

Installation and maintenance instructions for contractors

Wall mounted gas condensing boiler

from FW 1.20

FGB wall mounted gas condensing boiler

FGB-K wall mounted gas condensing combi boiler

FGB-28

FGB-35

FGB-K-28

FGB-K-35



1.	Information on documentation / standard delivery	3
2.	Safety instructions	5
3.	Dimensions	8
4.	Specification	9
5.	Set-up	10
6.	Standards and regulations	12
Installation		
7.	Positioning	15
8.	Installation dimensions	16
9.	Opening the casing	17
10.	Installation	18
11.	Gas connection	19
12.	Fitting the trap	20
13.	Air/flue gas routing	21
Control unit		
14.	Electrical connection	22
15.	Control unit	28
16.	HG control parameters	33
17.	Parameter description	35
Commissioning		
18.	Filling the heating system / trap	44
19.	Filling for optional appliance versions	50
20.	Draining the heating system	51
21.	Determining the gas type	52
22.	Checking the gas supply pressure	53
24.	Adjusting the maximum heating output	56
25.	Checking the combustion parameters	57
26.	High efficiency pump function description	58
27.	Commissioning report	60
Maintenance		
28.1.	Maintenance – Fault messages	62
28.2.	Maintenance – Spare parts maintenance set	63
28.3.	Preparing for maintenance	64
28.4.	Determining the soiling level on the heating water heat exchanger (flue gas side)	65
28.5.	Burner maintenance	66
28.6.	Checking the ignition ionisation electrode	68
28.7.	Cleaning the trap / checking the expansion vessel	69
28.8.	Removing the heat exchanger	70
28.9.	Assembling the heat exchanger	72
29.	Checking the DHW heating	75
Specification		
30.	Safety devices	76
32.	Design information, underfloor heating / DHW circulation	93
33.	Service report	94
34.	Troubleshooting	95
35.	FGB wiring diagram	99
36.	Product fiche according to Regulation (EU) no. 811/2013	100
37.	Technical parameters according to EU regulation no. 813/2013 ..	102
	EU DECLARATION OF CONFORMITY	103

Other applicable documents

Operating instructions for users

Also applicable are the instructions for all accessory modules and any further accessories used.

Safekeeping of these documents

The system user or operator should ensure the safekeeping of all instruction manuals and documents.

Pass on these installation instructions as well as all other applicable manuals to the system user or operator.

Instructing the system user

- Instruct the system user to take out an inspection and maintenance contract with an approved contractor.
- Inform the system use that the annual inspection and maintenance may only be performed by an approved contractor.
- Inform the system use that repair work may only be performed by an approved contractor.
- Inform the system user that only original spare parts may be used.
- Inform the system user that no technical changes may be made to the boiler or control unit.
- Inform the system user that they are responsible for the safety, environmental compatibility and energy quality of the heating system (German Immission Control Act/Energy Saving Ordinance) [Germany].
- Inform the system user that these instructions and the other applicable documents must be kept in a safe place

Applicability of these instructions

These installation instructions apply to the FGB-(K) gas condensing boilers.

Recycling and disposal

- Old equipment may only be disconnected from the gas and electricity supply by a qualified contractor.
- Always dispose of materials according to environmental, recycling and waste management standards.
- Old equipment, worn parts, defective components and liquids and oils which are a hazard to the environment must be disposed of or recycled according to the applicable waste disposal regulations in an environmentally compatible manner.
They must not be disposed of as household waste.
- Dispose of packaging made of cardboard, recyclable plastics and synthetic filler materials in an environmentally compatible manner through appropriate recycling systems or a recycling centre.
- Please observe the applicable national and local regulations

Standard delivery

- 1 x gas condensing boiler, ready to connect, with casing
- 1 x suspension bracket for wall mounting
- 1 x installation and maintenance instructions for contractors
- 1 x operating instructions for users
- 1 x commissioning checklist
- 1 x power cable with standard plug, flexible, 3 x 0.75 mm²
- 1 x M16 cable gland
- 3 x M12 cable glands
- 5 x cable ties
- 1 x trap
- 1 x 1000 mm condensate hose
- 1 x bleed key

Accessories

The following accessories are required for installing the gas condensing boiler:

- Air / flue gas accessories (see design information)
 - Condensate drain outlet with hose retainer
 - Maintenance shut-off valves for heating flow and return
 - Gas ball valve with fire protection
 - Safety assembly for DHW
 - Cylinder connections short circuiting pipework (for heating operation only)
- Other accessories as per pricelist.

Authorised personnel should read these instructions before any installation, commissioning or maintenance work. Observe the instructions given in this document. Failure to observe these installation instructions voids any WOLF warranty.

In some countries, the installation of a gas boiler must be notified to and approved by the relevant gas supply company.

Please note that regional permits may be required for the flue system and for connecting the condensate drain to the public sewer.

Before installation work begins, the local flue gas inspector and water authority must be informed.

The gas condensing boiler must be installed, commissioned and maintained by qualified and trained personnel only. In accordance with VDE 0105 Part 1, work on electrical components (e.g. control units) must only be carried out by qualified electricians.

Electrical installation work is governed by VDE/ÖVE regulations and those of your local power supply utility.

Only operate the gas condensing boiler within its output range, which is stated in the technical documentation supplied by WOLF. Intended use of the boiler includes the exclusive use for hot water heating systems in accordance with DIN EN 12828.

The gas condensing boiler is intended solely for installation and operation in sealed unvented heating systems.

Never remove, bypass or otherwise disable any safety or monitoring equipment. Only operate the boiler when it is in perfect technical condition.

Any faults or damage which impact or might impact upon safety must be remedied immediately by a qualified contractor. Only replace faulty components and equipment with original WOLF spare parts.

Symbols

The following warning symbols are used in these instructions.

These relate to personal safety and operational reliability.



Instructions that must be followed precisely in order to prevent risk and injury to persons.



Instructions that must be followed precisely in order to prevent risk and injury to persons from live electrical components.

Please note Indicates technical instructions that must be observed to prevent damage to the boiler and malfunctions.



Danger: if you smell gas

- Close the gas tap.
- Open the windows.
- Do not operate any electrical switches.
- Extinguish naked flames.
- Phone the gas supply utility company and an approved contractor from an external location.



Danger from "live" electrical components

Never touch electrical components or contacts when the ON/OFF switch is in the ON position. There is a danger of electrocution, resulting in a risk to health or death. The main terminals are 'live', even when the ON/OFF switch is in the OFF position.

The main terminals are 'live', even when the appliance is set to "OFF".



Danger: if you smell flue gas

- Switch OFF the appliance.
- Open windows and doors.
- Notify an approved contractor.



Risk of scalding

Boilers may contain hot water. Hot water can cause severe scalding. Before working on parts which are in contact with water, allow the appliance to cool to below 40 °C, shut off all valves and, if necessary, drain the appliance.



Risk of burns

Boiler components may be extremely hot. Hot components can cause burns. Before working on the opened up appliance, allow it to cool below 40 °C or wear suitable gloves.



The boiler is intended solely for installation and operation in sealed unvented heating systems.

**Danger from pressurised water**

Boilers are subject to high water pressure.

Water pressure can cause severe injuries.

Before working on parts which are in contact with water, allow the appliance to cool to below 40 °C, shut off all valves and, if necessary, drain the appliance.

Note:

Sensors can be in contact with water and therefore exposed to pressure.

Working on the system

- Close the gas shut-off valve and secure it against unintentional reopening.
- Isolate the system from the power supply (e.g. by removing the separate mains fuse or by means of a main switch or a heating emergency stop switch) and check to ensure there is no voltage.
- Safeguard the system against reconnection.

Inspection and service

- Ensure the correct operation of the gas boiler by having a contractor carry out inspections at least once a year and maintenance/repair when required.
- (DVGW - TRGI 2008 - G600).
We recommend arranging a suitable maintenance contract.
- The operator is responsible for the safety, environmental compatibility and energy quality of the heating system (German Immission Control Act/Energy Saving Ordinance) [Germany].
- Only use genuine WOLF spare parts.

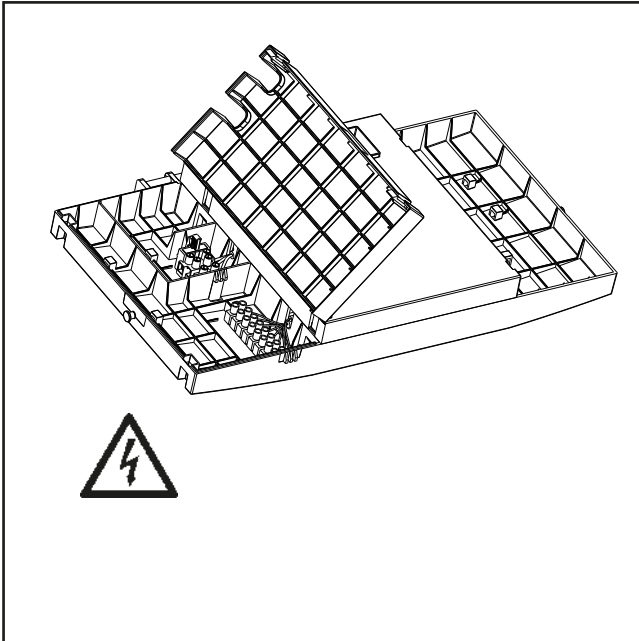


Fig: Terminal box: Danger through 'live' electrical components.

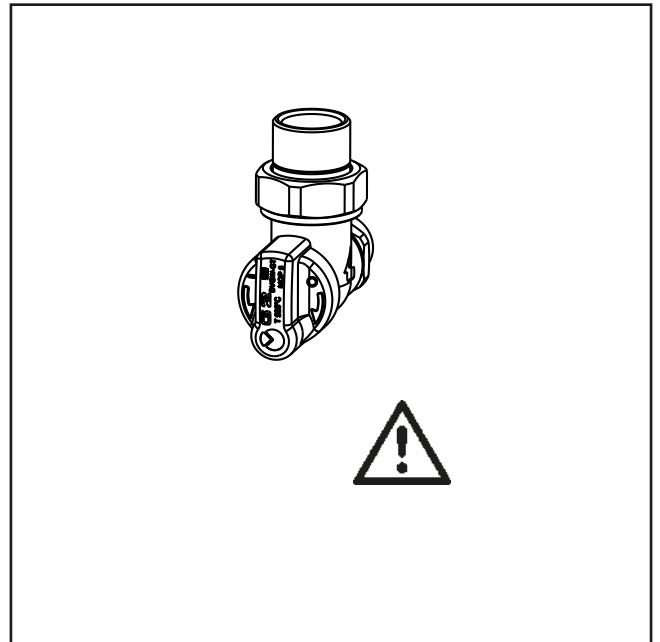


Fig: Gas connection: Risk of poisoning or explosion in the event of gas escaping.

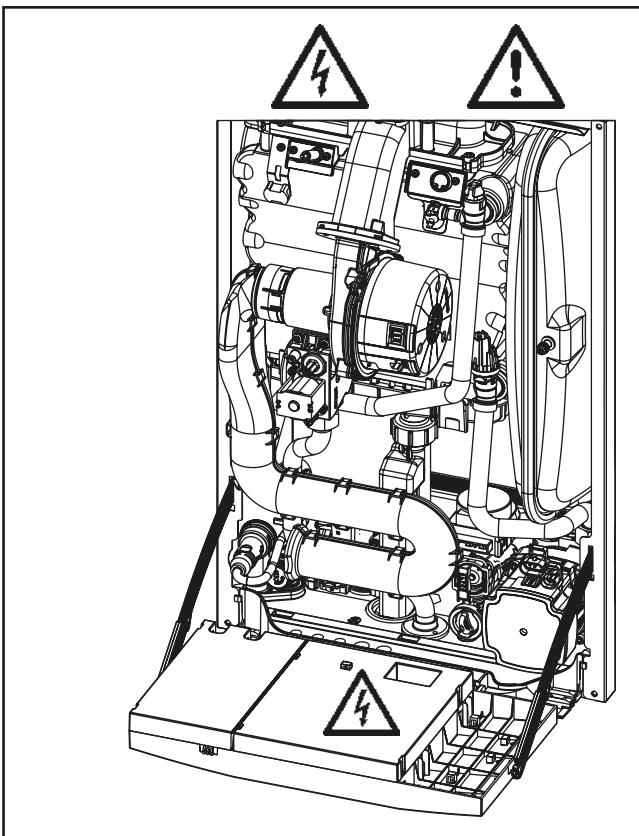


Fig: Ignition transformer, high voltage ignition electrode, combustion chamber, 3-way diverter valve, pump and fan
Danger through 'live' electrical components, danger from ignition voltage, danger of burns from hot components.

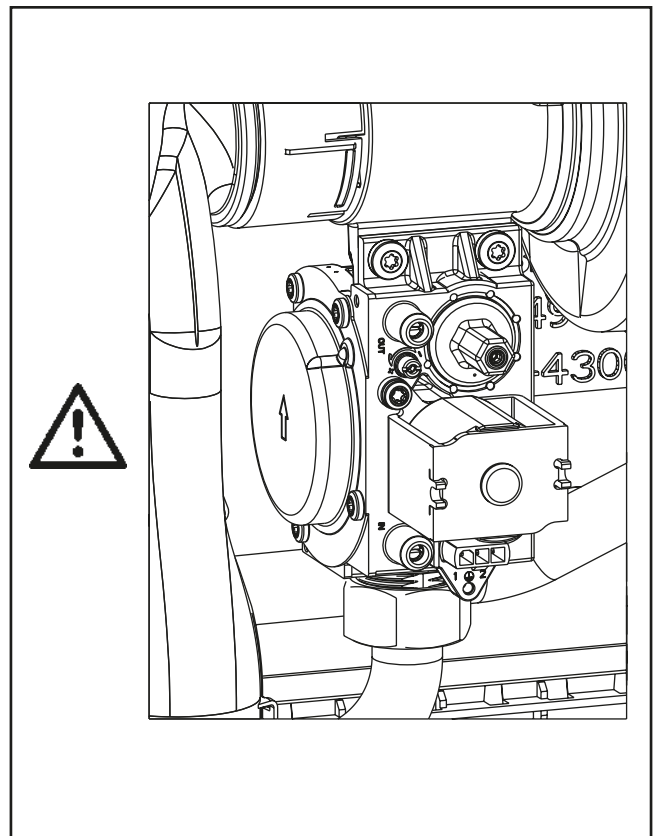
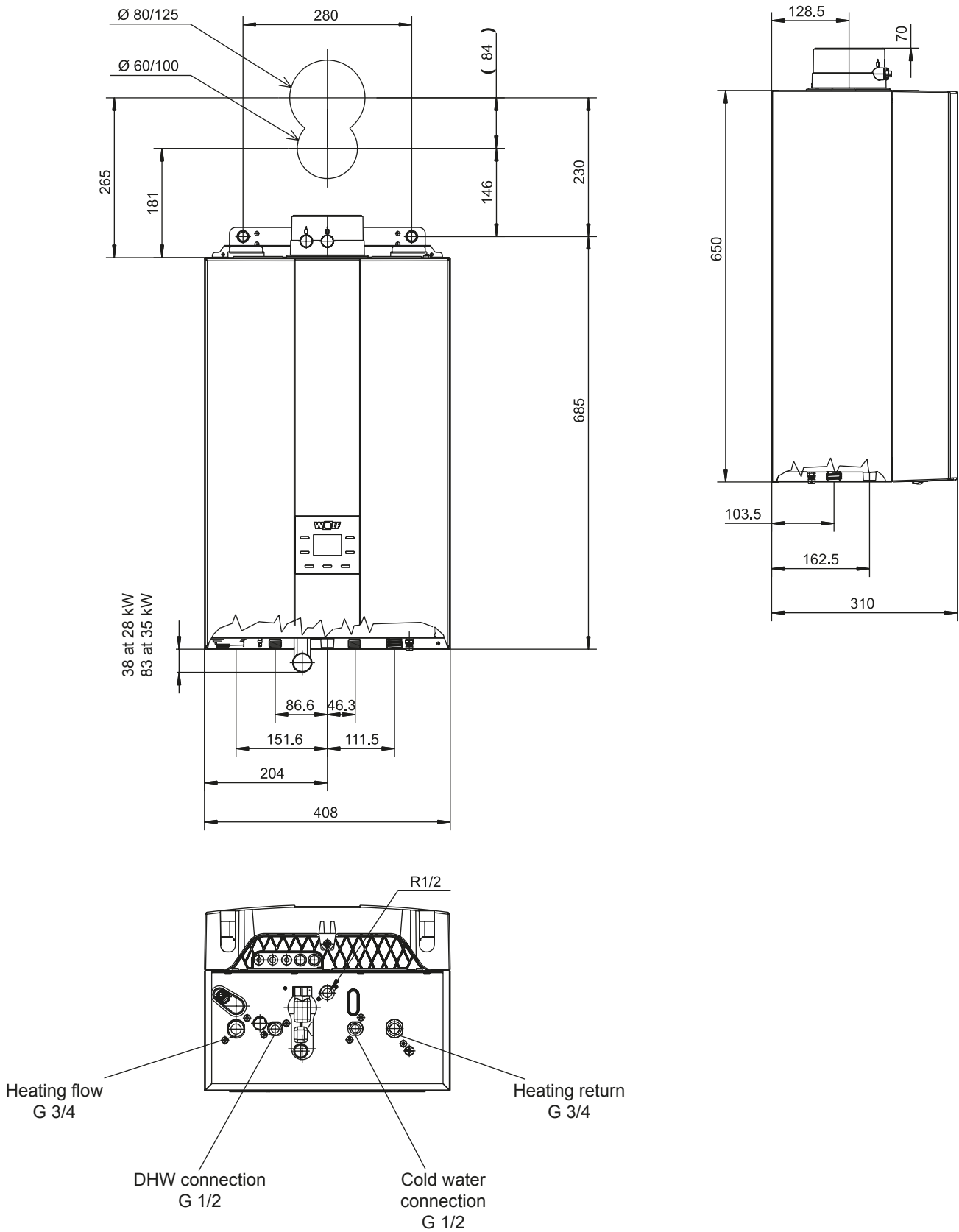


Fig: Gas combination valve
Risk of poisoning or explosion in the event of gas escaping.

3. Dimensions

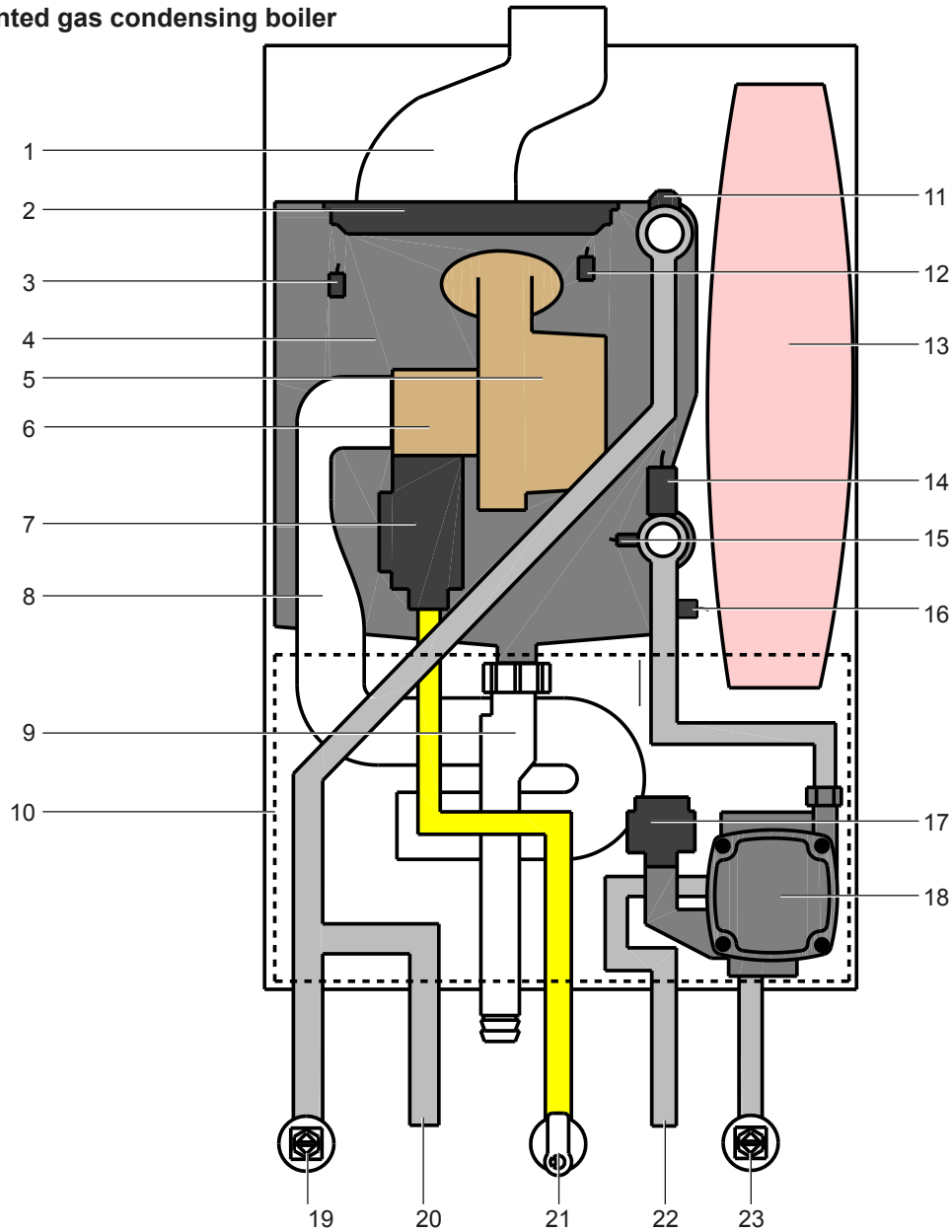


4. Specification

Type		FGB-28	FGB-35	FGB-K-28	FGB-K-35
Rated heating output at 80/60 °C	kW	24.4/27.3 ¹⁾	31.1/34 ¹⁾	24.4/27.3 ¹⁾	31.1/34 ¹⁾
Rated heating output at 50/30 °C	kW	27.3	34.9	27.3	34.9
Rated heat input	kW	25/28 ¹⁾	32/35 ¹⁾	25/28 ¹⁾	32/35 ¹⁾
Lowest heating output (modul.) at 80/60 °C	kW	4.8	6.7	4.8	6.7
Lowest heating output (modul.) at 50/30 °C	kW	5.3	7.5	5.3	7.5
Lowest heat input (modul.)	kW	4.9	6.9	4.9	6.9
Heating flow connection	G	3/4"(DN 20)		3/4"(DN 20)	
Heating return connection	G	3/4"(DN 20)		3/4"(DN 20)	
DHW connection / DHW circulation	G	1/2"		1/2"	
Cold water connection	G	1/2"		1/2"	
Gas connection	R	1/2"		1/2"	
Balanced flue connection	mm	60/100		60/100	
Dimensions	Depth	310		310	
	Width	408		408	
	Height	720 (incl. device connection flange)			
Balanced flue system	Type	B23P, B33P, C13(x), C33(x), C43(x), C53(x), C63(x), C83(x), C93(x)			
Gas category		see table on page 44			
Gas supply details					
Natural gas E/H (Hi [net cv]=9.5 kWh/m ³ =34.2 MJ/m ³)	m ³ /h	2.63/2.94	3.36/3.68	2.63/2.94	3.36/3.68
Natural gas LL (Hi [net cv]=8.6 kWh/m ³ =31.0 MJ/m ³)	m ³ /h	2.90/3.25	3.72/4.06	2.90/3.25	3.72/4.06
LPG (Hi [net cv]=12.8 kWh/m ³ =46.1 MJ/m ³)	kg/h	1.95/2.18	2.5/2.73	1.95/2.18	2.5/2.73
Natural gas supply pressure (permissible min./max.)	mbar	see table on page 44		see table on page 44	
LPG supply pressure (permissible min./max.)	mbar	see table on page 44		see table on page 44	
Efficiency at rated load at 80/60 °C (Hi[net cv]/Hs[gross cv])	%	98/88	98/88	98/88	98/88
Efficiency at 30 % partial load and TR=30 °C (Hi[net cv]/Hs[gross cv])	%	109/98	109/98	109/98	109/98
Flow temperature. factory setting	°C	75		75	
Flow temperature up to approx.	°C	85		85	
Max. overall positive pressure. heating circuit	bar	2.5		2.5	
Max. residual head for heating circuit: High efficiency pump (EEI<0.20)					
1075 l/h pump rate (25 kW at dt=20 K)	mbar	450	450	450	450
1376 l/h pump rate (32 kW at dt=20 K)	mbar	-	350	-	350
Max. permiss. overall positive pressure	bar			10	10
DHW throughput	l/min			2.0-14.4	2.0-14.4
Minimum flow pressure 15502-2-2	bar			0.2	0.3
DHW temperature range (adjustable)	°C			30-65	30-65
Spec. water throughput "D" at ΔT = 30 K	l/min			13.4	16.3
Expansion vessel. total capacity	l	8	8	8	8
Expansion vessel. pre-charge pressure	bar	0.75-0.95	0.75-0.95	0.75-0.95	0.75-0.95
Flue gas temperature 80/60-50/30 at Qmax	°C	85-65	70-50	85-65	70-50
Flue gas temperature 80/60-50/30 at Qmin	°C	50-40	50-40	50-40	50-40
Flue gas mass flow rate at Qmax	g/s	11.2/12.50	14.26/15.50	11.2/12.50	14.26/15.50
Flue gas mass flow rate at Qmin	g/s	2.33	3.25	2.33	3.25
Available gas fan draught at Qmax	Pa	150	160	150	160
Available gas fan draught at Qmin	Pa	8	12	8	12
Flue gas category		G52		G52	
NOx class		6		6	
Amount of condensate at 50/30 °C	l/h	ca. 1.0	ca. 1.7	ca. 1.0	ca. 1.7
pH value of condensate		ca. 4.3	ca. 4.3	ca. 4.3	ca. 4.3
Power consumption in standby	W	2	2	2	2
Power consumption	W	max. 102	max. 114	max. 102	max. 114
IP rating	IP	IPX4D	IPX4D	IPX4D	IPX4D
Power supply/fuse/MCB protection		230V / 50Hz / 3.15A		230V / 50Hz / 3.15A	
Total weight (wall mounted gas condensing boiler)	kg	27	28	27	28
CE ID number		CE-0085CQ0261		CE-0085CQ0261	

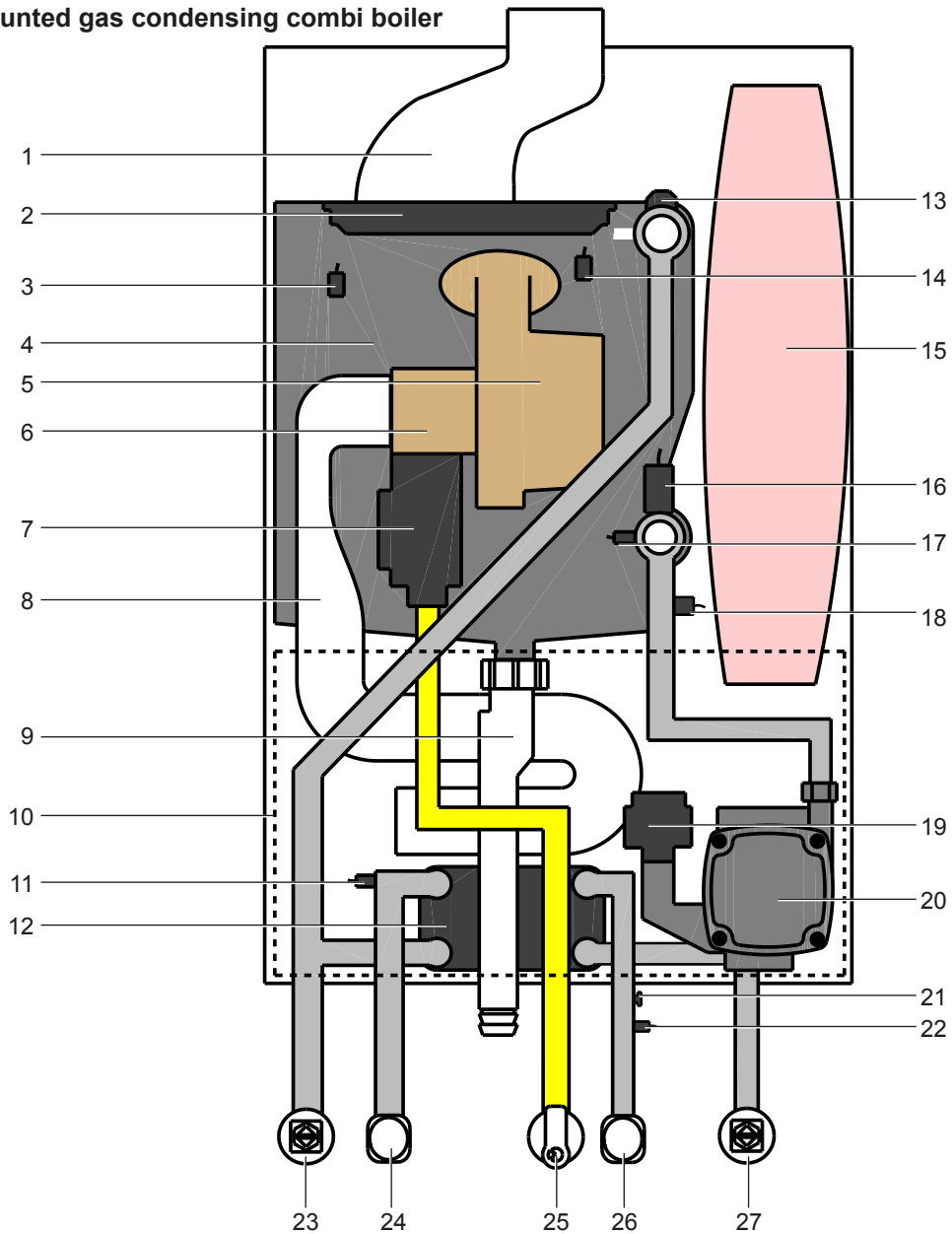
1) Heating mode / DHW mode

FGB wall mounted gas condensing boiler



- | | |
|---|---|
| 1 Flue pipe | 13 Expansion vessel |
| 2 Burner | 14 Pressure sensor |
| 3 Boiler water temperature sensor | 15 Return temperature sensor |
| 4 Heating water heat exchanger | 16 Flue gas temperature sensor |
| 5 Gas fan | 17 3-way valve (motor) |
| 6 Mixing valve (venturi insert) | 18 Heating circuit pump with air vent valve |
| 7 Gas valve | 19 Heating flow |
| 8 Inlet pipe | 20 Cylinder flow |
| 9 Trap | 21 Gas supply pipe |
| 10 Control unit casing | 22 Cylinder return |
| 11 Air vent valve | 23 Heating return |
| 12 Combustion chamber - high limit safety cut-out | |

FGB-K wall mounted gas condensing combi boiler



- | | |
|---|---|
| 1 Flue pipe | 15 Expansion vessel |
| 2 Burner | 16 Pressure sensor |
| 3 Boiler water temperature sensor | 17 Return temperature sensor |
| 4 Heating water heat exchanger | 18 Flue gas temperature sensor |
| 5 Gas fan | 19 3-way valve (motor) |
| 6 Mixing valve (venturi insert) | 20 Heating circuit pump with air vent valve |
| 7 Gas valve | 21 Flow limiter |
| 8 Inlet pipe | 22 Flow sensor |
| 9 Trap | 23 Heating flow |
| 10 Control unit casing | 24 DHW connection |
| 11 DHW outlet temperature sensor | 25 Gas supply pipe |
| 12 Plate heat exchanger | 26 Cold water connection |
| 13 Air vent valve | 27 Heating return |
| 14 Combustion chamber - high limit safety cut-out | |

6. Standards and regulations

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

Observe the information on the boiler type plate.

The following local regulations must be complied with during installation and operation of the heating system:

- Siting conditions
- Ventilation and exhaust air facilities and connection to a chimney
- Electrical connection to the power supply
- Technical regulations of the gas supply utility company regarding the connection of the gas appliance to the local gas mains
- Regulations and standards regarding the safety equipment of the water heating system
- DHW installation

The following general regulations, rules and guidelines must be observed for installation in particular:

- (DIN) EN 806 Specifications for installations inside buildings conveying water for human consumption
- (DIN) EN 1717 Protection against pollution of potable water installations
- (DIN) EN 12831 Heating systems in buildings – Method for calculating the design heat load
- (DIN) EN 12828 Heating systems in buildings – Design of water-based heating systems
- (DIN) EN 13384 Chimneys – Thermal and fluid dynamic calculation methods
- (DIN) EN 50156-1 (VDE 0116 Part 1) Electrical equipment for furnaces and ancillary equipment
- VDE 0470/(DIN) EN 60529 Degrees of protection provided by enclosures
- VDI 2035 Prevention of damage in water heating installations
 - Scale formation (Sheet 1)
 - Water-side corrosion (Sheet 2)
 - Corrosion by fuel gases (Sheet 3)

The following also apply to installation and operation in Germany:

- Technical Regulations for Gas Installations DVGW-TRGI 1986/1996 (DVGW Code of Practice G600 and TRF)
- DIN 1988 Drinking water supply systems
- DIN 18160 Chimneys
- DWA-A 251 Condensate from condensing boilers
- ATV-DVWK-M115-3 Indirect discharge of non-domestic waste water – Part 3: Indirect discharge monitoring in practice
- VDE 0100 Erection of power installations with rated voltages below 1000 V
- VDE 0105 Operation of high voltage systems, general stipulations
- KÜO German Federal Sweeping and Inspection Act
- Energy Savings Act (EnEG) and related ordinances:
EnEV Energy Saving Ordinance (currently applicable version)
- DVGW Code of Practice G637

The following apply to installation and operation in Austria in particular:

- ÖVE regulations
- Provisions of the ÖVGW and the corresponding Austrian standards
- ÖVGW TR-Gas (G1), ÖVGW-TRF (G2)
- Provisions of ÖVGW guideline G41 for condensate drainage
- Local regulations of building and industry regulatory agencies (usually represented by the flue gas inspector [Germany])
- Local regulations of the gas supply utility
- Regulations and requirements of the local power supply utility
- Provisions of regionally applicable building regulations
- The minimum heating water requirements in accordance with ÖNORM H5195-1 must be observed

The following apply to installation and operation in Switzerland in particular:

- SVGW regulations
- VKF regulations
- BUWAL and local regulations must be observed.
- G1 gas guidelines
- EKAS form 1942; LPG guideline Part 2

FGB ... wall mounted gas condensing boiler

Gas condensing boiler, with electronic ignition and electronic flue gas temperature monitoring, for low temperature heating and DHW heating in heating systems with flow temperatures up to 90 °C and 2.5 bar permissible operating pressure to DIN EN 12828. This Wolf gas condensing boiler is also approved for installation in garages.



Gas condensing boilers operated with an open flue may only be installed in rooms that comply with the appropriate ventilation requirements. Otherwise there is a risk of asphyxiation or poisoning. Read the installation and maintenance instructions before installing the boiler. Also take into consideration all technical information.



When operating the boiler with LPG use only propane according to DIN 51 622, otherwise faults may arise when starting and operating the gas condensing boiler, which may lead to injury and material losses. A poorly vented LPG tank can lead to problems with ignition. In such a case, contact the company that fills the LPG tank.



The adjustable cylinder water temperature can exceed 60 °C. Short-term operation at temperatures above 60 °C must be monitored in order to prevent scalding. For permanent operation, appropriate precautions should be taken to prevent draw-off temperatures above 60 °C, e.g. thermostatic valve.

To protect against scaling, the DHW temperature should be set to max. 50 °C when the total water hardness is 15 °dH (2.5 mol/m³) or above.

In accordance with the Drinking Water Ordinance [Germany], this is the lowest permissible value for DHW temperatures, as it practically rules out the risk of legionella proliferation with daily use of the hot water system. (When installing a DHW cylinder ≤ 400 l; complete exchange of water in the cylinder through usage within 3 days.)

With a total hardness of 20 °dH or higher, the use of a water treatment facility in the cold water supply line when heating DHW is essential, in order to extend the maintenance intervals.

Even if water hardness is below 20 °dH, a higher risk of scale build-up may occur locally, necessitating suitable softening measures. Failure to take such measures will result in premature scaling of the appliance and reduced DHW convenience. The contractor should always check the local conditions.



Fig: Wolf wall-mounted gas condensing boiler

Minimum clearances

We recommend observing minimum clearances to facilitate inspection and maintenance work on the boiler. This ensures that adequate inspection and function tests can be carried out on the appliance.



The boiler may only be installed in rooms that are protected from frost.

The temperature in the installation room must be between 0°C and 40°C.

In addition, all components of the condensing boiler must be freely accessible from the front. It must be possible to carry out flue gas emissions tests. If minimum clearances and accessibility are not observed, Wolf may stipulate accessibility for on-site customer service attendance.



Clearance between the boiler and combustible materials or components is not required, as temperatures are limited to 85 °C at the rated boiler heating output. However, explosive or readily flammable materials must not be used in the installation room as this would cause a risk of fire or explosion.



The installation room and the combustion air supplied to the appliance must be free from chemicals, e.g. fluoride and chlorine or sulphur. Such materials are contained in sprays, paints, adhesives, solvents and cleaning agents. Under unfavourable conditions, these may lead to corrosion, including in the flue system.



The appliance is not suitable for outdoor installation.



The boiler is intended solely for installation and operation in sealed unvented heating systems.

Please note During boiler installation, ensure that no contaminants (e.g. drilling dust) enter the gas boiler, as this could lead to appliance faults.

Operation in wet rooms

In the delivered condition and for balanced flue operation, the Wolf gas condensing boiler has IP rating IPx4D. When installing it in wet rooms, the following conditions must be met:

- Balanced flue operation
- Compliance with IP rating IPX4D
- All outgoing and incoming cables must be routed through the strain relief cable glands and secured. Tighten the cable glands securely, to ensure that no water can enter the casing.

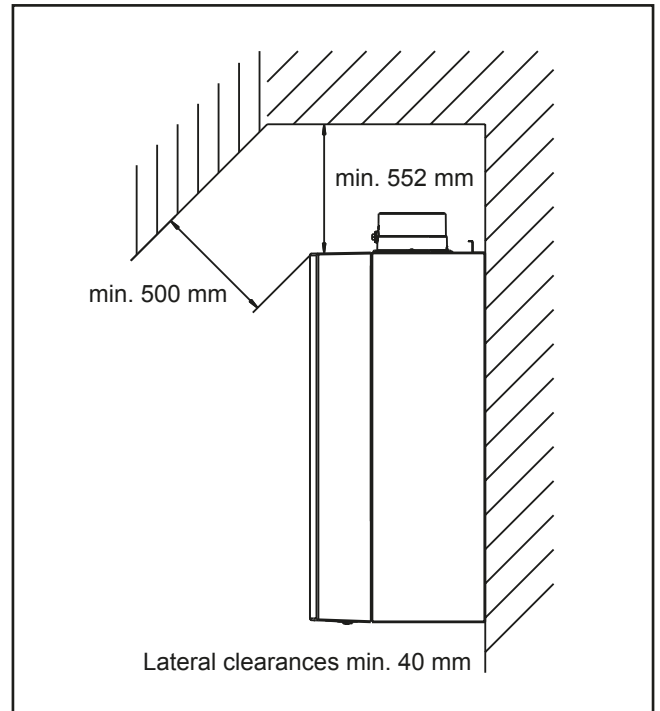


Fig: Minimum clearances

First determine where the appliance is to be installed. For this, consider the flue outlet, the lateral clearances towards walls and ceiling and any existing connections for gas, central heating, DHW and electrics.

Sound insulation: Under certain critical installation conditions (e.g. installation on a drywall), additional measures may be necessary to soundproof the boiler. In such a case, use anti-vibration rawl plugs and, if necessary, rubber mounts or insulation strips.

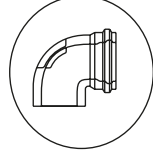
Securing the appliance, suspension bracket / flue gas system



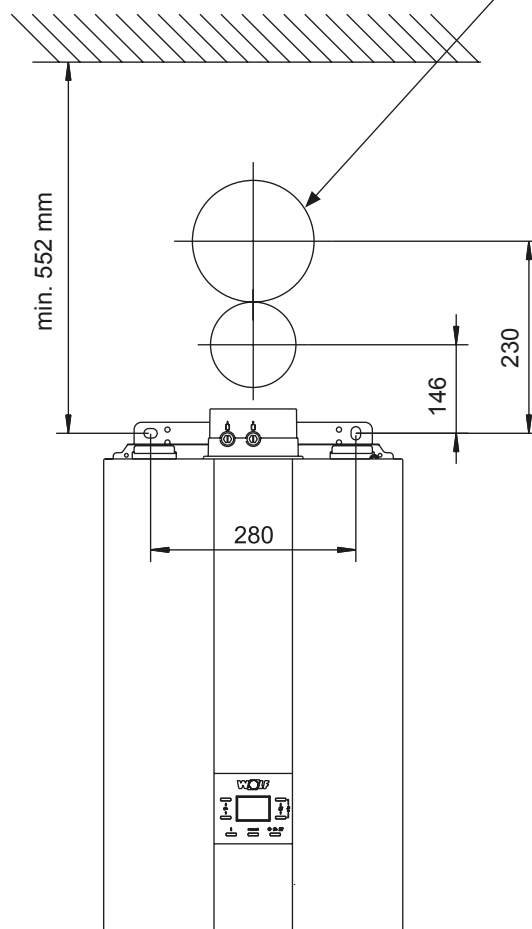
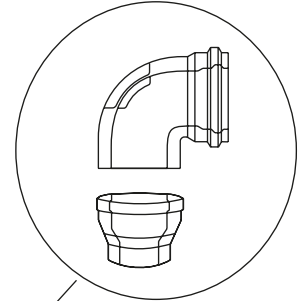
When installing the appliance, ensure that the fixings have sufficient load-bearing capacity. Also take into account the condition of the wall, to prevent gas or water from escaping, resulting in a risk of explosion and flooding.

1. Mark the $\varnothing 12$ holes to be drilled for the suspension bracket, taking into account the minimum clearances.
2. Insert the rawl plugs and fit the suspension bracket using the screws supplied.
3. Hook the boiler onto the suspension bracket using the mounting stay.

Flue system component
60/100

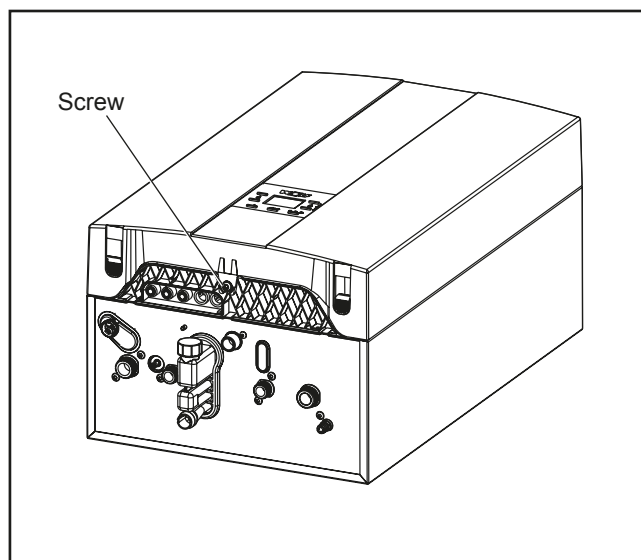


Flue system component
80/125

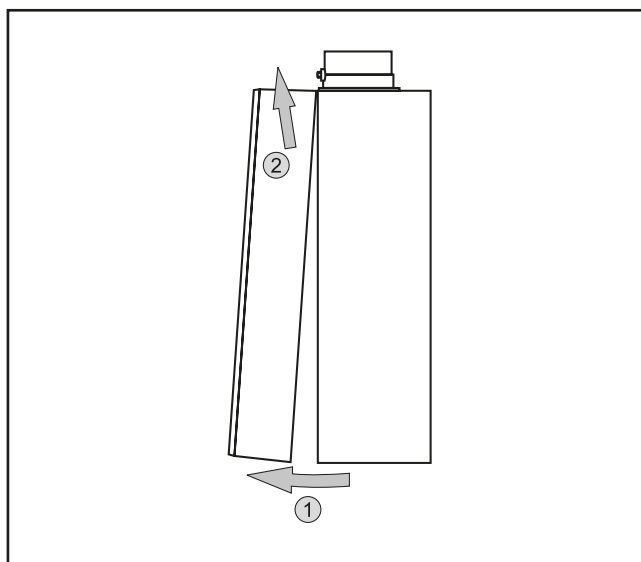


9. Opening the casing

- Undo the central screw at the bottom of the front casing.



- Push in the two locking hooks at the bottom left and right and pull the casing forwards.
- Lift the front casing upwards to release it and remove it.



Heating circuit

We recommend installing a maintenance valve in both the heating flow and heating return – straight design for surface mounting.

Please note

The return line to the appliance must have a dirt trap. A sludge separator with magnetite separator should be used to protect the appliance and the high efficiency pump from dirt/sludge and magnetite.

Deposits in the heat exchanger may lead to boiling noise, a drop in performance or faults in the appliance.



In wall mounted boilers without DHW heating, install a short circuiting section (accessories) between cylinder flow and cylinder return.

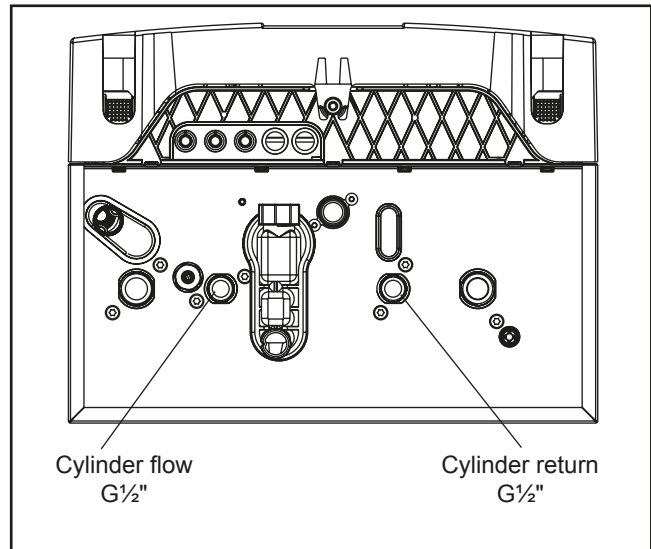


Fig: Cylinder flow / return connections

Cold water and DHW connection

A maintenance valve must be installed in the cold water supply line.

If the cold water supply pressure is above the maximum permissible operating pressure of 10 bar, install a tested and certified pressure reducer.

If mixer taps are used, provide a centralised pressure reducer. Observe the regulations of EN 806 as well as those of your local water supply utility when connecting cold water and DHW. Your warranty is void if the installation does not comply with the illustration shown.

Note: When selecting the installation material for the system, observe engineering standards and take into account possible electrochemical processes (mixed installation).

When installing make sure that, according to EN 1717, a non return valve is installed in the drinking water pipeline.

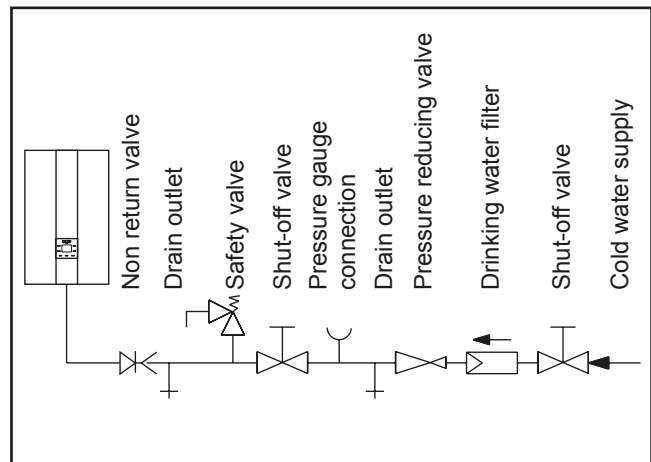


Fig: Drinking water installation

Connect the gas supply line at the gas connection or the expansion joint (recommended) using gas connection R $\frac{1}{2}$ " and an approved sealant. Ensure the supply line is stress-free.



Only a licensed gas fitter may route the gas pipe and make the gas connections.

Remove all residues from the heating pipework and the gas line prior to connecting the condensing boiler, particularly in older systems. Prior to commissioning, test all pipe and gas connections for leaks. Inappropriate installation or using unsuitable components or assemblies may lead to gas escaping, which results in a risk of poisoning and explosion.



Install a gas ball valve with fire protection in the gas supply line upstream of the condensing boiler. This prevents a risk of explosion during a fire. Size the gas supply line in accordance with DVGW-TRGI regulations.



Mount the gas ball valve in an easily accessible place.



Carry out a tightness test on the gas line without the gas condensing boiler. Never release the test pressure via the gas valve.



Gas fittings on the appliance should be pressure tested to a maximum of 150 mbar. Higher pressure may damage the gas valve, resulting in a risk of explosion, asphyxiation or poisoning. When pressure testing the gas line, close the gas ball valve on the gas condensing boiler.



When installing the gas connection, ensure all fittings are sufficiently tightened to prevent gas leaks.

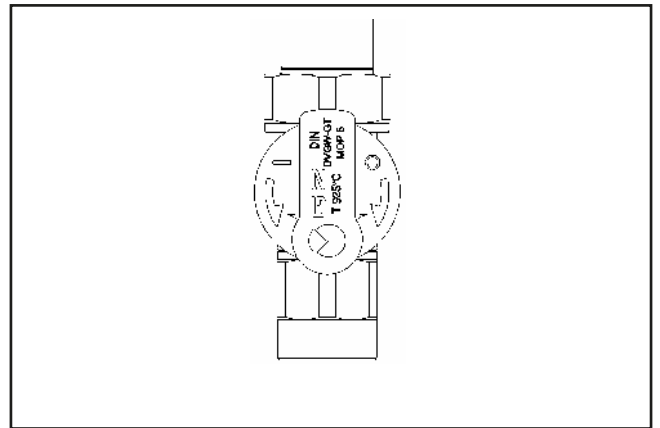


Fig: Gas ball valve, straight (accessories)



Fig: Gas ball valve, angled (accessories)

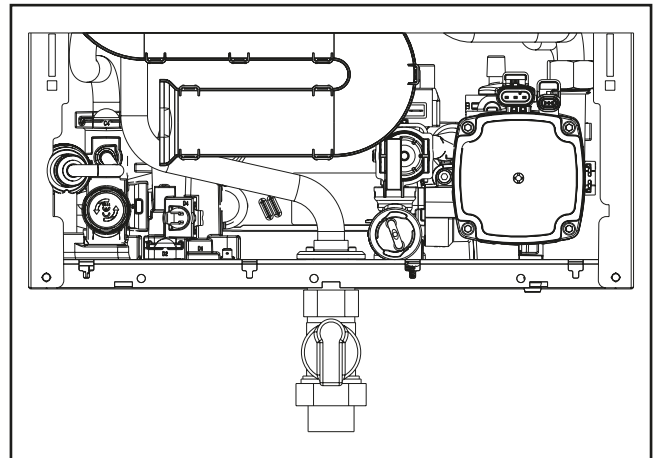


Fig: Gas connection installation

Condensate drain connection

Please note

The trap must be fitted before commissioning the appliance.

The trap included in the standard delivery must be fitted from underneath the appliance. **Before installing, apply silicone grease to the sealing collar.** After insertion, secure the screw fitting of the trap to the connector and check the connection is firm. Secure the sealing collar. Ensure that the sealing collar seals the casing base. The drain hose must be safely secured above the tundish (trap).

If the condensate is directly routed to the sewer pipe, provide a ventilation facility. This is to prevent retroactive effects from the sewer pipe to the gas condensing boiler.

If installing a neutralising system (accessories), observe the instructions supplied.

According to Code of Practice ATV-DVWK- A251, no neutralising system is required for condensing boilers up to 200 kW.

If a neutralising system is used, the national regulations regarding the disposal of residues from such systems apply.

The trap is filled via the flue; see chapter 18 "Filling the heating system / trap".

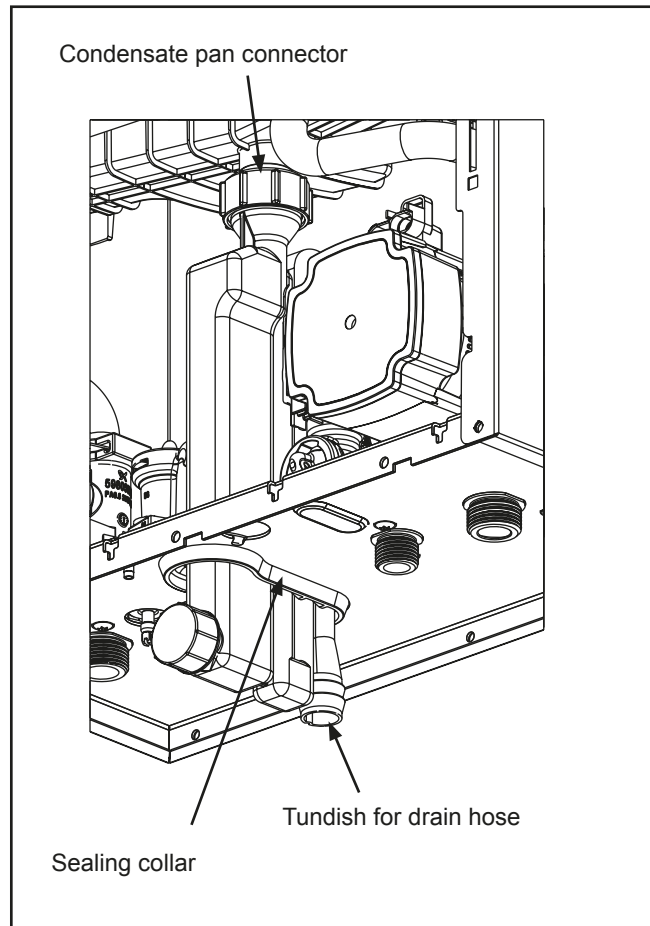


Fig: Trap



The trap must be filled with water prior to commissioning. Operating the appliance with an empty trap presents a risk of poisoning or asphyxiation due to flue gases escaping. Unscrew the trap, remove and fill until water runs out of the drain hole on the side. Refit the trap and ensure the gasket seals tightly.

Note:

The condensate hose attached to the trap must not form a loop or roll up, as this could lead to impaired operation.



**Before commissioning, carry out a tightness test on all hydraulic pipework:
 Test pressure on the DHW water side max. 10 bar
 Test pressure on the heating water side max. 4.5 bar**

Please note For concentric balanced flue systems, use only original Wolf parts.
Prior to installation, read the technical information regarding balanced flue systems.

As regulations in the individual Federal States [Germany] differ, we recommend consulting the relevant authorities and local flue gas inspector prior to installation.

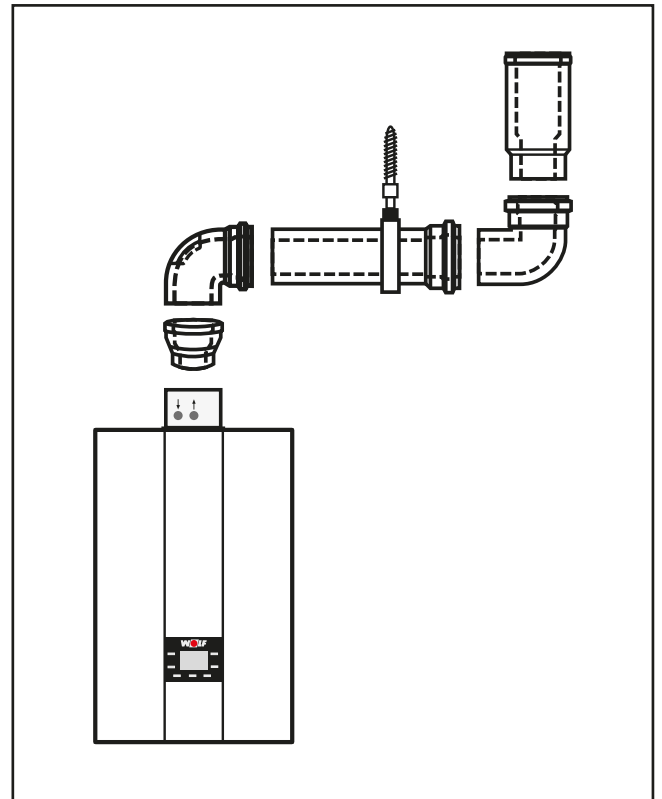


Fig: Example ventilation air/ flue system

Please note The flue gas test ports must remain accessible for your local flue gas inspector, even after ceiling bezels have been fitted.



With low outside temperatures, the water vapour contained in the flue gas may condense on the balanced flue and freeze. Provide on-site measures to prevent ice from falling, e.g. by installing a snow guard.

14. Electrical connection

General information, electrical connection



The installation must be carried out by an approved electrical contractor. Observe VDE regulations and all local regulations of your power supply utility company.



The applicable national regulations and conditions, as well as those of the local utility company must be observed for electrical installation work.



An omnipolar isolator with at least 3 mm contact separation must be integrated in the power cable upstream of the appliance. A connection box must also be installed on site.



Do not route sensor leads alongside 230 V cables.



Danger through "live" electrical components. Please note: Turn OFF the omnipolar isolator before removing the casing.

Never touch electrical components or contacts when the isolator is in the ON position. This carries a risk of electrocution that could result in injury or death.

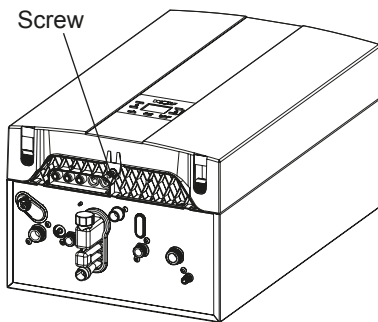


During servicing and installation work, isolate the entire system from the power supply at all poles, to prevent risk of electrocution.

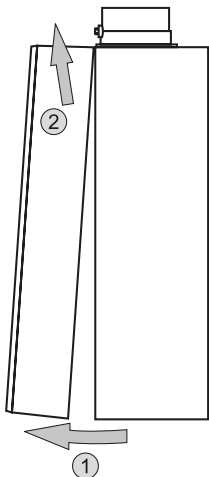
Please note

No mains isolator on the appliance. When working on the boiler, always ensure that there is no voltage by opening the omnipolar isolator or removing the external mains fuse.

Removing the front casing

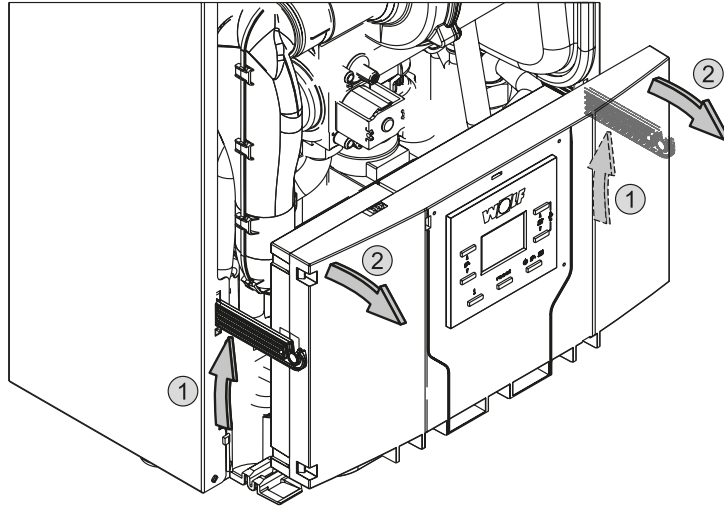


First undo the central screw at the bottom of the front casing.



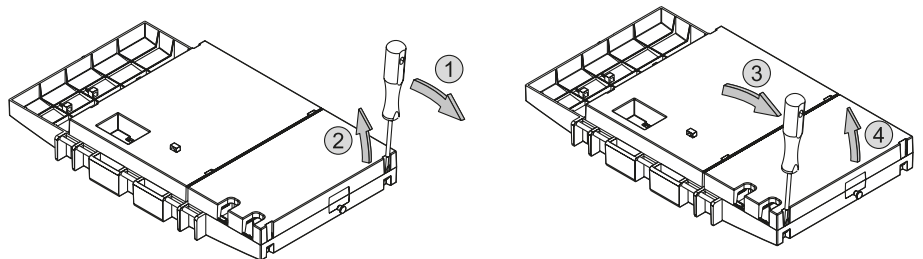
Push in the two locking hooks at the bottom left and right and pull the casing forwards. Lift the front casing upwards to release and remove it.

Opening the control unit



Push the retaining bracket on the casing upwards and pivot the control unit forwards.

Opening the control unit back



Open the control unit cover using a screwdriver.

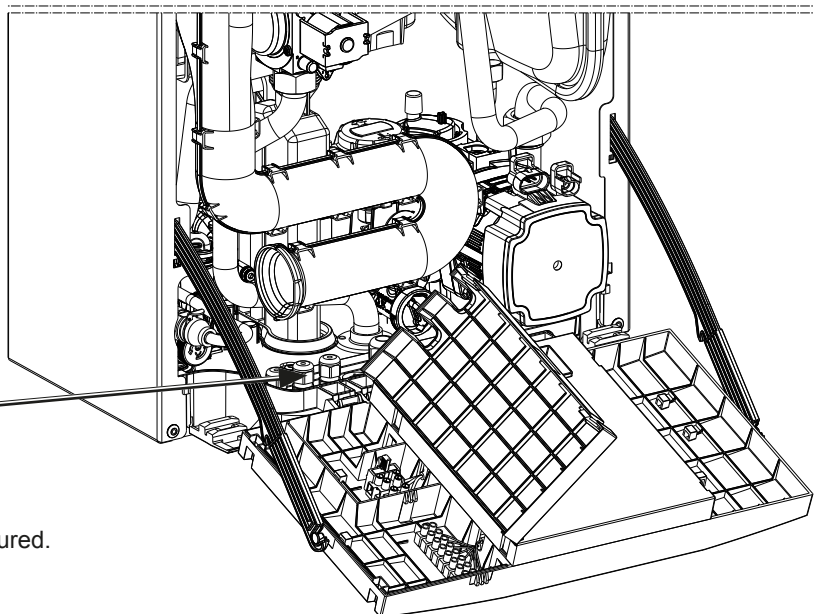
Please
note

Cable glands

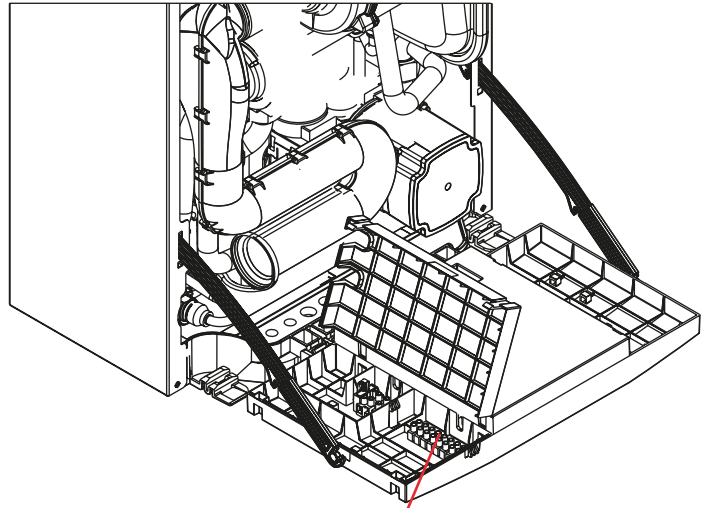
M12 M12 M12 M16 M16



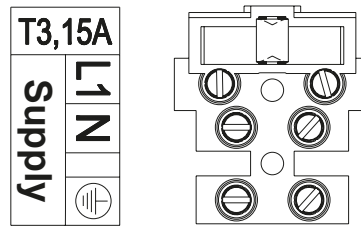
Only open the cable entries required.
Insert cable with cable gland and secure.
Otherwise room sealed operation is not ensured.



Terminal strip



Power supply 230 V / 50 Hz

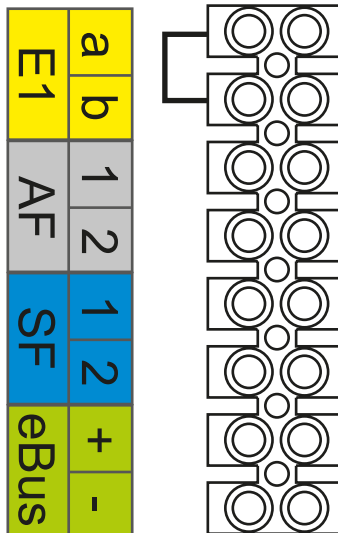


Room thermostat input (jumper)
Please note: No external voltage must be connected to input E1, as this would destroy the PCB.

Outside temperature sensor
 T_Outside (5K NTC)

Cylinder temperature sensor
 T_DHW (5K NTC)

eBus



Installation information, electrical connection

- Isolate the system from the power supply before opening.
- Check that the appliance is isolated from the power supply.
- Remove the front casing.
- Pivot the front of the control unit forwards.
- Open the rear enclosure cover of the control unit.
- Strip approx. 70 mm of insulation from the flexible power cable 3x0,75 mm².
- Route the cable through the cable entry M16 in the appliance base.
- Fit strain relief to the cable using a cable tie.
- Clamp down the relevant cores in the terminal area.

Power supply 230 V / 50 Hz

The programming, control and safety equipment is fully wired and tested.

You only need to connect the power supply and the external accessories.

Create a permanent connection for the power supply.

The connection to the mains is made via the standard plug from the assembly set provided, or alternatively via permanent connection.

The appliance (IP rating IPX4D) is approved for installation in the immediate vicinity of a bath or shower (protected area 1 according to DIN VDE 0100). Measures must be taken to prevent jets of water.

A permanent connection must be used instead of the standard plug for a power connection in protected area 1

In the case of a permanent connection, install a junction box on site and connect to the mains via a mains isolator (e.g. heating system emergency stop switch), which ensures at least 3 mm contact separation across all poles. Flexible power cables, min. 3 x 0.75 mm².

No other consumers may be connected to the power cable. In rooms with a bathtub or shower, the appliance may only be connected via an RCD.

Changing the fuse

Ensure omnipolar isolation of the appliance from the power supply via the on-site isolator prior to changing a fuse.

Danger due to 'live' electrical components. Never touch electrical components or contacts if the condensing boiler has not been isolated from the power supply. This constitutes a risk to life!

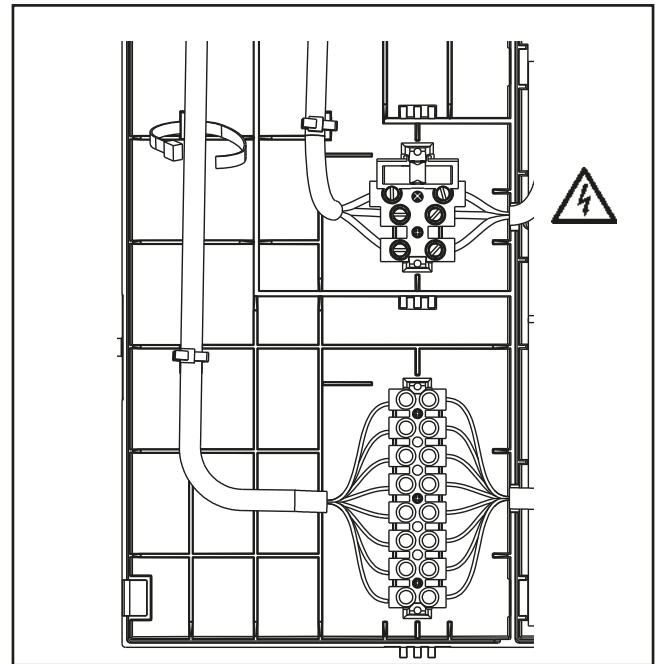


Fig: Strain relief on connection cables in the control unit

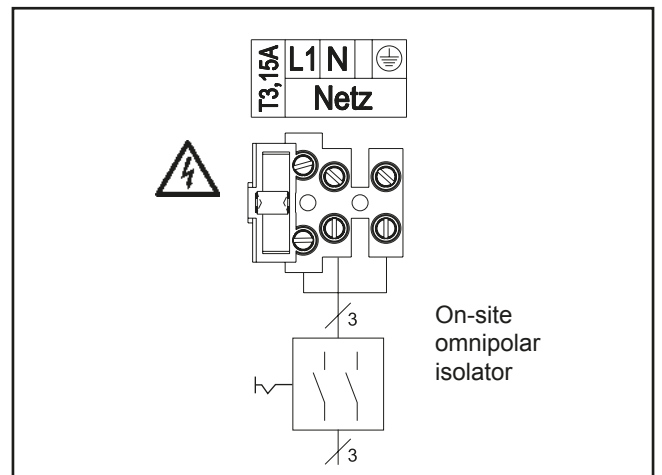


Fig: Power supply

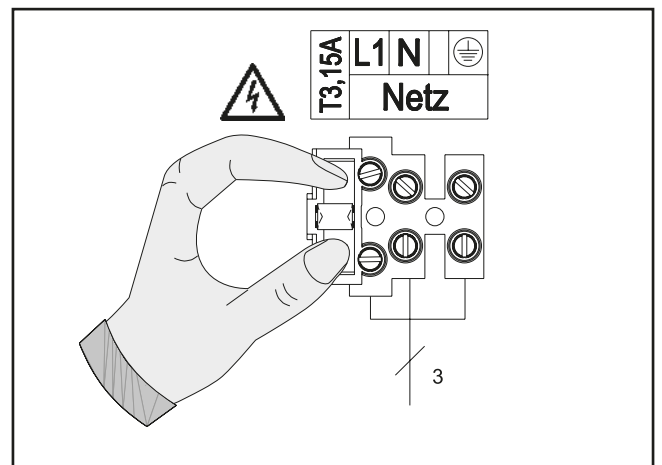


Fig: Changing the fuse

Low voltage appliance connections

Connecting input E1

Route the power cable through the cable entry and secure it in the control unit using a cable tie. Isolate jumper at input E1. Connect the connection cable for input E1 to terminals E1 as shown in the wiring diagram.

Please note No external voltage may be connected to input E1, as this could destroy the component.

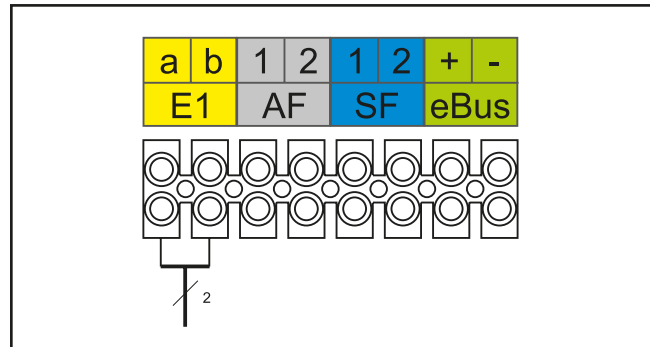


Fig: Connecting input E1

Connecting the outside temperature sensor

Insert and secure the connecting cable through the cable entry. The outside sensor can be connected to the terminal strip of the condensing boiler at connection AF, or to the terminal strip of the control accessories.

Please note When installing the appliance in places where there is a risk of high electromagnetic interference, it is advisable to fit shielded sensor and eBUS cables. The cable shield should be connected at one end to the PE potential in the control unit.

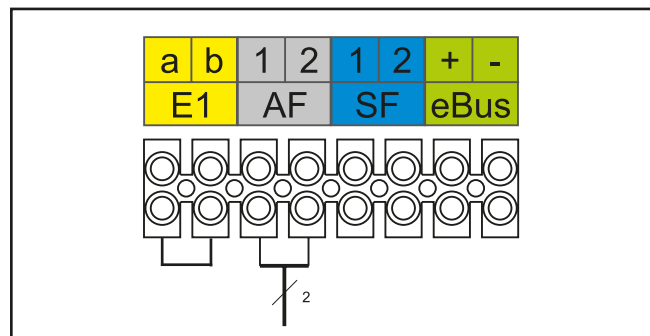


Fig: Connecting the outside temperature sensor

Connecting the cylinder sensor

Insert and secure the connecting cable through the cable entry. Connect the connection cable for cylinder sensor SF to the SF terminals as shown in the wiring diagram.

Please note When installing the appliance in places where there is a risk of high electromagnetic interference, it is advisable to fit shielded sensor and eBUS cables. The cable shield should be connected at one end to the PE potential in the control unit.

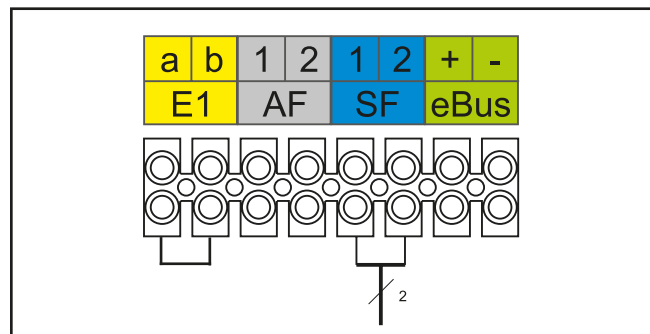


Fig: Connecting the cylinder sensor

Connecting digital Wolf control accessories

(e.g. BM-2, MM, KM, SM1, SM2, ISM7e)

Only connect control units from the Wolf accessory range. Each accessory is supplied with its own connection diagram. Use a two-core cable (cross-section > 0.5 mm²) as the connecting cable between the control unit accessory and the condensing boiler.

Please note When installing the appliance in places where there is a risk of high electromagnetic interference, it is advisable to fit shielded sensor and eBUS cables. The cable shield should be connected at one end to the PE potential in the control unit.

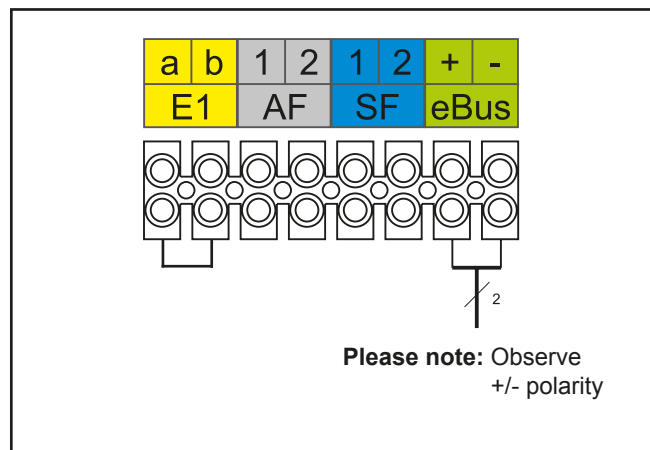


Fig: Connecting digital Wolf control accessories (eBUS interface)

Connection extension for ISM7e digital Wolf control accessories

Module description

The ISM7e interface module enables remote access to components of the FGB/FGB-K gas condensing boiler via networks and the internet.

The connection is made via eBus.

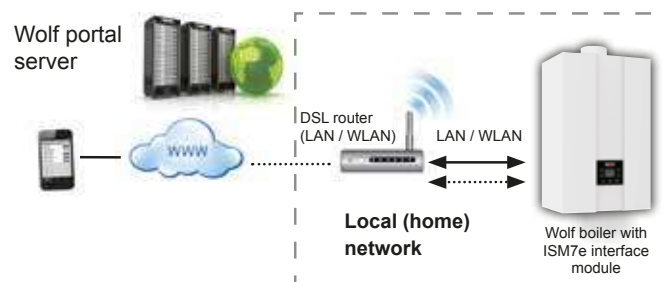
The ISM7e interface module enables the user to display current states, readings and parameters of the gas condensing boiler and to input various settings. The ISM7e is designed for installation outside a gas condensing boiler and is supplied with a casing that is also suitable for wall mounting. The ISM7e interface module can be integrated into an existing network either with a network cable (LAN) or wirelessly (WLAN).

For secure communication over the internet, the ISM7e interface module is linked to the existing DSL router, through which a secure connection to the Wolf portal server is established.

The system is operated over the internet either by means of the Wolf portal user interface operated via internet browser or with the "Smartset" smartphone app, which can be downloaded and installed from the appropriate app store.

An internet connection is not required if access to the gas condensing boiler is to be limited to the local home network.

Operation from within the home network occurs either via the "Wolf Smartset" smartphone app or via the "Smartset" Windows PC application (available to download from the Wolf website: www.wolf-heiztechnik.com).



The following operating options are available

1. ISM7e module with FGB/FGB-K **without** programming unit in eBus system

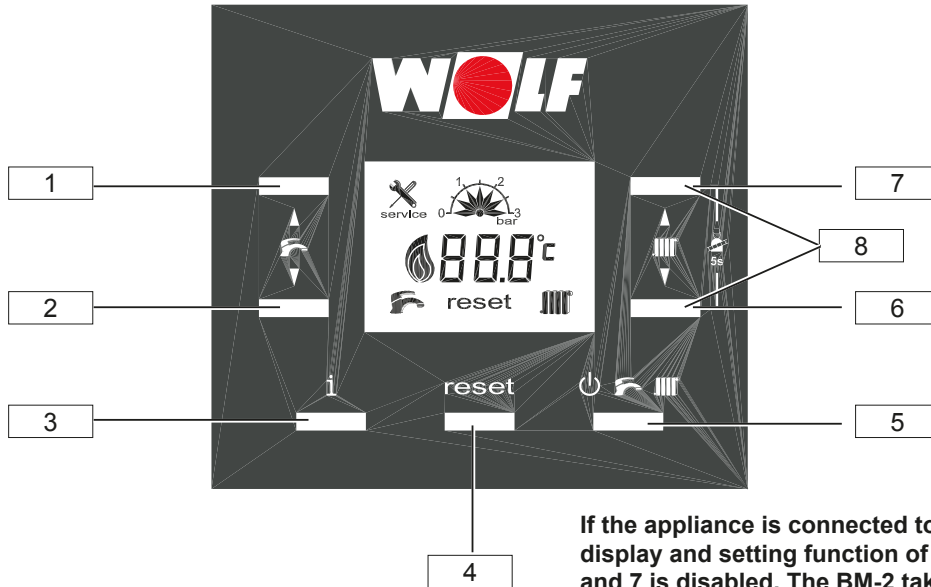
FGB/FGB-K operating options without programming unit	Description	Authorisation
Operating mode	Possible system status – winter, summer, standby (off)	Change
Set flow temperature	Permanent set flow temperature with non-weather-compensated control unit (H54=0)	Change
Set value correction (± 4)	Weather-compensated control unit (H54 > 0, heating curve active)	Change
Set DHW temperature	Only if DHW heating is available (cylinder, wall mounted combi boiler, H51:1,2,3).	Change
Control parameters (H...)	For safety reasons some of the control parameters cannot be changed here	Change (limited)
Message history	Message history can be displayed via PC application or smartphone app	Display
Fault message	Fault messages can be sent by email to one or more fault message addresses	Send

2. ISM7e module with FGB/FGB-K **with** BM-2 programming unit in eBus system

FGB/FGB-K operating options with BM-2	Description	Authorisation
Additionally full functionality of BM-2 (see BM-2 installation instructions); significant features are:		
Room influence	For a description, see BM-2 installation instructions	Change
Summer/winter changeover	For a description, see BM-2 installation instructions	Change
ECO / ABS	For a description, see BM-2 installation instructions	Change
1x DHW	Single DHW heating (see BM-2 installation instructions)	Change

All functions such as operating modes, expert parameters, frost protection, etc. occur in the FGB/FGB-K. The ISM7e interface module is only for remote adjustment and to display active faults and the message history.







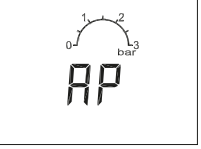
Key assignment



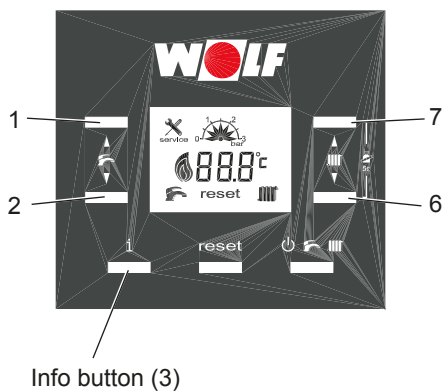
If the appliance is connected to a BM-2, the display and setting function of keys 1, 2, 5, 6 and 7 is disabled. The BM-2 takes over these functions.

Key 1	DHW key +		
	Display/adjustment of set DHW temperature	Press ▲(+)	Hotter
	Contractor level	Press ▲(+)	<Contractor level>
	HG parameter number	Press ▲(+)	<Parameter level>
	Display value	Press ▲(+)	<Info level>
Key 2	DHW key -		
	Display/adjustment of set DHW temperature	Press ▼(-)	Colder
	Contractor level	Press ▼(-)	<Contractor level>
	HG parameter number	Press ▼(-)	<Parameter level>
	Display value	Press ▼(-)	<Info level>
Key 3	Info key		
	Display menu	Display	<Display level>
Key 4	Reset key		
	Reset (press 1x briefly)	Press briefly	For fault messages
	Contractor level (tS, In, Hi, rES)	Display	Press and hold for 10 s
	Contractor level (tS, In, Hi, rES)	Confirm	Press for 1 s
Key 5	Operating mode key (inactive if programming unit in eBus system)		
	OFF	Press briefly	Frost protection active
	Summer mode	Press briefly	Only DHW heating enabled
	Winter mode	Press briefly	Heating and DHW heating enabled
Key 6	Heating key -		
	Display/adjustment of set flow temperature	Press ▼(-)	Colder H54 ≤ 0, fixed temperature
	Display/adjustment of set value correction	Press ▼(-)	H54 > 0, heating curve active
	HG parameter value -	Press ▼(-)	<Parameter level>
	Display value (display menu, fault history)	Press ▼(-)	<Contractor level>
Key 7	Heating key +		
	Display/adjustment of set flow temperature	Press ▲(+)	Hotter H54 = 0, fixed temperature
	Display/adjustment of set value correction	Press ▲(+)	H54 > 0, heating curve active
	HG parameter value -	Press ▲(+)	<Parameter level>
	Display value (display menu, fault history)	Press ▲(+)	<Contractor level>
Key 8	Emissions test mode (press and hold 6 and 7 simultaneously for 5 s)		
	DHW key (1) +	Switch to upper load	
	DHW key (2) -	Switch to lower load	
	Disable emissions test mode	Press (key 4)	

Display

	DHW mode (A flashing symbol indicates an active heat demand for DHW heating.) Only shown if DHW heating is available.
	Heating mode (A flashing symbol indicates an active heat demand for heating operation.) Changes are only possible when the heating curve is disabled.
reset	Shown when there are active fault codes. Reset button (press 1x briefly). Fault codes are reset.
	Display of temperature, fault codes, HG parameters and set values. In emissions test mode, the modulation level is displayed.
	Burner modulating levels. 1% - 30%, 30% - 75%, 75 - 100%
 service	Service - Emissions test mode enabled. - Fault is displayed.
	Indication of water pressure in the heating system.
	Venting program When switching on the mains power, following a power failure, if the water pressure is below 0.5 bar or if the high limit safety cut-out is reset, the venting program runs for 2 minutes. The gas fan runs for the first 30 s and then stops. The pump and 3-way diverter valve are activated alternately. To cancel, press "reset".

Display menu (info button)

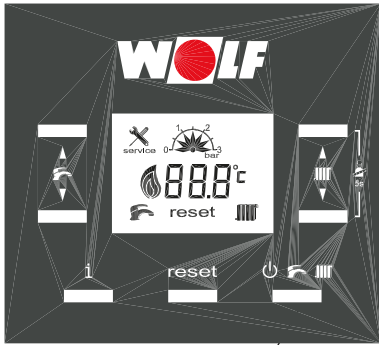


To bring up the display level, briefly press info button (3).
Use buttons 1 and 2 to scroll to the corresponding display value, e.g. I06.
Press button 6 or 7 to display the associated value.
Press button 1 or 2 to return to the display selection.
To exit the display menu, press the info button or wait for 2 min.

Name	Description	Display in
i00 ¹⁾	Flow sensor temperature	(°C)
i01	Flow temperature	(°C)
i02	Return sensor temperature	(°C)
i03	DHW sensor temperature	(°C)
i04	DHW solar inlet / DHW cylinder temperature	(°C)
i05	Flue gas sensor temperature	(°C)
i06	Outside temperature	(rpm x 60)
i07	Fan speed	(%)
i08	PWM pump speed	(l / min)
i09	DHW flow rate	bar
i10	Actual water pressure	ON and OFF
i11	High limit safety cut-out	(µA x 10)
i12	Flame current	Version x.xx
i13	Firmware version	

¹⁾ from FW 1.10

Operating modes (operating mode button)



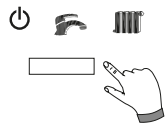
Operating mode button (5)

Operating mode button (5) is used to select the boiler operating mode. "Standby (OFF)", "Summer mode" or "Winter mode"

If the appliance is connected to a BM-2 the operating mode button is disabled. The BM-2 takes over this function.

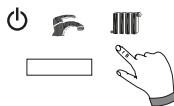
Standby (OFF)

The boiler is switched off, only frost protection is enabled.



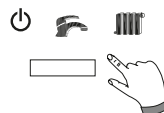
Winter mode

Winter mode, heating operation and DHW heating are enabled.

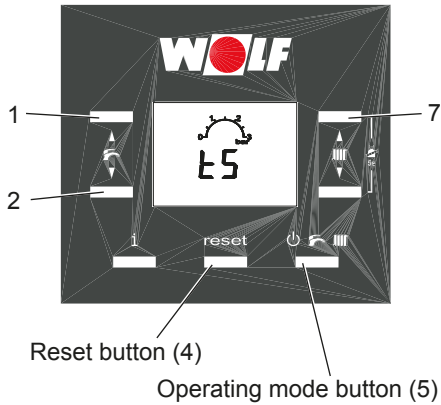


Summer mode

Summer mode, only DHW heating is enabled.



Contractor level



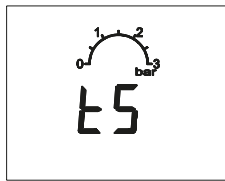
To navigate to the contractor level, press and hold reset button (4) for 10 s.

Press buttons (1) and (2) to select one of the following 4 options. They are indicated by the following displays (flashing). The first menu shown is the parameter menu, indicated by a flashing "tS".

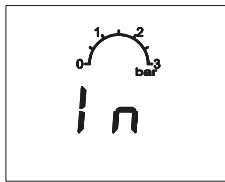
Briefly press reset (4) to select the required menu.

Press and hold operating menu button (5) for 1 s to exit the contractor level.

Heating appliance parameter (see heating appliance control parameters)



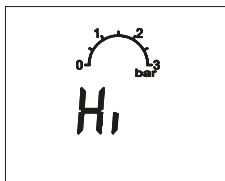
Display menu (see info button)



Fault history

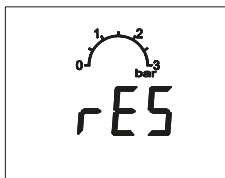
The last 8 faults are displayed:

- Press button (1) to select H01 to H08.
- Press button (7) to display the fault code.



To reset the fault history:

- When rES is displayed, press and hold operating mode button (5) for 5 s.

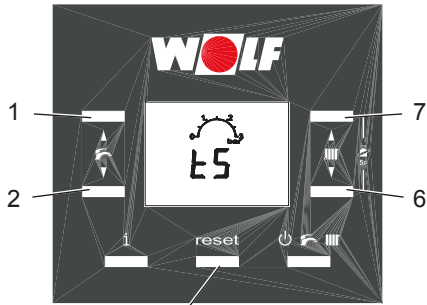


Emissions test mode

Emissions test mode is activated by simultaneously pressing and holding keys (6) and (7) for 5 s.

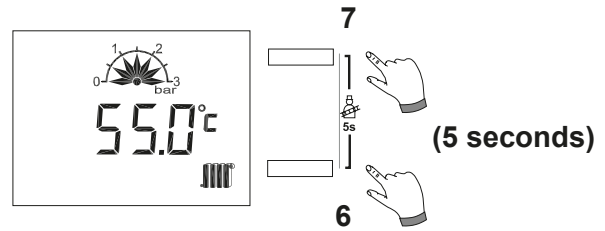
This mode will now run for up to 15 min, i.e. it is automatically terminated after this time has elapsed. It can be terminated sooner by pressing key (4).

The heating appliance starts and initially switches to upper load.

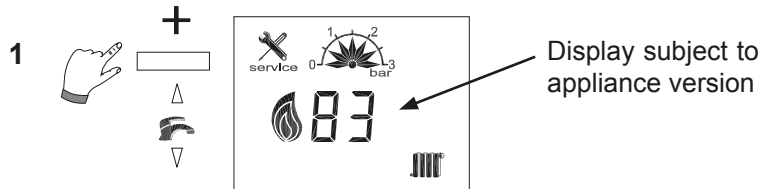


Reset key (4)

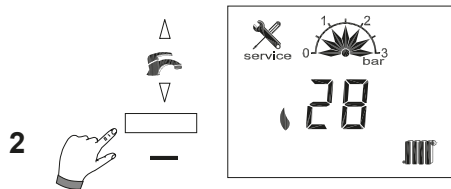
Enabling emissions test mode



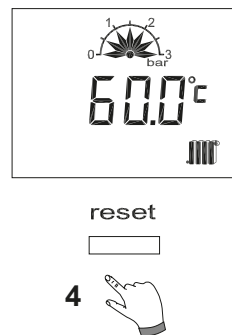
Emissions test upper load



Emissions test lower load (for adjusting the CO₂)



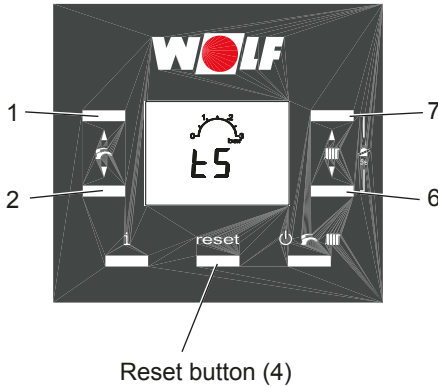
Disabling emissions test mode



Please note Modifications must only be carried out by a recognised heating contractor or by the Wolf customer service. Incorrect operation can lead to system faults.



To prevent damage to the entire heating system, cancel night setback when connecting a BM-2 module and outside temperatures fall below -12 °C. If this rule is not observed, ice may build up on the flue outlet which may cause personal injury or material losses.



The control parameters can only be modified or displayed via the integral control unit.

Contractor parameters

When menu "tS" has been selected via reset button (4), the first parameter to be displayed is H01.

Press DHW buttons (1) and (2) to select one of the parameters H01 to A09.

To view or adjust the value of the selected parameter, **briefly** press one of the heating buttons (6) or (7). The set value is displayed.

Press heating button (6) or (7) to modify the set value.

The modification is immediately applied and saved.

Press reset button (4) to exit the parameter level.

No.:	Description:		Factory settings				Min.	Max.
			28 kW		35 kW			
			Natural gas	LPG	Natural gas	LPG		
H01	Switching hysteresis, burner	K	7	7	7	7	5	30
H02 ¹⁾	Lower burner output, heat generator	%	28	26	31	29	26	100
H03 ¹⁾	Upper burner output, DHW (DHW mode)	%	92	87	100	94	26	100
H04 ¹⁾	Upper burner output, HTG (heating mode)	%	83	78	92	86	26	100
H07	Run-on time, heating pump	min	2	2	2	2	0	30
H08	Maximum boiler water temperature, heating mode TV-max	°C	75	75	75	75	40	90
H09	Burner cycle block, heating mode	min	7	7	7	7	1	30
H10	eBUS address of the heat source	-	1	1	1	1	1	5
H12	Gas type	-	1	2	3	4	1	4
H15	Cylinder hysteresis, switching differential for buffer cylinder charging (only shown if H51 = 3)	K	5	5	5	5	1	30
H16	HC pump rate, minimum	%	45	45	45	45	15	100
H17	HC pump rate, maximum	%	95	95	95	95	15	100
H19	Run-on time, DHW pump (only shown if H51 = 1, 2, 3)	min	3	3	3	3	1	10
H21	Minimum boiler water temperature, heating mode (TK-min)	°C	20	20	20	20	20	90
H23	Maximum DHW temperature (only shown if H51 = 1, 2, 3)	°C	65	65	65	65	60	80
H25	Boiler excess temperature during buffer cylinder charging (only shown if H51 = 3)	K	15	15	15	15	1	30

No.:	Description:	Factory settings				Min.	Max.	
		28 kW		35 kW				
		Natural gas	LPG	Natural gas	LPG			
H34	eBUS feed					0	1	
H37	Pump control type (constant = 0; spread $\Delta T = 1$)					0	1	
H38	Set spread, pump control	°C	15	15	15	15	1	30
H39	Time, soft start	min	3	3	3	3	0	10
H40	System configuration 1 = Direct heating circuit 2 = Mixer module (no direct heating circuit) 60 = Cascade module (no direct heating circuit)		1	1	1	1	1	60
H41	Speed, feed/heating circuit pump for DHW (only shown if H51 = 1, 2, 3)	%	95	95	95	95	15	100
H51	DHW configuration 1 = Combi mode 2 = Combi mode + solar 3 = Cylinder mode 4 = No DHW (heating mode only)		1/4	1/4	1/4	1/4	1	4
H52 ²⁾	Pasteurisation function (only shown if H51 = 3)	°C	5	5	5	5	0	80
H53 ²⁾	Activation interval, pasteurisation function (only shown if H51 = 3)	Days	7	7	7	7	1	7
H54 ²⁾	Heating curve		0	0	0	0	0	30
H55 ²⁾	DHW quick start (only shown if H51 = 1.2)		0	0	0	0	0 ECO	1 Comfort
A09 ²⁾	System frost protection	°C	2	2	2	2	-20	10

¹⁾ Parameters H02 - H04 are automatically modified by adjusting value H12 (gas / output selection)

²⁾ If a BM-2 is installed, parameters H52 - A09 can only be set in the BM-2

Parameters H12, H40 and H51 must be specified at the start of commissioning or should be set in advance.

Parameter H01

Switching hysteresis, burner

Factory setting: see table

Setting range: 5 to 30 °C

Individual setting: _____

The burner switching hysteresis regulates the boiler water temperature within the set range by switching the burner on and off. The higher the start / stop temperature differential is set, the greater the boiler water temperature fluctuation around the set value with concurrent longer burner runtimes and vice versa. Longer burner runtimes protect the environment and extend the service life of wearing parts.

Parameter H02

Lower burner output

Factory setting: see table

Setting range: 26 to 100 %

Individual setting: _____

The setting for the minimum burner output (minimum appliance load) is applicable to all operating modes. This percentage value corresponds approximately to the real device output.

This setting may only be modified by qualified personnel, as faults may otherwise result.

Parameter H03

Upper burner output, DHW

Factory setting: see table

Setting range: 26 to 100 %

Individual setting: _____

The setting for the maximum burner output in DHW mode (maximum appliance load). Applies to buffer cylinder charging and combi mode. This percentage value corresponds approximately to the real device output.

Parameter H04

Upper burner output, HTG

Factory setting: see table

Setting range: 26 to 100 %

Individual setting: _____

The setting for the maximum burner output in heating mode (maximum appliance load). Applies to heating mode, cascade and emissions test. This percentage value corresponds approximately to the real device output.

Parameter H07

Run-on time, heating circuit pump

Factory setting: see table

Setting range: 0 to 30 min

Individual setting: _____

If there is no longer a heat demand from the heating circuit, the internal appliance pump runs on for the set amount of time, to prevent a boiler safety shutdown due to high temperatures.

Parameter H08

Max. boiler water temp. HZ TV-max.

Factory setting: see table

Setting range: 40 to 90 °C

Individual setting: _____

This function limits the upper boiler water temperature in heating mode and shuts the burner down. During cylinder heating, this parameter has no effect, the boiler water temperature may therefore be higher during this time. "Reheating effects" can result in the temperature being slightly exceeded.

Parameter H09

Burner cycle block

Factory setting: see table
Setting range: 1 to 30 min

Individual setting: _____

Each time the burner is shut down in heating mode, it will be disabled for the duration of the burner cycle block. The burner cycle block is reset via power supply OFF – power supply ON.

Parameter H10

eBUS address of the heat source

Factory setting: see table
Setting range: 1 to 5

Individual setting: _____

If multiple heat sources in one heating system are controlled with a cascade module, addresses must be allocated to the heat sources. Each heat source requires its own eBUS address in order to communicate with the cascade module. The activation sequence of the heat sources can be set in the cascade module.
Please note: Duplicated addresses lead to malfunctions of the heating system.

Parameter H12

Gas type and output of heat source

Factory setting: see table
Setting range: 1 to 4

Individual setting: _____

In this parameter, the gas type used for the gas condensing boiler can be set to 1 = natural gas or 2 = LPG.
When changing the gas type, it is imperative to observe chapter "Determining / changing the gas type".

Please note Never change the appliance output, as this can lead to appliance damage or faults.

Output settings

Parameter	28 kW		35 kW	
	1 = Natural gas	2 = LPG	3 = Natural gas	4 = LPG
H02	28 %	26 %	31 %	29 %
H03	92 %	87 %	100 %	94 %
H04	83 %	78 %	92 %	86 %

Parameter H15

Cylinder hysteresis

Factory setting: see table
Setting range: 1 to 30 K

Individual setting: _____

The cylinder hysteresis regulates the start point for cylinder heating. The higher the setting, the lower the start point for cylinder heating.

Example: Set cylinder temperature 60 °C

Cylinder hysteresis 5 K

Cylinder heating commences at 55 °C and ends at 60 °C.

(Parameter is only shown if H51 = 3)

The cylinder frost protection function starts the charging pump and the burner at a cylinder temperature of 5 °C, regardless of the set cylinder hysteresis. When the cylinder temperature reaches 10 °C, the charging pump and burner are stopped again.

Parameter H16

HC pump rate, minimum

Factory setting: see table
Setting range: 15 to 100 %

Individual setting: _____

In heating mode, the internal appliance pump does not regulate below this set value.

Parameter H17

HC pump rate, maximum

Factory setting: see table

Setting range: 15 to 100 %

Individual setting: _____

In heating mode, the internal appliance pump does not regulate above this set value. With pump control type "constant", H17 is used as the set value for the pump speed in heating mode.

Parameter H19Run-on time, CLP
(cylinder loading pump)

Factory setting: see table

Setting range: 1 to 10 min

Individual setting: _____

After cylinder heating has ended (the cylinder has reached the set temperature), the cylinder loading pump runs on for the set run-on time.
(Parameter is only shown if H51 = 1, 2, 3)

Parameter H21

Minimum boiler temperature TK-min

Factory setting: see table

Setting range: 20 to 90 °C

Individual setting: _____

The control unit is equipped with an electronic boiler thermostat, which has an adjustable minimum start temperature. If this temperature is undershot during a heat demand, the burner is started under observance of the anti-cycle block. If there is no heat demand, the minimum boiler water temperature TK-min. may be undershot.

Parameter H23

Maximum DHW temperature

Factory setting: see table

Setting range: 60 to 80 °C

Individual setting: _____

The maximum DHW temperature is the upper limit to which the DHW set temperature can be set using DHW button + (1).

Please note: Take adequate measures to prevent scalding.

Parameter H25Excess boiler temperature
for cylinder heating

Factory setting: see table

Setting range: 1 to 30 °C

Individual setting: _____

Parameter H25 serves to select the excess temperature differential between the cylinder temperature and the boiler water temperature during cylinder heating. This ensures that, even in spring and autumn, the boiler water temperature is higher than the cylinder temperature, thereby ensuring short heating times.

Parameter H34

eBUS feed

Factory setting: see table

Setting range: OFF(0) to ON(1)

Individual setting: _____

The eBUS feed is enabled in the factory setting (1). If in a cascade system, the eBUS address is set greater than 1 with parameter H10, the eBUS feed is automatically disabled (0) in parameter H34 for these appliances.

When wanting to connect several consumers to the eBUS, causing the eBUS current to be insufficient, additional eBUS feeds can be enabled with parameter H34.

Parameter H37

Pump control type

For setting the type of pump speed control in heating mode and with cascade operation.

Factory setting: see table

Factory setting: 0 to 1

0: Constant = fixed pump speed (H17)

1: Spread ΔT = speed control between H16 and H17 to achieve flow/return temperature spread (H38)

Individual setting: _____

Parameter H38

Set spread, pump control

If spread control ΔT is enabled in parameter H37, the set spread value specified in H38 applies. Via modification of the pump speed, the spread between flow and return is regulated within the speed limits set in H16 and H17.

Factory setting: see table

Setting range: 1 to 30 °C

Individual setting: _____

Parameter H39

Time, soft start

In heating mode, the burner is run at reduced output for the set time following burner start.

Factory setting: see table

Setting range: 0 to 10 min

Individual setting: _____

Parameter H40

System configuration

The condensing boiler is matched to the heating system by selecting from 3 pre-configured system configurations under parameter H40. This parameter influences the function of the internal appliance pump.

Factory setting: see table

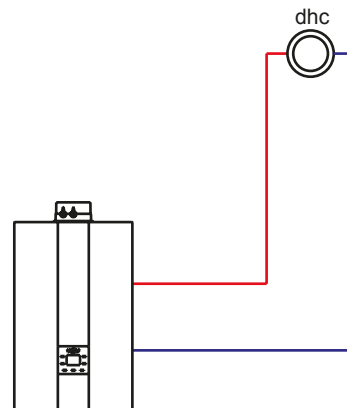
Factory setting: 1 to 3

Individual setting: _____

System configuration 01

Direct heating circuit on the condensing boiler

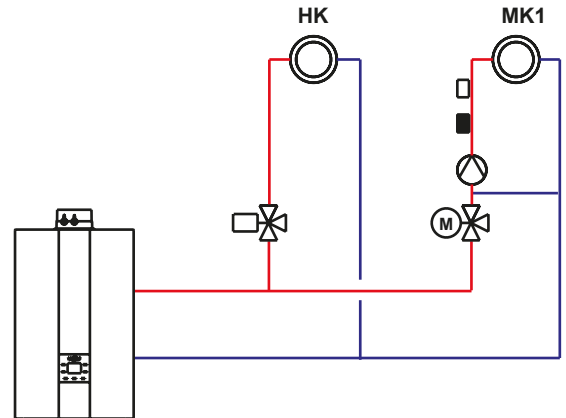
- Burner is activated following demand from the direct heating circuit
- Internal appliance pump is enabled as a heating circuit pump
- Thermostatic boiler control, set value specified by heating circuit



System configuration 02

Direct heating circuit and one or more circuits with mixer via mixer modules
(no direct heating circuit at the condensing boiler)

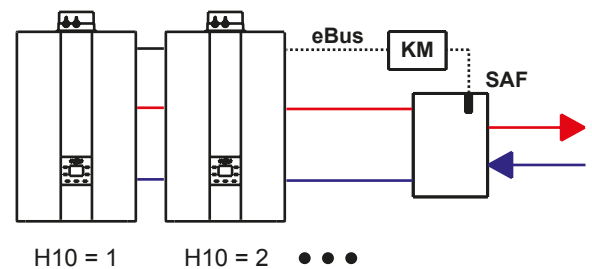
- Burner starts subject to demand from the connected circuits with mixer
- Internal appliance pump is enabled as a feed pump
- Thermostatic boiler control; set value is specified by circuits with mixer



System configuration 60

Cascade (automatic setting if cascade module is connected)

- eBus address H10 must be set for each condensing boiler
- Burner starts following a demand from the cascade module via eBus (0-100 % burner output; min. to max. within the programmed limits H02 and H04)
- Internal appliance pump is enabled as a feed pump
- Header temperature control via cascade module
- Automatic output reduction when approaching TV_{max} (H08) is enabled. Shutdown when TV_{max} is reached
- A low loss header or plate heat exchanger can be used to provide hydraulic separation.



Important information:

In these schematic diagrams, shut-off valves, air vent valves and safety equipment are not fully represented. These should be provided subject to the individual system, in line with the applicable standards and regulations. Hydraulic and electrical data can be found in the Hydraulic System Solutions technical guide.

Parameter H41

Feed/heating circuit pump speed, DHW

Factory setting: see table

Setting range: 15 to 100 %

In DHW mode, the pump runs at this set value. Independent of the pump control type set in H37.

Individual setting: _____

17. Parameter description

Parameter H51
DHW configuration

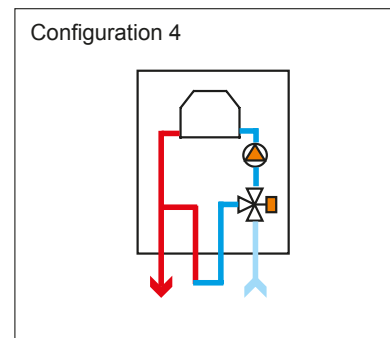
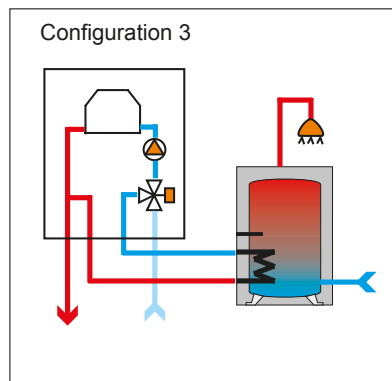
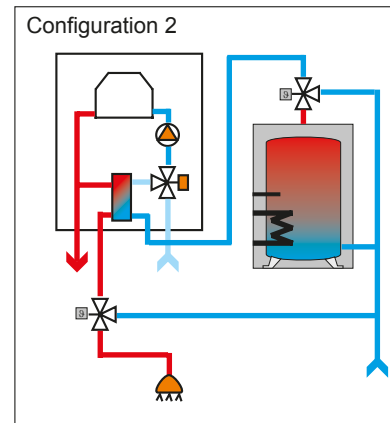
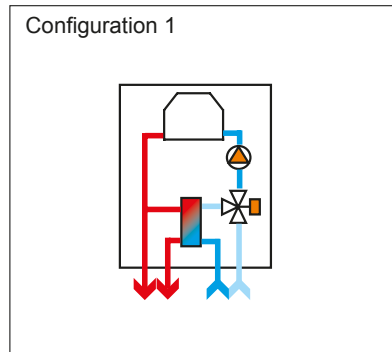
Factory setting: see table
Setting range: 1 to 4

Individual setting: _____



The DHW configuration is used to set the type of DHW heating..
If the configuration is modified, all parameters are returned to factory settings (except H12 and H40).

Configuration 1	Combi mode
Configuration 2	Combi mode + solar integration
Configuration 3	Cylinder operation
Configuration 4	No DHW (heating mode only)



Parameter H52
Pasteurisation

Factory setting: see table
Setting range: 0 to 80

Individual setting: _____

Parameter H52 is only visible during DHW configuration in cylinder mode.
If the appliance is connected to a BM-2, pasteurisation mode is disabled.
The BM-2 takes over this function.

If pasteurisation is enabled (setting > 0), the DHW cylinder is heated to the temperature set here, unless the cylinder temperature has already reached the pasteurisation temperature within the activation intervals (H53).
Pasteurisation is disabled with the value 0.

Parameter H53
Activation interval
Pasteurisation

Factory setting: see table
Setting range: 1 to 7 days

Individual setting: _____

If pasteurisation was enabled in H52, the interval for activation of this function can be specified.

If the appliance is connected to a BM-2, the pasteurisation mode activation interval is disabled. The BM-2 takes over this function.

If set to 5, pasteurisation takes place every 5 days.

Parameter H54

Heating curve

Factory setting: see table

Setting range: 0 to 30

Individual setting: _____

Sample setting:

Gradient 12

Climate zone -14 °C

Flow temperature 60 °C

If the heating curve is greater than 0, the heating flow temperature setting at keys 6 and 7 is disabled. In this scenario, key 6 (-) and key 7 (+) serve to set the temperature correction (± 4) for the heating circuit.

If the appliance is connected to a BM-2, the operating mode key is disabled. The BM-2 takes over this function.

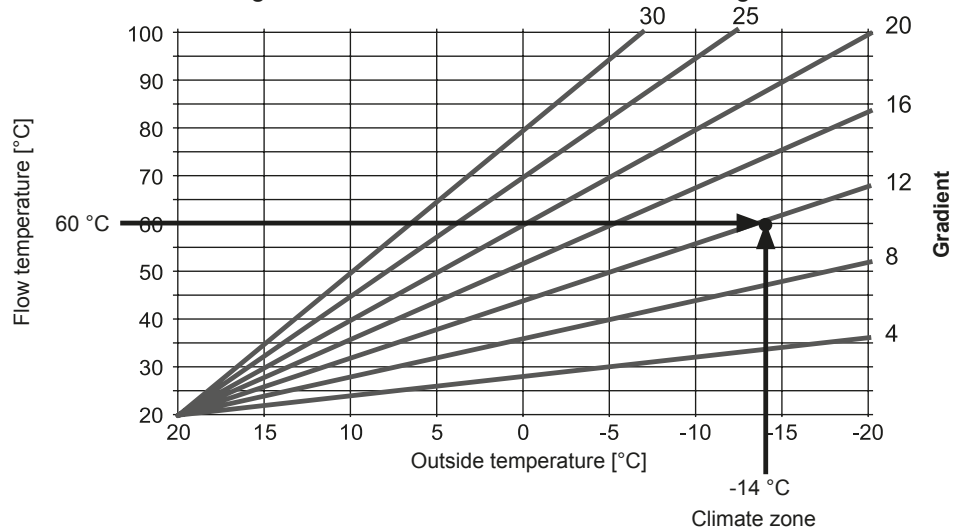
The setting is made by the heating contractor for each heating circuit separately, subject to the heating system, the thermal insulation of the building and the relevant climate zone.

Setting the slope will match the heating water temperature to these conditions.

For setting with BM-2, see BM-2 installation instructions.

The following diagram shows an example applicable to the following heating system:

- Climate zone with an average minimum outside temperature of -14 °C
- Radiator for flow/return temperatures 60/50 °C, with direct control
- Thermal building insulation in accordance with current regulations



For all other conditions, match the slope to the prevailing circumstances. The slope must always be set so that, at the min. outside temperature, the maximum flow temperature for the radiators or the underfloor heating system will be achieved.

As rule of thumb, a slope of 9 can be used for a radiator heating system, and a slope of 3 for underfloor heating systems in a well insulated house. In a less well insulated house, a slope of 12 can be used for a radiator heating system, and a slope of 6 for underfloor heating systems.

Calculation of temperature selection -4...+4:

Flow temperature (correction) =
 Flow temperature in accordance with heating curve + (H54 set value / 2.5) x temperature correction (+/-4)

Example: temperature correction +2

According to the heating curve, an outside temperature of -10 °C results in a flow temperature of 65.6 °C in heating mode.
 $= 56\text{ °C} + ((12/2.5) \times 2)\text{ K}$
 $= 56\text{ °C} + (4.8 \times 2)\text{ K}$
 $= 56\text{ °C} + 9.6\text{ K}$
 $= 65.6\text{ °C}$

Temperature selection -4...+4 for heating circuit

The flow temperature of the heating curve is changed with temperature selection -4...+4 as follows:

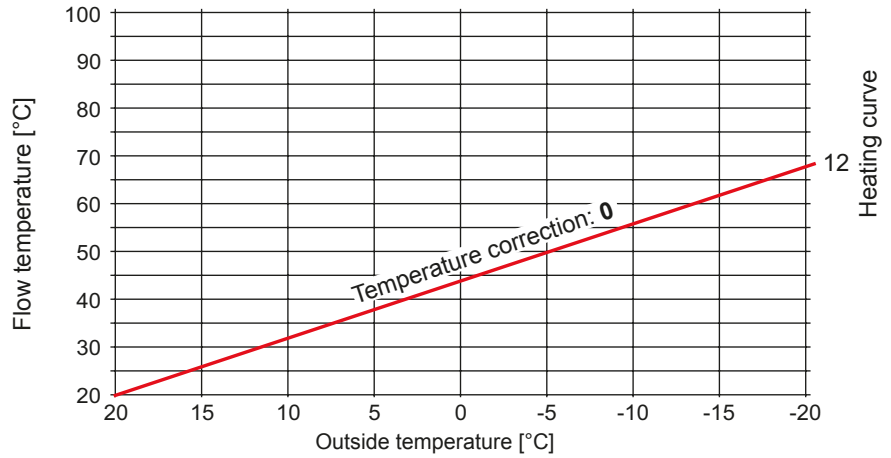
Sample setting:

Temperature correction: **0**

H08 - (flow, max. heating operation)
75 °C

H21 - (boiler, min. temperature) 20 °C

H54 - (heating curve) 12



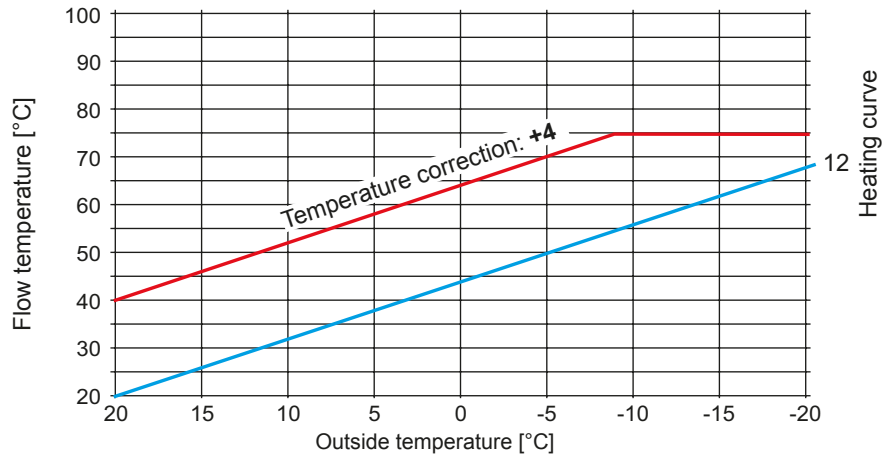
Sample setting:

Temperature correction: **+4**

H08 - (flow, max. heating operation)
75 °C

H21 - (boiler, min. temperature) 20 °C

H54 - (heating curve) 12



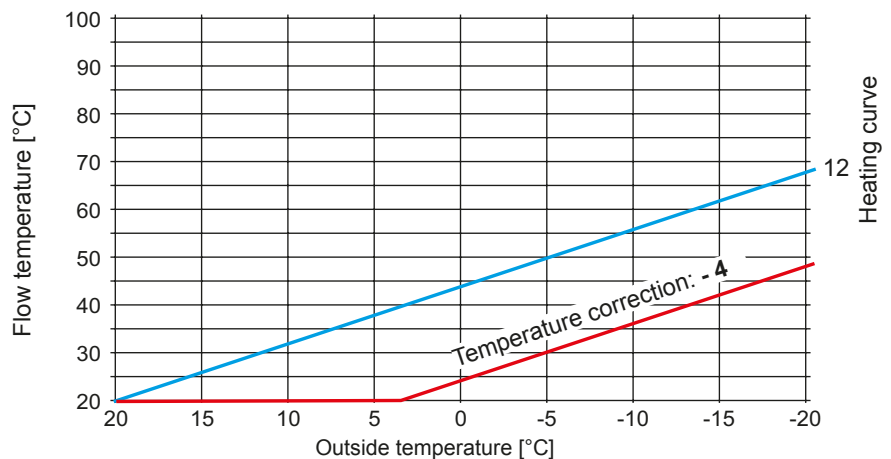
Sample setting:

Temperature correction: **-4**

H08 - (flow, max. heating operation)
75 °C

H21 - (boiler, min. temperature) 20 °C

H54 - (heating curve) 12



Parameter H55

DHW quick start

Factory setting: see table

Setting range: 0 to 1

Individual setting: _____

In summer mode and outside the DHW switching times (in control accessories), the water in the plate heat exchanger can be maintained at a set temperature to increase DHW convenience.

For this, the set DHW temperature selected with the DHW buttons applies.

If the appliance is connected to a BM-2, DHW quick start is disabled. The BM-2 takes over this function.

0: ECO = DHW quick start OFF

1: Comfort = DHW quick start ON

Parameter A09

System frost protection

Factory setting: see table

Setting range: -20 to 10 °C

Individual setting: _____

If the outside temperature undershoots the selected value, the appliance pump goes into continuous operation. If the minimum boiler water temperature falls below the fixed set value of +5 °C, the burner starts and heats the boiler up to the minimum boiler water temperature.

If the appliance is connected to a BM-2, system frost protection is disabled. The BM-2 takes over this function.

Note: Only change the factory setting if you can ensure that the heating system and its components will not freeze up at low outside temperatures.

Caution

Material damage from frost

Frost can cause the heating system to freeze up, which can result in material damage to the system and the premises.

- Please observe the frost protection settings of the boiler.
- Ensure that the system is adequately protected against frost.
- Inform the user about the frost protection measures taken.
- Ensure that there is a constant power supply to the heating appliance.

18. Filling the heating system / trap

Hydraulics

Note Before commissioning, carry out a leak test on all hydraulic pipework

If the appliance is not watertight, there is a risk of leaks and resulting material damage.

Test pressure on the heating water side max. 4 bar

Prior to testing, close the shut-off valves in the heating circuit for the appliance, as otherwise, the safety valve (accessory) will open at 3 bar. The appliance has already been leak tested at the factory at 4.5 bar.

Treatment of heating water in accordance with VDI 2035:

Filling

Potable water may be used as filling and top-up water if the limits in table 1 are not exceeded. Otherwise, the water must be treated using a desalination process. If the water quality does not meet the required values, the warranty for components on the water side becomes void.

Note The only permissible water treatment process is desalination!

Thoroughly flush the system prior to commissioning. In order to keep oxygenation as low as possible, it is recommended to flush the system using tap water and then to use this water for the water treatment (position the dirt filter upstream of the ion exchanger).

Note Heating water additives such as antifreeze or inhibitors are not permitted, as they can damage the heating water heat exchanger. Alkalisating additives may be used by a water treatment specialist to stabilise the pH value.

Filling

In order to prevent corrosion damage to the aluminium heating water heat exchanger, the pH value of the heating water must be between 6.5 and 9.0.

Note In mixed installations, a pH value of **8.2 to 9.0** must be maintained in accordance with VDI 2035

The pH value should be checked again 8-12 weeks after commissioning, as under certain circumstances, chemical reactions may cause it to change. If it does not fall within this range after 8-12 weeks, remedial measures must be taken.

Electrical conductivity and water hardness

Heating water quality requirement relating to the entire heating system

Limits in relation to specific system volume V_A (V_A = system volume / max. rated heating output ¹⁾) Total hardness conversion: 1 mol/m ³ = 5.6 °dH = 10°fH										
Total heating output	$V_A \leq 20$ l/kW			$V_A > 20$ l/kW and < 50 l/kW		$V_A \geq 50$ l/kW				
	Total hardness / total alkaline earths	Conductivity ²⁾ at 25°C	LF [µS/cm]	Total hardness / total alkaline earths	Conductivity ²⁾ at 25°C	LF [µS/cm]	Total hardness / total alkaline earths			
[kW]	[°dH]	[mol/m ³]	[µS/cm]	[°dH]	[mol/m ³]	[µS/cm]	[°dH]	[mol/m ³]	[µS/cm]	
1	≤ 50	≤ 16.8	≤ 3.0	< 800	≤ 11.2	≤ 2	< 800	≤ 0.11 ³⁾	≤ 0.02	< 800
2	50-200	≤ 11.2	≤ 2	< 100	≤ 8.4	≤ 1.5	< 100	≤ 0.11 ³⁾	≤ 0.02	< 100
3	200-600	≤ 8.4	≤ 1.5		≤ 0.11 ³⁾	≤ 0.02		≤ 0.11 ³⁾	≤ 0.02	
4	≤ 600	≤ 0.11 ³⁾	≤ 0.02		≤ 0.11 ³⁾	≤ 0.02		≤ 0.11 ³⁾	≤ 0.02	

The total amount of fill and top-up water over the life cycle of the boiler must not exceed three times the nominal volume of the heating system.

¹⁾ According to VDI 2035, in systems with multiple boilers, use the maximum rated heating output of the smallest heat source
²⁾ High salinity < 800 µS/cm
 Low salinity < 100 µS/cm
³⁾ < 0.11°dH recommended standard; permissible up to a limit of < 1 °dH

Table 1

Commissioning

Vent the system completely at the maximum system temperature.

The commissioning parameters must be recorded in the system log. This system log must be handed to the system operator following commissioning of the system. From that point onward, the operator is responsible for maintaining and keeping the system log. The system log is provided with the accompanying documents.

The water values, in particular the pH value, electrical conductivity and hardness, must be measured **annually** and documented in the system log.

Top-up water

The total amount of fill water used over the life cycle of the boiler must not exceed three times the system volume (oxygenation!). Where a system requires large volumes of top-up water (e.g. more than 10 % of the system volume per year), the cause must be sought immediately and the fault remedied.

Example:

Limits in relation to specific system volume V_A ($V_A = \text{system volume} / \text{max. rated heating output}^{1)}$) Total hardness conversion: $1 \text{ mol/m}^3 = 5.6 \text{ }^\circ\text{dH} = 10 \text{ }^\circ\text{fH}$										
Total heating output	$V_A \leq 20 \text{ l/kW}$				$V_A > 20 \text{ l/kW and } < 50 \text{ l/kW}$			$V_A \geq 50 \text{ l/kW}$		
	Total hardness / total alkaline earths			Conductivity ²⁾ at 25°C	Total hardness / total alkaline earths		Conductivity ²⁾ at 25°C	Total hardness / total alkaline earths		Conductivity ²⁾ at 25°C
	[kW]	[°dH]	[mol/m ³]	LF [$\mu\text{S/cm}$]	[°dH]	[mol/m ³]	LF [$\mu\text{S/cm}$]	[°dH]	[mol/m ³]	LF [$\mu\text{S/cm}$]
1	≤ 50	≤ 16.8	≤ 3.0	< 800	≤ 11.2	≤ 2	< 800	$\leq 0.11^{3)}$	≤ 0.02	< 800
2	50-200	≤ 11.2	≤ 2	< 100	≤ 8.4	≤ 1.5	< 100	$\leq 0.11^{3)}$	≤ 0.02	< 100
3	200-600	≤ 8.4	≤ 1.5		$\leq 0.11^{3)}$	≤ 0.02		$\leq 0.11^{3)}$	≤ 0.02	
4	≤ 600	$\leq 0.11^{3)}$	≤ 0.02		$\leq 0.11^{3)}$	≤ 0.02		$\leq 0.11^{3)}$	≤ 0.02	

The total amount of fill and top-up water over the life cycle of the boiler must not exceed three times the nominal volume of the heating system.

¹⁾ According to VDI 2035, in systems with multiple boilers, use the maximum rated heating output of the smallest heat source
²⁾ High salinity $< 800 \mu\text{S/cm}$
 Low salinity $< 100 \mu\text{S/cm}$
³⁾ $< 0.11^\circ\text{dH}$ recommended standard; permissible up to a limit of $< 1^\circ\text{dH}$

System with an FGB-28 system volume = 800 l
 Total hardness of untreated potable water = 18°dH

$$V_A = 800 \text{ l} / 28 \text{ kW} = 29 \text{ l} / \text{kW}$$

Because the specific system volume V_A is between 20 and 50 l/kW with a total output of $< 50 \text{ kW}$, the fill and top-up water must be in the range of 2 to 11.2°dH. If the total hardness of the untreated potable water is too high, some of the filling and top-up water must be desalinated.

A% desalinated water must be added.

$$A = 100\% - [(C_{\text{max}} - 0.1^\circ\text{dH}) / C_{\text{potable water}} - 0.1^\circ\text{dH}] \times 100\%$$

C_{max} : Maximum permissible total hardness in °dH
 $C_{\text{potable water}}$: Total hardness of untreated potable water in °dH

$$A = 100\% - [(11.2^\circ\text{dH} - 0.1^\circ\text{dH}) / (18^\circ\text{dH} - 0.1^\circ\text{dH})] \times 100\% = 38\%$$

38% of the filling and top-up water must be desalinated.

$$V_{\text{treatment}} = 38\% \times 800 \text{ l} = 304 \text{ l}$$

At least 304 L of desalinated water must be added when filling the system.
 The system can then be topped up with potable water.

Filling the heating system

To ensure correct function of the condensing boiler, fill the system as instructed, vent it completely and fill the trap.

We recommend using a sludge separator with integral magnetite separator in the boiler inlet to protect the high efficiency pump and the boiler. This is particularly relevant for old systems and mixed installations.

Please note Before connecting it, flush the entire system to remove residues such as weld beads, hemp, putty, etc. from the pipework. Check the dirt filter.

- The gas condensing boiler must be switched OFF. Close the gas ball valve.
- Open the cap of the automatic air vent valve on the high efficiency pump by one revolution.
- Open all radiator valves.
Open the flow and return valves on the boiler.
- Slowly fill the entire heating system and gas condensing boiler while cold up to approx. 2 bar via the return line (external pressure gauge required).

Please note **Inhibitors and antifreeze are not permitted.**

- Bleed all radiators and if the system pressure drops significantly, top up with water to reach 2 bar again.
- Check the entire system and all component unions for water leaks.



If leak tightness cannot be ensured, there is a risk of water damage.

- Switch on the power supply to the gas condensing boiler AP indication on the display for the duration of the venting program.
- Briefly open the manual air vent valve on the flow pipe until all air has escaped and then close it again. Collect any water expelled.

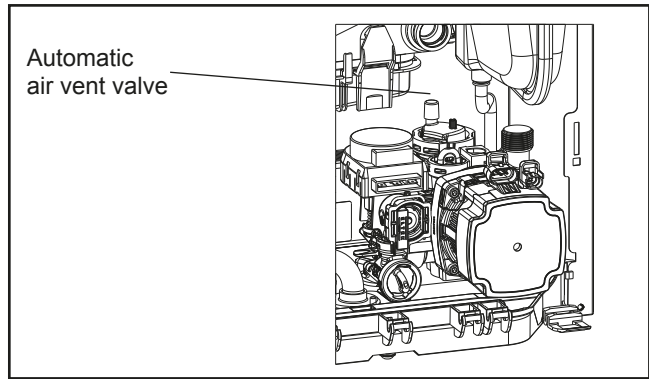


Fig: Automatic air vent valve on the heating circuit pump

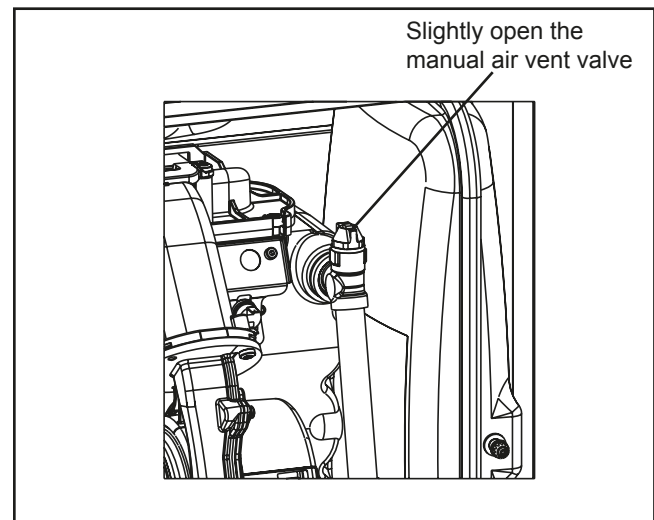


Fig: Manual air vent valve

- Check the system pressure again (info key 3) and top up with water if required.

Please note:

During continuous operation, the heating circuit is automatically vented via the high efficiency pump.

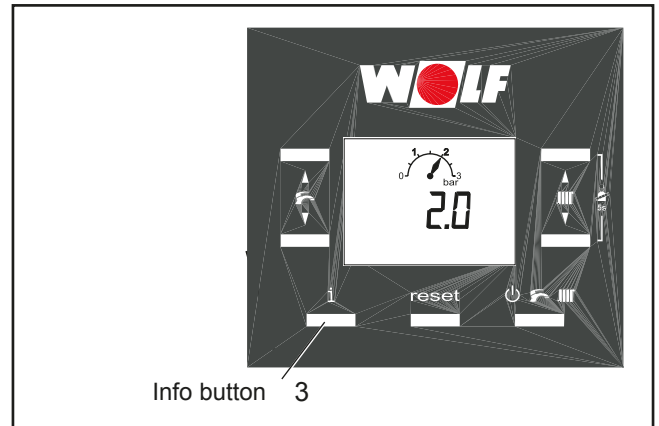


Fig: Pressure indication on the control unit display

Filling the heating system via the filling facility

- Open the fill valve on the filling facility.
- Fill the heating circuit via the DHW circuit.
- Close the fill valve and test the entire appliance and the component unions for tightness.
- Observe all information on venting the system (see above)



Note that a pipe separator must be installed in the DHW line during installation as specified in EN 171.

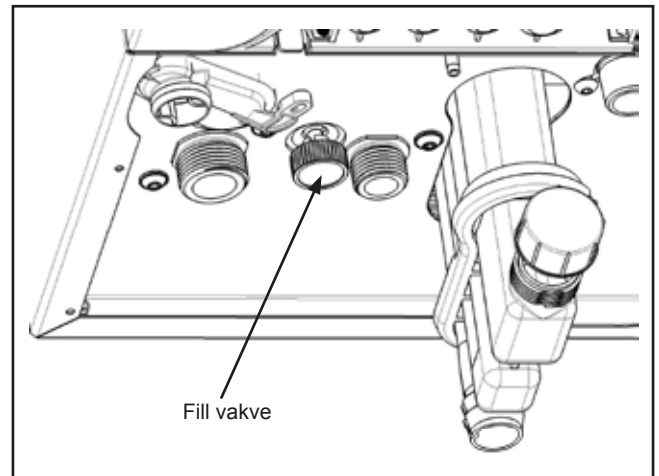


Fig: Filling facility integrated in the appliance on delivery

Filling the trap

Prior to opening the gas ball valve and acknowledging the fault

- Fill the trap from above through the inspection port in the flue pipe / bend.



Fill only through the flue; do not fill water into the ventilation air aperture, as this could cause the burner to malfunction.

- Reopen the gas ball valve.

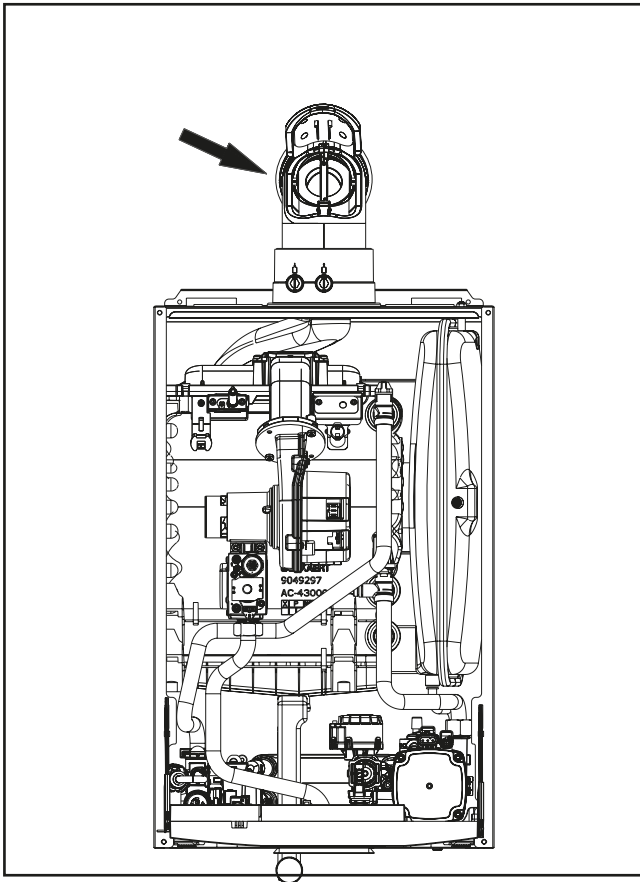


Fig.: Trap - filling via flue

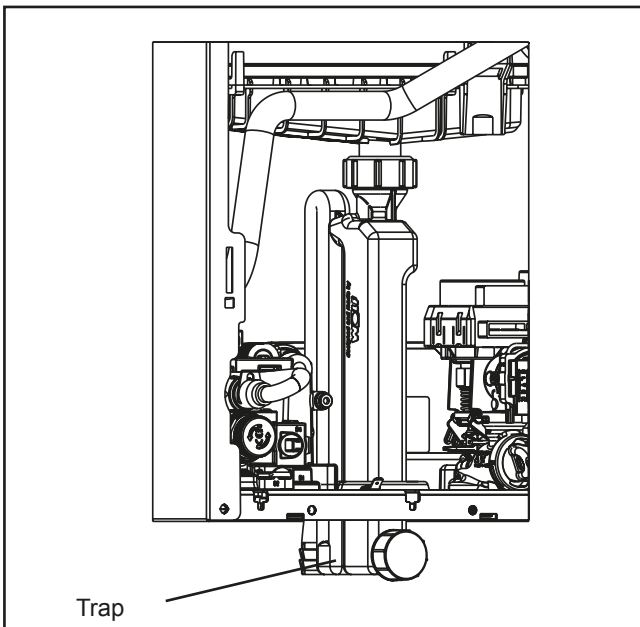


Fig.: Trap

Installing the condensate drain

Connect the condensate hose provided to the safety valve drain/hydraulic separator.

Please note:

The condensate hose attached to the trap must not form a loop or roll up, as this could lead to impaired operation. The angle of fall to the drain should be approx. 5°.

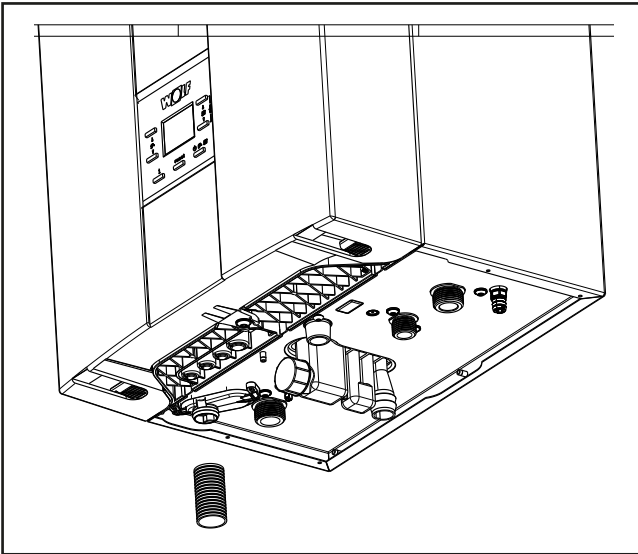


Fig: Condensate hose installation (included in standard delivery)

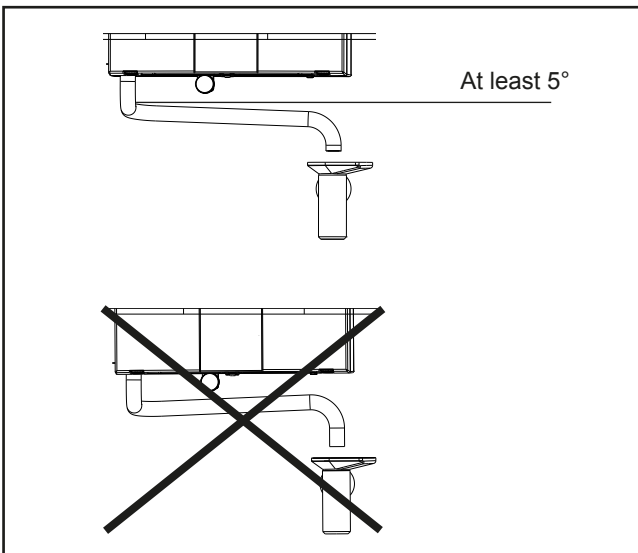


Fig: Install with correct fall

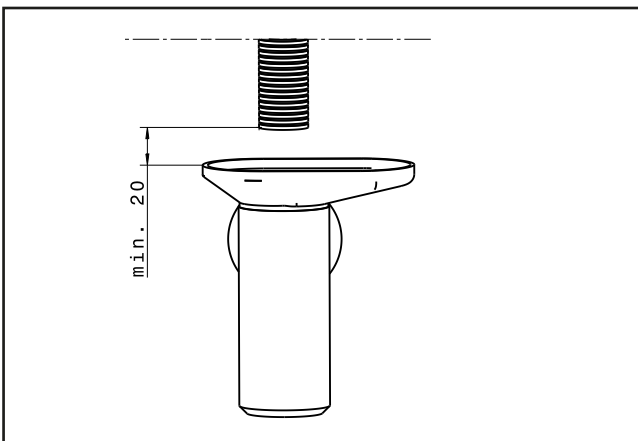


Fig: Air gap to be maintained

Optional boiler versions (subject to country-specific version):

Equipped with heating system filling facility with system separation

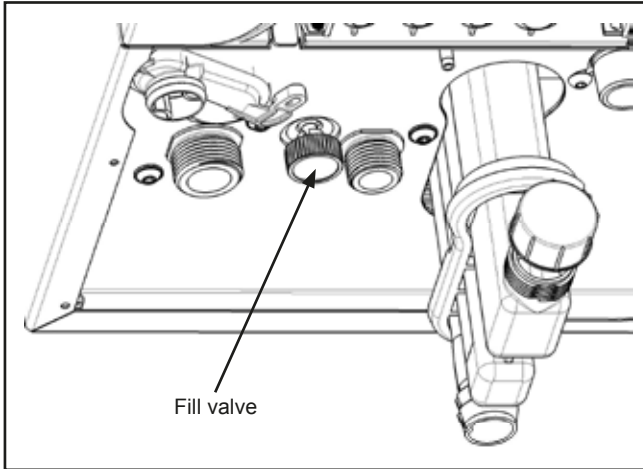


Fig: Filling facility integrated in the appliance on delivery

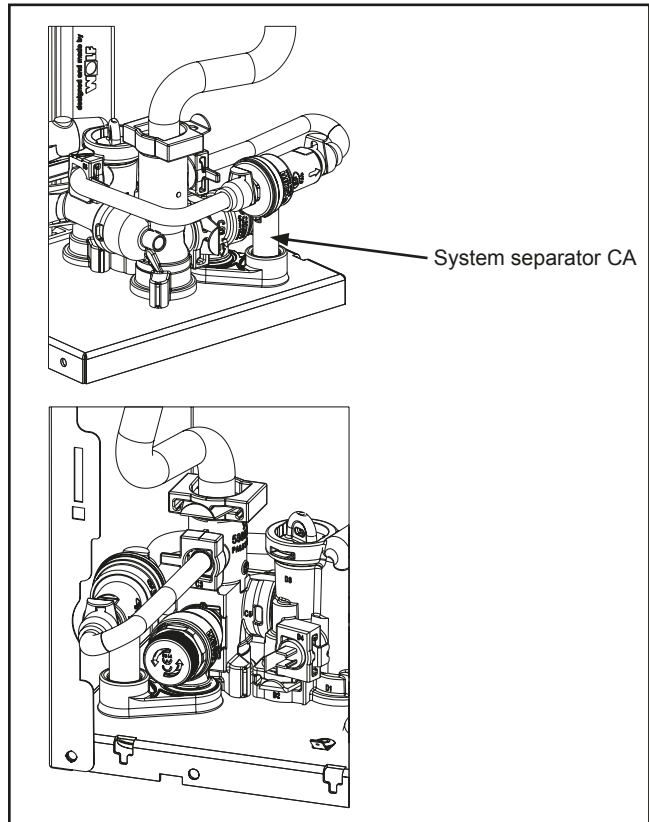


Fig: Filling facility with system separation

Applicable standards for filling facility with system separation

(DIN) EN 1717 Protection against pollution of potable water installations

(DIN) EN 14367 Non controllable backflow preventer - Family C, type A

Also observe the country-specific standards and guidelines on installation and operation.

Installation and operating information:

The filling facility contains a system separator CA (class b) to DIN EN 14367.

According to DIN EN 1717, system separators of type CA are approved for liquids up to and including hazard category 3 (e.g. heating water without inhibitors).

For Germany and Austria, only drinking water may be used for the (initial) filling of the heating system using the filling facility with system separator. An (initial) filling with treated water (deionised water, etc.) corresponds to a higher hazard category, for which the CA system separator may not be used.

To ensure long-term and fault-free operation of the filling facility, we recommend using a dirt trap (fine filter) in the DHW installation.

Operation:

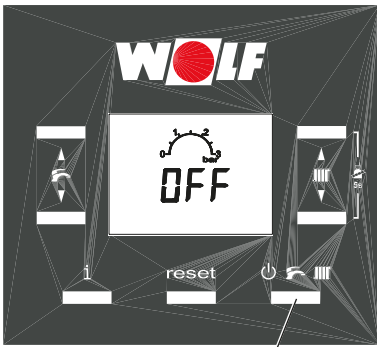
For the filling procedure, open the fill valve and fill to about 2 bar system pressure (observe pressure indication on control unit display). After filling, close the fill valve.

Maintenance:

The filling facility with CA system separator does not require any maintenance.

If there is water leaking from the CA system separator outlet, correct function can no longer be guaranteed and the CA system separator should be replaced.

Draining the heating system:



Operating mode button

- Switch the boiler OFF at the control unit.
Press the operating mode button until "OFF" shows in the display.
The boiler then enters standby mode.
If the appliance is connected to a BM-2, the operating mode key is disabled. The BM-2 takes over this function.
- Isolate the boiler from the power supply at the on-site appliance fuse.
- Close the gas ball valve.
- Allow the temperature in the heating circuit to cool to at least 40 °C.
(Risk of scalding!)
- Safeguard the heating system against accidental reconnection to the power supply.
- Open the drain valve (boiler drain & fill valve, on site).
- Open the air vent valves on the radiators.
- Drain the heating water.

Setting the gas/air mixture

Please note Carry out the adjustments in the order described below. The gas combination valve has been set at the factory to the gas type specified on the type plate. Only adjust the gas combination valve after the system has been changed to a different gas type.

Determining the gas type

The gas condensing boiler is equipped with a pneumatic gas/air mixing facility. In the delivered condition the boiler is set to natural gas E/H.

For operation with natural gas LL remove the gas restrictor.

For operation with LPG P, replace the gas restrictor as indicated in the table "Gas restrictors".

1. Request information regarding the gas type and Wobbe index from your local gas supply utility or LPG supplier.
2. For operation with natural gas LL and LPG P, match the gas restrictor.
3. Enter the gas type in the commissioning report.
4. Open the gas ball valve.

Natural gas E/H 15,0:

$$W_s = 11.4 - 15.2 \text{ kWh/m}^3 = 40.9 - 54.7 \text{ MJ/m}^3$$

Natural gas LL 12.4:¹⁾

$$W_s = 9.5 - 12.1 \text{ kWh/m}^3 = 34.1 - 43.6 \text{ MJ/m}^3$$

LPG P

$$W_s = 20.2 - 21.3 \text{ kWh/m}^3 = 72.9 - 76.8 \text{ MJ/m}^3$$

¹⁾ not applicable in Austria / Switzerland

Table: Wobbe index subject to gas type

Gas categories and supply pressures

Country of destination	Appliance category		Supply pressure in mbar					
	Natural gas	LPG	Natural gas			LPG		
			nom.	min	max	nom.	min	max
DE	II2ELL3P		20	18	25	50	42,5	57,5
AT, LU	II2H3P		20	18	25	50	42,5	57,5
BE	I2ER		20/25	18	30			
BE	I2ES		20/25	18	30			
BE		I3P				37	25	45
BE		I3P				50	42,5	57,5
FR	II2Esi3P		20/25	17	25	37	25	45
FR	II2Esi3P		20/25	17	30	50	42,5	57,5
PL	II2ELw3P		20	18	25	37	25	45
TR	II2H3P		20	18	25	30/37	25	45
DK,EE, SI, RO,MO,BG,CN,FI,NO,SE	II2H3P		20	18	25	30	25	35
CZ, IT,ES,GR,TR,HR,IE,SI LT,LV,NO,PT,SE	II2H3P		20	18	25	37	25	45
CH,CZ,ES,GB,NO,SE	II2H3P		20	18	25	50	42,5	57,5
RU	II2H3P		20	13	25	30 50	25 42,5	35 57,5
UA	II2H3P		20	13	25	37	25	45
HU	II2H3P		20	18	25	37	25	45
HU	II2H3P		20	18	25	50	42,5	57,5
NL	II2L3P, II2EK3P		25	18	30	30/37	25	45
NL	II2L3P, II2EK3P		25	18	30	50	42,5	57,5

If the supply pressure is outside the specified range, no adjustments may be carried out and the boiler must not be started.

Checking the gas supply pressure



For permissible values, see table "Gas categories and supply pressures".
Work on gas components must only be performed by a licensed gas fitter. Work that is carried out incorrectly may lead to gas escaping, resulting in a risk of explosion, suffocation or poisoning.

1. The gas boiler must be switched OFF. Close the gas ball valve.
2. Loosen screw (C) on the gas test connector of the gas combination valve with a screwdriver. Do not remove the screw.
3. Connect the pressure gauge.
4. Open the gas ball valve.
5. Switch the gas condensing boiler ON by pressing button 5.
If the appliance is connected to a BM-2, the operating mode key is disabled. The BM-2 takes over this function.
6. After the boiler has started, read the supply pressure on the pressure gauge and enter it in the commissioning report.
7. Turn OFF the boiler, close the gas ball valve, remove the pressure gauge and tighten the screw in the gas test connector.
8. Open the gas ball valve.
9. Check the gas test connector on the gas combination valve for tightness.
10. Complete the enclosed notice and affix it to the inside of the casing.
11. Close the boiler.



If any screws are not fully tightened, there is a danger of gas escaping, leading to a risk of explosion, suffocation or poisoning.

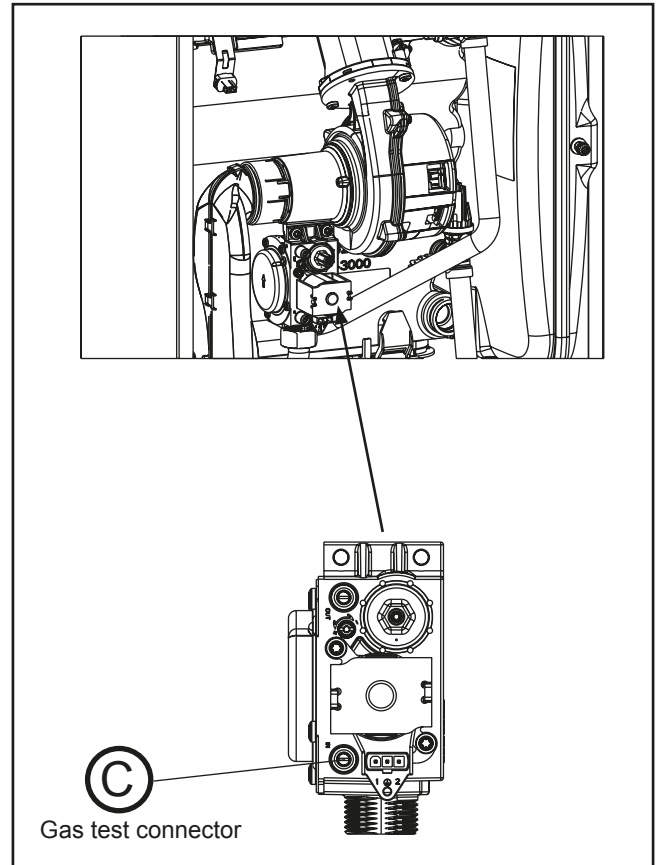


Fig: Changing the gas supply pressure

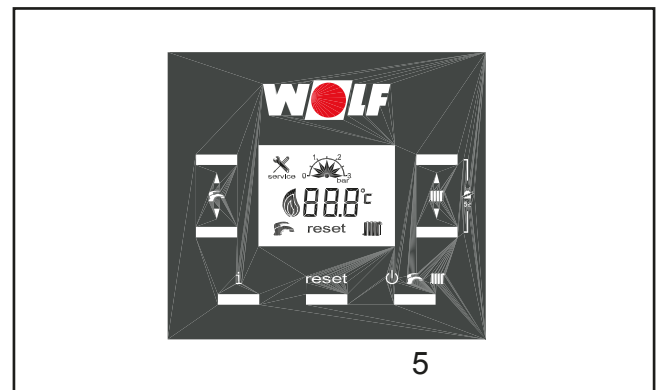


Fig: Control unit buttons

Changing the gas type

(for operation with natural gas LL and LPG only)

Change the gas type for operation with natural gas or LPG.

1. The gas boiler must be switched OFF. Close the gas ball valve.

Please note The boiler starts automatically when there is a heat demand, even if the gas type has not yet been correctly set.

2. Pull the plug from the gas combination valve

3. Undo the union nut fitting at gas combination valve (A)

4. Remove screws (B) on the gas combination valve

5. Pull the gas combination valve downwards and forwards, then remove it (C)

6. Remove gas restrictor (E) from rubber grommet (D)

7. Insert the gas restrictor according to the table "Gas restrictors".

8. Refit parts in reverse order, ensuring that all gaskets are seated properly.

9. Open the gas ball valve.

10. Check the gas combination valve is gas-tight

11. Switch the gas boiler ON (button 5)

If the appliance is connected to a BM-2, the operating mode key is disabled. The BM-2 takes over this function.

12. Set the gas type in the contractor level (only for LPG).

- Call up the HG parameter list:
Press and hold (key 4) for 10 s
- Briefly press (key 4) again
- Select H12 via (key 1 or 2)
- Set the gas type according to the table (via key 6 or 7)
- Exit contractor level (via key 4)
 - Update the type plate.
Affix the label "Conversion to LPG" (included with the LPG P conversion kit) next to the type plate.
If converted to natural gas LL, affix the label "Conversion to natural gas LL" (included with the documentation) next to the type plate.

13. Carry out the CO₂ test
with open appliance – lower load
with open appliance – upper load
(see next page)

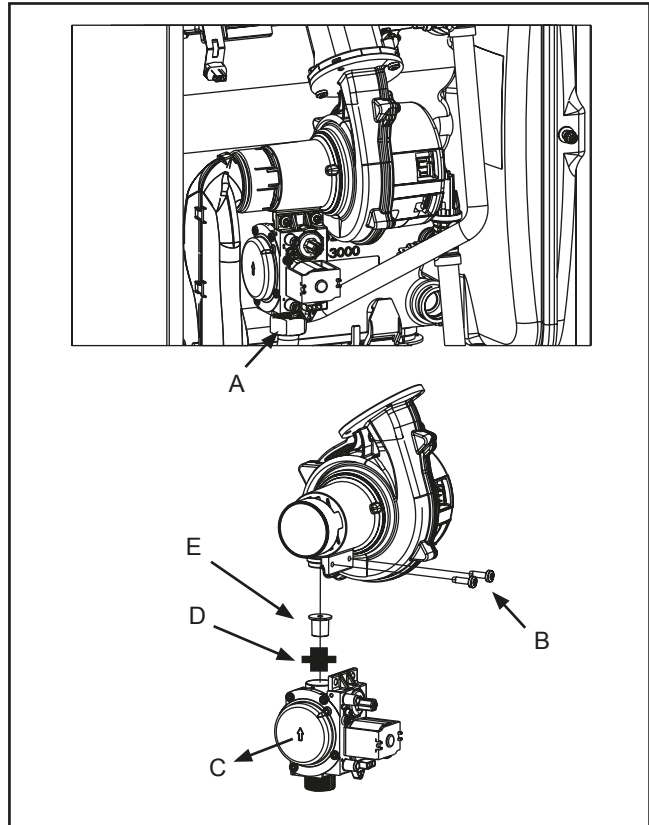


Fig: Changing the gas type

Gas type	Gas restrictor	
	28 kW	35 kW
Natural gas E/H	One notch / green (delivered condition)	Three notches / white (delivered condition)
Natural gas LL	No gas restrictor	No gas restrictor
LPG P	Two notches / yellow	Four notches / red

Table: Gas restrictors

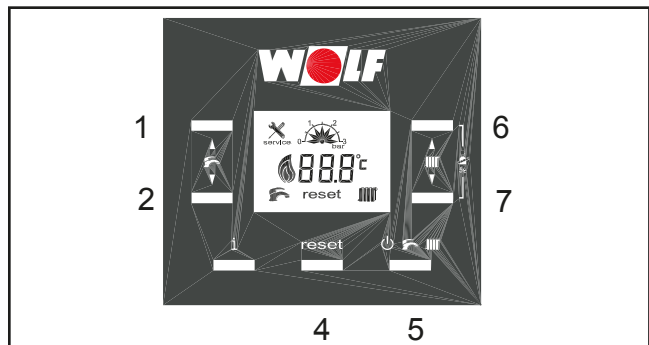


Fig: Control unit buttons

H 12	Type
1	28 kW natural gas
2	28 kW LPG
3	35 kW natural gas
4	35 kW LPG

Fig: HG parameter H12

CO₂ setting at upper load

Please note When the test port is open, flue gas can escape into the installation room. There is a risk of asphyxiation.

1. Remove screw **(B)** from the right hand test port.
 2. Open the gas ball valve.
 3. Insert the test probe.
 4. Activate emissions test mode (see control unit).
 5. Approx. 20 s after the burner start, check the CO₂ content with the CO₂ tester. If required, adjust with the zero point screw in accordance with the table.
- Clockwise rotation (-) – lower CO₂ content.
 - Anti-clockwise rotation (+) – higher CO₂ content.

Gas type	FGB / FGB-K appliance open at upper load	
	CO ₂ in %	O ₂ in %
Natural gas E/H/LL	9.1 % ± 0.2 %	4.5 ± 0.3 %
LPG P	10.2 % ± 0.2 %	5.4 ± 0.3 %

CO₂ setting at lower load

1. Activate emissions test mode and press DHW key - (2)
- Clockwise rotation – higher CO₂ content.
 - Anti-clockwise rotation – lower CO₂ content.

Gas type	FGB / FGB-K appliance open at lower load	
	CO ₂ in %	O ₂ in %
Natural gas E/H/LL	8.9 % ± 0.2 %	5.0 ± 0.3 %
LPG P	9.8 % ± 0.2 %	6.0 ± 0.3 %

2. After completing the work, refit the casing cover and check the CO₂ values with the appliance closed.
The boiler is correctly adjusted when the CO₂ values correspond to those in table "25. Testing the combustion parameters".
3. Optionally, a change to the upper load range can be made by pressing the hot water button (1).
4. Disable emissions test mode (press key 4). After the test has been completed, switch the appliance off, remove the test probe and close the test port. Ensure the screws/gasket are tight/seated firmly.

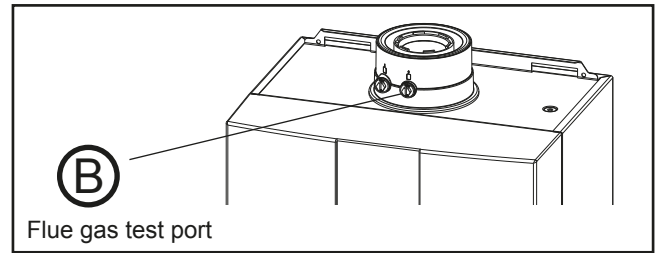


Fig: Test ports

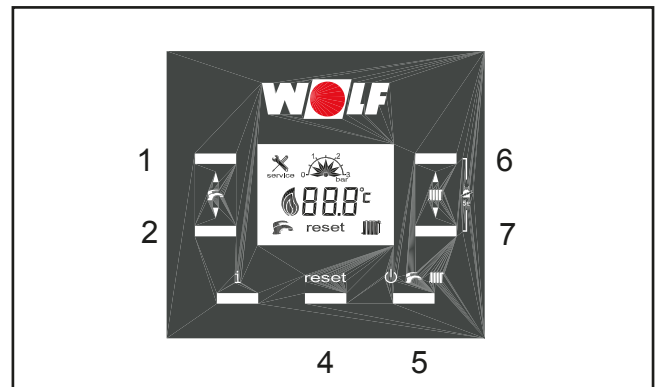


Fig: Control unit buttons

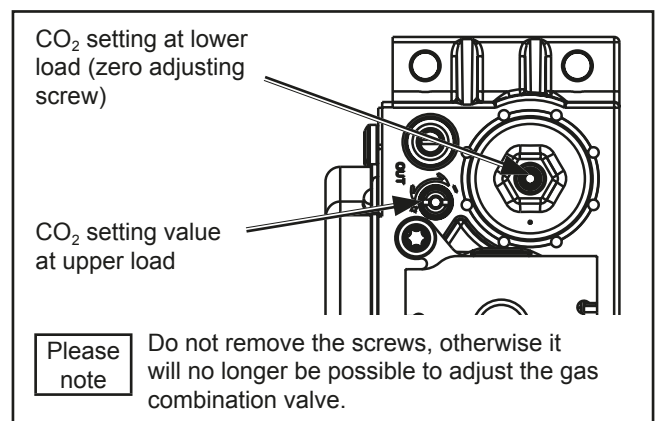


Fig: Gas combination valve

Output setting (parameter H04)

The output settings for the control parameters can only be adjusted via the integral control unit.

The heating output is determined by the gas fan speed.

By reducing the gas fan speed in accordance with the table, the maximum heating output at 80/60 °C is matched.

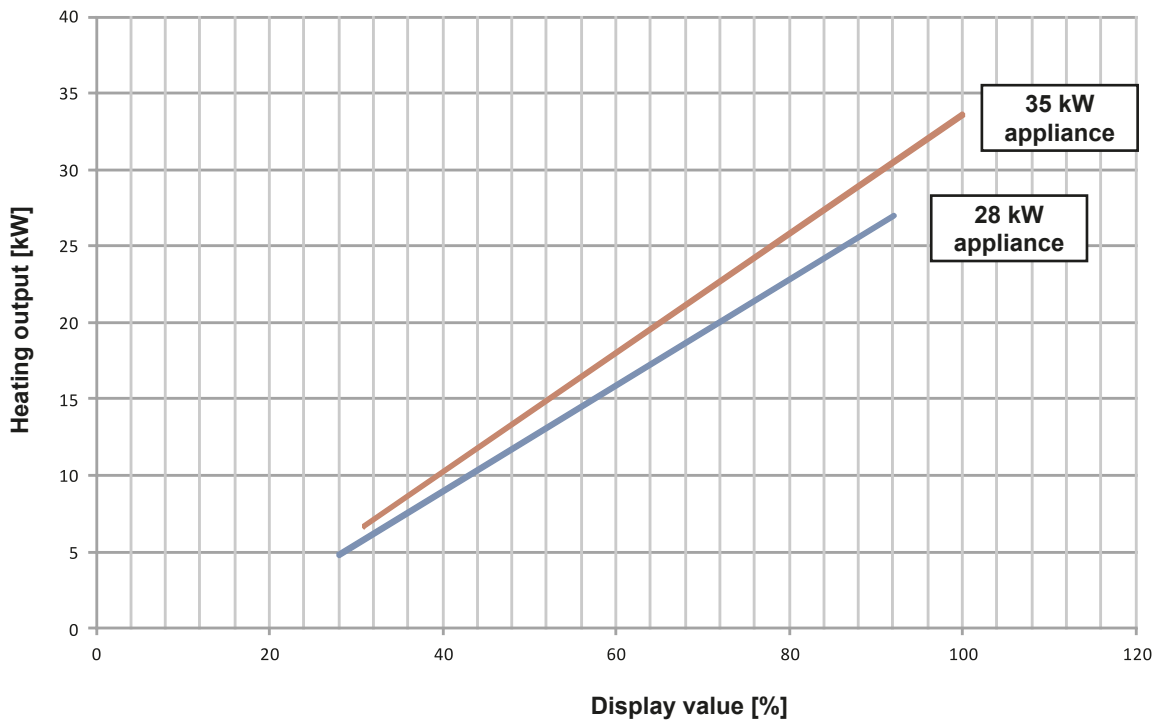
28 kW appliance

Display value (%)	28	30	40	50	60	70	80	90	92
Heating output (kW)	4.8	5.5	9.0	12.4	15.9	19.4	22.8	26.3	27.0

35 kW appliance

Display value (%)	30	31	40	50	60	70	80	90	100
Heating output (kW)	6.3	6.7	10.2	14.1	18.0	21.9	25.8	29.7	33.6

Limiting the maximum heating output relative to a flow/return temperature of 80/60 °C



Please note A flue gas emissions test by a contractor is necessary after every modification of the components, including the control unit PCB, fan, mixing device, burner and gas valve.
Test the combustion parameters with the appliance closed.

Checking the intake air

1. Remove screw **(A)** from the left hand test port.
2. Open the gas ball valve.
3. Insert the test probe.
4. Switch ON the boiler and enable the emissions test mode via buttons 6 and 7 (press and hold for 5 s).
5. Check the temperature and CO₂.
6. In the case of a balanced flue, the flue is not gas-tight if the CO₂ content is > 0.3 %. The leak must be rectified.
7. After the test has been completed, switch the boiler OFF, remove the test probe and close the test port. Ensure the screws are tightly secured.

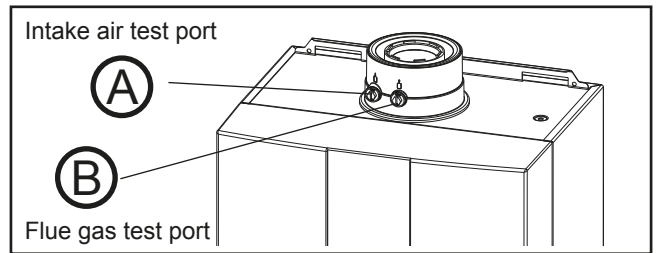


Fig: Checking the flue gas parameters

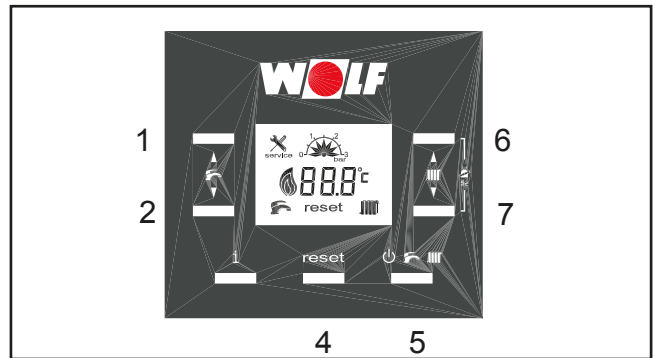


Fig: Control unit buttons

Checking the flue gas parameters

Please note When the test port is open, flue gas can escape into the installation room. There is a risk of asphyxiation.

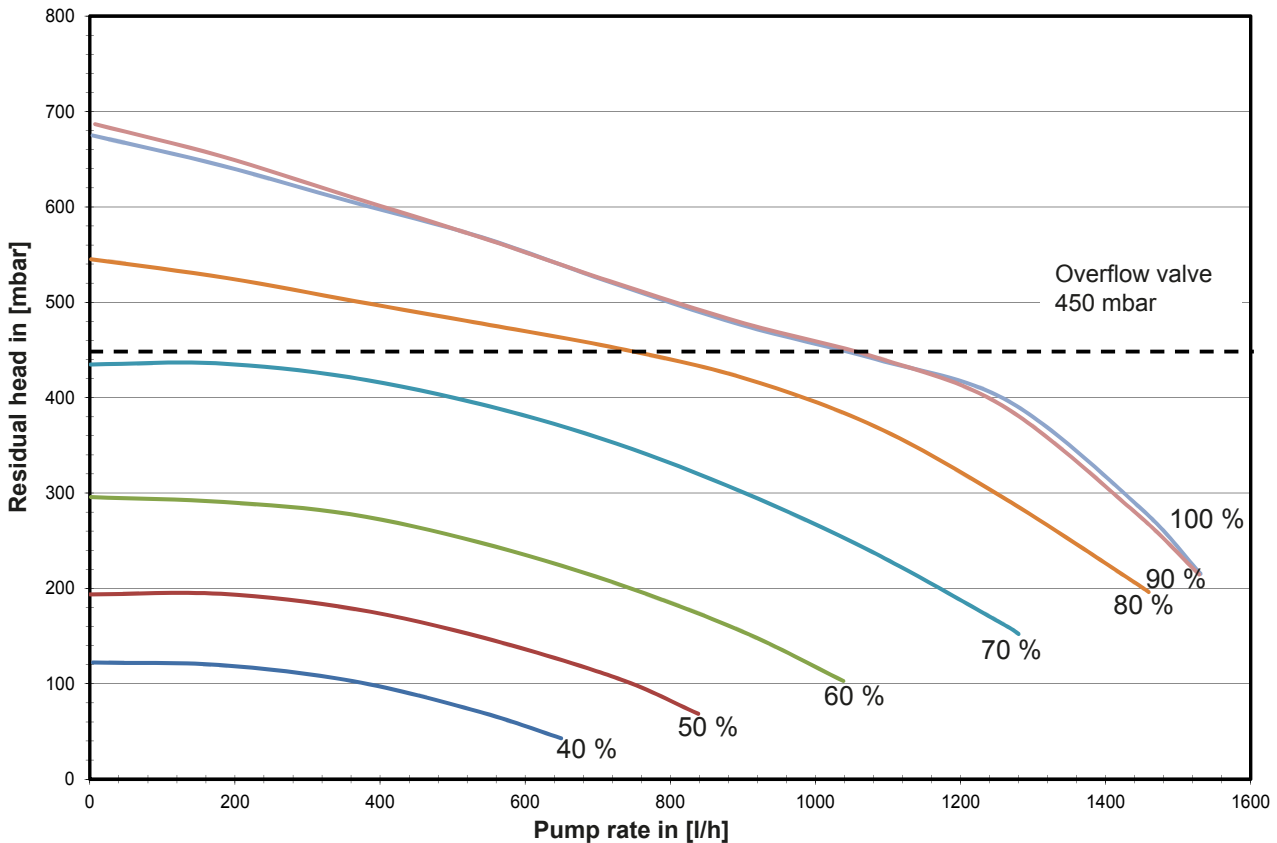
1. Remove screw **(B)** from the right hand test port.
2. Open the gas ball valve.
3. Insert the test probe.
4. Switch ON the boiler and enable the emissions test mode via buttons 6 and 7 (press and hold for 5 s).
5. Carry out the checks after a minimum of 20 s of operation, measuring first at upper load and then at lower load.
6. Flue gas values (for permissible values, see table)
7. After the test has been completed, switch the boiler OFF, remove the test probe and close the test port. Ensure the screws / gasket are tight / seated firmly.

FGB / FGB-K appliance closed at upper load		
Gas type	CO ₂ in %	O ₂ in %
Natural gas E/H/L	9.3 % ± 0.2 %	4.2 ± 0.3 %
LPG P	10.5 % ± 0.2 %	4.9 ± 0.3 %

FGB / FGB-K appliance closed at lower load		
Gas type	CO ₂ in %	O ₂ in %
Natural gas E/H/L	9,1 % ± 0.2 %	4,7 ± 0.3 %
LPG P	10.0% ± 0.2 %	5.7 ± 0.3 %

Table: Flue gas parameters

Residual head of the high efficiency pump (EEI ≤ 0,20)



High efficiency pump function description (EEI ≤ 0,20)

Possibilities	Heating mode	<p>2 operating modes are possible with the modulating heating circuit pump:</p> <p>1. Spread control (ΔT) This type of control aims to utilise the condensing effect as fully as possible while minimising the electrical energy required by the pump. This is achieved by constantly maintaining a prescribed spread.</p> <p>2. Fixed speed setting (constant) The heating circuit pump runs at the fixed set speed, both for minimum and maximum burner output. The pump rate is not controlled subject to the required heating load and power consumption is not reduced.</p>
	DHW mode	The heating circuit pump does not modulate, it continuously operates at the selected "DHW" pump speed. (See table "Factory settings for pump speed".)
	Standby mode	The pump does not run when the boiler is in standby mode.
Operating setting	The pump control can be set with parameter H37.	

Troubleshooting

Problem	Remedy
Individual radiators do not warm up properly.	Carry out hydraulic balancing, i.e. reduce the flow rate of hotter radiators. Increase the pump speed (H16).
In the spring and autumn, the required room temperature is not achieved.	Increase the set room temperature at the controller, e.g. with set value setting ± 4 .
The required room temperature is not achieved when outside temperatures are very low.	Select a steeper heating curve at the controller, e.g. increase the flow temperature at standard outside temperatures.

Commissioning steps	Test values or confirmation
1.) Serial number on the type plate	_____
2.) Electrical wiring / connection / fuse protection checked in accordance with technical data of installation instructions and VDE regulations?	<input type="checkbox"/>
2.) System flushed?	<input type="checkbox"/>
3.) System filled and water treatment carried out? - pH value set - total hardness set	<input type="checkbox"/> _____ pH value _____ °dH
4.) Appliance and system vented?	<input type="checkbox"/>
5.) System pressure 2.0 - 2.5 bar?	<input type="checkbox"/>
6.) Water connections checked for leaks?	<input type="checkbox"/>
7.) Trap filled?	<input type="checkbox"/>
8.) Gas restrictor inserted according to gas type?	<input type="checkbox"/> Natural gas <input type="checkbox"/> LPG Wobbe index _____ kWh/m ³ Net calorific value, heating _____ kWh/m ³
9.) Gas supply pressure checked?	<input type="checkbox"/>
10.) Gas tightness test carried out?	<input type="checkbox"/>
11.) Switch boiler ON, set control unit to OFF / Standby.	<input type="checkbox"/>
12.) Standard setting of control unit set?	<input type="checkbox"/>

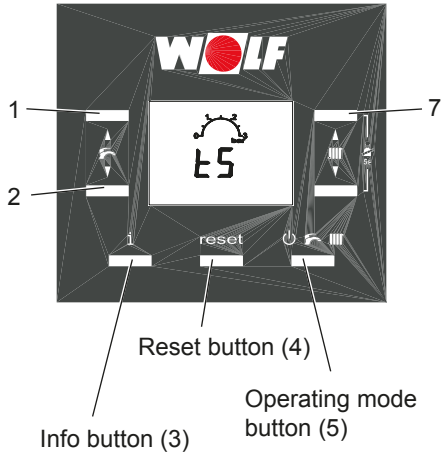
Commissioning steps	Test values or confirmation
13.) Required heating output set in contractor parameter H04?	<input type="checkbox"/>
14.) Gas type set in contractor parameter H12?	1 = Natural gas = 28 kW <input type="checkbox"/> 2 = LPG = 28 kW <input type="checkbox"/> 3 = Natural gas = 35 kW <input type="checkbox"/> 4 = LPG = 35 kW <input type="checkbox"/>
15.) Check system configuration and change as necessary Expert parameter H40 Check hot water configuration and change as necessary Expert parameter H51	<input type="checkbox"/>
16.) Gas type and output entered on label?	<input type="checkbox"/>
17.) Balanced flue system checked?	<input type="checkbox"/>
18.) Flue gas emissions test (emissions test mode): Gross flue gas temperature _____ t_{FL} [°C] Intake air temperature _____ t_{IA} [°C] Net flue gas temperature _____ $(t_{FL} - t_A)$ [°C] Carbon dioxide content (CO ₂) or oxygen content (O ₂) _____ % Carbon monoxide content (CO) _____ ppm	
19.) Casing fitted?	<input type="checkbox"/>
20.) Function test carried out?	<input type="checkbox"/>
21.) System user trained, documentation handed over?	<input type="checkbox"/>
22.) Commissioning confirmed?	_____ <input type="checkbox"/>

Safety information for maintenance

For maintenance, observe the safety instructions from page 4.

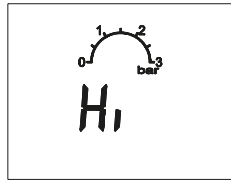
Fault history

Any faults that have occurred during operation can be called up on the contractor level under "Fault history".



To do this, press and hold reset (4) for 10 seconds (until ts appears). Using keys (1) and (2), access the fault history menu "Hi" and select with reset (4).

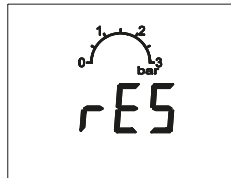
The most recent faults are shown, providing maintenance information for the heating contractor.



Fault history

- Press button (1) to select H01 to H08.
- Press button (7) to display the fault code.

To return to the contractor level, press reset button (4) twice. Here, use buttons (1) and (2) to select the fault history menu "rES" in order to reset the fault.



To reset the fault history:

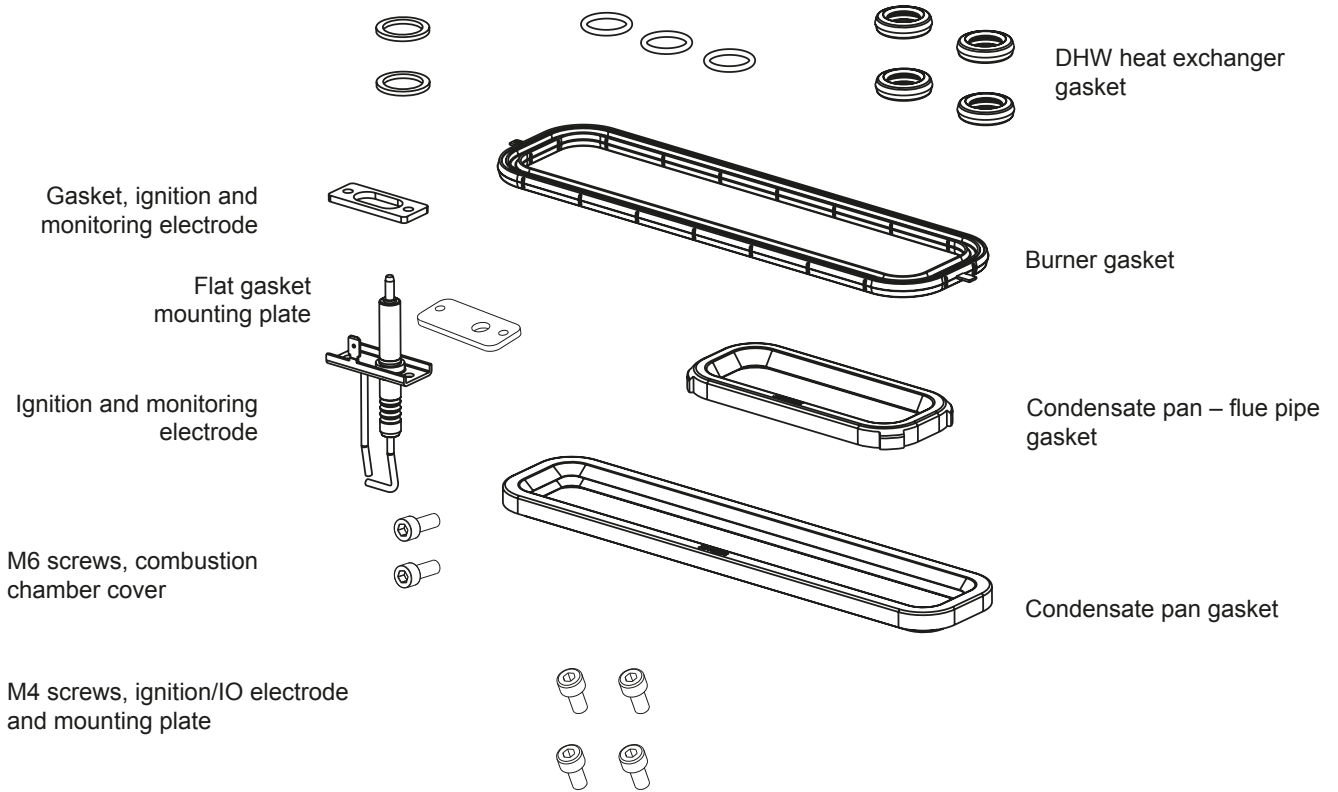
- When "rES" is displayed, press and hold operating mode button (5) for 10 s.

Press and hold info button (3) for 1 s to exit the contractor level.

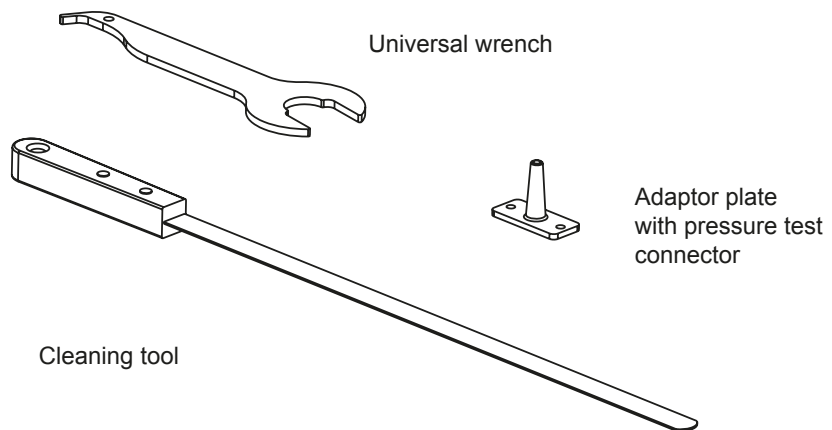
Maintenance requires the following

1	Maintenance set	Part no. 8614950
1	Cleaning set	Part no. 8614952
1	Measuring device for BlmSch test	No accessories
1	Differential pressure tester	No accessories

FGB spare parts maintenance set



Spare parts cleaning set



Isolating the system from the power supply

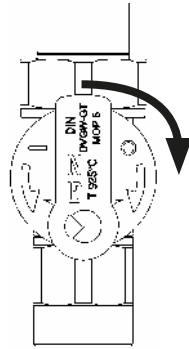


The mains terminals remain live even when the ON/OFF switch has been switched OFF.

- Isolate the system from the power supply.

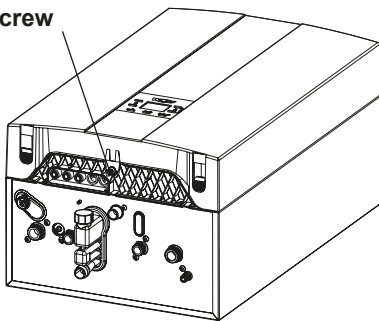


Closing the gas ball valve

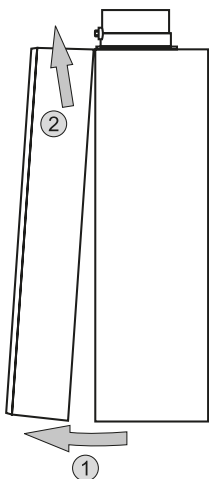


Removing the front casing

Screw



- First undo the central screw at the bottom of the front casing.



- Push in the two locking hooks at the bottom left and right and pull the casing forwards.
- Lift the front casing upwards to release and remove it.

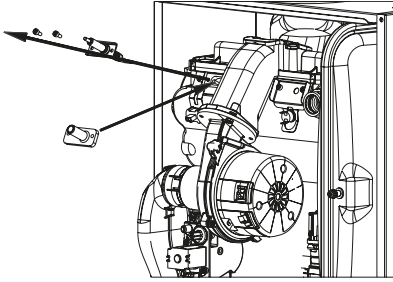
Risk of burns



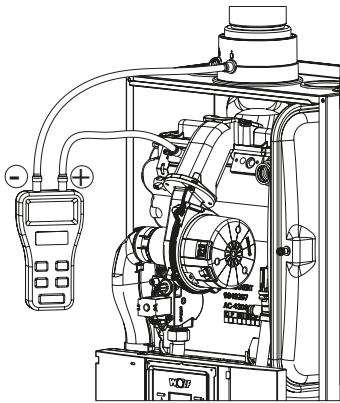
Some components can be very hot. Let them cool down or wear gloves.

28.4. Determining the soiling level on the heating water heat exchanger (flue gas side)

Fitting the pressure test connector



- Undo the M4 Allen screws on the ignition IO electrode
- Fit the adapter plate with pressure test connector
- The Ignition IO electrode must be refitted after maintenance



- Connect the differential pressure tester between the adapter plate "+" and the flue gas test port "-" on the device connection flange

Switching on the appliance (rack in again)



- The appliance starts with the venting program (AP function) for 30 sec. (see chapter 15 – Control unit) and the fan runs at constant speed for 30 sec.

Determining combustion chamber / heat exchanger pressure differential

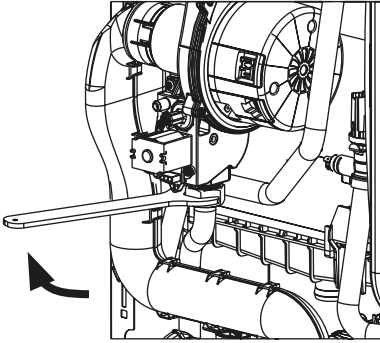
28 kW		35 kW	
Reading	What to do	Reading	What to do
> 3 mbar ¹⁾	Cleaning	> 3 mbar ¹⁾	Cleaning

Table: Limits for heat exchanger cleaning

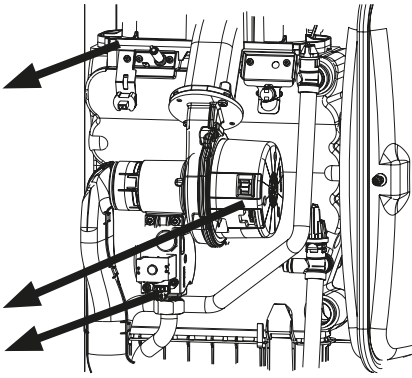
¹⁾ Up to software version 1.10, limit at 7 mbar

- Compare the reading with the table and take the required measures
- Clean the heat exchanger as described in 28.8.

Undoing the fitting on the gas combination valve



Disconnecting the plug-in connections



Disconnect the following plugs:

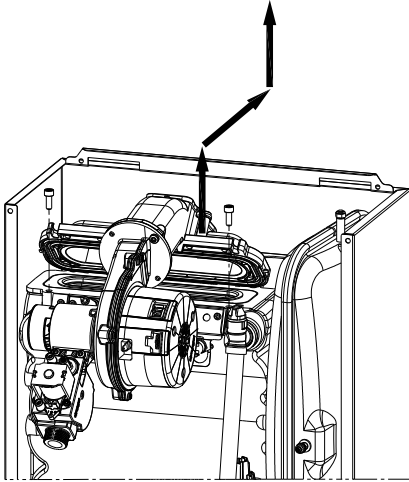
- Fan
- Gas combination valve
- Ignition / IO electrode



Pull off with small twisting movements.

Removing the combustion chamber cover

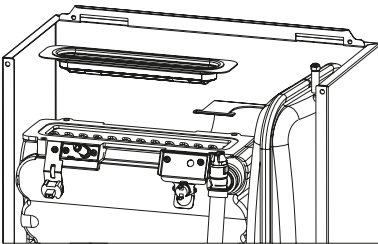
- Pull off the inlet pipe
- Undo 2 screws on the combustion chamber cover
- Raise the combustion chamber cover, slide it back and lift it to remove.



Burner maintenance

The burner must be cleaned every time maintenance work is carried out.

- Remove the burner
- Visual inspection for damage
- Replace if damaged
- Clean with compressed air, through suction or by tapping out against the direction of flow
- Clean sealing faces on heat exchanger and burner
- Replace the burner gasket

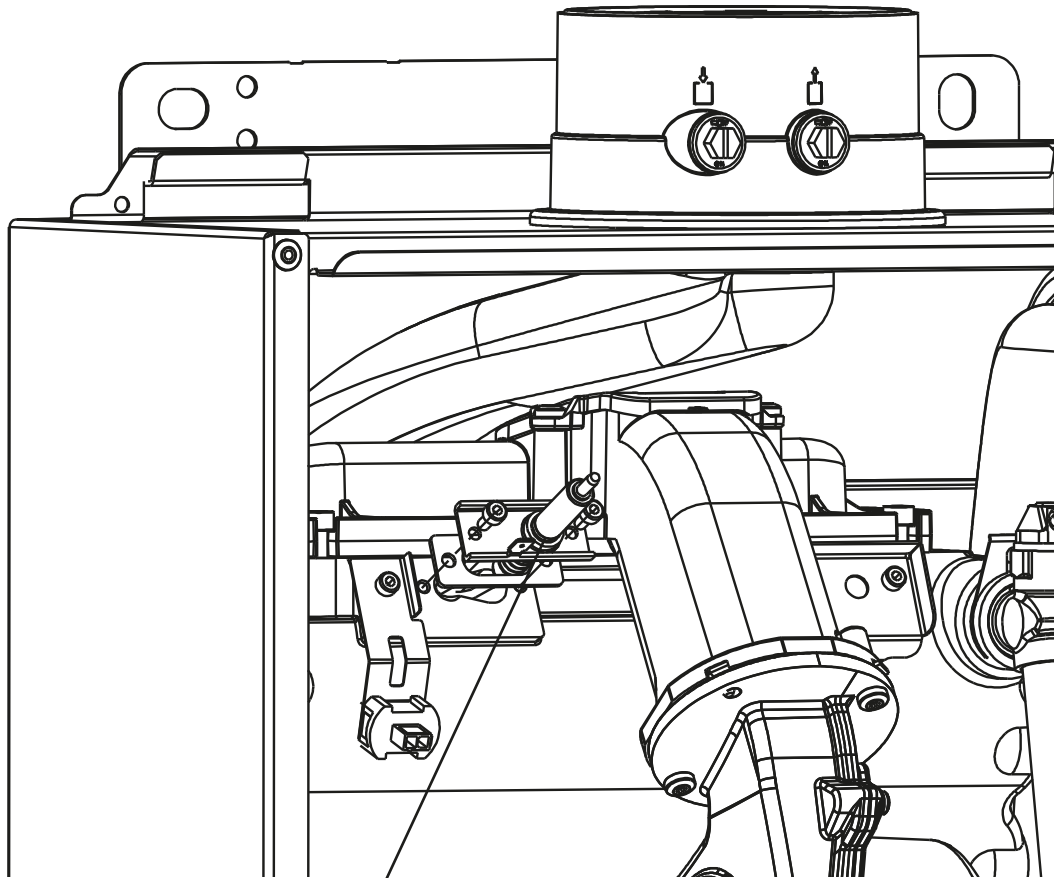


Caution:

Never use boiler cleaning agents, acids, alkaline solutions or water for cleaning.

Replacing the electrodes

- Remove the electrode by releasing the two M4 screws.
- The electrode, including gasket, must be replaced every time maintenance work is carried out (torque for fixing screws 3.0 ± 0.3 Nm).



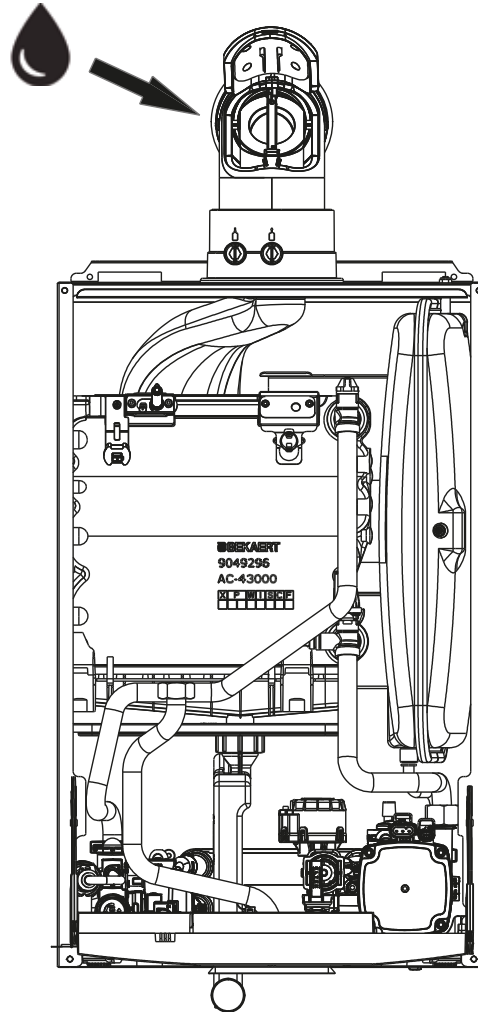
Electrode

Cleaning the trap

- Remove any residue from the trap
- Place a drip pan under the trap
- Open the cleaning aperture on the trap
- Fill / flush the trap from above through the inspection port in the flue pipe/ bend



Flush only through the flue; do not fill water into the ventilation air aperture, as this could cause the burner to malfunction.



Checking the expansion vessel

Check the expansion vessel

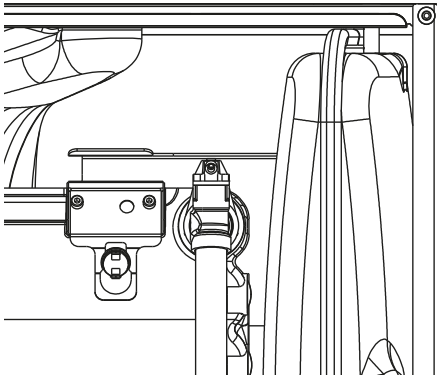
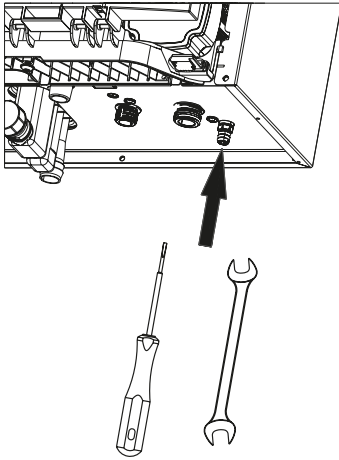
If you notice a loss of water, check the expansion vessel pre-charge pressure.

The connection valve is located at the front and is secured with a protective cap.

When the heating circuit is depressurised, the pre-charge pressure should be about 0.75 bar.

Emptying the condensing boiler on the heating water side

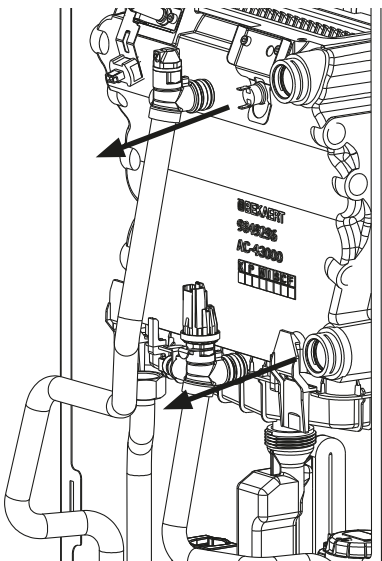
- Close the flow and return maintenance shut-off valves
- Open the drain valve



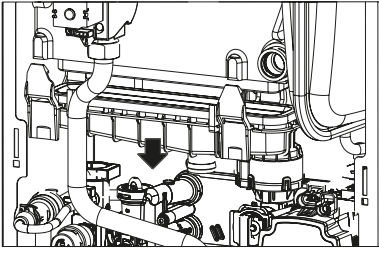
- Open the manual air vent valve

Removing the flow and return pipes

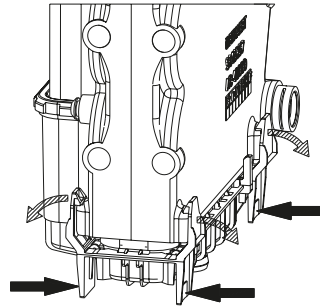
- Disconnect the plugs for the flow temperature sensor, high limit safety cut-out and flue gas temperature
- Disconnect the return sensor and pressure sensor plugs
- Release the retaining clips
- Undo the pump fitting
- Remove the pipes



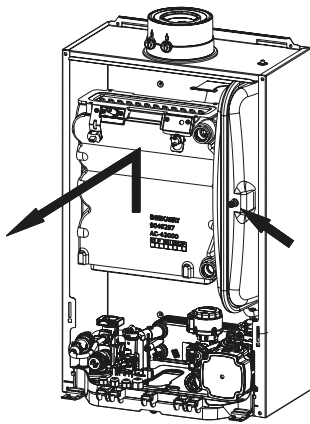
Removing the condensate pan



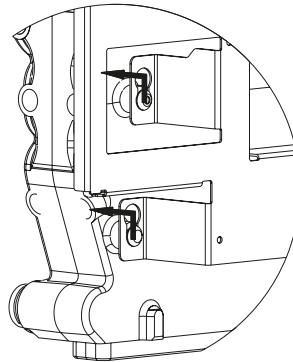
- Remove the trap
- Pressing together the retaining clips, pull them off downwards and place them in the casing



Unhooking the heat exchanger

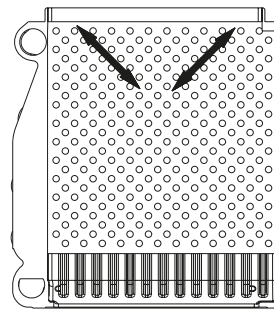
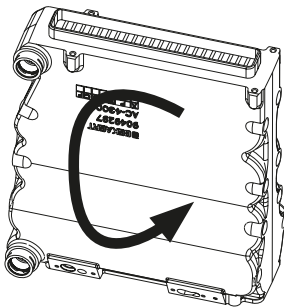


- Lift the heat exchanger and remove it towards the front




Cleaning the heat exchanger

- Set the heat exchanger down on the burner flange
- With the cleaning tool from the maintenance set, clean the pin rows diagonally.

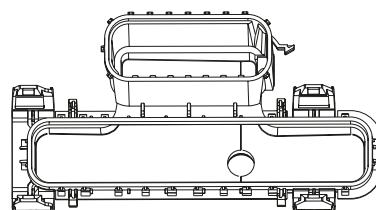


Caution:
Do not use cylinder cleaning agents
or water!

 Turn through 180°

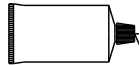
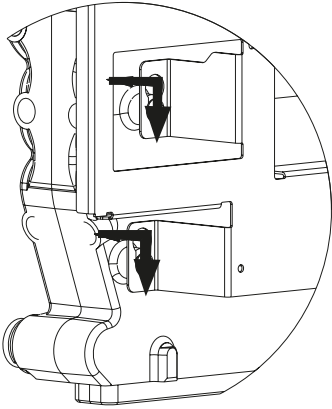
- Once residues have been loosened, tap the heat exchanger to remove them (towards the burner flange).
The heat exchanger can also be flushed with water.

Removing residue from the condensate pan



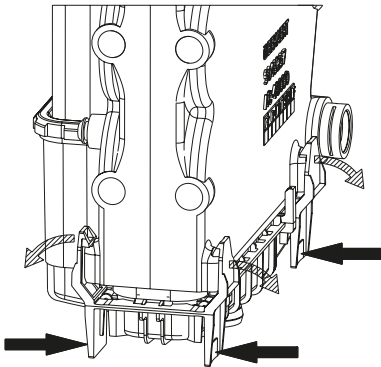
Assembling the heat exchanger

- Replace the condensate pan gaskets and grease them with silicone grease
- Insert the condensate pans into the casing
- Hook the heat exchanger into place from above



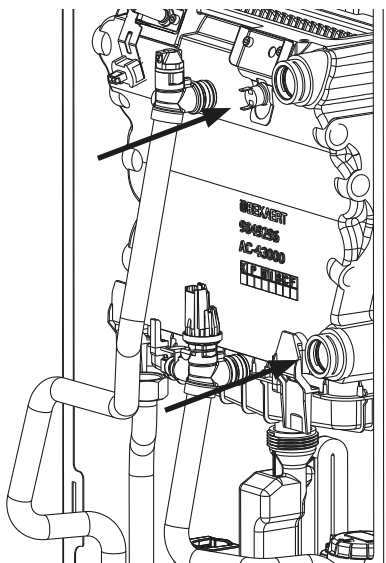
Fitting the condensate pan

- Press together the retaining clips, guide them straight up and secure them on the heat exchanger
- The flue pipe must be positioned in the condensate pan
- Refit the trap

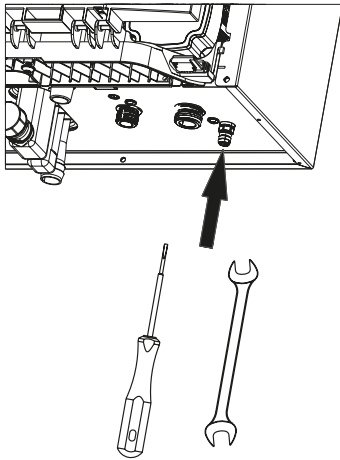


Fitting the flow and return pipes

- Replace and grease the gaskets
- Fit the pipes to the pump using retaining clips and the threaded connection
- Connect the flow temperature sensor, high limit safety cut-out and flue gas temperature sensor plugs
- Reconnect the return sensor and pressure sensor plugs

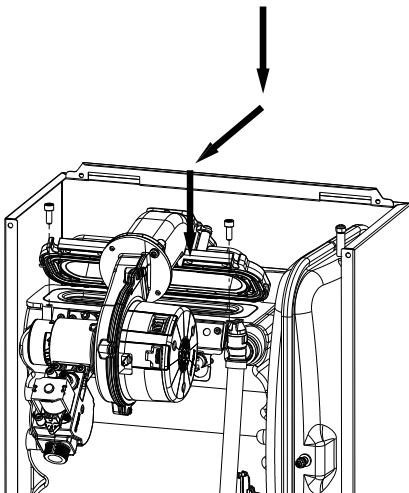


Filling the condensing boiler on the heating water side



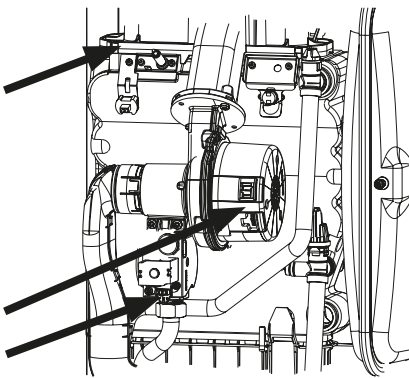
- Close the drain valve
- For filling, see chapters 18 and 19
- Vent the condensing boiler
- Open the flow and return maintenance shut-off valves

Fitting the combustion chamber cover



- Replace the burner gasket
- Insert the burner horizontally
- Place the combustion chamber cover on the combustion chamber and evenly pull it forwards
- Tighten the screws on the combustion chamber cover
- Fit the inlet pipe

Fitting the plug-in connections



- Re-connect the following plug-in connections:

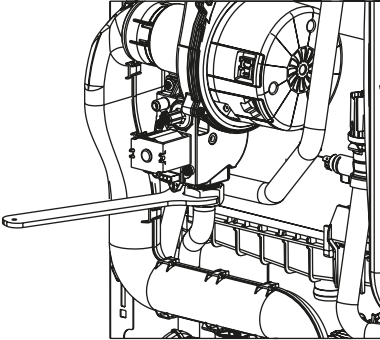
- Fan
- Gas combination valve
- Ignition / IO electrode



Insert with small twisting movements

Tightening the fitting on the gas combination valve

- Replace the threaded connection seals
- Tighten the threaded connection on the gas combination valve and check for leaks.

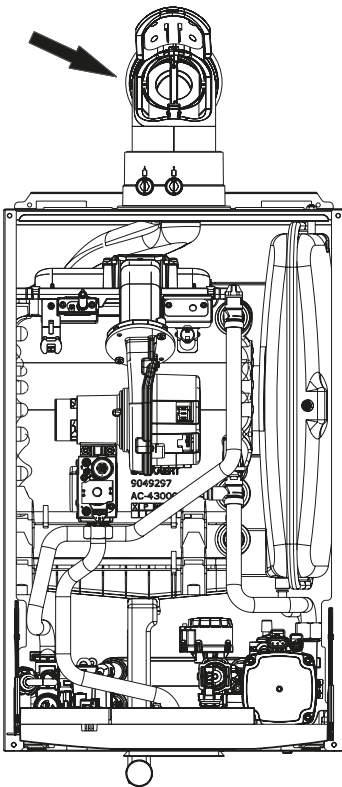


Filling the trap

- Fill the trap from above through the inspection port in the flue pipe/bend.



Fill only through the flue; do not fill water into the ventilation air aperture, as this could cause the burner to malfunction.



Control reading Heat exchanger pressure differential after cleaning

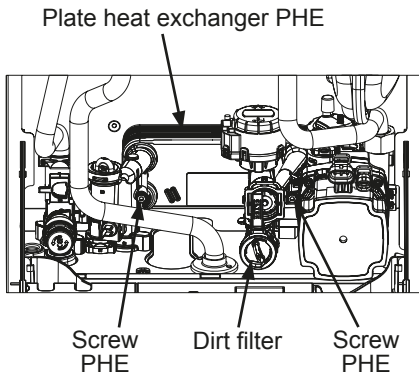
- Carry out test as described in chapter 28.4, Determining the soiling level on the heating water heat exchanger.
- The measured pressure drop values must lie below the limits.
- If no improvement is apparent, install the "heat exchanger" spare part.

Checking the DHW heating

- Shut off the cold water and depressurise the system.

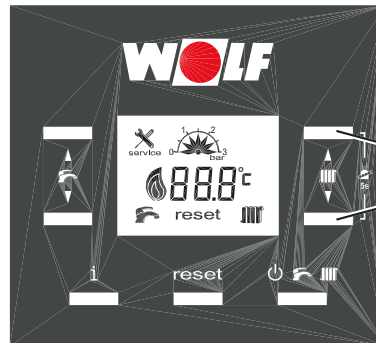
If the DHW output of a FGB-K is too low, take the following action:

- On FGB-K units, check and clean the dirt filter.
- Remove the plate heat exchanger of the FGB-K.
- With a 4 mm Allen key, release screws (2 pce) and pull off the plate heat exchanger (PHE) upwards.
- **Descale or replace the plate heat exchanger.**
- Replace and grease the gaskets of the plate heat exchanger.
- After fitting, tighten the screws to a torque of 3.5 ± 0.5 Nm.



Test run

- Open the gas ball valve and switch on the appliance.
- Check the gas train and hydraulics for tightness.
- Hook the casing back into place and secure it.
- Press the emissions test mode key.



Activate emissions test mode (press and hold both keys simultaneously for 5 seconds).

Testing the combustion parameters

Test the combustion parameters following all maintenance work. For instructions, see chapter 25.

Temperature monitoring

High limit safety cut-out (thermostat)

The high limit safety cut-out shuts down the boiler when the temperature reaches 110 °C.

This causes the burner to be shut down and results in a lockout fault → with fault code 01. When the temperature drops below the shut-down point, the boiler restarts once the fault has been acknowledged.

Boiler water temperature sensor

- The boiler water temperature sensor is a contact sensor on the combustion chamber. The appliance is controlled via the temperature determined here.
- The maximum possible boiler water temperature is 90 °C. Exceeding this temperature causes the boiler to shut down and results in a burner cycle block (factory setting 7 min.).
- The boiler water temperature sensor is a high limit safety cut-out and shuts down the appliance at 105 °C (lockout). → Fault code 02
- The boiler water temperature sensor is a temperature limiter and shuts down the appliance at 95 °C (without lockout). → Fault code 06

Flue gas temperature sensor

The flue gas temperature sensor shuts down the boiler when the flue gas temperature exceeds 115 °C → Fault code 07.

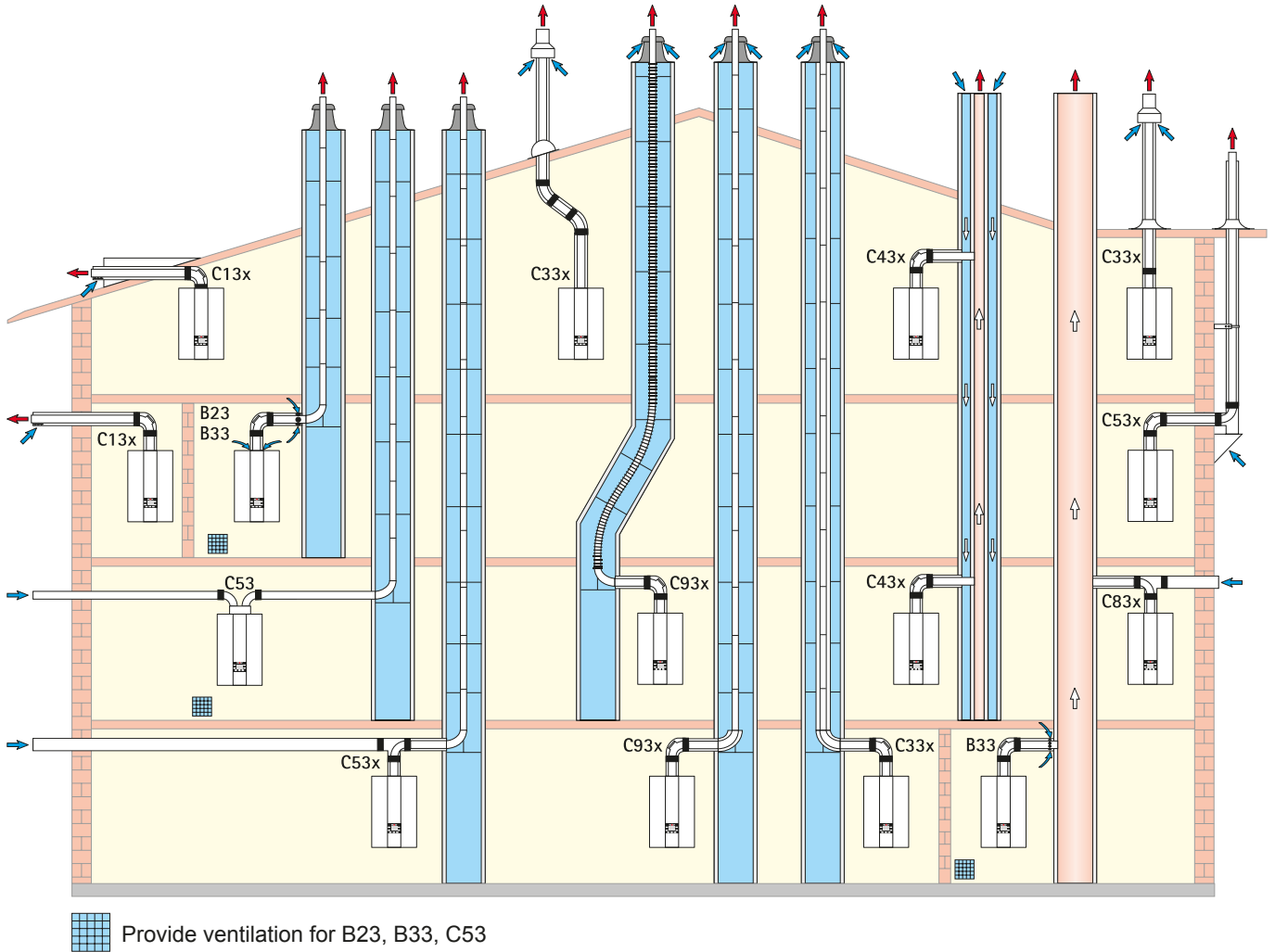
The flue gas temperature is determined by a sensor in the condensate pan.

System pressure monitoring

Dry fire protection

The appliance is equipped with a pressure sensor that monitors the operating pressure in the heating circuit. When the system pressure falls below 0.5 bar, the burner is shut down without appliance lockout. Once the pressure exceeds the shut-down threshold again, the appliance restarts independently.

Balanced flue system



Connection types

Type ¹⁾	Operating mode		Can be connected to				
	open flue	balanced flue	moisture-resistant chimney	room sealed balanced flue	balanced flue	certified balanced flue	moisture-resistant flue
B23P, B33P, C13x, C33x, C43x, C53, C53x, C83x, C93x	X	X	B33, C53, C83x	C43x	C13x ²⁾ , C33x, C53x	C63x	B23, C53x, C83x, C93x

¹⁾ Marking "x" indicates that all components of the flue gas route are surrounded by combustion air.

²⁾ In Switzerland, observe the G1 gas guidelines.

Information about multiple connections:

Point	Safe differential pressure in accordance with DIN EN 15502-2-1	FGB-28	FGB-35
a	The maximum safe differential pressure at the lowest thermal load ($\Delta p_{max, saf(max)}$)	25	
b	The maximum safe differential pressure at the highest thermal load ($\Delta p_{max, saf(min)}$)	77	75
c	The maximum safe differential pressure at start ($\Delta p_{max, saf(start)}$)	25	
d	The maximum functional differential pressure at the highest thermal load ($\Delta p_{max, func(max)}$)	25	
e	The minimum safe differential pressure ($\Delta p_{min, saf}$)	-200	

Balanced flue

Flue gas routing options			Maximum length ¹⁾ [m]	
			up to 28 kW	up to 35 kW
B23P	Flue in a shaft and combustion air directly via boiler (open flue)	DN60 DN80	11 50	7 50
B33P	Flue in a shaft with horizontal, concentric connecting pipe (open flue)	DN60 DN80	9 50	5 50
B33P	Connection to moisture-resistant chimney with horizontal concentric connecting pipe (open flue)		Calculation to EN 13384 (room sealed balanced flue manufacturer)	
C13x	Horizontal roof outlet through pitched roof (balanced flue – on-site dormer)	DN60/100 DN80/125	5 10	3 10
C33x	Vertical concentric roof outlet through pitched or flat roof, vertical concentric balanced flue system for installation in a shaft (room sealed)	DN60/100 DN80/125 DN110/160	6 18 19	4 29 48
C43x	Connection to moisture-resistant room sealed balanced flue chimney, maximum pipe length from centre of boiler bend to connection 2 m (room sealed)		Calculation to EN 13384 (room sealed balanced flue manufacturer)	
C53	Connection to flue in a shaft and ventilation air supply through external wall (room sealed), 3 m ventilation air duct incl.	DN80/80	50	50
C53x	Connection to flue on external wall, combustion air intake via external wall (room sealed)	DN60/100 DN80/125	9 50	5 50
C83x	Connection to flue in a shaft and ventilation air through external wall (room sealed)	DN80/125	50	50
C83x	Concentric connection to moisture-resistant flue gas chimney and combustion air through external wall (room sealed)		Calculation to EN 13384 (room sealed balanced flue manufacturer)	
C93x	Flue for installation in a shaft, connecting pipe DN60/100, vertical DN60	rigid	8	5
C93x	Flue for installation in a shaft, vertical DN80 connecting pipe DN60/100 connecting pipe DN80/125 connecting pipe DN80/125	rigid	14	27
		rigid	15	39
		flexible	14	37

¹⁾ The maximum length corresponds to the total length from the appliance to the flue terminal.

For available lifting pressures of gas blowers, see specification.

Note: Systems C33x and C83x are also suitable for installation in garages.

Where necessary, adapt the installation examples to the relevant building regulations and requirements in your country/region. Any questions relating to the installation, particularly regarding the provision of inspection components and ventilation apertures (ventilation generally required above 50 kW output) should be raised with your local flue gas inspector prior to installation.

The specified lengths refer to concentric balanced flues and standard flues, and apply to original Wolf components only.

Balanced flue systems DN60/100 and DN80/125 are certified as single units together with Wolf gas condensing boilers.

The following balanced flues or standard flues with CE-0036-CPD-9169003 certification may be used:

- Flue pipe DN80
- Concentric balanced flue DN60/100 and DN80/125
- Flue pipe DN110
- Concentric balanced flue (on external walls) DN80/125
- Flexible flue pipe DN83

Wolf accessories are supplied with the relevant necessary identification labels.

Please also observe the installation information supplied with the accessories.

General information

For reasons of operational safety, use only original Wolf components for concentric balanced flues and standard flues.

Where necessary, adapt the installation examples to the relevant building regulations and requirements in your country/region. Any questions relating to the installation, particularly regarding the inspection components and ventilation apertures should be raised with your local flue gas inspector prior to installation.



With low outside temperatures, the water vapour contained in the flue gas may condense on the balanced flue and freeze. **This ice may fall from the roof, causing personal injuries or material losses.** Prevent ice from falling by taking on-site measures, e.g. installing a snow guard.



If the balanced flue crosses different floors, route the pipes outside the boiler room inside a shaft with at least 90 min fire resistance. In low-rise residential buildings (building category 1 to 2) a minimum of 30 min fire resistance is required. Fire may spread if these instructions are not observed.



Gas condensing boilers with a balanced flue with roof outlet may only be installed in attics or in rooms, where the ceiling also forms the roof or where only the roof construction is located above the ceiling.

The following applies to gas boilers with a balanced flue routed above the roof, where only the roof structure lies above the ceiling:



If fire resistance **is** required for the ceiling, the pipes for combustion air supply and flue gas must be equipped with a casing in the area between the top edge of the ceiling and the roof skin. The casing must provide the same fire resistance as the ceiling and must be made from non-combustible materials. There is a risk of fire spreading if these requirements are not observed.



If fire resistance is **not** required for the ceiling, route the lines for the combustion air supply and the flue gas from the top edge of the ceiling to the roof skin in a shaft made from non-combustible, rigid materials or in a protective metal pipe (mechanical protection). There is a risk of fire spreading if these requirements are not observed.

No clearance is required between the concentric balanced flue and combustible materials or components, as no temperatures higher than 85 °C will occur at the rated output. If only a standard flue is installed, maintain the clearances specified by DVGW/TRGI 2008 [or local regulations].



Balanced flue systems without shaft must not be routed through other installation rooms, as there is a risk of fire spreading, and mechanical protection is not ensured.

Please note The combustion air must not be drawn from chimneys previously used to carry flue gases from oil or solid fuel boilers.



Outside the shaft, secure the balanced flue or standard flue with spacer brackets. These must be provided at a minimum 50 cm from the appliance connection and upstream/downstream of diversions, to prevent the pipe joints being pulled apart. Flue gas may escape if these instructions are not observed. Furthermore, equipment damage may result.

If the gas condensing boiler is installed with a balanced flue routed over an external wall (type C13x), the rated boiler output in heating mode must be reduced to below 11 kW (for appropriate measures, see chapter "Matching the maximum output").

Connection to balanced flue

Ensure that the flues can be inspected regarding their free cross-section. For this, provide an appropriate inspection aperture in the installation room, in consultation with your local flue gas inspector.

Connections on the flue gas side are made using female connections with gaskets. Always position female connections against the direction of the condensate flow. **Install the balanced flue with a slope of at least 3° towards the gas condensing boiler. Use spacer brackets to secure the sections in place (see installation examples).**

Calculating the balanced flue length

The calculated length of the balanced flue or standard flue is comprised of the straight pipe length and the length of the pipe bends.

Example for a 60/100 system¹⁾:

Straight balanced flue pipe. length 1.5 m

1 x 87° bend \triangleq 1.5 m

2 x 45° bends \triangleq 2 x 1.3 m

$L = \text{straight length} + \text{bend length}$

$L = 1.5 \text{ m} + 1 \times 1.5 \text{ m} + 2 \times 1.3 \text{ m}$

$L = 5.6 \text{ m}$

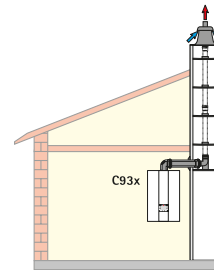
Note: To avoid reciprocal interference between balanced flues routed above the roof, we recommend maintaining a minimum clearance of 2.5 m between balanced flues.

¹⁾ Length equivalence of the system:

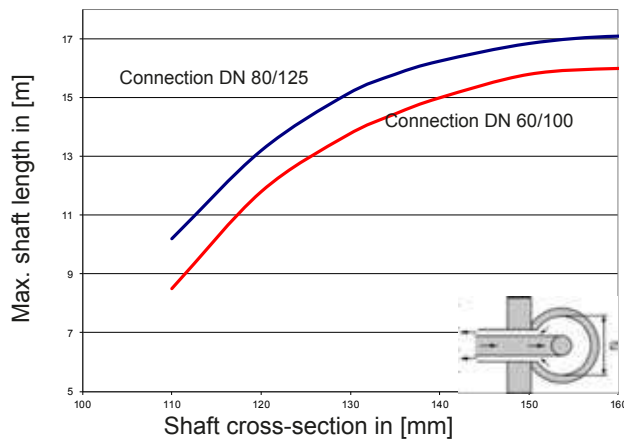
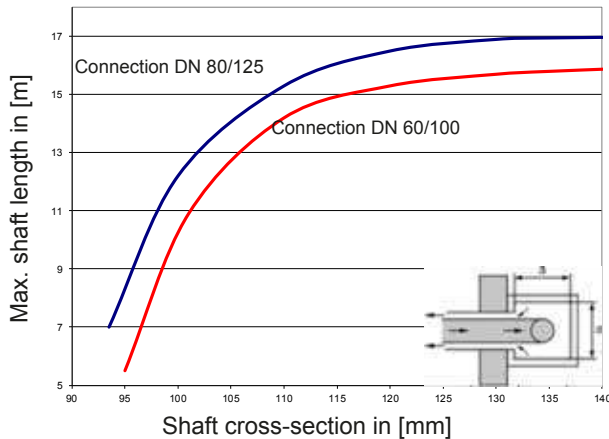
	60/100	80/125
87° bend	1.5 m	3 m
45° bend	1.3 m	1.5 m

Minimum shaft size for room sealed operation C93x

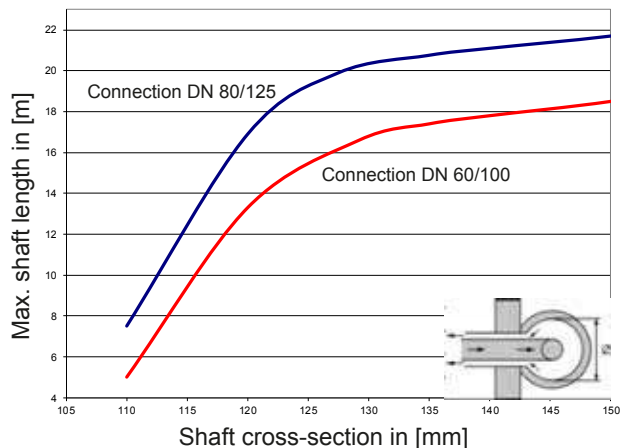
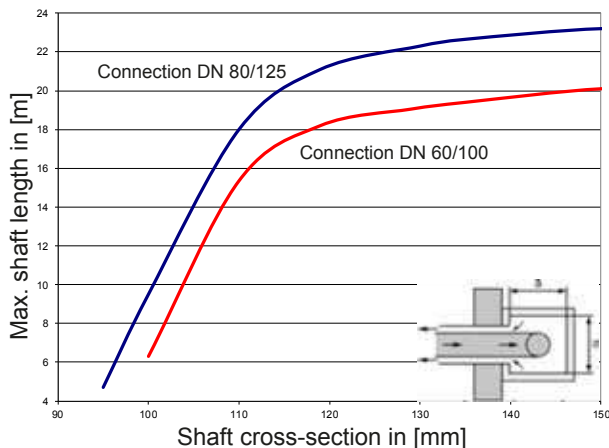
Assumption: the installation room contains 2x inspection bends, 1x 87° bend and 1.5 m horizontal with 87° support bend



FGB-28



FGB-35



Connection to a moisture-resistant room sealed balanced flue chimney, flue gas chimney or flue system, type C 43x

Horizontal balanced flues must **not be more than 2 m long when connecting the system to a balanced flue chimney**. The room sealed balanced flue chimney must be certified by DIBT - Deutsches Institut für Bautechnik [Germany] or CE-designated and must be approved for condensing operation with positive pressure / negative pressure respectively.
For sizing, use calculations to EN 13384.

Connection to a moisture-resistant flue gas chimney or a flue system type B33 for open flue operation

Horizontal balanced flues must be **no longer than 2 m** when connecting the system to a flue gas chimney. In addition to the boiler connection bend, up to **two** 90° diverters may be installed.
The flue gas chimney must be certified by DIBT [Germany] or CE-designated, and must be approved for condensing operation.
If necessary, obtain the connection piece from the chimney manufacturer.
The air apertures to the boiler room must be completely free from obstruction.

Connection to a moisture-resistant flue type B23 for open flue operation

For this version, observe the regulations concerning ventilation for boiler rooms acc. to DVGW-TRGI.

Connection to a moisture-resistant flue, type C53, C83x, for room sealed operation

For horizontal air ducts, a maximum length of 2 m is recommended. Observe special requirements for flues that are not surrounded by combustion air acc. to DVGW-TRGI 2008 and all locally applicable combustion regulations.

Connection to a combustion air and flue gas system type C63x that is not tested together with the gas combustion equipment

Original Wolf components are designed for long-term use, are designated with the DVGW quality seal and are matched for use with Wolf gas condensing boilers. When using third party equipment that is only DIBT certified or CD-designated, the installer himself is responsible for the correct sizing and trouble-free function of the system. Faults, material losses and injuries resulting from incorrect pipe lengths, excessive pressure drop, premature wear with escaping flue gas and condensate or incorrect function, e.g. through components working themselves loose, are excluded from our warranty if non-approved third party equipment is used.

If the combustion air is drawn from the shaft, the shaft must be free from contamination.

Multiple connections / cascade

These boilers are suitable for multiple connections to a shared chimney in accordance with DVGW Code of Practice G 635. An internal non-return valve is used to prevent a return flow of flue gas. The plumb clearance between two gas boilers must be at least 2,5 m. The installed flue system must be approved for multiple connections to a shared chimney. The approval must be verified by relevant calculations in accordance with fire protection regulations.

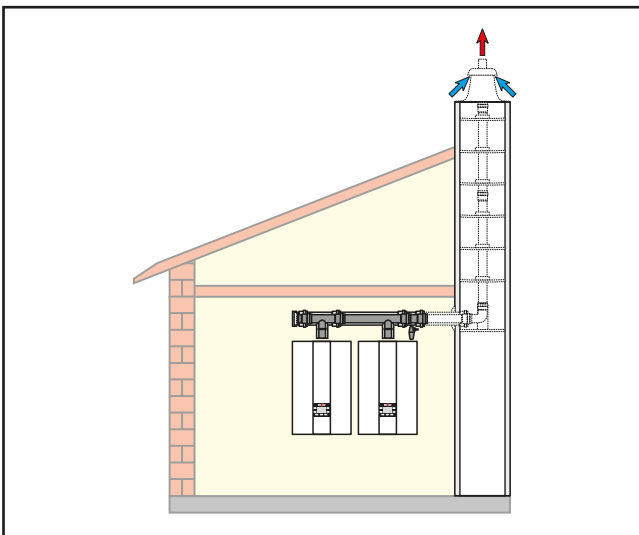


Fig: Cascade

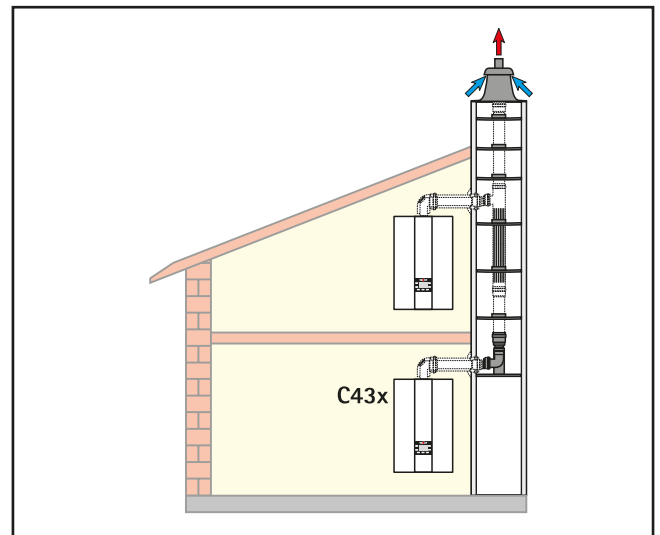


Fig: Multiple connection

Sizing table, flue system for cascade operation

Wolf FGB appliance combination	Flue diameter			Height, vertical* in m
	Connection pipe	Header	Vertical	
28 + 28	DN110	DN110	DN110	50
28 + 35	DN110	DN110	DN110	50
35 + 35	DN110	DN110	DN110	50
28 + 28 + 28	DN110	DN110	DN110	46
28 + 28 + 28	DN110	DN110	DN125	50
28 + 28 + 35	DN110	DN110	DN110	38
28 + 28 + 35	DN110	DN110	DN125	50
28 + 35 + 35	DN110	DN110	DN110	32
28 + 35 + 35	DN110	DN110	DN125	50
35 + 35 + 35	DN110	DN110	DN110	29
35 + 35 + 35	DN110	DN110	DN125	50
28 + 28 + 28 + 28	DN110	DN110	DN110	19
28 + 28 + 28 + 28	DN110	DN110	DN125	46
28 + 28 + 28 + 28	DN110	DN125	DN125	50
28 + 28 + 28 + 35	DN110	DN110	DN110	15
28 + 28 + 28 + 35	DN110	DN110	DN125	39
28 + 28 + 28 + 35	DN110	DN125	DN125	45
28 + 28 + 28 + 35	DN110	DN125	DN160	50
28 + 28 + 35 + 35	DN110	DN110	DN110	12
28 + 28 + 35 + 35	DN110	DN110	DN125	32
28 + 28 + 35 + 35	DN110	DN125	DN125	39
28 + 28 + 35 + 35	DN110	DN125	DN160	50
28 + 35 + 35 + 35	DN110	DN110	DN110	10
28 + 35 + 35 + 35	DN110	DN110	DN125	26
28 + 35 + 35 + 35	DN110	DN125	DN125	33
28 + 35 + 35 + 35	DN110	DN125	DN160	50
35 + 35 + 35 + 35	DN110	DN110	DN110	9
35 + 35 + 35 + 35	DN110	DN110	DN125	25
35 + 35 + 35 + 35	DN110	DN125	DN125	31
35 + 35 + 35 + 35	DN110	DN125	DN160	50

* Max. height, shaft inlet to outlet point

Tightness test on connections to adjacent appliances

As part of the annual boiler test, the cascade damper on overpressure boiler systems must be tested for tightness, to ensure no CO₂ can escape into the boiler room (risk of poisoning or asphyxiation). The check must be carried out with the appliance closed.

We recommend proceeding as follows:



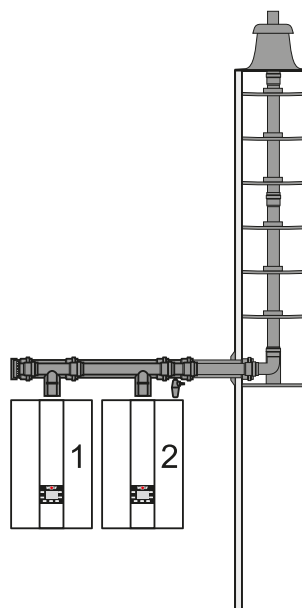
Tightness test on connections to adjacent appliances

- Select the mixer circuit via the right hand rotary selector. Press function key 3 and use the rotary selector to select "Standby", then press to confirm. Repeat process for "DHW".
- On the first FGB, press and hold buttons 6 and 7 simultaneously for 5 seconds to enable the emissions test mode for the boiler. → FGB- starts.
- Operate the first FGB- for at least 5 minutes.
- On all other appliances, check the CO₂ content in the air connector:
- If the CO₂ value exceeds 0.2 % within 15 minutes, the leak must be found and remedied.
- Subsequently close all test ports again. When doing so, ensure the caps are seated firmly.

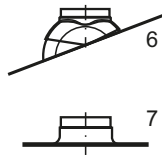


Testing the first FGB for tightness

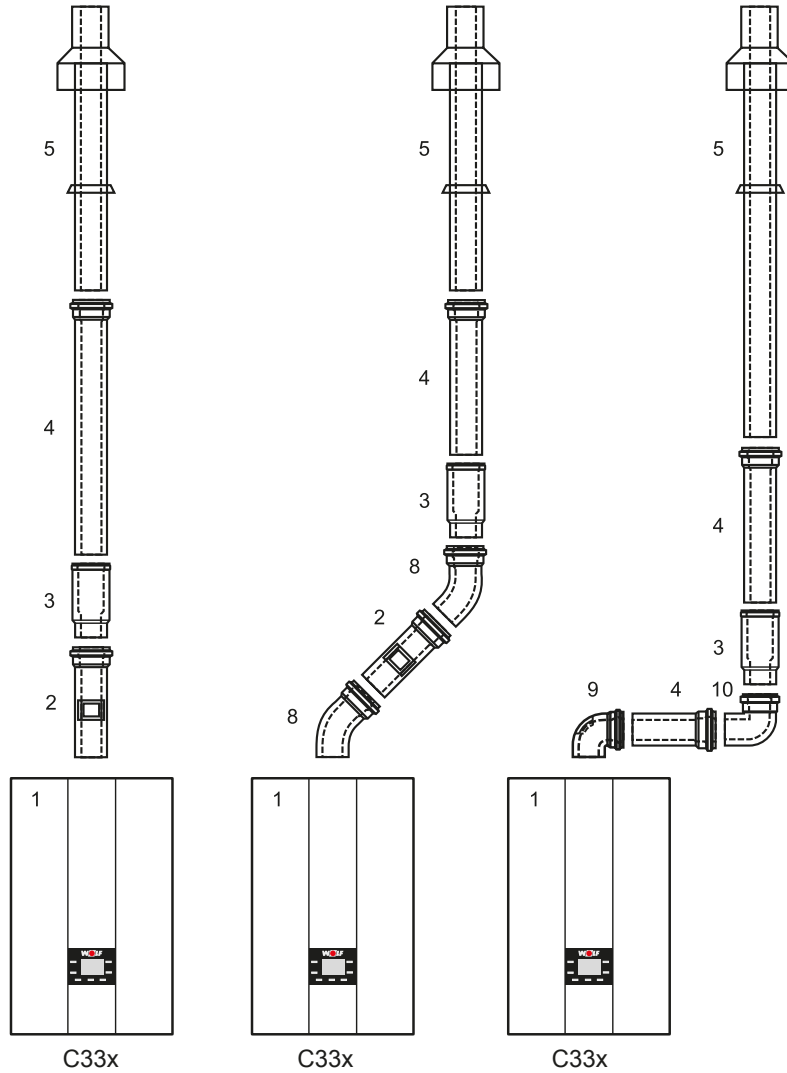
- Press reset button 4 to return the first FGB into the previous operating mode → emissions test mode is disabled. Press the operating mode button repeatedly until the display shows "OFF". The boiler shuts down (standby mode).
- On the second FGB, press and hold buttons 6 and 7 simultaneously for 5 seconds to enable the emissions test mode for the boiler. → FGB- starts.
- Operate the second FGB for at least 5 minutes.
- Check the CO₂ content in the air connector on the first FGB.
- If the CO₂ value exceeds 0.2 % within 15 minutes, the leak must be found and remedied.
- Subsequently close all test ports again. When doing so, ensure the caps are seated firmly.



Vertical balanced flue routing (examples) system DN 60/100



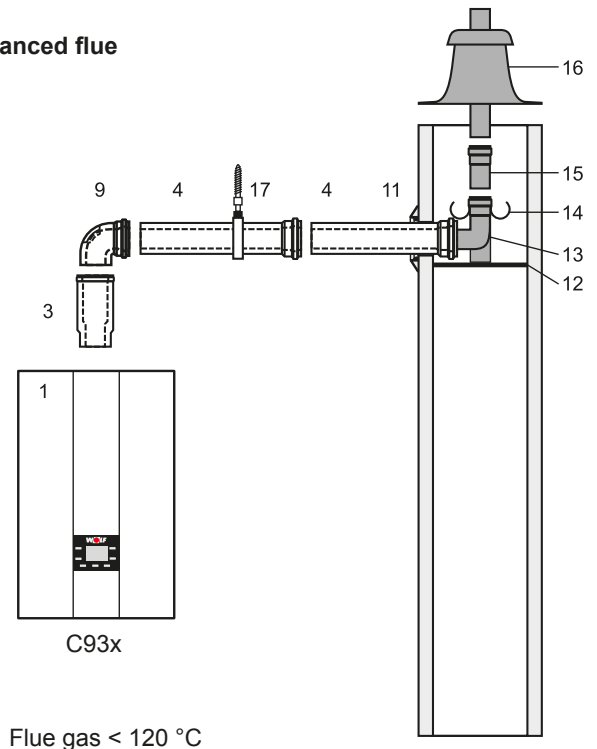
- 1 Gas condensing boiler
- 2 Balanced flue with inspection port (250 mm long)
- 3 Separator DN60/100 (slide coupling) if required
- 4 Balanced flue DN60/100
500 mm
1000 mm
2000 mm
- 5 Balanced flue, vertical DN60/100 (roof outlet for flat or pitched roofs)
L = 1200 mm
L = 1200 mm ... 1700 mm
- 6 Universal tile for pitched roof 25/45°
- 7 Flat roof collar
- 8 Bend 45° DN60/100
- 9 Inspection bend DN60/100
- 10 Bend 87° DN60/100
- 11 Pipe collar
- 12 Support rail
- 13 Support bend 87° DN60 to DN80
- 14 Spacer
- 15 Flue pipe DN80
500 mm
1000 mm
2000 mm
- 16 Shaft cover with UV resistant terminal
- 17 Spacer bracket



Installation examples for balanced flue connections (vertical)

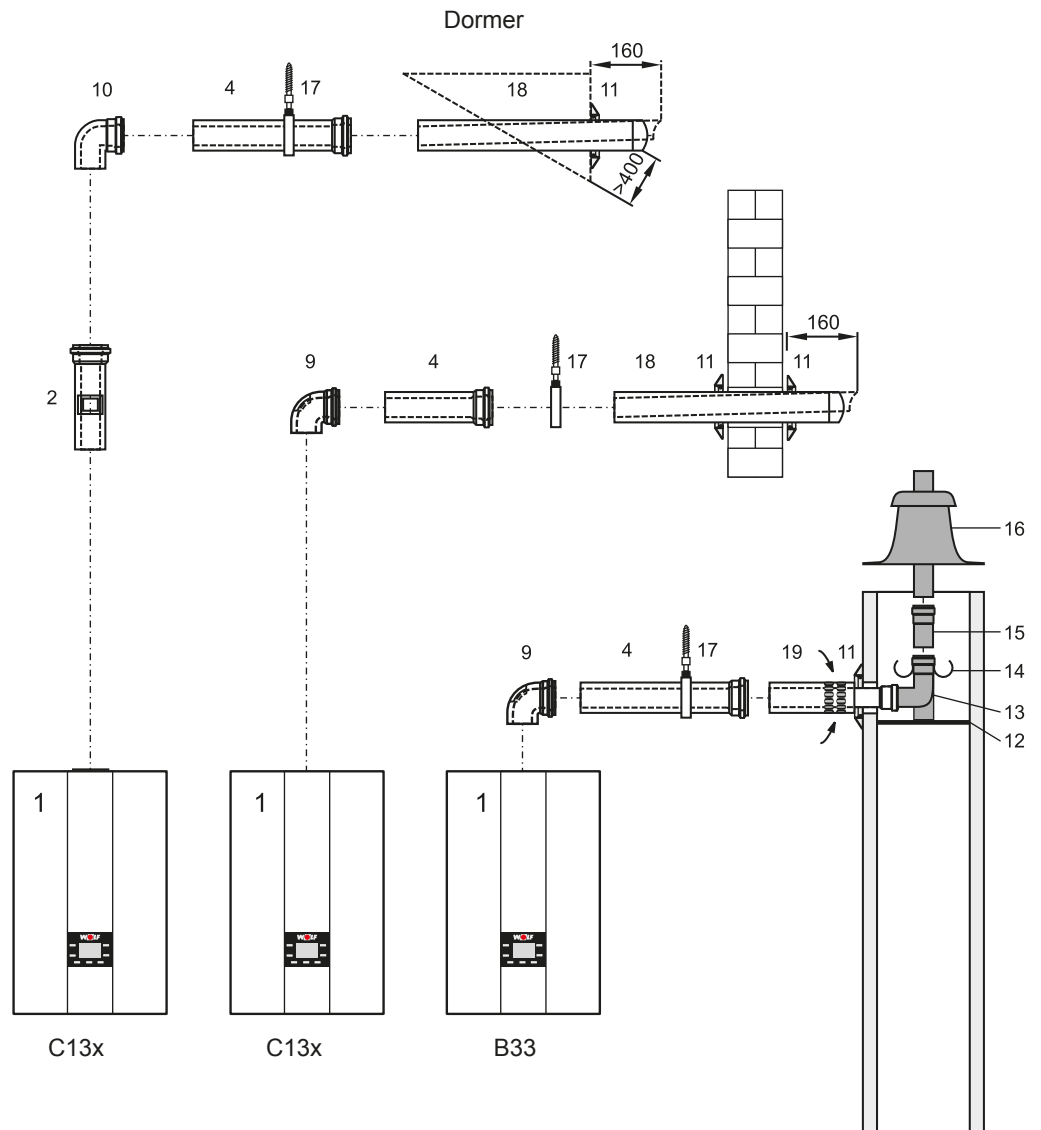
Please note

 Install horizontal pipe with > 3° slope towards boiler

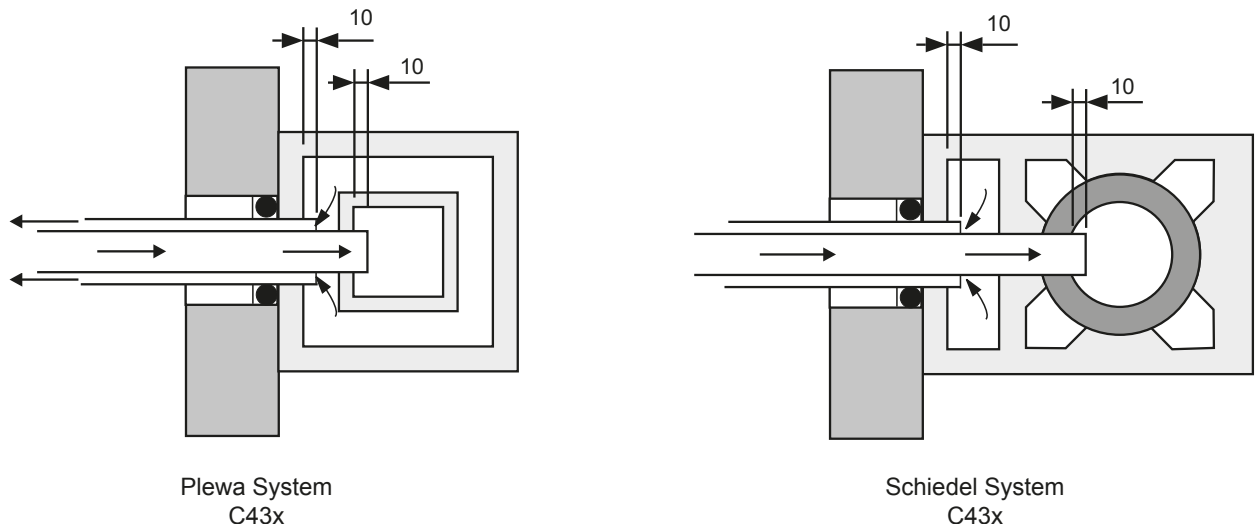


Horizontal balanced flue / connection to balanced flue chimney (examples) system DN60/100

- 1 Gas condensing boiler
- 2 Balanced flue with inspection port (250 mm long)
- 4 Balanced flue DN60/100
500 mm
1000 mm
2000 mm
- 9 Inspection bend
- 10 Bend 87° DN60/100
- 11 Pipe collar
- 12 Support rail
- 13 Support bend 87° DN60 to DN80
- 14 Spacer
- 15 PP flue pipe DN80
500 mm
1000 mm
2000 mm
- 16 Shaft cover with UV resistant terminal
- 17 Spacer bracket
- 18 Balanced flue horizontal, with wind protector
- 19 Connection to flue gas chimney B33 length 250 mm with air apertures



Connection to a moisture-resistant flue system and balanced flue chimney

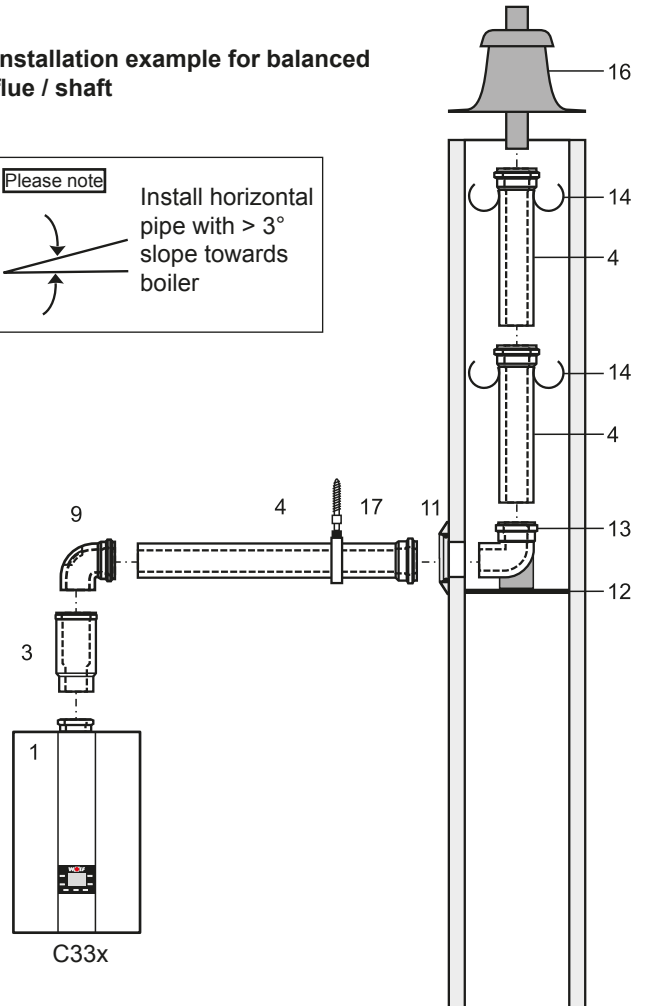


Balanced flue inside a shaft with horizontal connecting pipe DN60/100

- 1 Gas condensing boiler**
- 3 Separator**
(slide coupling)
if required
- 4 Balanced flue DN60/100**
500 mm
1000 mm
2000 mm
- 9 Inspection bend**
- 11 Pipe collar**
- 12 Support rail**
- 13 Support bend 87° DN60/100**
- 14 Spacer**
- 16 Shaft cover with UV resistant terminal**
- 17 Spacer bracket**

Installation example for balanced flue / shaft

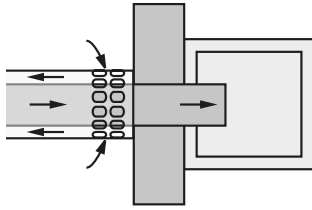
Please note Install horizontal pipe with $> 3^\circ$ slope towards boiler



Flue gas $< 110^\circ\text{C}$

Connection to a flue gas chimney (examples) DN60/100

Connection to a moisture-resistant flue gas chimney B33

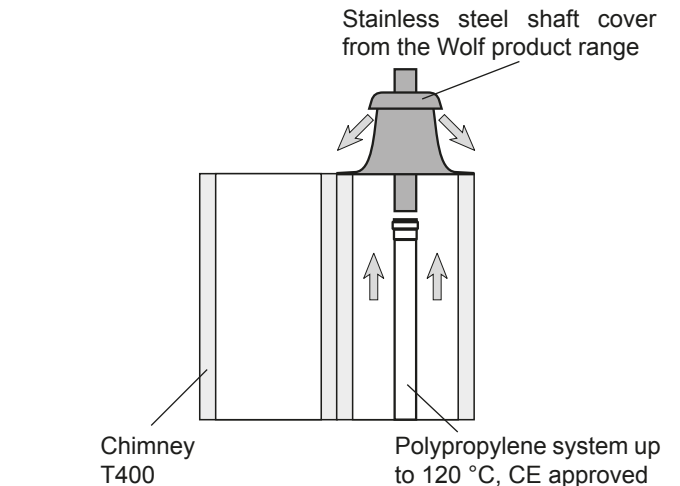
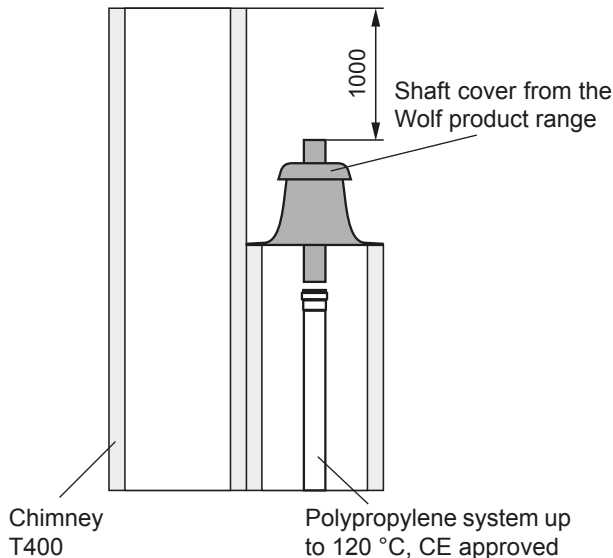


Install flue gas chimney connections with air apertures directly on the flue gas chimney as shown in the diagram, so that all components of the flue gas path are surrounded by combustion air.

The air apertures must be completely free from obstruction.

The flue gas chimney must be tested for suitability. Apply 0 Pa when calculating the chimney draught. Obtain the connection piece from the chimney manufacturer if required, to safeguard the connection conditions.

Connection to a moisture-resistant flue with two or multiple draught chimneys (shaft)



Open flue and balanced flue operation

The requirements of DIN 18160-1 supplementary sheet 3 apply. Notify your local flue gas inspector prior to installation.

Open flue operation only

Supplementary installation instructions for balanced flue DN60/100

Flat roof: Affix ceiling outlet (7), approx. Ø 130 mm, to the roof cover.

Pitched roof: For (6), observe the installation instructions on the cowl regarding roof pitches.

Insert roof outlet (5) into the roof from above and secure vertically with the mounting bracket to a rafter or brickwork.

Install the roof outlet only in its original condition. Modifications are not permissible.

Mounting bracket

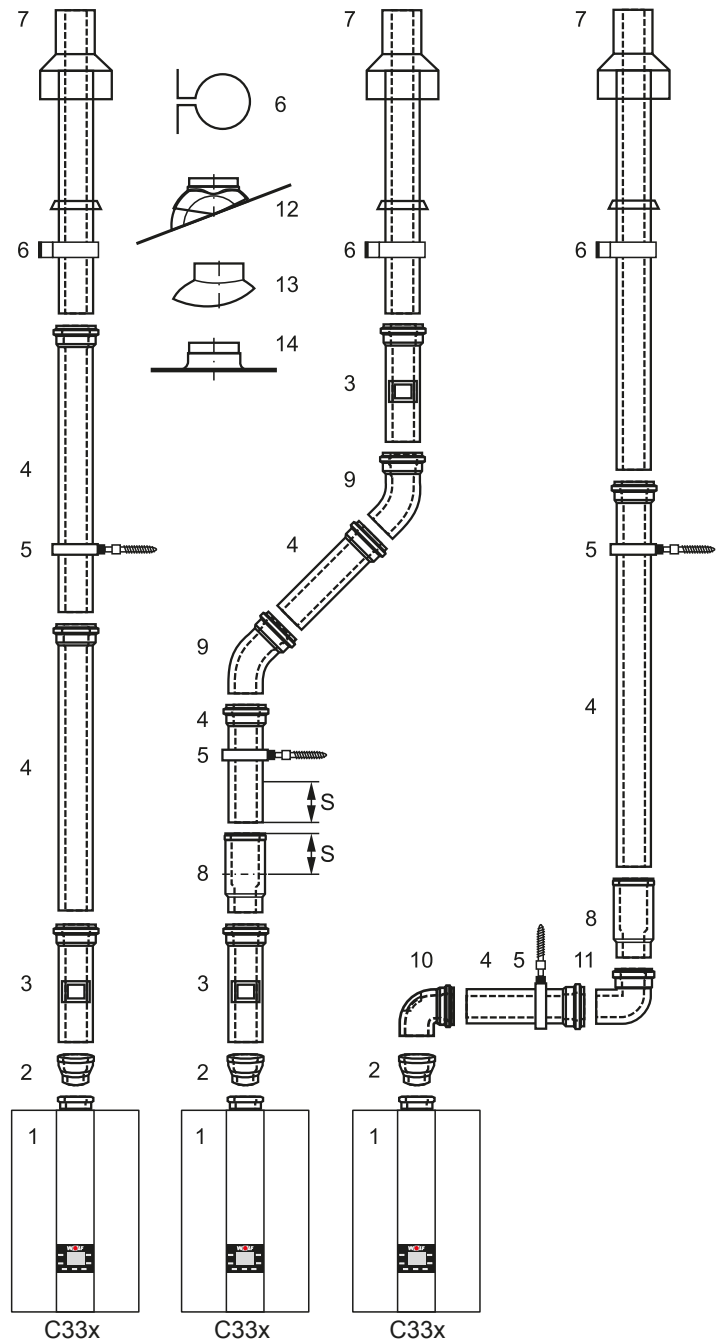
If an inspection aperture is required for the balanced flue, insert a balanced flue with inspection aperture (2) (200 mm length).

Bend	Offset
87 °	min. 170 mm
45 °	min. 73 mm

Determine distance A. Length of balanced flue (4) always approx. 100 mm longer than distance A. Always trim the flue pipe on the smooth side, **never** on the female connection side. **Chamfer the flue with a file after trimming.**

Vertical concentric balanced flue C33x (examples) system DN80/125

- 1 Gas condensing boiler
- 2 Adaptor DN60/100 to DN80/125
- 3 Balanced flue with inspection port (250 mm long)
- 4 Balanced flue DN80/125
500 mm
1000 mm
2000 mm
- 5 Spacer bracket
- 6 Mounting bracket DN125 for roof outlet
- 7 Balanced flue, vertical DN80/125 (roof outlet for flat or pitched roofs)
L = 1200 mm
L = 1800 mm
- 8 Separator (slide coupling) if required
- 9 Bend 45° DN 80/125
- 10 Inspection bend 87° DN 80/125
- 11 Bend 87° DN 80/125
- 12 Universal tile for pitched roof 25/45°
- 13 "Klöver" adaptor 20-50°
- 14 Flat roof collar



Type C33x: Gas condensing boiler with combustion air and flue gas routed vertically to above the roof.

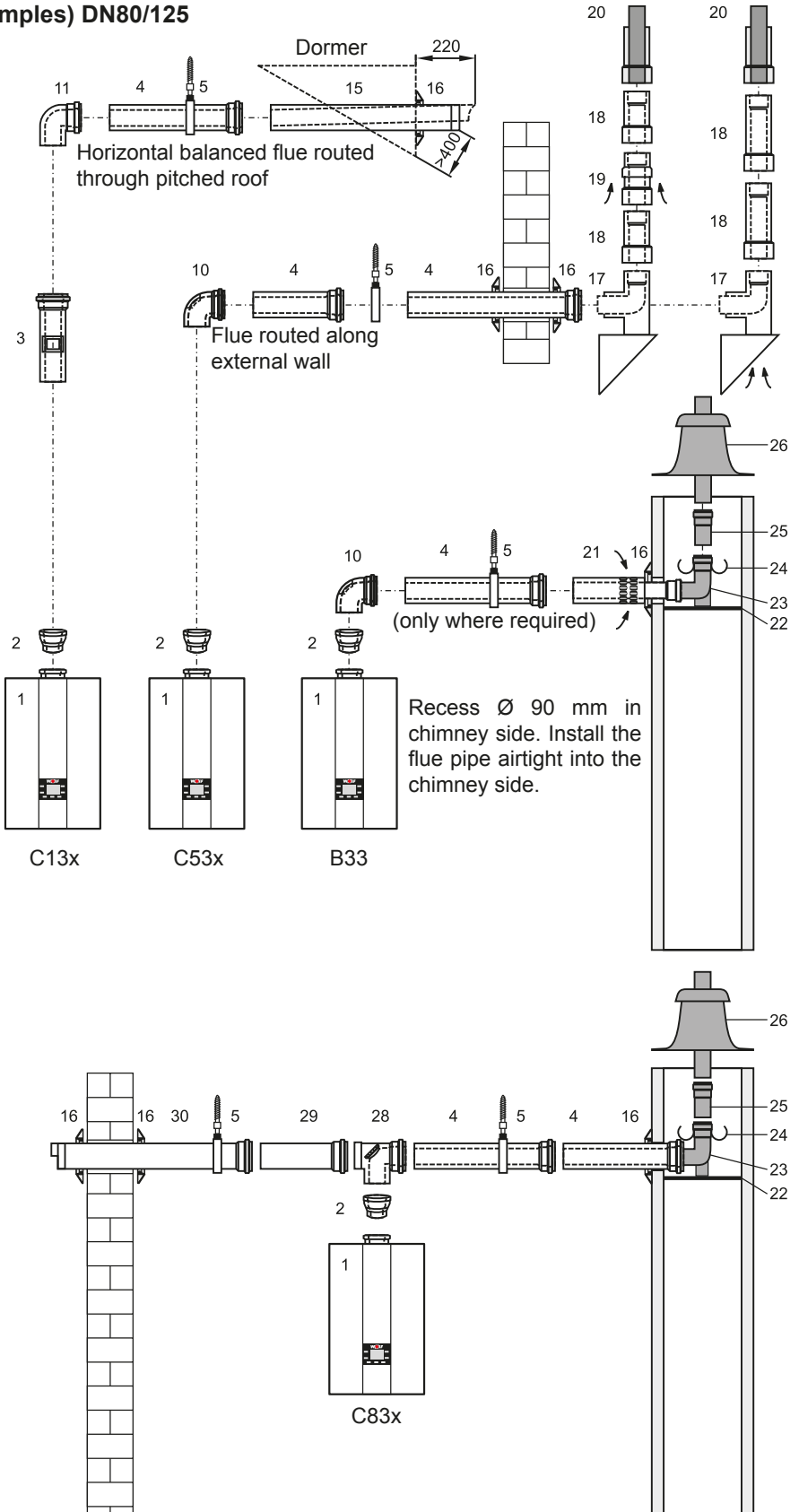
Notes: When installing, slide the separator (8) fully into the female connection. Push the subsequent balanced flue (4) 50 mm (dim. "S") into the female connection of the separator and always secure in this position, e.g. with pipe clips DN125 (5) or with a locking screw on the air side.

Lubricate the pipe ends and gaskets for easier installation (use silicone-free grease only).

Please note Prior to installation, liaise with your local flue gas inspector regarding the required inspection piece (3) (10). Adapter (2) is always required.

Concentric balanced flue, horizontal C13x, C83x and B33 and flue on an external wall C53x (examples) DN80/125

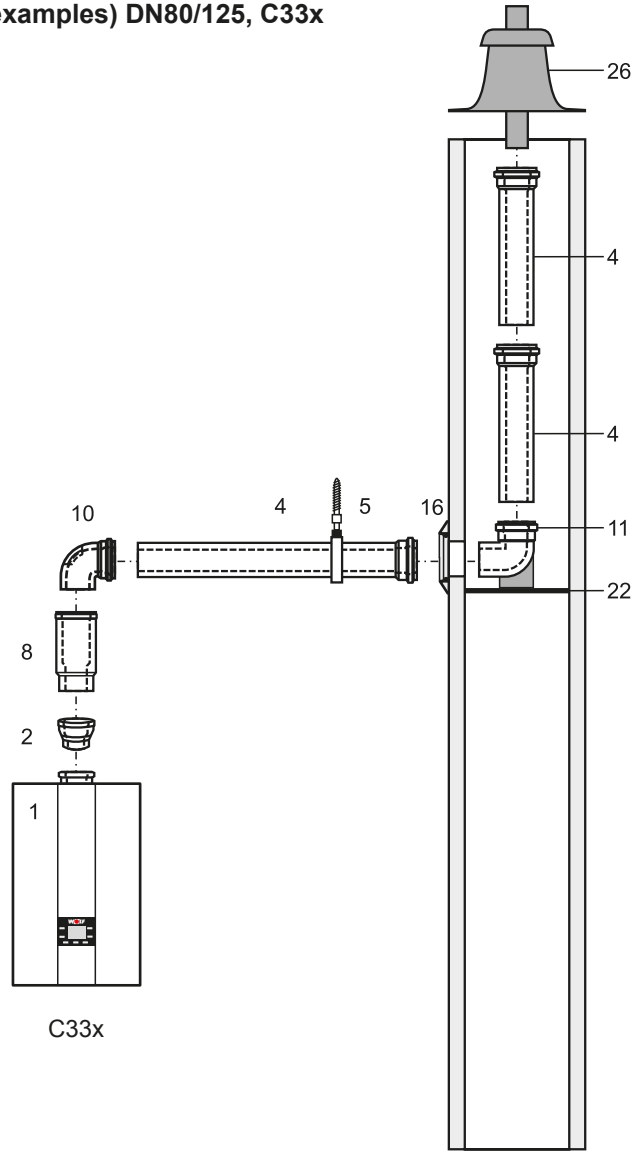
- 1 Gas condensing boiler
- 2 Adaptor DN60/100 to DN80/125
- 3 Balanced flue with inspection port DN80/125 (250 mm long)
- 4 Balanced flue DN80/125
500 mm
1000 mm
2000 mm
- 5 Spacer bracket
- 10 Inspection bend 87° DN 80/125
- 11 Bend 87° DN 80/125
- 15 Balanced flue horizontal, with wind protector
- 16 Pipe collar
- 17 External wall panel 87° DN80/125 with smooth air pipe end
- 18 Balanced flue, external walls DN80/125
- 19 Air inlet, external wall DN80/125
- 20 Conc. outlet terminal with clamp fitting
- 21 Connection to a flue gas chimney B33 Length 250 mm with air aperture
- 22 Support rail
- 23 Support bend 87° DN80
- 24 Spacer
- 25 PP flue pipe DN80
- 26 Shaft cover with UV resistant terminal
- 28 Inspection tee
- 29 Air pipe Ø 125 mm
- 30 Air inlet pipe Ø 125 mm



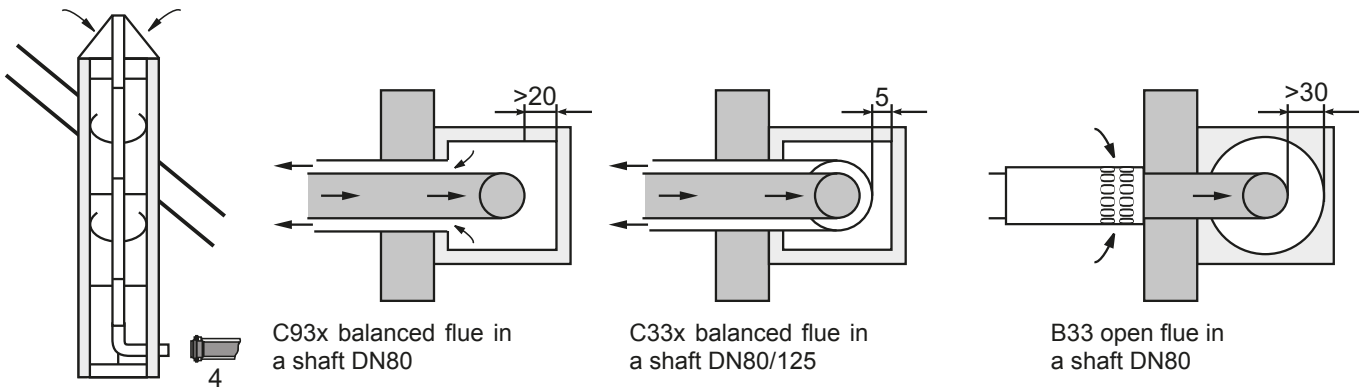
Install the horizontal flue pipe with a slope of approx. 3° (6 cm/m) towards the boiler. Route the horizontal air supply with a 3° slope towards the outside – provide the air inlet with a wind protector; permissible wind pressure at the air inlet 90 Pa. The burner will not start if the wind pressure is higher. After the support bend (23), the flue can be routed in DN80 inside the shaft. A flexible flue pipe DN83 can be connected downstream of support bend (23).

Connection to a concentric balanced flue inside a shaft (examples) DN80/125, C33x
 Connection to a flue inside a shaft, C93x

- 1 Gas condensing boiler
- 2 Adaptor DN60/100 to DN80/125
- 4 Balanced flue DN80/125
 500 mm
 1000 mm
 2000 mm
- 5 Spacer bracket
- 8 Separator
 (slide coupling) if required
- 10 Inspection bend 87° DN 80/125
- 11 Support bend 87° DN80/125
- 16 Pipe collar
- 22 Support rail
- 26 Shaft cover with
 UV resistant terminal



Notify your local flue gas inspector prior to installation.



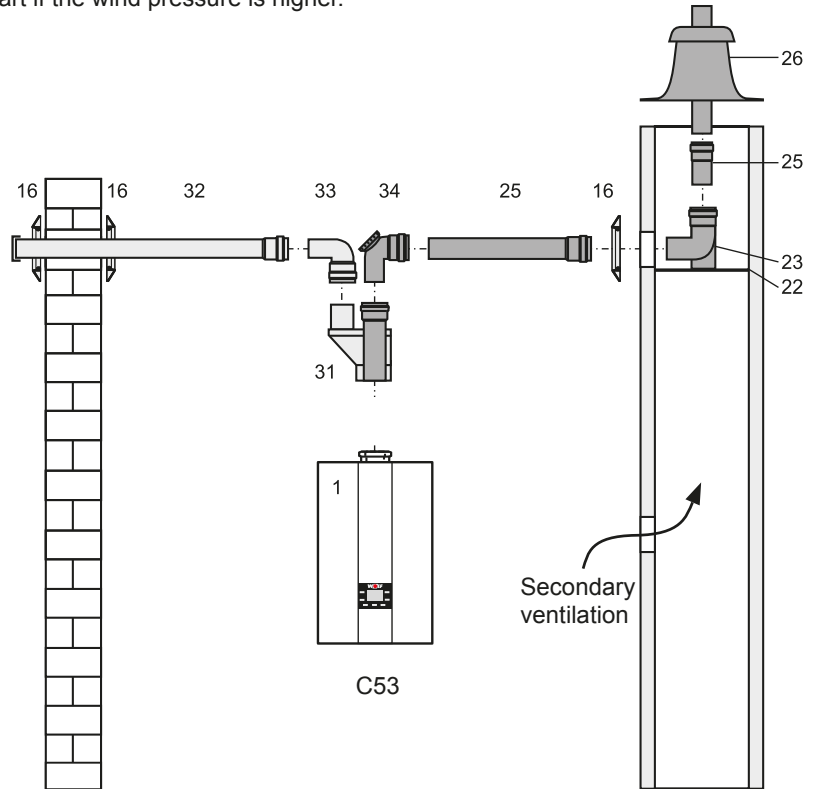
C93x balanced flue system DN80/185 horizontal and DN80 vertical

Eccentric balanced flue

Install the eccentric balanced flue distributor 80/80 mm (31) for separate air supply/flue gas routing downstream of the connection adaptor DN80/125 (2) with a test connector. When connecting a balanced flue certified acc. to Building Regulations, observe the permit of the relevant body.

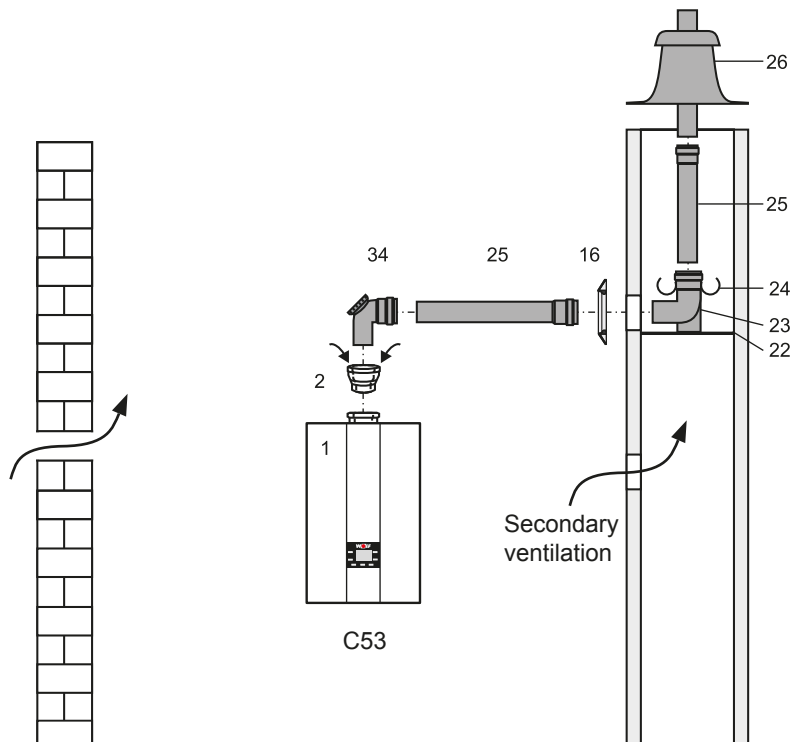
Install the horizontal flue pipe with a slope of approx. 3° (6 cm/m) towards the boiler. Route the horizontal air supply with a 3° slope towards the outside – provide the air inlet with a wind protector; permissible wind pressure at the air inlet 90 Pa. The burner will not start if the wind pressure is higher.

- 1 Gas condensing boiler**
- 2 Adaptor DN60/100 to DN80/125**
- 16 Pipe collar**
- 22 Support rail**
- 23 Support bend 87° DN80**
- 24 Spacer**
- 25 PP flue pipe DN80**
- 26 Shaft cover with UV resistant terminal**
- 31 Balanced flue distributor 80/80 mm**
- 32 Air inlet pipe Ø 125 mm**
- 33 Bend 90° DN80**
- 34 87° tee with inspection port DN80**
- 35 Flue pipe DN80**
500 mm
1000 mm
2000 mm



Maintain the following clearance between the internal shaft wall and the flue:

for round shafts:	3 cm
for square shafts:	2 cm

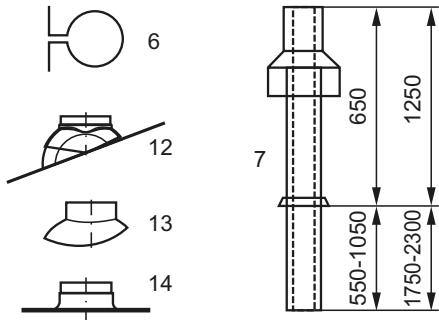


Supplementary installation instructions for balanced flue DN80/125

Flat roof: Affix ceiling outlet (14), approx. Ø 130 mm, to the roof cover.
 Pitched roof: For (12), observe the installation instructions on the cowl regarding roof pitches.

Insert roof outlet (7) into the roof from above and secure vertically with (6) to a rafter or brickwork.

Install the roof outlet only in its original condition. Modifications are not permissible.



If an inspection aperture is required for the balanced flue, insert a balanced flue with inspection aperture (3) (200 mm length).

As a rule, install the adaptor from balanced flue gas routing DN60/100 to DN80/125 (2) **vertically and always on the flue outlet of the gas condensing boiler.**



Adaptor from balanced flue DN60/100 to DN80/125

Inspection piece (3)

When installing, slide the separator (8) fully into the female connection. Push the subsequent balanced flue (4) 50 mm (dim. "S") into the female connection of the separator and always secure in this position, e.g. with pipe clips DN125 (5) or with a locking screw on the air side.

Secure support bend (23) on the support rail (22)

* Observe the installation instructions for polypropylene (PP) flue systems.

Bend	Offset
87 °	min. 205 mm
45 °	min. 93 mm

Determine distance A. Length of balanced flue (4) always approx. 100 mm longer than distance A. Always trim the flue pipe on the smooth side, **never** on the female connection side.
Chamfer the flue with a file after trimming.

Underfloor heating system

If pipes which are impermeable to oxygen are used, an underfloor heating system can be connected directly to a heat source with up to 10 kW heating output, depending on the system pressure drop.

Always install a temperature limiter for the underfloor heating system to protect the pipes from overheating.

The output of the integrated pump should be increased if underfloor heating is connected (parameters HG16 and HG17). Recommendation HG16 → 75% and HG17 → 100%

For connection of an underfloor heating system with an output requirement in excess of approx. 10 kW, a 3-way mixer (accessories MM) and an additional pump are required.

Install a regulating valve in the return; this can be used to reduce the excessive head of the additional pump if required.

Please note Ensure the system user cannot adjust any regulating valves.

When using pipes that are diffusion-proof to oxygen, it is necessary to provide system separation by means of a heat exchanger. Inhibitors may not be used.

If an additional heating circuit is operated in parallel to the underfloor heating system, it must be hydraulically matched to the underfloor heating system.

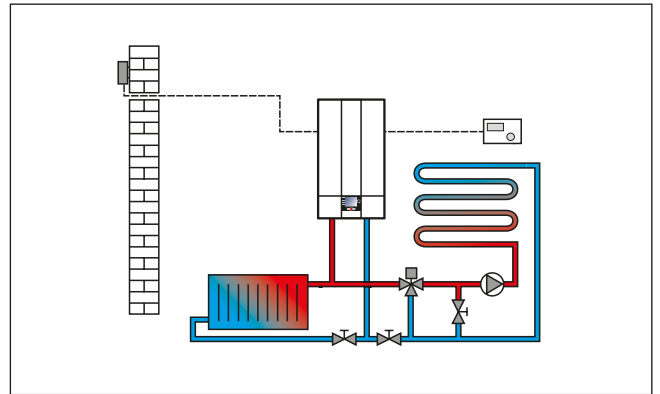


Fig: Underfloor heating system (example)

For heating systems with plastic pipes, we recommend the use of impermeable pipes to prevent the diffusion of oxygen through the pipe walls.

Please note When operating the condensing boiler in conjunction with an underfloor heating system, we recommend sizing the usable volume of a diaphragm expansion vessel 20 % larger than recommended by DIN 4807-2. An diaphragm expansion vessel of insufficient size results in oxygen ingress into the heating system, causing corrosion damage.

NTC Sensor resistances

Flow temperature sensor, cylinder temperature sensor, DHW outlet temperature sensor, outside temperature sensor, return temperature sensor, flue gas temperature sensor

Temp. °C	Resist. Ω	Temp. °C	Resist. Ω	Temp. °C	Resist. Ω	Temp. °C	Resist. Ω
-17	40810	17	7162	51	1733	85	535
-16	38560	18	6841	52	1669	86	519
-15	36447	19	6536	53	1608	87	503
-14	34463	20	6247	54	1549	88	487
-13	32599	21	5972	55	1493	89	472
-12	30846	22	5710	56	1438	90	458
-11	29198	23	5461	57	1387	91	444
-10	27648	24	5225	58	1337	92	431
-9	26189	25	5000	59	1289	93	418
-8	24816	26	4786	60	1244	94	406
-7	23523	27	4582	61	1200	95	393
-6	22305	28	4388	62	1158	96	382
-5	21157	29	4204	63	1117	97	371
-4	20075	30	4028	64	1078	98	360
-3	19054	31	3860	65	1041	99	349
-2	18091	32	3701	66	1005	100	339
-1	17183	33	3549	67	971	101	330
0	16325	34	3403	68	938	102	320
1	15515	35	3265	69	906	103	311
2	14750	36	3133	70	876	104	302
3	14027	37	3007	71	846	105	294
4	13344	38	2887	72	818	106	285
5	12697	39	2772	73	791	107	277
6	12086	40	2662	74	765	108	270
7	11508	41	2558	75	740	109	262
8	10961	42	2458	76	716	110	255
9	10442	43	2362	77	693	111	248
10	9952	44	2271	78	670	112	241
11	9487	45	2183	79	649	113	235
12	9046	46	2100	80	628	114	228
13	8629	47	2020	81	608	115	222
14	8233	48	1944	82	589	116	216
15	7857	49	1870	83	570	117	211
16	7501	50	1800	84	552	118	205

No.	Step	Report item	Report item	Report item
	Date			
1	Switch OFF boiler, set emergency stop switch to OFF			
2	Close gas supply valve			
3	Remove front casing			
4	Determine level of soiling of heating water heat exchanger (mbar)			
5	Check burner	○	○	○
6	If necessary, clean burner and check ignition monitoring electrode	○	○	○
7	Clean heating water heat exchanger	○	○	○
8	Clean condensate pan	○	○	○
9	Check gaskets, if necessary replace gaskets and apply silicone grease	○	○	○
10	Check neutralisation system if installed, top up with granulate if required	○	○	○
11	On enamelled cylinders, check protective anode every 2 years	○	○	○
12	Assemble appliance			
13	Clean, fill and install trap and check for secure fit	○	○	○
14	Level of soiling of heating water heat exchanger after cleaning (mbar)			
15	Descale DHW heat exchanger if necessary	○	○	○
16	Clean DHW strainer	○	○	○
17	Check expansion vessel and safety valve	○	○	○
18	Fill and vent the system			
18	Open gas supply, switch on appliance			
19	Gas tightness test	○	○	○
20	Flue gas tightness test	○	○	○
21	Check ignition	○	○	○
22	Check bus connection to control accessories	○	○	○
23	Flue gas emissions test in emissions test mode	○	○	○
24	Gross flue gas temperature	°C	°C	°C
25	Ventilation air temperature	°C	°C	°C
26	Carbon dioxide content (CO ₂)	%	%	%
27	or oxygen content (O ₂)	%	%	%
28	Carbon monoxide content (CO)	%	%	%
29	Flue gas loss	%	%	%
30	Call up maintenance display and acknowledge fault history	○	○	○
	Confirm service (company stamp, signature)			

General information

Never remove, bypass or otherwise disable any safety or monitoring equipment. Only operate the gas condensing boiler when it is in perfect technical condition. Any faults or damage which impact or might impact upon safety must be remedied immediately by a qualified contractor. Only replace faulty components and equipment with original Wolf spare parts.

Faults are shown on the display of the control unit or the control accessory BM-2 programming unit and correspond to the messages listed in the following tables.

A fault symbol in the display indicates an active fault message.

Please note **Faults must only be repaired by qualified personnel. If a lockout fault message is acknowledged several times without the cause of the problem being repaired, this can lead to component or system damage.**

The control unit automatically acknowledges faults such as faulty temperature sensors or other sensors if the part concerned has been replaced and plausible test values have been supplied.

Procedure for faults:

- Read the fault number.
- Determine the cause of the fault using the table below and remedy it.
- Reset the fault via reset button (4). If the fault message cannot be acknowledged, high temperatures at the heat exchanger might be preventing a reset.
- Check that the system is functioning correctly.

Message history:

A message history displaying the last 8 fault messages can be called up in the menu level of the heating system control unit.

Fault code	Fault	Possible causes	Remedy
01	HLSC excess temp.	<p>The high limit safety cut-out (thermostat) has responded.</p> <p>The temperature at the heat exchanger cover has exceeded 110 °C.</p> <p>Combustion chamber contaminated.</p>	<p>High limit safety cut-out:</p> <ul style="list-style-type: none"> - Check cables and plugs. - If electrical connection OK and no function: Replace HLSC. <p>Combustion chamber:</p> <ul style="list-style-type: none"> - If combustion chamber is contaminated, clean or replace combustion chamber. <p>Check heating circuit pump. Vent the system. Press reset button.</p>
02	TL excess temp.	<p>One of the temperature sensors in the flow or return has exceeded the temperature limiter limit (105 °C).</p> <p>System pressure</p> <p>Air in heating circuit</p> <p>Temperature limiter</p> <p>Pump</p>	<p>Check system pressure. Vent heating circuit.</p> <p>Temperature limiter (flow / return)</p> <ul style="list-style-type: none"> - Check cables and plugs. - If OK and no function, replace flow temperature sensor or return temperature sensor. <p>Pump:</p> <ul style="list-style-type: none"> - Check if pump is running. - If not, check cables and plugs. - If electrical connection OK and no function: Replace the pump. <p>Press reset button.</p>
03	dt flow-return drift	<p>Sensor test function failed, temperature difference between flow and return sensor > 5 °C.</p>	<p>Check sensors, replace if necessary</p>
04	No flame formation	<p>When the burner starts, no flame forms by the end of safety time.</p> <p>Monitoring electrode faulty</p> <p>Ignition electrode faulty, ignition transformer faulty.</p> <p>Gas supply</p> <p>Gas condensing boiler contaminated</p>	<p>Gas supply:</p> <ul style="list-style-type: none"> - Check the gas train (gas valve open?). <p>Ionisation electrode:</p> <ul style="list-style-type: none"> - Check the position and condition of the electrode, adjust or replace if necessary. <p>Ignition electrode:</p> <ul style="list-style-type: none"> - Check the position of the ignition electrode and adjust if necessary. Check the ignition transformer and wiring. <p>Gas valve:</p> <ul style="list-style-type: none"> - Check that the gas valve opens, if not, check cables and plugs and repeat test. - If faulty, replace the gas valve. Press reset button.
05	Flame failure	<p>Flame failure during flame stabilisation after flame detection</p> <p>Monitoring electrode faulty</p> <p>Flue path blocked</p> <p>Condensate drain blocked</p> <p>Gas type setting</p> <p>Gas pressure</p> <p>Flue gas recirculation (flue gas in the ventilation air)</p> <p>Gas condensing boiler contaminated</p>	<p>Gas type setting:</p> <ul style="list-style-type: none"> - Check gas type setting on the gas valve and in H12. <p>Gas pressure:</p> <ul style="list-style-type: none"> - Check the gas supply pressure (flow pressure). Monitoring electrode: - Check the condition of the electrode; clean or replace if necessary. - Adjust gap and position or replace if necessary. <p>Flue gas recirculation:</p> <ul style="list-style-type: none"> - Check flue path inside and outside the appliance (leaking, blocked). <p>Press reset.</p>

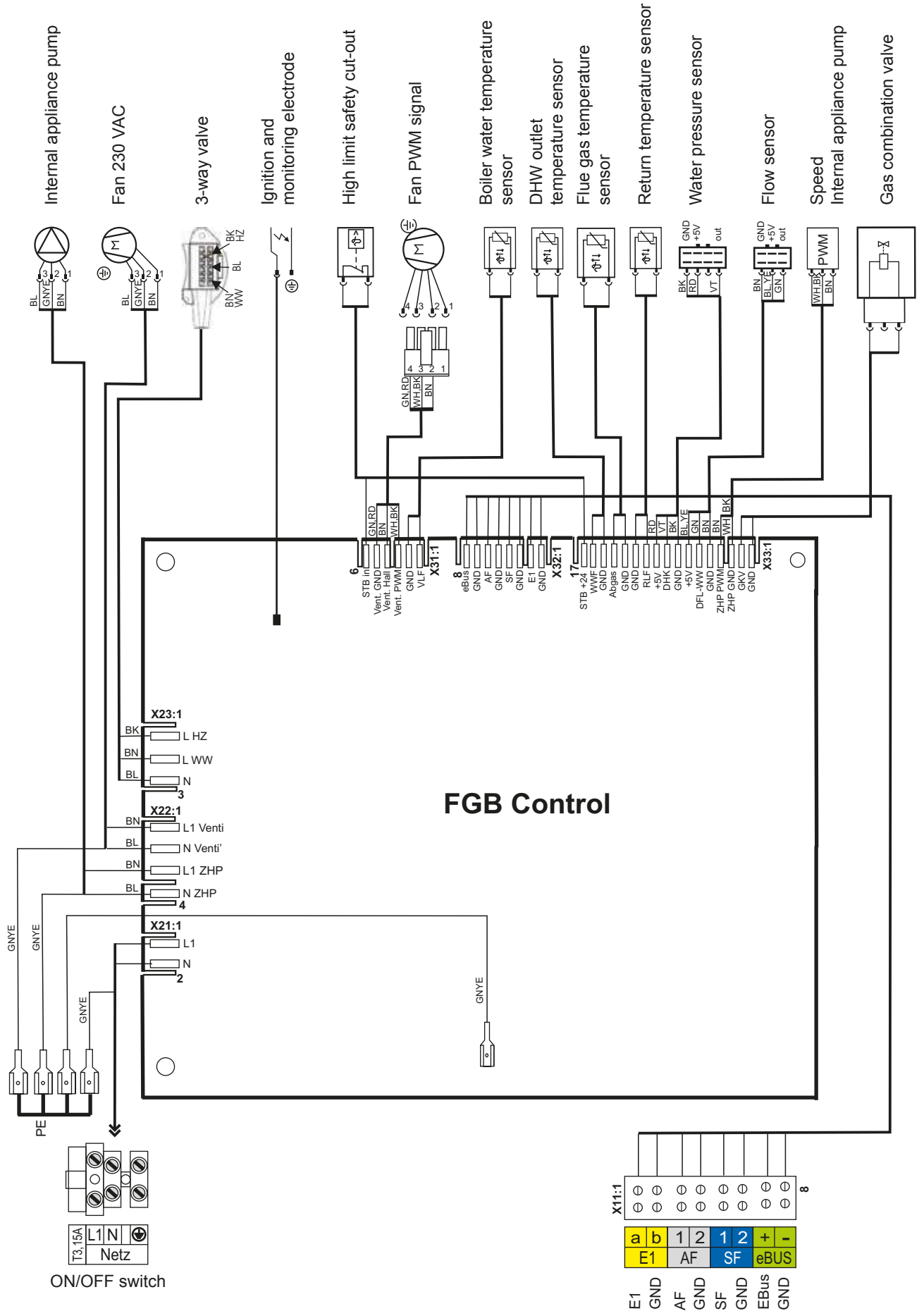
Fault code	Fault	Possible causes	Remedy
06	Temp. limiter excess temp.	The flow sensor has exceeded the limit of the temperature limiter (95 °C) System pressure Air in heating circuit Temperature limiter in the flow Pump	Check system pressure. Vent heating circuit. Temperature limiter in the flow: - Check leads and plug-in connections. - If electrical connection OK and no function, replace temperature limiter. Pump: - Check if pump is running. - If not, check cables and plugs. - If electrical connection OK and no function: Replace pump. Press reset button.
07	Flue gas TL, excess temperature	The flue gas temperature has exceeded the limit of the flue gas temperature limiter shutdown temperature of 115 °C. Combustion chamber Flue gas temperature limiter	Combustion chamber: - If the combustion chamber is heavily contaminated, carry out maintenance or replace. Flue gas temperature limiter: - Check leads and plug-in connections. - If electrical connection OK and no function: Replace temperature limiter. Press reset button.
11	Flame pretence	Flame signal is detected when burner is off.	Check monitoring electrode. Press reset button.
12	Boiler sensor faulty	Boiler sensor or sensor lead has short circuit or pump break.	Pump: - Increase the minimum pump speed. Excess flow temperature: - Increase the minimum pump speed. Boiler sensor: - Check leads and plug-in connections. - If OK and no function, replace the boiler sensor. Press reset button.
13	Flue gas sensor faulty	Flue gas sensor or sensor lead has short circuit or break.	Flue gas temperature sensor: - Check leads and plug-in connections. - If electrical connection OK and no function: Replace the sensor. Reset / switch power supply OFF/ON.
14	DHW sensor faulty	DHW sensor (cylinder sensor) or sensor lead has short circuit or break.	DHW temperature sensor: - Check leads and plug-in connections. - If OK, replace sensor. Press reset button.
15	Outside sensor faulty	Outside sensor or sensor lead has short circuit or break.	Outside temperature sensor: - Check leads and plug-in connections. - Check for wireless reception interference or if outside sensor battery is flat.
16	Return sensor faulty	Return sensor or sensor lead has short circuit or break.	Return sensor: - Check leads and plug-in connections. - If OK and no function, replace the return sensor.
24	Fan speed < (too low)	Set fan speed is not achieved.	Fan: - Check cables, plug-in connections, power supply and switching. - If OK and no function: Replace the fan. Press reset button.

Fault code	Fault	Possible causes	Remedy
27	DHW outlet sensor faulty	DHW outlet sensor faulty. Stratification sensor faulty.	DHW outlet sensor: - Check cables and plug-in connections. - If OK and no function, replace the sensor.
30	CRC burner control unit	Invalid EEPROM data.	Switch power supply OFF/ON. If the fault persists, replace the PCB.
32	AC supply	AC supply outside permissible range (< 170 VAC).	Check the power supply. Switch power supply OFF/ON.
47	Flow / return sensor check failed	Value of flow sensor / return sensor does not change (2 minutes) after burner start. System pressure too low. Air in heating circuit. Pump faulty / low output.	Check flow / return sensors. Check system pressure. Vent the system. - Increase minimum pump speed. Pump: - Check if pump is running. - If not, check cables and plugs. - If electrical connection OK and no function: Replace pump.
85	Valve feedback fault	The valve feedback does not correspond to the control unit commands.	
96	Reset	Reset button pressed too many times.	Switch power supply OFF/ON If the fault persists, call out a contractor.
99	System fault, burner control unit	Internal burner control unit fault. PCB faulty.	Internal burner control unit fault: PCB - Check plug-in connection or power supply. - If OK, replace PCB. Press reset button
107	HC pressure	System pressure too low / too high. Supply line pressure sensor faulty. Pressure sensor faulty.	Check system pressure. Check if supply line is faulty. Pressure sensor: - Check leads and plug-in connections. - If OK and no function, replace the pressure sensor.

Key:

BCU = Burner control unit
 GCV = Gas combination valve
 TM = Temperature monitor
 TL = Temperature limiter
 HLSC = High limit safety cut-out
 GAM = Gas/air mixture
 ΔT = Temperature differential
 VAC = Mains voltage AC

35. FGB wiring diagram



Product fiche according to Regulation (EU) no. 811/2013



Product group: FGB

Supplier's name or trade mark			Wolf GmbH	Wolf GmbH
Supplier's model identifier			FGB-28	FGB-35
Seasonal space heating energy efficiency class			A	A
Rated heat output	P_{rated}	kW	24	31
Seasonal space heating energy efficiency	η_s	%	93	93
Annual energy consumption for space heating	Q_{HE}	kWh	13634	17376
Sound power level, indoors	L_{WA}	dB	53	54
Any specific precautions that shall be taken when the space heater is assembled, installed or maintained			See installation instruction	See installation instruction



Product group: FGB-K

Supplier's name or trade mark			Wolf GmbH	Wolf GmbH
Supplier's model identifier			FGB-K-28	FGB-K-35
Load profile			XL	XL
Seasonal space heating energy efficiency class			A	A
Water heating energy efficiency class			A	A
Rated heat output	P_{rated}	kW	24	31
Annual energy consumption for space heating	Q_{HE}	kWh	13634	17376
Annual fuel consumption for water heating	AFC	GJ	17	17
Seasonal space heating energy efficiency	η_s	%	93	93
Seasonal water heating energy efficiency	η_{wh}	%	84	84
Sound power level, indoors	L_{WA}	dB	53	54
Any specific precautions that shall be taken when the space heater is assembled, installed or maintained			See installation instruction	See installation instruction



Type			FGB-28	FGB-K-28	FGB-35	FGB-K-35
Condensing boiler	[yes/no]		yes	yes	yes	yes
Low temperature boiler (**)	[yes/no]		no	no	no	no
B11 boiler	[yes/no]		no	no	no	no
Cogeneration space heater	[yes/no]		no	no	no	no
If yes, equipped with a supplementary heater	[yes/no]		-	-	-	-
Combination heater	[yes/no]		no	yes	no	yes
Item	Symbol	Unit				
Rated heat output	P_{rated}	kW	24	24	31	31
Useful heat output at rated heat output and high-temperature regime (*)	P_4	kW	24.4	24.4	31.1	31.1
Useful heat output at 30% of rated heat output and low-temperature regime (**)	P_1	kW	7.3	7.3	9.3	9.3
Auxiliary electricity consumption at full load	elmax	kW	0.042	0.042	0.054	0.054
Auxiliary electricity consumption at part load	elmin	kW	0.015	0.015	0.016	0.016
Auxiliary electricity consumption in standby mode	P_{SB}	kW	0.002	0.002	0.002	0.002
Seasonal space heating energy efficiency	η_s	%	93	93	93	93
Useful efficiency at rated heat output and high-temperature regime (*)	η_4	%	87.9	87.9	87.4	87.4
Useful efficiency at 30% of rated heat output and low-temperature regime (**)	η_1	%	98.1	98.1	98.1	98.1
Standby heat loss	P_{stby}	kW	0.052	0.052	0.060	0.060
Ignition burner power consumption	P_{ing}	kW	0.000	0.000	0.000	0.000
Emissions of nitrogen oxides	NO_x	mg/kWh	26	26	26	26
Declared load profile	(M,L,XL,XXL)		-	XL	-	XL
Daily electricity consumption	Q_{elec}	kWh	-	0.230	-	0.224
Water heating energy efficiency	η_{wh}	%	-	84	-	84
Daily fuel consumption	Q_{fuel}	kWh	-	22.947	-	23.116
Contact details	Wolf GmbH, Industriestrasse 1, D-84048 Mainburg					

(*) High-temperature regime means 60 °C return temperature at heater inlet and 80 °C feed temperature at heater outlet.

(**) Low temperature means 30 °C for condensing boilers, 37 °C for low-temperature boilers and for 50 °C return temperature (at heater inlet) other heaters.

EU DECLARATION OF CONFORMITY

(to ISO/DIN 17050-1)

Number: 3064219
Issued by: **Wolf GmbH**
Address: Industriestrasse 1, D-84048 Mainburg
Product: Gas condensing boiler
FGB-28 FGB-K-28
FGB-35 FGB-K-35

The product described above conforms to the requirements specified in the following documents:

§6, 1. BImSchV, 26.01.2010
DIN EN 437 : 2009 EN 437 : 2003 + A1 : 2009)
DIN EN 15502-2-1 : 2013 (EN 15502-2-1 : 2012)
DIN EN 13203-1 : 2015 (EN 13203-1 : 2015)
DIN EN 15502-1 : 2015 (EN 15502-1 + A1 : 2015)
DIN EN 60335-1 : 2012 / AC 2014 (EN 60335-1 : 2012 / AC 2014)
DIN EN 60335-2-102 : 2010 (EN 60335-1 : 2006 + A1 : 2010)
DIN EN 62233 : 2009 (EN 62233 : 2008)
DIN EN 61000-3-2 : 2015 (EN 61000-3-2 : 2014)
DIN EN 61000-3-3 : 2014 (EN 61000-3-3 : 2013)
DIN EN 55014-1 : 2012 (EN 55014-1 : 2006 + A1 : 2009 + A2 : 2011)

In accordance with the following Directives

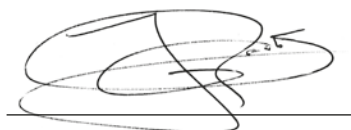
92/42/EEC (Efficiency Directive)
2016/426/EU (Gas Appliances Directive)
2014/30/EU (EMC Directive)
2014/35/EU (Low Voltage Directive)
2009/125/EC (ErP Directive)
2011/65/EU (RoHS Directive)
EU Regulation 811/2013
EU Regulation 813/2013

this product is identified as follows:

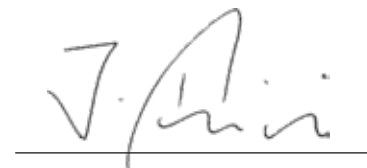


This declaration of conformity is issued under the sole responsibility of the manufacturer

Mainburg, 01/08/2017



Gerdewan Jacobs
Engineering Director



Jörn Friedrichs
Head of Development

WOLF GMBH

POSTFACH 1380 / D-84048 MAINBURG / TEL. +49.0. 87 51 74- 0 / FAX +49.0.87 51 74- 16 00

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Document no.: 3064458_201811

Subject to technical modifications