

Installation and Servicing instructions

Condensing gas heater Logamax plus GB142-24/30/45/60



CAUTION!

Before putting the appliance into operation read this manual carefully.

WARNING!

Improper installation, adjustment, alteration, service or maintenance can cause injury, loss of life or property damage. Refer to this manual. For assistance or additional information consult a qualified installer, service agency or the gas supplier.

CAUTION!

The operating manual is part of the documentation that is delivered to the installation's operator. Go through the information in this manual with the owner/operator and make sure that he or she is familiar with all the necessary operating instructions.

Warning: If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury or death.

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- **What to do if you smell gas**
 - Do not try to light any appliance
 - Do not touch any electrical switch; do not use any phone in your building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
 - If you cannot reach your gas supplier, call the fire department.
- **Installation and service must be performed by a qualified installer, service agency or the gas supplier.**



Notice:

This manual must be retained for future reference.

Buderus

HYDRONIC SYSTEMS

Please read thoroughly before installing and servicing

About these instructions

These Installation and Servicing Instructions contain important information for the safe and professional installation, start-up and maintenance of the appliance with appliance capacities 24, 30, 45 and 60 kW.

These Installation and Servicing Instructions are intended for specialist installers, who have the necessary training and experience for working on heating and gas systems.

Subject to technical changes!

Slight changes may be made to the illustrations, process steps and technical data as a result of our policy of continuous improvement.

Updating of documentation

Please contact us if you have any suggestions for improvements or corrections.

1	Safety and general instructions	5		
1.1	Designated use	5		
1.2	Hazard definitions	5		
1.3	The following instructions must be observed	5		
1.4	Observe these instructions for heating system water	6		
1.5	Tools, materials and additional equipment	6		
1.6	Disposal	6		
2	Regulations and guidelines	7		
3	Product description	8		
4	Dimensions and connections	9		
5	Packaging and transportation	11		
5.1	Scope of delivery	11		
5.2	Transporting the appliance	11		
6	Installation	12		
6.1	Requirements for the installation room	12		
6.2	Fitting the appliance	12		
6.3	Making the gas connection	13		
6.4	Fitting the heating circuit supply and return pipes	14		
6.5	Combustion Air and Ventilation Openings	17		
6.6	Installation of the flue gas adapter (included in the scope of delivery)	18		
6.7	Installation of the Exhaust and Air Intake system	18		
7	Connecting the condensate water drain	23		
8	Electrical connections	24		
8.1	External connection board connections	24		
9	Start-up procedure	27		
9.1	Testing for gas leaks	28		
9.2	Filling the appliance	28		
9.3	Filling the condensate trap	29		
9.4	Venting the gas supply valve	29		
9.5	Checking the combustion air/flue gas connection	30		
9.6	Checking the orrifices	30		
9.7	Inlet gas pressure	30		
9.8	Checking and adjusting the gas/air ratio	31		
9.9	Carrying out a tightness test in operating conditions	33		
9.10	Measuring the carbon monoxide content (CO)	33		
9.11	Function testing	33		
9.12	Measuring the ionization current	33		
9.13	Installing the casing	35		
9.14	Informing the owner, handing over the technical documents	35		
10	BC10 basic controller	36		
10.1	Operating the BC10 basic controller	36		
10.1.1	Switching the heating system on and off	36		
10.1.2	Displaying the operating conditions of the burner and resetting the burner or resetting burner faults	36		
10.1.3	Displaying the heating system status and/or faults	37		
10.2	Carrying out additional tasks	39		
10.2.1	Carrying out a flue gas test	39		
10.2.2	Selecting partial load operation (e. g. during flue gas testing)	39		
10.2.3	Switching the heating system to manual mode	39		
10.3	Configuring the appliance	40		
10.3.1	Adjusting the heating capacity	40		
10.3.2	Setting the DHW temperature value	41		
10.3.3	Entering the heater water temperature	41		
10.3.4	Setting the pump post-purge period	41		
11	Shutting down the system	43		
11.1	Shut down the heating system using the control unit	43		
11.2	Shutting down the heating system in the event of an emergency	43		
12	Inspection	44		
12.1	Preparing the appliance for inspection	44		
12.2	Visual inspection for general signs of corrosion	44		
12.3	Internal tightness testing	45		
12.4	Measuring the ionization current	45		
12.5	Measuring the inlet gas pressure	45		
12.6	Checking and adjusting the gas/air ratio	45		
12.7	Carrying out a gas tightness test in operating conditions	45		
12.8	Measuring the carbon monoxide content (CO)	45		
12.9	Carrying out a pressure test of the heating system	45		
12.10	Checking the functioning and the safety of the air intake and flue gas conduit	45		
12.11	Checking venting systems	45		
13	Maintenance	46		
13.1	Cleaning the heat exchanger, burner and condensate trap	46		
13.2	Checking and adjusting the gas/air-ratio	48		
14	Servicing	49		
14.1	Checking the UBA3 fuse; replace if necessary	49		
14.2	External connection board fuse	49		
14.3	Checking the fan unit; 120 VAC control	50		
14.4	Checking the fan unit; Supply cord (120 VAC)	51		
14.5	Checking the fan unit; Tacho cable	52		
14.6	Replacing the fan unit	52		
14.7	Checking the supply/return/safety/hot-water temperature sensors	53		
14.8	Replacing the supply/return/safety sensors	54		
14.9	Checking the supply/return/safety sensors cable	55		
14.10	Checking the hot surface ignitor; Control	56		
14.11	Checking the hot surface ignitor; resistance	57		

Contents

14.12	Checking the hot surface ignitor; Supply cord	57
14.13	Replacing the hot surface ignitor	58
14.14	Testing the ionization current	59
14.15	Checking the ionization electrode; cable . . .	60
14.16	Checking the ionization electrode; replace if necessary	61
14.17	Checking the gas control valve; cable connections	62
14.18	Checking the gas control valve; Control	62
14.19	Checking the gas control valve; Cable connection between gas control valve and UBA3 installation base	62
14.20	Ohming out the gas control valve	64
14.21	Replacing the gas control valve	65
14.22	Checking the control unit; connections to the appliance	68
14.23	Transformer; checking and if necessary replacing	70
14.24	Automatic air purging system; replacing	72
14.25	Burner; replacing	73
14.26	Sight glass; replacing	76
14.27	Condensate trap; replacing	77
14.28	Pressure sensor; replacing	77
14.29	Heat exchanger; replacing	78
14.30	UBA3; replacing	85
15	Converting the appliance to propane or high altitude conversion	86
16	Appendix	87
16.1	Operating messages	87
16.2	Error messages	88
16.3	Technical specifications	89
17.1	Start-up report	91
17.2	Inspection report	92
17.3	Maintenance report	93
18	Spare parts	94
19	Index	97

1 Safety and general instructions

Please observe these instructions in the interest of your own safety.

1.1 Designated use

The appliance was designed for heating water for a heating system and generating hot water e.g. for domestic purposes.

The appliance is delivered with a BC10 basic controller and the "Universal Automatic Burner Control Unit 3" (UBA3) pre-installed.

The appliance can be fitted with a modulating room thermostat from the RC series or an On/Off thermostat or relay panel end switch (24 V) (accessories).

1.2 Hazard definitions

The following defined terms are used throughout the documentation to bring attention to the presence of hazards of various risk levels. Notices give important information concerning the life of the product.



DANGER:

Indicates the presence of hazards that will cause severe personal injury, death or substantial property damage.



WARNING:

Indicates the presence of hazards that can cause severe personal injury, death or substantial property damage.



CAUTION:

Indicates presence of hazards that will or cause minor personal injury or property damage.



CAUTION:

Risk of electric shock.

Indicates presence of hazards due to electric shock.



NOTICE:

Indicates special instructions on installation, operation or maintenance that are important but not related to personal injury or property damage.

1.3 The following instructions must be observed

- The appliance must only be used for its designated purpose, observing the Installation and Servicing Instructions.
- Only use the appliance in the combinations and with the accessories and spares listed.
- Other combinations, accessories and consumables must only be used if they are specifically designed for the intended application and do not affect the system performance and the safety requirements.
- Maintenance and repairs must only be carried out by authorized professionals.
- You must report the installation of a condensing gas heater to the relevant gas utility company and have it approved.
- You are only allowed to operate the condensing gas heater with the combustion air/flue gas system that has been specifically designed and approved for this type of appliance.
- Please note that local permission for the flue system and the condensate water connection to the public sewer system may be required.

You must also observe:

- the local building regulations stipulating the installation rules.
- the local building regulations concerning the air intake and outlet systems and the chimney connection.
- the regulations for the power supply connection.
- the technical rules laid down by the gas utility company concerning the connection of the gas burner fitting to the local gas main.
- the instructions and standards concerning the safety equipment for the water/heating system.
- the Installation Instructions for building heating systems.
- The appliance must be located in an area where leakage of the tank or connections will not result in damage to the area adjacent to the appliance or to lower floors of the structure. When such locations cannot be avoided, it is recommended that a suitable drain pan, adequately drained, be installed under the appliance. The pan must not restrict combustion air flow.
- Do not restrict or seal any air intake or outlet openings.
- If you find any defects, you must inform the owner of the system of the defect and the associated hazard in writing.



DANGER

if flammable gas explodes.

Beware if you smell gas: there may be an explosion hazard!

Warning: If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury or death.

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

What to do if you smell gas

- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

Installation and service must be performed by a qualified installer, service agency or the gas supplier.

1.4 Observe these instructions for heating system water

- Thoroughly flush the system prior to filling. Only use untreated main water to fill and top off the system.
- Do not use salt bedding exchangers to soften the water.
- Do not use inhibitors or other additives!
- No Toxic chemicals such as used for boiler treatment, shall be introduced into the portable water used for space heating.
- The maximum permissible flow rate of the GB142-24/30 this is 11 GPM (gal./min.), for the GB142-45 is 15 GPM and for the GB142-60 is 20 GPM.
- When using oxygen-permeable pipes, e. g. for floor heating systems, you must separate the system using heat exchangers. Unsuitable heating system water promotes the formation of sludge and corrosion. This may damage the heat exchanger or affect its operation.

1.5 Tools, materials and additional equipment

For the installation and maintenance of the appliance you will need the standard tools for central heating, gas and water fitting.

In addition, a handtruck with a fastening belt is very useful.

1.6 Disposal

- Dispose of the appliance packaging in an environmentally sound manner.
- Dispose of components of the heating system (e. g. appliance or control device), that must be replaced, by handing them in to an authorized recycling facility.

2 Regulations and guidelines

The installation must conform to the requirements of the authority having jurisdiction or, in the absence of such requirements, to the latest edition of the National Fuel Gas Code, ANSI Z223.1. In Canada, installation must be in accordance with the requirements of CAN/CGA B149.1 or 2 Installation Code for Gas Burning Appliances and Equipment.

Where required by the authority having jurisdiction, the installation must conform to the Standard for Controls and Safety Devices for Automatically Fired Boilers, ANSI/ASME CSD-1.

Install CO detectors per local regulations. Appliance requires yearly maintenance, see maintenance section see chapter 13 "Maintenance", page 46

Operating Limits of the appliance:

Max. appliance temperature: 220 °F (105 °C)

Max. operating pressure: 44 psi (3 bar)

The hot water distribution system must comply with all applicable codes and regulations. When replacing an existing appliance, it is important to check the condition of the entire hot water distribution system to ensure safe operation.

3 Product description

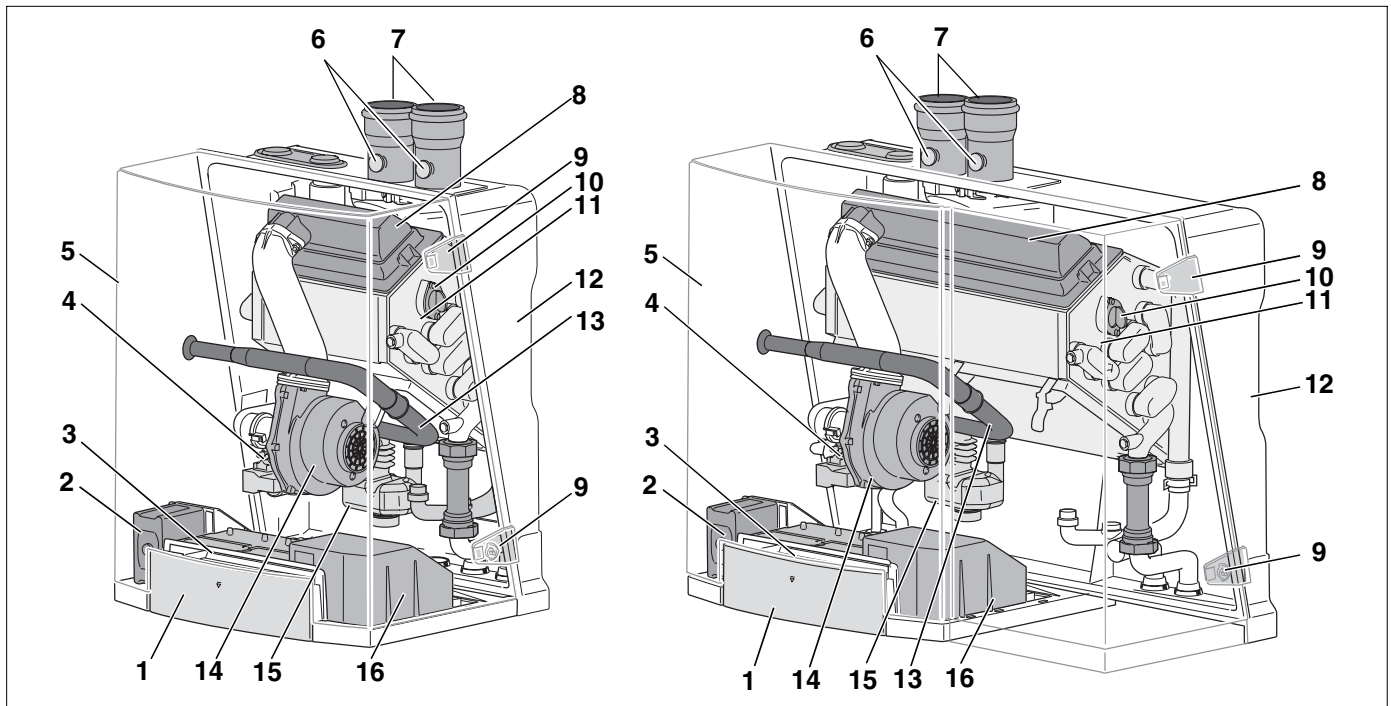


Fig. 1 Logamax plus GB142-24/30 (left) and GB142-45/60 (right)

- | | |
|--|---|
| <ul style="list-style-type: none"> pos. 1: Drawer with control unit pos. 2: Universal Burner Automat (UBA3) pos. 3: Control unit BC10 pos. 4: Gas valve pos. 5: Cover pos. 6: Flue measuring points pos. 7: Parallel flue | <ul style="list-style-type: none"> pos. 8: Burner pos. 9: Latches of which two have locks pos. 10: Sighting glass pos. 11: Heat exchanger pos. 12: Back cover pos. 13: Air intake for the fan pos. 14: Fan pos. 15: Condensate trap pos. 16: External Connection Board (under the cover) |
|--|---|

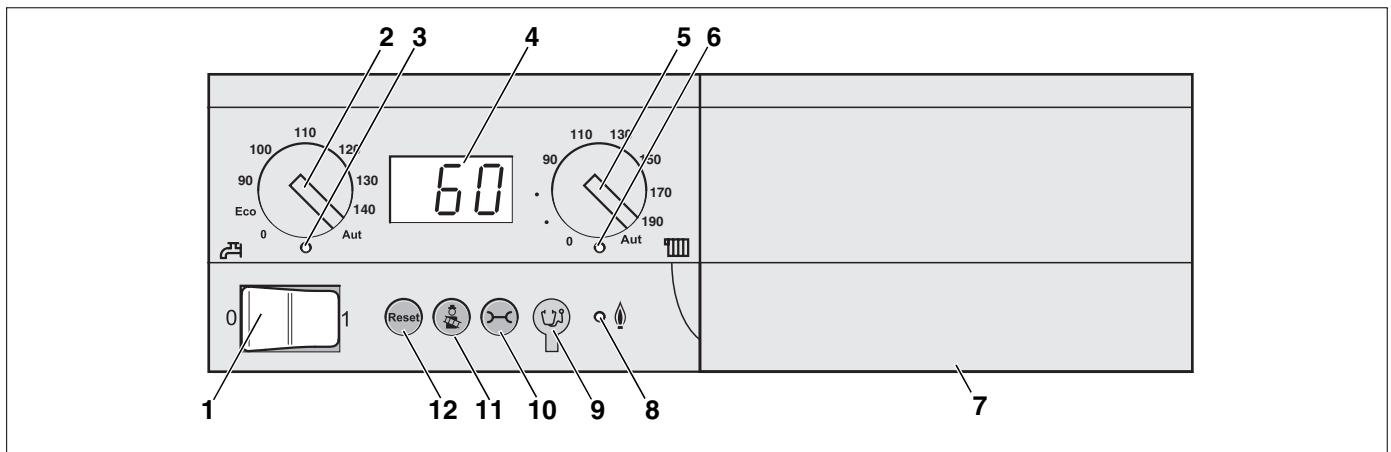


Fig. 2 Basic Controller Logomatic BC10

- | | |
|---|---|
| <ul style="list-style-type: none"> pos. 1: Main switch pos. 2: DHW temperature knob pos. 3: LED "DHW status" pos. 4: Display pos. 5: Heating water temperature knob pos. 6: LED "Heating system status" | <ul style="list-style-type: none"> pos. 7: Under the cover a RC system controller can be installed. Only when the appliance is used for outdoor weather responsive operation. pos. 8: LED "Burner Operation" pos. 9: Service Tool connector pos. 10: "Service" button pos. 11: "Chimney sweep" button pos. 12: "Reset" button Switching the heating system on and off |
|---|---|

4 Dimensions and connections

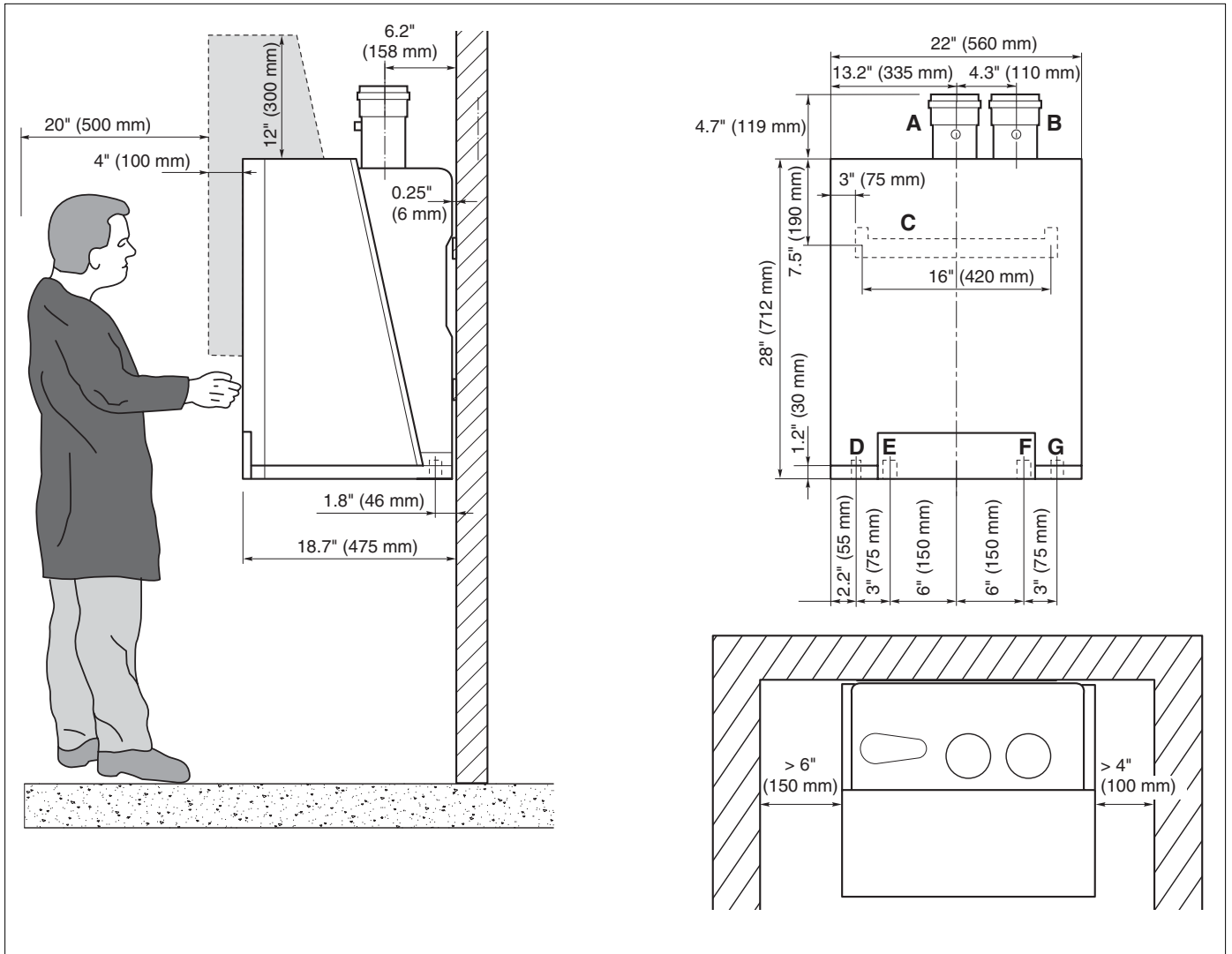


Fig. 3 Dimensions and connections for appliance GB142-24/30 (dimensions in inches)

- AA (A) = Flue gas connection (inside diameter 3")
- AKO (E) = Condensate water outlet, Ø 1.3" (Ø 32 mm)
- GAS (D) = outside diameter
Gas connection, 3/4" NPT

- LA (B) = Air intake (inside diameter 3")
- RK (G) = Return, Ø 1.1"¹ (Ø 28 mm)
- VK (F) = Supply, Ø 1.1"¹ (Ø 28 mm)
- WB (C) = Wall bracket

¹ One Ø 1.1" (Ø 28 mm) inside x 1" NPT threaded compression fitting is.



NOTICE

Observe the lateral minimum distances of the appliance (4" = 100 mm) and the necessary distances (24" (600 mm) at the front and 12" (300 mm) at the top) for removing the casing and service accessibility.

Closet clearances are:

4" (100 mm) to the right, 4" (100 mm) at the top and 6" (150 mm) to the left.

4 Dimensions and connections

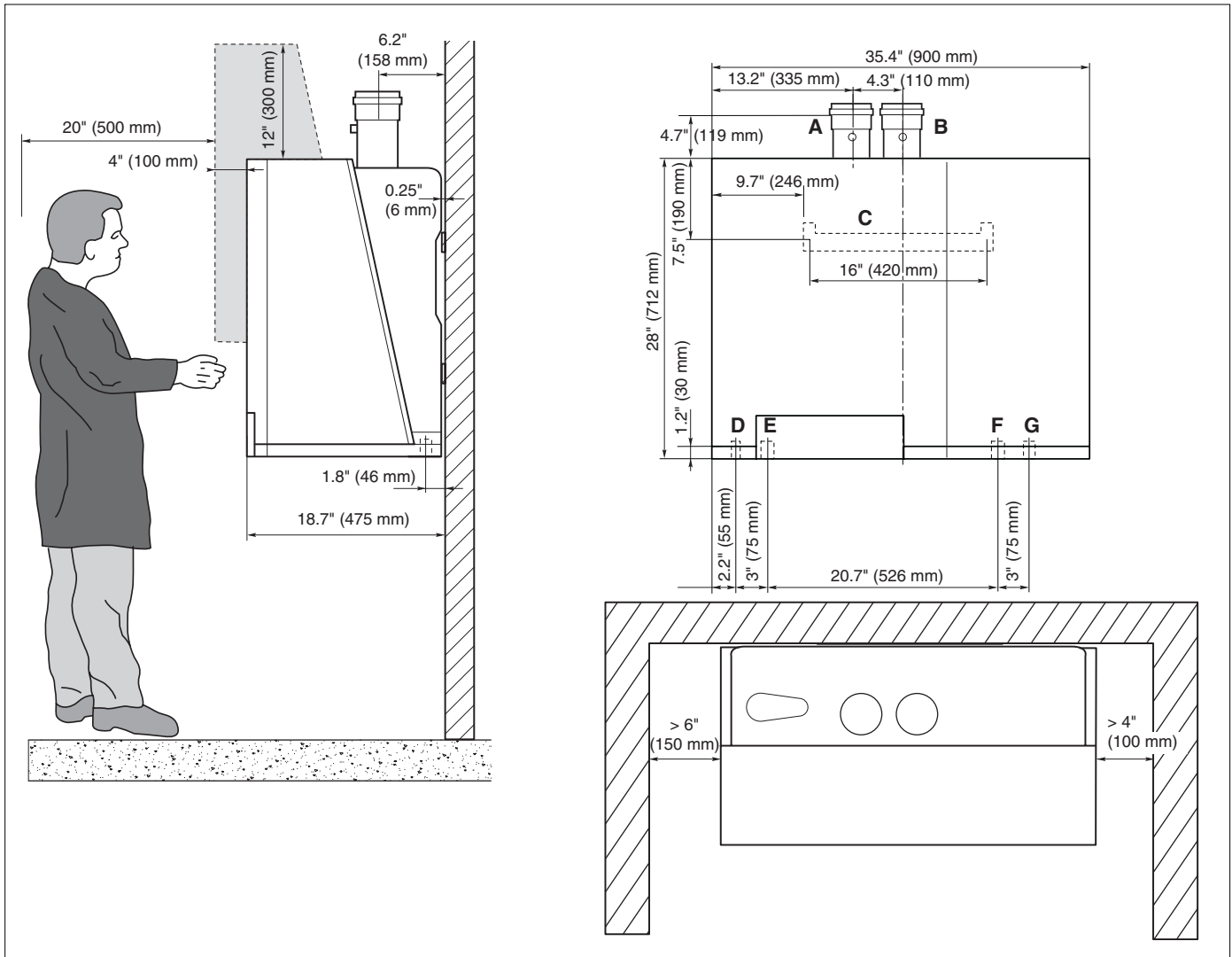


Fig. 4 Dimensions and connections for appliance GB142-45/60 (dimensions in inches)

AA (A) = Combustion air

AKO (E) = Condensate water outlet, $\text{Ø } 1.3''$ ($\text{Ø } 32 \text{ mm}$)

GAS (D) = Gas connection, $\frac{3}{4}''$ NPT

LA (B) = Air intake

RK (G) = Return, $\text{Ø } 1.1''^1$ ($\text{Ø } 28 \text{ mm}$)

VK (F) = Supply, $\text{Ø } 1.1''^1$ ($\text{Ø } 28 \text{ mm}$)

WB (C) = Wall bracket

¹ One $\text{Ø } 1.1''$ ($\text{Ø } 28 \text{ mm}$) inside x $1''$ NPT threaded compression fitting is delivered enclosed.



NOTICE

Observe the lateral minimum distances of the appliance ($4'' = 100 \text{ mm}$) and the necessary distances ($24''$ (600 mm) at the front and $12''$ (300 mm) at the top) for removing the casing and service accessibility.

Closet clearances are:

$4''$ (100 mm) to the right, $4''$ (100 mm) at the top and $6''$ (150 mm) to the left.

5 Packaging and transportation

5.1 Scope of delivery

The appliance is delivered fully assembled.

- When receiving the delivery, check if the packaging is intact.
- Check that all the items listed in table 1 are included in the delivery.

5.2 Transporting the appliance



CAUTION

The appliance may be damaged when it is improperly secured.

- Only transport the appliance using the right transportation equipment, such as a handtruck with a fastening belt or special equipment for manoeuvring steps.
 - During transportation the appliance must be secured on the transportation equipment to prevent it from falling off.
 - Protect all parts against impacts if they are to be transported.
 - Observe the transportation markings on the packaging.
- Packaged heaters must always be lifted and carried to their destination by two people, or you must use a handtruck or special equipment to transport them to their destination.
 - Transport the appliance to the room where it is to be installed.

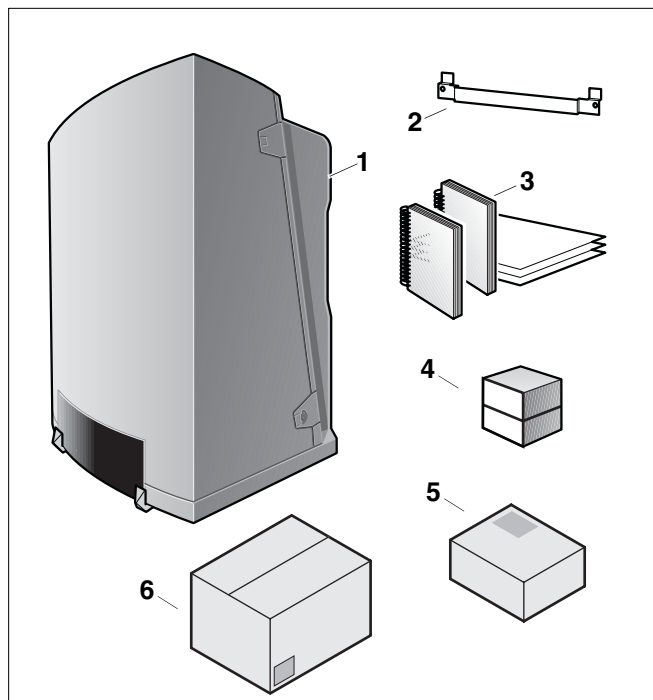


Fig. 5 Items supplied with unit

Pos.	Parts	Quantity	Packaging
1	Appliance with casing	1	1 box
2	Wall bracket	1	
3	Technical documents ¹ including: - User's Instructions - Installation and Servicing instructions - wall mounting template	3	
4	Compression fittings	2	
5	Room thermostat	1	
6	Flue gas adapter	1	

Table 1 Items supplied with unit

¹ The user's instructions (in a special format) is located in the appliance drawer

6 Installation

6.1 Requirements for the installation room



DANGER

- Install the heating system in a frost-free room.
- Do not store any flammable materials or liquids in the immediate vicinity of the appliance.
- Never use any chlorinated detergents or halogenated hydrocarbons (e. g. in spraycans, solvents and detergents, paints, adhesives).
- Do not allow too much dust to collect on the appliance.

6.2 Fitting the appliance

Observe the installation distances of the combustion air/flue gas system.



NOTICE

- To protect the connection orifice you must not remove the styropor bottom panel.
 - Do not lift the appliance by the drawer.
 - Do not remove the transport safety clamps (see fig. 6) from the drawer at this time.
 - Protect the appliance and the combustion air/flue gas orifice against pollution during installation.
- Remove the packaging materials and dispose of them.
 - Use the mounting template to mark the drill holes.
 - Install the wall bracket taking into account the necessary service clearances.
 - Remove the transport safety clamps (fig. 6) taking into account the necessary service clearances.

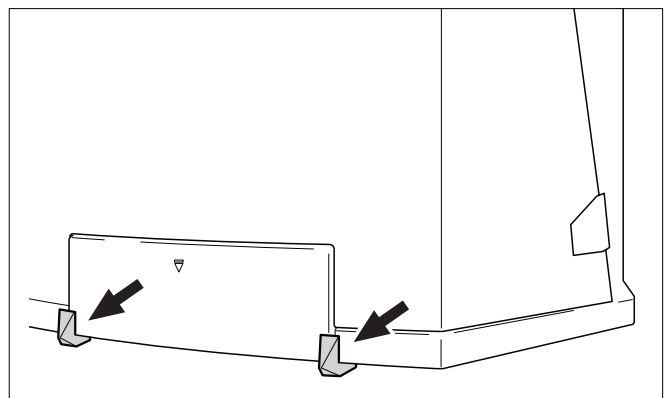


Fig. 6 Removing the transport safety clamps

- Use the radiator key to unlock the two latches a quarter turn (fig. 7, pos. 1).
- Open the latches (fig. 7, pos. 2).
- Remove the casing by lifting it upwards and then pulling it forwards (fig. 7, pos. 3); do not hold it by the latches.
- Hold the appliance by the rear appliance casing and place it on the wall bracket.
- Level out the appliance.

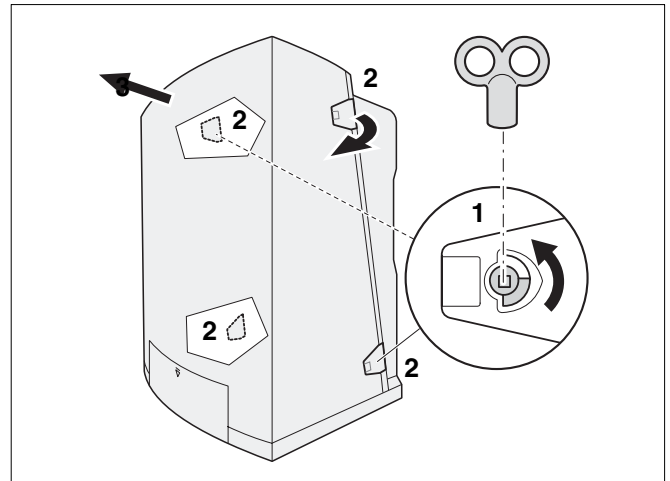


Fig. 7 Removing the casing

6.3 Making the gas connection



DANGER

Only carry out work on gas conduits and fittings if you are licensed for such work.

- Determine proper size gas pipe for the installation using table 2 and table 3. Do not forget the pipe fitting losses and observe proper size of the fittings.
- Install the furnished 3/4" gas cock on the gas connection.
- Connect the gas pipe to the gas cock (fig. 8, pos. 1) so that it is free from any strain.

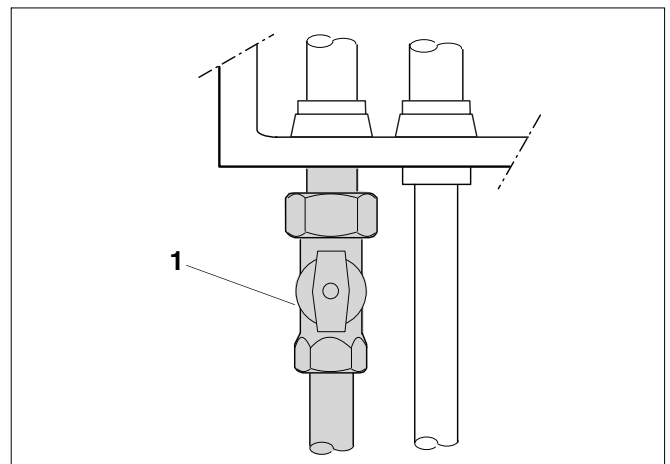


Fig. 8 Making the gas connection



NOTICE

When installing the gas supply connection, it must comply with local regulations or, if such regulations do not exist, with the National Fuel Gas Code, ANSI Z 223.1. In Canada, the gas supply connection must comply with local regulations or, if such regulations do not exist, with CSA/CGA-B149 Installation Guidelines.

Length of pipe (feet)	Gas Volume Capacity (ft ³ / hr) ¹			
	3/4"	1"	1 1/4"	1 1/2"
10	278	520	1,060	1,600
20	190	350	730	1,100
30	152	285	590	890
40	130	245	500	760
50	115	215	440	670
75	93	175	360	545
100	79	160	305	480
150	64	120	250	380

Table 2 Gas Pipe Capacity for different pipe sizes

¹ Maximum pipe capacity in ft³/hr, based on a specific gravity of .60 (42 mbar) and a inlet gas pressure of .5 psi (35 mbar) or less and a pressure drop of .3 inches W.C. (20 mbar)

6.4 Fitting the heating circuit supply and return pipes



NOTICE

- Piping and components connected to the water appliance for the space heating application are suitable for use with potable water.
- A water appliance which will be used to supply potable water shall not be connected to any heating system or component(s) previously used with a nonpotable water heating appliance.



NOTICE

- To protect the entire heating system we recommend installing a dirt particle filter in the return circuit. When connecting the appliance to an existing heating system this filter must definitely be installed.
- Install shut-off valves immediately before and after the dirt particle filter to enable the filter to be cleaned.

- Fit a filling and drain cock in the heating system supply pipe if required.
- Also fit a safety valve in the system.



NOTICE

When using oxygen-permeable pipes, e. g. for floor heating systems, you must separate the system using heat exchangers.

- Thoroughly flush all pipes and radiators.
- Refer to the installation template for the pipe connection dimensions.
- Fit the compression fittings (fig. 9, pos. 1 and 2) first to the Hydronic set (see fig. 10, 11 and 12) and then to the appliance.
- Connect the expansion tank to the system.
- Connect the pipes so that they are free from strain.

Steel pipe diameter in inches	Equivalent length for Pipe Fittings in feet			
	Type of pipe fitting			
	90°-Elbow	Tee (flow thru branch)	Gate valve	Gas cocks
Equivalent length in feet				
3/4	2.1	4.1	0.5	1.25
1	2.6	5.2	0.6	1.60
1 1/4	3.5	6.9	0.8	2.15
1 1/2	4.0	8.0	0.9	2.50

Table 3 Equivalent length for pipe fittings in feet

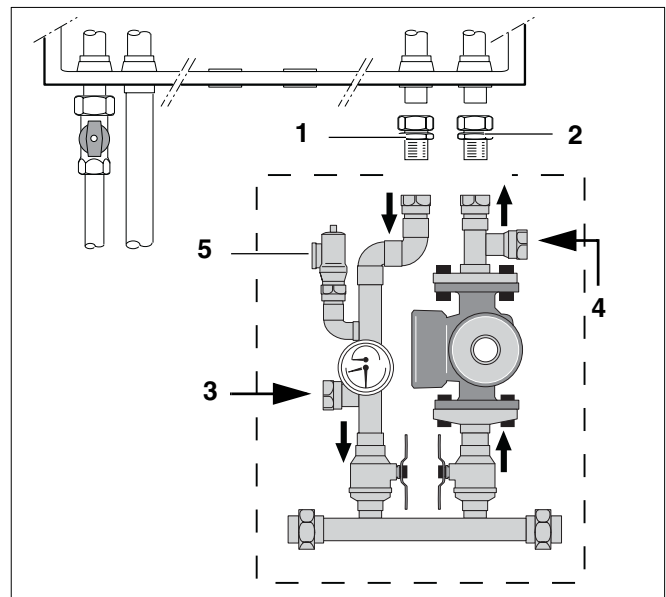


Fig. 9 Pump manifold installation

- pos. 1: Compression fitting (heating system supply pipe)
- pos. 2: Compression fitting (heating system return pipe)
- pos. 3: DHW supply
- pos. 4: DHW return
- pos. 5: Relief valve

Appliance with external tank

- Connect the external hot-water tank according to the Installation instructions of the hot-water tank and fittings concerned.

Piping examples

The following illustrations are two Installation examples.



NOTICE

The following illustrations are simplified conceptual illustrations only.

Piping and field components must be field verified.

- Install a low water cut-off (LWCO) when required by local code or when the appliance is installed above piping level.

Fig. 10 is a schematic representation of fig. 9.



NOTICE

If this water heater is installed in a closed water supply system, such as one having a backflow preventer in the cold water supply line, means shall be provided to control thermal expansion. Contact the water supplier or local plumbing inspector on how to control this situation.

The separate storage vessel must have a temperature and pressure relief valve installed. The relief valve shall comply with the Standard for *Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems, ANSI Z21.22-CSA 4.4*.

When the system requires water for space heating at temperatures higher than required for other uses, a means such as a mixing valve shall be installed to temper the water for those uses in order to reduce scald hazard potential.

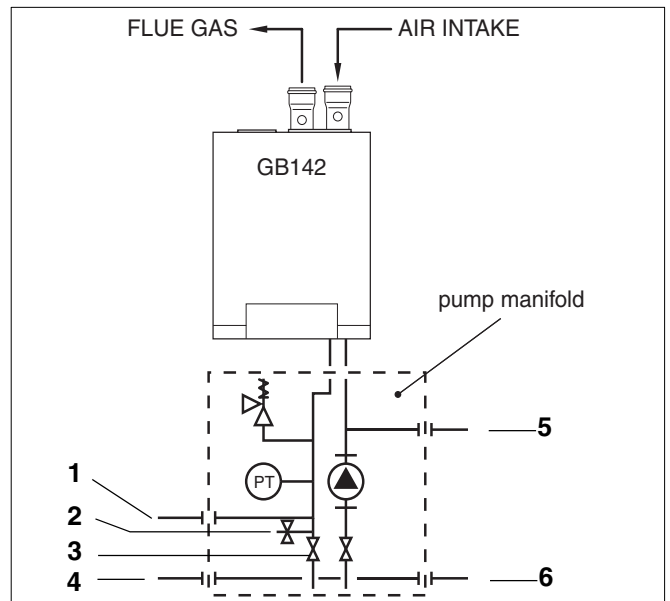


Fig. 10 Schematic representation of the appliance with the hydronic set

- pos. 1: DHW supply
- pos. 2: drain valve
- pos. 3: pump manifold shut-off valves
- pos. 4: secondary supply
- pos. 5: DHW return
- pos. 6: secondary return

**WARNING**

No valve is to be placed between the relief valve and the tank. Discharge of the relief valve must be conducted to a suitable place for disposal when relief occurs and no reducing coupling or other restriction may be installed in the discharge line.

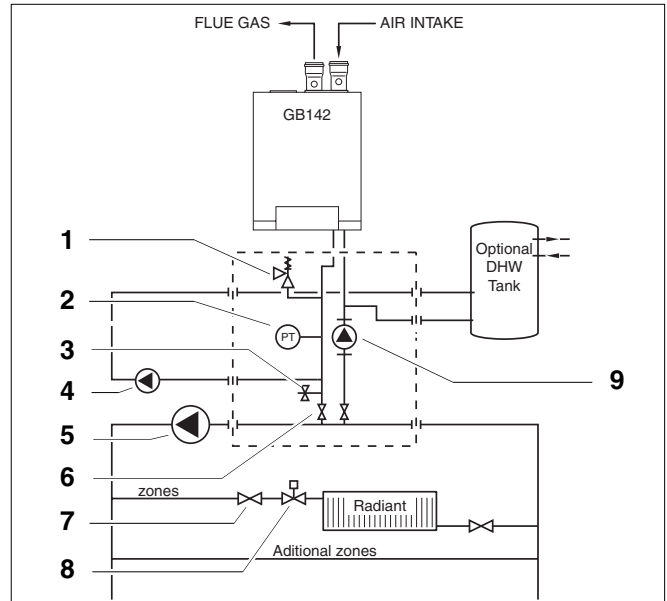


Fig. 11 Schematic representation of the appliance with the hydraulic set connected to an optional hot water tank with one or multiple zones including one pump and zone valves

- | | |
|---|------------------------|
| pos. 1: pressure relief valve | pos. 5: secondary pump |
| pos. 2: PT meter
(Pressure and
temperature meter) | pos. 6: shut-off valve |
| pos. 3: drain valve | pos. 7: shut-off valve |
| pos. 4: DHW pump | pos. 8: zone valve |
| | pos. 9: primary pump |

**NOTICE**

Primary pump and DHW tank pump must have an internal check valve.

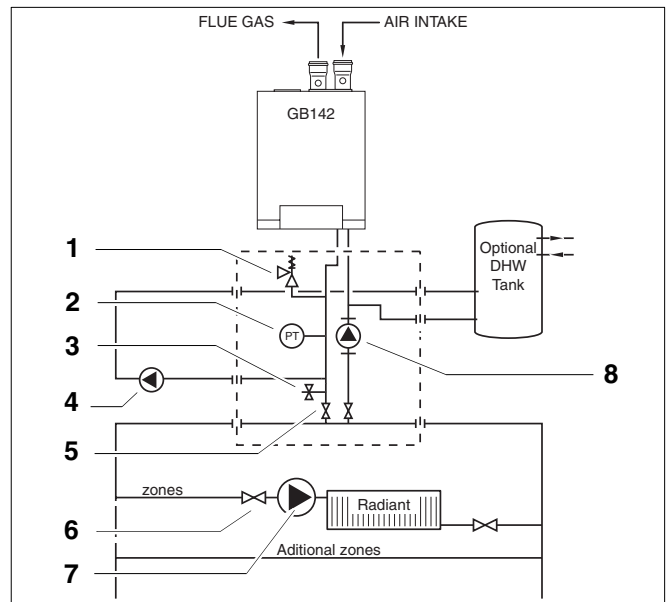


Fig. 12 Schematic representation of the appliance with the Hydronic set connected to an optional hot water tank with one or multiple zones and zone pumps

- | | |
|---|------------------------|
| pos. 1: pressure relief valve | pos. 5: shut-off valve |
| pos. 2: PT meter
(Pressure and
temperature meter) | pos. 6: shut-off valve |
| pos. 3: drain valve | pos. 7: zone pump |
| pos. 4: DHW pump | pos. 8: primary pump |

6.5 Combustion Air and Ventilation Openings



CAUTION:
APPLIANCE DAMAGE AND OPERATIONAL FAILURES !

Due to insufficient or lacking openings for combustion air and/or ventilation of the appliance room.

Provisions for combustion air and ventilation are always required, regardless whether the combustion air is taken from the outside (sealed combustion) or inside (room air for combustion).

Insufficient ventilation of the appliance room can lead to high air temperatures. This can result in appliance damage.

- Make sure that intake and exhaust openings are sufficiently sized and no reduction or closure of openings takes place.
- When the problem is not resolved, do not operate the appliance.
- Please note these restrictions and its dangers to the operator of the appliance.



WARNING:
APPLIANCE DAMAGE !

due to contaminated air.

- Appliance must be clear and free from combustible materials, gasoline and other flammable vapors and liquids, and corrosive liquids and vapors.
Never use chlorine and hydrocarbon containing chemicals (such as spray chemicals, solution and cleaning agents, paints, glues etc) in the vicinity of the appliance.
- Do not store and use these chemicals in the appliance room.
- Avoid excessive dust formation and build-up.



NOTICE

When one expects contaminated combustion air (near swimming pools, chemical cleaning operations and hair salons), sealed combustion operation is recommended.



DANGER:
FIRE DANGER !

due to flammable materials or liquids.

- Do not store flammable materials and liquids in the immediate vicinity of the appliance.

All Air from Inside the Building (room air)

The closet shall be provided with two permanent openings communicating directly with an additional room(s). The total input of all gas utilization equipment installed in the combined space shall be considered in making this determination. Each opening shall have a minimum free area of 1 square inch per 1,000 Btu per hour of total input rating of all gas utilization equipment in the confined space, but no less than 100 square inches. One opening shall commence within 12 inches (300 mm) of the top, and one opening shall commence within 12 inches (300 mm) of the bottom of the enclosure. The minimum dimension of air openings shall be not less than 3 inches (75 mm).

All Air from Outdoor (sealed combustion)

The closet shall be provided with two permanent openings, one commencing within 12 inches (300 mm) from the top, and one commencing within 12 inches (300 mm) from the bottom of the enclosure. The openings shall communicate directly, or by ducts, with the outdoors or spaces (crawl or attic) that freely communicate with the outdoors. The minimum dimension of air openings shall be no less than 3 inches (75 mm).

1. Where directly communicating with the outdoors, each opening shall have a minimum free area of 1 square inch per 4,000 Btu/hr of total input rating of all equipment in the enclosure.
2. Where communicating with the outdoors through vertical ducts, each opening shall have a minimum free area of 1 square inch per 4,000 Btu/hr of total input rating of all equipment in the enclosure.
3. Where communicating with the outdoors through horizontal ducts, each opening shall have a minimum free area of 1 square inch per 2,000 Btu/hr of total input rating of all equipment in the enclosure.
4. Where ducts are used, they shall be of the same cross-sectional area as the free area of the opening to which they connect.

6.6 Installation of the flue gas adapter (included in the scope of delivery)

Before installing the exhaust and air intake system it is necessary to install the flue gas adapter (see fig. 13).

- Screw on the flue gas adapter using six screws.

6.7 Installation of the Exhaust and Air Intake system.



NOTICE:

Consult local and state codes pertaining to special building code and fire department requirements. Adhere to national code requirements.

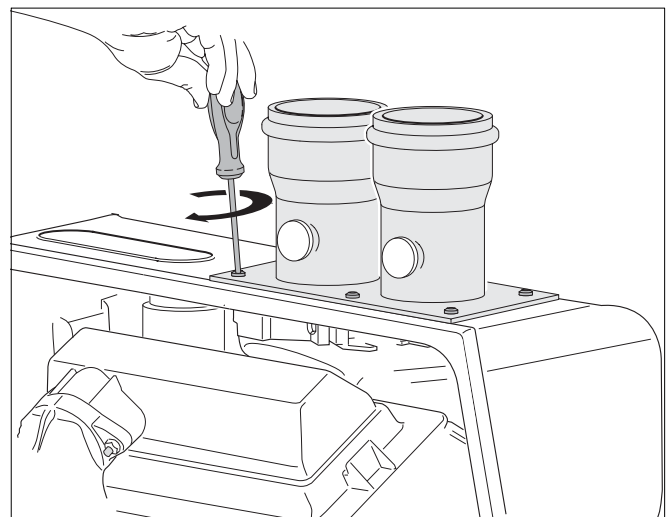


Fig. 13 Connecting the flue gas adapter



NOTICE:

Observe the listed maximum lengths of vent system, which are appliance model dependent. The maximum permissible lengths are listed in table 4, page 22.

An optional concentric vent/air intake body (see fig. 15, pos. 1) can be used for the installation of a vertical venting system as well as for a horizontal venting system. The concentric vent/air intake body can be ordered by Buderus Hydronic Systems, part no. BRYKGAVTO601CV.

The appliance can also be operated with separate air intake and exhaust piping (see fig. 18 and fig. 20).

The termination shall be at least 3 ft (910 mm) away from a gas utility meter, service regulator or the like (for room air applications only).

The termination shall terminate at least 4 ft (1220 mm) below, 4 ft (1220 mm) horizontally from, or 1 ft (305 mm) above any door, window, or gravity air inlet into any building.

All vent pipes must be glued, except for the flue gas adapter (fig. 14, pos. 1) which is screwed into place and the first connection to the flue gas adapter (fig. 14, pos. 2). Installed you can slide the pipe onto the adapter, properly supported and the exhaust pipe must be pitched a minimum of a ¼ inch per foot back to the appliance. This allows the condensate to drain away.

All combustion air and vent pipe materials and fittings must comply with the following:

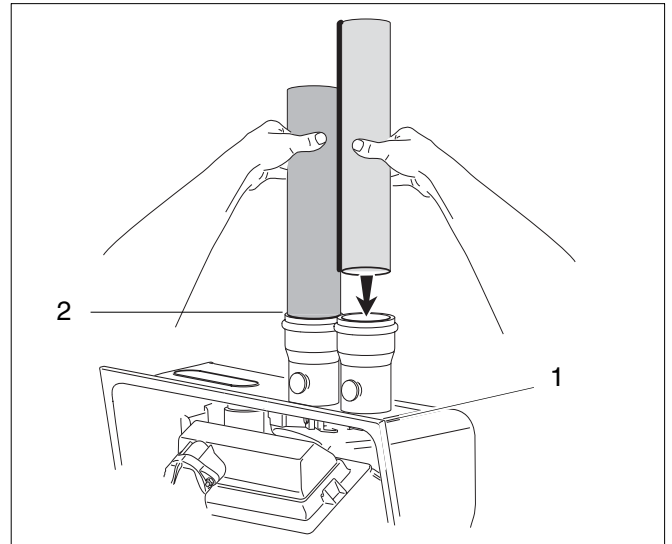


Fig. 14 Vent pipes

Item	Material	United states	Canada
Vent or air pipe and fitting	PVC schedule 40	ANSI/ASTM D1785	CSA or ULC certified only
	PVC-DWV	ANSI/ASTM D2665	
	CPVC schedule 40	ANSI/ASTM F441	
	ABS-DWV schedule 40	ANSI/ASTM D2661	
Pipe cement/primer	PVC	ANSI/ASTM D2564	CSA or ULC certified only
	CPVC	ANSI/ASTM F493	
	ABS	ANSI/ASTM D2235	



NOTICE

Do not use cellular core pipe.



NOTICE

Ensure that a condensate drain is always installed at the exhaust connection see Chapter “7 Connecting the condensate water drain” on page 23

Below are approved examples of vertical and horizontal venting installation

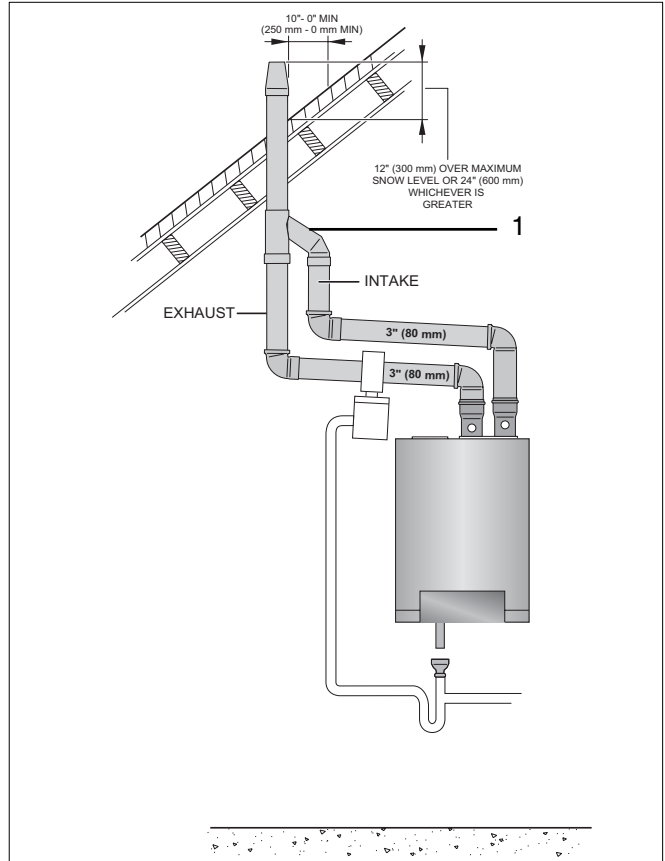


Fig. 15 Vertical venting system (sealed combustion)

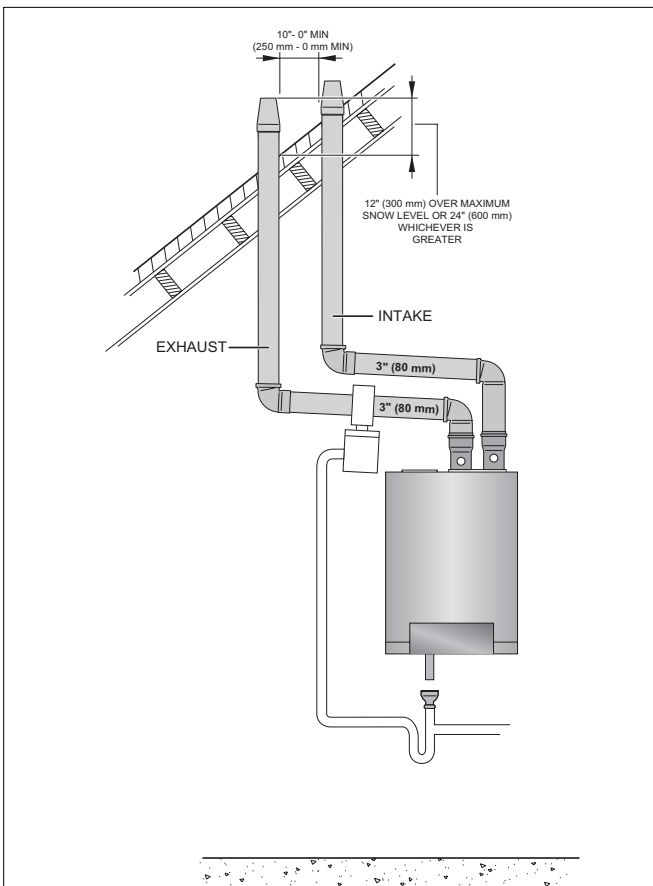


Fig. 17 Vertical parallel venting system (sealed combustion)

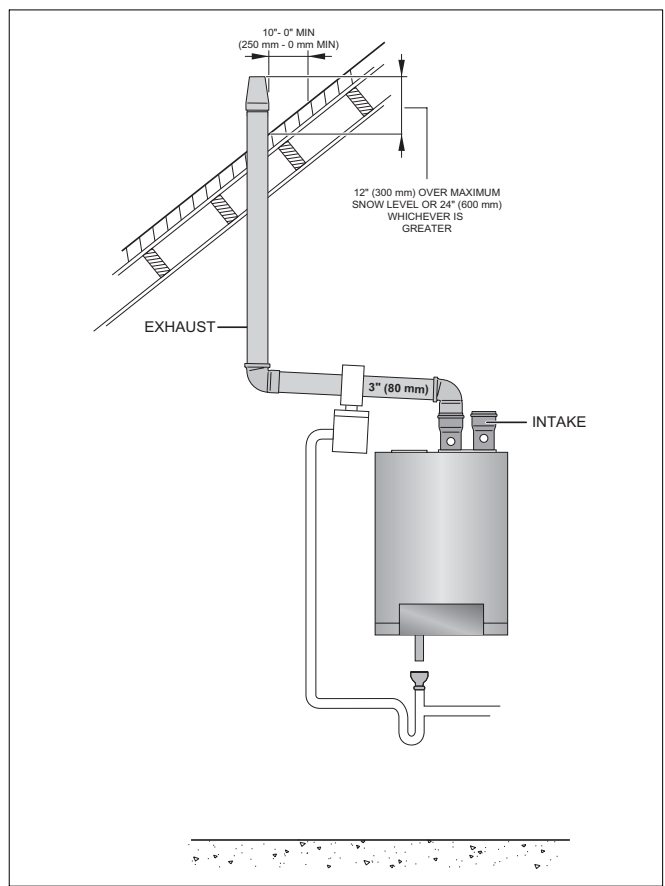


Fig. 16 Vertical venting system (room air only)



NOTICE

The condensate water must be drained in accordance with the applicable rules. See chapter 7 „Connecting the condensate water drain“.

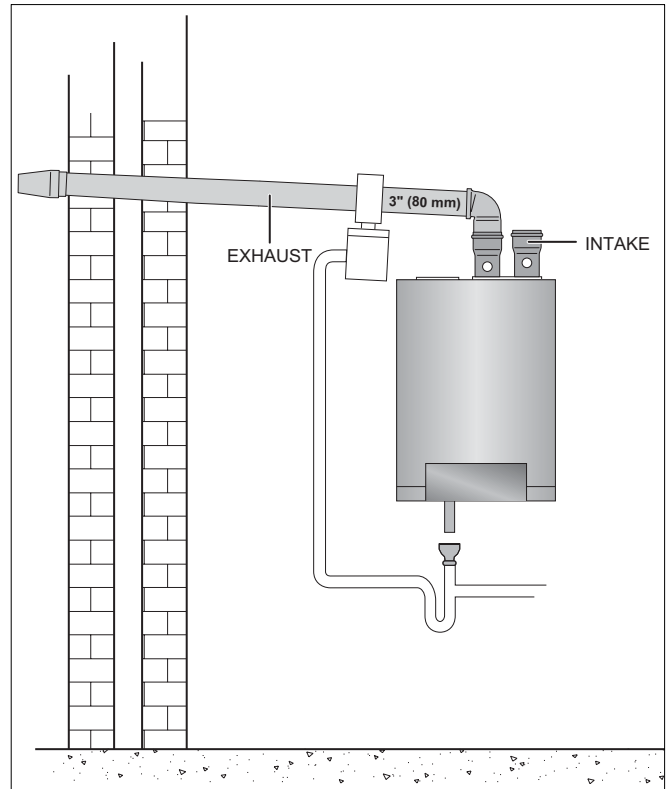


Fig. 18 Horizontal venting system (room air only)

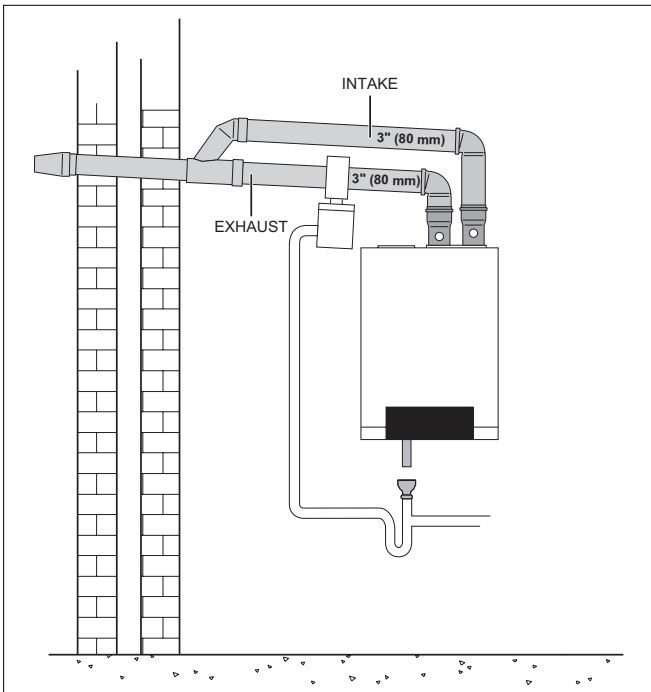


Fig. 20 Horizontal venting system (sealed combustion)

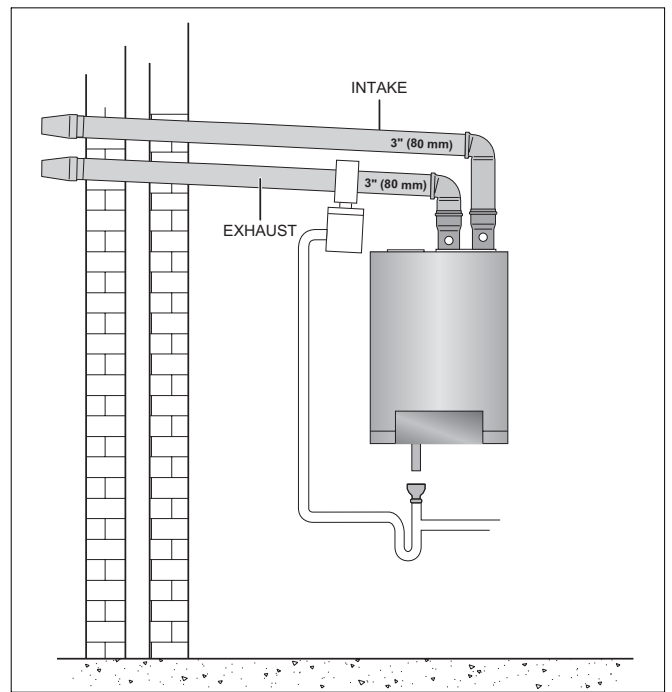


Fig. 19 Horizontal parallel venting system (sealed combustion)

Do not exceed the total equivalent venting length of 100 feet (GB142-24/30/45) and 60 feet (GB142-60) maximum requirement each for the intake and exhaust piping.

See table 4 for the Friction Loss Equivalent in piping and fittings.

Example:

When you end up using 3 x 45°-elbows and the concentric vent kit, then the total venting length may not exceed 88 feet (26.82 m) (GB142-24/30/45) or 48 feet (14.63 m) (GB142-60).

$$\begin{array}{r}
 3 \times 45^\circ\text{-elbow} = 3 \times 3 \text{ ft (0.91 m)} = 9 \text{ ft (2.73 m)} \\
 \text{concentric vent kit} = \underline{3 \text{ ft (0.91 m)}} \\
 \text{Total friction loss equivalent} = 12 \text{ ft (3.66 m)}
 \end{array}$$

Total venting length for this example is:

$$\text{GB142-24/30/45} = 100 \text{ ft (30.48 m)} - 12 \text{ ft (3.66 m)} =$$

88 feet (26.82 m)

$$\text{GB142-60} = 60 \text{ ft (18.29 m)} - 12 \text{ ft (3.66 m)} =$$

48 feet (14.63 m).

Fittings or Piping	Equivalent	
	feet	m
45 degree elbow	3	0.91
90 degree elbow	5	1.52
plastic pipe per foot	1	0.30
concentric vent kit	3	0.91

Table 4 Friction Loss Equivalent in piping and fittings



NOTICE

The minimum covering wall thickness is 1". The maximum covering wall thickness is 16".

7 Connecting the condensate water drain



NOTICE

The condensate water must be drained from the appliance and possibly from the flue in accordance with the applicable rules. Observe the local regulations.

No condensate water drain is integrated into the appliance. It is necessary to install the furnished 3" x 3/4" drain tee as an external condensate water drain. See fig. 21. Install this drain tee as close as possible to the appliance exhaust connection.



NOTICE

Use materials approved by the authority having jurisdiction. In the absence of other authority, PVC and CPVC pipe must comply with ASTM D1785, F441 or D2665. Cement and primer must comply with ASTM D2564 or F493. For Canada, use CSA or ULC certified PVC or CPVC pipe, fittings and cement.

If the condensate outlet of the appliance is lower than the drain, a condensate pump must be used. The condensate produced by the appliance has a pH value between 3 and 4. Install a neutralization unit if required by the local code.

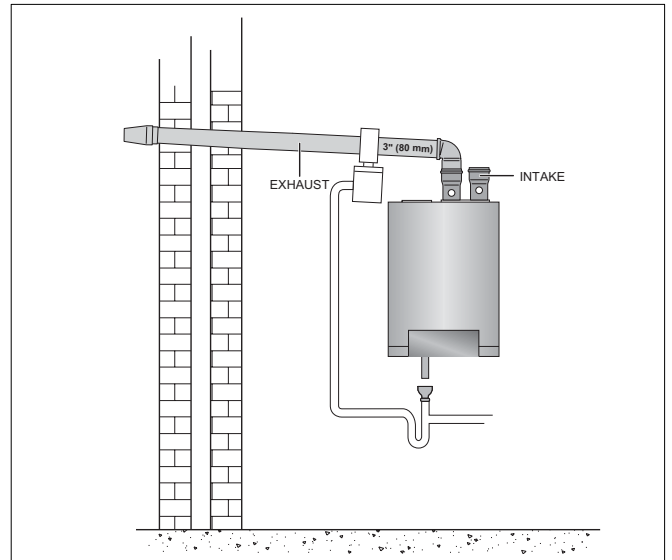


Fig. 21 Condensate water drain

8 Electrical connections

Devices such as pumps, outdoor sensor and 3-way valve are all connected to the external connection board.

The electrical connections to the appliance must be made in accordance with all applicable local codes and the latest revision of the National Electrical Code, ANSI/NFPA-70

Installations should also conform with CSA C22.1 Canadian Electrical Code Part 1 if installed in Canada.

8.1 External connection board connections

Make all electrical connections inside the external connection box.

- Remove the cover of the external connection box (fig. 22).

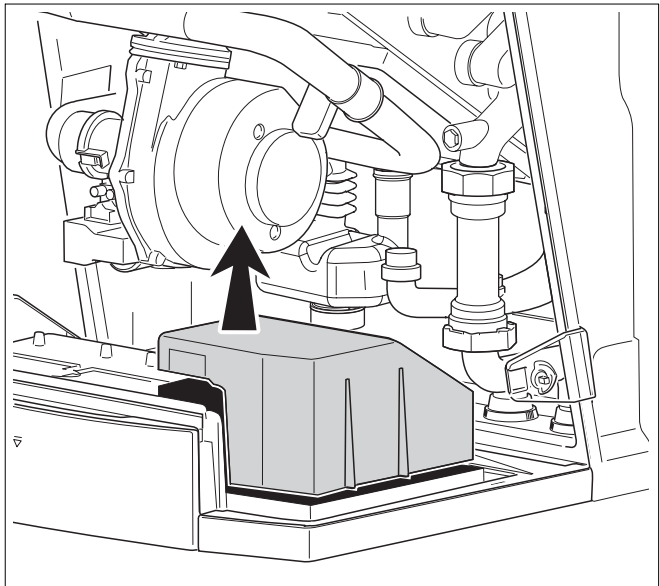


Fig. 22 Removing the cover from the external connection box

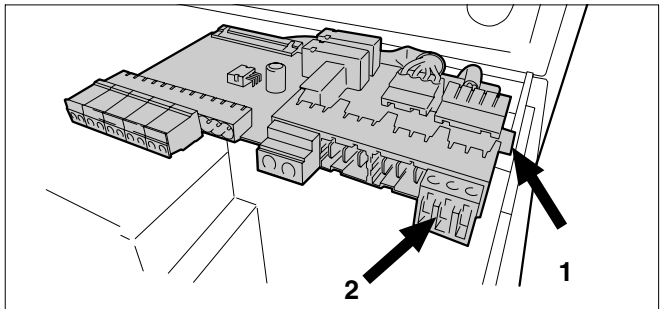


Fig. 23 external connection board

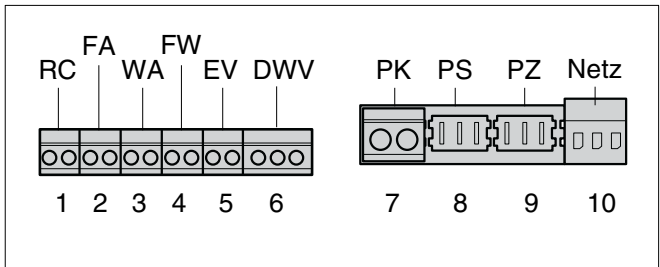


Fig. 24 Connections to external connection board

Abbr.	Color	Component
RC	orange	RC Room thermostat connection for a module
FA	blue	Outdoor-temperature sensor
WA	green	Potential-free On/Off thermostat
FW	gray	DHW temperature sensor
EV	red	External switching contact, potential-free for floor heating safety etc.
DWV	green	Connection for external 3-way valve
PK	green	Primary loop pump 120V 60Hz
PS	gray	DHW tank pump 120V 60Hz
PZ	lilac	DHW recirculating pump 120V 60Hz
Netz	white	main connection 120V 60Hz



Connecting incoming power

The appliance must be electrically grounded in accordance with local codes, or in absence of local codes, with the National Electrical Code, ANSI/INFA 70 and/or the CSA C22.1, Electrical Code.

- Install a 120V cable to the appliance (see fig. 23, pos. 1).
- Lead the cable through the cable guide (see fig. 23, pos. 2).

Terminals 1 – 6 (fig. 24) are low-voltage connections and terminals 7 – 10 (fig. 24) are 120 Volt connections.



CAUTION Risk of electric shock.

Once the main power supply is on then there is 120V on terminals 7 – 10 (can only be used with the correct configuration of the control unit and specific system hydraulics), if the main switch of the BC10 basic controller is switched on.

RC terminal

Connector for installation of an RC controller for indoor reset operation or a module.

FA terminal

This is the terminal where you connect the outdoor temperature sensor. Only necessary for outdoor weather responsive operation.

WA terminal

For connection of a potential free thermostat or relay panel end switch.

FW

Connection for an external DHW tank sensor

EV terminal (external switching contact)

This terminal can be used for example for the safety switch of floor heating. This protects the floor heating against too high appliance water temperatures (external manual reset high limit).

The appliance is shut down when the external switching contact is opened.

DWV

Terminal for connection of an external 3-way valve.

PK

Connector for the primary loop pump 120V 60Hz.

PS

Connector for the DHW tank pump 120V 60Hz.

PZ

Connector for the DHW recirculating pump 120V 60Hz.

Netz

Main power connector 120V 60Hz.

120-volt connections



CAUTION

Make sure that the power consumption of each of the terminals 7 – 9 (see circuit diagram) does not exceed 250 W.



WARNING

Label all wires prior to disconnection when servicing.
Wiring errors can cause improper and dangerous operation.

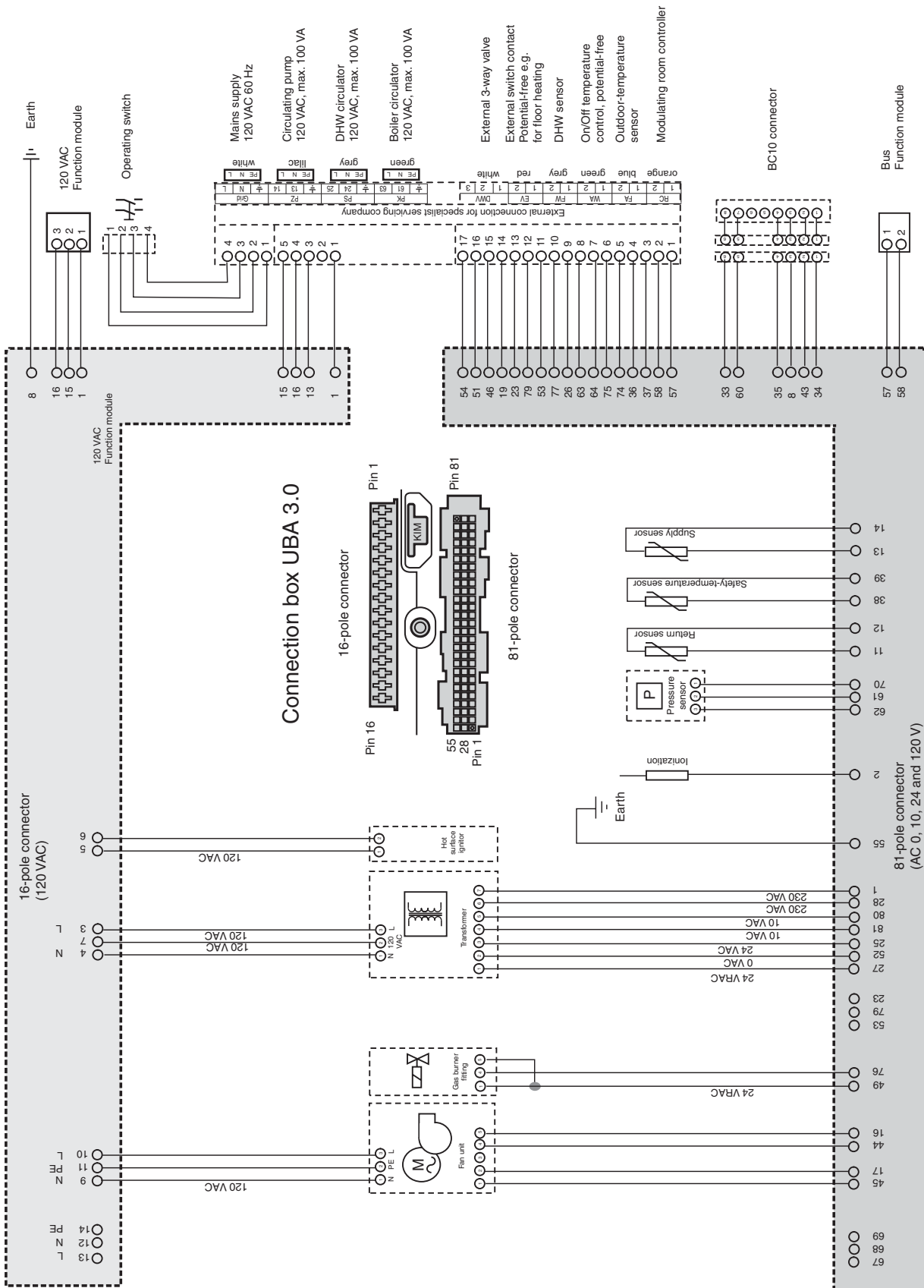


Fig. 25 Electric circuit diagram

9 Start-up procedure

There are several steps involved in starting up the boiler.

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

- A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
- B. **BEFORE OPERATING** smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instruction.
- If you cannot reach your gas supplier, call the fire department.
- C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- D. Do not use this appliance if any parts have been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

OPERATING INSTRUCTION

1. **STOP!** read the safety information above on this label.
2. Turn off all electric power to the appliance.
3. Set the thermostat or other operating control to lowest setting.
4. This appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
5. Close main gas shut off valve.
6. Wait (5) minutes to clear out any gas. Then smell for gas. Including near the floor. If you smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.
7. Open main shut off valve.
8. Set the thermostat or other operation control to desired setting.
9. Turn on all electric power to the appliance.
10. If the appliance will not operate, follow the instruction "To Turn Off Gas To Appliance" and call your service technician or gas supplier.

TO TURN OFF GAS TO APPLIANCE

1. Turn off all the electric power to the appliance if service is to be performed.
2. Set the thermostat or other operating control to lowest setting.
3. Close main gas shut off valve.

708.375A - 2172B

9.1 Testing for gas leaks

Prior to start-up of the appliance you must check the external tightness of the gas supply valve and confirm this in the start-up report.



WARNING

- Cover endangered positions before leak testing.
- Do not spray the leak testing agent onto cables, plugs or electrical connection lines. Do not allow it to drip onto them either.



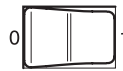
DANGER

Leaks may be caused to pipes and screw connections during commissioning and maintenance activities.

- Carry out a proper leak test.
 - Only use approved leak detection agents for leak detection.
- Disconnect the heating system from the power supply.
 - Check the exterior tightness of new conduit sections up to and including the direct sealing point on the gas burner fitting. The maximum test pressure allowed on the input of the gas burner fitting is 60 inch W.C. (150 mbar).

9.2 Filling the appliance

Set the main switch to "1". P0.0 appears in the display of the BC10 telling you that there is no system pressure.



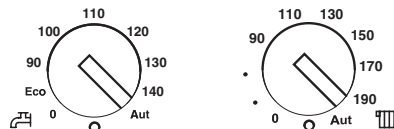
- Fill the heating system to a pressure of around 20 psi (1.5 bar).
- Observe the pressure on the BC10 or the P/T gauge in the pump manifold for the heating circuit. The fill pressure of the system should be at least the required inlet pressure for the expansion tank plus 7.2 psi (0.5 bar). The minimum pressure is 15 psi (1.0 bar) (on a cold system). The maximum pressure is 44 psi (3.0 bar) (if the heating medium temperature is at its highest possible level). If this pressure is exceeded, the pressure relief valve will open.



NOTICE

If a relief valve discharges periodically, this may be due to thermal expansion in a closed water supply system. Contact the water supplier or local plumbing inspector on how to correct the situation. Do not plug the relief valve.

For first time start up it is necessary to set the DHW temperature knob and the heating water temperature knob to the desired setting (see subsection 10.3.2 and 10.3.3). Factory setting is "0".



**WARNING**

There is a hot water scald potential if the BC10 is set too high.

9.3 Filling the condensate trap

- Make sure that you fill the condensate trap with water. This is to prevent exhaust gases from entering the appliance.
- Remove the condensate trap (see fig. 26).
- Fill with water and refit the condensate trap in reverse order.

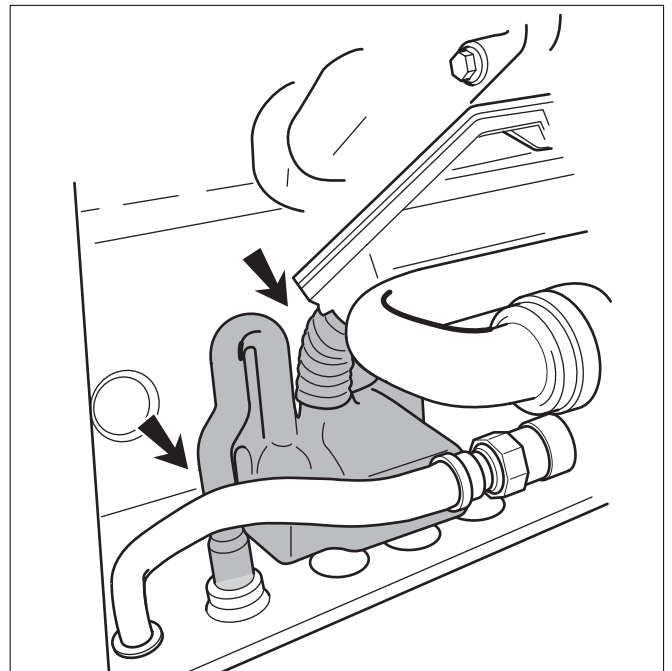


Fig. 26 Filling water into the condensate trap

9.4 Venting the gas supply valve

- Loosen the screw plug on the testing nipple for the gas connection and venting (fig. 27, pos. 1) by two turns and fit a hose.
- Slowly open the gas shut-off valve.
- Run the gas that is discharged through a water bath.
- Close the gas shut-off valve when no more air is released.
- Remove the hose and tighten the screw plug again.

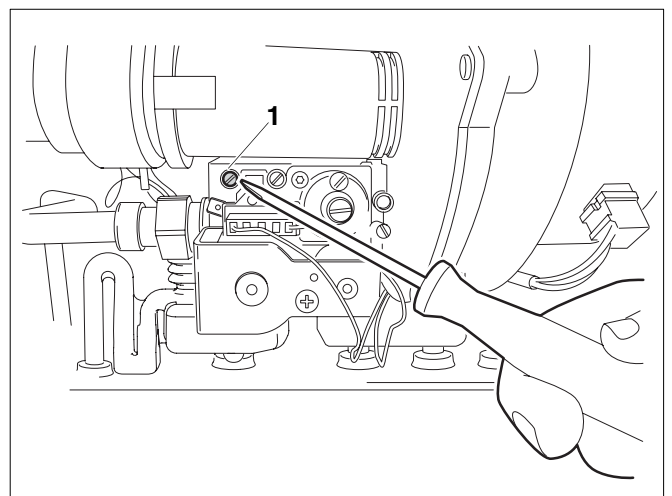


Fig. 27 Venting the gas supply conduit

9.5 Checking the combustion air/flue gas connection

Check the following points:

- Is the prescribed combustion air/flue system used?
- Have the instructions for configuring the flue system as specified in the relevant Installation instruction for the flue gas system been observed?
- Has an annular gap clearance measurement been carried out as part of commissioning? Check this with a tightness testing instrument if necessary. Were the permissible limit values observed as specified in the Installation Instructions for the flue gas system?

9.6 Checking the orrifices



CAUTION

The burner must only be commissioned if the correct orrifices are fitted (table 7).

- Convert the burner fitting to another gas type if required (see chapter 15 "Converting the appliance to propane or high altitude conversion", page 86).

9.7 Inlet gas pressure

- Open at least one thermostatic radiator valve if present to allow water to flow through the appliance. Do not switch on the appliance.
- Close the gas shut-off valve. Loosen the screw plug on the inlet gas pressure testing nipple by two turns (fig. 28, pos. 1).

- Connect the pressure gauge connection hose to the testing nipple (fig. 28, pos. 2).
- Slowly open the gas shut-off valve.

The appliance and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of ½ psi (3.5 kPa).

The appliance must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping system at test pressures equal to or less than ½ psi (3.5 kPa).

Type of gas supply	Factory setting of gas burner fitting
Natural gas H	Delivered factory-set to Wobbe index 14.1 kWh/m ³ (based on 59 °F (15 °C), 14.7 psi (=1,013 mbar)), suitable for Wobbe index range 11.3 – 15.2 kWh/m ³ . Information on gas type instruction plate: Set to gas category: G 20 – 2E. Previous indications: set to Wobbe index 15.0 kWh/m ³ (based on 32 °F (0 °C), 14.7 psi (=1,013 mbar)), suitable for Wobbe index range 12.0 – 15.7 kWh/m ³ .
LPG P	Suitable for propane after conversion (also see the chapter "Conversion to another type of gas supply"). Information on gas type instruction plate: Set to gas category: G 31 – 3P.

Table 6 Factory setting of gas burner fitting

Appliance capacity	Type of gas supply	Gas orifice diameter in mm (inch)	High altitude
24 kW	Natural gas	4.45 (0.174)	4.65 (0.181)
	LPG P	3.35 (0.131)	3.35 (0.131)
30 kW	Natural gas	4.45 (0.174)	4.65 (0.181)
	LPG P	3.35 (0.131)	3.35 (0.131)
45 kW	Natural gas	5.35 (0.209)	5.55 (0,216)
	LPG P	4.05 (0.158)	4.05 (0.158)
60 kW	Natural gas	7.25 (0.283)	7.45 (0.291)
	LPG P	5.35 (0.209)	4.05 (0.158)

Table 7 Gas orifice diameter

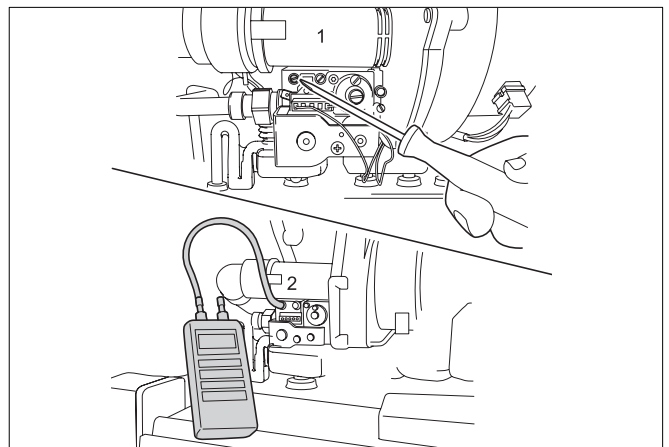


Fig. 28 Measuring the inlet gas pressure

- Briefly press on the control panel cover to open it.

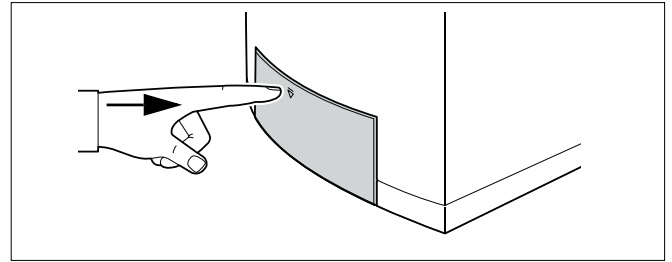





Fig. 29 Opening the control panel

- Switch on the heating system by setting the main switch to position "1" (see chapter 10 "BC10 basic controller", page 36).
- Press the "Chimney Sweep"  button and hold it (for approx. two seconds) until the display shows a decimal point.
- Measure the gas connection pressure as soon as the "Burner" LED lights and enter this value in the start-up report.



The inlet gas pressure must be:

- for natural gas - min. 6.5 – 9.6 inch W.C. (17 – 25 mbar), nominal supply pressure 7.7 inch W.C. (20 mbar).
- for LPG - min. 8.0 inch W.C. (19.9 mbar), max. 13.0 inch W.C. (32.3 mbar), nominal supply pressure 11.0 inch W.C. (27.3 mbar)

- Repeatedly press the "Service"  button until the temperature indication is displayed.
- Press the "Chimney Sweep"  button to end the measurement procedure.
- Close the gas shut-off valve.
- Remove the connection hose again and tighten the screw plug on the testing nipple.
- Open the gas shut-off valve again.

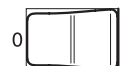


CAUTION

- Contact the relevant gas utility company if the required inlet gas pressure is not available.
- Install a gas pressure regulator before the gas burner fitting if the supply pressure is too high.

9.8 Checking and adjusting the gas/air ratio

- Switch off the heating system using the main switch.



9 Start-up procedure

- Loosen the screw plug on the measuring nipple for the burner pressure by two rotations (fig. 30, pos. 1).
- Set the pressure gauge to zero.
- Use a hose to connect the plus terminal of the pressure gauge to the burner pressure measuring nipple (fig. 30, pos. 2).

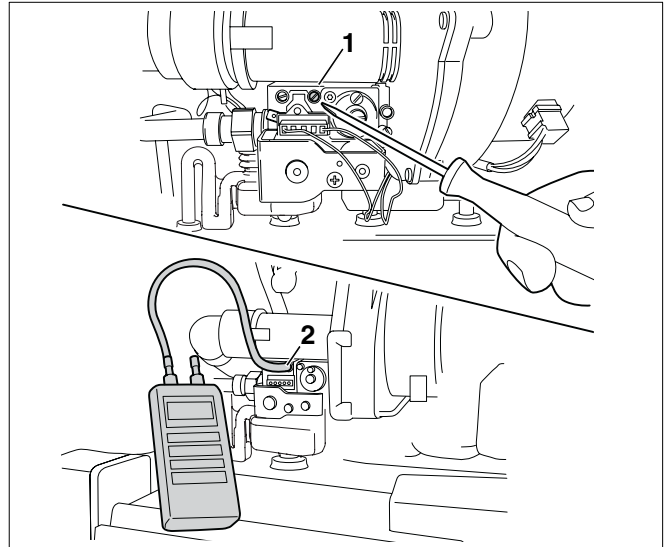


Fig. 30 Checking the gas/air ratio

- Switch on the heating system using the main switch.
- Press the "Chimney Sweep" button and hold it (for approx. two seconds) until the display shows the decimal point.
- Press and hold the "Chimney Sweep" and "Service" buttons (for approx. five seconds) until the display shows "Lxx" (e. g. L80).
- Set the appliance to partial load "L30" by pressing the "Chimney Sweep" button (higher values) or the "Reset" button (lower values).
- Read out the differential pressure.
The differential pressure ($p_{\text{Gas}} - p_{\text{Air}}$) must be -0.2 inch W.C. (- 5 Pa) (± 0.2 inch W.C. = ± 5 Pa) (read-out on pressure gauge: -0.4 – 0 inch W.C. = -10 – 0 Pa).
- Enter the value measured in the start-up report.
- If the gas/air ratio is not correct it can be adjusted using the adjustment screw (fig. 31, pos. 1). The adjustment screw is located behind the cover screw.

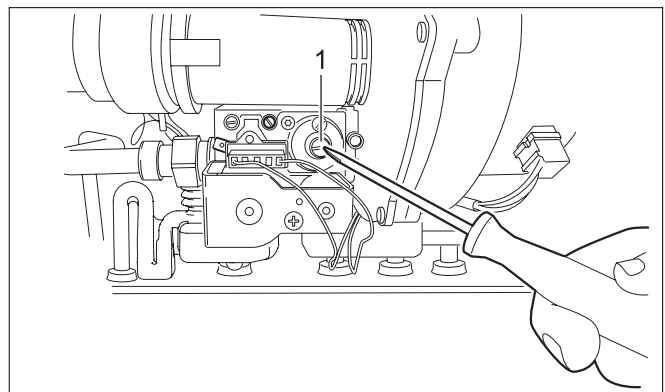
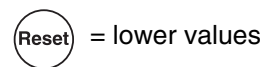
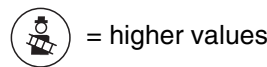
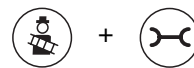
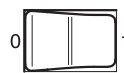


Fig. 31 Setting the gas/air ratio

- Repeatedly press the "Service" button until the temperature indication is displayed.
- Press the "Chimney Sweep" button until the decimal point is cleared from the display.
- Switch off the heating system using the main switch.
- Remove the measurement set-up, tighten the screw in the burner pressure measuring nipple.
- Switch on the heating system using the main switch.



9.9 Carrying out a tightness test in operating conditions

- Check the tightness of all gaskets and joints in the burner gas circuit while the burner is operational, using a foaming agent.



DANGER

Leaks may be caused to pipes and screw connections during start-up activities if flammable gas explodes.

- Only use approved leak detection agents for leak detection such as a soapy water solution.



CAUTION

due to a short circuit.

- Cover damageable parts before leak testing.
- Do not spray the leak testing agent onto cables, plugs or electrical connection lines. Do not allow it to drip onto them either.

9.10 Measuring the carbon monoxide content (CO)

- Measure the carbon monoxide content on the flue gas sampling point (fig. 32).

The CO values in an air-free condition must be below 400 ppm or 0.04 vol. %.

Values of 400 ppm and up indicate that the burner adjustment may be wrong, the gas burner fitting or the heat exchanger are dirty or that there may be burner faults.

- You must establish and resolve the cause. The appliance must be operational when you do this.

9.11 Function testing

- You must check the functioning and, if readjustment is possible, the adjustment of all control, regulating and safety devices when carrying out start-up tests, annual inspections or maintenance as required.
- You must also test the gas and water tightness.

9.12 Measuring the ionization current

- Switch off the heating system using the main switch.

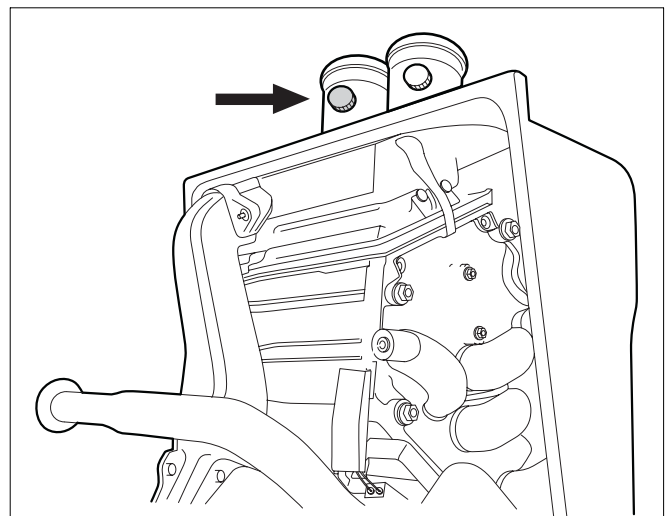
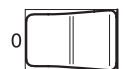


Fig. 32 Flue gas sampling point



9 Start-up procedure

- Disconnect the plug and socket connection of the monitoring cable and connect the measuring device in series (fig. 33). Select the μA direct current range on the measuring device. The measuring device must have a resolution of at least $1 \mu\text{A}$.

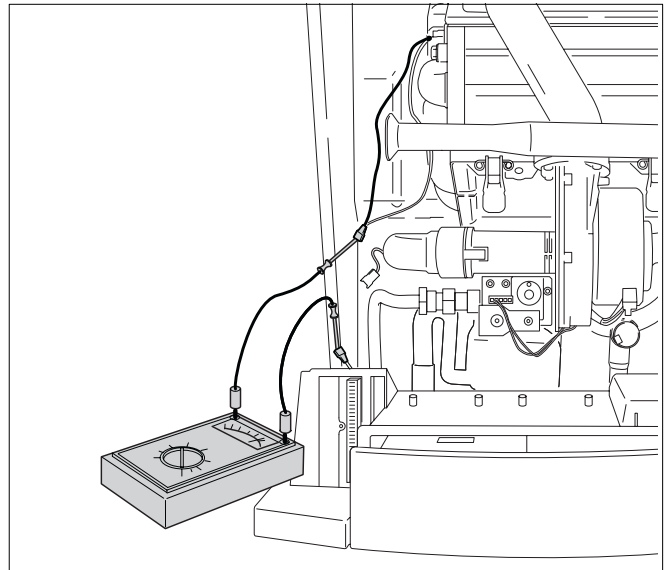







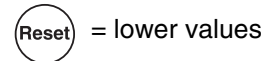
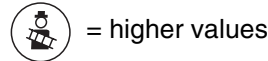
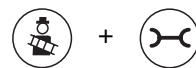
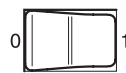


Fig. 33 Measuring the ionization current

- Switch on the heating system using the main switch.
- Press the "Chimney Sweep"  button and hold it (for approx. two seconds), until the display shows the decimal point.
- Press and hold the "Chimney Sweep"  and "Service"  buttons, until the display shows "Lxx" (e. g. L88).
- Set the appliance to partial load "L 30" by pressing the "Chimney Sweep"  button (higher values) or the "Reset"  button (lower values).
- Measure the ionization current. When the appliance is in partial load mode the ionization current must be $> 5 \mu\text{A}$ DC.
- Enter the value measured in the start-up report.
- Repeatedly press the "Service"  button, until the temperature indication is displayed.
- Press the "Chimney Sweep"  button to end the measurement procedure.
- Switch off the heating system using the main switch.
- Remove the measuring device and restore the plug and socket connection.
- Switch on the heating system again using the main switch.



- Push against the drawer (fig. 34) to close the control panel.

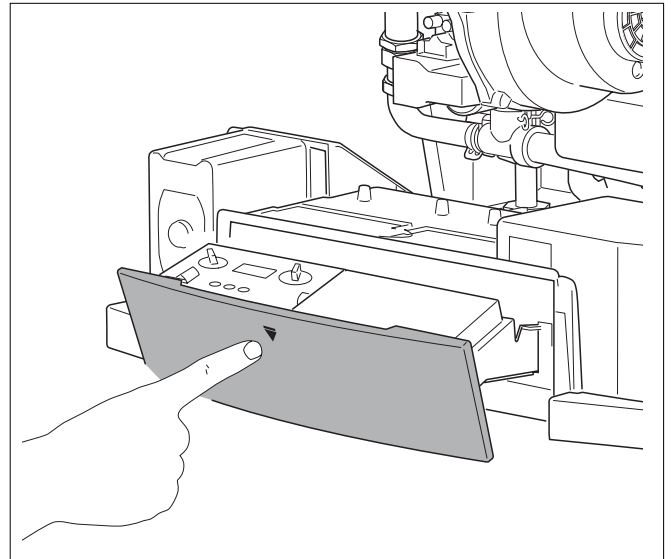


Fig. 34 Closing the control panel

9.13 Installing the casing

- Install the casing and close the latches (fig. 35). Do not lift the casing by the latches!
- Lock the latches using the radiator key.

9.14 Informing the owner, handing over the technical documents

- Show the owner how the heating system works and how the appliance can be operated. Hand over the technical documents.

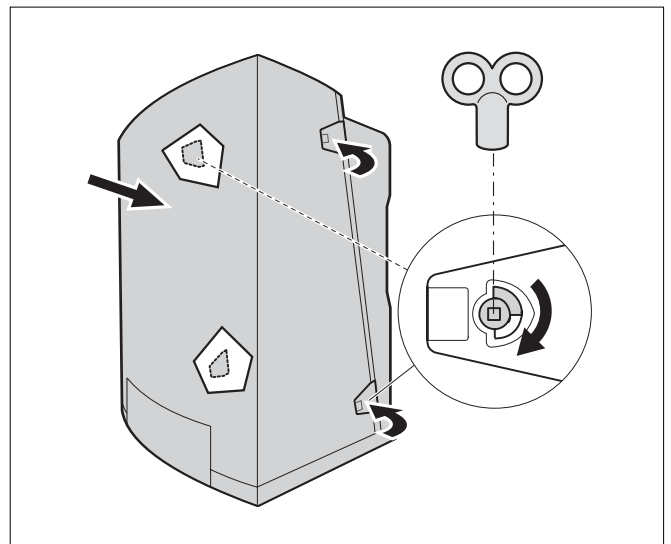


Fig. 35 Installing the casing

10 BC10 basic controller

10.1 Operating the BC10 basic controller

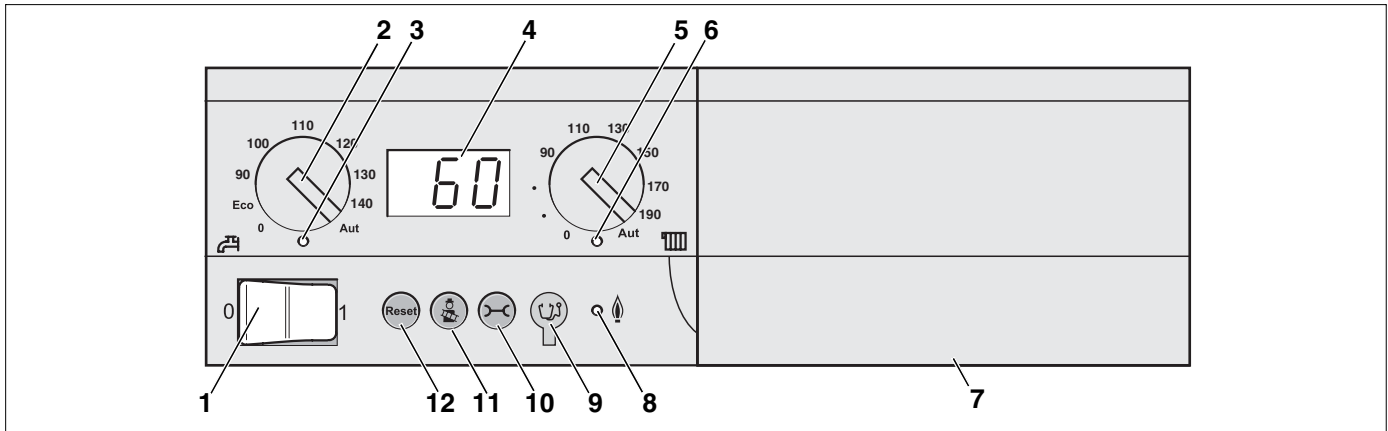


Fig. 36 BC10 basic controller – Controls

pos. 1: Main switch

pos. 2: DHW temperature knob

pos. 3: LED "DHW status"

pos. 4: Display

pos. 5: Heating water temperature knob

pos. 6: LED "Heating system status"

pos. 7: Under the cover a RC system controller can be installed.

pos. 8: LED "Burner Operation"

pos. 9: Service Tool connector

pos. 10: "Service" button

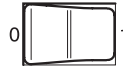
pos. 11: "Chimney sweep" button

pos. 12: "Reset" button

10.1.1 Switching the heating system on and off

Switching on the heating system

- Set the main switch on the BC10 basic controller to position "1" (On).



Switching off the heating system

- Set the main switch on the BC10 basic controller to position "0" (Off).



10.1.2 Displaying the operating conditions of the burner and resetting the burner or resetting burner faults

Displaying the operating conditions of the burner


The LED indicates the operating condition of the burner.




LED	Condition	Explanation
On	Burner operational	The water in the appliance is being heated.
Off	Burner off	The water in the appliance has reached the required temperature or there is no heat request.

Table 8 LED indication

Resetting the appliance or resetting faults

If the appliance is down due to a fault, you can reset the appliance by pressing the "Reset"  button. This is only possible for so-called lock-out faults. There is another type of fault, so-called blocking faults, that reset themselves when the cause has been remedied.

- Press the "Reset"  button to reset the appliance.



The display shows "rE" while resetting. It is only possible to reset the appliance when a lock-out code (blinking fault code) is visible in the display.




NOTICE

If the burner returns to fault mode after resetting the appliance, you must resolve the fault using the servicing section in this document. Contact your supplier if necessary.

10.1.3 Displaying the heating system status and/or faults

The display of the BC10 basic controller shows the status of the heating system.

In the event of a fault the display immediately shows the fault or the warning in the form of an error code (see subsection 16.2). The status display will flash if the fault is a lock-out fault.

- Press the "Service"  button to switch between status displays or to read out the service and error codes.
- Resolve the fault see subsection 16.3.



The following status displays can be seen depending on the operating conditions:
















Displays (examples)	Values	Meaning	Operating condition/Remedy
 ¹	number 0 ... 199	Current heater water temperature (in °F)	Normal operating conditions
   	> P15	Current system pressure (in psi)	
  ¹ (changing)  	P3 ... P12	Warning: System pressure is too low (between 3 and 12 psi = 0.2 and 0.8 bar)	
 			Warning Heating system remains operational between 12 psi and 3 psi (0.8 and 0.2 bar). Fill the heating system and restore the minimum filling pressure (≥ 14.5 psi = ≥ 1.0 bar). The system pressure is shown for 10 minutes after which the standard display returns.
 	number 0 ... 199	Current heater water temperature (in °F)	
 	P3 ... P12	Current system pressure (in psi)	

Table 9 Possible status displays

¹ Standard display for this operating condition. This display appears after 5 minutes if no button is pressed.
















Displays (examples)	Values	Meaning	Operating condition/Remedy
 ¹ (flashing)	< P3	Fault: system pressure is far too low (< 3 psi = < 0.2 bar)	Fault Burner and appliance circuit pump are not operational. Frost protection is active up to 2 psi (0.1 bar). The heating system will only become operational again if the pressure is back to 14.5 psi (1.0 bar). Fill the heating system and restore the minimum filling pressure (≥ 14.5 psi = ≥ 1.0 bar). The system pressure is shown for 10 minutes after which the standard display returns.
 207	number > 200	Error code Remedy the error see servicing section	
 140	number 0 ... 199	Current heater water temperature (in °F)	
 P3	< P3	Current system pressure (in psi)	
 ¹ (partially flashing)	Combination of letters and digits	Service code	Fault Lock-out faults (flashing display) must be reset by pressing the "Reset"  button. Blocking faults reset automatically as soon as the cause has been removed. Remedy any blocking faults that remain active for a long time using the service section in this manual.
 207	number > 200	Error code Remedy the error using the servicing section in this manual	
 140	number 0 ... 199	Current heater water temperature (in °F)	
 P21	> P15	Current system pressure (in psi)	
 ¹	A00 ... A99	Service code	System faults System faults are faults in the heating system that do not affect the burner operation.
 816	number > 800	Error code Remedy the error using the service section in this manual	
 -H			
 140	number 0 ... 212	Current heater water temperature (in °F)	
 P21	> P15	Current system pressure (in psi)	
 (flashing)		Fault No communication between BC10 and automatic gas burner.	Fault Remedy the error using the service section in this manual. Check the connections to both devices. Check the communication lines.

Table 9 Possible status displays





¹ Standard display for this operating condition. This display appears after 5 minutes if no button is pressed.

10.2 Carrying out additional tasks

10.2.1 Carrying out a flue gas test









The "Chimney Sweep"  button is used for the flue gas test.

The heating control system works at the maximum flow temperature for 30 minutes. This is set on the BC10 basic controller using the "maximum heater temperature" knob. During flue gas testing the decimal point lights up in the display.

- Press and hold the "Chimney Sweep"  button (< 5 seconds) until the decimal point is displayed. 
- Carry out the flue gas test.
- Press the "Chimney Sweep"  button to interrupt the flue gas test. 







10.2.2 Selecting partial load operation (e. g. during flue gas testing)

You can operate the appliance at a reduced appliance capacity during flue gas testing. This reduction is only effective for the duration of the flue gas test.

- Press the "Chimney Sweep"  button (max. 2 seconds) until the decimal point shows in the status display. This will switch on the flue gas test. 
- Press and hold the "Chimney Sweep"  and "Service"  buttons (for approx. 5 seconds) to enter the partial load mode.  + 
- Press the "Reset"  button to reduce the appliance capacity percentage. 

Example: appliance capacity reduced to 50 % of the rated appliance capacity.





- Press the "Chimney Sweep"  button to increase the appliance capacity percentage. 
- When test is completed, press the "Service"  button until the temperature indication is displayed. 
- Press the "Chimney Sweep"  button until the decimal point is cleared from the display. 


10.2.3 Switching the heating system to manual mode

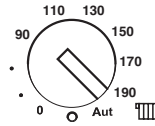
In manual mode the heating system can be operated independently of an external control unit. The appliance is operated with the heating system temperature set on the right knob serving as the target value.

A blinking decimal point is displayed while manual mode is active.

- Press the "Chimney Sweep"  button (for more than 5 seconds) until the decimal point in the status display flashes. 

10 BC10 basic controller

- Turn the knob to set the maximum heating system temperature.
- Press the "Chimney Sweep"  button to exit manual mode.



WARNING

- Turn the "heating system temperature" knob to limit the heating system temperature to the permissible flow temperature for the floor heating circuit (e. g. 86 – 104 °F = 30 – 40 °C), so pipes will not overheat.



DANGER

The heating system can freeze up if a power failure occurs or after switching off the power supply, because manual operation then is no longer active.

- You must re-activate manual operation after switching on the system to keep the heating system operational (especially if there is a risk of frost).



Regulator setting in %	Heating capacity in kW (±5 %)			
	appliance cap. 24 kW	appliance cap. 30 kW	appliance cap. 45 kW	appliance cap. 60 kW
L30	7.2	8.7	13.5	18.0
L40	9.6	11.7	18.0	24.0
L50	12.0	14.8	24.5	30.0
L60	14.4	17.8	27.0	36.0
L70	16.8	20.9	31.5	42.0
L80	19.2	23.9	36.0	48.0
L90	21.6	27.0	40.5	54.0
L--	24.0	30.0	45.0	60.0

Table 10 Heating capacity



10.3 Configuring the appliance


10.3.1 Adjusting the heating capacity

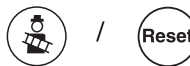
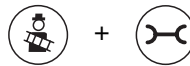
Setting the heating capacity depending on the maximum heat requirement (table 10).

- Press and hold the "Chimney Sweep"  and "Service"  buttons until an "L" with a double-digit value (e. g. L80) or an "L" followed by two dashes (L--) is displayed.

Factory setting "L--".

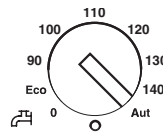
- Set the heating capacity by pressing the "Chimney Sweep"  button (higher values) or the "Reset"  button (lower values).

- Press the "Service"  button to confirm the setting.



10.3.2 Setting the DHW temperature value

- Turn the "DHW temperature" rotary knob to set the desired temperature of the hot water in the hot-water tank.



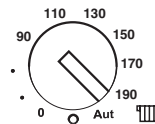
	Condition	Explanation	LED
0	Off	No hot water supply (only heating mode).	Off
Eco ¹	Economy mode, Hot water temperature 140 °F (60 °C)	The DHW will only be reheated to 140 °F (60 °C), if the temperature has significantly fallen. This reduces the number of burner starts and saves energy. As a result the water may be a bit colder initially.	On ²
86 – 140	Direct setting on BC10 in °F	The temperature set on the BC10 is a temperature that cannot be changed using a RC thermostat.	On ²
Aut	Entry via thermostat (presetting)	The temperature is set on the thermostat (e. g. RC30). If no thermostat is connected, the maximum DHW temperature is 140 °F (60 °C).	On ²

Table 11 Settings of "DHW temperature" knob

- ¹ This function has been optimized for appliances with combined DHW heating (combi-units).
- ² The heating program (timer) of the room control unit remains active, as a result of which no hot water is heated during night-time operation.
- ³ The LED under the rotary knob lights up if the DHW temperature is below the target value (heat request for DHW).

10.3.3 Entering the heater water temperature

- Turn the "heater water temperature" knob to set the upper limit value of the heater water for the heating operation. This limitation does not apply to DHW preparation.



	Condition	Explanation	LED
0	Off	No supply to heating system (only DHW operation).	Off
86 – 190	Direct setting on BC10 in °F (86 – 190 °F = 30 – 90 °C)	The temperature set on the BC10 is a temperature that cannot be changed using a RC thermostat. Supply temperature does not rise above the set temperature.	On ¹
Aut	Entry via thermostat (presetting)	The temperature is automatically determined on the basis of the heating characteristic. If no thermostat is connected, the maximum heater temperature is 190 °F (90 °C).	On ¹

Table 12 Settings of "heater water temperature" rotary knob

- ¹ The LED under the rotary knob lights up when the heating system is switched on and heat is requested. In summer mode the heating system is switched off (LED off).




10.3.4 Setting the pump post-purge period

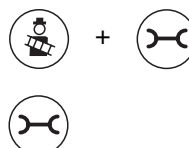
A pump must be connected to PK (see fig. 23, pos. 7) of the external connection board in order to be able to set the pump run over time.






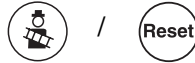
CAUTION

- Set the appliance primary pump post-purge period to 24 hours if the heating system is controlled by room temperature sensor and there is a risk of parts of the heating system that are outside the coverage of the room thermostat freezing (e. g. radiators in a garage; constant circulation).

- Press and hold the "Chimney Sweep"  and "Service"  buttons until the display shows "L--".
- Press the "Service"  button. The display shows "F05". The heating system has been factory-set to a pump post-purge period of 5 minutes.



- Press the "Chimney Sweep"  or "Reset"  buttons to set the pump post-purge period. The pump post-purge period can be set from 5 – 60 minutes (F 5 - F60) or to 24 hours (F1d).
- Press the "Service"  button to confirm the setting.

**NOTICE**

On thermostat only systems a 5 to 10 minute post-purge setting is recommended to purge heat from the appliance.

11 Shutting down the system



DANGER

The heating system may freeze if it is not operational in times of frost.

Protect the heating system against freezing if there is a danger of frost affecting the system.

Drain the heating system water from the lowest point of the heating system.

The vent screw at the highest point of the heating system must then be open.



DANGER

Should overheating occur or gas supply fail to shut off, turn off the manual gas control valve to the appliance.

11.1 Shut down the heating system using the control unit

Shut down your heating system using the BC10 basic controller. When the BC10 basic controller is shut down, the burner is also switched off automatically. Further information on how to operate the BC10 basic controller can be found in chapter 10 "BC10 basic controller", page 36.

- Switch off the heating system using the main switch.
- Close the main shut-off valve or the gas shut-off valve.



11.2 Shutting down the heating system in the event of an emergency

You must immediately close the main shut-off valve or gas shut-off valve and disconnect the power from the heating system.

- Close the main shut-off valve.

12 Inspection

We advise you to offer your customer an annual inspection and maintenance contract (for the contents of this contract, see page 92 and page 93).

If inspection reveals that maintenance work is necessary you can carry this out as required (see chapter 13 "Maintenance", page 46).



CAUTION

- Check and clean the heating system once a year.
- Carry out a maintenance overhaul if necessary. Immediately repair defects to avoid damage to the heating system!



WARNING

Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.



CAUTION

Risk of electric shock.

- Before opening the system: disconnect the heating system from the power supply using the heating system emergency OFF button or disconnect the relevant circuit breaker of the house from the power grid.
- Secure the heating system against accidental restarting.

12.1 Preparing the appliance for inspection

- Switch off the heating system using the main switch.
- Remove the cover from the appliance (fig. 7, page 13).



INSTRUCTION FOR THE INSTALLER

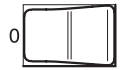
- If gas pipes have to be disconnected from the gas burner fitting, the burner cover must only be opened by a specialized professional.

12.2 Visual inspection for general signs of corrosion

- Check all gas and water pipes for signs of corrosion.
- Replace any pipes that are corroded.

12.3 Internal tightness testing

- Switch off the heating system using the main switch.
- Test the internal tightness of the gas burner fitting on the inlet side, applying a test pressure of 7.7 inch W.C. (20 mbar) in case of natural gas and 19.2 inch W.C. (50 mbar) in case of LPG.



After one minute the pressure must not have dropped by more than 3.8 inch W.C. (10 mbar).

- If the pressure has dropped more, you must check the tightness of all gaskets and joints upstream of the gas burner fitting using a foaming agent. Repeat the pressure test if no leaks are found. If the pressure has again dropped by more than 3.8 inch W.C. (10 mbar) per minute you will have to replace the gas burner fitting.

12.4 Measuring the ionization current

See subsection 9.12 "Measuring the ionization current", page 33

12.5 Measuring the inlet gas pressure

See subsection 9.7 "Inlet gas pressure", page 30

12.6 Checking and adjusting the gas/air ratio

See subsection 9.8 "Checking and adjusting the gas/air ratio", page 31

12.7 Carrying out a gas tightness test in operating conditions

See subsection 9.9 "Carrying out a tightness test in operating conditions", page 33

12.8 Measuring the carbon monoxide content (CO)

See subsection 9.10 "Measuring the carbon monoxide content (CO)", page 33

12.9 Carrying out a pressure test of the heating system

See chapter 9 "Start-up procedure", page 27.

12.10 Checking the functioning and the safety of the air intake and flue gas conduit

See subsection 9.5 "Checking the combustion air/flue gas connection", page 30.

12.11 Checking venting systems

Check air intake and flue gas for obstruction or damage.

13 Maintenance

- Switch off the heating system using the main switch.
- Close the gas shut-off valve.
- Remove the casing.

13.1 Cleaning the heat exchanger, burner and condensate trap



CAUTION

To avoid a short circuit.

- Do not spray the cleaning agent onto the burner, the hot surface ignitor, the ionization electrode or other electric components.

- Dismantle the hot surface ignitor and the ionization electrode.
- Loosen the fastening nuts (fig. 37, pos. 1).
- Remove the earth cable (fig. 37, pos. 2).
- Remove the retaining plate.
- Pull the hot surface ignitor (fig. 37, pos. 3) and the ionization electrode (fig. 37, pos. 4) out of the heat exchanger.
- Loosen the threaded connection to the gas control valve (fig. 38, pos. 1) and pull the plug (fig. 38, pos. 2) from the gas valve terminal block.
- Pull the plug from the fan unit (fig. 38, pos. 3).

- Loosen both sets of retaining clips (fig. 38, pos. 4 and 5) of the burner cover and remove the burner cover with the fan unit and the gas burner fitting (fig. 39, pos. 1). Then remove the gas/air distributor plate (fig. 39, pos. 2), the orifice plate (fig. 39, pos. 3) and the burner (fig. 39, pos. 4).
- Clean the gas/air distributor plate, the orifice plate (GB142-24 and GB142-30 only) and the burner using compressed air.

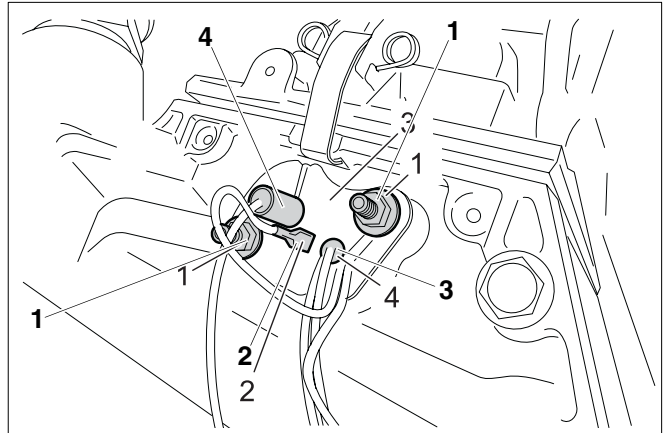
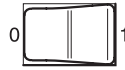


Fig. 37 Removing the hot surface ignitor and the ionization electrode

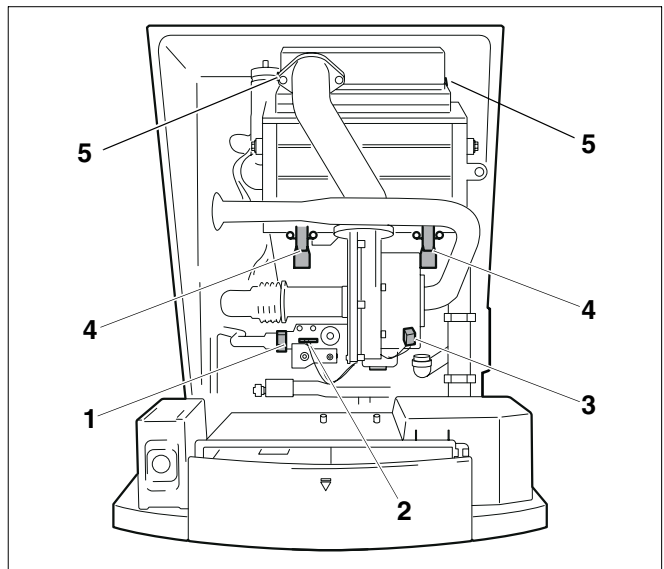


Fig. 38 Removing the connections

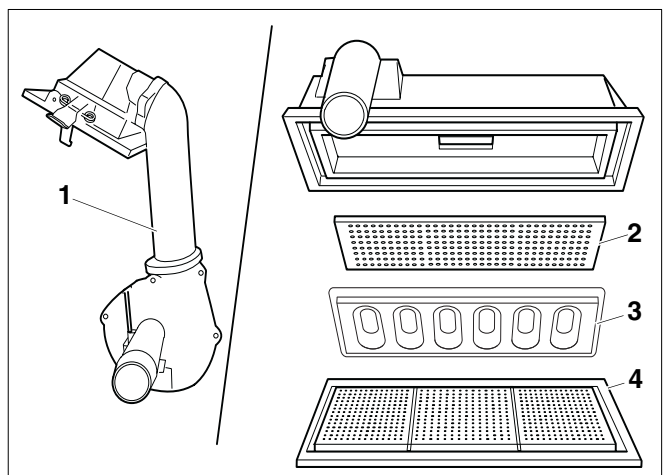


Fig. 39 Cleaning the burner cover, gas/air distributor plate, orifice plate and burner

- Remove the baffle plate and clean it using compressed air (fig. 40).

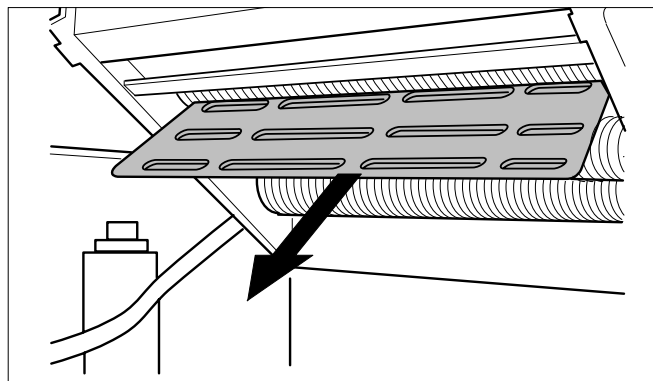


Fig. 40 Baffle plate

- Flush the heat exchanger with water.
- Re-assemble all parts in reverse order of disassembly.



NOTE

It is important to inspect and properly replace the rubber gaskets.

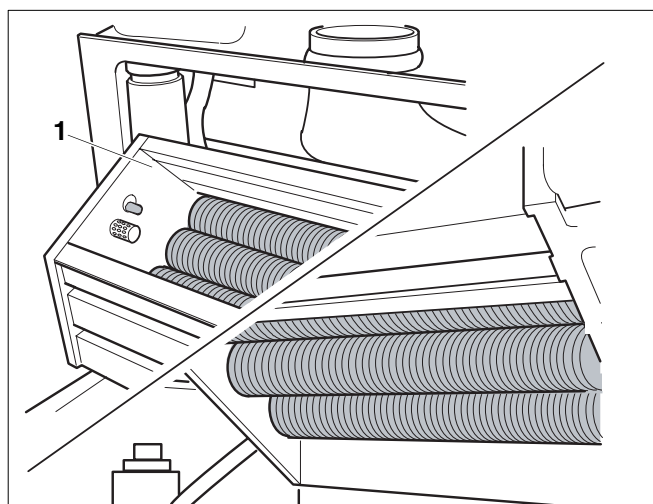



Fig. 41 Cleaning the heat exchanger

- Switch on the heating system using the main switch.
- Press the "Chimney Sweep"  button until the decimal point is displayed. Leave the appliance on for approx. 10 minutes.
- Switch off the heating system using the main switch.



- Dismantle the appliance again and flush the heat exchanger with water.
- Pull the condensate trap from the condensate plate (fig. 42, pos. 1).
- Loosen the condensate trap from the connection (fig. 42, pos. 2) and remove it.
- Flush the condensate trap.
- Fill the condensate trap with water before re-installing it.
- Loosen the retaining clips (fig. 38, pos. 5, page 46) on the condensate trap and remove the condensate trap.
- Use a bristle brush to clean the condensate trap.
- Check the condensate trap gasket for damage and replace it if necessary.
- Re-assemble all parts in reverse order of disassembly.

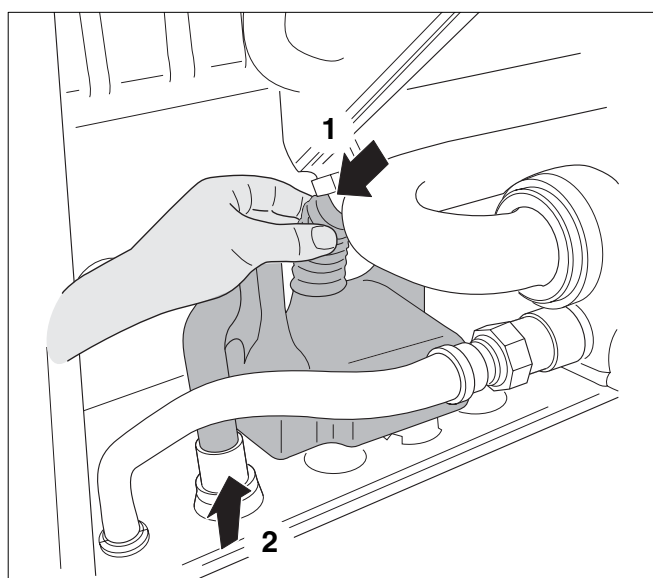


Fig. 42 Condensate trap

13.2 Checking and adjusting the gas/air-ratio

See chapter 9.8 "Checking and adjusting the gas/air ratio", page 31.

14 Servicing

14.1 Checking the UBA3 fuse; replace if necessary

- Disconnect the heating system from the power supply, remove the main fuse or switch off circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Loosen the fastening screw of the UBA3 (see fig. 43, pos. 1).
- Remove the UBA3 by pulling it forward as indicated by the arrow (see fig. 43, pos. 2).
- Dismantle the fuse holder by loosening the bayonet connector (see fig. 44, pos. 1).
- Remove the fuse from the fuse holder.
- Check the circuit continuity through the fuse using the volt-ohm-multiammeter. If broken, replace it by (a new) spare fuse 5 amps, 120 V slow blow (fig. 44, pos. 2).
- Re-assemble the UBA3 in reverse order of disassembly.
- Fit the casing.
- Connect the heating system to the power supply.
- Set the main switch on the BC10 to "1" (On).

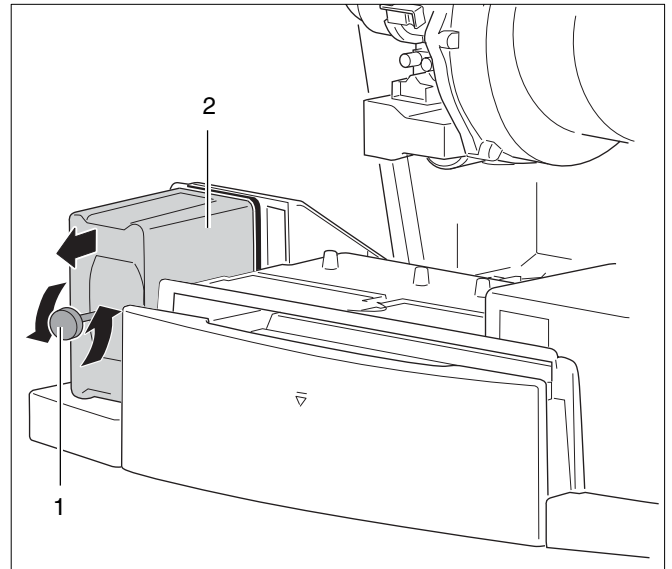


Fig. 43 Dismantling the UBA3

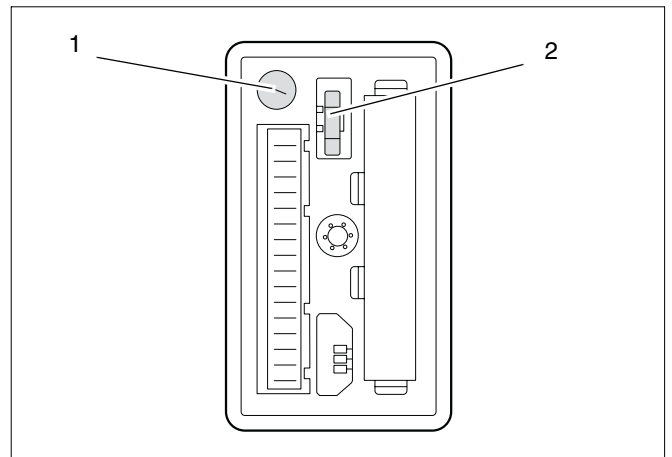


Fig. 44 Checking the fuses

14.2 External connection board fuse

- Disconnect the heating system from the power supply via the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Remove the cover from the connection box (fig. 45).

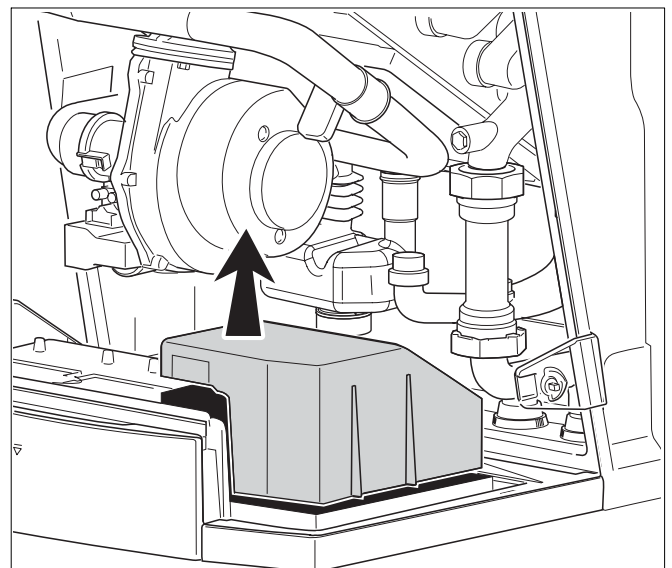


Fig. 45 Removing the cover from the connection box

- Dismantle the fuse holder (fig. 46, pos. 11)
- Remove the fuse from the fuse holder.
- Check the circuit continuity through the fuse using the volt-ohm-multiammeter. If broken, replace it by (a new) ceramic fuse 2 amps, 120 V slow blow.
- Re-install the cover on the connection box.
- Fit the casing.
- Connect the heating system to the power supply.
- Set the main switch on the BC10 to "1" (On).

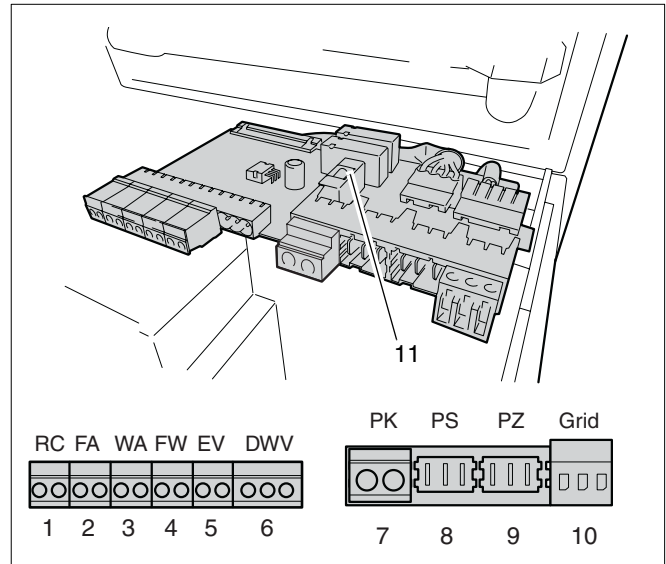


Fig. 46 External connection board

- pos. 1: RC Room thermostat (connection color orange)
- pos. 2: Outdoor-temperature sensor (connection color blue)
- pos. 3: Potential-free On/Off thermostat (connection color green)
- pos. 4: DHW temperature sensor (connection color grey)
- pos. 5: External switching contact, potential-free for floor heating safety etc. (connection color red)
- pos. 6: Connection for external 3-way valve (connection color green)
- pos. 7: Primary loop pump 120V 60Hz (connection color green)
- pos. 8: DHW tank pump 120V 60Hz (connection color grey)
- pos. 9: DHW recirculating pump 120V 60Hz (connection color lilac)
- pos. 10: main connection 120V 60Hz (connection color white)
- pos. 11: Fuse holder

14.3 Checking the fan unit; 120 VAC control



WARNING!

Avoid damage: do not push the measuring pin of the volt-ohm-multiammeter too deeply into the socket.

- Remove the casing.
- Disconnect the heating system from the power supply, remove the main fuse or switch of the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Disconnect the 120 VAC plug of the fan unit.
- Test the voltage with the volt-ohm-multiammeter; set it to VAC. Minimum value 250 VAC.
- Connect the volt-ohm-multiammeter to the outer two plug contacts (blue and brown) (see fig. 47).

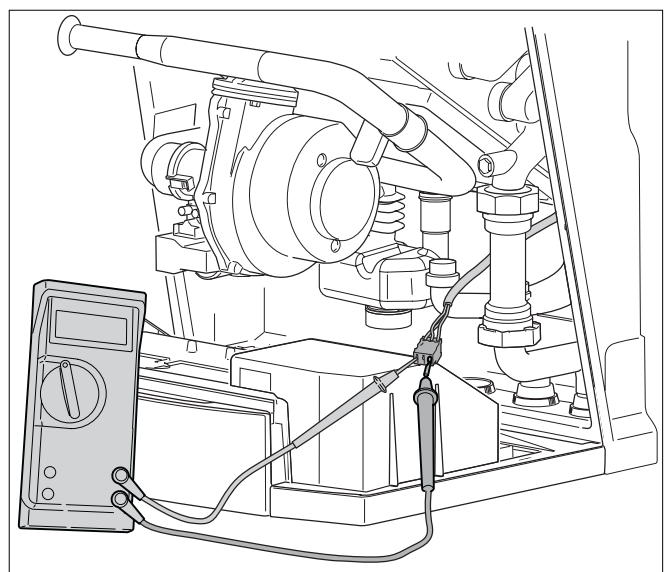


Fig. 47 Checking for 120 VAC voltage

- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).
- Start up the appliance.
- Check that while the operating code 0L is displayed, 120 VAC is available on the outer two contacts (blue and brown) of the plug (see fig. 47).
- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Reconnect the plug to the fan unit.
- Fit the casing.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

14.4 Checking the fan unit; Supply cord (120 VAC)



WARNING!

Avoid damage: do not push the measuring pin of the volt-ohm-multiammeter too deeply into the socket.

- Remove the casing.
- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Disconnect the 120 VAC plug of the fan unit.
- Loosen the fastening screw of the UBA3 (see fig. 48, pos. 1).
- Remove the UBA3 by pulling it forward as indicated by the arrow (see fig. 48, pos. 2).
- Set the volt-ohm-multiammeter to "Resistance testing".
- Test the fan unit supply cord to make sure that there is no short circuit in it and that it is not broken anywhere (see fig. 49 and fig. 25 on page 26).
- Reconnect the plug to the fan unit.
- Re-assemble the UBA3 in reverse order of disassembly.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).
- Fit the casing.

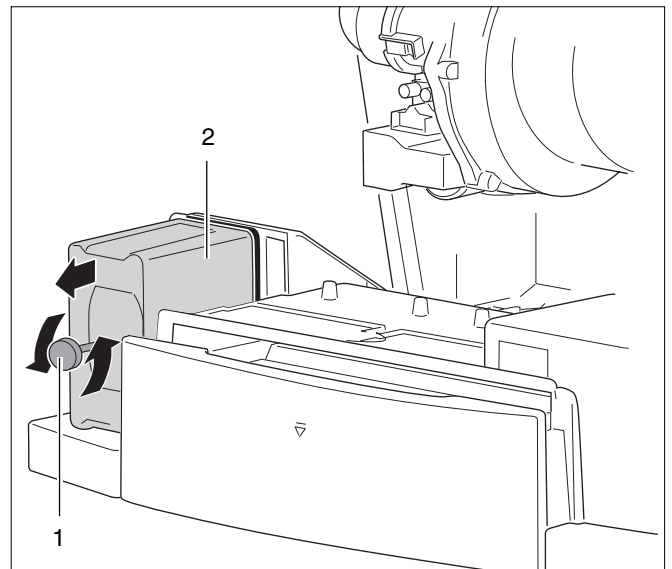


Fig. 48 Dismantling the UBA3

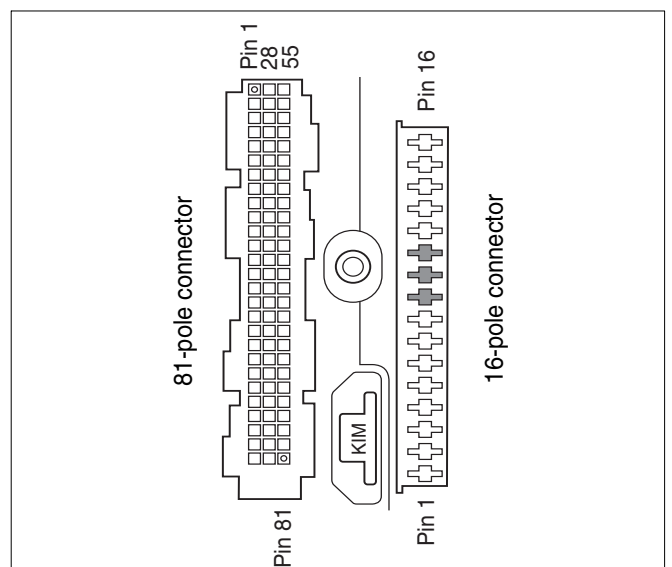


Fig. 49 UBA3 installation base

14.5 Checking the fan unit; Tacho cable



WARNING!

Avoid damage: do not push the measuring pin of the volt-ohm-multiammeter too deeply into the socket.

- Remove the casing.
- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Dismantle the tacho cable plug.
- Loosen the fastening screw of the UBA3 (see fig. 48, pos. 1).
- Remove the UBA3 by pulling it forward as indicated by the arrow (see fig. 48, pos. 2).
- Test the tacho cable to make sure that there is no short circuit in it and that it is not broken (see fig. 50).
- Assemble the tacho cable plug.
- Re-assemble the UBA3 in reverse order of disassembly.
- Fit the casing.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

14.6 Replacing the fan unit



NOTICE!

Follow the installation instructions for 120V fan units!

- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Remove both cable plugs from the fan unit (see fig. 51, pos. 1).

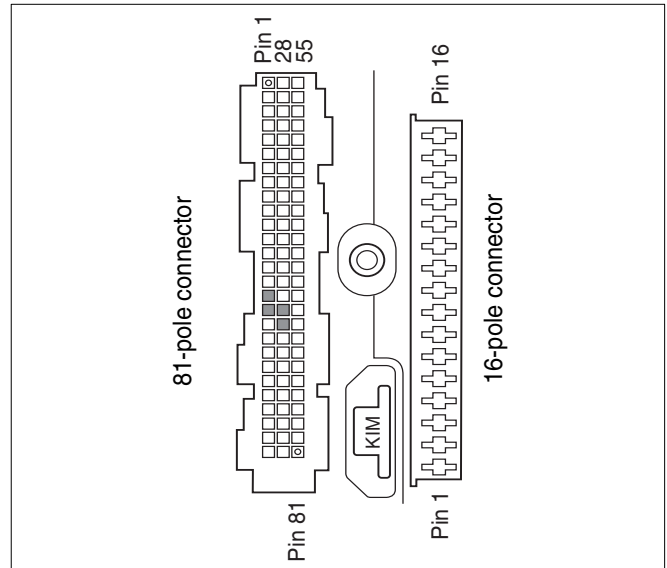


Fig. 50 UBA3 installation base

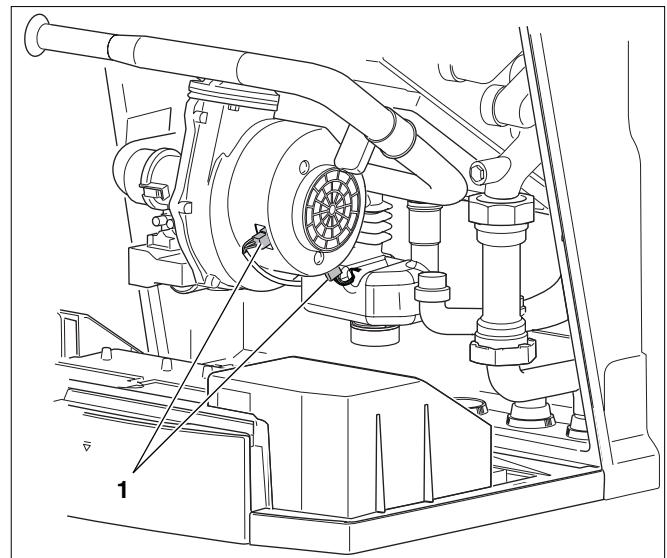


Fig. 51 Disconnect the cable plug from the fan unit

- Remove the air suction tube (see fig. 52, pos. 1).
- Remove the fan unit fastening screw (see fig. 52, pos. 2).
- Remove the fan unit by swinging it to the right (see fig. 52, pos. 3).
- Install the new fan unit.
- Install the fastening screw, air suction tube and both plugs.
- Fit the casing.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

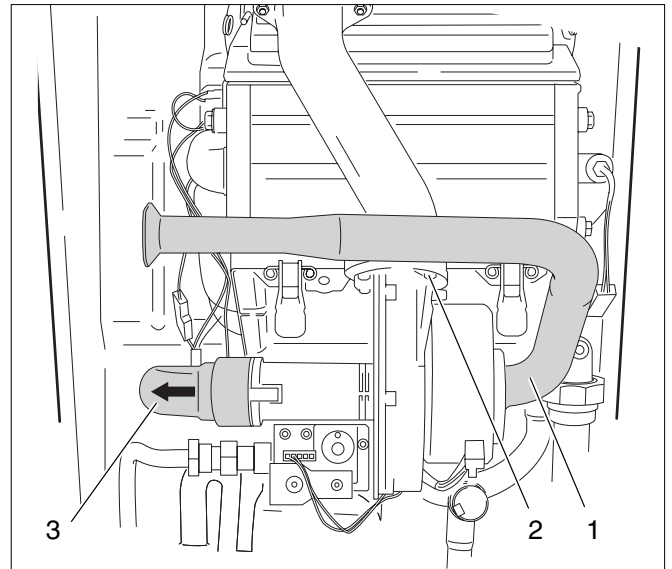


Fig. 52 Dismantling the fan unit

14.7 Checking the supply/return/safety/hot-water temperature sensors



WARNING!

Avoid damage: do not push the measuring pin of the volt-ohm-multiammeter too deeply into the socket.

- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Disconnect the plug and socket connection of the cable for the sensor concerned.
- Test the resistance of the sensor concerned.
Supply sensor see fig. 53, pos. 1.
Return sensor see fig. 53, pos. 2.
Safety sensor see fig. 54, pos. 1.
- Measure the temperature near the sensor using a seconds thermometer.
- Compare the values measured to the values in table 13 on the next page. If the values differ, the sensor is broken.
- Reconnect the plug and socket connection if the sensor is OK.
- Fit the casing.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

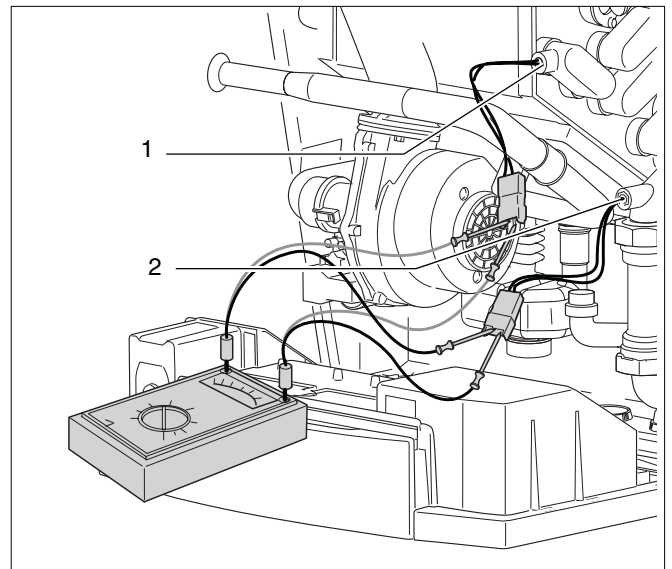


Fig. 53 Checking the supply/return sensors

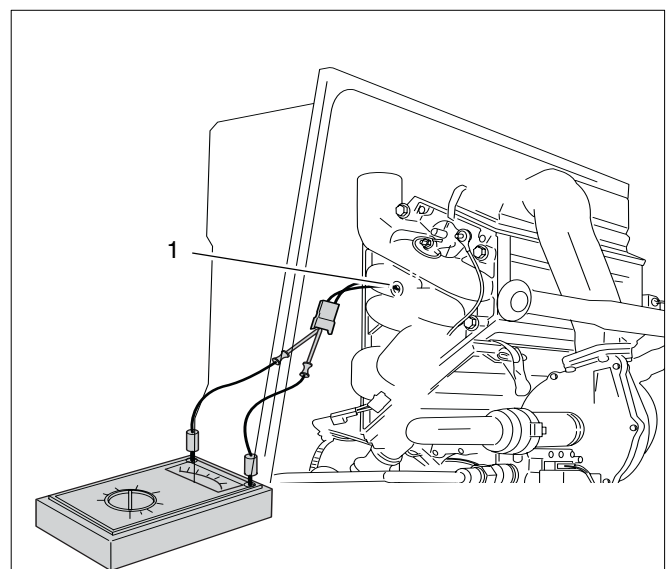


Fig. 54 Checking the safety sensor

Temperature		Resistance in Ω
$^{\circ}\text{F}$	$^{\circ}\text{C}$	
32	0	29,490
41	5	23,462
50	10	18,787
59	15	15,136
68	20	12,268
77	25	10,000
86	30	8,197
95	35	6,754
104	40	5,594
113	45	4,656
122	50	3,893
131	55	3,271
140	60	2,760
149	65	2,339
158	70	1,990
167	75	1,700
176	80	1,458
185	85	1,255
194	90	1,084
203	95	940
212	100	817

Table 13 Sensor resistance values (target values)

14.8 Replacing the supply/return/safety sensors

- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Close the maintenance shut-off valves.
- Drain the Logamax plus GB142.
- Disconnect the plug and socket connection.
- Unscrew the sensor concerned and replace it by a new one.
 Supply sensor see fig. 55, pos. 1.
 Return sensor see fig. 55, pos. 2.
 Safety sensor see fig. 56, pos. 1.
- Restore the plug and socket connection.
- Open the maintenance shut-off valves.
- Purge air from the appliance.

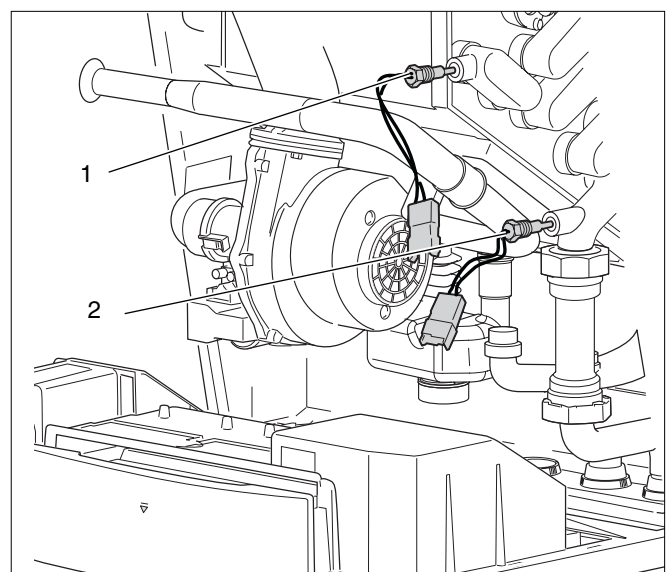


Fig. 55 Replacing the supply/return sensors



NOTICE!

Fill and purge the Logamax plus GB142 as required. See page 28.

- Fit the casing.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

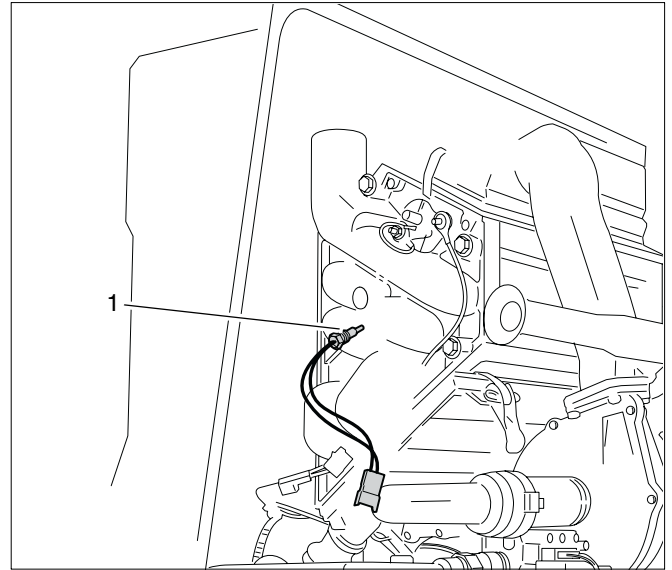



Fig. 56 Replacing the safety sensor

14.9 Checking the supply/return/safety sensors cable



WARNING!

Avoid damage: do not push the measuring pin of the volt-ohm-multiammeter too deeply into the socket.

- Check all plug and socket connections of the sensors and the UBA3.
A plug that has not been inserted correctly may be the cause for a fault message.
Then start the appliance by pressing "Reset" .
- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Loosen the fastening screw of the UBA3 (see fig. 57, pos. 1).
- Remove the UBA3 by pulling it forward as indicated by the arrow (see fig. 57, pos. 2).
- Disconnect the plug and socket connection of the cable for the sensor.

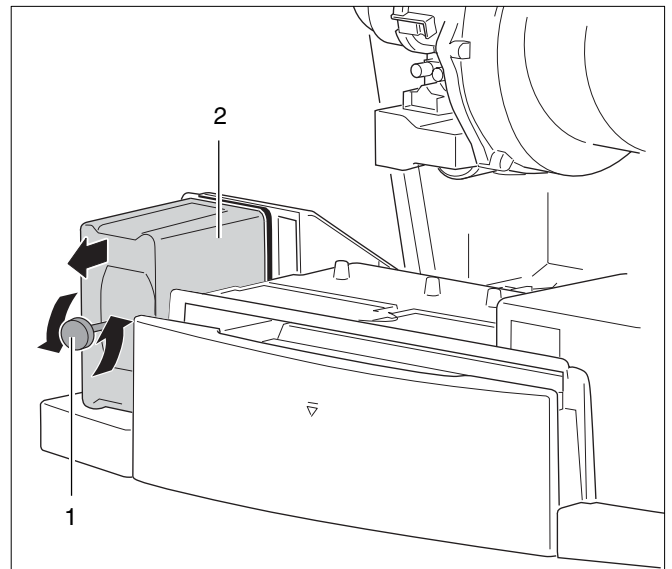


Fig. 57 Dismantling the UBA3

- Check the cable between the plug and socket connection and the 81-pole plug in the UBA3 installation base (see fig. 58) using a circuit continuity testing device.
See the electric circuit diagram, fig. 25 on page 26.
- Test this in a straight line twice and test it diagonally twice.
- Restore the plug and socket connection if the cables are OK.
- Install the UBA3.
- Fit the casing.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

14.10 Checking the hot surface ignitor; Control

- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Disconnect the plug and socket connection of the hot surface ignitor.
- Set the measuring device to 120 VAC.
- Connect the measuring device to the plug on the cable harness.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).
- Start up the appliance.
- Test that during the ignition phase, while the operating code 0L is being displayed, 120 VAC is measured.
- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the measuring device.
- Assemble the plug and socket connection of the hot surface ignitor.
- Fit the casing.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

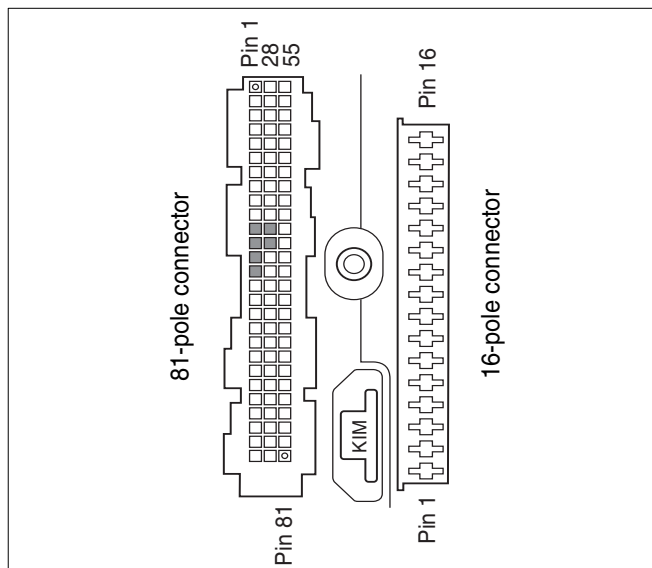


Fig. 58 UBA3 installation base

14.11 Checking the hot surface ignitor; resistance

- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Disconnect the plug and socket connection of the cable of the hot surface ignitor.
- Test the resistance of the hot surface ignitor on the plug. A resistance value between 50 – 300 Ω means that the hot surface ignitor is OK (see fig. 59).
- Remove the measuring device.
- Reconnect the cable plug if the hot surface ignitor is OK.
- Fit the casing.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

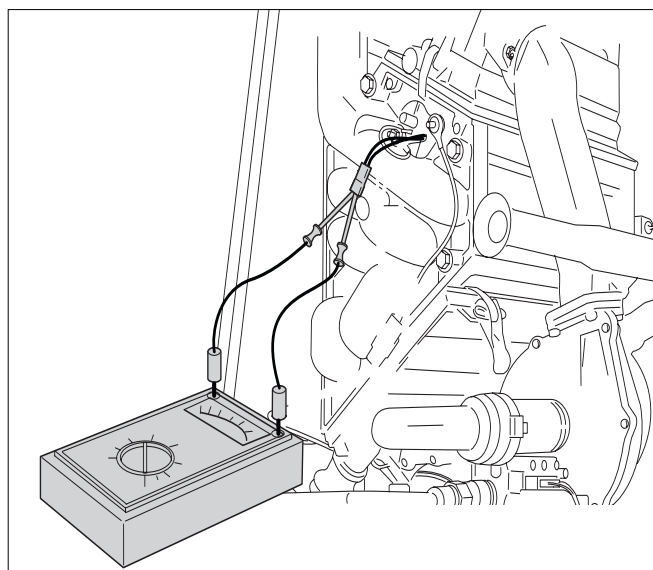


Fig. 59 Checking the hot surface ignitor

14.12 Checking the hot surface ignitor; Supply cord



WARNING!

Avoid damage: do not push the measuring pin of the volt-ohm-multiammeter too deeply into the socket.

- Remove the casing.
- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Pull the plug of the hot surface ignitor.
- Loosen the fastening screw of the UBA3 (see fig. 60, pos. 1).
- Remove the UBA3 by pulling it forward as indicated by the arrow (see fig. 60, pos. 2).
- Set the volt-ohm-multiammeter to "Resistance testing".

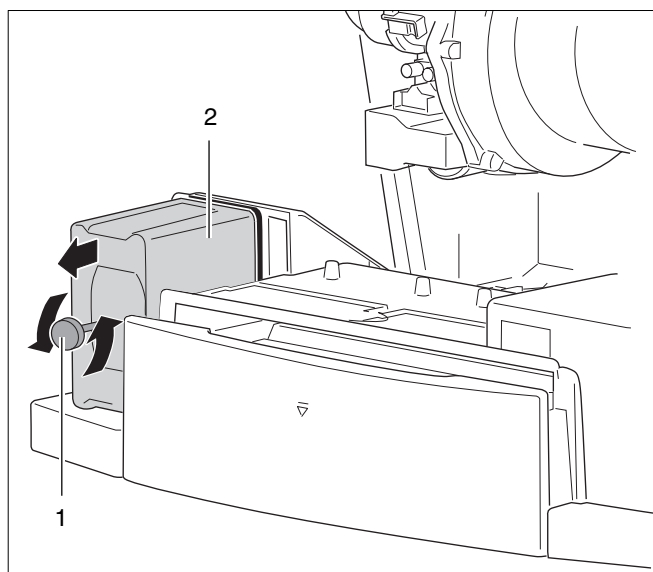


Fig. 60 Dismantling the UBA3

- Test the supply cord of the hot surface ignitor to make sure that there is no short circuit in it and that it is not broken (fig. 62, fig. 61 and fig. 25 on page 26).

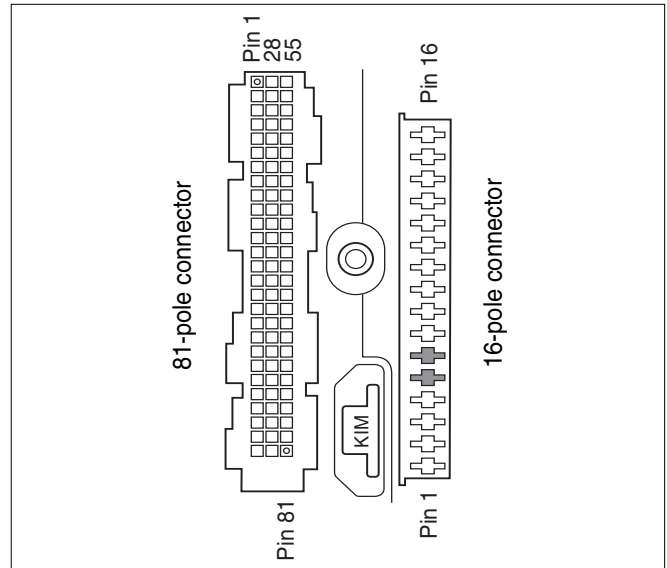


Fig. 61 UBA3 installation base

- Fit the plug to the hot surface ignitor.
- Re-assemble the UBA3 in reverse order of disassembly.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).
- Fit the casing.

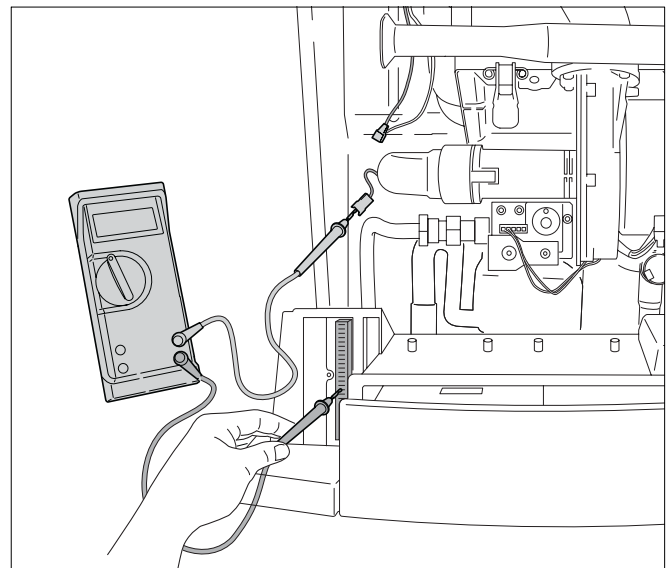


Fig. 62 Testing the supply cord of the hot surface ignitor

14.13 Replacing the hot surface ignitor

- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Disconnect the plug and socket connection of the cable of the hot surface ignitor.
- Loosen the fastening screws (fig. 63, pos. 1).
- Remove the earth cable (fig. 63, pos. 2).
- Remove the mounting plate (fig. 63, pos. 3).
- Remove the hot surface ignitor (fig. 63, pos. 4).
- Install the new hot surface ignitor with a new gasket and attach the mounting plate with fastening screws (see fig. 63, pos. 1).
- Restore the plug and socket connection of the hot surface ignitor.

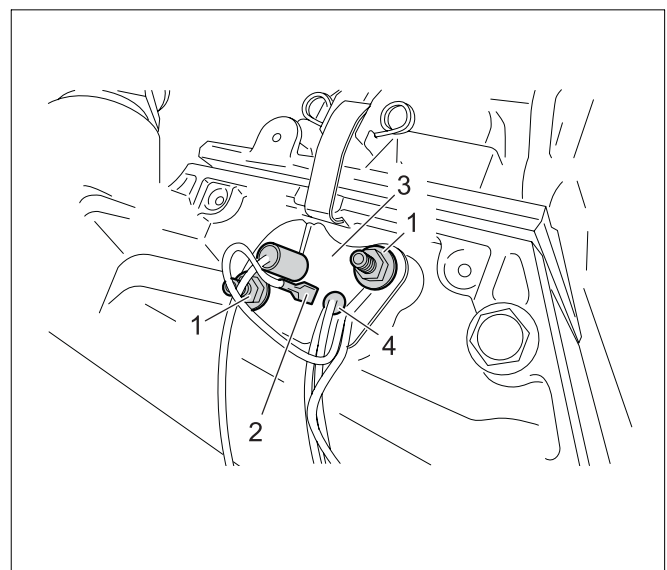


Fig. 63 Replacing the hot surface ignitor

- Fit the casing.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

14.14 Testing the ionization current



WARNING!

Avoid damage: do not push the measuring pin of the volt-ohm-multiammeter too deeply into the socket.

- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Disconnect the plug and socket connection of the monitoring cable.
- Connect the measuring device in series (see fig. 64).
- Set the multi-meter to DC μ A.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).
- Start up the appliance in accordance with the "Service Mode" menu.
- Test the ionization current at partial load. The appliance is in part-load operation as soon as, in the "Service Mode" menu, **L30** is selected. The ionization current must be > 1.4 DC μ A.
- Remove the measuring device.
- Reconnect the plug and socket connection of the monitoring cable if the ionization current is OK.
- Fit the casing.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

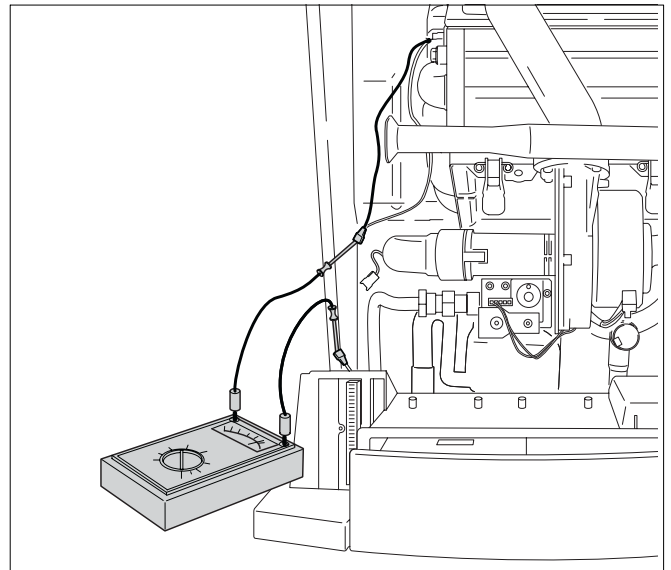


Fig. 64 Testing the ionization current

14.15 Checking the ionization electrode; cable

- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Dismantle the plug and socket connection of the ionization electrode.
- Loosen the fastening screw of the UBA3 (see fig. 65, pos. 1).
- Remove the UBA3 by pulling it forward as indicated by the arrow (see fig. 65, pos. 2).

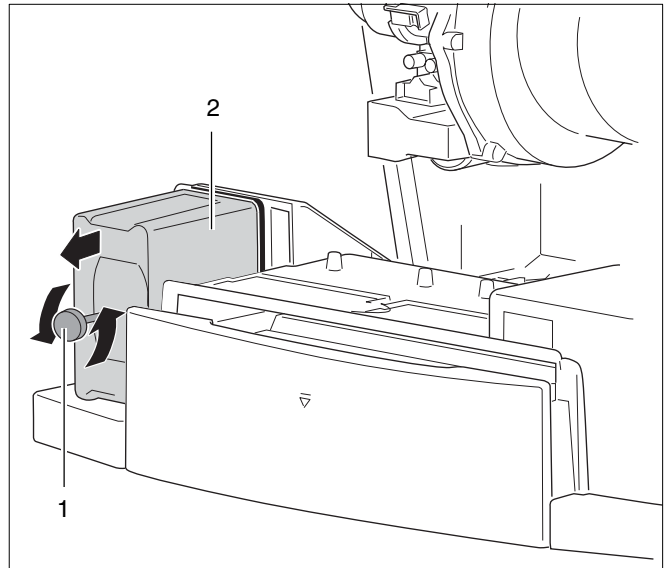


Fig. 65 Dismantling the UBA3

- Test the ionization cable between the plug and socket connection and the UBA3 installation base to make sure that it has no short circuit to earth (see fig. 66 and fig. 25 on page 26) and that it is not broken anywhere (see fig. 67).
- Assemble the plug and socket connection of the ionization electrode.
- Re-assemble the UBA3 in reverse order of disassembly.
- Fit the casing.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

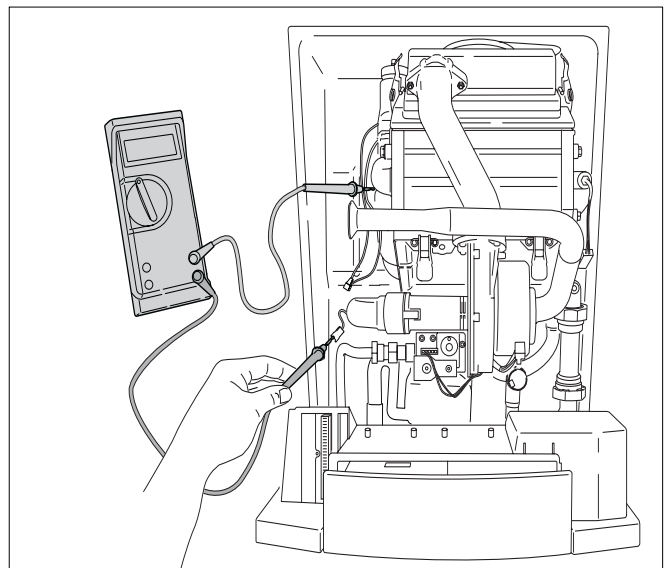


Fig. 66 Testing the earth connection circuit of the ionization electrode (1)

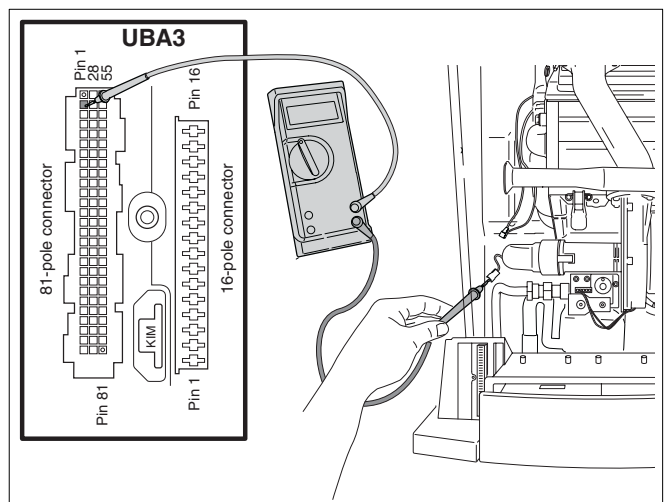


Fig. 67 Testing the earth connection circuit of the ionization electrode (2)

14.16 Checking the ionization electrode; replace if necessary

- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Disconnect the plug and socket connection of the cable.
- Set the volt-ohm-multiammeter to "Resistance testing".
- Test the earth connection circuit of the ionization electrode (see fig. 66). The height of the resistance value must be infinite.
- Loosen the fastening screws (see fig. 68, pos. 1).
- Remove the earth cable (see fig. 68, pos. 2).
- Remove the mounting plate (see fig. 68, pos. 3).
- Dismantle the ionization electrode (see fig. 68, pos. 4).
- Set the volt-ohm-multiammeter to "Resistance measurement".
- Test the resistance of the ionization electrode (see fig. 69). The resistance must be 0 Ω.
- Do a visual check of the ionization electrode.
- Check the ionization electrode for contamination, wear or damage (see fig. 70).
- Replace the ionization electrode if required.
- Install a new ionization electrode with a new gasket and secure the mounting plate with the fastening screws.
- Fit the earth cable (see fig. 68, pos. 2).
- Restore the plug and socket connection.
- Fit the casing.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

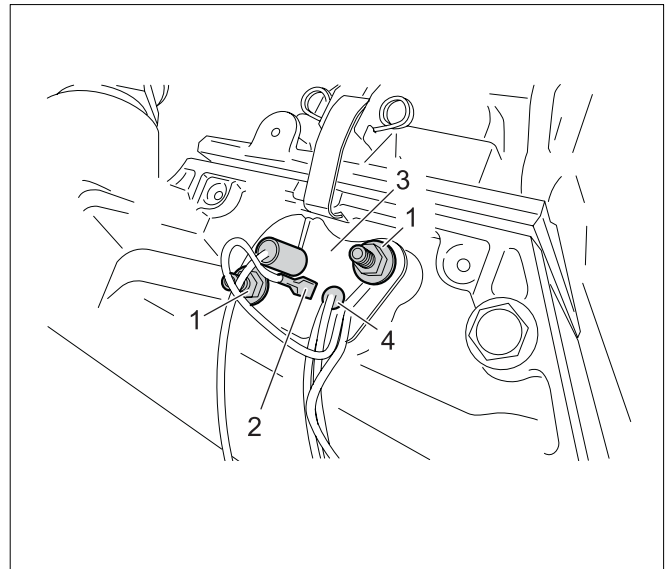


Fig. 68 Replacing the ionization electrode

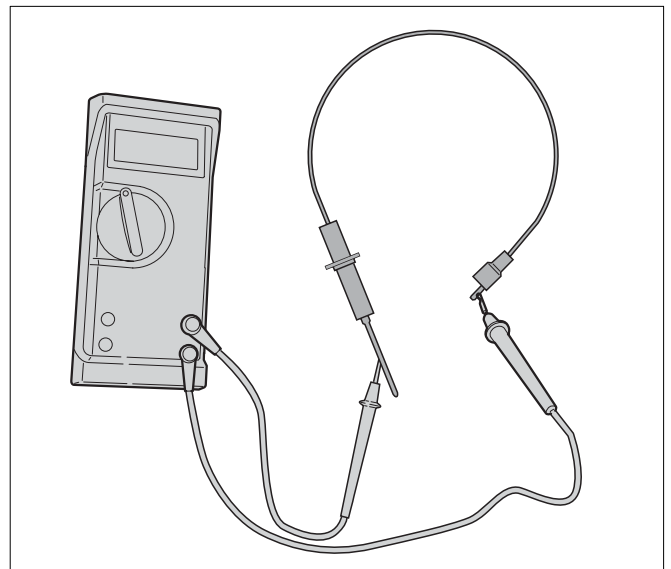


Fig. 69 Testing the resistance of the ionization electrode

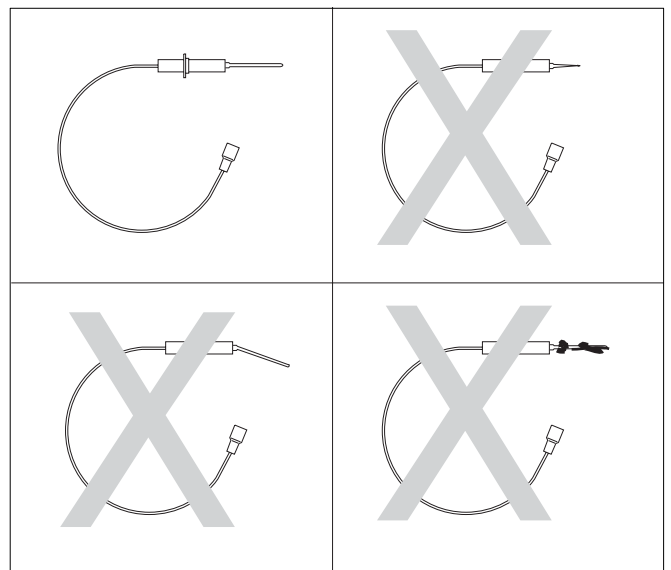


Fig. 70 Checking the ionization electrode

14.17 Checking the gas control valve; cable connections

- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Check that the plug of the gas control valve has been installed correctly (see fig. 71, pos. 1).
- Fit the casing.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

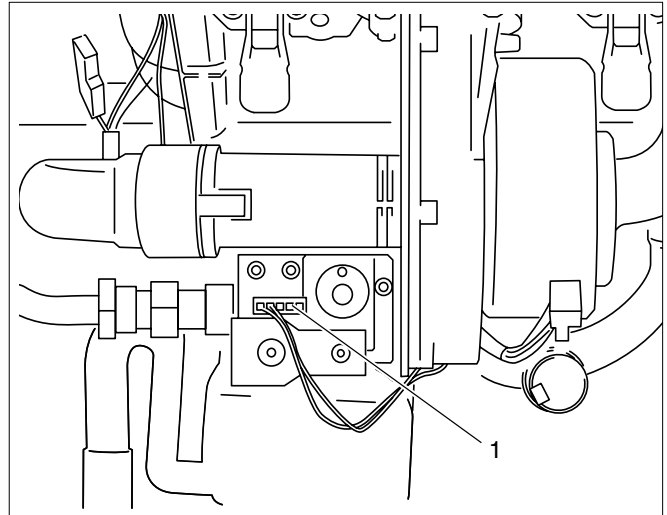


Fig. 71 Checking the cable connections to the gas control valve (e.g. HONEYWELL gas control valve)

14.18 Checking the gas control valve; Control



WARNING!

Avoid damage: do not push the measuring pin of the volt-ohm-multiammeter too deeply into the socket.

- Remove the casing.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).
- Start up the appliance.
- Use a volt-ohm-multiammeter to check that, while operating code $\square L$ is displayed, there is a voltage on the plug of the gas control valve. The test must indicate a voltage of 20 – 24 VDC both when testing on the central and left contacts and when testing on the central and right contacts (see fig. 72).
- $\square L$ = Gas valve energized.
- Fit the casing.

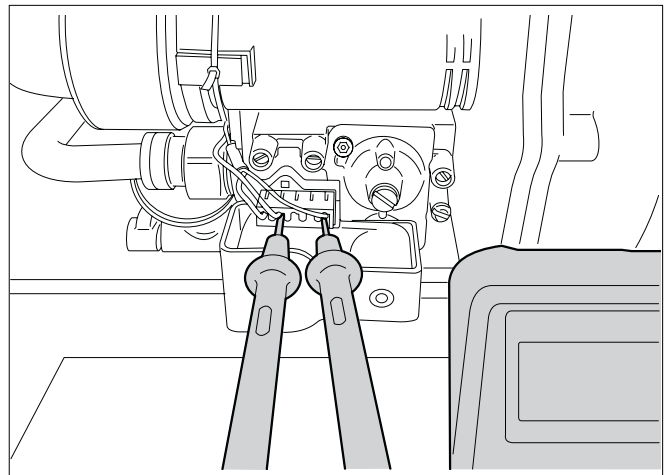


Fig. 72 Voltage testing on the gas control valve

14.19 Checking the gas control valve; Cable connection between gas control valve and UBA3 installation base



WARNING!

Avoid damage: do not push the measuring pin of the volt-ohm-multiammeter too deeply into the socket.

- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.

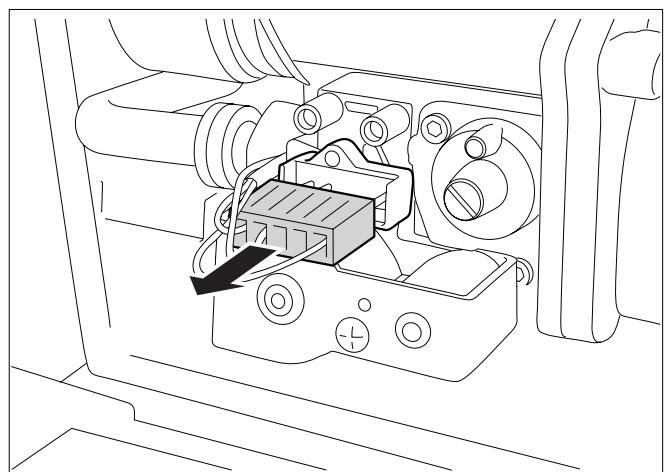


Fig. 73 Removing the gas control valve plug

- Remove the plug of the gas control valve (see fig. 73).
- Loosen the fastening screw of the UBA3 (see fig. 74, pos. 1).
- Pull the UBA3 forward in the direction indicated by the arrow (see fig. 74, pos. 2).

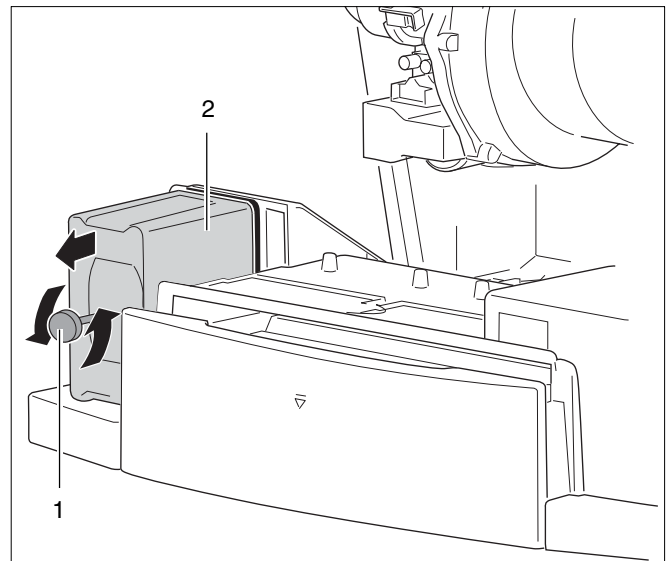


Fig. 74 Dismantling the UBA3

- Test the resistance of the cable between the plug of the gas control valve and the UBA3 installation base (see fig. 75, fig. 76 and circuit diagram, fig. 25 on page 26).
- Reconnect the plug to the gas control valve (see fig. 73).
- Re-install the UBA3 (see fig. 74).
- Fit the casing.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

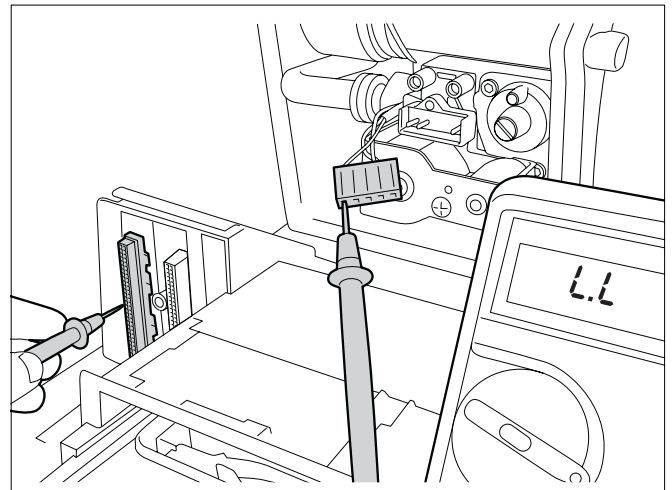


Fig. 75 Testing the cable between the gas control valve and the UBA3 installation base

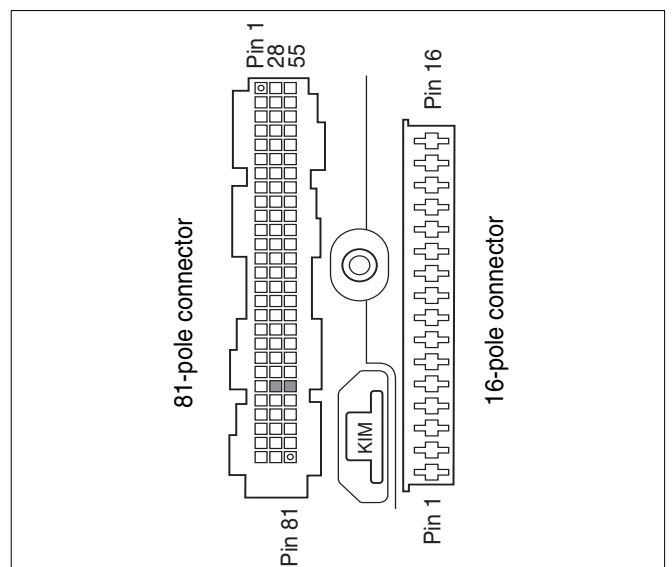


Fig. 76 UBA3 installation base

14.20 Ohming out the gas control valve

- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
 - Set the main switch on the BC10 to "0" (Off).
 - Remove the casing.
 - Remove the plug of the gas control valve (see fig. 77).
 - Set the volt-ohm-multimeter to "Resistance testing". Use a scale of 200 Ω or greater.
-
- Test the resistance of both coils of the gas control valve using the volt-ohm-multimeter. The resistance measured between the left and central contacts (see fig. 78) must be approx. 75 Ω and between the right and central contacts (see fig. 79) this must be approx. 185 Ω (+/- 10 Ω). If this is not the case, the gas control valve will probably be defective. It must then be replaced.
 - Attach the plug to the gas control valve.
 - Fit the casing.
 - Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
 - Set the main switch on the BC10 to "1" (On).

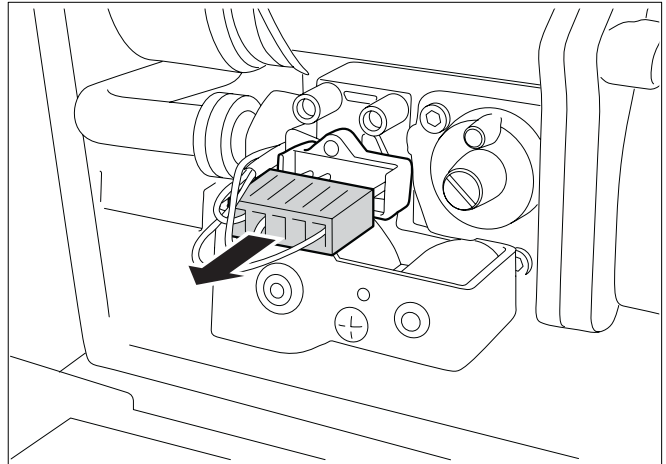


Fig. 77 Removing the gas control valve plug

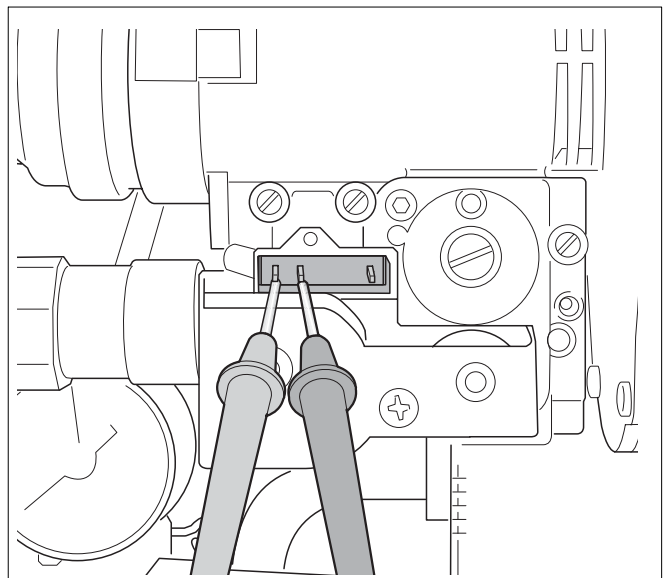


Fig. 78 Testing the resistance on the gas burner ass'y (1)

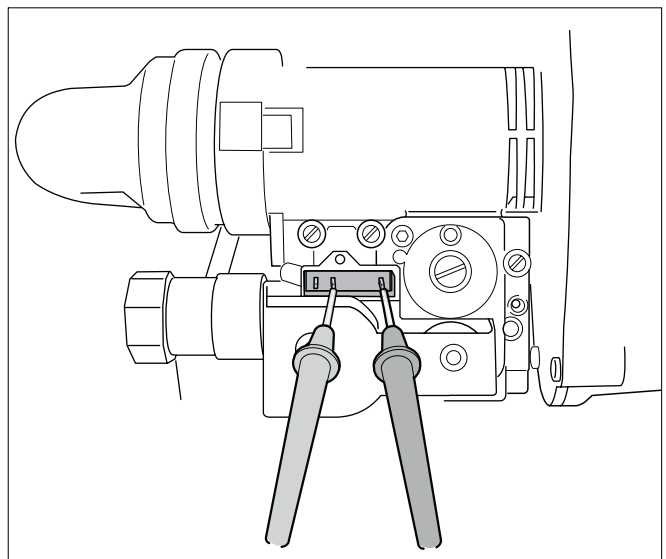


Fig. 79 Testing the resistance on the gas burner ass'y (2)

14.21 Replacing the gas control valve



DANGER

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

- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Close the gas shut-off valve (see fig. 80, pos. 1).

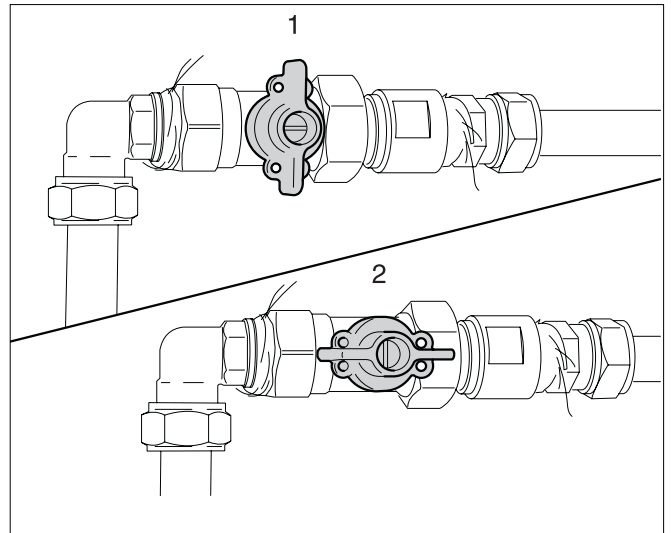


Fig. 80 Gas shut-off valve closed (1), gas shut-off valve open (2)

- Remove the cable plug from the gas control valve (see fig. 81, pos. 1).

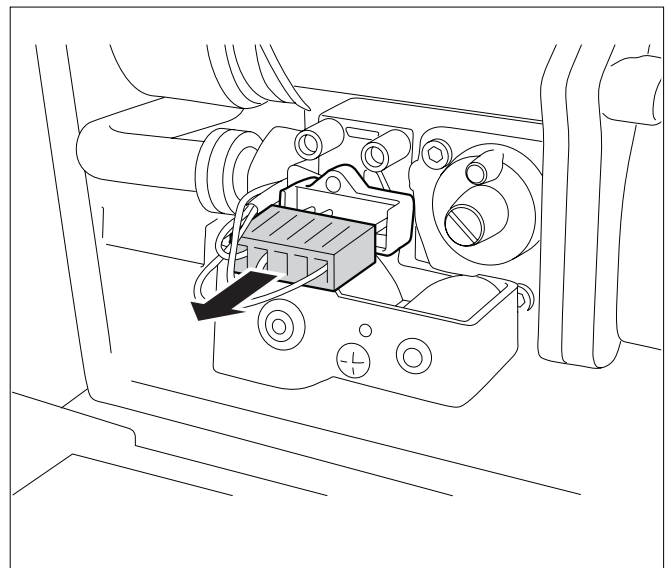


Fig. 81 Removing the gas control valve plug

- Remove both cable plugs from the fan unit (see fig. 82, pos. 1).

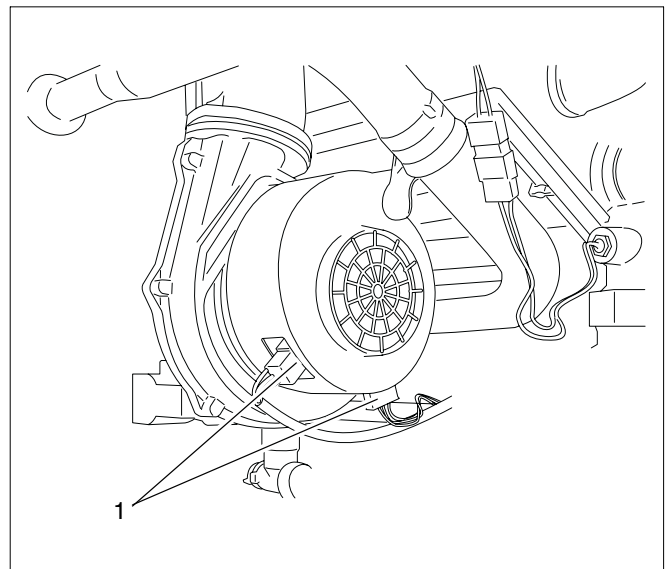


Fig. 82 Disconnect the cable plug from the fan unit

- Loosen the union nut of the gas control valve (see fig. 83, pos. 1).

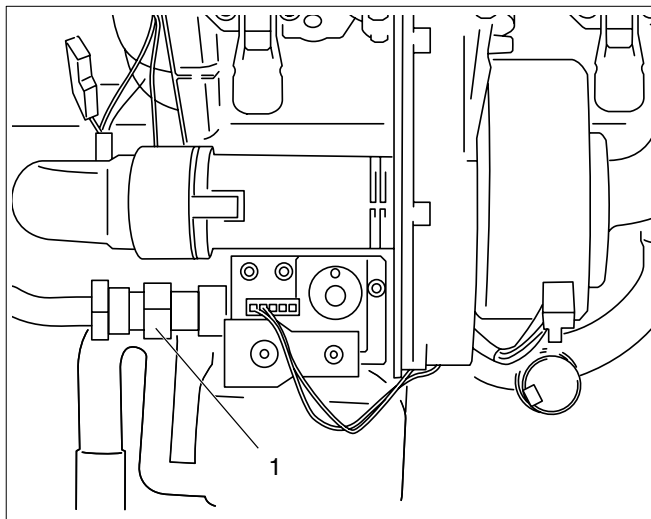


Fig. 83 Loosening the union nut

- Pull both retaining clips (see fig. 84, pos. 1) on the burner cover to open them and remove the burner cover with the fan unit and the gas control valve.

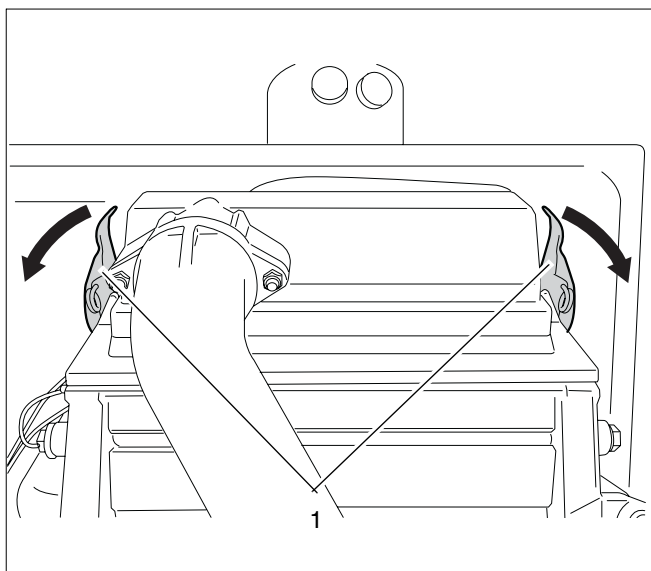


Fig. 84 Loosening the retaining clips

- Loosen three screws on the gas control valve (see fig. 85, pos. 1).

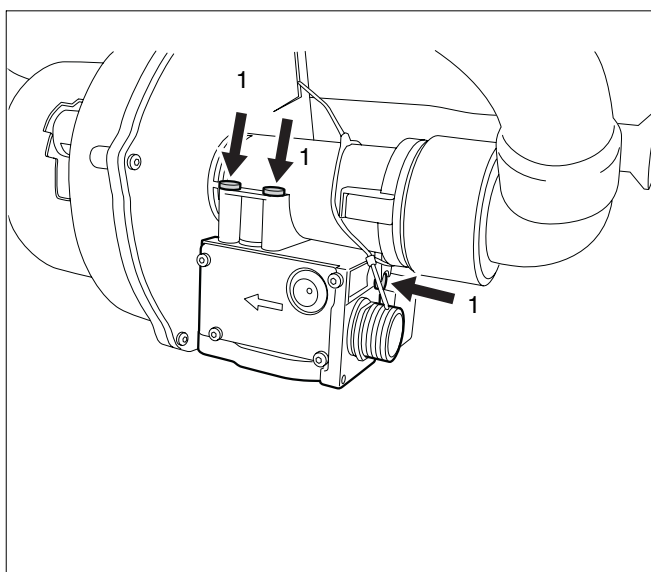


Fig. 85 Loosening the screws

- Remove the gas control valve (see fig. 86).

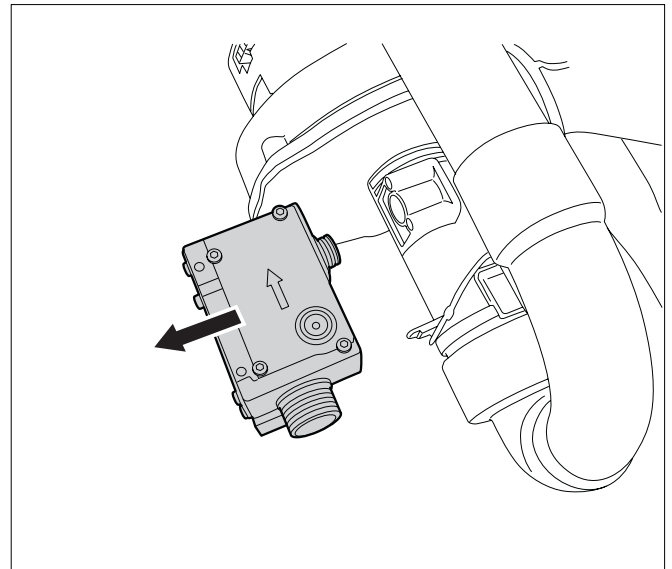


Fig. 86 Dismantling the gas control valve

- Remove the gas orifice from the gas control valve (see fig. 87, pos. 1).
- Install the gas orifice in the new gas control valve.
- Mount the new gas control valve on the fan unit.
- Assemble the burner cover with the fan unit and the gas control valve.
- Close both retaining clips.
- Tighten the union nut of the gas pipe on the gas control valve. Make sure that you have inserted the gasket!
- Connect both cable plugs to the fan unit.
- Connect the cable plug to the gas control valve.

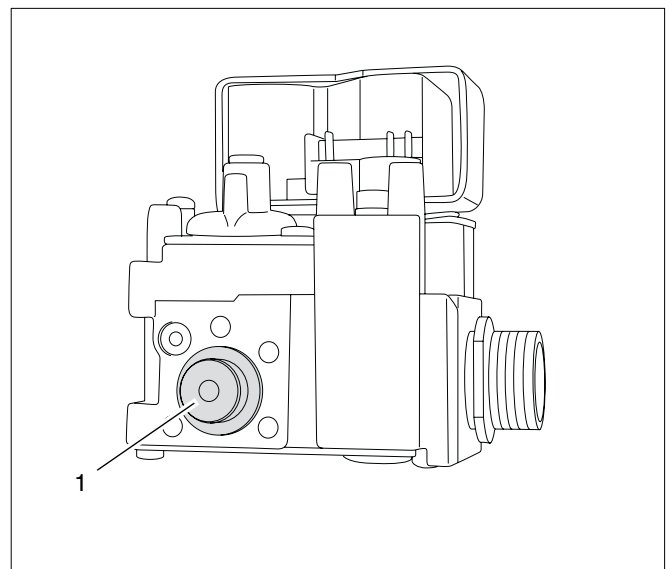


Fig. 87 Dismantling the gas orifice

- Open the gas shut-off valve (see fig. 88, pos. 2).
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).



NOTICE!

Carry out all start-up activities according to the Installation and Servicing Instructions and complete the start-up report.

You must also check all gaskets and seals affected by the replacement activities during the tightness test carried out in operating conditions!

- Fit the casing.

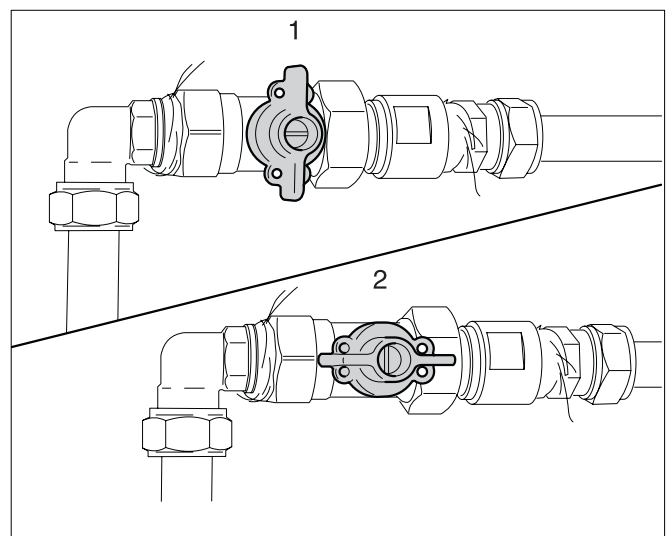


Fig. 88 Gas shut-off valve closed (1), gas shut-off valve open (2)

14.22 Checking the control unit; connections to the appliance

If an On/Off thermostat is used and the appliance does not react to a heat request:

- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Remove the cover from the connection box (see fig. 89).
- Use a jumper wire to create a bridging circuit between the two "WA" contacts (see fig. 92, pos. 3).
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).
- If the appliance switches to heating mode (operating code -H) after some time, the cause of the fault must be outside the appliance.
- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the bridge between the two "WA" contacts (see fig. 92, pos. 3).
- Connect the On/Off thermostat directly to the two "WA" contacts of the appliance using a short cable (see fig. 92, pos. 3).
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).
- Set the On/Off thermostat to the request position.
- If the appliance switches to heating operation (operating code -H) after some time, the fault is caused by the cable between the On/Off thermostat and the appliance.
- If the appliance does not switch to heating mode after some time, the fault is caused by the On/Off thermostat.
- Correct the cause of the fault.
- Fit the cover on the connection box (see fig. 90).
- Fit the casing.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

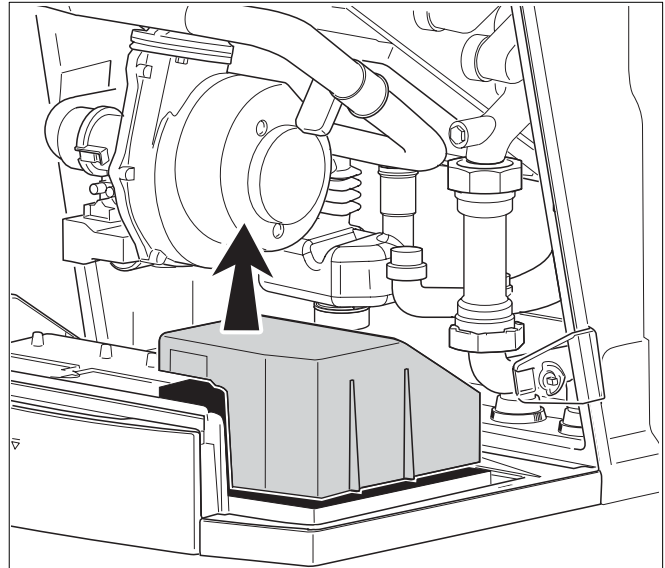


Fig. 89 Removing the cover from the connection box

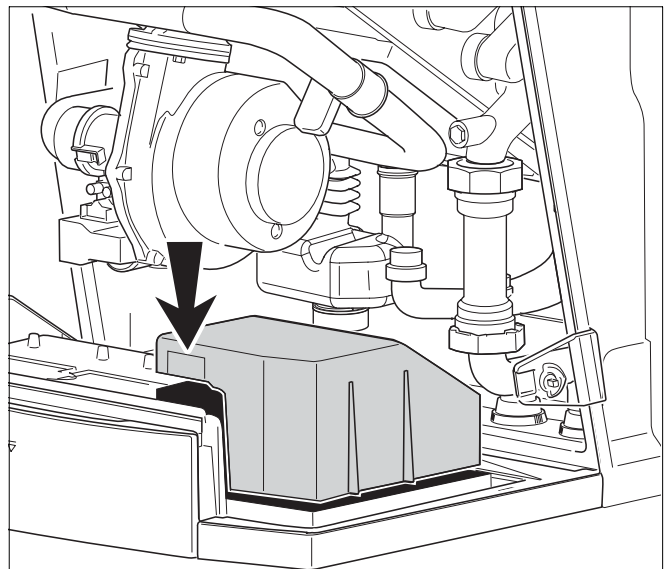


Fig. 90 Installing the cover of the connection box

If a modulating control unit is used and the appliance does not react to a heat request:

- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Remove the cover from the connection box (see fig. 91).

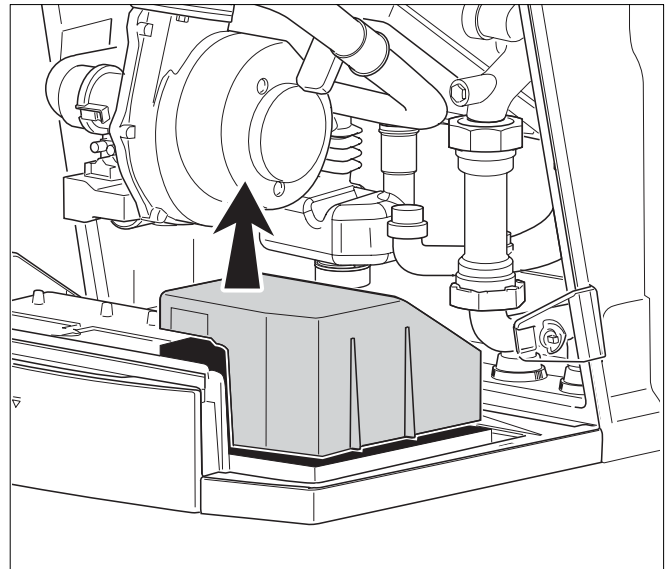


Fig. 91 Removing the cover from the connection box

- Connect the modulating control directly to the two "RCxx" contacts of the appliance using a short cable (see fig. 92, pos. 1).
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).
- Set the modulating control to the request position.
- If the appliance switches to heating mode (operating code $\boxed{-H}$) after some time, the fault is caused by the cable between the modulating control and the appliance.
- If the appliance does not switch to heating mode after some time, the fault is caused by the modulating control.
- Correct the cause of the fault.

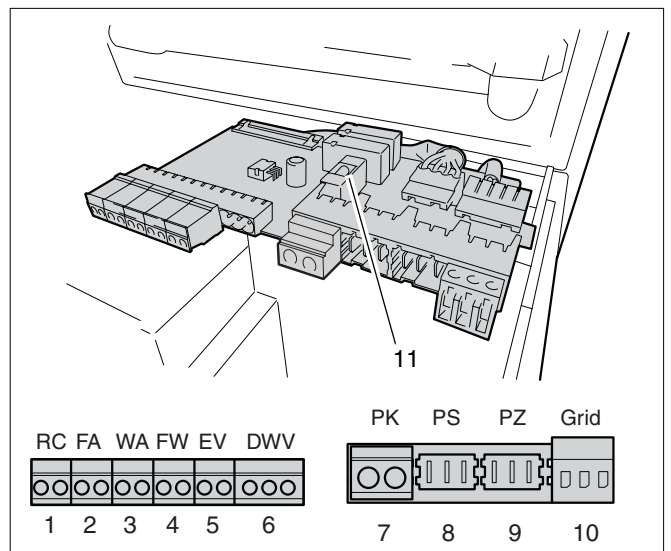


Fig. 92 External connection board

- pos. 1: RC Room thermostat (connection color orange)
- pos. 2: Outdoor-temperature sensor (connection color blue)
- pos. 3: Potential-free On/Off thermostat (connection color green)
- pos. 4: DHW temperature sensor (connection color grey)
- pos. 5: External switching contact, potential-free for floor heating safety etc. (connection color red)
- pos. 6: Connection for external 3-way valve (connection color green)
- pos. 7: Primary loop pump 120V 60Hz (connection color green)
- pos. 8: DHW tank pump 120V 60Hz (connection color grey)
- pos. 9: DHW recirculating pump 120V 60Hz (connection color lilac)
- pos. 10: main connection 120V 60Hz (connection color white)
- pos. 11: Fuse holder

- Fit the cover on the external connection box (see fig. 93).
- Fit the casing.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

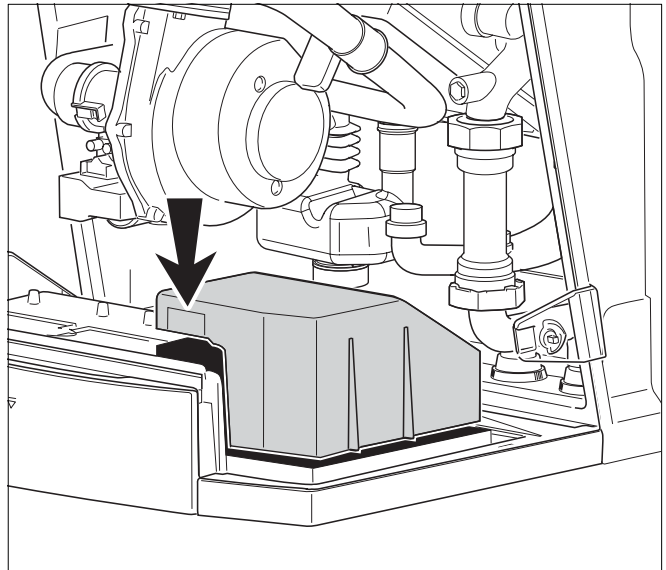


Fig. 93 Installing the cover of the connection box

14.23 Transformer; checking and if necessary replacing

- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Dismantle the cover of the external connection board (see fig. 94).

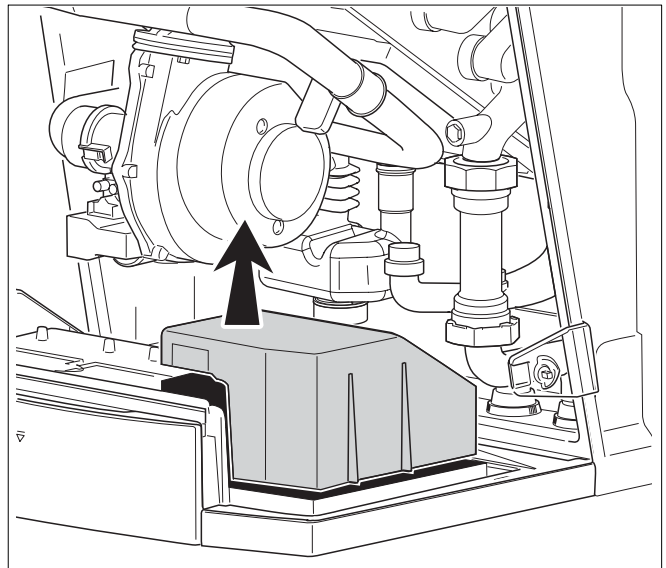


Fig. 94 Dismantling the cover of the external connection board

- Pull the 4 plugs from the external connection board (see fig. 95, pos. 1, 2, 3 and 4).

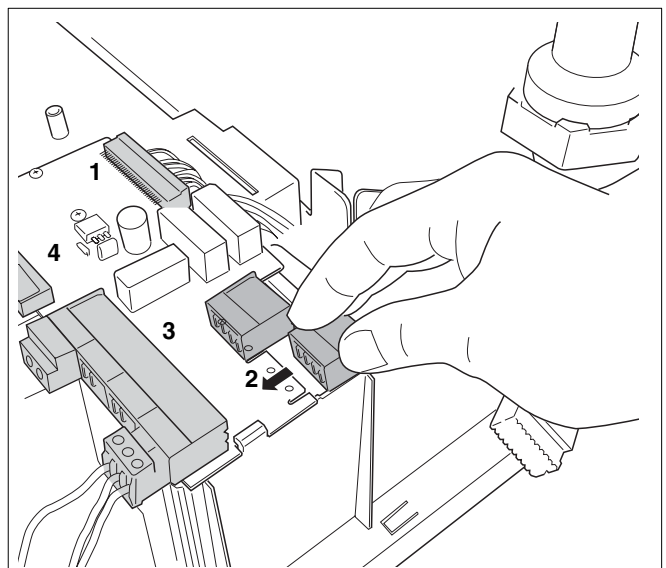


Fig. 95 Pulling the external connection board plug

- Loosen the 2 external connection board fastening screws (see fig. 96, pos. 1).

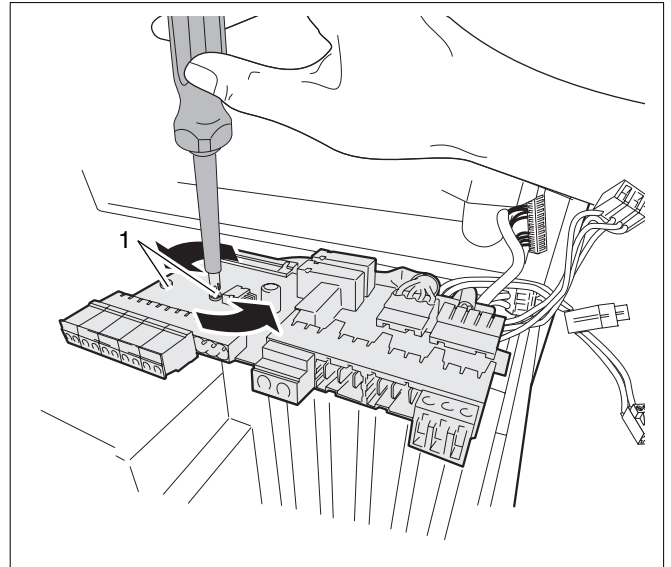


Fig. 96 Loosening the fastening screws

- Remove the external connection board (see fig. 97).

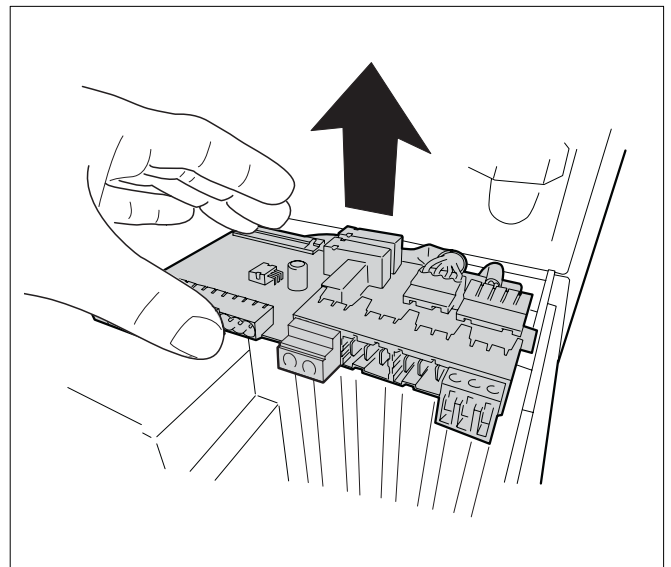


Fig. 97 Removing the external connection board

- Remove the transformer shield (see fig. 98).

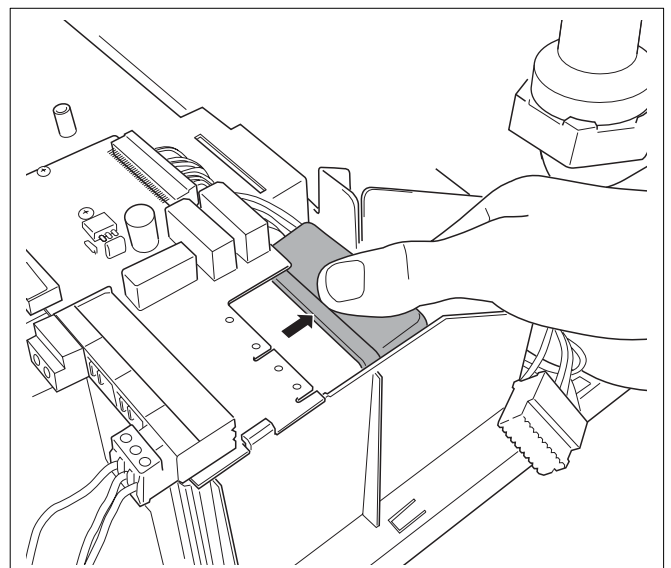


Fig. 98 Removing the transformer shield

- Pull both plugs on the rear of the transformer (see fig. 99).
- Check to see if you measure any resistance on the two cable plugs. If you do then the transformer is not the problem. If you don't measure any resistance then replace the transformer as described in the following steps.

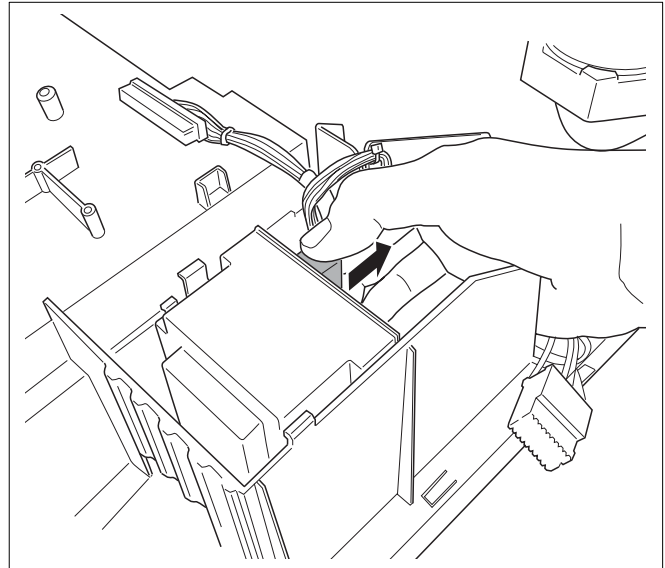


Fig. 99 Pulling the plugs from the transformer

- Remove the transformer by pulling it in the direction indicated by the arrow (see fig. 100).
- Install the new transformer.
- Re-assemble all parts and plugs in reverse order of disassembly.
- Fit the casing.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

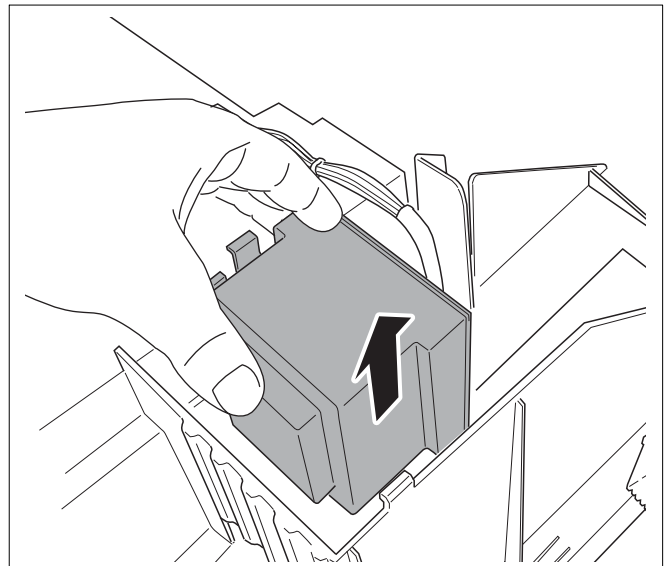


Fig. 100 Removing the transformer

14.24 Automatic air purging system; replacing

- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Close the maintenance shut-off valves and drain the Logamax plus GB142.
- Remove the plastic cover from the top of the appliance (see fig. 101).

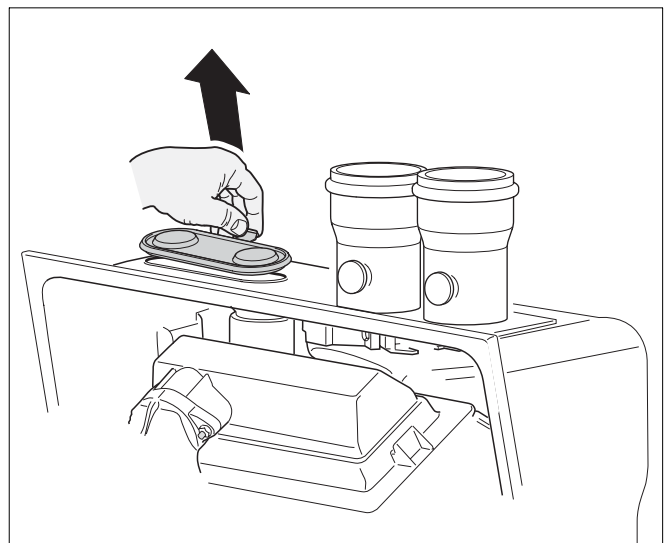


Fig. 101 Removing the plastic cover of the automatic air purging system

- Remove the float cap (see fig. 102).

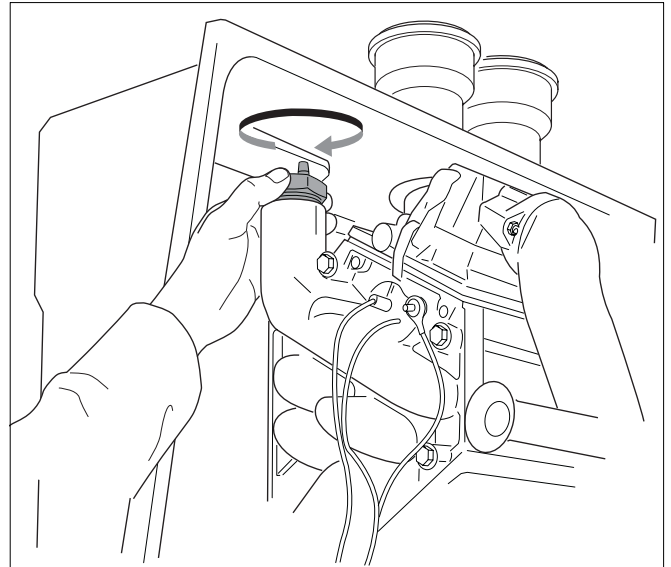


Fig. 102 Removing the float cap

- Dismantle the valve case by pulling it upwards through the opening in the housing (see fig. 103).
- Assemble the new valve case and all other parts in reverse order of disassembly.

NOTICE!

Fill and purge the Logamax plus GB142 as required. See page 28.

- Fit the casing.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

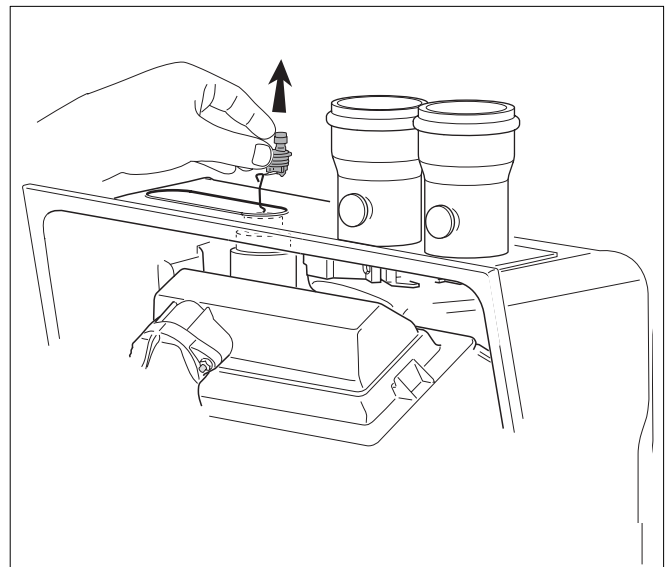


Fig. 103 Dismantling the valve case for the automatic air purging system

14.25 Burner; replacing

- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Close the gas shut-off valve (see fig. 104, pos. 1).

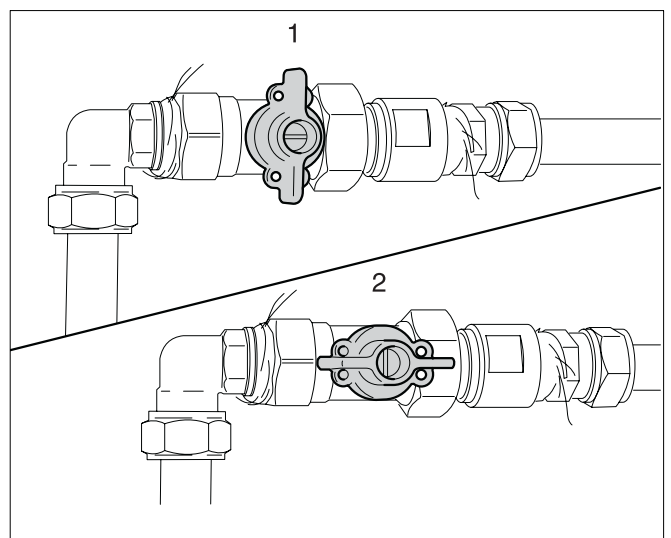
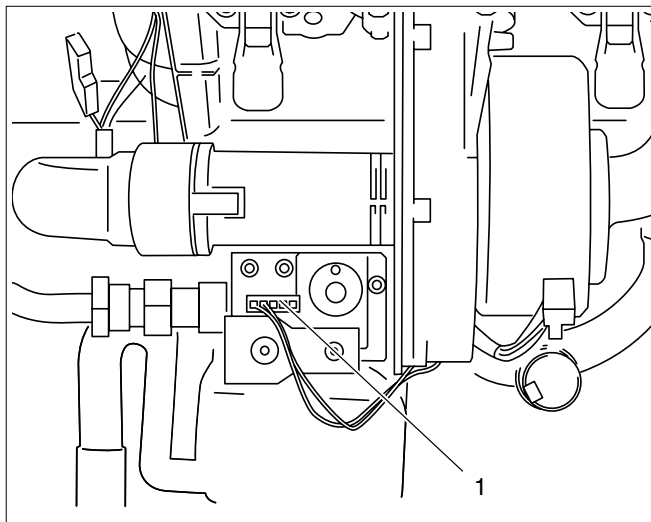


Fig. 104 Gas shut-off valve closed (1), gas shut-off valve open (2)

- Remove the cable plug from the gas control valve (see fig. 105, pos. 1).



*Fig. 105 Replacing the gas control valve
(e.g. HONEYWELL gas control valve)*

- Remove both cable plugs from the fan unit (see fig. 106, pos. 1).

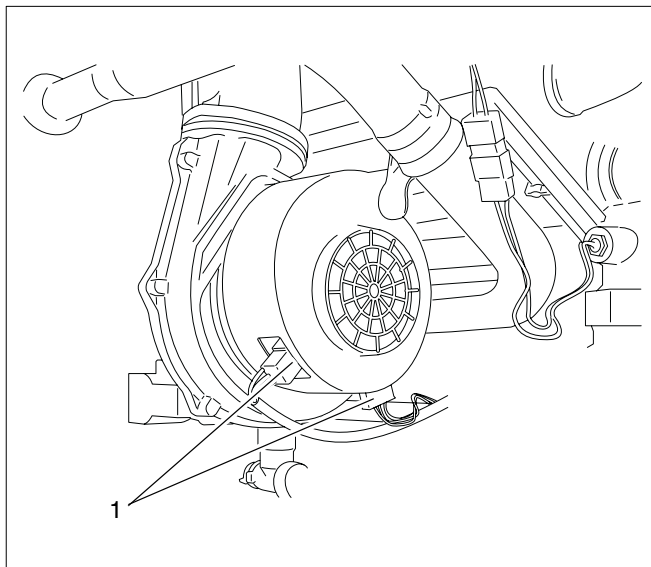


Fig. 106 Disconnecting the cable plug from the fan unit

- Loosen the union nut of the gas control valve (see fig. 107, pos. 1).

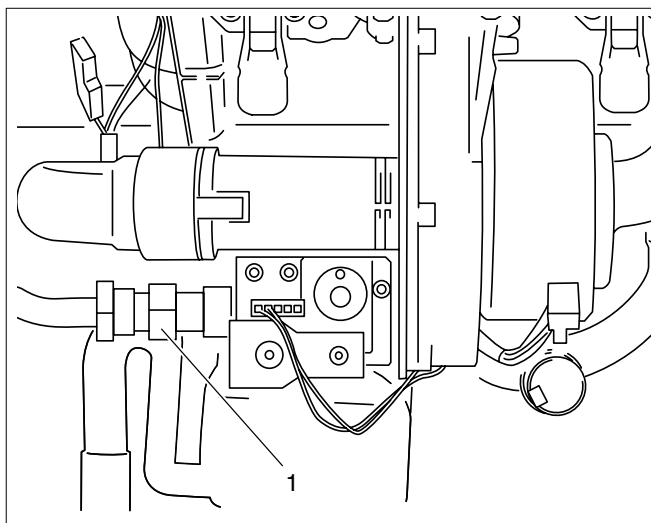


Fig. 107 Loosening the gas control valve

- Pull both retaining clips (see fig. 108, pos. 1) on the burner cover to open them and remove the burner cover with the fan unit and the gas control valve.

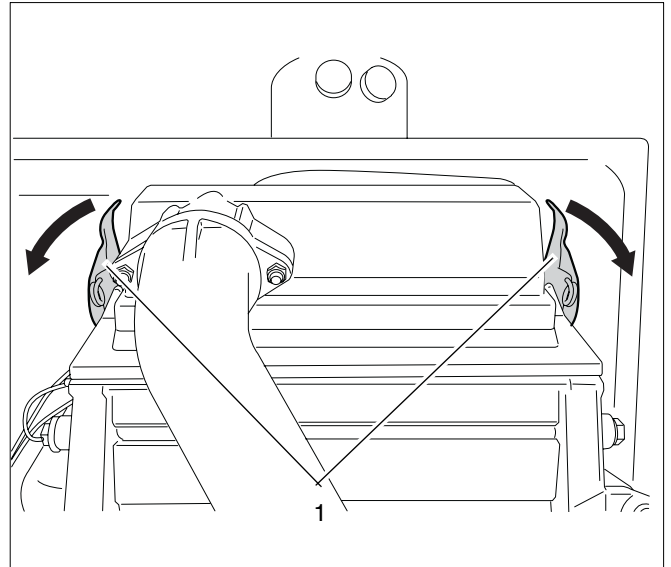


Fig. 108 Loosening the retaining clips

- Remove the burner gasket (see fig. 109, pos. 1).
- Remove the gas/air distributor plate (see fig. 109, pos. 2).
- Remove the orifice plate (only applies to GB142-24/30) (see fig. 109, pos. 3).
- Remove the burner (see fig. 109, pos. 4).

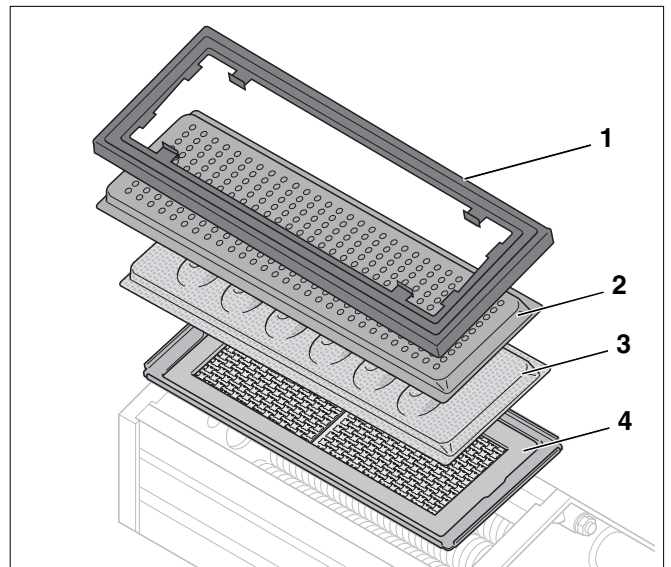


Fig. 109 Removing the burner

- Install the new burner (see fig. 110).



WARNING

Fit the burner so that the scale mark is located on the left-hand side (see fig. 110).

- Re-assemble all other parts in reverse order of disassembly.

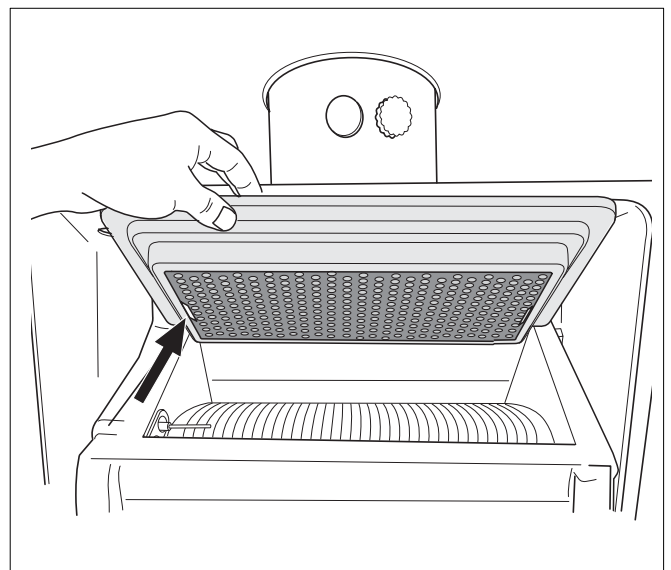


Fig. 110 Installing the burner

- Open the gas shut-off valve (see fig. 111, pos. 2)
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).
- Also check all joints and gaskets affected by the replacement activities while carrying out the tightness test in operating conditions.
- Set the gas/air ratio again. See Chapter 9.8.

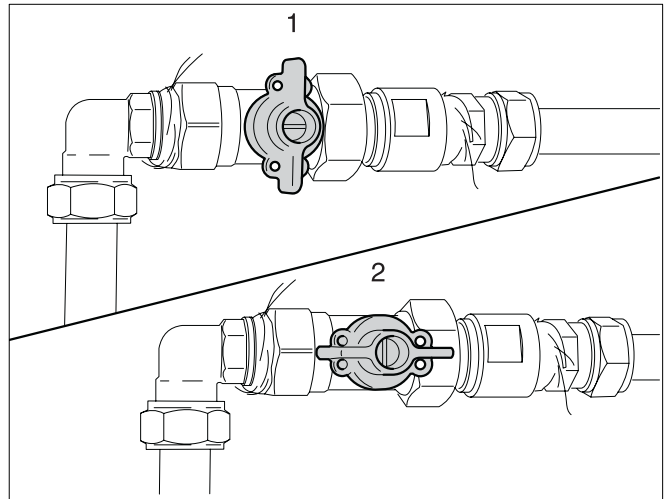


Fig. 111 Gas shut-off valve closed (1), gas shut-off valve open (2)

14.26 Sight glass; replacing

- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Loosen both screws of the sight glass (see fig. 112, pos. 1).
- Remove the sight glass mounting plate.
- Disassemble the sight glass inclusive of both gaskets.
- Assemble the new sight glass and all further parts in reverse order of disassembly; remember to fit new gaskets.
- Fit the casing.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

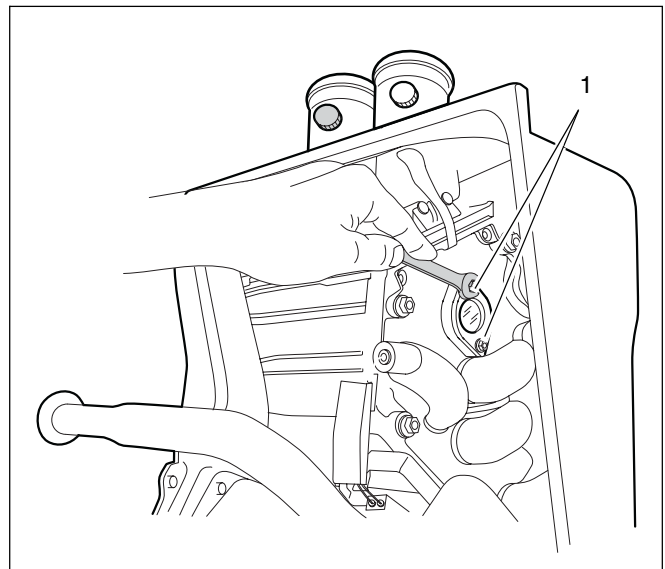


Fig. 112 Loosening the screws of the sight glass

14.27 Condensate trap; replacing

- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Pull the condensate trap from the condensate plate (fig. 113, pos. 1).
- Remove the condensate trap (fig. 113, pos. 2).
- Fill the new condensate trap with water before re-installing it.
- Re-assemble the new condensate trap in reverse order of disassembly.
- Fit the casing.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

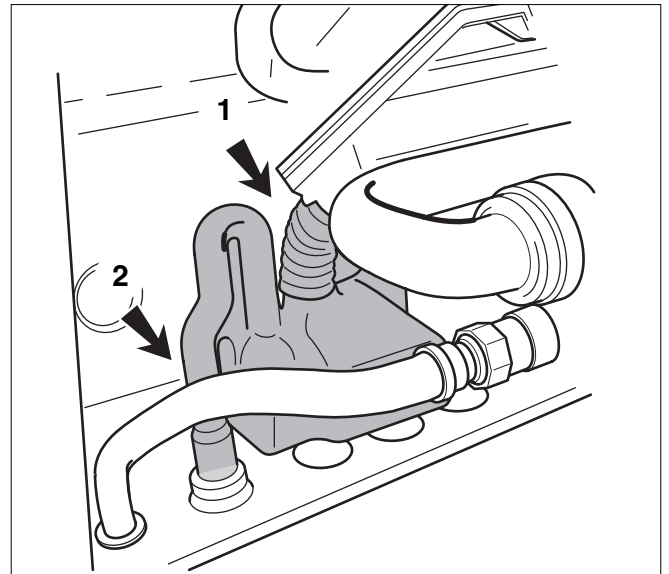


Fig. 113 Disconnecting the condensate trap connection

14.28 Pressure sensor; replacing

- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Close the maintenance shut-off valves and drain the Logamax plus GB142.
- Remove the cable plug from the pressure sensor.
- Loosen the pressure sensor by removing the securing clip (see fig. 114).
- Assemble the new pressure sensor and the plug in reverse order of disassembly.



NOTICE!

Fill and purge the Logamax plus GB142 as required. See page 28.

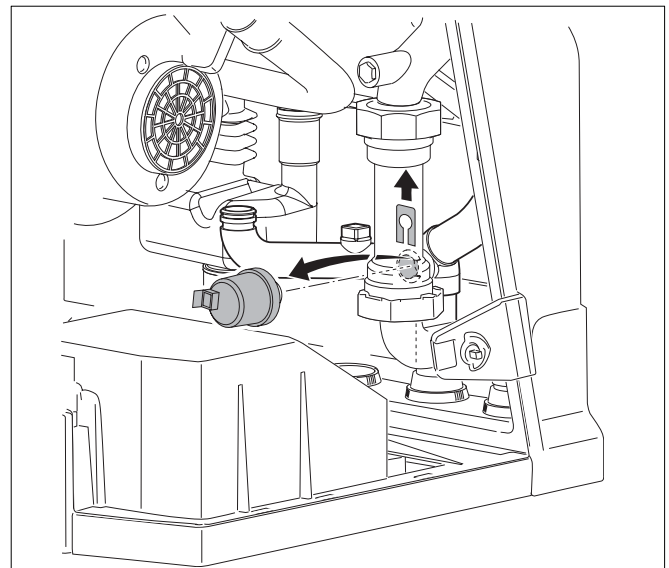


Fig. 114 Loosening the pressure sensor

- Fit the casing.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

14.29 Heat exchanger; replacing

- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Close the maintenance shut-off valves and drain the Logamax plus GB142.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Close the gas shut-off valve (see fig. 115, pos. 1).

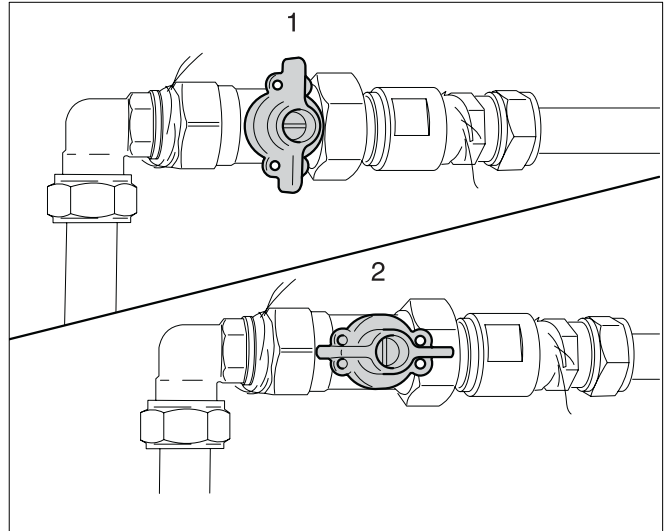


Fig. 115 Gas shut-off valve closed (1), gas shut-off valve open (2)

- Remove the cable plug from the gas control valve (see fig. 116, pos. 1).

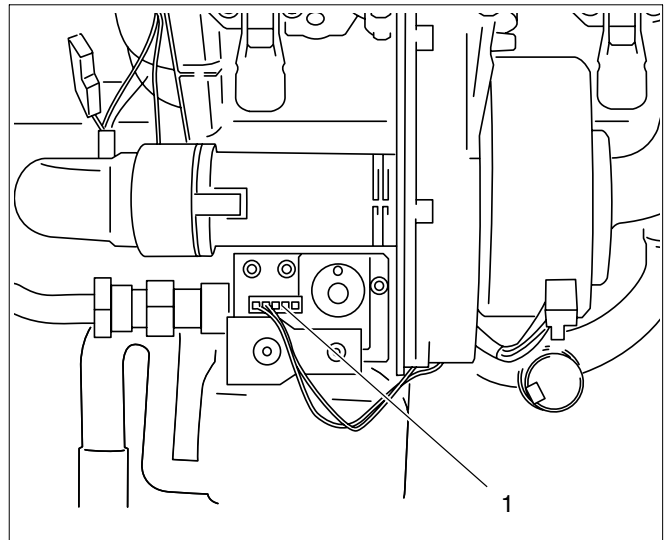


Fig. 116 Replacing the gas control valve (e.g. HONEYWELL gas control valve)

- Remove both cable plugs from the fan unit (see fig. 117, pos. 1).

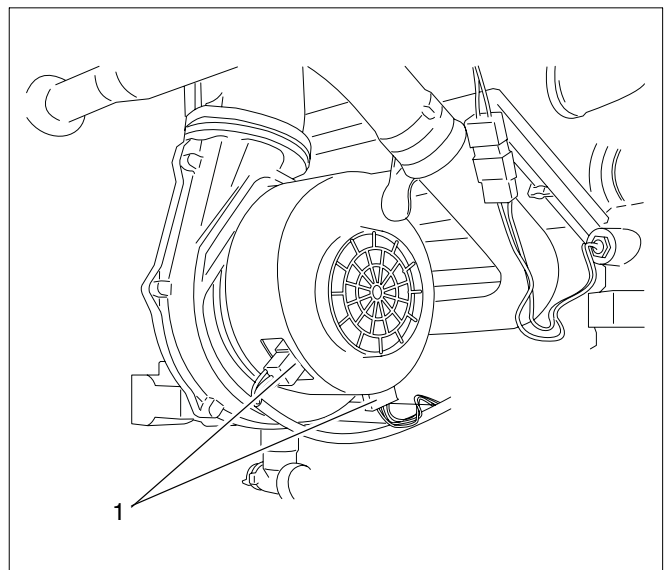


Fig. 117 Disconnecting the cable plug from the fan unit

- Loosen the union nut of the gas control valve (see fig. 118, pos. 1).

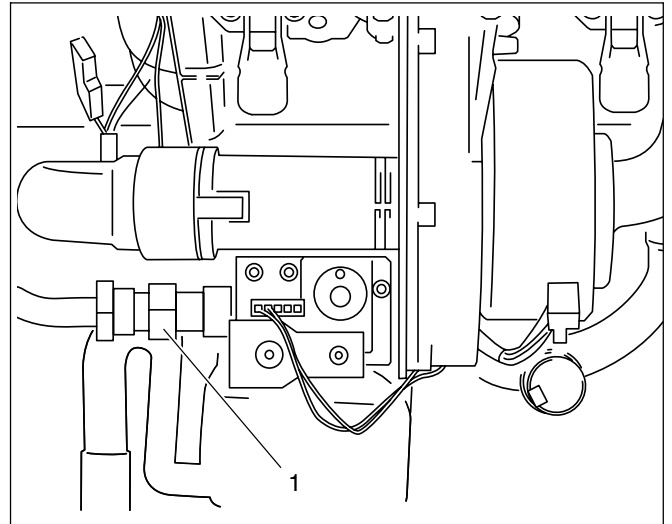


Fig. 118 Loosening the gas control valve

- Pull both retaining clips (see fig. 119, pos. 1) on the burner cover to open them and remove the burner cover with the fan unit and the gas control valve.

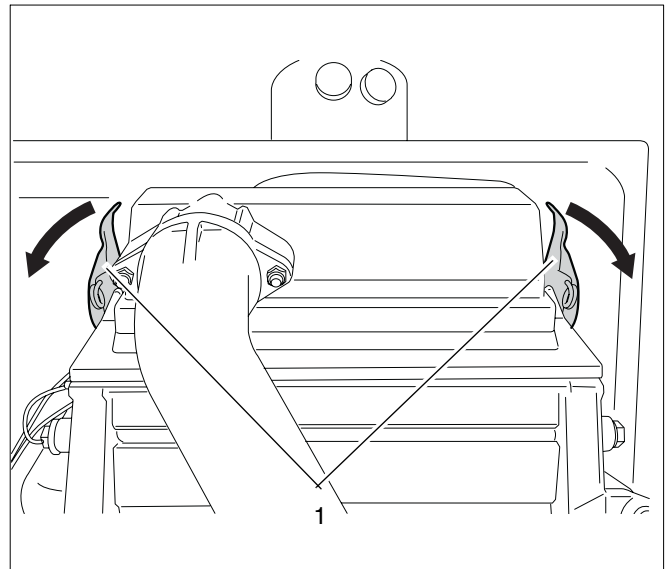


Fig. 119 Loosening the retaining clips

- Remove the burner gasket (see fig. 120, pos. 1).
- Remove the gas/air distributor plate (see fig. 120, pos. 2).
- Remove the orifice plate (only applies to GB142-24/30) (see fig. 120, pos. 3).
- Remove the burner (see fig. 120, pos. 4).

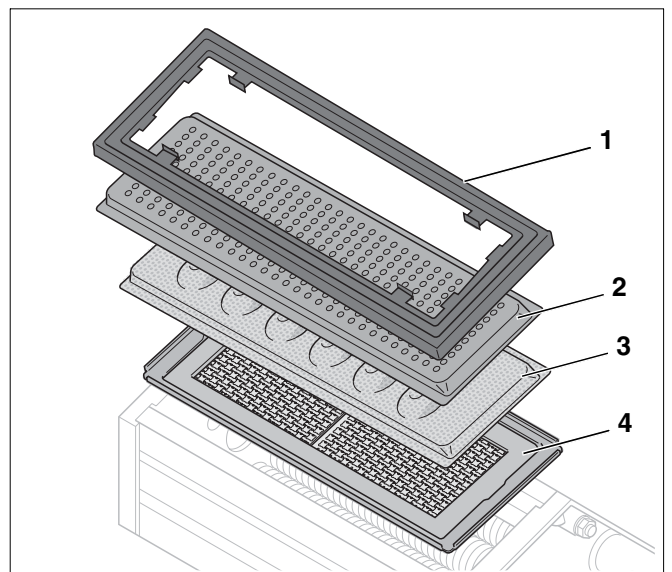


Fig. 120 Removing the burner

- Disconnect the plug and socket connections of the supply, return and safety sensors (see fig. 121, 122 and 123).

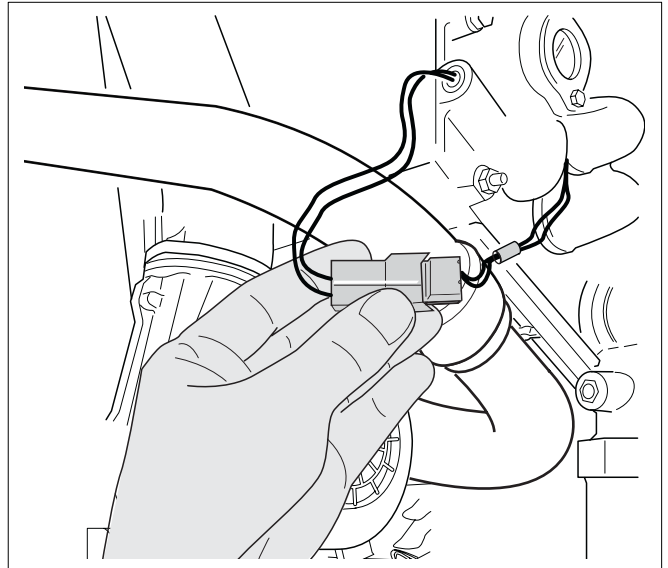


Fig. 121 Loosening the plug and socket connections of the supply sensor

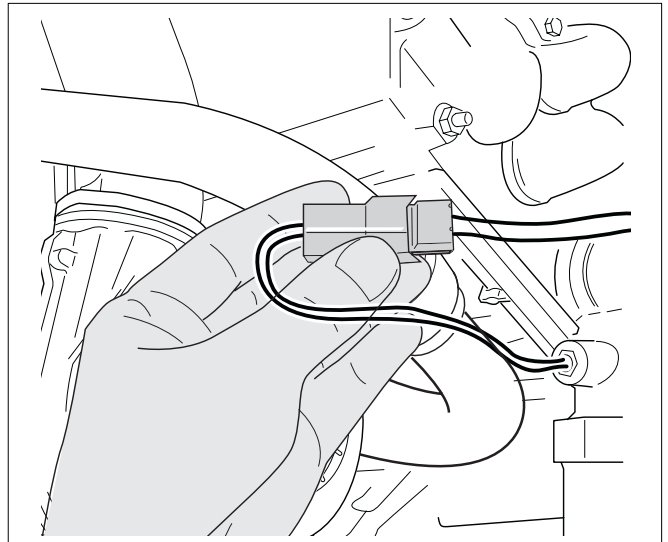


Fig. 122 Undoing the plug and socket connection of the return sensor

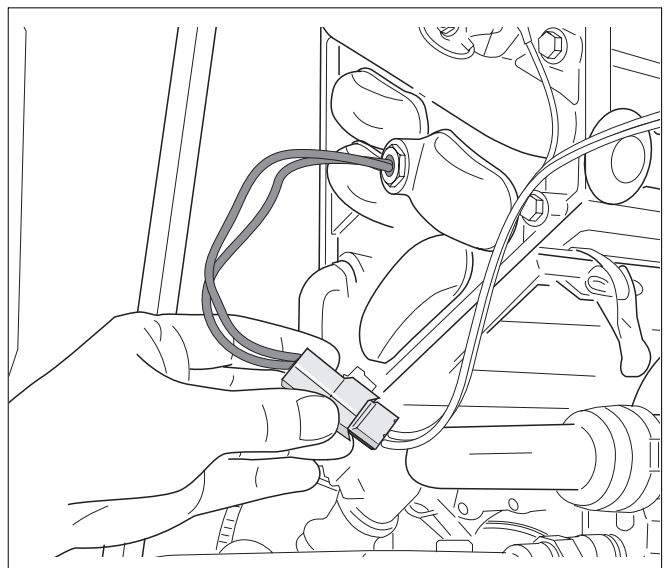


Fig. 123 Undoing the plug and socket connection of the safety sensor

- Disassemble the supply and return sensors (see fig. 124, pos. 1 and 2).



WARNING

To prevent mix-ups, the supply sensor is marked by a red sleeve on the side of the cable harness.

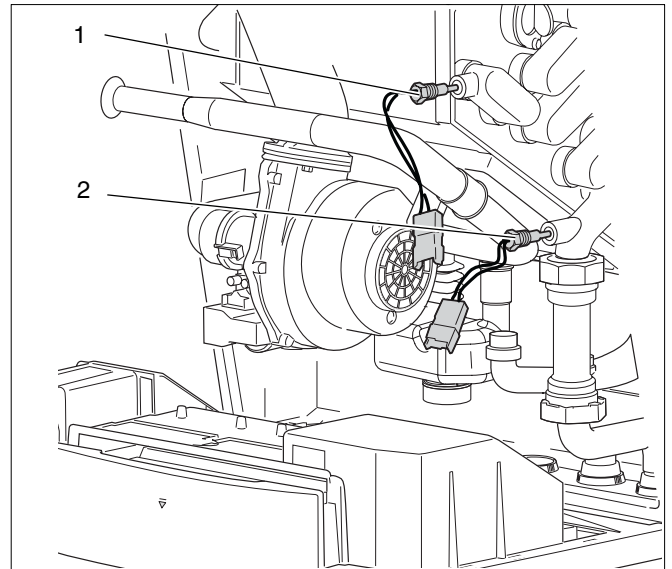


Fig. 124 Replacing the supply/return sensors

- Dismantle the safety sensor (see fig. 125, pos. 1).

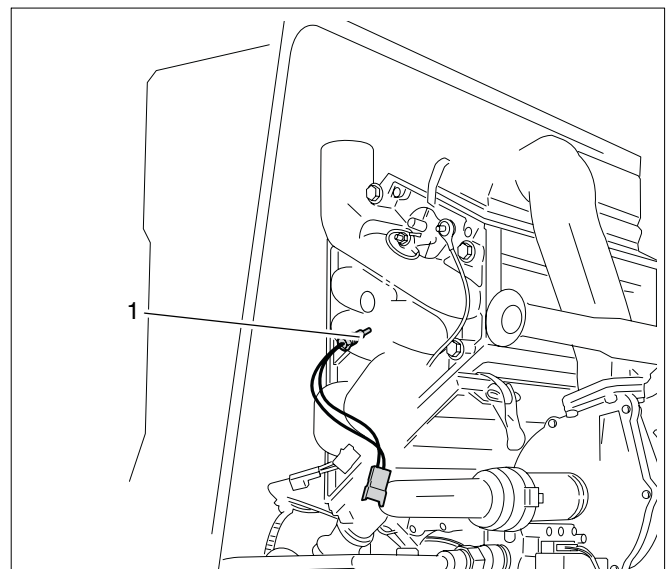


Fig. 125 Dismantling the safety sensor

- Disconnect the hot surface ignitor and ionization electrode plugs.
- Loosen the fastening screws (see fig. 126, pos. 1).
- Pull the earth cable from the hot surface ignitor (see fig. 126, pos. 2).
- Dismantle the mounting plate (see fig. 126, pos. 3).

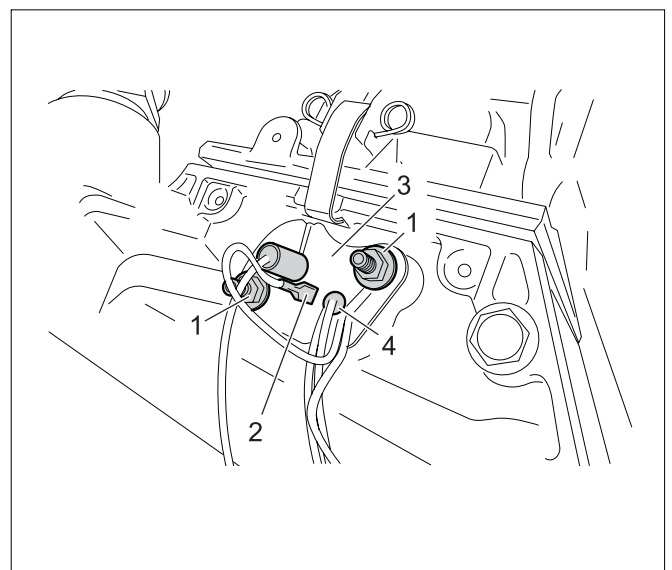


Fig. 126 Replacing the hot surface ignitor

- Remove both the hot surface ignitor and the ionization electrode by pulling them loose (see fig. 127, pos. 1).

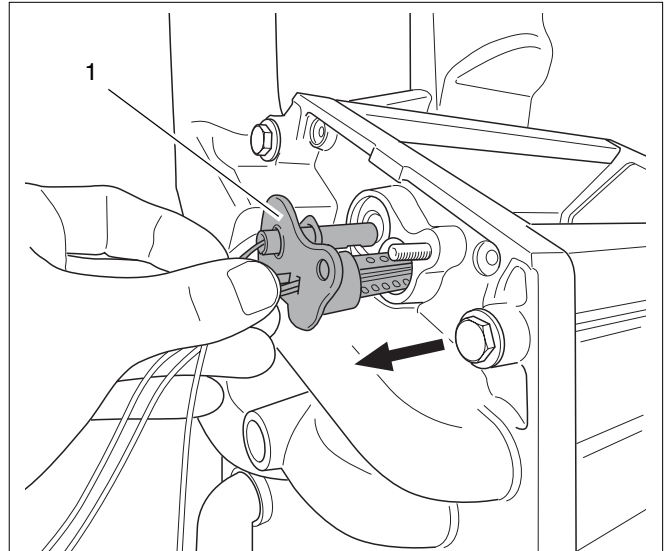


Fig. 127 Removing the hot surface ignitor and the ionization electrode

- Dismantle the condensate trap connection to the condensate collector (see fig. 128, pos. 1).

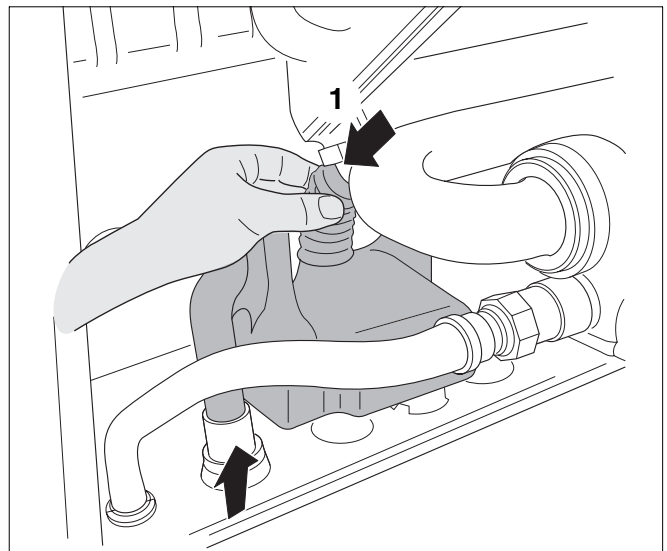


Fig. 128 Dismantling the condensate trap connection to the condensate collector

- Open the four latches of the condensate collector (see fig. 129, pos. 1).

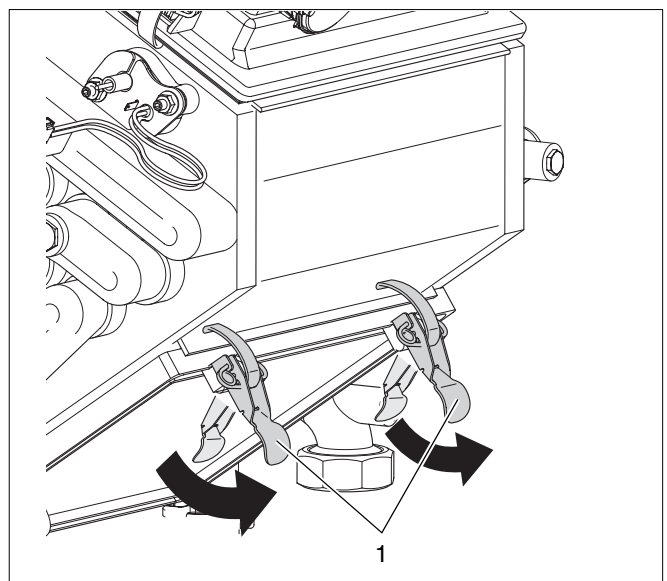


Fig. 129 Opening the latches of the condensate collector

- Remove the condensate collector (see fig. 130, pos. 1).

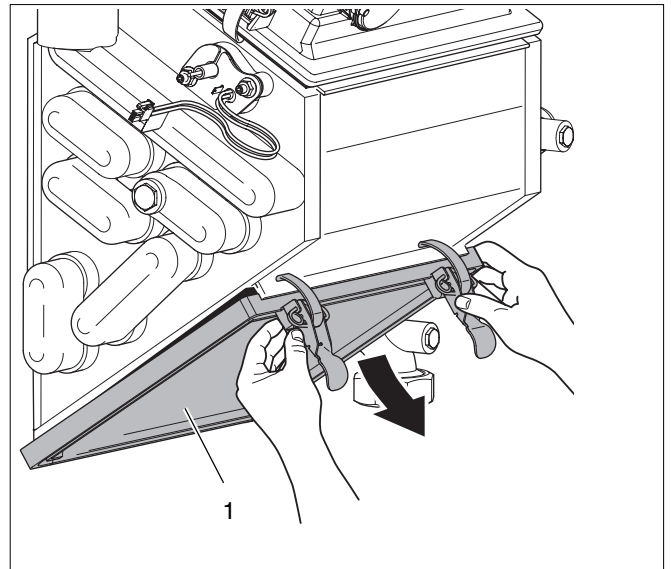


Fig. 130 Removing the condensate collector

- Dismantle the tension spring between the supply pipe and the heat exchanger (see fig. 131, pos. 1).

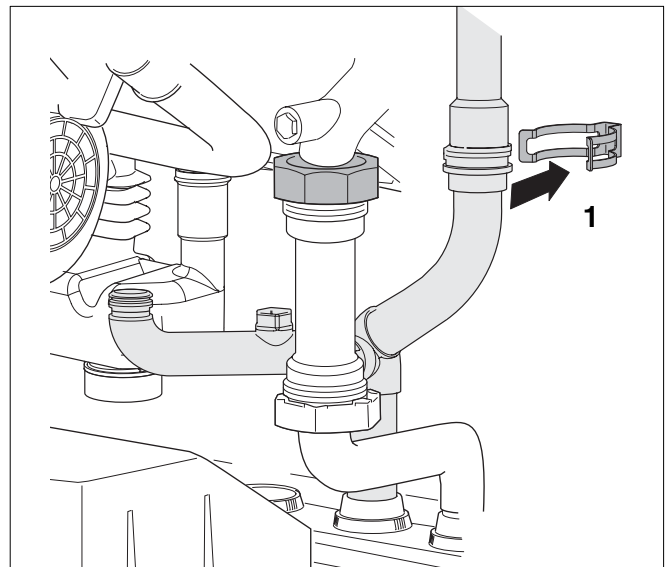


Fig. 131 Loosening the backflow connection and dismantling the tension spring

- Pull the supply pipe out of the heat exchanger (see fig. 132, pos. 1).



WARNING!
Water will be released.

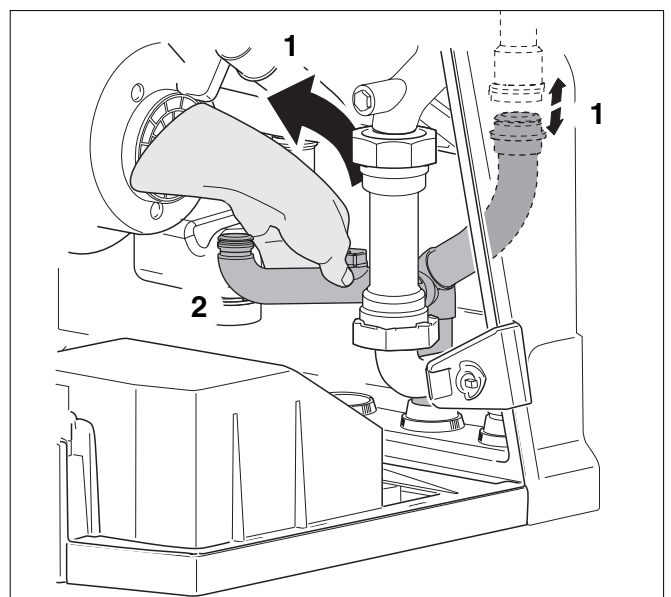


Fig. 132 Removing the supply pipe

- Pull the combustion air supply and flue gas exhaust connections on top of the appliance upwards to remove them (see fig. 133, pos. 1).

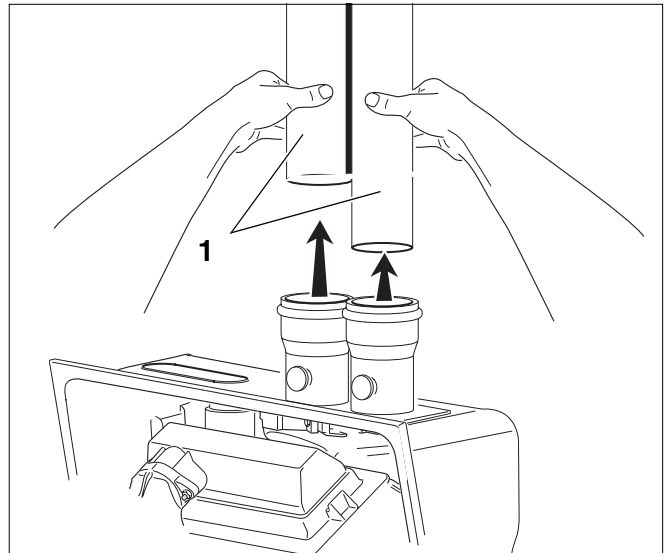


Fig. 133 Loosening the combustion air supply and flue gas exhaust connections

- Loosen the 6 fastening screws of the flue gas adapter (see fig. 134, pos. 1).

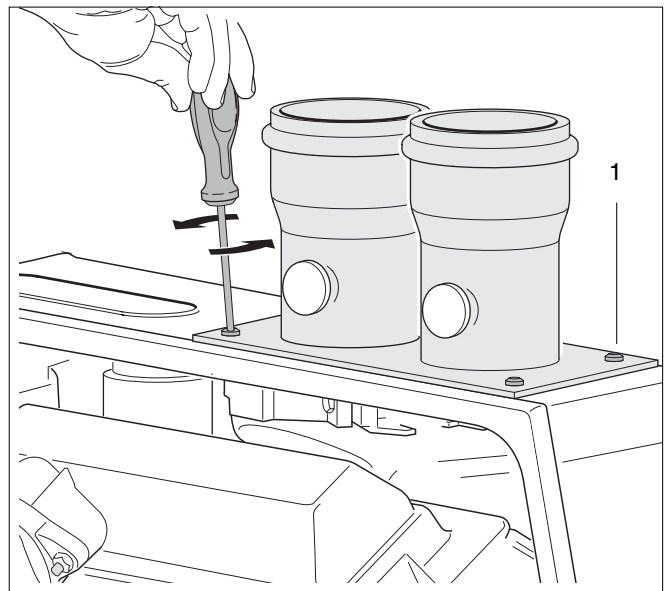


Fig. 134 Loosening the fastening screws

- Remove the flue gas adapter (see fig. 134, pos. 1) from the top of the appliance.

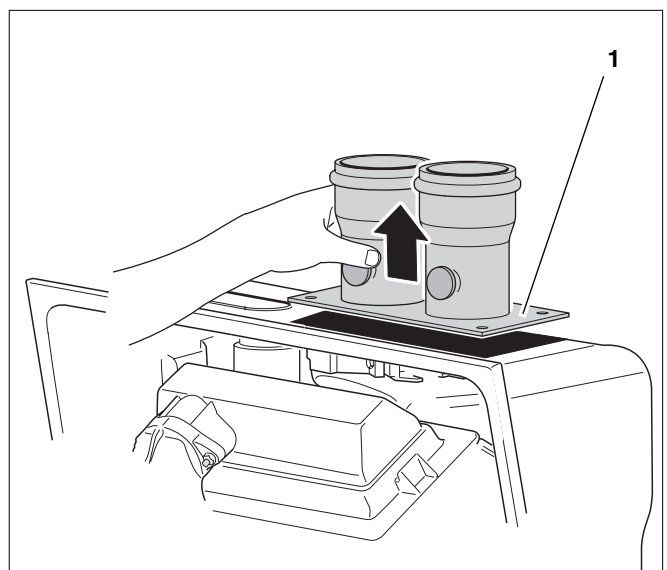


Fig. 135 Removing the flue gas adapter

- Remove the heat exchanger by grabbing its bottom end and pulling forward and then pushing it upwards (see fig. 136, pos. 1).
- Assemble the new heat exchanger and all other parts in reverse order of disassembly.



NOTICE!

Fill and purge the Logamax plus GB142 as required. See page 28.

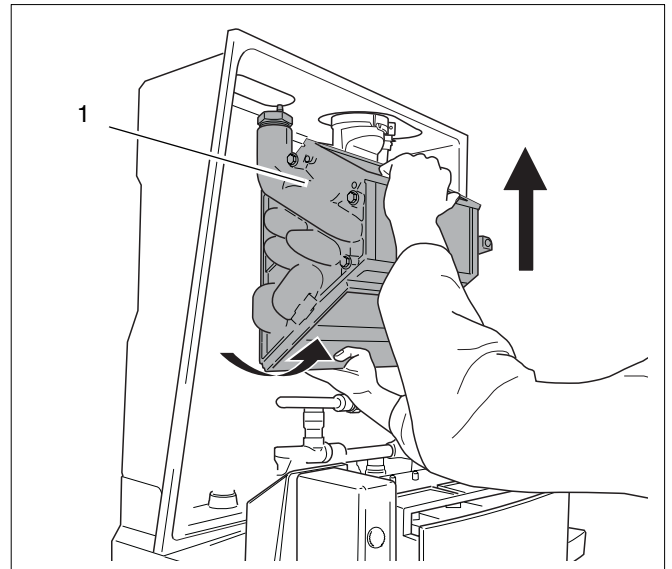


Fig. 136 Dismantling the heat exchanger

- Open the gas shut-off valve (see fig. 137, pos. 2)
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).
- Also check all joints and gaskets affected by the replacement activities while carrying out the tightness test in operating conditions.
- Set the gas/air ratio again. See Chapter 9.8, page 31.

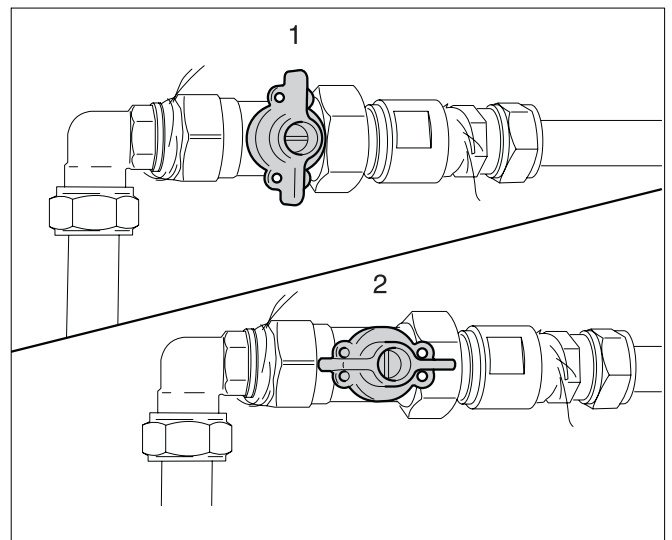


Fig. 137 Gas shut-off valve closed (1), gas shut-off valve open (2)

14.30 UBA3; replacing

- Disconnect the heating system from the power supply, remove the main fuse or switch off the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Loosen the fastening screw of the UBA3 (see fig. 138, pos. 1).
- Pull the UBA3 forward in the direction indicated by the arrow (see fig. 138, pos. 2).
- Install the new UBA3.
- Tighten the fastening screw again.
- Fit the casing.
- Connect the heating system to the power supply, insert the main fuse or switch on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

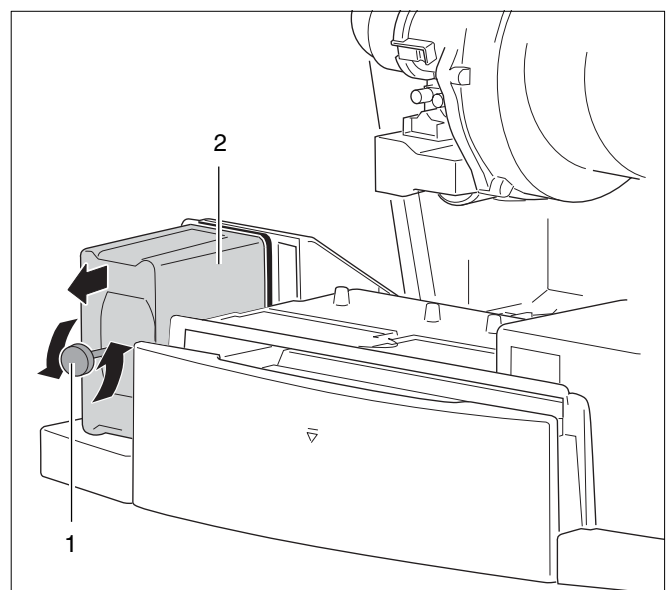


Fig. 138 Dismantling the UBA3

15 Converting the appliance to propane or high altitude conversion



NOTICE

The appliance is factory set for operation with natural gas at elevations up to 4,500 ft.

The appliance must be derated for installations above 4,500 ft. The derate is accomplished by changing the main burner orifice.

Contact Buderus in this case to obtain the suitable high elevation conversion kit.



DANGER

if flammable gas explodes.

Only carry out work on gas conduits and fittings if you are licensed for such work.

- Close the gas shut-off valve.
- Switch off the heating system using the main switch.
- Remove the casing.
- Loosen the screw connection on the gas burner fitting (fig. 38, pos. 1, page 46) and pull the plug (fig. 38, pos. 2, page 46) from the gas burner fitting.
- Pull the plug from the fan unit (fig. 38, pos. 3, page 46).
- Loosen both retaining clips (fig. 38, pos. 4, page 46) on the burner cover and remove the burner cover together with the fan unit and the gas burner fitting.
- Loosen the three crosshead screws and remove the gas burner fitting from the fan unit (fig. 139, pos. 1).
- Remove the gas orifice (fig. 139, pos. 2).

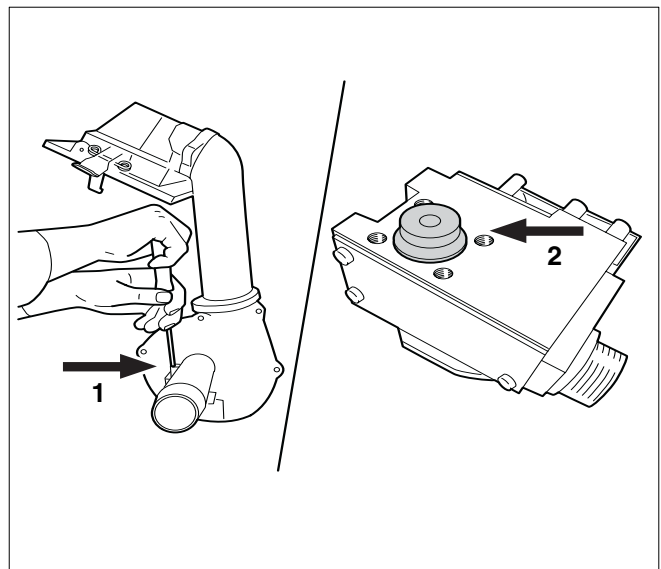


Fig. 139 Replacing the gas orifice


- Fit the right orifice for the new type of gas supply (table 14). Make sure not to damage the O-rings.
- Re-assemble all parts in reverse order of disassembly.
- Carry out the start-up activities and complete a new start-up report.
- Also check all joints and gaskets affected by the installation activities while carrying out the tightness test in operating conditions.
- Place a new sticker over the existing sticker indicating the type of gas supply installed.
- Fit the casing again.

Appliance capacity	Type of gas supply	Gas orifice diameter in mm (inch)	Type of orifice above 4,500 ft
24 kW	Natural gas	4.45 (0.174)	4.65 (0.181)
	LPG P	3.35 (0.131)	3.35 (0.131)
30 kW	Natural gas	4.45 (0.174)	4.65 (0.181)
	LPG P	3.35 (0.131)	3.35 (0.131)
45 kW	Natural gas	5.35 (0.209)	5.55 (0.216)
	LPG P	4.05 (0.158)	4.05 (0.158)
60 kW	Natural gas	7.25 (0.283)	7.45 (0.291)
	LPG P	5.35 (0.209)	4.05 (0.158)

Table 14 Gas orifice diameter

16 Appendix

16.1 Operating messages

- Press the "Service"  button a number of times to switch between the various status displays.

















Display	Meaning
Normal mode =/-	
	Appliance in heating mode
	Appliance in DHW mode
Normal mode 	
	Burner interval circuit, 10 minutes after burner start
	Burner is started
	More capacity was delivered than required
	Standby
	Gas burner fitting is opened
	Initializing/ pre purge
	Flow temperature higher than set
Test mode -	
 Dot displayed in right-hand bottom corner	Appliance in flue gas test
Manual mode -	
 Blinking dot in right-hand bottom corner	Appliance in manual mode
Reset	
	Reset (after holding the "Reset"  button for 5 seconds, the heating system is returned to its switch-on condition)

Table 15 Normal operating messages

16.2 Error messages

- Press the "Service"  button to display the service code (e. g. "3F").
- Press the "Service"  button to display the error code (e. g. "207").

The error message is a combination of the service code (e. g. "3F") and the error code (e. g. "207"). You can only resolve the error message using the Service chapter in this manual.



INSTRUCTION FOR INSTALLERS

The display may also show system faults (e. g. "R11"). In principle, they are identified by the initial letter "A" and they refer to faults between the appliance and the additionally available electronic components.

Display	Meaning
2	Water flow / water pressure
E 207	System pressure too low < 3 psi (20 mbar).
F 271	Temperature difference between safety and supply sensors too much or no temperature increase after starting the burner.
L 266	Test of pump operation via a pressure increase in the heating system (during pump start).
P	Temperature increase of safety sensor or supply sensor too high.
U	Temperature difference between supply and return sensor too much.
Y	Pump feedback fault.
3	Fan speed
R 264	Fan unit failed during operation.
F 273	Air volume flow not lost for 24 hours.
L 214	Fan shut down during security test.
P 216	Fan unit is running too slowly.
Y 215	Fan unit is running too fast.
4	Temperatures
R 218	Supply sensor over 220 °F (105 °C).
E 278	Sensor test failed
L 220	Safety sensor affected by short circuit or higher than 266 °F (130 °C).
P 221	Loose contact or defective safety sensor.
U 222	Supply sensor affected by short circuit.
Y 223	Loose contact or faulty supply sensor.

Display	Meaning
6	Flame monitoring
R 227	No ionization message after ignition.
C 228	Ionization measured before burner start.
L 306	The flame went out during the heating phase.
P 229	Hot-surface ignitor on for too long.
7	Grid voltage
C 231	The grid power was interrupted after an error.
L 267	UBA fault.
	280
8	External switching contact
Y	External switching contact, e. g. temperature safety switch for floor heating, has taken place.
9	System faults
R 235	Communication fault between UBA and KIM.
H 237	UBA fault.
	267
	272
P 239	UBA fault.
L 234	Faulty gas burner fitting cable connection.
	238
	239
U 233	KIM out of order.
Y	Communication fault between BC10 basic controller and UBA.
E	System faults
	1, R, C, Internal UBA fault.
	F, H, L,
	Y

16.3 Technical specifications

General specifications	Unit	Appliance cap. 24 kW	Appliance cap. 30 kW	Appliance cap. 45 kW	Appliance cap. 60 kW
Gas category		Natural gas	Natural gas	Natural gas	Natural gas
Rated thermal load for Natural gas	btu/hr	25,700 – 84,800	31,800 – 106,000	48,100 – 160,900	64,400 – 198,800
Rated heating capacity for heating curve 176/140 °F (80 – 60 °C)	btu/hr	22,700 – 75,200	28,100 – 91,500	42,500 – 142,000	56,800 – 176,300
Rated heating capacity for heating curve 122/86 °F (50 – 130 °C)	btu/hr	25,300 – 83,300	30,700 – 102,400	47,200 – 158,000	63,200 – 196,600
Appliance efficiency rating max. capacity for heating curve 176/140 °F (80 – 60 °C)	%	88	88	88	88
Appliance efficiency rating max. capacity for heating curve 122/86 °F (50 – 130 °C)	%	97	97	97	97
CSA output	btu/hr	76,300	95,400	144,800	178,900
Heating					
Max. flow temperature	°F (°C)	194 (90)	194 (90)	194 (90)	194 (90)
Heater water temperature	°F (°C)	86 – 190 (30 – 90), can be set on BC10 basic controller	86 – 190 (30 – 90), can be set on BC10 basic controller	86 – 190 (30 – 90), can be set on BC10 basic controller	86 – 190 (30 – 90), can be set on BC10 basic controller
Max. operating overpressure of appliance	psi (bar)	43.5 (3)	43.5 (3)	58 (4)	58 (4)
Heat exchanger heating circuit volume	gallons (l)	0.7 (2.5)	0.7 (2.5)	1.0 (3.6)	1.3 (4.7)
Pipe connections					
Gas connection	inch	¾" NPT	¾" NPT	¾" NPT	¾" NPT
Heating system water connection	inch (mm)	1.1" NPT (28)	1.1" NPT (28)	1.1" NPT (28)	1.1" NPT (28)
Condensate water connection	inch (mm)	Ø 1.3" (Ø 32)	Ø 1.3" (Ø 32)	Ø 1.3" (Ø 32)	Ø 1.3" (Ø 32)
Flue gas values					
Condensate water quantity for natural gas G20, 104/86 °F (40/30 °C)	gallons per hour	2.6	3.3	4.7	7.1
pH value condensate water	pH	approx. 4.1	approx. 4.1	approx. 4.1	approx. 4.1
Flue gas mass flow rate at full load	g/s	10.0	12.6	19.4	25.9
Flue gas temperature 176/140 °F (80/60 °C), full load	°F (°C)	150 (66)	167 (75)	150 (66)	150 (66)
Flue gas temperature 176/140 °F (80/60 °C), partial load	°F (°C)	135 (57)	137 (58)	135 (57)	135 (57)
Flue gas temperature 122/86 °F (50/30 °C), full load	°F (°C)	113 (45)	118 (48)	96 (36)	96 (36)
Flue gas temperature 122/86 °F (50/30 °C), partial load	°F (°C)	91 (33)	91 (33)	91 (33)	91 (33)
CO ₂ content, full load, natural gas G20	%	9.2	9.2	9.3	9.3
CO ₂ content, full load, LPG G31, propane	%	10.0	10.0	10.0	10.0
Standard emission factor CO	mg/kWh	≤ 15	≤ 15 ¹	≤ 15	≤ 15
Standard emissions factor NO _x	mg/kWh	≤ 20	≤ 20 ¹	≤ 20	≤ 20
Free fan unit feed pressure	inch W.C. (Pa)	up to 0.023 (up to 60)	up to 0.039 (up to 100)	up to 0.054 (up to 140)	up to 0.054 (up to 140)
Flue gas connection					
Ø Flue system, dependent on the air in the room	inch (mm)	3 (80)	3 (80)	3 (80)	3 (80)
Ø Flue system, independent of the air in the room	inch (mm)	3/3 (80/80) parallel	3/3 (80/80) parallel	3/3 (80/80) parallel	3/3 (80/80) parallel
Electric data					
main voltage	V, Hz	120, 60	120, 60	120, 60	120, 60
Fuses	amps	5 amps 120V slow blow	5 amps 120V slow blow	5 amps 120V slow blow	5 amps 120V slow blow
Electrical protection rating		IP X4D	IP X4D	IP X4D	IP X4D
Electrical power consumption, at full load	W	96	117	64	82
Electrical power consumption, at partial load	W	22	22	20	22
Appliance dimensions and weight					
Height x Width x Depth	inch (mm)	28 x 22 x 18.7 (712 x 560 x 475)	28 x 22 x 18.7 (712 x 560 x 475)	28 x 35.4 x 18.7 (712 x 900 x 475)	28 x 35.4 x 18.7 (712 x 900 x 475)
Weight	lbs (kg)	110 (50)	110 (50)	143 (65)	158 (72)

Table 16 Technical specifications

¹ If the heating capacity is limited to max. 80% (L80).

Type of gas supply	Factory pre-setting of the gas control valve
Natural gas	Delivered factory-set: Natural Gas
LPG P	Suitable for propane after conversion (also see the chapter "Conversion to another type of gas supply"). Information on gas type instruction plate: Set to gas category: Propane.

Table 17 Factory setting of the gas control valve

Thermal power gas appliance	Type of gas supply	Gas orifice diameter in mm (inch)	Type of orifice above 4,500 ft	Venturi article number
GB142-24	Natural gas	4.45 (0.174)	4.65 (0.181)	423.072A
	LPG P	3.35 (0.131)	3.35 (0.131)	423.072A
GB142-30	Natural gas	4.45 (0.174)	4.65 (0.181)	423.072A
	LPG P	3.35 (0.131)	3.35 (0.131)	423.072A
GB142-45	Natural gas	5.35 (0.209)	5.55 (0.216)	423.072A
	LPG P	4.05 (0.158)	4.05 (0.158)	423.072A
GB142-60	Natural gas	7.25 (0.283)	7.45 (0.291)	423.072A
	LPG P	5.35 (0.209)	4.05 (0.158)	423.072A

Table 18 Gas orifice diameter

- The gas orifice diameter is marked on the gas orifice (in mm).
- The venturi article number is marked on both clips of the venturi (see fig. 140, pos. 1 and 2).

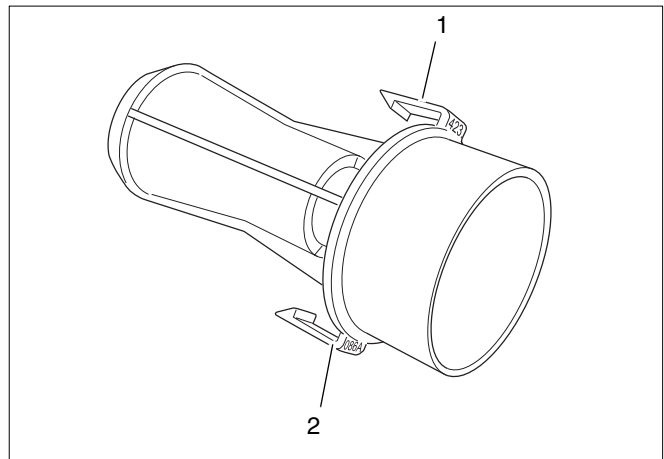


Fig. 140 Venturi article number

17 Reports

17.1 Start-up report

Put your signature and the date at the bottom of the start-up report.

Start-up activities	Page	Measured values	Remarks
1. Fill the heating system and check that all connections are tight – Inlet pressure of expansion tank (observe the Installation Instructions for the expansion tank) – Pressurize the system – Fill the condensate trap	27	<input type="checkbox"/>	
	27	_____ psi	
	27	_____ psi	
	27	<input type="checkbox"/>	
2. Carry out a gas tightness test	27		
3. Note down the gas characteristics:	27	_____ kWh/m ³	Wobbe index
		_____ kWh/m ³	
4. Vent the gas supply conduit	29	<input type="checkbox"/>	
5. Check and if necessary adjust the carbon monoxide content (CO ₂)		_____ %	
6. Check the combustion air/flue gas connection	30	<input type="checkbox"/>	
7. Convert the appliance to another type of gas supply (only if allowed)	86	<input type="checkbox"/>	
8. Measure the gas connection pressure (flow pressure)	30	_____ inch W.C.	
9. Check and adjust the gas/air ratio	31	_____ inch W.C.	
10. Measure the pressure on the testing nipple on the burner cover		_____ inch W.C.	
11. Measure the pressure in the flue pipe		_____ inch W.C.	
12. Measure the carbon monoxide content (CO)	33	_____ ppm	
13. Check and if necessary adjust the carbon monoxide content (CO ₂)		_____ %	
14. Make the necessary settings on the thermostat	36	<input type="checkbox"/>	
15. Carry out function testing	33	<input type="checkbox"/>	
16. Measuring the ionization current	33	_____ μA	
17. Fitting the casing	35	<input type="checkbox"/>	
18. Inform the owner; hand over the technical documents	35	<input type="checkbox"/>	
Confirm proper start-up			
Company stamp/signature/date			

17.2 Inspection report

- Please indicate the inspection activities that you have carried out and enter the values measured.

Inspection activities	page	Date: _____	Date: _____	Date: _____
1. Test the general condition of the heating system		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Carry out a visual inspection and test the functions of the heating system		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Test all gas and water conduits and fittings for: – their tightness during operation – visible corrosion – signs of aging – fill the condensate trap	45 44 29	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Check the burner, the heat exchanger and the condensate trap for pollution. First shut down the heating system	46	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Check the burner and the ignition and ionization electrodes. First shut down the heating system	46	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Measure the ionization current	33	_____ μ A	_____ μ A	_____ μ A
7. Measure the gas connection pressure (flow pressure)	30	_____ psi	_____ psi	_____ psi
8. Check the gas/air ratio	31	_____ inch W.C.	_____ inch W.C.	_____ inch W.C.
9. Carry out a gas tightness test in operating conditions	45	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Measure the carbon monoxide content (CO)	45	_____ ppm	_____ ppm	_____ ppm
11. Check the water pressure of the heating system – Inlet pressure of expansion tank (also see the Installation Instructions for the expansion tank) – Filling pressure	27 27	<input type="checkbox"/> _____ _____ psi _____ psi	<input type="checkbox"/>	<input type="checkbox"/>
12. Check the operation and safety of the air intake and flue pipe	30	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Check that the thermostat is set in line with the needs (see documents with thermostat)	36	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Final check of inspection activities, note down the measurement and test results		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Confirm proper inspection				
		Company stamp/signature	Company stamp/signature	Company stamp/signature

17.3 Maintenance report

- Sign for the maintenance activities that you have carried out and enter the date.

Needs-dependent maintenance activities	Page	Date: _____	Date: _____
1. Clean the burner, the heat exchanger and the condensate trap. First shut down the heating system	46	<input type="checkbox"/>	<input type="checkbox"/>
2. Check and adjust the gas/air ratio CO ₂ content with full load CO ₂ content with partial load	31	_____ inch W.C. _____% _____%	_____ inch W.C. _____% _____%
3. Confirm proper maintenance	Company stamp/ Signature	Company stamp/ Signature	

18 Spare parts

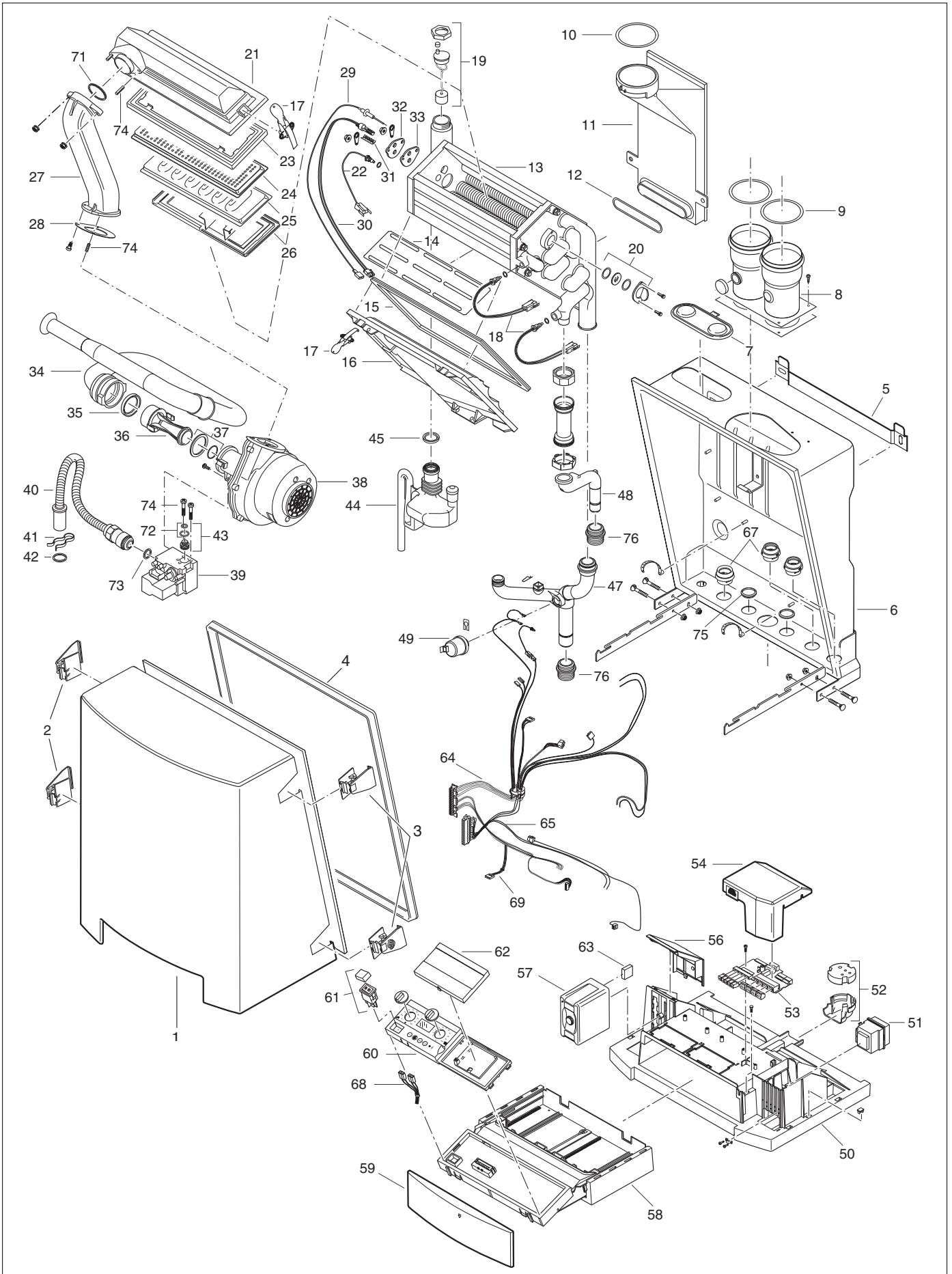
Below is a list of the spare parts for this appliance. Look up the position number in the exploded view drawing on the next two pages for the illustration. Spare parts may be ordered from Buderus Hydronic Systems.

Pos.	Description	Product No.
1	Casing 24/30	7099988
	Casing 45/60	7099901
2	Casing latches left (2 pc)	7099039
3	Casing latches right (2 pc)	7099038
4	Casing seal 24/30	7098752
	Casing seal 45/60	7098798
5	Wall mounting bracket	7098364
6	Back panel 24/30	7099001
	Back panel 45/60	7099903
7	Cap air vent	7100250
8	Exhaust adapter 3" – 3"	28268
9	Seal ring Ø90 mm	77470s
10	Seal ring Ø80 mm	7096476
11	Flue gas collector	7098857
12	Oval seal	7098858
13	Heat exchanger 24/30 kW	7099005
	Heat exchanger 45 kW	7099911
	Heat exchanger 60 kW	73147
14	Heat exchanger baffle 24/30 kW	7098828
	Heat exchanger baffle 45 kW	7098832
	Heat exchanger baffle 60 kW	67900523
15	Seal condensate collector 24-30 kW	7098834
	Seal condensate collector 45 kW	7098838
	Seal condensate collector 60 kW	
16	Condensate collector 24/30 kW	7098840
	Condensate collector 45 kW	7098844
	Condensate collector 60 kW	67900521
17	Clamp	7098848
18	Sensor NTC	7100136
19	Revision set air vent **	7098822
20	Sight glass	7098575
21	Burner box 24/30 kW	73838
	Burner box 45 kW	7099057
	Burner box 60 kW	73246
22	Safety sensor	7098854
23	Seal burner 24/30 kW	7098916
	Seal burner 45 kW	7098920
	Seal burner 60 kW	67900526
24	Gas/air distribution plate 24/30 kW	7100922
	Gas/air distribution plate 45 kW	7098926
	Gas/air distribution plate 60 kW	67900527
25	Orifice plate 24/30 kW	7100920
26	Burner 24/30 kW	
	Burner 45 kW	
	Burner 60 kW	
27	Gas-air inlet	7099004
28	Sealing	7099023
29	Ionization electrode	7100238
30	Hot surface ignitor	7099006
31	Shield hot surface ignitor	7100229
32	Seal mounting plate (5 pc)	7098850
33	Mounting plate	7098852

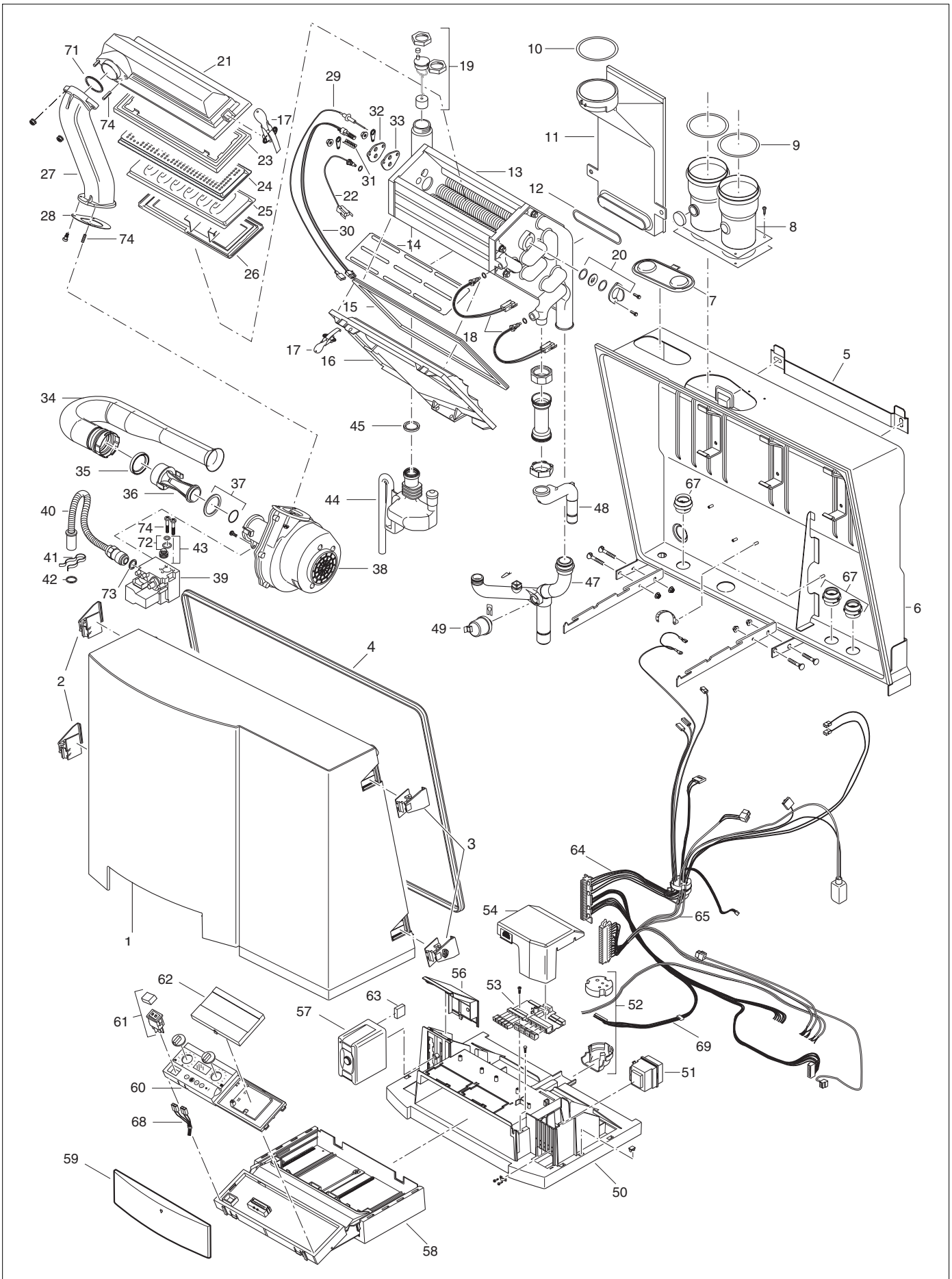
** not shown in exploded views

Pos.	Description	Product No.
34	Air inlet pipe; 24/30 kW	7099024
	Air inlet pipe; 45/60 kW	7099023
35	Seal Ø50 mm (5 pc)	7099058
36	Venturi 24/30 kW	7099020
	Venturi 45 kW	7099925
	Venturi 60 kW	7099931
37	Seal set (4 pc)	7099021
38	Fan	78184
39	Gas control valve	7099025
40	Gas supply pipe GB142 USA	76685
41	Spring (5 pc)	7100549
42	Seal 2x16x22 (5 pc)	7098778
43	Orifice 24/30 kW	7099016
	Orifice 45 kW	7099935
	Orifice 60 kW	7099939
44	Condensate trap	75978
45	Seal condensate trap (5 pc)	7100742
47	Supply pipe CH; 24/30/45 kW	75974
	Supply pipe CH; 60 kW	75976
48	Return pipe 24/30/45 kW	75973
	Return pipe 60 kW	75975
49	Pressure sensor **	7101362
50	Bottom plate	7099049
51	Transformer 120V	78191
52	Grommet	7099050
53	External connection board	78185
54	External connection board cover	7099046
56	UBA cover	7099047
57	UBA3 - 120V	7099707
58	Drawer	7099043
59	Drawer front	7099037
60	Controller connection plate	78186
61	On/off switch	7099041
62	Controller cover	73698
63	Appliance ident. module 24 kW	78187
	Appliance ident. module 30 kW	78188
	Appliance ident. module 45 kW	78189
	Appliance ident. module 60 kW	78190
64	Cable harness low voltage	7099969
65	Cable harness high voltage	7099957
67	Sealing bush (set)	7099002
68	Cable harness of on/off switch	7099072
69	Cable harness BX holder	7099070
71	Seal Ø60 mm (5 pc)	7098878
72	O-ring set orifice	7099018
73	Seal (5 pc)	7099059
74	Setscrew M5x20 (5 pc)	7099065
75	Cap 24/30 kW	79105
76	Double nipple THR x COMPR	75977

Exploded view Logamax plus GB142-24/30



Exploded view Logamax plus GB142-45/60



19 Index

- B**
- Baffle plate 47
 - BC10 basic controller 8, 36
 - Burner 46
 - Burner cover 46
- C**
- Carbon monoxide content 33
 - Casing 13
 - CO values 33
 - Combustion air/flue gas connection 30
 - Condensate trap 46, 47
 - Condensate water 23
 - Condensate water drain 23
 - Connection 120 volts 25
 - Connections (for gas, flue gas and water) 9, 10
- D**
- DHW recirculating pump 24
 - DHW tank pump 24
 - DHW temperature 24
 - Dimensions 9, 10
 - Disposal 6
- E**
- Earth cable 58, 61
 - Emergency 43
 - Errors 88
 - External connection board connections 24
- F**
- Fan unit 88
 - Faults 37
 - Flue gas test 39
 - Frost 12, 43
 - Function testing 33
- G**
- Gas leak tests 28
 - Gas nozzle 67
 - Gas nozzles 30
 - Gas supply conduit 29
 - Gas supply pressure 30
 - Gas/air distributor plate 46
 - Gas/air ratio 31
- H**
- Heat exchanger 46, 89
 - Heater water temperature 41
 - Heating mode 68
 - Heating system water 43
 - Hot-water target value 41
- I**
- Inspection report 92
 - Installation room 12
 - Internal tightness testing 45
 - Ionisation electrode 61
 - Ionization current 33
 - Items supplied with unit 11
- M**
- Mains connection 24
 - Maintenance report 93
 - Manual mode 39
- O**
- Operating messages 87
 - Orifice plate 46
 - Outdoor-temperature sensor 24
- P**
- Part-load operation 39
 - Primary loop pump 24
 - Pump slowing-down period 41
- R**
- Resetting the burner 36, 37
- S**
- Safety 6
 - Service codes 88
 - Signs of corrosion 44
 - Start-up report 91
 - Switching contact, external 24
 - Switching on the heating system 36
- T**
- Technical specifications 89
 - Tightness test 33
 - Tools 6
 - Transportation 11
- V**
- Venturi 90

Contractor:



PRODUCTS MANUFACTURED BY

Buderus Heiztechnik GmbH,
35573 Wetzlar
<http://www.heiztechnik.buderus.de>
email: inof@heiztechnik.buderus.de

Buderus

Buderus Hydronic Systems
50 Wentworth Avenue
Londonderry, NH 03053
Tel: 603-552-1100 • Fax: 603-421-2719
www.buderus.net

***Buderus Hydronic Systems, reserves the right to make changes without
notice due to continuing engineering and technological advances***