

Installation and maintenance instructions

Gas boiler Logano G124X II/SP

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 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.

Please read carefully prior to installation and maintenance.

Service manual

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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 special 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 G124X II/SP special gas-fired boiler is designed to heat water for a hot water heating system 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:



WARNING!

RISK TO LIFE

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



CAUTION!

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:.



WARNING!

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 44).

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.



WARNING!

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.

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

from explosion of flammable gases.

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.

**CAUTION!****SYSTEM DAMAGE**

due to incorrect installation.

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

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

from electric shock.

- 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.

**CAUTION!****SYSTEM DAMAGE**

due to unsatisfactory cleaning and maintenance.

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

from explosion of flammable gases.

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

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

from electric shock.

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

by poisoning.

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 aquastats. The Logamatic 2107 control can also be installed in addition to the factory-installed aquastats.

The boiler consists of:

- Automatic igniter (G124X II only) and aquastat
- Logamatic 2107 control (optional)
- 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 energy loss.

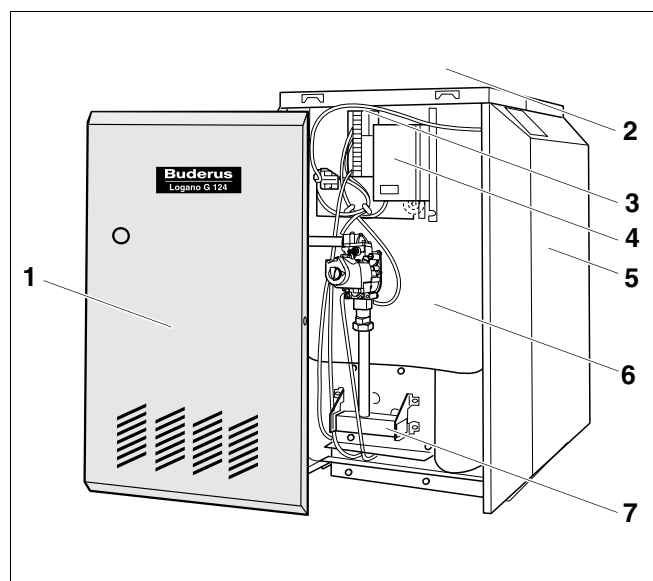


Fig. 1 Logano G124X II boiler

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

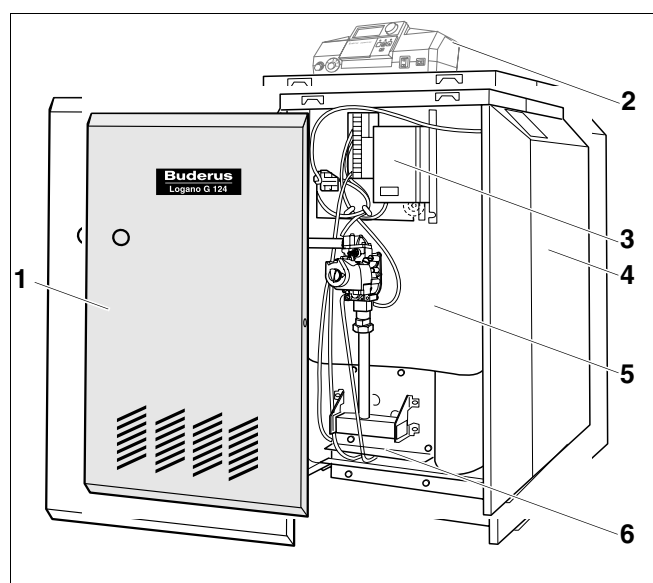


Fig. 2 Logano G124X SP boiler

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

3 Dimensions and connections

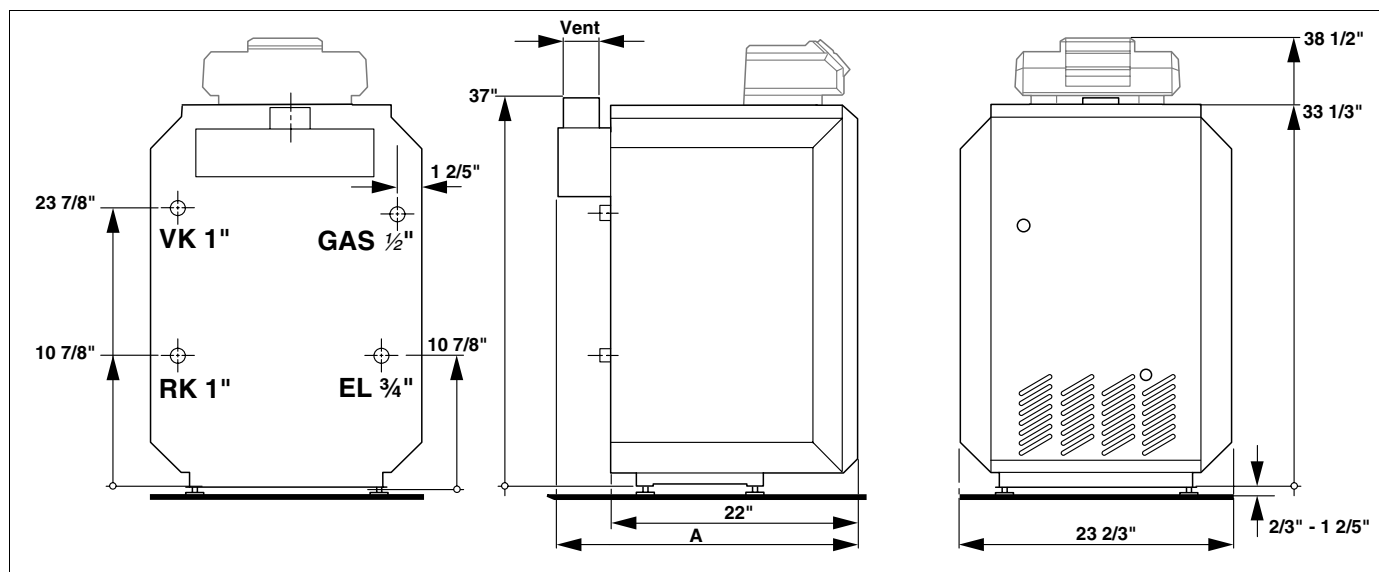


Fig. 3 Back, side and front view, measurements in inches

Connections (measurements see the following tables):

VK = Boiler supply
 RK = Boiler return
 EL = Drain
 GAS = Gas connection

Boiler size	Boiler output	A	Flueconnection II/SP	Min. overflow valve capacity	Number of Nozzles	Water volume	Empty weight
	MBtu/hr	Inches	Inches	lb/hr	Qty	US gal.	lbs
18	74	29 2/5"	5"	62	2	2.4	229
25	103	30 1/5"	5"	86	3	2.9	240
32	132,5	30 7/8"	6"	110	4	3.4	337

Tab. 1 Dimensions



USER NOTE

For the size and dimensions of the main gas orifices see → Chapter 15, page 73.

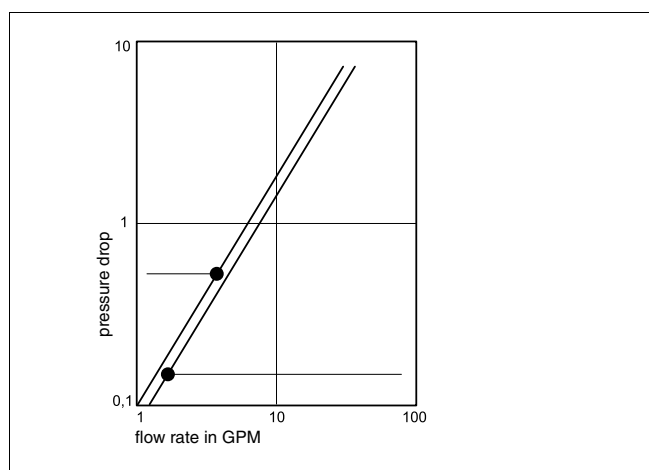


Fig. 4 Pressure drop

4 Scope of delivery

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

Component	Qty	Packaging
Boiler, complete	1	1 pallet
B-kit components: - supply manifold - 30 psi relief valve - boiler drain (¾") - pressure/temperature gauge - 90° elbow (1" NPT) - 90° elbow (¾" NPT) - screw-in feet (4)	1	1 foil package ¹
Technical documents		1 foil package

Tab. 2 Scope of delivery

¹ On pallet

Accessories ¹	Unit
Logamatic 2107 control	1
Heat circulation pump	1
Cleaning brush	1
Vertical flue system	1

Tab. 3 Scope of delivery

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

Move the boiler with packaging and on pallet as much as possible.



CAUTION!

RISK OF INJURY

if the boiler is not properly secured to the trolley.

- Use suitable transport equipment, such as a boiler cart with a belt.
- Secure the boiler to prevent it from falling.
- Position transport equipment (e.g. boiler cart) at the back of the boiler.
- Secure boiler to cart.
- Move the boiler 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 and roll it on additional pipes to the installation location.
- Place the boiler in its final position.

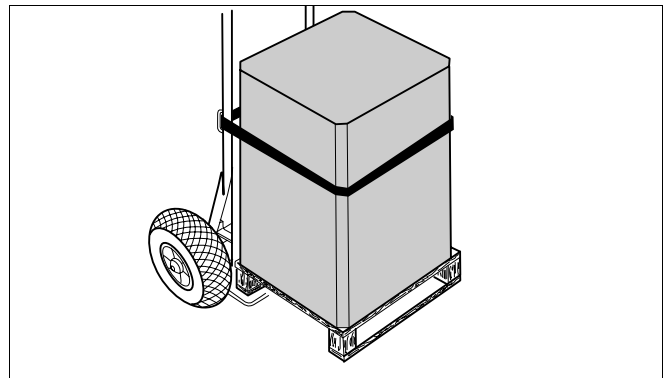


Fig. 5 Moving boiler with boiler cart

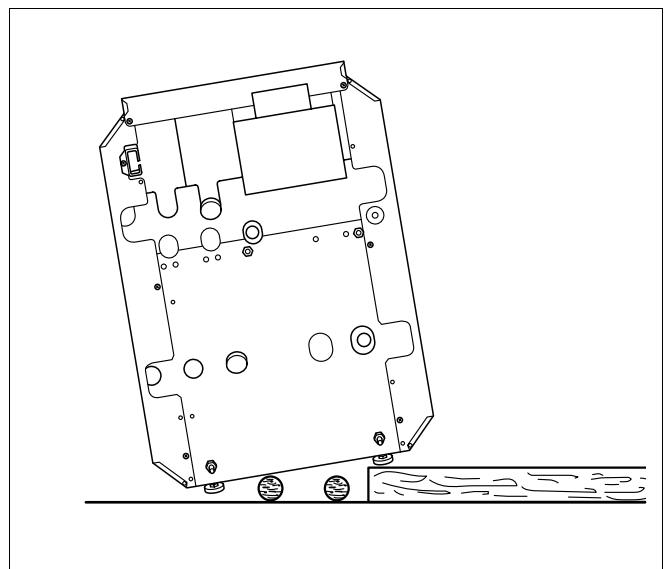


Fig. 6 Moving the boiler

5.2 Lifting and carrying the boiler

The boiler can be picked up at the hand grips shown.



CAUTION!

RISK OF INJURY

due to carrying heavy loads.

- Lift and carry the boiler with at least four people at the designated hand grip positions.

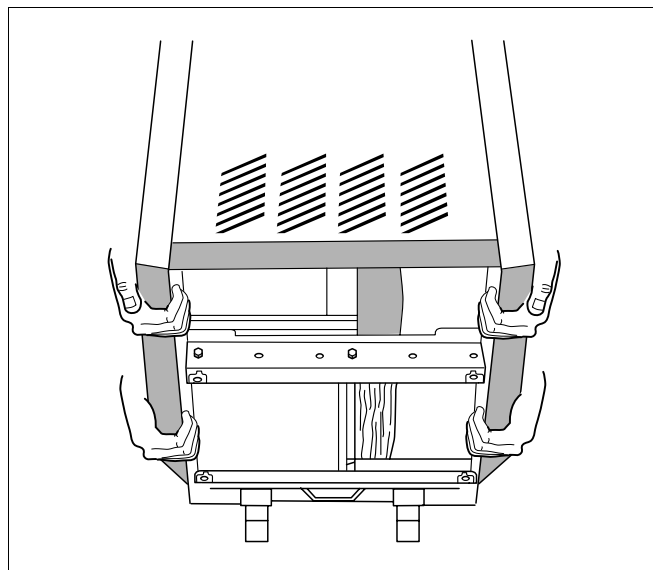


Fig. 7 Lifting and carrying the boiler

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 required 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, 2 inches clearance is also required for the flue pipe and 30 inches clearance to the ceiling. The installation location and the base must be smooth and horizontal. The boiler may be installed on a flammable base, but not on carpet.

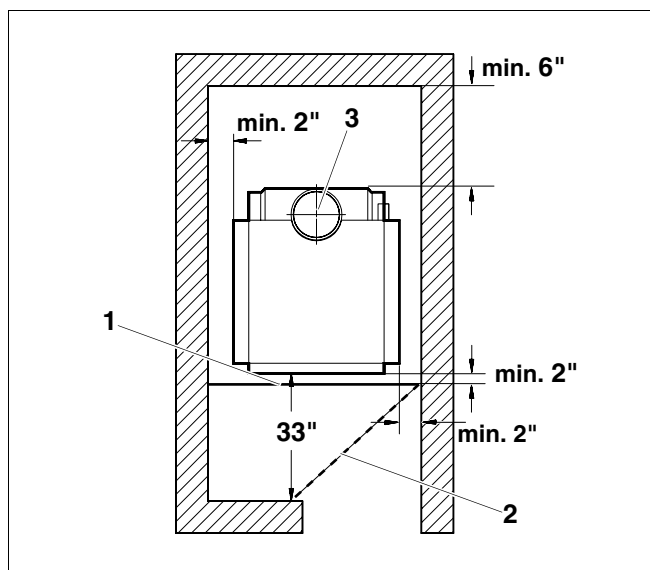


Fig. 8 Required clearances in the boiler room

1 Door closed

2 Door open

3 Flue pipe

6.2 Leveling the boiler

- Screw the four rubber feet 0.25 to 1.0 inches into the bottom rails.
- Place boiler on the feet.
- Level boiler horizontally and vertically by screwing the feet in and out.

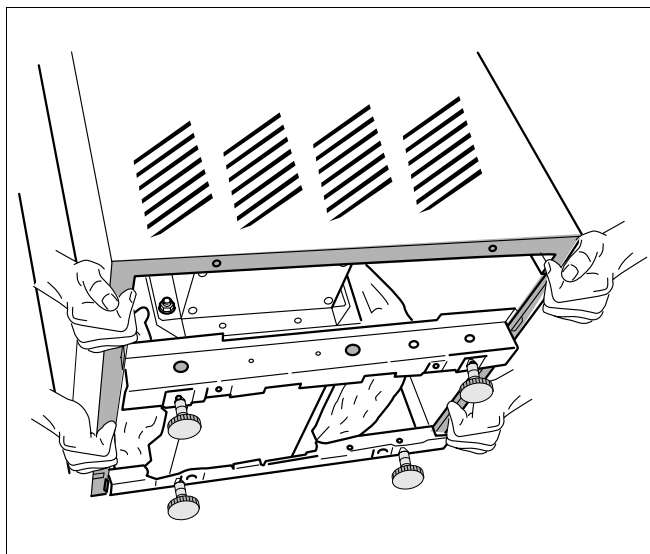


Fig. 9 Unscrewing screw-in feet

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.

7.2 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 cutoff. The low-water cutoff must be installed during installation of the boiler (→ Fig. 10).



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.

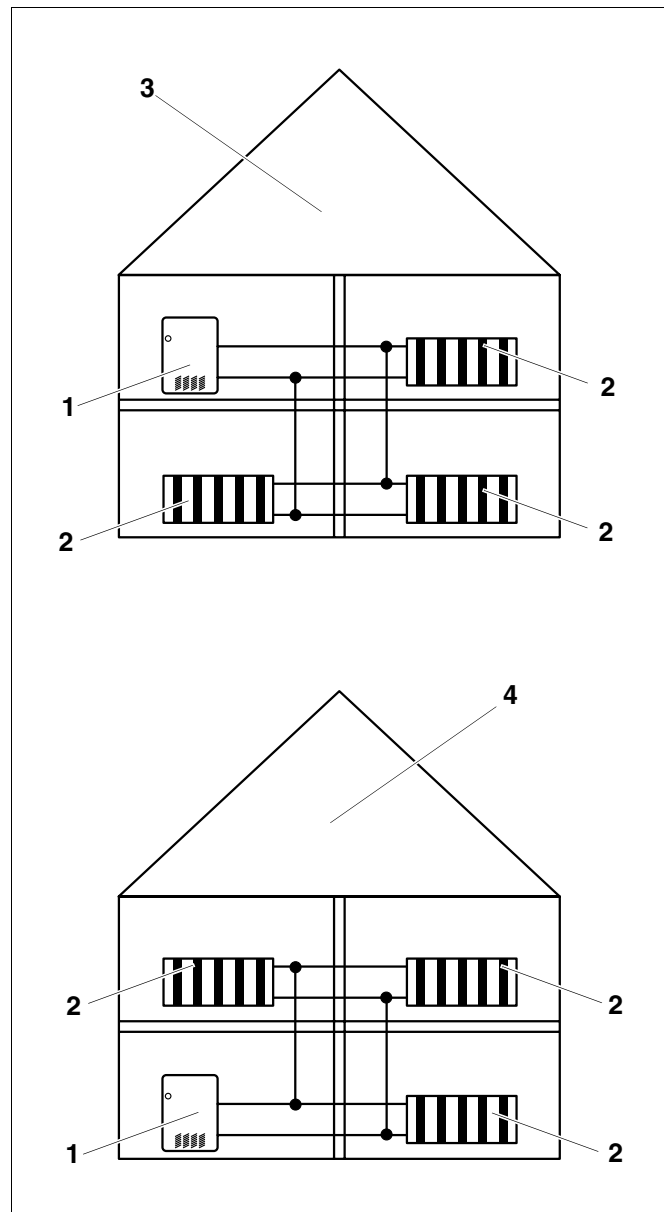


Fig. 10 Low-water alarm

1 Boiler

2 Radiator

3 Heating system with low-water cutoff

4 Heating system without low-water cutoff

Installation of B-kit

The relief valve and the pressure/temperature gauge are mounted on the boiler supply VK over the supply manifold (included in B-kit).

- Seal 90° 1" NPT elbow on VK.
- Seal supply manifold on 90° 1" NPT elbow. The supply manifold can be mounted vertically or rotated 90° to the right.
- Seal temperature/pressure gauge on supply manifold.



USER NOTE

Install the relief valve after the leak test (→ Chapter 7.6, page 23).

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 heater return connection to reduce build-up of debris on the water side.



USER NOTE

Observe the local regulations for connection of boiler systems.



CAUTION!

FIRE DANGER

through frost.

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

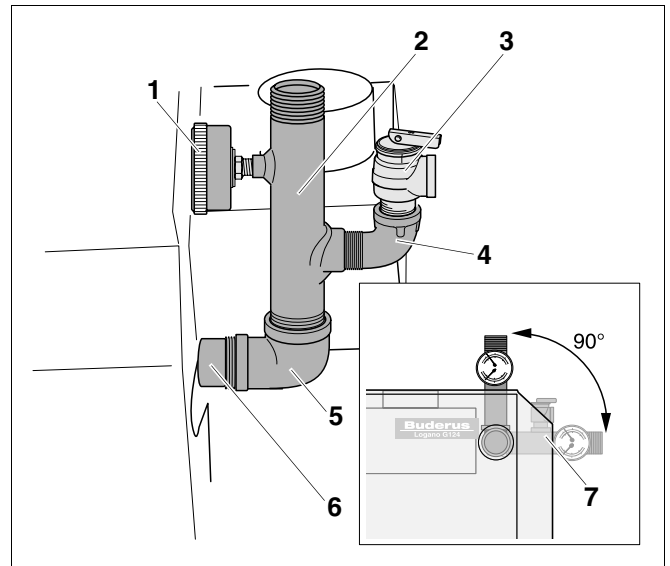


Fig. 11 Installation of B-kit

1 Pressure/temperature gauge

2 Supply manifold

3 Relief valve 3/4"

4 90° 3/4" elbow

5 90° 1" NPT elbow

6 Boiler supply VK

7 B-kit rotated 90° right

7.3 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 74 to → page 78.

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.

7.4 Installation of Logamatic 2107 control (accessory)

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



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

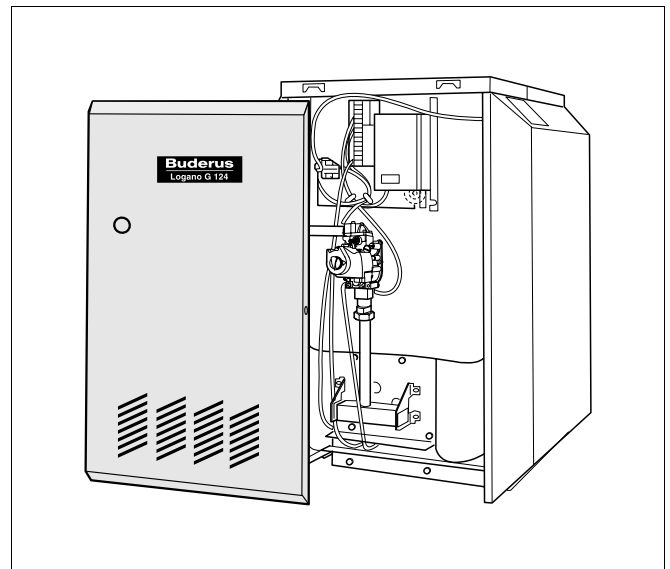


Fig. 12 Removing front panel of boiler

2. Unscrew the two fastening screws on the back boiler jacket. Lift the back boiler jacket and remove to the back.

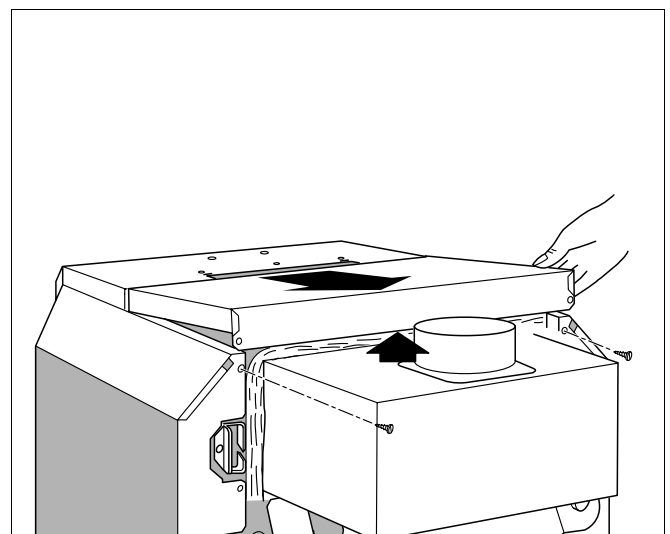


Fig. 13 Removing boiler jacket

3. Slide the insertion tabs of the control into the oval openings.
4. Slide control toward the boiler front panel.
5. Push to snap plastic tabs of the control into the knock-outs.

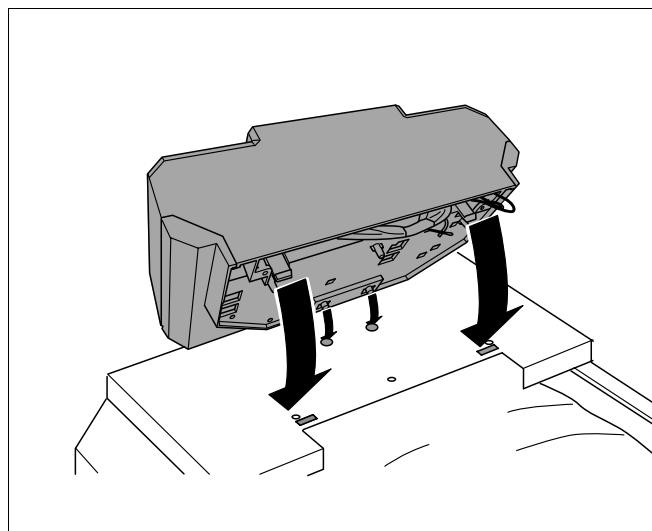


Fig. 14 Removing terminal cover

6. Remove top cover of control Remove screws from the top cover.
7. Fasten control with sheet-metal screws.
8. Route boiler water sensor cable through the cable opening and unroll to the required length.

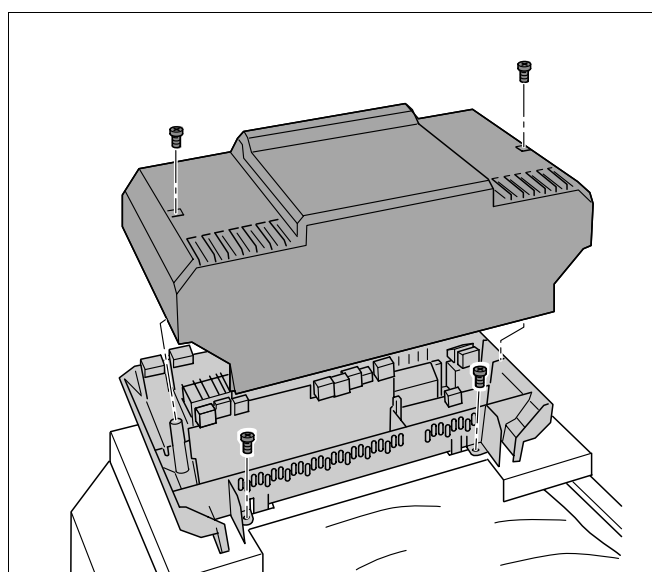


Fig. 15 Installation of Logamatic 2000 control system

1 Screws

Installation of Logamatic boiler water sensor

9. Trace boiler water capillary package wiring under the front boiler cover to the measuring point (immersion well).
10. Remove all spacers from the immersion well.
11. Remove carefully the copper sleeves from the Logamatic capillaries and slide Logamatic capillaries together with Honeywell capillary into boiler immersion well.
12. Press sensor clip (included with control) from the side or from above to the head of the immersion well.
13. 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.



WARNING!

FIRE DANGER

Hot boiler components may damage electrical wiring.

- Make sure that all cables are routed in the ducts or on the boiler insulation.

14. Route all wiring to the control through the wiring opening and connect as specified by the 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).

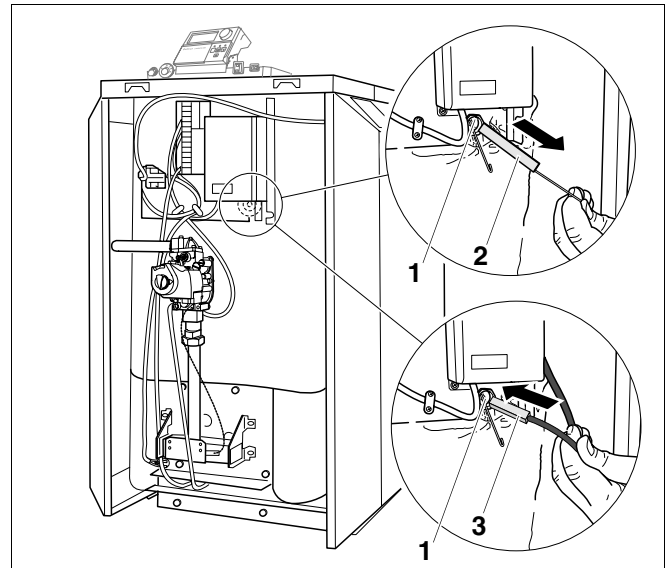


Fig. 16 Front of boiler

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

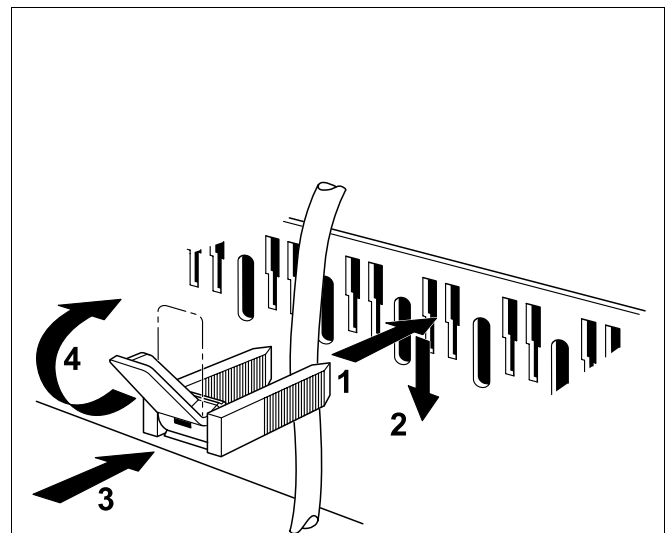


Fig. 17 Secure wiring with wiring clip

Install panel components

15. Swivel display unit to the desired position.

**USER NOTE**

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

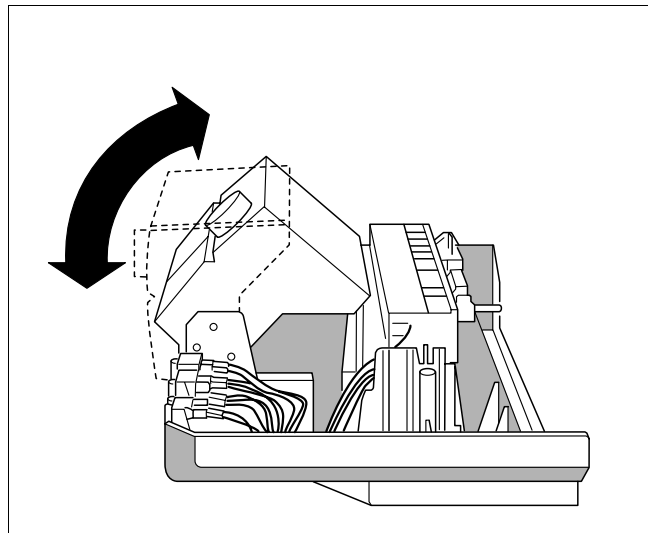


Fig. 18 Swivel display unit

16. Position terminal cover and screw to control.

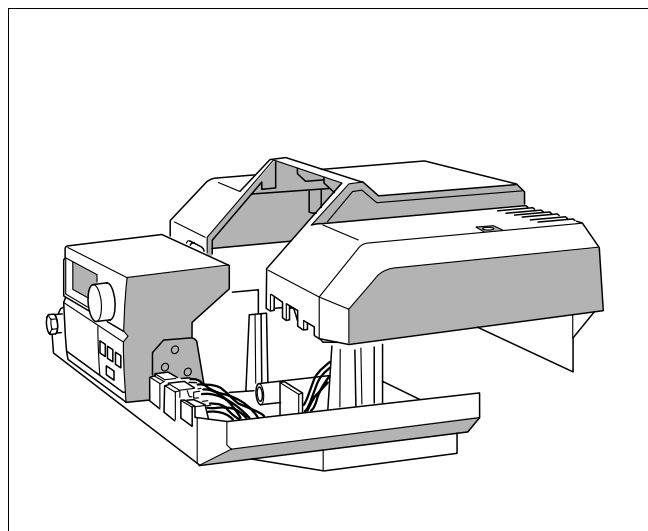


Fig. 19 Positioning terminal cover

17. Slide tabs of rear boiler cover under the front boiler cover and press down at back.

18. Screw rear boiler cover to rear panel of boiler.



CAUTION!

SYSTEM DAMAGE

due to dirt.

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

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

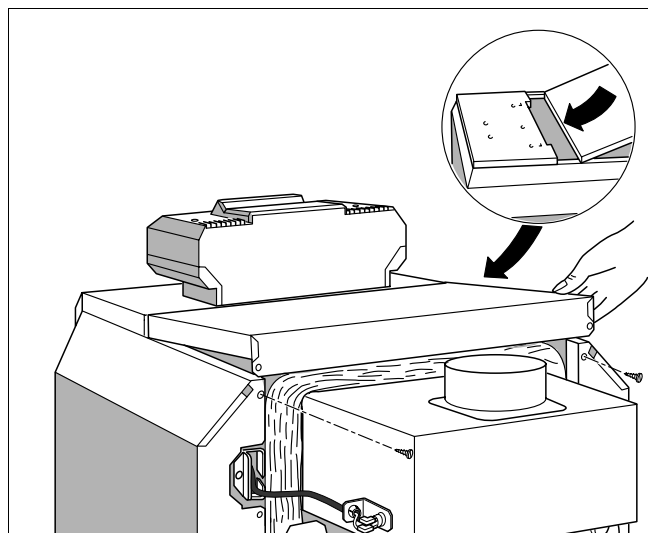


Fig. 20 Installing rear boiler cover

7.5 Fuel supply connection

7.5.1 Gas connections

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 gas cock shut-off must be installed outside the boiler jacket if required by the local code. We recommend installing a gas cock shut-off in the main gas pipe to the boiler. The gas pipe must be fastened outside the boiler.

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.



WARNING!

DANGER OF EXPLOSION

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

- Use soap solution to find leaks.

Length of Iron pipe in feet	Gas pipe supply volume in cubic feet of gas per hour ¹				
	1/2	3/4	1	1 1/4	1 1/2
10	132	278	520	1060	1600
20	92	190	350	730	1100
30	73	152	285	590	890
40	63	130	245	500	760
50	56	115	215	440	670
75	45	93	175	360	545
100	38	79	160	305	480
150	31	64	120	250	380

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 rise 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	Ball valve	Gas valve
	Equivalent lengths in feet			
1/2	1.4	2.7	0.3	0.80
3/4	2.1	4.1	0.5	1.25
1	2.6	5.2	0.6	1.6
1 1/4	3.5	6.9	0.8	2.15
1 1/2	4.0	8.0	0.9	2.50

Tab. 5 Equivalent lengths for pipe fittings

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

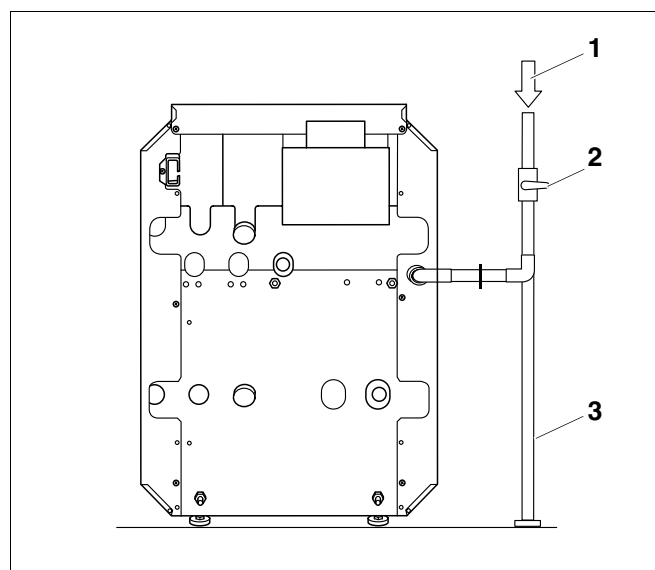


Fig. 21 Pipe connection to gas fittings – back view

- 1 Gas supply
- 2 Shut-off
- 3 Sediment trap

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.

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.

7.5.2 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).

7.6 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. The water may require treatment as a result of the analysis.

Please consult the local water supply company if the water is extremely hard or has 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.

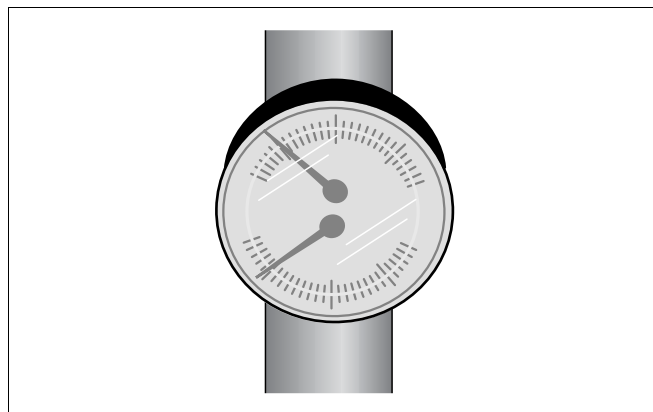


Fig. 22 Temperature/pressure gauge

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

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

- Close connection for relief valve (→ Fig. 11, page 15) and all other open connections with 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. 11, page 15).

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.

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 draft hood cannot be modified.

1. Mount flue pipe on the flue connection of the draft hood and fasten with four (4) corrosion-resistant sheet metal screws.

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 an electronic ignition system.

The position of the vent damper must be visible.

The back flow check must be at least six 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.

Installation of vent damper

2. Install pins in the hole of the vent baffle.
3. Fasten vent damper to the flue pipe of the back flow check with three (3) corrosion-resistant sheet metal screws.

Connecting flue pipe

4. 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 18" 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.

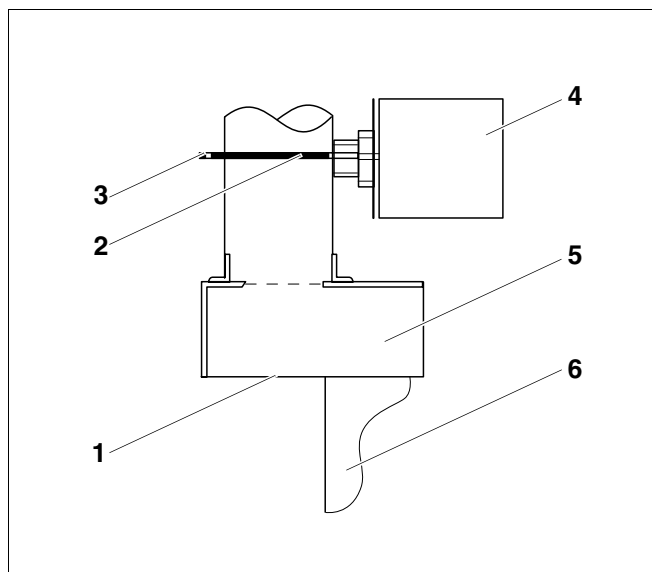


Fig. 23 Installation of vent baffle

- 1 Open draft hood
- 2 Vent damper
- 3 Position indicator
- 4 Motor
- 5 Draft hood
- 6 Boiler

Installing electrical connection of vent damper

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

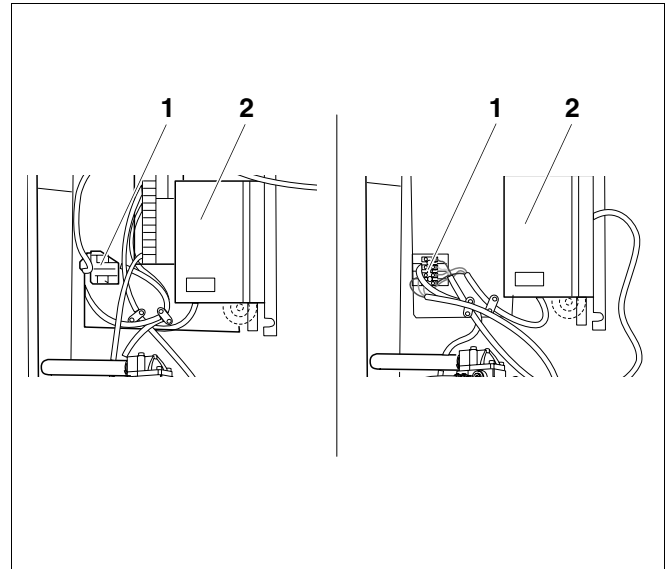


Fig. 24 Connecting vent damper (G124X II left, G124X SP right)

- 1 Terminal plug on aquastat
- 2 Aquastat

11 Placing the heating system in 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 CGA 4.9 to ensure safe operation of the heating system and to test specific performance indicators.



WARNING!

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.

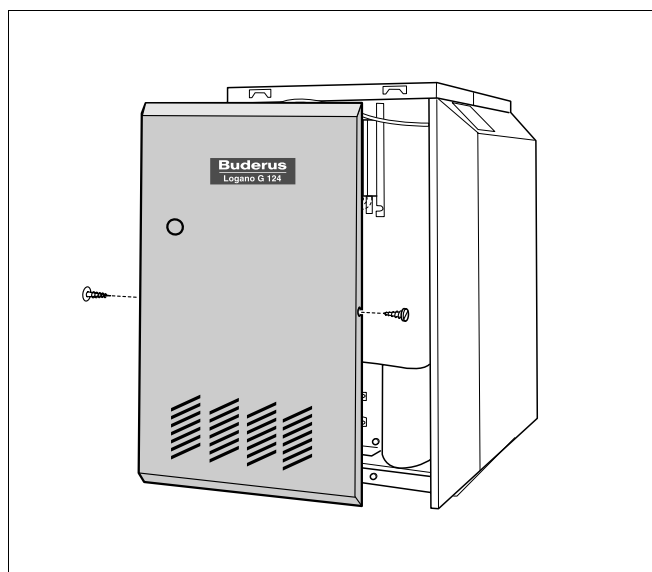


Fig. 25 Removing front panel of boiler

Carrying out leak test

5. Open gas shut-off in the gas line.
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. Remove the screw plug for the gas pressure measuring port on the gas valve. Install pressure measuring nipple and attach a water manometer to measure the gas supply pressure.
9. Remove the screw plug for the manifold pressure measuring port on the gas valve. Install pressure measuring nipple and attach a manometer to measure the manifold pressure.
10. Open gas shut-off and measure the supply pressure of the boiler. The supply pressure for natural gas must be between 4.7" and 10.5" W.C. and between 11" and 13" W.C. for propane gas. If the supply pressure for natural gas is not between 4.7" and 10.5" W.C. and not between 11" and 13" W.C. for propane gas, contact the service technician or the gas company. Close main gas valve.
11. Always follow the start-up instructions on the next page.

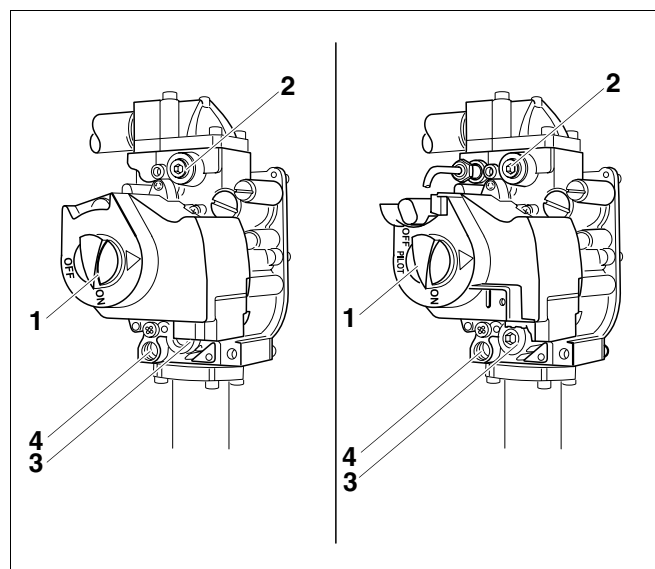


Fig. 26 Gas valve (G124X II left, G124X SP right)

- 1 ON/OFF button (at ON position switch)
- 2 Screw plug for gas supply pressure measuring port
- 3 Screw plug for manifold pressure measuring port
- 4 Pilot gas line connection

11.1 Start-up instructions

Read the instructions before start-up for your safety.



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 installation 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.
- Close main gas valve.
- Open doors and windows.
- Warn other occupants of the building.
- Evacuate the building.
- Call gas company, heating service company or fire department from outside the building.

A G124X II only:

This unit is fitted with an ignition module that automatically starts the burner. Do not attempt to ignite it manually.

G124X SP only:

This unit is fitted with a burner that must be ignited manually. Follow the instructions below to ignite the burner.

- 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 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 valve that were under water.*

11.2 Making G124X II and G124X SP boilers ready for operation

STOP! First read the safety instructions on → page 8 of this manual.

1. Carry out leak test (→ page 7). 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 28 of this manual. If there is no sign of a gas odor, continue with the next step.
2. Open main gas shut-off.

11.2.1 Placing heating system with aquastat control in operation

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

3. Turn on ON/OFF switch (contractor installed) (ON position). This turns on the boiler with all its components. Then continue with step 7 (G124X II) or step 35, page 36 (G124X SP).
4. Make sure that the room thermostat signals a heat requirement (set thermostat at least 10 °F above room temperature).

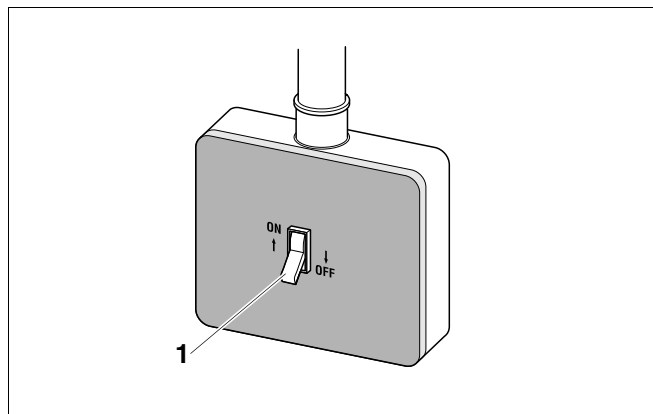


Fig. 27 Switching on heating system (with aquastat)

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.

Turn 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. Turn on ON/OFF switch ("I" position). Then continue with step 7 (G124X II) or step 35, page 36 (G124X SP).



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.

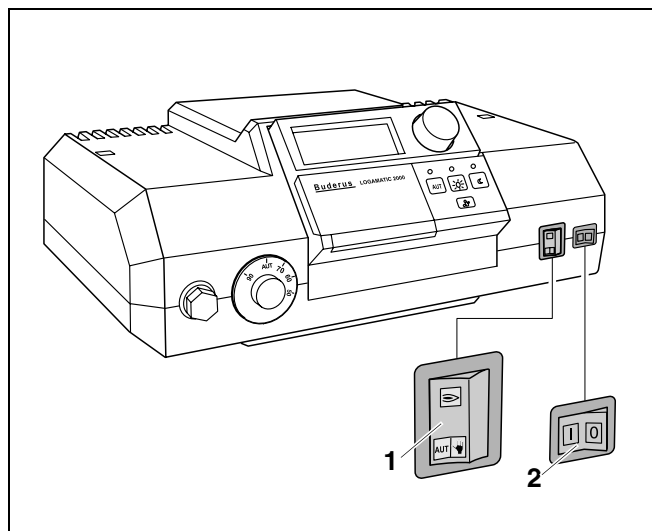


Fig. 28 Turning on heating system (with Logamatic 2107 control)

- 1 Mode selection switch
- 2 ON/OFF switch

11.3 Conducting final commissioning for G124X II boiler

The final commissioning for the G124X SP boiler is described in (→ Chapter 11.4, page 36).

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

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

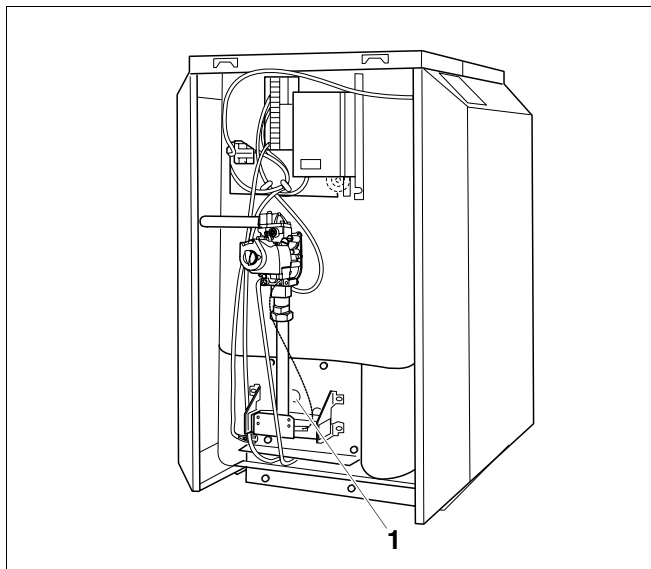


Fig. 29 G124X II boiler

- 1 Sight glass

8. Turn gas valve ON/OFF switch counterclockwise to ON position.
9. The ignition module 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 shut-off. Disconnect heating system from the power supply and inform your customer service technician or LP 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 supply gas pressure while the boiler is operating. The supply pressure must be between 4.7" and 10.5" W.C. for natural gas and between 11" and 13" W.C. for propane gas. Record the measured values in the commissioning protocol in the installation and maintenance instructions.
- 12b. Shut-off main gas supply. Install manometer on manifold to measure manifold pressure. Open shut-off valve, turn on boiler and measure manifold pressure.

G124X II	Natural gas [inch W.C.]	Propane [inch W.C.]
18	3.6	9.8
25	3.5	10.3
32	3.6	10.0

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. 30) 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. 30, page 33) into the gas valve again.

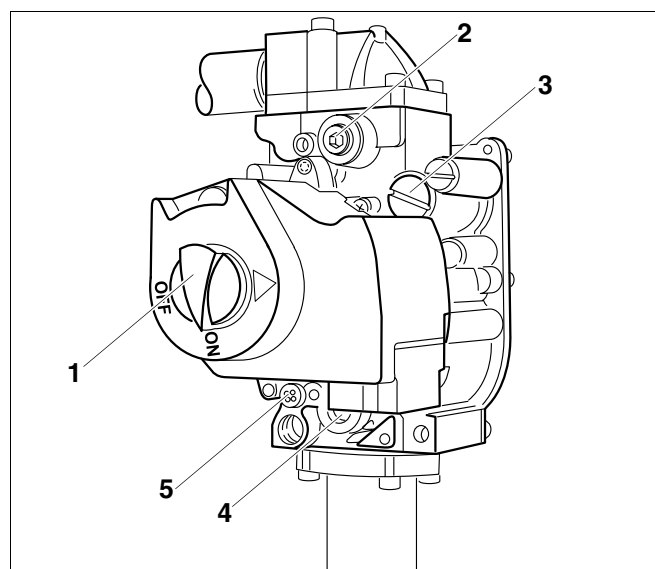


Fig. 30 G124X II gas valve

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

15. Observe pilot flame through the sight glass (→ Fig. 29, 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 burner must be adjusted with the corresponding adjustment screw.



USER NOTE

The adjustment screw is behind the pilot burner pressure adjustment safety screw (→ Fig. 30, page 33).

18. Remove safety screw for igniter orifice pressure setting (→ Fig. 30, 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. 30, page 33) again.
20. Observe main burner flame through the sight glass (→ Fig. 29, 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. 30, page 33) on the gas fitting clockwise to OFF. Close the gas valve and disconnect the heating system from the power supply and contact the customer service technician or the gas company.

Checking flame sensor

21. Test the safety switch by closing the gas shut-off. The main burner flame (→ Fig. 32) and the ignition flame (→ Fig. 31) are extinguished. After six (6) seconds at the most the main gas solenoid valve on the gas fitting must close with an audible noise.
22. After 90 seconds the ignition module 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 fitting operates correctly, proceed to step 25. If the gas fitting does not operate correctly, switch ON/OFF switch (→ Fig. 33) on the gas fitting clockwise to the OFF position immediately. Close main gas shut-off. Disconnect heating system from the power supply and inform the customer service technician or LP gas company.

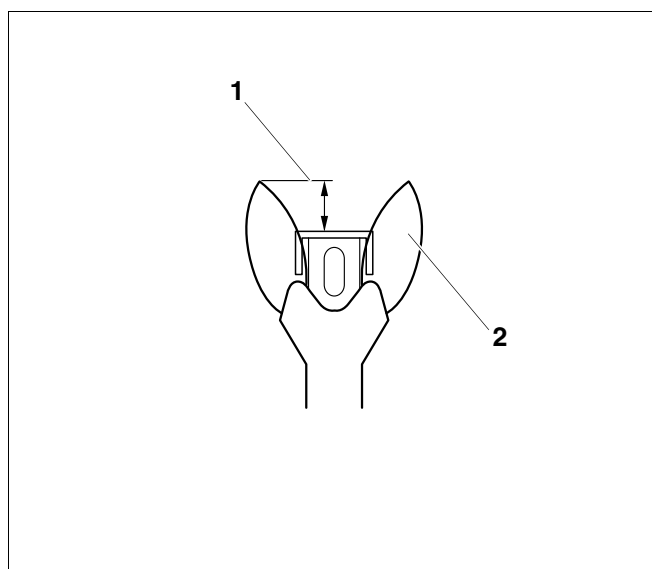


Fig. 31 Correct pilot flame setting

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

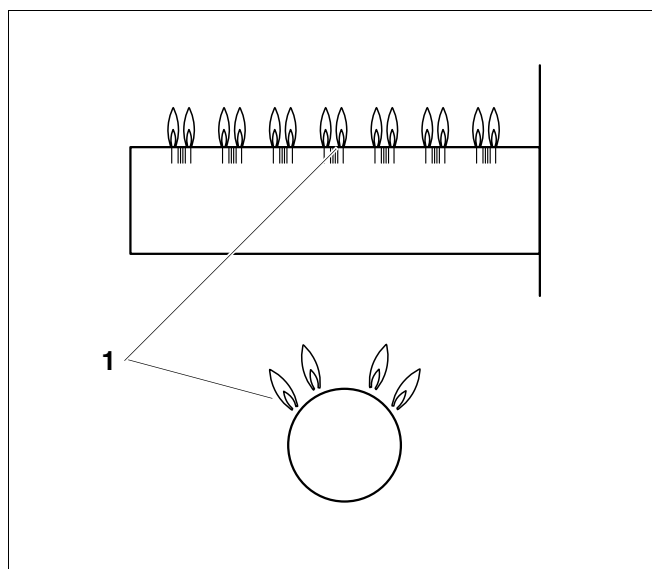


Fig. 32 Main burner

- 1 Main burner flame

25. Turn gas valve ON/OFF button clockwise to OFF position.
26. Close main gas shut-off.
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 shut-off 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 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.

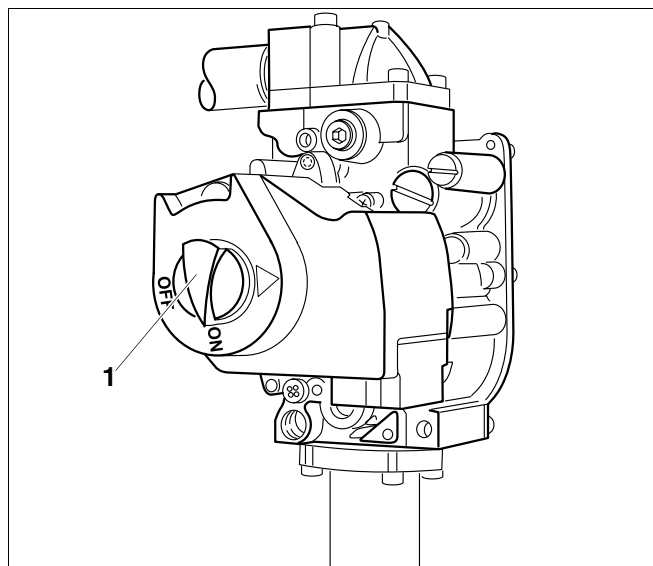


Fig. 33 G124X II gas valve

1 ON/OFF button (at ON position)

11.4 Conducting final commissioning for G124X SP boiler

The final commissioning for the G124X II boiler is described in (➔ Chapter 11.3, page 32).

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

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

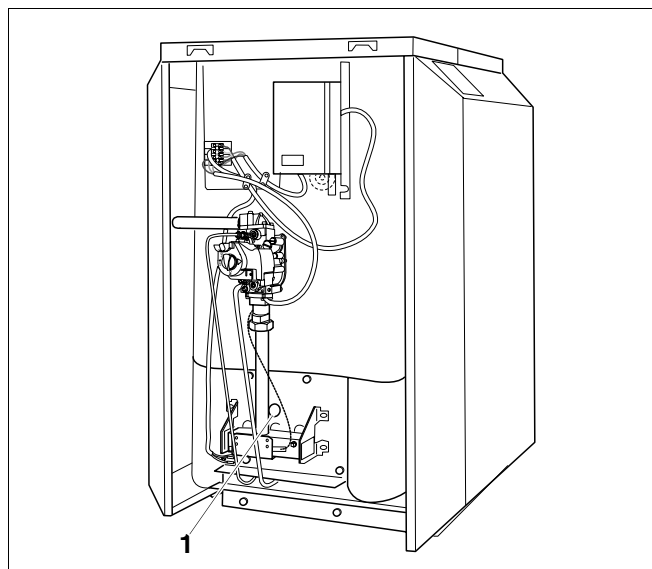


Fig. 34 G124X SP boiler

1 Sight glass

36. Turn gas valve ON/OFF switch counterclockwise to PILOT position.
37. Press reset button in completely and hold.
38. Ignite the pilot burner with the supplied match holder and a burning match through the sight glass in the burner housing.
39. When the pilot burner is burning, continue to hold the red reset button for about a minute.
40. Release red reset button. The red reset button must pop up and the pilot burner must continue burning. If the pilot burner goes out, switch ON/OFF switch on gas valve clockwise to OFF and repeat steps 1 and 2 (regardless of the control).

Caution:

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

Then repeat steps 35 to 39 regardless of the control in use.

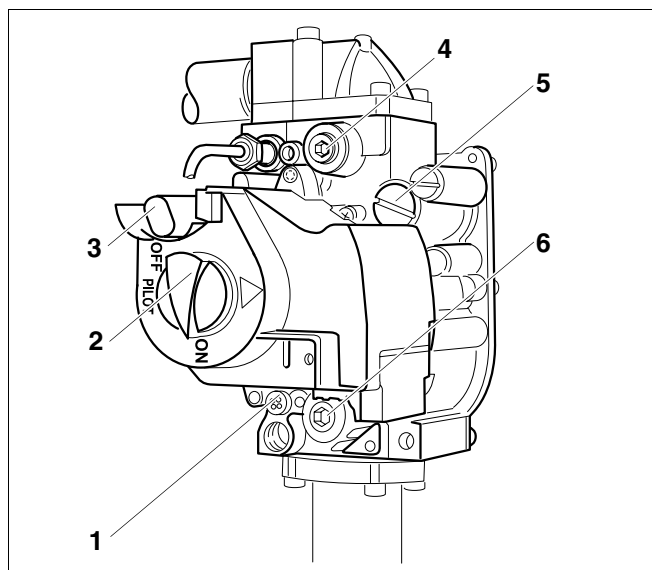


Fig. 35 G124X SP gas valve

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

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

due to poisoning by leaking gas.

If the red reset button does not pop up when you release it, **STOP**.

- Close gas shut-off immediately to prevent gas from leaking.
- Contact your service technician or LP gas supplier immediately and have the fault repaired.
- If the pilot burner continues to go out after several attempts, turn the ON/OFF button on the gas valve to OFF immediately to prevent gas from leaking.

41. Check pilot gas line for leaks with soap solution. If no leaks are found, continue with step 43. If leaks have been found, switch ON/OFF switch on gas valve (→ Fig. 35, page 36) clockwise to the OFF position.

42. 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 35 to 41 regardless of the control in use.

43. Observe pilot flame through the sight glass (→ Fig. 36) in the burner housing.

44. The pilot flame must surround the thermal element 3/8 to 1/2 inch. If this is the case continue with step 48.

45. If the pilot flame is too small or too large, the pressure for the pilot burner must be adjusted with the corresponding adjustment screw.

**USER NOTE**

The adjustment screw is behind the pilot burner pressure adjustment safety screw (→ Fig. 35, page 36).

46. Remove safety screw for pilot burner pressure setting (→ Fig. 37, page 38). Turn the inner adjustment screw clockwise to reduce the pilot flame and counterclockwise to enlarge the pilot flame.

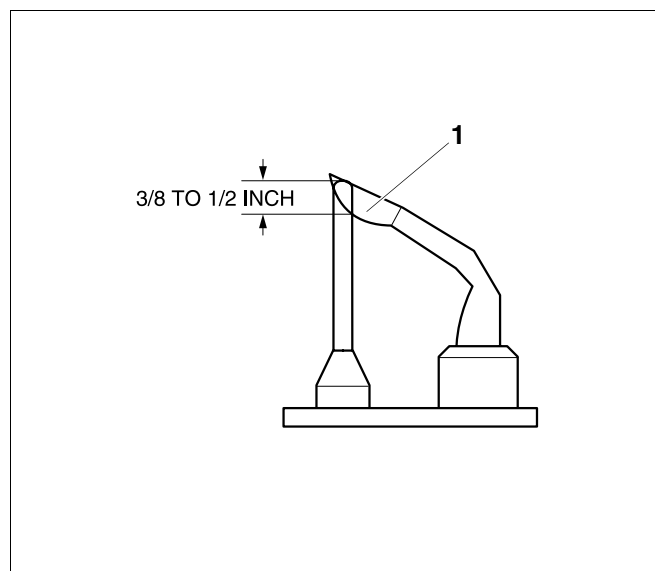


Fig. 36 Correct pilot flame setting

1 Pilot flame

47. After adjustment tighten the pilot burner pressure adjustment safety screw (→ Fig. 37) again.
48. Turn gas valve ON/OFF switch (→ Fig. 37) counterclockwise to ON position. The gas valve ON/OFF switch can only be set to ON if the red reset button is out.
49. Place the heating system electrically in operation
50. Make sure that the thermal element responds to heat.
51. The pilot flame must 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 LP gas company.
52. 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 54. If leaks have been found, switch ON/OFF switch on gas valve (→ Fig. 37) clockwise to the OFF position. Disconnect the heating system from the power supply.
53. Seal leaks. Repeat steps 35 to 52.
54. Check manifold pressure. The manifold pressure must be set in accordance with the values in → Tab. 8. To set the manifold pressure the safety screw for setting the manifold pressure 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.

G124X SP	Natural gas [inch W.C.]	Propane [inch W.C.]
18	3.6	9.8
25	3.5	10.3
32	3.6	10.0

Tab. 8 Manifold pressure

55. Record the set value in the commissioning protocol of the installation and maintenance instructions and screw the safety screw into the gas valve again.

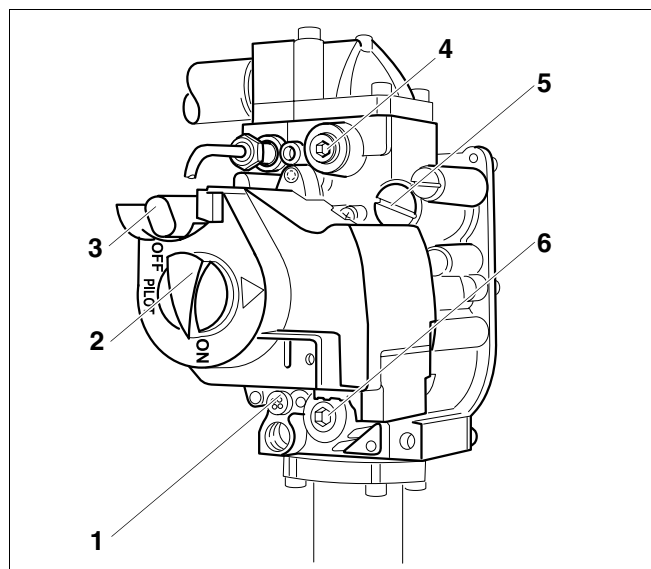


Fig. 37 G124X SP gas valve

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

Check flame sensor

56. Turn gas valve ON/OFF button (→ Fig. 37) clockwise to OFF position. The main burner flame and the pilot flame are extinguished.
57. Turn gas valve ON/OFF switch (→ Fig. 38) counterclockwise to PILOT position.
58. Wait three (3) minutes and turn gas valve ON/OFF switch (→ Fig. 38) counterclockwise to ON position. Gas must not flow into the main burner.
59. Use a pressure gauge to check that the manifold pressure (output pressure) is 0.
60. If gas flows turn gas valve ON/OFF switch (→ Fig. 38) to OFF position immediately and close the gas shut-off.
61. Disconnect heating system from the power supply and inform your customer service technician or LP gas company. If no gas flows continue with step 62.
62. Turn gas valve ON/OFF button clockwise to OFF position.
63. Close main gas shut-off.
64. Disconnect the heating system from the power supply.
65. 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.
66. Repeat steps 1 to 6 and 35 to 52 to place the heating system in operation again. Check the screw plugs for leaks with soap solution. If no leaks are found, continue with step 68. If leaks are found, close gas shut-off and switch ON/OFF button on gas valve clockwise to the OFF position. Disconnect the heating system from the power supply.
67. Seal leaks. Open gas shut-off and repeat step 66.
68. Carefully wipe away the soap solution to prevent corrosion caused by the alkali content of the soap.
69. Replace front panel of boiler.

With the Logamatic 2107 control only

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

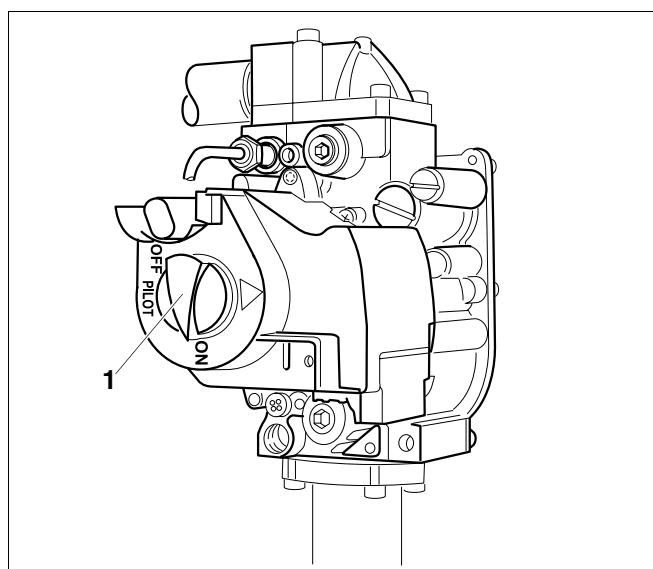


Fig. 38 G124X SP gas valve

1 ON/OFF button (at ON position)

11.5 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. Remove front panel of boiler.

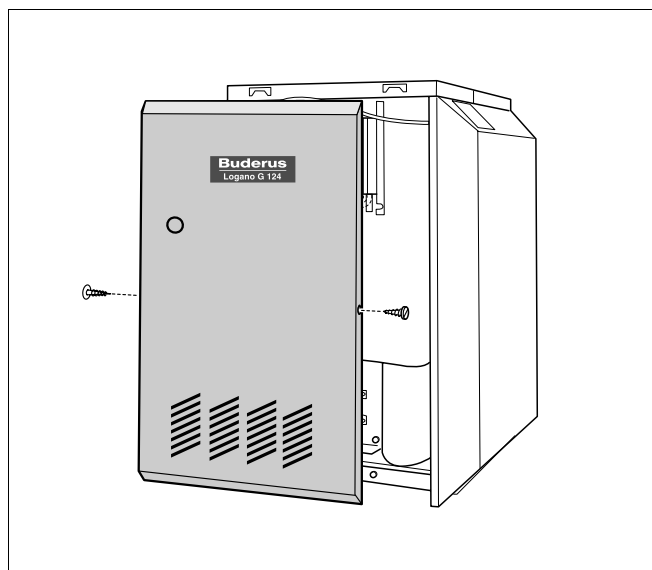


Fig. 39 Remove front panel of boiler

4. Turn gas valve ON/OFF button clockwise to OFF position. Do not use force.
5. Replace front panel of boiler.

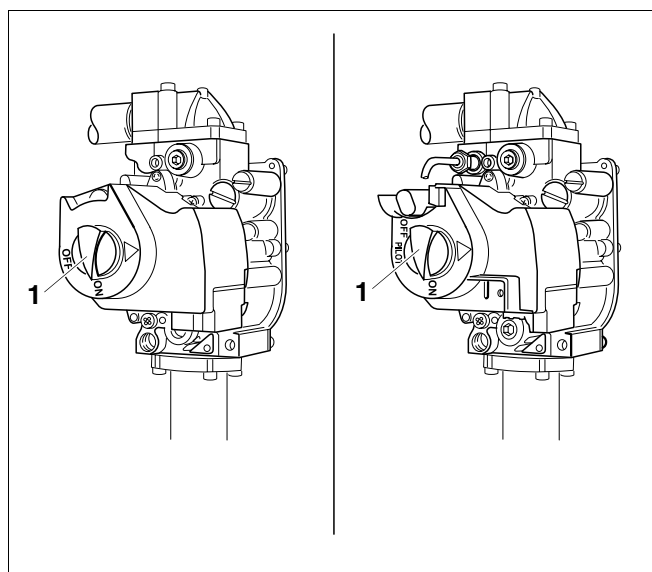


Fig. 40 Gas valve (G124X II left, G124X SP right)

1 ON/OFF button (at ON position)

11.6 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 42 and hand over the technical documentation.



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.

11.7 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	Remarks or measured values
1. Type of gas	☐ Natural gas ☐ Propane
2. Check combustion air, inlet and outlet openings and flue gas connection	☐
3. Check the unit orifices (correct orifices? See → Tab. 9 below) and convert gas type if necessary	☐
4. Fill boiler with water and bleed complete heating system	☐
5. Measure gas supply pressure (flow pressure)	_____ inches W. C.
6. Measure manifold pressure and adjust if necessary	_____ inches W. C.
7. Leak check in operating status, check ignition and main burner flame and correct functioning of the venting system	☐
8. Check maximum aquastat	☐
9. Install front boiler panel	☐
10. Inform operator, hand over technical documentation	☐
11. Installer	Signature: _____
Operator:	Signature: _____

	Main orifice identification		
Boiler size	18	25	32
Natural gas	265	250	250
Propane gas	175	160	160

Tab. 9 Main gas orifice identification



USER NOTE

- Inform the customer of the correct fuel and enter it in the table (→ operating manual of boiler).

12 Taking the boiler out of operation

12.1 Normal boiler shut-down

1. With the aquastat:
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 aquastat.
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.



CAUTION!

SYSTEM DAMAGE

through frost.

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.

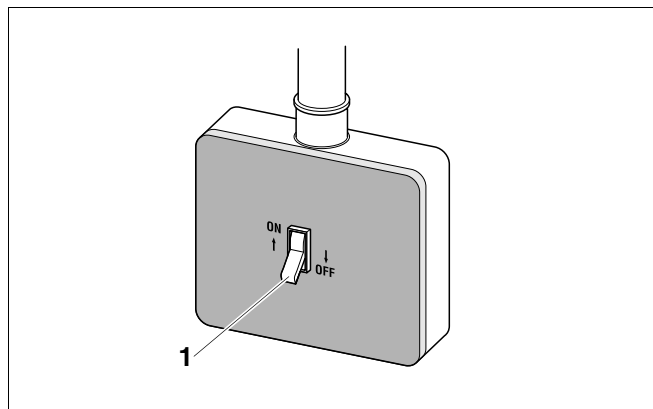


Fig. 41 Shutting down heating system (with aquastat)

1 ON/OFF switch (main switch)

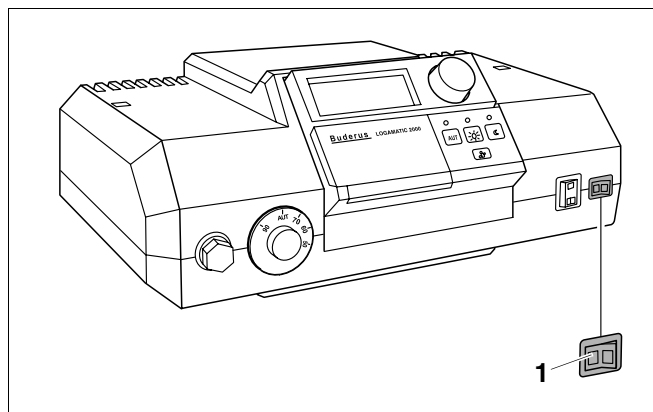


Fig. 42 Shutting down heating system (with Logamatic 2107 control)

1 ON/OFF switch

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 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 53.



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 43).



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. 25, page 28).



RISK TO LIFE

from explosion of flammable gases.

WARNING!

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

3. 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.

- Prior to opening boiler: Disconnect electricity and secure against accidental activation.

1. Shut off electrical supply.
2. Shut off main gas supply.

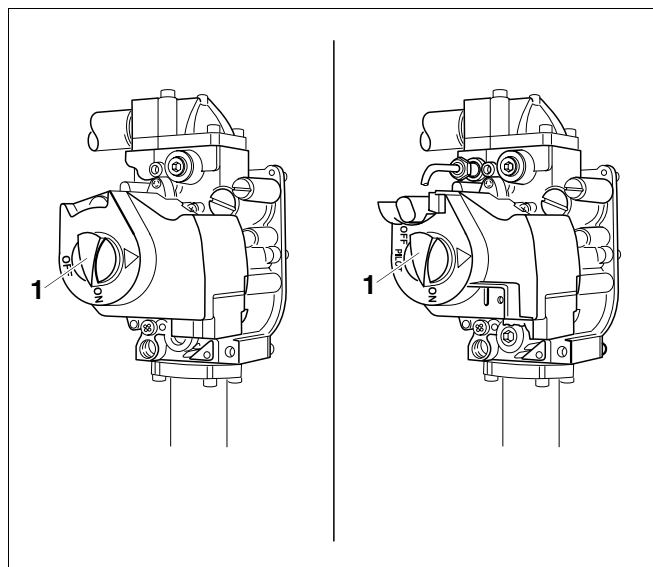


Fig. 43 Gas valve (G124X II left, G124X SP right)

1 ON/OFF button (at ON position)

3. Disconnect pilot gas line from gas valve.
4. **G124X II only:** Disconnect ignition cable from ignition module.
5. **G124X SP only:** Disconnect thermal element from gas valve.
6. Tie gas line with wire or cord (secure).
7. Remove screws between gas valve and burner. Place the gas supply pipe gasket in a safe place.
8. Label wires of flame roll-out switch and disconnect from the switch.

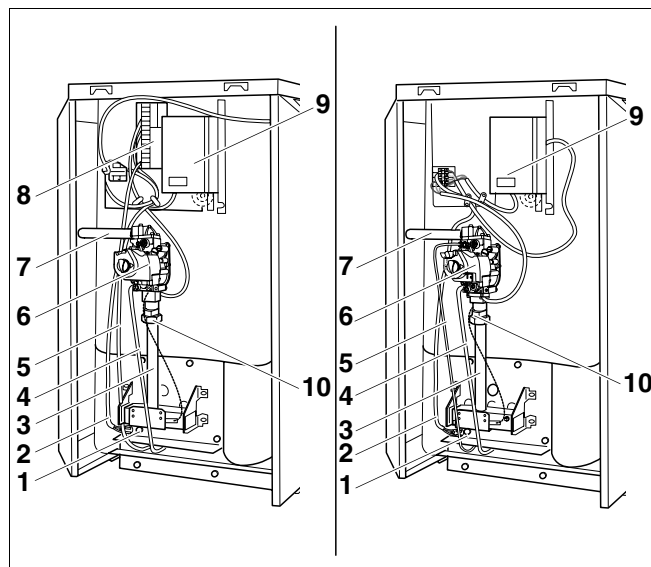


Fig. 44 Front view (G124X II left, G124X SP right)

- 1 Flame roll-out switch
- 2 Wires for flame roll-out switch
- 3 Gas supply pipe
- 4 Pilot gas line
- 5 Ignition cable (G124X II only) or thermocouple (G124X SP only)
- 6 Gas valve
- 7 Gas supply line
- 8 Automatic ignition (automatic switch unit) G124 X II only
- 9 Aquastat
- 10 Screws between gas valve and burner

9. Unscrew nuts and remove burner

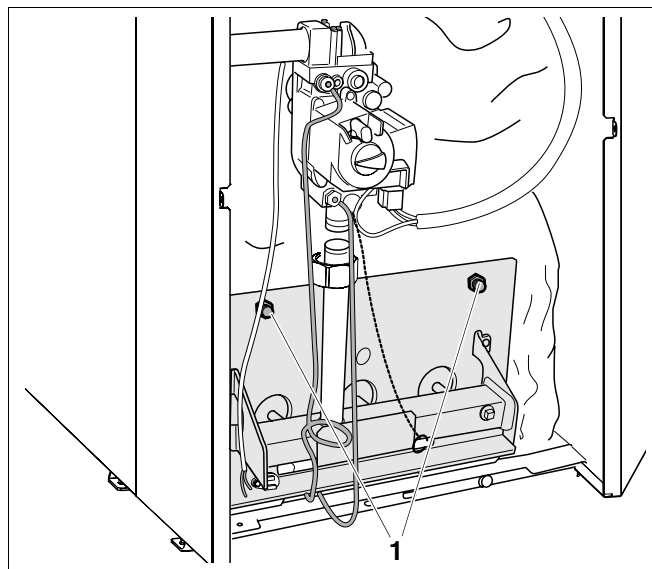


Fig. 45 Removing burner as shown on the G124X SP

- 1 Attachment screws (4)

10. Remove boiler jacket.
11. Fold insulation to the side.
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 insulation.
16. Screw cleaning cover into place and replace insulation.

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 45).



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.

17. Cover control with foil to prevent entry of spray into the control.
18. Ventilate boiler room well.
19. Spray flue gas vents evenly with the cleaning agent.
20. Replace and install the burner in reverse order of removal and disassembly (→ page 45).
21. Place the heating system in operation.
22. Heat the boiler water to a temperature of at least 122 °F.
23. Take the boiler out of operation.
24. Allow boiler to cool.
25. Remove burner (→ page 45).
26. Brush out flue gas passages.
27. Clean combustion chamber and bottom insulation.
28. Ventilate boiler room well again.
29. Install burner.
30. Attach boiler jacket.

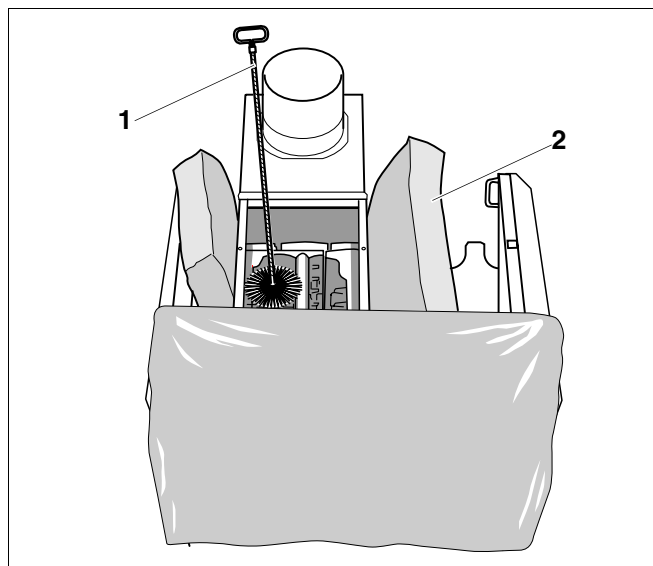


Fig. 46 Cleaning the hot flue passages

- 1 Cleaning brush
- 2 Insulation

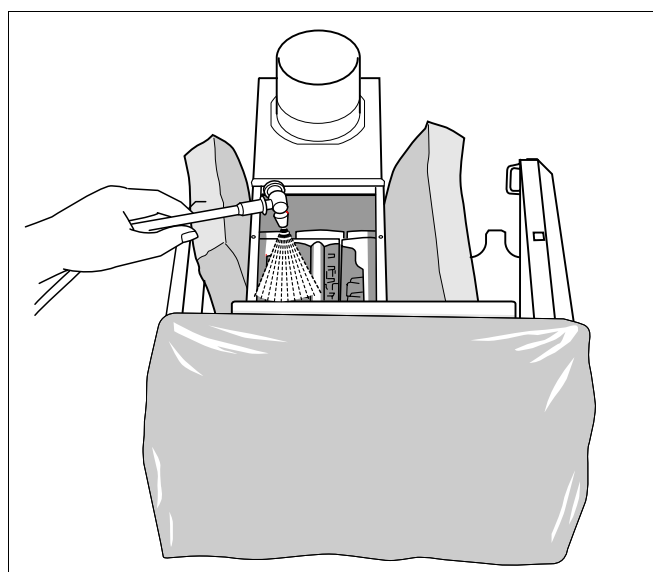


Fig. 47 Wet-cleaning the boiler

13.6 Cleaning the burner

1. Remove burner (→ page 45).
2. Check burner tubes for dirt. If necessary, clean burner as described below.
3. Unscrew pilot burner unit from burner.
4. Disconnect pilot gas line from pilot burner unit.
5. Remove pilot orifice 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 tubes with water; hold burner so water enters all slots if the burner tubes and drains out again.

8. Remove remaining water by swinging the burner.
9. Check that the slots of the burner tubes 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 45).
11. Place boiler in operation as directed in → Chapter 11 "Placing the heating system in operation", page 28 to page 42.
12. Check operation of aquastat.
13. Test low water cut-off if installed.
14. 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.

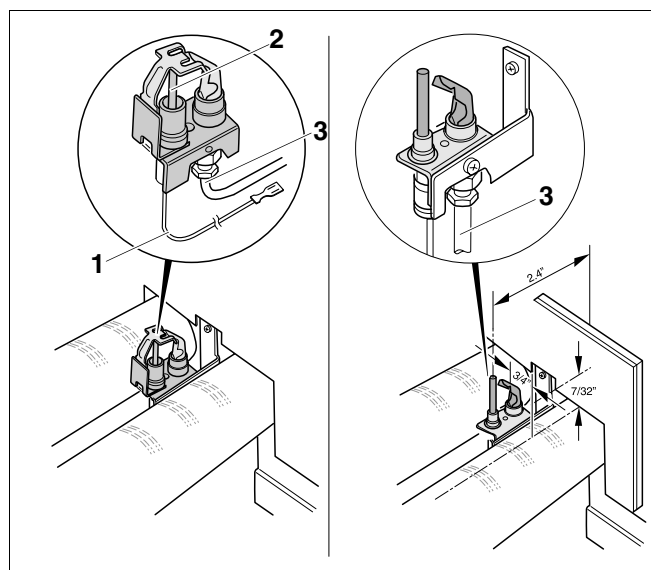


Fig. 48 Pilot burner (G124X II left, G124X SP right)

- 1 Ignition cable
- 2 Ignition electrode
- 3 Pilot gas line

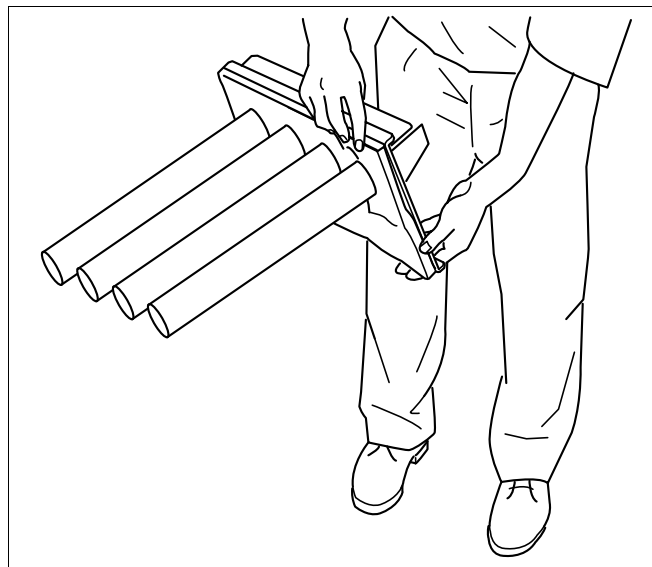


Fig. 49 Swinging burner



WARNING!

RISK TO LIFE

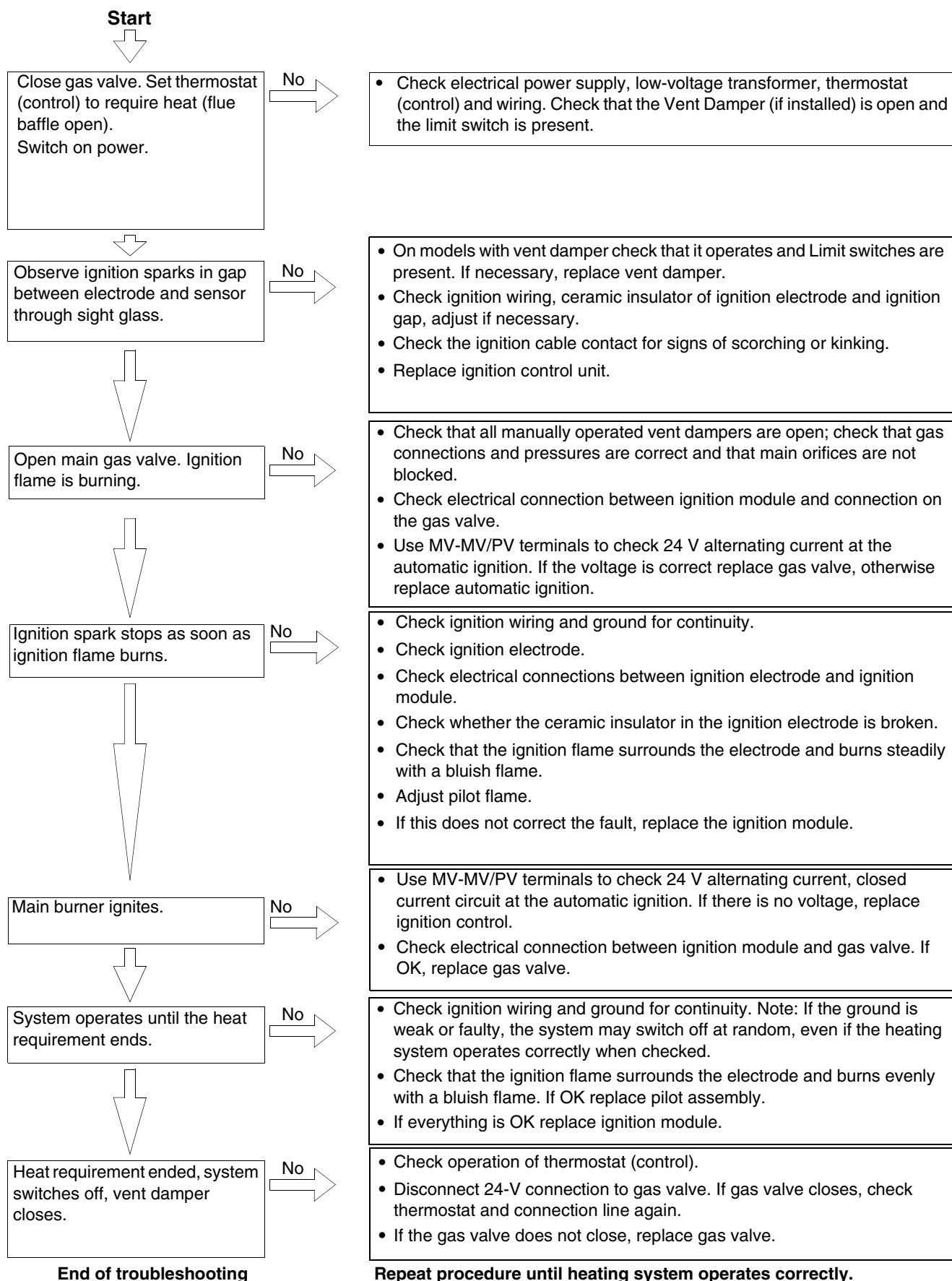
from explosion of flammable gases.
After maintenance work leaks may occur in pipes and threaded fastenings.

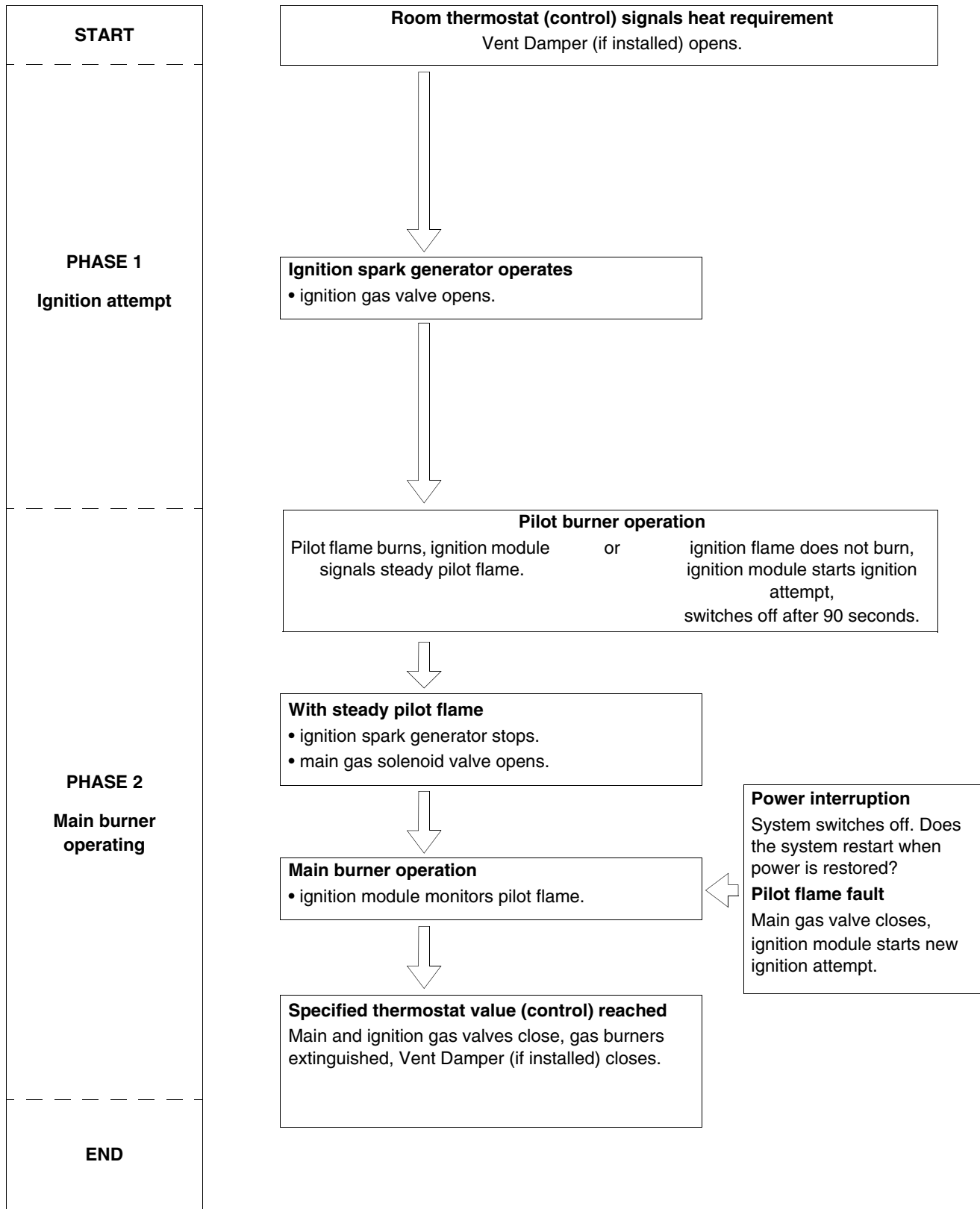
- Make a thorough check for leaks.
- Use only approved leak testing agents to search for leaks.

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 G124X II

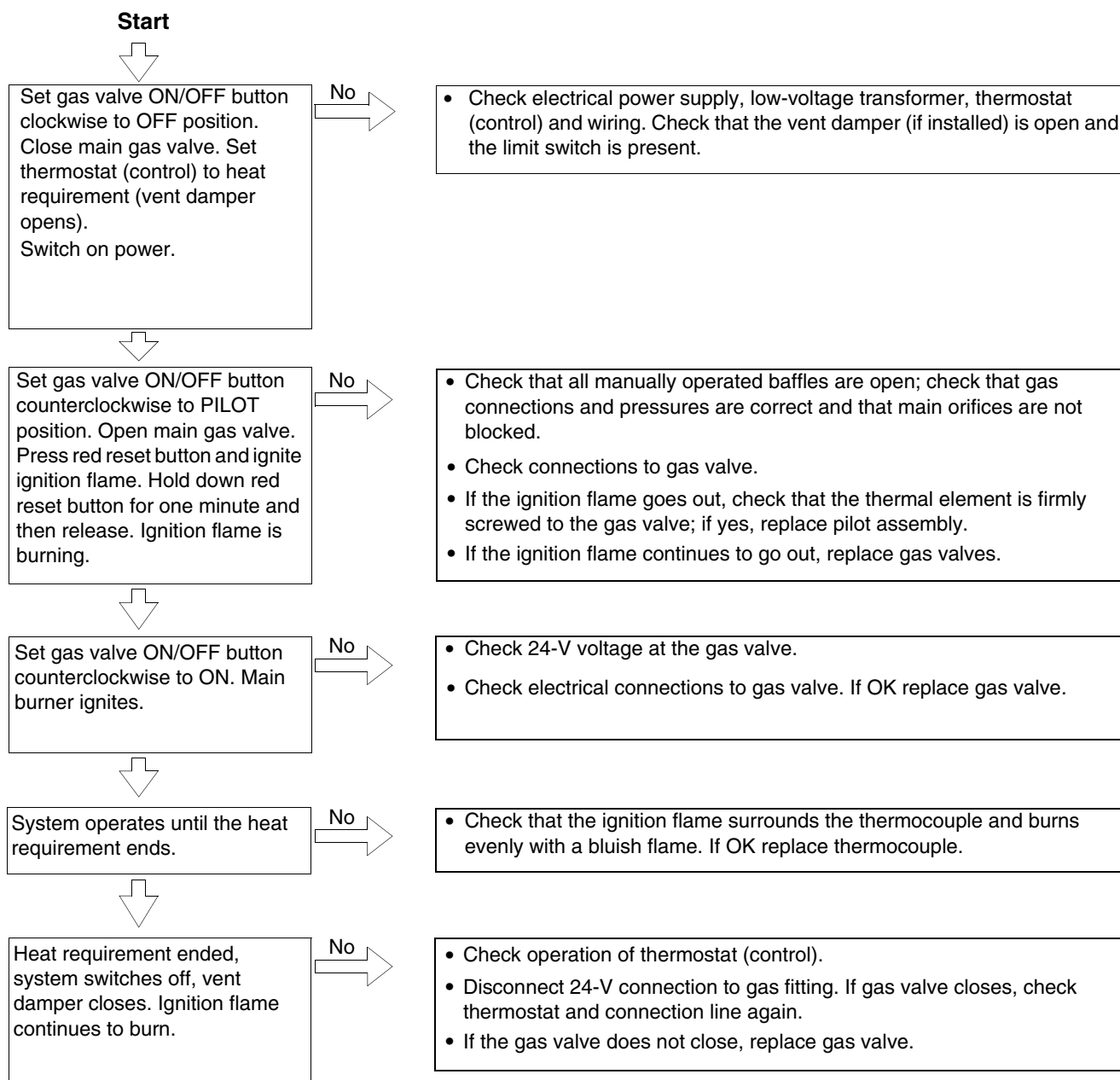
Equipment required: Wiring diagrams (→ Chapter 16, page 74) and voltage detectors for 120 VAC and 24 VAC.





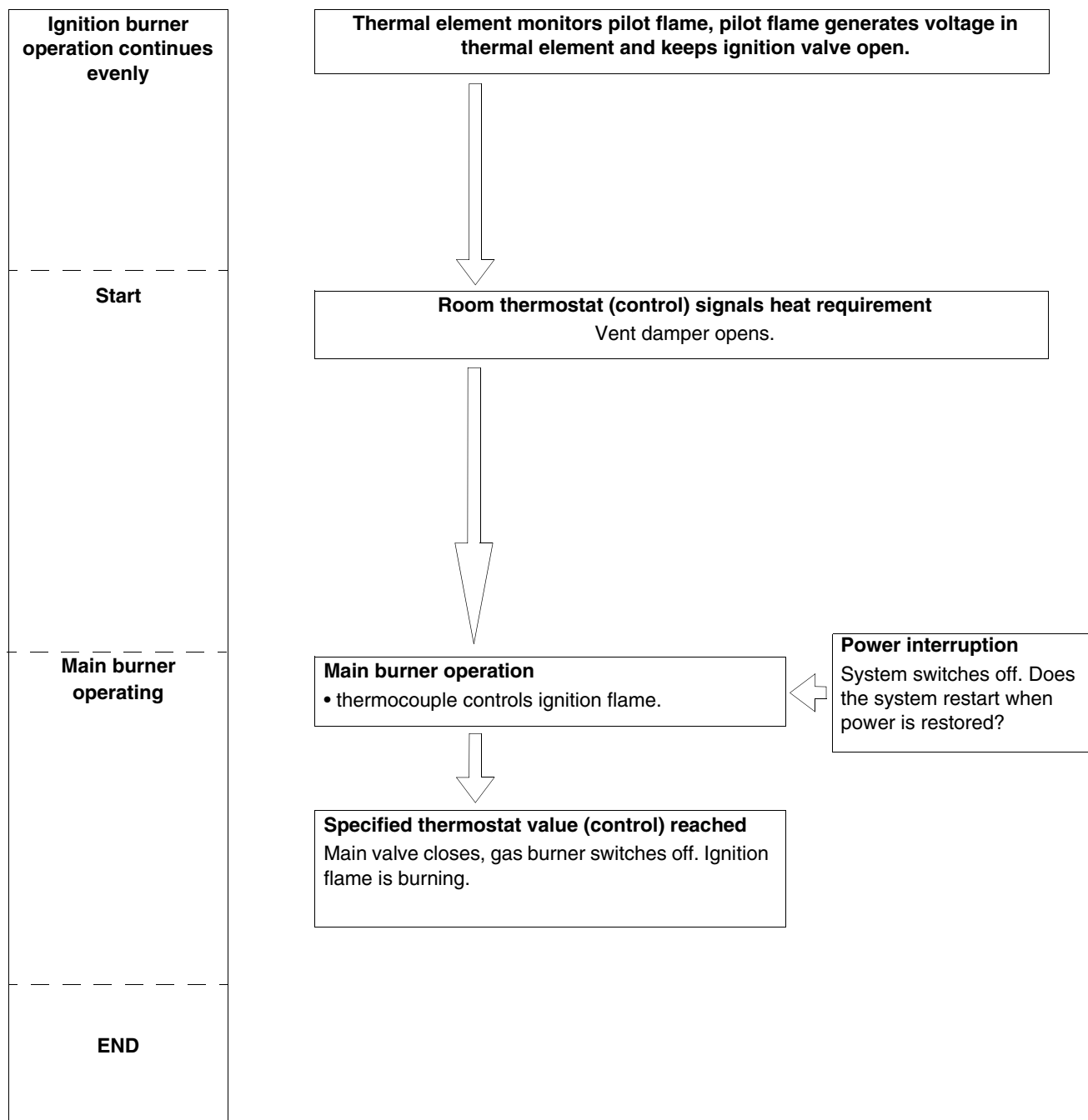
13.8 Troubleshooting on the G124X SP

Equipment required: Wiring diagrams (→ Chapter 16, page 74) and voltage detectors for 120 VAC and 24 VAC.



End of troubleshooting

Repeat procedure until heating system operates correctly.



13.9 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 44	☐	☐
2. Inspection of boiler	page 44	☐	☐
3. Inspection of burner	page 44	☐	☐
4. Cleaning boiler	page 45	☐	☐
5. Cleaning burner	page 48	☐	☐
6. Measuring gas supply pressure	page 29	_____inches W. C.	_____inches W. C.
7. Measuring manifold pressure	page 33/page 38	_____inches W. C.	_____inches W. C.
8. Checking for leaks in operating condition	page 29	☐	☐
9. Checking pilot and main burner flame	page 34/page 37 ff.	☐	☐
10. Check maximum aquastat setting	page 48	☐	☐
11. Check the area around the boiler for flammable materials, gasoline or other corrosive liquids.	page 48	☐	☐
12. Confirm maintenance		☐	☐
Confirmation of correct maintenance (company stamp, signature)			

Date:	Date:	Date:	Date:	Date:
☐	☐	☐	☐	☐
☐	☐	☐	☐	☐
☐	☐	☐	☐	☐
☐	☐	☐	☐	☐
☐	☐	☐	☐	☐
_____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.
☐	☐	☐	☐	☐
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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.

Boiler jacket (→ Fig. 50)

Item no.	Description	Buderus article number	Model 18 Quantity/ model	Model 25 Quantity/ model	Model 32 Quantity/ model
10	Front panel complete G124 X	63029202	1	1	1
20	Logano G124 name plate	67902838	1	1	1
30	Side panel left/right G124X	63029217	2	2	2
40	Cable holder	07060754	1	1	1
50	Cover front G124X	63035780	1	1	1
60	Cover rear 365 mm wide	63029222	1	1	1
70	Angle 3x30/20x463 complete	63012813	1	1	1
80	Rear panel complete G124 X	05078140	1	1	1
90	Boiler block insulation	6303-	5770	5771	5772
100	Clip	00476378	1	1	1
110	Sheet metal screws	Mounting material for boiler jacket	12	12	12
120	Angle 458X55	70001239	1	1	1
130	Cover plate 300 x 160 front cover	63016429	1	1	1
	Mounting material for G124X 2 - 5 section B	05078804	1	1	1

Tab. 10 Boiler jacket

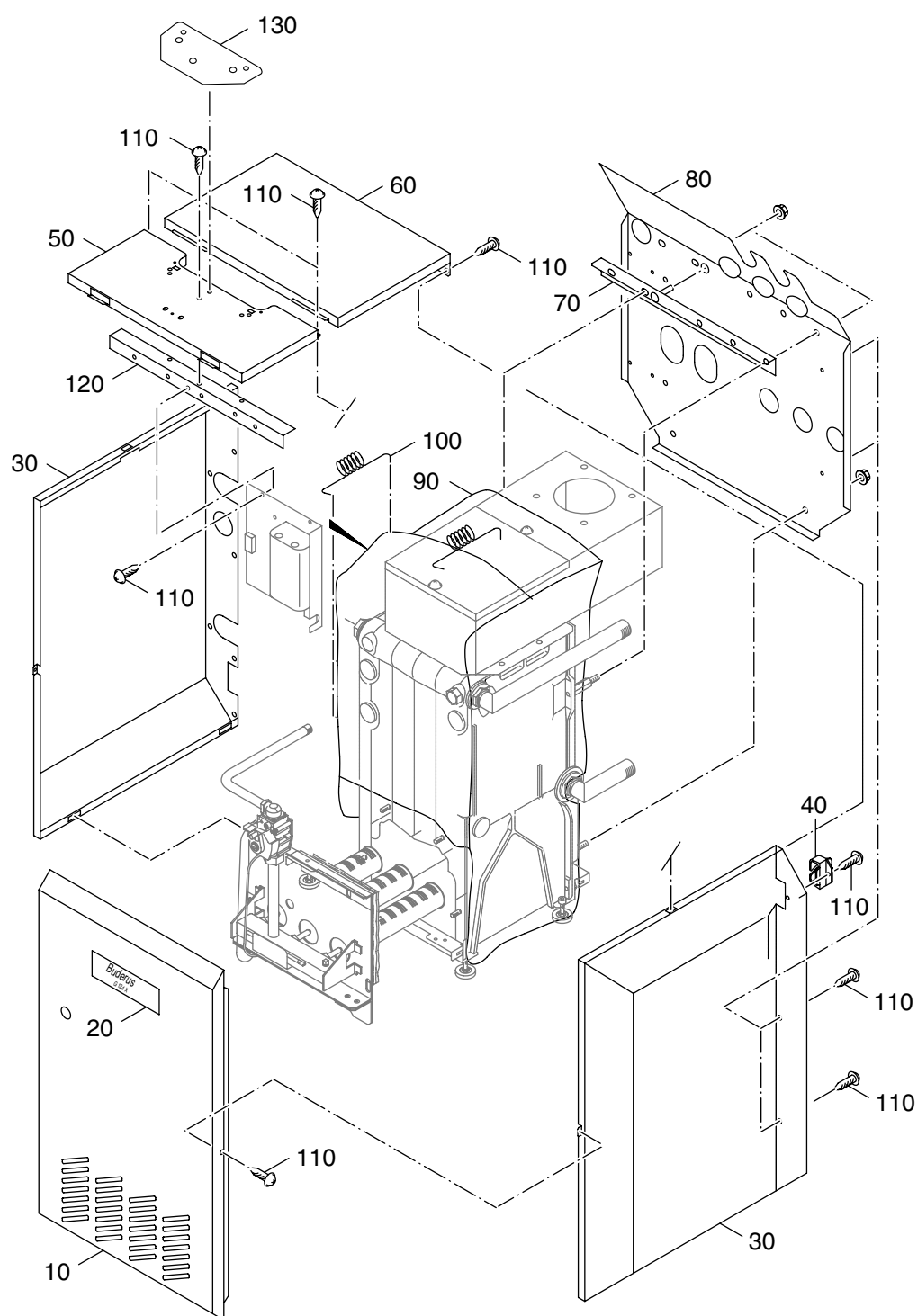


Fig. 50 Boiler jacket

Boiler block – attachment parts (→ Fig. 51)

Item no.	Description	Buderus article number	Model 18 Quantity/ model	Model 25 Quantity/ model	Model 32 Quantity/ model
10	Boiler block	08197-	252	254	256
11	Threaded stud M8x30	see Mounting material boiler block	4	4	4
12	Hex head nut M8	see Mounting material boiler block	5	5	5
13	Immersion well	05446065	1	11	1
14	Gasket	86159710	4	4	4
15	Plug	06073304	2	2	2
20	Boiler rail complete G124X	05078130	1	1	1
30	Boiler rail rear	63039580	1	1	1
50	Washer	see Mounting material boiler block	2	2	2
60	Hex screw M8x16	see Mounting material boiler block	4	4	4
70	Leveling legs M10x51mm	05871596	4	4	4
80	Insulation for base group	05078-	302	304	306
90	Spacer	05176794	4	4	4
100	Distance pin M8x63.5	00475485	1	1	1
110	Hex nut M10	see Mounting material boiler block	2	2	2
120	Snap nut 4.8-SNU2012	see Mounting material boiler block	4	4	4
130	Sheet metal screw ST4.8x22	see Mounting material boiler block	2	2	2
140	Flue collar	05521-	240	240	242
150	Elbow	05407350	1	1	1
160	Back flow check	05181-	710	712	714
161	Cleaning cover	05371-	974	976	978
162	Sheet metal screw ST4.8x13	see Mounting material boiler block	2	2	2
170	Elbow	05407352	1	1	1
180	Vent Damper	9990-	6864	6864	6865
200	B-kit G/GA124"US/CA"	63037069	1	1	1
	Mounting material for boiler block G124X	05078806	1	1	1

Tab. 11 Boiler

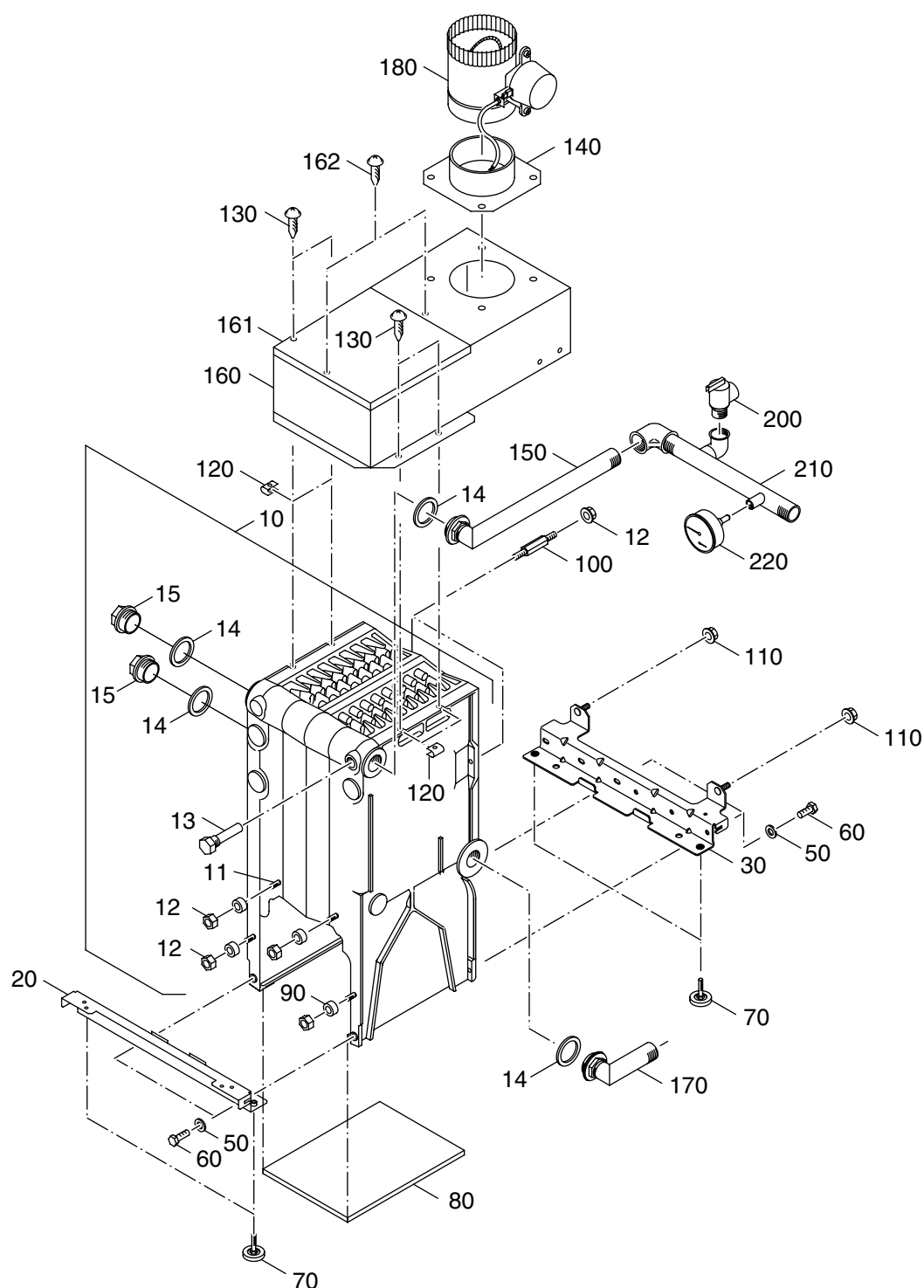


Fig. 51 Boiler block – attachment parts

Control panel assembly for G124X II (→ Fig. 52)

Item no.	Description	Buderus article number	Model 18 Quantity/ model	Model 25 Quantity/ model	Model 32 Quantity/ model
10	Control Panel Assembly	05249884	1	1	1
20	Mounting Plate	05078168	1	1	1
30	Terminal Strip	see M-kit no.1	1	1	1
40	Screw C ST3.5x16 A3K	see M-kit no.1	2	2	2
50	Strain Relief	see M-kit no.1	2	2	2
60	Screw F ST3.5x9.5 A3K	see M-kit no.1	2	2	2
70	Wiring Harness	05182064	2	2	2
80	Strain Relief Bracket for blocked vent switch	see M-kit no.1	1	1	1
90	Strain Relief	see M-kit no.1	1	1	1
100	Wiring Harness	00920137	1	1	1
110	Cable orange/black	07079806	1	1	1
120	Ignition Control	05493087	1	1	1
130	Screw (flathead) 3.5x9.5 A3K	see M-kit no.1	5	5	5
140	Aquastat	05996360	1	1	1
150	Screw F ST3.5x6.5 A3K	see M-kit no.1	3	3	3
160	Bracket 2x23x79	-	1	1	1
170	Wiring Harness	07079804	1	1	1
180	Igniter Cable	05493096	1	1	1
190	Blocked Vent Switch	07079498	1	1	1
200	Spring Clip	05446800	1	1	1
210	Spacer	07060110	2	2	2
	Mounting kit no. 1	07079534	1	1	1

Tab. 12 Control panel assembly for G124X II

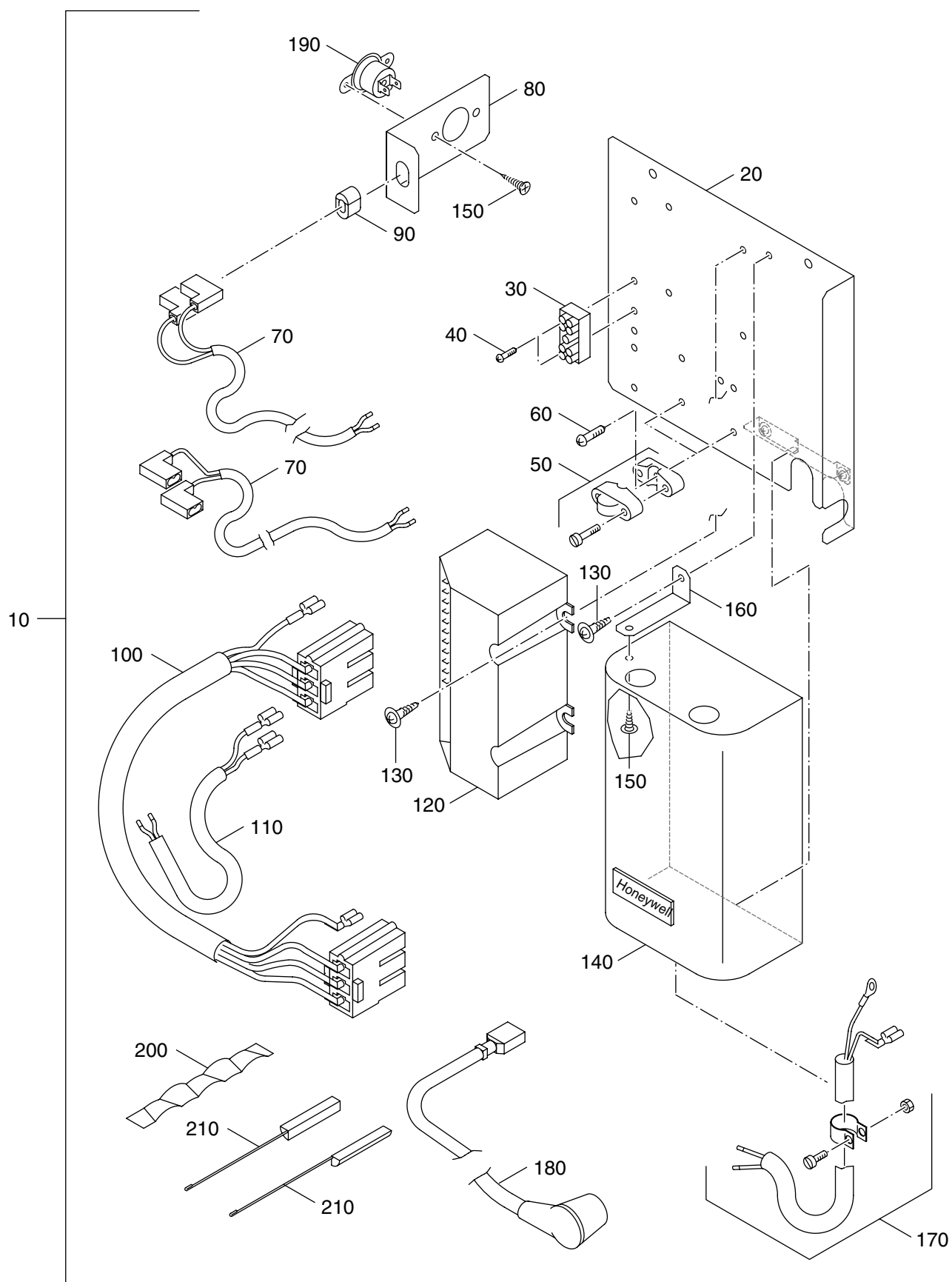


Fig. 52 Control panel assembly for G124X II

Control panel assembly for G124X SP (→ Fig. 53)

Item no.	Description	Buderus article number	Model 18 Quantity/ model	Model 25 Quantity/ model	Model 32 Quantity/ model
10	Control Panel Assembly GAW 021	05249885	1	1	1
20	Mounting Plate	05078168	1	1	1
30	Terminal Strip	see M-kit no.1	1	1	1
40	Screw C ST3.5x16 A3K	see M-kit no.1	2	2	2
50	Strain Relief	see M-kit no.1	2	2	2
60	Screw F ST3.5x9.5 A3K	see M-kit no.1	2	2	2
70	Wiring Harness	05182064	2	2	2
80	Strain Relief Bracket for blocked vent switch	see M-kit no.1	1	1	1
90	Strain Relief	see M-kit no.1	1	1	1
100	Cable Harness	63015948	1	1	1
110	Aquastat	05996360	1	1	1
120	Screw F ST3.5x6.5 A3K	see M-kit no.1	3	3	3
130	Screw (flathead) 3.5x9.5 A3K	see M-kit no.1	3	3	3
140	Bracket 2x23x79	-	1	1	1
150	Blocked Vent Switch	07079498	1	1	1
160	Spring Clip	05446800	1	1	1
170	Spacer	07060110	2	2	2
	Mounting kit no. 1	07079534	1	1	1

Tab. 13 Control panel assembly for G124X SP

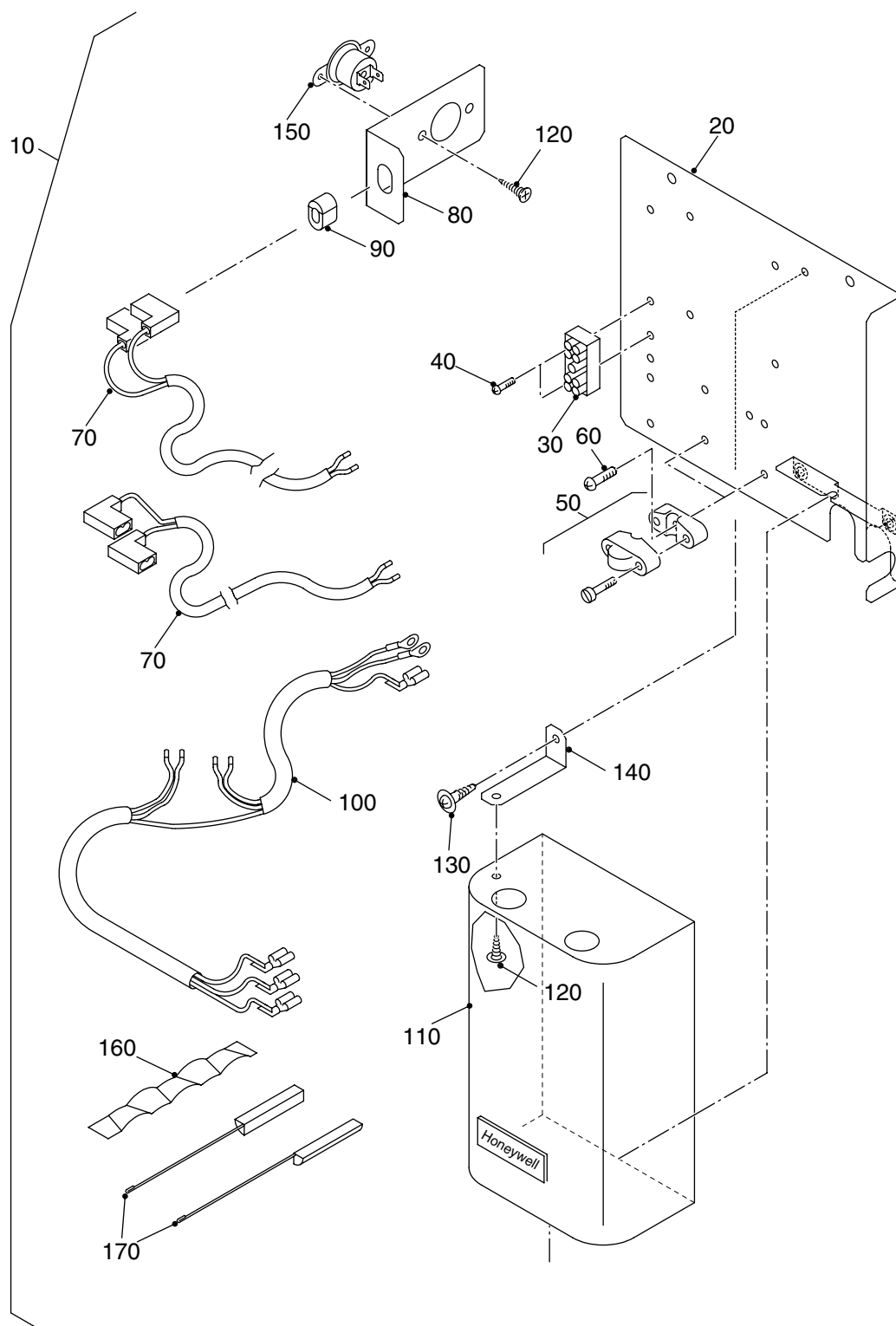


Fig. 53 Control panel assembly for G124X SP

Manifold - component parts (→ Fig. 54)

Item no.	Description	Buderus article number	Model 18 Quantity/ model	Model 25 Quantity/ model	Model 32 Quantity/ model
10	Bracket	70000-	463	464	465
20	Screw, M5x8-A3K	see M-kit no. 2	4	4	4
30	Insulation including adhesive	05181396	1	1	1
31	Adhesive for insulation	02037312	1	1	1
40	Roll-out switch	00471336	1	1	1
50	Screw, M4x16-ST	see M-kit no. 2	2	2	2
60	Manifold	05176-	979	980	981
61	Gasket for union	05959280	1	1	1
	All orifices are for 0-8500 feet elevation. Contact Buderus Hydronic Systems for high altitude conversions				
62	Gasket	05883094	2	3	4
70	Nozzle Kit NG-0-8500 ft	5484	408	400	396
80	Match Bracket (only for G124X SP)	05176863	1	1	1
	Mounting kit no. 2 for G124X II:	05181 883	1	1	1
	Mounting kit no. 2 for G124X SP	05176 996	1	1	1
90	Manifold Assembly NG 8500 ft. AE124X II	05272-	514	516	518
100	Manifold Assembly NG 8500 ft. AE124X SP	05272-	570	572	574

Tab. 14 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.

Gas type conversion parts

Item no.	Description	Buderus article number	Model 18 Quantity/ model	Model 25 Quantity/ model	Model 32 Quantity/ model
	NG kit G124X 0-8500 ft "US/CA"	6303-	8348	8349	8350
	NG kit G124X 8501 - 12000 ft "US/CA"	6303-	7801	7802	7803
	LP kit G124X II 0-8500 ft "US/CA"	6303-	7780	7781	7782
	LP kit G124X II 8501 - 12000 ft "US/CA"	6303-	7783	7784	7785
	LP kit G124X SP 0-8500 ft "US/CA"	6303-	7786	7788	7790
	LP kit G124X SP 8501 - 12000 ft "US/CA"	6303-	7794	7797	7800

Tab. 15 Gas-type conversion parts for G124 X II and G124X SP

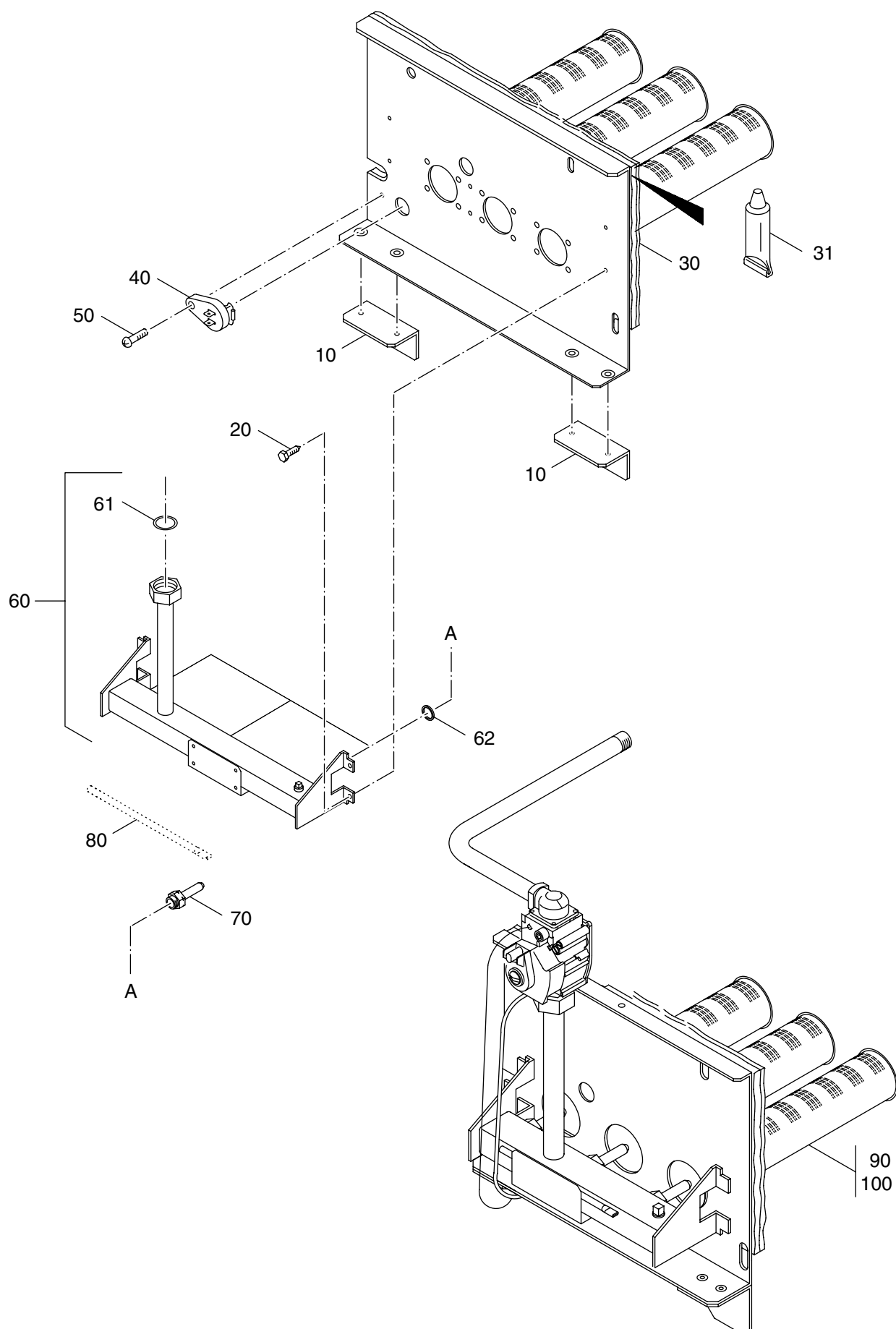


Fig. 54 Manifold - component parts

Gas union for G124X II (→ Fig. 55)

Item no.	Description	Buderus article number	Model 18 Quantity/ model	Model 25 Quantity/ model	Model 32 Quantity/ model
10	Gas Supply Pipe Assy 151 mm incl. O-ring	05176736	1	1	-
10	Gas Supply Pipe Assy 241 mm incl. O-ring	05176737	-	-	1
20	Gas Control for Natural Gas	00475825	1	1	1
30	Gas Pipe for union	00905239	1	1	1

Tab. 16 Gas union for G124X II

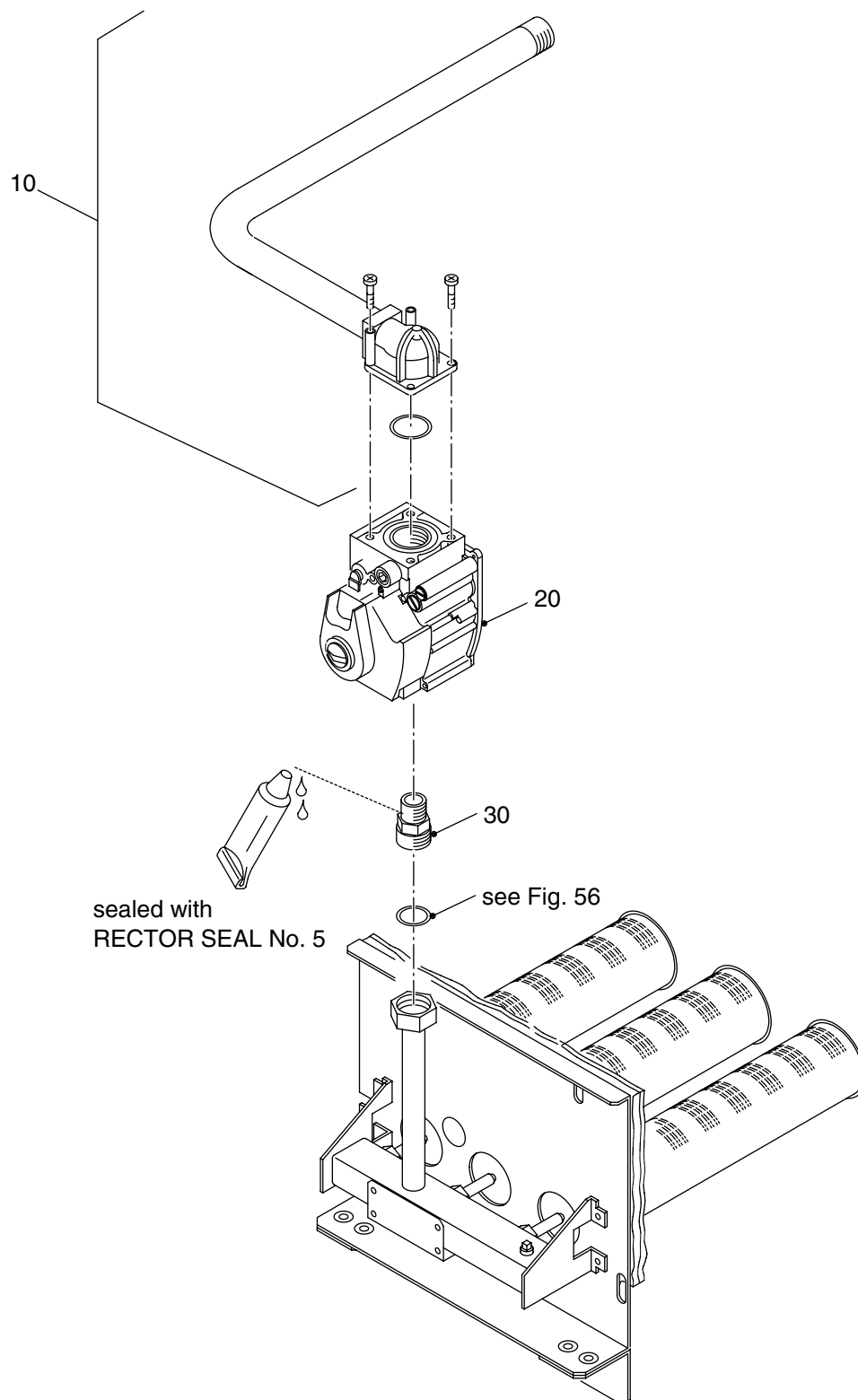


Fig. 55 Gas union for G124X II

Gas union for G124X SP (→ Fig. 56)

Item no.	Description	Buderus article number	Model 18 Quantity/ model	Model 25 Quantity/ model	Model 32 Quantity/ model
10	Gas Supply Pipe Assy 151 mm incl. O-ring	05176736	1	1	-
10	Gas Supply Pipe Assy 241 mm incl. O-ring	05176737	-	-	1
20	Gas Control for Natural Gas	05181446	1	1	1
30	Gas Pipe for union	00905239	1	1	1

Tab. 17 Gas union for G124X SP

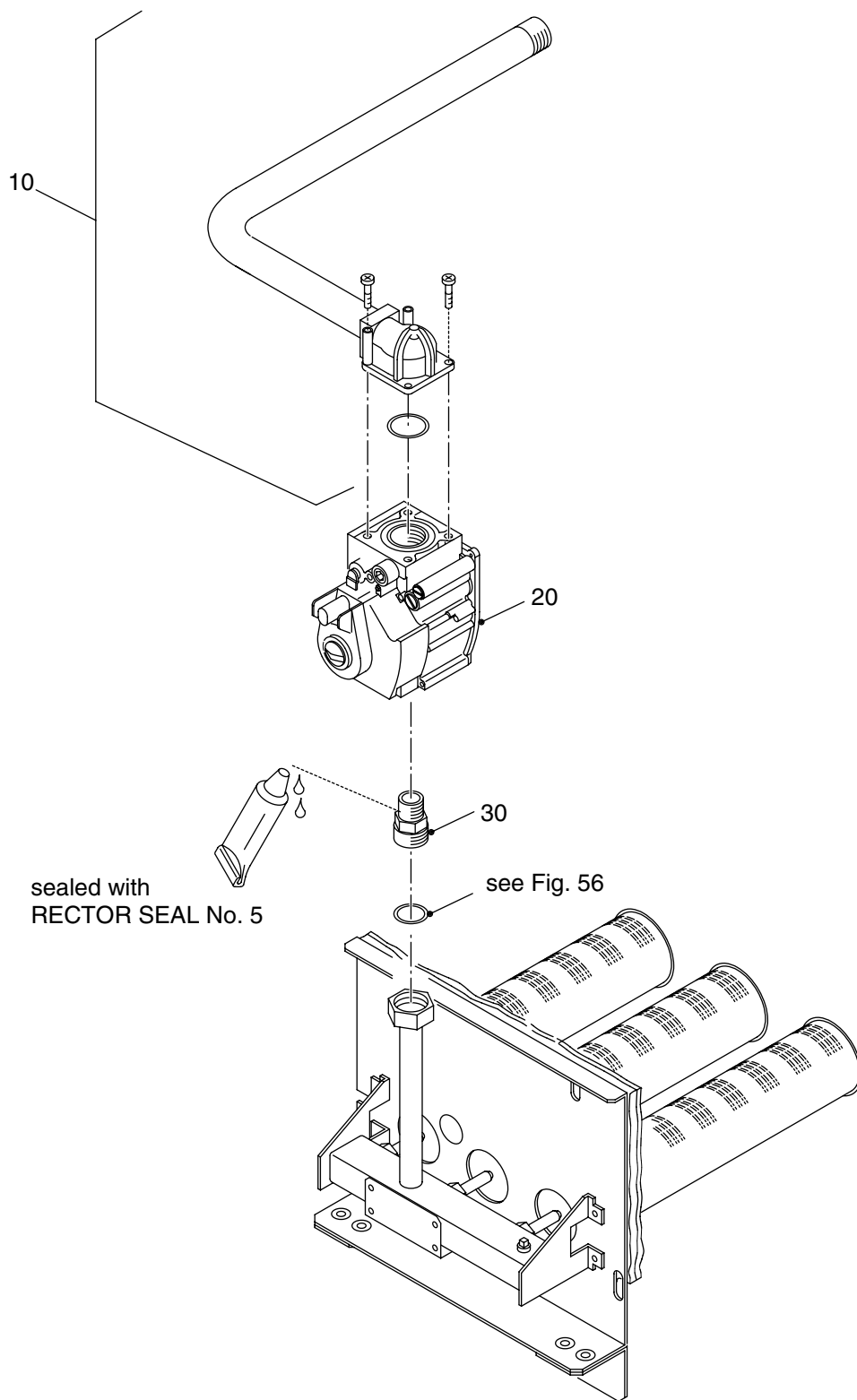


Fig. 56 Gas union for G124X SP

Pilot burner for G124X II (→ Fig. 57)

Item no.	Description	Buderus article number	Model 18 Quantity/ model	Model 25 Quantity/ model	Model 32 Quantity/ model
10	Hex screw, 10x32x3/16-ST	see M-kit no. 2	1	1	1
20	Pilot burner, Q3451E	05181443	1	1	1
30	Pilot orifice, natural gas, BCR20	05181648	1	1	1
30	Pilot orifice, propane gas, BCR12	05176998	1	1	1
40	Mounting for pilot line	05181672	1	1	1
50	Pilot bracket	see M-kit no. 2	1	1	1
60	Pilot line	05181-	920	920	922
70	Screw, M5x8-A3K	see M-kit no. 2	1	1	1
80	Screw, M4x12-A3K	see M-kit no. 2	1	1	1
	Mounting kit no. 2	05181883	1	1	1

Tab. 18 Pilot burner for G124X II

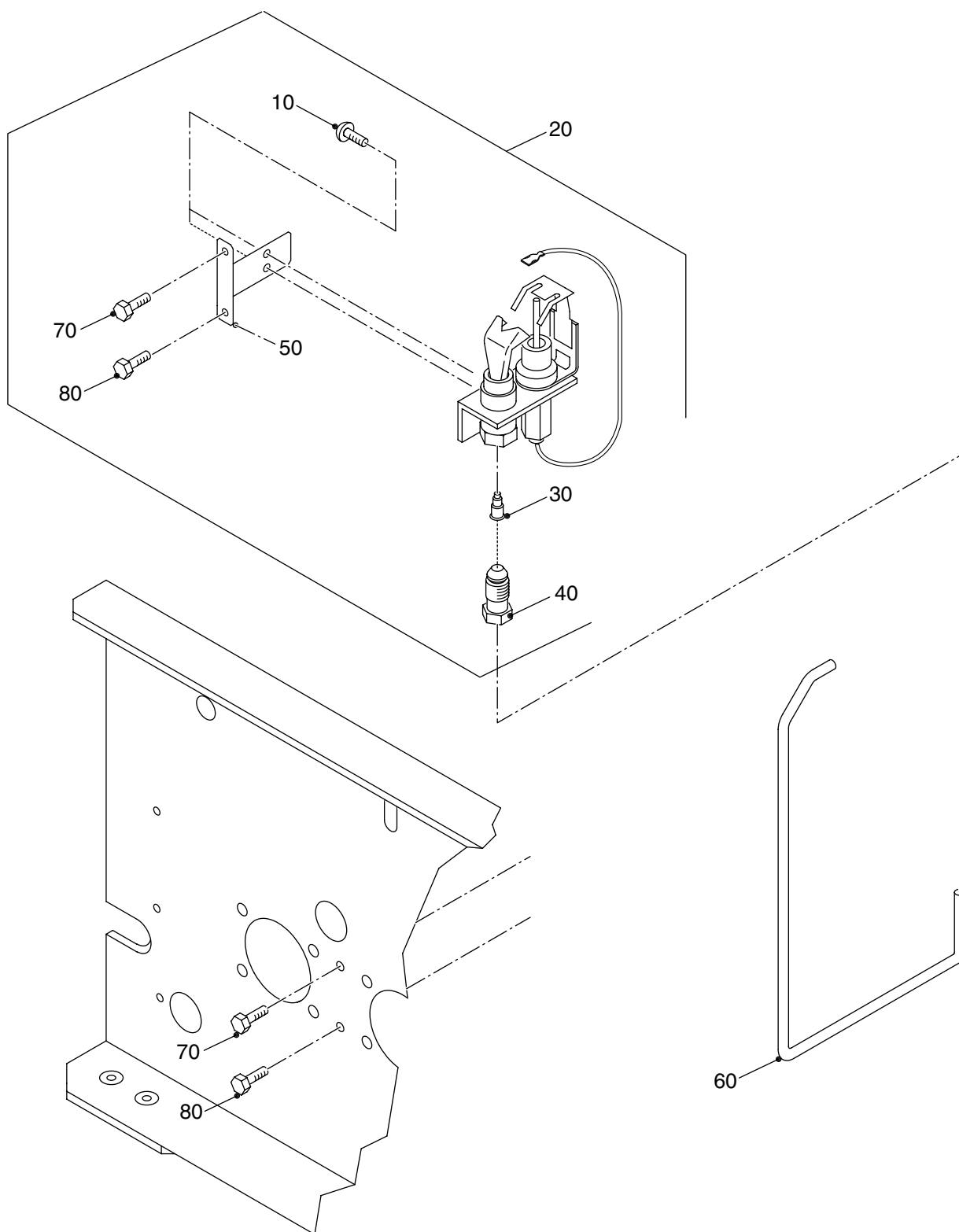


Fig. 57 Pilot burner for G124X II

Pilot burner for G124X SP (→ Fig. 58)

Item no.	Description	Buderus article number	Model 18 Quantity/ model	Model 25 Quantity/ model	Model 32 Quantity/ model
10	Hex screw, 10x32x3/16-ST	see M-kit no. 2	2	2	2
20	Pilot bracket	05181451	1	1	1
30	Pilot burner, Q350	05181314	1	1	1
40	Pilot orifice, natural gas, CAR12	05181016	1	1	1
40	Pilot orifice, propane gas, GAF8	05181017	1	1	1
50	Mounting for pilot line	05181672	1	1	1
60	Pilot line	05181-	924	924	926
70	Thermocouple, Q309	05176988	1	1	1
80	Screw, M5x8-A3K	see M-kit no. 2	1	1	1
90	Screw, M4x12-A3K	see M-kit no. 2	1	1	1
	Mounting kit no. 2	05176996	1	1	1

Tab. 19 Pilot burner for G124X SP

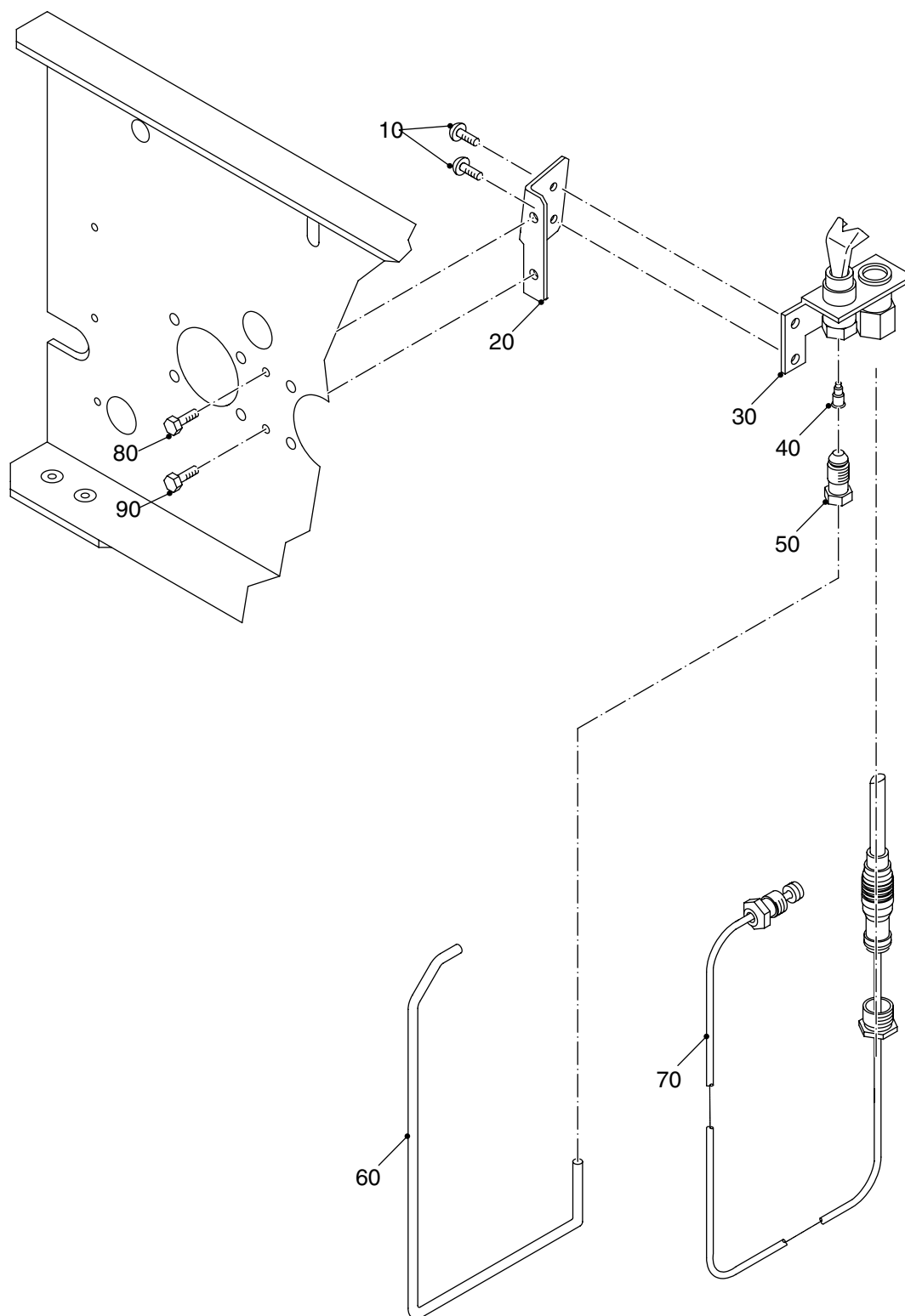


Fig. 58 Pilot burner for G124X SP

15 Specifications

Main gas orifice identification and rated manifold pressure for natural gas orifice

Boiler size	Number of orifices	Main gas orifice identification for altitudes [feet]		Rated manifold pressure [in. W.C.]
		0–8500 ft ¹⁾	8501–12000 ft ²⁾	
18	2	285	280	3.6
25	3	275	270	3.5
32	4	270	265	3.6

Tab. 20 Main gas orifice identification and rated manifold pressure for natural gas orifice

Main gas orifice identification and rated manifold pressure for LP gas orifice

Boiler size	Number of nozzles	Main gas orifice identification for altitudes [feet]		Rated manifold pressure [in. W.C.]
		0–8500 ft ¹⁾	8501–12000 ft ²⁾	
18	2	180	175	9.8
25	3	175	170	10.3
32	4	170	165	10.0

Tab. 21 Main gas orifice identification and rated manifold pressure for LP gas orifice

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

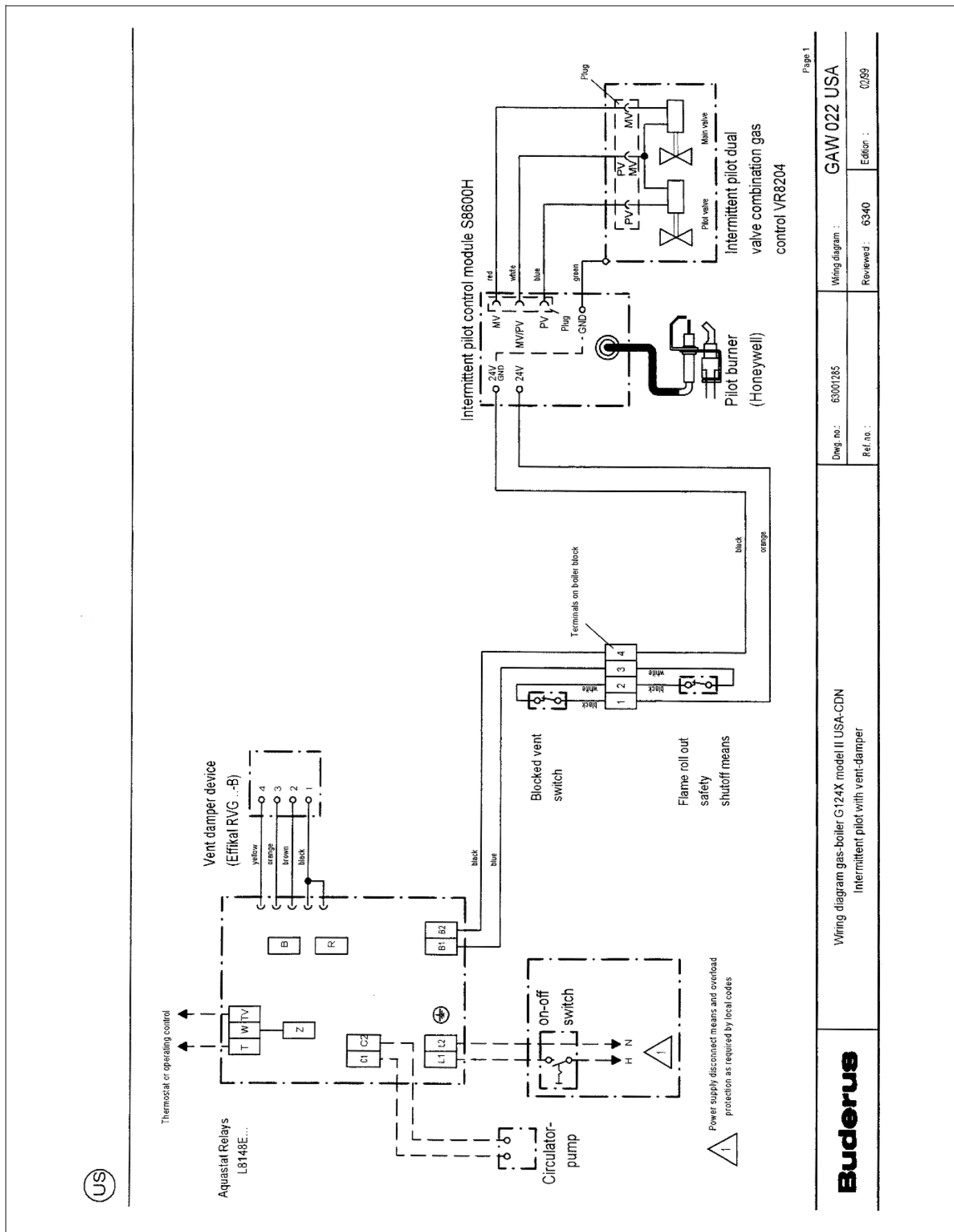


Fig. 59 Wiring diagram – G124X II

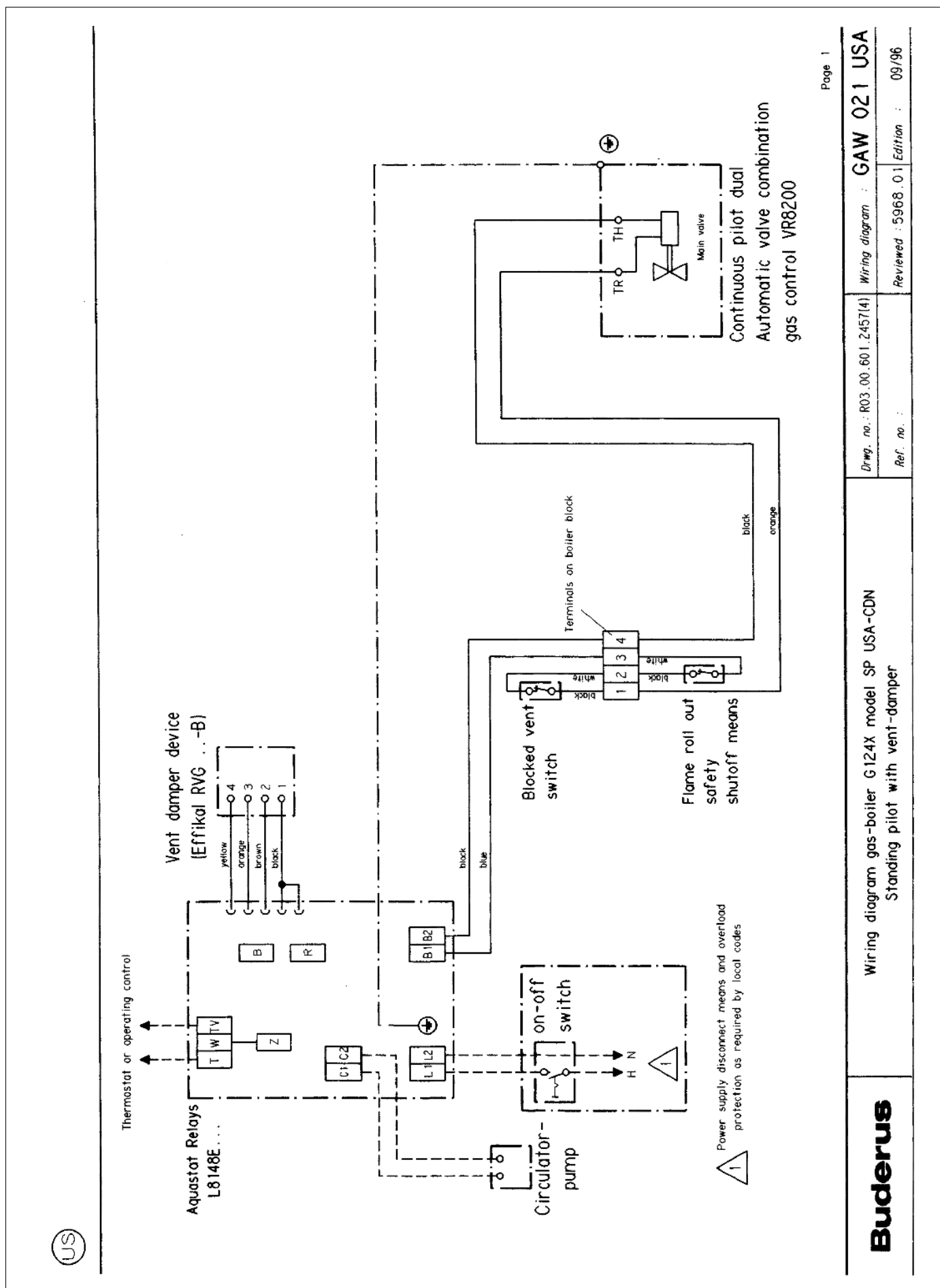


Fig. 60 Wiring diagram – G124X SP

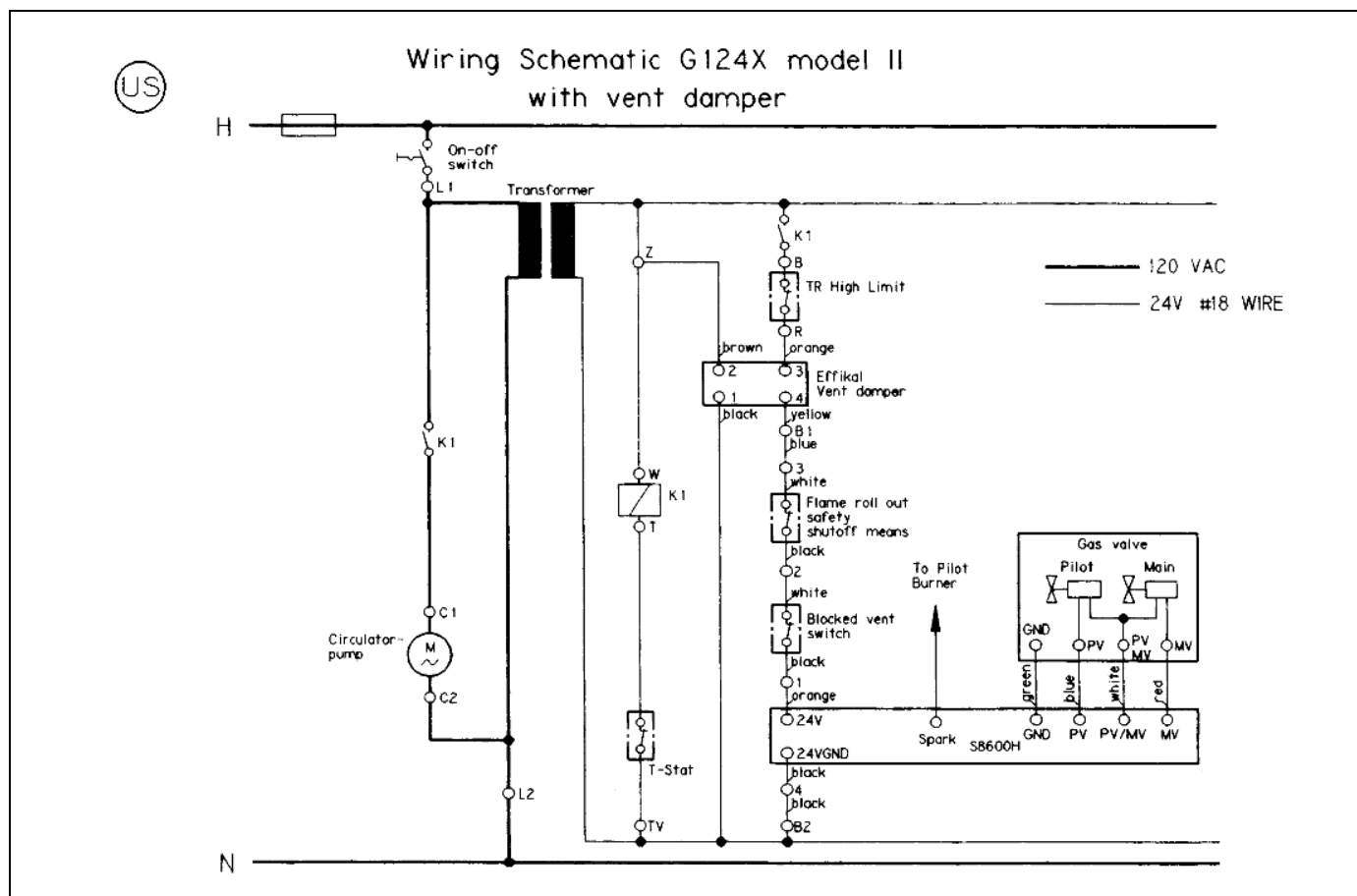


Fig. 61 Wiring diagram – G124X II with vent damper

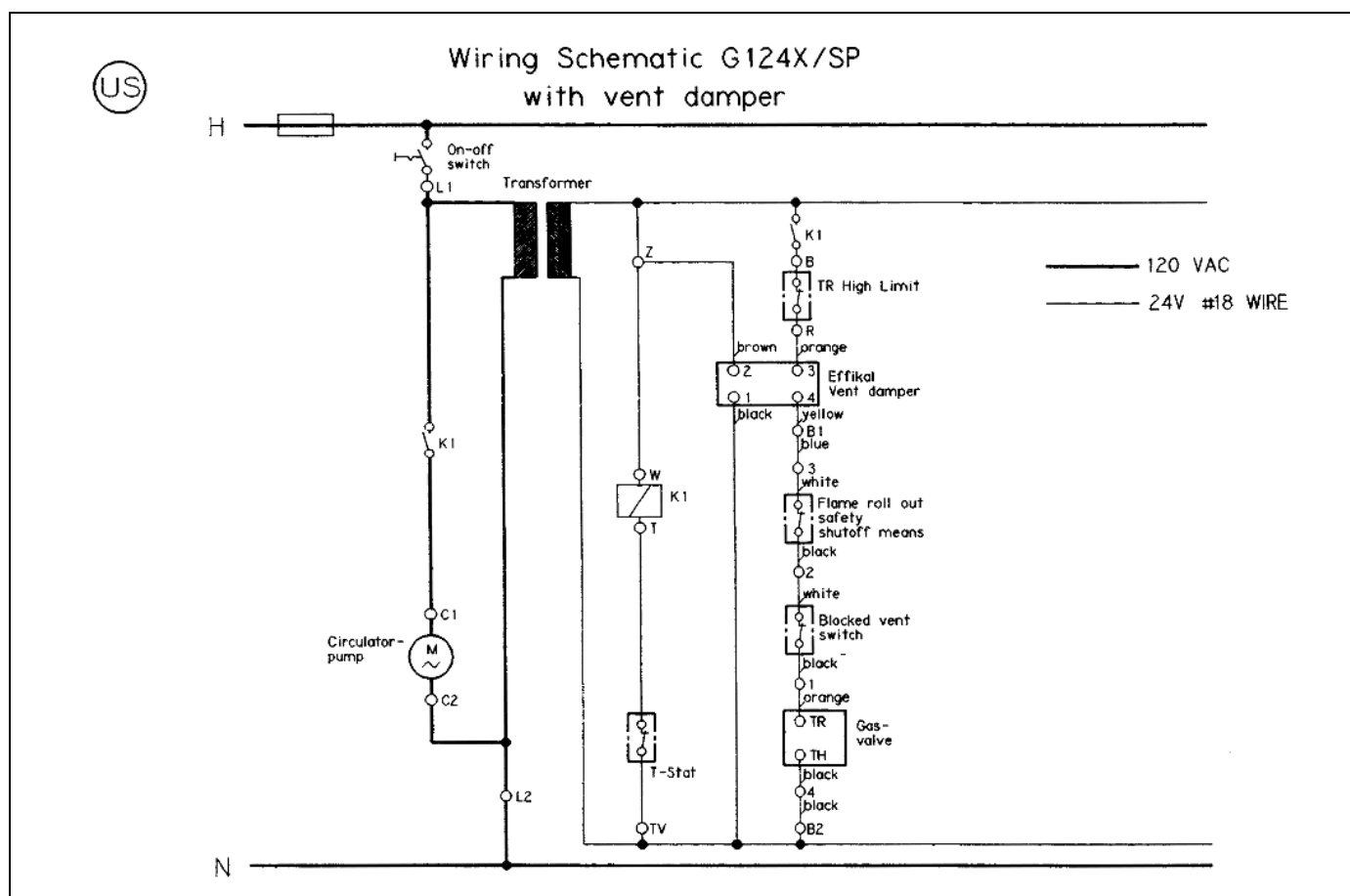


Fig. 62 Wiring diagram – G124X SP with vent damper

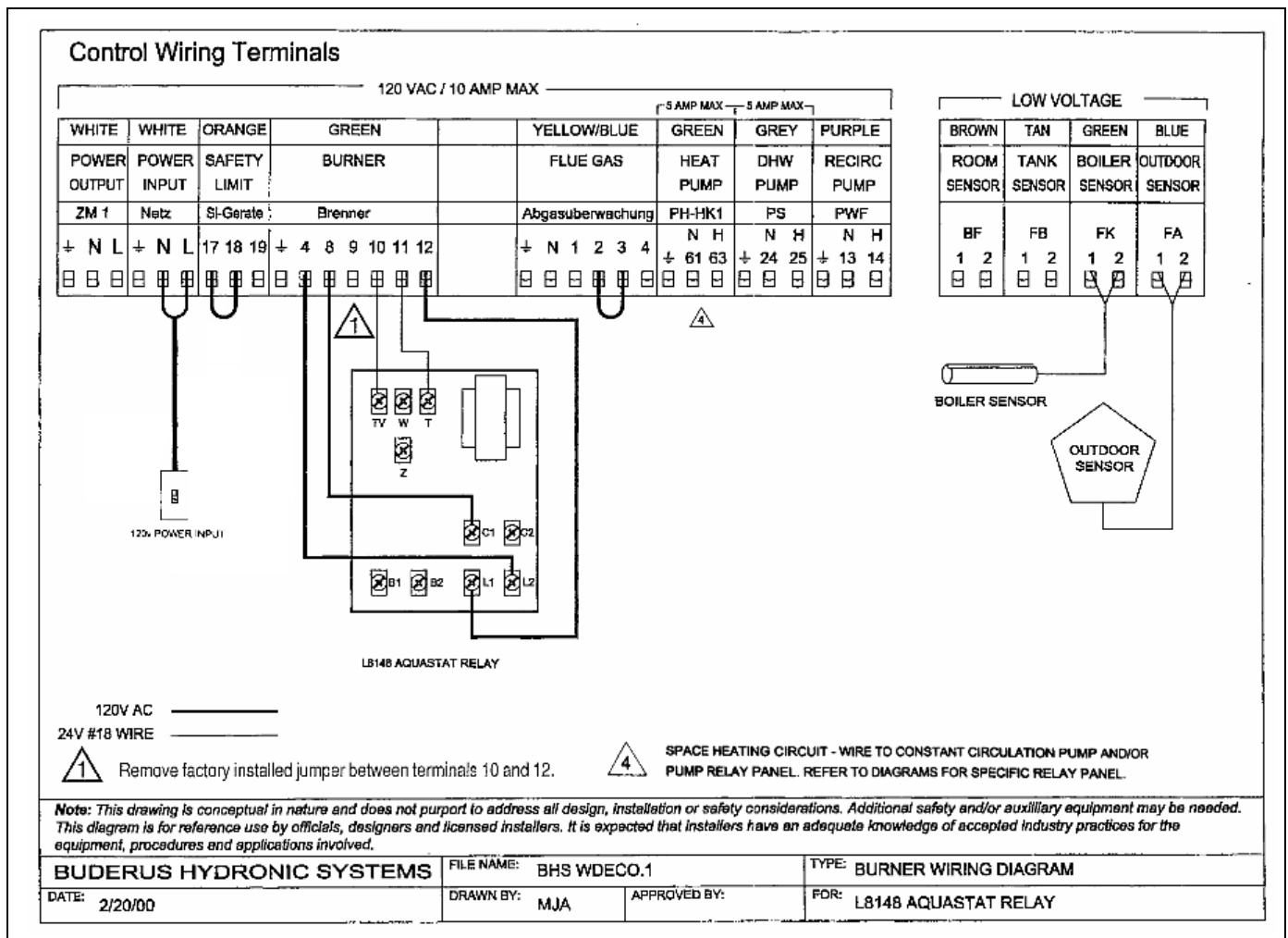


Fig. 63 Wiring diagram – G124X II/SP with Logamatic control

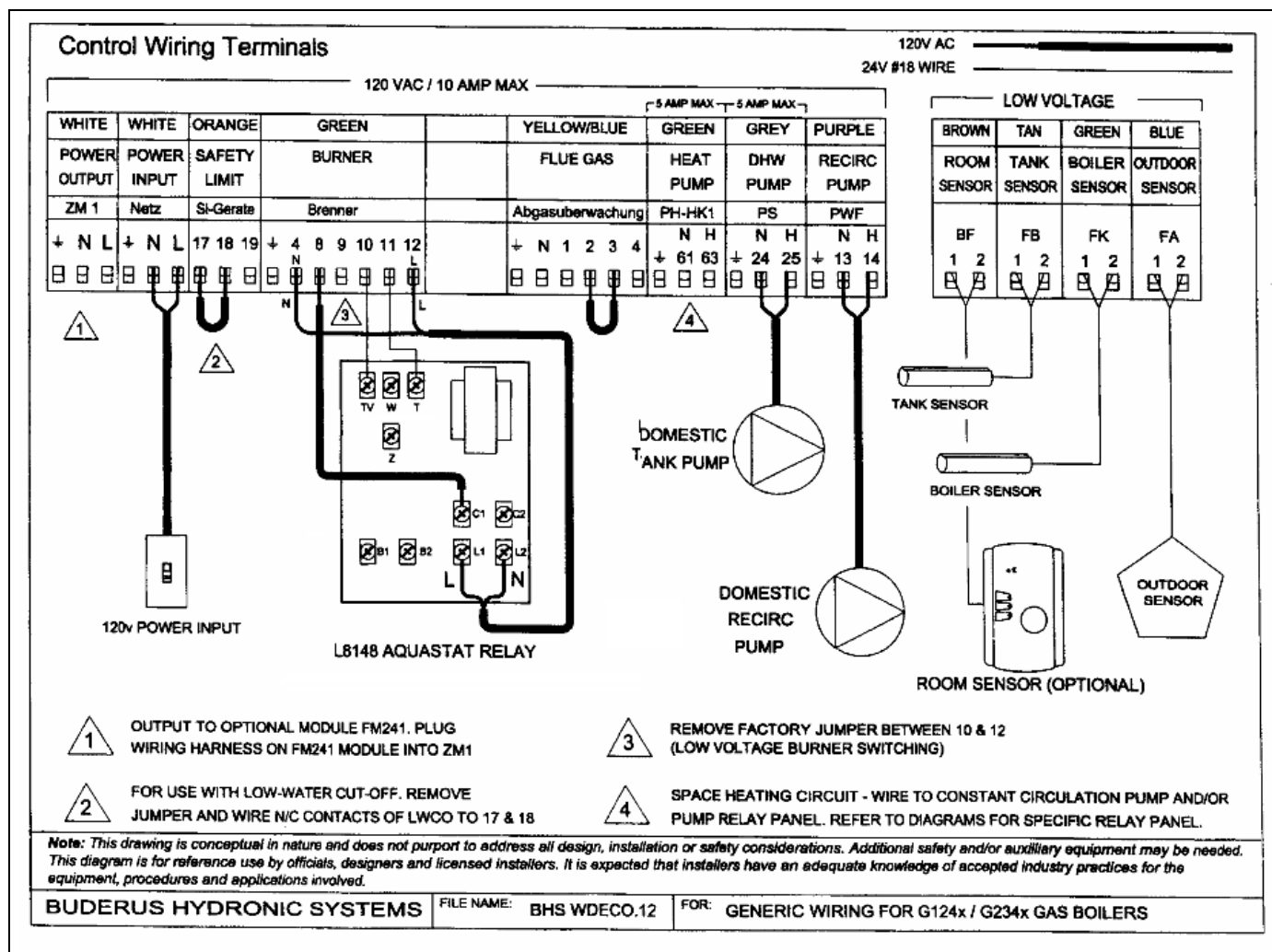


Fig. 64 Wiring diagram – G124X II/SP with Logamatic control with DHW circuit

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