>– Check the earthing cable connections (yellow/green wire)</li> <li>– Check the cabling on the ionisation electrode</li> </ul>
4	There is a flame, but the flame disappears when the fan starts up	<ul style="list-style-type: none"> <li>– Check the gas-supply pressure (see subsection 2.2.3), this should be higher than 20 mbar for natural gas</li> <li>– Check and adjust the gas/air ratio (see subsection 2.2.4)</li> <li>– Check the earthing cable connections (yellow/green wire)</li> <li>– Check the cabling on the ionisation electrode</li> <li>– Press reset. If fault code remains than try to temporarily connect a different UBA (see subsection 5.3.5)</li> </ul>

Code	Meaning	
БС	<i>Ionisation message, but no flame</i>	
Possible cause		Action
1	There is no flame, ionisation electrode doesn't glow, fan is turning	<ul style="list-style-type: none"> <li>– Check wiring of the hot surface ignitor, measure the resistance of the hot surface ignitor (should be between 50 and 300 Ohm). Replace hot surface ignitor if necessary (see subsection 5.3.15 and subsection 5.3.16)</li> <li>– Check the UBA's F1 fuse, replace if necessary</li> </ul>
2	There is no flame, ionisation electrode does glow, fan isn't turning	<ul style="list-style-type: none"> <li>– Check the fan and KIM connectors and the UBA fuses</li> </ul>
3	There is no flame, ionisation electrode and fan are working	<ul style="list-style-type: none"> <li>– Check and adjust the gas/air ratio (see subsection 2.2.4)</li> <li>– Check for 24V – on the gas valve during start up</li> <li>– Check the gas-supply pressure (see subsection 2.2.3), this should be higher than 20 mbar for natural gas</li> <li>– Check the earthing cable connections (yellow/green wire)</li> <li>– Check the cabling on the ionisation electrode</li> </ul>
4	There is a flame, but the flame disappears when the fan starts up	<ul style="list-style-type: none"> <li>– The gas valve doesn't close properly. If there is still more than 20 V~ on the gas valve when there is no heat demand then check the UBA by temporarily connecting a different UBA.</li> <li>– Check ionisation electrode/circuit (see subsection 2.2.7)</li> <li>– When both the UBA and the ionisation electrode/circuit are OK, then replace the gas valve</li> <li>– Press reset. If fault code remains than try to temporarily connect a different UBA (see subsection 5.3.5)</li> </ul>

Code	Meaning	
БН	<i>Flame dies out after gas valve is opened</i>	
Possible cause		Action
1	Gas/air ratio not in order	Check and adjust the gas/air ratio (see subsection 2.2.4)
2	Gas supply pressure may need adjusting	Check the gas-supply pressure (see subsection 2.2.3), this should be higher than 20 mbar for natural gas
3	Earthing cable may be faulty	Check the earthing cable connections (yellow/green wire)
4	Ionisation electrode may be faulty	Check the cabling on the ionisation electrode

Code	Meaning	
БЛ	<i>Flame goes out during warm-up phase</i>	
Possible cause		Action
1	Gas/air ratio not in order	Check and adjust the gas/air ratio (see subsection 2.2.4)
2	Gas supply pressure may need adjusting	Check the gas-supply pressure (see subsection 2.2.3), this should be higher than 20 mbar for natural gas
3	Earthing cable may be faulty	Check the earthing cable connections (yellow/green wire)
4	Ionisation electrode may be faulty	Check the cabling on the ionisation electrode

Code	Meaning	
⌘R	<i>Voltage in burner-control unit too low (lower than 187 V~) or too high (higher than 246 V~)</i>	
Possible cause	Action	
1	Regulating device may have to cope with interference	<ul style="list-style-type: none"> <li>– Check if for example induction fields interfere with the regulating device</li> <li>– Check if there are any peaks in the electrical network caused by maybe windmills or a power generator</li> </ul>

Code	Meaning	
⌘L	<i>Mains supply interrupted</i>	
Possible cause	Action	
1	A problem with the mains supply	Check the mains supply during operation (230V~)
2	Reset button pressed too briefly	Press the Reset button until "r" appears in the display

Code	Meaning	
⌘F	<i>F3 fuse defect, or burner control unit error</i>	
Possible cause	Action	
1	Short circuit in the 24V circuit (three-way-valve or connector)	– Check for a short circuit and replace the F3 fuse (see subsection 5.3.3)
2	Regulating device may have to cope with interference	<ul style="list-style-type: none"> <li>– Check if for example induction fields interfere with the regulating device</li> <li>– Check if there are any peaks in the electrical network caused by maybe windmills or a power generator</li> </ul>

Code	Meaning	
⌘H	<i>Voltage peaks in the UBA</i>	
Possible cause	Action	
1	Regulating device may have to cope with interference	<ul style="list-style-type: none"> <li>– Check if for example induction fields interfere with the regulating device</li> <li>– Check if there are any peaks in the electrical network caused by maybe windmills or a power generator</li> </ul>

Code	Meaning	
⌘L	<i>Internal UBA error</i>	
Possible cause	Action	
1	Regulating device may have to cope with interference	<ul style="list-style-type: none"> <li>– Check if for example induction fields interfere with the regulating device</li> <li>– Check if there are any peaks in the electrical network caused by maybe windmills or a power generator</li> </ul>

## 5 Servicing

Code	Meaning	
8Y	<i>Gas fault</i>	
Possible cause	Action	
1	External switching contact (e.g. temperature-monitoring device for underfloor heating has been tripped or gas pressure too low	Check gas pressure detector is defective or the wires have not been properly connected to the back of the UBA (see subsection 5.3.18)

Code	Meaning	
9R	<i>System error</i>	
Possible cause	Action	
1	Regulating device may have to cope with interference	<ul style="list-style-type: none"> <li>– Check if for example induction fields interfere with the regulating device</li> <li>– Check if there are any peaks in the electrical network caused by maybe windmills or a power generator</li> </ul>
2	UBA may be defective	– Press reset. If fault code remains then try to temporarily connect a different UBA (see subsection 5.3.5)

Code	Meaning	
9C	<i>KIM error</i>	
Possible cause	Action	
1	Kim connected incorrectly or KIM defective	Check the KIM connector and fan connector (see subsection 5.3.21). If the connectors are fine then contact Buderus

Code	Meaning	
9L	<i>Gas valve assembly error</i>	
Possible cause	Action	
1	Wiring to the gas valve incorrect, or loose wiring connections in UBA	<ul style="list-style-type: none"> <li>– Check the electrical connections of the gas valve</li> <li>– Measure the resistance of the gas valve (18-55 Ohm)</li> <li>– Check if for example induction fields interfere with the regulating device</li> </ul>
2	UBA may be defective	– Press reset. If fault code remains then try to temporarily connect a different UBA (see subsection 5.3.5)
3	Peaks in the electrical network	– Check if there are any peaks in the electrical network caused by maybe windmills or a power generator

Code	Meaning	
9U	<i>KIM defective</i>	
Possible cause	Action	
1	Kim connected incorrectly or KIM defective	Check the KIM connector and fan connector (see subsection 5.3.21). If the connectors are fine then contact Buderus

Code	Meaning	
E with any character but P	<i>UBA defective</i>	
Possible cause	Action	
1	Regulating device may have to cope with interference	<ul style="list-style-type: none"> <li>– Check if for example induction fields interfere with the regulating device</li> <li>– Check if there are any peaks in the electrical network caused by maybe windmills or a power generator</li> </ul>
2	UBA may be defective	<ul style="list-style-type: none"> <li>– Press reset. If fault code remains then try to temporarily connect a different UBA (see subsection 5.3.5)</li> </ul>

Code	Meaning	
EP	<i>Non compatible UBA fitted</i>	
Possible cause	Action	
1	Regulating device may have to cope with interference	<ul style="list-style-type: none"> <li>– Check if for example induction fields interfere with the regulating device</li> <li>– Check if there are any peaks in the electrical network caused by maybe windmills or a power generator</li> </ul>
2	Kim connected incorrectly or KIM defective	<ul style="list-style-type: none"> <li>– Check the KIM connector and fan connector (see subsection 5.3.21). If the connectors are fine then contact Buderus</li> </ul>

<b>Problem:</b> <i>No DHW , despite the system being operational</i>
– Set chimney sweep switch to "0"
– Check three-way valve replace if necessary
– Check DHW sensor and replace if necessary

<b>Problem:</b> <i>No heating, despite that there is a demand for heat and the boiler is operational</i>
– Check regulating device configuration and/or the wiring
– Check the wiring between the regulating device and the UBA (see subsection 5.3.18)
– Check all the wiring
– Check the UBA and replace if necessary (see subsection 5.3.5)

## 5.3 Checking and replacing parts

### 5.3.1 Unblock the 800 Series

Each time a fault has been rectified, push the “reset” button (fig. 53) and keep it pressed for five seconds. A letter “r” will appear on the display. After five seconds, the display returns to “0”. This unblocks the UBA and returns it to standby mode.



#### NOTE

The system cannot be unblocked by disconnecting at the master switch.

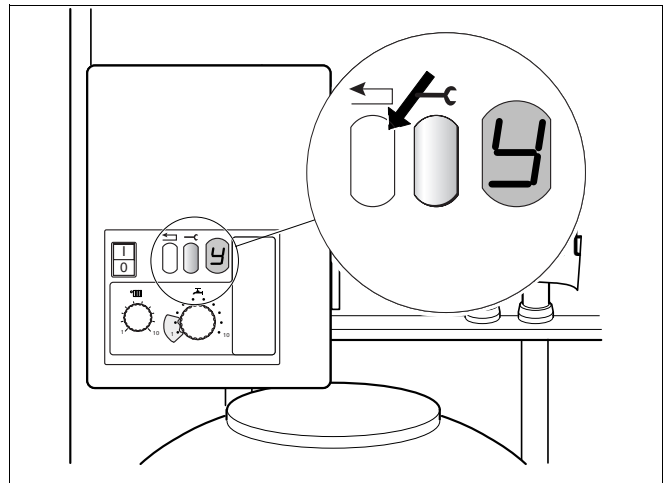


fig. 53 “Reset” button

### 5.3.2 Chimney sweep mode

Certain troubleshooting tasks must be carried out with the 800 Serie in heating mode. When doing so, the chimney sweep switch should be set to “1”.

Remember to return the chimney sweep switch to “0” once work is complete.



#### NOTE

The system cannot be used for heating water while it is in chimney sweep mode.

- Remove cover of control level 2.
- Set chimney sweep switch (fig. 54) to “1”.

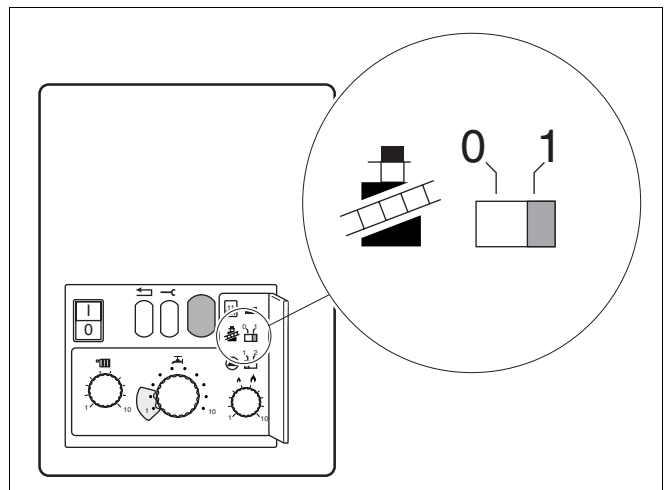


fig. 54 Chimney sweep switch

### 5.3.3 Checking the fuses

- Disconnect the system from the power supply.
- Swivel the UBA to one side.
- Check fuse for throughput or carry out visual inspection (fig. 55, items 1, 2 and 3). If defective, fit new fuse (1.25 AT).
- Connect system to mains power supply.

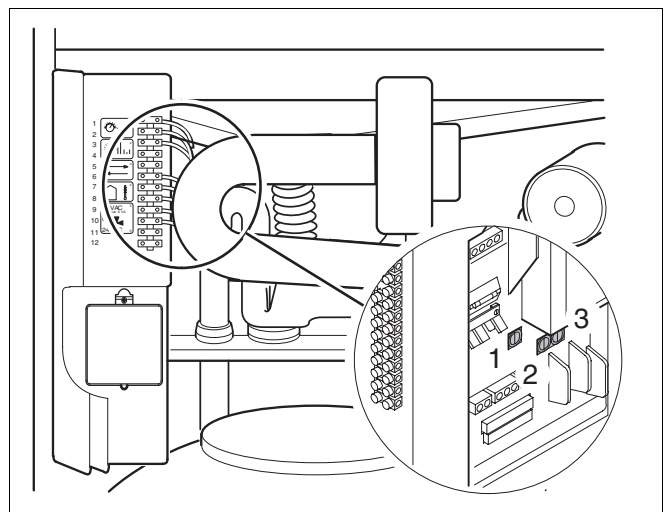


fig. 55 Checking the fuses

### 5.3.4 Check combustion air/flue gas system and hose connections

- Check combustion air/flue gas system for blockages.

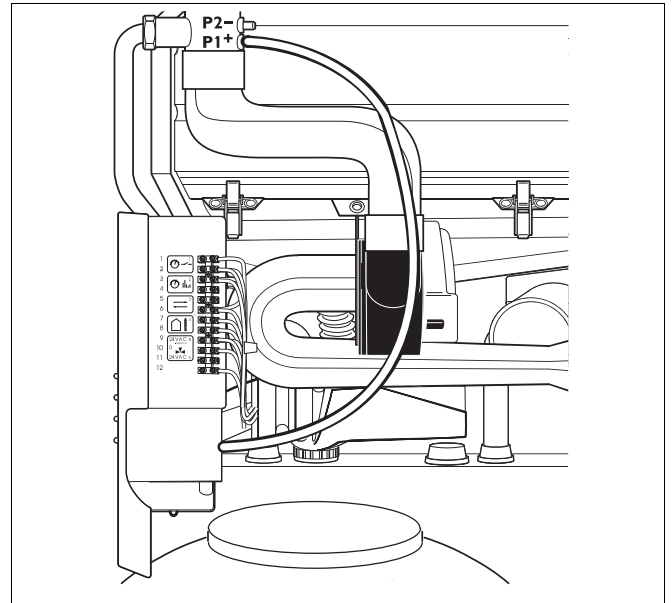


fig. 56 Checking combustion air/flue gas system and hose connections

### 5.3.5 Replacing the UBA

- Disconnect system from power supply by removing main fuse or power connection plug.
- Swivel the UBA to one side and pull the four-pin plug of the mains power switch out at the back of the UBA.
- Disconnect all plug-in cables. Note the position of each plug-in cable.
- Loosen the three screws on the UBA and remove it.
- Remove mains power switch and fit to new UBA.
- Screw the replacement UBA into position.
- Reconnect all plug-in cables to their correct sockets.
- Fit the casing.
- Connect system to mains power supply.
- Move mains power switch to "I".

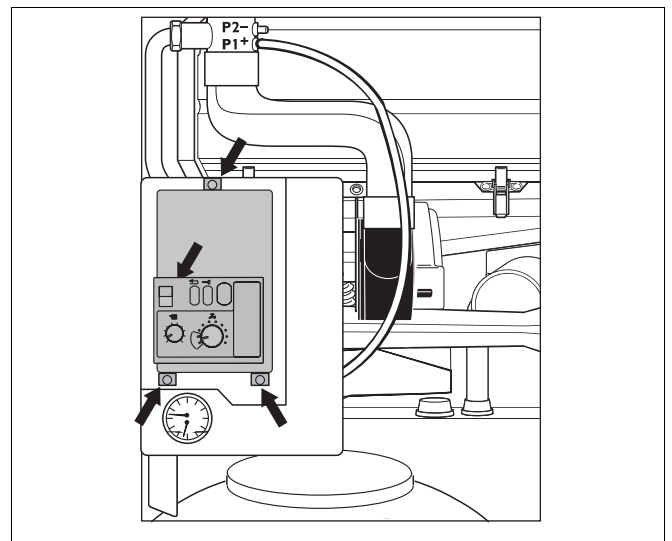


fig. 57 Replacing the UBA

## 5.3.6 Replacing the fan unit

**NOTE**

Please refer to fitting instructions for 230 V fan unit.

- Loosen the screw couplings of the gas injector (fig. 58, item 1) and safety valve (fig. 58, item 2).
- Pull off the hoses leading to the fan (fig. 58, item 3).
- Pull off the hoses at the differential pressure measuring point (fig. 58, item 4).
- Pull out the plug of the burner thermostat (fig. 58, item 5).

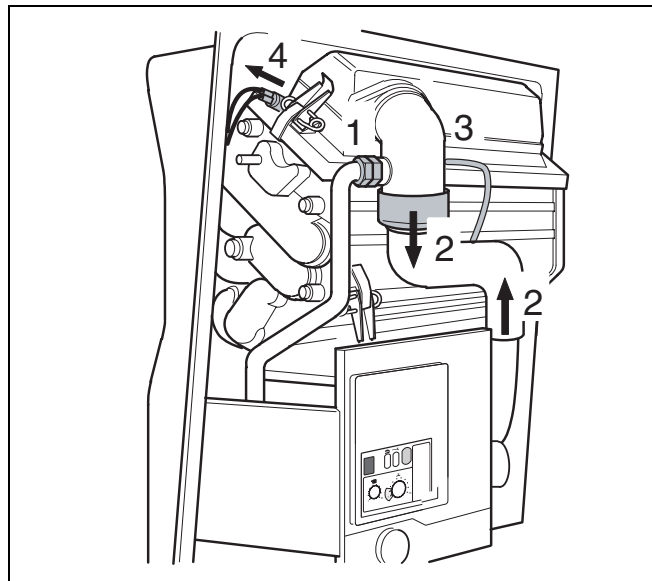


fig. 58 Disconnecting

- Pull out the plug of the fan (fig. 59, item 1).
- Turn and pull out the safety retainer of the fan (fig. 59, item 2).

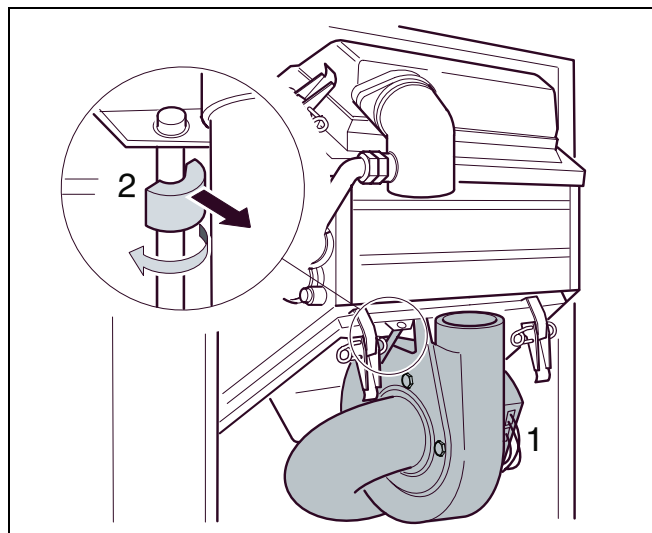


fig. 59 Removing safety retainers

- Push up the fan (fig. 60, item 1).
- Pivot the lower end of the fan forward (fig. 60, item 2) and take it out downwards and forwards (fig. 60, item 3).
- Replace the fan
- Reassemble in reverse order.

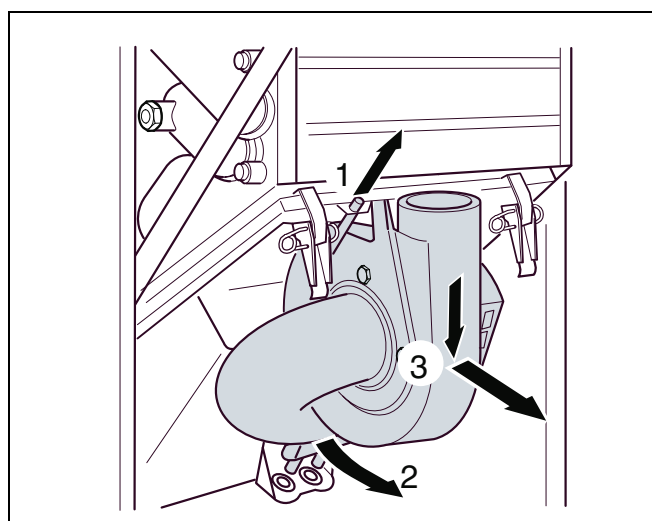


fig. 60 Removing the fan



### 5.3.7 Checking the modulating pump

- Unscrew the plug on the modulating pump.



**CAUTION!**  
Water will flow out.

- Set the mains switch to "I".
- Check to ensure that the modulating pump is running. The modulating pump's running mechanism may become blocked if the heating system has been out of use for an extended period.
- If the modulating pump fails to run: Set the mains switch to "0".
- Use a spanner to rotate the modulating pump in its normal running direction. If this fails to unblock the mechanism, the modulating pump is defective.
- If the modulating pump is working correctly, screw the plug in.

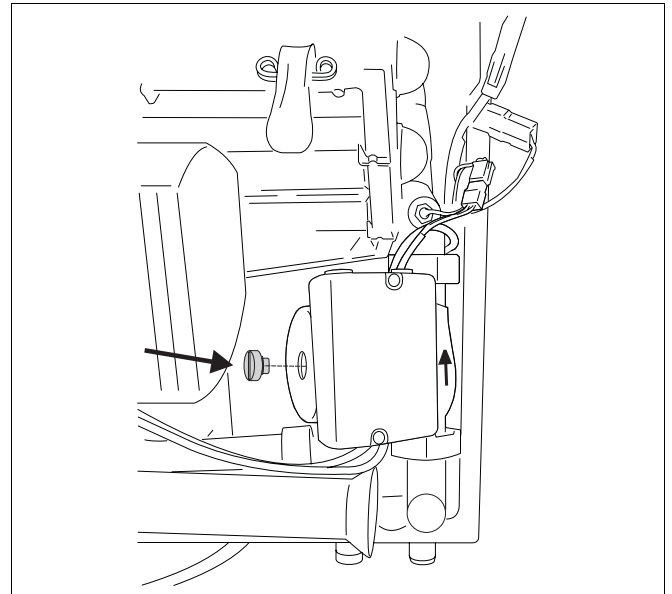


fig. 61 Checking the modulating pump

### 5.3.8 Replacing the modulating pump

- Disconnect the system from the power supply (fig. 62, item 1).
- Close maintenance isolating valves.
- Drain the 800 Series.
- Loosen screws on modulating pump terminal box and open terminal box (fig. 62, item 2).
- Loosen cable (fig. 63, item 1). Note order of cable terminals.
- Loosen modulating pump screw-in adapters and remove pump (fig. 62, item 3).
- Fit new pump and connect to system (fig. 62, item 4). Ensure when doing so that the heat-exchanger spacer washer is inserted correctly.
- Connect cables in correct order inside terminal box, close terminal box and screw shut.
- Connect system to mains power supply.
- Open maintenance isolating valves.

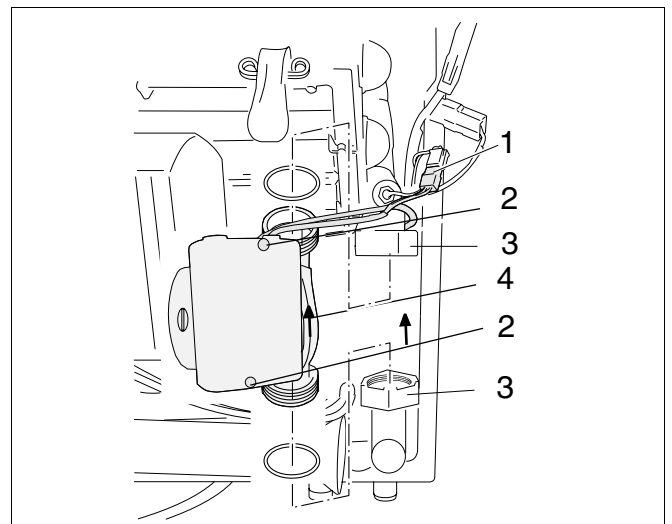


fig. 62 Replacing the modulating pump



**NOTE**  
Fill the 800 Series and purge the system of air.

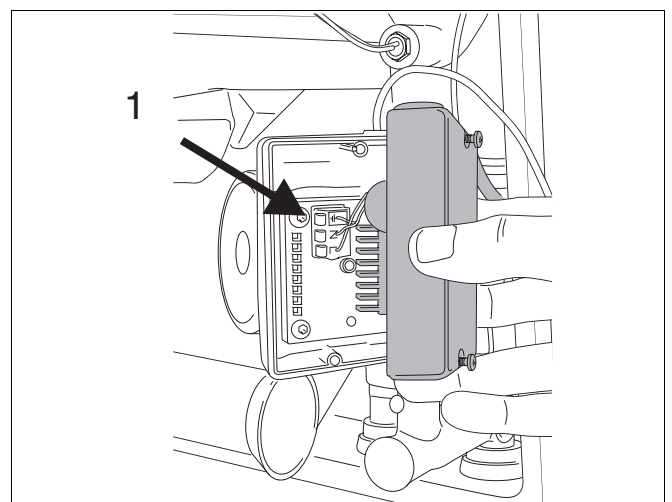


fig. 63 Cable modulating pump

### 5.3.9 Checking the flow, return, safety and mains-water sensors

- Unplug cable connection from sensor.
- Measure resistance of sensor.
- Use a second-reading thermometer to measure the temperature around the sensor.
- Check readings against values shown in table 10 (see page 51). If there is any mismatch, the sensor is defective.
- If the sensor is working correctly, plug it in once more.

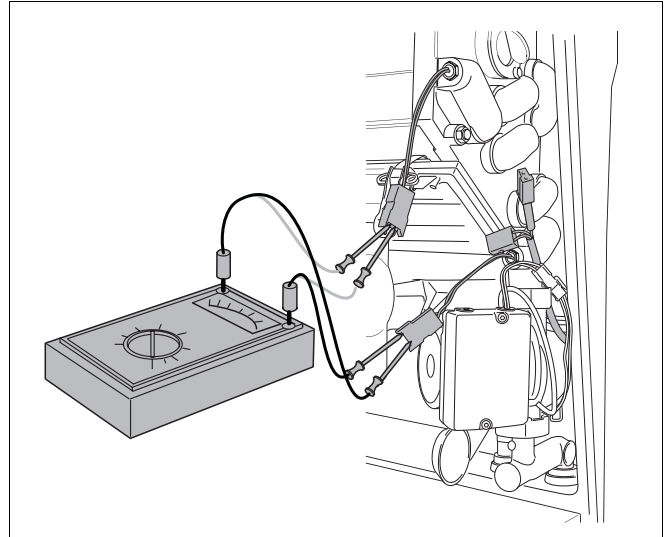


fig. 64 Checking the flow/return sensors

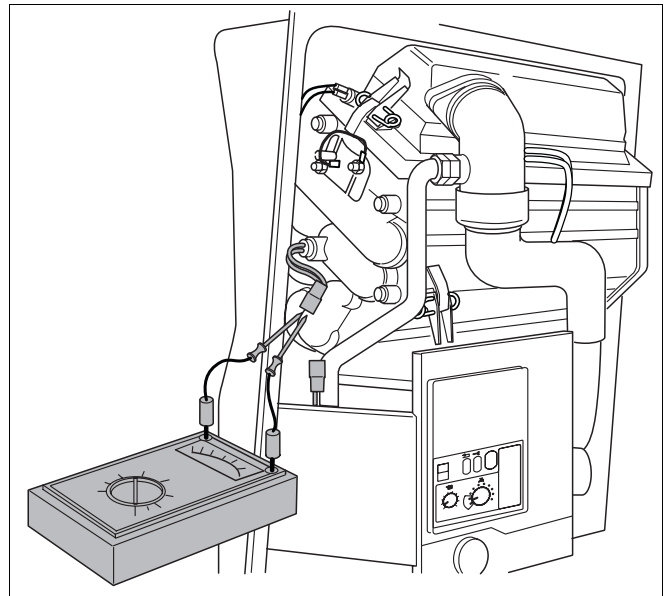


fig. 65 Checking the safety sensors

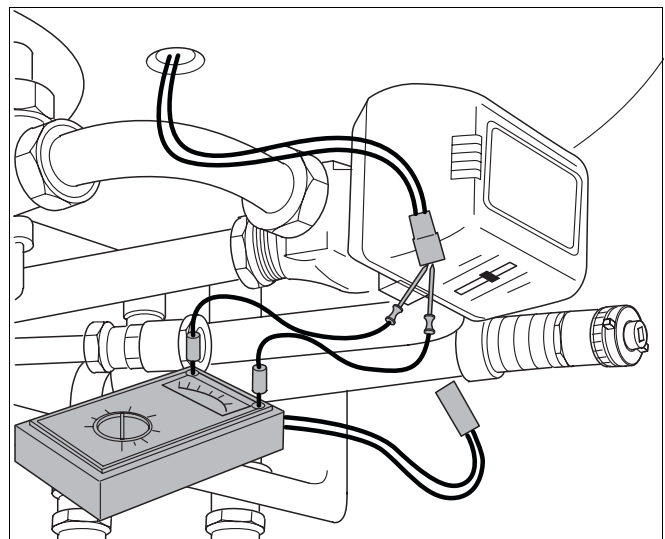


fig. 66 Checking the mains-water sensor

5.3.10 Replacing the flow, return and safety sensors

- Close maintenance isolating valves.
- Drain the 800 Series.
- Unplug.
- Unscrew sensor and replace with new unit.
- Plug in cable connection.
- Open maintenance isolating valves.



**NOTE**  
Fill the 800 Series and purge the system of air.

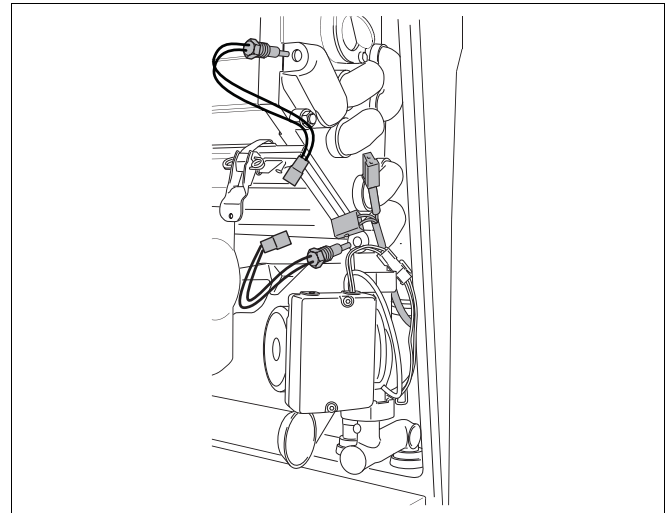


fig. 67 Replacing the flow/return sensors

Temperature in °C	Resistance in Ω	Temperature in °C	Resistance in Ω
0	29,490		
5	23,462	55	3,271
10	18,787	60	2,760
15	15,136	65	2,339
20	12,268	70	1,990
25	10,000	75	1,700
30	8,197	80	1,458
35	6,754	85	1,255
40	5,594	90	1,084
45	4,656	95	940
50	3,893	100	817

Table 10 Resistance values (indicative values) of the sensors

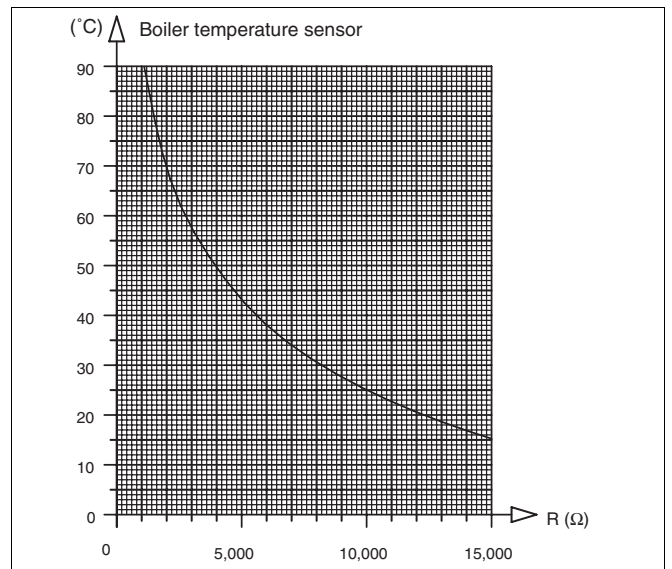


fig. 68 Boiler temperature sensor diagram

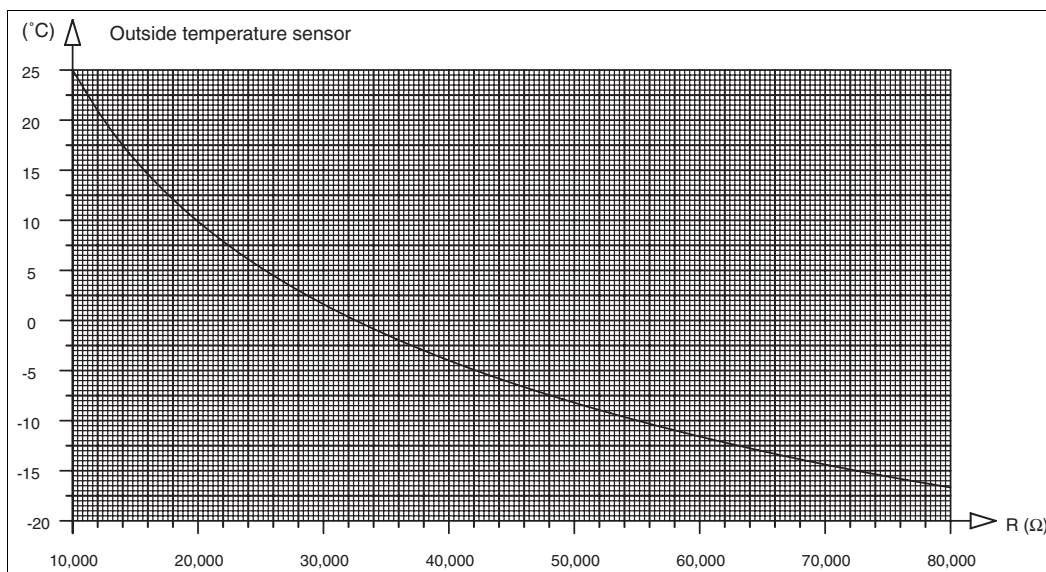


fig. 69 Outside temperature sensor diagram

### 5.3.11 Replacing the mains-water sensor

- Unplug cable connection from mains-water sensor.
- Pull mains-water sensor out and push new unit in.
- Plug in cable connection.

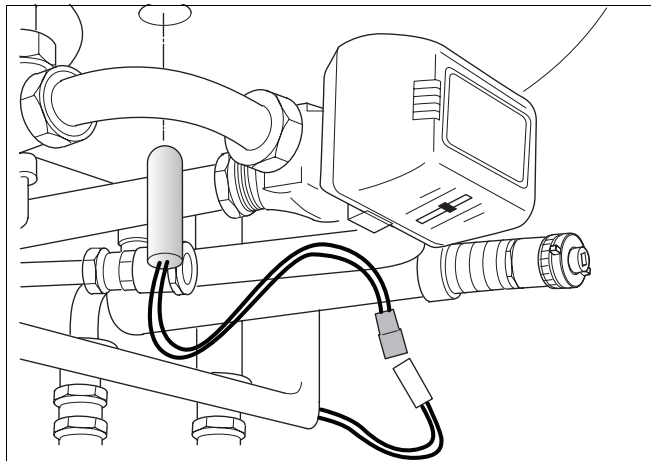


fig. 70 Replacing the mains-water sensor

### 5.3.12 Checking the cables to the flow, return and safety sensors, and to the burner thermostat

Check to ensure that all plug-in connections to the sensors/burner thermostat - and in the UBA - are in order. Note that an incorrectly-inserted plug can lead to the generation of error messages. Start up the boiler by pressing the “reset” button.

- Set the mains switch to “0”.
- Disconnect the system from the power supply.
- Unplug the cable connection from the sensor/burner thermostat.
- Check the cable between the plug-in connection and the 24-pin plug in the UBA with a continuity tester.
- If the cables are in order, plug them in.
- Connect system to mains power supply.
- Set the mains switch to “I”.

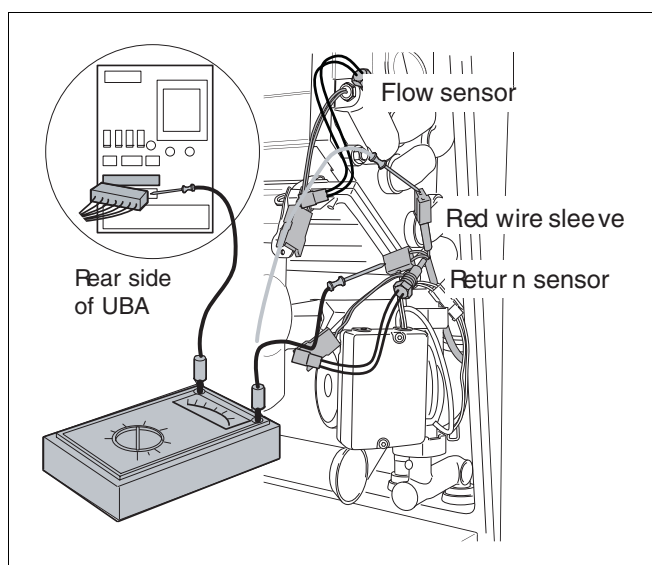


fig. 71 Checking the cable to the flow/return sensors

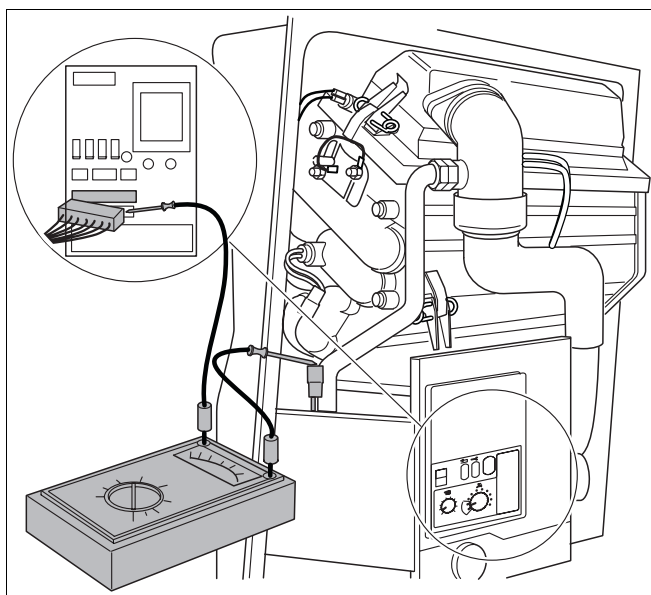


fig. 72 Checking the cable to the safety sensor

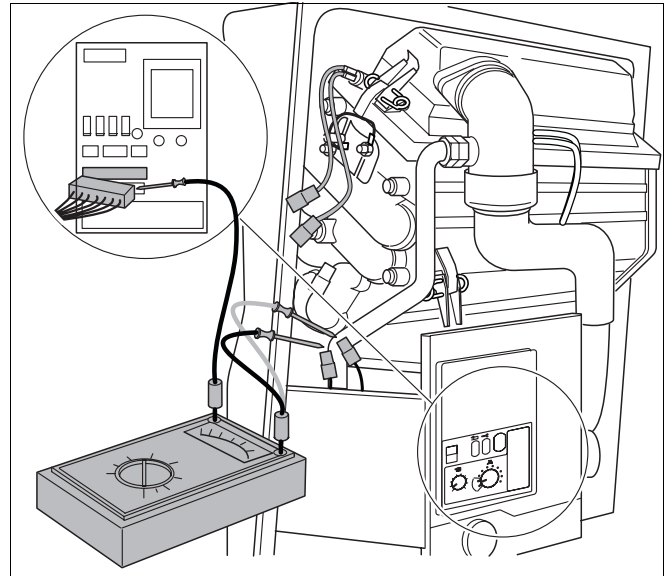


fig. 73 Checking the cable to the burner thermostat

### 5.3.13 Checking the burner thermostat

- Unplug cable connection from burner thermostat.
- Allow burner thermostat to cool down (activation temperature 107 °C).
- Check burner thermostat for throughput. If no throughput is detected, the burner thermostat is defective.
- If the burner thermostat is working correctly, plug it in once more.

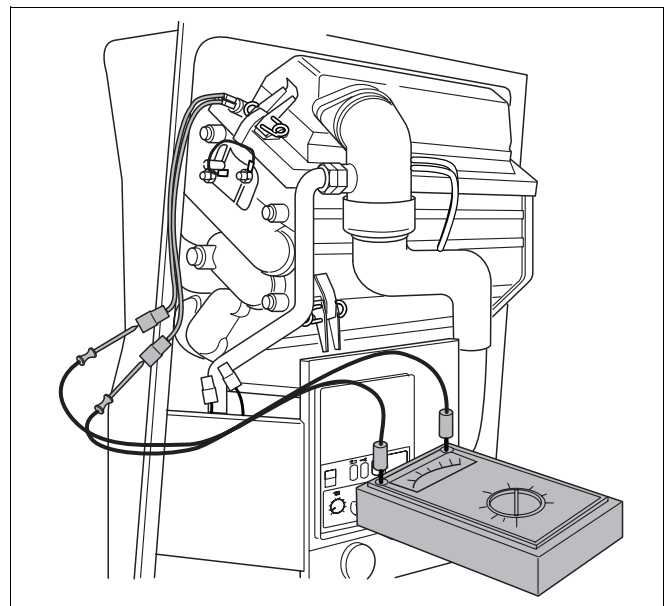


fig. 74 Checking the burner thermostat

### 5.3.14 Replacing the burner thermostat

- Pull cable lugs off.
- Unscrew burner thermostat and screw in new unit.
- Reconnect cable lugs and plug in once more.

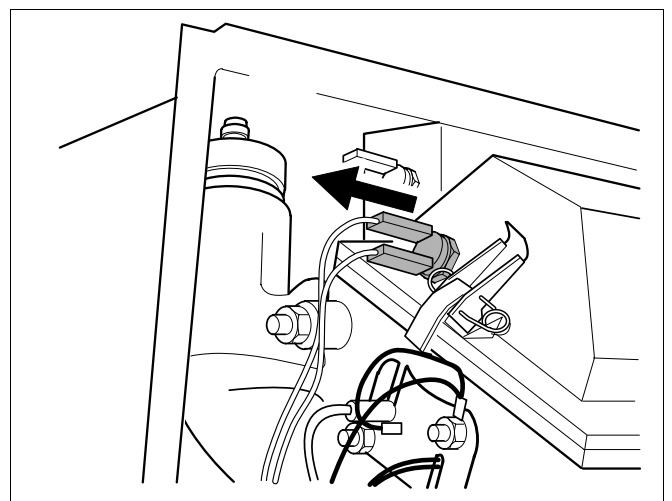


fig. 75 Replacing the burner thermostat

### 5.3.15 Checking the hot surface ignitor

- Disconnect the system from the power supply.
- Unplug the hot surface ignitor.
- Measure the resistance of the hot surface ignitor at the plug. If the resistance is less than 200  $\Omega$ , the hot surface ignitor is in order.
- Disconnect measuring device.
- If the hot surface ignitor is working correctly, plug it in once more.
- Connect system to mains power supply.

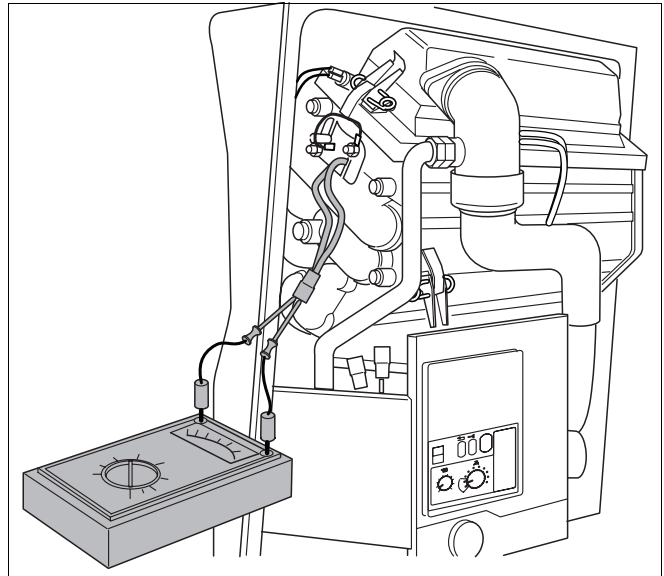


fig. 76 Checking the hot surface ignitor

### 5.3.16 Replacing the hot surface ignitor

- Disconnect the system from the power supply.
- Disconnect the plug-in cable.
- Loosen fixing screws and remove hot surface ignitor.
- Fit new hot surface ignitor and retighten fixing screws.
- Plug in cable connection.
- Connect system to mains power supply.

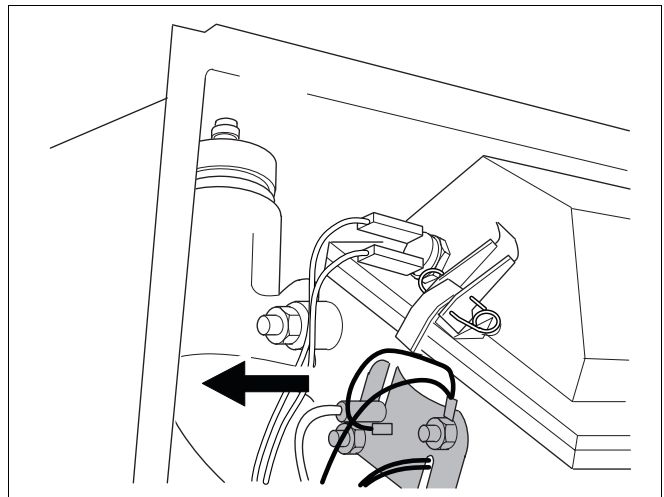


fig. 77 Replacing the hot surface ignitor

### 5.3.17 Checking the hose connection between the gas-air injector and gas-valve assembly

- Check hose connection for tightness and for signs of possible blockages or damage.
- Check that the hoses are correctly fitted to P1.

Hose connection:

P1 + , to T-piece gas-valve assembly.

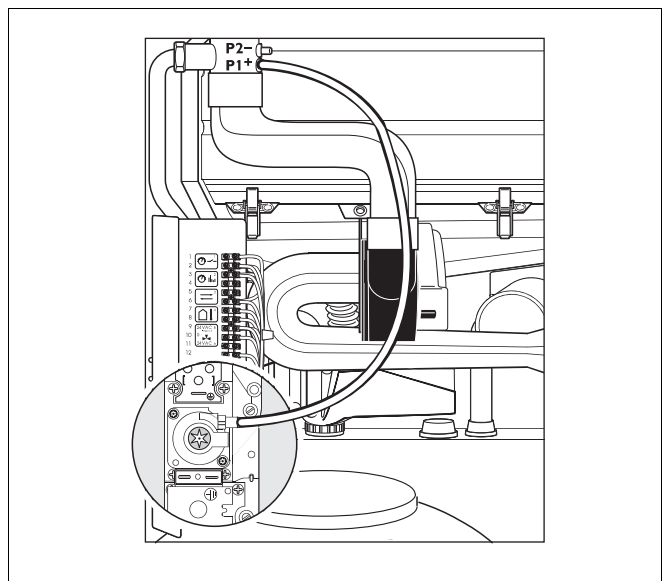


fig. 78 Checking the hose connection between the gas-air injector and gas-valve assembly (Honeywell gas units)

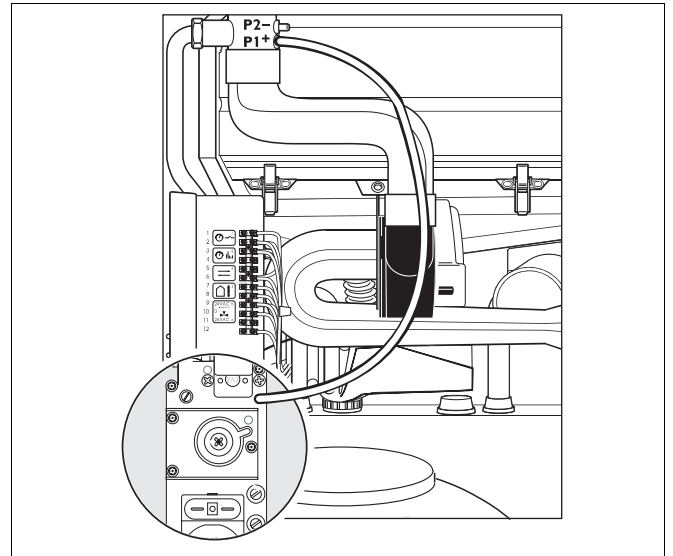


fig. 79 Checking the hose connection between the gas-air injector and gas-valve assembly (SIT gas units)

### 5.3.18 Check wiring connections on gas-valve assembly

- Check that the plug-in cables are correctly attached to the gas-valve assembly.  
The plug-in cables should be connected as follows:  
Blue plug-in lead: fig. 80, item 1 ;  
White plug-in lead: fig. 80, item 2.

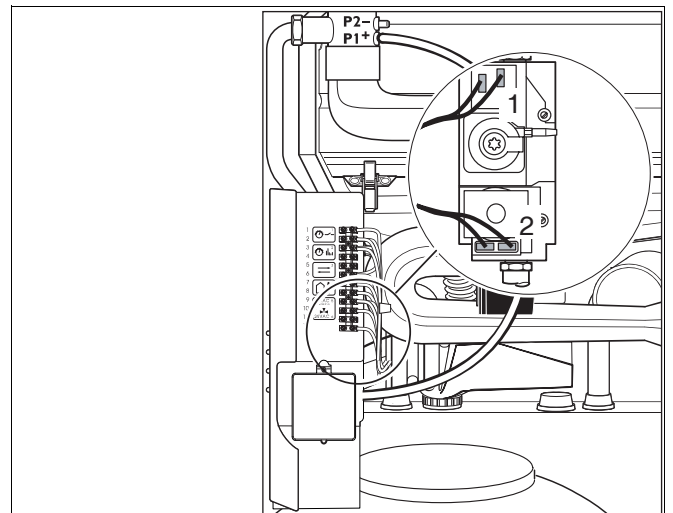


fig. 80 Checking the wiring connections on the gas-valve assembly (HONEYWELL assembly illustrated to provide example)

### 5.3.19 Checking the gas-burner assembly for correct activation

- Set the mains switch to "0".
- Remove a plug-in cable at the main gas valve and connect a current-measuring device, at the same point, with a measuring range of up to 1000 mA AC (fig. 81, item 1).
- Set the mains switch to "1".
- Unblock the 800 Series by pressing "reset" button, and take current reading during start-up procedure.
- Carry out the same measuring procedure at the ignition-gas valve (fig. 81, item 2).
- If the current reading at pos. 1 is approximately 210 mA and the reading at pos. 2 is about 450 mA, the gas-valve activation system is in order.
- Set the mains switch to "0".
- If the gas-valve assembly activation system is in order, plug the cable in once more.

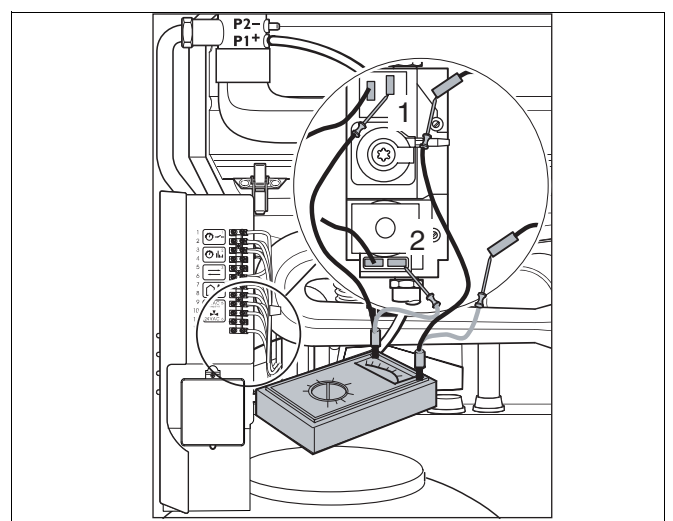


fig. 81 Checking the gas valve assembly activation system (HONEYWELL valve assembly shown as example)

### 5.3.20 Replacing the gas valve assembly



#### CAUTION!

Work on gas pipes and fittings must only be carried out by a registered service provider.

- Disconnect the system from the power supply.
- Close the gas shutoff valve.
- Remove all plug-in cables from the gas valve assembly. Note order of cable terminals.
- Loosen the screw-in adapter on the tube connector.
- Remove the valve assembly and replace with a new unit; attaching it to the screw-in connection adapter.
- Connect all plug-in cables in the correct order.



#### NOTE

Carry out all initial start-up tasks as indicated in the installation and servicing instructions, and complete the corresponding report form.

With the system running, check for leaks at all joints likely to have been affected by the fitting of replacement parts.

### 5.3.21 Checking the wiring connection to the KIM

- Disconnect the system from the power supply.
- Check plugs and wiring connections to KIM
- Connect system to mains power supply.

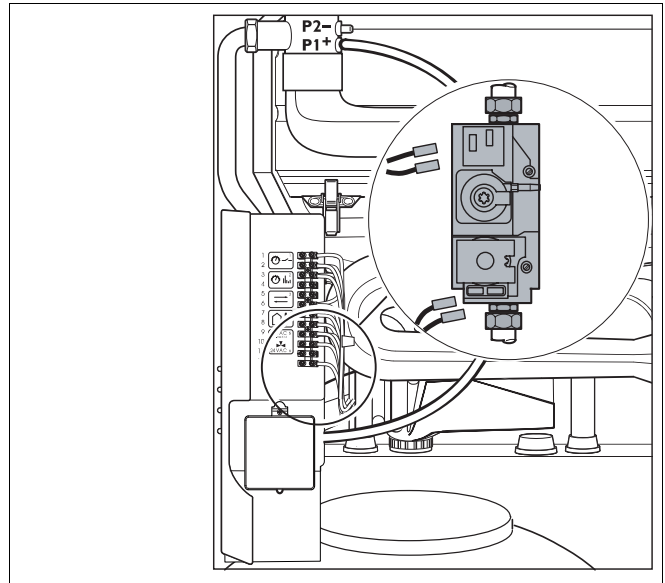


fig. 82 Gas valve assembly replacement (HONEYWELL valve assembly shown as example)

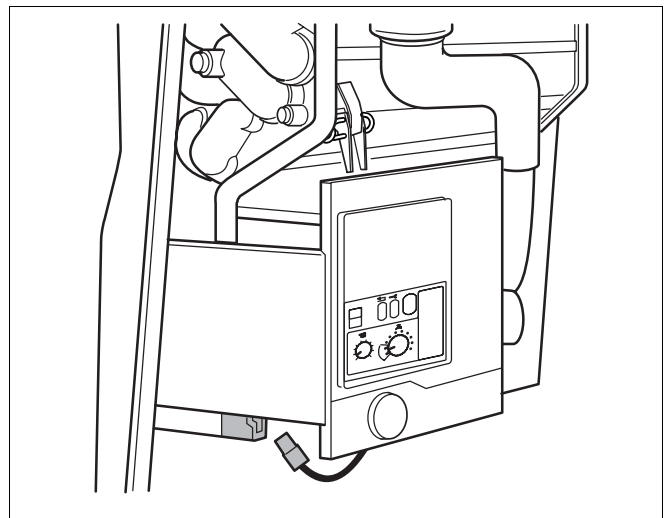


fig. 83 Checking the wiring connection to the KIM



**5.3.22 Checking the controller connections at the boiler**

- Set the mains switch to “0”.
- Remove loop (non-conductive) from terminals 1 and 2.
- Loosen cable at terminals 3 and 4.
- Fit a link between terminals 1 and 2, 3 and 4.



**NOTE**

The system is delivered ready-fitted with a non-conductive link between terminals 1 and 2.

- Set the mains switch to “1” and press “reset”.
- If the 800 Series goes into standby mode after start-up (display □ H), the room-temperature control device is defective.
- Move mains power switch to “0”.
- If the room-temperature control device is in order, remove the bridging leads and attach the cable and (non-conducting) link.

**5.3.23 Replacing the room-temperature control device**

- Loosen all cables. Note order of cable terminals.
- Attach cables, in the right order, to the new room-temperature control device.
- Carry out the corresponding adjustment settings on the room-temperature control device.

**5.3.24 Checking the three-way valve for correct activation**

- Set the mains switch to “0”.
- Push in catch on regulating motor and remove bayonet connector by twisting anticlockwise (fig. 85).
- Remove regulating motor.
- Set the mains switch to “1” and press the “reset” button.
- Once the 800 Series is in operation, open one of the hot-water taps. If the regulating motor starts up (check for movement of red adjusting lever), the activation system of the three-way valve is in order.
- Shut the hot-water tap.
- Set the mains switch to “0”.
- If the activation system of the three-way valve is in order, attach the regulating motor and lock into place by twisting the bayonet connector.

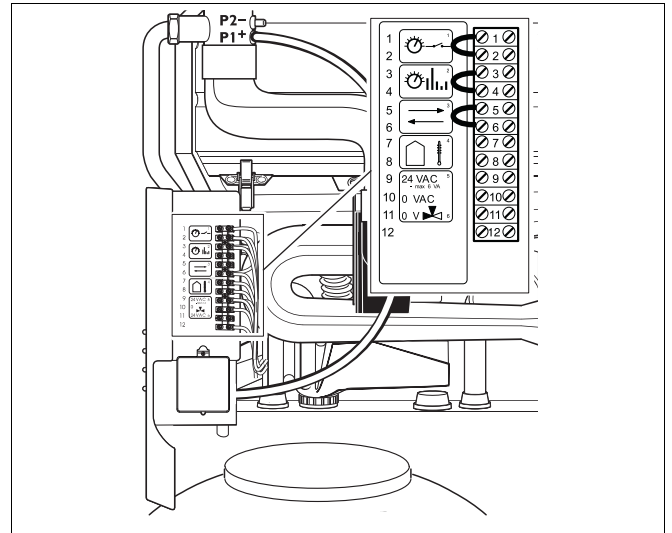


fig. 84 Checking the controller connections at the boiler

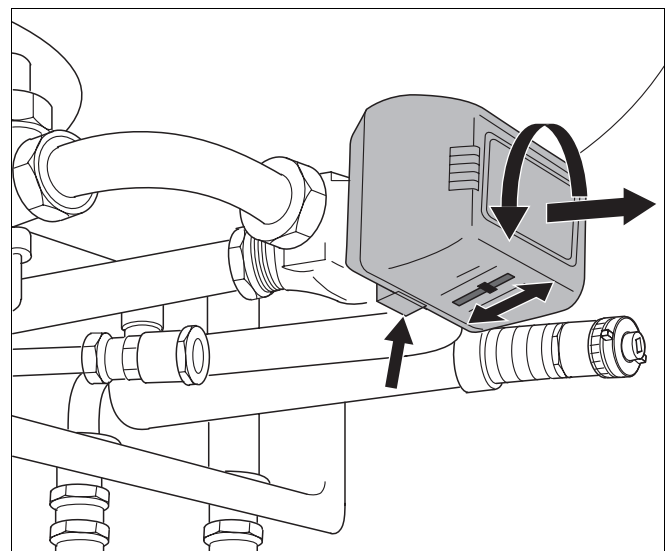


fig. 85 Checking the three-way valve for correct activation

### 5.3.25 Replacing the control valve

- Close maintenance isolating valves and drain the 800 Series.
- Remove the control valve with a spanner and fit a new unit.
- Fit regulating motor and lock into place by twisting the bayonet connector.
- Plug cable in.



**NOTE**

Open the maintenance isolating valves and then fill the 800 Series and purge the system of air.

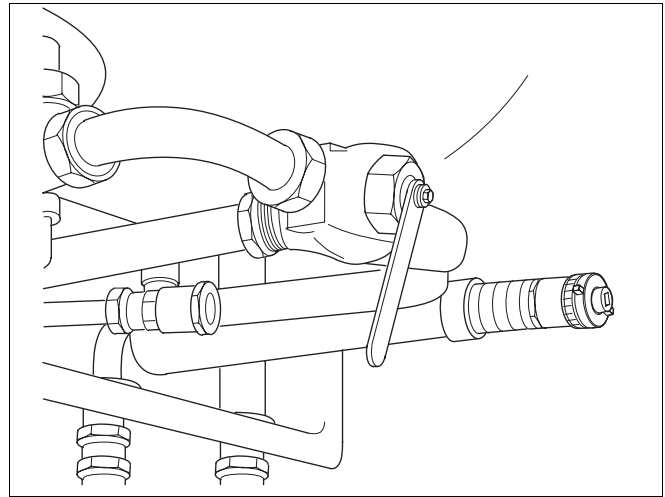


fig. 86 Replacing the valve core on the 800 – 24/24T25/29/43/60

### 5.3.26 Replacing the three-way valve

- Close maintenance isolating valves and drain the 800 Series.
- Loosen all screw-in tube connectors.
- Remove three-way valve and fit new unit. Refit screw-in tube connectors.
- Fit regulating motor and lock into place by twisting the bayonet connector.
- Plug cable in.
- Open maintenance isolating valves.



**NOTE**

Fill the 800 Series and purge the system of air.

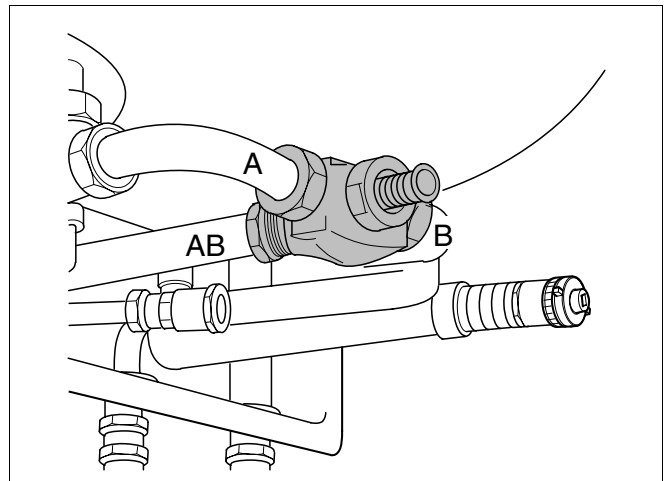


fig. 87 Replacing the three-way valve

Key to three-way valve:

A hot water

B heating

AB boiler feed line

### 5.3.27 Checking the condensation-water bypass

- Check to ensure that the condensation-water bypass is connected.



**NOTE**

The device itself is fitted with an additional condensation-water bypass (located on the fume exhaust outlet).

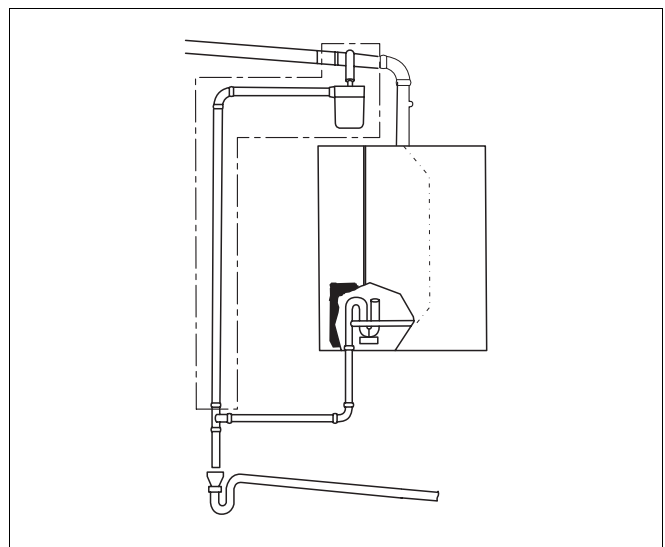


fig. 88 Function diagram of condensation-water bypass

## 6 Appendix

### 6.1 Technical data

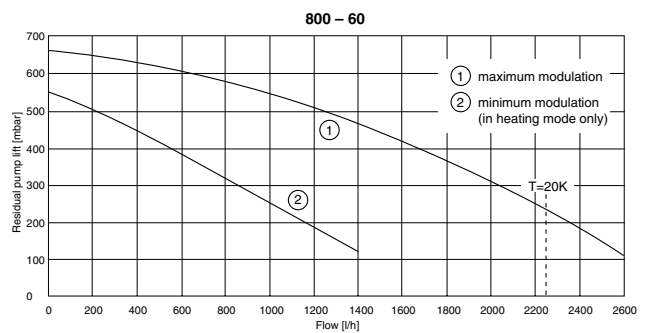
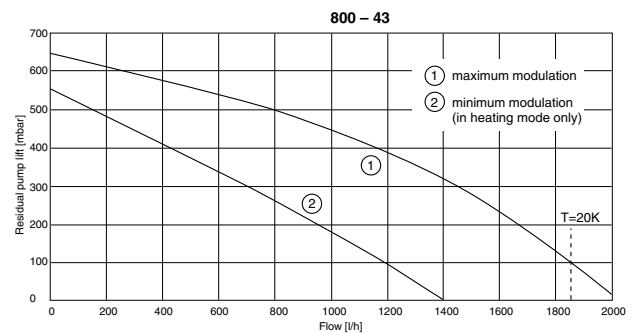
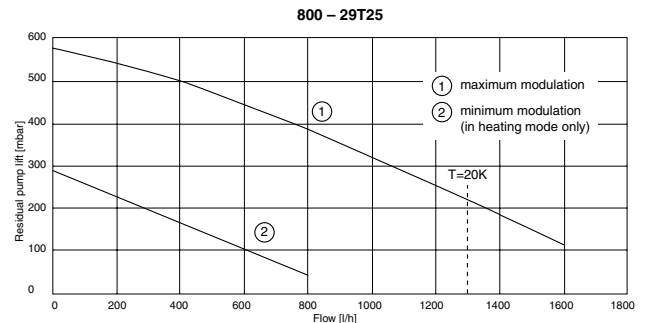
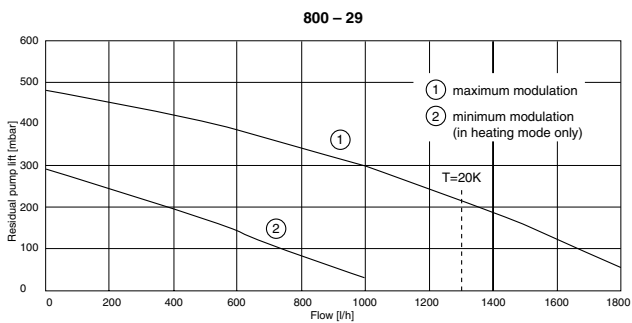
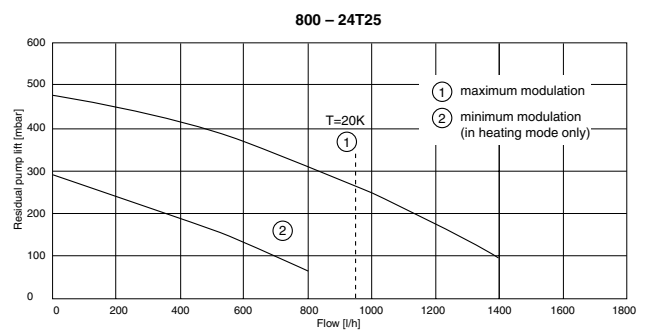
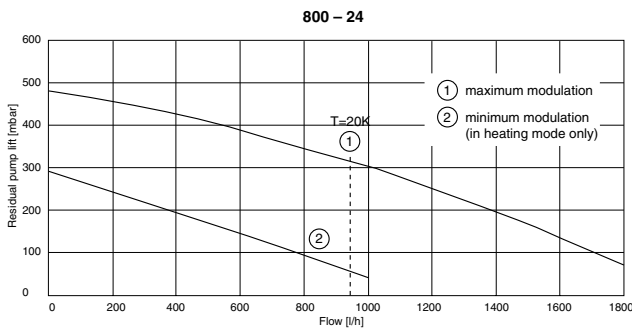
Size	Unit	800 – 24	800 – 24T25 H/V	800 – 29	800 – 29T25 H/V	800 – 43	800 – 60	
Type of gas category as per EN 437 Great Britain		GB I <sub>2H3P</sub> 20 mbar (natural gas H); 37 mbar (LPG)						GB I <sub>2H</sub> 20 mbar (natural gas H)
Rated thermal load G20	[kW] [Btu/h]	6.6 – 22.0 22,520 – 75,060	6.6 – 22.0 22,520 – 75,060	8.4 – 28.0 28,660 – 95,540	8.4 – 28.0 28,660 – 95,540	12.1 – 40.2 41,285 – 137,162	22.0 – 56.5 75,064 – 192,778	
Rated heating capacity Heating curve 75/60 °C	[kW] [Btu/h]	6.4 – 21.4 21,840 – 73,020	6.4 – 21.4 21,840 – 73,020	8.2 – 27.3 27,980 – 93,150	8.2 – 27.3 27,980 – 93,150	11.8 – 39.3 40,260 – 134,090	21.4 – 55.1 73,016 – 188,000	
Heating curve 40/30 °C	[kW] [Btu/h]	7.0 – 23.4 23,880 – 79,840	7.0 – 23.4 23,880 – 79,840	8.8 – 29.9 30,030 – 102,020	8.8 – 29.9 30,030 – 102,020	12.9 – 42.9 44,015 – 146,375	23.7 – 60.0 80,865 – 204,720	
Seasonal efficiency (SEDBUK)	%	90.0	90.4	90.1	90.5	90.3	90.2	
Boiler efficiency								
Heating curve 75/60 °C (max. capacity)	[%]	97.3	97.3	97.5	97.5	97.8	97.6	
Heating curve 40/30 °C (min. capacity)	[%]	107.0	107.0	107.1	107.1	107.0	107.1	
Stand-by heat losses	[%]	0.60	0.50	0.50	0.50	0.40	0.34	
<b>Central heating installation</b>								
Min. circulation water volume	[l/h]	150	150	225	225	300	500	
Heating water temperature	[°C]	40 - 80	40 - 80	40 - 80	40 - 80	40 - 80	40 - 80	
ΔT at residual head of 200 mbar	[K]	approx. 15	approx. 18	approx. 18	approx. 18	approx. 22	approx. 20	
Max. operating overpressure boiler	[bar]	3	3	3	3	3	3	
Volume heat exchanger heating circuit	[l]	2.5	2.5	3.0	3.0	3.6	4.7	
Pump over-run time								
Position 1	[min]	4	4	4	4	4	4	
Position 2	[h]	24	24	24	24	24	24	
<b>Hot water circuit combination boilers</b>								
Volume hot water reservoir	[l]	–	25	–	25	–	–	
Max. operating overpressure hot water reservoir	[bar]	–	8	–	8	–	–	
Pump over-run time following domestic hot water mode	[min]	–	2	–	2	–	–	
Domestic hot water flow rate at 60 °C	[l/min]	–	6.0	–	8.0	–	–	
Stand-by heat losses in hot water mode in 24 hours at WW (DHW) temp = 60 °C	[kWh]	–	approx. 1.6	–	approx. 1.6	–	–	

## Technical data - cont'd

Size	Unit	800 – 24	800 – 24T25 H/V	800 – 29	800 – 29T25 H/V	800 – 43	800 – 60		
<b>Pipe connections</b>									
Gas	[inch]	R ½	R ½	R ½	R ½	R ½	R ¾		
Flow & return	[mm]	Ø 28	Ø 28	Ø 28	Ø 28	Ø 28	Ø 28		
Condensate water drain	[mm]	Ø 32	Ø 32	Ø 32	Ø 32	Ø 32	Ø 32		
<b>Flue gas values</b>									
Condensate water volume natural gas H, 40/30 °C	[l/h]	2.6	2.6	3.3	3.3	4.7	7.1		
pH value condensate water		approx. 4.1	approx. 4.1	approx. 4.1	approx. 4.1	approx. 4.1	approx. 4.1		
Flue gas mass flow full load	[g/s]	10.03	10.03	12.64	12.64	18.33	25.9		
Flue gas temperature Heating curve 40/30 °C Heating curve 75/60 °C	[°C] [°C]	45 65	45 65	45 65	45 65	45 65	45 65		
CO <sub>2</sub> full load, natural gas G20	[%]	9.2	9.2	9.2	9.2	9.2	9.3		
Standard emission factor CO	[mg/kWh]	<15	<15	<15	<15	<15	<15		
Standard emission factor NO <sub>x</sub>	[mg/kWh]	<20	<20	<20	<20	<20	<20		
Free feed pressure of fan	[Pa]	up to 140	up to 140	up to 140	up to 140	up to 140	up to 140		
Gasrate G20	[m <sup>3</sup> /h]	2.33	2.33	2.96	2.96	4.25	5.98		
<b>Flue gas system</b>									
Type of flue gas system		B <sub>23</sub> , B <sub>33</sub> , C <sub>13</sub> , C <sub>33</sub> , C <sub>43</sub> , C <sub>53</sub> , C <sub>73</sub> depending on room air and independent of room air							
Diameter of flue gas system dependent on room air independent of room air	[mm] [mm]	80 80/125 concentric	80 80/125 concentric	80 80/125 concentric	80 80/125 concentric	80 80/125 concentric	80 80/125 concentric		
<b>Electrical data</b>									
Mains connection voltage	[V]	230	230	230	230	230	230		
Type of enclosure		IP40 (B <sub>xx</sub> ) IP4X (C <sub>xx</sub> )	IP40 (B <sub>xx</sub> ) IP4X (C <sub>xx</sub> )	IP40 (B <sub>xx</sub> ) IP4X (C <sub>xx</sub> )	IP40 (B <sub>xx</sub> ) IP4X (C <sub>xx</sub> )	IP40 (B <sub>xx</sub> ) IP4X (C <sub>xx</sub> )	IP40 (B <sub>xx</sub> ) IP4X (C <sub>xx</sub> )		
Power consumption full load partial load	[W] [W]	120 60	120 60	130 70	130 70	180 85	200 100		
<b>Boiler dimensions and weight</b>									
		V		H		V		H	
Height	[mm]	685	1250	685	685	1250	685	685	685
Width	[mm]	560	560	900	560	560	900	900	900
Depth	[mm]	431	431	431	431	431	431	431	431
Weight without casing	[kg]	41	71	66	48	77	70	53	61
Weight casing	[kg]	11	14	11	11	14	11	11	11

## 6.2 Residual pump lift for wall-hung gas boilers

The residual pump lift graphics show the amount of pump lift that remains for the heating system



## 6.3 Short list of spare parts

The following are parts commonly required due to damage or expendability. Their failure or absence is likely to affect safety or performance of this appliance. For a pictorial representation of the part see the respective position number on the exploded view picture on page 8.

pos.	description	article no.
10	Casing complete	7098751
20	Door	7098756
30	Casing clamp (2x left and 2x right)	73466
40	Casing seal	73454
50	Back panel	73030
60	Mounting bracket	75038
70	Seal lid for air vent	79090
80	Heat exchanger (800-29 only)	73020
80	Heat exchanger (800-24 only)	73031
90	Revision set for air vent	73116
100	Seal	73451
110	Sight glas complete with sealing rings	73412
120	Restriction plate (800-24 only)	73033
120	Restriction plate (800-29 only)	73019
130	Seal for condensate collector (800-24 only)	73471
130	Seal for condensate collector (800-29 only)	73458
140	Condensate collector incl. seal (800-24 only)	73127
140	Condensate collector incl. seal (800-29 only)	73125
150	Sensor complete with o-ring	38323
160	Mounting clip	73459
170	Seal for hot surface ignitor/ionisation electrode. Set of 5 pieces	73461s
180	Hot surface ignitor	78105
190	Ionisation electrode with cable and connector	38320
200	Safety sensor-ntc complete	73321
210	Flue gas collector	77450
220	Lip ring seal DN 80mm (set of 10 pieces)	38419s
230	Condensate by-pass	75950
240	Syphon complete	7100825
260	Safety valve pipe	73555
270	Seal set for syphon	73124
280	Burner housing (800-24 only)	73035
280	Burner housing (800-29 only)	73011
290	Burner thermostat 107 °C	36318
300	Burner seal (800-24 only)	73475
300	Burner seal (800-29 only)	73441
310	Gas/air distribution plate (800-24 only)	73217
310	Gas/air distribution plate (800-29 only)	73208
320	Secondary gas/air distribution plate	73046
330	Burner plaque assembly (incl. gas/air distribution plate) (800-24 only)	73018
330	Burner plaque assembly (incl. gas/air distribution plate) (800-29 only)	73010

pos.	description	article no.
340	Gas/air manifold	73215
350	O-ring gas/air manifold to burner (set of 5 pieces)	73440s
360	Gas injector, natural gas (G20) incl. O-ring (800-24 only)	73224
360	Gas injector, natural gas (G20) incl. O-ring (800-29 only)	73266
370	Air restrictor natural gas (G20) (800-24 only)	73448
370	Air restrictor natural gas (G20) (800-29 only)	73267
375	Connection tube, fan/burner (800-24 only)	73477
380	Connection tube, fan/burner (800-29 only)	73438
390	Air inlet pipe incl. gasket	73439
400	Support mounting bracket fan anti vibration	73016
410	Fan	73320
420	Connection pipe gas valve/burner (800-24 only)	73219
420	Connection pipe gas valve/burner (800-29 only)	73207
430	Connection nipple 3/4" x 1/2" with O-ring	73209
440	Gas unit	73264
460	Gas inlet pipe 1/2"	76610
470	Control uba	7099845
480	Temp. pressure gauge	79021
490	Bracket for uba	73432
500	Power switch	38340
510	230V cable	7099204
520	Cable harness complete	75958
530	Supply pipe heat exchanger	73600
540	O-ring (set of 10 pieces)	79025s
550	Spring clip heat exchanger/supply (set of 5 pieces)	73446s
560	Pressure relief valve	73197
570	Non return valve R 1/4"	75823
580	Pump	38622
590	Gasket for pump DN 44 x 2.5 (set of 10 pieces)	15022s
600	Pump power cable complete with connector	73319
610	Ring (set of 5 pieces)	73480s
620	Nut for heat exchanger 1 1/2" (set of 5 pieces)	73481s
630	Swivel nut for pump	15020s
640	Return pipe	73122
650	Filling-, draining valve	38452
660	RTH converter	78079

## 7 Reports

### 7.1 Start-up report

- Please check off the start-up tasks carried out and enter the corresponding readings, while making sure that you carefully follow the instructions.

Initial start-up tasks	Remarks or measurement readings
1. Note down gas characteristics:  <div style="text-align: right;">                         Wobbe index _____ kWh/m<sup>3</sup>                          Operational heat value _____ kWh/m<sup>3</sup> </div>	
2. Has a leak test been carried out? (see chapter 2.1.5 on page 23)	<input type="checkbox"/>
3. Check combustion air/flue gas connection	<input type="checkbox"/>
4. Check the boiler equipment (change to another type of gas if necessary)(see chapter 2.2.1 on page 24)	<input type="checkbox"/>
5. Carry out adjustment settings (see chapter 2.2.2 on page 25)	<input type="checkbox"/>
6. Measure the gas supply pressure (flow pressure) (see chapter 2.2.3 on page 27)	_____ mbar
7. Check and set the gas/air ratio CO <sub>2</sub> -content:        under full load _____ % under partial load _____ % (see chapter 2.2.4 on page 28)	_____ Pa _____ % _____ %
8. Check for leaks with system in operational condition (see chapter 2.2.5 on page 30)	<input type="checkbox"/>
9. Record readings Flow pressure _____ Pa Exhaust-gas temperature, gross t <sub>A</sub> _____ °C Air temperature t <sub>L</sub> _____ °C Flue temperature, net t <sub>A</sub> - t <sub>L</sub> _____ °C Carbon dioxide (CO <sub>2</sub> ) or oxygen (O <sub>2</sub> ) content _____ % Exhaust-gas losses q <sub>A</sub> _____ % Carbon monoxide content (CO), free from air (see chapter 2.2.6 on page 30)	_____ ppm
10. Testing the operation Measure the ionisation current (see chapter 2.2.7 on page 30)	<input type="checkbox"/> _____ µA
11. Fit the boiler casing (see chapter 2.2.8 on page 31)	<input type="checkbox"/>
12. Instruct the user, hand over the documentation (see chapter 2.2.9 on page 31)	<input type="checkbox"/>
13. Confirm commissioning (see <b>Benchmark</b> )  Confirmation of professional commissioning  (Company stamp, signature)	

## 7.2 Inspection and service reports

The inspection and maintenance reports provide an overview of all the tasks and operations carried out. See section 3: "Inspection" (page 32) and section 4: "Maintenance" (page 33).

Please check off the inspection and/or requirement-related maintenance tasks carried out and enter the corresponding readings.

- Sign details of inspection and maintenance tasks, indicating date carried out.

Use only original replacement parts.

Inspection work	Date: _____	Date: _____
1. Check the general condition of the installation	<input type="checkbox"/>	<input type="checkbox"/>
2. Visual and functional inspection of the installation	<input type="checkbox"/>	<input type="checkbox"/>
3. Check the gas and water transporting parts for: - internal leaks (see chapter 3.2 on page 32) - visible corrosion (see chapter 3.3 on page 32) - ageing	<input type="checkbox"/>	<input type="checkbox"/>
4. Check pollution of the burner, heat exchanger and siphon (see chapter 4.1 on page 33)	<input type="checkbox"/>	<input type="checkbox"/>
5. Check the ionization electrode and incandescent firing electrode (see chapter 4.1 on page 33)	<input type="checkbox"/>	<input type="checkbox"/>
6. Measure the ionization current (see chapter 2.2.7 on page 30)	_____ $\mu\text{A}$	_____ $\mu\text{A}$
7. Measure the gas distribution pressure (see chapter 2.2.3 on page 27)	_____ mbar	_____ mbar
8. Check the gas/air ratio (see chapter 2.2.4 on page 28)	_____ Pa	_____ Pa
9. Gas leak test in operational condition (see chapter 2.2.7 on page 30)	<input type="checkbox"/>	<input type="checkbox"/>
10. Measure the carbon monoxide content (CO), vacuum (see chapter 2.2.6 on page 30)	_____ ppm	_____ ppm
11. Pressure-testing of heating system: - Inlet pressure of expansion vessel (see chapter 2.1.1 on page 22 + instructions supplied with the vessel) - filling pressure (see chapter 2.1.1 on page 22)	_____ mbar _____ mbar	_____ mbar _____ mbar
12. Check combustion air/flue gas pipes for correct functioning and safety (see chapter 5.3.4 on page 47)	<input type="checkbox"/>	<input type="checkbox"/>
13. Check requirement-related adjustment settings of control device (see documentation supplied with control unit)	<input type="checkbox"/>	<input type="checkbox"/>
14. Final check of inspection tasks, with record kept of measurement readings and test results	<input type="checkbox"/>	<input type="checkbox"/>
15. Confirm servicing work  Confirmation of professional servicing work  (Company stamp, signature)		



Inspection and service reports - cont'd

Date: _____	Date: _____	Date: _____	Date: _____	Date: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____ $\mu$ A	_____ $\mu$ A	_____ $\mu$ A	_____ $\mu$ A	_____ $\mu$ A
_____ mbar	_____ mbar	_____ mbar	_____ mbar	_____ mbar
_____ Pa	_____ Pa	_____ Pa	_____ Pa	_____ Pa
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____ ppm	_____ ppm	_____ ppm	_____ ppm	_____ ppm
_____ mbar	_____ mbar	_____ mbar	_____ mbar	_____ mbar
_____ mbar	_____ mbar	_____ mbar	_____ mbar	_____ mbar
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Date: _____	Date: _____	Date: _____	Date: _____	Date: _____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____ Pa _____ % _____ %	_____ Pa _____ % _____ %	_____ Pa _____ % _____ %	_____ Pa _____ % _____ %	_____ Pa _____ % _____ %

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