

# Installation and Maintenance Instructions

Gas-fired boiler



7 747 014 639-001RS

## **WARNING!**

Before commissioning the boiler, heed the safety instructions for mounting and maintenance.

## **DANGER!**

If installation, adjustment, modification, operation or maintenance of the heating system is carried out by an unqualified person, this may result in danger to life and limb or property damage. The installation and servicing instructions must be followed precisely. If you require assistance or further information, contact a qualified installer or an appropriate service provider.

## **CAUTION!**

The operating instructions are part of the technical documents that must be handed over to the operator of the heating system. Discuss the instruction in this manual with the owner or operator of the heating system to ensure that they are familiar with all information required for operation of the heating system.

## Logano G234X gas-fired boiler

**For heating contractors**

**Please read carefully before installing and servicing.**

# Contents

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<b>1</b>	<b>Explanation of symbols and safety information</b>	<b>3</b>
1.1	Explanation of symbols	3
1.2	Safety instructions	3

---

<b>2</b>	<b>Product description</b>	<b>5</b>
2.1	Intended use	5
2.2	Standards, regulations and directives	5
2.2.1	National regulations	5
2.2.2	Boiler operating conditions	5
2.3	Notes on installation and operation	5
2.3.1	Other important information	5
2.4	Tools, materials and equipment	6
2.5	Disposal	6
2.6	Product description	6
2.7	Package Contents	6
2.8	Dimensions and specifications	7
2.8.1	Logano G234X dimensions	7
2.8.2	Specifications	8
2.8.3	Main gas orifice identification and rated orifice pressure	8

---

<b>3</b>	<b>Moving the boiler</b>	<b>9</b>
----------	--------------------------	----------

---

<b>4</b>	<b>Placing the boiler</b>	<b>10</b>
4.1	Boiler room requirements	10
4.2	Recommended wall clearances	10
4.3	Leveling the boiler	11

---

<b>5</b>	<b>Installing the boiler</b>	<b>12</b>
5.1	Preparations	12
5.2	Connecting the heating system	12
5.2.1	General safety instructions	12
5.2.2	Connect the central heating supply and return	13
5.3	Electrical connection	14
5.3.1	Connecting power supply	14
5.3.2	Mount the Logamatic 2000 control unit (accessory)	14
5.3.3	Installing the rear boiler cover	17
5.4	Connecting the gas supply	18
5.4.1	Installing gas feed	18
5.4.2	Converting boiler to propane	20
5.4.3	Installation at high altitudes	20
5.5	Filling the heating system and checking for water leaks	21
5.6	Install front wall of boiler	22
5.7	Connecting the flue	23

---

5.7.1	Check openings for combustion air supply and venting	23
5.7.2	Requirements for connection to chimneys or venting systems	24
5.7.3	Installing the flue pipe	25
5.7.4	Connecting flue pipe	25
5.7.5	Installation of vent damper	25
5.7.6	Installing electrical connection of vent damper	26

---

<b>6</b>	<b>Commissioning the heating system</b>	<b>27</b>
6.1	Test safety valve	27
6.2	Making the heating system ready for operation	27
6.3	Start-up instructions	29
6.4	Making boiler ready for operation	30
6.4.1	Commission the heating system with aquastat control	30
6.4.2	Placing heating system with Logamatic 2000 control unit in operation	30
6.5	Then carry out start-up procedures.	30
6.6	Shutting off gas supply to boiler	34
6.7	Inform owner/operator, hand over technical documentation	34
6.8	Commissioning log	35

---

<b>7</b>	<b>Shut down the heating system</b>	<b>36</b>
7.1	Normal shut-down	36
7.2	Shutting down the boiler in an emergency	36
7.2.1	Action in an emergency	36

---

<b>8</b>	<b>Heating system inspection and maintenance</b>	<b>37</b>
8.1	Why is regular maintenance important?	37
8.2	Checking the flue system including the combustion air supply, inlet and outlet air openings	37
8.3	Inspection of the boiler and burner	37
8.4	Preparing boiler for cleaning	38
8.5	Cleaning the boiler	39
8.5.1	Cleaning the boiler with cleaning brushes	39
8.5.2	Wet cleaning (chemical cleaning)	40
8.6	Cleaning the burner	41
8.7	Troubleshooting	42
8.8	Maintenance log book	44

---

<b>9</b>	<b>Spare parts</b>	<b>46</b>
----------	--------------------	-----------

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<b>10</b>	<b>Circuit diagrams</b>	<b>61</b>
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# 1 Explanation of symbols and safety information

## 1.1 Explanation of symbols

### Warnings



Warnings in the text are indicated by a warning triangle with a gray background in a framed box.



In case of danger due to current, the exclamation point on the warning triangle is replaced with a lightning symbol.

Signal words at the beginning of a warning are used to indicate the type and seriousness of the ensuing risk if measures for minimizing damage are not taken.

- **NOTE** indicates that damage to property may occur.
- **CAUTION** indicates possible minor to medium personal injury.
- **WARNING** indicates possible severe personal injury.
- **DANGER** indicates that severe personal injury may occur.

### Important Information



Important information that presents no risk to people or property is indicated with this symbol. They are separated by lines above and below the text.

### Additional symbols

Symbol	Explanation
▶	Sequence of steps
→	Cross-reference to other points in this document or to other documents
•	Listing/list entry
–	Listing/list entry (2nd level)

Tab. 1

## 1.2 Safety instructions

### If you smell gas

- ▶ Turn off the gas shut-off valve (→ page 36).
- ▶ Open windows and doors.
- ▶ Do not operate any electrical switches, not even telephones, plugs or doorbells.
- ▶ Extinguish all open flames. Do not smoke! Do not use lighters.
- ▶ Warn all occupants of the building, but do not ring doorbells.
- ▶ If you can actually hear gas escaping, leave the building immediately. Prevent others from entering and notify the police and fire department **from outside** the building.
- ▶ **From outside the building**, call the gas utility company and approved heating contractor.

### If you smell flue gas

- ▶ Switch off the heating system (→ page 36).
- ▶ Open windows and doors.
- ▶ Inform an authorized heating contractor.

### Danger from escape of toxic flue gases.

- ▶ Ensure that the boiler is not equipped with a thermostatic shut-off damper downstream of the draft hood.

### Risk of poisoning. Intervention in the flue gas monitor can result in dangerous escape of flue gas.

- ▶ Do not attempt to repair the flue gas temperature sensor.
- ▶ When changing the flue gas temperature sensor, use only original spare parts.
- ▶ When replacing the flue gas temperature sensor install the new one in the specified position.

### Danger from escape of toxic flue gases if the flue gas monitor trips frequently.

If the flue gas monitor trips frequently, there may be a problem with the chimney or the flue gas venting. This can cause flue gas to escape.

- ▶ Remedy faults and perform function test.

### Risk of poisoning. Insufficient ventilation may cause dangerous flue gas leaks.

- ▶ Never close off or reduce the size of air intake and outlet openings.
- ▶ The boiler must not be operated until the obstruction has been removed.
- ▶ Inform the system user in writing of the problem and associated danger.

**Danger from escaping flue gases**

- ▶ Make sure that the vent pipes and gaskets are not damaged.
- ▶ Use silicone as sealing compound.
- ▶ The boiler must not be fitted with a barometric damper or a thermally controlled flue flap downstream of the flue socket.
- ▶ Connect only one boiler to each venting system or chimney flue.
- ▶ Connection of another boiler may cause serious injury or death.
- ▶ The venting system piping must not feed into another air extraction duct.
- ▶ Do not route the flue system piping through or inside another air extraction duct, for example where there is a masonry or prefabricated chimney flue.

**Danger of explosion of flammable gases.**

- ▶ Work on gas components may only be carried out by qualified and authorized personnel.
- ▶ Mounting, gas and flue connection, initial commissioning, electrical connection and maintenance activities must only be carried out by a trained service provider.

**Dangers posed by explosive and easily combustible materials**

- ▶ Do not use or store easily-combustible materials (paper, lace curtains, clothing, thinners, paints, etc.) near the boiler.
- ▶ Maintain a clearance of 16.2 inches (415 mm) from the boiler.

**Combustion air**

- ▶ Keep the combustion air free of corrosive substances (e. g. halogenated hydrocarbons that contain chlorine or fluorine compounds). This will help prevent corrosion.

**Danger from electric shock when the boiler is open.**

- ▶ Before opening the boiler:  
Disconnect the heating system from the electrical power supply by means of the emergency shutoff switch or the heating system circuit breaker on the main fuse panel.
- ▶ It is not enough to only switch off the control unit.
- ▶ Take measures to ensure that the heating system cannot be switched on again unintentionally.

**Danger due to short-circuits**

To prevent short circuits, only

- ▶ use genuine Buderus wiring.

**Set-up, installation, commissioning**

- ▶ Correct and proper installation and adjustment of the burner and the control panel are the fundamental requirements for safe and economical operation of the boiler.
- ▶ The boiler may only be installed or converted by an approved heating contractor.
- ▶ Never change any parts in contact with flue gas.
- ▶ Only qualified electricians are permitted to carry out electrical work. Installation regulations must be complied with.
- ▶ The hot water tank may only be used for heating domestic hot water.
- ▶ **Never shut off safety valves!**  
Water may escape from the safety valve for the hot water system and piping when the water is being heated.

**Inspection/maintenance**

- ▶ Servicing and repairs may only be carried out by an approved heating contractor.
- ▶ Immediately correct all faults to prevent system damage.
- ▶ The operator is responsible for the general and environmental safety of the heating system.
- ▶ Use only genuine spare parts! Damage caused by the use of parts not supplied by Buderus is not covered by the Buderus warranty.
- ▶ **Recommendation for users:** take out a maintenance and servicing contract with an approved heating contractor covering annual servicing and condition-based maintenance.

**Instructing the customer**

- ▶ Explain to the customer how the boiler works and how to operate it.
- ▶ Inform the customer that he/she must not carry out any alterations or repairs.

## 2 Product description

This installation and maintenance manual contains important information for the safe and correct installation, initial commissioning, and maintenance of this boiler.

The special gas-fired boiler Logano G234X is generally referred to below as a boiler.

The installation and maintenance manual is provided for technicians who have been trained and have experience in working with heating systems and oil and gas fired installations.

Only use the boiler in the combinations and with the accessories and spare parts that are specified in the installation and servicing instructions.

Other combinations, accessories and worn out parts must only be used if they are specifically designed for the intended application and do not affect the system performance and the safety requirements.

### 2.1 Intended use

The boiler is designed for heating central heating system water and indirect heating of domestic hot water (e.g. in a hot water cylinder), for instance in individual homes or apartment buildings.

### 2.2 Standards, regulations and directives



Observe all standards and guidelines applicable to the installation and operation of this heating system in your jurisdiction!

#### 2.2.1 National regulations

The design and mode of operation of this boiler comply with the American National Standard ANSI Z21.13/CSA4.9, latest edition for Gas Fired Low Pressure Steam and Hot Water Boilers.

Other confirmed approvals and certifications are indicated by stickers on the boiler.

Installation of the boiler must comply with all applicable codes and regulations imposed by the national, Federal or local authorities and bodies. If no specific requirements are defined, in the USA, the latest edition of the National Fuel Gas Code ANSI Z223.1/NFPA 54 must be complied with. In Canada, installation must comply in all respects with the latest edition of the Installation Code for Gas Burning Appliances and Equipment, CAN/CSA-B.149 and the applicable local regulations and requirements for the appliance category. The relevant authorities and regulatory bodies must be informed before installation starts.

Where required by local regulations, the system must comply with the American Society of Mechanical

Engineers Safety Code for Controls and Safety Devices for Automatically Fired Boilers (ASME CSD-1).

Carbon monoxide detectors must be installed as specified by the local regulations. The boiler must be serviced annually.

#### 2.2.2 Boiler operating conditions

Maximum boiler temperature: 220 °F (104 °C)

Maximum operating pressure: 58 psi (4 bar)

The hot water distribution system must comply with all applicable codes and regulations. If an existing boiler is replaced, the complete hot water piping system must be inspected to ensure that it is in perfect condition to ensure safe operation.

### 2.3 Notes on installation and operation

When installing and operating the heating system observe the following:

- The local building codes regarding the installation
- The local building regulations regarding air supply and venting systems and the chimney flue connection.
- Regulations governing power connection to the power supply
- The technical regulations of the gas utility company regarding the connection of the gas burner to the local main gas supply.
- The regulations and standards relating to the safety systems for the water heating system

#### 2.3.1 Other important information

- The installation of a boiler must be notified to and approved by the relevant gas utility company.
- Only operate the boiler with the combined air/flue system specifically designed and approved for it.
- Regional approvals with regard to the flue system may be required.

## 2.4 Tools, materials and equipment

For the installation and maintenance of the boiler, you will need the standard tools used for central heating and gas and water systems plus set of a metric wrenches and Allen wrenches

The following may also prove useful:

- Pipes for transport
- Wood battens
- Cleaning brushes and/or chemical cleaning agent for wet cleaning

## 2.5 Disposal

- ▶ Dispose of boiler packaging in an environmentally-responsible manner.
- ▶ All heating system components that have to be replaced should be disposed of in environmentally-responsible manner at an authorized disposal site.

## 2.6 Product description

The boiler is a low temperature gas-fired boiler.



The boiler is fully functional with the factory-installed aquastat. A Logamatic 2000 control can be installed in addition to the aquastat. The control unit can be ordered as an accessory from Buderus.

The boiler consists of:

- Automatic ignition unit and aquastat
- Boiler casing and front wall of boiler
- Boiler block with thermal insulation
- Burner
- Logamatic 2000 control unit (accessory)

The automatic ignition, the aquastat and, if applicable, the Logamatic 2000 control unit monitor and control all electrical components of the boiler.

The boiler casing and the front wall of the boiler prevent heat loss and reduce noise.

The boiler block transfers the heat generated by the burner to the boiler water. The insulation prevents energy loss.

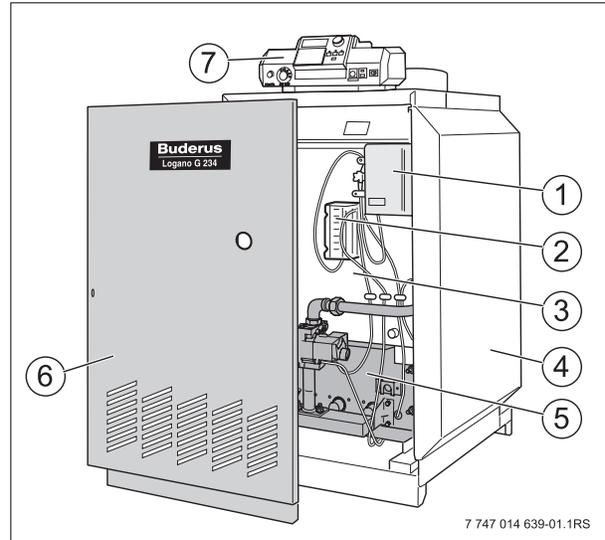


Fig. 1 G234X boiler

- 1 Aquastat
- 2 Burner control unit
- 3 Boiler block with thermal insulation
- 4 Boiler casing
- 5 Burner
- 6 Front wall of boiler
- 7 Logamatic 2000 control unit

## 2.7 Package Contents

- ▶ After delivery, check all packaging for perfect condition.
- ▶ Check the delivery for completeness.

The boiler is supplied in one packing unit with the mounted boiler casing, gas burner and gas fitting, and technical documentation.

Component	Qty	Packaging
Boiler	1	Pallets/box
<ul style="list-style-type: none"> <li>• 90°-elbow (3/4 " NPT)</li> <li>• Safety valve</li> <li>• Drain valve (3/4 ")</li> </ul>	1	Box
Vent Damper	1	Box
Technical documentation	1	Foil package

Tab. 2 Package Contents

All accessories can be ordered optionally from Buderus:

- Logamatic 2000 control unit
- Heating pump
- Cleaning brush

## 2.8 Dimensions and specifications

### 2.8.1 Logano G234X dimensions

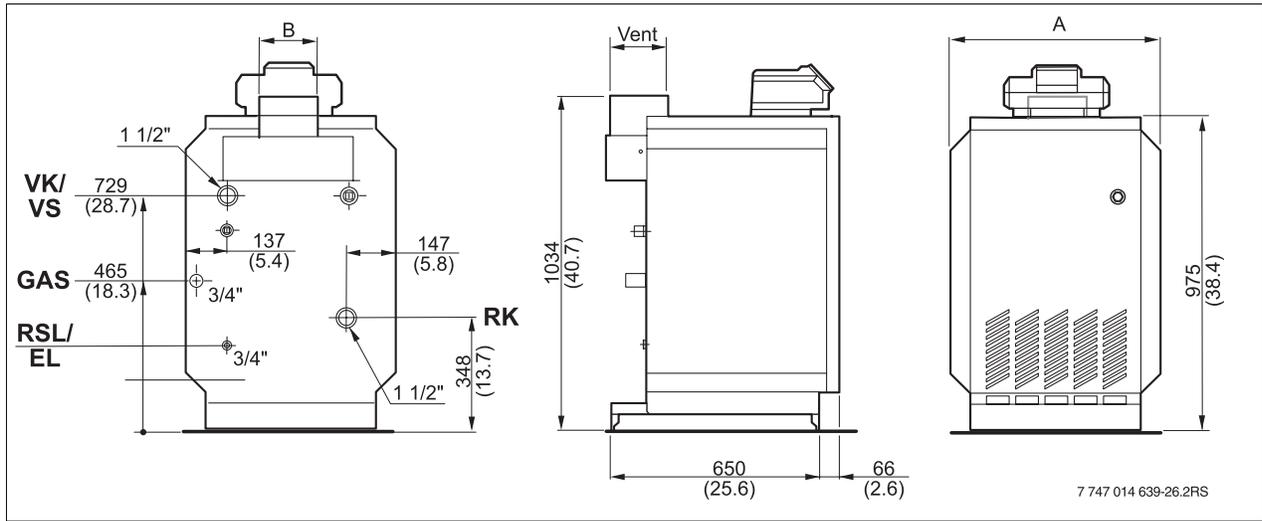


Fig. 2 Connections and dimensions for Logano G234X, dimensions in mm (dimensions in inches)

- VK/VS** Boiler supply/Storage tank supply
- GAS** Gas connection + main isolating valve
- RK** Boiler return
- RSL/EL** Return safety line/draining

Boiler capacity	Unit	38	45	55	64
Ignition heat load	MBtu/hr	160	187	228	266
	kW	46.9	54.8	66.8	78.0
Nominal output	MBtu/hr	130	154	188	219
	kW	38	45	55	64
Dimension A	Inches	25.6	25.6	29.1	32.7
	mm	650	650	739	831
Vent	Inches	7	7	7	8
Minimum capacity of the safety relief valve	lb/hr	130	153	188	218
	kg/h	59	69	85	99
Number of burner rods	Qty	3	3	4	4
Water volume	US gal.	6.1	6.1	7.1	8.2
	l	23	23	27	31
Dry weight	lbs	487	487	562	684
	kg	221	221	255	310

Tab. 3 Dimensions

2.8.2 Specifications

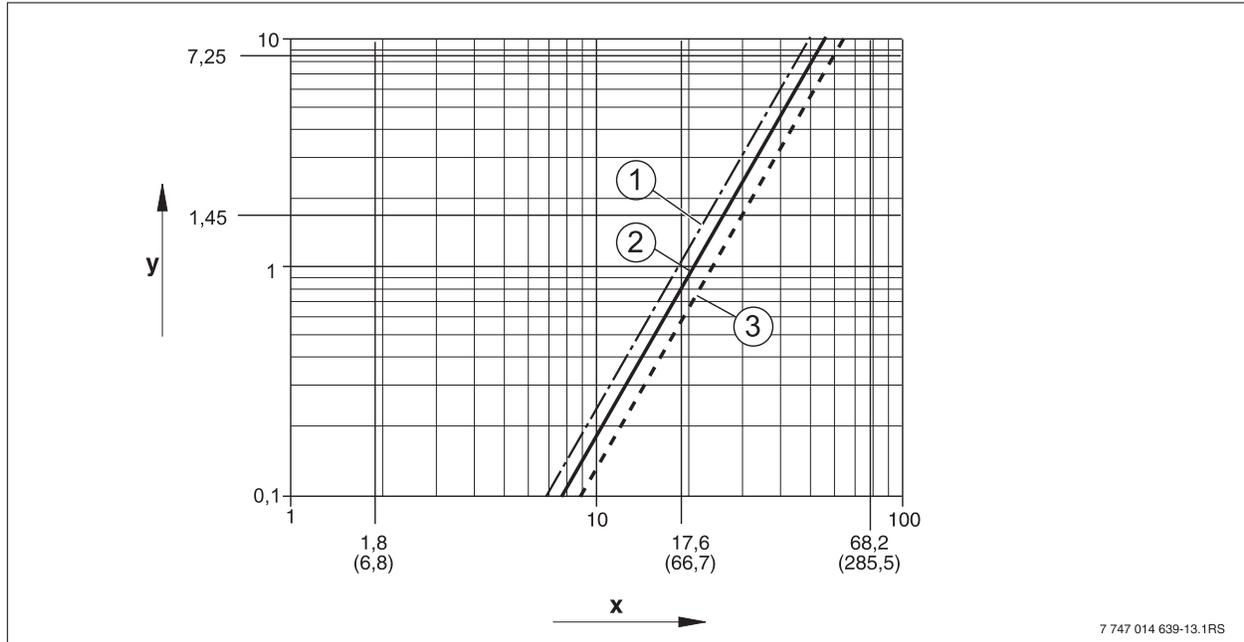


Fig. 3 Pressure drops (1 psi = 69 mbar, 1 GPM = 0.23 m<sup>3</sup>/h)

**x** Flow Rate in GPM ( m<sup>3</sup>/h)  
**y** Pressure drops in psi

- 1 160 500/187 700 BTU/hr (boiler rating 38/45)
- 2 228 400 BTU/hr (boiler rating 64)
- 3 266 400 BTU/hr (boiler rating 55)

2.8.3 Main gas orifice identification and rated orifice pressure

Boiler capacity	Number of injectors	Main gas orifice identification 0 - 2000 ft (0 - 610 m)	Rated orifice pressure for natural gas	
			[In. W.C.]	[mbar]
38	3	3.70	3.0	7.6
45	3	3.70	4.1	10.4
55	4	3.50	4.6	11.5
64	4	3.80	4.4	10.9

Tab. 4 Main gas orifice identification and rated orifice pressure for natural gas

Boiler capacity	Number of injectors	Main gas orifice identification 0 - 2000 ft (0 - 610 m)	Rated orifice pressure for propane gas	
			[In. W.C.]	[mbar]
38	3	2.20	10.6	26.5
45	3	2.40	10.5	26.2
55	4	2.30	10.3	25.8
64	4	2.45	10.3	25.9

Tab. 5 Main gas orifice identification and rated orifice pressure for propane gas

### 3 Moving the boiler

This section details how to move the boiler safely.



**NOTICE:** Risk of system damage from impact shocks!

Fragile components could be damaged.

- ▶ Observe the transport instructions on the packaging.



**NOTICE:** System damage due to improper transport!

- ▶ Protect sheet metal parts, flue gas pipe, burner, and control unit during transport.
- ▶ Do not lift the boiler using these components.



Dispose of packaging in an environmentally responsible manner.

#### Moving the boiler with hand truck



**WARNING:** Risk of injury if load is inadequately secured during transportation.

- ▶ Use suitable means of transportation, e.g. a trolley with strap.
- ▶ When transporting, secure the boiler to prevent it falling.

- ▶ Position transport equipment (e.g. trolley) at the back of the boiler.
- ▶ Secure packaged boiler to the hand truck.
- ▶ Move the packaged boiler to the installation location.

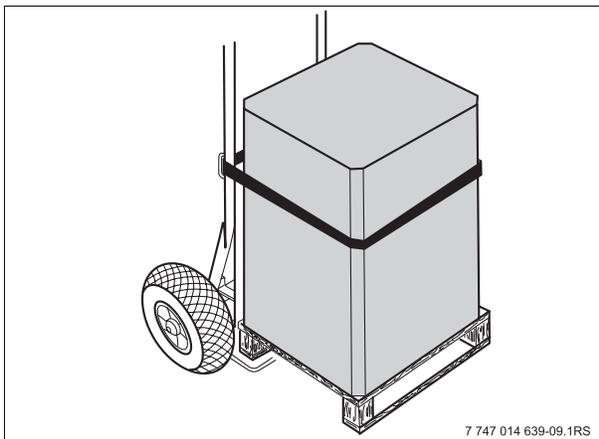


Fig. 4 Moving boiler with trolley

- ▶ Remove the straps and the cardboard packaging.
- ▶ Loosen the retaining screws.
- ▶ Lift the boiler at the sides and slide to the edge of the pallet.
- ▶ Place a pipe under the boiler and roll it on additional pipes to the installation location.
- ▶ Place the boiler in its final position.

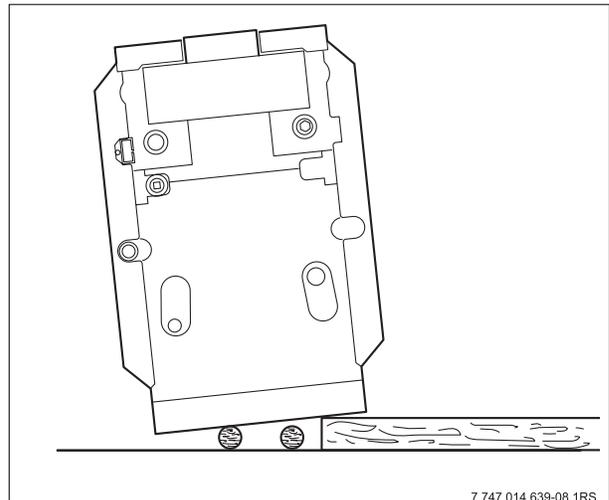


Fig. 5 Moving the boiler

## 4 Placing the boiler

This section explains how to erect and position the boiler correctly in the boiler room.

### 4.1 Boiler room requirements



**NOTICE:** Risk of system damage due to freezing!

- ▶ Install the heating system in a frost-free room.



**WARNING:** Damage to the building due to insufficient load capacity of the floor!

- ▶ Before setting the boiler up, check the load capacity of the floor.



**DANGER:** Dangers posed by explosive and easily combustible materials!

- ▶ Do not use or store easily-combustible materials (paper, lace curtains, clothing, thinners, paints, etc.) near the boiler.
- ▶ Maintain a clearance of 16 inches (415 mm) from the boiler.



**NOTICE:** Risk of boiler damage from contaminated combustion air!

- ▶ Do not use cleaning agents that contain chlorine or halogenated hydrocarbons (e.g. in spray cans, solvents and cleaning agents, paints, glues).
- ▶ Do not store or use these substances in the boiler room.
- ▶ Avoid excessive dust accumulation (building dust).

### 4.2 Recommended wall clearances

Wherever possible, position the boiler with the recommended wall clearances. Reducing the minimum clearances makes the boiler more difficult to access.

The base or foundation on which the boiler is to stand must be perfectly flat and level. The boiler may be installed on a flammable base, but not on carpet.

Dimension	Wall clearance inches (mm)
A	33 (840)
B	6 (155)
C	2 (50)

Tab. 6 Wall clearances



Where applicable, allow extra wall clearances for additional components such as DHW storage tank, pipe connections, flue silencer or other flue components, etc.

A space of at least 33 inches (840 mm) is required in front of the boiler with the door open to allow sufficient accessibility for operation and maintenance. When the door is closed, a minimum clearance of 2 inches (50 mm) is required at the front and sides, a wall clearance of 6 inches (155 mm) is also required for the flue pipe and 30 inches (762 mm) clearance to the ceiling.

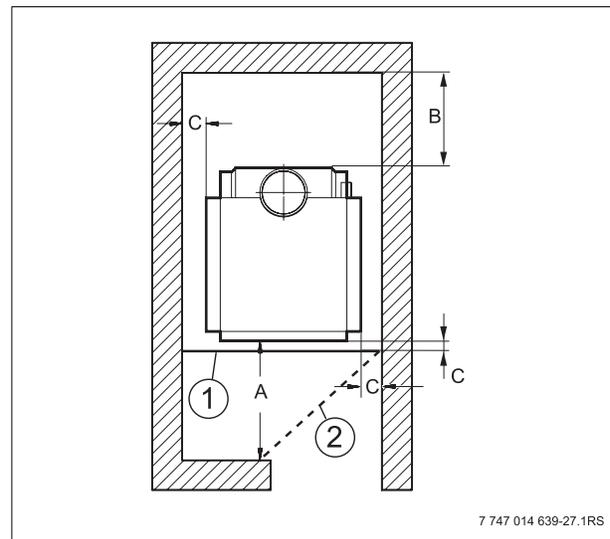


Fig. 6 Wall clearances in the boiler room

- 1 Closed door
- 2 Open door

### 4.3 Leveling the boiler

The boiler must be leveled horizontally and vertically to prevent air pockets forming inside.

- ▶ Level the boiler vertically and horizontally, inserting metal shims underneath as required.



**NOTICE:** Risk of system damage due to contamination!

- ▶ Protect boiler connections from damage and dirt if the boiler is not to be installed immediately.

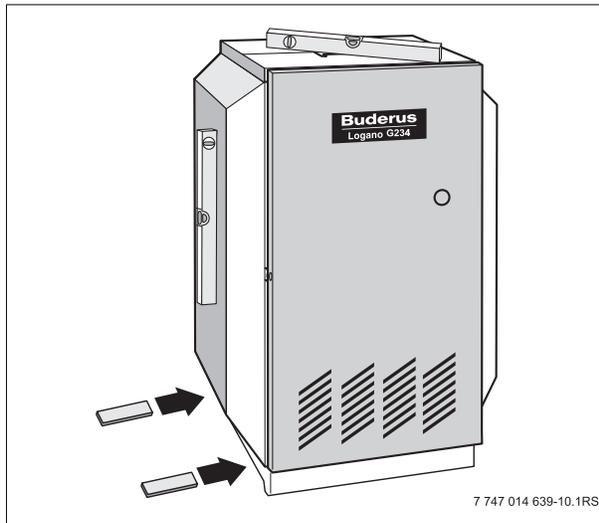


Fig. 7 Leveling the boiler (example)

## 5 Installing the boiler

This section details how to install your boiler correctly. This involves the following steps:

- Flue gas connection
- Heating circuit connection
- Making the electrical connections
- Connecting the fuel supply

### 5.1 Preparations

- ▶ Unpack all cartons and boxes.
- ▶ Using the included packing list, check to be sure that you have all the included parts.



Every boiler is carefully inspected and tested before it leaves the factory. However, if you discover any damage or missing parts, please inform the supplier immediately. Before disposing of packing material, make sure that no parts are still in it.

#### Route the gas connection towards the left



The gas connection pipe is designed for a gas connection on the right side.

- ▶ Loosen the screws on the gas connection pipe completely.
- ▶ Attach the gas connection pipe shifted by 180° and seal.
- ▶ Carry out the leak test.

## 5.2 Connecting the heating system

This section explains how the boiler is connected to the heating system.

### 5.2.1 General safety instructions



**NOTICE:** Risk of boiler damage due to moisture!

- ▶ Protect the individual components of the control system and the ignition system from damp (dripping water, water spray, rain) during installation, operation and servicing (e.g. pump replacement, programmer replacement, etc).



**NOTICE:** Risk of system damage due to overheating as a result of lack of water!

- ▶ Make sure that if the boiler is located above the level of the heating system, it is fitted with a low-water cut-off.
- ▶ The low-water cut-off must be used when the boiler is installed (→ Fig. 8).

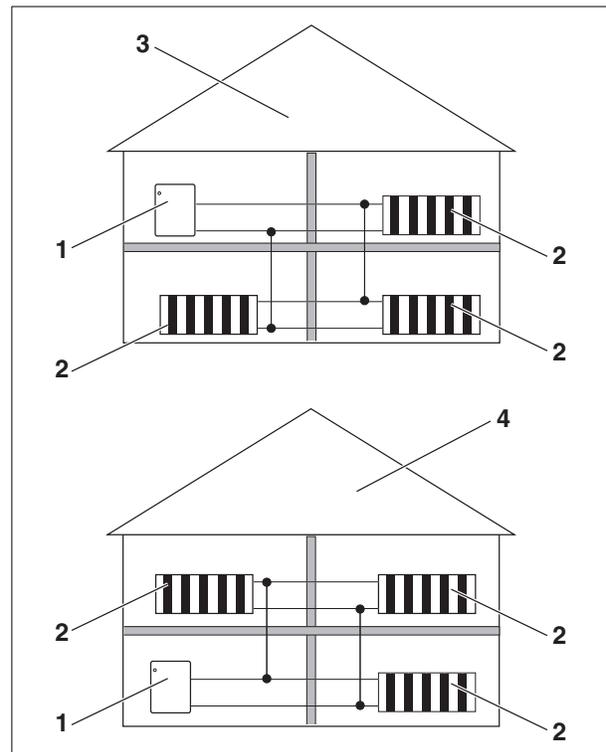


Fig. 8 Low-water cut-off

- 1 Boiler
- 2 Panel radiator
- 3 Heating system with low-water cut-off
- 4 Heating system without low-water cut-off



**NOTICE:** Risk of system damage due to high temperature variations in the heating system!

- ▶ If the boiler is operated in conjunction with an air conditioning system, it is essential to ensure that the pipes for the refrigerant fluid are connected in parallel with the boiler system using suitable valves to prevent the refrigerant from entering the boiler.
- ▶ The pipe system of a boiler connected to the heating coils of hot-air heating systems that may be exposed to the circulation of cooled air must be fitted with a flow-control valve or some other automatic system for preventing the boiler water from circulating by gravity during the cooling cycle.



**NOTICE:** Risk of system damage due to leaking connections!

- ▶ Install the connection cables to the boiler in such a way that they are not under stress.

### 5.2.2 Connect the central heating supply and return



**DANGER:** Risk of fire from flammable materials!

- ▶ Maintain a clearance of 2 inches (51 mm) from pipes carrying hot water and flammable walls in the installation room.



We recommend installing a dirt filter and a silt clearance filter (accessory) in the boiler return connection to reduce build-up of debris on the water side.



Observe the local regulations for connection of boiler systems.

### Connecting the safety valve in the central heating supply



**NOTICE:** System damage due to faulty safety valve!

During the leak test, the safety valve can be damaged.

- ▶ Do not install the safety valve until the leak test (→ Section 5.5 „Filling the heating system and checking for water leaks“, page 21) has been completed.

- ▶ Install the included supply manifold and the 90° elbow.
- ▶ Do not install the safety valve until the leak test has been completed.

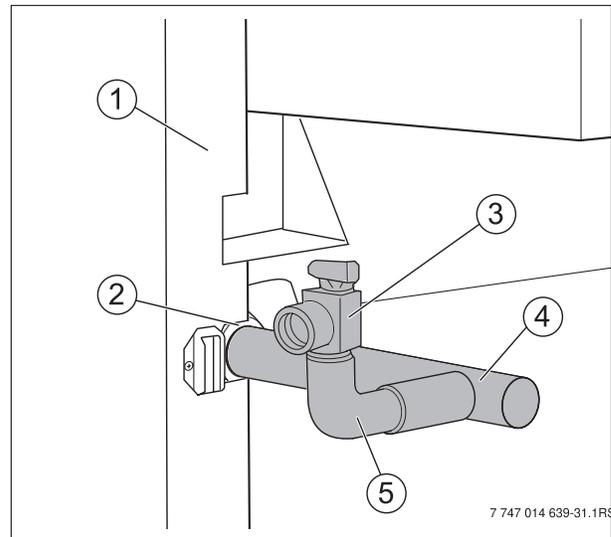


Fig. 9 Supply connection

- 1 Boiler
- 2 Supply connection
- 3 Safety valve
- 4 Supply manifold pipe (factory-installed)
- 5 90°-elbow (¾ " NPT)

### 5.3 Electrical connection

The electrical connections to the boiler must conform to the locally applicable regulations and the relevant requirements of the National Electrical Code, ANSI/NFPA-70. In Canada the regulations of CSA C22.1 Canadian Electrical Code, Part 1, must be observed.

The boiler must be grounded in accordance with the regulations of the relevant authorities or else the requirements of the National Electrical Code, ANSI/NFPA-70.



**DANGER:** Risk of fatal injury from electric shock!

- ▶ Only carry out electrical work on the heating system if you are properly qualified for the work in question. If you do not have the proper qualifications, have the work done by a suitably qualified electrician.
- ▶ Observe the local regulations.
- ▶ If cables are connected incorrectly the system may not operate correctly with possibly dangerous consequences. When making the electrical connections follow the wiring diagrams on pages 61 and 62.

#### 5.3.1 Connecting power supply

- ▶ Establish a permanent connection to the factory-installed aquastat in accordance with the locally applicable regulations.
- ▶ Mount a power switch near the boiler.

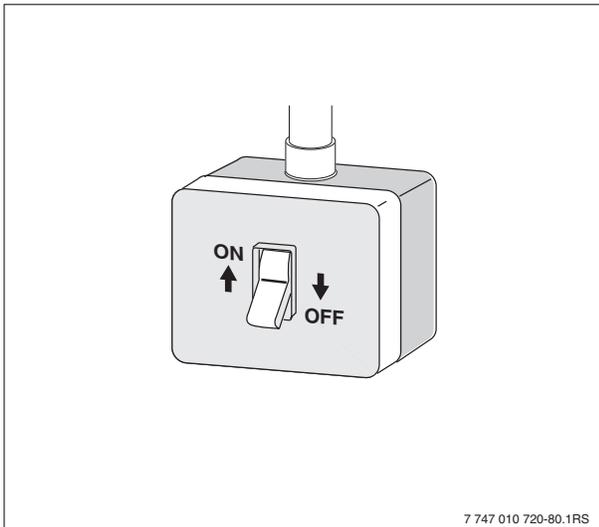


Fig. 10 Main power switch

#### 5.3.2 Mount the Logamatic 2000 control unit (accessory)

The boiler is fully functional with the factory-installed aquastat. A Logamatic 2000 control unit can be installed in addition to the factory-installed aquastat.



Observe the following points regarding the electrical connections of the control unit:

- ▶ Carefully route the cables/leads and capillary tubes.
- ▶ Never kink cables and capillary tubes during installation.

- ▶ Remove the cover plate from the front boiler cover.
- ▶ Remove the rear boiler cover.

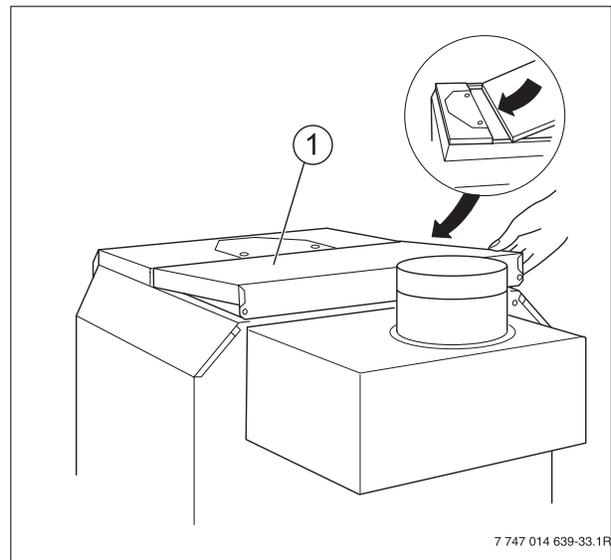


Fig. 11 Remove the rear boiler cover.

- 1 Rear boiler cover

- ▶ Position the tabs of the control unit in the slots.
- ▶ Slide control toward the boiler front panel.
- ▶ Push to snap plastic tabs of the control into the knock-outs.

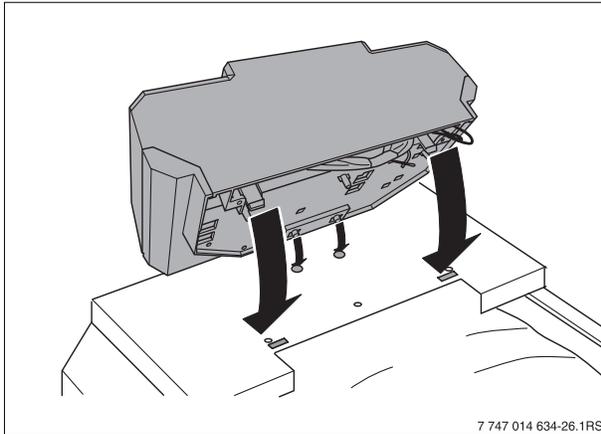


Fig. 12 Put the control unit on the boiler

- ▶ Unscrew the cover screws of the cover unit.
- ▶ Remove the cover.
- ▶ Secure the controls with self-tapping screws.
- ▶ Route the temperature sensor line through the cable duct and unroll to the required length.

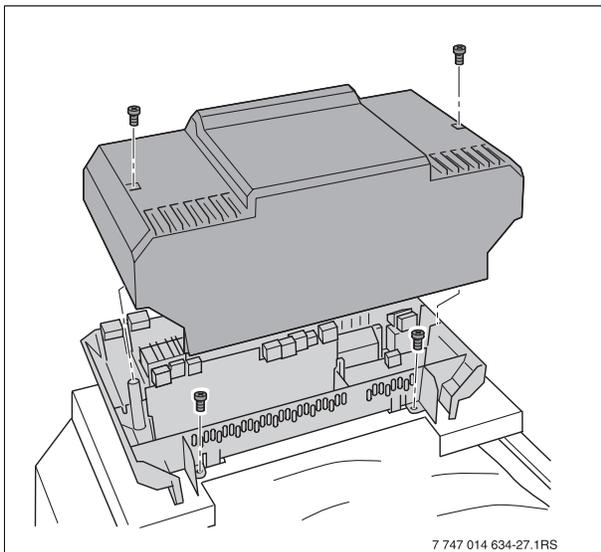


Fig. 13 Fastening the control unit

- ▶ Unscrew left and right screws in the side panels, lift front panel up, pull outward and remove to the front.

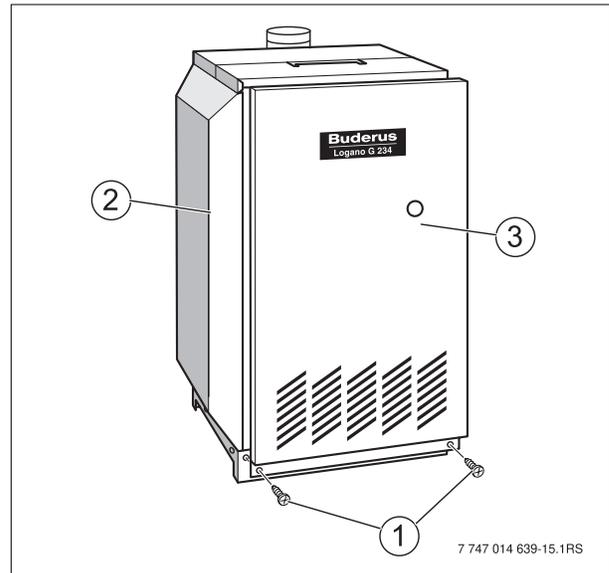


Fig. 14 Remove front wall of boiler

- 1 Locking screws
- 2 Boiler casing
- 3 Front wall of boiler

**Installation of boiler water sensor**

- ▶ Remove the temperature/pressure gauge [1] on the boiler.
- ▶ Mount the temperature/pressure gauge [1] on the supply pipe [2] and seal.

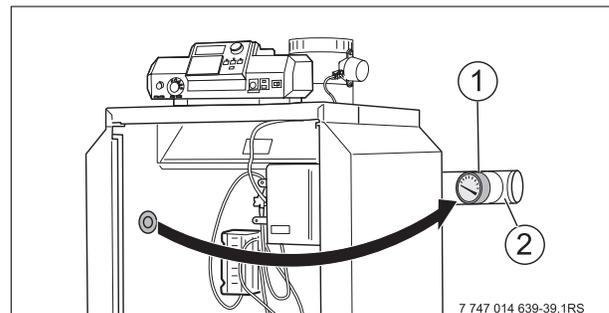


Fig. 15 Removing the temperature/pressure gauge

- 1 temperature/pressure gauge
- 2 supply pipe

- ▶ Mount the Logamatic sensor well [2] on the boiler instead of the temperature/pressure gauge and seal.
- ▶ Place the Logamatic sensor packet [1] under the front boiler cover towards the front for the sensor well.

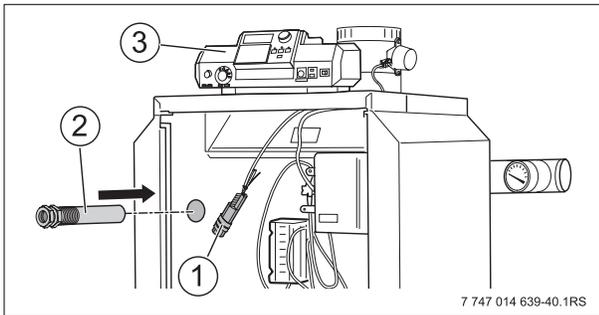


Fig. 16 Mounting the Logamatic sensor well on the boiler

- 1 Logamatic sensor packet
- 2 Logamatic sensor well
- 3 Logamatic 2000 control unit

- ▶ Place entire Logamatic sensor packet fully into the immersion well [1] to the stop. The plastic coil [2] is pushed back automatically.
- ▶ At the same time insert the compensating spring [3] into the sensor well [1].
- ▶ Press sensor clip [5] (scope of delivery of the control unit) from the side or from above to the head of the sensor well.
- ▶ Carefully roll up unnecessary wiring and capillaries and stow in the Logamatic 2000 control unit.

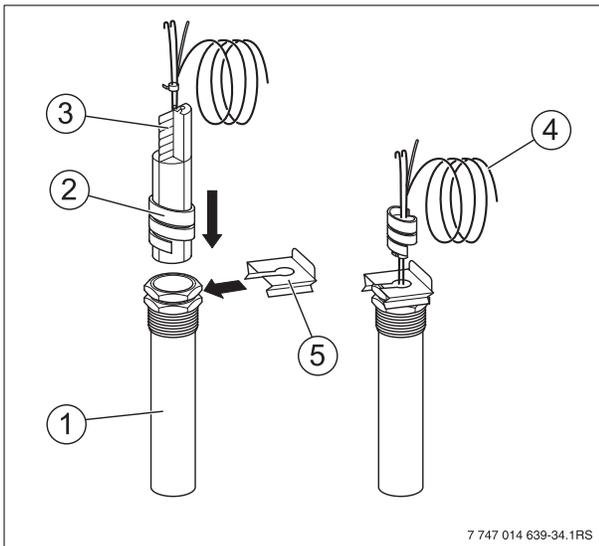


Fig. 17 Sensor well and temperature sensor

- 1 Sensor well
- 2 Plastic coil
- 3 Compensator spring
- 4 Capillary line
- 5 Sensor retaining clip

### Power connection and connections of additional components



**DANGER:** Fire hazard from hot boiler components!

Hot boiler components may damage electrical cables.

- ▶ Ensure that the electrical cables are not touching any hot parts.
- ▶ Make sure that all cables are routed through the conduits provided or on the outside of the boiler's thermal insulation.

- ▶ Establish a permanent connection to the control unit in accordance with the locally applicable regulations.
- ▶ Route all wiring to the control unit through the conduit and connect as specified by the control unit circuit diagram.

### Installing strain relief

The required cable clips are in the scope of delivery of the control unit.

Insert the cable clip together with the cable from the top into the slots in the frame. The bar of the lever must point upwards.

Slide the cable clip downwards.

Counterhold.

Flip the lever up.

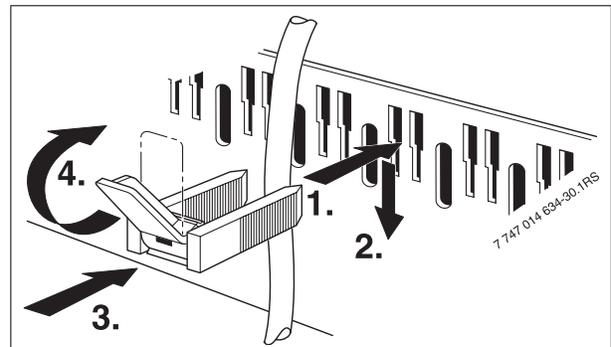


Fig. 18 Installing strain relief

**Installing outer casing panels**

- ▶ Swivel display unit to the desired position.



We recommend positioning the display unit straight on combinations with an L-tank.

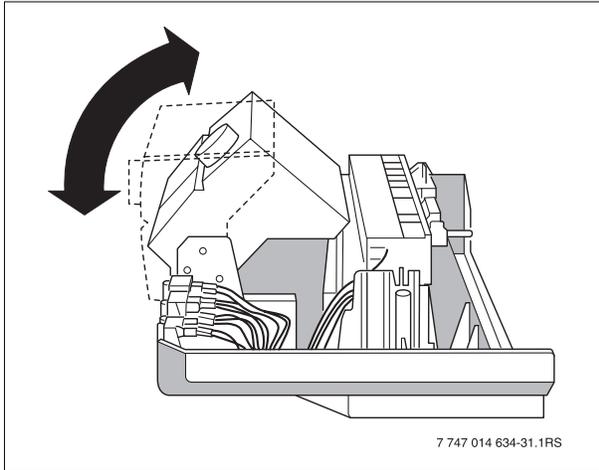


Fig. 19 Swivel display unit

- ▶ Position the cover and secure on the control unit.

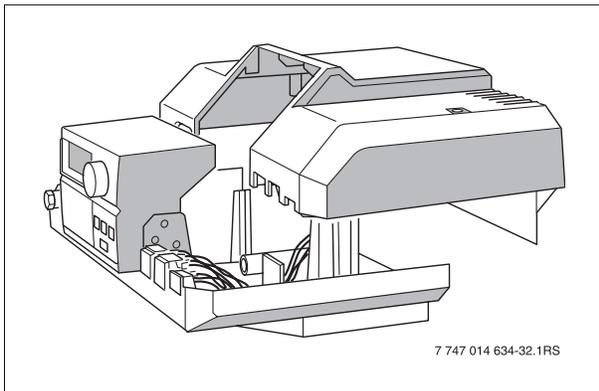


Fig. 20 Positioning the cover

**5.3.3 Installing the rear boiler cover**

- ▶ Slide tabs of rear boiler cover under the front boiler cover and press down at back.
- ▶ Screw rear boiler cover to rear panel of boiler.

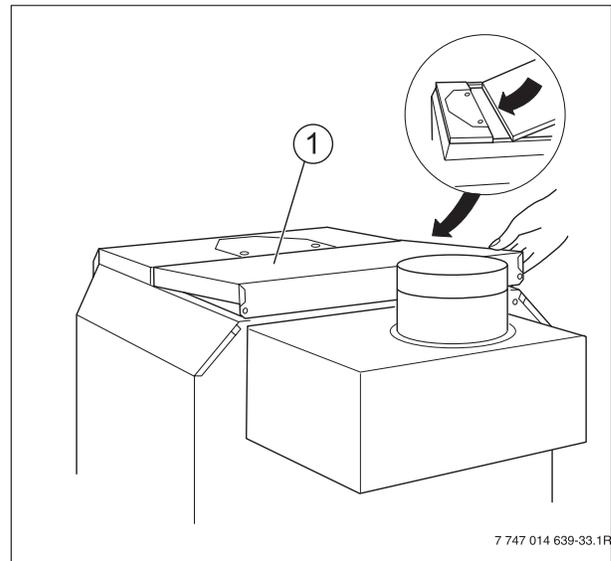


Fig. 21 Installing the rear boiler cover

- 1 Rear boiler cover

**NOTICE:** Risk of system damage due to contamination!

- ▶ Protect boiler connections from damage and dirt if the boiler is not to be installed immediately.

## 5.4 Connecting the gas supply



Heed the following points for connecting the fuel supply:

- ▶ Work on gas components may only be carried out by qualified and authorized personnel.
- ▶ Observe the local regulations or else the requirements the National Fuel Gas Code, ANSI Z 223.1 when connecting the gas supply. In Canada, the requirements of CAN/CSA-B.149.1 and 2, Installation Guidelines, must be observed.
- ▶ A gas shut-off valve must be installed outside the boiler casing if required by the local code. We recommend installing a gas shut-off valve in the main gas pipe to the boiler.
- ▶ The gas pipes must be fastened outside the boiler.

### 5.4.1 Installing gas feed

For details of the required gas pipe diameter, refer to Tab. 7 and Tab. 8 on page 19. Make absolutely sure that the pipe fittings have the correct thread size.

- ▶ Make sure that a sediment trap is fitted at the inlet for the gas supply pipe to the boiler.



The gas feed pipe is designed for a gas connection on the right side.

For the conversion to left-side gas connection, see section 5.1.

To prevent strain on the gas valves, extensions of the gas supply line must be supported.

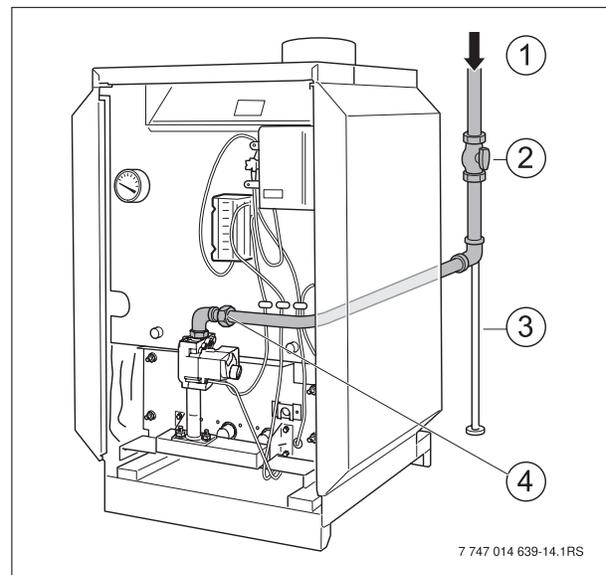


Fig. 22 Gas valve pipe connection

- 1 Gas supply
- 2 Shut-off
- 3 Sediment trap
- 4 Retaining screws at the gas feed line (on site)

Length of the pipe in feet (1 foot = 0.3 m)	Gas pipe delivery rate in cubic feet of gas per hour <sup>1)</sup> (1 ft <sup>3</sup> /h = 28.3 l/h)				
	1"	1¼ "	1½ "	2"	2½ "
10	520	1060	1600	3050	4800
20	350	730	1100	2100	3300
30	285	590	890	1650	2700
40	245	500	760	1450	2300
50	215	440	670	1270	2000
75	175	360	545	1020	1650
100	160	305	480	870	1400
150	120	250	380	710	1130

Tab. 7 Gas pipe delivery rate

1) Maximum gas pipe delivery rate in cu ft/hr (1 ft<sup>3</sup>/h = 28.3 l/h) based on a gas specific gravity of 0.60 and a gas pressure of 0.5 psi (34.5 mbar) or less and a pressure drop equivalent to a water column of 0.3 inches (7.6 mm).

Iron pipe nominal diameter (in inches)	Equivalent lengths for pipe fittings in feet (1 foot = 0.3 m)			
	Type of pipe fitting			
	90° elbow	T-piece	Shut-off valve	Gas shut-off valve
1	3	5	0.6	1.60
1¼	4	6	0.8	2.15
1½	5	7	1.0	2.50
2	7	10	1.3	3.00
2½	8	12	1.6	3.50

Tab. 8 Equivalent lengths for pipe fittings

**Leak test****DANGER:** Risk of explosion!

Leakage from the gas pipes and gas connections may cause an explosion.

- ▶ Carry out a proper leakage test using soap solution.

**NOTICE:** Risk of system damage due to short-circuits!

- ▶ Cover the areas at risk before carrying out the leakage test.
- ▶ Do not spray leak detector onto cable conduits, plugs or electrical connecting leads or allow it to drip onto them.



Use only sealant that is resistant to corrosion by LPG for the pipe connections. The sealing compound must be applied sparingly to the male thread of the pipe connections.

- ▶ Test the boiler and gas supply connections for leaks before commissioning (→ page 28).

**Pressure tests**

Disconnect the boiler and its gas isolating valve from the gas supply pipe system if that system is subjected to pressure tests in which the test pressure exceeds 0.5 psi (34.5 mbar).

If the gas supply pipe system is pressure tested at a test pressure of 0.5 psi (34.5 mbar) or less, it is sufficient to disconnect the boiler from the pipe system by closing the stop valve.

**5.4.2 Converting boiler to propane**

The boiler is factory-set for operation with natural gas.



If you wish to convert the boiler to propane, please contact Buderus for the required conversion components.

Do not attempt to convert the appliance without the approved Buderus parts and the relevant technical documentation. The technical documentation is included with the conversion parts.



For information about the identification of the main gas orifice and the nominal gas orifice pressure for natural gas and propane gas, see section 2.8.3, page 8.

**5.4.3 Installation at high altitudes**

The boiler is designed for installation at altitudes below 2000 feet (610 m) above sea level.



Contact Buderus if your installation is above 2000 feet (610 m) above sea level.

Do not attempt to restrict the boiler without the approved Buderus parts and the relevant technical documentation. The technical documentation is included with the conversion parts.

### 5.5 Filling the heating system and checking for water leaks

The boiler is tested for leaks at the factory. Before putting the heating system into operation, it must be checked to ensure that no leaks will occur during operation.

**NOTICE:** Risk of damage to system due to temperature stress!  
 If you fill the heating system when it is hot, the resulting temperature stress can cause stress cracks. The boiler will then leak.

- ▶ Only fill the heating system when it is in a cold state. Maximum permissible supply temperature 100 °F (38 °C).

**WARNING:** Health risk from contaminated domestic water!

- ▶ Observe all national standards and regulations regarding prevention of drinking water contamination (e.g. by water from heating systems).

**NOTICE:** Risk of system damage due to excess pressure when testing for leaks!  
 Pressure, control and safety equipment may be damaged through excessive pressure.

- ▶ When you carry out a leakage test, make sure that no pressure, control or safety device that cannot be isolated from the boiler water chamber is installed.

**Water treatment**

- ▶ Have the water analyzed before filling the heating system.
- ▶ Compare the results of this analysis with the technical documentation on water quality for boiler water.
- ▶ Please consult the local water supply company if there are major differences, such as extremely hard water or a pH value below 7.0.

Carry out the leak test at 1.5 times the normal operating pressure (→ Tab. 9) and in accordance with the local regulations.

Maximum operating pressure	Maximum on-site testing pressure
30 psi (2.1 bar) with the included safety valve	45 psi (3.1 bar)
58 psi (4 bar) with a different safety valve	75 psi (5.2 bar)

Tab. 9 Test pressures

- ▶ Seal off connection for safety valve in the heating supply and all other unused connections with blanking plugs.
- ▶ Isolate the expansion tank from the system by closing the valve.
- ▶ Open the mixing and shut-off valves on the heating water (primary) side.
- ▶ Slowly fill the boiler with tap water.
- ▶ Open the cap of the automatic air vent by one full turn to allow air to escape.
- ▶ Slowly fill the heating system. Observe the pressure gauge while filling.

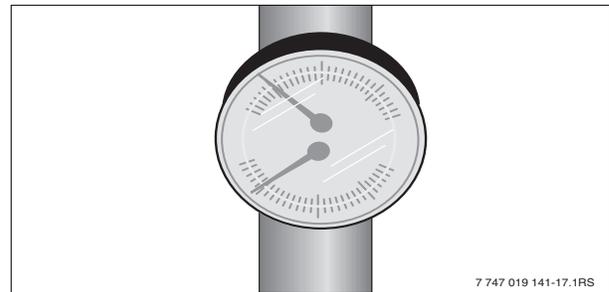


Fig. 23 temperature/pressure gauge

- ▶ Check the connections and piping to make sure they are watertight.
- ▶ Bleed the heating system via the purge valves on the heating bodies.
- ▶ Top up with water if the operating pressure drops as a result of bleeding the system.

**NOTICE:** System damage due to faulty safety valve!

- ▶ Do not install the safety valve until the leak test (→ Section 5.5) has been completed.
- ▶ Install the safety valve vertically.
- ▶ Install the safety valve in accordance with the requirements of the ANSI/ASME Boiler and Pressure Vessel Code, Section IV.
- ▶ Observe the local regulations for connection of boiler systems.

► Install safety valve.

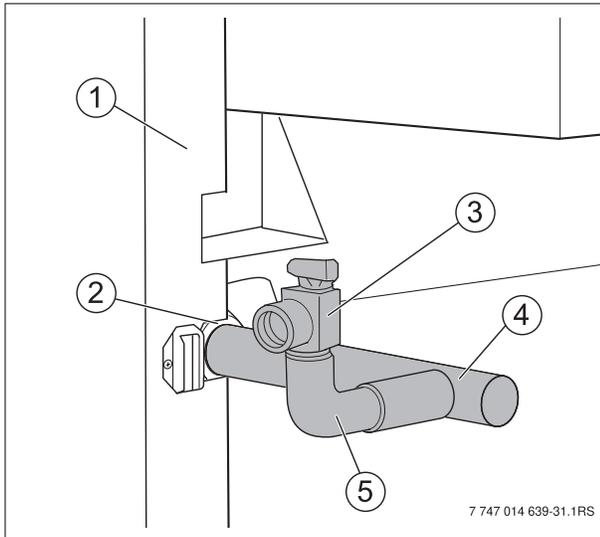


Fig. 24 Supply connection

- 1 Boiler
- 2 Supply connection
- 3 Safety valve
- 4 Supply manifold pipe (factory-installed)
- 5 90°-elbow (¾" NPT)

### 5.6 Install front wall of boiler

► Hang front wall of boiler [2] from above, fold down and screw in securing screws [3] into the front cover below.

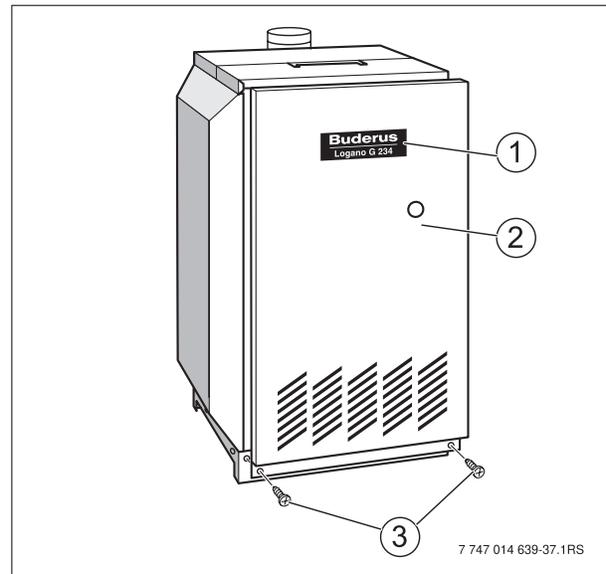


Fig. 25 Install front wall of boiler

- 1 Appliance insignia plate
- 2 Front wall of boiler
- 3 Locking screws

## 5.7 Connecting the flue

### 5.7.1 Check openings for combustion air supply and venting

To ensure an adequate combustion air supply and venting of the heating system, suitable measures must be taken in accordance with the National Fuel Gas Code, NFPA 54 (ANSI Z223.1), Section 5.3, Air for Combustion and Ventilation, and the local building codes. In Canada the regulations in accordance with CAN/CSA B 149.1 and 2 Installation Codes apply.



**NOTICE:** Risk of boiler damage and malfunctions due to missing or inadequate openings for combustion air and venting of the boiler room!

Inadequate venting of the boiler room may result in excessive ambient temperatures. This can damage the boiler. Inadequate combustion air supply may cause malfunctions in operation.

- ▶ Make sure that air inlet or outlet vents are not closed off or their size reduced and that they are adequately dimensioned.
- ▶ The boiler must not be operated until the obstruction has been removed.
- ▶ Draw the operator's attention to any deficiencies and the potential dangers.



**NOTICE:** Risk of boiler damage from contaminated combustion air!

- ▶ Never use cleaning agents containing chlorine and never use halogenated hydrocarbons (as, for example, contained in spray cans, solvents, cleaning agents, paints and adhesives).
- ▶ Do not store or use these substances in the boiler room.
- ▶ Avoid excessive dust accumulation.



If impurities in the combustion air are possible (e.g. installation near swimming pools, dry cleaners or hairdressing salons), sealed combustion is recommended.

### Total air supply from inside the building

Make sure that the boiler room has two permanent air vents that are connected to one or more other rooms. When calculating the cross-sectional areas of the vent apertures, the total burner output of all gas-fired appliances in the connected rooms must be taken into account. Each vent must have a minimum cross-section of one square inch per 1000 Btu/h (2200 mm<sup>2</sup>/kW) of the total burner output of all gas-fired appliances inside the connected rooms. Make sure that the cross-sectional area of each vent is at least 100 square inches (0.06 m<sup>2</sup>). One of the vents must be no more than 12 inches (300 mm) from the ceiling and the other no more than 12 inches (300 mm) from the floor of the boiler room, measured from the outer edge of the vent aperture. The smallest dimension of all air intake and outlet openings must be not less than 3 inches (80 mm).

### Total air supply from outside the building

Make sure that the boiler room has two permanent air vents, one of which must not be more than 12 inches (300 mm) from the ceiling and the other not more than 12 inches (300 mm) from the floor of the boiler room, measured from the outer edge of the vent aperture. The vents must be connected either directly or via air ducts to the outside or to rooms that have an unobstructed connection to the open air (crawl passage or roof space). The smallest dimension of all air intake and outlet openings must be not less than 3 inches (80 mm).

- If there is a direct connection to the outside, each opening must have a minimum cross-section of one square inch (25 mm<sup>2</sup>) per 4000 Btu/h (550 mm<sup>2</sup>/kW) of the total combustion output of all gas-fired appliances inside the closed room.
- If there is a connection to the outside through a ventilated attic with vertical ventilation ducts, each vent aperture must have a minimum cross-section of one square inch per 4000 Btu/h (550 mm<sup>2</sup>/kW) of the total burner output of all gas-fired appliances inside the closed room.
- If there is a connection to the outside through a ventilated attic with vertical ventilation ducts, each vent aperture must have a minimum cross-section of one square inch per 2000 Btu/h (1100 mm<sup>2</sup>/kW) of the total burner output of all gas-fired appliances inside the closed room.
- If the openings are connected to ventilation ducts, the ducts must have the same cross-section area as the openings.

### 5.7.2 Requirements for connection to chimneys or venting systems

The flue connection must comply with the regulations of the National Fuel Gas Code NFPA 54, Part 7, Venting of Equipment, and the local building codes. In Canada the regulations of CAN/CSA B 149.1 as well as local building codes apply.

Flue connections of heating systems with natural venting must not be connected with any component of a mechanically operated venting system that operates with overpressure.

The cross-section of the flue connection must not be less than that specified in Tab. 10.

Boiler capacity	Diameter of the flue gas connection [inches]
38	7
45	7
55	7
64	8

Tab. 10 Cross-section of the flue gas connection

If the boiler is to be connected to a brick chimney, the chimney must be thoroughly inspected before use. The chimney must be clean, in compliance with construction codes and of sufficient dimensions.

Chimneys with an internal liner are preferred and are only permitted if the liner complies with all national, state and local construction codes.

Liners of fire-glazed brick with moisture-proof joints and liners of corrosion-resistant material are recommended.

Contact the local gas supply utility for advice and recommendations for flue connection and chimney liners. A flue pipe of single-walled sheet metal is required for flue connections for type II models.

An adequate chimney height in compliance with the tables of the National Fuel Gas Code, ANSI Z 223.1, is required.

#### Separation of a boiler from a common flue system

If an existing boiler is separated from a common flue system, the dimensioning of this flue system will be too big. A proper venting for the remaining heating systems is then no longer guaranteed.

#### Test the venting system by the following procedure:

Carry out these steps with every heating system that remains connected to the venting system when the boiler is separated from a common venting system. Every heating system must be started in operation and the other heating systems connected to the venting system must remain switched off.

- A All unused openings of the common system must be sealed.
- B Perform a visual inspection of the venting system to ensure that it has the correct dimensions and longitudinal inclination. Make sure that the system is not blocked, leaking, corroded or has any other faults that cause it to operate improperly.
- C If necessary, close all doors and windows of the building. Close all doors between the space in which the heating systems that remain connected to the venting system are installed and the other rooms of the building. Switch off dryers and all appliances that are not connected to the venting system. Run all venting fans and bathroom exhaust fans at maximum speed. Fans in use in summer must remain in operation and oven exhaust system flaps must be closed.
- D Start up the heating system to be tested. Follow the instructions for commissioning. Set the thermostat for continuous operation.
- E After the main gas burner has been operating for five minutes, check the opening at the back flow check for drafts with a match flame or a candle, or with the smoke of a cigarette, cigar or pipe.
- F Check this way that all heating systems that remain connected to the venting system have been checked as above to ensure that the venting operates properly. Then place all doors, windows, venting fans, exhaust system flaps, and all other gas fired appliances back into their original state.

- G Any incorrect status of the common venting system must be corrected to ensure that the heating system complies with the regulations of the National Fuel Gas Code, ANSI Z 223.1. If the size of any component of the common venting system is changed, the complete venting system must be resized to comply with the relevant tables in Part 11 of the National Fuel Gas Code, ANSI Z 223.1.

In Canada the regulations in accordance with CAN/CSA B 149.1 and 2 Installation Codes apply.

### 5.7.3 Installing the flue pipe



**DANGER:** Risk of fatal injury from escaping flue gases!

A draft hood that does not work properly can cause dangerous flue gases to escape.

- ▶ Note that the draft hood check cannot be modified.

- ▶ Mount the flue pipe on the flue outlet of the draft hood.
- ▶ Mount the flue pipe (4) with corrosion-resistant sheet metal screws.

### 5.7.4 Connecting flue pipe

Use only flue pipes with a suitable diameter for the boiler.

Every horizontal section of the flue pipe must have a minimum rise of 1/4 inches per foot (21 mm per m) towards the chimney. The flue pipe must be securely fastened to prevent it from hanging. A suspension must be installed at least every 5 feet (1.5 m). Fasten every connection with at least three (3) corrosion-resistance sheet metal screws. The end section of the flue pipe must connect to the inside of the chimney smoke duct.

A minimum clearance of 6 inches (155 mm) is required between the flue pipes and all flammable materials.

The flue pipe must not be reduced in size and venting must not be prevented by the installation of additional components.

- ▶ Connect flue pipe to the chimney with the shortest possible length of flue pipe.

### 5.7.5 Installation of vent damper

Only the vent damper supplied with the boiler must be used for venting the boiler.



In Canada the vent damper must not be installed on a propane-fired heating system with a electronic ignition system.

The position of the vent damper must be visible.

The back flow check must be at least 6 inches (155 mm) from all flammable components.

The vent damper must be freely accessible for maintenance.

The vent damper must be open when the main burner of the boiler is operating.

- ▶ Place flue gas adapter [3] on the pipe nipples of the draft diverter.
- ▶ Install pins in the hole of the vent baffle [1].
- ▶ Fasten flue baffle to the flue connector adapter with three (3) corrosion-resistant self-tapping screws.

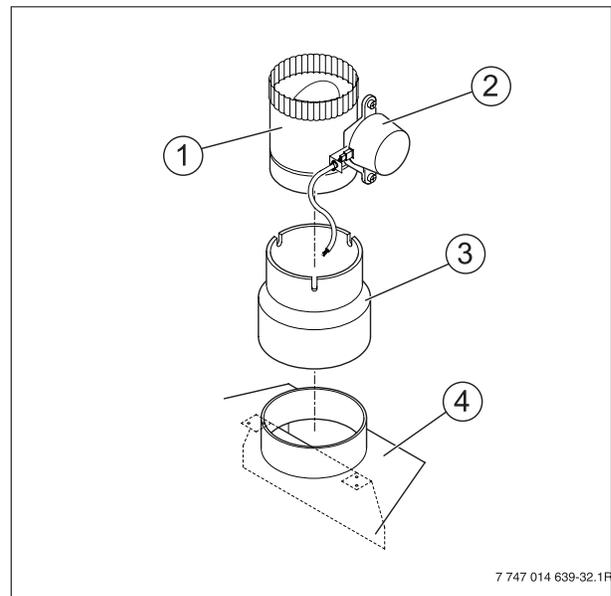


Fig. 26 Installation of vent damper

- 1 Vent Damper
- 2 Motor
- 3 Adapter for the flue outlet
- 4 Draft hood

### 5.7.6 Installing electrical connection of vent damper



**DANGER:** Risk of fatal injury from electric shock!

- ▶ Only qualified electricians are permitted to carry out electrical work.
- ▶ Before opening the appliance, disconnect it from the power supply by means of the emergency shutoff switch or the relevant circuit breaker in the main fuse board.
- ▶ Take measures to ensure that the heating system cannot be switched on again unintentionally.
- ▶ Please observe all installation instructions.



**DANGER:** Fire hazard from hot boiler components!

Hot boiler components may damage electrical cables.

- ▶ Ensure that the electrical cables are not touching any hot parts.
- ▶ Make sure that all cables are routed through the conduits provided.

- ▶ Disconnect all electrical power to your heating system.
- ▶ Route the connection cable of the vent damper through the wiring retainer behind the boiler and between the insulation and the casing to the aquastat [1] on the front of the boiler.

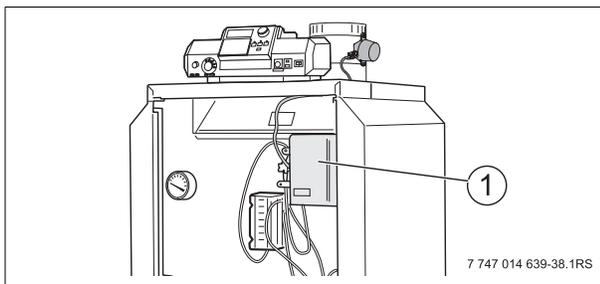


Fig. 27 Installing electrical connection of vent damper

1 Aquastat

- ▶ Connect flue baffle to aquastat as shown in the wiring diagram.



All connection points on the complete venting system must be checked for correct installation and sealing immediately after carrying out one of the installation steps. The seams and connections must be checked for gas leaks. Regulations require the complete flue system to be checked at least once a year by a qualified technician after installation and initial operation.

## 6 Commissioning the heating system

- ▶ Complete the commissioning log during the commissioning procedure (→ page 35).

### 6.1 Test safety valve

The safety valve must open and release pressure. If the safety valve fails to release excess pressure, it must be replaced, because otherwise system components may be damaged by excessive operating pressure.

### 6.2 Making the heating system ready for operation

The burner and gas fittings unit integrated in the boiler have been tested in the factory as described in detail in ANSI Z 21.13 and CSA 4.9 to ensure safe operation of the heating system and to test specific performance indicators.



**DANGER:** Risk of fatal injury from electric current when appliance is opened up!

- ▶ Before opening the boiler:  
Disconnect the heating system from the electrical power supply by means of the emergency shutoff switch or the heating system circuit breaker on the main fuse panel.
- ▶ It is not sufficient just to switch off the control panel.
- ▶ Take measures to ensure that the heating system cannot be switched on again unintentionally.

1. Set the room thermostats to the lowest setting.
2. Inspect flue and combustion air piping and the openings for combustion air supply and ventilation.
3. Fill heating system with water and bleed the complete system including the radiators.
4. Unscrew left and right screws in the side panels, lift front panel up, pull outward and remove to the front.

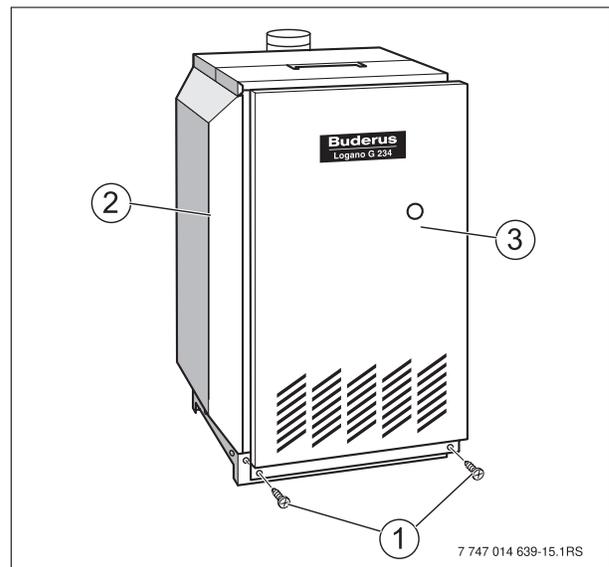


Fig. 28 Remove front wall of boiler

- 1 Locking screws
- 2 Boiler casing
- 3 Front wall of boiler

**Carrying out leak test**

5. Open the gas shut-off valve.



**NOTICE:** Risk of system damage due to short-circuits!

- ▶ Cover any hazardous locations prior to locating the leaks.
- ▶ Do not spray leak detector onto conduits, plugs or electrical connection cables or allow it to drip onto them.

6. Check the gas supply line to the gas valve for leaks with soap solution. If no leaks are found, continue with step 8.
7. If leaks are detected, shut off the gas shut-off valve, seal the leaks, and repeat step 6.
8. Close the gas shut-off valve. Remove the screw plug for the gas supply port [2] on the gas valve in order to measure the gas supply pressure. Install pressure measuring nipple and attach a pressure gauge.
9. Remove the screw plug for the gas supply port [3] on the gas valve in order to measure the nozzle pressure. Install pressure measuring nipple and attach a pressure gauge.

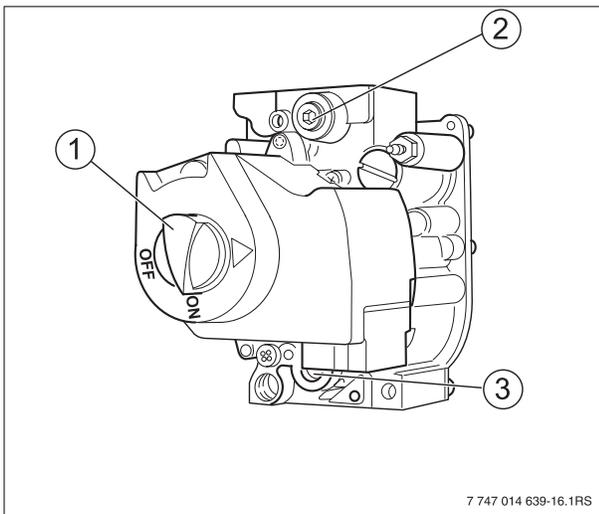


Fig. 29 Gas valve

- 1 ON/OFF button (at ON position)
- 2 Screw plug for gas connection pressure test port
- 3 Screw plug for nozzle pressure test port

10. Open gas shut-off and measure the supply pressure of the boiler. The connection pressure for natural gas must be between 7 and 10.5 inches W.C. (17.4 to 26.2 mbar) and between 11 and 13 inches W.C. for propane gas (27.4 to 32.4 mbar). If the connection pressure is not in this range with natural gas, contact your customer service technician or gas utility company. Close the gas shut-off valve.

11. Always follow the start-up instructions on the next page.

### 6.3 Start-up instructions

#### For your safety, read before lighting.



**DANGER:** Risk of fatal injury due to not observing the start-up instructions and resulting incorrect operation!

- ▶ If these instructions are not followed exactly, a fire or explosion may be caused. This can cause significant property damage or risk to life and limb.
- ▶ Observe the start-up instructions.



**DANGER:** Risk of explosion!

If you smell gas there is a danger of explosion.

- ▶ Close the gas shut-off valve.
- ▶ Open windows and doors.
- ▶ Do not operate any electrical switches or equipment such as telephones, power plugs and doorbells.
- ▶ Extinguish all open flames. Do not smoke. Do not use lighters.
- ▶ Warn all occupants of the building, but do not ring doorbells.
- ▶ If you can actually hear gas escaping, leave the building immediately. Prevent others from entering and notify the police and fire department **from outside** the building.
- ▶ **From outside the building**, call the gas utility company and approved heating contractor.

- A *This unit is fitted with an ignition module that automatically starts the pilot burner. Do not attempt to ignite it manually.*
- B *Check for an odor of gas around the heating system. This test must also be conducted at floor level, because some types of gas are heavier than air and may accumulate at floor level.*
- C *Switch on the ON/OFF switch on the gas valve by hand only. Never use a tool as assistance. If you cannot actuate the ON/OFF switch on the gas valve by hand, do not attempt to repair it. Contact a qualified technician. Any attempt to use force or to repair the valve may cause a fire or explosion.*
- D *Do not operate the appliance if any part is under water. Contact a qualified technician immediately. The service technician will check the appliance and replace the parts of the control system and gas valve that were under water.*

## 6.4 Making boiler ready for operation

STOP! First read the safety instructions on page 29 of these instructions.

1. If the boiler is not commissioned directly after the installation:  
carry out another leak test (→ page 28). Wait five (5) minutes until all gas residues have dissipated. Finally check whether there is any smell of gas, including at floor level. If you smell gas, STOP! Seal leaks and repeat the leak test.  
If you do not smell gas, go to the next step.
2. Open the gas shut-off valve.

### 6.4.1 Commission the heating system with aquastat control

The boiler is fully functional with the factory-installed aquastat.

3. Switch on ON/OFF switch [1] ("ON" position). This turns on the boiler with all its components.
4. Make sure that the room thermostat signals a heat requirement (set thermostat at least 10 °F above room temperature).

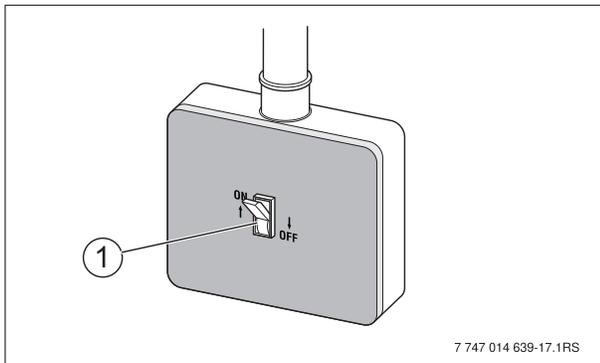


Fig. 30 Switching on heating system (with aquastat)

- 1 Main power switch

### 6.4.2 Placing heating system with Logamatic 2000 control unit in operation

The boiler is fully functional with the factory-installed aquastat. A Logamatic 2000 control unit can be installed in addition to the factory-installed aquastat.



Suitable Logamatic 2000 control units can be obtained from Buderus as accessories.

Use the on/off switch on the control unit to switch the heating system on. The burner starts operating if heat is required (→ observe control unit service manual).

5. Make sure that heat is required at the control. To do this, select "Manual operation" operating mode (hand symbol) with the mode selector switch [1].
6. Switch on ON/OFF switch [2] ("ON" position).



After carrying out the instructions for starting described below, the control unit must be set to "AUT" operating mode (automatic operation) with the mode selector.

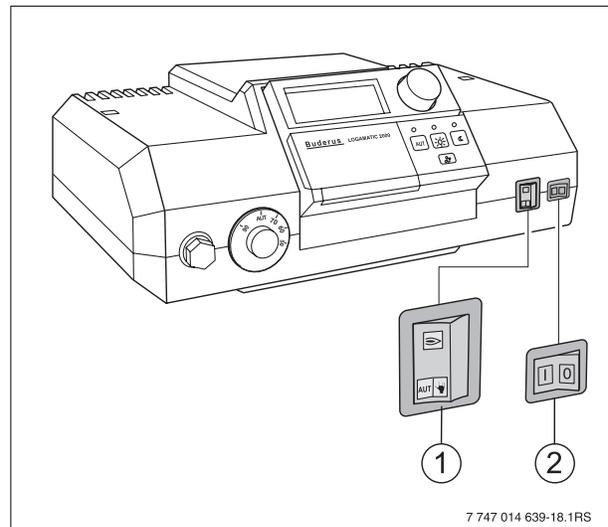


Fig. 31 Turning on heating system (with Logamatic 2000 control unit)

- 1 Mode selection switch  
2 Main power switch

## 6.5 Then carry out start-up procedures.

The following commissioning work must be performed regardless of the control unit type.

- Look at the pilot burner through the inspection hole [1] in the burner cover.

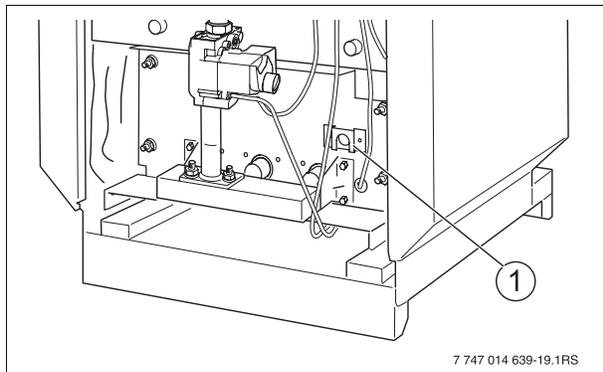


Fig. 32 Inspection hold in the burner cover

- Inspection hole
- Turn gas valve ON/OFF switch [1] counterclockwise to ON position.
- The burner control unit must generate ignition sparks towards the pilot burner. The pilot flame must appear and then ignite the main burner. If the main burner does not ignite, close the gas shut-off. Disconnect heating system from the power supply and inform your customer service technician or LP gas company.
- If the main burner has ignited, the gas valve must be checked for leaks with soap solution. If no leaks are found, continue with step 12.
- If leaks have been found, switch the ON/OFF switch on the gas shut-off valve [1] clockwise to the OFF position. Disconnect heating system from the power supply and set the thermostat to the lowest setting. Seal the leaks. Repeat steps 1 and 2. For **aquastat control units**, continue with steps 3 and 4. For **Logamatic 2000 control units**, continue with steps 5 and 6. Then repeat steps 7 to 10 **regardless of the control unit in use**.

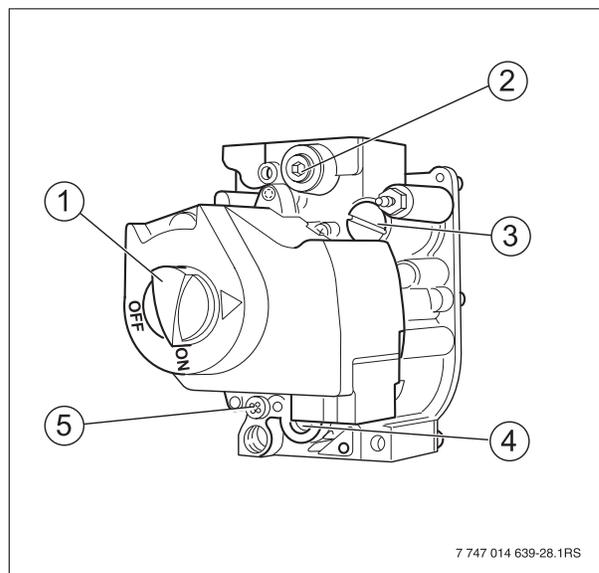


Fig. 33 Gas valve

- ON/OFF button (at ON position)
- Screw plug for gas connection pressure test port
- Safety screw for nozzle pressure setting
- Screw plug for nozzle pressure test port
- Safety screw for ignition nozzle pressure setting
- Check the supply gas pressure while the boiler is operating. The connection pressure for natural gas must be between 7 and 10.5 inches W.C. (17.4 to 26.2 mbar) and between 11 and 13 inches W.C. for propane gas (27.4 to 32.4 mbar). Record the values measured in the commissioning log (→ page 35).

Boiler capacity	Natural Gas		Propane	
	[Inch W.C.]	[mbar]	[Inch W.C.]	[mbar]
38	3.0	7.6	10.6	26.5
45	4.1	10.4	10.5	26.2
55	4.6	11.5	10.3	25.8
64	4.4	10.9	10.3	25.9

Tab. 11 Nozzle pressure

13. Check nozzle pressure. To set the nozzle pressure according to Tab. 11 while the boiler is operating, the safety screw for setting the nozzle pressure [3] on the gas valve must be removed. Turn the adjustment screw clockwise to increase the nozzle pressure. Turn the adjustment screw counterclockwise to decrease the pressure.
14. Record the value set in the commissioning log (→ page 35). To set the nozzle pressure, screw the safety screw for setting the nozzle pressure [3] back into the gas valve.

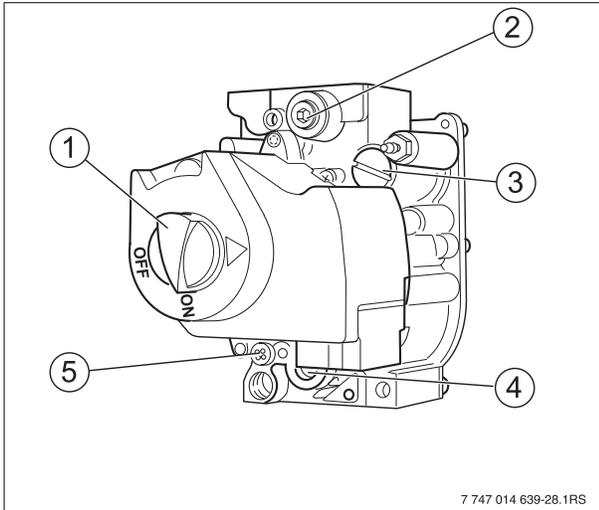


Fig. 34 Gas valve

- 1 ON/OFF button (at ON position)
- 2 Screw plug for gas connection pressure test port
- 3 Safety screw for nozzle pressure setting
- 4 Screw plug for nozzle pressure test port
- 5 Safety screw for ignition nozzle pressure setting

15. Observe pilot flame through the inspection hole in the burner cover (→ Fig. 32 page 31).
16. The flame must surround the flame rod by 1/2 to 1 1/2 inches (15 to 40 mm). If this is the case continue with step 20.

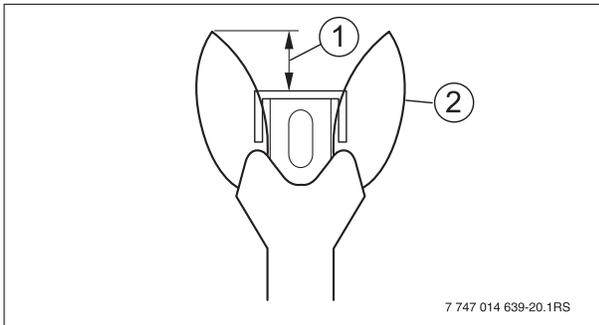


Fig. 35 Correct pilot flame setting

- 1 1/2 to 1 1/2 Inch (12.7 to 38.1 mm)
- 2 Pilot flame



The adjustment screw for the pilot ignition pressure setting is behind the pilot burner adjustment safety screw (Fig. 34, [5]).

17. If the ignition flame is too small or too large, the nozzle pressure for pilot burner must be adjusted with the corresponding adjustment screw.
18. Remove the safety screw for ignition nozzle pressure setting (Fig. 34, [5]). Turn the inner adjustment screw clockwise to reduce the pilot flame and counterclockwise to enlarge the pilot flame.
19. After adjustment tighten the pilot burner pressure adjustment safety screw (Fig. 34, [5]) again.
20. Observe pilot flame [1] through the inspection hole in the burner cover (→ Fig. 32, page 31). The flame must have a steady and fixed contour and generally has a bluish color.  
If the main burner flame meets the requirements, proceed with step 21.  
If the main burner flame is too weak or is yellow or goes out, turn the ON/OFF switch on the gas shut-off valve (Fig. 34, [1], page 32) clockwise to OFF. Close the gas shut-off valve and disconnect the heating system from the power supply and contact the customer service technician or the gas supply utility.

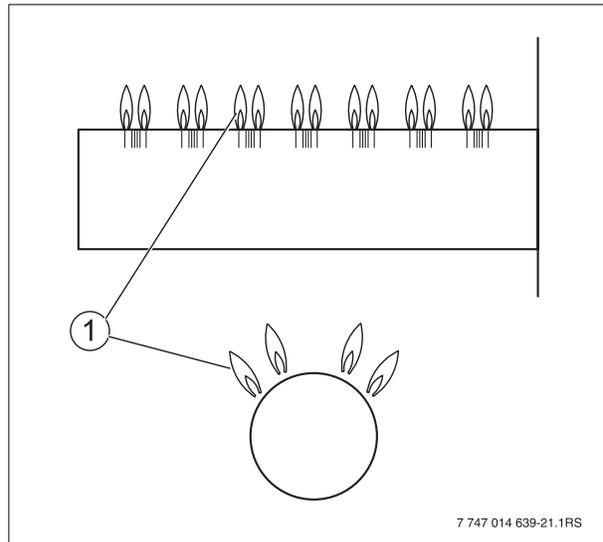


Fig. 36 Main burner

- 1 Main burner flame

### Checking flame sensor

21. Test the safety switch by closing the gas shut-off. The main burner flame (→ Fig. 36) and the ignition flame (→ Fig. 35) are extinguished. After six (6) seconds at the most the main gas solenoid valve on the gas valve must close with an audible noise.
22. After 90 seconds the ignition module must switch to lock status and stop generating sparks.
23. Shut off the heating system from the power supply. Open the gas shut-off valve. Switch on unit power supply.  
A normal operating cycle must follow. If the gas shut-off operates correctly, proceed to step 25.
24. If the gas shut-off does not operate correctly, switch ON/OFF switch on the gas shut-off valve [1] clockwise to the OFF position immediately. Close the gas shut-off valve. Disconnect heating system from the power supply and inform the customer service technician or LP gas company.
25. Turn the gas valve ON/OFF button [1] clockwise to the OFF position.
26. Close the gas shut-off valve.
27. Disconnect heating system from the power supply and set the thermostat to the lowest setting.
28. Remove pressure measuring nipple and pressure gauge for measuring gas supply pressure and nozzle pressure from the gas valve. Close the openings with the screw plugs [2] and [3] again.
29. Repeat steps 1 to 10 (depending on the control unit used) and step 20.  
Thus the heating system is started up again.  
Check the screw plugs [2] and [3] for leaks with soap solution.  
If no leaks are found, continue with step 31.

30. If leaks are found, close gas shut-off and switch ON/OFF button on gas valve [1] clockwise to the OFF position. Shut off the heating system from the power supply.  
Seal the leaks. Open the gas shut-off valve and repeat step 23.

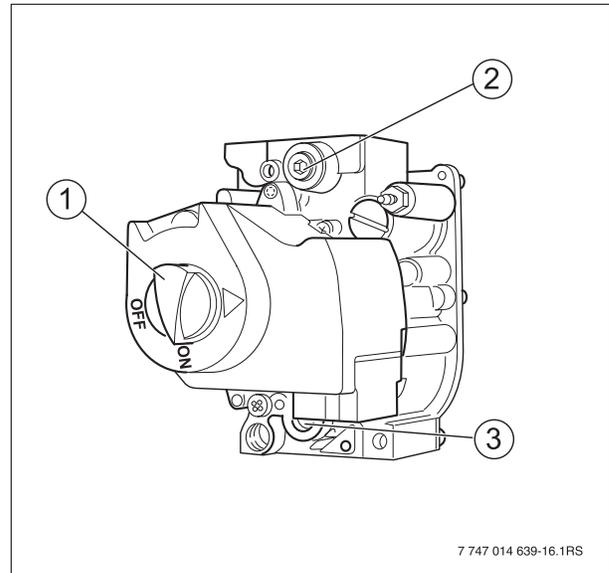


Fig. 37 Gas valve

- 1 ON/OFF button (at ON position)
- 2 Screw plug for gas connection pressure test port
- 3 Screw plug for nozzle pressure test port

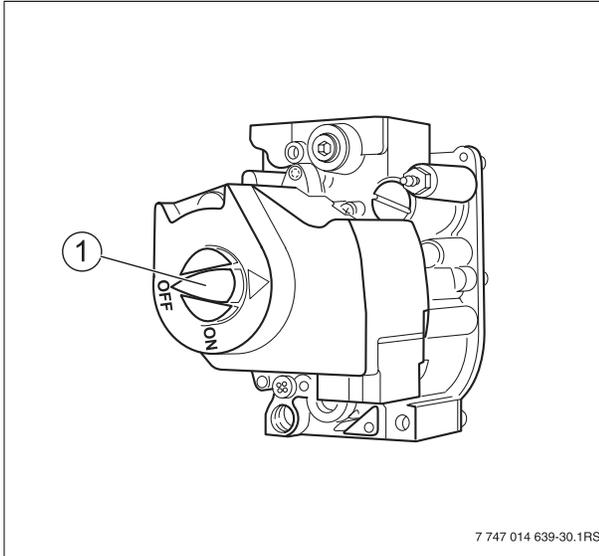
31. To avoid corrosion, carefully wipe off the soap solution afterwards.
32. Check the function of the maximum aquastat to make sure that it switches off the boiler as soon as the boiler water temperature set at the aquastat or the Logamatic 2000 control unit is reached. Record the result in the commissioning log (→ page 35).

### Only for the Logamatic 2000 control unit

Select operating mode AUT (automatic mode) with the mode selection switch.

## 6.6 Shutting off gas supply to boiler

- ▶ Set thermostat to the lowest value.
- ▶ Disconnect the heating system from the power supply before carrying out maintenance work.
- ▶ Turn the gas valve ON/OFF button [1] clockwise to the OFF position. Do not use force.

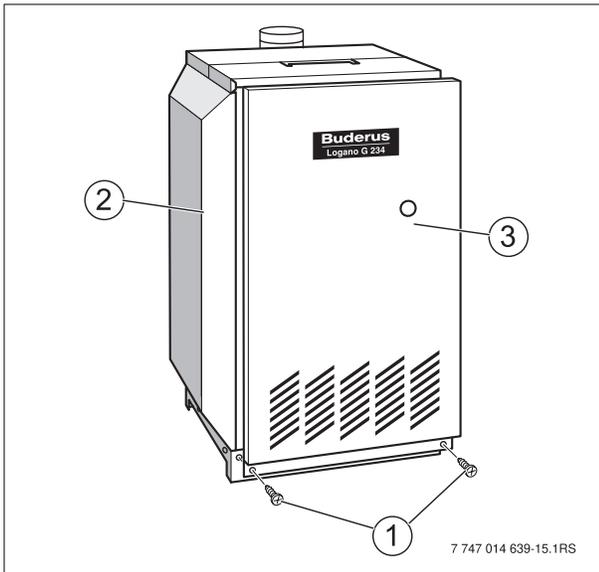


7 747 014 639-30.1RS

Fig. 38 Gas valve

- 1 ON/OFF button (at OFF position)

- ▶ Hang front wall of boiler [3] from above, fold down and screw in securing screws [1] into the front cover below.



7 747 014 639-15.1RS

Fig. 39 Install front wall of boiler

- 1 Locking screws  
2 Boiler casing  
3 Front wall of boiler

## 6.7 Inform owner/operator, hand over technical documentation

Familiarize the owner/operator with the entire heating system and the operating instructions for the boiler. Hand over the technical documentation to the owner/operator and then both sign the commissioning log (→ page 35).



**NOTICE:** Risk of system damage due to freezing!

The heating system may freeze in frosty weather if it is not switched on with the main switch or control unit.

- ▶ Protect the heating system against frost when temperatures below zero are expected.
- ▶ If the main switch or control is switched off, drain the water from the boiler, the tank and the pipe of the heating system.

## 6.8 Commissioning log

Please check off the commissioning work as it is completed and record the measured values in the table.

	Commissioning operations	Page	Comments or measured value	
			Natural Gas <input type="checkbox"/>	Propane Gas <input type="checkbox"/>
1.	Type of gas supply		<input type="checkbox"/>	<input type="checkbox"/>
2.	Check combustion air, inlet and outlet openings and flue	page 23		<input type="checkbox"/>
3.	Check the appliance orifices (correct nozzles → Tab. 12), if necessary adjust gas type.	page 35		<input type="checkbox"/>
4.	Fill boiler with water and bleed complete heating system	page 21		<input type="checkbox"/>
5.	Measure gas supply pressure [inches W.C.] or [mbar]	page 31	Measurement value: _____ Unit _____	
6.	Measure nozzle pressure and adjust if necessary [inches W.C.] or [mbar]	page 31	Measurement value: _____ Unit _____	
7.	Leak test in operating status Check of the ignition flame Check of the main burner flame Check of the perfect function of the venting system	page 28 page 32 page 32		<input type="checkbox"/>
8.	Check maximum aquastat setting	page 33		<input type="checkbox"/>
9.	Install front wall of boiler	page 34		<input type="checkbox"/>
10.	Inform operator, hand over technical documentation	page 34		<input type="checkbox"/>
11.	Installer:  Operator:		Signature: _____  Signature: _____	

Main gas orifice identification of the main gas nozzles (0 - 2000 ft / 0 - 610 m)				
Boiler capacity	38	45	55	64
Natural gas <sup>1)</sup>	3.70	3.70	3.50	3.80
Only convert natural gas <sup>2)</sup>	2.20	2.40	2.30	2.45

Tab. 12 Main gas orifice identification

1) factory setting

2) to propane gas according to conversion instructions

## 7 Shut down the heating system



**NOTICE:** Risk of system damage due to freezing!

The heating system can freeze up in cold weather if it is switched off.

- ▶ Leave the heating system switched on as long as possible.
- ▶ Protect your system from freezing by draining the boiler, the heating system and hot water pipes at the lowest point.

### 7.1 Normal shut-down

#### With aquastat:

- ▶ Switch off the on/off switch ("OFF" position). This switches off the boiler and all its components (e.g. burner).
- ▶ Further shut-down procedure refer to → aquastat documentation.
- ▶ Shut off the fuel supply by closing the main valve.

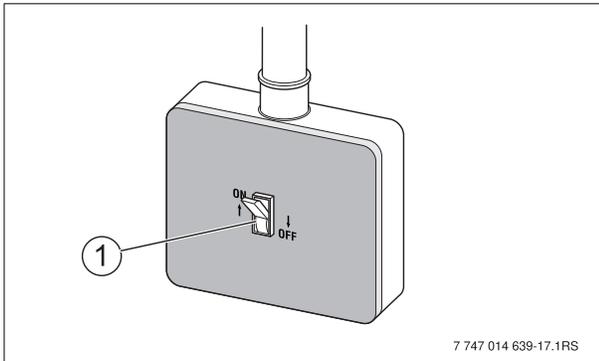


Fig. 40 Heating system shut-down (with aquastat)

- 1 Main power switch

#### With Logamatic 2000 control unit

- ▶ Switch off the on/off switch ("0" position). This switches off the boiler and all its components (e.g. burner).

- ▶ Shut off the fuel supply by closing the main valve.

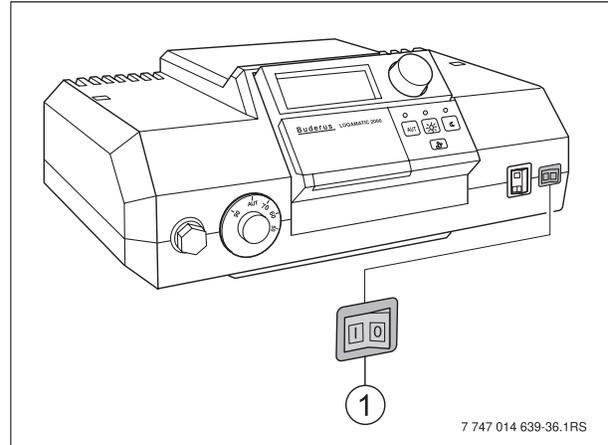


Fig. 41 Shutting down heating system (with Logamatic 2000 control unit)

- 1 Main power switch

### 7.2 Shutting down the boiler in an emergency



Use the heating system emergency shut-off switch located outside the boiler room or the heating system circuit breaker for emergency shutdown.

#### 7.2.1 Action in an emergency

Explain to the customer what to do in an emergency, e.g. a fire.

- ▶ Never risk your own life. Your own safety must always take the highest priority.
- ▶ Shut off the fuel supply by closing the main valve.
- ▶ Disconnect the heating system from the electrical power supply by means of the emergency stop switch or the appropriate circuit breaker.

## 8 Heating system inspection and maintenance

When carrying out maintenance work, observe:



**DANGER:** Risk of fatal injury from electric shock!

- ▶ When carrying out servicing work, label all connection cables before disconnecting them.
- ▶ If cables are connected incorrectly, the system may not operate correctly with possibly dangerous consequences.

- ▶ Always check that the heating system is working properly after carrying out any maintenance work.

### 8.1 Why is regular maintenance important?

Heating systems must be serviced regularly for the following reasons:

- to maintain a high level of efficiency and to operate the system economically (low fuel consumption)
- to achieve a high level of operational safety
- to maintain the cleanest possible combustion
- to ensure reliable operation and a long service life.

Maintenance work may only be carried out by a qualified service technician. If parts are replaced, only Buderus approved components may be used. Maintenance must be carried out once a year. The results of the inspection must be recorded in the maintenance log (→ page 44).



Spare parts can be ordered from Buderus using the parts list.

### 8.2 Checking the flue system including the combustion air supply, inlet and outlet air openings

Check the venting system, including the combustion air, inlet and outlet openings. All faults must be repaired immediately. Make sure that the combustion air supply and the inlets and outlets are not blocked at any point.

### 8.3 Inspection of the boiler and burner

- ▶ Perform a visual inspection of the boiler and burner for external contamination.
- ▶ If contamination is found, clean the boiler and burner.

## 8.4 Preparing boiler for cleaning



**DANGER:** Risk of fatal injury from electric current when appliance is opened up!

- ▶ Before opening the boiler:  
Disconnect the heating system from the electrical power supply by means of the emergency shutoff switch or the heating system circuit breaker on the main fuse panel.
- ▶ It is not sufficient just to switch off the control panel.
- ▶ Take measures to ensure that the heating system cannot be switched on again unintentionally.

- ▶ Decommission the heating system (→ page 36).
- ▶ Remove front wall of boiler

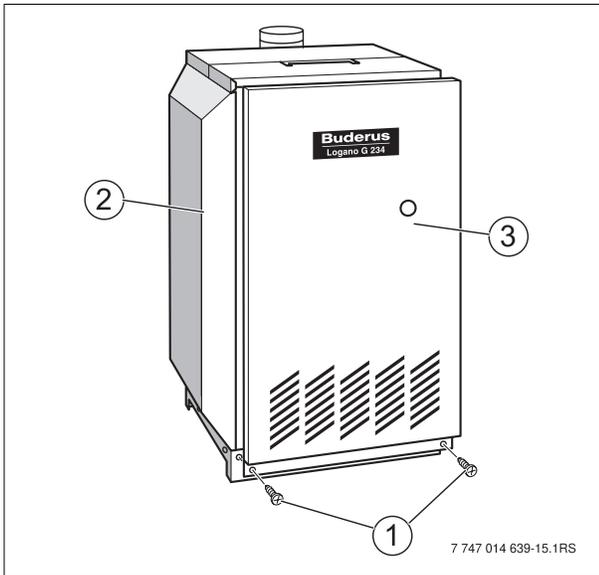


Fig. 42 Remove front wall of boiler

- 1 Locking screws
- 2 Boiler casing
- 3 Front wall of boiler



**DANGER:** Risk of fatal injury from the explosion of flammable gases!

- ▶ Operations on the gas pipes may only be carried out by a properly licensed gas contractor.
- ▶ Wait five (5) minutes until all gas residues have dissipated. Check whether there is any smell of gas, including at floor level. If you smell gas, STOP!  
Check that the gas shut-off is closed.  
Repeat the odor test. If you do not smell gas, go to the next step.

- ▶ Turn the gas valve ON/OFF button [1] clockwise to the "OFF" position. Do not use force.

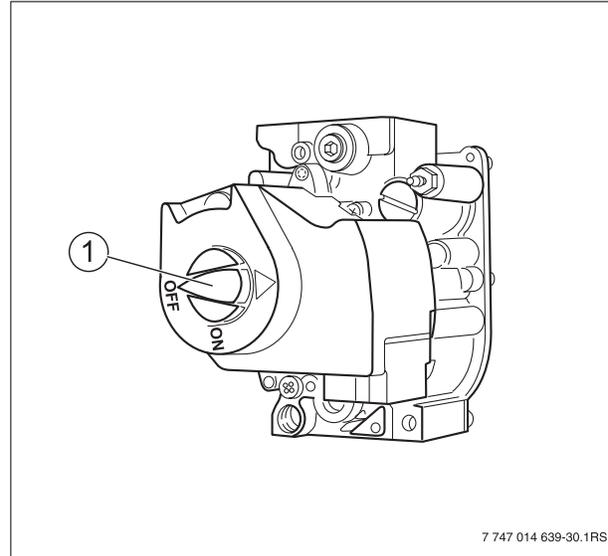


Fig. 43 Gas valve

- 1 ON/OFF button (at "OFF" position)

## 8.5 Cleaning the boiler

The boiler can be cleaned with brushes and/or by a wet method. Cleaning equipment is available as accessory.

### 8.5.1 Cleaning the boiler with cleaning brushes

#### Remove burner:



**DANGER:** Risk of fatal injury from electric shock!

If cables are connected incorrectly, the system may not operate correctly with possibly dangerous consequences.

- ▶ When carrying out servicing work, label all connection cables before disconnecting them.
- ▶ After maintenance test the heating system for proper function.



**DANGER:** Risk of fatal injury from electric current when appliance is opened up!

- ▶ Before opening the boiler:  
Disconnect the heating system from the electrical power supply by means of the emergency shutoff switch or the heating system circuit breaker on the main fuse panel.
- ▶ It is not sufficient just to switch off the control panel.
- ▶ Take measures to ensure that the heating system cannot be switched on again unintentionally.

- ▶ Disconnect all electrical power to your heating system.
- ▶ Close the main shutoff valve.
- ▶ Disconnect pilot gas pipe [6] from the gas valve [8].
- ▶ Loosen igniter sensor cable [3] from the automatic igniter.
- ▶ Tie gas line [2] with wire or cord (secure).
- ▶ Loosen the retaining screw [1] on the gas feed line
- ▶ Check the gasket for damage. Replace damaged gasket. Keep the gasket in a safe place.
- ▶ Label wires of flame roll out switch [4] and disconnect from the switch [5].

- ▶ Disconnect connection lines to the gas fitting [7].

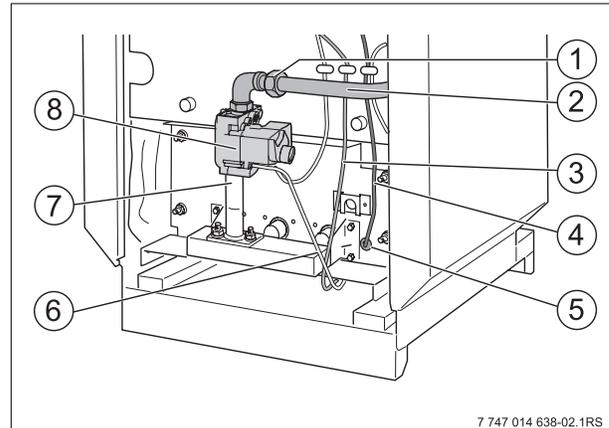


Fig. 44 Removing the burner

- 1 Retaining screw on the gas feed line
- 2 Gas supply line
- 3 Igniter sensor cable
- 4 Connection lines to the flame baffle
- 5 Flame roll out switch
- 6 Pilot gas pipe
- 7 Connection cables to the gas fitting
- 8 Gas valve

- ▶ Loosen fixing nuts [1] on the burner shield. Pull the burner out straight.
- ▶ Make sure that the spacers [2] remain on the studs.

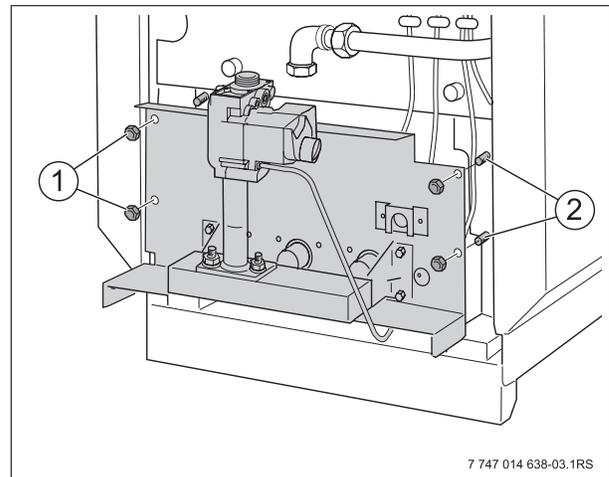


Fig. 45 Removing the burner

- 1 Fixing nuts
- 2 Studs with spacers

**Cleaning the boiler:**

- ▶ Remove the boiler cover and heat insulation, check for damage.
- ▶ Unscrew cleaning cover from the draft diverter.
- ▶ Cover control unit with foil to prevent entry of metal dust into the control unit.
- ▶ Use boiler brush to clean out flue gas passages.
- ▶ Clean combustion chamber and bottom panel.
- ▶ Screw cleaning cover into place and replace insulation.
- ▶ Install boiler cover.

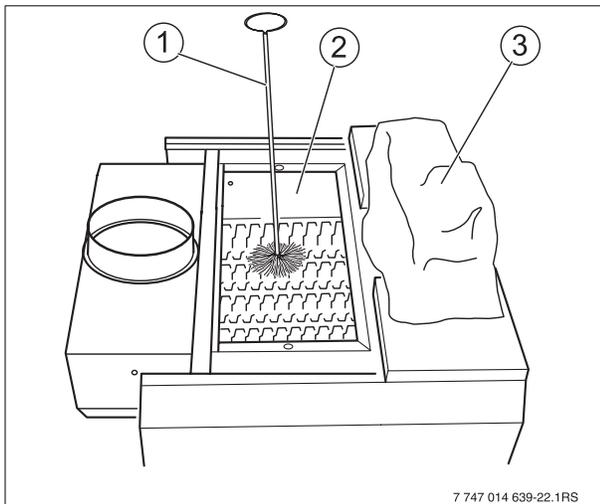


Fig. 46 Cleaning the hot flue passages

- 1 Cleaning brushes
- 2 Thermal insulation
- 3 Foil cover of the control unit

**8.5.2 Wet cleaning (chemical cleaning)**

For wet cleaning use a cleaning agent appropriate for the degree of soiling (soot or scale).

Follow the same procedure as for cleaning with brushes (→ page 39).



Observe the operating instructions of the cleaning agent. Under some circumstances you may have to proceed differently from the method described here.

- ▶ Remove the boiler cover and heat insulation, check for damage.
- ▶ Unscrew cleaning cover from the draft diverter.
- ▶ Cover the control panel with foil to prevent spray getting into the control panel.
- ▶ Ventilate boiler room well.
- ▶ Spray cleaning agent evenly into the heat exchanger heater passages.
- ▶ Carry out the burner assembly and installation in reverse order to their removal and disassembly (→ page 39).

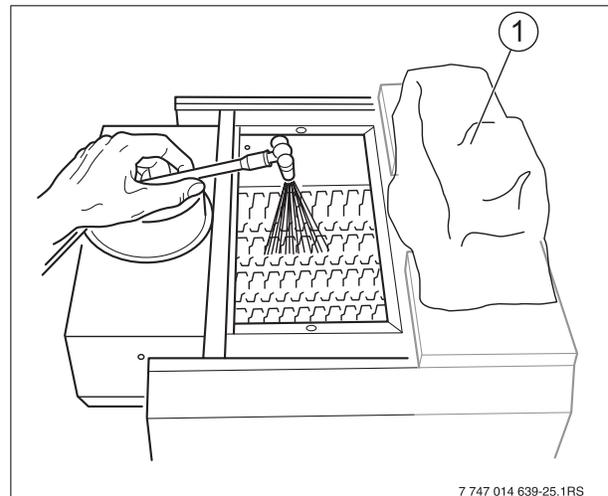


Fig. 47 Wet-cleaning the boiler

- ▶ Start up the heating system.
- ▶ Heat up the boiler to a boiler water temperature of at least 122 °F (55 °C).
- ▶ Shut down the heating system.
- ▶ Allow boiler to cool.
- ▶ Remove the burner (→ page 39).
- ▶ Brush out the heat exchanger heater.
- ▶ Clean combustion chamber and bottom panel.
- ▶ Ventilate boiler room well again.
- ▶ Install or clean the burner (→ page 41).
- ▶ Screw cleaning cover into place and replace insulation.
- ▶ Install boiler cover.

### 8.6 Cleaning the burner

- ▶ Remove the burner (→ page 39).
- ▶ Check burner tubes for dirt. If necessary, clean burner as described below.
- ▶ Unscrew ignition burner unit [1] from burner.
- ▶ Disconnect pilot gas pipe [3] from pilot burner unit.
- ▶ Remove pilot nozzle [2] and blow out.
- ▶ Immerse burner rods in water with cleaning agent and brush off.



Make sure that the insulation on the burner shield does not get wet.

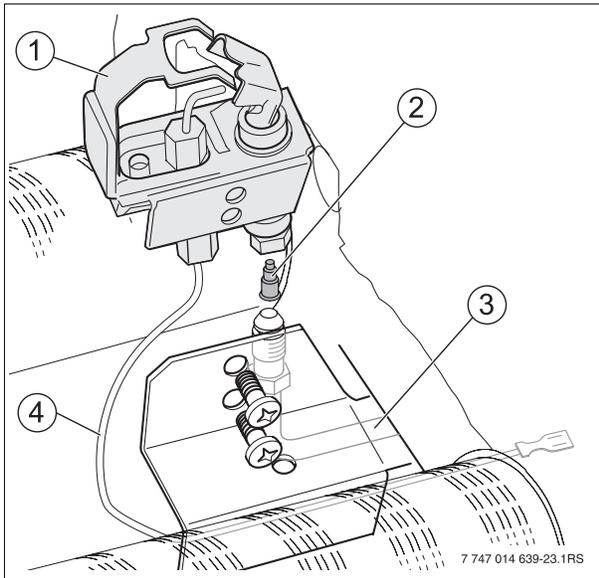


Fig. 48 Pilot burner

- 1 Igniter sensor cable
- 2 Ignition electrode
- 3 Pilot gas pipe

- ▶ Flush the burner rod with a water jet. Hold burner so that water enters all slots of the burner rods and drains out again.
- ▶ Remove remaining water by swinging the burner.
- ▶ Check that the burner rods are free. Remove water and dirt residue in the slots. If any slots are damaged the burner must be replaced.

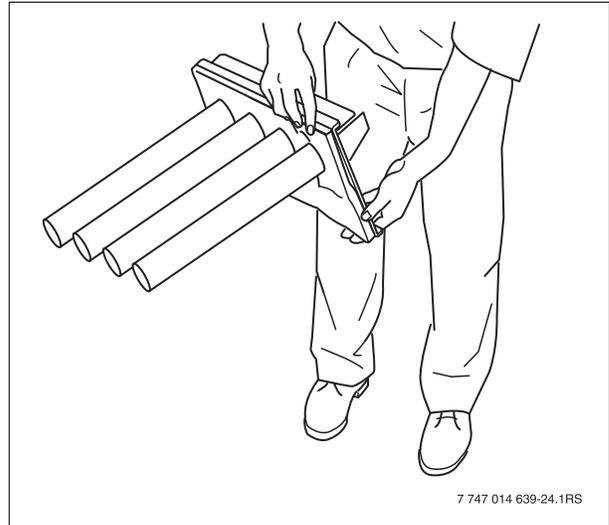


Fig. 49 Swinging burner

- ▶ Carry out the burner assembly and installation in reverse order to their removal and disassembly (→ page 39).
- ▶ Place boiler in operation as directed in section 6, starting on page 27.
- ▶ Check function of the aquastats.
- ▶ Test water low cut-off if installed.
- ▶ Check area around boiler for hazards.

The area around the boiler must be free from flammable substances, gasoline or any other flammable or corrosive vapors and liquids.



**DANGER:** Risk of fatal injury from the explosion of flammable gases!

Leaks may have been created on pipes and fittings following maintenance work.

- ▶ Carry out a proper leak test.
- ▶ Only use approved leak detection agents.

- ▶ Complete the maintenance log to confirm that all maintenance work has been carried out (→ page 44). Sign the maintenance protocol and discuss it with the owner of the heating system.

## 8.7 Troubleshooting

Required tools: wiring diagrams (→ page 61 and 62) and voltage testers 120 VAC and 24 VAC.

	Steps for troubleshooting	Measures to remedy faulty function
1.	<b>Beginning of troubleshooting</b>	<b>Measures to remedy faulty function</b>
2.	Close the gas shut-off valve. Set thermostat (control unit) to heat requirement (vent damper opens). Switch on power.	Check electrical power supply, low-voltage transformer, thermostat (control) and wiring. Check that the vent damper (if installed) is open and the limit switch is present.
3.	Observe ignition sparks in gap between electrode and sensor through inspection hole.	On models with vent damper check that it is functional and limit switch is present. If necessary, replace vent damper. Check igniter sensor cable, grounding, ceramic insulator of ignition electrode and ignition gap, adjust if necessary. Check spade connector of the igniter sensor cable contact for signs of scorching or kinking. Replace ignition control unit.
4.	Open the gas shut-off valve. Ignition flame is burning.	Check that all manually operated vent dampers are open; check that gas connections and pressures are correct and that main orifices are not blocked. Check electrical connection between ignition module and connection on the gas valve. Use MV-MV/PV clamps to check 24 V AC at the automatic ignition. If the voltage is correct replace gas fitting, otherwise replace automatic ignition.
5.	Ignition spark stops as soon as ignition flame burns.	Check ignition/monitoring cable and grounding for continuity. Check the ignition and monitoring electrodes. Check electrical connections between ignition/monitoring electrode and ignition module. Check whether the ceramic insulator in the ignition electrode is broken. Check that the ignition flame surrounds the electrode and burns steadily with a bluish flame. Adjust pilot flame. If this does not correct the fault, replace the ignition module.
6.	Main burner ignites.	Use MV-MV/PV clamps to check 24 V AC closed circuit at the automatic ignition. If there is no voltage, replace ignition control. Check electrical connections between automatic ignition and the gas fitting. If OK replace gas valve.
7.	System operates until the heat requirement ends.	Check ignition/monitoring cable and grounding for continuity. Note: If the grounding is weak or faulty, the system may switch off at random, even if the heating system operates correctly when checked. Check that the ignition flame surrounds the electrode and burns evenly with a bluish flame. If OK replace electrode. If everything is OK replace ignition module.
8.	Heat requirement ended, system switches off, vent damper closes.	Check function of thermostat (control unit). Disconnect 24-V connection to gas fitting. If gas valve closes, check thermostat and connection line again. If the gas valve does not close, replace gas valve.
9.	<b>End of troubleshooting</b>	<b>Repeat procedure until heating system operates correctly.</b>

**Sequence of normal operation**

START	<b>Room thermostat (control unit) signals heat requirement</b> vent damper opens.		
PHASE 1 ignition attempt	⇓		
	<b>Ignition spark generator is working</b> pilot gas valve opens.		
	⇓		
PHASE 2 Main burner	<b>Pilot burner operation</b>		
	Ignition flame burns, burner control unit reports constant ignition flame.	or	ignition flame does not burn, burner control unit starts ignition attempt, switches off after 90 seconds.
	⇓		
	<b>With constant ignition flame</b> ignition spark generator stops. Main gas solenoid valve opens.		
	⇓		
	<b>Main burner operation</b> ignition module monitors pilot flame.	⇐	<b>Power failure</b> System switches off. Does the system restart when power is restored?
			<b>Ignition flame fault</b> Main gas valve closes. Ignition module starts ignition attempt.
⇓			
END	<b>Specified thermostat value (control) reached</b> Close main and pilot gas valve. Gas burners go out. Vent damper closes.		

## 8.8 Maintenance log book

	Maintenance	Page	Date:	Date:
1.	Check of the flue system, including combustion air, inlet, and outlet openings	page 23	<input type="checkbox"/>	<input type="checkbox"/>
2.	Inspection of boiler	page 37	<input type="checkbox"/>	<input type="checkbox"/>
3.	Inspection of burner	page 37	<input type="checkbox"/>	<input type="checkbox"/>
4.	Cleaning boiler	page 39	<input type="checkbox"/>	<input type="checkbox"/>
5.	Cleaning burner	page 41	<input type="checkbox"/>	<input type="checkbox"/>
6.	Measure gas supply pressure [inches W.C.] or [mbar]	page 31	Measurement value: _____ Unit _____	Measurement value: _____ Unit _____
7.	Measure nozzle pressure [inches W.C.] or [mbar]	page 31	Measurement value: _____ Unit _____	Measurement value: _____ Unit _____
8.	Leak test in operating status	page 28	<input type="checkbox"/>	<input type="checkbox"/>
9.	Check of the pilot flame Check of the main burner flame	page 32 page 32	<input type="checkbox"/>	<input type="checkbox"/>
10.	Check maximum aquastat setting	page 33	<input type="checkbox"/>	<input type="checkbox"/>
11.	Check of the boiler area for flammable materials, gasoline or other corrosive liquids	page 41	<input type="checkbox"/>	<input type="checkbox"/>
12.	Confirmation of properly completed servicing:  Company stamp/signature:			

	Date:	Date:	Date:	Date:	Date:	Date:
1.	<input type="checkbox"/>					
2.	<input type="checkbox"/>					
3.	<input type="checkbox"/>					
4.	<input type="checkbox"/>					
5.	<input type="checkbox"/>					
6.	Measurement value:____ Unit_____					
7.	Measurement value:____ Unit_____					
8.	<input type="checkbox"/>					
9.	<input type="checkbox"/>					
10.	<input type="checkbox"/>					
11.	<input type="checkbox"/>					
12.						

## 9 Spare parts

The following spare parts are available from Buderus Hydronic Systems. If there are several Buderus article numbers for one item number, the numbers for the various models are listed in the relevant columns. Otherwise the table shows the number of components for each model.

### Boiler outer casing (→ Fig. 50)

Item No.	Designation	Product-number	G234X/38 5 sections	G234X/45 5 sections	G234X/55 6 sections	G234X/64 7 sections
10	Boiler jacket (complete)	5024-	240	240	242	244
20	Left jacket	6302 9212	1	1	1	1
30	Jacket clip SNU-5743	5834 364	2	2	2	2
40	Right jacket	6302 9211	1	1	1	1
50	Front jacket	6302-	9199	9199	9198	9197
60	"Buderus" sign	6790 2840	1	1	1	1
70	Top front cover	5024-	061	061	063	065
80	Top rear cover	5024-	081	081	083	085
	Mounting kit no. 1	5015 951	1	1	1	1

Tab. 13 Individual parts boiler casing

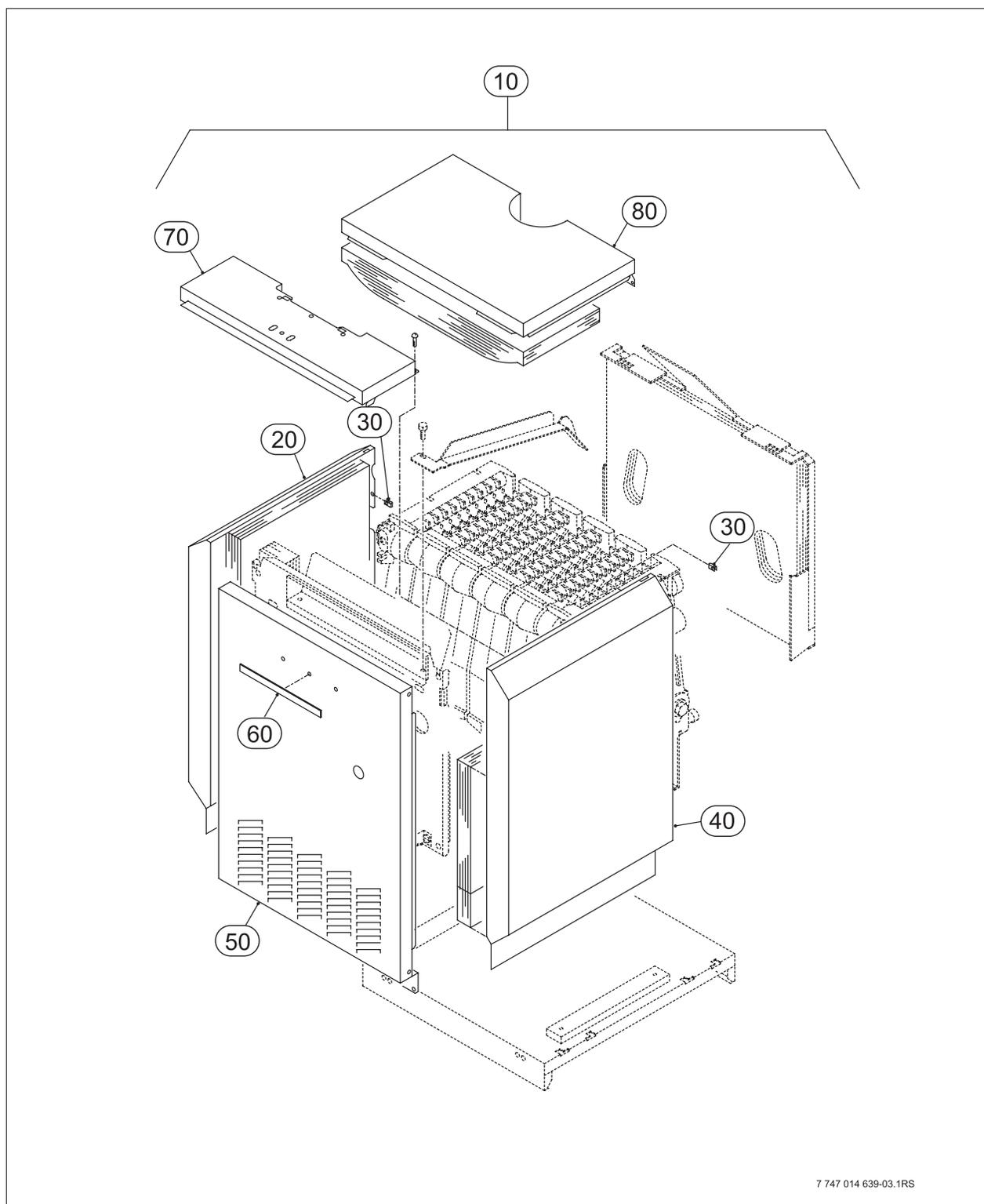


Fig. 50 Boiler casing

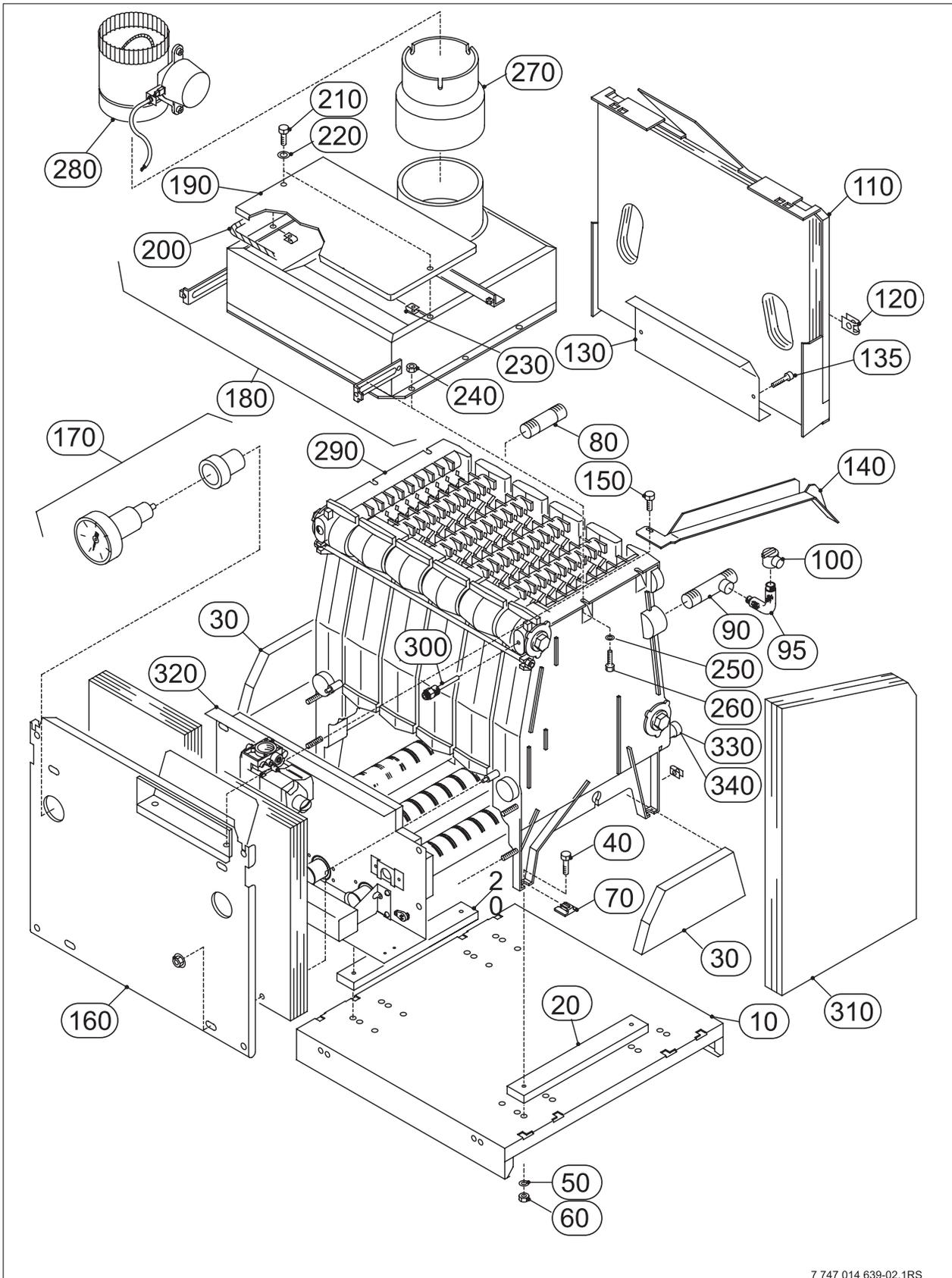
## Boiler heat exchanger (→ Fig. 51)

Item No.	Designation	Product-number	G234X/38 5 sections	G234X/45 5 sections	G234X/55 6 sections	G234X/64 7 sections
10	Bottom cover, non-combustible	5024-	140	140	142	144
20	Suspension plate	5015 257	2	2	2	2
30	Shield rear	5015 273	2	2	2	2
40	Screw M8x25	→ Mounting kit no. 2	4	4	4	4
50	Lock washer	→ Mounting kit no. 2	4	4	4	4
60	M8-8-A3K nut	→ Mounting kit no. 2	4	4	4	4
70	Block shoe	→ Mounting kit no. 2	4	4	4	4
80	Return pipe	5584 754	1	1	1	1
90	Supply pipe	5584 752	1	1	1	1
95	3/4" 90° elbow	9990 8401	1	1	1	1
100	Safety relief valve	5947 650	1	1	1	1
110	Rear jacket	63002-	790	790	791	792
120	Jacket clip SNU-5743	→ Mounting kit no. 2	2	2	2	2
130	Shield for rear jacket	5512-	526	526	528	530
135	Screw C-ST 4.8x22	→ Mounting kit no. 2	2	2	2	2
140	Conduit	5495 471	1	1	1	1
150	Screw 3.5x9.5-A3T	→ Mounting kit no. 2	1	1	1	1
160	Partition wall	63002-	776	776	777	778
170	Tridicator set	5900 076	1	1	1	1
180	Draft diverter		6302 2583	6302 2583	6302 2582	5624 535
190	Clean out cover	5371-	923	923	924	925
200	Sealant rope GP 6x1500 mm	6302 0956			1	
200	Sealant rope GP 8x3000	6302 0958				1
200	Sealant rope GP 6x10000	5822 706				
	Buderus sealant - 3055	6301 4362	1	1	1	1

Tab. 14 Individual parts of boiler heat exchanger

Item No.	Designation	Product-number	G234X/38 5 sections	G234X/45 5 sections	G234X/55 6 sections	G234X/64 7 sections
210	Screw M6x16-MS	→ Mounting kit no. 3	2	2	2	2
220	Washer A 6.4	→ Mounting kit no. 3	2	2	2	2
230	Jacket clip M6-A3F-MCU5315	→ Mounting kit no. 3	2	2	2	2
	Glue PK-W11	2037 038	1	1	1	1
240	M8 nut	→ Mounting kit no. 3	4	4	4	4
250	Washer	→ Mounting kit no. 3	4	4	4	4
260	Screw M8-25	→ Mounting kit no. 3	4	4	4	4
270	Adapter for the flue outlet 7" D182.5M	5384 516	1	1	1	
270	Adapter for the flue outlet 8" D202.5M	5384 508				1
280	Vent damper RVGP-KS 7 inch BKF	9990 8399	1	1	1	
280	Vent damper RVGP-KS 8 inch BKF	9990 8400				1
290	Boiler heat exchanger	67900-	358	358	359	360
300	Sensor well	5446 190	1	1	1	1
310	Thermal insulation	6790 0566	1	1	1	1
320	Burner AE234X "US" replacement	5181-	736	748	738	740
	Mounting kit no. 2	5621 818	1	1	1	1
	Mounting kit no. 3	5621 819	1	1	1	1
330	Reducer DIN 2950 241 1" x 3/4"	3869 828	1	1	1	1
340	Pipe extension DIN 2950 526 3/4" x 80	320 840	1	1	1	1

Tab. 14 Individual parts of boiler heat exchanger



7 747 014 639-02.1RS

Fig. 51 Boiler heat exchanger

**Control unit GAW025 US (→ Fig. 52)**

Item No.	Designation	Product-number	G234X/38 5 sections	G234X/45 5 sections	G234X/55 6 sections	G234X/64 7 sections
10	Control unit GAW025 US	5557 946	1	1	1	1
20	Cable protector	→ Installation material no. 4	1	1	1	1
30	Attachment bracket for flue gas safety switch	→ Installation material no. 4	1	1	1	1
40	Flue gas safety switch	7079 498	1	1	1	1
50	Screw F ST 3.5x6.5 A3K	→ Installation material no. 4	2	2	2	2
60	Cable assembly	5182 064	2	2	2	2
70	Screw KA 3.5x16	→ Installation material no. 4	2	2	2	2
80	Terminal strip	→ Installation material no. 4	1	1	1	1
90	Screw C ST 2.9x16 A3K	→ Installation material no. 4	2	2	2	2
100	Cable clamp	→ Installation material no. 4	2	2	2	2
110	Cable assembly	6301 5744	1	1	1	1
120	Cable orange/black	7079 806	1	1	1	1
130	Screw (flat head) 3.9x9.5 A3K	→ Installation material no. 4	4	4	4	4
140	Burner control unit	7747 007 839	1	1	1	1
150	Aquastat	5996 360	1	1	1	1
170	Cable assembly	7079 804	1	1	1	1
	Mounting kit no. 4	7079 764	1	1	1	1

Tab. 15 Individual parts control unit GAW025 US

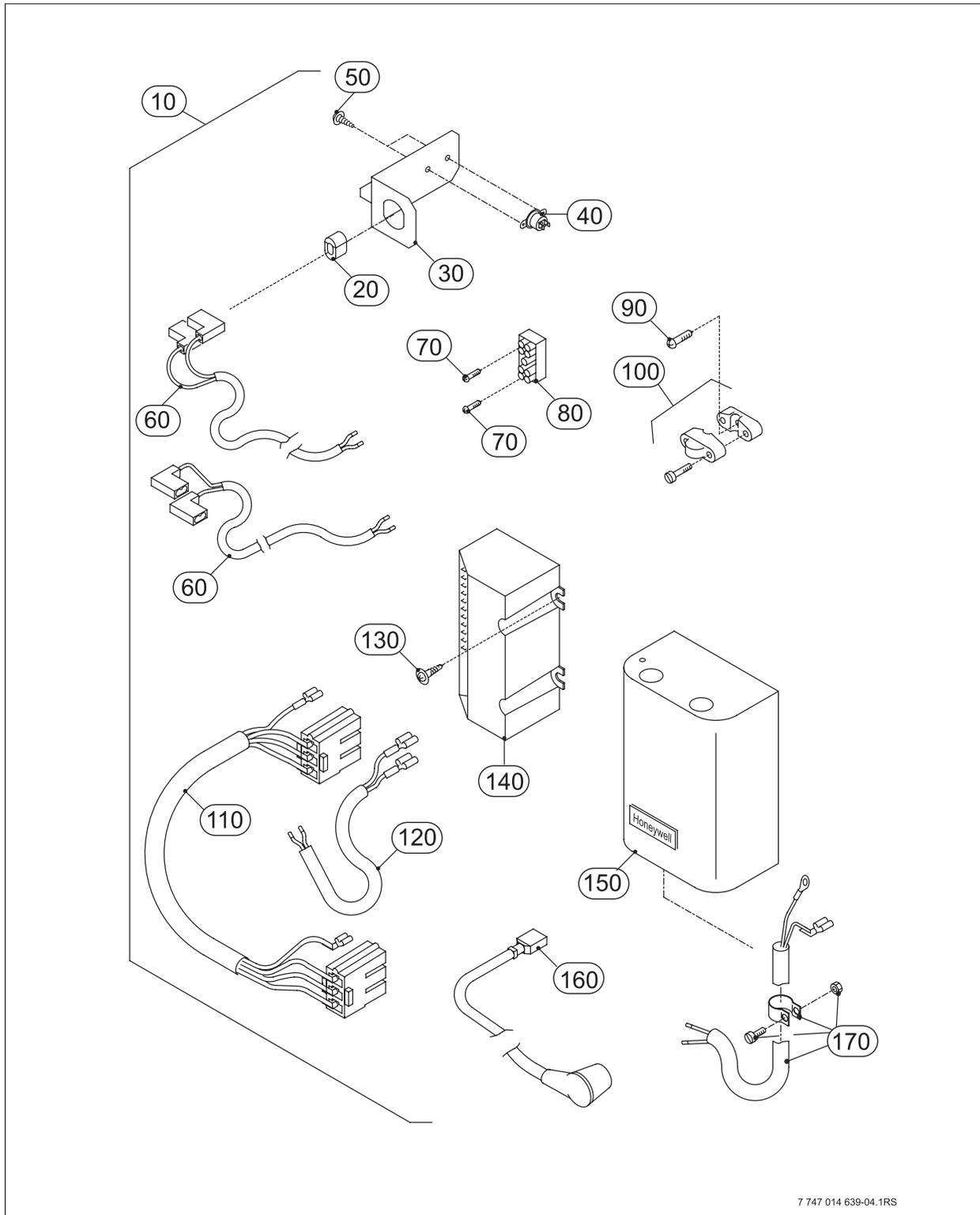


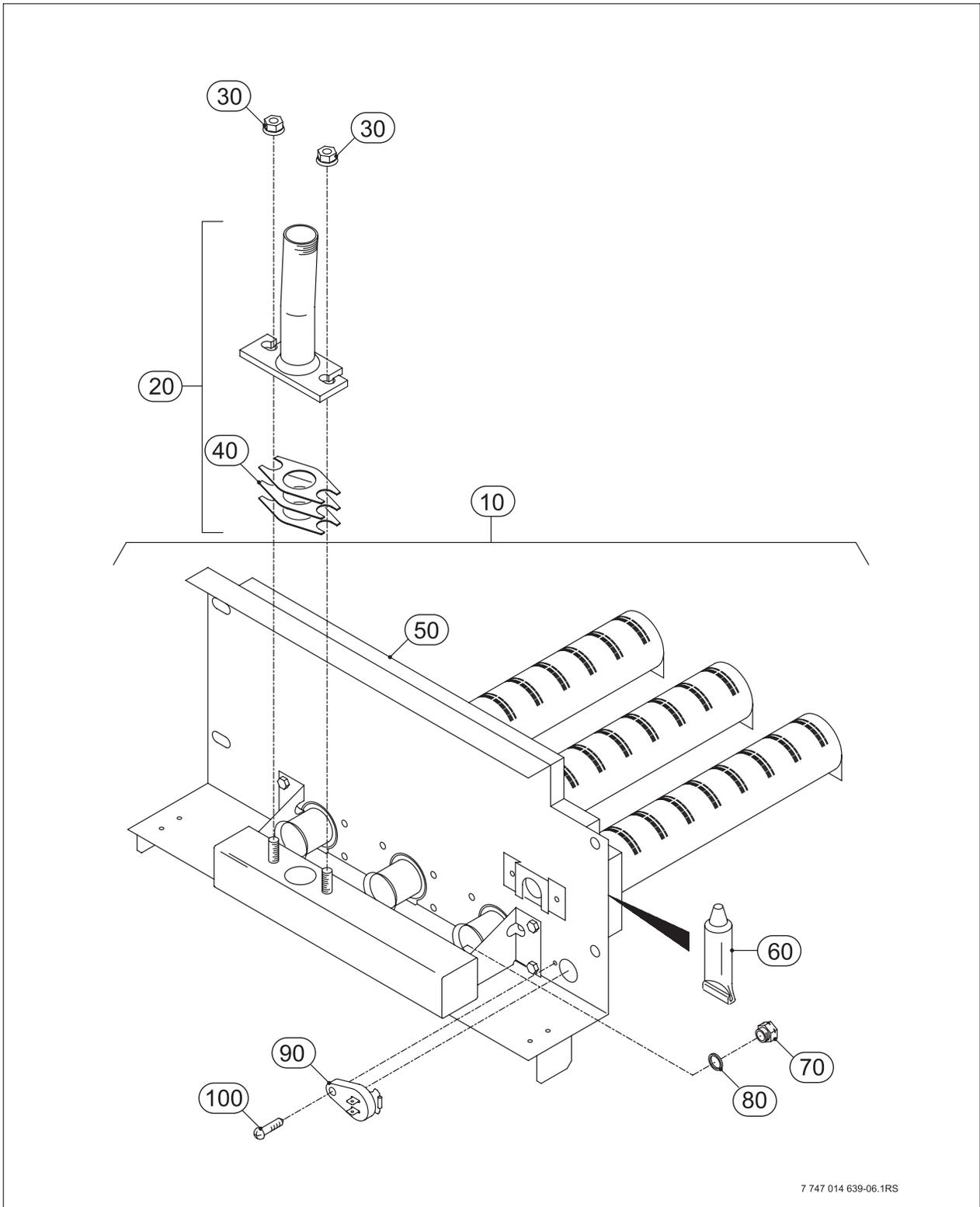
Fig. 52 Control unit GAW025 US

7 747 014 639-04.1RS

**Gas distributor (→ Fig. 53)**

Item No.	Designation	Product-number	G234X/38 5 sections	G234X/45 5 sections	G234X/55 6 sections	G234X/64 7 sections
10	Burner assembly	5181-	742	742	744	746
20	Gas pipe	7747 002 195	1	1	1	1
30	M8 nut	→ Installation material no. 5	2	2	2	2
40	Gasket	5489 280	3	3	3	3
50	Heat shield incl. glue	5181 396	1	1	1	1
60	Glue for heat shield	2037 312	1	1	1	1
	All factory installed nozzles are for elevation of 0 - 2000 ft (0-610 m). Contact Buderus for high elevation kits.					
70	Nozzle set NG-0-2000 ft (0-610 m)	5484-	176 (3x)	176 (3x)	168 (4x)	184 (4x)
80	Gasket	5883 094	3	3	4	4
90	Flame escape switch 171°F (77 °C)	5176 272	1	1	1	1
100	Screw M4x16 ST	→ Installation material no. 5	1	1	1	1
	Mounting kit no. 5	5181 883	1	1	1	1

*Tab. 16 Individual parts of gas distributor*



7 747 014 639-06.1RS

Fig. 53 Gas distributor

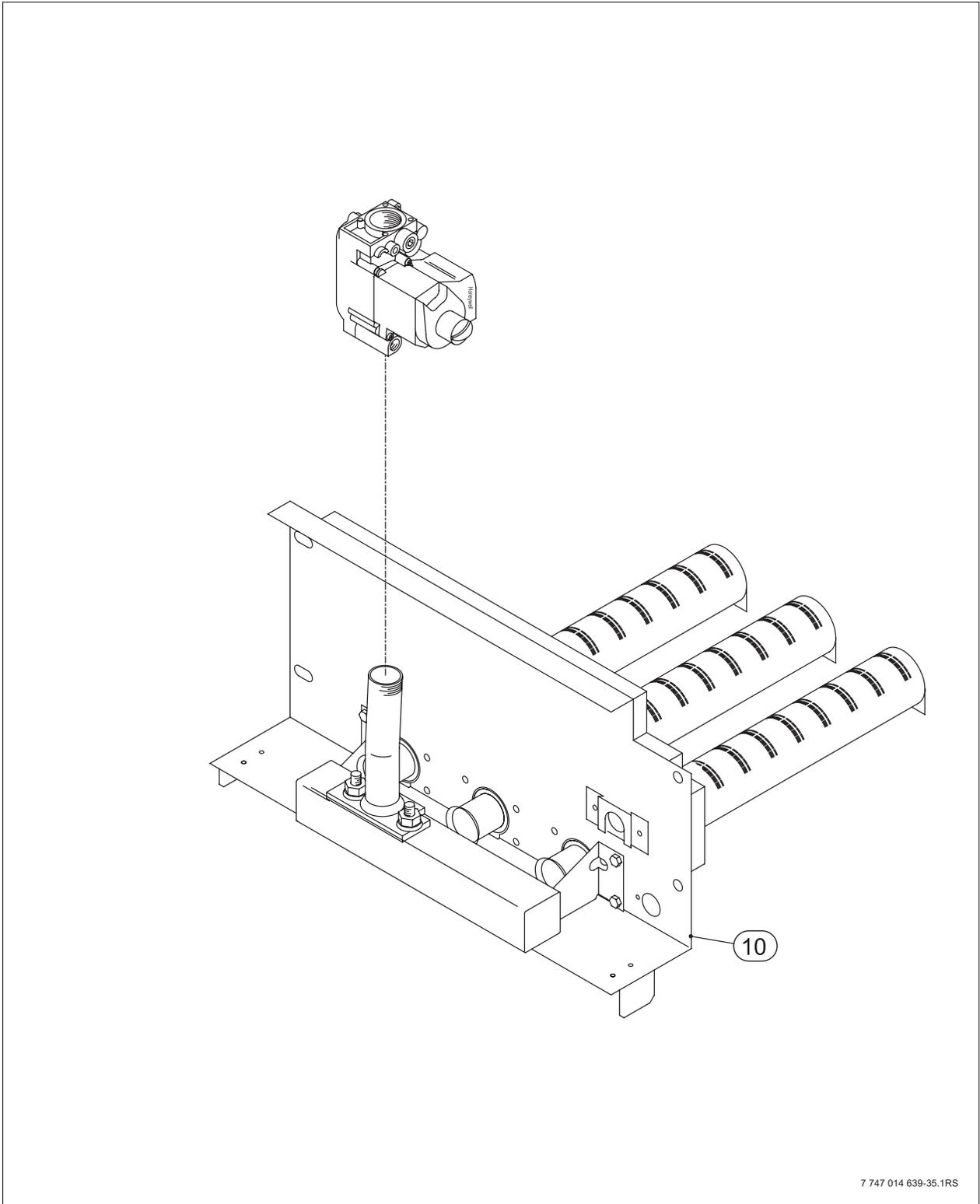
### Burner models, gas conversion parts G234X US (→ Fig. 54)



The complete burner is supplied only in the model for natural gas G20 for 0 - 2000 feet (0 - 610 m). If you want another model burner, you must also order the appropriate gas conversion parts. The replaced parts must remain with the heating system for a possible future reconversion.

Item No.	Designation	Product-number	G234X/38 5 sections	G234X/45 5 sections	G234X/55 6 sections	G234X/64 7 sections
10	Burner AE234X "US" replacement	5181-	736	748	738	740
	NG Kit G234X 0 - 2000 ft "US"	5993-	394	394	396	398
	LP Kit G234X 0 - 2000 ft "US"	5993-	336	338	340	344

Tab. 17 Individual parts gas type conversion parts



7 747 014 639-35.1RS

Fig. 54 Burner models, gas type conversion parts AE234X US

**Gas valve VR8304H4206 G234X FAS US/CA (→ Fig. 55)**

Item No.	Designation	Product-number	G234X/38 5 sections	G234X/45 5 sections	G234X/55 6 sections	G234X/64 7 sections
10	Gas valve WARNING: Do not use the screw fitting included with the gas fitting for the pilot gas pipe!	5181 870	1	1	1	1

Tab. 18 Gas fitting VR8304H4206  $\frac{3}{4}$  24V 60Hz

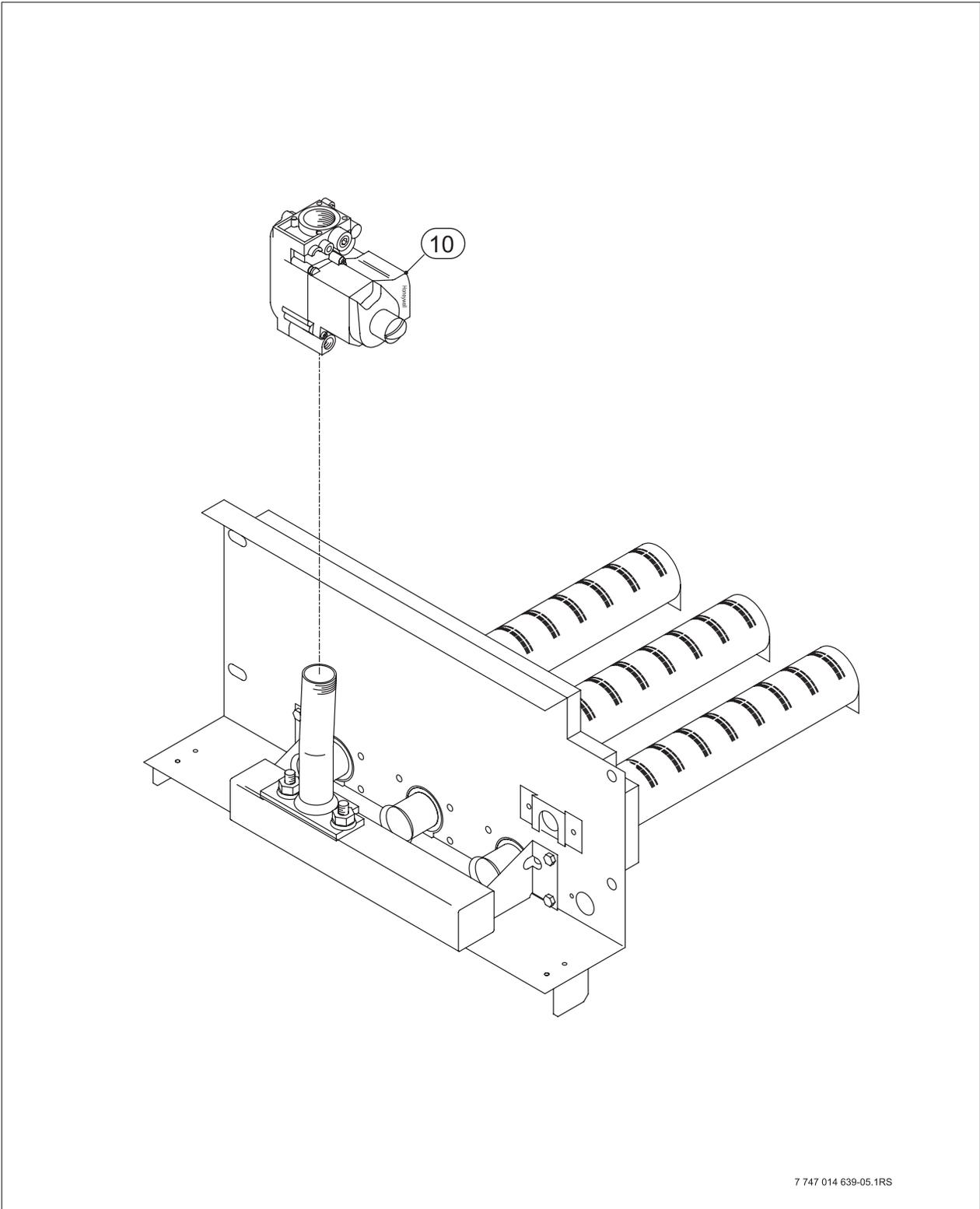
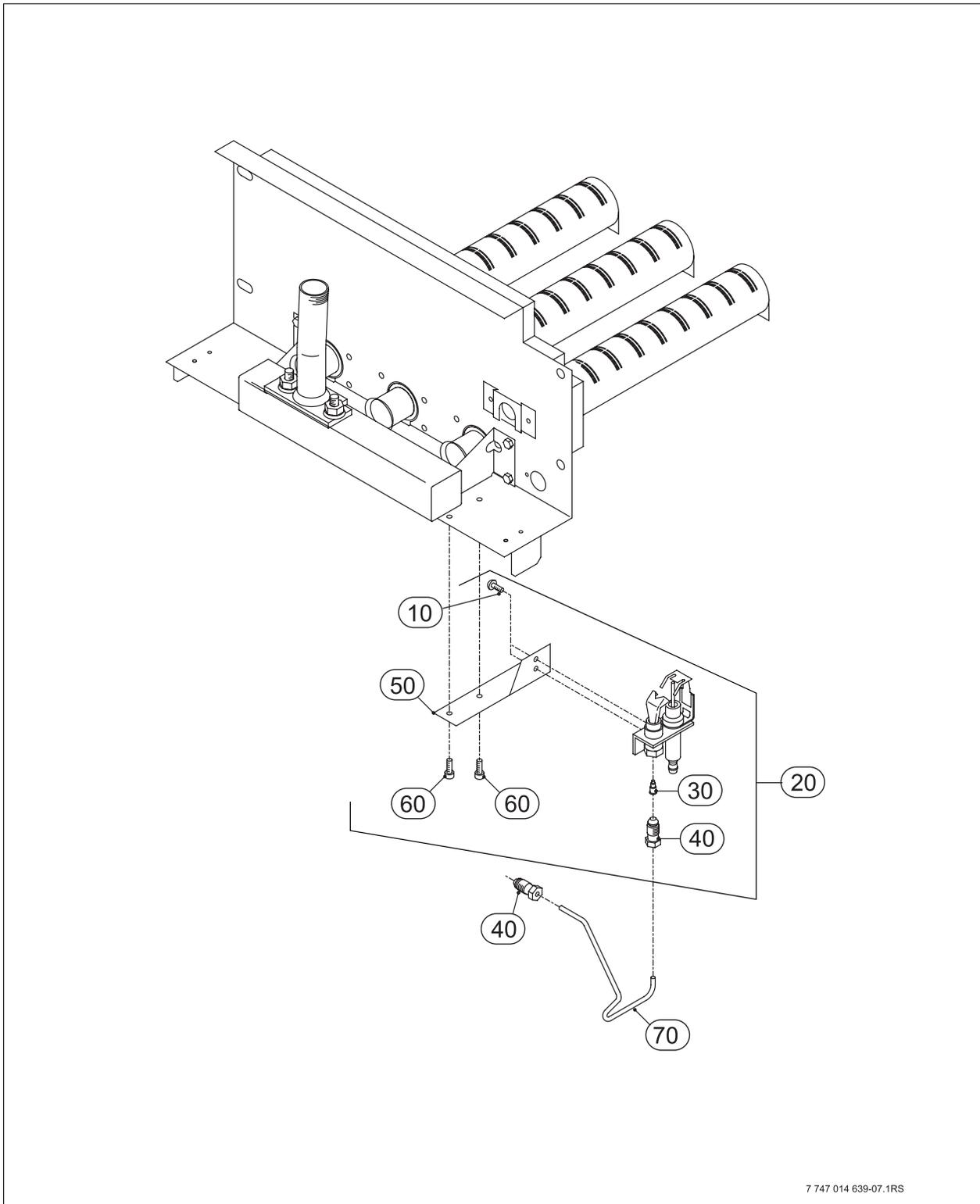


Fig. 55 Gas fitting VR8304H4206  $\frac{3}{4}$  24V 60Hz

**Pilot burner for G234X (→ Fig. 56)**

Item No.	Designation	Product-number	G234X/38 5 sections	G234X/45 5 sections	G234X/55 6 sections	G234X/64 7 sections
10	Allen screw 8x32x3/16	→ Mounting kit no. 5	1	1	1	1
20	Pilot burner Q345 1E	5181 443	1	1	1	1
30	Ignition gas nozzle, natural gas, BCR20	5181 648	1	1	1	1
30	Ignition gas nozzle, LP gas, BBR12	5176 998	1	1	1	1
40	Screw fitting for pilot gas pipe	5181 672	1	1	1	1
50	Ignition burner holder	→ Installation material no. 5	1	1	1	1
60	Screw M5x12 A3K	→ Installation material no. 5	2	2	2	2
70	Pilot gas pipe	5181 670	1	1	1	1

Tab. 19 Pilot burner for G234X



7 747 014 639-07.1RS

Fig. 56 Pilot burner for G234X

# 10 Circuit diagrams

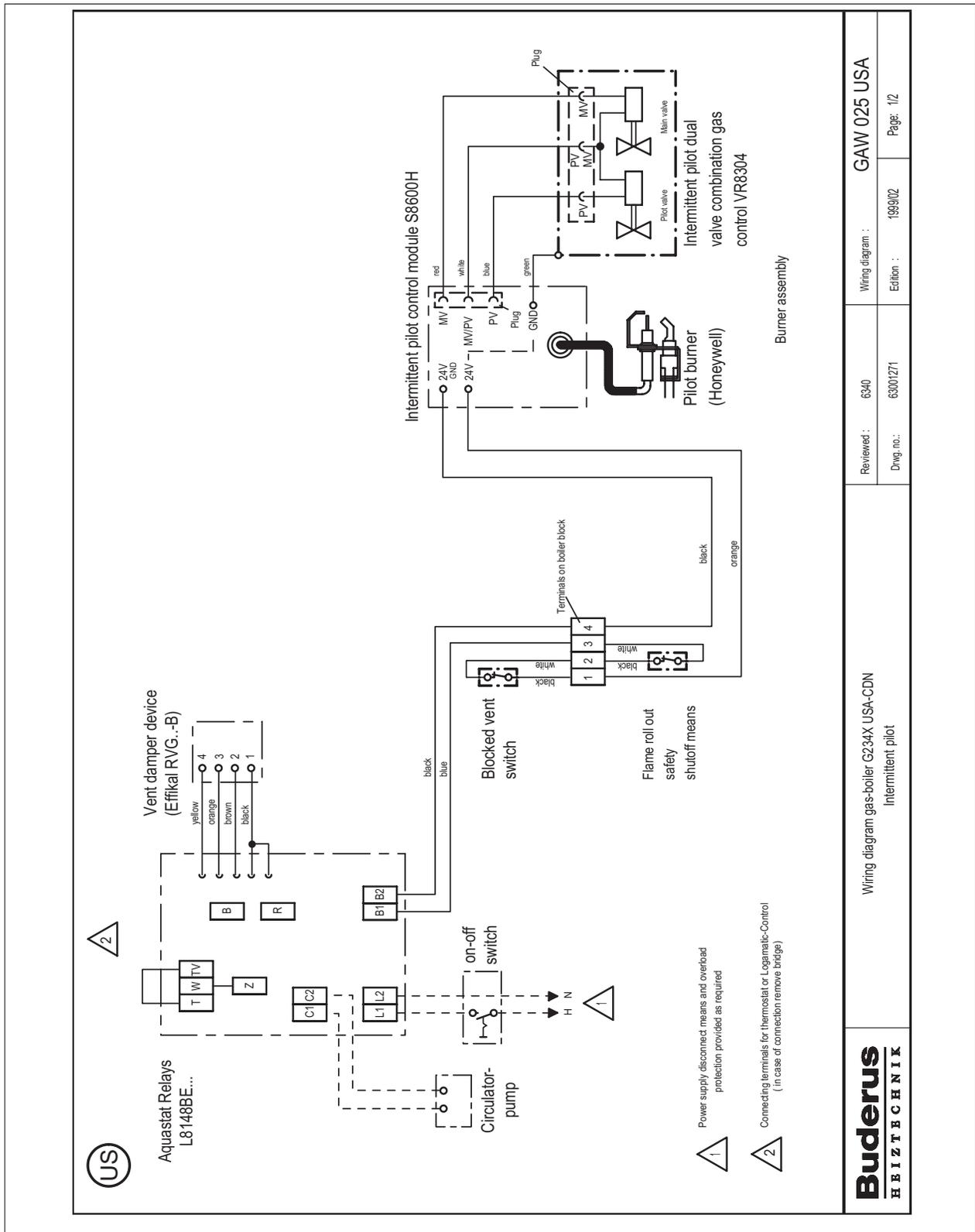


Fig. 57 Circuit diagram 1

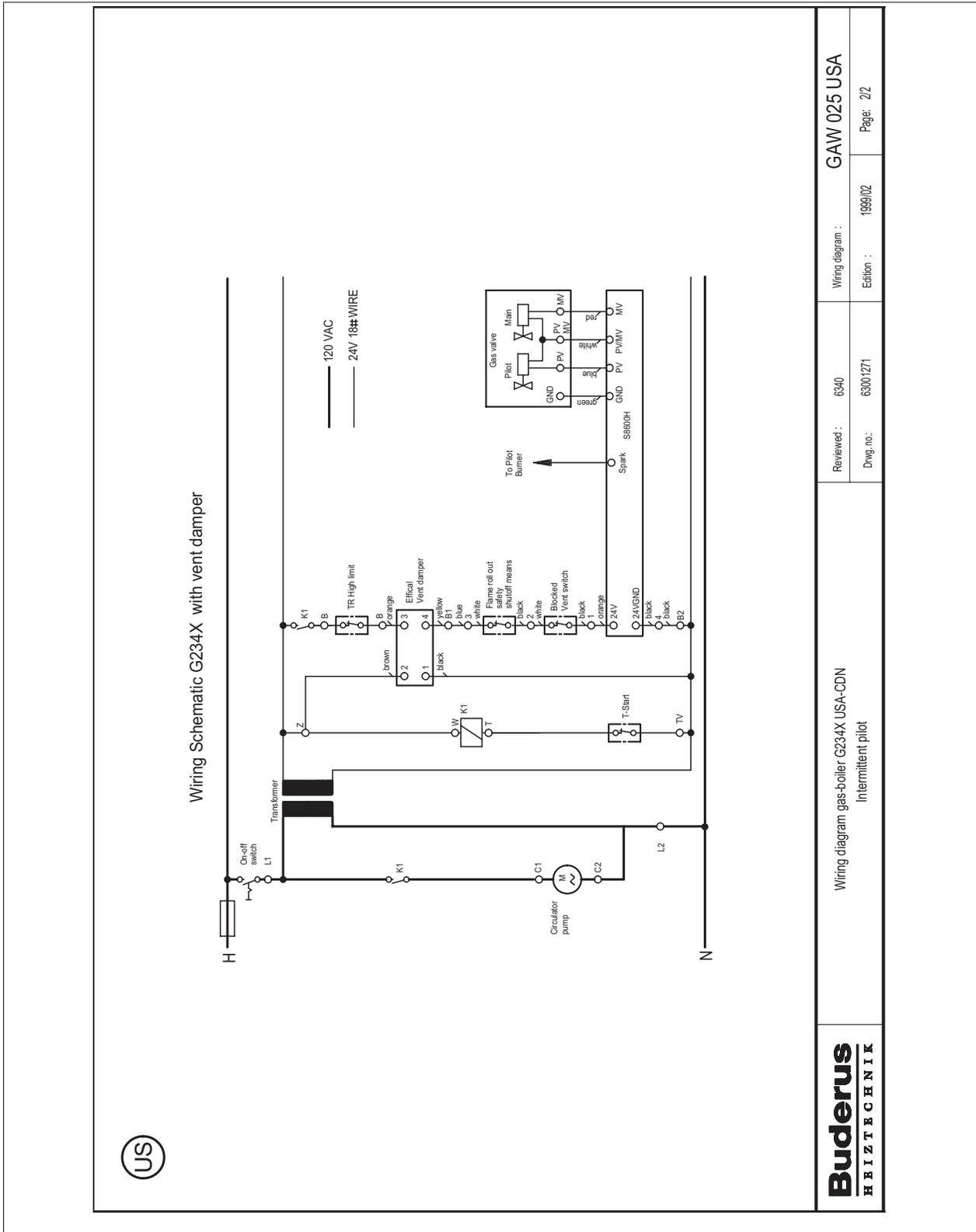


Fig. 58 Circuit diagram 2

## Notes

**United States and Canada**

Bosch Thermotechnology Corp.  
50 Wentworth Avenue  
Londonderry, NH 03053  
Tel. 603-552-1100  
Fax 603-584-1681  
[www.buderus.us](http://www.buderus.us)  
U.S.A.

Products manufactured by  
Bosch Thermotechnik GmbH  
Sophienstrasse 30-32  
D-35576 Wetzlar  
[www.buderus.com](http://www.buderus.com)

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