

# Installation, Operation and Maintenance Manual

## Sealed Combustion Hot Water Gas Boiler Logano GA244

**CAUTION!**

Before putting the boiler into operation read this manual carefully.

**WARNING !**

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

**CAUTION !**

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



**Notice:** This manual must be retained for future reference.

**Read manual prior to installation and maintenance of the boiler**

# Buderus

**Please read this manual carefully!**

Correct installation and adjustment of the burner and the control panel is a precondition for safe and efficient operation of the gas boiler.

Read this manual and the specifications on the safety label carefully before attempting to put the boiler into operation.

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# 1 Safety Considerations

Please observe the following safety instructions.

## 1.1 Application purpose

The GA244 gas boiler is designed for use as a hot water heating boiler to heat water for space heating purposes for a single and multi family houses.

## 1.2 Guideline of Notices

Two levels of danger are identified by the following warning labels:



**WARNING!**

### DANGER

Denotes a possible severely dangerous situation where, without proper caution, bodily injury or loss of life may result.



**CAUTION!**

### DANGER OF INJURY/ SYSTEM DAMAGE

Denotes a possible dangerous situation that can lead to mild to moderate bodily injury or physical damage.

The following symbols are used to denote a danger and other notices:



**WARNING!**

### DANGER

due to electricity.



### APPLICATION NOTICE

Application comment for optimum use of equipment and adjustment as well as useful information.

## 1.3 Observe the following symbols



**WARNING!**

### DANGER

due to explosion of gas.

- Work only on gas components when you have a license to do so.
- Note that the assembly of gas and vent connections, the initial start-up, the electrical connections, the maintenance and service can only be performed by a licensed service contractor or technician.



**WARNING!**

### DANGER

due to electricity.

- Prior to doing any work on the heating system, disconnect all electrical power to the boiler at the emergency switch.
- It is NOT sufficient to shut off only the boiler control!



**CAUTION!**

### SYSTEM DAMAGE

due to improper installation.

- Observe local and state codes as well as common industry practices during the installation and operation of the heating appliance.



**CAUTION!**

### SYSTEM DAMAGE

due to inadequate cleaning and maintenance.

- A boiler cleaning and maintenance should be performed annually. Verify complete system operation at the same time.
- Correct the problem immediately to prevent damage to the system!

## 2 Regulations and Guidelines

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

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

Install CO detectors per local regulations. Boiler requires yearly maintenance, see maintenance section see section 12 „Maintenance“, page 35.

### **Operating Limits of the boiler:**

Max. boiler temperature:	220°F
Max. operating pressure:	58 psi

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

### 3 Dimensions and Boiler Connections

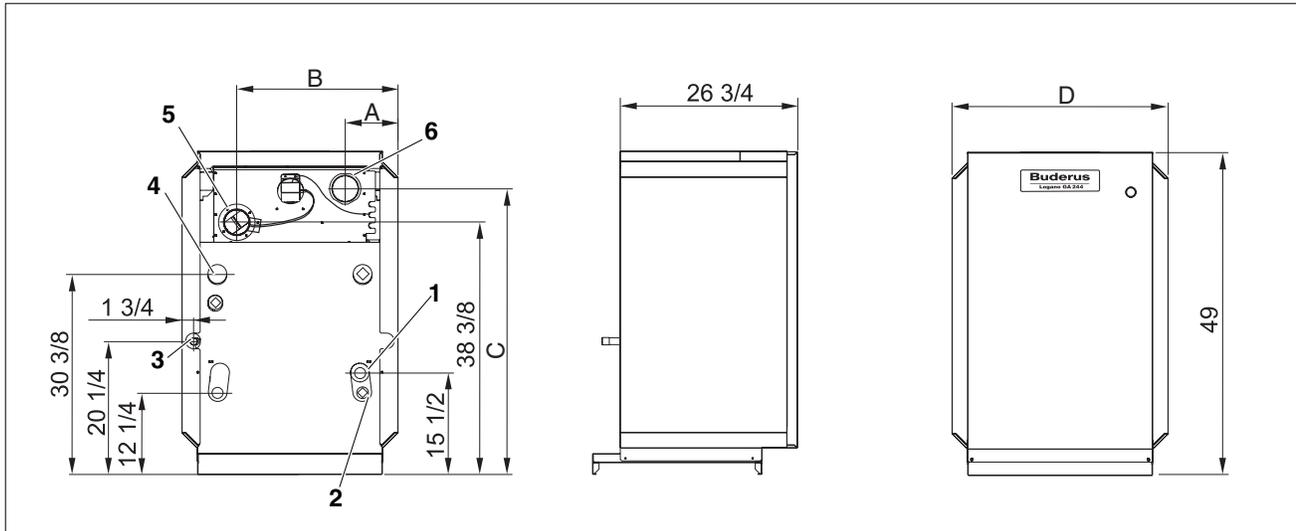


Fig. 1 Rear, side and front views, measurements in inches

**Pos. 1:** Boiler return (1 1/2")

**Pos. 2:** Boiler drain connection (3/4")

**Pos. 3:** Gas connection (3/4")

**Pos. 4:** Boiler supply (1 1/2")

**Pos. 5:** Exhaust connection

**Pos. 6:** Air intake connection

Boiler model	Heating capacity	Air intake connection	Exhaust connection	Min. Relief Valve	No. of Burners	Water-content	Dry weight
	MBtu/hr	Inches	Inches	lb/hr	No.	US Gal.	lbs
37	128	4	3	130	4	6.1	635
44	148	4	3	153	4	6.1	635
53	181	4	3	188	5	7.1	688
62	212	4	4	218	6	8.2	772

Table. 1 Dimensions

Boiler model	A	B	C	D
	Air intake	Exhaust		
	Inches	Inches	Inches	Inches
37	7 3/8	17 1/2	43 3/4	25 6/8
44	7 3/8	17 1/2	43 3/4	25 6/8
53	7.9	20.9	43.3	29.1
62	7.9	24.4	43.3	32.7

Table. 2 Dimensions

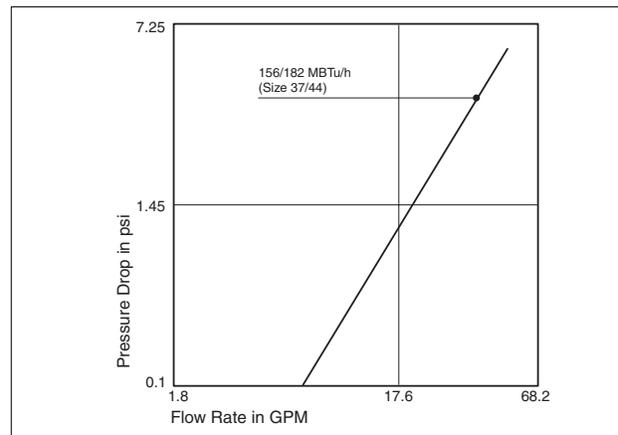


Fig. 2 Pressure drop through the boiler

## 4 Packaging and Components

The boiler is shipped as a packaged unit complete with jacket panels, installed gas burner tray and gas valve and technical documents. The following components are packaged in a separate box within the boiler packaging:

- 1 3/4" female boiler drain elbow
- 1 3/4" 90° Elbow
- 1 3/4" Relief valve
- 1 horizontal wall terminal body

Following accessories are available as well:

- Cleaning brushes
- Vertical wall terminal body

## 5 Installation

This boiler is certified for closet installations. To ensure adequate access to the boiler during installation and maintenance, the boiler should have a minimum space in front of the boiler of at least 33" with the access door open. When the access door is closed, a minimum clearance of 2 inches in front and on the sides of the boiler from combustibles is required (Fig.3). Maintain a minimum clearance from combustibles of 2 inches for the exhaust vent pipe. A 20" top clearance is recommended for cleaning access and is strictly required when the boiler is placed in a fully enclosed closet. A 2" rear clearance is required for horizontal vent pipe installations. The gas boiler is certified for installation on combustible flooring. The boiler must not be installed on carpeting.

Provide 2" clearance between vent pipe and combustible construction.

No clearance is required between wall terminal body and combustible construction

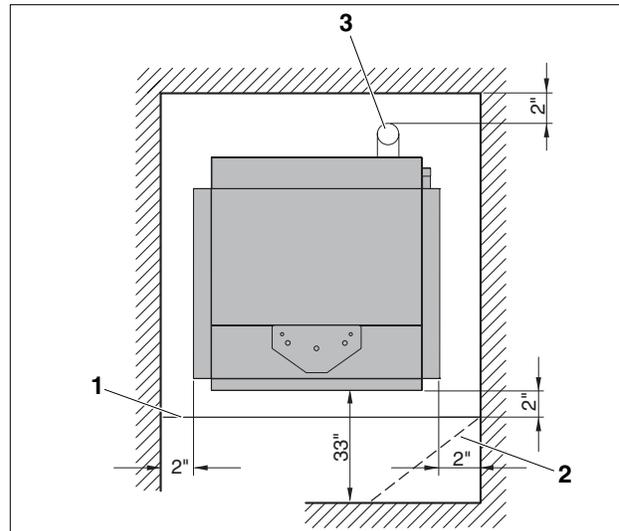


Fig. 3 Minimum clearances from combustible construction

**Item. 1:** Access door closed

**Item. 2:** Access door open

**Item. 3:** Exhaust vent pipe

### 5.1 Transporting the Boiler

- Transport the boiler to the installation site in the shipping carton and on the pallet.
- Remove strapping and lift off carton.
- Remove the two bolts that secure boiler to the wooden pallet.
- Lift the boiler from one side and slide to the side of the pallet. Push a pipe under the boiler as shown in Fig. 4 and roll boiler on several pipes to its final location.
- Move the boiler to its final installation position.



#### NOTICE !

Always protect sheet metal parts, gas pipe, burner and control panel during handling.

- Never lift the boiler on these parts.

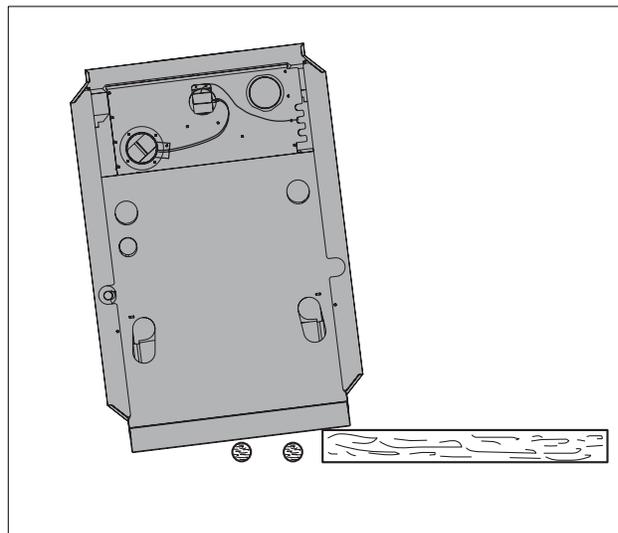


Fig. 4 Moving the boiler

## 5.2 Installation Surface Requirements

The boiler is very heavy when filled with water. Make sure the floor is strong enough to support the load.

## 5.3 Preparations for Boiler Installation

- Unpack all boxes and cartons and check that all parts have been delivered using the packing list.



### **NOTICE !**

Each boiler is checked and tested carefully before leaving the factory. If there is any damage or parts are missing, inform the supplier without delay. Check all packaging materials for missing components before discarding them.

## 6 Boiler Water Connections



### BOILER DAMAGE !

due to moisture.

**DANGER!**

- Install this boiler so that the gas ignition system components are protected from water (dripping, spraying, rain, etc.) during appliance operation and service (circulator replacement, control replacement etc.).



### SYSTEM DAMAGE !

due to over heating during low water conditions.

**DANGER!**

- If this boiler is installed above radiation level it must be provided with a low water cut-off device either as a part of the boiler or at the time of installation (see Fig. 5).



### SYSTEM DAMAGE !

due to high temperature differences in the system.

**DANGER!**

- If the boiler is used in conjunction with a refrigeration system, pipe the chilled medium in parallel with the boiler and install the proper valve to prevent the chilled medium from entering the boiler.
- When the boiler is connected to heating coils located in air handling units where they may be exposed to refrigerated air circulation, the boiler must be equipped with flow control valves or other automatic means to prevent gravity circulation of the boiler water during the cooling cycle.

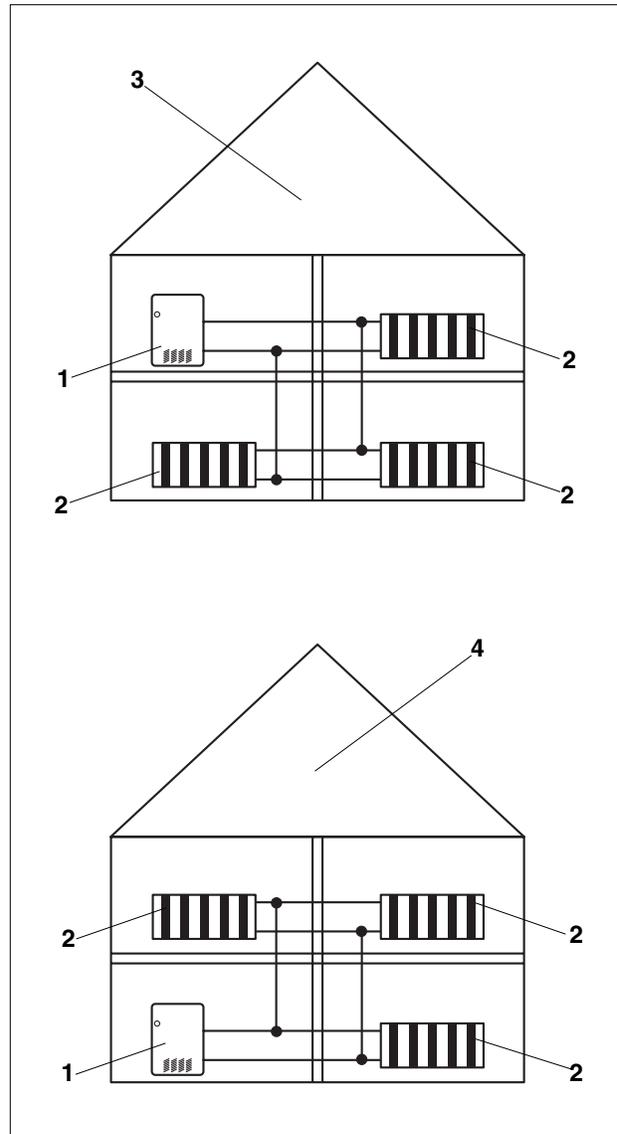


Fig. 5 Low water cut off installation

**Item. 1:** Gas boiler

**Item. 2:** heating elements (panel radiator, baseboard, etc.)

**Item. 3:** system requiring low water cut off

**Item. 4:** system not requiring low water cut off

- Install the 90° street elbow (Fig. 6) and the relief valve (Fig. 6) on the boiler supply connection.
- Install relief valve according to ANSI/ASME Boiler and Pressure Vessel Code, Section IV. Mount the relief valve stem vertically. Use ¾" street elbow as needed.



**NOTICE !**

Observe local and state codes when installing the boiler.



**FIRE DANGER !**

due to hot piping.

**DANGER!**

- Maintain a minimum 2" clearance between the hot water piping and combustible walls.

**Water treatment**



**NOTICE !**

Perform a water analysis prior to filling the boiler system. Treatment of the boiler water may be required depending on the analysis results.

For extremely hard water or pH value below 7.0 consult your local water treatment company.

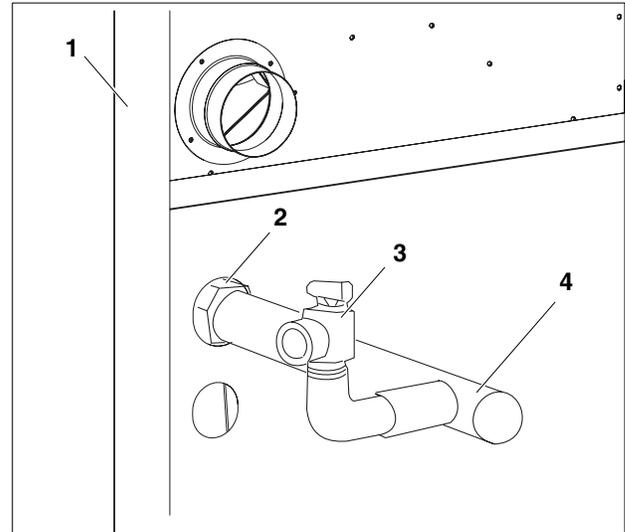


Fig. 6 Rear view

**Item. 1:** Gas boiler

**Item. 2:** Boiler supply connection

**Item. 3:** Relief valve

**Item. 4:** Boiler supply pipe

## 7 Electrical Supply

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

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

The boiler must be electrically grounded in accordance with the requirements of the authority having jurisdiction or, in the absence of such requirements, with the National Electrical Code, ANSI/NFPA 70.



### NOTICE

For wiring details, follow the wiring diagrams found on page 69 and page 70.

Install an emergency switch near the boiler.



### CAUTION !

due to electricity.

- WARNING!**
- Label all wires prior to disconnection when servicing controls.
  - Wiring errors can cause improper and dangerous operation.
- 
- Verify proper operation after servicing.

## 8 Gas Supply

### 8.1 Gas Connections

Determine proper size gas pipe for the installation using Table 3 and Table 4. Do not forget the pipe fitting losses and observe proper size of the fittings.

A sediment trap must be installed at the inlet of the gas supply piping to the boiler. When local codes require, a manual shut-off valve must be installed outside the boiler jacket. It is recommended that a manual shut-off valve be installed on the main gas piping to the boiler. The gas piping must be supported external to the boiler.

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



**DANGER!**

#### EXPLOSION DANGER !

The possibility for explosions exists due to leaks in gas piping and connections.

- All gas connections must be tested for leaks with a soap and water solution.

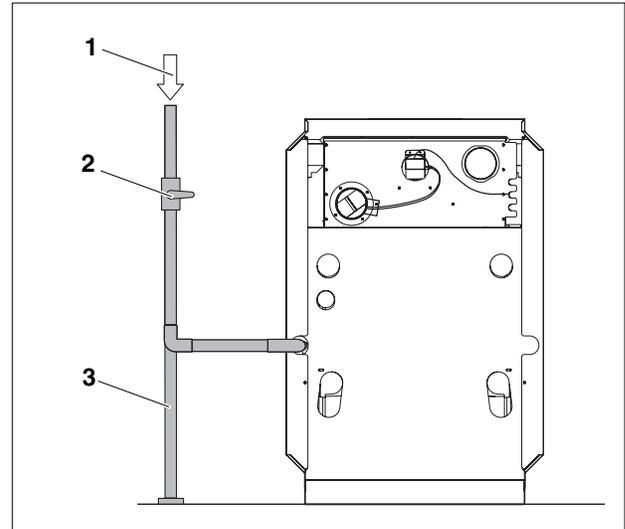


Fig. 7 Gas supply piping: rear view

**Item. 1:** Gas supply piping

**Item. 2:** Manual shut off valve

**Item. 3:** Sediment trap

Length of pipe (Feet)	Gas Volume Capacity (ft <sup>3</sup> / hr) <sup>1</sup>				
	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

Table 3 Gas Pipe Capacity for different pipe sizes

<sup>1</sup> Maximum pipe capacity in ft<sup>3</sup>/hr, based on a specific gravity of .60 and a gas supply pressure of .5 psi or less and a pressure drop of .3 inches W.C.

Steel pipe Diameter (in Inch)	Equivalent Length for Pipe Fittings in feet			
	Type of pipe fitting			
	90°-Elbow	Tee (flow thru branch)	Gate valve	Gas cocks
	Equivalent length in feet			
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

Table 4 Equivalent length of pipe fittings in feet

The boiler must be isolated from the gas supply piping system by closing its individual manual shut-off valve during any pressure testing of the gas supply piping system at test pressures equal to or less than ½ psi.

- The boiler and its gas connection must be leak tested before placing the boiler in operation. Refer to Chapter 11 "Placing the Boiler in Operation", page 26.

Pipe joint compound (pipe dope) must be resistant to corrosive action of liquified petroleum gases and applied sparingly only on male threads of pipe joints.

To field convert the boiler for operation with LP gas, please contact Buderus Hydronic Systems to obtain the proper components. Do not convert the boiler without the proper parts and instructions. Parts for LP conversion are included with the documents.

## 8.2 Installation at Higher Elevations

The boiler is factory set for operation with natural gas at elevations up to 2,000 ft. The boiler must be derated for installations above 2,000 ft. The derate is accomplished by changing the main burner orifices. Contact your supplier in this case to obtain the suitable high elevation conversion kit (Natural gas or LP). Do NOT attempt to derate the appliance without Buderus certified parts and instructions.

## 9 Combustion Air and Ventilation Openings



**CAUTION!**

### **BOILER DAMAGE AND OPERATIONAL FAILURES !**

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

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

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

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

Provisions must be made for combustion air and ventilation air in accordance with section 5.3 Air for Combustion and Ventilation, of the National Fuel Gas Code, ANSI Z 223.1, or applicable provisions of the local building code.

Canadian installations must comply with CSA/CGA-B149.1 and .2 Installation Codes.



**CAUTION!**

### **BOILER DAMAGE !**

due to contaminated air.

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



### **NOTICE !**

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



**DANGER!**

### **FIRE DANGER !**

due to flammable materials or liquids.

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

**All Air from Inside the Building**

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

**All Air from Outdoor**

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

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

## 10 Installation of the Exhaust and Air Intake System

A horizontal terminal body is included with every boiler.

Materials from the following manufacturers are approved for use for exhaust venting materials and air intake piping:

Manufacturer	Exhaust venting piping 3"/ 4"	
	horizontal Typ	vertical* Typ
Heat fab	SAF-T vent	SAF-T vent
O-flex-L	Star 34	-
Pro Tech	FasNSeal	-
Z-Flex	Z-Flex, model SVE	-

Table 5 Approved exhaust vent pipe manufacturers

\* Vertical „trough the roof“ configuration is not part of the standard boiler package.



### APPLICATION NOTICE !

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



### APPLICATION NOTICE !

Observe the listed maximum lengths of vent system, which are boiler model dependent. The maximum permissible lengths are listed in Table 7, page 24 to Table 9, page 25.



### APPLICATION NOTICE !

Install vent pipe components per manufacturer's instructions. Observe the listed maximum diameters of vent system, which are boiler model dependent. Use only 3" or 4" (4" for model /62 only) stainless steel (AL29-4C) components (e.g. 37/44 kW = 3") for exhaust vent piping as listed in the above table (Table 5).

Use only 4" flexible or 4" galvanized rigid pipe for combustion air intake piping.

The exhaust and intake air piping components are available from your local wholesaler. Make sure to use matching components.



NOTICE!

### OPERATIONAL PROBLEMS !

due to strong winds.

The boiler will cease to operate under strong winds when no termination tee is installed at the end of the venting system.

- Note that a termination tee **MUST** always be installed at the end of every horizontal venting system.
- Purchase the suitable termination tee together with your selected vent pipe manufacturer for best fit.

### 10.1 Installation of Horizontal Wall Terminal Body

Read these instructions first completely concerning horizontal termination body installation and observe the noted safety precautions.

The horizontal wall terminal body must be installed through the wall according to previously mentioned codes and/or local requirements.

- Make a 6" round opening in the outside wall at the desired location. Refer to the information on the next page regarding limitations of termination location.
- Remove fresh air connection end from the terminal body and insert terminal body from the outside through the round 6" hole in the wall (Fig. 8). Install fresh air connection piece. Secure wall plate with 4 furnished screws to the wall.
- Insert a 2 or 3 foot straight exhaust pipe (Fig. 9, **Item. 2**) from the outside into the wall terminal body. Slide termination tee on exhaust pipe and seal joint with silicone (Fig. 9, **Item. 3**). Orient termination tee horizontally and observe the manufacturer's installation instructions.

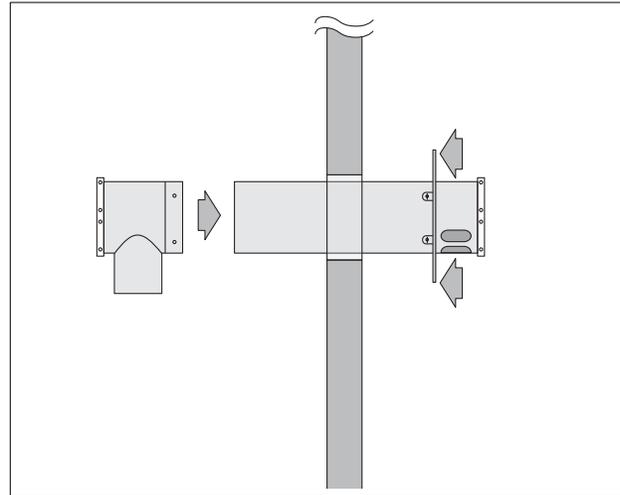


Fig. 8 Installation of horizontal wall terminal body

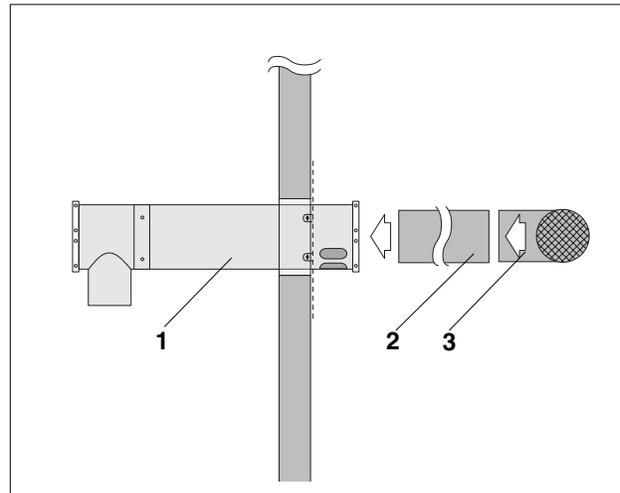


Fig. 9 Installation of exhaust pipe

**Item. 1:** wall terminal body

**Item. 2:** Exhaust vent pipe

**Item. 3:** Termination tee

- Insert the vent pipe into the terminal body far enough so that distance between the termination tee and the wall is about 10" (Fig. 10).
- Secure both ends of the exhaust pipe through the terminal body using the furnished locking collars. (Fig. 10, **Item. 1**). Rotate collars downward and secure set screw on locking collars (Fig. 11, **Item. 2**).
- Seal the space between vent pipe and locking collars with silicone (Fig. 11, **Item. 1**).

A venting system that exits the structure through a sidewall or the like, shall terminate at least 12 inches above the ground.

**The installation of a screened termination tee is required** to ensure trouble free operation and prevent entry of foreign objects into the vent system.

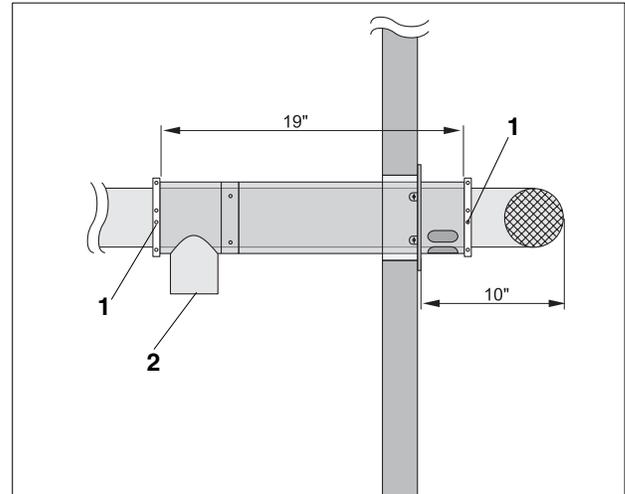


Fig. 10 Positioning of the termination tee

**Item. 1:** Locking collars

**Item. 2:** 4" Air intake connection

The termination of the system shall be located at least 12 inches above the maximum snow line in geographic areas where snow accumulates.

No changes or modifications are allowed in the venting system. All components must be installed in their original condition.

The termination shall not terminate less than 7 ft above a paved sidewalk or driveway.

The termination shall be at least 6 ft away from the combustion air intake of any other appliance.

**Room air only:**

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

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

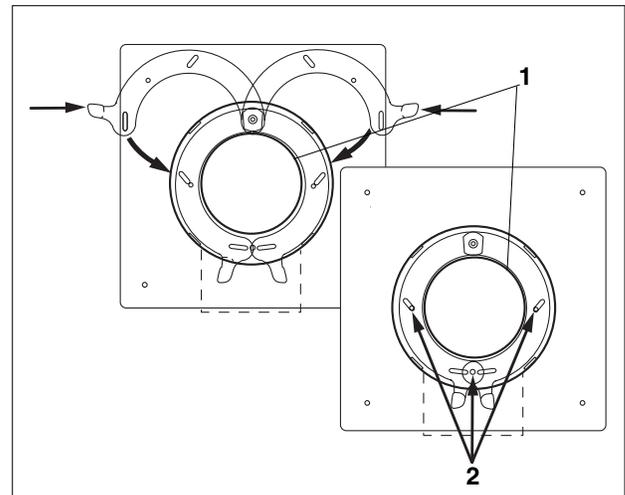


Fig. 11 Vent pipe locking collars

**Item. 1:** Seal space with beads of silicone

**Item. 2:** Set screws

## 10.2 Installation of Vertical Venting System



### NOTICE !

Only venting components and concentric vent pipe manufactured by Heat-Fab type SAF-T Vent can be used for vertical venting applications. Please contact Buderus Hydronic Systems, Inc. for assistance in selecting proper venting components.

Follow all instructions concerning assembly of the individual venting components. Follow in particular the instructions furnished by the vent pipe manufacturer.

The combustion air is ducted in using a concentric 6" or 7" pipe configuration in a vertical venting application Fig. 12.



### NOTICE !

Ensure that a condensate drain is always installed at the boiler exhaust connection.

Observe the vent extension above the roof line as shown in Fig. 12.

The maximum length of the concentric "through the roof" venting is 10 ft. (see Fig. 12).

Observe the maximum length of the entire vent system including the concentric piping based on Table 7, page 24 to Table 9, page 25.

The concentric piping permits a zero clearance to combustibles. Note, however, that the exhaust vent pipe leading up to the concentric piping requires a 2" minimum clearance to combustibles.

Install fire stop plates when penetrating the roof (Fig. 12, **Item. 2**).

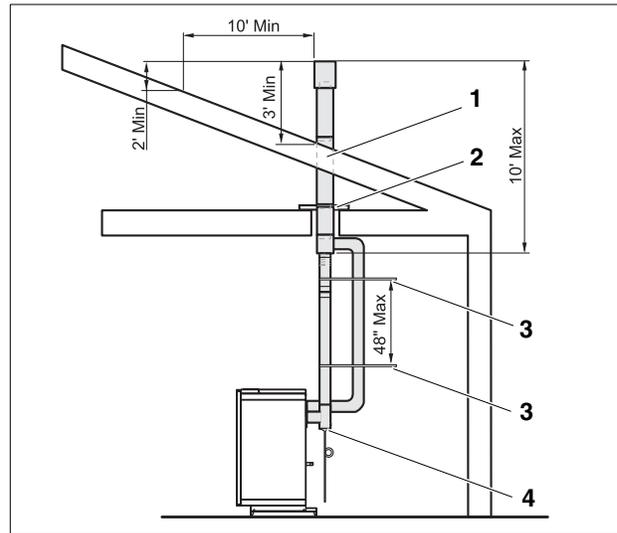


Fig. 12 Vertical venting system (sealed combustion)

**Item. 1:** Wall terminal body

**Item. 2:** Fire stop plate

**Item. 3:** Support of vent system

**Item. 4:** Condensate drain

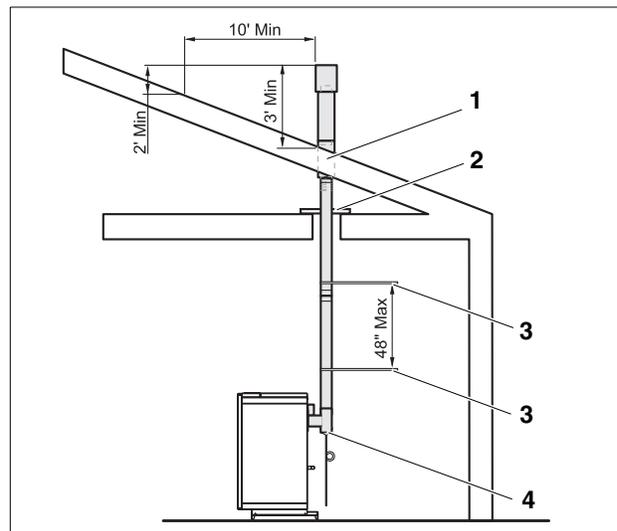


Fig. 13 Vertical venting system (Room air only)

**Item. 1:** Roof termination

**Item. 2:** Fire stop plate

**Item. 3:** Support for vent system

**Item. 4:** Condensate drain

## 10.3 Installation of Exhaust and Air Intake Piping

### Installation of exhaust vent pipe at the boiler

(Fig. 15, Item. 2)

- Install a condensate drain at the rear of the boiler (Fig. 14).



**NOTICE !**

Always install a condensate drain as the first component of the exhaust system.

- Place a ¼" wide silicone bead (Fig. 14, **Item. 1**) on the boiler exhaust collar. (Use silicone with a 500 F temperature rating, G.E. 106 or equivalent).
- Slide condensate drain on exhaust collar (Fig. 14, **Item. 4**) and secure with the furnished pipe clamp (Fig. 14, **Item. 3**). (Heat-Fab condensate drain will fit around outer collar, other condensate drains fit on inner collar.)
- Place a silicone bead around the clamp (Fig. 14, **Item. 2**) and spread out to ensure an air tight seal.

### Installation of the air intake pipe (Fig. 15, Item. 1) at the boiler

Follow the same installation procedure as with the exhaust piping. Do not install a condensate drain here.

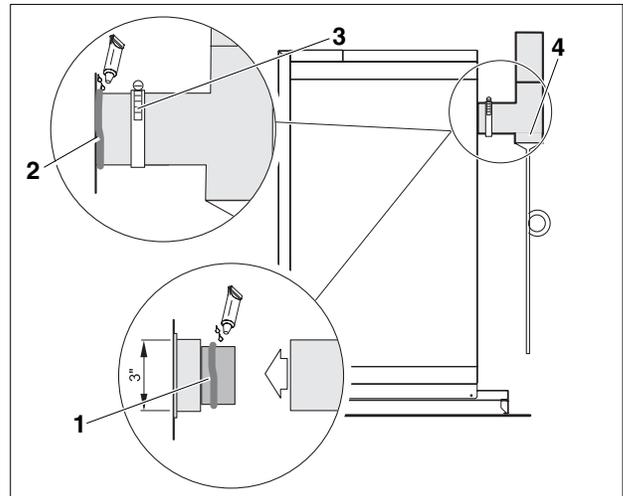


Fig. 14 Condensate drain

**Item. 1:** Silicone bead

**Item. 2:** Silicone bead

**Item. 3:** Gear clamp

**Item. 4:** Condensate drain

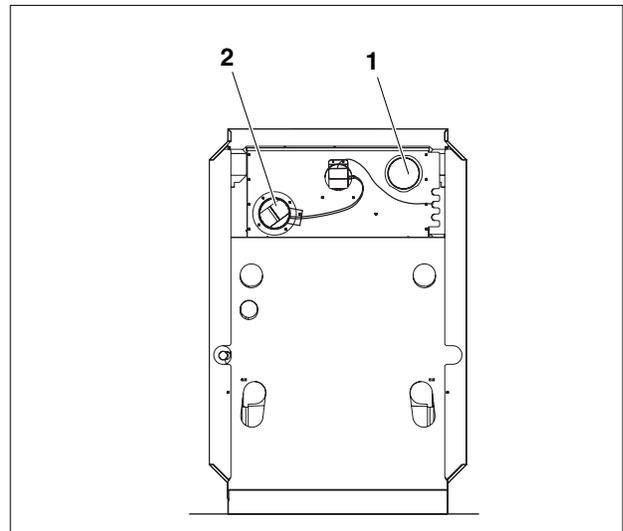


Fig. 15 Rear view of the boiler

**Item. 1:** Air intake connection

**Item. 2:** Exhaust connection

**DANGER !**

due to possible intake of exhaust gases.

- WARNING!**
- Connect the venting system only to a single appliance.
  - Venting of an additional appliance could cause serious injury or loss of life.
  - The venting system shall not be routed into, through or within any other vent, such as an existing masonry or factory built chimney flue.

**FIRE DANGER !**

due to minimal distances between vent pipe and combustible materials.

- WARNING!**
- Provide 2" clearance between vent pipe and combustible construction.
  - No clearance is required between wall terminal body and combustible construction.

The vent pipe must be properly supported. Vertical runs must use firestops as lateral supports at each ceiling level and at least one support collar at the base of the vertical run.

Horizontal runs require a loose fitting metal strap or similar support every 4 ft and at every elbow and pipe connection joint.

Make sure never to penetrate the piping components when securing the straps or installing the various vent components. When cutting pipes to length, file the cut length smooth. Do not cut off the female end of the vent pipe.

All horizontal runs must be sloped down towards the boiler at least  $\frac{1}{4}$ " per foot. In the case of multiple horizontal runs, slope all runs towards the boiler to prevent moisture build-up in the system.

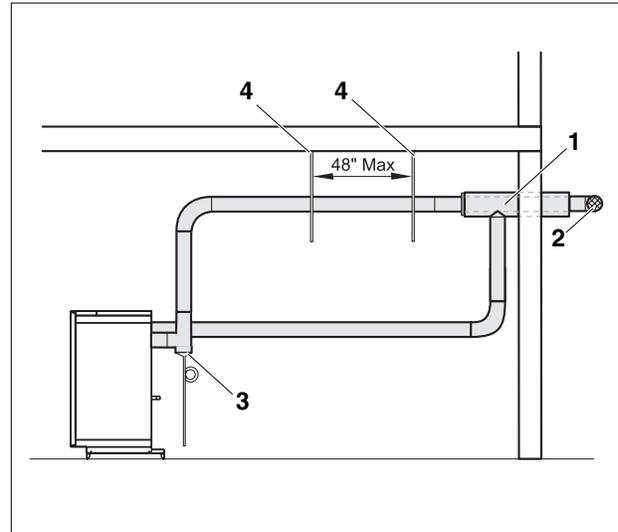


Fig. 16 Horizontal venting system

**Item. 1:** Wall terminal body

**Item. 2:** Termination tee

**Item. 3:** Condensate drain

**Item. 4:** Support bracket of venting system

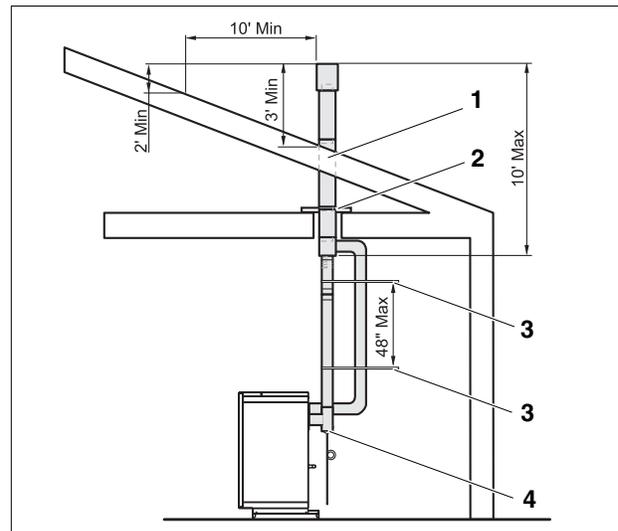


Fig. 17 Vertical venting system

**Item. 1:** Roof termination

**Item. 2:** Fire stop plate

**Item. 3:** Support bracket of venting system

**Item. 4:** Condensate drain

The vent system will be under positive pressure. Check all seams for gas tightness. Allow 24 hours for silicone to cure before operating the boiler.



**DANGER !**

due to possible intake of exhaust gases.

**DANGER!**

- When any of the previous installation procedures are completed be sure to go over the entire system to make sure all joints are secure and sealed correctly.
- Check all seams and joints for gas tightness.
- It is required to have the entire system checked by a qualified inspector at least annually following initial installation.



**NOTICE !**

Table 6 shows the equivalent length for each 45° and 90° elbow for each listed vent pipe manufacturer of each GA244 model boiler.

		Equivalent length of vent pipe / air intake pipe in ft.							
		model 37		model 44		model 53		model 62	
Manufacturer	Typ	45°	90°	45°	90°	45°	90°	45°	90°
heat fab	SAF-T vent	4.5	9	4.5	9	5	10	3.5	7
O-flex-L	Star 34	5	10	5	10	5	10	5	10
Pro Tech	FasNSeal	5	10	5	10	5	10	4	8
Z-Flex	Z-Flex	4.5	9	4.5	9	5	10	4	8

Table 6 Equivalent length of vent pipe / air intake pipe



**NOTICE!**

The following maximum equivalent length of exhaust pipe (Table 7, page 24 and Table 9, page 25) represents the maximum equivalent length of exhaust vent pipe or air intake pipe only, without condensate drain tee, vent piping within the termination body and length of the termination tee. Note that we only need to be concerned about the longest run; do **not** combine intake and exhaust piping.



**NOTICE !**

To increase overall vent length, use a couple of 45° elbows on air intake piping and run the intake piping at an angle.

## 10.3.1 Sealed Combustion and Horizontal Venting

Combustion air from outside the building.

Boiler model	Sealed Combustion Configuration
	Exhaust vent pipe/ Air intake pipe
37	50 feet
44	40 feet
53	50 feet
62	50 feet

Table 7 Maximum equivalent length of exhaust vent pipe or air intake pipe for horizontal venting (Fig. 18)

## 10.3.2 Room Air Configuration and Horizontal Venting

Combustion air from boiler room.

(No air intake pipe needed)

Boiler model	Room Air Configuration
	Exhaust vent pipe
37	50 feet
44	40 feet
53	50 feet
62	50 feet

Table 8 Maximum equivalent length of exhaust vent pipe (for horizontal venting Fig. 19)

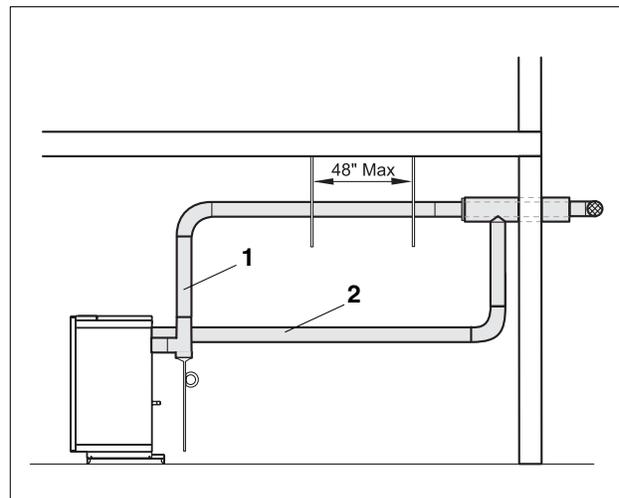


Fig. 18 Horizontal sealed combustion vent system

Item. 1: Exhaust vent pipe 3"

Item. 2: Air intake pipe 4"

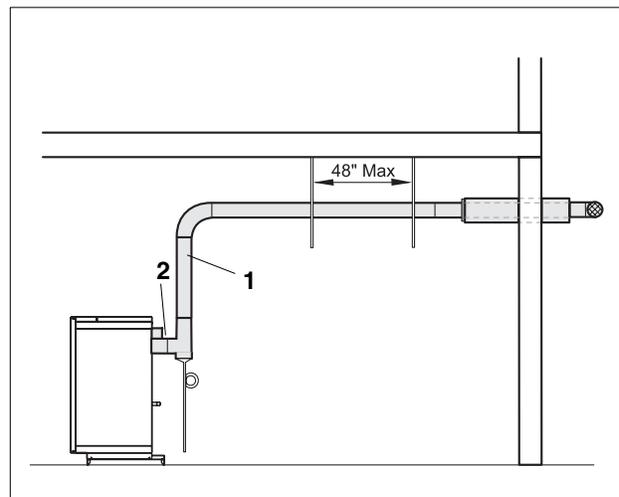


Fig. 19 Horizontal room air venting system

Item. 1: Exhaust vent pipe 3"

Item. 2: Combustion air from room

### 10.3.3 Sealed Combustion and Vertical Venting

Combustion air from outside the Building.

Boiler model	Sealed Combustion Configuration
	Exhaust vent pipe/ Air intake pipe
37	40 feet (max. 10 feet co-axial)
44	40 feet (max. 10 feet co-axial)
53	50 feet (max. 10 feet co-axial)
62	50 feet (max. 10 feet co-axial)

Table 9 Maximum equivalent length of exhaust vent pipe or air intake pipe for vertical venting (Fig. 20)



**NOTICE !**

Do **not** exceed 10 ft concentric piping with vertical termination.

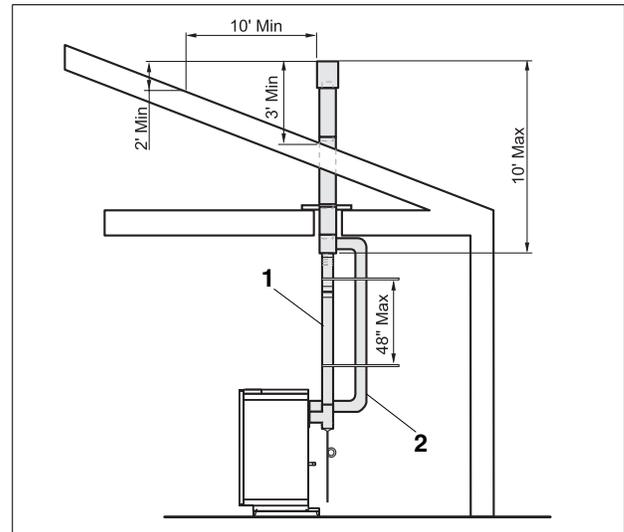


Fig. 20 Vertical sealed combustion vent system

Item. 1: Exhaust vent pipe 3" (models 37, 44 and 53)

Item. 2: Air intake pipe 4"

### 10.3.4 Room Air Configuration and Vertical Venting

Boiler model	Room Air Configuration
	Exhaust vent pipe
37	40 feet
44	40 feet
53	50 feet
62	50 feet

Tab. 10 Maximum equivalent length of exhaust vent pipe for vertical venting (Fig. 21)



**NOTICE !**

Vertical concentric piping is only required for the length of the roof penetration. Combustion air can be drawn then directly from the boiler room.

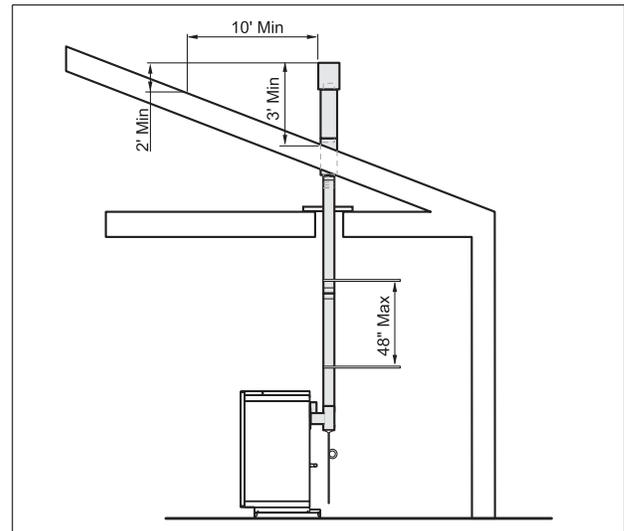


Fig. 21 Vertical vent system for room air configuration

Item. 1: Exhaust vent pipe 3" (models 37, 44 and 53)

## 11 Placing the Boiler in Operation

Safe lighting and other performance criteria were met with the gas manifold and control assembly provided on the boiler when the boiler underwent factory tests specified in ANSI Z 21.13 and CSA 4.9.



### DANGER

due to electricity when control is opened.

#### WARNUNG!

- Before opening the boiler: ensure all electric power has been disconnected with the main shut-off switch.
- Secure the system from someone accidentally turning on the power.

1. Turn off all electric power to the appliance and set the thermostat to lowest setting.

2. Check the combustion air inlet, exhaust vent and ventilation openings.
3. Fill the boiler system with water and purge the air from the boiler and radiators.
4. Remove the screws from the boiler front access panel (Fig. 22, **Item. 1**) and remove the boiler front access panel (Fig. 22, **Item. 2**).
5. Remove side cover plate screws (Fig. 23, **Item. 1**) from the right side jacket panel (Fig. 23, **Item. 3**) and then remove the side cover plate (Fig. 23, **Item. 2**).

### Testing for leaks

6. Open the main gas supply shutoff valve.
7. Test the equalizing hose (Fig. 23, **Item. 7**) on the side of the gas valve connection (Fig. 23, **Item. 4**) and on the side of the burner box connection (Fig. 23, **Item. 5**) for leaks.
8. Check if the pressure test port on the burner box (Fig. 23, **Item. 6**) is closed.
9. Test the gas piping on the side of the gas control for leaks (Fig. 24) by applying a soap and water solution. If no leaks are found go to step 10. If any leaks are found, shut off the main gas piping shut-off valve.

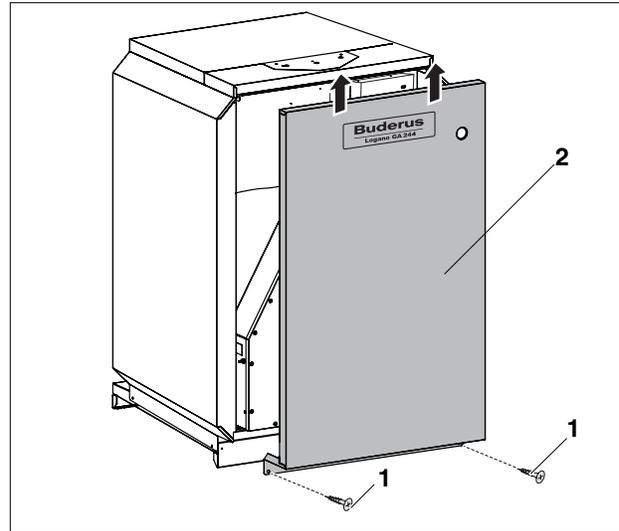


Fig. 22 Remove the boiler front access panel

**Item. 1:** Screws

**Item. 2:** Boiler front jacket panel

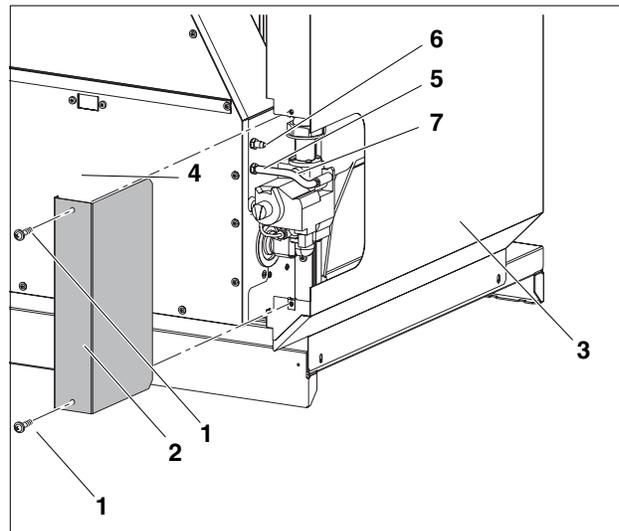


Fig. 23 Removal of side cover plate

**Item. 1:** Screws

**Item. 2:** Side cover plate

**Item. 3:** Right side jacket panel

**Item. 4:** Connection port for equalizing hose, gas valve side

**Item. 5:** Lower testing port from the burner to the gas valve

**Item. 6:** Pressure test port, burner box

**Item. 7:** Equalizing hose

10. Repair leaks and repeat step 9.
11. Remove the manifold pressure tapping plug (Fig. 24, **Item. 3**) from the gas control, install a test fitting (Fig. 23, **Item. 6**) and hook up a manometer between pressure tapping plug (Fig. 24, **Item. 3**) (overpressure) and the pressure test port (burner box) (negative pressure) (Fig. 24, **Item. 6**) so that the line pressure can be checked. Check manifold pressure. Set the manifold pressure according to the values in Table 11, page 29. If corrections are necessary see Table 11, page 29.
12. Open main gas piping shutoff valve and measure the supply pressure to the boiler. The supply pressure must be between 4.7 and 10.5 inches water column (WC) for natural gas or 11 and 13 inches water column for propane gas. If the pressure is not between 4.7 and 10.5 inches WC for natural gas or between 11 and 13 inches WC for propane gas, call your service technician or gas supplier.
13. Follow the lighting instructions below.

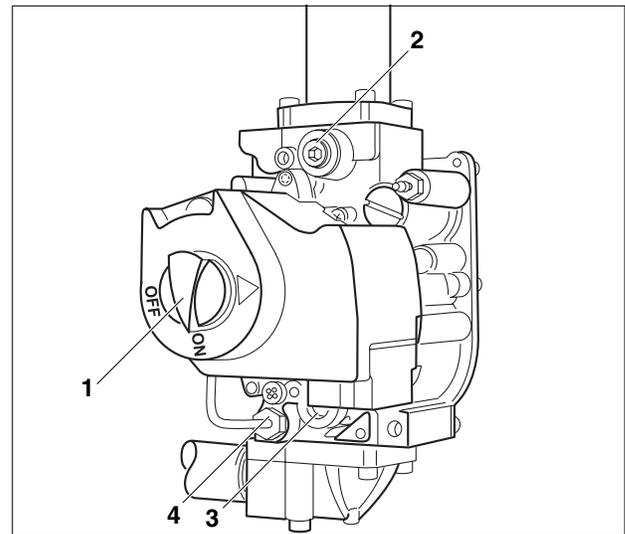


Fig. 24 Gas control

**Item. 1:** Gas control knob (set to "ON")

**Item. 2:** Test port screw for gas supply measurement

**Item. 3:** Test port screw for manifold pressure measurement

**Item. 4:** Pilot tubing

## 11.1 Lighting Instructions

**For your safety, read these instructions before lighting.**



### **WARNING !**

due to not follow these instructions.

**WARNING!**

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



### **DANGER !**

#### **What to do if you smell gas:**

**DANGER!**

- No open fire! Do not smoke!
- Avoid formation of sparks! Do not touch any electric switch, phone, electric plug or bell!
- Shut off main gas supply.
- Open windows and doors!
- Notify all occupants!
- Leave the building!
- Immediately call your gas supplier, heating contractor or fire department from a phone outside the building!

- A)** This appliance is equipped with an ignition device which automatically lights the pilot. Do not try to light the pilot by hand.
- B)** Check for smell of gas around the appliance area. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

- C)** Use only your hand to turn the gas control knob. Never use tools. If the knob will not turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- D)** Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

## 11.2 Operating Instructions

**STOP!** Read the safety precautions on page 28 of this manual.

1. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! Follow "B" in the safety information on page 28. If you do not smell gas, go to the next step.
2. Locate the pilot assembly by looking through the access viewing port (Fig. 25, **Item. 1**) on the burner front plate.
3. Turn the gas control knob (Fig. 26, **Item. 1**) counterclockwise to position "ON".
4. Turn on the electrical power to the application.
5. Set the thermostat to the desired setting to activate the boiler (Thermostat adjustment should be at least 10 °F above the room temperature).

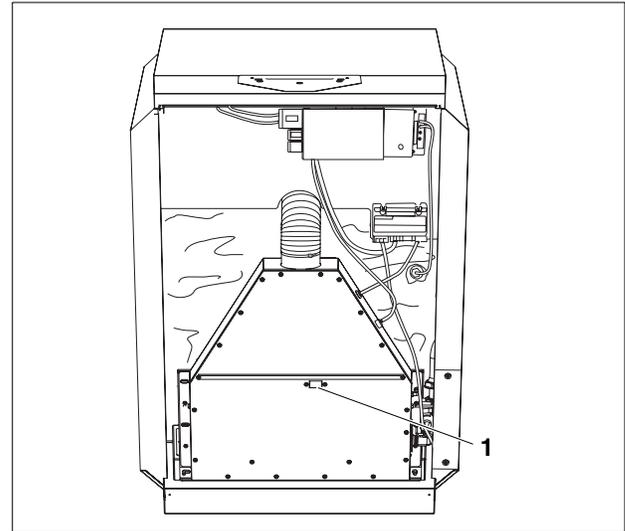


Fig. 25 Burner tray box

**Item. 1:** Access viewing port

6. The ignition control should initiate sparking at the pilot. The pilot should light and then the main burners should light. If the main burners do not light, shut off the main gas piping shutoff valve. Shut off all electric power to the appliance and call your service technician or gas supplier.
7. If the main burners light, then the gas fittings, union and orifices must be tested for leaks with a soap and water solution. If no leaks are found then go to step 9. If any leaks are found, turn off gas control knob (Fig. 26, **Item. 1**) clockwise to "OFF". Turn off all electric power to the appliance, set the thermostat to lowest setting.
8. Repair leaks. Repeat steps 1 through 7.
9. Check the supply pressure while the boiler is running. Pressure must be between 4.7 and 10.5 inches WC for natural gas. Pressure must be between 11 and 13 inches WC for propane gas. Record supply pressure on the boiler start-up procedure on page 33.

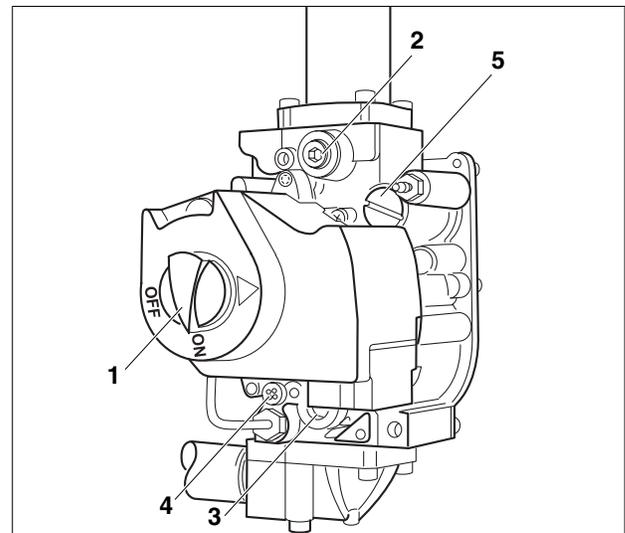


Fig. 26 Gas control valve

**Item. 1:** Gas control knob (set to "ON")

**Item. 2:** Test port screw for gas supply measurement

**Item. 3:** Test port screw for manifold pressure measurement

**Item. 4:** Protective screw for pilot pressure adjustment

**Item. 5:** Protective screw for manifold pressure adjustment

10. Check manifold pressure. Set the manifold pressure according to the values in Table 11. To adjust the manifold pressure (Fig. 26, **Item. 5**), remove the capscrew from the gas control and remove the hose from the manometer to the burner box test port (Fig. 23, **Item. 6**). Turn the pressure regulating adjusting screw clockwise to increase, or

GA244	Natural Gas [inch W.C.]	Propan [inch W.C.]
37	3.77	8.03
44	3.65	7.63
53	3.73	8.11
62	3.77	6.15

Table. 11 Required manifold pressure

## 11 Placing the Boiler in Operation

counterclockwise to decrease the manifold pressure. This adjustment must be made while the boiler is in operation.

11. After adjustment, record pressure on the form on page 33, and install the capscrew (Fig. 26, **Item. 5**) on the gas control valve. Shut the test port screw for manifold pressure measurement.
12. Observe the pilot flame (Fig. 27, **Item. 2**) through viewing port (Fig. 27, **Item. 1**) in the burner cover plate. The flame should envelop the flame sensor  $1/2$  to  $1\ 1/2$  inch, see (Fig. 27, **Item. 1**). If the pilot flame is satisfactory then go to step 13. If the pilot flame is too small or too large, adjust the pilot using pilot adjustment screw. Turn the inner adjustment screw (Fig. 26, **Item. 4**) clockwise to decrease, or counterclockwise to increase the pilot flame. After adjustment, replace the cover screw (Fig. 26, **Item. 4**) and tighten firmly.

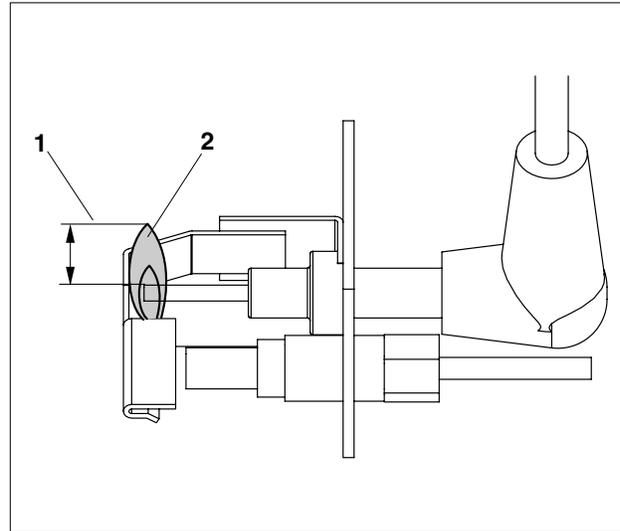


Fig. 27 Pilot flame

**Item. 1:**  $1/2$ " to  $1\ 1/2$ "

**Item. 2:** Pilot flame

13. Observe the main burner flame (Fig. 28, **Item. 1**) through the viewing port (Fig. 25, **Item. 1**) in the burner cover plate. The flame should have a smooth, firm contour and must be mostly blue color. If the main burner flame is satisfactory then go to step 14. If the main burner flame is lazy, yellow, or lifting off the burners, turn the gas control knob (Fig. 26, **Item. 1**) to "OFF". Shut off the main gas supply shut-off valve. Disconnect all electric power to the appliance and call your technician or gas supplier.
14. The ignition safety shut-off must be tested. Test the safety shut-off by shutting off the main gas piping shutoff valve.

The main burner and pilot flame (Fig. 27, **Item. 2**) will extinguish. Within six (6) seconds the gas control main gas solenoid should close and make an audible sound. The ignition will spark.

After 90 seconds, the module should go into lock out mode and the spark should stop. Disconnect the electric power to the appliance. Open the main gas shutoff valve. Turn on the electric power to the unit. A normal operating sequence should occur. If the gas control functions satisfactorily then go to step 15. If the gas control does not function satisfactorily, immediately turn the gas control knob (Fig. 29,

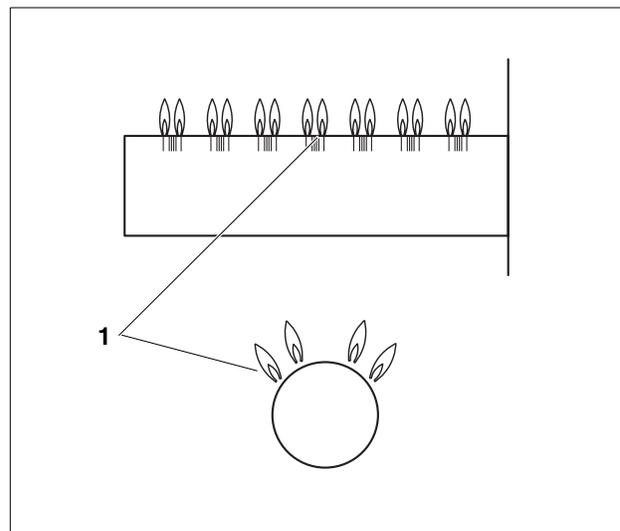


Fig. 28 Main gas burner

**Item. 1:** Main burner flame

**Item. 1)** clockwise to "OFF".

Shut off the main gas piping shut-off valve.

Disconnect all electric power to the appliance and call your service technician or gas supplier.

15. Turn the gas control knob (Fig. 29, **Item. 1**) counterclockwise to "OFF".
16. Shut the main gas piping shut-off valve.
17. Turn off electric power to the appliance, and set the thermostat to the lowest setting.
18. Remove the pressure test fittings from the gas supply and manifold pressure tabs in the gas control and replace the plugs.
19. Repeat steps 1 to 6, and 13 to place the appliance back in operation. Check the plugs in the gas control with a soap and water solution. If no leaks are found go to step 21. If any leaks are found, shut off the main gas piping shut-off valve and turn off all electric power to the appliance and turn the gas control knob clockwise to "OFF" (Fig. 29, **Item. 1**).
20. Repair leaks. Open the main gas shutoff valve and repeat step 19.
21. Wash off the soap and water solution used to test for leaks to ensure no corrosive effects from the soap.
22. Check the high limit aquastat operation to ensure that it shuts off the boiler when the boiler water temperature reaches the setpoint of the aquastat. Records fill in on form found on page 33.
23. Replace the front boiler jacket panel.

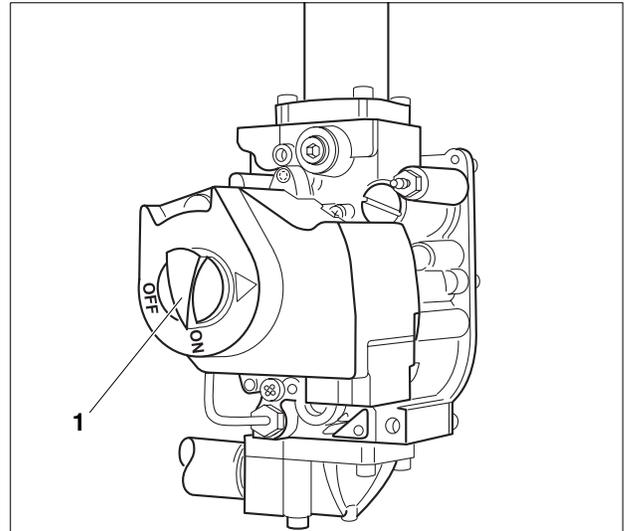


Fig. 29 Gas control valve

**Item. 1:** Gas control knob

### 11.3 Shut off of Gas Supply

1. Set thermostat to its lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Remove the front boiler jacket panel, see Fig. 22, page 26.
4. Turn gas control knob (Fig. 29, **Item. 1**) clockwise to "OFF". Do not force.
5. Replace the front boiler jacket panel.

## 11.4 Start-up Procedure Chart

Record the following information during initial start-up of the boiler. This record will save as a reference for yearly inspections.

Please consider the instructions on the following pages.

Putting into operation	Remarks or measurements
1. Note type of gas.	<input type="checkbox"/> Natural Gas <input type="checkbox"/> Propane
2. Check combustion air and ventilation openings and flue connection	<input type="checkbox"/>
3. Check boiler for correct orifices, see Table. 12 below	<input type="checkbox"/>
4. Fill boiler with water and purge air from the system.	<input type="checkbox"/>
5. Measure gas inlet pressure in inches water colum.	_____ inches W. C.
6. Check manifold pressure and adjust if necessary.	_____ inches W. C.
7. Leakage test during operation Check pilot and main burner flames and vent system operation.	<input type="checkbox"/>
8. Take stack measurements; see instructions on following pages. Gross stack flue gas temperature $t_A$ Ambient air temperature $t_L$ Net stack flue gas temperatiure $t_A - t_L$ Carbon dioxide content stack ( $CO_2$ ) or oxygen content ( $O_2$ ) Flue gas loss $q_A$ Carbon monoxide content (CO), airfree in ppm	_____ °F _____ °F _____ °F _____ % _____ % _____ ppm
9. Check the high limit aquastat operation	<input type="checkbox"/>
10. Replace the boiler front jacket panel	<input type="checkbox"/>
11. Inform owner/sign and hand over the technical documents	<input type="checkbox"/>
12. Installing Contractor  Owner:	Signature: _____  Signature: _____

	Main orifice Size			
Boiler model	37	44	53	62
Natural gas	3.00	3.25	3.20	3.15
Propane gas	1.95	2.15	2.10	2.20

Table. 12 Main orifice sizes

## 11.5 Detailed Steps for Start-up Procedure

### 11.5.1 Taking flue gas measurements

- Record all measurements on page 33.
- Take sampling probe to the outside of the building. Under no circumstances drill a hole in the venting system!
- Take all flue gas samples from this location.
- Allow boiler to run for 5 minutes before taking measurements.

### 11.5.2 Carbon dioxide content

- If the carbon dioxide content is less than 5 % or more than 9 % for natural gas or less than 6 % or more than 10 % for propane, check the setting of the air inlet plate and the integrity of the complete venting system (Fig. 18a).

### 11.5.3 Flue gas loss

Flue gas loss can be calculated with the following formula:

$$q_A = ((t_A - t_L) \cdot A) / CO_2 \text{ in } \%$$

$q_A$  = flue gas loss

$t_A$  = gross flue gas temperature in F

$t_L$  = ambient air temperature in F

A = see Table 12

$CO_2$  = carbon dioxide in %

Values for A and B are listed below:

	A
Natural gas	0.62
Propane gas	0.53

Table. 13

### Carbon monoxide content

The measured carbon monoxide content must be converted according to the following formula to an air free state and entered in the record.  $CO_2$  max for natural gas is approx. 12 % (propane, approx. 14 %)

$$CO \text{ airless} = CO_2 \text{ max.} / CO_2 \text{ measured} \times CO \text{ measured}$$

In an airless state, CO measurements must be lower than 400 ppm or .04 % volume. Measurements around or greater than 200 ppm indicate an erroneous burner setting, dirt in the gas burner or heat exchanger, or defects in the burner.

- The problem must be corrected immediately.

### Inform the owner/operator and hand over the technical documents.

Make the owner/operator familiar with the entire installation and the operation of the boiler. Sign the form with the owner on page 35 and turn over the documents to the owner (page 33).



CAUTION!

### SYSTEM DANGER !

due to frost.

The heating system can freeze up if the system is shut down for the winter.

- Protect the heating installation from freezing.
- Drain water from the boiler, heating system and hot water tank to prevent freezing.

## 12 Maintenance

### 12.1 Maintenance Record

Maintenance should only be performed by a trained technician on a yearly basis.  
 Check off the maintenance items once they are completed and enter the measurements where indicated.  
 Read and follow the maintenance instructions on the following pages.

Maintenance items	Date:	Date:	Date:
1. Examine venting system, including combustion, ventilation and intake air	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Inspect boiler	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Inspect gas burner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Clean boiler	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Clean gas burner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Measure gas supply pressure	_____ inches W. C.	_____ inches W. C.	_____ inches W. C.
7. Measure manifold pressure	_____ inches W. C.	_____ inches W. C.	_____ inches W. C.
8. Check for air tightness of boiler	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Check pilot and main burner flames	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10: Check inducer motor operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Take measurements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gross flue gas temperature $t_A$	_____ °F	_____ °F	_____ °F
Air temperature $t_L$	_____ °F	_____ °F	_____ °F
Net flue gas temperature $t_A - t_L$	_____ °F	_____ °F	_____ °F
Carbon dioxide content (CO <sub>2</sub> ) in % or oxygen content (O <sub>2</sub> )	_____ %	_____ %	_____ %
Flue gas loss $q_A$ , see page 36	_____ %	_____ %	_____ %
Carbon monoxide content (CO), airfree	_____ ppm	_____ ppm	_____ ppm
12. Check high limit aquastat operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Check boiler area for combustible materials, gasoline and other flammable or corrosive liquids.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Confirmation of maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Confirmation by service provider			
(Signature)			

Date:	Date	Date	Date	Date
<input type="checkbox"/>				
<input type="checkbox"/>				
<input type="checkbox"/>				
<input type="checkbox"/>				
<input type="checkbox"/>				
_____ inches W. C				
_____ inches W. C				
<input type="checkbox"/>				
<input type="checkbox"/>				
<input type="checkbox"/>				
_____ °F				
_____ °F				
_____ °F				
_____ %	_____ %	_____ %	_____ %	_____ %
_____ %	_____ %	_____ %	_____ %	_____ %
_____ ppm				
<input type="checkbox"/>				
<input type="checkbox"/>				
<input type="checkbox"/>				

## 12.2 Maintenance Procedure

Maintenance should only be performed by a qualified service technician. When replacing parts, use only Buderus authorized components. Maintenance should be done on a yearly basis. Results of the inspection must be recorded on the form provided on page 35. Comments below refer back to points of maintenance record list on page 35.

### 1.: Examination of venting system, including combustion, ventilation and intake air components

Inspect the venting system including the combustion, ventilation and intake air openings. Any repairs identified must be corrected immediately.

Ensure that there is no obstruction of combustion, air intake and ventilation air flow.

### 2.: Inspection of boiler



**DANGER!**

#### **DANGER !**

due to electric power with opened boiler jacket panel.

- Before removing the boiler front jacket panel: disconnect electric power to appliance or turn off power switch to the appliance.
- Protect the system against accidental power up.

**Removal of gas burner:**

1. Shut-off main gas piping shut off valve.
2. Remove the screws from the boiler front access panel (Fig. 30, **Item. 1**) and remove the boiler front access panel (Fig. 30, **Item. 2**).

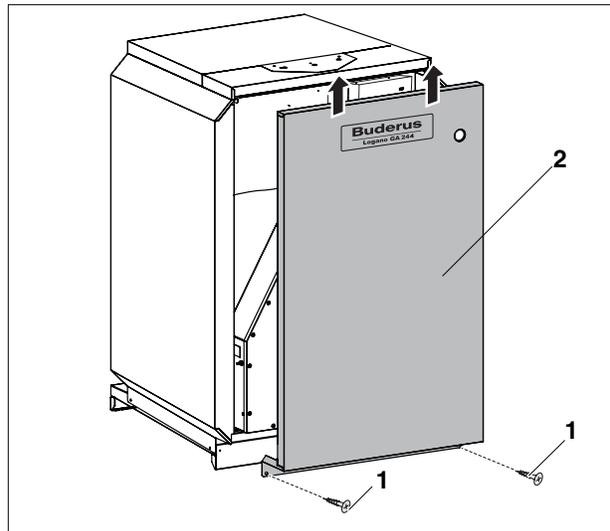


Fig. 30 Removal of boiler jacket front panel

**Item. 1:** Screws

**Item. 2:** Boiler jacket front panel

3. Turn the gas control knob (Fig. 31, **Item. 1**) counterclockwise to "OFF". Do not force.

**DANGER**

due to explosion of the gas.

**WARNING!**

- Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! Follow "B" in the safety information on page 28. If you do not smell gas, go to the next step.

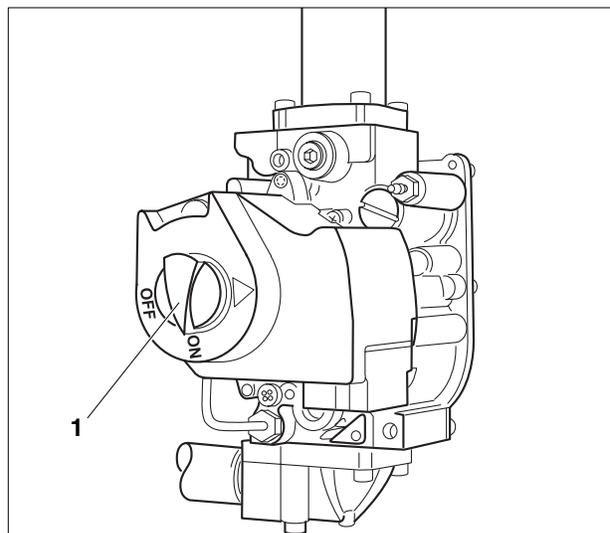


Fig. 31 Gas control valve

**Item. 1:** Gas valve knob (set to "ON")

4. Disconnect gas pilot line (Fig. 32, **Item. 1**) from gas control (Fig. 32, **Item. 9**)
5. Label the flame roll-out switch wires (Fig. 32, **Item. 2**) and disconnect the wires from the flame roll-out switch (Fig. 32, **Item. 3**).
6. Disconnect gas control valve wires (Fig. 32, **Item. 4**) from the gas control valve (Fig. 32, **Item. 7**).
7. Secure gas supply pipe (Fig. 32, **Item. 5**) with a cable or rope around the gross control bracket.
8. Disconnect union (Fig. 32, **Item. 6**) between the gas valve (Fig. 32, **Item. 7**) and the main gas supply pipe (Fig. 32, **Item. 5**). Place the gasket from the union in a safe position.



**DANGER !**

due to electricity .

- WARNING!**
- Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.
  - Verify proper operation after servicing.

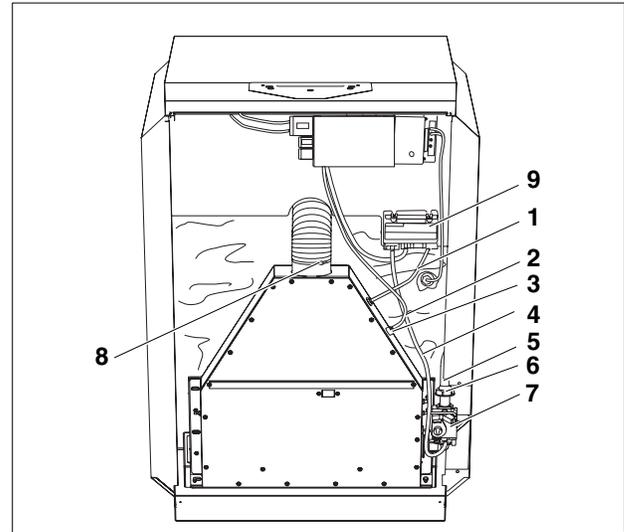


Fig. 32 Front view

- Item. 1:** Ignition cable
- Item. 2:** Flame roll-out switch cable
- Item. 3:** Flame roll-out switch
- Item. 4:** Gas valve cable
- Item. 5:** Gas supply pipe
- Item. 6:** Union
- Item. 7:** Gas valve
- Item. 8:** Air intake hose
- Item. 9:** Gas control module

9. Loosen air intake hose (Fig. 32, **Item. 8**) and remove from burner tray box
10. Remove the nuts (Fig. 33, **Item. 1**) that secure the burner tray to the boiler and remove entire burner tray (Fig. 33, **Item. 3**).
11. Remove inducer motor when boiler requires cleaning; or go to 5.: "Cleaning of the gas burner", page 42.

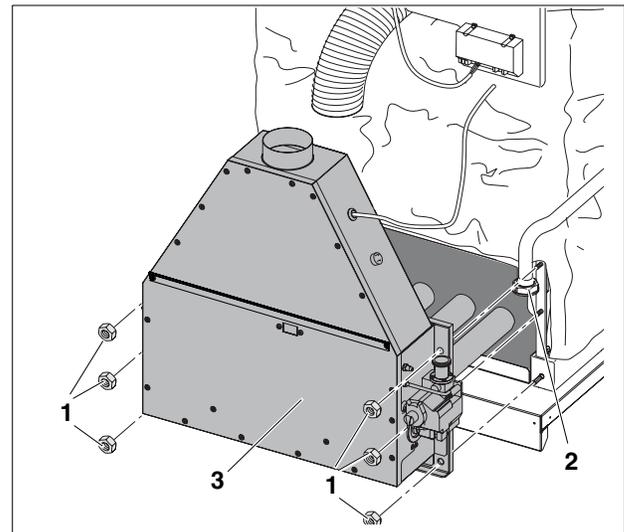


Fig. 33 Removal of the gas burner tray

- Item. 1:** Nuts
- Item. 2:** Union
- Item. 3:** Gas burner tray assembly

**Removal of inducer.**

1. Remove both screws (Fig. 34, **Item. 1**) on top rear jacket cover (Fig. 34, **Item. 2**).
2. Remove top rear jacket cover (Fig. 34, **Item. 2**).

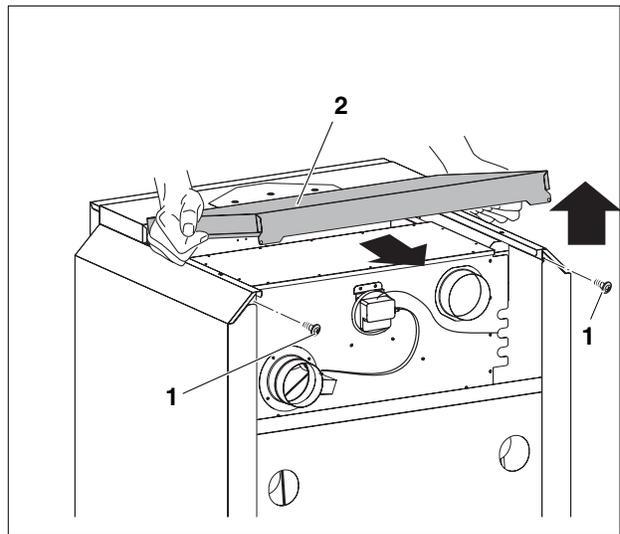


Fig. 34 Removal of the Top rear jacket cover

3. Remove the screws from the fan blower box and remove the cover plate from the fan blower box.
4. Pull off the electrical connections.
5. Remove the screws from the flue collector.
6. Remove the screws (Fig. 35, **Item. 3**) that secure the sheet metal blower base.
7. Check blower wheel for dirt and clean when necessary.
8. Clean the boiler heat exchanger when necessary, see 4.: "Cleaning the boiler", page 41.

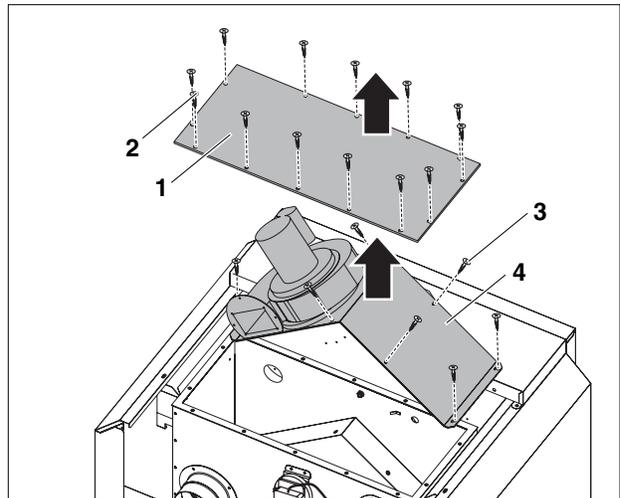


Fig. 35 Removal of the inducer

**Item. 1:** Fan blower box cover plate

**Item. 2:** Screws

**Item. 3:** Screws

**Item. 4:** Sheet metal blower base

### 3.: Inspection of the gas burner

1. Check burner box, air intake hose and burner tubes for contamination, and clean components when necessary, see 5.: "Cleaning of the gas burner", page 42.
2. Check air intake hose for damage and replace when necessary.

### 4.: Cleaning the boiler

The cleaning of the heat exchanger of the boiler can be achieved with brushes and/or a wet spray cleaning.

#### a) Brush cleaning:

1. Brush out from the top the heating passages.

#### b) Spray cleaning / combined cleaning:

1. Select proper cleaning agent based nature of build-up. (Soot or corrosive build-up).
2. Follow manufacturer's instructions with respect to use of cleaning unit and cleaning agent. It may be that the application of the cleaning agent is different that described here.
3. Heat boiler to a temperature of about 122° F.
4. Shut off main gas piping shutoff valve.
5. Disconnect electric power to the appliance.
6. Remove gas burner tray and inducer blower (Refer to 2. "Inspection of the boiler", see page 37).
7. Cover controls with aluminum foil; avoid spraying on gas and electrical controls.
8. Put dry absorbing rags on top of board insulation in the bottom of boiler.
9. Spray the heating passages evenly from the top with the cleaning agent.

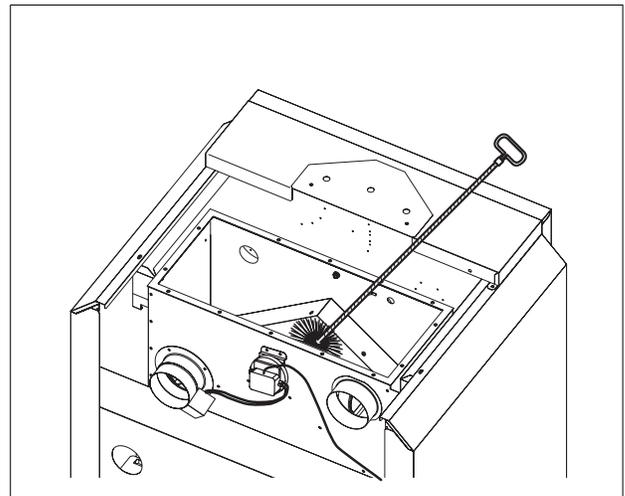


Fig. 36 Cleaning with a brush

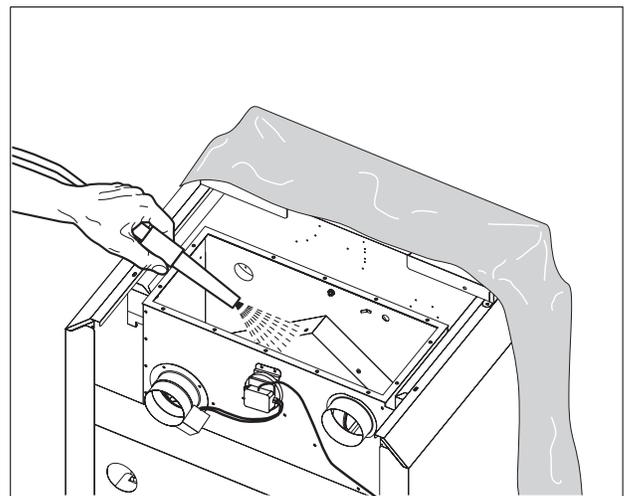


Fig. 37 Spray cleaning of the boiler

\* Cleaning accessories= please order separate.

**Spray only in the heating passages!**

10. Let the cleaning agent soak for about 15 minutes.
11. Remove dry absorbing rags from the bottom of the chamber.
12. Remove aluminum foil from controls.
13. Install inducer and gas burner tray (Refer to next section: "Reassembly of removed components").
14. Bring boiler to maximum temperature. (Set Logamatic control, if present, to manual setting). Remove gas burner tray after the boiler has dried out.
15. A thorough brushing of the heating surfaces is recommended. This requires a disassembly and reassembly as previously discussed.
16. Clean burner chamber and insulation board in the bottom of the chamber.
17. Vent the boiler room thoroughly.

**5.: Cleaning of the gas burner**

1. Remove burner tray cover plate screws from the burner tray box.
2. Remove ignition cable (Fig. 38, **Item. 4**) from pilot burner assembly (Fig. 38, **Item. 1**).
3. Loosen the pilot gas line (Fig. 38, **Item. 3**) on the pilot burner (Fig. 38, **Item. 1**).
4. Remove pilot gas orifice (Fig. 38, **Item. 2**) and blow out to clean.
5. Dip burner tubes into water with dishwashing cleaning agent and brush off. Ensure that insulation does not get wet.
6. Rinse the burner rods with a stream of water: when doing so, hold the gas burner in such a way that the water penetrates into all burner perforations and runs out again through the Venturi tubes.
7. Remove the rest of the water by shaking the burner tubes.
8. When necessary, clean burner box housing and air intake hose.
9. Check the burner perforations for free passages; remove any water from the perforations. If any perforations are damaged, the burner tray must be replaced.

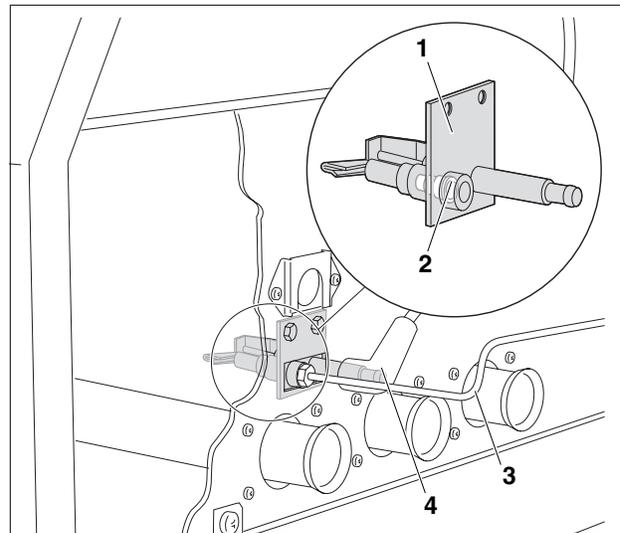


Fig. 38 Pilot burner assembly

**Item. 1:** Pilot burner assembly

**Item. 2:** Pilot gas orifice

**Item. 3:** Pilot gas line

**Item. 4:** Ignition cable

**Reassembly of removed components**

1. Reassemble and install the pilot burner assembly and gas burner in reverse order from its removal. Make sure that sheet metal burner box cover is assembled properly in the gasketed seal.
2. Reassemble and install the gas burner in reverse order from its removal. Tighten the four (4) burner tray nuts evenly (see page 38 to page 39.)
3. Secure union between gas valve (Fig. 39, **Item. 7**) and gas supply pipe (Fig. 39, **Item. 5**) and make sure to install the gasket, discussed in step 8 on page 39.
4. Replace gaskets and seals when necessary.
5. Reconnect wires to the flame roll-out switch (Fig. 39, **Item. 2**).
6. Remove rope or wire that secured the gas piping (Fig. 39, **Item. 5**) as discussed in step 7 on page 39.
7. Reconnect the ignition cable (Fig. 39, **Item. 1**) to ignition control box (Fig. 39, **Item. 12**).
8. Install the inducer by reversing removal process, see, page 40.
9. Take to boiler in operation according section 11 "Placing the Boiler in Operation", page 26 to page 34.
10. Take flue measurements according to the procedure on section 11.5.1 "Taking flue gas measurements", page 34.

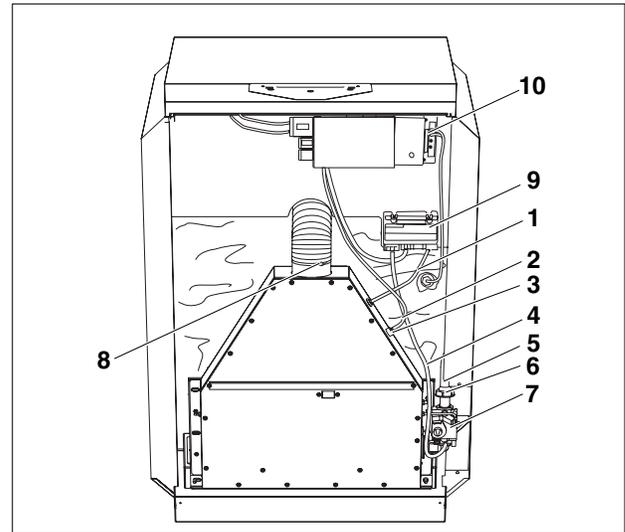


Fig. 39 Front view

**Item. 1:** Ignition cable

**Item. 2:** Flame roll-out switch cable

**Item. 3:** Flame roll-out switch

**Item. 4:** Gas valve cable

**Item. 5:** Gas supply pipe

**Item. 6:** Union

**Item. 7:** Gas valve

**Item. 8:** Air intake hose

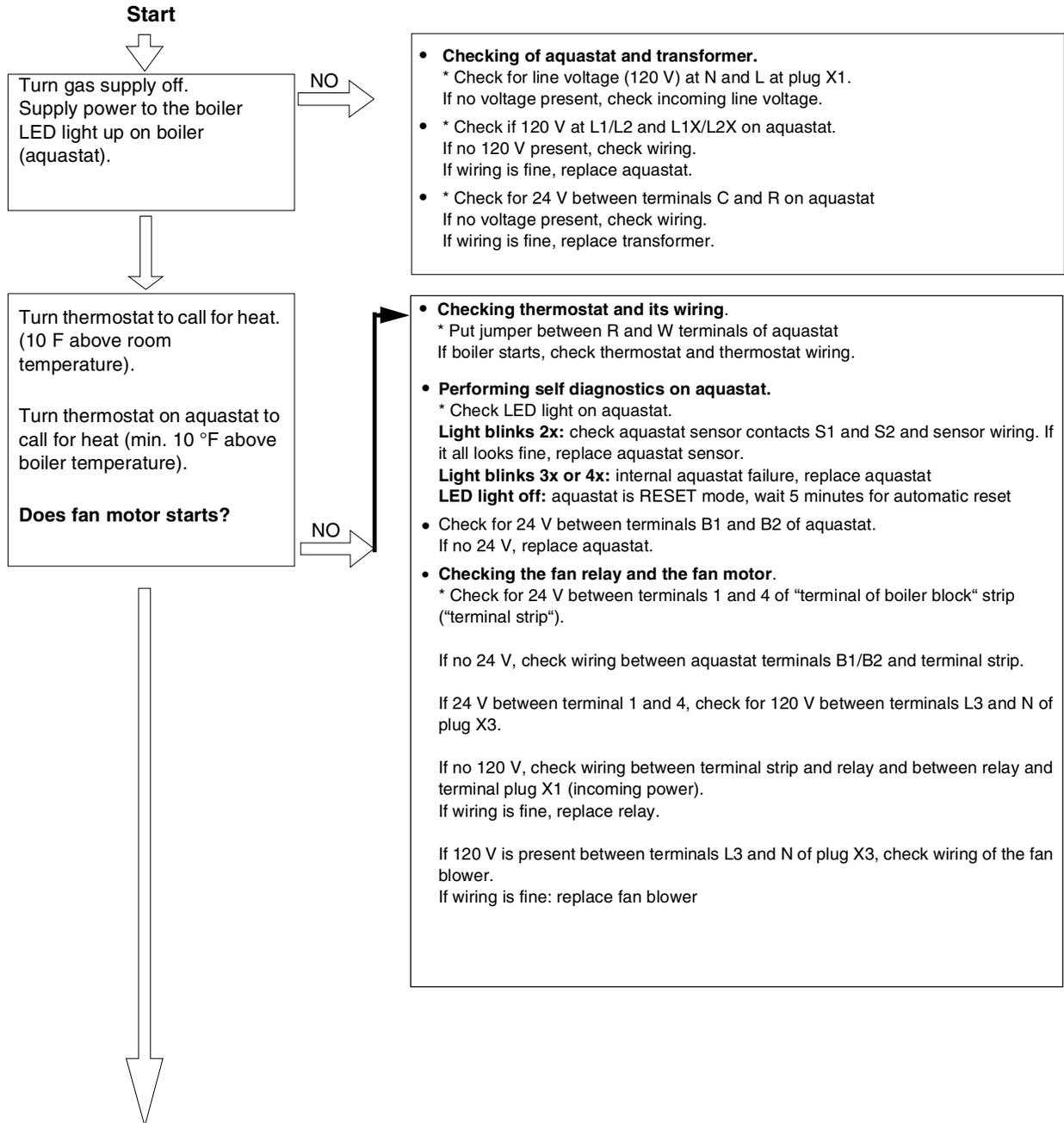
**Item. 9:** Gas control module

**Item. 10:** Aquastat

11. Verify proper operation of the aquastat (Fig. 39, **Item. 10**).
12. Test low water cut-off operation, if present.
13. Check boiler surroundings for irregularities. Its surroundings must be free of flammable materials, gasoline or other flammable or corrosive gases and liquids.
14. Confirm the maintenance record by filling out all listed items. Sign the maintenance record and hand it to the owner/operator of the boiler.

### 12.3 Trouble Shooting Guide

Required tools: electrical diagram on page 69 and a multimeter with 120 VAC and 24 VAC scales.



↓

Spark across ignitor/sensor gap  
(look through sight glass) NO →



Turn gas supply on.  
Pilot burners lights. NO →



#### Checking the S 8600 ignition module.

- Check for 24 V between terminals 3 and 4 of the terminal strip. (Power supply to S8600 ignition module)

If present:

- Check wiring between terminal strip and S8600 module.
- Check position of ignition cable plug on ignition sensor ceramic insulator.
- Check ignition cable, ground wiring, ignition sensor ceramic insulator and gap. Set gap to 3 - 4 mm. (1/8" to 1/6").
- Check boot of the ignition cable for signs of melting or buckling.
- If everything checks okay, replace S8600 ignition module.

#### Checking the flame roll-out switch.

- Check for 24 V between terminals 2 and 3 of terminal strip. If no 24 V present, check wiring between terminal strip and flame roll-out switch. Check for continuity of flame roll-out switch. If open circuit, replace flame roll-out switch.

#### Checking the pressure switch.

- Check for 24 V between terminals 1 and 2 of terminal strip.

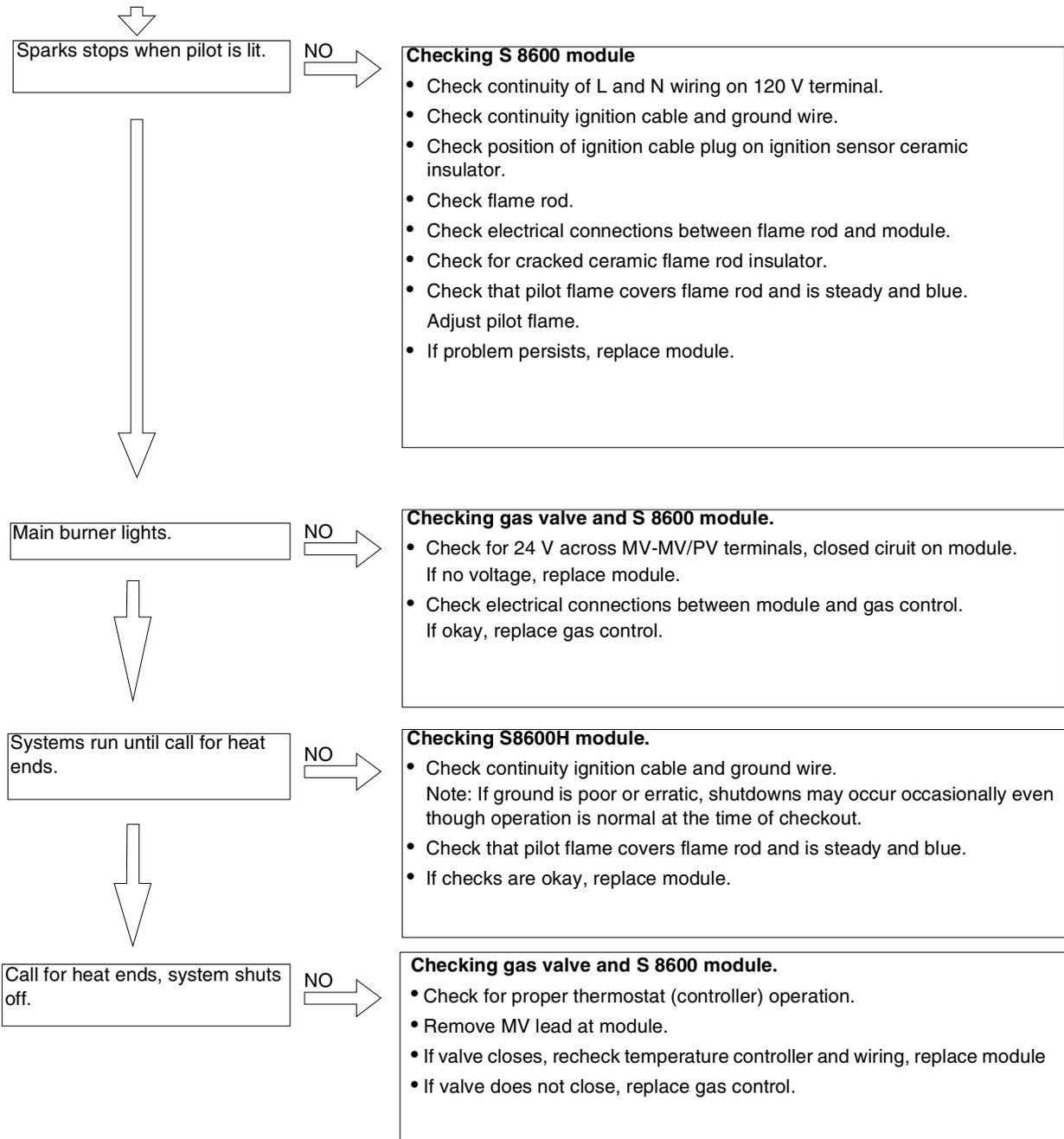
If no 24 V present, do following:

- Check wiring between pressure switch and terminal strip on boiler block.
- Check exhaust and air intake piping for blockage.
- Check air intake hose of boiler for blockage and ensure full diameter.
- Check for blocked heat exchanger of the boiler.
- Check total length of exhaust and air intake piping versus listed tables Table 7 to Table 9 on page 24 and page 25.

If everything checks okay: replace pressure switch.

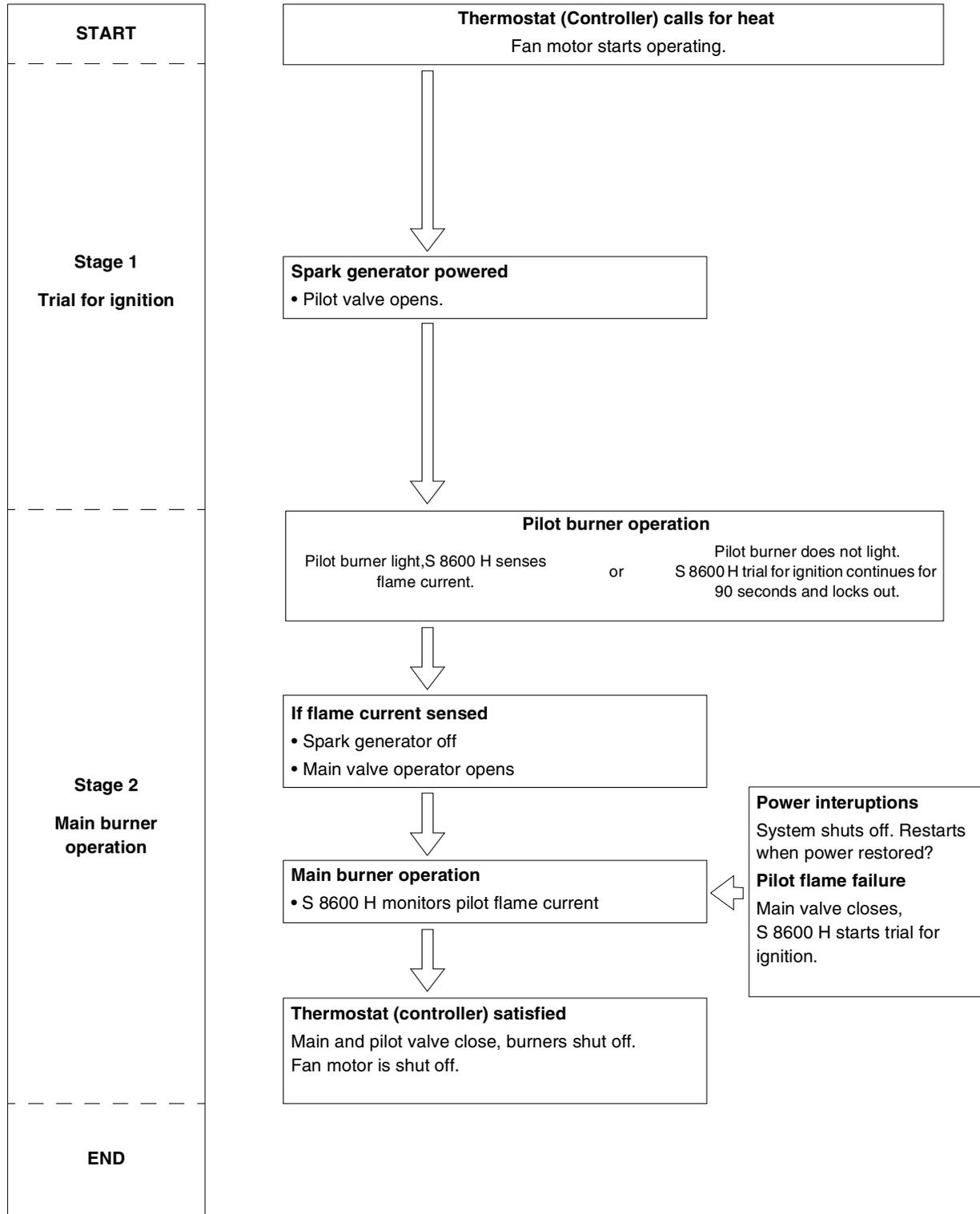
#### Checking gas valve and S 8600 module.

- Check that all manual gas valves are open, supply tubing and pressures are good and pilot burner orifice is not blocked.
- Before first start-up, purge the air from gas supply pipe.
- Check electrical connections between module and pilot operator on gas control.
- Check for 24 V across MV-MV/PV terminals on module. If voltage is fine, replace gas control. If not, replace module.



**Troubleshooting ends**

**Repeat procedure until troublefree operation is obtained.**



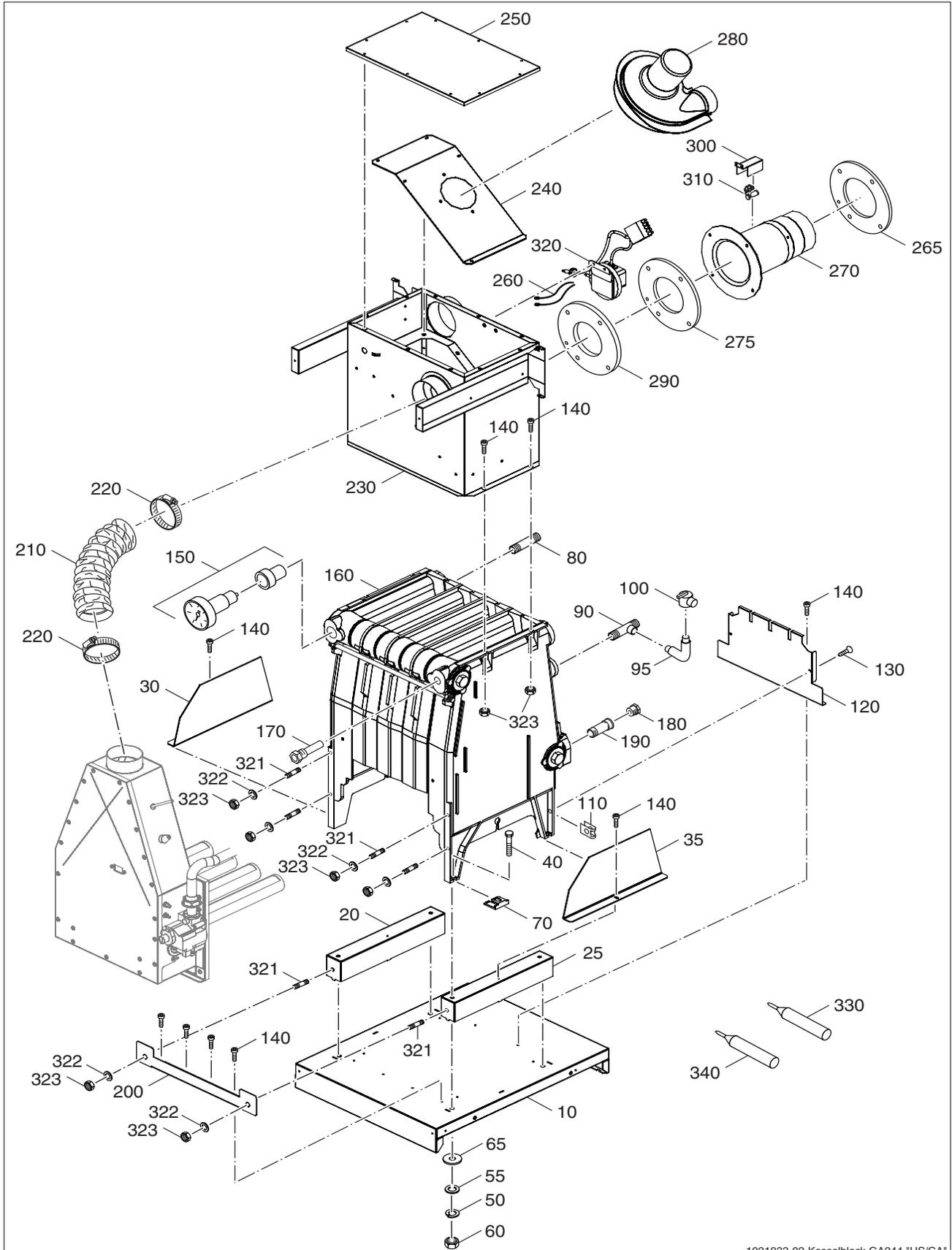
## 13 Parts List

The following parts are directly available from Buderus Hydronic Systems, Inc. Please use the listed description and part number when ordering replacement components.

### Boiler block (Fig. 40)

Item No.	Part description	Buderus Part number	Model 37 Quantity	Model 44 Quantity	Model 53 Quantity	Model 62 Quantity
10	Non combustible base	63025-	312	312	313	314
20	Bottom support rail 386x54x65 left side	63026979	1	1	1	1
25	Bottom support rail 386x54x65 right side	63026980	1	1	1	1
30	Combustion chamber side plate 303x135 left	63026977	1	1	1	1
35	Combustion chamber side plate 303x135 right	63026978	1	1	1	1
40	Hex.-screw ISO4017 M8x100 8.8	Mounting Material	4	4	4	4
50	Spring DIN128 A8 A3k	Mounting Material	4	4	4	4
55	Washer DIN125 A8 A3k	Mounting Material	4	4	4	4
60	Hex.-nut ISO4032 M8 8 A3k	Mounting Material	4	4	4	4
65	Gasket D6x20x2 SIL24	Mounting Material	4	4	4	4
70	Boiler feet	Mounting Material	4	4	4	4
80	Return pipe R1 1/2xNpt11/2	5584754	1	1	1	1
90	Supply pipe R11/2xNpt11/2x3/4	5584752	1	1	1	1
95	Elbow 90° Nr92 NPT3/4	99908401	1	1	1	1
100	Relief valve Conbraco 30PS1	5900076	1	1	1	1
110	Snap nut 4,8 SNU2012	Mounting Material	2	2	2	2
120	Rear insulation board	63026-	974	974	975	976
130	Sheet metal screw DIN7981 C ST4,8x22	Mounting Material	2	2	2	2
140	Screw ST3,9x9,5 A3T	Mounting Material	1	1	1	1
150	Temperature and pressure gauge	5900076	1	1	1	1
160	Cast iron boiler block	63026-	967	967	968	969
170	Chrome well (Npt)	5446190	1	1	1	1
180	Adapter 1-3/4"	3869828	1	1	1	1
190	Connection piece DIN2950 526 3/4"x80	320840	1	1	1	1
200	Elbow	63026-	973	973	972	971
210	Air intake hose DN 100x690	63026981	1	1	1	1
220	Air intake hose clamp set 90-110x9	63026991	1	1	1	1
230	Flue gas blower box	6302-	6831	6832	9098	8849
240	Base plate for flue gas blower	6302-	6833	6833	9097	8853
250	Flue gas blower box cover plate	6302-	6834	6834	9096	8855
260	Hose set DN4x2x880 Silicone	63016451	1	1	1	1
265	Flange plate D87x140x2	63028921	1	1	1	-
270	Collar D79,5/D77/D75x160	6302-	6835	6835	9099	8857
275	Flange plate D140/D77	63028858	-	-	-	1
280	Flue gas fan motor 120V/60	63026836	6836	6836	8856	8856
290	Gasket D140xD72x5	63026837	1	1	1	1
300	Cover plate test-port fan blower	63026838	1	1	1	1
310	Pressure switch for flue gas blower	63011683	1	1	1	1
320	Pressure switch DL3ET-Z	6302-	6839	6840	9100	8839
321	Threaded bolt DIN 939 M8x30 5.6	Mounting Material	6	6	6	6
322	Washer DIN 125 A8.4 A3k	Mounting Material	4	4	4	4
323	Hex. nut ISO 4032 M8	Mounting Material	4	4	4	4
330	Tube with sealant material for block assembly PK-W11 310 ml	2037038	1	1	1	1
340	Silicone HT	63000116	1	1	1	1
350	Mounting Material for boiler block	63026970	1	1	1	1

Table 14 Boiler block



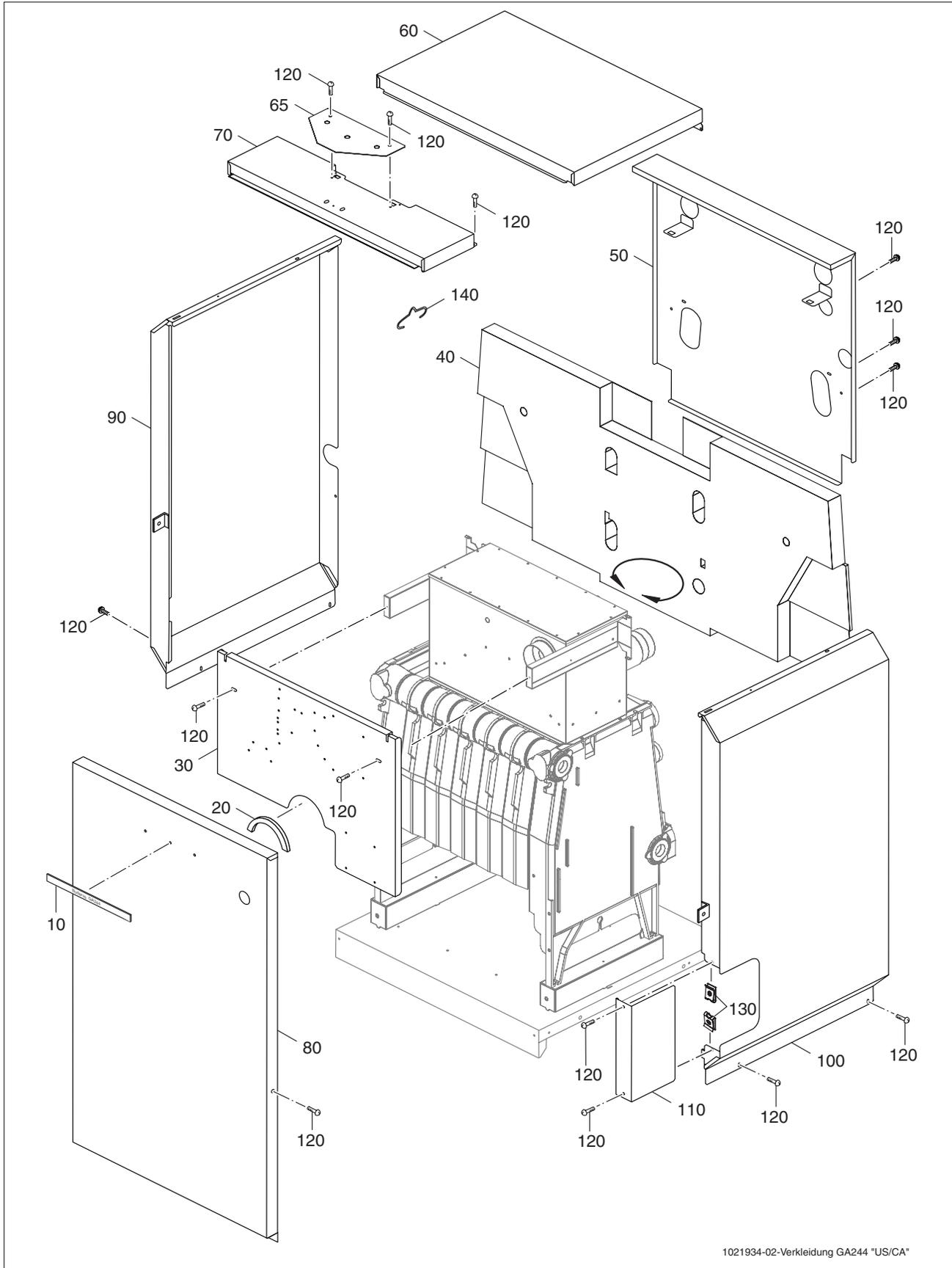
1021933-02-Kesselblock GA244 "US/CA"

Fig. 40 Boiler block

**Boiler Jacket Panels (Fig. 41)**

Item No.	Part description	Buderus Part number	Model 37 Quantity	Model 44 Quantity	Model 53 Quantity	Model 62 Quantity
10	Name plate	63025232	1	1	1	1
20	Edge protection set	63020896	1	1	1	1
30	Middle panel	63025-	238	238	239	240
40	Boiler block insulation	63025-	233	233	234	235
50	Rear panel	63025-	229	229	230	231
60	Top rear cover panel	63025-	226	226	227	228
70	Top front cover panel	63025-	223	223	224	225
80	Front panel (delivered until February 2004)	63025-	220	220	221	222
80	Front panel (delivered from March 2004)	63028-	708	708	709	710
90	Side panel left (delivered until February 2004)	63025219	1	1	1	1
90	Side panel left (delivered from March 2004 )	63028706	1	1	1	1
100	Side panel right (delivered until February 2004)	63025218	1	1	1	1
100	Side panel right (delivered from March 2004)	63028705	1	1	1	1
110	Right side panel cover plate (delivered until February 2004)	63026310	1	1	1	1
110	Right side panel cover plate (delivered from March 2004)	63028711	1	1	1	1
120	Sheet metal screw C St3.9x50	Mounting Material	20	20	20	20
130	Snap nut	Mounting Material	2	2	2	2
140	Clip spring	476378	5	5	5	5
-	Mounting material for boiler jacket	63025389	1	1	1	1

Table 15 Boiler jacket



1021934-02-Verkleidung GA244 "US/CA"

Fig. 41 Boiler jacket panels

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

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**Measuring Line - Set (Fig. 42)**

Item No.	Part description	Buderus Part number	Model 37 Quantity	Model 44 Quantity	Model 53 Quantity	Model 62 Quantity
10	Measuring line set CE244	6302-	5822	5822	5822	5822
The measuring line set contains the following components:						
20	Pressure measuring orifice G1/8" (DIN288-1)	0548-	1194	1194	1194	1194
30	Gasket ring DIN7603 A 10x13,5x1,5 Cu	6301-	5874	5874	5874	5874
40	Hex.-nut G1/8"		2	2	2	2
50	Pressure measuring orifice G1/8"		1	1	1	1
60	Silicone hose 3x1,5x120mm		1	1	1	1
70	Pressure measuring orifice 394537		1	1	1	1

Table 16 Measuring line set

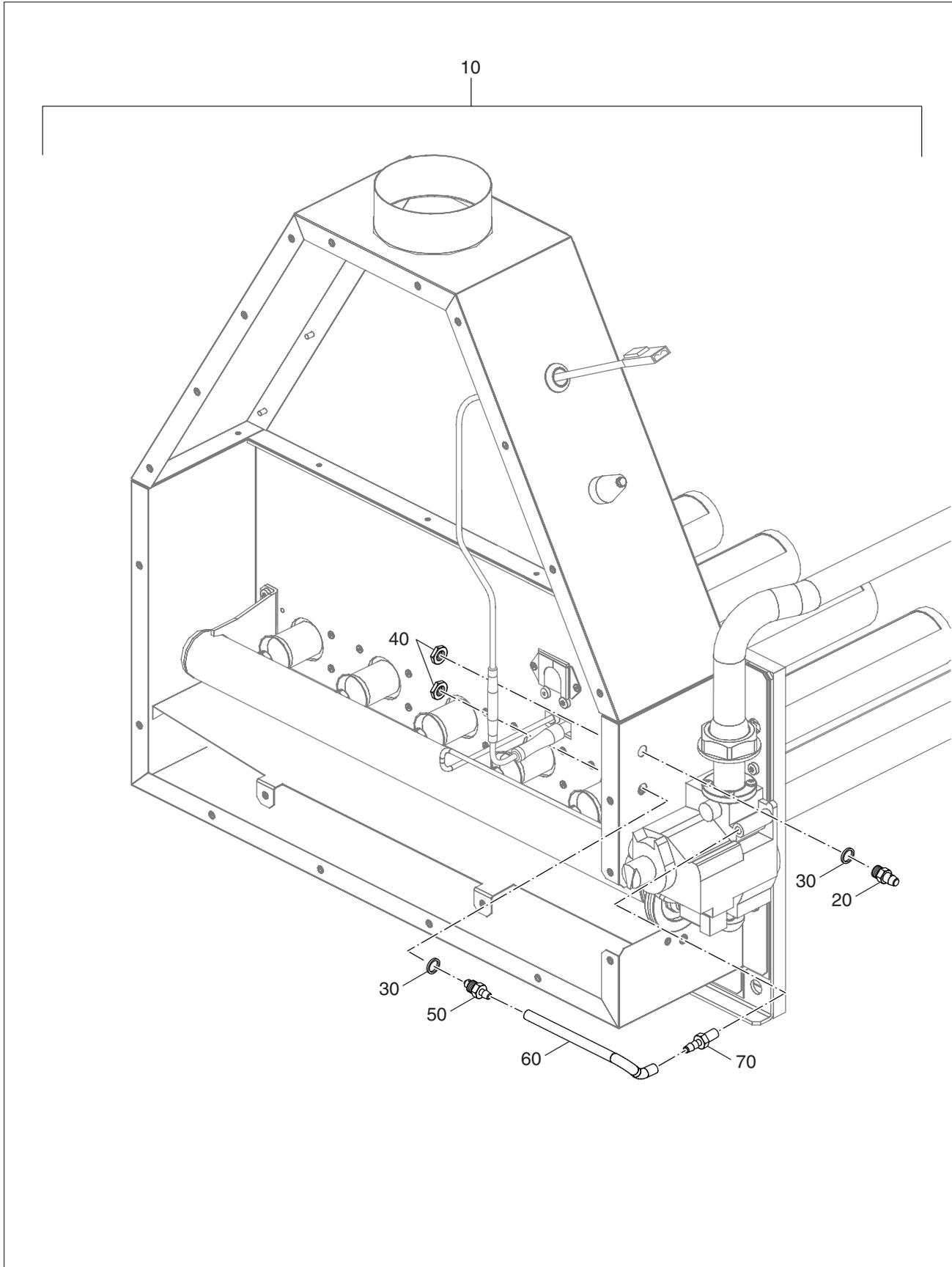


Fig. 42 Measuring line set

## Control panel GAW028 (Fig. 43)

Item No.	Part description	Buderus Part number	Model 37 Quantity	Model 44 Quantity	Model 53 Quantity	Model 62 Quantity
10	Control panel GAW 028 00 compl. "US"	-	63026298	63026298	63026299	63026300
20	Relay 24V AC 1xS 120V AC/15A	63015750	1	1	1	1
30	Sheet metal screw DIN7981 F ST3,5x6,5 A3	see mounting-material for GAW027/GAW028 „US“				
40	Terminal strip 4 qmm 4-pin	see mounting-material for GAW027/GAW028 „US“				
50	Sheet metal screw DIN7981 F ST3,5x16 A3K	see mounting-material for GAW027/GAW028 „US“				
60	Middle panel GA244 "US"	see boiler jacket	1	1	1	1
70	Ignition module S 8600H1006	63015743	1	1	1	1
80	Screw ST3,9x9,5 A3K	see mounting-material for GAW027/GAW028 „US“				
90	Cover plate for ignition module GAW028 "US"	63026301	1	1	1	1
100	Tooth lock washer DIN6797 A4,3 A3K	see mounting-material for GAW027/GAW028 „US“				
110	Hose AWG 2x18 063/076	63015745	1	1	1	1
120	Cabling tree GAW 022/024/026/027	63015746	1	1	1	1
130	Temperature sensor 32004955-003B	63015749	1	1	1	1
140	Blank piece für 1/4 circuit sensor	07060110	2	2	2	2
150	Distance spring	05446800	1	1	1	1
160	Sensor bracket	07060986	1	1	1	1
170	Transformer 120V/24V "US" compl.	63015748	1	1	1	1
180	Aquastat Relay L7148F	63015742	1	1	1	1
190	Sheet metal screw DIN7981 C ST3,5x25 A3K	see mounting-material for GAW027/GAW028 „US“				
200	Interconnecting cable	63015744	1	1	1	1
210	Sheet metal screw DIN7981 C ST2,9x16 A3K	see mounting-material for GAW027/GAW028 „US“				
220	3-pin plug black 93.923.4354	05493464	1	1	1	1
230	3-pin female connector black 93.031.3253.0	07060911	1	1	1	1
240	3-pin plug green/black	05493465	1	1	1	1
250	3-pin female connector green	07060912	1	1	1	1
260	Sheet metal screw DIN7981 C ST2,9x25 A3K	see mounting-material for GAW027/GAW028 „US“				
270	5-pin female connector black	07060913	1	1	1	1
280	Sheet metal screw DIN7981 F ST3,5x9,5A3K	see mounting-material for GAW027/GAW028 „US“				

**Control panel GAW028 (Fig. 43)**

Item No.	Part description	Buderus Part number	Model 37 Quantity	Model 44 Quantity	Model 53 Quantity	Model 62 Quantity
	Mounting-material for GAW027/GAW028 „US“	63015810				
	The mounting material contains the following components:					
30	Sheet metal screw DIN7981 F ST3,5x6,5 A3		10	10	10	10
40	Terminal strip 4 qmm 4-pin		1	1	1	1
50	Sheet metal screw DIN7981 F ST3,5x16 A3K		5	5	5	5
80	Schreue ST3,9x9,5 A3E		5	5	5	5
100	Tooth lock washer DIN6797 A4,3 A3K		5	5	5	5
190	Sheet metal screw DIN7981 C ST3,5x25 A3K		5	5	5	5
210	Sheet metal screw DIN7981 C ST2,9x16 A3K		5	5	5	5
260	Sheet metal screw DIN7981 C ST2,9x25 A3K		4	4	4	4
280	Sheet metal screw DIN7981 F ST3,5x9,5A3K		2	2	2	2

Tab. 17 Control panel GAW028

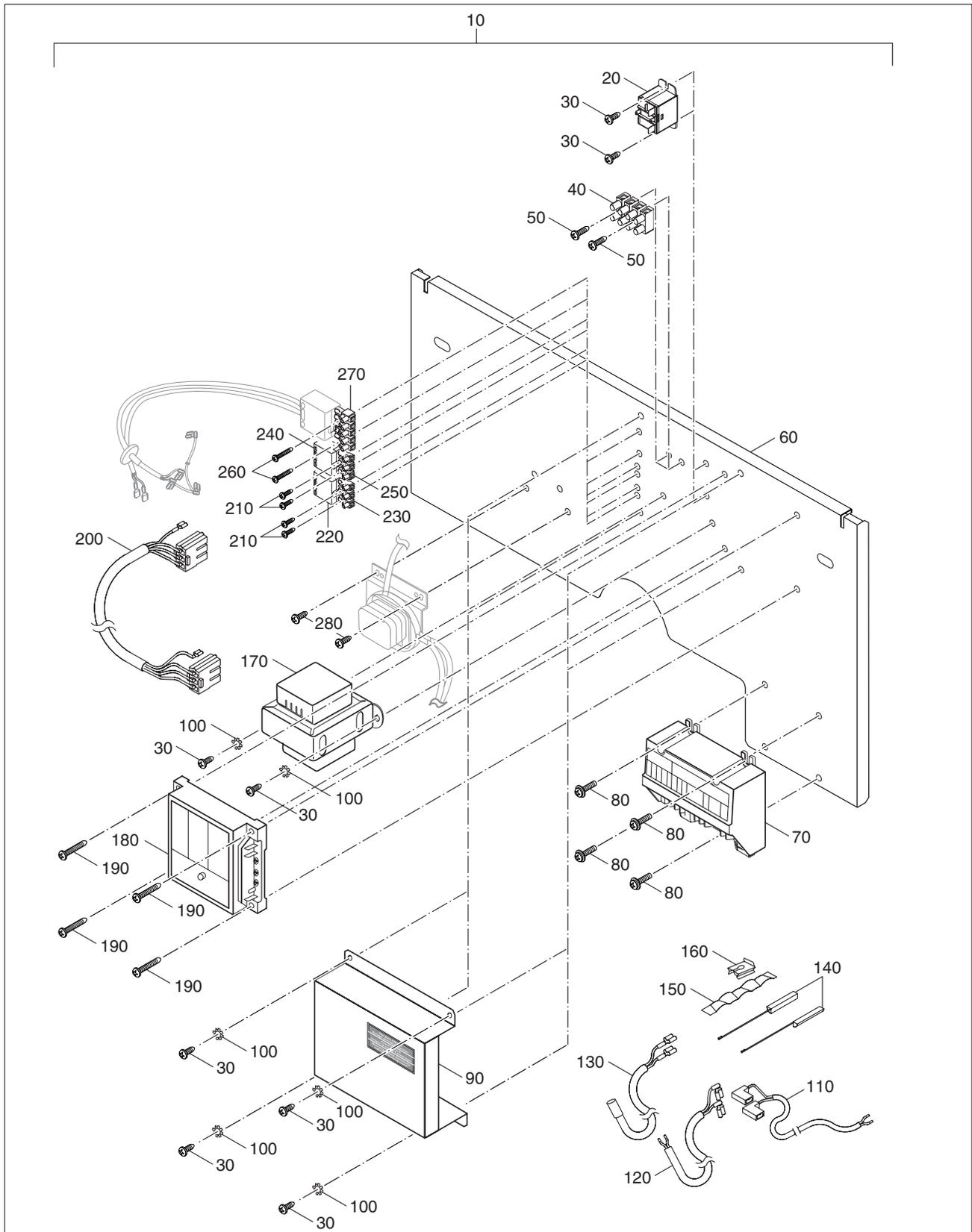


Fig. 43 Control panel GAW028

**Burner Tray Assembly (Fig. 44)**

Item No.	Part description	Buderus Part number	Model 37 Quantity	Model 44 Quantity	Model 53 Quantity	Model 62 Quantity
10	Burner tray assembly CE244 compl.	6302-	5795	5795	5796	5797
20	Gasket for burner tray assembly	Gasket set				
30	Secondary air guide plate					
40	Lens screw DIN7985-M4x20-5.8-A3K	0588-	3286	3286	3286	3286
50	Flame roll-out switch 377Grad f	0047-	1336	1336	1336	1336
60	Screw DIN7500 CE M5x12 CombiTorx 15 pieces/set	6302-	8938	8938	8938	8938
70	Burner tray cover plate CE244 5Gld compl. "US"	6302-	5808	5808	5809	5810
80	Bottom - gasket for burner tray cover plate	Gasket set				
90	Top - gasket for burner tray cover plate	Gasket set				
100	Observation port compl.	0710-	0256	0256	0256	0256
110	Screw St3,9x9,5 A3T	0594-	7754	7754	7754	7754
120	Gasket - Set for burner tray assembly CE244 5 section compl.	6302-	5925	5925	5926	5927
130	Clue Elastosil E 41 in 90ml tube	6301-	1270	1270	1270	1270

Table 18 Burner tray assembly

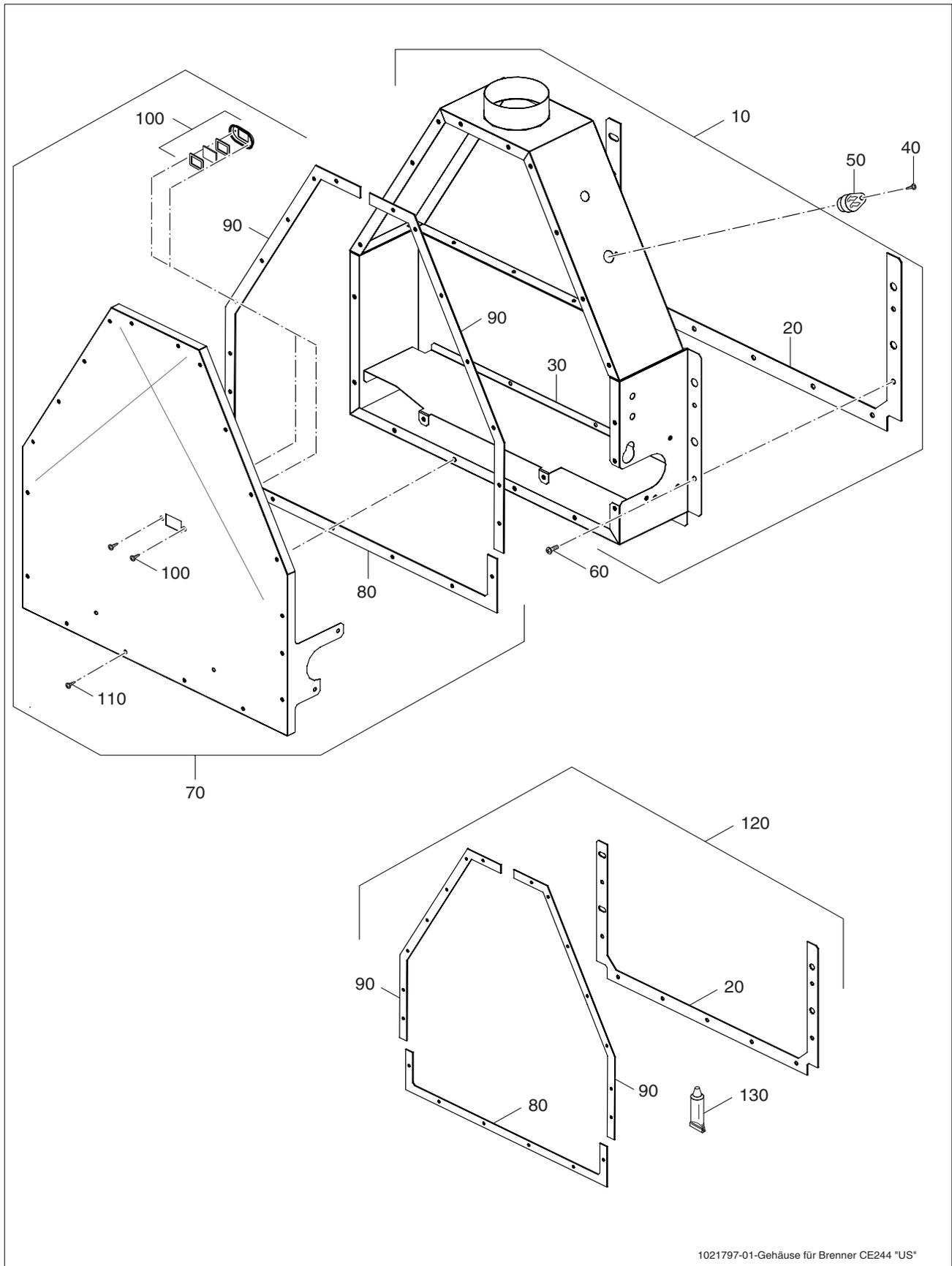


Fig. 44 Burner tray assembly

**Gas Valve VR8304 (Fig. 45)**

Item No.	Part description	Buderus Part number	Model 37 Quantity	Model 44 Quantity	Model 53 Quantity	Model 62 Quantity
10	Gas supply pipe CE244 compl. "US" with sleeve nut and gasket	6302-	5807	5807	5807	5807
20	Sleeve nut G 1 1/4	0518-	1564	1564	1564	1564
30	Gasket D27x38x2mm C4400 Klinger SIL, green	0548-	9356	9356	9356	9356
40	Socket with Flange 25,4x25,4 compl. with O-ring gasket and Screws	6302-	5821	5821	5821	5821
50	Screw 8x32x1/2	s. Screw Set Gas valve VR8304				
60	O-ring gasket 24, 2x3 PERBUNAN	6302-	5931	5931	5931	5931
70	VR8304 gas valve, complete w/ O-Ring, pressure tap and screws	6302-	5794	5794	5794	5794
80	Pressure measuring orifice 394537	s. pressure measuring set CE244				
90	Screw - Set gas valve VR8304 compl.	6302-	5928	5928	5928	5928
100	Screw 8x32x11/4 A3T	s. Screw Set Gas valve VR8304				

Table 19 Gas valve VR8304

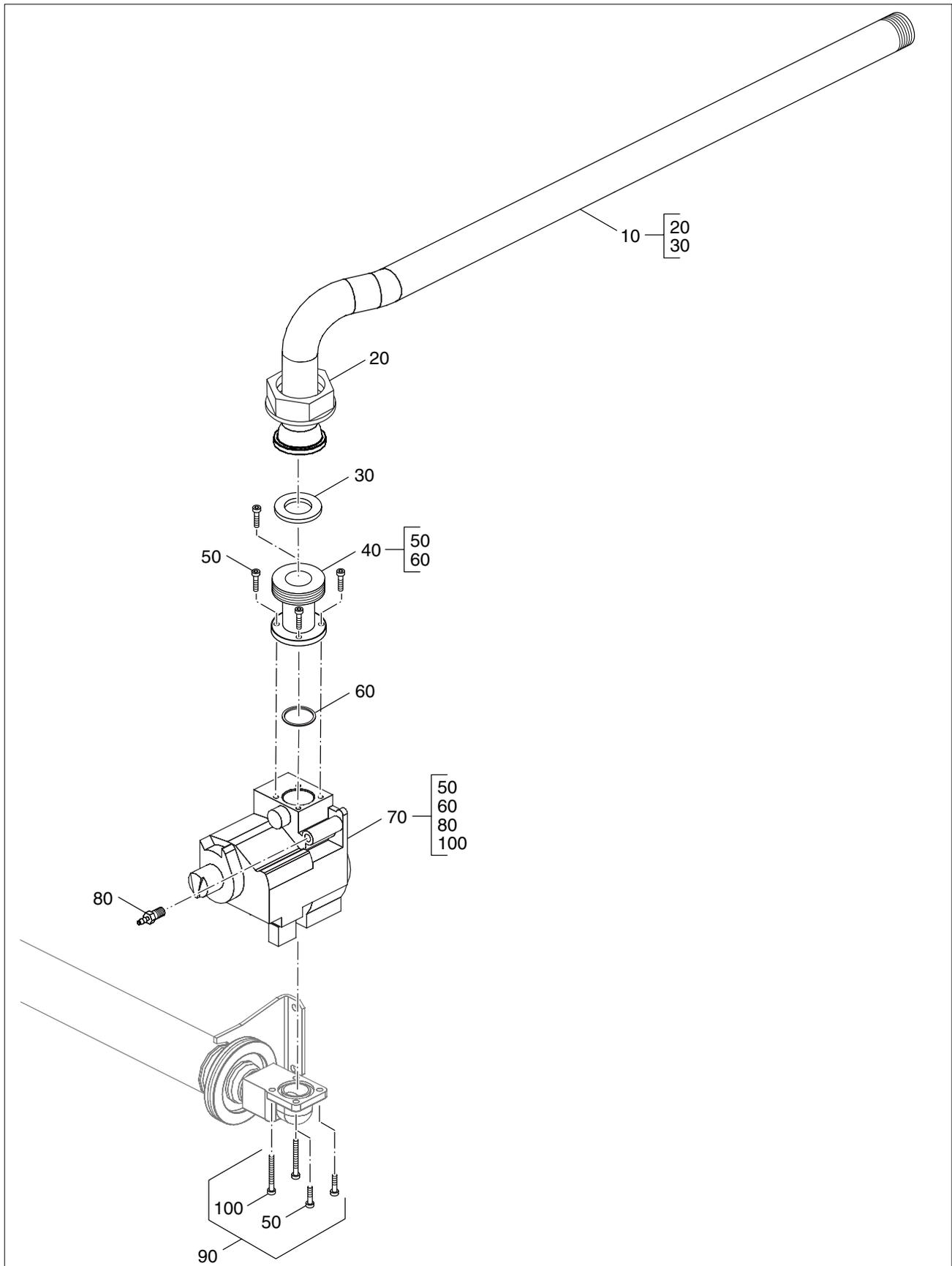


Fig. 45 Gas valve VR8304

**Pilot burner, Pilot gas line (Fig. 46)**

Item No.	Part description	Buderus Part number	Model 37 Quantity	Model 44 Quantity	Model 53 Quantity	Model 62 Quantity
10	Pilot burner Q381 A compl. with pilot orifice, union and screws	6302-	5819	5819	5819	5819
20	Screws DIN7500 CE M5x12 CombiTorx 15 pieces/set	6301-	0217	0217	0217	0217
40	Pilot gas orifice for natural gas 390686-37	6302-	4518	4518	4518	4518
40	Pilot gas orifice for propane gas 390686-61	6302-	6339	6339	6339	6339
50	Pilot burner union D4	0518-	1672	1672	1672	1672
60	Pilot gas line CE244 5/7Gld. compl. "US" with union and grommet	6302-	5817	5817	5818	5818
70	Grommet D68/D60/D48/D22	s. grommet Set CE244				
80	Ignition cable KD7 SD6,3 S6,3x0,8 HF compl. with grommet	6302-	5820	5820	5820	5820
90	Grommet DV 4/9	s. grommet Set CE244				
100	Cable fastener 2,5x92	s. grommet Set CE244				
110	Grommet Set CE244 compl. "US"	6302-	5823	5823	5823	5823

Table 20 Pilot burner, pilot gas line

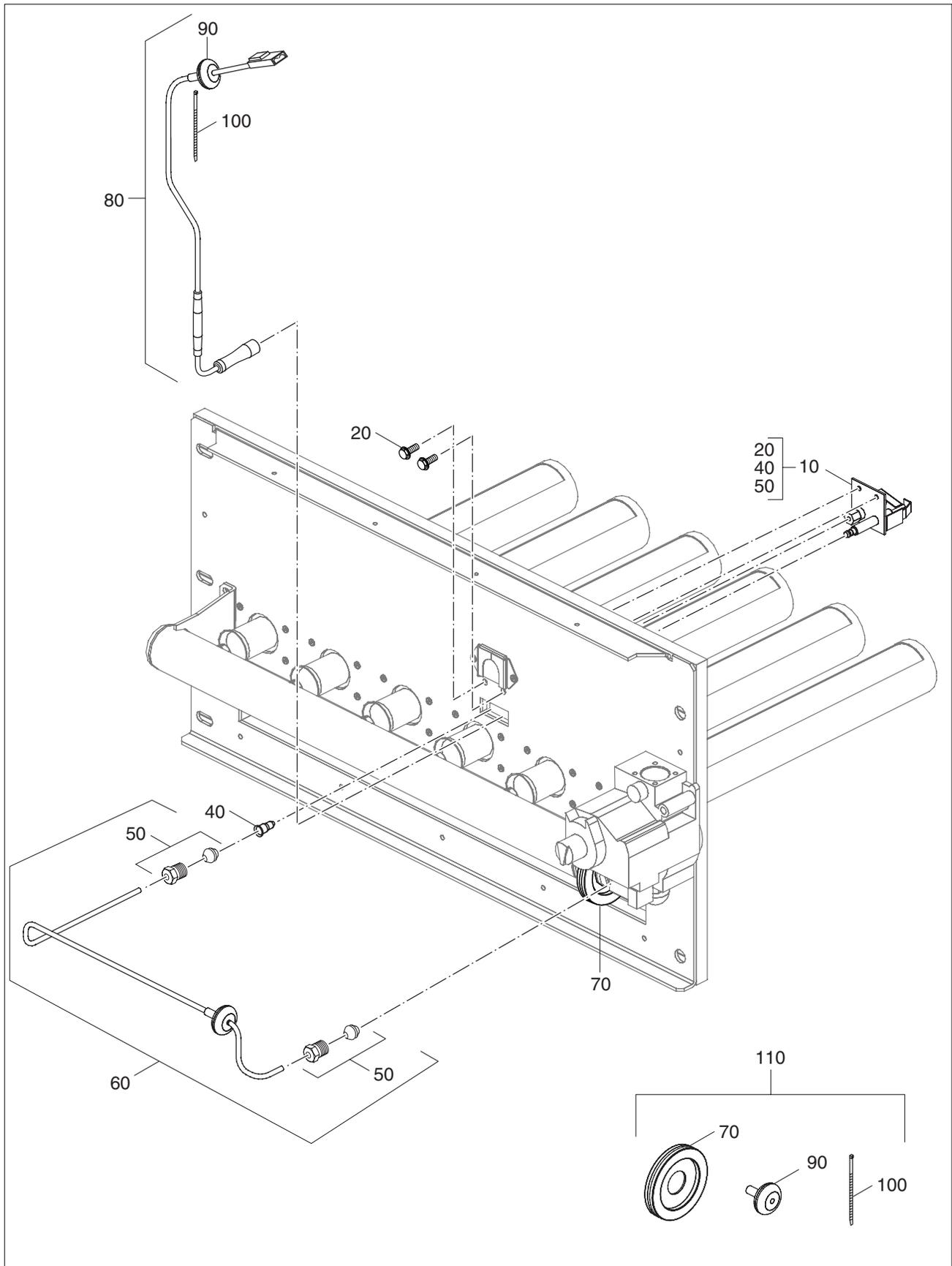


Fig. 46 Pilot burner, pilot gas line

**Burner tray assembly (Fig. 47)**

Item No.	Part description	Buderus Part number	Model 37 Quantity	Model 44 Quantity	Model 53 Quantity	Model 62 Quantity
10	Burner bar assembly CE 244 compl. "US with main orifices for Natural gas (G20) 0-2000FT	6302-	5802	5803	5804	5804
20	Insulation CE244 5 section compl. "US"	6302-	5811	5811	5812	5813
30	Ceramic clue Thermofix Tube 115gr.	0203-	7312	7312	7312	7312
40	Manifold CE244 5 section compl. "US"	6302-	5814	5814	5815	5816
50	Screw 8x32x1/2	s. Screw Set VR8304				
60	Screw 8x32x11/4 A3T	s. Screw Set VR8304				
70	Grommet D68/D60/D48/D22	s. Grommet Set CE244"US"				
80	Screw DIN7500 CE M5x12 CombiTorx 15 pieces/set	6301-	0217	0217	0217	0217
90	Gasket 13x18x1,5mm	0588-	3094	3094	3094	3094
100	Main orifice 3,00 mm SW16 16mm long 4 pieces	0548-				
100	Main orifice 3,25 mm SW16 16mm long 4 pieces	0548-	7620	7620	7620	7620
110	Sight glas Tempax 30x30x3,3mm	0544-	5802	5803	5804	5804

Table 21 Burner tray assembly

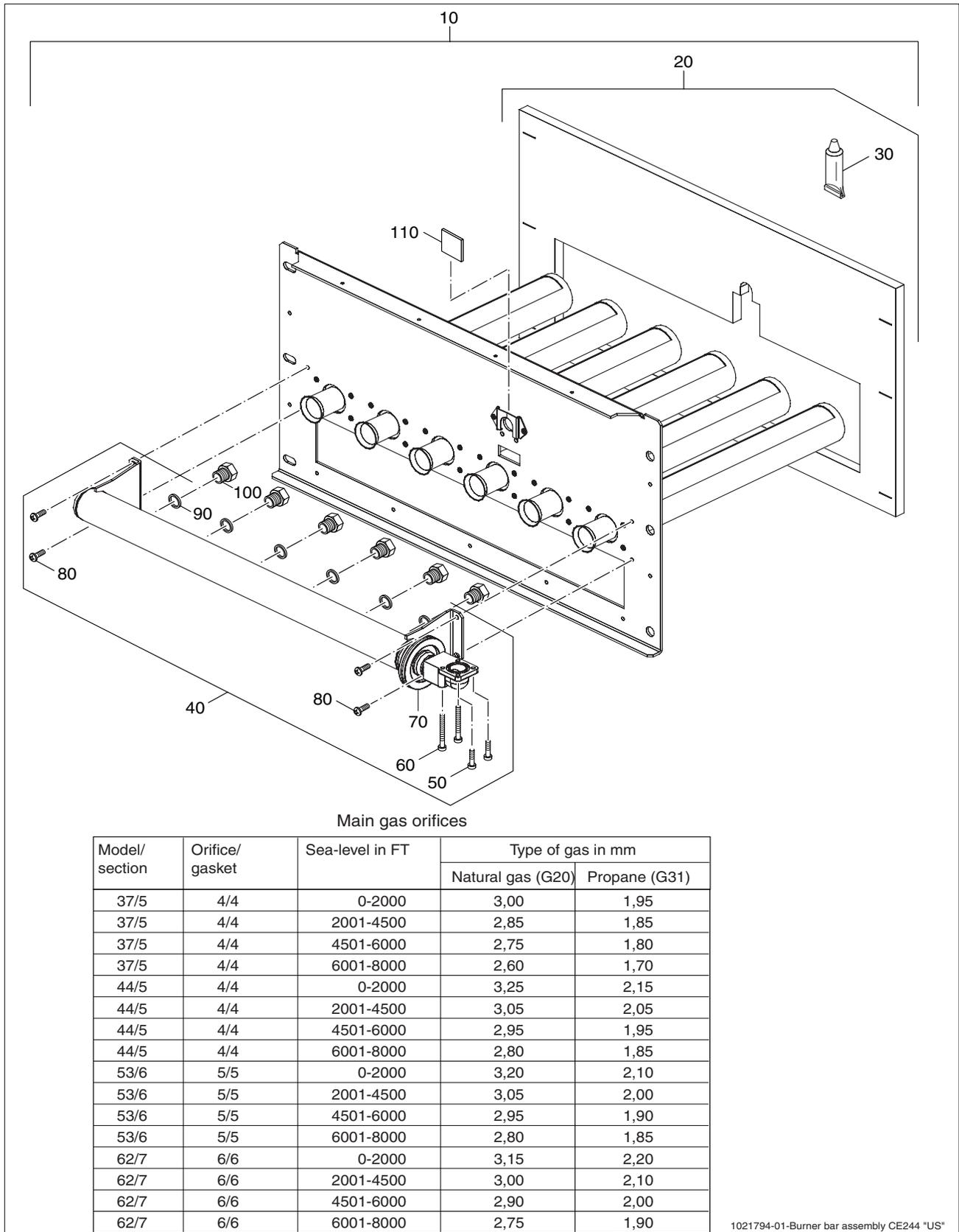


Fig. 47 Burner tray assembly

**NOTICE!**

The boiler is factory set for operation with natural gas at elevations up to 2000 ft.

The boiler must be derated for installations above 2000 ft. The derate is accomplished by changing the main burner orifices. Contact Buderus in this case to obtain the suitable high elevation conversion kit.

**Types of Burners, Conversion Kits (Fig. 48)**

Item. No.	Part description	Buderus Part number	Model 37 Quantity	Model 44 Quantity	Model 53 Quantity	Model 62 Quantity
10	Gas burner CE244 Gr.37/5 G20 compl. "US"	6302-	5798	5799	5800	5801
	Gas conversion kit for propane CE244 G31 0-2000FT "US"	630-	26333	26334	30003	26336
	Gas conversion kit for propane CE244 G31 2001-4500FT "US"	630-	27390	27393	30004	28910
	Gas conversion kit for propane CE244 G31 4501-6000FT "US"	630-	27391	27394	30005	28911
	Gas conversion kit for propane CE244 G31 6001-8000FT "US"	630-	27392	27395	30006	28912
	Gas conversion kit for natural gas CE244 G20 0-2000FT "US"	630-	25921	27396	29999	28913
	Gas conversion kit for natural gas CE244 G20 2001-4500FT "US"	630-	25922	27397	30000	28914
	Gas conversion kit for natural gas CE244 G20 4501-6000FT "US"	630-	25923	27398	30001	28915
	Gas conversion kit for natural gas CE244 G20 6001-8000FT "US"	630-	25924	27399	30002	28916

Table 22 Types of burners, Gas conversion kits

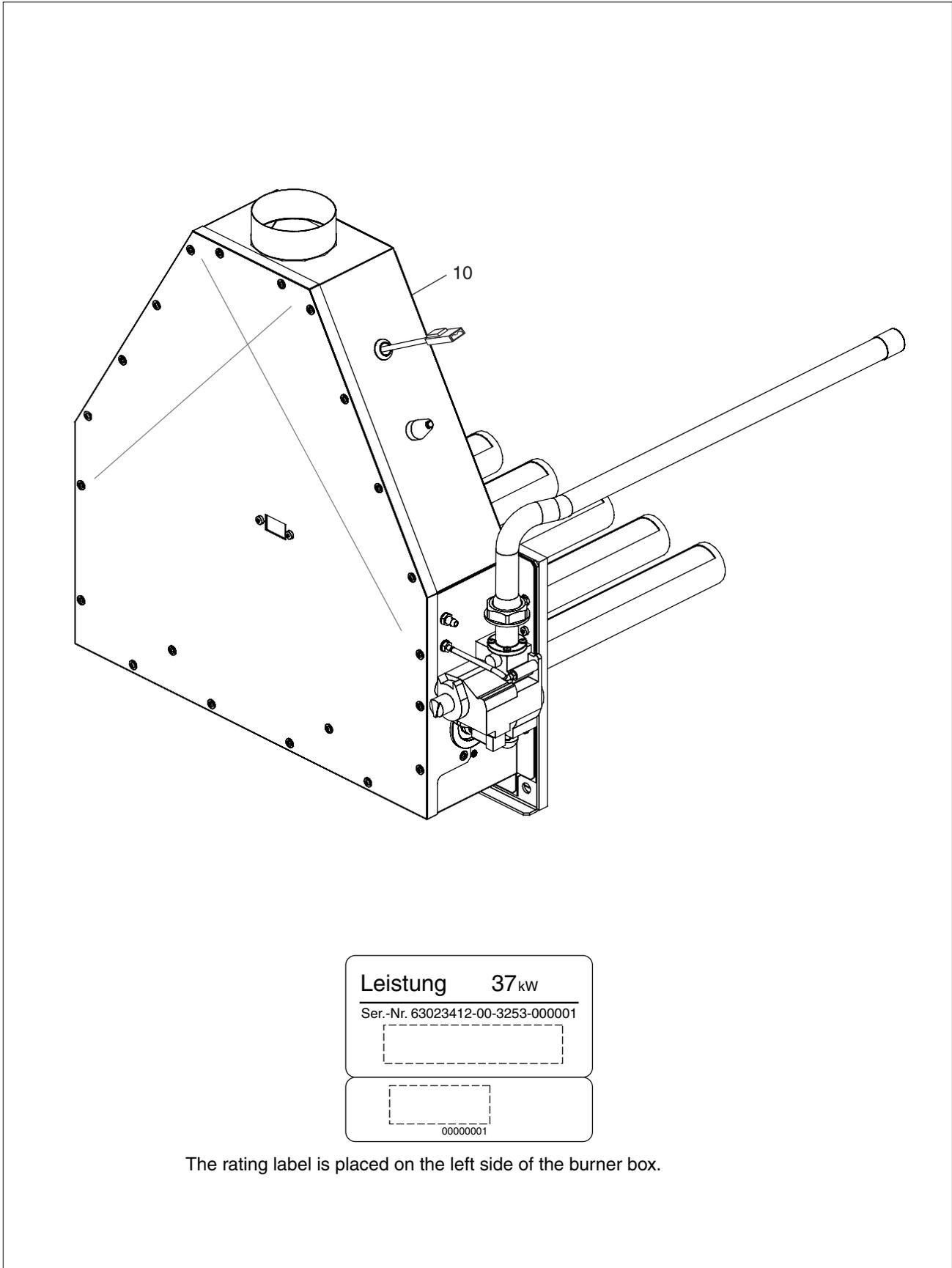


Fig. 48 Burner tray assembly, Gas conversion kits

## 14 Orifice Tables for High Elevations and Propane

Orifice Table for Natural Gas and High Elevations

Orifice Sizes for Natural Gas and High Altitude		
Model	0 – 8500'	8501'–12000'
GA244-37	3.00	2.95
GA244-44	3.25	3.20
GA244-53	3.20	3.15
GA244-62	3.15	3.10

Table 23 Main orifice sizes and high elevations for natural gas

Orifice Table for Propane Gas and High Elevations

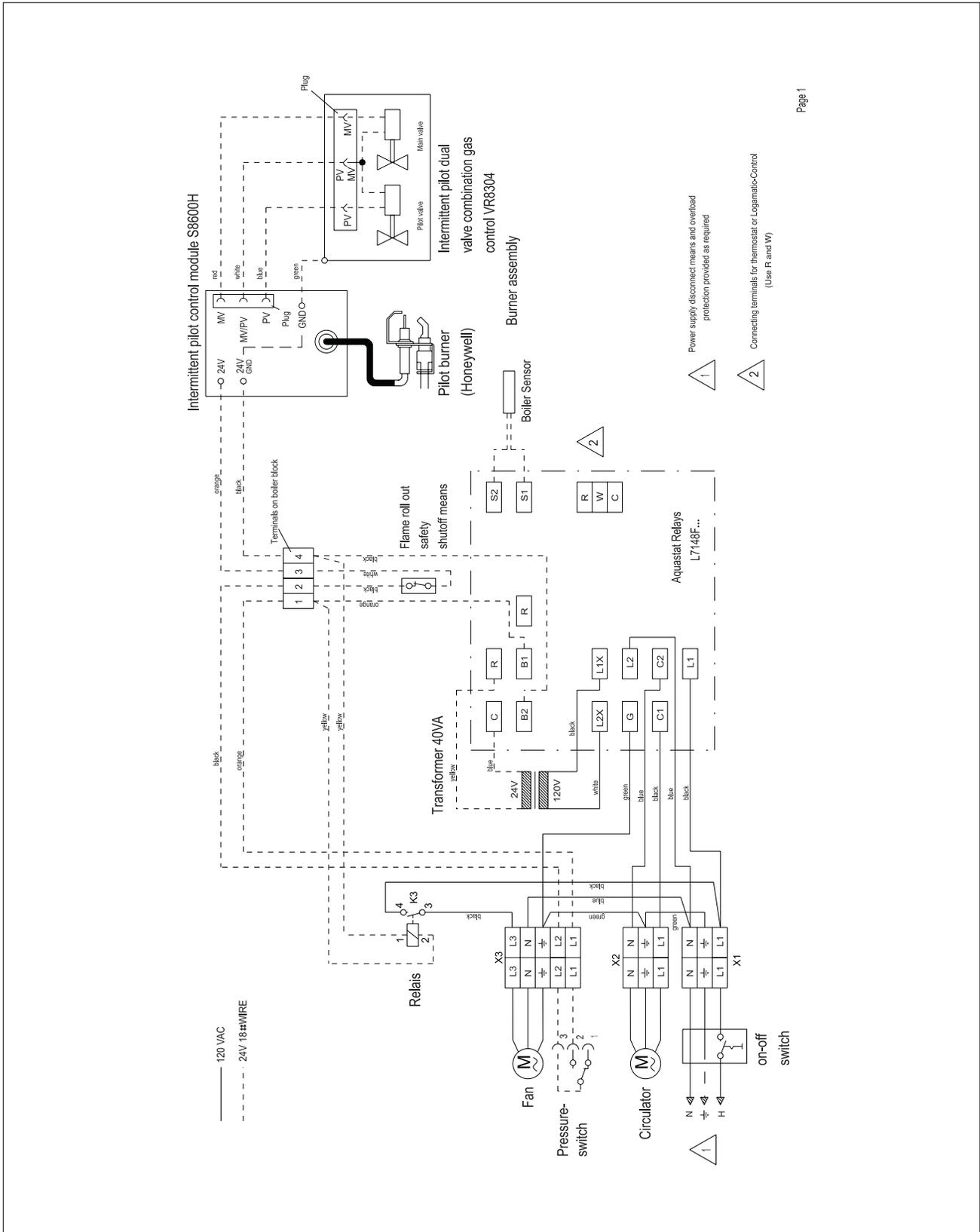
Orifice Sizes for Propane Conversion and High Altitude		
Model	0 – 8500'	8501'–12000'
GA244-37	1.95	1.90
GA244-44	2.15	2.10
GA244-53	2.10	2.05
GA244-62	2.20	2.15

Table 24 Main orifice sizes and high elevations for propane gas

### Spare part numbers for orifices

Part description	Buderus Part number	Remark	Part description	Buderus Part number	Remark
Main orifice 1,90 mm	63030022	Vtolerance 2% SW16 Length 16 mm	Main orifice 2,95mm	63029404	Vtolerance 2% SW16 Length 16 mm
Main orifice 1,95 mm	63029146		Main orifice 3,00mm	63029145	
Main orifice 2,05mm	63029401		Main orifice 3,10mm	63034472	
Main orifice 2,10 mm	63030024		Main orifice 3,15 mm	63029406	
Main orifice 2,15 mm	63029402		Main orifice 3,20 mm	63029188	
Main orifice 2,20 mm	63030241		Main orifice 3,25 mm	63029147	

15 Wiring diagrams



Page 1

Fig. 49 Wiring diagram– GA244 model

Wiring Schematic GA244

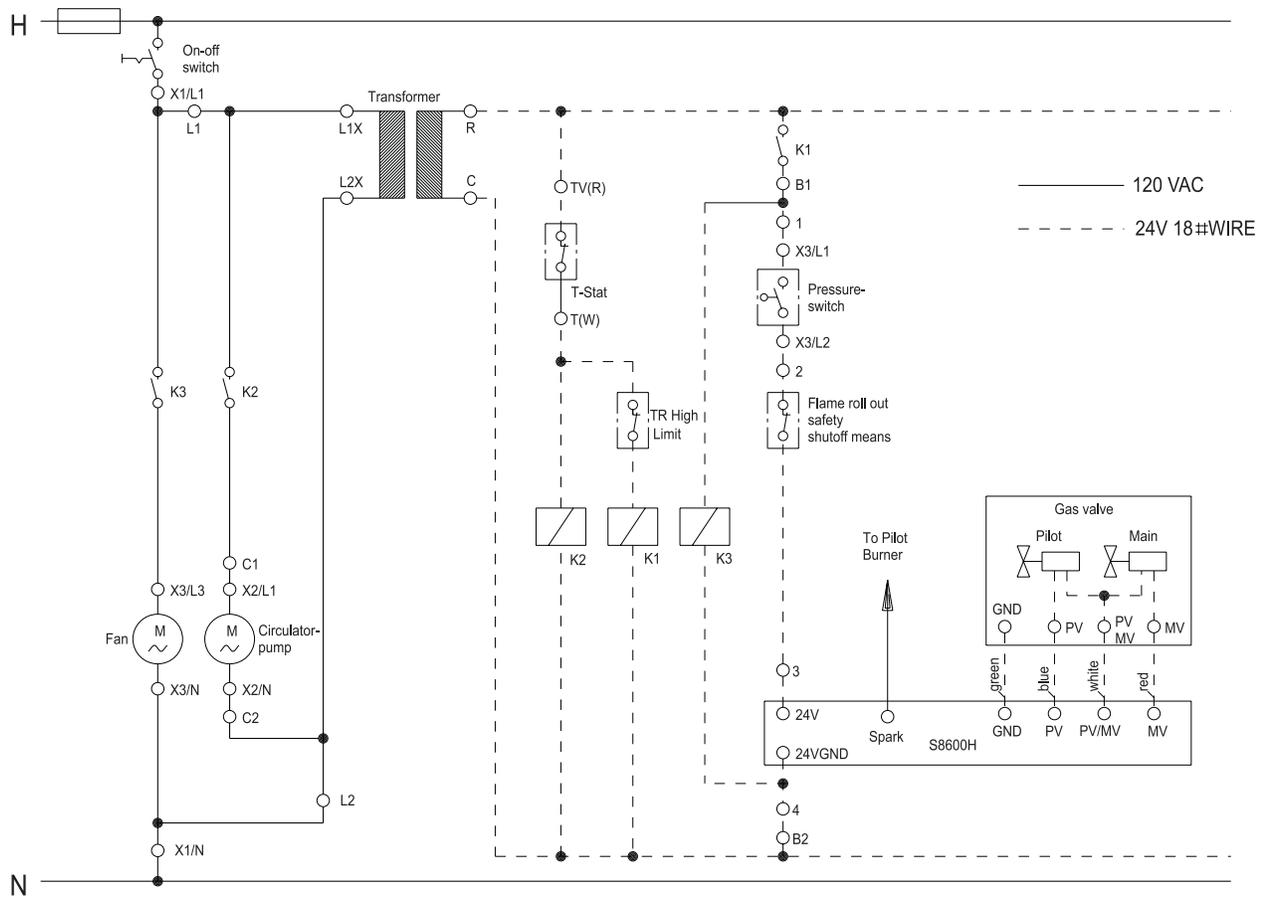


Fig. 50 Wiring diagram– GA244 model

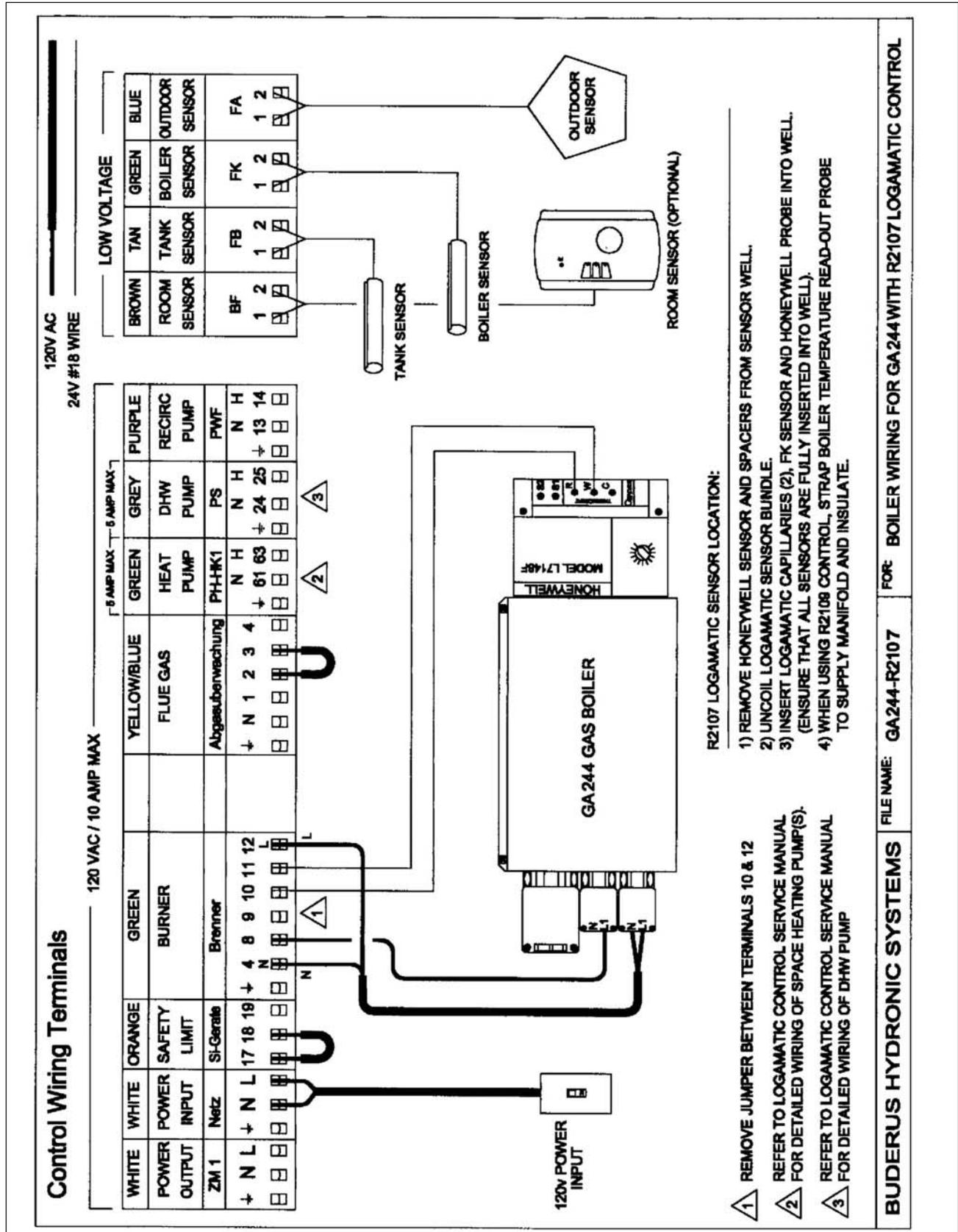


Fig. 51 Wiring diagram – GA244 with control panel Logamatic 2107 or Logamatic 2109

Heating Contractor:

PRODUCTS MANUFACTURED BY

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due to continuing engineering and technological advances.*