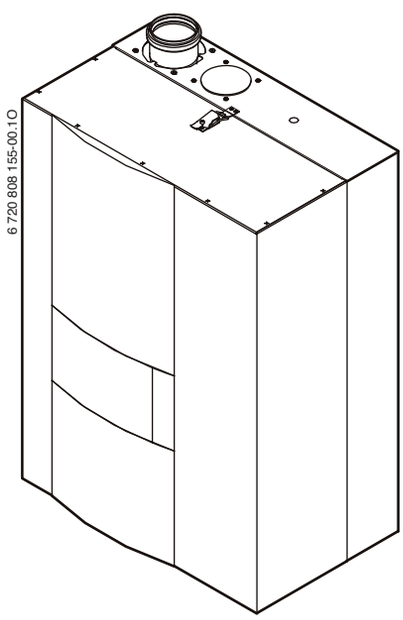
Installation and maintenance instructions for the contractor

THRs

Gas condensing boiler



THRs 0.9-9 C/DC/B120/B120 DC
THRs 2-17 C/DC/B120/B120 DC
THRs 2-17 M75 V/M75 H/M75 H DC
THRs 5-25 C/DC/B120
THRs 5-25 M75 V/H
THRs 10-35 C
THRs 10-50 C

6 720 808 441 (2016/03) UK

Geminox

Contents

1 Key to symbols and safety instructions

1.1 Key to symbols

Warnings

Warnings in this document are identified by a warning triangle printed against a grey background. Keywords at the start of a warning indicate the type and seriousness of the ensuing risk if measures to prevent the risk are not taken.

The following keywords are defined and can be used in this document:

- **NOTICE** indicates a situation that could result in damage to property or equipment.
- **CAUTION** indicates a situation that could result in minor to medium injury.
- **WARNING** indicates a situation that could result in severe injury or death.
- **DANGER** indicates a situation that will result in severe injury or death.

Important information

This symbol indicates important information where there is no risk to people or property.

Additional symbols

Symbol	Explanation
▶	Step in an action sequence
→	Cross-reference to another part of the document
•	List entry
–	List entry (second level)

Table 1

1.2 General safety instructions

Instructions for the target group

These installation instructions are intended for gas fitters, plumbers, heating engineers and electricians. All instructions must be observed. Failure to comply with instructions may result in material damage and personal injury, including possible loss of life.

- ▶ Read the installation instructions (heat source, heating controller, etc.) before installation.
- ▶ Observe safety instructions and warnings.
- ▶ Observe national and regional regulations, technical rules and guidelines.
- ▶ Keep a record of all work carried out.

Determined use

The product may only be used for the heating of central heating water and for DHW heating in closed-loop DHW and heating systems.

Any other use is considered inappropriate. Any damage that may result is excluded from liability.

If you smell gas

A gas leak could potentially cause an explosion. If you smell gas, observe the following rules.

- ▶ Prevent flames or sparks:
  - – Do not smoke, use a lighter or strike matches.
  - – Do not operate any electrical switches or unplug any equipment.

- Do not use the telephone or ring doorbells.

▶ Turn off the gas at the meter or regulator.
▶ Open windows and doors.
▶ Warn your neighbours and leave the building.
▶ Prevent anyone from entering the building.
▶ Well away from the building: call the National Gas Emergency Service on 0800 111 999.
▶ L.P.G. boilers: Call the supplier's number on the side of the gas tank.

Risk to life from poisoning by flue gas

There is a risk to life from escaping flue gas.

▶ Never modify any parts for flue gas routing.
▶ Ensure that flue pipes and gaskets are not damaged.

Risk to life from poisoning by flue gas due to inadequate combustion

There is a risk to life from escaping flue gas. If flues are damaged or leaking, observe the following rules.

▶ Close off the fuel supply.
▶ Open windows and doors.
▶ If necessary, warn your neighbours and leave the building.
▶ Prevent anyone from entering the building.
▶ Rectify any damage to the flue immediately.
▶ Ensure that there is an adequate combustion air supply.
▶ Do not cover or reduce the size of ventilation apertures in doors, windows and walls.
▶ Ensure that there is an adequate combustion air supply, including for any heat sources, which have been installed at a later date, e.g. if there are extractor fans, kitchen fans or air conditioning units with an air discharge outside.
▶ Never operate the product, if there is an insufficient combustion air supply.

Installation, commissioning and servicing

Installation, commissioning and servicing must only be carried out by a competent, Gas Safe registered engineer.

▶ Carry out a gas tightness test after completing work on gas-carrying components.
▶ Only use original spares.

Electrical work

Electrical work must only be carried out by qualified electricians.

▶ Before starting electrical work:
  – Isolate all poles of the mains voltage and secure against reconnection.
  – Using suitable means, test that the power supply is disconnected.
▶ Also see connection diagrams of other system components.

Handover to the user

When handing over, instruct the user how to operate the heating system and inform him about its operating conditions.

▶ Explain how to operate the heating system and draw the user's attention to any safety-relevant action.
▶ Explain that modifications and repairs must only be carried out by an authorised contractor.
▶ Advise the user to have the system serviced annually by a competent, Gas Safe registered engineer.
▶ Leave the installation instructions and the operating instructions with the user or at the gas meter.

2 Product details

THRs...C appliances are wall mounted gas condensing boilers providing central heating. With the internal 3-way valve accessories, a DHW cylinder can be connected.
THRs...DC appliances are wall mounted gas condensing boilers for connecting two heating circuits. With the internal 3-way valve accessories, a DHW cylinder can be connected.
THRs ...B120 and **THRs...M75** are appliances for central heating and DHW heating with an integrated DHW cylinder.

2.1 Standard delivery

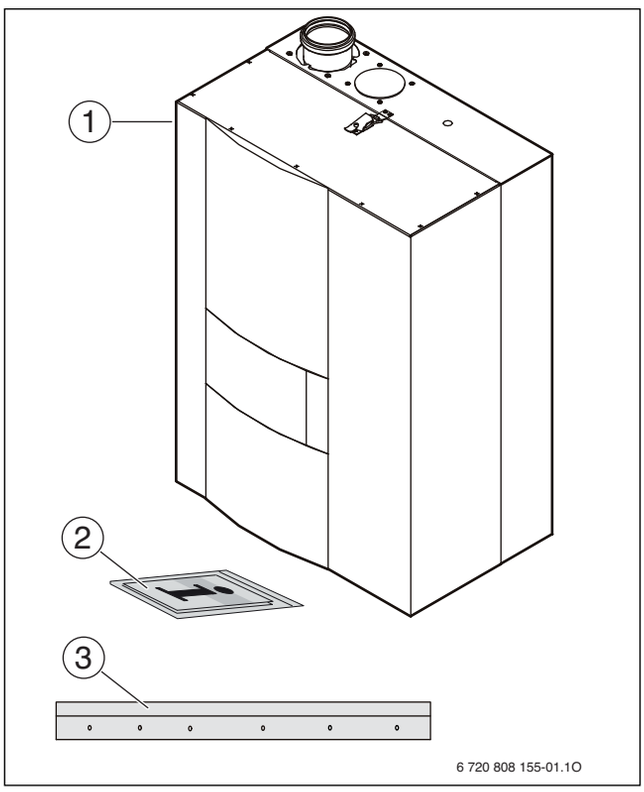


Fig. 1

[1] Wall mounted gas condensing boiler
[2] Set of printed documents for product documentation
[3] Mounting bracket (THRs...C/DC and THRs...M75)

2.2 Overview of the gas groups to be used

The code number indicates the gas group according to EN 437:

Wobbe index (W_S) (15 °C)	Gas family
12.5 - 15.2 kWh/m^3	Natural gas, types 2H
11.4 - 15.2 kWh/m^3	Natural gas, types 2E
20.2 - 24.3 kWh/m^3	LPG 3B/P
20.2 - 21.4 kWh/m^3	LPG 3P

Table 2

2.3 EC Declaration of Conformity

The design and operation of this product conform to European Directives and the supplementary national requirements. Its conformity is demonstrated by the CE designation.

You can ask for a copy of the declaration of conformity for this product. For this see the contact address at the back cover of these instructions.

The nitrogen oxide content of the flue gas is lower than 60 mg/kWh.

The appliance is tested in accordance with EN 677.

	THRs 0,9-9 C/DC 0,9-9 B120/DC 2-17 C/DC 2-17 B120/DC	**THRs 5-25 C/DC 5-25 B120 5-25 M75**	**THRs 10-35 C 10-50 C**
Prod. ID.	CE 0085AT0244	CE 0085AQ0543	CE 0085AR0323
Gas group classification (gas type)			
Denmark	I_{2H}	$II_{2H3B/P}$	$II_{2H3B/P}$
Czech Republic	I_{2H}	II_{2H3P}	II_{2H3P}
Slovakia	I_{2H}	II_{2H3P}	II_{2H3P}
Italy	I_{2H}	II_{2H3P}	II_{2H3P}
United Kingdom	I_{2H}	II_{2H3P}	II_{2H3P}
Type of installation	B_{23}, C_{13}, $C_{33, C53, C83, C93}$		

Table 3

2.4 Data plate

The data plate includes details of the appliance performance, approval data and serial number.

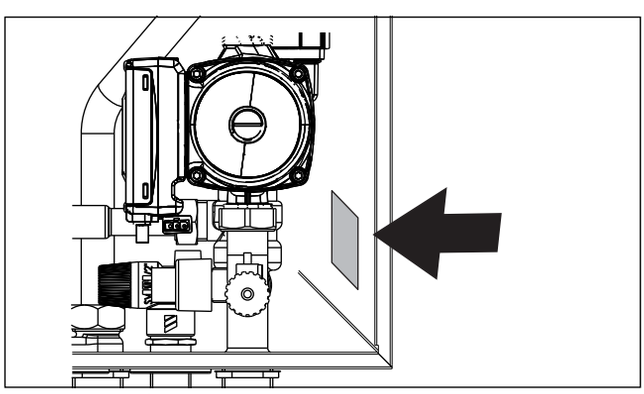


Fig. 2 Data plate

2.5 Description of appliance

Basic Version THRs...C:

- Wall mounted gas condensing boiler for wall installation
- Control device
- Modulating high efficiency pump (energy efficiency labelling A)
- Connecting lead
- Display
- Automatic ignition
- Full protection with flame monitoring and solenoid valves to EN 298
- Optional connections for flue gas/combustion air as concentric pipe Ø 80/125 mm, Ø 75/110 mm or as single pipe Ø 80 mm, Ø 125 mm
- Variable speed fan
- Gas premix burner
- Temperature sensor and temperature control for central heating
- Temperature limiter in the flow
- Air vent valve
- Safety valve (heating)
- Pressure gauge (heating)
- Flue gas temperature limiter
- DHW priority

Additionally for THRs ...DC:

- Connections and heating circuit pump for the 2nd heating circuit

Additionally for THRs ...M75 and THRs ...B120:

- Expansion vessel
- Motorised three-way valve
- DHW cylinder

2.6 Accessories

Below is a list of typical accessories for this appliance. You can find comprehensive details of all available accessories in our catalogue.

- Connection set
- Flue accessories
- 8 l expansion vessel (THRs...C/DC)
- Cylinder temperature sensor
- Outside temperature sensor QAC34
- Room temperature-compensated QAA55/QAA75 heating controller
- Wireless module for installation in the boiler
- Wireless signal amplifier
- Wireless outside temperature sensor
- Room temperature-compensated wireless QAA58/QAA78 heating controller
- External flow temperature sensor with pipe clip
- Cascade module (clip-in)
- Heating circuit module (clip-in)
- Solar module (clip-in, THRs...C/DC)
- Connection set for connecting a third extension module
- 3-way valve for connecting a DHW cylinder (for installation in the THRs...C/DC heating appliance)
- Gas type conversion set (THRs 5-25)
- DHW cylinder (THRs...C/DC)
- Condensate pump

2.7 Dimensions, minimum distances and connections

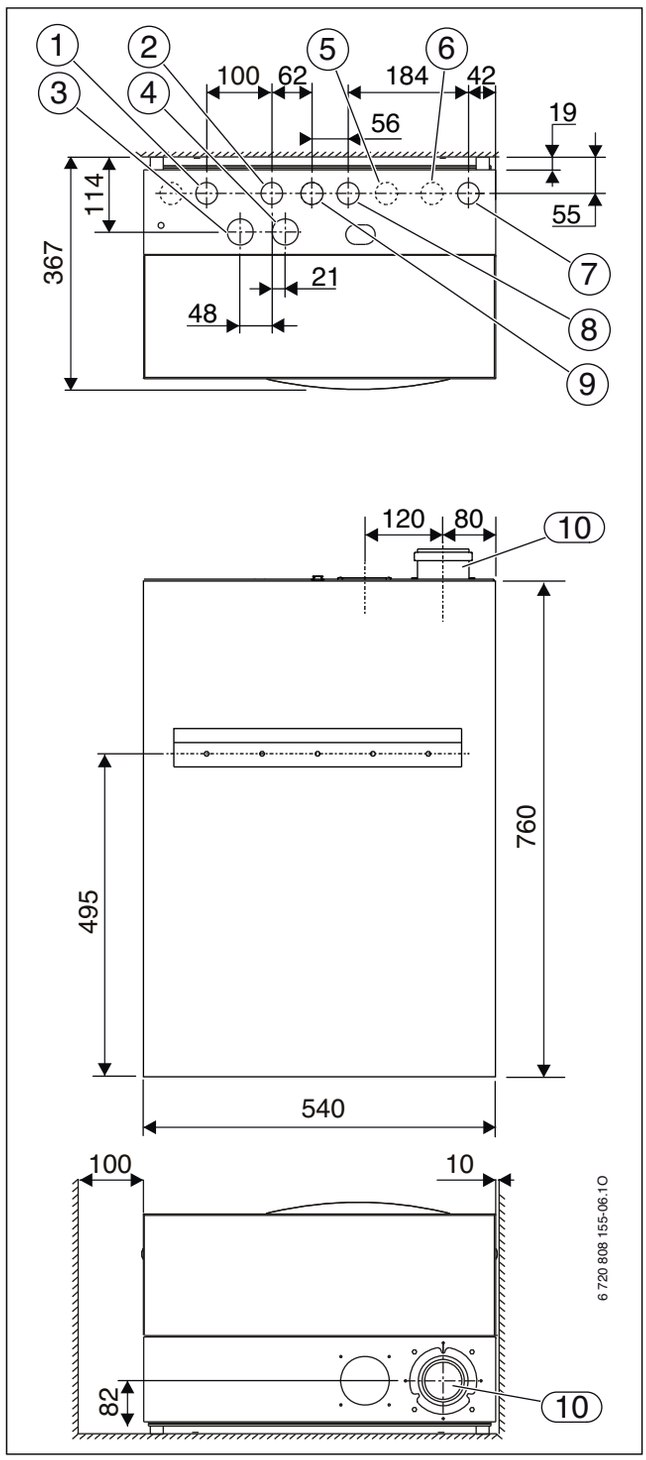


Fig. 3 THRs 0.9-9 C/DC and THRs 2-17 C/DC and THRs 5-25 C/DC (dim. in mm)

Key to Fig. 3:

[1] Heating return
[2] Heating flow
[3] Drain from safety valve
[4] Condensate drain
[5] 2nd heating circuit heating return (THRs...DC)
[6] 2nd heating circuit heating flow (THRs...DC)
[7] Gas
[8] Connection for DHW cylinder return (accessories)
[9] Connection for DHW cylinder flow (accessories)
[10] Flue pipe

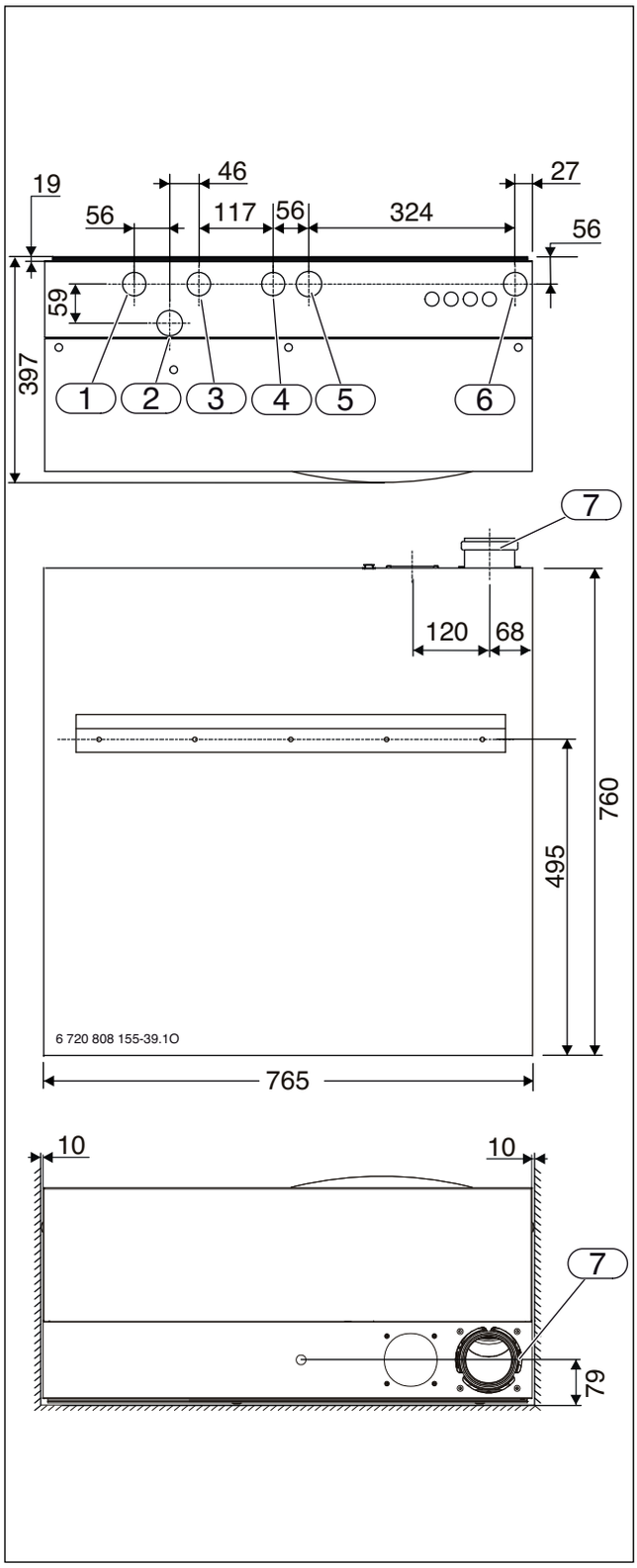


Fig. 4 THRs 10-35 C/THRs 10-50 C (dim. in mm)

Key to Fig. 4:

[1] Heating return
[2] Drain from safety valve
[3] Heating flow
[4] Connection for module (accessories)
[5] Condensate drain
[6] Gas
[7] Flue pipe

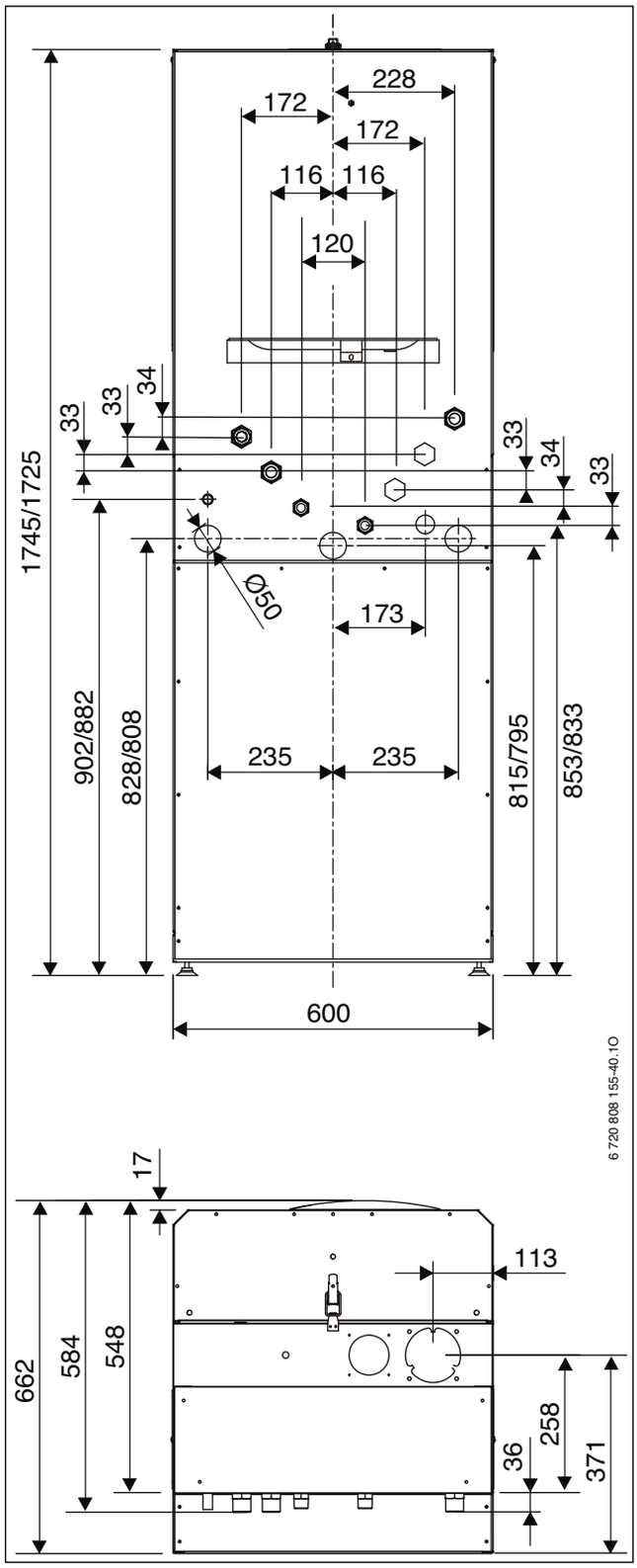


Fig. 5 THRs 0.9-9/2-17/5-25 B120/B120 DC (dim. in mm)

Key to Fig. 5:

Data before/after the forward slash represents the maximum/ minimum values depending on the set height of the feet.
For connections see Fig. 11.

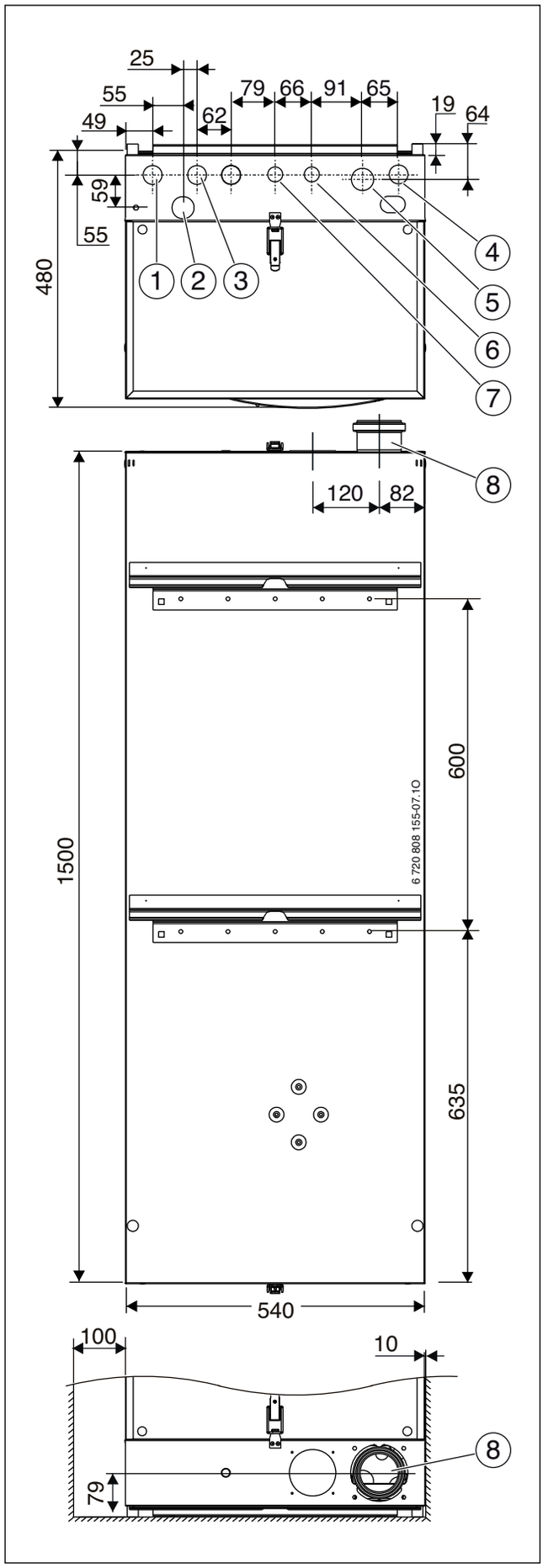


Fig. 6 THRs 2-17/5-25 M75 V (dim. in mm)

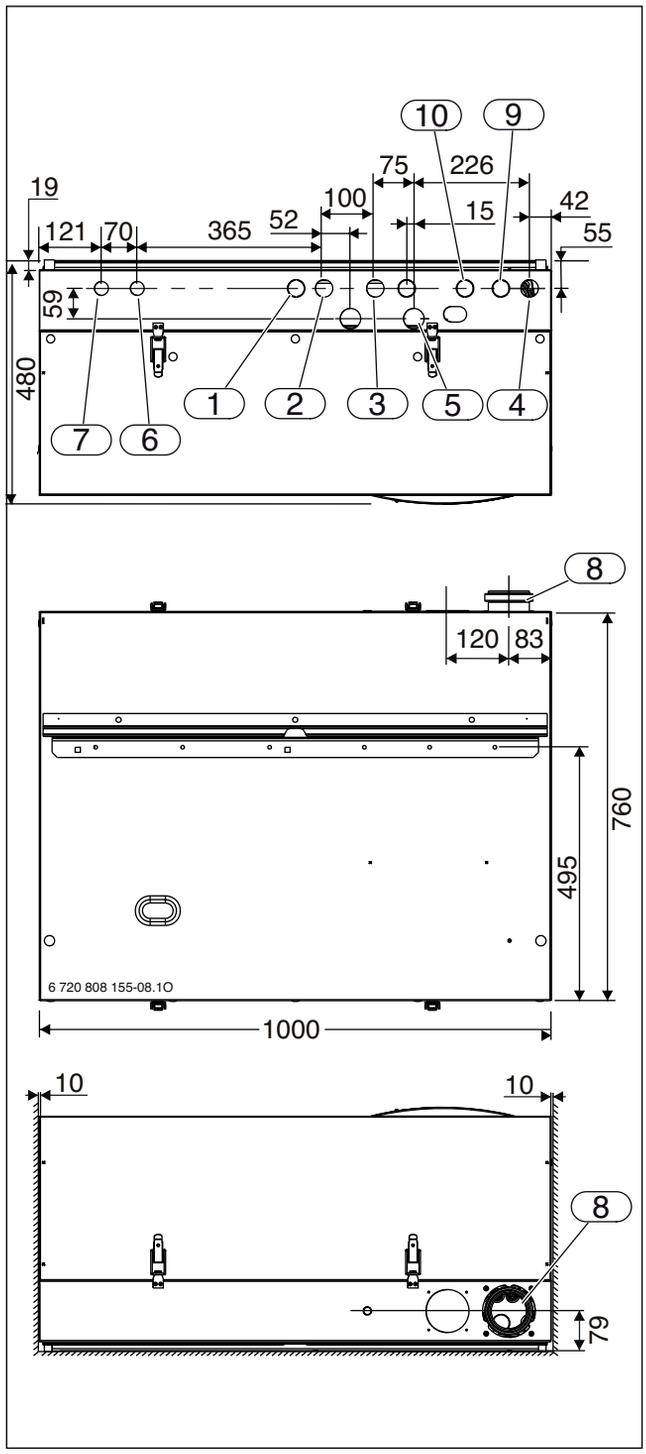


Fig. 7 THRs 2-17/5-25 M75 H and THRs 2-17 M75 H DC (dim. in mm)

Key to Fig. 6 and Fig. 7:

[1] Heating return
[2] Drain from safety valve
[3] Heating flow
[4] Gas
[5] Condensate drain
[6] Cold water
[7] DHW
[8] Flue pipe
[9] 2nd heating circuit heating flow (THRs 2-17 M75 H DC)
[10] 2nd heating circuit heating return (THRs 2-17 M75 H DC)

2.8 Dimensions in conjunction with flue accessories

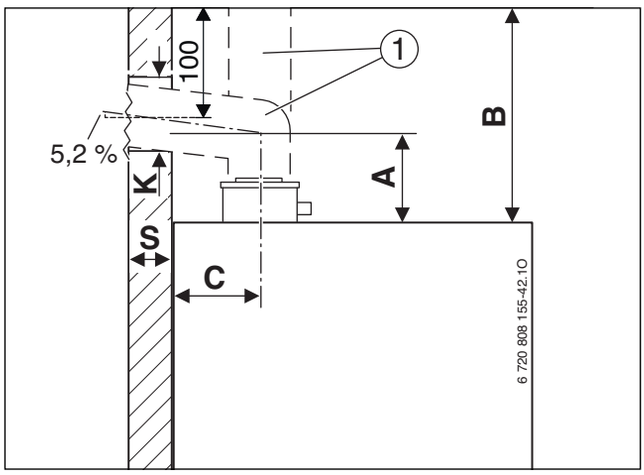


Fig. 8 Dimensions and minimum clearances

[1] Flue accessory

Wall thickness S	K [mm] for Ø flue accessories [mm]		
	Ø 80	**Ø 80/125**	**Ø 75/110**
15 - 24 cm	110	155	135
24 - 33 cm	115	160	145
33 - 42 cm	120	165	150
42 - 50 cm	145	170	160

Table 4 Wall thickness S subject to flue accessories

THRs	C [mm]
0.9-9/2-17/5-25 C/DC	82
10-35/10-50 C	79
0.9-9 B120/B120 DC **2-17 B120/B120 DC** **5-25 B120/B120 DC**	371
2-17/5-25 M75 V	79
2-17 M75 H/M75 H DC **5-25 M75 H**	79

Table 5 Dim. C

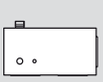
Flue accessories for horizontal flue pipe		A [mm]
	**Ø 75/110 mm** Ø 75/110 mm horizontal connection accessories (THRs 0,9-9/2-17/5-25)	70
	**Ø 80/125 mm** Ø 80/125 mm horizontal connection accessories (THRs 10-35/10-50)	70

Table 6 Dimension A subject to flue accessories

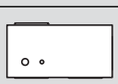
Flue accessories for vertical flue pipe		B [mm]
	**Ø 80/125 mm** Ø 80/125 mm connecting adaptor (THRs 0,9-9/2-17/5-25)	≥ 500
	**Ø 80/125 mm** Ø 80/125 mm connecting adaptor (THRs 10-35/10-50)	≥ 500

Table 7 Dimension B subject to flue accessories

2.9 Appliance layout

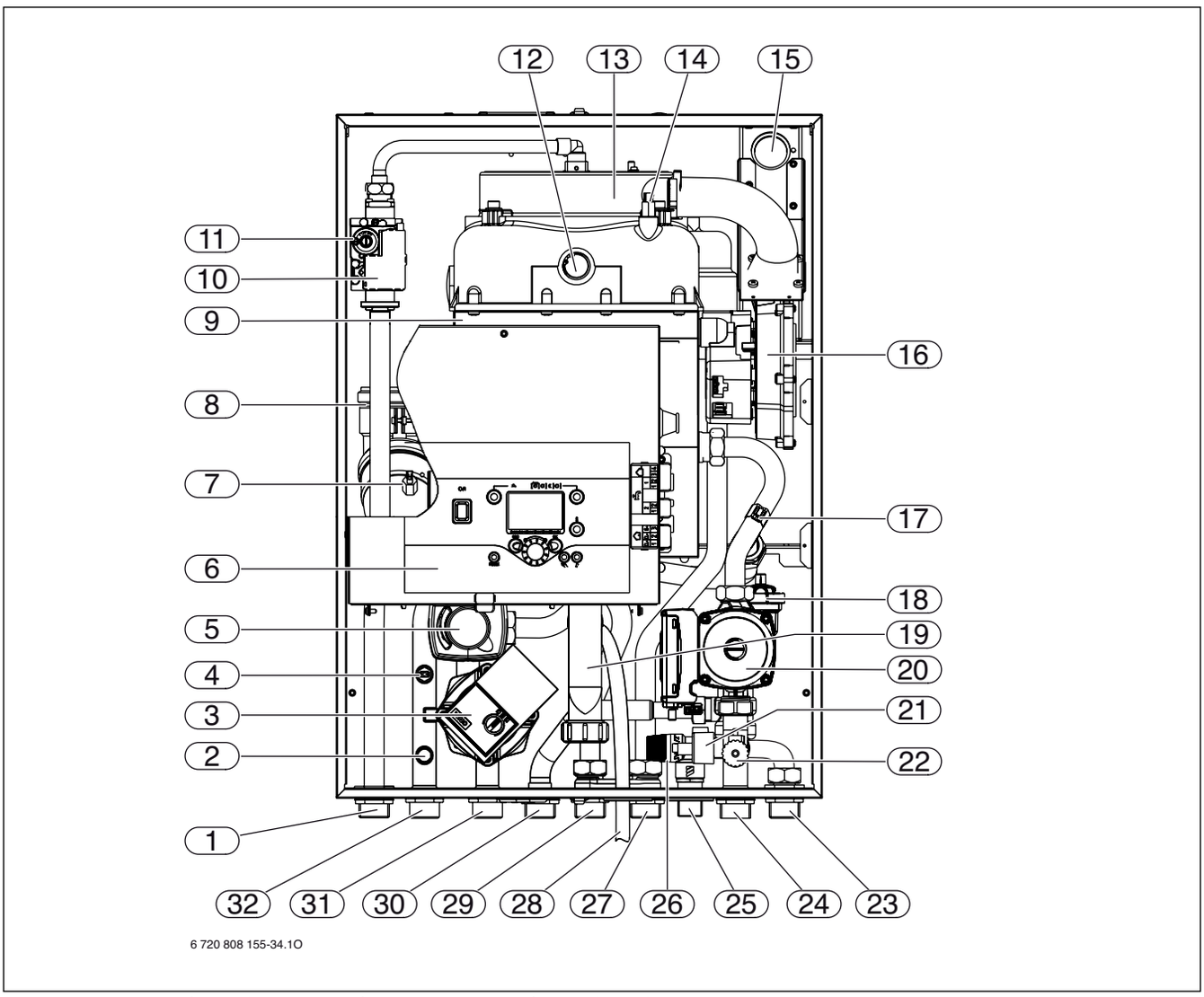


Fig. 9 THRs 0.9-9 C/DC and THRs 2-17 C/DC and THRs 5-25 C/DC appliance layout

[1] Gas connection
[2] 2nd heating circuit overheating protection (THRs...DC)
[3] 2nd heating circuit heating circuit pump (THRs..DC)
[4] 2nd heating circuit flow temperature sensor (THRs...DC)
[5] Mixing valve with motor (THRs..DC)
[6] Control device
[7] Flue gas temperature sensor
[8] Flue pipe
[9] Heat exchanger
[10] Ignition transformer
[11] Gas valve
[12] Sight glass
[13] Burner
[14] Flow temperature sensor and heat exchanger temperature limiter
[15] Pressure gauge
[16] Fan
[17] Return temperature sensor
[18] Automatic air vent valve
[19] Siphon
[20] Heating circuit pump
[21] Pressure sensor
[22] Drain tap
[23] Connection for expansion vessel (THRs..DC, accessories)
[24] Heating return
[25] Drain from safety valve
[26] Safety valve
[27] Heating flow
[28] Condensate drain
[29] Connection for DHW cylinder flow (accessories)
[30] Connection for DHW cylinder return (accessories)
[31] 2nd heating circuit heating return (THRs...DC)
[32] 2nd heating circuit heating flow (THRs...DC)

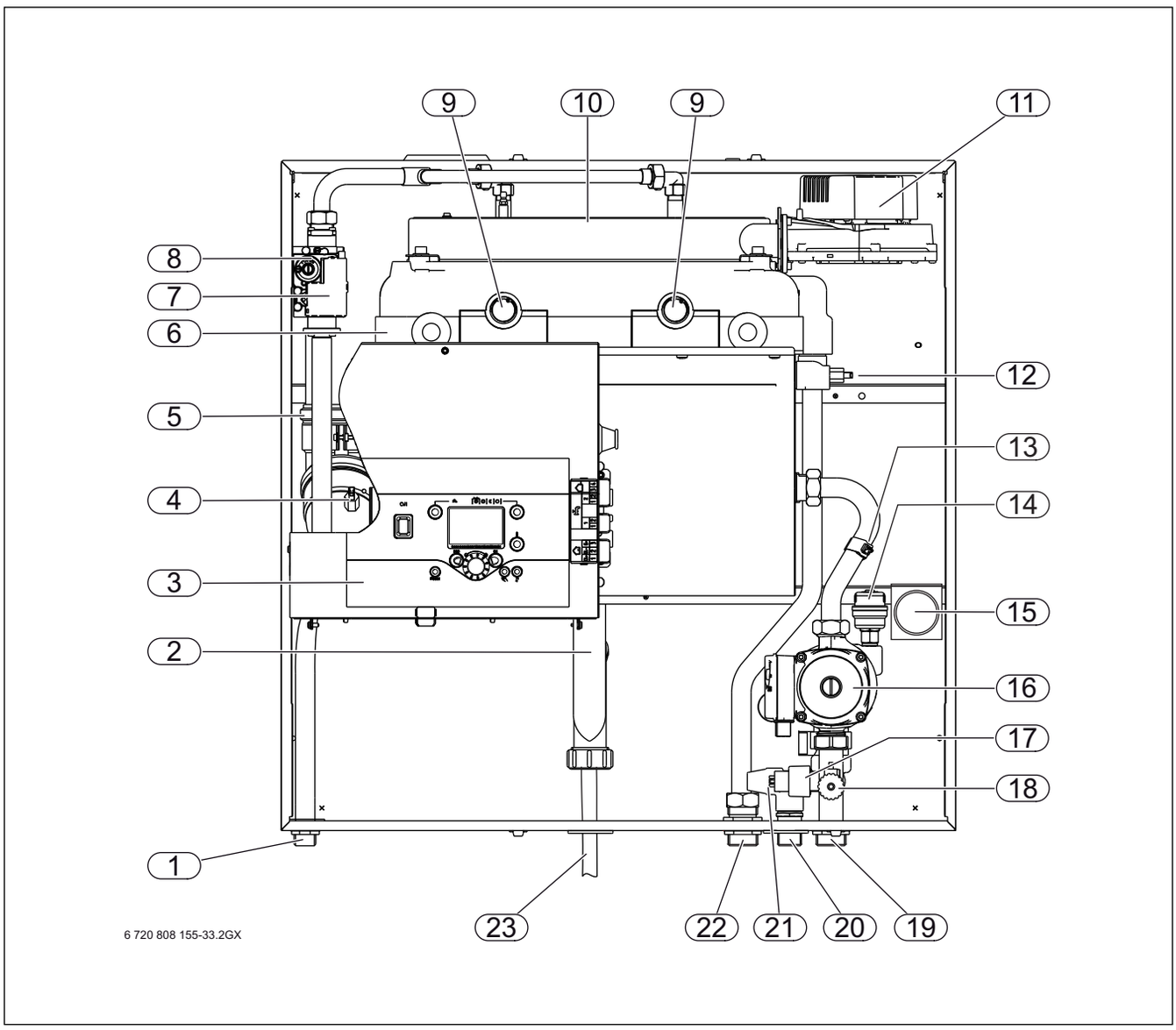


Fig. 10 THRs 10-35 C/THRs 10-50 C appliance layout

[1] Gas connection
[2] Siphon
[3] Control device
[4] Flue gas temperature sensor
[5] Flue pipe
[6] Heat exchanger
[7] Ignition transformer
[8] Gas valve
[9] Sight glass
[10] Burner
[11] Fan
[12] Flow temperature sensor and heat exchanger temperature limiter
[13] Return temperature sensor
[14] Automatic air vent valve
[15] Pressure gauge
[16] Heating circuit pump
[17] Pressure sensor
[18] Drain tap
[19] Heating return
[20] Drain from safety valve
[21] Safety valve
[22] Heating flow
[23] Condensate drain

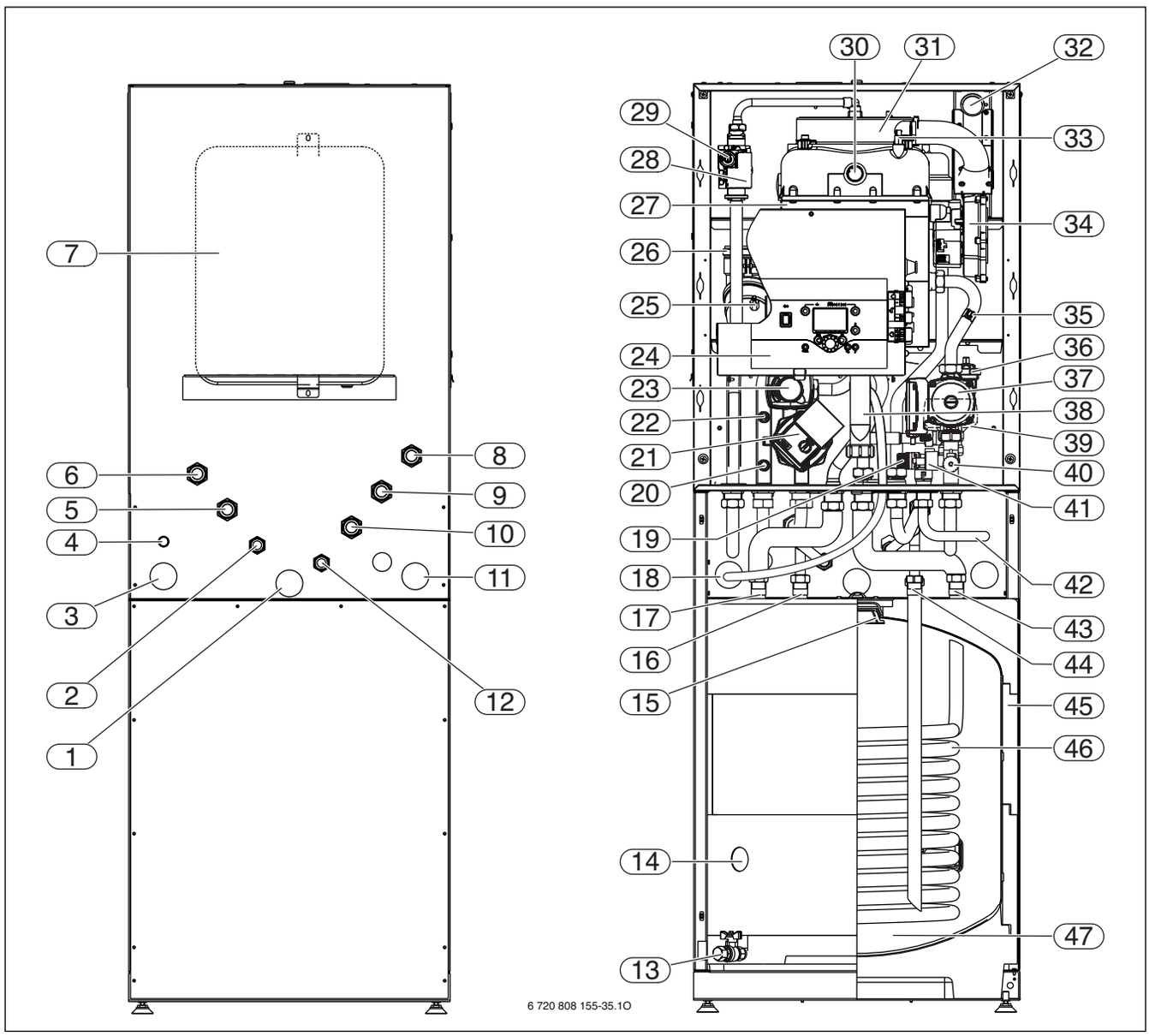


Fig. 11 THRs 0.9-9/2-17/5-25 B120 and THRs 0.9-9/2-17 B120 DC appliance layout

[1] Opening for circulation line
[2] Cold water
[3] Opening for transport and condensate drain
[4] Drain from safety valve
[5] Heating flow
[6] Heating return
[7] Expansion vessel
[8] Gas connection
[9] 2nd heating circuit heating flow (THRs...DC)
[10] 2nd heating circuit heating return (THRs...DC)
[11] Opening for transport and condensate drain
[12] DHW
[13] Drain tap
[14] Cylinder temperature sensor
[15] Inspection aperture
[16] DHW outlet
[17] Cylinder return
[18] Condensate drain
[19] Safety valve
[20] 2nd heating circuit overheating protection (THRs...DC)
[21] 2nd heating circuit heating circuit pump (THRs..DC)
[22] 2nd heating circuit flow temperature sensor (THRs...DC)
[23] Mixing valve with motor (THRs...DC)
[24] Control device
[25] Flue gas temperature sensor
[26] Flue pipe
[27] Heat exchanger
[28] Ignition transformer
[29] Gas valve
[30] Sight glass
[31] Burner
[32] Pressure gauge
[33] Flow temperature sensor and heat exchanger temperature limiter
[34] Fan
[35] Return temperature sensor
[36] Automatic air vent valve
[37] Heating circuit pump
[38] Siphon
[39] Heating return, 3-way valve with motor
[40] Drain tap
[41] Pressure sensor
[42] Drain from safety valve
[43] Cylinder flow
[44] Cold water
[45] Thermal insulation
[46] Coiled piping
[47] DHW cylinder

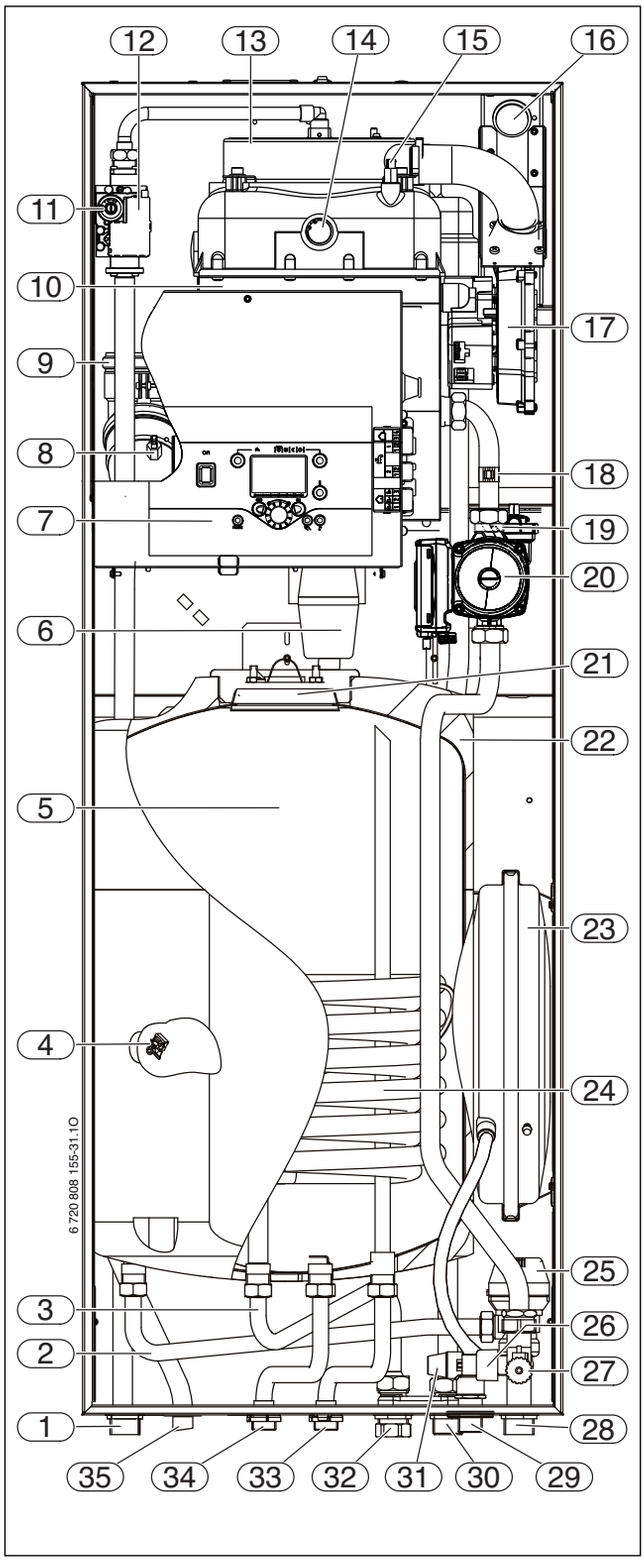


Fig. 12 THRs 2-17/5-25 M75 V appliance layout

Key to Fig. 12:

[1] Gas connection
[2] Cylinder return
[3] Cylinder flow
[4] Cylinder temperature sensor
[5] DHW cylinder
[6] Siphon
[7] Control device
[8] Flue gas temperature sensor
[9] Flue pipe
[10] Heat exchanger
[11] Gas valve
[12] Ignition transformer
[13] Burner
[14] Sight glass
[15] Flow temperature sensor and heat exchanger temperature limiter
[16] Pressure gauge
[17] Fan
[18] Return temperature sensor
[19] Automatic air vent valve
[20] Heating circuit pump
[21] Inspection aperture
[22] Thermal insulation
[23] Expansion vessel
[24] Coiled piping
[25] Motorised 3-way valve
[26] Pressure sensor
[27] Drain tap
[28] Heating return
[29] Drain from safety valve
[30] Heating flow
[31] Safety valve
[32] Connection without function
[33] DHW outlet
[34] Cold water
[35] Condensate drain

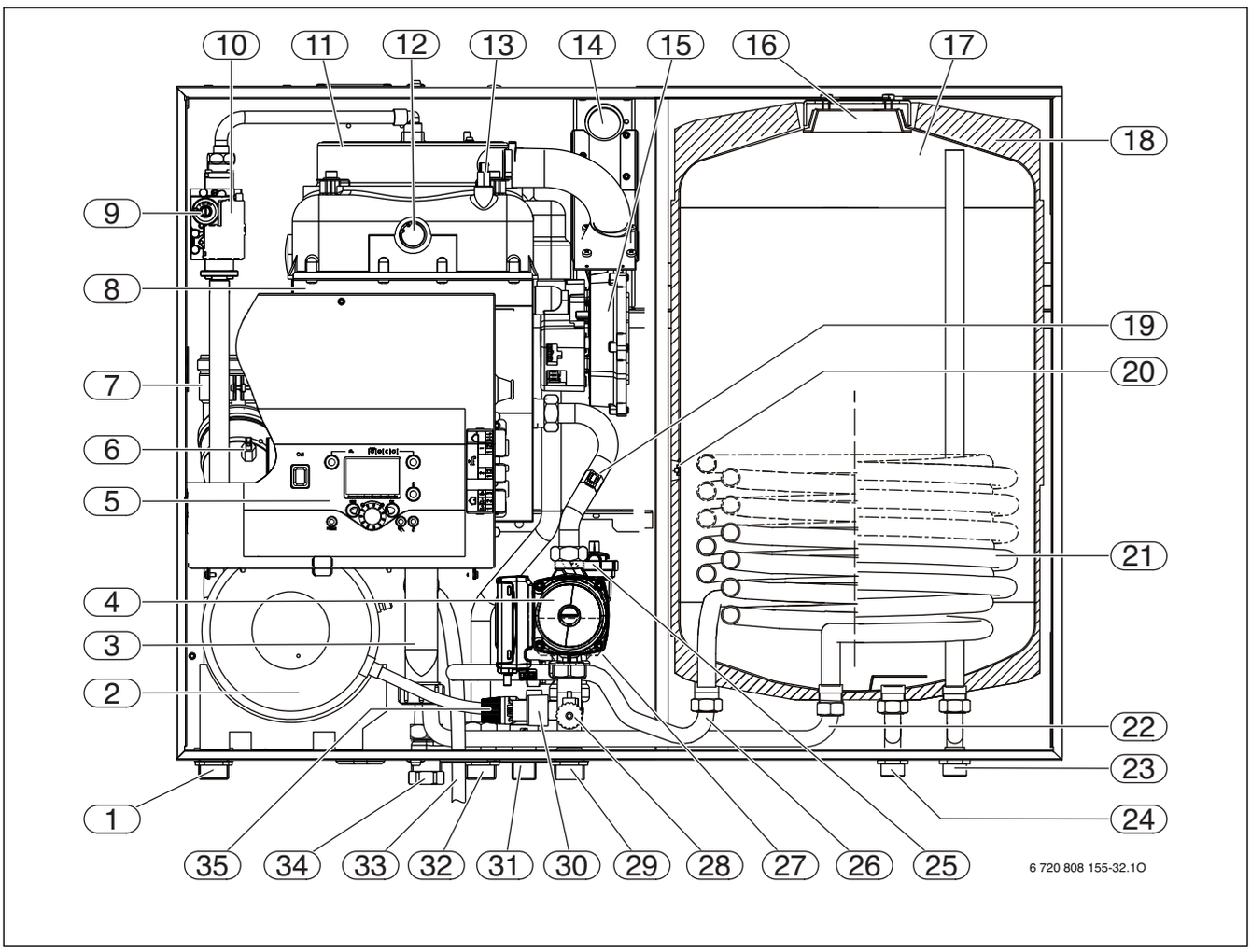


Fig. 13 THRs 2-17/5-25 M75 H appliance layout

[1] Gas connection
[2] Expansion vessel
[3] Siphon
[4] Heating circuit pump
[5] Control device
[6] Flue gas temperature sensor
[7] Flue pipe
[8] Heat exchanger
[9] Gas valve
[10] Ignition transformer
[11] Burner
[12] Sight glass
[13] Flow temperature sensor and heat exchanger temperature limiter
[14] Pressure gauge
[15] Fan
[16] Inspection aperture
[17] DHW cylinder
[18] Thermal insulation
[19] Return temperature sensor
[20] Cylinder temperature sensor
[21] Coiled piping
[22] Cylinder flow
[23] Hot water outlet
[24] Cold water
[25] Automatic air vent valve
[26] Cylinder return
[27] Motorised 3-way valve
[28] Drain tap
[29] Heating return
[30] Pressure sensor
[31] Drain from safety valve
[32] Heating flow
[33] Condensate drain
[34] Connection without function
[35] Safety valve

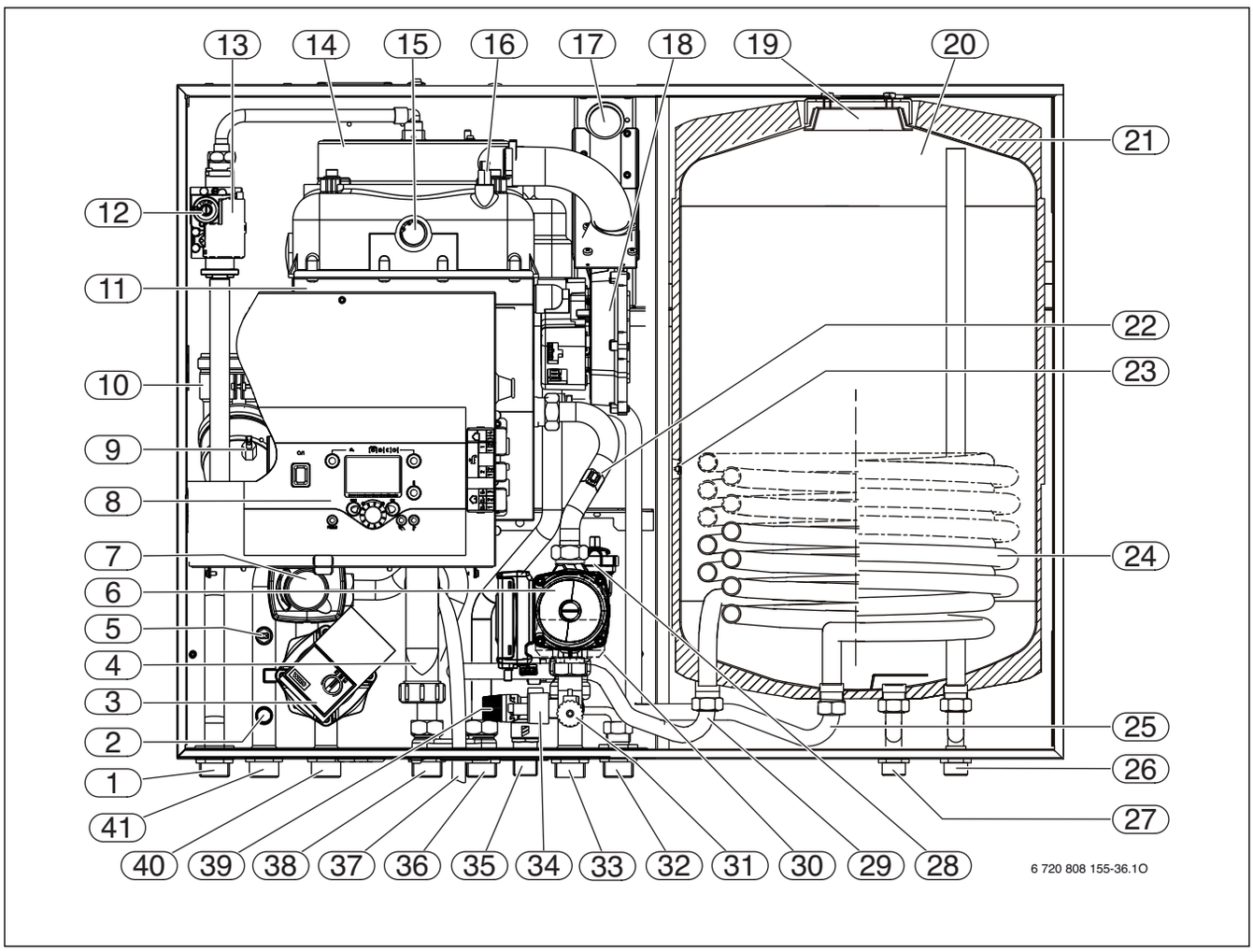


Fig. 14 THRs 2-17 M75 H DC appliance layout

[1] Gas connection
[2] 2nd heating circuit overheating protection
[3] 2nd heating circuit heating circuit pump
[4] Siphon
[5] 2nd heating circuit flow temperature sensor (THRs...DC)
[6] Heating circuit pump
[7] Mixing valve with motor
[8] Control device
[9] Flue gas temperature sensor
[10] Flue pipe
[11] Heat exchanger
[12] Gas valve
[13] Ignition transformer
[14] Burner
[15] Sight glass
[16] Flow temperature sensor and heat exchanger temperature limiter
[17] Pressure gauge
[18] Fan
[19] Inspection aperture
[20] DHW cylinder
[21] Thermal insulation
[22] Return temperature sensor
[23] Cylinder temperature sensor
[24] Coiled piping
[25] Cylinder flow
[26] DHW outlet
[27] Cold water
[28] Automatic air vent valve
[29] Cylinder return
[30] Motorised 3-way valve
[31] Drain tap
[32] Expansion vessel connection (accessory)
[33] Heating return
[34] Pressure sensor
[35] Drain from safety valve
[36] Heating flow
[37] Condensate drain
[38] Connection without function
[39] Safety valve
[40] 2nd heating circuit heating return
[41] 2nd heating circuit heating flow

2.10 Electrical wiring diagram

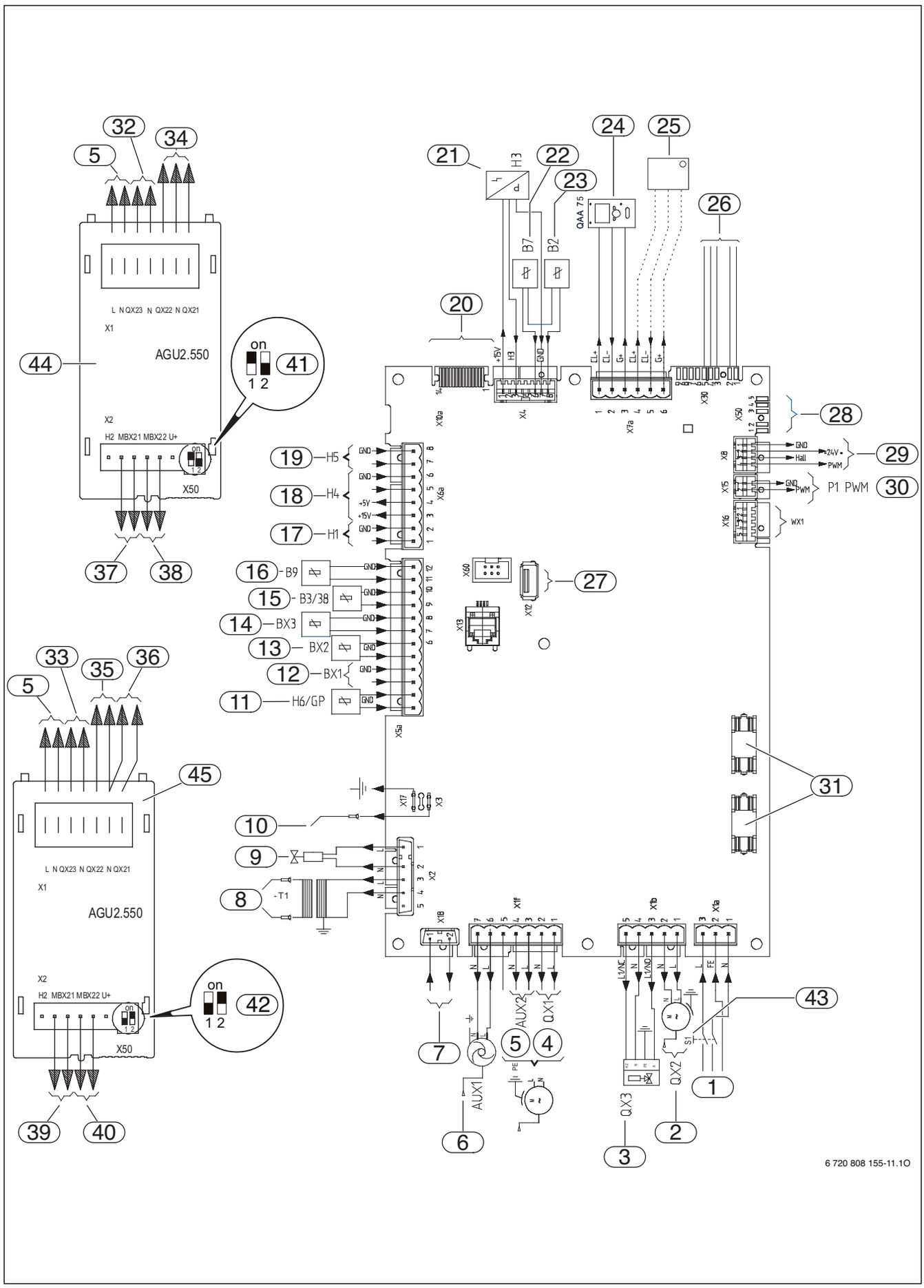


Fig. 15

Key to Fig. 15:

[1] Power supply
[2] Output connection QX2 for domestic hot water circulation pump (THRs…C with DHW cylinder)
[3] 3-way valve for connecting a DHW cylinder (accessories for THRs…C)
[4] Output QX1 can be configured
[5] Heating circuit pump and power supply for AGU2.550 extension module
[6] Fan
[7] External switching contact, potential-free (e.g. temperature monitor for underfloor heating system, bridged when delivered from the factory)
[8] Ignition transformer
[9] Gas valve
[10] Ionisation electrode
[11] Input H6
[12] Sensor input BX1, can be configured
[13] Flue gas temperature sensor
[14] DHW temperature sensor 2 BX3
[15] DHW temperature sensor 1 B3
[16] Connection for outside temperature sensor QAC34
[17] Input H1, can be configured
[18] Input H4, can be configured
[19] Input H5, can be configured
[20] LPB OCI345 module
[21] Pressure sensor
[22] Heating return temperature sensor
[23] Boiler temperature sensor
[24] Connection for heating controller QAA75
[25] Connection for wireless module AVS71
[26] AVS37 user interface
[27] Programming interface
[28] Connection for AGU2.550 extension module (accessories)
[29] PWM fan
[30] PWM heating circuit pump
[31] Fuses (2xT6.3 H250)
[32] Heating circuit pump connection (2nd heating circuit), QX23
[33] Connection for solar pump, QX23
[34] Connection for mixing valve motor (2nd heating circuit)
[35] Relay output QX22, can be configured
[36] Relay output QX21, can be configured
[37] Connection for flow temperature sensor BX21 (2nd heating circuit)
[38] Sensor input BX22 (2nd heating circuit)
[39] Connection for solar collector sensor BX21 (solar module)
[40] Connection for DHW temperature sensor BX22 on solar cylinder (solar module)
[41] Addressing of extension module 1
[42] Addressing of extension module 2
[43] ON/OFF switch
[44] AGU2.550 extension module 1
[45] AGU2.550 extension module 2

2.11 Specification

	Unit	THRs 0.9-9 C 0.9-9DC	THRS 2-17 C 2-17DC	THRs 5-25 C 5-25DC	THRs 10-35 C	THRs 10-50 C	THRs 2-17 M75	THRs 5-25 M75
Max. rated output (P_{max}) 50/30 °C	kW	9.8	18.3	25.8	35.7	52.6	18.3	25.8
Max. rated output (P_{max}) 80/60 °C	kW	9.1	16.9	23.9	33.1	48.7	16.9	23.9
Max. rated heat input ($\dot{Q}_{max}$) central heating	kW	9.3	17.4	24.5	34.0	50.0	17.4	24.5
Min. rated output (P_{min}) 50/30 °C	kW	1.2	2.6	5.4	10.7	10.7	2.6	5.4
Min. rated output (P_{min}) 80/60 °C	kW	1.0	2.3	4.8	9.7	9.7	2.3	4.8
Min. rated heat input ($\dot{Q}_{min}$) central heating	kW	1.1	2.5	5.0	10.0	10.0	2.5	5.0
Max. rated heat input ($\dot{Q}_{nW}$) DHW	kW	9.3	17.4	24.5	34.0	50.0	17.4	24.5
Min. rated heat input ($\dot{Q}_{nW}$) DHW	kW	1.1	2.5	5.0	10.0	10.0	2.5	5.0
Appliance efficiency, max. output heat curve 80/60 °C	%	90/97.4	96/97.4	96/97.4	95.9/97.3	95.9/97.3	96/97.4	96/97.4
Appliance efficiency, max. output heat curve 50/30 °C	%	109/ 105.4	108/ 105.8	108/ 105.3	107.7/ 105.1	107.7/ 105.1	108/ 105.8	108/ 105.3
Appliance efficiency under partial load (30%) according to 92/42 EWG	%	108.5	108.5	108.5	107.7	107.7	108.5	108.5
Gas supply value								
Natural gas H ($H_{i(15\,°C)}$ = 9.5 kWh/m^3)	m^3/h	0.98	1.84	2.59	3.70	5.29	1.84	2.59
Butane/propane (H_i = 12.9 kWh/kg)	kg/h	-	-	1.90	2.72	3.88	-	1.90
Permissible gas supply pressure								
Natural gas H	mbar	17 - 25	17 - 25	17 - 25	17 - 25	17 - 25	17 - 25	17 - 25
LPG	mbar	-	-	-	25 – 45	25 – 45	25 – 45	25 – 45
Expansion vessel								
Pre-charge pressure	bar	0.75[1)]	0.75[1)]	0.75[1)]	0.75[1)]	0.75[1)]	0.75	0.75
Total capacity	l	8[1)]	8[1)]	8[1)]	8[1)]	8[1)]	H: 8 V: 10	H: 8 V: 10
DHW								
Specific flow rate according to EN 13203	l/min	-	-	-	-	-	12.4	16.0
Outlet temperature range	°C	-	-	-	-	-	10–65	10–65
Max. permissible water supply pressure	bar	-	-	-	-	-	10	10
Min. inlet pressure	bar	-	-	-	-	-	1	1
Calculation figures for calculating cross-sectional area to EN 13384								
Flue gas mass flow rate min./max. rated	kg/h	16.4/2.2	30.7/4.9	51.2/9.7	87.3/19.9	87.3/19.9	30.7/4.9	51.2/9.7
Flue gas temperature 80/60 °C max./min. rated	°C	75/60	80/60	85/62	80/60	85/62	80/60	85/62
Flue gas temperature 40/30 °C max./min. rated	°C	42/30	47/30	55/32	47/30	55/32	47/30	55/32
Max. standard CO emissions factor	mg/kWh	50	50	50	50	50	50	50
Max. standard NO_x emissions factor	mg/kWh	60	60	60	60	60	60	60
Available fan draught min rated	Pa	100	100	100	100	100	100	100
Required combustion air min./max.	m^3/h	1.5/11.4	3.4/21.4	6.8/35.7	14.0/60.8	14.0/60.8	3.4/21.4	6.8/35.7
CO_2 at max. rated output for natural gas H and LPG	%	9.5/ -	9.5/ -	9.5/11.0	9.5/11.0	9.5/11.0	9.5/ -	9.5/11.0
CO_2 for min. rated output for natural gas H and LPG	%	8.5/ -	8.5/ -	8.5/10.5	8.5/10.5	8.5/10.5	9.5/ -	8.5/10.5
Condensate								
Max. condensate quantity (t_R = 30 °C)	l/h	0.9	1.3	1.8	2.5	3.6	1.3	1.8
pH level, approx.	–	3.5	3.5	3.5	3.5	3.5	3.5	3.5
General data								
Power supply voltage	AC ... V	230	230	230	230	230	230	230
Frequency	Hz	50	50	50	50	50	50	50
Max. power consumption in standby mode	W	5	5	5	5	5	5	5
Power consumption in heating mode at min./max. rated output (without heating circuit pump)	W	13/33	14/33	15/32	14/25	14/43	14/33	15/32
Heating circuit pump power consumption in heating mode at min./max. rated output	W	11/36	11/36	11/50	- /67	- /67	11/36	11/50

Table 8

	Unit	THRs 0.9-9 C 0.9-9DC	THRS 2-17 C 2-17DC	THRs 5-25 C 5-25DC	THRs 10-35 C	THRs 10-50 C	THRs 2-17 M75	THRs 5-25 M75
2nd heating circuit pump power consumption in heating mode Speed 1/2/3	W	DC : 15/34/45	DC : 15/34/45	DC : 15/34/45	-	-	-	-
Power consumption in DHW operation at min./max. rated output (without heating circuit pump)	W	-	-	-	-	-	14/33	15/32
Heating circuit pump power consumption in DHW operation at min./max. rated output	W	-	-	-	-	-	-/63	-/63
Absorbed intensity	A	C : 0.30 DC : 0.50	C : 0.30 DC : 0.50	C : 0.35 DC : 0.55	0.40	0.48	0.42	0.41
Max. power consumption	W	C : 69 DC : 114	C : 69 DC : 114	C : 82 DC : 127	92	110	96	95
EMC limit class	–	B	B	B	B	B	B	B
IP rating (with B_{23} type of installation)	IP	24	24	24	24	24	24	24
IP rating (with C_{13}/C_{33} type of installation)	IP	44	44	44	44	44	24	44
Max. flow temperature	°C	80	80	80	80	80	80	80
Over-heating safety of combustion products	°C	100	100	100	100	100	100	100
Water overheating safety thermostat	°C	92	92	92	92	92	92	92
Max. permissible operating pressure (P_{MS}) heating	bar	3	3	3	3	3	3	3
Permissible ambient temperature	°C	0–50	0–50	0–50	0–50	0–50	0–50	0–50
Nominal capacity of appliance heating	l	2.5	2.5	2.5	3.8	3.8	2.5	7.5
Nominal capacity (heat exchanger)	l	-	-	-	-	-	-	3.2
Weight (excl. packaging)	kg	C: 52 DC: 61	C: 52 DC: 61	C: 52 DC: 61	64	65	V:113 H:101	V:113 H:101
Dimensions, W x H x D	mm	540 x760 x367	540 x760 x367	540 x760 x367	765 x760 x397	765 x760 x397	H: 1000 x760 x480 V: 540 x1500 x480	H: 1000 x760 x480 V: 540 x1500 x480

Table 8

1) Accessory

2.12 Specification with cylinder

	Unit	THRs 0,9-9 B120 DC	THRs 2-17 B120/B120 DC	THRs 5-25 B120
Tank capacity	l	120	120	120
Max. power consumption in cylinder operation	kW	9,1	16.9	23.9
Flow rate at T_Z = 40 °C	l/min	4,4	8.1	11.4
Specific flow rate according to EN 13203	l/min	13,6	18.1	18.7
Min. heat-up time at T_{Sp} = 60 °C[1)]	min	34	18	13
Min. charging time at T_{Sp} = 60 °C	min	60	32	23
Max. draw rate at T_Z=40 °C, T_{Sp} = 65 °C, t=10 min	l	186	186	187
Max. draw rate at T_Z=40 °C, T_{Sp} = 65 °C, t=1 h	l	404	591	758
Heat loss via casing (at 65 °C in cylinder)	W	53,7	53,7	53.7

Table 9 THRs 0.9-9/2-17B120/B120 DC

1) following draw-off with specific flow rate

Key to Tab. 9:

T_{Sp} Temperature of the Tank
T_Z DHW outlet temperature

	Unit	THRs 2-17 M75 V/M75 H/M75 H DC	THRs 5-25 M75 V/M75 H
Tank capacity	l	75	75
Max. power consumption in cylinder operation	kW	16.9	23.9
Flow rate at T_Z = 40 °C	l/min	8.1[1)]	11.4[1)]
Specific flow rate according to EN 13203	l/min	12.4	16.0
Min. heat-up time at T_{Sp} = 60 °C[2)]	min	11	8
Min. charging time at T_{Sp} = 60 °C	min	19	14
Max. draw rate at T_Z=40 °C, T_{Sp} = 65 °C, t=10 min	l	124	158
Max. draw rate at T_Z=40 °C, T_{Sp} = 65 °C, t=1 h	l	529	729
Heat loss via casing (at 65 °C in cylinder)	W	67	67

Table 10 THRs 2-17/5-25 M75

1) Set flow rate at safety assembly on commissioning

2) following draw-off with specific flow rate

2.13 Specification with cylinder (accessories)

		THRs 5-25 C/DC with			
	Unit	BS 100	BS 150	BS 200	BS 300
Tank capacity	l	100	150	200	300
Max. power consumption in cylinder operation	kW	23.9	23.9	23.9	23.9
Flow rate at T_Z = 40 °C	l/min	11.4	11.4	11.4	11.4
Specific flow rate according to EN 13203	l/min	17.6	23.9	27.2	35.2
Min. heat-up time at T_{Sp} = 60 °C	min	11	17	21	33
Min. charging time at T_{Sp} = 60 °C	min	19	29	38	58
Max. draw rate at T_Z=40 °C, T_{Sp} = 65 °C, t=10 min	l	176	241	313	476
Max. draw rate at T_Z=40 °C, T_{Sp} = 65 °C, t=1 h	l	748	813	885	1047
Heat loss via casing (at 65 °C in cylinder)	W	58	77	97	136

Table 11 THRs 5-25 C/DC with cylinder (accessory)

		THRs 0.9-9 C/DC with				THRs 2-17 C/DC with			
	Unit	BS 100	BS 150	BS 200	BS 300	BS 100	BS 150	BS 200	BS 300
Tank capacity	l	100	150	200	300	100	150	200	300
Max. power consumption in cylinder operation	kW	9,1	9.1	9.1	9.1	16.9	16.9	16.9	16.9
Flow rate at T_Z = 40 °C	l/min	4,4	4.4	4.4	4.4	8.1	8.1	8.1	8.1
Specific flow rate according to EN 13203	l/min	12,3	16.3	19.9	27.8	16.0	20.2	23.7	31.7
Min. heat-up time at T_{Sp} = 60 °C	min	29	43	56	86	15	23	30	46
Min. charging time at T_{Sp} = 60 °C	min	51	77	100	153	28	42	54	82
Max. draw rate at T_Z=40 °C, T_{Sp} = 65 °C, t=10 min	l	160	241	313	476	160	241	313	476
Max. draw rate at T_Z=40 °C, T_{Sp} = 65 °C, t=1 h	l	377	459	531	693	564	645	717	880
Heat loss via casing (at 65 °C in cylinder)	W	58	77	97	136	58	77	97	136

Table 12 THRs 0.9-9 C/DC and 2-17 C /DC with cylinder (accessory)

		THRs 10-35 C with				THRs 10-50 C with			
	Unit	BS 100	BS 150	BS 200	BS 300	BS 100	BS 150	BS 200	BS 300
Tank capacity	l	100	150	200	300	100	150	200	300
Max. power consumption in cylinder operation	kW	33.1	33.1	33.1	33.1	35	35	50	50
Flow rate at T_Z = 40 °C	l/min	15.8	15.8	15.8	15.8	16.7	16.7	23.3	23.3
Specific flow rate according to EN 13203	l/min	22.0	25.2	31.3	39.8	22.9	26.1	35.4	47.5
Min. heat-up time at T_{Sp} = 60 °C	min	8	12	16	24	7	11	11	16
Min. charging time at T_{Sp} = 60 °C	min	14	21	28	42	13	20	19	29
Max. draw rate at T_Z=40 °C, T_{Sp} = 65 °C, t=10 min	l	220	252	313	476	229	261	354	476
Max. draw rate at T_Z=40 °C, T_{Sp} = 65 °C, t=1 h	l	1012	1044	1105	1267	1067	1098	1519	1641
Heat loss via casing (at 65 °C in cylinder)	W	58	77	97	136	58	77	97	136

Table 13 THRs 10-35 C and 10-50 C with cylinder (accessory)

Key to Tab. 10, Tab. 12, Tab. 11, and Tab. 13:

T_{Sp} Temperature of the Tank

T_Z DHW outlet temperature

3 Regulations

The installation of the boiler must be carried out by a competent person in accordance with the relevant requirements of the Gas Safety (Installation and Use) Regulations, Building Regulations, Model Water Byelaws and the Building Standards (Scotland) Regulations.

The installation of the boiler must also comply with the current I.E.E. Wiring Regulations and the relevant recommendations of the following British Standard Codes of Practice:

- **CP.331.3**, Low pressure installation pipes.
- **BS.5449.1**, Forced circulation hot water systems.
- **BS.5546**, Installation of gas hot water supplies for domestic purposes.
- **BS.5440.1**, Flues (for gas appliances of rated input not exceeding 60 kW).
- **BS.5440.2**, Air supply (for gas appliances of rated input not exceeding 60 kW).
- **BS.6798**, Boilers of rated input not exceeding 60 kW.

NOTICE:
The boiler is only suitable for installation in a sealed system and must not be used with an open vented system.

3.1 Location of boiler

The boiler can be installed on the inner face of an external wall — and some internal walls — providing they are flat, vertical and capable of adequately supporting the weight of the boiler and any ancillary equipment.

The boiler may be installed in any room or internal space, although particular attention is drawn to the requirements of the current I.E.E. Wiring Regulations and, in Scotland, the electrical provisions of the Building Regulations applicable in Scotland with respect to the installation of the boiler in a room or internal space containing a bath or shower. Where installation is in a room containing a bath or shower, any electrical switch or boiler control utilising mains electricity should be situated so that it cannot be touched by a person using the bath or shower.

Where installation will be in an unusual location, special procedures may be necessary and BS.6798 gives detailed guidance on this subject.

A compartment used to enclose the boiler **MUST** be designed and constructed specially for this purpose. An existing cupboard or compartment may be used provided it is modified for the purpose. Details of essential features of cupboard/compartment design, including airing cupboard installations, are given in BS.6798.

In siting the boiler, the following limitations **MUST** be observed:

- The position selected for installation **MUST** allow adequate space for servicing in front of the boiler and for air circulation around the boiler and
- this position **MUST** also permit the provision of a satisfactory balanced flue termination.

NOTICE:
If the boiler is to be fitted in a timber framed building, it should be fitted in accordance with the British Gas publication “Guide for Gas Installations in Timber Frame Housing”. Reference DM2.
If in doubt, advice must be sought from the Local Gas Region of British Gas.

When siting the boiler, provision must be made for the disposal of the condensate (→Chapter 5.6.3, page 31).

The pressure relief valve connection should be routed to an external, visible point where the discharge of steam or water cannot create a hazard to persons or property. BS.5449.1 refers.

3.2 Gas supply

Installation pipes should be fitted in accordance with CP.331.3.

The complete installation must be tested for soundness and purged in accordance with CP.331.3.

3.3 Flueing

Detailed recommendations for flueing are given in BS.5440.1. The following notes are intended for general guidance (→ Chapter 4, page 22).

3.4 Air supply

For room-sealed systems

Detailed recommendations for air supply are given in BS.5440.2. The following notes are intended for general guidance (→ Chapter 4, page 22).

Where the boiler is to be installed in a room or internal space, the boiler does not require the room or internal space containing it to have a permanent air vent.

For natural draught system

Detailed requirements are given in BS.5440.2.

3.5 Water circulation system

The expansion vessel is suitable for systems up to 100 l water content. For systems in excess of this capacity an additional pressurised expansion vessel will be required. BS7074 and "British Gas Specifications for Domestic Wet Central Heating Systems Part 3' gives guidance in this subject.

The central heating system should be in accordance with the relevant recommendations given in BS.6798 and, in addition, for small bore and microbore systems, in BS.5449.1. The domestic hot water system, if applicable, should be in accordance with the relevant recommendations of BS.5546.

Copper tubing, to BS.2871.1, is recommended for water carrying pipework.

3.6 Electrical supply

Wiring external to the boiler must be in accordance with the I.E.E. Wiring Regulations and any local regulations.

4 Flue gas routing

4.1 Approved flue accessories

The flue accessories form part of the CE approval for the device. For this reason, only the listed original flue accessories must be installed.

- Flue accessories, concentric pipe Ø 75/110 mm
- Flue accessories, concentric pipe Ø 80/125 mm
- Flue accessories, single pipe Ø 80 mm

You will find the designations and order numbers for the components of these original flue accessories in the main catalogue.

4.2 Installation conditions

4.2.1 General information

- ▶ Follow installation instructions for the flue gas accessories.
- ▶ Take cylinder dimensions into consideration when installing flue accessories.
- ▶ Grease gaskets on the female connections of the flue accessories with solvent-free grease.
- ▶ Push the flue accessories as far as possible into the female connections.
- ▶ Route horizontal sections with 3 ° gradient (= 5.2 %, 5.2 cm per metre) in the flow direction of the flue gas.
- ▶ Insulate the combustion air line in humid rooms.
- ▶ Place inspection apertures so that they are easily accessible.

4.2.2 Arrangement of inspection apertures

- One inspection aperture is sufficient for flue gas routings up to 4 m in length tested together with the device.
- Provide at least one inspection aperture in horizontal sections/ connection pieces. The maximum clearance between inspection apertures is 4 m. Provide inspection apertures in deflections greater than 45°.
- For horizontal sections/connection pieces, one inspection aperture is adequate provided that
  - the horizontal section upstream of the inspection aperture is not longer than 2 m **and**
  - the inspection aperture in the horizontal section is located no further than 0.3 m from the vertical section **and**
  - there are no more than two deflections in the horizontal section upstream of the inspection aperture.
- The lower inspection aperture in the vertical flue section may be arranged as follows:
  - In the vertical flue section of the flue system immediately above the introduction of the connection piece **or**
  - In the side of the connection piece no more than 0.3 m away from the deflection in the vertical section of the flue system **or**
  - In the face of the straight joint, no more than 1 m away from the deflection in the vertical flue section.
- Flue systems that cannot be cleaned from the terminal must provide an additional top inspection aperture up to 5 m below the terminal. Vertical flue sections with a slope greater than 30° between the axis and the vertical must have an inspection aperture no more than 0.3 m from the kinking points.
- The upper inspection aperture can be omitted in vertical sections, provided that:
  - The vertical section of the flue system runs no more than once at a slope of up to 30° **and**
  - the lower inspection aperture is located no further than 15 m from the terminal.

4.2.3 Routing the flue through a duct

Requirements

- Only one device may be connected to the ducted flue.
- If the flue is installed inside an existing duct, any existing connection apertures may need to be tightly sealed using appropriate materials.
- The duct must be made from non-flammable, solid material and offer a fire rating of at least 90 minutes. A fire rating of 30 minutes is adequate for low buildings.

Structural characteristics of the duct

- Flue to the duct as single pipe (B_{23}, → Fig. 19 and 20):
  - The boiler room must have an aperture of 150 cm^2 or two apertures each with 75 cm^2 unrestricted cross-section towards the outside.
  - The flue must be ventilated (secondary) inside the entire duct.
  - The entry aperture for the secondary ventilation (minimum 75 cm^2) must be provided in the boiler room of the combustion equipment and be covered with an air grille.
- Combustion air supply through a concentric pipe inside a duct (C_{33},→ Fig. 21):
  - The combustion air is supplied through the annular gap of the concentric pipe inside the duct.
  - No opening to the outside is required.
  - An aperture for providing secondary ventilation inside the duct is not permissible. An air grille is not required.
- Combustion air supply through the duct as a countercurrent (C_{93}, to Fig. 23 and 24):
  - The combustion air supply is the air surrounding the flue pipe and flowing as countercurrent inside the duct.
  - No opening to the outside is required.
  - An aperture for providing secondary ventilation inside the duct is not permissible. An air grille is not required.

Duct dimensions

- ▶ Check whether the permissible duct dimensions have been met.

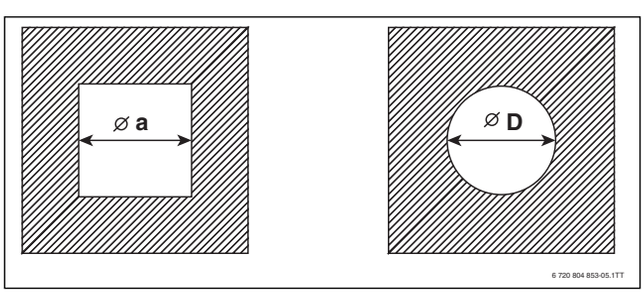


Fig. 16 Rectangular and round cross-section

Flue accessory	a_{min}	a_{max}	D_{min}	D_{max}
Ø 80 mm	120 mm	300 mm	140 mm	300 mm
Ø 80/125 mm	180 mm	300 mm	200 mm	380 mm

Table 14 Permissible duct dimensions

Cleaning existing ducts and chimneys

- Cleaning is not required if the flue gas is routed inside a duct with secondary ventilation (→ Fig. 19, 20, 22).
- If the combustion air supply is routed in countercurrent through the duct (→ Fig. 23 and 24), the duct must be cleaned.

Previous usage	Required cleaning
Ventilation duct	Mechanical cleaning
Routing flue gas from gas combustion	Mechanical cleaning
Flue gas routing for oil or solid fuel	Mechanical cleaning; sealing the surface to prevent vapour from residues (e.g. sulphur) in the brickwork permeating the combustion air

Table 15 Required cleaning tasks

To avoid having to seal the surface:

▶ Opt for open flue operation.

-or-

▶ Draw in combustion air with a concentric pipe in the duct or via a separate pipe from outside.

4.2.4 Vertical flue gas routing

Extension with flue accessories

The flue accessory “vertical balanced flue” can be extended using the flue accessories “concentric pipe”, “concentric bend” or “inspection aperture”.

Routing the flue gas over the roof

According to TRGI, a clearance of 0.4 m between the terminal of the flue accessories and the roof surface is adequate, as the rated output of the listed devices is below 50 kW.

Installation location and balanced flue

- Installation of the devices in a room where only the roof structure is located above the ceiling:
  - If a fire rating is required for the ceiling, then the balanced flue must have the same fire rating between the top edge of the ceiling and the roof skin, and must be made from non-flammable materials.
  - If no fire rating is required for the ceiling, then the balanced flue must be routed through a duct made from non-flammable, solid materials or a metal protective pipe (mechanical protection) running from the top edge of the ceiling to the roof skin.
- If the balanced flue bridges floors in a multi-storey building, then the balanced flue outside the boiler room must be routed through a duct with a fire rating of at least 90 minutes and, in buildings of low height, of at least 30 minutes.

Roof clearances

To maintain the minimum clearances above the roof, the external pipe of the roof outlet can be extended up to 500 mm with flue accessory “extension pipe”.

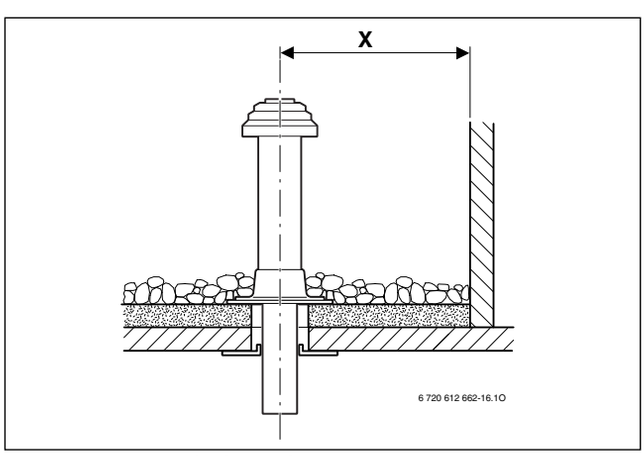


Fig. 17 Clearances for flat roofs

	Flammable materials	Non-flammable materials
X	≥ 1500 mm	≥ 1000 mm

Table 16 Clearances for flat roofs

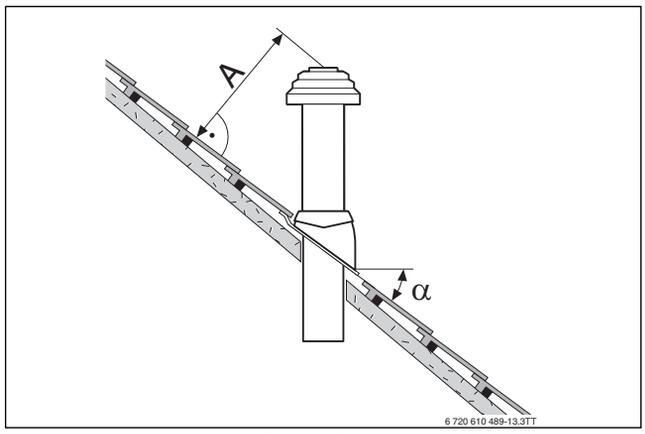


Fig. 18 Clearances and roof slopes for sloped roofs

A	≥ 400 mm, in areas with heavy snow loads ≥ 500 mm
α	25° - 45°, in areas with heavy snow loads ≤ 30°

Table 17 Clearances for sloped roofs

4.2.5 Horizontal flue gas routing

Extension with flue accessories

The flue accessory “horizontal flue gas routing” can be extended between the device and the wall outlet at any point using the flue accessories “concentric pipe”, “concentric bend” (90°) or “inspection aperture”.

Routing a balanced flue type C_{13} over the external wall

- Observe the minimum clearances towards windows, doors, wall protrusions and between terminals themselves.
- In accordance with TRGI and LBO, the terminal of the concentric pipe must not be fitted in a sub-surface duct.

Routing a balanced flue type C_{33} over the roof

- With covering on site, maintain the minimum clearances to TRGI. A clearance of 0.4 m between the flue accessory terminal and the roof surface is adequate, as the rated output of the listed devices is below 50 kW.
  The Geminox dormers meet the requirements regarding minimum dimensions.
- The flue accessory terminal must protrude above structures on the roof, room openings and unprotected components made from flammable materials, excluding roof cover, by at least 1 m or must be at least 1.5 m away from them.
- Local regulations specify no output limit in heating operation for the routing a balanced flue horizontally above a roof with dormer.

4.2.6 Separate pipe connection

Devices may be connected via separate pipes using the flue accessory “separate pipe connection”.

The combustion air is routed through a single Ø 80 mm pipe.

A sample installation is shown in Fig. 22 on page 25.

4.3 Length of FLUE pipes

4.3.1 Permissible flue pipe lengths

The maximum permissible flue pipe lengths are set out in the table 18.

The flue pipe length L (if applicable, the sum of L_1, L_2 and L_3) is the total length of the flue gas routing.

- each additional 90° elbow is equivalent to 1 m.
- each additional 45° or 15° elbow is equivalent to 0.5 m respectively.

Flue gas routing as per TRGI/CEN		Figures	Diameter of the flue accessories	Maximum pipe lengths L $L = L_1+L_2$ $L = L_1+L_2+L_3$	L_2	L_3
Duct	B_{23}	19, 20	80 mm	20 m[1)]	1 m	–
	C_{33}	21	80/125 mm	10 m[1)]	1 m	–
	C_{53}	22	To the duct: 80/125 mm In the duct: 80 mm	20 m[1)]	2 m	2 m
	C_{93}	23, 24	To the duct: 80/125 mm In the duct: 80 mm	14 m[1)]	1 m	–
Horizontal	C_{13}	25	75/110 mm	4 m[2)]	4 m	–
Vertical	C_{33}	26	80/125 mm	10 m	–	–

Table 18 Overview of pipe lengths subject to the flue gas routing situation

1) The elbow on the device and the support bends inside the duct have been taken into consideration in the maximum lengths.

2) The elbow on the device is taken into account in the maximum lengths.

For bends additional to the bend on the device and the support bend inside the duct:

▶ Preferably use 45° bends instead of 90° bends. Each time possible, use no additional 90° bends.

▶ Install at the boiler outlet a sliding sleeve to facilitate the maintenance.

4.3.2 Flue gas routing as per CEN

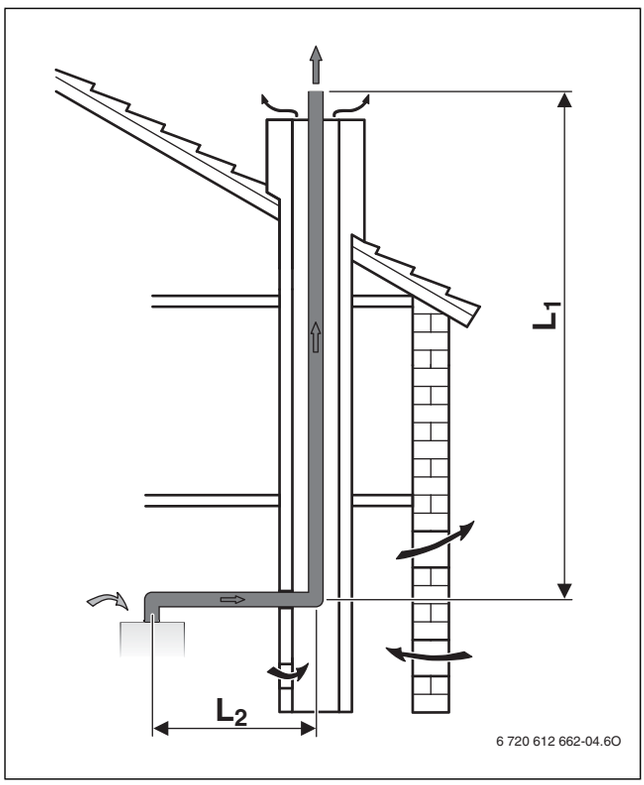


Fig. 19 Routing the flue through a duct as per B_{23}

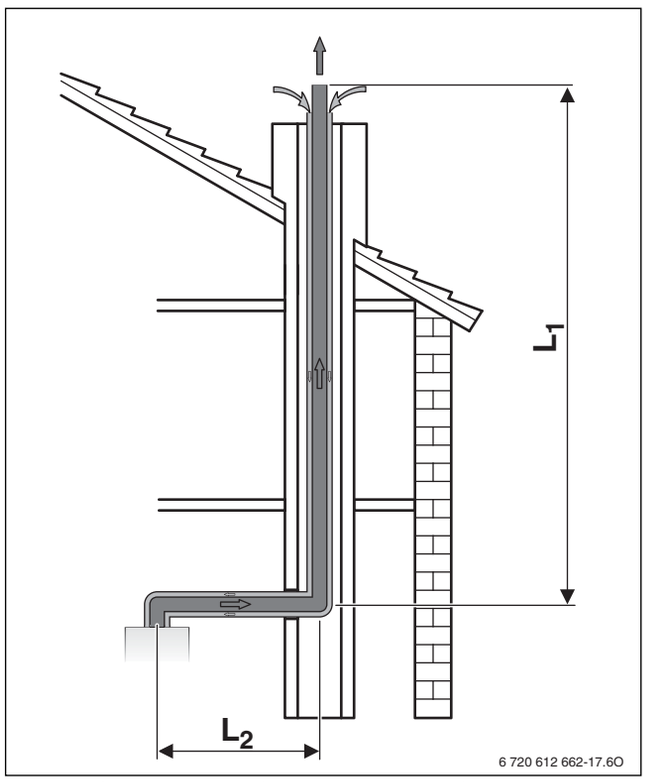


Fig. 21 Flue gas routing with concentric pipe in a duct as per C_{33}

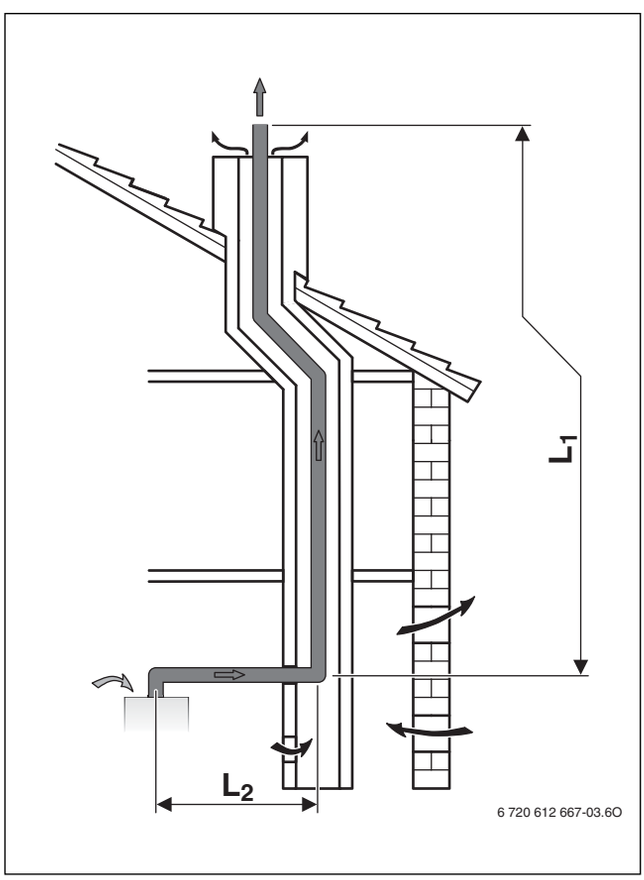


Fig. 20 Routing the flue through a duct as per B_{23}

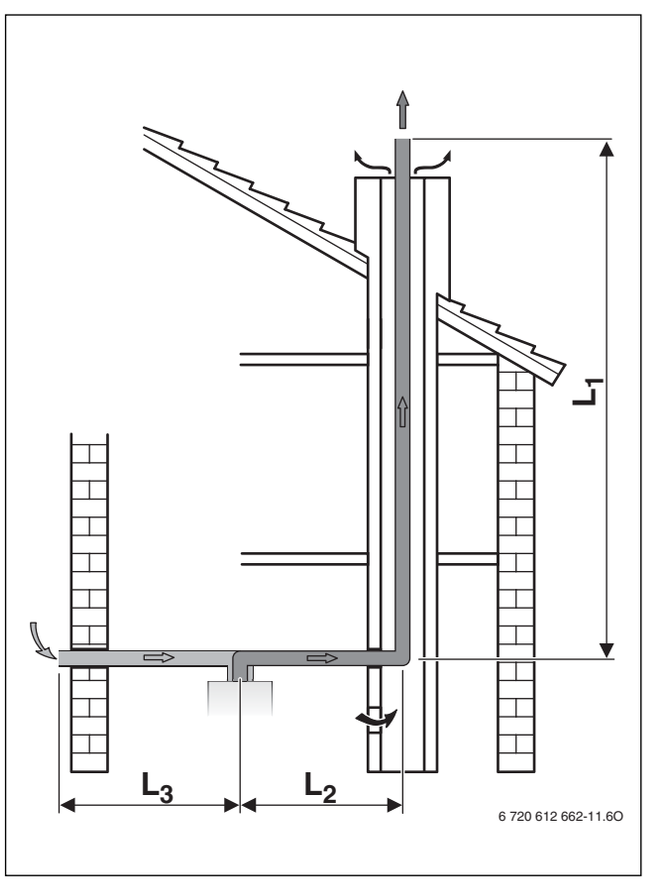


Fig. 22 Routing the flue through a duct as per C_{53}

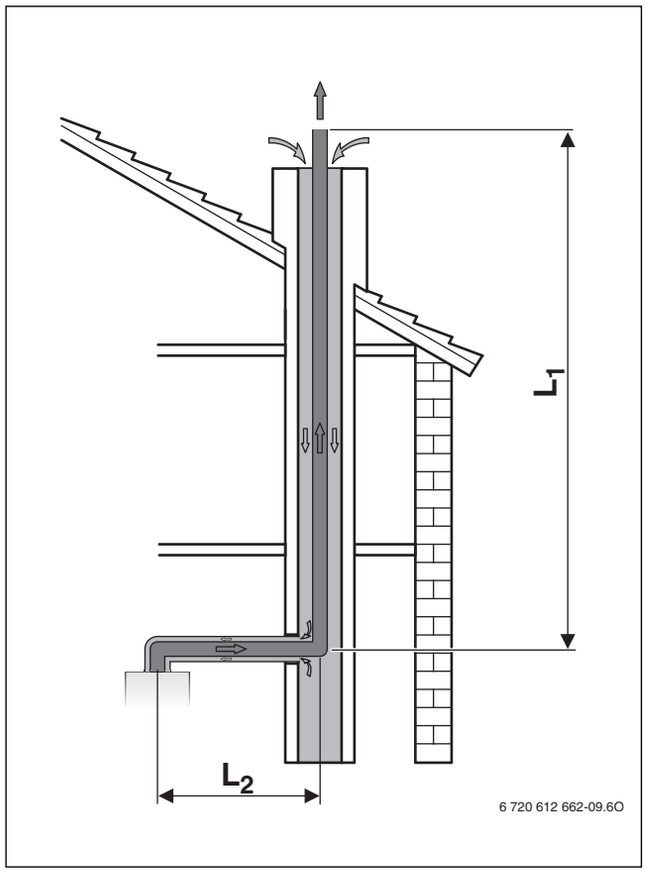


Fig. 23 Routing the flue through a duct as per C_{93}

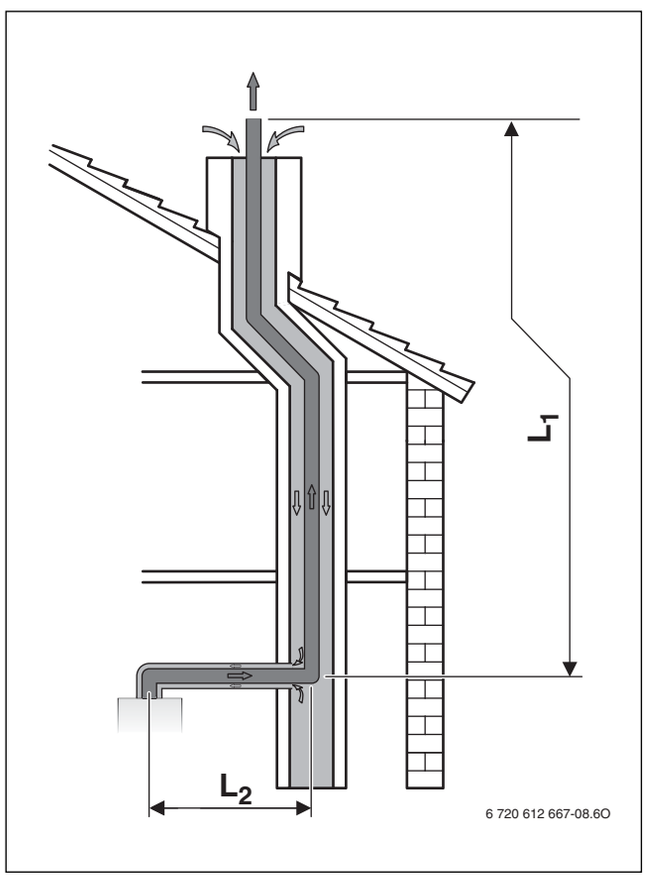


Fig. 24 Routing the flue through a duct as per C_{93}

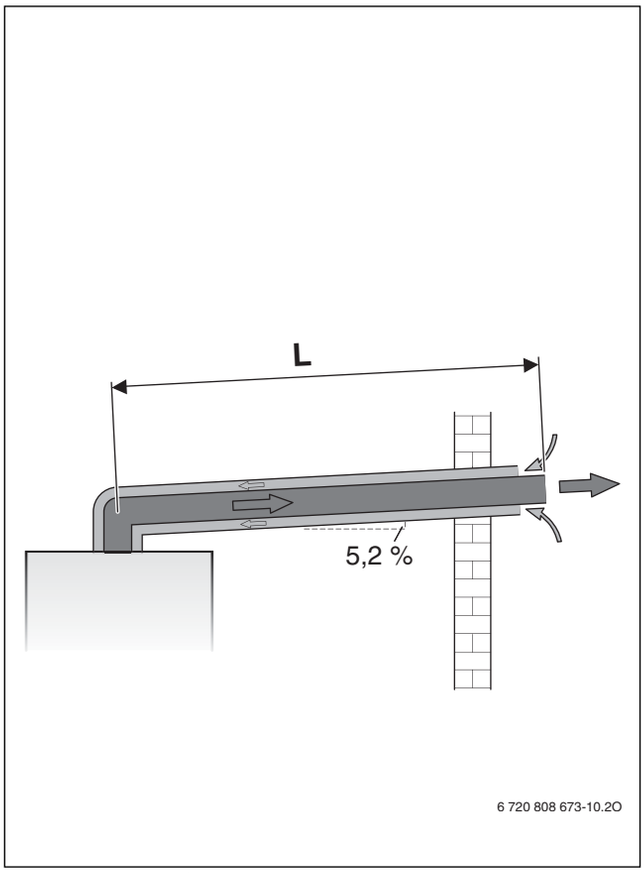


Fig. 25 Horizontal flue gas routing as per C_{13}

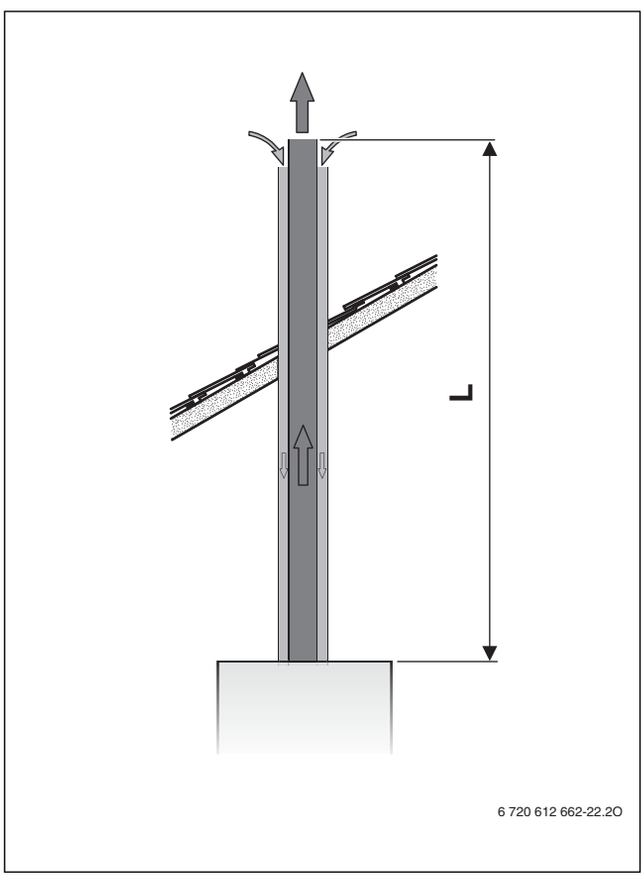


Fig. 26 Vertical flue gas routing as per C_{33}

4.3.3 Determining the flue lengths for single assignment

Analysing the installation situation

▶ Determine the following variables based on the installation situation on site:
- Route of the flue
- Flue gas routing as per CEN
- Wall mounted gas condensing boiler
- Horizontal pipe length(s)
- Vertical pipe length
- Number of additional 90° elbows in the flue pipe
- Number of 15°, 30° and 45° elbows in the flue pipe

Determining parameters

▶ Determine the following values subject to the routing of the flue pipe, the CEN flue gas routing, the wall mounted gas condensing boiler and the flue pipe diameter (→ Tab. 18):
- Maximum pipe length L
- If applicable, maximum horizontal pipe lengths L_2 and L_3

Checking the horizontal pipe length (unless using vertical flue gas routing)

The horizontal flue length L_2 must be shorter than the maximum horizontal flue length L_2 from Table 18.

Additionally at C_{53}: The horizontal combustion air pipe length L_3 must be shorter than the maximum horizontal combustion air pipe length L_3 from Table 18.

Calculating the pipe length L

The pipe length L is the total of the horizontal and vertical flue lengths (L_1, L_2, L_3) and the lengths of the elbows.

The required 90° elbows have been taken into consideration in the maximum lengths. Additional elbows must be taken into consideration for the pipe length:

- each additional 90° elbow is equivalent to 2 m.
- each additional 45° or 15° elbow is equivalent to 1 m respectively.

The total pipe length L must be shorter than the maximum pipe length L from Table 18.

Form for calculation

Horizontal flue length L_2		
Real length [m]	**Maximum length (from Table 18) [m]**	**Complied with?**

Table 19 Checking the horizontal flue length

Horizontal combustion air pipe length L_3 (only C_{53})		
Real length [m]	**Maximum length (from Table 18) [m]**	**Complied with?**

Table 20 Checking the horizontal combustion air pipe length

Total pipe length L	**Quantity**		**Length [m]**		**Total [m]**
Horizontal pipe length		×		=	
Vertical pipe length		×		=	
90° elbows		×		=	
45° elbows		×		=	
Total pipe length L					
Maximum total pipe length L from Table 18					
Complied with?					

Table 21 Calculating total pipe length

Example: flue gas routing as per C_{93}

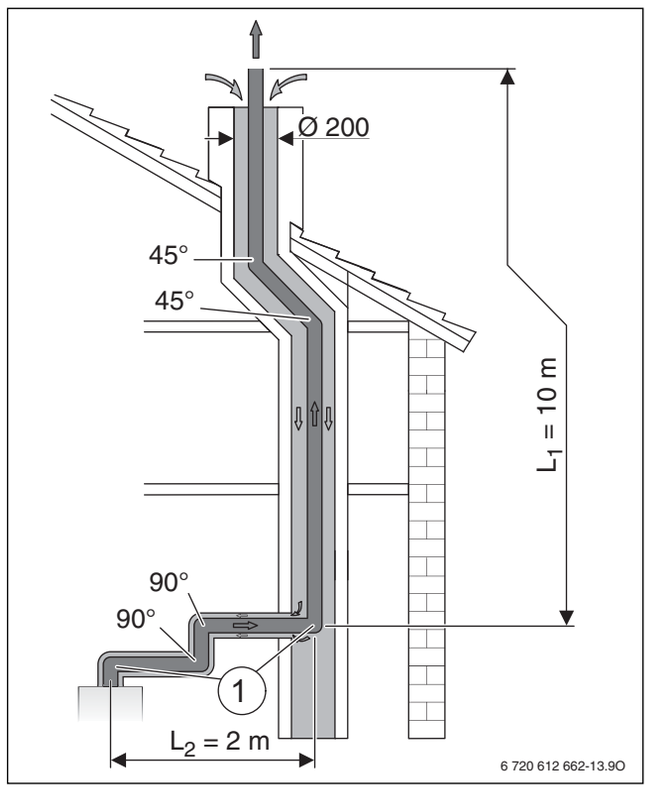


Fig. 27 Installation situation for flue gas routing as per C_{93}

[1] The 90° elbow on the device and the support bends inside the duct have been taken into consideration in the maximum lengths

L_1 Vertical flue length
L_2 Length of horizontal flue

The installation situation shown and the parameters for C_{93} in Tab. 18 produce the following values:

	Fig. 27	**Tab. 18**
Duct cross-section	¡ 200 mm	L = 14 m
Horizontal pipe length	L_2 = 1 m	L_2 = 3 m
Vertical pipe length	L_1 = 10 m	–
Additional 90° elbows[1)]	2	2 × 2 m
45° elbows	2	2 × 1 m

Table 22 Parameters for routing the flue through a duct as per C_{93}

1) The 90 elbow on the device and the support bends inside the duct have been taken into consideration in the maximum lengths.°

Horizontal flue length L_2		
Real length [m]	**Maximum length (from Table 18) [m]**	**Complied with?**
2	3	**o.k.**

Table 23 Checking the horizontal flue length

Total pipe length L	**Quantity**		**Length [m]**		**Total [m]**
Horizontal pipe length	1	×	2	=	2
Vertical pipe length	1	×	10	=	10
90° elbows	2	×	2	=	4
45° elbows	2	×	1	=	2
Total pipe length L					18
Maximum total pipe length L from Table 18					24
Complied with?					**o.k.**

Table 24 Calculating total pipe length

5 Installation

DANGER: Risk of explosion!
- ▶ Turn off gas cock before working on gas-carrying components.
- ▶ Check for leaks before working on gas-carrying components.

WARNING:
- ▶ Never block the safety valve outlet.
- ▶ Lay the safety valve drain with a downward gradient.
- ▶ The drain must be free and must be able to be observed above a dewatering point.

Installation, connections on the gas and flue gas sides and commissioning must only be carried out by a contractor approved for such work by the local gas or power supply utility.

5.1 Important notes

▶ Before installing the appliance, consult your gas supply utility and your local flue gas inspector [where appropriate].

Fill and top-up water for the heating system

Unsuitable fill and top-up water in the heating system can result in the heat exchanger scaling up and failing prematurely.

Hardness range	Water treatment
soft (≤ 10.5 °e)	not required
medium (10.5 - 17.5 °e)	recommended
hard (≥ 17.5 °e)	required

Table 25

Open vented heating systems

▶ Open vented heating systems must be converted to sealed systems.

Gravity fed heating systems

Due to the large pipework, the heating appliance must be decoupled from the heating circuit:

▶ Connect the appliance to the existing pipework via a low loss header with a dirt separator.

Underfloor heating systems

▶ The appliance is suitable for underfloor heating systems; observe permissible flow temperatures.

Galvanised radiators and pipes

To prevent gas formation:

▶ Do not use galvanised radiators or pipes.

Neutralisation device

If the building regulations require the use of a neutraliser unit:

▶ Use a neutraliser unit.

Anti-freeze

We recommend the following anti-freeze:

- Bionibagel (concentration 14% to 42%)

Corrosion inhibitor

We recommend the following corrosion inhibitor:

- Bionibal (concentration 1% to 2%)

Sealants

In our experience, adding sealants to the heating water may result in problems (deposits in the heating block). We therefore advise against using them.

Mono-lever taps and thermostatically controlled mixer taps

All pressure-tested mono-lever taps and thermostatically controlled mixer taps can be used.

LPG

To protect the appliance against excessive pressure:

▶ Fit a pressure regulator with a safety valve.

5.2 Checking the size of the expansion vessel

The following diagram provides you with a rough estimate of whether the installed 10 l/8 l expansion vessel (THRs...M75V/H) or the 8 l expansion vessel which can be installed in the appliance as an accessory is sufficient or whether an additional expansion vessel is required (not for underfloor heating system).

The characteristic curves shown are based on the following key data:

- 1% water volume in expansion vessel or 20% of nominal volume of expansion vessel
- Differential operating pressure of the safety valve of 0.5 bar, according to DIN 3320
- Pre-charge pressure of expansion vessels matches static head of the system above the heat exchanger
- Maximum operating pressure of 3 bar

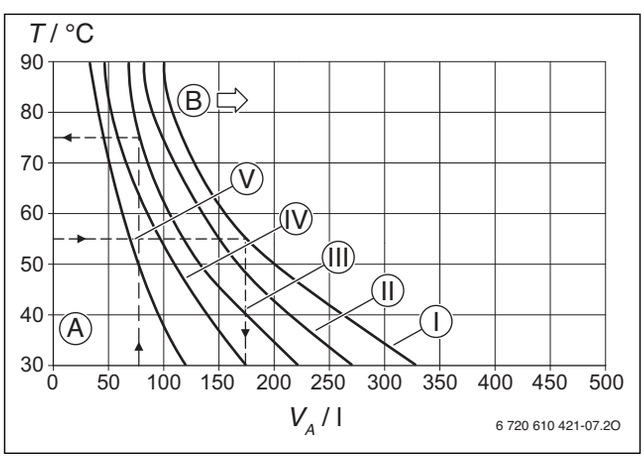


Fig. 28 8 l expansion vessel

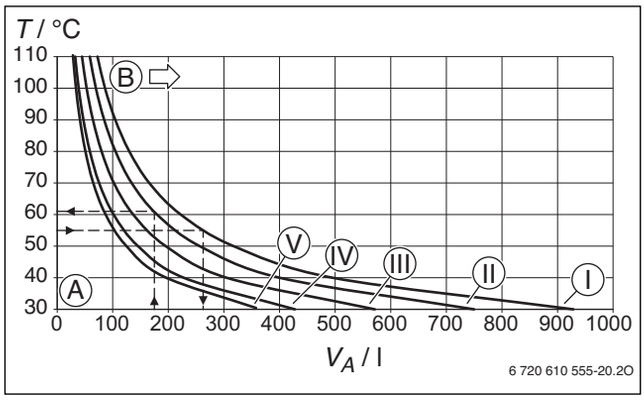


Fig. 29 10 l expansion vessel

Key to Fig. 28 and 29:

[I] Pre-charge pressure 0.2 bar
[II] Pre-charge pressure 0.5 bar
[III] Pre-charge pressure 0.75 bar
[IV] Pre-charge pressure 1.0 bar
[V] Pre-charge pressure 1.3 bar
[A] Operating range of the expansion vessel
[B] Additional expansion vessel required

T Flow temperature
V_A System content in litres

- If intersection is on the limit: determine the exact size of the vessel according to DIN EN 12828.
- If the intersection is to the right of the curve: install additional expansion vessel.

5.3 Siting the appliance

Regulations concerning the installation site

- Observe relevant national regulations.
- Consult the flue kit installation instructions for details of minimum clearances required.

Combustion air

In order to prevent corrosion, the combustion air must not contain any corrosive substances.

Corrosive substances are halogenated hydrocarbons containing chlorine and fluoride compounds. These could be contained in, for example, solvents, paints, adhesives, propellants and domestic cleaning agents.

Industrial sources	
Chemical cleaners	Trichloroethylene, tetrachloroethylene, fluorinated hydrocarbons
Degreasing baths	Perchloroethylene, trichloroethylene, methylchloroform
Printing shops	Trichloroethylene
Hairdressing salons	Aerosol propellants, hydrocarbons containing fluorine and chlorine (difluorodichloromethane)
Household sources	
Cleaning and degreasing agents	Perchloroethylene, methylchloroform, trichloroethylene, methylene chloride, carbon tetrachloride, hydrochloric acid
Hobby rooms	
Solvents and thinners	Various chlorinated hydrocarbons
Aerosols	Chlorofluorinated hydrocarbons (Freon)

Table 26 Corrosive materials

Surface temperature

The maximum surface temperature of the appliance is below 85 °C. That means that no special safety precautions are required with regard to flammable building materials and fitted furniture. If regulations differ in individual countries they must be observed.

LPG systems below ground level

The appliance meets the requirements of the local regulations for installation below ground level.

5.4 Fitting the mounting bracket

Choose a suitable installation site for the appliance, taking the following restrictions into account:

- Observe minimum side clearances (→ page 6 and 8).
- Drill holes for mounting bracket. Observe the following dimensions (→ Fig. 31, 30 and Tab. 27):

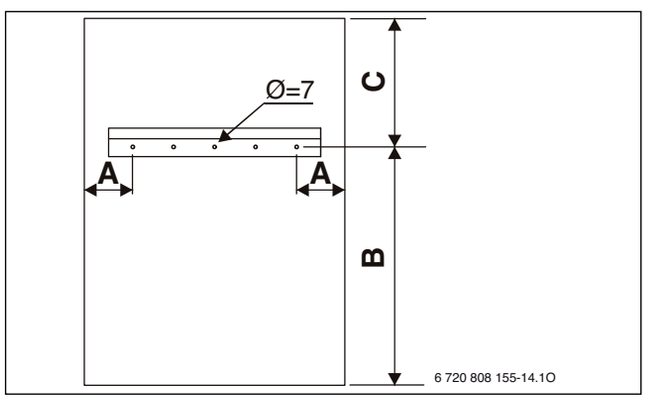


Fig. 30 THRs...C/DC and THRs...M75 H

Type	A (mm)	B (mm)	C (mm)	D (mm)
THRs...C/DC	100	495	265	-
THRs...M75H	110	495	265	-
THRs...M75V	100	635	265	600

Table 27

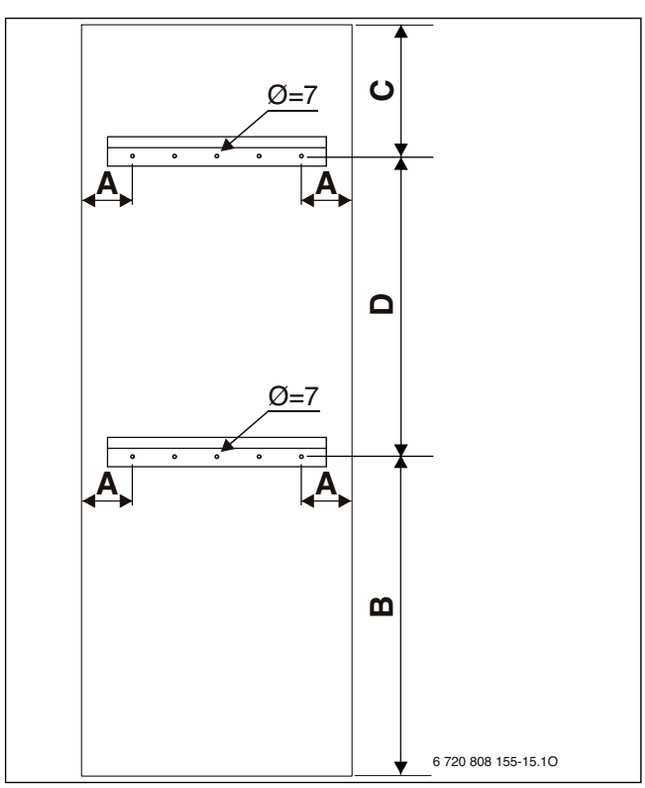


Fig. 31 THRs...M75V

NOTICE: Install the THRs...M75V appliance on two mounting brackets. When drilling the holes, make sure you maintain the vertical distance between the two mounting brackets.

NOTICE: The THRs...C/DC appliances which are ready for operation weigh approx. 60 kg. The THRs...M75 which are ready for operation weigh approx. 190 kg. The mounting bracket must be designed for this weight.

5.5 Installing the appliance

NOTICE: Residues in the pipework can damage the appliance.
- ▶ Flush out the system to remove all dirt residues.

- ▶ Remove packing, taking care to observe the instructions on the packing.
- ▶ Check the destination country on the data plate and make sure that the gas type specified on the data plate matches that of the gas supplied by the gas utility company (→ page 5).

Removing the outer casing

The casing is secured with two screws against unauthorised removal (electrical safety).
- ▶ Always secure the outer casing with these screws.

1. Undo 1 screw on each of the locking levers above and below the casing (→Fig. 32).
2. Unlock the locking lever.
3. Pull the casing forward.
4. Unhinge the casing at the top and lift it off.

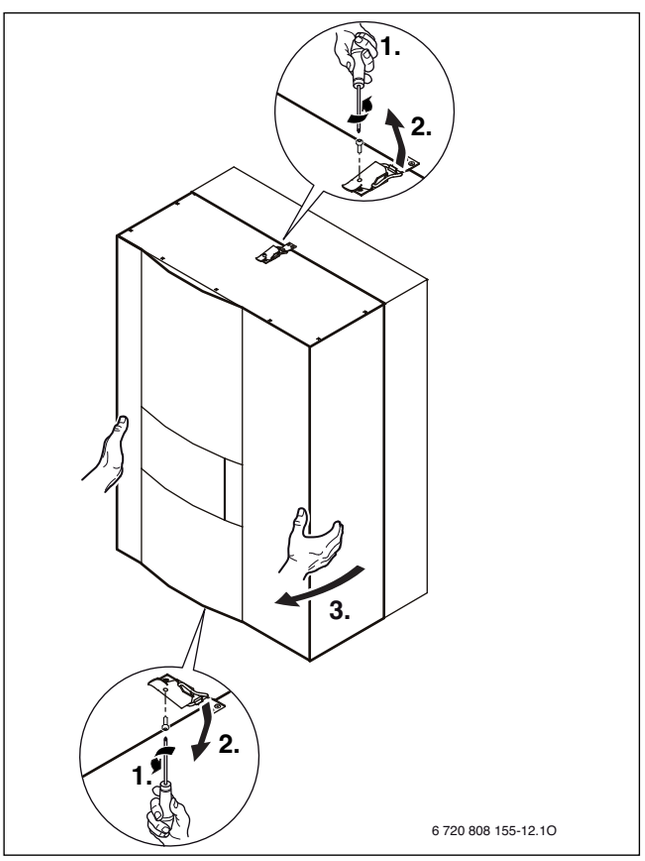


Fig. 32

Securing the appliance
- ▶ Place the appliance on the wall and hook it into the mounting bracket.

DHW (THRs...M75)

The static pressure must not exceed 7 bar.

Alternatively:
- ▶ fit a pressure limiter to the system.

WARNING:
- ▶ Never block the safety valve outlet.
- ▶ Lay the safety valve drain with a downward gradient.
- ▶ The drain must be free and must be able to be observed above a dewatering point.

The hot water system pipes and taps must be dimensioned according to the supply pressure so as to allow adequate flow of water at the hot water points.

Central heating system

WARNING:
- ▶ Never block the safety valve outlet.
- ▶ Lay the safety valve drain with a downward gradient.

- ▶ For draining the system on site, install a fill and drain valve at the lowest possible point in the system.

Gas supply pipe
- ▶ Determine internal diameter for the gas supply.

5.6 Installing pipework

5.6.1 Installing the cold water safety assembly

WARNING: Risk of scalding and water damage!
Operating the device without a safety assembly will destroy the DHW cylinder.
- ▶ Install a safety assembly in the cold water inlet.
- ▶ Never close the blow-off aperture of the pressure relief valve.

The safety control box must be installed at a low point (0.25 m from the floor) to allow the domestic hot water tank to be emptied by siphoning. Otherwise provide a connection weld for a valve at a low point.

To prevent a rapid drop in pressure in the tank when hot water is being drawn, thus prematurely ageing the seals and the domestic hot water system itself, please ensure the following:
- properly size the cold water inlet tube to a diameter at least equal to or greater than the diameter of the hot water distribution,
- do not create large pressure losses on the cold water inlet by installing different accessories (various valves, etc.).

It is normal that the domestic hot water safety box lets a little water escape when heating the hot water tank.

However, to prevent these water flows from the safety box and if the cold water pressure exceeds 4 bars, it is advisable to:
- fit a pressure reducing valve on the cold water inlet.
- fit a d.h.w. expansion vessel at the cold water inlet between the safety box and the tank (refer to the instructions of the d.h.w. vessel for its size and the initial pressure according to the volume of the tank and the domestic cold water pressure).

5.6.2 Safety valve

This must be connected to the used water drain via a siphon funnel.

5.6.3 Draining off condensate

- ▶ Use outlet siphon.
- ▶ Use corrosion-resistant materials to produce the drain.
  Such materials include: vitrified clay pipes, hard PVC pipes, PVC pipes, PE-HD pipes, PP pipes, ABS/ASA pipes, cast-iron pipes with enamel lining or coating, steel pipes with plastic coating, stainless steel pipes, borosilicate glass pipes.
- ▶ Fit drain directly to an external DN 40 connection.
- ▶ Do not modify or seal off drain pipes.
- ▶ Hoses must always slope downwards.

5.7 Connecting the flue pipe

For further installation information, see the respective installation instructions of the flue accessories.

- ▶ Check the flue gas path for tightness (→ chapter 11.2).

5.8 Gas connection

- ▶ Only use connections and gaskets that are approved for gas installation use.
- ▶ In natural gas operational mode, a gas stopcock complying to gas regulations must be installed on the gas inlet close to the boiler and within easy access.
- ▶ For operation on propane (for the THRs...5-25 models), the 37 mbar pressure-reducing valve-trigger used as a gas cock must also remain accessible.
- ▶ Make sure that the gas inlet connections are correctly tightened on the boiler.
- ▶ The gas pipe should be flushed before putting the boiler into operation. This is to evacuate any particles created by welding or fitting connections.
- ▶ Never flush the gas pipe whilst the boiler is operational (Max Gas Pressure = 100 mbar).
- ▶ The gas pipe to the boiler should not cause load losses in excess of 1 mbar (10 mmCE).

Example: For natural gas type G20, 20 mbar for 10 m of piping and 4 bends: minimum diameter 20/22.

5.9 Checking the connections

Water connections

- ▶ Open the heating flow and return valves and fill the heating system.
- ▶ Check all joints for tightness (test pressure: max. 2.5 bar on the pressure gauge).

For THRs...B120 and THRs...M75:

- ▶ Open the cold water tap in the appliance supply and open a hot water tap at a draw-off point until water flows from it (test pressure: 7 bar max.).

Gas supply pipe

- ▶ Close the gas cock to protect the gas valve from pressure damage.
- ▶ Check sealing points for leaks (testing pressure: max. 150 mbar).
- ▶ Release the pressure on the gas supply pipe.

6 Electrical connections

6.1 General notes

DANGER: Risk of electric shock

- ▶ Before carrying out work on electrical components, isolate them from the power supply (230 V AC) (fuse, circuit breaker) and secure against unintentional reconnection.

The electrical connection must only be carried out by an approved electrician.

All appliance modulation, control and safety components are tested and ready-wired for use.

Observe special regulations of the local electricity suppliers.

Depending on national regulations, the installation of the appliance in rooms with a bath or shower may be prohibited in safety zones 1 and 2 (→Fig. 33).

In any case, in rooms with a bath or shower the appliance may only be connected via an RCD protected circuit.

No other electrical consumer units may be connected to the same power cable.

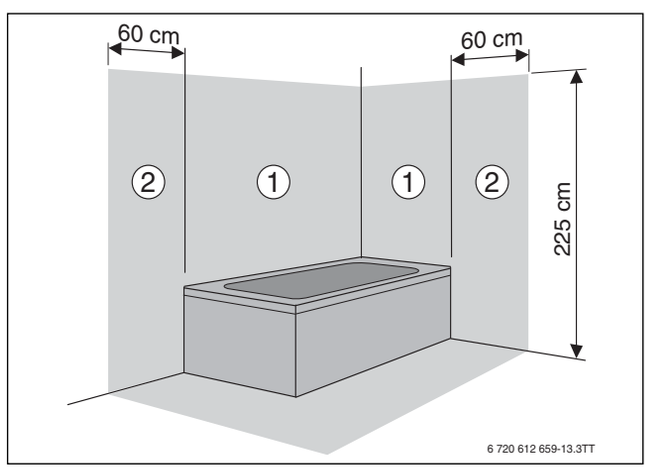


Fig. 33

[1] Safety zone 1, directly above the bath
[2] Safety zone 2, within a radius of 60 cm from the bath tub/shower

Fuses

The appliance is protected by 2 fuses. They are located on the main PCB (→ Fig. 15, page 16).

6.2 Electrical connection of the boiler to the mains using the supply cable

DANGER: Danger to life through electric shock!
Touching live parts can result in an electric shock.

- ▶ Respect the Live-Neutral polarities,
- ▶ Earth connection compulsory.
- ▶ the premises must be suitable in terms of boiler protection IPX4D.

- ▶ According to the EN 60335-1 standard, a separator device with at least a 3 mm contact gap between each pole is to be taken into account in the fixed installation.

6.3 Connecting temperature sensors

Do not feed the temperature sensor cable through the same cable feeds as 230 V cables.

Switch off the power to the control device in order to connect the temperature sensor. The temperature sensors are automatically recognised when the control device is switched on for the first time.

If another temperature sensor is connected after the heating appliance has been commissioned, it must be manually activated via the QAA75 or QAA78, service function **6200** in the expert menu (see the supplement on heating controller QAA75/78).

The cables of temperature sensors from the accessories (hot water temperature sensor, flow temperature sensor, second heating circuit, room temperature sensor) must first be fed through a strain relief and then through a cable feed on the rear of the control device.

Follow installation instructions for the accessories.

6.4 230 V connections on air-flow sensor

6.4.1 DHW circulation pump

The DHW circulation pump (Q4) is connected to the programmable output QX2 of the air-flow sensor ([2], Fig. 15, page 16).

The programmable output QX2 is configured in the factory settings for the DHW circulation pump (Q4).

A weekly program can be set for the DHW circulation pump (Q4):

- ▶ Select service function **1660** in the **DHW** menu (see supplement for the QAA75/78 heating controller).
- ▶ The standard setting is time program **5**.
- ▶ Select service function **600** to **616** in the **time program 5** menu and set the switching times accordingly (see supplement for the QAA75/78 heating controller).

6.4.2 Temperature limiter for underfloor heating systems

The temperature limiter from the second heating circuit accessories is connected to the air-flow sensor.

Observe the installation instructions for the accessories.

When the temperature limiter is triggered, the power supply to the associated heating pump is interrupted.

6.5 Connection of external accessories

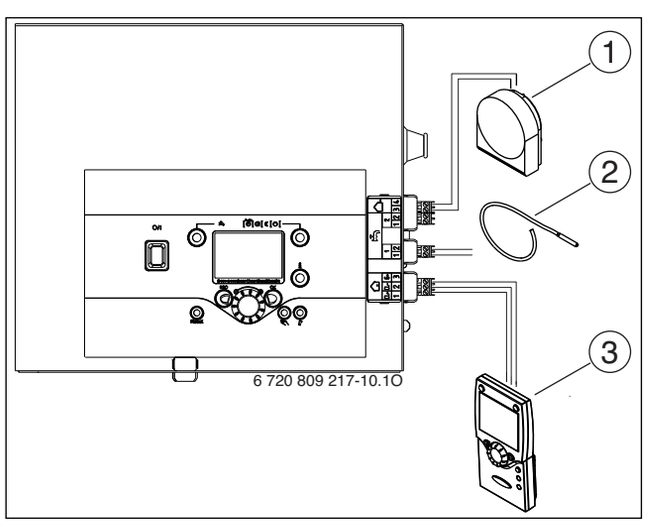


Fig. 34

[1] Outside sensor
[2] DHW temperature sensor
[3] Wired room sensor (QAA55/QAA75) and/or for the antenna wireless sensors (QAA58/QAA78/QAC34)

7 Commissioning

7.1 Overview of connections

You can find an overview of the connections in section 2.9 from page 10.

7.2 Before commissioning

NOTICE: Lack of water can damage the device!
Commissioning without water will destroy the device.

- ▶ Only operate the heating system once it has been filled with water.

NOTICE: Only for the THRs..DC models.

- ▶ Install a manual bleed after the 2nd circuit heating pump and open it when filling the boiler with water to bleed the air which may remain blocked in the circuit.
- ▶ Set the 2nd circuit heating pump to speed III.

- ▶ Adjust pre-charge pressure of expansion vessel to static head of the heating system (→ page 28).
- ▶ Open the cold water valve.
- ▶ Open the air vent valve (leave open).
- ▶ Open the heating flow and return valves.
- ▶ Open all system radiator valves.
- ▶ Fill the installation slowly (to make degassing easier) by using the valve of the filling system.
- ▶ Check the leaktightness of the circuit.
- ▶ Close all system radiator valves.
- ▶ Activate the deaeration function (→ Chapter 7.6).
- ▶ Close the air vent valve of the boiler.
- ▶ Read the pressure on the pressure gauge of the boiler.
- ▶ Fill the heating system again to approx. 1.5 bar.
- ▶ Close the filling valve
- ▶ Check the radiator bleed
- ▶ Check that the gas type specified on the type plate matches that of the gas supply.
- ▶ Open the gas isolation valve.
- ▶ Carefully bleed the gas piping. If the installation is new, the bleed evacuates the air that is contained in the piping so that the boiler has an adequate fuel. The presence of air in the gas prevents the ignition of the burner and leads to safety shut-down by the flame monitoring unit. This is the case both with a natural gas and a LPG new installation. With a LPG installation the storage tank must also be bled properly before commissioning.
  The external discharge of the gas bleed must be carried out with all necessary safety measures..
- ▶ Check the tightness of the connectors and the air- tightness of the gas circuit using a foaming pro- duct or a water column pressure gauge.

7.2.1 Verifications prior to commissioning

- ▶ Ensure that the installation has been issued with a certificate of conformity granted by an approved organisation (according to the installation standards).
- ▶ Check that there are no leaks on the various seals and connections of the system.
- ▶ Check that the boiler is adequately adapted to the gas used and that there are no gas leaks.
- ▶ Check that the boiler is filled with water and under pressure (1.5 bar) and that there are no leaks.
  Never let the pressure drop below 1 bar.

- ▶ Check that the electrical connections of the boiler are correct: 230 V, 50 Hz, earth connection compliant, polarities correct.
- ▶ Check that the combustion products outlet is correctly assembled, that there are no leaks and no obstruction.
- ▶ Check that the heating system ventilations are not obstructed.
- ▶ Check that the condensate siphons of the flues are filled with water.
- ▶ Check that the condensate outlet is connected properly and that there are no leaks.
- ▶ Check the system is totally cleaned and had been cleaned and flushed in accordance with BS 7593. Failure to do this may invalidate the warranty.

7.3 Control elements and displays

7.3.1 Keyboards

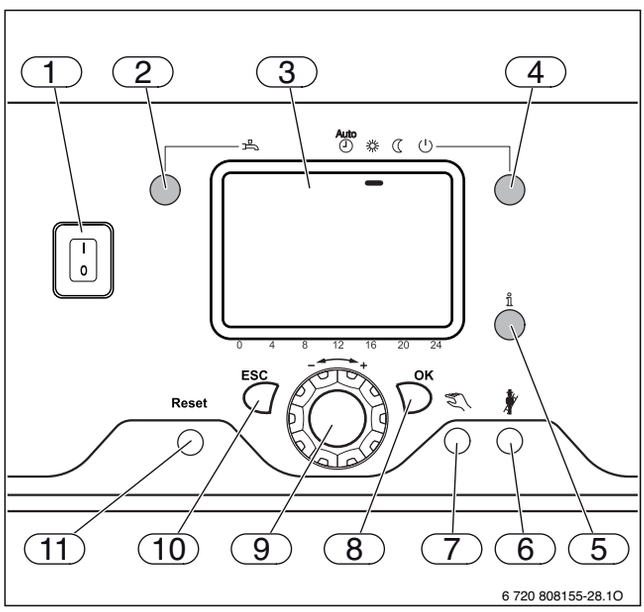


Fig. 35 Keyboards

[1] On/Off switch
[2] DHW
[3] Display
[4] Operating mode selector
[5] Info button
[6] Chimney sweep button
[7] Manual mode
[8] OK button (= confirm selection, save value)
[9] Rotary selector
[10] ESC button (= exit selection without saving, press twice to return to the standard display)
[11] Reset button

7.3.2 Displays

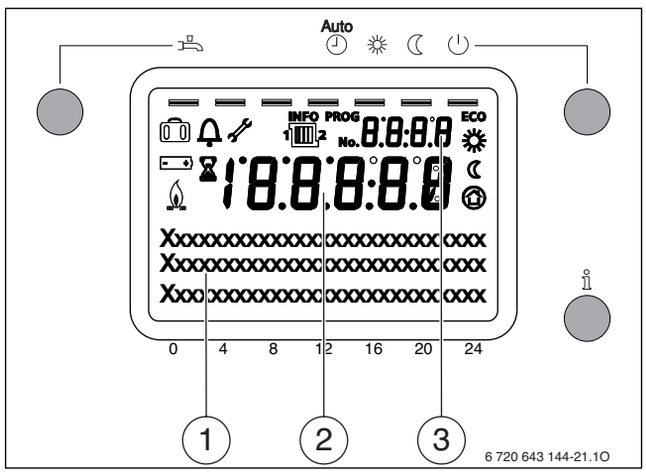


Fig. 36

[1] Three-line text display for messages
[2] Alphanumeric display (e.g. temperature)
[3] Alphanumeric display (e.g. time)

Symbol	Description
	Comfort mode
	Reduced mode
	Frost protection mode
	Synchronising - please wait
	Burner ON
	Fault
INFO	Information level active
PROG	Access to programming
ECO	ECO function (appliance OFF temporarily)
	Holiday function active
1 2	Heat. circ. sel.
	Maintenance/Special mode
	Replace batteries
	Show the heating or domestic hot water mode chosen

Table 28

7.4 Switching the appliance on/off

Switching on

▶ Switch appliance on at the main switch.
The display lights up and after a brief interval, shows the appliance temperature.

Switching off the appliance

▶ Switch appliance off at the main switch.
The lamp goes out.
▶ If the appliance is taken out of service for a longer period: observe frost protection.

7.5 Setting language

The language must be set once the appliance has been switched on for the first time (default setting: English).

▶ Press the ESC button.
The display changes to the standard display.
▶ Press OK button.
The display switches to the **End user** menu.
▶ Select service function **20** with the rotary selector.
▶ Press OK button.
The alphanumeric display at the top right shows **PROG No.20**. The description of the selected menu item appears at the bottom of the display.
▶ Press OK button.
The selected language flashes at the bottom right (e.g. **English**).
▶ Use the rotary selector to select the required language.
▶ Press OK button.
▶ Press the ESC button.
The display changes to the standard display.

7.6 Deaeration function

To remove any air from the space heating/DHW system:

▶ Press and hold down the manual mode button until deaeration function starts.
During deaeration the symbol and the line **312:Deaeration** are displayed.

Deaeration terminates automatically..

Deaeration can be aborted any time:
▶ Press and hold down the manual mode button until deaeration aborts.

7.7 Selecting the central heating mode

▶ Press the operating mode selector switch until the heating mode display is shown under the symbol for the required operating mode.
– = automatic mode (day and night temperature values according to time control, automatic switching between summer/winter mode if outside temperature sensor present)
– = continuous comfort mode (continuous heating with room temperature set for comfort mode)
– = continuous reduced mode (continuous heating with room temperature set for reduced mode)
– = frost protection mode (continuous frost protection with room temperature set for frost protection)

NOTICE: Heating system at risk through frost. In frost protection mode, only the appliance is protected from freezing.

When the burner is switched on, the symbol is displayed.

The required room temperature for each operating mode is set via the service menu (refer to the supplied accessories instructions).

7.8 Setting the DHW heating

To switch DHW heating on or off:

▶ Activate the DHW switch.
DHW operation is switched on if the marking appears under the symbol on the display.

When the burner is switched on, the symbol is displayed.

The required DHW temperature is set via the service menu (refer to the supplied accessories instructions).

7.9 Setting the maximum rated heat input in heating mode

The maximum rated heat input in heating mode, $\dot{Q}_{max}$, can be set. To do this, set service function **2441** on the heating controller to the required parameter value according to Fig. 37.

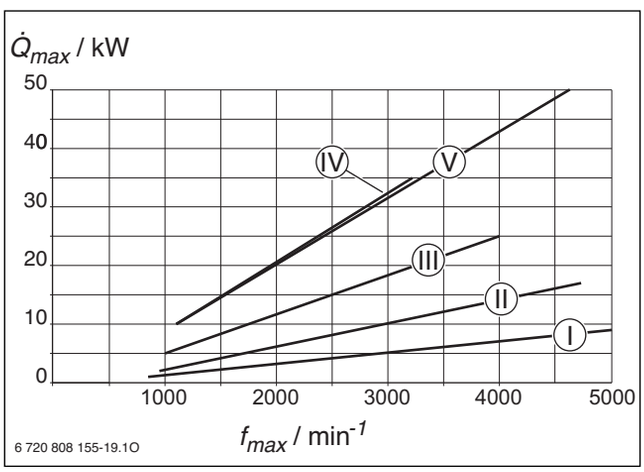


Fig. 37

[I] THRs 0.9-9
[II] THRs 2-17
[III] THRs 5-25
[IV] THRs 10-35
[V] THRs 10-50
[f_{max}] Maximum fan speed
[Q_{max}] Maximum rated heat input in heating mode

Adjusting the maximum output of the appliance to the maximum heating output of the heating circuit prevents excessive charging during the heat-up phase. The reduces the maximum amount of noise that the appliance produces.

7.10 After commissioning

▶ Check the gas supply pressure (→ page 37).
▶ Record the settings in the commissioning report (→ page 45).

7.11 Selecting manual mode

In manual mode, the appliance switches to heating mode. The burner remains in operation until the set flow temperature is reached.

CAUTION: Equipment damage
In this mode, any mixing valve that is present in a heating circuit with mixing valve is not controlled; it remains "open". This can result in the circuit overheating.

To select manual mode:

▶ Press and hold down the manual mode button until the symbol appears on the display.
The set flow temperature is displayed (default setting 50 °C).

If the flow temperature set value is to be changed:

- ▶ Press OK button.
  The temperature value flashes.
- ▶ Select a new value using the rotary selector.
- ▶ Press OK button.
  The selection is saved.

To terminate manual mode:

- ▶ Briefly press the manual mode button.
  The symbol disappears from the display.
  The boiler returns to standard mode.

8 Carrying out thermal disinfection (THRs...C/DC with DHW cylinder, THRs...B120 and THRs...M75)

8.1 General information

To prevent the DHW becoming contaminated by bacteria such as legionella, we recommend you pasteurise the system after longer idle periods.

The default setting of the THRs appliances is to carry out thermal disinfection once a week on Sundays at 24:00. To adjust this setting on the controller, use service functions **1640** to **1644** (refer to the supplied accessories instructions).

Pasteurisation covers the DHW system including the draw-off points when a circulation pump is installed.

Following thermal disinfection, the cylinder content only gradually cools back down to the set hot water temperature through heat losses. Consequently, the hot water temperature may briefly be higher than the selected temperature.

WARNING: Risk of scalding!
Hot water can lead to severe scalding.

- ▶ Only schedule thermal disinfection for periods outside normal usage times.

9 Anti-block protection

This function prevents the heating pump and the 3-way valve seizing up following long periods of inactivity.

Every time the pump is switched off, a timer starts to briefly switch on the heating circuit pump and the 3-way valve at regular intervals.

10 Converting the appliance to different gas types

The gas-air ratio must always be set on the basis of a CO_2 reading taken at maximum rated heat output and minimum rated heat output using an electronic tester.

Adjustment to different flue systems using restrictors or baffle plates is not necessary.

Natural gas

- Appliances are set at the factory to **natural gas H** with test gas G20 and to 20 mbar supply pressure and then sealed.

10.1 Converting to a different gas type

DANGER: Risk of explosion!

- ▶ Turn off gas valve before working on gas-carrying components.
- ▶ Check for leaks before working on gas-carrying components.

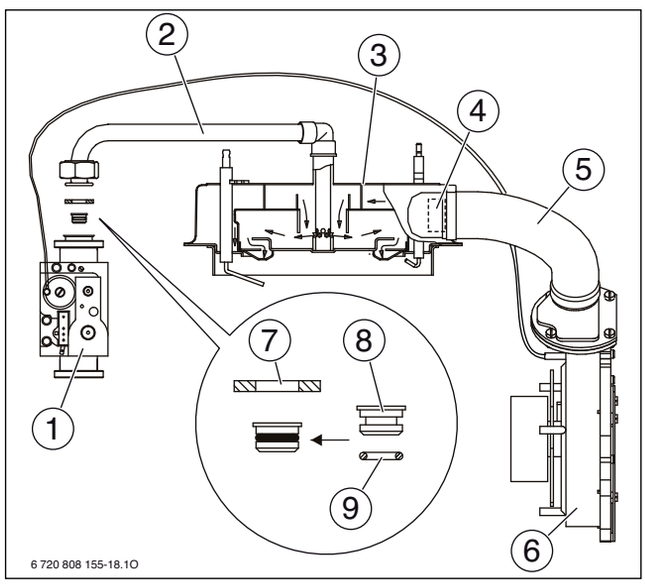


Fig. 38

[1] Gas valve
[2] Gas pipe
[3] Burner
[4] Air reducer
[5] Air hose
[6] Fan
[7] Flat gasket
[8] Gas reducer
[9] O-Ring

- ▶ To convert from natural gas H to propane an vice versa, order the conversion set (→Tab. 31) and follow the instructions sheet.
- ▶ Always adjust the gas-air ratio (CO_2) after converting to a different gas type (→ Section 10.2).
- ▶ Check gas soundness before starting the appliance

Gas type	THRs 0.9-9	THRs 2-17	THRs 5-25	THRs 10-35	THRs 10-50
H-Gas	3.00 mm	4.20 mm	5.75 mm	-	-
LPG	-	-	4.65 mm	6.40 mm	6.40 mm

Table 29 Diameter of gas reducer, according to gas type

Gas type	THRs 0.9-9	THRs 2-17	THRs 5-25	THRs 10-35	THRs 10-50
H-Gas	12.0 mm	18.2 mm	29.0 mm	-	-
LPG	-	-	27.0 mm	31.0 mm	31.0 mm

Table 30 Diameter of air reducer according to gas type

The following gas conversion sets are available for converting from natural gas to LPG or from LPG to natural gas:

Appliance	Conversion to	Part no.
THRs 5-25	LPG	V07.31649
THRs 5-25	Natural gas H	V07.31713
THRs 10-35	LPG	V07.31651
THRs 10-35	Natural gas H	
THRs 10-50	LPG	V07.31651
THRs 10-50	Natural gas H	

Table 31

- ▶ Install the gas conversion set in accordance with the instructions provided.
- ▶ Always adjust the gas-air ratio (CO_2) after converting to a different gas type (→ Section 10.2).

10.2 Setting the gas/air ratio (CO_2)

- ▶ Switch appliance off at the main switch.
- ▶ Remove the outer casing (→ page 30).
- ▶ Switch appliance on at the main switch.
- ▶ Remove sealing plug from flue gas testing point.
- ▶ Insert the flue gas probe into the flue gas test port and seal the test point.

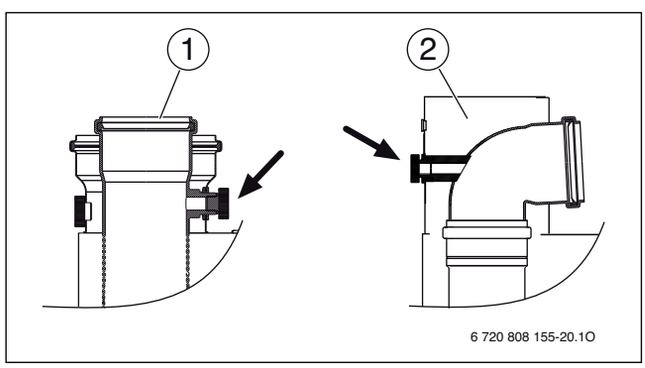


Fig. 39 Flue gas test port

[1] Type of installation B_{23}/C_{33}
[2] Type of installation C_{13}

To ensure heat transfer:

- ▶ Open all system radiator valves.

To measure the flue gas, service function **7143**: **Controller stop function** is activated. In this operating mode, make sure that the measurements are always carried out at maximum rated output first. Only then switch the appliance to minimum rated output and carry out the measurements. Proceed as described below.

Set maximum rated output operation:

- ▶ Press the operating mode selector switch until the **Controller stop function** service function and the value **On** are shown (approx. 5 s). The display then changes to the standard display.
- ▶ Wait until the **Controller stop function** service function is activated (approx. 1 min). The display shows , and the row of text **Controller stop function**.

If nothing appears on the display after 2 minutes, press the ESC button and then the info button to call up the status of the **Controller stop function** service function.

- ▶ Press the info button.
  0 % and **Controller stop function set value** are displayed.
- ▶ Press OK button.
  The **0 %** display flashes.
- ▶ Use to rotary selector to select **100 %**.
- ▶ Press the OK button to confirm the selection.
  The burner now changes to maximum rated output operation.
- ▶ Adjust the gas srew [2] to set the CO_2 content for maximum rated output according to Tab. 32.

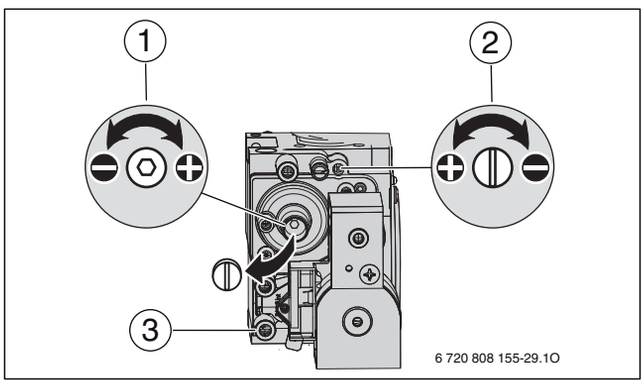


Fig. 40

Gas type	max. rated heat output CO_2	max. rated heat output CO	min. rated heat output CO_2	min. rated heat output CO
Natural gas	9,0 % - 9.5 %	20 ppm	8.0 % - 8.5 %	0 ppm
LPG	10.5 %-11.0 %	40 ppm	10.0 %-10.5 %	0 ppm

Table 32

Set minimum rated output operation:

- ▶ Press the info button.
  100 % and **Controller stop function set value** are displayed.
- ▶ Press OK button.
  The **100 %** display flashes.
- ▶ Use to rotary selector to select **0 %**.
- ▶ Press the OK button to confirm the selection.
  The burner now changes to minimum rated output operation.
- ▶ Check the CO_2 value.
- ▶ Adjust the gas screw [2] to set the CO_2 content for maximum rated output according to Tab. 32.
  If necessary:
  – Take off the protection screw [1], and screw to increase the gas flow. When adjustments are realized, reset the protection screw.
- ▶ Re-check settings at maximum and minimum rated output and re-adjust if necessary.
- ▶ Hold down the operating mode selector switch until the **Controller stop function** has finished (at least 5 s).
- ▶ Wait until the display changes to the standard display (approx. 1 min).
  The appliance is back in standard mode.

When you exit the **Controller stop function** service function, make sure that the **Controller stop setpoint** is set to **0 %**.

- ▶ Record the CO_2 content in the commissioning report.
- ▶ Remove flue gas probe from flue gas testing point and refit sealing plug.
- ▶ Seal the gas valve.

10.3 Check the gas supply pressure

- ▶ Switch off the appliance and turn off the gas tap.
- ▶ Undo the screw on the test nipple for gas supply pressure [3] and connect a pressure gauge.
- ▶ Turn on the gas tap and switch on the appliance.
- ▶ Ensure heat transfer by opening the radiator valves.
- ▶ Set the burner to maximum rated output operation: (→ chapter 10.2).
- ▶ Check the required gas supply pressure in accordance with the table.

Gas type	Unit	Rated pressure
Natural gas H	mbar	17 - 25
LPG	mbar	25 – 45

Table 33

Commissioning must not take place outside of the permissible pressure range. Identify the cause and rectify the fault. Where that is not possible, isolate the appliance from the gas side and notify the customer.

- ▶ Press the info button.
  100 % and **Controller stop setpoint** are displayed.
- ▶ Press OK button.
  The **100 %** display flashes.
- ▶ Use to rotary selector to select **0 %**.
- ▶ Press the OK button to confirm the selection.
- ▶ Hold down the operating mode selector switch for at least 5 seconds. The display shows the row of text **Controller stop function** for 1 minute and then changes to the standard display. The appliance is back in standard mode.
- ▶ Switch off the appliance, turn off the gas cock, remove the pressure gauge and refit the plug.
- ▶ Refit the outer casing.

11 Flue gas testing

Flue inspection in accordance with the brushing and monitoring order

The checking of the flue includes the testing of the flue gas and a CO test:

- Testing the flue (→ chapter 11.2)
- CO test (→ chapter 11.3)

11.1 Flue gas inspector mode (operation with constant output)

You have 15 minutes in which to take your measurements or make your settings. Afterwards, the appliance returns to standard mode.

- ▶ Ensure heat transfer by opening the radiator valves.
- ▶ Press .
  Chimney sweep function appears on the display.
  After a short period of time, the burner starts to operate at maximum rated output.

11.2 Checking flue system for leaks

Measuring CO_2 levels in combustion air.

Use an annular-slot flue gas probe for the measurements.

With a type C_{13} or C_{33} flue system, the **gas tightness of the flue system** can be tested by measuring the CO_2 content of the combustion air. The CO_2 level must not exceed 0.2%.

- ▶ Remove the plug from the combustion air test nipple.
- ▶ Insert a flue gas probe into the testing point socket and seal the testing point.
- ▶ Press .
  Chimney sweep function appears on the display.
  After a short period of time, the burner starts to operate at maximum rated output.

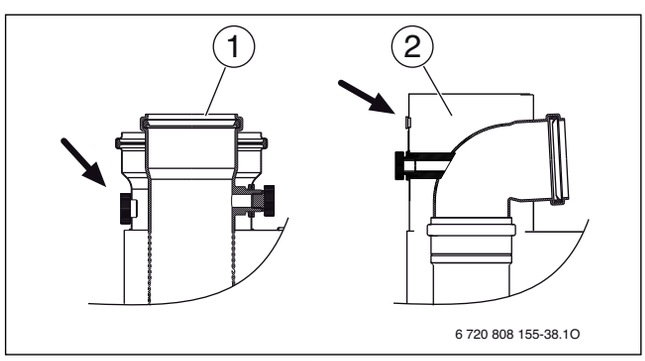


Fig. 41 Combustion air test nipple

[1] Type of installation B_{23}/C_{33}
[2] Type of installation C_{13}

- ▶ Measure the CO_2 levels.
- ▶ Press again.
  The boiler returns to standard mode.
- ▶ Remove the flue gas probe.
- ▶ Refit plug.

11.3 Checking the CO levels in flue gas

Use a multi hole flue gas probe for the test.

- ▶ Switch appliance off at the main switch.
- ▶ Remove the outer casing (→ page 30).
- ▶ Switch appliance on at the main switch.
- ▶ Remove sealing plug from flue gas testing point.
- ▶ Insert the flue gas probe into the flue gas test port and seal the test point.

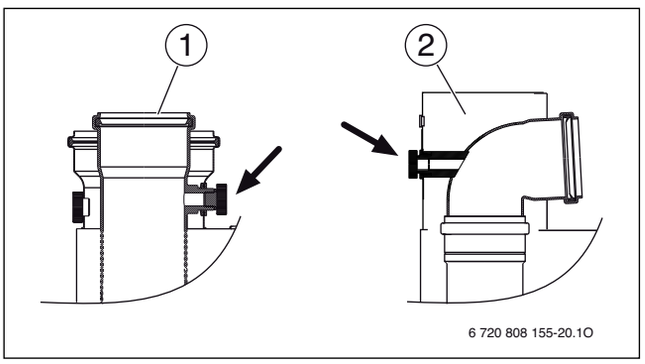


Fig. 42 Flue gas test port

[1] Type of installation B_{23}/C_{33}
[2] Type of installation C_{13}

- ▶ Press .
  Chimney sweep function appears on the display.
  After a short period of time, the burner starts to operate at maximum rated output.
- ▶ Measure CO content.
- ▶ Press again.
  The boiler returns to standard mode.
- ▶ Remove the flue gas probe.
- ▶ Refit plug.

12 Environmental protection/disposal

Environmental protection is a key commitment of the Bosch Group. Quality of products, efficiency and environmental protection are equally important objectives for us. Laws and requirements aimed at protecting the environment are strictly adhered to.
To protect the environment we will, subject to economical aspects, use the best possible technology and materials.

Packaging
Where packaging is concerned, we participate in country-specific recycling processes that ensure optimum recycling.
All packaging materials are environmentally compatible and can be recycled.

Used appliances
Used appliances contain materials that should be recycled.
The components are easy to separate and the plastics carry identification markings. This allows the various assemblies to be appropriately sorted for recycling or disposal.

13 Inspection/Maintenance

So that gas consumption and environmental impact can be kept as low as possible for as long as possible, we recommend that you take out a servicing and maintenance contract with an authorised contractor covering an annual inspection and demand-dependent maintenance of the boiler.

Only approved contractors may carry out the inspection and maintenance.

DANGER: Risk of death from explosion!
- ▶ Turn off gas cock before working on gas-carrying components.
- ▶ Check for leaks before working on gas-carrying components.

DANGER: Risk of poisoning!
- ▶ Check for leaks before working on gas-carrying components.

DANGER: Danger to life through electric shock!
- ▶ Before carrying out work on electrical components, isolate them from the power supply (230 V AC) (fuse, circuit breaker) and secure against unintentional reconnection.

WARNING: Risk of scalding
Hot water can lead to severe scalding.
- ▶ Close all valves and possibly drain appliance prior to working on parts carrying water.

NOTICE: Damage to the appliance!
The control unit can be damaged by escaping water.
- ▶ Cover the control unit prior to work on parts carrying water.

DANGER: If the condensate trap is not filled, flue gas can escape.
- ▶ Fill the condensate trap before commissioning.

Important notes

For an overview of the faults, see from page 42.

- The following test equipment is required:
  - Electronic flue gas analyser for CO_2, CO and flue gas temperature
  - Pressure gauge 0 - 60 mbar (minimum resolution 0.1 mbar)
  - Current measuring device
- ▶ Only use genuine spare parts!
- ▶ Refer to the spare parts catalogue when ordering spare parts.
- ▶ Always renew seals and O-rings removed during servicing or repair work.

After inspection/maintenance

- ▶ Retighten all loosened threaded fittings.
- ▶ Recommission the appliance (→ page 32).
- ▶ Check all connections for leaks.
- ▶ Check the gas-air ratio and adjust if necessary (→ page 36).

13.1 Description of various maintenance operations

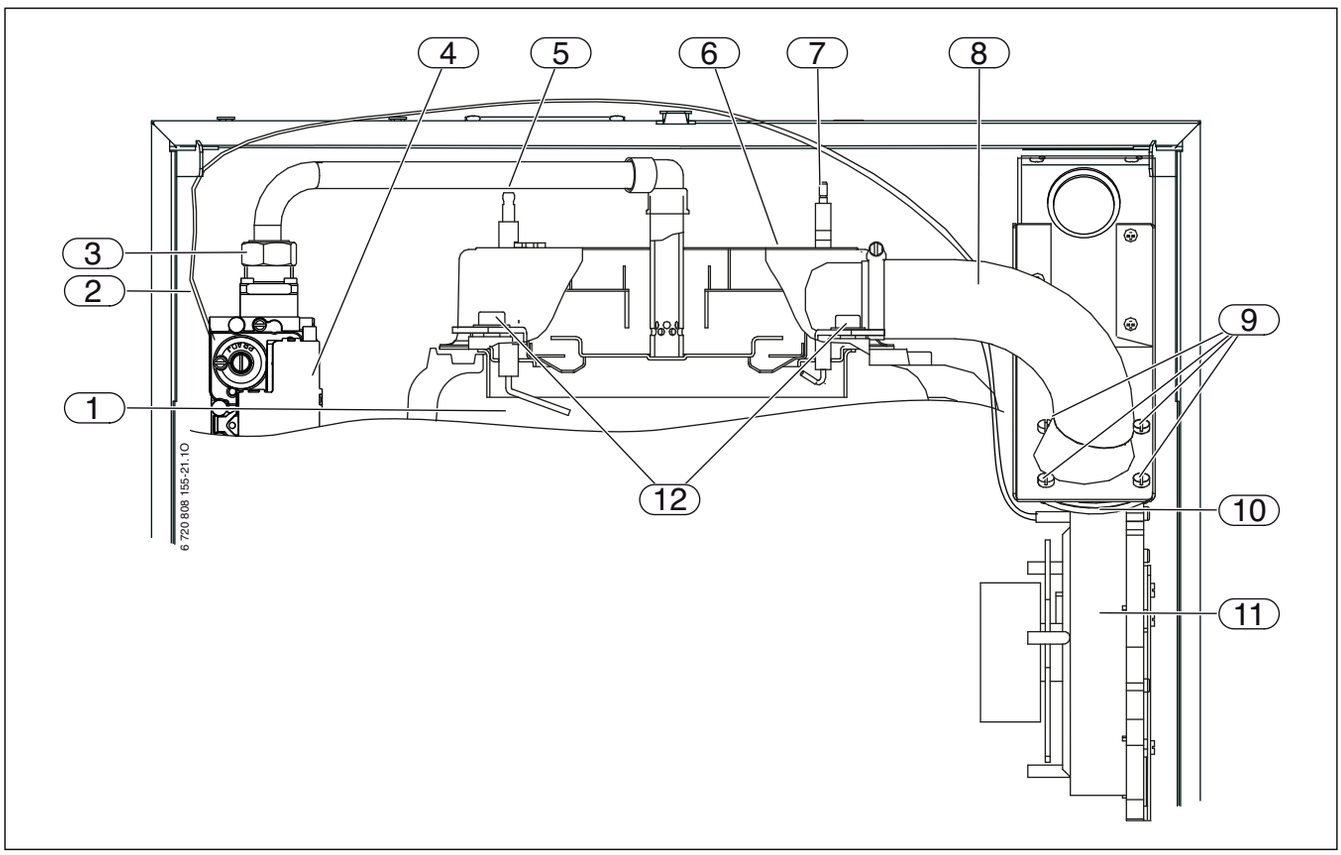


Fig. 43

[1] Heat exchanger
[2] Air/gas servosystem
[3] Nut
[4] Ignition transformer
[5] Ionisation electrode
[6] Burner
[7] Ignition electrode
[8] Air intake pipe
[9] Screws
[10] Seal
[11] Fan
[12] Screws

13.1.1 Calling up the last fault saved

- ▶ Service function **6705** (refer to the supplied accessories instructions).

For an overview of the faults, see from page 42.

13.1.2 Cleaning the fan

- ▶ Disconnect the cables from the burner, fan and gas valve:
  - Ignition cable from ignition electrode [7].
  - Cable from ionisation electrode [5].
  - 2 cables from the fan [11].
  - Air/gas servosystem [2].
- ▶ Undo 4 screws [9] and detach the air intake pipe.
- ▶ Clean the air inlet and then the air outlet of the fan using a household vacuum cleaner.
- ▶ Refit the components in the reverse order of removal.
- ▶ Check for leaks. If required, replace the gaskets of the fixing screws [9].

13.1.3 Cleaning the burner and checking the electrodes

- ▶ Disconnect the cables from the burner, fan and gas valve:
  - – Ignition cable from ignition electrode [7].
  - – Cable from ionisation electrode [5].
  - – 2 cables from fan [11].
  - – Air/gas servosystem [2].
- ▶ Undo 4 screws [12].
- ▶ Undo the union nut [3].
- ▶ Removing the burner.
- ▶ Clean the air inlet and then the gas inlet of the burner using a household vacuum cleaner.
- ▶ Check the ignition electrode (→ Fig. 44) and ionisation electrode (→ Fig. 45).
- ▶ Refit components in reverse order using a new burner gasket.

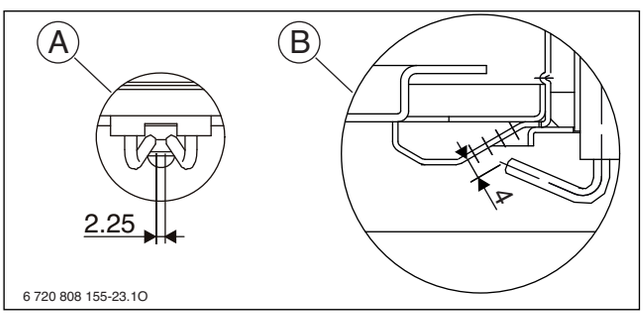


Fig. 44 Ignition electrode

[A] Top view
[B] Side view

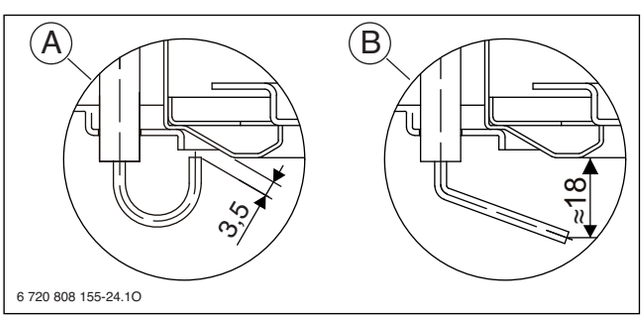


Fig. 45 Monitoring electrode

[A] THRs 0.9-9/2-17
[B] THRs 5-25

13.1.4 Cleaning the heat exchanger

- ▶ Remove burner (→ chapter 13.1.3).
- ▶ Remove the condensate siphon and place a suitable container below.
- ▶ Flush out the heating block with water from the top.
- ▶ Clean the condensate pan and condensate connection.
- ▶ Refit components in reverse order using a new burner gasket.

13.1.5 Cleaning condensate trap

- ▶ Clean the condensate trap and re-fill with water.

13.1.6 Checking the 3-way valve

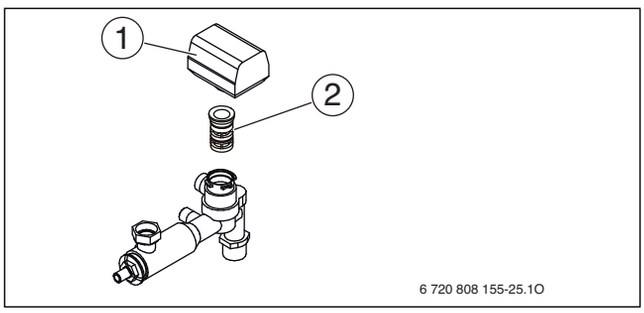


Fig. 46

- ▶ Once a year, check the piston return [2] of the 3-way valve [1].
- ▶ Clean and lubricate the return spring.
- ▶ If required, replace the return spring.

An installation key for the piston return of the 3-way valve is available (part number: V00.24191).

13.1.7 Checking the expansion vessel (also see page 28)

The expansion vessel must be checked annually.

- ▶ Depressurise the appliance.
- ▶ Adjust the pre-charge pressure of the expansion vessel to the static head of the heating system, if necessary.

13.1.8 Checking electrical wiring

- ▶ Check wiring for mechanical damage and replace faulty cables/leads.

13.1.9 Draining the appliance

- ▶ Switch off the power supply.
- ▶ Close the gas tap.
- ▶ Shut off the heating flow and heating return valve.
- ▶ Open the drain valve [2] and drain off the heating water via a connected hose.
- ▶ Open the air vent valve [1] to allow air to be supplied to the heat exchanger.

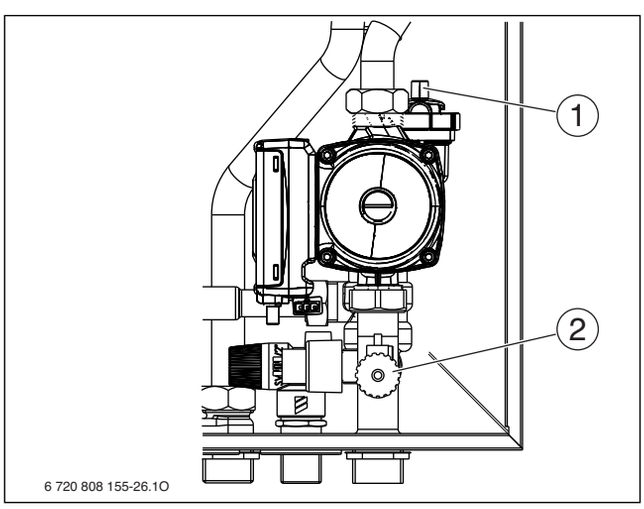


Fig. 47

[1] Air vent valve
[2] Drain tap

13.2 Checklist for inspection and maintenance (maintenance and inspection log book)

Date								
1	Call up the last fault saved in the control unit, service function **6705** (refer to the supplied accessories instructions).							
2	Perform a visual check of the air/flue gas routing.							
3	Check the gas supply pressure (→ page 37).	mbar						
4	Check the gas-air ratio at min./max. and adjust if necessary (→ page 36).	min. % max. %						
5	Check for leaks on the gas and water connections (→ page 31).							
6	Check heat exchanger, (→ page 40).							
7	Check burner (→ page 40).							
8	Check electrodes (→ page 40).							
9	Clean condensate trap (→ page 40).							
10	Check the expansion vessel pre-charge pressure matches the static head of the heating system.	bar						
11	Check the heating system pressure.	bar						
12	Check electrical wiring for damage.							
13	Check the cylinder for scaling (THRs...M75 und THRs...B120).							
14	Check the heating controller settings.							

Table 34

14 Operating, service and fault displays

The control unit monitors all safety and control components.

The service and fault displays facilitate simple diagnosis using tables 35 and 36 below.

14.1 Service displays

If the symbol appears on the display during normal operation, an inspection is required.

To obtain details on service display **105**:

▶ Press the info button.

Only one service display is ever shown.

Service display	Service code	Description	Priority
105	1	Burner runtime exceeded	6
105	2	Number of burner starts exceeded	6
105	3	Inspection interval reached	6
105	10	Replace heating controller batteries	6
105	22	Water pressure 3 heating circuit too low (dropped below lower pressure limit 3)	9

Table 35 Service displays

14.2 Fault displays

The presence of a fault is indicated on the display by symbol .

To obtain details on the fault display:

▶ Press the info button.

Only one fault display is ever shown. The display sequence is made in accordance with the priority specified in Tab. 36.

14.2.1 Fault Overview

Fault code	Description	Remedy	Priority
10	Fault outside temperature sensor	▶ Check sensor (→ Tab. 37, 38, page 47); replace if required. ▶ Check lead for breaks or short circuits; replace if required.	6
20	Fault at boiler temperature sensor		9
28	Fault at flue gas temperature sensor		6
32	Fault at flow temperature sensor for heating circuit 2		6
40	Fault at return temperature sensor		6
50	Fault DHW tank temperature sensor		6
52	Fault potable water temperature sensor		6
57	Fault at temperature sensor (DHW circulation pump)		6
60	Fault at room temperature sensor 1	▶ Check lead for breaks or short circuits; replace if required.	6
65	Fault at room temperature sensor 2		6
68	Fault at room temperature sensor 3		6
73	Fault at solar collector sensor	▶ Check sensor (→ Tab. 37, page 47); replace if required. ▶ Check lead for breaks or short circuits; replace if required.	6
82	LPB address collision	▶ Check call up (addressing) of the connected appliances.	3
83	BSB wire short circuit/no communication	▶ Check lead for breaks or short circuits; replace if required.	8
84	BSB wire address collision	More than one controller is assigned to the same heating circuit. ▶ Assign one of the controllers to heating circuit 2 (refer to the supplied accessories instructions).	3
85	BSB wireless communication fault	▶ Check the connection of the wireless module to the appliance electronics (→ Fig. 15, page 16). ▶ Perform a communication test (see accessories supplement). ▶ Delete addressing for the heating controllers and reassign the heating controllers (see accessories supplement).	8
91	Data loss in EEPROM	▶ Replace the main PCB of the control unit.	9

Table 36 Fault displays

Fault code	Description	Remedy	Priority
98	Fault at extension module 1	▶ Check the connection of the modules to the appliance electronics (→ Fig. 15, page 16).	8
99	Fault at extension module 2		8
105	Service display	→ chapter 14.1.	5
110	Underfloor temperature limiter has responded.	If no underfloor heating system is connected: ▶ Make sure that connection X18 of the main PCB is bridged (→ Fig. 15, [7], page 16) If underfloor heating system is connected: ▶ Check the underfloor temperature limiter. ▶ Check the setting for the underfloor heating circuit.	9
119	Heat exchanger temperature limiter has responded.	▶ Check heat exchanger temperature limiter and lead for breaks; replace if required. ▶ Purge the appliance ▶ Check the operating pressure of the heating system. ▶ Turn on service shut-off valves. ▶ Set the pump rate or pump parameter field correctly and match it to the maximum output. ▶ Actuate the heating pump; replace if required. ▶ Check heating block on the water side; replace if required.	6
127	Temperature for thermal disinfection not reached	▶ Check the setting for the legionella function in the service menu. Adjust PROG line 1646 if required.	6
128	Flame fault in operation	▶ Check whether gas valve is open. ▶ Check the ionisation electrode (→ page 40).	3
130	Maximum flue gas temperature exceeded.	▶ Check flue gas temperature limiter and lead for breaks; replace if required. ▶ Check whether the heat exchanger temperature limiter has responded (fault code 119). ▶ Clean heat exchanger (→ page 40).	9
133	Flame not detected.	▶ Check whether gas cock is open. ▶ Check the gas supply pressure (→ page 37). ▶ Check power supply. ▶ Check electrodes with lead; replace if required. ▶ Check flue gas system; clean or repair if required. ▶ Check gas/air ratio; correct if required (→ page 36).	3
151	BMU fault		9
152	Parameterisation fault		9
153	Appliance locked manually	▶ Clear fault by pressing the reset button (→ Fig. 35, [11], page 33).	9
160	Fan speed threshold not reached	▶ Check fan cable and plug; replace if required. ▶ Clean fan (→ page 39); replace if required.	9
171	Contact fault H1	▶ Check connected appliance for malfunction at connection H1 (→ Fig. 15, [17], page 33).	6
172	Contact fault H5	▶ Check connected appliance for malfunction at connection H5 (→ Fig. 15, [18], page 33).	6
323	Water pressure too low	▶ Check and adjust the pressure level if necessary with P > 0.4 bar	
324	Input BX same sensors	▶ Set different values for PROG lines 5930 to 5933 in the service menu.	3
325	Input BX/extension module same sensors.	▶ Set different values for PROG lines 6040 to 6043 in the service menu.	3
326	Input BX/mixer group same sensors.	▶ Set different values for PROG lines 6040 to 6043 in the service menu.	3
327	Extension module same function	▶ Set different values for PROG lines 6020 to 6022 in the service menu.	3
330	Sensor input BX1 no function	▶ Check connection of the sensors to the main PCB (→ page 16)	3
331	Sensor input BX2 no function		3
332	Sensor input BX3 no function		3
333	Sensor input BX4 no function		3

Table 36 Fault displays

Fault code	Description	Remedy	Priority
335	Sensor input BX21 no function	▶ Check connection of the sensors to the extension module (→ page 16)	3
336	Sensor input BX22 no function		3
337	Sensor input BX11 no function		3
338	Sensor input BX12 no function		3
339	Solar pump Q5 missing		3
340	Solar pump Q16 missing		3
341	Sensor B6 missing		3
342	Solar charging sensor B31 missing		3
343	Solar integration missing		3
344	Solar controlling element for buffer K8 missing		3
345	Solar controlling element for swimming pool K8 missing		3
346	Solid fuel boiler pump Q10 missing		3
347	Solid fuel boiler comparison sensor missing		3
348	Solid fuel boiler address fault		3
349	Buffer cylinder return valve Y15 missing		3
350	Buffer cylinder address fault		3
351	Primary controller/system pump address fault		3
352	Low loss header address fault		3
353	Sensor B10 missing		3
371	Circuit 3 flow temperature		6
372	Heating circuit 3 temperature monitor		3
373	Fault at extension module 3		8
374	Sitherm Pro calculation		9
375	BV stepper motor		9
376	Drift test limit value		3
376	Drift test limit value		6
376	Drift test limit value		9
377	Drift test prevented		9
378	Internal repetition		9
382	Speed repetition		9
384	"Illegal" flame		6
384	"Illegal" flame		9
385	Mains voltage too low		9
386	Fan speed tolerance		6
386	Fan speed tolerance		9
387	Air pressure tolerance		6
387	Air pressure tolerance		9
388	Potable water sensor no function		3
426	Flue gas damper response		9
427	Flue gas damper configuration		3
429	Dynamic water pressure too high		6
429	Dynamic water pressure too high		9
430	Dynamic water pressure too low		6
430	Dynamic water pressure too low		9
431	Primary heat exchanger sensor		6
431	Primary heat exchanger sensor		9
432	Functional earth not connected		9
433	Primary heat exchanger temperature too high		6
433	Primary heat exchanger temperature too high		9

Table 36 Fault displays

15 Commissioning report for the appliance

Customer/system user:			
Surname, first name		Street, house number	
Telephone/fax		Postcode, town	
System installer:			
Order number:			
Appliance type:		(**Complete a separate report for every appliance!**)	
Serial number:			
Date commissioned:			
☐ Individual appliance | ☐ Cascade, Number of appliances:			
Boiler room:	☐ Cellar | ☐ Attic | Other:		
	Ventilation apertures: Number: ....., Size: approx.		cm^2
Flue routing:	☐ Twin pipe system | ☐ LAS | ☐ Duct | ☐ Separate pipe routing		
	☐ Plastic | ☐ Aluminium | ☐ Stainless steel		
	Total length: approx. ..... m | 90° bend: ..... pce | 15 - 45° bend: ..... pce		
	Flue tightness test (with combustion air flowing in countercurrent): ☐ Yes | ☐ No		
	CO_2 value in the combustion air at maximum rated output:		%
	O_2 value in the combustion air at maximum rated output:		%
Notes regarding underpressure or overpressure operation:			
Gas setting and flue gas test:			
Set gas type: ☐ Natural gas H | ☐ Propane | ☐ Butane			
Gas supply pressure:	mbar	Gas static supply pressure:	mbar
Selected maximum rated output:	kW	Selected minimum rated output:	kW
Gas rate at maximum rated output:	l/min	Gas rate at minimum rated output:	l/min
Net calorific value H_{iB}:	kWh/m^3		
CO_2 at maximum rated output:	%	CO_2 at minimum rated output:	%
O_2 at maximum rated output:	%	O_2 at minimum rated output:	%
CO at maximum rated output:	ppm	CO at minimum rated output:	ppm
Flue gas temperature at maximum rated output:	°C	Flue gas temperature at minimum rated output:	°C
Maximum measured flow temperature:	°C	Minimum measured flow temperature:	°C
System hydraulics:			
☐ Low loss header, type:		☐ Additional expansion vessel Size/pre-charge pressure: Automatic air vent valve installed? ☐ Yes | ☐ No	
☐ Heating circuit pump:			
☐ System hydraulics checked, notes:			

Modified service functions: (Select the modified service functions and enter the values here.)	
Example: service function 20 changed to German	
Heating control unit:	
☐ QAA75 | ☐ QAA78	
☐ AVS71 × ..... , wireless module:	
☐ AGU2.550 × ..... , heating circuit(s) coding:	
☐ AGU2.550 × ..... , solar module coding:	
Miscellaneous:	
☐ Heating control unit set, notes:	
☐ Modified heating control unit settings documented in the controller operating/installation instructions	
The following work has been carried out:	
☐ Electrical connections checked, notes:	
☐ Condensate trap filled	☐ Combustion air/flue gas test carried out
☐ Function check carried out	☐ Was a tightness test carried out on the gas and water sides?
Commissioning includes checking the settings, a visual boiler tightness test and a function check of the boiler and control unit. The system installer conducts a test of the heating system. If, in the course of commissioning, any small installation faults in Geminox assemblies are noticed, Geminox is always willing to remedy these installation faults after release by the end customer. This does not imply any liability for the installation performance.	
The system named above has been checked to the extent described. _____ Name of service engineer	The documents have been handed over to the user. The user has been made aware of the safety information and operation of the above-mentioned heat source, including accessories. Attention has been drawn to the requirement for regular maintenance of the above-mentioned heating system. _____ Date, user's signature
_____ Date, system installer's signature	**Affix the test report here.**

16 Appendix

16.1 Sensor values

16.1.1 Outside temperature sensor (accessories)

Outside temperature (°C) Testing tolerance ± 10%	Resistance/ Ω
-20	7578
-15	5861
-10	4574
-5	3600
0	2857
5	2284
10	1840
15	1492
20	1218
25	1000
30	827
35	688

Table 37

16.1.2 Flow/return temperature sensor, DHW temperature sensor, flue gas temperature sensor, solar collector sensor

Temperature/ °C Measuring tolerance ± 10 %	Resistance/ Ω
0	32624
10	19897
15	15711
20	12493
25	10000
30	8056
40	5324
50	3599
60	2483
70	1748
80	1252
90	912

Table 38

16.2 Pressure sensor

Pressure/ bar	Voltage U between GND (-) and OUT/ V
0	0.5
0.4	0.8
0.8	1.1
1.0	1.3
1.2	1.4
1.6	1.7
2.0	2.0
2.4	2.3
2.8	2.6
3.2	2.9
3.6	3.2
4.0	3.5

Table 39

16.3 Pump characteristic maps

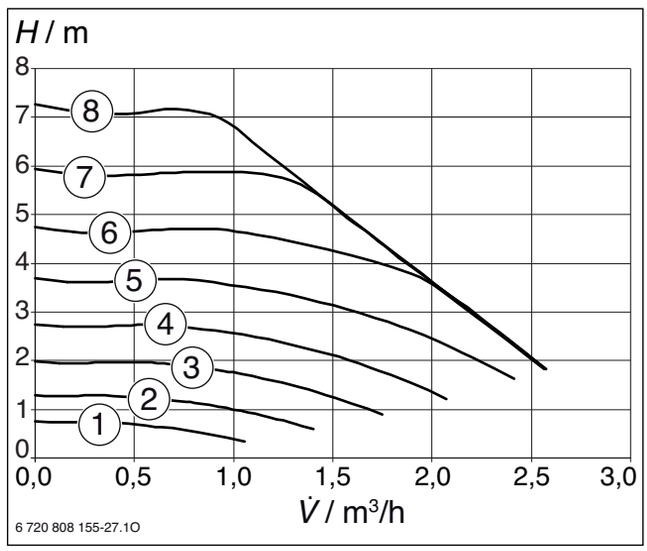


Fig. 48 THRs 0.9-9 C, THRs 2-17 C and THRs 5-25 C

[1] Pump characteristics, constant pressure 75 mbar
[2] Pump characteristics, constant pressure 130 mbar
[3] Pump characteristics, constant pressure 200 mbar
[4] Pump characteristics, constant pressure 275 mbar
[5] Pump characteristics, constant pressure 375 mbar
[6] Pump characteristics, constant pressure 475 mbar
[7] Pump characteristics, constant pressure 600 mbar
[8] Pump characteristics, constant pressure 730 mbar
[H] Residual head
[V̇] Amount of heating water

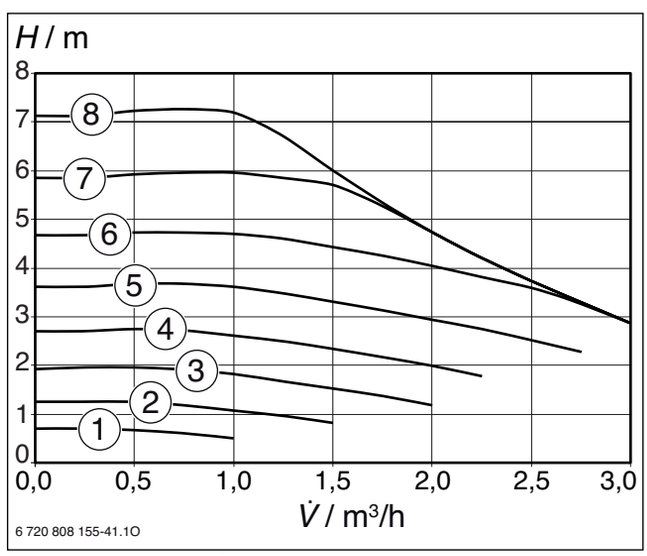


Fig. 49 THRs 10-35 C/THRs 10-50 C

[1] Pump characteristics, constant pressure 75 mbar
[2] Pump characteristics, constant pressure 130 mbar
[3] Pump characteristics, constant pressure 200 mbar
[4] Pump characteristics, constant pressure 275 mbar
[5] Pump characteristics, constant pressure 370 mbar
[6] Pump characteristics, constant pressure 470 mbar
[7] Pump characteristics, constant pressure 600 mbar
[8] Pump characteristics, constant pressure 730 mbar
[H] Residual head
[V̇] Amount of heating water

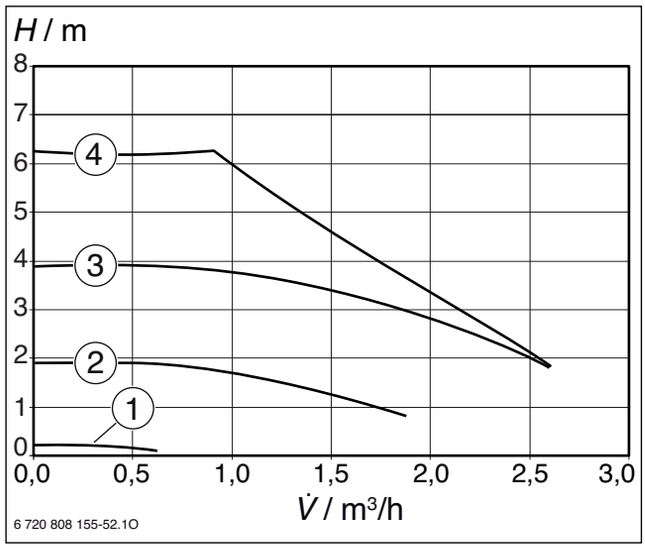


Fig. 50 THRs 0.9-9 DC, THRs 2-17 DC and THRs 5-25 DC

[1] Pump characteristics, constant pressure 20 mbar
[2] Pump characteristics, constant pressure 200 mbar
[3] Pump characteristics, constant pressure 400 mbar
[4] Pump characteristics, constant pressure 630 mbar
[H] Residual head
[V̇] Amount of heating water

Speed	Setting of the QAA75
8	100%
7	86%
6	71%
5	57%
4	43%
3	29%
2	14%
1	0%

Table 40

To adjust minimal and maximal pump speed in heating mode:

▶ Set service functions **2322** and **2323**, respectively (refer to the supplied accessories instructions).

Modulation of the pump allows reduction of power consumption by adapting the flow to the installation.
The pump speed is modulated such that the nominal flow/return temperature difference is achieved (Service function **2317**, refer to the supplied accessories instructions).
When the actual temperature difference exceeds the nominal difference, pump speed increases. It decreases otherwise.

▶ Set service function **2317** to a value suited to the installation:

Service function	Radiators	Underfloor heating
2317	15 °C	8 °C

Table 41

16.3.1 Pressure drop

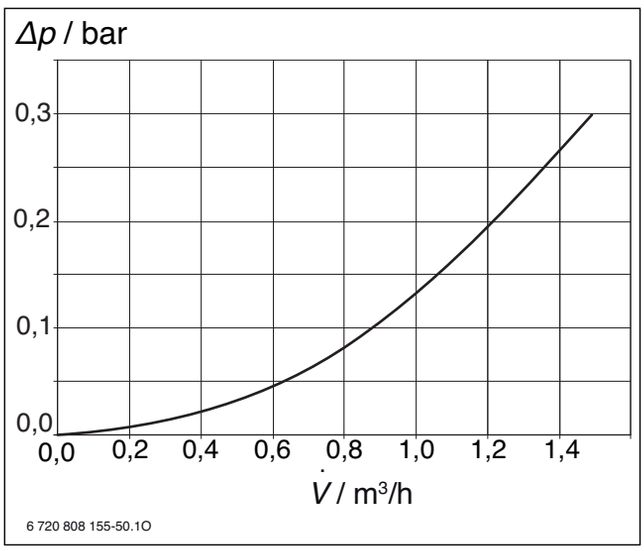


Fig. 51 THRs 5-25

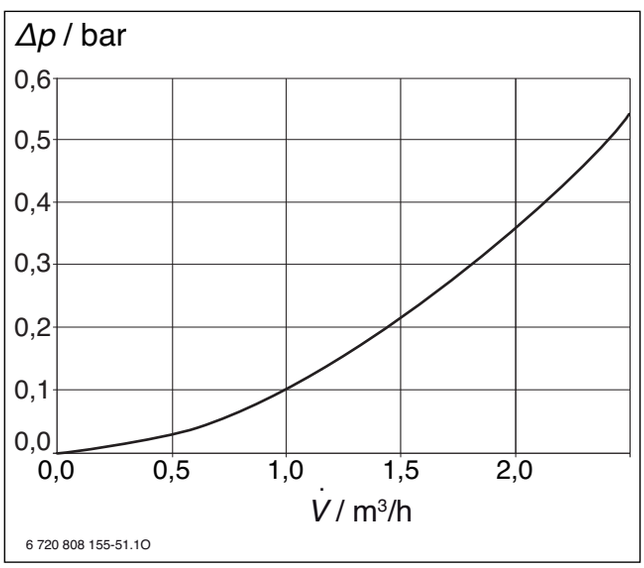


Fig. 52 THRs 10-50

Key to Fig. 51 and Fig. 52:
[Δp] Pressure loss
[V̇] Amount of heating water

16.4 Technical Data of Control Unit LMS14

	Unit	Value
General data		
Power supply voltage	AC V	230
Frequency	Hz	50
Safety class		Parts of safety class 0 and of PELV
Degree of pollution		2
Software classes as per BS EN 60730-2-5		
- Controller part		Class A
- Burner control		Class C
Unit fuse		2 x T6.3H250 internal
Weight	kg	0.254
Dimensions (L x B x H)	mm	230 x 150 x 30
Electrical connection		
Total current all mains components connected to LMS14 and clip-ins (at U_{Mains} = AC 230 V; T_a = 25 °C)	A	5
Mains extension		AUX1 / AUX2
- Voltage	AC V	230
- Current		Depending on current draw of heating circuit pump, programmable AC 230 V output, fuel valve, DHW charging pump, external ignition module and clip-ins used
QX1, QX2. QX3		
- Voltage	AC V	230
- Current	A	0.005...1, cos $\phi > 0.8$
Flame supervision / ionization probe		
- Switching thresholds Min.	DC µA	0.8
- Current (typically)	mA	4
- Current max.	mA	10.5
Safety limit thermostat		
- Voltage	AC V	230 +10% / -24%
- Current Carrying power to the fuel valve and ignition	A	0.005...1, cos ϕ > 0.6
Boiler sensor TK1 (B2)	kΩ	NTC 10
Return sensor (B7/BX4)	kΩ	NTC 10
DHW sensor (B3/B38)	kΩ	NTC 10
- Max. cable length	m	10
Sensor inputs BX1...BX3	kΩ	NTC 10
- Max. cable length	m	120
Outside sensor (B9)	kΩ	NTC 1
- Max. cable length	m	120
Overview input H1		
Pressure sensor		
- Output voltage LMS14	DC V	15 ± 15 %
	DC V	5 ± 5 %
- Max. current (each input)	mA	10
- Input voltage LMS14	DC V	10
- Analog input Operating Range Min. Input resistance	 DC V kΩ	Safety extra low-voltage 0...10 100
- Digital input Voltage with contact open Current with contact closed	 DC V mA	Safety extra low-voltage for potential-free low-voltage contacts 15 1.5
- Max. cable length	m	10
Overview input H5		
Room thermostat		

Table 42

	Unit	Value
- Voltage	DC V	5
- Digital input Voltage with contact open Current with contact closed	 DC V mA	Safety extra low-voltage for potential-free low-voltage contacts 5 2
- Max. cable length	m	120
BSB users		
Room unit		QAA55.../QAA75...
- Connection		2- or 3-wire
- Max. cable length at 1.5 mm^2 cross-sectional area of cable	m	200
- Max. cable resistance	W	3 x 14
- Min. cross-sectional area of cable	mm^2	0.5
Users		Max.5 (1 operator unit, 3 room units, 1 service unit)

Table 42

Checking the LED

State LED	Meaning
LED off	No power supply
LED on	Ready
LED flashes	Local fault

Table 43

16.5 Operational status of the 2nd circuit pump (THRs...DC)

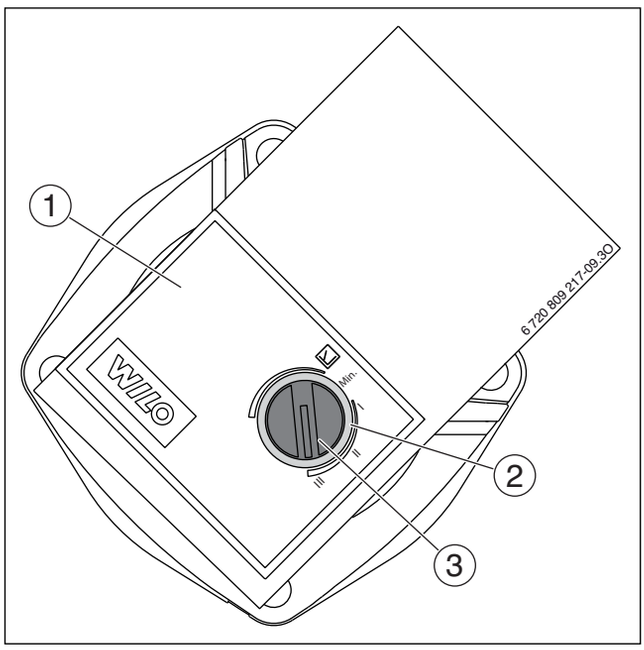


Fig. 53

[1] 2nd circuit pump
[2] LED indicator
[3] Speed selector

The LED indicator [2], located around the speed selector [3], indicates the operational status of the pump [1].

LED color	Meaning	Diagnostic	Cause	Remedy
LED lights continuously green	Normal running of the pump.	The pump runs as expected.	Normal operation.	
LED blinking Green and red color	Abnormal running of the pump. Pump stopped but still functional.	The pump restarts itself after the disappearance of the external failure.	• Under voltage U<160 V or • over voltage U>253 V.	▶ Check main voltage supply 195 V<U<253 V
			• Overheat of motor: temperature inside the motor is too high.	▶ Check water temperature and ambient temperature.
			• Overload of motor: pump is seized.	▶ Check installation water quality. ▶ Clean system if debris.
LED blinking Red color	Pump out of use.	The pump is stopped.	The pump does not start due to a permanent failure. Electronic or motor faulty.	▶ Replace the pump.
LED off	No power supply.	No voltage on electronics.	• Pump is not connected to main supply.	▶ Check cables connection.
			• Faulty LED.	▶ Check if pump is running.
			• Faulty electronics.	▶ Replace the pump.

Table 44

Index

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