



### **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.

### **NOTICE!**

In the Commonwealth of Massachusetts this boiler must be installed by a licensed Plumber or Gas Fitter.

**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 boiler.
- **What to do if you smell gas**
  - Do not try to light any boiler
  - 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.

## Logamax plus GB142-24/30/45/60

For installers

Please read thoroughly  
before servicing

# **Buderus**

### **About these instructions**

These Servicing Instructions contain important information to diagnose and resolve issues concerning the GB142 boiler with capacities 24, 30, 45 and 60 kW.

These 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.

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# 1 Safety and general instructions

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

## 1.1 Designated use

The boiler was designed for heating water for a space heating system and generating hot water e.g. for domestic purposes. The boiler is delivered with a BC10 basic controller and the "Universal Automatic Burner Control Unit 3" (UBA 3) pre-installed.

The boiler can be fitted with a modulating outdoor reset control AM10 (scope of delivery) and 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 can 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 can 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 boiler must only be used for its designated purpose, observing the Installation Instructions.
- Only use the boiler 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 boiler to the relevant gas utility company and have it approved.
- You are only allowed to operate the condensing gas boiler with the combustion air/flue gas system that has been specifically designed and approved for this type of boiler.
- 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/space heating system.
  - the Installation Instructions for building heating systems.
- The boiler must be located in an area where leakage of the tank or connections will not result in damage to the area adjacent to the boiler 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 boiler. The pan must not restrict combustion air flow.
- The boiler must be installed such that the gas ignition system components are protected from water (dripping, spraying, rain etc.) during boiler operation and service.
- The boiler must not be installed on carpeting.
- 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 boiler.

**What to do if you smell gas**

- Do not try to light any boiler.
- 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 heating 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 boiler 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 Inspection

We advise you to offer your customer an annual inspection and maintenance contract. If inspection reveals that maintenance work is necessary you can carry this out as required in the Installation instruction of the boiler.

### Installation

**CAUTION:**

- Check and clean the heating system at least once a year.
- Carry out a maintenance overhaul if necessary. Immediately repair defects to avoid damage to the heating system!
- Periodically examine the venting systems and cleaning of the screens in the vent terminal.
- Also periodically inspect the low water cutoffs, including flushing of float types.
- And periodically inspect the burner flames (see page 8, fig. 1, pos. 10).
- Check the neutralization unit if present.
- Check to see if there are no obstructions to the flow combustion and ventilation air.
- For direct vent boilers, proper reassembly and resealing of the vent-air intake system is required.

### Maintenance

- Cleaning the heat exchanger, the burner and the condensate trap (see installation instructions, Maintenance).
- Checking the ionization signal (par. 8.1.15, page 95)
- Checking and adjusting the gas/air ratio (par. 8.1.26, page 108).

## 1.7 Disposal

- Dispose of the boiler packaging in an environmentally sound manner.
- Dispose of components of the heating system (e. g. boiler or control device), that must be replaced, by handing them in to an authorized recycling facility.
- Keep boiler area clear and free from combustible materials, gasoline and other flammable vapors and liquids.

**1.8 Abbreviations**

AM10	=	Outdoor reset module
AS	=	System fault code
AV	=	Air Vent
BC	=	Operating code
BC10	=	Control panel (on the boiler)
BCT	=	Boulter Buderus cylinder thermostat
BDV	=	Boulter Buderus diverter valve
BKS	=	Blocking boiler fault code
CB	=	Connection Block
CH	=	Central Heating
CHF	=	Central Heating Supply
CHR	=	Central Heating Return
CM10	=	Cascade module
CT	=	Cylinder Thermostat
CWDO	=	Condensate water drainage outlet
CM10	=	Cascade module
DHW	=	Domestic Hot Water
DV	=	Diverter Valve
E	=	Earth
EM10	=	External control module
EMS	=	Energy management system
FA	=	Outdoor sensor
HK1 or HK2	=	Central Heating line
KIM	=	Boiler identification module
L	=	Live Line
LED	=	Light Emitting Diode
LSV	=	Lock Shield Valve
MCW	=	Mains Cold Water
MM10	=	Controler for HK2, second Central Heating line module.
N	=	Neutal
PE	=	Ground
PL	=	Permanent hot line
Prog	=	Programmer
RT or RC	=	Room Thermostat
SC	=	Service code
T	=	Timer
TRV	=	Thermostatic Radiator Valve
ÜC	=	Other display codes
UBA 3	=	Universal automatic burner control unit 3
VKS	=	Locking boiler fault code
WC	=	Wiring Centre
WM10	=	Controler for HK1, first Central Heating line
ZV	=	Two Port Zone Valve

## 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/CSA B149.1, Natural Gas and Propane Installation Code.

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. The boiler requires yearly maintenance, see maintenance section see chapter „8.1.27 Measuring the carbon monoxide content (CO)“ on page 109.

### Operating Limits of the boiler:

Max. boiler 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 boiler, it is important to check the condition of the entire hot water distribution system to ensure safe operation.

### Massachusetts Installations Only:

For direct-vent boilers, mechanical-vent heating boilers or domestic hot water equipment, where the bottom of the vent terminal and the intake is installed below four feet above grade the following requirements must be satisfied:

- 1) If there is not one already present, a carbon monoxide detector and alarm shall be placed in a living area outside the bedrooms. The carbon monoxide detector and alarm shall comply with NFPA 720 (2005 Edition).
- 2) A carbon Monoxide detector and alarm shall be located in the room that houses the boiler or equipment and shall:
  - a) Be powered by in series on the same electrical circuit as the boiler or equipment:
  - b) Have battery back-up power:
  - c) Meet ANSI/UL 2034 Standards and comply with NFPA 720 (2005 Edition):
  - d) Have been approved and listed by a Nationally Recognized Testing Lab:
- 3) A product-approved vent terminal must be used, and if applicable, a Product approved air intake must be used. Installation shall be in strict compliance with the manufacturer's instructions. A copy of the installation.

- 4) A metal or plastic identification plate shall be mounted at the exterior of the building, four feet directly above the location of vent terminal. The plate shall be of sufficient size to be easily read from a distance of eight feet away, and read "Gas Vent Directly Below".
  - b) For direct-vent boilers mechanical-vent heating boilers or domestic hot water equipment where the bottom of the vent terminal and the intake is installed four feet or above grade the following requirements must be satisfied:
    - 1) If there is not one already present, a carbon monoxide detector and alarm shall be placed in the living area outside the bedrooms, The carbon monoxide detector and alarm shall comply with NFPA 720 (2005 Edition).
    - 2) A carbon monoxide detector shall:
      - a) Be located inn the area where the boiler or equipment is located:
      - b) Have battery back-up power:
      - c) Be a minimum comply with NFPA 720 (2005 Edition).
    - 3) A product-approved vent terminal must be used, and if applicable, a product-approved air intake must be used. Installation shall be in strict compliance with the manufacturer's instructions. A copy of the installation instructions shall remain with the boiler or equipment at the completion of the installation.

### 3 Product description

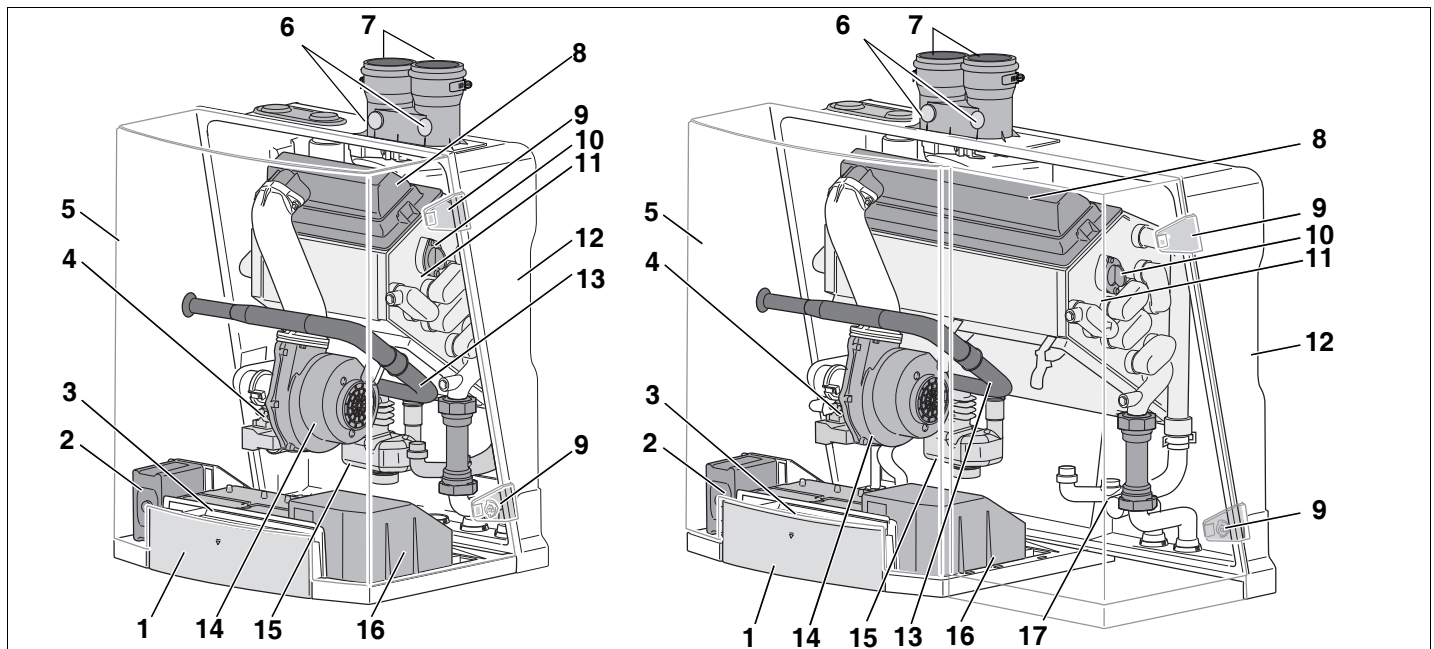


fig. 1 Logamax plus GB142-24/30 (left) and GB142-45/60 (right)

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>pos. 1: Drawer with control unit</li> <li>pos. 2: Universal Burner Automat (UBA 3)</li> <li>pos. 3: Control unit BC10</li> <li>pos. 4: Gas valve</li> <li>pos. 5: Cover</li> <li>pos. 6: Flue measuring points</li> <li>pos. 7: Parallel flue</li> <li>pos. 8: Burner</li> <li>pos. 9: Latches of which two have locks</li> </ul> | <ul style="list-style-type: none"> <li>pos. 10: Sighting glass</li> <li>pos. 11: Heat exchanger</li> <li>pos. 12: Back cover</li> <li>pos. 13: Air intake for the fan</li> <li>pos. 14: Fan</li> <li>pos. 15: Condensate trap and internal condensate drain flue gas pipe</li> <li>pos. 16: External Connection Board (under the cover)</li> <li>pos. 17: Pressure sensor</li> </ul> |
|--|--|

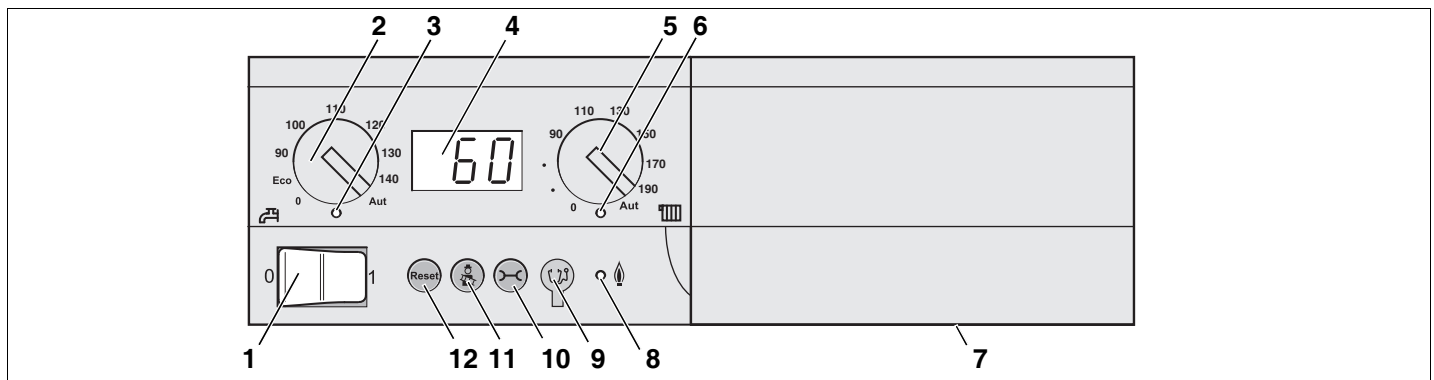


fig. 2 Basic Controller Logamatic BC10

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>pos. 1: Main switch</li> <li>pos. 2: DHW temperature knob <sup>1)</sup></li> <li>pos. 3: LED "DHW status"</li> <li>pos. 4: Display</li> <li>pos. 5: Space heating water temperature knob</li> <li>pos. 6: LED "Heating system status"</li> </ul> | <ul style="list-style-type: none"> <li>pos. 7: Under the cover a RC system controller can be installed.</li> <li>pos. 8: LED "Burner Operation"</li> <li>pos. 9: Service Tool connector</li> <li>pos. 10: "Service" button</li> <li>pos. 11: "Chimney sweep" button</li> <li>pos. 12: "Reset" button</li> </ul> |
|---|---|

<sup>1)</sup> ECO mode means that the temperature inside the hot water tank is 140 °F (60 °C), with a hysteresis ( $\Delta T$ ) of 18 °F instead of 9 °F



## 4 Operation

### 4.1 Operating the BC10 basic controller

#### 4.1.1 General

The boiler is equipped with an control unit, the basic controller BC10. The BC10 allows you to operate the boiler.

- Briefly press on the control panel cover to open it (see fig. 3).

The basic controller BC10 (see fig. 2) is located on the left side in the drawer.

On the right side of the drawer there's space for a RC control unit.

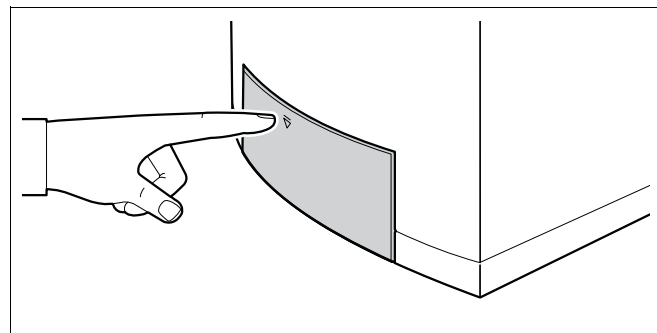


fig. 3 Opening the control panel

#### 4.1.2 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).



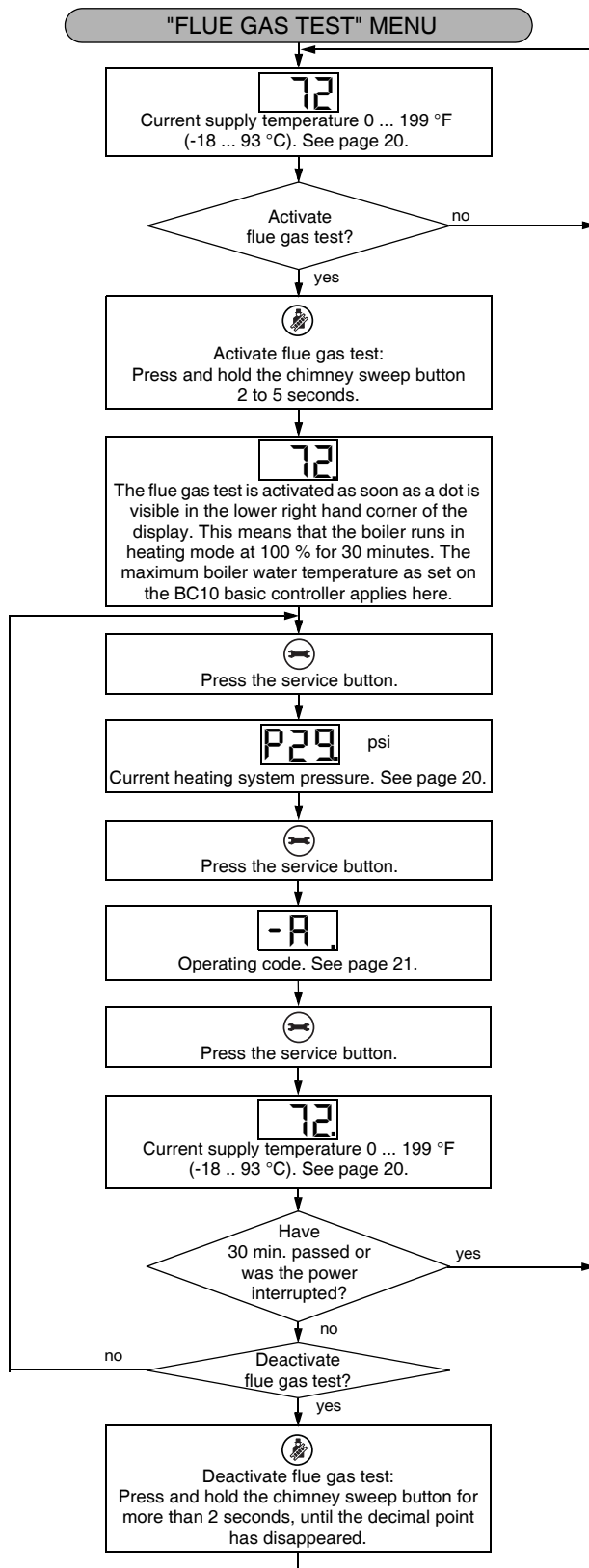
### 4.2 Menu structure of the BC10 basic controller

The menu structure of the boiler can be viewed on the BC10 using the "Reset" (Reset), "Chimney sweep" (Chimney sweep) and "Service" (Service) (see fig. 2, pos. 9, 10 and 11) buttons and the display indication (see fig. 2, pos. 4).

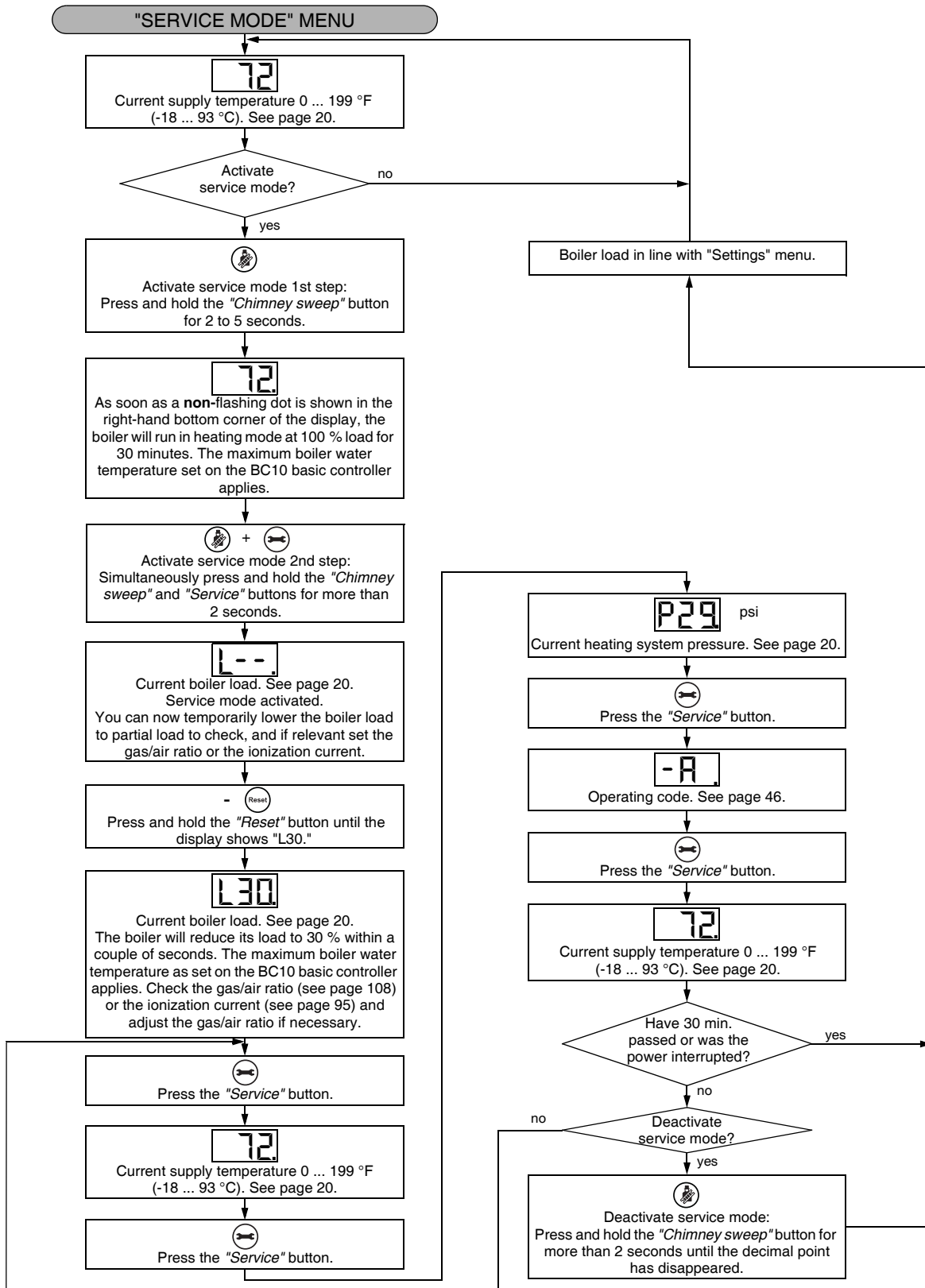
The menu structure consists of 4 menus, schematically represented on the following pages using structure diagrams:

- "Flue gas test" menu (page 10)
- "Service Mode" menu (page 11)
- "Manual Operation" menu (page 12)
- "Settings" menu (page 12).

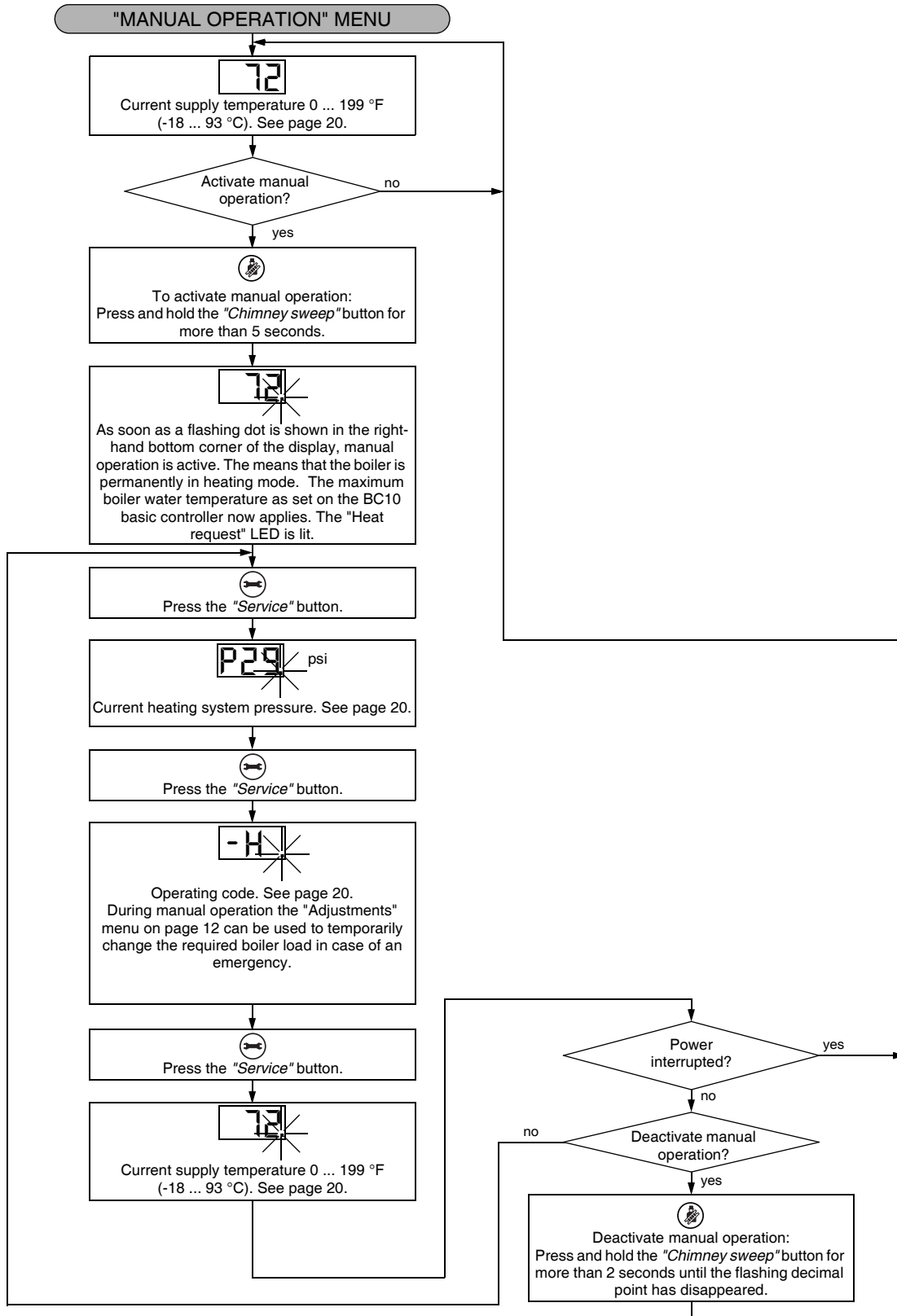
## 4.2.1 "Flue gas test" menu



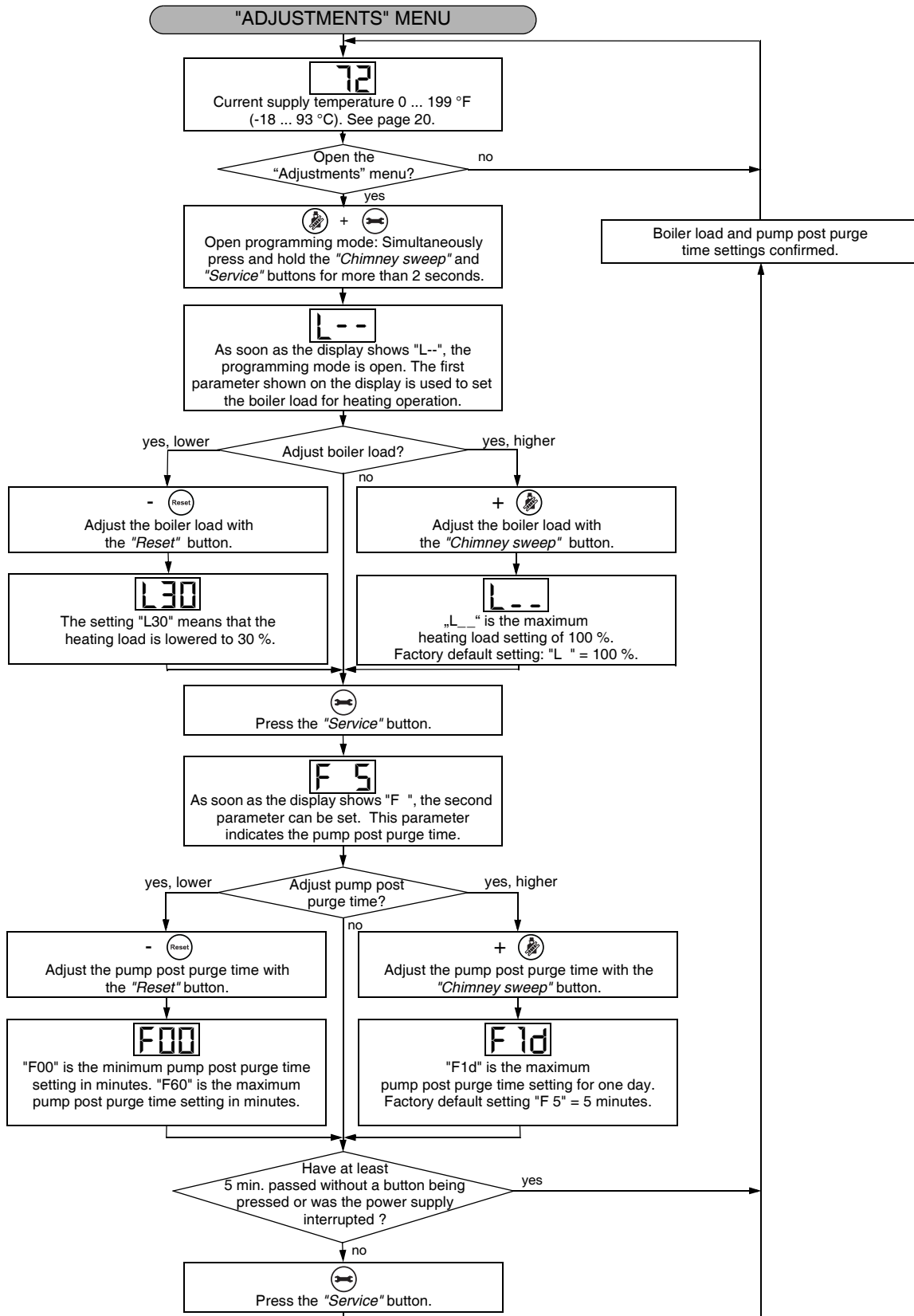
4.2.2 "Service Mode" menu



4.2.3 "Manual Operation" menu



4.2.4 "Adjustments" menu

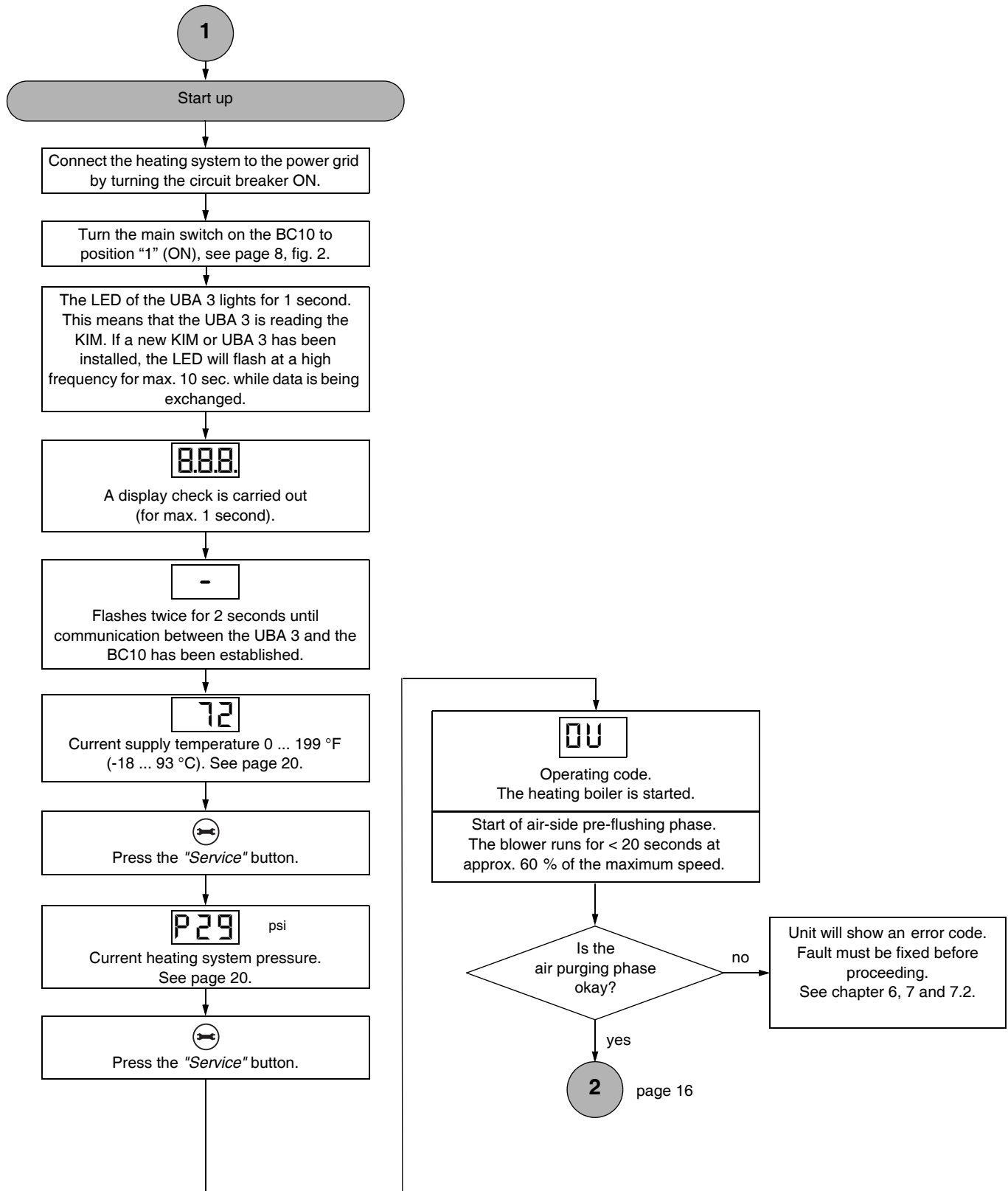


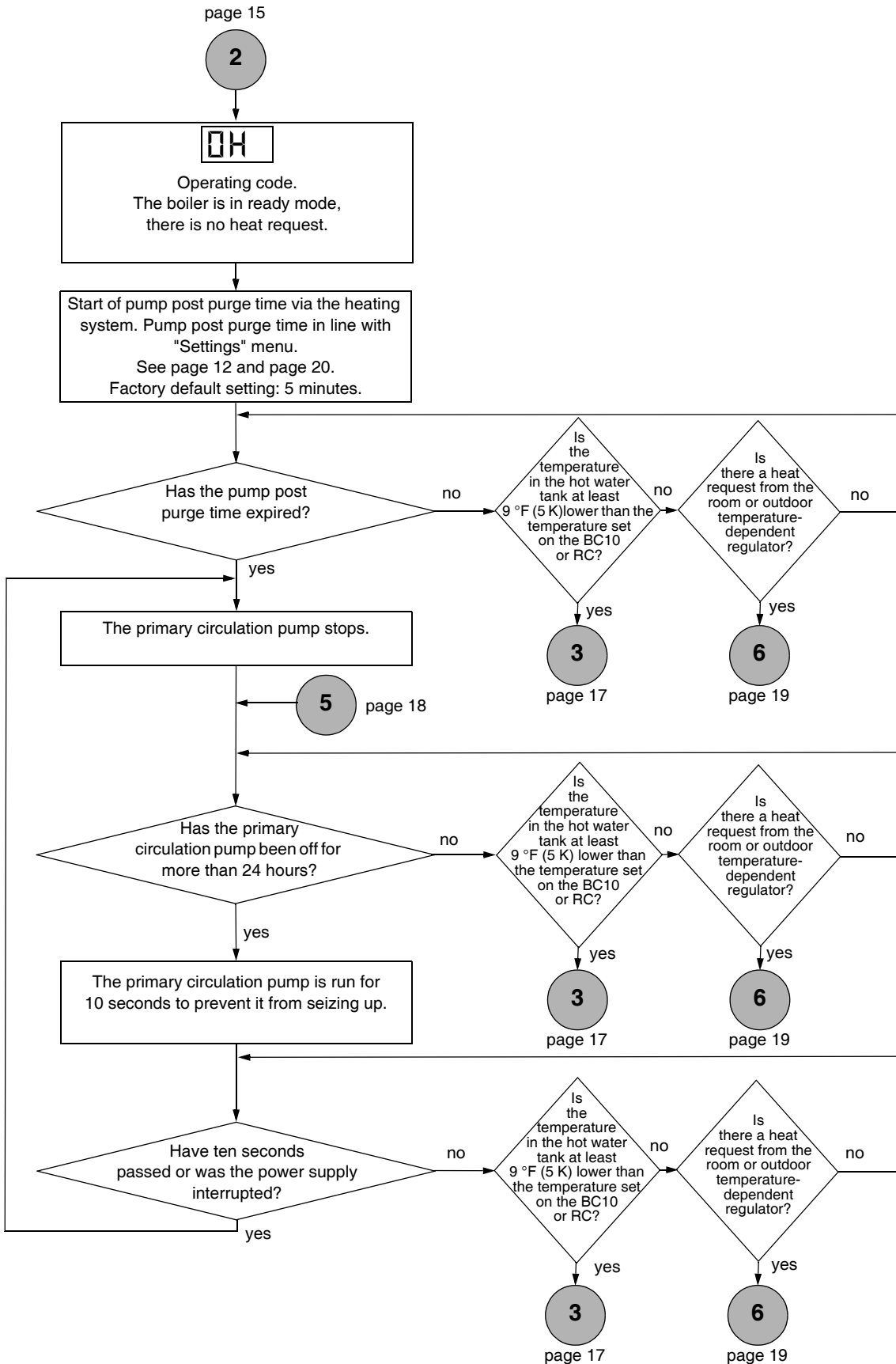
## 5 Function

### 5.1 General

To clarify the operation of the Logamax plus GB142-24/30/45/60 thermal power gas boilers under normal operating conditions, the work steps are schematically represented in the structure diagrams on the following pages of this chapter.

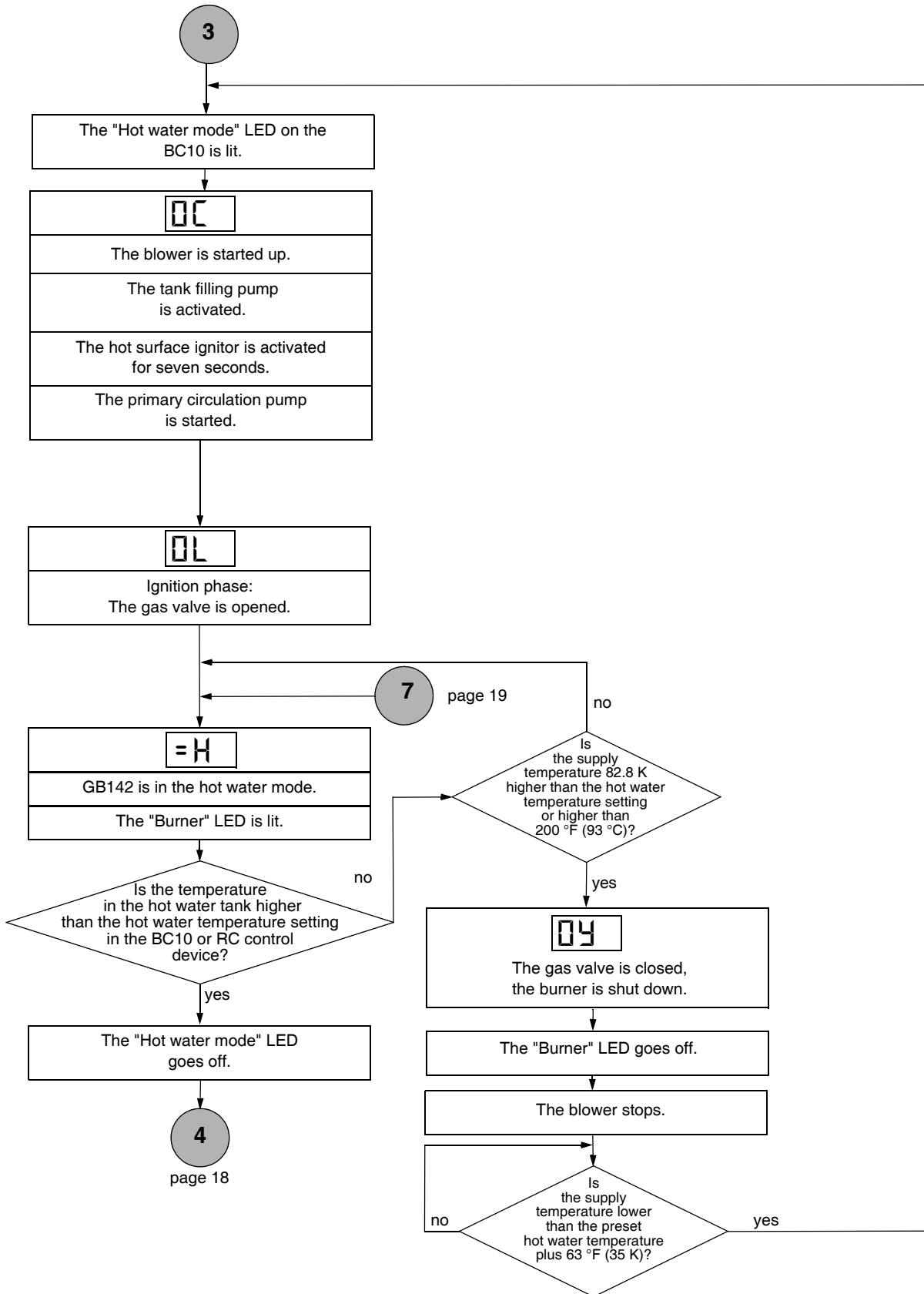
5.2 Structure diagram "Function"







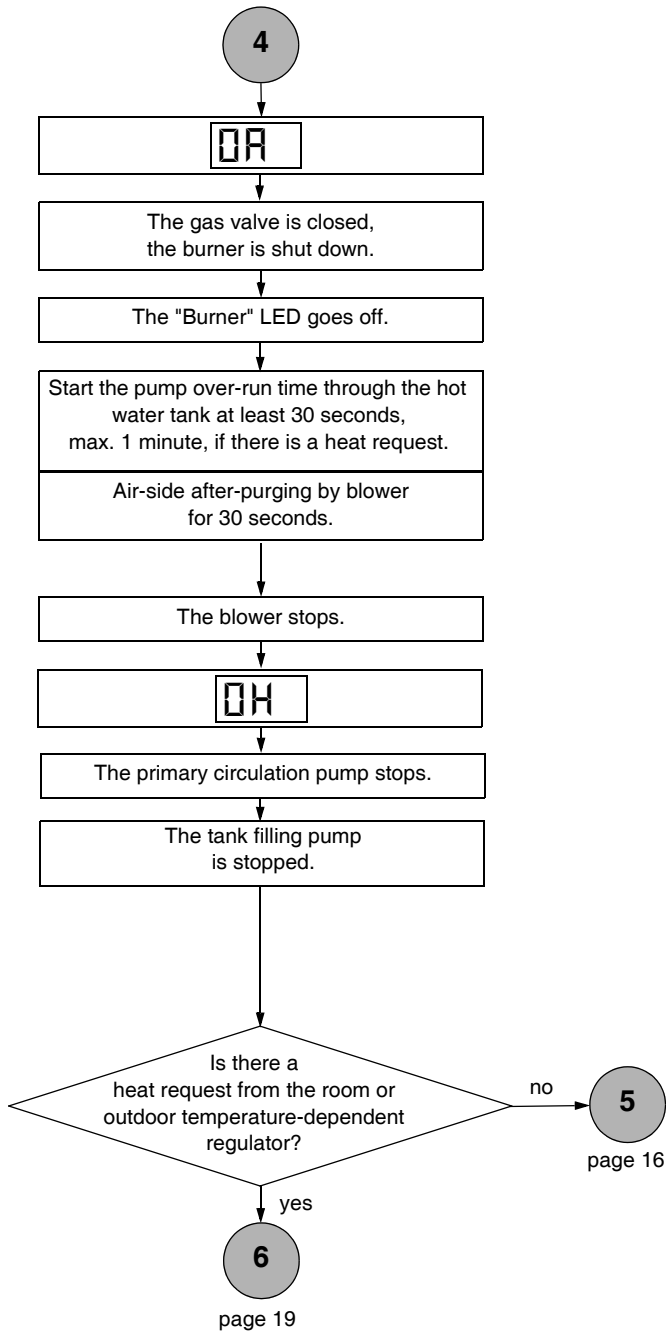
page 16



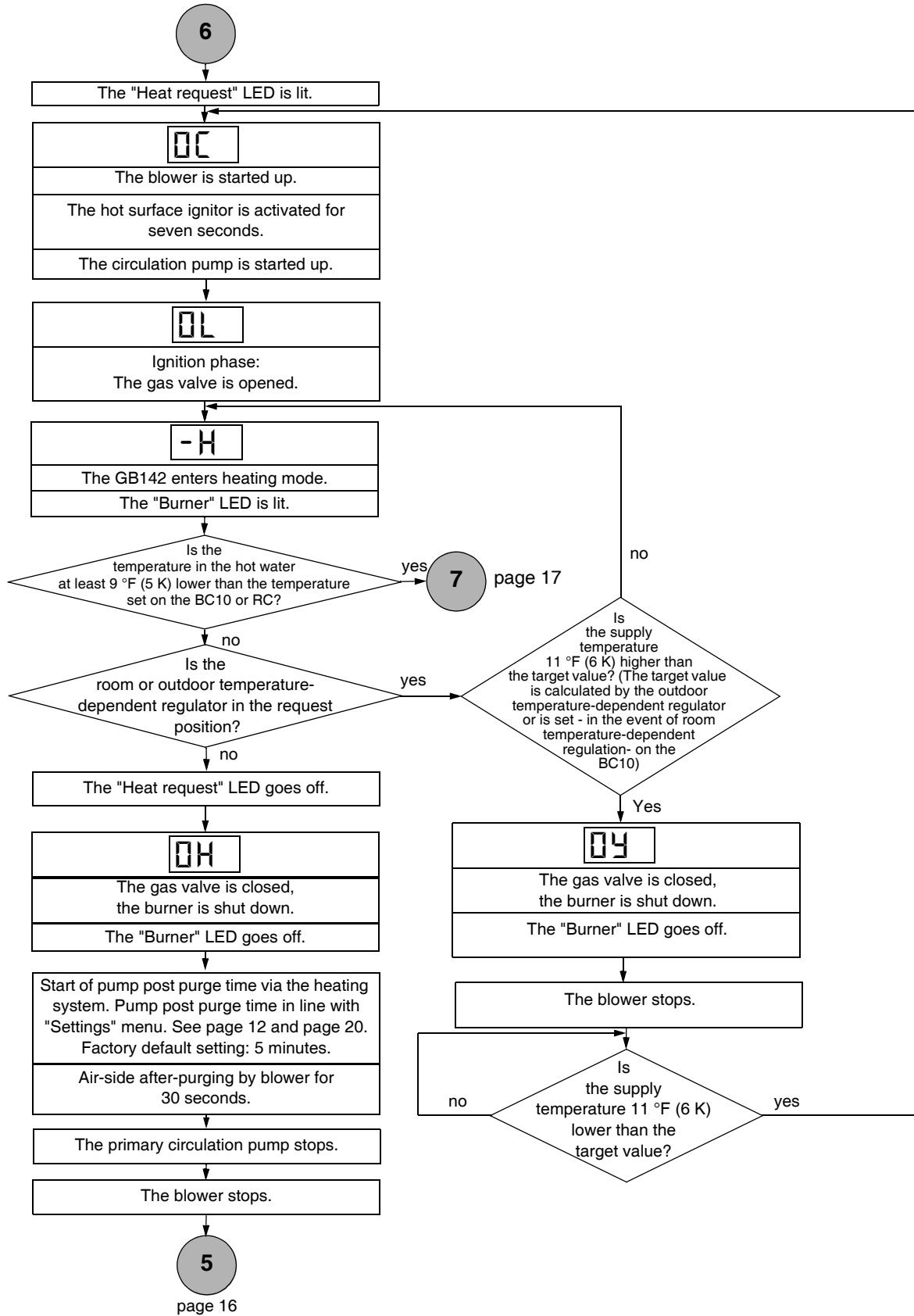
4  
page 18

7  
page 19

page 18



page 16, page 18





## 6 Symptoms

### 6.1 Display indication on the BC10 basic controller

#### 6.1.1 General

A display value or code is shown on the display of the BC 10 basic controller (see page 8, fig. 2).

#### 6.1.2 Display values on the display of the BC10 basic controller

The display value is shown automatically or can be called up by pressing the "Chimney sweep"  or "Service"  button (see page 10 and 12).


The following display values can be shown on the display of the BC10 basic controller:


Display value	Type of display value	Unit	Range	Factory default setting
72	Current supply temperature	°F	0 – 199 <sup>1)</sup> /	
		°C	-18 – 93	
P29	Current heating system pressure	psi	P00 – P29 /	
L99	Configured target load	%	L30 – L99 / L__	L__
F5	Configured target pump post purge time	min	F00 – F60 / F1d	F5

table 1 Display values on the BC10 basic controller

#### 6.1.3 Display codes on the display of the BC10 basic controller

A display code shows the current status of the Logamax plus GB142.

The display value is shown automatically or can be called up by pressing the "Service"  button.

Two display codes (see table 2 level 3 and level 4) are shown. After the first display code (level 3) is displayed, the second one (level 4) can be called up by pushing the "Service"  button. On the BC10 basic controller level 4 can only be called up in the event of a fault code.

Under normal operating conditions it is only possible to call up level 4 using the RC control device or a service tool.

If the display code is a fault code, this fault code either flashes (locked fault code) in the display or it is shown permanently (blocking fault code). A boiler reset is only necessary with a locking fault code (flashing) (see 8, fig. 2). The cause of the fault must be remedied first. The cause has to be remedied and the boiler resumes regular operation.

In the event of a locking boiler fault code both the display value and the display code flash.

If there are more than once display codes at the same time, the display codes will be shown in turn. And if one of these display codes is a locking display code, the blocking display codes shown will also flash.

The following display values can be shown on the display of the BC10 basic controller:

**Abbreviations used in table 2:**

Type of display code:

BC - Operating code

SC - Service code

BKS - Blocking boiler fault code

VKS - Locking boiler fault code (flashing)

AS - System fault code

ÜC - Other display codes
















Symptoms					Key to display code	Type of display code	Reset required ?	Other symptoms	Diagnosis	Remedy
Display code										
	Main display code		Sub-display code							
								No indication in display.	page 28	page 28
					Communication test while starting up. This code flashes 2 x 2 seconds while starting up to indicate that the communication between the UBA 3 and the BC10 basic controller is being tested. If a new UBA 3 or a new KIM was fitted, this code will flash for max. 10 seconds. If this code continues to flash on the display, there is a fault in the communication between the UBA 3 and the BC10 basic controller. See page 46. This fault code will also appear when connecting a thermostat to the RC terminals.	ÜC		No heating operation and no hot water.		
	-R		200 1)		The boiler is in the flue gas test mode or in service mode.	BC			page 10 or page 11	page 10 or page 11
	-H		200 1)		The boiler is in heating mode.	BC				
	-H		200 1)		The boiler is in manual operation mode.	BC		The room temperature is too high.	page 12	page 12
	H		201 1)		The boiler is in hot water mode.	BC				
	0A		305 1)		The boiler has switched off. Start the pump over-run time via the tank for at least 30 seconds and maximum 1 minute.	BC				

table 2 Display indications on the BC10 basic controller

<sup>1)</sup> only visible using the service tool

<sup>2)</sup> is being carried out



































Symptoms					Diagnosis	Remedy				
Display code			Key to display code	Type of display code			Reset required ?	Other symptoms		
	Main display code				Sub-display code					
	0R		202 1)		Operating phase: The switch optimization program is activated.  This program is activated if there is more than one burner firing requests from an RC or ON/OFF regulator within 10 minutes.  This means that the boiler cannot be restarted until at least ten minutes have elapsed since initial startup of the burner.	BC		Possibly no heating operation.		
	0C		283 1)		The burner is started.	BC				
	0E		265 1)		Readiness for operation: The boiler is in ready mode. The time-proportional program is activated.  The time-proportional program is activated as soon the load requested by the modulating room controller is lower than the lower limit of the boiler load.  During the time-proportional program the burner is switched on and off repeatedly.  The period in which the burner is switched on depends on the difference between the load required by the modulating room controller and the lower limit of the boiler load. As soon as the burner is switched on, the device is operating at minimum load. As soon as the burner is switched off, the display code  265 is indicated in the display of the BC10.  The time-proportional program is deactivated automatically as soon as the load required by the modulating room controller is higher than the lower limit of the boiler load.	BC				
	0H		203 1)		The boiler is in ready mode, there is no heat request.	BC				
	0L		284 1)		The gas valve is opened.	BC				
	0U		270 1)		Power Up. Boiler is starting up after a reset or after the main power is switched on. This display code will be displayed for 4 minutes maximum.	BC				
	0Y		204 1)		The boiler switches off, the temperature is higher than the target temperature.	BC				
	0Y		276		The supply sensor has measured a temperature higher than 203 °F (95 °C).	BKS	no			
	0Y		277		The safety sensor has measured a temperature higher than 203 °F (95 °C).	BKS	no			
	0Y		285		The return sensor has measured a temperature higher than 203 °F (95 °C).	BKS	no			

table 2 Display indications on the BC10 basic controller

1) only visible using the service tool  
2) is being carried out


























































Display code					Symptoms			Diagnosis	Remedy
	Main display code		Sub-display code		Key to display code	Type of display code	Reset required ?		
	1C		210		Flue gas sensor is activated (not available).	BKS	no	Flue gas sensor has measured a flue gas temperature higher than 221 °F (105 °C)	
	1L		211		The UBA 3 does not register any connections to the unused contacts 78 and 50.	BKS	no	No heating operation and no hot water.	page 48
	2E		207		The system pressure is too low.	BKS	no	No heating operation and no hot water.	page 48
	2F		260 <sup>1)</sup>		No temperature increase after burner start or the temperature difference between the supply and safety sensors is more than 27 °F (15 K).	BC			page 49
	2F		271		The temperature difference between the supply and safety sensors is more than 27 °F (15 K).	BKS	no		page 49
	2L		266		The primary circulation pump does not generate a pressure difference.	VKS	yes	No heating operation and no hot water.	page 50
	2P		212 <sup>1)</sup>		Temperature increase of supply sensor or safety sensor is more than 9 °F/sec (5 K/sec).	BC			page 52
	2U		213 <sup>1)</sup>		The temperature difference between the supply and return sensors is more than 90 °F (50 K).	BC			page 53
	3A		264		The air flow by the blower has failed during the operating phase.	BKS	no		page 54
	3F		273		The blower is switched off during the safety test.	BKS	no		page 55
	3L		214		The blower is switched off during the safety test.	VKS	yes	No heating operation and no hot water.	page 56
	3P		216		The blower is running too slowly.	VKS	yes	No heating operation and no hot water.	page 57
	3Y		215		The blower is running too fast.	VKS	yes	No heating operation and no hot water.	page 58
	4A		218		The supply sensor has measured a temperature higher than 221 °F (105 °C).	VKS	yes	No heating operation and no hot water.	page 59
	4C		224		The UBA 3 does not register the short cut between the unused contacts 22 and 24.	VKS	yes	No heating operation and no hot water.	page 60
	4E		278		The sensor test has failed.	VKS	yes	No heating operation and no hot water.	page 60
	4L		220		The safety sensor is shorted or measures temperatures higher than 266 °F (130 °C).	VKS	yes	No heating operation and no hot water.	page 61
	4P		221		The safety sensor contact is interrupted.	VKS	yes	No heating operation and no hot water.	page 62
	4U		222		The supply sensor is shorted.	VKS	yes	No heating operation and no hot water.	page 63

table 2 Display indications on the BC10 basic controller

<sup>1)</sup> only visible using the service tool

<sup>2)</sup> is being carried out


























































Symptoms					Key to display code	Type of display code	Reset required ?	Other symptoms	Diagnosis	Remedy
Display code										
	Main display code		Sub-display code							
	44		223		The supply sensor contact is interrupted.	VKS	yes	No heating operation and no hot water.	page 64	page 64
	6A		227		No ionization after ignition. After four startup attempts, a locking boiler fault follows -6A-	BKS	no		page 65	page 65
	6A		227		No ionization after four startup attempts.	VKS	yes	No heating operation and no hot water.	page 65	page 65
	6C		228		An ionization current was measured before the burner start.	VKS	yes	No heating operation and no hot water.	page 72	page 72
	6C		306		An ionization current was measured after the burner switch-off.	VKS	yes	No heating operation and no hot water.	page 72	page 72
	6L		229		Ionization fails during the operating phase.	BKS	no		page 73	page 73
	6P		269		The hot surface ignitor activates too long.	VKS	yes	No heating operation and no hot water.	page 78	page 78
	7C		231		The power supply was interrupted and switched on again after a fault message.	VKS	yes	No heating operation and no hot water.	page 78	page 78
	7L		261		The UBA 3 is defective.	VKS	yes	No heating operation and no hot water.	page 78	page 78
	7L		280		The UBA 3 is defective.	VKS	yes			
	84		232 1)		The external switch contact is activated.	BC			page 79	page 79
	888				Display test while starting up. This code is displayed for a maximum of 1 second.	ÜC				
	9A		235		KIM or UBA 3 is defective.	VKS	yes	No heating operation and no hot water.	page 80	page 80
	9H		237		KIM or UBA 3 is defective.	VKS	yes	No heating operation and no hot water.	page 80	page 80
	9H		267		The UBA 3 is defective.	VKS	yes	No heating operation and no hot water.		
	9H		272		The UBA 3 is defective.	VKS	yes	No heating operation and no hot water.		
	9L		234		The gas valve coil or the wiring to the gas valve is defective.	VKS	yes	No heating operation and no hot water.	page 81	page 81
	9L		238		The UBA 3 is defective.	VKS	yes			
	9P		239		KIM or UBA 3 is defective.	VKS	yes	No heating operation and no hot water.	page 80	page 80
	9U		233		KIM or UBA 3 is defective.	VKS	yes	No heating operation and no hot water.	page 80	page 80

table 2 Display indications on the BC10 basic controller

1) only visible using the service tool  
 2) is being carried out





















Symptoms					Diagnosis	Remedy				
Display code			Key to display code	Type of display code			Reset required ?	Other symptoms		
	Main display code				Sub-display code					
	A01		800		Outdoor sensor	AS		The minimum outdoor temperature is assumed.	Sensor connected or fitted incorrectly.	Check the sensor connection and the sensor wire.
									Sensor wire broken or shorted.	Check the sensor installation.
									The sensor is defective.	Compare the resistance value to the sensor graph.
	A01		808		Hot water temperature sensor	AS		No water is heated any more.	Sensor connected or fitted incorrectly.	Check the sensor connection and the sensor wire.
	A01		809		Hot water temperature sensor 2				Sensor wire broken or shorted.	Check the sensor installation on the hot water tank.
									The sensor is defective.	Compare the resistance value to the sensor graph.
	A01		810		Hot water remains cold.	AS		The system constantly tries to heat the hot water tank to the hot water target value setting. The hot water priority is cancelled when the fault message appears.	Permanent tapping or leak.	Remedy the leak if relevant.
					Sensor connected or fitted incorrectly.				Check the sensor connection and the sensor wire.	
					Sensor wire broken or shorted.				Check the sensor installation on the hot water tank.	
					The sensor is defective.				Compare the resistance value to the sensor graph.	
									Fill pump connected incorrectly or defective.	Test the fill pump operation e. g. using a relay test.
	A01		811		Thermal disinfection.	AS		Thermal disinfection was interrupted.	Tap flow rate too great during disinfection period.	Choose the time for thermal disinfection so that no additional heat request occurs at this time.
					Boiler load too low for simultaneous heat use by other connected loads (e. g. 2nd heating circuit).					
					Sensor connected or fitted incorrectly.				Check the sensor connection and the sensor wire.	
					Sensor wire broken or shorted.				Check the sensor installation on the hot water tank.	
					The sensor is defective.				Compare the resistance value to the sensor graph.	
					Fill pump defective				Test the fill pump operation e. g. using a relay test.	

table 2 Display indications on the BC10 basic controller

1) only visible using the service tool

2) is being carried out




































Symptoms					Key to display code	Type of display code	Reset required ?	Other symptoms	Diagnosis	Remedy
Display code										
	Main display code		Sub-display code							
	RD1		B16		No communication with EMS.	AS		The boiler no longer gets heat requests; the heating system no longer heats.	EMS bus system is overloaded. UBA 3/MC10 is defective.	Reset by switching the heating system on and off. Inform the BUDERUS customer service department if necessary.
	RD1		B28		Water pressure sensor.	AS			The digital water pressure sensor is defective.	Replace the digital water pressure sensor.
	RD2		B16		No communication with BC10.	AS		BC10 settings are no longer taken over by RCxx devices.	Contact problem at BC10 or BC10 is defective.	Check the BC10 connection. Replace the BC10 if necessary.
	CO		288		The UBA 3 has no connection to the pressure sensor or there is a short circuit.	VKS	yes	No heating operation and no hot water.	page 82	page 82
	CO		289		Short circuit in connection to pressure sensor.					
	CA		286		The return sensor has measured a temperature higher than 221 °F (105 °C).	VKS	yes			
	CU		240		The return sensor is shorted.	VKS	yes			
	CY		241		The return sensor contact is interrupted.	VKS	yes			
	E + any digit or letter		290		The UBA 3 is defective.	BKS	no	No heating operation and no hot water.	page 80	page 80
	E + any digit or letter		242 to 287		KIM or UBA 3 is defective.	VKS	yes	No heating operation and no hot water.	page 80	page 80
	H7				The heating system pressure is too low.	SC			page 78	page 80
	H7				The heating system pressure is too low.	SC			page 78	page 80
	rE				Reset is carried out. After pressing the "Reset" button this code is displayed for 5 seconds.	ÜC	<sup>2)</sup>			

table 2 Display indications on the BC10 basic controller

<sup>1)</sup> only visible using the service tool

<sup>2)</sup> is being carried out

## 6.2 LED on the UBA 3

In addition to the display indication on the BC10 basic controller, there is a red LED on the UBA 3.

The meaning of this LED is explained in see table 3.

LED	Meaning
Off	Normal operation
Flashing slowly (1 Hz)	There is a boiler fault (locking fault).
Flashing fast (10 seconds)	During startup after replacing the KIM or the UBA 3.
On	During a fault in the UBA 3 or if the KIM is not recognized.

table 3 LED on the UBA 3

## 7 Diagnosis

### 7.1 Faults without a fault code

#### Hot water request

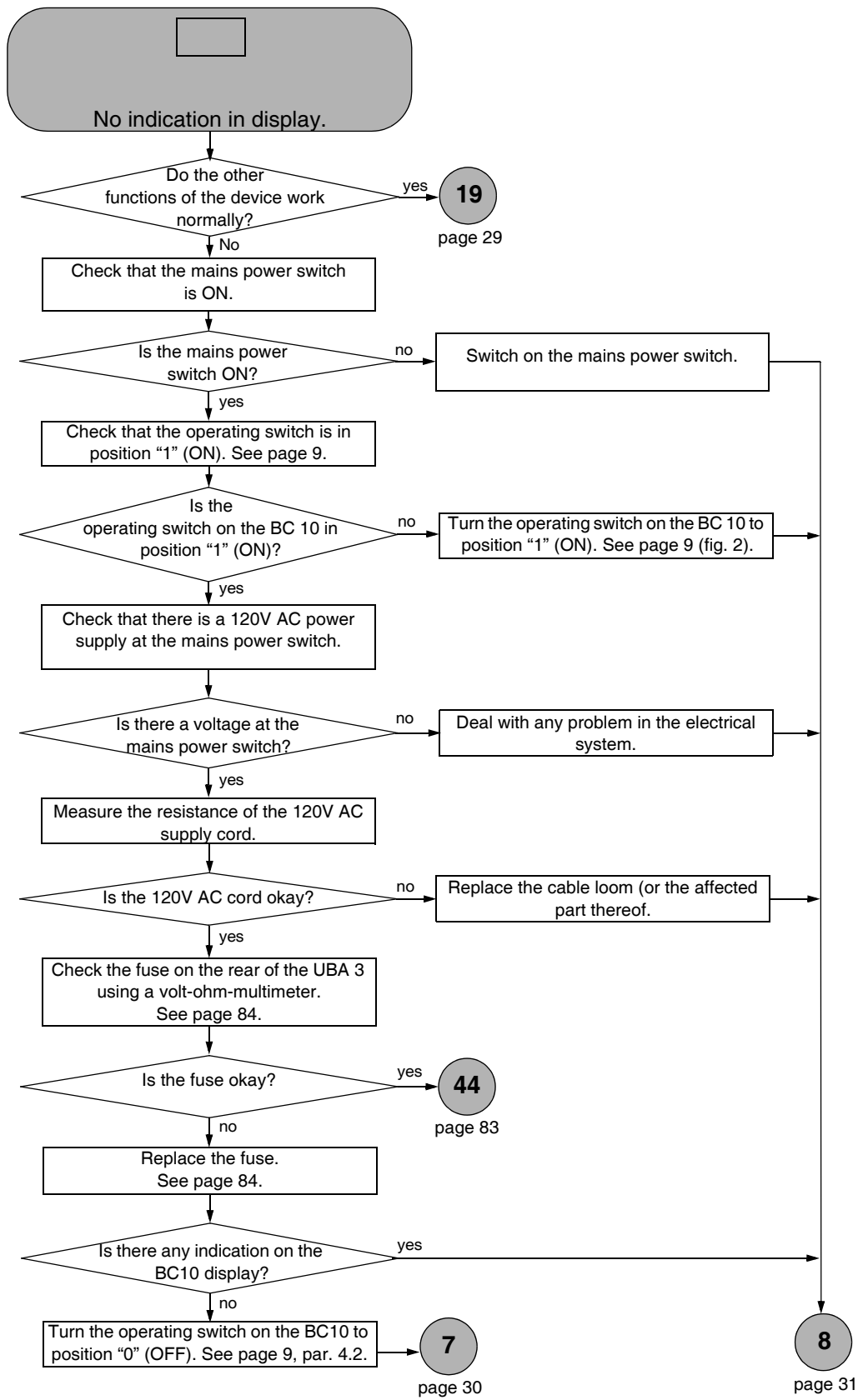
Although the UBA 3 indicates that the system is ready for operation, it is possible that in the event of a hot water request no hot water is made available, or it is only made available for a short time.

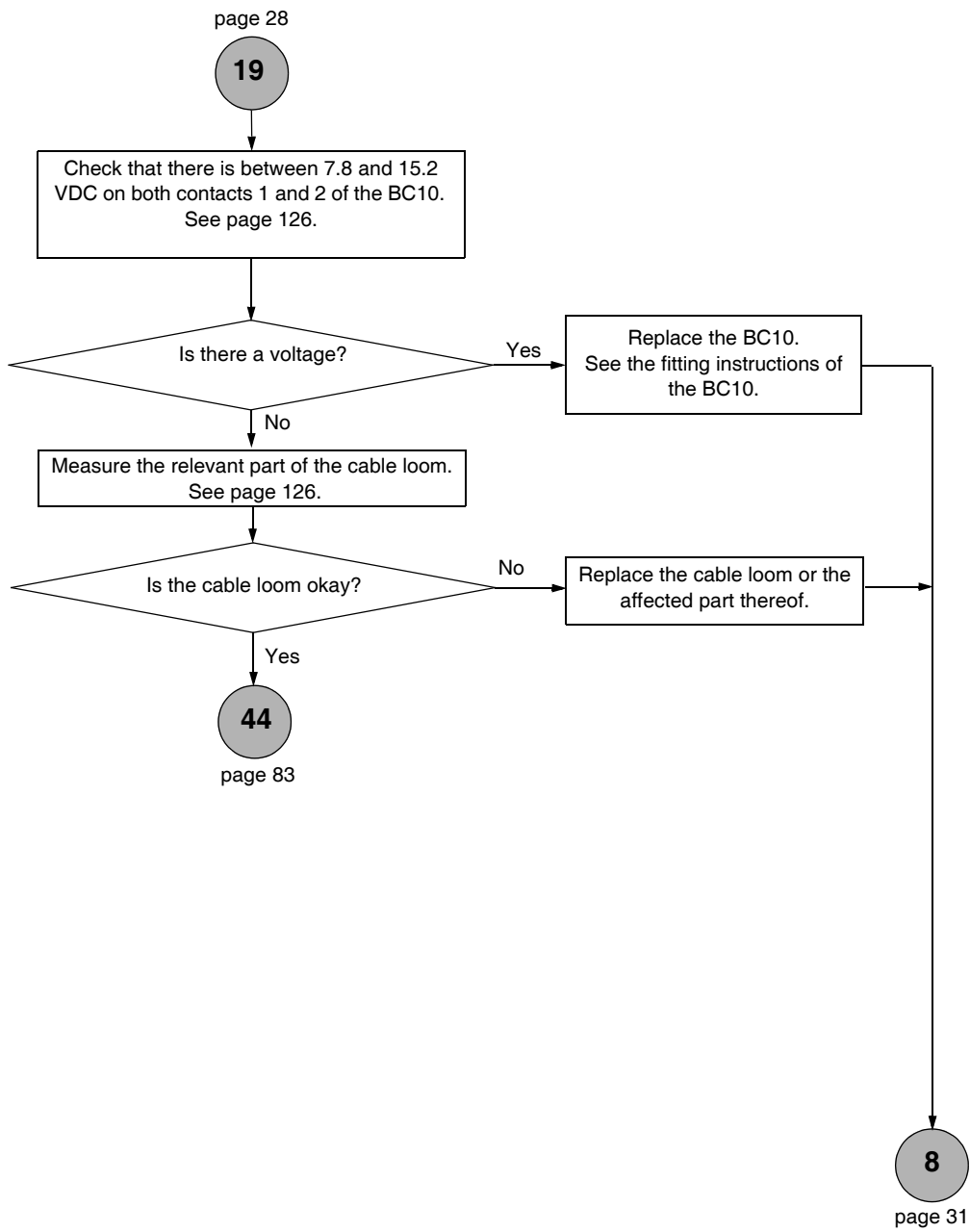
Structure diagram for troubleshooting, see page 33.

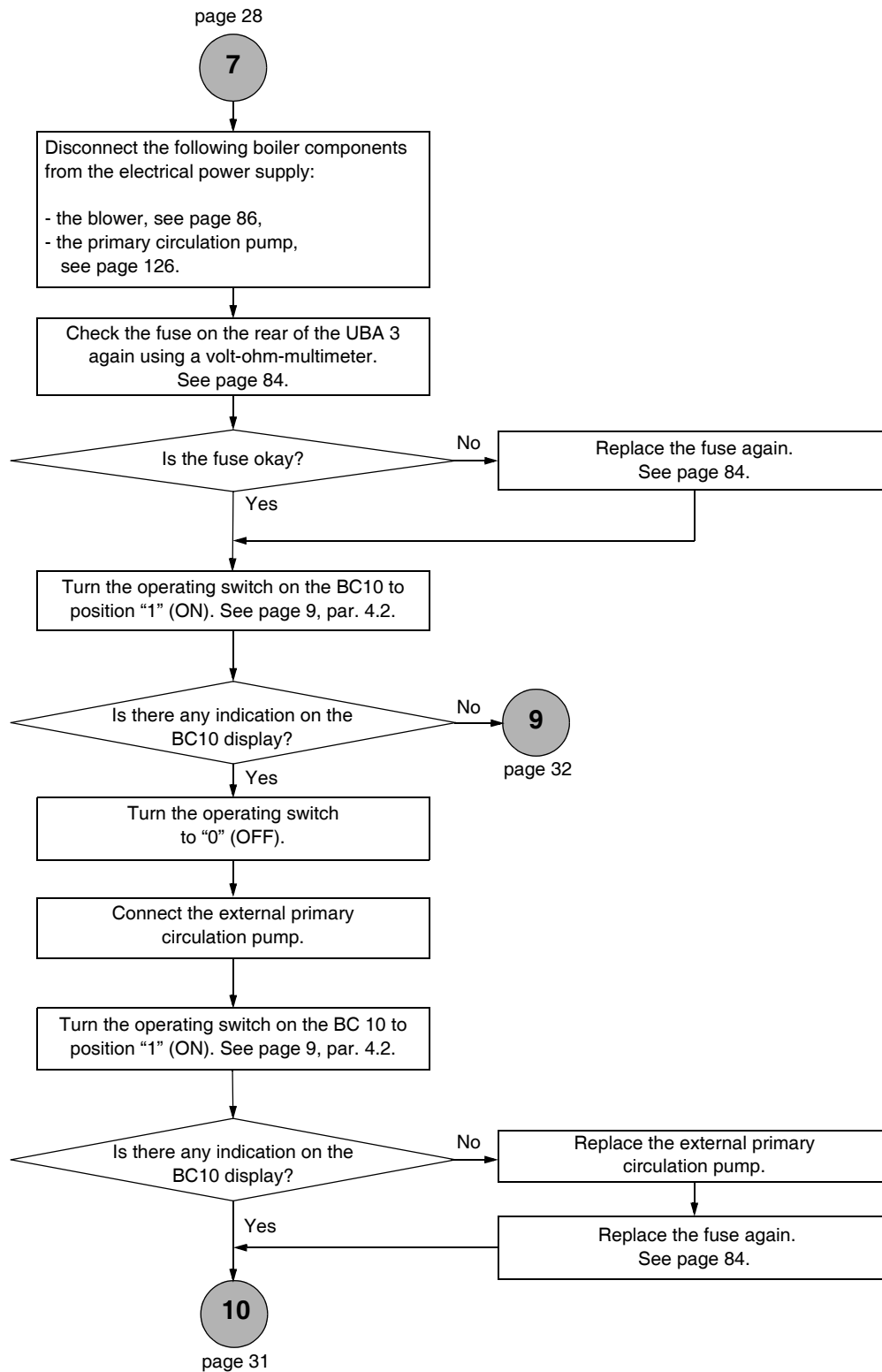
#### Heating mode

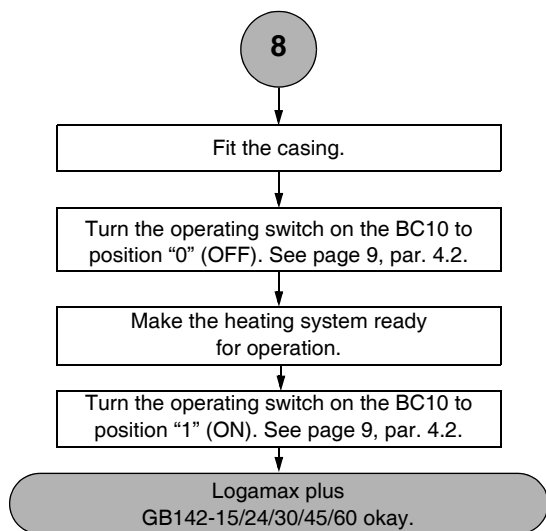
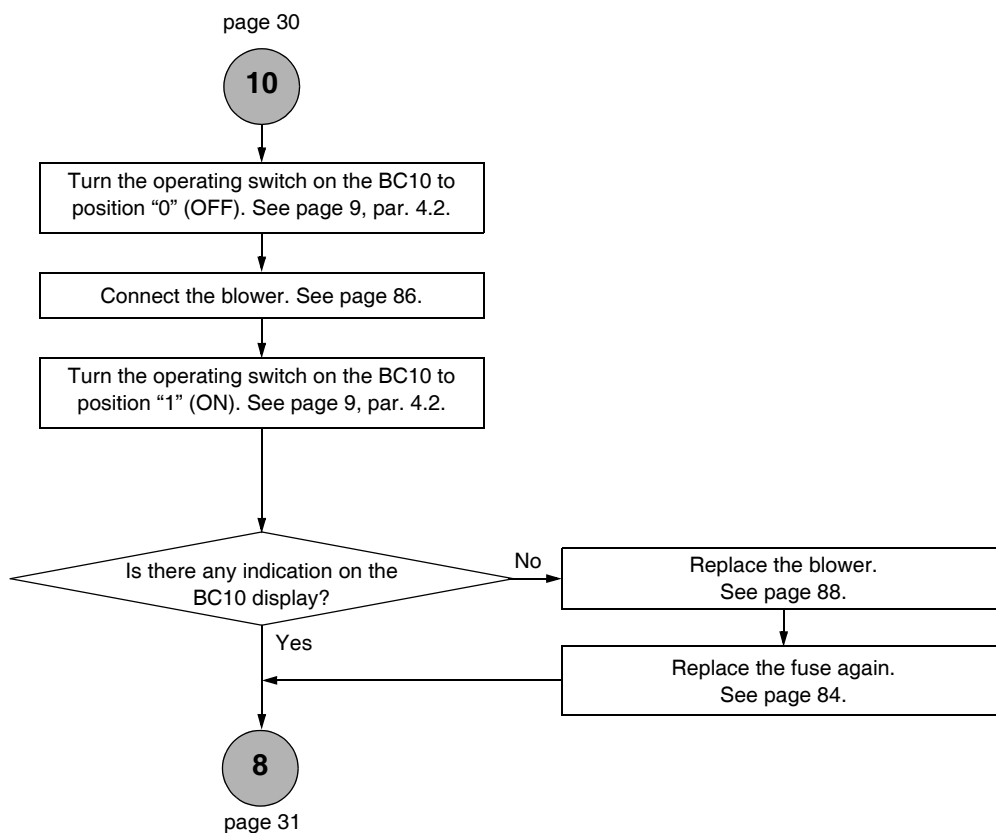
Although the UBA 3 shows that the system is ready for operation and the room temperature has not reached the preset value, the Logamax plus GB142 does not enter the heating mode.

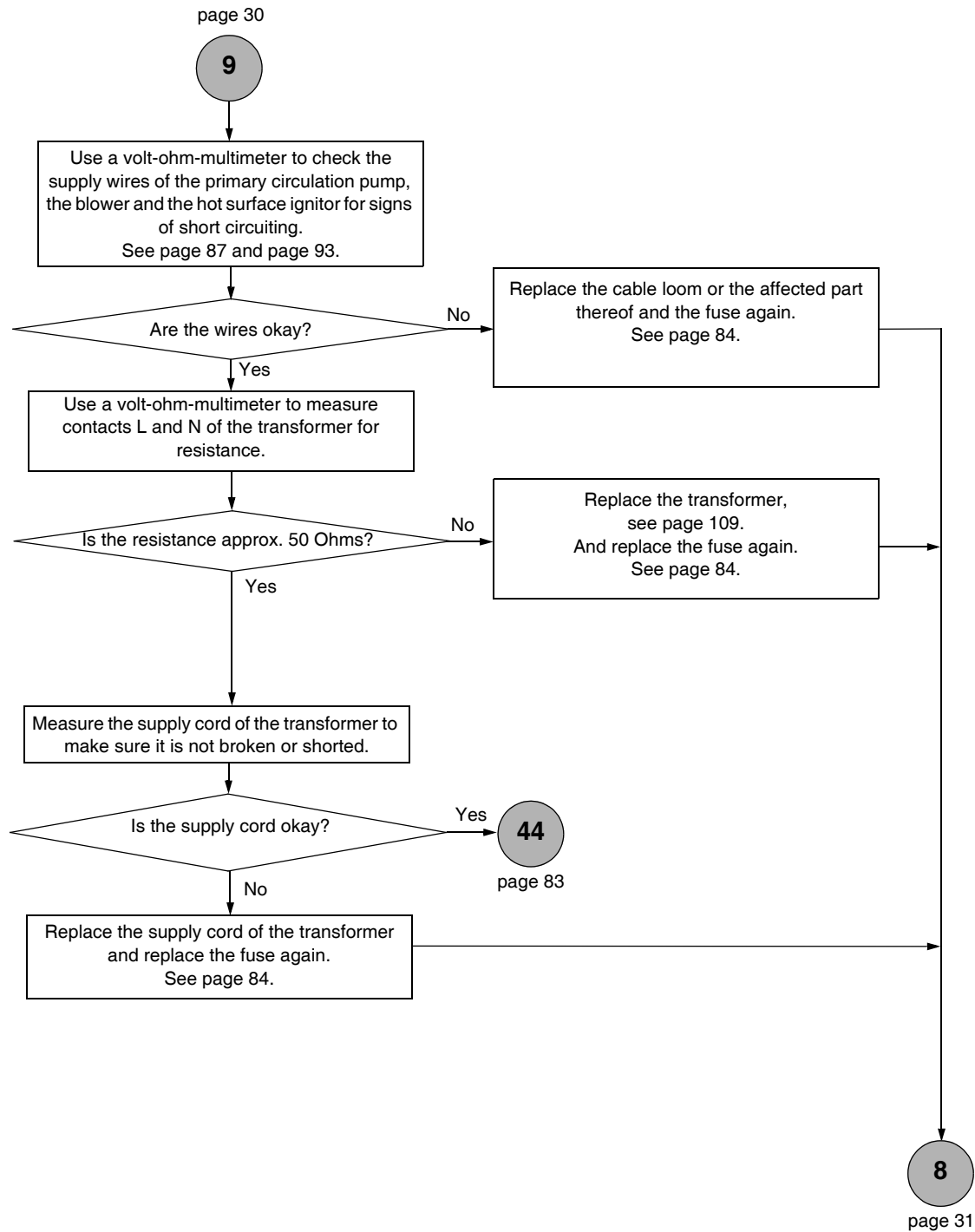
Structure diagram for troubleshooting: page 44.



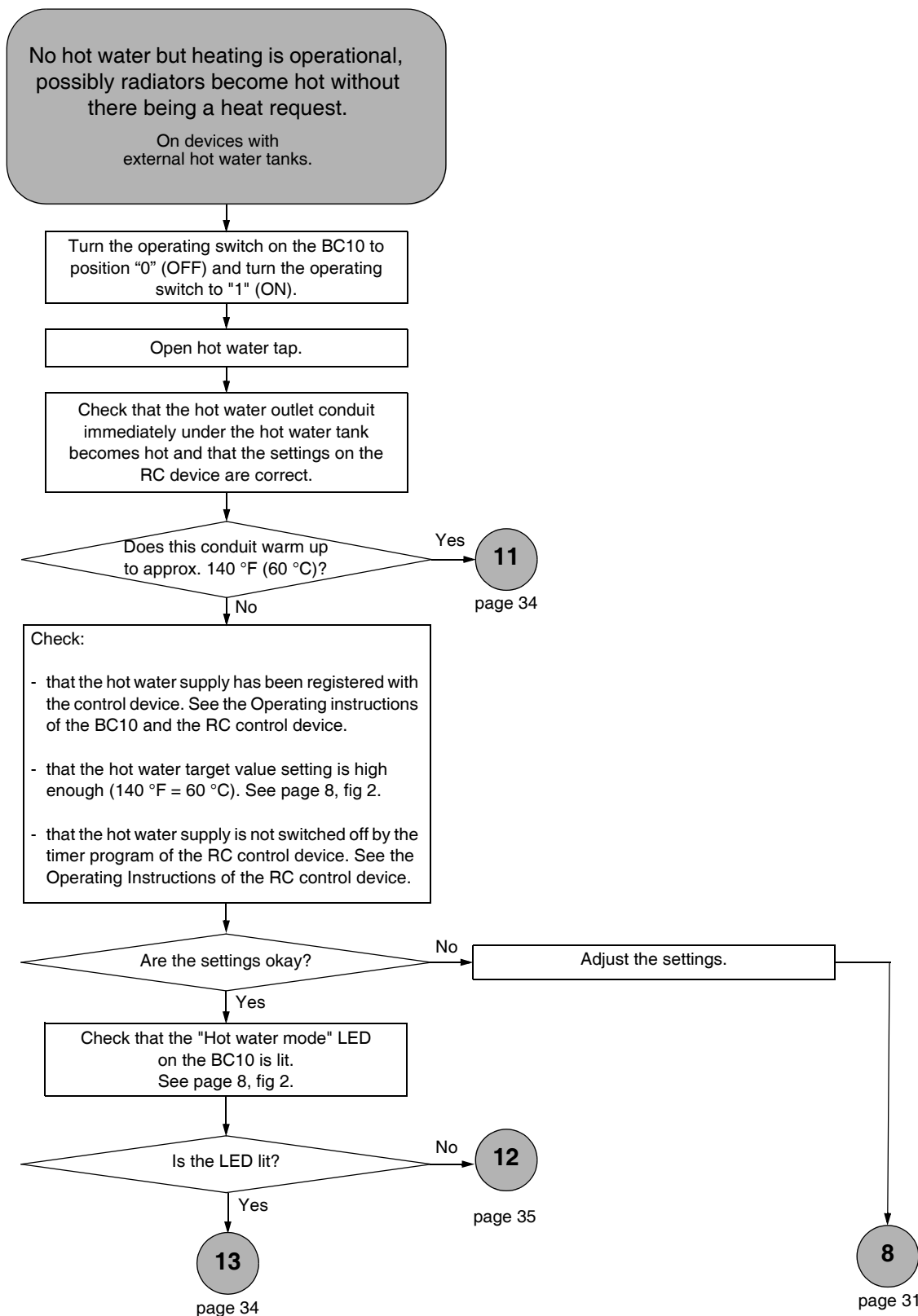


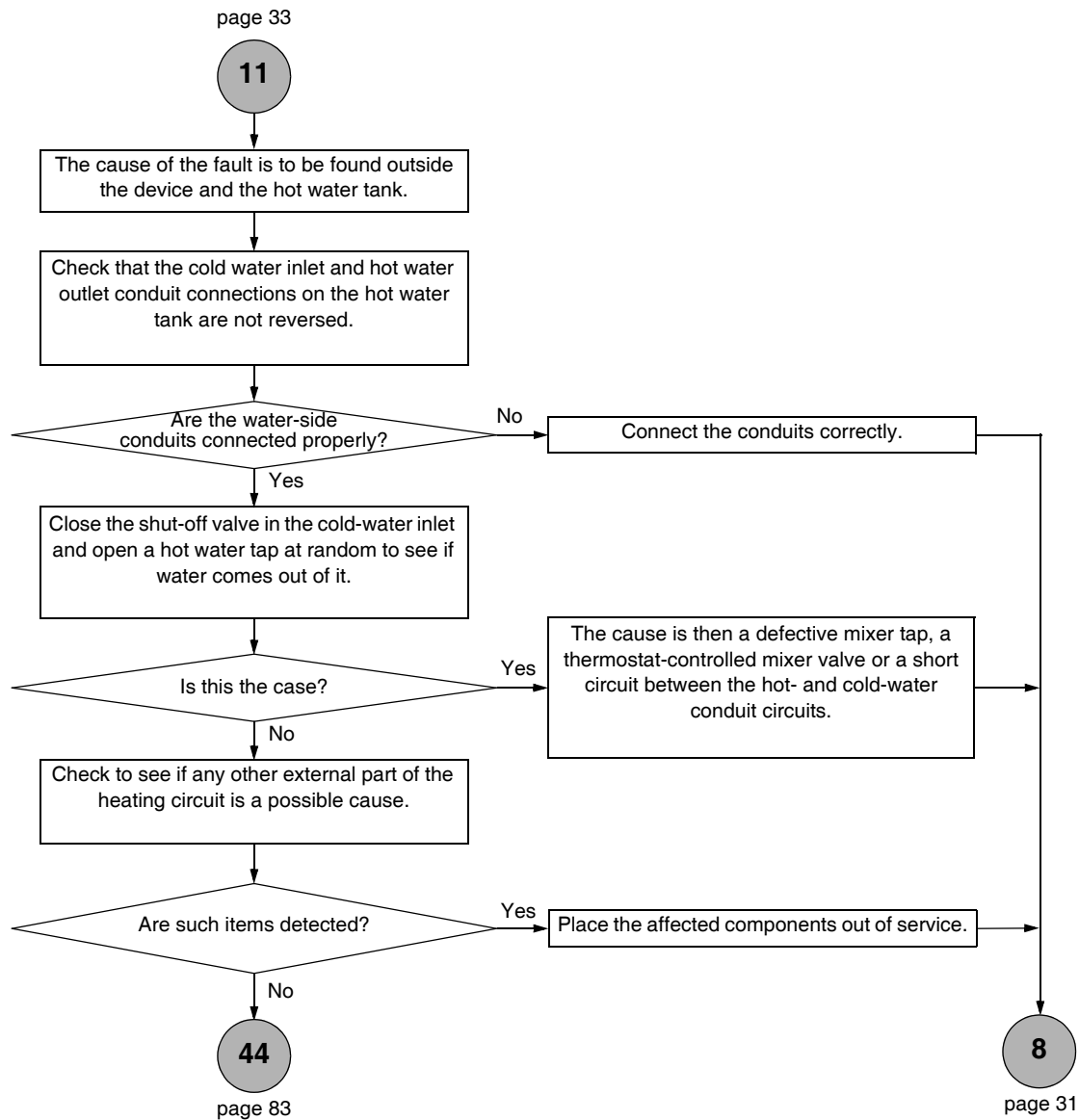


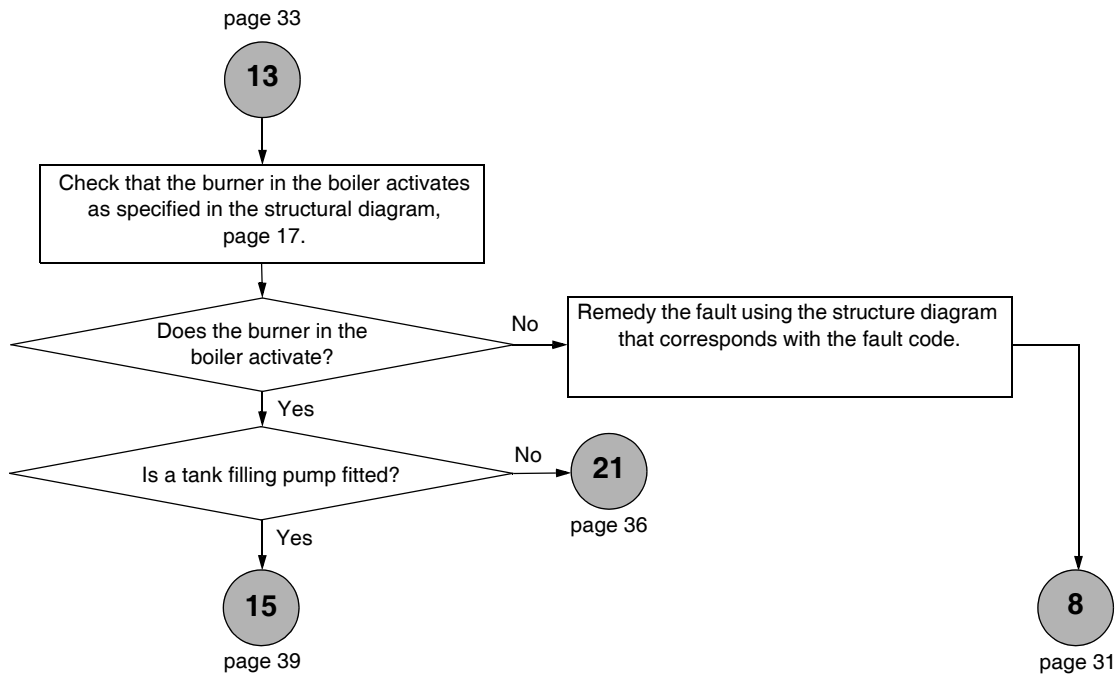
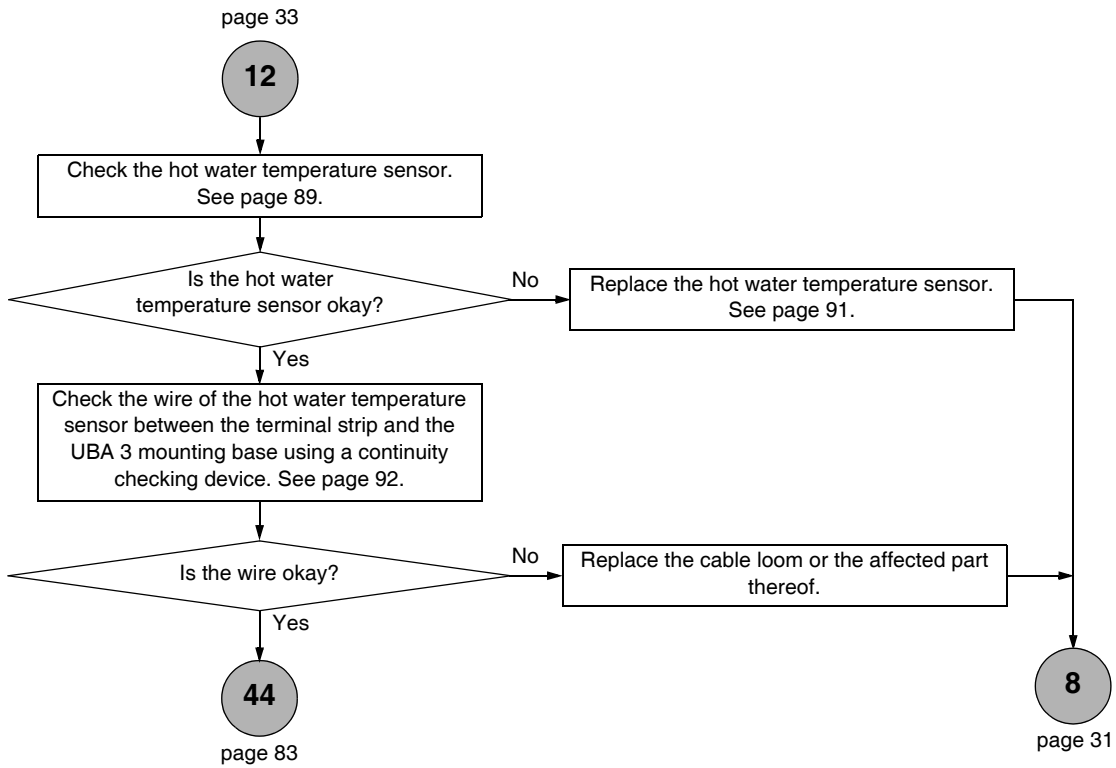


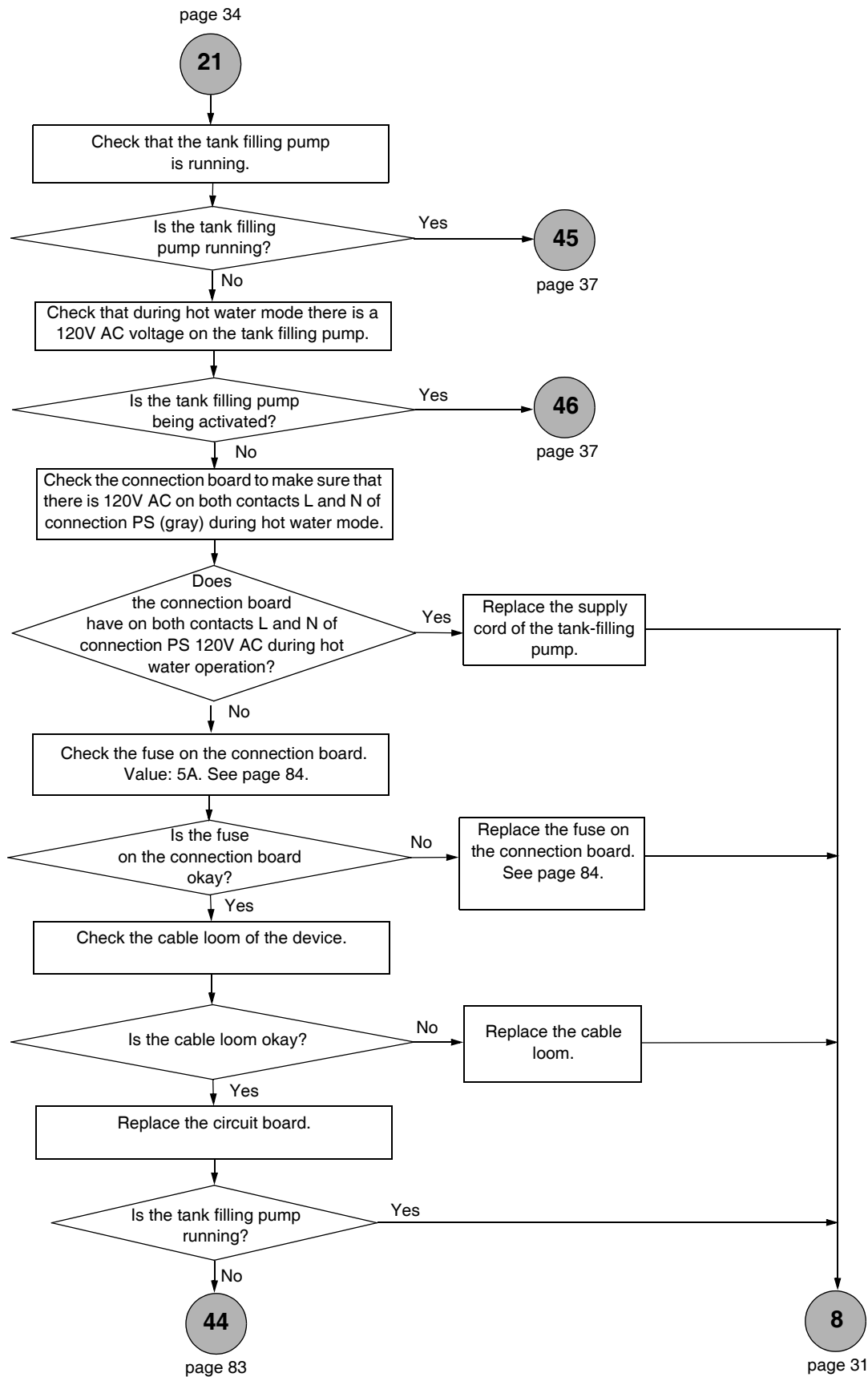


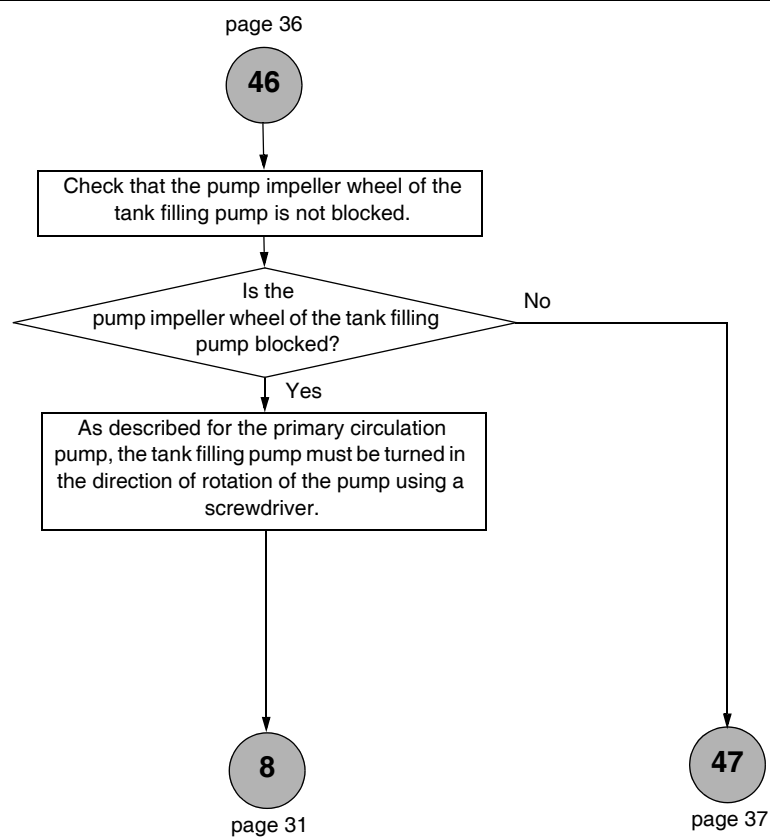
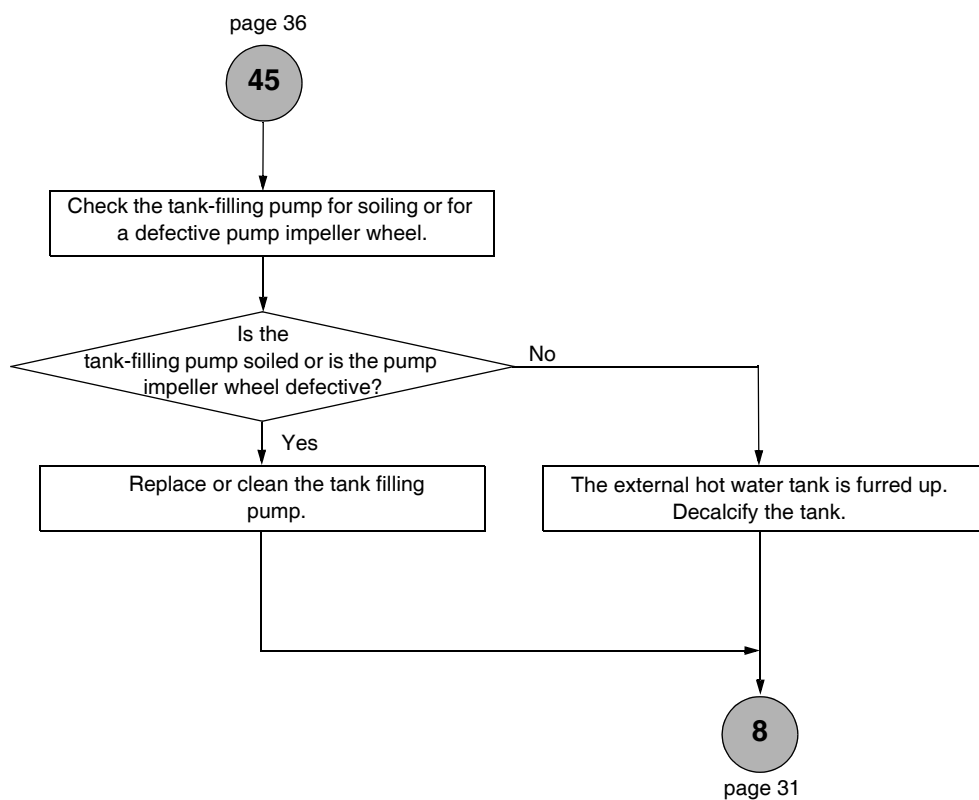








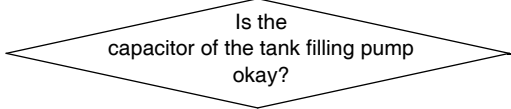




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Check that the capacitor of the tank filling pump is okay.

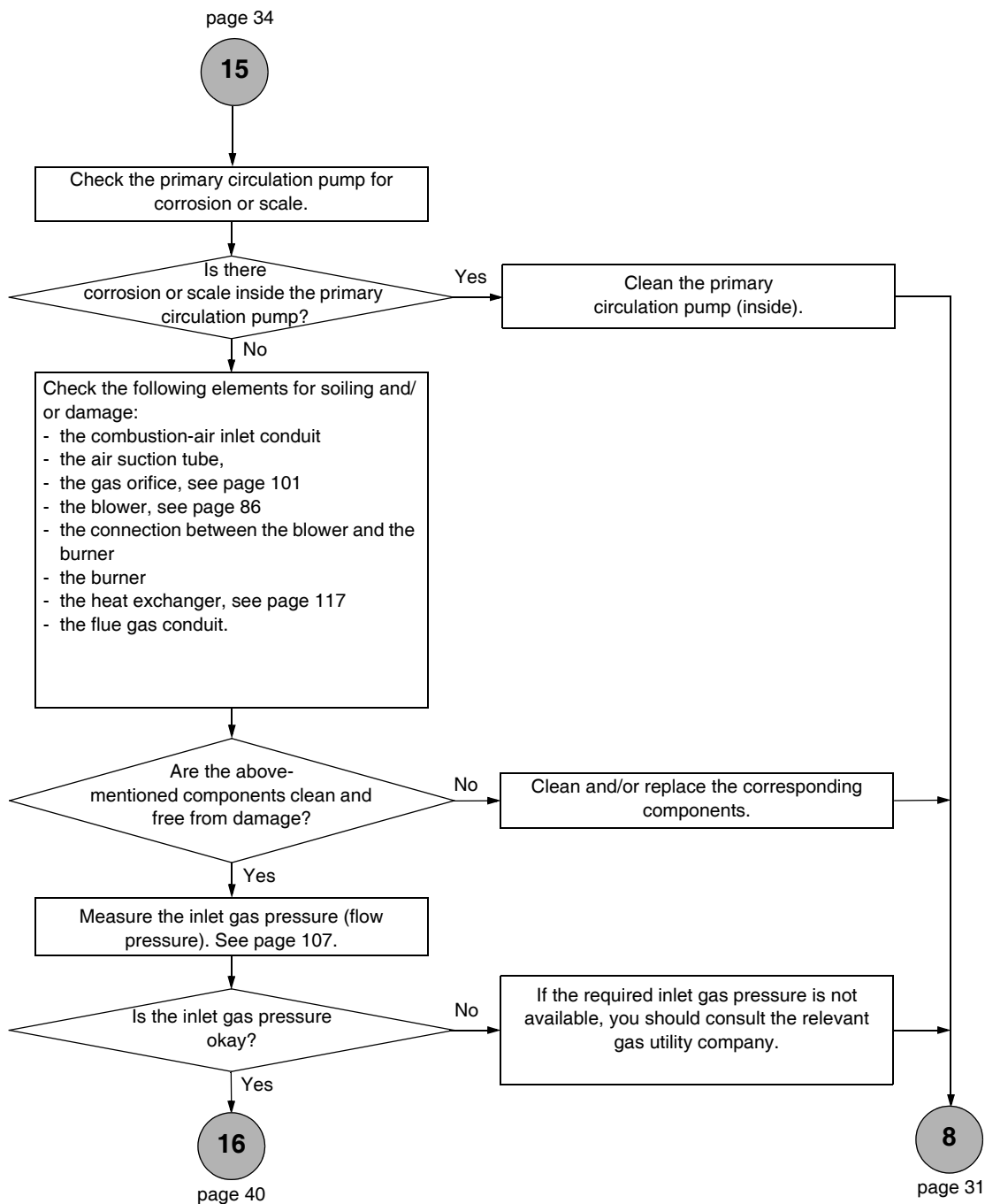


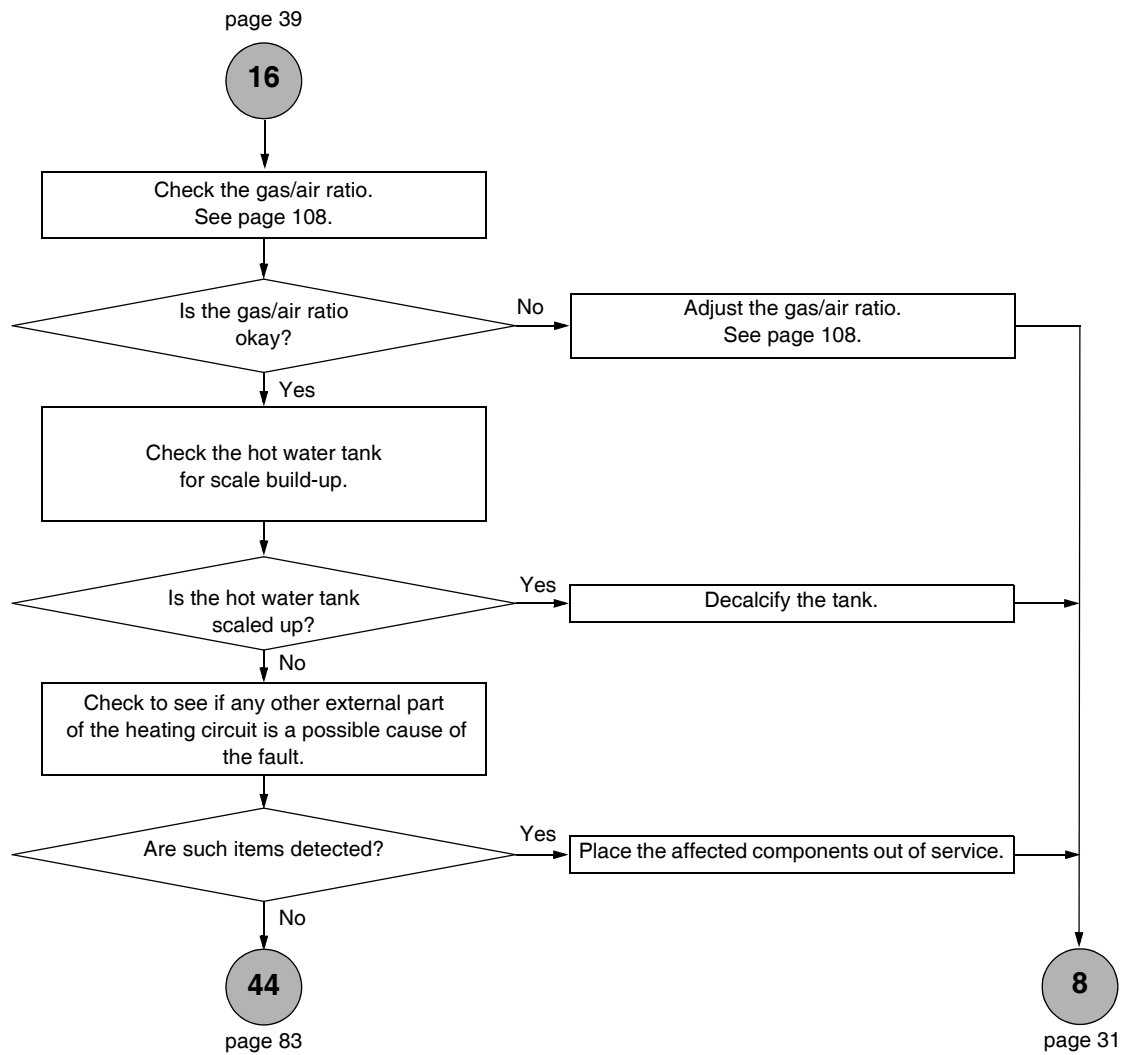
Replace the tank filling pump.

Replace the capacitor.

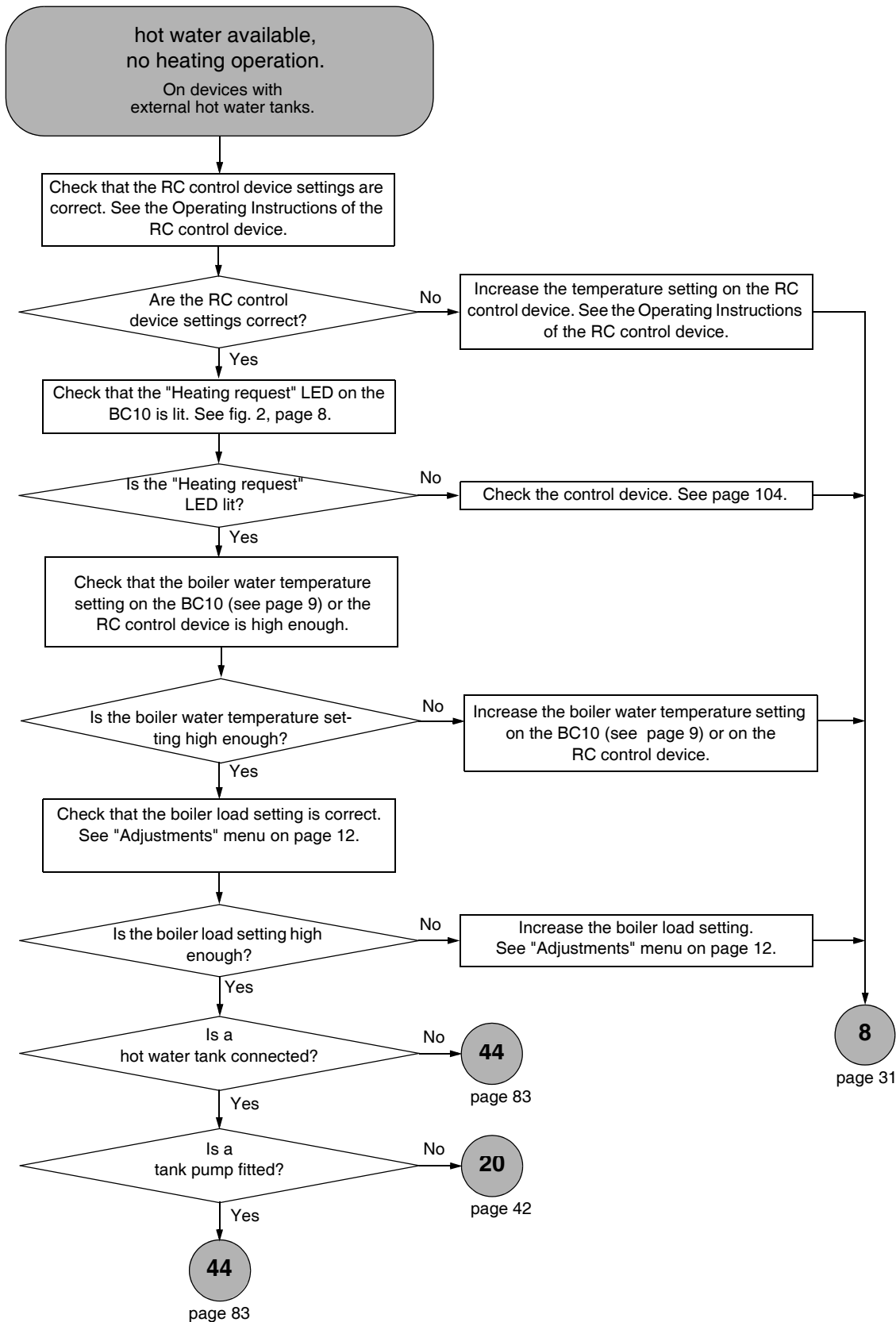


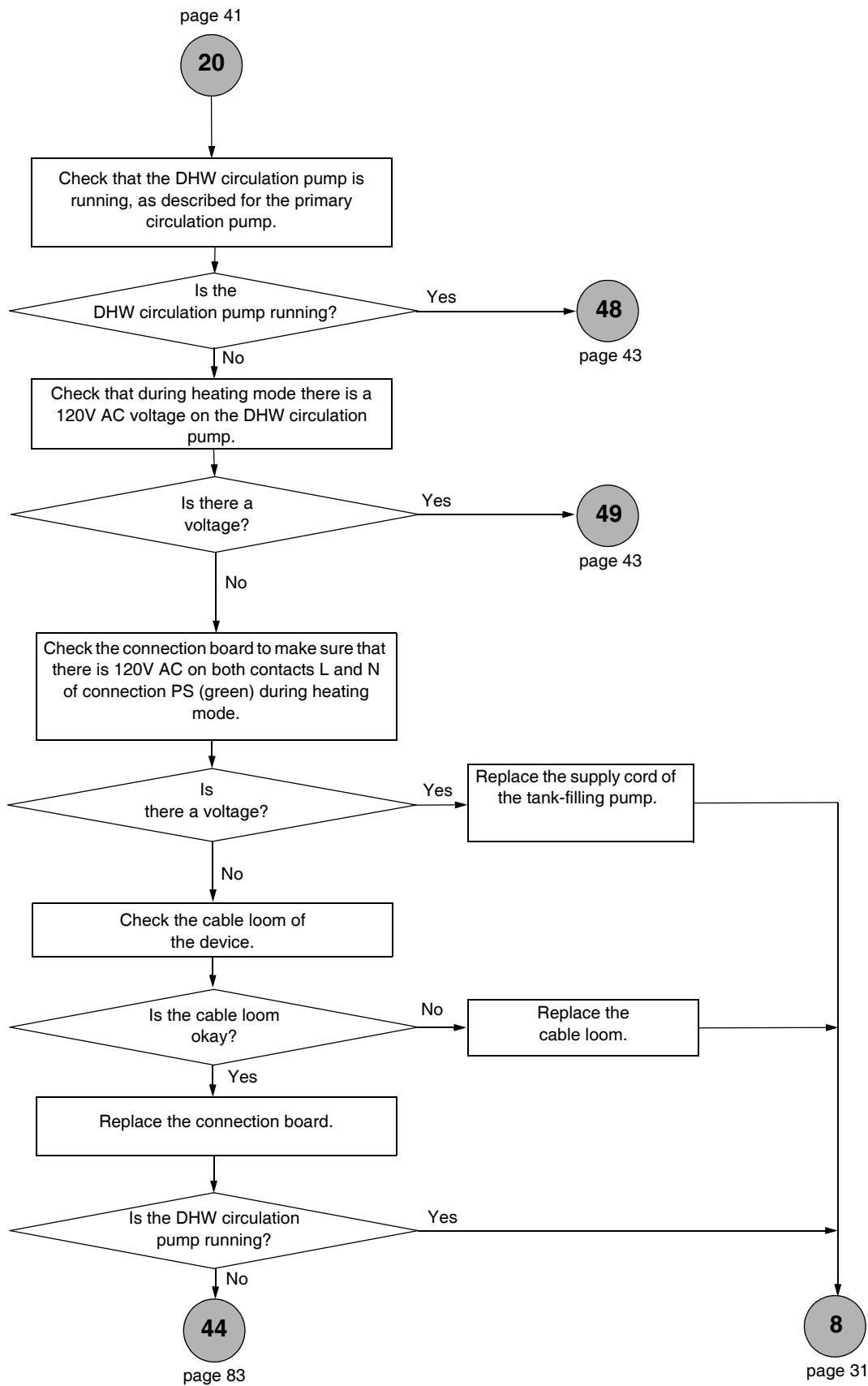
page 31

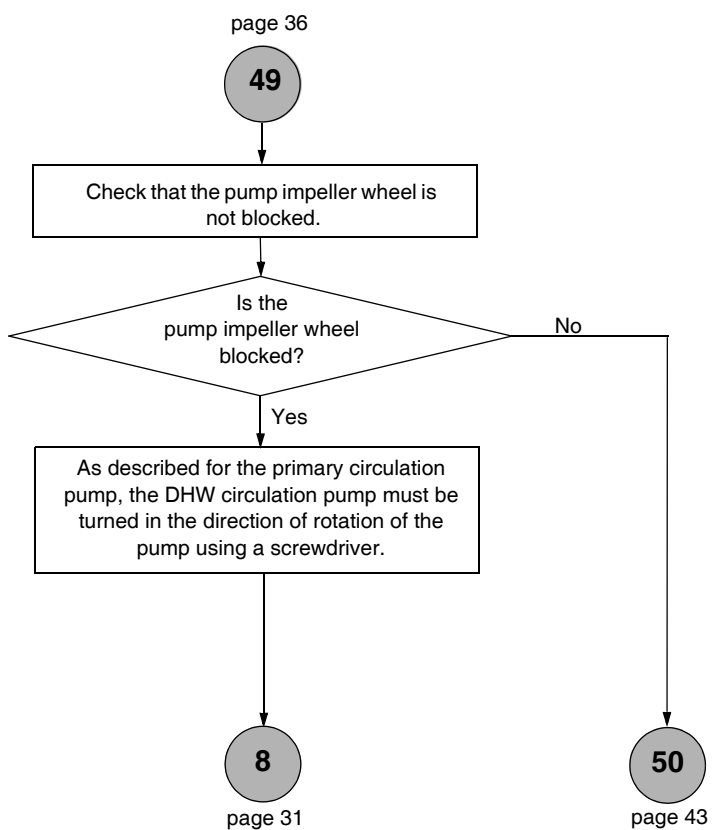
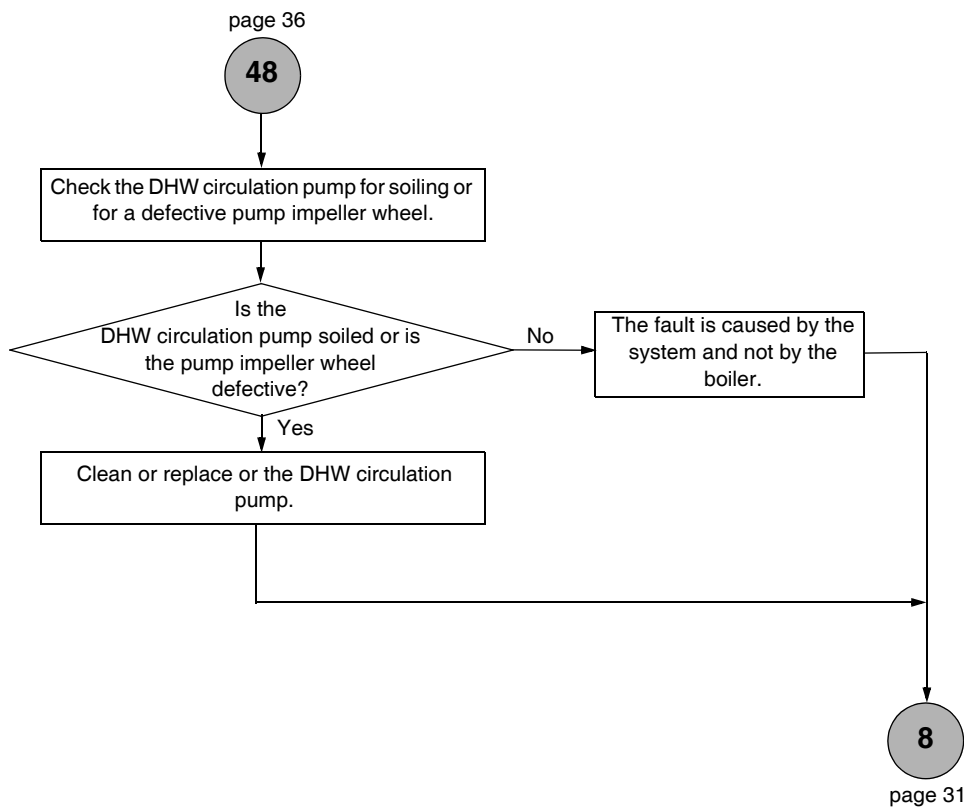












page 36

50

Check that the capacitor of the DHW circulation pump is okay.

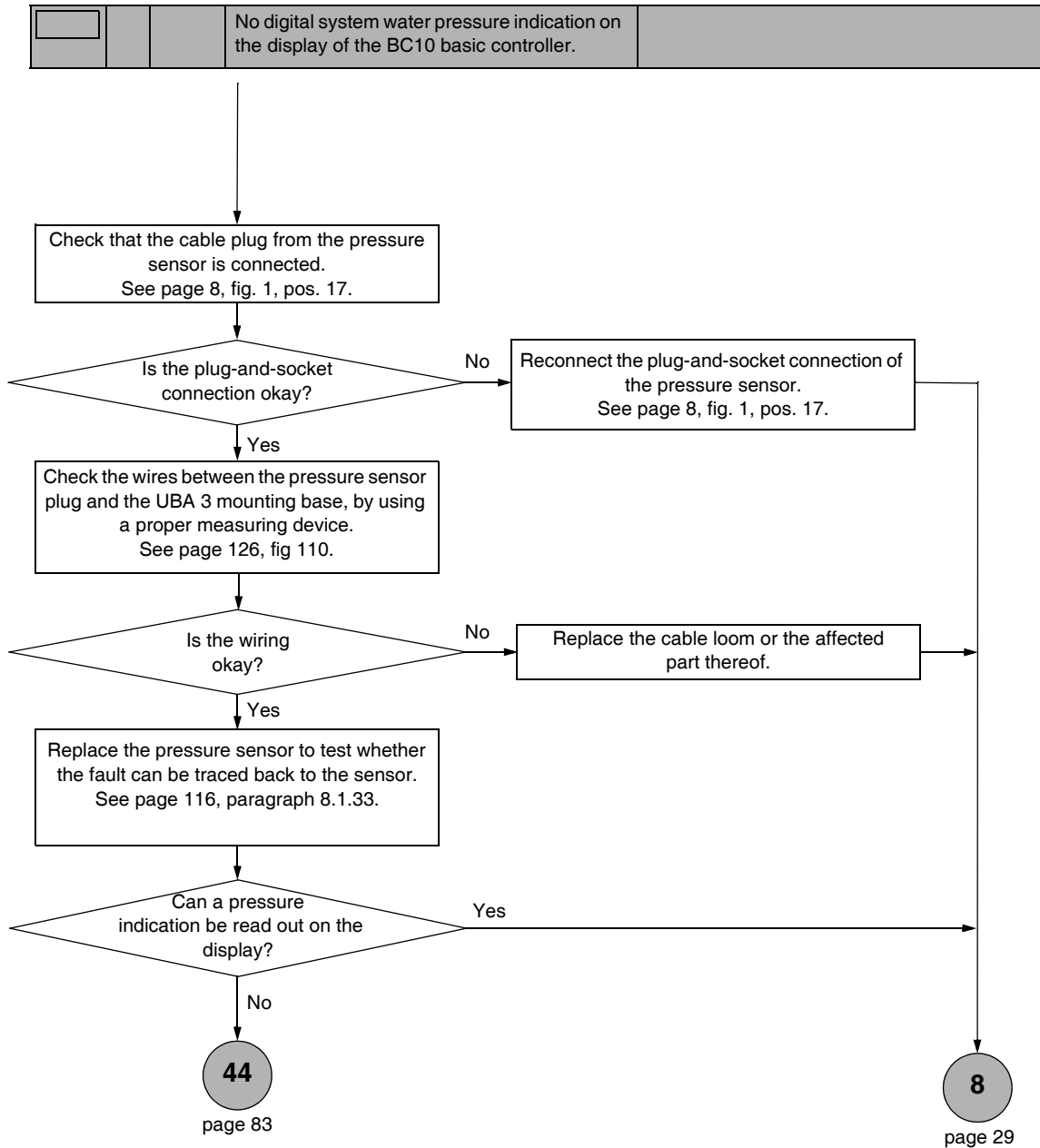
Is the capacitor of the DHW circulation pump okay?

Replace the capacitor.

Replace the DHW circulation pump.

8

page 31



## 7.2 Faults with a fault code

The following structural diagrams can be used for the systematic troubleshooting of faults with fault codes.

While trying to establish the fault causes, you should always also check the contacts of all electrical plug-and-socket connections and the connection plugs in the UBA 3.



### WARNING!

Danger to life due to electric shock.

- Switch off the Logamax plus GB142 when testing the connections!

Whenever a fault has been remedied, you must press the "Reset" button (for at least 5 seconds) to reset the UBA 3 to its setting status (release).

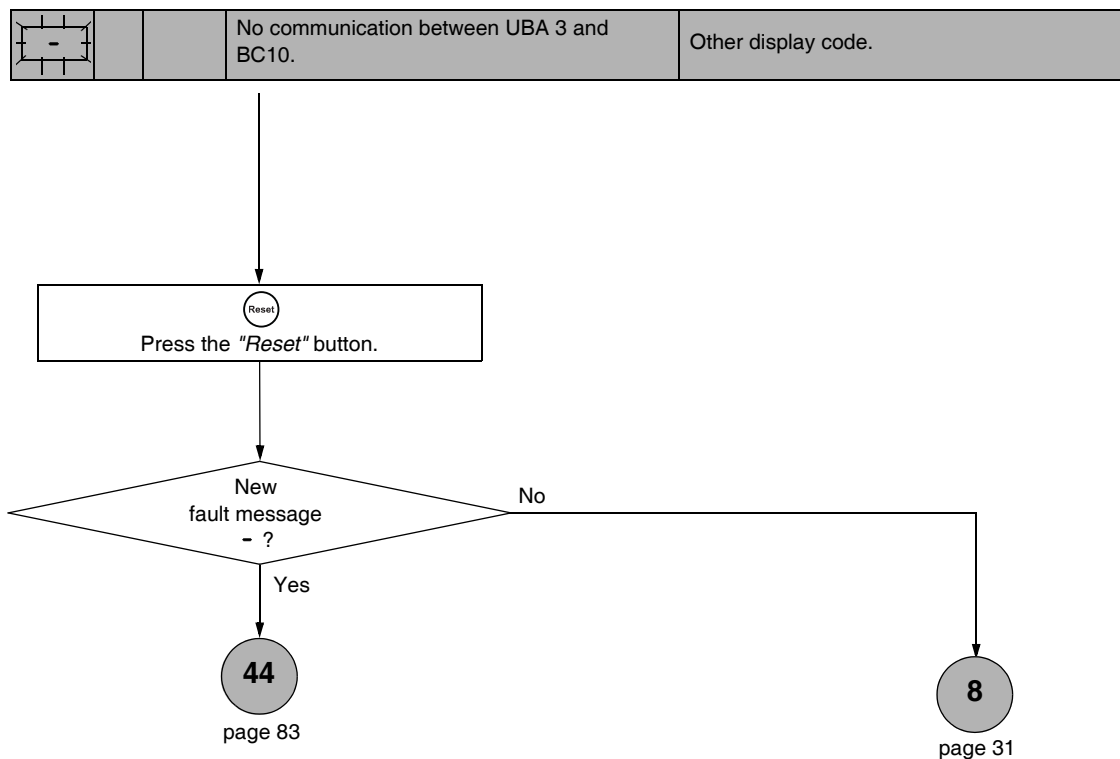


### NOTE!

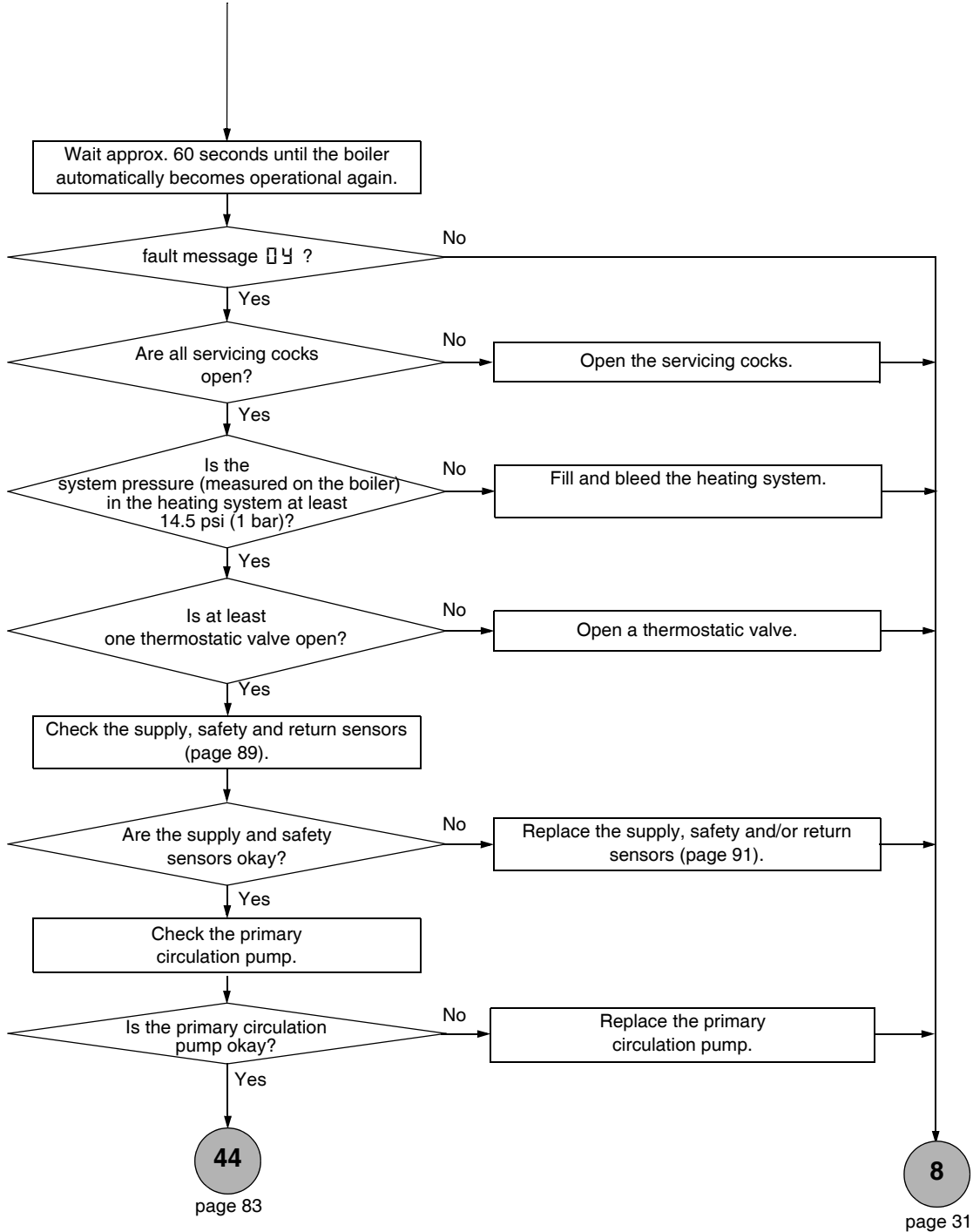
Resetting is **not** possible by switching off the operating switch!

If a fault is displayed again, you should follow the relevant structural diagram to carry out further troubleshooting.

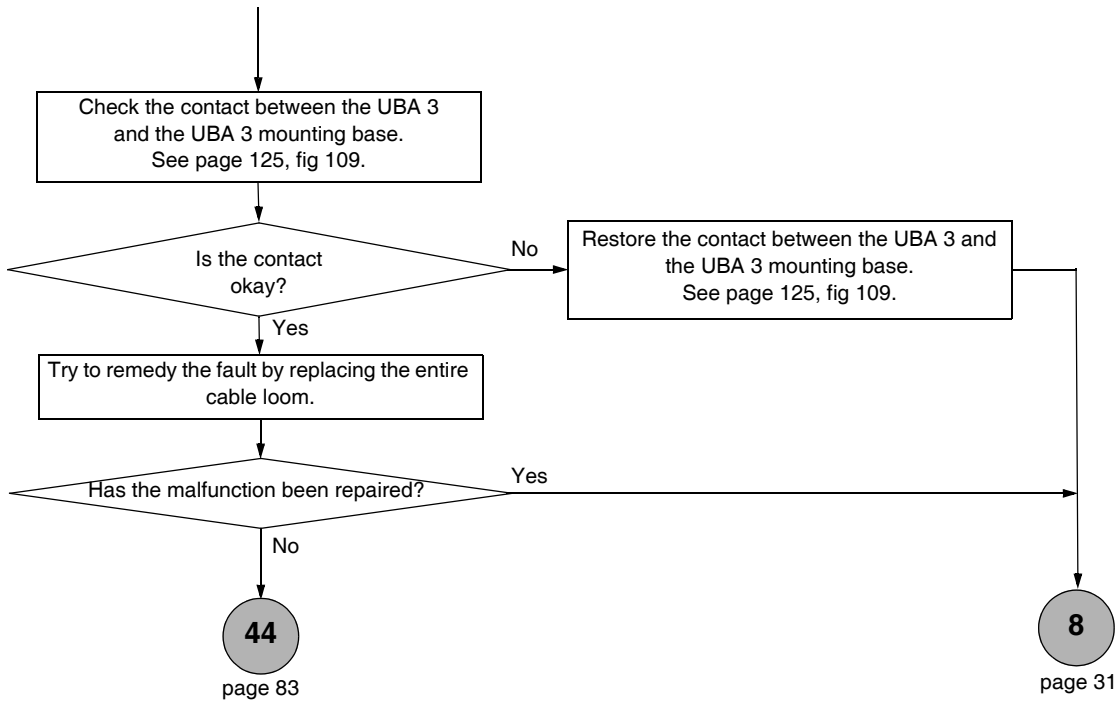
Certain trouble-shooting activities have to be carried out in the heating mode of the Logamax plus GB142. The flue gas test or the service mode must be activated then, see chapter „4 Operation“ on page 9, "Flue gas test" menu on page 10 and "Service Mode" menu on page 11.



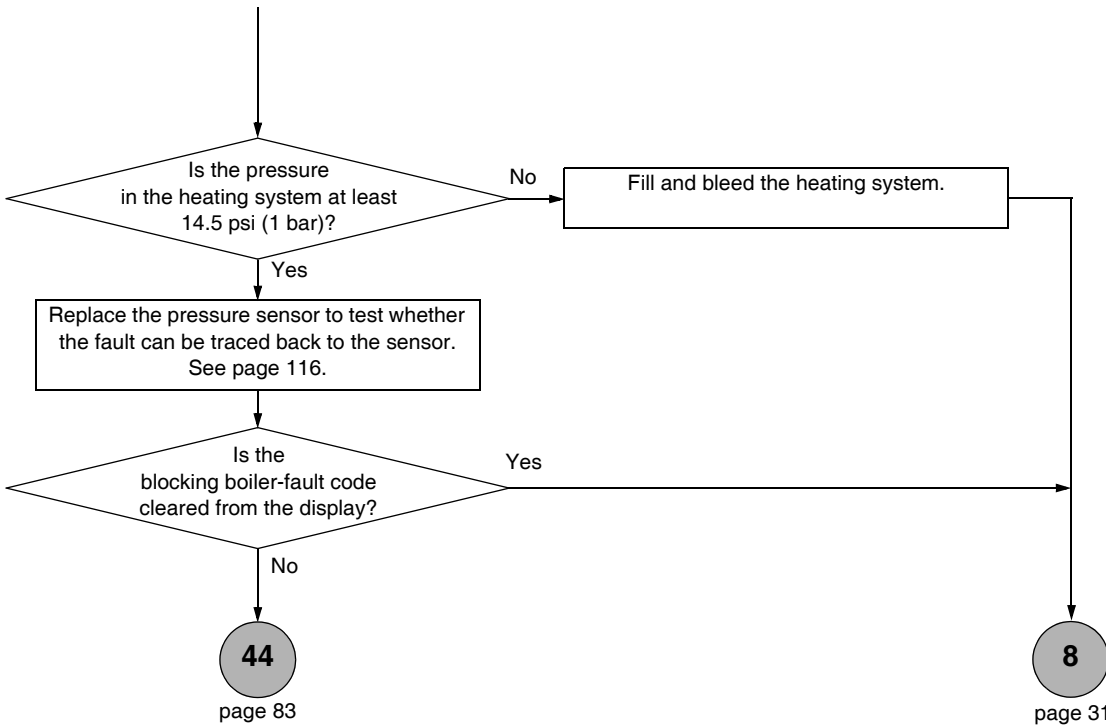
04	⊗	276	The supply sensor has measured a temperature higher than 203 °F (95 °C).	Locking boiler-fault code.
04	⊗	277	The safety sensor has measured a temperature higher than 203 °F (95 °C).	Locking boiler-fault code.
04	⊗	285	The return sensor has measured a temperature higher than 203 °F (95 °C).	Locking boiler-fault code.



1L	⊗	211	The UBA 3 does not register any connections to the unused contacts 78 and 50.	Locking boiler-fault code.
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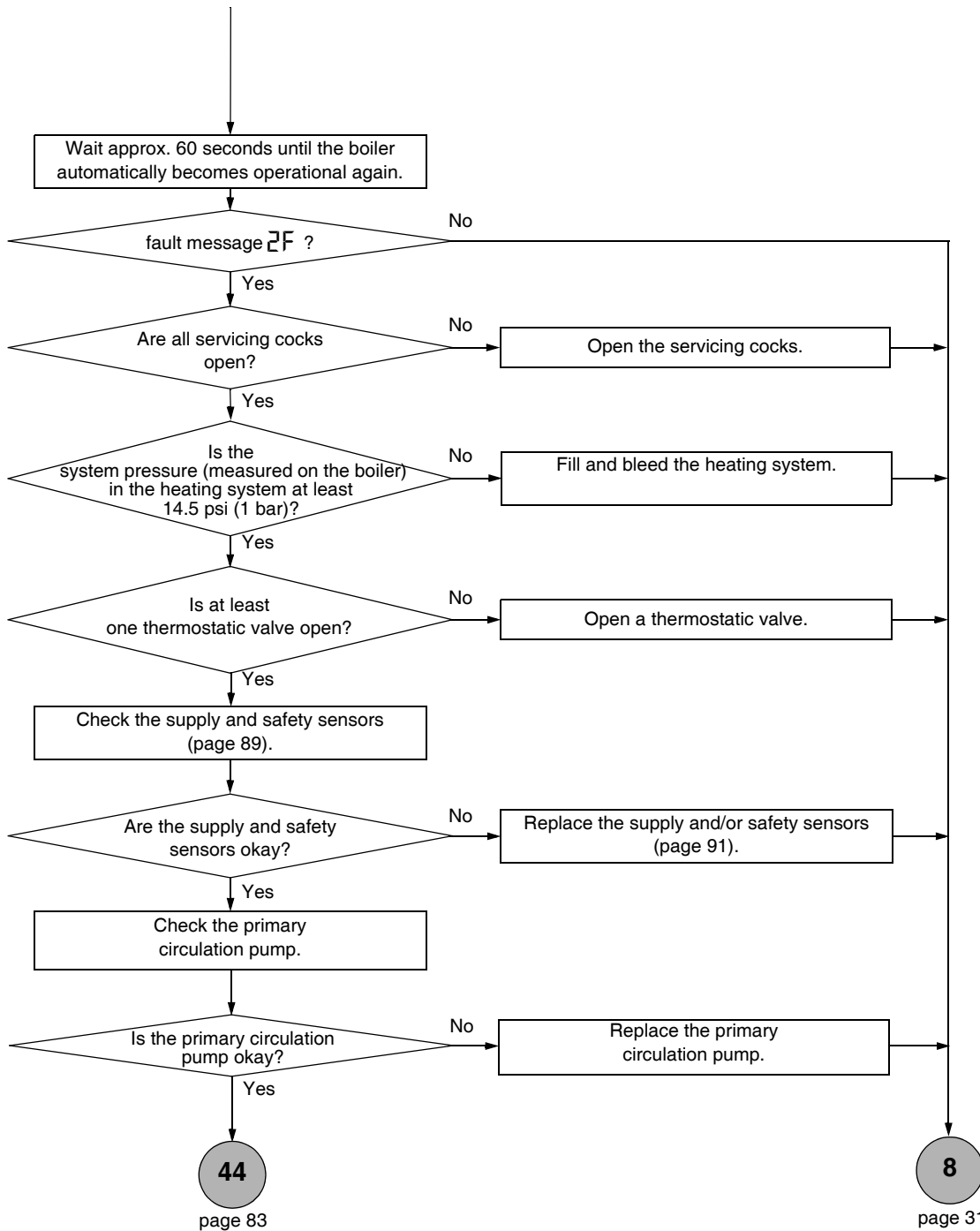


2E	⊗	207	The system pressure is too low.	Locking boiler-fault code.
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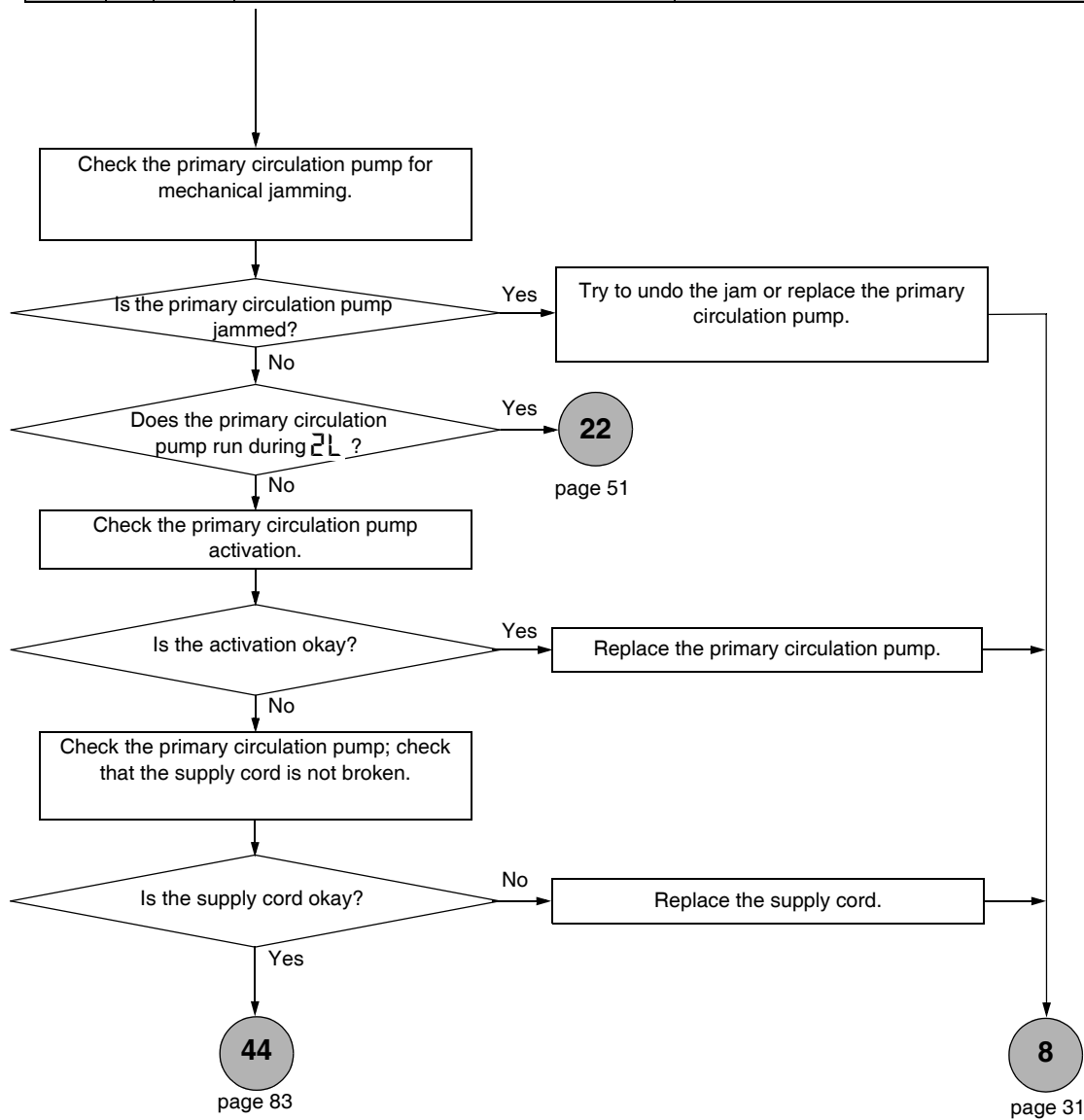


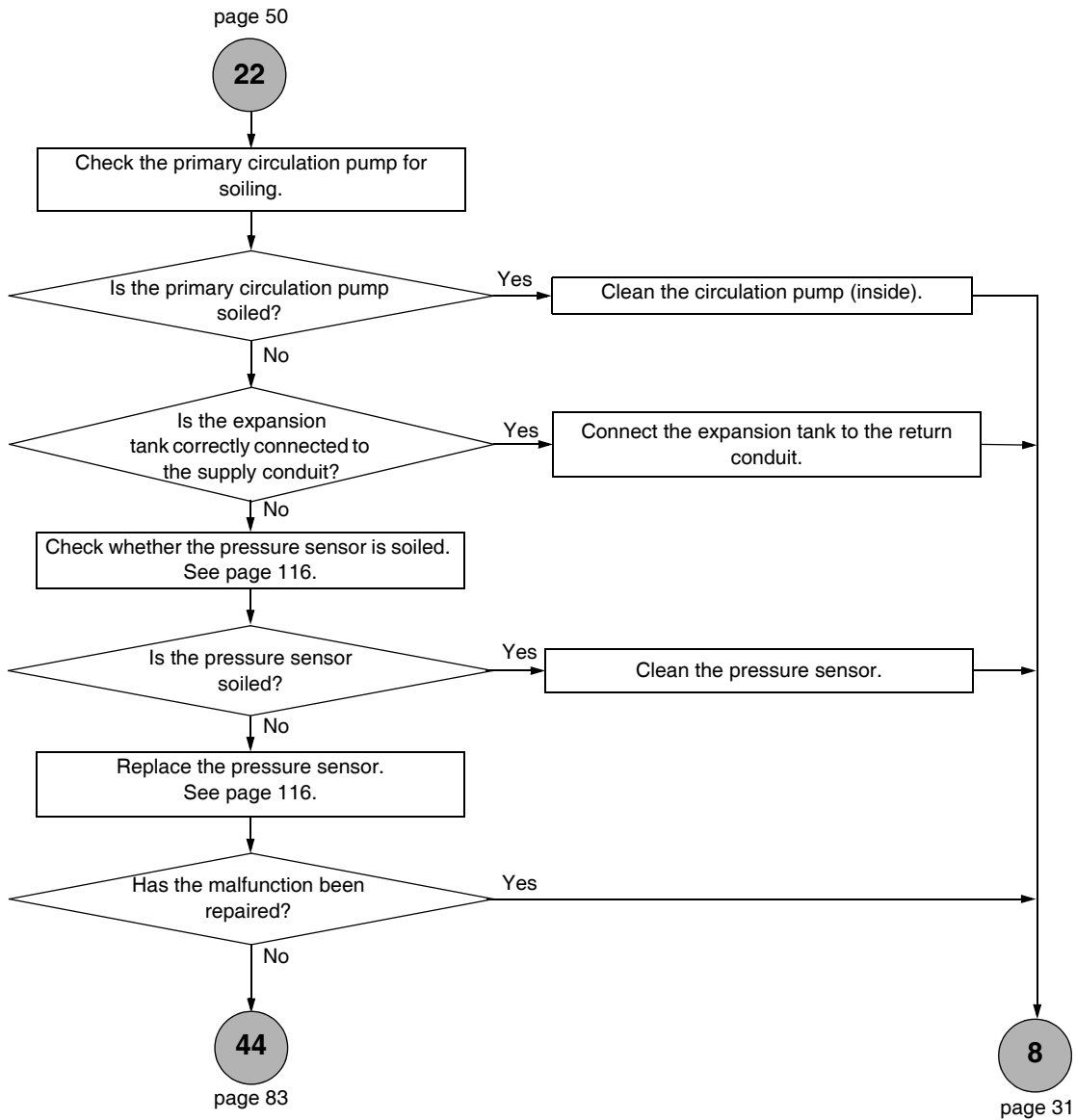


2F	⊗	260	No temperature increase after burner start or the temperature difference between the supply and safety sensors is more than 27 °F (15 K).	Operating code
2F	⊗	271	The temperature difference between the supply and safety sensors is more than 27 °F (15 K).	Locking boiler-fault code.

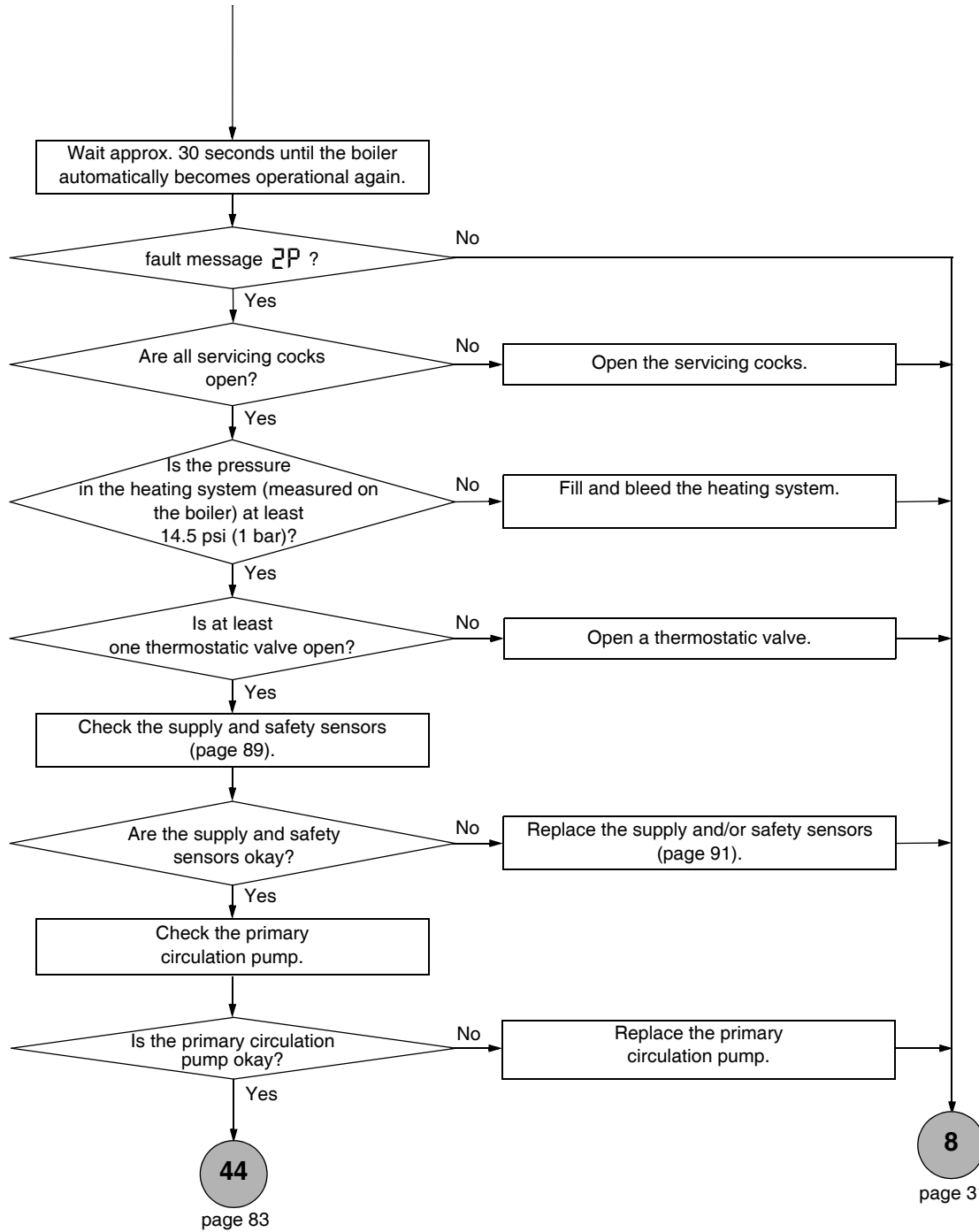


	The primary circulation pump does not generate a pressure difference.	Locking boiler-fault code.
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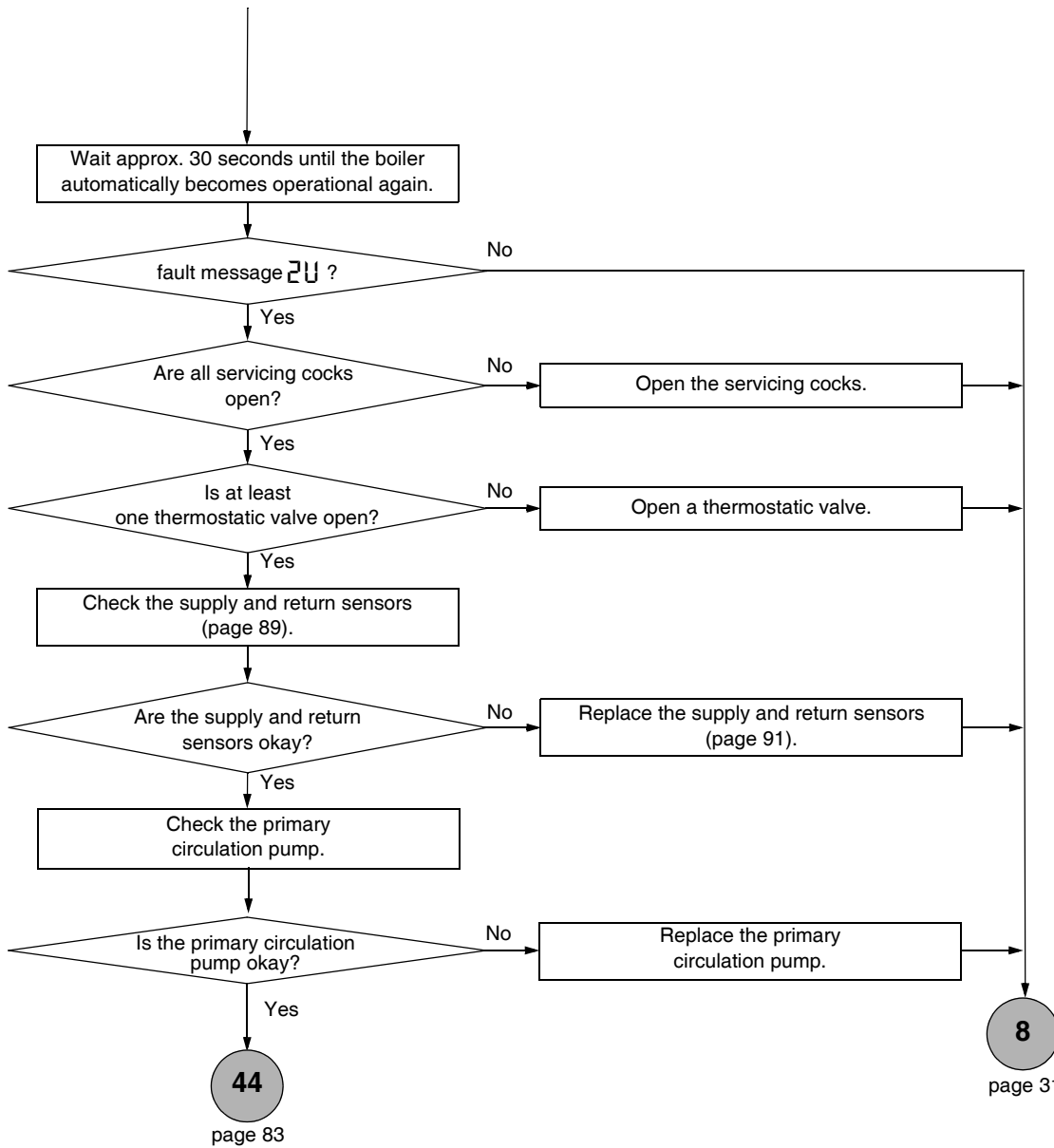




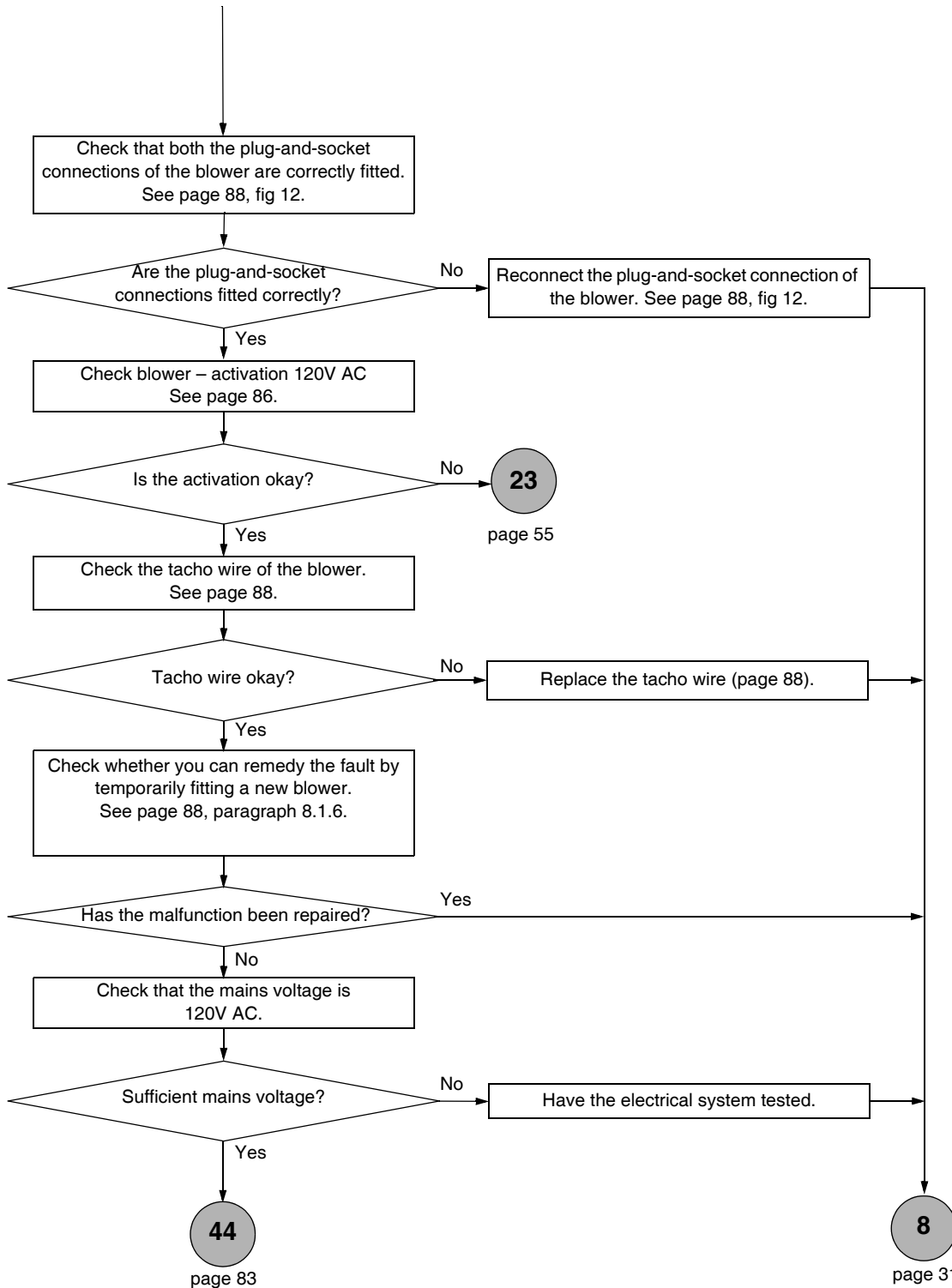
2P	⊗	212	Temperature increase of supply sensor or safety sensor is more than 7.5 °F/sec (5 K/sec).	Operating code
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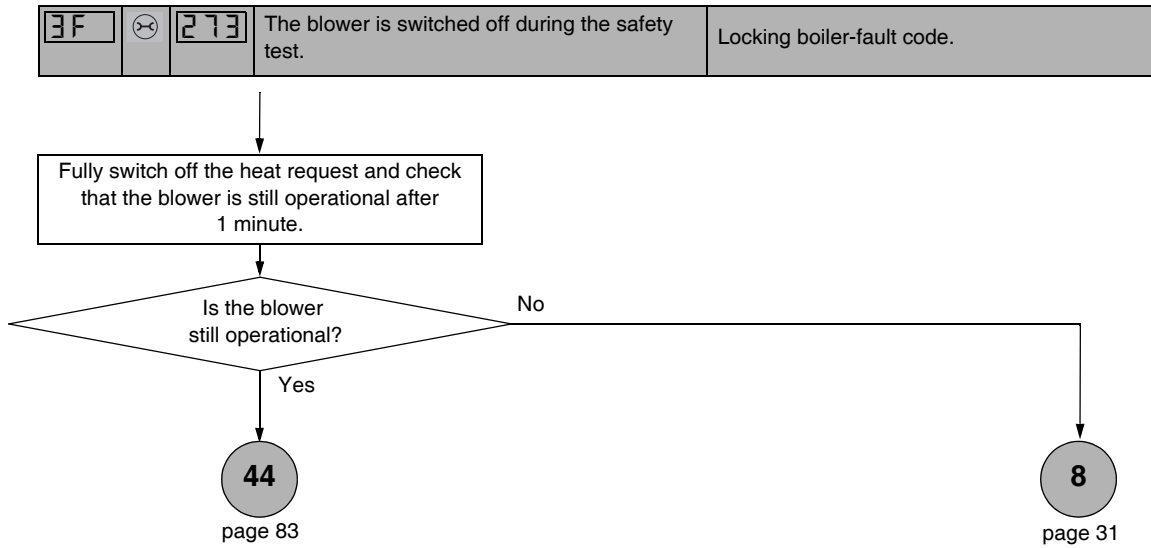
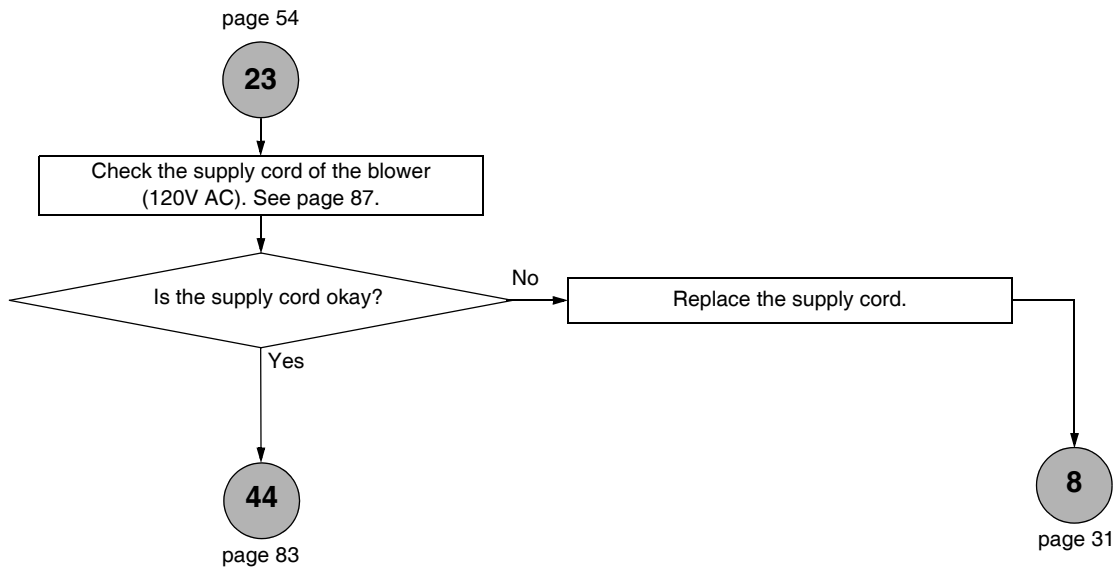


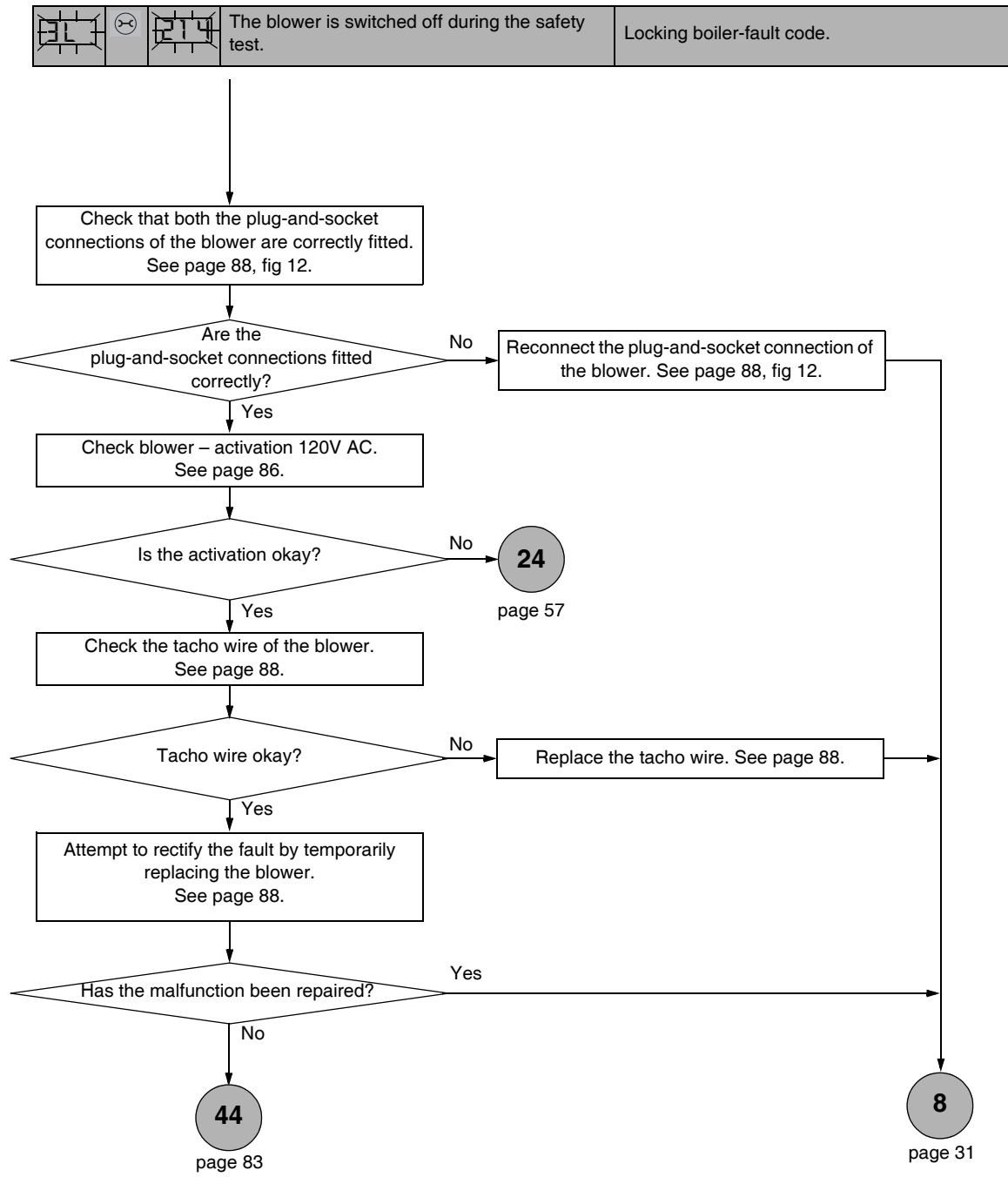
20	⊖	213	The temperature difference between the supply and return sensors is more than 90 °F (50 K).	Operating code
----	---	-----	---	----------------



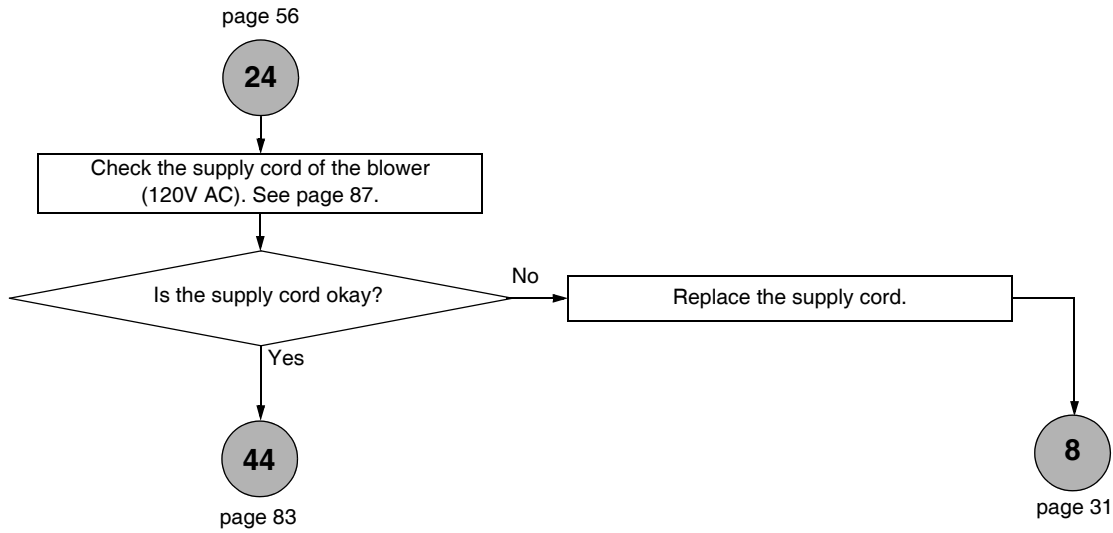
3A	264	The air fan has failed during the operating phase.	Locking boiler-fault code.
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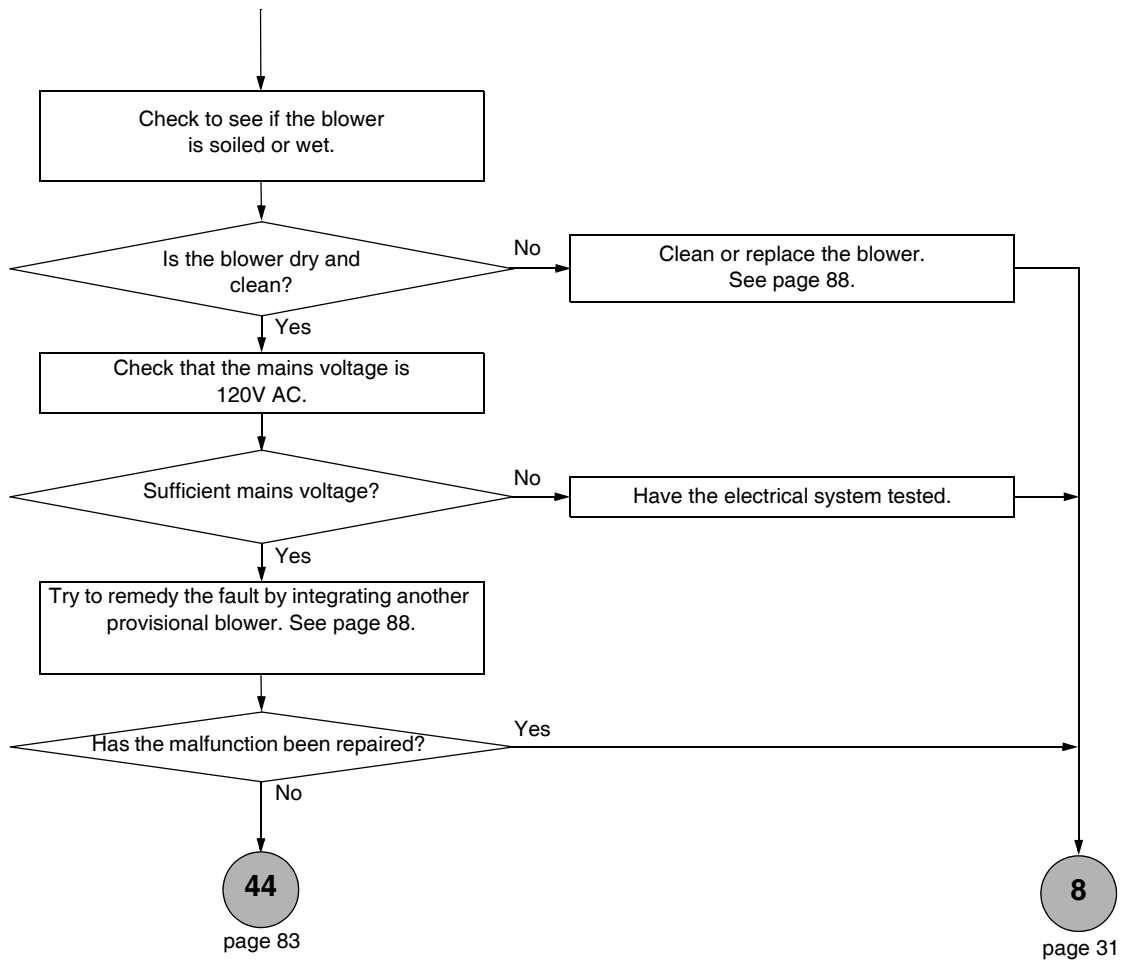




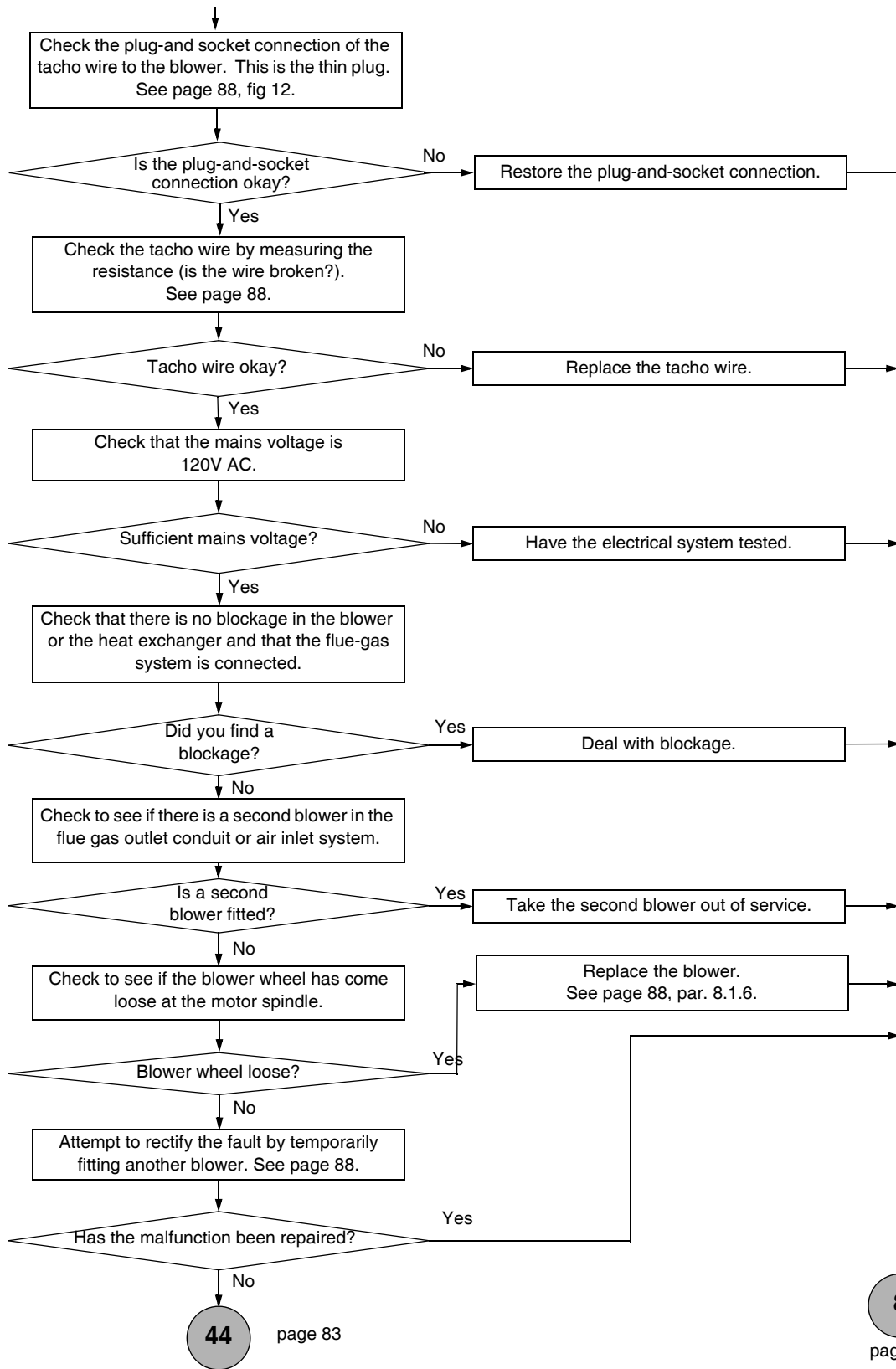




			The blower is running too slowly.	Locking boiler-fault code.
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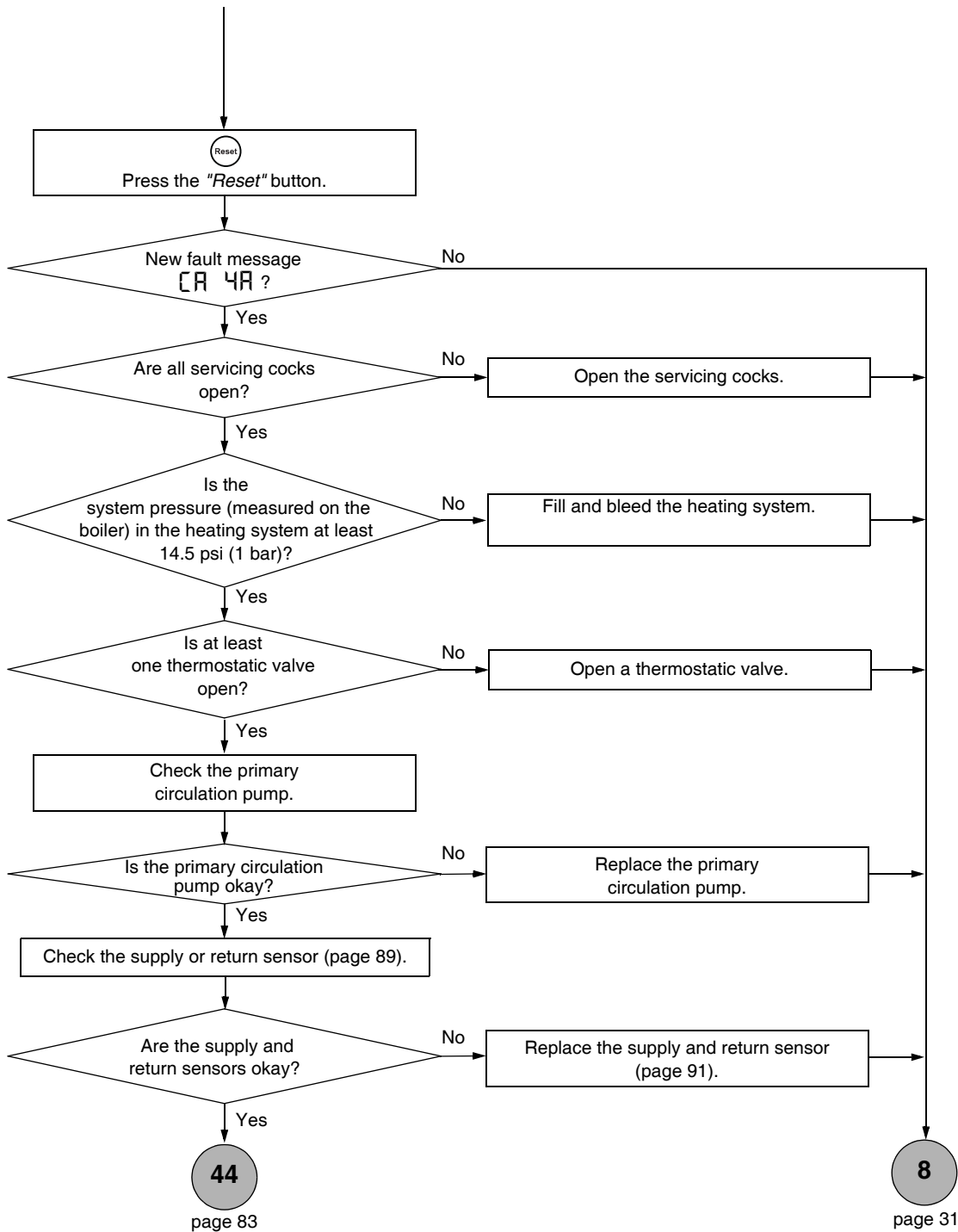
		<b>The blower is running too fast.</b>	Locking boiler-fault code.
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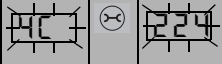




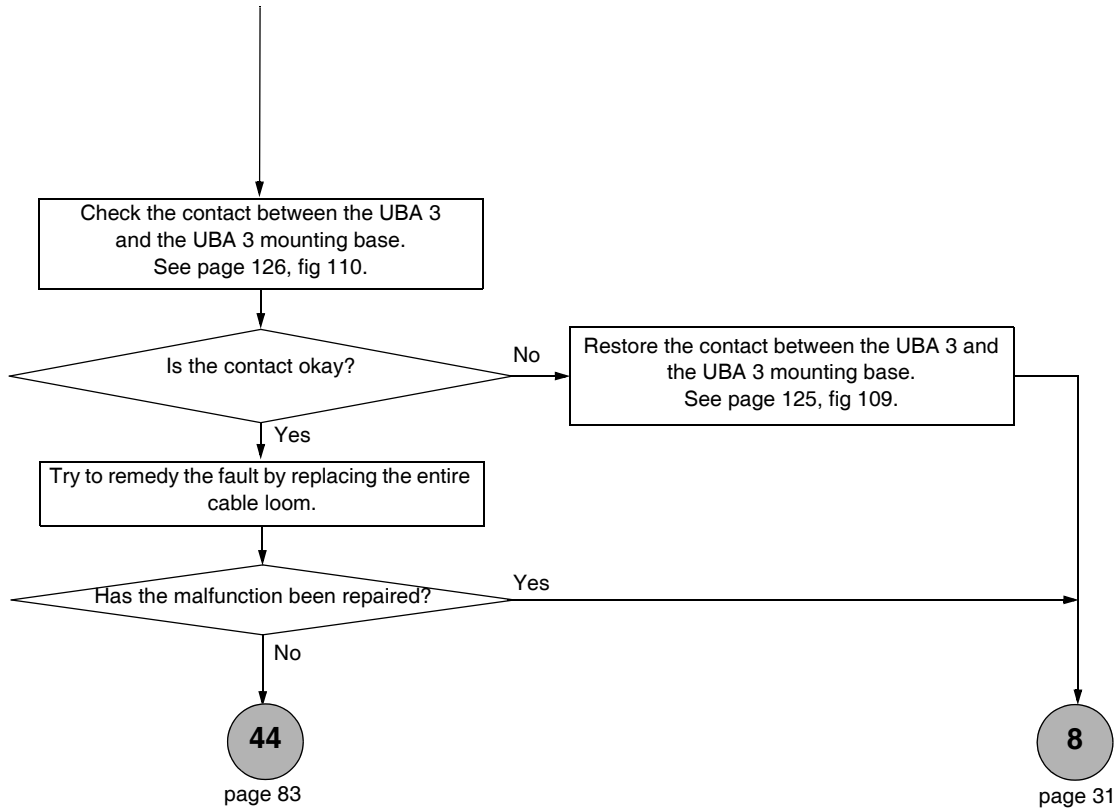
**44** page 83

**8** page 31

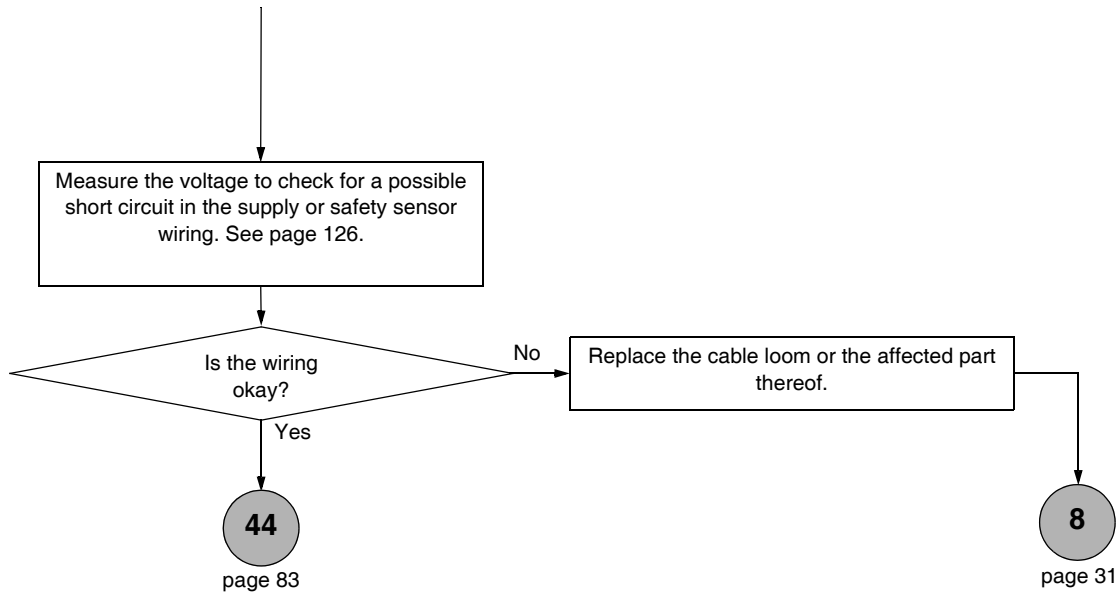
		The supply sensor has measured a temperature higher than 221 °F (105 °C).	Locking boiler-fault code.
		The return sensor has measured a temperature higher than 221 °F (105 °C).	Locking boiler-fault code.







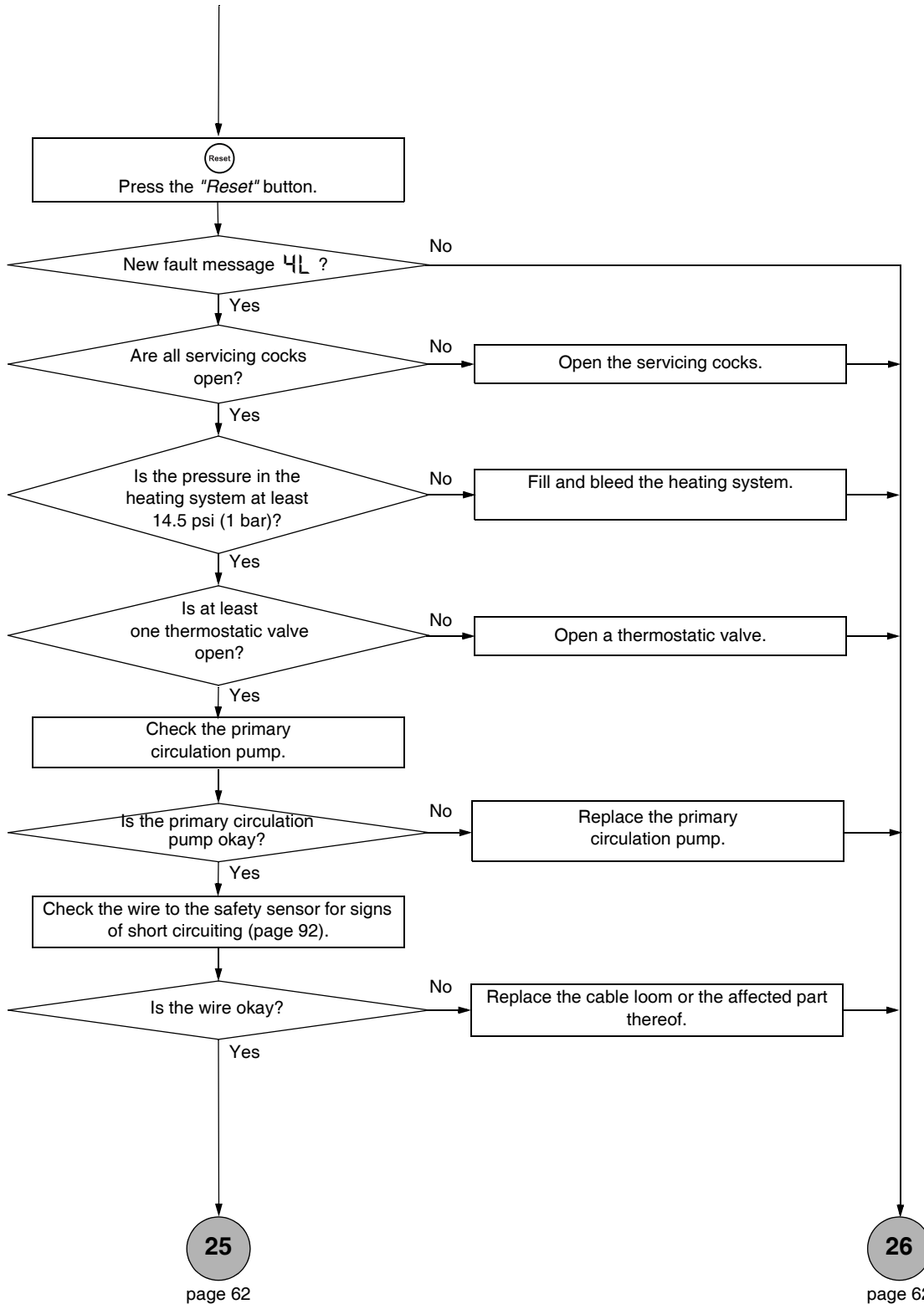
			The UBA 3 does not register the short cut between the unused contacts 22 and 24.	Locking boiler-fault code.
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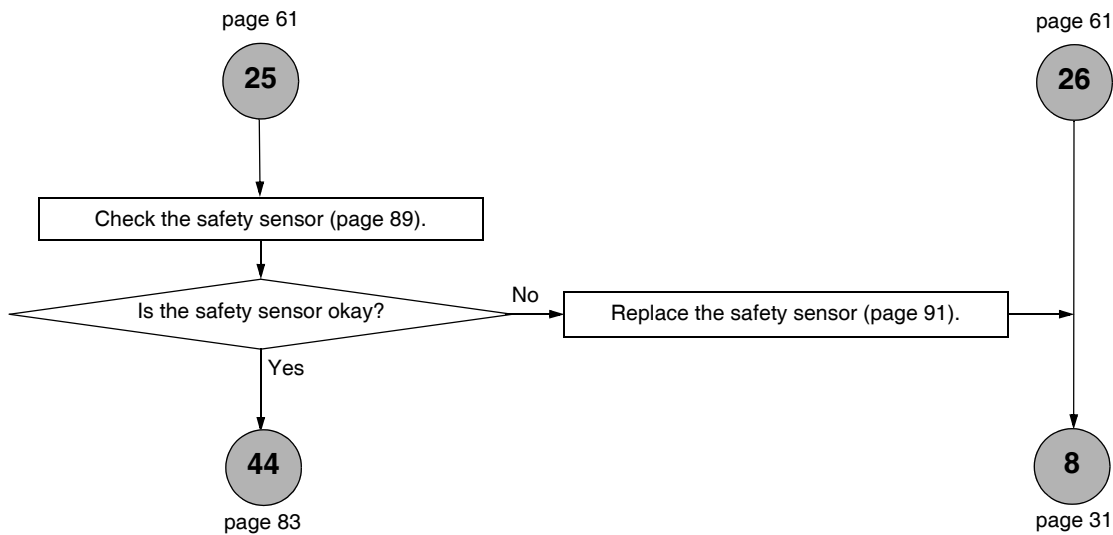


			The sensor test has failed.	Locking boiler-fault code.
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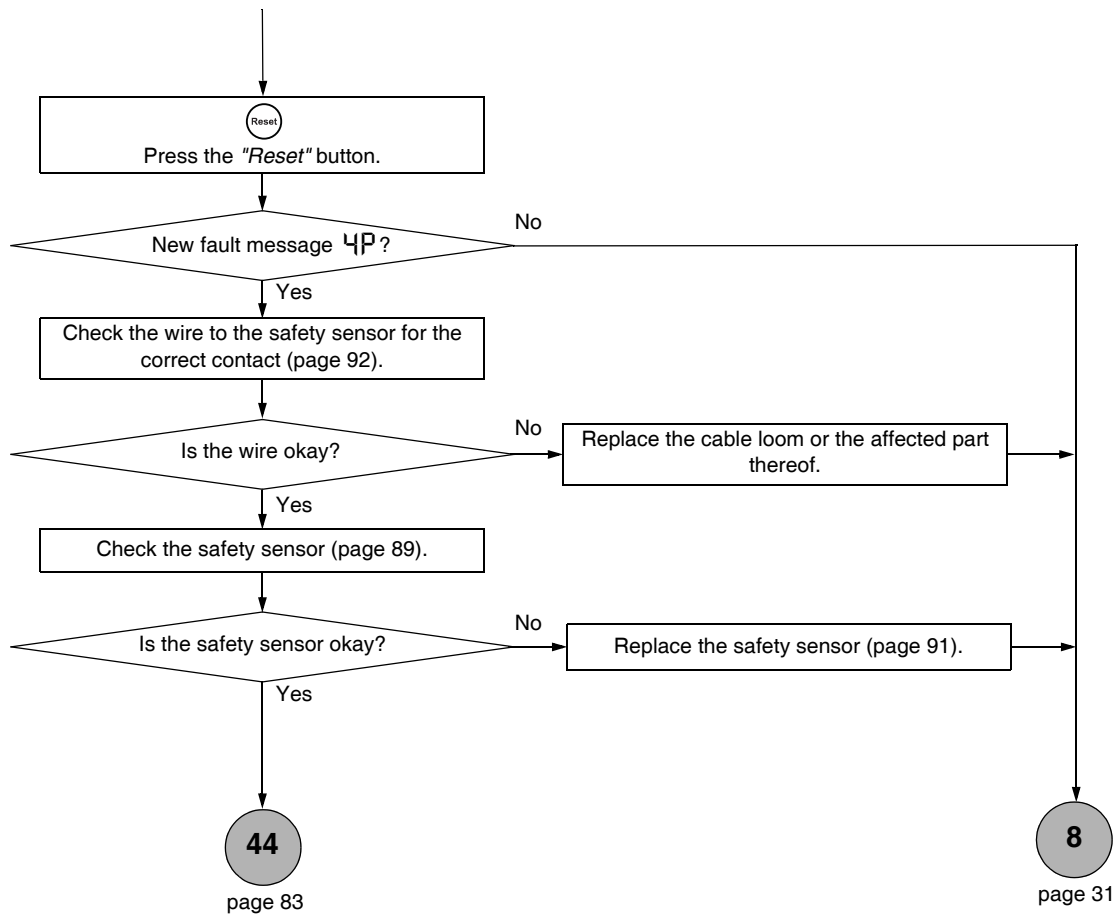






 			The safety sensor is shorted or measures temperatures higher than 266 °F (130 °C).	Locking boiler-fault code.
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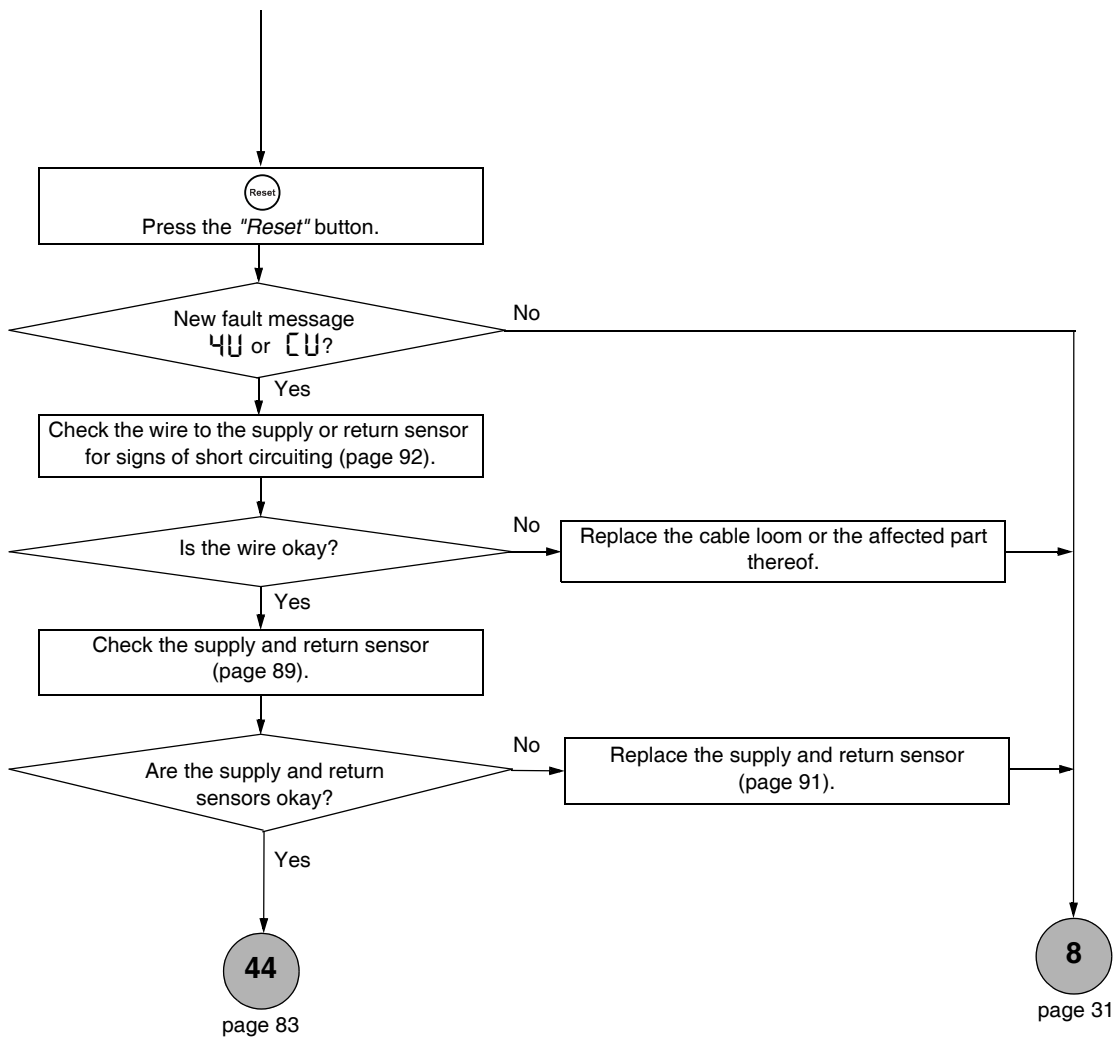










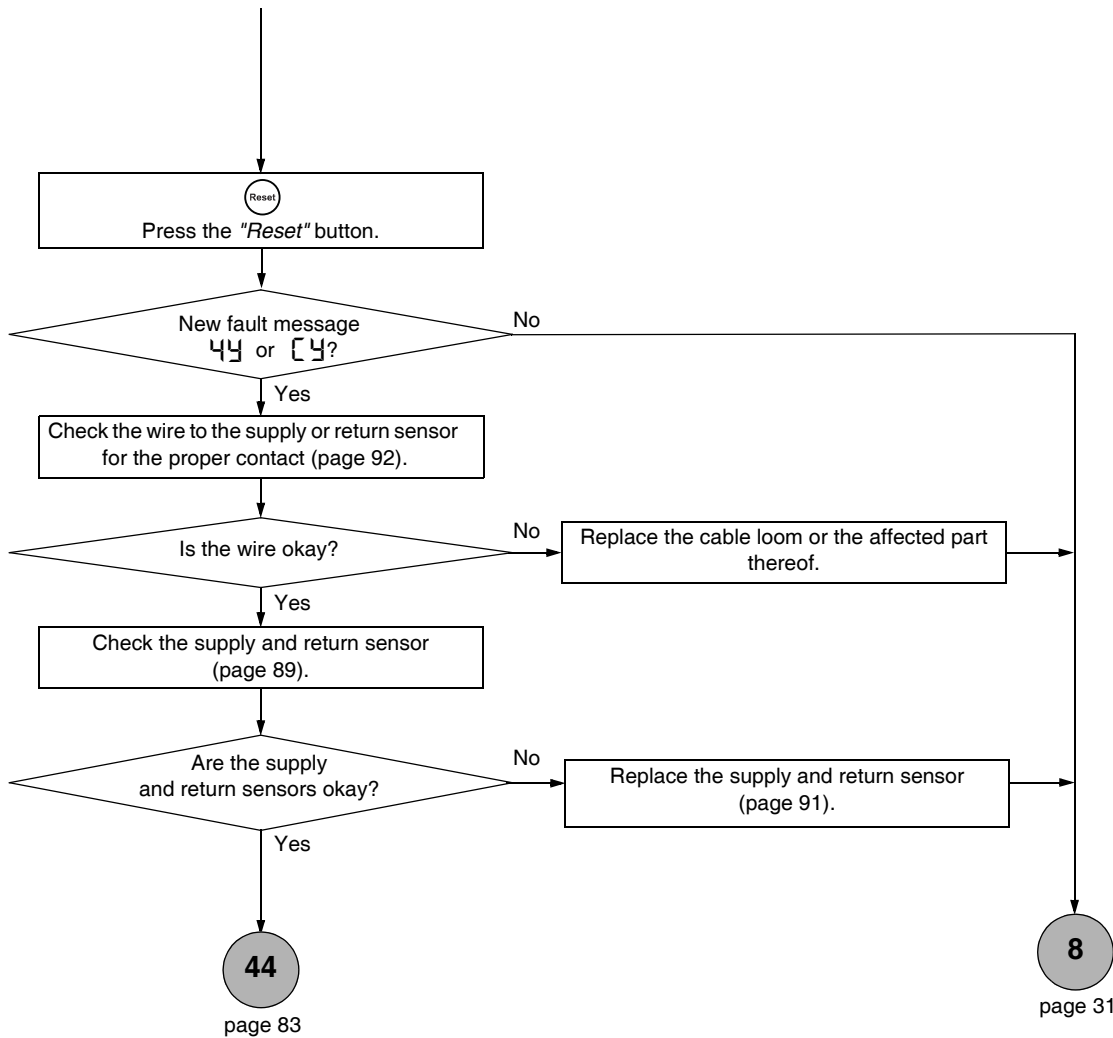
4P	⊗	221	The safety sensor contact is interrupted.	Locking boiler-fault code.
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		The supply sensor contact is shorted.	Locking boiler-fault code.
		The return sensor contact is shorted.	Locking boiler-fault code.

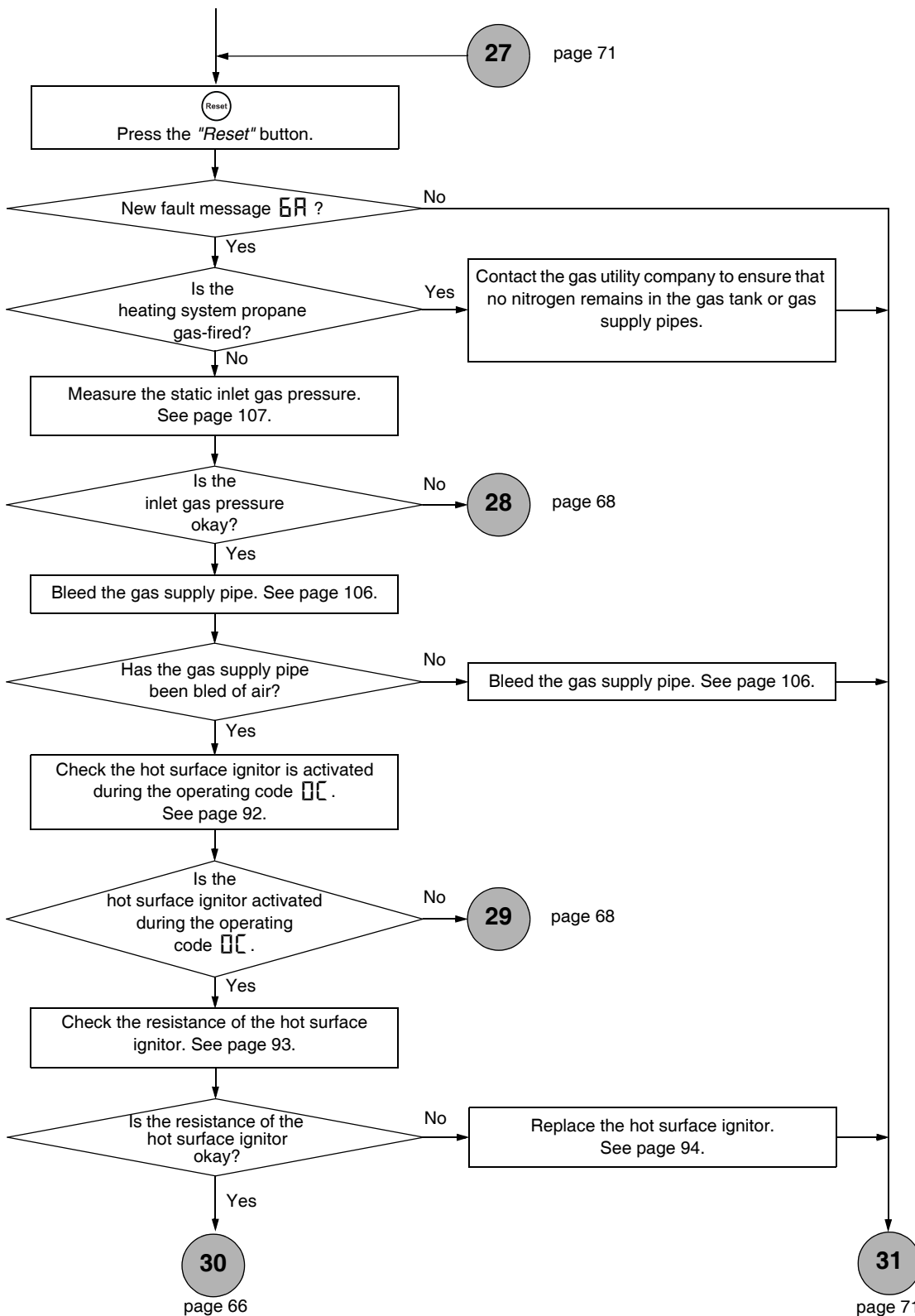


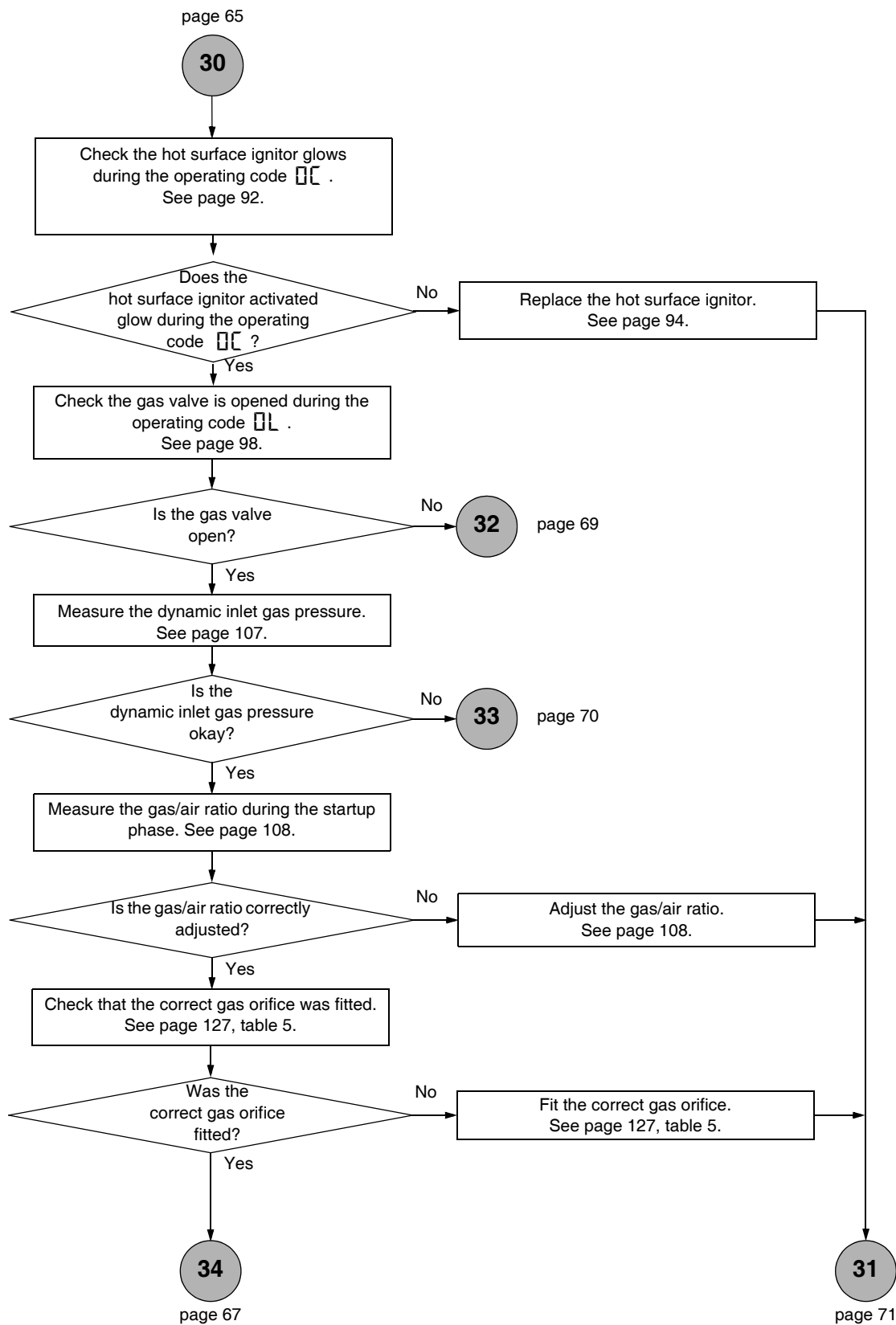
			The supply sensor contact is interrupted.	Locking boiler-fault code.
			The return sensor contact is interrupted.	Locking boiler-fault code.





			No ionization after four startup attempts.	Locking boiler-fault code.
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Check the following elements for soiling, damage and correct assembly:

- the combustion-air inlet conduit
- the air suction tube
- the seal between the Venturi and the blower
- the gas orifice, see page 101 and page 127, table 5
- the blower, see page 86
- the connection between the blower and the burner
- the burner
- the heat exchanger, see page 117
- the flue gas conduit.

Are the above-mentioned components clean and free from damage?

No  
Clean and/or replace the corresponding components.

Yes  
Measure the ionization current. See page 95.

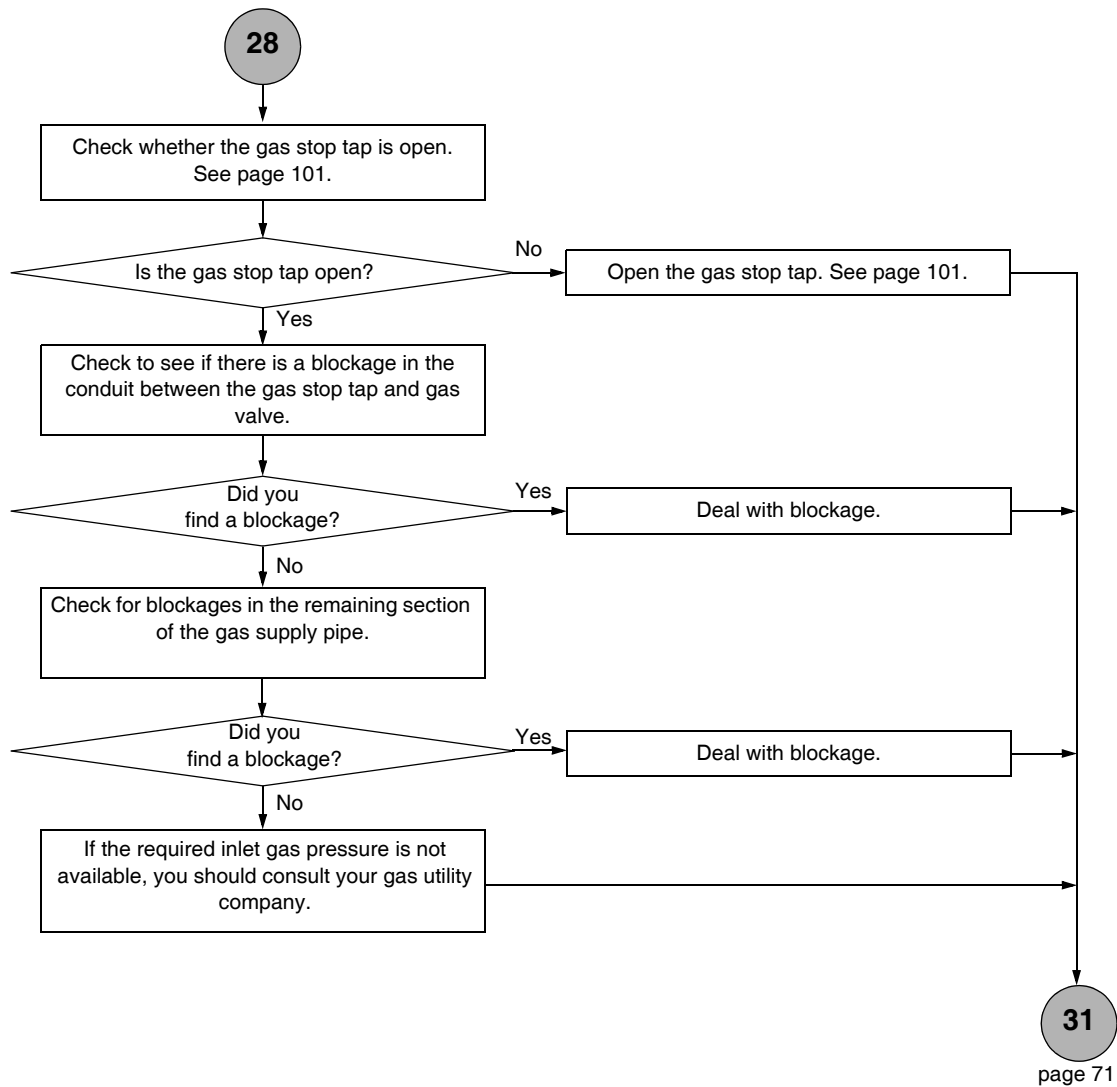
Is the ionization current okay?

No  
35 page 71

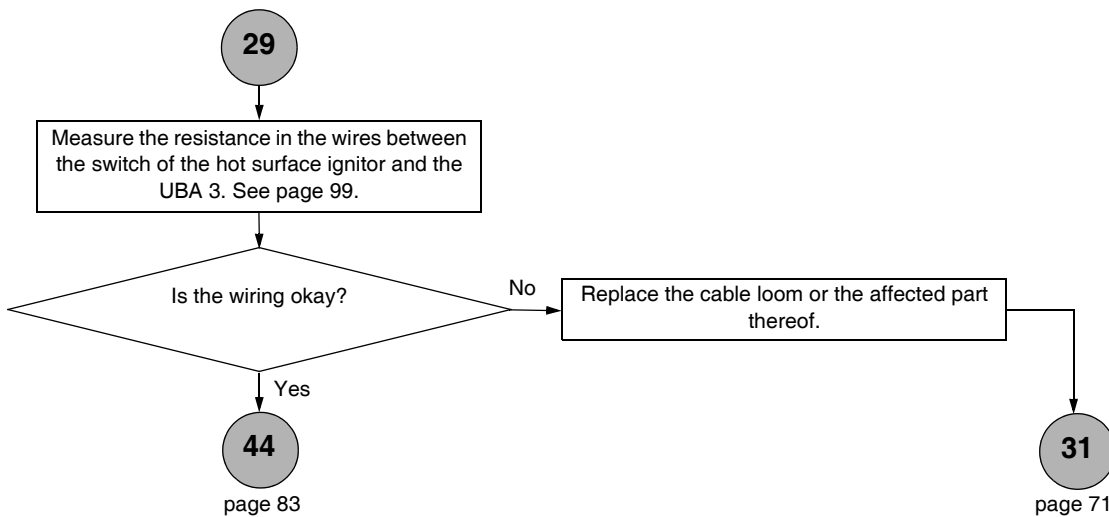
Yes

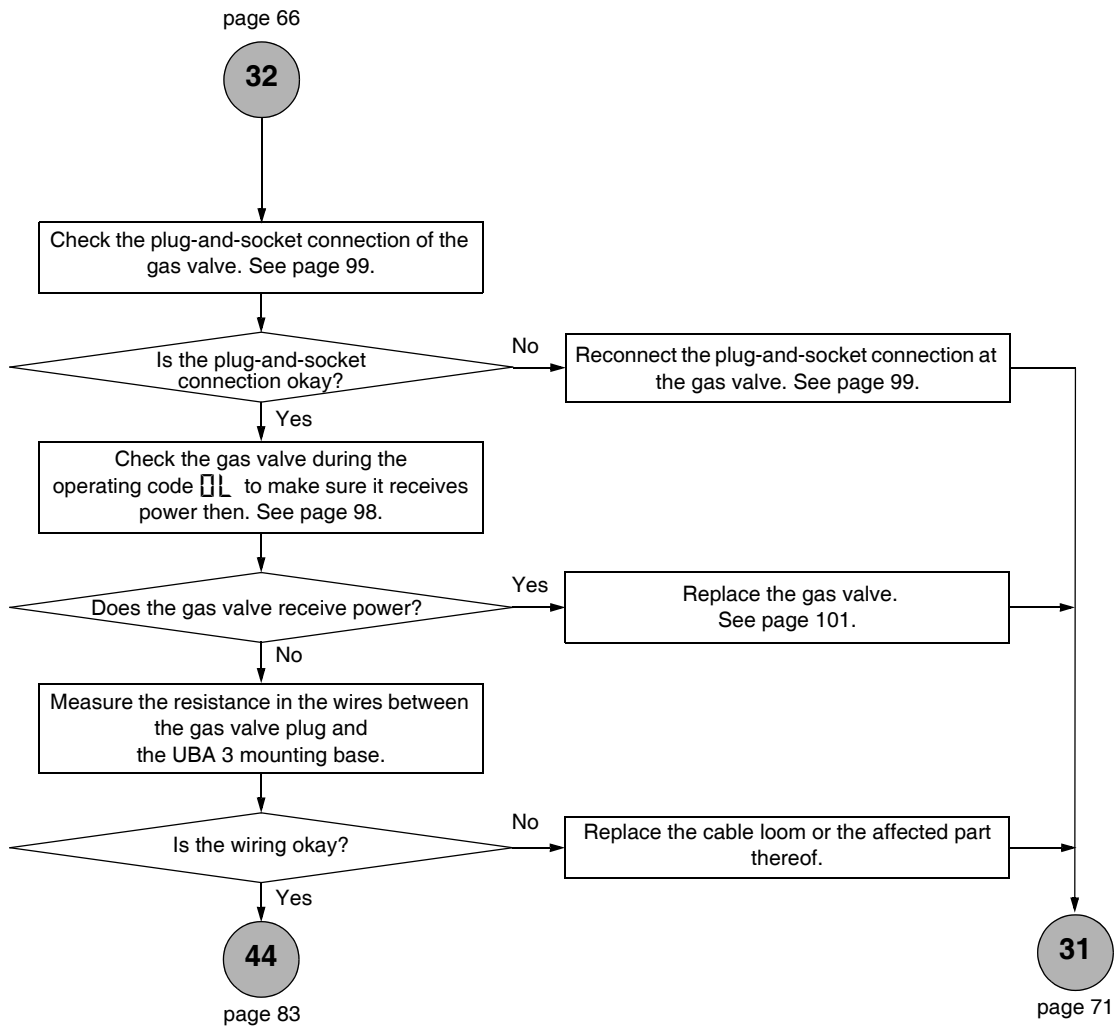
31  
page 71

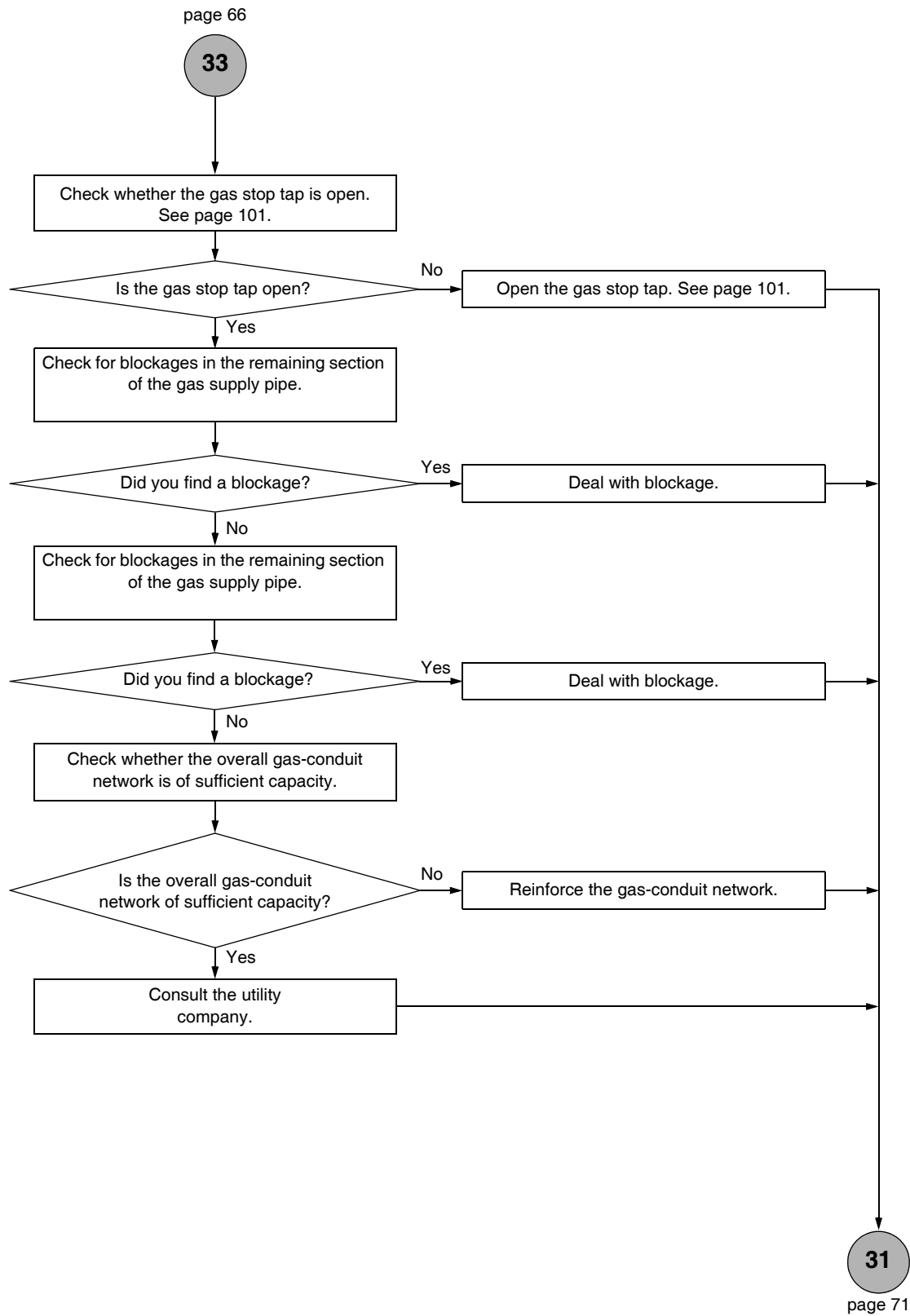
page 65

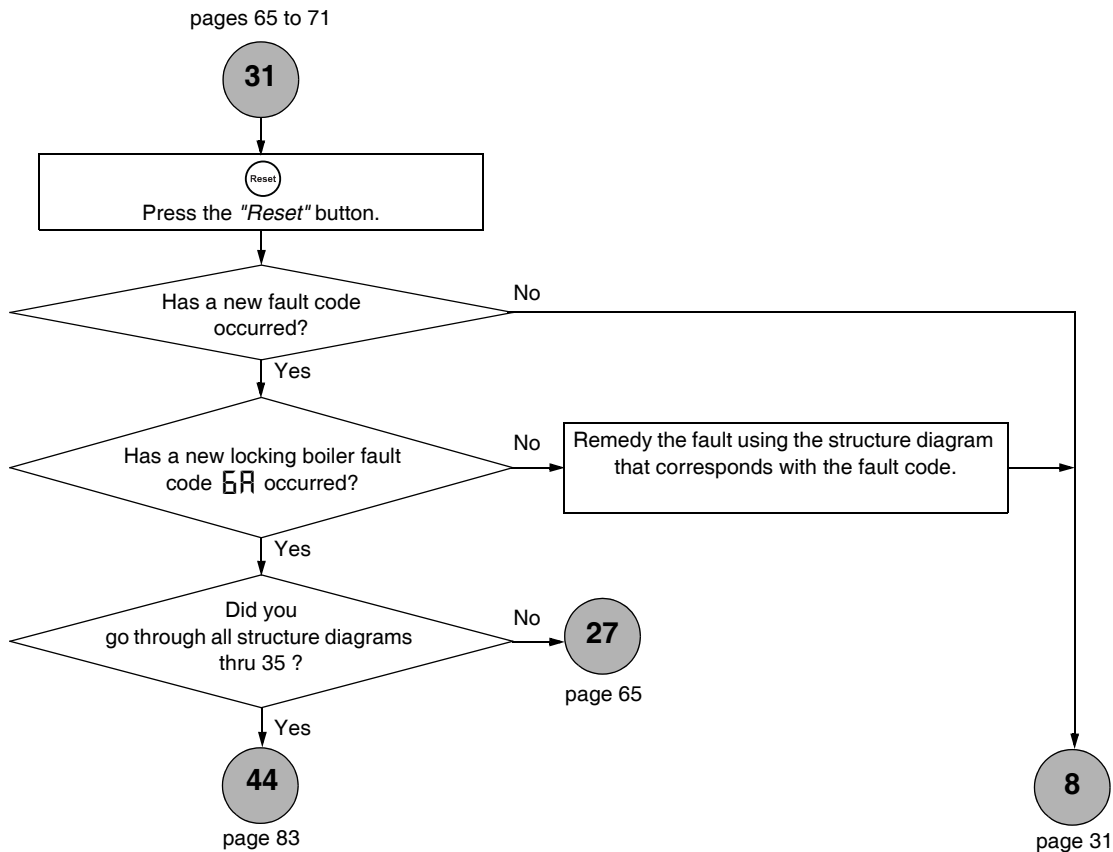
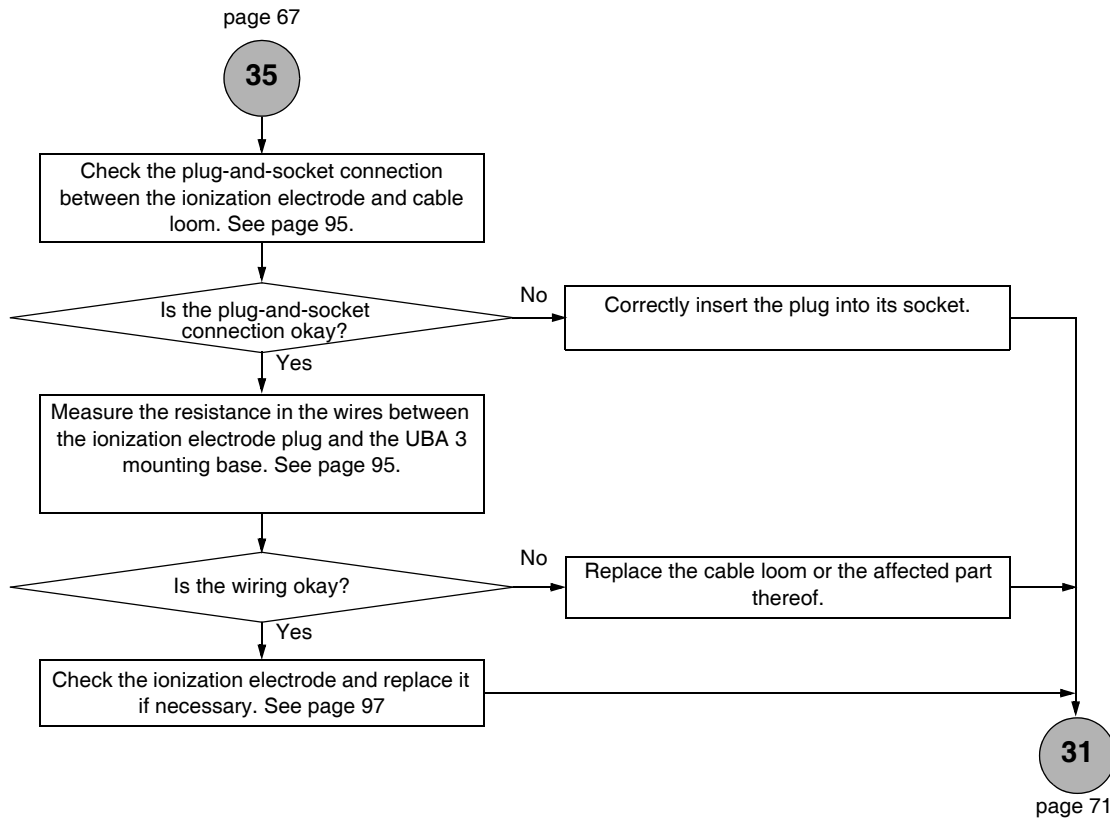


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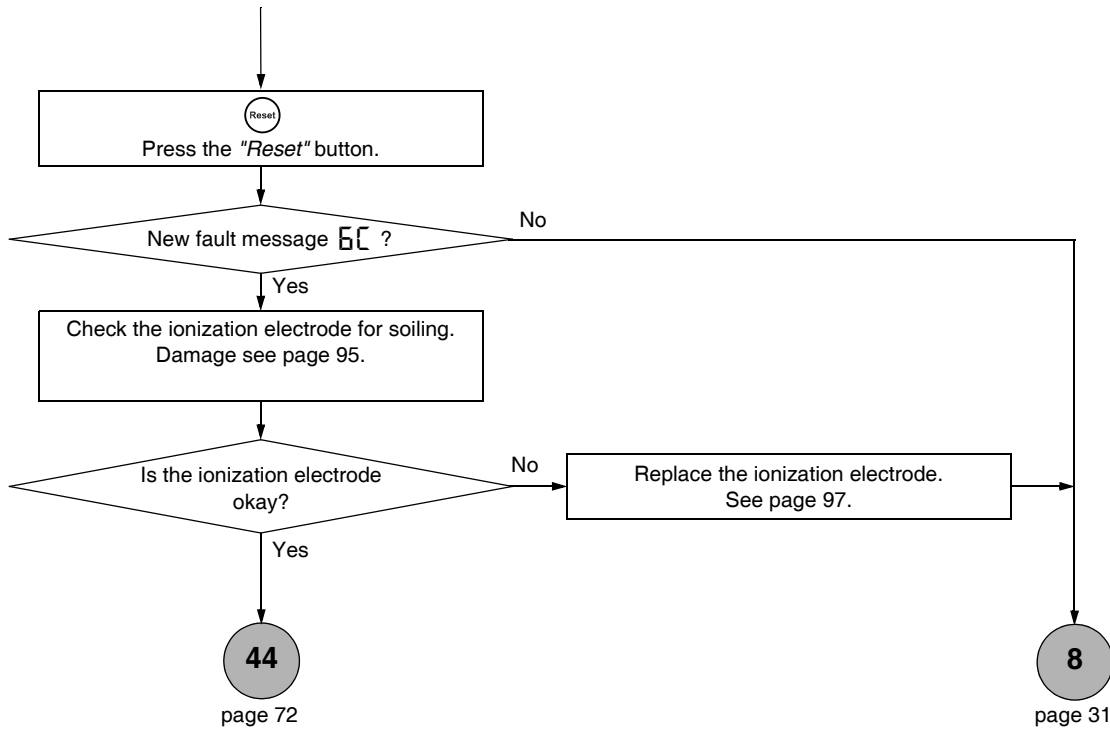




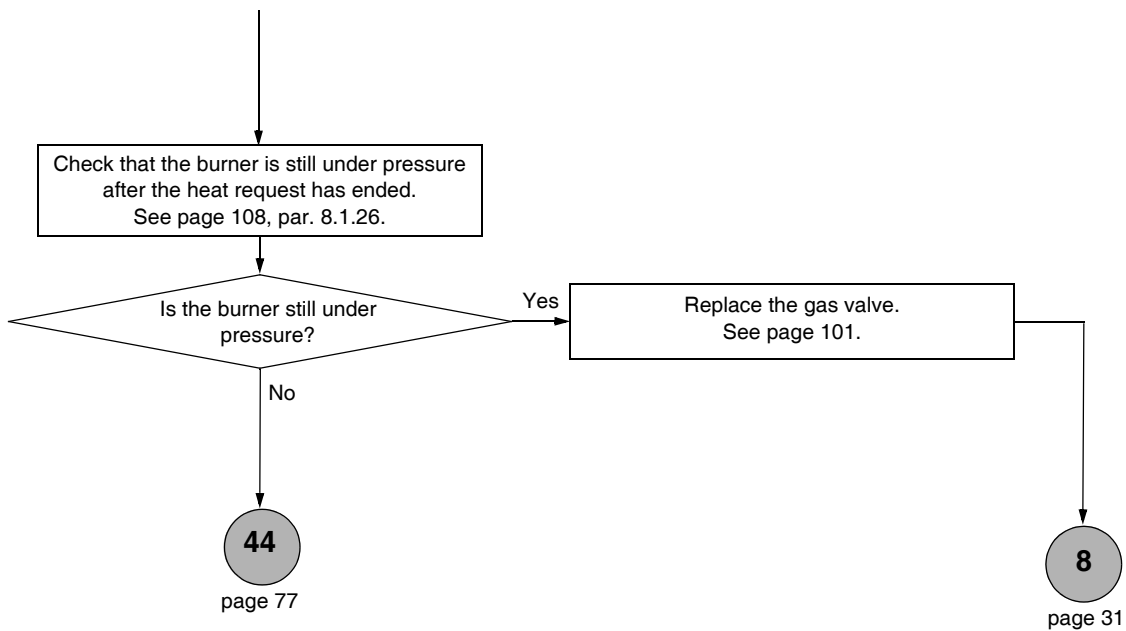




			An ionization current was measured before the burner start.	Locking boiler-fault code.
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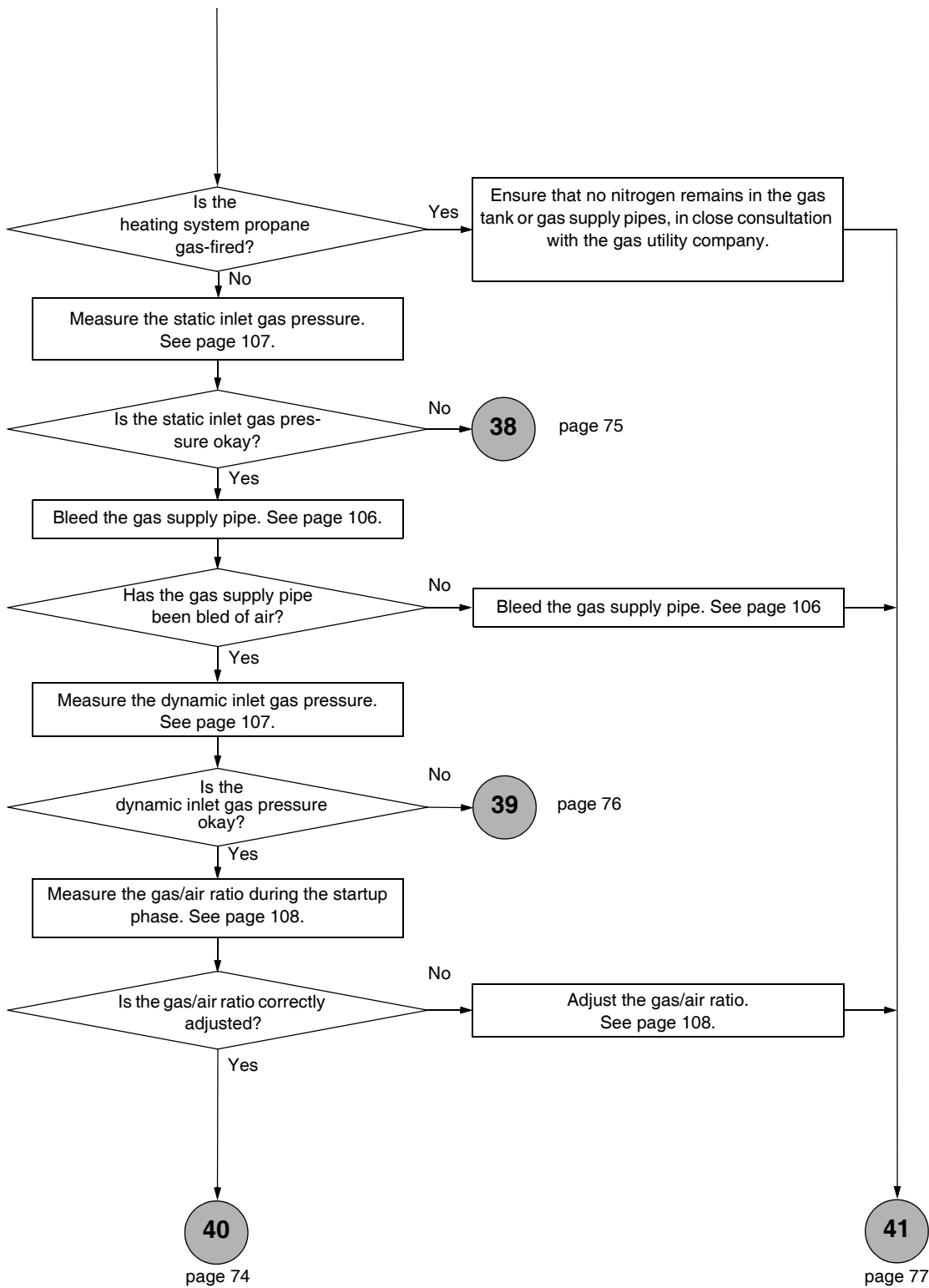


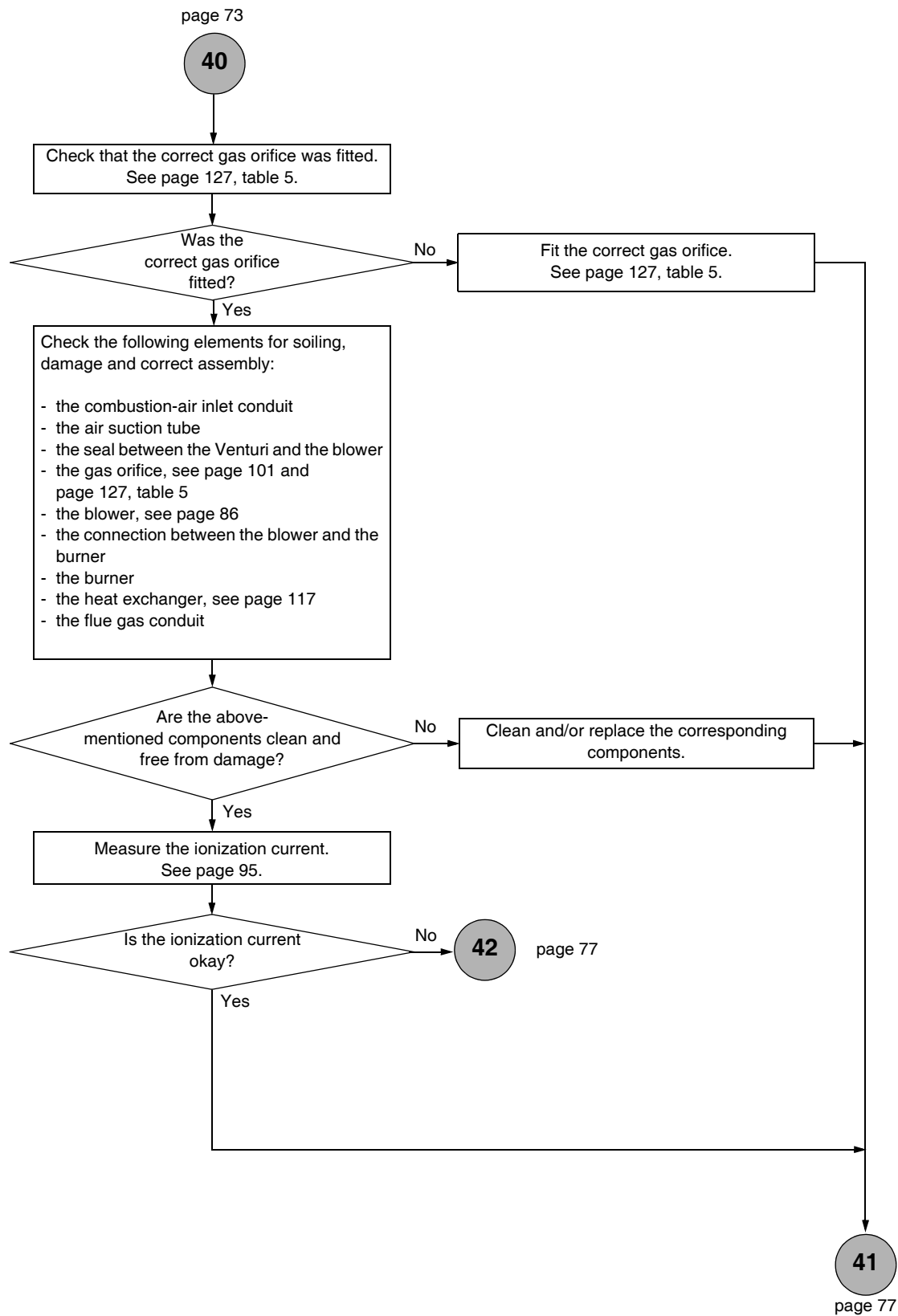
			An ionization current was measured after the burner switch-off.	Locking boiler-fault code.
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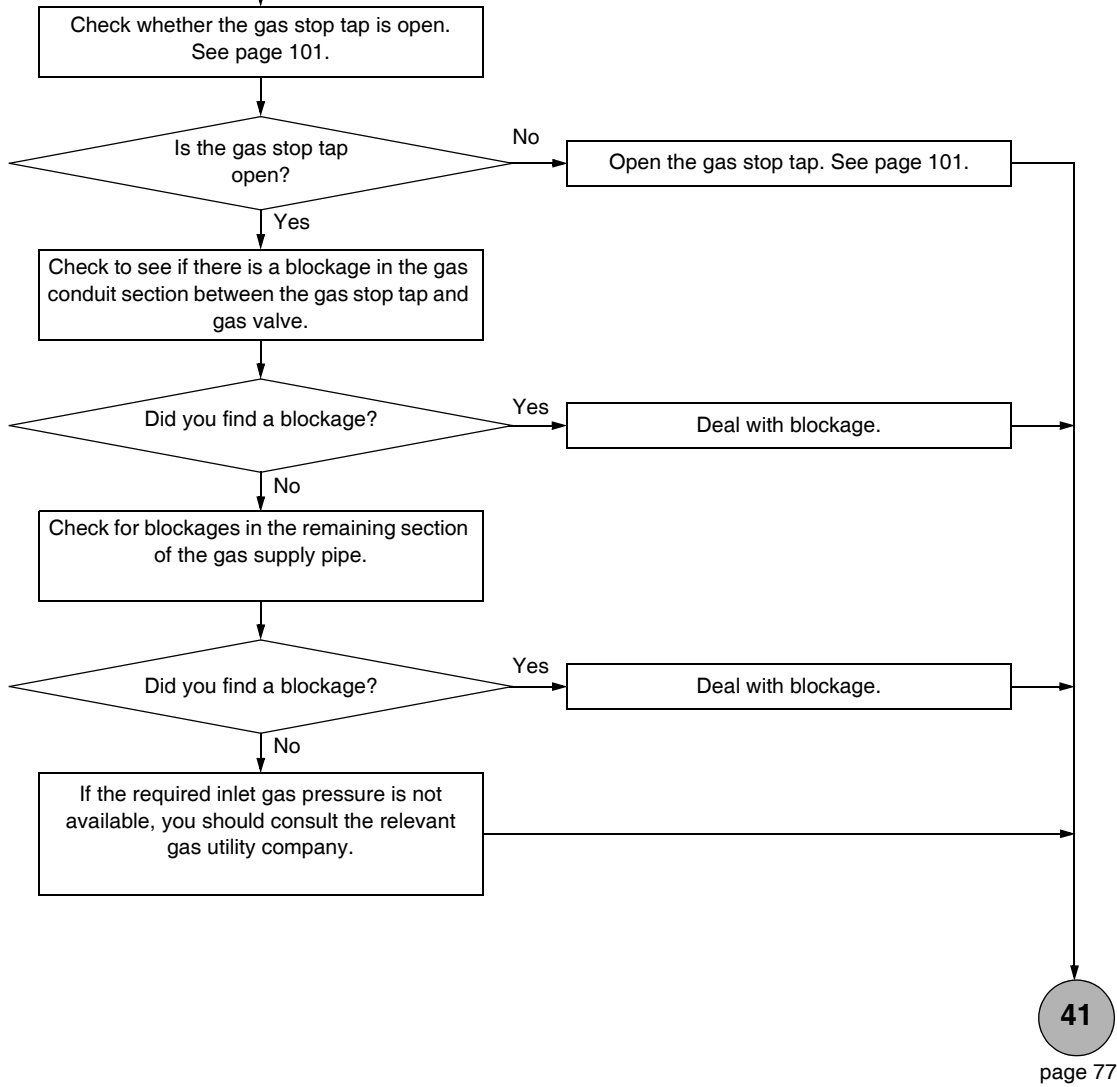
6L	229	Ionization fails during the operating phase.	Locking boiler-fault code.
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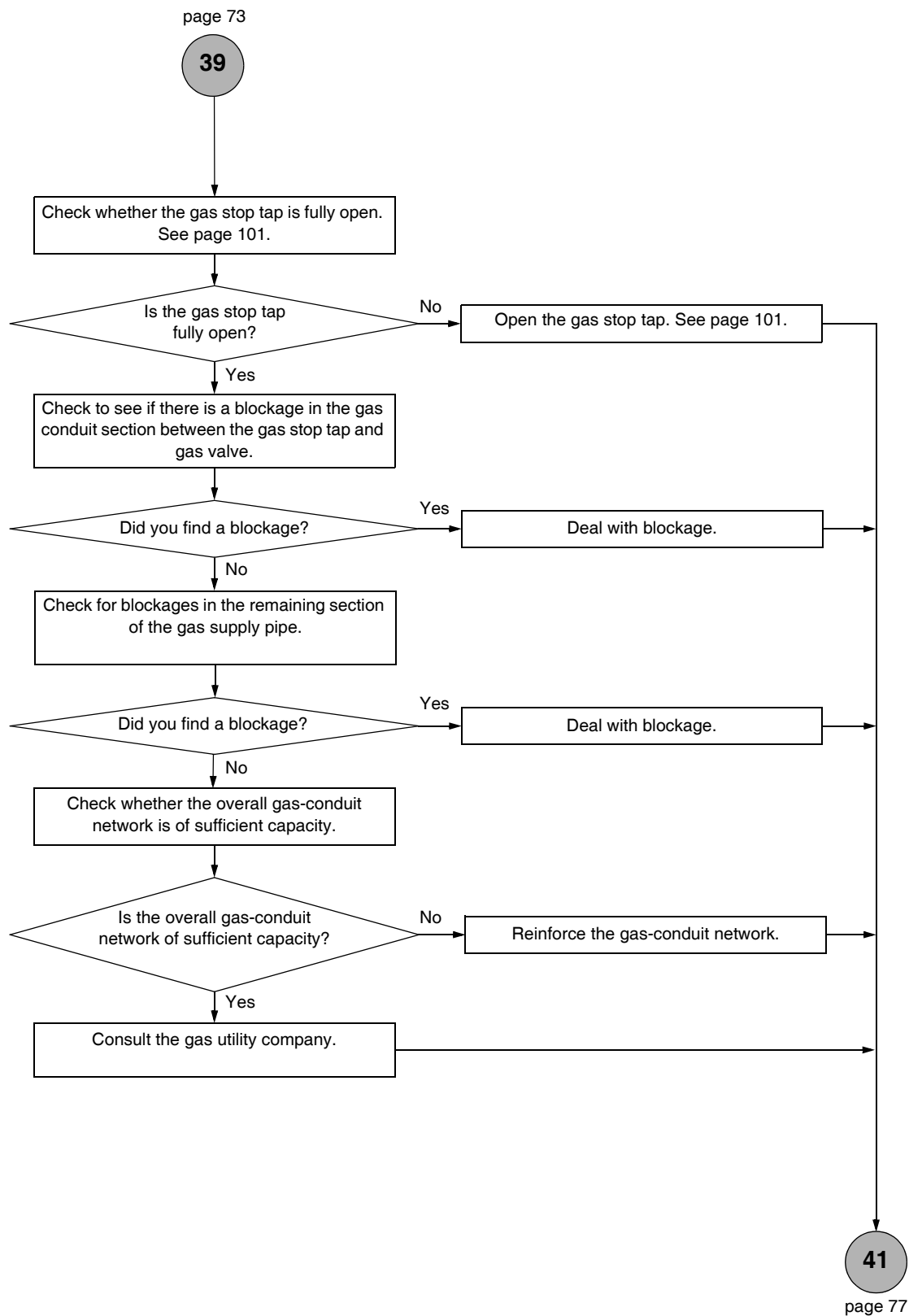


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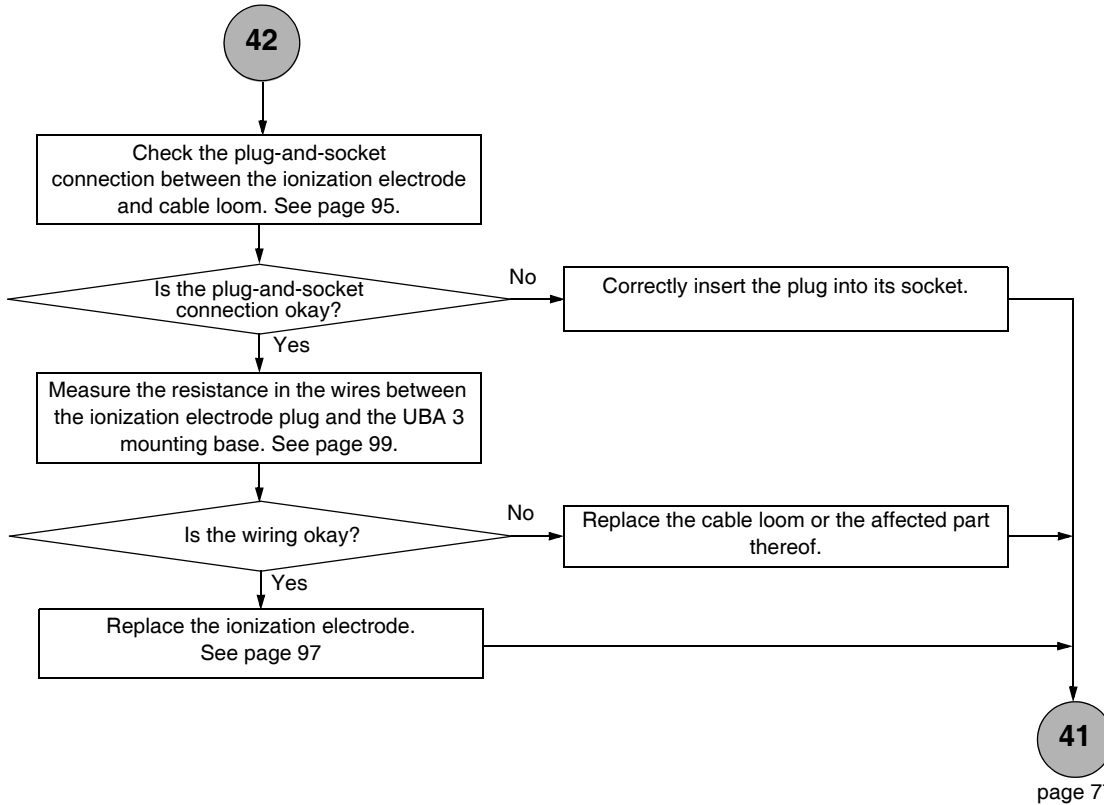
38



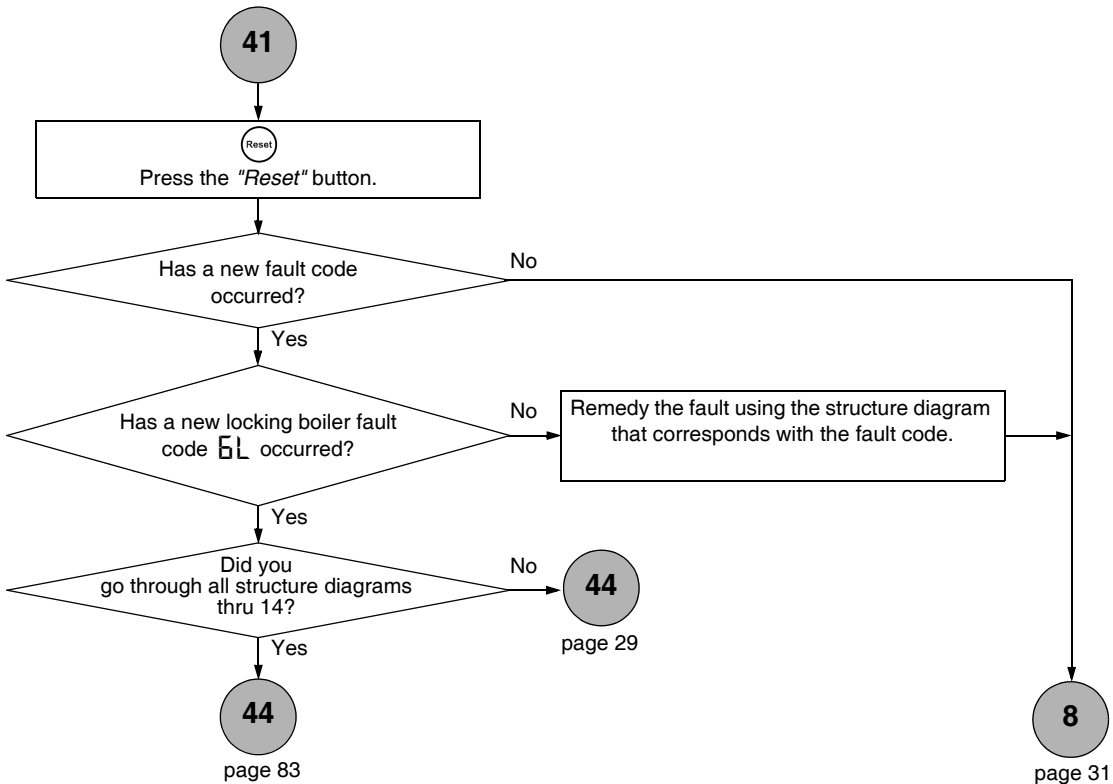
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




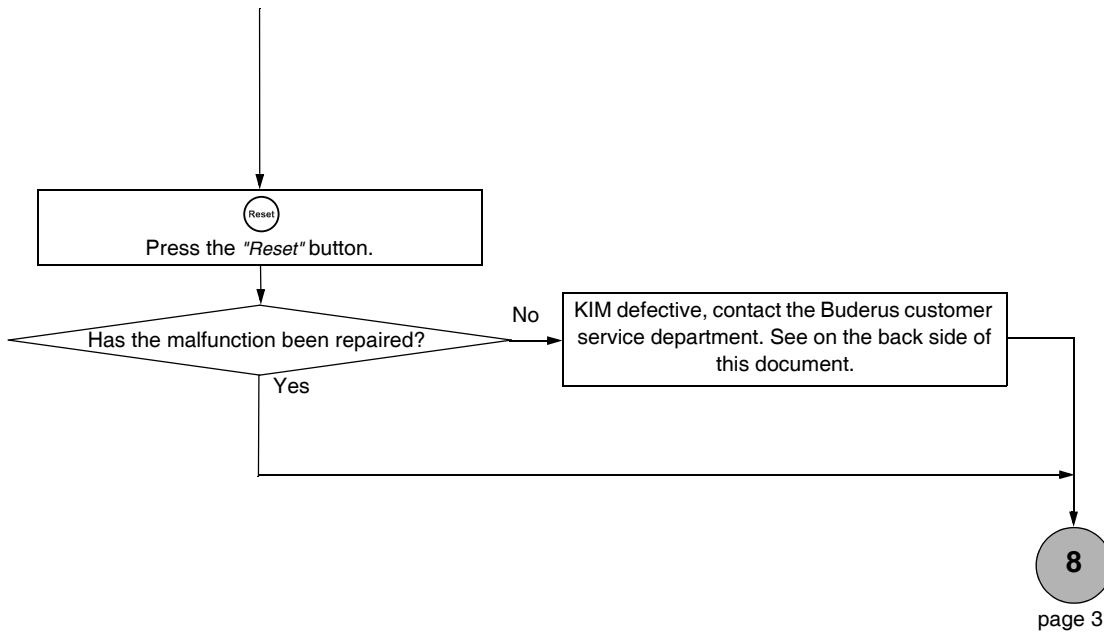
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


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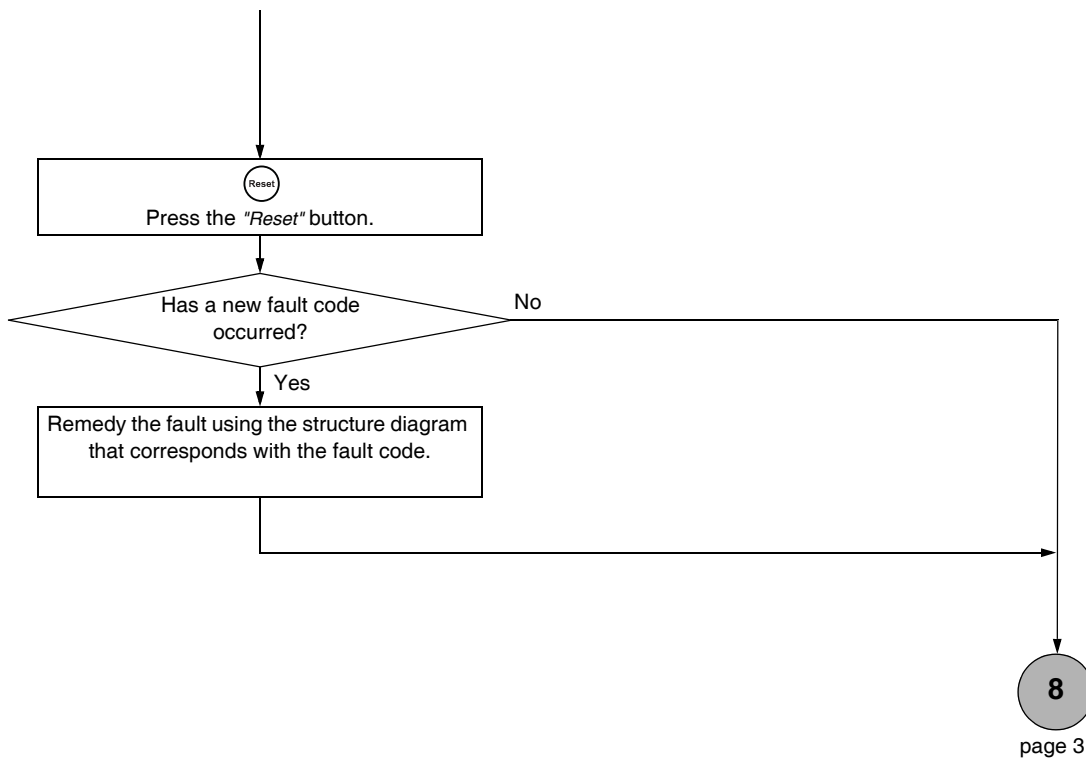


  	The hot surface ignitor activates too long.	Locking boiler-fault code.
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  	The power supply was interrupted after a fault message.	Locking boiler-fault code.
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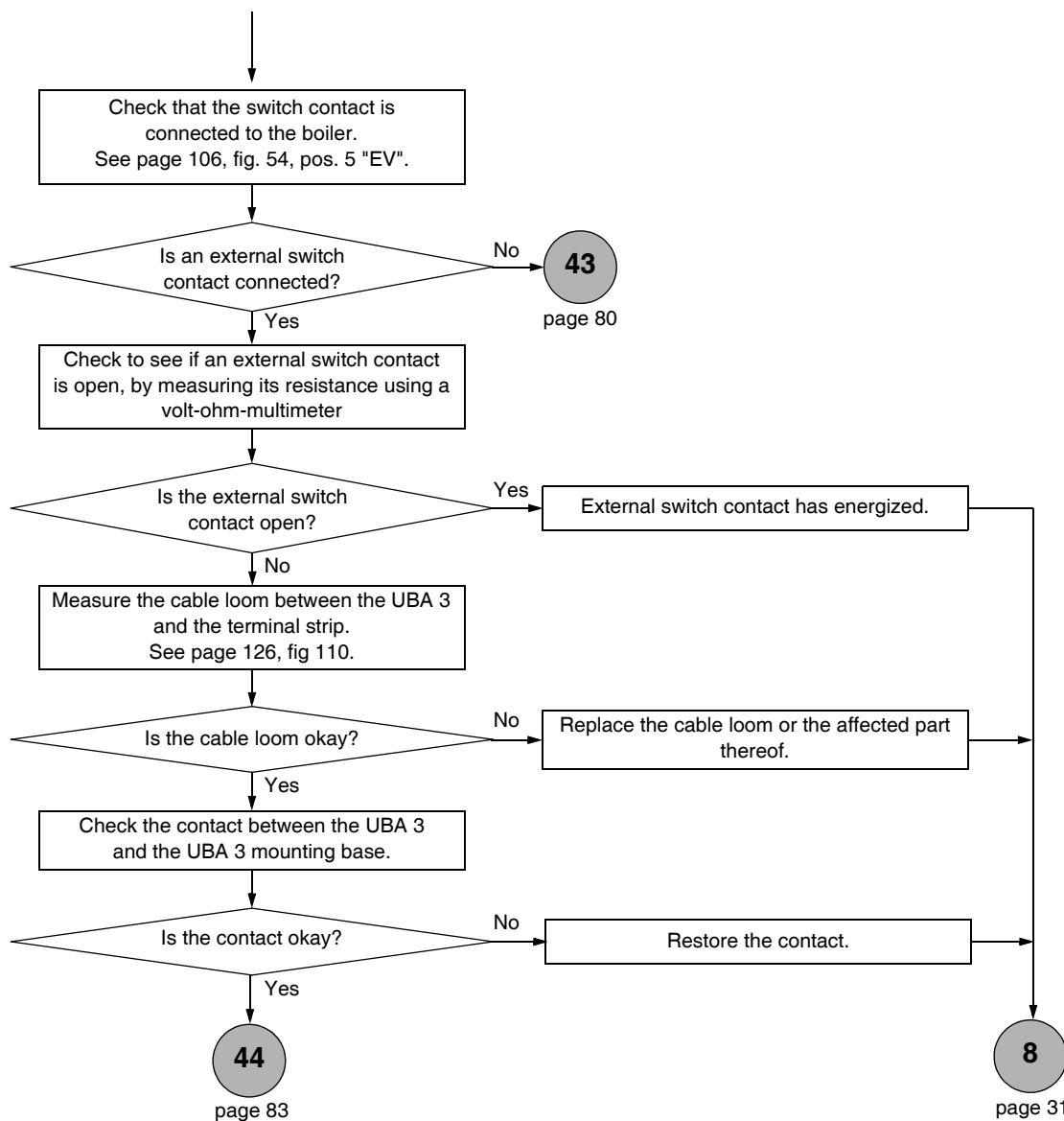


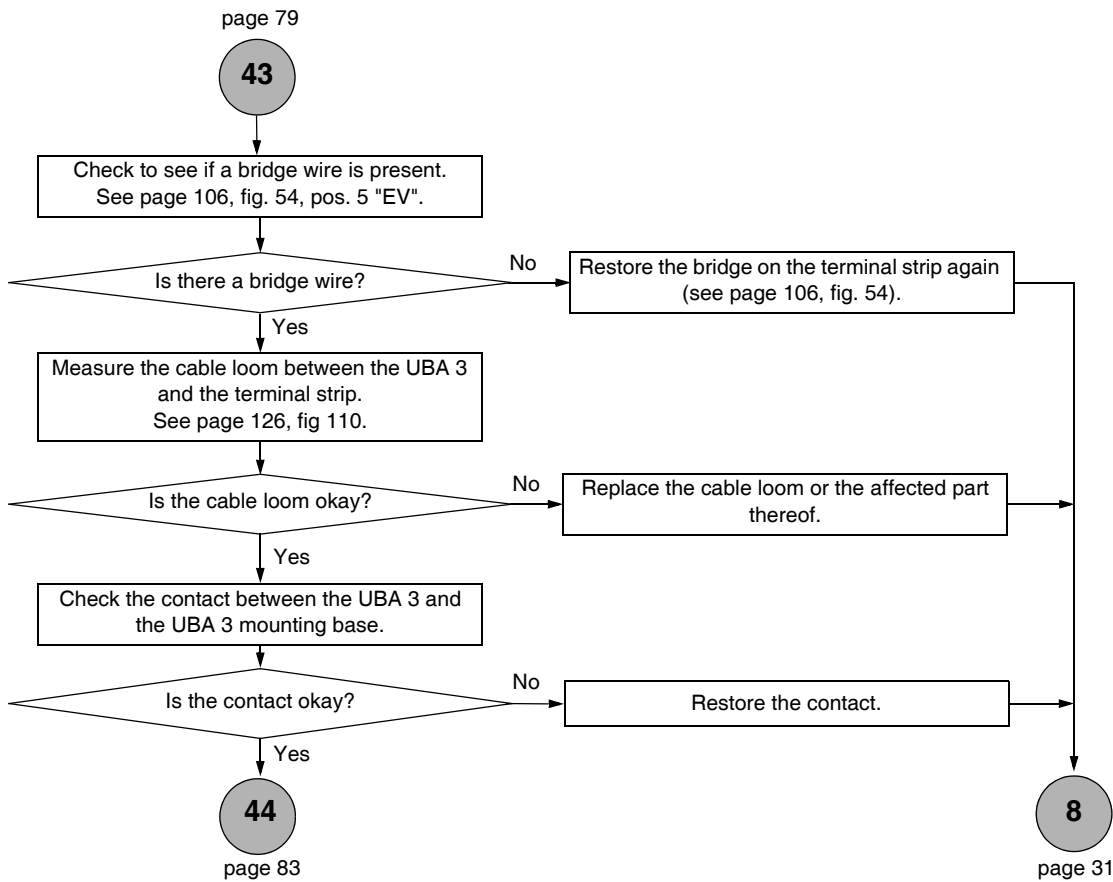
page 31

		261	The UBA 3 is defective.	Locking boiler-fault code.
		280	The UBA 3 is defective.	Locking boiler-fault code.

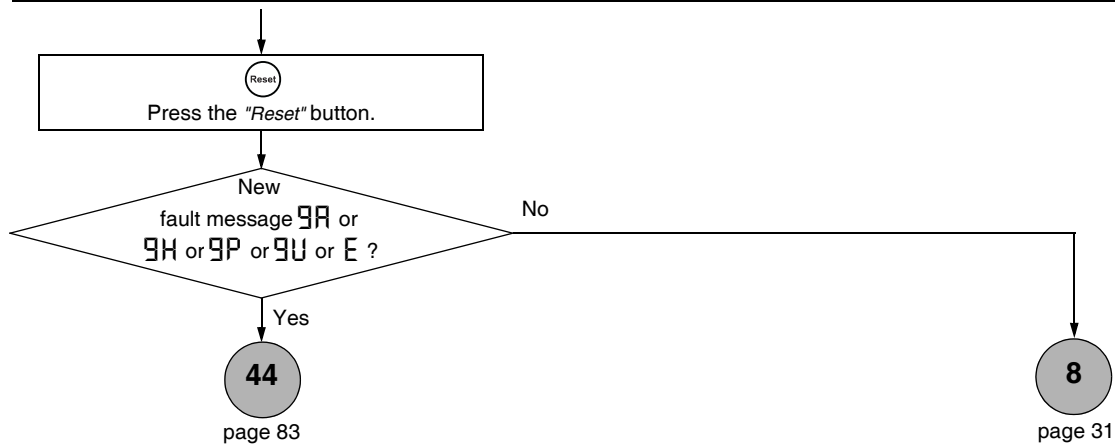


		232	The external switch contact is activated.	Locking boiler-fault code.
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







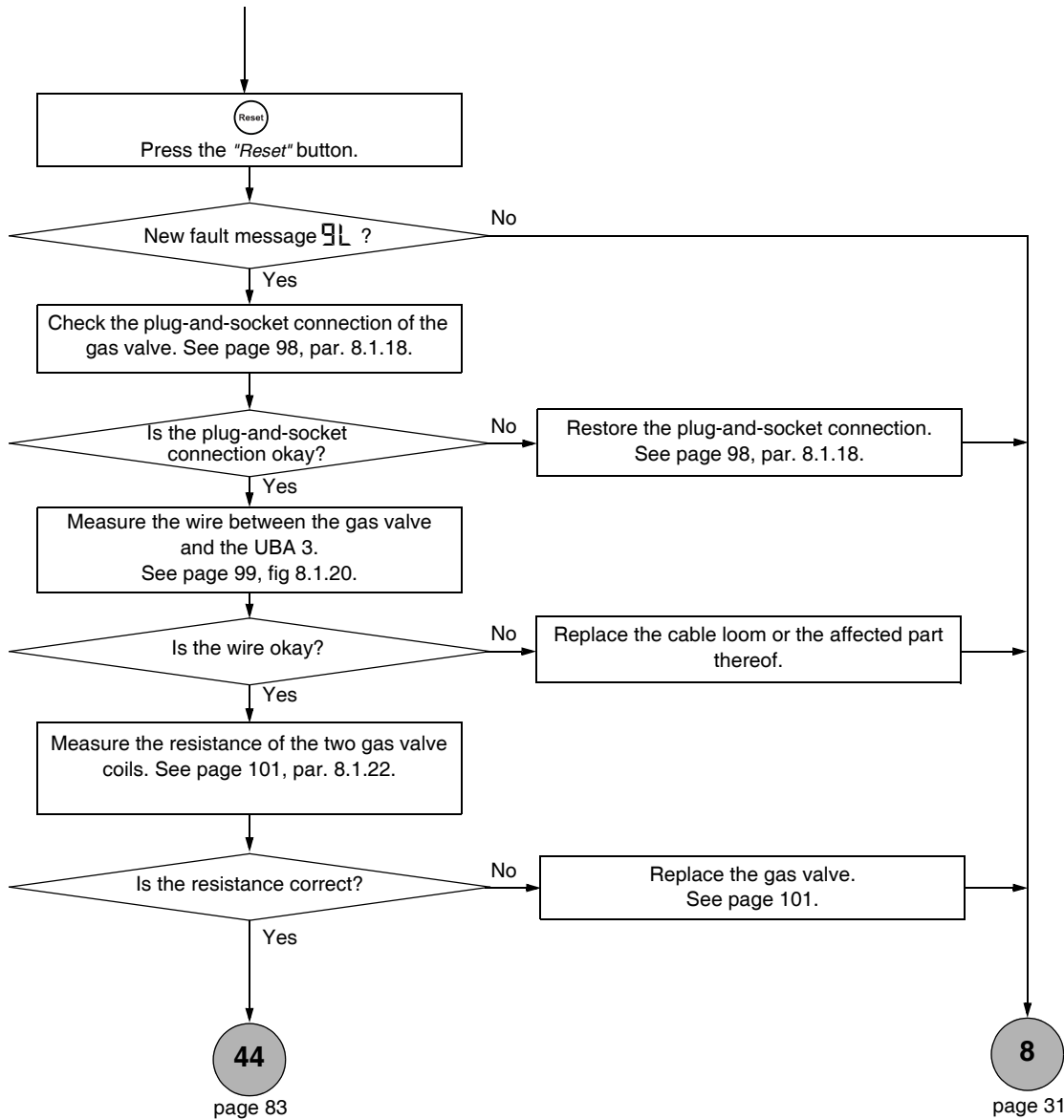






			KIM or UBA 3 is defective.	Locking boiler-fault code.
			KIM or UBA 3 is defective.	Locking boiler-fault code.
			KIM or UBA 3 is defective.	Locking boiler-fault code.
			KIM or UBA 3 is defective.	Locking boiler-fault code.
+ any digit or letter			KIM or UBA 3 is defective.	Locking boiler-fault code.
+ any digit or letter			The UBA 3 is defective.	Locking boiler-fault code.

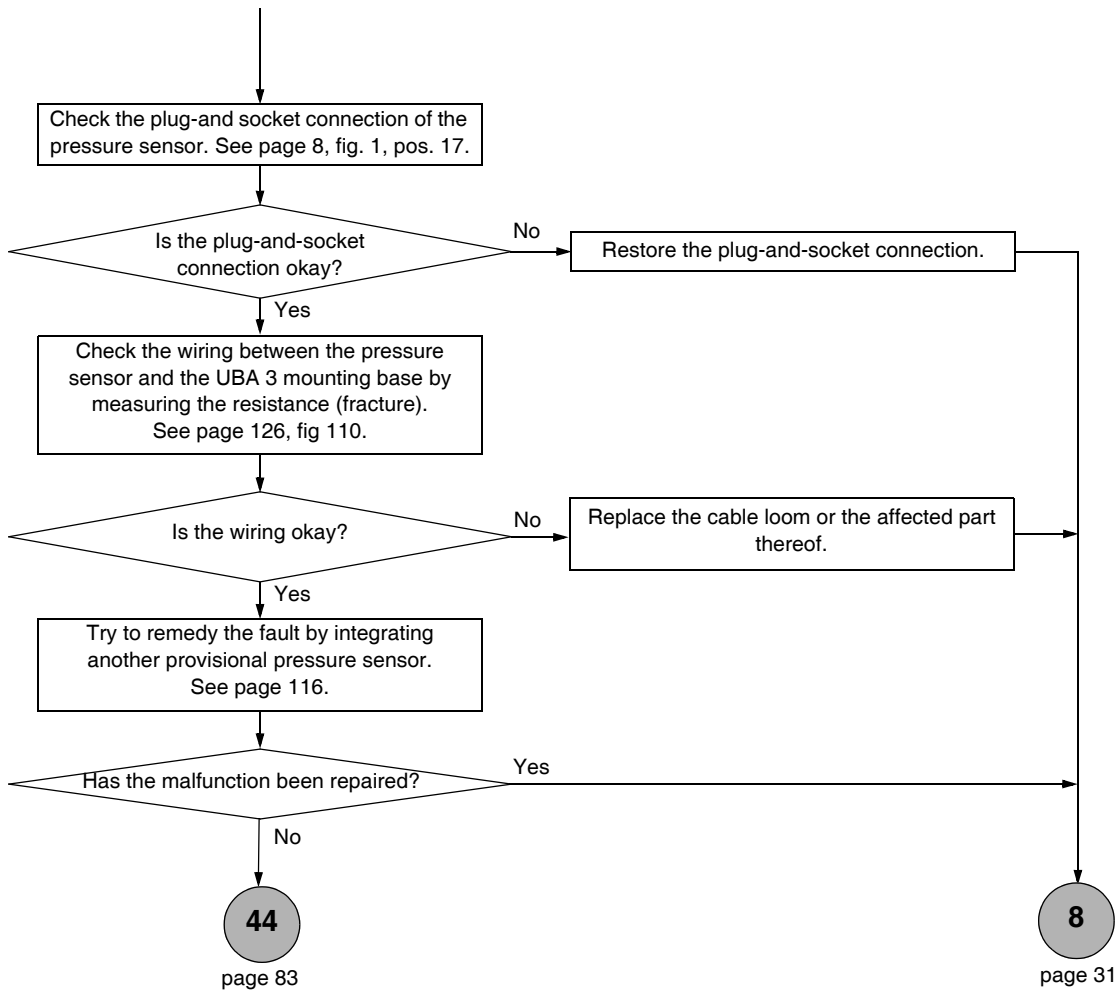


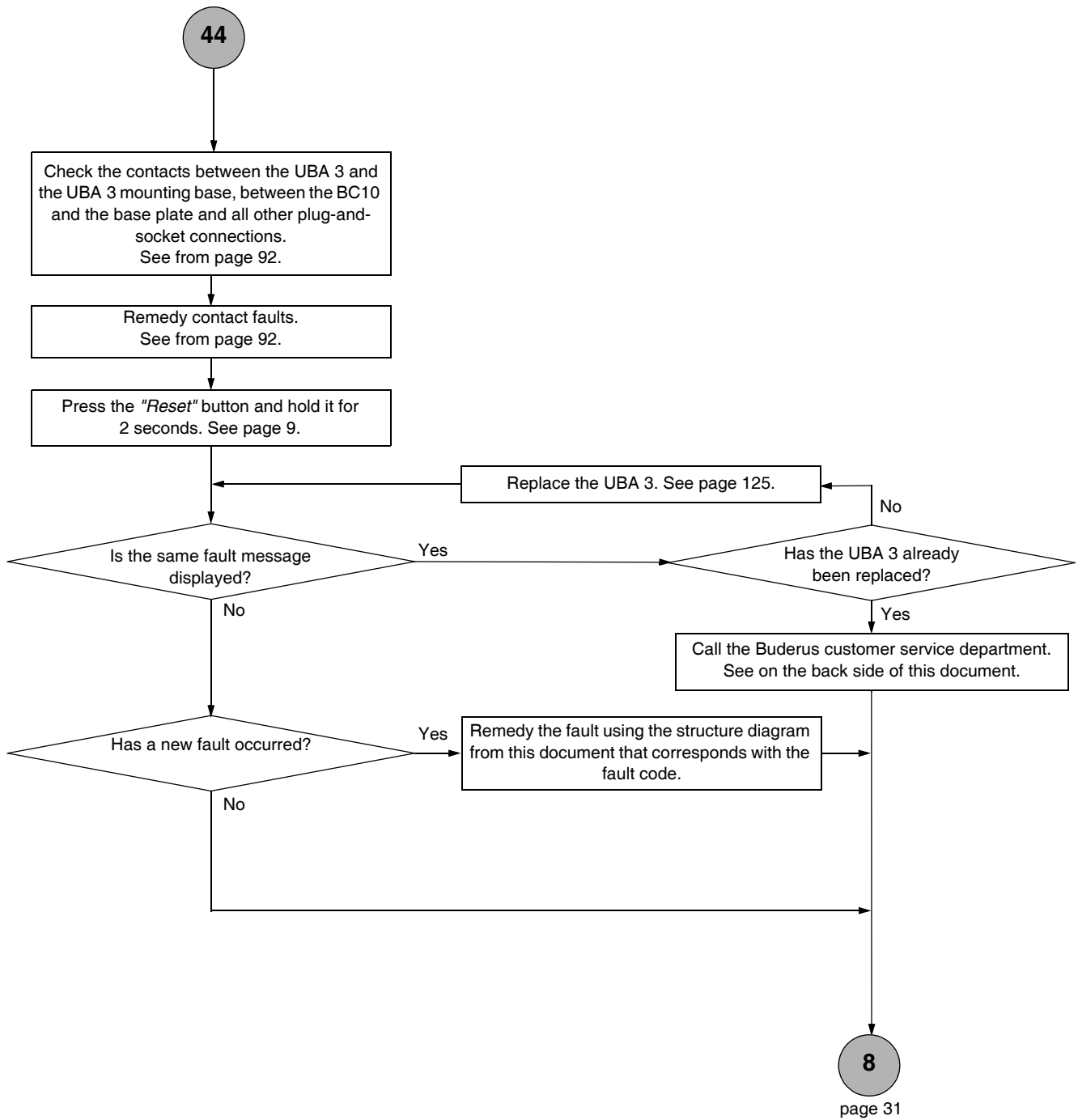


			The gas valve coil or the wiring to the gas valve is defective.	Locking boiler-fault code.
			The UBA 3 is defective.	Locking boiler-fault code.



		The UBA 3 has no connection to the pressure sensor or there is a short circuit.	Locking boiler-fault code.
		Short circuit in connection to pressure sensor.	Locking boiler-fault code.





## 8 Actions

### 8.1 Testing, measuring, adjusting and replacing various components

#### 8.1.1 Checking the UBA 3 fuse; replace if necessary

- Switch off the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Loosen the fastening screw of the UBA 3 by turning it counter-clockwise (see fig. 4, pos. 1).



#### WARNING!

Do not **pull or move side to side** the UBA 3 during loosening or tightening of UBA 3 fastening screw.

- Remove the UBA 3 once the fastening screw is fully loosened by pulling it forward carefully as indicated by the arrow (see fig. 4, pos. 2).
- Dismantle the fuse holder by loosening the bayonet connector (see fig. 5, pos. 1).
- Remove the fuse from the fuse holder.
- Check the circuit continuity through the fuse using the volt-ohm-multimeter. If broken, replace it by (a new) spare ceramic fuse 5 amps, 250V fast blow (F5AH, 250V) (fig. 5, pos. 2).
- Re-assemble the UBA 3 in reverse order of disassembly.
- Fasten the UBA 3 by only turning the fastening screw clockwise.



#### WARNING!

Do not **push or force** the UBA 3 in place by hand.

- Fit the casing.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

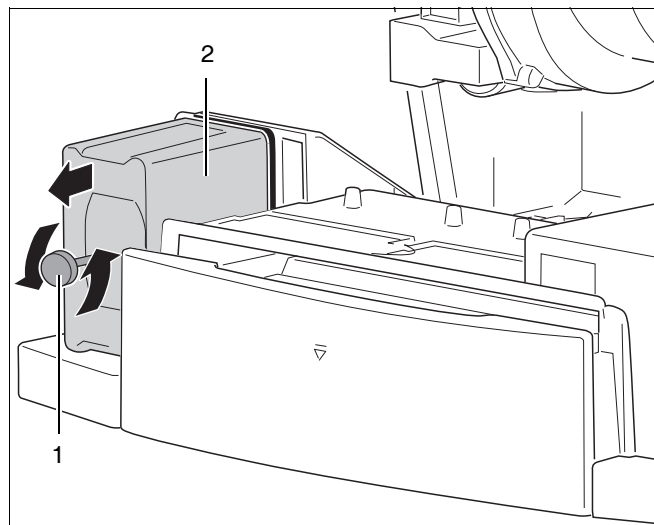


fig. 4 Dismantling the UBA 3

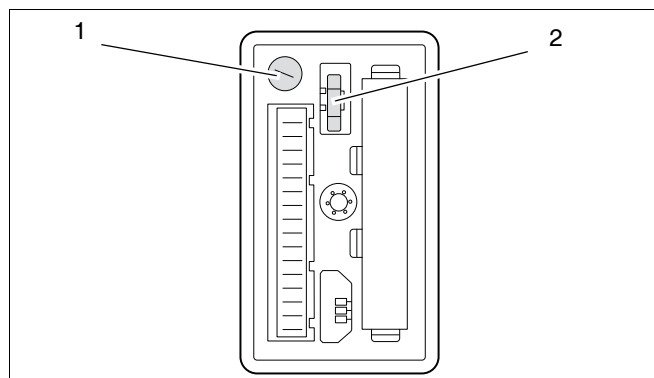


fig. 5 Checking the fuses

### 8.1.2 External connection board fuse

- Switch off the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Remove the cover from the connection box (fig. 6).

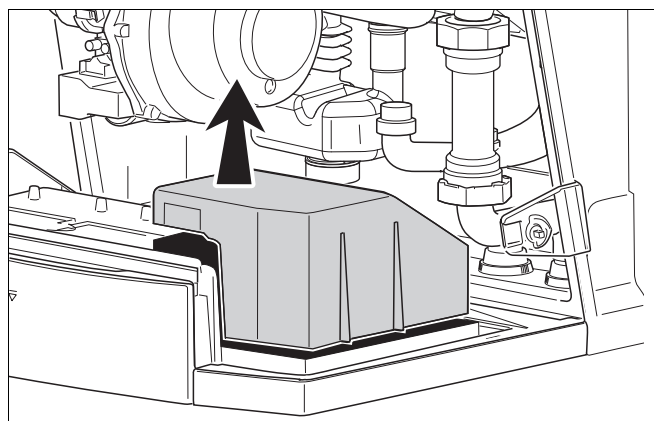


fig. 6 Removing the cover from the connection box

- Dismantle the fuse holder (fig. 7, pos. 10).
- Remove the fuse from the fuse holder.
- Check the circuit continuity through the fuse using the volt-ohm-multimeter. If broken, replace it with a (new) ceramic fuse 5 amps, 250V fast blow (F5AH, 250V).
- Re-install the cover on the connection box.
- Fit the casing.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

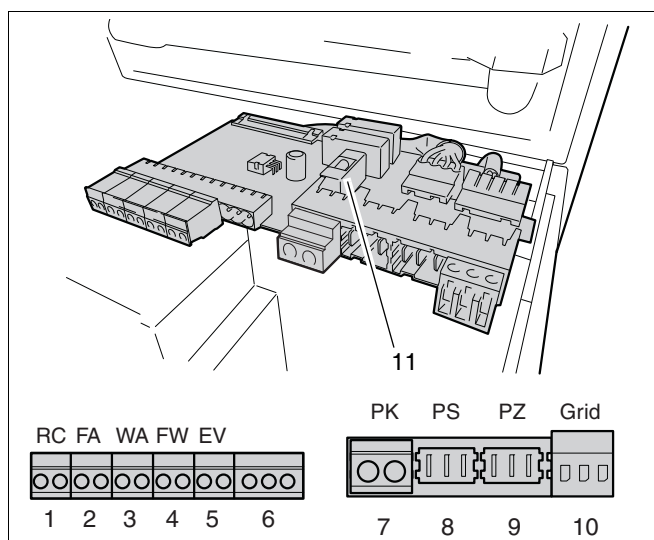


fig. 7 External connection board

- 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: DO NOT USE
- 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

## 8.1.3 Checking the fan unit; 120 VAC control

**NOTE**

The fan unit can be controlled using the RC control device relay test function. Further instructions for the RC control device are in the Installation and Maintenance Instructions.

**WARNING!**

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

- Remove the casing.
- Switch off the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Disconnect the 120V AC plug of the fan unit.
- Test the voltage with the volt-ohm-multimeter; set it to VAC. Minimum value 250V AC.
- Connect the volt-ohm-multimeter to the outer two plug contacts (blue and brown) (see fig. 8).
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).
- Start up the boiler in accordance with the "Flue gas test" menu. See page 10 "Flue gas test" menu.
- Check that while the operating code  is displayed, 120V AC is available on the outer two contacts (blue and brown) of the plug (see fig. 8).
- Switch off the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Reconnect the plug to the fan unit.
- Fit the casing.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

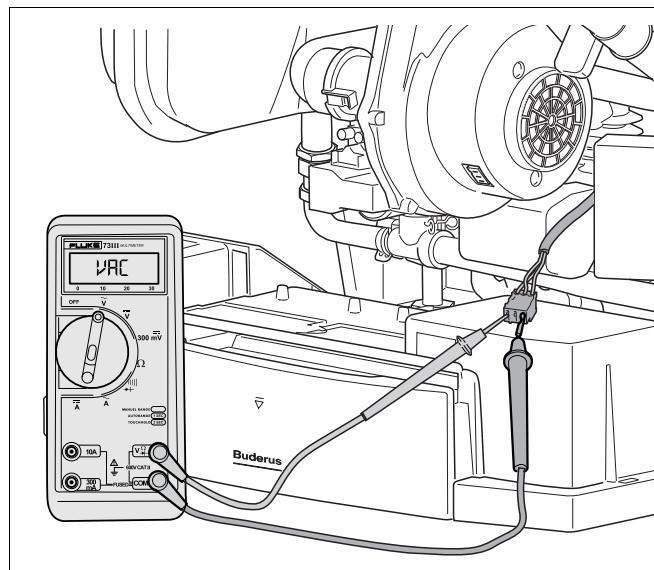


fig. 8 Checking for 120V AC voltage

### 8.1.4 Checking the fan unit; supply cord (120V AC)



#### WARNING!

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

- Remove the casing.
- Switch off the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Disconnect the 120V AC plug of the fan unit.
- Loosen the fastening screw of the UBA 3 (see fig. 9, pos. 1).
- Remove the UBA 3 by pulling it forward as indicated by the arrow (see fig. 9, pos. 2).
- Set the volt-ohm-multimeter 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. 10 and fig. 110 on page 126).
- Reconnect the plug to the fan unit.
- Re-assemble the UBA 3 in reverse order of disassembly.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).
- Fit the casing.

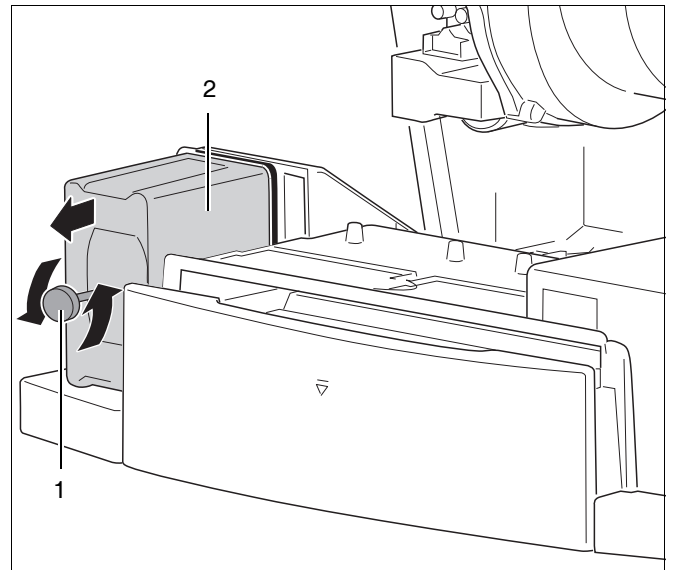


fig. 9 Dismantling the UBA 3

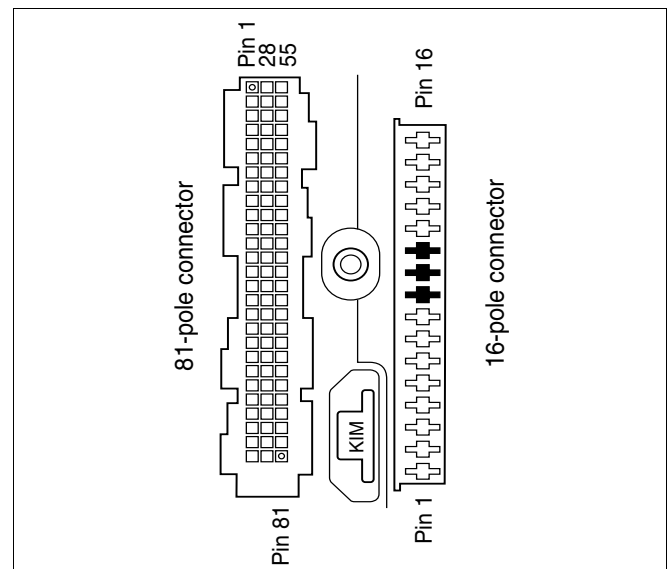


fig. 10 UBA 3 installation base

## 8.1.5 Checking the fan unit; tacho cable

**WARNING!**

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

- Remove the casing.
- Switch off the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Dismantle the tacho cable plug.
- Loosen the fastening screw of the UBA 3 (see fig. 9, pos. 1).
- Remove the UBA 3 by pulling it forward as indicated by the arrow (see fig. 9, 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. 11).
- Assemble the tacho cable plug.
- Re-assemble the UBA 3 in reverse order of disassembly.
- Fit the casing.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

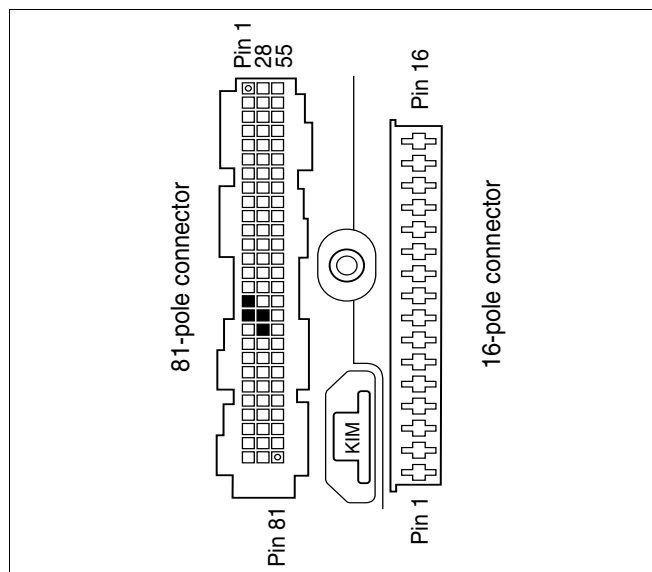


fig. 11 UBA 3 installation base

## 8.1.6 Replacing the fan unit

**NOTE**

Follow the installation instructions for 120V fan units!

- Switch off the power supply of the heating system on 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. 12, pos. 1).

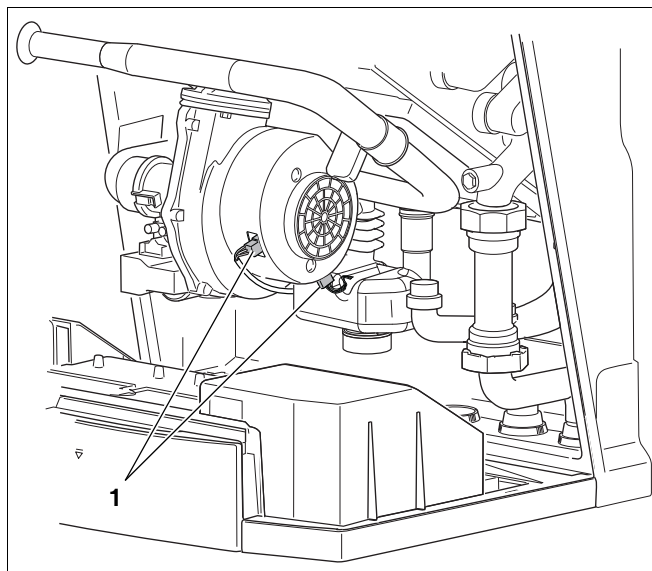


fig. 12 Disconnect the cable plug from the fan unit



- Remove the air suction tube (see fig. 13, pos. 1).
- Remove the fan unit fastening screw (see fig. 13, pos. 2).
- Remove the fan unit by swinging it to the right (see fig. 13, pos. 3).
- Install the new fan unit.
- Install the fastening screw, air suction tube and both plugs.
- Fit the casing.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

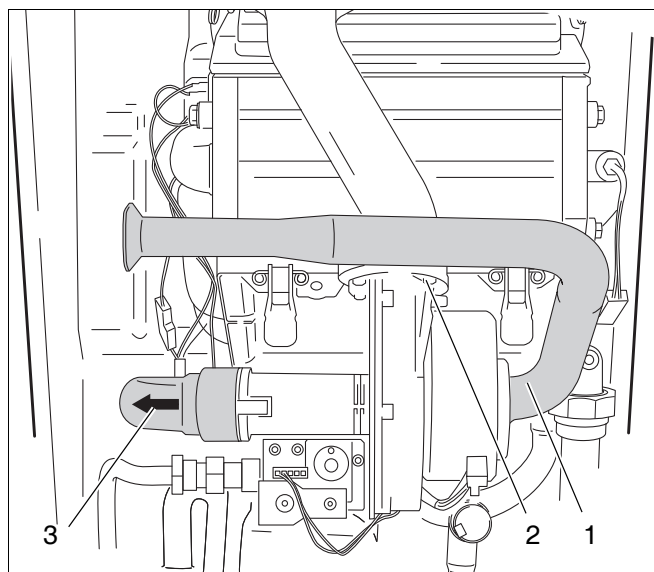


fig. 13 Dismantling the fan unit

### 8.1.7 Checking the supply/return/safety/hot-water temperature sensors



#### NOTICE

The current temperature measured by the supply, return and safety sensors, can be read out from the RC control device.

For further instructions, see installation and maintenance instructions of the RC control device.



#### WARNING!

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

- Switch off the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.

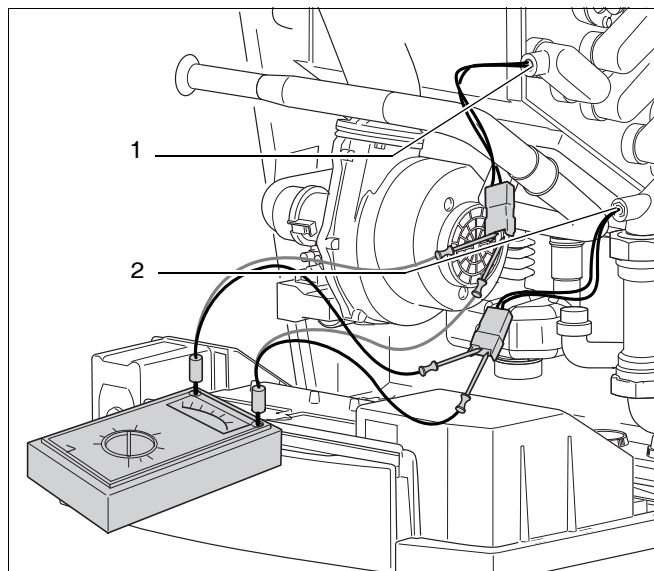


fig. 14 Checking the supply/return sensors

- Disconnect the plug and socket connection of the cable for the sensor concerned.
- Test the resistance of the sensor concerned.  
Supply sensor see fig. 14, pos. 1.  
Return sensor see fig. 14, pos. 2.  
Safety sensor see fig. 15, pos. 1.
- Measure the temperature near the sensor using a seconds thermometer.
- Compare the values measured to the values in table 4 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.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

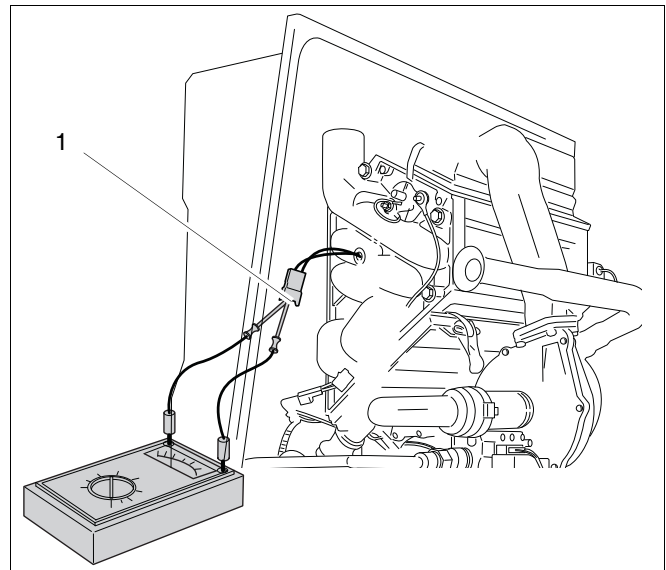


fig. 15 Checking the safety sensor

Temperature in		Resistance in
°F	°C	Ω
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 4 Sensor resistance values (target values)

### 8.1.8 Replacing the supply/return/safety sensors

- Switch off the power supply of the heating system on 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. 16, pos. 1.  
Return sensor see fig. 16, pos. 2.  
Safety sensor see fig. 17, pos. 1.
- Restore the plug and socket connection.
- Open the maintenance shut-off valves.
- Purge air from the boiler.

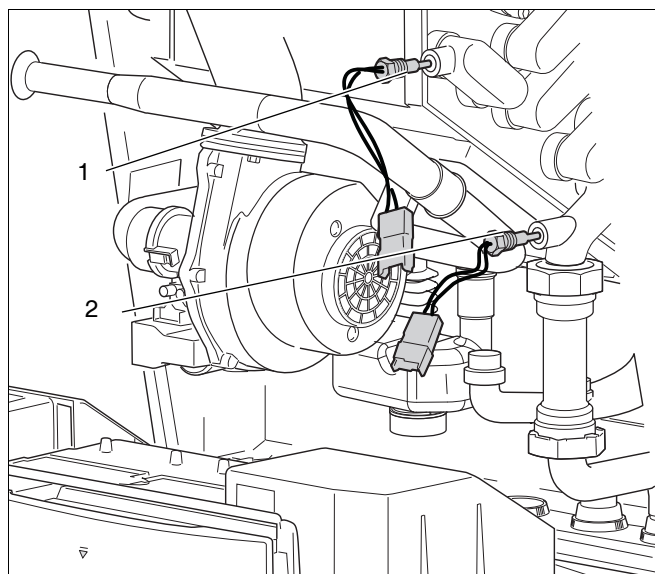


fig. 16 Replacing the supply/return sensors



#### NOTICE

Fill and purge the Logamax plus GB142 as required. See installation and maintenance instructions Logamax plus GB142-24/30/45/60.

- Fit the casing.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

### 8.1.9 Checking the hot-water temperature sensor

- Switch off the power supply of the heating system on 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 hot-water temperature sensor.
- Pull out the sensor and replace it by a new one.
- Restore the plug and socket connection.
- Fit the casing.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

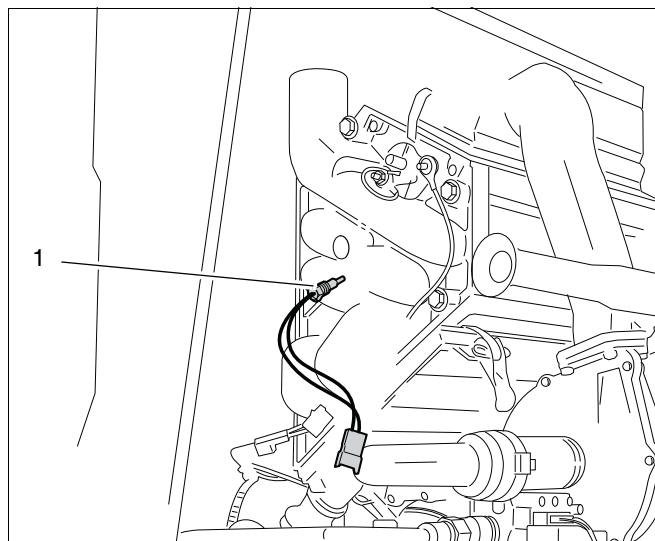



fig. 17 Replacing the safety sensor

## 8.1.10 Checking the supply/return/safety sensors cable

**WARNING!**

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

- Check all plug and socket connections of the sensors and the UBA 3. A plug that has not been inserted correctly may be the cause for a fault message. Then start the boiler by pressing "Reset" .
- Switch off the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Loosen the fastening screw of the UBA 3 (see fig. 18, pos. 1).
- Remove the UBA 3 by pulling it forward as indicated by the arrow (see fig. 18, pos. 2).
- Disconnect the plug and socket connection of the cable for the sensor.
- Check the cable between the plug and socket connection and the 81-pole plug in the UBA 3 installation base (see fig. 19) using a circuit continuity testing device. See the electric circuit diagram, fig. 110 on page 126.
- 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 UBA 3.
- Fit the casing.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

## 8.1.11 Checking the hot surface ignitor; control

**NOTICE**

The hot surface ignitor can be controlled using the RC control device relay test function. Further instructions for the RC control device are in the installation and maintenance instructions.

- Switch off the power supply of the heating system on 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 120V AC.
- 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.

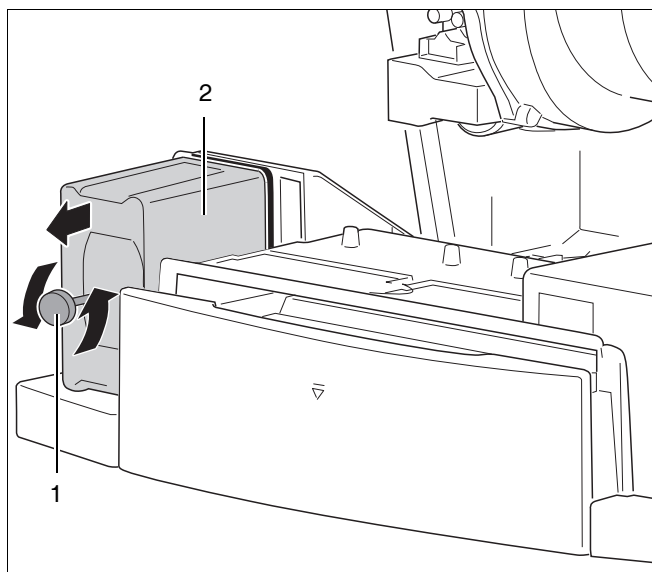


fig. 18 Dismantling the UBA 3

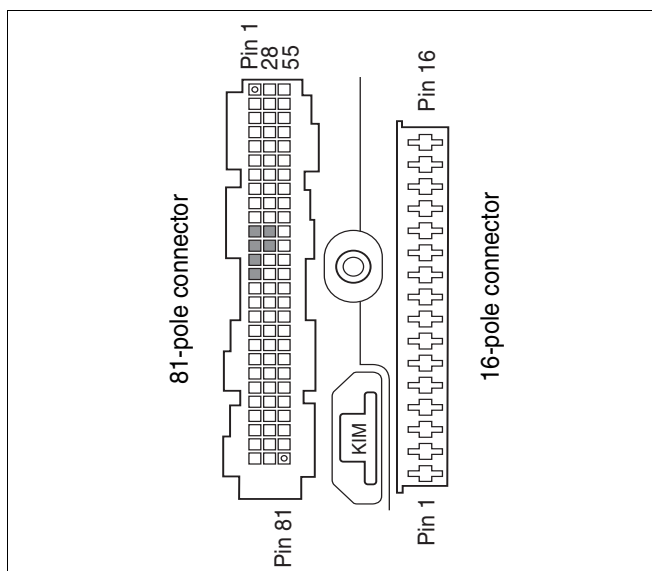



fig. 19 UBA 3 installation base

- Set the main switch on the BC10 to "1" (On).
- Start up the boiler in accordance with the "Flue gas test" menu. See page 10 "Flue gas test" menu.
- Test that during the ignition phase, while the operating code  is being displayed, 120V AC is measured.
- Switch off the power supply of the heating system on 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.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

#### 8.1.12 Checking the hot surface ignitor; resistance

- Switch off the power supply of the heating system on 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  $\Omega$  means that the hot surface ignitor is OK (see fig. 20).
- Remove the measuring device.
- Reconnect the cable plug if the hot surface ignitor is OK.
- Fit the casing.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

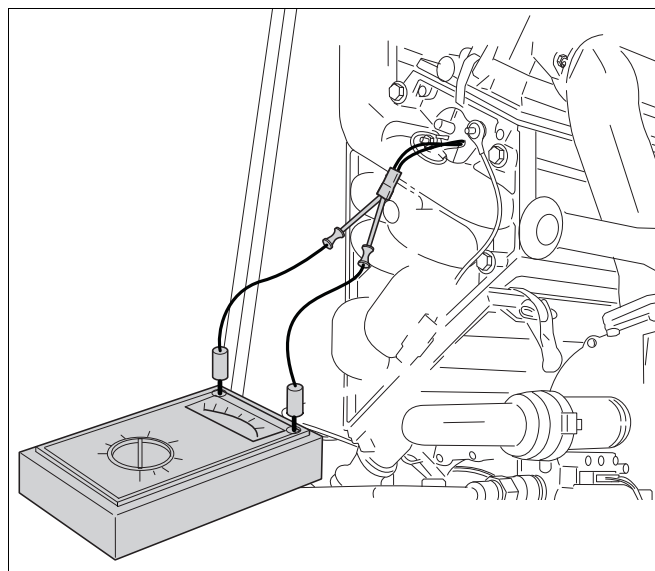


fig. 20 Checking the hot surface ignitor

#### 8.1.13 Checking the hot surface ignitor; supply cord



#### WARNING!

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

- Remove the casing.
- Switch off the power supply of the heating system on 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 UBA 3 (see fig. 21, pos. 1).
- Remove the UBA 3 by pulling it forward as indicated by the arrow (see fig. 21, pos. 2).
- Set the volt-ohm-multimeter to "Resistance testing".

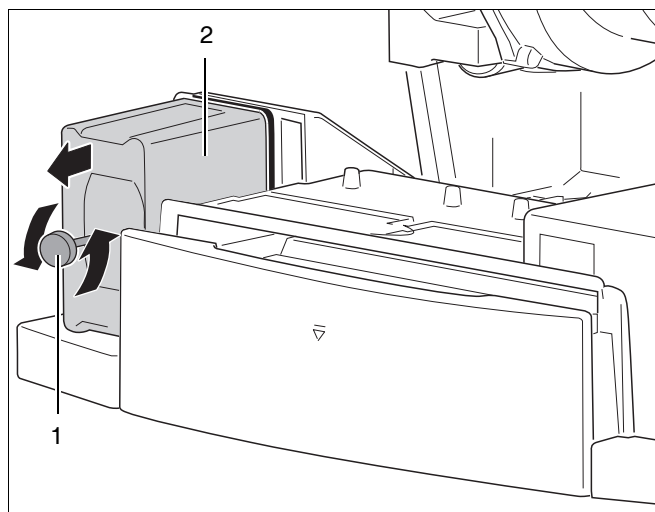


fig. 21 Dismantling the UBA 3

- 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. 23, fig. 22 and fig. 110 on page 126).

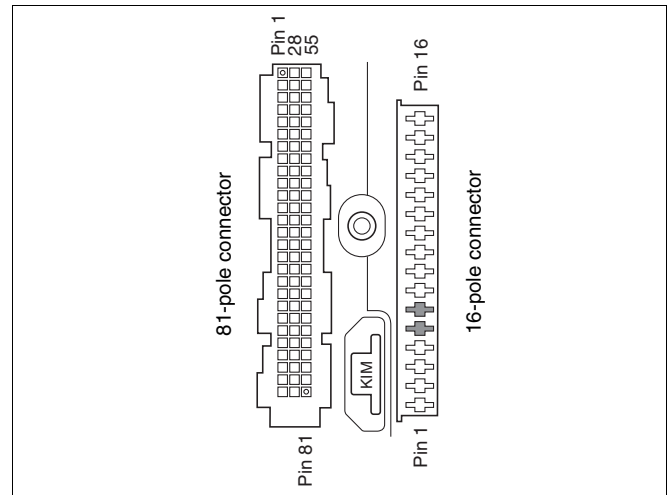


fig. 22 UBA 3 installation base

- Fit the plug to the hot surface ignitor.
- Re-assemble the UBA 3 in reverse order of disassembly.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).
- Fit the casing.

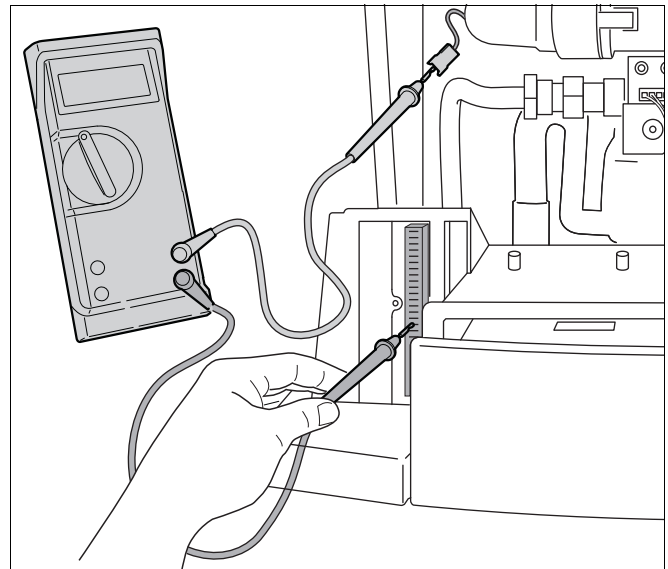


fig. 23 Testing the supply cord of the hot surface ignitor

#### 8.1.14 Replacing the hot surface ignitor

- Switch off the power supply of the heating system on 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. 24, pos. 1).
- Remove the earth cable (fig. 24, pos. 2).
- Remove the mounting plate (fig. 24, pos. 3).
- Remove the hot surface ignitor (fig. 24, pos. 4).
- Install the new hot surface ignitor with a new gasket and attach the mounting plate with fastening screws (see fig. 24, pos. 1).
- Restore the plug and socket connection of the hot surface ignitor.
- Fit the casing.

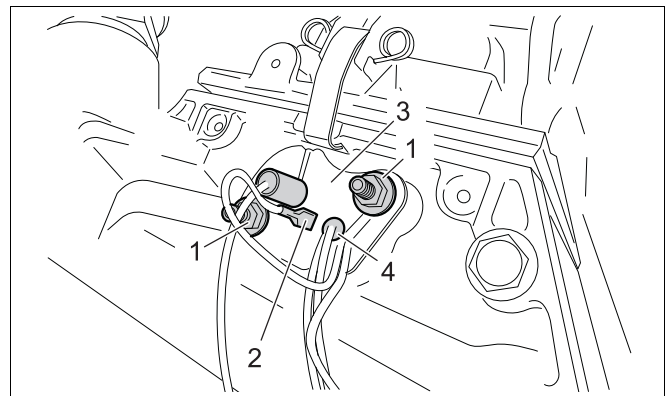


fig. 24 Replacing the hot surface ignitor

- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

### 8.1.15 Testing the ionization current



#### WARNING!

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

- Switch off the power supply of the heating system on 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. 25).
- Set the multi-meter to DC  $\mu$ 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 boiler in accordance with the "Service Mode" menu. See page 11 "Service Mode" menu.
- Test the ionization current at partial load. The boiler is in part-load operation as soon as, in the "Service Mode" menu, **L30** is selected. The ionization current must be  $> 1.4$  DC  $\mu$ A.
- Remove the measuring device.
- Reconnect the plug and socket connection of the monitoring cable if the ionization current is OK.
- Fit the casing.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

### 8.1.16 Checking the ionization electrode; cable

- Switch off the power supply of the heating system on 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 UBA 3 (see fig. 26, pos. 1).
- Remove the UBA 3 by pulling it forward as indicated by the arrow (see fig. 26, pos. 2).

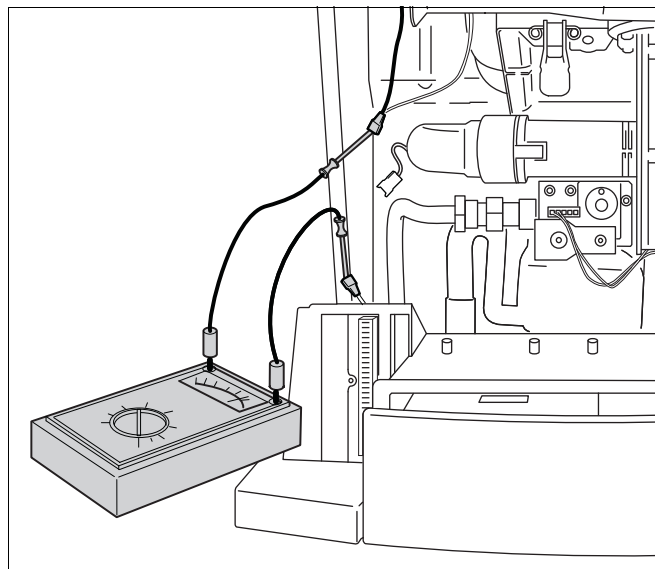


fig. 25 Testing the ionization current

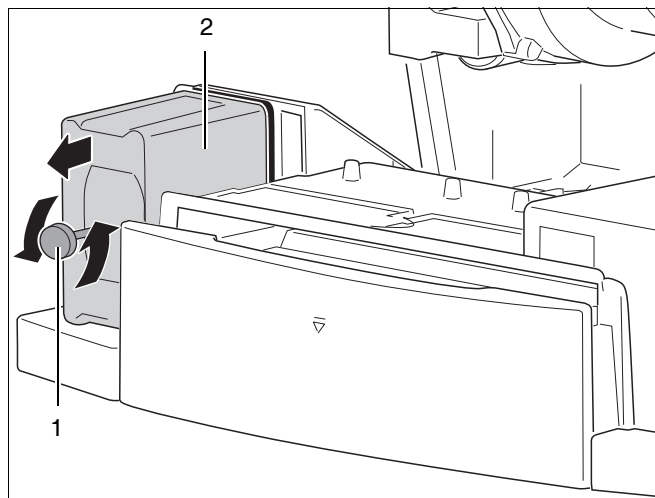


fig. 26 Dismantling the UBA 3

- Test the ionization cable between the plug and socket connection and the UBA 3 installation base to make sure that it has no short circuit to earth (see fig. 27 and fig. 110 on page 126) and that it is not broken anywhere (see fig. 28).
- Assemble the plug and socket connection of the ionization electrode.
- Re-assemble the UBA 3 in reverse order of disassembly.
- Fit the casing.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

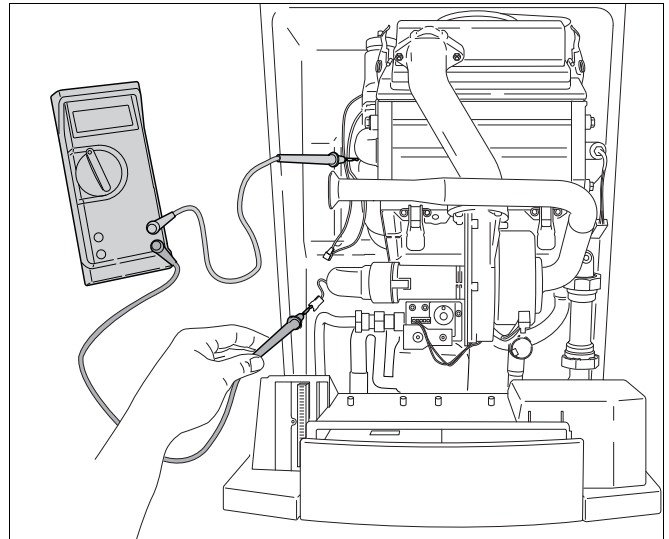


fig. 27 Testing the earth connection circuit of the ionization electrode (1)

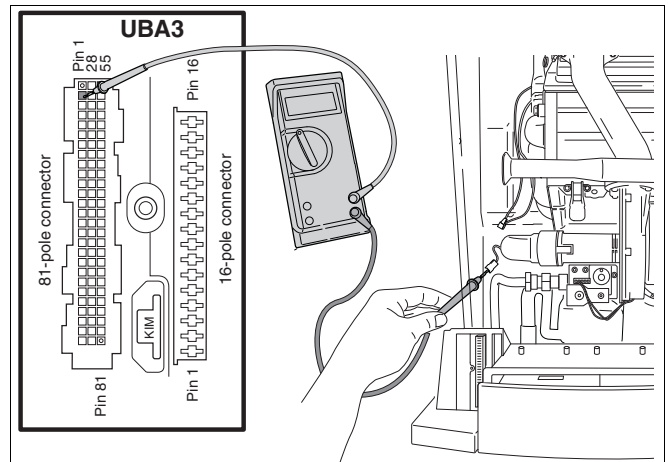


fig. 28 Testing the earth connection circuit of the ionization electrode (2)



### 8.1.17 Checking the ionization electrode; replace if necessary

- Switch off the power supply of the heating system on 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-multimeter to "Resistance testing".
- Test the earth connection circuit of the ionization electrode (see fig. 27). The height of the resistance value must be infinite.
- Loosen the fastening screws (see fig. 29, pos. 1).

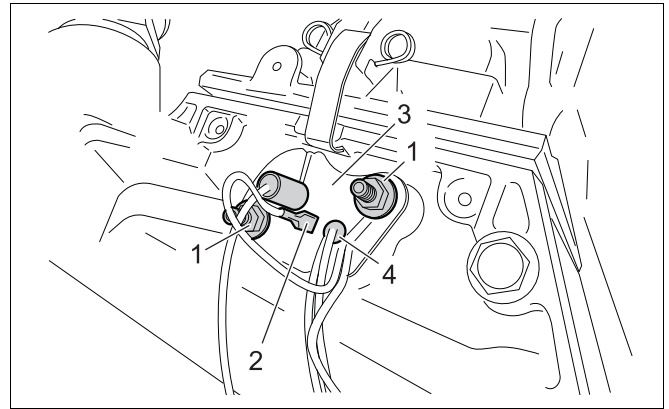


fig. 29 Replacing the ionization electrode

- Remove the earth cable (see fig. 29, pos. 2).
- Remove the mounting plate (see fig. 29, pos. 3).
- Dismantle the ionization electrode (see fig. 29, pos. 4).
- Set the volt-ohm-multimeter to "Resistance measurement".
- Test the resistance of the ionization electrode (see fig. 30). The resistance must be 0  $\Omega$ .

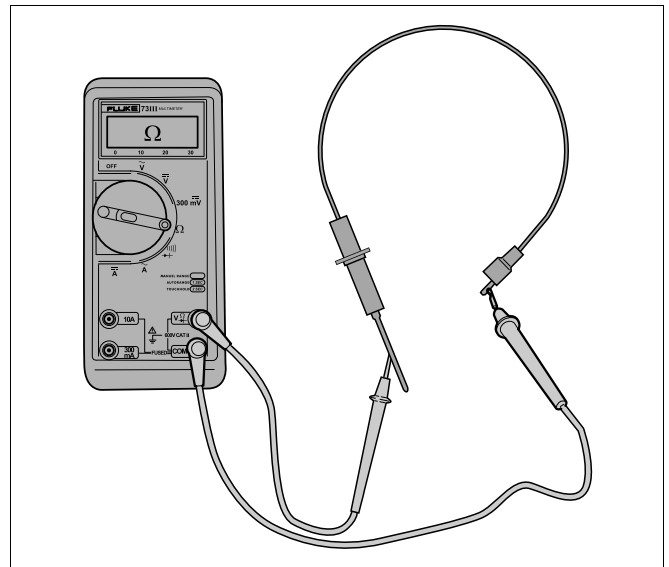


fig. 30 Testing the resistance of the ionization electrode

- Check the ionization electrode for contamination, wear or damage (see fig. 31).
- 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. 29, pos. 2).
- Restore the plug and socket connection.
- Fit the casing.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

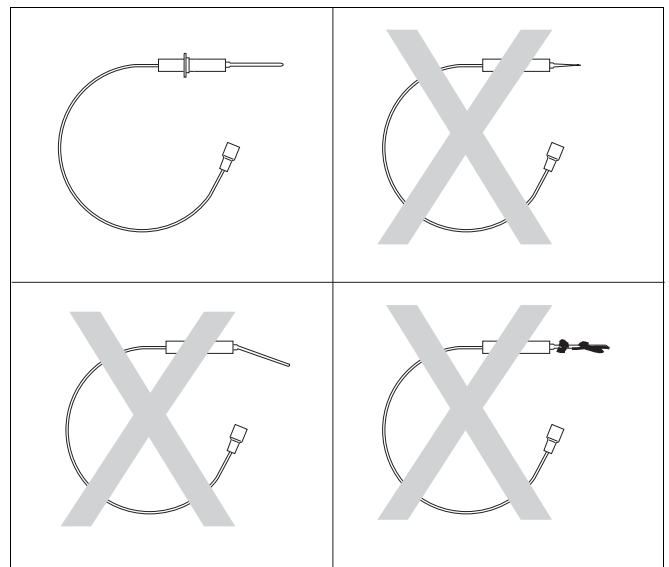


fig. 31 Checking the ionization electrode

### 8.1.18 Checking the gas control valve; cable connections

- Switch off the power supply of the heating system on 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. 32, pos. 1).
- Fit the casing.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

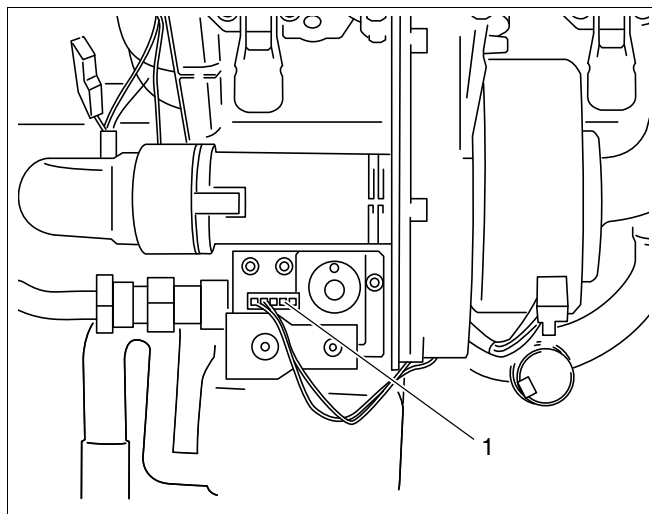


fig. 32 Checking the cable connections to the gas control valve (e.g. HONEYWELL gas control valve)

### 8.1.19 Checking the gas control valve; Control




#### NOTICE

You can drive the burner (the gas valve) using the relay test in combination with the RC control device. See installation and maintenance instructions of the RC control device.



#### WARNING!

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

- Remove the casing.
- Switch off the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).
- Start up the boiler in accordance with the "Flue gas test" menu. See page 10 "Flue gas test" menu.
- Use a volt-ohm-multimeter to check that, while operating code  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. 33).
- Fit the casing.

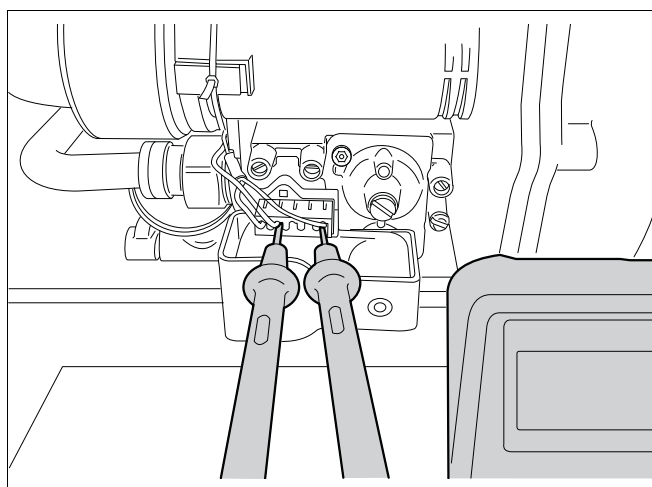


fig. 33 Voltage testing on the gas control valve

**8.1.20 Checking the gas control valve; cable connection between gas control valve and UBA 3 installation base**



**WARNING!**

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

- Switch off the power supply of the heating system on 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. 34).
  
- Loosen the fastening screw of the UBA 3 (see fig. 35, pos. 1).
- Pull the UBA 3 forward in the direction indicated by the arrow (see fig. 35, pos. 2).

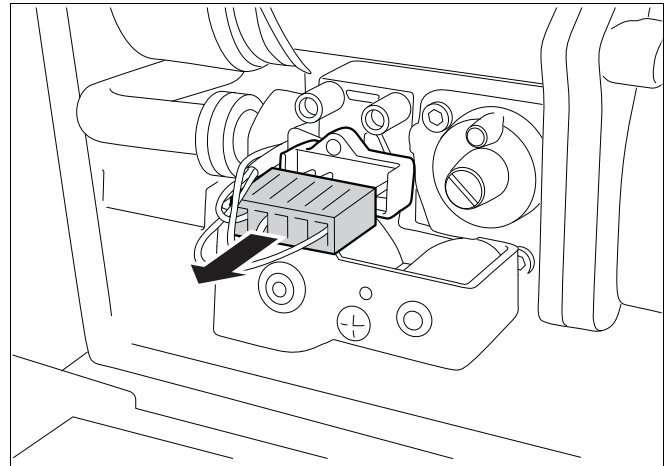


fig. 34 Removing the gas control valve plug

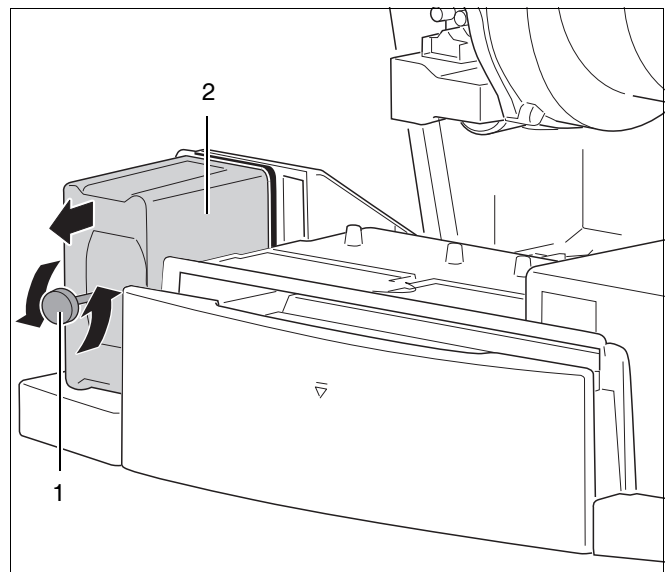


fig. 35 Dismantling the UBA 3

- Test the resistance of the cable between the plug of the gas control valve and the UBA 3 installation base (see fig. 36, fig. 37 and circuit diagram, fig. 110 on page 126).
- Reconnect the plug to the gas control valve (see fig. 34).
- Re-install the UBA 3 (see fig. 35).
- Fit the casing.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

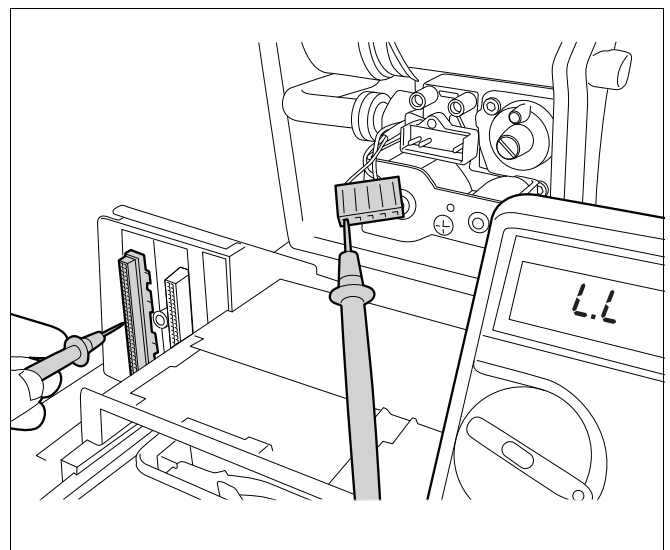


fig. 36 Testing the cable between the gas control valve and the UBA 3 installation base

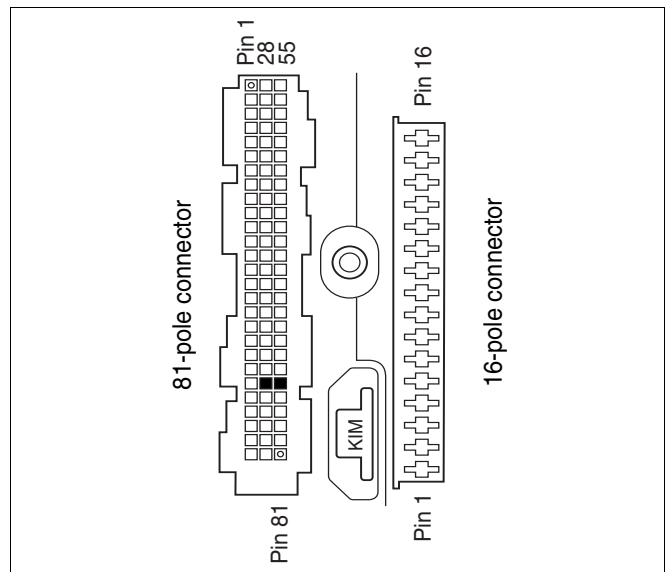


fig. 37 UBA 3 installation base

### 8.1.21 Ohming out the gas control valve

- Switch off the power supply of the heating system on 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. 38).
- Set the volt-ohm-multimeter to "Resistance testing". Use a scale of 200  $\Omega$  or greater.

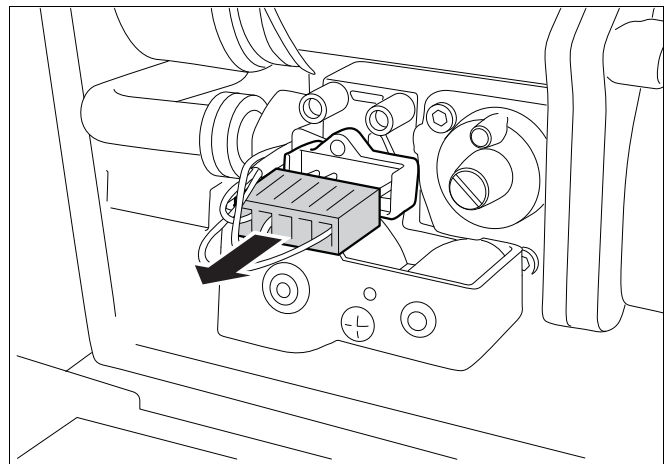


fig. 38 Removing the gas control valve plug

- 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. 39) must be approx. 75  $\Omega$  and between the right and central contacts (see fig. 40) this must be approx. 185  $\Omega$  (+/- 10  $\Omega$ ). 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.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

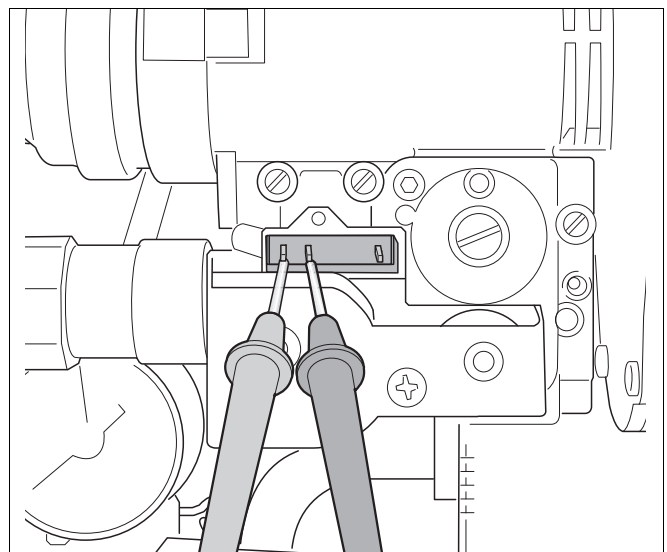


fig. 39 Testing the resistance on the gas burner ass'y (1)

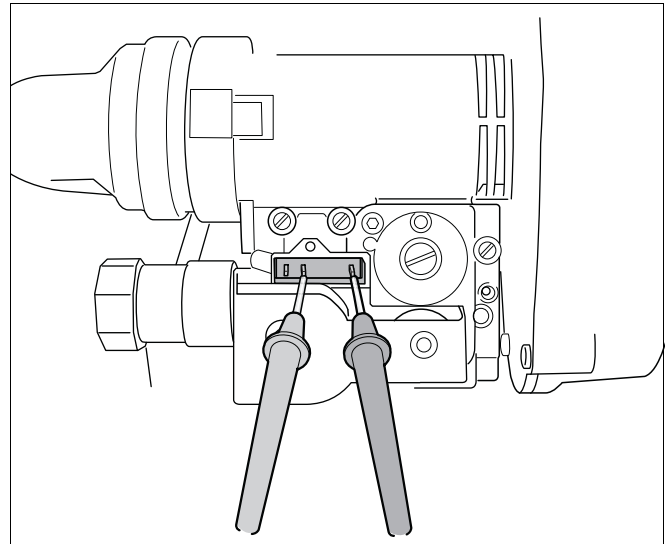


fig. 40 Testing the resistance on the gas burner ass'y (2)

### 8.1.22 Replacing the gas control valve



**DANGER**

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

- Switch off the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Close the gas shut-off valve (see fig. 41, pos. 1).

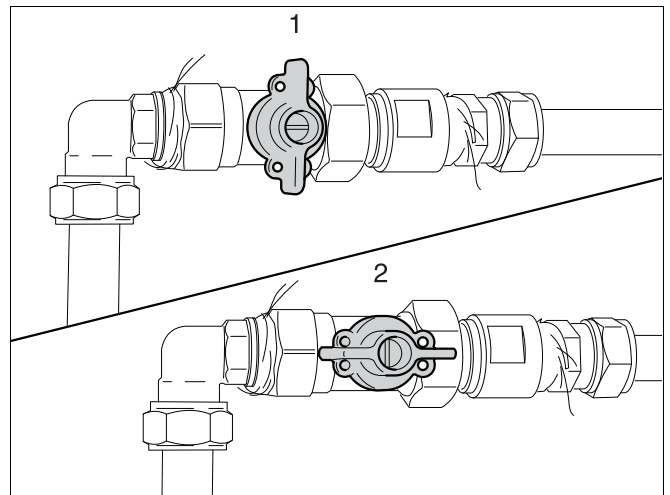


fig. 41 Gas shut-off valve closed (1), gas shut-off valve open (2)

- Remove the cable plug from the gas control valve (see fig. 42, pos. 1).

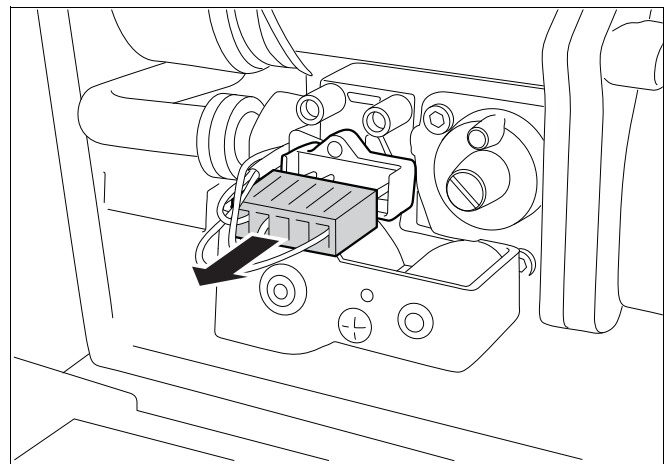


fig. 42 Removing the gas control valve plug

- Remove both cable plugs from the fan unit (see fig. 43, pos. 1).

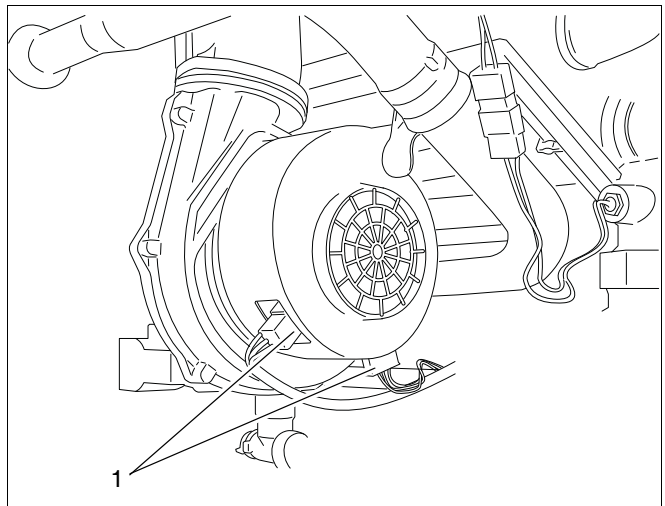


fig. 43 Disconnect the cable plug from the fan unit

- Loosen the union nut of the gas control valve (see fig. 44, pos. 1).

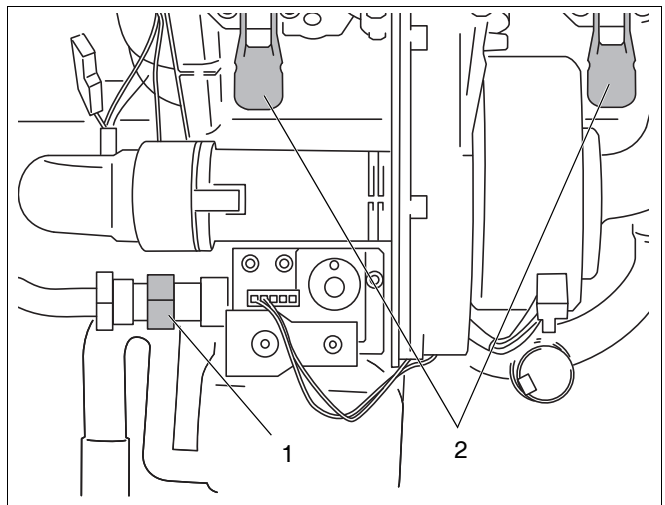


fig. 44 Loosening the union nut

- Loosen both sets of retaining clips (fig. 44, pos. 2 and fig. 45, pos. 1) of the burner cover and remove the burner cover with the fan unit and the gas burner fitting.

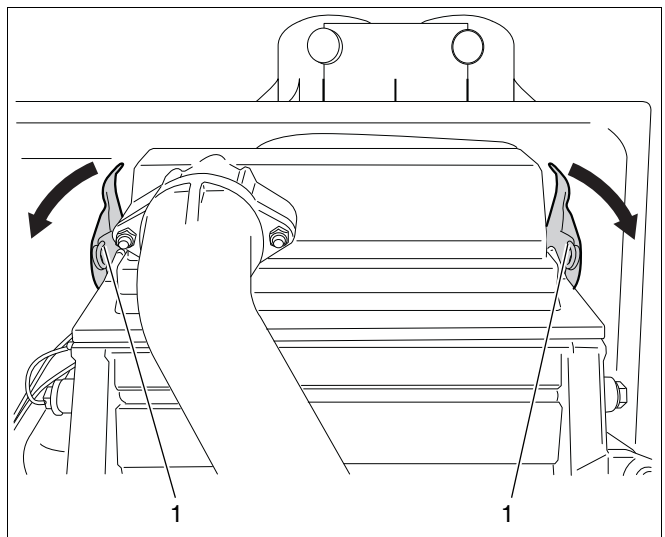


fig. 45 Loosening the retaining clips

- Loosen three screws on the gas control valve (see fig. 46, pos. 1).

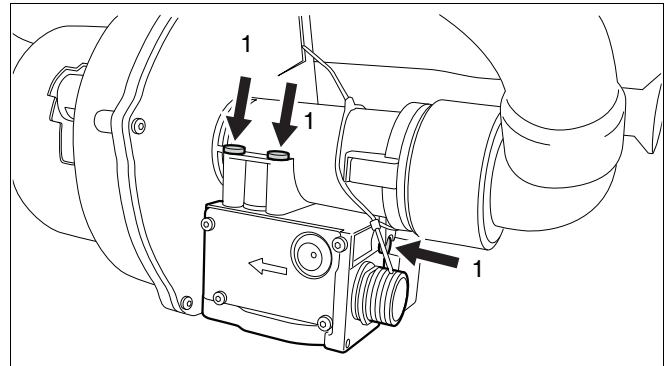


fig. 46 Loosening the screws

- Remove the gas control valve (see fig. 47).

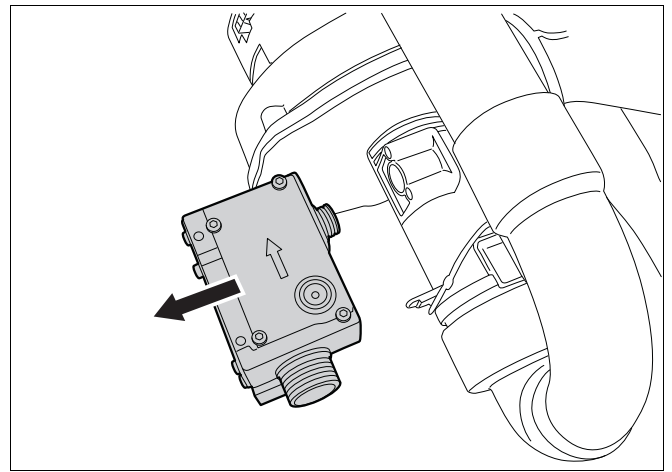


fig. 47 Dismantling the gas control valve

- Remove the gas orifice from the gas control valve (see fig. 48, 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.
- Open the gas shut-off valve (see fig. 49, pos. 2).
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

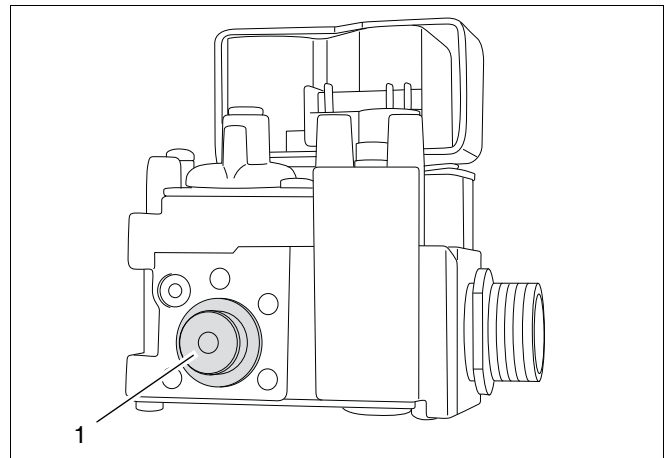


fig. 48 Dismantling the gas orifice

**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.

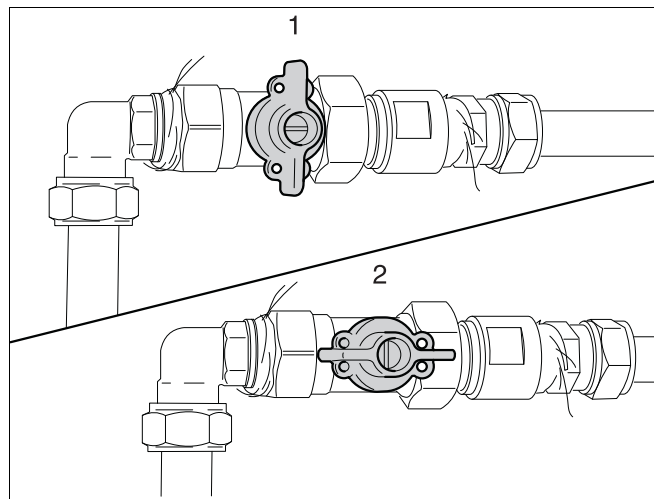


fig. 49 Gas shut-off valve closed (1), gas shut-off valve open (2)

### 8.1.23 Checking the control unit; connections to the boiler

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

- Switch off the power supply of the heating system on 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. 50).
- Use a jumper wire to create a bridging circuit between the two "WA" contacts (see fig. 53, 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).

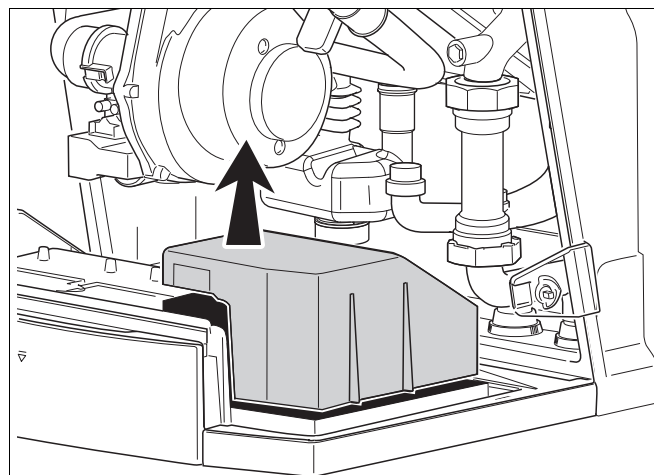


fig. 50 Removing the cover from the connection box

- If the boiler switches to heating mode (operating code  $\boxed{-H}$ ) after some time, the cause of the fault must be outside the boiler.
- Switch off the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "0" (Off). See page 9 „Menu structure of the BC10 basic controller“.
- Remove the bridge between the two "WA" contacts (see fig. 53, pos. 3).
- Connect the On/Off thermostat directly to the two "WA" contacts of the boiler using a short cable (see fig. 53, pos. 3).
- Switch on the power supply of the heating system 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 boiler switches to heating operation (operating code  $\boxed{-H}$ ) after some time, the fault is caused by the cable between the On/Off thermostat and the boiler.

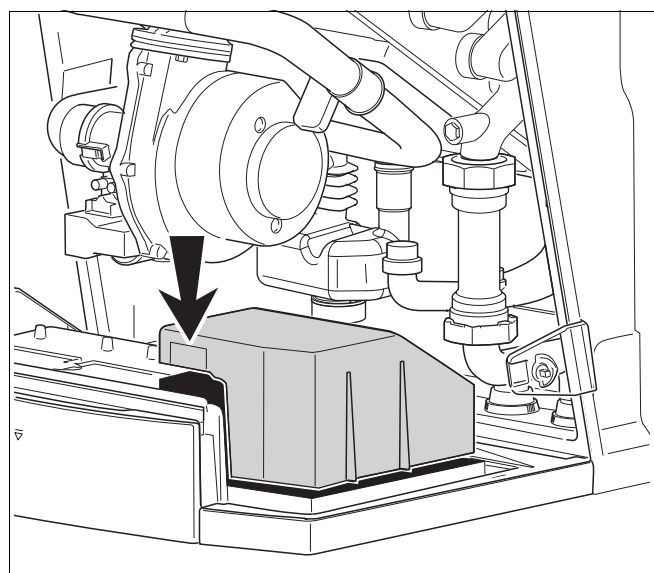


fig. 51 Installing the cover of the connection box



- If the boiler 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. 51).
- Fit the casing.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

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

- Switch on the power supply of the heating system on 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. 52).
- Connect the modulating control directly to the two "RCxx" contacts of the boiler using a short cable (see fig. 53, 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 boiler switches to heating mode (operating code ) after some time, the fault is caused by the cable between the modulating control and the boiler.
- If the boiler does not switch to heating mode after some time, the fault is caused by the modulating control.
- Correct the cause of the fault.

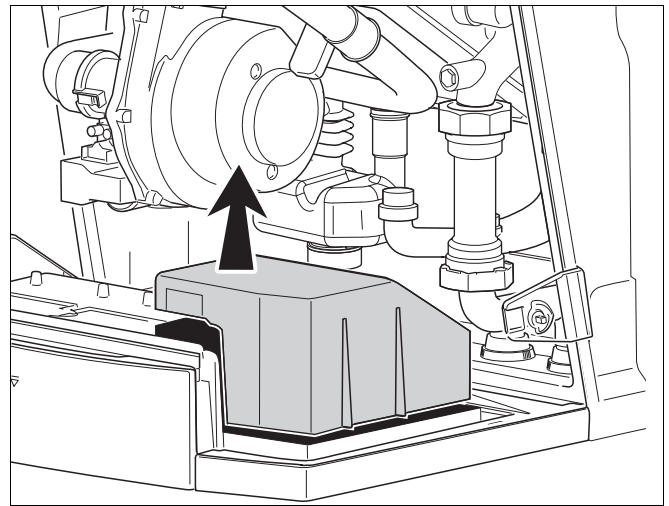


fig. 52 Removing the cover from the connection box

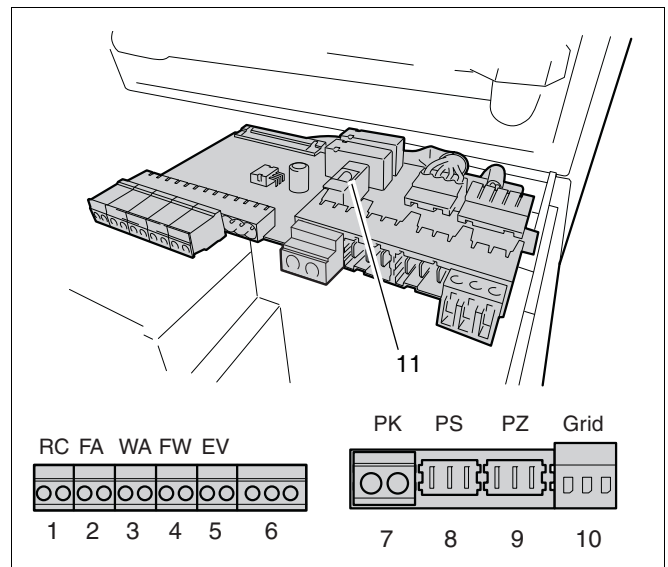


fig. 53 External connection board

- 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: DO NOT USE
- 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. 54).
- Fit the casing.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

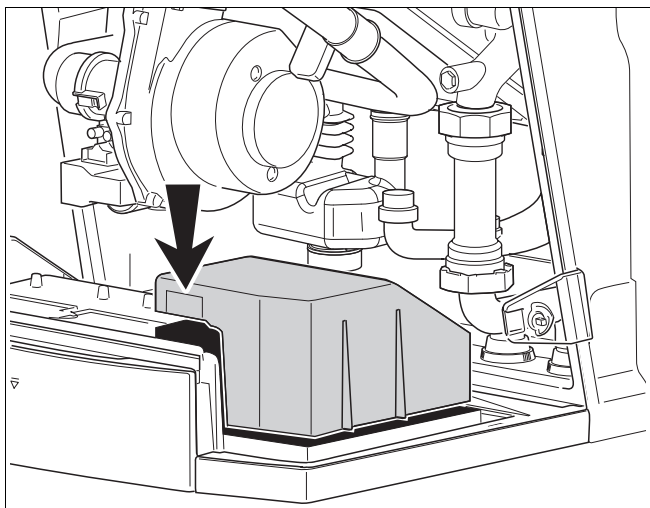


fig. 54 Installing the cover of the connection box

#### 8.1.24 Bleed the gas supply pipe

- Switch off the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Close the gas shut-off valve (see fig. 56, pos. 1).
- Open the screw plug on the testing nipple for the inlet gas pressure and for purging (fig. 55) by two turns and install a hose.
- Open slowly the gas shut-off valve.
- Run the gas that flows out through a water bath.
- Close the gas shut-off valve when no more air escapes.
- Remove the hose and tighten the screw plug again.
- Carefully open the gas shut-off valve (see fig. 56, pos. 2).
- Check the testing nipple for leaks.
- Fit the casing.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

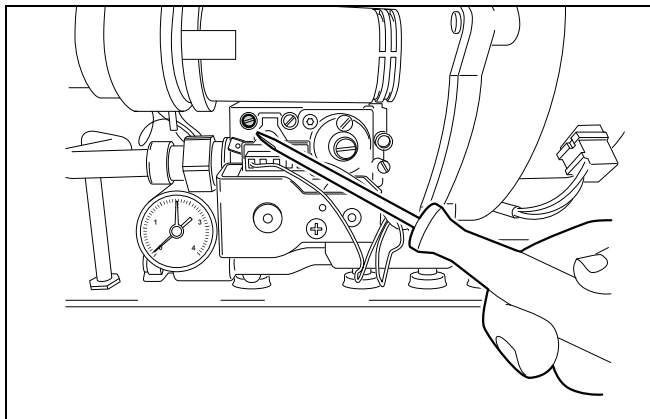


fig. 55 Bleeding the gas supply pipe

### 8.1.25 Measuring the inlet gas pressure (flow pressure)

- Switch off the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Open at least one thermostatic radiator valve.
- Close the gas shut-off valve (see fig. 56, pos. 1).
- Open the screw plug on the testing nipple for the inlet gas pressure (see fig. 57, pos. 1) by two turns.
- Set the pressure gauge to zero.
- Connect the measuring hose of the pressure gauge to the testing nipple (see fig. 57, pos. 2).
- Carefully open the gas shut-off valve (see fig. 56, pos. 2).

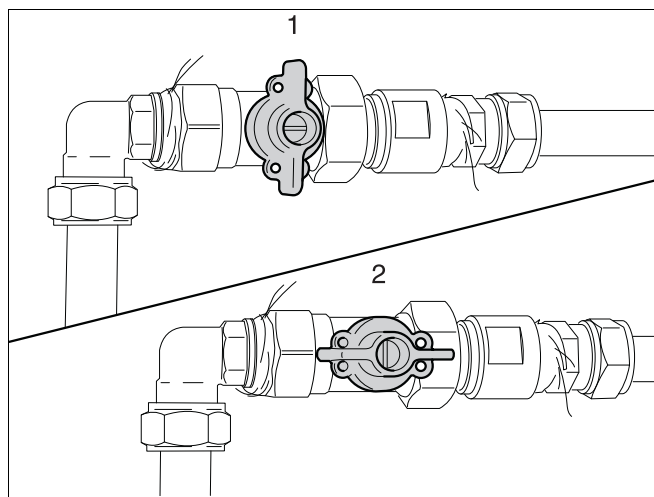


fig. 56 Gas shut-off valve closed (1), gas shut-off valve open (2)

- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).
- Put the heating boiler into operation, see "Flue gas test" menu on page 10.
- Measure the inlet gas pressure when the "Burner" (On/Off) LED on the BC10 basic controller lights.
- The inlet gas pressure must be:
  - for **natural gas** – min. 3.5 to 10.5 inch W.C. (8.7 to 26.1 mbar), nominal supply pressure 7.0 inch W.C. (17,4 mbar)
  - for **LPG** – min. 8.0 to 13.0 inch W.C. (19.9 to 32.3 mbar), nominal supply pressure 11.0 inch W.C. (27.4 mbar).
- Set the main switch on the BC10 to "0" (Off).
- Close the gas shut-off valve (see fig. 56, pos.1).
- Remove the hose and tighten the screw plug on the testing nipple again.
- Open again the gas shut-off valve (see fig. 56, pos. 2).
- Check the testing nipple for leaks.
- Fit the casing.
- Set the main switch on the BC10 to "1" (On).

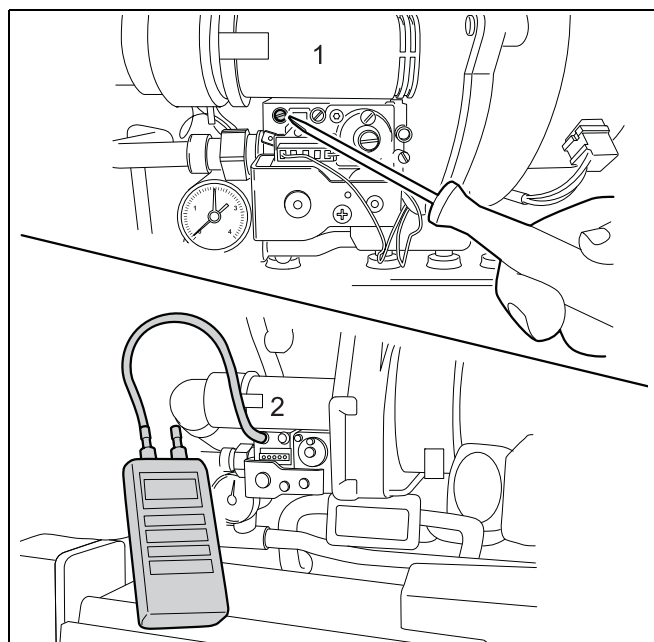


fig. 57 Measure the inlet gas pressure



#### NOTE!

If the required inlet gas pressure is not available, you should consult your gas utility company. If the inlet gas pressure is too high, a gas pressure regulator is to be integrated upstream of the gas valve.

### 8.1.26 Measure and adjust the gas/air ratio

- Switch off the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Close the gas shut-off valve (see fig. 56, pos. 1).
- Open at least one thermostatic radiator valve.
- Open the screw plug on the testing nipple for the burner pressure (fig. 58, pos. 1) by two turns.
- Set the pressure gauge to zero.
- Use a hose to connect the + connection of the pressure gauge to the burner pressure measuring nipple (fig. 58, pos. 2).
- Open the gas shut-off valve (see fig. 56, pos. 2).
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

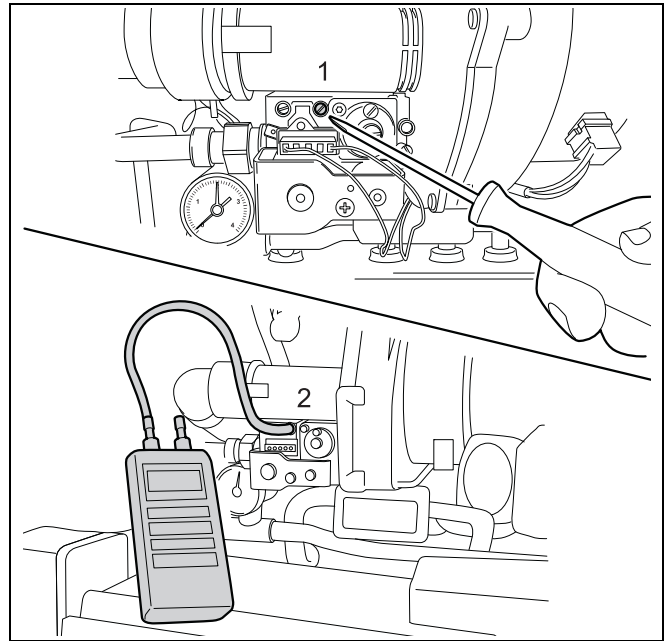


fig. 58 Checking the gas/air ratio

- Put the heating boiler into operation, see "Service Mode" menu on page 11.
- Read out the gas/air ratio from the pressure gauge when the boiler is in part-load operation. The boiler is running in part-load operation when, in the "Service mode" menu **L30** has been set.
- The differential pressure ( $p_{\text{Gas}} - p_{\text{Air}}$ ) must be  $-0.02$  inch W.C. ( $-5$  Pa) ( $\pm 0.02$  inch W.C. =  $\pm 5$  Pa) (read-out on pressure gauge:  $-0.04 - 0$  inch W.C. =  $-10$  Pa  $- 0$  Pa). See fig. 59.

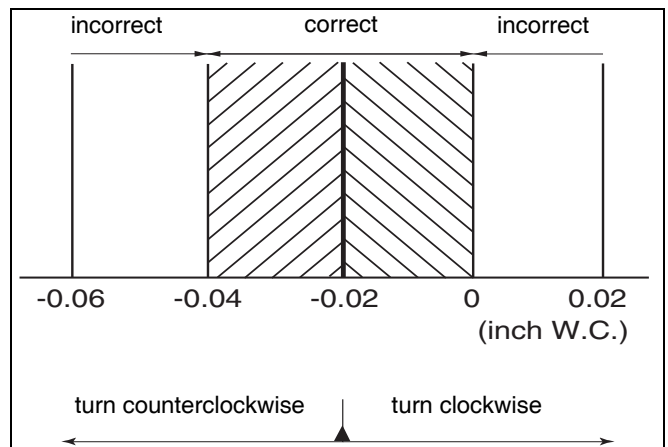


fig. 59 Differential pressure gas/air ratio part-load

- If the gas/air ratio is incorrect, it can be adjusted on the set screw (fig. 60, pos. 1).



#### NOTE!

The set screw is located behind the screw-on cover. This must be removed first.

- Set the main switch on the BC10 to "0" (Off).
- Close the gas shut-off valve (see fig. 56, pos. 1).
- Remove the hose and tighten the screw plug on the testing nipple again.
- Open the gas shut-off valve (see fig. 56, pos. 2).
- Check the testing nipple for leaks.
- Fit the casing.
- Set the main switch on the BC10 to "1" (On).

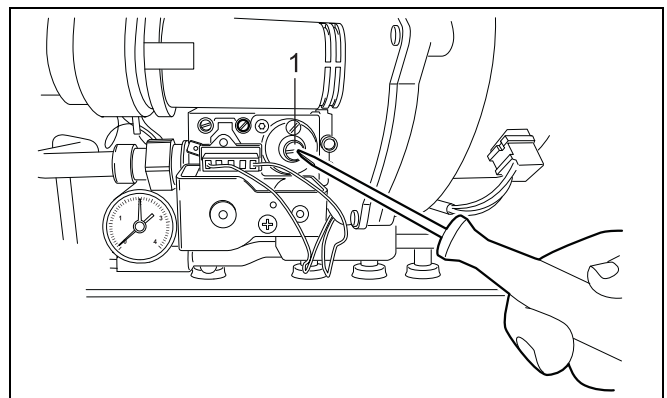


fig. 60 Adjusting the gas/air ratio

### 8.1.27 Measuring the carbon monoxide content (CO)

- Measure the carbon monoxide content on the flue gas sampling point (see fig. 61).
- 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 boiler must be operational when you do this.

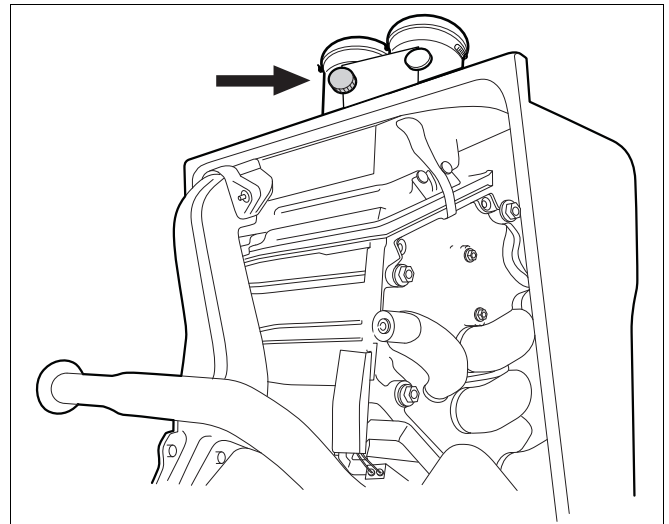


fig. 61 Flue gas sampling point

### 8.1.28 Transformer; replacing

- Switch off the power supply of the heating system on 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. 62).

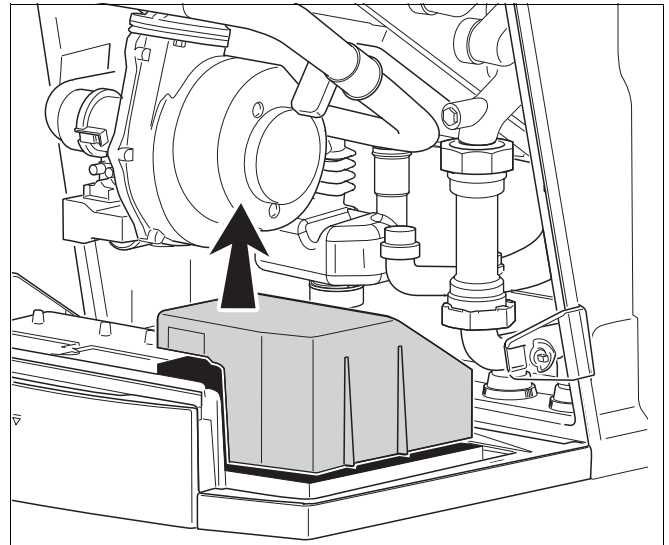


fig. 62 Removing the cover from the connection box

- Pull the 4 plugs from the external connection board (see fig. 63, pos. 1, 2, 3 and 4).

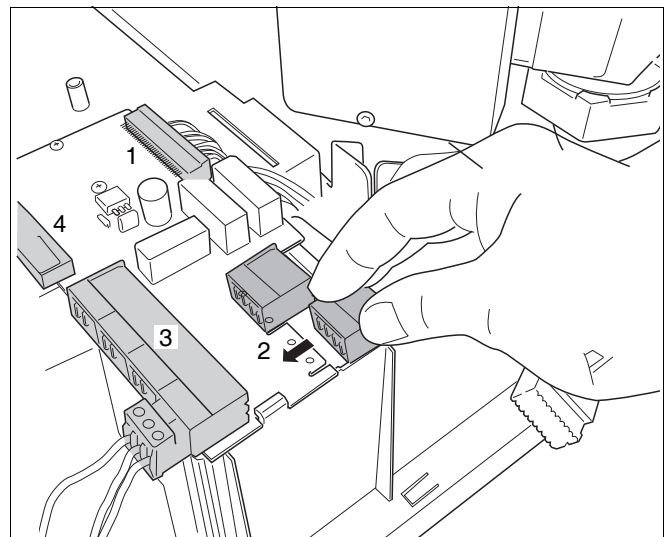


fig. 63 Pulling the external connection board plug

- Loosen the 2 external connection board fastening screws (see fig. 64, pos. 1).

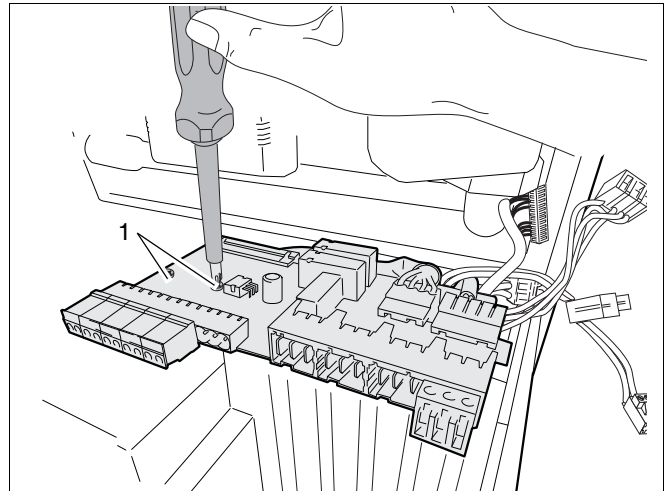


fig. 64 Loosening the fastening screws

- Remove the external connection board (see fig. 65).

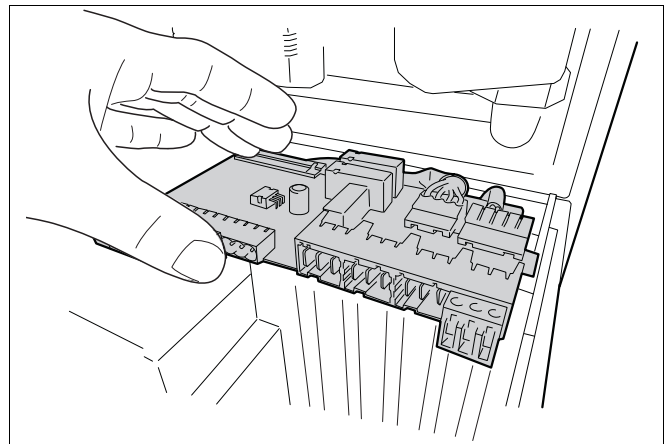


fig. 65 Removing the external connection board

- Remove the transformer shield (see fig. 66).

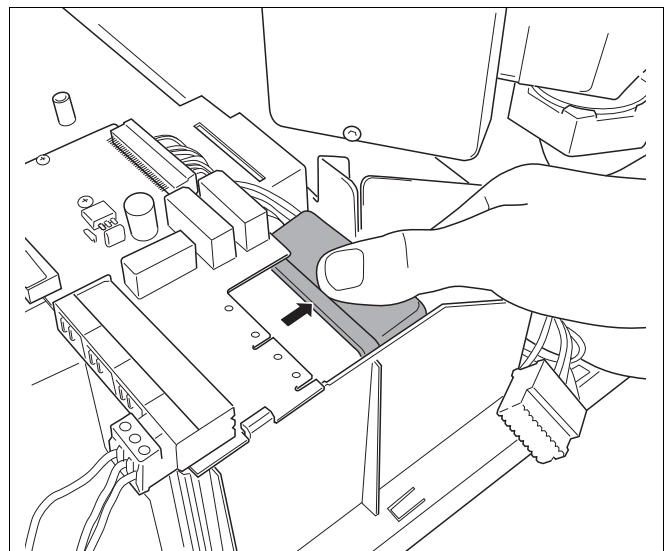


fig. 66 Removing the transformer shield

- Pull both plugs on the rear of the transformer (see fig. 67).
- 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.

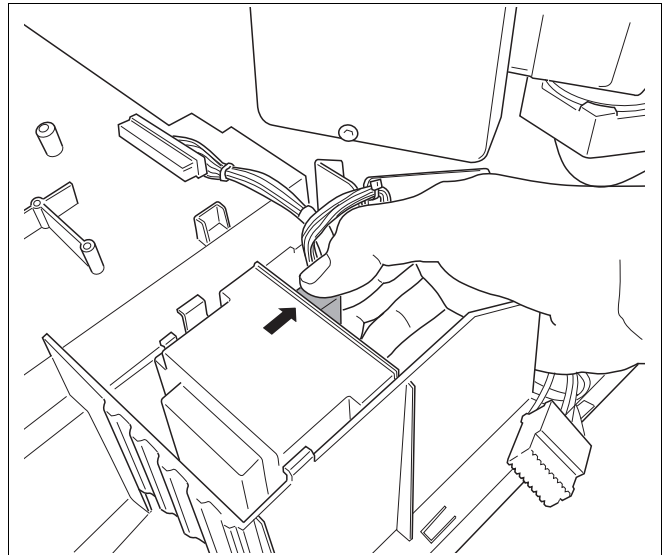


fig. 67 Pulling the plugs from the transformer

- Remove the transformer by pulling it in the direction indicated by the arrow (see fig. 68).
- Install the new transformer.
- Re-assemble all parts and plugs in reverse order of disassembly.
- Fit the casing.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

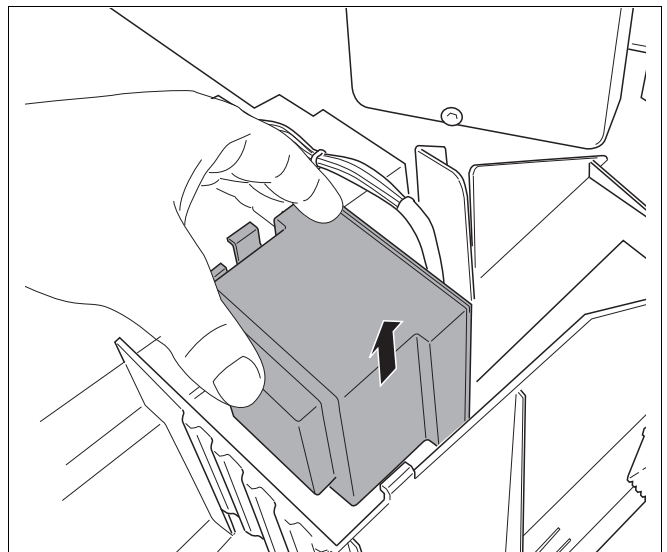


fig. 68 Removing the transformer

#### 8.1.29 Automatic air purging system; replacing

- Switch off the power supply of the heating system on 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. (see fig. 69).

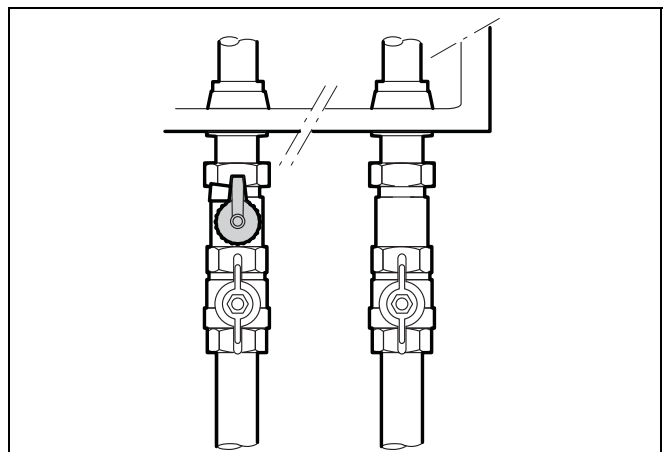


fig. 69 Draining the Logamax plus GB142

- Remove the plastic cover from the top of the boiler (see fig. 70).

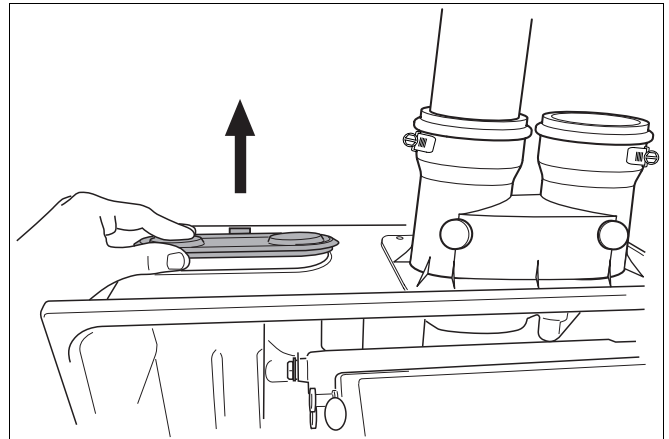


fig. 70 Removing the plastic cover of the automatic air purging system

- Remove the float cap (see fig. 71).

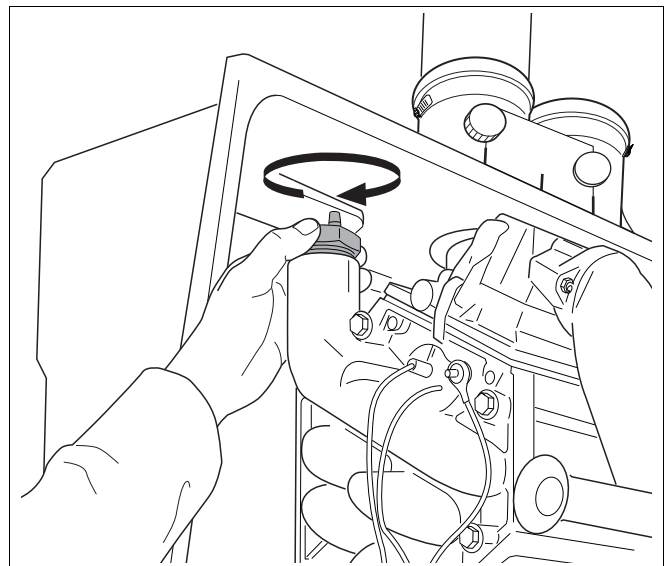


fig. 71 Removing the float cap

- Dismantle the valve case by pulling it upwards through the opening in the housing (see fig. 72).
- 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 installation and maintenance instructions Logamax plus GB142-24/30/45/60.

- Fit the casing.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

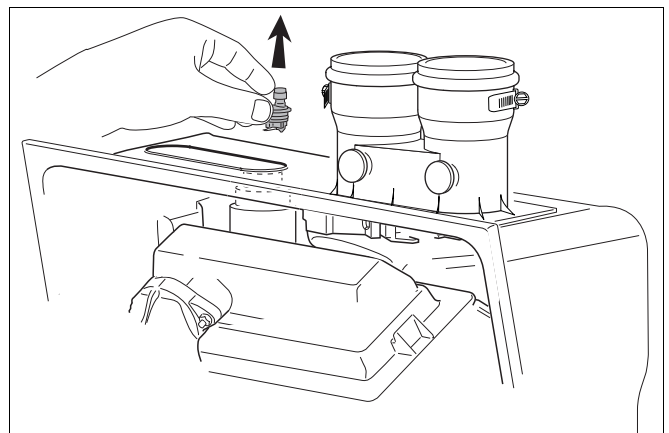


fig. 72 Dismantling the valve case for the automatic air purging system



### 8.1.30 Burner; replacing

- Switch off the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Close the gas shut-off valve (see fig. 73, pos. 1).

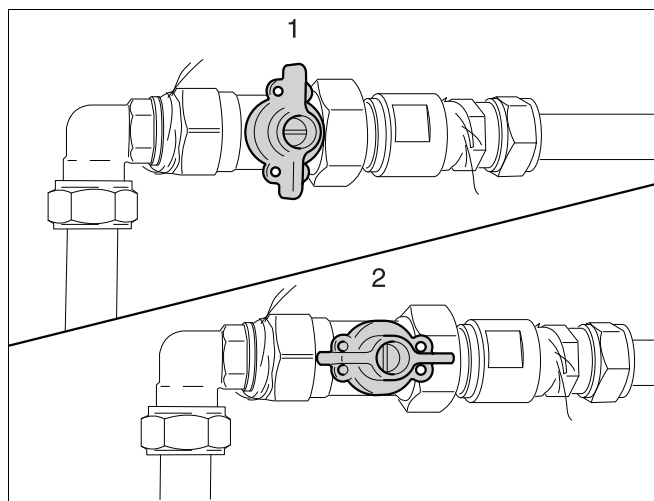


fig. 73 Gas shut-off valve closed (1), gas shut-off valve open (2)

- Remove the cable plug from the gas control valve (see fig. 74, pos. 1).

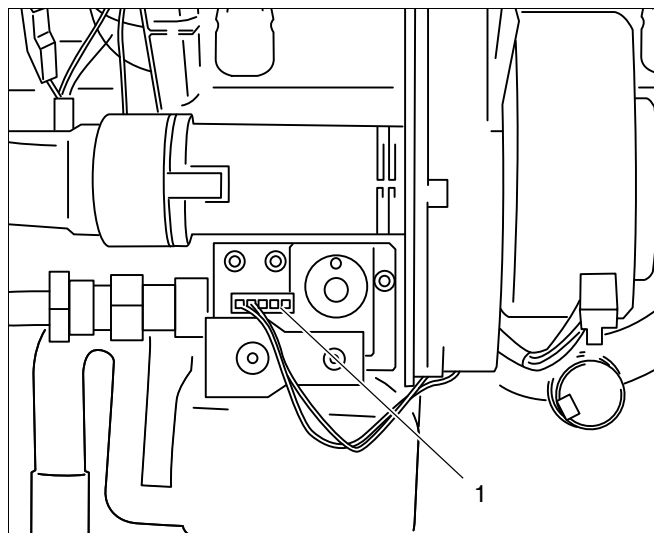


fig. 74 Replacing the gas control valve (e.g. HONEYWELL gas control valve)

- Remove both cable plugs from the fan unit (see fig. 75, pos. 1).

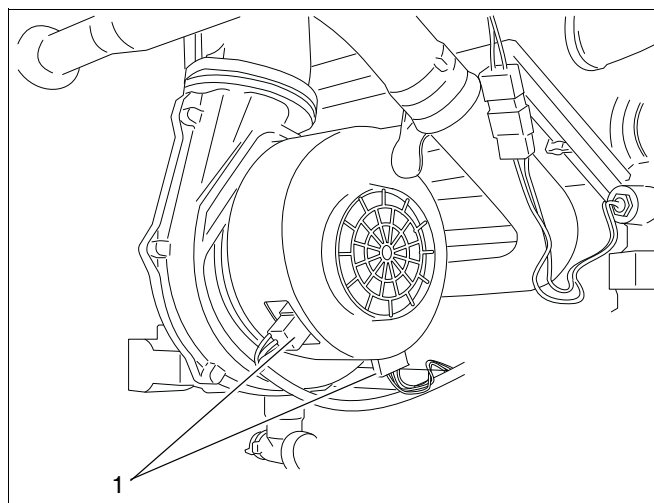


fig. 75 Disconnecting the cable plug from the fan unit

- Loosen the union nut of the gas control valve (see fig. 76, pos. 1).

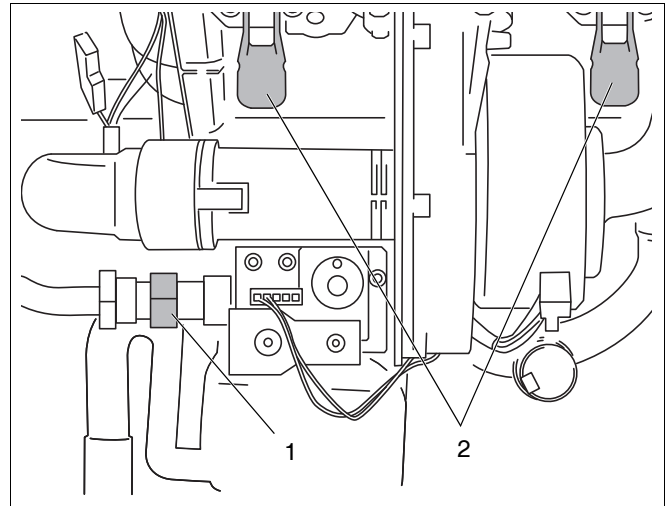


fig. 76 Loosening the gas control valve

- Loosen both sets of retaining clips (fig. 76, pos. 2 and fig. 77, pos. 1) of the burner cover and remove the burner cover with the fan unit and the gas burner fitting.

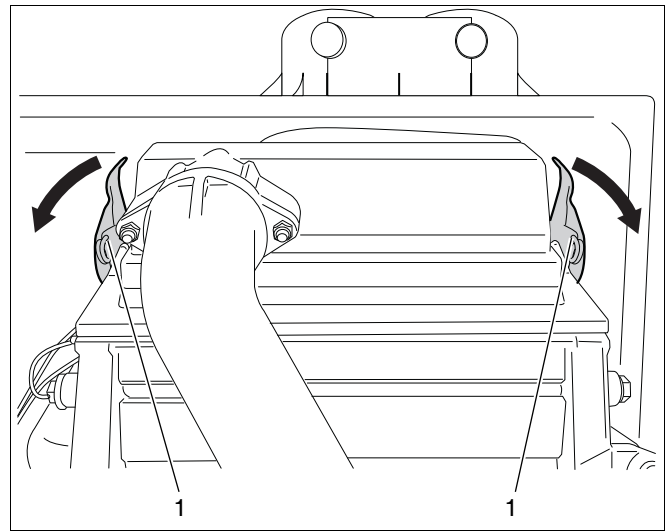


fig. 77 Loosening the retaining clips

- Remove the burner gasket (see fig. 78, pos. 1).
- Remove the gas/air distributor plate (see fig. 78, pos. 2).
- Remove the orifice plate (only applies to Logamax plus GB142-24/30 and GB142-60) (see fig. 78, pos. 3). Note that the orifice plate of the GB142-60 has a different shape.
- Remove the burner (see fig. 78, pos. 4).

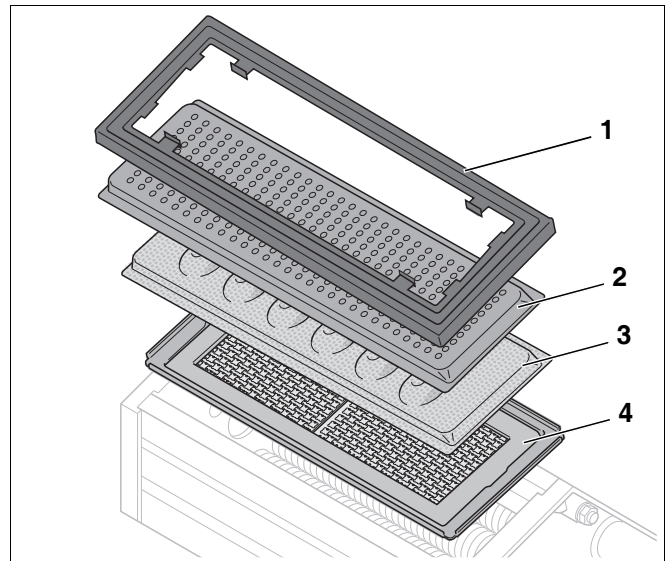


fig. 78 Removing the burner

- Install the new burner (see fig. 79).



**WARNING!**

Fit the burner so that the scale mark is located on the left-hand side (see fig. 79).

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

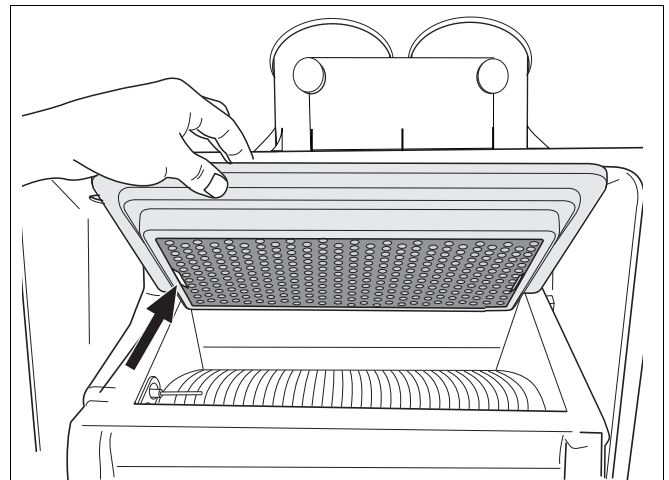


fig. 79 Installing the burner

- Open the gas shut-off valve (see fig. 80, pos. 2).
- Switch on the power supply of the heating system 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 paragraph 8.1.26.

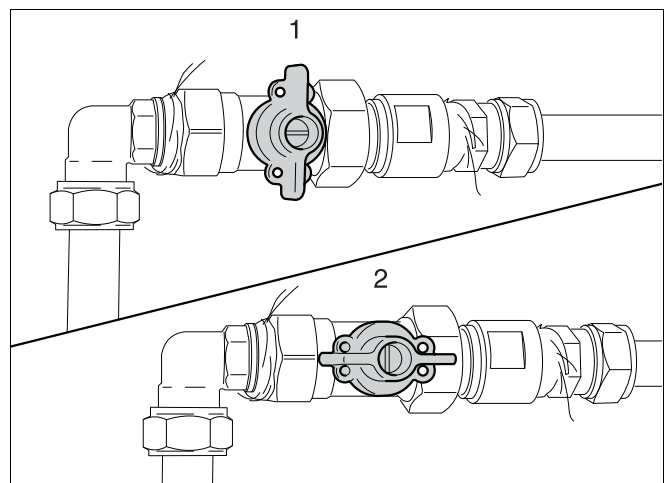


fig. 80 Gas shut-off valve closed (1), gas shut-off valve open (2)

**8.1.31 Sight glass; replacing**

- Switch off the power supply of the heating system on 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. 81, 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.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

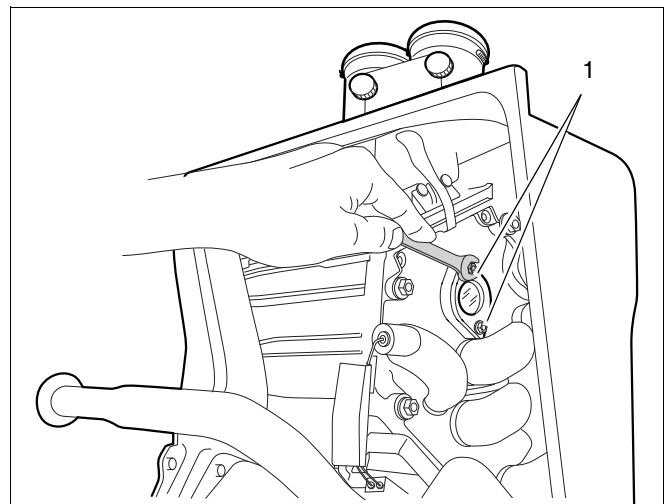


fig. 81 Loosening the screws of the sight glass

### 8.1.32 Condensate trap; replacing

- Switch off the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Pull the condensate trap from the condensate plate (see fig. 82, pos. 1).
- Pull the internal condensate bypass pipe from the condensate trap (see fig. 82, pos. 2).
- Loosen the condensate trap from the connection (see fig. 82, pos. 3) and remove it.
- Fill the new condensate trap with water.
- Re-assemble the new condensate trap in reverse order of disassembly.
- Fit the casing.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

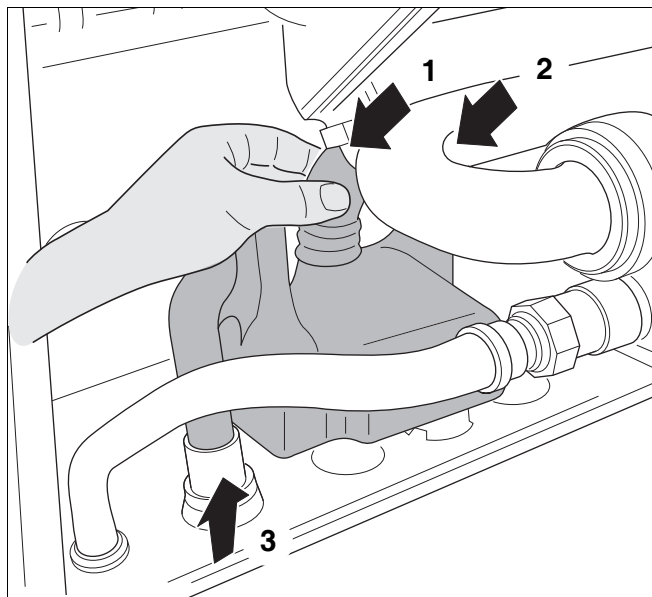


fig. 82 Disconnecting the condensate trap connection

### 8.1.33 Pressure sensor; replacing

- Switch off the power supply of the heating system on 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.

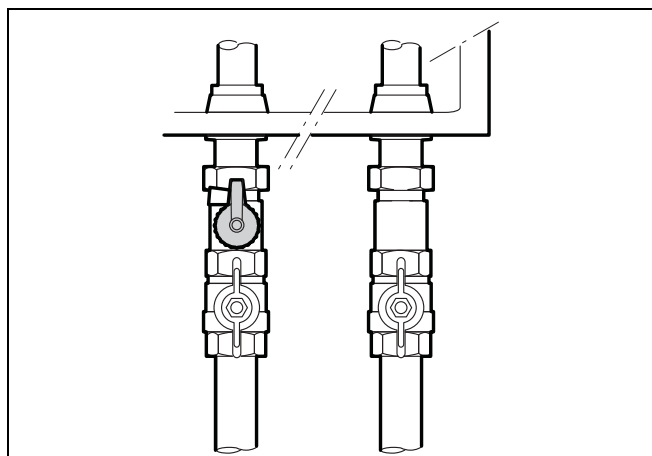


fig. 83 Draining the Logamax plus GB142

- Loosen the pressure sensor by removing the securing clip (see fig. 84).
- Assemble the new pressure sensor and the plug in reverse order of disassembly.

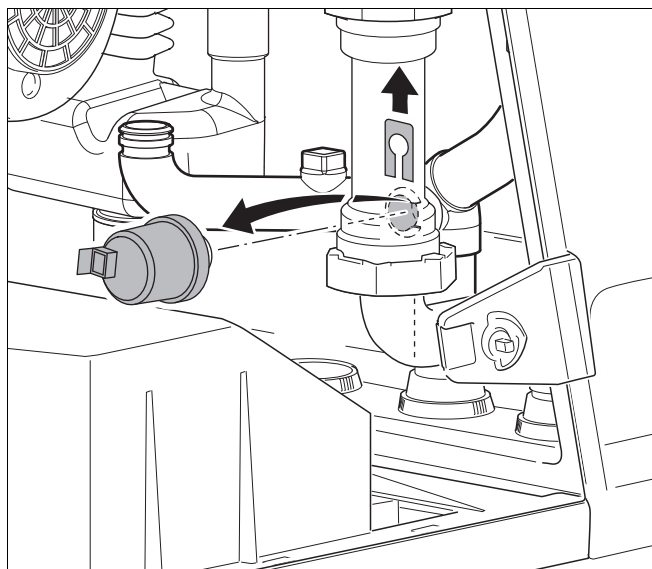


fig. 84 Loosening the pressure sensor



#### NOTICE

Fill and purge the Logamax plus GB142 as required.  
See installation and maintenance instructions Logamax plus GB142-24/30/45/60.

- Fit the casing.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

### 8.1.34 Heat exchanger; replacing

- Switch off the power supply of the heating system on the circuit breaker.
- Close the maintenance shut-off valves and drain the Logamax plus GB142, see 116, fig. 83.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Close the gas shut-off valve(see fig. 85, pos. 1).

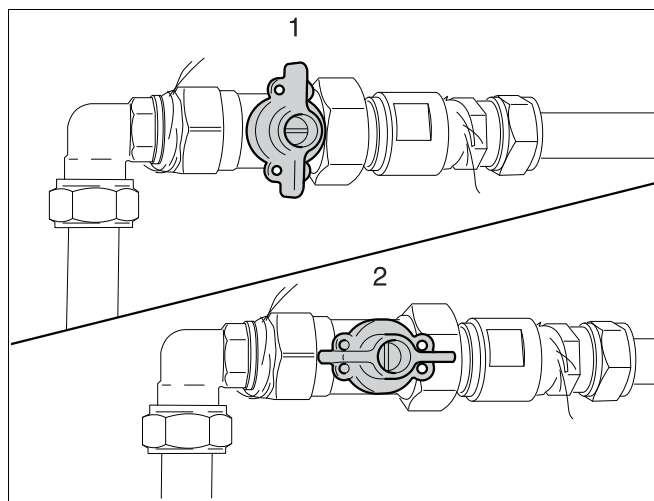


fig. 85 Gas shut-off valve closed (1), gas shut-off valve open (2)

- Remove the cable plug from the gas control valve (see fig. 86, pos. 1).

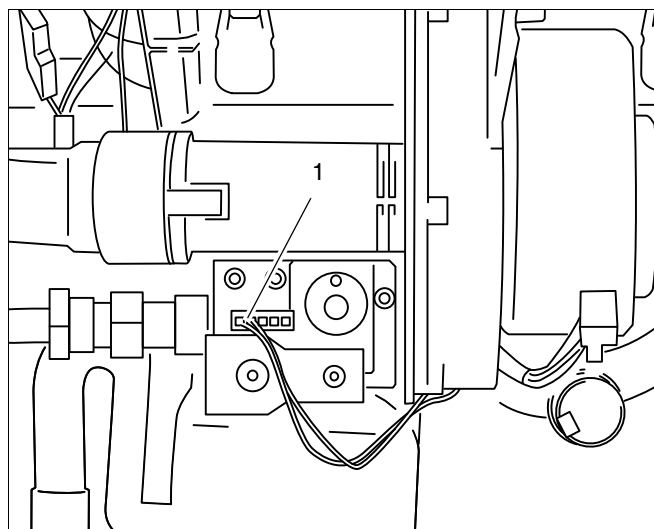


fig. 86 Replacing the gas control valve (e.g. HONEYWELL gas control valve)

- Remove both cable plugs from the fan unit (see fig. 87, pos. 1).

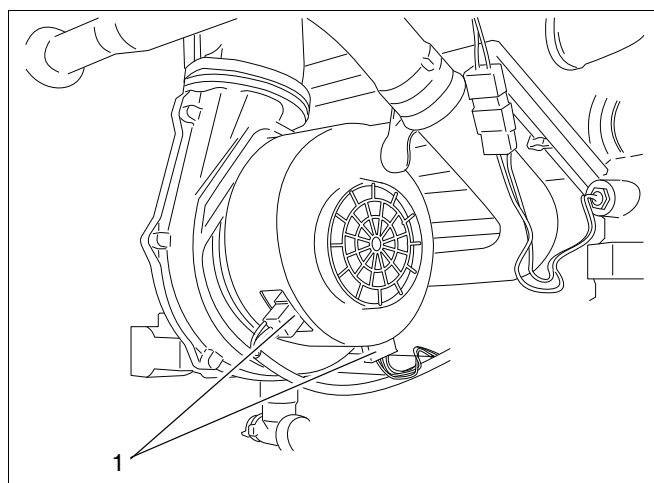


fig. 87 Disconnecting the cable plug from the fan unit

- Loosen the union nut of the gas control valve (see fig. 88, pos. 1).

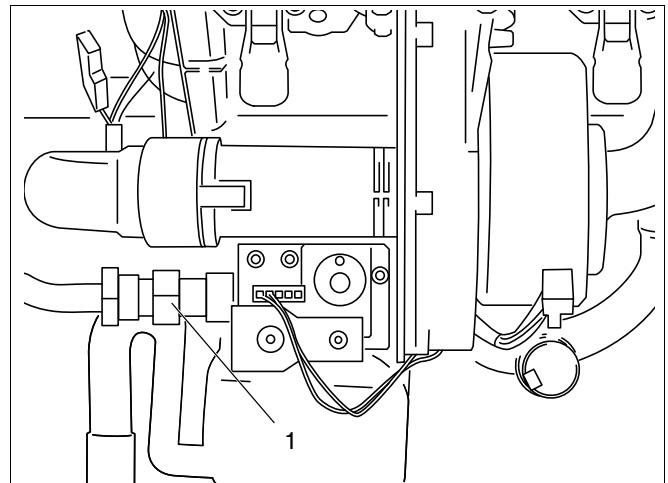


fig. 88 Loosening the gas control valve

- Pull both retaining clips (see fig. 89, pos. 1) on the burner cover to open them and remove the burner cover with the fan unit and the gas control valve.

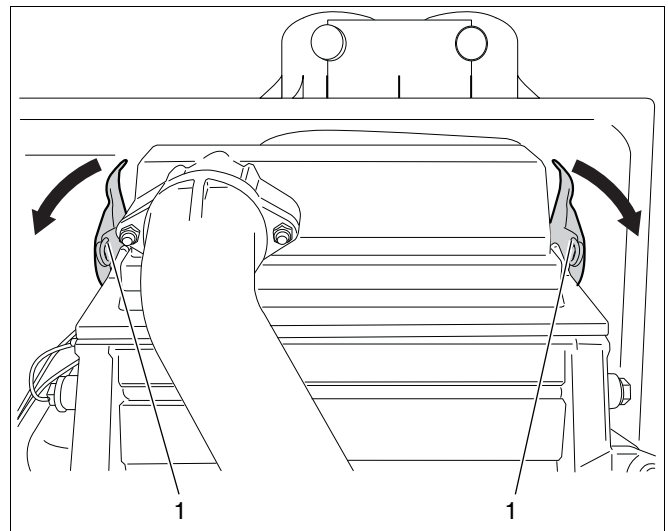


fig. 89 Loosening the retaining clips

- Remove the burner gasket (see fig. 90, pos. 1).
- Remove the gas/air distributor plate (see fig. 90, pos. 2).
- Remove the orifice plate (only applies to Logamax plus GB142-24/30 and GB142-60) (see fig. 90, pos. 3). Note that the orifice plate of the GB142-60 has a different shape.
- Remove the burner (see fig. 90, pos. 4).

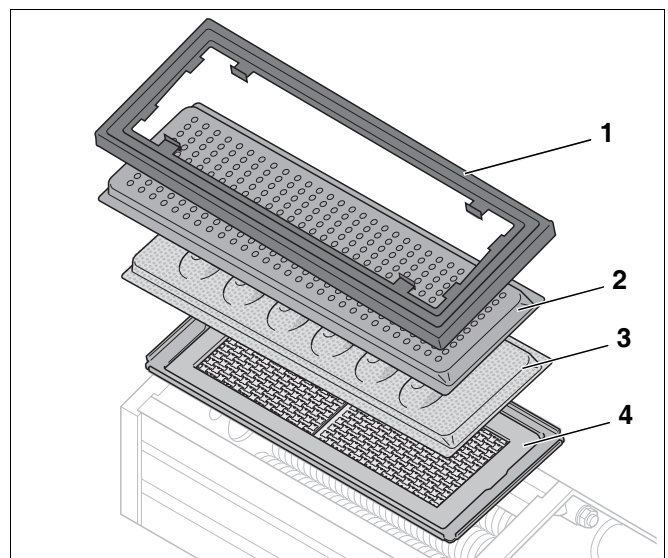


fig. 90 Removing the burner

- Disconnect the plug and socket connections of the supply, return and safety sensors (see fig. 91, 92 and 93).

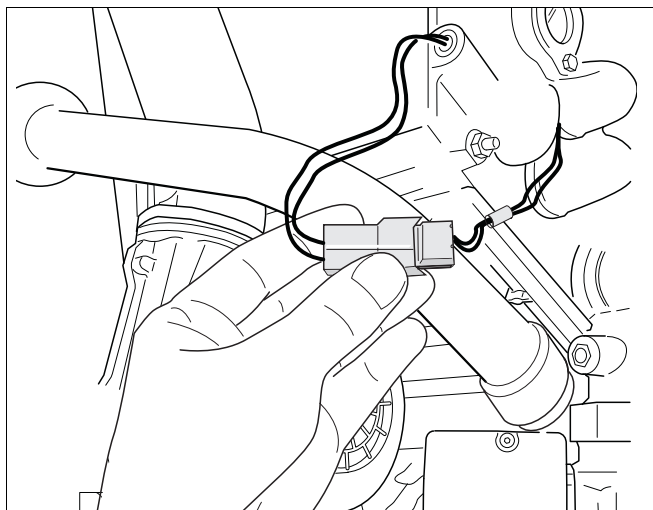


fig. 91 *Loosening the plug and socket connections of the supply sensor*

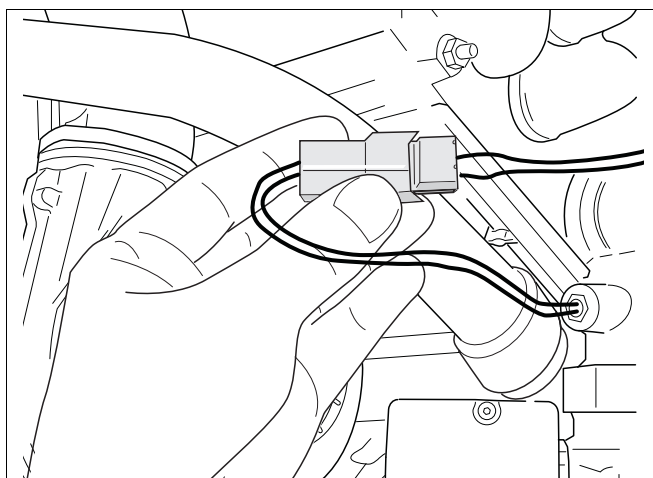


fig. 92 *Disconnect the plug and socket connection of the return sensor*

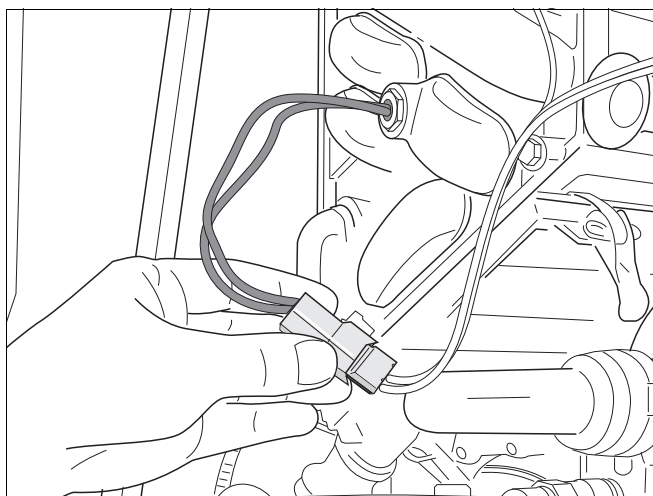


fig. 93 *Disconnect the plug and socket connection of the safety sensor*

- Disassemble the supply and return sensors (see fig. 94, 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.

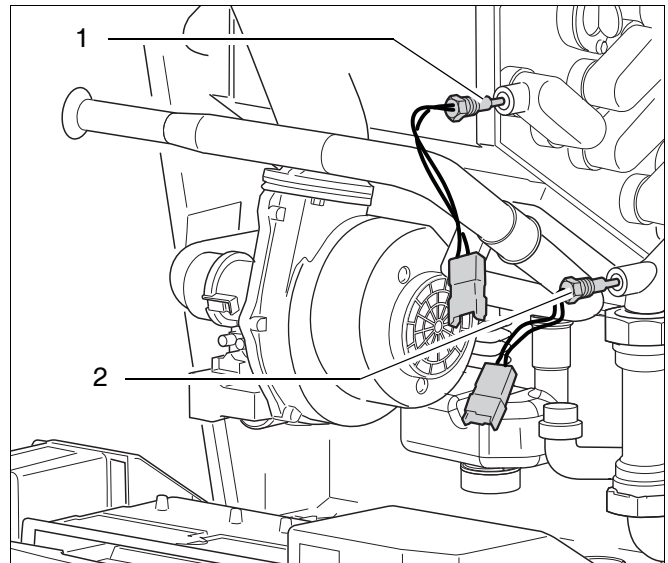


fig. 94 Replacing the supply/return sensors

- Dismantle the safety sensor (see fig. 95, pos. 1).

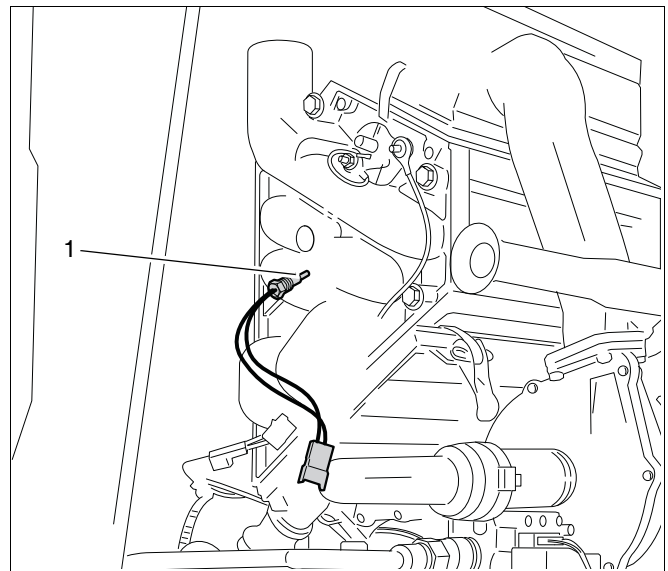


fig. 95 Dismantling the safety sensor

- Disconnect the hot surface ignitor and ionization electrode plugs.
- Loosen the fastening screws (see fig. 96, pos. 1).
- Pull the earth cable from the hot surface ignitor (see fig. 96, pos. 2).
- Dismantle the mounting plate (see fig. 96, pos. 3).

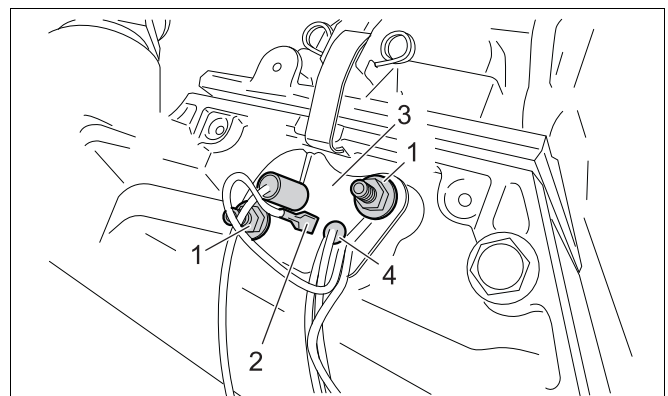


fig. 96 Replacing the hot surface ignitor



- Remove both the hot surface ignitor and the ionization electrode by pulling them loose (see fig. 97, pos. 1).

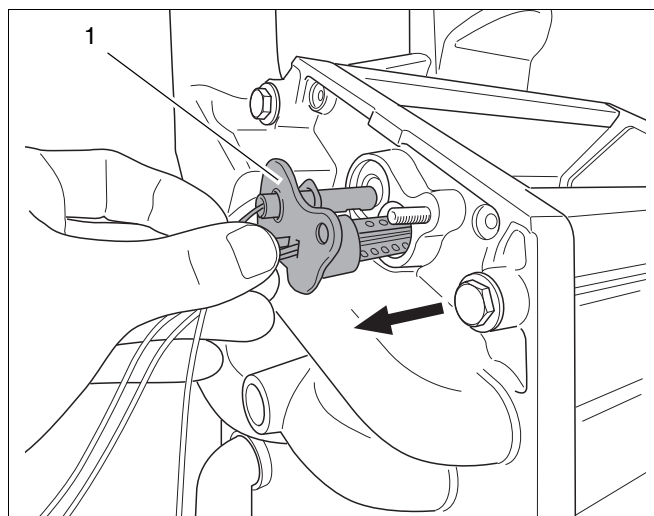


fig. 97 Removing the hot surface ignitor and the ionization electrode

- Dismantle the condensate trap connection to the condensate collector (see fig. 98, pos. 1).

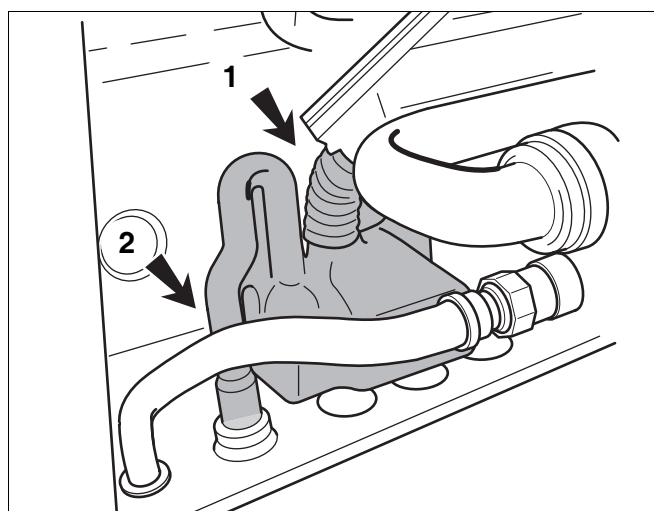


fig. 98 Dismantling the condensate trap connection to the condensate collector

- Open the four latches of the condensate collector (see fig. 99, pos. 1).

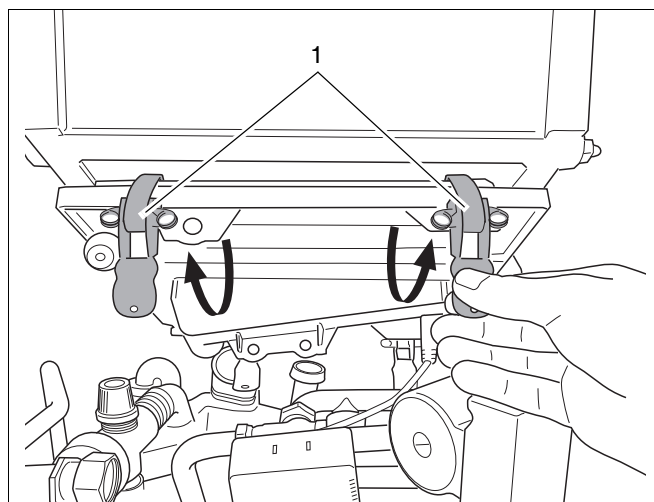


fig. 99 Opening the latches of the condensate collector

- Remove the condensate collector (see fig. 100, pos. 1).

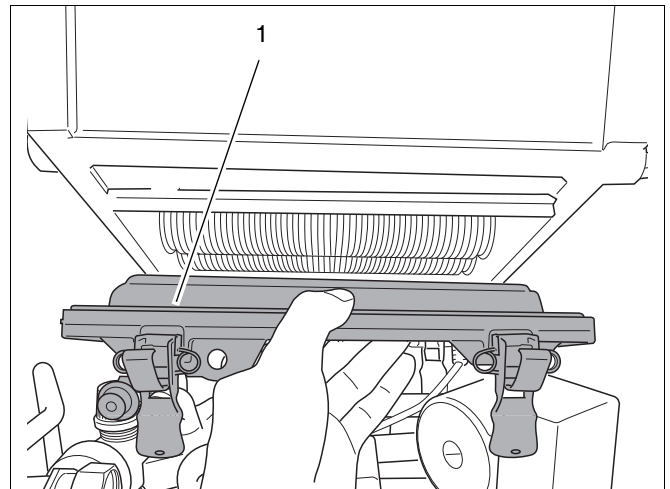


fig. 100 Removing the condensate collector

- Loosening the backflow connection between the primary pump and heat exchanger (see fig. 101, pos. 1).
- Dismantle the tension spring between the supply pipe and the heat exchanger (see fig. 101, pos. 2).

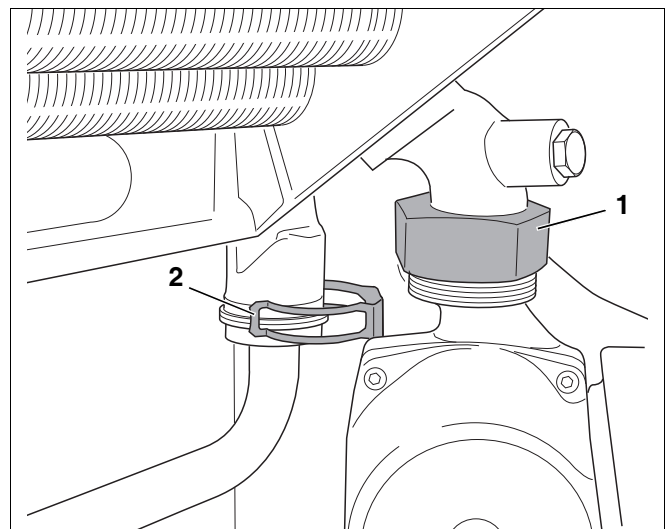


fig. 101 Loosening the backflow connection and dismantling the tension spring

- Loosening with one turn the nut between the supply connection and three way valve connection AB (see fig. 102, pos. 2).
- Pull the supply pipe out of the heat exchanger (see fig. 102, pos. 1).

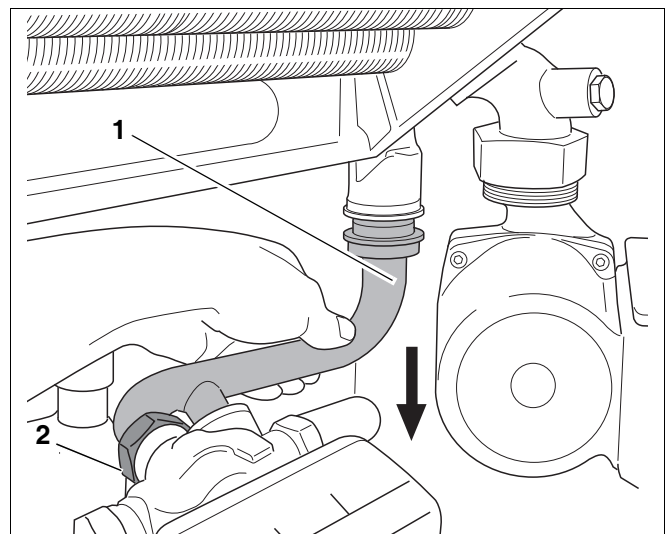


fig. 102 Removing the supply pipe



**WARNING!**

Water will be released.

- Loosen the fastening screws of the combustion air supply and flue gas exhaust connections (see fig. 103, pos. 1).

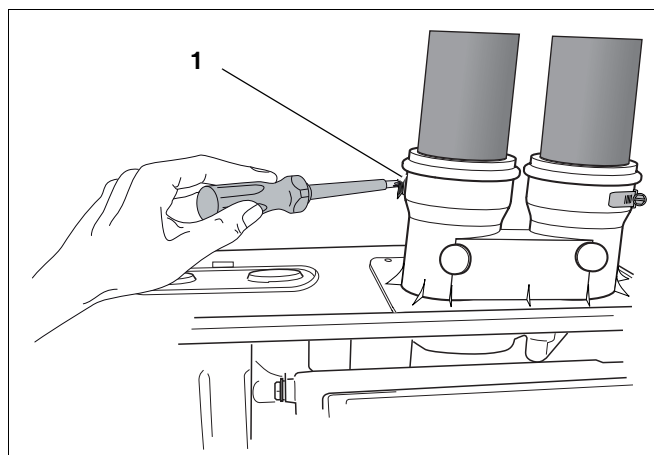


fig. 103 Loosening the fastening screws of the combustion air supply and flue gas exhaust connections

- Pull the combustion air supply (see fig. 104, pos. 2) and flue gas exhaust (see fig. 104, pos. 1) connections on top of the boiler upwards to remove them.

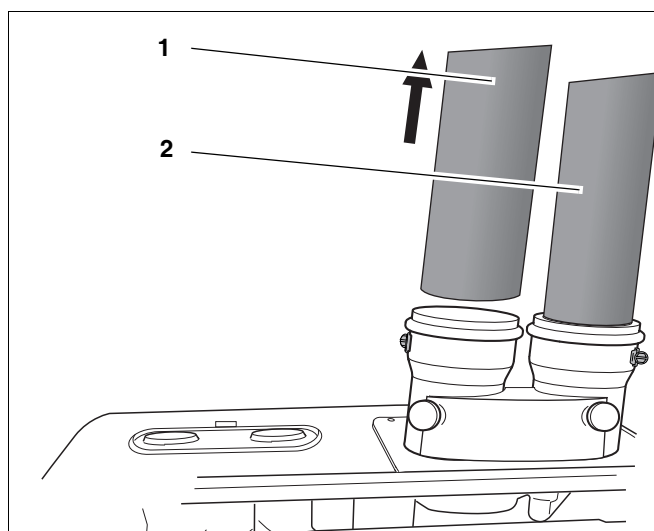


fig. 104 Loosening the combustion air supply and flue gas exhaust connections

- Loosen the 6 fastening screws of the flue gas adapter (see fig. 105, pos. 1).

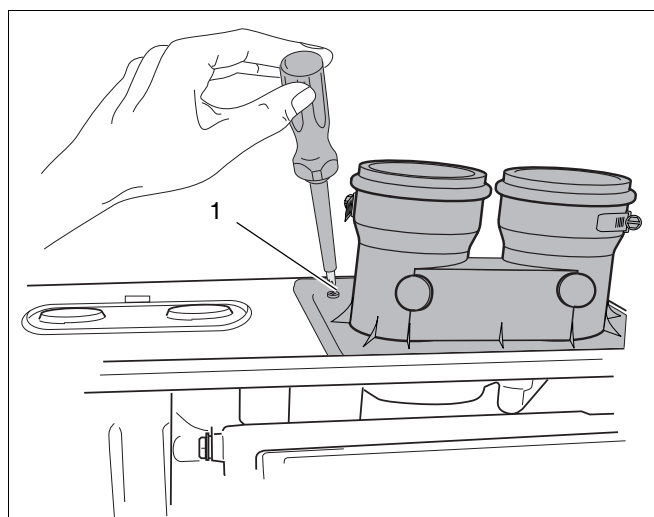


fig. 105 Loosening the fastening screws

- Remove the flue gas adapter (see fig. 105, pos. 1) from the top of the boiler.

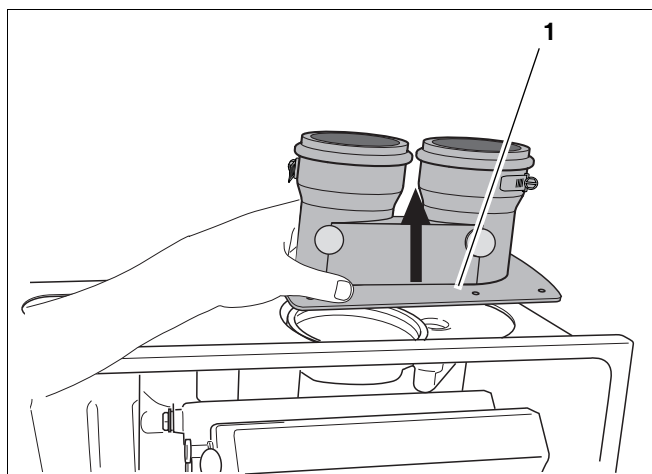


fig. 106 Removing the flue gas adapter

- Remove the heat exchanger by grabbing its bottom end and pulling forward and then pushing it upwards (see fig. 107, 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 installation and maintenance instructions Logamax plus GB142-24/30/45/60.

Remove the flue gas collector from the old heat exchanger, including the oval seal. Put silicon kit on both sides of the oval seal, the flue gas collector and the heat exchanger. Reassemble the flue gas collector with the oval seal to the heat exchanger. Check if the oval seal is placed correctly by opening the condensate collector (see page 122, fig. 100).

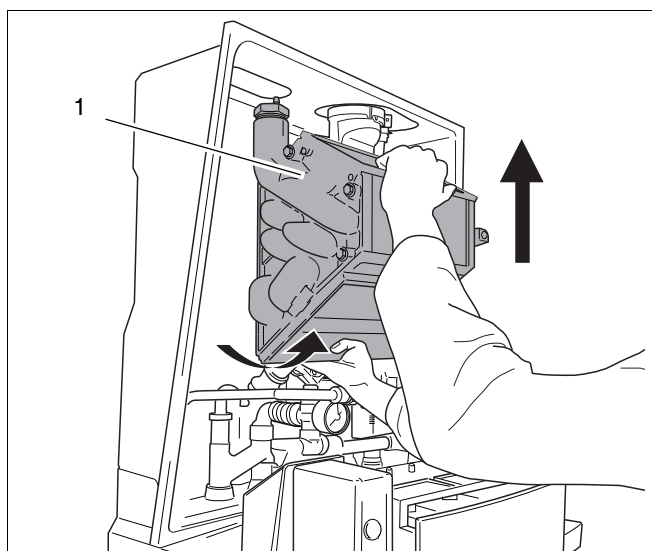


fig. 107 Dismantling the heat exchanger

- Open the gas shut-off valve (see fig. 108, pos. 2).
- Switch on the power supply of the heating system 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 paragraph 8.1.26, page 108.

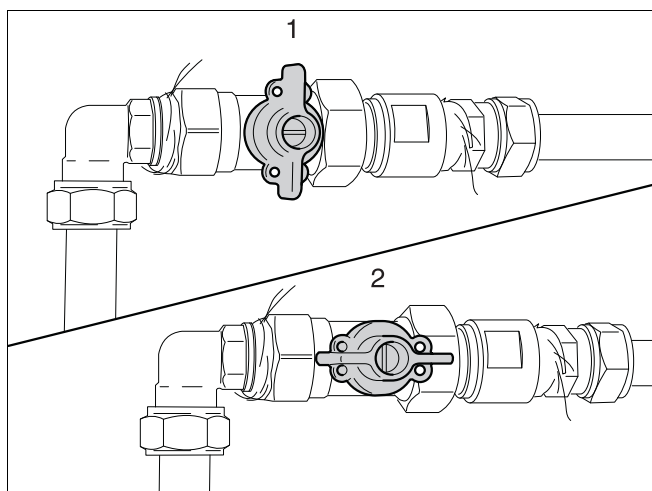


fig. 108 Gas shut-off valve closed (1), gas shut-off valve open (2)

### 8.1.35 UBA 3; replacing

- Switch off the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "0" (Off).
- Remove the casing.
- Loosen the fastening screw of the UBA 3 (see fig. 109, pos. 1).
- Pull the UBA 3 forward in the direction indicated by the arrow (see fig. 109, pos. 2).
- Install the new UBA 3.
- Tighten the fastening screw again.
- Fit the casing.
- Switch on the power supply of the heating system on the circuit breaker.
- Set the main switch on the BC10 to "1" (On).

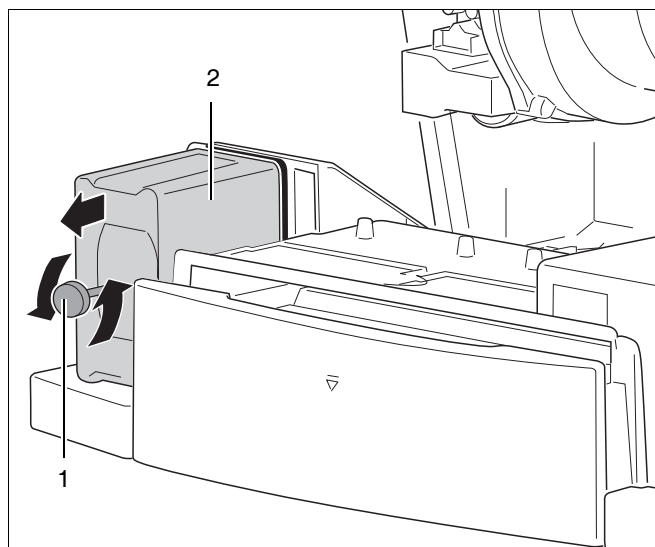


fig. 109 Dismantling the UBA 3

# 9 Appendix



**WARNING**

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

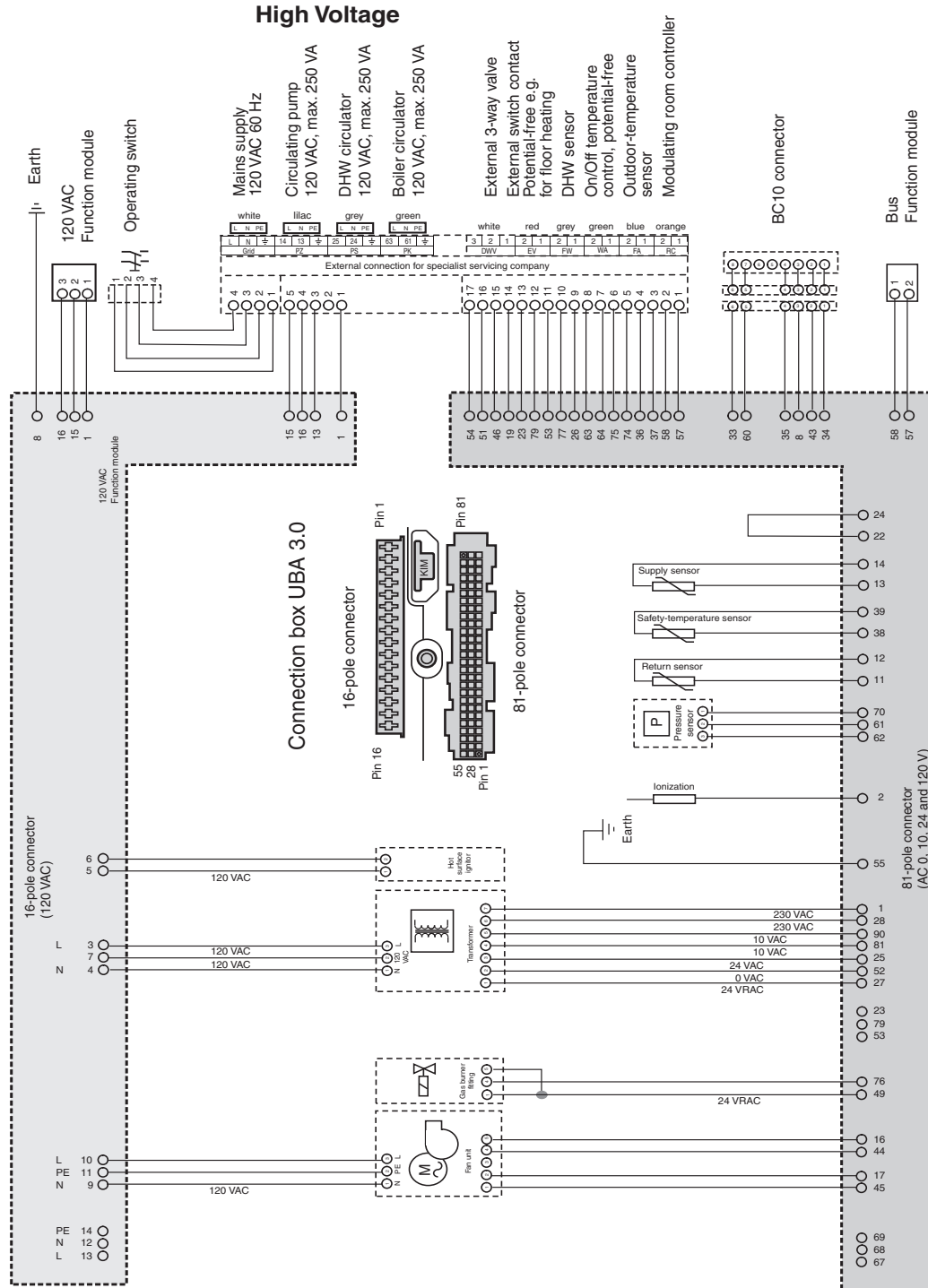


fig. 110 Electric circuit diagram

Boiler capacity	Type of gas supply	Venturi article number	Gas orifice diameter Altitude 0 - 10,200 ft			
			No CO <sub>2</sub> correction		Altitude 4,001 - 10,200 ft with CO <sub>2</sub> correction	
			[inch]	[mm]	[inch]	[mm]
24 kW	Natural gas <b>H</b>	423.072A	0.175	4.45	0.179	4.55
	LPG <b>P</b>	423.072A	0.132	3.35	0.134	3.40
30 kW	Natural gas <b>H</b>	423.072A	0.175	4.45	0.177	4.50
	LPG <b>P</b>	423.072A	0.132	3.35	0.134	3.40
45 kW	Natural gas <b>H</b>	423.170A	0.213	5.40	0.219	5.55
	LPG <b>P</b>	423.170A	0.163	4.15	0.163	4.15
60 kW	Natural gas <b>H</b>	423.173A	0.295	7.50	0.301	7.65
	LPG <b>P</b>	423.173A	0.213	5.40	0.215	5.45

table 5 Gas orifice diameter

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

- The diameter of the gas orifice is located on the gas orifice.
- The article number of the Venturi is located on both clamps of the Venturi (see fig. 111, pos. 1 and 2).

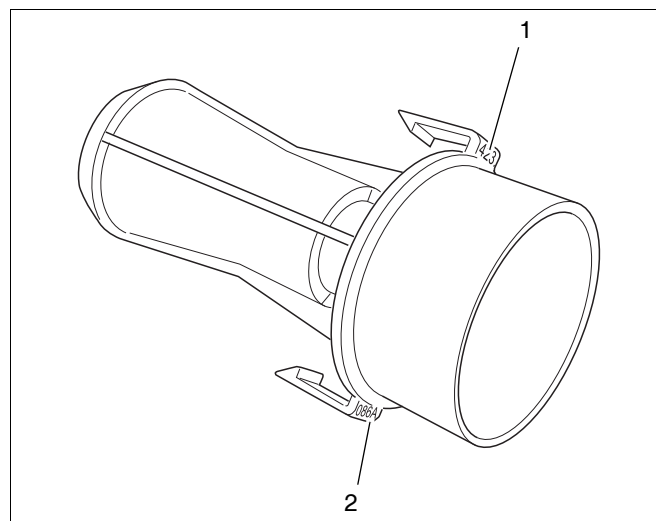


fig. 111 Venturi article number

## 10 Spare parts

Below is a list of the spare parts for this boiler. 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.

Pos.	Description	Product No.
1	Casing 24/30 kW	7099988
	Casing 45/60 kW	7099901
2	Casing latches left (2 pc)	7099039
3	Casing latches right (2 pc)	7099038
4	Casing seal 24/30 kW	7098752
	Casing seal 45/60 kW	7098798
5	Wall mounting bracket	7098364
6	Back panel 24/30 kW	7099001
	Back panel 45/60 kW	7099903
7	Cap air vent	7100250
9	Seal ring Ø 3"	77470s
10	Seal ring Ø 80 mm	7096475
11	Flue gas collector	7098857
12	Oval seal	7098858
13	Heat exchanger 24/30 kW	7746900159
	Heat exchanger 45 kW	7746900160
	Heat exchanger 60 kW	7746900161
14	Heat exchanger baffle 24/30 kW	7098828
15	Seal condensate collector 24/30 kW	7098834
	Seal condensate collector 45 kW	7098838
	Seal condensate collector 60 kW	67900522
16	Condensate collector + sealing 24/30 kW	7098840
	Condensate collector + sealing 45 kW	7098844
	Condensate collector + sealing 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	7099057
	Burner box 45 kW	7098875
	Burner box 60 kW	67900525
22	Safety sensor	78194
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
	Orifice plate 60 kW	7746900120
26	Burner 24/30 kW	7099003
	Burner 45 kW	7098932
	Burner 60 kW	67900528
27	Gas-air inlet	7099004
28	Seal fan	7099023
29	Ionization electrode	78195
30	Hot surface ignitor	7099006
31	Shield hot surface ignitor	7100229
32	Mounting plate	7098852
33	Seal mounting plate (5 pc)	7098850

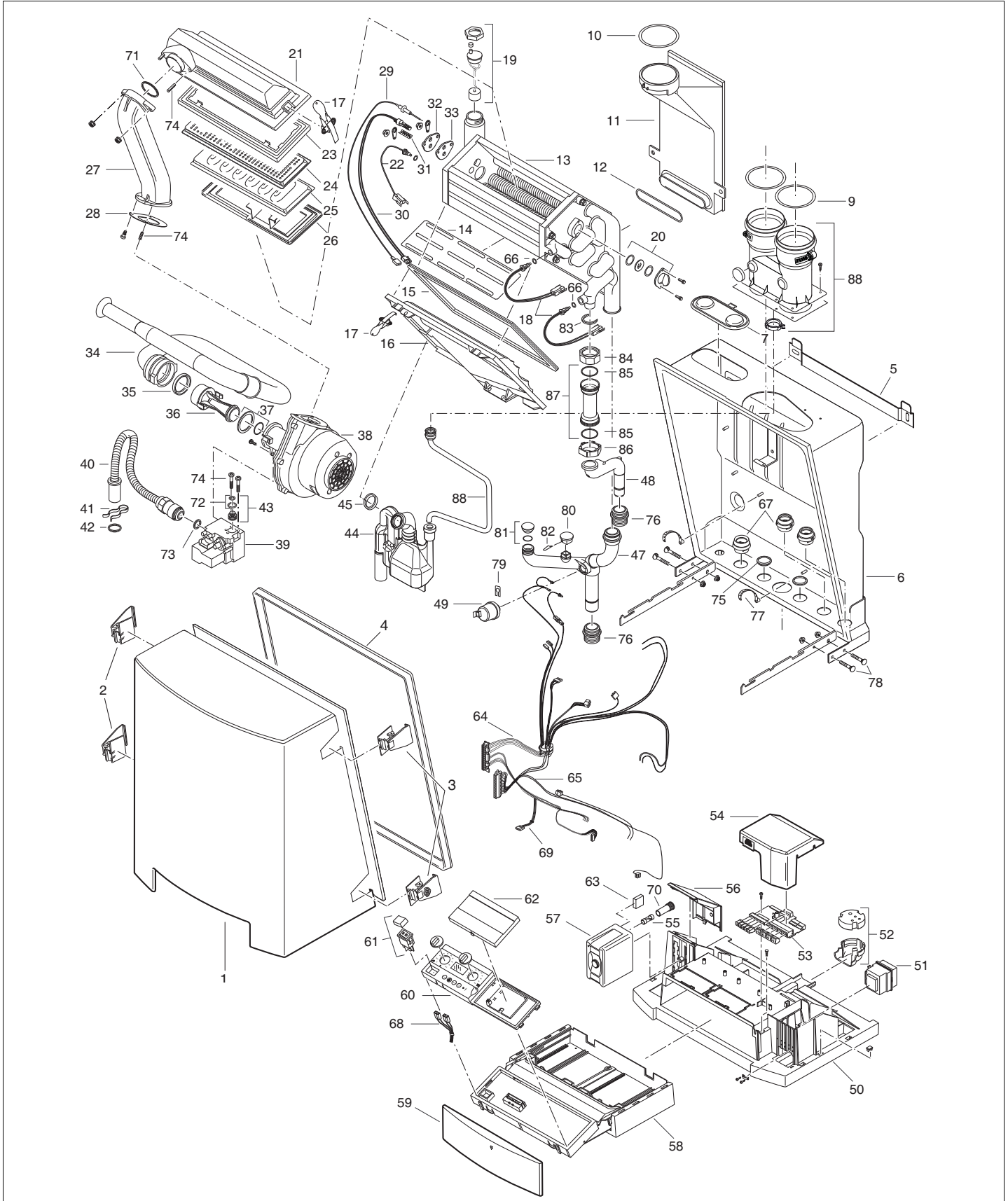
Pos.	Description	Product No.
34	Air inlet pipe; 24/30 kW	7099024
	Air inlet pipe; 45/60 kW	7099023
35	Seal Ø50 mm (5 pc)	7099058
36	Venturi 24/30 kW	7099020
	Venturi 45 kW	7099925
	Venturi 60 kW	7099931
37	Seal set (4 pc)	7099021
38	Fan	78184
39	Gas control valve	7099025
40	Gas supply pipe GB142 USA	76685
41	Spring (5 pc)	7100549
42	Seal 2x16x22 (5 pc)	7098778
43	L.P. Orifice Ø 3.35 - 24/30 kW 0-10,200 ft	76687
	L.P. Orifice Ø 3.40 - 24/30 kW 4,001-10,200 ft	7746901353
	L.P. Orifice Ø 4.15 - 45 kW 0-10,200 ft	7746901355
	N.G. Orifice Ø 4.45 - 24/30 kW 0-10,200 ft	7099016
	N.G. Orifice Ø 4.50 - 30 kW 4,001-10,200 ft	7746901421
	N.G. Orifice Ø 4.55 - 24 kW 4,001-10,200 ft	7746901354
	N.G. Orifice Ø 5.40 - 45 kW 0-10,200 ft	76690
	L.P. Orifice Ø 5.40 - 60 kW 0-10,200 ft	76690
	L.P. Orifice Ø 5.45 - 60 kW 4,001-10,200 ft	7746901357
	N.G. Orifice Ø 5.55 - 45 kW 4,001-10,200 ft	7746901356
	N.G. Orifice Ø 7.50 - 60 kW 0-10,200 ft	76686
	N.G. Orifice Ø 7.65 - 60 kW 4,001-10,200 ft	7746901358
44	Condensate trap, part of pos. 88	8718600689
45	Seal condensate trap (5 pc)	7100742
47	Supply pipe CH; 24/30/45 kW	75990
	Supply pipe CH; 60 kW	75991
48	Return pipe 24/30/45 kW	709965
	Return pipe 60 kW	709945
49	Pressure sensor **	8718600019
50	Bottom plate	7099049
51	Transformer 120V	78191
52	Grommet	7099050
53	External connection board	7099042
54	External connection board cover	7099046
55	Fuse 5 AF slow blow	73904s
56	UBA cover	7099047
57	UBA 3 - 120V	7099707

\*\* not shown in exploded views

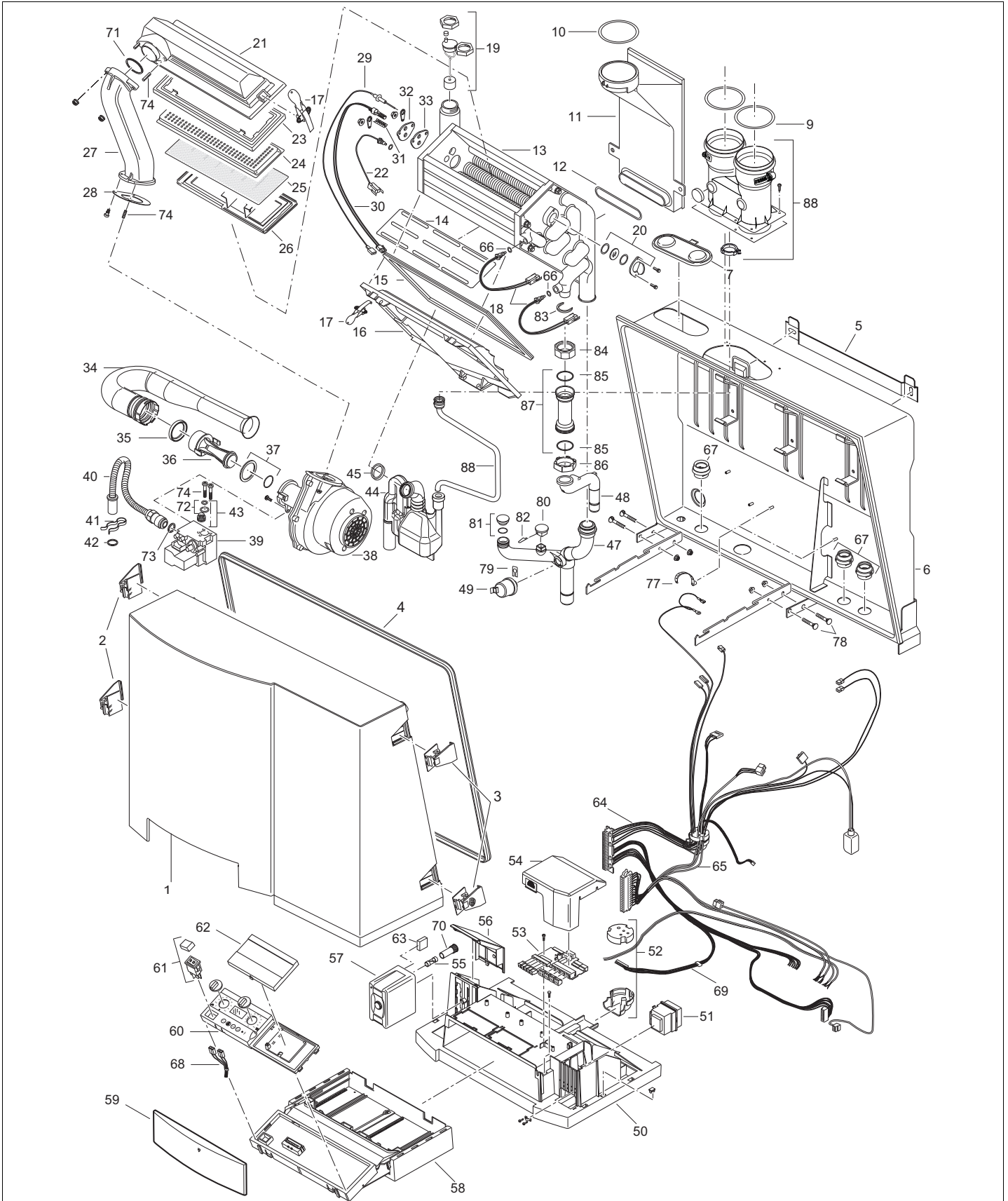


Pos.	Description	Product No.
58	Drawer	7099043
59	Drawer front	7099037
60	Controller connection plate	78186
61	On/off switch	7099041
62	Controller cover	73698
63	Boiler ident. module 24 kW	78223
	Boiler ident. module 30 kW	78224
	Boiler ident. module 45 kW	78225
	Boiler ident. module 60 kW	78226
64	Cable harness low voltage	78193
65	Cable harness high voltage	7099957
66	O-ring (10 pc)	38434s
67	Sealing bush (set)	7099002
68	Cable harness of on/off switch	7099072
69	Cable harness BX holder	7099070
70	Fuse holder	38345
71	Seal Ø60 mm (5 pc)	7098878
72	O-ring set orifice	7099018
73	Seal (5 pc)	7099059
74	Set screw M5x20 (5 pc)	7099065
75	Cap 24/30 kW	79105
76	Double nipple THR x COMPR	75977
77	Cabel saddle (10 pc)	7098810
78	Bolt M6x16 (2 pc)	7099078
79	Clip pressure sensor	7101370
80	Drainplug	7099364
81	Cap connection piece	38498
82	Clip (5 pc)	73651s
83	Centering ring (5 pc)	73480s
84	Coupling nut pump	73481s
85	Seal pump (10 pc)	15022s
86	Coupling nut pump	15020
87	Conversion set pump	73149
88	Condensate drain set, incl. pos. 44	8718600686

Exploded view Logamax plus GB142-24/30



Exploded view Logamax plus GB142-45/60



**Unites States and Canada**

Bosch Thermotechnology Corp.  
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