

Commissioning and maintenance instructions

Logano GE434
Gas-fired special boiler



Buderus



This product meets all fundamental requirements of applicable European Directives:

Its conformity has been verified. All associated documents and the original Declaration of Conformity are available from the manufacturer.

About these instructions

This manual lists the gas types applicable to each country, which only apply to those countries.



PLEASE NOTE

Observe all standards and guidelines applicable to the operation of this system in your country.

These installation and maintenance instructions contain important information for the safe and appropriate initial start-up and maintenance of the Logano GE434 gas-fired special boiler.

These installation and maintenance instructions are designed for specialists, who, due to their vocational training and experience, are knowledgeable in handling heating systems and gas installations.

This document also refers to accessories which may be used in conjunction with the boiler installation. Observe the appropriate installation instructions when installing such accessories.

For information about the standard delivery, handling, installation and electrical connection see the boiler installation instructions.

Subject to technical modifications.

Constant development may lead to minor deviations in the illustrations, functional steps and specifications from those described/shown.

Updating your documentation

Please let us know if you have any suggestions which would improve our documentation or if you have noticed any errors.

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1 General



PLEASE NOTE

Observe all standards and guidelines applicable to the operation of this system in your country.

Please note the details on the boiler type plate. These are decisive and must be observed.

Observe Chapter 12 "Boiler operating conditions for countries outside the EU" on page 61, if the boiler is used in countries outside the European Union.

Operating conditions	Dimension		Notes - More detailed requirements
Maximum flow temperature T_{\max}/TS	°C	100 - 120	The maximum permissible flow temperature may, in compliance with national regulations, be limited to a value within this range. Safety limit (high limit safety cut-out). Max. possible flow temperature = safety limit (STB) - 18 K Example: Safety limit (STB) = 100 °C Flow temperature = 100 °C - 18 K = 82 °C.
Permissible operating pressure PMS:	bar	max. 6	
Maximum time constant High limit safety cut-out:	s	max. 40	
Maximum time constant Control thermostat	s	max. 40	
Type	-	-	B ₁₁ , B ₁₁ BS

Tab. 1 Boiler operating conditions

Gas categories in countries subject to EN 437 (countries of the EU)

For country-specific details see the relevant national regulations.

Country	Gas category	Supply pressure in mbar
DK, FI, IT, SE	I _{2H}	20
BE	I _{2E(R)B}	20; 25
DE	II _{2ELL3P}	20; 50
AT, CH	II _{2H3P}	20; 50
CZ	II _{2H3P}	18; 37
ES, GB, IT, PT	II _{2H3P}	20; 37
GR	II _{2H3B/P}	20; 50
FR	II _{2Esi3P}	20; 25, 37
LU	II _{2E3B/P}	20; 50
HU	II _{2HS3P}	25; 50
NL	II _{2L3P}	25; 50

Tab. 2 Gas categories acc. to EN 437 (countries of the EU)

Gas categories in countries outside the sphere of EN 437 (countries outside the EU)

For countries outside the European Union observe the details in Chapter 12 "Boiler operating conditions for countries outside the EU", page 61.

Country	Gas category	Supply pressure in mbar
BR, EE	I _{2H}	20
BY, CN, HR, RO, RU, SI, TR, UA	II _{2H3P}	20; 50
SK, TR	II _{2H3P}	20; 37
BA, BG, HR, TR	II _{2H3B/P}	20; 50
PL	GZ 50, propane	20; 36

Tab. 3 Gas categories in countries outside the European Union

List of countries

Country abbreviation	Country
AT	Austria
BA	Bosnia-Herzegovina
BE	Belgium
BG	Bulgaria
BR	Brasil
BY	Belarus
CH	Switzerland
CN	China
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
ES	Spain
FI	Finland
FR	France
GB	Great Britain
GR	Greece
HR	Croatia
HU	Hungary
IE	Ireland
IT	Italy
LU	Luxembourg
NL	Netherlands
PL	Poland
PT	Portugal
RO	Rumania
RU	Russia
SE	Sweden
SI	Slovenia
SK	Slovakia
TR	Turkey
UA	Ukraine

Tab. 4 List of countries

2 Safety

For your own safety, observe these safety instructions.

2.1 Correct use

The Logano plus GE434 gas-fired special boiler is designed for generating heating water and DHW, for example, the central heating of detached homes or apartment buildings.

This boiler may be equipped with the Logomatic 4000 control system.

Design and operation of the Logano GE434 atmospheric gas-fired special boiler comply with the general requirements of the Gas Equipment Directive 90/396/EWC, taking EN 656 into account. The requirements of the Efficiency Directive 92/42/EWC (low temperature boilers) are met.

2.2 Notes structure

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



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.

Further symbols identifying dangers and user notes:



WARNING!

RISK TO LIFE

from risk of electric shock.



PLEASE NOTE

User tip for the optimum utilisation and setting of the control(s) plus useful information.

2.3 Please observe these notes

Observe the following during installation and operation:

- Local Building Regulations concerning boiler room installations.
- Local Building Regulations regarding air supply and extract equipment as well as connection to a chimney.
- Regulations for the electrical connection to the mains power supply.
- The technical rules of the gas supply company regarding the connection of a gas burner to the mains gas supply.
- Regulations and standards regarding safety equipment of water-filled heating systems.
- Installation instructions for heating engineers.

The following applies to Poland (PL):

In accordance with the Polish standard PN-91/B-0214, section 2.5, boilers > 100 kW must be equipped with a low water indicator (in the heating flow). Install the low water indicator on-site between the boiler connection and the first shut-off valve.



PLEASE NOTE

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



WARNING!

RISK TO LIFE

through the explosion of volatile gases. There is a risk of explosion if you can smell gas.

- Keep naked flames away. Do not smoke.
Do not use lighters.
- Avoid sparks!
Do not operate electrical switches, including telephone, plugs or doorbells.
- Close the main gas shut-off valve.
- Open windows and doors.
- Warn all occupants, but do not use doorbells.
- Call your gas supplier from outside the building!
- If you hear gas escaping, immediately leave the building, prevent others from entering and notify the police and fire brigade from outside the building.



WARNING!

RISK TO LIFE

through the explosion of volatile gases.

- Work on gas components must only be carried out by qualified and authorised personnel.



WARNING!

RISK TO LIFE

from electric shock when the control device is open.

- Before you open the control device: Isolate the heating system from the mains power supply using the heating system emergency stop switch or by extracting the mains fuse.
- Safeguard the heating system against unintentional re-connection.

Air supply and flue pipe in the boiler room**WARNING!****RISK TO LIFE**

through poisoning.
Insufficient ventilation can lead to dangerous flue gas leaks.

- Never close air ducts and vent apertures or reduce their size.
- The boiler must not be operated, unless you immediately remedy the fault.
- Inform the system user, in writing of the fault and associated danger.

**WARNING!****RISK OF FIRE**

through flammable material or liquids.

- Never store flammable materials or liquids in the immediate vicinity of the boiler.

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

through toxic flue gases

- Ensure that, during the burner operation, there is no mechanical air handling equipment inside the boiler room, which might withdraw combustion air from the boiler room, e.g. cooker hoods, dryers, ventilation equipment.

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

through toxic flue gases.

- Only operate these boilers with a chimney or flue gas system, which supplies the stated draught during operation.

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

through frost.

The heating system can freeze up, if the control device has been switched off.

- Protect your heating system against frost damage, where temperatures below zero are expected.
- With the control device switched OFF, drain the water from the boiler, the DHW cylinder and the pipework of the heating system and, as far as possible, from the drinking water pipes.

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

through poisoning.

Unauthorised access to the flue gas monitoring can cause a risk to life through escaping flue gas.

- Never repair the flue gas monitoring system.
- Only use original spare parts as replacements.
- After the replacement, fit the sensor into its appropriate position.

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

through toxic flue gases.
The chimney function or the flue pipe may be faulty, if the flue gas monitor trips frequently.

- Repair the fault and carry out a function test, if the flue gas monitor trips frequently.

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

through toxic flue gases.

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

2.4 Tools, materials and accessories

For the installation and maintenance of the boiler, you require standard tools, as used in central heating as well as gas and water installations.

The following may also prove useful:

- sack trolley with strap

2.5 Disposal

- Dispose of the boiler packaging in an environmentally responsible manner.
- Dispose of all boiler components (e.g. boiler or control device) which must be replaced, via an authorised disposal site.

3 Product description

The Logano GE434 (Fig. 1) boiler comprises a r.h. and a l.h. boiler block, each of which is equipped with a separate gas burner.

The main components of this boiler are:

- Boiler blocks (Fig. 1, **Item 5**) and gas burner (Fig. 1, **Item 1**).
The boiler blocks transfer the heat generated by the burners to the heating water.
- Boiler casing (Fig. 1, **Item 2**) and thermal insulation (Fig. 1, **Item 5**).
The boiler casing and thermal insulation prevent energy loss.
- Control device (Fig. 1, **Item 3**), auxiliary control device and two burner control units (one burner control unit for each burner).
The control device and the burner control unit monitor and control all electrical boiler components.

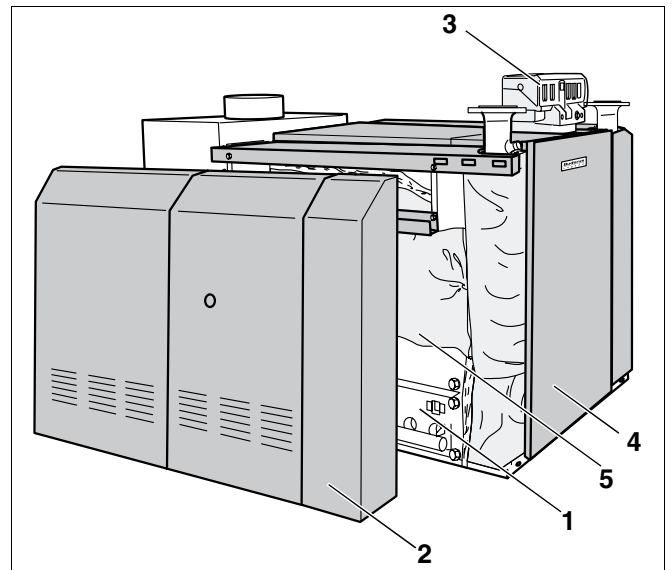


Fig. 1 Logano GE434

Item 1: R.h. gas burner

Item 2: Boiler casing

Item 3: Control panel

Item 4: Boiler front panel

Item 5: R.h. boiler block with thermal insulation

4 Specification

Specification - Logano GE434 gas-fired special boiler												
Boiler size		kW	150	175	200	225	250	275	300	325	350	375
Boiler sections		Number	2 x 7	2 x 8	2 x 9	2 x 10	2 x 11	2 x 12	2 x 13	2 x 14	2 x 15	2 x 16
Rated output	Partial load	kW	75.0	87.5	100.0	112.5	125.0	137.5	150.0	162.5	175.0	187.5
	Full load	kW	150.0	175.0	200.0	225.0	250.0	275.0	300.0	325.0	350.0	375.0 ¹
Combustion output	Partial load	kW	81.0	94.5	108.0	121.5	134.5	148.0	161.5	175.0	188.5	202.0
	Full load	kW	162.0	189.0	216.0	243.0	269.0	296.0	323.0	350.0	377.0	404.0 ²
Flue gas temperature 3	Partial load	°C	84	72	75	78	76	76	77	91	81	84
	Full load	°C	116	104	110	117	103	109	113	116	121	124
Flue gas mass flow rate	Partial load	kg/s	0.0798	0.1187	0.1146	0.1197	0.1510	0.1612	0.1671	0.1958	0.2053	0.2090
	Full load	kg/s	0.0925	0.1382	0.1393	0.1405	0.1903	0.1938	0.1997	0.2398	0.2432	0.2497
CO ₂ content	Partial load	%	4.0	3.1	3.7	4.0	3.5	3.6	3.8	3.5	3.6	3.8
	Full load	%	7.2	5.5	6.3	7.1	5.7	6.2	6.6	5.9	6.3	6.6
Draught		Pa	3									
CE designation, boiler			CE-0085 AS 0285									

Tab. 5 Specification

1 Alternative for Spain (ES): 370 kW (rated output)

2 Alternative for Spain (ES): 399 kW (combustion output)

3 Acc. to DIN EN 656. The minimum flue gas temperature for the chimney calculation acc. to DIN 4705 is approx. 6 K lower.

Boiler size	Main gas nozzle designation				Rated gas nozzle pressure ¹
	Natural gas	Natural gas	LPG Propane P (G31)	LPG B/P (G30)	
kW	H (G20)	L (G25)			Natural gas H (G20) mbar
150 - 375	295	340	190	180	14

Tab. 6 Main gas nozzle and rated gas nozzle pressure

1 Relative to 15 °C gas temperature and 1013 mbar air pressure

Boiler size	Nozzle pressure										
	LPG Propane P (G 31)										
kW	Supply pressure (Flow pressure)										
	58 - 37	36	35	34	33	32	31	30	29	28	27
	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar
150 - 375	35	34	33	32	31	30	29	28	27	26	25

Tab. 7 Nozzle pressure for LPG P subject to the supply pressure

Boiler size	Nozzle pressure										
	LPG Butane/propane mixtures B/P (G 30)										
kW	Supply pressure (Flow pressure)										
	58 - 37	36	35	34	33	32	31	30	29	28	27
	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar
150 - 375	31.5	31.5	31.5	31.5	31	30	29	28	27	26	25

Tab. 8 Nozzle pressure for LPG B/P subject to the supply pressure

Boiler size	Gas throughput			
	Natural gas H (G20)	Natural gas L (G25)	LPG Propane (G31)	LPG B/P (G30)
kW	m³/h	m³/h	kg/h	kg/h
150	16.2	18.9	12.6	12.8
175	19.0	22.0	14.7	14.9
200	21.7	25.2	16.8	17.0
225	24.4	28.3	18.9	19.2
250	27.0	31.4	20.9	21.2
275	29.7	34.5	23.0	23.3
300	32.4	37.7	25.1	25.5
325	35.1	40.8	27.2	27.6
350	37.8	44.0	29.3	29.7
375	40.5	47.1	31.4	31.9

Tab. 9 Gas throughput

5 Boiler connection

This chapter details how you connect your boiler properly

- on the flue gas side
- on the water side (heating water and DHW)
- on the gas side
- to the electrical mains supply.

5.1 Notes regarding the flue pipe connection and flue gas monitoring

5.1.1 Flue gas connection

Observe the following during the installation of the flue gas connection:

- The flue pipe cross-section must comply with all current regulations.
- Select the shortest possible flue pipe run.
- Route flue pipes inclined to the chimney.
- Never fit thermostatically controlled flue gas dampers into flue pipes.

5.1.2 Flue gas monitor

Check, whether because of the building utilisation or regional/national regulations, flue gas monitoring equipment is required.

- If necessary, install such equipment in accordance with current regulations.

Type B₁₁ (excl. flue gas monitoring)

Only install boilers without flue gas monitoring equipment in rooms, which are not part of the living accommodation of the building and which are provided with ventilation in accordance with current regulations, e.g. boiler rooms.

Type B_{11BS} (incl. flue gas monitoring)

Flue gas monitoring equipment may be required in accordance with regional or national regulations or laws, e.g. when boilers are operated in living accommodation, similar utility rooms or in an attic installation.

The flue gas monitor interrupts the gas supply, should flue gas enter the boiler room. The burner will then be switched OFF.



WARNING!

RISK TO LIFE

through poisoning.

Unauthorised access to the flue gas monitoring can cause a risk to life through escaping flue gas.

- Never repair the flue gas monitoring system.
- Only use original spare parts as replacements.
- After the replacement, fit the flue gas temperature sensor into its appropriate position.



WARNING!

RISK TO LIFE

through poisoning.

Insufficient ventilation can lead to dangerous flue gas leaks.

- Never close or obstruct air ducts and vent apertures or reduce their size.
- The boiler must not be operated, unless you immediately remedy the fault.
- Inform the system user in writing of the fault and its associated dangers.

5.2 Notes for the connection of the boiler to the pipework

Please observe the following note regarding the boiler connection to the pipework. These notes are important for fault-free operation.



SYSTEM DAMAGE

through leaking connections.

CAUTION!

- Connect the pipes without stress to the boiler connections.



PLEASE NOTE

To prevent boiler contamination through the water system, we strongly recommend the on-site installation of a dirt trap.

5.2.1 Heating return

- Connect the heating system return stress-free to the boiler return = RK (Fig. 2, **Item 3**).

5.2.2 Heating flow

- Connect the heating system flow stress-free to the boiler flow = VK (Fig. 2, **Item 2**).

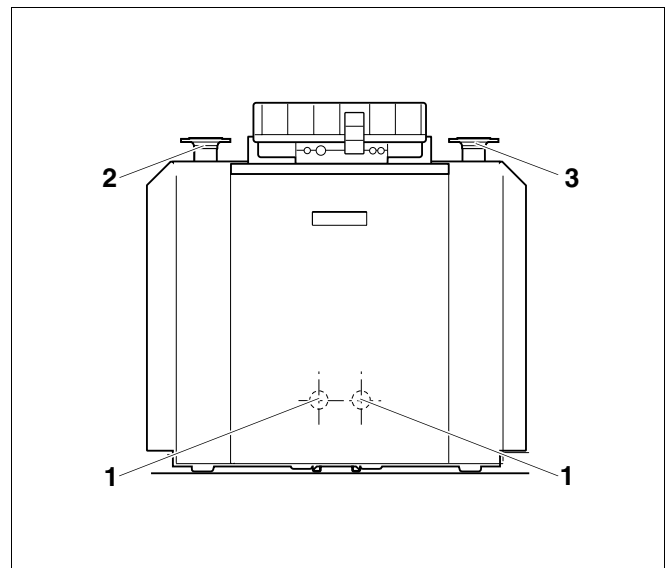


Fig. 2 Water connections

Item 1: Fill and drain connection = EL

Item 2: Boiler flow = VK

Item 3: Boiler return = RK

5.3 Filling the boiler and checking connections for leaks

Before commissioning, check the heating system for leaks to avoid leaks occurring during operation.



CAUTION!

SYSTEM DAMAGE

through overpressure during leak testing. Pressure, control and safety equipment may be damaged through excessive pressure.

- Ensure that, when you carry out a leak test, no pressure, control or safety equipment is fitted, which cannot be shut off towards the boiler water space.



CAUTION!

SYSTEM DAMAGE

through temperature stresses.

- Only fill the system when cold (the flow temperature should be a maximum of 40 °C).
- Fill the heating system via the on-site boiler fill and drain valve in the heating return with fill water.
- Vent the heating system during filling.
- Check all connections for leaks.

5.4 Gas pipe connection

Make the gas connection in accordance with all locally applicable regulations.

- Install the gas shut-off valve into the gas supply pipe.
- Connect the gas pipe without stress to the gas connector (Fig. 3, **Item 1**).



PLEASE NOTE

Buderus recommends the installation (in accordance with local regulations) of a gas filter into the gas supply pipe.

5.5 Electrical connection

For details about the electrical mains supply see the boiler installation instructions, chapter 7 "Installing control devices".

Boiler size kW	Gas connection
150 - 225	2 x Rp 3/4"
(225) 250 - 375	2 x Rp 1 1/4"

Tab. 10 Gas connection

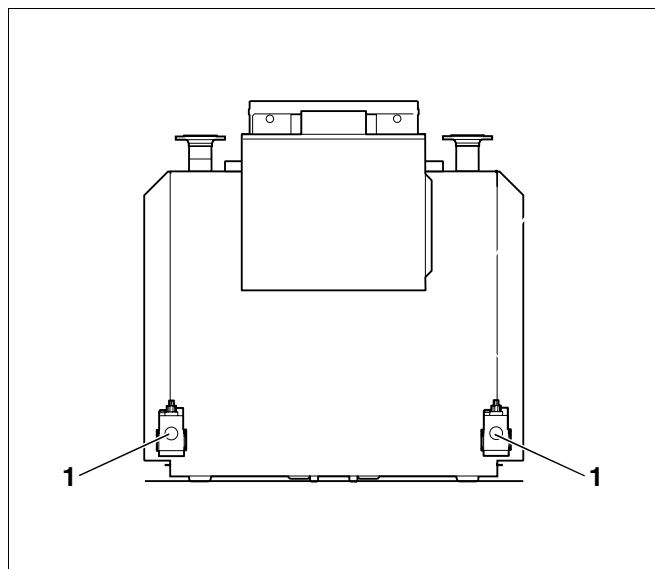


Fig. 3 Making the gas connection (viewed from the back)

Item 1: Gas connection (l.h. and r.h. gas burner)

6 Heating system start-up

This chapter details how to properly commission the heating system.



CAUTION!

BOILER DAMAGE

through excessive dust and airborne seed.

- Do not operate the boiler where heavy dust contamination persists, e.g. through building work inside the boiler room.
- Ensure that incoming combustion air is not contaminated with excessive dust from dirt roads and paths or through dusty production or processing installations, e.g. quarries, mines, etc.
- Ensure that incoming combustion air is not contaminated with excessive airborne seed from composite blossom. Where necessary, prevent such contamination through the use of air filters.



CAUTION!

BOILER DAMAGE

through contaminated combustion air.

- Ensure adequate air supply.
- Ensure that chlorinated cleaning agents or halogenated hydrocarbons (as, for example, contained in spray cans, solvents or cleaning agents, paints and adhesives) are not used or stored in the boiler room.
- Clean burners contaminated through building work before commissioning the heating system (see Chapter 8.2 "Preparing the boiler for cleaning", page 35 and following).



WARNING!

RISK TO LIFE

through toxic flue gases

- Ensure that, during the burner operation, there is no mechanical air handling equipment inside the boiler room, which might withdraw combustion air from the boiler room, e.g. cooker hoods, dryers, ventilation equipment.



PLEASE NOTE

To reach components which are vital for commissioning, the central and rear side panels and the front panel must be removed.

The bottom of the central and rear side panels are secured with screws.

6.1 Commissioning

Please complete the commissioning report on page 33 after completing the work described in the following.

6.1.1 Recording gas characteristics

Ask your gas supplier for the gas characteristics (Wobbe index and calorific value).

6.1.2 Making the heating system operational

Carry out the following steps to prepare the heating system for operation:

- Set the red needle (Fig. 4, **Item 1**) of the heating system pressure gauge to the required minimum pressure of 1 bar.
- Check the heating system water pressure (see Chapter 8.6 "Checking and correcting the heating system water pressure", page 42).



PLEASE NOTE

Slowly fill in water, if you have noticed water losses.

6.1.3 Checking all gas pipes for leaks

Check the gas supply pipe for leaks before commissioning the heating system, and confirm this step in the commissioning report.



WARNING!

RISK TO LIFE

through the explosion of volatile gases. Leaks may have been created on pipes and fittings following the commissioning and maintenance work.

- Carry out a proper leak test.
- Only use approved leak test agents to discover leaks.

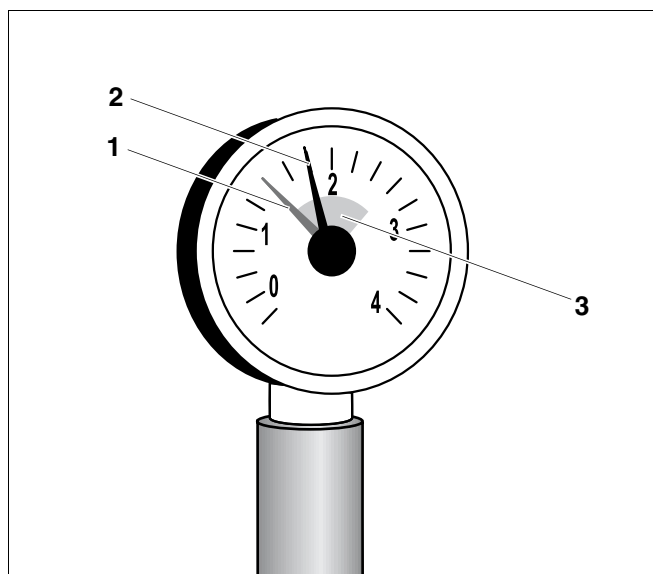


Fig. 4 Pressure gauge for sealed heating systems

Item 1: Red needle

Item 2: Pressure gauge needle

Item 3: Green field



SYSTEM DAMAGE

through short circuits.

CAUTION!

- Cover areas at risk before searching for leaks.
- Never apply leak detector spray to cableways, plugs or electrical leads. Never let any spray drop down onto such areas.
- If necessary, disconnect your heating system from the mains electricity supply.
- Check the new pipe section, incl. the immediate seal at the gas train for external leaks. The test pressure on the gas train inlet must be no higher than 150 mbar.

6.1.4 Purging the gas supply pipe

Carry out the following steps on the l.h. and the r.h. gas burner.

- Release the plug on the test port for gas supply pressure and venting (Fig. 5, **Item 1**) on the gas train by two turns, and connect the hose.
- Slowly open the mains gas shut-off valve.
- Purge the gas supply pipe.

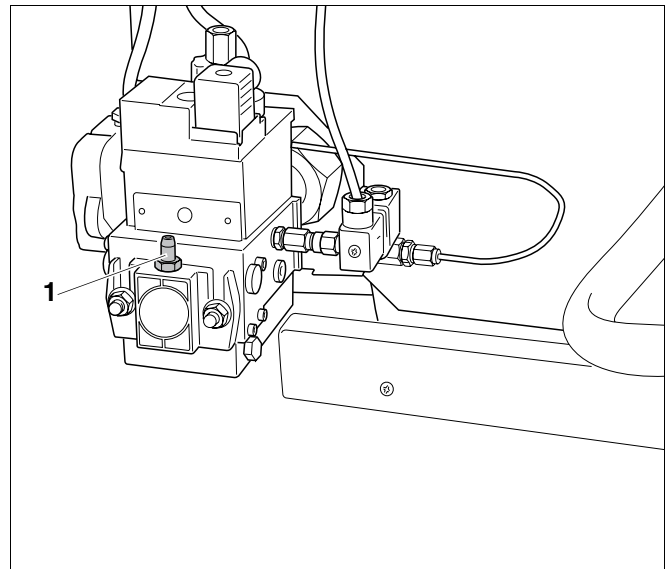


Fig. 5 Purging the gas supply pipe

Item 1: Test port for gas supply pressure and venting

6.1.5 Checking the air supply/ventilation and flue pipe connections

- Check, whether the ventilation and extract apertures comply with local regulations or those stipulated by your local gas supply company.



WARNING!

RISK TO LIFE

through poisoning.
Insufficient ventilation can lead to dangerous flue gas leaks.

- Never close air ducts and vent apertures or reduce their size.
 - The boiler must not be operated, unless you immediately remedy the fault.
 - Inform the system user, in writing of the fault and associated danger.
- Check, whether the flue gas connection complies with all current regulations (see Chapter 5.1.1 "Flue gas connection", page 14).



PLEASE NOTE

Ensure that any faults are immediately repaired.

6.1.6 Checking the system equipment

The burner is factory-set for natural gas H (Table 11).

Country	Gas type	Factory settings
AT, BA, BE, BG, BR, BY, CH, CN, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IT, LU, PL, PT, RO, RU, SE, SI, SK, TR, UA	Natural gas H (G20) GZ 50	Factory-set ready for use. The pressure regulator is adjusted and sealed. Wobbe index for 15 °C, 1013 mbar: Adjusted to 14.1 kWh/m ³ Applicable for 11.4 to 15.2 kWh/m ³ Wobbe index for 0 °C, 1013 mbar: Adjusted to 14.9 kWh/m ³ Applicable for 12.0 to 16.1 kWh/m ³
DE, NL	Natural gas L (G25)	After conversion (see Chapter 9 "Converting the boiler to a different gas type", page 48) suitable for natural gas L. Wobbe index for 15 °C, 1013 mbar: Adjusted to 11.5 kWh/m ³ Applicable for 9.5 to 12.4 kWh/m ³ Wobbe index for 0 °C, 1013 mbar: Adjusted to 12.2 kWh/m ³ Applicable for 10.0 to 13.1 kWh/m ³
HU	Natural gas S (G25.1)	After conversion (see Chapter 9 "Converting the boiler to a different gas type", page 48) suitable for natural gas S. Wobbe index for 15 °C, 1013 mbar: Adjusted to 10.9 kWh/m ³ Applicable for 10.1 to 11.6 kWh/m ³ Wobbe index for 0 °C, 1013 mbar: Adjusted to 11.5 kWh/m ³ Applicable for 10.7 to 12.2 kWh/m ³
AT, BY, CH, CN, CZ, DE, ES, FR, GB, HU, HR, IE, LU, NL, PL, PT, RO, RU, SI, SK, TR, UA	LPG Propane P (G31)	After conversion (see Chapter 9 "Converting the boiler to a different gas type", page 48) suitable for propane.
BA, BG, GR, HR, LU	LPG B/P (G30)	After conversion (see Chapter 9 "Converting the boiler to a different gas type", page 48) suitable for butane, propane and mixtures thereof.

Tab. 11 Burner factory settings

- Check which main gas nozzles suit the mains gas supply: Check for gas characteristics with your gas supply company and observe the details in Table 11, page 22 and Tab. 12.
- Ensure that the designation of the main gas nozzles (Fig. 6) correlates to Table 12), and convert to a different gas type, if necessary (see "Converting the boiler to a different gas type", page 48).



SYSTEM DAMAGE

through incorrect main gas nozzles.

CAUTION!

- Only commission the gas burner with correct main gas nozzles.
- Ensure that the correct main gas nozzles have been used.
- If necessary, change the gas type see Chapter 9 "Converting the boiler to a different gas type", page 48.



RISK TO LIFE

from risk of electric shock.

WARNING!

- The installation, repairs, electrical wiring, the initial start-up, the mains electrical connection as well as maintenance and service work must only be carried out by a competent, authorised specialist.
- Ensure that, during any work of that nature, all current technical rules and local regulations are applied.

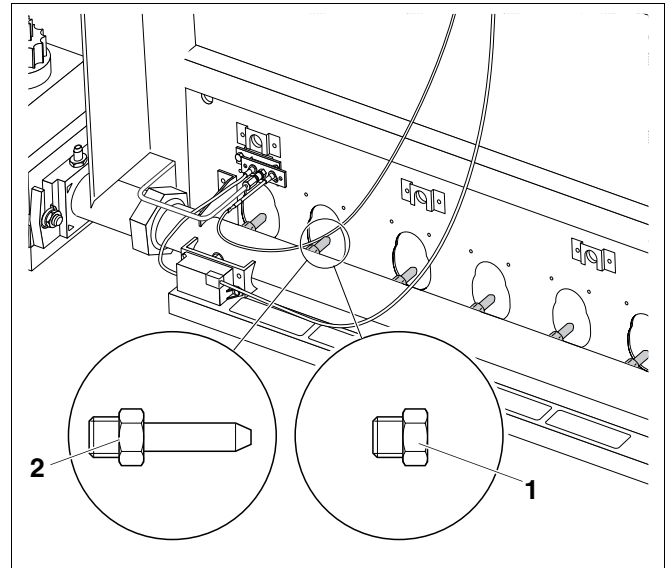


Fig. 6 Checking the main gas nozzle

- Item 1:** Short version (natural gas L (G25), S (G25.1))
- Item 2:** Long version (natural gas H (G20), GZ50 or LPG)

Main gas nozzle designation			
Natural gas H (G20) GZ 50	Natural gas L (G25) S (G25.1)	LPG Propane P (G31)	LPG B/P (G30)
295	340	190	180

Tab. 12 Main gas nozzle designation

The following applies to Belgium (BE):

Only Buderus service engineers may carry out a conversion to another gas type.

6.1.7 Starting the heating system and commissioning the burner

- Set the ON/OFF switch (Fig. 7, **Item 2**) to "I" (ON).

The entire heating system is switched ON.

- Slowly open the mains gas shut-off valve.
- Set the boiler water thermostat (Fig. 7, **Item 1**) to "AUT". For operation at a constant temperature, select the required temperature (min. 65 °C).

The gas burner receives a heat demand from the control device and starts.



PLEASE NOTE

- Please observe the operating instructions included with the control device.

Fault:

- Any faults are indicated on the control device display.

Faults on boilers with analog burner control unit (burner control unit TFI 812)

- Press the reset button (Fig. 8, **Item 1**). If the gas burner will not start after pressing the reset button several times (see Chapter 11 "Troubleshooting", page 55).

Faults on boilers with digital burner control unit (burner control unit MPA 50)

- To reset, set the ON/OFF switch (Fig. 7, **Item 2**) to "0" (OFF).
- After waiting approx. 3 minutes, set the ON/OFF switch (Fig. 7, **Item 2**) to "I" (ON). If the gas burner will not start after activating the ON/OFF switch several times (see Chapter 11 "Troubleshooting", page 55).

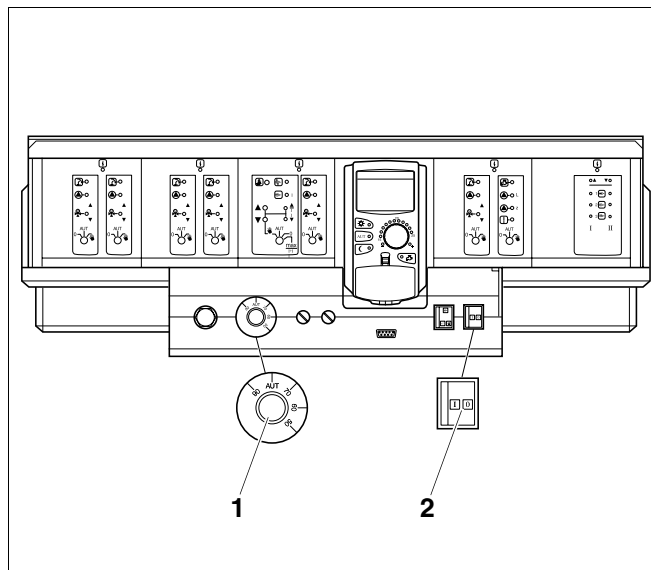


Fig. 7 Logamatic 4000 control unit

Item 1: Boiler control thermostat

Item 2: ON/OFF switch

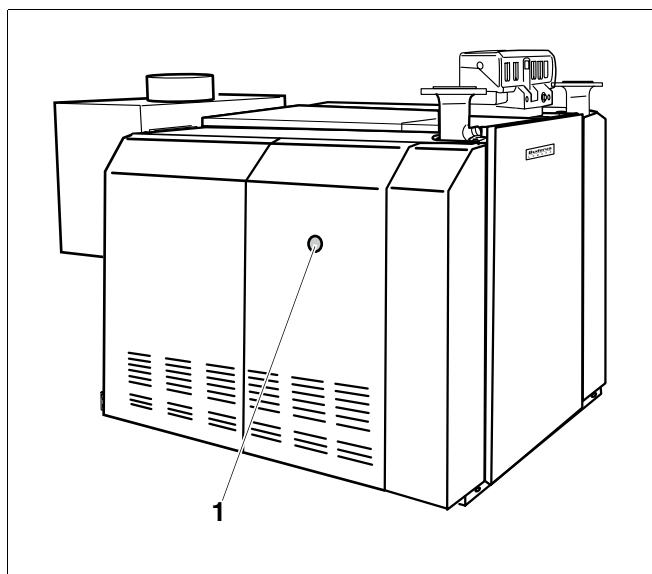


Fig. 8 Reset button

Item 1: Reset button

6.1.8 Checking the mains gas pressure



PLEASE NOTE

- Ensure that both gas burners are operating for the following checks.
- Release the plug on the test port for gas supply pressure and venting (Fig. 9, **Item 1**) on the gas train by two turns.
- Push the test hose of the U-tube pressure gauge onto the test nipple (Fig. 9, **Item 1**).
- Check the gas supply pressure when the burner operates. Record the value in the commissioning report.
- Contact your local gas supplier if insufficient gas supply pressure (Table 13, page 26) is entering your system.
- Install a secondary gas pressure regulator upstream of the gas train, if the gas supply pressure is too high.
- Pull the test hose off again.
- Carefully tighten the plug on the test port for gas supply pressure and venting (Fig. 9, **Item 1**).

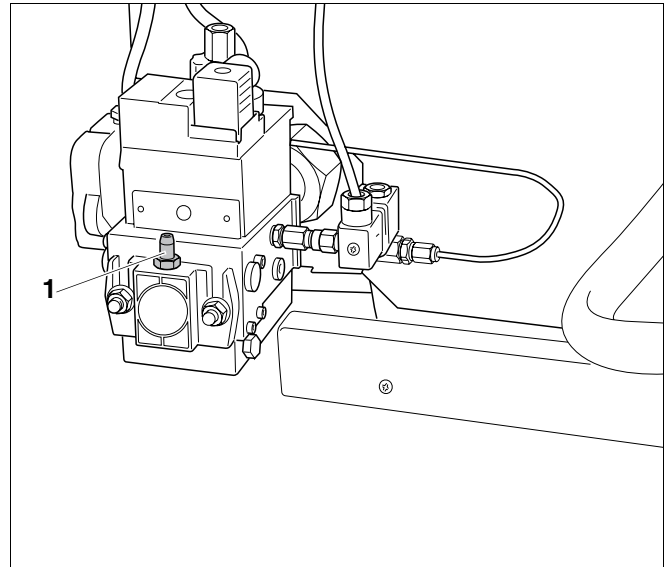


Fig. 9 Checking the mains gas pressure

Item 1: Test port for gas supply pressure and venting

6.1.9 Checking for leaks during operation

- Test all sealing points on the entire burner gas route with a foaming leak detector agent, whilst the burner operates, e.g.:
 - test port,
 - nozzles,
 - plugs, etc.

The agent must be approved for gas leak testing.



SYSTEM DAMAGE

through short circuits.

- CAUTION!**
- Cover areas at risk before searching for leaks.
 - Never apply leak detector spray to cableways, plugs or electrical leads. Never let any spray drop down onto such areas.

Country	Gas type	Supply pressure		
		Min. mbar	rated mbar	Max. mbar
AT, BA, BE, BG, BR, BY, CH, CN, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, IE, IT, LU, PL, PT, RO, RU, SE, SI, SK, TR, UA	Natural gas H (G20) Natural gas L (G25) Natural gas GZ 50	16 *	20	25
NL	Natural gas L (G25)	20 *	25	30
HU	Natural gas H (G20) Natural gas S (G25.1)	20 *	25	33
AT, BY, CH, CN, CZ, DE, ES, GB, HU, HR, IE, LU, NL, PL, PT, RO, RU, SI, SK, TR, UA	LPG P Propane (G31)	42,5	50	57,5
CZ, ES, FR, IE, PL, PT, SK	LPG P Propane (G31)	25	37	45
BA, BG, GR, HR, LU, TR	LPG B/P (G30)	42,5	50	57,5

Tab. 13 Gas types and supply pressures

* When the auxiliary gas pressure switch is installed, the system may be operated for short periods at a max. of 10 mbar.

6.1.10 Recording actual values

Install a test port in the flue pipe (Fig. 10, **Item 1**) to carry out the following tests. The distance from the draught hood must be equal to twice the flue pipe diameter (AA).

If the flue pipe immediately downstream of the boiler is connected with a bend, install the test port upstream of the bend.

- Install the flue pipe test port (Fig. 10, **Item 1**) on the side towards the boiler. For this purpose, drill a 8 mm hole into the flue pipe.
- Carry out the following tests at the flue pipe test port:
 - Draught
 - Flue gas loss
 - Carbon monoxide content



PLEASE NOTE

The following tools are required to carry out these tests:

- flue gas thermometer
 - U-tube
 - fine draught pressure gauge (chimney draught)
-
- Insert the test probe into the core of the flue gas flow.

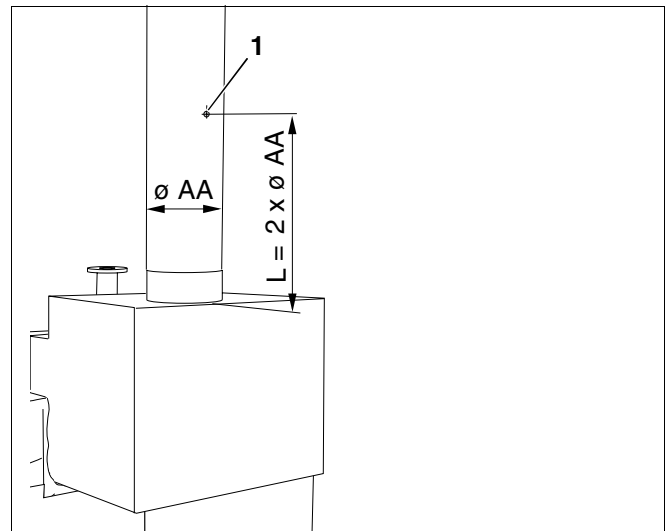


Fig. 10 Recording actual values

Item 1: Flue pipe test port

Draught

Recommendation: 3 Pa (0.03 mbar) and 10 Pa (0.1 mbar).



RISK TO LIFE

through toxic flue gases.

WARNING!

- Only operate these boilers with a chimney or flue gas system, which supplies the stated draught during operation.



PLEASE NOTE

Higher draught leads to avoidable heat losses, leading to higher heating costs. In addition, errors can occur during flue gas loss tests.

A draught stabiliser is recommended for values above 10 Pa (0.1 mbar).

Flue gas loss

Flue gas losses must not be higher than 9 %.

Higher values indicate test errors or boiler and/or burner contamination.

Check the test arrangements or clean the system (see Chapter 8 "Heating system inspection and maintenance", page 35).

Carbon monoxide content

CO values in the airless state must be below 400 ppm or 0.04 % vol.

Values above 400 ppm indicate an incorrect burner adjustment, incorrect device setup, burner and/or heat exchanger contamination or burner faults.

In such cases, identify and remedy all related causes.

Function checks

During commissioning and the annual inspection, check all regulating, control and safety equipment for correct function and correct adjustment, where applicable.

Checking the high limit safety cut-out (STB)

See control device documentation.

Checking the ionisation monitoring



PLEASE NOTE

We recommend the use of an ionisation lead set from Buderus.

1. Simulating faults:

- Disconnect the heating system from the mains electrical supply, e.g. emergency stop switch of the heating system upstream of the boiler room.
- Remove the contact protector (Fig. 11, **Item 2**) from the monitoring lead (Fig. 11, **Item 1**) and release the plug-in connector.
- Re-connect the heating system to the mains electrical supply, e.g. switch ON the heating system emergency stop switch.

The solenoid valve opens after approx. 12 seconds (recognised by a quiet audible click).

Approx. 10 seconds later (for analog burner control units) and approx. 20 seconds later (for digital burner control units), the burner must change over to a fault condition, i.e. the indicator lamp on the reset button lights up.

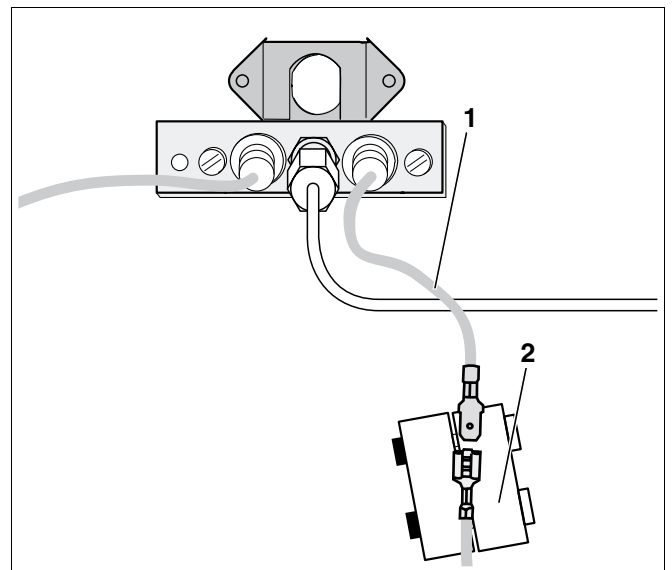


Fig. 11 Remove the contact protector

Item 1: Monitoring lead

Item 2: Contact protector

2. Check the ionisation current:



PLEASE NOTE

We recommend the use of an ionisation lead set from Buderus.

- Disconnect the heating system from the mains electrical supply, e.g. emergency stop switch of the heating system upstream of the boiler room.
- Connect the test equipment (Fig. 12, **Item 1**) in series to the contacts of the split plug-in connector of the monitoring lead (Fig. 12, **Item 3**).
- Fit the contact protector (Fig. 12, **Item 4**) around the plug-in connector.
- On the test equipment (Fig. 12, **Item 1**), select μA DC.
- Reconnect the heating system to the mains electrical supply and test the ionisation current. Record the value in the commissioning report (page 33).

Perfect operation requires an ionisation current of at least $2 \mu\text{A}$ when the pilot light burns without the main flame being ON. A fault shutdown occurs at approx. $1 \mu\text{A}$.



PLEASE NOTE

During maintenance work, also check the ionisation current when both the pilot light and the main flame are ON.

- Disconnect your heating system from the mains electricity supply.
- Remove the test equipment.
- Plug the monitoring lead plug-in connector (Fig. 12, **Item 3**) into its mating part again.
- Refit the contact protector (Fig. 12, **Item 4**) to the monitoring lead (Fig. 12, **Item 5**).
- Reconnect the heating system to the electrical mains supply.

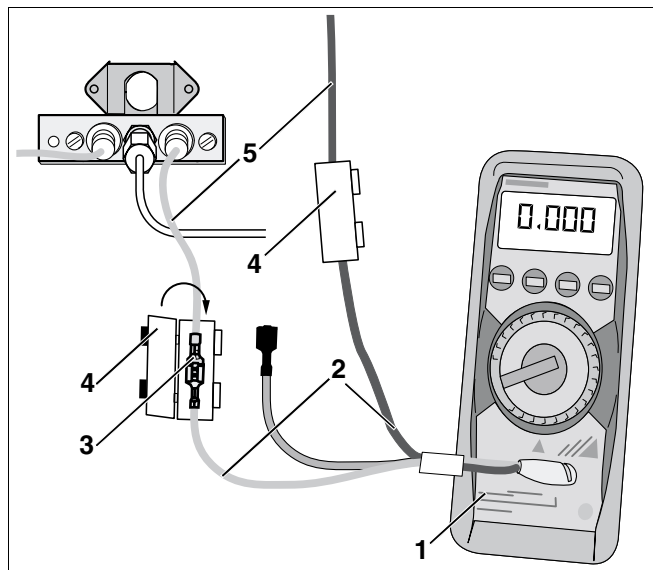


Fig. 12 Checking the ionisation current

Item 1: Test equipment

Item 2: Ionisation lead set

Item 3: Monitoring lead plug-in connector

Item 4: Contact protector

Item 5: Monitoring lead

Checking the flue gas damper (accessory)



PLEASE NOTE

Please note that, during heat demand, the flue gas damper must be in the "OPEN" position.

- Check the position of the flue gas damper on the setting of the actuator lever (Fig. 13).
- The gas burner must only start after the terminal position "OPEN" (Fig. 13, **Item 1**) has been reached.

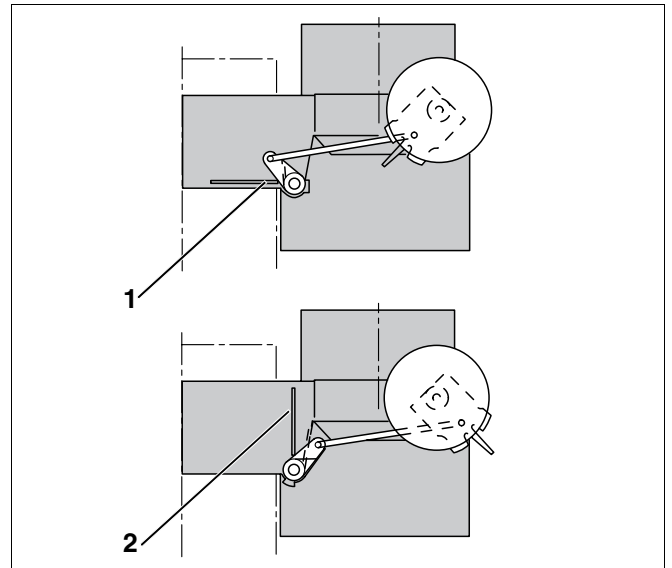


Fig. 13 Flue gas damper position

Item 1: Position "OPEN"

Item 2: Position "CLOSED"

Checking the flue gas monitor

- Start-up the heating system.
- Unscrew the flue gas temperature sensor (Fig. 14, **Item 1**, in total two flue gas temperature sensors, i.e. one per burner) from the draught hood (Fig. 14, **Item 2**).
- With control system 4000, press the "Flue gas test button" and hold down for approx. 1 second. When operating at a constant boiler temperature, set the boiler water thermostat to maximum.
- Hold the tip of the flue gas temperature sensor (Fig. 14, **Item 1**) into the core of the flue gas flow, whilst the burner is operating. The gas supply will be interrupted for a max. of 120 seconds, and the burner will be switched OFF. The burner is automatically restarted 20 minutes later, if heat is called for.
- Refit the flue gas temperature sensor (Fig. 14, **Item 1**).
- For control system 4000, press the "Flue gas test" button once to reset the system.

Also carry out the respective steps with the second flue gas temperature sensor.

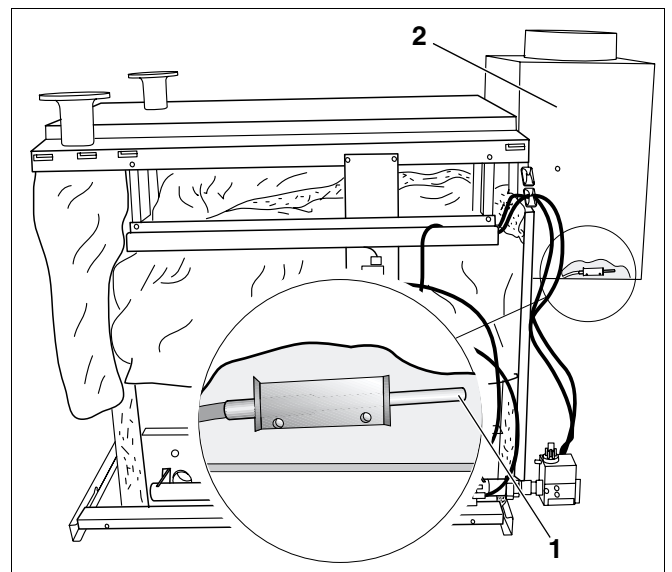


Fig. 14 Checking the flue gas temperature sensor

Item 1: Flue gas temperature sensor

Item 2: Draught hood

6.1.11 Installing the side panels**6.1.12 Informing the system user and handing over all technical documentation**

Make the heating system user familiar with the boiler operation. Hand over all technical documentation to the user.

6.2 Commissioning report

- Sign all commissioning work as completed and enter the relevant date.

	Commissioning steps	Page (individual steps)	Actual values Comments	
1.	Fill the heating system with fill water and vent.	page 16		
2.	Record gas characteristics: Wobbe index	page 19 kWh/m ³	
	Net calorific value	 kWh/m ³	
3.	Check all gas pipes for leaks Purging the gas supply pipe	page 19	<input type="checkbox"/>	
4.	Check the air supply/ventilation and flue pipe connections	page 21	<input type="checkbox"/>	
5.	Check the equipment (correct main gas nozzles?); if necessary, change over the gas type	page 22 and following.	<input type="checkbox"/>	
6.	Start-up the burner	page 24	<input type="checkbox"/>	
7.	Check the gas supply pressure (flow pressure)	page 25 mbar	
8.	Check for leak during operation	page 26	<input type="checkbox"/>	
9.	Record actual values: Draught Gross flue gas temperature t_A Air temperature t_L Net flue gas temperature $t_A - t_L$ Carbon dioxide content (CO ₂) or oxygen content (O ₂) Flue gas losses q_A Carbon monoxide content (CO), airless	page 27 Pa °C °C °C % % ppm	
10.	Function checks: Check the high limit safety cut-out (STB) Check the ionisation current - pilot burner operation Check the ionisation current - main burner operation Check the flue gas monitor	page 29 and following.	L.h. R.h.	
			<input type="checkbox"/>	
		 µA µA
		 µA µA
			<input type="checkbox"/>	
11.	Install the side panels		<input type="checkbox"/>	
12.	Inform the system user, hand over the technical documentation, and enter the fuel used in this heating system in the table of the operating instructions on page 2).		<input type="checkbox"/>	
	Confirm professional commissioning			
	Company stamp/signature/date			

7 Shutting down the heating system



CAUTION!

SYSTEM DAMAGE

through frost.

The heating system can freeze up, if the control device has been switched OFF.

- Protect your heating system against frost damage, where temperatures below zero are expected.
- With the control device switched OFF, drain the water from the boiler, the DHW cylinder and the pipework of the heating system and, as far as possible, from the drinking water pipes.

7.1 Shutting down the heating system via the control device

- Set the ON/OFF switch (Fig. 15, **Item 2**) to "0" (OFF).
- Close the main shut-off valve or the gas supply cock.

7.2 Shutting down the heating system in emergencies



PLEASE NOTE

- Only in emergencies, switch OFF the heating system via the boiler room fuse or the heating system emergency stop switch.

In other dangerous circumstances, immediately turn off the mains gas shut-off valve and isolate the electrical power supply of the heating system via the boiler room main fuse or the emergency stop switch for the boiler room.

- Close the mains gas shut-off valve.

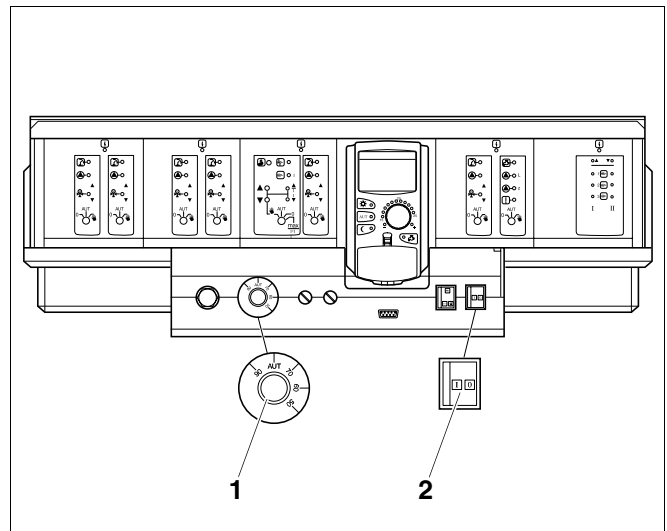


Fig. 15 Logamatic 4000 control unit

Item 1: Boiler control thermostat

Item 2: ON/OFF switch

8 Heating system inspection and maintenance

8.1 General notes

Offer an annual inspection and maintenance contract (depending on requirements) to your customer. You can check in Chapter 8.8 "Inspection and maintenance reports", page 45 what is required for such contracts.



PLEASE NOTE

You may order spare parts from the Buderus spare parts catalogue.

8.2 Preparing the boiler for cleaning

- Shut down the heating system (see Chapter 7 "Shutting down the heating system", page 34).



WARNING!

RISK TO LIFE

from electric shock when the heating system is open.

- Before you open the heating system: Isolate the heating system with the heating system emergency stop switch or by extracting the mains fuse.
 - Safeguard the heating system against unintentional re-connection.
- Remove the side panels from the boiler, the bottoms of which are secured with self-tapping screws.



WARNING!

RISK TO LIFE

through the explosion of volatile gases.

- Work on gas components must only be carried out by qualified and authorised personnel.

8.3 Cleaning the boiler

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

Carry out the following steps on the l.h. and the r.h. gas burner or boiler block.

8.3.1 Cleaning the boiler with cleaning brushes

Removing the gas burner

- Release the connection cable (Fig. 16, **Item 5**) on the intermittent ignition (Fig. 16, **Item 4**).
- Remove the contact protector (Fig. 16, **Item 6**) from the monitoring lead and release the plug-in connector.



PLEASE NOTE

Insert the cables into the cable channel.

- Remove the pilot gas pipe (Fig. 16, **Item 1**) from the burner shield and the gas train (Fig. 16, **Item 2**).
- Remove the pilot burner nozzle and air strainer, and retain carefully.

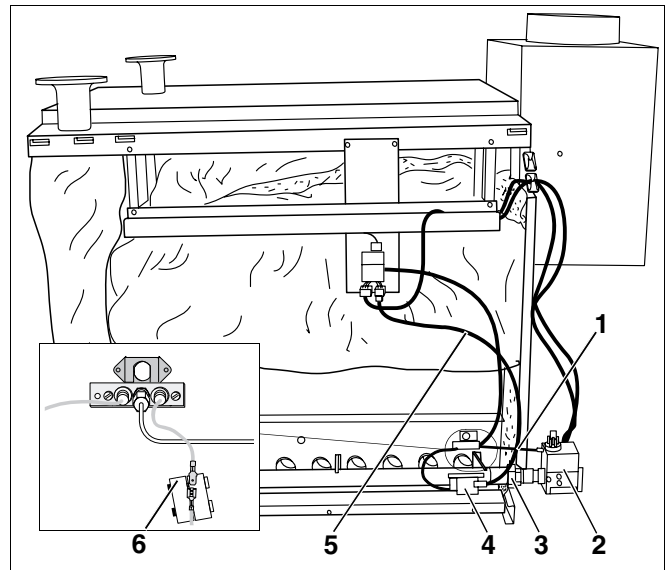


Fig. 16 Preparing the boiler for cleaning with brushes

Item 1: Pilot gas line

Item 2: Gas train

Item 3: Fittings between gas burner and gas train

Item 4: Timed ignition

Item 5: Connection cable between intermittent ignition and burner control unit

Item 6: Contact protection on the monitoring cable

- Separate the gas burner at the fitting (Fig. 17, **Item 6**) from the gas train.
- Release the fixing nut (Fig. 17, **Item 2**) on the burner shield (Fig. 17, **Item 3**), and remove the gas burner.



PLEASE NOTE

During the removal of the gas burner ensure, that the spacers (Fig. 17, **Item 1**) remain on the threaded studs.

You can remove the gas burner clean-out cover (Fig. 17, **Item 4**) only after the gas burner has been removed.

- Release the hexagon nuts from the clean-out cover (Fig. 17, **Item 4**) and remove the cover.

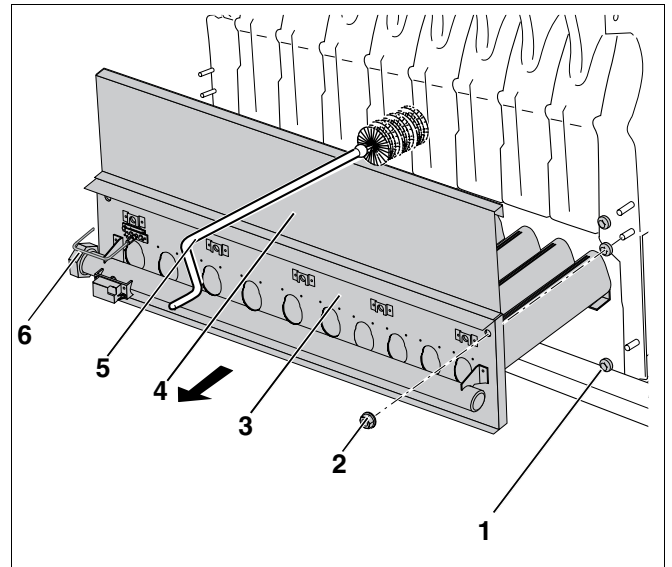


Fig. 17 Removing the gas burner and cleaning the boiler block

- Item 1:** Spacer ring
- Item 2:** Fixing nut on the burner shield
- Item 3:** Burner label
- Item 4:** Clean-out cover
- Item 5:** Cleaning brush
- Item 6:** Screw connection

- Remove the boiler hoods, thermal insulation and clean-out cover of the flue gas header.
- Alternately brush out the hot gas flues several times from the side (horizontally) and from above using the cleaning brush (see Fig. 17 and Fig. 18).
- Remove the bottom plate.
- Clean the combustion chamber, floor and bottom plate.
- Slide the bottom plate back in place.
- Assemble the clean-out cover of the flue gas header, the thermal insulation and the boiler hoods.
- Reinstall the gas burner in reverse order.

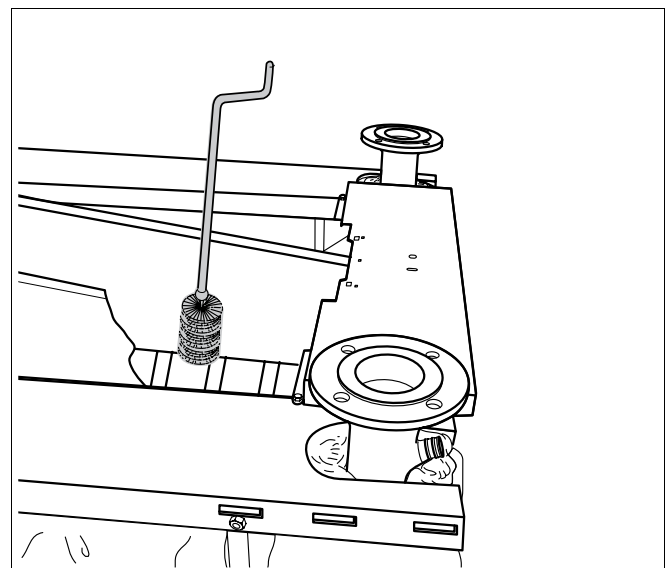


Fig. 18 Brush cleaning

8.3.2 Wet-cleaning the boiler

When wet-cleaning, use a cleaning agent appropriate to the level of contamination (soot level and encrusted residues).

- Ensure adequate ventilation of the boiler room.



PLEASE NOTE

- For wet-cleaning (chemical cleaning), observe the operating instructions of the relevant cleaning equipment and the cleaning agent. It may be necessary to vary the wet-cleaning process from that described here.

- Start-up the heating system.
- Heat up the boiler water temperature to at approx. 50 °C.
- Close the gas shut-off valve in the gas supply pipe.
- Disconnect your heating system from the mains electricity supply.
- Remove the boiler hoods, thermal insulation and clean-out cover of the flue gas header.
- Remove the gas burner, see Chapter 8.3.1 "Cleaning the boiler with cleaning brushes", page 36.
- Brush out severely encrusted hot gas flues, see Chapter 8.3.1 "Cleaning the boiler with cleaning brushes", page 36.
- Cover the control device with foil. Spray must not enter the control device.
- Place cleaning rags onto the bottom plate to absorb any spray agent run-off.
- Evenly spray hot gas flues from the top and the sides with cleaning agent (Fig. 19 and Fig. 20).
- Only spray cleaning agent into the hot gas flues.

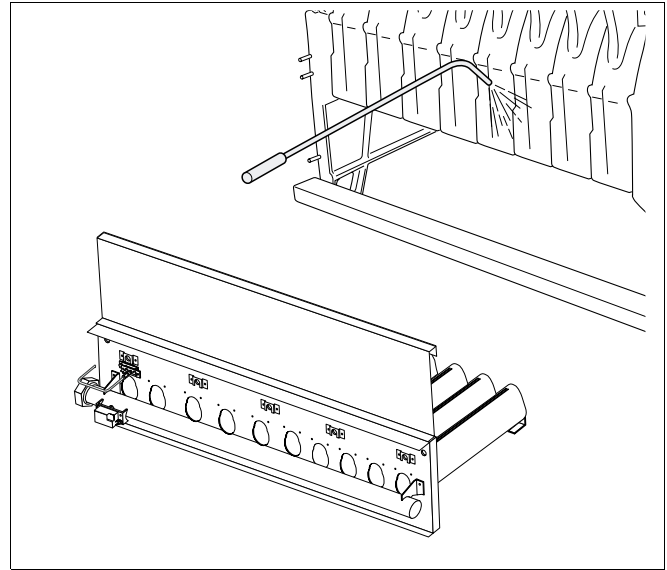


Fig. 19 Wet-cleaning the boiler

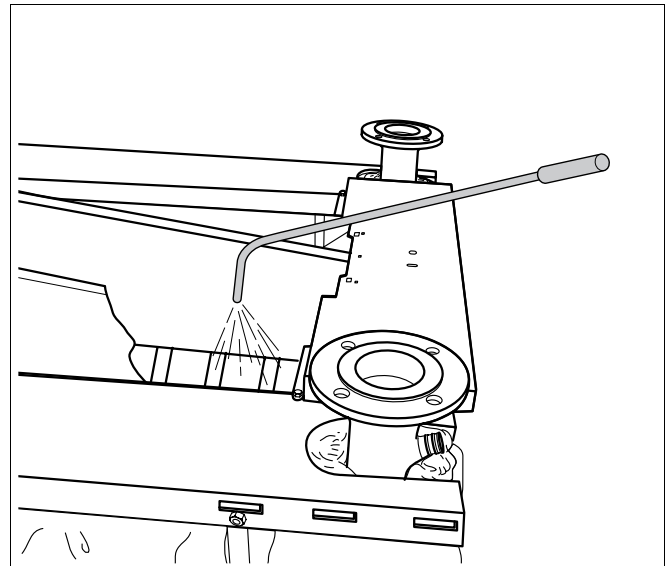


Fig. 20 Wet-cleaning the boiler

- Let the cleaning agent soak in according to manufacturer's instructions.
- Remove the cleaning rags.
- Remove the foil from the control device.
- Fit the flue gas header clean-out cover.
- Reinstall the gas burner in reverse order.
- Start up the boiler to dry out its interior, until the boiler water has reached its maximum temperature (operating selector set to manual).
- Switch off the boiler and allow it to cool down.
- Remove the flue gas header clean-out cover.
- Brush out the hot gas flues again after the heating surfaces have dried. To do this, repeat all steps in Chapter 8.3.1 "Cleaning the boiler with cleaning brushes", page 36.
- Continue to ensure adequate ventilation of the boiler room.

8.4 Cleaning the gas burner

- Remove the gas burner (see "Removing the gas burner", page 36) for cleaning.
- Release the ignition cable plug-in connector on the intermittent ignition and remove the ignition unit.
- Release both screws on the pilot burner and carefully remove it.
- Initially flush the burner rods (Fig. 21, **Item 1**) with a water hose from above, then spray the slots from the front.



PLEASE NOTE

Ensure that the thermal insulation on the burner shield (Fig. 22, **Item 1**) stays dry.

- Position the gas burner vertically onto the burner rods (Fig. 21, **Item 1**).
- Spray the burner rods (Fig. 21, **Item 1**) internally with water and wait, until all water has been expelled from the burner rod slots.

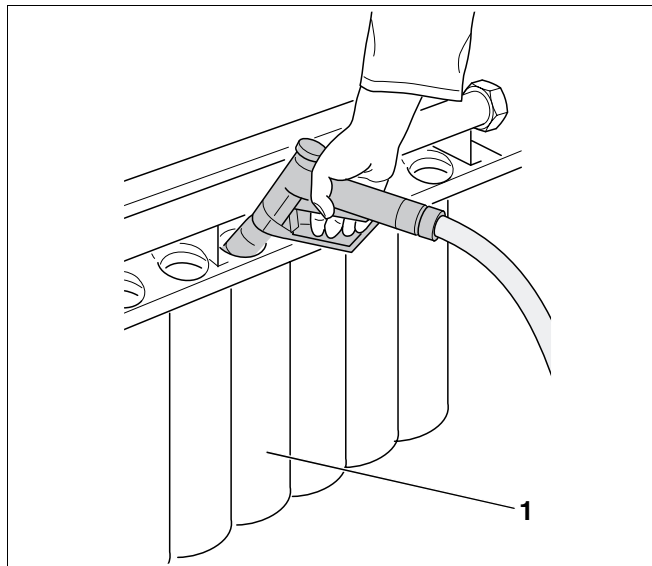


Fig. 21 Cleaning the gas burner

Item 1: Burner rods

- Invert the gas burner and position with the burner rod aperture pointing down to allow water to drain off (Fig. 22).
- Position the gas burner with slots pointing down to enable all residual water to drain off.
- Check that the burner rod slots are unobstructed. Remove water film and residual contamination from the slots. Replace the burner if the slots are damaged.

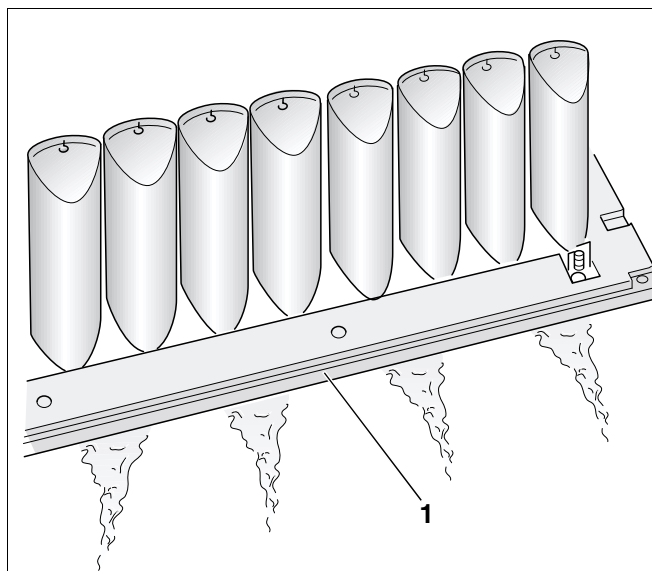


Fig. 22 Pivoting the gas burner

Item 1: Thermal insulation on the burner shield

- Clean and assemble the pilot burner.
- Fit the clean-out cover above the gas burner.



PLEASE NOTE

When fitting the gas burner, ensure that the spacers are located on the threaded studs.

- Carry out the gas burner assembly and installation in reverse order to their removal (see "Removing the gas burner", page 36).
- Replace gaskets, if necessary.



WARNING!

RISK TO LIFE

through the explosion of volatile gases. Leaks may have been created on pipes and fittings by the maintenance work.

- Carry out a proper leak test.
- Only use approved leak test agents to discover leaks.

8.5 Internal leak test

- Check the inlet side of the gas train with a test pressure of at least 100 mbar and maximum 150 mbar for internal leaks.

After one minute, the pressure drop may be a maximum of 10 mbar.

Should the pressure drop be greater, carry out a full leak test with foaming leak detector spray on all gas train sealing points. Repeat the leak test, if you discover a leak.

Replace the gas train, if you cannot detect a leak, and the pressure drop is again greater than 10 mbar per minute.

8.6 Checking and correcting the heating system water pressure

On sealed systems the pressure gauge needle (Fig. 23, **Item 2**) must be within the green field (Fig. 23, **Item 3**).

Set the red needle (Fig. 23, **Item 1**) on the pressure gauge to pressure required by your heating system.



PLEASE NOTE

- Set the system pressure to at least 1 bar when the system is cold.

- Check the heating system water pressure.

The water pressure in your heating system is too low if the pressure gauge needle (Fig. 23, **Item 2**) falls below the green field (Fig. 23, **Item 3**). Then re-fill the heating system with top-up water.



SYSTEM DAMAGE

through frequent topping up.

CAUTION!

The heating system may be damaged, subject on water quality, by corrosion or scaling, if you frequently need to top-up your system with water.

- Ensure that your heating system is adequately vented.
- Check the heating system for leaks and the function of the expansion vessel.



SYSTEM DAMAGE

through temperature stresses.

CAUTION!

- Only fill the system when cold (the flow temperature should be a maximum of 40 °C).



PLEASE NOTE

Slowly fill in water in case you notice water losses.

- Fill top-up water via the on-site boiler fill and drain valve in the heating return.
- Vent the heating system.
- Check the water pressure once more.

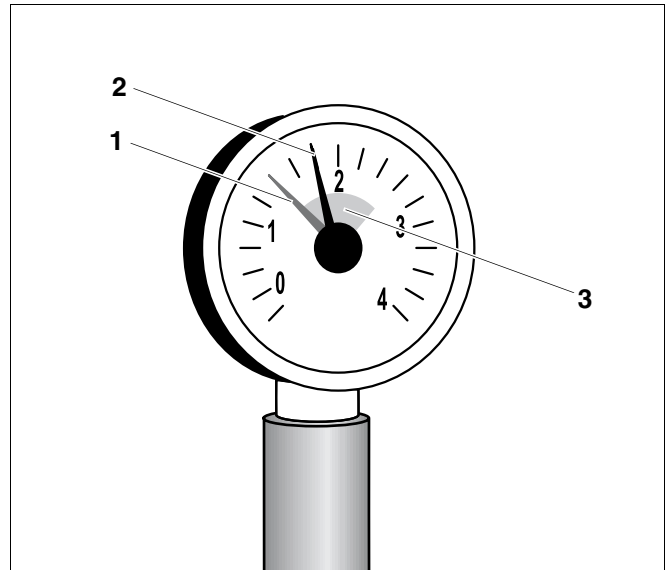


Fig. 23 Pressure gauge for sealed heating systems

Item 1: Red needle

Item 2: Pressure gauge needle

Item 3: Green field

8.7 Checking the nozzle pressure

- Release the plug of the test port on the burner manifold (Fig. 24, **Item 1**) by two full turns.
- Push the test hose of the U-tube pressure gauge onto the test port (Fig. 24, **Item 1**).
- Read off the nozzle pressure at the U-tube pressure gauge, and compare the actual value with those in Table 14 to Table 16, page 44.
Inform the customer service department, if the actual value deviates by more than ± 1 mbar from the set value.

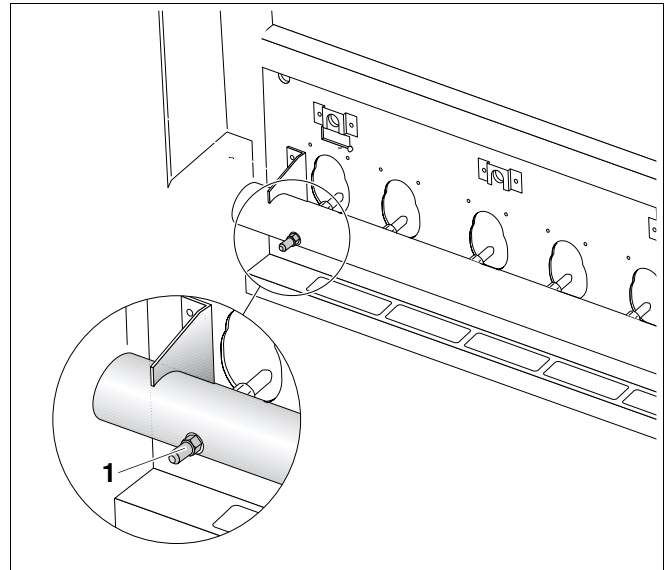


Fig. 24 Checking the nozzle pressure

Item 1: Test point on the burner manifold

8 Heating system inspection and maintenance

Boiler size	Rated gas nozzle pressure
	Natural gas H (G 20) L (G 25) S (G 25.1) GZ50 mbar
150 - 375	14

Tab. 14 Rated gas nozzle pressure

Boiler size	Nozzle pressure											
	LPG Propane P (G 31)											
kW	Supply pressure (Flow pressure)											
	58 - 37	36	35	34	33	32	31	30	29	28	27	
	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar
150 - 375	35	34	33	32	31	30	29	28	27	26	25	

Tab. 15 Nozzle pressure for LPG P subject to the supply pressure

Boiler size	Nozzle pressure											
	LPG Butane/propane mixtures B/P (G 30)											
kW	Supply pressure (Flow pressure)											
	58 - 37	36	35	34	33	32	31	30	29	28	27	
	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar
150 - 375	31.5	31.5	31.5	31.5	31	30	29	28	27	26	25	

Tab. 16 Nozzle pressure for LPG B/P subject to the supply pressure

Confirm maintenance

- Sign the maintenance report in this manual.

8.8 Inspection and maintenance reports

The inspection and maintenance reports provide an overview of the required inspection and maintenance work.

Complete the reports during inspection and maintenance. Sign all inspection work as completed and enter the relevant date.

	Inspection work	Page	Date	Date																																
1.	Check the general condition of the heating system (visual and function check)	–	<input type="checkbox"/>	<input type="checkbox"/>																																
2.	Check the gas and water components of the system for: internal leaks visible signs of corrosion signs of ageing	page 41	<input type="checkbox"/>	<input type="checkbox"/>																																
3.	Check the heating system water pressure	page 42	<input type="checkbox"/>	<input type="checkbox"/>																																
4.	Check the air supply/ventilation and flue pipe connections	page 21	<input type="checkbox"/>	<input type="checkbox"/>																																
5.	Check the gas supply pressure (flow pressure)	page 25	_____ mbar	_____ mbar																																
6.	Check the nozzle pressure	page 43	_____ mbar	_____ mbar																																
7.	Check for leak during operation	page 26	<input type="checkbox"/>	<input type="checkbox"/>																																
8.	Record actual values: Draught Gross flue gas temperature t_A Air temperature t_L Net flue gas temperature $t_A - t_L$ Carbon dioxide content (CO ₂) or oxygen content (O ₂) Flue gas losses q_A Carbon monoxide content (CO), airless	page 27	<table border="1"> <thead> <tr> <th>Full load</th> <th>Partial load</th> <th>Full load</th> <th>Partial load</th> </tr> </thead> <tbody> <tr> <td>_____ Pa</td> <td>_____ Pa</td> <td>_____ Pa</td> <td>_____ Pa</td> </tr> <tr> <td>_____ °C</td> <td>_____ °C</td> <td>_____ °C</td> <td>_____ °C</td> </tr> <tr> <td>_____ °C</td> <td>_____ °C</td> <td>_____ °C</td> <td>_____ °C</td> </tr> <tr> <td>_____ °C</td> <td>_____ °C</td> <td>_____ °C</td> <td>_____ °C</td> </tr> <tr> <td>_____ %</td> <td>_____ %</td> <td>_____ %</td> <td>_____ %</td> </tr> <tr> <td>_____ %</td> <td>_____ %</td> <td>_____ %</td> <td>_____ %</td> </tr> <tr> <td>_____ ppm</td> <td>_____ ppm</td> <td>_____ ppm</td> <td>_____ ppm</td> </tr> </tbody> </table>	Full load	Partial load	Full load	Partial load	_____ Pa	_____ Pa	_____ Pa	_____ Pa	_____ °C	_____ °C	_____ °C	_____ °C	_____ °C	_____ °C	_____ °C	_____ °C	_____ °C	_____ °C	_____ °C	_____ °C	_____ %	_____ %	_____ %	_____ %	_____ %	_____ %	_____ %	_____ %	_____ ppm	_____ ppm	_____ ppm	_____ ppm	
Full load	Partial load	Full load	Partial load																																	
_____ Pa	_____ Pa	_____ Pa	_____ Pa																																	
_____ °C	_____ °C	_____ °C	_____ °C																																	
_____ °C	_____ °C	_____ °C	_____ °C																																	
_____ °C	_____ °C	_____ °C	_____ °C																																	
_____ %	_____ %	_____ %	_____ %																																	
_____ %	_____ %	_____ %	_____ %																																	
_____ ppm	_____ ppm	_____ ppm	_____ ppm																																	
9.	Function tests: Test the high limit safety cut-out STB Check ionisation current – pilot burner function – main burner function Check the flue gas monitor	page 29 page 29 page 31	<table border="1"> <thead> <tr> <th>L.h.</th> <th>R.h.</th> <th>L.h.</th> <th>R.h.</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/></td> <td></td> <td><input type="checkbox"/></td> <td></td> </tr> <tr> <td>_____ µA</td> <td>_____ µA</td> <td>_____ µA</td> <td>_____ µA</td> </tr> <tr> <td>_____ µA</td> <td>_____ µA</td> <td>_____ µA</td> <td>_____ µA</td> </tr> <tr> <td><input type="checkbox"/></td> <td></td> <td><input type="checkbox"/></td> <td></td> </tr> </tbody> </table>	L.h.	R.h.	L.h.	R.h.	<input type="checkbox"/>		<input type="checkbox"/>		_____ µA	_____ µA	_____ µA	_____ µA	_____ µA	_____ µA	_____ µA	_____ µA	<input type="checkbox"/>		<input type="checkbox"/>														
L.h.	R.h.	L.h.	R.h.																																	
<input type="checkbox"/>		<input type="checkbox"/>																																		
_____ µA	_____ µA	_____ µA	_____ µA																																	
_____ µA	_____ µA	_____ µA	_____ µA																																	
<input type="checkbox"/>		<input type="checkbox"/>																																		
10.	Check the demand-dependent settings of the control device (see control device documentation)	–	<input type="checkbox"/>	<input type="checkbox"/>																																
11.	Final checks of the inspection work	–	<input type="checkbox"/>	<input type="checkbox"/>																																
	Confirm the professional commissioning																																			
	Company stamp/date/signature																																			

8 Heating system inspection and maintenance

	Date	Date	Date			
1.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
2.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
3.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
4.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
5.	_____ mbar	_____ mbar	_____ mbar			
6.	_____ mbar	_____ mbar	_____ mbar			
7.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
8.	Full load	Partial load	Full load	Partial load	Full load	Partial load
	_____ Pa	_____ Pa	_____ Pa	_____ Pa	_____ Pa	_____ Pa
	_____ °C	_____ °C	_____ °C	_____ °C	_____ °C	_____ °C
	_____ °C	_____ °C	_____ °C	_____ °C	_____ °C	_____ °C
	_____ °C	_____ °C	_____ °C	_____ °C	_____ °C	_____ °C
	_____ %	_____ %	_____ %	_____ %	_____ %	_____ %
	_____ ppm	_____ ppm	_____ ppm	_____ ppm	_____ ppm	_____ ppm
9.	L.h.	R.h.	L.h.	R.h.	L.h.	R.h.
	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
	_____ μA	_____ μA	_____ μA	_____ μA	_____ μA	_____ μA
	_____ μA	_____ μA	_____ μA	_____ μA	_____ μA	_____ μA
	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
10.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
11.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			



PLEASE NOTE

Should you identify a condition during inspection, which requires maintenance steps to be taken, carry out such steps immediately in accordance with the prevailing demand.

	Demand-dependent maintenance work	Page	Date	Date	Date	Date	Date
1.	Clean the boiler	page 36	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	Clean the gas burner	page 40	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	Confirm professional maintenance						
	Company stamp/date/signature						

9 Converting the boiler to a different gas type



CAUTION!

OPERATING FAULT

through an error during gas type conversion.

- Strictly observe the sequence of the steps described.
- Complete all steps.

The Logano GE434 gas-fired special boiler is factory-set to natural gas. Should you wish to change the gas type, proceed as follows:



PLEASE NOTE

The following applies to Belgium (BE):

Only Buderus service engineers may carry out a conversion to another gas type.

Main gas nozzle designation			
Natural gas H (G20) GZ 50	Natural gas L (G25) S (G25.1)	LPG Propane P (G31)	LPG B/P (G30)
295	340	190	180

Tab. 17 Main gas nozzle designation

9.1 Conversion within a gas family

- Isolate the heating system from the mains electrical supply; to do that, set the ON/OFF switch to "0" (OFF).
- Close the gas shut-off valve.
- Remove the boiler side panels.
- Replace the main gas nozzle for those used with the new gas type, and use new gaskets.
- Check the main gas nozzles by means of their designation Table 17 and Fig. 25.
- Carry out all commissioning steps and complete the commissioning report.
- Affix the label for the new gas type on the type plate.

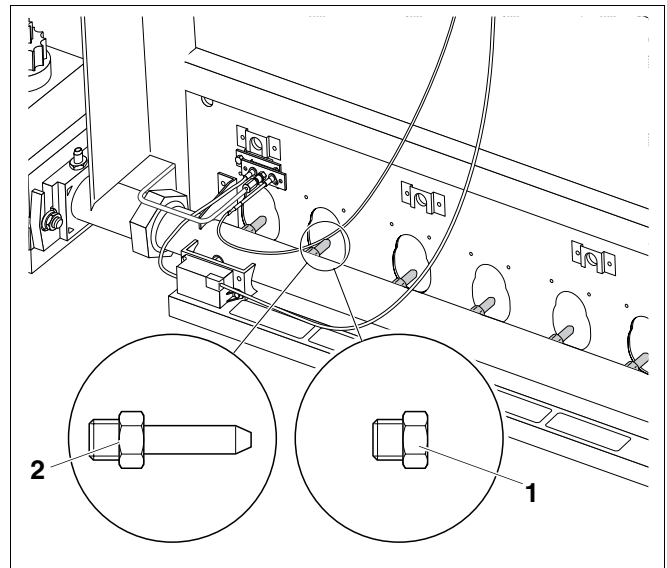


Fig. 25 Checking the main gas nozzle

Item 1: Short version (natural gas L (G25), S (G25.1))

Item 2: Long version (natural gas H (G20), GZ50 or LPG)

9.2 Conversion to a different gas type

Only boilers with digital burner control unit can be converted to LPG. Take the following steps:

- Isolate the heating system from the mains electrical supply; to do that, set the ON/OFF switch to "0" (OFF).
- Close the gas shut-off valve.
- Remove the boiler side panels.
- Replace the main gas nozzle for those used with the new gas type, and use new gaskets.
- Check the main gas nozzles by means of their designation Table 17 and Fig. 25, page 48.
- Release the pilot gas pipe from the pilot burner and replace with the pilot burner nozzle for the new gas type. pilot burner nozzle designation (Table 18).



PLEASE NOTE

To convert the boiler to a different gas type, proceed strictly in the following order:

Conversion from natural gas to LPG:

First carry out procedure A, then procedure B (see the following pages).

Conversion from LPG to natural gas:

First carry out procedure B, then procedure A (see the following pages).

- Reinstall the pilot gas pipe.

Gas type	Pilot gas nozzle designation
Natural gas H (G20), GZ50:	5
Natural gas L (G25), S (G25.1):	5
LPG P propane (G31):	3
LPG B/P butane/propane (G30):	3

Tab. 18 Pilot gas nozzle designation

9 Converting the boiler to a different gas type

Procedure A

Setting the gas burner output in accordance with the nozzle pressure method

- Release the plug of the test port on the burner manifold (Fig. 26, **Item 1**) by two full turns, and push on the test hose of the U-tube pressure gauge.
- Switch the ON/OFF switch to "I" (ON).
- Read off the nozzle pressure at the U-tube pressure gauge with the burner operating, and compare the actual value with the following values.

Boiler size	Rated gas nozzle pressure
	Natural gas H (G 20) L (G 25) S (G 25.1) GZ50
	mbar
150 - 375	14

Tab. 19 Rated gas nozzle pressure

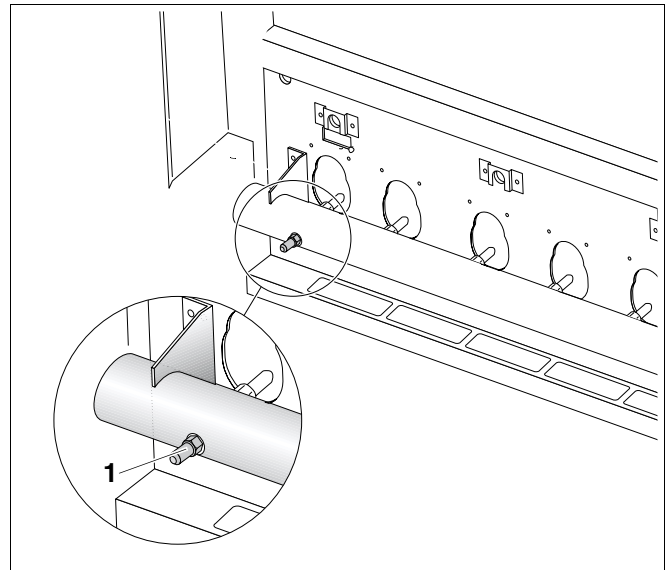


Fig. 26 Checking the nozzle pressure

Item 1: Test port on the burner manifold

Boiler size	Nozzle pressure											
	LPG Propane P (G 31)											
kW	Supply pressure (Flow pressure)											
	58 - 37	36	35	34	33	32	31	30	29	28	27	
	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar
150 - 375	35	34	33	32	31	30	29	28	27	26	25	

Tab. 20 Nozzle pressure for LPG P subject to the supply pressure

Boiler size	Nozzle pressure											
	LPG Butane/propane mixtures B/P (G 30)											
kW	Supply pressure (Flow pressure)											
	58 - 37	36	35	34	33	32	31	30	29	28	27	
	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar
150 - 375	31.5	31.5	31.5	31.5	31	30	29	28	27	26	25	

Tab. 21 Nozzle pressure for LPG B/P subject to the supply pressure

- Check the inlet pressure or gas supply pressure (see Chapter 6.1.8 "Checking the mains gas pressure", page 25).



PLEASE NOTE

In case of deviations from the set value, correct the nozzle pressure at the setting screw on the top of the valve.

- Push the plastic cover aside and turn the setting screw below the cover (Fig. 27, **Item 1**) clockwise or anti-clockwise, using a screwdriver.
 - turning **clockwise** = pressure rises
 - turning **anti-clockwise** = pressure reduces
- Pull off the test hose and close the plug, after the set value has been achieved.
- Carry out the commissioning points 7 - 11, and complete the report (see Chapter 6.2 "Commissioning report", page 33).
- Include all sealing points concerned with the conversion into the leak test (in the operating condition).
- Affix the label for the new gas type on the type plate.



PLEASE NOTE

Retain all parts which are removed.

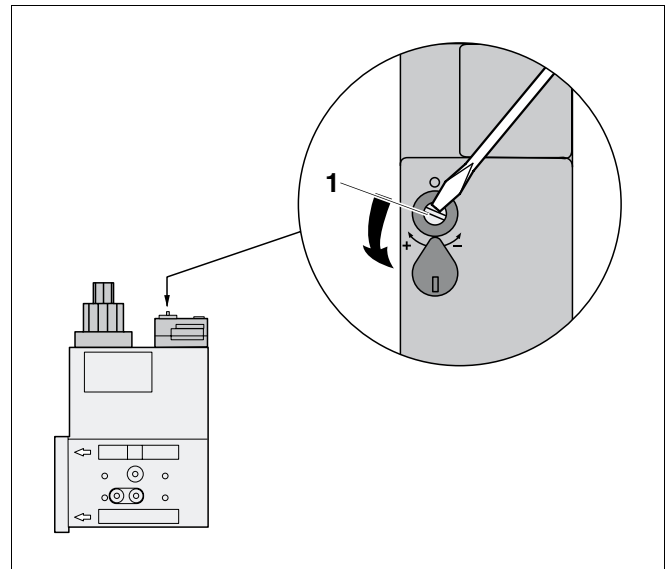


Fig. 27 Selecting the set value

Item 1: Adjusting screw

Procedure B

Setting the gas governor



PLEASE NOTE

Conversion to a different gas type requires an appropriate adjustment of the gas governor.

- Checking or correcting the gas governor setting (see Table 22).
- To carry out the conversion, remove the cover by releasing screws (Fig. 28, **Item 2**).
- Move the setting disc (Fig. 28, **Item 3**) to marking (Fig. 28, **Item 1**).
- - refit the cover.
- Carry out the commissioning points 1 -6, and complete the report (see Chapter 6.2 "Commissioning report", page 33).



PLEASE NOTE

The gas governor settings are subject to each country's circumstances. Check or correct the settings in accordance with Table 22).

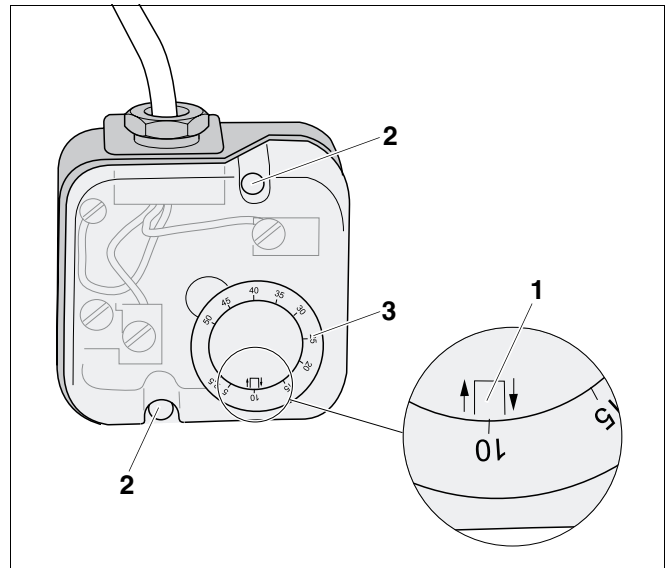


Fig. 28 Gas governor

Item 1: Setting marking

Item 2: Screws

Item 3: Setting disc

Country	Gas type	Rated supply pressure	Setting
		mbar	mbar
AT, BA, BE, BG, BR, BY, CH, CN, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, IE, IT, LU, PL, PT, RO, RU, SE, SI, SK, TR, UA	Natural gas H (G20) Natural gas L (G25) Natural gas GZ 50	20	10
NL	Natural gas L (G25)	25	10
HU	Natural gas H (G20) Natural gas S (G25.1)	25	10
AT, BY, CH, CN, CZ, DE, ES, GB, HU, HR, IE, LU, NL, PL, PT, RO, RU, SI, SK, TR, UA	LPG P Propane (G31)	50	25
CZ, ES, FR, IE, PL, PT, SK	LPG P Propane (G31)	37	15
BA, BG, GR, HR, LU, TR	LPG B/P (G30)	50	25

Tab. 22 Gas governor settings

10 Correcting burner faults



CAUTION!

SYSTEM DAMAGE

through frost.

The heating system can freeze up, if the control device has been switched off.

- Protect your heating system against frost damage, where temperatures below zero are expected.
- With the control device switched OFF, drain the water from the boiler, the DHW cylinder and the pipework of the heating system and, as far as possible from the drinking water pipes.

10.1 Burner faults on boilers with analog burner control unit (burner control unit TFI 812)

In case of burner fault, a fault lamp (Fig. 29, **Item 1**) lights up at the boiler.

You can activate the burner reset button through an aperture (Fig. 29, **Item 1**) in the side panel. The side panel does not need to be removed.

- Press the boiler reset button (Fig. 29, **Item 1**).

Should the boiler fail to start after three attempts see Chapter 11 "Troubleshooting", page 55.

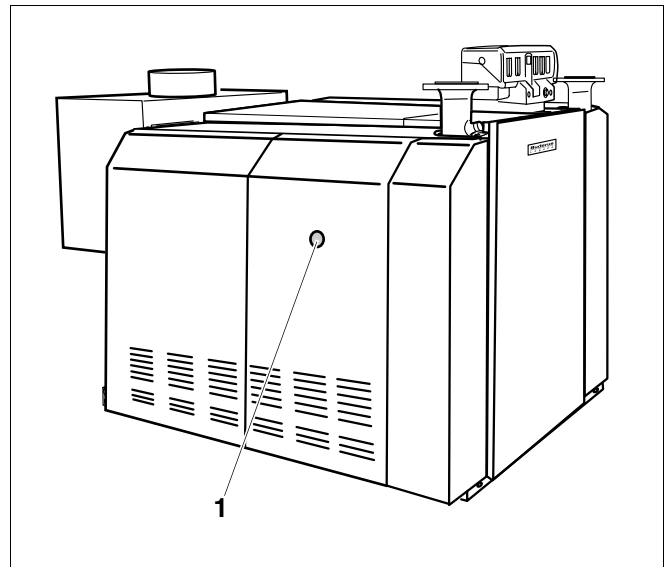


Fig. 29 Reset button

Item 1: Reset button

10.2 Burner faults on boilers with digital burner control unit (burner control unit MPA 50)

Any faults are indicated on the control device display.

- To reset, set the ON/OFF switch (Fig. 30, **Item 2**) to "0" (OFF).

After waiting approx. 3 minutes, set the ON/OFF switch (Fig. 30, **Item 2**) to "1" (ON). If the gas burner will not start after pressing the ON/OFF switch several times (see Chapter 11 "Troubleshooting", page 55).

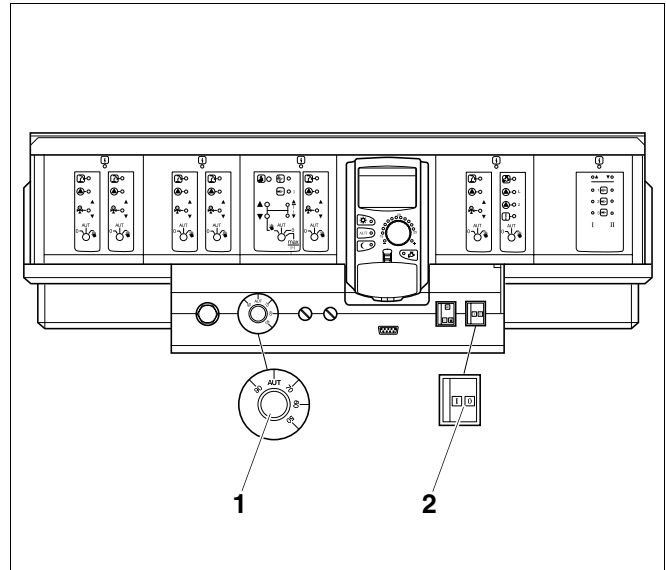


Fig. 30 Logamatic 4000 control unit

Item 1: Boiler control thermostat

Item 2: ON/OFF switch

11 Troubleshooting

11.1 Analog burner control unit

Fault	Possible causes for faults	Remedy
The burner does not start.	Heating system emergency stop switch ON?	Switch ON
	Control device ON/OFF switch ON?	Switch ON
	Fuses OK?	Check continuity and replace fuse, if required.
	Boiler water thermostat is satisfied?	Check and replace faulty parts, if required.
	High limit safety cut-out has tripped?	Check and replace faulty parts, if required.
	Fault signals from external safety equipment (e. g. low water indicator)?	Check the on-site installation of the heating system and correct faults; if required replace faulty devices.
Burner starts and enters fault state. No ignition spark recognised.	Ignition spark audible with ignition cable pulled off?	If not: Replace the ignition transformer. If yes: Replace ignition electrode or pilot burner, if required.
Burner starts and enters fault state. No pilot flame recognised.	Are all gas shut-off valves open?	Open all gas shut-off valves.
	Natural gas supply pressure > 10 mbar?	If not: Check cause and remedy fault.
	Gas supply pipe purged?	Purge until gas is flammable.
	Burner warm – pilot flame OK and cold burner – no pilot flame?	If yes: Replace the ignition transformer.
	Pilot burner nozzle contaminated?	Blow out pilot gas pipe and nozzle.
	Can you hear the pilot gas valve's opening click?	If not: Check wiring and plug contacts.
Burner starts and enters fault state. Only a very small pilot flame is recognisable.	Pilot burner nozzle contaminated?	Blow out pilot gas pipe and nozzle.
	Natural gas supply pressure > 10 mbar?	If not: Check cause and remedy fault.
Burner starts and enters fault state. A perfect pilot flame is recognisable. No ionisation current can be measured.	N and L leads interchanged?	Remedy the fault.
	Voltage between L and PE?	If not: Earth PE and install isolating transformer, if required.
	No proper ionisation lead contact?	Remedy fault and replace faulty part, if required.
	Earth connection at ionisation electrode?	
	Burner control unit faulty?	
Burner starts and enters fault state. A perfect pilot flame is recognisable. Ionisation current < 1.5 µA.	Ionisation electrode wire or ceramics contaminated?	Clean ionisation electrode and replace start-up burner, if required.
Boiling noises	Scale deposits or boiler scaling?	Clean the boiler waterways in accordance with manufacturer's details. Check and remedy the cause of constant water losses. If required, treat the water and install a dirt trap.

Fault	Possible causes for faults	Remedy
Main flame does not burn. Pilot flame burns constantly, but no fault.	Wiring not in accordance with wiring diagram?	Correct wiring in accordance with the wiring diagram.
	Gas solenoid valve or burner control unit faulty?	Check the gas solenoid valve or burner control unit, and replace faulty parts, if required.
	Contact not OK (loose contact)?	Check and replace contacts, if required.
Main flame burns very shallow. Unpleasant burner whistle. Burner sooty.	Are main gas nozzle and supply gas compatible?	If not: Install the correct main gas nozzle.
	Is the nozzle pressure adjusted correctly?	Check the setting details and correct, if required.
	Is the start-up load setting correct?	
	Is contamination of slots or below the burner rod slots obvious e.g. fluff, fibre, airborne seeds, building dust?	Carry out the burner wet cleaning process described in this manual. Determine the source of contamination and prevent further contamination. In case of airborne seed, install an air filter in the inlet air supply acc. to requirements.
Main flame burns very shallow. Unpleasant burner whistle. Burner sooty.	Do ventilation and extract apertures comply with local regulations or those stipulated by your local gas supply company?	In case of insufficient ventilation air, immediately and permanently remedy that shortcoming.
	Do apertures function permanently?	Carry out the dry and possibly wet cleaning process for the boiler described in this manual.
	Are deposits or fibre contamination visible on the heat exchanger surface? Visual check through the clean-out cover and combustion chamber.	
	Are burner rods damaged, deformed or individual slots deformed?	
Burner ignition very noisy and extreme combustion noises. Flame may be visible at the main gas nozzles.	Are the correct nozzles installed?	Shut the burner down, install new burner rod and remedy faulty gas conversion.
	Is the nozzle pressure adjusted correctly?	
	Is the start-up load setting correct?	
Flue gas odour inside the boiler room.	Does flue gas escape around the draught hood?	Determine and remedy the cause for insufficient flue draught. Shut the burner down, if the fault cannot be remedied immediately.
	Negative pressure in the flue pipe > 3 Pa?	
	Is the flue pipe blocked?	
	Is the size of the chimney OK?	
	Are fans used in the boiler room, which extract air from the room (extractor hoods, dryers...)?	
	Are deposits or fibre contamination visible on the heat exchanger surface? Visual check through the clean-out cover and combustion chamber.	Clean the boiler dry or, if required, wet.

11.2 Digital burner control unit



PLEASE NOTE

A sizeable number of current faults and earlier faults saved to the automatic device can be downloaded from the memory with a special MPA hand-held terminal. This makes a fault analysis substantially quicker and more reliable. A corresponding fault code table is included with the service set hand-held terminal.

Operating condition/faults observed	Troubleshooting	Remedy
The burner does not start.	Heating system emergency stop switch ON?	Switch ON.
	Control device ON/OFF switch ON?	Switch ON.
	Fuses OK?	Check continuity and faulty part, if required.
	Boiler water thermostat is satisfied?	Check and replace faulty part, if required.
	High limit safety cut-out has tripped?	Check and replace faulty part, if required.
	Has the flue gas monitor responded?	If the monitor responds repeatedly, check the flue gas system and carry out a flue gas monitor function check. Replace, if faulty.
Initial start-up: Burner starts and goes into a fault state after approx. 20 seconds. Fault display on the control device.	Info: The valve check system (leak monitor) of the burner control unit signals a gas valve leak.	Remedy the installation fault.
	Gas governor installed acc. to instructions?	
	Gas governor adjusted to the correct value?	
	Correct sequence observed during the gas type conversion?	
After commissioning: Burner attempts to start but goes into a fault state after approx. 20 seconds. Fault display on the control device.	Info: The valve check system (leak monitor) of the burner control unit signals a gas valve leak.	Due to contamination, one of the solenoid valves leaks and must be replaced.
After commissioning: Burner attempts to start but goes into a fault state after approx. 5 seconds. Fault display on the control device.	Info: The burner control unit has detected a flue gas sensor fault.	Remedy fault and replace sensor, if required.
	Is the flue gas sensor inserted?	
	Has the plug a loose contact or is there a break in the sensor lead?	

Operating condition/faults observed	Troubleshooting	Remedy
Initial start-up: Burner starts, gas valve click audible. Afterwards no further reaction discernible. Control device indicates no fault.	Info: The burner control unit detects insufficient gas pressure.	Remedy the installation fault.
	Gas governor installed acc. to instructions?	
	Gas governor adjusted to the correct value?	
	Correct sequence observed during the gas type conversion?	
After commissioning: Burner starts, gas valve click audible. Afterwards no further reaction discernible. Control device indicates no fault.	Info: The burner control unit detects insufficient gas pressure.	Does the gas pressure < comply with the stated values; determine the fault in the gas supply.
	Natural gas supply pressure >10 mbar?	
	LPG supply pressure > 25 mbar or 15 mbar	Pressure OK – check and, correct the gas governor settings, if required.
	Gas governor adjusted acc. to instructions?	
Burner starts but goes into a fault state approx. 3 minutes after the second start. Fault display on the control device. No ignition spark recognised.	Ignition spark audible with ignition cable pulled off?	If not: Replace intermittent ignition.
		If yes: Replace ignition electrode or pilot burner.
Burner starts but goes into a fault state approx. 3 minutes after the second start. Fault display on the control device. No or only a very small pilot flame is recognisable.	Gas supply pipe purged?	Purge until gas is flammable.
	Pilot gas nozzle contaminated?	Blow out pilot gas pipe and nozzle.
	Burner warm – pilot flame OK and cold burner – no pilot flame?	If yes: Replace intermittent ignition.
	Can you hear the pilot gas valve's opening click?	If not: Check wiring and plug contacts.
Burner starts but goes into a fault state approx. 3 minutes after the second start. Fault display on the control device. A perfect pilot flame is recognisable. No ionisation current can be measured.	N and L leads interchanged?	Remedy the fault.
	Voltage between L and PE?	If not: Earth PE and install isolating transformer, if necessary.
	No proper ionisation lead contact?	Remedy fault and replace faulty part, if required.
	Ionisation electrode short to earth?	
	Burner control unit faulty?	
Burner starts but goes into a fault state approx. 3 minutes after the second start. Fault display on the control device. A perfect pilot flame is recognisable. Ionisation current < 1.5 µA.	Ionisation electrode wire or ceramics contaminated?	Clean the electrode or, if necessary, replace the pilot burner.
Main flame does not burn. Pilot flame burns constantly, but no fault.	Wiring not in accordance with wiring diagram?	Correct wiring in accordance with the wiring diagram.
	Gas solenoid valve or burner control unit faulty?	Check the gas solenoid valve or burner control unit, and replace faulty parts, if required.
	Contact not OK (loose contact)?	Check contacts and renew, if required.

Operating condition/faults observed	Troubleshooting	Remedy
Main flame burns for approx. 2 to 5 minutes. Then the burner goes off and only restarts after 15 minutes. The control device also indicates a fault intermittently.	Info: The integral flue gas monitor recognises flue gas escaping from the draught hood.	Determine and remedy the cause for insufficient flue draught. Shut the burner down, if the fault cannot be remedied immediately. Info: flue gas escaping during a heat demand will be tolerated four times. A fault shutdown is activated the fifth time this occurs.
	Negative pressure in the flue pipe > 3 Pa?	
	Is the flue pipe blocked?	
	Is the size of the chimney OK?	
Main flame burns very shallow. Unpleasant burner whistle. Burner sooty.	Are fans used in the boiler room, which extract air from the room (extractor hoods, dryers ...)?	If not: Install correct nozzles. Check the setting details and correct, if required. Carry out the burner wet cleaning described in this manual. Determine the source of contamination and prevent further contamination. In case of airborne seed, install an air filter in the inlet air supply acc. to requirements. In case of insufficient ventilation air, immediately and permanently remedy that shortcoming. Clean the boiler dry or, if required, wet. Replace the burner grate. Determine and remedy the cause of the fault. Info: Damage and deformation only arise, if one of the faults listed above has occurred.
	Are the main gas nozzles suitable for the re-checked gas supply?	
	Is the nozzle pressure adjusted correctly?	
	Is the start-up load setting correct?	
	Is contamination of slots or below the burner rod slots obvious (e.g. fluff, fibres, airborne seeds, building dust)?	
	Do ventilation and extract apertures comply with local regulations or those stipulated by your local gas supply company?	
	Do apertures function permanently?	
Are deposits or fibre contamination visible on the heat exchanger surface (visual check through the clean-out cover and combustion chamber)?		
Are burner rods damaged, deformed or individual slots deformed?		
Burner ignition very noisy and extreme combustion noises. Flame may be visible at the main gas nozzles.	Are the correct nozzles installed?	Shut the burner down, install new burner grate and remedy faulty gas conversion.
	Is the nozzle pressure adjusted correctly?	
	Is the start-up load setting correct?	

Operating condition/faults observed	Troubleshooting	Remedy
Flue gas odour inside the boiler room.	Does flue gas escape around the draught hood?	Determine and remedy the cause for insufficient flue draught. Shut the burner down, if the fault cannot be remedied immediately.
	Negative pressure in the flue pipe >3 Pa?	
	Is the flue pipe blocked?	
	Is the size of the chimney OK?	
	Are fans used in the boiler room, which extract air from the room (extractor hoods, dryers ...)?	
	Are deposits or fibre contamination visible on the heat exchanger surface? Visual check through the clean-out cover and combustion chamber.	Clean the boiler dry or, if required, wet.

12 Boiler operating conditions for countries outside the EU

This chapter details the boiler operating conditions for countries, where EN 437 does not apply (countries outside the EU), as well as their operation with Logamatic control devices from Buderus. By maintaining these conditions you can achieve high quality usage and a long service life from applying the European standard. Subject to the type and magnitude of any deviation from the following operating conditions, the operation may become prone to faults, which may ultimately lead to the destruction of the boiler or individual components.



PLEASE NOTE

Observe all standards and guidelines applicable to the operation of this system in your country.

Please note the details on the boiler type plate. These are decisive and must be observed.

12.1 Power supply conditions

Operating conditions	Dimension		Notes – More detailed requirements
Boiler supply voltage	V	185 – 244	The housing/boiler must be earthed for personnel protection and function. The flame monitor requires a connection between neutral and earth. Install an isolation transformer, where this connection is not already established, e.g. through two-phase operation.
Fuse	A	10	
Frequency	Hz	47.5 – 63	sinusoidal voltage curve
Protection	–	–	IP40

Tab. 23 Power supply

12.2 Boiler room conditions

Operating conditions	Dimension		Notes – Requirement in greater detail
Operation – ambient temperature	°C	+ 5 to +40	Boiler room temperature
relative humidity	%	max. 90	No dew formation or precipitation inside the boiler room
dust/airborne seeds	–	–	<p>Excessive dust must be prevented inside the boiler room, when the boiler is operating, e.g.:</p> <ul style="list-style-type: none"> ● building dust through very dusty building measures <p>The inrushing combustion air must not be excessively dusty, e.g.:</p> <ul style="list-style-type: none"> ● air supply loaded with dust from dirt roads and paths. ● air supply loaded with dust from production and processing facilities, e.g. quarries, mines, etc. <p>Combustion air supplied from outside must not be excessively loaded with airborne seeds, which should be prevented, where required, by air filters, e.g.</p> <ul style="list-style-type: none"> ● airborne seed from composite blossom
halogenated hydrocarbon compounds	–	–	<p>The combustion air must be free from halogenated hydrocarbon compounds.</p> <ul style="list-style-type: none"> ● Identify the source of halogenated hydrocarbon compounds and eliminate their ingress. Where this is impossible, route combustion air from areas which are not contaminated by halogenated hydrocarbon compounds. <p>Observe the following:</p> <ul style="list-style-type: none"> – Buderus Catalogue Heating Technology Germany – Code of Practice K 3 (Information Sheet No. 1 of the Federal Association of the Germany Heating Industry)
fans, which extract air from the boiler room.	–	–	<p>During burner operation, no mechanical air handling equipment may be operated, which would extract combustion air from the boiler room, e.g.:</p> <ul style="list-style-type: none"> ● cooker hood ● dryer ● ventilation equipment
small animals	–	–	Protect the boiler room and particularly the combustion air inlet against ingress of small animals, e.g. by means of a grille.
fire protection	–	–	Maintain clearances between the boiler and flammable materials in accordance with local regulations. Generally, maintain a minimum clearance of 40 cm. Never store flammable materials or liquids in the vicinity of the boiler.
flooding	–	–	In case of an acute risk of flooding, disconnect the gas-fired boiler from its power supply and shut off the gas supply before water enters the boiler room. Any valves and control equipment which comes into contact with water, must be replaced before re-commissioning.

Tab. 24 Installation conditions – environment

12.3 Conditions for air supply and flue pipes

Operating conditions	Dimension	Boiler output (in case of multi-boiler systems = total output) in kW	Air supply cross-section in cm ² (unrestricted aperture)
Cross-section for the supply of combustion air from outside – total output of all combustion equipment in kW	cm ²	100 to 150	350
		150 to 200	450
		200 to 250	550
		250 to 300	650
		300 to 350	750
		350 to 400	850

Operating conditions	Dimension		Notes – More detailed requirements
Required flue gas system draught (negative pressure inside the flue pipe)	Pa	3 – 30	Only operate these boilers with a chimney or flue gas system, which supply the stated draught during operation. Only use non-flammable materials.

Tab. 25 Air supply and flue pipe

12.4 Conditions for fuel – natural gas H (physical requirements)

Operating conditions	Dimension		Notes – More detailed requirements
General information	–	–	Only use natural gas as fuel. The following are, amongst others, not permissible: <ul style="list-style-type: none"> ● Propane:air mixtures ● Sewer gas ● Biogas ● Pit gas ● Methane
Wobbe index (Ws)	kWh/m ³ _n	12.0 – 16.1	Ws at 0 °C; 1013 hPA
Gross calorific value (Hs)	kWh/m ³ _n	9.5 – 13.1	
Relative density	–	0.55 – 0.75	
Water content – dewpoint	°C	max. + 5	
Dust, mist, liquid	–	–	Technically free, i.e. a constant operation of gas systems will not lead to accumulation, which causes reductions in the cross-section of valves, strainers and filters.
Hydrocarbons – condensing point	°C	–	Ground temperature at the respective pipe pressure.
Supply pressure	mbar	17.0 – 25.0 (10.0)	The additional "Gas pressure switch" is required for systems, where the supply pressure can temporarily fall below 17 mbar.
Static pressure (burner OFF)	mbar	max. 30	
Protection against overpressure upstream of the boiler	mbar	max. 100.0	The stated pressure must not be exceeded in case of faults caused by a failure of the supply network pressure regulator. Ensure the protection against overpressure through the installation of a safety shut-off valve or a safety blow-off valve.

Tab. 26 Fuel – natural gas H (physical requirements)

12.5 Conditions for fuel – natural gas H (chemical requirements)

Operating conditions	Dimension		Notes – More detailed requirements
Water content	%	max. 23	
Total sulphur content	mg/m ³	max. 100	Including the sulphur content through use of odouriser.
Total peak sulphur content	mg/m ³	max. 150	Including the sulphur content through use of odouriser.
Hydrogen sulphide	mg/m ³	max. 5	
Ammonia content	mg/m ³	max. 3	

Tab. 27 Fuel – natural gas H (chemical requirements)

12.6 Conditions for fuel – LPG butane/propane mixtures (chemical requirements)

Operating conditions	Dimension		Notes – More detailed requirements
Butane content	% in weight	max. 60	
Gaseous constituents (H ₂ , N ₂ , O ₂ , CH ₄)	% in weight	max. 0.2	
Sulphur content	mg/kg	max. 50	
Supply pressure	mbar	32 – 50	
Protection against overpressure	mbar	max. 100	The stated pressure must not be exceeded in case of faults caused by a failure of the supply network pressure regulator. Ensure the on-site protection against overpressure.

Tab. 28 Fuel – LPG – butane/propane mixtures

12.7 Conditions for fuel – LPG propane (chemical requirements)

Operating conditions	Dimension		Notes – More detailed requirements
Butane content	% in weight	max. 5	
Gaseous constituents (H ₂ , N ₂ , O ₂ , CH ₄)	% in weight	max. 0.2	
Sulphur content	mg/kg	max. 50	
Supply pressure	mbar	30 – 50	
Protection against overpressure	mbar	–	The stated pressure must not be exceeded in case of faults caused by a failure of the supply network pressure regulator. Ensure the on-site protection against overpressure.

Tab. 29 Fuel – LPG propane (chemical requirements)

12.8 Conditions for hydraulics and water quality

Operating conditions	Dimension		Notes – More detailed requirements
Operating pressure (overpressure)	bar	1.0 – 6.0	
Permissible site test pressure	bar	1.0 – 6.0	
Protection against over-temperatures via "TR" thermostat	°C	50 – 105	
Protection against over-temperatures via "STB" high limit safety cut-out	°C	100 – 120	In some areas adjustable on site from 100 to 120 °C
Boiler fill water	–	–	Only use drinking water to fill and top-up the boiler. Observe the manual "Water treatment – requirements for heating water". This manual is included with the technical documentation.

Tab. 30 Hydraulics; water quality

12.9 Operating conditions

Always maintain the operating conditions to safeguard the perfect boiler function. It may be necessary to install a second annular butterfly valve with actuator motor (Fig. 31, **Item 1**) (accessory) in place of the adaptor (Fig. 31, **Item 2**) in the l.h. boiler block. This is the case,

- if no external components are used to reduce the volume flow (e.g. control of the heating circuit actuators or external butterfly valve through the control unit), and
- if the functionality of the control unit used cannot maintain the Buderus EcoStream conditions (Buderus control units for modulating low temperature operation, applicable for medium and large boilers are equipped with this control logic).

In such cases, please contact your nearest Buderus sales office.

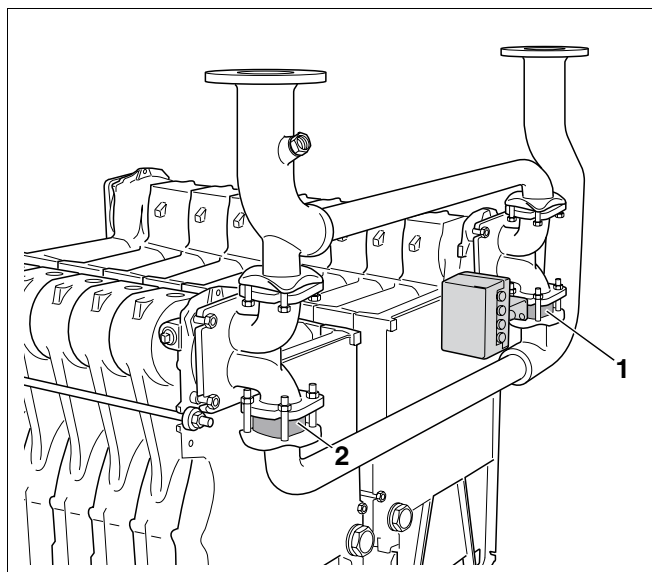


Fig. 31 Adaptor

Item 1: Annular butterfly valve with actuator motor

Item 2: Adaptor

Boiler	Operating conditions			
	Boiler water volume flow	Operating flow temperature at burner "ON"	Operating interruption (complete boiler shutdown)	Min. return temperature
in conjunction with a Logamatic control device for modulating low-temperature operation				
Logano GE434	No requirements	No requirements Operating temperatures are safeguarded by the Logamatic control device ¹	No requirements	No requirements
in conjunction with a Logamatic control device for constant boiler water temperatures, expanded by external control				
Logano GE434	No requirements	60 °C ²	No requirements	No requirements

Tab. 31 Operating conditions

- ¹ If heating circuits (pumps, actuators) or a boiler circuit actuator (control of the operating flow temperature) cannot be regulated via the control device, an operating temperature of 50 °C must be reached within 10 minutes of switching the burner ON by means of restricting the volume flow.
- ² Boiler control thermostat setting: When the burner is ON, the minimum boiler water temperature inside the boiler must be reached and maintained as minimum temperature within 10 minutes by suitable means, e.g. a reduction in volume flow.

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Konformitätserklärung

Declaration of conformity

Déclaration de conformité

Wir
We
Nous

Buderus Heiztechnik GmbH, D-35576 Wetzlar

erklären in alleiniger Verantwortung, dass die Heizkessel-Reihe
declare under our responsibility that the boiler series
déclarons sous notre seule responsabilité que le série des chaudières

Logano GE434 / ... (B)

konform ist mit den Anforderungen der Richtlinien
is in conformity with the requirements of the directives
est conforme aux exigences des directives

Richtlinie Directive Directive	Norm Standard Norme	Bemerkung Remark Remarque
90/396/EEC gas appliance directive	EN 656	PIN: CE-0085AS0285 GE434 CE-0461AT0339 GE434(B) Notified Body : 0085
92/42/EEC boiler efficiency directive	-	PIN: CE-0085AS0285 GE434 CE-0461AT0339 GE434(B) Notified Body : 0085
73/23/EEC low voltage directive	EN 60335 EN 50165	-
89/336/EEC EMC directive	EN 55014 EN 60730-1 EN 50081-1	-
97/23/EC* pressure equipment directive	TRD 702	Module B : Z-FDK-MUC-00-318302-03 Module D : 0091

* nur gültig für den Betrieb als Heißwassererzeuger (mit TS>110°C)
effective only if operating as hot water boiler (with TS>110°C)
uniquement valable pour chaudière chauffage seul (avec TS>110°C)

Ergänzung für Deutschland :
Supplement for Germany :
Supplément pour l'Allemagne :

● EnEV vom 16.11.2001 :

Niedertemperaturkessel nach § 2, Abs. 10

Wetzlar, 08.04.2002

BUDERUS HEIZTECHNIK GMBH
Geschäftsführung

Becker

Dr. Schulte

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