

Installation and maintenance instructions

Gas boiler Logano G334 X

CAUTION!

Observe the safety instructions of this installation and maintenance manual before placing the boiler in operation.

WARNING!

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 directions of this installation and maintenance manual must be followed precisely. Contact a qualified service company, service provider or the gas company if support or additional information is required.

CAUTION!

The operating manual is a component of the technical documentation and 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.



Note: Keep this installation and maintenance manual available for future reference.

Buderus

Please read carefully prior to installation and maintenance.

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1 Safety

Observe these instructions for your safety.

The burner and control must be correctly installed and adjusted to ensure safe and economical operation of the gas-fired boiler.

Read this installation and maintenance manual carefully and note the details on the boiler nameplate before placing the boiler in operation.

1.1 Correct use

The Logano G334 X gas-fired boiler is designed to heat water for a hot water heating system and for heating single or multiple occupancy buildings.

1.2 Observe the following symbols

Two levels of danger are identified and signified by the following terms:



RISK TO LIFE

Identifies possible dangers emanating from a product, which might lead to serious injury or death if appropriate care is not taken.



RISK OF INJURY/ SYSTEM DAMAGE

Identifies potentially dangerous situations, which might lead to medium or slight injuries or to material losses.

Additional symbols for identification of dangers and user instructions:



RISK TO LIFE

from electric shock.



USER NOTE

Tip for the optimum utilization and setting of the control(s) plus other useful information.

1.3 Please observe these notes

1.3.1 National regulations

The heating system must comply with the relevant regulations issued by national authorities, or the regulations issued by the National Fuel Gas Code, ANSI Z 223.1. In Canada the regulations of CAN/CGA B 149.1 or 2, Installation Code for Gas Burning Appliances and Equipment, must be observed.

If specified by the local regulatory authorities the heating system must comply with the regulations of the "Standard for Controls and Safety Devices for Automatically Fired Boilers," ANSI/ASME CSD-1.

Carbon monoxide detectors must be installed as specified by the local regulations. The boiler must be serviced annually (→ Chapter 13, page 39).

Boiler operating conditions

Maximum boiler temperature	220 °F
Maximum operating pressure	58 psi

The hot water pipe system must comply with the current legislation and regulations. If an existing boiler is replaced, the complete hot water pipe system must be inspected to ensure that it is in perfect condition to ensure safe operation.



RISK TO LIFE

due to neglecting your own safety in case of emergency, such as with a fire.

- Never put yourself at risk. Your own safety must always take priority.

**RISK TO LIFE**

from explosion of flammable gases.

WARNING!

If you smell gas there is a danger of explosion.

- Never work on gas lines unless you are licensed for this type of work.
- Make sure that a qualified company installs the boiler, connects gas and venting, places the boiler in operation, connects the electrical power, and maintains and repairs the boiler.
- No open flame. No smoking. Do not use lighters.
- Prevent spark formation. Do not operate electrical switches, including telephones, plugs or door bells.
- Close main gas valve.
- Open doors and windows.
- Warn other occupants of the building, but do not use door bells.
- Call gas company from outside the building.
- If gas can be heard escaping, leave the building immediately, prevent other people from entering, notify police and fire from outside the building.

**SYSTEM DAMAGE**

due to incorrect installation.

CAUTION!

- Observe all current standards and guidelines applicable to the installation and operation of the heating system as applicable in your country.

**RISK TO LIFE**

from electric shock.

WARNING!

- Disconnect the power supply to the heating system before conducting any work on it, e.g. switch off the heating emergency switch outside the boiler room.
- It is not sufficient just to switch off the control.

**SYSTEM DAMAGE**

due to unsatisfactory cleaning and maintenance.

CAUTION!

- Clean and service the system once a year. Check that the complete heating system operates correctly.
- Immediately correct all faults to prevent system damage.

**USER NOTE**

Only use original Buderus spare parts. Losses caused by the use of parts not supplied by Buderus are excluded from the Buderus warranty.

1.3.2 Installation notes**RISK TO LIFE**

from explosion of flammable gases.

WARNING!

- Never work on gas lines unless you are licensed for this type of work.

**RISK TO LIFE**

from electric shock.

WARNING!

- Do not carry out electrical work unless you are qualified for this type of work.
- Before opening a unit: disconnect electrical power completely and lock to prevent accidental reconnection.
- Observe the installation regulations.

1.3.3 Information on the boiler room**RISK TO LIFE**

by poisoning.

WARNING!

Insufficient ventilation may cause dangerous flue gas leaks.

- Make sure that inlets and outlets are not reduced in size or closed.
- If faults are not corrected immediately, the boiler must not be operated.
- Inform the system operator of the fault and the danger in writing.

**WARNING!****RISK TO LIFE**

by poisoning.

When working on the flue gas monitoring equipment leaking flue gas may endanger the lives of people.

- Do not attempt to repair the flue gas temperature sensor.
- Use only original parts when replacing parts.
- When replacing the flue gas temperature sensor install the new one in the specified position.

**WARNING!****RISK TO LIFE**

by poisoning by leaking flue gas.

If the flue gas monitor trips frequently, there may be a problem with the chimney or the flue gas venting.

- If the flue gas monitor trips frequently the fault must be corrected and a function test must be conducted.

**WARNING!****RISK TO LIFE**

by poisoning by leaking flue gas.

- Make sure that the boiler is not fitted with a thermally controlled flue gas baffle after the back flow check.

**WARNING!****FIRE DANGER**

due to flammable materials or liquids.

- Make sure that there are no flammable materials or liquids in the immediate vicinity of the boiler.

1.4 Tools, materials and accessories

You need standard tools for the installation and maintenance of the boiler as used in heating system installation and oil, gas and water installations.

The following additional items will also be useful.

- Boiler cart with rope or Buderus boiler cart
- Cleaning brushes and/or chemical cleaning agents for wet cleaning

1.5 Disposal

- Dispose of the packaging material in an environmentally compatible fashion.
- Dispose of any components of the heating system that require replacement in an environmentally compatible fashion.

2 Product description

The boiler is a low temperature gas-fired boiler.



USER NOTE

The boiler is fully functional with the factory-installed aquastat. The Logamatic 2107 control can also be installed in addition to the factory-installed aquastat.

The boiler consists of:

- Automatic ignition unit and aquastat
- Logamatic 2107 control (accessory for separate order)
- Boiler jacket and front panel
- Boiler block with insulation
- Burner

The automatic igniter, the aquastat and, if applicable, the Logamatic 2107 monitor and control all electrical components of the boiler.

The boiler jacket prevents energy loss and acts as soundproofing.

The boiler block transfers the heat generated by the burner to the heater water. The insulation prevents stand-by losses.

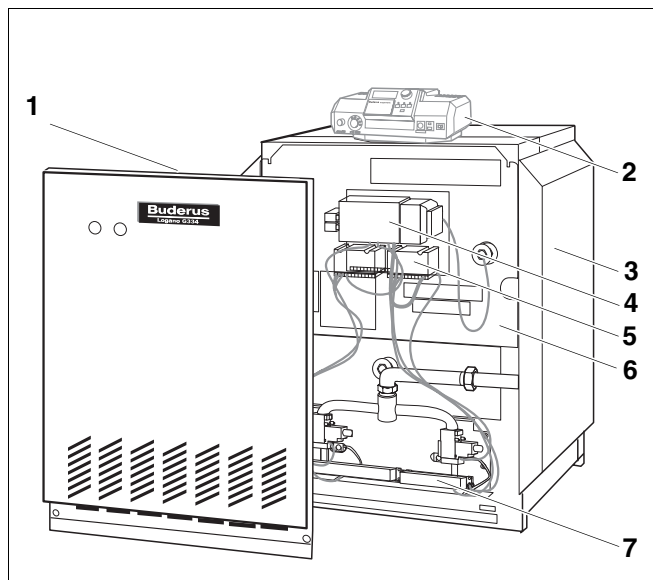


Fig. 1 Logano G334 X boiler

- 1 Boiler front panel
- 2 Logamatic 2107 control (accessory)
- 3 Boiler jacket
- 4 Aquastat (control unit)
- 5 Automatic igniter
- 6 Boiler block with insulation
- 7 Burner

3 Dimensions and connections

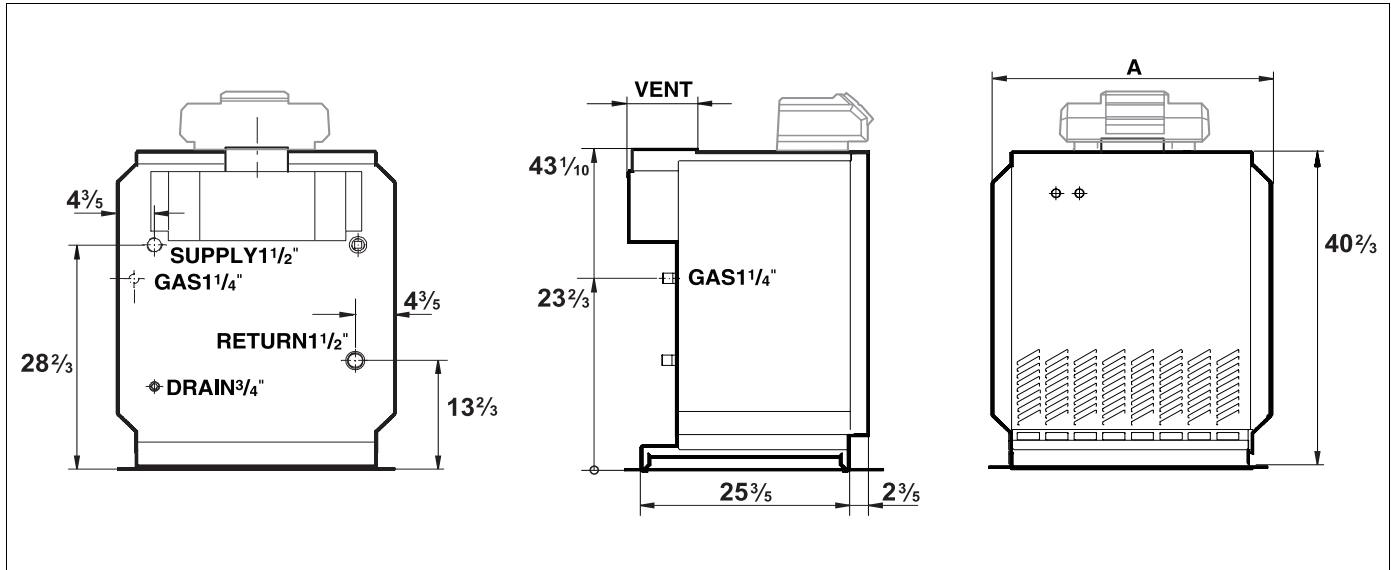


Fig. 2 Back, side and front view, measurements in inches

Boiler size	Input MBtu/hr	Heating capacity MBtu/hr	A Inches	VENT Inches	Min. overflow valve capacity lb/hr	Number of burner tubes No.	Water volume US gal.	Empty weight lbs
73	301	249	34.6	8	249	5	9.2	758
92	378	314	41.7	9	314	6	11.4	930
116	476	396	48.8	10	396	7	13.5	1093
132	541	450	55.9	10	450	8	15.6	1265

Tab. 1 Dimensions



USER NOTE

For the size and dimensions of the main gas orifice see → Chapter 15, page 66.

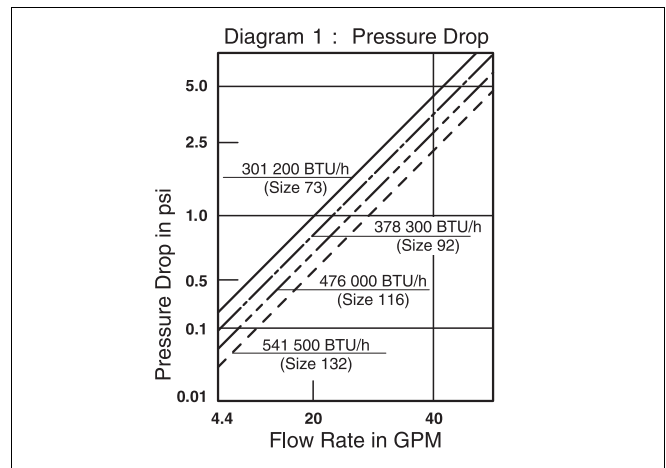


Fig. 3 Pressure chart

4 Scope of delivery

- Check packaging on delivery for damage.
- Check delivery for completeness.

The boiler is supplied in one package with the gas burner and gas valve, boiler jacket and technical documentation.

The following accessories are supplied in separate packages:

Component	Qty	Packaging
Boiler block	1	1 pallet
Draft hood	1	1 box
Boiler jacket	1	1 box
Technical documents	1	1 foil package
90° elbow (¾" NPT)	1	1 box
Safety valve	1	
Drain valve ½"	1	

Tab. 2 Scope of delivery

Accessories ¹	Qty
Logamatic 2107 control	1
Heat circulation pump	1
Cleaning brush	1
Exhaust flap	1

Tab. 3 Accessories

¹ Accessories available by separate order

5 Moving the boiler

This chapter describes how to move the boiler safely,



CAUTION!

SYSTEM DAMAGE

due to bumps.

- Check the transport diagrams on the packaging to protect the sensitive components from damage by bumping.



USER NOTE

- Protect the boiler connections from dirt if the boiler is not installed immediately.



USER NOTE

Dispose of the packaging material in an environmentally compatible fashion.

5.1 Moving the boiler with boiler cart

- The boiler must be fully packed for transport to the installation location.
- Remove the straps and the cardboard packaging.
- Remove the bolts from the pallet.
- Lift the boiler at the sides and slide to the edge of the pallet. Place a pipe under the boiler (Fig. 4) and roll it on additional pipes to the installation location.
- Place the boiler in its final position.



USER NOTE

Make sure that all sheet metal parts, pipe connections, burners and the controller are protected during transport.

- Never lift the boiler by these parts.



CAUTION!

RISK OF INJURY

if the boiler is not properly secured to the trolley.

- Use suitable transport equipment, such as a trolley with a belt.
- Secure the boiler to prevent it from falling.

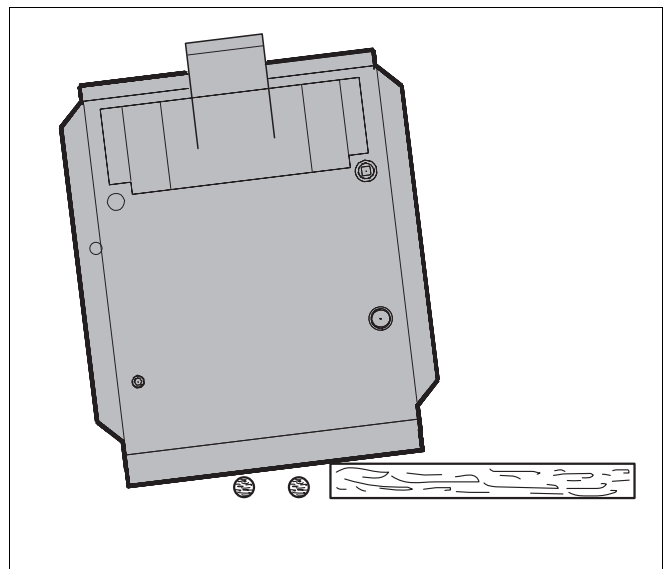


Fig. 4 Moving the boiler

6 Placing the boiler

This chapter explains how to place the boiler and position it in the boiler room.



SYSTEM DAMAGE

through frost.

CAUTION!

- Place the boiler in a frost-free room.

The boiler is very heavy when full. Check that the floor can bear the weight before installation.

6.1 Clearances

A space of at least 33 inches is recommended in front of the boiler with the door open to allow sufficient access space for operation and maintenance. When the door is closed, a minimum clearance of 2 inches is required at the front and sides, 6 inches clearance is also required for the flue pipe and 30 inches clearance to the ceiling (→ Fig. 5). The installation location and the base must be smooth and horizontal. The boiler may be installed on a flammable base, but not on carpet.

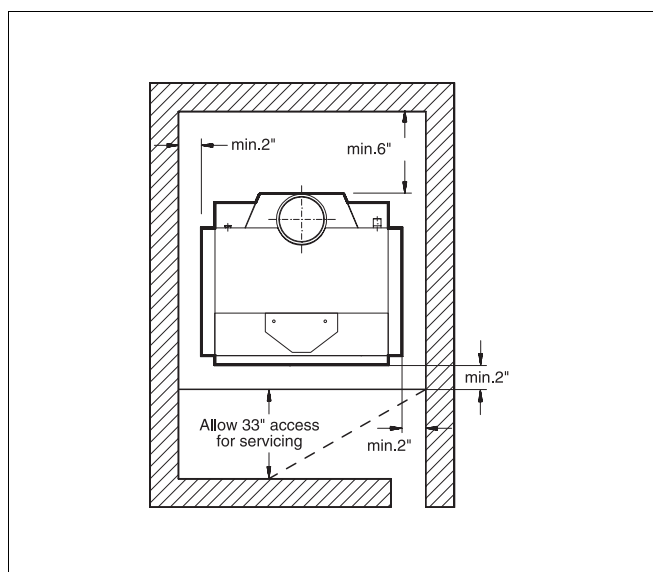


Fig. 5 Required clearances in the boiler room

6.2 Leveling the boiler

- Level the boiler block vertically and horizontally. Use metal wedges or metal strips if necessary.

7 Boiler installation

This chapter describes how to install the boiler. This includes the following tasks:

- Connecting the heating system
- Electrical connection
- Fuel supply connection

7.1 Preparing for installation

- Unpack all boxes and containers and check all parts against the packing lists to make sure that everything has been supplied.



USER NOTE

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.



USER NOTE

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

- If the gas connection is from the left, the gas connection pipe must be completely unscrewed, turned 180° and then sealed again.
- Check the connection for leaks.

7.2 Installing the draft hood and the main drain

- Fasten draft hood to the exhaust manifold with the eight retaining screws (included).

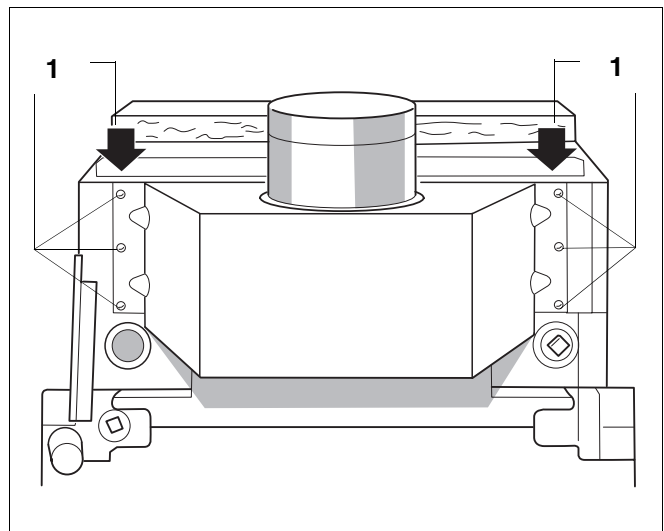


Fig. 6 Installing draft hood, Logano G334 X

1 Retaining screws on exhaust manifold

7.3 Installing the side panels and the front boiler jacket

- Press insulation panels into the side between the cast feet.
- Insert thermal insulation mats for the right side panel behind the gas connection pipe.

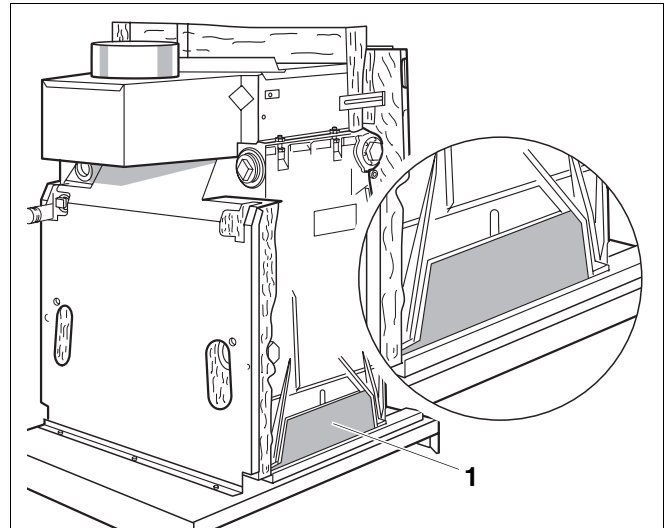


Fig. 7 Insulation panels

1 Insulation panel

- Fasten the two side panels with two self-tapping screws at the bottom and one at the back of the boiler
- Position the intermediate panel thermal insulation mats on the top of the front of the boiler with the fabric side on the outside.
- If the two side hooks on the front boiler jacket are not in position, bend them with pliers and push them into the slots in the side panel edges from behind.
- Fasten the two rear tabs on the front boiler jacket to the side panels with two self-tapping screws.

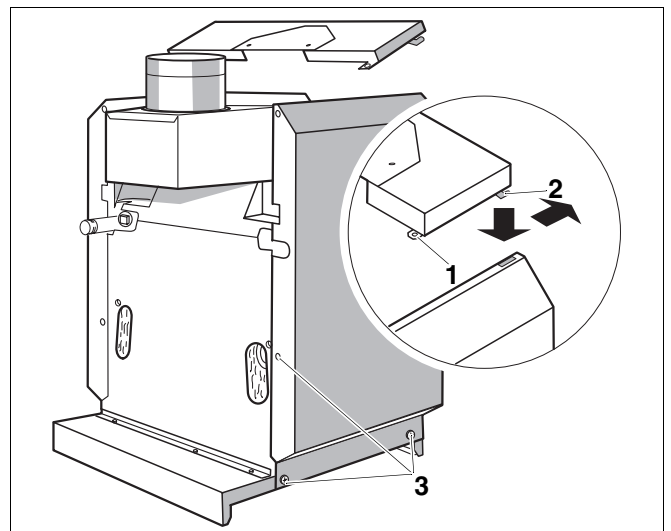


Fig. 8 Side panels and front boiler jacket

1 Rear tab

2 Side hook

3 Side panel screws

7.4 Connecting the heating system



CAUTION!

BOILER DAMAGE

through moisture.

- Protect the components of the gas ignition system from moisture (dripping, spray, rain) during installation of the boiler, during operation and during maintenance work (such as replacing the pump, replacing the control, etc.).



CAUTION!

SYSTEM DAMAGE

due to overheating as a result of low water.

- Note that a boiler installed above the level of the heating system must be fitted with a low-water alarm. The low-water alarm must be installed during installation of the boiler (→ Fig. 9).



CAUTION!

SYSTEM DAMAGE

due to high temperature variations in the heating system.

- If the boiler is operated in connection with a refrigeration system, make sure that the pipes for the refrigerated liquid are connected in parallel to the boiler system with suitable valves to prevent the refrigerated liquid 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.

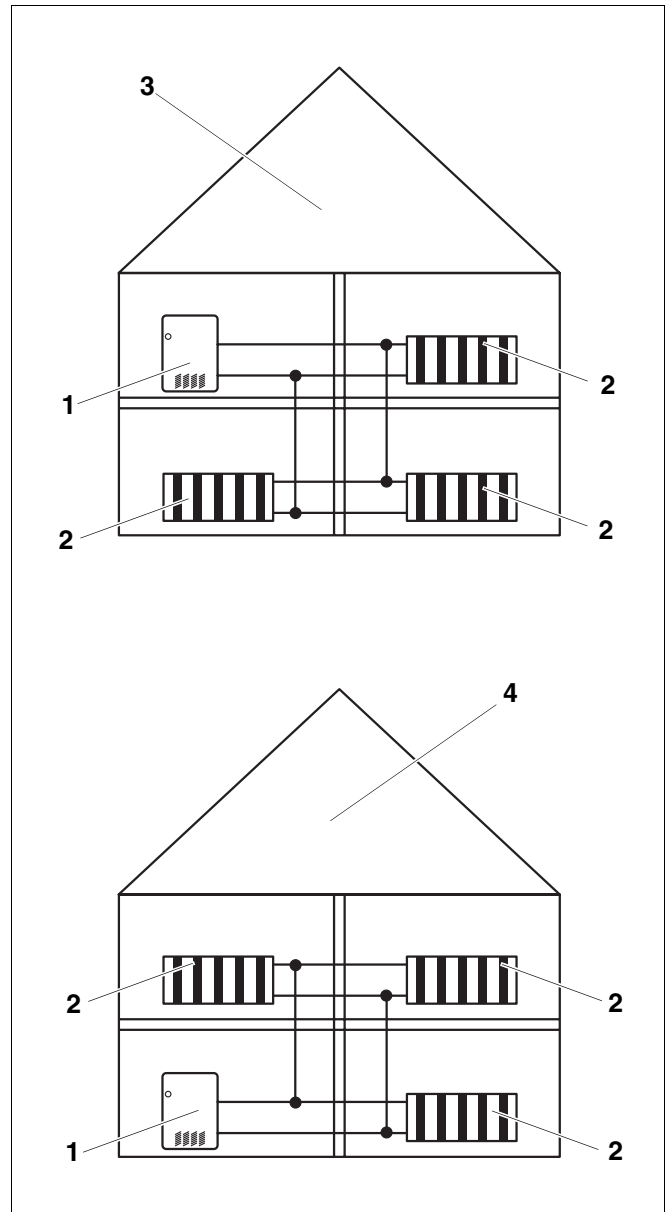


Fig. 9 Low-water alarm

- 1 Boiler
- 2 Radiator
- 3 Heating system with low-water alarm
- 4 Heating system without low-water alarm

Supply connection

- Install the elbow and the safety valve as shown in Fig. 10.



USER NOTE

Install the relief valve after the leak test (→ Chapter 7.8, page 22).

The relief valve must be installed in a vertical position.

The relief valve must also be installed in accordance with the requirements of the ANSI/ASME Boiler and Pressure Vessel Code, Section IV.



USER NOTE

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



USER NOTE

Observe the local regulations for connection of boiler systems.



FIRE DANGER

due to heat.

CAUTION!

- Note that a minimum clearance of two inches is required between pipes carrying hot water and flammable walls in the boiler room.

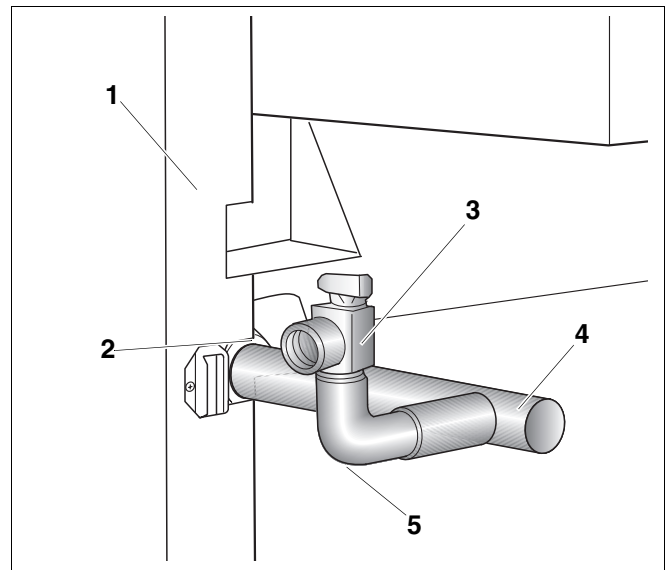


Fig. 10 Supply connection

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

7.5 Electrical connection

The electrical connections of the boiler must be manufactured as specified by the local codes and the current regulations of the National Electrical Code, ANSI/NFPA-70.

In Canada the regulations of CSA C 22.1 Canadian Electrical Code, Part 1, must be observed.

The boiler must be grounded as specified by the regulations of the relevant local authorities; otherwise follow the regulations of the National Electrical Code, ANSI/NFPA-70.



USER NOTE

When making the electrical connections follow the circuit diagrams on → page 67 and → page 68.

Install an ON/OFF switch near the boiler.



WARNING!

RISK TO LIFE

from electric shock.

- When conducting maintenance work label all cables before disconnecting them.
 - If cables are connected incorrectly the system may not operate correctly with possibly dangerous consequences.
-
- Check that the heating system functions correctly after any maintenance work.

7.6 Installation of Logamatic 2107 control (accessory)

The boiler is fully functional with the factory-installed aquastat. The Logamatic 2107 control can also be installed in addition to the factory-installed aquastat.



USER NOTE

Note the following when making electrical connections:

- Lay out cables and capillaries carefully.
 - Do not bend the capillaries during installation.
 - Never carry out any electrical work on the heating system unless you are licensed for this type of work. If you are not a licensed electrician, have a specialist electrical company make the electrical connections.
 - Observe the local regulations.
1. Slide the insertion tabs of the control into the oval openings.
 2. Slide control toward the boiler front panel.
 3. Push to snap plastic tabs of the control into the knock-outs.
4. Remove top cover of control Remove screws from the top cover.
 5. Fasten control with sheet-metal screws.
 6. Route boiler water sensor cable through the cable opening and unroll to the required length.

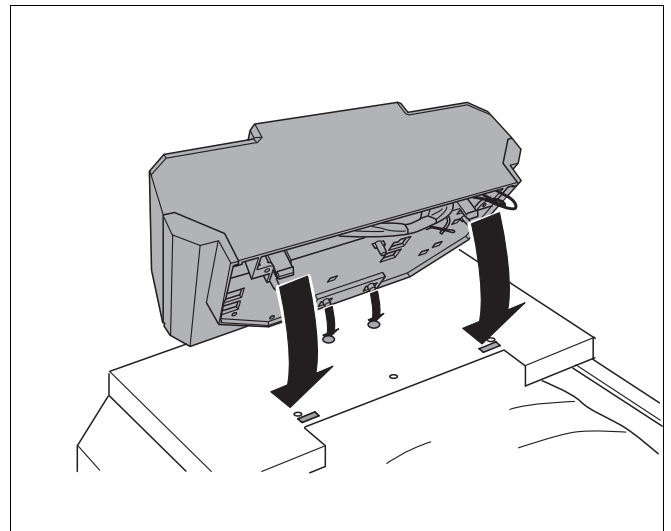


Fig. 11 Removing terminal cover

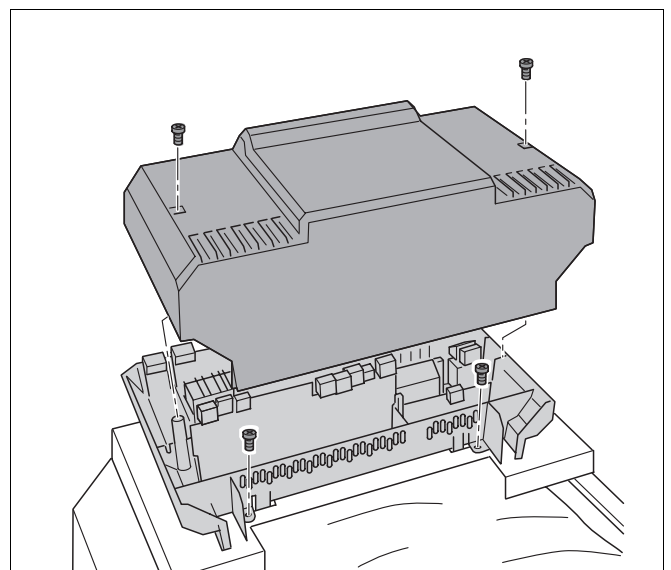


Fig. 12 Installation of Logamatic 2000 control system

1 Screws

Installation of boiler water sensor

7. Route boiler water sensor wiring bundle under the front boiler cover to the measuring point (immersion well). Discard quadrant filler apart from sensor bundle.
8. Remove quadrant (blanking piece) from the immersion well.
9. Insert the Honeywell boiler water sensor and Logamatic sensor bundle into the immersion well to the stop to replace the quadrant.
10. Press sensor clip (included with control) from the side or from above to the head of the immersion well.
11. Carefully roll up unnecessary wiring and capillaries and stow in the Logamatic 2107 control.

Power connection and connections of additional components

Connect to the power supply as specified by the local code.

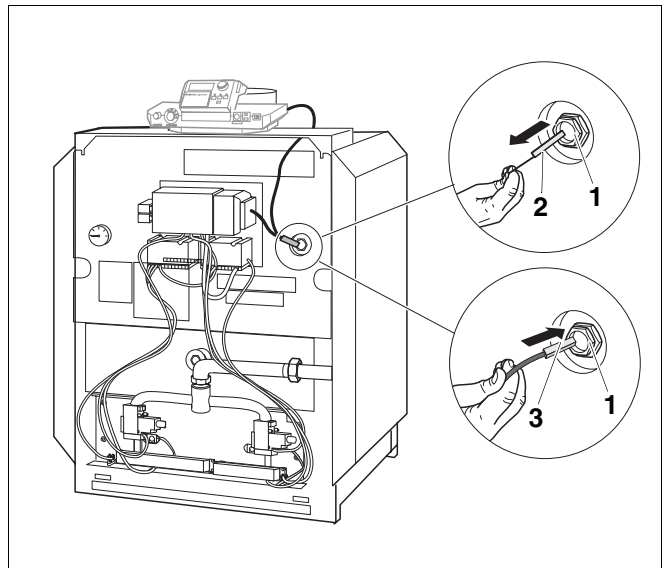


Fig. 13 Front of boiler

- 1 Measuring point (immersion well)
- 2 Quadrant (blanking piece)
- 3 Boiler water sensor (Logamatic 2107 control)



WARNING!

FIRE DANGER

Hot boiler components may damage electrical wiring.

- Make sure that all wiring is routed in the ducts or on outside the boiler insulation.

12. Route all wiring to the control through the wiring opening and connect as specified by the control circuit diagram.

Install strain relief

Secure all wiring with wiring clips (included with control):

- Insert wiring clip with wiring from above into the slot of the clip frame; the lever bar must point upwards (step 1).
- Slide wiring clip down (step 2).
- Press (step 3).
- Move lever up (step 4).

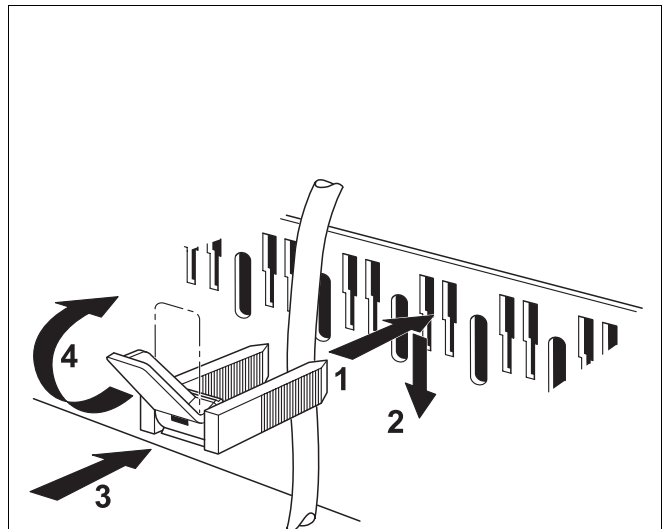


Fig. 14 Secure wiring with wiring clip

Installing panel components

13. Swivel display unit to the desired position.



USER NOTE

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

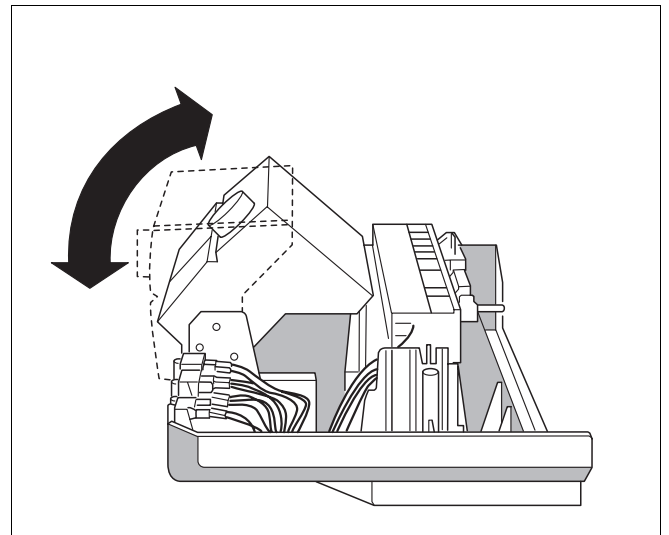


Fig. 15 Swivel display unit

14. Position terminal cover and screw to control.

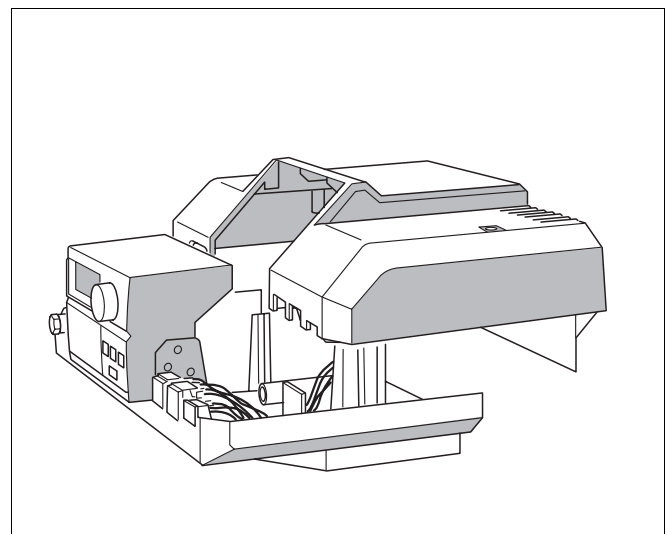


Fig. 16 Positioning terminal cover

Installing 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.



SYSTEM DAMAGE

due to dirt.

CAUTION! If the boiler is assembled and not in use, note the following:

- Protect the boiler connections from dirt by closing the connections.

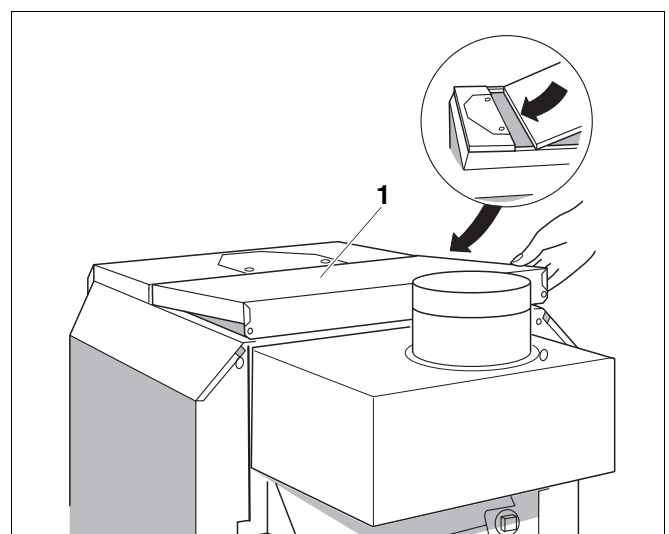


Fig. 17 Installing rear boiler cover

1 rear boiler cover

7.7 Gas supply connection

7.7.1 Installing gas feed

For the gas pipe diameter required for the installation please see Tab. 4 and Tab. 5. Make sure that the pipe fitting has the correct thread size.

Make sure that a sediment trap is installed at the inlet for the gas supply pipe to the boiler. A hand stop valve must be installed outside the boiler jacket if required by the local code. We recommend installing a hand stop valve in the main gas pipe to the boiler. The gas pipes must be fastened outside the boiler.



USER NOTE

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

- If the gas feed is from the left, the gas connection pipe must be completely unscrewed, turned 180° and installed again.
- Check the connection for leaks.
- Please support extension gas piping to relieve stress on gas train.

The local codes must be observed during installation of the gas connection, otherwise the regulations of the National Fuel Gas Code, ANSI Z 223.1.

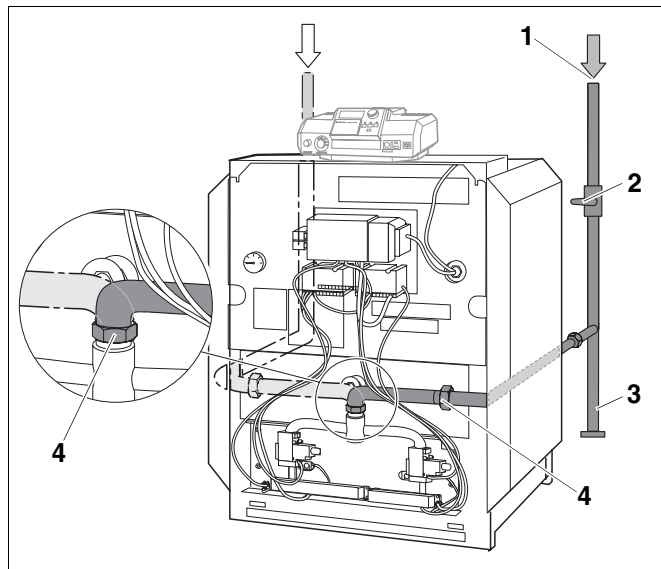


Fig. 18 Pipe connection to gas valves – back view

- 1 Gas feed
- 2 Main gas shut-off valve
- 3 Sediment trap
- 4 Retaining screws at the gas supply line



WARNING!

DANGER OF EXPLOSION

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

- Use soap solution to find leaks.



CAUTION!

SYSTEM DAMAGE

due to short-circuit.

- Cover the hazardous locations before checking for leaks.
- Do not spray the leak solution on wiring openings, plugs or electrical connections. Do not allow the solution to drip on these locations.

Length of pipe in feet	Gas pipe supply volume in cubic feet of gas per hour ¹				
	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. 4 Gas pipe supply volume

¹ Maximum gas supply volume in cubic feet per hour, based on a specific gas weight of 0.60 and a gas pressure of 0.5 psi or less and a pressure gradient corresponding to a water column of 0.3 inches.

Nominal diameter of iron pipe (inches)	Equivalent lengths for pipe fittings in feet			
	Pipe fitting type			
	90° angle	T-piece	Stop valve	Gas valve
	Equivalent lengths in feet			
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. 5 Equivalent lengths for pipe fittings

Disconnect the boiler with the stop valve from the gas supply pipe system the system is pressure tested with a test pressure greater than 1/2 psi.

If the gas supply pipe system is pressure tested at a test pressure of 1/2 psi or less, it is sufficient to disconnect the boiler from the pipe system by closing the stop valve.

- The boiler and its gas connections must be tested for leaks before placing it into operation (→ page 29).

Use only sealant that is resistant to corrosion by LPG for pipe connection. Only a small amount of sealant must be applied to the external thread of the pipe connections.

7.7.2 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 boiler without the approved Buderus parts and the relevant technical documentation. The technical documentation is included with the conversion parts.

7.7.3 Installation at high altitudes

The boiler is designed for installation at altitudes below 8500 feet above sea level. The boiler must be converted appropriately for installation above altitudes of 8500 feet. The conversion consists of replacing the main gas nozzles.



USER NOTE

If the installation location is over 8500 feet above sea level, please contact Buderus for the required conversion components.

Do not attempt to convert the boiler without the approved Buderus parts and the relevant technical documentation.

The technical documentation is included with the conversion parts (accessory).

7.8 Filling heating system and checking for leaks

The boiler is tested for leaks at the factory. Before placing the heating system tank into use, check it for soundness to avoid leaks occurring during operation.

Water treatment



USER NOTE

- 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 level below 7.0.



CAUTION!

SYSTEM DAMAGE

due to overpressure during the leak test. Pressure, control or safety components may be damaged by high pressure.

- Before conducting the leak test make sure that no pressure, control or safety components that cannot be disconnected from the water compartment of the boiler are installed.

Carry out the leak test at 1.5 times the normal operating pressure and as specified by the local codes as follows:

- Close valve at supply connection (→ page 15).
- Close open connections with blank plugs.
- Disconnect the expansion tank from the system by closing the cap valve.
- Open mixing and stop valves on hot water side.
- Fill boiler slowly with water from the building connection.
- Turn cap of automatic vent one revolution to allow the air to escape.
- Slowly fill heating system. Observe pressure display on pressure gauge during this process.
- Check connections and pipes for leaks.
- Bleed heating system through the bleed valves on the radiators.
- If the pressure falls while bleeding, water must be added.
- Install relief valve.

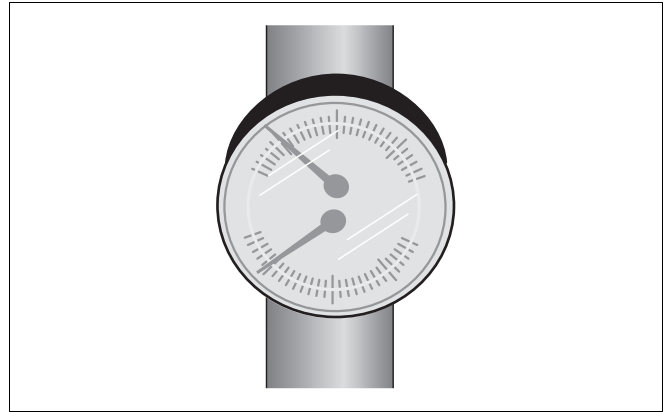


Fig. 19 Temperature/pressure gauge (owner installation)

Maximum operating pressure	Maximum construction site test pressure
30 psi (with the included relief valve)	45 psi
58 psi (with a different relief valve)	75 psi

Tab. 6 Test pressures

7.9 Install front boiler panel

- Hang front boiler panel from above, fold down and screw in securing screws into the front panel below.
- Fasten nameplate to the front panel of boiler.

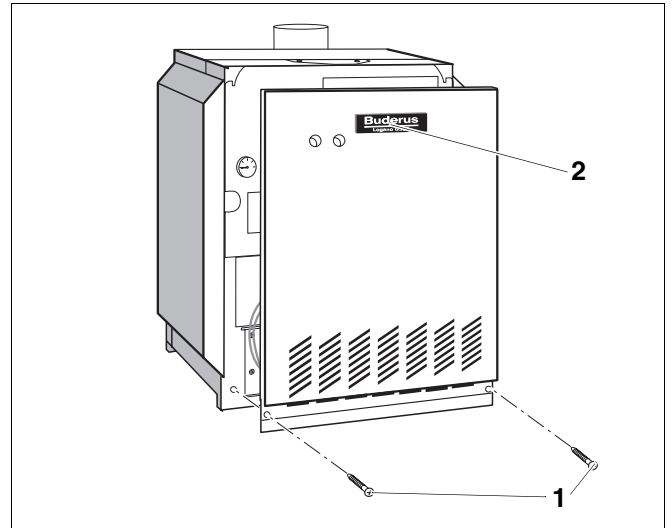


Fig. 20 Install front boiler panel

- 1 Screws
- 2 Nameplate

8 Check openings for combustion air supply and venting



CAUTION!

BOILER DAMAGE AND OPERATING FAULTS

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 operating faults.

- Make sure that inlets and outlets are not reduced or closed and that they are adequately dimensioned.
- If faults are not corrected immediately, the boiler must not be operated.
- Inform the system operator of the fault and the danger.

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, Section 5.3, Air for Combustion and Ventilation, or the local codes.

In Canada the regulations in accordance with the CSA/CGA-B 149.1 or 2 Installation Codes apply.



CAUTION!

BOILER DAMAGE

due to contaminated combustion air.

- Never use cleaning agents that contain chlorine and halogenated hydrocarbons (e.g. spray bottles, solvents and cleaning agents, paints, glues).
- Do not store or use these substances in the boiler room.
- Prevent excessive dust levels.



WARNING!

FIRE DANGER

due to flammable materials or liquids.

- Do not store flammable materials or liquids in the immediate vicinity of the heat generator.



USER NOTE

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

Total air supply from inside the building

Make sure that the boiler room has two permanent openings that are connected with one or more other rooms. When calculating the cross-section areas of the openings, the total combustion output of all gas-fired appliances in the connected rooms must be taken into account. Each opening must have a minimum cross-section of one square inch per 1000 Btu/h of the total combustion output of all gas-fired appliances inside the connected rooms. Note that the minimum cross-section of every opening must not be less than 100 square inches. One opening must not be more than 12 inches from the ceiling and the other must not be more than 12 inches from the floor of the boiler room, calculated from the outer edge of the opening. The shortest dimension of all inlet and outlet openings must not be less than three inches.

Total air supply from outside the building

Make sure that the boiler room has two permanent openings, one of which must not be more than 12 inches from the ceiling and the other must not be more than 12 inches from the floor of the boiler room, calculated from the outer edge of the opening. The openings have a direct connection or a connection through ventilation ducts to the outside or to rooms that have an unobstructed connection to the outside (crawl space or attic). The shortest dimension of all inlet and outlet openings must not be less than three inches.

1. If there is a direct connection to the outside, each opening must have a minimum cross-section of one square inch per 4000 Btu/h of the total combustion output of all gas-fired appliances inside the closed room.
2. If there is a connection to the outside through vertical ventilation ducts, each opening must have a minimum cross-section of one square inch per 4000 Btu/h of the total combustion output of all gas-fired appliances inside the closed room.
3. If there is a connection to the outside through horizontal ventilation ducts, each opening must have a minimum cross-section of one square inch per 2000 Btu/h of the total combustion output of all gas-fired appliances inside the closed room.
4. If the openings are connected to ventilation ducts, the ducts must have the same cross-section area as the openings.

9 Requirements for connection to chimneys or venting systems

The flue connection must comply with the regulations of the National Fuel Gas Code, Part 7, Venting of Equipment, and the local construction codes.

In Canada the regulations in accordance with the CSA/CGA-B 149.1 or 2 Installation 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 the table.

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 company 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 venting system, the venting system will then be too large to guarantee correct venting for the heating systems that remain connected to the system.

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 must remain switched off.

- A** All unused openings of the common system must be sealed.
- B** Inspect 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 in the building and 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 washing machines and 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** Now start the heating system that is to be tested. Follow the instructions for starting. 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** When all heating systems that remain connected to the venting system have been checked as above to ensure that the venting operates properly, return all doors, windows, exhaust fans, oven exhaust flaps and all other gas-fired appliances to their original position.
- 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 the CSA/CGA-B 149.1 or 2 Installation Codes apply.

10 Flue pipe installation

This section describes the connection of the flue pipe.

Note that the back flow check cannot be modified.

- Mount flue pipe on the flue connection of the back flow check and fasten with four (4) corrosion-resistant sheet metal screws.

Connecting flue pipe

- Connect flue pipe to the chimney with the shortest possible length of 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 inch per foot towards the chimney. The flue pipe must be securely fastened to prevent it from hanging. A support must be installed at least every five feet. 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 six inches 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.

Installing vent damper (optionally available)

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



USER NOTE

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

The position of the vent damper must be visible.

The draft hood check must be at least 6 inches 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.

1. Place flue gas adapter on the exhaust manifold connecting sleeve.
2. Install pins in the hole of the vent damper.
3. Fasten vent damper to the flue connector adapter with three (3) corrosion-resistant self-tapping screws.

Installing electrical connection of vent damper

4. Disconnect your heating system from the mains electricity supply.
5. Route the connection wiring of the vent damper through the wiring retainer behind the boiler and between the insulation and the jacket to the aquastats on the front of the boiler.
6. Connect vent damper to aquastat as shown in the diagram.



USER NOTE

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.

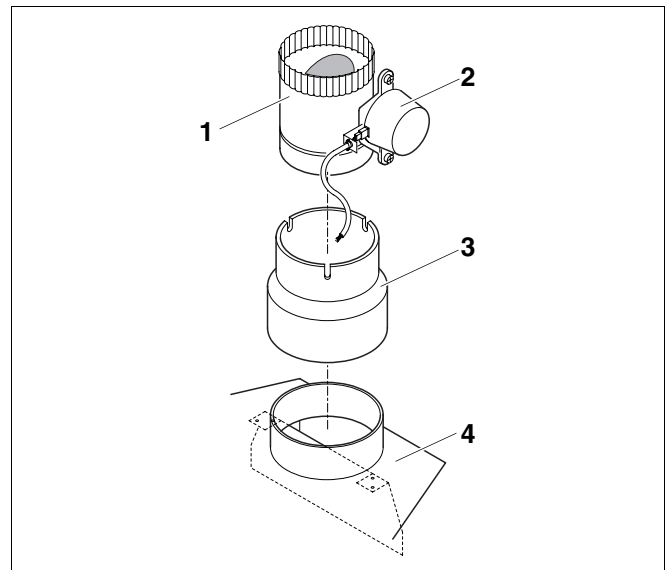


Fig. 21 Installation of vent damper

- 1 Vent damper (optionally available)
- 2 Motor
- 3 Vent pipe adapter
- 4 Draft hood

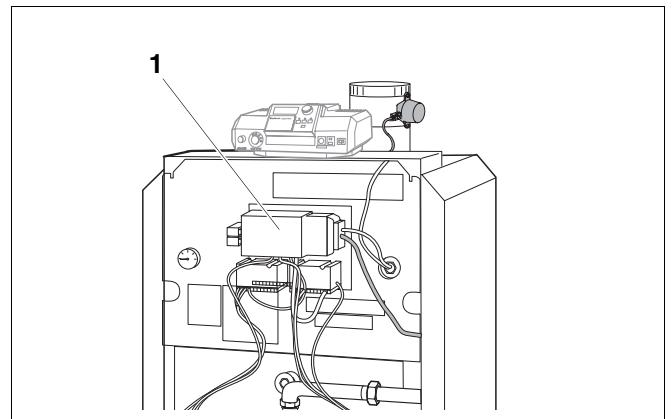


Fig. 22 Connecting vent damper

- 1 Aquastat

11 Placing the heating system in operation

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



RISK TO LIFE

due to electrical current when the unit is open.

- Before opening the unit:
To prevent electrical shock, isolate the heating system with the heating system emergency stop switch or by shutting off the main fuse.
- Lock the heating system to prevent accidental reactivation.

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 down and remove to the front.

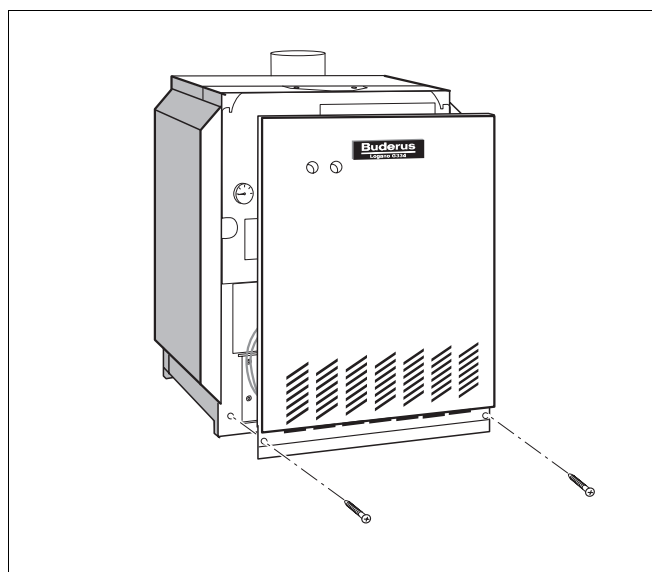


Fig. 23 Removing front panel of boiler

Carrying out leak test**USER NOTE**

The boiler has two gas valve. Make all measurements and adjustments on both gas valves.

5. Open gas valve in the gas line.

**SYSTEM DAMAGE**

due to short-circuit.

CAUTION!

- Cover the hazardous locations before checking for leaks.
- Do not spray the leak solution on wiring openings, plugs or electrical connections. Do not allow the solution to drip on these locations.

6. Check the gas connection line to the gas valve for leaks with soap solution. If no leaks are found, continue with step 8. If any leaks are found, close gas valve.
7. Seal leaks and repeat step 6.
8. Close main gas shut-off valve. Remove the screw plug for the gas pressure measuring port on the gas valve. Install pressure measuring nipple and attach a pressure gauge to measure the gas pressure.
9. Remove the screw plug for the manifold pressure measuring port on the gas valve. Install pressure measuring nipple and attach a pressure gauge to measure the manifold pressure.
10. Open gas valve and measure the gas pressure of the boiler. The connection pressure for natural gas must be between 7" and 10.5" W.C. and between 11" and 13" W.C. for propane gas. If the connection pressure for natural gas is not between 7" and 10.5" W.C. and not between 11" and 13" W.C. for propane gas, contact the customer service technician or the gas company. Close main gas valve.
11. Always follow the start-up instructions on the next page.

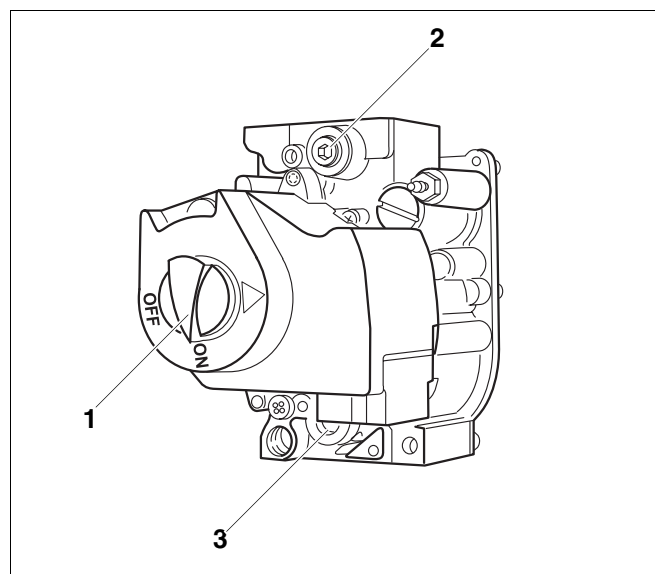


Fig. 24 Gas valve

- 1 ON/OFF button (at ON position)
- 2 Screw plug for gas pressure measuring port
- 3 Screw plug for manifold measuring port

11.1 Start-up instructions

For your safety read the instructions before start-up.



WARNING!

RISK TO LIFE

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 with serious property damage or loss of life or serious injury.
- Observe the start-up instructions.



WARNING!

DANGER OF EXPLOSION

If you smell gas there is a danger of explosion.

- No open flame. No smoking.
- Prevent spark formation.
Do not operate electrical switches, including telephones, plugs or door bells.
- Shut off main gas supply valve.
- Open doors and windows.
- Warn other occupants of the building.
- Evacuate the building.
- Call gas company or fire department from outside the building.

- A** This unit is equipped with an igniter that automatically starts the pilot burner. Do not attempt to ignite it manually.
- B** Check for an odor of gas around the 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 switch may cause a fire or explosion.
- D** Do not operate the unit if any part is under water. Contact a qualified customer service technician immediately to have the unit checked and to replace the parts of the control and gas valves that were under water.

11.2 Making boiler ready for operation

STOP! First read the safety instructions on → page 30 of this manual.

1. Carry out leak test (→ page 29). Wait five (5) minutes until all gas residues have dissipated. Finally check whether there is any smell of gas, including at floor level. If there is a gas odor: **STOP!** Follow instructions in section "B" of the safety instructions on → page 30 of this manual. If there is no sign of a gas odor, continue with the next step.
2. Open main gas valve.

11.2.1 Placing heating system with aquastat control in operation

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

3. Switch on ON/OFF switch (building side) (ON position). This switches on the boiler with all its components. Then continue with step 7.
4. Make sure that the room thermostat signals a heat requirement (set thermostat at least 10 °F above room temperature).

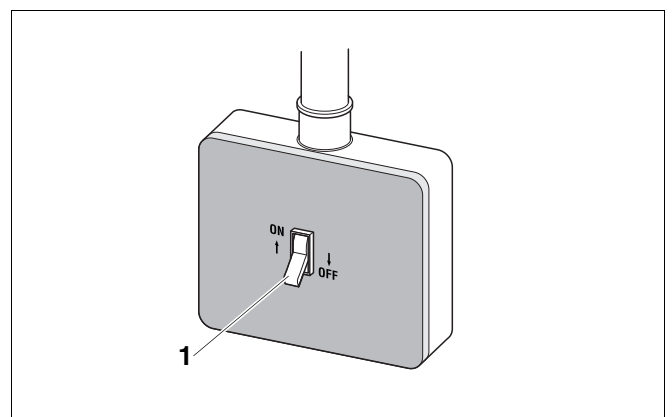


Fig. 25 Switching on heating system (with aquastat)

1 ON/OFF switch (main switch)

11.2.2 Placing heating system with Logamatic 2107 (accessory) in operation

The boiler is fully functional with the factory-installed aquastat. The Logamatic 2107 control can also be installed in addition to the factory-installed aquastat.

Switch on the heating system with the ON/OFF switch on the control. The burner starts operating if heat is required (→ observe control service manual).

5. Make sure that heat is required at the control. Select "Manual operation" (hand symbol) with the mode selector switch.
6. Switch on ON/OFF switch ("I" position). Then continue with step 7.



USER NOTE

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

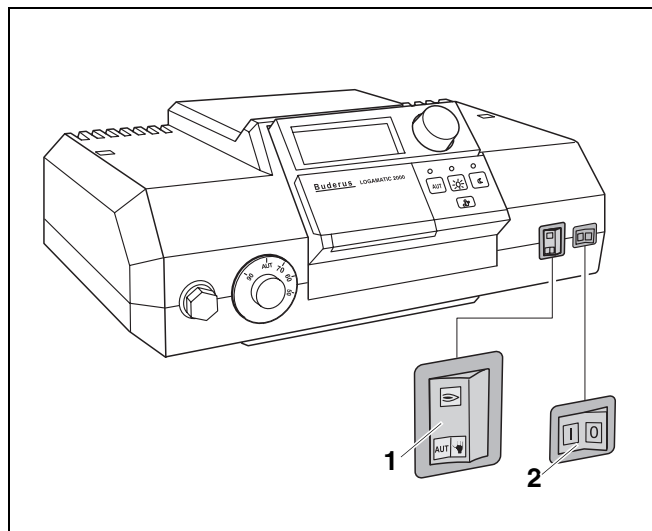


Fig. 26 Switching on heating system (with Logamatic 2107 control)

- 1 Mode selection switch
- 2 ON/OFF switch

11.2.3 Then carry out start-up procedures.

The following start-up procedures must be carried out regardless of the control type.

7. Look at the igniter through the sight glass in the burner housing.

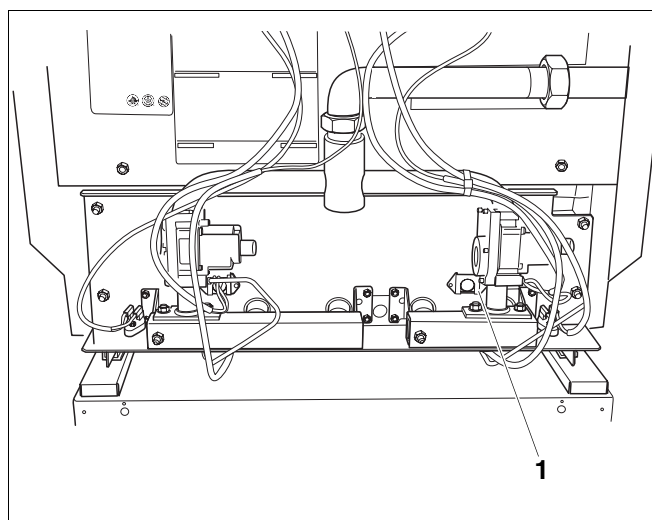


Fig. 27 Front view

- 1 Sight glass

8. Turn gas valve ON/OFF switch counterclockwise to ON position.
9. The automatic igniter must generate 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 valve. Disconnect heating system from the power supply and inform your customer service technician or gas company.
10. 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 ON/OFF switch on gas valve clockwise to the OFF position. Disconnect heating system from the power supply and set the thermostat to the lowest setting.
11. Seal leaks. Repeat steps 1 and 2 (regardless of the control in use).

Caution:

With aquastat control continue with steps 3 and 4, with the Logamatic 2107 continue with steps 5 and 6.

Then repeat steps 7 to 10 regardless of the control in use.

12. Check the gas supply pressure at the connection while the boiler is operating. The supply pressure for natural gas must be between 7" and 10.5" W.C. and between 11" and 13" W.C. for propane gas. Record the measured values in the commissioning protocol in the installation and maintenance instructions.

G334 X	Natural gas [inch W.C.]	Propane [inch W.C.]
73	4.4	10.4
92	4.4	10.3
116	4.1	10.3
132	4.2	10.2

Tab. 7 Manifold pressure

13. Check manifold pressure. The manifold pressure must be set in accordance with the values in → Tab. 7. To set the manifold pressure the cover (→ Fig. 28) on the gas valve must be removed. Turn the adjustment screw clockwise to increase the pressure and counterclockwise to reduce the pressure. This setting must be adjusted while the boiler is operating.
14. Record the set value in the commissioning protocol of the installation and maintenance instructions and screw the safety screw (→ Fig. 28) into the gas valve again.

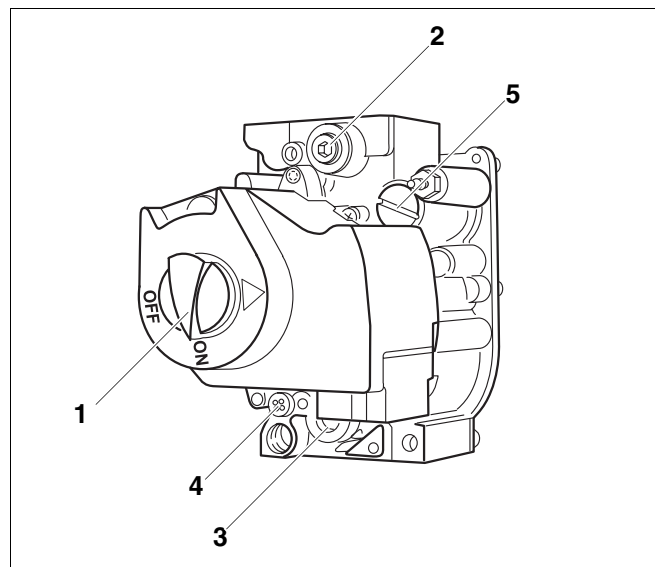


Fig. 28 Gas valve

- 1 ON/OFF button (at ON position)
- 2 Screw plug for gas supply pressure measuring port
- 3 Screw plug for manifold measuring port
- 4 Safety screw for pilot pressure setting
- 5 Safety screw for inlet pressure setting

15. Observe pilot flame through the sight glass (→ Fig. 27, page 32) in the burner housing.
16. The flame must envelope the flame guard 1/2 to 1 1/2 inches. If this is the case continue with step 20.
17. If the pilot flame is too small or too large, the pressure for the pilot must be adjusted with the corresponding adjustment screw.



USER NOTE

The adjustment screw is behind the ignition gas pressure adjustment safety screw (→ Fig. 28, page 33).

18. Remove safety screw for pilot pressure setting (→ Fig. 28, page 33). Turn the inner adjustment screw clockwise to reduce the pilot flame and counterclockwise to enlarge the pilot flame.
19. After adjustment tighten the pilot gas pressure adjustment safety screw (→ Fig. 28, page 33) again.
20. Observe main burner flame through the sight glass (→ Fig. 27, page 32) in the burner housing. 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 (→ Fig. 28, page 33) on the gas valve 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 company.

Checking ignition safety switch

21. Test the safety switch by closing the gas shut-off valve. The main burner flame (→ Fig. 30) and the pilot flame (→ Fig. 29) 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 automatic igniter must switch to lock status and stop generating sparks.
23. Disconnect the heating system from the power supply. Open main gas valve. Switch on unit power supply. A normal operating cycle must follow.
24. If the gas valve operates correctly, proceed to step 25. If the gas valve does not operate correctly, switch ON/OFF switch (→ Fig. 31) on the gas valve clockwise to the OFF position immediately. Close main gas valve. Disconnect heating system from the power supply and inform the customer service technician or gas company.

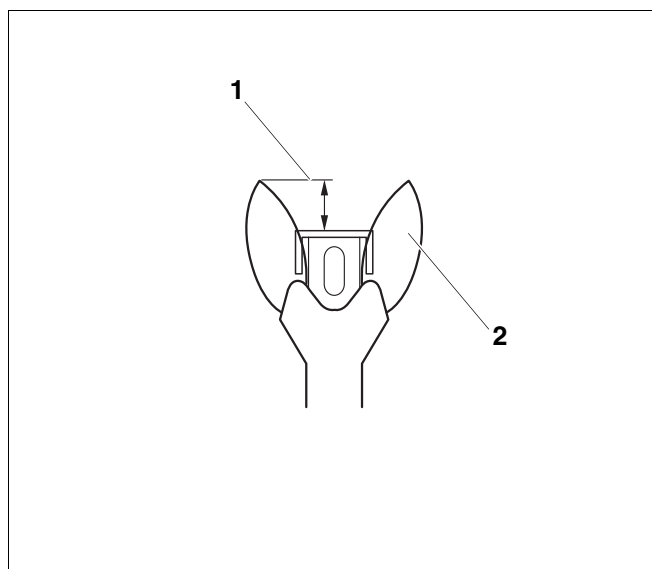


Fig. 29 Correct pilot flame setting

- 1 1/2 to 1 1/2 inches
- 2 Pilot flame

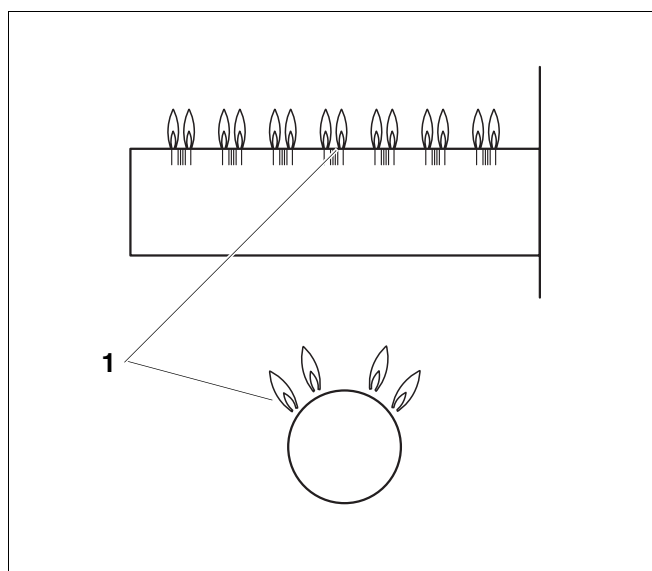


Fig. 30 Main burner

- 1 Main burner flame

25. Turn gas valve ON/OFF button clockwise to OFF position.
26. Close main 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 manifold pressure from the gas valve and close the openings with the screw plugs.
29. Repeat steps 1 to 10 (depending on the control) and 20 to restart the heating system. Check the screw plugs for leaks with soap solution. If no leaks are found, continue with step 31. If leaks are found, close gas valve and switch ON/OFF button on gas valve clockwise to the OFF position. Disconnect the heating system from the power supply.
30. Seal leaks. Open gas shut-off valve and repeat step 24.
31. Carefully wipe away the soap solution to prevent corrosion caused by the alkali content of the soap.
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 2107 control is reached. Record the result in the commissioning protocol of the installation and maintenance instructions.
33. Replace front panel of boiler.

With the Logamatic 2107 control only

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

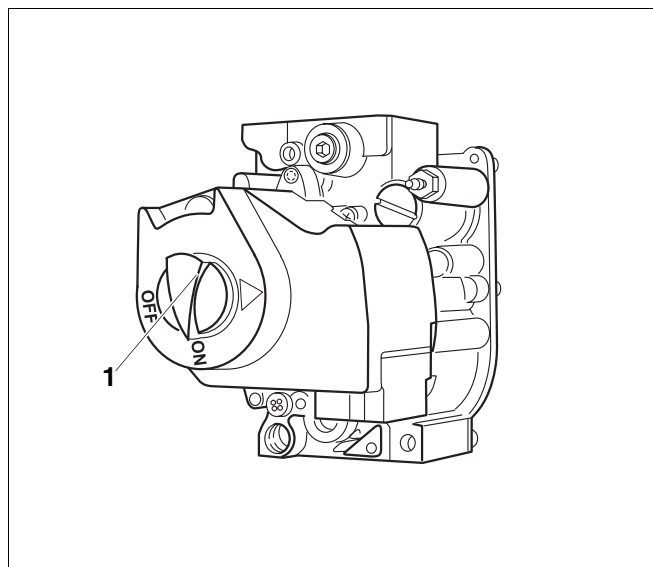


Fig. 31 Gas valve

1 ON/OFF button (at ON position)

11.3 Shutting off gas supply to boiler

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

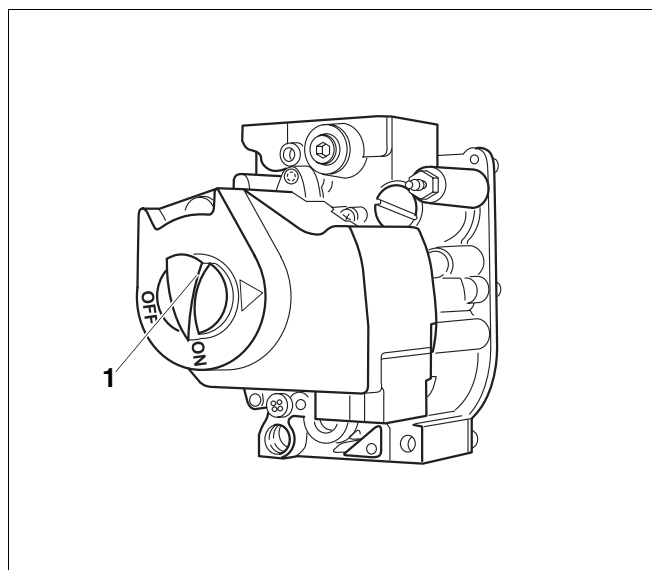


Fig. 32 Gas valve

1 ON/OFF button (at ON position)

4. Hang front boiler panel from above, fold down and screw in securing screws into the front panel of the boiler below.

11.4 Instruct owner/operator and hand over technical documentation

Inform the owner/operator of the operation of the complete heating system and the operating instructions for the boiler. Together with the owner sign the protocol on → page 37 and hand over the technical documentation.

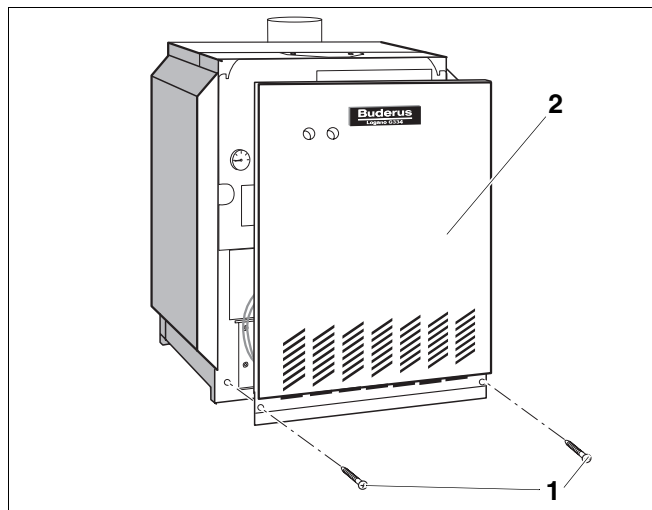


Fig. 33 Install front boiler panel

1 Screws

2 Boiler front panel



CAUTION!

SYSTEM DAMAGE

due to frost.

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

- Protect the heating system from freezing when there is a danger of frost.
- If the main switch or control is switched off, drain the water from the boiler, the tank and the pipe of the heating system.

11.5 Start-up protocol

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

Start-up work	Page	Remarks or measured values
1. Type of gas		<input type="checkbox"/> Natural gas <input type="checkbox"/> Propane
2. Check combustion air, inlet and outlet openings and flue gas connection	page 24	<input type="checkbox"/>
3. Check the unit fittings (correct orifices? See → Tab. 8 below) and convert gas type if necessary	page 37	<input type="checkbox"/>
4. Fill boiler with water and bleed complete heating system	page 22	<input type="checkbox"/>
5. Measure gas supply pressure (flow pressure)	page 29	_____ inches W. C.
6. Measure manifold pressure and adjust if necessary	page 29	_____ inches W. C.
7. Leak check in operating status, check pilot and main burner flame and correct functioning of the venting system	page 34	<input type="checkbox"/>
8. Check maximum aquastat	page 35	<input type="checkbox"/>
9. Install front boiler panel	page 36	<input type="checkbox"/>
10. Inform operator, hand over technical documentation	page 36	<input type="checkbox"/>
11. Installer Operator:		Signature: _____ Signature: _____

Boiler size	Main gas orifice identification for altitudes [feet]							
	0-8500				8501-12000			
	73	92	116	132	73	92	116	132
Natural gas	360 ¹⁾	370 ¹⁾	390 ¹⁾	390 ¹⁾	355 ²⁾	365 ²⁾	385 ²⁾	385 ²⁾
Propane gas	235 ²⁾	240 ²⁾	250 ²⁾	250 ²⁾	230 ²⁾	235 ²⁾	245 ²⁾	245 ²⁾

Tab. 8 Main gas orifice identification

1) factory setting

2) use conversion parts only as directed by the technical documentation

12 Taking the boiler out of operation

12.1 Normal boiler shut-down

1. With the aquastats:
Switch off ON/OFF switch ("OFF" position). This shuts down the boiler with all components (e.g. burner).
2. Additional shut-down procedure → follow the directions for the aquastats.

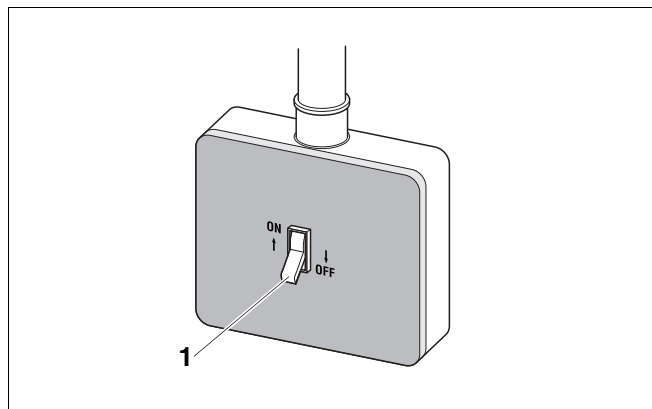


Fig. 34 Shutting down heating system (with aquastat)
1 ON/OFF switch (main switch)

3. Logamatic 2107 control (accessory):
Switch off ON/OFF switch on control ("0" position). This shuts down the boiler with all components (e.g. burner).
4. Shut off main fuel supply valve.

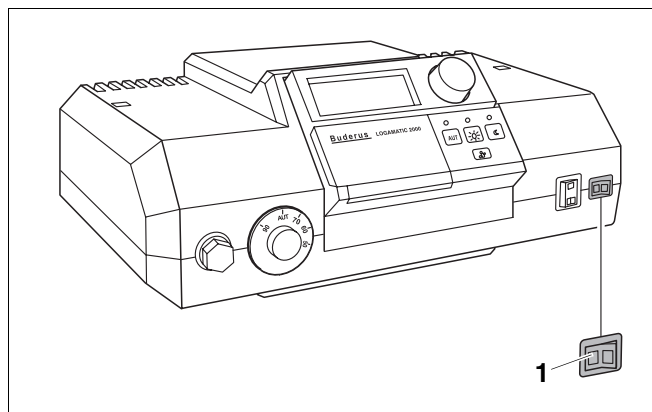


Fig. 35 Shutting down heating system (with Logamatic 2107 control)
1 ON/OFF switch



SYSTEM DAMAGE

through frost.

CAUTION!

The heating system can freeze up in cold weather if it is shut down.

- Leave the heating system switched ON constantly as much as possible.
- Protect the heating system from freezing by draining the heater and water pipes at the lowest point.

12.2 Emergency shut-down

Inform your customer of the procedure in case of emergency, such as a fire.

1. Never put yourself at risk. Your own safety must always take priority.
2. Shut off main fuel supply valve.
3. Shut down the heating system with the heater emergency switch or the corresponding circuit-breaker.

13 Boiler inspection and maintenance

13.1 Why is regular maintenance important?

Heating systems require regular maintenance for the following reasons:

- To maintain high efficiency operation and to operate the heating system economically (low fuel consumption).
- To sustain safe operation.
- To maintain combustion at an environmentally friendly level.

All maintenance work must be carried out by a qualified customer service technician only. When replacing components use only parts approved by Buderus. Maintenance is required once a year. Record the results of the inspection in the protocol at → page 46.



USER NOTE

Spare parts can be ordered from the spare parts catalog.

13.2 Testing the flue system, including combustion air, air inlets and Ventilation 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 feed and the inlets and outlets are not blocked at any point.

13.3 Inspection of the boiler and burner

1. Visually check the boiler and burner for external dirt.
2. If dirt is found, clean boiler and burner.

13.4 Preparing boiler for cleaning

1. Take the boiler out of operation (→ Chapter 12.1, page 38).



RISK TO LIFE

from electric shock.

WARNING!

- Before opening a unit: disconnect electrical power completely and lock to prevent accidental reconnection.

2. Remove front panel of boiler (→ Fig. 23, page 28).



RISK TO LIFE

from explosion of flammable gases.

WARNING!

- Never work on gas lines unless you are licensed for this type of work.

- Turn gas valve ON/OFF button clockwise to OFF position. Do not use force.



WARNING!

RISK TO LIFE

from explosion of flammable gases.

- Wait five (5) minutes until all gas residues have dissipated. Check whether there is any smell of gas, including at floor level. If there is a gas odor: STOP! Follow instructions in section "B" of the safety instructions on → page 30 of this manual. If there is no sign of a gas odor, continue with the next step.

13.5 Cleaning the boiler

The boiler can be cleaned with brushes and/or by wet cleaning. Cleaning tools are available as accessories.

13.5.1 Cleaning the boiler with brushes

Remove burner:



WARNING!

RISK TO LIFE

from electric shock.

- Label all electrical wiring before disconnecting it for cleaning the boiler. If cables are connected incorrectly the system may not operate correctly with possibly dangerous consequences.
- After maintenance test the heating system for proper function.



WARNING!

RISK TO LIFE

from electric shock.

- Before opening a unit: disconnect electrical power completely and lock to prevent accidental reconnection.

- Disconnect your heating system from the mains electricity supply.
- Shut off main gas supply valve.

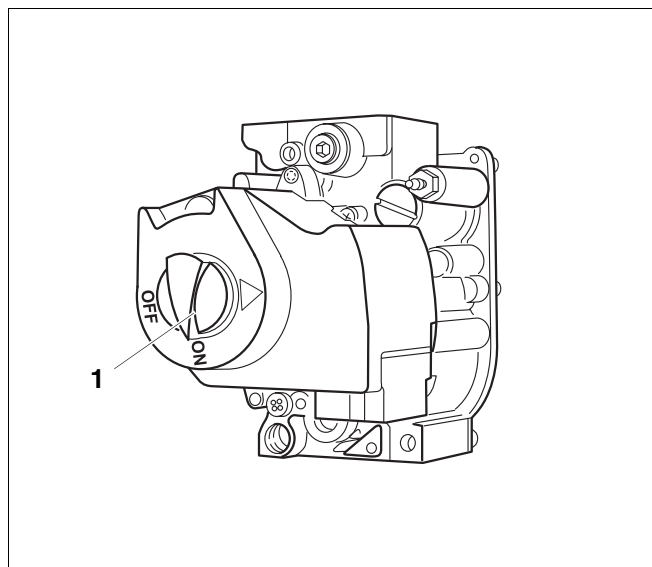


Fig. 36 Gas valve

1 ON/OFF button (at ON position)

3. Disconnect pilot gas line from gas valve.
4. Disconnect ignition cable from automatic ignition.
5. Tie gas line with wire or cord (secure).
6. Unscrew retaining screws of gas supply line at burner. Place the gas connection pipe gasket in a safe place.
7. Check gasket for damage and replace if damaged.
8. Label connection lines of flame roll-out switch and disconnect from the flame roll-out switch.

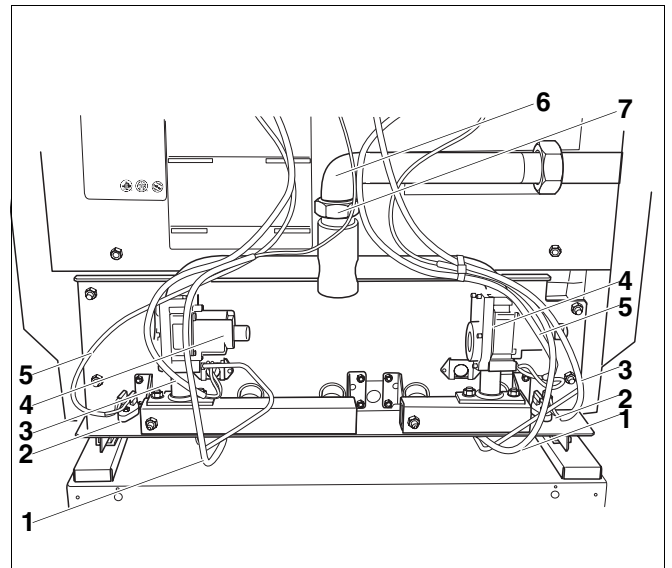


Fig. 37 Front view

- 1 Ignition cable
- 2 Flame roll-out switch
- 3 Connection lines to the gas valve
- 4 Gas valve
- 5 Connection lines to the flame roll-out switch
- 6 Gas supply line
- 7 Retaining screw on the gas supply line

9. Unscrew nuts and remove burner
10. When removing the burner make sure that the spacers remain on the studs.

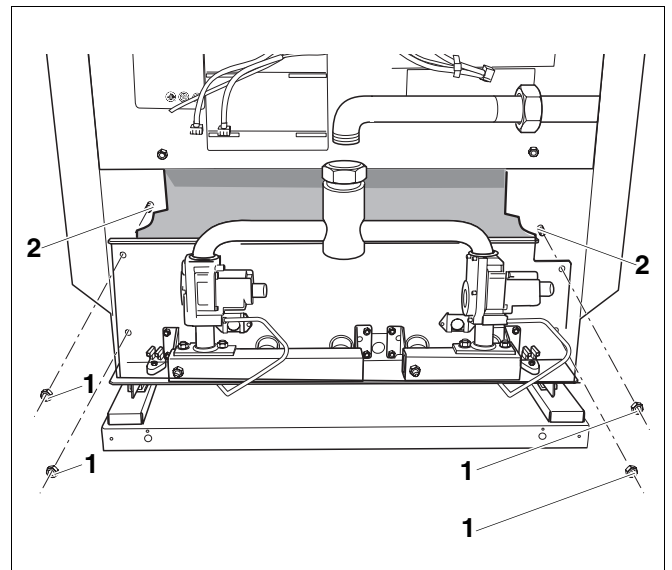


Fig. 38 Removing burner

- 1 Fixing nuts
- 2 Threaded studs

11. Remove boiler jacket and thermal insulation.
12. Unscrew cleaning cover from the venting manifold.
13. Cover control with foil to prevent entry of metal dust into the control.
14. Use boiler brush to clean out flue gas passages.
15. Clean combustion chamber and bottom panel.
16. Screw cleaning cover into place and replace insulation.
17. Install boiler jacket.

13.5.2 Wet cleaning (chemical cleaning)

For the wet cleaning use a suitable cleaning agent for the degree of build-up of dirt (soot or scale).

Use the same procedure as described for cleaning with brushes (→ Chapter 13.5.1, page 40).



USER NOTE

Observe the directions for use of the cleaning agent. In some case you may need use a different procedure from that described here.

18. Cover control with foil to prevent entry of spray into the control.
19. Ventilate boiler room well.
20. Spray flue gas vents evenly with the cleaning agent.
21. Assemble and install the burner in reverse order of removal and disassembly (→ page 40).
22. Check gasket for damage and replace if damaged.
23. Place the heating system in operation.
24. Heat the boiler water to a temperature of at least 122 °F.
25. Take the boiler out of operation.
26. Allow boiler to cool.
27. Remove burner (→ page 40).
28. Brush out flue gas passages.
29. Clean combustion chamber and bottom panel.
30. Ventilate boiler room well again.
31. Install burner.

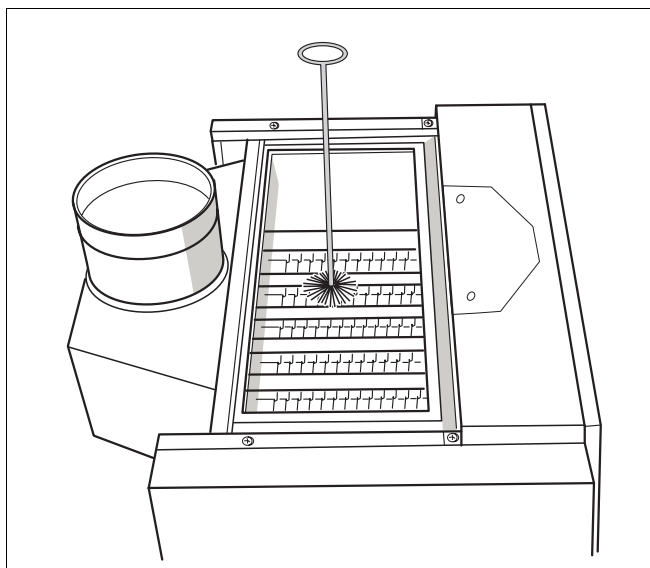


Fig. 39 Cleaning the hot flue passages

- 1 Cleaning brush
- 2 Lagging

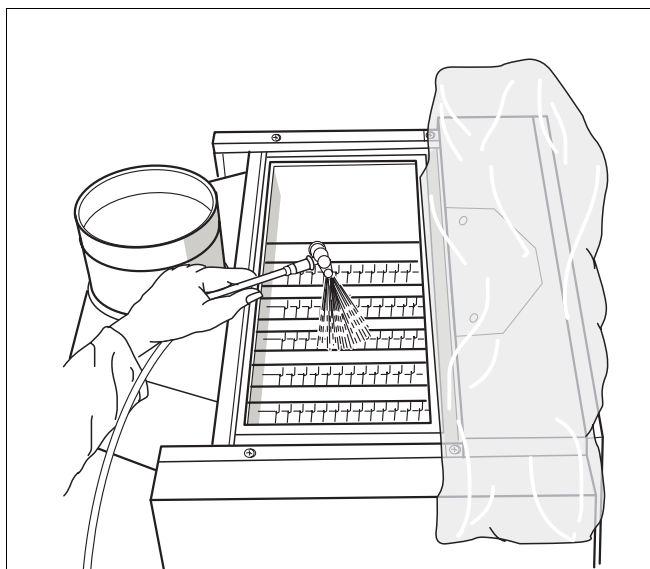


Fig. 40 Wet-cleaning the boiler

13.6 Cleaning the burner

1. Remove burner (→ page 40).
2. Check burner rods for dirt. If necessary, clean burner as described below.
3. Unscrew pilot burner assembly from burner.
4. Disconnect pilot gas line from pilot burner assembly.
5. Remove pilot gas jet and blow out.
6. Immerse burner rods in water with cleaning agent and brush off.



USER NOTE

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

7. Rinse out burner rods with a water jet; hold burner so water enters all slots if the burner rods and drains out again.

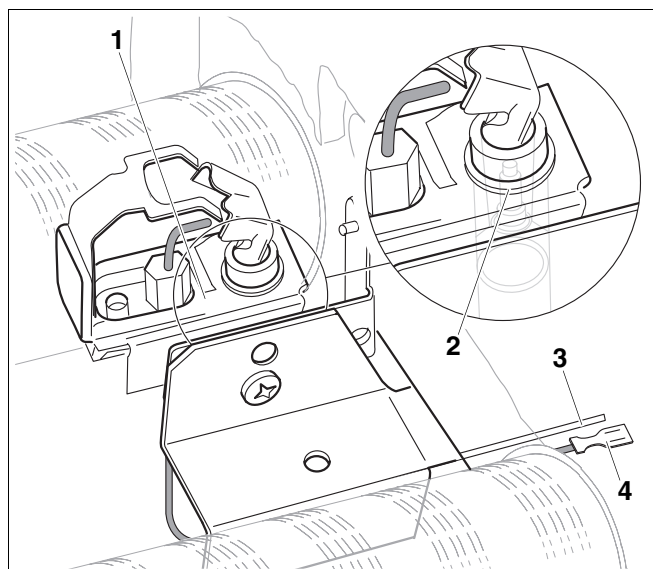


Fig. 41 Pilot burner assembly

- 1 Pilot burner assembly
- 2 Pilot gas orifice
- 3 Pilot gas line
- 4 Ignition cable

8. Remove remaining water by swinging the burner.
9. Check that the slots of the burner rods are free. Remove water and dirt residue in the slots. If any slots are damaged the burner must be replaced.
10. Assemble and install the burner in reverse order of removal and disassembly (→ page 40).
11. Replace gaskets if necessary.
12. Place boiler in operation as directed in → Chapter 11 "Placing the heating system in operation", page 28 to page 37.
13. Check operation of aquastat.
14. Test low water alarm if installed.
15. 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.



WARNING!

RISK TO LIFE

from explosion of flammable gases.
After maintenance work leaks may occur in pipes and threaded fastenings.

- Make a thorough check for leaks.
- Use only approved leak testing agents to search for leaks.

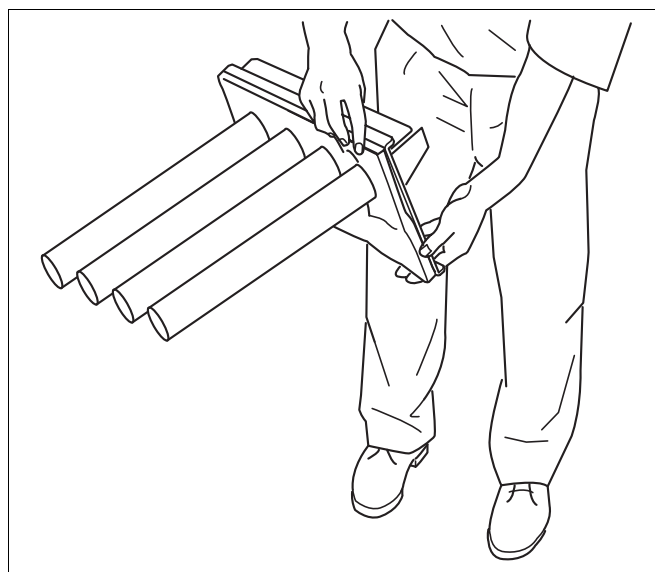
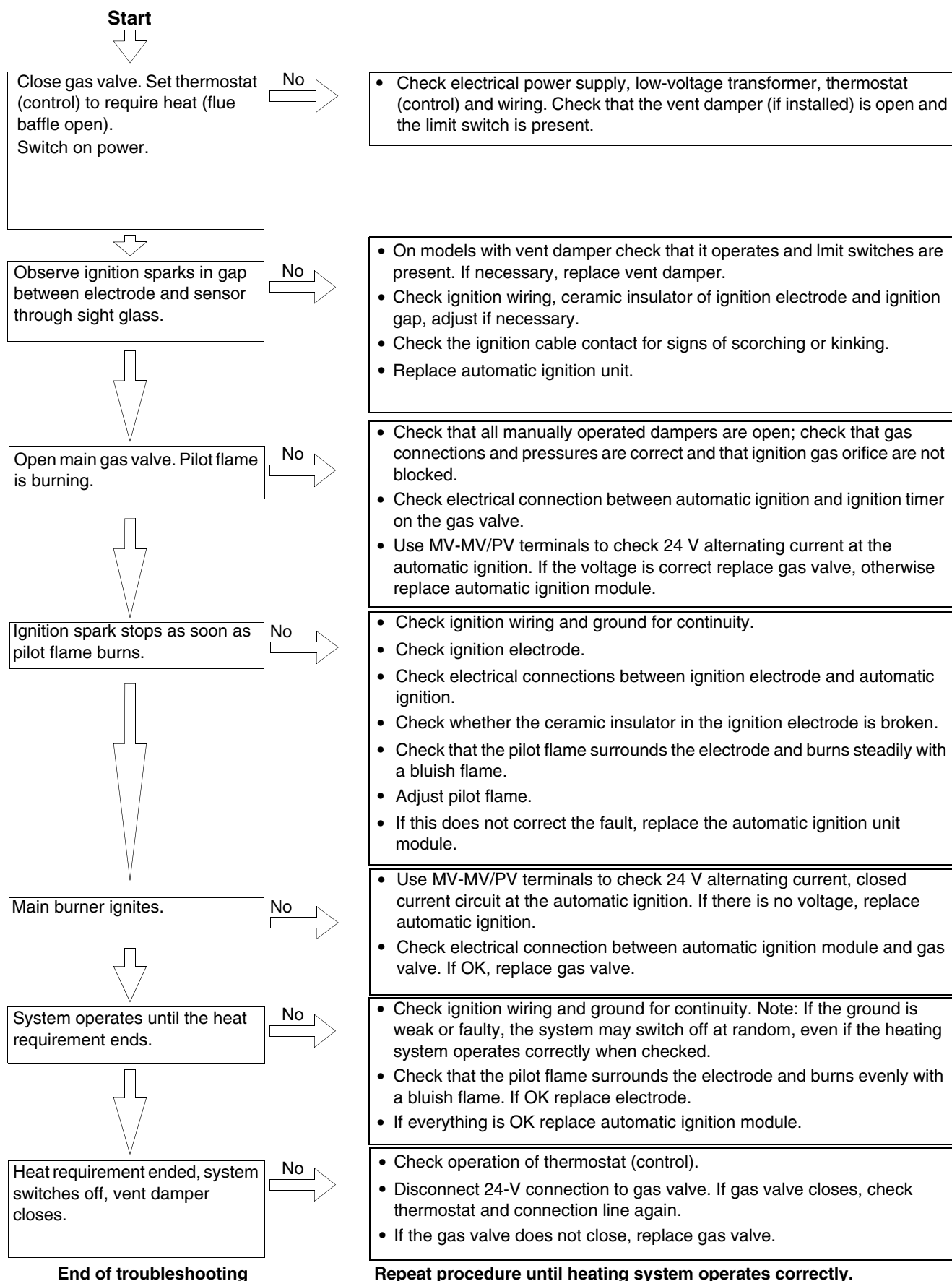


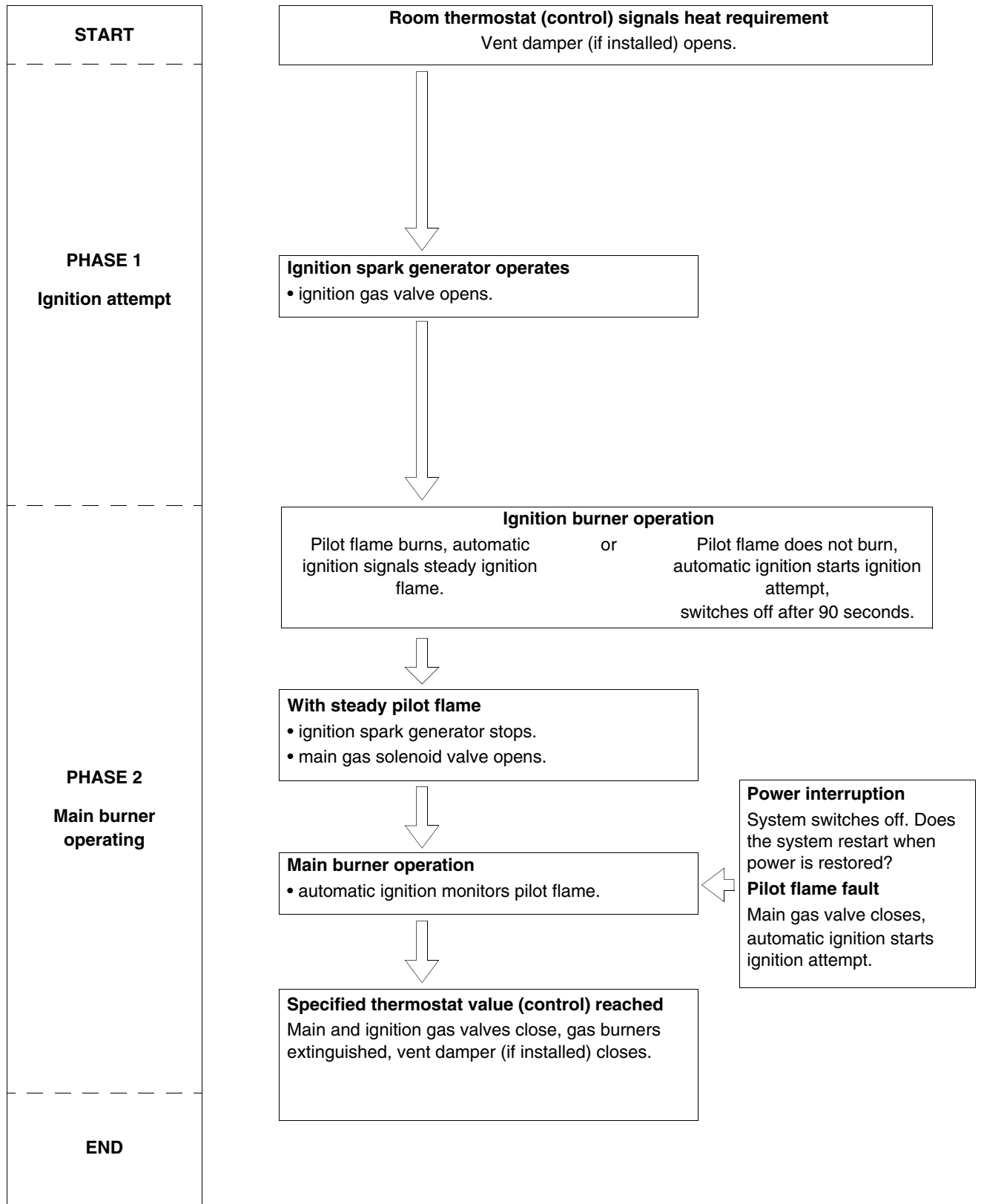
Fig. 42 Swinging burner

Complete the maintenance protocol to confirm that all maintenance work has been conducted. Sign the maintenance protocol and discuss it with the owner of the heating system.

13.7 Troubleshooting on the G334 X

Equipment required: Wiring diagrams (→ Chapter 16, page 67) and voltage detectors for 120 VAC and 24 VAC.





13.8 Maintenance protocol

Please check off the maintenance work as it is completed and record the measured values.
Follow the instructions on the following pages.

Maintenance work	Page	Date:	Date:
1. Inspection of the flue system including combustion air, inlet and outlet openings	page 39	<input type="checkbox"/>	<input type="checkbox"/>
2. Inspection of boiler	page 39	<input type="checkbox"/>	<input type="checkbox"/>
3. Inspection of burner	page 39	<input type="checkbox"/>	<input type="checkbox"/>
4. Cleaning boiler	page 40	<input type="checkbox"/>	<input type="checkbox"/>
5. Cleaning burner	page 43	<input type="checkbox"/>	<input type="checkbox"/>
6. Measuring gas supply pressure	page 29	_____ inches W. C.	_____ inches W. C.
7. Measuring manifold pressure	page 33	_____ inches W. C.	_____ inches W. C.
8. Checking for leaks in operating condition	page 29	<input type="checkbox"/>	<input type="checkbox"/>
9. Checking pilot and main burner flame	page 34	<input type="checkbox"/>	<input type="checkbox"/>
10. Check maximum aquastat	page 43	<input type="checkbox"/>	<input type="checkbox"/>
11. Check the area around the boiler for flammable materials, gasoline or other corrosive liquids.	page 43	<input type="checkbox"/>	<input type="checkbox"/>
12. Confirm maintenance		<input type="checkbox"/>	<input type="checkbox"/>
Confirmation of correct maintenance (company stamp, signature)			

Date:	Date:	Date:	Date:	Date:
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____ inches W. C.	_____ inches W. C.	_____ inches W. C.	_____ inches W. C.	_____ inches W. C.
_____ inches W. C.	_____ inches W. C.	_____ inches W. C.	_____ inches W. C.	_____ inches W. C.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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14 Parts lists

The following spare parts are available for Buderus heating systems. If there are more than one Buderus article numbers at one item number, these numbers are listed in the columns corresponding to the various models. In other cases the number of components is shown.

Jacket assembly (→ Fig. 43)

Item no.	Description	Buderus article number	Model 73 Quantity/m odel	Model 92 Quantity/m odel	Model 116 Quantity/m odel	Model 132 Quantity/m odel
10	Jacket complete	05024-	250	252	254	256
20	Left side jacket panel	63002797	1	1	1	1
30	Clip nut SNU-5743	05834364	2	2	2	2
40	Right side jacket panel	63003095	1	1	1	1
50	Front jacket panel	05024-	037	039	041	043
60	"Buderus" plate	67902841	1	1	1	1
70	Top front jacket panel	05024-	067	069	071	073
80	Top back jacket panel	05024-	087	089	091	093
90	Cover panel	63016429	1	1	1	1
	Mounting kit no. 1	05015951	1	1	1	1

Tab. 9 Jacket assembly

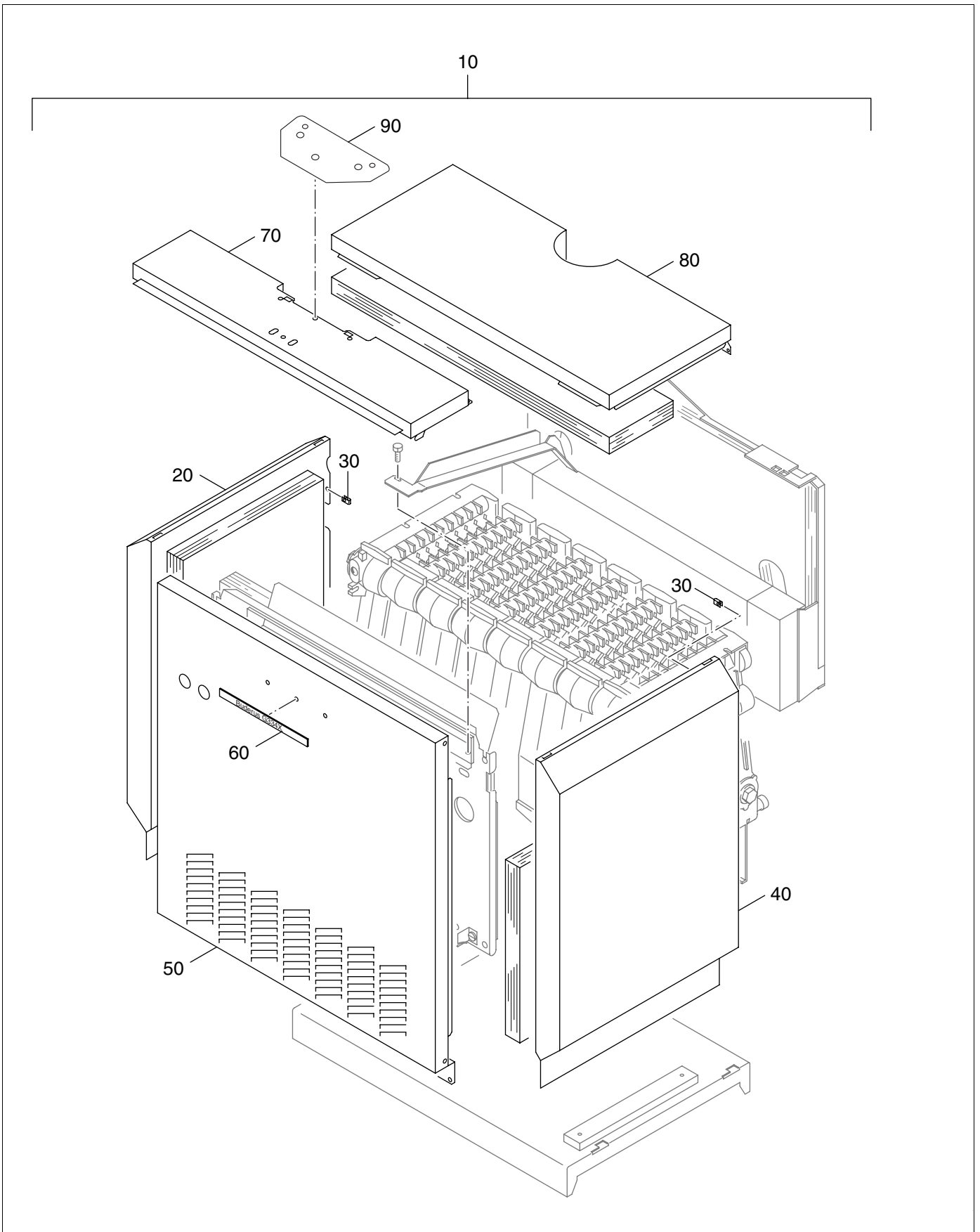


Fig. 43 Boiler jacket

Block assembly - component parts (→ Fig. 44)

Item no.	Description	Buderus article number	Model 73 Quantity/model	Model 92 Quantity/model	Model 116 Quantity/model	Model 132 Quantity/model
10	Block assembly	67900-	361	362	363	365
20	Mounting Plate	05015257	2	2	2	2
30	Non-combustible base	05024-	146	148	150	152
40	Bolt M8x25	see M-kit no. 2	4	4	4	4
50	Spring ring	see M-kit no. 2	4	4	4	4
60	Nut M8-8-A3K	see M-kit no. 2	4	4	4	4
70	Block clamp	see M-kit no. 2	4	4	4	4
80	Return pipe	05584754	1	1	1	1
90	Supply pipe	05584752	1	1	1	1
100	3/4" Elbow	99908401	1	1	1	1
110	Safety relief valve	05947650	1	1	1	1
120	Black jacket panel	63002-	789	793	794	795
130	Clip nut SNU-5743	see M-kit no. 2	2	2	2	2
140	Back screening panel	05512-	532	534	536	538
150	Screw C-ST4.8x22	see M-kit no. 2	2	2	2	2
160	Insulation plate	05015273	2	2	2	2
170	Immersion well R3/4"x100 compl.	05446065	1	1	1	1
180	Cable way	05495471	1	1	1	1
190	Screw 3.5x9.5-A3T	see M-kit no. 2	1	1	1	1
200	Insulation	67900567	1	1	1	1
210	Middle panel	63002-	768	769	770	771
220	Tridicator set	05900076	1	1	1	1
230	Flue collector	05321-	772	774	776	779
240	Flueway access panel	05371-	926	928	930	932
250	Gasket cord GP6x1825	63020958	1	-	-	-
250	Gasket cord GP6x2185	63020958	-	1	-	-
250	Gasket cord GP6x2545	63020958	-	-	1	-
250	Gasket cord GP6x2905	63020958	-	-	-	1
250	Gasket cord GP6x10000	05822706	-	-	-	-
	Sealling material Buderus-3055	63014361	1	1	1	1
260	Bolt M6x16-MS	see M-kit no. 3	2	2	2	2
270	Washer A6.4	see M-kit no. 3	2	2	2	2

Tab. 10 Block assembly

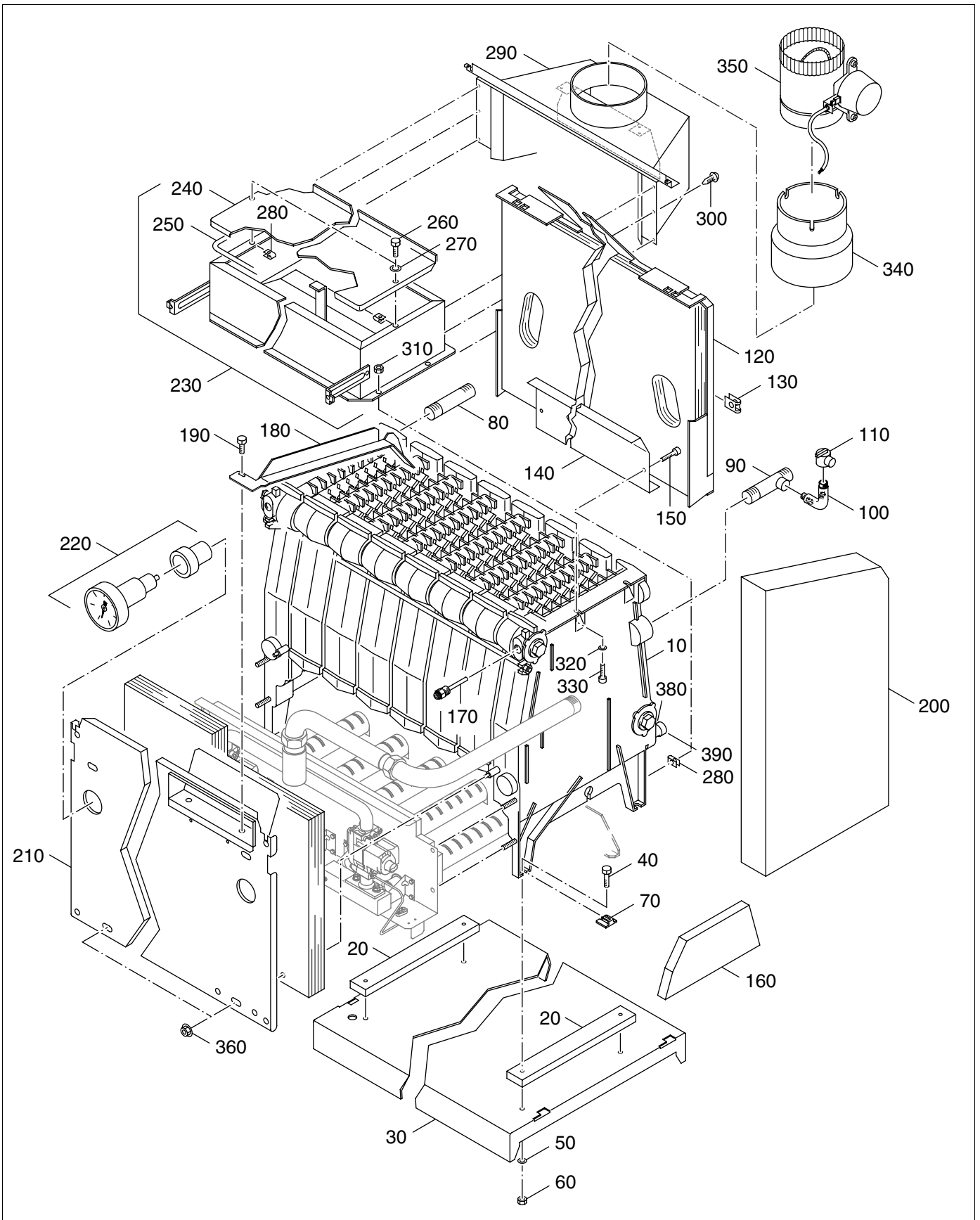


Fig. 44 Block assembly

Block assembly - component parts (→ Fig. 45)

Item no.	Description	Buderus article number	Model 73 Quantity/model	Model 92 Quantity/model	Model 116 Quantity/model	Model 132 Quantity/model
280	Cage nut M6-A3F-MCU5315	see M-kit no. 3	2	2	2	2
	Cement PK-W11	02037038	1	1	1	1
290	Draft hood	05321-	830	832	834	836
300	Screw ST3.9x9.5A3T	see M-kit no. 3	6	6	6	6
310	M8 NUT	see M-kit no. 3	4	4	4	4
320	Washer	see M-kit no. 3	4	4	4	4
330	Bolt M8-25	see M-kit no. 3	4	4	4	4
340	Exhaust gas adapter 8" D 202.5M	05384508	1	-	-	-
340	Exhaust gas adapter 9" D 227.5M	05384510	-	1	--	
340	Exhaust gas adapter 10" D 227.5M	05384512	-	-	1	1
350	Vent damper	(optional)	1	1	1	1
360	Nut	see M-kit no. 2	2	2	2	2
	Mounting kit no. 2	05621818	1	1	1	1
	Mounting kit no. 3	05621819	1	1	1	1
380	Reducing bushing DIN2950 241 1"x3/4"	03869828	1	1	1	1
390	Extension tube DIN2950 526 3/4"x80	00320840	1	1	1	1

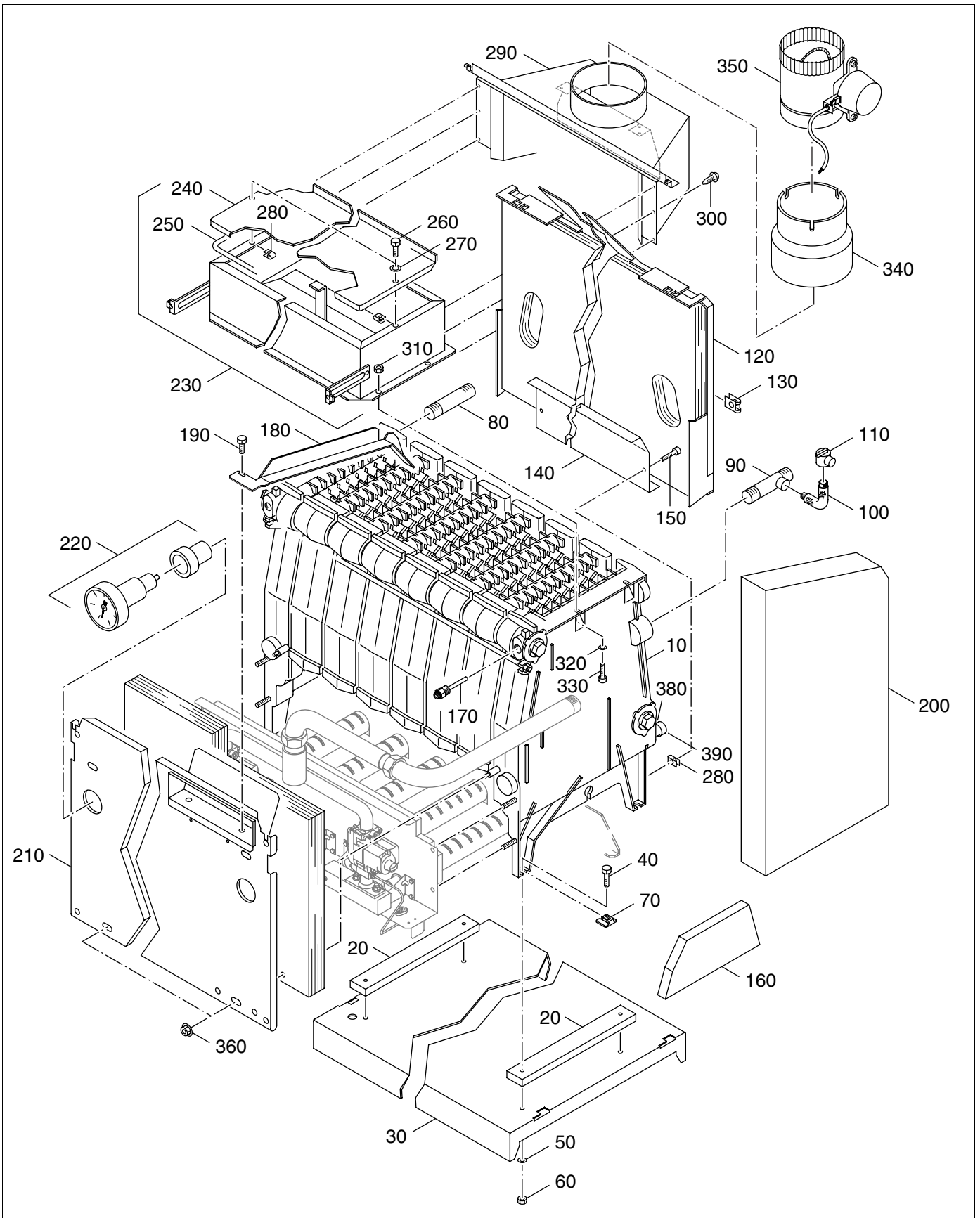


Fig. 45 Block assembly

Control GAW029 "US" (→ Fig. 46)

Item no.	Description	Buderus article number	Model 73 Quantity/model	Model 92 Quantity/model	Model 116 Quantity/model	Model 132 Quantity/model
10	Switch box GAWo29 00 "US"	63031170	1	1	1	1
	Available small parts:					
20	Aquastat relay L7148F	63015742	1	1	1	1
30	(x) self-tapping screw DIN7981 F ST3.5x25 A3K	s. Inst. Mat. GAW027/028/ 029	4	4	4	4
40	(x) terminal 4mm ² 4-pin	s. Inst. Mat. GAW027/028/ 029	1	1	1	1
50	(x) self-tapping screw DIN7981 F ST3.5x16 A3K	s. Inst. Mat. GAW027/028/ 029	2	2	2	2
60	Plug 3-pin green/black	05493465	1	1	1	1
70	Socket 3-pin green	07060912	1	1	1	1
80	Plug 3-pin black 93.923.4354	05493464	1	1	1	1
90	Socket 3-pin black 93.031.3253.0	07060911	1	1	1	1
100	(x) self-tapping screw DIN7981 F ST2.9x16 A3K	s. Inst. Mat. GAW027/028/ 029	4	4	4	4
110	Transformer 120V/24V "US" compl.	63015748	1	1	1	1
120	(x) serrated washer DIN6797 A4.3 A3K	s. Inst. Mat. GAW027/028/ 029	4	4	4	4
130	(x) self-tapping screw DIN7981 F ST3.5x6.5 A3K	s. Inst. Mat. GAW027/028/ 029	6	6	6	6
140	x burner control mounting panel GAW029		1	1	1	1
150	Automatic igniter S 8600H1006	63015743	2	2	2	2
160	(x) flathead screw ST3.9x9.5 A3K	s. Inst. Mat. GAW027/028/ 029	8	8	8	8
165	Burner control cover panel GAW029 compl.	63031172	1	1	1	1
	Comprising:					
170	x Burner control cover panel GAW029		1	1	1	1
180	x Burner control cover panel GAW029		1	1	1	1
120	(x) serrated washer DIN6797 A4.3 A3K	s. Inst. Mat. GAW027/028/ 029	2	2	2	2
130	(x) self-tapping screw DIN7981 F ST3.5x6.5 A3K	s. Inst. Mat. GAW027/028/ 029	2	2	2	2

Tab. 11 Control GAW029 "US" for G334 X

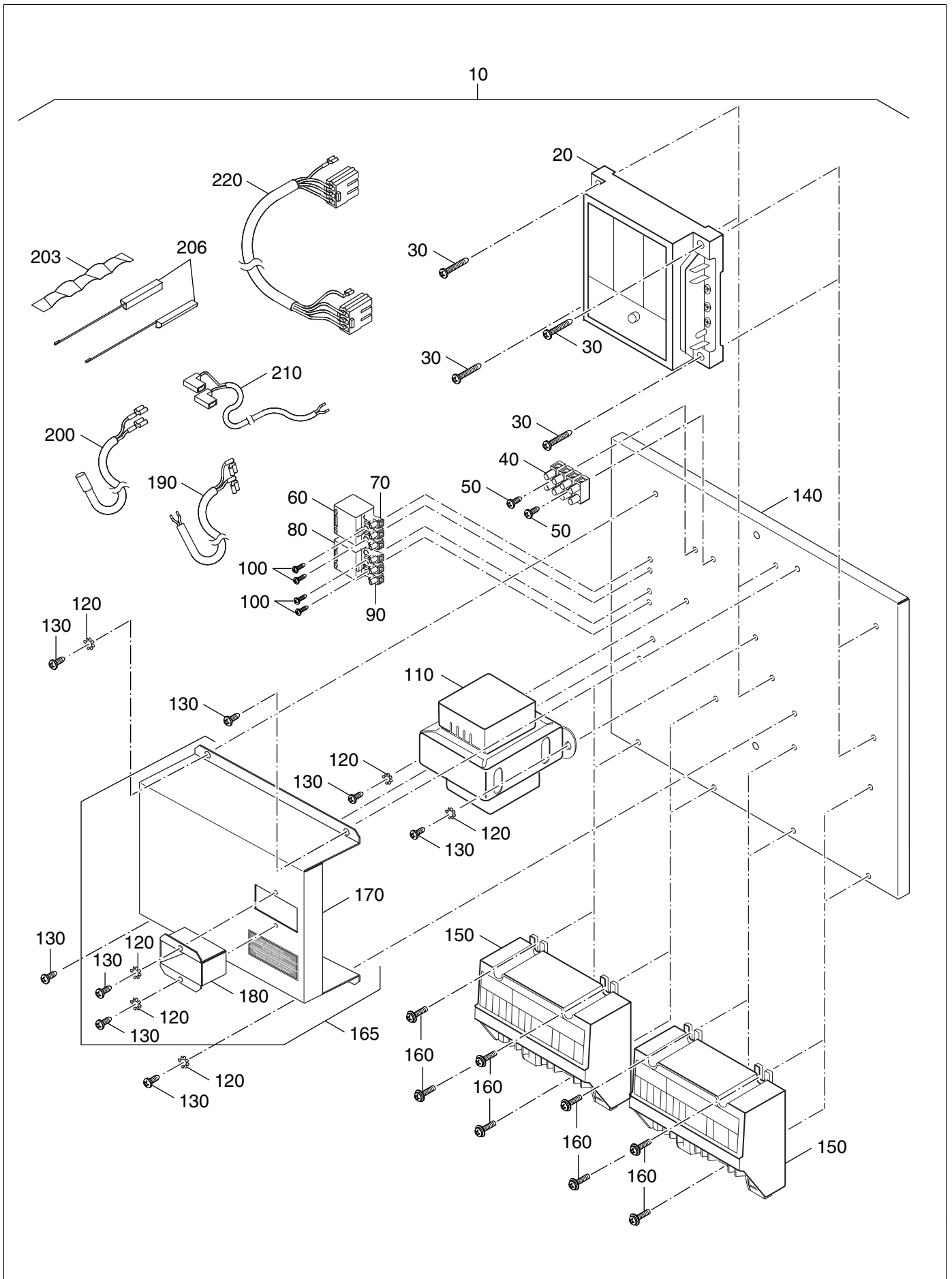


Fig. 46 Control GAW029 "US" for G334 X

We reserve the right to make any changes due to technical modifications.

Control GAW029 "US" (→ Fig. 47)

Item no.	Description	Buderus article number	Model 73 Quantity/model	Model 92 Quantity/model	Model 116 Quantity/model	Model 132 Quantity/model
190	Wiring harness GAW022/024/026/027	63015746	2	2	2	2
200	Temperature sensor 32004955-003B	63015749	1	1	1	1
203	Compensator spring	05446800	1	1	1	1
206	Blank for 1/4 annular sensor	7060110	2	2	2	2
210	Hose line AWG 2x18 063/076	63015745	2	2	2	2
220	Connection line	63015744	2	2	2	2
	Mounting material for GAW027/028/029 "US" (not shown)	63015810	1	1	1	1
	Comprising:					
	5x self-tapping screw DIN7981 F ST3.5x25 A3K					
	1 terminal 2mm ² 4-pin					
	5x self-tapping screw DIN7981 F ST3.5x16 A3K					
	5x self-tapping screw DIN7981 F ST2.9x 16 A3K					
	5x serrated washer DIN6797 A4.3 A3K					
	10x self-tapping screw Din7981 F ST3.5x6.5 A3K					
	5x flathead screw ST3.9x9.5 A3K					
	4x self-tapping screw DIN7981 2.9x25 A3K not shown – not for GAW029					
	2x self-tapping screw DIN7981 F ST3.5x9.5 A3K not shown – not for GAW029					

Tab. 12 Control GAW029 "US" for G334 X

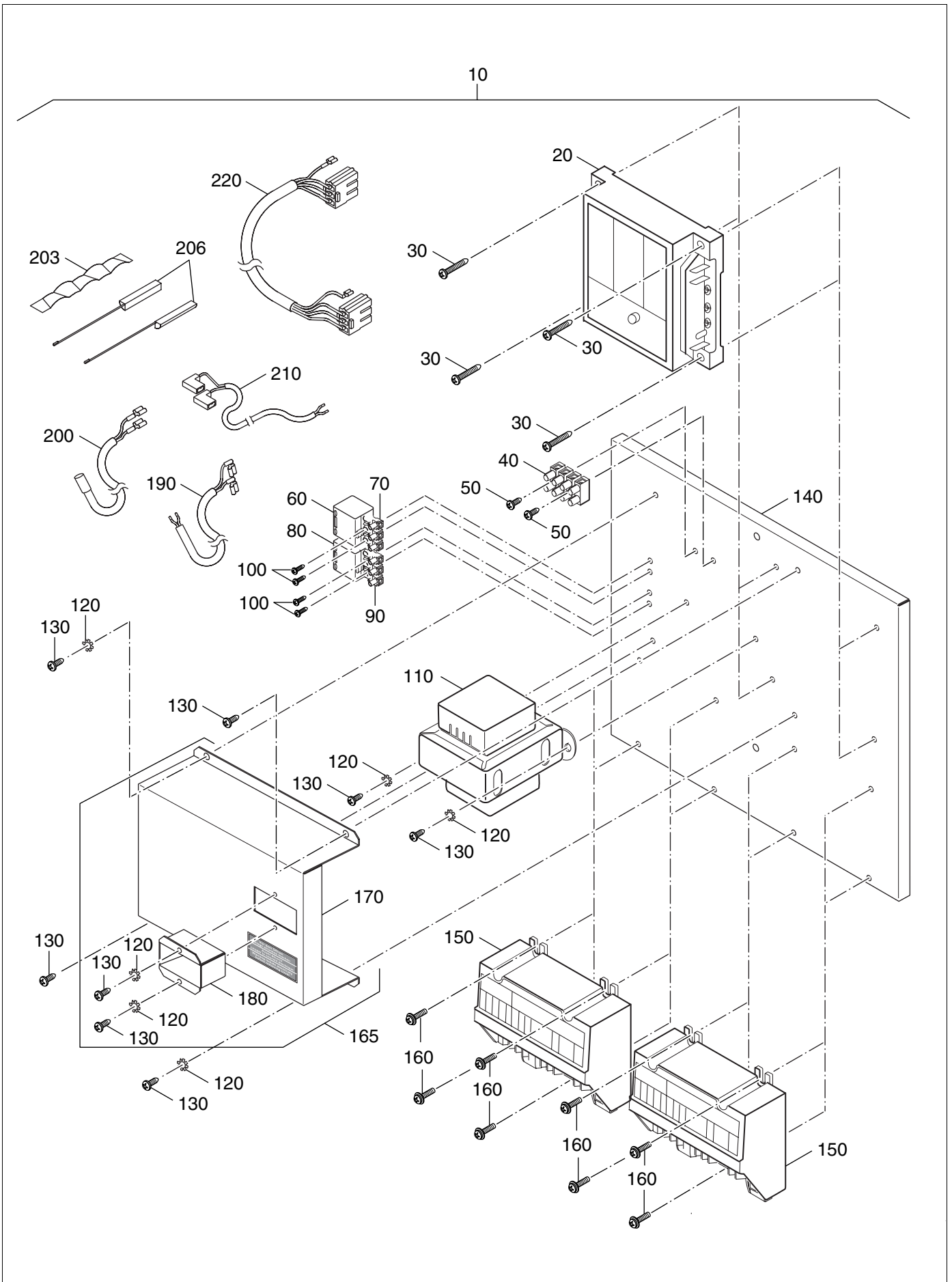


Fig. 47 Control GAW029 "US" for G334 X

We reserve the right to make any changes due to technical modifications.

Manifold - component parts (→ Fig. 48)

Item no.	Description	Buderus article number	Model 73 Quantity/model	Model 92 Quantity/model	Model 116 Quantity/model	Model 132 Quantity/model
10	Burner tray	6303-	0105	0106	0107	0108
20	Manifold pipe	05181874	2	2	2	2
30	M8 Nut	see M-kit no. 5	4	4	4	4
40	Gasket	05489280	6	6	6	6
50	Insulation including adhesive	05181-	860	862	864	866
60	Adhesive for insulation	02037312	1	1	1	1
	All orifices are for 0-8500 feet elevation. Contact Buderus for high altitude conversions					
70	Orifice kits NG-0-8500 ft	05484-	172	176	192	192
80	Gasket	05883094	5	6	7	8
90	Observation port	05447620	2	2	2	2
	Mounting kit no. 5	05181883	1	1	1	1
100	Flame roll-out switch 77° C	63030949	2	2	2	2
110	Screw M4x20	see M-kit no. 5	2	2	2	2

Tab. 13 Manifold - component parts

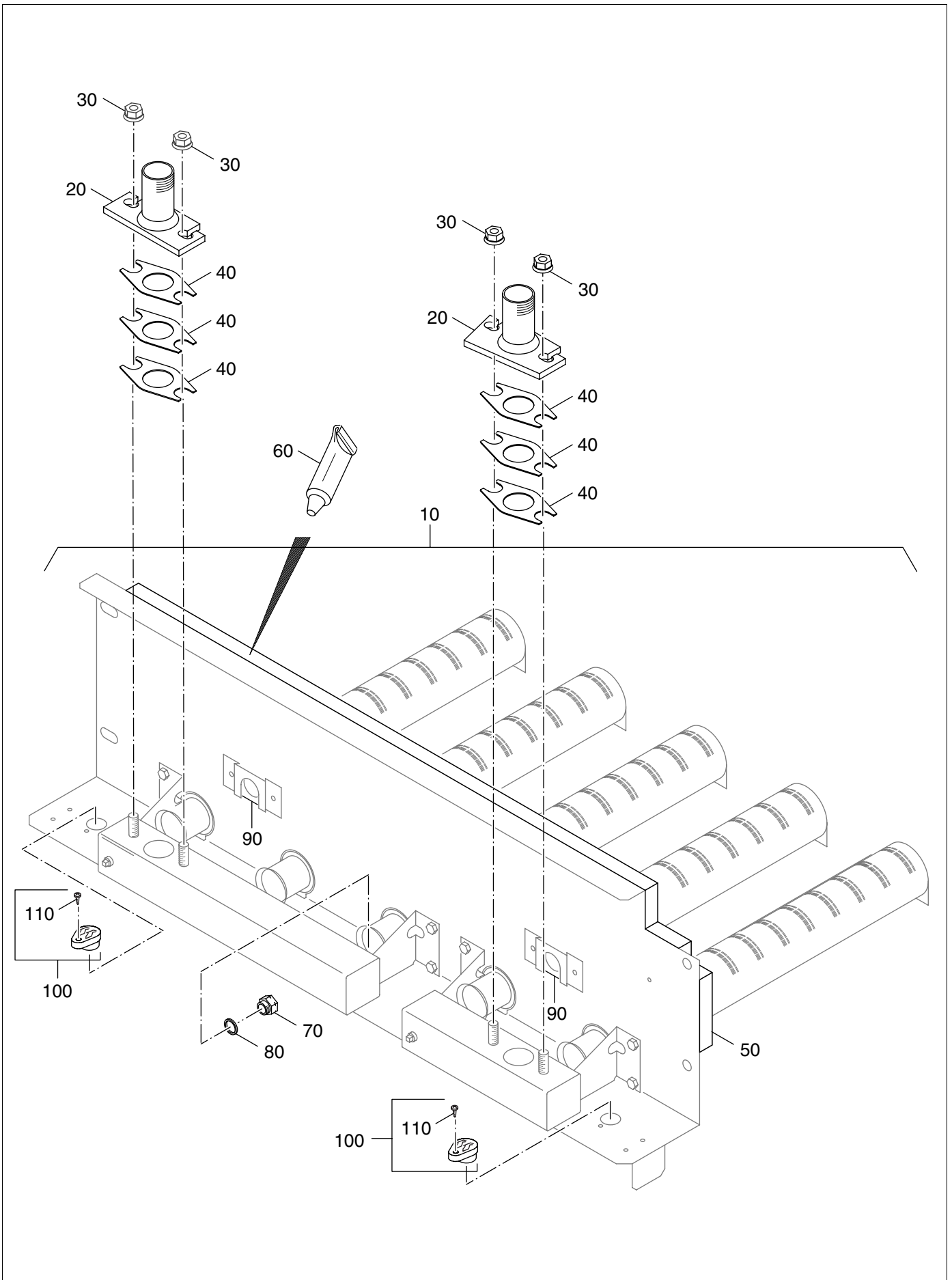


Fig. 48 Manifold - component parts

**USER NOTE**

The complete burner is supplied only in the model for natural gas G20 for 0-8500 feet. If a different model of burner is wanted, the corresponding gas conversion parts must be included in the order. The replaced parts must remain with the heating system for a possible future reconversion.

Burner models, gas conversion parts G334 X FAS US/CA (→ Fig. 49)

Item no.	Description	Buderus article number	Model 73 Quantity/model	Model 92 Quantity/model	Model 116 Quantity/model	Model 132 Quantity/model
10	Gas burner AZ334X FAS "US"	6303-	0096	0097	0098	0099
	NG Kit G334 X 0- 8500 ft "US/CA"	6304-	1457	1458	1459	1459
	NG Kit G334 X 8501-365 760.00 cm "US/CA"	6303-	7830	7831	7832	7832
	LP Kit G334 X 0 - 8500 ft "US/CA"	6303-	7817	7818	7819	7819
	LP Kit G334 X 8501 -365 760.00 cm "US/CA"	6303-	7824	7825	7826	7826

Tab. 14 Gas conversion parts G334 X FAS US/CA

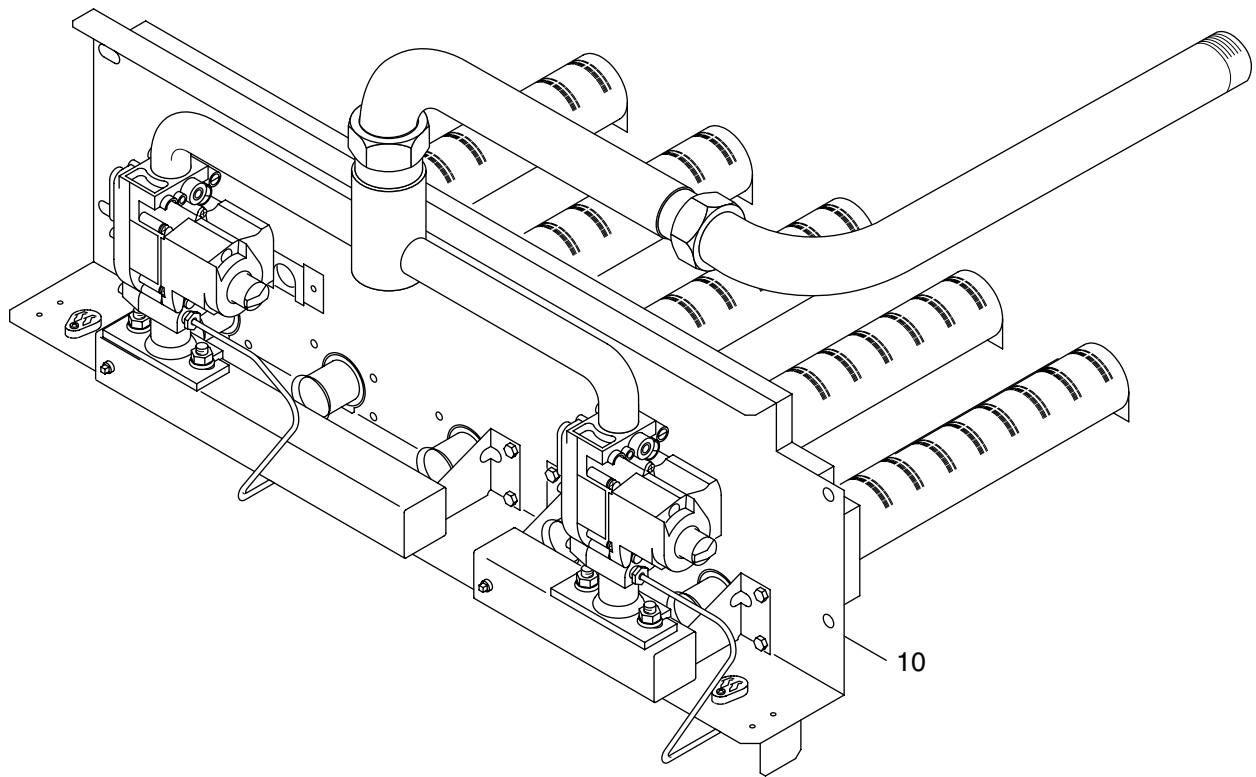


Fig. 49 Burner models, gas conversion parts AZ334X FAS US/CA

Gas valve VR8304H4206 G334 X FAS US/CA(→ Fig. 50)

Item no.	Description	Buderus article number	Model 73 Quantity/model	Model 92 Quantity/model	Model 116 Quantity/model	Model 132 Quantity/model
10	Gas valve VR8304H4206	05181870	2	2	2	2
	Caution: Do not use the gas ignition screws supplied with the gas valve.					
20	Pipe section	63040975	1	1	1	1
30	Gasket D32x44x2	05489360	1	1	1	1
40	Gas connection pipe	6304-	1346	1347	1348	1349
50	Flame roll-out switch 77° C	63030949	2	2	2	2
60	Screw M4x20	see M-kit no. 5	2	2	2	2

Tab. 15 Gas valve VR8304H4206 G334 X FAS US/CA

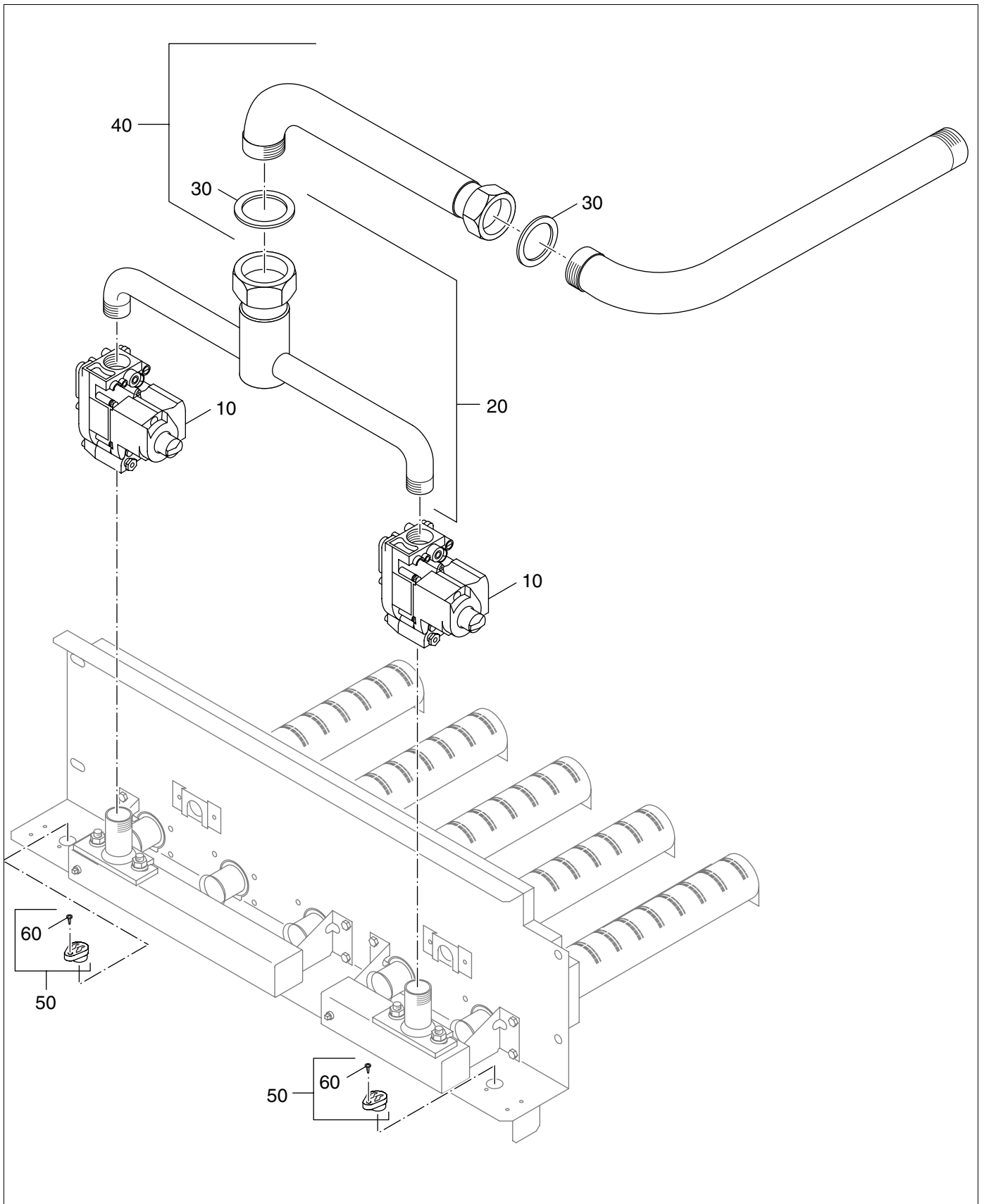


Fig. 50 Gas valve VR8304H4206 G334 X FAS US/CA

Pilot burner for G334 X (→ Fig. 51)

Item no.	Description	Buderus article number	Model 73 Quantity/ model	Model 92 Quantity/ model	Model 116 Quantity/ model	Model 132 Quantity/ model
10	Hex screw, 8x32x3/16	see M-kit no. 5	2	2	2	2
20	Pilot burner, Q3451E	63046297	2	2	2	2
30	Pilot orifice, natural gas, BCR20	05181648	2	2	2	2
30	Pilot orifice, propane gas, BCR12	05176998	2	2	2	2
40	Mounting for pilot line	05181672	2	2	2	2
50	Pilot bracket	see M-kit no. 5	2	2	2	2
60	Screw, M5x12-A3K	see M-kit no. 5	4	4	4	4
70	Pilot line, left	05181-	854	856	854	856
80	Pilot line, right	05181-	852	856	854	856

Tab. 16 Pilot burner for G334 X

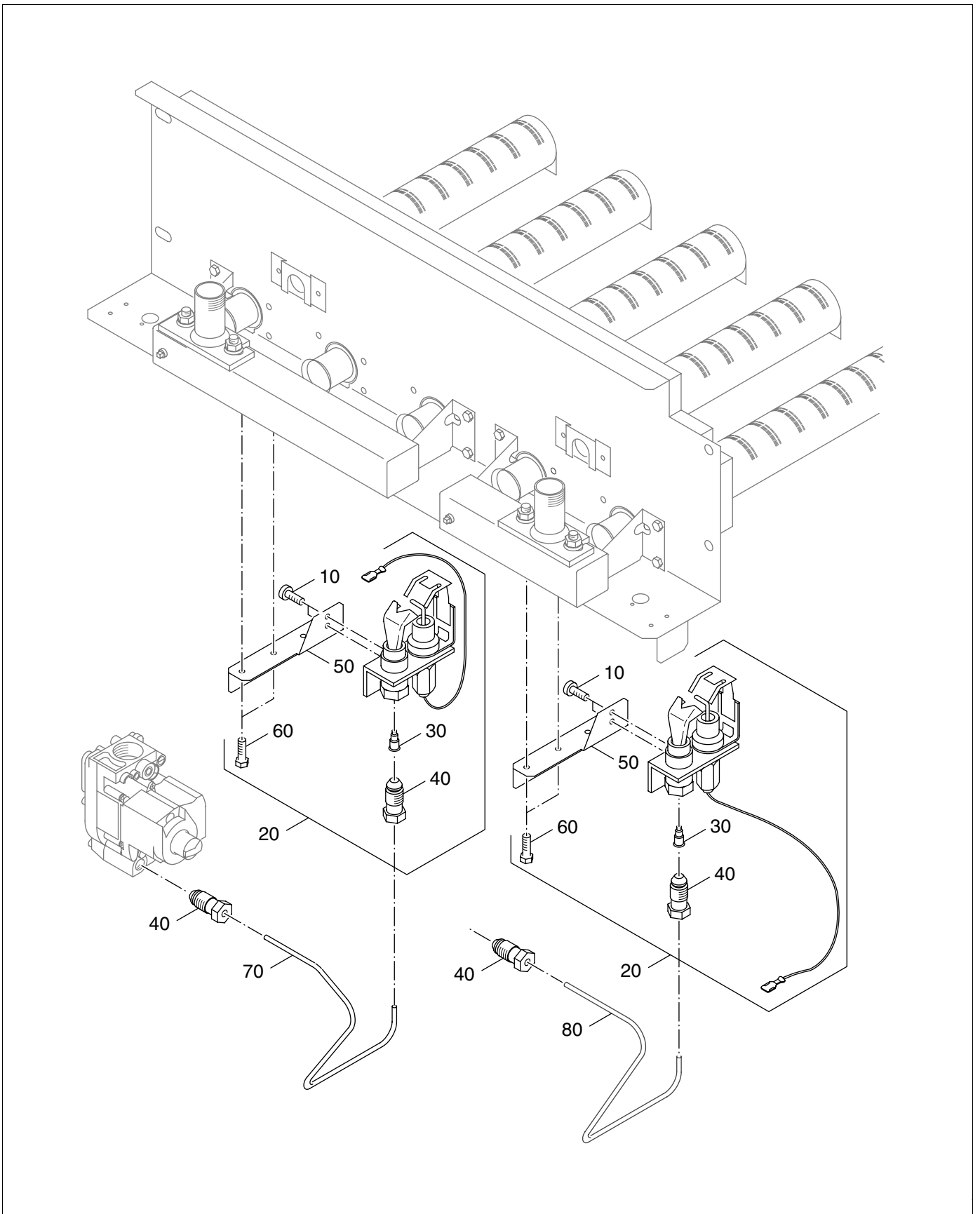


Fig. 51 Pilot burner for G334 X

15 Specifications

Main gas orifice identification and rated manifold pressure for natural gas

Boiler size	Number of burner orifices	Main gas orifice identification for altitudes [feet]		Rated manifold pressure [in. W.C.]
		0–8500 ft ¹⁾	8501–12000 ft ²⁾	
73	5	3.60	3.55	4.4
92	6	3.70	3.65	4.4
116	7	3.90	3.85	4.1
132	8	3.90	3.85	4.2

Tab. 17 Main gas orifice identification and rated manifold pressure for natural gas

Main gas orifice identification and rated manifold pressure for LP gas

Boiler size	Number of orifices	Main gas orifice identification for altitudes [feet]		Rated nozzle pressure [in. W.C.]
		0–8500 ft ²⁾	8501–12000 ft ²⁾	
73	5	2.35	2.30	10.4
92	6	2.40	2.35	10.3
116	7	2.50	2.45	10.3
132	8	2.50	2.45	10.2

Tab. 18 Main gas orifice identification and rated manifold pressure for LP gas

1) factory setting

2) use conversion parts only as directed by the technical documentation



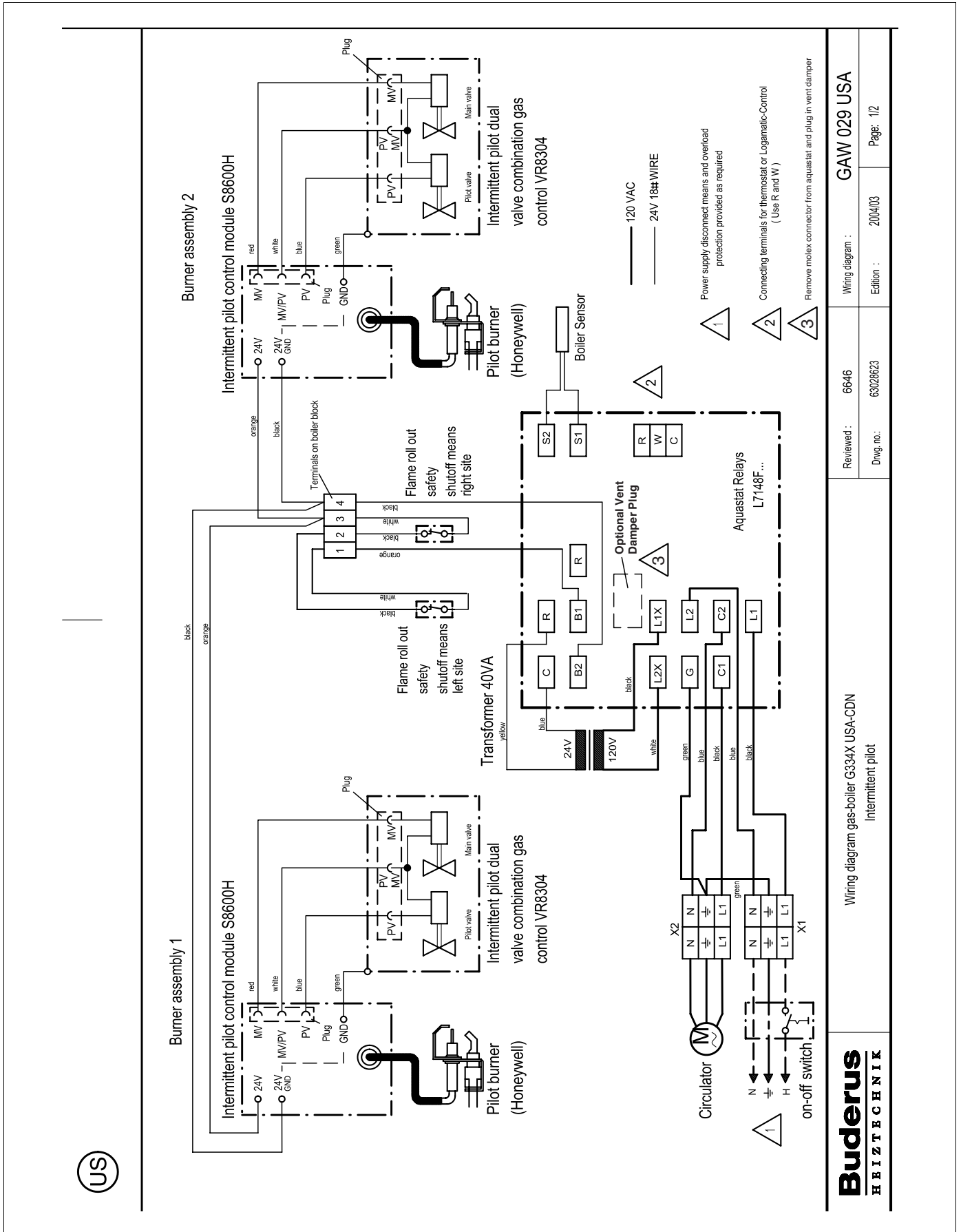
USER NOTE

If the installation location is over 8500 feet above sea level, please contact Buderus for the required conversion components.

Do not attempt to convert the boiler without the approved Buderus parts and the relevant technical documentation.

The technical documentation is included with the conversion parts (accessories).

16 Wiring diagrams



Wiring diagram : GAW 029 USA	
Reviewed : 6646	Wiring diagram : GAW 029 USA
Dwg. no. : 63028623	Edition : 2004/03
Page : 1/2	

Fig. 52 Wiring diagram – G334 X

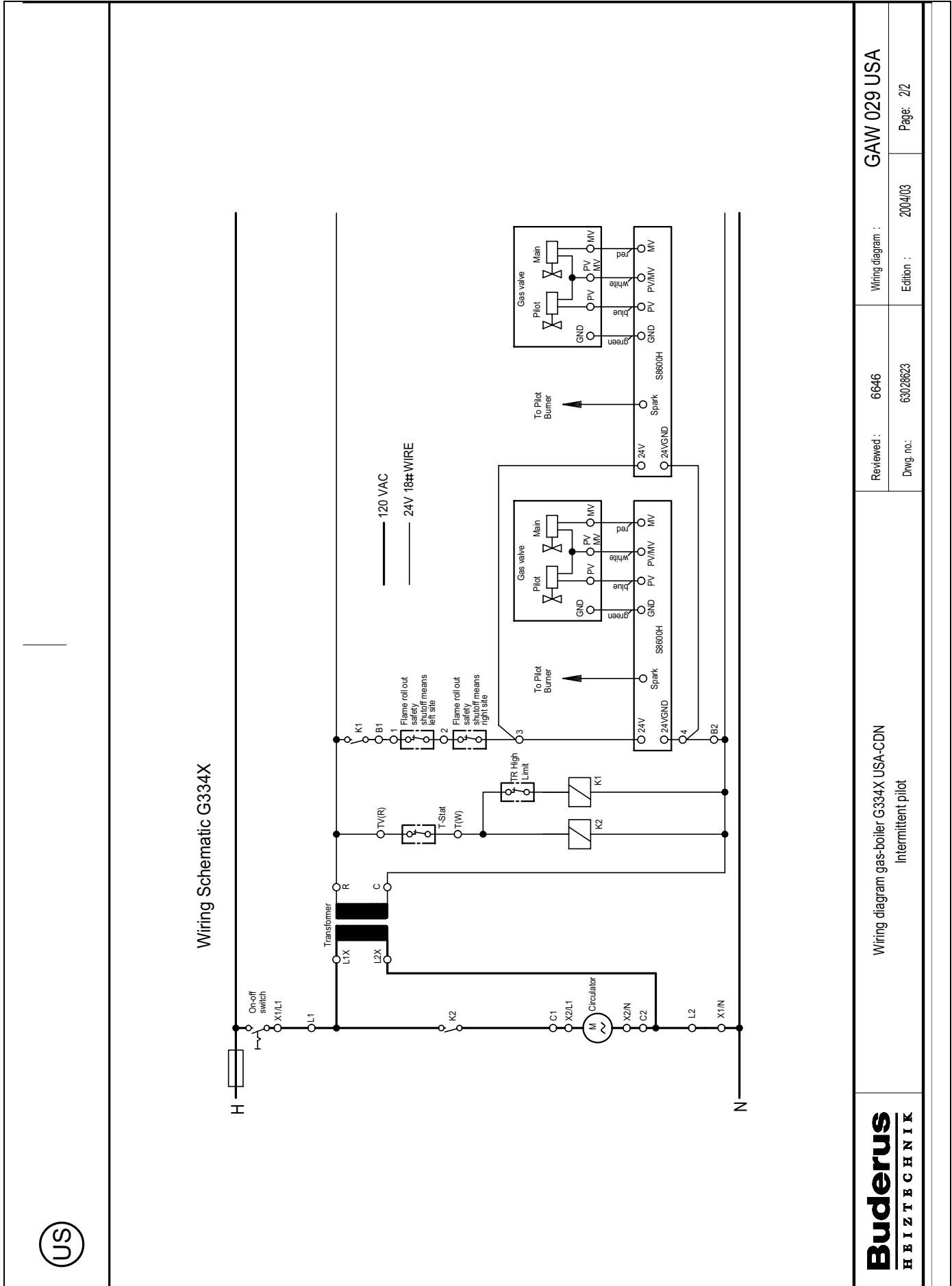


Fig. 53 Wiring diagram – G334 X

Buderus HEIZTECHNIK	Wiring diagram gas-boiler G334X USA-CDN Intermittent pilot	GAW 029 USA Reviewed : 6646 Dwg. no.: 63028623
		Edition : 2004/03 Page: 2/2

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